



**MONITORING YEAR 3
ANNUAL BUFFER REPORT
FINAL**

PERRY HILL MITIGATION SITE

Orange County, NC
Neuse River Basin
HUC 03020201

NCDEQ Contract No. 7744
DMS Project No. 100093
NCDWR Project No. 2019-0157v2
RFP No. 16-007576

Data Collection Period: September 2023
Draft Submission Date: November 2023
Final Submission Date: December 2023

PREPARED FOR:



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

PREPARED BY:



Wildlands Engineering, Inc.
312 West Millbrook Road, Suite 225
Raleigh, NC 27609

PERRY HILL MITIGATION SITE
Monitoring Year 3 Buffer Report

TABLE OF CONTENTS

Section 1: PROJECT OVERVIEW1

 1.1 Project Summary..... 1

 1.2 Project Goals and Objectives 1

 1.3 Monitoring Year 3 Data Assessment..... 2

 1.3.1 Vegetative Assessment 2

 1.3.2 Vegetation Areas of Concern 3

 1.4 Monitoring Year 3 Summary 3

Section 2: REFERENCES4

APPENDICES

Appendix 1 General Figures and Tables

Figure 1 Project Vicinity Map

Figure 2 Service Area Map

Figure 3 Project Component/Asset Map

Table 1 Buffer Project Areas and Assets

Table 2 Project Activity and Reporting History

Table 3 Project Contact Table

Table 4 Project Information and Attributes

Table 5 Adjacent Forested Areas Existing Tree and Shrub Species

Table 6 Planted Tree Species

Appendix 2 Visual Assessment Data

Figure 4 Monitoring Plan View Map

Table 7 Vegetation Condition Assessment Table

 Vegetation Plot Photographs

 Overview Photographs

Appendix 3 Vegetation Plot Data

Table 8 Vegetation Plot Criteria Attainment Table

Table 9 Vegetation Plot Data

Table 10 Vegetation Performance Standards Summary Table

Table 11 Vegetation Height Data



Section 1: PROJECT OVERVIEW

1.1 Project Summary

Wildlands Engineering, Inc. (Wildlands) implemented a full delivery project at the Perry Hill Mitigation Site (Site) for the North Carolina Department of Environmental Quality Division of Mitigation Services (DMS). The 26.88-acre Site encompasses portions of Perry Branch, three unnamed tributaries (UT1, UT2, and UT3) and two ephemeral channels (EC1 and EC3), all of which eventually drain to Falls Lake and the Neuse River. A total of 24.53 acres (1,068,625 ft²) of riparian buffer have been restored or enhanced and are expected to generate 868,212.512 riparian buffer credits, with potential to convert some buffer credits to nutrient offset credits dependent on the need. The Site is located approximately three miles northwest of Hillsborough, NC (Figure 1). The project resides within Hydrologic Unit Code 03020201030020 and North Carolina Department of Water Resources (NCDWR) Sub-basin 03-04-01. Three unnamed tributaries (UT1, UT2, and UT3) drain to Perry Branch, which drains to Corporation Lake water supply reservoir on the Eno River, and then Falls Lake.

Work at the Site was planned, designed, and constructed per the Perry Hill Mitigation Site – Riparian Buffer Mitigation Plan (Wildlands Engineering, 2020) and the Consolidated Buffer Mitigation Rule 15A NCAC 02B .0295 (effective November 1, 2015). The purpose of the riparian buffer restoration is to provide riparian buffer credits to compensate for buffer impacts within the Hydrologic Unit Code 03020201 and the Falls Lake Watershed. The service area for the riparian buffer credits is depicted in Figure 2.

1.2 Project Goals and Objectives

Prior to stream construction, the Perry Hill Site was cattle pasture and livestock had access to all streams, causing streambank erosion. Onsite streams and riparian buffers at the Site were restored and/or enhanced.

The major goals of the riparian restoration project are to provide ecological and water quality enhancements to the Neuse River Watershed within the Falls Lake Water Supply Watershed by creating a functional riparian corridor and restoring the riparian area. The project supports specific goals identified in the 2010 Neuse River Basin Restoration Priorities Plan (RBRP) for the Neuse River Targeted Local Watershed (TLW). This document highlights the importance of riparian buffers for stream restoration projects. Forested riparian areas immobilize and retain nutrients and suspended sediment. The RBRP also supports the Falls Lake watershed plan. Falls Lake is a receiving water supply water body downstream of the Site and is classified as WS-IV and NSW. Specific enhancements to water quality and ecological processes are outlined below:

- Exclude cattle from project streams – Fencing has been installed around project areas adjacent to cattle pastures.
- Restore and enhance native floodplain vegetation – Planted native tree species in riparian zone where tree growth was insufficient.
- Permanently protect the project Site from harmful uses – Established a conservation easement on the site.

The 26.88-acre Site is protected with a permanent conservation easement. However, in October 2021, waterlines were installed by the tenant farmer within the conservation easement, parallel to the internal crossings without consulting Wildlands. In an effort to find the most reasonable and least disruptive solution, it was decided the area containing the waterlines would be marked as a



maintenance area. This will allow for maintenance in the future and avoid any further easement encroachments.

Approximately 20 feet (or a total of 0.19 acres) was added alongside both internal crossings as a maintenance area. No credit is claimed in the maintenance area and project credits were reduced accordingly. Of the 26.88-acres, Neuse riparian buffer credits were generated by restoring 16.65 acres and enhancing 7.88 acres. No buffer credit will be generated from the remaining 2.35 acres. In general, riparian buffer restoration area widths on streams extend out to 50 feet from top of bank on each side of the stream channel. Figure 3 and Table 1 in Appendix 1 detail the buffer credit generation updated to include the maintenance areas.

1.3 Monitoring Year 3 Data Assessment

The Mitigation Plan (Wildlands Engineering, 2020) was submitted and accepted by DMS in July 2020. Construction activities by Main Stream Earthwork, Inc. and tree planting by Bruton Natural Systems, Inc. were completed in March and April 2021 respectively. The baseline as-built survey was completed by IPW Construction Group in April 2021. Refer to Appendix 1 for detailed project activity, history, contact information, and watershed/site background information.

Vegetative performance for buffer restoration areas will be in accordance with 15A NCAC 02B .0295(n)(2)(B), and (n)(4) (effective November 1, 2015). To meet success criteria, areas generating buffer mitigation credits shall include a minimum of four native hardwood tree species, where no one species is greater than 50 percent of stems, and shall have a survival of at least 260 planted stems per acre at the end of the required five-year monitoring period. For monitoring to be completed and buffer credit to be awarded, NCDWR must provide written approval of successful revegetation of buffer restoration areas.

1.3.1 Vegetative Assessment

The quantity of monitoring vegetation plots was determined in accordance with the Carolina Vegetative Sampling Protocol (Lee et al., 2008) such that at least 2 percent of the Site is encompassed in monitoring plots. A total of fourteen fixed 100 square meter vegetation monitoring quadrants were established within the project easement boundaries. All planted stems were marked with flagging tape and a reference photograph was taken from the southwestern corner of each vegetation plot during vegetation assessments. Annually, trees will be re-marked and plot photos will be taken along with overview photographs of the Site. Species composition, vigor, height, density, and survival rates will be evaluated by plot on an annual basis. The extent of invasive species coverage will also be monitored and controlled as necessary.

The MY3 vegetative survey was completed in September 2023. Vegetation monitoring resulted in an average density of 529 stems per acre of project planting list species across all vegetation plots, which exceeds the final success criteria of 260 stems per acre required at MY5. Thirteen of the fourteen vegetation plots individually met the success criteria and planting list stem densities for each plot range from 202 to 769 stems per acre. While vegetation plot 10 does not meet the stem density success criteria, it is not representative of the area surrounding it. There are healthy planted trees outside the plot that seem to be on par with density and growth across the rest of the site. We do not believe it is currently a concern. Plots have an average of 12 planted stems per plot and range from 4 to 10 different species from the project planting list. The majority of surviving planted stems have excellent (4) vigor (see Table 11 in Appendix 3). Additionally, other desirable tree species are establishing themselves including green ash (*Fraxinus pennsylvanica*), hackberry (*Celtis occidentalis*), and hickory species (*Carya spp.*).



The Site is on track to surpass the final success criteria. Refer to Appendix 2 for the vegetation condition assessment table, the monitoring plan view map, vegetation plot and overview photographs. Appendix 3 contains vegetation plot data and the vegetation performance summary table.

1.3.2 Vegetation Areas of Concern

Wildlands does not believe the area around vegetation plot 10 has low stem density or needs replanting at this point. As mentioned above, there are healthy planted stems with density and growth that resemble the rest of the site outside the vegetation plot boundary. However, Wildlands will continue to observe the area to confirm that tree health and density stays at an appropriate level.

As in the previous year, planted trees are growing well but pasture grasses are still dense in areas. To ensure planted trees remain competitive, herbicide ring sprays were applied around the base of trees where necessary in April 2023.

Areas where patches of blackberry (*Rubus spp.*) were competing with trees along UT2 were treated via mechanical removal or a foliar spray application of triclopyr. Wildlands plans to continue to treat aggressive blackberry growth as needed in spring of 2024.

Additionally, follow up treatments were done on a few of stems of Chinese privet (*Ligustrum sinense*) along the west side of UT2 using a cut stump application of triclopyr in May 2023. In 2024, Wildlands plans to target scattered resprouts of Chinese privet in the wooded area along Perry Branch Reaches 1 and 2 that was previously treated in 2020. Wildlands will continue to monitor for invasive species and treatments will be applied as necessary.

While the vegetation across the maintenance areas is no longer a concern, Wildlands is still working to mark the area appropriately. At the beginning of November, the surveyor was finally able to move the corners of the Perry Hill II bank conservation easement that shares a boundary with the DMS easement, and in doing so, marked the edge of the maintenance area as well. Wildlands would like to order appropriate signs to differentiate the maintenance area from the rest of the conservation easement and will install them in MY4.

