MONITORING YEAR 2 ANNUAL REPORT

Final

BURNETTS CHAPEL MITIGATION SITE-PHASE II

Guilford County, NC
NCDEQ Contract No. 7430
DMS ID No. 100045
DWR Project Number 2011-0841

Randleman Lake Watershed
Cape Fear River Basin
HUC 03030003

Data Collection Period: September 2020
Submission Date: December 14, 2020

PREPARED FOR:

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BURNETTS CHAPEL MITIGATION SITE-PHASE II
Monitoring Year 2 Annual Report

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Section 1: PROJECT OVERVIEW

1.1 Project Description

The Burnetts Chapel Mitigation Site-Phase II (Site) is a buffer restoration project located approximately three miles west of the Town of Pleasant Garden and four miles south of the City of Greensboro in Guilford County, NC (Figure 1). The Site is comprised of 7.50 acres along several unnamed tributaries to the Randleman Reservoir (Figure 2). The Site is surrounded by fields that are used for agriculture and is immediately adjacent to Phase I of the Burnetts Chapel Mitigation Project, which was successfully completed by Wildlands in 2017 for the North Carolina Division of Environmental Quality (NCDEQ) Division of Mitigation Services (DMS). The project expands the Phase I riparian buffer area from 50 feet to 100 to 200 feet on five of the original project streams and channels. The Site is expected to generate 280,577.321 riparian buffer credits.

The Site is located within the Cape Fear River Basin Hydrologic Unit Code (HUC) 03030003-010050 and the North Carolina Department of Water Resources (NCDWR) Sub-basin 03-06-08. Five unnamed tributaries on the Site flow into the Randleman Reservoir (Reaches B1-B5). These water bodies are classified as WS-IV, as the Randleman Reservoir is a major source of drinking water for the region.

This buffer restoration project will reduce sediment and nutrient loading and improve terrestrial habitat. The area surrounding the streams proposed for restoration is primarily open agricultural fields. Restoring the vegetative buffer on the areas up to 200 feet from the streams will remove the hay fields and fertilizer inputs within the project area. The restored floodplain areas will filter sediment-laden farm runoff during rainfall events. The establishment of riparian buffers will create shading to minimize thermal pollution. Finally, invasive vegetation will be treated within the project area as needed and the proposed native vegetation will provide cover and food for wildlife.

Tables 1 and 2 in Appendix 1 provide more detailed watershed and Site background information for this project.

1.2 Project Goals and Objectives

The major goals of the proposed buffer restoration project are to provide ecological and water quality enhancements to the Randleman Reservoir watershed of the Cape Fear River Basin by creating a functional riparian corridor and restoring the riparian buffer. Specific enhancements to water quality and ecological processes are outlined below.

Goals	Objectives
Decrease nutrient levels	Nutrient input will be decreased by filtering runoff from the agricultural fields through restored native buffer zones. The off-site nutrient input will also be absorbed on-site by dispersing flood flows through native vegetation.
Decrease sediment input	Sediment from off-site sources will be deposited on restored floodplain areas where native vegetation will slow overland flow velocities.
Create appropriate terrestrial habitat	Buffer areas will be restored by removing invasive vegetation and planting native vegetation.
Permanently protect the Site from harmful uses.	A conservation easement will be established on the Site.

1.3 Project History

On March 26, 2018, NCDWR conducted on-site determinations to review features and land use within the project boundary. The resulting NCDWR site viability letter and map confirming the Site as suitable for riparian buffer mitigation is located in Appendix 1. NCDWR also approved the five project reaches as appropriate for buffer mitigation as related to the rules set forth in the Randleman Lake Water Supply Watershed: Mitigation Program for Protection and Maintenance of Existing Riparian Buffers (15A NCAC 02B .0252). The on-site determination approval letter from NCDWR is also included in Appendix 1.

The final mitigation plan was submitted and accepted by the NC DMS in September 2018. Planting activities were completed by Bruton Natural Systems, Inc. in March 2019. The baseline monitoring and as-built survey were completed in May 2019. There were no significant deviations reported in the project elements in comparison to the design plans. Tables 1 and 2 in Appendix 1 provides more detailed project activity, history, and contact information for this project.

1.4 Project Location

The Site is located (Center of project 35.944022 N and -79.845255 W) in Guilford County, NC approximately three miles west of the Town of Pleasant Garden and four miles south of the City of Greensboro) within the Cape Fear River Basin (HUC 03030003-010050) and the NCDWR Sub-basin 03-06-08. Directions to the project are as follows: Traveling south on I-73 from Greensboro, take Exit 94 for Old Randleman Road. Turn right onto Old Randleman Road. Travel 0.5 miles and take a slight right onto Kivett Drive. Continue on Kivett Drive for 0.7 miles and take a left onto Drake Road. Continue on Drake Road for 1.7 miles and turn left onto Burnetts Chapel Road. The project parcel will be on the right approximately 0.1 miles down Burnetts Chapel Road. Enter the Site via the gravel driveway. The property location is depicted on the Vicinity Map (Figure 1), which is located in Appendix 1.

1.5 Project Design

The Wildlands Team restored high quality riparian buffers along several unnamed tributaries on the Site. The project design ensured that no adverse impacts to wetlands or existing riparian buffers occurred. Figure 2 illustrates the conceptual design for the Site. Detailed descriptions of the proposed restoration activity follow in Sections 1.5.1 through 1.5.2. General site and buffer photographs are included in Appendix 2.

1.5.1 Riparian Area Restoration Activities

Prior to planting, the buffer restoration area was used as agricultural fields. These areas were tilled with a chisel plow to reduce soil compaction prior to planting. The fields within the project area contained only a few invasive species; therefore, only some selective spot herbicide treatments were required. The Site's ephemeral channels were located fully within the conservation easement area and were completely buffered as part of the project; therefore, no land disturbance to maintain diffuse flow was required.

The revegetation plan for the buffer restoration area included permanent seeding, planting bare root trees, live stakes, and herbaceous plugs. These revegetation efforts were coupled with the select treatment of invasive species to control their population. The specific species composition planted was selected based on the desired community type, observation of occurrence of species in riparian buffers adjacent to the Site, and best professional judgement on species establishment and anticipated site conditions in the early years following project implementation. The total number of tree species planted across the buffer areas are as follows: tulip poplar (*Liriodendron tulipifera*) 450 stems, willow oak (*Quercus phellos*) 900 stems, American sycamore (*Platanus occidentalis*) 900 stems, river birch (*Betula nigra*) 900 stems, green ash (*Fraxinus pennsylvanica*) 900 stems, and swamp chestnut oak (*Quercus*

michauxii) 450 stems. In total, 4,500 stems were planted across the buffer areas of the Site resulting in a planting density of 608 stems per acre. Trees were planted at a density sufficient to meet the performance standards outlined in the Rule 15A NCAC 02B .0295 of 260 trees per acre at the end of five years. No one tree species planted was greater than 50% of the established stems. An appropriate seed mix was applied as necessary to provide temporary ground cover for soil stabilization and reduction of sediment loss during rain events in disturbed areas. This was followed by an appropriate permanent seed mixture. Planting was completed on March 16, 2019.

Vegetation management and herbicide applications were implemented as needed during tree establishment in the restoration areas to prevent establishment of invasive species that could compete with the planted native species.

1.5.2 Riparian Area Preservation Activities

No work was done in the buffer preservation areas, as allowed under 15A NCAC 02B .0295(o). The preservation area will be protected in perpetuity under a conservation easement.

Section 2: DETERMINATION OF CREDITS

In addition to buffer restoration on subject streams, per the Consolidated Buffer Mitigation Rules (15A NCAC 02B 0.0295 (o)), alternative mitigation is proposed on the Site in the form of buffer restoration on ephemeral channels and preservation of forested buffer on subject streams. The proposed project is in compliance with these rules in the following ways:

Buffer Restoration on Ephemeral Channels (15A NCAC 02B 0.0295(o)(7)):

- NCDWR performed an evaluation of the Site (Phase I in 2011 and Phase II in 2018) and identified the perennial, intermittent, and ephemeral channels on the property.
- The mitigation area on the Site's ephemeral channels is located completely within their drainage areas.
- The ephemeral channels are directly connected to intermittent or perennial stream channels and will be protected under the same contiguous easement boundary.
- The mitigation area on the ephemeral channels is less than 25% of the total buffer mitigation area on the Site (Table 1, Appendix 1).

Preservation on Subject Streams (15A NCAC 02B .0295 (o)(5):

- The buffer width is at least 30 feet from the stream.
- The area meets the requirements of 15A NCAC 02R 0.0403(c)(7), (8), and (11) with no known structures, infrastructure, hazardous substances, solid waste, or encumbrances within the mitigation boundary.
- Preservation mitigation is being requested on no more than 25% of the total buffer mitigation area (Table 1, Appendix 1).

Mitigation credits are presented in Table 1 and Figure 2 in Appendix 1 and are based upon the as-built survey included in the Burnetts Chapel Mitigation Site-Phase II Baseline Monitoring Report (2019).

Section 3: PERFORMANCE CRITERIA AND MONITORING PROTOCOLS

The performance criteria for the Site follows approved performance criteria presented in Burnetts Chapel Mitigation Site-Phase II Mitigation Plan (Wildlands Engineering, Inc., 2018), the NC DMS Riparian Buffer and Nutrient Offset Buffer Baseline & Annual Monitoring Report Template, Version 2.0 (May 2017) and the Consolidated Buffer Rule (15A NCAC 02B .0295).

The buffer restoration project has been assigned specific performance criteria components for vegetation. Performance criteria will be evaluated throughout the five-year post-construction monitoring. The monitoring period will extend for five years beyond the completion of construction or until performance criteria have been met. An outline of the performance criteria and monitoring components are described below.

3.1 Annual Monitoring and Reporting

Annual monitoring and semi-annual site visits will be conducted to assess the condition of the finished project. The extent of invasive species coverage will also be monitored and treated as necessary throughout the required monitoring period (five years). Complete monitoring reports will be prepared in the fall of each monitoring year and submitted to DMS. Annual monitoring reports will be based on the above referenced DMS Template (May 2017).

3.2 Vegetation Success Criteria and Monitoring Protocol

The final vegetative success criteria will be the survival of 260 planted stems per acre in the riparian corridor at the end of the required monitoring period (Monitoring Year (MY) 5). The final performance standard shall include a minimum of four native hardwood tree species or four native hardwood tree and native shrub species, where no one species is greater than 50 percent of stems. Native hardwood and native shrub volunteer species may be included to meet the final performance standard of 260 stems per acre. Performance criteria will be evaluated throughout the five-year post-construction monitoring or until performance criteria have been met. Annual vegetation monitoring will follow the CVS-EEP Level 1 & 2 Protocol for Recording Vegetation (2008).

A total of six (6) vegetation monitoring quadrants were established within the project easement area using standard 10 meter by 10 meter vegetation monitoring plots. Plots were randomly established within planted portions of the riparian buffer areas to capture the heterogeneity of the designed vegetative communities. The plot corners have been marked and are recoverable either through field identification or with the use of a GPS unit. Reference photographs of the vegetation plots are taken annually from the origin looking diagonally across the plot to the opposite corner.

Vegetation plot locations are depicted on the Current Conditions Plan View (CCPV) Map (Figure 3) in Appendix 2. Photos depicting the current conditions of the vegetation plots for MY2 are also presented in Appendix 2.

3.3 Photo Reference Stations

Photographs will be taken within the project area once a year to visually document stability for five years following construction. A total of eight (8) permanent markers were established and located with GPS equipment so that the same locations and view directions on the Site are photographed each year. Photo reference locations are depicted on the Integrated CCPV map (Figure 3) in Appendix 2. Photos depicting the current conditions of the conservation easement for MY2 are also presented in Appendix 2.

3.4 Visual Assessments

Visual assessments should support the specific performance standards for each metric as described

above. Visual assessments will be performed within the Site on a semi-annual basis during the five-year monitoring period. Problem areas with vegetative health will be noted (e.g. low stem density, vegetation mortality, invasive species, and/or encroachment). Areas of concern will be mapped, photographed, and accompanied by a written description in the annual monitoring report. Problem areas will be re-evaluated during each subsequent visual assessment.

