Final Mitigation Plan
Monkey Wall Project

DMS Project #: 100069 | Contract #: 7536 | USACE Action ID: SAW- 2018-01162
DWR Project #: 20181029 | RFP: 16-007336

June 2020

French Broad River Basin | HUC 06010108 | Mitchell County, North Carolina

Prepared By:
Resource Environmental Solutions, LLC
For Environmental Banc & Exchange, LLC
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Raleigh, NC 27605
919-209-1062

Prepared For:
NC Department of Environmental Quality
Division of Mitigation Services
1652 Mail Service Center
Raleigh, NC 27699-1652

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:

May 27, 2020

Regulatory Division

Re: NCIRT Review and USACE Approval of the NCDMS Monkey Wall Mitigation Site / Mitchell Co./ SAW-2018-01162/ NCDMS Project # 100069

Mr. Tim Baumgartner
North Carolina Division of Mitigation Services
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 Monkey Wall Draft Mitigation Plan, which closed on April 24, 2020. 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 Project Manager
for Tyler Crumbley

Enclosures

Electronic Copies Furnished:

NCIRT Distribution List
Harry Tsomides, Paul Wiesner—NCDMS
Brad Breslow—RES

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

REPLY TO
ATTENTION OF:

CESAW-RG/Browning May 8, 2020

MEMORANDUM FOR RECORD

SUBJECT: Monkey Wall Mitigation Site - NCIRT Comments during 30-day Mitigation Plan Review

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

NCDMS Project Name: Monkey Wall Mitigation Site, Mitchell County, NC

USACE AID#: SAW-2018-01162
NCDMS #: 100069
30-Day Comment Deadline: April 24, 2020

DWR Comments, Mac Haupt:

1. DWR appreciates the review from DMS staff prior to IRT review. In this case there seemed to be quite a few comments. DWR will follow up on a few of their comments and RES's responses:
    a. Comment #3- DWR is concerned about moving the stream credit above the JD origin. As will be stated several times, the main concern about this project will be maintenance of appropriate flow.
    b. Comment #11 and comment #15- one response states that cattle will be removed so no fencing is needed while comment #15 states that cattle have the ability to access this reach but will not because it is steep. If any cattle are adjacent to the easement the project needs to be fenced.
    c. Comment # 33- DWR is also concerned with the wetlands adjacent to the stream channels constructed, both in terms of wetland drainage (more about that later) and maintenance of appropriate channel characteristics.
    d. Comment #34- DWR has noted recently on older projects (10-15 years old) the continued presence of fescue. DWR recommends treating the fescue before planting the trees.
    e. Plan sheet comment-2nd bullet- DWR is also concerned about the potential for piping and loss of channel stability if the log cascade structures are not installed properly.

2. The central issue at this site will be flow. Table 6 shows the DWR stream determination scores, and while all the reaches made intermittent, they just made it.
3. Section 7- Mitigation Workplan- Reach G2- DWR does not think the upper portion of reach G2 will have the appropriate flow or show the relevant channel characteristics. DWR believes there will be at least 300 linear feet of stream credit at risk on this reach.
4. Figure 12- DWR likes the planned wetland monitoring gauge in wetland WA.

5. Design sheet 6- DWR believes it will be very important to properly fill and pack the relict channel since it is adjacent to the newly constructed channel. In addition, the old channel is downslope from the wetlands and if the channel is not filled correctly, groundwater will be lost through this relic channel and it will essentially be acting like a ditch and drain the adjacent wetlands.
6. Design sheet 7- this is the reach that DWR believes is most vulnerable to losing flow. Similar to the comment above, DWR believes it is critical to fill the relic "channel" correctly or it may cause flow to enter the relic channel and thereby reduce flow to a channel that is already intermittent at best.
7. Design sheet P1- please limit the Ash planting percentage to 5%. In addition, to make up for the 10% needed DWR recommends that the tree species selected is an appropriate mountain species, something other than Tulip poplar or Sycamore.
8. Design sheet D3- in order to alleviate problems of the previous two comments, DWR strongly recommends closely adhering to 12 inch compacted lifts shown in the channel backfill detail.

NCWRC Comments, Andrea Leslie:

1. There are Brown Trout in Big Rock Creek, and in-stream activities should be avoided during the Brown Trout moratorium (October 15 – April 15).
2. There is a robust Eastern Hellbender (*Cryptobranchus alleganiensis*, US Federal Species of Concern, NC Special Concern) population in Big Rock Creek. In order to minimize impacts from sedimentation to this population, it is extremely important that excellent erosion and sediment control be practiced on-site.
3. We recommend supplementing the woody species planting list with some additional understory species.

USACE Comments, Kim Browning:

1. Reach G2: The formation of stream channel characteristics and flow is a concern in the upper section of this reach being daylighted. Please revise Section 8.1.2 performance standard to include maintaining an OHWM *and* that the channel will be jurisdictional at the end of the 7-year monitoring period. A minimum of 30-days flow must be documented every year of the monitoring period.
    a. Please move the flow gauge closer to the top of this reach. It is also advisable to have photos/video footage to document flow.
2. When submitting the PCN, please include an estimate of the number of trees, or acres, to be cleared for the NLEB 4(d) Rule.
3. Please place a veg plot in the planted area of WA, random is fine.
    a. Will FACW species be planted in this area since it was not identified as a different planning zone?
4. Tables 1 and 16: footnote indicates that Section 7.7 contains explanation of credit adjustments. I believe this should read Section 7.4.
5. Section 7.5: The area under the utility easement should receive a credit reduction using the Buffer Credit Calculator, despite the fact that these areas will be protected in an easement, the areas will not be maintained in a permanent buffer due to utility maintenance/access, plus these areas are designed with ford crossings, which are deductions using the Calculator. Please revise the credit calculator and associated asset tables.
6. Sections 3.2.4 and 9.5 do not address invasive species. Please update accordingly and ensure that invasives are reported each year in the plot data.
7. Section 3.3: With pastures directly east and west of the project, and no assurance that Environmental Banc & Exchange will be the perpetual landowner of the property surrounding the easement, there is concern that future landowners may use the existing pastures adjacent to the CE for cattle. Livestock exclusion should be considered in future risks and uncertainties since the easement boundary is not being fenced.

8. Section 3.4.2: Should this read "…are classified as A/**B**-type…?"
9. Section 5: the first paragraph has fragmented sentences. Please correct
10. Section 5.2: Other potential items to discuss in this section is the potential for road widening, maintenance along the southwest side of the easement; the effect of utility line maintenance on the riparian buffer; invasive species; adjacent landowner encroachments; hydrologic trespass near WA.
11. With the small watersheds, flow is a concern for this project, especially near the upper reaches that appear to be an old landslide area. Documentation of flow will be closely monitored for this project.
12. Section 7.2.1: Sweetgum and red maple will not be counted towards vegetative success. It is anticipated they will occur naturally because they are high dispersal species.
    a. Any planting that occurs after April 30 will likely not count towards a full year of vegetative monitoring.
    b. Please reduce the amount of Ash planted to less than 5%.
13. Section 7.2.2: Please confirm that fescue will be treated prior to planting.
14. Section 7.3: Areas where existing stream channels are abandoned and partially filled and left for habitat diversity and flood storage: Please ensure these areas are designed so that they are not inundated year-round and should ideally dry up toward the end of spring to ensure that predatory fish species do not live within the pools. The maximum depth of ephemeral pools should typically be between 8 and 14 inches, with very gradual and wide side slopes to promote easy access by desired species. These areas should not be so numerous that they leave gaps in the tree canopy.
15. Section 8.1.4: Please clarify if permanent cross section will be used for the digital image stations, or show photo points on Figure 12.
16. Section 8.1.3: The ER should be no less than 1.4 for B channels and 2.2 for C/E channels. Please update Table 17 as necessary.

Kim Browning
Mitigation Project Manager
Regulatory Division

M E M O R A N D U M

3600 Glenwood Ave, Suite 100 Raleigh, North Carolina 27612 919.209.1062 tel.
919.829.9913 fax

TO: **NCIRT and NCDMS**

FROM: **Kasey Carrere - RES**

DATE: **June 26th, 2020**

RE: **Response to Monkey Wall Mitigation Site - NCIRT Comments during 30-day Mitigation Plan Review; DMS Project ID No. 100069, Contract #7536, USACE AID#: SAW-2018-01162**

DWR Comments, Mac Haupt:

1. DWR appreciates the review from DMS staff prior to IRT review. In this case there seemed to be quite a few comments. DWR will follow up on a few of their comments and RES's responses:

    a. Comment #3- DWR is concerned about moving the stream credit above the JD origin. As will be stated several times, the main concern about this project will be maintenance of appropriate flow.

    RES understands the IRT's concern with flow on G2. As discussed in Section 3.3 of the mitigation plan, Reach G2's historic valley has been heavily modified, so determining an exact point for the stream origin presented challenges. Because the valley is so manipulated, the origin of Reach G1 was utilized as a reference for determining the origin of Reach G2. Both reaches have very similar drainage areas at the top of their respective valleys (approximately 12 acres) and Reach G1 originates from a wetland seep (Wetland WB). Based on these similarities and the unique nature of the project reaches, RES decided to begin the alignment of G2 just below an existing wetland seep (Wetland WC) comparable to the current condition of Reach G1-A. Furthermore, the design approach will include the removal of an existing 15 inch perched culvert and associated road, and include re-grading the valley to mimic conditions similar to the cascade morphology seen along Reach G1-A. RES staff has continually observed flow from the existing culvert and on multiple occasions has observed (and heard) flow below the rocks along the proposed "daylighting" restoration section. Lastly, RES is proposing a flow gauge approximately 35-feet downstream of the proposed G2 stream origin, with the purpose of demonstrating consecutive flow requirements as stated in the Wilmington Mitigation guidance.

b. Comment #11 and comment #15- one response states that cattle will be removed so no fencing is needed while comment #15 states that cattle have the ability to access this reach but will not because it is steep. If any cattle are adjacent to the easement the project needs to be fenced.

   Livestock was initially on the parcel prior to closing of the parcel. However, recently cattle have been removed from the project and will not have access to the conservation easement in the future.

c. Comment # 33- DWR is also concerned with the wetlands adjacent to the stream channels constructed, both in terms of wetland drainage (more about that later) and maintenance of appropriate channel characteristics.

   RES anticipated that DWR would be concerned with the unintentional drainage of the wetlands adjacent to G1 and G2. Thus, RES is proposing the installation of one groundwater gauge to monitor these adjacent wetlands. Since proposed channel slopes are steep (8% to 12%), the channel should easily maintain appropriate channel characteristics.

d. Comment #34- DWR has noted recently on older projects (10-15 years old) the continued presence of fescue. DWR recommends treating the fescue before planting the trees.

   The following sentence in section 7.2.2 was revised and states "Non-native and invasive species on site include, bermudagrass, tall fescue, broomsedge bluestem, all of which will be treated prior to planting.".

e. Plan sheet comment-2nd bullet- DWR is also concerned about the potential for piping and loss of channel stability if the log cascade structures are not installed properly.

   RES understands DWR's concern. However, if the structures are installed per detail, there should be minimal or no issues with the structures. RES plans to have staff onsite when the first several cascades are installed to ensure that the structures are installed properly by the contractor. Additionally, all structures will be monitored during construction to ensure that they are functioning properly. Any issues will be addressed before construction is completed.

2. The central issue at this site will be flow. Table 6 shows the DWR stream determination scores, and while all the reaches made intermittent, they just made it.

   RES understands the IRT's concern of flow but is confident that flow performance criteria will be met by the end of the project. Flow will be monitored closely during the monitoring period and updates will be found in the yearly monitoring reports.

3. Section 7- Mitigation Workplan- Reach G2- DWR does not think the upper portion of reach G2 will have the appropriate flow or show the relevant channel characteristics. DWR believes there will be at least 300 linear feet of stream credit at risk on this reach.

   RES understands the IRT's concern of flow but is confident that flow performance criteria will be met by the end of the project. Flow will be monitored closely during the monitoring period and updates will be found in the yearly monitoring reports.

4. Figure 12- DWR likes the planned wetland monitoring gauge in wetland WA.
   RES appreciates this feedback.

5. Design sheet 6- DWR believes it will be very important to properly fill and pack the relict channel since it is adjacent to the newly constructed channel. In addition, the old channel is downslope from the wetlands and if the channel is not filled correctly, groundwater will be lost through this relic channel and it will essentially be acting like a ditch and drain the adjacent wetlands.
   RES appreciates DWR's concern. If the existing channel is filled and plugged per plan, RES does not anticipate any issues with permanent loss of groundwater to the old channel.

6. Design sheet 7- this is the reach that DWR believes is most vulnerable to losing flow. Similar to the comment above, DWR believes it is critical to fill the relic "channel" correctly or it may cause flow to enter the relic channel and thereby reduce flow to a channel that is already intermittent at best.
   RES appreciates DWR's concern. As noted in 5 above, RES does not anticipate issues with loss of groundwater if the old channel is filled/plugged per plan.

7. Design sheet P1- please limit the Ash planting percentage to 5%. In addition, to make up for the 10% needed DWR recommends that the tree species selected is an appropriate mountain species, something other than Tulip poplar or Sycamore.
   RES has revised the planting plan to not include ash and replaced that with additional understory species, as per NCWRC recommendations.

8. Design sheet D3- in order to alleviate problems of the previous two comments, DWR strongly recommends closely adhering to 12-inch compacted lifts shown in the channel backfill detail.
   As noted in 5 & 6 above, RES does not anticipate issues with loss of groundwater if the old channel is filled/plugged per plan.

NCWRC Comments, Andrea Leslie:

1. There are Brown Trout in Big Rock Creek, and in-stream activities should be avoided during the Brown Trout moratorium (October 15 – April 15).
   RES will adhere to WRC recommendations. No construction is anticipated to occur during the trout moratorium.

2. There is a robust Eastern Hellbender (*Cryptobranchus alleganiensis)*, US Federal Species of Concern, NC Special Concern) population in Big Rock Creek. In order to minimize impacts from sedimentation to this population, it is extremely important that excellent erosion and sediment control be practiced on-site.
   RES understands and has addressed this concern in Section 4.2 by adding the following statement "… it is important to note that there is population of Eastern Hellbender (*Cryptobranchus alleganiensis*), an US Federal Species of Concern and NC Special Concern Species, in Big Rock Creek (where our project reaches ultimately drain to). In order to minimize impacts from sedimentation to this population, it is extremely important that

excellent erosion and sediment control be practiced on-site." RES will ensure that proper erosion and sediment control measures will be installed and maintained during the construction of this site.

3. We recommend supplementing the woody species planting list with some additional understory species.
   RES agrees and has supplemented the proposed planting list in Section 7.2.1 (Table 13) with the following understory species: tag alder (*Alus serrulata),* eastern redbud (*Cerdis canadensis),* flowering dogwood (*Cornus florida),* and red mulberry (*Morus rubra*).

USACE Comments, Kim Browning:

1. Reach G2: The formation of stream channel characteristics and flow is a concern in the upper section of this reach being daylighted. Please revise Section 8.1.2 performance standard to include maintaining an OHWM *and* that the channel will be jurisdictional at the end of the 7-year monitoring period. A minimum of 30-days flow must be documented every year of the monitoring period. a. Please move the flow gauge closer to the top of this reach. It is also advisable to have photos/video footage to document flow.
   A sentence was added to Section 8.1.2, "Additionally, all streams must maintain an Ordinary High-Water Mark and the channel will be jurisdictional by year 7, which will be monitored and reported in each monitoring report". The flow gauge will be moved closer to the top of the reach and Figure 12 will be updated to show this change. Pictures will be taken at the flow gauge to document flow over the monitoring period.

2. When submitting the PCN, please include an estimate of the number of trees, or acres, to be cleared for the NLEB 4(d) Rule.
   When submitting the PCN, RES will provide the approve Categorical Exclusion, which includes the Northern Long-Earned Bat 4(d) Rule Streamlined Consultation Form.

3. Please place a veg plot in the planted area of WA, random is fine. a. Will FACW species be planted in this area since it was not identified as a different planning zone?
   Figure 12 has been updated to move a random to the planted area of WA, as requested.

4. Tables 1 and 16: footnote indicates that Section 7.7 contains explanation of credit adjustments. I believe this should read Section 7.4.
   Both tables have been revised to refer to Section 7.4 instead of Section 7.7.

5. Section 7.5: The area under the utility easement should receive a credit reduction using the Buffer Credit Calculator, despite the fact that these areas will be protected in an easement, the areas will not be maintained in a permanent buffer due to utility maintenance/access, plus these areas are designed with ford crossings, which are deductions using the Calculator. Please revise the credit calculator and associated asset tables.
   RES has re-ran the Buffer Credit Calculator, and due to the fact that the areas under the powerline easement will be protected in an easement and may not be maintained in a permanent buffer due to utility access, credit will deducted from the 0-30 foot buffer width zone, and no additional credit will be generated in the 31-150 buffer width zone. RES has

confirmed with the IRT that this is an appropriate credit adjustment and has provided the credit calculator and associated asset tables in the digital submission. Clarification has been added in Section 7.5 stating "RES is not seeking any stream credit for the linear footage or additional credit for wider buffers within the footprint of the utility easement and is applying a credit reduction for the area within the 0-30 foot buffer width zone."

6. Sections 3.2.4 and 9.5 do not address invasive species. Please update accordingly and ensure that invasives are reported each year in the plot data.
   Section 3.2.4 has been revised to indicate that the pastures adjacent to the project reaches are "… composed primarily of non-native species including, bermudagrass (*Cynodon dactylon)* with tall fescue (*Festuca arundinacea*) and broomsedge bluestem (*Andropogon virginicus*) mixed throughout." Section 9.5 does address non-native species, stating "Invasive and noxious species will be monitored so that none become dominant or alter the desired community structure of the Project. If necessary, RES will develop a species-specific treatment plan."

7. Section 3.3: With pastures directly east and west of the project, and no assurance that Environmental Banc & Exchange will be the perpetual landowner of the property surrounding the easement, there is concern that future landowners may use the existing pastures adjacent to the CE for cattle. Livestock exclusion should be considered in future risks and uncertainties since the easement boundary is not being fenced.
   The following language has been added to Section 3.3: "Signage will be placed along the entire conservation easement boundary, in addition to no trespassing signs along the property boundary, to reduce potential encroachment from future adjacent landowners. RES will take the necessary legal actions and provide warnings to anyone who may potentially encroach on the property".

8. Section 3.4.2: Should this read "…are classified as A/**B**-type…?"
   That is correct, Section 3.4.2 has been revised per comment.

9. Section 5: the first paragraph has fragmented sentences. Please correct
   Revised the fragmented sentences

10. Section 5.2: Other potential items to discuss in this section is the potential for road widening, maintenance along the southwest side of the easement; the effect of utility line maintenance on the riparian buffer; invasive species; adjacent landowner encroachments; hydrologic trespass near WA.
    The following statement has been added to Section 5.2: RES does not anticipate hydrologic trespassing to occur near WA. Additionally, all potential future encroachments will be addressed at the time of occurrence. Signage will be placed around the entire conservation easement to deter any possibilities of utility maintenance on the riparian buffer, widening, potential future encroachments or any other possible occurrences.

11. With the small watersheds, flow is a concern for this project, especially near the upper reaches that appear to be an old landslide area. Documentation of flow will be closely monitored for this project.

RES understands the IRT's the concern of flow but is confident that flow performance criteria will be met by the end of the project. Flow will be monitored closely during the monitoring period and updates will be found in the yearly monitoring reports.

12. Section 7.2.1: Sweetgum and red maple will not be counted towards vegetative success. It is anticipated they will occur naturally because they are high dispersal species.

    a. Any planting that occurs after April 30 will likely not count towards a full year of vegetative monitoring.
    RES understands and has addressed this concern in Section 7.2.1 by adding the following statement: "It is important to note that if any planting occurs after April 30th, it may not count towards a full year of vegetative monitoring."

    b. Please reduce the amount of Ash planted to less than 5%.
    RES has revised the planting plan to not include ash and replaced that with additional understory species, as per NCWRC recommendations.

13. Section 7.2.2: Please confirm that fescue will be treated prior to planting.
    Section 7.2.2 has been revised to indicate that fescue as well as other species will be treated prior to planting

14. Section 7.3: Areas where existing stream channels are abandoned and partially filled and left for habitat diversity and flood storage: Please ensure these areas are designed so that they are not inundated year-round and should ideally dry up toward the end of spring to ensure that predatory fish species do not live within the pools. The maximum depth of ephemeral pools should typically be between 8 and 14 inches, with very gradual and wide side slopes to promote easy access by desired species. These areas should not be so numerous that they leave gaps in the tree canopy.
    Section 7.3 now includes the following statement to address this concern: "These filled areas will have a maximum depth of 8-14 inches, with very gradual and wide slopes to promote easy access to wildlife. Furthermore, with these parameters these areas will not be inundated year-round and will be spaced adequately as to avoid gaps in the canopy layer." The channel backfill detail (Sheet D3) has also been revised to reflect a maximum depth of 14".

15. Section 8.1.4: Please clarify if permanent cross section will be used for the digital image stations or show photo points on Figure 12.
    Added the following sentence to Section 8.1.4 to address this concern: "Digital image stations will be collocated with monitoring all monitoring devises (cross sections, vegetation plots, and monitoring gauges)", and revised Figure 12 to indicate the collocation of digital images stations and monitoring devices.

16. Section 8.1.3: The ER should be no less than 1.4 for B channels and 2.2 for C/E channels. Please update Table 17 as necessary.
    This has been revised in Section 8.1.3 and in Table 17.

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Appendices

1 PROJECT INTRODUCTION

1.1 Project Components

The Monkey Wall Project (Project) is located within a rural watershed in Mitchell County, North Carolina approximately two miles northwest of Bakersville, NC, and is accessible from Fork Mountain Road off Highway 226 (-82.2067° W, 36.0559° N). The Project lies within the French Broad River Basin North Carolina Division of Water Resources (NCDWR) sub-basin 04-03-06, and United States Geological Survey (USGS) 8-digit hydrologic unit code (HUC) 06010108, 14-digit HUC 06010108060010 (**Figure 1**), and within the Southern Crystalline Ridges and Mountains Level IV ecoregion. The Project area is comprised of a 25.25-acre easement involving two unnamed tributaries totaling 3,514 existing LF, which drain to Big Rock Creek, a tributary of the French Broad River. This Project proposes to restore 3,116 linear feet (LF) of stream, enhance 120 LF of stream, and preserve 278 LF of stream and provide water quality benefit for 86.6 acres of drainage area. The stream mitigation components are summarized in **Table 1**.

1.2 Project Outcomes

The streams proposed for restoration and enhancement have been significantly impacted by livestock production, agricultural practices, and a lack of riparian buffer. Proposed improvements to the Project will help meet the river basin needs expressed in the 2009 French Broad River Basin Restoration Priorities (RBRP) as well as ecological improvements to the riparian corridor within the easement.

Through stream restoration, enhancement, and preservation, the Project presents 3,514 LF of proposed stream generating 3,999.160 Cold Stream Mitigation Units (SMU) (**Table 1**). This mitigation plan is consistent with the July 4, 2018 Post Contract IRT Meeting Minutes and IRT response emails (**Appendix B**).

Table 1. Monkey Wall Project Components Summary

Stream Mitigation			
Mitigation Approach	**Linear Feet**	**Ratio**	**Cold SMU**
Restoration	3,116	1	3,116.000
Enhancement II	120	5	24.000
Preservation	278	10	27.800
Total	**3,514**		**3,167.800**
		Non-standard Buffer Width Adjustment	**831.360***
		Total Adjusted SMUs	**3,999.160**

** Credit adjustment for Non-standard Buffer Width calculation using the Wilmington District Stream Buffer Credit Calculator issued by the USACE in January 2018. See section 7.4 for further information.*

2 WATERSHED APPROACH

The Project was selected based on its potential to support the objectives and goals of the DMS 2009 French Broad RBRP. The French Broad RBRP identified several restoration needs for the entire River Basin, and two for the Toe, Cane, and Nolichucky Rivers (06010108). The Project watershed, Big Rock Creek, was identified as a Targeted Local Watershed (TLW) (HUC 06010108060010), a watershed that exhibits both the need for conservation and restoration. Approximately 11% of this TLW is agricultural lands, while the remaining 85% of the area is forested. Goals outlined in the 2009 RBRP include:

French Broad River Basin Restoration Goals:

1. *Implement wetland and stream restoration projects that reduce sources of sediment and nutrients by restoring riparian buffer vegetation, stabilizing banks, excluding livestock, and restoring natural geomorphology, especially in headwater streams;*

2. *Restore and protect habitat for priority fish, mussel, snail, and crayfish species in the basin [see Wildlife Resource Commission (2005) for a complete list];*

3. *Cooperate with land trusts and resource agencies to help leverage federal and state grant funding for watershed restoration and conservation efforts;*

4. *Protect high quality habitats, especially those prioritized by the Natural Heritage Program as Significant Natural Heritage Areas;*

Catalog Unit Specific Goals (06010108):

5. *Focus restoration efforts in the expanded Bald Creek LWP area,*

6. *Work with Partners to protect and restore habitat for the Appalachian elktoe in the Cane and Toe river watersheds.*

The Project will address one of the goals outlined in the 2009 French Broad RBRP. Restoring the Project stream with a stable, natural design will reduce erosion and sedimentation while improving habitat (RBRP Goal 1). By establishing a permanent conservation easement at the Project, aquatic habitat and riparian buffers within the Big Rock Creek Watershed will be protected in perpetuity. Additionally, excess nutrient loads and sedimentation are also major stressors within the watershed, and the Project will help address these stressors as described in **Section 6**.

2.1 Site Selection

Currently, the Project area lacks riparian buffers on much of the Project and livestock have complete access to both streams. Livestock access has resulted in bank erosion, sediment deposition, and channel incision. The Project will directly and indirectly address stressors identified in the RBRP by stabilizing eroding stream banks, reconnecting incised streams to their floodplains, reducing sediment and nutrient loads, and restoring forested buffers on two headwater stream channels. Project-specific goals and objectives will be addressed further in **Section 5**. A project watershed map with the Project's drainage areas is shown on **Figure 2** and watershed planning priority boundaries are shown on **Figure 1.**

The land required for the construction, management, and stewardship of this Project includes portions of three parcels in Mitchell County with the following ownership **Appendix C** and **Figure 3**.

3 BASELINE AND EXISTING CONDITIONS

3.1 Watershed Summary Information

3.1.1 Drainage Area and Land Cover

The Project area is comprised of two unnamed tributaries that flow southwest into an on-site confluence and ultimately drain into Big Rock Creek, approximately a half-mile downstream of the Project. The drainage area for the Project is 86.6 acres (0.13 mi^2) (**Table 2**). Primary land use within the drainage area consists of approximately 50% forest, 47% pasture, 1% cropland, less than 1% residential, and less than 1% impervious surface (**Figure 4**). Historic and current land-use within the immediate Project vicinity has been pastureland, where livestock have had complete access to the Project streams. This long-term land use has negatively impacted both water quality and streambank stability along the Project streams.

Table 2. Project Watershed Summary Information

Watershed Feature	Designation
Level IV Ecoregion	66d – Southern Crystalline Ridges and Mountains
River Basin	French Broad
USGS Hydrologic Unit 8-digit	06010108
USGS Hydrologic Unit 14-digit	06010108060010
DWR Sub-basin	04-03-06
Project Drainage Area (acres)	86.6
Percent Impervious Area	<1%

3.1.2 Surface Water Classification

The project tributaries have not been classified, but the portion of Big Rock Creek that the Project reaches ultimately drain to has been classified as Class C and Trout Waters (NCDEQ, 1998). Class C Waters protected for uses such as secondary recreation, fishing, wildlife, fish consumption, aquatic life including propagation, survival and maintenance of biological integrity, and agriculture. Secondary recreation includes wading, boating, and other uses involving human body contact with water where such activities take place in an infrequent, unorganized, or incidental manner (NCDEQ, n.d.). Trout Waters is a supplemental classification intended to protect freshwaters which have conditions which shall sustain and allow for trout propagation and survival of stocked trout on a year-round basis. This classification is not the same as the NC Wildlife Resources Commission's Designated Public Mountain Trout Waters designation (NCDEQ, n.d.).

3.2 Landscape Characteristics

3.2.1 Physiography and Topography

The Project is located in the Southern Crystalline Ridges and Mountains level IV ecoregion within the Blue Ridge level III ecoregion (Griffith, 2002). The southern part of the region is wetter than the north. It is mostly forested with chestnut oak dominating on most slopes and ridges. There are a few small areas of pasture, apple orchards, Christmas tree farms, and cropland. This region occurs primarily on Precambrian igneous and high-grade metamorphic rocks. The crystalline rock types are mostly gneiss and schist, cover by well drained, acidic, loamy soils. Topography of the region includes steep slopes and elevations ranging from 1,200-4,500 feet. The topography within the project limits consists of relatively narrow valleys and steep slopes from 5 percent to over 33 percent and elevations that range from 2,487-2,935 feet.

3.2.2 Geology and Soils

According to geology data from the North Carolina Geologic Survey, published in 1985, the Project is within Ymg map unit, occurring in the Blue Ridge Belt. This map unit is associated with metamorphic rocks of the magmatic biotite-hornblende gneisses formation that formed from the Proterozoic periods within 1,214 million years ago. The layered biotite-granite gneiss, biotite-hornblende gneiss, amphibolite, calc-silicate rock, locally contains relict granulite facies rock.

The NRCS Web Soil Survey depicts several map units across the Project and are summarized in **Table 3** and **Figure 5**.

Table 3. Mapped Soil Series

Map Unit Symbol	Map Unit Name	Percent Hydric	Drainage Class	Hydrologic Soil Group	Landscape Setting
BtF	Buladean-Chestnut complex, central mountain, 50 to 95 percent slopes, stony	0%	Well Drained	A	Mountain Slopes
CnD2	Clifton clay loam, 15 to 30 percent slopes, eroded	0%	Well Drained	B	Mountain Slopes
FeE2	Fannin sandy clay loam, 30 to 50 percent slopes, eroded	0%	Well Drained	B	Mountain Slopes
TsC	Thunder-Saunook complex, 8 to 15 percent slopes, very bouldery	0%	Well Drained	B	Mountain Slopes
TsD	Thunder-Saunook complex, 15 to 30 percent slopes, very bouldery	0%	Well Drained	B	Mountain Slopes

During field investigations of the site, shallow rock and outcrops were observed throughout the project area; and therefore, it is anticipated that rock will be encountered during construction. Given that the project streams are high gradient and require armoring for vertical stability, RES plans to utilize on-site rock for proposed structures and channel substrate. Additionally, any encounters with bedrock will be addressed through field adjustments that take advantage of the site's natural geology.

3.2.3 Existing Wetlands

A survey of existing wetlands was performed in August of 2018. Wetland boundaries were delineated using current methodology outlined in the 1987 U.S. Army Corps of Engineers Wetland Delineation Manual (Environmental Laboratory 1987). Soils were characterized and classified using the Field Indicators of Hydric Soils in the United States, Version 7.0 (NRCS, 2010). Within the boundaries of the proposed Project, three jurisdictional wetlands are present in and adjacent to the Project (**Appendix I, Figure 6, Table 4**). Wetlands are labeled as WA (Wetland A) through to WC (Wetland C) and are described below in **Table 4**. A preliminary jurisdictional determination (PJD) request was sent to the USACE on April 26, 2019 and confirmed on June 17, 2019 (SAW-2018-01162, **Appendix I**).

Table 4. Existing Wetlands

Wetland ID	Wetland Type	Area (ac)	Vegetation
WA	Emergent Palustrine	0.24 ac	Tree Stratum: NA Shrub Stratum: NA Herb Stratum: False nettle (*Boehmeria cylindrica*), common threesquare (*Schoenoplectus pungens var. pungens*), soft rush *(Juncus effuses),* shallow sedge (C*arex lurida*) Woody Vine Stratum: NA
WB	Forested Palustrine	0.02 ac	Tree Stratum: Northern red oak (*Quercus rubra*), southern red oak (*Quercus falcata*), white oak (*Quercus alba*), chestnut oak (*Quercus montana*), red maple (*Acer rubrum*), American sycamore (*Platanus occidentalis*), eastern red cedar (*Juniperus virginiana*), cucumber magnolia (*Magnolia acuminate*), and hickory (*Carya spp*.)
WC	Forested Palustrine	0.01 ac	Shrub Stratum: NA Herb Stratum: False nettle (*Boehmeria cylindrica*), common threesquare (*Schoenoplectus pungens var. pungens*), soft rush *(Juncus effuses),* shallow sedge (C*arex lurida*) Woody Vine Stratum: NA

3.2.4 Existing Vegetation

Vegetation around the unbuffered Project reaches is active pastureland, composed primarily of non-native species including, bermudagrass (*Cynodon dactylon)* with tall fescue (*Festuca arundinacea*) and broomsedge bluestem (*Andropogon virginicu*s) mixed throughout. The project reaches have been heavily grazed by livestock, and thus a well-developed understory is absent. Vegetation within the forested areas of the project reaches consist of northern red oak, southern red oak, white oak, chestnut oak, red maple, American sycamore, eastern red cedar, cucumber magnolia, and hickory.

3.3 Land Use – Historic, Current, and Future

Historic aerial imagery indicates that the Project has been used extensively for agricultural purposes, where the Project streams lacked a forested riparian buffer, since at least 1956. According to landowner accounts, the rock wall located on top of reach G2 was constructed in the early 1900s while clearing rocks from the adjacent pastures (the wall is discussed further in **Section 3.4**). This wall has remained intact since its construction. The location of the project streams has remained essentially unchanged and have not moved significantly. Imagery indicates that the Project and adjacent areas have been utilized for pasture, and minimal residential development has taken place (**Figure 7**). The area remains in an agricultural community, and pastures remain active directly east and west of the Project.

Several watershed characteristics, such as farm paths, vegetation, and potentially soil parameters have been modified. Livestock currently have access to the entire Project and are actively degrading the channel. Furthermore, riparian buffers are absent on much of the Project reaches. Soil structure and surface texture have been altered from long-term active grazing.

The future land use for the Project area will include a 25.25-acre conservation easement, that will be protected in perpetuity. The Project easement will encompass 3,514 linear feet of functioning streams with a minimum 30-foot riparian buffer. The riparian buffer while meeting the minimum 30-foot width required, will exceed the minimum out to 150-feet on much of the Project. Outside the Project, the area will likely remain in agricultural and single-family residential use. Signage will be placed along the entire conservation easement boundary, in addition to no trespassing signs along the property boundary, to reduce potential encroachment from future adjacent landowners. RES will take the necessary legal actions and provide warnings to anyone who may potentially encroach on the property.

3.4 Reach Summary Information

The Project area is comprised of two easement areas, bisected by an overhead powerline, where two unnamed tributaries drain southwest to an on-site confluence (**Figures 2** & **6**). Results of the preliminary data collection are presented in **Table 5**. Morphological parameters are in **Appendix B**; the USACE district assessment form is located in **Appendix H**.

Table 5. Summary of Existing Channel Characteristics

Reach	Drainage Area (ac)	A_{BKF} [1] (ft^2)	BKF Width (ft)	BKF Mean Depth (ft)	Low Bank Height (ft)	Width/Depth Ratio	Bank Height Ratio	Entrenchment Ratio	Sinuosity	Slope (ft/ft)
G1-A	12	3.3	6.7	0.5	0.7	13.9	1.0	1.2	NA	0.16
G1-B	14	3.7	7.4	0.5	0.7	15	1.0	1.3	NA	0.16
G1-C	41	4.0	6.0	0.7	2.2	8.7	1.6	2.3	NA	0.15
G2	34	3.7	5.4	0.7	2.3	7.7	1.7	2.3	NA	0.14

[1] A_{BKF} = cross-sectional area (measured at approximate bankfull stage as estimated using existing conditions data and NC Regional Curve equations where field indicators were not present)

3.4.1 Existing Channel Morphology

G1-A

Reach G1-A begins just downstream of WB, a slope seep on the northwest end of the project. This 278-linear foot reach flows southwest towards G1-B and is classified as a A/B-type channel. This reach currently has a forested buffer greater than 150 feet and the right bank has an intact 75-foot buffer. The reach is confined to a steep valley with little evidence of livestock, though having full access.

Reach G1-A
Looking upstream

Reach G1-A
Looking downstre

G1-B

Reach G1-B begins on the northwest end of the Project, from G1-A. This 120-linear foot reach flows southwest towards G1-C and is classified as an A/B-type channel. This reach currently has a forested buffer, along the left bank, but the right bank has a very narrow buffer that will be planted. Evidence of livestock is apparent on this reach, and has caused, erosion, and bank instability.

Reach G1-B
Looking downstream towards G1-B from the G1-A reach break

G1-C

Reach G1-C begins where G1-B leaves the forested buffer. This 1,521-linear foot reach flows southwest to the confluence with G2 and is classified as a high gradient G-type channel. This reach lacks a riparian buffer entirely, and livestock have complete access to the reach. Livestock access has caused channel incision, degradation, erosion, and bank instability. Moreover, this channel is moderately incised at the most upstream portion, and incision increases as the reach continues downstream. This reach is bisected by a 40-foot powerline easement.

Reach G1-C
Looking upstream

Reach G1-C
Looking downstream

G2

Reach G2 begins on the southeast end of the project, where the rock had been installed within the channel footprint in the early 1900s. The wall is approximately 268 linear feet and 5-foot tall at its tallest, is located entirely in the valley bottom, and occurs on the upper portion of this reach. This 1,725-linear foot reach flows south to southwest towards the confluence with G1-C and is classified as a high gradient G-type stream. This reach lacks a riparian buffer entirely, and livestock have complete access to this entire reach. Livestock access has caused channel incision, degradation, erosion, and bank instability. This reach is bisected by a 40-foot powerline easement.

Reach G2
Looking west toward the rock wall

Reach G2
Looking upstream along the rock wall

Reach G2
Looking upstream

Reach G2
Looking downstream

3.4.2 Channel Classification

The Project streams have been classified as intermittent using the NCDWR Stream Identification Form version 4.11 and are classified as A/B-type, G/C-type, and G- type streams, (Rosgen, 1996). **Table 6** summarizes these stream parameters and the stream determination scores can be found in **Appendix G**; stream determinations have been confirmed by the USACE.

Table 6. Summary of Stream Parameters

Reach	Hydrology Status	Stream Determination Score	USACE Classification	Existing Reach Length (LF)	Rosgen Stream Classification
G1-A	Intermittent	22	77	278	A/B
G1-B	Intermittent	22	39	120	A/B
G1-C	Intermittent	22	26	1,521	G/C
G2	Intermittent	21.5	23	1,595	G

4 REGULATORY CONSIDERATIONS

Table 7 is a summary of regulatory considerations for the Project. Supporting documentation can be found in **Appendix I**, **Appendix K,** and **Figure 8**.

Table 7. Regulatory Considerations

Regulation	Applicable?	Resolved?	Supporting Documentation
Endangered Species Act	Yes	Yes	Appendix K
National Historic Preservation Act	Yes	Yes	Appendix K
FEMA Floodplain Compliance	No	N/A	N/A
Coastal Zone Management Act (CZMA)/ Coastal Area Management Act (CAMA)	No	N/A	N/A
Magnuson Stevens Act - Essential Fisheries Habitat	No	N/A	N/A
Waters of the United States - Section 404	Yes	Yes	Appendix I
Waters of the United States - Section 401	Yes	Yes	Appendix I

4.1 Environmental Screening and Documentation

To ensure that a project meets the "Categorical Exclusion" criteria, the Federal Highways Administration (FHWA) and NCDMS have developed a categorical exclusion (CE) checklist that is included as part of each mitigation project's Environmental Screening process. The CE Approval Form for the Monkey Wall Project is included in **Appendix K** and was approved by DMS and FHWA in February 2019.

4.2 Threatened and Endangered Species

Plants and animals with a federal classification of endangered or threatened are protected under provisions of Sections 7 and 9 of the Endangered Species Act of 1973, as amended. A desktop analysis was performed to identify rare species or unique habitats on-site, including using the USFWS Information for Planning and Conservation (IPAC) online tool and performing a query of the North Carolina Natural Heritage Program database of natural heritage element occurrences (USFWS, 2018; NCNHP, 2018). Additionally, a field investigation was conducted to evaluate federally protected species potentially occurring on the Project. A letter was sent to the USFWS requesting review of the project and input on whether there are any possible concerns for threatened and endangered species, and a response was received October 12, 2018. Additionally, to comply with the NLEB 4(d) streamlined rule for federal agencies, the required consultation form was submitted by the Federal Administration to the USFWS as part of the Categorical Exclusion. It was determined that the project "may affect the NLEB, but any incidental take of the NLEB is not prohibited by the final 4(d) rule." However, RES will avoid tree cutting from May 15 – August 15, if possible, to protect sensitive summer roosting habitat. Documentation of all correspondence is included in **Appendix K**.

Furthermore, it is important to note that there is population of Eastern Hellbender (*Cryptobranchus alleganiensis*), an US Federal Species of Concern and NC Special Concern Species, in Big Rock Creek (where our project reaches ultimately drain to). In order to minimize impacts from sedimentation to this population, it is extremely important that excellent erosion and sediment control be practiced on-site.

The Fish and Wildlife Coordination Act requires consultation with state fish and wildlife agencies when "waters of any stream or other body of water are proposed or authorized, permitted or licensed to be impounded, diverted…or otherwise controlled or modified." A letter was sent to the NCWRC in September of 2018 requesting review and comment of possible issues with respect to fish and wildlife resources on

the Project. NCWRC responded on October 12, 2018. The only comment received from the NCWRC was to ensure coordination with the USFWS, regarding the NLEB, was completed. Documentation is included in **Appendix K.**

4.3 Cultural Resources

A review of the North Carolina State Historic Preservation Office GIS Web Service database and a field evaluation were conducted to evaluate potential occurrences near or on the Project. No archeological artifacts have been observed or noted during preliminary surveys of the Project for restoration purposes. Letters describing the Project and requesting review or comment on potential resources in its vicinity were sent to the North Carolina Department of Cultural Resources, State Historic Preservation Office (SHPO; September 11, 2018), to the Eastern Band of Cherokee Indians (EBCI; September 24, 2018), to the Cherokee Nation (CN; October 8, 2018), and to the United Keetoowah Band of Cherokee Indians in Oklahoma (UKBCI; October 5, 2018). RES received a response letter from SHPO on October 8, 2018 which confirmed that no known historic resources would be affected by the project. RES received a response from CN on November 26, 2018, stating the Nation does not foresee this project imparting impacts to Cherokee cultural resources at this time. Additionally, the CN further states that should any items of cultural significance be discovered, all activity should be halted, and to contact the CN for further consultation. No correspondence has been received from the ECBI or the UKBCI at the time of this submittal. All correspondence is included in **Appendix K**.

4.4 Federal Emergency Management Agency (FEMA)/ Hydrologic Trespass

According to the North Carolina Floodplain Mapping Information System, the Project reaches are not within a flood hazard zone (FEMA, 2009) (**Figure 8**). The Project can be found on Flood Insurance Rate Map (FIRM) Panel 0855 (map number 3710085500J), effective date February 4, 2009. Furthermore, there will be no hydrologic trespass outside of the Project as a result of the stream restoration activities. A DMS Floodplain Requirements Checklist form was completed for the Project and is included in **Appendix L**.

4.5 Clean Water Act - Section 401/404

Impacts to jurisdictional streams and wetlands will be unavoidable, due to the restoration and enhancement actives proposed. Although these impacts are unavoidable, the proposed stream treatment will result in an overall functional uplift of the stream system, as described in **Section 5**. **Table 8** outlines the anticipated impacts to aquatic resources associated with the Project. In general, G1-A and G1-B, which are proposed for preservation and enhancement II respectively, will not have any stream, wetland, or open water impacts. Furthermore, the two reaches proposed for restoration, G1-C and G2, will have permanent impacts, due to stream restoration and stream realignment. One wetland (WA) will be impacted due to stream restoration and enhancement activities. Wetland A will have both permanent and temporary impacts due to the restoration and re-alignment of G1-C and G2. Thus, one wetland gauge will be installed in WA to monitor wetland hydrology and this data will be reported in yearly monitoring reports. All stream and wetland impacts will be accounted for in the Pre-Construction Notification form.

Table 8. Anticipated Impacts to Aquatic Resources

Resource Type	Aquatic Resource ID	Permanent/ Temporary	Classification	Impact Type	Impact Area/Length
Stream	G1-C	Permanent	Intermittent	Stream Restoration	1,529 LF*
	G2	Permanent	Intermittent	Stream Restoration	1,710 LF*
Wetland	WA	Permanent	NA	Stream Restoration	0.04 ac
		Temporary	NA	Stream Restoration	0.16 ac

Open Water	NA
Buffer	NA

*Includes stream restoration length under power line

5 FUNCTIONAL UPLIFT POTENTIAL

The Stream Functions Pyramid Framework (Harman et. al. 2012) brings together four components: the five functional categories, function-bases parameters, measurement methods, and performance standards. By using the Stream Functions Pyramid Framework, this can aid in developing project objectives, perform existing condition assessments and monitoring, developing performance metrics, and design criteria. The Framework separates stream functions into five categories, ordered into a hierarchy, which communicate the interrelations among functions and illustrate the dependence of higher-level functions (biology, physicochemical, and geomorphology) on lower level functions (hydrology and hydraulics). Fischenich (2006) found that the most critical functions include those that address hydrodynamic processes, sediment transport processes, stream stability and riparian buffer restoration. By addressing these fundamental functions and processes, a restored stream and riparian system can support more dependent functions that typically require time to establish, such as diverse biological communities, chemical and nutrient processes, diverse habitats and improved water, and soil quality. Project goals and objectives will address the most critical functional parameters that will result in a restored stream and riparian area over time. Anticipated functional benefits and improvements within the Project area, as based on the Function-Based Framework, are outlined in **Table 11.**

5.1 Anticipated Functional Benefits and Improvements

A functional based approach broadens the reach-scale goals of a restoration project by contextualizing the functional uplift to the watershed scale. By applying an ecosystem restoration approach, the proposed Project will provide localized ecological and water quality benefits that could, in combination with other restoration projects within the watershed, have beneficial impacts on the French Broad River Basin. The restoration approach at the reach scale of this Project will benefit the hydraulic and geomorphology functions of the system but could also benefit the upper-level functions (physicochemical and biology) over time.

5.1.1 Hydrology

According to the Stream Functions Pyramid Framework, hydrology is defined as the transport of water from the watershed to the channel. The Project has no limiting factors of water transportation from the watershed to the channel. The Project will locally address several historic hydrologic disturbances including deforestation and channel modification. The land use within the Project's catchment area will not be altered outside of the easement area, meaning hydrologic parameters such as reach runoff, flow duration, and discharge will continue to be determined by existing watershed characteristics occurring beyond the boundaries of the Project. However, it is important to note that with the conversion of approximately 22% of the Project watershed from pastureland to forest (**Table 9**), it is anticipated that the Project will provide an overall benefit to the hydrology at the catchment scale; this will provide considerable functional uplift through the functional tiers of the Pyramid.

Table 9. Land Use Comparison Before and After Restoration Activities

Land use	% of Project Drainage Area Before Restoration	% of Project Drainage Area After Restoration	Percent Change
Pasture	47.26%	25.26%	↓ 21.99%
Forest	50.40%	72.40%	↑ 21.99%
Cropland	0.95%	0.95%	0.00%
Residential	0.79%	0.79%	0.00%
Impervious Surface	0.60%	0.60%	0.00%

5.1.2 Hydraulic

The hydraulic function of the Pyramid is defined as transport of water in the channel, on the floodplain, and through sediments. The greatest potential uplift at the Project will be achieved through increasing floodplain connectivity throughout the Project and the removal of the rock wall on G2. Floodplain connectivity and stable flow dynamics are actively degrading through the Project and approaching not functioning. With the restoration of G1-C and G2 floodplain connectivity will be re-established and documented by installing stage recorders on each reach. Bank-height ratios will be reduced, and entrenchment ratios will be increased by restoring G1-C and G2 and measured by surveying cross sections during the monitoring period.

5.1.3 Geomorphology

Geomorphology, as defined within the Pyramid Framework, is the transport of wood and sediment to create bed forms and dynamic equilibrium. Sediment transport will be improved on restoration and enhancement reaches (G1-B, G1-C, and G2) of the Project. This will be accomplished, by reducing the excess sediment load entering the stream. This reduction will be achieved by establishing a functional buffer, constructing a channel that maintains stable dimension, plan, and profile, and daylighting the upstream portion of G2. This will be measured through the monitoring period by surveying vegetation plots and cross sections. Furthermore, by daylighting of the upstream portion of G2, the rock wall will yield substrate material to be utilized for channel bed stability and habitat creation. Transport and storage of woody debris will be improved through increases in channel roughness from plantings and the installation of structures. All of these functional parameters are interconnected and depend on each other, improving this wide range of parameters will result in long-term functional geomorphic uplift.

5.1.4 Physicochemical

The Pyramid Framework defines the physicochemical category as temperature and oxygen regulation and the processing of organic matter and nutrients. Many of these physicochemical benefits occur slowly over time and are dependent on multiple variables within the stream ecosystem. Therefore, it is not practical or feasible to directly measure these parameters within the monitoring time frame of this project. With that said, it is logical to use existing riparian buffer and visual performance standards to demonstrate the positive correlation between geomorphic parameters and physicochemical parameters. The restoration activities associated with this Project can be expected to promote the following: nutrient and sediment reduction, temperature regulation, and oxygen regulation. These reasonable outcomes, although not measured, will be promoted though the reforestation of the riparian buffer, daylighting the upstream portion of G2, adding bank stabilization to Project reaches, and drop structure installation.

5.1.5 Biology

The highest category of the Pyramid is biology and is defined as the biodiversity and life histories of aquatic and terrestrial life, specifically referring to animals. Since the life histories of many species will likely benefit from stream restoration and are depending on all the lower-level functions, the functional uplift from the hydraulic and geomorphic levels would likely have a positive effect on the biology over time is anticipated. However, biological monitoring will not be conducted as a part of this project. With that said, it is logical to use established riparian buffers and visual performance standards to demonstrate the positive correlation between lower levels of the Pyramid. Reasonable outcomes of this project will include improved aquatic habitat through the installation of habitat features, construction of pools at varying depths, and planting the riparian buffer

5.2 Potential Constraints to Functional Uplift, Project Risks, and Uncertainties

The main constraint associated with the Project is the presence of an existing overhead powerline that bisects the parcel. RES explored re-locating the powerline, but this was not feasible due to surrounding

topography, the need to coordinate with multiple landowners outside the Project area, and the associated costs of relocation. In-lieu of moving the powerline, RES is proposing to include the existing utility easement within the boundary of the conservation easement (**Figure 8**). While the utility company will still reserve the right to maintain the powerline corridor, other uses (e.g. cattle access) will be restricted by the conservation easement. The easement language will be modified in coordination with DMS and the State Property Office (SPO) to include this area as an internal crossing. RES will not be seeking stream credit for the linear stream footage within this area. Fords have been designed along Reaches G1 and G2 within the powerline easement to provide access for utility maintenance. Culvert installation was also explored, but the engineer determined a culvert would be a much greater impact to the channels, especially since access should be infrequent.
No General Aviation or Commercial airports are located within five miles of the proposed project.

All reaches will have the required 30-foot minimum riparian buffer required for mountain streams, while in most places the buffer will extend out to a maximum of 150-feet. RES does not anticipate hydrologic trespassing to occur near WA or anywhere outside the property. Additionally, all potential future encroachments will be addressed at the time of occurrence. Signage will be placed around the entire conservation easement to deter any possibilities of utility maintenance on the riparian buffer, widening, potential future encroachments or any other possible occurrences.

6 MITIGATION PROJECT GOALS AND OBJECTIVES

Through the comprehensive analysis of the Project's maximum functional uplift using the Stream Functions Pyramid Framework, specific, attainable goals and objectives will be realized by the Project. These goals clearly address the degraded water quality and nutrient input from farming that were identified as major watershed stressors in the 2009 French Broad River RBRP. The Project will address outlined RBRP Goals 1 and 5 (listed in **Section 2**).

The Project goals are:

- Improve water transport from watershed to the channel in a non-erosive manner in a stable channel;
- Improve flood flow attenuation on-site and downstream by allowing for overbank flows and connection to the floodplain;
- Restore native floodplain and riparian vegetation; and

The expected outcomes are:

- Improve instream habitat;
- Reduce sediment, nutrient, and fecal coliform inputs into stream system;
- Indirectly support the goals of the 2009 French Broad RBRP to improve water quality and to reduce sediment and nutrient loads, especially in the Big Rock Creek watershed.

The Project objectives to address the goals are:

- Design and reconstruct the stream channels sized to convey bankfull flows that will maintain a stable dimension, profile, and planform;
- Add in-stream structures and bank stabilization measures to protect the restored stream;
- Install habitat features such as brush toes, woody materials, and pools of varying depths to the restored stream;
- Remove the 268-linear foot rock wall located on the most upstream portion of G2 to daylight the existing stream and restore the natural profile of the channel;
- Increase forested riparian buffers to at least 30 feet on both sides of the channel along the Project reach with a hardwood riparian plant community;
- Treat any exotic invasive species present within the Project; and
- Establish a permanent conservation easement on the Project that will exclude future livestock from the stream channel and its associated buffers and prevent future land-use changes.

Anticipated functional uplift, benefits, and improvements within the Project area, as based on the Function Based Framework are outlined in **Table 10.**

Table 10. Functional Benefits and Improvements

Level	Function	Goal	Objective	Measurement Method
1	***Hydrology°*** *Transport of water from the watershed to the channel*	to transport water from the watershed to the channel in a non-erosive manner	Convert the land-use of streams and their watersheds from pasture to riparian forest	Percent Project drainage area converted to riparian forest (indirect measurement)
2	***Hydraulic*** *Transport of water in the channel, on the floodplain, and through the sediments*	to transport water in a stable non-erosive manner	Improve flood bank connectivity by reducing bank height ratios and increasing entrenchment ratios	Cross sections Stage Recorders Bank Height Ratio Entrenchment Ratio
3	**Geomorphology** *Transport of wood and sediment to create diverse bedforms and dynamic equilibrium*	to create a diverse bedform and a stable channel that achieves healthy dynamic equilibrium and provides suitable habitat for life	Reduce erosion rates and channel stability to reference reach conditions Improve bedform diversity (pool spacing, percent riffles, etc.) Increase buffer width to a minimum 30 feet	As-built stream profile Cross sections Visual monitoring Vegetation plots
4	**Physicochemical °** *Temperature and oxygen regulation; processing of organic matter and nutrients*	to achieve appropriate levels for water temperature, dissolved oxygen concentration, and other important nutrients including but not limited to Nitrogen and Phosphorus through buffer planting	*Unmeasurable Objective/Expected Benefit* Establish native hardwood riparian buffer and exclude livestock.	Vegetation plots (indirect measurement) Established a perpetual conservation easement (indirect measurement)
5	**Biology *** *Biodiversity and life histories of aquatic life histories and riparian life*	to achieve functionality in levels 1-4 to support the life histories of aquatic and riparian plants and animals through instream	*Unmeasurable Objective/Expected Benefit* Improve aquatic habitat through the installation of habitat features, construction of pools at varying depths, and planting the riparian buffer	As-Built Survey (in-direct measurement

*° These categories are measured indirectly; *This category is not quantifiably measured*

7 MITIGATION WORK PLAN

7.1 Reference Streams

Physical parameters of channels located within the Project were used, as well as other reference materials, to determine the target stream type. The "Classification of the Natural Communities of North Carolina" was also used to narrow the potential community types that would have existed at the Project (Schafale, 2012). An iterative process was used to develop the final design parameters for the restoration reaches based on cascade reference data found on site, and published step-pool data. The channel morphology characteristics of high gradient, headwater streams in North Carolina have been characterized by Zink et al. (2012) and are applicable as a starting point for the design of step-pool systems. With cascade and step-pool systems, design objectives focus on energy dissipation, grade control and stability. The morphological design parameters of importance when considering these objectives include riffle slope ratio, riffle length ratio, pool length ratio, pool-to-pool spacing and step height ratio. A hybrid design approach was adapted for G1 and G2 that incorporates, analytical, analog and empirical techniques. The primary purpose of the proposed cascade and step-pool systems is to provide grade control and energy dissipation as stormflows move down valley and to enhance physicochemical functions through processing of nutrient loads.

Select morphological parameters reported by Zink et al. (2012) with similar longitudinal slopes to the middle and lower sections of G1 and G2 are presented in **Table 11** while the morphological table with proposed design parameters for G1 and G2 is presented in **Appendix B**. All morphological design parameters are within the range of the reference dataset below.

Table 11. Select Reference Streams from Zink et al. (2012) with Morphological Data

Stream	Slope (ft/ft)	D_{50}	D_{84}	W/D	H_{STEP}/ W_{BKF}	S_{RIF}/ S_{WSE}	L_{RIF}/ W_{BKF}	L_{POOL}/ W_{BKF}	p-p/ W_{BKF}
LS4	0.0370	71	347	21.5	0.02	1.0	0.6	0.4	0.6
LS2	0.0450	175	512	18.1	0.04	0.8	1.3	1.0	2.1
BF	0.0480	39	194	16.9	0.04	1.6	0.7	0.9	1.6
LS1	0.0540	145	450	18.4	0.04	-	-	0.8	1.0
SR1	0.0680	163	745	17.6	0.07	0.4	1	0.7	1.3
AC	0.0900	70	191	20.7	0.08	1.1	0.8	0.7	2.0
NC	0.0920	47	154	25.0	0.09	0.7	1.5	0.7	1.9
PC	0.1040	96	268	19.5	0.10	0.8	1.5	0.2	1.3
Min	**0.0370**	**39**	**154**	**16.9**	**0.02**	**0.4**	**0.6**	**0.2**	**0.6**
Median	**0.0610**	**84**	**308**	**19.0**	**0.06**	**0.8**	**1.0**	**0.7**	**1.5**
Max	**0.1040**	**175**	**745**	**25.0**	**0.10**	**1.6**	**1.5**	**1.0**	**2.1**

7.1.1 Reference Data Characterization

Through the course of conducting reference reach searches, several streams were identified as possessing qualities of stability and natural form. However, these reaches were determined not to be suitable references for the project due to either incompatible stream type, valley form, slope or insufficient reach length. Reference streams for high gradient, small drainage, head-waters mountain streams representative for the Monkey Wall restoration site are just not readily available in the region. Also, it was determined that typical reference reach tables and values of the pattern and long-profile data were found to not be applicable to the design of cascade and step-pool systems in this high of a gradient valley.

Given the uniqueness of the project site consisting of cascade and step-pool morphology, a combination of approaches was used for the design and reference values as stated above and in the below sections of this report. The best on-site reference conditions came from G1-A (see image below) which exhibits a cascade morphology. Along this reach, step height ratios were measured, cross-sectional areas, slopes and discharge were calculated, verified and compared to the design. The restoration design parameter values relied heavily on a hybrid of cascade and step pool morphology and have come from previous project related experience, a small amount of varied published regional empirical relationships, and reference reach conditions along Reaches G1-A and -B.

When pools occupy greater than 50% of the length of the channel reach (which is the case for the Monkey Wall reaches), correlations can be made between the step height ratio and slope, resulting in step heights approximated from channel width and slope (Zink et al, 2012). Given the gradient of the project site and design reaches, both cascade and step-pool morphology were heavily relied on as it is the best fit for high gradient stream designs.

7.1.2 Stream Restoration Approach

The treatment plan and design approach were developed based on existing conditions, project goals, and objectives outlined in **Sections 3 and 5**. The Project will include a combination of Priority I and Priority II Restoration, Enhancement II, and Preservation. As stated above, the restoration design approach will incorporate the construction of a single-thread, high gradient, cascade and step-pool channel system, with parameters based on cascade and step-pool morphology and reference conditions along the representative reaches within the Monkey Wall site. A combination of analog, empirical, and analytical design techniques were used to determine the design discharge and to verify design stability. Conceptual plan views are provided in **Figure 9**.

The design approach for G1 and G2 are specific to cascade and step-pool systems for treatment mitigation goals for the site. The proposed systems include a series of cascades or pools connected by riffles and/or boulder and log steps that restores floodplain connectivity to the site. The riffles, steps and pools provide grade control, energy dissipation and bedform diversity to restore high gradient systems. The proposed design for all reaches has been set to not exceed a drop of 1.25 ft per step structure which is consistent with published information (see above) and reference step data observed and collected on-site.

The detailed treatment plan and design approach is as follows:

Reach G1-A

A Preservation approach is proposed for this reach, due to its high quality, wide riparian buffers, and terrain. Preservation activities will include:

- Minimal buffer planting on the right bank, to increase riparian buffer beyond 75 feet;
- Livestock exclusion; and
- Establishing a conservation easement to be protected in perpetuity.