1.4 Monitoring Year 3 Summary

Vegetation across the Site is exceeding performance standards and is on track to achieve the final requirement of 260 planted stems per acre. Monitoring Year 3 data shows an average density of project planting list tree species of 529 stems per acre across vegetation plots. Competitive vegetation in the form of pasture grasses and blackberry were treated in MY3. Wildlands plans to treat scattered resprouts of invasive species in MY4. Wildlands is working to mark the maintenance area with appropriate signage. The Site has been walked and no fencing issues, livestock access, or other easement encroachments have been identified.

Summary information/data related to the performance of various project and monitoring elements can be found in the tables and figures in the report appendices. Narrative background and supporting information, formerly found in these reports, can be found in the Mitigation Plan (Wildlands, 2020) available on DMS's website. All raw data supporting the tables and figures in the appendices are available from DMS upon request.



Section 2: REFERENCES

- Breeding, R. 2010. Neuse River Basin Restoration Priorities. North Carolina Ecosystem Enhancement Program. Accessed at:
https://files.nc.gov/ncdeq/Mitigation%20Services/Watershed_Planning/Neuse_River_Basin/FINAL%20ORBRP%20Neuse%202010_%2020111207%20CORRECTED.pdf
- Lee, M.T., Peet, R.K., Roberts, S.D., & Wentworth, T.R. 2008. CVS-EEP Protocol for Recording Vegetation Version 4.2. Accessed at: <http://cvs.bio.unc.edu/protocol/cvs-eep-protocol-v4.2-lev1-2.pdf>
- Natural Resources Conservation Service (NRCS), 2011. Web Soil Survey. Accessed at:
<http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>
- North Carolina Department of Environmental Quality, Division of Mitigation Services (NCDMS). 2017. Riparian Buffer and Nutrient Offset Buffer Baseline and Annual Monitoring Report Template version 2.0 Accessed at:
https://files.nc.gov/ncdeq/Mitigation%20Services/Document%20Management%20Library/Guidance%20and%20Template%20Documents/RB_NO_Base_Mon_Template_2.0_2017_5.pdf
- North Carolina Department of Environmental Quality, Division of Water Resources (NCDWR). 2015. 15A NCAC 02B .0295 Mitigation Program Requirements for Protection and Maintenance of Riparian Buffers. Accessed at: <http://reports.oah.state.nc.us/ncac/title%2015a%20-%20environmental%20quality/chapter%2002%20-%20environmental%20management/subchapter%20b/15a%20ncac%2002b%20.0295.pdf>
- North Carolina Department of Environmental Quality, Division of Water Resources (NCDWR). 2011. Surface Water Classifications. Accessed at: <https://deq.nc.gov/about/divisions/water-resources/planning/classification-standards/classifications#DWRPrimaryClassification>
- Wildlands Engineering, Inc. (2020). Perry Hill Mitigation Site – Riparian Buffer Mitigation Plan. North Carolina Department of Environmental Quality, Division of Mitigation Services (NCDMS), Raleigh, NC.



APPENDIX 1. General Figures and Tables

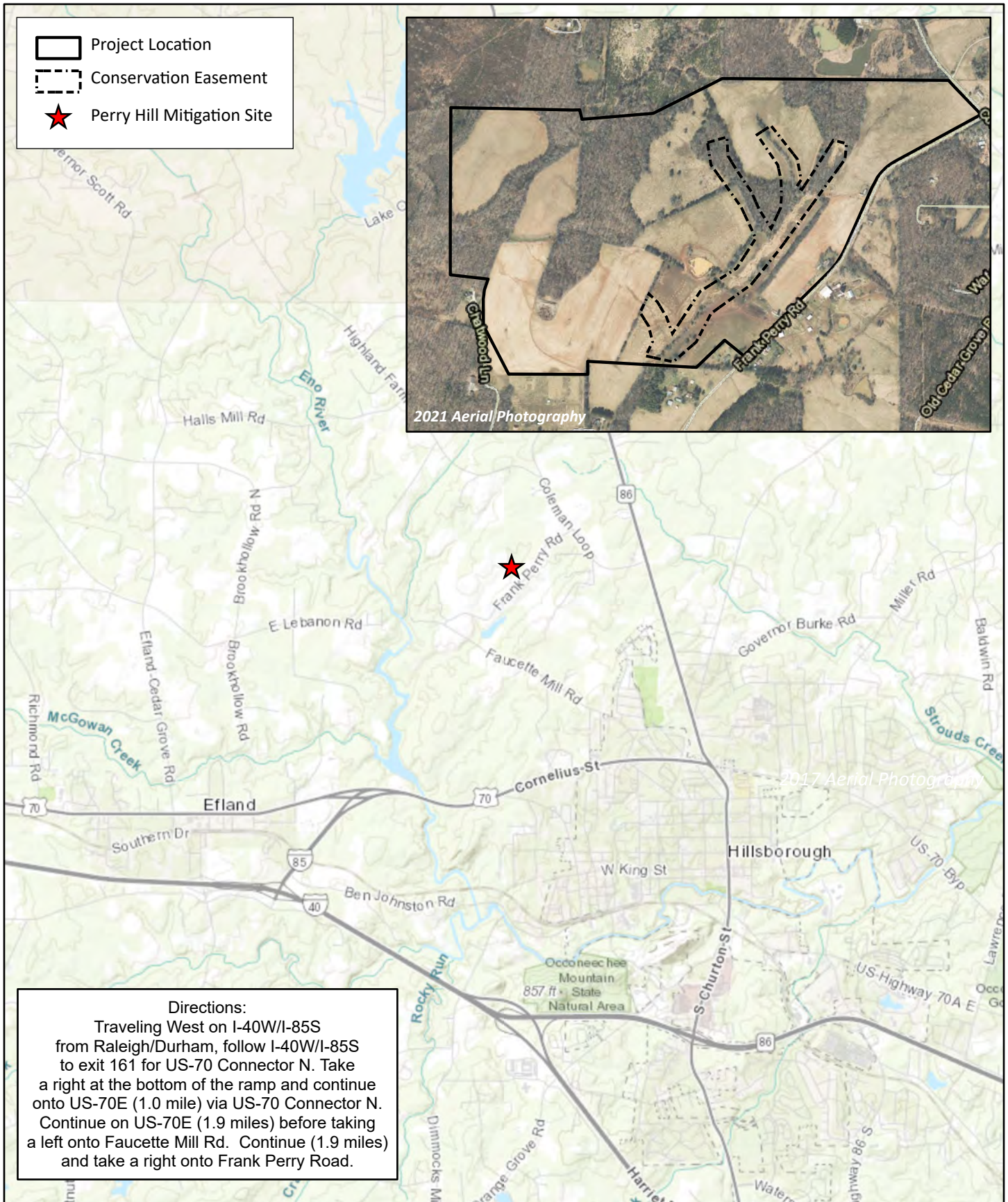
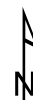
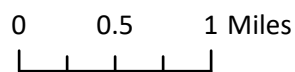
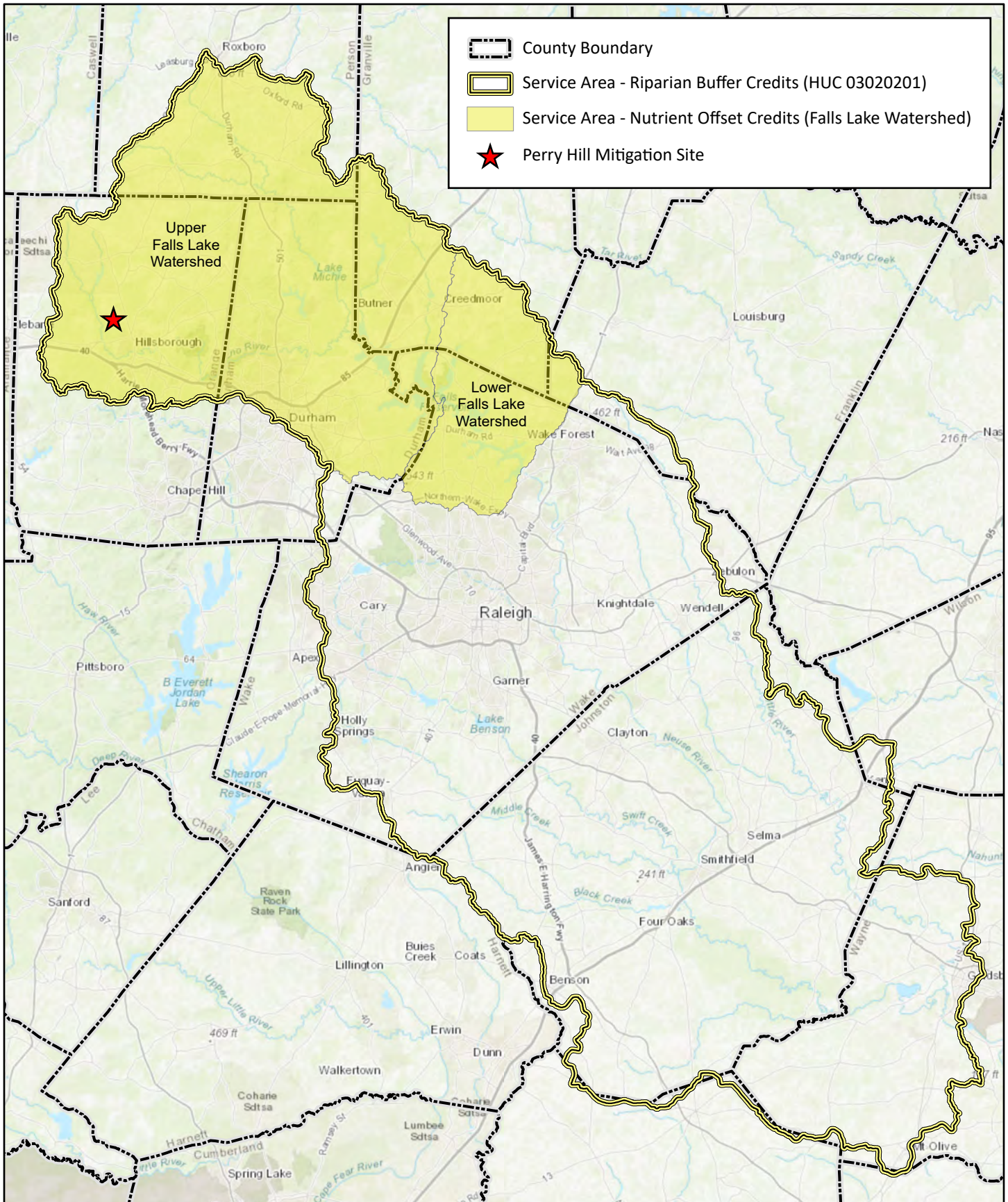