Section 4: Results of Year 2 Monitoring

4.1 Vegetative Success

The six vegetation plots were sampled in September 2020 towards the end of the second growing season. A reference photo was taken from the southwest corner of each plot, which can be found in Appendix 2. Total numbers of tree species identified within the monitoring plots as well as density and composition are summarized in Table 9. The field data sheets are also in Appendix 3.

One stem within the plot 3 was mis-identified as swamp chestnut oak (*Quercus michauxii*) during baseline monitoring based on the planting list provided by the contractor. During the MY1 monitoring period after leaf-out, this stem was reexamined and correctly identified as white oak (*Quercus alba*); the identity of the tree was again confirmed in MY2. Though white oak was not included on the planting list provided by the contractor, it appears to have been a mistake since the stem was part of the original planted stems and is evidently a white oak. Therefore, the vegetation plot composition table was updated in MY1 to include the accurate label of *Q. alba* for the associated planted stem.

The MY2 vegetation monitoring resulted in an average stem density of 486 planted stems per acre, which exceeds the final stem density requirement of at least 260 stems per acre by the end of MY5. Stem densities within individual monitoring plots range from 283 to 567 planted stems per acre. The number of different species planted per plot ranged from three to six with a Site average of five planted species, which meets the species diversity criteria of a minimum of four native hardwood species. With the inclusion of desirable volunteer species such as persimmon (*Diospyros virginiana*) and black walnut (*Juglans nigra*), the total species diversity increased to nine native species. Plots one through four met or exceeded the MY5 species diversity criteria; however, VP5 and VP6 only had three species. In addition, no one planted species represents more than 50% of the total planted species throughout the Site. Though volunteer species were noted as present, none were included in the monitoring assessment vegetative success results for MY2.

Species diversity throughout the site, as well as within the monitoring plots, will likely increase in subsequent monitoring years by way of resprouts and/or reseeding of planted species and the continued introduction of volunteer species. If species diversity does not continue to improve, supplemental planting may be needed. See Table 9 in Appendix 3 for additional information. Please refer to Appendix 3 for vegetation plot data and vegetation plot photographs.

4.2 Vegetative Problem Areas

Though a few problems areas were noted throughout the conservation easement in MY2, their presence continues to be minimal and are not negatively affecting the overall vegetative success of the Site. These areas are described below in Section 4.2.1 and 4.2.2. Please refer Figure 3 in Appendix 2 for mapped visual assessment data locations.

4.2.1 Invasive Species

As in MY1, a small patch of tree of heaven (*Ailanthus altissima*) and Japanese honeysuckle (*Lonicera japonica*) continue to persist within a patch of intact forest located within the easement. Small pockets or individual stems of seedling Callery pear (*Pyrus calleryana*) and oriental bittersweet (*Celastrus orbiculatus*) were hand-cut in July to keep it under control. Japanese honeysuckle within the Site continued to have only a limited occurrence. Johnsongrass (*Sorghum halepense*) was present during MY1 in small areas but it has expanded to cover a larger area in MY2; it currently covers 16% of the planted acreage. As Johnsongrass is listed as a species of low/moderate concern, and because the species' presence is not affecting the survival or growth of the planted stems, it is not shown on either

Table 6 or Figure 3. Consequently, although there are some invasive species present throughout the Site, none are affecting the survival of the planted stems or the success of the project. Spot herbicide treatments may be applied around the base of the trees as needed to reduce the competition from *S. halepsense* and allow the trees to grow up and shade out the grass. Invasive species populations will continue to be monitored and spot herbicide treatments will be conducted as needed during the appropriate time of year.

4.2.2 Bare Areas

There is one small area (0.01 acres) along the left bank of Reach B4 continues to have a low planted stem density based on the visual assessment conducted in September of 2020. It is likely that this area's density will increase throughout the monitoring period; therefore, no additional planting is needed at this time. Wildlands will continue to monitor this area for emergence of woody species. If species density does not continue to improve, supplemental planting may be needed.

4.3 Parcel Maintenance

Adaptive measures will be developed, or appropriate remedial actions will be implemented in the event that the Site or a specific component of the Site fails to achieve the success criteria outlined in the Site's Mitigation Plan. Site maintenance will be performed to correct any identified problems on the Site that have a high likelihood of affecting project success. Such items include but are not limited to excess tree mortality caused by fire, flooding, drought, or insects. Any actions implemented will be designed to achieve the success criteria and will include a work schedule and updated monitoring criteria.

4.4 Conclusions

The 2020 vegetation monitoring data reflects that the Site is on trajectory to achieve the final vegetative success criteria by the end of Monitoring Year Five. These criteria include a stem density of 260 stems per acre, a species diversity of at least four native species, and no one planted species representing greater than 50 percent of stems for the Site. No major problems, such as large invasive species populations, excessive areas lacking vegetative cover, or excessive tree mortality, were identified during Monitoring Year 2. Therefore, no corrective actions are needed at this time; however, the Site will continue to be re-evaluated throughout the monitoring period.

Section 5: REFERENCES

15A NCAC 02B .0252

15A NCAC 02B .0295

Lee, Michael T., Peet, Robert K., Steven D., Wentworth, Thomas R. 2008. CVS-EEP Protocol for Recording Vegetation Version 4.2. Retrieved from http://cvs.bio.unc.edu/protocol/cvs-eep-protocol-v4.2-lev1-5.pdf

North Carolina Ecosystem Enhancement Program. 2009. Cape Fear River Basin Restoration Priorities 2009. http://www.nceep.net/services/lwps/cape_fear/RBRP%20Cape%20Fear%202008.pdf

North Carolina Division of Mitigation Services (DMS). 2017. Riparian Buffer and Nutrient Offset Buffer Baseline & Annual monitoring Report Template (Version 2.0, 05-2017). Raleigh, North Carolina. https://ncdenr.s3.amazonaws.com/s3fs-public/Mitigation%20Services/Document%20Management%20Library/Guidance%20and%20Template%20Documents/RB_NO_Base_Mon_Template_2.0_2017_5.pdf

North Carolina Interagency Review Team. 2016. Wilmington District Stream and Wetland Compensatory Mitigation Update. October 24, 2016.

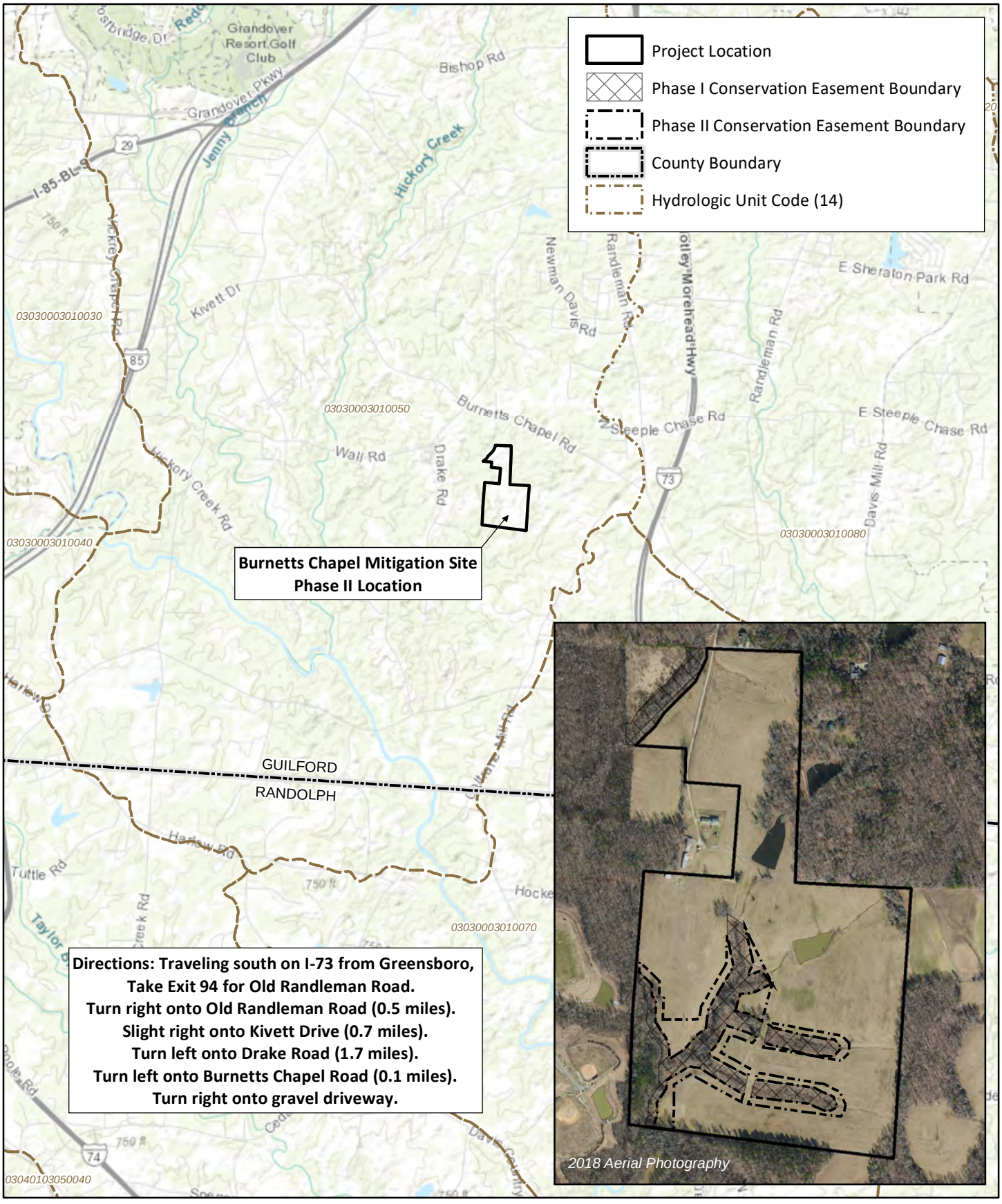
Schafale, M.P. and A.S. Weakley. 1990. Classification of the Natural Communities of North Carolina, 3rd approx. North Carolina Natural Heritage Program, Raleigh, North Carolina.

United States Army Corps of Engineers (USACE), 2003. Stream Mitigation Guidelines. USACE, NCDENR-DWQ, USEPA, NCWRC.

Wildlands Engineering, Inc. 2018. Burnetts Chapel Mitigation Site-Phase II Mitigation Plan. DMS, Raleigh, NC. September 28, 2018.

Wildlands Engineering, Inc. 2019. Burnetts Chapel Mitigation Site-Phase II Baseline Monitoring Report. DMS, Raleigh, NC. May 16, 2019.