Reach G1-B

An Enhancement II approach is proposed for the reach to address eroding banks and channel entrenchment. Enhancement activities include:

- Livestock exclusion; and
- Riparian buffer planting to 150-feet.

Reach G1-C

A combination of Priority I and Priority II restoration is proposed for the reach to address eroding banks, channel incision, bed degradation and floodplain connectivity.
Restoration activities include:

- Constructing a new single thread channel and floodplain benches in the existing floodplain;
- Installing log and rock structures to provide grade control with drops no greater than 1.25 feet;
- Establishing a cascade, step-pool or riffle-pool sequence throughout the reach;
- Filling the existing channel;
- Creating floodplain to reduce shear stresses at higher flows;
- Livestock exclusion; and
- Riparian buffer planting to a minimum of 30-feet at the downstream end and out to 150-feet everywhere else.

One gauge will be installed on the right floodplain in WA to monitor wetland hydrology. This data will be reported in yearly monitoring reports. No wetland credits will be generated on WA; thus, wetland success criteria will not need to be met during the monitoring period.

Reach G2

A combination of Priority I and Priority II restoration is proposed for the reach to address eroding banks, channel incision, bed degradation, and floodplain connectivity. Since the post-contract IRT visit in July 2018, and the subsequent design, reach G2-A was incorporated into G2-B (now G2) and is proposed for restoration. Reach G2's historic valley has been heavily modified, so determining an exact point for the stream origin presented challenges. Because the valley is so manipulated, the origin of Reach G1 was utilized as a reference for designing the origin of Reach G2. Both reaches have very similar drainage areas at the top of their respective valleys (approximately 12 acres) and Reach G1 originates from a wetland seep (Wetland WB). Based on the similarities of the valleys, and the unique nature of the project reaches, RES decided to begin the alignment of G2 just below an existing wetland seep (Wetland WC) similar to the current condition of Reach G1A. Furthermore, the design approach will include the removal of an existing 15 inch perched culvert and associated road, and include re-grading the valley to mimic conditions similar to the cascade morphology seen along Reach G1-A. RES staff has continually observed flow from the existing culvert and on multiple occasions has observed (and heard) flow below the rocks along the proposed "daylighting" restoration section. RES is proposing to gage Reach G2 for the purpose of demonstrating consecutive flow requirements as stated in the Wilmington Mitigation guidance.

Restoration activities along this reach include:

- Remove culvert and associated road at upstream of reach and tie proposed channel into seep located above the culvert;
- Removing the rock wall, and therefore daylighting the channel, present on the upper portion of the reach;
- Constructing a new single thread channel and floodplain benches in the existing floodplain;
- Installing log and rock structures to provide grade control with drops no greater than 1.25 feet;
- Establishing a cascade, step-pool or riffle-pool sequence throughout the reach;
- Filling the existing channel;
- Creating floodplain to reduce shear stresses at higher flows;
- Livestock exclusion; and
- Riparian buffer planting to 150-feet on both sides of the stream.

Typical Design Sections

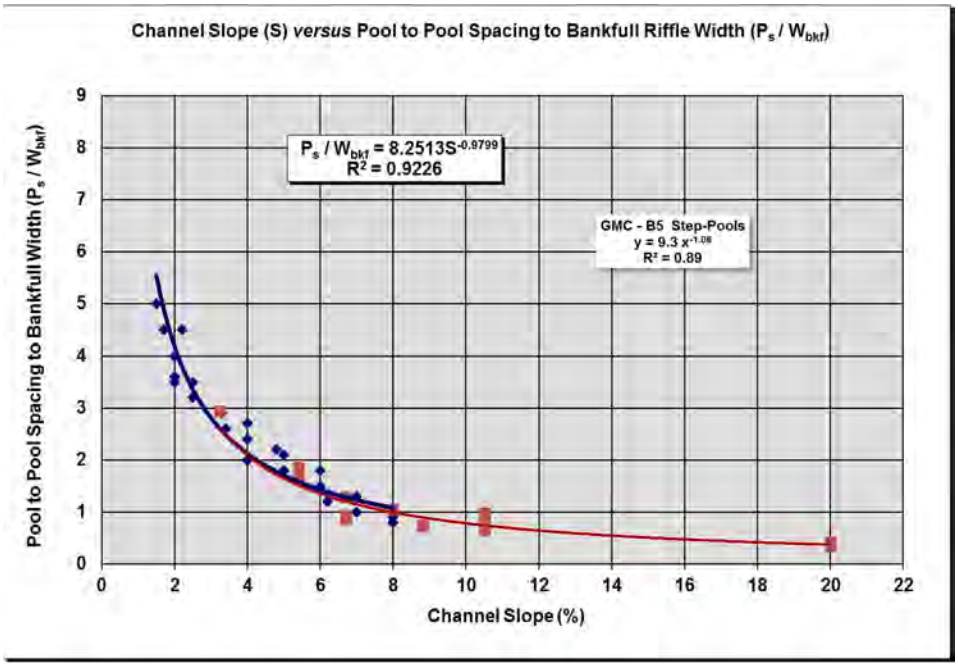
The riffle cross-sections are sized to convey the equivalent of the Q1-2 discharge within the channel. Higher flows will spread onto vegetated benches beyond top of bank and the historical floodplain that has been

disconnected by the down cutting of the channel over time. A higher with-to-depth ratio (15-20) and wide floodplain benches has been designed to minimize flow depths, thus decreasing potential velocities and shear stresses that cause erosion. The higher width to depth ratios will allow for encouragement of vegetation to establish and grow at the low flow channel stage, allowing the channel to narrow up overtime. Large riffle substrate material is needed to resist the high shear stresses of the relatively steep channel slopes. The material will be harvested from the abandoned channel, rock from the removal of the wall on G2 and substrate found in the valley. For both reaches, the design D50 and D85 particles are 180 mm and 256 mm, respectively, which will resist shear stresses and mobilization up to the 100-year storm. Boulder step structures will be used for additional grade control and energy dissipation. The boulder structures will be silled in across the vegetated bench and perpendicular to flow to prevent scour and failure around the structures during high flows.

Typical cross sections for riffles/steps and pools are shown on the design plan sheets in **Appendix A**. The cross-section dimensions were developed for the design reach by using an in-house spreadsheet. The cross sections were altered slightly to facilitate constructability; however, the cross-sectional area, width to depth ratio, and side slopes were preserved.

Longitudinal Profiles

The design profiles are presented in **Appendix A**. These profiles extend throughout the entire project for the proposed channel alignment. The profiles were designed using empirical relationships, past project experience, and published reference stream data. The bed slopes and energy gradients were determined for the design reach based on the existing valley slope of the design reach. Log and rock structures will be utilized in the design to control grade, divert flows, and provide additional habitat diversity and stability.



In-Stream Structures

Structures will be incorporated into the channel design to provide additional stability and improve aquatic habitat. Native materials and vegetation will be used for revetments and grade control structures where applicable. Typical structures that will protect the channel bed will include constructed riffles and log and rock step pools. Given the slope and gradient of the creek, structures are designed to not exceed 1.25 feet of drop from one pool to the next. This is done to limit the potential scour of the upstream structure.

7.1.3 Data Analysis

Stream Hydrologic Analysis

Stable cross-section dimensions were readily identified on the reference stream section above the project site (Reach G1-A), and the resulting cross-sectional areas correlated well with the cross-section dimensions/areas measured throughout the existing project reaches. Discharge estimates based on the measured cross-sections were calculated for the project reaches using a single-section analysis. Manning's 'n' was estimated from relative roughness calculations of the bed material and from observation of the channel flow conditions. Water surface slope was assumed to be consistent with the slope of the bed profile. Discharge was then plotted against a graph of the regional curve data. The graphing of this data indicated that the calculated discharges were not consistent with the bankfull discharges generated from regional curve data; but instead correlate with larger storm events. The data set used for the published regional curve equations did not include any streams with gradients steeper than 5% on drainage areas similar in size to the project and was therefore determined not suitable for estimating design flows for the Project. However, we are confident that the dimensions of the channel are correct and consistent based on our analyses of the project reaches.

Hydrologic evaluations were performed for the design reaches using multiple methods to determine and validate the design discharge and channel geometry required to provide regular floodplain inundation. The use of various methods allows for comparison of results and eliminates reliance on a single model. Peak flows (**Table 12**) and corresponding channel cross sectional areas were calculated for comparison to design parameters using the following methods:

- Reference and on-site channel discharge calculations (Manning's)
- Regional Flood Frequency Analysis,
- NC and VA Regional Curves for the Mountains,
- USGS regional regression equations

Regional Flood Frequency Analysis

A flood frequency analysis was completed for the study region using historic gauge data on all nearby USGS gauges with drainage areas between 0.46 and 18.8 mi^2. Flood frequency equations were developed for the 1.5- and 10-year peak discharges based on the gauge data. Discharges were then computed for the design reaches for comparison.

Regional Curve Equations

The North Carolina Mountain regional curves by Harman et al. (2003), the Virginia Mountain regional curves by Keaton et al. (2005) and USGS for discharge were used to provide comparison of flows predicted by the flood frequency analysis, reference reach and project reaches. The regional curve equations for NC discharges by Harman et al. (2003) and for VA discharges by Keaton et al. (2005):

(1) $Q_{bkf}=100.64(DA)^{0.76}$ (Harman et al., 2003)

(2) $Q_{bkf}=43.249*(DA)^{0.7938}$ (Keaton et al., 2005)

Where Q_{bkf}=bankfull discharge (ft^3/s) and DA=drainage area (mi^2).

USGS Regional Regression Equations

USGS regression equations estimate the magnitude and frequency of flood-peak discharges (Weaver, et al., 2009). The regression equations were developed from gauge data in different physiographic regions of the Southeastern United States. For this analysis, the 5- and 10-year return intervals were used and the corresponding equations for the rural Blue Ridge ecoregion (Hydrologic Region 2) are below:

(3) $Q_5=209*(DA)^{0.749}$

(4) $Q_{10}=288*(DA)^{0.736}$

Table 12. Peak Flow Comparison

Reach	Drainage Area (Ac)	FFQ $Q_{1.5}$	FF Q Q_{10}	NC Regional Curve Q (1)	VA Regional Curve Q (2)	USGS RR Q_5 (3)	USGS RR Q_{10} (4)	Ex. Conds. Calculated Q	Design Q
G1A	12	1	2	5	2	11	15	20-25	NA
G1C (U/S G2)	41	3	8	12	5	27	38	38-50	50
G1C (D/S G2)	87	6	17	22	9	47	66	38-50	70
G2	34	2	7	11	4	23	33	30-45	40

Sediment Supply

There is significant instability and erosion along the channel, which appears to be a result of historic cattle activity and agricultural activities occurring up to and along channel banks and not from watershed activities. It is anticipated that sediment supply from agricultural land adjacent to the project will decrease as buffers are enhanced and widened and as the channel is stabilized and realigned. The lower bank height ratios will allow for dissipation of the flows over the floodplain.

7.2 Vegetation and Planting Plan

7.2.1 Plant Community Restoration

The restoration of the plant communities is an important aspect of the restoration Project. The selection of plant species is based on what is typically native to the area. Several sources of information were used to determine the most appropriate species for the restoration project.

A Montane Oak-Hickory Forest will be the target community along the Project reaches. The target community will be used for the planting areas within the Project, shown in **Figure 10**. The plant species list has been developed and can be found in **Table 13**. Species with high dispersal rates are not included because of local occurrence, adjacent seed sources, and the high potential for natural regeneration. The high dispersal species include red maple and sweetgum, and both species are common in Montane Red-Cedar Hardwood Woodland. However, sweetgum especially seems to be associated with more disturbed examples, so while these species could be counted towards success, they should be monitored to ensure they do not outcompete the other proposed species (Schafale and Weakley, 1990; Schafale, 2012).

The restoration of plant communities along the Project will provide stabilization and diversity. For rapid stabilization of the stream banks (primarily outside meanders), silky dogwood (*Cornus amomum*), black willow (*Salix nigra*), and Tag alder (*Alnus serrulata*), were chosen for live stakes along the restored channel because of their rapid growth patterns and high success rates. Willows grow at a faster rate than the species planted around them, and they stabilize the stream banks. Willows will also be quicker to contribute organic matter to the channel. When the other species are bigger, the black willows will slowly stop growing or die out because the other species would outgrow them and create shade that the willows do not tolerate. The live stake species will be planted along the outside of the meander bends three feet from the top of bank, creating a three-foot section along the top of bank.

It is anticipated that the vegetation planting/replanting will be conducted between November 15 and March 15, per the October 2016 USACE/NCIRT monitoring guidance. If the Project completes construction after

March 15, but before April 30, the Project will be planted immediately following construction so that there are 180 days prior to the initiation of the first year of monitoring. It is important to note that if any planting occurs after April 30th, it may not count towards a full year of vegetative monitoring.

Table 13. Proposed Plant List

Bare Root Planting Tree Species					
Species	**Common Name**	**Stratum**	**Spacing (ft)**	**Unit Type**	**% of Total Species Composition**
Betula nigra	River Birch	Canopy	9X6	Bare Root	15
Liriodendron tulipifera	Tulip poplar	Canopy	9X6	Bare Root	15
Platanus occidentalis	American sycamore	Canopy	9X6	Bare Root	15
Carya ovata	Shagbark hickory	Canopy	9X6	Bare Root	10
Quecrus alba	White oak	Canopy	9X6	Bare Root	10
Quercus montana	Chestnut oak	Canopy	9X6	Bare Root	10
Alnus serrulata	Tag Alder	Understory	9X6	Bare Root	5
Cercis canadensis	Eastern Redbud	Understory	9X6	Bare Root	5
Cornus florida	Flowering Dogwood	Understory	9X6	Bare Root	5
Morus rubra	Red Mulberry	Understory	9X6	Bare Root	5
Quercus rubra	Northern red oak	Canopy	9X6	Bare Root	5

Live Staking and Live Cuttings Bundle Tree Species		
Species	**Common Name**	**% of Total Species Composition**
Alnus serrulata	Tag alder	20
Cornus amomum	Silky dogwood	20
Physocarpus opulifolius	Ninebark	20
Platanus occidentalis	American Sycamore	20
Salix nigra	Black willow	20

7.2.2 In-Site Invasive Species Management

Treatment for invasive species will be required within all grading limits associated with stream restoration, as well as within the entire conservation easement. Invasive species will require different and multiple treatment methods, depending on plant phenology and the location of the species being treated (**Appendix J**). Non-native and invasive species on site include, bermudagrass, tall fescue, broomsedge bluestem, all of which will be treated prior to planting.

All treatment will be conducted as to maximize its effectiveness and reduce chances of detriment to surrounding native vegetation. Treatment methods will include mechanical (cutting with loppers, clippers, or chain saw) and chemical (foliar spray, cut stump, and hack and squirt techniques). Plants containing mature, viable seeds will be removed from the Project and properly disposed. All herbicide applicators will be supervised by a certified ground pesticide applicator with a North Carolina Department of Agriculture and Consumer Services (NCDA&CS) license and adhere to all legal and safety requirements according to herbicide labels, and NC and Federal laws. Management records will be kept on the plant species treated, type of treatment employed, type of herbicide used, application technique, and herbicide concentration and quantities used. These records will be included in all reporting documents.

7.2.3 Soil Restoration

After construction activities, the subsoil will be scarified, and any compaction will be deep tilled before the topsoil is placed back over the Project. Any topsoil that is removed during construction will be stockpiled and placed over the Project during final soil preparation. This process should provide favorable soil conditions for plant growth. Rapid establishment of vegetation will provide natural stabilization for the Project.

7.3 Mitigation Summary

Natural channel design techniques have been used to develop the restoration design described in this document. The combination of the analog, empirical, and analytical design methods was determined to be appropriate for this Project because the watershed is rural, the causes of disturbance are known and have been abated, and there are minimal infrastructure constraints. The original design parameters were developed through an iterative process using analytical and empirical tools and numerical simulations of fluvial processes and checked against measured analog/reference reach data and step pool morphology published data. The designs presented in this report provide for the restoration of natural Mountain cobble-bed channel features and stream bed diversity to improve benthic habitat. The proposed design will allow flows that exceed the design bankfull stage to spread out over the floodplain and help reduce shear stresses and limit erosion and degradation.

Areas where the existing stream alignment is abandoned due to realignment, it will be filled in with using material excavated from the new channel. However, multiple segments will be left partially filled to provide habitat diversity and flood storage. These filled areas will have a maximum depth of 8-14 inches, with very gradual and wide slopes to promote easy access to wildlife. Furthermore, with these parameters these areas will not be inundated year-round and will be spaced adequately as to avoid gaps in the canopy layer. Native woody material will be installed throughout the restored reach to reduce bank stress, provide grade control, and increase habitat diversity.

Forested riparian buffers will be established along the Project reaches. An appropriate riparian plant community (Montane Oak-Hickory Forest) will be established to include a diverse mix of species. The plant species list has been developed and can be found in **Table 14**. Although there is one planting zone, certain targeted species will be planted in the appropriate target community location. Replanting of native species will occur where the existing buffer is impacted during construction.

Due to the nature of the project, complete avoidance of stream and wetland impacts is not possible. Proposed stream impacts, including stream relocation, will be replaced on-site. Wetland impacts associated with restoration efforts will have both temporary and permanent impacts to existing wetlands. However, stream restoration will provide an overall increase to wetland function due to the addition of native trees and shrubs along the stream banks, and restored hydrology. All stream and wetland impacts will be accounted for in the Pre-Construction Notification (PCN) form.

7.4 Determination of Credits

Mitigation credits presented in **Table 14** and **Table 15** are projections based upon Project design (**Figure 9**; **Appendix A**). Upon completion of Project construction, the project components and credits data will only be revised to be consistent with the as-built condition if there is a large discrepancy. Any deviation from the mitigation plan post approval, including adjustments to credits, will require a Mitigation Plan Addendum. This would require approval by the IRT.

Table 14. Monkey Wall Project (ID-100069) - Mitigation Assets and Components

Project Segment	Existing Footage/ Acreage	Proposed Stationing			Mitigation Plan Footage/ Acreage	Mitigation Category	Restoration Level	Priority Level	Mitigation Ratio (X:1)	Credits (SMUs)	As-Built Footage or Acreage	Comments
G1-A	278	0+55	to	3+33	278	Cold	P	-	10:1	27.800	-	Extend riparian buffer to at least 30- feet, livestock exclusion, and conservation easement establishment
G1-B	120	3+33	to	4+53	120	Cold	EII	-	5:1	24.000	-	Extend riparian buffer to at least 30-feet, minor bank stability work, livestock exclusion, and conservation easement establishment
G1-C§	944	4+53	to	13+79	926	Cold	R	1	1:1	926.000	-	Full channel restoration, establish a riparian buffer to at least 30-feet, livestock exclusion, and conservation easement establishment
	577	14+55	to	19+82	527	Cold	R	1	1:1	527.000		
G2§	516	0+07	to	6+35	628	Cold	R	1	1:1	628.000	-	Full channel restoration, establish a riparian buffer to at least 30-feet, livestock exclusion, and conservation easement establishment
	1,079	6+82	to	17+17	1,035	Cold	R	1	1:1	1,035.000		

§ *Powerline bisects this reach*

Table 15. Monkey Wall Project Credits- Base SMUs

Restoration Level	Stream			Riparian Wetland		Non-riparian Wetland	Coastal Marsh
	Warm	Cool	Cold	Riverine	Non-Riv		
Restoration	-	-	3,116.000	-	-	-	-
Re-establishment	-	-	-	-	-	-	-
Rehabilitation	-	-	-	-	-	-	-
Enhancement	-	-	-	-	-	-	-
Enhancement I	-	-	-	-	-	-	-
Enhancement II	-	-	24.000	-	-	-	-
Creation	-	-	-	-	-	-	-
Preservation	-	-	27.800	-	-	-	-
Totals	-	-	**3,167.800**	-	-	-	-

Table 16. Project Credit Adjustments

Type	SMUs
Total Base SMUs	**3,167.800**
Credit Loss in Required Buffer	**-132.476***
Credit Gain in Required Buffer	**839.145***
Net Change in Credit Buffers	**706.669**
Total Adjusted SMUs	**3,874.469**

*** Credit adjustment for Non-standard Buffer Width calculation using the Wilmington District Stream Buffer Credit Calculator issued by the USACE in January 2018. See section 7.4 for further information.*

7.5 Credit Calculations for Non-Standard buffer Widths

To calculate functional uplift credit adjustments, the Wilmington District Stream Buffer Credit Calculator from the USACE in January 2018 was utilized. To perform this calculation, GIS analysis was performed to determine the area (in square feet) of ideal buffer zones and actual buffer zones around the Project stream. Minimum standard buffer widths are measured from the top of bank (50 feet in Piedmont and Coastal Plain counties or 30 feet in mountain counties). The ideal buffers are the maximum potential size (in square feet) of each buffer zone measured around all creditable stream reaches, calculated using GIS, including areas outside of the easement. The actual buffer is the square feet in each buffer zone, as measured by GIS, excluding non-forested areas, all other credit type (e.g., wetland, nutrient offset, buffer), easement exceptions, open water, areas failing to meet the vegetation performance standard, etc. The stream lengths, mitigation type, ideal buffer, and actual buffer are all entered into the calculator. This data is processed, and the resulting credit amounts are totaled for the whole project. In conclusion, the Buffer Credit Calculator calculated a net gain of 706.669 credits; therefore, the total adjusted SMUs for the Project is 3,874.469 (**Table 16, Figure 11, Appendix B**). As shown on **Figure 11**, RES is not seeking any stream credit for the linear footage or additional credit for wider buffers within the footprint of the utility easement and is applying a credit reduction for the area within the 0-30 foot buffer width zone.

8 PERFORMANCE STANDARDS

The success criteria for the Project will follow the 2016 USACE Wilmington District Stream and Wetland Compensatory Mitigation Update and subsequent agency guidance. Specific success criteria components are presented below.

8.1 Stream Restoration Success Criteria

8.1.1 Bankfull Events

Four bankfull flow events must be documented within the seven-year monitoring period. The bankfull events must occur in separate years. Otherwise, the stream monitoring will continue until four bankfull events have been documented in separate years. Stage Recorders will be installed on G1-C and G2.

8.1.2 Surface Flow

All intermittent stream restoration reaches will be monitored to document intermittent or seasonal surface flow. This will be accomplished through direct observation and the use of hydraulic pressure transducers with data loggers. Reaches must demonstrate a minimum of 30 consecutive days of flow. Flow gauges will be installed on G1-C and G2. Additionally, all streams must maintain an Ordinary High-Water Mark and the channel will be jurisdictional by year 7, which will be monitored and reported in each monitoring report. This will be documented using flow gauges and visual indicators.

8.1.3 Cross Sections

There should be little change in as-built cross sections. If changes do take place, they should be evaluated to determine if they represent a movement toward a less stable condition (for example down-cutting or erosion) or are minor changes that represent an increase in stability (for example settling, vegetative changes, deposition along the banks, or decrease in width/depth ratio). Cross sections shall be classified using the Rosgen stream classification method, and all monitored cross sections should fall within the quantitative parameters defined for channels of the design stream type. Bank height ratio shall not exceed 1.2, and the entrenchment ratio shall be no less than 1.4 within restored riffle cross sections for B channels and 2.2 for C and E streams. Channel stability should be demonstrated through a minimum of four bankfull events documented in the seven-year monitoring period.

8.1.4 Digital Image Stations

Digital images will be used to subjectively evaluate channel aggradation or degradation, bank erosion, success of riparian vegetation, and effectiveness of erosion control measures. Longitudinal images should not indicate the presence of developing bars within the channel or an excessive increase in channel depth. Lateral images should not indicate excessive erosion or continuing degradation of the banks over time. A series of images over time should indicate successional maturation of riparian vegetation. Digital image stations will be collocated with monitoring all monitoring devises (cross sections, vegetation plots, and monitoring gauges).

8.2 Vegetation Success Criteria

Specific and measurable success criteria for plant density within the riparian buffers on the site will follow IRT Guidance. Vegetation monitoring plots will be a minimum of 0.02 acres in size and cover a minimum of two percent of the planted area. Vegetation monitoring will occur annually between July 15 and leaf drop and will include a combination of fixed and random plots. The interim measures of vegetative success for the site will be the survival of at least 320 planted three-year old trees per acre at the end of Year 3, 260 five-year old trees with an average height of six feet at the end of Year 5, and the final vegetative success criteria will be 210 trees per acre with an average height of eight feet at the end of Year 7. Volunteer trees

will be counted, identified to species, and included in the yearly monitoring reports, and may be counted towards the success criteria of total planted stems if the species is from the approved planting list in **Section 7.4**. Furthermore, any single species can only account for up to 50 percent of the required number of stems within any vegetation plot. Any stems more than 50 percent will be shown in the monitoring table but will not be used to demonstrate success.

9 MONITORING PLAN

Annual monitoring data will be reported using the DMS Monitoring Report Template dated June 2017 and NC IRT monitoring template. The monitoring report shall provide a project data chronology that will facilitate an understanding of project status and trends, research purposes, and assist in decision making regarding project close-out. Monitoring reports will be prepared annually and submitted to DMS. Monitoring of the Project will adhere to metrics and performance standards established by the USACE's April 2003 Wilmington District Stream Mitigation Guidelines and the NC IRT's October 2016 Wilmington District Stream and Wetland Compensatory Mitigation Update. **Table 17** outlines links between project objectives and treatments and their associated monitoring metrics and performance standards within the context of functional uplift based on the Stream Functions Pyramid Framework. **Table 18** outlines the monitoring quantities and schedules for the Project. **Figure 12** is the monitoring Plan with proposed locations for vegetation plots, flow gauges, stage recorders, one wetland gauge, and one rain gauge.

9.1 As-Built Survey

An as-built survey will be conducted following construction to document channel size, condition, and location, and monitoring gauge locations. The survey will include a complete profile of thalweg, water surface, bankfull, and top of bank to compare with future geomorphic data. Longitudinal profiles will not be required in annual monitoring reports unless requested by USACE. Stream channel stationing will be marked with stakes placed near the top of bank every 200 feet. The As-built survey will follow the requirements outlined in the 2016 USACE/NCIRT monitoring guidance.

9.2 Visual Monitoring

Visual monitoring of all mitigation areas will be conducted a minimum of twice per monitoring year by qualified individuals. The visual assessments will include vegetation density, vigor, invasive species, and easement encroachments. Visual assessments of stream stability will include a complete streamwalk and structure inspection. Digital images will be taken at fixed representative locations to record each monitoring event, as well as any noted problem areas or areas of concern. Results of visual monitoring will be presented in a plan view exhibit with a brief description of problem areas and digital images. Photographs will be used to subjectively evaluate channel aggradation or degradation, bank erosion, success of riparian vegetation, and effectiveness of erosion control measures. Longitudinal photos should indicate the absence of developing bars within the channel or an excessive increase in channel depth. Lateral photos should not indicate excessive erosion or continuing degradation of the banks over time. A series of photos over time should indicate successional maturation of riparian vegetation.

9.3 Hydrology Events

Stage recorders will be installed to document the occurrence of bankfull events. A minimum of one gauge will be installed on each tributary that is greater than 1,000 feet in length, with one gauge required for every 5,000 feet of length on each tributary and a maximum of five gauges per tributary. Reaches with Priority 1 Restoration (designed to reconnect the stream to its floodplain), gauges will be capable of tracking the frequency and duration of overbank events. Where restoration or enhancement activities are proposed for intermittent streams, monitoring gauges will be installed to track the frequency and duration of stream flow events.

9.4 Cross Sections

Permanent cross sections will be installed at an approximate frequency of one per 20 bankfull widths with half in pools and half in riffle on the restoration portions of the Project reaches. Morphological data will be measured and recorded for all cross-sections; however, only riffle cross sections will include bank height ratio and entrenchment ratio measurements. Cross sections will be monitored in Years 1, 2, 3, 5, and 7.

9.5 Vegetation Monitoring

Vegetation monitoring plots will be a minimum of 0.02 acres in size and cover a minimum of two percent of the planted area (Peet, Wentworth, and White, 1998; USACE, 2016). There will be 16 plots within the planted area (19.02 acres; **Figure 12**). Plots will be a mixture of fixed and random plots, with 13 fixed plots and three random plots. Planted area indicates all area in the easement that will be planted with trees. Existing wooded areas are not included in the planted area. The following data will be recorded for all trees in the fixed plots: species, height, planting date (or volunteer), and grid location. For random plots, species and height will be recorded for all woody stems. The location (GPS coordinates and orientation) of the random plots will be identified in the annual monitoring reports. Vegetation will be planted, and plots established at least 180 days prior to the initiation of the first year of monitoring. Monitoring will occur in Years 1, 2, 3, 5, and 7 between July 1st and leaf drop. Invasive and noxious species will be monitored so that none become dominant or alter the desired community structure of the Project. If necessary, RES will develop a species-specific treatment plan.

9.6 Scheduling/Reporting

A baseline monitoring report and as-built drawings documenting stream and wetland restoration activities will be developed within 60 days of the planting completion on the Project. The report will include all information required by DMS mitigation plan guidelines, including elevations, photographs and sampling plot locations, gauge locations, and a description of initial species composition by community type. The report will also include a list of the species planted and the associated densities. Baseline vegetation monitoring will include species, height, date of planting, and grid location of each stem. The baseline report will follow DMS As-Built Baseline Monitoring Report Template June 2017, USACE guidelines, and the October 2017 Mitigation Credit Calculation Memo.

The monitoring program will be implemented to document system development and progress toward achieving the success criteria. The restored stream morphology will be assessed to determine the success of the mitigation. The monitoring program will be undertaken for seven years or until the final success criteria are achieved, whichever is longer.

Monitoring reports will be prepared in the fall of each year of monitoring and submitted to DMS. The monitoring reports will include all information and be in the format required by USACE.

Table 17. Monitoring Requirements

Level		Treatment	Objective	Monitoring Metric	Performance Standard
1	***Hydrology***	Convert land-use of Project reaches from pasture to riparian forest	Improve the transport of water from the watershed to the Project reaches in a non-erosive way	NA	NA
2	***Hydraulic***	Reduce bank height ratios and increase entrenchment ratios by reconstructing the channel to mimic reference reach conditions	Improve flood bank connectivity by reducing bank height ratios and increase entrenchment ratios	Stage Recorders and/or pressure transducers: Inspected semiannually	Four bankfull events occurring in separate years
					At least 30 days of continuous flow each year
				Cross sections: Surveyed in Years 1, 2, 3, 5 and 7	Entrenchment ratio shall be no less than 1.4 within restored B channels, and 2.2 for C/E channels
					Bank height ratio shall not exceed 1.2
3	***Geomorphology***	Establish a riparian buffer to reduce erosion and sediment transport into the project stream. Establish stable banks with livestakes, erosion control matting, and other in stream structures.	Reduce erosion rates and channel stability to reference reach conditions Improve bedform diversity (pool spacing, percent riffles, etc. Increase buffer width to 30 feet	As-built stream profile	NA
				Cross sections: Surveyed in Years 1, 2, 3, 5 and 7	Entrenchment ratio shall be no less than 1.4 within restored reaches
					Bank height ratio shall not exceed 1.2
				Visual monitoring: Performed at least semiannually	Identify and document significant stream problem areas; i.e. erosion, degradation, aggradation, etc.
				Vegetation plots: Surveyed in Years 1, 2, 3, 5 and 7	MY 1-3: 320 trees/acre MY 5: 260 trees/acre and 6 feet avg. height MY 7: 210 trees/acre and 8 feet avg. height
4	***Physicochemical***	Exclude livestock from riparian areas and conservation easement, and plant a riparian buffer	*Unmeasurable Objective/Expected Benefit* Establish native hardwood riparian buffer and exclude livestock.	Vegetation plots: Surveyed in Years 1, 2, 3, 5 and 7 (*indirect measurement*)	MY 1-3: 320 trees/acre MY 5: 260 trees/acre and 6 feet avg. height MY 7: 210 trees/acre and 8 feet avg. height
				Visual assessment of established conservation easement signage: Performed at least semiannually (*indirect measurement*)	Inspect signage. Identify and document any damaged or missing signs Easement Compliance

Table 18. Monitoring Quantities and Schedules

Parameter	Quantity	Frequency	Notes
Pattern	1 project reach	Baseline	Additional surveys will be performed upon request by USACE
Dimension	6 cross sections	Baseline, Monitoring years 1, 2, 3, 5, and 7	Surveyed cross sections will be split between riffles and pools
Profile	1 project reach	Baseline	Additional surveys will be performed upon request by USACE
Surface Water Hydrology	2 flow gauges	Annual	Two pressure transducer gauges will be installed on-site; these devices will be inspected on a quarterly basis to document the occurrence of consecutive flow days
	2 stage recorders	Annual	Two stage recorders will be installed on-site; these devices will be inspected on a quarterly basis to document the occurrence of bankfull events
Groundwater Hydrology	1 groundwater monitoring well	Annual	Pressure transducers will be installed on-site; the devices will be inspected on a quarterly basis to document wetland hydroperiods
Vegetation	13 fixed vegetation plots and 3 random plot	Monitoring years 1, 2, 3, 5, and 7	Vegetation will be monitored per IRT guidelines
Exotic and Nuisance Vegetation	N/A	Annual	Locations of exotic and nuisance vegetation will be mapped
Project Boundary	N/A	Semi-annual	Locations of fence damage, vegetation damage, boundary encroachments, etc. will be mapped
Stream Visual	N/A	Annual	Semi-annual visual assessments

10 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, the sponsor shall notify the members of the IRT and work with the IRT to develop contingency plans and remedial actions.

11 LONG-TERM MANAGEMENT PLAN

The Project will be transferred to the NCDEQ Stewardship Program (or 3rd party if approved). This party shall serve as conservation easement holder and long-term steward for the property and will conduct periodic inspection of the Project 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 nonreverting, interest-bearing Conservation Lands Conservation Fund Account. The use of funds from the Endowment Account will be governed by North Carolina General Statute 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. The landowner will be responsible for easement compliance per the terms of the recorded conservation easement (including fence/crossing maintenance etc.)

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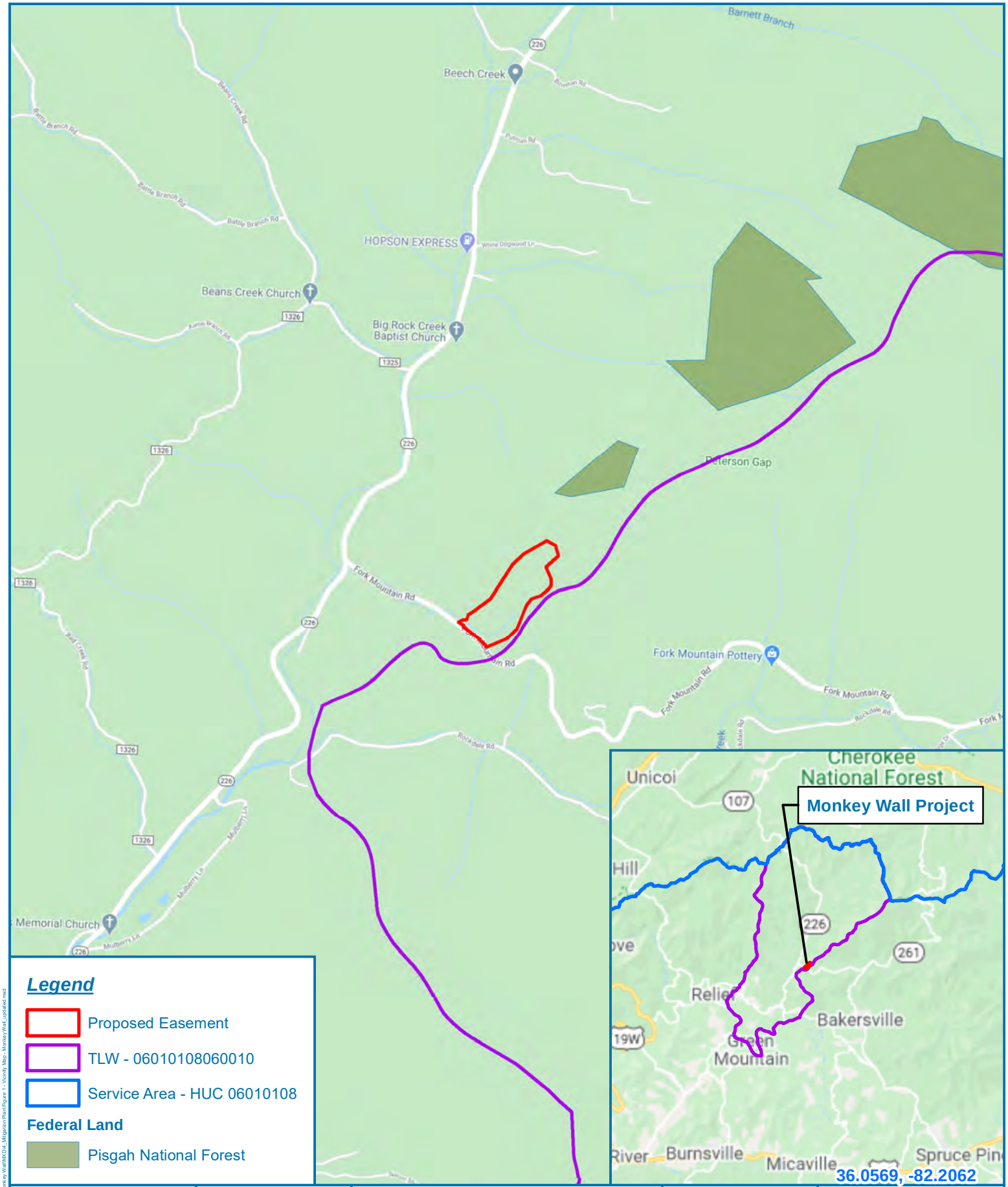

Legend

- Proposed Easement
- TLW - 06010108060010
- Service Area - HUC 06010108

Federal Land

- Pisgah National Forest

N
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0 1,000 2,000

Feet

Figure 1 - Project Vicinity

Monkey Wall Mitigation Project

Mitchell County, North Carolina

Date:	2/27/2020
Drawn by:	EJU
Checked by:	MDE
	1 inch = 2,000 feet

res

Document Path: R:\Regional\projects\NC\Monkey Wall\MX014_Mitigation Plan\Figure 1 - Vicinity Map - MonkeyWall_updated.mxd

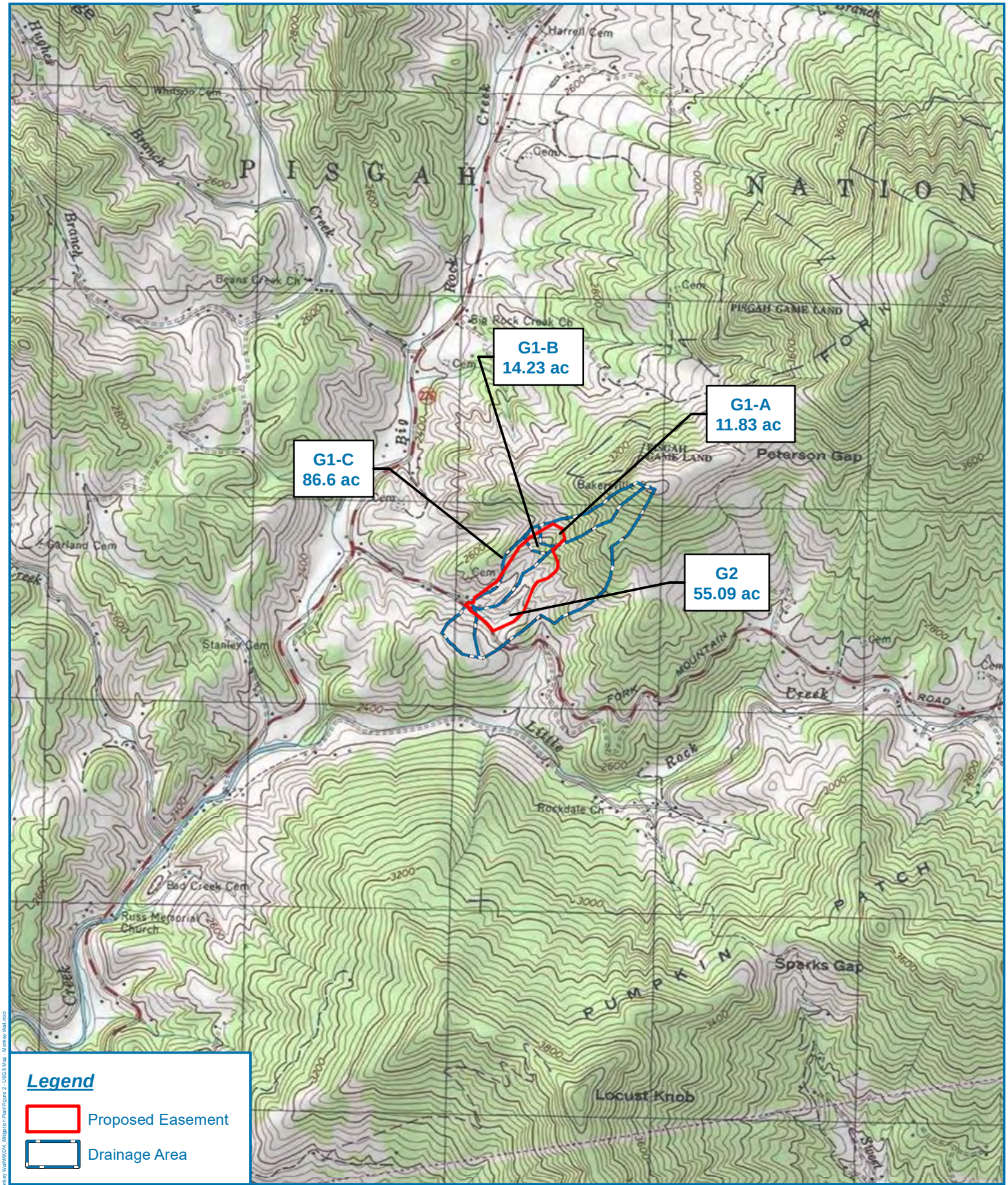


Figure 2 - USGS Quadrangle Bakersville (1979)

Monkey Wall Mitigation Project

Mitchell County, North Carolina

Date: 2/27/2020

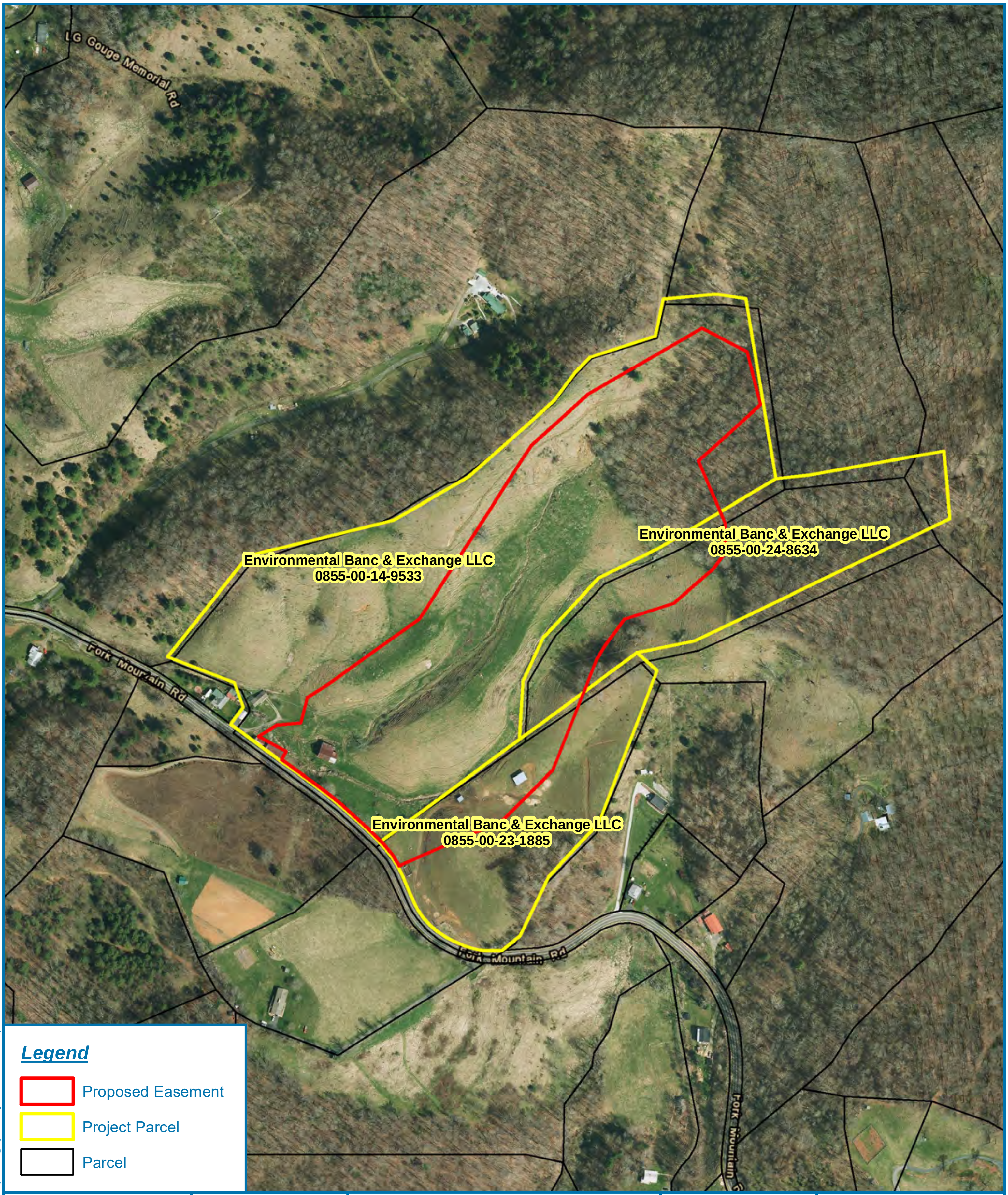
Drawn by: EJU

Checked by: MDE

1 inch = 2,000 feet

res

Document Path: R:\Resgis\projects\NC\Monkey Wall\MXD\4_Mitigation Plan\Figure 2 - USGS Map - Monkey Wall.mxd



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Feet

Figure 3 - Landowner Parcels

Monkey Wall Mitigation Project

Mitchell County, North Carolina

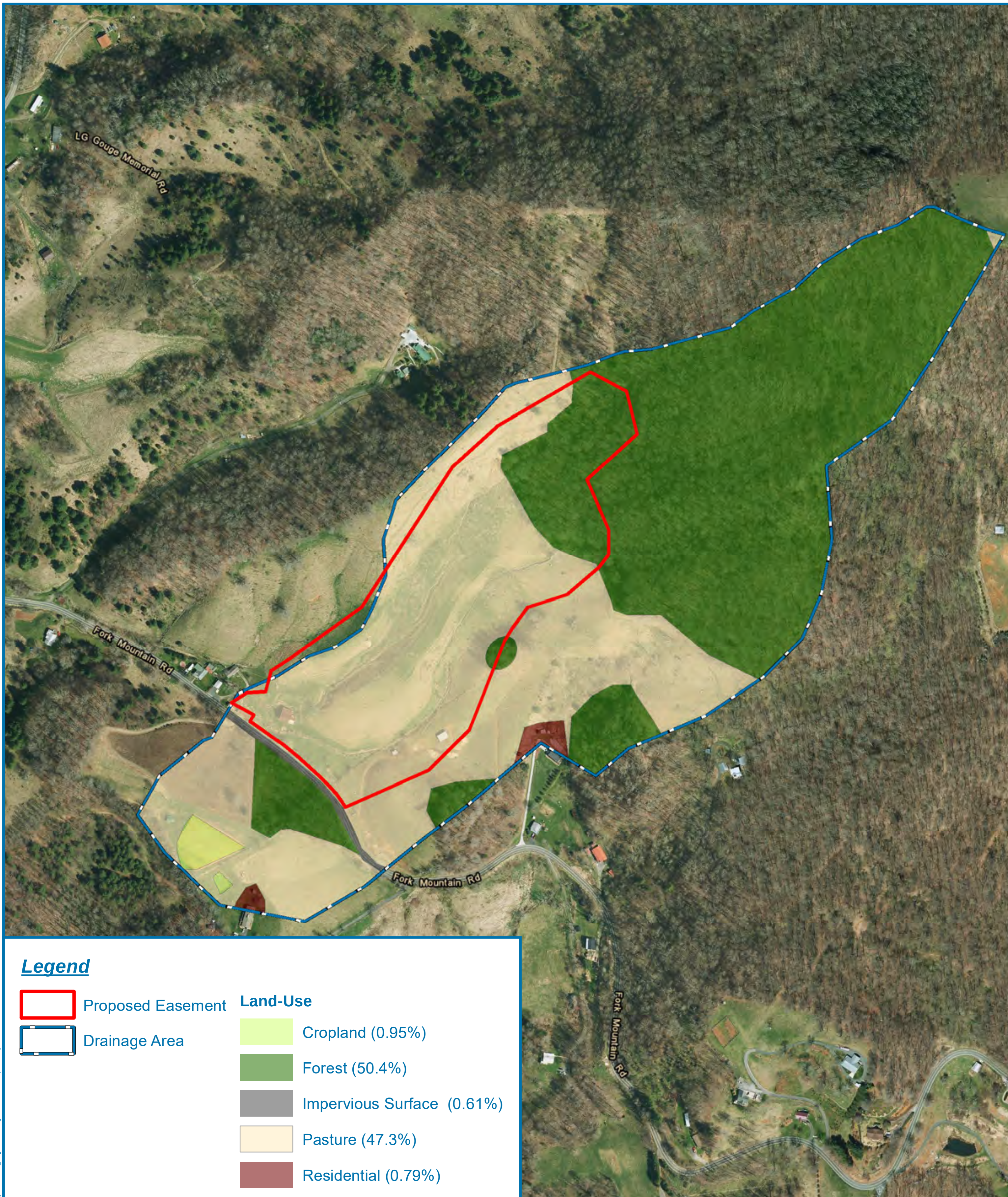
Date: 2/27/2020

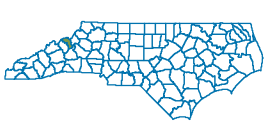
Drawn by: EJU

Checked by: MDE

1 inch = 400 feet

res





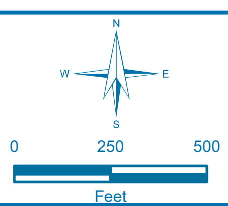


Figure 4 - Land-Use

Monkey Wall Mitigation Project

Mitchell County, North Carolina

Date: 2/27/2020

Drawn by: EJU

Checked by: MDE

1 inch = 500 feet

res

Document Path: R:\Resgis\dropboxgis\projects\NC\Monkey Wall\MXD\4_Mitigation Plan\Figure 4 - Landuse Map - Monkey Wall.mxd

Legend

Proposed easement

Nonhydric (0%)

NRCS - Web Soil Survey 2019

Map Unit Symbol	Map Unit Name
BtF	Buladean-Chestnut complex, 50 to 95 percent slopes
TsD	Thunder-Saunook complex, 15 to 30 percent slopes
CnD2	Clifton clay loam, 15 to 30 percent slopes
TsC	Thunder-Saunook complex, 8 to 15 percent slopes
FeE2	Fannin sandy clay loam, 30 to 50 percent slopes

N W E S

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Feet

Figure 5 - Mapped Soils

Monkey Wall Mitigation Project

Mitchell County, North Carolina

Date: 2/28/2020

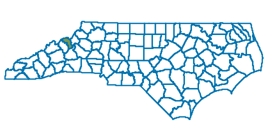
Drawn by: EJU

Checked by: MDE

1 inch = 400 feet

res

Document Path: R:\Regional\cranbourg\projects\NC\Monkey Wall\MX014_Mitigation Plan\Figure 5 - Soils Map - Monkey Wall.mxd



N
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Feet

Figure 6 - Existing Conditions

Monkey Wall Mitigation Project

Mitchell County, North Carolina

Date: 2/28/2020

Drawn by: EJU

Checked by: MDE

1 inch = 300 feet

res

Legend

Proposed Easement

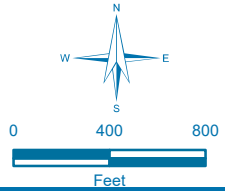

Figure 7 - Historical Conditions

Monkey Wall Mitigation Project

Mitchell County, North Carolina

Date: 3/2/2020

Drawn by: EJU

Checked by: MDE

1 inch = 800 feet

res

Document Path: R:\Regional\Asheville\projects\NC\Monkey Wall\MXD\4_Mitigation Plan\Figure 7 - Historical Imagery.mxd - Monkey Wall.mxd

Legend

- Proposed Easement
- Utility Access Easement
- Existing Wetland
- NWI Wetlands (USFWS 10-29-2018) (None)

N
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Feet

Figure 8 - Project Constraints

Monkey Wall Mitigation Project

Mitchell County, North Carolina

Date: 2/28/2020

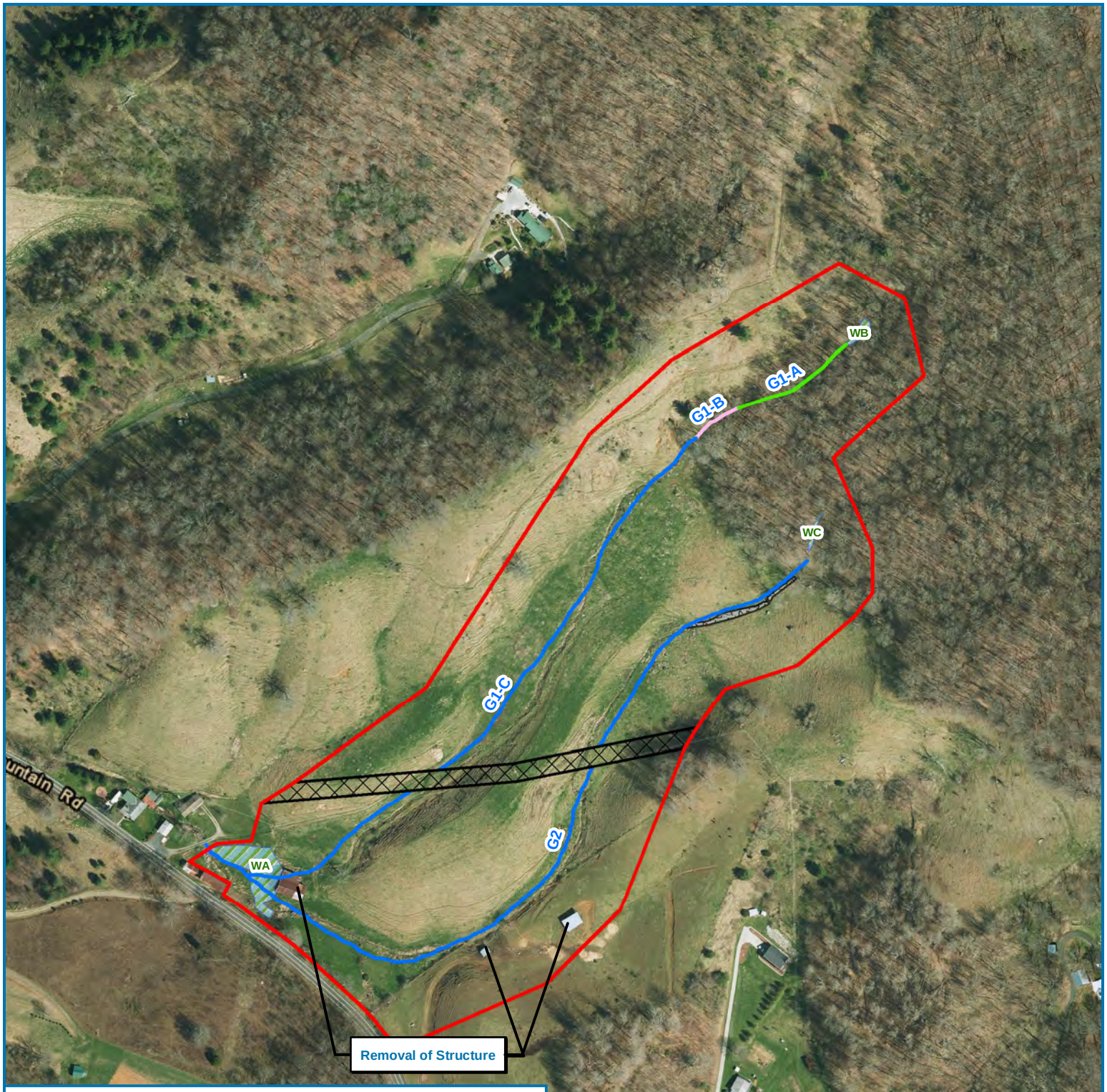
Drawn by: EJU

Checked by: MDE

1 inch = 400 feet

res

Document Path: R:\Regional\projects\NC\Monkey Wall\MXD\4_Mitigation Plan\Figure 8 - Constraints Map - Monkey Wall.mxd



Legend

- Proposed Easement (25.25 ac)
- Utility Access Easement
- Existing Wetland
- Remove Rock Wall

Approach

- Restoration
- Enhancement II
- Preservation

Monkey Wall Project Credits				
Reach	Mitigation Type	Proposed Length (LF)	Mitiation Ratio	SMUs
G1-A	Preservation	278	10:1	27.800
G1-B	Enhancement II (5)	120	5:1	24.000
G1-C	Restoration	926	1:1	926.000
G1-C	Restoration	527	1:1	527.000
G2	Restoration	628	1:1	628.000
G2	Restoration	1,035	1:1	1,035.000
	Total	3,514		3,167.800
			Credit Loss in Required Buffer	-132.476
			Credit Gain for Additional Buffer	839.145
			Total Adjusted SMUs	3,874.469

N
W E
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0 150 300
Feet

Figure 9 - Concept Design Plan

Monkey Wall Mitigation Project

Mitchell County, North Carolina

Date: 6/11/2020

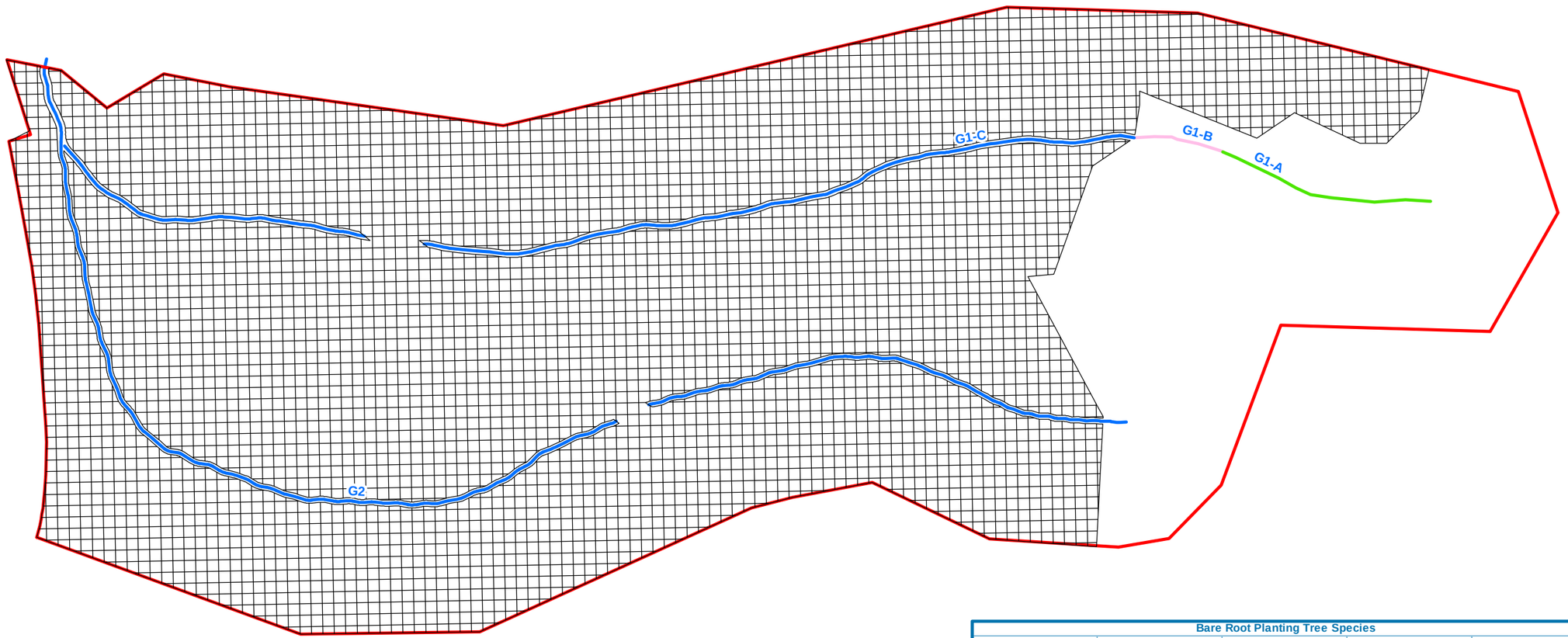
Drawn by: MDE

Checked by: KC

1 inch = 300 feet

res

Document Path: R:\Regional\projects\NC\Monkey Wall\MXD\4_Mitigation Plan\Figure 9 - Concept Design Plan - Monkey Wall.mxd



