



MONITORING YEAR 0 ANNUAL REPORT FINAL

May 2022

OAK HILL DAIRY MITIGATION SITE

Gaston County, NC
Catawba River basin
HUC 03050102

DMS Project No. 100120

DMS Contract No. 7867

DMS RFP No. 16-007704 (Date of Issue: September 6, 2018)

USACE Action ID No. SAW-2019-00833

DWR Project No. 2019-0863

Data Collection Dates: January 2022 – March 2022

PREPARED FOR:



NC Department of Environmental Quality Division of Mitigation Services

1652 Mail Service Center
Raleigh, NC 27699-1652

PREPARED BY:



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NORTH CAROLINA
Environmental Quality

June 9, 2022

Ms. Kristi Suggs
Wildlands Engineering, Inc.
1430 S. Mint St, Suite 104
Charlotte, NC 28203

Subject: Oak Hill Dairy Draft MY0 Report Review
Catawba River Basin – CU# 03050102
Gaston County
DMS Project ID No. 100120
Contract # 7867

Dear Ms. Suggs,

The Division of Mitigation Services (DMS) received the Draft Mitigation Plan for Oak Hill Dairy from Wildlands Engineering, Inc on May 23, 2022. The Project is expected to provide 4,618.933 SMUs and 7.680 WMUs. The following are the DMS review team's comments on the draft report.

- Please add "Date of Issue: September 6, 2018" following RFP number on title page.
- Table of Contents: A set of coordinates is accidentally shown under 1.3 Project Attributes. Please revise for final.
- CCPV: Recommend labeling BMP1 and BMP2.
- Photos of BMP1 and BMP2 show a considerable amount of ponded water. Does WEI expect the BMPs to hold water year-round or dry seasonally?
- 3.2 Vegetation Areas of Concern: WEI has identified and treated several of the most concerning invasive species prior to and during the construction process. Please continue aggressively treating the kudzu, knotweed, bamboo and marsh dewflower as new populations are observed on the site. Also, please note on future CCPV maps the locations of invasives and where treatment occurs.
- Several areas were not planted with bare roots due to depth of standing water. Does WEI intend to plant these areas at a later date?
- Sheet 1.14: Pools on UT2 profile are shown and noted as being filled with sediment. WEI expects the pools to adjust as vegetation becomes established. Please provide an update in MY1 regarding the UT2 stream conditions. Note that UT2 is not a credited reach.

Digital Deliverable Comments

- Draft digital deliverables were reviewed and complete.



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At your earliest convenience, please provide a written response letter addressing the DMS comments provided and one final hard copy of the revised/updated Baseline Monitoring Document and Record Drawings. The comment response letter should be included in the revised report after the report cover page. Please include a full final electronic copy with electronic support files on a CD or USB drive.

Sincerely,

Matthew Reid

Matthew Reid
Western Project Manager
NCDENR – Division of Mitigation Services
5 Ravenscroft Dr., Suite 102
Asheville, NC 28801
828-231-7912



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June 17, 2022

Mr. Matthew Reid
Western Project Manager
NCDEQ – Division of Mitigation Services
5 Ravenscroft Dr., Suite 102
Asheville, NC 28801

RE: Oak Hill Dairy Draft MY0 Report Review
Catawba River Basin – CU# 03050102 – Gaston County
DMS Project ID No. 100120
Contract # 7867

Dear Mr. Reid:

Wildlands Engineering, Inc. (Wildlands) has reviewed Division of Mitigation Services' (DMS) comments from the Draft Monitoring Year 0 (MY0) Report for the Oak Hill Dairy Mitigation Site. The report has been updated to reflect those comments. Wildlands responses to DMS's comments are noted below.

DMS Comments, Matthew Reid:

1. *Please add "Date of Issue: September 6, 2018" following RFP number on title page.*

Wildlands Response: Title page has been updated to include RFP date of issue.

2. *Table of Contents: A set of coordinates is accidentally shown under 1.3 Project Attributes. Please revise for final.*

Wildlands Response: Wildlands has removed the set of coordinates from the table of contents.

3. *CCPV: Recommend labeling BMP1 and BMP2.*

Wildlands Response: BMP labels are now shown on CCPV maps.

4. *Photos of BMP1 and BMP2 show a considerable amount of ponded water. Does WEI expect the BMPs to hold water year-round or dry seasonally?*

Wildlands Response: Wildlands expects water levels for BMP1 to drawn down when vegetation becomes established and dry-out during the drier months from late spring to early fall. BMP2 should also draw down when vegetation becomes established and during drier months; however, it will likely continue to hold a shallow pond of water especially during monitoring years or months experiencing greater than average rainfall.

Wildlands will continue to monitor, and remedial action will be initiated if it is deemed necessary.

5. *3.2 Vegetation Areas of Concern: WEI has identified and treated several of the most concerning invasive species prior to and during the construction process. Please continue aggressively treating the kudzu, knotweed, bamboo and marsh dewflower as new populations are observed on the site. Also, please note on future CCPV maps the locations of invasives and where treatment occurs.*

Wildlands Response: Invasive species presence will continue to be monitored, treated, and documented in future monitoring reports.

6. *Several areas were not planted with bare roots due to depth of standing water. Does WEI intend to plant these areas at a later date?*

Wildlands Response: Wildlands does not anticipate the installation of bare roots in these areas in the future. The areas that were not planted with bare roots due to standing water were planted with live stakes of species tolerant to inundation. Wildlands did not anticipate that these wetland areas would hold water, so these areas were not separated from the remainder of the wetland planting areas during the design phase of the project. However, after construction was complete, it was more evident that these areas may remain inundated or be inundated for long periods of time. Therefore, to increase survival and establishment of woody vegetation in these areas, Wildlands decided to use live stakes rather than bare roots in the inundated areas and based this judgement on past project experience on sites with similar site conditions and professional experience.

7. *Sheet 1.14: Pools on UT2 profile are shown and noted as being filled with sediment. WEI expects the pools to adjust as vegetation becomes established. Please provide an update in MY1 regarding the UT2 stream conditions. Note that UT2 is not a credited reach.*

Wildlands Response: A brief summation of UT2 stream conditions will be included in MY1.

As requested, Wildlands has included one hard copy of the revised/updated Baseline Monitoring Document and Record Drawings and has placed the DMS comment letter and our response letter after the report's cover page. A full final electronic copy of the report and support files are included on a USB drive. Please let me know if you have any questions.

Sincerely,



Kristi Suggs

Senior Environmental Scientist

ksuggs@wildlandseng.com

OAK HILL DAIRY MITIGATION SITE
Monitoring Year 0 Annual Report

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Section 1: PROJECT OVERVIEW

The Oak Hill Dairy Mitigation Site (Site) is in Gaston County, approximately 2 miles northeast of Cherryville and 7 miles southwest of Lincolnton. Watersheds UT1, UT1A, UT1B, and Oak Hill Creek drain into Indian Creek, which drains to the Catawba River. Both Indian Creek and Catawba River are listed as high restoration priorities in the 2013 Catawba River Basin Restoration Priorities (RBRP) and the 2008-2010 Indian Creek and Howards Creek Local Watershed Plan (LWP). Table 3 presents information related to the project attributes.

1.1 Project Quantities and Credits

Mitigation work within the Site included restoration, enhancement I, and enhancement II of perennial and intermittent stream channels, and the creation, re-establishment, and rehabilitation of wetland areas. Table 1 below shows stream credits by reach and the total amount of stream credits expected at closeout.

Table 1: Project Quantities and Credits

PROJECT MITIGATION QUANTITIES							
Project Segment	Mitigation Plan Footage ^{1,2}	As-Built Footage	Mitigation Category	Restoration Level	Mitigation Ratio (X:1)	Credits	Comments
Stream							
Oak Hill Creek R1	488.527	489.000	Warm	EI	1.5	325.685	Restored dimension and profile, created a floodplain bench, planted buffers, treated invasive species, fenced out livestock, and protected with a conservation easement.
Oak Hill Creek R2	470.085	470.000	Warm	R	1.0	470.085	Restored dimension, profile pattern, and floodplain access, planted buffers, treated invasive species, fenced out livestock, and protected with a conservation easement.
Oak Hill Creek R3	877.051	877.000	Warm	R	1.0	877.051	Restored dimension, profile pattern, and floodplain access, planted buffers, treated invasive species, fenced out livestock, provided stormwater treatment, and protected with a conservation easement.



PROJECT MITIGATION QUANTITIES							
Project Segment	Mitigation Plan Footage ^{1,2}	As-Built Footage	Mitigation Category	Restoration Level	Mitigation Ratio (X:1)	Credits	Comments
Oak Hill Creek R4	388.273	388.900	Warm	R	1.0	388.273	Restored dimension, profile pattern, and floodplain access, planted buffers, treated invasive species, fenced out livestock, and protected with a conservation easement.
UT1 R1	217.749	218.000	Warm	R	1.0	217.749	Restored dimension, profile pattern, and floodplain access, planted buffers, fenced out livestock, and protected with a conservation easement.
UT1 R2	1,834.520	1,834.100	Warm	R	1.0	1,834.520	Restored dimension, profile pattern, and floodplain access, planted buffers, fenced out livestock, provided stormwater treatment, and protected with a conservation easement.
UT1A	469.110	469.600	Warm	R	1.0	469.110	Restored dimension, profile, and pattern, planted buffers, fenced out livestock, and protected with a conservation easement.
UT1B	291.680	292.100	Warm	EII	8.0	36.460	Planted buffers, treated invasive species, fenced out livestock, and protected with a conservation easement.
Wetland							
Project Segment	Mitigation Plan Acreage	As-Built Acreage	Mitigation Category	Restoration Level	Mitigation Ratio (X:1)	Credits	Comments
Wetland Re-establishment	4.859	4.863	RR	RE	1.0	4.859	Raised stream bed elevation, plugged/filled drainage features, removed berm material, planted native wetland vegetation community, treated invasive species, fenced out livestock and protected with a conservation easement.



PROJECT MITIGATION QUANTITIES							
Project Segment	Mitigation Plan Footage ^{1,2}	As-Built Footage	Mitigation Category	Restoration Level	Mitigation Ratio (X:1)	Credits	Comments
Wetland Rehabilitation	1.805	1.805	RR	RH	1.0	1.805	Raised stream bed elevation, plugged/filled drainage features, removed cultivation and vegetation management impacts, removed berm material, planted native wetland vegetation community, treated invasive species, fenced out livestock, provided stormwater treatment, and protected with a conservation easement.
Wetland Rehabilitation	0.284	0.284	RR	RH	1.5	0.189	Raised stream bed elevation, plugged/filled drainage features, removed berm material, planted and supplementally planted native wetland vegetation community, treated invasive species, fenced out livestock and protected with a conservation easement.
Wetland Creation	2.481	2.480	RR	C	3.0	0.827	Raised stream bed elevation, plugged/filled drainage features, removed berm material, planted native wetland vegetation community, treated invasive species, fenced out livestock and protected with a conservation easement.
Total Stream Credits:						4,618.933	
Total Wetland Credits:						7.680	

1. Crossing lengths have been removed from restoration footage.
2. No direct credit for BMPs on site.

Restoration Level	Stream			Riparian Wetland		Non-Rip
	Warm	Cool	Cold	Riverine	Non-Riverine	Wetland
Restoration	4,256.788					
Re-establishment				4.859		
Rehabilitation (1:1 & 1.5:1)				1.994		
Enhancement						
Enhancement I	325.685					
Enhancement II	36.460					
Creation				0.827		
Preservation						
Totals	4,618.933			7.680		

1.2 Project Goals and Objectives

The project is intended to provide numerous ecological benefits. Table 2 below describes expected outcomes to water quality and ecological processes and provides project goals and objectives.

Table 2: Goals, Performance Criteria, and Functional Improvements

Goal	Objective/ Treatment	Likely Functional Uplift	Performance Criteria	Measurement	Cumulative Monitoring Results
Treat concentrated agricultural runoff.	Install stormwater BMPs to treat runoff areas of concentrated agricultural runoff before it enters the stream channel.	Reduce agricultural and sediment inputs to the project, which will reduce likelihood of accumulated fines and excessive algal blooms from nutrients.	There is no required performance standard for this metric.	Visually inspect BMPs and document with photos.	N/A
Exclude livestock from stream channels and riparian wetlands.	Install livestock fencing as needed to exclude livestock from stream channels, wetlands, and riparian areas, or remove livestock from adjacent fields.	Reduce agricultural and sediment inputs to the project. Reduce sediment inputs from bank erosion and degradation. Provide riparian and wetland habitat. Support all stream and wetland functions.	Prevent easement encroachments.	Visually inspect the perimeter of the Site to ensure no easement encroachment is occurring.	No easement encroachments.



Goal	Objective/ Treatment	Likely Functional Uplift	Performance Criteria	Measurement	Cumulative Monitoring Results
Improve the stability of stream channels.	Construct stream channels that will maintain stable cross-sections, patterns, and profiles over time. Add bank revetments and instream structures to protect restored/enhanced streams.	Reduce sediment inputs from bank erosion. Reduce shear stress on channel boundary.	$ER \geq 2.2$ and $BHR \leq 1.2$ with visual assessments showing progression towards stability.	14 Cross-section monitoring will be assessed during MY1, MY2, MY3, MY5, and MY7 and visual inspections will be assessed annually.	Cross-sections show streams are stable and functioning as designed. ERs are over 2.2 and BHRs are below 1.2.
Improve instream habitat.	Install habitat features such as constructed steps, cover logs, and brush toes on restored/enhanced streams. Add woody materials to channel beds. Construct pools of varying depth.	Increase and diversify available habitats for macroinvertebrates, fish, and amphibians leading to colonization and increase in biodiversity over time.	There is no required performance standard for this metric.	N/A	N/A
Reconnect channels with floodplains and riparian wetlands.	Reconstruct stream channels with designed bankfull dimensions and depth based on reference reach data.	Reduce shear stress on channel; Hydrate adjacent wetland areas; Filter pollutants out of overbank flows.	Four bankfull events in separate years within the 7-year monitoring period.	Three automated pressure transducers were installed on restoration reaches and will record flow elevations and durations.	Reported in MY1.
Restore wetland hydrology, soils, and plant communities.	Restore and enhance riparian wetlands by raising stream bends, filling existing ditch network, removing berm material over relic hydric soils, and planting native wetland species.	Increase water storage, increase groundwater recharge, water quality treatment through retention, and increase habitat for aquatic and terrestrial species.	Free groundwater within 12 inches of soil surface for a minimum of 12% (28 consecutive days) of the growing season	Eleven (11) groundwater gages were installed in wetland re-establishment, creation, and rehabilitation areas and monitored annually.	Reported in MY1.



Goal	Objective/ Treatment	Likely Functional Uplift	Performance Criteria	Measurement	Cumulative Monitoring Results
Restore and enhance native floodplain and streambank vegetation.	Plant native tree and understory species in riparian zones and plant native shrub and herbaceous species on streambanks.	Reduce sediment inputs from bank erosion and runoff. Increase nutrient cycling and storage in floodplain. Provide riparian habitat. Add a source of LWD and organic material to stream.	Survival rate of 320 stems per acre at MY3, 260 planted stems per acre at MY5 and a height of 8 ft., and 210 stems per acre at MY7 with a height of 10 ft.	Thirteen (13) permanent and 6 mobile one hundred square meter vegetation plots are placed on 2% of the planted area of the Site and monitored during MY1, MY2, MY3, MY5, and MY7.	All 19 vegetation plots have a planted stem density greater than 320 stems per acre.
Permanently protect the project Site from harmful uses.	Establish conservation easements on the Site. Crop field removal and exclusion of livestock.	Protect Site from encroachment on the riparian corridor and direct impact to streams and wetlands.	Prevent easement encroachment.	Visually inspect the perimeter of the Site to ensure no easement encroachment is occurring.	No easement encroachments.

1.3 Project Attributes

The project is bordered by residential properties and an active dairy farm comprised of cattle pastures, an outdoor feeding area, and row crops. Based on historic aerials from 1950 to 2016, the streams existed in their same location for over 60 years. Agricultural use of the land was consistent during this period as well. Several alterations to the Site visible from historical aerial photography were the addition of the large pond in northeast corner of the Site between 1964 and 1973, and the addition of the no-discharge waste lagoon south of the large pond between 2006 and 2009. Additionally, most structures were built between 1964 and 1976 with the two large feed barns being built within the last 15 years. The Site, based on aerial photography, has a history of ditching, field grading, and stream channelization which increased drainage effects and impaired wetland hydrology. Table 3 below and Table 9 in Appendix C present additional information on pre-restoration conditions.

Table 3: Project Attributes

PROJECT INFORMATION			
Project Name	Oak Hill Dairy Mitigation Site	County	Gaston County
Project Area (acres)	20.4	Project Coordinates	35.403339, -81.351724
PROJECT WATERSHED SUMMARY INFORMATION			
Physiographic Province	Piedmont	River Basin	Catawba River
USGS HUC 8-digit	03050102	USGS HUC 14-digit	03050102050010
DWR Sub-basin	03-08-35	Land Use Classification	24% agriculture, 40% forested, 36% developed
Project Drainage Area (acres)	1,070 (Oak Hill Creek)	Percentage of Impervious Area	11.6%



RESTORATION TRIBUTARY SUMMARY INFORMATION				
Parameters	Oak Hill Creek	UT1	UT1A	UT1B
Pre-project length (feet)	2,417	1,958	482	292
Post-project (feet)	2,225	2,052	470	292
Valley confinement (Confined, moderately confined, unconfined)	Moderately Confined to Unconfined	Unconfined	Confined	Moderately Confined
Drainage area (acres)	1070	333	12	4
Perennial, Intermittent, Ephemeral	Perennial			Intermittent/Perennial
DWR Water Quality Classification	C			
Dominant Stream Classification (existing)	B4c/G4c/C4/E5	F4/G4	F6b	Cb
Dominant Stream Classification (proposed)	C4	C4	E4b	Cb
Dominant Evolutionary class (Simon) if applicable	Stage IV/V	Stage IV/V	Stage IV	Stage I
REGULATORY CONSIDERATIONS				
Parameters	Applicable?	Resolved?	Supporting Documentation	
Water of the United States - Section 404	Yes	Yes	SAW-2019-00833	
Water of the United States - Section 401	Yes	Yes	DWR# 2019-0863	
Endangered Species Act	Yes	Yes	Categorical Exclusion in Mitigation Plan (Wildlands, 2021)	
Historic Preservation Act	Yes	Yes		
FEMA Floodplain Compliance	Yes	Yes	Conditional Letter of Map Revision (CLOMR)	
Essential Fisheries Habitat	No	N/A	N/A	
Coastal Zone Management Act	No	N/A	N/A	
Wetland Summary Information				
Parameters	Wetland A	Wetland B	Wetland C	Wetland D
Pre-project area (acres)	2.203	0.138	0.021	0.028
Wetland Type	Bottom Hardwood Forest	Headwater Forest	Headwater Forest	Headwater Forest
Mapped Soil Series	Chewacla loam, Wedowee sandy loam, Worsham loam	Chewacla loam, Pacolet sandy clay loam, Pacolet sandy loam	Chewacla loam, Pacolet sandy loam	Pacolet sandy loam
Drainage Class	Somewhat poorly drained, Well-drained, Poorly drained	Somewhat poorly drained, Well-drained, Well-drained	Somewhat poorly drained, Well-drained	Well drained
Soil Hydric Status	No, No, Yes	No, No, No	No, No	No
Source of Hydrology	Groundwater/Overbank	Groundwater	Groundwater	Groundwater
Restoration or enhancement method	Enhancement	Enhancement	Enhancement	Enhancement



Parameters	Wetland F	Wetland J	Wetland K ¹
Pre-project area (acres)	0.131	0.047	<0.000
Wetland Type (non-riparian, riparian)	Headwater Forest	Headwater Forest	Bottomland Hardwood Forest
Mapped Soil Series	Chewacla loam	Helena sandy loam	Chewacala loam
Drainage Class	Somewhat poorly drained	Moderately well drained	Somewhat poorly drained
Soil Hydric Status	No	No	No
Source of Hydrology	Groundwater	Groundwater/Overbank	Groundwater
Restoration or enhancement method	Enhancement	Enhancement	None

¹No wetland credit is being sought for Wetland K.

Section 2: As-Built Condition (Baseline)

The Site construction was completed on January 21, 2022, and as-built surveys were completed in March 2022. The survey included developing an as-built topographic surface; as well as, surveying the as-built channel centerlines, top of banks, structures, and monitoring components. The Site's construction planting was completed on 02/21/22. Monitoring device installation and vegetative and substrate data collection were completed by 02/21/2022.

2.1 As-Built/Record Drawings

A sealed half-size set of the record drawing and as-built survey are in Appendix E which includes the post-construction survey, alignments, structures, and monitoring features. Field adjustments made during construction that differ from the design plans are shown as red lines on the record drawing. These adjustments were made during construction, where needed, based on field evaluations and are listed below.

2.1.1 Oak Hill Creek Reach 1

- STA: 100+31 – INCREASED BANK GRADING TO STABILIZE BEGINNING OF STREAM ENHANCEMENT
- STA: 102+17 – BANK ROUGH ADDED TO INCREASE FLOODPLAIN ROUGHNESS
- STA: 102+21 – LOG SILL ADDED IN PLACE OF ROCK SILL DUE TO EXCESS LOGS
- STA: 102+98 – LOG SILL ADDED FOR EXTRA GRADE CONTROL
- STA: 104+58 – LOG VANE REPLACED BY LOG J-HOOK FOR ADDITIONAL GRADE CONTROL
- STA: 104+91 – LOG VANE NOT BUILT TO AVOID DISTURBANCE TO STABLE BANK AND TOE
- STA: 105+39 – RIFFLE EXTENDED ACROSS FORD CROSSING FOR ADDITIONAL STABILITY

2.1.2 Oak Hill Creek Reach 2

- STA: 107+30 – LOG SILL NOT BUILT DUE TO SUFFICIENT GRADE CONTROL PROVIDED BY RIFFLE



- STA: 110+23 – BRUSH TOE ADDED TO PROTECT BANK AT CONFLUENCE

2.1.3 Oak Hill Creek Reach 3

- STA: 110+69 – LOG J-HOOK ADDED IN PLACE OF ROCK SILL FOR EXTRA STABILITY
- STA: 112+63 – GEOLIFT NOT BUILT DUE TO SUFFICIENT BANK STABILITY
- STA: 112+66 – GEOLIFT NOT BUILT DUE TO SUFFICIENT BANK STABILITY
- STA: 115+29 – LOG J-HOOK ADDED IN PLACE OF ROCK SILL FOR ADDED POOL STABILITY
- STA: 116+56 – LOG SILL ADDED IN PLACE OF LOG J-HOOK; BEND SUFFICIENTLY PROTECTED BY BRUSH TOE
- STA: 117+84 – LOG J-HOOK ADDED IN PLACE OF LOG SILL FOR ADDED STABILITY
- STA: 118+18 – BANK ROUGHENING EXTENDED TO IMPROVE CONFLUENCE STABILITY

2.1.4 Oak Hill Creek Reach 4

- STA: 120+34 – LOG SILL ADDED IN PLACE OF ROCK SILL DUE TO PREFERENCE FOR USE OF ONSITE MATERIAL
- STA: 120+86 – BANK ROUGHENING ADDED FOR STABILITY
- STA: 122+57 – STABILIZED OUTLET CHANNEL; ADDED FOR ROADSIDE CULVERT
- STA: 122+71 – LOG J-HOOK NOT BUILT DUE TO EXTENSION OF GEOLIFT

2.1.5 UT1 Reach 1

- STA: 200+21 – RIPRAP ADDED TO STABILIZE BANK
- STA: 200+37 – ROCK SILL NOT INSTALLED DUE TO ADEQUATE STABILITY
- STA: 200+88 – LOG SILL NOT BUILT DUE TO TREE SAVES ON RIGHT BANK AND ADEQUATE GRADE CONTROL FROM RIFFLE
- STA: 201+63 – BANK ROUGHENING ADDED TO ROUGHEN FLOODPLAIN

2.1.6 UT1 Reach 2

- STA: 202+26 – LOG J-HOOK BUILT IN PLACE OF ROCK SILL TO INCREASE CONFLUENCE STABILITY
- RIPRAP ADDED TO STABILIZE INLET OF BMP 1
- STA: 205+04 – BANK ROUGHENING INSTALLED FOR ADDITIONAL BANK STABILITY
- STA: 205+93 – BANK ROUGHENING INSTALLED FOR ADDITIONAL BANK STABILITY
- STA: 206+80 – BANK ROUGHENING INSTALLED FOR ADDITIONAL BANK STABILITY
- STA: 207+42 – LOG SILL NOT INSTALLED DUE TO ADEQUATE GRADE CONTROL
- STA: 208+49 – LOG SILL BUILT IN PLACE OF ROCK SILL DUE TO PREFERENCE FOR USE OF ONSITE MATERIAL
- STA: 209+43 – VEGETATED GEOLIFT NOT BUILT DUE TO ADEQUATE BANK STABILITY
- STA: 210+63 – LOG SILL BUILT AT TAIL OF RIFFLE IN LOG STEP RIFFLE SEQUENCE
- STA: 212+51 – ROCK SILL NOT INSTALLED DUE TO ADEQUATE GRADE CONTROL
- STA: 214+38 – ROCK SILL NOT INSTALLED DUE TO ADEQUATE STABILITY
- STA: 217+03 – BRIDGE REPLACED CULVERT CROSSING FOR LANDOWNER ACCESS
- STA: 219+02 – LOG SILL INSTALLED INSTEAD OF ROCK SILL AS CONTINUATION OF LOG DROP RIFFLE
- STA: 219+99 – LOG SILL NOT INSTALLED DUE TO ADEQUATE GRADE CONTROL
- STA: 220+78 – ROCK SILL NOT INSTALLED DUE TO ADEQUATE STABILITY



2.1.7 UT1A

- STA: 300+63 – LOG SILL BUILT IN PLACE OF ROCK SILL FOR DIVERSITY
- STA: 300+96 – LOG SILL INSTALLED INSTEAD OF ROCK SILL FOR DIVERSITY
- STA: 301+00 – 302+20 – PROFILE ADJUSTED TO ACCOMMODATE STRUCTURE DESIGN CHANGES FOR STREAM STABILITY
- STA: 301+06 – RIFFLE AND ROCK SILL NOT BUILT FOR POOL EXPANSION
- STA: 301+32 – RIFFLE AND ROCK SILL NOT BUILT FOR POOL EXPANSION
- STA: 301+45 – LOG SILL INSTALLED INSTEAD OF ROCK SILL FOR DIVERSITY
- STA: 301+52 – RIPRAP ADDED TO STABILIZE BANK
- STA: 302+05 – INSTALLED (1) LONG RIFFLE WITH (1) LOG SILL INSTEAD OF (2) RIFFLES WITH (1) LOG SILL AND (1) ROCK SILL FOR ADDED STREAM STABILITY
- STA: 302+60 – 304+90 – PROFILE ADJUSTED TO ACCOMMODATE STRUCTURE DESIGN CHANGES FOR STREAM STABILITY
- STA: 302+79 – INSTALLED (1) LONG RIFFLE AND (1) LOG SILL INSTEAD OF (2) RIFFLES AND (2) LOG SILLS FOR STREAM STABILITY
- STA: 303+16 – INSTALLED (1) LONG RIFFLE AND (1) LOG SILL INSTEAD OF (2) RIFFLES AND (2) ROCK SILLS FOR ADDED STREAM STABILITY
- STA: 303+54 – INSTALLED (1) LONG RIFFLE AND (1) LOG SILL INSTEAD OF (2) RIFFLES, (1) LOG SILL, AND (1) ROCK SILL FOR STREAM STABILITY
- STA: 303+83 – INSTALLED (1) LONG RIFFLE AND (1) ROCK SILL INSTEAD OF (2) RIFFLES, (1) ROCK SILL, AND (1) LOG SILL FOR STREAM STABILITY
- STA: 304+19 – RIFFLE AND ROCK SILL NOT BUILT FOR POOL EXPANSION
- STA: 304+59 – LOG SILL BUILT IN PLACE OF ROCK SILL FOR ADDED DIVERSITY

2.1.8 UT1B

- NO CHANGES

2.1.9 UT2

- STA: 2+33 – RIPRAP ADDED TO STABILIZE DRAINAGE PIPE
- STA: 2+79 – BOULDER TOE INSTALLED INSTEAD OF BRUSH TOE FOR ADDITIONAL BANK STABILITY
- STA: 3+25 – BRUSH TOE NOT INSTALLED DUE TO ADEQUATE BANK STABILITY

2.1.10 UT3

- STA: 300+50 – RIPRAP ADDED TO STABILIZE CULVERT INLET
- STA: 300+83 – RIPRAP ADDED TO STABILIZE CULVERT OUTLET
- STA: 302+18 – BRUSH TOE NOT INSTALLED DUE TO ADEQUATE BANK STABILITY

2.1.11 Wetland Grading #4, Cross-section #6

- STA: 0+19 – 0+64 – WETLAND GRADING ADJUSTED TO REDUCE FLOODPLAIN SLOPE

2.1.12 Wetland Grading #3, Cross-section #7

- STA: 1+23 – 1+57 – WETLAND GRADING EXTENDED TO TIE SLOPE INTO EXISTING GROUND
- STA: 2+58 – 2+70 – FLOODPLAIN GRADING ADJUSTED TO SOFTEN SLOPE GRADE AT FLOODPLAIN TIE-IN



2.1.13 Vegetation Planting List & Plan

As-built changes in species planted and densities were minimal when compared to design. Species replacements and planting density adjustments were made due to availability of the species at the time of planting. All species replacements were approved species or alternate species within the Final Mitigation Plan's planting list (Wildlands, 2021), so no approval for the inclusion of the species is needed.

Open Buffer Planting Zone

- Tag alder (*Alnus serrulata*) was replaced by elderberry (*Sambucus canadensis*).
- Northern red oak (*Quercus rubra*), slippery elm (*Ulmus rubra*), and sweetshrub (*Calycanthus floridus*) were added at densities of 5%, 1% and 1%, respectively.
- The stem density of persimmon (*Diospyros virginiana*) bare roots was increased from 5% to 6%.

Wetland Planting Zone

- Tag alder was reduced from 5% to 1%.
- Silky dogwood (*Cornus amomum*) was added at a density of 1%.
- Silky willow (*Salix sericea*) was added at a density of 2%.
- Live stakes of black willow (*Salix nigra*) were added at a density of 1%.

Partially Vegetated Buffer Zone

- Stem densities for American hornbeam (*Carpinus caroliniana*), strawberry bush (*Euonymus americana*), pawpaw (*Asima triloba*), and American beech (*Fagus grandifolia*) were increased from 10% to 14%.
- Densities for slippery elm, witch hazel (*Hamamelis virginiana*), , sweetshrub, and flowering dogwood (*Cornus florida*) were decreased from 10% to 7%.
- Densities for spicebush (*Lindera benzoin*) and northern red oak were reduced from 10% to 8%.

Planting Plan

- Sheets 3.3– 3.5 – No bare roots were planted due to the depth of standing water.

2.1.14 Fencing Plan

- UT1 REACH 2 – FENCE LINE ADJUSTED TO RUN CLOSER TO TOE OF SLOPE
- OAK HILL CREEK REACH 1 & 2 – FENCE LINE MOVED TO TOP OF SLOPE

2.1.15 Monitoring Components

Installed monitoring devices and plot locations closely mimic the locations of those proposed in the Site's Mitigation Plan. Minor deviations from these locations were made when professional judgement deemed them necessary to better represent as-built field conditions or when installation of the device in the proposed location was not physically feasible.

Vegetation Monitoring Plots

- Permanent Vegetation Plot (VP1) was moved from the right side of UT1A to the left side of UT1A.
- VP2 was moved the left side on UT1 Reach 1 to the right side of UT1 Reach 1.
- Mobile Vegetation Plot 5 (MVP5) was moved from the left side of Oak Hill Creek Reach 3 to the left floodplain of UT1 Reach 2 near the confluence of Oak Hill Creek Reach 3. The previous location for this mobile vegetation plot was inadvertently located within the extents of BMP2.



Cross-sections

- Cross-section 3 (XS3) was moved upstream on UT1 Reach 1 due to a large diameter tree within the floodplain.

Section 3: Monitoring Year 0 Data Assessment

Annual monitoring and site visits were conducted during MY0 to assess the condition of the project. The vegetation and stream success criteria for the Site follow the approved success criteria presented in the Mitigation Plan (Wildlands, 2021). Performance criteria for vegetation, stream, and hydrologic assessment are located in Section 1.2 Table 3: Goals, Performance Criteria, and Functional Improvements. The first annual monitoring assessment (MY1) will be completed in the fall of 2022, at least 6 months after the MY0 assessment. The Site will be monitored for a total of seven years, with the final monitoring activities scheduled for 2028.

3.1 Vegetative Assessment

The MY0 vegetative survey was completed in February 2022. Vegetation monitoring resulted in a stem density range of 445 to 688 planted stems per acre which is well above the interim requirement of 320 stems per acre required at MY3. Average stem density was 603 planted stems per acre. All 13 permanent and 6 mobile vegetation plots met the interim success criteria and are on track to meet the final success criteria required for MY7. Herbaceous vegetation is establishing itself across the site. Refer to Appendix A for Vegetation Plot Photographs and the Vegetation Condition Assessment Table and Appendix B for Vegetation Plot Data.

3.2 Vegetation Areas of Concern

Vegetation management and herbicide applications were implemented prior and during construction to prevent the spread of invasive species that could compete with planted native species. A dense stand of bamboo (*Phyllostachys aurea*) was mechanically removed along UT1A during construction. Kudzu (*Pueraria montana*) was removed along UT1B. Other areas of Chinese privet (*Ligustrum sinense*), Japanese privet (*Lonicera japonica*), Japanese knotweed (*Polygonum cuspidatum*), English Ivy (*Hedera helix*), marsh dewflower (*Murdannia keisack*), and multiflora rose (*Rosa multiflora*), were treated on the Site during construction. Invasive species will continue to be monitored, mapped, and controlled as necessary throughout the monitoring period.

3.3 Stream Assessment

Morphological surveys for MY0 were conducted from February 2022 to March 2022. All streams within the Site are stable and functioning as designed. All 14 cross sections at the Site show little to no change from design in the bankfull area and width-to-depth ratio, and bank height ratios are less than 1.2. Reachwide and riffle 100-count substrate sampling were conducted during baseline condition assessment to classify the reach and characterize the riffle pavement. Riffles along most reaches have a median particle size classification of medium gravel to small cobble. Based on a DMS Technical Workgroup memo from 10/19/21 and concurrence received on 10/27/2021 from the DMS project manager for the Site, pebble counts will not be conducted during the remaining monitoring years unless requested by the IRT or deemed necessary by best professional judgement. Refer to Appendix A for the Visual Stream Morphology Stability Assessment Table and Stream Photographs. Refer to Appendix C for Stream Geomorphology Data.



3.4 Stream Areas of Concern

Inspection of stream structures and banks did not identify any stream areas of concern, indicating that the stream is performing as designed. The Site will continue to be monitored and any issues will be mapped and reported throughout the monitoring period.

3.5 Hydrology Assessment

Crest Gages (CG) were installed on Oak Hill Creek, UT1, and UT1A to monitor bankfull events. Hydrologic data will be collected and reported during MY1.

3.6 Wetland Assessment

Eleven groundwater gages were installed before the start of the growing season in wetland creation, rehabilitation, and re-establishment areas to determine wetland hydrology success across different restoration levels. Soil profile descriptions and groundwater gage photographs were taken during installation and are located in Appendix A. Groundwater gage data will be collected and reported during MY1.

3.7 Adaptive Management Plan

Site maintenance and adaptive measurement implementation will follow those outlined in the project's Final Mitigation Plan (Wildlands, 2021). No adaptive management plans are needed at this time.

3.8 Monitoring Year 0 Summary

Overall, the Site looks good, is performing as intended, and is on track to meet success criteria. All vegetation plots are exceeding the MY3 interim requirement of 320 planted stems per acre, and all streams within the Site are stable and meeting project goals. Herbaceous vegetation is establishing itself across the site. Invasive species were treated and/or physically removed across the Site prior to and during construction and will continued to be assessed throughout the monitoring years.

Summary information and data related to the performance of various project and monitoring elements can be found in the tables and figures in the report appendices. All raw data supporting the tables and figures in the appendices are available from DMS upon request.



Section 4: METHODOLOGY

Annual monitoring will consist of collecting morphologic, vegetative, and hydrologic data to assess project success based on the goals outlined in the Site's Mitigation Plan (Wildlands, 2021). Monitoring requirements will follow guidelines outlined in the NC IRT Stream and Wetland Mitigation Guidance Update (2016). Installed monitoring devices and plot locations closely mimic the locations of those proposed in the Site's Mitigation Plan. Deviations from these locations were made when professional judgement deemed them necessary to better represent as-built field conditions or when installation of the device in the proposed location was not physically feasible.

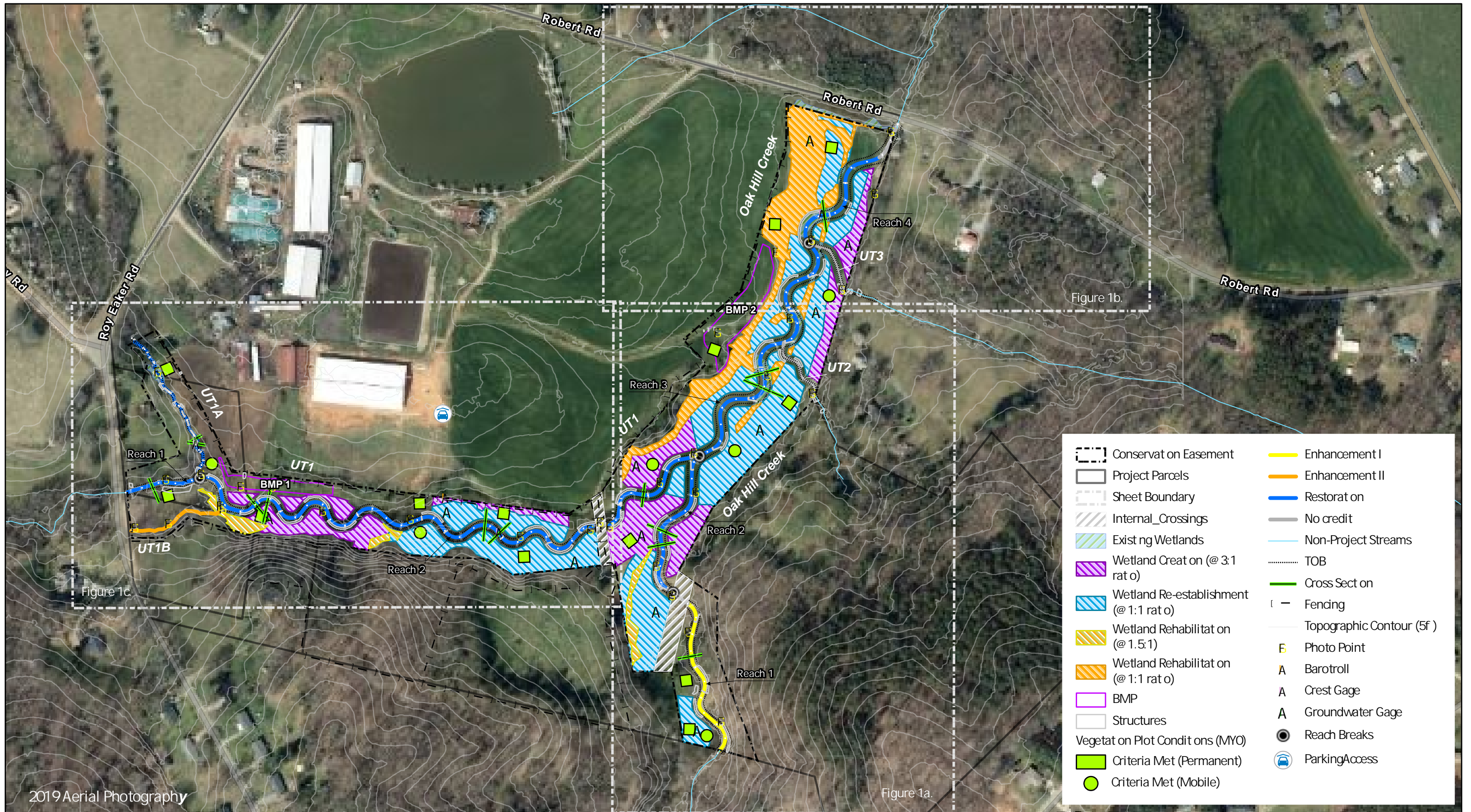
Geomorphic data was collected following the standards outlined in The Stream Channel Reference Site: An Illustrated Guide to Field Techniques (Harrelson et al., 1994) and in Stream Restoration: A Natural Channel Design Handbook (Doll et al., 2003). All Integrated Current Condition Mapping was collected by either a professional licensed surveyor or an Arrow 100® Submeter GNSS Receiver and processed using ArcPro. Crest gages, using automated pressure transducers, were installed in riffle cross-sections to monitor stream hydrology throughout the year. Groundwater gages were installed using guidance from the USACE's *Technical Standard for Water-Table Monitoring of Potential Wetland Sites* (2005). Stream hydrology and vegetation monitoring protocols followed the Wilmington District Stream and Wetland Compensatory Mitigation Update (NCIRT, 2016). Vegetation installation data collection follow the Carolina Vegetation Survey-EEP Level 2 Protocol (Lee et al., 2008); however, vegetation data processing follows the NC DMS Vegetation Data Entry Tool and Vegetation Plot Data Table (NCDMS, 2020).

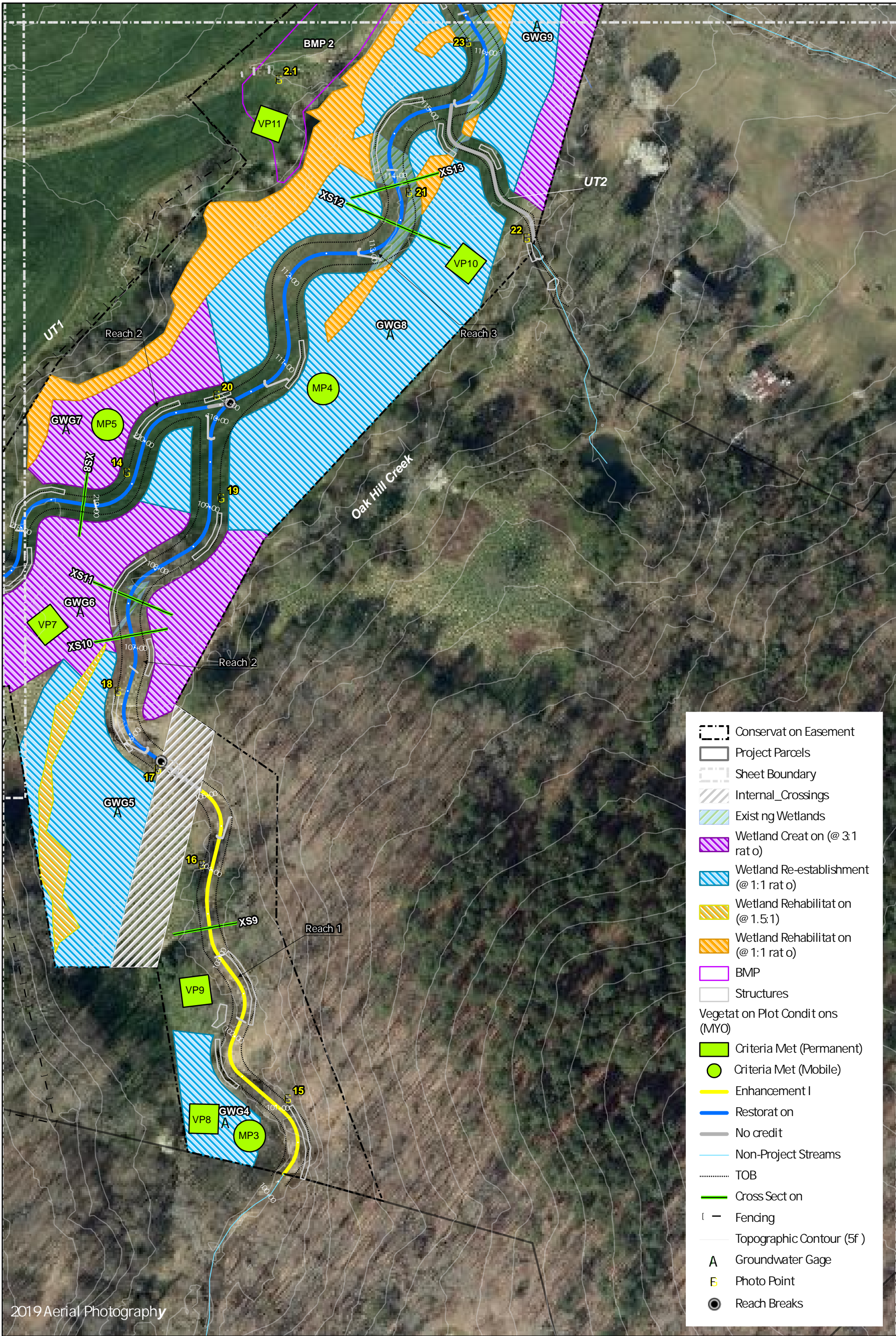


Section 5: REFERENCES

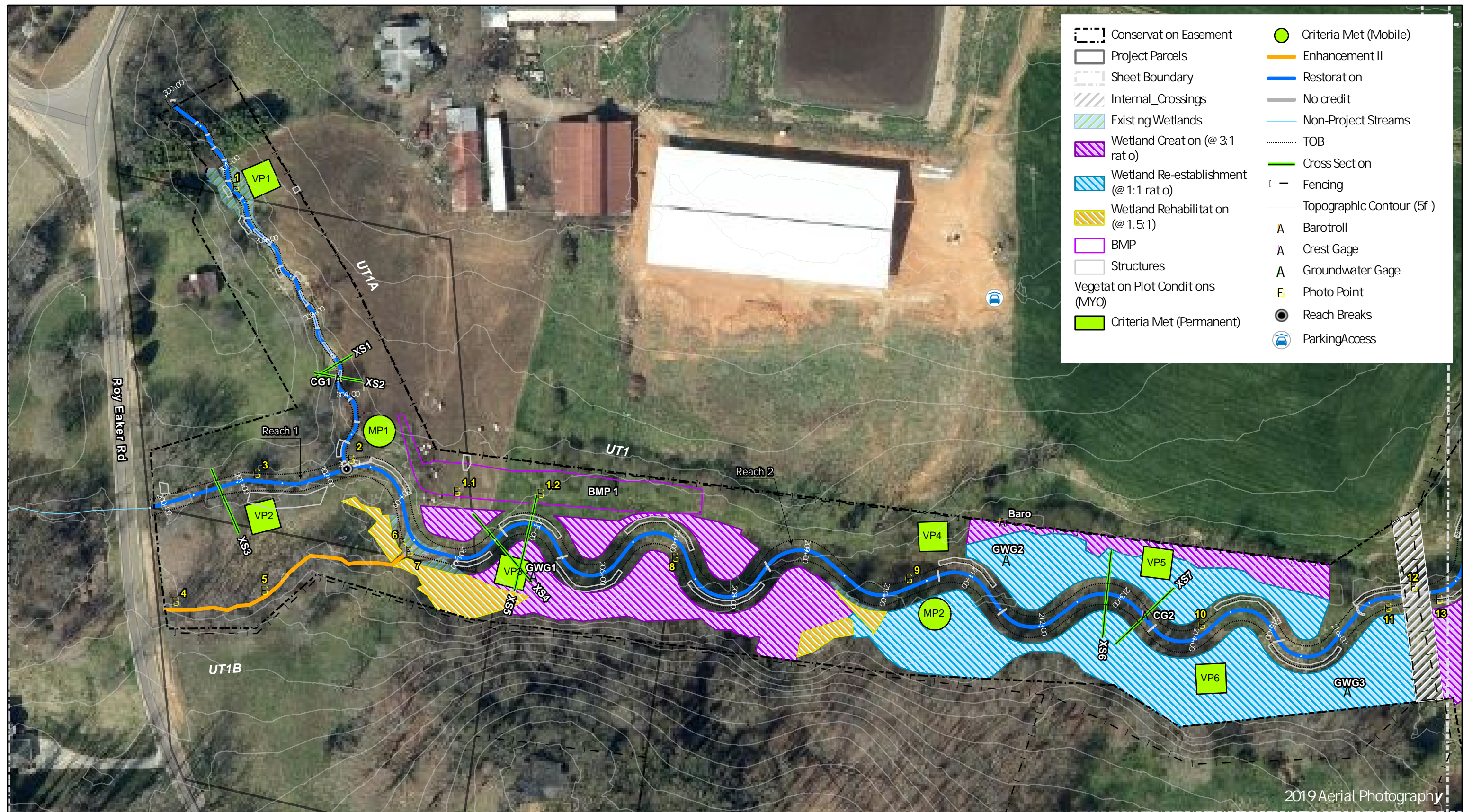
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1
Figure 1a. Current Condition Plan View
Oak Hill Dairy Mitigation Site
DMS Project No. 100120
Monitoring Year 0 - 2022
Gaston County, NC



Appendix A
Visual Assessment Data

Table 4. Visual Stream Morphology Stability Assessment Table

Oak Hill Dairy Mitigation Site

DMS Project No. 100120

Monitoring Year 0 - 2022

Assessment Date: 4/18/2022

UT1A

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-Built	Amount of Unstable Footage	% Stable, Performing as Intended
Assessed Stream Length						470
Assessed Bank Length						940
Bank	Surface Scour/ Bare Bank	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour.			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse.			0	100%
Totals:					0	100%
Structure	Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	17	17		100%
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%.	5	5		100%

UT1B

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-Built	Amount of Unstable Footage	% Stable, Performing as Intended
Assessed Stream Length						292
Assessed Bank Length						584
Bank	Surface Scour/ Bare Bank	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour.			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse.			0	100%
Totals:					0	100%
Structure	Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	0	0		N/A
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%.	0	0		N/A

Table 4. Visual Stream Morphology Stability Assessment Table

Oak Hill Dairy Mitigation Site
DMS Project No. 100120
Monitoring Year 0 - 2022
Assessment Date: 4/18/2022

UT1 Reach 1

Major Channel Category			Metric	Number Stable, Performing as Intended	Total Number in As-Built	Amount of Unstable Footage	% Stable, Performing as Intended
Assessed Stream Length							218
Assessed Bank Length							436
Bank	Surface Scour/ Bare Bank	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour.				0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.				0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse.				0	100%
Totals:						0	100%
Structure	Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	0	0			
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%.	1	1			

UT1 Reach 2

Major Channel Category			Metric	Number Stable, Performing as Intended	Total Number in As-Built	Amount of Unstable Footage	% Stable, Performing as Intended
Assessed Stream Length							1,834
Assessed Bank Length							3,668
Bank	Surface Scour/ Bare Bank	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour.				0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.				0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse.				0	100%
Totals:						0	100%
Structure	Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	11	11		100%	
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%.	13	13		100%	

Table 4. Visual Stream Morphology Stability Assessment Table

Oak Hill Dairy Mitigation Site
DMS Project No. 100120
Monitoring Year 0 - 2022
Assessment Date: 4/18/2022