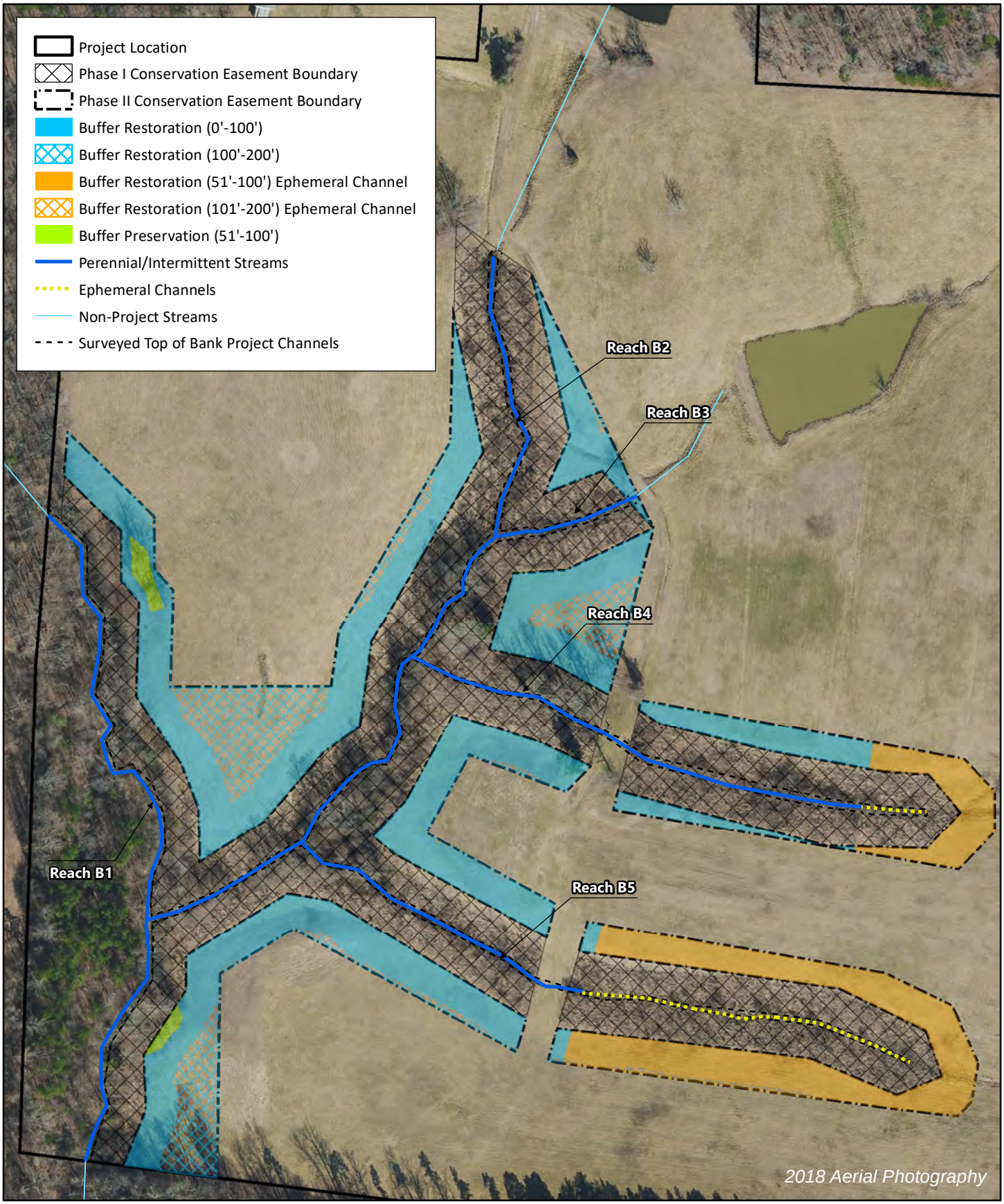
APPENDIX 1. General Tables and Figures



WILDLANDS ENGINEERING

0 0.5 1 Miles

Figure 1 Project Vicinity Map
Burnetts Chapel Mitigation Site - Phase II
2020 Monitoring Report (MY2)
Cape Fear River Basin (03030003)
Guilford County, NC



WILDLANDS ENGINEERING

0 100 200 Feet

N

Figure 2 Project Component/Asset Map
Burnetts Chapel Mitigation Site - Phase II
2020 Monitoring Report (MY2)
Cape Fear River Basin (03030003)

Guilford County, NC

Table 1. Buffer Project Areas and Assets

Burnetts Chapel Mitigation Site - Phase II

DMS Project No. 100045

Monitoring Year 2 - 2020

RIPARIAN BUFFER (15A NCAC 02B.0295)

Location	Jurisdictional Streams	Method	Feature Name	Min-Max Buffer Width (ft)	Total Area (sf)	Creditable Area (sf)	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Riparian Buffer Credits	Convertible to Nutrient Offset (Yes or No)
Rural or Urban	Subject or Nonsubject	Restoration	~	20-29	--	--	1	75%	1.33333	--	--
Rural or Urban	Subject or Nonsubject	Restoration	Ephemeral	0-100	70,473	70,473	1	100%	1.00000	70,473.000	No
Rural or Urban	Subject or Nonsubject	Restoration	Streams	0-100	188,792	188,792	1	100%	1.00000	188,792.000	No
Rural or Urban	Subject or Nonsubject	Restoration	Ephemeral	101-200	2,837	2,837	1	33%	3.03030	936.211	No
Rural or Urban	Subject or Nonsubject	Restoration	Streams	101-200	60,573	60,573	1	33%	3.03030	19,989.110	No
Rural or Urban	Subject or Nonsubject	Enhancement	~	20-29	--	--	2	75%	2.66667	--	--
Rural or Urban	Subject or Nonsubject	Enhancement	~	0-100	--	--	2	100%	2.00000	--	--
Rural or Urban	Subject or Nonsubject	Enhancement	~	101-200	--	--	2	33%	6.06061	--	--
					SUBTOTALS	**322,675**				**280,190.321**	

ELIGIBLE PRESERVATION AREA					**107,558**	

Location	Jurisdictional Streams	Method	Feature Name	Min-Max Buffer Width (ft)	Total Area (sf)	Creditable Area (sf)	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Riparian Buffer Credits
Rural	Subject	Preservation	~	20-29	--	--	10	75%	13.33333	--
Rural	Subject	Preservation	Streams	0-100	3,870	3,870	10	100%	10.00000	387.000
Rural	Subject	Preservation	~	101-200	--	--	10	33%	30.30303	--
Rural	Nonsubject	Preservation	~	20-29	--	--	5	75%	6.66667	--
Rural	Nonsubject	Preservation	~	0-100	--	--	5	100%	5.00000	--
Rural	Nonsubject	Preservation	~	101-200	--	--	5	33%	15.15152	--
Urban	Subject or Nonsubject	Preservation	~	20-29	--	--	3	75%	4.00000	--
Urban	Subject or Nonsubject	Preservation	~	0-100	--	--	3	100%	3.00000	--
Urban	Subject or Nonsubject	Preservation	~	101-200	--	--	3	33%	9.09091	--
					SUBTOTALS	**3,870**				**387.000**
					TOTALS	**326,545**				**280,577.321**

Table 2. Project Activity and Reporting History

Burnetts Chapel Mitigation Site - Phase II
DMS Project No. 100045
Monitoring Year 2 - 2020

Activity or Report	Data Collection Complete	Completion or Scheduled Delivery
Mitigation Plan	-	September 2019
Bare roots plantings	-	March 2019
Baseline Monitoring (Year 0)	April 2019	May 2019
Year 1 Monitoring	October 2019	November 2019
Invasive Species Treatment	July 2020	
Year 2 Monitoring	September 2020	November 2020
Year 3 Monitoring		November 2021
Year 4 Monitoring		November 2022
Year 5 Monitoring		November 2023

Table 3. Project Contact Table

Burnetts Chapel Mitigation Site - Phase II
DMS Project No. 100045
Monitoring Year 2 - 2020

Designers	**Wildlands Engineering, Inc.** 1430 South Mint Street, Suite 104 Charlotte, NC 28203 704.332.7754
Project Manager (POC)	Andrea Eckardt, 704.332.7754, Ext. 101
Planting Contractor	**Bruton Natural Systems, Inc.** 150 Old Black Creek Rd Freemont, NC 27830
Nursery Stock Suppliers	**Dykes & Son Nursery** 825 Maude Etter Rd. McMinnville, TN 37110
Monitoring Performers	**Wildlands Engineering, Inc.**
Monitoring (POC)	Kristi Suggs, 704.332.7754, Ext. 110

Table 4. Project Information and Attributes
Burnetts Chapel Mitigation Site - Phase II
DMS Project No. 100045
Monitoring Year 2 - 2020

Project Name	Burnetts Chapel Mitigation Site – Phase II
Hydrologic Unit Code	03030003010050
River Basin	Cape Fear
Geographic Location (Lat, Long)	35° 56' 46.0"N, 79° 50' 44.2"W
Site Protection Instrument (DB, PG)	8127 / 2755
Total Credits (BMU)	280,577.321
Types of Credits	Riparian Buffer

Table 5. Monitoring Components Summary
Burnetts Chapel Mitigation Site - Phase II
DMS Project No. 100045
Monitoring Year 2 - 2020

Parameter	Monitoring Feature	Quantity/Length by Reach					Frequency
		B1	B2	B3	B4	B5	
Vegetation	CVS Level 1 & 2	6					Annual
Visual Assessment		Y	Y	Y	Y	Y	Semi-Annual
Exotic and Nuisance Vegetation		Y	Y	Y	Y	Y	Semi-Annual
Project Boundary		Y	Y	Y	Y	Y	Semi-Annual
Reference Photos	Photographs	8					Annual

Water Resources
ENVIRONMENTAL QUALITY

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
LINDA CULPEPPER
Interim Director

March 27, 2018

DWR ID# 2011-0841v2
Guilford County

Wildlands Engineering, Inc.
Attn: Andrea Eckardt
1430 South Mint Street Suite 104
Charlotte, NC
(via electronic mail: aeckardt@wildlandseng.com)

Re: Site Viability for Buffer Mitigation & Nutrient Offset – Burnetts Chapel Phase II Site
1323 Burnetts Chapel Road, Greensboro, NC
Randleman Lake Watershed

Dear Ms. Eckardt

On March 26, 2018, Katie Merritt, with the Division of Water Resources (DWR), assisted you and staff with Division of Mitigation Services (DMS) at the proposed Burnetts Chapel Mitigation Site (Site) in Greensboro, NC. The Site is located in the Randleman Lake WS of the Cape Fear River Basin within the 8-digit Hydrologic Unit Code 03030003. The Site is being proposed as part of a full-delivery buffer mitigation project for the DMS (RFP # 16-007242). At your request, on March 26, 2018, Ms. Merritt performed an onsite assessment of riparian land uses adjacent to streams onsite, which are shown on the attached map labeled "Site Map". This site is adjacent to an existing DMS full-delivery buffer mitigation site known as "Burnetts Chapel Mitigation Site" (DWR# 2011-0841) where fifty-foot riparian buffers were restored.

Ms. Merritt's evaluation of the features onsite and their associated mitigation determination for the riparian areas are provided in the table below. This evaluation was made from 51' out to 200' from the top of bank from each feature for buffer mitigation pursuant to 15A NCAC 02B .0295 (effective November 1, 2015).

Feature	Classification	[1]Subject to Buffer Rule	Riparian Land uses adjacent to Feature (51-200')	Buffer Credit Viable	[2]Nutrient Offset Viable at 2,273 lbs/acre	Mitigation Type Determination w/in riparian areas
B1	Stream	Yes	Hay crop fields	Yes	N/A	**Fields** - Restoration Site per 15A NCAC 02B .0295 (n)
B2	Stream	Yes	Hay crop fields	Yes	N/A	**Fields** - Restoration Site per 15A NCAC 02B .0295 (n)
B3	Stream	Yes	Hay crop fields	Yes	N/A	**Fields** - Restoration Site per 15A NCAC 02B .0295 (n)
B4 Above DWR 2011 flag (green)	Wetland / Swale	No	N/A	No	N/A	N/A

Feature	Classification	[1]Subject to Buffer Rule	Riparian Land uses adjacent to Feature (51-200')	Buffer Credit Viable	[2]Nutrient Offset Viable at 2,273 lbs/acre	Mitigation Type Determination w/in riparian areas
B4 At DWR 2011 flag	Ephemeral	No	Hay crop fields	Yes[4]	N/A	**Fields** - Restoration Site per 15A NCAC 02B .0295 (o)(7) *Must meet additional requirements under .0295 (o)(7) to be viable for buffer mitigation*
B4 At DWR 2010 flag	Stream	Yes	Hay crop fields	Yes	N/A	**Fields** - Restoration Site per 15A NCAC 02B .0295 (n)
B5 Above DWR 2011 flag (green)	Wetland / Swale	No	N/A	No	N/A	N/A
B5 At DWR 2011 flag	Ephemeral	No	Hay crop fields	Yes[4]	N/A	**Fields** - Restoration Site per 15A NCAC 02B .0295 (o)(7) *Must meet additional requirements under .0295 (o)(7) to be viable for buffer mitigation*
B5 At DWR 2010 flag	Stream	Yes	Hay crop fields	Yes	N/A	**Fields** - Restoration Site per 15A NCAC 02B .0295 (n)

[1]Subjectivity calls for the features were determined by DWR in correspondence dated March 27, 2018 using the 1:24,000 scale quadrangle topographic map prepared by USGS and the most recent printed version of the soil survey map prepared by the NRCS

[2] *NC Division of Water Resources - Methodology and Calculations for determining Nutrient Reductions associated with Riparian Buffer Establishment*

[3]The area of preservation credit within a buffer mitigation site shall comprise of no more than 25 percent (25%) of the total area of buffer mitigation per 15A NCAC 0295 (o)(5) and 15A NCAC 0295 (o)(4). Site cannot be a Preservation only site to comply with this rule.

[4]The area of the mitigation site on ephemeral channel shall comprise no more than 25 percent (25%) of the total area of buffer mitigation per 15A NCAC 02B .0295 (o)(7).