Bare Root Planting Tree Species

Species	Common Name	Spacing (ft)	Unit Type	% of Total Species Composition
Fraxinus americana	American ash	9X6	Bare Root	15
Liriodendron tulipifera	Tulip poplar	9X6	Bare Root	15
Platanus occidentalis	American sycamore	9X6	Bare Root	10
Betula lenta	Sweet birch	9X6	Bare Root	10
Carya ovalis	Red Hickory	9X6	Bare Root	10
Carya ovata	Shagbark hickory	9X6	Bare Root	10
Quecrus alba	White Oak	9X6	Bare Root	10
Quercus montana	Chestnut oak	9X6	Bare Root	5
Quercus rubra	Northern red oak	9X6	Bare Root	5
Magnolia fraseri	Mountain magnolia	9X6	Bare Root	5
Oxydendrum arboretum	Sourwood	9X6	Bare Root	5

Live Staking and Live Cuttings Bundle Tree Species

Species	Common Name	% of Total Species Composition
Salix nigra	Black willow	50
Cornus amomum	Silky dogwood	25
Alnus serrulata	Tag Alder	50

res

N W E S

0 75 150
Feet

Figure 10 - Planting Plan

Monkey Wall Mitigation Project

Mitchell County, North Carolina

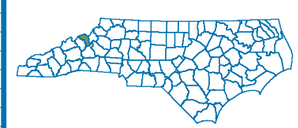
Date: 2/27/2020	Drawn by: MDE
Checked by: RTM	1 in = 150 feet

Legend

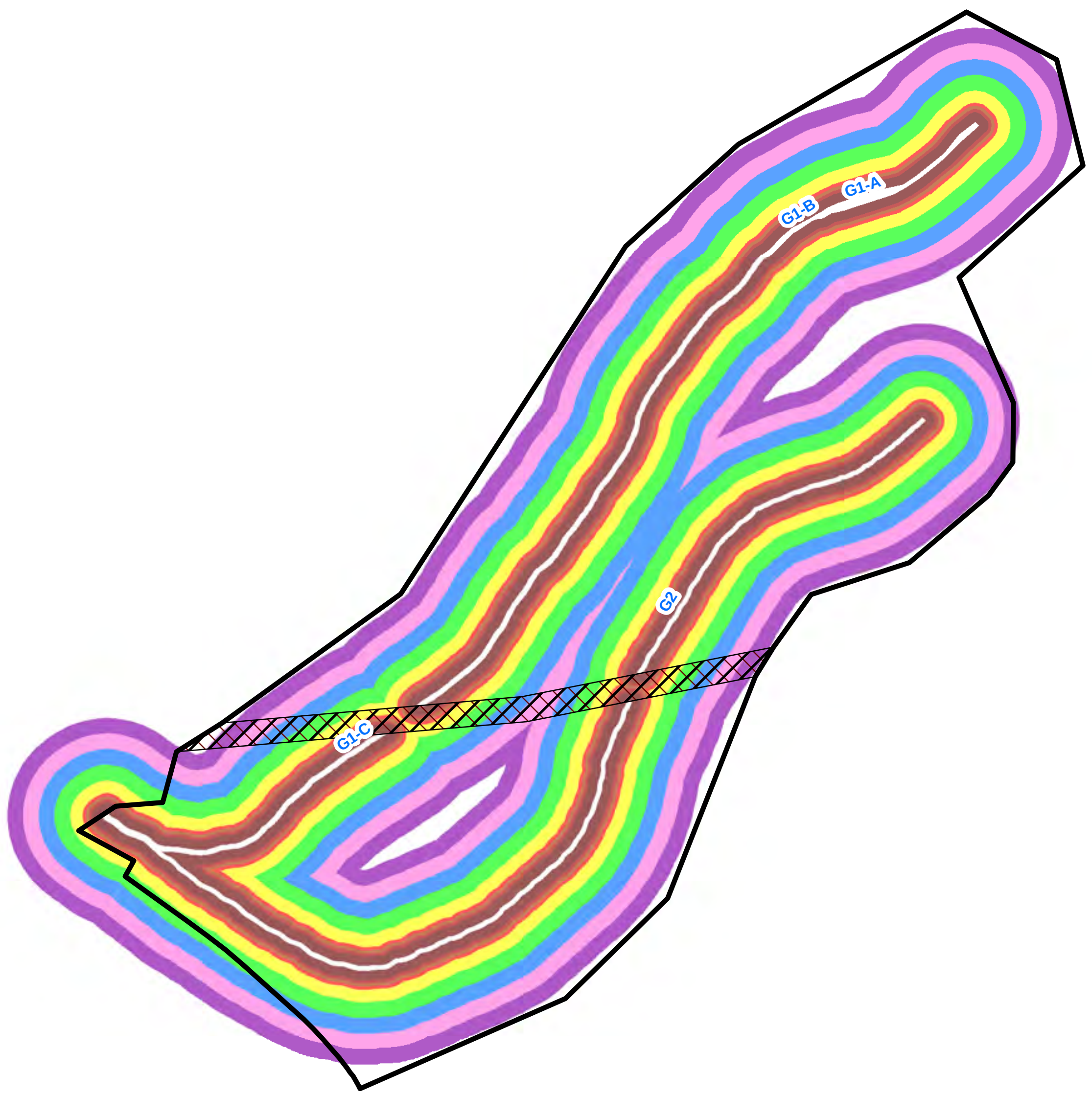
- Proposed Easement
- Planting Area (19.86)

Mitigation Approach

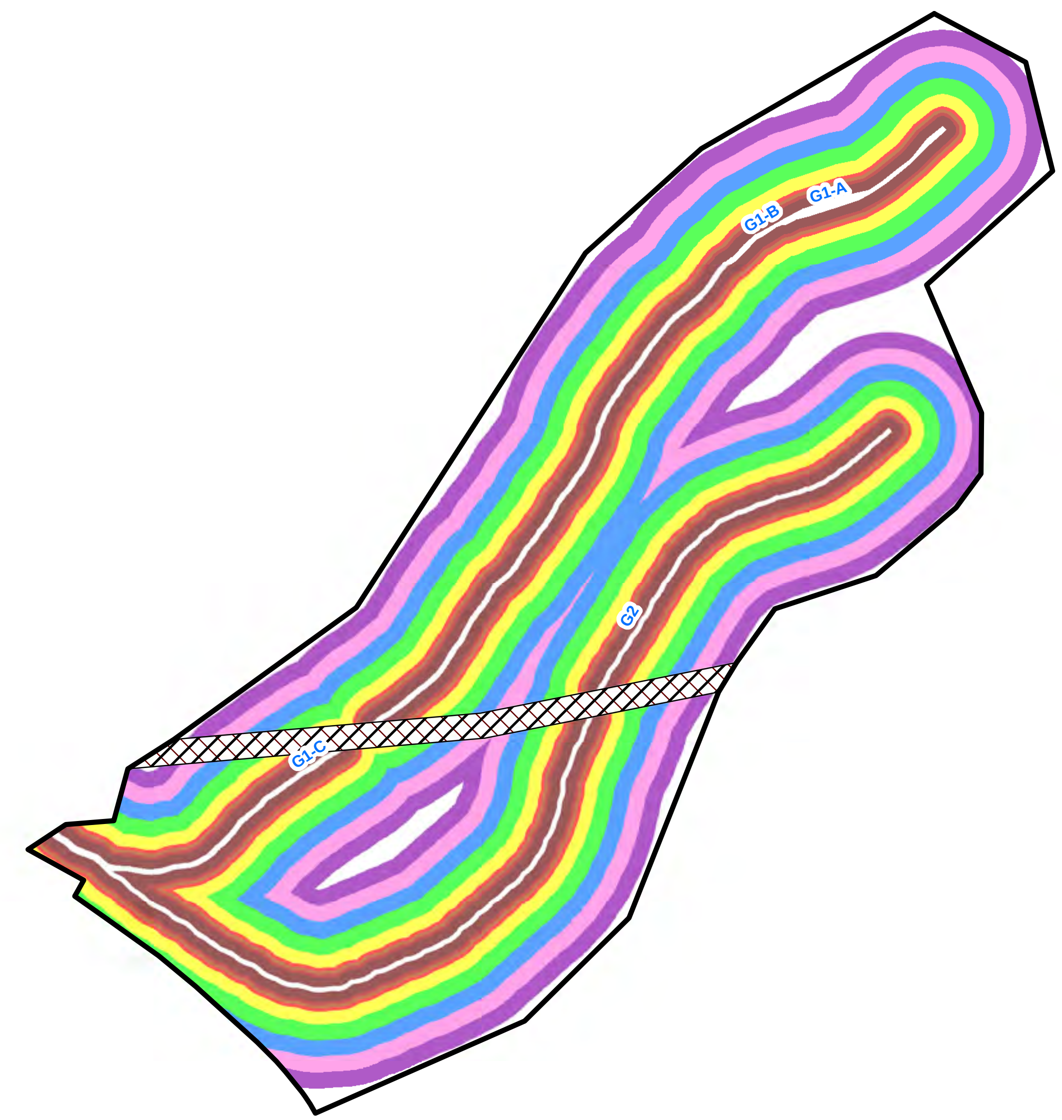
- Restoration
- Enhancement II
- Preservation



Ideal Buffers



Actual Buffers



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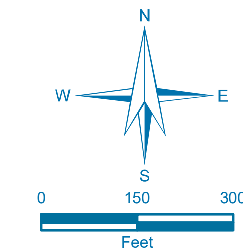


Figure 11 - Buffer Width Zones

Monkey Wall Project

Mitchell County, North Carolina

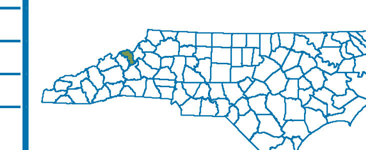
Date: 6/11/2020	Drawn by: MDE
Checked by: KC	1 in = 300 feet

Legend

- Proposed Easement
- Right of Way

Buffer Width Zone

- 0-15 feet
- 16-20 feet
- 21-25 feet
- 26-30 ft
- 31-50 feet
- 51-75 feet
- 76-100 feet
- 101-125 feet
- 126-150 feet



Buffer Width Zone (feet from Ordinary High Water Mark)

Buffer Zones	less than 15 feet	>15 to 20 feet	>20 to 25 feet	>25 to 30 feet	>30 to 50 feet	>50 to 75 feet	>75 to 100 feet	>100 to 125 feet	>125 to 150 feet
Max Possible Buffer (square feet)	105,420	35,140	35,140	35,140	140,560	175,700	175,700	175,700	175,700
Ideal Buffer (square feet)	108,214	36,777	37,055	37,176	148,956	187,907	190,723	175,183	165,445
Actual Buffer (square feet)	105,298	34,932	34,889	34,811	137,862	168,779	165,586	147,320	135,596
Zone Multiplier	50%	20%	15%	15%	9%	7%	6%	5%	3%
Buffer Credit Equivalent	1,584	634	475	475	285	222	190	158	95
Percent of Ideal Buffer	97%	95%	94%	94%	93%	90%	87%	84%	82%
Credit Adjustment	-43	-32	-28	-30	264	199	165	133	78

Total Baseline Credit	Credit Loss in Required Buffer	Credit Gain for Additional Buffer	Net Change in Credit from Buffers	Total Credit
3,167.800	-132.476	839.145	706.669	3,874.469

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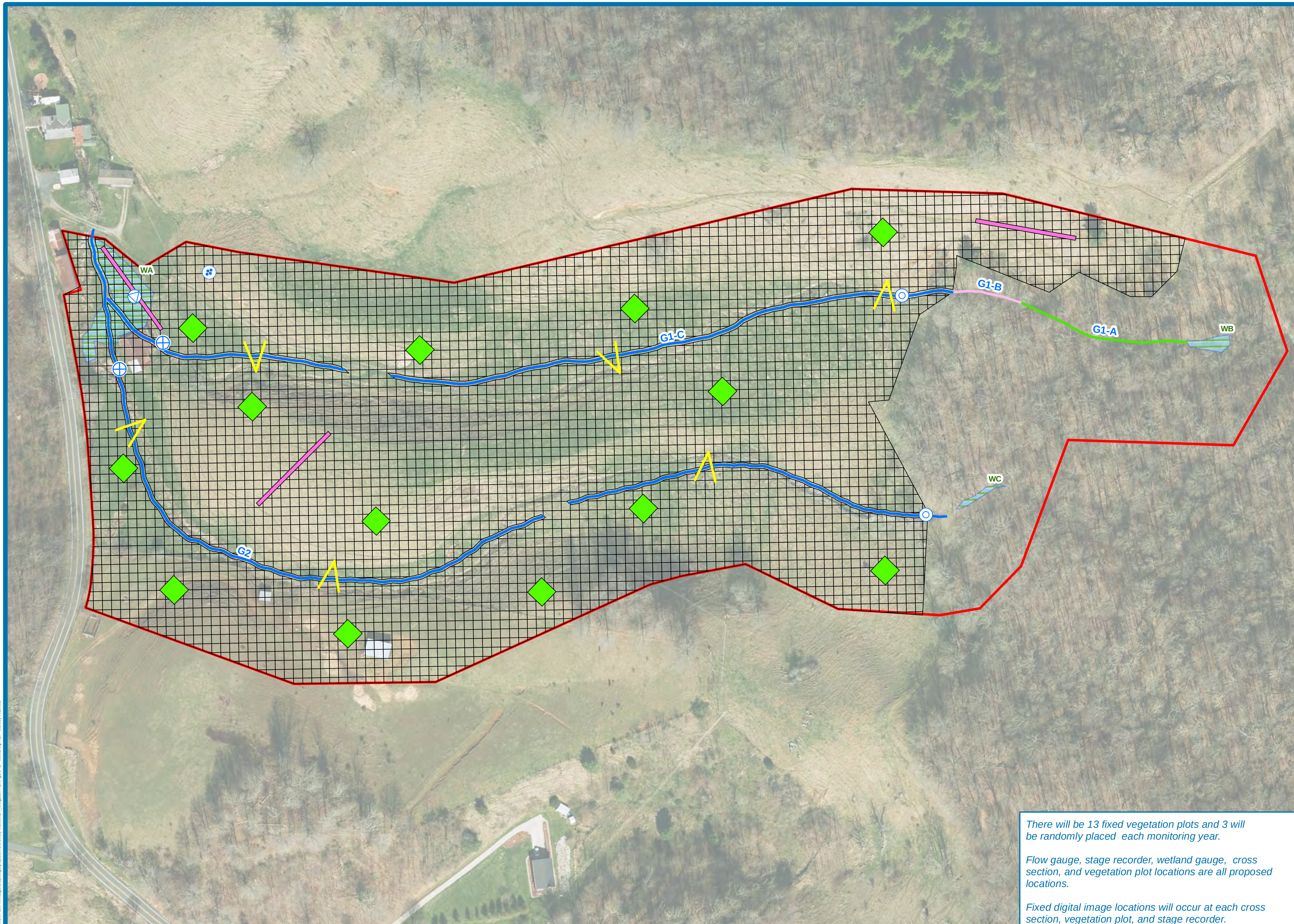


There will be 13 fixed vegetation plots and 3 will be randomly placed each monitoring year.

Flow gauge, stage recorder, wetland gauge, cross section, and vegetation plot locations are all proposed locations.

Fixed digital image locations will occur at each cross section, vegetation plot, and stage recorder.

res

0 75 150
Feet

Figure 12 - Monitoring Plan

Monkey Wall Mitigation Project

Mitchell County, North Carolina

Date: 5/22/2020	Drawn by: MDE
Checked by: RTM	1 in = 150 feet

Legend

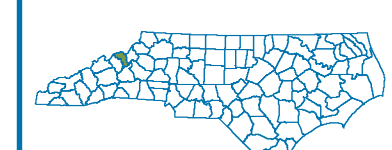
- Proposed Easement
- Existing Wetland
- Planting Area (19.86)

Monitoring Approach

- Fixed Vegetation Plot
- Random Vegetation Plot
- Cross Section
- Stage Recorder
- Flow Gauge
- Wetland Gauge
- Rain Gauge

Mitigation Approach

- Restoration
- Enhancement II
- Preservation



Appendix A - Plan Sheets

MONKEY WALL MITIGATION SITE

MITCHELL COUNTY, NORTH CAROLINA

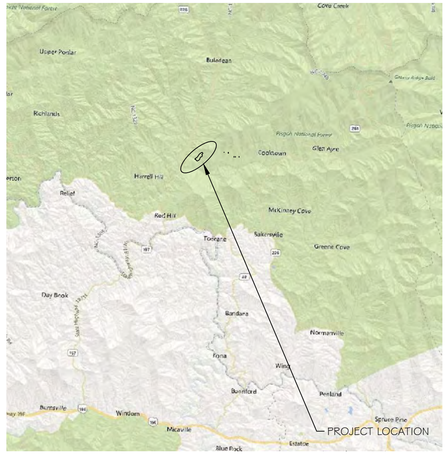
FRENCH BROAD RIVER BASIN: HUC 06010108

JUNE 2020

RESOURCE ENVIRONMENTAL SOLUTIONS, LLC

3600 GLENWOOD AVE, SUITE 100

RALEIGH, NC 27612



VICINITY MAP
NTS

Know what's below.
Call before you dig

NOTICE TO CONTRACTOR

PRIOR TO CONSTRUCTION, DIGGING, OR EXCAVATION THE CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL UNDERGROUND UTILITIES (PUBLIC OR PRIVATE) THAT MAY EXIST AND CROSS THROUGH THE AREA(S) OF CONSTRUCTION, WHETHER INDICATED ON THE PLANS OR NOT. CALL "811" A MINIMUM OF 72 HOURS PRIOR TO DIGGING OR EXCAVATING. REPAIRS TO ANY UTILITY DAMAGED RESULTING FROM CONSTRUCTION ACTIVITIES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

PROJECT DIRECTORY

DESIGNED BY:
RESOURCE ENVIRONMENTAL SOLUTIONS, LLC
3600 GLENWOOD AVE., SUITE 100
RALEIGH, NC 27612

SURVEYED BY:
ASCENSION LAND SURVEYING, PC
116 WILLIAMS ROAD
MOCKSVILLE, NC 27028

DMS PROJECT #: 100069
CONTRACT #: 7536
USACE ACTION ID #: SAW-2018-01162
RFP #: 16-007336

PROJECT TOPOGRAPHY AND EXISTING CONDITIONS PLANIMETRICS SURVEY WAS PROVIDED BY ASCENSION LAND SURVEYING, PC (NC FIRM LICENSE NUMBER C-4288, CHRISTOPHER L. COLE, NC PLS L-5008), DATED APRIL 18, 2019 - JULY 27, 2019

SITE MAP
NTS

Sheet List Table	
Sheet Number	Sheet Title
-	COVER
A1	OVERALL AERIAL VIEW
E1	GENERAL NOTES & LEGEND
E2	EXISTING CONDITIONS
S1	REACH G1
S2	REACH G1
S3	REACH G1
S4	REACH G1
S5	REACH G1
S6	REACH G1
S7	REACH G2
S8	REACH G2
S9	REACH G2
S10	REACH G2
S11	REACH G2
P1	PLANTING PLAN
F1	DEMOLITION PLAN
EC1	EROSION CONTROL NOTES
D1	DETAILS
D2	DETAILS
D3	DETAILS
D4	DETAILS

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PLOT DATE:
6/23/2020

REVISIONS:

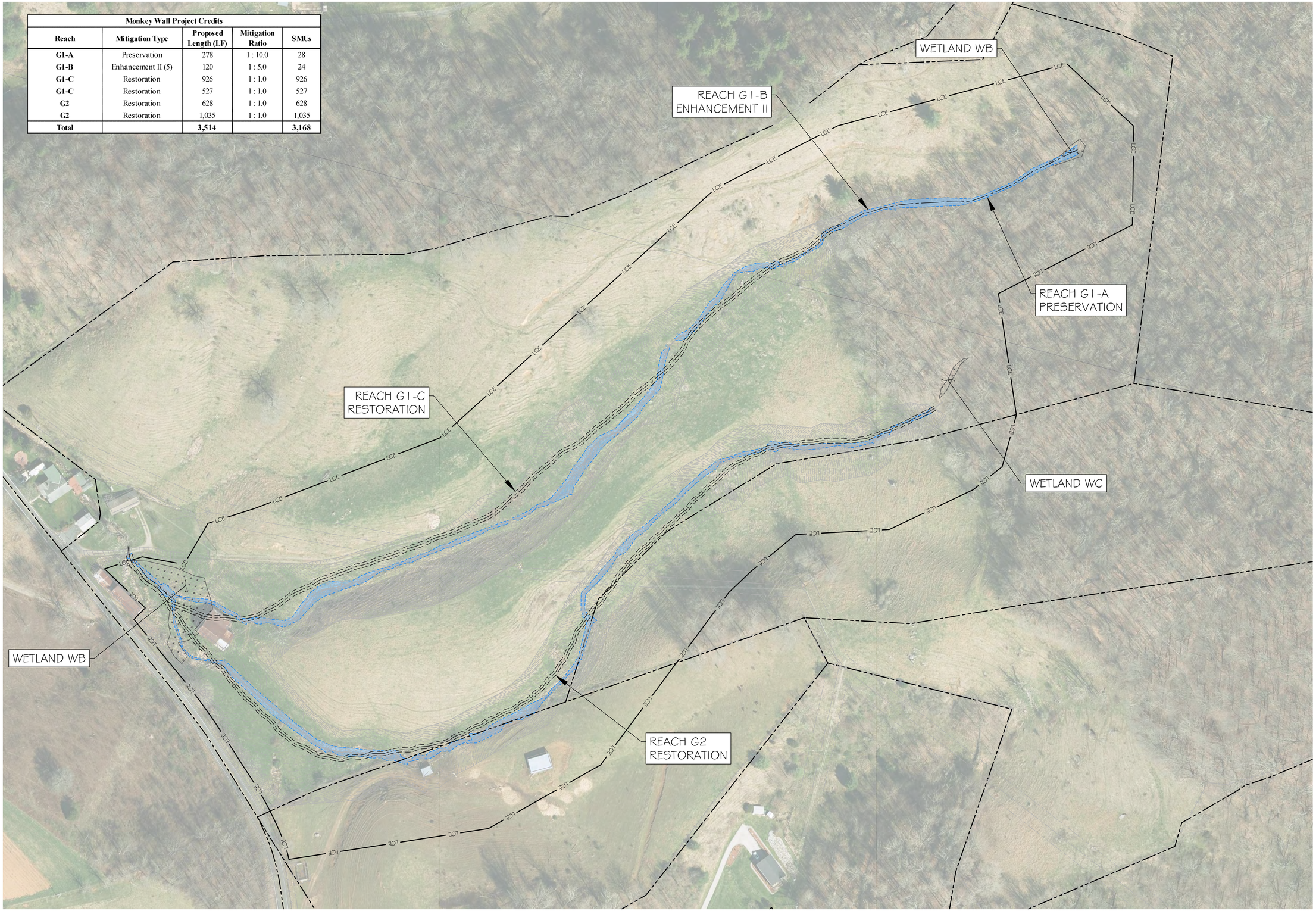
RELEASED FOR:
PRELIMINARY - NOT FOR CONSTRUCTION

PROJECT NUMBER:	100918
PROJECT MANAGER:	KMC
DESIGNED:	MKG
DRAWN:	TRS
CHECKED:	AFM

SHEET NUMBER:

-

Monkey Wall Project Credits				
Reach	**Mitigation Type**	**Proposed Length (LF)**	**Mitigation Ratio**	**SMUs**
G1-A	Preservation	278	1 : 10.0	28
G1-B	Enhancement II (5)	120	1 : 5.0	24
G1-C	Restoration	926	1 : 1.0	926
G1-C	Restoration	527	1 : 1.0	527
G2	Restoration	628	1 : 1.0	628
G2	Restoration	1,035	1 : 1.0	1,035
Total		**3,514**		**3,168**



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FULL SCALE: 1"=80

0 80 160

2" = FULL SCALE
1" = HALF SCALE

PLOT DATE:
6/23/2020

REVISIONS:

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PROJECT NAME:
MONKEY WALL MITIGATION SITE
MITCHELL COUNTY, NORTH CAROLINA

DRAWING TITLE:
OVERALL AERIAL VIEW

PROJECT NUMBER:	100918
PROJECT MANAGER:	KMC
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DRAWN:	TRS
CHECKED:	AFM

SHEET NUMBER:

A1

FILE NAME:R:\Resgis\dropboxgis\projects\NC\Monkey Wall\CAD\DWG\100918_SHT_ESC.dwg SAVED BY: Stasking

STREAM CONSTRUCTION NOTES:

1. ALL PROPOSED CHANNELS AND TEMPORARY AND PERMANENT CROSSINGS SHALL BE CONSTRUCTED IN A DRY CONDITION VIA OFFLINE CONSTRUCTION WHERE POSSIBLE. PUMP AROUND OPERATIONS SHOULD BE LIMITED TO AREAS WHERE THE EXISTING AND PROPOSED CHANNEL ALIGNMENTS OVERLAP.
2. ALL IMPERVIOUS DIKES AND PUMPING APPARATUS SHALL BE REMOVED FROM THE STREAM AT THE END OF EACH DAY TO RESTORE NORMAL FLOW BACK TO THE CHANNEL UNLESS OTHERWISE APPROVED BY THE ENGINEER. WITH APPROVAL, A PUMP AROUND MAY BE ALLOWED TO RUN CONTINUOUSLY IF THERE IS NO FORECAST FOR RAIN OVERNIGHT, AND/OR THE PUMP APPARATUS IS MAINTAINED AND MONITORED CONTINUOUSLY.
3. CONSTRUCT UPSTREAM PORTION OF THE CHANNEL FIRST, WORKING IN AN UPSTREAM TO DOWNSTREAM DIRECTION, UNLESS OTHERWISE APPROVED BY THE ENGINEER.
4. REMOVE AND STOCKPILE TOPSOIL WITHIN AREAS THAT ARE TO BE CUT 9" OR MORE BELOW EXISTING GRADE. STOCKPILED TOPSOIL IS TO BE PLACED ALONG THE FLOODPLAIN BENCHES.
5. STRUCTURES ARE TO BE INSTALLED IN LOCATIONS SHOWN ON PLAN SHEETS (AS INDICATED ON THE STRUCTURE TABLES) USING METHODS DESCRIBED IN THE DETAIL SHEETS. PRIOR TO FINE GRADING, OBTAIN APPROVAL OF THE ENGINEER ON INSTALLATION OF STRUCTURES.
6. UPON COMPLETION OF FINE GRADING, INSTALL STREAM BANK STABILIZATION INCLUDING, EROSION CONTROL MATTING OR SOD MATS ALONG CHANNEL BANKS.
7. FILL AND STABILIZE ABANDONED SEGMENTS OF THE EXISTING CHANNEL PER DIRECTION OF THE ENGINEER.

LEGEND

- EXISTING CONTOUR MAJOR — 50
- EXISTING CONTOUR MINOR — 46
- PROPOSED CONTOUR MAJOR — 50
- PROPOSED CONTOUR MINOR — 42
- EXISTING WETLAND
- EXISTING STREAM
- EXISTING TOP OF BANK
- EXISTING BOTTOM OF BANK
- EXISTING OVERHEAD ELECTRIC UTILITY LINE
- PROPERTY LINE
- EXISTING FENCELINE
- PROPOSED TOP OF BANK
- PROPOSED CENTERLINE OF CHANNEL
- LIMITS OF PROPOSED CONSERVATION EASEMENT — LCE
- PROPOSED CHANNEL PLUG (SEE DETAIL D3)
- LOG CASCADE (SEE DETAIL D4)
- BOULDER CASCADE (SEE DETAIL D4)
- RIFFLE GRADE CONTROL (SEE DETAIL D4)
- LOG STRUCTURE (PROFILE)
- ROCK STRUCTURE (PROFILE)

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SEAL

PLOT DATE:
6/23/2020

REVISIONS:

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PROJECT NAME:
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MITCHELL COUNTY, NORTH CAROLINA

DRAWING TITLE:
GENERAL NOTES & LEGEND

PROJECT NUMBER:	100918
PROJECT MANAGER:	KMC
DESIGNED:	MKG
DRAWN:	TRS
CHECKED:	AFM

SHEET NUMBER:
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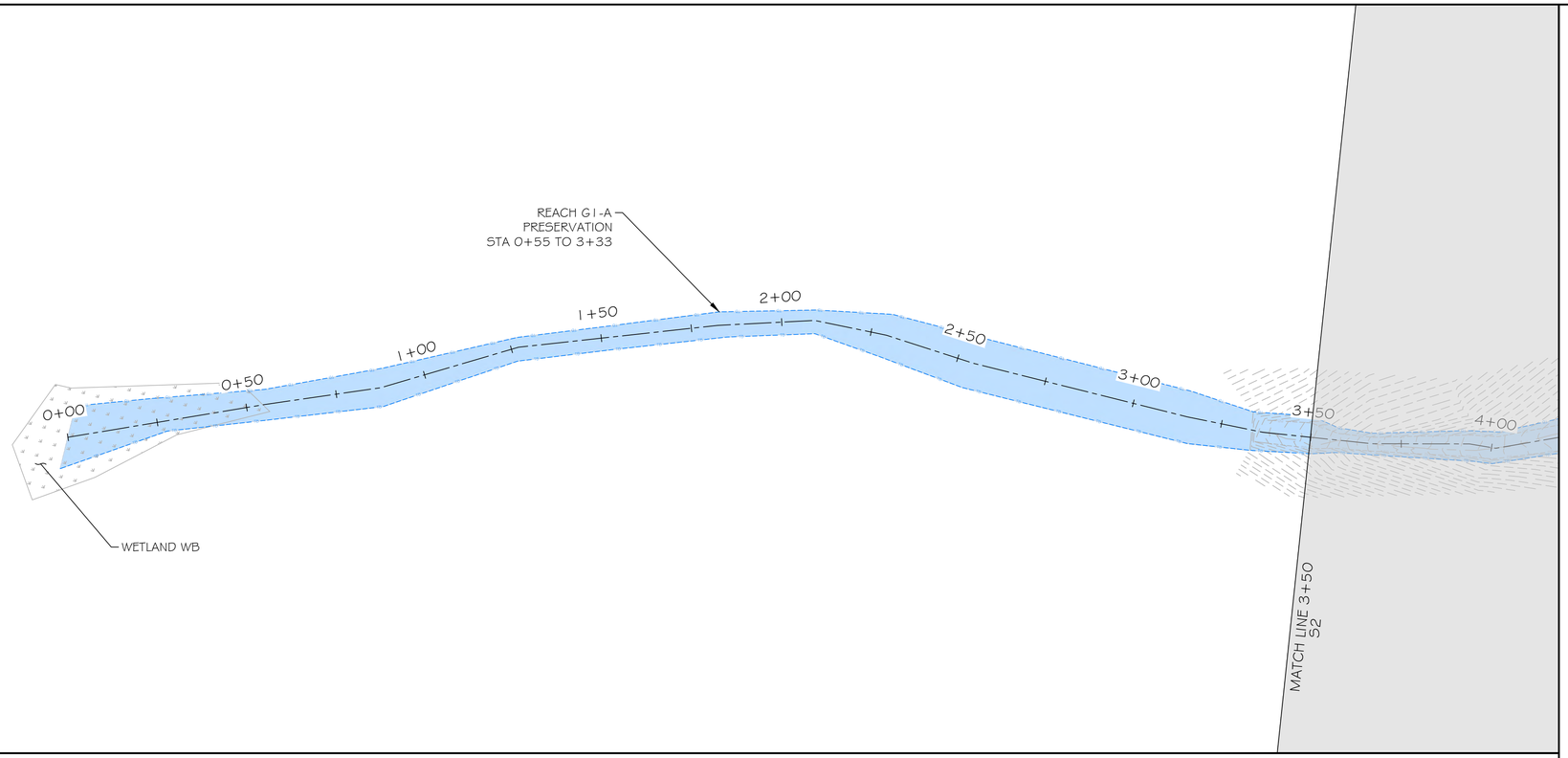
E2



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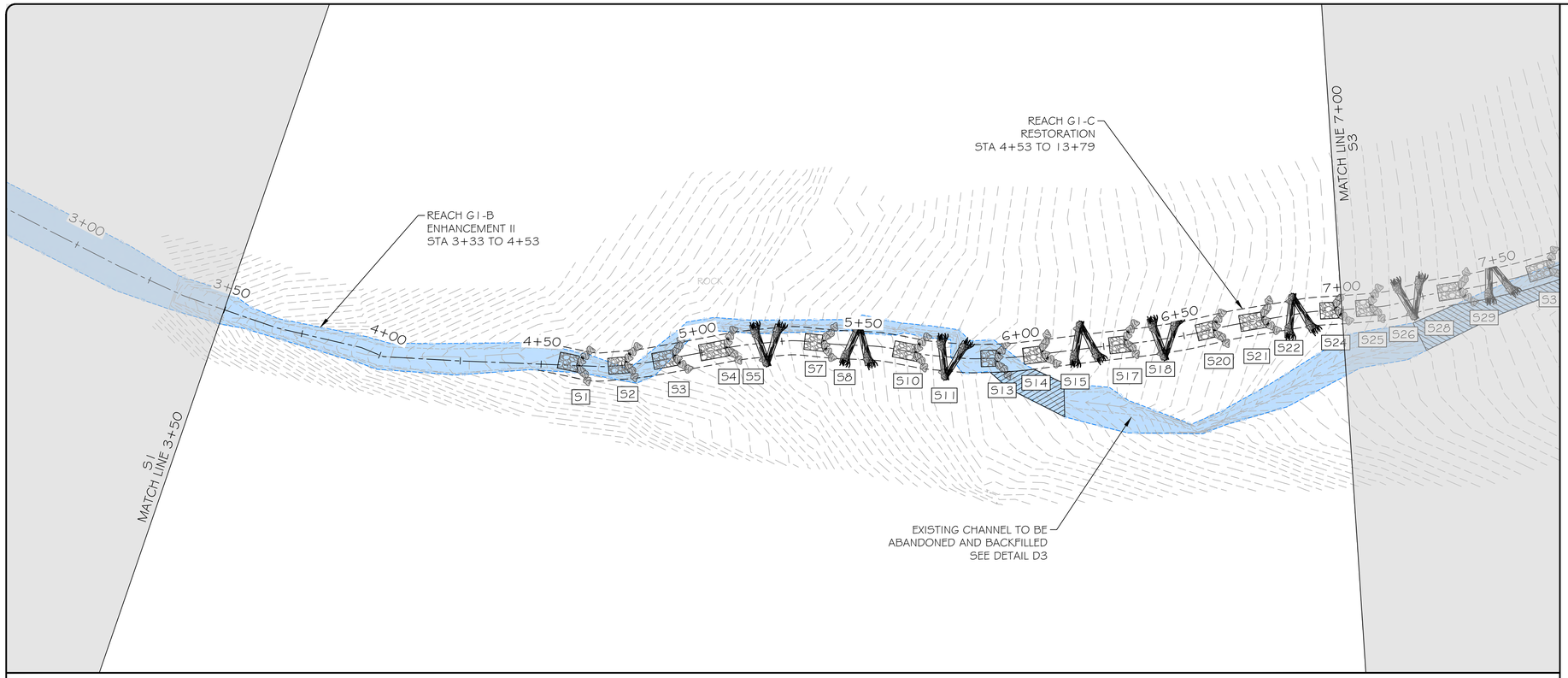

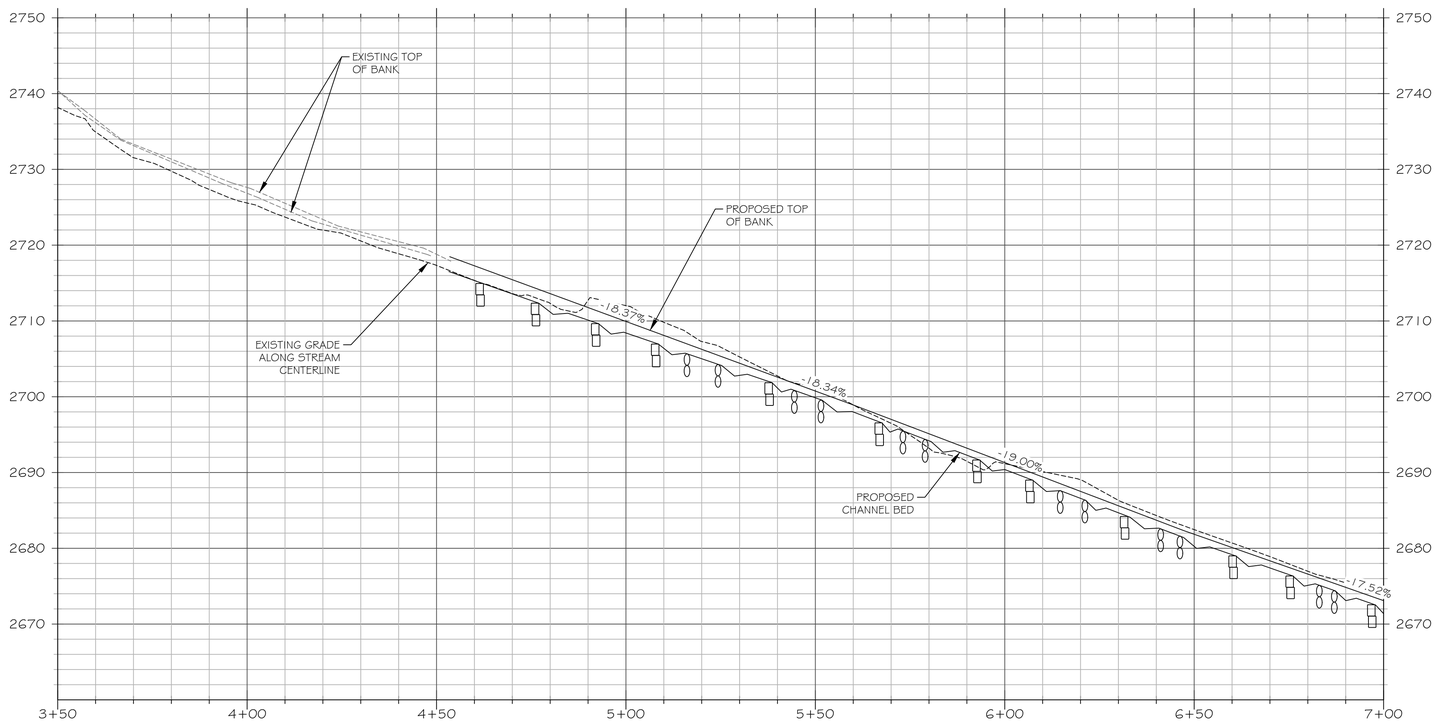

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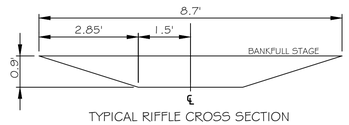

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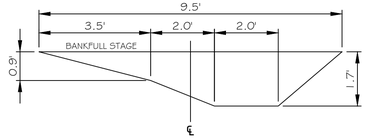

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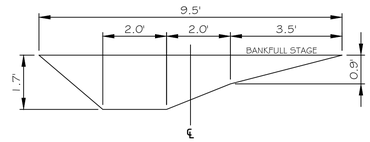

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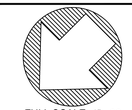

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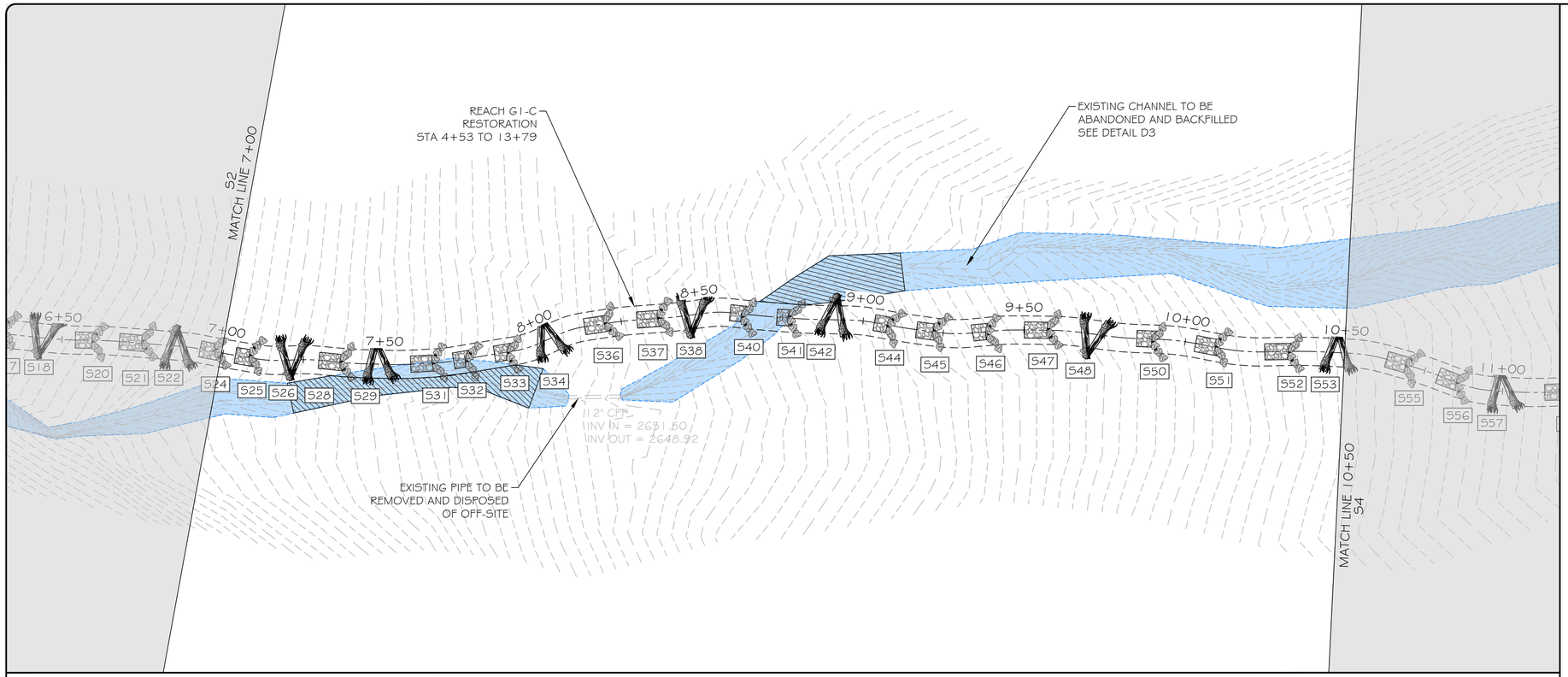

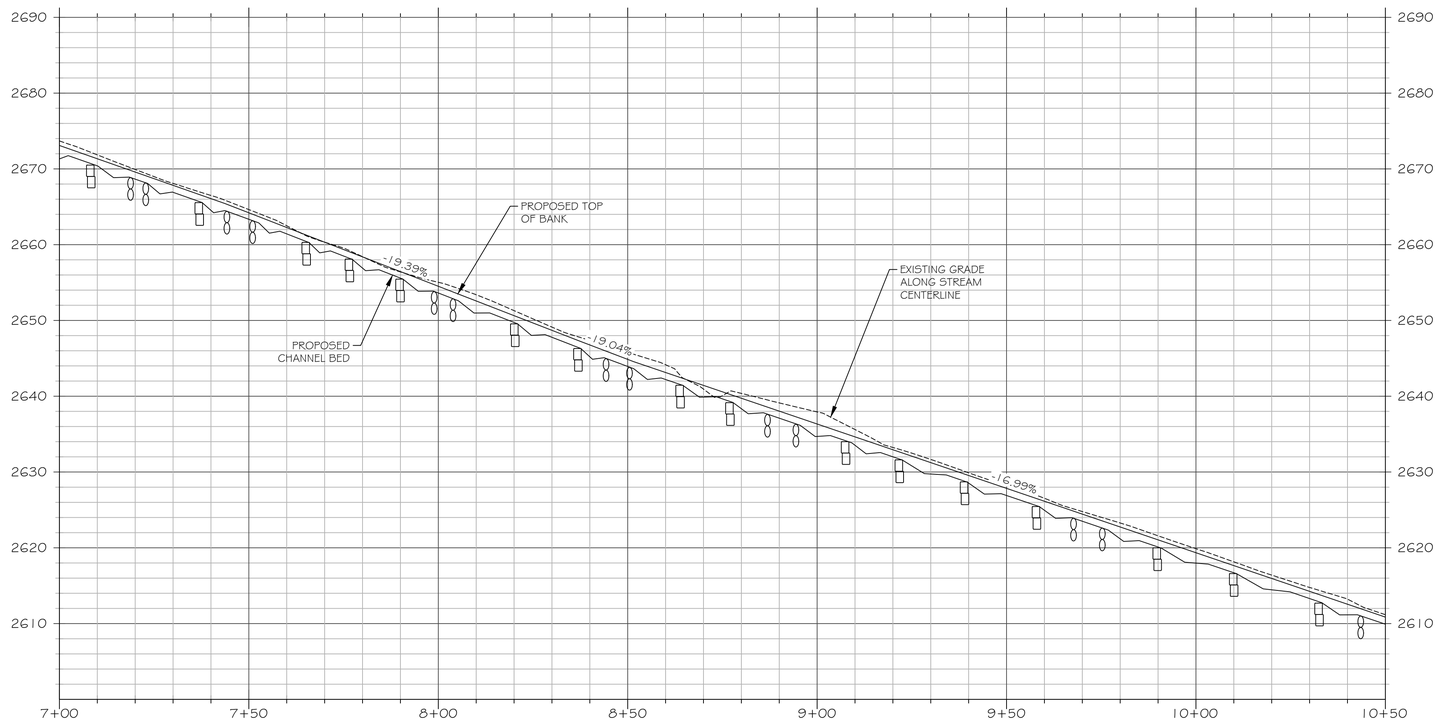

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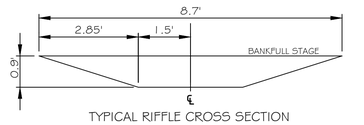

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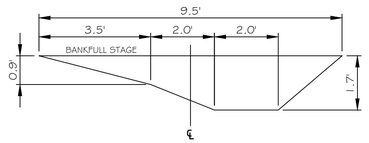

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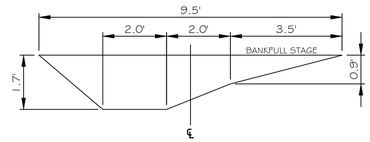

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0 20 40

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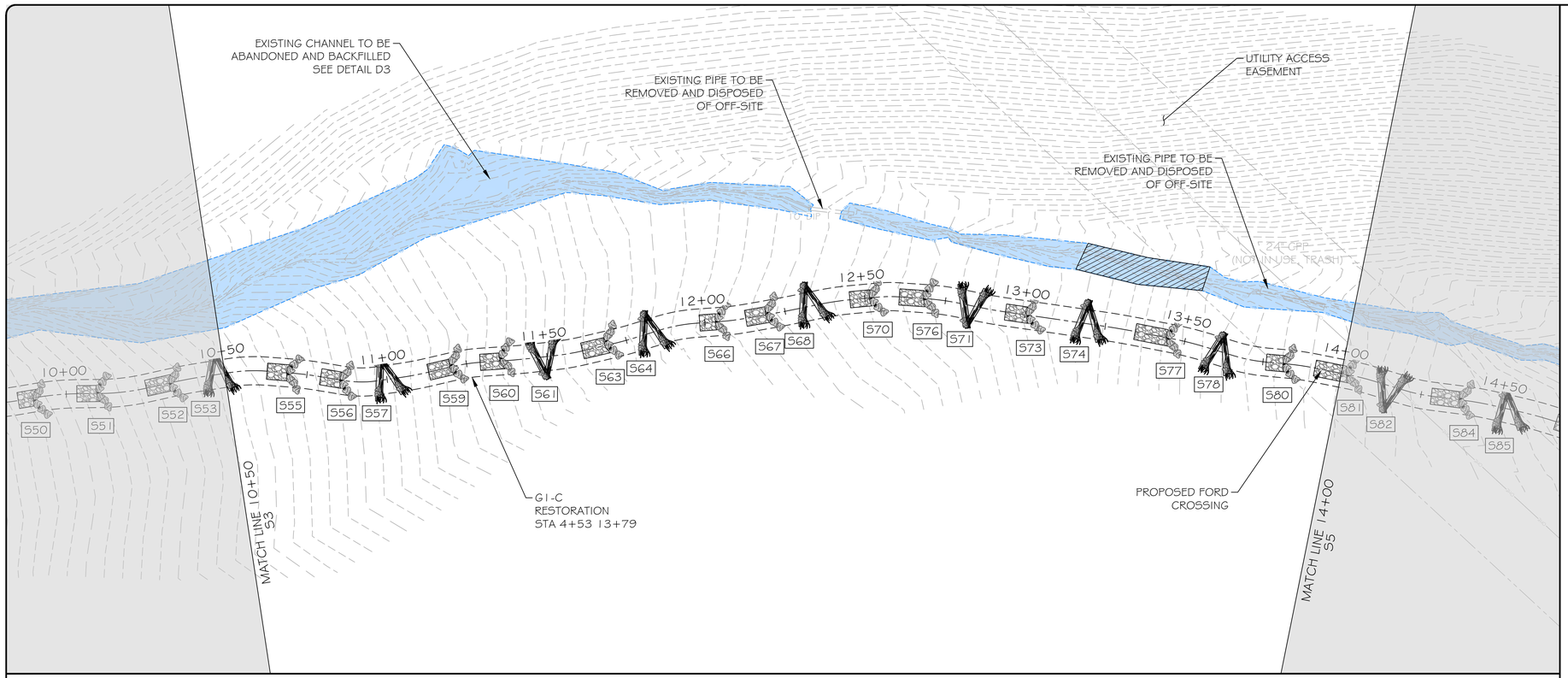

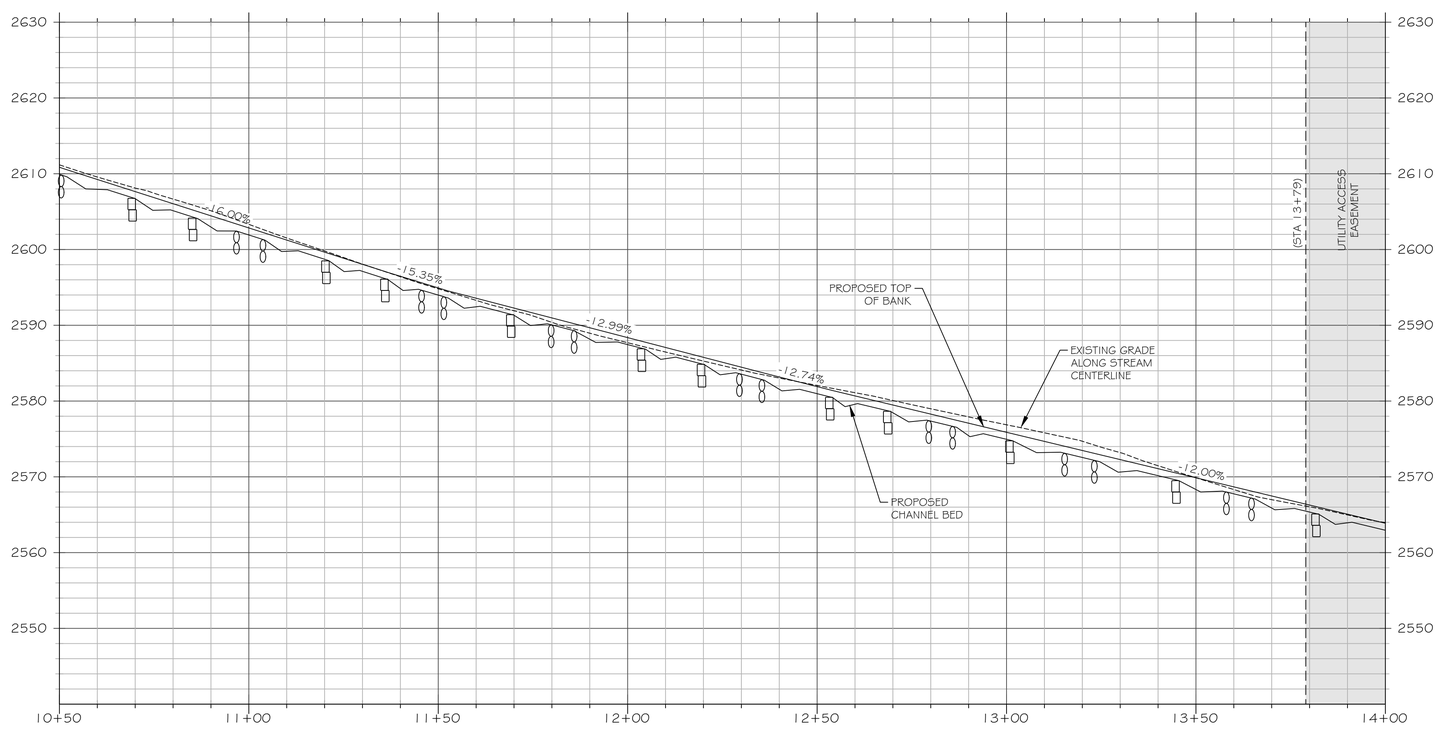

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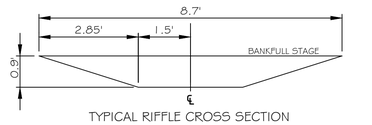

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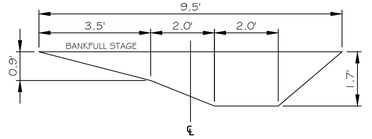

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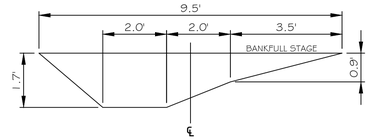

TYPICAL LEFT MEANDER CROSS SECTION

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SEAL

FULL SCALE: 1"=20

0 20 40

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PLOT DATE: 6/23/2020

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PROJECT NUMBER:	100918
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CHECKED:	AFM

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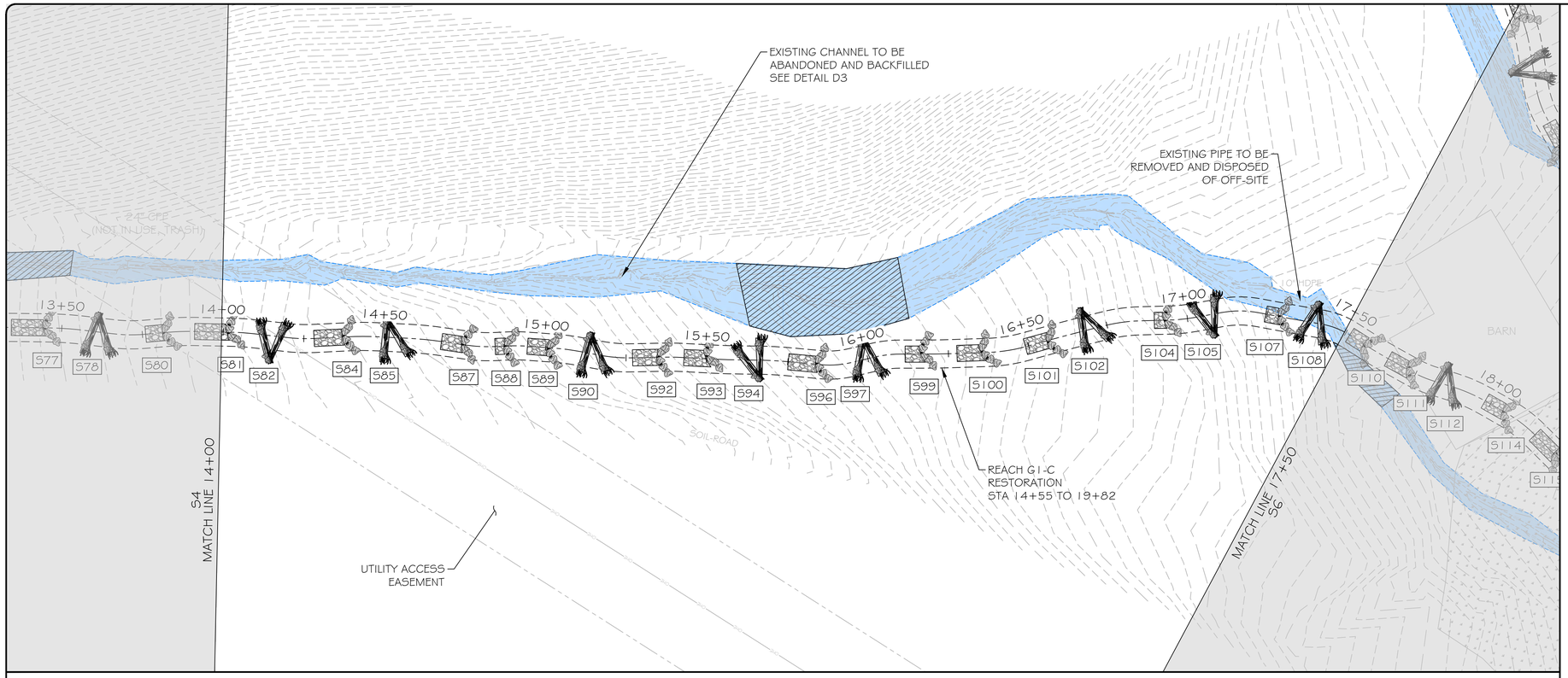

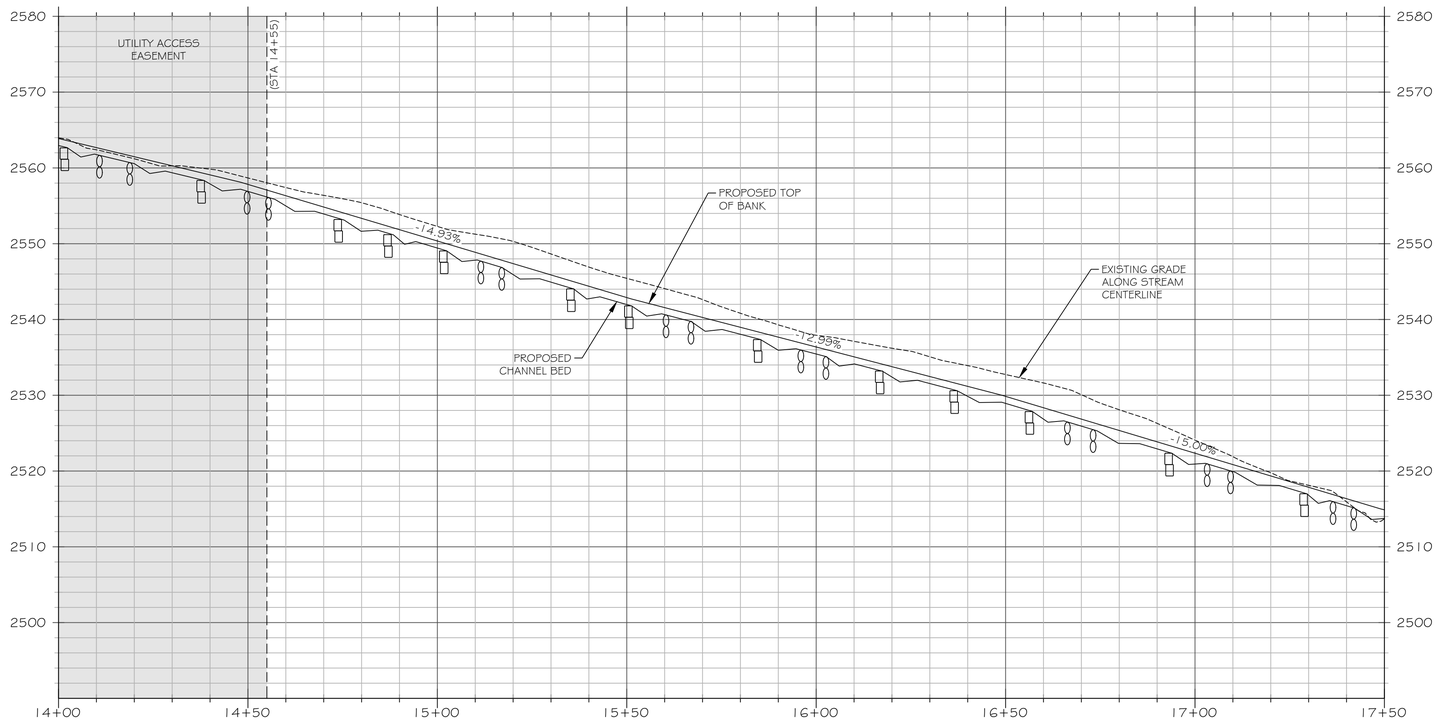

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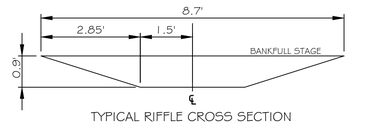
REACH G1-C STA 4+53 TO STA 19+00