Oak Hill Creek Reach 1

Major Channel Category			Metric	Number Stable, Performing as Intended	Total Number in As-Built	Amount of Unstable Footage	% Stable, Performing as Intended
Assessed Stream Length							489
Assessed Bank Length							978
Bank	Surface Scour/ Bare Bank	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour.				0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.				0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse.				0	100%
Totals:						0	100%
Structure	Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	3	3			
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%.	4	4			

Oak Hill Creek Reach 2

Major Channel Category			Metric	Number Stable, Performing as Intended	Total Number in As-Built	Amount of Unstable Footage	% Stable, Performing as Intended
Assessed Stream Length							470
Assessed Bank Length							940
Bank	Surface Scour/ Bare Bank	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour.				0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.				0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse.				0	100%
Totals:						0	100%
Structure	Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	3	3			
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%.	4	4			

Table 4. Visual Stream Morphology Stability Assessment Table

Oak Hill Dairy Mitigation Site
DMS Project No. 100120
Monitoring Year 0 - 2022
Assessment Date: 4/18/2022

Oak Hill Creek Reach 3

Major Channel Category			Metric	Number Stable, Performing as Intended	Total Number in As-Built	Amount of Unstable Footage	% Stable, Performing as Intended
Assessed Stream Length							877
Assessed Bank Length							1,754
Bank	Surface Scour/ Bare Bank	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour.				0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.				0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse.				0	100%
Totals:						0	100%
Structure	Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	6	6			
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%.	7	7			

Oak Hill Creek Reach 4

Major Channel Category			Metric	Number Stable, Performing as Intended	Total Number in As-Built	Amount of Unstable Footage	% Stable, Performing as Intended
Assessed Stream Length							389
Assessed Bank Length							778
Bank	Surface Scour/ Bare Bank	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour.				0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.				0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse.				0	100%
Totals:						0	100%
Structure	Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	3	3			
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%.	4	4			

Table 5. Vegetation Condition Assessment Table

Oak Hill Dairy Mitigation Site

DMS Project No. 100120

Monitoring Year 0 - 2022

Assessment Date: 2/21/22

Planted Acreage 19.1

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%

Easement Acreage 19.9

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 ac	

Stream Photographs



PP1 – UT1A looking upstream (02/24/2022)



PP1 – UT1A looking downstream (02/24/2022)



PP2 – UT1A looking upstream (02/24/2022)



PP2 – UT1 R1 looking upstream (02/24/2022)



PP2 – UT1 R2 looking downstream (02/24/2022)



PP3 – UT1 R1 looking upstream (02/24/2022)



PP3 – UT1 R1 looking downstream (02/24/2022)



PP4 – UT1B looking upstream (02/24/2022)



PP4 – UT1B looking downstream (02/24/2022)



PP5 – UT1B looking upstream (02/24/2022)



PP5 – UT1B looking downstream (02/24/2022)



PP6 – UT1 R2 looking upstream (02/24/2022)



PP6 – UT1 R2 looking downstream (02/24/2022)



PP7 – UT1B looking upstream (02/24/2022)



PP7 – UT1B – UT1 R2 Confluence (02/24/2022)



PP8 – UT1 R2 looking upstream (02/24/2022)



PP8 – UT1 R2 looking downstream (02/24/2022)



PP9 – UT1 R2 looking upstream (02/24/2022)



PP9 – UT1 R2 looking downstream (02/24/2022)



PP10 – UT1 R2 looking upstream (02/24/2022)



PP10 – UT1 R2 looking downstream (02/24/2022)



PP11 –UT1 R2 looking upstream (02/24/2022)



PP11 – UT1 R2 looking downstream (02/24/2022)



PP12 – UT1 R2 looking upstream (02/24/2022)



PP12 – UT1 R2 looking downstream (02/24/2022)



PP13 – UT1 R2 looking upstream (02/24/2022)



PP13 – UT1 R2 looking downstream (02/24/2022)



PP14 – UT1 R2 looking upstream (02/24/2022)



PP14 – UT1 R2 looking downstream (02/24/2022)



PP15 – Oak Hill R1 looking upstream (02/24/2022)



PP15 – Oak Hill R1 looking downstream (02/24/2022)



PP16 – Oak Hill R1 looking upstream (02/24/2022)



PP16 – Oak Hill R1 looking downstream (02/24/2022)



PP17 – Oak Hill R2 looking upstream (02/24/2022)



PP17 – Oak Hill R2 looking downstream (02/24/2022)



PP18 – Oak Hill R2 looking upstream (02/24/2022)



PP18 – Oak Hill R2 looking downstream (02/24/2022)



PP19 – Oak Hill R2 looking upstream (02/24/2022)



PP19 – Oak Hill R2 looking downstream (02/24/2022)



PP20 – UT1 R2 looking upstream (02/24/2022)



PP20 – Oak Hill R2 looking downstream (02/24/2022)



PP20 –Oak Hill R2 upstream (02/24/2022)



PP21 – Oak Hill R3 looking upstream (02/24/2022)



PP21 – Oak Hill R3 looking downstream (02/24/2022)



PP22 – UT2 looking upstream (02/24/2022)



PP22 – UT2 looking downstream (02/24/2022)



PP23 – Oak Hill R3 looking upstream (02/24/2022)



PP23 – Oak Hill R3 looking downstream (02/24/2022)



PP24 – UT3 looking upstream (02/24/2022)



PP24 – UT3 looking downstream (02/24/2022)



PP25 – Oak Hill R4 looking upstream (02/24/2022)



PP25 – Oak Hill R4 looking downstream (02/24/2022)



PP25 – UT3 looking upstream (02/24/2022)



PP26 – Right floodplain ditch looking upstream (02/24/2022)



PP26 – Right floodplain ditch looking downstream (02/24/2022)



PP27 – Oak Hill R4 upstream (02/24/2022)



PP27 – Oak Hill R4 downstream (02/24/2022)



PP27 – Left floodplain ditch looking upstream (02/24/2022)



PP1.1 – BMP 1 looking north (02/24/2022)



PP1.1 – BMP 1 looking northwest (02/24/2022)



PP1.2 – BMP 1 looking west (02/24/2022)



PP2.1 – BMP 2 looking northwest (02/24/2022)



PP2.1 – BMP 2 looking northeast (02/24/2022)



PP2.2 – BMP 2 looking northwest (02/24/2022)



PP2.2 – BMP 2 looking west (02/24/2022)

Vegetation Plot Photographs



PERMANENT VEGETATION PLOT 1 (02/21/2022)



PERMANENT VEGETATION PLOT 2 (02/21/2022)



PERMANENT VEGETATION PLOT 3 (02/21/2022)



PERMANENT VEGETATION PLOT 4 (02/21/2022)



PERMANENT VEGETATION PLOT 5 (02/21/2022)



PERMANENT VEGETATION PLOT 6 (02/21/2022)



PERMANENT VEGETATION PLOT 7 (02/21/2022)



PERMANENT VEGETATION PLOT 8 (02/21/2022)



PERMANENT VEGETATION PLOT 9 (02/21/2022)



PERMANENT VEGETATION PLOT 10 (02/21/2022)



PERMANENT VEGETATION PLOT 11 (02/21/2022)



PERMANENT VEGETATION PLOT 12 (02/21/2022)



PERMANENT VEGETATION PLOT 13 (02/21/2022)



MOBILE VEGETATION PLOT 1 (02/21/2022)



MOBILE VEGETATION PLOT 2 (02/21/2022)



MOBILE VEGETATION PLOT 3 (02/21/2022)



MOBILE VEGETATION PLOT 4 (02/21/2022)



MOBILE VEGETATION PLOT 5 (02/21/2022)



MOBILE VEGETATION PLOT 6 (02/21/2022)

Groundwater Gage Photographs



Groundwater Gage 1 - (01/28/2022)



Groundwater Gage 2 - (01/28/2022)



Groundwater Gage 3 - (01/28/2022)



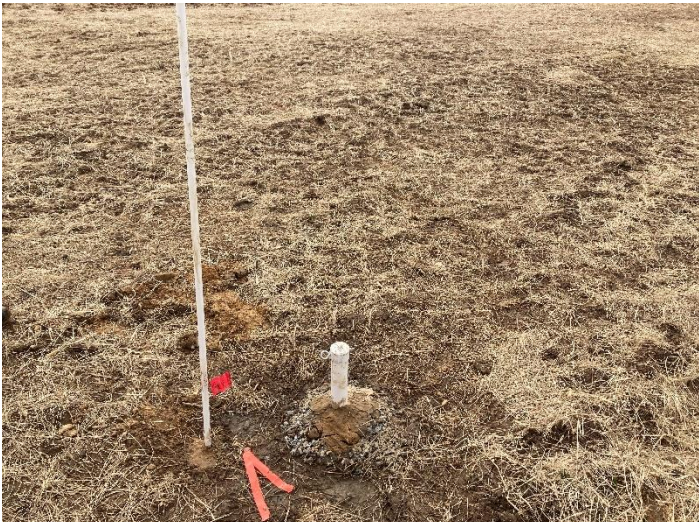
Groundwater Gage 4 - (01/28/2022)



Groundwater Gage 5 - (01/28/2022)



Groundwater Gage 6 - (01/28/2022)



Groundwater Gage 7 - (01/28/2022)



Groundwater Gage 8 - (01/28/2022)



Groundwater Gage 9 - (01/28/2022)



Groundwater Gage 10 - (01/28/2022)



Groundwater Gage 11 - (01/28/2022)

MONITORING GAUGE INSTALLATION DATA SHEET

Project Name: OHG
 Project Location:
 Purpose of Gauge: Water Table Monitoring

Gauge Description:

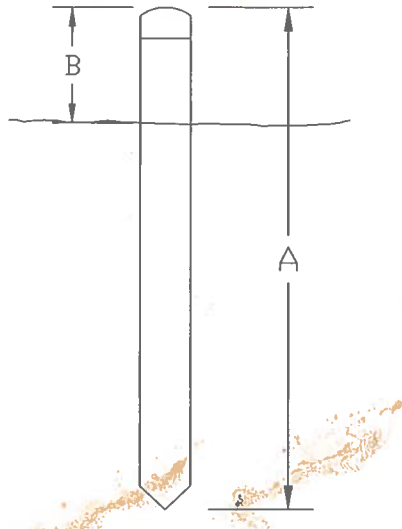
Gauge ID: GWG1
 Serial Number:
 Total Well Casing Length (A):
 Well Casing Height Above Ground (B):
 Distance From Eye Bolt To Probe Sensor:
 Material: 2" PVC Well Screen
 Type of Measurement: Pressure, Temperature, & Depth
 Type of Logger: In-Situ Level Troll 100
 Gauge Location:

Notes:

hit rock layer at 4 ft (soil is super sandy)

Soil Profile Description at Location of Well:

Depth Range (in.)	Color	Redox	Texture	Notes
0 - .4	7.5YR 6/1	5YR 4/6	Sandy silt	Redox 20%
.4 - .7	5YR 5/4	—	Silty sand	—
.7 - 1.7	10YR 5/3	10YR 5/6	Silty fine sand	Redox 10%
1.7 - 2.7	10YR 4/1	5YR 3/4	Silty sand	Redox 5%
2.7 - 4.1	10YR 5/4	—	Coarse sand w gravel	—
4.1 - 4.3	5Y 8/1	7.5YR 5/6	11 11 11	Redox 5%
4.3 - 5.2	7.5YR 4/4	—	Coarse sand	—



revisit w/
Rock bar

2 concentrations
 5YR 3/4 (5%)
 7.5YR 5/6 (20%)

Bolt to Probe is 6.51
 Standing water: 0.2
 Bolt to ground: 1.39

MONITORING GAUGE INSTALLATION DATA SHEET

Project Name:
Project Location:
Purpose of Gauge:

OPD
Water Table Monitoring

Gauge Description:

Gauge ID:
Serial Number:
Total Well Casing Length (A):
Well Casing Height Above Ground (B):
Distance From Eye Bolt To Probe Sensor
Material:
Type of Measurement:
Type of Logger:
Gauge Location:

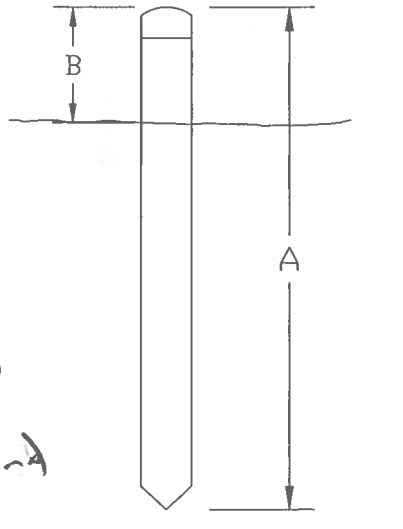
GW72
2" PVC Well Screen
Pressure, Temperature, & Depth
In-Situ Level Troll 100

Notes:

Water level 1.4 ft down from surface

Soil Profile Description at Location of Well:

Depth Range (ft)	Color	Redox	Texture	Notes
0 - .7	10YR 4/2	7.5YR 5/4	sandy silt	Redox 10%
.7 - 1.1	7.5YR 4/6		silty sand	
1.1 - 1.6	7.5YR 5/3	7.5YR 5/6	fine sand	Redox 5%
1.6 - 2.0	7.5YR 5/3	7.5YR 4/6	silty sand	Redox 75%
2.0 - 2.3	2.5Y 6/3	5YR 7/6	silt/loam	Redox 35%
2.3 - 3.4	2.5Y 4/2	7.5YR 4/6	clay loam	Redox 30%
3.4 - 4.9	7.5YR 5/2		silty sand	
4.9 - 5.2	10YR 3/1		medium sand	organic debris + spherulite



- Bolt to probe
- 6.43
- Bolt to ground
- 1.30

MONITORING GAUGE INSTALLATION DATA SHEET

Project Name:
Project Location:
Purpose of Gauge:

04D
Water Table Monitoring

Gauge Description:

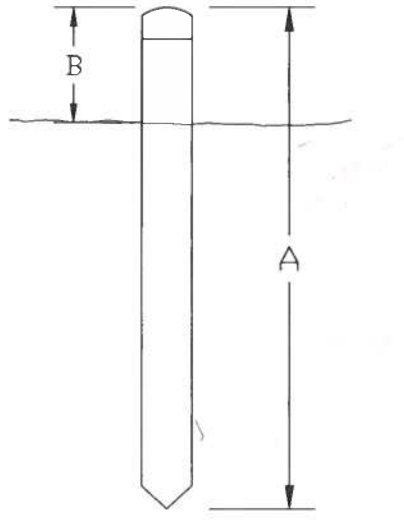
Gauge ID:
Serial Number:
Total Well Casing Length (A):
Well Casing Height Above Ground (B):
Distance From Eye Bolt To Probe Sensor
Material:
Type of Measurement:
Type of Logger:
Gauge Location:

GW53
700011
2" PVC Well Screen
Pressure, Temperature, & Depth
In-Situ Level Troll 100

Notes:

Soil Profile Description at Location of Well:

Depth Range (ft.)	Color	Redox	Texture	Notes
0 - 0.4	7.5YR 4/4	2.5YR 3/6	Silt loam	Redox 59%
0.4 - 1.5	5YR 5/8	10YR 5/4	Silt loam	Depletions 10%
1.5 - 3.0	2.5Y 6/2	2.5YR 4/6	Sandy loam	Redox 30%
3.0 - 3.9	10YR 5/2	7.5YR 4/6	Silty sandy	Redox 10%
3.9 - 5.2	2.5Y 4/1	—	Sandy silt	Super saturated, uncohesive



Bolt to Probe: 6.37

standing water: 1.6

Bolt to ground: 1.14

MONITORING GAUGE INSTALLATION DATA SHEET

Project Name: OFD
 Project Location:
 Purpose of Gauge: Water Table Monitoring

Gauge Description:

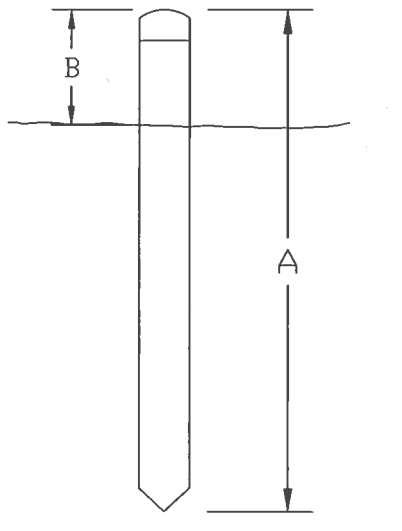
Gauge ID: SW54
 Serial Number: 700456
 Total Well Casing Length (A):
 Well Casing Height Above Ground (B): 1.32
 Distance From Eye Bolt To Probe Sensor: 6.36
 Material: 2" PVC Well Screen
 Type of Measurement: Pressure, Temperature, & Depth
 Type of Logger: In-Situ Level Troll 100
 Gauge Location:

Notes:

Free water @ 4.8'

Soil Profile Description at Location of Well:

Depth Range (ft.)	Color	Redox	Texture	Notes
0 - 0.3	7.5YR 4/2	—	Clayey silt	
0.3 - 0.7	10YR 5/4	5YR 4/6	Silty sand	15% Redox
0.7 - 1.8	10YR 5/3	7.5YR 4/6	Silt. sand	10% Redox
1.8 - 2.2	10YR 5/8	10YR 6/1	sandy loam	15% Depletions
2.2 - 2.9	10YR 6/1	10YR 5/8	clay loam	30% Redox
2.9 - 4.1	10YR 6/1	10YR 6/4	silty sand	5% Redox
4.1 - 5.2	7.5YR 4/1	—	loamy sand	20% gravel



MONITORING GAUGE INSTALLATION DATA SHEET

Project Name: OHIO
 Project Location:
 Purpose of Gauge: Water Table Monitoring

Gauge Description:

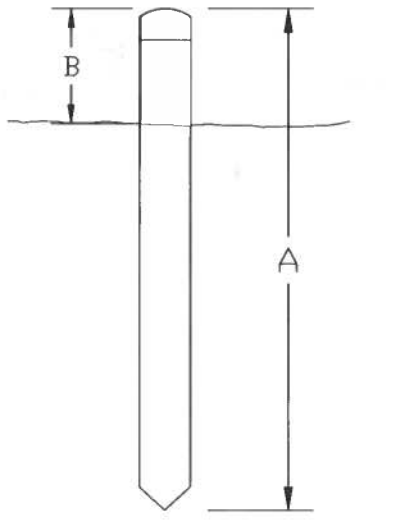
Gauge ID: GWG5
 Serial Number:
 Total Well Casing Length (A): 1.91
 Well Casing Height Above Ground (B): 6.5
 Distance From Eye Bolt To Probe Sensor:
 Material: 2" PVC Well Screen
 Type of Measurement: Pressure, Temperature, & Depth
 Type of Logger: In-Situ Level Troll 100
 Gauge Location:

Free water 1.3

Notes:

Soil Profile Description at Location of Well:

Depth Range (ft.)	Color	Redox	Texture	Notes
0 - 0.4	2.5Y12/4-3	-	Loam	
0.4 - 1.1	2.5Y16-7	2.5Y12/3-6	Sand. 1mm	Redox 10%
1.1 - 1.4	10Y16/3-1	2.5Y12/4-6	→	Redox 20% → Text - Coarse Sandy loam
1.4 - 2.1	10Y16/3-1	2.5Y12/4-8	Sandy loam	Redox 15%
2.1 - 3.6	10Y16/3-1	2.5Y12/4-8	Sandy loam	Redox 25%
3.6 - 4.1	5Y14-1	2.5Y12/4-6	→	Redox 5% → Text - Coarse Sandy loam
4.1 - 5.2	2.5Y5-1		Small Gravel	



MONITORING GAUGE INSTALLATION DATA SHEET

Project Name:
Project Location:
Purpose of Gauge:

OHF
Water Table Monitoring

Gauge Description:

Gauge ID:
Serial Number:
Total Well Casing Length (A):
Well Casing Height Above Ground (B):
Distance From Eye Bolt To Probe Sensor
Material:
Type of Measurement:
Type of Logger:
Gauge Location:

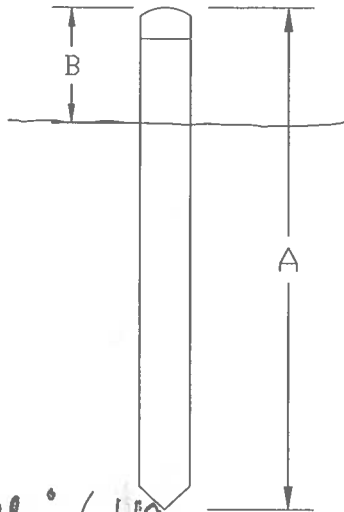
5W076
1.22
6.49
2" PVC Well Screen
Pressure, Temperature, & Depth
In-Situ Level Troll 100

Notes:

1.25' to free water

Soil Profile Description at Location of Well:

Depth Range (ft.)	Color	Redox	Texture	Notes
0 - 0.9	7.5YR 4/6	5YR 4/6	Loamy sand	Small gravel scattered w/
0.9 - 2.2	10YR 5/4	2.5YR 4/8	Silt loam	Redox 20%
2.2 - 3.9	5Y 5/1	2.5YR 4/8	Silt loam	Redox 15%
3.9 - 5.2	2.5Y 5/1	2.5YR 3/6	Sandy loam	Redox 5%



Bolt to probe: 6.49

Standing water: 1.25'

Bolt to ground: 1.22'

MONITORING GAUGE INSTALLATION DATA SHEET

Project Name:
Project Location:
Purpose of Gauge:

OHD
Water Table Monitoring

Gauge Description:

Gauge ID:
Serial Number:
Total Well Casing Length (A):
Well Casing Height Above Ground (B):
Distance From Eye Bolt To Probe Sensor:
Material:
Type of Measurement:
Type of Logger:
Gauge Location:

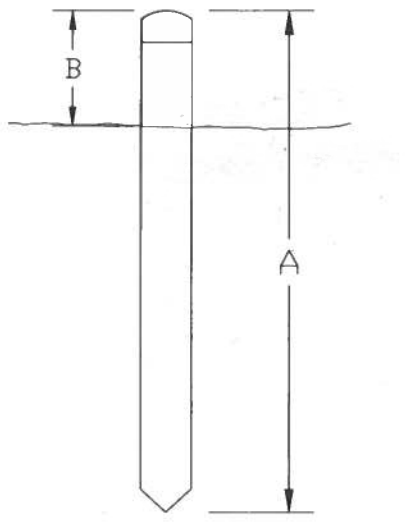
GWG 7
699928
1.12
6.39
2" PVC Well Screen
Pressure, Temperature, & Depth
In-Situ Level Troll 100
.

Notes:

1.2' to standing water

Soil Profile Description at Location of Well:

Depth Range (ft.)	Color	Redox	Texture	Notes
0 - 0.4	10YR 3/3	—	clayey loam	
0.4 - 0.8	5YR 4/6	2.5Y 5/2	silty sand	Depletion (15%)
0.8 - 1.6	10YR 5/4	5YR 4/6	loamy sand	Redox (20%)
1.6 - 2.4	2.5Y 5/2	5YR 4/6	clay loam	Redox (20%)
2.4 - 3.5	2.5Y 3/1	5YR 3/4	clay loam	Redox (15%)
3.5 - 5.2	2.5Y 2.5/1	—	sandy silt loam	



MONITORING GAUGE INSTALLATION DATA SHEET

Project Name:
Project Location:
Purpose of Gauge:

OFID
Water Table Monitoring

Gauge Description:

Gauge ID:
Serial Number:
Total Well Casing Length (A):
Well Casing Height Above Ground (B):
Distance From Eye Bolt To Probe Sensor
Material:
Type of Measurement:
Type of Logger:
Gauge Location:

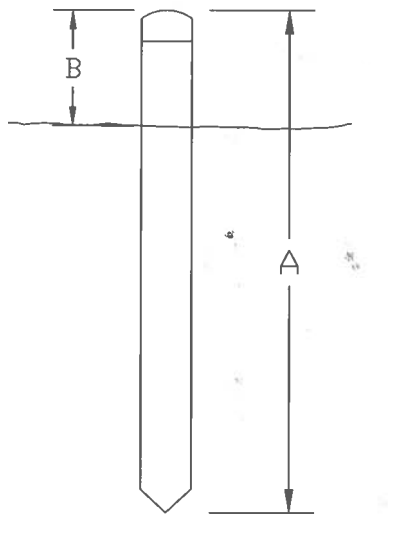
5WG 8
890051
1.39
6.39
2" PVC Well Screen
Pressure, Temperature, & Depth
In-Situ Level Troll 100

Notes:

Fill water at 2.4'

Soil Profile Description at Location of Well:

Depth Range (ft.)	Color	Redox	Texture	Notes
0 - 0.65	7.5YR 4/4	—	loam	
0.65 - 1.2	10YR 5/3	5YR 4/6	silt loam	Redox 57%
1.2 - 1.8	10YR 4/2	5YR 4/6	clay silt	Redox 40%
1.8 - 2.6	2.5Y 5/2	7.5YR 3/4	clay silt	Redox 20%
2.6 - 3.2	2.5Y 3/1	2.5YR 3/6	silty clay	Redox 5%
3.2 - 4.2	2.5Y 4/1	2.5YR 4/8	silty clay	Redox 10%
4.2 - 5.2	5Y 5/1	5YR 5/8	clay	Redox 50%



MONITORING GAUGE INSTALLATION DATA SHEET

Project Name: OFD
 Project Location:
 Purpose of Gauge: Water Table Monitoring

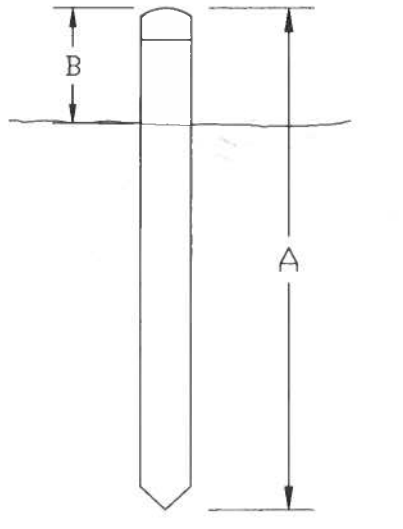
Gauge Description:

Gauge ID: 5259
 Serial Number: 889708
 Total Well Casing Length (A): 1.24
 Well Casing Height Above Ground (B): 6.40
 Distance From Eye Bolt To Probe Sensor: 2" PVC Well Screen
 Material: Pressure, Temperature, & Depth
 Type of Measurement: In-Situ Level Troll 100
 Type of Logger:
 Gauge Location:

Notes:

Soil Profile Description at Location of Well:

Depth Range (ft.)	Color	Redox	Texture	Notes
0.0 - 0.4	10YR 4/2	—	Silt loam	
0.4 - 1.2	7.5YR 5/6	2.5YR 4/8	Silt loam	Redox 5%
1.2 - 1.8	5YR 4/6	—	Coarse sand	
1.8 - 2.4	2.5Y 5/2	5YR 5/8	Clay loam	Redox 10%
2.4 - 3.0	2.5Y 5/2	10R 3/6	clay loam	Redox 20%
3.0 - 3.2	5Y 5/1	5YR 5/8	clay	Redox 10%



MONITORING GAUGE INSTALLATION DATA SHEET

Project Name:
Project Location:
Purpose of Gauge:

OHD
Water Table Monitoring

Gauge Description:

Gauge ID:
Serial Number:
Total Well Casing Length (A):
Well Casing Height Above Ground (B):
Distance From Eye Bolt To Probe Sensor
Material:
Type of Measurement:
Type of Logger:
Gauge Location:

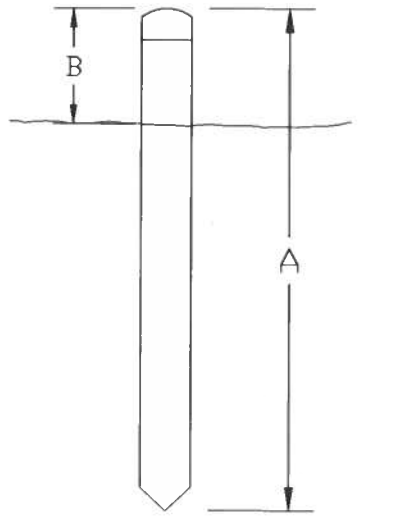
5W510
883380
1.34'
6.44'
2" PVC Well Screen
Pressure, Temperature, & Depth
In-Situ Level Troll 100

Notes:

Free water at 2.2'

Soil Profile Description at Location of Well:

Depth Range (ft.)	Color	Redox	Texture	Notes
0 - 1.5	7.5YR 4/4	-	Sandy loam	
1.5 - 2.2	7.5YR 5/4	5YR 4/6	Silty loam	Redox 20%
2.2 - 2.7	2.5Y 5/1	5YR 4/6	Silty loam	Redox 15%
2.7 - 3.0	5YR 5/6	-	Sand	
3.0 - 4.0	10YR 4/1	-	Loamy sand	
4.0 - 5.2	2.5Y 5/2	5Y 4/4	Clay	Redox 40%



MONITORING GAUGE INSTALLATION DATA SHEET

Project Name: OHV
 Project Location:
 Purpose of Gauge: Water Table Monitoring

Gauge Description:

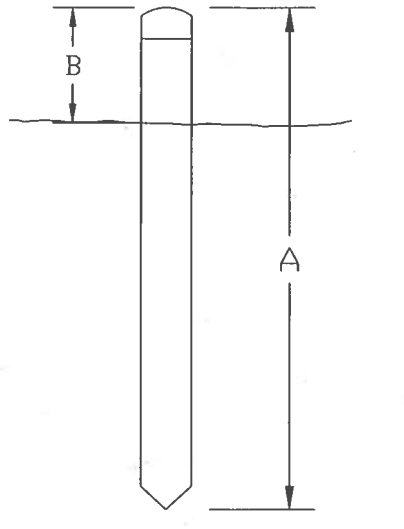
Gauge ID: 674844 GWG 11
 Serial Number:
 Total Well Casing Length (A):
 Well Casing Height Above Ground (B):
 Distance From Eye Bolt To Probe Sensor:
 Material: 2" PVC Well Screen
 Type of Measurement: Pressure, Temperature, & Depth
 Type of Logger: In-Situ Level Troll 100
 Gauge Location:

Notes:

overcast

Soil Profile Description at Location of Well:

Depth Range (ft.)	Color	Redox	Texture	Notes
0 - .3	10YR 2-2	—	Silty loam	Organic
.3 - .9	5YR 5-6	—	Coarse sand	no depletion
.9 - 2.9	2.5Y 6-2	5YR 6-6	Clay loam	25% Redox
2.9 - 3.9	2.5Y 5-3	5YR 5-8	Clay silty loam	40% Redox
3.9 - 5.2	Gray 2.5/IV	—	Clay sand	Super Black, coarse water



Free water = .5

Bolt to Probe = 6.34

Bolt to Ground = 1.14

Appendix B
Vegetation Plot Data

Table 6. Vegetation Plot Data

Oak Hill Dairy Mitigation Site

DMS Project No. 100120

Monitoring Year 0 - 2022

Planted Acreage	19.1
Date of Initial Plant	2022-02-21
Date(s) of Supplemental Plant(s)	NA
Date(s) Mowing	2022-02-21
Date of Current Survey	2022-02-21
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	
					Planted	Total	Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	<i>Acer negundo</i>	boxelder	Tree	FAC						
	<i>Alnus serrulata</i>	hazel alder	Tree	OBL						
	<i>Amelanchier arborea</i>	common serviceberry	Tree	FAC			2	2		
	<i>Betula nigra</i>	river birch	Tree	FACW	1	1	2	2	3	3
	<i>Calycanthus floridus</i>	eastern sweetshrub	Shrub	FACU	2	2				
	<i>Carya cordiformis</i>	bitternut hickory	Tree	FACU	2	2				
	<i>Celtis laevigata</i>	sugarberry	Tree	FACW					1	1
	<i>Cephalanthus occidentalis</i>	common buttonbush	Shrub	OBL						
	<i>Cornus amomum</i>	silky dogwood	Shrub	FACW					1	1
	<i>Cornus florida</i>	flowering dogwood	Tree	FACU	2	2				
	<i>Diospyros virginiana</i>	common persimmon	Tree	FAC	1	1	1	1		
	<i>Hamamelis virginiana</i>	American witchhazel	Tree	FACU			1	1		
	<i>Lindera benzoin</i>	northern spicebush	Tree	FAC						
	<i>Liriodendron tulipifera</i>	tuliptree	Tree	FACU	1	1	1	1		
	<i>Nyssa sylvatica</i>	blackgum	Tree	FAC					5	5
	<i>Oxydendrum arboreum</i>	sourwood	Shrub	UPL			1	1		
	<i>Platanus occidentalis</i>	American sycamore	Tree	FACW	3	3	3	3	3	3
	<i>Populus deltoides</i>	eastern cottonwood	Tree	FAC	1	1				
	<i>Quercus alba</i>	white oak	Tree	FACU						
	<i>Quercus michauxii</i>	swamp chestnut oak	Tree	FACW					1	1
	<i>Quercus nigra</i>	water oak	Tree	FAC						
	<i>Quercus pagoda</i>	cherrybark oak	Tree	FACW						
	<i>Quercus phellos</i>	willow oak	Tree	FAC						
	<i>Quercus rubra</i>	northern red oak	Tree	FACU	1	1				
	<i>Salix sericea</i>	silky willow	Shrub	OBL						
	<i>Sambucus canadensis</i>	American black elderberry	Tree		1	1			1	1
	<i>Ulmus americana</i>	American elm	Tree	FACW					2	2
	<i>Ulmus rubra</i>	slippery elm	Tree	FAC			2	2		
Sum	Performance Standard				15	15	13	13	17	17
Mitigation Plan Performance Standard	Current Year Stem Count					15		13		17
	Stems/Acre					607		526		688
	Species Count					10		8		8
	Dominant Species Composition (%)					20		23		29
	Average Plot Height (ft.)					2		2		2
Post Mitigation Plan Performance Standard	% Invasives					0		0		0
	Current Year Stem Count					15		13		17
	Stems/Acre					607		526		688
	Species Count					10		8		8
	Dominant Species Composition (%)					20		23		29
	Average Plot Height (ft.)					2		2		2
	% Invasives					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 6. Vegetation Plot Data

Oak Hill Dairy Mitigation Site

DMS Project No. 100120

Monitoring Year 0 - 2022

Planted Acreage	19.1
Date of Initial Plant	2022-02-21
Date(s) of Supplemental Plant(s)	NA
Date(s) Mowing	2022-02-21
Date of Current Survey	2022-02-21
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Veg Plot 4 F		Veg Plot 5 F		Veg Plot 6 F		Veg Plot 7 F	
			Planted	Total	Planted	Total	Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	<i>Acer negundo</i>	boxelder	1	1			1	1	2	2
	<i>Alnus serrulata</i>	hazel alder					1	1		
	<i>Amelanchier arborea</i>	common serviceberry								
	<i>Betula nigra</i>	river birch	5	5	3	3	2	2	1	1
	<i>Calycanthus floridus</i>	eastern sweetshrub								
	<i>Carya cordiformis</i>	bitternut hickory								
	<i>Celtis laevigata</i>	sugarberry			1	1	1	1	1	1
	<i>Cephalanthus occidentalis</i>	common buttonbush					2	2	1	1
	<i>Cornus amomum</i>	silky dogwood							1	1
	<i>Cornus florida</i>	flowering dogwood								
	<i>Diospyros virginiana</i>	common persimmon								
	<i>Hamamelis virginiana</i>	American witchhazel								
	<i>Lindera benzoin</i>	northern spicebush			2	2				
	<i>Liriodendron tulipifera</i>	tuliptree								
	<i>Nyssa sylvatica</i>	blackgum	1	1	1	1				
	<i>Oxydendrum arboreum</i>	sourwood								
	<i>Platanus occidentalis</i>	American sycamore	1	1	1	1	2	2	3	3
	<i>Populus deltoides</i>	eastern cottonwood								
	<i>Quercus alba</i>	white oak	1	1						
	<i>Quercus michauxii</i>	swamp chestnut oak			2	2			1	1
	<i>Quercus nigra</i>	water oak			1	1	4	4	1	1
	<i>Quercus pagoda</i>	cherrybark oak								
	<i>Quercus phellos</i>	willow oak	2	2	1	1			2	2
	<i>Quercus rubra</i>	northern red oak	1	1						
	<i>Salix sericea</i>	silky willow								
	<i>Sambucus canadensis</i>	American black elderberry	2	2	1	1	1	1		
	<i>Ulmus americana</i>	American elm	2	2	4	4	1	1	1	1
	<i>Ulmus rubra</i>	slippery elm								
Sum	Performance Standard		16	16	17	17	15	15	14	14
Mitigation Plan Performance Standard	Current Year Stem Count			16		17		15		14
	Stems/Acre			648		688		607		567
	Species Count			9		10		9		10
	Dominant Species Composition (%)			31		24		27		21
	Average Plot Height (ft.)			2		2		2		2
	% Invasives			0		0		0		0
Post Mitigation Plan Performance Standard	Current Year Stem Count			16		17		15		14
	Stems/Acre			648		688		607		567
	Species Count			9		10		9		10
	Dominant Species Composition (%)			31		24		27		21
	Average Plot Height (ft.)			2		2		2		2
	% Invasives			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 6. Vegetation Plot Data

Oak Hill Dairy Mitigation Site

DMS Project No. 100120

Monitoring Year 0 - 2022

Planted Acreage	19.1
Date of Initial Plant	2022-02-21
Date(s) of Supplemental Plant(s)	NA
Date(s) Mowing	2022-02-21
Date of Current Survey	2022-02-21
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Veg Plot 8 F		Veg Plot 9 F		Veg Plot 10 F	
			Planted	Total	Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	<i>Acer negundo</i>	boxelder	1	1	1	1	1	1
	<i>Alnus serrulata</i>	hazel alder						
	<i>Amelanchier arborea</i>	common serviceberry			1	1		
	<i>Betula nigra</i>	river birch	4	4	4	4	1	1
	<i>Calycanthus floridus</i>	eastern sweetshrub						
	<i>Carya cordiformis</i>	bitternut hickory						
	<i>Celtis laevigata</i>	sugarberry	1	1				
	<i>Cephalanthus occidentalis</i>	common buttonbush					1	1
	<i>Cornus amomum</i>	silky dogwood					1	1
	<i>Cornus florida</i>	flowering dogwood			1	1		
	<i>Diospyros virginiana</i>	common persimmon						
	<i>Hamamelis virginiana</i>	American witchhazel			1	1		
	<i>Lindera benzoin</i>	northern spicebush	1	1	1	1	2	2
	<i>Liriodendron tulipifera</i>	tuliptree						
	<i>Nyssa sylvatica</i>	blackgum					1	1
	<i>Oxydendrum arboreum</i>	sourwood						
	<i>Platanus occidentalis</i>	American sycamore	5	5	2	2	1	1
	<i>Populus deltoides</i>	eastern cottonwood			2	2		
	<i>Quercus alba</i>	white oak			1	1		
	<i>Quercus michauxii</i>	swamp chestnut oak	1	1			1	1
	<i>Quercus nigra</i>	water oak					3	3
	<i>Quercus pagoda</i>	cherrybark oak						
	<i>Quercus phellos</i>	willow oak	1	1				
	<i>Quercus rubra</i>	northern red oak			1	1		
	<i>Salix sericea</i>	silky willow					1	1
	<i>Sambucus canadensis</i>	American black elderberry	2	2			1	1
	<i>Ulmus americana</i>	American elm					1	1
	<i>Ulmus rubra</i>	slippery elm			1	1		
Sum	Performance Standard		16	16	16	16	15	15
Mitigation Plan Performance Standard	Current Year Stem Count			16		16		15
	Stems/Acre			648		648		607
	Species Count			8		11		12
	Dominant Species Composition (%)			31		25		20
	Average Plot Height (ft.)			3		2		3
Post Mitigation Plan Performance Standard	% Invasives			0		0		0
	Current Year Stem Count			16		16		15
	Stems/Acre			648		648		607
	Species Count			8		11		12
	Dominant Species Composition (%)			31		25		20
	Average Plot Height (ft.)			3		2		3
	% Invasives			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 6. Vegetation Plot Data

Oak Hill Dairy Mitigation Site

DMS Project No. 100120

Monitoring Year 0 - 2022

Planted Acreage	19.1
Date of Initial Plant	2022-02-21
Date(s) of Supplemental Plant(s)	NA
Date(s) Mowing	2022-02-21
Date of Current Survey	2022-02-21
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Veg Plot 11 F		Veg Plot 12 F		Veg Plot 13 F	
			Planted	Total	Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	<i>Acer negundo</i>	boxelder	1	1				
	<i>Alnus serrulata</i>	hazel alder			1	1		
	<i>Amelanchier arborea</i>	common serviceberry						
	<i>Betula nigra</i>	river birch	4	4	1	1	5	5
	<i>Calycanthus floridus</i>	eastern sweetshrub						
	<i>Carya cordiformis</i>	bitternut hickory						
	<i>Celtis laevigata</i>	sugarberry					1	1
	<i>Cephalanthus occidentalis</i>	common buttonbush			1	1	1	1
	<i>Cornus amomum</i>	silky dogwood						
	<i>Cornus florida</i>	flowering dogwood						
	<i>Diospyros virginiana</i>	common persimmon						
	<i>Hamamelis virginiana</i>	American witchhazel	1	1				
	<i>Lindera benzoin</i>	northern spicebush	2	2	1	1	1	1
	<i>Liriodendron tulipifera</i>	tuliptree						
	<i>Nyssa sylvatica</i>	blackgum			2	2	1	1
	<i>Oxydendrum arboreum</i>	sourwood	1	1				
	<i>Platanus occidentalis</i>	American sycamore			2	2	1	1
	<i>Populus deltoides</i>	eastern cottonwood	3	3				
	<i>Quercus alba</i>	white oak	2	2				
	<i>Quercus michauxii</i>	swamp chestnut oak			1	1	1	1
	<i>Quercus nigra</i>	water oak					2	2
	<i>Quercus pagoda</i>	cherrybark oak						
	<i>Quercus phellos</i>	willow oak			3	3	2	2
	<i>Quercus rubra</i>	northern red oak						
	<i>Salix sericea</i>	silky willow						
	<i>Sambucus canadensis</i>	American black elderberry					1	1
	<i>Ulmus americana</i>	American elm			2	2		
	<i>Ulmus rubra</i>	slippery elm						
Sum	Performance Standard		14	14	14	14	16	16
Mitigation Plan Performance Standard	Current Year Stem Count			14		14		16
	Stems/Acre			567		567		648
	Species Count			7		9		10
	Dominant Species Composition (%)			29		21		31
	Average Plot Height (ft.)			3		2		2
	% Invasives			0		0		0
Post Mitigation Plan Performance Standard	Current Year Stem Count			14		14		16
	Stems/Acre			567		567		648
	Species Count			7		9		10
	Dominant Species Composition (%)			29		21		31
	Average Plot Height (ft.)			3		2		2
	% Invasives			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.

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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 6. Vegetation Plot Data

Oak Hill Dairy Mitigation Site

DMS Project No. 100120

Monitoring Year 0 - 2022

Planted Acreage	19.1
Date of Initial Plant	2022-02-21
Date(s) of Supplemental Plant(s)	NA
Date(s) Mowing	2022-02-21
Date of Current Survey	2022-02-21
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Veg Plot 1 R Total	Veg Plot 2 R Total	Veg Plot 3 R Total	Veg Plot 4 R Total	Veg Plot 5 R Total	Veg Plot 6 R Total
Species Included in Approved Mitigation Plan	<i>Acer negundo</i>	boxelder			1			
	<i>Alnus serrulata</i>	hazel alder			1			1
	<i>Amelanchier arborea</i>	common serviceberry						
	<i>Betula nigra</i>	river birch	2	1	1	1	1	4
	<i>Calycanthus floridus</i>	eastern sweetshrub						
	<i>Carya cordiformis</i>	bitternut hickory	2					
	<i>Celtis laevigata</i>	sugarberry	1				3	1
	<i>Cephalanthus occidentalis</i>	common buttonbush		1	2	1		
	<i>Cornus amomum</i>	silky dogwood				1	1	
	<i>Cornus florida</i>	flowering dogwood						
	<i>Diospyros virginiana</i>	common persimmon						
	<i>Hamamelis virginiana</i>	American witchhazel						
	<i>Lindera benzoin</i>	northern spicebush	1	1			1	
	<i>Liriodendron tulipifera</i>	tuliptree						
	<i>Nyssa sylvatica</i>	blackgum	1					2
	<i>Oxydendrum arboreum</i>	sourwood						
	<i>Platanus occidentalis</i>	American sycamore	2	3	1	5	1	3
	<i>Populus deltoides</i>	eastern cottonwood	1		1			
	<i>Quercus alba</i>	white oak						
	<i>Quercus michauxii</i>	swamp chestnut oak		2			3	1
	<i>Quercus nigra</i>	water oak			1	1		
	<i>Quercus pagoda</i>	cherrybark oak				2	1	
	<i>Quercus phellos</i>	willow oak	1	2	2	1	1	
	<i>Quercus rubra</i>	northern red oak	2	1				
	<i>Salix sericea</i>	silky willow	2		3	1	2	
	<i>Sambucus canadensis</i>	American black elderberry				1		1
	<i>Ulmus americana</i>	American elm					2	1
	<i>Ulmus rubra</i>	slippery elm			2			
Sum	Performance Standard		15	11	15	14	16	14
Mitigation Plan Performance Standard	Current Year Stem Count		15	11	15	14	16	14
	Stems/Acre		607	445	607	567	648	567
	Species Count		10	7	10	9	10	8
	Dominant Species Composition (%)		13	27	20	36	19	29
	Average Plot Height (ft.)		2	2	2	2	2	2
	% Invasives		0	0	0	0	0	0
Post Mitigation Plan Performance Standard	Current Year Stem Count		15	11	15	14	16	14
	Stems/Acre		607	445	607	567	648	567
	Species Count		10	7	10	9	10	8
	Dominant Species Composition (%)		13	27	20	36	19	29
	Average Plot Height (ft.)		2	2	2	2	2	2
	% 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 7. Vegetation Performance Standards Summary Table
Oak Hill Dairy Mitigation Site
DMS Project No. 100120
Monitoring Year 0 - 2022

	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 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1												
Monitoring Year 0	607	2	10	0	526	2	8	0	688	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 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1												
Monitoring Year 0	648	2	9	0	688	2	10	0	607	2	9	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 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1												
Monitoring Year 0	567	2	10	0	648	3	8	0	648	2	11	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 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1												
Monitoring Year 0	607	3	12	0	567	3	7	0	567	2	9	0
	Veg Plot 13 F				Veg Plot Group 1 R				Veg Plot Group 2 R			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1												
Monitoring Year 0	648	2	10	0	607	2	10	0	445	2	7	0
	Veg Plot Group 3 R				Veg Plot Group 4 R				Veg Plot Group 5 R			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1												
Monitoring Year 0	607	2	10	0	567	2	9	0	648	2	10	0
	Veg Plot Group 6 R											
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives								
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1												
Monitoring Year 0	567	2	8	0								

*Each monitoring year represents a different plot for the random vegetation plot "groups". Random plots are denoted with an R, and fixed plots with an F.