The attached map (Site Map) showing the project site and features was provided by Wildlands Engineering and was initialed by Ms. Merritt on March 27, 2018. This letter should be provided in any future stream, wetland, buffer and/or nutrient offset mitigation plans for this Site.

This letter does not constitute an approval of this site to generate mitigation credits. Pursuant to 15A NCAC 02B .0295, a mitigation proposal and a mitigation plan shall be submitted to DWR for written approval **prior** to conducting any mitigation activities in riparian areas and/or surface waters for buffer mitigation credit. Pursuant to 15A NCAC 02B .0240, a proposal regarding a proposed nutrient load-reducing measure for nutrient offset credit shall be submitted to DWR for approval prior to any mitigation activities in riparian areas and/or surface waters.

All vegetative plantings, performance criteria and other mitigation requirements for riparian restoration, enhancement and preservation must follow the requirements in 15A NCAC 02B .0295 to be eligible for buffer and/or nutrient offset mitigation credits. For any areas depicted as not being viable for nutrient offset credit above, one could propose a different measure, along with supporting calculations and sufficient detail to support estimates of load reduction, for review by the DWR to determine viability for nutrient offset in accordance with 15A NCAC 02B .0240. For any areas generating wetland mitigation credit, no buffer or nutrient offset credit can be generated.

This viability assessment will expire on March 27, 2020 or upon the submittal of an As-Built Report to the DWR, whichever comes first. Please contact Katie Merritt at (919)-807-6371 if you have any questions regarding this correspondence.

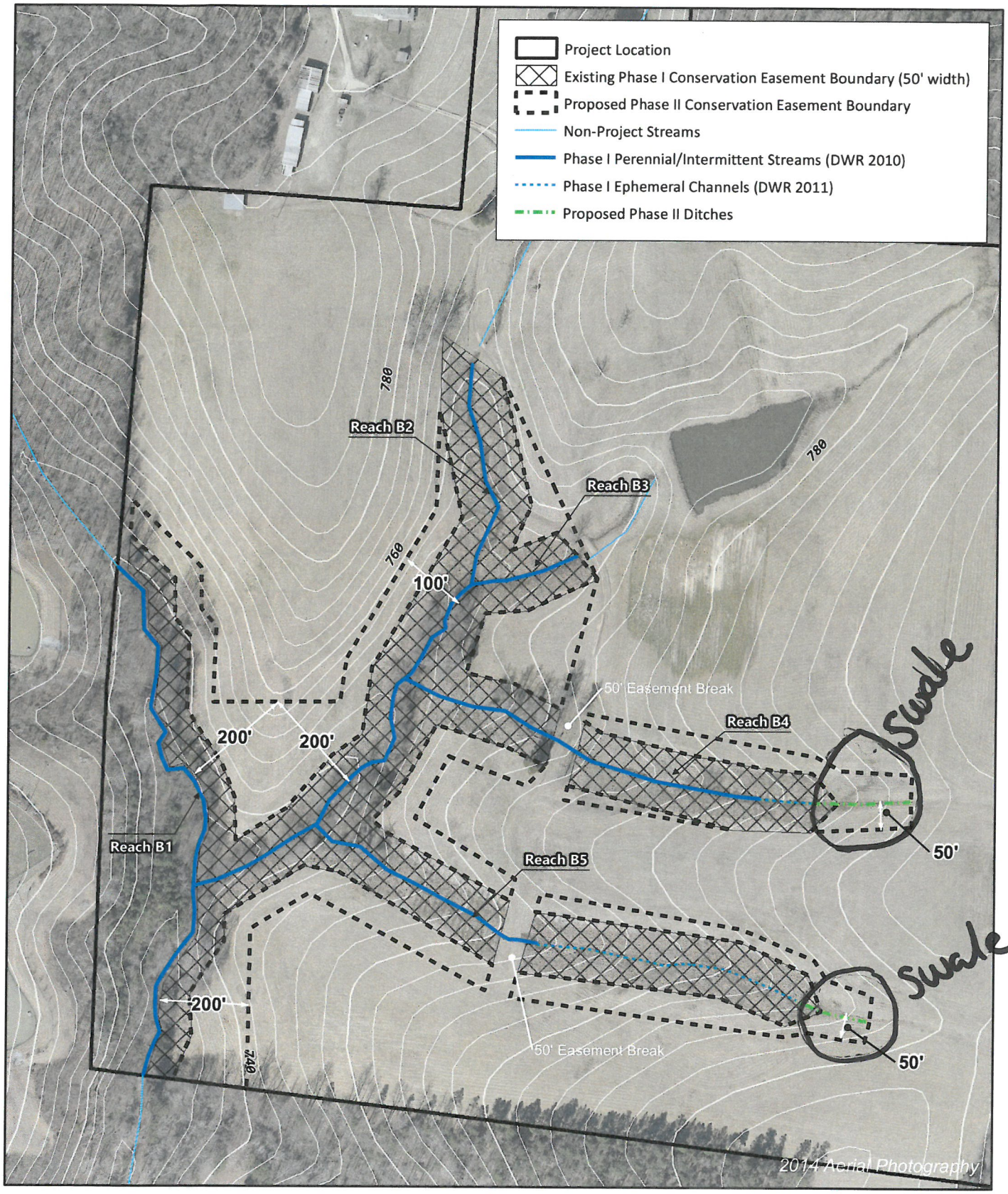
Sincerely,

Karen Higgins

Karen Higgins, Supervisor
401 and Buffer Permitting Branch

KAH/*km*
Attachments: Site Map

cc: File Copy (Katie Merritt)
DMS – Jeff Schaffer (via electronic mail)



WILDLANDS ENGINEERING

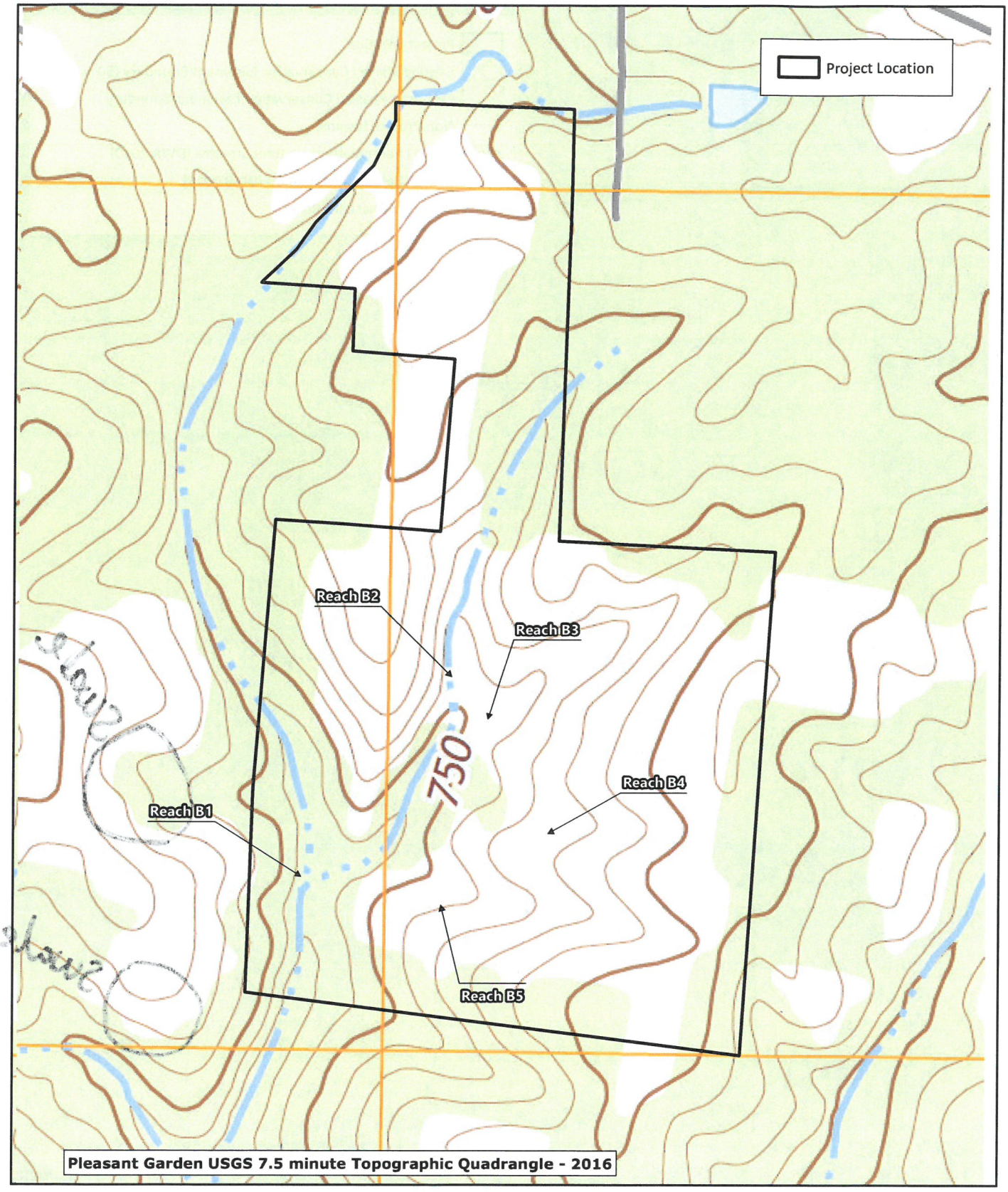
0 125 250 Feet

N

Site Map
Burnetts Chapel Mitigation Site - Phase II
Cape Fear River Basin (03030003)

Guilford County, NC

3/20/18



WILDLANDS ENGINEERING

0 250 500 Feet

N

USGS Topographic Map
Burnetts Chapel Mitigation Site - Phase II
Cape Fear River Basin (03030003)

Guilford County, NC

Water Resources
Environmental Quality

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
LINDA CULPEPPER
Interim Director

March 27, 2018

Andrea Eckardt
Wildlands Engineering Inc.
1430 South Mint Street, Suite 104
Charlotte NC 28203

Subject: On-Site Determination for Applicability to the Randleman Lake Buffer Rules (15A NCAC 2B .0250)

Subject Property: Burnett's Chapel Mitigation Site, 1323 Burnetts Chapel Rd, Greensboro NC
Guilford County
DWR# 2011-0841

Dear Ms. Eckardt:

On March 26, 2018, at your request, Sue Homewood conducted an on-site determination to review features located on the subject project for stream determinations with regards to the above noted state regulations. Katie Merritt with the Division of Water Resources (Division) was also present during the site visit.

During the site visit the upper portions of Reach B4 and Reach B5, as shown in green on the attached map, were reviewed. Both areas were representative of vegetated swales and had characteristics of wetlands and were therefore were determined not to be subject to the Randleman Buffer Rules as stated above.

The owner (or future owners) should notify the Division (and other relevant agencies) of this decision in any future correspondences concerning this property. This on-site determination shall expire five (5) years from the date of this letter.

Landowners or affected parties that dispute a determination made by the Division or Delegated Local Authority that a surface water exists and that it is subject to the buffer rule may request a determination by the Director. A request for a determination by the Director shall be referred to the Director in writing c/o 401 & Buffer Permitting Branch, 1650 Mail Service Center, Raleigh, NC 27699-1650. Individuals that dispute a determination by the Division or Delegated Local Authority that "exempts" surface water from the buffer rule may ask for an adjudicatory hearing. You must act within 60 days of the date that you receive this letter. Applicants are hereby notified that the 60-day statutory appeal time does not start until the affected party (including downstream and adjacent landowners) is notified of this decision. The Division recommends that the applicant conduct this notification in order to be certain that third party appeals are made in a timely manner. To ask for a hearing, send a written petition, which conforms to Chapter 150B of the North Carolina General Statutes to the Office of Administrative Hearings, 6714 Mail Service Center, Raleigh, N.C. 27699-6714. This determination is final and binding unless you ask for a hearing within 60 days.

This letter only addresses the applicability to the buffer rules and does not approve any activity within Waters of the United States or Waters of the State or their associated buffers. If you have any additional questions or require additional information, please contact me at 336-776-9693 or sue.homewood@ncdenr.gov.