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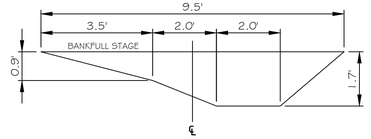

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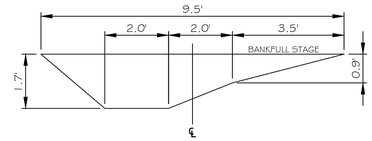

TYPICAL LEFT MEANDER CROSS SECTION

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SEAL

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SHEET NUMBER:
S5

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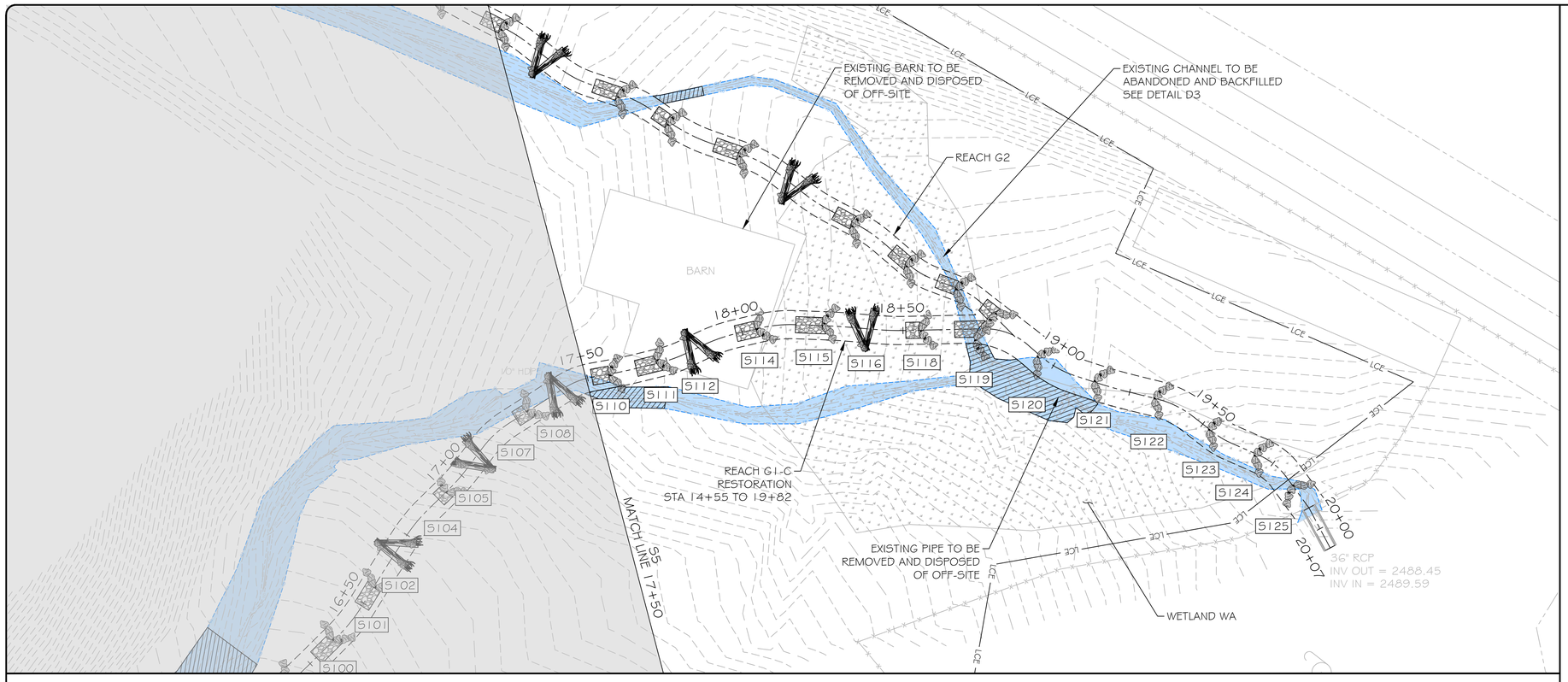

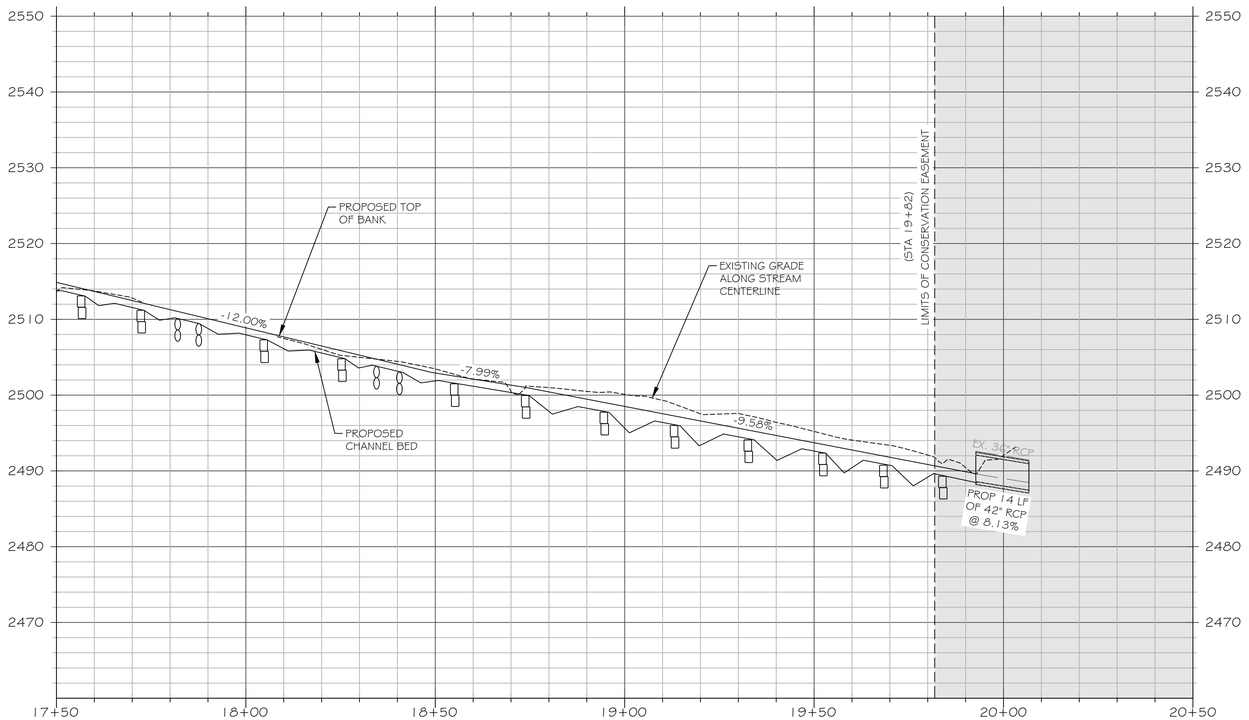

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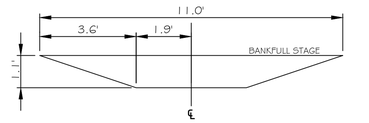
REACH G1-C STA 19+00 TO STA 19+93



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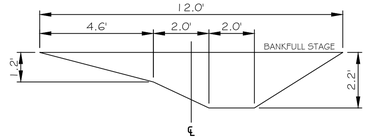

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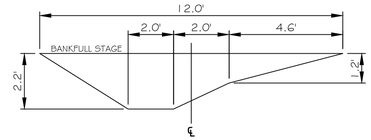

TYPICAL LEFT MEANDER CROSS SECTION

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SEAL

FULL SCALE: 1"=20

0 20 40

2" = FULL SCALE
1" = HALF SCALE

PLOT DATE:
6/23/2020

REVISIONS:

RELEASED FOR:
PRELIMINARY - NOT FOR CONSTRUCTION

PROJECT NAME:
MONKEY WALL MITIGATION SITE
MITCHELL COUNTY, NORTH CAROLINA

DRAWING TITLE:
REACH G1

PROJECT NUMBER:	100918
PROJECT MANAGER:	KMC
DESIGNED:	MKG
DRAWN:	TRS
CHECKED:	AFM

SHEET NUMBER:

S6

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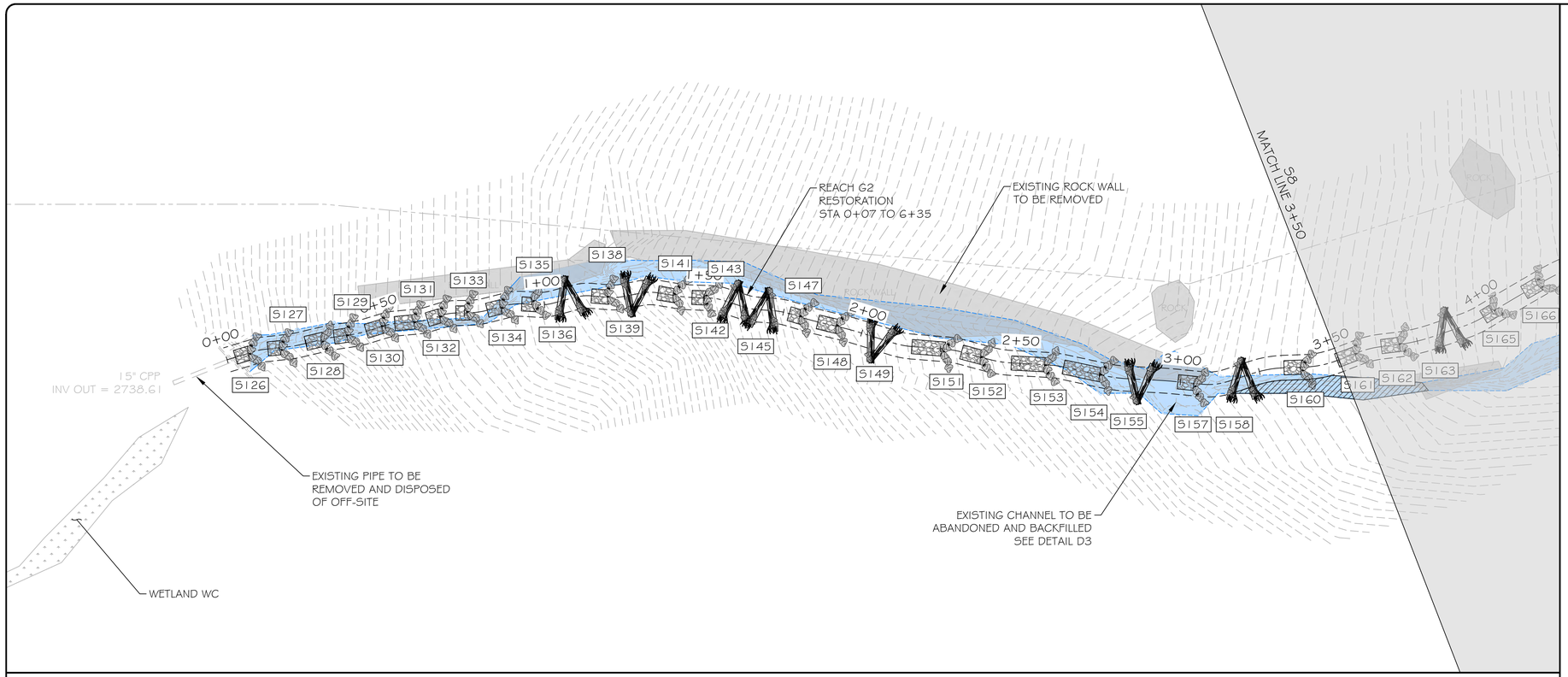

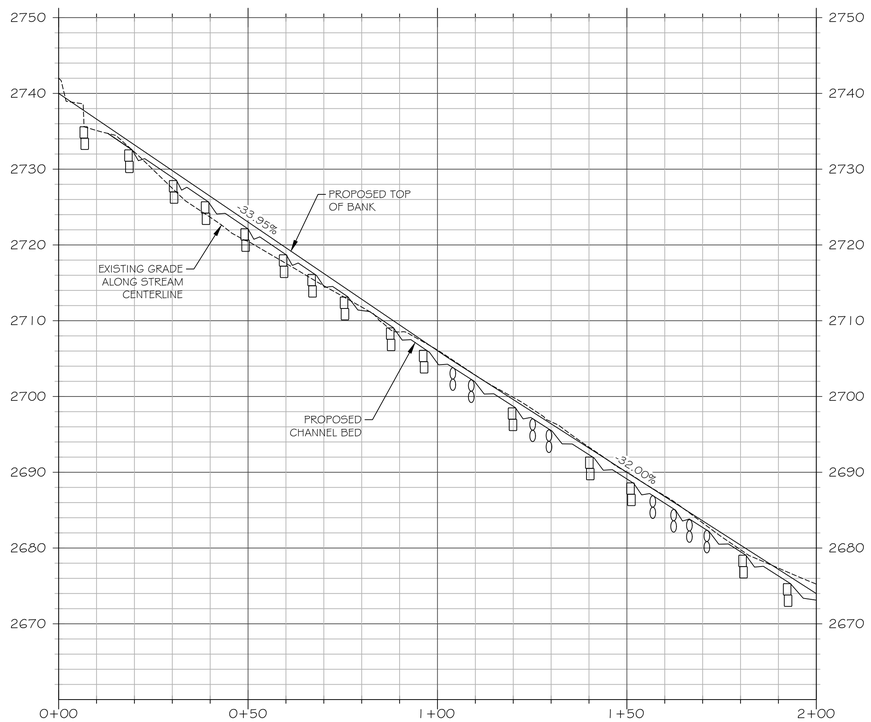

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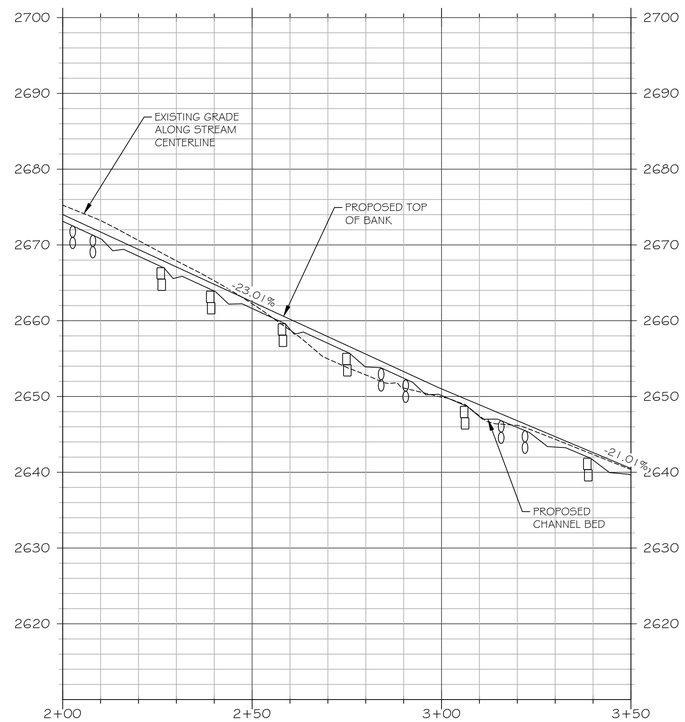

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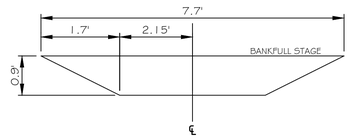
REACH G2 STA 0+07 TO STA 17+17



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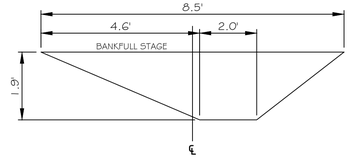

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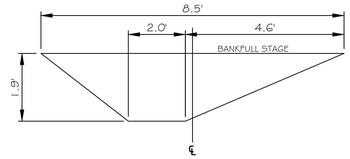

TYPICAL LEFT MEANDER CROSS SECTION

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SEAL

FULL SCALE: 1"=20

0 20 40

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PLOT DATE: 6/23/2020

REVISIONS:

RELEASED FOR: PRELIMINARY - NOT FOR CONSTRUCTION

PROJECT NAME: MONKEY WALL MITIGATION SITE
MITCHELL COUNTY, NORTH CAROLINA

DRAWING TITLE: REACH G2

PROJECT NUMBER:	100918
PROJECT MANAGER:	KMC
DESIGNED:	MKG
DRAWN:	TRS
CHECKED:	AFM

SHEET NUMBER:

S7

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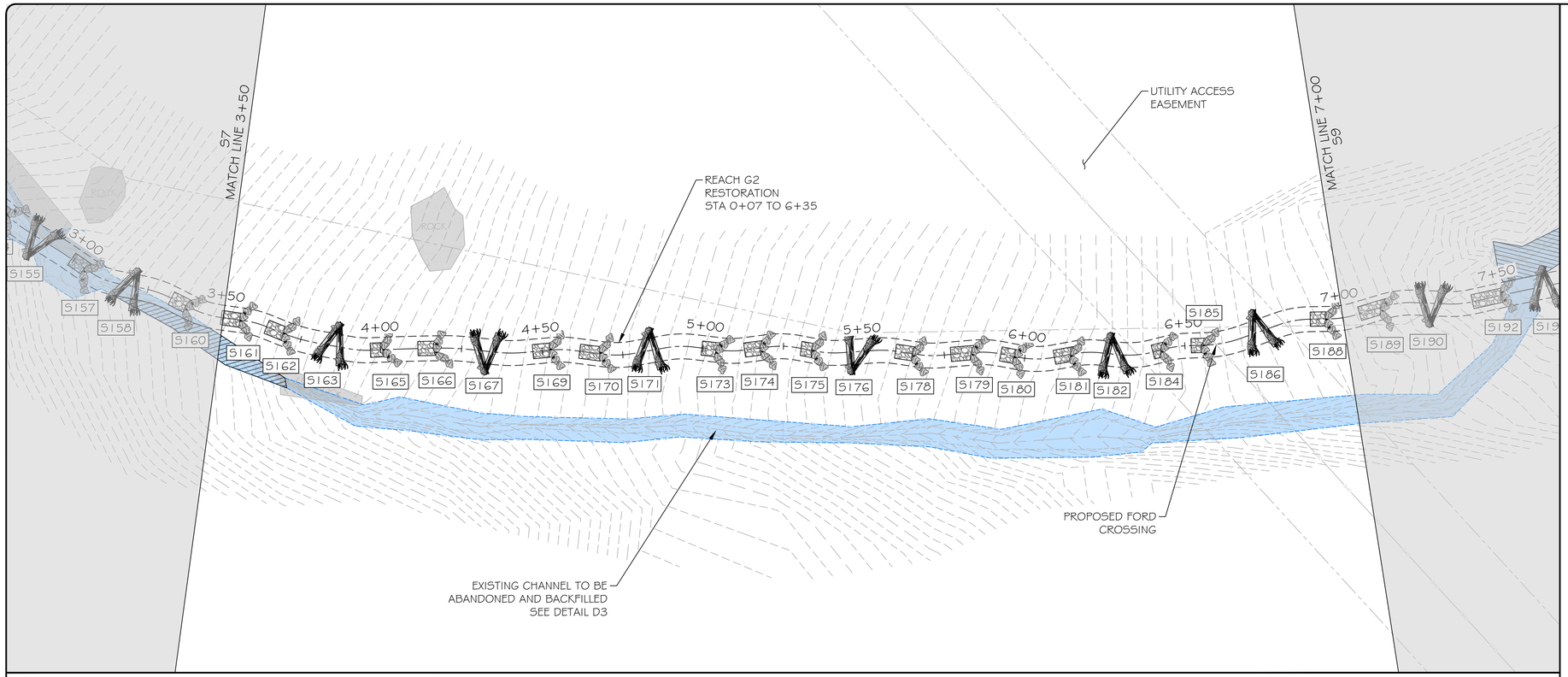
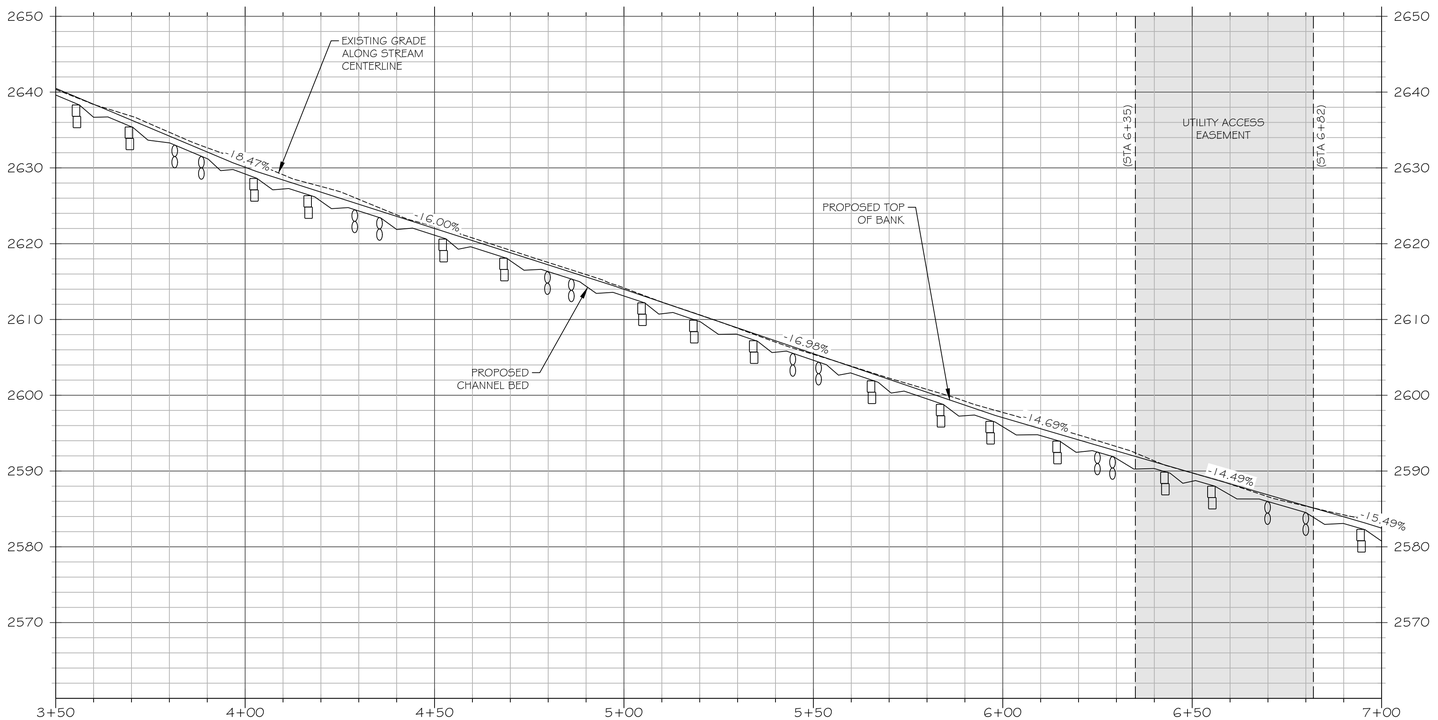
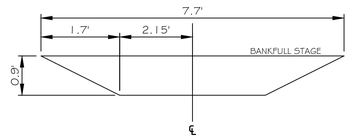




SCALE: HOR 1"=20'; VERT 1"=10'

REACH G2 STA 0+07 TO STA 17+17



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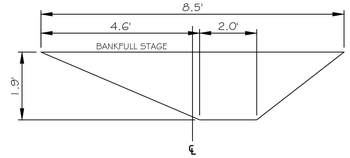

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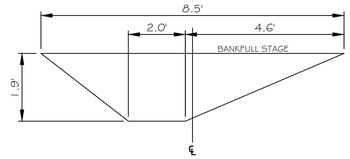

TYPICAL LEFT MEANDER CROSS SECTION

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SEAL

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0 20 40

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MITCHELL COUNTY, NORTH CAROLINA

DRAWING TITLE:
REACH G2

PROJECT NUMBER:	100918
PROJECT MANAGER:	KMC
DESIGNED:	MKG
DRAWN:	TRS
CHECKED:	AFM

SHEET NUMBER:

S8

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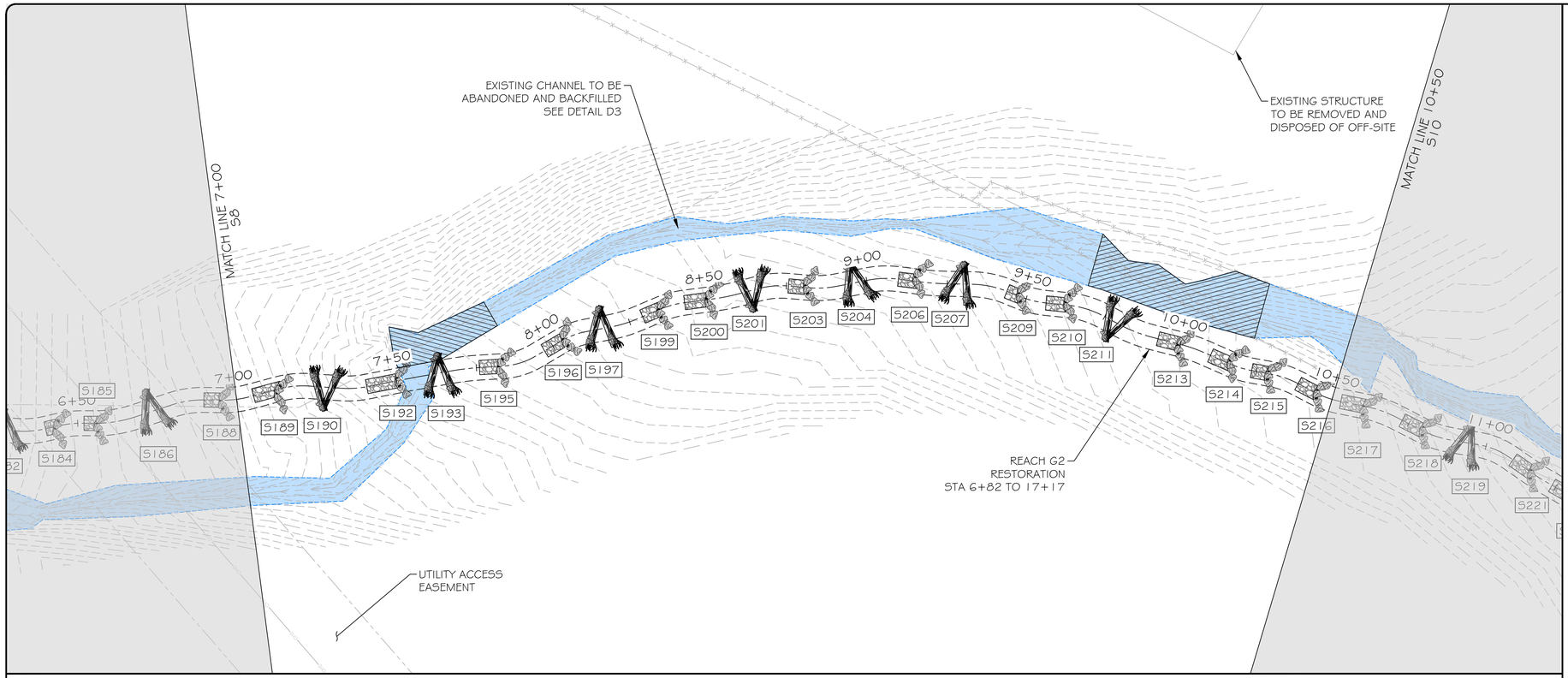
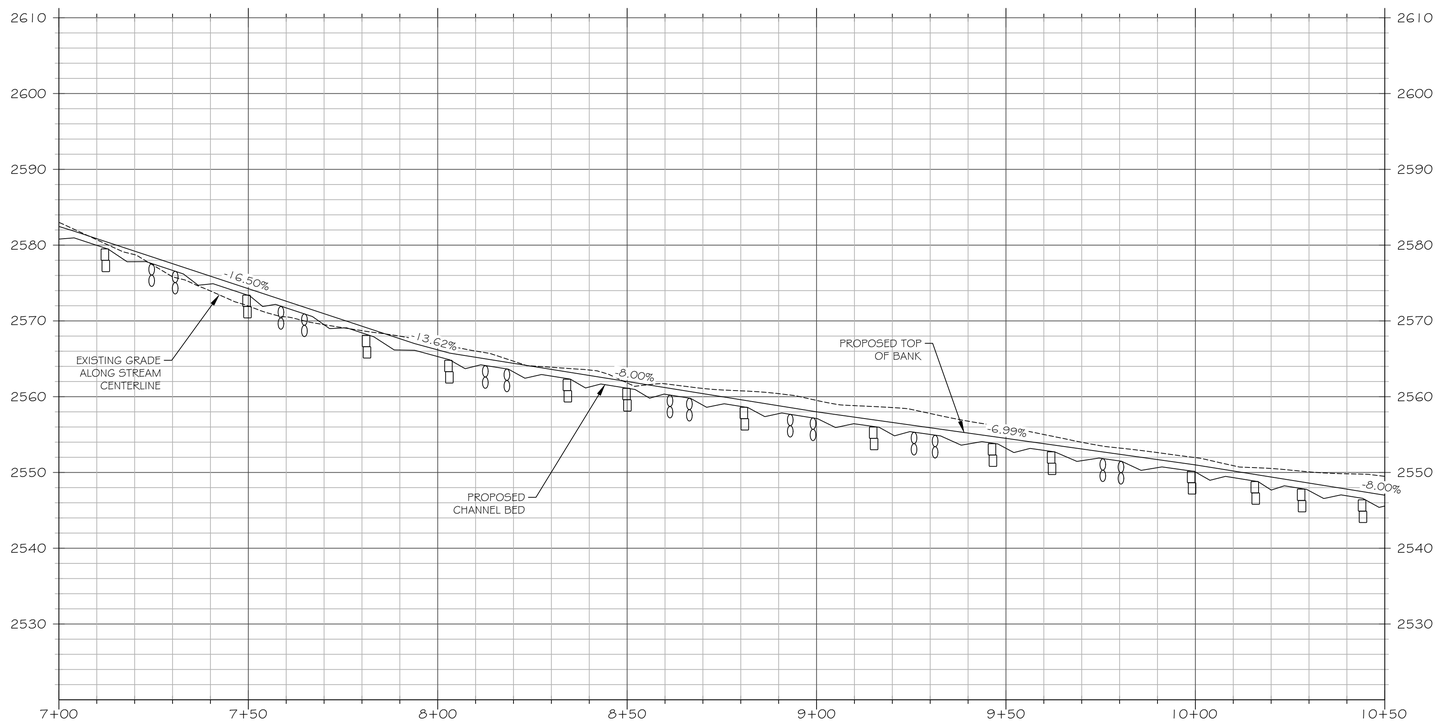
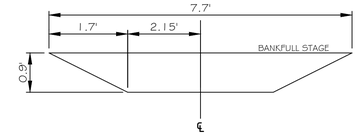




SCALE: HOR 1"=20'; VERT 1"=10'

REACH G2 STA 0+07 TO STA 17+17



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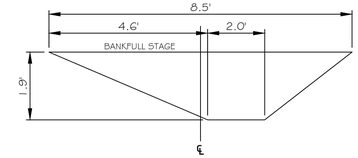

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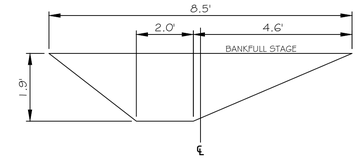

TYPICAL LEFT MEANDER CROSS SECTION

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SEAL

FULL SCALE: 1"=20

0 20 40

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PLOT DATE:
6/23/2020

REVISIONS:

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PROJECT NAME:
MONKEY WALL MITIGATION SITE
MITCHELL COUNTY, NORTH CAROLINA

DRAWING TITLE:
REACH G2

PROJECT NUMBER:	100918
PROJECT MANAGER:	KMC
DESIGNED:	MKG
DRAWN:	TRS
CHECKED:	AFM

SHEET NUMBER:

S9

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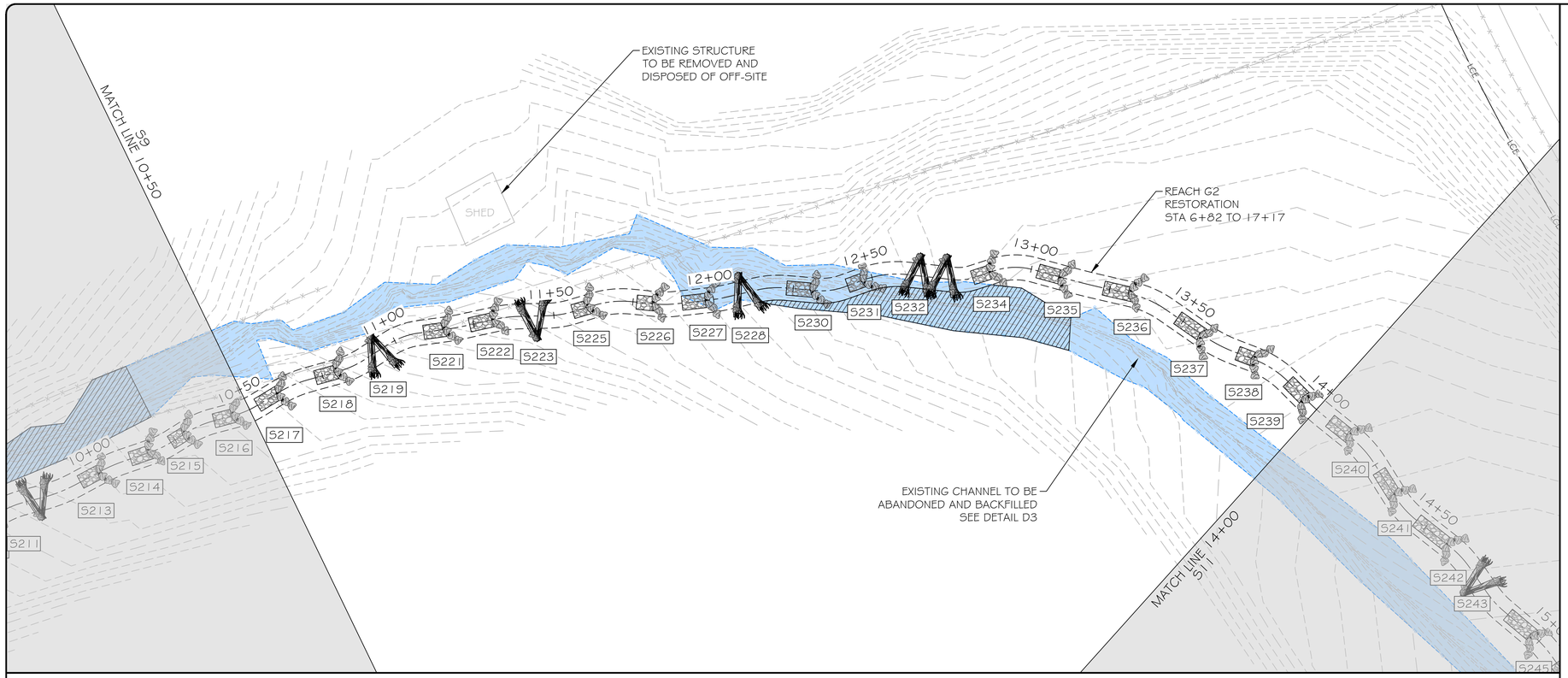
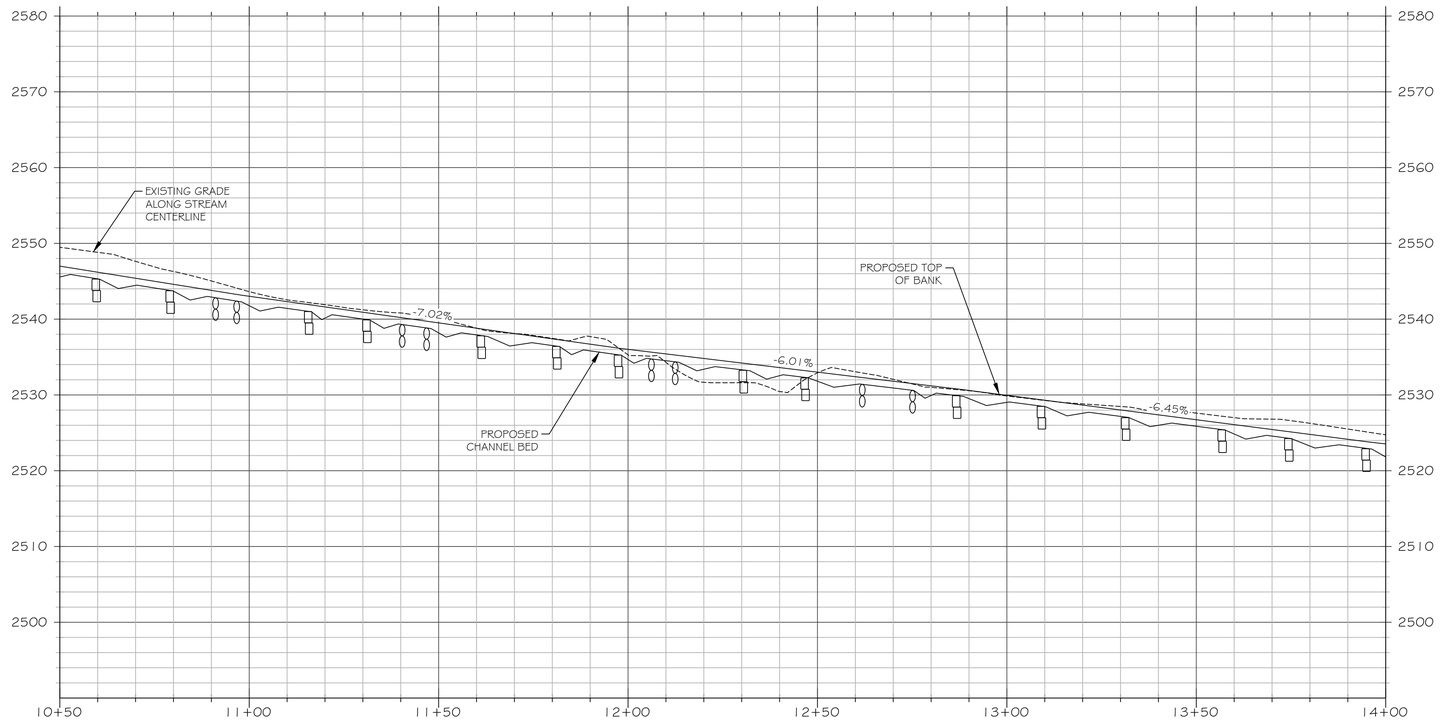
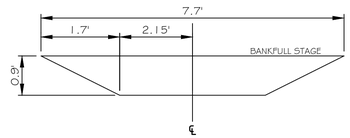




SCALE: HOR 1"=20'; VERT 1"=10'

REACH G2 STA 0+07 TO STA 17+17



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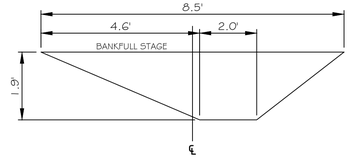
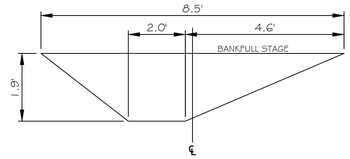


TYPICAL RIGHT MEANDER CROSS SECTION



TYPICAL LEFT MEANDER CROSS SECTION

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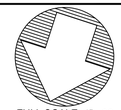

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MITCHELL COUNTY, NORTH CAROLINA

DRAWING TITLE:
REACH G2

PROJECT NUMBER:	100918
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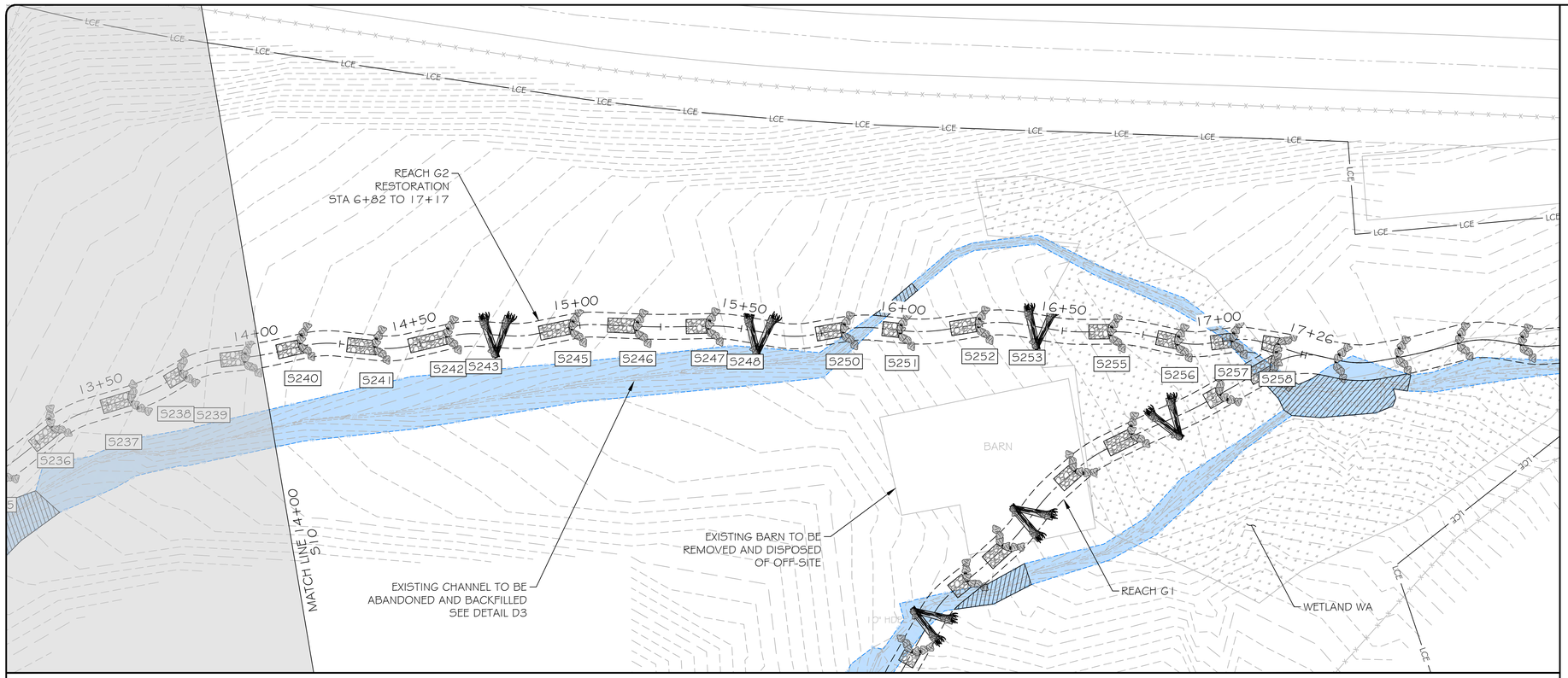
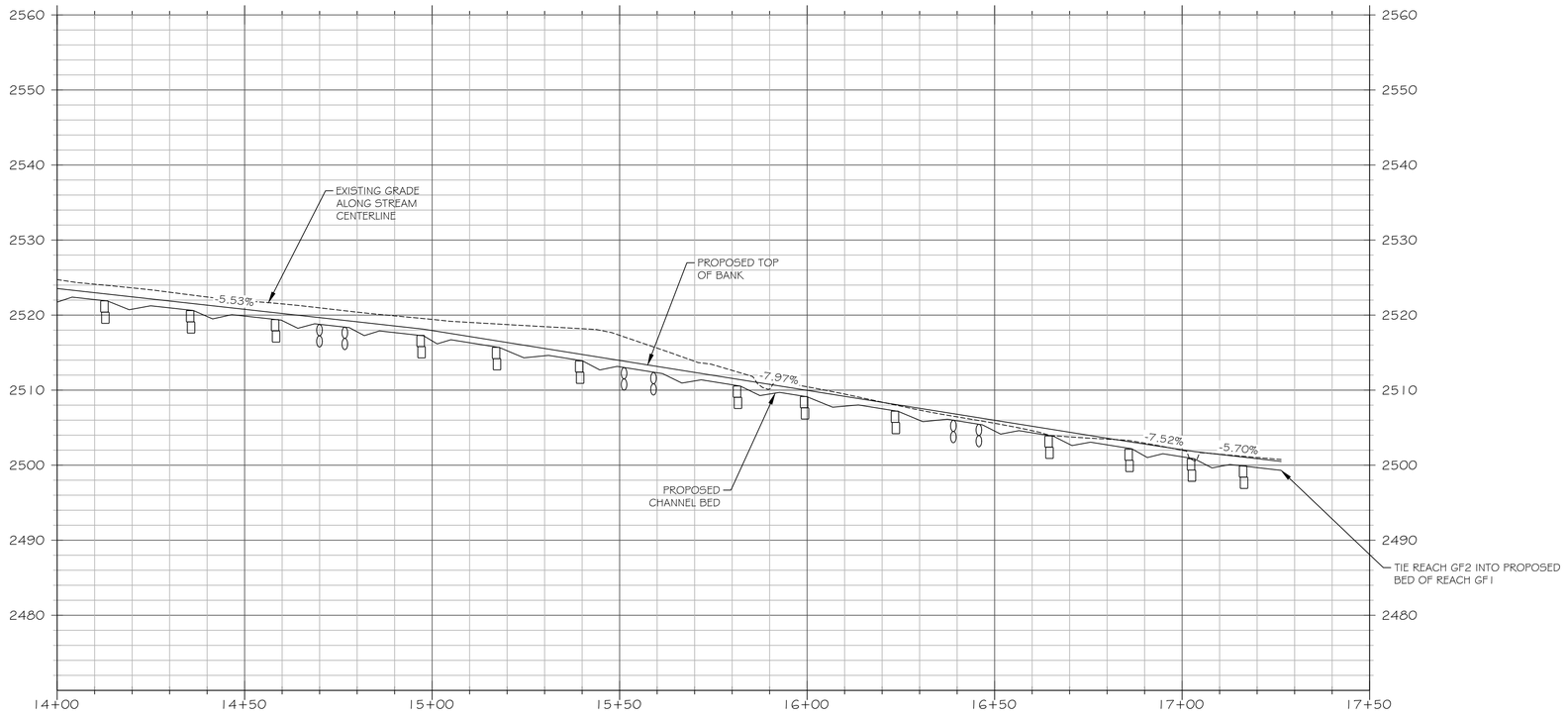
SHEET NUMBER:

S10

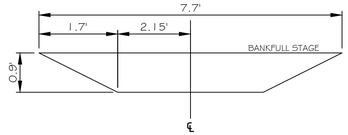
FILE NAME:R:\Resgis\dropboxgis\projects\NC\Monkey Wall\CAD\DWG\100918_SHT_G2.dwg SAVED BY: Stasking





SCALE: HOR 1"=20'; VERT 1"=10'

REACH G2 STA 0+07 TO STA 17+17



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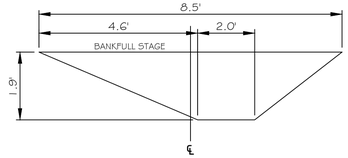

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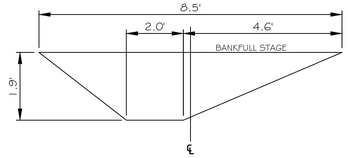

TYPICAL LEFT MEANDER CROSS SECTION

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SEAL

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0 20 40

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PLOT DATE:
6/23/2020

REVISIONS:

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PROJECT NAME:
MONKEY WALL MITIGATION SITE
MITCHELL COUNTY, NORTH CAROLINA

DRAWING TITLE:
REACH G2

PROJECT NUMBER:	100918
PROJECT MANAGER:	KMC
DESIGNED:	MKG
DRAWN:	TRS
CHECKED:	AFM

SHEET NUMBER:

S11

FILE NAME:R:\Resgis\dropboxgis\projects\NC\Monkey Wall\CAD\DWG\100918_SHT_G2.dwg SAVED BY: Stasking

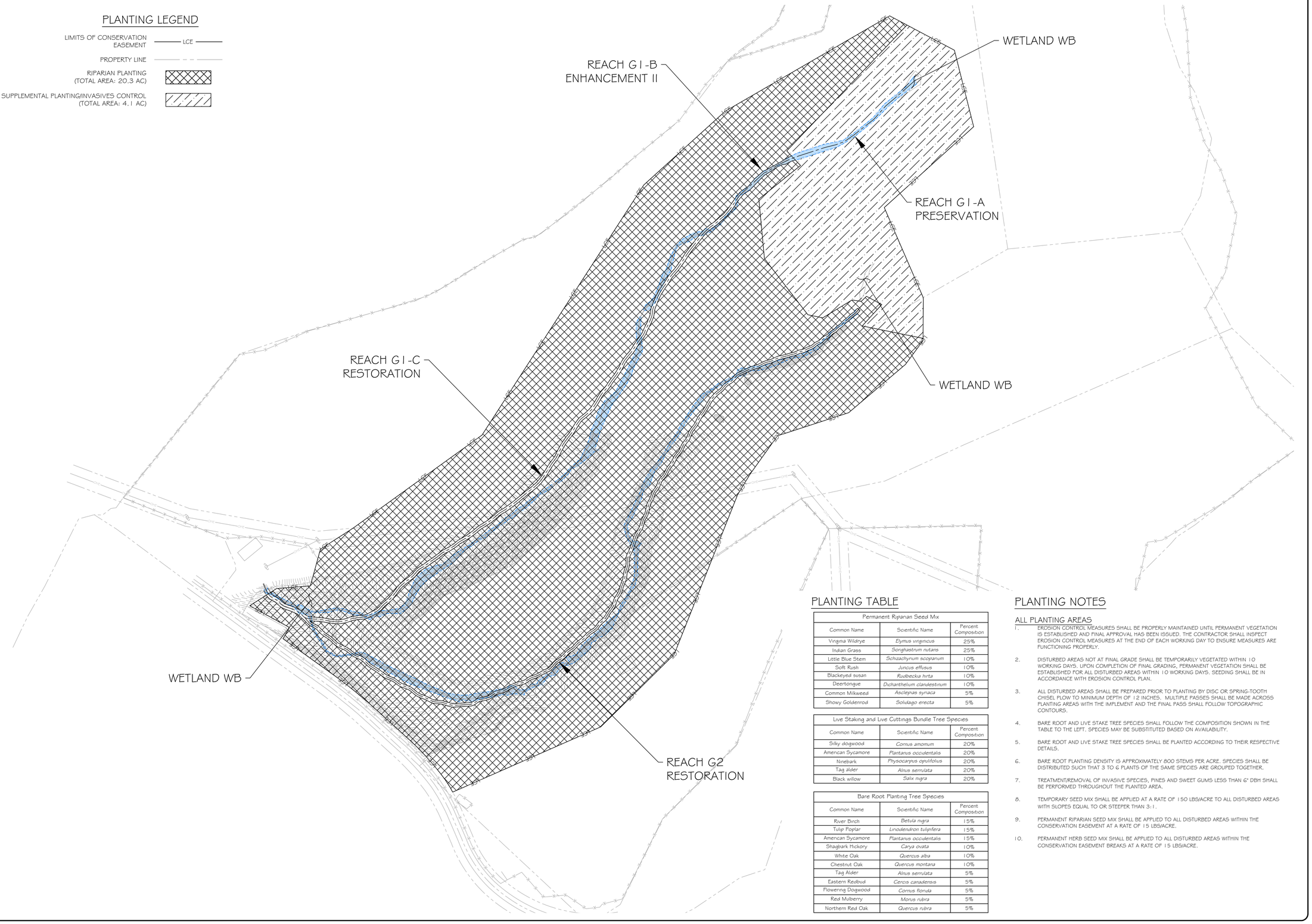
PLANTING LEGEND

LIMITS OF CONSERVATION EASEMENT — LCE —

PROPERTY LINE

RIPARIAN PLANTING (TOTAL AREA: 20.3 AC)

SUPPLEMENTAL PLANTING/INVASIVES CONTROL (TOTAL AREA: 4.1 AC)



PLANTING TABLE

Permanent Riparian Seed Mix		
Common Name	Scientific Name	Percent Composition
Virginia Wildrye	*Elymus virginicus*	25%
Indian Grass	*Sorghastrum nutans*	25%
Little Blue Stem	*Schizachyrium scoparium*	10%
Soft Rush	*Juncus effusus*	10%
Blackeyed susan	*Rudbeckia hirta*	10%
Deertongue	*Dichanthelium clandestinum*	10%
Common Milkweed	*Asclepias syriaca*	5%
Showy Goldenrod	*Solidago erecta*	5%

Live Staking and Live Cuttings Bundle Tree Species		
Common Name	Scientific Name	Percent Composition
Silky dogwood	*Cornus amomum*	20%
American Sycamore	*Plantanus occidentalis*	20%
Ninebark	*Physocarpus opulifolius*	20%
Tag alder	*Alnus serrulata*	20%
Black willow	*Salix nigra*	20%

Bare Root Planting Tree Species		
Common Name	Scientific Name	Percent Composition
River Birch	*Betula nigra*	15%
Tulip Poplar	*Liriodendron tulipifera*	15%
American Sycamore	*Plantanus occidentalis*	15%
Shagbark Hickory	*Carya ovata*	10%
White Oak	*Quercus alba*	10%
Chestnut Oak	*Quercus montana*	10%
Tag Alder	*Alnus serrulata*	5%
Eastern Redbud	*Cercis canadensis*	5%
Flowering Dogwood	*Cornus florida*	5%
Red Mulberry	*Morus rubra*	5%
Northern Red Oak	*Quercus rubra*	5%

PLANTING NOTES

ALL PLANTING AREAS

1. EROSION CONTROL MEASURES SHALL BE PROPERLY MAINTAINED UNTIL PERMANENT VEGETATION IS ESTABLISHED AND FINAL APPROVAL HAS BEEN ISSUED. THE CONTRACTOR SHALL INSPECT EROSION CONTROL MEASURES AT THE END OF EACH WORKING DAY TO ENSURE MEASURES ARE FUNCTIONING PROPERLY.
2. DISTURBED AREAS NOT AT FINAL GRADE SHALL BE TEMPORARILY VEGETATED WITHIN 10 WORKING DAYS. UPON COMPLETION OF FINAL GRADING, PERMANENT VEGETATION SHALL BE ESTABLISHED FOR ALL DISTURBED AREAS WITHIN 10 WORKING DAYS. SEEDING SHALL BE IN ACCORDANCE WITH EROSION CONTROL PLAN.
3. ALL DISTURBED AREAS SHALL BE PREPARED PRIOR TO PLANTING BY DISC OR SPRING-TOOTH CHISEL PLOW TO MINIMUM DEPTH OF 12 INCHES. MULTIPLE PASSES SHALL BE MADE ACROSS PLANTING AREAS WITH THE IMPLEMENT AND THE FINAL PASS SHALL FOLLOW TOPOGRAPHIC CONTOURS.
4. BARE ROOT AND LIVE STAKE TREE SPECIES SHALL FOLLOW THE COMPOSITION SHOWN IN THE TABLE TO THE LEFT. SPECIES MAY BE SUBSTITUTED BASED ON AVAILABILITY.
5. BARE ROOT AND LIVE STAKE TREE SPECIES SHALL BE PLANTED ACCORDING TO THEIR RESPECTIVE DETAILS.
6. BARE ROOT PLANTING DENSITY IS APPROXIMATELY 800 STEMS PER ACRE. SPECIES SHALL BE DISTRIBUTED SUCH THAT 3 TO 6 PLANTS OF THE SAME SPECIES ARE GROUPED TOGETHER.
7. TREATMENT/REMOVAL OF INVASIVE SPECIES, PINES AND SWEET GUMS LESS THAN 6" DBH SHALL BE PERFORMED THROUGHOUT THE PLANTED AREA.
8. TEMPORARY SEED MIX SHALL BE APPLIED AT A RATE OF 150 LBS/ACRE TO ALL DISTURBED AREAS WITH SLOPES EQUAL TO OR STEEPER THAN 3:1.
9. PERMANENT RIPARIAN SEED MIX SHALL BE APPLIED TO ALL DISTURBED AREAS WITHIN THE CONSERVATION EASEMENT AT A RATE OF 15 LBS/ACRE.
10. PERMANENT HERB SEED MIX SHALL BE APPLIED TO ALL DISTURBED AREAS WITHIN THE CONSERVATION EASEMENT BREAKS AT A RATE OF 15 LBS/ACRE.

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SEAL

FULL SCALE: 1"= 100

0 100 200

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PLOT DATE: 6/23/2020

REVISIONS:

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PROJECT NAME: MONKEY WALL MITIGATION SITE
MITCHELL COUNTY, NORTH CAROLINA

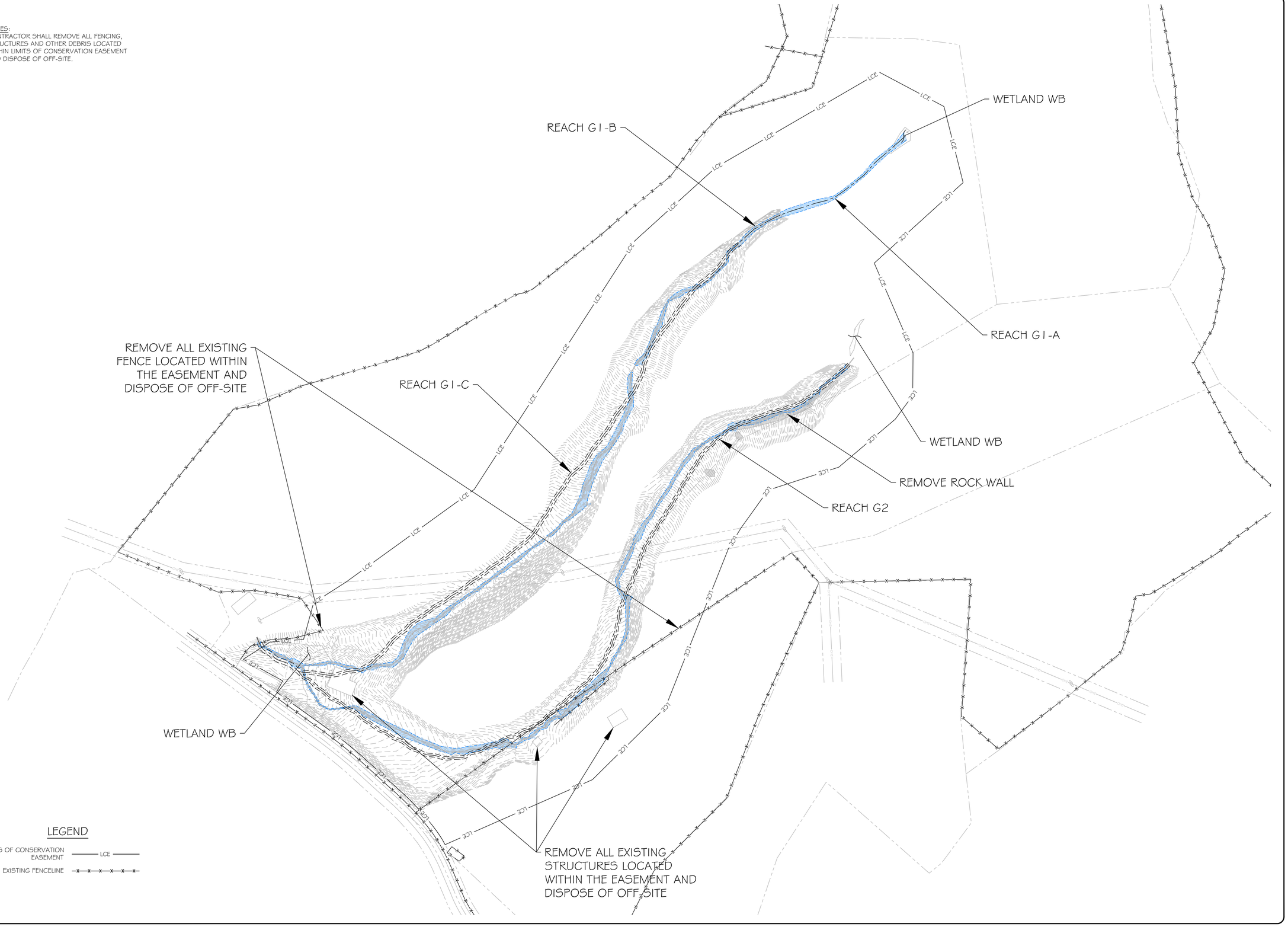
DRAWING TITLE: PLANTING PLAN

PROJECT NUMBER:	100918
PROJECT MANAGER:	KMC
DESIGNED:	MKG
DRAWN:	TRS
CHECKED:	AFM

SHEET NUMBER: P1

FILE NAME:R:\Resgis\dropboxgis\projects\NC\Monkey Wall\CAD\DWGs\100918_SHT_SITE.dwg SAVED BY: Fmullen

NOTES:
CONTRACTOR SHALL REMOVE ALL FENCING, STRUCTURES AND OTHER DEBRIS LOCATED WITHIN LIMITS OF CONSERVATION EASEMENT AND DISPOSE OF OFF-SITE.