Figure 1. Project Vicinity Map
 Perry Hill Mitigation Site
 DMS Project No. 100093
 Monitoring Year 3 - 2023









-  County Boundary
-  Service Area - Riparian Buffer Credits (HUC 03020201)
-  Service Area - Nutrient Offset Credits (Falls Lake Watershed)
-  Perry Hill Mitigation Site



Figure 2. Service Area Map
 Perry Hill Mitigation Site
 DMS Project No. 100093
 Monitoring Year 3 - 2023

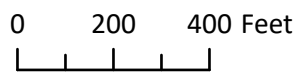
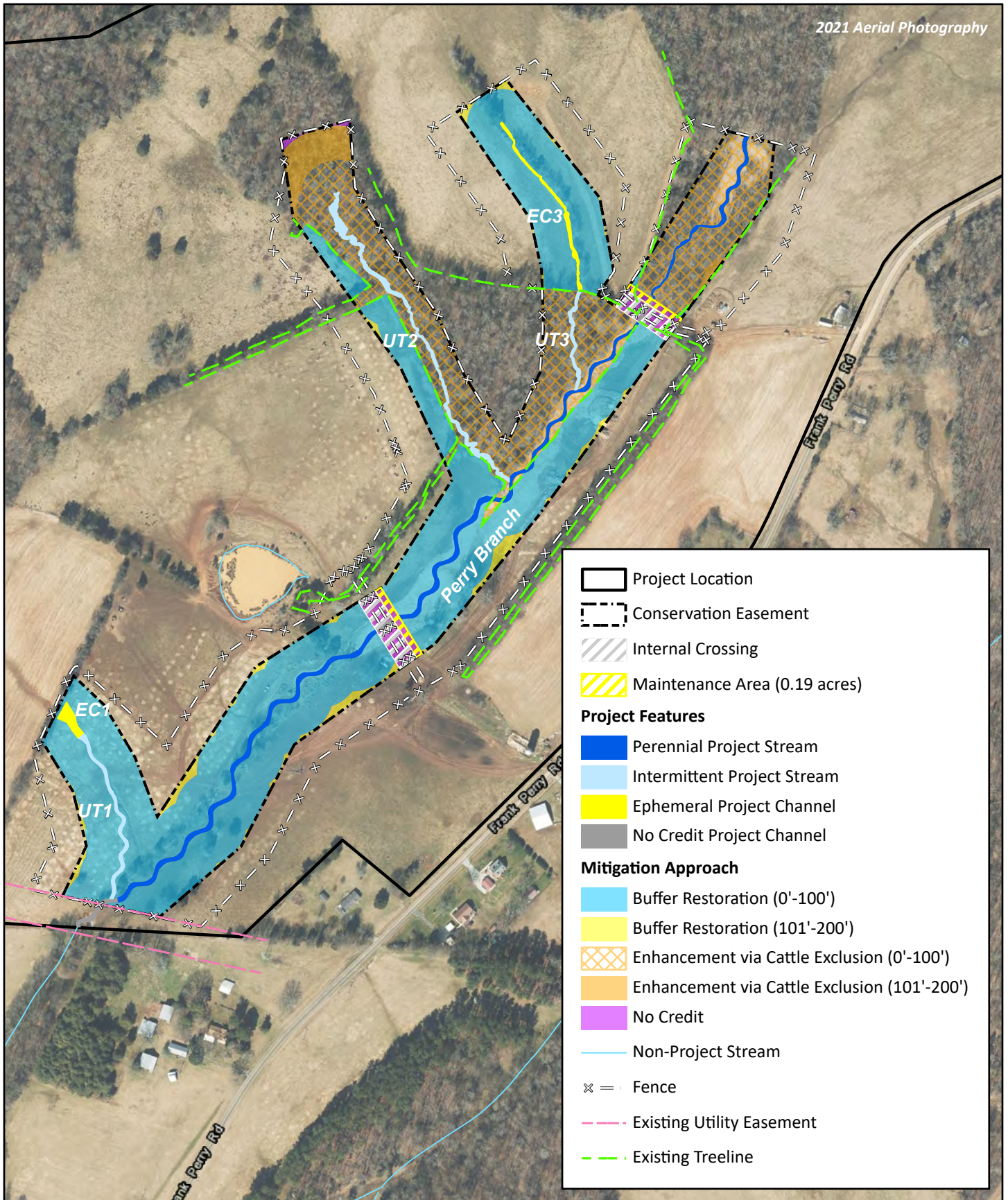


Figure 3. Project Component/Asset Map
 Perry Hill Mitigation Site
 DMS Project No. 100093
 Monitoring Year 3 - 2023

Table 1. Buffer Project Areas and Assets

Perry Hill Mitigation Site
 DMS Project No. 100093
 Monitoring Year 3 - 2023

Neuse 03020201 - Upper Falls Lake		Project Area														
19.16394		N Credit Conversion Ratio (ft ² /pound)														
297.54099		P Credit Conversion Ratio (ft ² /pound)														
Credit Type	Location	Subject? (enter NO if ephemeral or ditch ¹)	Feature Type	Mitigation Activity	Min-Max Buffer Width (ft)	Feature Name	Total Area (ft ²)	Total (Creditable) Area of Buffer Mitigation (ft ²)	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Convertible to Riparian Buffer?	Riparian Buffer Credits	Convertible to Nutrient Offset?	Delivered Nutrient Offset: N (lbs)	Delivered Nutrient Offset: P (lbs)
Buffer	Rural	Yes	I / P	Restoration	0-100	Perry Branch	403,389	403,389	1	100%	1.00000	Yes	403,389.000	Yes	21,049.377	1,355.743
Buffer	Rural	Yes	I / P	Restoration	101-200	Perry Branch	22,131	22,131	1	33%	3.03030	Yes	7,303.237	Yes	1,154.825	74.380
Buffer	Rural	Yes	I / P	Enhancement via Cattle Exclusion	0-100	Perry Branch	155,190	155,190	2	100%	2.00000	Yes	77,595.000	No	—	—
Buffer	Rural	Yes	I / P	Enhancement via Cattle Exclusion	101-200	Perry Branch	1,903	1,903	2	33%	6.06061	Yes	313.995	No	—	—
Buffer	Rural	Yes	I / P	Restoration	0-100	UT1	92,839	92,839	1	100%	1.00000	Yes	92,839.000	Yes	4,844.447	312.020
Buffer	Rural	Yes	I / P	Restoration	101-200	UT1	2,558	2,558	1	33%	3.03030	Yes	844.141	Yes	133.487	8.598
Buffer	Rural	No	I / P	Restoration	0-100	UT2	58,526	58,526	1	100%	1.00000	Yes	58,526.000	Yes	3,053.947	196.698
Buffer	Rural	No	I / P	Restoration	101-200	UT2	1,007	1,007	1	33%	3.03030	Yes	332.310	Yes	52.529	3.383
Buffer	Rural	No	I / P	Enhancement via Cattle Exclusion	0-100	UT2	124,130	124,130	2	100%	2.00000	Yes	62,065.000	No	—	—
Buffer	Rural	No	I / P	Enhancement via Cattle Exclusion	101-200	UT2	24,834	24,834	2	33%	6.06061	Yes	4,097.607	No	—	—
Buffer	Rural	No	I / P	Enhancement via Cattle Exclusion	0-100	UT3	37,195	37,195	2	100%	2.00000	Yes	18,597.500	No	—	—
Buffer	Rural	No	I / P	Enhancement via Cattle Exclusion	101-200	UT3	24	24	2	33%	6.06061	Yes	3.960	No	—	—
Buffer	Rural	No	Ephemeral	Restoration	0-100	EC1	15,423	15,423	1	100%	1.00000	Yes	15,423.000	Yes	804.795	51.835
Buffer	Rural	No	Ephemeral	Restoration	101-200	EC1	0	0	1	33%	—	Yes	—	Yes	0.000	0.000
Buffer	Rural	No	Ephemeral	Restoration	0-100	EC3	125,605	125,605	1	100%	1.00000	Yes	125,605.000	Yes	6,554.216	422.142
Buffer	Rural	No	Ephemeral	Restoration	101-200	EC3	3,872	3,872	1	33%	3.03030	Yes	1,277.761	Yes	202.050	13.014
Totals:							1,068,625	1,068,625								

Enter Preservation Credits Below

								Eligible for Preservation (ft ²):				
Credit Type	Location	Subject?	Feature Type	Mitigation Activity	Min-Max Buffer Width (ft)	Feature Name	Total Area (sf)	Total (Creditable) Area for Buffer Mitigation (ft ²)	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Riparian Buffer Credits
Buffer				Preservation								—
Preservation Area Subtotal (ft²):								0				
Preservation as % Total Area of Buffer Mitigation:								0.0%				
Ephemeral Reaches as % Total Area of Buffer Mitigation:								13.6%				

TOTAL AREA OF BUFFER MITIGATION (TABM)		
Mitigation Totals	Square Feet	Credits
Restoration:	725,349	705,539.450
Enhancement:	343,276	162,673.062
Preservation:	0	0.000
Total Riparian Buffer:	1,068,625	868,212.512
TOTAL NUTRIENT OFFSET MITIGATION		
Mitigation Totals	Square Feet	Credits
Nutrient	Nitrogen:	0
Offset:	Phosphorus:	0.000

*Credits updated in Monitoring Year 2 to reflect the addition of the maintenance areas and resulting reduction in credits. Buffer credits along Perry Branch were reduced as follows: Restoration from 0-100 feet was reduced by 4,904 square feet and 4,904.000 credits, Restoration from 101-200 feet by 280 square feet and 92.400 credits, and Enhancement via Cattle Exclusion from 0-100 feet by 2,763 square feet and 1,381.500 credits.