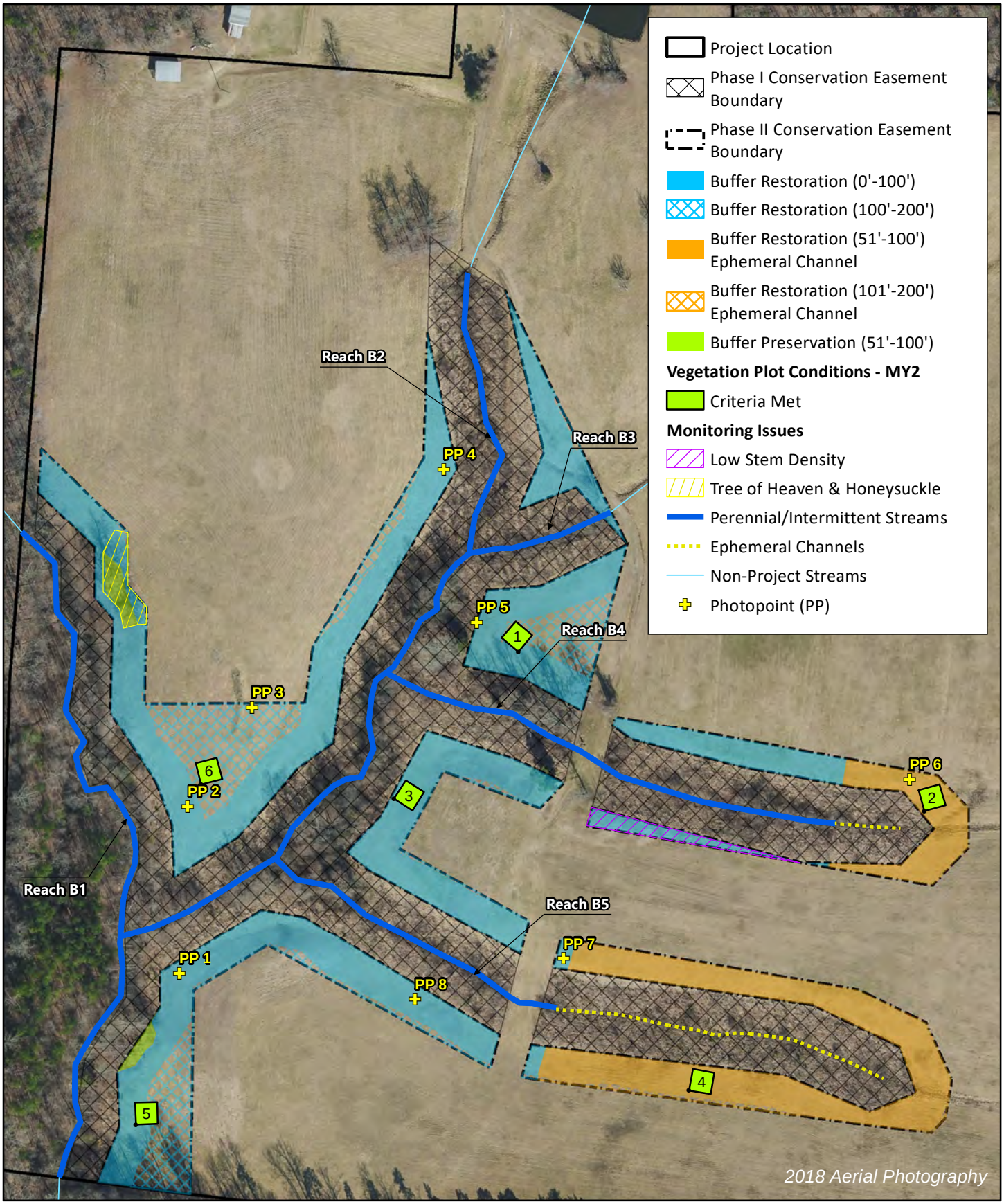
Sincerely,

Sue Homewood
Winston-Salem Regional Office

Enclosures: USGS Topo Map
Wildlands Features Map

Cc: Rick & Val Ingram, 1323 Burnetts Chapel Rd, Greensboro NC 27406
Katie Merritt, DWR (via email)
DWR, Winston-Salem Regional Office

APPENDIX 2. Visual Assessment Data



WILDLANDS ENGINEERING

0 100 200 Feet

N

Figure 3 Current Conditions Plan View
Burnetts Chapel Mitigation Site - Phase II
2020 Monitoring Report (MY2)
Cape Fear River Basin (03030003)
Guilford County, NC

Table 6. Vegetation Condition Assessment Table

Burnetts Chapel Mitigation Site - Phase II

DMS Project No. 100045

Monitoring Year 2 - 2020

Planted Acreage **7.4**

Vegetation Category	Definitions	Mapping Threshold (acres)	Number of Polygons	Combined Acreage	% of Planted Acreage
Bare Areas	Very limited cover of both woody and herbaceous material	0.1	0	0.0	0%
Low Stem Density Areas[1]	Woody stem densities clearly below target levels based on MY5 stem count criteria.	0.1	1	0.1	1%
		Total	**1**	**0.0**	**1%**
Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.0	0	0.0	0%
		Cumulative Total	**1**	**0.0**	**1%**

Easement Acreage **7.5**

Vegetation Category	Definitions	Mapping Threshold (SF)	Number of Polygons	Combined Acreage	% of Planted Acreage
Invasive Areas of Concern	Areas or points (if too small to render as polygons at map scale).	1,000	1	0.1	1%
Easement Encroachment Areas	Areas or points (if too small to render as polygons at map scale).	none	0	0.0	0%

[1]Acreage calculated from vegetation plots monitored for site and visual assessement during the site walk.

Burnetts Chapel Mitigation Site – Phase II

Monitoring Year 2

Buffer and Site Condition Photographs

	
Photo Point 1 – Looking upstream B2 and B5 (09/03/2020)	**Photo Point 1 –** Looking downstream B1 (09/03/2020)
	
Photo Point 2 – Looking upstream B1 (09/03/2020)	**Photo Point 2 –** Looking downstream to B1-B2 confluence (09/03/2020)
	
Photo Point 3 – Looking upstream B2 (09/03/2020)	**Photo Point 3 –** Looking downstream B2 (09/03/2020)

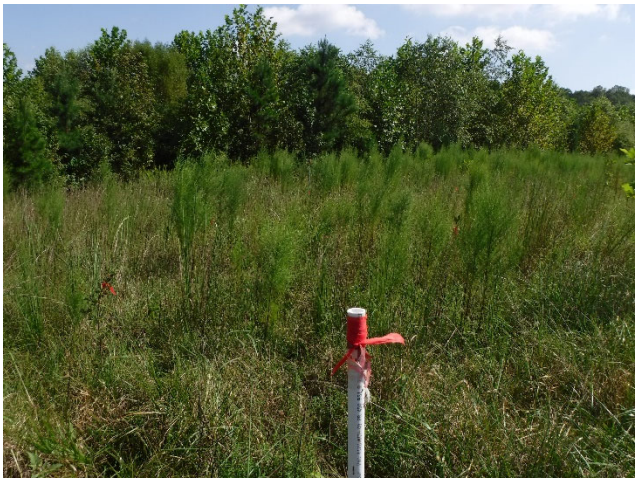
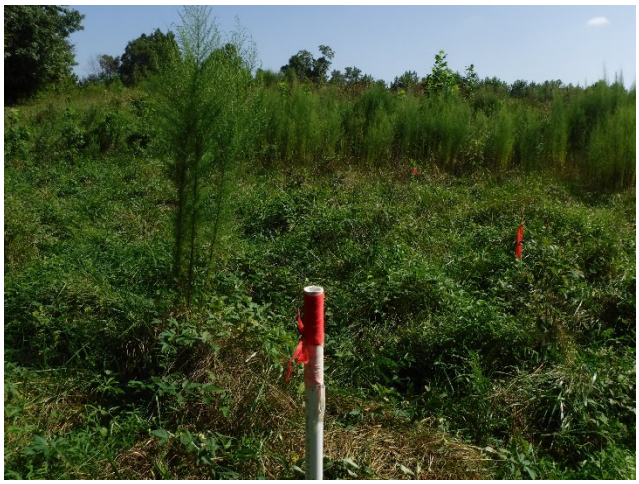
	
Photo Point 4 – Looking upstream B2 (09/03/2020)	**Photo Point 4 –** Looking downstream B2 (09/03/2020)
	
Photo Point 5 – Looking upstream B3 (09/03/2020)	**Photo Point 5 –** Looking downstream to B2-B4 confluence (09/03/2020)
	
Photo Point 6 – Looking upstream across top of B4 (09/03/2020)	**Photo Point 6 –** Looking downstream B4 (09/03/2020)

	
Photo Point 7 – Looking upstream B5 (09/03/2020)	**Photo Point 7 –** Looking downstream B5 (09/03/2020)
	
Photo Point 8 – Looking upstream B5 (09/03/2020)	**Photo Point 8 –** Looking downstream B5 (09/03/2020)

Burnetts Chapel Mitigation Site – Phase II

Monitoring Year 2

Vegetation Plot Photographs

	
Vegetation Plot 1 (09/03/2020)	**Vegetation Plot 2** (09/03/2020)
	
Vegetation Plot 3 (09/03/2020)	**Vegetation Plot 4** (09/03/2020)
	
Vegetation Plot 5 (09/03/2020)	**Vegetation Plot 6** (09/03/2020)

APPENDIX 3. Vegetation Plot Data

Table 7. Vegetation Plot Criteria Attainment

Burnetts Chapel Mitigation Site - Phase II
DMS Project No. 100045
Monitoring Year 2 - 2020

Plot	Success Criteria Met (Y/N)	Tract Mean
1	Y	100%
2	Y	
3	Y	
4	Y	
5	Y	
6	Y	

Table 8. CVS Vegetation Tables - Metadata

Burnetts Chapel Mitigation Site - Phase II

DMS Project No. 100045

Monitoring Year 2 - 2020

Report Prepared By	Sara Thompson
Date Prepared	9/8/2020 13:27
Database Name	cvs-eep-entrytool-v2.5.0 Burnetts Phase II MY2_2020.mdb
Database Location	Q:\ActiveProjects\005-02170 Burnetts Chapel Phase II\Monitoring\Monitoring Year 2_2020\Vegetation Assessment
Computer Name	SARA2020
File Size	51654656
DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT----------	
Metadata	Description of database file, the report worksheets, and a summary of project(s) and project data.
Project Planted	Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
Project Total Stems	Each project is listed with its TOTAL stems per acre, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems.
Plots	List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
Vigor	Frequency distribution of vigor classes for stems for all plots.
Vigor by Spp	Frequency distribution of vigor classes listed by species.
Damage	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
Damage by Spp	Damage values tallied by type for each species.
Damage by Plot	Damage values tallied by type for each plot.
Planted Stems by Plot and Spp	A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.
ALL Stems by Plot and Spp	A matrix of the count of total living stems of each species (planted and natural volunteers combined) for each plot; dead and missing stems are excluded.
PROJECT SUMMARY----------	
Project Code	100045
Project Name	Burnett's Chapel Mitigation Site - Phase II
Project Description	NC DMS Full Delivery Project - Buffer Mitigation
Sampled Plots	6

Table 9. Planted and Total Stem Count
Burnetts Chapel Mitigation Site - Phase II
DMS Project No. 100045
Monitoring Year 2 - 2020

			Current Plot Data (MY2 2020)																	
Scientific Name	**Common Name**	**Species Type**	**Vegetation Plot 1**			**Vegetation Plot 2**			**Vegetation Plot 3**			**Vegetation Plot 4**			**Vegetation Plot 5**			**Vegetation Plot 6**		
			PnoLS	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**
Betula nigra	River Birch, Red Birch	Tree	4	4	4	6	6	6	4	4	4	4	4	4	1	1	1			
Diospyros virginiana	American Persimmon, Possumwood	Tree									1									
Fraxinus pennsylvanica	Green Ash, Red Ash	Tree	1	1	1	1	1	1	3	3	3	4	4	4	1	1	1			
Juglans nigra	Black Walnut	Tree									1									
Liquidambar styraciflua	Sweet Gum, Red Gum	Tree			18						1			3						
Liriodendron tulipifera	Tulip Poplar	Tree	1	1	13													3	3	3
Platanus occidentalis	Sycamore, Plane-tree	Tree	2	2	2	3	3	3	1	1	1	2	2	2				3	3	3
Quercus alba	White Oak	Tree							1	1	1									
Quercus michauxii	Basket Oak, Swamp Chestnut Oak	Tree	4	4	4	4	4	4	1	1	1	2	2	2	5	5	5			
Quercus phellos	Willow Oak	Tree	2	2	2				3	3	3	2	2	2				3	3	3
		Stem count	14	14	44	14	14	14	13	13	16	14	14	17	7	7	7	9	9	9
		size (ares)	1			1			1			1			1			1		
		size (ACRES)	0.0247			0.0247			0.0247			0.0247			0.0247			0.0247		
		Species count	6	6	7	4	4	4	6	6	9	5	5	6	3	3	3	3	3	3
		Stems per ACRE	567	567	1781	567	567	567	526	526	647	567	567	688	283	283	283	364	364	364