Appendix C
Stream Geomorphology Data

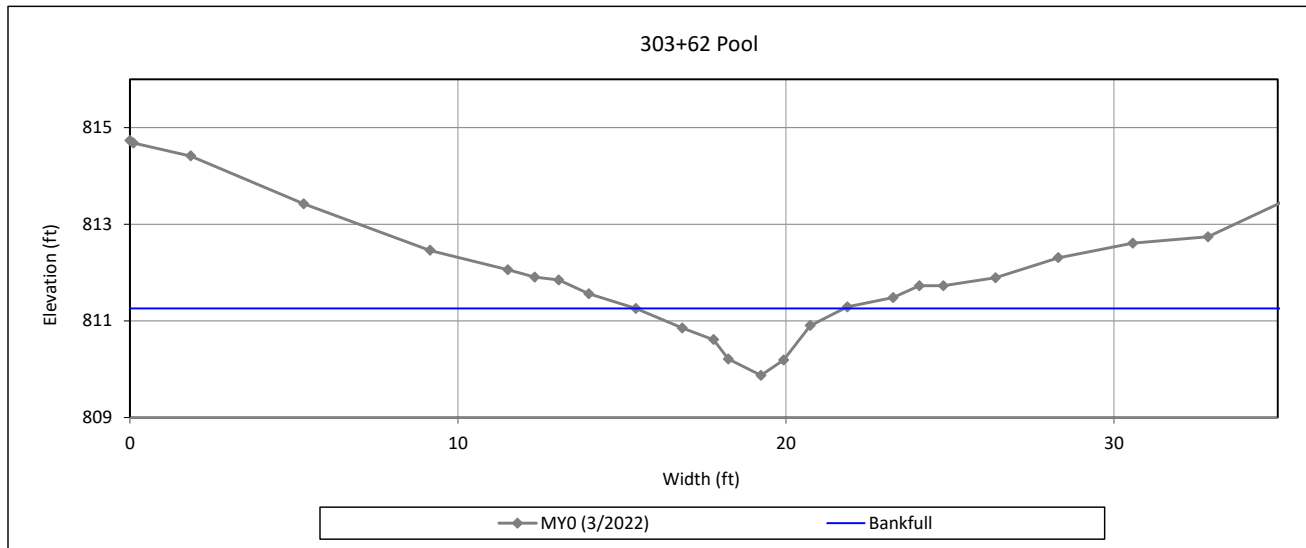
Cross-Section Plots

Oak Hill Dairy Mitigation Site

DMS Project No. 100120

Monitoring Year 0 - 2022

Cross-Section 1-UT1A



Bankfull Dimensions

4.0	x-section area (ft.sq.)
6.4	width (ft)
0.6	mean depth (ft)
1.4	max depth (ft)
7.1	wetted perimeter (ft)
0.6	hydraulic radius (ft)
10.1	width-depth ratio

Survey Date: 3/2022

Field Crew: Kee Mapping & Surveying



View Downstream

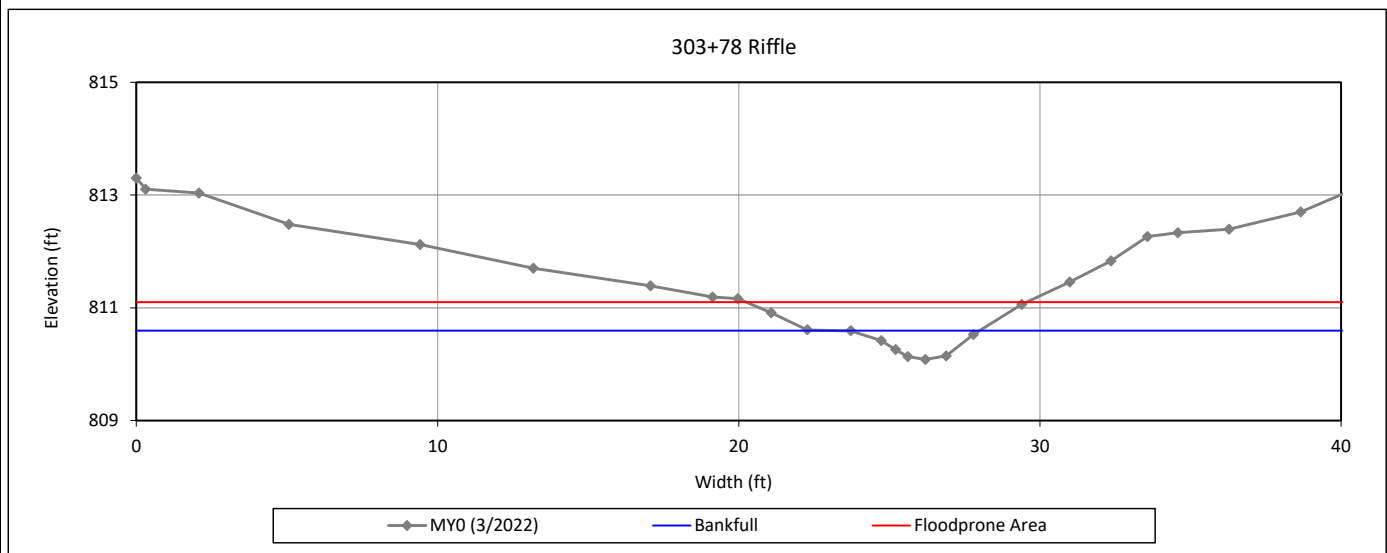
Cross-Section Plots

Oak Hill Dairy Mitigation Site

DMS Project No. 100120

Monitoring Year 0 - 2022

Cross-Section 2-UT1A



Bankfull Dimensions

- 1.2 x-section area (ft.sq.)
- 4.3 width (ft)
- 0.3 mean depth (ft)
- 0.5 max depth (ft)
- 4.4 wetted perimeter (ft)
- 0.3 hydraulic radius (ft)
- 15.0 width-depth ratio
- 9.3 W flood prone area (ft)
- 2.2 entrenchment ratio
- 1.0 low bank height ratio

Survey Date: 3/2022
Field Crew: Kee Mapping & Surveying



View Downstream

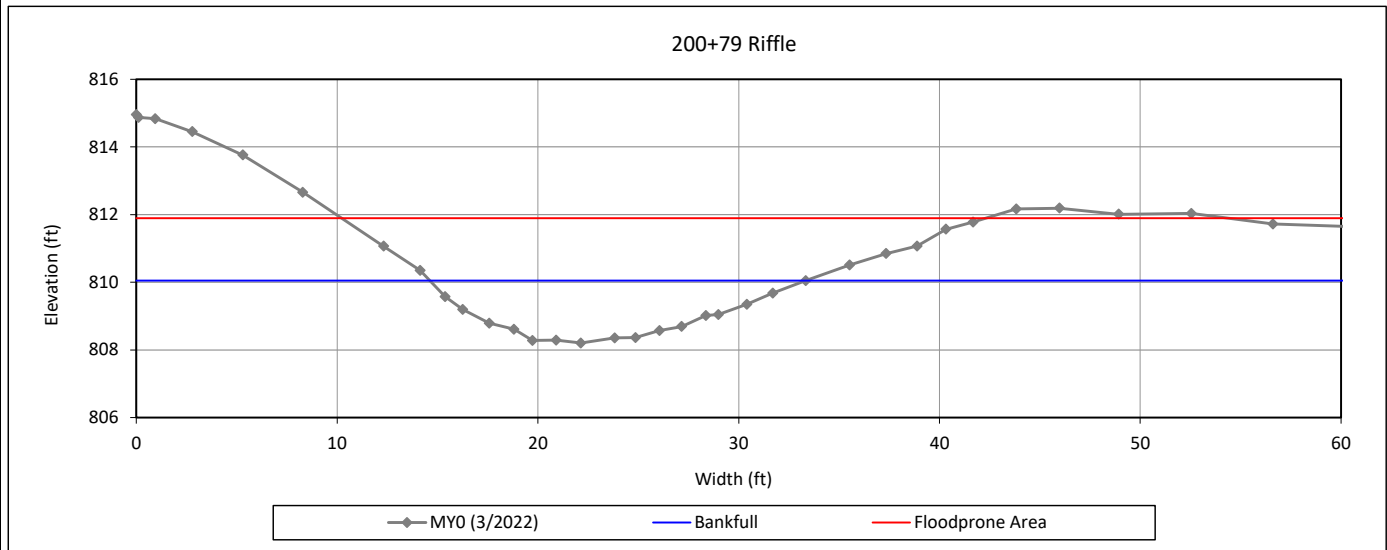
Cross-Section Plots

Oak Hill Dairy Mitigation Site

DMS Project No. 100120

Monitoring Year 0 - 2022

Cross-Section 3-UT1 Reach 1



Bankfull Dimensions

22.0	x-section area (ft.sq.)
18.7	width (ft)
1.2	mean depth (ft)
1.8	max depth (ft)
19.3	wetted perimeter (ft)
1.1	hydraulic radius (ft)
15.9	width-depth ratio
54.8	W flood prone area (ft)
2.9	entrenchment ratio
1.0	low bank height ratio

Survey Date: 3/2022

Field Crew: Kee Mapping & Surveying



View Downstream

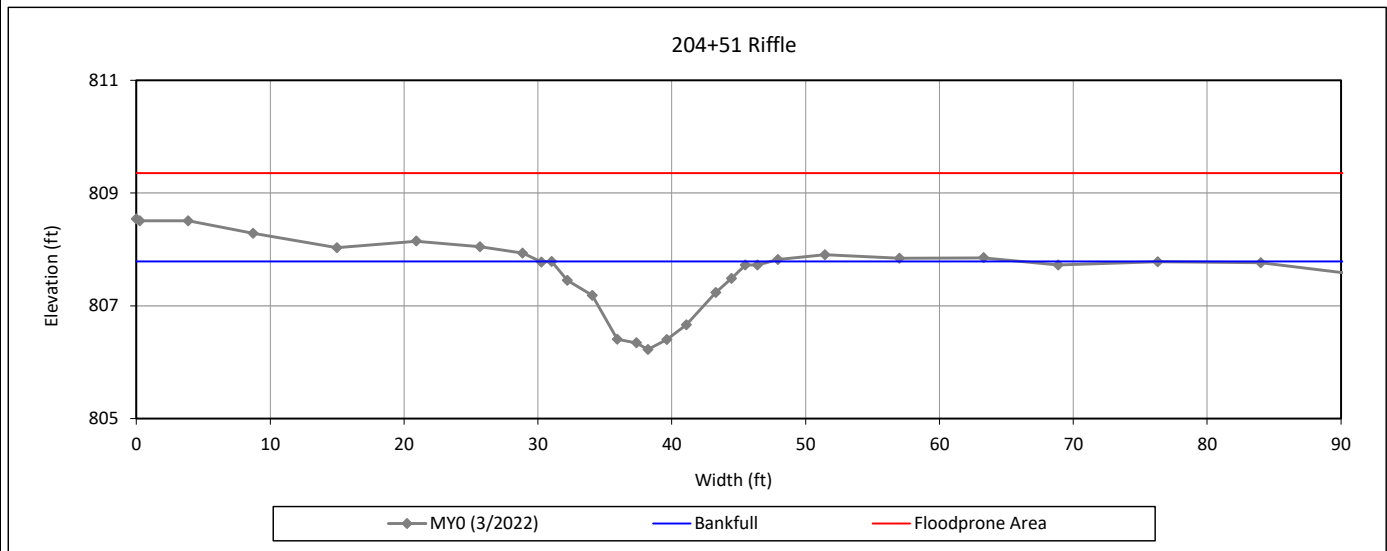
Cross-Section Plots

Oak Hill Dairy Mitigation Site

DMS Project No. 100120

Monitoring Year 0 - 2022

Cross-Section 4-UT1 Reach 2



Bankfull Dimensions

12.8	x-section area (ft.sq.)
16.4	width (ft)
0.8	mean depth (ft)
1.6	max depth (ft)
16.8	wetted perimeter (ft)
0.8	hydraulic radius (ft)
21.0	width-depth ratio
100.0	W flood prone area (ft)
6.1	entrenchment ratio
1.0	low bank height ratio

Survey Date: 3/2022
Field Crew: Kee Mapping & Surveying



View Downstream

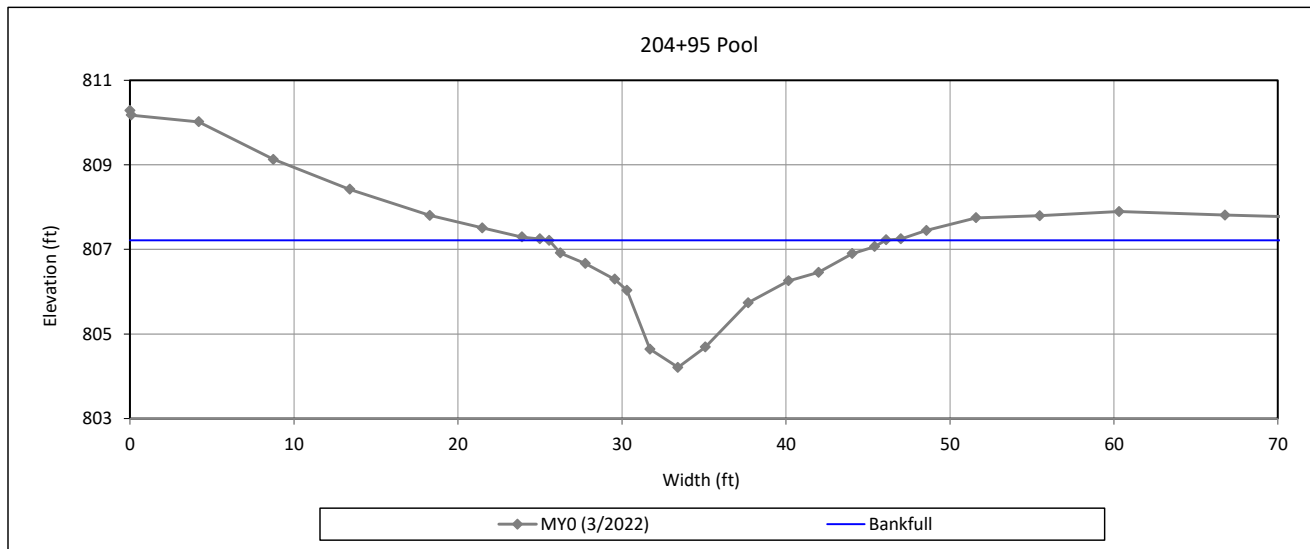
Cross-Section Plots

Oak Hill Dairy Mitigation Site

DMS Project No. 100120

Monitoring Year 0 - 2022

Cross-Section 5-UT1 Reach 2



Bankfull Dimensions

26.1	x-section area (ft.sq.)
20.5	width (ft)
1.3	mean depth (ft)
3.0	max depth (ft)
21.7	wetted perimeter (ft)
1.2	hydraulic radius (ft)
16.1	width-depth ratio

Survey Date: 3/2022

Field Crew: Kee Mapping & Surveying



View Downstream

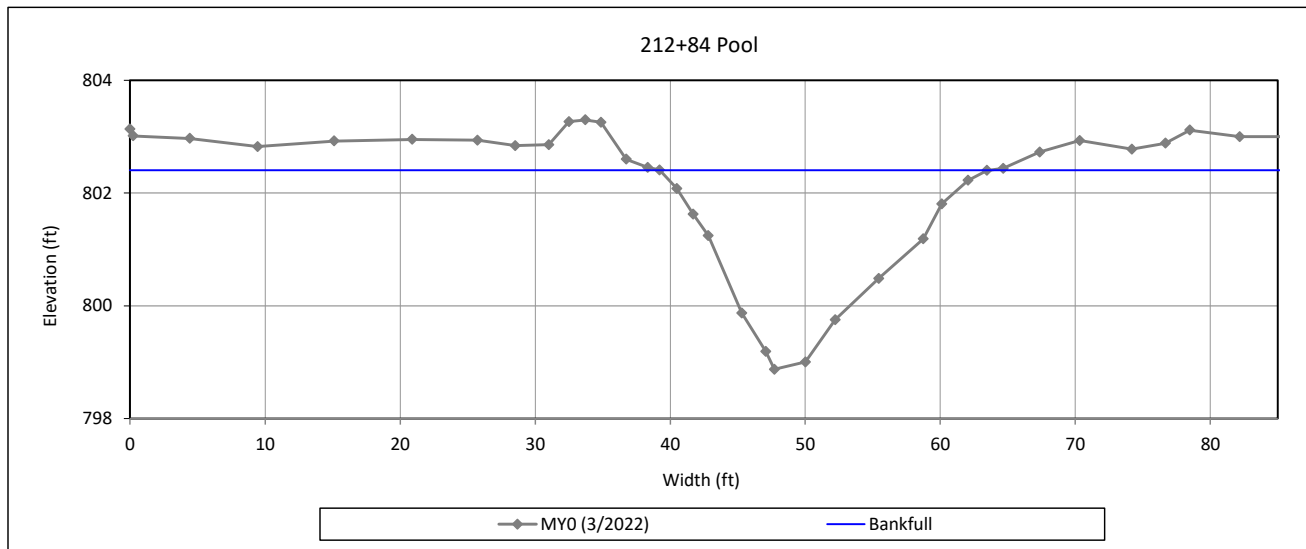
Cross-Section Plots

Oak Hill Dairy Mitigation Site

DMS Project No. 100120

Monitoring Year 0 - 2022

Cross-Section 6-UT1 Reach 2



Bankfull Dimensions

43.0	x-section area (ft.sq.)
24.2	width (ft)
1.8	mean depth (ft)
3.5	max depth (ft)
25.4	wetted perimeter (ft)
1.7	hydraulic radius (ft)
13.6	width-depth ratio

Survey Date: 3/2022

Field Crew: Kee Mapping & Surveying



View Downstream

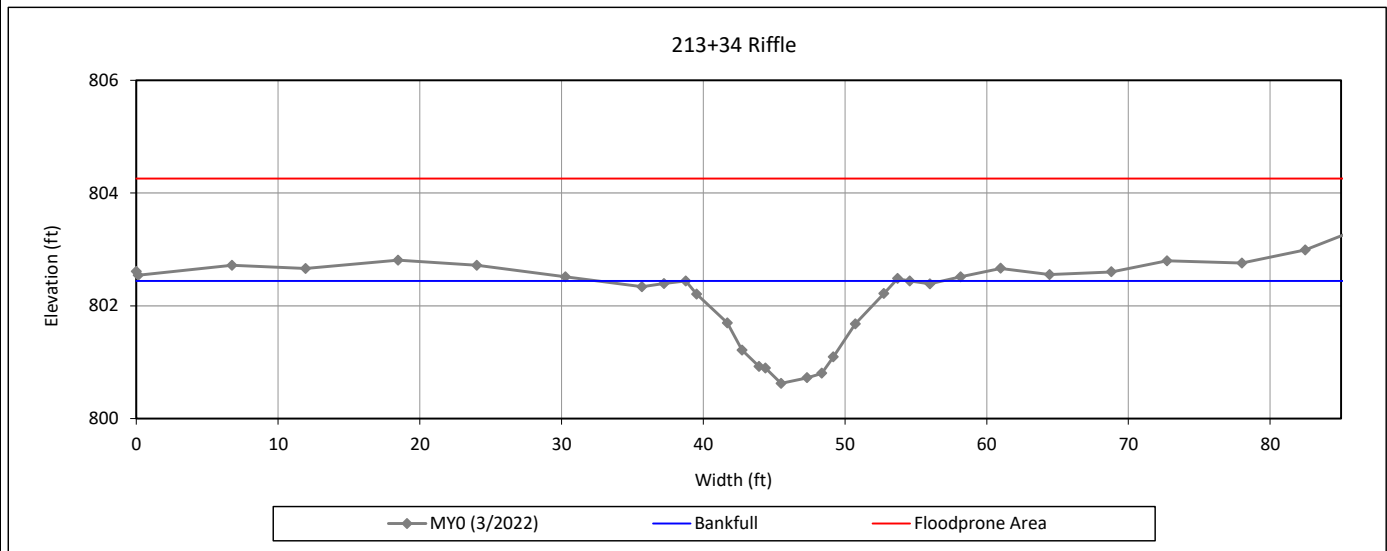
Cross-Section Plots

Oak Hill Dairy Mitigation Site

DMS Project No. 100120

Monitoring Year 0 - 2022

Cross-Section 7-UT1 Reach 2



Bankfull Dimensions

- 15.2 x-section area (ft.sq.)
- 14.8 width (ft)
- 1.0 mean depth (ft)
- 1.8 max depth (ft)
- 15.3 wetted perimeter (ft)
- 1.0 hydraulic radius (ft)
- 14.3 width-depth ratio
- 89.6 W flood prone area (ft)
- 6.1 entrenchment ratio
- 1.0 low bank height ratio

Survey Date: 3/2022
Field Crew: Kee Mapping & Surveying



View Downstream

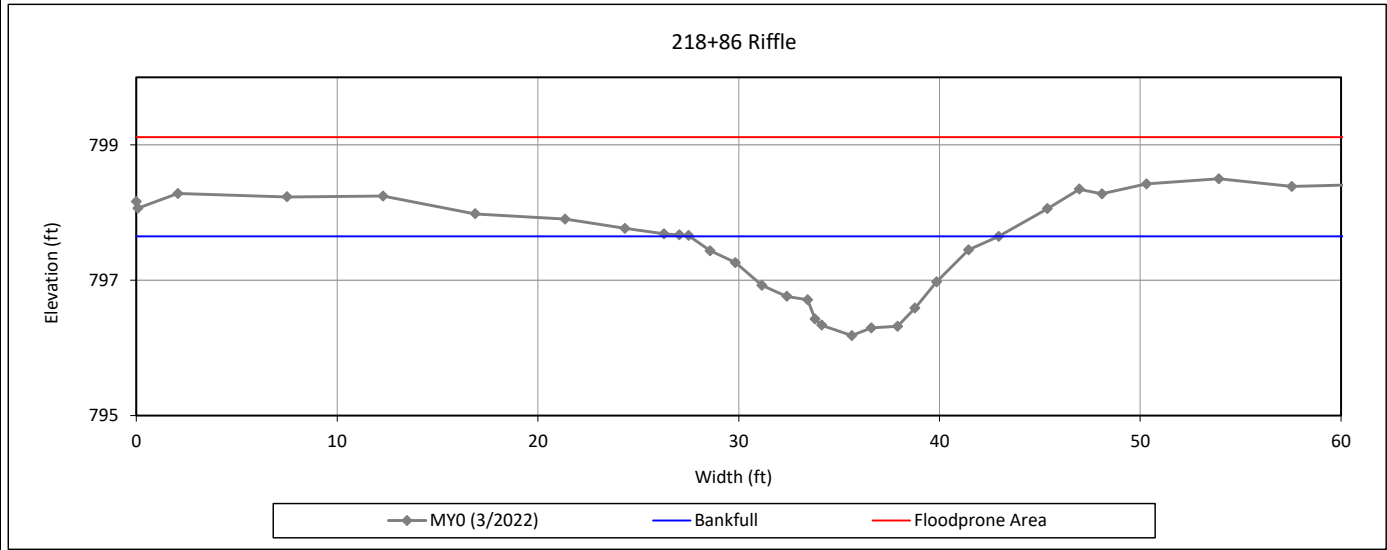
Cross-Section Plots

Oak Hill Dairy Mitigation Site

DMS Project No. 100120

Monitoring Year 0 - 2022

Cross-Section 8-UT1 Reach 2



Bankfull Dimensions

12.0	x-section area (ft.sq.)
15.4	width (ft)
0.8	mean depth (ft)
1.5	max depth (ft)
15.8	wetted perimeter (ft)
0.8	hydraulic radius (ft)
19.8	width-depth ratio
72.6	W flood prone area (ft)
4.7	entrenchment ratio
1.0	low bank height ratio

Survey Date: 3/2022

Field Crew: Kee Mapping & Surveying



View Downstream

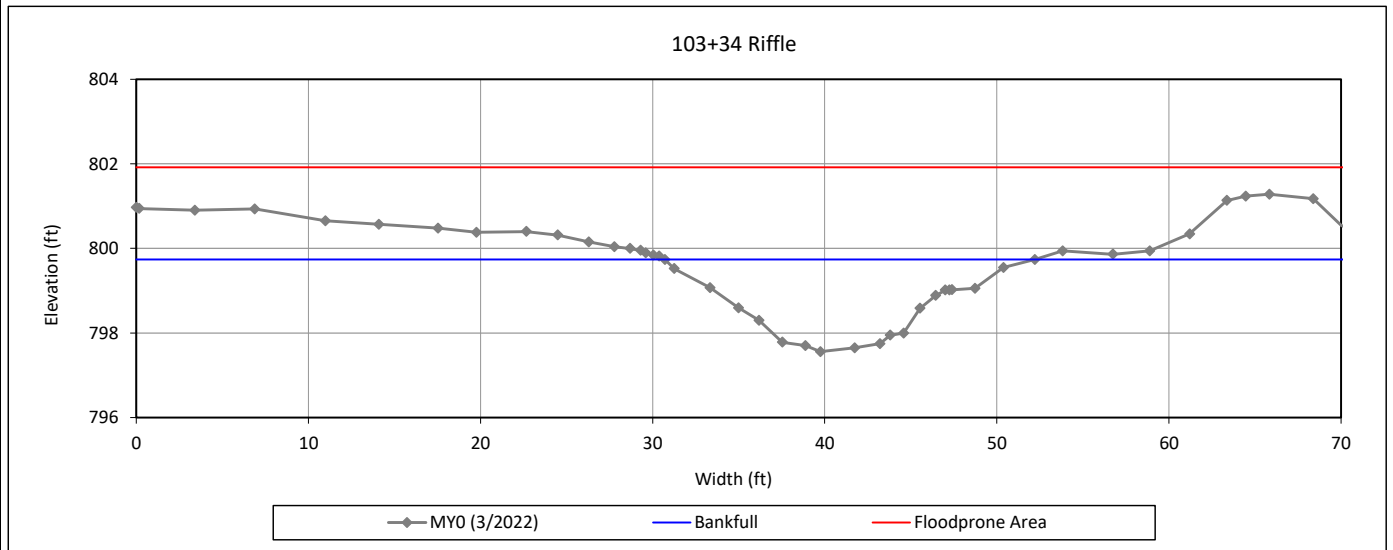
Cross-Section Plots

Oak Hill Dairy Mitigation Site

DMS Project No. 100120

Monitoring Year 0 - 2022

Cross-Section 9-Oak Hill Reach 1



Bankfull Dimensions

- 25.3 x-section area (ft.sq.)
- 21.5 width (ft)
- 1.2 mean depth (ft)
- 2.2 max depth (ft)
- 22.1 wetted perimeter (ft)
- 1.1 hydraulic radius (ft)
- 18.2 width-depth ratio
- 72.4 W flood prone area (ft)
- 3.4 entrenchment ratio
- 1.0 low bank height ratio

Survey Date: 3/2022

Field Crew: Kee Mapping & Surveying



View Downstream

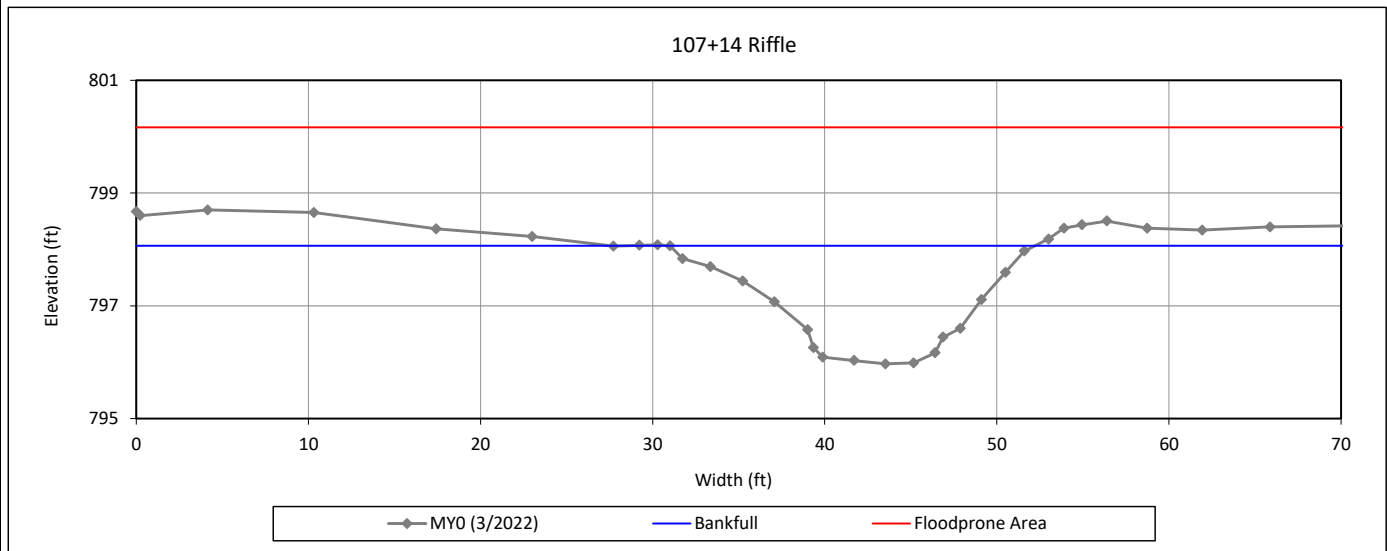
Cross-Section Plots

Oak Hill Dairy Mitigation Site

DMS Project No. 100120

Monitoring Year 0 - 2022

Cross-Section 10-Oak Hill Reach 2



Bankfull Dimensions

- 25.5 x-section area (ft.sq.)
- 21.2 width (ft)
- 1.2 mean depth (ft)
- 2.1 max depth (ft)
- 21.9 wetted perimeter (ft)
- 1.2 hydraulic radius (ft)
- 17.7 width-depth ratio
- 83.8 W flood prone area (ft)
- 4.0 entrenchment ratio
- 1.0 low bank height ratio

Survey Date: 3/2022

Field Crew: Kee Mapping & Surveying



View Downstream

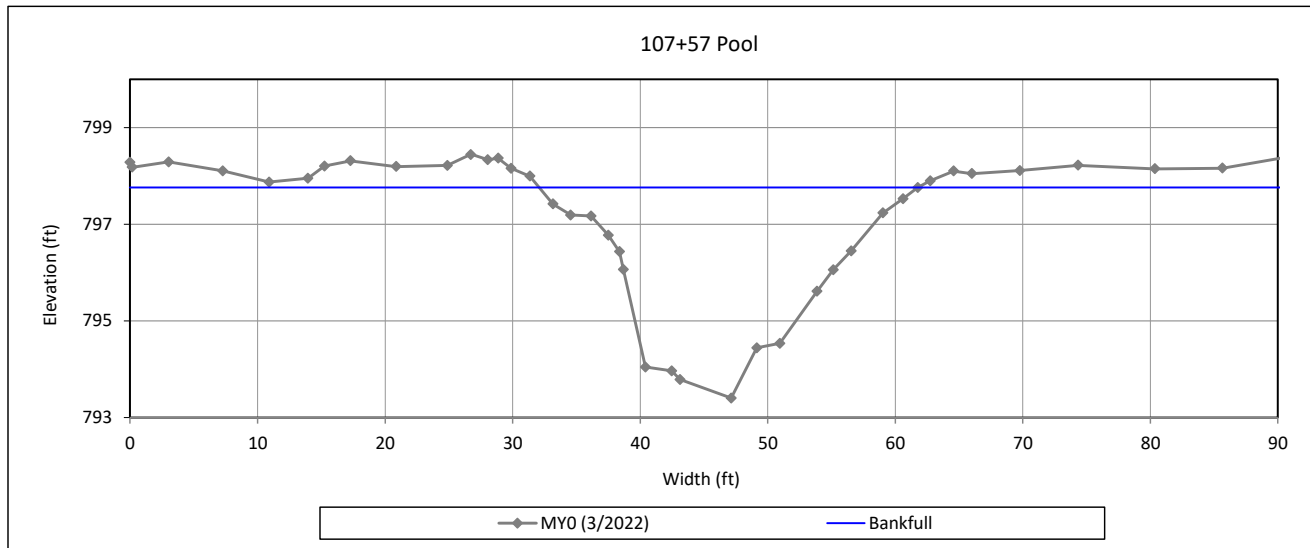
Cross-Section Plots

Oak Hill Dairy Mitigation Site

DMS Project No. 100120

Monitoring Year 0 - 2022

Cross-Section 11-Oak Hill Reach 2



Bankfull Dimensions

64.9	x-section area (ft.sq.)
29.7	width (ft)
2.2	mean depth (ft)
4.4	max depth (ft)
31.8	wetted perimeter (ft)
2.0	hydraulic radius (ft)
13.6	width-depth ratio

Survey Date: 3/2022

Field Crew: Kee Mapping & Surveying



View Downstream

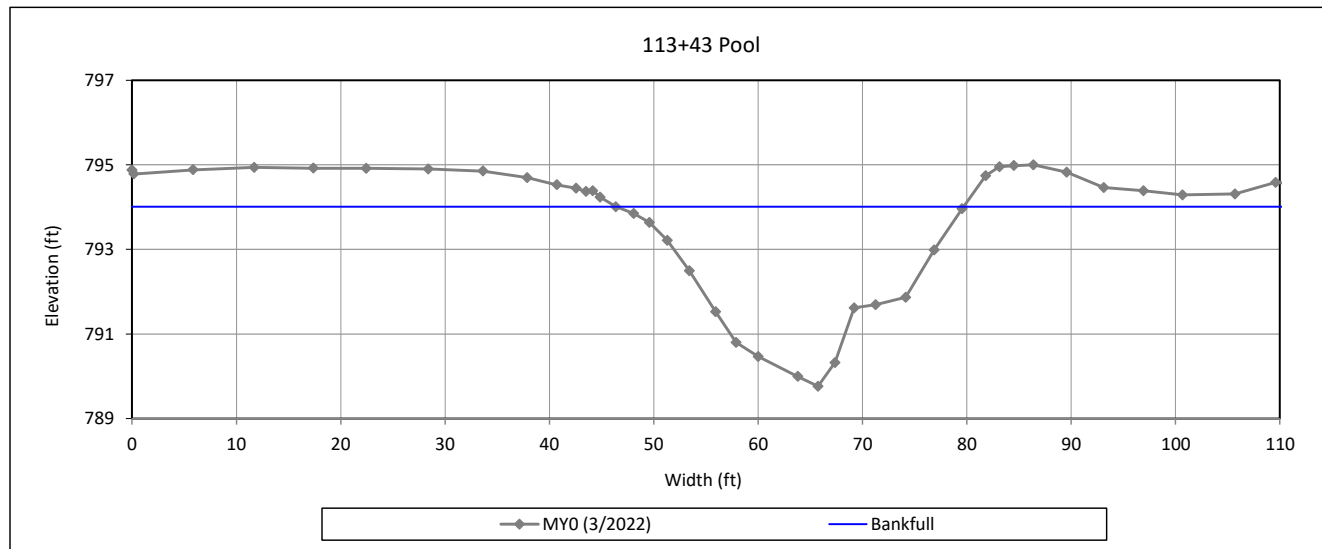
Cross-Section Plots

Oak Hill Dairy Mitigation Site

DMS Project No. 100120

Monitoring Year 0 - 2022

Cross-Section 12-Oak Hill Reach 3



Bankfull Dimensions

73.1	x-section area (ft.sq.)
33.3	width (ft)
2.2	mean depth (ft)
4.2	max depth (ft)
34.8	wetted perimeter (ft)
2.1	hydraulic radius (ft)
15.2	width-depth ratio

Survey Date: 3/2022

Field Crew: Kee Mapping & Surveying



View Downstream

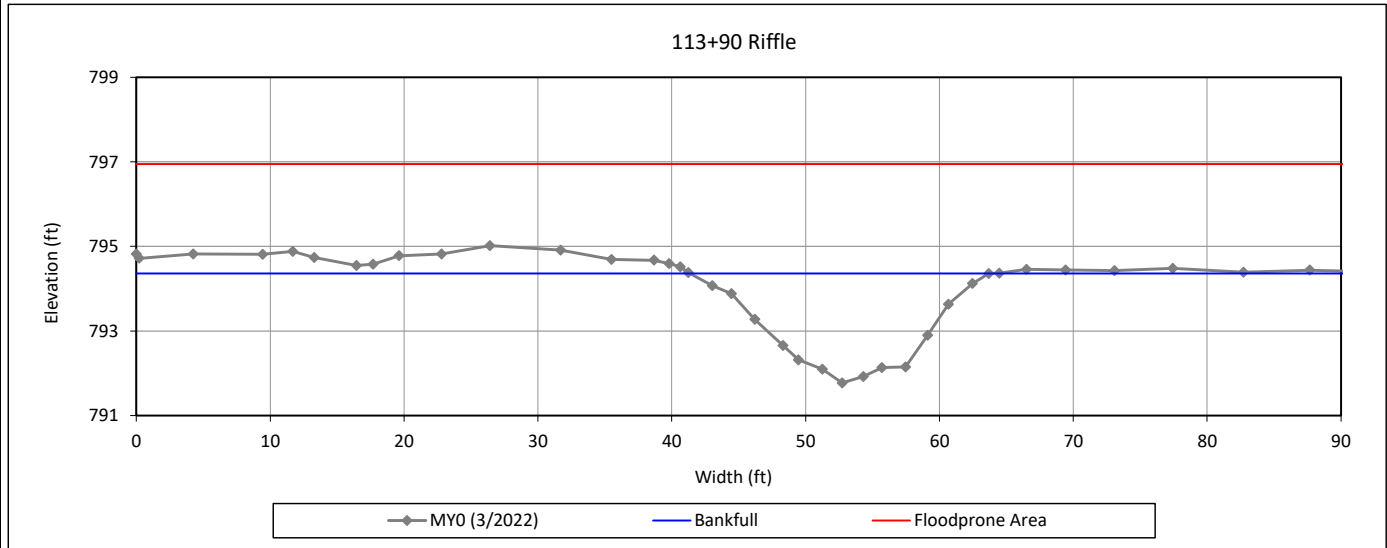
Cross-Section Plots

Oak Hill Dairy Mitigation Site

DMS Project No. 100120

Monitoring Year 0 - 2022

Cross-Section 13-Oak Hill Reach 3



Bankfull Dimensions

31.5	x-section area (ft.sq.)
22.3	width (ft)
1.4	mean depth (ft)
2.6	max depth (ft)
23.1	wetted perimeter (ft)
1.4	hydraulic radius (ft)
15.8	width-depth ratio
102.5	W flood prone area (ft)
4.6	entrenchment ratio
1.0	low bank height ratio

Survey Date: 3/2022
Field Crew: Kee Mapping & Surveying



View Downstream

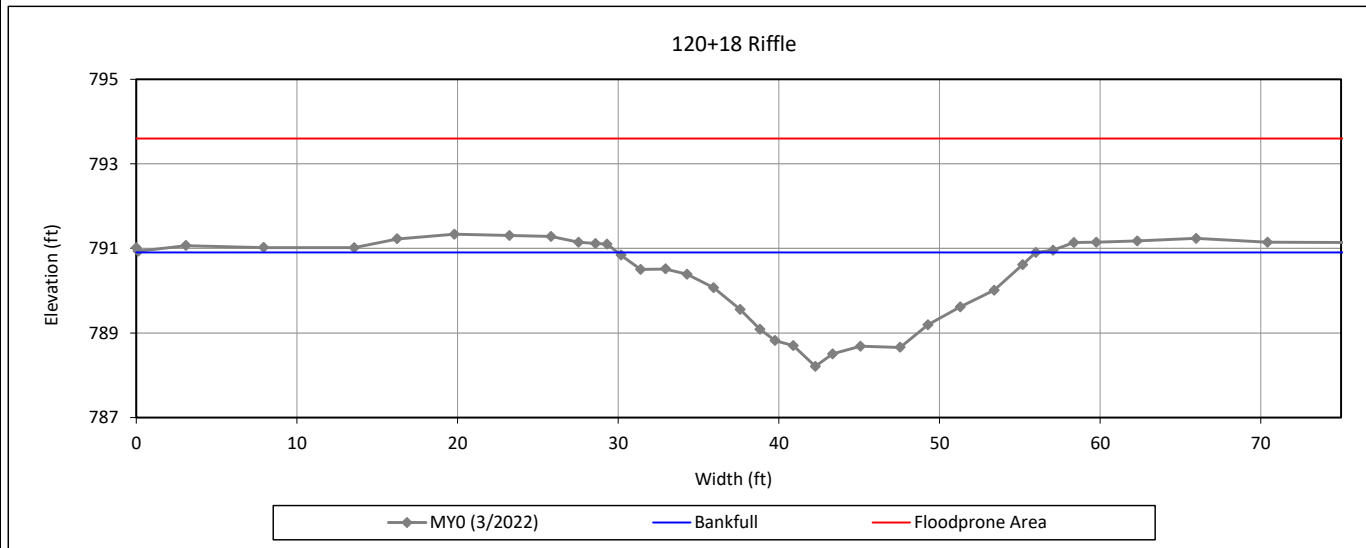
Cross-Section Plots

Oak Hill Dairy Mitigation Site

DMS Project No. 100120

Monitoring Year 0 - 2022

Cross-Section 14-Oak Hill Reach 4



Bankfull Dimensions

36.1	x-section area (ft.sq.)
26.0	width (ft)
1.4	mean depth (ft)
2.7	max depth (ft)
26.8	wetted perimeter (ft)
1.3	hydraulic radius (ft)
18.8	width-depth ratio
94.3	W flood prone area (ft)
3.6	entrenchment ratio
1.0	low bank height ratio

Survey Date: 3/2022

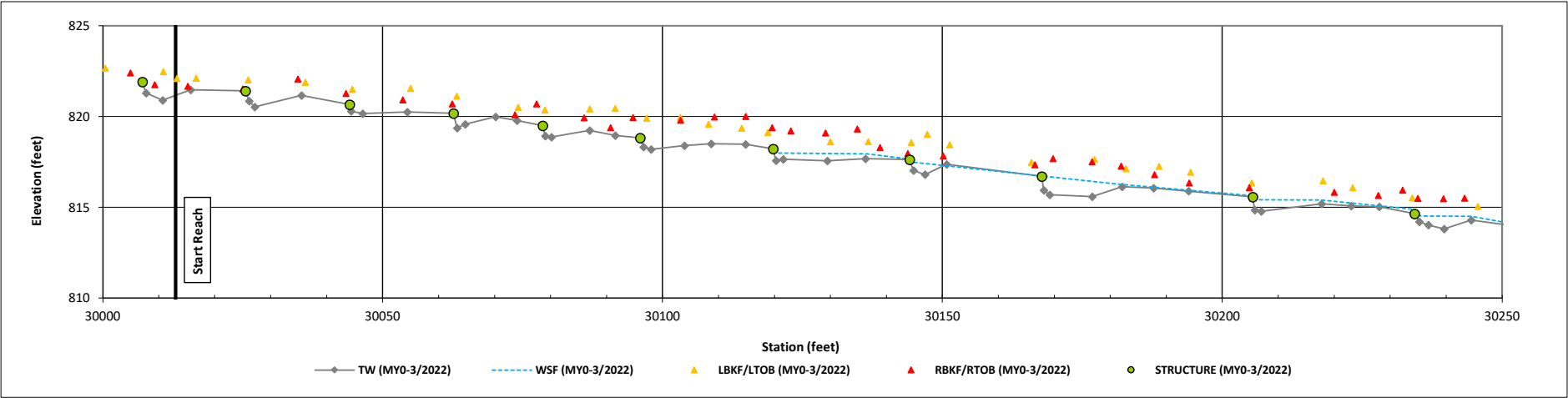
Field Crew: Kee Mapping & Surveying



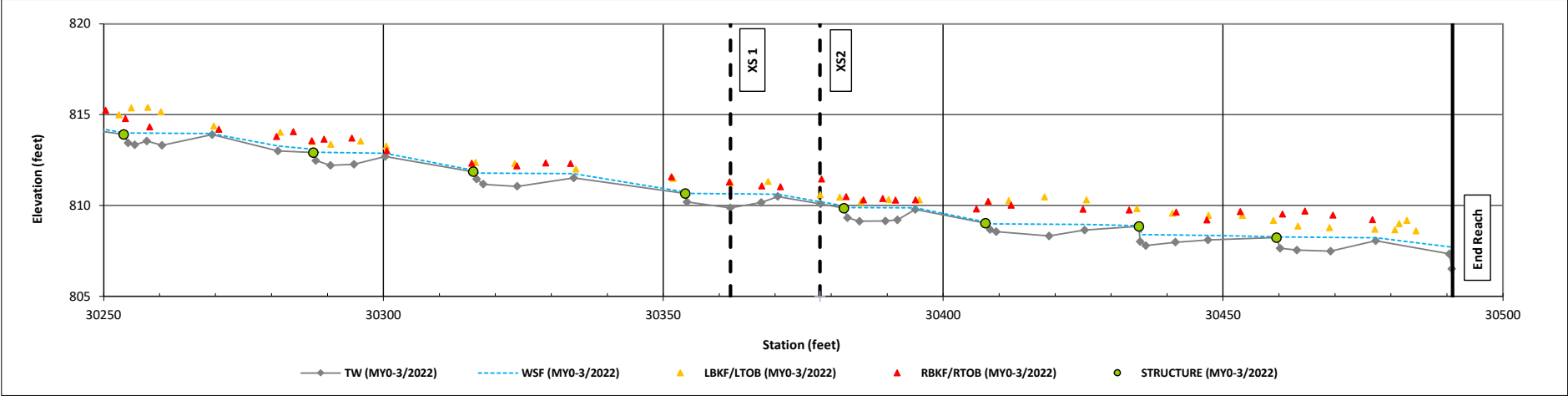
View Downstream

Longitudinal Profile Plots
Oak Hill Creek Mitigation Site
DMS Project No. 100120
Monitoring Year 0 - 2022

UT1A (STA 300+13 to 304+91)

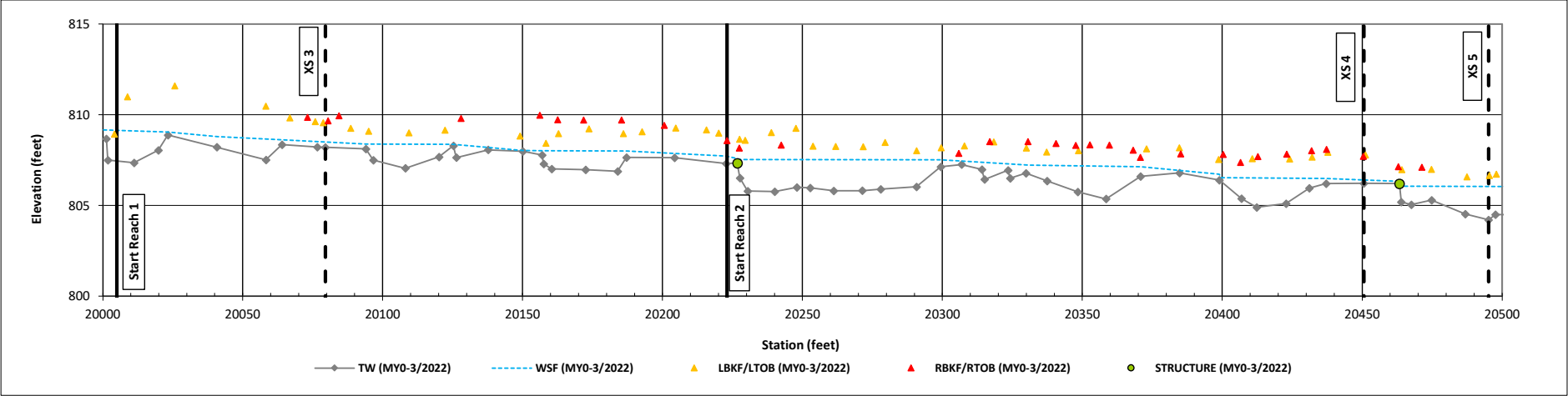


UT1A (STA 300+13 to 304+91)

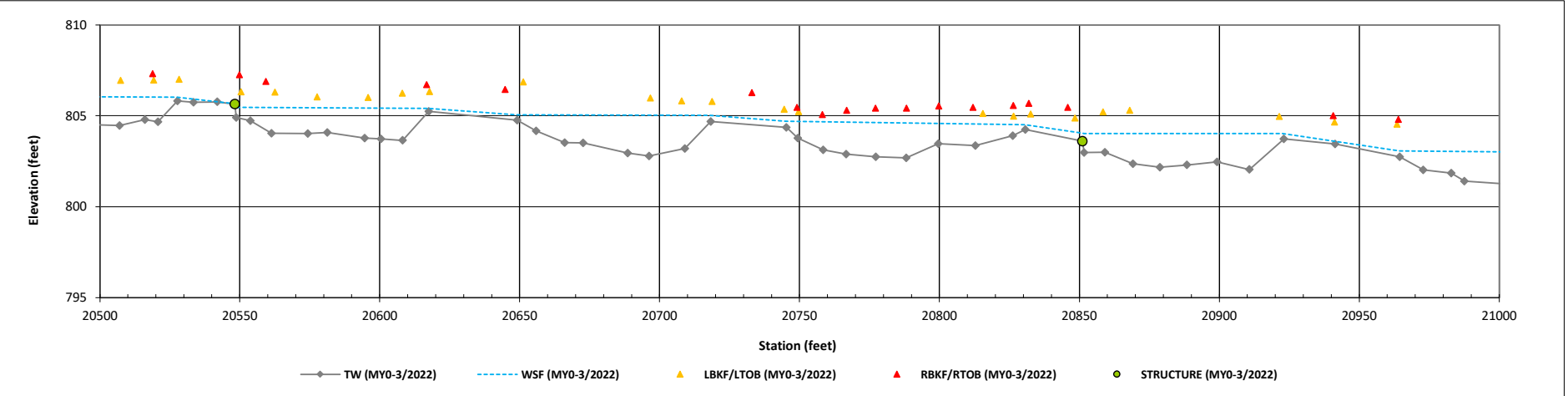


Longitudinal Profile Plots
Oak Hill Creek Mitigation Site
DMS Project No. 100120
Monitoring Year 0 - 2022

UT1 (STA 200+05 to 221+11)

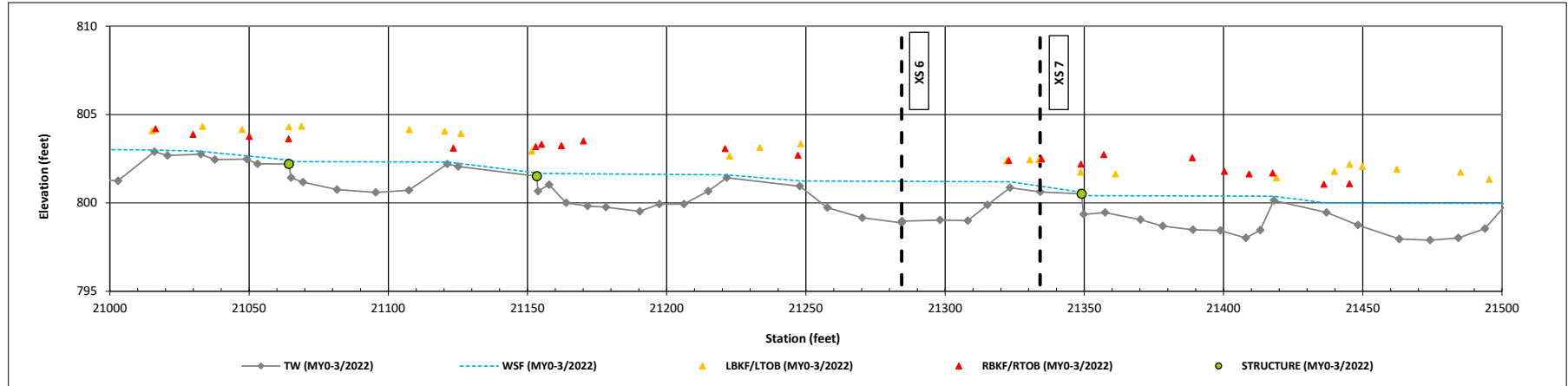


UT1 (STA 200+05 to 221+11)

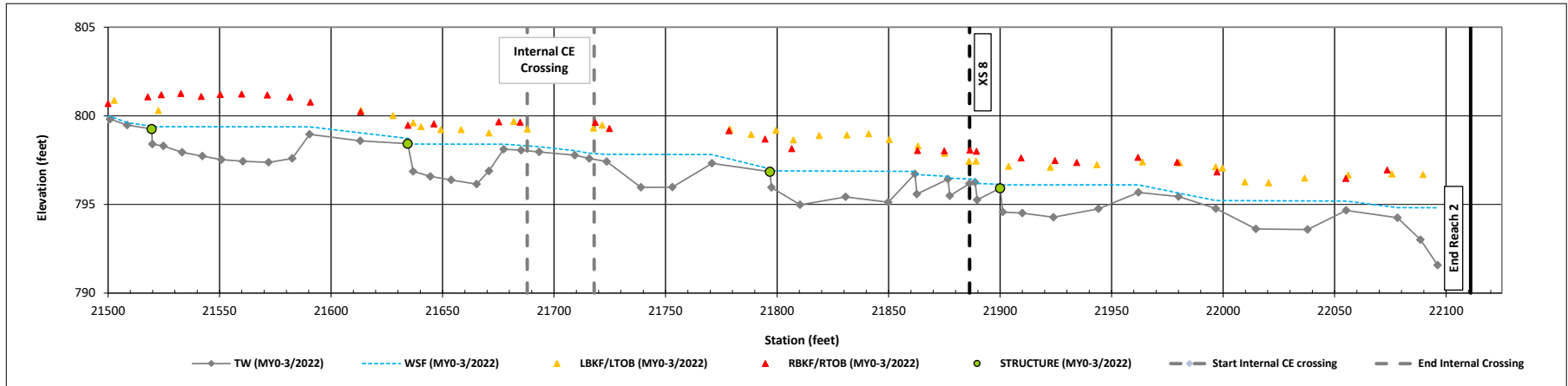


Longitudinal Profile Plots
Oak Hill Creek Mitigation Site
DMS Project No. 100120
Monitoring Year 0 - 2022

UT1 (STA 200+05 to 221+11)