Table 2. Project Activity and Reporting History

Perry Hill Mitigation Site

DMS Project No. 100093

Monitoring Year 3 - 2023

Activity or Report		Data Collection Complete	Completion or Scheduled Delivery
Mitigation Plan		July 2020	July 2020
Final Design - Construction Plans		September 2020	September 2020
Invasive Vegetation Treatment			November 2020
Construction		January-March 2021	March 2021
Temporary S&E mix applied to entire project area ¹		March 2021	March 2021
Permanent seed mix applied to reach/segments ¹		March 2021	March 2021
Soils ripped to a depth of 15-18 inches		March-April 2021	April 2021
Bare root and live stake plantings for reach/segments		April 2021	April 2021
Competitive Vegetation Treatment ²			April 2021
Baseline Monitoring Document (Year 0)		April 2021	May 2021
Year 1 Monitoring	Invasive Vegetation Treatment		October 2021
	Easement Encroachment		October 2021
	Vegetation Survey	October 2021	December 2021
Year 2 Monitoring	Competitive Vegetation Treatment ²		April 2022
	Invasive Vegetation Treatment		March and August 2022
	Vegetation Survey	September 2022	December 2022
Year 3 Monitoring	Competitive Vegetation Treatment ²		April 2023
	Invasive Vegetation Treatment		May 2023
	Vegetation Survey	September 2023	December 2023
Year 4 Monitoring		2024	December 2024
Year 5 Monitoring		2025	December 2025

¹Seed and mulch is added as each section of construction is completed.

²Herbicide ring sprays around the base of planted stems.

Table 3. Project Contact Table

Perry Hill Mitigation Site

DMS Project No. 100093

Monitoring Year 3 - 2023

Designer Geoff Smith, PE	Wildlands Engineering, Inc. 497 Bramson Ct, Suite 104 Mt. Pleasant, SC 29464 843.277.6221
Construction Contractor	Main Stream Earthwork, Inc. 631 Camp Dan Valley Rd Reidsville, NC 27320
Planting Contractor	Bruton Natural Systems, Inc P.O. Box 1197 Fremont, NC 27830
Seeding Contractor	Main Stream Earthwork, Inc. 631 Camp Dan Valley Rd Reidsville, NC 27320
Seed Mix Sources	Green Resources 5204 Highgreen Court Colfax, NC 27235
Nursery Stock Suppliers Bare Roots	Dykes and Sons Nursery and Greenhouse 825 Maude Etter Rd McMinnville, TN 37110
Live Stakes	Bruton Natural Systems, Inc
	Foggy Mountain Nursery 797 Helton Creek Rd Lansing, NC 28643
Monitoring Performers Monitoring, POC	Wildlands Engineering, Inc. Jason Lorch 919.851.9986

Table 4. Project Information and Attributes

Perry Hill Mitigation Site
 DMS Project No. 100093
Monitoring Year 3 - 2023

PROJECT INFORMATION	
Project Name	Perry Hill Mitigation Site
County	Orange County
Project Coordinates (latitude and longitude)	36° 06' 25.81" N, 79° 07' 46.66" W
Project Area (acres)	26.88
Planted Acreage (acres of woody stems planted)	20.53
PROJECT WATERSHED SUMMARY INFORMATION	
Physiographic Province	Carolina Slate Belt of the Piedmont Physiographic Province
River Basin	Neuse River
USGS Hydrologic Unit 8-digit	03020201
USGS Hydrologic Unit 14-digit	03020201030020
DWR Sub-basin	03-04-01
Project Drainage Area (acres)	174
Project Drainage Area Percentage of Impervious Area	<1%
CGIA Land Use Classification	68% managed herbaceous cover/pasture, 22% forested, 5% shrub, 3% grassland/herbaceous, 2% residential area, <1% impervious

Table 5. Adjacent Forested Areas Existing Tree and Shrub Species

Perry Hill Mitigation Site
 DMS Project No. 100093
Monitoring Year 3 - 2023

Common Name	Scientific Name	Wetland Indicator Status
American elm	<i>Ulmus americana</i>	FACW
American hornbeam	<i>Carpinus caroliniana</i>	FAC
Eastern Red Cedar	<i>Juniperus virginiana</i>	FACU
Green Ash	<i>Fraxinus pennsylvanica</i>	FACW
Red Maple	<i>Acer rubrum</i>	FAC
Shagbark Hickory	<i>Carya ovata</i>	FACU
Sugarberry	<i>Celtis laevigata</i>	FACW
Sweet Gum	<i>Liquidambar styraciflua</i>	FAC

Table 6. Planted Tree Species

Perry Hill Mitigation Site
DMS Project No. 100093
Monitoring Year 3 - 2023

Common Name	Scientific Name	Number Planted	% of Total
Bare Roots			
American sycamore	<i>Platanus occidentalis</i>	2,209	18.7%
River birch	<i>Betula nigra</i>	1,869	15.8%
American persimmon	<i>Diospyros virginiana</i>	1,141	9.6%
Eastern cottonwood	<i>Populus deltoides</i>	1,048	8.9%
Cherrybark oak	<i>Quercus pagoda</i>	1,017	8.6%
Boxelder	<i>Acer negundo</i>	960	8.1%
American elm	<i>Ulmus americana</i>	559	4.7%
Northern red oak	<i>Quercus rubra</i>	545	4.6%
Willow oak	<i>Quercus phellos</i>	468	4.0%
Pawpaw	<i>Asimina triloba</i>	468	4.0%
Southern sugar maple	<i>Acer floridanum</i>	266	2.2%
Black gum	<i>Nyssa sylvatica</i>	203	1.7%
White oak	<i>Quercus alba</i>	203	1.7%
Winged elm	<i>Ulmus alata</i>	203	1.7%
Blackhaw viburnum	<i>Viburnum prunifolium</i>	179	1.5%
Southern red oak	<i>Quercus falcata</i>	102	0.9%
Sourwood	<i>Oxydendrum arboreum</i>	102	0.9%
Overcup oak	<i>Quercus lyrata</i>	96	0.8%
Silky dogwood	<i>Cornus amomum</i>	93	0.8%
Arrowwood viburnum	<i>Viburnum dentatum</i>	31	0.3%
American beech	<i>Fagus grandifolia</i>	25	0.2%
Flowering dogwood	<i>Cornus florida</i>	20	0.2%
Sugarberry	<i>Celtis laevigata</i>	12	0.1%
Ironwood	<i>Carpinus caroliniana</i>	10	0.1%
Live Stakes			
Buttonbush	<i>Cephalanthus occidentalis</i>	248	
Silky dogwood	<i>Cornus amomum</i>	650	
Silky willow	<i>Salix sericea</i>	788	
Black willow	<i>Salix nigra</i>	123	
Elderberry	<i>Sambucus canadensis</i>	263	

APPENDIX 2. Visual Assessment Data

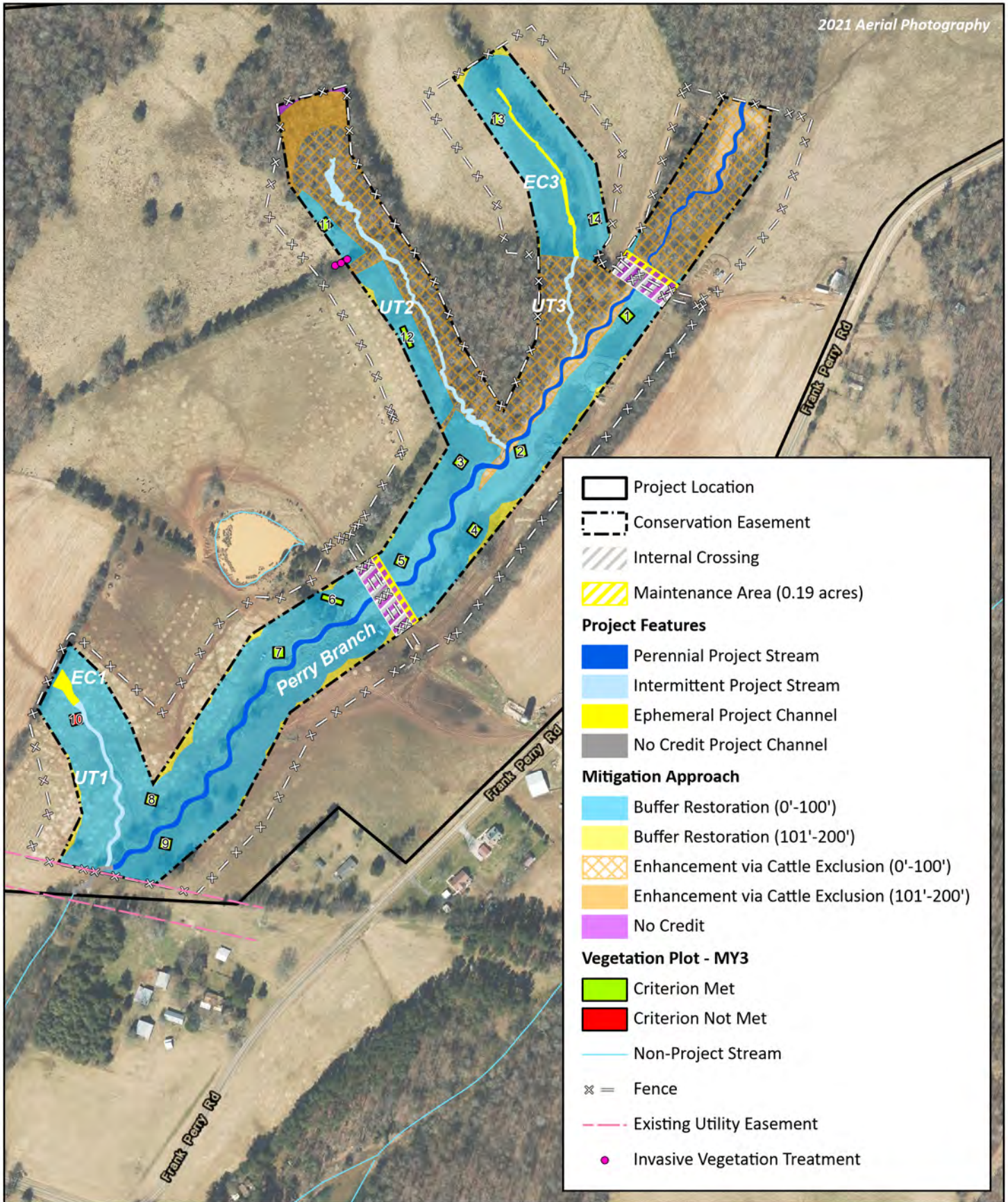


Figure 4. Monitoring Plan View Map
 Perry Hill Mitigation Site
 DMS Project No. 100093
 Monitoring Year 3 - 2023

Table 7. Vegetation Condition Assessment Table

Perry Hill Mitigation Site
 DMS Project No. 100093
 Monitoring Year 3 - 2023

Planted Acreage 20.53

Vegetation Category	Definitions	Mapping Threshold (ac)	Combined Acreage	% of Planted Acreage
Bare Areas	Very limited cover of both woody and herbaceous material.	0.10	0	0%
Low Stem Density Areas	Woody stem densities clearly below target levels based on current MY stem count criteria.	0.10	0	0%
Total			0	0%
Areas of Poor Growth Rates	Planted areas where average height is not meeting current MY Performance Standard.	0.10	0	0%
Cumulative Total			0.0	0%

Visual assessment was completed October 18, 2023.