			Annual Means								
Scientific Name	**Common Name**	**Species Type**	**MY2 (2020)**			**MY1 (2019)**			**MY0 (2019)**		
			PnoLS	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**
Betula nigra	River Birch, Red Birch	Tree	20	20	20	20	20	20	20	20	20
Diospyros virginiana	American Persimmon, Possumwood	Tree			1			1			
Fraxinus pennsylvanica	Green Ash, Red Ash	Tree	10	10	10	10	10	10	11	11	11
Juglans nigra	Black Walnut	Tree			1						
Liquidambar styraciflua	Sweet Gum, Red Gum	Tree			22						
Liriodendron tulipifera	Tulp Poplar	Tree	4	4	16	8	8	8	9	9	9
Platanus occidentalis	Sycamore, Plane-tree	Tree	11	11	11	13	13	13	13	13	13
Quercus alba	White Oak	Tree	1	1	1	1	1	1			
Quercus michauxii	Basket Oak, Swamp Chestnut Oak	Tree	16	16	16	18	18	18	20	20	20
Quercus phellos	Willow Oak	Tree	10	10	10	13	13	13	17	17	17
		Stem count	72	72	108	83	83	84	90	90	90
		size (ares)	6			6			6		
		size (ACRES)	0.1483			0.1483			0.1483		
		Species count	7	7	10	7	7	8	6	6	6
		Stems per ACRE	486	486	728	560	560	567	607	607	607

Exceeds requirements by 10%
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%
Volunteers included

PnoLS: Number of planted stems excluding live stakes
P-All: Number of planted stems including live stakes
T: Total stems

Burnetts Chapel Mitigation Site – Phase II (MY2)
Vegetation Monitoring Data Sheets

Plots 1-6

Sampled:
09/03/2020

Notes:

Party:

JT	Jeff Turner
ST	Sara Thompson

Abbreviations for Natural Woody Stems:

Be.ni.	*Betula nigra*	River birch
Di.vi.	*Diospyros virginiana*	American Persimmon
Fr.pe.	*Fraxinus pennsylvanica*	Green ash
Li.st.	*Liquidambar styraciflua*	Sweetgum
Li.tu.	*Liriodendron tulipifera*	Tulip poplar
Pl.oc.	*Platanus occidentalis*	American sycamore
Qu.mi.	*Quercus michauxii*	Swamp chestnut oak
Qu.al.	*Quercus alba*	White Oak
Qu.ph.	*Quercus phellos*	Willow oak
Ju. ni.	*Juglans nigra*	Eastern black walnut

Plot (continued): 10045-01-VP1

ID	Species	map char	source	X (m)	Y (m)	Sep 2019 Data ddh (mm)	Height (cm)	DBH (cm)	Notes*	THIS YEAR'S DATA ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes

Vegetation Monitoring Data (VMD) Datasheet **Please fill in any missing data and correct any errors.**

Plot 10045-01-VP1

VMD Year (1-5): 2 Date: 09/03/20 - / /

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: (dec.deg. or m) 35.94385 Datum: NAD83/WGS84

Longitude or UTM-E: -79.84587 UTM Zone: 17

Coordinate Accuracy (m): 1 X-Axis bearing (deg): 50.36

Plot Dimensions: X: 10 Y: 10 ☐ Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X

Party: ST / JT Role:

Date last planted:

New planting date m/yy? /

☐ Check box if plot was not sampled, specify reason below

Notes:

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Sep 2019 Data Height 1cm*	DBH 1 cm	Notes*	THIS YEAR'S DATA Height 1cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*	Notes
1	Quercus michauxii	c	R	0.4	0.4	94.0		☐	117		☐	3	insects	
2	Platanus occidentalis	f	R	5.0	0.4	122.0	DBH?	☐	153	0	☐	3	insects	
3	Betula nigra	k	R	9.6	0.4	87.0		☑	55		☑	4		
4	Quercus michauxii	l	R	9.6	2.4	53.0		☐	65		☐	3		
5	Quercus phellos	j	R	5.2	2.5	43.0		☑	43		☐	3		
6	Betula nigra	a	R	0.3	2.4	87.0		☑	82		☐	3	shaded	
7	Platanus occidentalis	d	R	0.4	4.6	104.0	DBH?	☐	130		☐	3	insects	
8	Fraxinus pennsylvanica	g	R	5.0	4.9	95.0		☐	115		☐	4		
9	Quercus phellos	n	R	9.8	5.0	51.0		☐	53		☐	4		
10	Quercus michauxii	o	R	9.9	7.5	81.0		☐	75		☐	4		
11	Betula nigra	h	R	5.0	7.3	64.0		☑	61		☐	3		
12	Quercus michauxii	b	R	0.3	6.7	66.0		☐	79		☐	3		
13	Liriodendron tulipifera	e	R	0.5	9.6	100.0		☐	122		☐	4		
14	Betula nigra	i	R	5.0	9.8	48.0		☑	40		☐	4		
15	Betula nigra	m	R	9.6	9.7	38.0		☑	—		☐	missing		

 # stems: 15

New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

***Notes by ID:**

3-Broken stem
5-Broken stem
6-Broken stem
11-Broken stem
14-Broken stem
15-Broken stem

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Printed in the CVS Entry Tool ver. 2.5.0

Plot (continued): 10045-01-VP1

ID	Species	map char	source	X (m)	Y (m)	Sep 2019 Data: ddh (mm)	Height (cm)	DBH (cm)	Notes*	THIS YEAR'S DATA: ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes

Natural Woody Stems - tallied by species

Explanation of cut-off & subsampling**:

Height Cut-Off (All stems shorter than this are ignored. If >10cm, explain why to the right.): ☐ 10cm ☐ 50cm ☐ 100cm ☐ 137cm

Species Name	☑ c	SEEDLINGS — HEIGHT CLASSES: Sub-Seed	10 cm-50 cm	50 cm-100 cm	100 cm-137 cm	SAPLINGS — DBH: Sub-Sapl	0-1 cm	1-2.5	TREES — DBH: 2.5-	5-	=10 (write DBH)
		___				___					
L.T.		___	12			___					
L.S.		___	8	10		___					
		___				___					
		___				___					
		___				___					
		___				___					

**Required if cut-off >10cm or subsample ? 100%.

●1 ●2 ●3 ●4 ●5 ●6 ●7 ●8 ●9 ●10

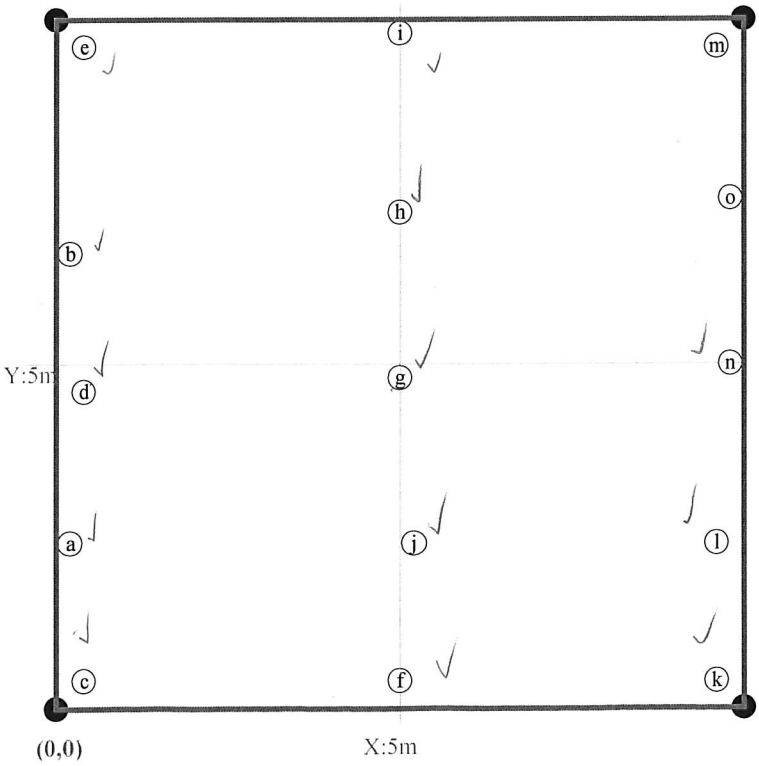
Form WS2, ver 9.1

Map of stems on plot 10045-01-VP1

X-axis: 50.4 °

N

 # stems: 15
map size: small



*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Printed in the CVS Entry Tool ver. 2.5.0

Vegetation Monitoring Data (VMD) Datasheet **Please fill in any missing data and correct any errors.**

Plot 10045-01-VP2

VMD Year (1-5): 2 Date: 09/03/20 - / /

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: (dec.deg. or m) 35.943204 Datum: NAD83/WGS84

Longitude or UTM-E: -79.843804 UTM Zone: 17

Coordinate Accuracy (m): 1 X-Axis bearing (deg): 15.06

Plot Dimensions: X: 10 Y: 10 ☐ Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X

Party:	Role:
ST / JT	

Date last planted:

New planting date m/yy? /

☐ Check box if plot was not sampled, specify reason below

Notes:

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Sep 2019 Data Height 1cm*	Sep 2019 Data DBH 1 cm	Notes*	THIS YEAR'S DATA Height 1cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*	Notes
16	Betula nigra	ⓐ	R	0.5	0.5	47.0		☑	59		☐	4		
17	Betula nigra	ⓕ	R	4.8	0.6	92.0		☑	80		☐	3		
18	Fraxinus pennsylvanica	ⓙ	R	9.5	0.5	93.0		☐	108		☐	4		
19	Quercus michauxii	ⓚ	R	9.5	2.4	84.0		☑	88		☐	2	Deer	
20	Betula nigra	ⓖ	R	4.8	2.2	96.0		☑	70		☐	4		
21	Betula nigra	ⓑ	R	0.5	1.9	40.0		☑	43		☐	4		
22	Platanus occidentalis	ⓒ	R	0.5	4.5	100.0		☐	44		☑	4		
24	Betula nigra	ⓛ	R	9.7	5.3	100.0		☑	51		☐	4		
25	Platanus occidentalis	ⓜ	R	9.7	7.5	101.0	*DBH?*	☐	73		☑	4		
26	Betula nigra	ⓗ	R	4.8	6.7	40.0		☑	45		☐	4		
27	Quercus michauxii	ⓓ	R	0.5	6.3	27.0		☐	49		☐	4		
28	Quercus michauxii	ⓔ	R	0.4	9.5	95.0		☐	60		☐	4		
29	Platanus occidentalis	ⓘ	R	4.8	9.4	133.0	*DBH?*	☐	89		☑	4		
30	Quercus michauxii	ⓝ	R	9.6	9.5	57.0		☑	63		☐	3		

 # stems: 14

New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes
NO VOLS								

***Notes by ID:**

16-Broken stem
17-Broken stem
19-Broken stem
20-Broken stem
21-Broken stem
24-Broken stem
26-Broken stem
30-Insects, Broken stem

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Plot (continued): 10045-01-VP2

ID	Species	map char	source	X (m)	Y (m)	Sep 2019 Data ddh (mm)	Height (cm)	DBH (cm)	Notes*	THIS YEAR'S DATA ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes

Natural Woody Stems - tallied by species

Explanation of cut-off & subsampling:**

Height Cut-Off (All stems shorter than this are ignored. If >10cm, explain why to the right.): ☐ 10cm ☐ 50cm ☐ 100cm ☐ 137cm

Species Name	☑ c	SEEDLINGS — HEIGHT CLASSES: Sub-Seed	10 cm-50 cm	50 cm-100 cm	100 cm-137 cm	SAPLINGS — DBH: Sub-Sapl	0-1 cm	1-2.5	TREES — DBH: 2.5-	5-	=10 (write DBH)