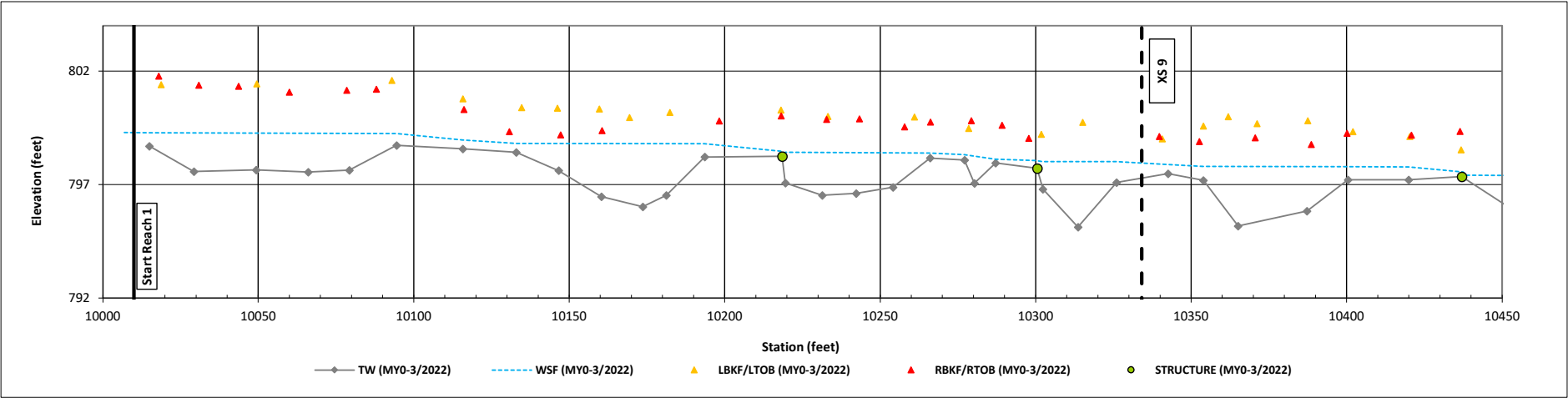


UT1 (STA 200+05 to 221+11)

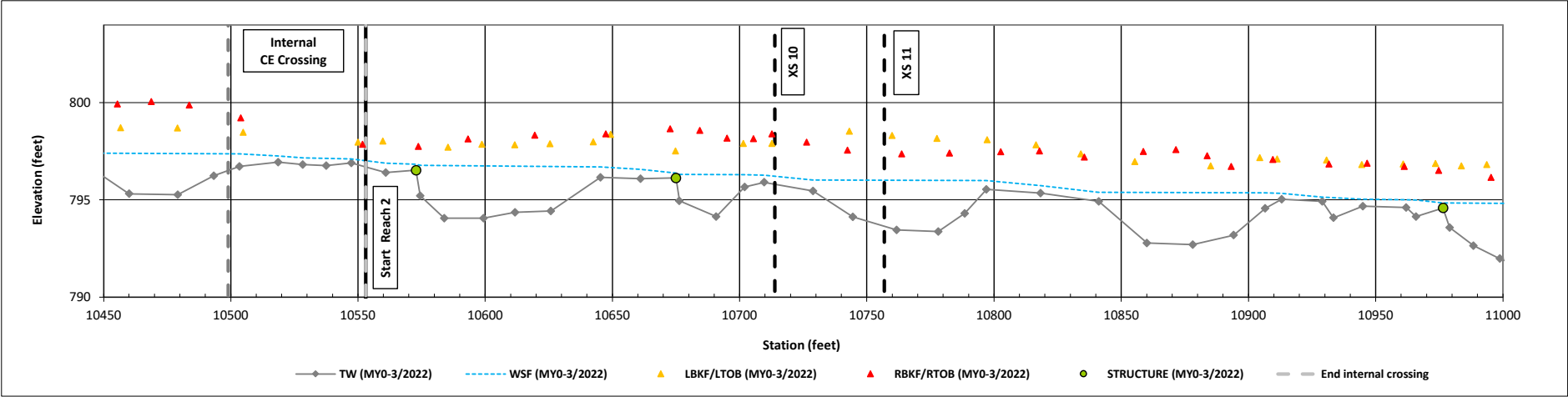


Longitudinal Profile Plots
Oak Hill Creek Mitigation Site
DMS Project No. 100120
Monitoring Year 0 - 2022

Oak Hill Creek (STA 100+10 to 123+73)

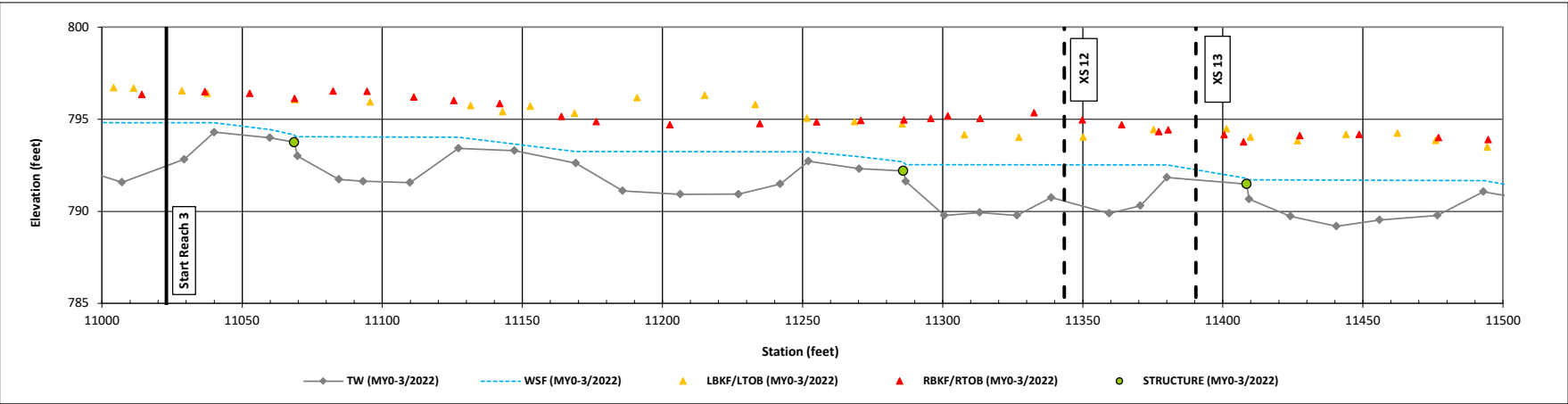


Oak Hill Creek (STA 100+10 to 123+73)

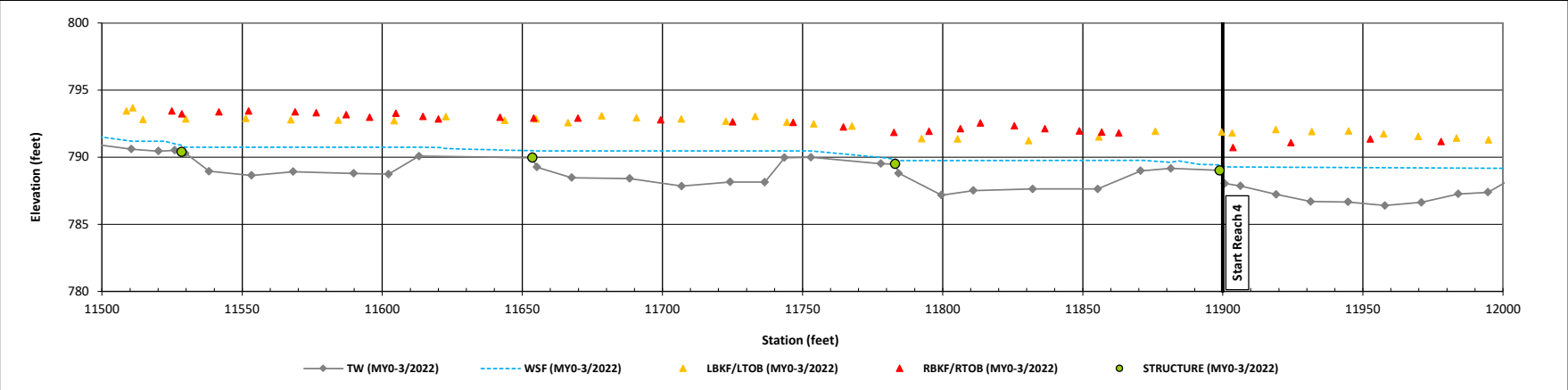


Longitudinal Profile Plots
Oak Hill Creek Mitigation Site
DMS Project No. 100120
Monitoring Year 0 - 2022

Oak Hill Creek (STA 100+10 to 123+73)

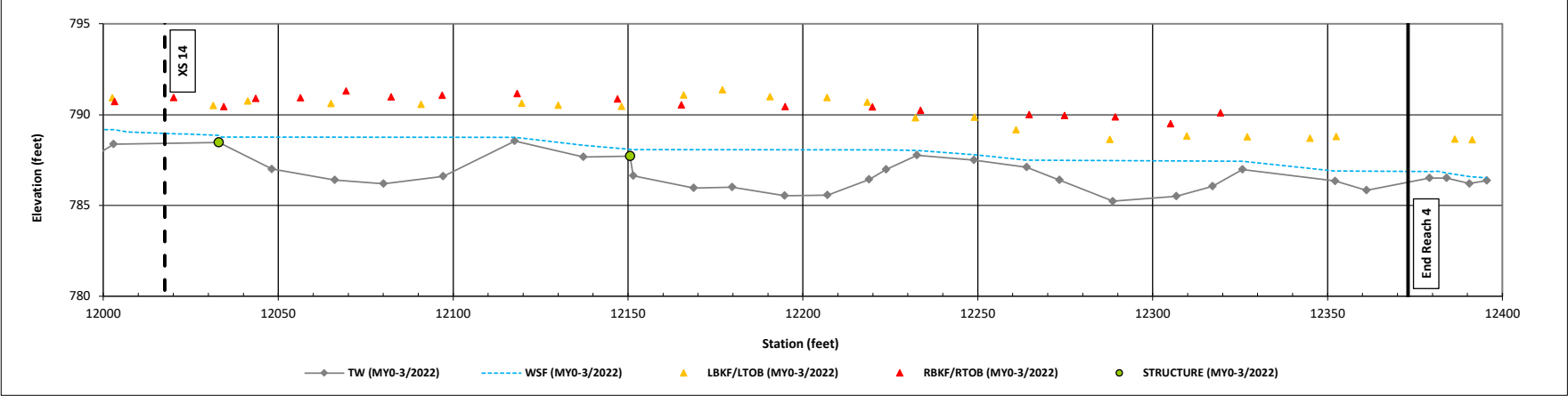


Oak Hill Creek (STA 100+10 to 123+73)



Longitudinal Profile Plots
Oak Hill Creek Mitigation Site
DMS Project No. 100120
Monitoring Year 0 - 2022

Oak Hill Creek (STA 100+10 to 123+73)



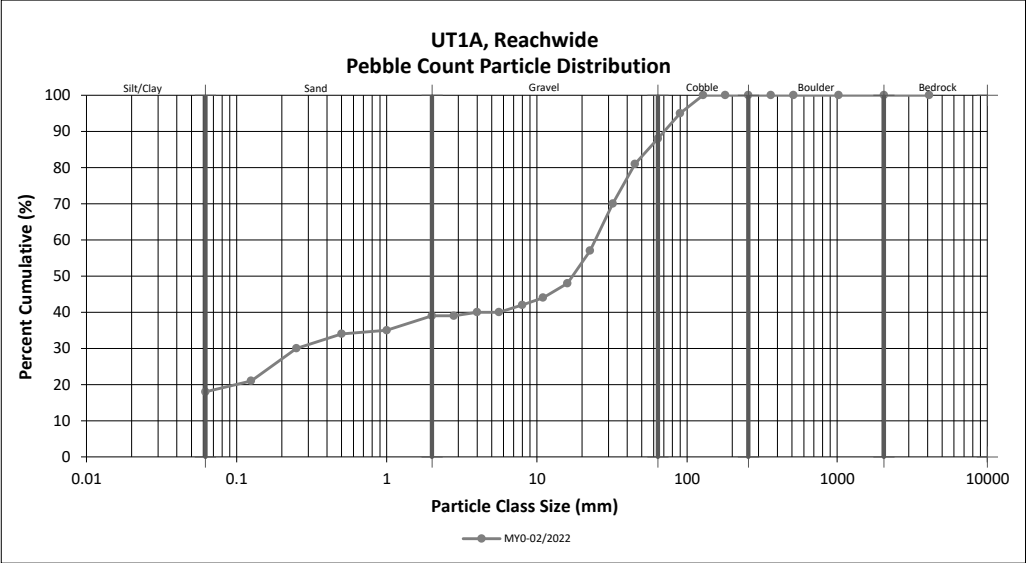
Reachwide and Cross-Section Pebble Count Plots

Oak Hill Dairy Mitigation Site
DMS Project No. 100120
Monitoring Year 0 - 2022

UT1A, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
<i>SILT/CLAY</i>	Silt/Clay	0.000	0.062		18	18	18	18
<i>SAND</i>	Very fine	0.062	0.125		3	3	3	21
	Fine	0.125	0.250	2	7	9	9	30
	Medium	0.25	0.50		4	4	4	34
	Coarse	0.5	1.0		1	1	1	35
	Very Coarse	1.0	2.0	2	2	4	4	39
<i>GRAVEL</i>	Very Fine	2.0	2.8					39
	Very Fine	2.8	4.0		1	1	1	40
	Fine	4.0	5.6					40
	Fine	5.6	8.0		2	2	2	42
	Medium	8.0	11.0	1	1	2	2	44
	Medium	11.0	16.0	4		4	4	48
	Coarse	16.0	22.6	8	1	9	9	57
	Coarse	22.6	32	11	2	13	13	70
	Very Coarse	32	45	6	5	11	11	81
	Very Coarse	45	64	6	1	7	7	88
<i>COBBLE</i>	Small	64	90	5	2	7	7	95
	Small	90	128	5		5	5	100
	Large	128	180					100
	Large	180	256					100
<i>BOULDER</i>	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
<i>BEDROCK</i>	Bedrock	2048	>2048					100
Total				50	50	100	100	100

Reachwide	
Channel materials (mm)	
D ₁₆ =	Silt/Clay
D ₃₅ =	1.0
D ₅₀ =	17.3
D ₈₄ =	52.3
D ₉₅ =	90.0
D ₁₀₀ =	128.0



Reachwide and Cross-Section Pebble Count Plots

Oak Hill Dairy Mitigation Site

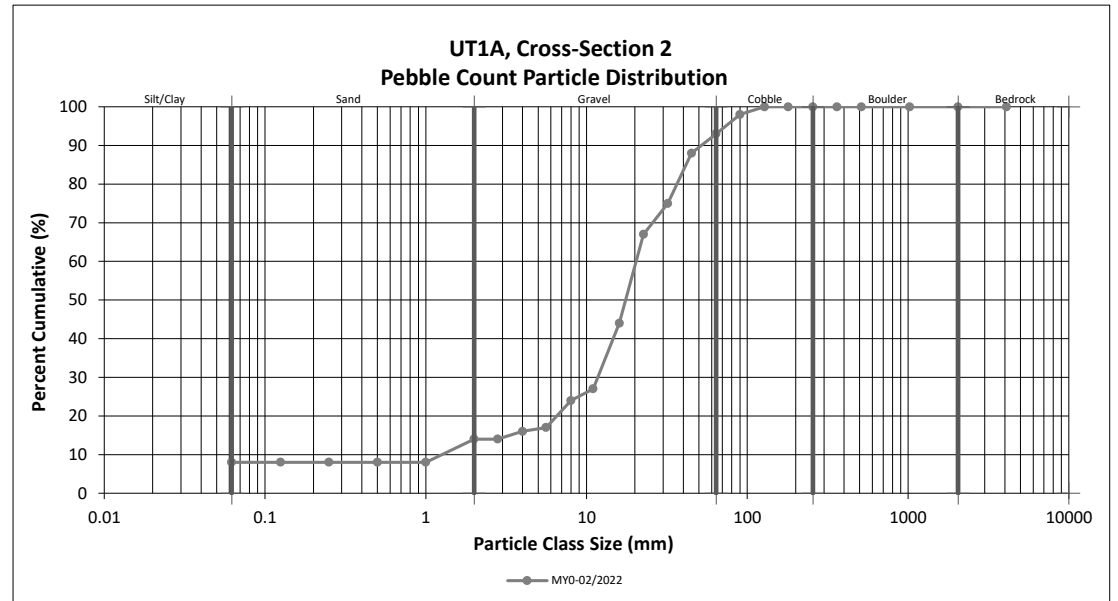
DMS Project No. 100120

Monitoring Year 0 - 2022

UT1A, Cross-Section 2

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	8	8	8
SAND	Very fine	0.062	0.125			8
	Fine	0.125	0.250			8
	Medium	0.25	0.50			8
	Coarse	0.5	1.0			8
	Very Coarse	1.0	2.0	6	6	14
GRAVEL	Very Fine	2.0	2.8			14
	Very Fine	2.8	4.0	2	2	16
	Fine	4.0	5.6	1	1	17
	Fine	5.6	8.0	7	7	24
	Medium	8.0	11.0	3	3	27
	Medium	11.0	16.0	17	17	44
	Coarse	16.0	22.6	23	23	67
	Coarse	22.6	32	8	8	75
	Very Coarse	32	45	13	13	88
	Very Coarse	45	64	5	5	93
COBBLE	Small	64	90	5	5	98
	Small	90	128	2	2	100
	Large	128	180			100
	Large	180	256			100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
Total				100	100	100

Cross-Section 2	
Channel materials (mm)	
D ₁₆ =	4.0
D ₃₅ =	13.1
D ₅₀ =	17.5
D ₈₄ =	40.5
D ₉₅ =	73.4
D ₁₀₀ =	128.0



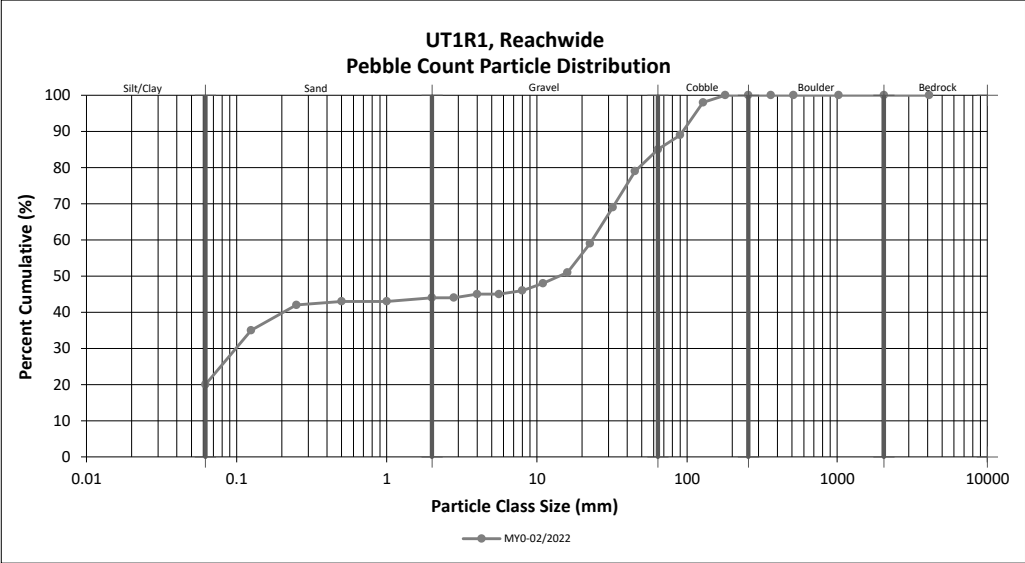
Reachwide and Cross-Section Pebble Count Plots

Oak Hill Dairy Mitigation Site
DMS Project No. 100120
Monitoring Year 0 - 2022

UT1R1, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
<i>SILT/CLAY</i>	Silt/Clay	0.000	0.062		20	20	20	20
<i>SAND</i>	Very fine	0.062	0.125		15	15	15	35
	Fine	0.125	0.250		7	7	7	42
	Medium	0.25	0.50	1		1	1	43
	Coarse	0.5	1.0					43
	Very Coarse	1.0	2.0	1		1	1	44
<i>GRAVEL</i>	Very Fine	2.0	2.8					44
	Very Fine	2.8	4.0		1	1	1	45
	Fine	4.0	5.6					45
	Fine	5.6	8.0		1	1	1	46
	Medium	8.0	11.0	2		2	2	48
	Medium	11.0	16.0	1	2	3	3	51
	Coarse	16.0	22.6	5	3	8	8	59
	Coarse	22.6	32	10		10	10	69
	Very Coarse	32	45	9	1	10	10	79
<i>COBBLE</i>	Very Coarse	45	64	6		6	6	85
	Small	64	90	4		4	4	89
	Small	90	128	9		9	9	98
	Large	128	180	2		2	2	100
<i>BOULDER</i>	Large	180	256					100
	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
<i>BEDROCK</i>	Large/Very Large	1024	2048					100
	Bedrock	2048	>2048					100
Total				50	50	100	100	100

Reachwide	
Channel materials (mm)	
D ₁₆ =	Silt/Clay
D ₃₅ =	0.1
D ₅₀ =	14.1
D ₈₄ =	60.4
D ₉₅ =	113.8
D ₁₀₀ =	180.0



Reachwide and Cross-Section Pebble Count Plots

Oak Hill Dairy Mitigation Site

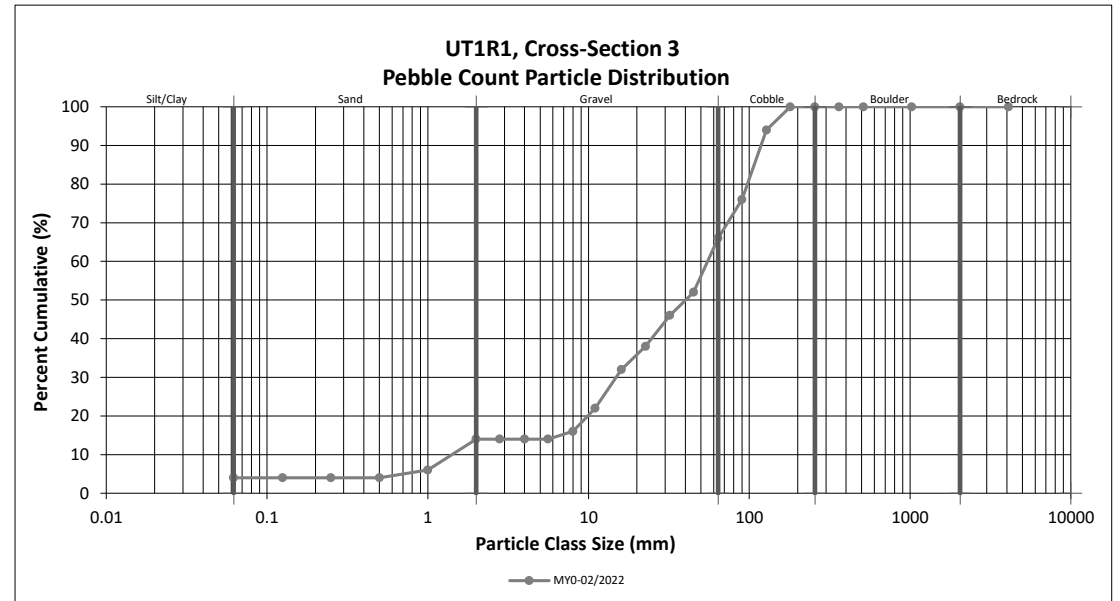
DMS Project No. 100120

Monitoring Year 0 - 2022

UT1R1, Cross-Section 3

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	4	4	4
SAND	Very fine	0.062	0.125			4
	Fine	0.125	0.250			4
	Medium	0.25	0.50			4
	Coarse	0.5	1.0	2	2	6
	Very Coarse	1.0	2.0	8	8	14
GRAVEL	Very Fine	2.0	2.8			14
	Very Fine	2.8	4.0			14
	Fine	4.0	5.6			14
	Fine	5.6	8.0	2	2	16
	Medium	8.0	11.0	6	6	22
	Medium	11.0	16.0	10	10	32
	Coarse	16.0	22.6	6	6	38
	Coarse	22.6	32	8	8	46
	Very Coarse	32	45	6	6	52
	Very Coarse	45	64	14	14	66
COBBLE	Small	64	90	10	10	76
	Small	90	128	18	18	94
	Large	128	180	6	6	100
	Large	180	256			100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
Total				100	100	100

Cross-Section 3	
Channel materials (mm)	
D ₁₆ =	8.0
D ₃₅ =	19.0
D ₅₀ =	40.2
D ₈₄ =	105.3
D ₉₅ =	135.5
D ₁₀₀ =	180.0



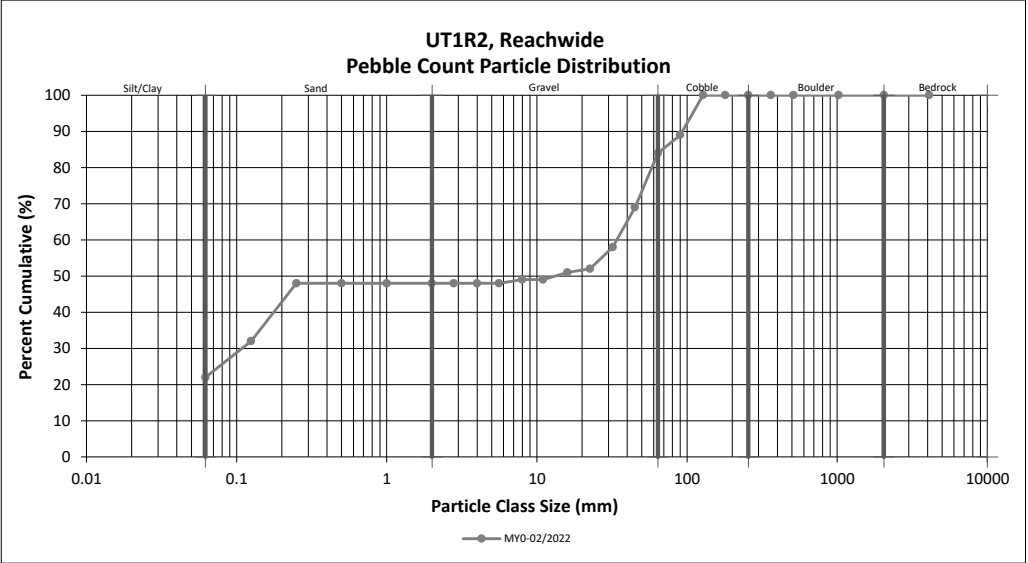
Reachwide and Cross-Section Pebble Count Plots

Oak Hill Dairy Mitigation Site
DMS Project No. 100120
Monitoring Year 0 - 2022

UT1R2, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
<i>SILT/CLAY</i>	Silt/Clay	0.000	0.062		22	22	22	22
<i>SAND</i>	Very fine	0.062	0.125		10	10	10	32
	Fine	0.125	0.250		16	16	16	48
	Medium	0.25	0.50					48
	Coarse	0.5	1.0					48
	Very Coarse	1.0	2.0					48
<i>GRAVEL</i>	Very Fine	2.0	2.8					48
	Very Fine	2.8	4.0					48
	Fine	4.0	5.6					48
	Fine	5.6	8.0		1	1	1	49
	Medium	8.0	11.0					49
	Medium	11.0	16.0	2		2	2	51
	Coarse	16.0	22.6	1		1	1	52
	Coarse	22.6	32	5	1	6	6	58
	Very Coarse	32	45	11		11	11	69
	Very Coarse	45	64	15		15	15	84
<i>COBBLE</i>	Small	64	90	5		5	5	89
	Small	90	128	11		11	11	100
	Large	128	180					100
	Large	180	256					100
<i>BOULDER</i>	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
<i>BEDROCK</i>	Bedrock	2048	>2048					100
Total				50	50	100	100	100

Reachwide	
Channel materials (mm)	
D ₁₆ =	Silt/Clay
D ₃₅ =	0.1
D ₅₀ =	13.3
D ₈₄ =	64.0
D ₉₅ =	109.1
D ₁₀₀ =	128.0



Reachwide and Cross-Section Pebble Count Plots

Oak Hill Dairy Mitigation Site

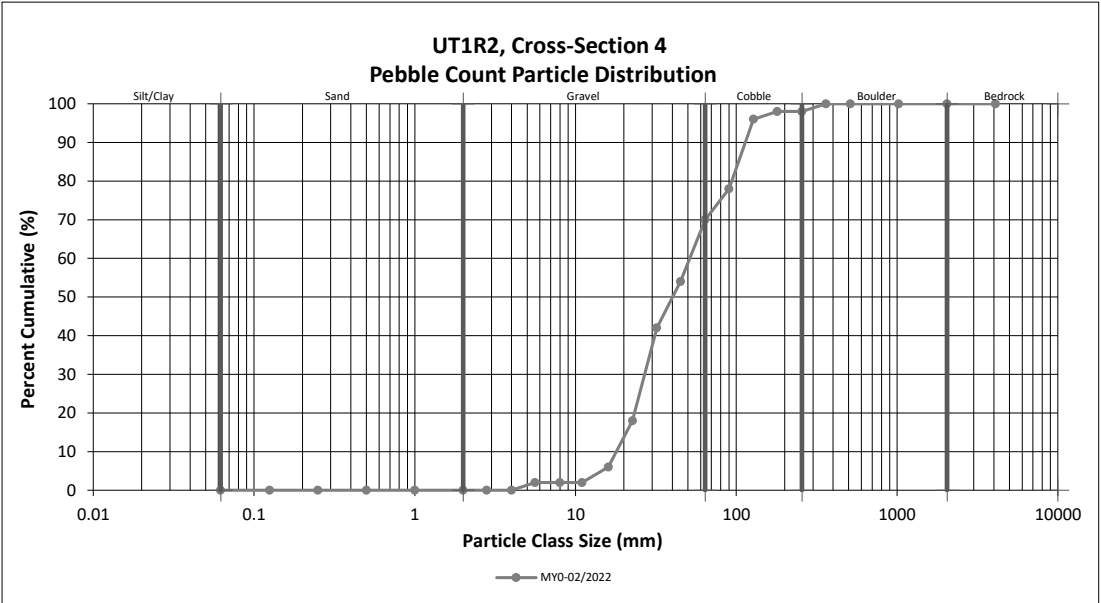
DMS Project No. 100120

Monitoring Year 0 - 2022

UT1R2, Cross-Section 4

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
<i>SILT/CLAY</i>	Silt/Clay	0.000	0.062			0
<i>SAND</i>	Very fine	0.062	0.125			0
	Fine	0.125	0.250			0
	Medium	0.25	0.50			0
	Coarse	0.5	1.0			0
	Very Coarse	1.0	2.0			0
<i>GRAVEL</i>	Very Fine	2.0	2.8			0
	Very Fine	2.8	4.0			0
	Fine	4.0	5.6	2	2	2
	Fine	5.6	8.0			2
	Medium	8.0	11.0			2
	Medium	11.0	16.0	4	4	6
	Coarse	16.0	22.6	12	12	18
	Coarse	22.6	32	24	24	42
	Very Coarse	32	45	12	12	54
<i>COBBLE</i>	Very Coarse	45	64	16	16	70
	Small	64	90	8	8	78
	Small	90	128	18	18	96
	Large	128	180	2	2	98
<i>BOULDER</i>	Large	180	256			98
	Small	256	362	2	2	100
	Small	362	512			100
	Medium	512	1024			100
<i>BEDROCK</i>	Large/Very Large	1024	2048			100
	Bedrock	2048	>2048			100
Total				100	100	100

Cross-Section 4	
Channel materials (mm)	
D ₁₆ =	21.3
D ₃₅ =	28.9
D ₅₀ =	40.2
D ₈₄ =	101.2
D ₉₅ =	125.5
D ₁₀₀ =	362.0



Reachwide and Cross-Section Pebble Count Plots

Oak Hill Dairy Mitigation Site

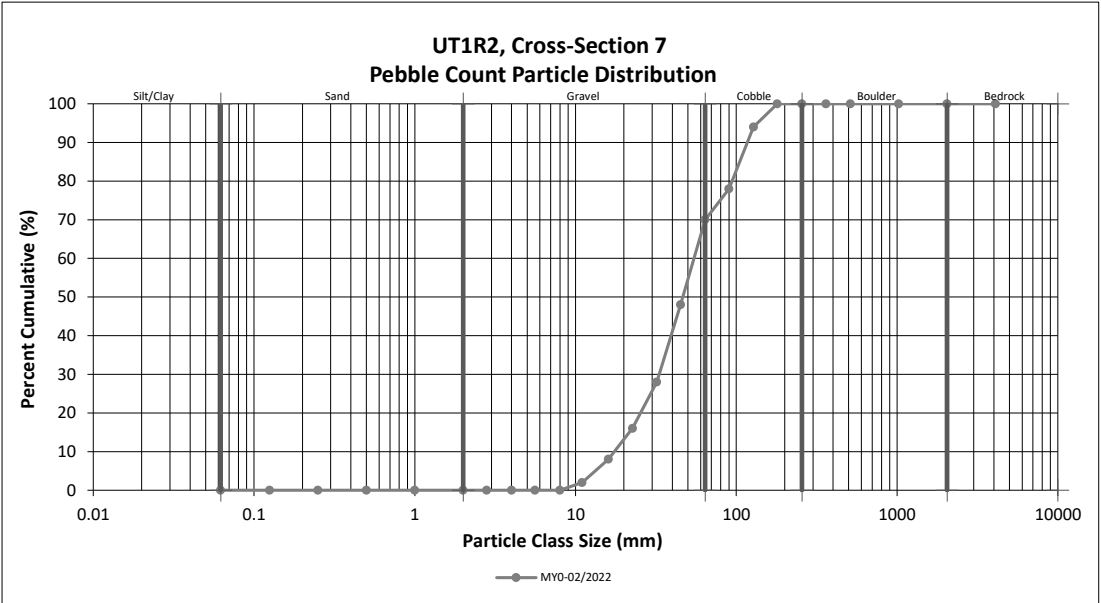
DMS Project No. 100120

Monitoring Year 0 - 2022

UT1R2, Cross-Section 7

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
<i>SILT/CLAY</i>	Silt/Clay	0.000	0.062			0
<i>SAND</i>	Very fine	0.062	0.125			0
	Fine	0.125	0.250			0
	Medium	0.25	0.50			0
	Coarse	0.5	1.0			0
	Very Coarse	1.0	2.0			0
<i>GRAVEL</i>	Very Fine	2.0	2.8			0
	Very Fine	2.8	4.0			0
	Fine	4.0	5.6			0
	Fine	5.6	8.0			0
	Medium	8.0	11.0	2	2	2
	Medium	11.0	16.0	6	6	8
	Coarse	16.0	22.6	8	8	16
	Coarse	22.6	32	12	12	28
	Very Coarse	32	45	20	20	48
<i>COBBLE</i>	Very Coarse	45	64	22	22	70
	Small	64	90	8	8	78
	Small	90	128	16	16	94
	Large	128	180	6	6	100
<i>BOULDER</i>	Large	180	256			100
	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
<i>BEDROCK</i>	Large/Very Large	1024	2048			100
	Bedrock	2048	>2048			100
Total				100	100	100

Cross-Section 7	
Channel materials (mm)	
D ₁₆ =	22.6
D ₃₅ =	36.1
D ₅₀ =	46.5
D ₈₄ =	102.7
D ₉₅ =	135.5
D ₁₀₀ =	180.0



Reachwide and Cross-Section Pebble Count Plots

Oak Hill Dairy Mitigation Site

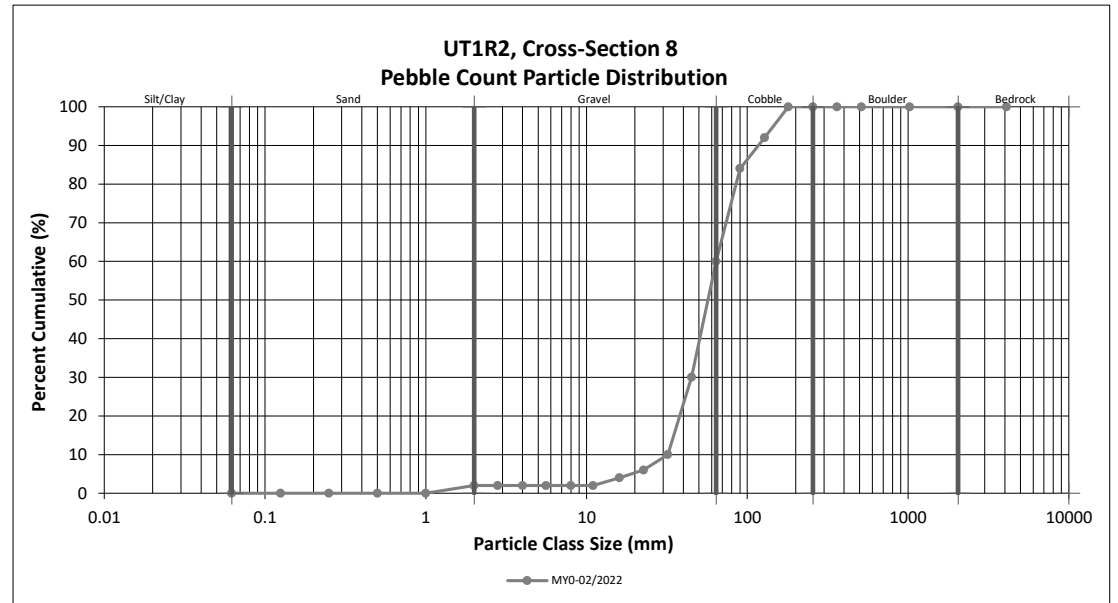
DMS Project No. 100120

Monitoring Year 0 - 2022

UT1R2, Cross-Section 8

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062			0
SAND	Very fine	0.062	0.125			0
	Fine	0.125	0.250			0
	Medium	0.25	0.50			0
	Coarse	0.5	1.0			0
	Very Coarse	1.0	2.0	2	2	2
GRAVEL	Very Fine	2.0	2.8			2
	Very Fine	2.8	4.0			2
	Fine	4.0	5.6			2
	Fine	5.6	8.0			2
	Medium	8.0	11.0			2
	Medium	11.0	16.0	2	2	4
	Coarse	16.0	22.6	2	2	6
	Coarse	22.6	32	4	4	10
	Very Coarse	32	45	20	20	30
	Very Coarse	45	64	30	30	60
COBBLE	Small	64	90	24	24	84
	Small	90	128	8	8	92
	Large	128	180	8	8	100
	Large	180	256			100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
Total				100	100	100

Cross-Section 8	
Channel materials (mm)	
D ₁₆ =	35.4
D ₃₅ =	47.7
D ₅₀ =	56.9
D ₈₄ =	90.0
D ₉₅ =	145.5
D ₁₀₀ =	180.0



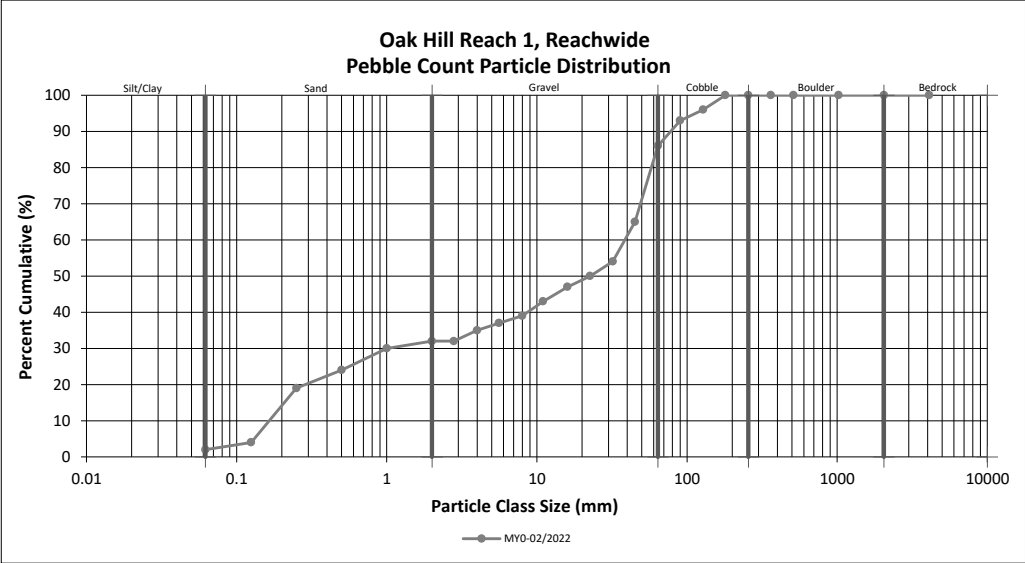
Reachwide and Cross-Section Pebble Count Plots

Oak Hill Dairy Mitigation Site
DMS Project No. 100120
Monitoring Year 0 - 2022

Oak Hill Reach 1, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062		2	2	2	2
SAND	Very fine	0.062	0.125		2	2	2	4
	Fine	0.125	0.250		15	15	15	19
	Medium	0.25	0.50		5	5	5	24
	Coarse	0.5	1.0		6	6	6	30
	Very Coarse	1.0	2.0		2	2	2	32
GRAVEL	Very Fine	2.0	2.8					32
	Very Fine	2.8	4.0		3	3	3	35
	Fine	4.0	5.6		2	2	2	37
	Fine	5.6	8.0		2	2	2	39
	Medium	8.0	11.0		4	4	4	43
	Medium	11.0	16.0	2	2	4	4	47
	Coarse	16.0	22.6	3		3	3	50
	Coarse	22.6	32	2	2	4	4	54
	Very Coarse	32	45	8	3	11	11	65
	Very Coarse	45	64	21		21	21	86
COBBLE	Small	64	90	7		7	7	93
	Small	90	128	3		3	3	96
	Large	128	180	4		4	4	100
	Large	180	256					100
BOULDER	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
Total				50	50	100	100	100

Reachwide	
Channel materials (mm)	
D ₁₆ =	0.2
D ₃₅ =	4.0
D ₅₀ =	22.6
D ₈₄ =	61.9
D ₉₅ =	113.8
D ₁₀₀ =	180.0



Reachwide and Cross-Section Pebble Count Plots

Oak Hill Dairy Mitigation Site

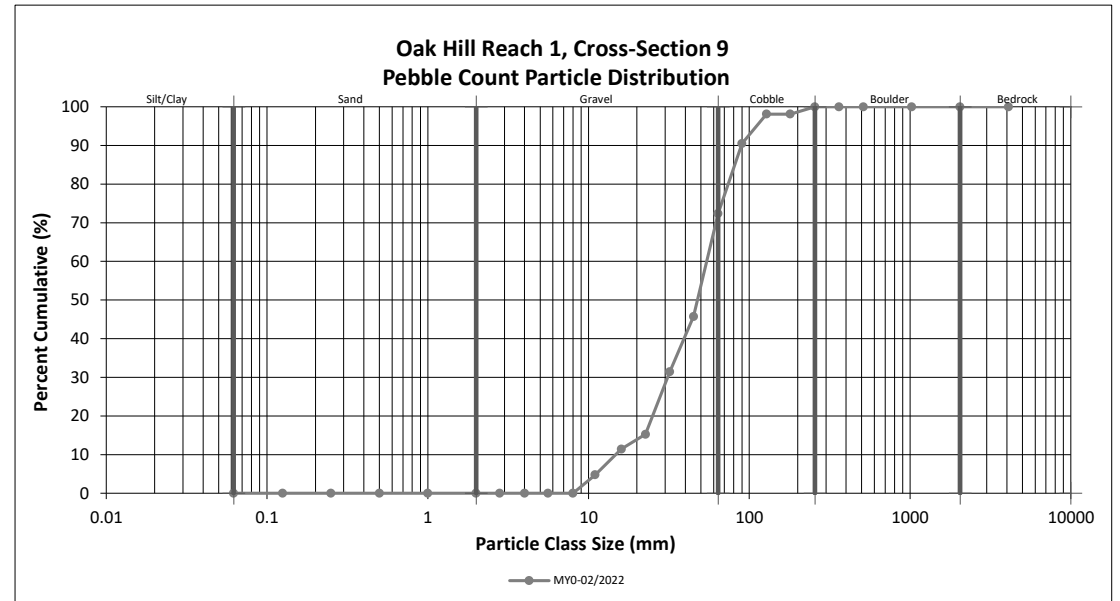
DMS Project No. 100120

Monitoring Year 0 - 2022

Oak Hill Reach 1, Cross-Section 9

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062			0
SAND	Very fine	0.062	0.125			0
	Fine	0.125	0.250			0
	Medium	0.25	0.50			0
	Coarse	0.5	1.0			0
	Very Coarse	1.0	2.0			0
GRAVEL	Very Fine	2.0	2.8			0
	Very Fine	2.8	4.0			0
	Fine	4.0	5.6			0
	Fine	5.6	8.0			0
	Medium	8.0	11.0	5	5	5
	Medium	11.0	16.0	7	7	11
	Coarse	16.0	22.6	4	4	15
	Coarse	22.6	32	17	16	31
	Very Coarse	32	45	15	14	46
	Very Coarse	45	64	28	27	72
COBBLE	Small	64	90	19	18	90
	Small	90	128	8	8	98
	Large	128	180			98
	Large	180	256	2	2	100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
Total				105	100	100

Cross-Section 9	
Channel materials (mm)	
D ₁₆ =	23.0
D ₃₅ =	34.8
D ₅₀ =	47.6
D ₈₄ =	79.7
D ₉₅ =	110.9
D ₁₀₀ =	256.0



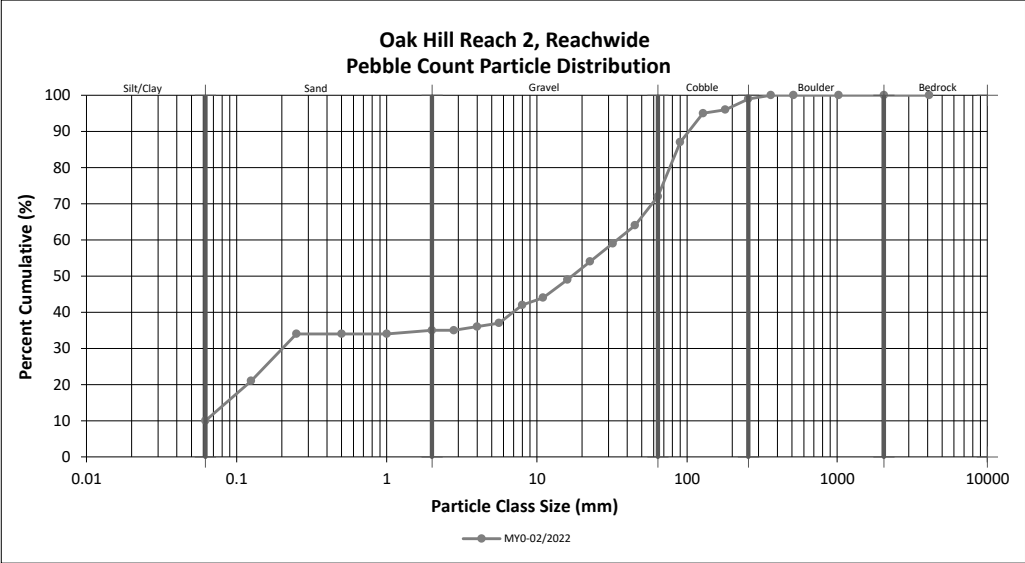
Reachwide and Cross-Section Pebble Count Plots

Oak Hill Dairy Mitigation Site
DMS Project No. 100120
Monitoring Year 0 - 2022

Oak Hill Reach 2, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
<i>SILT/CLAY</i>	Silt/Clay	0.000	0.062		10	10	10	10
<i>SAND</i>	Very fine	0.062	0.125		11	11	11	21
	Fine	0.125	0.250		13	13	13	34
	Medium	0.25	0.50					34
	Coarse	0.5	1.0					34
	Very Coarse	1.0	2.0		1	1	1	35
<i>GRAVEL</i>	Very Fine	2.0	2.8					35
	Very Fine	2.8	4.0		1	1	1	36
	Fine	4.0	5.6	1		1	1	37
	Fine	5.6	8.0		5	5	5	42
	Medium	8.0	11.0		2	2	2	44
	Medium	11.0	16.0	3	2	5	5	49
	Coarse	16.0	22.6	3	2	5	5	54
	Coarse	22.6	32	3	2	5	5	59
	Very Coarse	32	45	4	1	5	5	64
	Very Coarse	45	64	8		8	8	72
<i>COBBLE</i>	Small	64	90	15		15	15	87
	Small	90	128	8		8	8	95
	Large	128	180	1		1	1	96
	Large	180	256	3		3	3	99
<i>BOULDER</i>	Small	256	362	1		1	1	100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
<i>BEDROCK</i>	Bedrock	2048	>2048					100
Total				50	50	100	100	100

Reachwide	
Channel materials (mm)	
D ₁₆ =	0.1
D ₃₅ =	2.0
D ₅₀ =	17.1
D ₈₄ =	84.1
D ₉₅ =	128.0
D ₁₀₀ =	362.0



Reachwide and Cross-Section Pebble Count Plots

Oak Hill Dairy Mitigation Site

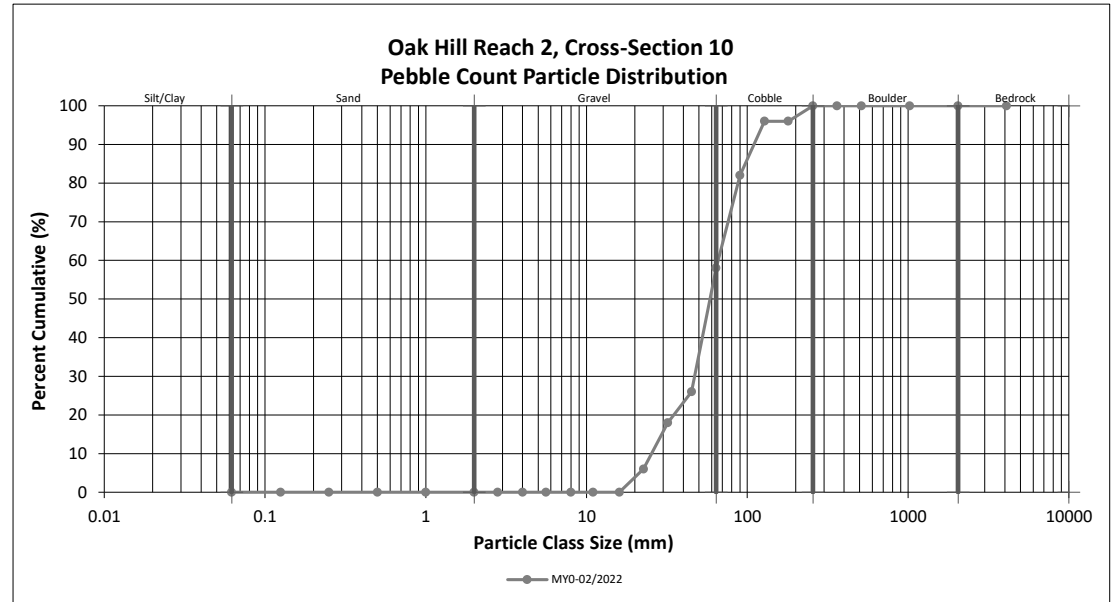
DMS Project No. 100120

Monitoring Year 0 - 2022

Oak Hill Reach 2, Cross-Section 10

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062			0
SAND	Very fine	0.062	0.125			0
	Fine	0.125	0.250			0
	Medium	0.25	0.50			0
	Coarse	0.5	1.0			0
	Very Coarse	1.0	2.0			0
GRAVEL	Very Fine	2.0	2.8			0
	Very Fine	2.8	4.0			0
	Fine	4.0	5.6			0
	Fine	5.6	8.0			0
	Medium	8.0	11.0			0
	Medium	11.0	16.0			0
	Coarse	16.0	22.6	6	6	6
	Coarse	22.6	32	12	12	18
	Very Coarse	32	45	8	8	26
	Very Coarse	45	64	32	32	58
COBBLE	Small	64	90	24	24	82
	Small	90	128	14	14	96
	Large	128	180			96
	Large	180	256	4	4	100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
Total				100	100	100