Easement Acreage 26.88

Vegetation Category	Definitions	Mapping Threshold (ac)	Combined Acreage	% of Easement Acreage
Invasive Areas of Concern	Invasives may occur outside of planted areas and within the easement and will therefore be calculated against the total easement acreage. Include species with the potential to directly outcompete native, young, woody stems in the short-term or community structure for existing communities. Invasive species included in summation above should be identified in report summary.	0.10	0	0%
Easement Encroachment Areas	Encroachment may be point, line, or polygon. Encroachment to be mapped consists of any violation of restrictions specified in the conservation easement. Common encroachments are mowing, cattle access, vehicular access. Encroachment has no threshold value as will need to be addressed regardless of impact area.	none	0 Encroachments Noted / 0.0 ac	

Visual assessment was completed October 18, 2023.

VEGETATION PLOT PHOTOGRAPHS



VEG PLOT 1 (09/07/2023)



VEG PLOT 2 (09/07/2023)



VEG PLOT 3 (09/07/2023)



VEG PLOT 4 (09/07/2023)



VEG PLOT 5 (09/07/2023)



VEG PLOT 6 (09/07/2023)





VEG PLOT 7 (09/07/2023)



VEG PLOT 8 (09/07/2023)



VEG PLOT 9 (09/07/2023)



VEG PLOT 10 (09/07/2023)



VEG PLOT 11 (09/07/2023)



VEG PLOT 12 (09/07/2023)





VEG PLOT 13 (09/07/2023)



VEG PLOT 14 (09/07/2023)



OVERVIEW PHOTOGRAPHS



05/17/2023



05/17/2023



Perry Hill Mitigation Site

Appendix 2: Visual Assessment Data – Overview Photographs



05/17/2023



05/17/2023



Perry Hill Mitigation Site

Appendix 2: Visual Assessment Data – Overview Photographs



05/17/2023



05/17/2023



Perry Hill Mitigation Site

Appendix 2: Visual Assessment Data – Overview Photographs



05/17/2023



APPENDIX 3. Vegetation Plot Data

Table 8. Vegetation Plot Criteria Attainment Table

Perry Hill Mitigation Site
 DMS Project No. 100093
Monitoring Year 3 - 2023

Plot	Success Criteria Met*	Tract Mean
1	Yes	93%
2	Yes	
3	Yes	
4	Yes	
5	Yes	
6	Yes	
7	Yes	
8	Yes	
9	Yes	
10	No	
11	Yes	
12	Yes	
13	Yes	
14	Yes	

*Based on the target stem density for MY5 of 260 stems per acre.

Table 9. Vegetation Plot Data

Perry Hill Mitigation Site
 DMS Project No. 100093
 Monitoring Year 3 - 2023

Planted Acreage	20.53
Date of Initial Plant	2021-04-04
Date of Current Survey	2023-09-07
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/ Shrub	Indicator Status	Veg Plot 1 F		Veg Plot 2 F		Veg Plot 3 F		Veg Plot 4 F		Veg Plot 5 F		Veg Plot 6 F	
					Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	<i>Acer floridanum</i>	southern sugar maple	Tree													
	<i>Acer negundo</i>	boxelder	Tree	FAC	1	1	1	1	1	1					1	1
	<i>Asimina triloba</i>	pawpaw	Tree	FAC												
	<i>Betula nigra</i>	river birch	Tree	FACW	3	3	2	2	1	1	4	4	2	2	3	3
	<i>Cornus amomum</i>	silky dogwood	Shrub	FACW	1	1										
	<i>Diospyros virginiana</i>	common persimmon	Tree	FAC					2	3			1	1		
	<i>Nyssa sylvatica</i>	blackgum	Tree	FAC												
	<i>Platanus occidentalis</i>	American sycamore	Tree	FACW	2	2	4	4	1	1	2	2	2	2	6	6
	<i>Populus deltoides</i>	eastern cottonwood	Tree	FAC			2	2	1	1			1	1		
	<i>Quercus alba</i>	white oak	Tree	FACU												
	<i>Quercus lyrata</i>	overcup oak	Tree	OBL	2	2					2	2			2	2
	<i>Quercus pagoda</i>	cherrybark oak	Tree	FACW	1	1			1	1	1	1	2	2	1	1
	<i>Quercus phellos</i>	willow oak	Tree	FAC									1	1		
	<i>Quercus rubra</i>	northern red oak	Tree	FACU			2	2								
	<i>Ulmus alata</i>	winged elm	Tree	FACU												
<i>Ulmus americana</i>	American elm	Tree	FACW					2	2	1	1	1	1	2	2	
<i>Viburnum prunifolium</i>	blackhaw	Tree	FACU									1	1			
Sum				Performance Standard	10	10	11	11	9	10	10	10	11	11	15	15
Post Mitigation Plan Species	<i>Carya glabra</i>	pignut hickory	Tree	FACU												
	<i>Carya tomentosa</i>	mockernut hickory	Tree				1									
	<i>Celtis occidentalis</i>	common hackberry	Tree	FACU			1									
	<i>Fraxinus caroliniana</i>	Carolina ash	Tree	OBL												
	<i>Fraxinus pennsylvanica</i>	green ash	Tree	FACW		4										
	<i>Juglans nigra</i>	black walnut	Tree	FACU												
	<i>Liquidambar styraciflua</i>	sweetgum	Tree	FAC					2				1			
	<i>Ulmus sp.</i>						1									
Sum				Proposed Standard	10	14	11	14	9	12	10	10	11	12	15	15
Mitigation Plan Performance Standard	Current Year Stem Count					10		11		10		10		11		15
	Stems/Acre					405		445		405		405		445		607
	Species Count					6		5		7		5		8		6
	Dominant Species Composition (%)					29		29		25		40		17		40
	Average Plot Height (ft.)					5		8		4		6		5		11
	% Invasives					0		0		0		0		0		0
Post Mitigation Plan Performance Standard	Current Year Stem Count					14		14		12		10		12		15
	Stems/Acre					567		567		486		405		486		607
	Species Count					7		8		8		5		9		6
	Dominant Species Composition (%)					29		29		25		40		17		40
	Average Plot Height (ft.)					6		7		4		6		5		11
	% Invasives					0		0		0		0		0		0

1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font indicates that the species has been approved.
 2). The "Species Included in Approved Mitigation Plan" section contains only those species that were included in the original approved mitigation plan. The "Post Mitigation Plan Species" section includes species that are being proposed through a mitigation plan addendum for the current monitoring year (bolded), species that have been approved in prior monitoring years through a mitigation plan addendum (regular font), and species that are not approved (italicized).
 3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan, whereas the "Post Mitigation Plan Performance Standard" includes data from mitigation plan approved, post mitigation plan approved, and proposed stems.

Table 9. Vegetation Plot Data

Perry Hill Mitigation Site
 DMS Project No. 100093
 Monitoring Year 3 - 2023

Planted Acreage	20.53
Date of Initial Plant	2021-04-04
Date of Current Survey	2023-09-07
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/ Shrub	Indicator Status	Veg Plot 7 F		Veg Plot 8 F		Veg Plot 9 F		Veg Plot 10 F		Veg Plot 11 F		Veg Plot 12 F	
					Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	<i>Acer floridanum</i>	southern sugar maple	Tree													
	<i>Acer negundo</i>	boxelder	Tree	FAC	1	1	1	1	3	3					1	1
	<i>Asimina triloba</i>	pawpaw	Tree	FAC											1	1
	<i>Betula nigra</i>	river birch	Tree	FACW	1	1	3	3	2	2			2	2	2	2
	<i>Cornus amomum</i>	silky dogwood	Shrub	FACW												
	<i>Diospyros virginiana</i>	common persimmon	Tree	FAC	1	1	3	3	1	1	1	1	3	4	2	4
	<i>Nyssa sylvatica</i>	blackgum	Tree	FAC									1	1		
	<i>Platanus occidentalis</i>	American sycamore	Tree	FACW	2	3	2	2	3	4	2	2	4	4	4	4
	<i>Populus deltoides</i>	eastern cottonwood	Tree	FAC	1	1	2	2	1	2	1	1			1	1
	<i>Quercus alba</i>	white oak	Tree	FACU												
	<i>Quercus lyrata</i>	overcup oak	Tree	OBL												
	<i>Quercus pagoda</i>	cherrybark oak	Tree	FACW	1	1	2	2	1	1	1	1	1	1	1	1
	<i>Quercus phellos</i>	willow oak	Tree	FAC	1	1										
	<i>Quercus rubra</i>	northern red oak	Tree	FACU	2	2							1	1	1	1
<i>Ulmus alata</i>	winged elm	Tree	FACU				2					1	1			
<i>Ulmus americana</i>	American elm	Tree	FACW			4	4	1	1							
<i>Viburnum prunifolium</i>	blackhaw	Tree	FACU	1	1			1	1							
Sum			Performance Standard		11	12	17	19	13	15	5	5	13	14	13	15
Post Mitigation Plan Species	<i>Carya glabra</i>	pignut hickory	Tree	FACU				1								
	<i>Carya tomentosa</i>	mockernut hickory	Tree										2			
	<i>Celtis occidentalis</i>	common hackberry	Tree	FACU									3			
	<i>Fraxinus caroliniana</i>	Carolina ash	Tree	OBL									1			
	<i>Fraxinus pennsylvanica</i>	green ash	Tree	FACW												
	<i>Juglans nigra</i>	black walnut	Tree	FACU										1		
	<i>Liquidambar styraciflua</i>	sweetgum	Tree	FAC				1								2
Sum			Proposed Standard		11	14	17	21	13	15	5	5	13	21	13	17
Mitigation Plan Performance Standard	Current Year Stem Count					12		19		15		5		14		15
	Stems/Acre					486		769		607		202		567		607
	Species Count					9		8		8		4		7		8
	Dominant Species Composition (%)					21		19		27		40		19		24
	Average Plot Height (ft.)					4		7		6		9		5		7
% Invasives					0		0		0		0		0		0	
Post Mitigation Plan Performance Standard	Current Year Stem Count					14		21		15		5		21		17
	Stems/Acre					567		850		607		202		850		688
	Species Count					10		10		8		4		11		9
	Dominant Species Composition (%)					21		19		27		40		19		24
	Average Plot Height (ft.)					4		7		6		9		4		7
% Invasives					0		0		0		0		0		0	