**Required if cut-off >10cm or subsample ? 100%.

1 2 3 4 5 6 7 8 9 10

Form WS2, ver 9.1

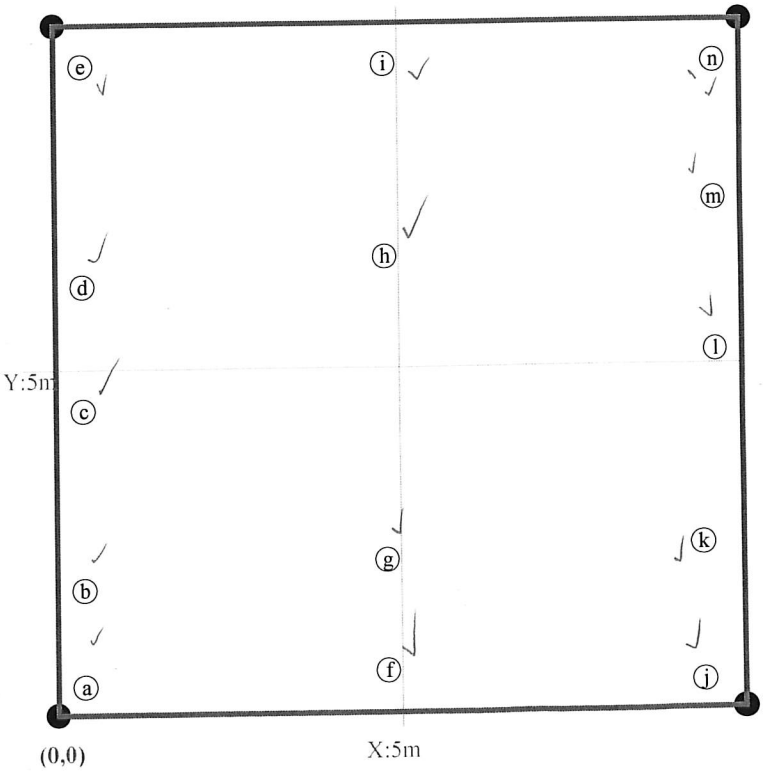
Map of stems on plot 10045-01-VP2

X-axis: 15.1°

N

 # stems: 14

map size: small



*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Printed in the CVS Entry Tool ver. 2.5.0

Vegetation Monitoring Data (VMD) Datasheet **Please fill in any missing data and correct any errors.**

Plot 10045-01-VP3

VMD Year (1-5): 2 Date: 09 / 03 / 20 - / /

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: (dec.deg. or m) 35.943236 Datum: NAD83/WGS84

Longitude or UTM-E: -79.846504 UTM Zone: 17

Coordinate Accuracy (m): 1 X-Axis bearing (deg): 328.89

Plot Dimensions: X: 10 Y: 10 ☐ Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X

Party: ST/JT Role:

Date last planted:

New planting date m/yy? /

☐ Check box if plot was not sampled, specify reason below

Notes: Johnson grass in 60% of plot

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Sep 2019 Data Height 1cm*	Sep 2019 Data DBH 1 cm	Notes*	THIS YEAR'S DATA Height 1cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*	Notes
31	Quercus phellos	ⓐ	R	0.5	0.5	65.0		☐	48		☐	3	Smothered	
32	Platanus occidentalis	ⓔ	R	2.4	0.5	91.0		☐	112		☐	4		
33	Quercus alba	ⓖ	R	4.9	0.5	82.0		☑	81		☐	3		
34	Betula nigra	ⓘ	R	7.1	0.4	35.0		☐	33		☑	4		
35	Betula nigra	ⓛ	R	9.4	0.5	38.0		☐	36		☑	4		
36	Quercus michauxii	ⓜ	R	9.6	4.9	64.0		☑	122		☐	4		
37	Quercus phellos	ⓙ	R	7.1	4.7	50.0		☑	57		☐	3	Smothered	
38	Quercus phellos	ⓗ	R	5.1	4.6	15.0		☐	9		☑	2		
39	Betula nigra	ⓕ	R	2.6	4.6	96.0		☐	91		☐	4		
40	Fraxinus pennsylvanica	ⓑ	R	0.5	4.5	64.0		☑	91		☐	4		
41	Fraxinus pennsylvanica	ⓒ	R	0.4	9.6	91.0		☐	91		☐	4		
42	Fraxinus pennsylvanica	ⓓ	R	2.3	9.5	98.0		☐	152	0	☐	4		
44	Betula nigra	ⓚ	R	7.2	9.7	108.0	*DBH?*	☑	94		☐	4		
45	Quercus phellos	ⓝ	R	9.6	9.5	33.0		☑			☐	Dead		

 # stems: 14

New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

***Notes by ID:**

33-Mislabeld MY0 as Q. mich.
36-Broken stem
37-Broken stem
40-Insect damage
44-Insect damage
45-Broken stem

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Printed in the CVS Entry Tool ver. 2.5.0

Plot (continued): 10045-01-VP3

ID	Species	map char	source	X (m)	Y (m)	Sep 2019 Data ddh (mm)	Height (cm)	DBH (cm)	Notes*	THIS YEAR'S DATA ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes

Natural Woody Stems - tallied by species

Explanation of cut-off & subsampling:**

Height Cut-Off (All stems shorter than this are ignored. If >10cm, explain why to the right.): ☐ 10cm ☐ 50cm ☐ 100cm ☐ 137cm

Species Name	☑ c	SEEDLINGS — HEIGHT CLASSES: Sub-Seed	10 cm-50 cm	50 cm-100 cm	100 cm-137 cm	SAPLINGS — DBH: Sub-Sapl	0-1 cm	1-2.5	TREES — DBH: 2.5-	5-	=10 (write DBH)
		—				—					
D.V.		—			1	—					
Black Walnut		—		1		—					
L.S.		—	1			—					
		—				—					
		—				—					
		—				—					

**Required if cut-off >10cm or subsample ? 100%.

●1 ●2 ●3 ●4 ●5 ●6 ●7 ●8 ●9 ●10

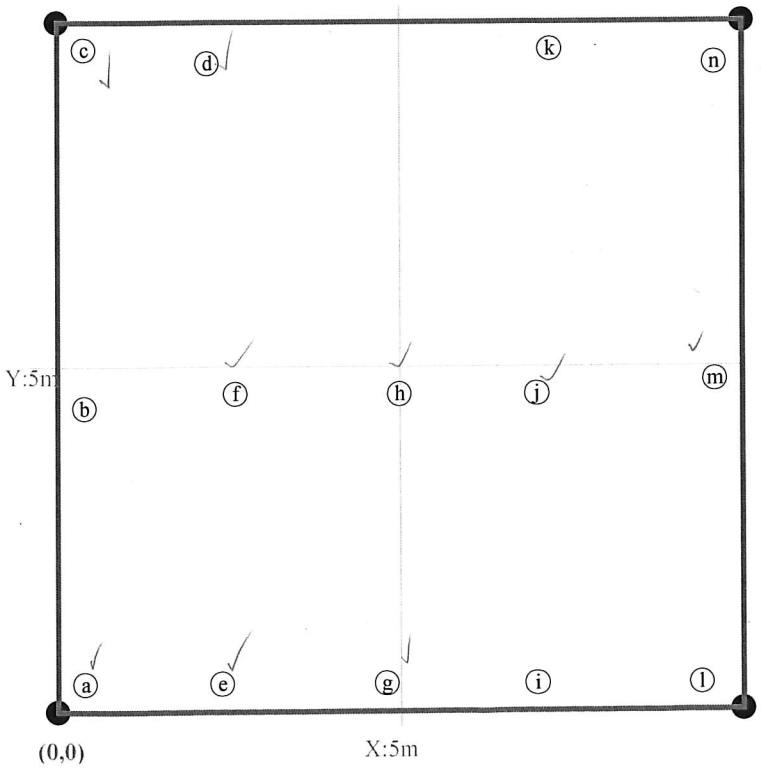
Form WS2, ver 9.1

Map of stems on plot 10045-01-VP3

X-axis: 329°

 # stems: 14
map size: small

N



*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Printed in the CVS Entry Tool ver. 2.5.0

Vegetation Monitoring Data (VMD) Datasheet **Please fill in any missing data and correct any errors.**

Plot 10045-01-VP4

VMD Year (1-5): 2 Date: 09/03/20 - / /

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: (dec.deg. or m) 35.942042 Datum: NAD83/WGS84

Longitude or UTM-E: -79.844988 UTM Zone: 17

Coordinate Accuracy (m): 1 X-Axis bearing (deg): 352.6

Plot Dimensions: X: 10 Y: 10 ☐ Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X

Party:	Role:
ST/JT	

Date last planted:

New planting date m/yy? /

☐ Check box if plot was not sampled, specify reason below

Notes:

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Sep 2019 Data Height 1cm*	Sep 2019 Data DBH 1 cm	Notes*	THIS YEAR'S DATA Height 1cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*	Notes
47	Platanus occidentalis	g	R	5.3	0.4	157.0	0.0	☐	195	1	☐	4		
48	Betula nigra	n	R	9.6	0.5	51.0		☐	52		☐	3		
49	Fraxinus pennsylvanica	k	R	9.5	2.5	84.0		☑	81		☐	2	Disease	
50	Fraxinus pennsylvanica	h	R	5.2	2.6	69.0		☐	70		☐	3	disease	
51	Quercus michauxii	d	R	0.6	2.5	99.0		☐	101		☐	2	insects	
52	Quercus phellos	a	R	0.5	5.1	14.0		☐	20		☑	3		
53	Betula nigra	i	R	5.2	5.1	41.0		☑	42		☐	4		
54	Fraxinus pennsylvanica	l	R	9.4	5.1	34.0		☐	38		☑	4		
55	Fraxinus pennsylvanica	j	R	9.3	7.5	25.0		☐	27		☑	4		
56	Quercus michauxii	e	R	5.1	7.5	65.0		☐	63		☐	4		
57	Betula nigra	b	R	0.4	7.5	45.0		☑	45		☐	3		
58	Platanus occidentalis	c	R	0.5	9.5	116.0	*DBH?*	☐	134		☐	3	insects	
59	Betula nigra	f	R	5.1	9.5	59.0		☑	56		☐	4		
60	Quercus phellos	m	R	9.5	9.6	60.0		☐	66		☐	4		

 # stems: 14

New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

***Notes by ID:**

49-Insect damage
53-Broken stem
57-Broken stem
59-Broken stem

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Printed in the CVS Entry Tool ver. 2.5.0

Plot (continued): 10045-01-VP4

ID	Species	map char	source	X (m)	Y (m)	Sep 2019 Data: ddh (mm)	Height (cm)	DBH (cm)	Notes*	THIS YEAR'S DATA: ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes

Natural Woody Stems - tallied by species

Explanation of cut-off & subsampling**:

Height Cut-Off (All stems shorter than this are ignored. If >10cm, explain why to the right.): ☐ 10cm ☐ 50cm ☐ 100cm ☐ 137cm

Species Name	☑ c	SEEDLINGS — HEIGHT CLASSES: Sub-Seed	10 cm-50 cm	50 cm-100 cm	100 cm-137 cm	SAPLINGS — DBH: Sub-Sapl	0-1 cm	1-2.5	TREES — DBH: 2.5-	5-	=10 (write DBH)
~~LYST~~ Li. st.		—	III			—					
		—				—					
		—				—					
		—				—					
		—				—					
		—				—					
		—				—					

**Required if cut-off >10cm or subsample ? 100%.

●1 ●2 ●3 ●4 ●5 ●6 ●7 ●8 ●9 ●10

Form WS2, ver 9.1

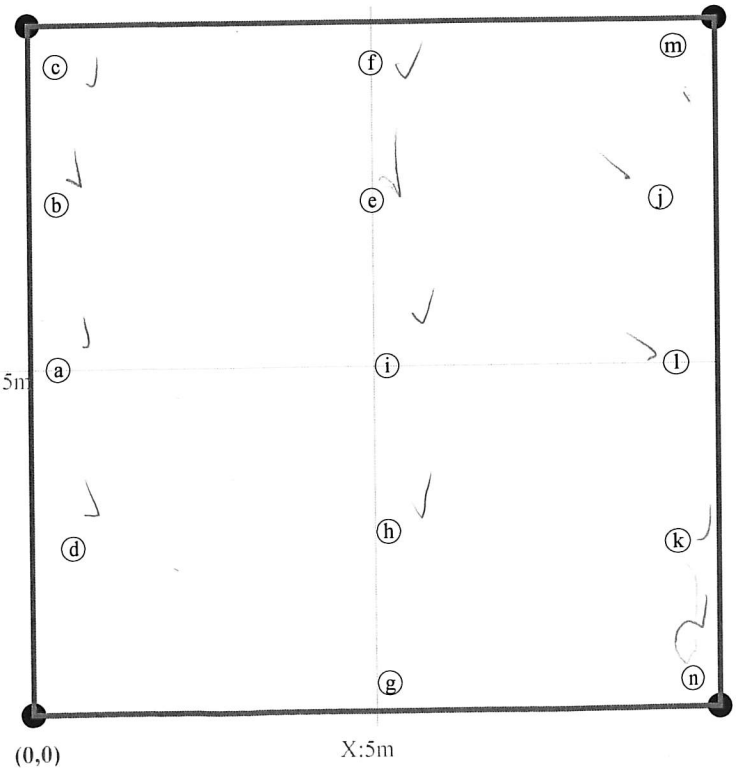
Map of stems on plot 10045-01-VP4

→ X-axis: 353°

 # stems: 14

map size: small

N



*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Printed in the CVS Entry Tool ver. 2.5.0