Cross-Section 10	
Channel materials (mm)	
D ₁₆ =	30.2
D ₃₅ =	49.7
D ₅₀ =	58.6
D ₈₄ =	94.6
D ₉₅ =	124.8
D ₁₀₀ =	256.0



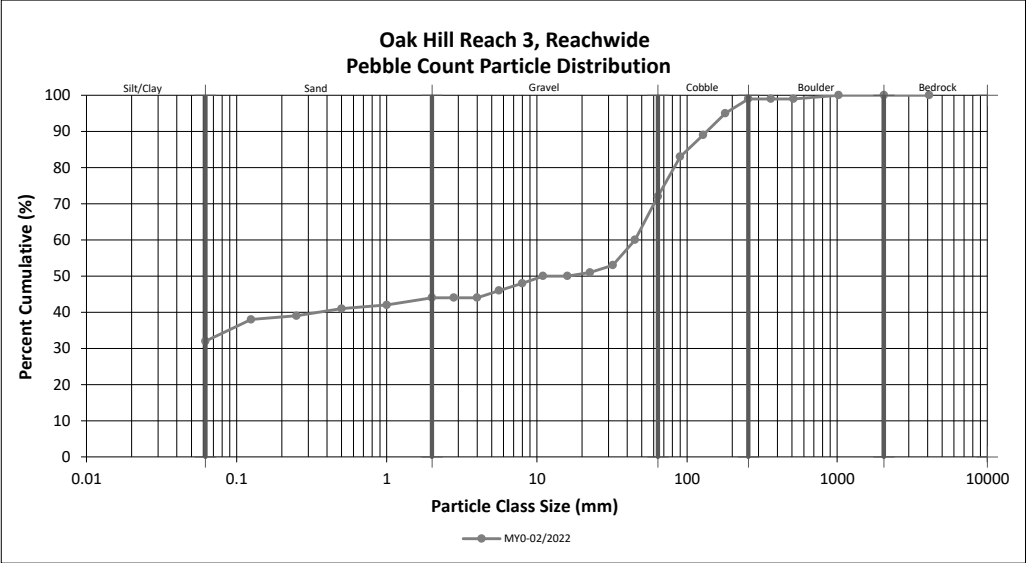
Reachwide and Cross-Section Pebble Count Plots

Oak Hill Dairy Mitigation Site
DMS Project No. 100120
Monitoring Year 0 - 2022

Oak Hill Reach 3, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062		32	32	32	32
SAND	Very fine	0.062	0.125		6	6	6	38
	Fine	0.125	0.250		1	1	1	39
	Medium	0.25	0.50		2	2	2	41
	Coarse	0.5	1.0		1	1	1	42
	Very Coarse	1.0	2.0		2	2	2	44
GRAVEL	Very Fine	2.0	2.8					44
	Very Fine	2.8	4.0					44
	Fine	4.0	5.6		2	2	2	46
	Fine	5.6	8.0		2	2	2	48
	Medium	8.0	11.0		2	2	2	50
	Medium	11.0	16.0					50
	Coarse	16.0	22.6	1		1	1	51
	Coarse	22.6	32	2		2	2	53
	Very Coarse	32	45	7		7	7	60
	Very Coarse	45	64	12		12	12	72
COBBLE	Small	64	90	11		11	11	83
	Small	90	128	6		6	6	89
	Large	128	180	6		6	6	95
	Large	180	256	4		4	4	99
BOULDER	Small	256	362					99
	Small	362	512					99
	Medium	512	1024	1		1	1	100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
Total				50	50	100	100	100

Reachwide	
Channel materials (mm)	
D ₁₆ =	Silt/Clay
D ₃₅ =	0.1
D ₅₀ =	11.0
D ₈₄ =	95.4
D ₉₅ =	180.0
D ₁₀₀ =	1024.0



Reachwide and Cross-Section Pebble Count Plots

Oak Hill Dairy Mitigation Site

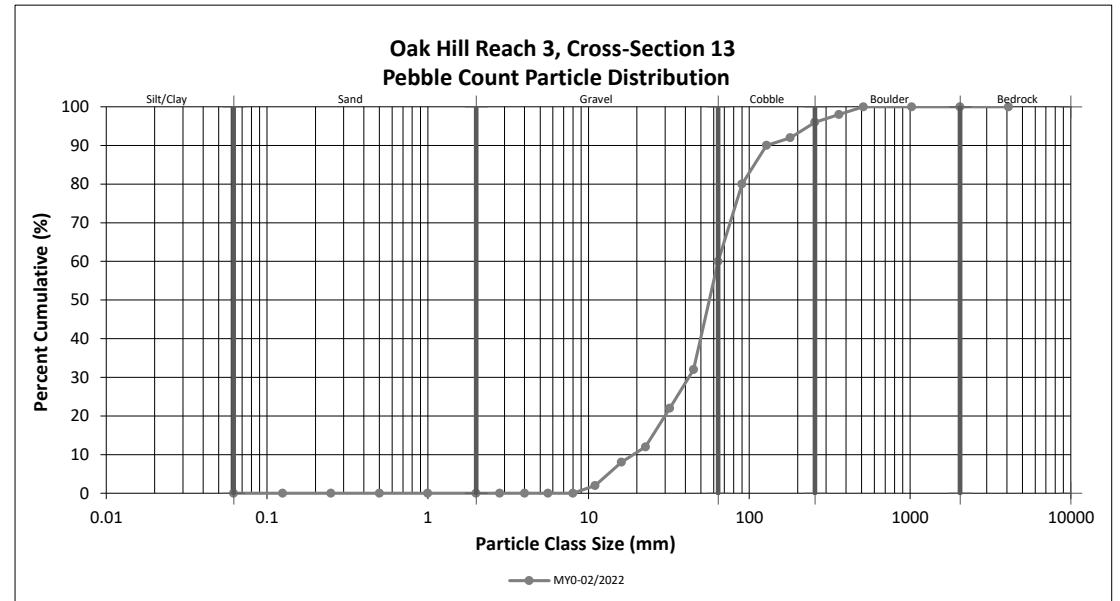
DMS Project No. 100120

Monitoring Year 0 - 2022

Oak Hill Reach 3, Cross-Section 13

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062			0
SAND	Very fine	0.062	0.125			0
	Fine	0.125	0.250			0
	Medium	0.25	0.50			0
	Coarse	0.5	1.0			0
	Very Coarse	1.0	2.0			0
GRAVEL	Very Fine	2.0	2.8			0
	Very Fine	2.8	4.0			0
	Fine	4.0	5.6			0
	Fine	5.6	8.0			0
	Medium	8.0	11.0	2	2	2
	Medium	11.0	16.0	6	6	8
	Coarse	16.0	22.6	4	4	12
	Coarse	22.6	32	10	10	22
	Very Coarse	32	45	10	10	32
COBBLE	Very Coarse	45	64	28	28	60
	Small	64	90	20	20	80
	Small	90	128	10	10	90
	Large	128	180	2	2	92
BOULDER	Large	180	256	4	4	96
	Small	256	362	2	2	98
	Small	362	512	2	2	100
	Medium	512	1024			100
BEDROCK	Large/Very Large	1024	2048			100
	Bedrock	2048	>2048			100
Total				100	100	100

Cross-Section 13	
Channel materials (mm)	
D ₁₆ =	26.0
D ₃₅ =	46.7
D ₅₀ =	56.4
D ₈₄ =	103.6
D ₉₅ =	234.4
D ₁₀₀ =	512.0



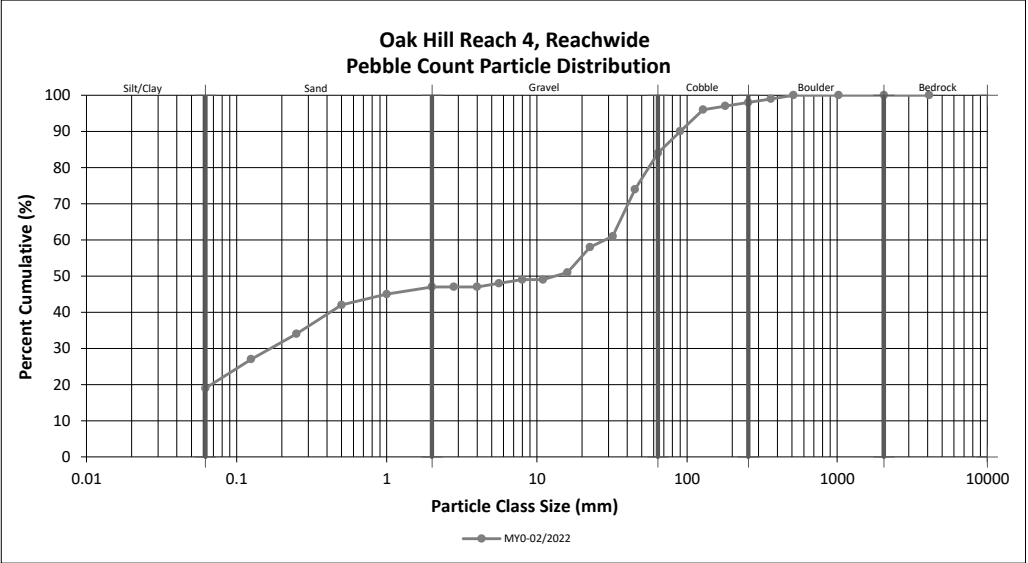
Reachwide and Cross-Section Pebble Count Plots

Oak Hill Dairy Mitigation Site
DMS Project No. 100120
Monitoring Year 0 - 2022

Oak Hill Reach 4, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
<i>SILT/CLAY</i>	Silt/Clay	0.000	0.062		19	19	19	19
<i>SAND</i>	Very fine	0.062	0.125		8	8	8	27
	Fine	0.125	0.250		7	7	7	34
	Medium	0.25	0.50		8	8	8	42
	Coarse	0.5	1.0		3	3	3	45
	Very Coarse	1.0	2.0		2	2	2	47
<i>GRAVEL</i>	Very Fine	2.0	2.8					47
	Very Fine	2.8	4.0					47
	Fine	4.0	5.6		1	1	1	48
	Fine	5.6	8.0		1	1	1	49
	Medium	8.0	11.0					49
	Medium	11.0	16.0	2		2	2	51
	Coarse	16.0	22.6	7		7	7	58
	Coarse	22.6	32	3		3	3	61
	Very Coarse	32	45	12	1	13	13	74
	Very Coarse	45	64	10		10	10	84
<i>COBBLE</i>	Small	64	90	6		6	6	90
	Small	90	128	6		6	6	96
	Large	128	180	1		1	1	97
	Large	180	256	1		1	1	98
<i>BOULDER</i>	Small	256	362	1		1	1	99
	Small	362	512	1		1	1	100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
<i>BEDROCK</i>	Bedrock	2048	>2048					100
Total				50	50	100	100	100

Reachwide	
Channel materials (mm)	
D ₁₆ =	Silt/Clay
D ₃₅ =	0.3
D ₅₀ =	13.3
D ₈₄ =	64.0
D ₉₅ =	120.7
D ₁₀₀ =	512.0



Reachwide and Cross-Section Pebble Count Plots

Oak Hill Dairy Mitigation Site

DMS Project No. 100120

Monitoring Year 0 - 2022

Oak Hill Reach 4, Cross-Section 14

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062			0
SAND	Very fine	0.062	0.125			0
	Fine	0.125	0.250			0
	Medium	0.25	0.50			0
	Coarse	0.5	1.0			0
	Very Coarse	1.0	2.0			0
GRAVEL	Very Fine	2.0	2.8			0
	Very Fine	2.8	4.0			0
	Fine	4.0	5.6			0
	Fine	5.6	8.0			0
	Medium	8.0	11.0			0
	Medium	11.0	16.0	2	2	2
	Coarse	16.0	22.6	2	2	4
	Coarse	22.6	32	4	4	8
	Very Coarse	32	45	14	14	22
	Very Coarse	45	64	24	24	46
COBBLE	Small	64	90	28	28	74
	Small	90	128	8	8	82
	Large	128	180	12	12	94
	Large	180	256	6	6	100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
Total				100	100	100

Cross-Section 14	
Channel materials (mm)	
D ₁₆ =	38.9
D ₃₅ =	54.5
D ₅₀ =	67.2
D ₈₄ =	135.5
D ₉₅ =	190.9
D ₁₀₀ =	256.0

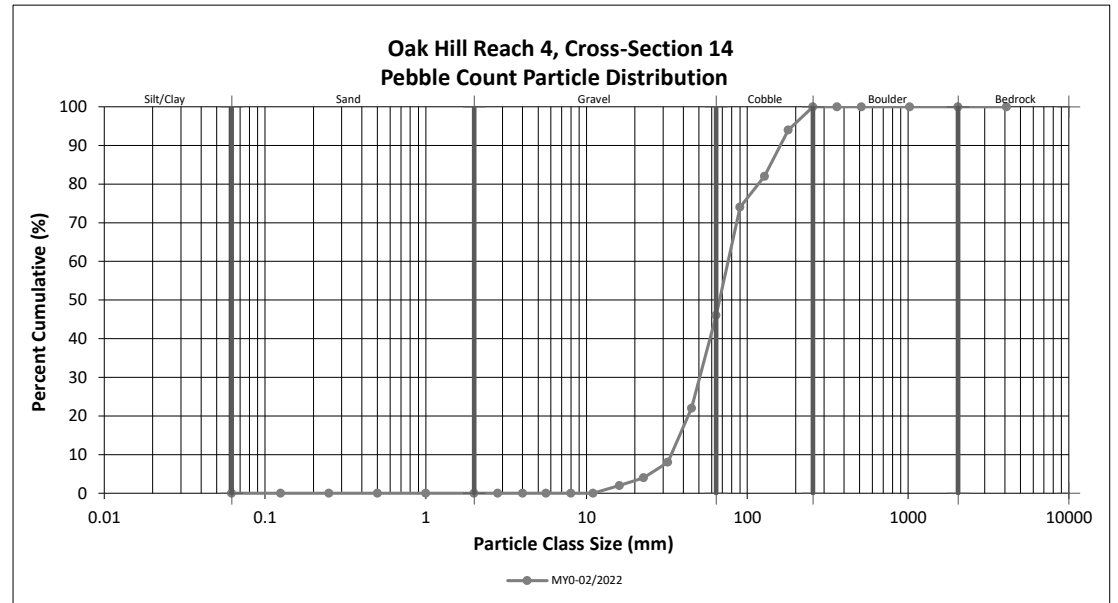


Table 8a. Baseline Stream Data Summary

Oak Hill Dairy Mitigation Site

DMS Project No. 100120

Monitoring Year 0 - 2022

	PRE-EXISTING CONDITIONS			DESIGN		MONITORING BASELINE (MY0)		
Parameter	UT1A							
Riffle Only	Min	Max	n	Min	Max	Min	Max	n
Bankfull Width (ft)	9.9		1	5.5		4.3		1
Floodprone Width (ft)	12.2		1	8.0	12.0	9.3		1
Bankfull Mean Depth	0.2		1	0.5		0.3		1
Bankfull Max Depth	0.4		1	0.6	0.8	0.5		1
Bankfull Cross Sectional Area (ft ²)	1.9		1	2.6		1.2		1
Width/Depth Ratio	51.0		1	12.0		15.0		1
Entrenchment Ratio	1.2		1	1.4	2.2	2.2		1
Bank Height Ratio	9.6		1	1.0	1.1	1.0		1
Max part size (mm) mobilized at bankfull	Silt			---		17.5		1
Rosgen Classification	F6b			E4b		E4b		
Bankfull Discharge (cfs)	3			7		---		
Sinuosity	1.07			1.10		1.10		
Water Surface Slope (ft/ft) ²	0.0250			0.0320		0.0274		
Other								
Parameter	UT1 Reach 1							
Riffle Only	Min	Max	n	Min	Max	Min	Max	n
Bankfull Width (ft)	15.9		1	17.0		18.7		1
Floodprone Width (ft)	24.5		1	37.0	85.0	54.8		1
Bankfull Mean Depth	0.7		1	1.1		1.2		1
Bankfull Max Depth	1.6		1	1.3	1.6	1.8		1
Bankfull Cross Sectional Area (ft ²)	10.7		1	18.4		22.0		1
Width/Depth Ratio	23.4		1	16.0		15.9		1
Entrenchment Ratio	1.5		1	2.2	5.0	2.9		1
Bank Height Ratio	2.4		1	1.0	1.1	1.0		1
Max part size (mm) mobilized at bankfull	3.2			---		40.2		1
Rosgen Classification	F4			C4		C4		
Bankfull Discharge (cfs)	31			42		---		
Sinuosity	1.03			1.20		1.20		
Water Surface Slope (ft/ft) ²	0.0077			0.0060		0.0064		
Other								

Table 8b. Baseline Stream Data Summary

Oak Hill Dairy Mitigation Site

DMS Project No. 100120

Monitoring Year 0 - 2022

	PRE-EXISTING CONDITIONS			DESIGN		MONITORING BASELINE (MY0)		
Parameter	UT1 Reach 2							
Riffle Only	Min	Max	n	Min	Max	Min	Max	n
Bankfull Width (ft)	9.1		1	17.0		14.8	16.4	3
Floodprone Width (ft)	16.2		1	37.0	85.0	72.6	100.0	3
Bankfull Mean Depth	1.5		1	1.1		0.8	1.0	3
Bankfull Max Depth	2.2		1	1.3	1.6	1.5	1.8	3
Bankfull Cross Sectional Area (ft ²)	14.1		1	18.4		12.0	15.2	3
Width/Depth Ratio	5.9		1	16.0		14.3	21.0	3
Entrenchment Ratio	1.8		1	2.2	5.0	4.7	6.1	3
Bank Height Ratio	2.4		1	1.0	1.1	1.0		3
Max part size (mm) mobilized at bankfull	3.3			---		40.2	56.9	3
Rosgen Classification	G4			C4		C4		
Bankfull Discharge (cfs)	52			51		---		
Sinuosity	1.15			1.20		1.20		
Water Surface Slope (ft/ft) ²	0.0070			0.0070		0.0070		
Other								
Parameter	Oak Hill Reach 1							
Riffle Only	Min	Max	n	Min	Max	Min	Max	n
Bankfull Width (ft)	19.9		1	20.0		21.5		1
Floodprone Width (ft)	40.0		1	44.0	100.0	72.4		1
Bankfull Mean Depth	1.4		1	1.4		1.2		1
Bankfull Max Depth	1.7		1	1.7	2.1	2.2		1
Bankfull Cross Sectional Area (ft ²)	27.5		1	28.4		25.3		1
Width/Depth Ratio	14.4		1	14.0		18.2		1
Entrenchment Ratio	2.0		1	2.2	5.0	3.4		1
Bank Height Ratio	2.4		1	1.0	1.1	1.0		1
Max part size (mm) mobilized at bankfull	22.6			---		47.6		1
Rosgen Classification	B4c			C4		C4		
Bankfull Discharge (cfs)	98			90		---		
Sinuosity	1.30			1.20		1.20		
Water Surface Slope (ft/ft) ²	0.0070			0.0040		0.0046		
Other								

Table 8c. Baseline Stream Data Summary

Oak Hill Dairy Mitigation Site

DMS Project No. 100120

Monitoring Year 0 - 2022

	PRE-EXISTING CONDITIONS			DESIGN		MONITORING BASELINE (MY0)		
Parameter	Oak Hill Reach 2							
Riffle Only	Min	Max	n	Min	Max	Min	Max	n
Bankfull Width (ft)	14.6		1	23.0		21.2		1
Floodprone Width (ft)	79		1	51	115	83.8		1
Bankfull Mean Depth	1.9		1	1.5		1.2		1
Bankfull Max Depth	3		1	1.7	2.3	2.1		1
Bankfull Cross Sectional Area (ft ²)	28.1		1	33.4		25.5		1
Width/Depth Ratio	7.6		1	16.0		17.7		1
Entrenchment Ratio	5.4		1	2.2	5.0	4.0		1
Bank Height Ratio	2.0		1	1.0	1.1	1.0		1
Max part size (mm) mobilized at bankfull	2.5			---		58.6		1
Rosgen Classification	G4c			C4		C4		
Bankfull Discharge (cfs)	94			88		---		
Sinuosity	1.65			1.20		1.20		
Water Surface Slope (ft/ft) ²	0.0057			0.0055		0.0051		
Other								
Parameter	Oak Hill Reach 3							
Riffle Only	Min	Max	n	Min	Max	Min	Max	n
Bankfull Width (ft)	19.3		1	25.0		22.3		1
Floodprone Width (ft)	49.8		1	55	125	102.5		1
Bankfull Mean Depth	1.5		1	1.8		1.4		1
Bankfull Max Depth	2.2		1	2.1	2.6	2.6		1
Bankfull Cross Sectional Area (ft ²)	29.1		1	43.9		31.5		1
Width/Depth Ratio	12.9		1	14.0		15.8		1
Entrenchment Ratio	2.6		1	2.2	5.0	4.6		1
Bank Height Ratio	2.6		1	1.0	1.1	1.0		1
Max part size (mm) mobilized at bankfull	8.0			---		56.4		1
Rosgen Classification	C4			C4		C4		
Bankfull Discharge (cfs)	95			149		---		
Sinuosity	1.15			1.20		1.20		
Water Surface Slope (ft/ft) ²	0.0052			0.0055		0.0060		
Other								

Table 8d. Baseline Stream Data Summary

Oak Hill Dairy Mitigation Site

DMS Project No. 100120

Monitoring Year 0 - 2022

	PRE-EXISTING CONDITIONS			DESIGN		MONITORING BASELINE (MY0)		
Parameter	Oak Hill Reach 4							
Riffle Only	Min	Max	n	Min	Max	Min	Max	n
Bankfull Width (ft)	19.8		1	25.0		26.0		1
Floodprone Width (ft)	90.7		1	55	125	94.3		1
Bankfull Mean Depth	1.8		1	1.8		1.4		1
Bankfull Max Depth	2.3		1	2.1	2.6	2.7		1
Bankfull Cross Sectional Area (ft ²)	35.1		1	43.9		36.1		1
Width/Depth Ratio	11.2		1	14.0		18.8		1
Entrenchment Ratio	4.6		1	2.2	5.0	3.6		1
Bank Height Ratio	2.3		1	1.0	1.1	1.0		1
Max part size (mm) mobilized at bankfull	1.7			---		67.2		1
Rosgen Classification	E5			C4		C4		
Bankfull Discharge (cfs)	122			156		---		
Sinuosity	1.16			1.20		1.20		
Water Surface Slope (ft/ft) ²	0.0050			0.0070		0.0054		
Other								

Table 9. Cross-Section Morphology Monitoring Summary

Oak Hill Dairy Mitigation Site

DMS Project No. 100120

Monitoring Year 0 - 2022

	UT1A												UT1 Reach 1							UT1 Reach 2						
	Cross-Section 1 (Pool)						Cross-Section 2 (Riffle)						Cross-Section 3 (Riffle)							Cross-Section 4 (Riffle)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY0	MY1	MY2	MY3	MY5	MY7	MY0	MY1	MY2	MY3	MY5	MY7	MY0	MY1	MY2	MY3	MY5	MY7		
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	811.26						810.59						810.05						807.79							
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.0						1.0						1.0						1.0							
Thalweg Elevation	809.87						810.08						808.20						806.22							
LTOB ² Elevation	811.26						810.59						810.05						807.79							
LTOB ² Max Depth (ft)	1.4						0.5						1.8						1.6							
LTOB ² Cross Sectional Area (ft ²)	4.0						1.2						22.0						12.8							
UT1 Reach 2																										
	Cross-Section 5 (Pool)						Cross-Section 6 (Pool)						Cross-Section 7 (Riffle)							Cross-Section 8 (Riffle)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY0	MY1	MY2	MY3	MY5	MY7	MY0	MY1	MY2	MY3	MY5	MY7	MY0	MY1	MY2	MY3	MY5	MY7		
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	807.22						802.40						802.44						797.65							
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.0						1.0						1.0						1.0							
Thalweg Elevation	804.21						798.88						800.62						796.18							
LTOB ² Elevation	807.22						802.40						802.44						797.65							
LTOB ² Max Depth (ft)	3.0						3.5						1.8						1.5							
LTOB ² Cross Sectional Area (ft ²)	26.1						43.0						15.2						12.0							
Oak Hill Reach 1							Oak Hill Reach 2										Oak Hill Reach 3									
	Cross-Section 9 (Riffle)						Cross-Section 10 (Riffle)						Cross-Section 11 (Pool)							Cross-Section 12 (Pool)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY0	MY1	MY2	MY3	MY5	MY7	MY0	MY1	MY2	MY3	MY5	MY7	MY0	MY1	MY2	MY3	MY5	MY7		
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	799.74						798.06						797.76						794.01							
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.0						1.0						1.0						1.0							
Thalweg Elevation	797.55						795.97						793.40						789.76							
LTOB ² Elevation	799.74						798.06						797.76						794.01							
LTOB ² Max Depth (ft)	2.2						2.1						4.4						4.2							
LTOB ² Cross Sectional Area (ft ²)	25.3						25.5						64.9						73.1							
Oak Hill Reach 3							Oak Hill Reach 4																			
	Cross-Section 13 (Riffle)						Cross-Section 14 (Riffle)																			
	MY0	MY1	MY2	MY3	MY5	MY7	MY0	MY1	MY2	MY3	MY5	MY7														
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	794.36						790.90																			
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.0						1.0																			
Thalweg Elevation	791.77						788.21																			
LTOB ² Elevation	794.36						790.90																			
LTOB ² Max Depth (ft)	2.6						2.7																			
LTOB ² Cross Sectional Area (ft ²)	31.5						36.1																			

¹Bank Height Ratio (BHR) takes the As-built bankfull area as the basis for adjusting each subsequent years bankfull elevation.

²LTOB Area and Max depth - These are based on the LTOB elevation for each years survey (The same elevation used for the LTOB in the BHR calculation). Area below the LTOB elevation will be used and tracked for each year as above. The difference between the LTOB elevation and the thalweg elevation (same as in the BHR calculation) will be recroded and tracked above as LTOB max depth.

Appendix D

Project Timeline and Contact Information

Table 10. Project Activity and Reporting History

Oak Hill Dairy Mitigation Site

DMS Project No. 100120

Monitoring Year 0 - 2022

Activity or Deliverable		Data Collection Complete	Task Completion or Deliverable Submission
Project Instituted		N/A	April 2019
Mitigation Plan Approved		July 2019 - March 2021	March 2021
Construction (Grading) Completed		September 2021-January 2022	January 2022
Planting Completed		February 2022	February 2022
As-Built Survey Completed		January - March 2022	April 2022
Baseline Monitoring Document (Year 0)	Stream Survey	February - March 2022	May 2022
	Vegetation Survey	February 2022	
Year 1 Monitoring	Stream Survey	2022	December 2022
	Vegetation Survey	2022	
Year 2 Monitoring	Stream Survey	2023	December 2023
	Vegetation Survey	2023	
Year 3 Monitoring	Stream Survey	2024	December 2024
	Vegetation Survey	2024	
Year 4 Monitoring			
Year 5 Monitoring	Stream Survey	2026	December 2026
	Vegetation Survey	2026	
Year 6 Monitoring			
Year 7 Monitoring	Stream Survey	2028	December 2028
	Vegetation Survey	2028	

Table 11. Project Contact Table

Oak Hill Dairy Mitigation Site

DMS Project No. 100120

Monitoring Year 0 - 2021

Designer Jake McLean, PE, CFM	Wildlands Engineering, Inc. 167-B Haywood Rd Asheville, NC 28806 828.774.5547
Construction Contractor	Wildlands Construction, Inc. 312 W. Millbrook Rd, Suite 225 Raleigh, NC 27609
Monitoring Performers Monitoring, POC	Wildlands Engineering, Inc. Kristi Suggs 704.332.7754

Appendix E

Record Drawings and Sealed As-Built Survey

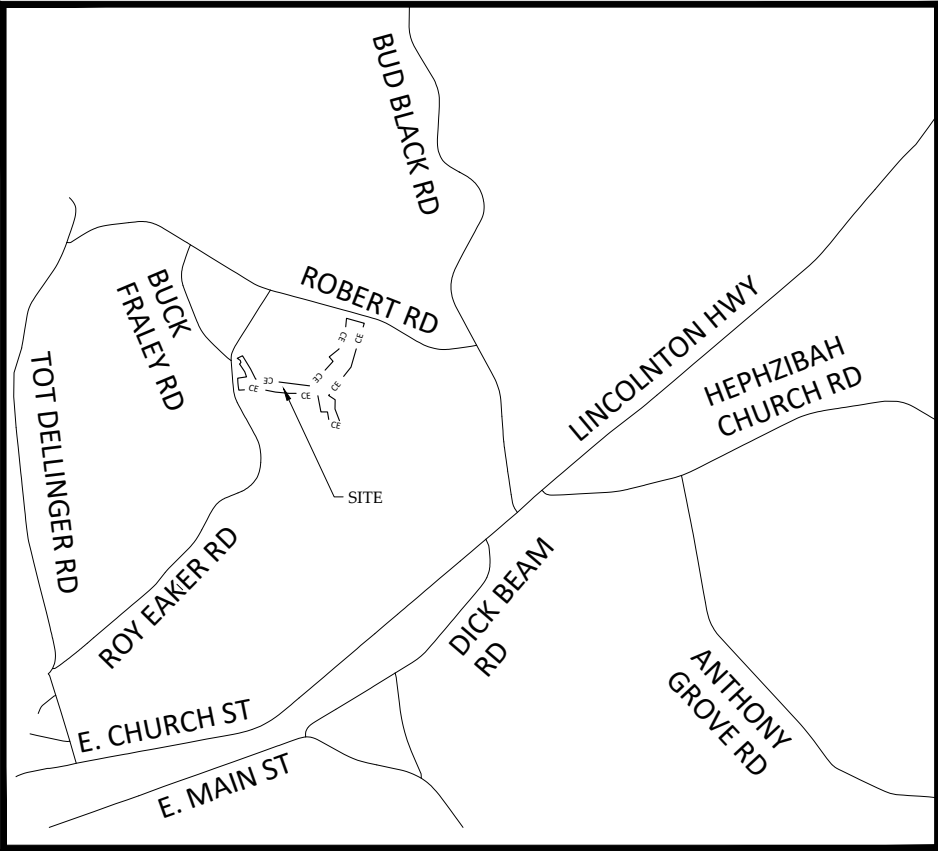
Oak Hill Dairy Mitigation Site Record Drawing

Gaston County, North Carolina

for

NCDEQ

Division of Mitigation Services



Vicinity Map
Not to Scale

STREAM ORIGINS		
NAME	NORTHING	EASTING
OAK HILL CREEK	609299	1299430
UT1	610055	1297694
UT1A	610499	1297711
UT1B	609941	1297705
UT2	610266	1299747
UT3	610616	1299891



PRELIMINARY PLANS
ISSUED May 12, 2022

Sheet Index

Title Sheet	0.1
Project Overview	0.2
General Notes and Symbols	0.3
Stream Plan and Profile	
Oak Hill Creek	1.1-1.6
UT1	1.7-1.11
UT1A	1.12
UT1B	1.13
UT2	1.14
UT3	1.15
Wetland Grading	2.1-2.4
Planting Sheets	3.1-3.5
Fencing and Gate Plan	4.1

Project Directory

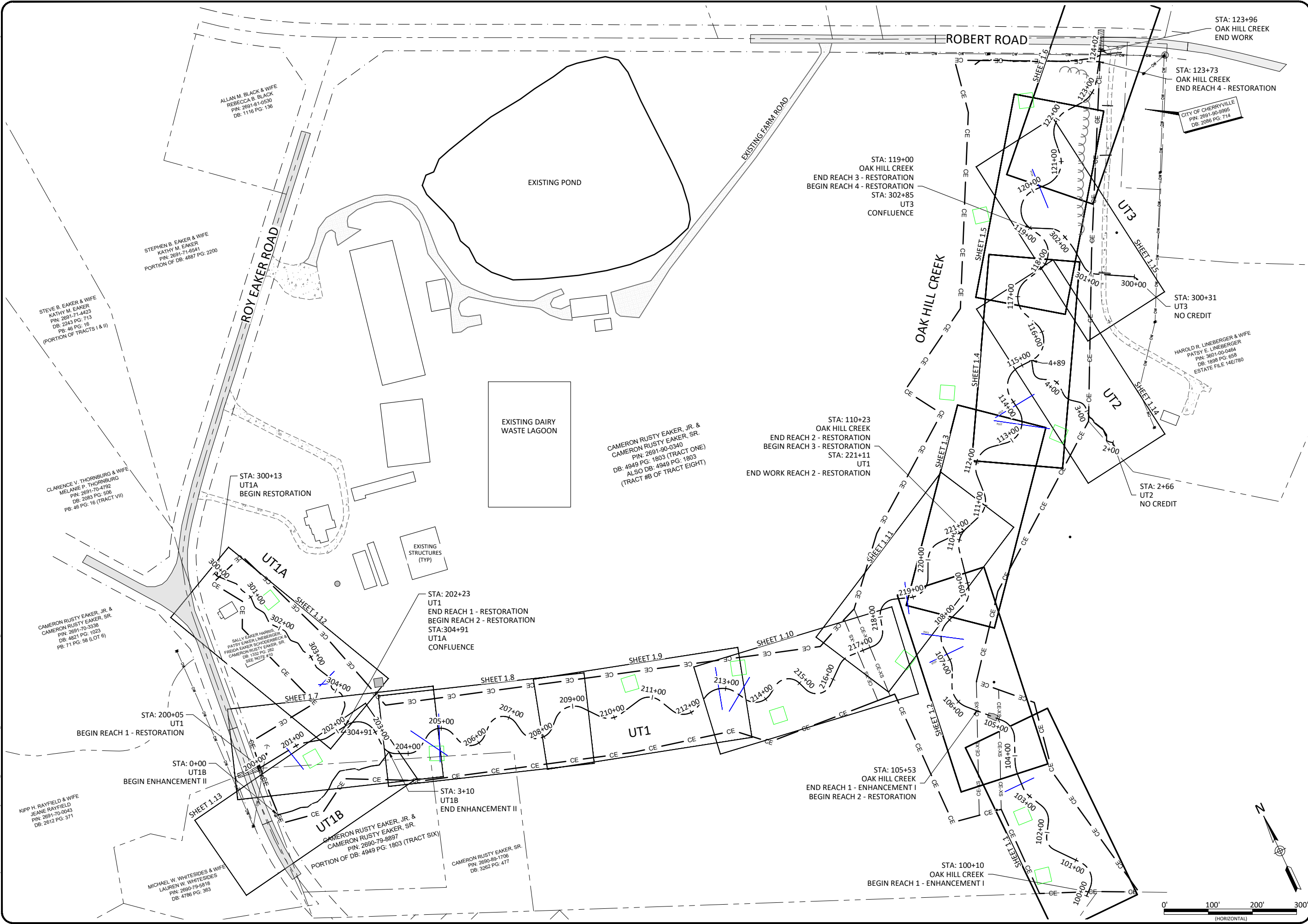
Engineering:
Wildlands Engineering, Inc
License No. F-0831
167-B Haywood Rd
Asheville, NC 28806
Jake Mclean, PE, CFM
828-774-5547

Surveying:
Kee Mapping and Surveying, PA
88 Central Avenue
Asheville, NC 28801
Phillip B. Kee, PLS
828-645-8275

Owner:
NCDEQ - NC DMS
1652 Mail Service Center
Raleigh, NC 27699
Mathew Reid
828-231-7912

NCDEQ Contract No. 7867
DMS ID No. 100120

NC DWR#20190863
Catawba River Basin 03050102



Oak Hill Dairy Mitigation Site Record Drawings
Gaston County, North Carolina

Date:	May 12, 2022
Job Number:	005-02182
Project Engineer:	AMR
Drawn By:	AMR
Checked By:	JCK

Revisions:

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Project Overview

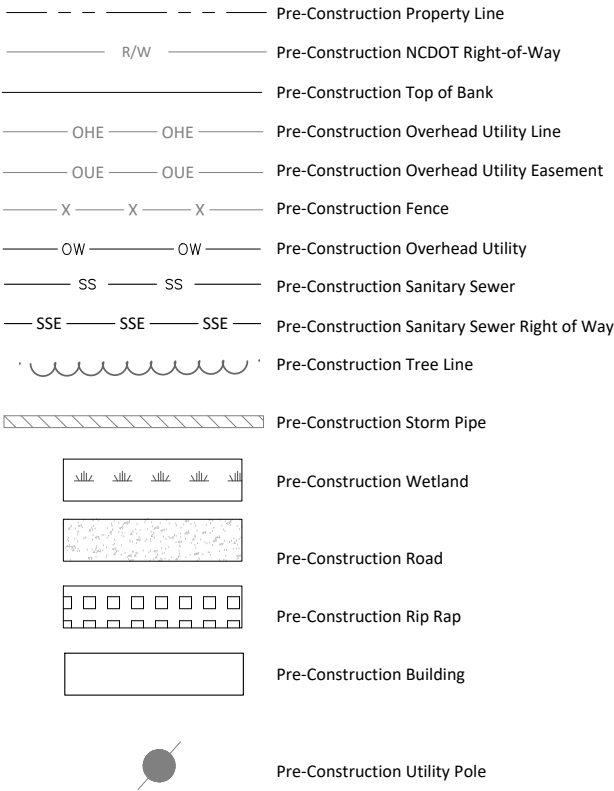
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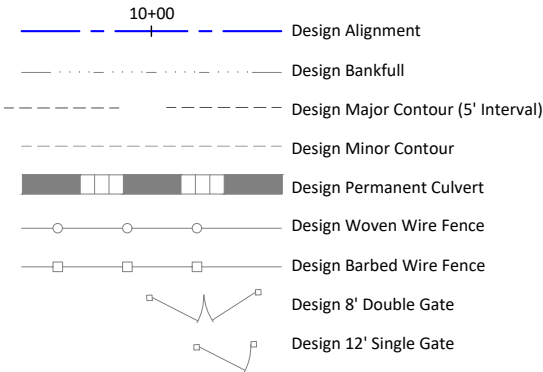
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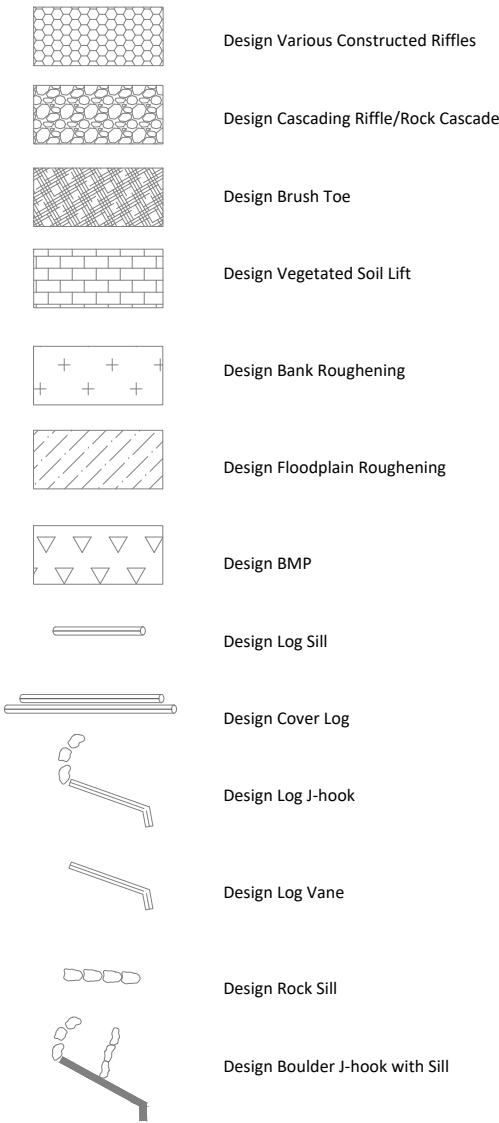
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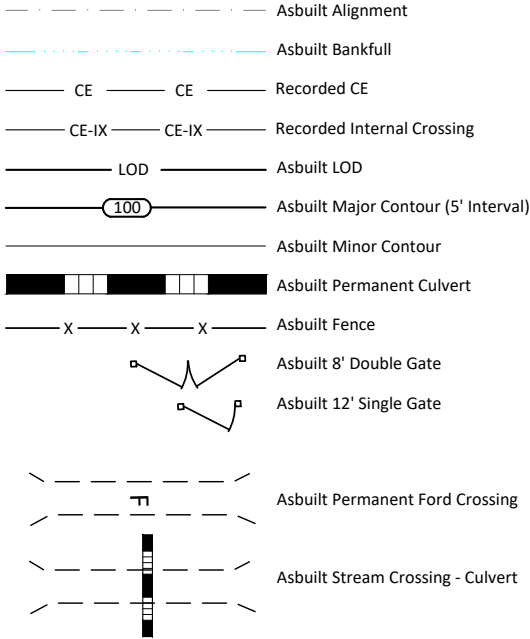
Design Features



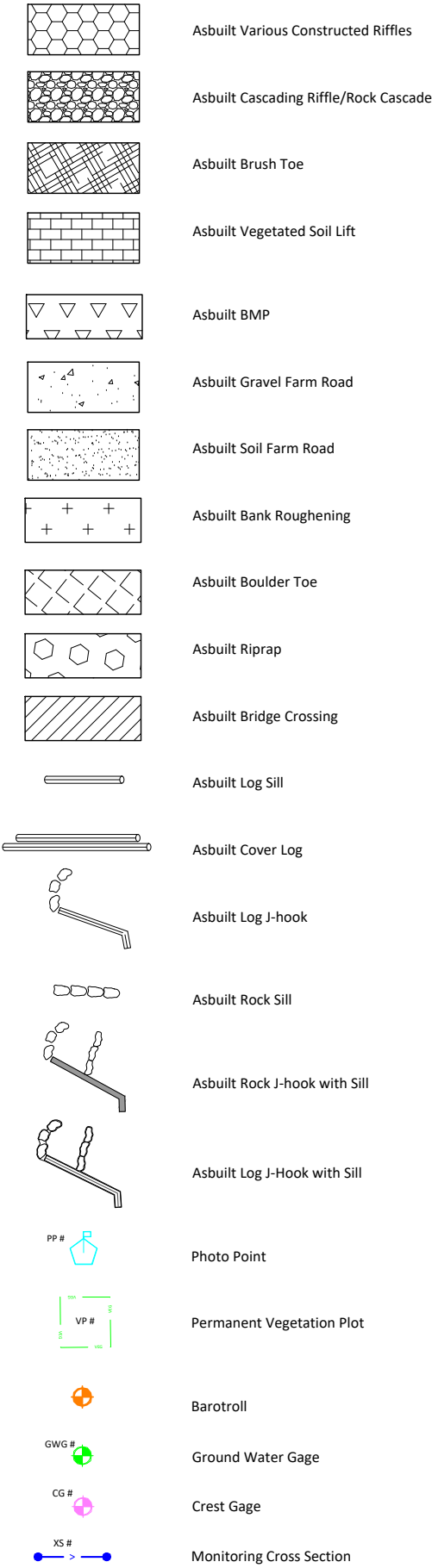
Design Structures



Asbuilt Features



Asbuilt Structures



PROJECT NOTES:

Topographic survey was completed by Kee Mapping and Surveying, PA in July 2019.

Parcel boundary survey completed by Kee Mapping and Surveying, PA in October 2019.

Conservation easement survey completed by Kee Mapping and Surveying, PA in October 2020.

Topographic data supplemented with Lidar data from Feb - April 2017.

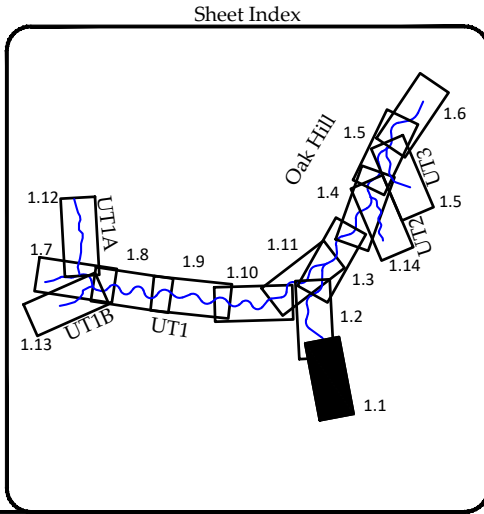
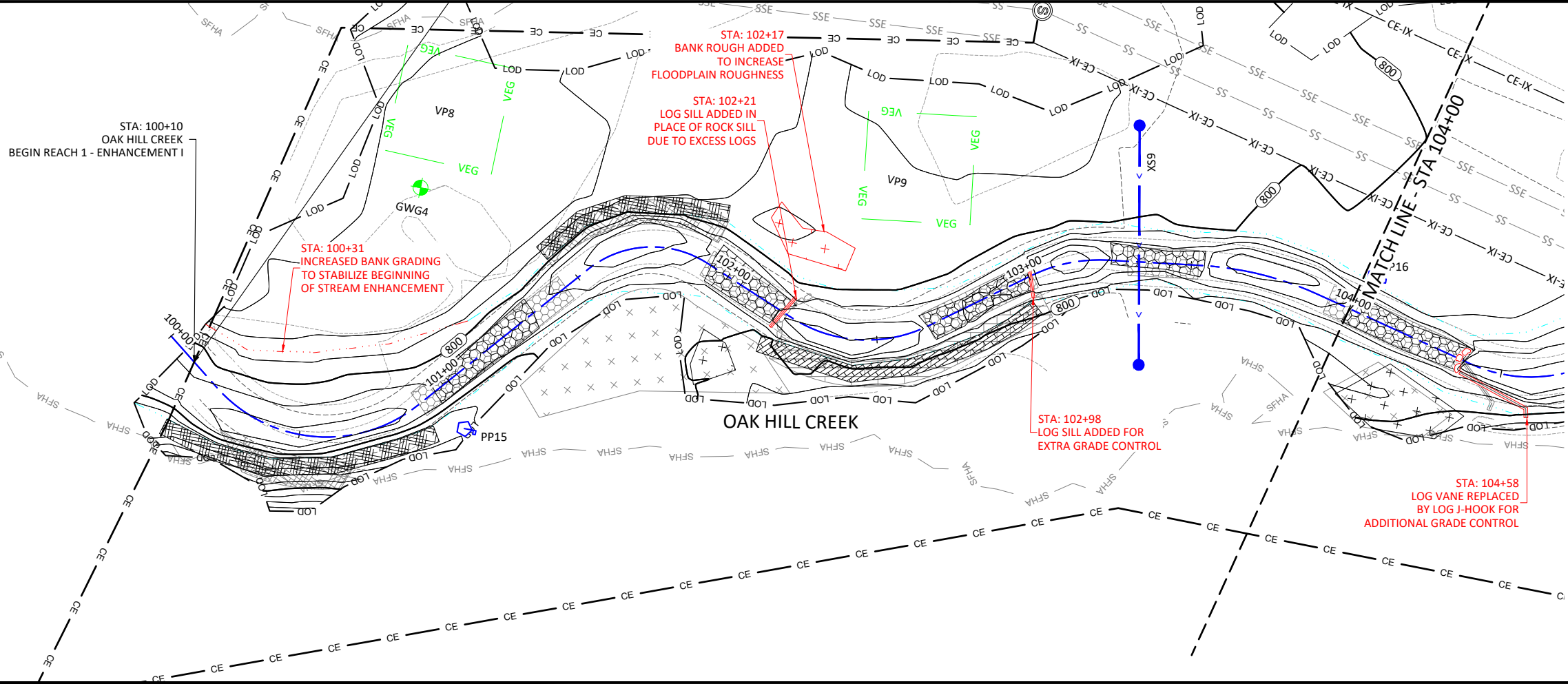
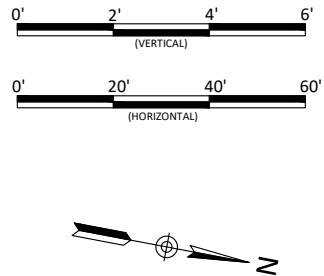
Riffle selection varied based on available materials at the Engineers' discretion. Field coordination will be required.

Project Notes:

1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.