LEGEND

LIMITS OF CONSERVATION EASEMENT ——— LCE ———

EXISTING FENCELINE —x—x—x—x—x—

FILE NAME:R:\Res\gis\dropbox\gis\projects\NC\Monkey Wall\CAD\DWG\100918_SHT_SITE.dwg SAVED BY: Fmullen

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Raleigh, NC 27612
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Angler Environmental, LLC
License: F-1428

SEAL

FULL SCALE: 1"=100

0 100 200

2" = FULL SCALE
1" = HALF SCALE

PLOT DATE:
6/23/2020

REVISIONS:

RELEASED FOR:
PRELIMINARY - NOT FOR CONSTRUCTION

PROJECT NAME:
MONKEY WALL MITIGATION SITE
MITCHELL COUNTY, NORTH CAROLINA

DRAWING TITLE:
DEMOLITION PLAN

PROJECT NUMBER:	100918
PROJECT MANAGER:	KMC
DESIGNED:	MKG
DRAWN:	TRS
CHECKED:	AFM

SHEET NUMBER:

F1

TEMPORARY SEEDING SCHEDULE - FALL

SEEDING MIXTURE

SPECIES	RATE (LB/ACRE)
• RYE (GRAIN)	120

SEEDING DATES
- MOUNTAINS—AUG. 15 - DEC. 15
- COASTAL PLAIN AND PIEDMONT—AUG. 15 - DEC. 30

SOIL AMENDMENTS
FOLLOW SOIL TESTS OR APPLY 2,000 LB/ACRE GROUND AGRICULTURAL LIMESTONE
AND 1,000 LB/ACRE 10-10-10 FERTILIZER.

MULCH
APPLY 4,000 LB/ACRE STRAW. ANCHOR STRAW BY TACKING WITH ASPHALT, NETTING, OR A MULCH ANCHORING TOOL. A DISK WITH BLADES SET NEARLY STRAIGHT CAN BE USED AS A MULCH ANCHORING TOOL.

MAINTENANCE
REPAIR AND REFERTILIZE DAMAGED AREAS IMMEDIATELY. TOPDRESS WITH 50 LB/ACRE OF NITROGEN IN MARCH. IF IT IS NECESSARY TO EXTEND TEMPORARY COVER BEYOND JUNE 15, OVERSEED WITH 50 LB/ACRE KOBE (PIEDMONT AND COASTAL PLAIN) OR KOREAN (MOUNTAINS) WINTER WHEAT IN LATE FEBRUARY OR
EARLY MARCH.

TEMPORARY SEEDING - LATE WINTER/EARLY SPRING

SEEDING MIXTURE

SPECIES	RATE (LB/ACRE)
• RYE (GRAIN)	120
• WINTER WHEAT*	50

*OMIT WINTER WHEAT WHEN DURATION OF TEMPORARY COVER IS NOT TO EXTEND BEYOND JUNE.

SEEDING DATES
- MOUNTAINS (ABOVE 2,500 FT): FEB. 15 - MAY 15
- MOUNTAINS (BELOW 2,500 FT): FEB. 1 - MAY 1
- PIEDMONT: JAN. 1 - MAY 1
- COASTAL PLAIN: DEC. 1 - APR. 15

SOIL AMENDMENTS
FOLLOW RECOMMENDATION OF SOIL TESTS OR APPLY 2,000 LB/ACRE GROUND AGRICULTURAL LIMESTONE AND 750 LB/ACRE 10-10-10 FERTILIZER.

MULCH
APPLY 4,000 LB/ACRE STRAW. ANCHOR STRAW BY TACKING WITH ASPHALT, NETTING, OR A MULCH ANCHORING TOOL. A DISK WITH BLADES SET NEARLY STRAIGHT CAN BE USED AS A MULCH ANCHORING TOOL.

MAINTENANCE
RE-FERTILIZE IF GROWTH IS NOT FULLY ADEQUATE. RESEED, RE-FERTILIZE AND MULCH IMMEDIATELY FOLLOWING EROSION OR OTHER DAMAGE.

TEMPORARY SEEDING - LATE WINTER/EARLY SPRING

SEEDING MIXTURE

SPECIES	RATE (LB/ACRE)
• GERMAN MILLET*	40

*IN THE PIEDMONT AND MOUNTAINS, A SMALL-STEMMED SUDANGRASS MAY BE SUBSTITUTED AT A RATE OF 50 LB/ACRE.

SEEDING DATES
- MOUNTAINS: MAY 15 - AUG. 15
- PIEDMONT: MAY 1 - AUG. 15
- COASTAL PLAIN: APR. 15 - AUG. 15

SOIL AMENDMENTS
FOLLOW RECOMMENDATION OF SOIL TESTS OR APPLY 2,000 LB/ACRE GROUND AGRICULTURAL LIMESTONE AND 750 LB/ACRE 10-10-10 FERTILIZER.

MULCH
APPLY 4,000 LB/ACRE STRAW. ANCHOR STRAW BY TACKING WITH ASPHALT, NETTING, OR A MULCH ANCHORING TOOL. A DISK WITH BLADES SET NEARLY STRAIGHT CAN BE USED AS A MULCH ANCHORING TOOL.

MAINTENANCE
REFERTILIZE IF GROWTH IS NOT FULLY ADEQUATE. RESEED, REFERTILIZE AND MULCH IMMEDIATELY FOLLOWING EROSION OR OTHER DAMAGE.

GROUND COVER SCHEDULE

SITE AREA DESCRIPTION	STABILIZATION TIME FRAME	STABILIZATION TIME FRAME EXCEPTIONS
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED
SLOPES 3:1 OR FLATTER	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50 FEET IN LENGTH
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	NONE (EXCEPT FOR PERIMETERS AND HWQ ZONES)

Permanent Riparian Seed Mix		
Common Name	Scientific Name	Percent Composition
Virginia Wildrye	*Elymus virginicus*	25%
Indian Grass	*Sorghastrum nutans*	25%
Little Blue Stem	*Schizachyrium scopanum*	10%
Soft Rush	*Juncus effusus*	10%
Blackeyed susan	*Rudbeckia hirta*	10%
Deertongue	*Dichanthelium clandestinum*	10%
Common Milkweed	*Asclepias synaca*	5%
Showy Goldenrod	*Solidago erecta*	5%

EROSION CONTROL:

GENERAL NOTES

1. REVIEW CONSTRUCTION SEQUENCE FOR ADDITIONAL EROSION CONTROL MEASURES. ALL PERMANENT AND TEMPORARY EROSION CONTROL STRUCTURES (I.E ROCK CHECK DAMS, SILT FENCE AND TEMPORARY CONSTRUCTION ENTRANCES) SHALL BE INSTALLED PRIOR TO THE START OF CONSTRUCTION OF THE LAND-DISTURBING ACTIVITY.
2. CONSTRUCTION ACCESS AREAS SHOWN ARE TO GUIDE CONTRACTOR DURING CONSTRUCTION. CONTRACTOR SHALL COORDINATE WITH ENGINEER IF ALTERNATIVE CONSTRUCTION ACCESS ROUTES WILL IMPROVE EFFICIENCY OF CONSTRUCTION.
3. ALL AREAS DISTURBED BY THE CONTRACTOR SHALL BE SEEDED PER THE SPECIFICATIONS IN THE SEEDING SCHEDULE SHOWN ON THIS SHEET.
4. CONTRACTOR TO PERFORM SOIL TESTING TO DETERMINE VEGETATIVE VIABILITY PRIOR TO LAND DISTURBANCE.
5. MULCH: APPLY 2 TONS/ACRE GRAIN STRAW AND ANCHOR STRAW ON ALL OTHER DISTURBED AREAS.
6. EROSION CONTROL:
   A. INSTALL PERMANENT VEGETATIVE COVER AND THE LONG-TERM EROSION PROTECTION MEASURES OR STRUCTURES AS DIRECTED BY ENGINEER UPON CONSTRUCTION COMPLETION. APPROPRIATE EROSION CONTROL MEASURES MUST BE PLACED BETWEEN THE DISTURBED AREA AND AFFECTED WATERWAY AND MAINTAINED UNTIL PERMANENTLY VEGETATED.
   B. PROVIDE FOR HANDLING THE INCREASED RUNOFF CAUSED BY CHANGED SOIL AND SURFACE CONDITIONS. USE EFFECTIVE MEANS TO CONSERVE EXISTING ON-SITE SOIL CONDITIONS.
   C. DURING CONSTRUCTION ACTIVITIES, ALL DISTURBED AREAS SHALL BE STABILIZED AT THE END OF EACH WORKING DAY. USE TEMPORARY PLANT COVER, MULCHING, AND/OR STRUCTURES TO CONTROL RUNOFF AND PROTECT AREAS SUBJECT TO EROSION DURING CONSTRUCTION.
   D. ALL SEDIMENT AND EROSION CONTROLS ARE TO BE INSPECTED AT LEAST ONCE EVERY SEVEN CALENDAR DAYS AND AFTER ANY STORM EVENT OF GREATER THAN 0.5 INCHES OF PRECIPITATION DURING ANY 24-HOUR PERIOD. MAINTENANCE OF SEDIMENT TRAPPING STRUCTURES SHALL BE PERFORMED AS NECESSARY PER THESE INSPECTIONS. SILT FENCING SHALL BE INSTALLED AS SHOWN ON PLANS.
   E. STABILIZATION MEASURES SHALL BE INITIATED AT THE END OF EACH DAY IN PORTIONS OF THE SITE WHERE CONSTRUCTION ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED. GROUNDCOVER MUST BE ESTABLISHED PER THE "GROUND COVER SCHEDULE" SHOWN ON THIS SHEET IN AREAS WHERE CONSTRUCTION HAS TEMPORARILY CEASED. ALL AREAS WHERE FINAL GRADE HAS BEEN ESTABLISHED SHALL BE PERMANENTLY STABILIZED WITHIN 2 CALENDAR DAYS.
   F. CONTRACTOR MUST TAKE THE NECESSARY ACTION INCLUDING BUT NOT LIMITED TO TIRE WASHING STATIONS AT EACH ACCESS POINT TO MINIMIZE THE TRACKING OF MUD ONTO THE PAVED ROADWAY FROM CONSTRUCTION AREAS. DAILY REMOVAL OF MUD/SOIL MAY BE REQUIRED.
   G. ALL EROSION CONTROL DEVICES SHALL BE PROPERLY MAINTAINED DURING ALL PHASES OF CONSTRUCTION UNTIL THE COMPLETION OF ALL CONSTRUCTION ACTIVITIES AND ALL DISTURBED AREAS HAVE BEEN STABILIZED. ADDITIONAL CONTROL DEVICES MAY BE REQUIRED DURING CONSTRUCTION IN ORDER TO CONTROL EROSION AND/OR OFF SITE SEDIMENTATION. CONTRACTOR SHALL REMOVE ALL TEMPORARY CONTROL DEVICES ONCE CONSTRUCTION IS COMPLETE AND THE SITE IS STABILIZED.
   H. EROSION CONTROL MATTING SHALL BE INSTALLED ALONG CONSTRUCTED CHANNEL BANKS FROM APPROXIMATELY 2.0' TO 3.0' ABOVE TOP OF BANK DOWN TO CHANNEL TOE.
   I. SILT FENCING TO BE INSTALLED AROUND INDICATED STOCKPILE AREAS TO PREVENT LOSS OF SEDIMENT. STOCKPILE AREAS MAY BE RELOCATED UPON APPROVAL FROM ENGINEER.
   J. ASPHALT TACKIFIER SHALL NOT BE USED.
   K. WETLANDS/STREAMS CANNOT BE ENCROACHED UNDER ANY CIRCUMSTANCES IF NOT APPROVED AS DESIGNATED IMPACT AREAS.
   L. ACTIVITIES MUST AVOID DISTURBANCE OF WOODY RIPARIAN VEGETATION WITHIN THE PROJECT AREA TO THE GREATEST EXTENT PRACTICABLE. REMOVAL OF VEGETATION MUST BE LIMITED TO ONLY THAT NECESSARY FOR CONSTRUCTION OF THE CHANNEL.
   M. NO ONSITE BURIAL OF VEGETATION OR CONSTRUCTION DEBRIS WILL BE PERMITTED. VEGETATIVE DEBRIS SHALL BE STOCKPILED AND DISPOSED OF ONSITE PER DIRECTION OF ENGINEER.
   N. ANY GRADING BEYOND THE CONSTRUCTION LIMITS SHOWN ON THE PLAN IS A VIOLATION OF THE NORTH CAROLINA EROSION CONTROL ORDINANCE, AND IS SUBJECT TO A FINE.
   O. PLEASE REFERENCE PLAN SHEET DETAILS AND NCDENR STANDARDS FOR CONSTRUCTION OF EROSION CONTROL MEASURES.
   P. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL EROSION CONTROL MEASURES RELATED TO THE CONSTRUCTION SITE.
   Q. THE LOCATIONS OF SOME EROSION CONTROL MEASURES MAY HAVE TO BE ALTERED FROM THOSE SHOWN ON THE PLANS IF DRAINAGE PATTERNS CHANGE DURING CONSTRUCTION.
   R. IF IT IS DETERMINED DURING THE COURSE OF CONSTRUCTION THAT SIGNIFICANT SEDIMENT IS LEAVING THE SITE (DESPITE THE PROPER IMPLEMENTATION AND MAINTENANCE OF EROSION CONTROL MEASURES), THE PERSON RESPONSIBLE FOR THE LAND DISTURBING ACTIVITY IS OBLIGATED TO TAKE ADDITIONAL PROTECTIVE ACTION.

CONSTRUCTION NOTES:

1. INSTALL EROSION CONTROL MEASURES AS DESCRIBED IN THE EROSION CONTROL PLAN AND NOTES. EROSION CONTROL MEASURES MAY BE PHASED-IN TO THOSE AREAS OF THE PROJECT CURRENTLY BEING WORKED ON. THE CONTRACTOR MAY MODIFY OR RELOCATE EROSION CONTROL MEASURES TO MAKE ADJUSTMENTS FOR UNFORESEEN FIELD CONDITIONS SO LONG AS PROPER CONSTRUCTION IS MAINTAINED TO ENSURE THE INTEGRITY AND USEFULNESS OF THE PROPOSED MEASURES. ALL DISTURBED AREAS ALONG CHANNEL BANKS SHALL BE STABILIZED WITH TEMPORARY SEED AND MULCH AT THE END OF EACH DAY.
2. EXISTING WETLANDS CANNOT BE ENCROACHED UPON UNDER ANY CIRCUMSTANCES IF NOT APPROVED AS DESIGNATED IMPACT AREAS. HIGH VISIBILITY FENCING MUST BE PLACED AROUND ALL EXISTING WETLANDS THAT ARE LOCATED ADJACENT TO CONSTRUCTION ACTIVITIES AND/OR ARE LOCATED WITHIN THE PROPOSED CONSERVATION EASEMENT.
3. STOCKPILE AREAS AND TEMPORARY STREAM CROSSINGS MAY BE RELOCATED OR ADDED UPON THE APPROVAL OF THE ENGINEER. SILT FENCING MUST BE INSTALLED AROUND ALL STOCKPILE AREAS.
4. THE WORK TO RESHAPE THE CHANNEL BANKS WILL BE PERFORMED USING EQUIPMENT WORKING FROM THE TOP OF THE EXISTING STREAM BANK, WHERE POSSIBLE.
5. CONSTRUCTION EQUIPMENT WILL NOT BE PLACED WITHIN THE ACTIVE CHANNEL TO PERFORM WORK IF POSSIBLE. PLATFORMS SHOULD BE USED TO CROSS CHANNEL WHERE ACCESS IS NOT POSSIBLE.
6. NO MORE CHANNEL SHALL BE DISTURBED THAN CAN BE STABILIZED BY THE END OF THE WORK DAY OR PRIOR TO RESTORING FLOW TO NEWLY CONSTRUCTED CHANNEL SEGMENTS.
7. CONTRACTOR SHALL REMOVE ALL TEMPORARY CONTROL DEVICES ONCE CONSTRUCTION IS COMPLETE AND THE SITE IS STABILIZED. A MAXIMUM OF 200 LINEAR FEET OF STREAM MAY BE DISTURBED AT ANY ONE TIME. STABILIZE STREAM BANKS IMMEDIATELY AFTER GRADING.
8. ALL EXCAVATED MATERIAL MUST BE PLACED WITHIN DESIGNATED STOCKPILE AREAS.
9. AT LOCATIONS IN WHICH THE EXISTING CHANNEL IS BEING MAINTAINED, TEMPORARY PUMP AROUND DAMS AND BYPASS PUMPING WILL BE USED TO DE-WATER THE WORK AREA AS DESCRIBED IN THE DETAILS.
10. WHEN THE PROPOSED CHANNEL HAS BEEN SUFFICIENTLY STABILIZED TO PREVENT EROSION, ALL TEMPORARY PUMP AROUND DAMS WILL BE REMOVED FROM THE ACTIVE STREAM CHANNEL AND NORMAL FLOW RESTORED. ACCUMULATED SEDIMENT SHALL BE DISPOSED OF IN DESIGNATED SPOILS AREAS PRIOR TO REMOVAL OF TEMPORARY PUMP AROUND DAM.
11. AT LOCATIONS IN WHICH LOG STRUCTURES, ROCK STRUCTURES, BOULDER TOE STABILIZATION, AND LOG TOE STABILIZATION ARE CALLED FOR ON THE PLANS, TEMPORARY COFFER DAMS AND BYPASS PUMPING WILL BE USED TO DE-WATER THE WORK AREA, EXCEPT AT LOCATIONS IN WHICH THE NORMAL FLOW CAN BE DIVERTED AROUND THE WORK AREA WITH THE USE OF AN EXISTING CHANNEL. WHEN THE TOE HAS BEEN SUFFICIENTLY STABILIZED TO RESTRAIN EROSION ALL TEMPORARY COFFER DAMS WILL BE REMOVED FROM THE ACTIVE STREAM CHANNEL AND NORMAL FLOW RESTORED. ACCUMULATED SEDIMENT SHALL BE DISPOSED OF IN DESIGNATED SPOILS AREA PRIOR TO REMOVAL OF TEMPORARY COFFER DAM.
12. MATERIAL THAT IS REMOVED FROM THE STREAM WILL BE RE-DEPOSITED OUTSIDE OF THE ACTIVE CHANNEL AND ITS FLOODPLAIN.
13. TEMPORARY AND PERMANENT STABILIZATION OF ALL DISTURBED GRASSED AREAS AT THE TOP OF THE CHANNEL BANKS WILL BE IN ACCORDANCE WITH THE SEEDING AND MULCHING SPECIFICATION AS SHOWN ON PLANS.
14. RE-FERTILIZE AND RE-SEED DISTURBED AREAS IF NECESSARY.
15. CONTRACTOR SHALL COMPLETE SELF INSPECTIONS AND MONITORING AS OUTLINED IN THE SELF-INSPECTION AND SELF-MONITORING COMBINED FORM LOCATED AT: https://deq.nc.gov/about/divisions/energy-mineral-land-resources/erosion-sediment-control/forms. THIS FORM SHOULD BE UP TO DATE AND AVAILABLE AT THE JOB SITE AT ALL TIMES.

STREAM CONSTRUCTION SEQUENCE:

1. CONDUCT PRE-CONSTRUCTION MEETING INCLUDING OWNER, ENGINEER, ASSOCIATED CONTRACTORS, AND OTHER AFFECTED PARTIES.
2. OBTAIN EROSION CONTROL PERMIT FROM COUNTY OFFICE AND ALL OTHER APPROVALS NECESSARY TO BEGIN AND COMPLETE THE PROJECT.
3. CONTRACTOR IS FULLY RESPONSIBLE FOR CONTACTING ALL APPROPRIATE PARTIES AND ASSURING THAT UTILITIES ARE LOCATED PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. CALL NC 811 FOR UTILITY LOCATING SERVICES 48 HOURS PRIOR TO COMMENCEMENT OF ANY WORK. CONTRACTOR SHALL VERIFY LOCATION AND DEPTH OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.
4. PRIOR TO CONSTRUCTION, STABILIZED GRAVEL ENTRANCE/EXIT AND ROUTES OF INGRESS AND EGRESS SHALL BE ESTABLISHED AS SHOWN ON THE PLANS AND DETAILS.
5. INSTALL TEMPORARY STREAM CROSSINGS AS SHOWN ON PLANS. TEMPORARY STREAM CROSSINGS SHOULD ONLY BE INSTALLED WHEN NECESSARY.
6. PREPARE STAGING AND STOCKPILING AREAS IN LOCATIONS AS SHOWN ON THE CONSTRUCTION PLANS OR AS APPROVED BY THE ENGINEER. ANY EXCESS SPOIL FROM STREAM CONSTRUCTION SHALL BE USED TO CONSTRUCT CHANNEL PLUGS AS SHOWN ON PLANS.
7. CONTRACTOR TO PERFORM SOIL TESTING TO DETERMINE VEGETATIVE VIABILITY PRIOR TO LAND DISTURBANCE.
8. ALL PROPOSED CHANNELS AND TEMPORARY AND PERMANENT CROSSINGS SHALL BE CONSTRUCTED IN A DRY CONDITION VIA OFFLINE CONSTRUCTION WHERE POSSIBLE. PUMP AROUND OPERATIONS SHOULD BE LIMITED TO AREAS WHERE THE EXISTING AND PROPOSED CHANNEL ALIGNMENTS OVERLAP.
9. INSTALL PUMP AROUND APPARATUS AND IMPERVIOUS DIKES AT UPSTREAM END OF PROJECT. AS CONSTRUCTION PROGRESSES, MOVE PUMP AROUND OPERATION DOWNSTREAM.
10. CONSTRUCT UPSTREAM PORTION OF THE CHANNEL FIRST, WORKING IN AN UPSTREAM TO DOWNSTREAM DIRECTION UNLESS OTHERWISE APPROVED BY THE ENGINEER.
11. ROUGH GRADING OF CHANNEL SHALL BE PERFORMED PRIOR TO INSTALLATION OF STRUCTURES.
12. INSTALL STRUCTURES AS SHOWN ON PLANS AND DETAILS. PRIOR TO FINE GRADING, OBTAIN APPROVAL OF THE ENGINEER ON INSTALLATION OF STRUCTURES.
13. UPON COMPLETION OF FINE GRADING, INSTALL STREAM BANK STABILIZATION INCLUDING, EROSION CONTROL MATTING OR SOD MATS ALONG CHANNEL BANKS.
14. FILL AND STABILIZE ABANDONED SEGMENTS OF THE EXISTING CHANNEL PER DIRECTION OF THE ENGINEER.
15. ALL IMPERVIOUS DIKES AND PUMPING APPARATUS SHALL BE REMOVED FROM THE STREAM AT THE END OF EACH DAY TO RESTORE NORMAL FLOW BACK TO THE CHANNEL UNLESS OTHERWISE APPROVED BY THE ENGINEER. WITH APPROVAL, A PUMP AROUND MAY BE ALLOWED TO RUN CONTINUOUSLY IF THERE IS NO FORECAST FOR RAIN OVERNIGHT, AND/OR THE PUMP APPARATUS IS MAINTAINED AND MONITORED CONTINUOUSLY.
16. DURING STREAM CONSTRUCTION ACTIVITIES, THE WORK AREA SHALL BE STABILIZED IMMEDIATELY AFTER GRADING AND AT THE END OF EACH WORKING DAY.
17. INSTALL LIVE STAKE, BARE ROOT, AND CONTAINERIZED PLANTINGS AS SPECIFIED ON PLANTING PLANS.

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SEAL

PLOT DATE: 6/23/2020

REVISIONS:

RELEASED FOR: PRELIMINARY - NOT FOR CONSTRUCTION

PROJECT NAME: MONKEY WALL MITIGATION SITE
MITCHELL COUNTY, NORTH CAROLINA

DRAWING TITLE: EROSION CONTROL NOTES

PROJECT NUMBER:	100918
PROJECT MANAGER:	KMC
DESIGNED:	MKG
DRAWN:	TRS
CHECKED:	AFM

SHEET NUMBER:

EC1

FILE NAME:R:\Resgis\dropboxgis\projects\NC\Monkey Wall\CAD\DWG\100918_SHT_ESC.dwg SAVED BY: Stasking

WHEN AND WHERE TO USE IT
SILT FENCE IS APPLICABLE IN AREAS:

WHERE THE MAXIMUM SHEET OR OVERLAND FLOW PATH LENGTH TO THE FENCE IS 100-FEET.
WHERE THE MAXIMUM SLOPE STEEPNESS (NORMAL [PERPENDICULAR] TO FENCE LINE) IS 2H:1V.
THAT DO NOT RECEIVE CONCENTRATED FLOWS GREATER THAN 0.5 CFS.

DO NOT PLACE SILT FENCE ACROSS CHANNELS OR USE IT AS A VELOCITY CONTROL BMP.

CONSTRUCTION SPECIFICATIONS:

1. USE A SYNTHETIC FILTER FABRIC OF AT LEAST 95% BY WEIGHT OF POLYOLEFINS OR POLYESTER, WHICH IS CERTIFIED BY THE MANUFACTURER OR SUPPLIER AS CONFORMING TO THE REQUIREMENTS IN ASTM D 6461. SYNTHETIC FILTER FABRIC SHOULD CONTAIN ULTRAVIOLET RAY INHIBITORS AND STABILIZERS TO PROVIDE A MINIMUM OF 6 MONTHS OF EXPECTED USABLE CONSTRUCTION LIFE AT A TEMPERATURE RANGE OF 0° TO 120° F.
2. ENSURE THAT POSTS FOR SEDIMENT FENCES ARE 1.33 LB/LINEAR FT STEEL WITH A MINIMUM LENGTH OF 5 FEET. MAKE SURE THAT STEEL POSTS HAVE PROJECTIONS TO FACILITATE FASTENING THE FABRIC.

CONSTRUCTION:

1. CONSTRUCT THE SEDIMENT BARRIER OF EXTRA STRENGTH SYNTHETIC FILTER FABRICS.
2. ENSURE THAT THE HEIGHT OF THE SEDIMENT FENCE DOES NOT EXCEED 24 INCHES ABOVE THE GROUND SURFACE. (HIGHER FENCES MAY IMPOUND VOLUMES OF WATER SUFFICIENT TO CAUSE FAILURE OF THE STRUCTURE.)
3. CONSTRUCT THE FILTER FABRIC FROM A CONTINUOUS ROLL CUT TO THE LENGTH OF THE BARRIER TO AVOID JOINTS. WHEN JOINTS ARE NECESSARY, SECURELY FASTEN THE FILTER CLOTH ONLY AT A SUPPORT POST WITH 4 FEET MINIMUM OVERLAP TO THE NEXT POST.
4. EXTRA STRENGTH FILTER FABRIC WITH 6 FEET POST SPACING DOES NOT REQUIRE WIRE MESH SUPPORT FENCE. SECURELY FASTEN THE FILTER FABRIC DIRECTLY TO POSTS. WIRE OR PLASTIC ZIP TIES SHOULD HAVE MINIMUM 50 POUND TENSILE STRENGTH.
5. EXCAVATE A TRENCH APPROXIMATELY 4 INCHES WIDE AND 8 INCHES DEEP ALONG THE PROPOSED LINE OF POSTS AND UPSLOPE FROM THE BARRIER.
6. PLACE 12 INCHES OF THE FABRIC ALONG THE BOTTOM AND SIDE OF THE TRENCH.
7. BACKFILL THE TRENCH WITH SOIL PLACED OVER THE FILTER FABRIC AND COMPACT. THOROUGH COMPACTION OF THE BACKFILL IS CRITICAL TO SILT FENCE PERFORMANCE.
8. DO NOT ATTACH FILTER FABRIC TO EXISTING TREES.

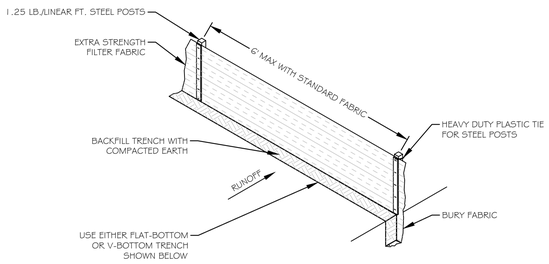
MAINTENANCE:

INSPECT SEDIMENT FENCES AT LEAST ONCE A WEEK AND AFTER EACH RAINFALL. MAKE ANY REQUIRED REPAIRS IMMEDIATELY.

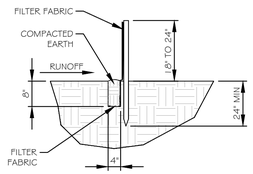
SHOULD THE FABRIC OF A SEDIMENT FENCE COLLAPSE, TEAR, DECOMPOSE OR BECOME INEFFECTIVE, REPLACE IT PROMPTLY.

REMOVE SEDIMENT DEPOSITS AS NECESSARY TO PROVIDE ADEQUATE STORAGE VOLUME FOR THE NEXT RAIN AND TO REDUCE PRESSURE ON THE FENCE. TAKE CARE TO AVOID UNDERMINING THE FENCE DURING CLEANOUT.

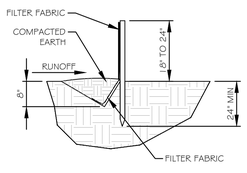
REMOVE ALL FENCING MATERIALS AND UNSTABLE SEDIMENT DEPOSITS AND BRING THE AREA TO GRADE AND STABILIZE IT AFTER THE CONTRIBUTING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.



SILT FENCE INSTALLATION



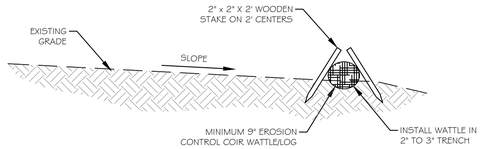
FLAT-BOTTOM TRENCH DETAIL



V-SHAPED TRENCH DETAIL

TEMPORARY SILT FENCE

NTS



PROFILE VIEW

NOTES:

1. EROSION CONTROL WATTLES OR COIR LOGS/WATTLES MAY BE USED IN PLACE OF SILT FENCE.
2. INSTLL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE IN PLACE.

EROSION CONTROL WATTLE

NTS

INSTALLATION NOTES:

SITE PREPARATION

1. GRADE AND COMPACT AREA.
2. REMOVE ALL ROCKS, CLODS, VEGETATION, AND OBSTRUCTIONS SO THAT MATTING WILL HAVE DIRECT CONTACT WITH THE SOIL.
3. PREPARE SEEDBED BY LOOSENING 3 TO 4 INCHES OF TOPSOIL ABOVE FINAL GRADE.
4. TEST SOILS FOR ANY NUTRIENT DEFICIENCIES AND SUBMIT SOIL TEST RESULTS TO THE ENGINEER. APPLY ANY TREATMENT SUCH AS LIME OR FERTILIZERS TO THE SOIL IF NEEDED.

SEEDING

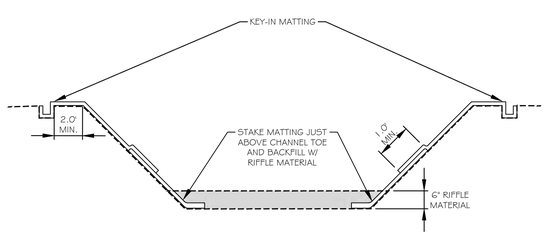
1. SEE PLANTING SHEETS FOR SEEDING REQUIREMENTS.
2. APPLY SEED TO SOIL BEFORE PLACING MATTING.

INSTALLATION - STREAM BANK

1. SEE GRADING NOTES ON PLAN AND PROFILE SHEETS AND DETAIL SHEETS FOR INFORMATION REGARDING WHAT AREAS ARE TO RECEIVE COIR MATTING.
2. OVERLAP ADJACENT MATS 6" (IN DIRECTION PARALLEL TO FLOW) AND ANCHOR EVERY 12" ACROSS THE OVERLAP. THE UPSTREAM MAT SHOULD BE PLACED OVER THE DOWNSTREAM MAT.
3. EDGES SHOULD BE SHINGLED AWAY FROM THE FLOW OF WATER.
4. LAY MAT LOOSE TO ALLOW CONTACT WITH SOIL. DO NOT STRETCH TIGHT.
5. ANCHOR MAT USING BIODEGRADABLE STAKES.
6. EXTEND MAT 2 TO 3 FEET PAST TOP OF BANK.
7. PLACE ADJACENT ROLLS IN THE ANCHOR TRENCH WITH A MINIMUM OF 4" OVERLAP. SECURE WITH BIODEGRADABLE STAKES, BACKFILL ANCHOR TRENCH, AND COMPACT SOIL.
8. STAKE AT 12" INTERVALS ALONG OVERLAP.
9. IF MORE THAN ROLL IS REQUIRED TO COVER THE CHANNEL FROM THE TOP OF BANK DOWN TO THE TOE, THEN OVERLAP MATTING BY A MINIMUM OF 1'.

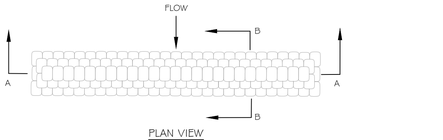
EROSION CONTROL MATTING MUST MEET OR EXCEED THE FOLLOWING REQUIREMENTS:

- 100 % COCONUT FIBER (COIR) TWINE WOVEN INTO A HIGH STRENGTH MATRIX.
- THICKNESS - 0.35 IN. MINIMUM.
- SHEAR STRESS – 5 LBS/SQFT
- FLOW VELOCITY- OBSERVED 16 FT/SEC
- WEIGHT - 29 OZ/SY
- OPEN AREA - 36%
- SLOPES – UP TO A MAXIMUM OF 1:1

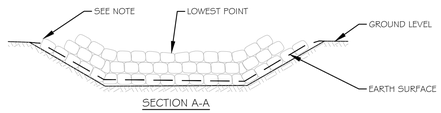


COIR MATTING

NTS

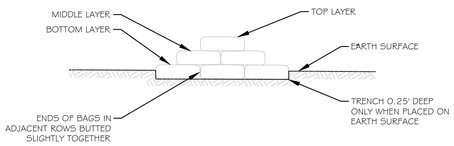


PLAN VIEW



SECTION A-A

NOTE: END OF DIKE AT GROUND LEVEL TO BE HIGHER THAN THE LOWEST POINT OF FLOW CHECK. SUFFICIENT SANDBAGS ARE TO BE PLACED TO PREVENT SCOURING.

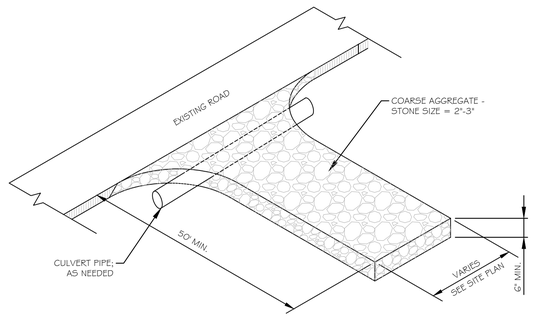


SECTION B-B

SANDBAG BARRIERS SHALL BE CONSTRUCTED OF THREE LAYERS OF SANDBAGS. THE BOTTOM LAYER SHALL CONSIST OF 3 ROWS OF BAGS, THE MIDDLE LAYER SHALL CONSIST OF 2 ROWS OF BAGS AND THE TOP LAYER SHALL CONSIST OF 1 ROW OF BAGS. THE RECOMMENDED DIMENSION OF A FILLED SANDBAG SHALL BE APPROXIMATELY 0.5 FT X 0.5 FT X 1.5 FT.

SANDBAG IMPERVIOUS DIKE

NTS



PURPOSE:

STABILIZED CONSTRUCTION ENTRANCES SHOULD BE USED AT ALL POINTS WHERE TRAFFIC WILL BE LEAVING A CONSTRUCTION SITE AND MOVING DIRECTLY ONTO A PUBLIC ROAD. **INSTALL A CULVERT PIPE ACROSS THE ENTRANCE WHEN NEEDED TO PROVIDE POSITIVE DRAINAGE**.

CONSTRUCTION SPECIFICATIONS:

1. CLEAR THE ENTRANCE AND EXIT AREA OF ALL VEGETATION, ROOTS, AND OTHER OBJECTIONABLE MATERIAL AND PROPERLY GRADE IT.
2. PLACE THE GRAVEL TO THE SPECIFIC GRADE AND DIMENSIONS SHOWN ON THE DETAIL, AND SMOOTH IT.
3. PROVIDE DRAINAGE TO CARRY WATER TO A SEDIMENT TRAP OR OTHER SUITABLE OUTLET.
4. USE GEOTEXTILE FABRICS BECAUSE THEY IMPROVE STABILITY OF THE FOUNDATION IN LOCATIONS SUBJECT TO SEEPAGE OR HIGH WATER TABLE.

MAINTENANCE:

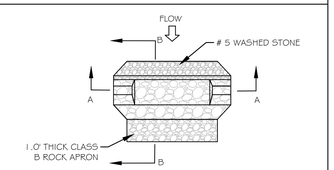
MAINTAIN THE GRAVEL PAD IN A CONDITION TO PREVENT MUD OR SEDIMENT FROM LEAVING THE CONSTRUCTION SITE. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH 2-INCH STONE. AFTER EACH RAINFALL, INSPECT ANY STRUCTURE USED TO TRAP SEDIMENT AND CLEAN IT OUT AS NECESSARY. IMMEDIATELY REMOVE ALL OBJECTIONABLE MATERIALS SPILLED, WASHED, OR TRACKED ONTO PUBLIC ROADWAYS, OR AIRFIELD PAVEMENTS.

TEMPORARY GRAVEL CONSTRUCTION ENTRANCE

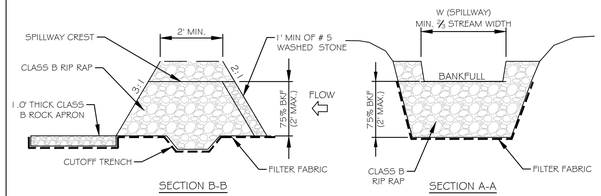
NTS

NOTES:

1. CONSTRUCT DAM ACCORDING TO NCDENR EROSION CONTROL MANUAL
2. RIPRAP SHALL BE CLASS I
3. PLACE ROCK DAM AS SHOWN ON PLANS. EXTEND CLASS B RIP RAP ROCK APRON 2 FEET DOWNSTREAM FROM TOE OF ROCK DAM



PLAN



SECTION B-B SECTION A-A

TEMPORARY ROCK CHECK DAM

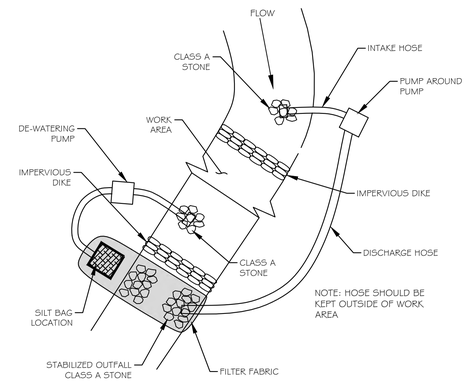
NTS

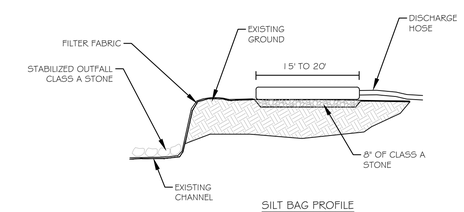
NOTES:

1. EXCAVATION SHALL BE PERFORMED ONLY IN DRY AND/OR ISOLATED SECTIONS OF CHANNEL.
2. IMPERVIOUS DIKES SHOULD BE USED TO ISOLATE WORK AREAS FROM STREAM FLOW.
3. THE CONTRACTOR SHALL NOT DISTURB MORE AREA THAN CAN BE STABILIZED IN ONE WORKING DAY. A MAXIMUM OF 200 FEET MAY BE DISTURBED AT ANY ONE TIME.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING PUMP SIZE SUFFICIENT TO PUMP BASE FLOW.
5. DIKE MUST BE CONSTRUCTED OF NON-ERODIBLE MATERIALS SUCH AS SANDBAGS.

SEQUENCE OF CONSTRUCTION:

1. INSTALL STILLING BASIN AND STABILIZED OUTFALL USING CLASS A RIP RAP AT THE DOWNSTREAM END OF THE DESIGNATED PROJECT WORKING AREA.
2. THE CONTRACTOR SHALL INSTALL THE PUMP AROUND PUMP AND THE TEMPORARY PIPING THAT WILL CONVEY THE BASE FLOW FROM UPSTREAM OF THE WORK AREA TO THE STABILIZED OUTFALL.
3. INSTALL UPSTREAM IMPERVIOUS DIKE AND BEGIN PUMPING OPERATIONS FOR STREAM DIVERSION.
4. INSTALL THE DOWNSTREAM IMPERVIOUS DIKE AND DEWATERING PUMPING APPARATUS IF NEEDED TO DEWATER THE ENTRAPPED AREA. THE PUMP AND HOSE FOR THIS PURPOSE SHALL BE OF SUFFICIENT SIZE TO DEWATER THE WORK AREA. THIS WATER WILL ALSO BE PUMPED TO AN OUTFALL STABILIZED WITH CLASS A RIP RAP.
5. THE CONTRACTOR SHALL EXCAVATE ANY ACCUMULATED SILT AND DEWATER BEFORE REMOVAL OF THE IMPERVIOUS DIKE. WHEN DEWATERING AREA, ALL DIRTY WATER MUST BE PUMPED THROUGH A SILT BAG. REMOVE IMPERVIOUS DIKES, PUMPS, AND TEMPORARY FLEXIBLE HOSE/PIPING STARTING WITH THE DOWNSTREAM DIKE FIRST.
6. ONCE THE WORKING AREA IS COMPLETED, REMOVE ALL RIP RAP AND IMPERVIOUS DIKES AND STABILIZE DISTURBED AREAS WITH SEED AND MULCH.
7. ALL WORK IN CHANNEL MUST BE COMPLETED BEFORE REMOVING IMPERVIOUS DIKE.





SILT BAG PROFILE

PUMP AROUND & DEWATERING DETAIL

NTS

302 Jefferson Street, Suite 110
Raleigh, NC 27605
Main: 919.829.9909
www.res.us

Engineering Services Provided By:
Angler Environmental, LLC
License: F-1428

SEAL

PLOT DATE:
6/23/2020

REVISIONS:

RELEASED FOR:
PRELIMINARY - NOT FOR CONSTRUCTION

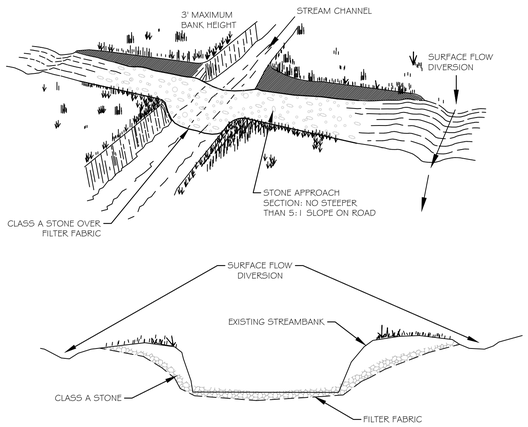
PROJECT NAME:
MONKEY WALL MITIGATION SITE
MITCHELL COUNTY, NORTH CAROLINA

DRAWING TITLE:
DETAILS

PROJECT NUMBER:	100918
PROJECT MANAGER:	KMC
DESIGNED:	MKG
DRAWN:	TRS
CHECKED:	AFM

SHEET NUMBER:

D1



NOTES:

1. CONSTRUCT STREAM CROSSING WHEN FLOW IS LOW.
2. HAVE ALL NECESSARY MATERIALS AND EQUIPMENT ON-SITE BEFORE WORK BEGINS.
3. MINIMIZE CLEARING AND EXCAVATION OF STREAM BANKS. DO NOT EXCAVATE CHANNEL BOTTOM. COMPLETE ONE SIDE BEFORE STARTING ON THE OTHER SIDE.
4. INSTALL STREAM CROSSING PERPENDICULAR TO FLOW.
5. GRADE SLOPES NO STEEPER THAN 5:1
6. MAINTAIN CROSSING SO THAT RUNOFF IN THE CONSTRUCTION ROAD DOES NOT ENTER EXISTING CHANNEL.
7. A STABILIZED PAD OF NATURAL CLASS A STONE, 6 TO 9 INCHES THICK, LINED WITH FILTER FABRIC SHALL BE USED OVER THE BERM AND ACCESS SLOPES.
8. FILTER FABRIC USED SHALL BE NCDOT TYPE 2 ENGINEERING FABRIC OR EQUIVALENT.
9. WIDTH OF THE CROSSING SHALL BE SUFFICIENT (8' MIN.) TO ACCOMMODATE THE LARGEST VEHICLE CROSSING THE CHANNEL.
10. CONTRACTOR SHALL DETERMINE AN APPROPRIATE RAMP ANGLE ACCORDING TO EQUIPMENT UTILIZED.
11. TEMPORARY CROSSINGS ARE TO BE ABANDONED IN PLACE.

FORD CROSSING

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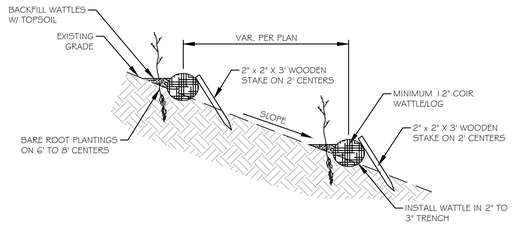
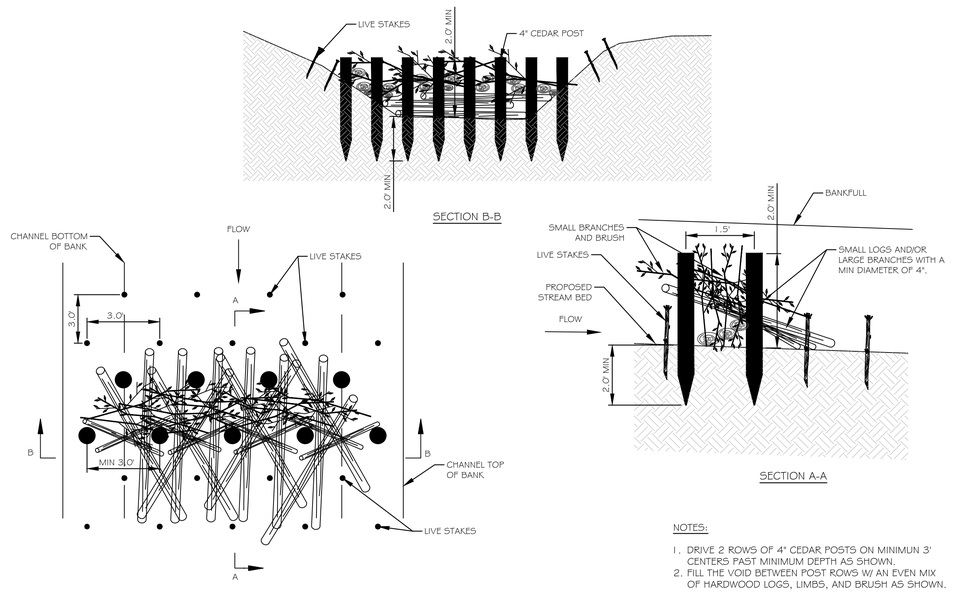


PROFILE VIEW

COIR WATTLE SLOPE BREAK

NTS

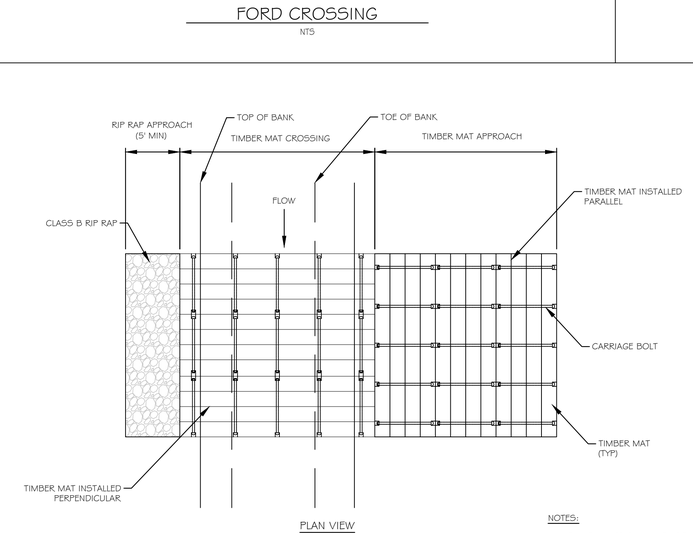


NOTES:

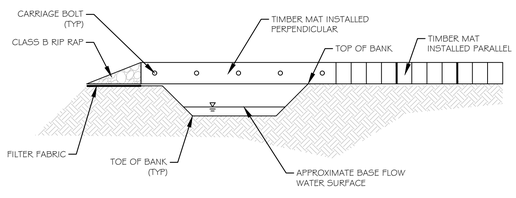
1. DRIVE 2 ROWS OF 4" CEDAR POSTS ON MINIMUN 3' CENTERS PAST MINIMUM DEPTH AS SHOWN.
2. FILL THE VOID BETWEEN POST ROWS W/ AN EVEN MIX OF HARDWOOD LOGS, LIMBS, AND BRUSH AS SHOWN.
3. REDUCE POST SPACING AS NEEDED TO IMPROVE STRUCTURE STABILITY.

ENGINEERED SEDIMENT PACK (ESP)

NTS



PLAN VIEW



SECTION VIEW

NOTES:

1. TIMBER MATS SHALL BE USED FOR TEMPORARY CONSTRUCTION ACCESS TO TRAVERSE WET AND/OR MUDDY ARES ADJACENT TO THE STREAM AND TO CROSS THE STREAM AND OTHER CONCENTRATED FLOW AREAS.
2. THE STREAM CROSSING SHALL BE INSTALLED WHEN FLOW IS LOW. THERE SHALL BE MINIMAL TO NO DISTURBANCE OF THE CHANNEL BED AND BANKS AS A RESULT OF INSTALLING THE APPROACHES OR CROSSING.
3. THE LENGTH OF TIMBER MAT REQUIRED TO CROSS THE STREAM OR CONCENTRATED FLOW AREAS SHALL BE SUCH THAT THE TIMBER MAT EXTENDS PAST THE TOP OF BANK ON EACH SIDE OF THE CROSSING A SUFFICIENT DISTANCE TO SUPPORT THE MAXIMUM EQUIPMENT SIZE USING THE CROSSING.
4. STREAM CROSSINGS SHALL BE INSTALLED WITH THE TIMBER MAT LENGTHS ORIENTED PERPENDICULAR TO THE TOPS OF THE STREAM BANKS. TIMBER MAT STREAM APPROACHES SHALL BE INSTALLED WITH THE TIMBER MAT LENGTHS ORIENTED PARALLEL TO THE TOPS OF THE STREAM BANKS.
5. STREAM CROSSING APPROACHES FROM DRY AREAS SHALL BE CONSTRUCTED USING CLASS B RIP RAP PLACED OVER FILTER FABRIC.
6. ALL TIMBER MATS, FILTER FABRIC, AND RIP RAP SHALL BE COMPLETELY REMOVED FROM THE SITE WHEN THE CROSSING IS REMOVED.

TIMBER MAT TEMPORARY CROSSING

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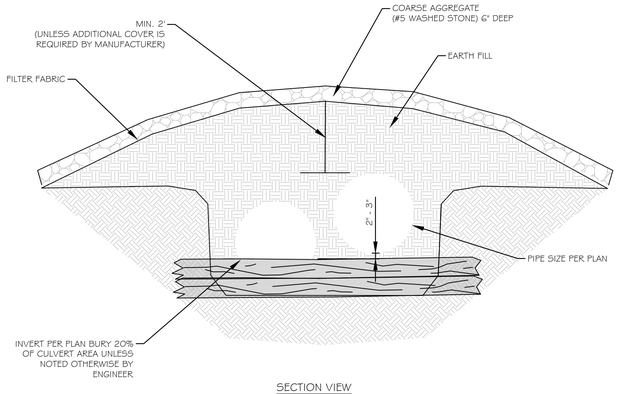
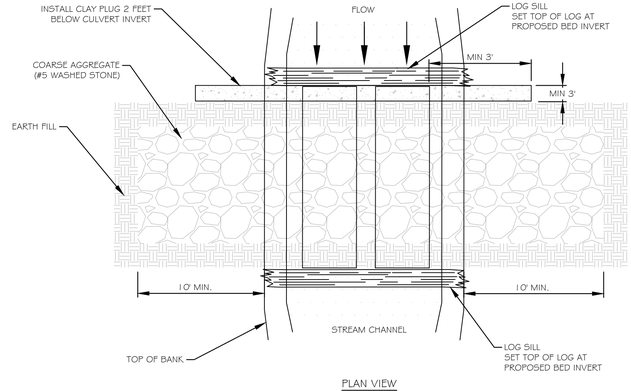


SECTION VIEW

NOTES:

1. CONSTRUCT STREAM CROSSING WHEN FLOW IS LOW.
2. INSTALL STREAM CROSSING PERPENDICULAR TO FLOW.
3. CONTRACTOR TO COORDINATE APPROPRIATE BEDDING MATERIAL WITH MANUFACTURER.
4. FILTER FABRIC USED SHALL BE NCDOT TYPE 2 ENGINEERING FABRIC OR EQUIVALENT.
5. WIDTH OF TYPICAL FARM CROSSINGS SHALL BE PER PLAN OR A MINIMUM OF 12'.
6. WHEN REQUIRED, CONTRACTOR TO ENSURE PIPE MATERIAL AND COVER MEET H-20 LOADING REQUIREMENTS.



PLAN VIEW

PROPOSED CULVERT CROSSING

NTS

302 Jefferson Street, Suite 110
Raleigh, NC 27605
Main: 919.829.9909
www.res.us

Engineering Services Provided By:
Angler Environmental, LLC
License: F-1428

SEAL

PLOT DATE:
6/23/2020

REVISIONS:

RELEASED FOR:
PRELIMINARY - NOT FOR CONSTRUCTION

PROJECT NAME:
MONKEY WALL MITIGATION SITE
MITCHELL COUNTY, NORTH CAROLINA

DRAWING TITLE:
DETAILS

PROJECT NUMBER:	100918
PROJECT MANAGER:	KMC
DESIGNED:	MKG
DRAWN:	TRS
CHECKED:	AFM

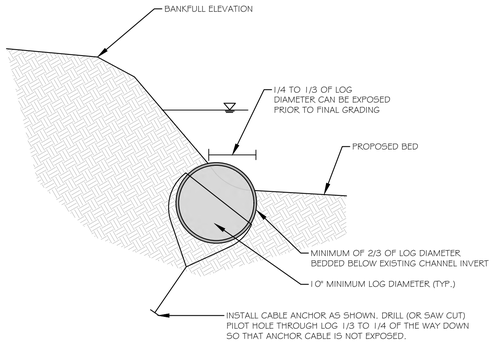
SHEET NUMBER:

D2

FILE NAME:R:\Regis\dropboxgis\projects\NC\Monkey Wall\CAD\DWG\100918_SHT_DETAIL.dwg SAVED BY: Fmullen

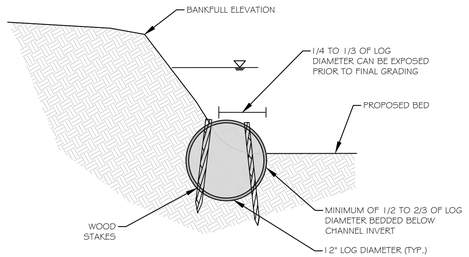
NOTES:

1. LOGS SHOULD BE AT LEAST 10" IN DIAMETER, 5-8' LONG, RELATIVELY STRAIGHT, AND HARDWOOD.
2. CABLE ANCHORS SHOULD BE PLACED 1' TO 3' FROM EACH END OF LOG.



LOG TOE PROTECTION

NTS

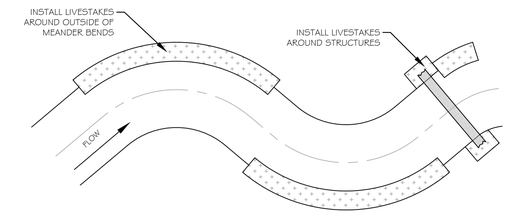


NOTES:

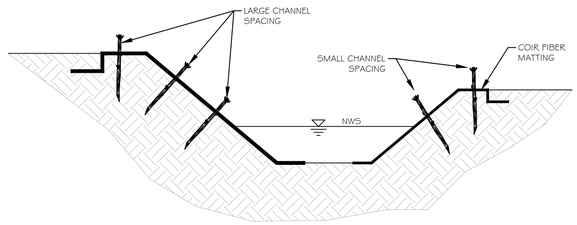
1. INSTALL STAKES ON 3' CENTERS ON EACH SIDE OF ROLL. TOP OF STAKE SHOULD NOT EXTEND ABOVE ROLL.
2. EXCAVATE A SMALL TRENCH (DEPTH APPROX 1/2 TO 2/3 OF LOG DIAM) FOR PLACEMENT OF ROLL.
3. COIR LOGS SHALL BE 10 FT LONG AND HAVE A DIAMETER OF 12 IN.

COIR LOG (TOE PROTECTION)

NTS



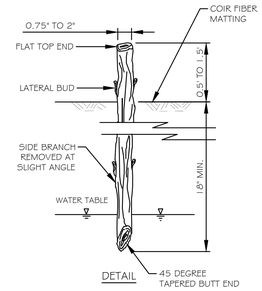
PLAN VIEW



TYPICAL SECTION

NOTES:

1. SEE TABLE ON PLANTING SHEET FOR ACCEPTABLE SPECIES AND COMPOSITION.
2. LIVE STAKES SHOULD BE 2 TO 3 FEET LONG AND 0.75 TO 2 INCHES IN DIAMETER.
3. LIVE STAKES SHALL BE PLANTED ON 1.5' ALTERNATING SPACING ON LARGE CHANNELS (POOL DEPTH > 2FT) AND 1.0' ALTERNATING SPACING ON SMALL CHANNELS (POOL DEPTH < 2FT).
4. LIVE STAKES SHALL BE PLANTED ON ALL RESTORATION REACHES AND ALONG ALL ENHANCEMENT REACHES AS SHOWN ON LIVE STAKE SHEET(S).



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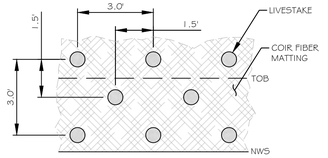
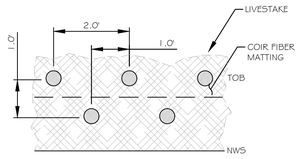


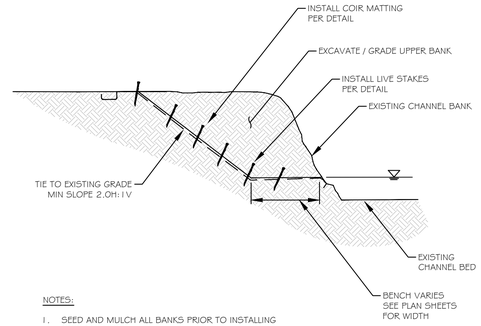
LIVESTAKE SPACING
LARGE CHANNEL



LIVESTAKE SPACING
SMALL CHANNEL

LIVE STAKING

NTS

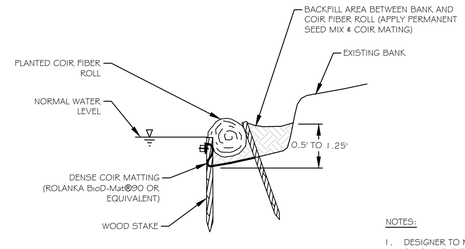


NOTES:

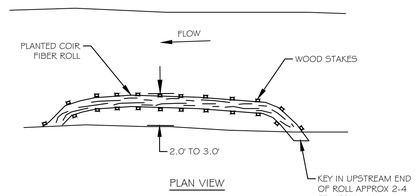
1. SEED AND MULCH ALL BANKS PRIOR TO INSTALLING COIR MATTING.