Vegetation Monitoring Data (VMD) Datasheet **Please fill in any missing data and correct any errors.**

Plot 10045-01-VP5

VMD Year (1-5): 2 Date: 09 / 03 / 20 - / /

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: (dec.deg. or m) 35.941879 Datum: NAD83/WGS84

Longitude or UTM-E: -79.847799 UTM Zone: 17

Coordinate Accuracy (m): 1 X-Axis bearing (deg): 2.09

Plot Dimensions: X: 10 Y: 10 ☐ Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X

Party:	Role:
ST / JT	

Date last planted:

New planting date m/yy? /

☐ Check box if plot was not sampled, specify reason below

Notes: plot covered in thick thespis grass

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Sep 2019 Height 1cm*	Sep 2019 DBH 1 cm	Notes*	THIS YEAR'S Height 1cm*	THIS YEAR'S DBH 1 cm	Re-sprout	Vigor*	Damage*	Notes
61	Liriodendron tulipifera	ⓐ	R	0.4	0.5	35.0		☑			☐		Dead	
62	Quercus michauxii	ⓓ	R	2.5	0.4	84.0		☐	115		☐	4		
63	Quercus michauxii	ⓖ	R	5.1	0.4	38.0		☑			☐		Dead	
64	Platanus occidentalis	ⓙ	R	7.7	0.4	111.0	*DBH?*	☐			☐		Dead	
65	Liriodendron tulipifera	ⓜ	R	9.6	0.5	94.0		☐			☐		Dead	
66	Quercus michauxii	ⓛ	R	9.5	5.1	89.0		☐	130		☐	4		
67	Fraxinus pennsylvanica	ⓘ	R	7.3	5.1	62.0		☐	87		☐	4		
68	Quercus michauxii	ⓕ	R	4.6	5.2	64.0		☐	63		☐	3	insects	
70	Quercus michauxii	ⓑ	R	0.5	5.3	87.0		☐	103		☐	3	vine	
71	Quercus michauxii	ⓒ	R	0.6	9.5	19.0		☐	64		☐	3	vine	
72	Quercus michauxii	ⓔ	R	2.7	9.4	74.0		☐			☐	missing		
73	Quercus phellos	ⓗ	R	5.3	9.3	60.0		☐			☐	missing		
74	Betula nigra	ⓚ	R	7.7	9.5	83.0		☑	67		☐	3	Dieback	
75	Platanus occidentalis	ⓝ	R	9.6	9.5	111.0	*DBH?*	☐	145	0	☐			

 # stems: 14

New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes
NO VOLS								

***Notes by ID:**
61-Broken stem
63-Broken stem
74-Broken stem

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Plot (continued): 10045-01-VP5

ID	Species	map char	source	X (m)	Y (m)	Sep 2019 Data ddh (mm)	Height (cm)	DBH (cm)	Notes*	THIS YEAR'S DATA ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes

Natural Woody Stems - tallied by species

Explanation of cut-off & subsampling**:

Height Cut-Off (All stems shorter than this are ignored. If >10cm, explain why to the right.): ☐ 10cm ☐ 50cm ☐ 100cm ☐ 137cm

Species Name	☑ c	SEEDLINGS — HEIGHT CLASSES: Sub-Seed	10 cm-50 cm	50 cm-100 cm	100 cm-137 cm	SAPLINGS — DBH: Sub-Sapl	0-1 cm	1-2.5	TREES — DBH: 2.5-	5-	=10 (write DBH)
		___				___					
		___				___					
		___				___					
		___				___					
		___				___					
		___				___					
		___				___					

**Required if cut-off >10cm or subsample ? 100%.

●1 ●2 ●3 ●●4 ●●5 ●●6 ●●7 ●●8 ●●9 ●●10

Form WS2, ver 9.1

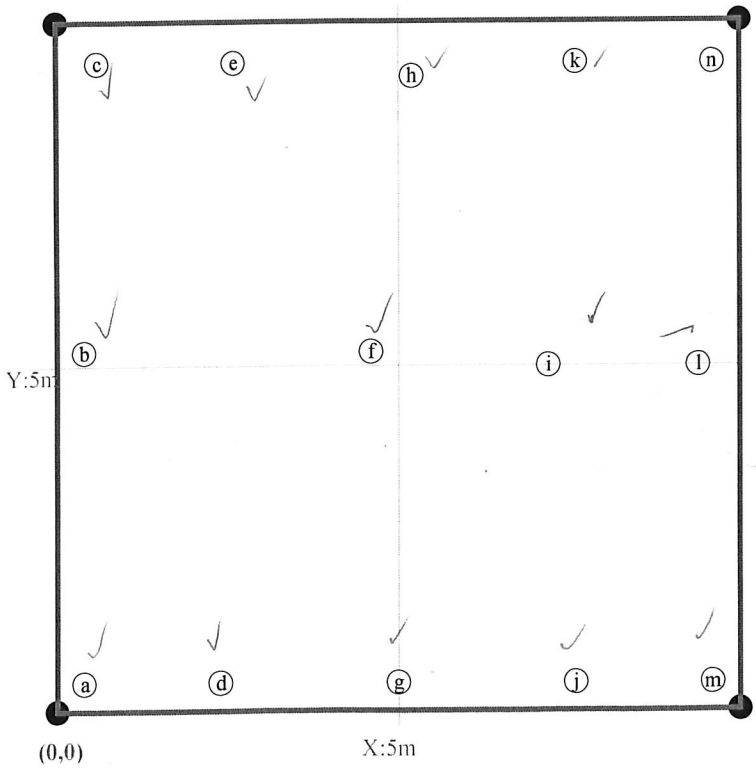
Map of stems on plot 10045-01-VP5

→ **X-axis:** 2.09 °

 # stems: 14

map size:

N *small*



*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Vegetation Monitoring Data (VMD) Datasheet **Please fill in any missing data and correct any errors.**

Plot 10045-01-VP6

VMD Year (1-5): 2 Date: 09/03/20 - / /

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N: (dec.deg. or m) 35.943291 Datum: NAD83/WGS84

Longitude or UTM-E: -79.847478 UTM Zone: 17

Coordinate Accuracy (m): 1 X-Axis bearing (deg): 13.54

Plot Dimensions: X: 10 Y: 10 ☐ Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X

Party: ST / JT Role:

Date last planted:

New planting date m/yy? /

☐ Check box if plot was not sampled, specify reason below

Notes:

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Sep 2019 Data Height 1cm*	Sep 2019 Data DBH 1 cm	Notes*	THIS YEAR'S DATA Height 1cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*	Notes
76	Quercus phellos	ⓐ	R	0.4	0.4	48.0		☑	50		☐	4		
78	Liriodendron tulipifera	ⓕ	R	5.0	0.3	115.0	DBH?	☐	127		☐	3	disease	
79	Platanus occidentalis	ⓗ	R	7.6	0.4	50.0		☐	47		☐	4		
80	Liriodendron tulipifera	ⓚ	R	9.6	0.4	10.0		☐	–		☐	missing		
81	Quercus phellos	ⓑ	R	0.4	4.8	43.0		☑	47		☐	4		
82	Quercus phellos	ⓓ	R	2.2	4.8	28.0		☐	32		☐	3	smothered	
83	Liriodendron tulipifera	ⓖ	R	5.0	4.7	85.0		☐	104		☐	3	disease	
85	Quercus phellos	ⓛ	R	9.7	4.8	15.0		☐	–		☐	Dead		
86	Liriodendron tulipifera	ⓒ	R	0.4	9.5	40.0		☐	54		☐	4		
87	Liriodendron tulipifera	ⓔ	R	2.3	9.5	22.0		☑	–		☐	missing		
89	Platanus occidentalis	ⓘ	R	7.6	9.5	128.0	DBH?	☐	150	0	☐	3		
90	Platanus occidentalis	ⓙ	R	9.4	9.5	100.0		☐	142	0	☐	3		

 # stems: 12

New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes
No VOLS								

***Notes by ID:**
76-Broken stem
81-Broken stem
87-Broken stem

*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSects, GAME, LIVESTock, Other/Unknown ANIMal, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRicane, DISeased, VINE Strangulation, UNKNown, specify other.

*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

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Plot (continued): 10045-01-VP6

ID	Species	map char	source	X (m)	Y (m)	Sep 2019 Data: ddh (mm)	Height (cm)	DBH (cm)	Notes*	THIS YEAR'S DATA: ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes

Natural Woody Stems - tallied by species

Explanation of cut-off & subsampling**:

Height Cut-Off (All stems shorter than this are ignored. If >10cm, explain why to the right.): ☐ 10cm ☐ 50cm ☐ 100cm ☐ 137cm

Species Name	☑ c	SEEDLINGS — HEIGHT CLASSES: Sub-Seed	10 cm-50 cm	50 cm-100 cm	100 cm-137 cm	SAPLINGS — DBH: Sub-Sapl	0-1 cm	1-2.5	TREES — DBH: 2.5-	5-	=10 (write DBH)
		___				___					
		___				___					
		___				___					
		___				___					
		___				___					
		___				___					
		___				___					

**Required if cut-off >10cm or subsample ? 100%.

●1 ●2 ●3 ●●4 ●●5 ●●6 ●●7 ●●8 ●●9 ●●10

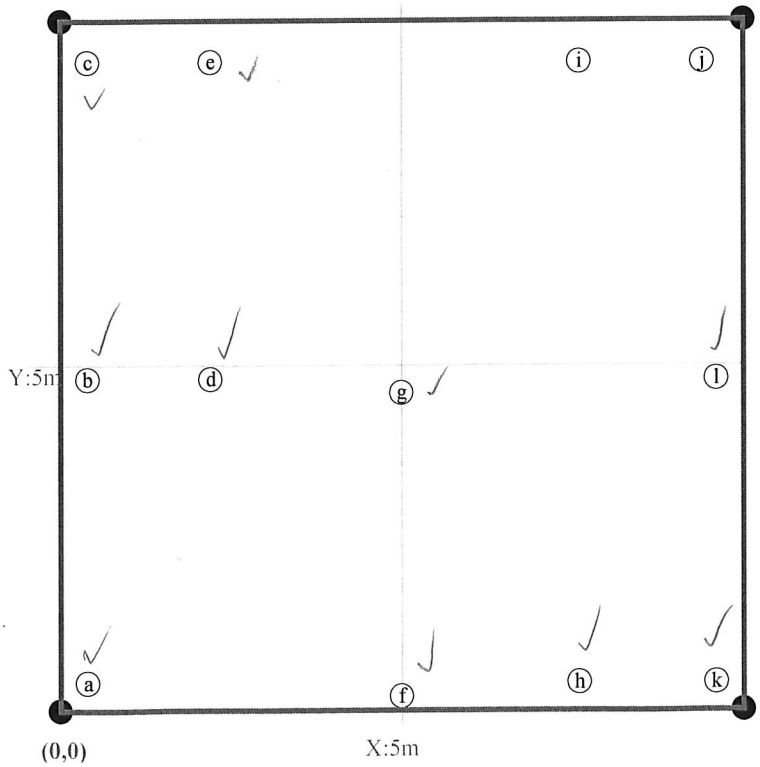
Form WS2, ver 9.1

Map of stems on plot 10045-01-VP6

→ X-axis: 13.5 °

N

 # stems: 12
map size: small



*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

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