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Oak Hill Dairy Mitigation Site Record Drawings
Gaston County, North Carolina

Oak Hill Creek
Stream Plan and Profiles

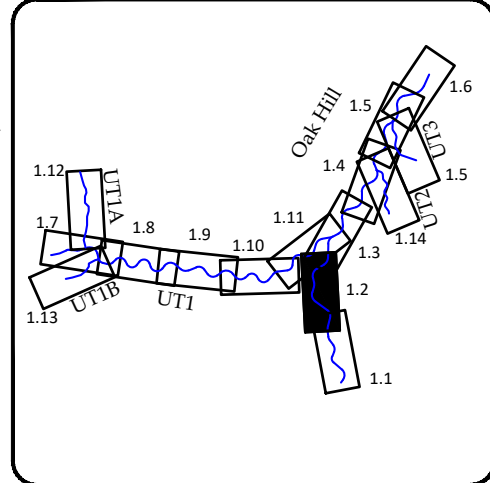
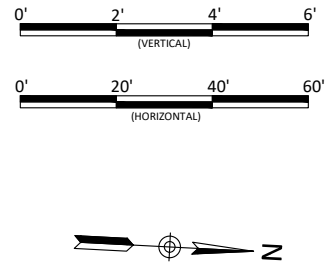
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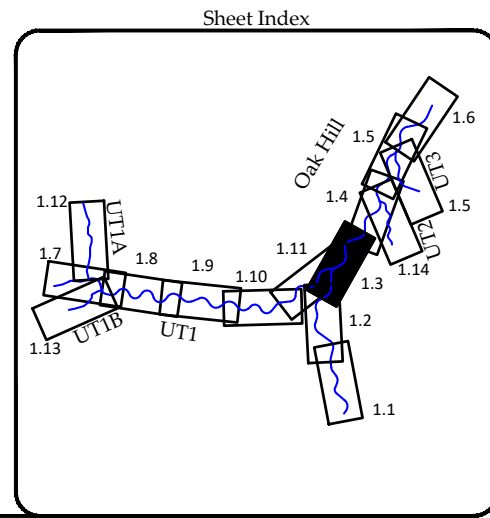
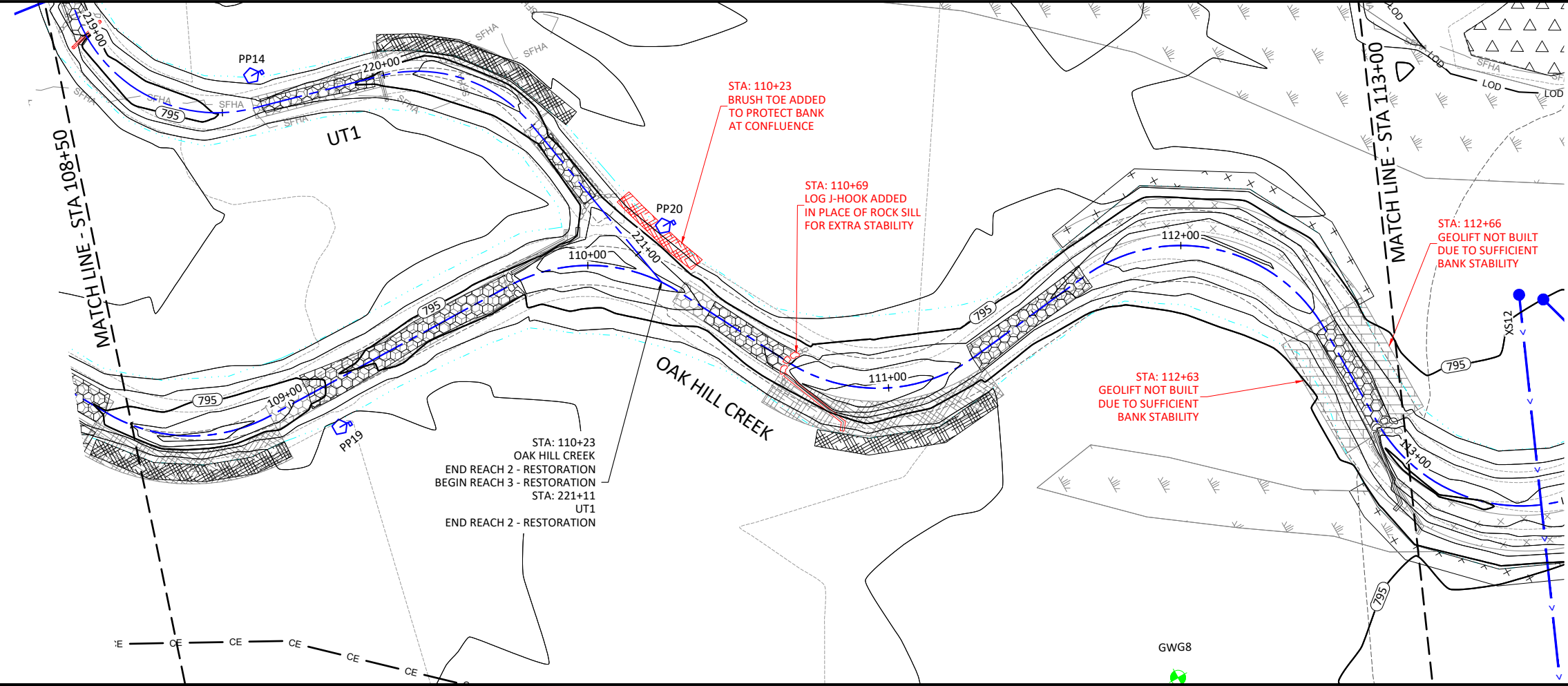
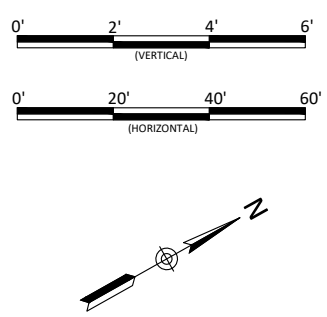
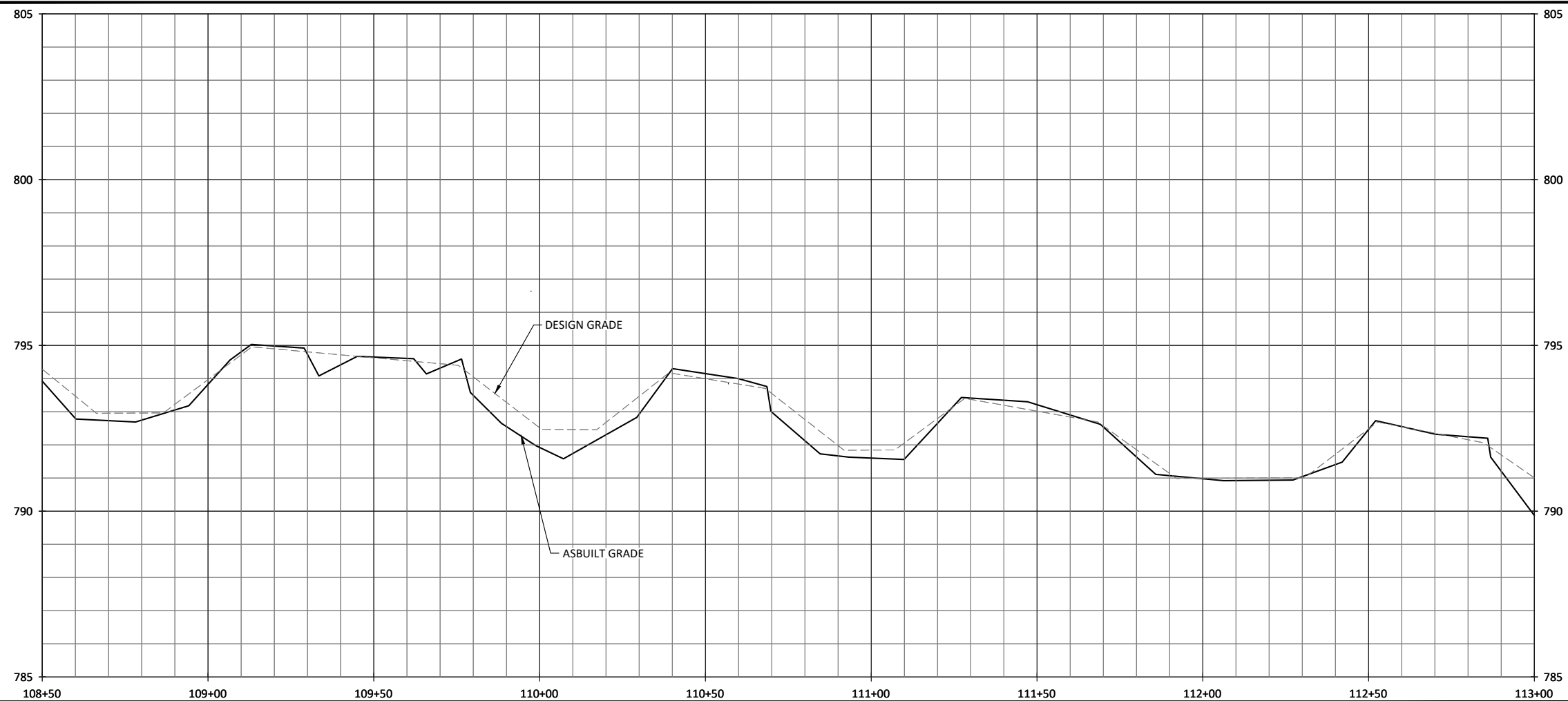
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Oak Hill Creek
Stream Plan and Profiles

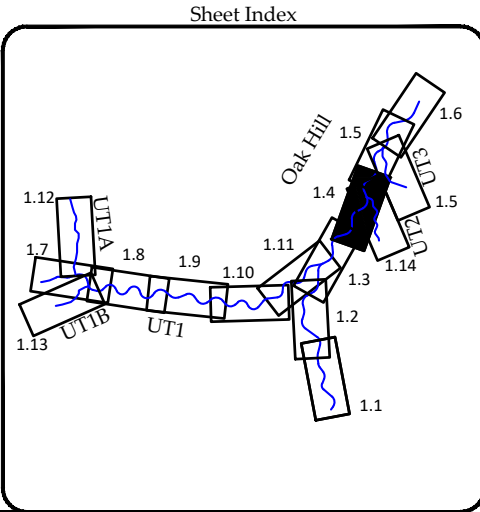
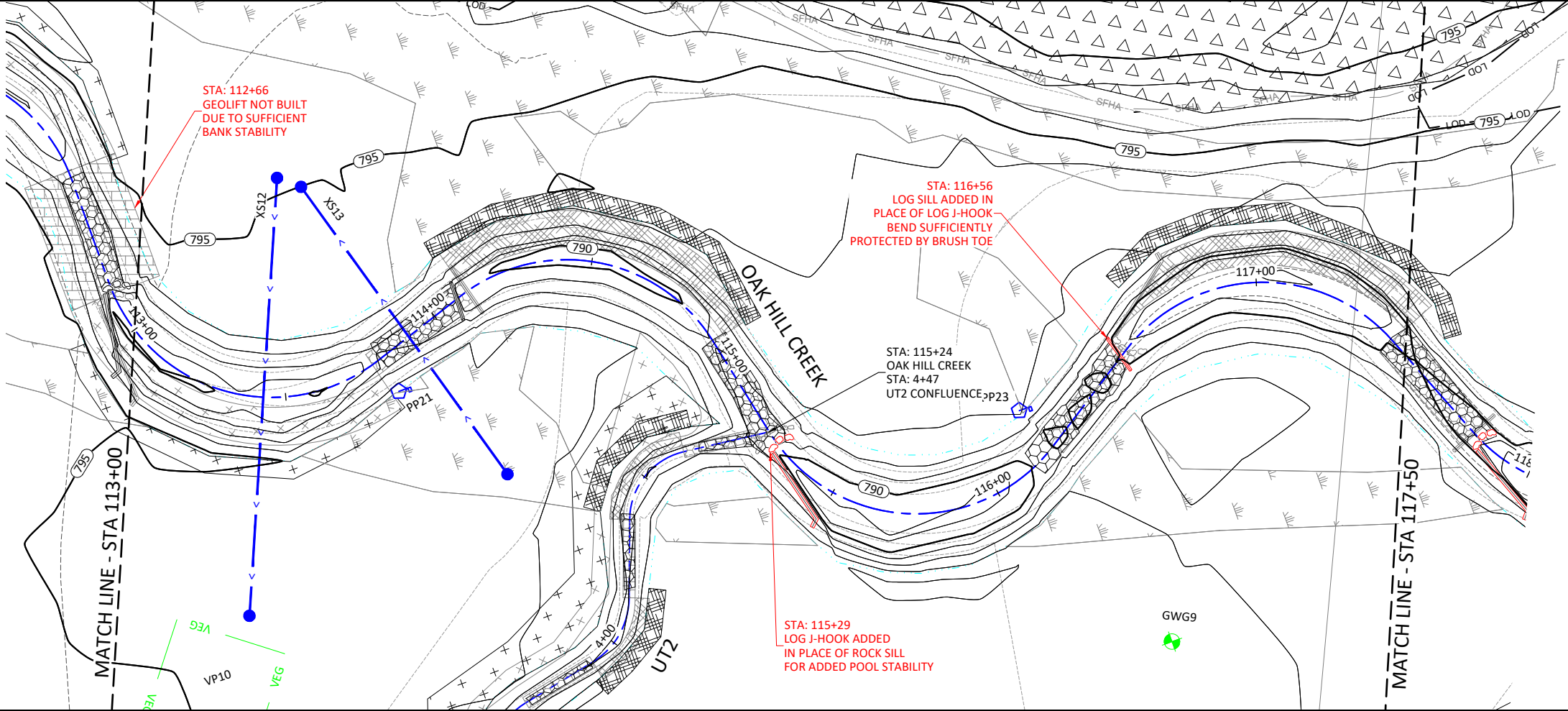
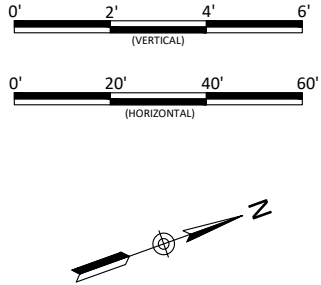
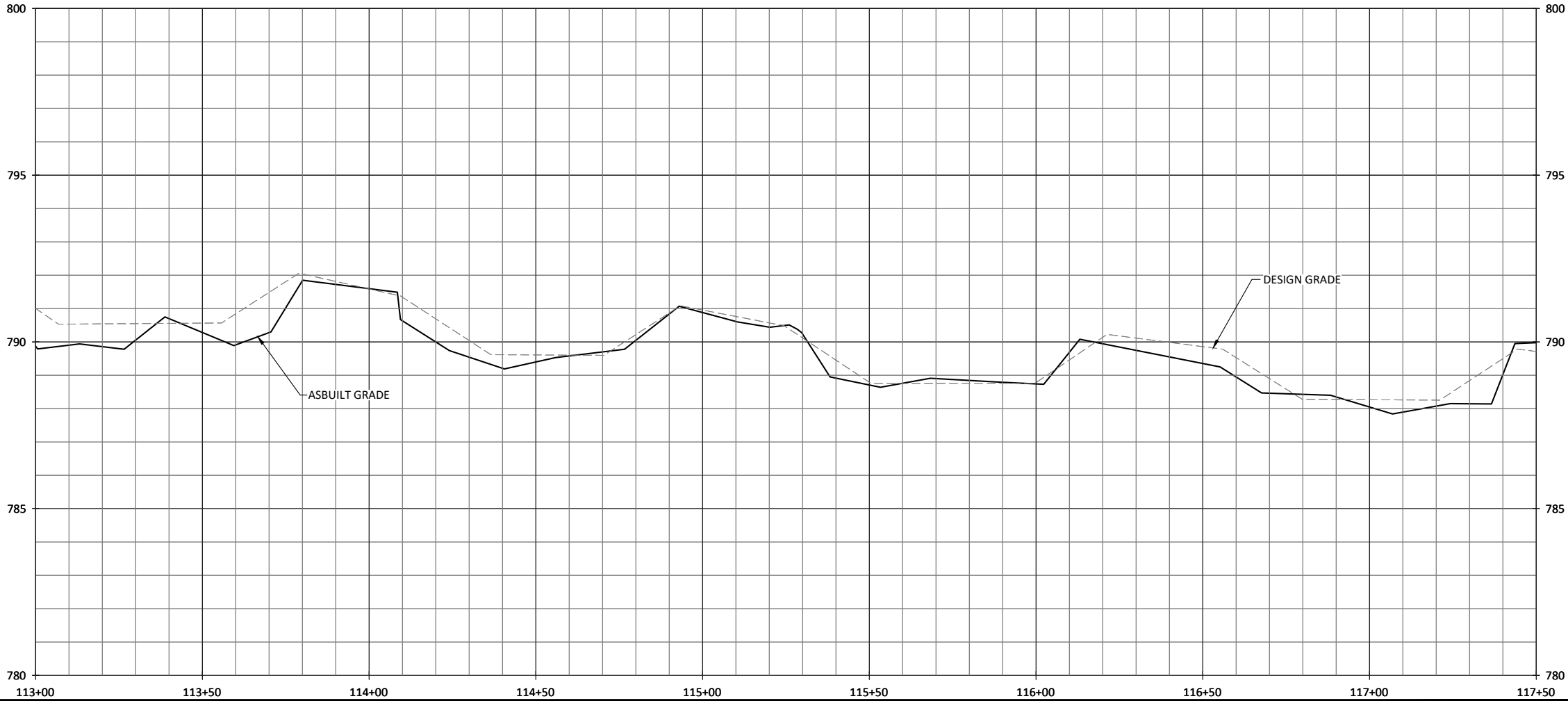
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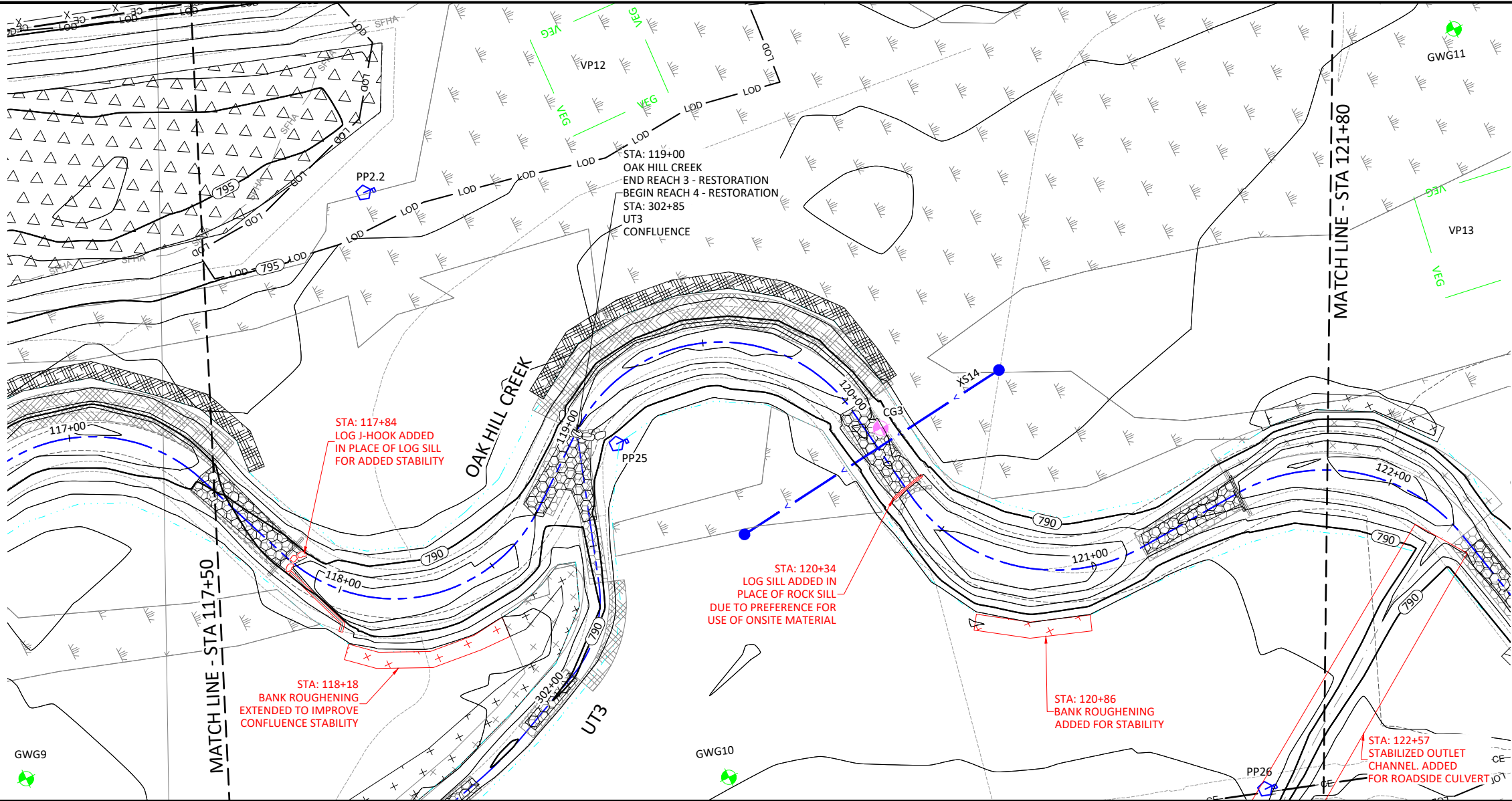
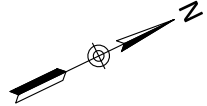
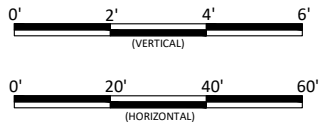
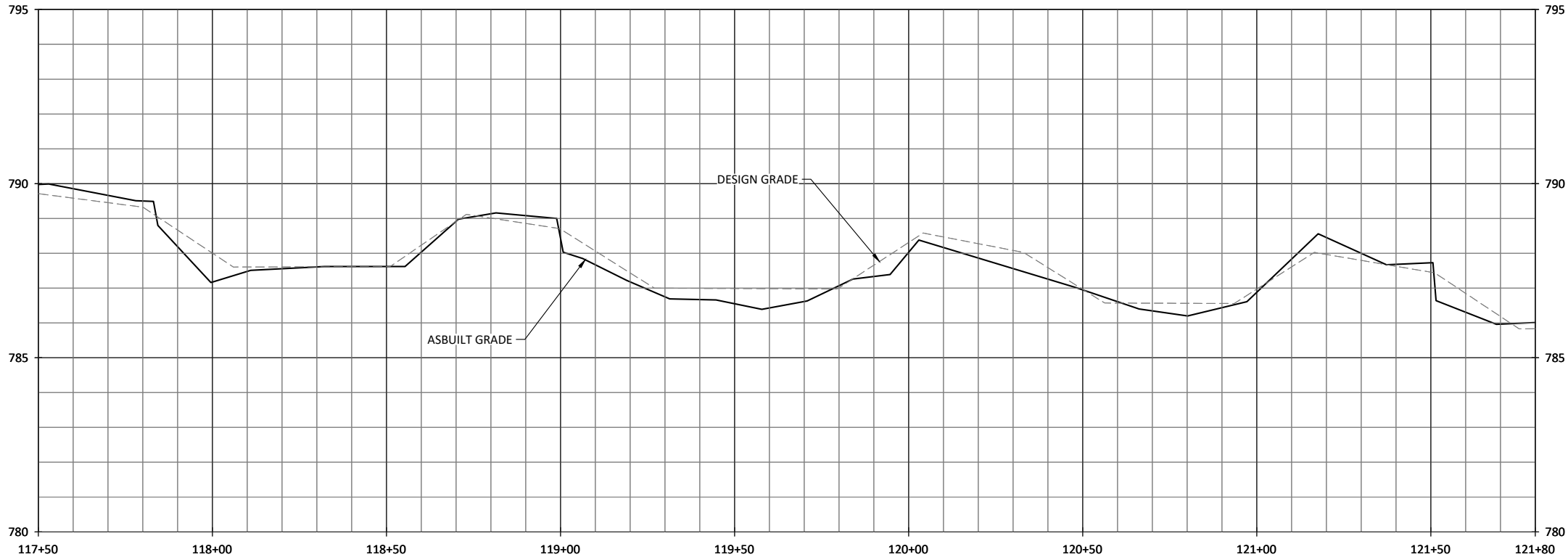
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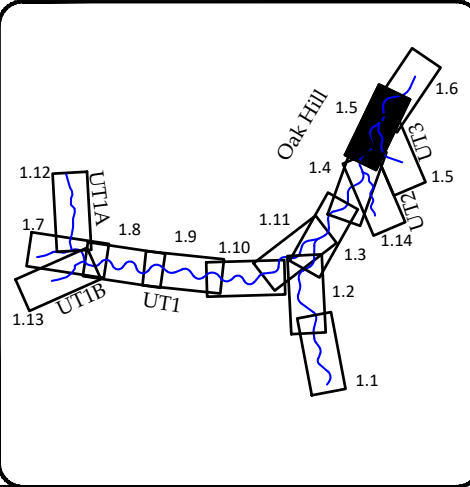


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Sheet Index



Oak Hill Dairy Mitigation Site Record Drawings

Gaston County, North Carolina

Oak Hill Creek
Stream Plan and Profiles



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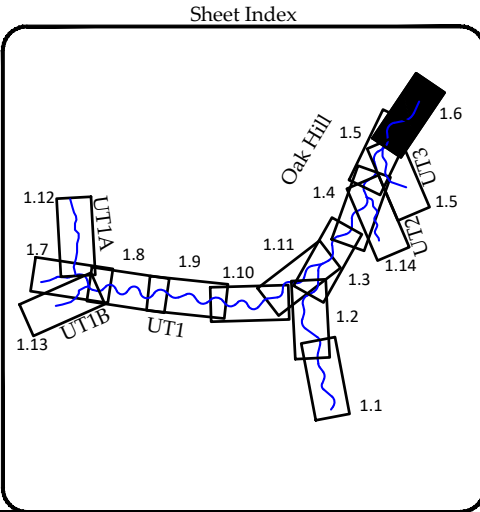
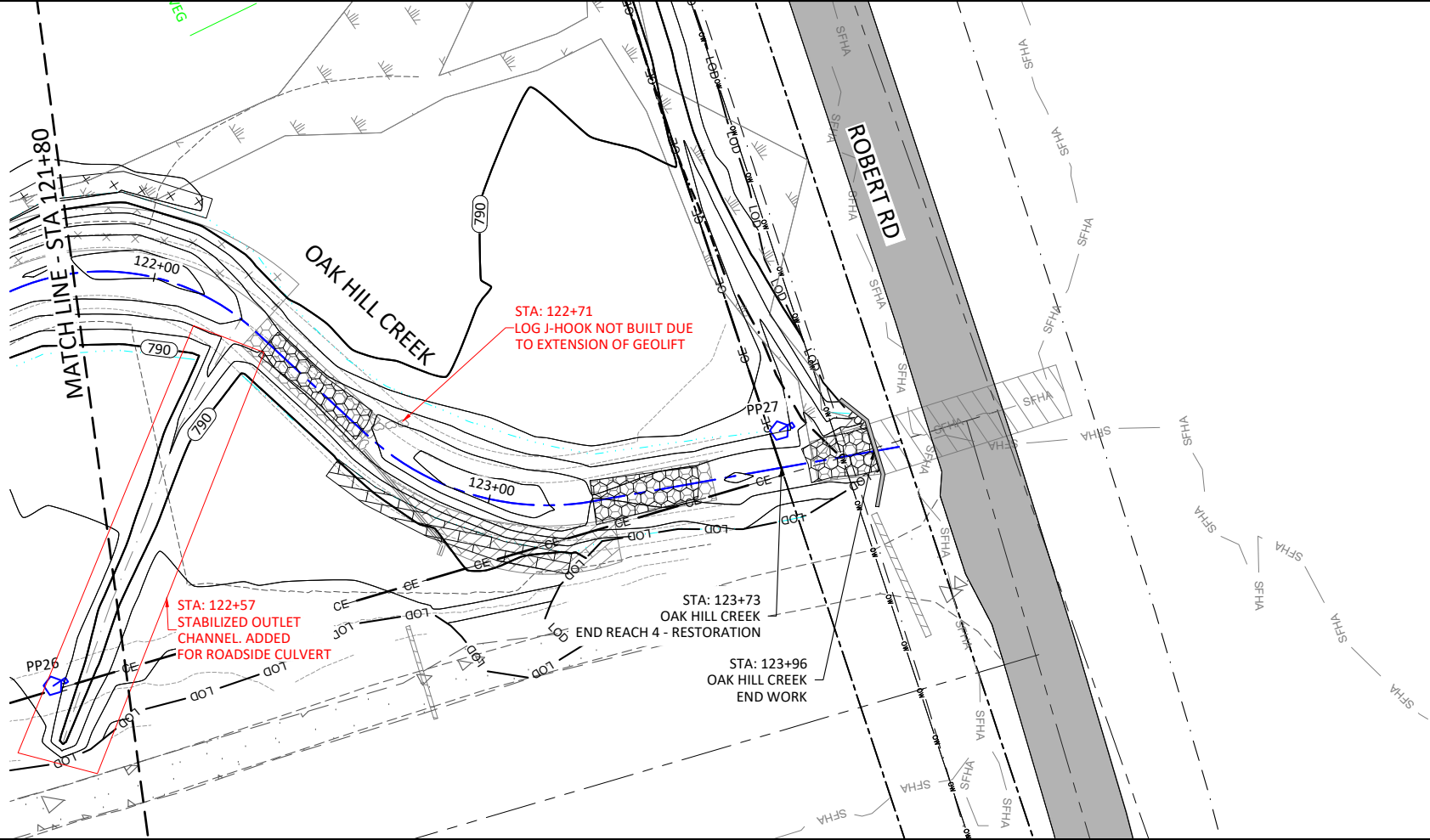
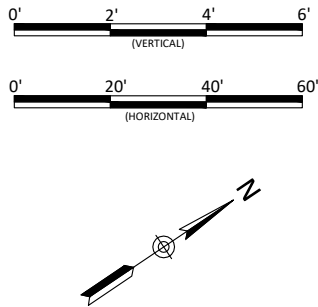
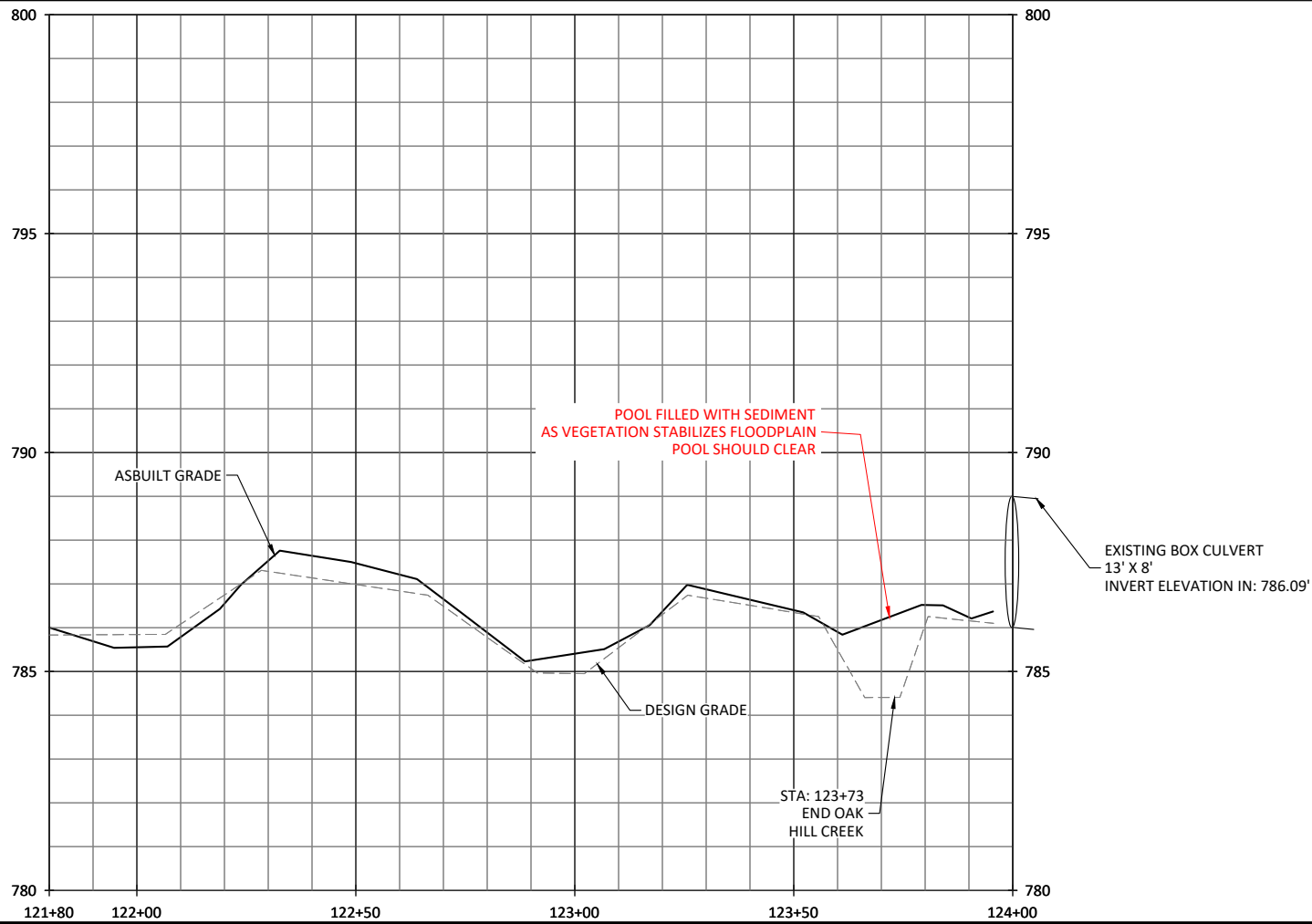
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Checked By:	JCK

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Oak Hill Dairy Mitigation Site Record Drawings
Gaston County, North Carolina

Oak Hill Creek
Stream Plan and Profiles

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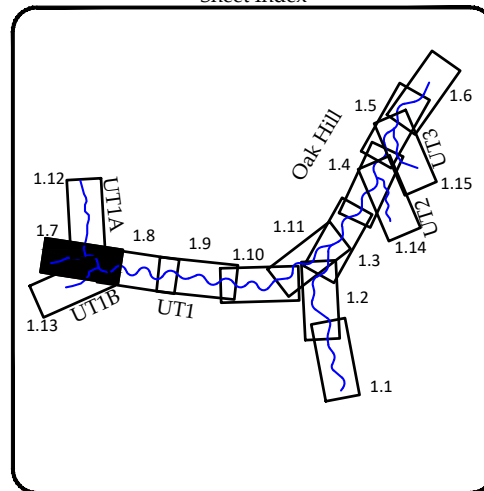
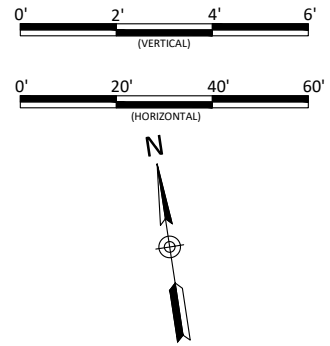
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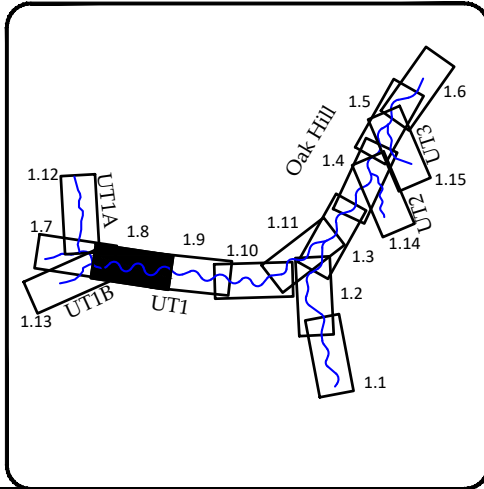
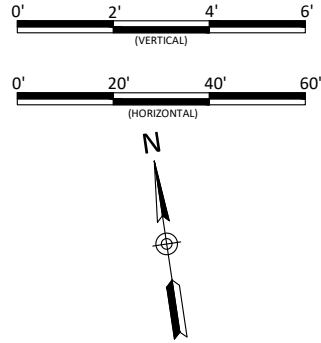
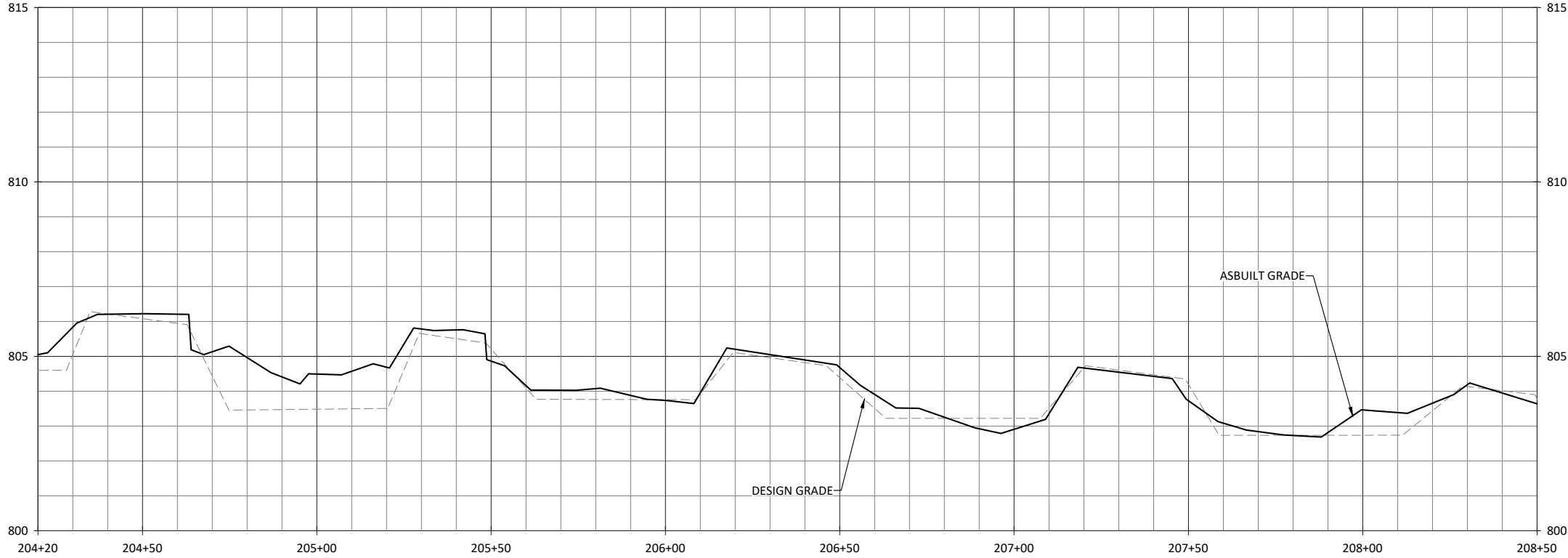
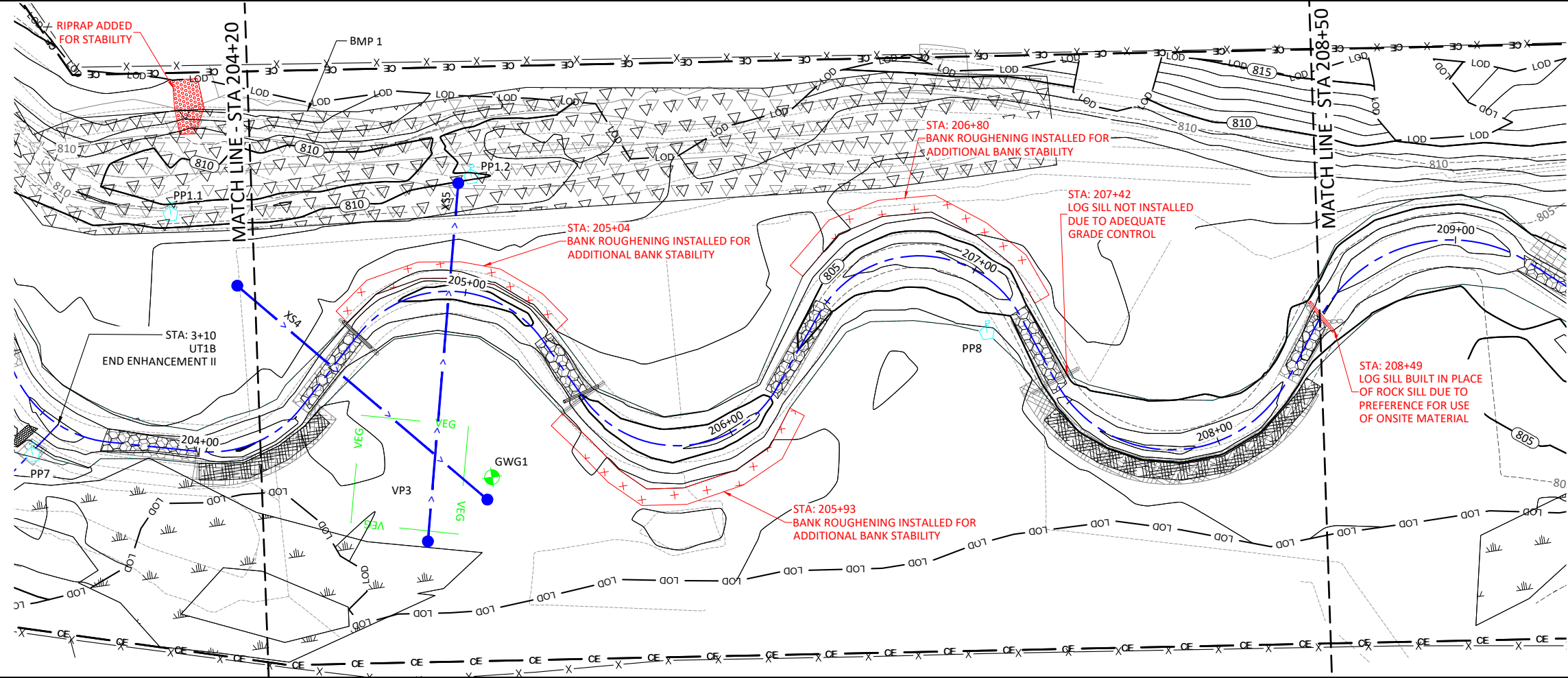
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Oak Hill Dairy Mitigation Site Record Drawings
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UT1
Stream Plan and Profiles

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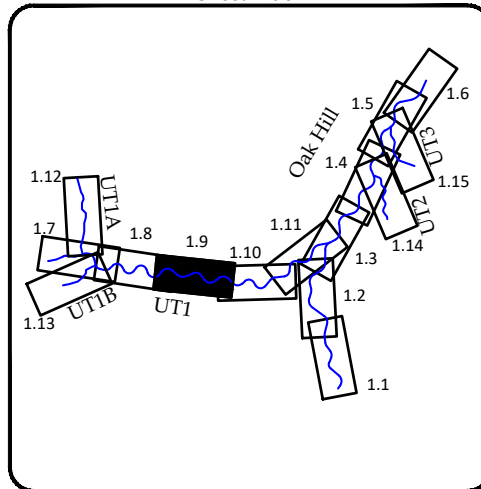
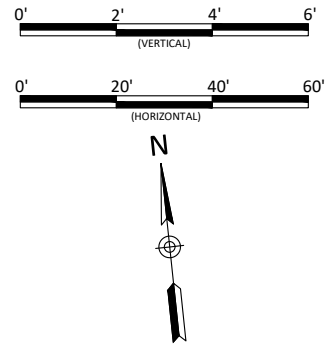
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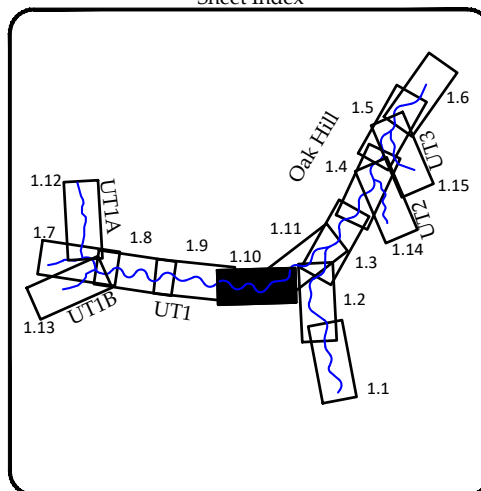
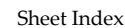
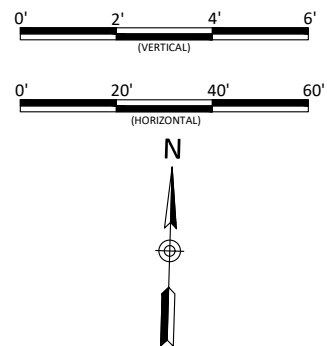
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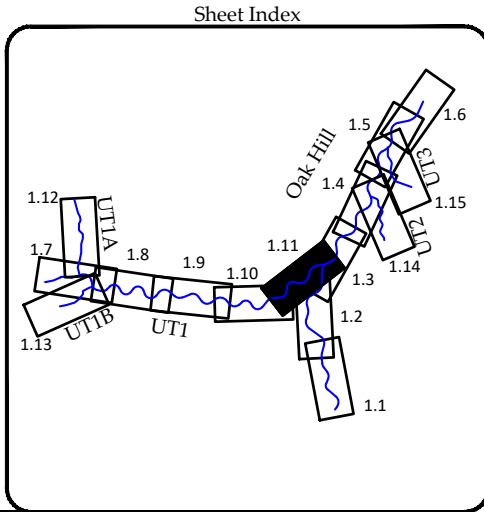
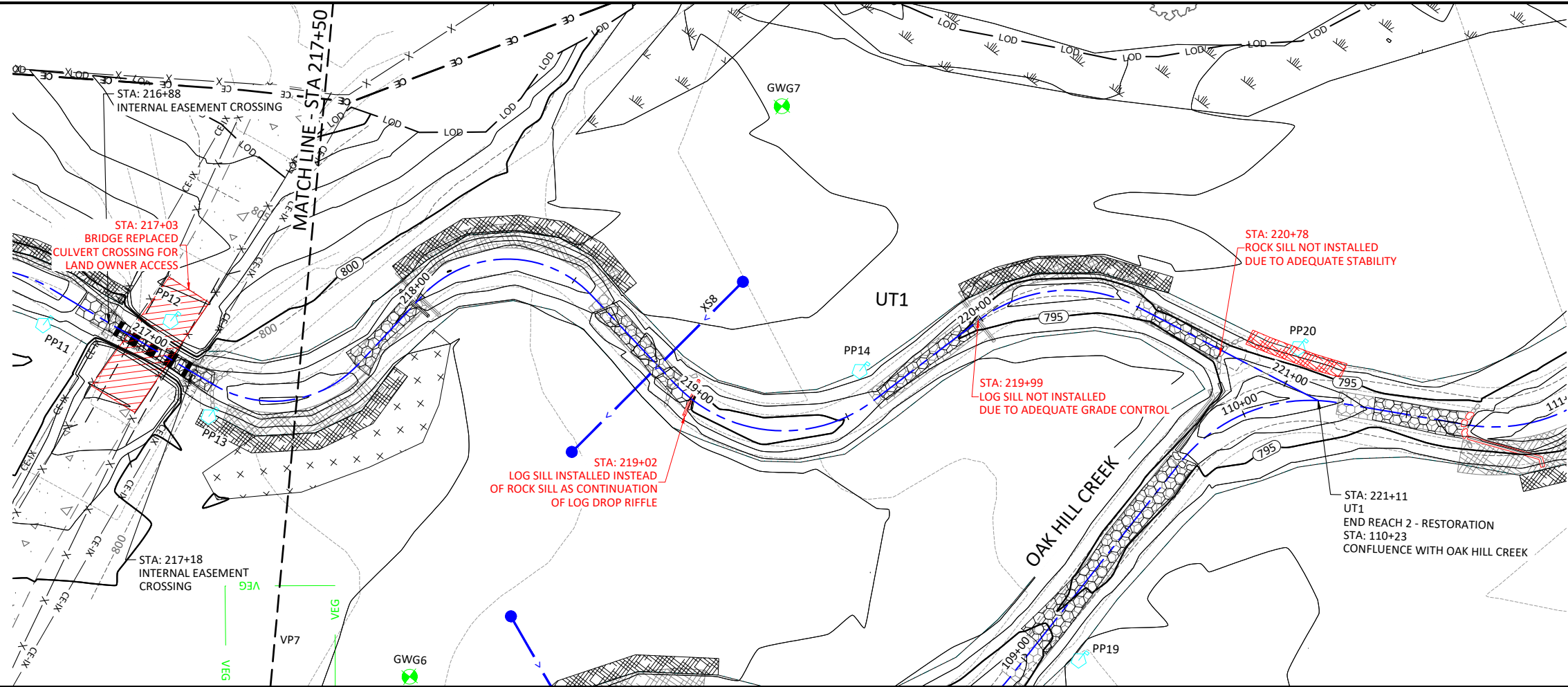
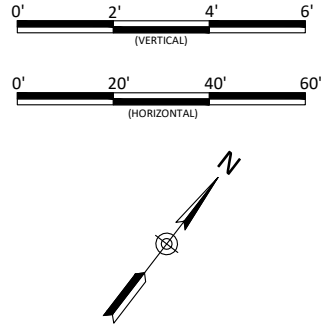
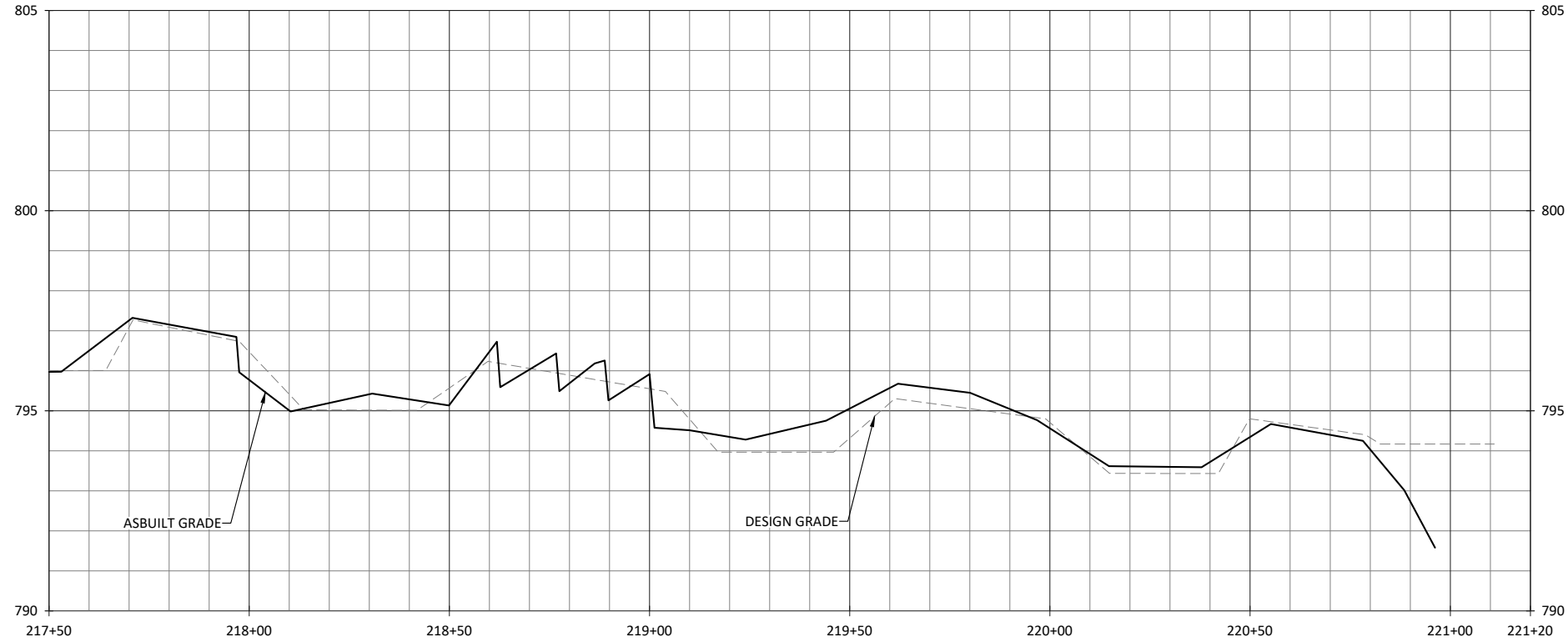
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UT1
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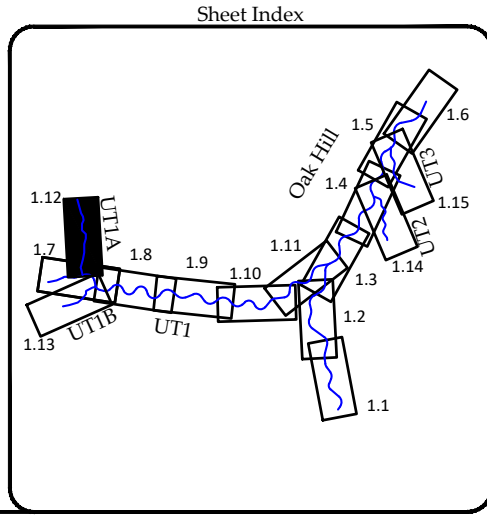
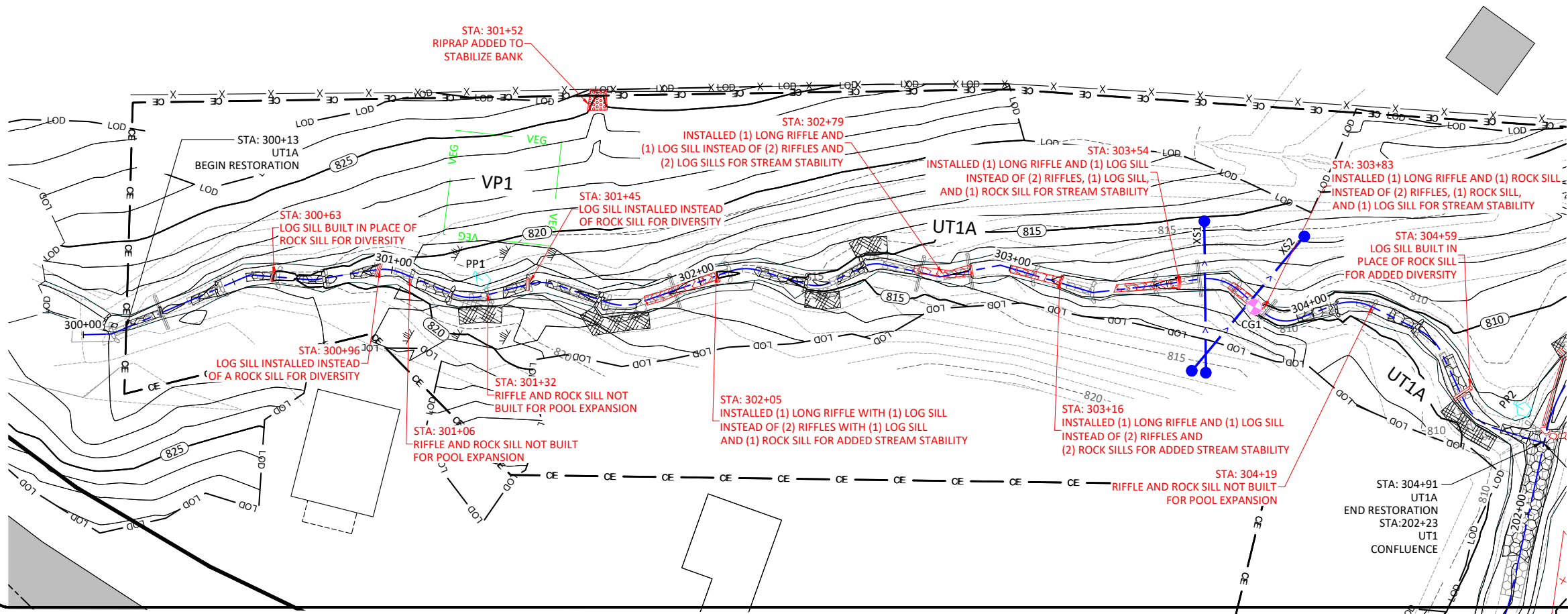
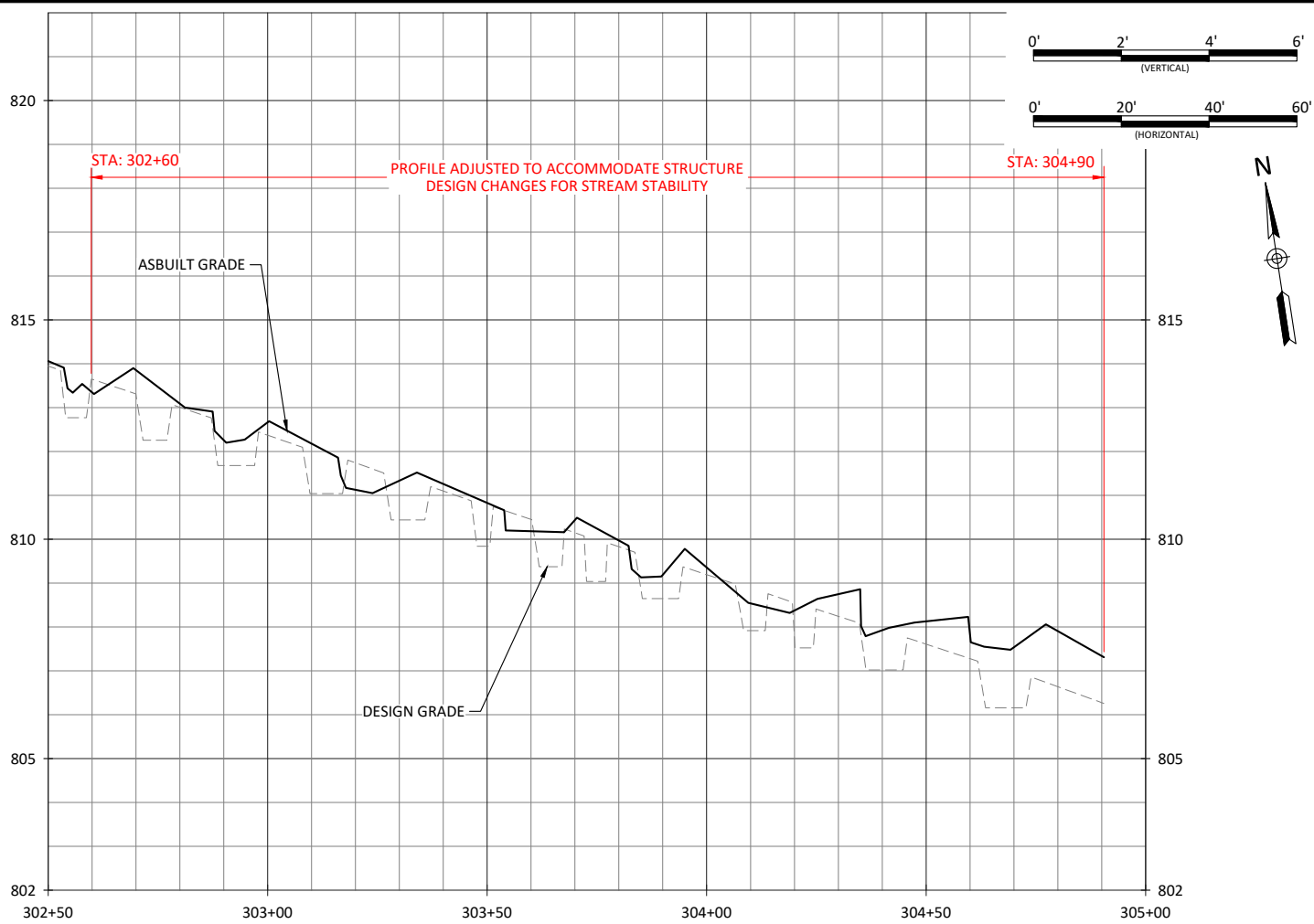
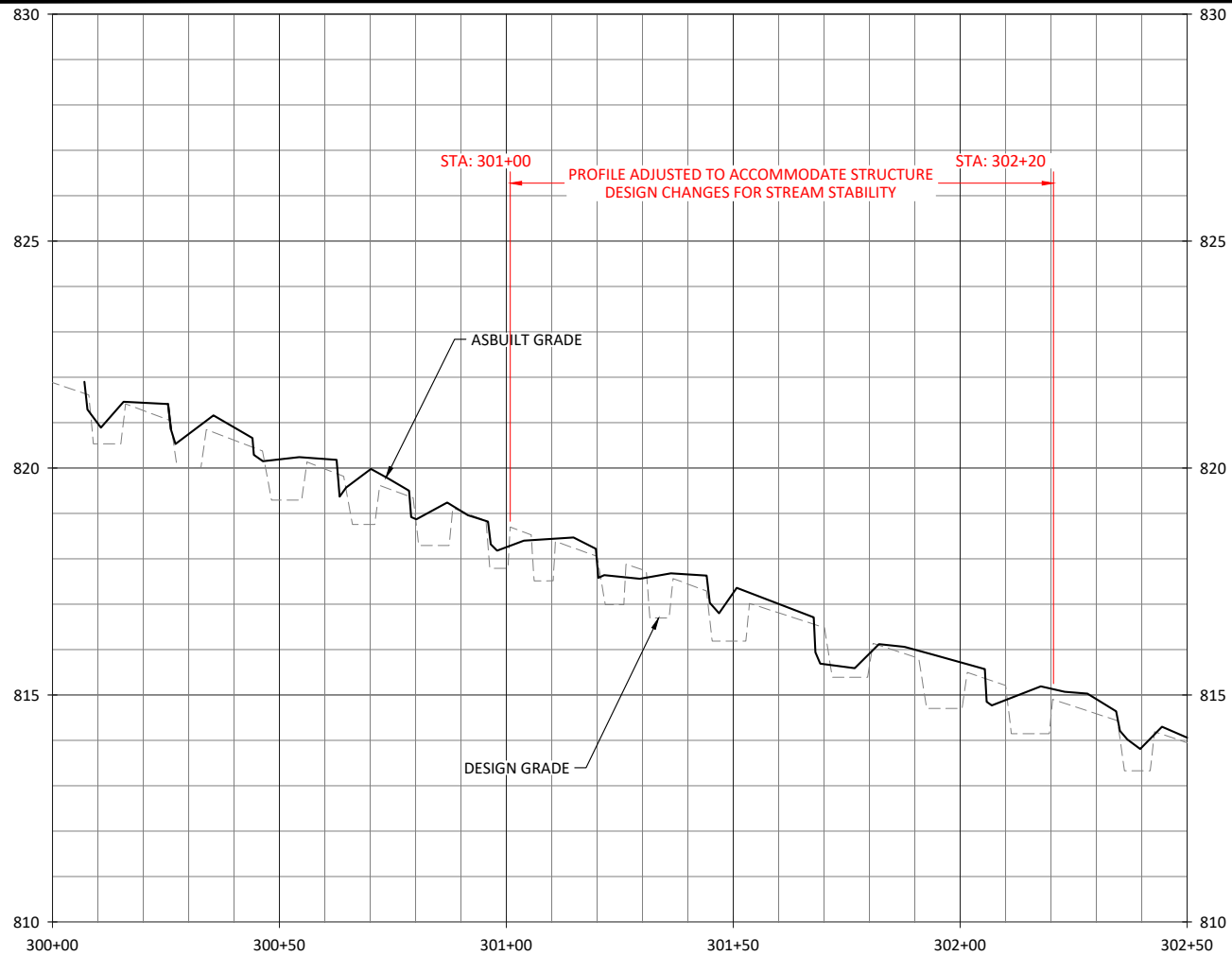
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Oak Hill Dairy Mitigation Site Record Drawings
Gaston County, North Carolina