TYPICAL BANK GRADING

NTS



SECTION VIEW



PLAN VIEW

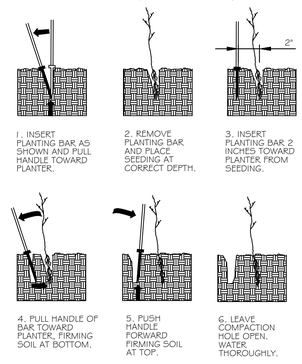
NOTES:

1. DESIGNER TO MARK LOCATIONS AND DIMENSIONS OF SILLS IN THE FIELD PRIOR TO CONSTRUCTION.
2. INSTALL STAKES ON 3' CENTERS ON EACH SIDE OF ROLL. TOP OF STAKE SHOULD NOT EXTEND ABOVE ROLL.
3. EXCAVATE A SMALL TRENCH (APPROX 2" DEEP) FOR PLACEMENT OF ROLL.

VEGETATED SILL DEFLECTOR

NTS

DIBBLE PLANTING METHOD
USING THE KBC PLANTING BAR



PLANTING NOTES:

PLANTING BAG
DURING PLANTING, SEEDLINGS SHALL BE KEPT IN A MOIST CANVAS BAG OR SIMILAR CONTAINER TO PREVENT THE ROOT SYSTEMS FROM DRYING.

KBC PLANTING BAR
PLANTING BAR SHALL HAVE A BLADE WITH A TRIANGULAR CROSS SECTION, AND SHALL BE 12 INCHES LONG, 4 INCHES WIDE AND 1 INCH THICK AT CENTER.

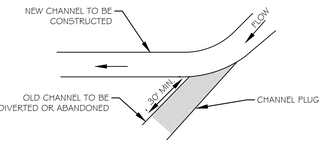
ROOT PRUNING
ALL SEEDLINGS SHALL BE ROOT PRUNED, IF NECESSARY, SO THAT NO ROOTS EXTEND MORE THAN 10 INCHES BELOW THE ROOT COLLAR.

NOTES:

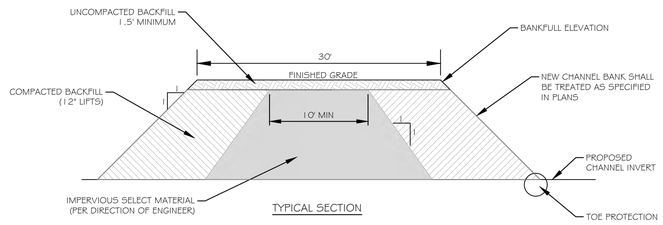
BARE ROOTS SHALL BE PLANTED 6 FT. TO 10 FT. ON CENTER, RANDOM SPACING, AVERAGING 8 FT. ON CENTER. APPROXIMATELY 680 PLANTS PER ACRE.

BARE ROOT PLANTING

NTS



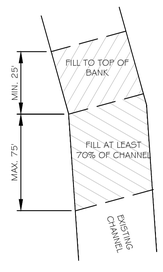
PLAN VIEW

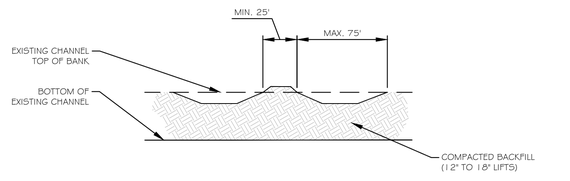


TYPICAL SECTION

CHANNEL PLUG

NTS





NOTES:

1. FILL EXISTING CHANNEL TO TOP OF BANK ELEVATION WHEN POSSIBLE.
2. CHANNEL MUST BE FILLED IN 12" TO 18" LIFTS.
3. IF CHANNEL CANNOT BE COMPLETELY FILLED TO TOP OF BANK, FILL TO 6" ABOVE TOP OF BANK FOR 25' OUT OF EVERY 100' SEGMENT.

CHANNEL BACKFILL

NTS

302 Jefferson Street, Suite 110
Raleigh, NC 27605
Main: 919.829.9909
www.res.us

Engineering Services Provided By:
Angler Environmental, LLC
License: F-1428

SEAL

PLOT DATE:
6/23/2020

REVISIONS:

RELEASED FOR:
PRELIMINARY - NOT FOR CONSTRUCTION

PROJECT NAME:
MONKEY WALL MITIGATION SITE
MITCHELL COUNTY, NORTH CAROLINA

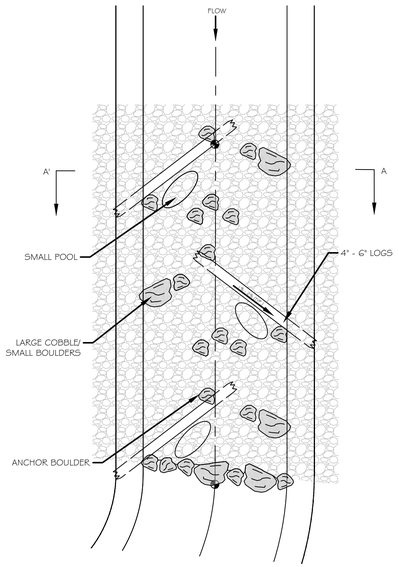
DRAWING TITLE:
DETAILS

PROJECT NUMBER:	100918
PROJECT MANAGER:	KMC
DESIGNED:	MKG
DRAWN:	TRS
CHECKED:	AFM

SHEET NUMBER:

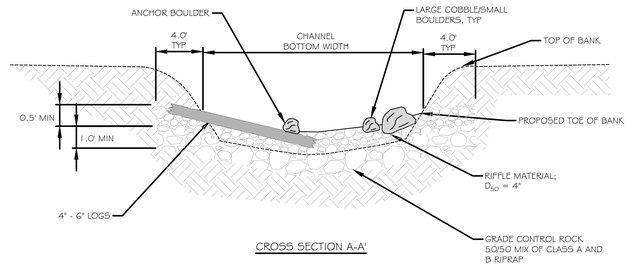
D3

FILE NAME:R:\Resgis\dropboxgis\projects\NC\Monkey Wall\CAD\DWG\100918_SHT_DETAIL.dwg SAVED BY: Fmullen

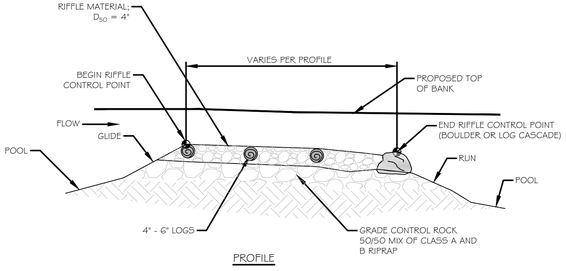


NOTES:

1. RIFFLE GRADE CONTROL STRUCTURES SHALL BE INSTALLED IN NEWLY GRADED CHANNEL SECTIONS, AS SPECIFIED ON THE PLAN SHEETS.
2. ELEVATION CONTROL POINTS SHALL BE DESIGNATED AT THE BEGINNING AND END OF RIFFLE POINTS TO ESTABLISH PART OF THE PROFILE OF THE CHANNEL. SURVEY OF CONTROL POINTS SHALL BE REQUIRED TO ESTABLISH ACCURATE RIFFLE INSTALLATION WITHIN A TOLERANCE OF ±0.2'.
3. GRADE CONTROL ROCK SHALL BE COMPRISED OF A 50/50 MIX OF CLASS A AND B RIPRAP. GRADE CONTROL ROCK SHALL BE PLACED SUCH THAT THE ADDITION OF THE SPECIFIED THICKNESS OF RIFFLE MATERIAL SHALL ACHIEVE THE DESIGNATED GRADES.
4. RIFFLE MATERIAL SHALL BE COMPRISED OF ROCKS AND LOGS. THE ROCK MATERIAL COMPOSITION SHALL MATCH TABLE 1. RIFFLE MATERIAL SHALL BE EXCAVATED, STOCKPILED, AND RE-USED FROM ABANDONED CHANNEL SECTIONS. ROCK RIFFLE MATERIAL OBTAINED OFFSITE SHALL BE SLIGHTLY ROUNDED, "RIVER-TYPE" ROCK, UNLESS OTHER ROCK CHARACTERISTICS ARE APPROPRIATE FOR THE CHANNEL.
5. SPACING AND NUMBER OF LOGS SHOULD BE BASED ON RIFFLE LENGTH AND MAY VARY BASED ON LOG AVAILABILITY. LOGS SHOULD BE SPACED EQUALLY AND ANCHORED TO THE CHANNEL BED WITH BOULDERS.
6. THE PLACEMENT OF GRADE CONTROL ROCK AND/OR RIFFLE MATERIAL SHALL BE DONE IN A MANNER TO CREATE A SMOOTH PROFILE, WITH NO ABRUPT "JUMP" (TRANSITION) BETWEEN THE UPSTREAM POOL-GLIDE AND THE RIFFLE, AND LIKEWISE NO ABRUPT "DROP" (TRANSITION) BETWEEN THE RIFFLE AND THE DOWNSTREAM RUN-POOL. THE FINISHED CROSS SECTION OF THE RIFFLE MATERIAL SHALL GENERALLY MATCH THE SHAPE AND DIMENSIONS SHOWN ON THE RIFFLE TYPICAL SECTION WITH SOME VARIABILITY OF THE THALWEG LOCATION AS A RESULT OF THE SMALL POOLS AND LOGS.
7. THE END OF RIFFLE CONTROL POINT MAY TIE IN TO ANOTHER IN-STREAM STRUCTURE (LOG SILL, J-HOOK, ETC.). NO LOGS SHOULD BE INCLUDED WITHIN THE FOOTPRINT OF THE PROPOSED STRUCTURE.
8. THE CONSTRUCTED RIFFLE SHALL BE KEYED IN TO THE STREAM BANKS AND/OR BED AS DESIGNATED BY THE DESIGNER. THE "KEY" SHALL EXTEND BEYOND THE TOP OF BANK FOR THE LENGTH OF THE RIFFLE. WHERE PRESERVATION OF EXISTING STREAM BANK VEGETATION IS A PRIORITY A "KEY" MAY NOT BE USED (OR THE DIMENSIONS MAY BE ADJUSTED) TO LIMIT DISTURBANCE.



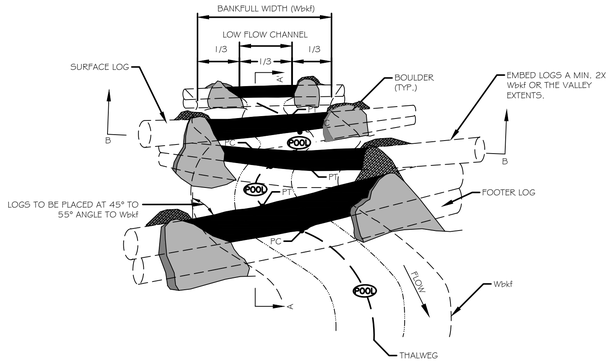
CROSS SECTION A-A'



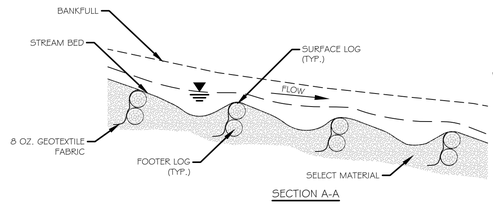
PROFILE

RIFFLE GRADE CONTROL

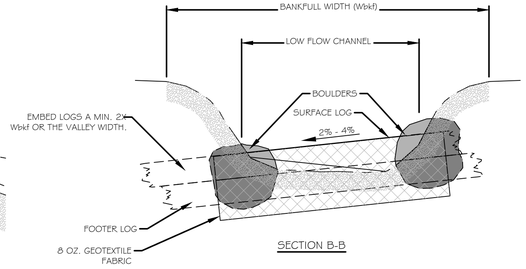
NTS



PLAN VIEW



SECTION A-A



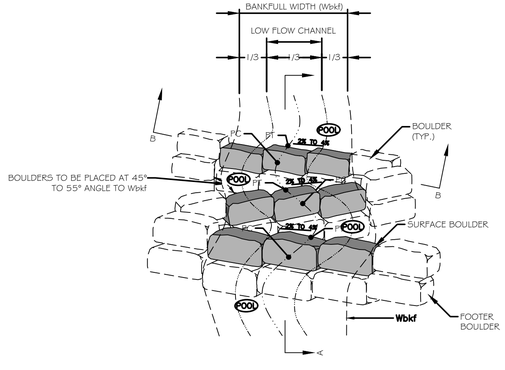
SECTION B-B

LOG CASCADE

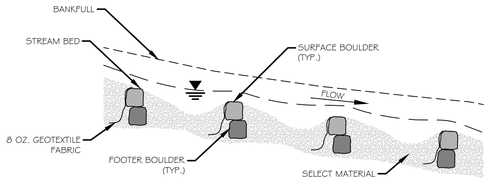
NTS

NOTES:

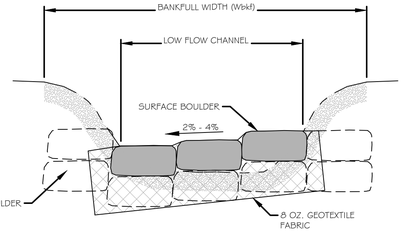
1. THIS DETAIL CAN BE USED FOR CONSTRUCTING LOG AND BOULDER CASCADES FOR HYDRAULIC SLOPES GREATER THAN 4%.
2. CASCADE STEPS SHALL BE CONSTRUCTED WITH 1 ROW OF FOOTER BOULDERS OR LOGS AND 1 ROW OF HEADER BOULDERS OR LOGS.
3. PLACE HEADER BOULDERS OR LOGS SLIGHTLY UPSTREAM ON TOP OF THE FOOTER BOULDERS OR LOGS.
4. PLACE BOULDERS AND BACKFILL WITH SELECT MATERIAL.
5. THE GEOTEXTILE FABRIC SHALL EXTEND FROM THE BOTTOM OF THE FOOTER TO THE FINISHED GRADE ELEVATION AND SHALL BE PLACED THE ENTIRE LENGTH OF THE STRUCTURE.
6. CASCADES SHALL BE CONSTRUCTED SO THAT LOW FLOW IS CENTERED WITHIN THE CENTER 1/3 OF THE BANKFULL CHANNEL.
7. CASCADE STEPS SHALL SLOPE 2-4% WITH THE HIGHEST PORTION OF THE STEP ON THE DOWNSTREAM LEADING EDGE.
8. REFER TO THE THALWEG PROFILE(S) FOR DROP HEIGHT BETWEEN CASCADE STEPS.
9. ALL MATERIALS ARE TO BE APPROVED BY ENGINEER OR ENGINEER'S ONSITE CONSTRUCTION OBSERVER.



PLAN VIEW



SECTION A-A



SECTION B-B

BOULDER CASCADE

NTS

302 Jefferson Street, Suite 110
Raleigh, NC 27605
Main: 919.829.9909
www.res.us

Engineering Services Provided By:
Angler Environmental, LLC
License: F-1428

SEAL

REVISIONS:

RELEASED FOR:
PRELIMINARY - NOT FOR CONSTRUCTION

PLOT DATE:
6/23/2020

PROJECT NAME:
MONKEY WALL MITIGATION SITE
MITCHELL COUNTY, NORTH CAROLINA

DRAWING TITLE:
DETAILS

PROJECT NUMBER:	100918
PROJECT MANAGER:	KMC
DESIGNED:	MKG
DRAWN:	TRS
CHECKED:	AFM

SHEET NUMBER:

D4

FILE NAME:R:\Resgis\dropboxgis\projects\NC\Monkey Wall\CAD\DWG\100918_SHT_DETAIL.dwg SAVED BY: Fmullen

Appendix B –
Data/Analysis/Supplementary Information

IRT Meeting Notes

M E M O R A N D U M

302 Jefferson Street, Suite 110 Raleigh, North Carolina 27605 919.209.1052 tel. 919.829.9913 fax

TO: **NC IRT, NC DMS, Wilmington District COE**

FROM: **Bob White, RES**

DATE: **9-4-18**

RE: **RES Monkey Wall Full Delivery Wetland Mitigation Site**
IRT Site Visit, July 30, 2018

Attendees: Todd Tugwell (USACE), Mac Haupt (NC DWR), Harry Tsomides (NC DMS), Amanda Jones (USACE), Paul Wiesner (NC DMS), Periann Russell (NC DMS), Kirsten Ullman (NC DMS), Bob White (RES), Daniel Ingram (RES), David Godley (RES), Jeff Baker (RES).

Site Visit Date: July 30, 2018, (Weather: Mostly Sunny ~ 85F)

The Monkey Wall site is located on the north side of Fork Mountain Road, north of Bakersville, Mitchell County, North Carolina. The project site is located at approximately 36.054691°N, and -82.207310°W. The site is within the French Broad 06010108 watershed and is comprised of two unnamed tributaries on an approximately 80-acre tract of land. The confluence of the tributaries is in the project easement and the continuing second order stream flows to Big Rock Creek approximately 0.4 miles downstream. Big Rock Creek is designated by the NCWRC as a Hatchery Supported Trout Water.

Field meeting comments:

- The group met and parked on the eastern (8-acre) parcel and proceeded downslope to restoration reach G2-B which flows on the 8-acre parcel for approximately 350 feet. This area of the reach is an area of concentrated cattle use and the stream is the only source of water. Two shelters are in this vicinity and will be removed during construction. The consensus of the group was that restoration is the appropriate treatment for the reach.

- The group next accessed the 72-acre parcel from the residential drive off Fork Mountain Road near three on-site barns at the confluence of the two project tributaries (G2-B to the east and G1-C to the west). All three barns will be removed during construction. This is an area of significant livestock use as the barns provide shade and shelter from the elements. Additionally, the cattle are fed immediately upslope. Here the banks are unstable and eroding, the bed exhibits a surplus of sediment from upslope erosion and the incised channel infrequently access the floodplain. Jurisdictional wetlands are present at the confluence.

- Further upslope on G1-C the channel is incised with occasional cattle access points. This character is present throughout the reach to G1-B.

- G1-B is an area that will benefit from an EII treatment through cattle exclusion fencing, invasive vegetation control and planting).

- Upstream from G1-B is preservation reach G1-A. It was discussed that the lower reach of G1-A exhibits characteristic of the potential design for the onsite restoration reaches and could be used as a reference. The head of G1-A is a seep which was observed by the group. The area surrounding the seep is a jurisdictional wetland.

- The top of the eastern tributary was next examined starting at the seep (spring) above the top of G2-A. Below the seep a channel does not form until surface water flows across the cattle and farm road and into reach G2-A.

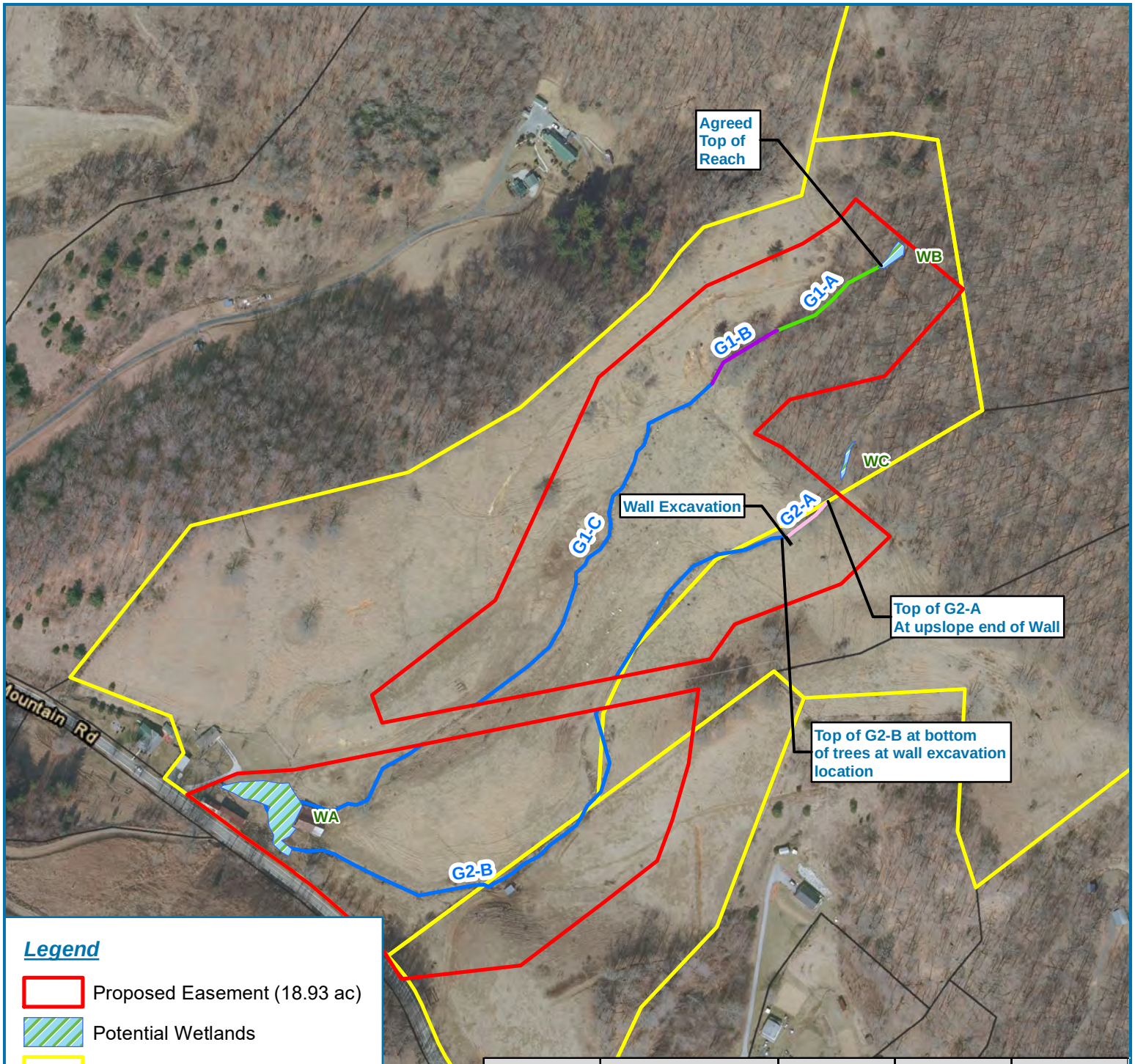
- After examining the area below the farm road, it was agreed that flow is subsurface, and that G2-A begins at the top of a rock wall to a location below the "crook" in the wall at the lowest mature tree. RES excavated the rock wall at this point before the field meeting to examine flow which was observed.

- G2-B at the point of the excavation is covered by a rock "wall". This wall was reportedly constructed in the early 1900's while clearing rocks from the adjacent pastures. A discussion ensued concerning what to call the aquatic feature below the wall. Amanda Jones (USACE) determined that the stream feature is non-jurisdictional. Todd Tugwell (USACE) expressed that the stream may not exhibit a bed and bank and could flow subsurface below the wall. The position of RES is that removal of the wall is analogous to "daylighting" stream channel as a form of restoration.

- Overall, the IRT members agree that the Monkey Wall Site is suitable to cold-water stream mitigation. RES and NC DMS understand that final design approaches and crediting rationale must be fully justified in the mitigation plan.

- It was recognized that Mr. Tugwell expressed concern that the soils and geology of the channel below the rock wall may not support continued surface flow within a channel. It is understood that the restored streams will exhibit a defined bed and bank and will be considered jurisdictional streams at project closeout. The mitigation plan will show the location of proposed stream gauges. It is understood that RES will document annual continuous flow of 30 days.

- A PJD will be obtained on the project site and the associated PJD map will show the origin and location of all streams and wetlands upon the subject site.



Legend

- Proposed Easement (18.93 ac)
- Potential Wetlands
- Project Parcels
- Parcels

Stream Mitigation

- Restoration
- Enhacement II (2.5:1)
- Enhancement II (5:1)
- Preservation

Reach	Approach	Length	Ratio	SMU
G1-A	Preservation	251	10:1	25
G1-B	Enhacement II	190	5:1	38
G1-C	Restoration	1,441	1:1	1,441
G2-A	Enhacement II	114	2.5:1	46
G2-B	Restoration	1,258	1:1	1,258
Total		**3,254**		**2,808**
Non-Standard Buffer Width Adjusted SMUs				***3,456***

0 150 300
Feet

IRT Site Visit Notes (7/30/2018)

Monkey Wall Mitigation Site

Mitchell County, North Carolina

Date: 9/4/2018
Drawn by: MDE

res

Document Path: S:\@RES GIS\Projects\NC\Monkey Wall\MXD\Proposal\Option B\Figure 7 - Conceptual Map - OPTION B- Monkey Wall.mxd

Megan Engel

From: Haupt, Mac <mac.haupt@ncdenr.gov>
Sent: Monday, September 17, 2018 4:50 PM
To: Wiesner, Paul; Todd Tugwell; Amanda.jones@usace.army.mil; Russell, Periann; Ullman, Kirsten J; Russell, Periann
Cc: Bob White; Tsomides, Harry; Daniel Ingram; David Godley
Subject: [EXTERNAL] RE: Monkey Wall_100069_ 7-30-18 IRT Site Meeting Memo_2018

Paul, Daniel, Bob,

In general, I believe the minutes reflect what we discussed on site.

However, I do recall a couple of areas excavated in the rock wall area that did not exhibit flow, or any sign of water. There may have been some water at the top of the rock wall, but I thought as we walked down there was a real question as to whether "daylighting" the valley at the rock wall would in fact yield a flowing stream.

In addition, the total SMUs with non-standard buffer width adjustment will likely need to be modified after our discussions with RES on October 11th.

Thanks,
Mac

From: Wiesner, Paul
Sent: Wednesday, September 5, 2018 4:06 PM
To: Todd Tugwell <todd.tugwell@usace.army.mil>; Amanda.jones@usace.army.mil; Russell, Periann <periann.russell@ncdenr.gov>; Ullman, Kirsten J <Kirsten.Ullman@NCDENR.gov>; Haupt, Mac <mac.haupt@ncdenr.gov>; Russell, Periann <periann.russell@ncdenr.gov>
Cc: Bob White (bwhite@res.us) <bwhite@res.us>; Tsomides, Harry <harry.tsomides@ncdenr.gov>; Daniel Ingram <dingram@res.us>; David Godley <dgodley@res.us>
Subject: Monkey Wall_100069_ 7-30-18 IRT Site Meeting Memo_2018

All:

RES sent out meeting minutes on Monday, August 20, 2018 for this post contract IRT site visit. DMS asked for several revisions.

The revised meeting minutes have been received by RES and are attached.

Please let us know if you have any additional comments/ concerns.

Thanks

Paul Wiesner
Western Regional Supervisor
North Carolina Department of Environmental Quality
Division of Mitigation Services

828-273-1673 Mobile
paul.wiesner@ncdenr.gov

Western DMS Field Office
5 Ravenscroft Drive
Suite 102
Asheville, N.C. 28801

From: Bob White [mailto:bwhite@res.us]
Sent: Monday, August 20, 2018 5:19 PM
To: Tsomides, Harry <harry.tsomides@ncdenr.gov>; Todd Tugwell <todd.tugwell@usace.army.mil>; Wiesner, Paul <paul.wiesner@ncdenr.gov>; Amanda.jones@usace.army.mil; Russell, Periann <periann.russell@ncdenr.gov>; Ullman, Kirsten J <Kirsten.Ullman@NCDENR.gov>
Subject: [External] Monkey Wall notes

Please see notes, I look forward to comments.
Sincerely,

Bob White
Project Manager
RES | res.us
Mobile: 239.233.7570

Megan Engel

From: Tsomides, Harry <harry.tsomides@ncdenr.gov>
Sent: Thursday, August 23, 2018 1:13 PM
To: Bob White
Cc: Wiesner, Paul; Russell, Periann; Ullman, Kirsten J
Subject: [EXTERNAL] RE: [External] Monkey Wall notes

Bob,
I left you a voice mail yesterday afternoon about this. Following are the DMS comments. Please address these and send a revised memo back to me. We will get it over to the IRT. If you have any questions please give me a call. I would like this by tomorrow noon if at all possible.
Harry

- Please include a map of the site with the memo. Areas of interest discussed in the memo should be included on the map for reference.

- Please include the following statement in the memo: RES and DMS understand that final design approaches and crediting rationale must be fully justified in the mitigation plan.

- The IRT stated that the restored streams will need to have a defined bed and bank and will need to be a considered jurisdictional streams at project closeout to receive mitigation stream credit. The mitigation plan should show the location of all proposed stream flow gauges. Project streams will need to show a yearly minimum of 30-days of continuous flow.

- There was discussion about where mitigation credit would begin on reaches G2-A and G2-B. Please indicate that a PJD will be obtained on the project site and the associated PJD map will show the origin and location of all streams and wetlands on the site. The starting location of reach and the associated crediting will be thoroughly explained and justified in the mitigation plan.

- It is stated “Overall, the IRT members agree that the Monkey Wall Site is suitable to cold-water stream mitigation at the SMUs proposed. Remove “at the SMUs proposed”. The purpose of the contracting meeting is to get IRT agreement on suitability of the project for mitigation. It is the providers responsibility during project development to justify the SMUs proposed.

- It is stated “Should the [rock wall] channel not maintain surface flow a credit adjustment would be assessed following success monitoring.”. Delete or revise statement. Performance criteria and monitoring requirements are developed in the mitigation plan, not agreed upon at the contracting meeting. In addition, credit adjustments for mitigation plan-approved project components not meeting performance criteria are made during the credit release schedule, not following success monitoring.

- It is stated “Amanda Jones (USACE determined that the stream feature is non-jurisdictional.” Please complete the set of parentheses around “USACE”.

- Add all attendees who were on site to the attendee section; Harry Tsomides; your construction guy (cannot recall his name); anyone else not listed ; correct the spelling of Periann’s last name.

==========
Harry Tsomides

Project Manager
Division of Mitigation Services
NC Department of Environmental Quality

Tel. (828) 545-7057
Harry.Tsomides@ncdenr.gov

5 Ravenscroft Drive
Suite 102
Asheville, NC 28801

From: Bob White [mailto:bwhite@res.us]
Sent: Monday, August 20, 2018 5:19 PM
To: Tsomides, Harry <harry.tsomides@ncdenr.gov>; Todd Tugwell <todd.tugwell@usace.army.mil>; Wiesner, Paul <paul.wiesner@ncdenr.gov>; Amanda.jones@usace.army.mil; Russell, Periann <periann.russell@ncdenr.gov>; Ullman, Kirsten J <Kirsten.Ullman@NCDENR.gov>
Subject: [External] Monkey Wall notes

Please see notes, I look forward to comments.
Sincerely,

Bob White
Project Manager
RES | res.us
Mobile: 239.233.7570

Morphological Parameters

Monkey Wall Morphological Parameters

	Existing										Design					
	G1A		G1B		G1C		G1C (D/S G2)		G2		G1C (U/S G2)		G1C (D/S G2)		G2	
Feature	Riffle/Step		Riffle		Riffle		Riffle		Riffle		Riffle	Pool	Riffle	Pool	Riffle	Pool
Drainage Area (ac)	12		14		41		87		34		41		87		34	
Drainage Area (mi^2)	0.02		0.02		0.06		0.14		0.05		0.06		0.14		0.05	
NC Regional Curve Discharge (cfs)[2]	5		6		12		22		11		12		22		11	
VA Regional Curve Discharge (cfs)[3]	2		2		5		9		4		5		9		4	
Design/Calculated Discharge (cfs)[1]	20-25		20-30		38-50		38-50		30-45		**50**		**70**		**40**	
Dimension																
BF Cross Sectional Area (ft^2)	3.3		3.7		4.0		8.1		3.7		5.0	9.5	8.0	15.0	5.0	10.0
BF Width (ft)	6.7		7.4		6.0		7.8		5.4		8.7	9.5	11	12	7.7	8.6
BF Mean Depth (ft)	0.5		0.5		0.7		1.0		0.7		0.6	1.0	0.7	1.2	0.7	1.2
BF Max Depth (ft)	0.7		0.7		1.3		1.7		1.4		0.9	1.7	1.2	2.2	1.0	1.9
Wetted Perimeter (ft)	7.1		7.7		7.1		9.3		6.3		9.1	10.3	11.4	13.1	8.3	9.7
Hydraulic Radius (ft)	0.5		0.5		0.6		0.9		0.6		0.7	0.9	0.8	1.1	0.8	1.0
Width/Depth Ratio	13.9		15.0		8.7		7.6		7.7		15.0	n/a	15.0	n/a	12.0	n/a
Floodprone Width (ft)	8.2		10		15.2		12.0		9.9		30	n/a	40	n/a	50	n/a
Entrenchment Ratio	1.2		1.3		2.3		1.5		2.3		3.4	n/a	3.6	n/a	6.5	n/a
Bank Height Ratio	1.0		1.0		1.6		1.1		1.7		1.0	1.0	1.0	1.0	1.0	1.0
Materials																
Description (D50)	cobble/boulders		cobble/boulders		cobble/gravel		cobble/gravel		cobble/gravel		cobble		cobble		cobble	
Profile																
	Min	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Riffle Length (ft)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5	11	8	12	5	14
Run Length (ft)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	n/a	n/a	n/a	n/a	n/a	n/a
Pool Length (ft)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8	16	11	13	8	14
Pool -to-Pool Spacing (ft)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	10	16	17	21	9	20
Additional Reach Parameters																
Valley Length (ft)	272		111		1427		98		1702		1427		98		1702	
Channel Length (ft)	278		120		1498		100		1790		1431		98		1710	
Sinuosity	NA		NA		NA		NA		NA		NA		NA		NA	
Channel Slope (ft/ft)	0.16		0.16		0.15		0.09		0.14		0.15		0.08		0.14	
Rosgen Classification	A/B3		A/B3		G4		C4b		G4		E4a		C4b		E4a	

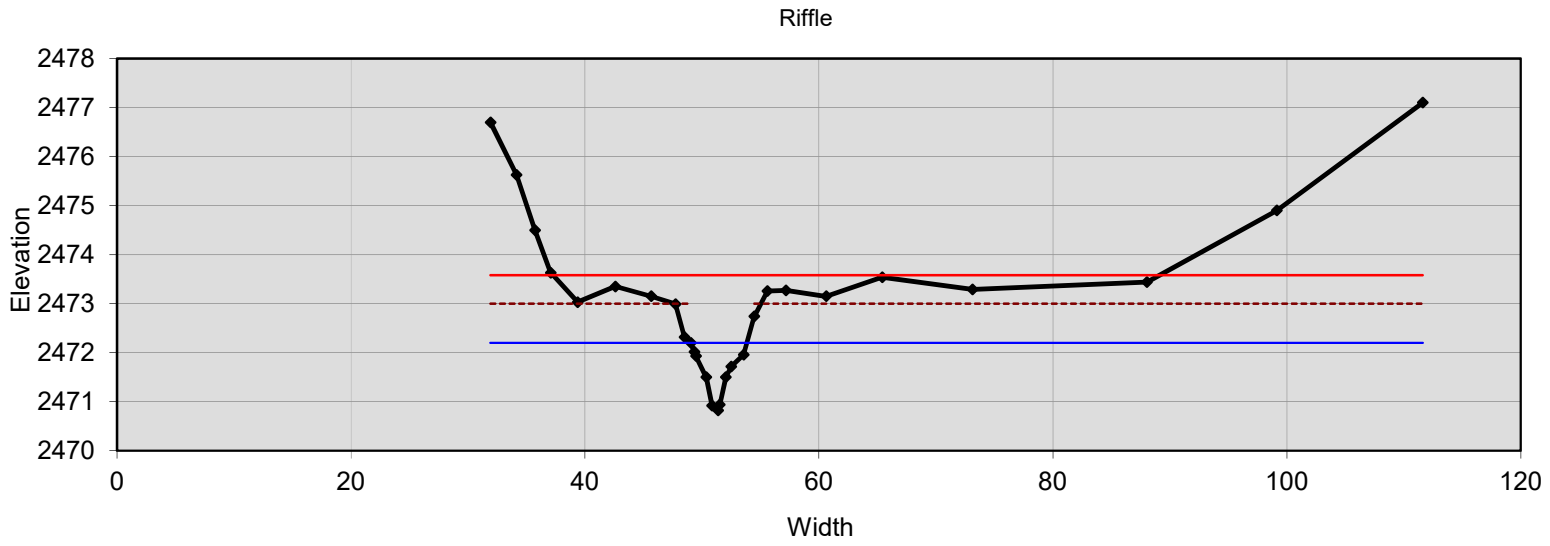
[1] Bankfull stage was estimated using NC Regional Curve equations and existing conditions data

[2] NC Regional Curve equations source: Harman et al. (2000)

[3] VA Regional Curve equations source: Keaton et al. (2005)

Cross Sections of Current Conditions & Reference Reaches

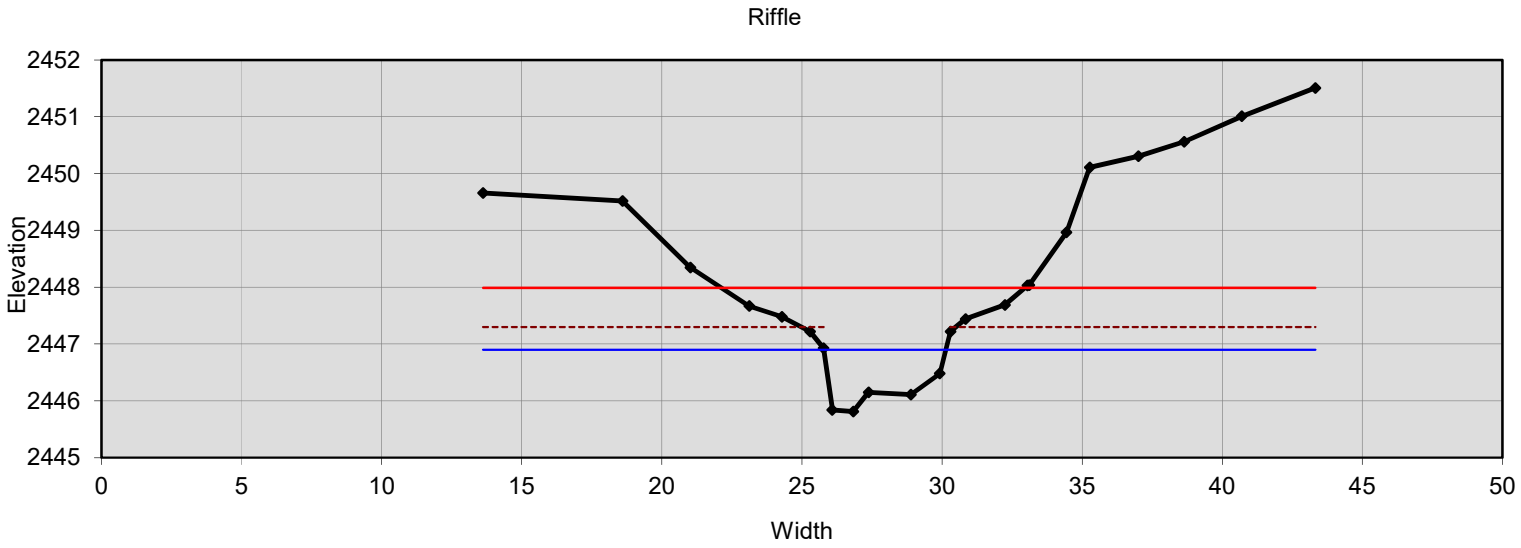
Cross Section G1 - XS1



Bankfull Dimensions		Flood Dimensions		Materials	
3.0	x-section area (ft.sq.)	51.8	W flood prone area (ft)	---	D50 (mm)
4.8	width (ft)	10.8	entrenchment ratio	---	D84 (mm)
0.6	mean depth (ft)	2.2	low bank height (ft)	229	threshold grain size (mm):
1.4	max depth (ft)	1.6	low bank height ratio		
5.7	wetted parimeter (ft)				
0.5	hyd radi (ft)				
7.5	width-depth ratio				

Bankfull Flow		Flow Resistance		Forces & Power	
8.2	velocity (ft/s)	0.045	Manning's roughness	14	channel slope (%)
24.8	discharge rate (cfs)	0.29	D'Arcy-Weisbach fric.	4.66	shear stress (lb/sq.ft.)
1.97	Froude number	---	resistance factor u/u*	1.55	shear velocity (ft/s)
		---	relative roughness	45	unit strm power (lb/ft/s)

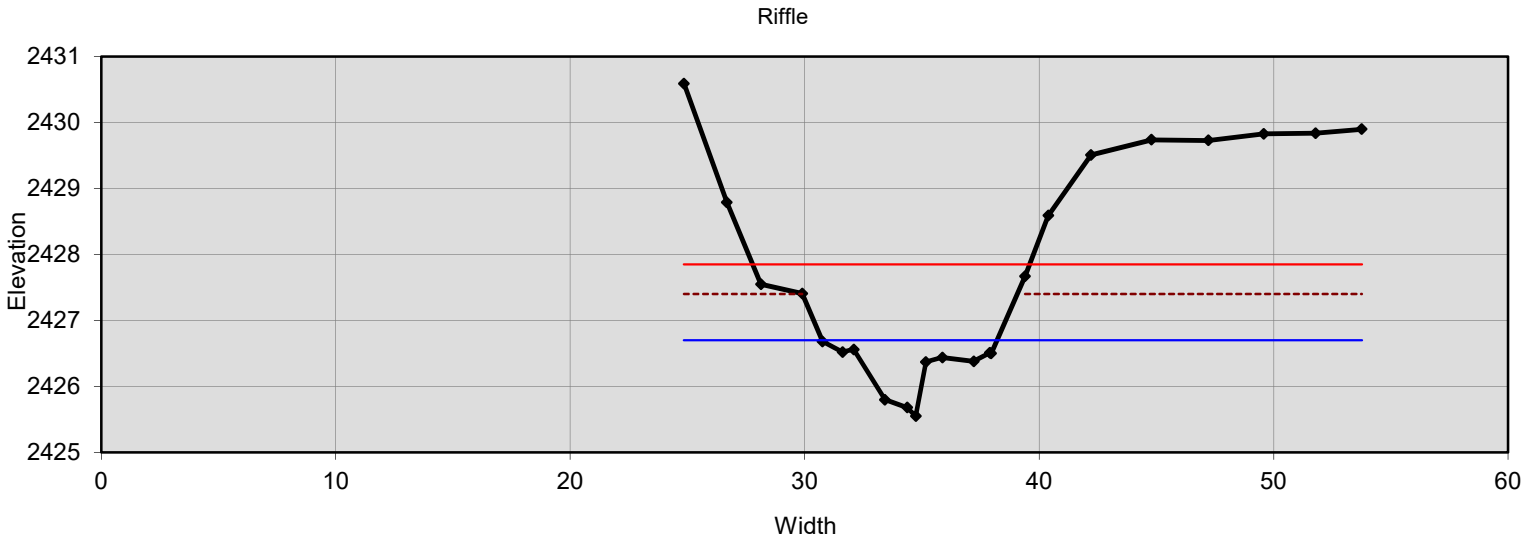
Cross Section G1 - XS2



Bankfull Dimensions		Flood Dimensions		Materials	
3.3	x-section area (ft.sq.)	10.8	W flood prone area (ft)	---	D50 (mm)
4.4	width (ft)	2.5	entrenchment ratio	---	D84 (mm)
0.8	mean depth (ft)	1.5	low bank height (ft)	218	threshold grain size (mm):
1.1	max depth (ft)	1.4	low bank height ratio		
5.6	wetted parimeter (ft)				
0.6	hyd radi (ft)				
5.7	width-depth ratio				

Bankfull Flow		Flow Resistance		Forces & Power	
8.1	velocity (ft/s)	0.045	Manning's roughness	12	channel slope (%)
26.7	discharge rate (cfs)	0.28	D'Arcy-Weisbach fric.	4.44	shear stress (lb/sq.ft.)
1.85	Froude number	---	resistance factor u/u*	1.51	shear velocity (ft/s)
		---	relative roughness	46	unit strm power (lb/ft/s)

Cross Section G1 - XS3



Bankfull Dimensions	
3.3	x-section area (ft.sq.)
7.5	width (ft)
0.4	mean depth (ft)
1.1	max depth (ft)
8.3	wetted parimeter (ft)
0.4	hyd radi (ft)
16.9	width-depth ratio

Flood Dimensions	
11.8	W flood prone area (ft)
1.6	entrenchment ratio
1.8	low bank height (ft)
1.6	low bank height ratio

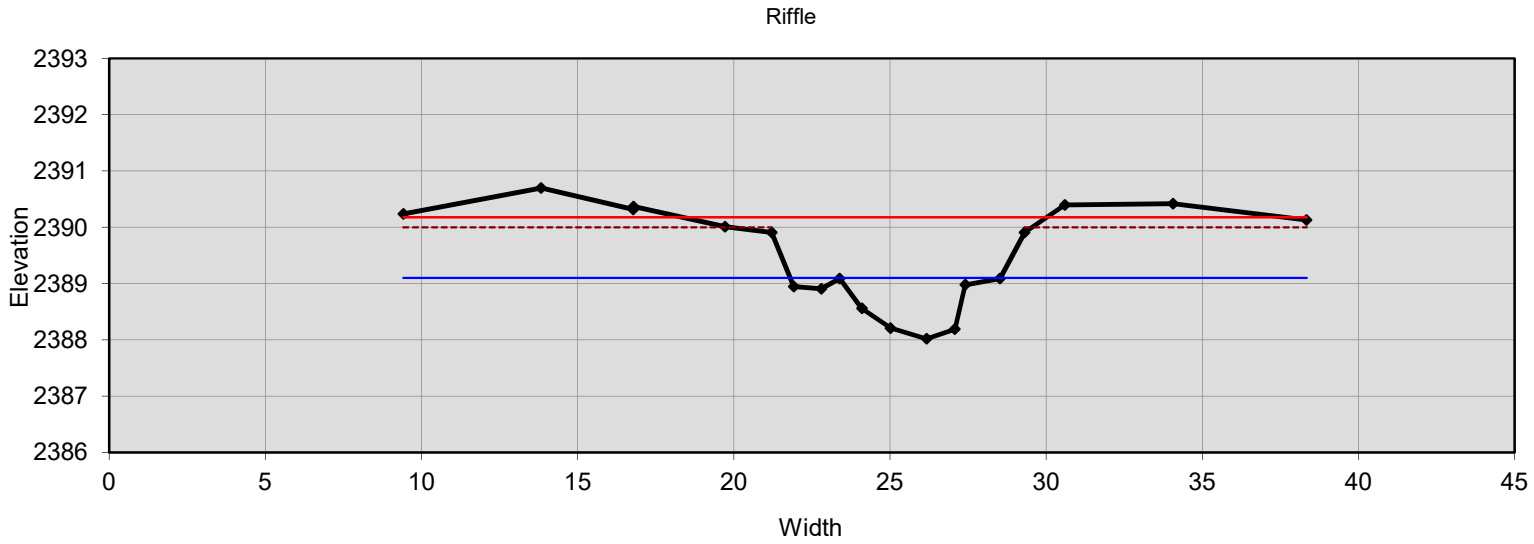
Materials	
---	D50 (mm)
---	D84 (mm)
122	threshold grain size (mm):

Bankfull Flow	
5.7	velocity (ft/s)
18.6	discharge rate (cfs)
1.58	Froude number

Flow Resistance	
0.045	Manning's roughness
0.32	D'Arcy-Weisbach fric.
---	resistance factor u/u*
---	relative roughness

Forces & Power	
10	channel slope (%)
2.47	shear stress (lb/sq.ft.)
1.13	shear velocity (ft/s)
15.6	unit strm power (lb/ft/s)

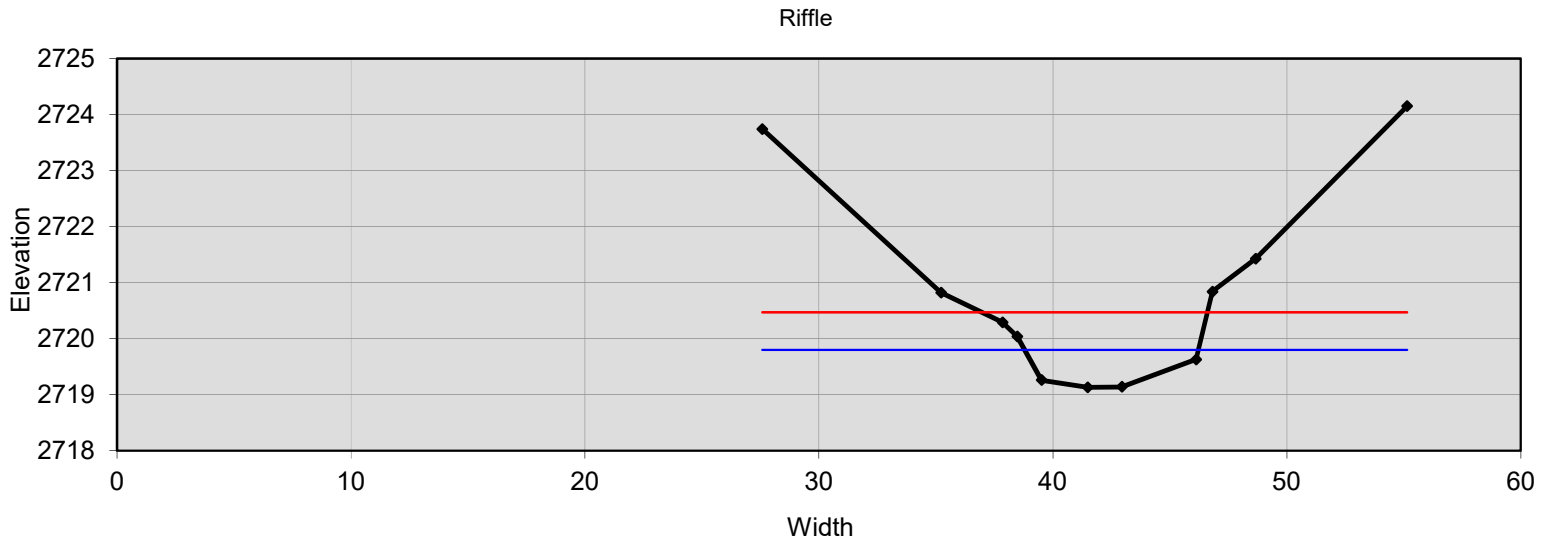
Cross Section G1G2 - XS1



Bankfull Dimensions		Flood Dimensions		Materials	
3.4	x-section area (ft.sq.)	12.0	W flood prone area (ft)	---	D50 (mm)
6.7	width (ft)	1.8	entrenchment ratio	---	D84 (mm)
0.5	mean depth (ft)	2.0	low bank height (ft)	121	threshold grain size (mm):
1.1	max depth (ft)	1.8	low bank height ratio		
7.6	wetted parimeter (ft)				
0.4	hyd radi (ft)				
13.5	width-depth ratio				

Bankfull Flow		Flow Resistance		Forces & Power	
5.7	velocity (ft/s)	0.045	Manning's roughness	9	channel slope (%)
19.2	discharge rate (cfs)	0.31	D'Arcy-Weisbach fric.	2.47	shear stress (lb/sq.ft.)
1.53	Froude number	---	resistance factor u/u*	1.13	shear velocity (ft/s)
		---	relative roughness	16.1	unit strm power (lb/ft/s)

Cross Section G1A/B-XS1



Bankfull Dimensions	
3.7	x-section area (ft.sq.)
7.4	width (ft)
0.5	mean depth (ft)
0.7	max depth (ft)
7.7	wetted parimeter (ft)
0.5	hyd radi (ft)
15.0	width-depth ratio

Flood Dimensions	
9.6	W flood prone area (ft)
1.3	entrenchment ratio
---	low bank height (ft)
---	low bank height ratio

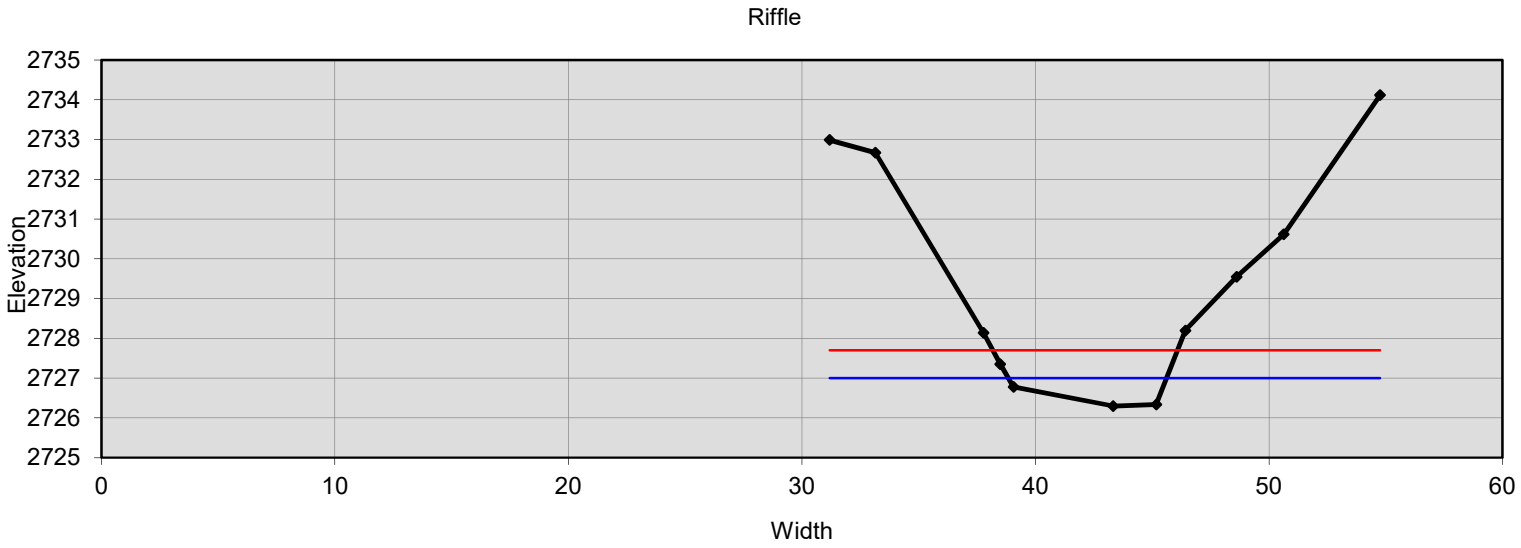
Materials	
---	D50 (mm)
---	D84 (mm)
233	threshold grain size (mm):

Bankfull Flow	
7.3	velocity (ft/s)
26.8	discharge rate (cfs)
1.86	Froude number

Flow Resistance	
0.050	Manning's roughness
0.37	D'Arcy-Weisbach fric.
---	resistance factor u/u*
---	relative roughness

Forces & Power	
16	channel slope (%)
4.75	shear stress (lb/sq.ft.)
1.57	shear velocity (ft/s)
36	unit strm power (lb/ft/s)

Cross Section G1A/B- XS2



Bankfull Dimensions

3.4	x-section area (ft.sq.)
6.8	width (ft)
0.5	mean depth (ft)
0.7	max depth (ft)
7.2	wetted parimeter (ft)
0.5	hyd radi (ft)
13.5	width-depth ratio

Flood Dimensions

7.9	W flood prone area (ft)
1.2	entrenchment ratio
---	low bank height (ft)
---	low bank height ratio

Materials

---	D50 (mm)
---	D84 (mm)
244	threshold grain size (mm):

Bankfull Flow

7.4	velocity (ft/s)
25.1	discharge rate (cfs)
1.91	Froude number

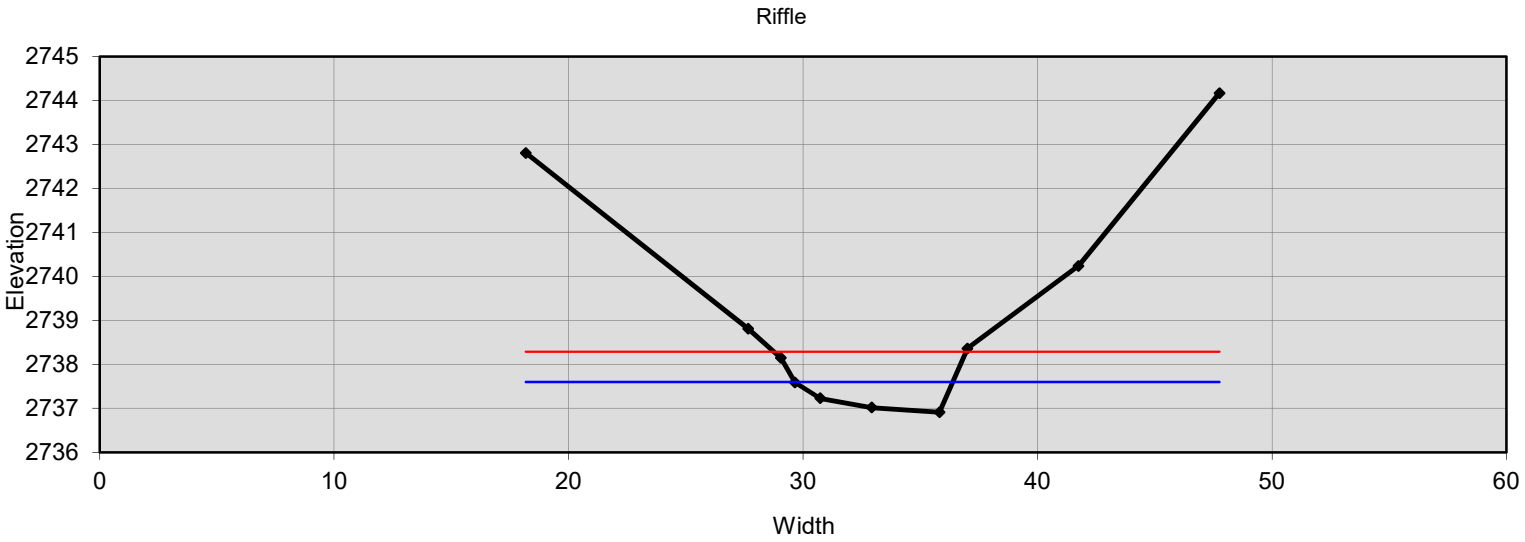
Flow Resistance

0.050	Manning's roughness
0.37	D'Arcy-Weisbach fric.
---	resistance factor u/u*
---	relative roughness

Forces & Power

17	channel slope (%)
4.96	shear stress (lb/sq.ft.)
1.60	shear velocity (ft/s)
39	unit strm power (lb/ft/s)

Cross Section G1A/B-XS3



Bankfull Dimensions	
3.3	x-section area (ft.sq.)
6.7	width (ft)
0.5	mean depth (ft)
0.7	max depth (ft)
7.1	wetted parimeter (ft)
0.5	hyd radi (ft)
13.9	width-depth ratio

Flood Dimensions	
8.2	W flood prone area (ft)
1.2	entrenchment ratio
---	low bank height (ft)
---	low bank height ratio

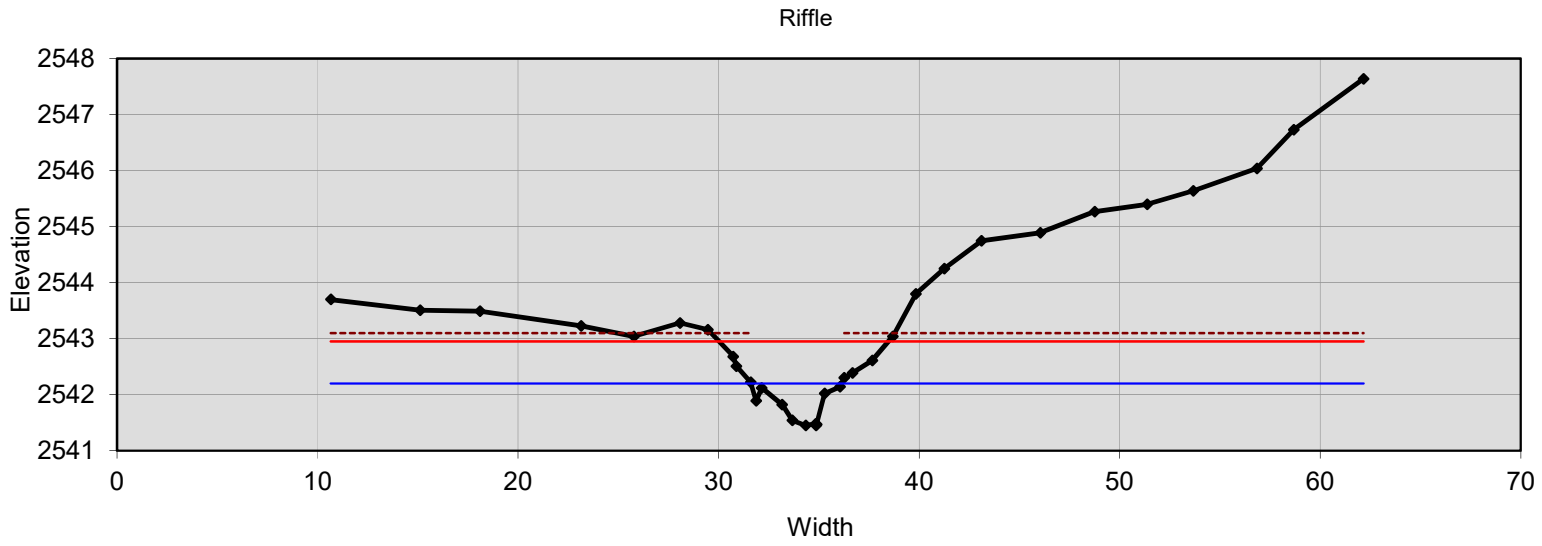
Materials	
---	D50 (mm)
---	D84 (mm)
211	threshold grain size (mm):