- 1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font indicates that the species has been approved.
- 2). The "Species Included in Approved Mitigation Plan" section contains only those species that were included in the original approved mitigation plan. The "Post Mitigation Plan Species" section includes species that are being proposed through a mitigation plan addendum for the current monitoring year (bolded), species that have been approved in prior monitoring years through a mitigation plan addendum (regular font), and species that are not approved (italicized).
- 3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan, whereas the "Post Mitigation Plan Performance Standard" includes data from mitigation plan approved, post mitigation plan approved, and proposed stems.

Table 9. Vegetation Plot Data

Perry Hill Mitigation Site
 DMS Project No. 100093
 Monitoring Year 3 - 2023

Planted Acreage	20.53
Date of Initial Plant	2021-04-04
Date of Current Survey	2023-09-07
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/ Shrub	Indicator Status	Veg Plot 13 F		Veg Plot 14 F	
					Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	<i>Acer floridanum</i>	southern sugar maple	Tree		1	1	1	1
	<i>Acer negundo</i>	boxelder	Tree	FAC	3	3	1	1
	<i>Asimina triloba</i>	pawpaw	Tree	FAC			1	1
	<i>Betula nigra</i>	river birch	Tree	FACW	2	2	2	2
	<i>Cornus amomum</i>	silky dogwood	Shrub	FACW				
	<i>Diospyros virginiana</i>	common persimmon	Tree	FAC				
	<i>Nyssa sylvatica</i>	blackgum	Tree	FAC				
	<i>Platanus occidentalis</i>	American sycamore	Tree	FACW	3	3	3	3
	<i>Populus deltoides</i>	eastern cottonwood	Tree	FAC			2	2
	<i>Quercus alba</i>	white oak	Tree	FACU				
	<i>Quercus lyrata</i>	overcup oak	Tree	OBL				
	<i>Quercus pagoda</i>	cherrybark oak	Tree	FACW	2	2	1	1
	<i>Quercus phellos</i>	willow oak	Tree	FAC	1	1		
	<i>Quercus rubra</i>	northern red oak	Tree	FACU			1	1
	<i>Ulmus alata</i>	winged elm	Tree	FACU		4		
<i>Ulmus americana</i>	American elm	Tree	FACW		1	2	6	
<i>Viburnum prunifolium</i>	blackhaw	Tree	FACU			1	1	
Sum			Performance Standard		12	17	15	19
Post Mitigation Plan Species	<i>Carya glabra</i>	pignut hickory	Tree	FACU				
	<i>Carya tomentosa</i>	mockernut hickory	Tree			1		
	<i>Celtis occidentalis</i>	common hackberry	Tree	FACU				
	<i>Fraxinus caroliniana</i>	Carolina ash	Tree	OBL				
	<i>Fraxinus pennsylvanica</i>	green ash	Tree	FACW				
	<i>Juglans nigra</i>	black walnut	Tree	FACU				1
	<i>Liquidambar styraciflua</i>	sweetgum	Tree	FAC		4		
Sum			Proposed Standard		12	22	15	20
Mitigation Plan Performance Standard	Current Year Stem Count					17		19
	Stems/Acre					688		769
	Species Count					8		10
	Dominant Species Composition (%)					18		30
	Average Plot Height (ft.)					4		4
	% Invasives					0		0
Post Mitigation Plan Performance Standard	Current Year Stem Count					22		20
	Stems/Acre					891		810
	Species Count					10		11
	Dominant Species Composition (%)					18		30
	Average Plot Height (ft.)					3		3
	% Invasives					0		0

- 1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font indicates that the species has been approved.
- 2). The "Species Included in Approved Mitigation Plan" section contains only those species that were included in the original approved mitigation plan. The "Post Mitigation Plan Species" section includes species that are being proposed through a mitigation plan addendum for the current monitoring year (bolded), species that have been approved in prior monitoring years through a mitigation plan addendum (regular font), and species that are not approved (italicized).
- 3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan, whereas the "Post Mitigation Plan Performance Standard" includes data from mitigation plan approved, post mitigation plan approved, and proposed stems.

Table 10. Vegetation Performance Standards Summary Table

Perry Hill Mitigation Site

DMS Project No. 100093

Monitoring Year 3 - 2023

	Veg Plot 1 F				Veg Plot 2 F				Veg Plot 3 F			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 5												
Monitoring Year 4												
Monitoring Year 3	405	5	6	0	445	8	5	0	405	4	7	0
Monitoring Year 2	364	5	6	0	445	6	5	0	364	4	7	0
Monitoring Year 1	607	2	6	0	486	3	6	0	405	3	7	0
Monitoring Year 0	607	2	6	0	486	2	6	0	486	2	8	0
	Veg Plot 4 F				Veg Plot 5 F				Veg Plot 6 F			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 5												
Monitoring Year 4												
Monitoring Year 3	405	6	5	0	445	5	8	0	607	11	6	0
Monitoring Year 2	364	4	4	0	445	4	8	0	648	6	6	0
Monitoring Year 1	567	2	6	0	445	3	8	0	648	4	6	0
Monitoring Year 0	607	2	6	0	486	2	9	0	688	2	6	0
	Veg Plot 7 F				Veg Plot 8 F				Veg Plot 9 F			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 5												
Monitoring Year 4												
Monitoring Year 3	486	4	9	0	769	7	8	0	607	6	8	0
Monitoring Year 2	486	3	9	0	769	5	9	0	526	4	8	0
Monitoring Year 1	486	2	9	0	729	3	8	0	526	3	8	0
Monitoring Year 0	486	2	9	0	729	2	8	0	526	2	8	0
	Veg Plot 10 F				Veg Plot 11 F				Veg Plot 12 F			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 5												
Monitoring Year 4												
Monitoring Year 3	202	9	4	0	567	5	7	0	607	7	8	0
Monitoring Year 2	324	4	6	0	567	4	7	0	607	5	8	0
Monitoring Year 1	567	2	8	0	567	3	7	0	607	3	8	0
Monitoring Year 0	648	2	8	0	607	2	7	0	607	2	8	0
	Veg Plot 13 F				Veg Plot 14 F							
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives				
Monitoring Year 5												
Monitoring Year 4												
Monitoring Year 3	688	4	8	0	769	4	10	0				
Monitoring Year 2	688	3	7	0	607	3	10	0				
Monitoring Year 1	567	2	6	0	607	2	10	0				
Monitoring Year 0	567	2	6	0	607	2	10	0				

Table 11. Vegetation Height Data

Perry Hill Mitigation Site

DMS Project No. 100093

Monitoring Year 3 - 2023

Plot	Scientific Name	Common Name	X	Y	Height (ft)	Vigor
1	<i>Acer negundo</i>	boxelder	1.1	2.1	Missing	M
1	<i>Quercus pagoda</i>	cherrybark oak	3.5	2.3	Missing	M
1	<i>Platanus occidentalis</i>	American sycamore	6.0	2.5	9.8	4
1	<i>Betula nigra</i>	river birch	7.9	2.4	9.0	4
1	<i>Quercus lyrata</i>	overcup oak	9.9	2.4	1.9	3
1	<i>Quercus lyrata</i>	overcup oak	8.4	5.9	3.1	4
1	<i>Betula nigra</i>	river birch	6.1	5.8	5.6	4
1	<i>Acer negundo</i>	boxelder	4.3	5.7	4.0	4
1	<i>Cornus amomum</i>	silky dogwood	2.4	5.4	2.3	4
1	<i>Quercus pagoda</i>	cherrybark oak	0.3	5.0	Missing	M
1	<i>Quercus pagoda</i>	cherrybark oak	0.8	8.2	0.7	3
1	<i>Platanus occidentalis</i>	American sycamore	2.7	8.4	4.8	4
1	<i>Cornus amomum</i>	silky dogwood	4.8	8.7	Missing	M
1	<i>Quercus pagoda</i>	cherrybark oak	6.9	9.0	Missing	M
1	<i>Betula nigra</i>	river birch	9.0	9.5	6.2	4

Vigor: 4 = excellent, 3 = good, 2 = fair, 1 = unlikely to survive year, 0 = dead, M = Missing

Table 11. Vegetation Height Data

Perry Hill Mitigation Site

DMS Project No. 100093

Monitoring Year 3 - 2023

Plot	Scientific Name	Common Name	X	Y	Height (ft)	Vigor
2	<i>Platanus occidentalis</i>	American sycamore	2.7	0.9	9.5	4
2	<i>Populus deltoides</i>	eastern cottonwood	6.1	1.3	10.3	4
2	<i>Quercus rubra</i>	northern red oak	9.3	1.4	6.7	4
2	<i>Platanus occidentalis</i>	American sycamore	8.8	4.1	9.8	4
2	<i>Quercus rubra</i>	northern red oak	5.3	3.8	5.8	4
2	<i>Populus deltoides</i>	eastern cottonwood	2.1	3.4	10.5	4
2	<i>Betula nigra</i>	river birch	1.7	6.0	2.8	4
2	<i>Acer negundo</i>	boxelder	4.8	6.6	6.0	4
2	<i>Platanus occidentalis</i>	American sycamore	8.0	6.8	8.5	4
2	<i>Betula nigra</i>	river birch	7.4	9.1	5.8	4
2	<i>Acer floridanum</i>	southern sugar maple	4.7	9.1	Missing	M
2	<i>Platanus occidentalis</i>	American sycamore	1.2	8.4	10.8	4