UT1A
Stream Plan and Profiles

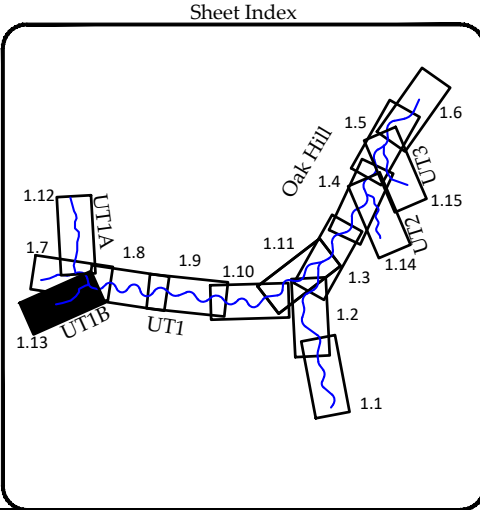
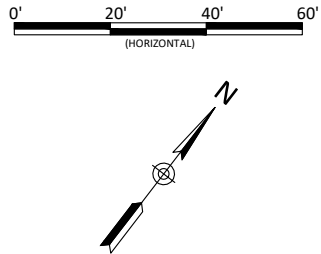
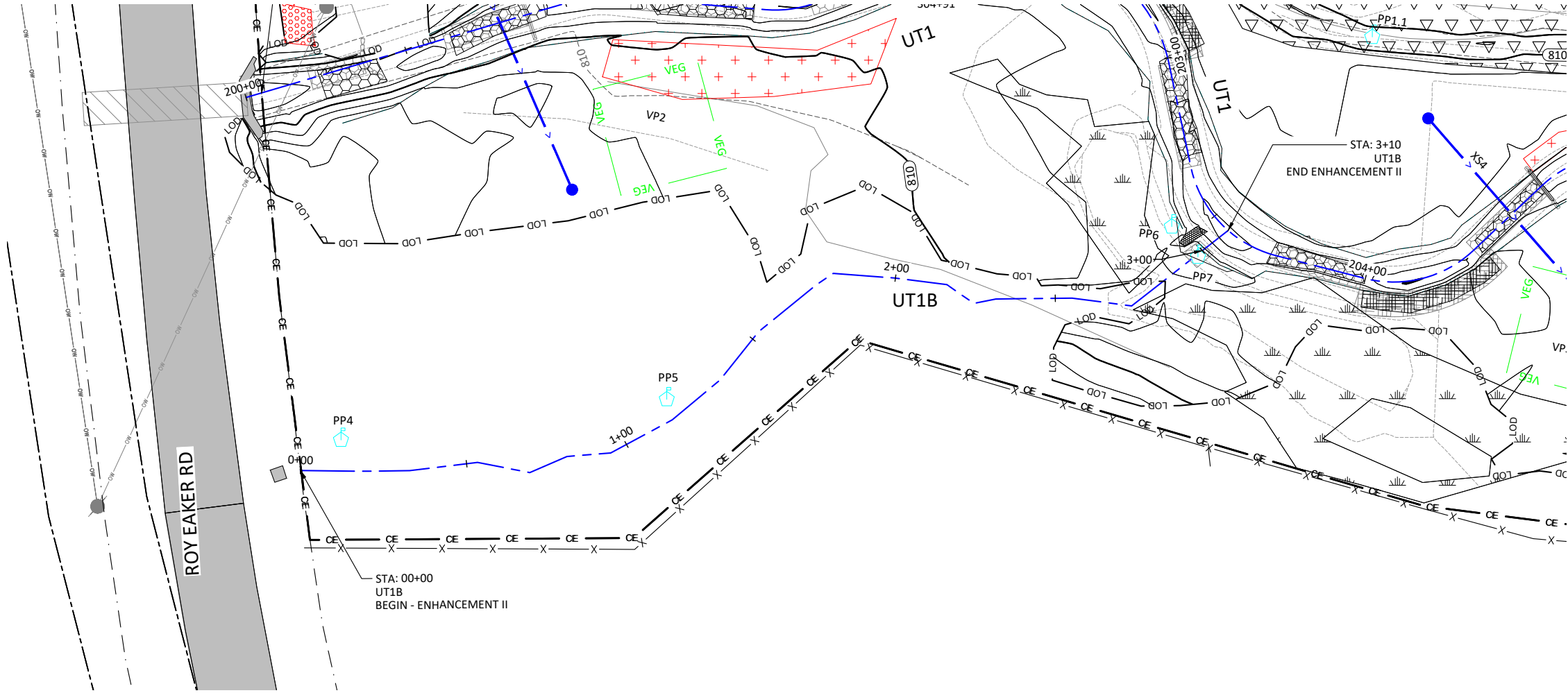
Date:	May 12, 2022
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Project Engineer:	JM
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Oak Hill Dairy Mitigation Site Record Drawings
Gaston County, North Carolina

UT1B
Stream Plan and Profiles

Revisions:	

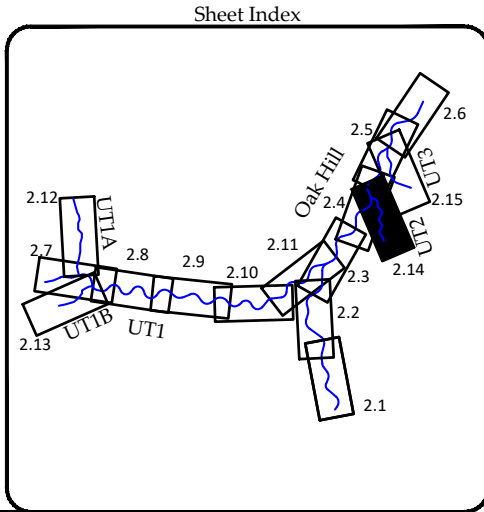
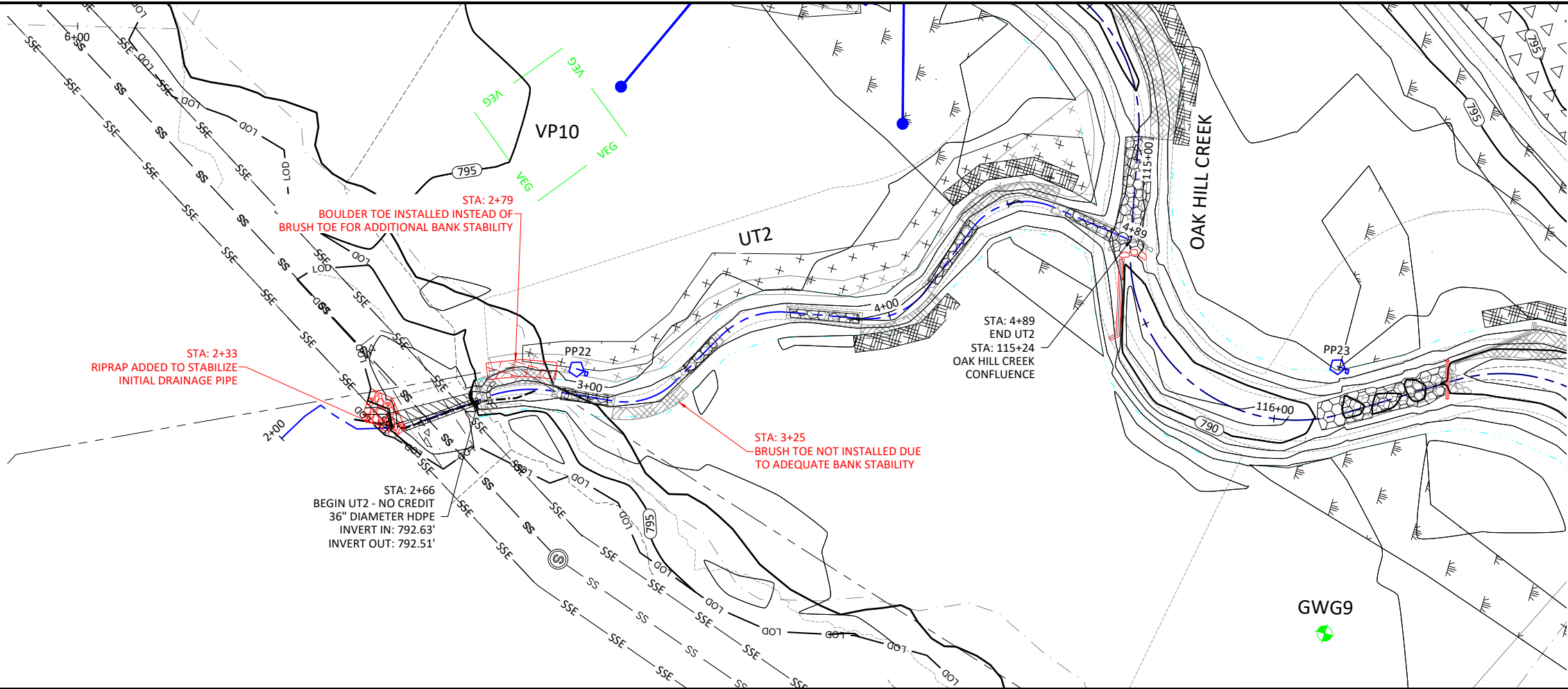
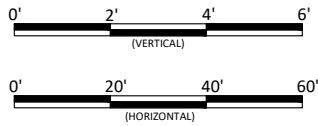
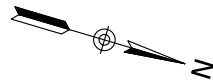
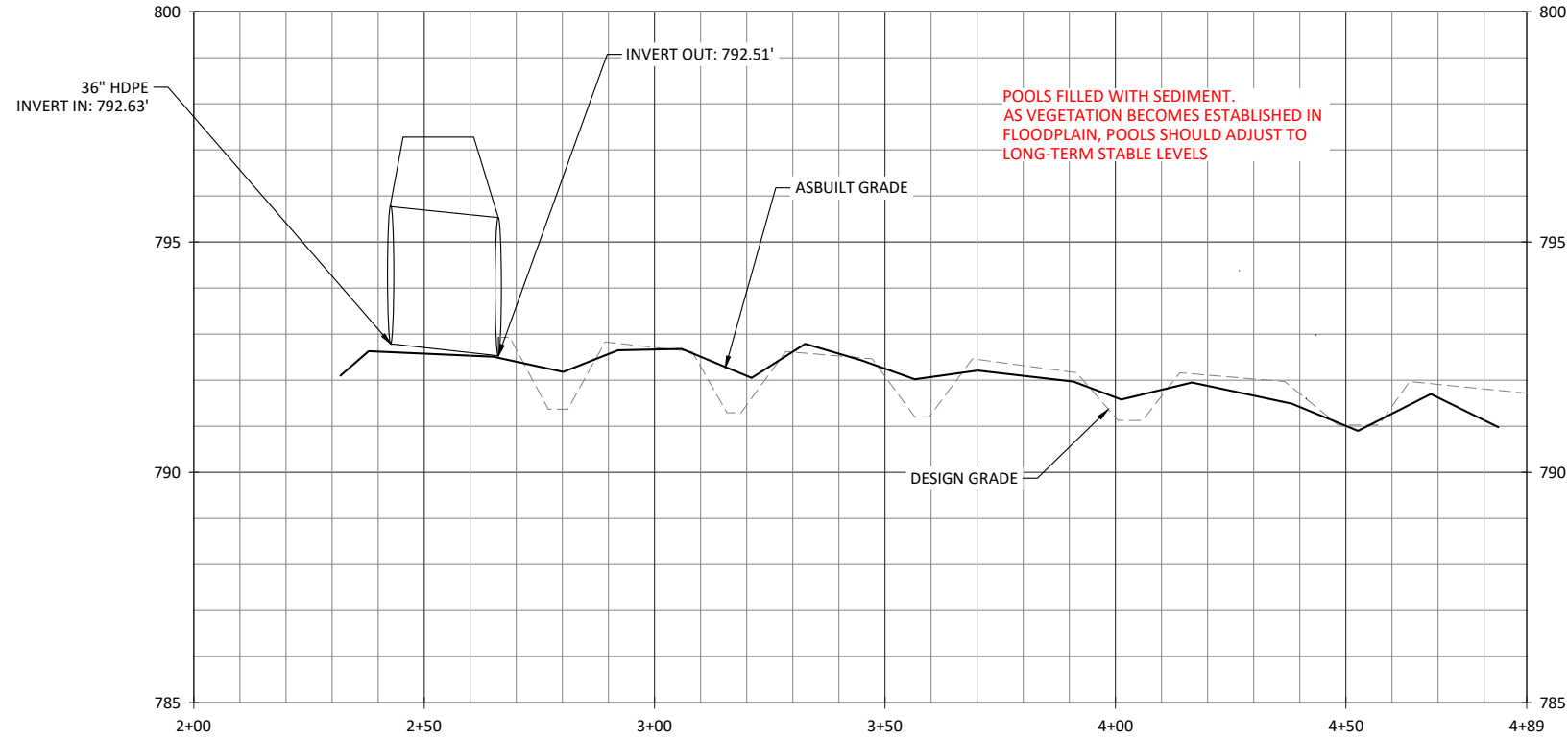
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Job Number:	005-02182
Project Engineer:	AMR
Drawn By:	AMR
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Oak Hill Dairy Mitigation Site Record Drawings
Gaston County, North Carolina

Uncredited-Tribs - UT2
Stream Plan and Profiles

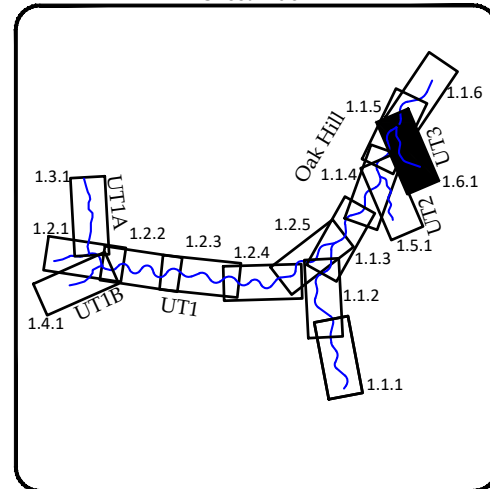
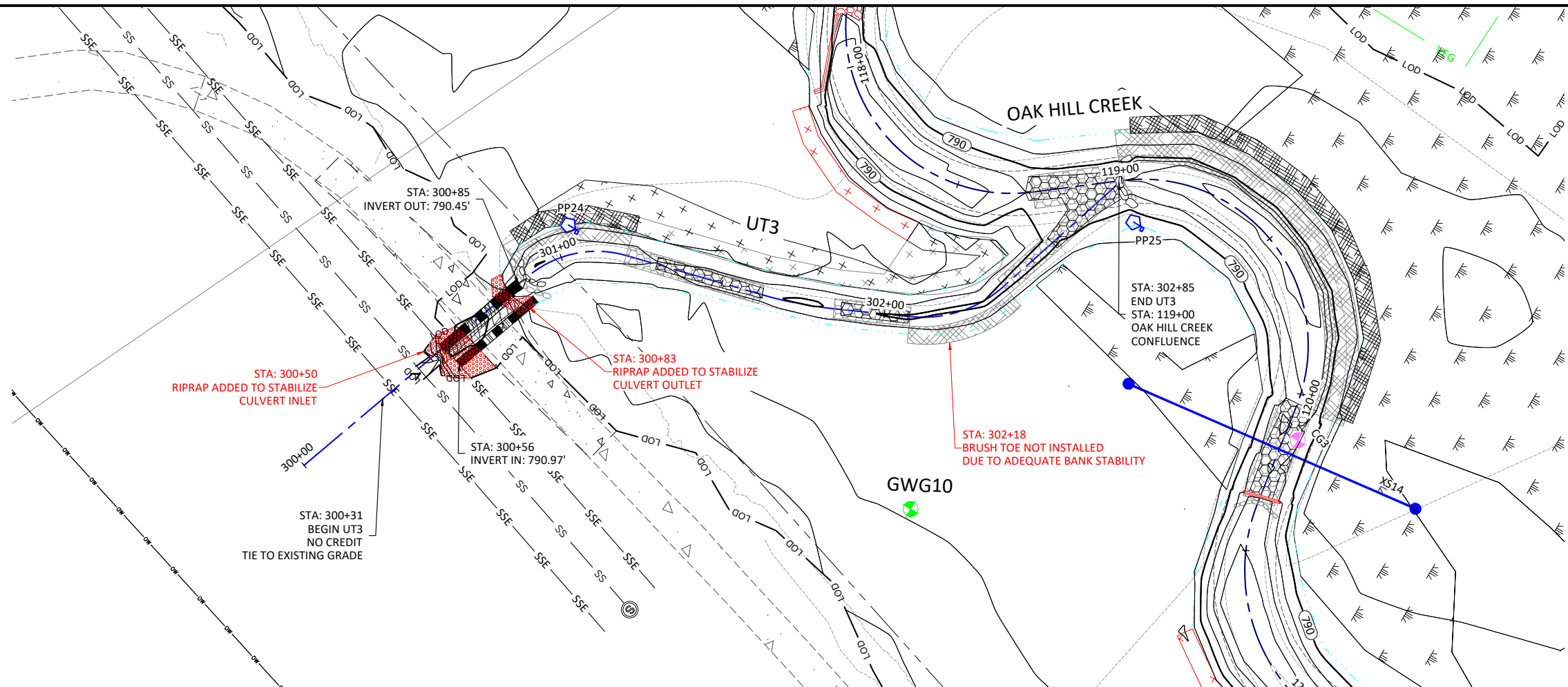
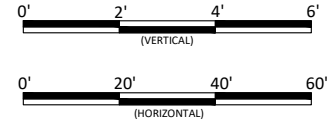
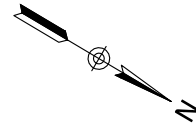
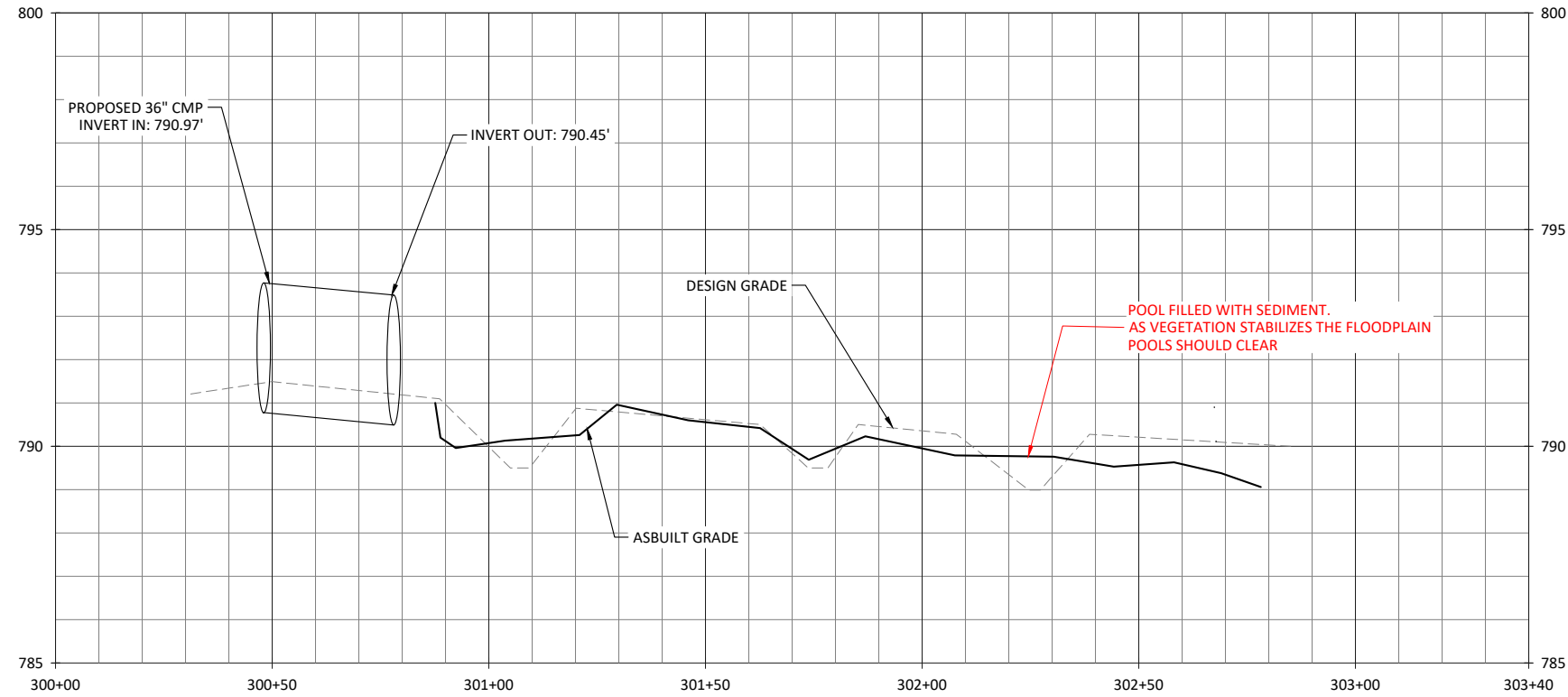
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Date:	May 12, 2022
Job Number:	005-02182
Project Engineer:	JM
Drawn By:	AMR
Checked By:	JCK

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Oak Hill Dairy Mitigation Site Record Drawings

Gaston County, North Carolina

Uncredited-Tribs - UT3
Stream Plan and Profiles



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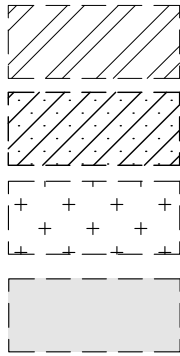
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Job Number:	005-02182
Project Engineer:	JM
Drawn By:	AMR
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May 13, 2022

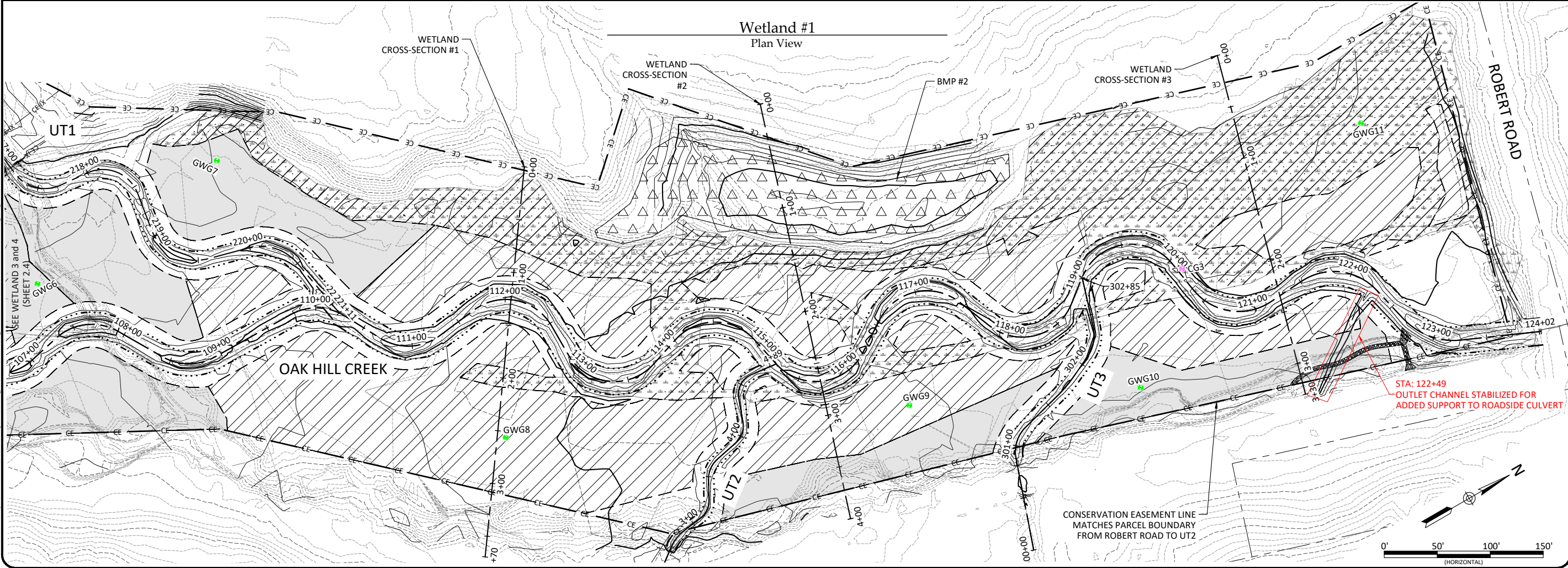
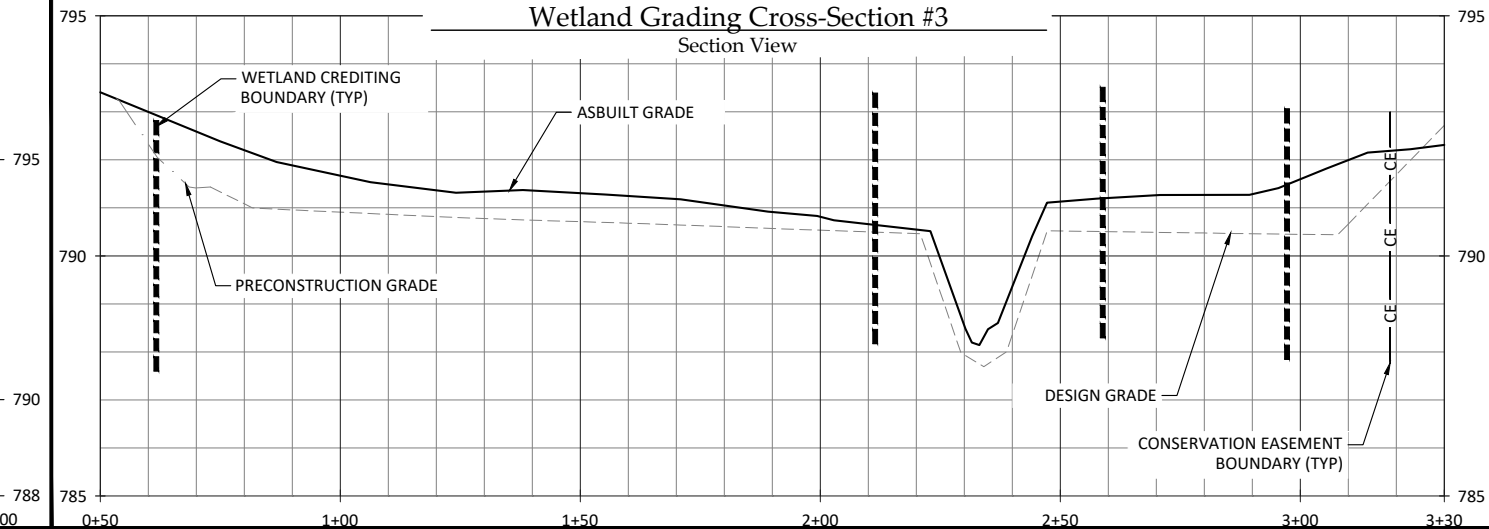
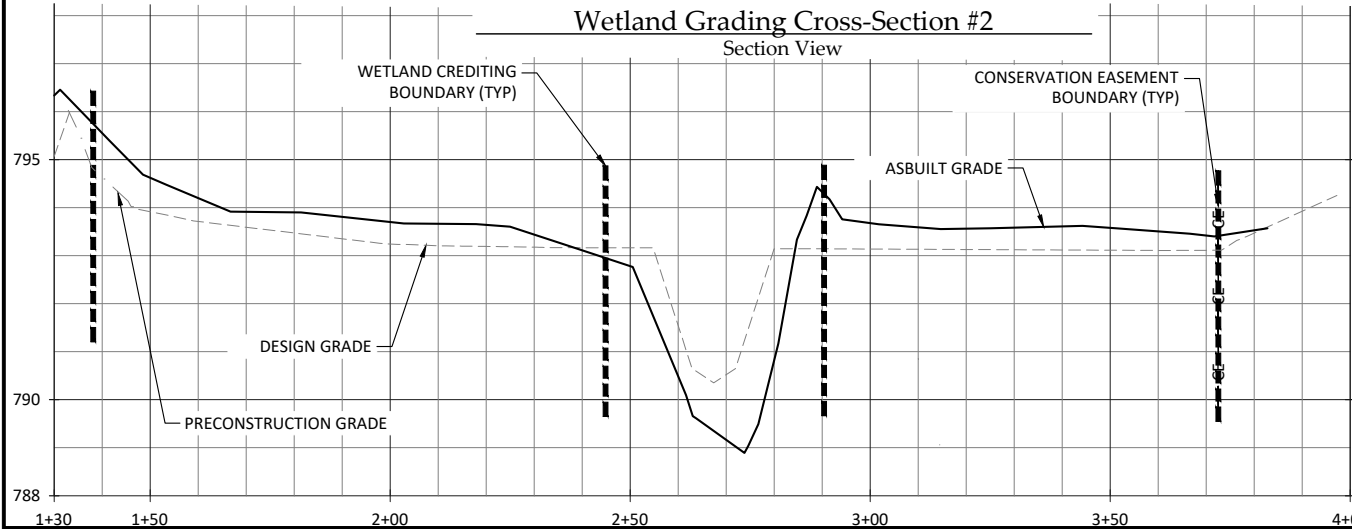
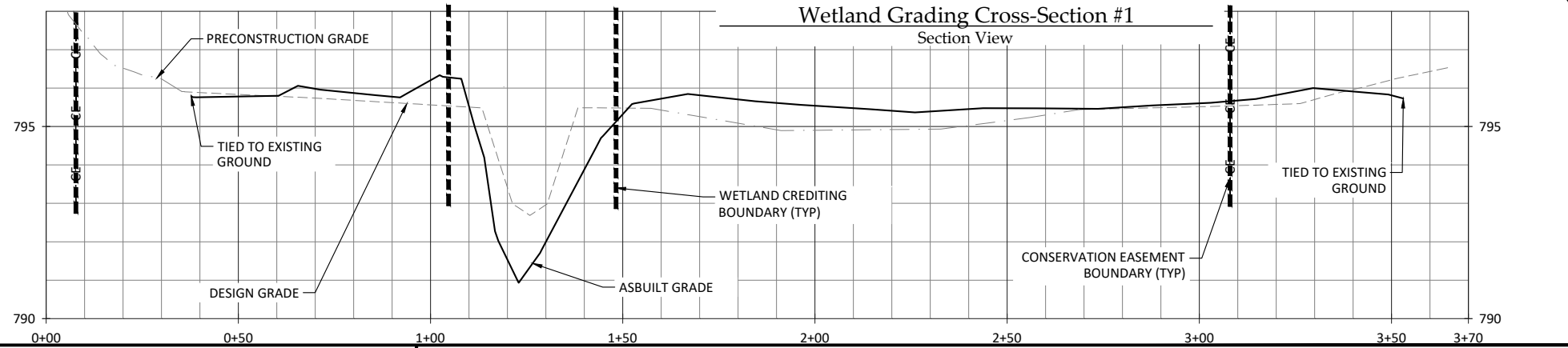
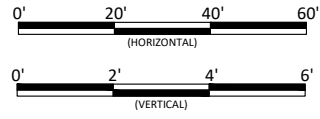


WETLAND RE-ESTABLISHMENT
PROPOSED AT A 1:1 CREDIT RATIO

WETLAND REHABILITATION
PROPOSED AT A 1:1 CREDIT RATIO

WETLAND REHABILITATION
PROPOSED AT A 1.5:1 CREDIT RATIO

WETLAND CREATION
PROPOSED AT A 3:1 CREDIT RATIO



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SEE WETLAND 3 AND 4
(SHEET 2.4)

STA: 122+49
OUTLET CHANNEL STABILIZED FOR
ADDED SUPPORT TO ROADSIDE CULVERT

Oak Hill Dairy Mitigation Site Record Drawings

Gaston County, North Carolina

Wetland Grading - Wetland 1
Wetland Grading

Revisions:

Date:	May 12, 2022
Job Number:	005-02182
Project Engineer:	AMR
Drawn By:	AMR
Checked By:	JCK

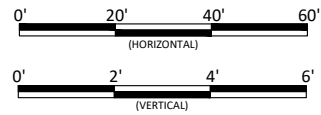
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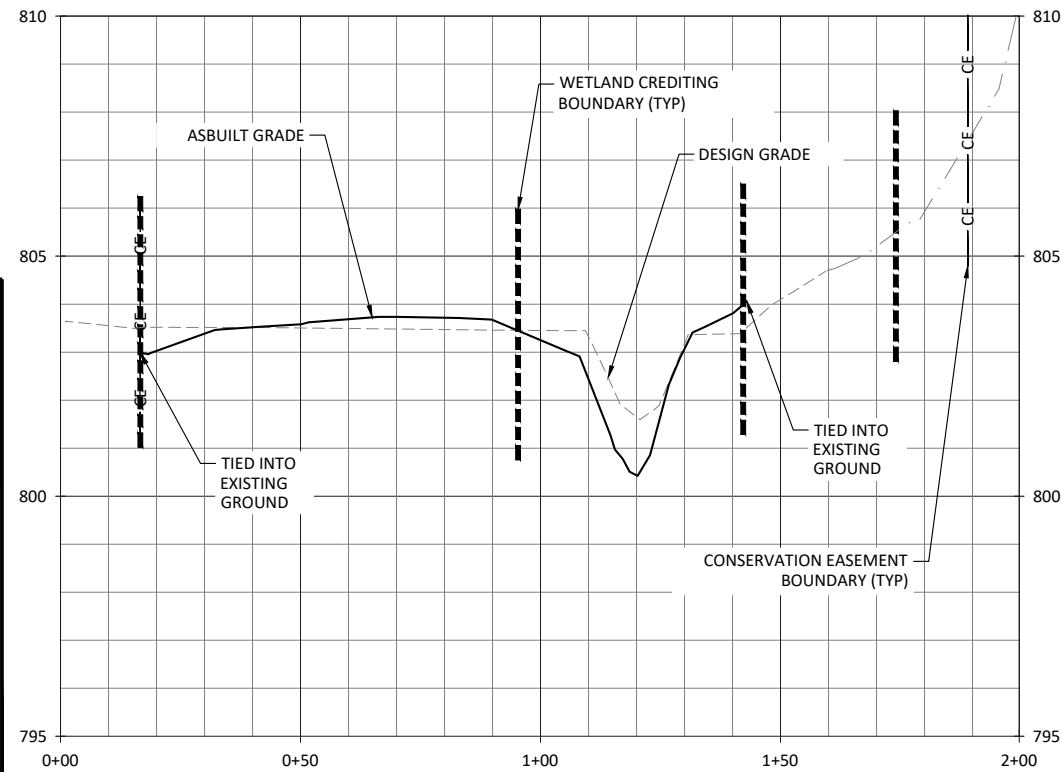
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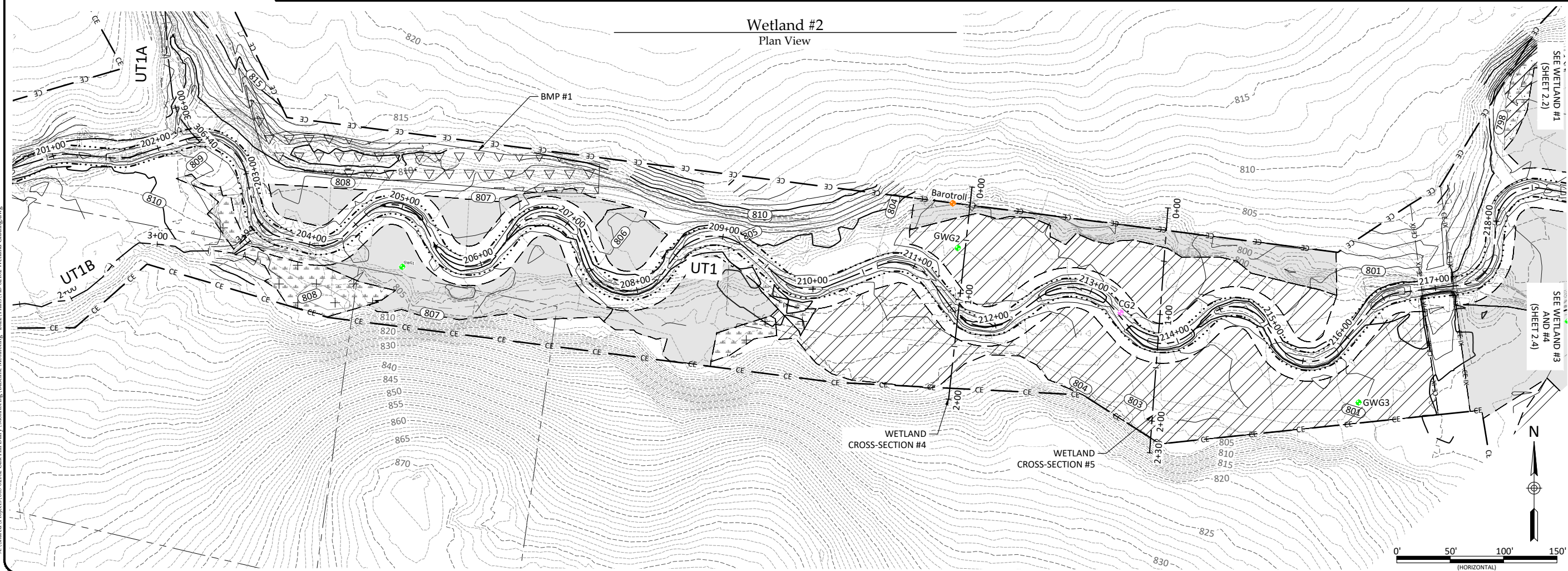
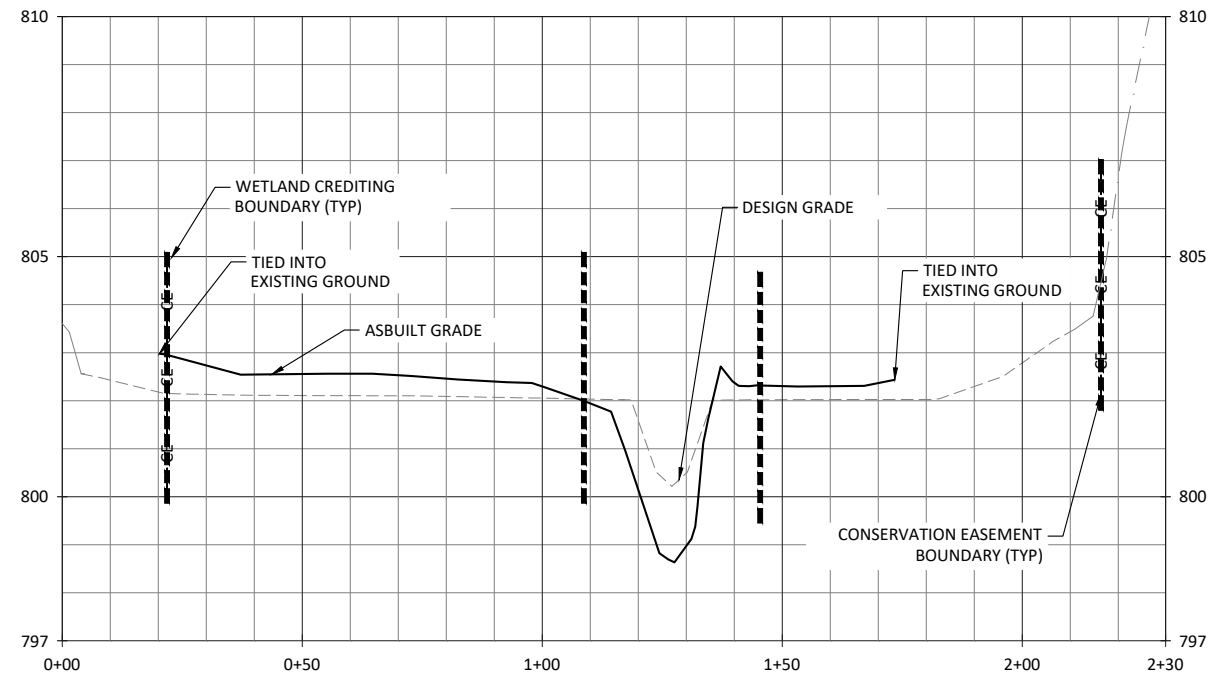