Bankfull Flow	
6.9	velocity (ft/s)
22.5	discharge rate (cfs)
1.79	Froude number

Flow Resistance	
0.050	Manning's roughness
0.38	D'Arcy-Weisbach fric.
---	resistance factor u/u*
---	relative roughness

Forces & Power	
15	channel slope (%)
4.30	shear stress (lb/sq.ft.)
1.49	shear velocity (ft/s)
31	unit strm power (lb/ft/s)

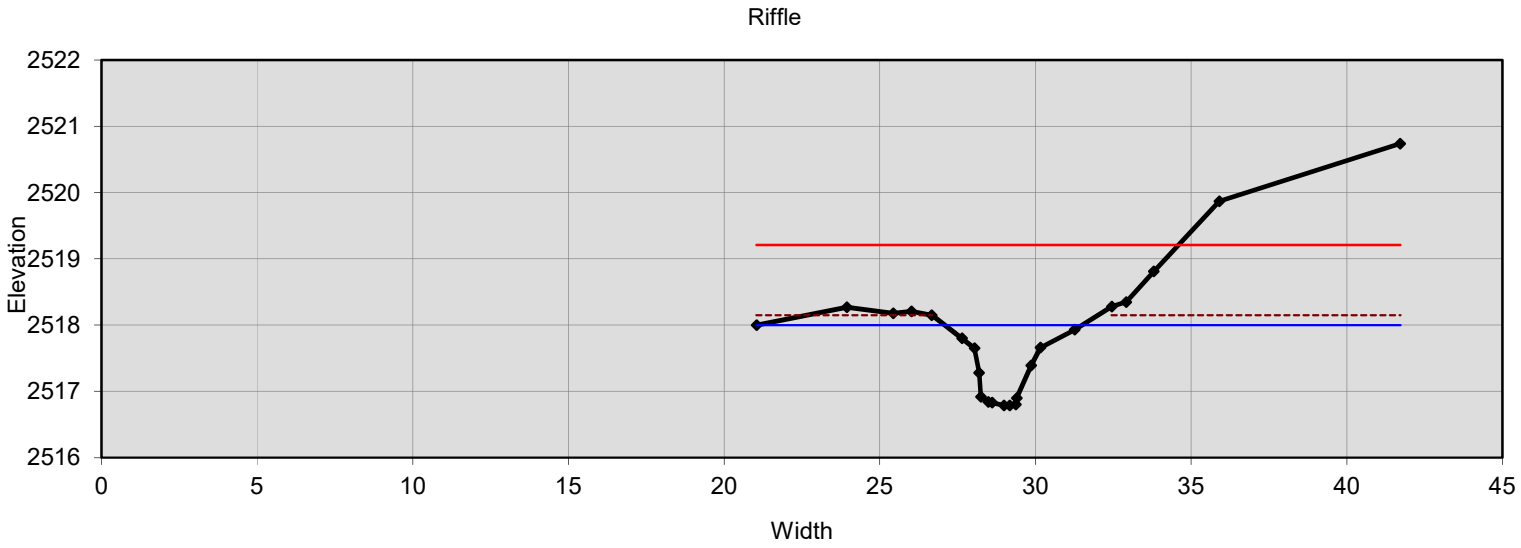
Cross Section G2 - XS1



Bankfull Dimensions		Flood Dimensions		Materials	
1.7	x-section area (ft.sq.)	8.5	W flood prone area (ft)	---	D50 (mm)
4.5	width (ft)	1.9	entrenchment ratio	---	D84 (mm)
0.4	mean depth (ft)	1.7	low bank height (ft)	184	threshold grain size (mm):
0.8	max depth (ft)	2.2	low bank height ratio		
5.2	wetted parimeter (ft)				
0.3	hyd radi (ft)				
11.7	width-depth ratio				

Bankfull Flow		Flow Resistance		Forces & Power	
6.8	velocity (ft/s)	0.045	Manning's roughness	18	channel slope (%)
11.8	discharge rate (cfs)	0.34	D'Arcy-Weisbach fric.	3.75	shear stress (lb/sq.ft.)
2.06	Froude number	---	resistance factor u/u*	1.39	shear velocity (ft/s)
		---	relative roughness	29	unit strm power (lb/ft/s)

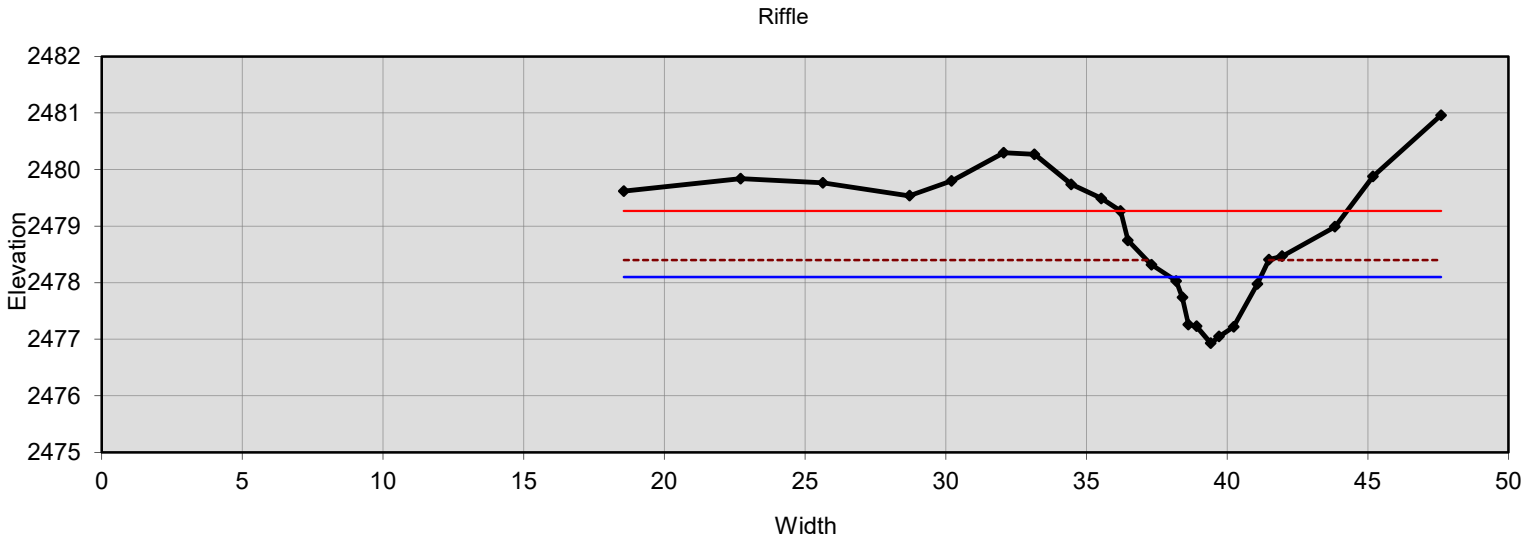
Cross Section G2 - XS2



Bankfull Dimensions		Flood Dimensions		Materials	
2.4	x-section area (ft.sq.)	15.0	W flood prone area (ft)	---	D50 (mm)
4.4	width (ft)	3.4	entrenchment ratio	---	D84 (mm)
0.5	mean depth (ft)	1.4	low bank height (ft)	231	threshold grain size (mm):
1.2	max depth (ft)	1.1	low bank height ratio		
5.5	wetted parimeter (ft)				
0.4	hyd radi (ft)				
8.0	width-depth ratio				

Bankfull Flow		Flow Resistance		Forces & Power	
7.9	velocity (ft/s)	0.045	Manning's roughness	17	channel slope (%)
19.2	discharge rate (cfs)	0.31	D'Arcy-Weisbach fric.	4.69	shear stress (lb/sq.ft.)
2.10	Froude number	---	resistance factor u/u*	1.56	shear velocity (ft/s)
		---	relative roughness	46	unit strm power (lb/ft/s)

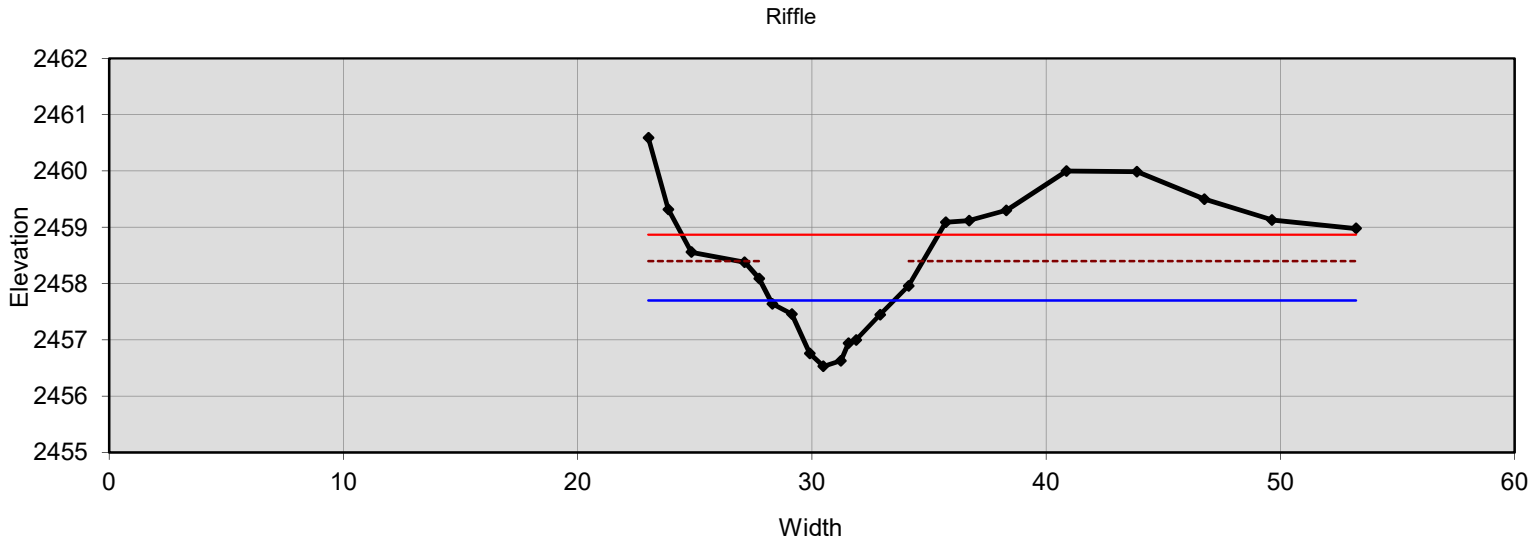
Cross Section G2 - XS3



Bankfull Dimensions		Flood Dimensions		Materials	
2.2	x-section area (ft.sq.)	11.0	W flood prone area (ft)	---	D50 (mm)
3.2	width (ft)	3.4	entrenchment ratio	---	D84 (mm)
0.7	mean depth (ft)	1.5	low bank height (ft)	260	threshold grain size (mm):
1.2	max depth (ft)	1.3	low bank height ratio		
4.2	wetted parimeter (ft)				
0.5	hyd radi (ft)				
4.7	width-depth ratio				

Bankfull Flow		Flow Resistance		Forces & Power	
8.7	velocity (ft/s)	0.045	Manning's roughness	16	channel slope (%)
19.1	discharge rate (cfs)	0.29	D'Arcy-Weisbach fric.	5.29	shear stress (lb/sq.ft.)
2.10	Froude number	---	resistance factor u/u*	1.65	shear velocity (ft/s)
		---	relative roughness	59	unit strm power (lb/ft/s)

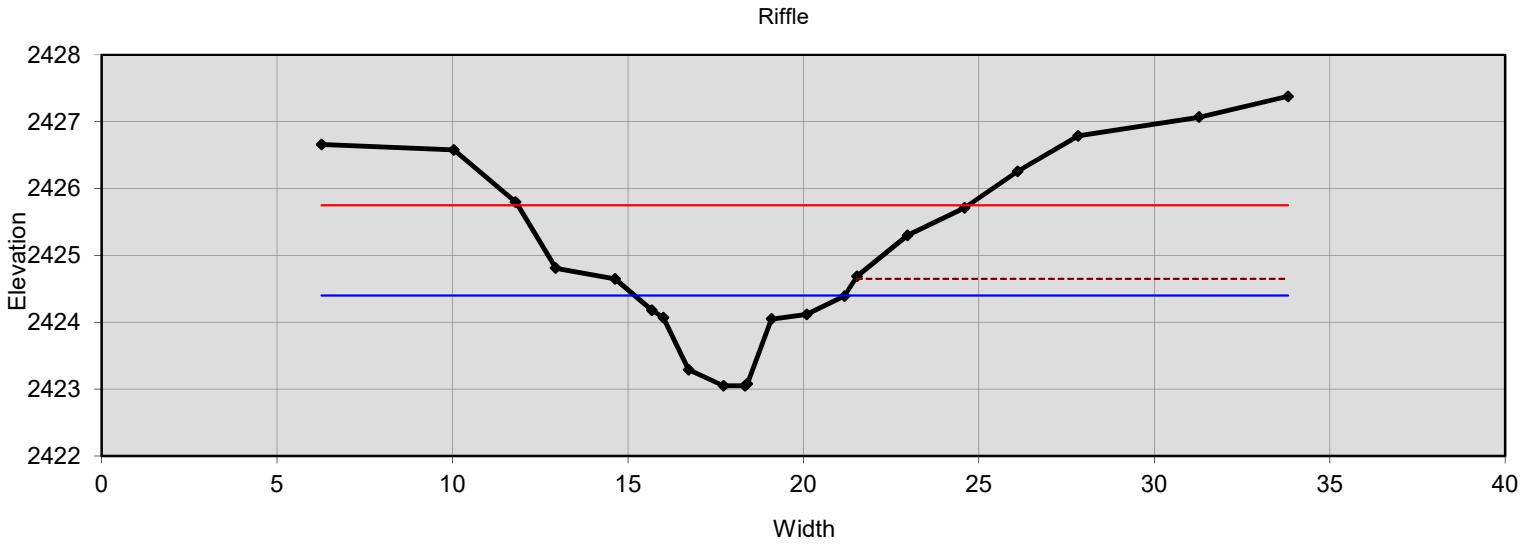
Cross Section G2 - XS4



Bankfull Dimensions		Flood Dimensions		Materials	
3.1	x-section area (ft.sq.)	15.0	W flood prone area (ft)	---	D50 (mm)
5.3	width (ft)	2.8	entrenchment ratio	---	D84 (mm)
0.6	mean depth (ft)	1.9	low bank height (ft)	130	threshold grain size (mm):
1.2	max depth (ft)	1.6	low bank height ratio		
5.9	wetted parimeter (ft)				
0.5	hyd radi (ft)				
8.9	width-depth ratio				

Bankfull Flow		Flow Resistance		Forces & Power	
6.1	velocity (ft/s)	0.045	Manning's roughness	8	channel slope (%)
19.2	discharge rate (cfs)	0.29	D'Arcy-Weisbach fric.	2.64	shear stress (lb/sq.ft.)
1.48	Froude number	---	resistance factor u/u*	1.17	shear velocity (ft/s)
		---	relative roughness	18.1	unit strm power (lb/ft/s)

Cross Section G2 - XS5



Bankfull Dimensions	
3.8	x-section area (ft.sq.)
6.0	width (ft)
0.6	mean depth (ft)
1.3	max depth (ft)
7.0	wetted parimeter (ft)
0.6	hyd radi (ft)
9.3	width-depth ratio

Flood Dimensions	
12.8	W flood prone area (ft)
2.1	entrenchment ratio
1.6	low bank height (ft)
1.2	low bank height ratio

Materials	
---	D50 (mm)
---	D84 (mm)
101	threshold grain size (mm):

Bankfull Flow	
5.5	velocity (ft/s)
21.0	discharge rate (cfs)
1.29	Froude number

Flow Resistance	
0.045	Manning's roughness
0.29	D'Arcy-Weisbach fric.
---	resistance factor u/u*
---	relative roughness

Forces & Power	
6	channel slope (%)
2.07	shear stress (lb/sq.ft.)
1.03	shear velocity (ft/s)
13.1	unit strm power (lb/ft/s)

Cross Section G2 - XS6

Bankfull Dimensions

2.7	x-section area (ft.sq.)
3.8	width (ft)
0.7	mean depth (ft)
1.3	max depth (ft)
5.2	wetted parimeter (ft)
0.5	hyd radi (ft)
5.4	width-depth ratio

Flood Dimensions

8.8	W flood prone area (ft)
2.3	entrenchment ratio
---	low bank height (ft)
---	low bank height ratio

Materials

---	D50 (mm)
---	D84 (mm)
79	threshold grain size (mm):

Bankfull Flow

4.8	velocity (ft/s)
12.7	discharge rate (cfs)
1.17	Froude number

Flow Resistance

0.045	Manning's roughness
0.29	D'Arcy-Weisbach fric.
---	resistance factor u/u*
---	relative roughness

Forces & Power

5	channel slope (%)
1.60	shear stress (lb/sq.ft.)
0.91	shear velocity (ft/s)
10.4	unit strm power (lb/ft/s)

Project Attribute Table

Project Background Information					
Project Name	Monkey Wall				
County	Mitchell				
Project Area (acres)	24.42 ac				
Project Coordinates (latitude and longitude)	-82.2067° W, 36.0559° N				
Planted Acreage (Acres of Woody Stems Planted)	19.05 ac				
Project Watershed Summary Information					
Physiographic Province	66d – Southern Crystalline Ridges and Mountains				
River Basin	French Broad				
USGS Hydrologic Unit 8-digit	6010108	USGS Hydrologic Unit 14-digit			6010108060010
DWR Sub-basin	04-03-06				
Project Drainage Area (Acres and Square Miles)	86.60 ac (0.13 mi^2)				
Project Drainage Area Percentage of Impervious Area	<1%				
CGIA Land Use Classification(s)	Mixed hardwoods/Conifers, Managed Herbaceous Cover, Unmanaged Herbaceous Cover-Upland, & Mixed Upland Hardwoods				
Reach Summary Information					
Parameters	**G1-A**	**G1-B**	**G1-C**	**G2**	
Length of reach (linear feet)	278	120	1,521	1,725	
Valley confinement (Confined, moderately confined, unconfined)	Confined	Confined	Confined	Confined	
Drainage area (Acres and Square Miles)	11.83 ac (0.01 mi^2)	14.23 ac (0.02 mi^2)	86.60 ac (0.13 mi^2)	55.09 ac (0.08 mi^2)	
Perennial, Intermittent, Ephemeral	Intermittent	Intermittent	Intermittent	Intermittent	
NCDWR Water Quality Classification	C, TR	C, TR	C, TR	C, TR	
Stream Classification (existing)	A	A	A	A	
Stream Classification (proposed)	B	B	B	B	
Evolutionary trend (Simon)	II	II	II	II	
FEMA classification	Zone X	Zone X	Zone X	Zone X	
Wetland Summary Information					
Parameters	**Wetland A**	**Wetland B**	**Wetland C**		
Size of Wetland (acres)	0.24	0.02	0.01		
Wetland Type (non-riparian, riparian riverine or riparian non-riverine)	Riparian riverine	Riparian riverine	Riparian riverine		
Mapped Soil Series	TsC	BtF	TsD		
Drainage class	Well Drained	Well Drained	Well Drained		
Soil Hydric Status	Non-hydric	Non-hydric	Non-hydric		
Source of Hydrology	Groundwater, surface hydrology	Groundwater	Groundwater		
Restoration or enhancement method (hydrologic, vegetative etc.)	NA	NA	NA		
Regulatory Considerations					
Parameters	**Applicable?**		**Resolved?**		
Water of the United States - Section 404	Yes		No		
Water of the United States - Section 401	Yes		No		
Endangered Species Act	Yes		Yes		
Historic Preservation Act	Yes		Yes		
Coastal Zone Management Act (CZMA or CAMA)	No		N/A		
FEMA Floodplain Compliance	No		N/A		
Essential Fisheries Habitat	No		N/A		

Appendix C – Site Protection Instrument

SITE PROTECTION INSTRUMENT

Site Protection Instrument(s) Summary Information

The land required for the construction, management, and stewardship of this mitigation project includes portions of the parcels listed below in **Table C1**. Environmental Banc & Exchange, LLC (a wholly owned subsidiary of RES) has obtained a conservation easement from the current landowners for the project area. The easement deed and survey plat will be submitted to DMS and State Property Office (SPO) for approval and will be held by the State of North Carolina. The easement deed will follow the NCDMS Full Delivery Conservation Easement Template dated May 5, 2017 and included in this appendix. Once recorded, the secured easement will allow Environmental Banc & Exchange, LLC to proceed with the project development and protect the mitigation assets in perpetuity. Once finalized, a copy of the land protection instrument(s) will be included in **Appendix C**.

Table C1. Project Parcel and Landowner Information

Owner of Record	PIN	County	Site Protection Instrument	Deed Book and Page Numbers	Acreage Protected
Environmental Banc & Exchange LLC	0855-00-24-8634	Mitchell	Conservation Easement	596/515	2.63
Environmental Banc & Exchange LLC	0855-00-14-9533	Mitchell	Conservation Easement	596/515	18.00
Environmental Banc & Exchange LLC	0855-00-23-1885	Mitchell	Conservation Easement	596/566	2.31

STATE OF NORTH CAROLINA

DEED OF CONSERVATION EASEMENT AND RIGHT OF ACCESS PROVIDED PURSUANT TO FULL DELIVERY MITIGATION CONTRACT

_____ COUNTY

SPO File Number:
DMS Project Number:

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 DEED OF CONSERVATION EASEMENT AND RIGHT OF ACCESS, made this _____day of _____, 20__, by _____ *Landowner name goes here* , ("**Grantor**"), whose mailing address is _____ *Landowner address goes here* _____, 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 of 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:

WHEREAS, pursuant to the provisions of N.C. Gen. Stat. § 143-214.8 et seq., the State of North Carolina has established the Division of Mitigation Services (formerly known as the Ecosystem Enhancement Program and 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, this Conservation Easement from Grantor to Grantee has been negotiated, arranged and provided for as a condition of a full delivery contract between *(insert name and address of full delivery contract provider)* and the North Carolina Department of Environmental Quality, to provide stream, wetland and/or buffer mitigation pursuant to the North Carolina Department of Environmental Quality Purchase and Services Contract Number _____.

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 Department of Environment and Natural Resources and the United States Army Corps of Engineers, Wilmington District entered into a Memorandum of Understanding, (MOU) duly executed by all parties on November 4, 1998. This MOU recognized that the Wetlands Restoration Program was to provide effective compensatory mitigation for authorized impacts to wetlands, streams and other aquatic resources by restoring, enhancing and preserving the wetland and riparian areas of the State; 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, which recognizes that the Division of Mitigation Services (formerly 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 Department of Environment and Natural Resources, the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the North Carolina Wildlife Resources Commission, the North Carolina Division of Water Quality, the North Carolina Division of Coastal Management, and the National Marine Fisheries Service entered into an agreement to continue the In-Lieu Fee operations of the North Carolina Department of Natural Resources' Division of Mitigation Services (formerly Ecosystem Enhancement Program) with an effective date of 28 July, 2010, which supersedes and replaces the previously effective MOA and MOU referenced above; 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 8th day of February 2000; and

WHEREAS, the Division of Mitigation Services in the Department of Environmental Quality, which has been delegated the authority authorized by the Governor and Council of State to the Department of Administration, has approved acceptance of this instrument; and

WHEREAS, Grantor owns in fee simple certain real property situated, lying, and being in _____ Township, _____ County, North Carolina (the "**Property**"), and being more particularly described as that certain parcel of land containing approximately _____ acres and being conveyed to the Grantor by deed as recorded in **Deed Book _____ at Page ____** of the _____ 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 areas of the Property subject to the Conservation Easement to the terms and conditions and purposes hereinafter set forth, and Grantee is willing to accept said Easement and Access Rights. The Conservation Easement shall be for the protection and benefit of the waters of ***if known, insert name of stream, branch, river or waterway here***.

NOW, THEREFORE, in consideration of the mutual covenants, terms, conditions, and restrictions hereinafter set forth, Grantor unconditionally and irrevocably hereby grants and conveys unto Grantee, its successors and assigns, forever and in perpetuity, a Conservation Easement along with a general Right of Access.

The Conservation Easement Area consists of the following:

Tracts Number _____ containing a total of _____ **acres** as shown on the plats of survey entitled "Final Plat, Conservation Easement for North Carolina Division of Mitigation Services, Project Name: _____, SPO File No._____, EEP Site No. _____, Property of _____," dated _____, 20__ by *name of surveyor*, PLS Number _____ and recorded in the _____ County, North Carolina Register of Deeds at **Plat Book _____ Pages _____.**

See attached "**Exhibit A**", Legal Description of area of the Property hereinafter referred to as the "Conservation Easement Area"

The purposes of this Conservation Easement are to maintain, restore, enhance, construct, create and preserve wetland and/or riparian resources in the Conservation 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 Conservation 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 ACTIVITIES

The Conservation 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 Conservation 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. Any rights not expressly reserved hereunder by the Grantor, including the rights to all mitigation credits, including, but not limited to, stream, wetland, and riparian buffer mitigation units, derived from each site within the area of the Conservation Easement, are conveyed to and belong to the Grantee. Without limiting the generality of the foregoing, 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, hunting and fishing, and access to the Conservation Easement Area for the purposes thereof.

B. Motorized Vehicle Use. Motorized vehicle use in the Conservation Easement Area is prohibited except within a Crossing Area(s) or Road or Trail as shown on the recorded survey plat**.**

C. Educational Uses. The Grantor reserves the right to engage in and permit others to engage in educational uses in the Conservation Easement Area not inconsistent with this Conservation Easement, and the right of access to the Conservation 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.

D. **Damage to Vegetation.** Except within Crossing Area(s) as shown on the recorded survey plat and as related to the removal of non-native plants, diseased or damaged trees, or vegetation that destabilizes or renders unsafe the Conservation Easement Area to persons or natural habitat, all cutting, removal, mowing, harming, or destruction of any trees and vegetation in the Conservation Easement Area is prohibited.

E. Industrial, Residential and Commercial Uses. All industrial, residential and commercial uses are prohibited in the Conservation Easement Area.

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

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

H. **Roads and Trails.** There shall be no construction or maintenance of new roads, trails, walkways, or paving in the Conservation Easement.

All existing roads, trails and crossings within the Conservation Easement Area shall be shown on the recorded survey plat.

I. Signs. No signs shall be permitted in the Conservation Easement Area except interpretive signs describing restoration activities and the conservation values of the Conservation 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 Conservation Easement Area.

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

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

L. 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 in the Conservation Easement Area. No altering or tampering with water control structures or devices, or disruption or alteration of the restored, enhanced, or created drainage patterns is allowed. All removal of wetlands, polluting or discharging into waters, springs, seeps, or wetlands, or use of pesticide or biocides in the Conservation Easement Area is prohibited. In the event of an emergency interruption or shortage of all other water sources, water from within the Conservation Easement Area may temporarily be withdrawn for good cause shown as needed for the survival of livestock on the Property.

M. Subdivision and Conveyance. Grantor voluntarily agrees that no further subdivision, partitioning, or dividing of the Conservation Easement Area portion of the Property owned by the Grantor in fee simple ("fee") that is subject to this Conservation Easement is allowed. Any future transfer of the Property shall be subject to this Conservation Easement and Right of Access and to the Grantee's right of unlimited and repeated ingress and egress over and across the Property to the Conservation Easement Area for the purposes set forth herein.

N. Development Rights. All development rights are permanently removed from the Conservation Easement Area and are non-transferrable.

O. Disturbance of Natural Features. Any change, disturbance, alteration or impairment of the natural features of the Conservation 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 not inconsistent with the purposes of this Conservation Easement, and the Grantor obtains advance written approval from the Division of Mitigation Services, 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 Conservation Easement Area over the Property at reasonable times to undertake any activities on the property to restore, construct, manage, maintain, enhance, protect, and monitor the stream, wetland and any other riparian resources in the Conservation 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. Signs. The Grantee, its employees and agents, successors or assigns, shall be permitted to place signs and witness posts on the Property to include any or all of the following: describe the project, prohibited activities within the Conservation Easement, or identify the project boundaries and the holder of the Conservation Easement.

D. Fences. Conservation Easements are purchased to protect the investments by the State (Grantee) in natural resources. Livestock within conservations easements damages the investment and can result in reductions in natural resource value and mitigation credits which would cause financial harm to the State. Therefore, Landowners (Grantor) with livestock are required to restrict livestock access to the Conservation Easement area. Repeated failure to do so may result in the State (Grantee) repairing or installing livestock exclusion devices (fences) within the conservation area for the purpose of restricting livestock access. In such cases, the landowner (Grantor) must provide access to the State (Grantee) to make repairs.

E. Crossing Area(s). The Grantee is not responsible for maintenance of crossing area(s), however, the Grantee, its employees and agents, successors or assigns, reserve the right to repair crossing area(s), at its sole discretion and to recover the cost of such repairs from the Grantor if such repairs are needed as a result of activities of the Grantor, his successors or assigns.

IV. ENFORCEMENT AND REMEDIES

A. Enforcement. To accomplish the purposes of this Conservation Easement, Grantee is allowed to prevent any activity within the Conservation Easement Area that is inconsistent with the purposes of this Conservation Easement and to require the restoration of such areas or features in the Conservation Easement Area that may have been damaged by such unauthorized activity or use. Upon any breach of the terms of this Conservation Easement by Grantor, the Grantee shall, except as provided below, notify the Grantor in writing of such breach and the Grantor shall have ninety (90) days after receipt of such notice to correct the damage caused by such breach. If the breach and damage remains uncured after ninety (90) days, the Grantee may enforce this Conservation Easement by bringing appropriate legal proceedings including an action to recover damages, as well as 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 Conservation 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 is or would irreversibly or otherwise materially impair the benefits to be derived from this Conservation Easement, and the Grantor and Grantee acknowledge that the damage would be irreparable and remedies at law 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 Conservation Easement Area over the Property at reasonable times for the purpose of inspection to determine whether the Grantor is 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 for any injury or change in the Conservation 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 or damage to the Property resulting from such causes.

D. Costs of Enforcement. Beyond regular and typical monitoring expenses, any costs incurred by Grantee in enforcing the terms of this Conservation Easement against Grantor, 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. Grantor is responsible for any real estate taxes, assessments, fees, or charges levied upon the Property. Grantee shall not be responsible for any costs or liability of any kind related to the ownership, operation, insurance, upkeep, or maintenance of the Property, except as expressly provided herein. Upkeep of any constructed bridges, fences, or other amenities on the Property are the sole responsibility of the Grantor. Nothing herein shall relieve the Grantor of the

obligation to comply with federal, state or local laws, regulations and permits that may apply to the exercise of the Reserved Rights.

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

D. 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 that any subsequent lease, deed, or other legal instrument by which any interest in the Property is conveyed is subject to the Conservation Easement herein created.

E. 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.

F. This Conservation Easement and Right of Access may be amended, but only in writing signed by all parties hereto, or their successors or assigns, if 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 owner of the Property shall notify the State Property Office and the U.S. Army Corps of Engineers in writing sixty (60) days prior to the initiation of any transfer of all or any part of the Property or of any request to void or modify this Conservation Easement. Such notifications and modification requests shall be addressed to:

Division of Mitigation Services Program Manager
NC State Property Office
1321 Mail Service Center
Raleigh, NC 27699-1321

and

General Counsel
US Army Corps of Engineers
69 Darlington Avenue
Wilmington, NC 28403

G. 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 Conservation 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 Conservation Easement Area, and the right of quiet enjoyment of the Conservation 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 is 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.

_____ (SEAL)

NORTH CAROLINA
COUNTY OF _____

I, _____, a Notary Public in and for the County and State aforesaid, do hereby certify that _____, Grantor, personally appeared before me this day and acknowledged the execution of the foregoing instrument.

IN WITNESS WHEREOF, I have hereunto set my hand and Notary Seal this the _____ day of _____, 20__.

_____
Notary Public

My commission expires:

_____

Exhibit A

[INSERT LEGAL DESCRIPTION]

Appendix D – Credit Release Schedule

CREDIT RELEASE SCHEDULE

All credit releases will be based on the total credit generated as reported in the approved final mitigation plan, unless there are major discrepancies and then a mitigation plan addendum will be submitted. Under no circumstances shall any mitigation project be debited until the necessary Department of the Army (DA) authorization has been received for its construction or the District Engineer (DE) has otherwise provided written approval for the project in the case where no DA authorization is required for construction of the mitigation project. The DE, in consultation with the IRT, will determine if performance standards have been satisfied sufficiently to meet the requirements of the release schedules below. In cases where some performance standards have not been met, credits may still be released depending on the specifics of the case. Monitoring may be required to be restarted or be extended, depending on the extent to which the site fails to meet the specified performance standard. The release of project credits will be subject to the criteria described as follows in **Table D.**

Table D. Stream Credit Release Schedule

Credit Release Milestone	Release Activity	Interim Release	Total Release
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 closeout approval	10%	90% (100%**)

**Please note that vegetation data may not be required with monitoring reports submitted during these monitoring years unless otherwise required by the Mitigation Plan or directed by the IRT.*

***10% reserve of credits to be held back until the bankfull event performance standard has been met.*

Initial Allocation of Released Credits

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

1) Approval of the final Mitigation Plan.
2) Recordation of the preservation mechanism, as well as a title opinion acceptable to the USACE covering the property.
3) Completion of project construction (the initial physical and biological improvements to the mitigation site) pursuant to the mitigation plan; per the DMS Instrument, construction means that a mitigation site 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.

4) 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 projects a reserve of 10% of a site's total stream credits shall be released after four bankfull 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, DMS 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.

Appendix E – Financial Assurance

FINANCIAL ASSURANCE

Pursuant to Section IV H and Appendix III of the NCDEQ DMS (formerly Ecosystem Enhancement Program) In-Lieu Fee Instrument dated July 28, 2010, the North Carolina Department of Environmental Quality (NCDEQ) has provided the USACE-Wilmington District with a formal commitment to fund projects to satisfy mitigation requirements assumed by NCDEQ DMS. This commitment provides financial assurance for all mitigation projects implemented by the program.

Appendix F – Maintenance Plan

MAINTENANCE PLAN

The site will be monitored on a regular basis and a physical inspection will be 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:

F1. Maintenance Plan

Component/ Feature	Maintenance through project close-out
Stream	Routine channel maintenance and repair activities may include chinking of in-stream structures to prevent piping, 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 may also require maintenance to prevent bank failures and head-cutting. Stream maintenance activities will be documented and reported in annual monitoring reports. Stream maintenance will continue through the monitoring period.
Wetland	Routine wetland maintenance and repair activities may include securing of loose coir matting, channel plug maintenance, and supplemental installations of live stakes and other target vegetation within the wetland.
Vegetation	Vegetation shall be maintained to ensure the health and vigor of the targeted plant community. Routine vegetation maintenance and repair activities may include supplemental planting, pruning, mulching, and fertilizing. Exotic invasive plant species shall be treated by mechanical and/or chemical methods. Any vegetation requiring herbicide application will be performed in accordance with NC Department of Agriculture (NCDA) rules and regulations. Vegetation maintenance activities will be documented and reported in annual monitoring reports. Vegetation maintenance will continue through the monitoring period.
Site Boundary	Site boundaries shall be identified in the field to ensure clear distinction between the mitigation site and adjacent properties. Boundaries will be marked with signs identifying the property as a mitigation site, and will include the name of the long-term steward and a contact number. 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. Easement compliance monitoring and staking/signage maintenance will continue in perpetuity as a stewardship activity.
Road Crossing	N/A
Beaver	Routine site visits and monitoring will be used to determine if beaver management is needed. If beaver activity poses a threat to project stability or vegetative success, RES will trap beavers and remove impoundments as needed. All beaver management activities will be documented and included in annual monitoring reports. Beaver monitoring and management will continue through the monitoring period.

Appendix G – DWR Stream ID Forms

G1

NC DWQ Stream Identification Form Version 4.11

Date: 1/26/2018	**Project/Site:** Monkey Wall	**Latitude:**
Evaluator: M. DeAngelo	**County:** Mitchell	**Longitude:**
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 22	**Stream Determination (circle one)** Ephemeral (Intermittent) Perennial	**Other** Bakersville *e.g. Quad Name:*

A. Geomorphology (Subtotal = 9)	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 = 6)				
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:

Sketch:

G2

NC DWQ Stream Identification Form Version 4.11

Date: 1/26/2018	**Project/Site:** Monkey Wall	**Latitude:**
Evaluator: M. Delnagelo	**County:** Mitchell	**Longitude:**
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 21.5	**Stream Determination (circle one)** Ephemeral (Intermittent) Perennial	**Other** Bakersville *e.g. Quad Name:*

A. Geomorphology (Subtotal = 9.5)	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 = 6)				
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)				
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:

Sketch:

Appendix H – USACE District Assessment Forms

Stream Quality Assessment Worksheet Summary						
		Reach	G1-A	G1-B	G1-C	G2
Physical	1	Presence of flow / persistent pools in stream	2	2	3	3
	2	Evidence of past human alteration	5	3	2	0
	3	Riparian zone	4	3	0	0
	4	Evidence of nutrient or chemical discharges	3	2	2	2
	5	Groundwater discharge	4	2	2	1
	6	Presence of adjacent floodplain	0	0	2	2
	7	Entrenchment / floodplain access	0	0	1	1
	8	Presence of adjacent wetlands	1	0	1	1
	9	Channel sinuosity	2	1	2	2
	10	Sediment input	4	3	3	3
	11	Size & diversity of channel bed substrate	5	3	2	2
Stability	12	Evidence of channel incision or widening	5	2	2	2
	13	Presence of major bank failures	5	4	2	2
	14	Root depth and density on banks	5	1	0	0
	15	Impact by agriculture, livestock, or timber production	4	2	0	0
	16	Presence of riffle-pool/ripple-pool complexes	4	3	1	1
Habitat	17	Habitat complexity	5	2	0	0
	18	Canopy coverage over streambed	5	2	0	0
	19	Substrate embeddedness	3	2	1	1
Biology	20	Presence of stream invertebrates	5	2	0	0
	21	Presence of amphibians	4	0	0	0
	22	Presence of fish	0	0	0	0
	23	Evidence of wildlife use	2	0	0	0

Total Score:	77	39	26	23

Appendix I – Wetland JD Forms and Maps

U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT

Action ID: **SAW-2018-01162** County: **Mitchell**

NOTIFICATION OF JURISDICTIONAL DETERMINATION

Property Owner: **Bradley Gouge Living Trust**
Address: **138 Bradley Gouge Road**
Johnson City, TN 37604

Property Owner: **Marshall Street, Janice Street and Milan Street**
Address: **10058 N. 226 Hwy**
Bakersville, NC 28705

Size (acres): **26 acres**
Nearest Town: **Bakersville**
Nearest Waterway: **Big Rock Creek**
Coordinates: **36.0548 -82.2091**
River Basin/ HUC: **French Broad / 06010105**

Location description: **The site is located at 385 Fork Mountain Road, near Bakersville, NC. PINs 0855-00-24-8634, 0855-00-14-9533, 0855-00-35-2677, 0855-00-34-2454 (Bradley Gouge Living Trust) and 0855-00-23-1885 (Street).**

Indicate Which of the Following Apply:

A. Preliminary Determination

X There are waters, including wetlands, on the above described project area, 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. 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 are waters on the above described 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 thewaters 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 at the project area, which is not sufficiently accurate and reliable to support an enforceable permit decision. We recommend that you have the waters of the U.S. on your 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 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 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 waters of the U.S. including wetlands on the above described 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 of the U.S. on your 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.

_ The waters of the U.S. including wetlands on your project area have been delineated and the delineation has been verified by the Corps. 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 of the U.S. including wetlands have been delineated and surveyed and are accurately depicted on the plat signed by the Corps Regulatory Official identified below on_____. 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 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 to determine their requirements.

Placement of dredged or fill material within waters of the US and/or 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 **Amanda Jones** at **828-271-7980**, **ext. 4225** or **amanda.jones@usace.army.mil**.

C. Basis for Determination:

See attached table and map depicted jurisdictional waters of the U.S.

D. Remarks:

This determination is associated with the study area shown on the attached map dated 04/26/19 and labeled Potential Wetland or Non-Wetland Waters of the U.S. Map.

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 **N/A (Preliminary-JD)**.

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: FUEMMELER.AMANDA.JONES.1242835090 Digitally signed by FUEMMELER.AMANDA.JONES.1242835090 Date: 2019.06.17 14:13:58 -04'00'

Amanda Jones

Issue Date of JD: **June 17, 2019** Expiration Date: N/A Preliminary JD

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 our Customer Satisfaction Survey, located online at http://corpsmapu.usace.army.mil/cm_apex/f?p=136:4:0.

Copy furnished:
Resource Environmental Solutions / Attn: Jeremy Schmid (via email)

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: **Bradley Gouge Living Trust**	File Number: **SAW-SAW-2018-01162**	Date: **June 17, 2019**

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 http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits.aspx or 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.

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: Amanda Jones** **151 Patton Avenue, Room 208** **Asheville, North Carolina 28801-5006** **828-271-7980, ext. 4232**	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.: Amanda Jones, 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

Appendix 2 - PRELIMINARY JURISDICTIONAL DETERMINATION (PJD) FORM

BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR PJD: 04/26/19

B. NAME AND ADDRESS OF PERSON REQUESTING PJD: Resource Environmental Solutions

C. DISTRICT OFFICE, FILE NAME, AND NUMBER: CESAW-RG-A Monkey Wall Mitigation Site 2018-01162

D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION:
(USE THE TABLE BELOW TO DOCUMENT MULTIPLE AQUATIC RESOURCES AND/OR AQUATIC RESOURCES AT DIFFERENT SITES)

State: NC County/parish/borough: Mitchell City: Bakersville

Center coordinates of site (lat/long in degree decimal format):

Lat.: 36.0548 Long.: -82.2091

Universal Transverse Mercator:

Name of nearest waterbody: Big Rock Creek

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

☐ Office (Desk) Determination. Date:

☒ Field Determination. Date(s): Aug 2018

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 resource in review area (acreage and linear feet, if applicable)	Type of aquatic resource (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)
WA	36.0548	-82.209	0.2476 ac	wetland	Section 404
WB	36.0581	-82.2047	0.0278	wetland	Section 404
WC	36.0569	-82.205	0.0134	wetland	Section 404
G1	36.0561	-82.206	1,977 lf	non wetland water	Section 404
G2	36.0573	-82.204	1,637 lf	non wetland water	Section 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:

- [x] Maps, plans, plots or plat submitted by or on behalf of the PJD requestor:
  Map: Vicinity, USGS, NWI, Soils, Existing Conditions, WOUS.
- [x] Data sheets prepared/submitted by or on behalf of the PJD requestor.
  - [x] 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.
- [x] U.S. Geological Survey map(s). Cite scale & quad name: 24k Bakersville.
- [x] 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): _____.

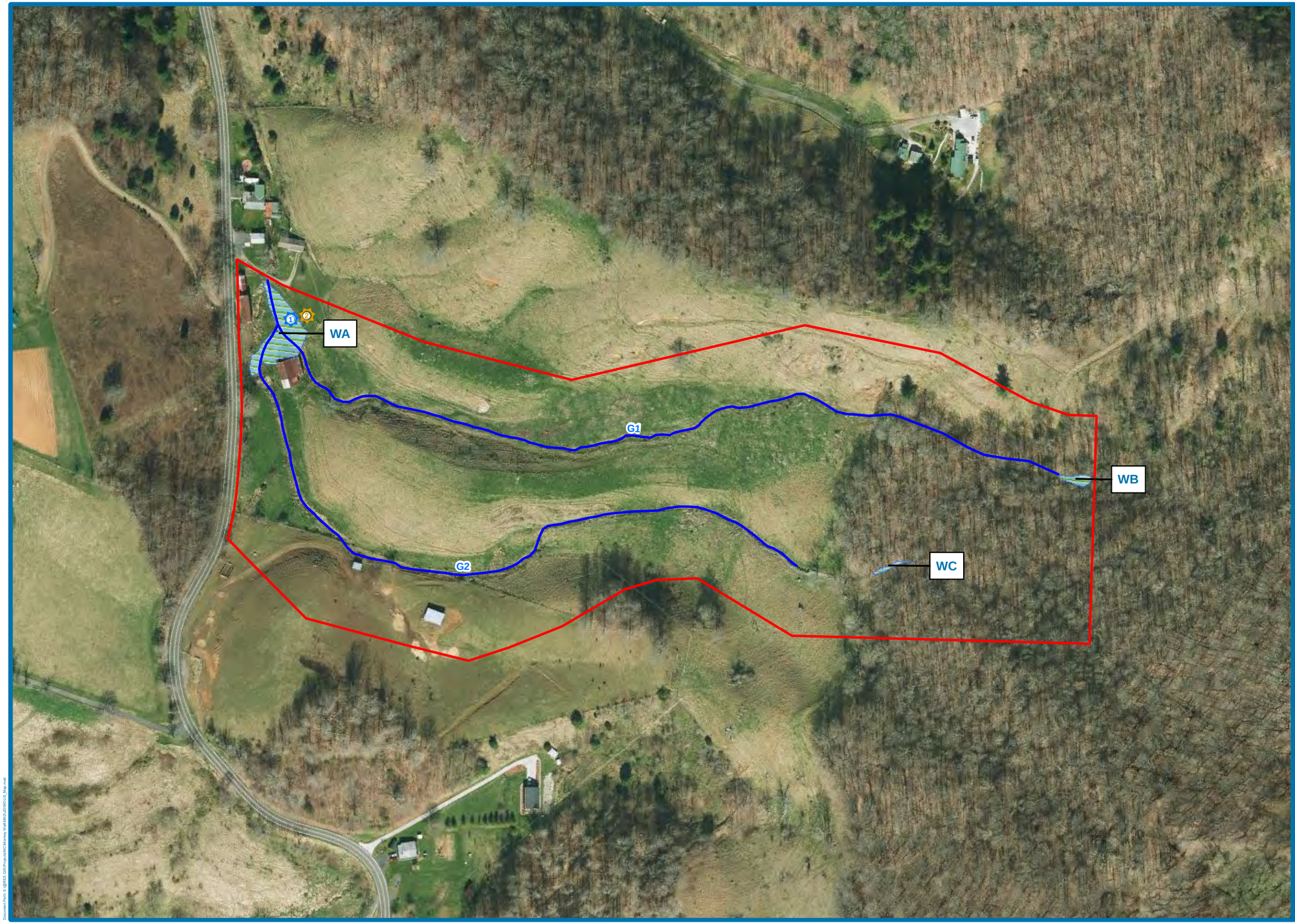
IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

FUEMMELER.AMANDA.JONES.1242835090 Digitally signed by FUEMMELER.AMANDA.JONES.1242835090 Date: 2019.06.17 14:09:51 -04'00'

Signature and date of Regulatory staff member completing PJD

Signature and date of person requesting PJD (REQUIRED, unless obtaining the signature is impracticable)[1]

[1] Districts may establish timeframes for requestor to return signed PJD forms. If the requestor 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.



res

0 100 200
Feet
1 in = 200 feet

Potential Wetland or Non-Wetland Waters of the U.S. Map

Monkey Wall Mitigation Site

Mitchell County, North Carolina

Date: 4/26/2019	Drawn by: JLS
Revisions: NONE	Checked by: BPB

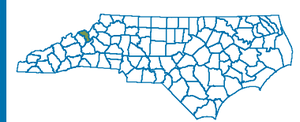
Legend

- Study Area (26 ac)
- Potential Wetland Waters of the US
- Potential Non-Wetland Waters of the US
- Wetland Data Point
- Upland Data Point

REFERENCE

1) Horizontal Datum is NAD83 UTM Z15N.

2) Map Projection is NAD_1983_StatePlane_North_Carolina_FIPS_3200_Feet



Document Path: S:\@RES GIS\Projects\NC\Monkey Wall\MXD\JD\WOUS_Map.mxd

302 Jefferson Street, Suite 110
Raleigh, NC 27605

Corporate Headquarters
5020 Montrose Blvd. Suite 650
Houston, TX 77006
Main: 713.520.5400

April 26, 2019

Amanda Jones
U.S. Army Corps of Engineers
Asheville Field Office
151 Patton Ave, Room 208
Asheville, NC 28801

Dear Ms. Jones,

Resource Environmental Solutions (RES) is pleased to present this Request for a Preliminary Jurisdictional Determination for the Monkey Wall Mitigation Site located in Mitchell County, North Carolina (36.0559° N, -82.2067° W.). As part of this scope of work, RES is submitting this request to the U.S. Army Corps of Engineers (Corps) for a confirmation of the limits of Waters of the U.S. on the subject site.

The Monkey Wall Mitigation Site (the "Site") is contained in five parcels totaling 78-acres of proposed easement in Mitchell County, NC. The Site was contracted through Division of Mitigation Services (DMS) in response to an RFP for the French Broad River Basin (8-digit USGS HUC 06010108, TLW 06010108060010) to provide cold water stream mitigation units. The Project will involve the restoration, enhancement, and preservation of tributaries to Big Rock Creek. The Project is consistent with the 2009 French Broad RBRP and will result in significant ecological improvements including water quality improvement, habitat restoration and a decrease in non-point source pollution from livestock.

We thank you in advance for your timely response and cooperation. Please feel free to contact me at (919) 345-3034 if you have any additional question regarding this matter.

Sincerely,

Jeremy Schmid | Senior Ecologist

Attachments: Jurisdictional Determination Request Form, Preliminary Jurisdictional Determination Form, Landowner Authorization Form, Vicinity Map, USGS Topographc Map, National Wetlands Inventory Map, Soils Map, Potential Waters of the U.S. Delineation Map, and Wetland Data Sheets

Jurisdictional Determination Request

US Army Corps of Engineers
Wilmington District

This form is intended for use by anyone requesting a jurisdictional determination (JD) from the U.S. Army Corps of Engineers, Wilmington District (Corps). Please include all supporting information, as described within each category, with your request. You may submit your request via mail, electronic mail, or facsimile. Requests should be sent to the appropriate project manager of the county in which the property is located. A current list of project managers by assigned counties can be found on-line at: http://www.saw.usace.army.mil/Missions/RegulatoryPermitProgram/Contact/CountyLocator.aspx, by calling 910-251-4633, or by contacting any of the field offices listed below. Once your request is received you will be contacted by a Corps project manager.

ASHEVILLE & CHARLOTTE REGULATORY FIELD OFFICES
US Army Corps of Engineers
151 Patton Avenue, Room 208
Asheville, North Carolina 28801-5006
General Number: (828) 271-7980
Fax Number: (828) 281-8120

RALEIGH REGULATORY FIELD OFFICE
US Army Corps of Engineers
3331 Heritage Trade Drive, Suite 105
Wake Forest, North Carolina 27587
General Number: (919) 554-4884
Fax Number: (919) 562-0421

WASHINGTON REGULATORY FIELD OFFICE
US Army Corps of Engineers
2407 West Fifth Street
Washington, North Carolina 27889
General Number: (910) 251-4610
Fax Number: (252) 975-1399

WILMINGTON REGULATORY FIELD OFFICE
US Army Corps of Engineers
69 Darlington Avenue
Wilmington, North Carolina 28403
General Number: 910-251-4633
Fax Number: (910) 251-4025

INSTRUCTIONS:

All requestors must complete Parts A, B, C, D, E, F and G.

NOTE TO CONSULTANTS AND AGENCIES: If you are requesting a JD on behalf of a paying client or your agency, please note the specific submittal requirements in **Part H**.

NOTE ON PART D – PROPERTY OWNER AUTHORIZATION: Please be aware that all JD requests must include the current property owner authorization for the Corps to proceed with the determination, which may include inspection of the property when necessary. This form must be signed by the current property owner(s) or the owner(s) authorized agent to be considered a complete request.

NOTE ON PART D - NCDOT REQUESTS: Property owner authorization/notification for JD requests associated with North Carolina Department of Transportation (NCDOT) projects will be conducted according to the current NCDOT/USACE protocols.

NOTE TO USDA PROGRAM PARTICIPANTS: A Corps approved or preliminary JD 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 also request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.

A. PARCEL INFORMATION

Street Address: 385 Fork Mountain Rd

City, State: Bakersville, NC

County: Mitchell

Parcel Index Number(s) (PIN): 0855-00-24-8634, 0855-00-14-9533, 0855-00-35-2677, 0855-00-34-2454; 0855-00-23-1885

B. REQUESTOR INFORMATION

Name: Jeremy Schmid

Mailing Address: 302 Jefferson Street, Suite 110

Raleigh, NC 27605

Telephone Number: 919-345-3034

Electronic Mail Address: jschmid@res.us

Select one:

- ☐ I am the current property owner.
- ☑ I am an Authorized Agent or Environmental Consultant[1]
- ☐ Interested Buyer or Under Contract to Purchase
- ☐ Other, please explain. _____

C. PROPERTY OWNER INFORMATION[2]

Name: Bradley Gouge Living Trust; Marshall Street, Janice Street and Milan Street

Mailing Address: 385 Fork Mountain Rd; 10058 N 226 HWY

Bakersville, NC; Bakersville, NC

Telephone Number: _____

Electronic Mail Address: _____

[1] Must provide completed Agent Authorization Form/Letter.

[2] Documentation of ownership also needs to be provided with request (copy of Deed, County GIS/Parcel/Tax Record).

LANDOWNER AUTHORIZATION FORM

PROPERTY LEGAL DESCRITION:

Deed Book: 571_____ **Page:** _464-469 **County:** _Mitchell_____

Parcel ID Number: 0855-00-24-8634, 0855-00-14-9533, 0855-00-35-2677, 0855-00-34-2454

Street Address: 385 Fork Mountain Road, Bakersville, NC 28705

Property Owner (please print: Bradley Gouge Living Trust

Property Owner (please print): Bradley Gouge (Trustee), Ricky Dean Gouge (Trustee), Sally Elizabeth Parker (Trustee)

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

Resource Environmental Solutions, the NC Department of Environmental Quality, and the US Army Corps of Engineers, their employees, agents or assigns to have reasonable access to the above referenced property 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).

Property Owners(s) Address: 138 Bradley Gouge Road, Johnson City, Tennessee 37604
(if different from above)

Property Owner Telephone Number: 423-202-0251

Property Owner Telephone Number: _____

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

Bradley Gouge * 12/8/17
(Property Owner Authorized Signature) **(Date)**

Ricky Gouge 12/8/17
(Property Owner Authorized Signature) **(Date)**

Sally Parker 12/8/17
(Property Owner Authorized Signature) **(Date)**

Landowner Authorization Form

Site: Monkey Wall

Property Legal Description

TRACT 1 - Deed Book: 133 **Page:** 6 **County:** Mitchell

Parcel ID Number: 0855-00-23-1885

Street Address: Fork Mountain Road, Bakersville, NC 28705

Property Owner (please print): Marshall Street, Janice Street and Milan Street

The undersigned, registered property owners of the above property, do hereby authorize

Resource Environmental Solutions, the NC Division of Water Resources, and the US Army Corps of Engineers, their employees, agents or assigns to have reasonable access to the above referenced property for the evaluation of the property as a potential stream, wetland, and or riparian buffer restoration project, including conducting stream and or wetland determinations and delineations, as well as issuance and acceptance of any required permit(s) or certification(s).

Property Owner Address: 10058 N 226 HWY, Bakersville, NC 28705

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

Milan Street — 2-7-18

(Property Owner Authorized Signature) — Date

Marshall Street — 2-7-18

(Property Owner Authorized Signature) — Date

Janice Street — 2-7-18

(Property Owner Authorized Signature) — Date

F. JURISDICTIONAL DETERMINATION (JD) TYPE (Select One)

☑ I am requesting that the Corps provide a preliminary JD for the property identified herein.

A Preliminary Jurisdictional Determination (PJD) provides an indication that there may be "waters of the United States" or "navigable waters of the United States"on a property. PJDs are sufficient as the basis for permit decisions. For the purposes of permitting, all waters and wetlands on the property will be treated as if they are jurisdictional "waters of the United States". PJDs cannot be appealed (33 C.F.R. 331.2); however, a PJD is "preliminary" in the sense that an approved JD can be requested at any time. PJDs do not expire.

☐ I am requesting that the Corps provide an approved JD for the property identified herein.

An Approved Jurisdictional Determination (AJD) is a determination that jurisdictional "waters of the United States" or "navigable waters of the United States" are either present or absent on a site. An approved JD identifies the limits of waters on a site determined to be jurisdictional under the Clean Water Act and/or Rivers and Harbors Act. Approved JDs are sufficient as the basis for permit decisions. AJDs are appealable (33 C.F.R. 331.2). The results of the AJD will be posted on the Corps website. A landowner, permit applicant, or other "affected party" (33 C.F.R. 331.2) who receives an AJD may rely upon the AJD for five years (subject to certain limited exceptions explained in Regulatory Guidance Letter 05-02).

☐ I am unclear as to which JD I would like to request and require additional information to inform my decision.

G. ALL REQUESTS

☑ Map of Property or Project Area. This Map must clearly depict the boundaries of the review area.

☑ Size of Property or Review Area 26 acres.

☑ The property boundary (or review area boundary) is clearly physically marked on the site.

H. REQUESTS FROM CONSULTANTS

☑ Project Coordinates (Decimal Degrees): Latitude: 36.0548
Longitude: -82.2091

☑ A legible delineation map depicting the aquatic resources and the property/review area. Delineation maps must be no larger than 11x17 and should contain the following: (Corps signature of submitted survey plats will occur after the submitted delineation map has been reviewed and approved).[6]

- North Arrow
- Graphical Scale
- Boundary of Review Area
- Date
- Location of data points for each Wetland Determination Data Form or tributary assessment reach.

For Approved Jurisdictional Determinations:

- Jurisdictional wetland features should be labeled as Wetland Waters of the US, 404 wetlands, etc. Please include the acreage of these features.
- Jurisdictional non-wetland features (i.e. tidal/navigable waters, tributaries, impoundments) should be labeled as Non-Wetland Waters of the US, stream, tributary, open water, relatively permanent water, pond, etc. Please include the acreage or linear length of each of these features as appropriate.
- Isolated waters, waters that lack a significant nexus to navigable waters, or non-jurisdictional upland features should be identified as Non-Jurisdictional. Please include a justification in the label regarding why the feature is non-jurisdictional (i.e. "Isolated", "No Significant Nexus", or "Upland Feature"). Please include the acreage or linear length of these features as appropriate.

For Preliminary Jurisdictional Determinations:

- Wetland and non-wetland features should not be identified as Jurisdictional, 404, Waters of the United States, or anything that implies jurisdiction. These features can be identified as Potential Waters of the United States, Potential Non-wetland Waters of the United States, wetland, stream, open water, etc. Please include the acreage and linear length of these features as appropriate.

☑ Completed Wetland Determination Data Forms for appropriate region
(at least one wetland and one upland form needs to be completed for each wetland type)

[6] Please refer to the guidance document titled "Survey Standards for Jurisdictional Determinations" to ensure that the supplied map meets the necessary mapping standards. http://www.saw.usace.army.mil/Missions/Regulatory-Permit-Program/Jurisdiction/

- [x] Completed appropriate Jurisdictional Determination form
  - **PJDs,** please complete a Preliminary Jurisdictional Determination Form[7] and include the Aquatic Resource Table
  - **AJDs**, please complete an Approved Jurisdictional Determination Form[8]
- [x] Vicinity Map
- [x] Aerial Photograph
- [x] USGS Topographic Map
- [x] Soil Survey Map
- [x] Other Maps, as appropriate (e.g. National Wetland Inventory Map, Proposed Site Plan, previous delineation maps, LIDAR maps, FEMA floodplain maps)
- [ ] Landscape Photos (if taken)
- [ ] NCSAM and/or NCWAM Assessment Forms and Rating Sheets
- [ ] NC Division of Water Resources Stream Identification Forms
- [ ] Other Assessment Forms

[7] www.saw.usace.army.mil/Portals/59/docs/regulatory/regdocs/JD/RGL_08-02_App_A_Prelim_JD_Form_fillable.pdf
[8] Please see http://www.saw.usace.army.mil/Missions/Regulatory-Permit-Program/Jurisdiction/

Principal Purpose: The information that you provide will be used in evaluating your request to determine whether there are any aquatic resources within the project area subject to federal jurisdiction under the regulatory authorities referenced above.
Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public, and may be made available as part of a public notice as required by federal law. Your name and property location where federal jurisdiction is to be determined will be included in the approved jurisdictional determination (AJD), which will be made available to the public on the District's website and on the Headquarters USAGE website.
Disclosure: Submission of requested information is voluntary; however, if information is not provided, the request for an AJD cannot be evaluated nor can an AJD be issued.