Vigor: 4 = excellent, 3 = good, 2 = fair, 1 = unlikely to survive year, 0 = dead, M = Missing

Table 11. Vegetation Height Data

Perry Hill Mitigation Site

DMS Project No. 100093

Monitoring Year 3 - 2023

Plot	Scientific Name	Common Name	X	Y	Height (ft)	Vigor
3	<i>Populus deltoides</i>	eastern cottonwood	3.2	1.1	3.8	4
3	<i>Betula nigra</i>	river birch	3.2	3.3	Missing	M
3	<i>Ulmus americana</i>	American elm	3.3	5.6	3.2	4
3	<i>Diospyros virginiana</i>	common persimmon	3.2	7.8	5.1	4
3	<i>Platanus occidentalis</i>	American sycamore	3.3	10.0	5.8	4
3	<i>Asimina triloba</i>	pawpaw	7.2	9.4	Dead	0
3	<i>Asimina triloba</i>	pawpaw	6.8	7.3	Dead	0
3	<i>Quercus pagoda</i>	cherrybark oak	6.8	4.5	4.7	3
3	<i>Acer negundo</i>	boxelder	6.5	2.0	2.7	4
3	<i>Betula nigra</i>	river birch	9.7	1.0	2.4	4
3	<i>Diospyros virginiana</i>	common persimmon	9.8	3.6	6.9	4
3	<i>Ulmus americana</i>	American elm	9.9	6.0	3.2	4

Vigor: 4 = excellent, 3 = good, 2 = fair, 1 = unlikely to survive year, 0 = dead, M = Missing

Table 11. Vegetation Height Data

Perry Hill Mitigation Site

DMS Project No. 100093

Monitoring Year 3 - 2023

Plot	Scientific Name	Common Name	X	Y	Height (ft)	Vigor
4	<i>Betula nigra</i>	river birch	0.7	0.3	3.0	4
4	<i>Quercus lyrata</i>	overcup oak	0.9	2.7	2.8	4
4	<i>Acer negundo</i>	boxelder	1.0	4.6	Missing	M
4	<i>Platanus occidentalis</i>	American sycamore	1.4	7.1	Missing	M
4	<i>Ulmus americana</i>	American elm	1.4	9.2	1.5	4
4	<i>Betula nigra</i>	river birch	5.7	10.0	7.9	4
4	<i>Quercus pagoda</i>	cherrybark oak	5.6	8.3	Missing	M
4	<i>Platanus occidentalis</i>	American sycamore	5.5	6.4	8.8	4
4	<i>Quercus pagoda</i>	cherrybark oak	5.4	4.5	5.8	4
4	<i>Betula nigra</i>	river birch	5.2	2.6	10.2	4
4	<i>Platanus occidentalis</i>	American sycamore	8.4	0.4	11.0	4
4	<i>Quercus lyrata</i>	overcup oak	8.7	2.9	5.0	4
4	<i>Betula nigra</i>	river birch	9.2	5.1	7.5	4
4	<i>Ulmus americana</i>	American elm	9.5	7.2	Missing	M
4	<i>Acer negundo</i>	boxelder	9.6	9.0	Missing	M

Vigor: 4 = excellent, 3 = good, 2 = fair, 1 = unlikely to survive year, 0 = dead, M = Missing

Table 11. Vegetation Height Data

Perry Hill Mitigation Site

DMS Project No. 100093

Monitoring Year 3 - 2023

Plot	Scientific Name	Common Name	X	Y	Height (ft)	Vigor
5	<i>Populus deltoides</i>	eastern cottonwood	1.7	3.3	12.7	4
5	<i>Platanus occidentalis</i>	American sycamore	3.5	2.5	17.2	4
5	<i>Quercus pagoda</i>	cherrybark oak	5.4	1.7	4.8	4
5	<i>Ulmus americana</i>	American elm	7.2	0.9	3.3	4
5	<i>Betula nigra</i>	river birch	9.2	0.1	2.3	2
5	<i>Viburnum prunifolium</i>	blackhaw	9.8	3.9	1.1	4
5	<i>Quercus phellos</i>	willow oak	7.8	4.8	1.9	3
5	<i>Diospyros virginiana</i>	common persimmon	5.7	5.5	1.9	4
5	<i>Betula nigra</i>	river birch	3.3	6.8	5.7	4
5	<i>Acer negundo</i>	boxelder	1.3	8.1	Dead	0
5	<i>Quercus pagoda</i>	cherrybark oak	7.2	9.2	1.5	3
5	<i>Platanus occidentalis</i>	American sycamore	9.7	8.1	7.1	4

Vigor: 4 = excellent, 3 = good, 2 = fair, 1 = unlikely to survive year, 0 = dead, M = Missing

Table 11. Vegetation Height Data

Perry Hill Mitigation Site

DMS Project No. 100093

Monitoring Year 3 - 2023

Plot	Scientific Name	Common Name	X	Y	Height (ft)	Vigor
6	<i>Quercus lyrata</i>	overcup oak	4.2	0.1	Missing	0
6	<i>Quercus lyrata</i>	overcup oak	2.7	1.0	4.3	2
6	<i>Betula nigra</i>	river birch	0.9	1.9	15.5	4
6	<i>Acer negundo</i>	boxelder	1.2	4.3	Dead	0
6	<i>Ulmus americana</i>	American elm	2.4	3.7	3.9	4
6	<i>Platanus occidentalis</i>	American sycamore	3.7	3.1	13.4	4
6	<i>Ulmus americana</i>	American elm	5.2	2.6	2.8	4
6	<i>Betula nigra</i>	river birch	7.0	2.0	7.6	4
6	<i>Acer negundo</i>	boxelder	8.0	1.3	7.4	4
6	<i>Platanus occidentalis</i>	American sycamore	11.3	0.7	14.3	4
6	<i>Betula nigra</i>	river birch	19.5	0.8	7.4	4
6	<i>Platanus occidentalis</i>	American sycamore	17.9	1.9	16.2	4
6	<i>Quercus pagoda</i>	cherrybark oak	16.5	2.5	11.2	4
6	<i>Platanus occidentalis</i>	American sycamore	14.9	3.6	15.6	4
6	<i>Platanus occidentalis</i>	American sycamore	13.0	4.0	15.9	4
6	<i>Platanus occidentalis</i>	American sycamore	11.5	4.5	14.3	4
6	<i>Quercus lyrata</i>	overcup oak	9.6	4.8	14.1	4

Vigor: 4 = excellent, 3 = good, 2 = fair, 1 = unlikely to survive year, 0 = dead, M = Missing

Table 11. Vegetation Height Data

Perry Hill Mitigation Site

DMS Project No. 100093

Monitoring Year 3 - 2023

Plot	Scientific Name	Common Name	X	Y	Height (ft)	Vigor
7	<i>Platanus occidentalis</i>	American sycamore	0.0	1.4	Missing	M
7	<i>Platanus occidentalis</i>	American sycamore	4.4	1.8	13.5	4
7	<i>Quercus rubra</i>	northern red oak	3.1	3.6	2.4	4
7	<i>Quercus rubra</i>	northern red oak	1.5	5.3	4.3	4
7	<i>Populus deltoides</i>	eastern cottonwood	4.3	9.0	2.9	4
7	<i>Quercus phellos</i>	willow oak	5.5	7.5	2.0	4
7	<i>Acer negundo</i>	boxelder	6.6	4.8	2.6	4
7	<i>Quercus pagoda</i>	cherrybark oak	7.7	2.6	2.4	4
7	<i>Viburnum prunifolium</i>	blackhaw	9.0	0.4	2.1	4
7	<i>Betula nigra</i>	river birch	10.0	5.6	2.5	4
7	<i>Diospyros virginiana</i>	common persimmon	9.3	7.5	5.4	4
7	<i>Platanus occidentalis</i>	American sycamore	8.2	9.3	6.7	4

Vigor: 4 = excellent, 3 = good, 2 = fair, 1 = unlikely to survive year, 0 = dead, M = Missing

Table 11. Vegetation Height Data

Perry Hill Mitigation Site

DMS Project No. 100093

Monitoring Year 3 - 2023

Plot	Scientific Name	Common Name	X	Y	Height (ft)	Vigor
8	<i>Populus deltoides</i>	eastern cottonwood	1.8	4.2	12.3	4
8	<i>Diospyros virginiana</i>	common persimmon	2.3	3.1	6.3	4
8	<i>Platanus occidentalis</i>	American sycamore	3.4	2.0	14.1	4
8	<i>Betula nigra</i>	river birch	4.7	1.0	13.0	4
8	<i>Ulmus americana</i>	American elm	8.8	0.5	5.1	3
8	<i>Platanus occidentalis</i>	American sycamore	7.5	1.4	16.3	4
8	<i>Diospyros virginiana</i>	common persimmon	6.2	3.2	5.3	4
8	<i>Quercus pagoda</i>	cherrybark oak	5.1	4.4	4.4	4
8	<i>Ulmus americana</i>	American elm	3.7	5.5	3.2	4
8	<i>Populus deltoides</i>	eastern cottonwood	2.9	6.8	14.0	4
8	<i>Diospyros virginiana</i>	common persimmon	1.8	8.3	2.4	4
8	<i>Quercus pagoda</i>	cherrybark oak	0.4	9.6	4.4	4
8	<i>Ulmus americana</i>	American elm	3.9	9.8	2.8	4
8	<i>Ulmus americana</i>	American elm	5.5	8.3	3.4	4
8	<i>Asimina triloba</i>	pawpaw	6.7	7.0	Missing	M
8	<i>Acer negundo</i>	boxelder	7.5	6.0	16.1	4
8	<i>Betula nigra</i>	river birch	9.3	4.8	7.9	4
8	<i>Betula nigra</i>	river birch	9.5	9.3	2.6	4

Vigor: 4 = excellent, 3 = good, 2 = fair, 1 = unlikely to survive year, 0 = dead, M = Missing

Table 11. Vegetation Height Data

Perry Hill Mitigation Site

DMS Project No. 100093

Monitoring Year 3 - 2023

Plot	Scientific Name	Common Name	X	Y	Height (ft)	Vigor
9	<i>Platanus occidentalis</i>	American sycamore	0.9	0.1	8.6	4
9	<i>Acer negundo</i>	boxelder	0.8	5.1	3.5	4
9	<i>Betula nigra</i>	river birch	1.9	3.6	4.3	4
9	<i>Diospyros virginiana</i>	common persimmon	3.3	1.5	5.2	4
9	<i>Ulmus americana</i>	American elm	8.9	1.0	3.2	4
9	<i>Acer negundo</i>	boxelder	7.2	2.7	2.7	4
9	<i>Populus deltoides</i>	eastern cottonwood	6.0	4.6	9.7	4
9	<i>Acer negundo</i>	boxelder	4.6	6.7	4.4	4
9	<i>Platanus occidentalis</i>	American sycamore	2.7	8.5	11.5	4
9	<i>Viburnum prunifolium</i>	blackhaw	1.2	10.0	2.1	4
9	<i>Betula nigra</i>	river birch	6.5	9.8	4.5	4
9	<i>Quercus pagoda</i>	cherrybark oak	7.9	7.9	5.2	4
9	<i>Platanus occidentalis</i>	American sycamore	9.5	6.0	9.8	4

Vigor: 4 = excellent, 3 = good, 2 = fair, 1 = unlikely to survive year, 0 = dead, M = Missing

Table 11. Vegetation Height Data

Perry Hill Mitigation Site

DMS Project No. 100093

Monitoring Year 3 - 2023

Plot	Scientific Name	Common Name	X	Y	Height (ft)	Vigor
10	<i>Diospyros virginiana</i>	common persimmon	5.1	0.9	5.5	4
10	<i>Quercus phellos</i>	willow oak	6.8	1.4	Missing	M
10	<i>Platanus occidentalis</i>	American sycamore	8.2	1.7	14.6	4
10	<i>Betula nigra</i>	river birch	10.0	2.1	Missing	M
10	<i>Populus deltoides</i>	eastern cottonwood	8.2	3.3	16.2	4
10	<i>Acer negundo</i>	boxelder	6.7	3.2	Missing	M
10	<i>Asimina triloba</i>	pawpaw	5.2	3.3	Dead	0
10	<i>Platanus occidentalis</i>	American sycamore	3.3	3.3	7.6	4
10	<i>Quercus phellos</i>	willow oak	1.2	3.2	Missing	M
10	<i>Quercus pagoda</i>	cherrybark oak	0.6	6.3	3.3	4
10	<i>Quercus pagoda</i>	cherrybark oak	2.1	6.3	Missing	M
10	<i>Betula nigra</i>	river birch	4.1	7.0	Missing	M
10	<i>Diospyros virginiana</i>	common persimmon	6.5	6.7	Missing	M
10	<i>Asimina triloba</i>	boxelder	8.0	6.6	Dead	0
10	<i>Betula nigra</i>	river birch	10.0	6.4	Missing	M
10	<i>Asimina triloba</i>	pawpaw	1.2	9.9	Missing	M

Vigor: 4 = excellent, 3 = good, 2 = fair, 1 = unlikely to survive year, 0 = dead, M = Missing

Table 11. Vegetation Height Data

Perry Hill Mitigation Site

DMS Project No. 100093

Monitoring Year 3 - 2023

Plot	Scientific Name	Common Name	X	Y	Height (ft)	Vigor
11	<i>Quercus alba</i>	white oak	1.6	0.4	Missing	M
11	<i>Quercus alba</i>	white oak	3.2	0.5	2.6	4
11	<i>Diospyros virginiana</i>	common persimmon	4.9	0.7	2.9	4
11	<i>Betula nigra</i>	river birch	7.0	0.6	0.7	4
11	<i>Platanus occidentalis</i>	American sycamore	9.0	0.6	13.1	4
11	<i>Betula nigra</i>	river birch	9.1	4.4	2.8	4
11	<i>Platanus occidentalis</i>	American sycamore	7.0	4.4	6.6	4
11	<i>Nyssa sylvatica</i>	blackgum	4.8	4.5	1.6	4
11	<i>Diospyros virginiana</i>	common persimmon	3.0	4.4	3.3	4
11	<i>Quercus rubra</i>	northern red oak	1.5	4.4	3.1	4
11	<i>Ulmus alata</i>	winged elm	1.4	8.5	2.7	4
11	<i>Platanus occidentalis</i>	American sycamore	2.9	8.5	12.3	4
11	<i>Diospyros virginiana</i>	common persimmon	5.6	8.5	2.8	4
11	<i>Platanus occidentalis</i>	American sycamore	7.1	8.6	11.2	4
11	<i>Diospyros virginiana</i>	common persimmon	9.0	8.7	Missing	M

Vigor: 4 = excellent, 3 = good, 2 = fair, 1 = unlikely to survive year, 0 = dead, M = Missing

Table 11. Vegetation Height Data

Perry Hill Mitigation Site

DMS Project No. 100093

Monitoring Year 3 - 2023

Plot	Scientific Name	Common Name	X	Y	Height (ft)	Vigor
12	<i>Platanus occidentalis</i>	American sycamore	0.9	3.3	14.4	4
12	<i>Acer negundo</i>	boxelder	2.9	3.5	8.7	4
12	<i>Populus deltoides</i>	eastern cottonwood	4.6	3.5	2.3	3
12	<i>Quercus pagoda</i>	cherrybark oak	4.4	7.3	2.1	4
12	<i>Diospyros virginiana</i>	common persimmon	2.7	7.5	3.4	4
12	<i>Betula nigra</i>	river birch	0.5	7.4	Missing	M
12	<i>Platanus occidentalis</i>	American sycamore	0.9	11.4	13.1	4
12	<i>Betula nigra</i>	river birch	2.8	11.3	2.2	4
12	<i>Quercus rubra</i>	northern red oak	4.3	11.4	3.0	4
12	<i>Asimina triloba</i>	pawpaw	4.9	15.0	1.2	4
12	<i>Platanus occidentalis</i>	American sycamore	2.7	14.9	14.8	4
12	<i>Diospyros virginiana</i>	common persimmon	0.9	14.9	5.1	4
12	<i>Platanus occidentalis</i>	American sycamore	0.8	18.5	12.5	4
12	<i>Asimina triloba</i>	pawpaw	3.0	18.5	Missing	M
12	<i>Betula nigra</i>	river birch	4.7	18.5	2.3	4

Vigor: 4 = excellent, 3 = good, 2 = fair, 1 = unlikely to survive year, 0 = dead, M = Missing

Table 11. Vegetation Height Data

Perry Hill Mitigation Site

DMS Project No. 100093

Monitoring Year 3 - 2023

Plot	Scientific Name	Common Name	X	Y	Height (ft)	Vigor
13	<i>Acer negundo</i>	boxelder	8.7	1.0	5.5	4
13	<i>Betula nigra</i>	river birch	9.6	7.8	1.6	4
13	<i>Quercus phellos</i>	willow oak	8.4	6.1	2.1	4
13	<i>Acer floridanum</i>	southern sugar maple	7.1	4.2	0.9	2
13	<i>Betula nigra</i>	river birch	5.9	2.5	Missing	M
13	<i>Platanus occidentalis</i>	American sycamore	4.9	0.9	10.1	4
13	<i>Quercus pagoda</i>	cherrybark oak	1.9	2.1	4.1	4
13	<i>Quercus pagoda</i>	cherrybark oak	3.3	3.9	2.5	4
13	<i>Acer negundo</i>	boxelder	4.5	5.4	3.3	4
13	<i>Platanus occidentalis</i>	American sycamore	5.7	7.5	9.7	4
13	<i>Quercus phellos</i>	willow oak	7.0	9.0	Missing	M
13	<i>Platanus occidentalis</i>	American sycamore	2.8	9.1	7.9	4
13	<i>Acer negundo</i>	boxelder	1.6	7.2	3.6	4
13	<i>Betula nigra</i>	river birch	0.2	5.2	1.9	4

Vigor: 4 = excellent, 3 = good, 2 = fair, 1 = unlikely to survive year, 0 = dead, M = Missing

Table 11. Vegetation Height Data

Perry Hill Mitigation Site

DMS Project No. 100093

Monitoring Year 3 - 2023

Plot	Scientific Name	Common Name	X	Y	Height (ft)	Vigor
14	<i>Ulmus americana</i>	American elm	10.0	0.9	1.7	4
14	<i>Ulmus americana</i>	American elm	9.0	4.9	1.8	4
14	<i>Betula nigra</i>	river birch	7.4	3.4	1.4	4
14	<i>Platanus occidentalis</i>	American sycamore	5.8	2.2	8.3	4
14	<i>Betula nigra</i>	river birch	4.1	0.5	2.8	4
14	<i>Platanus occidentalis</i>	American sycamore	0.3	1.6	9.9	4
14	<i>Quercus rubra</i>	northern red oak	0.7	2.9	4.3	4
14	<i>Viburnum prunifolium</i>	blackhaw	3.4	4.2	2.4	4
14	<i>Populus deltoides</i>	eastern cottonwood	5.1	5.9	6.3	4
14	<i>Quercus pagoda</i>	cherrybark oak	6.4	7.3	2.8	4
14	<i>Platanus occidentalis</i>	American sycamore	8.1	8.9	6.2	4
14	<i>Acer negundo</i>	boxelder	9.8	9.8	4.0	4
14	<i>Acer floridanum</i>	southern sugar maple	3.7	10.0	2.1	4
14	<i>Populus deltoides</i>	eastern cottonwood	2.3	8.9	5.0	4
14	<i>Asimina triloba</i>	pawpaw	1.0	7.7	1.9	2

Vigor: 4 = excellent, 3 = good, 2 = fair, 1 = unlikely to survive year, 0 = dead, M = Missing