Appendix 2 - PRELIMINARY JURISDICTIONAL DETERMINATION (PJD) FORM

BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR PJD: 3/4/19

B. NAME AND ADDRESS OF PERSON REQUESTING PJD: Jeremy Schmid

C. DISTRICT OFFICE, FILE NAME, AND NUMBER: CESAW-RG-A

D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION:
(USE THE TABLE BELOW TO DOCUMENT MULTIPLE AQUATIC RESOURCES AND/OR AQUATIC RESOURCES AT DIFFERENT SITES)

State: NC County/parish/borough: Mitchell City: Bakersville

Center coordinates of site (lat/long in degree decimal format):

Lat.: 36.0548 Long.: -82.2091

Universal Transverse Mercator: NAD83

Name of nearest waterbody: Big Rock Creek

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

☐ Office (Desk) Determination. Date:

☐ Field Determination. Date(s):

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 resource in review area (acreage and linear feet, if applicable)	Type of aquatic resource (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)
			see attached table		

Waters_Name	State	Cowardin_Code	HGM_Code	Meas_Type	Amount	Units	Waters_Type	Latitude	Longitude	Local_Waterway
WA	NORTH CAROLINA	PEM	DEPRESS	Area	0.2476	ACRE	DELINEATE	36.0548	-82.209	
WB	NORTH CAROLINA	PFO	DEPRESS	Area	0.0278	ACRE	DELINEATE	36.0581	-82.2047	
WC	NORTH CAROLINA	PFO	DEPRESS	Area	0.0134	ACRE	DELINEATE	36.0569	-82.205	
G1	NORTH CAROLINA	R4		Linear	1977.4	FOOT	DELINEATE	36.0561	-82.206	
G2	NORTH CAROLINA	R4		Linear	1754.3	FOOT	DELINEATE	36.0573	-82.204	

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)

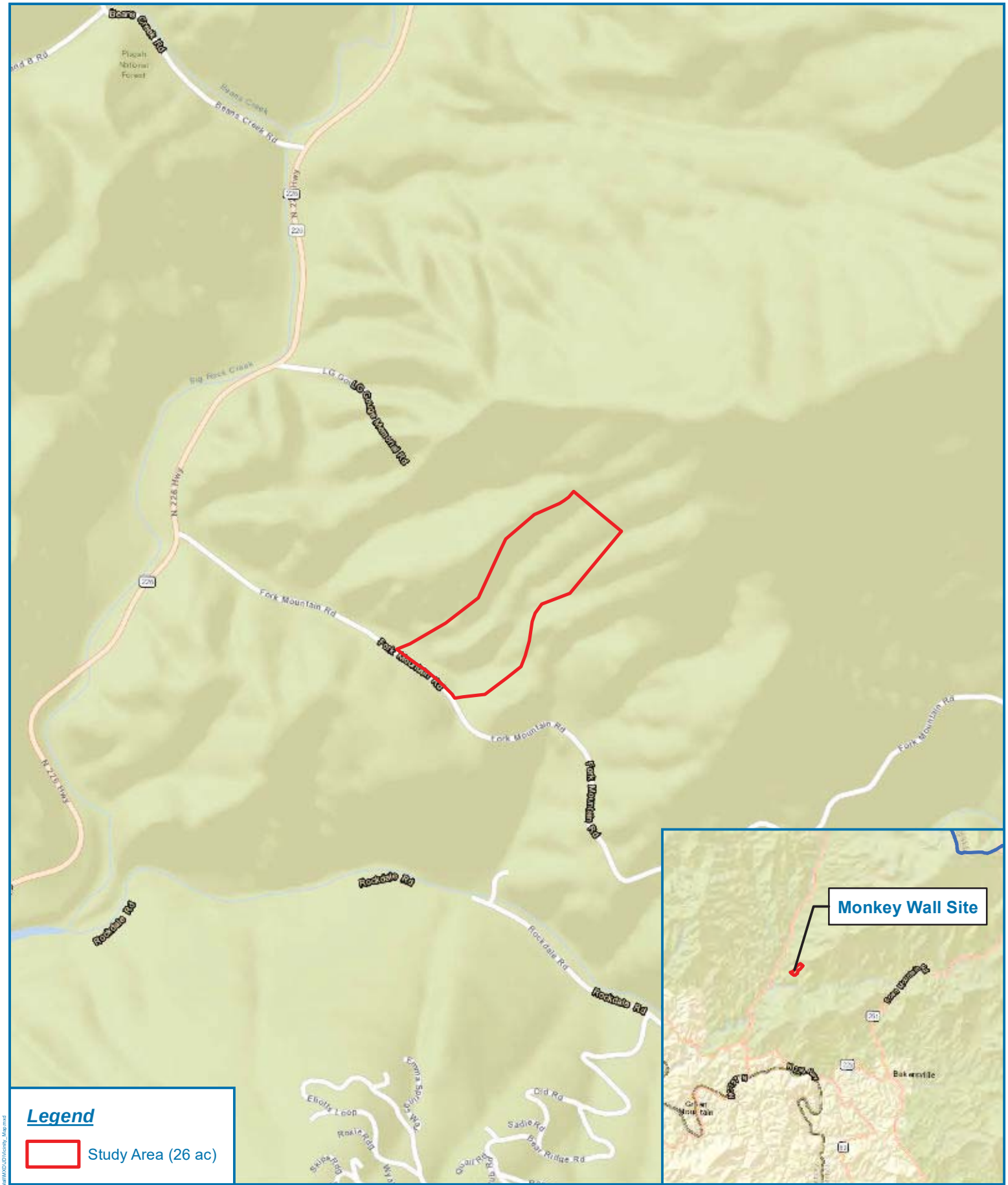
Checked items should be included in subject file. Appropriately reference sources below where indicated for all checked items:

- [x] Maps, plans, plots or plat submitted by or on behalf of the PJD requestor:
  Map: Vicinity, USGS, NWI, Soil, Existing conditions, WOUS.
- [x] 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.
- [x] U.S. Geological Survey map(s). Cite scale & quad name: 24k Bakersville.
- [ ] Natural Resources Conservation Service Soil Survey. Citation: _____.
- [x] 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): _____.

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.

_____	Jeremy Schmid Digitally signed by Jeremy Schmid DN: cn=Jeremy Schmid, o, ou, email=jschmid@res.us, c=US Date: 2018.04.24 10:02:26 -04'00'
Signature and date of Regulatory staff member completing PJD	Signature and date of person requesting PJD (REQUIRED, unless obtaining the signature is impracticable)[1]

[1] Districts may establish timeframes for requestor to return signed PJD forms. If the requestor 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.



Legend

Study Area (26 ac)

N
W E
S

0 500 1,000

Feet

Vicinity Map

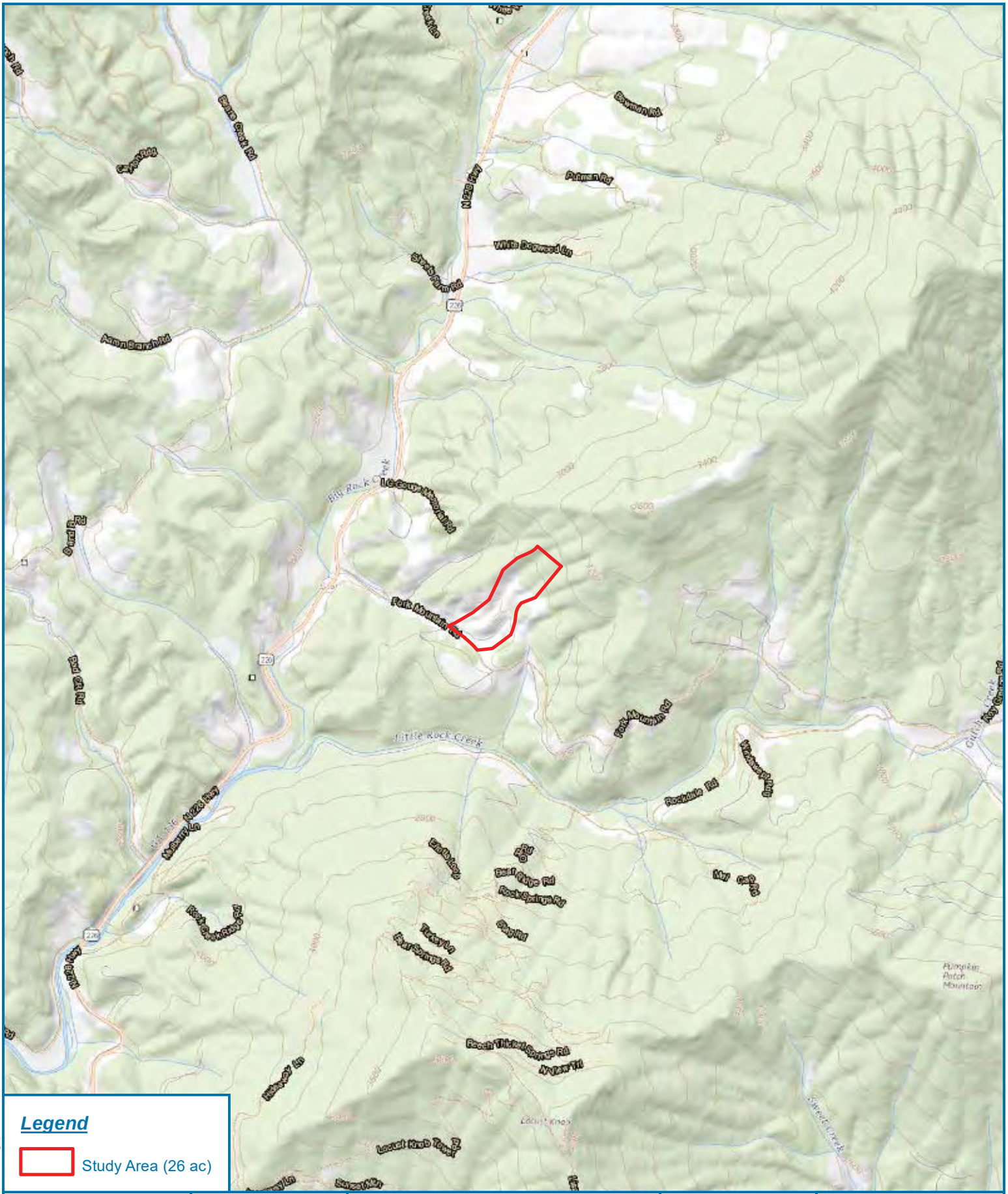
Monkey Wall Mitigation Site

Mitchell County, North Carolina

Date:	3/1/2019
Drawn by:	GDS
Checked by:	MDE
	1 inch = 1,000 feet

res

Document Path: S:\@RES GIS\Projects\NC\Monkey Wall\MXD\Vicinity_Map.mxd



Legend

Study Area (26 ac)

N
W E
S

0 1,000 2,000

Feet

USGS Bakersville Quadrangle (2016)

Monkey Wall Mitigation Site

Mitchell County, North Carolina

Date: 3/1/2019

Drawn by: GDS

Checked by: MDE

1 inch = 2,000 feet

res

Document Path: S:\@RES GIS\Projects\NC\Monkey Wall\MXD\USGS_Map.mxd

Legend

- Study Area (26 ac)
- Hydric (100%)
- Predominantly Hydric (66-99%)
- Partially Hydric (33-65%)
- Predominantly Nonhydric (1-32%)
- Nonhydric (0%)

N
W E
S

0 200 400
Feet

Mapped Soils

Monkey Wall Mitigation Site

Mitchell County, North Carolina

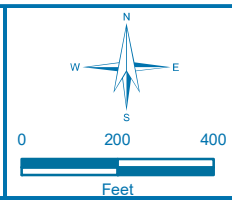
Date: 3/1/2019
Drawn by: GDS
Checked by: MDE
1 inch = 400 feet

res

Document Path: S:\@RES GIS\Projects\NC\Monkey Wall\MXD\GDS\Soils_Map.mxd

Legend

- Study Area (26 ac)
- NWI Wetlands (USFWS 10/29/2018)



National Wetlands Inventory

Monkey Wall Mitigation Site

Mitchell County, North Carolina

Date:	3/1/2019
Drawn by:	GDS
Checked by:	MDE
	1 inch = 400 feet

res

Document Path: S:\@RES GIS\Projects\NCMonkey Wall\MXD\DNWI_Map.mxd

res

0 100 200
Feet
1 in = 200 feet

Potential Wetland or Non-Wetland Waters of the U.S. Map

Monkey Wall Mitigation Site

Mitchell County, North Carolina

Date: 3/4/2019	Drawn by: JLS
Revisions: NONE	Checked by: BPB

Legend

- Study Area (26 ac)
- Potential Wetland Waters of the US
- Potential Non-Wetland Waters of the US
- Wetland Data Point
- Upland Data Point

REFERENCE

1) Horizontal Datum is NAD83 UTM Z15N.

2) Map Projection is NAD_1983_StatePlane_ North_Carolina_FIPS_3200_Feet

Document Path: S:\@RES GIS\Projects\NC\Monkey Wall\MXD\JOW\OJS_Map1.mxd

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Monkey Wall **City/County:** Bakersville/Mitchell **Sampling Date:** 13-Aug-18

Applicant/Owner: RES **State:** NC **Sampling Point:** DP-1

Investigator(s): Robert White **Section, Township, Range:** S T R

Landform (hillslope, terrace, etc.): Floodplain **Local relief (concave, convex, none):** convex **Slope:** 0.0% / 0.0 °

Subregion (LRR or MLRA): MLRA 228 in LRR N **Lat.:** 36.0548 **Long.:** -82.2087 **Datum:**

Soil Map Unit Name: Thunder-Saunook complex **NWI classification:** PEM

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

Are Vegetation ☑ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(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 ◉	No ○	
Hydric Soil Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ◉ No ○
Wetland Hydrology Present?	Yes ◉	No ○	

Remarks:
site heavily impacted by livestock access

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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 along 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 ○	Depth (inches): 1	
Water Table Present?	Yes ◉	No ○	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):	**Wetland Hydrology Present?** Yes ◉ No ○

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

Remarks:

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: DP-1

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size:)				
1. Boehmeria cylindrica	5	☐	11.1%	FACW
2. Schoenoplectus pungens var. pungens	10	☑	22.2%	OBL
3. Juncus effusus	20	☑	44.4%	FACW
4. Carex lurida	10	☑	22.2%	OBL
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	45	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20	
FACW species	25	x 2 =	50	
FAC species	0	x 3 =	0	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column Totals:	45	(A)	70	(B)

Prevalence Index = B/A = 1.556

Hydrophytic Vegetation Indicators:

- ☑ **Rapid Test for Hydrophytic Vegetation**
- ☑ **Dominance Test is > 50%**
- ☑ **Prevalence Index is ≤3.0** [1]
- ☐ **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.**

Definition of Vegetation Strata:

Four Vegetation Strata:

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

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

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

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ◉ No ○

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

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: DP-1

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]	Loc²	Texture	Remarks
0-1	10YR 3/1						Loam	
1-12	10YR 4/1	85	10YR 5/8	15	C	M	Sandy Loam	

[1] Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains ²Location: 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 Muck 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 ○

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont Region

Project/Site: Monkey Wall **City/County:** Bakersville/Mitchell **Sampling Date:** 13-Aug-18

Applicant/Owner: RES **State:** NC **Sampling Point:** DP-2

Investigator(s): Robert White **Section, Township, Range:** S _____ T _____ R _____

Landform (hillslope, terrace, etc.): Hillside **Local relief (concave, convex, none):** convex **Slope:** 0.0% / 0.0 °

Subregion (LRR or MLRA): MLRA 228 in LRR N **Lat.:** 36.0549 **Long.:** -82.2086 **Datum:** _____

Soil Map Unit Name: Thunder-Saunook complex **NWI classification:** Upland

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

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(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 ○	No ◉	
Hydric Soil Present?	Yes ○	No ◉	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one 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 along 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 ◉	Depth (inches): _____	
Water Table Present?	Yes ○	No ◉	Depth (inches): _____	
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches): _____	**Wetland Hydrology Present?** Yes ○ No ◉

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

Remarks:

VEGETATION (Five/Four Strata)- Use scientific names of plants.

Sampling Point: DP-2

	Absolute % Cover	Dominant Species?	Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
	0	= Total Cover		
Sapling-Sapling/Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
	0	= Total Cover		
Shrub Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
	0	= Total Cover		
Herb Stratum (Plot size:)				
1. Trifolium repens	20	☑	33.3%	FACU
2. Digitaria serotina	10	☐	16.7%	FAC
3. Schedonorus arundinaceus	30	☑	50.0%	FACU
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
7.	0	☐	0.0%	
8.	0	☐	0.0%	
9.	0	☐	0.0%	
10.	0	☐	0.0%	
11.	0	☐	0.0%	
12.	0	☐	0.0%	
	60	= Total Cover		
Woody Vine Stratum (Plot size:)				
1.	0	☐	0.0%	
2.	0	☐	0.0%	
3.	0	☐	0.0%	
4.	0	☐	0.0%	
5.	0	☐	0.0%	
6.	0	☐	0.0%	
	0	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	10	x 3 =	30	
FACU species	50	x 4 =	200	
UPL species	0	x 5 =	0	
Column Totals:	60	(A)	230	(B)

Prevalence Index = B/A = 3.833

Hydrophytic Vegetation Indicators:

- ☐ **Rapid Test for Hydrophytic Vegetation**
- ☐ **Dominance Test is > 50%**
- ☐ **Prevalence Index is ≤3.0** [1]
- ☐ **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.**

Definition of Vegetation Strata:

Four Vegetation Strata:

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

Sapling/shrub stratum – Consists of woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

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

Woody vines – Consists of all woody vines greater than 3.28 ft in height.

Five Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling stratum – Consists of woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub stratum – Consists of woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb stratum – Consists of all herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody species, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vines – Consists of all woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes ○ No ◉

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

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: DP-2

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]	Loc²	Texture	Remarks
0-4	7.5YR 4/3						Clay Loam	
4-12	7.5YR 5/4						Clay Loam	

[1] Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains ²Location: 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 Muck 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 ◉

Remarks:

Appendix J – Invasive Species Plan

INVASIVE SPECIES PLAN

Annual monitoring and semi-annual site visits will be conducted to assess the condition of the finished project. These site inspections may identify the presence of invasive vegetation. RES will treat invasive species vegetation within the project area and provide remedial action on a case-by-case basis. Common invasive species vegetation, such as Chinese privet (*Ligustrum sinense*), multiflora rose (*Rosa multiflora*), tree-of-heaven (*Ailanthus altissima*), and Japanese honeysuckle (*Lonicera japonica*), will be treated to allow native plants to become established within the conservation easement. Invasive species vegetation will be treated by approved mechanical and/or chemical methods such that the percent composition of exotic/invasive species is less than 5% of the total planted area. Any control methods requiring herbicide application will be performed in accordance with NC Department of Agriculture (NCDA) rules and regulations. If areas of invasive species exist within the easement, they will be monitored yearly as part of the monitoring protocol and treated if necessary. If required, problem areas will continue to be treated until the project easement shows overall trending towards meeting all monitoring requirements.

Appendix K – Approved FHWA Categorical Exclusion Form

Categorical Exclusion Form for Division of Mitigation Services Projects
Version 1.4

Part 1: General Project Information	
Project Name:	Monkey Wall
County Name:	Mitchell
DMS ID Number:	100069
Project Sponsor:	Resource Environmental Solutions LLC
Project Contact Name:	Bob White
Project Contact Address:	302 Jefferson Street Suite 110, Raleigh, NC 27605
Project Contact E-mail:	bwhite@res.us
DMS Project Manager:	Paul Weisner

Project Description

The Monkey Wall Stream Mitigation Project ("Project") is located in Mitchell County, approximately two miles northwest of Baskerville. The Project is located in the French Broad River Basin within Cataloging Unit 06010108, and TLW 06010108060010. The Project's watershed is primarily forested and pasture, and historically served this purpose. Water quality stressors currently affecting the site include livestock production and lack of riparian buffer. This project presents the opportunity to provide up to 3,942 cold stream mitigation units. These will be derived from 3,062 linear feet of Priority I Restoration, 104 linear feet of Enhancement II, and 251 linear feet of Preservation.

For Official Use Only

Reviewed By:

Date — **DMS Project Manager**

Conditional Approved By:

Date — **For Division Administrator FHWA**

☐ **Check this box if there are outstanding issues**

Final Approval By:

2-5-19

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

Northern Long-Eared Bat 4(d) Rule Streamlined Consultation Form

Federal agencies should use this form for the optional streamlined consultation framework for the northern long-eared bat (NLEB). This framework allows federal agencies to rely upon the U.S. Fish and Wildlife Service's (USFWS) January 5, 2016, intra-Service Programmatic Biological Opinion (BO) on the final 4(d) rule for the NLEB for section 7(a)(2) compliance by: (1) notifying the USFWS that an action agency will use the streamlined framework; (2) describing the project with sufficient detail to support the required determination; and (3) enabling the USFWS to track effects and determine if reinitiation of consultation is required per 50 CFR 402.16.

This form is not necessary if an agency determines that a proposed action will have no effect to the NLEB or if the USFWS has concurred in writing with an agency's determination that a proposed action may affect, but is not likely to adversely affect the NLEB (i.e., the standard informal consultation process). Actions that may cause prohibited incidental take require separate formal consultation. Providing this information does not address section 7(a)(2) compliance for any other listed species.

Information to Determine 4(d) Rule Compliance:	**YES**	**NO**
1. Does the project occur wholly outside of the WNS Zone[1]?	☐	☒
2. Have you contacted the appropriate agency[2] to determine if your project is near known hibernacula or maternity roost trees?	☒	☐
3. Could the project disturb hibernating NLEBs in a known hibernaculum?	☐	☒
4. Could the project alter the entrance or interior environment of a known hibernaculum?	☐	☒
5. Does the project remove any trees within 0.25 miles of a known hibernaculum at any time of year?	☐	☒
6. Would the project cut or destroy known occupied maternity roost trees, or any other trees within a 150-foot radius from the maternity roost tree from June 1 through July 31.	☐	☒

You are eligible to use this form if you have answered yes to question #1 **or** yes to question #2 **and** no to questions 3, 4, 5 and 6. The remainder of the form will be used by the USFWS to track our assumptions in the BO.

Agency and Applicant[3] (Name, Email, Phone No.):

Donnie Brew, Donnie.brew@dot.gov, (919) 747-7017
Federal Highway Administration

Bob White, bwhite@res.us, (239) 233-7570
Resource Environmental Solutions

[1] http://www.fws.gov/midwest/endangered/mammals/nleb/pdf/WNSZone.pdf
[2] See http://www.fws.gov/midwest/endangered/mammals/nleb/nhisites.html
[3] If applicable - only needed for federal actions with applicants (e.g., for a permit, etc.) who are party to the consultation.

Project Name: Monkey Wall Mitigation Project, DMS Project #: 100069

Project Location (include coordinates if known): 36.0559° N, -82.2067° W

The Project is in Mitchell County approximately 2 miles northwest of Bakersville, NC. To access the site from Asheville, proceed west on I-240 and take the exit for I-26 W. Continue on I-26 and then take the exit for US-19 N and follow as it turns into US-19 E. Then take a left onto NC-197 N. NC-197 N will merge into NC-226 N; follow this for three miles, and then take a left onto Fork Mountain Road. In 0.3 mile, the site will be on your left.

Basic Project Description (provide narrative below or attach additional information):

The Project is in the French Broad River Basin within Cataloging Unit 06010108, TLW 06010108060010, and NC Division of Water Resources (DWR) sub basin 04-03-06. The Project area includes two unnamed tributaries that drain to Big Rock Creek. The current State classification for Big Rock Creek is C; Tr.; however, the Tr. designation does not apply to the Project tributaries (NCDWQ 2011). Therefore, the Project streams are classified as Class C waters.

The Project will include Priority I stream restoration on two reaches (G1-C and G2-B), Enhancement II on two reaches (G1-B, and G2-A), and Preservation on one reach (G1-A).

Stream Restoration activities will include constructing an A type stream with appropriate dimensions and pattern, reconnecting the channel to the floodplain. In-stream structures such as log sills and brush toes will be installed for vertical stability and to improve habitat. Buffer improvements will filter runoff from agricultural fields, thereby reducing nutrient and sediment loads to the channel. Livestock exclusion fence will be installed, as needed, along the easement boundary. The widening and restoration of the riparian areas will also provide wildlife corridors throughout the project area.

Enhancement activities will include channel grading to commit all flow to a single thread channel, grading, and vegetative planting. Livestock exclusion fencing will be installed.

Preservation activities will include livestock exclusion fencing and establishment of a permanent conservation easement.

General Project Information	YES	NO
Does the project occur within 0.25 miles of a known hibernaculum?	☐	☒
Does the project occur within 150 feet of a known maternity roost tree?	☐	☒
Does the project include forest conversion[4]? (if yes, report acreage below)	☒	☐
Estimated total acres of forest conversion	<2.0	
If known, estimated acres[5] of forest conversion from April 1 to October 31	<2.0	
If known, estimated acres of forest conversion from June 1 to July 31[6]		
Does the project include timber harvest? (if yes, report acreage below)	☐	☒
Estimated total acres of timber harvest		
If known, estimated acres of timber harvest from April 1 to October 31		
If known, estimated acres of timber harvest from June 1 to July 31		
Does the project include prescribed fire? (if yes, report acreage below)	☐	☒
Estimated total acres of prescribed fire		
If known, estimated acres of prescribed fire from April 1 to October 31		
If known, estimated acres of prescribed fire from June 1 to July 31		
Does the project install new wind turbines? (if yes, report capacity in MW below)	☐	☒
Estimated wind capacity (MW)		

Agency Determination:

By signing this form, the action agency determines that this project may affect the NLEB, but that any resulting incidental take of the NLEB is not prohibited by the final 4(d) rule.

If the USFWS does not respond within 30 days from submittal of this form, the action agency may presume that its determination is informed by the best available information and that its project responsibilities under 7(a)(2) with respect to the NLEB are fulfilled through the USFWS January 5, 2016, Programmatic BO. The action agency will update this determination annually for multi-year activities.

The action agency understands that the USFWS presumes that all activities are implemented as described herein. The action agency will promptly report any departures from the described activities to the appropriate USFWS Field Office. The action agency will provide the appropriate USFWS Field Office with the results of any surveys conducted for the NLEB. Involved parties will promptly notify the appropriate USFWS Field Office upon finding a dead, injured, or sick NLEB.

Signature: _____ Date Submitted: 2-5-19

[4] Any activity that temporarily or permanently removes suitable forested habitat, including, but not limited to, tree removal from development, energy production and transmission, mining, agriculture, etc. (see page 48 of the BO).
[5] If the project removes less than 10 trees and the acreage is unknown, report the acreage as less than 0.1 acre.
[6] If the activity includes tree clearing in June and July, also include those acreage in April to October.

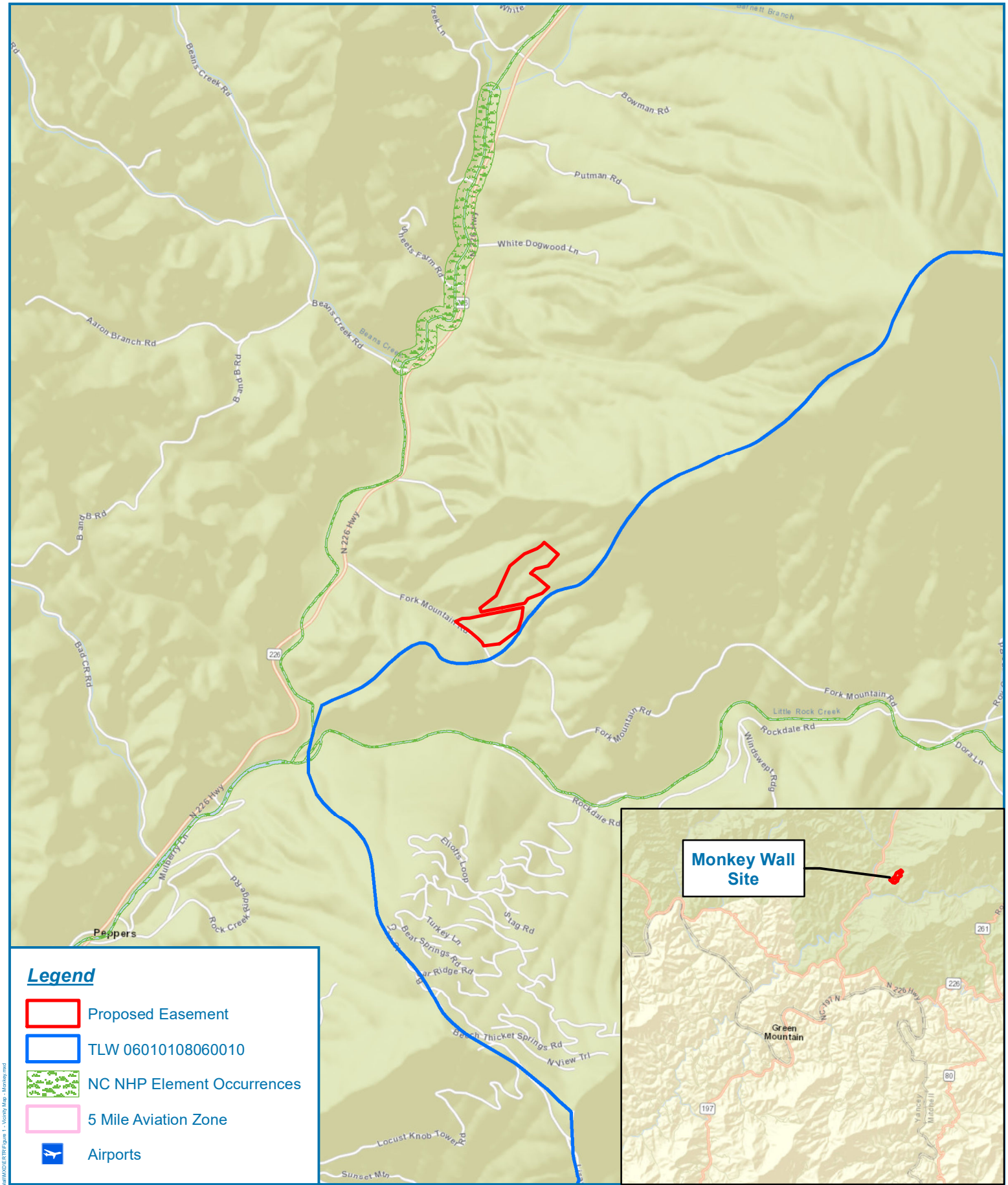


Figure 1 - Vicinity Map

Monkey Wall Mitigation Site

Mitchell County, North Carolina

Date: 9/28/2018

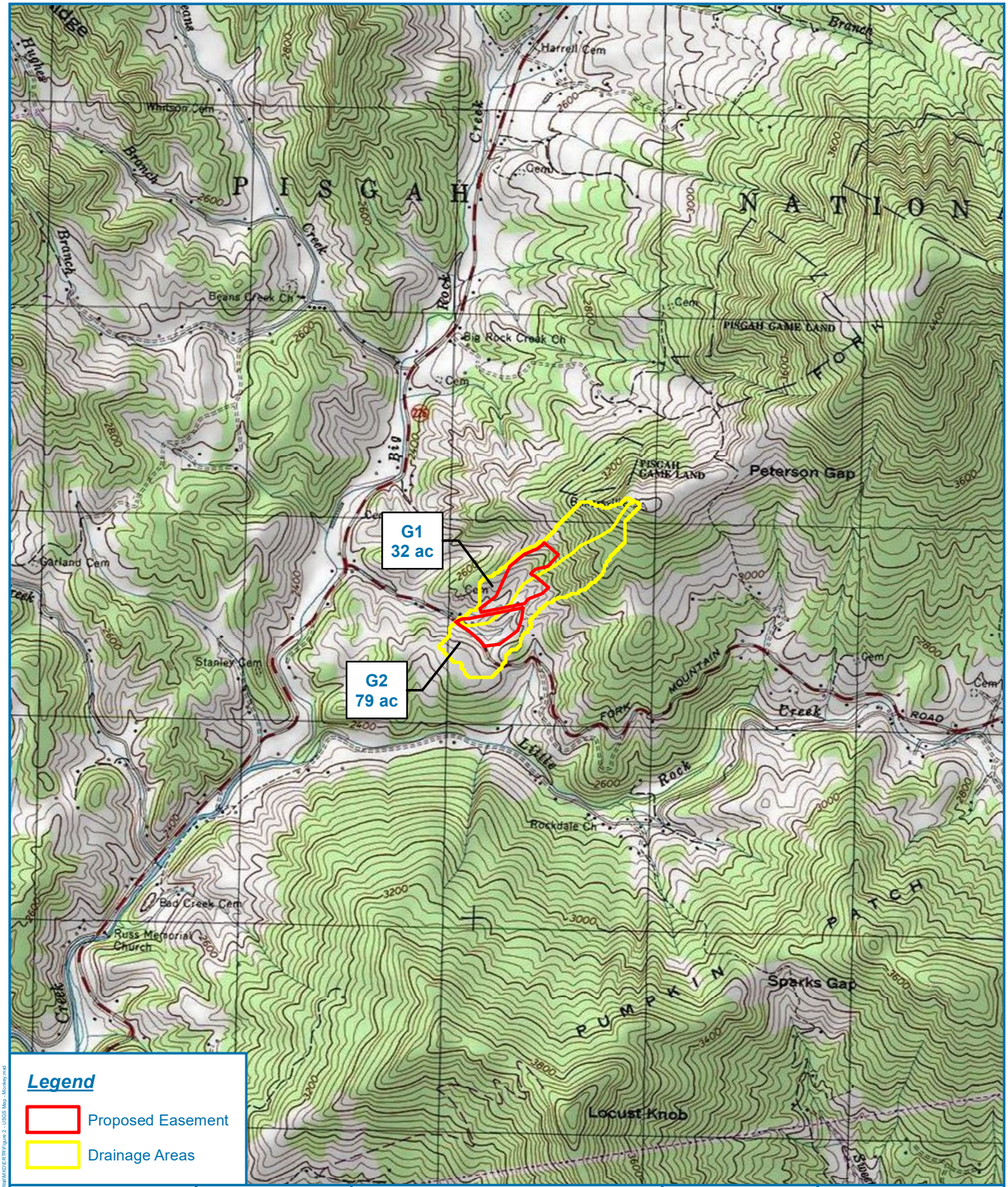
Drawn by: MDE

Checked by: RMW

1 inch = 2,000 feet

res

Document Path: S:\@RES GIS\Projects\NC\Monkey Wall\MXD\EIR\Figure 1 - Vicinity Map - Monkey.mxd



Legend

- Proposed Easement
- Drainage Areas

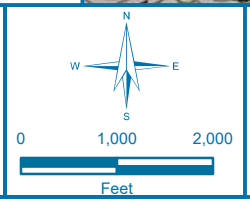


Figure 2 - USGS Map

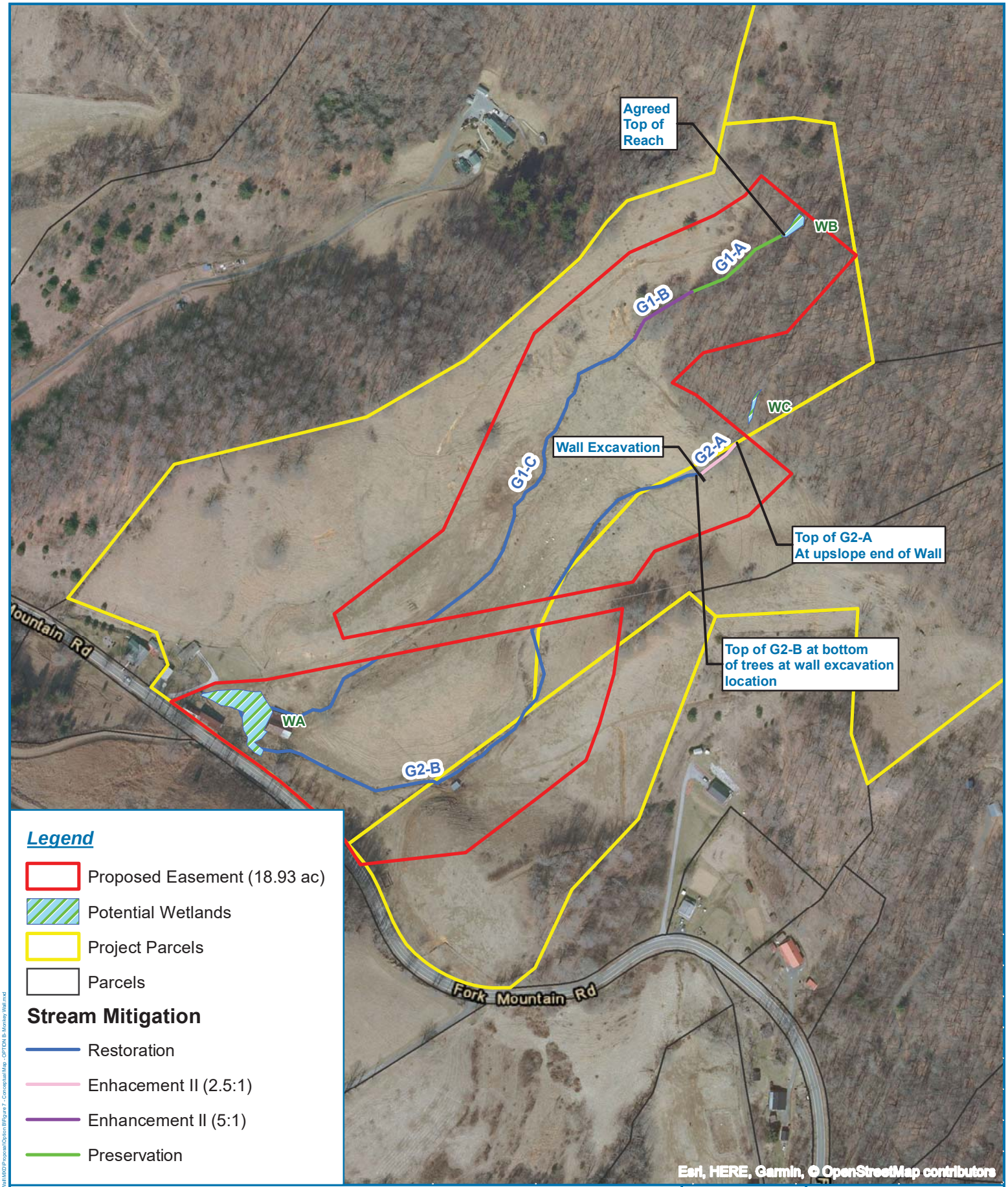
Monkey Wall Mitigation Site

Mitchell County, North Carolina

Date:	9/28/2018
Drawn by:	MDE
Checked by:	RMW
	1 inch = 2,000 feet

res

Document Path: S:\@RES GIS\Projects\NC\Monkey Wall\MXD\EIR\Figure 2 - USGS Map - Monkey.mxd



Legend

- Proposed Easement (18.93 ac)
- Potential Wetlands
- Project Parcels
- Parcels

Stream Mitigation

- Restoration
- Enhacement II (2.5:1)
- Enhancement II (5:1)
- Preservation

0 150 300
Feet

Figure 6 - Conceptual Map

Monkey Wall Mitigation Site

Mitchell County, North Carolina

Date: 9/4/2018
Drawn by: MDE

res

Matthew DeAngelo

From: Stancil, Vann F <vann.stancil@ncwildlife.org>
Sent: Friday, October 12, 2018 2:19 PM
To: Matthew DeAngelo
Subject: [EXTERNAL] RE: [External] Project Scoping for Monkey Wall Mitigation Site in Mitchell County

Matt,

I've reviewed the description for the Monkey Wall Mitigation Site, which is located on the north side of Fork Mountain Road and east of NC Hwy 226 in Mitchell County. The site includes two small, unnamed tributaries to Big Rock Creek, which is a tributary to the North Toe River. There are no records of any state or federally listed species at the site nor any in the immediate vicinity of the site.

Regarding terrestrial species, the U.S. Fish and Wildlife Service (USFWS) has listed the northern long-eared bat (*Myotis septentrionalis*) as threatened under the Endangered Species Act. Mitchell County is within the range (https://www.fws.gov/midwest/endangered/mammals/nleb/pdf/WNSZone.pdf) of the northern long-eared bat and may be present or in the vicinity of the project site. As such, consultation with the USFWS may be required. For more information, please see https://www.fws.gov/midwest/endangered/mammals/nleb/ or https://www.fws.gov/raleigh/NLEB_RFO.html or contact the Asheville office of the USFWS to ensure that potential issues related to this species are addressed.

Thanks for the opportunity to review this mitigation project for issues related to fish and wildlife. Please let me know if I can assist further.

Vann

From: Matthew DeAngelo <mdeangelo@res.us>
Sent: Tuesday, September 11, 2018 2:29 PM
To: Stancil, Vann F <vann.stancil@ncwildlife.org>
Cc: Jamey McEachran <jmceachran@res.us>; Bob White <bwhite@res.us>
Subject: [External] Project Scoping for Monkey Wall Mitigation Site in Mitchell County

Dear Mr. Stancil,

The Monkey Wall Stream Mitigation Site has been identified by Resource Environmental Solutions, LLC (RES) to provide compensatory mitigation for unavoidable stream impacts in Mitchell County, North Carolina.

The purpose of this letter is to request, review, and comment on any possible issues that might emerge with respect to fish and wildlife associated with a potential stream restoration project on the attached site. A detailed project description along with maps showing the location and approximate limits of the conservation easement are attached along with a KMZ file.

We thank you in advance for your timely response and cooperation. You may return the comment to my attention at the address listed in the attached letter or via email. Please feel free to contact me at mdeangelo@res.us with any questions that you may have concerning the extent of site disturbance associated with this project.

Sincerely,

Matt DeAngelo
Ecologist

RES | res.us
Direct: 984.255.9133 | Mobile: 757.202.4471

Matthew DeAngelo

From: Cortes, Milton - NRCS, Raleigh, NC <Milton.Cortes@nc.usda.gov>
Sent: Sunday, October 28, 2018 4:45 PM
To: Matthew DeAngelo
Subject: [EXTERNAL] RE: AD-1006 Request for the Monkey Wall Mitigation Site in Mitchell County
Attachments: AD1006_ Monkey_Wall_ConsewrvationEasyment.pdf

Importance: High

Follow Up Flag: Flag for follow up
Flag Status: Flagged

Mathew:

Please find attached the Farmland Conversion Impact Rati ng evaluations for the Monkey Wall Conservation Easement in Mitchell Co., NC

If we can be of further assistance please let us know

Best regards;

Milton Cortes
Acting State Soil Scientist
Natural Resources Conservation Service
4407 Bland Rd, Suite 117
Raleigh, NC 27609
Phone: 919-873-2171
milton.cortes@usda.gov

From: Matthew DeAngelo [mailto:mdeangelo@res.us]
Sent: Monday, September 17, 2018 9:49 AM
To: Cortes, Milton - NRCS, Raleigh, NC <Milton.Cortes@nc.usda.gov>
Subject: AD-1006 Request for the Monkey Wall Mitigation Site in Mitchell County

Mr. Cortes,

Resource Environmental Solutions (RES) requests review and comment from the Natural Resources Conservation Service on any possible concerns that may emerge with respect to farmland resources including prime, unique, statewide, or local important farmland associated with the Monkey Wall stream mitigation project. This project is being developed for the North Carolina Division of Mitigation Services. Please note that this request is in support of the development of the Categorical Exclusion (CE) and an Environmental Resources Technical Report for the referenced project.

Attached is a request letter along with Form AD-1006 with Parts I and III completed and maps of the Monkey Wall Site. We ask that you review the site information and complete Parts II, IV, and V as required by NRCS. We thank you in advance for your timely response and cooperation. Please feel free to contact me with any questions that you may have concerning the extent of site disturbance with this project.

Sincerely,

Matt DeAngelo
Ecologist

RES | res.us
Direct: 984.255.9133 | Mobile: 757.202.4471

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*		Date Of Land Evaluation Request 9/11/2018	
Name of Project Monkey Wall		Federal Agency Involved Federal Highway Admin (FWHA)	
Proposed Land Use Conservation Easement		County and State Mitchell County	
PART II *(To be completed by NRCS)*		Date Request Received By NRCS 09/24/2018	Person Completing Form: Milton Cortes NRCS NC
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 68 acres
Major Crop(s) CORN	Farmable Land In Govt. Jurisdiction Acres: 13.3 % 18,871 acres	Amount of Farmland As Defined in FPPA Acres: 21.3 % 28,546 acres	
Name of Land Evaluation System Used Mitchell Co. NC LESA	Name of State or Local Site Assessment System N/A	Date Land Evaluation Returned by NRCS October 28, 2018 By eMail	

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	19			
B. Total Acres To Be Converted Indirectly				
C. Total Acres In Site	21.6			
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland	0			
B. Total Acres Statewide Important or Local Important Farmland	16.80			
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted	0.0890			
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value	99.3			
PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value of Farmland To Be Converted (Scale of 0 to 100 Points)	0			

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	0	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	0	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:

$$\frac{\text{Total points assigned Site A}}{\text{Maximum points possible}} = \frac{180}{200} \text{ X } 160 = 144 \text{ points for Site A}$$

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.

North Carolina Department of Natural and Cultural Resources

State Historic Preservation Office

Ramona M. Bartos, Administrator

Governor Roy Cooper
Secretary Susi H. Hamilton

Office of Archives and History
Deputy Secretary Kevin Cherry

October 8, 2018

Matt DeAngelo
RES
302 Jefferson Street, Suite 110
Raleigh, NC 27605

Re: Monkey Wall Mitigation Site, Mitchell County, ER 18-2693

Dear Mr. DeAngelo:

Thank you for your letter of September 11, 2018, 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 environmental.review@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

Renee Gledhill-Earley

for Ramona M. Bartos

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CHEROKEE NATION®
P.O. Box 948 • Tahlequah, OK 74465-0948 • 918-453-5000 • cherokee.org

Office of the Chief

Bill John Baker
Principal Chief
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S. Joe Crittenden
Deputy Principal Chief
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November 26, 2018

Kim Browning
United States Army Corps of Engineers, Wilmington District
Mitigation Field Office
3331 Heritage Trade Drive, Suite 105
Wake Forest, NC 27584

Re: SAW-2018-01162, Monkey Wall Mitigation Site

Ms. Kim Browning:

The Cherokee Nation (Nation) is in receipt of your correspondence about **SAW-2018-01162, Monkey Wall Mitigation Site**, and appreciates the opportunity to provide comment upon this project. Please allow this letter to serve as the Nation's interest in acting as a consulting party to this proposed undertaking.

The Nation maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office reviewed this project, cross referenced the project's legal description against our information, and found no instances where this project intersects or adjoins such resources. Thus, the Nation does not foresee this project imparting impacts to Cherokee cultural resources at this time.

However, the Nation requests that the United States Army Corps of Engineers (USACE) halt all project activities immediately and re-contact our Offices for further consultation if items of cultural significance are discovered during the course of this project.

Additionally, the Nation requests that USACE conduct appropriate inquiries with other pertinent Tribal and Historic Preservation Offices regarding historic and prehistoric resources not included in the Nation's databases or records.

If you require additional information or have any questions, please contact me at your convenience. Thank you for your time and attention to this matter.

Wado,

Elizabeth Toombs, Tribal Historic Preservation Officer
Cherokee Nation Tribal Historic Preservation Office
elizabeth-toombs@cherokee.org
918.453.5389

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Asheville Field Office
160 Zillicoa Street
Asheville, North Carolina 28801

October 12, 2018

Matt DeAngelo
RES
302 Jefferson Street, Suite 110
Raleigh, North Carolina 27605

Dear Mr. DeAngelo:

Subject: Monkey Wall Mitigation Project; Mitchell County, North Carolina
Log No. 4-2-18-486

The U.S. Fish and Wildlife Service (Service) has reviewed the information provided in your correspondence dated September 11, 2018, wherein you solicit comments regarding potential impacts to federally protected species that may result from the proposed project. 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).

Project Description

According to the information provided, the proposed project is still in the scoping phase, but aims to restore/enhance approximately 3,617 linear feet of an unnamed tributary to Big Rock Creek near Bakersville, North Carolina to generate mitigation credits in the French Broad River Basin. The site is currently dominated by agricultural land use (pasture). Project objectives would include livestock exclusion, invasive species management, riparian planting, and streambank stabilization. You indicated that 21.6 acres would be maintained under a conservation easement.

Federally Listed Endangered and Threatened Species

According to Service records, suitable summer roosting habitat may be present in the project area for the federally threatened northern long-eared bat (*Myotis septentrionalis*). However, the final 4(d) rule (effective as of February 16, 2016), exempts incidental take of northern long-eared bat associated with activities that occur greater than 0.25 miles from a known hibernation site, and greater than 150 feet from a known, occupied maternity roost during the pup season (June 1 – July 31). Based on the information provided, the project (which may or may not require tree clearing) would occur at a location where any incidental take that may result from associated activities is exempt under the 4(d) rule. **Although not required, we encourage you to avoid any associated tree clearing activities during the maternity roosting season from May 15 – August 15 if possible.**

According to our records and a review of the information presented, no other federally protected species or their respective habitats occur within the project area. Please be aware that in accordance with the Act, it is the responsibility of the appropriate federal agency or its designated representative to review its activities or programs and to identify any such activities or programs that may affect endangered or threatened species or their habitats. If it is determined that the proposed activity may adversely affect any species federally listed as endangered or threatened, formal consultation with this office must be initiated.

A population of eastern hellbenders (*Cryptobranchus alleganiensis*) occurs in the project's receiving waters (Big Rock Creek). This is a federal species of concern and is not currently afforded legal protection under the Act. However, employing proactive conservation measures on its behalf may help preclude the need to list it in the future. Like most aquatic species Hellbenders are sensitive to perturbations to physical habitats and water quality. We offer the following recommendations in the interest of protecting this and wildlife resources:

Stream Channel and Bank Restoration

A natural, stable stream system is one that is able to transport a wide range of flows and associated sediment bed load while maintaining channel features and neither degrading nor aggrading. Alterations to the dimension, pattern, or profile of the stream channel as well as changes to streambank vegetation, floodplains, hydrology, or sediment input can significantly alter this equilibrium. Accordingly, we recommend the following:

1. Only the absolute minimum amount of work should be done within stream channels to accomplish necessary reconstruction. **The amount of disturbance to in-stream and riparian areas should not exceed what can be stabilized by the end of the workday.** Restoration plans should account for the constraints of the site and the opportunities to improve stream pattern, dimension, and profile with minimal disturbance.

2. Reconstruction work should follow natural channel design methodologies that are based on the bank-full, or channel-forming, stage of the stream. Bank-full stage maintains the natural channel dimensions and transports the bulk of sediment over time. Natural channel conditions should be identified using a reference reach (nearby stream reaches that exemplify restoration goals). Restoration design should match the pattern, dimension, and profile of the reference reach to ensure the project's success. The Service is available to assist with the identification of reference reaches.

3. All work in or adjacent to stream waters should be conducted in a dry work area to the extent possible. Sandbags, cofferdams, bladder dams, or other diversion structures should be used to prevent excavation in flowing water. These diversion structures should be removed as soon as the work area is stable.

4. Equipment should not be operated in the stream unless absolutely necessary. Machinery should be operated from the banks in a fashion that minimizes disturbance to woody vegetation. Equipment should be: (a) washed to remove any contaminant residue prior to project construction, (b) in good working order, and (c) checked to ensure there are no

leaks of potential contaminants (such as oil or other lubricants) prior to and during construction.

5. Streambanks with deep-rooted woody vegetation are the most stable, and stream restoration efforts should incorporate the use of native vegetation adapted to the site conditions. Live dormant stakes (such as black willow) may be used to reestablish root structure in riparian areas.

   In areas where banks are severely undercut, high, and steep, whole-tree revetment or rock may be used as a stabilization treatment (small rock, gravel, sand, and dirt are not recommended due to their erosive nature), and it should not extend above the bank-full elevation (the elevation of the channel where the natural floodplain begins). Deep-rooting woody vegetation should be established along banks where any channel work is accomplished. Tree and shrub plantings should be spaced at intervals no greater than 10 feet along banks. Vegetated riparian zone widths should be as wide as practical but should extend at least 30 feet from the stream channel.

6. Adequate measures to control sediment and erosion must be implemented prior to any ground-disturbing activities in order to minimize effects on downstream aquatic resources. In North Carolina, non-cohesive and erosion-prone soils are most common in the felsic-crystalline terrains of the mountain and upper piedmont regions. Therefore, reconstruction work should be staged such that disturbed areas would be stabilized with seeding, mulch, and/or biodegradable (coir) erosion-control matting prior to the end of each workday. **No erosion-control matting or blankets should contain synthetic (netting) materials as they trap animals and can persist in the environment beyond their intended purpose.** Matting should be secured in place with staples; stakes; or, wherever possible, live stakes of native trees. If rain is expected prior to temporary seed establishment, additional measures should be implemented to protect water quality along slopes and overburden stockpiles (for example, stockpiles may be covered with plastic or other geotextile material and surrounded with silt fencing).

If you have not done so already, we encourage you to contact the North Carolina Wildlife Resources Commission regarding potential impacts to state-protected natural resources.

The Service appreciates the opportunity to provide these comments. 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 4-2-18-486.

Sincerely,

- - original signed - -

Janet Mizzi
Field Supervisor

E.c. Andrea Leslie; NCWRC

302 Jefferson Street, Suite 110
Raleigh, NC 27605

Corporate Headquarters
5020 Montrose Blvd. Suite 650
Houston, TX 77006
Main: 713.520.5400

October 5, 2018

Elizabeth Toombs
Cherokee Nation - Tribal Historic Preservation Office
PO Box 948
Tahlequah, OK 74465

Subject: Project Scoping for Monkey Wall Mitigation Project in Mitchell County

Dear Ms. Toombs,

The Monkey Wall Site has been identified by Resource Environmental Solutions, LLC (RES) to provide compensatory mitigation for unavoidable stream impacts through the North Carolina Division of Mitigation Services (NCDMS). The proposed project involves the restoration and enhancement of 3,617 linear feet of stream.

RES requests review and comment on any possible issues that might emerge with respect to tribal resources and/or sites of religious importance to American Indians associated with a potential stream mitigation project on the Monkey Wall Site (maps with approximate limits of conservation easement is attached).

A review of the N.C. State Historic Preservation Office (SHPO) HPOWEB GIS Service database (http://gis.ncdcr.gov/hpoweb/; accessed September 13, 2018) was performed as part of the site due diligence evaluation. The database did not reveal any listed or potentially eligible historic or archeological resources on the proposed properties or within a one-mile radius. In addition, the majority of the site has historically been disturbed due to agriculutral practices, specifically pastureland.

We ask that you review this site based on the attached information to determine the presence of any valued tribal resources. We thank you in advance for your timely response and cooperation. You may return the comment to my attention at the address below, or via email. Please feel free to contact me at mdeangelo@res.us with any questions that you may have concerning the extent of site disturbance associated with this project.

Sincerely,

Matt DeAngelo | Ecologist

302 Jefferson Street, Suite 110
Raleigh, NC 27605

Corporate Headquarters
5020 Montrose Blvd. Suite 650
Houston, TX 77006
Main: 713.520.5400

September 24, 2018

Miranda Panther
Eastern Band of Cherokee Indians - Tribal Historic Preservation Office
PO Box 455
Cherokee, NC 28719

Subject: Project Scoping for Monkey Wall Mitigation Project in Mitchell County

Dear Ms. Panther,

The Monkey Wall Site has been identified by Resource Environmental Solutions, LLC (RES) to provide compensatory mitigation for unavoidable stream impacts through the North Carolina Division of Mitigation Services (NCDMS). The proposed project involves the restoration and enhancement of 3,617 linear feet of stream.

RES requests review and comment on any possible issues that might emerge with respect to tribal resources and/or sites of religious importance to American Indians associated with a potential stream mitigation project on the Monkey Wall Site (maps with approximate limits of conservation easement is attached).

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We ask that you review this site based on the attached information to determine the presence of any valued tribal resources. We thank you in advance for your timely response and cooperation. You may return the comment to my attention at the address below, or via email. Please feel free to contact me at mdeangelo@res.us with any questions that you may have concerning the extent of site disturbance associated with this project.

Sincerely,

Matt DeAngelo | Ecologist

302 Jefferson Street, Suite 110
Raleigh, NC 27605

Corporate Headquarters
5020 Montrose Blvd. Suite 650
Houston, TX 77006
Main: 713.520.5400

October 5, 2018

Sheila Bird
United Keetoowah Band of Cherokee Indians in Oklahoma - Tribal Historic Preservation Office
PO Box 746
Tahlequah, OK 74465

Subject: Project Scoping for Monkey Wall Mitigation Project in Mitchell County

Dear Ms. Bird,

The Monkey Wall Site has been identified by Resource Environmental Solutions, LLC (RES) to provide compensatory mitigation for unavoidable stream impacts through the North Carolina Division of Mitigation Services (NCDMS). The proposed project involves the restoration and enhancement of 3,617 linear feet of stream.

RES requests review and comment on any possible issues that might emerge with respect to tribal resources and/or sites of religious importance to American Indians associated with a potential stream mitigation project on the Monkey Wall Site (maps with approximate limits of conservation easement is attached).

A review of the N.C. State Historic Preservation Office (SHPO) HPOWEB GIS Service database (http://gis.ncdcr.gov/hpoweb/; accessed September 13, 2018) was performed as part of the site due diligence evaluation. The database did not reveal any listed or potentially eligible historic or archeological resources on the proposed properties or within a one-mile radius. In addition, the majority of the site has historically been disturbed due to agriculutral practices, specifically pastureland.

We ask that you review this site based on the attached information to determine the presence of any valued tribal resources. We thank you in advance for your timely response and cooperation. You may return the comment to my attention at the address below, or via email. Please feel free to contact me at mdeangelo@res.us with any questions that you may have concerning the extent of site disturbance associated with this project.

Sincerely,

Matt DeAngelo | Ecologist

Megan Engel

From: TERM Bob White
Sent: Tuesday, October 22, 2019 9:13 AM
To: Megan Engel
Subject: FW: Monkey Wall Task 1
Attachments: Monkey Wall_100069_ERTR_2019.pdf

From: Tsomides, Harry <harry.tsomides@ncdenr.gov>
Sent: Tuesday, February 5, 2019 11:17 AM
To: Bob White <bwhite@res.us>
Subject: [EXTERNAL] Monkey Wall Task 1

Bob
Attached is the final ERTR with the signature page included, for your files. This task is complete. If you have not invoiced, please do so.
Have a great day!

==========

Harry Tsomides
Project Manager
Division of Mitigation Services
NC Department of Environmental Quality

Tel. (828) 545-7057
Harry.Tsomides@ncdenr.gov

5 Ravenscroft Drive
Suite 102
Asheville, NC 28801

Appendix L – 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:	Monkey Wall
Name if stream or feature:	Unnamed Tributaries to Big Rock Creek
County:	Mitchell County
Name of river basin:	French Broad River Basin
Is project urban or rural?	Rural
Name of Jurisdictional municipality/county:	Mitchell County
DFIRM panel number for entire site:	Panel: 0855 Map Number: 3710085500J Effective Date: February 4, 2019
Consultant name:	Resource Environmental Solutions
Phone number:	919.821.8404
Address:	302 Jefferson Street, Suite 110 Raleigh, NC 27605

Design Information

The Monkey Wall Stream Mitigation Project (Project) is in in the French Broad River Basin and comprised of two unnamed tributaries. The Project is located within a rural watershed in Mitchell County, North Carolina approximately two miles northwest of Bakersville, NC. The Project lies within the French Broad River Basin, North Carolina Division of Water Resources (NCDWR) sub-basin 04-03-06, and United States Geological Survey (USGS) 14-digit hydrologic unit code (HUC) 06010108060010. The Project proposes to restore, enhance and preserve 3,514 linear feet (LF) of stream and provide water quality benefit for 86.6 acres of drainage area. The stream mitigation components are summarized in the table below. The purpose of the Project is to meet water quality improvements addressed in the River Basin Restoration Priorities and improve overall stream health.

Reach	Existing Length	Mitigation Type
G1-A	278	Preservation
G1-B	120	Enhancement II
G1-C	1,521	Restoration
G2	1,595	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: Zone X (outside 0.2% floodplain)

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: NA

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 (CLOMR)
- ☐ Other Requirements

List other requirements:

Comments:

Name: FRASIER MULLEN Signature: [signature]

Title: ENGINEER Date: 10/23/19