Wetland Grading Cross-Section #4
Section View



Wetland Grading Cross-Section #5
Section View



Oak Hill Dairy Mitigation Site Record Drawings

Gaston County, North Carolina

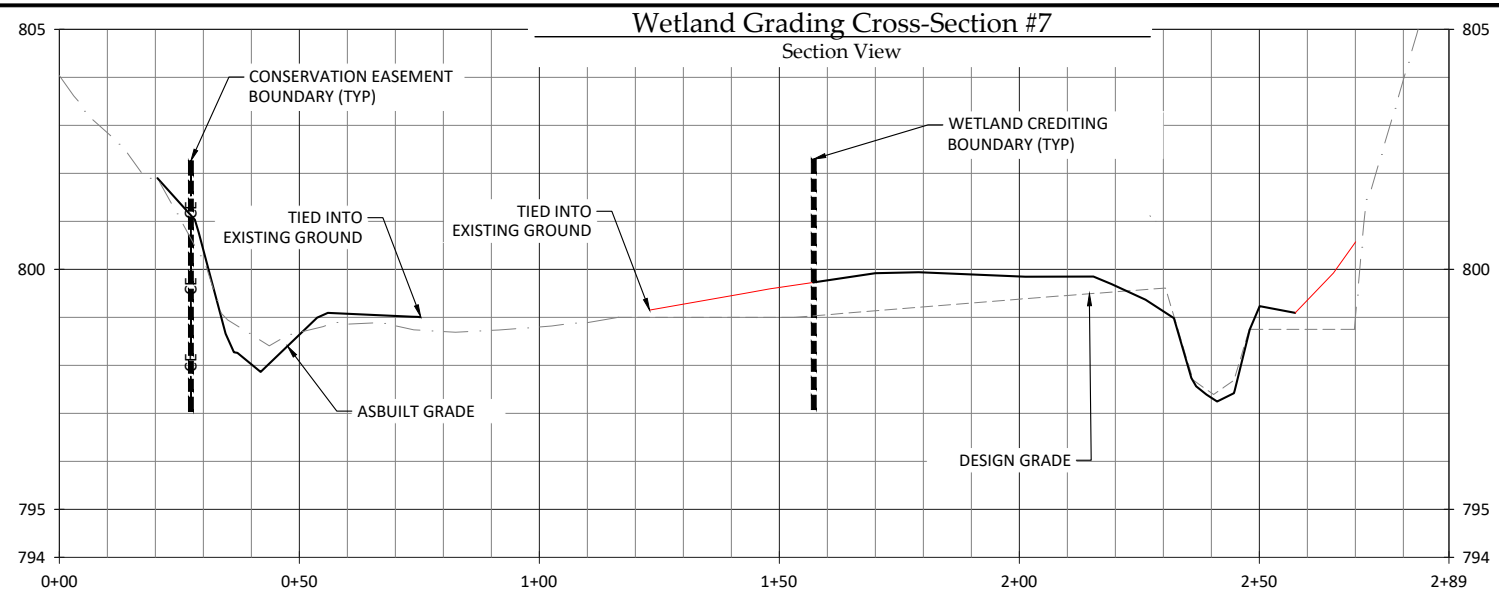
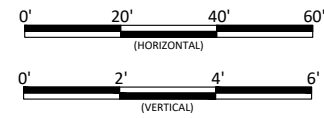
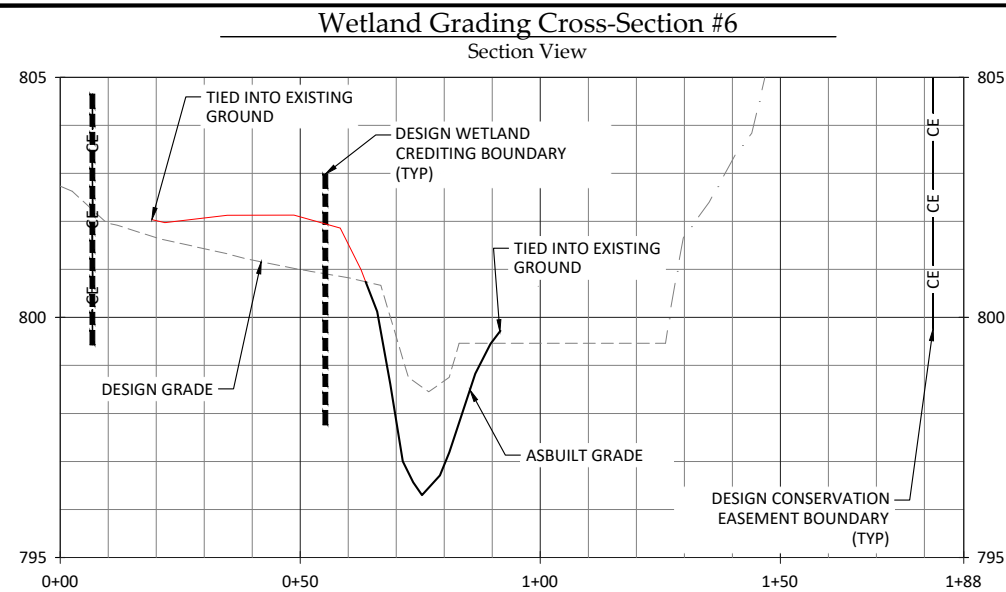
Wetland Grading - Wetland 2
Wetland Grading

Date:	May 12, 2022
Job Number:	005-02182
Project Engineer:	JM
Drawn By:	AMR
Checked By:	JCK

2.3

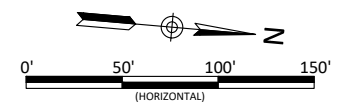
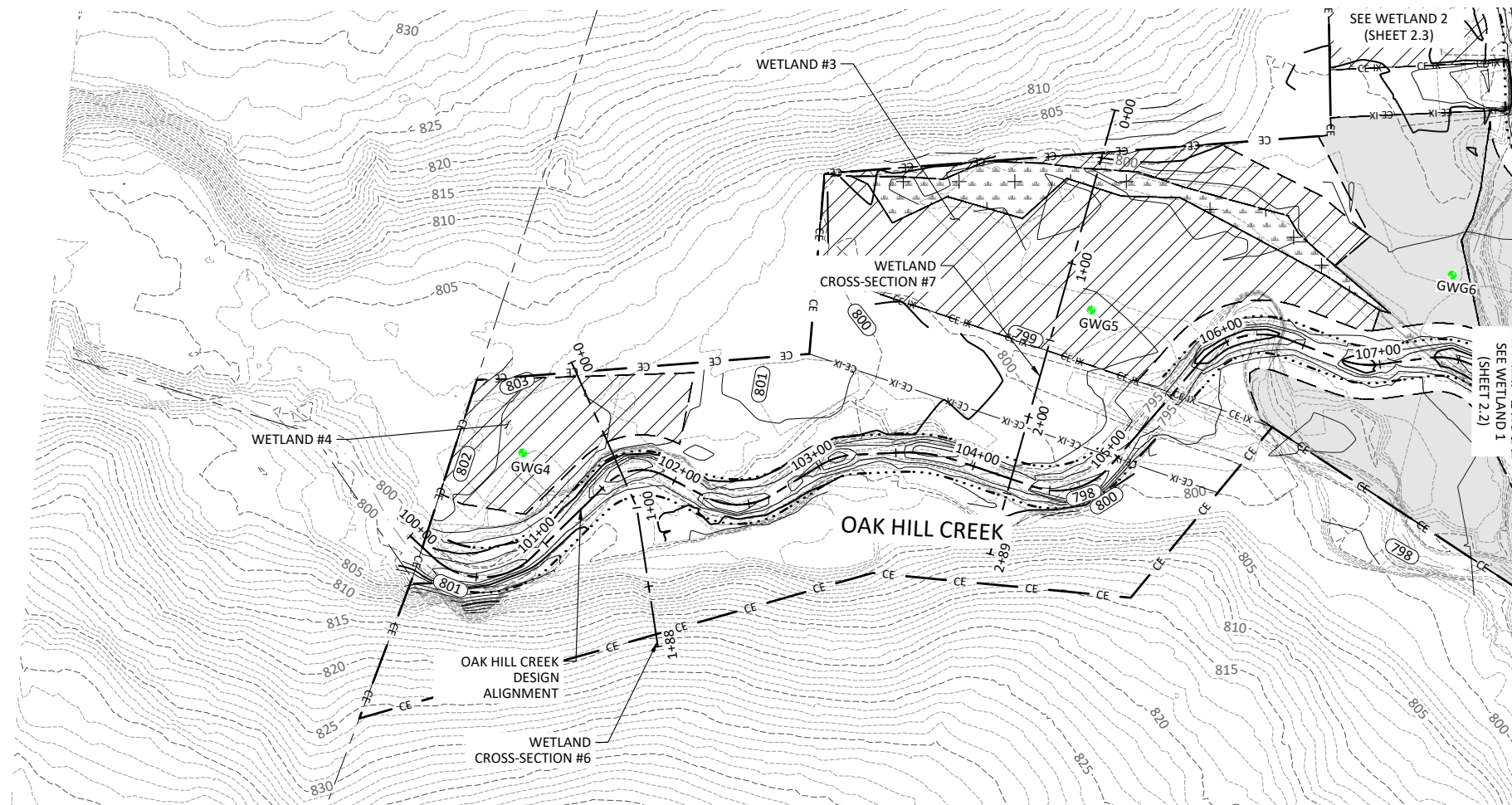


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Wetland #3 and #4

Plan View



Oak Hill Dairy Mitigation Site Record Drawings
Gaston County, North Carolina

Wetland Grading - Wetland 3-4
Wetland Grading



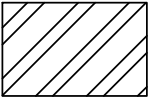
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Date:	May 12, 2022
Job Number:	005-02162
Project Engineer:	JM
Drawn By:	AMR
Checked By:	JCK

2.4

Open Area Buffer Planting



Open Buffer Planting Zone Trees							
Bare Root							
Species	Common Name	Max Spacing	Indiv. Spacing	Min. Caliper Size	Stratum	Wetland Indicator	# of Stems
<i>Acer negundo</i>	Boxelder	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FAC	10%
<i>Platanus occidentalis</i>	Sycamore	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FACW	15%
<i>Betula nigra</i>	River Birch	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FACW	15%
<i>Liriodendron tulipifera</i>	Tulip Poplar	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FACU	2%
<i>Quercus phellos</i>	Willow Oak	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FAC	10%
<i>Oxydendrum arboreum</i>	Sourwood	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	UPL	5%
<i>Diospyros virginiana</i>	Persimmon	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FAC	6%
<i>Populus deltoides</i>	Eastern Cottonwood	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FAC	10%
<i>Carya cordiformis</i>	Bitternut Hickory	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FACU	5%
<i>Quercus alba</i>	White Oak	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FACU	5%
<i>Quercus rubra</i>	Northern Red Oak	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FACU	5%
<i>Ulmus rubra</i>	Slippery Elm	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FACU	1%
Total							89%

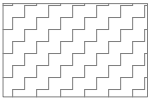
Open Buffer Planting Zone Small Trees / Shrubs							
Bare Root							
Species	Common Name	Max Spacing	Indiv. Spacing	Min. Caliper Size	Stratum	Wetland Indicator	# of Stems
<i>Ainus serrulata</i>	Tag Alder	12 ft.	6-12 ft.	0.25"-1.0"	Sub-Canopy	OBL	2%
<i>Hamamelis virginiana</i>	Witch Hazel	12 ft.	6-12 ft.	0.25"-1.0"	Shrub	FACU	2%
<i>Cornus florida</i>	Flowering Dogwood	12 ft.	6-12 ft.	0.25"-1.0"	Sub-Canopy	FACU	2%
<i>Lindera benzoin</i>	Spicebush	12 ft.	6-12 ft.	0.25"-1.0"	Shrub	FAC	2%
<i>Amelanchier arborea</i>	Serviceberry	12 ft.	6-12 ft.	0.25"-1.0"	Shrub	FAC	2%
<i>Calycanthus floridus</i>	Sweet Shrub	12 ft.	6-12 ft.	0.25"-1.0"	Shrub	FACW	1%
<i>Sambucus canadensis</i>	Elderberry	12 ft.	6-12 ft.	0.25"-1.0"	Shrub	FAC	2%
Total							11%

- Notes:
- (1) Substitute species: Sweetshrub, northern red oak, slippery elm.
 - (2) Transplants from on-site to be used at Designer's discretion for streambank and floodplain planting.
 - (3) Percentages of each species may be varied at Designer's discretion but shall not exceed 20% per each species.
 - (4) Designer may substitute container plantings or other plantings for bare roots.

TEMPORARY SEEDING		
APPROVED DATE	TYPE	PLANTING RATE (lbs/acre)
Jan 1 – May 1	Rye Grain (<i>Secale Cereale</i>)	120
	Ladino clover (<i>Trifolium Repens</i>)	5
	Crimson Clover (<i>Trifolium incarnatum</i>)	5
	Straw Mulch	4,000
May 1 – Aug 15	German Millet (<i>Setaria italica</i>)	40
	Ladino clover (<i>Trifolium Repens</i>)	5
	Crimson Clover (<i>Trifolium incarnatum</i>)	5
	Straw Mulch	4,000
Aug 15 – Dec 31	Rye Grain (<i>Secale Cereale</i>)	120
	Ladino clover (<i>Trifolium Repens</i>)	5
	Crimson Clover (<i>Trifolium incarnatum</i>)	5
	Straw Mulch	4,000

Note:
Rates of fertilizer and lime if necessary can be found in the site preparation plan included in the specification documents.

Wetland Planting



Wetland Planting Zone Trees							
Bare Root							
Species	Common Name	Max Spacing	Indiv. Spacing	Min. Caliper Size	Stratum	Wetland Indicator	# of Stems
<i>Platanus occidentalis</i>	Sycamore	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FACW	15%
<i>Betula nigra</i>	River Birch	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FACW	15%
<i>Quercus phellos</i>	Willow Oak	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FAC	10%
<i>Ulmus americana</i>	American Elm	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FACW	10%
<i>Nyssa sylvatica</i>	Black Gum	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FAC	5%
<i>Quercus michauxii</i>	Swamp Chestnut Oak	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FACW	8%
<i>Acer negundo</i>	Boxelder	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FAC	5%
<i>Quercus nigra</i>	Water Oak	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FACW	7%
<i>Celtis laevigata</i>	Sugarberry	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FACW	5%
Total							80%

Wetland Planting Zone Small Trees/Shrubs							
Bare Root							
Species	Common Name	Max Spacing	Indiv. Spacing	Min. Caliper Size	Stratum	Wetland Indicator	# of Stems
<i>Alnus serrulata</i>	Tag Alder	12 ft.	6-12 ft.	0.25"-1.0"	Sub-Canopy	OBL	1%
<i>Lindera benzoin</i>	Spicebush	12 ft.	6-12 ft.	0.25"-1.0"	Shrub	FAC	5%
<i>Cephalanthus occidentalis</i>	Buttonbush	12 ft.	6-12 ft.	0.25"-1.0"	Shrub	OBL	5%
<i>Sambucus canadensis</i>	Elderberry	12 ft.	6-12 ft.	0.25"-1.0"	Shrub	FAC	5%
<i>Cornus amomum</i>	Silky Dogwood	12 ft.	6-12 ft.	0.25"-1.0"	Shrub	FACW	1%
<i>Salix sericea</i>	Silky Willow	12 ft.	6-12 ft.	0.25"-1.0"	Shrub	OBL	2%
Livestakes							
<i>Salix nigra</i>	Black Willow	8 ft	6-8 ft.	0.5"-1.5"	Shrub	OBL	1%
Total							20%

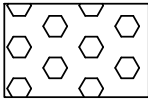
- Notes:
- (1) Substitute species: Silky willow, silky dogwood.
 - (2) Tag Alder shall be limited to Wetland 1 or other wetter areas of the site as designated by Designer.
 - (3) Transplants from on-site to be used at Designer's discretion for streambank and floodplain planting.
 - (4) Percentages of each species may be varied at Designer's discretion but shall not exceed 20% per each species.
 - (5) Designer may substitute container plantings or other plantings for bare roots.

Partially Vegetated Buffer Area Planting



Open Buffer Planting Zone Trees							
Bare Root							
Species	Common Name	Max Spacing	Indiv. Spacing	Min. Caliper Size	Stratum	Wetland Indicator	# of Stems
<i>Carpinus caroliniana</i>	American Hornbeam	12 ft.	6-12 ft.	0.25"-1.0"	Sub-Canopy	FAC	14%
<i>Euonymus americana</i>	Strawberry Bush	12 ft.	6-12 ft.	0.25"-1.0"	Shrub	FAC	14%
<i>Lindera benzoin</i>	Spicebush	12 ft.	6-12 ft.	0.25"-1.0"	Shrub	FAC	8%
<i>Fagus grandifolia</i>	American Beech	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FACU	14%
<i>Ulmus rubra</i>	Slippery Elm	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FAC	7%
<i>Hamamelis virginiana</i>	Witchhazel	12 ft.	6-12 ft.	0.25"-1.0"	Shrub	FACU	7%
<i>Calycanthus floridus</i>	Sweetshrub	12 ft.	6-12 ft.	0.25"-1.0"	Shrub	FACU	7%
<i>Cornus florida</i>	Flowering Dogwood	12 ft.	6-12 ft.	0.25"-1.0"	Sub-Canopy	FACU	7%
<i>Asimina triloba</i>	Pawpaw	12 ft.	6-12 ft.	0.25"-1.0"	Sub-Canopy	FAC	14%
<i>Quercus rubra</i>	Northern Red Oak	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FACU	8%
Total							100%

Riparian Corridor and Inundated Wetland Planting



Streambank Planting Zone							
Live Stakes							
Species	Common Name	Max Spacing	Indiv. Spacing	Min. Size	Stratum	Wetland Indicator	% of Stems
<i>Salix nigra</i>	Black Willow	8 ft.	6-8 ft.	0.5"-1.5" cal.	Shrub	OBL	25%
<i>Cornus amomum</i>	Silky Dogwood	8 ft.	6-8 ft.	0.5"-1.5" cal.	Shrub	FACW	20%
<i>Salix sericea</i>	Silky Willow	8 ft.	6-8 ft.	0.5"-1.5" cal.	Shrub	OBL	25%
<i>Cephalanthus occidentalis</i>	Buttonbush	8 ft.	6-8 ft.	0.5"-1.5" cal.	Shrub	OBL	15%
<i>Sambucus canadensis</i>	Elderberry	8 ft.	6-8 ft.	0.5"-1.5" cal.	Shrub	FAC	15%
Total							100%
Herbaceous Plugs							
<i>Juncus effusus</i>	Common Rush	5 ft.	3-5 ft.	1.0"- 2.0" plug	Herb	FACW	40%
<i>Carex crinita</i>	Fringed Sedge	5 ft.	3-5 ft.	1.0"- 2.0" plug	Herb	OBL	10%
<i>Carex lurida</i>	Lurid Sedge	5 ft.	3-5 ft.	1.0"- 2.0" plug	Herb	OBL	20%
<i>Carex lupulina</i>	Hop Sedge	5 ft.	3-5 ft.	1.0"-2.0" plug	Herb	OBL	15%
<i>Scirpus cyperinus</i>	Woolgrass	5 ft	3-5 ft.	1.0"-2.0" plug	Herb	FACW	15%
Total							100%

Note: See live staking and herbaceous plugs detail.

Permanent Seeding

Riparian Seeding - Open Canopy					
Pure Live Seed (21 lbs/ acre)					
Approved Date	Species Name	Common Name	Stratum	Wetland Indicator	Density (lbs/acre)
All Year	<i>Schizachyrium scoparium</i>	Little Bluestem	Herb	FACU	4.0
All Year	<i>Panicum virgatum</i>	Switchgrass	Herb	FAC	2.0
All Year	<i>Panicum rigidulum</i>	Redtop Panicgrass	Herb	FACW	1.0
All Year	<i>Rudbeckia hirta</i>	Blackeyed Susan	Herb	FACU	1.0
All Year	<i>Coreopsis lanceolata</i>	Lanceleaf Coreopsis	Herb	FACU	1.0
All Year	<i>Echinacea purpurea</i>	Purple coneflower	Herb	UPL	1.0
All Year	<i>Panicum clandestinum</i>	Deertongue	Herb	FAC	2.0
All Year	<i>Elymus virginicus</i>	Virginia Wild Rye	Herb	FACW	2.0
All Year	<i>Sorghastrum nutans</i>	Indiangrass	Herb	FACU	3.0
All Year	<i>Bidens aristosa</i>	Bur-Marigold	Herb	FACW	1.0
All Year	<i>Helianthus angustifolia</i>	Narrowleaf Sunflower	Herb	FACW	1.0
All Year	<i>Coreopsis tinctoria</i>	Plains coreopsis	Herb	FAC	1.0
All Year	<i>Achillea millefolium</i>	Common yarrow	Herb	FACU	1.0

Wetland Seeding - Open Canopy					
Pure Live Seed (19 lbs/ acre)					
Approved Date	Species Name	Common Name	Stratum	Wetland Indicator	Density (lbs/acre)
All Year	<i>Coleataenia anceps</i>	Beaked Panicgrass	Herb	FAC	3.0
All Year	<i>Carex vulpinoidea</i>	Fox Sedge	Herb	OBL	2.0
All Year	<i>Elymus virginicus</i>	Virginia Wild Rye	Herb	FACW	4.0
All Year	<i>Bidens aristosa</i>	Bur-Marigold	Herb	FACW	3.0
All Year	<i>Panicum cirgatum</i>	Switchgrass	Herb	FAC	2.0
All Year	<i>Polygonum pensylvanicum</i>	Smartweed	Herb	FACW	0.5
All Year	<i>Juncus effusus</i>	Common Rush	Herb	OBL	1.5
All Year	<i>Panicum dichotomiflorum</i>	Panicgrass	Herb	FACW	2.0
All Year	<i>Helianthus augustifolia</i>	Narrowleaf sunflower	Herb	FACW	1.0

- Notes:
- (1) Apply Permanent Riparian seeding in all disturbed areas within Conservation Easement.
 - (2) Apply Permanent seeding in all other disturbed areas outside of Easement per specification.

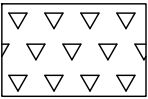
Stabilization Seeding

Stabilization Seeding		
Pure Live Seed (32 lbs/ac)		
Species Name	Common Name	lbs/acre
<i>Festuca arundinacea</i>	Fescue (KY 31)	20
<i>Dactylis glomerata</i>	Orchard Grass	12

- Notes:
- (1) Apply Pasture Seeding for grading outside Conservation Easement, utility easements, and stream crossings.
 - (2) Install temporary seed and mulch with all permanent seed.

Best Management Practice (BMP) Planting

- Notes:
- (1) Apply "Wetland Seeding - Open Canopy" seed mix to all disturbed areas of BMP including bottom of basin.
 - (2) Apply "Riparian Corridor Planting - Herbaceous Plugs and Livestakes" species in areas shown in detail.



Revisions:									
Date:	May 12, 2022	Job Number:	005-02182	Project Engineer:	AMR	Drawn By:	AMR	Checked By:	JCK



X:\Shared Projects\005-02182 Oak Hill Dairy\Monitoring\Baseline Monitoring - 2021\Plans\AB-02182 Planting.dwg
May 13, 2022

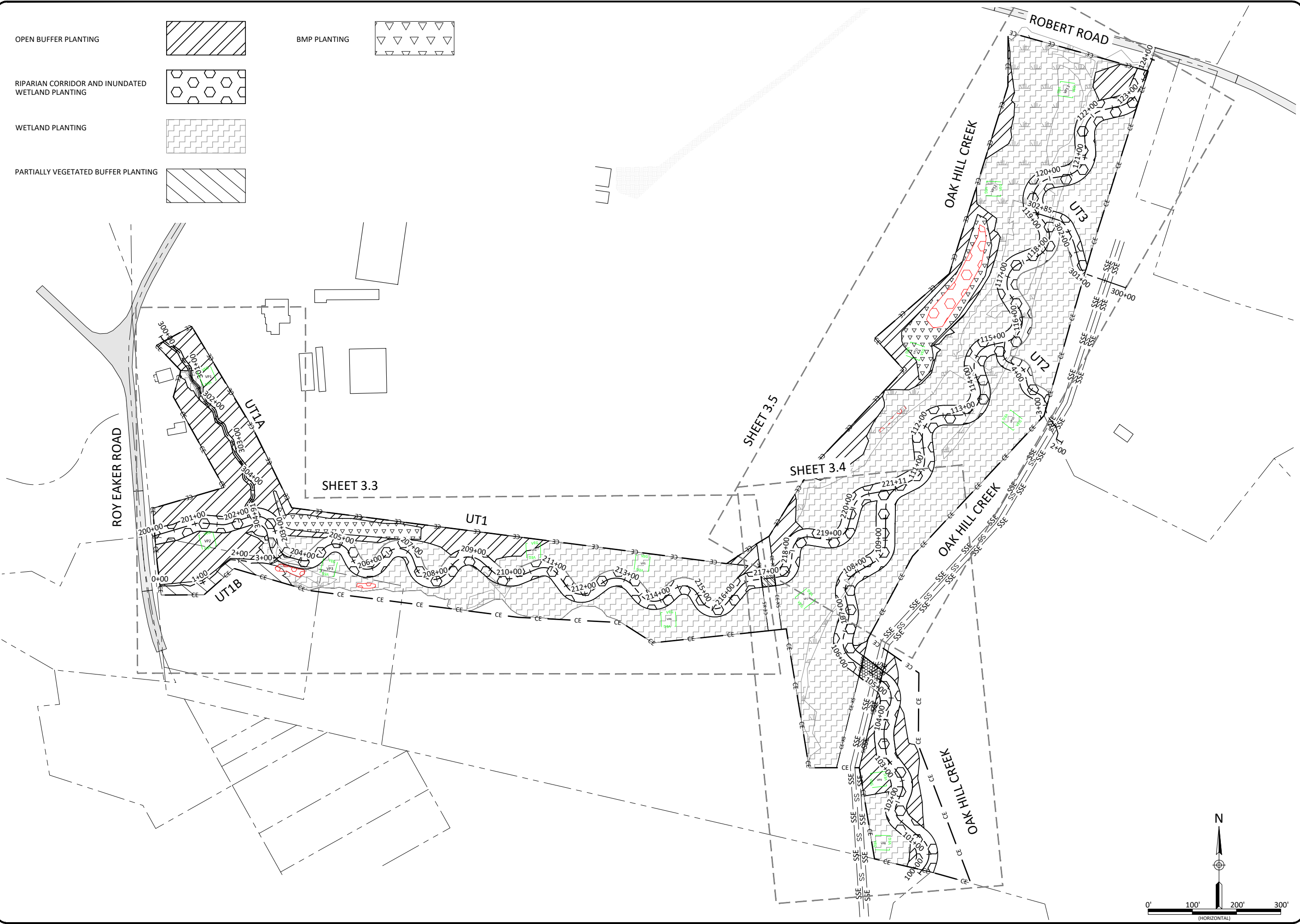
OPEN BUFFER PLANTING

BMP PLANTING

RIPIARIAN CORRIDOR AND INUNDATED WETLAND PLANTING

WETLAND PLANTING

PARTIALLY VEGETATED BUFFER PLANTING



0'100'200'300'

(HORIZONTAL)

N

Revisions:

Date: May 12, 2022

Job Number: 005-02182

Project Engineer: JM

Drawn By: AMR

Checked By: JCK

Oak Hill Dairy Mitigation Site Record Drawings

Gaston County, North Carolina

Planting Overview

WILDLANDS

ENGINEERING

167-B Haywood Rd

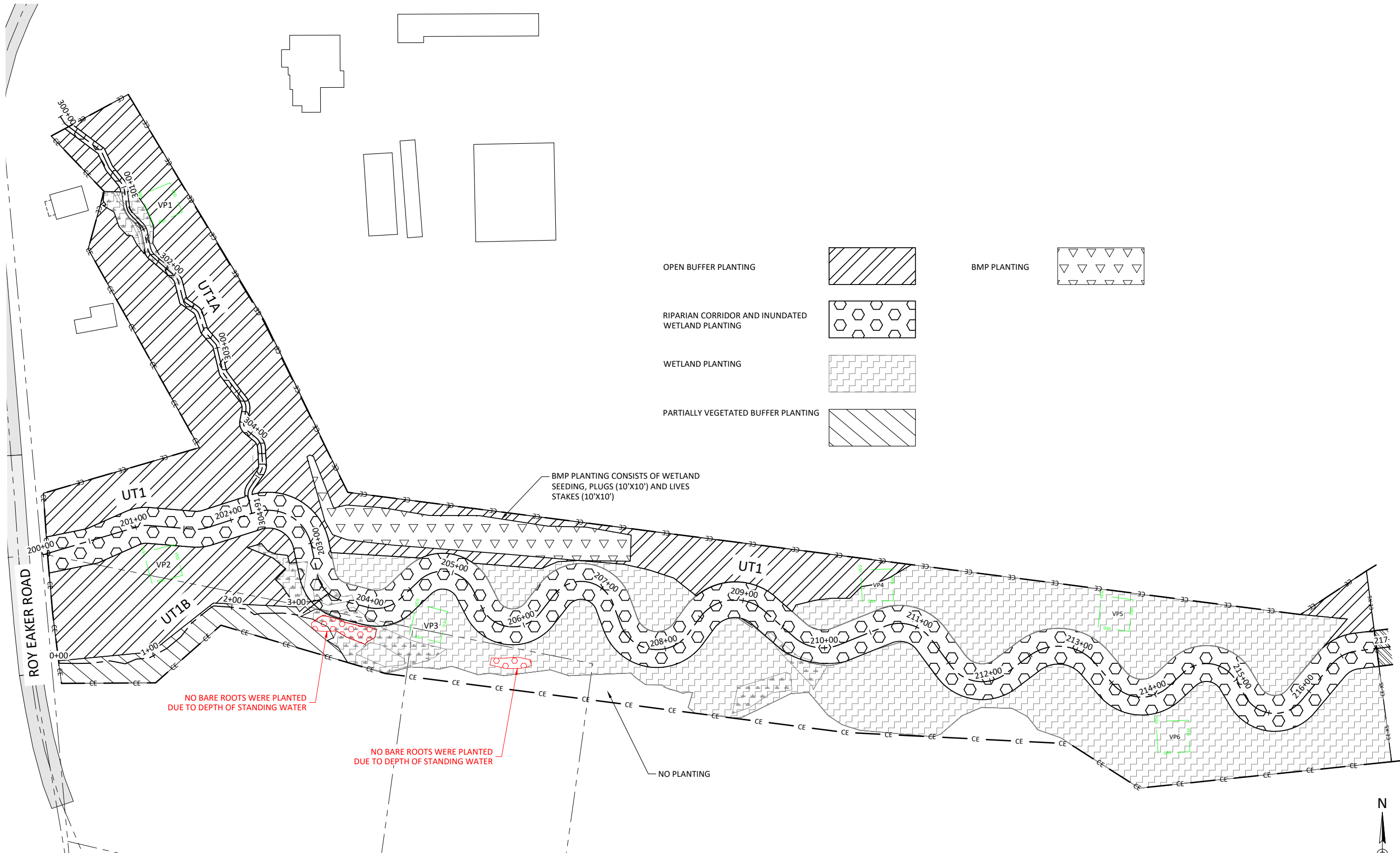
Ashville, NC 28806

Tel: 828.774.5547

License No. F-0831

3.2

Sheet



Oak Hill Dairy Mitigation Site Record Drawings
Gaston County, North Carolina

Planting Plan

Revisions:

Date:	May 12, 2022
Job Number:	005-02182
Project Engineer:	JM
Drawn By:	AMR
Checked By:	JCK

3.3

Sheet



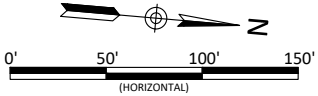
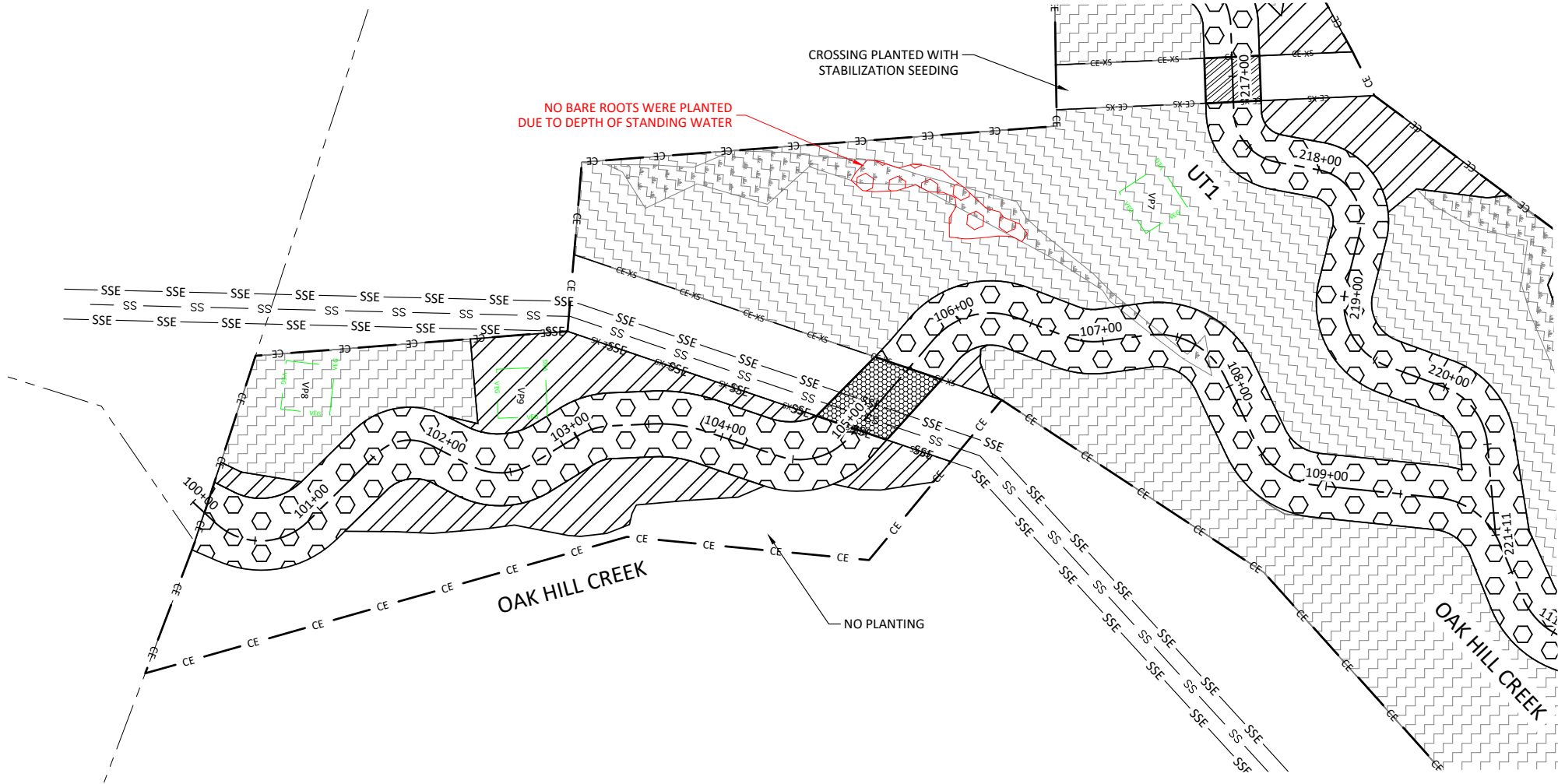
OPEN BUFFER PLANTING

RIPARIAN CORRIDOR AND INUNDATED WETLAND PLANTING

WETLAND PLANTING

PARTIALLY VEGETATED BUFFER PLANTING

BMP PLANTING



Oak Hill Dairy Mitigation Site Record Drawings
Gaston County, North Carolina

Revisions:

Date:	May 12, 2022
Job Number:	005-02182
Project Engineer:	JM
Drawn By:	AMR
Checked By:	JCK

3.4



WILDLANDS

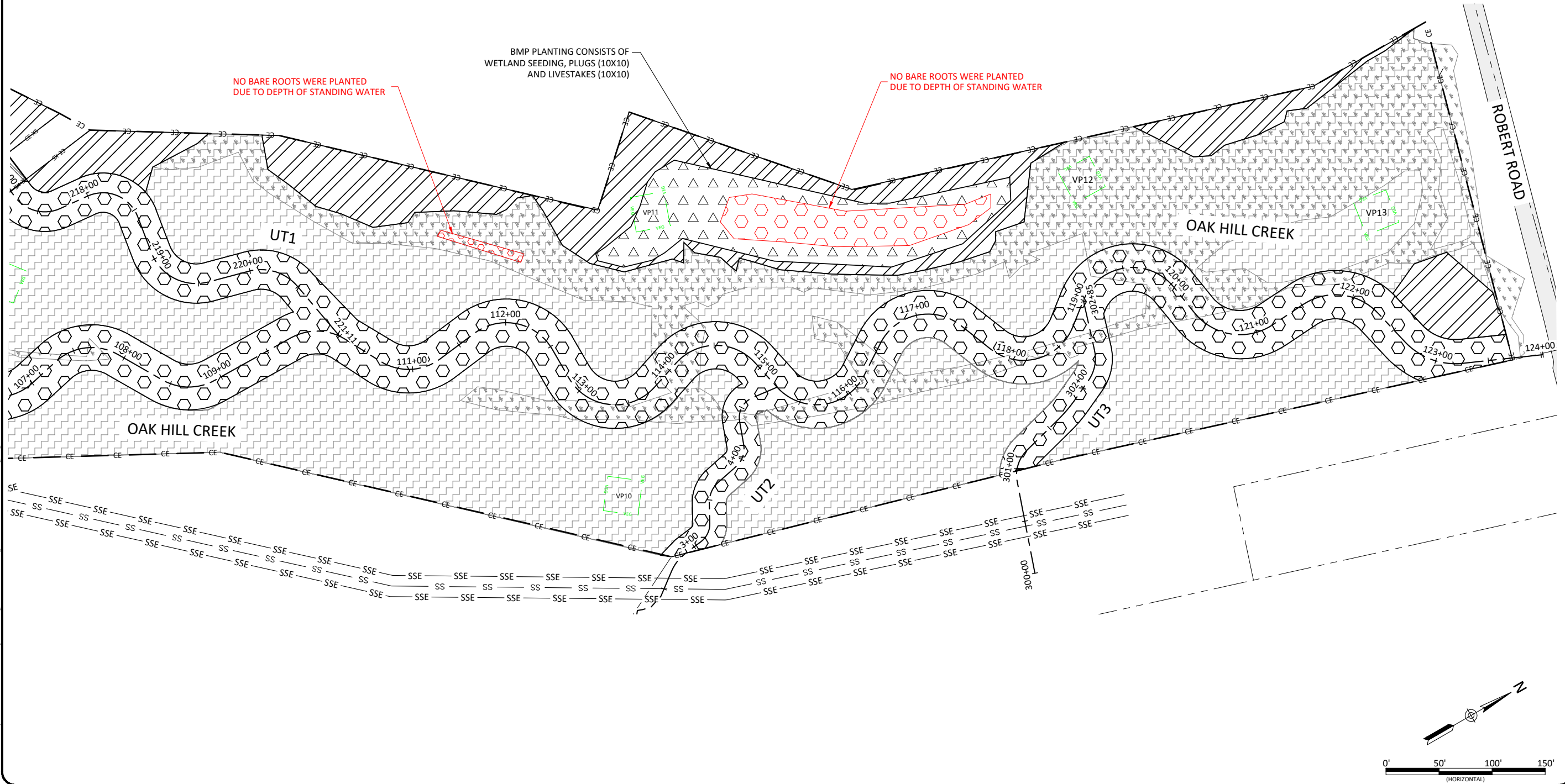
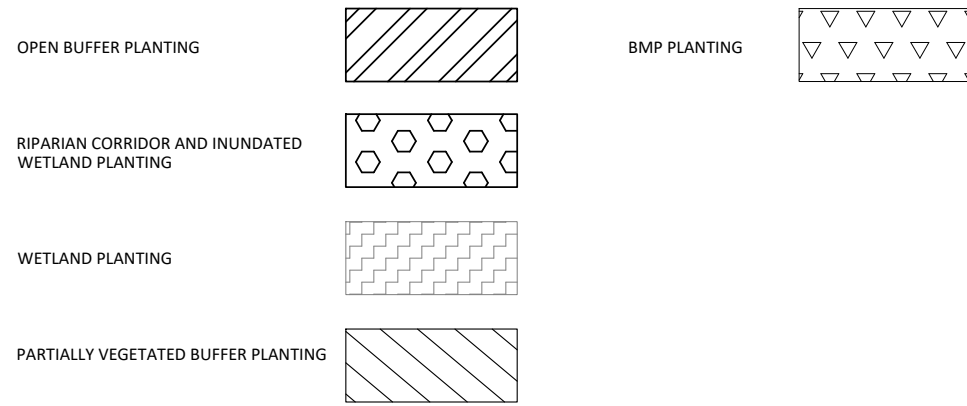
ENGINEERING

167-B Haywood Rd

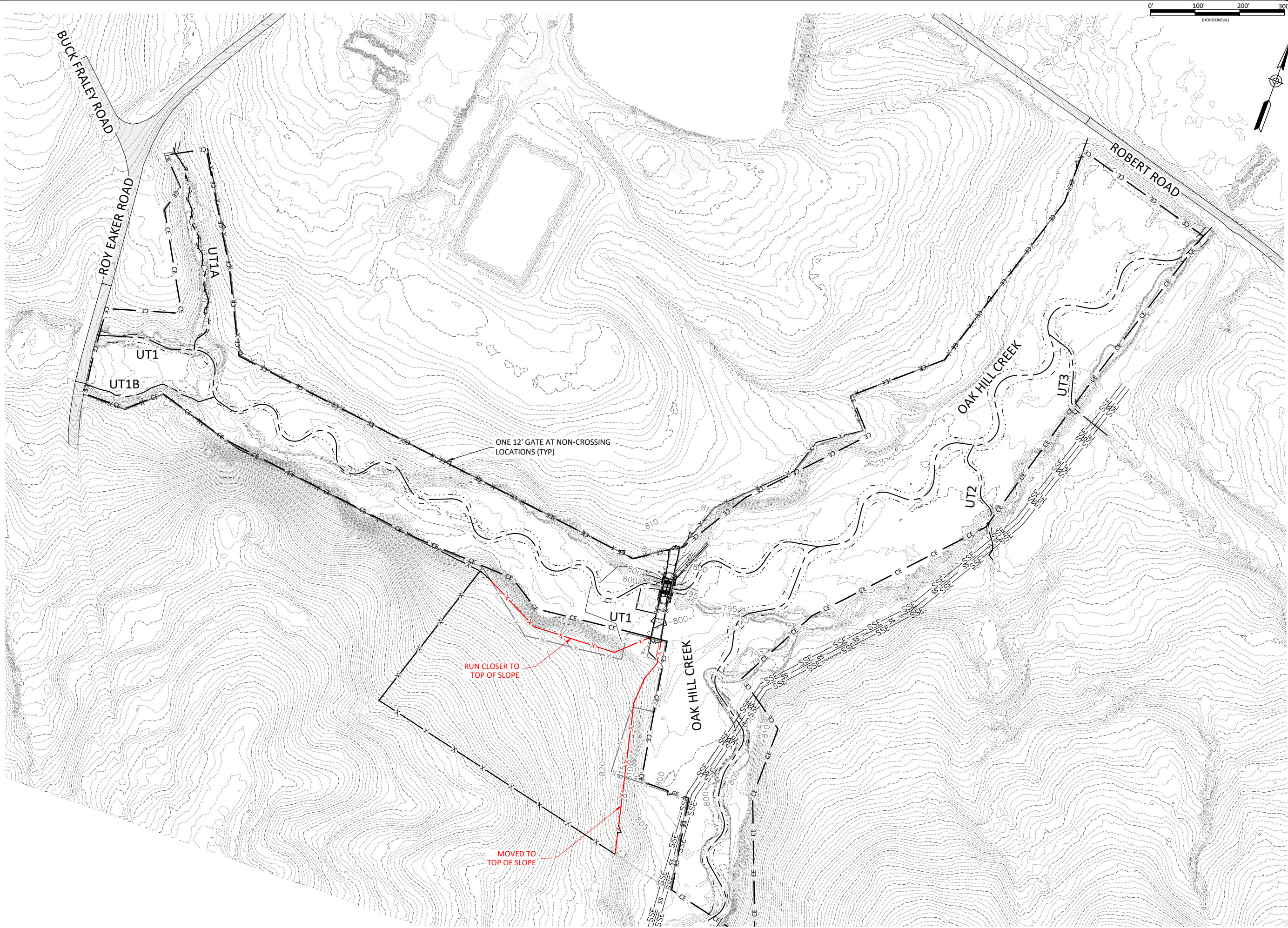
Ashville, NC 28806

Tel: 828.774.5547

License No. F-0831



A:\Shared Projects\005-02162 Oak Hill Dairy\Monitoring\Baseline Monitoring - ZUZZ\Plans\05-02162 - Farm Fencing



Oak Hill Dairy Mitigation Site Record Drawings
Gaston County, North Carolina

Date:	May 12, 2022
Job Number:	005-02162
Project Engineer:	JM
Drawn By:	AMR
Checked By:	JCK

Revisions:

4.1

Sheet

Fencing Plan



WILD LANDS
ENGINEERING
167-B Haywood Rd
Asheville, NC 28806
Tel: 828.774.5547
License No. F-0831

CERTIFICATE OF SURVEY AND ACCURACY

I, PHILLIP B. KEE, CERTIFY THAT THE GROUND TOPOGRAPHIC SURVEY PORTION OF THIS PROJECT WAS COMPLETED UNDER MY DIRECT SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY DIRECT SUPERVISION; THAT THIS SURVEY WAS PERFORMED AT THE 95% CONFIDENCE LEVEL TO MEET THE FEDERAL GEOGRAPHIC DATA COMMITTEE STANDARDS; THAT THIS SURVEY WAS PERFORMED TO THE CLASS A HORIZONTAL AND CLASS C VERTICAL WHERE APPLICABLE; THAT THE ORIGINAL DATA WAS OBTAINED BETWEEN THE DATES OF 2/15/22-03/16/22; THAT THE CONTOURS SHOWN AS BROKEN LINES MAY NOT MEET THE STATED STANDARD AND ALL COORDINATES ARE BASED ON NAD 83 (NSRS 2011) AND ALL ELEVATIONS ARE BASED ON NAVD 88; THAT THE GPS PORTION OF THIS PROJECT WAS TO PERFORM A GRID TIE TO THE NC STATE PLANE COORDINATE SYSTEM AND THE INFORMATION USED IS SHOWN & NOTED HEREON; THAT THIS MAP MEETS THE SPECIFICATIONS FOR TOPOGRAPHIC SURVEYS AS STATED IN TITLE 21, CHAPTER 56, SECTION .1606; THAT THIS MAP WAS NOT PREPARED IN ACCORDANCE WITH G.S. 47-30, AS AMENDED AND DOES NOT REPRESENT AN OFFICIAL BOUNDARY SURVEY.

GPS METADATA
SEE SURVEY CONTROL WILDLANDS ENGINEERING, INC. BY KEE MAPPING & SURVEYING, PA. (LICENSE # C-3039); SIGNED, SEALED AND DATED ON DECEMBER 17, 2019 BY PHILLIP B. KEE, NC PLS (LICENSE #4647).

WITNESS MY ORIGINAL SIGNATURE, LICENSE NUMBER, AND SEAL. This is a true and correct copy of the original.

DocuSigned by:
PHILLIP B. KEE, PLS L-4647
D965004A7692407

SURVEYOR'S NOTES:

- ALL DISTANCES AND COORDINATES ARE GROUND MEASUREMENTS IN US SURVEY FEET UNLESS OTHERWISE NOTED.
- PROPERTY SUBJECT TO ALL EASEMENTS, RIGHT OF WAYS AND RESTRICTIONS THAT ARE RECORDED, UNRECORDED, WRITTEN AND UNWRITTEN.
- CONSERVATION EASEMENT BOUNDARIES SHOWN HEREON WERE TAKEN FROM PLATS OF SURVEY ENTITLED: "A CONSERVATION EASEMENT SURVEY FOR THE STATE OF NORTH CAROLINA, DIVISION OF MITIGATION SERVICES, OAK HILL DAIRY SITE" AND RECORDED IN PB: 93 PGS:53-56 DATED MARCH 23, 2021, RECORDED IN THE GASTON COUNTY REGISTRY.
- GASTON COUNTY GIS WEBSITE USED TO IDENTIFY ADJOINING PROPERTY OWNERS.
- BY GRAPHIC DETERMINATION, A PORTION OF THE SUBJECT PROPERTY APPEARS TO LIE WITHIN A SPECIAL FLOOD HAZARD AREA (SFHA) AS DETERMINED BY THE FIRM. MAP# 3710269100K, 3710360100K, & 3710269000J DATED 09/28/2007.
- STATE PLANE COORDINATES AND ELEVATIONS WERE DERIVED FROM THE CONTROL SURVEY PREPARED BY KEE MAPPING & SURVEYING. THE HORIZONTAL DATUM IS NAD 83 (2011) AND THE VERTICAL DATUM IS NAVD 88. ALL COORDINATES SHOWN HEREON ARE GROUND MEASUREMENTS IN US SURVEY FEET.
- UTILITIES WERE LOCATED BASED ON VISIBLE ABOVE GROUND STRUCTURES, THEREFORE THE LOCATION OF UNDERGROUND UTILITIES ARE APPROXIMATE OR MAY BE PRESENT AND NOT SHOWN HEREON. CALL 1-800-632-4949 BEFORE DIGGING.
- STATIONING AND STREAM LABELS FOR PLAN AND PROFILES ARE BASED OFF OF FINAL PLANS AND DESIGN CENTERLINES PROVIDED BY WILDLANDS ENGINEERING, INC.
- CONTOUR INTERVAL: 1 FOOT
VERTICAL DATUM: NAVD 88
- AREA OF LIMITS OF DISTURBANCE: 17.48 ACRES
- WETLANDS SHOWN HEREON WERE PROVIDED BY WILDLANDS ENGINEERING, INC.

AN AS-BUILT SURVEY FOR: WILDLANDS ENGINEERING, INC.

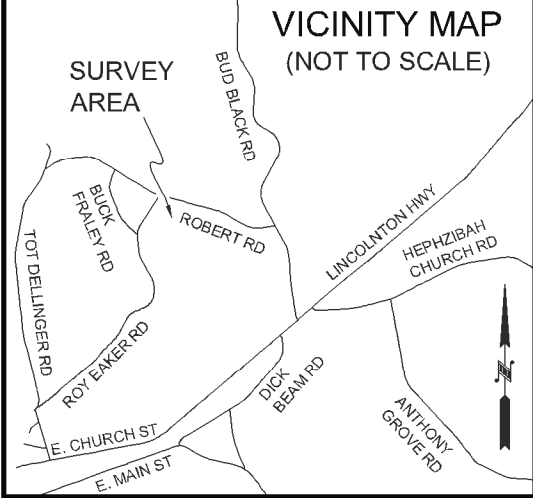
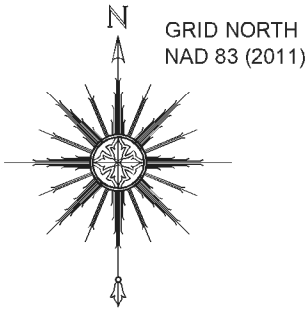
THE STATE OF NORTH CAROLINA,
NCDEQ: DEPARTMENT OF MITIGATION SERVICES

"OAK HILL DAIRY MITIGATION SITE"

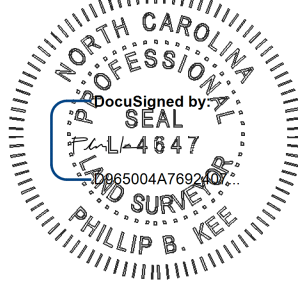
GASTON COUNTY, NORTH CAROLINA

SPO FILE NOS. 36-CR & 36-CS

DMS SITE ID NO. 100120



SEAL:



NOTE: SEE SHEET 1 FOR
SURVEYOR'S NOTES, LEGEND &
STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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AN AS-BUILT SURVEY FOR:
**WILDLANDS
ENGINEERING, INC**

SPO FILE NOS. 36-CR & 36-CS
DMS SITE ID NO. 100120

PROJECT:
**OAK HILL DAIRY
MITIGATION SITE**

SHEET TITLE:
PROJECT OVERVIEW

TOWNSHIP: CHERRYVILLE	COUNTY: GASTON	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: PBK	SURVEY BY: KP, AC, JR, CB, DP

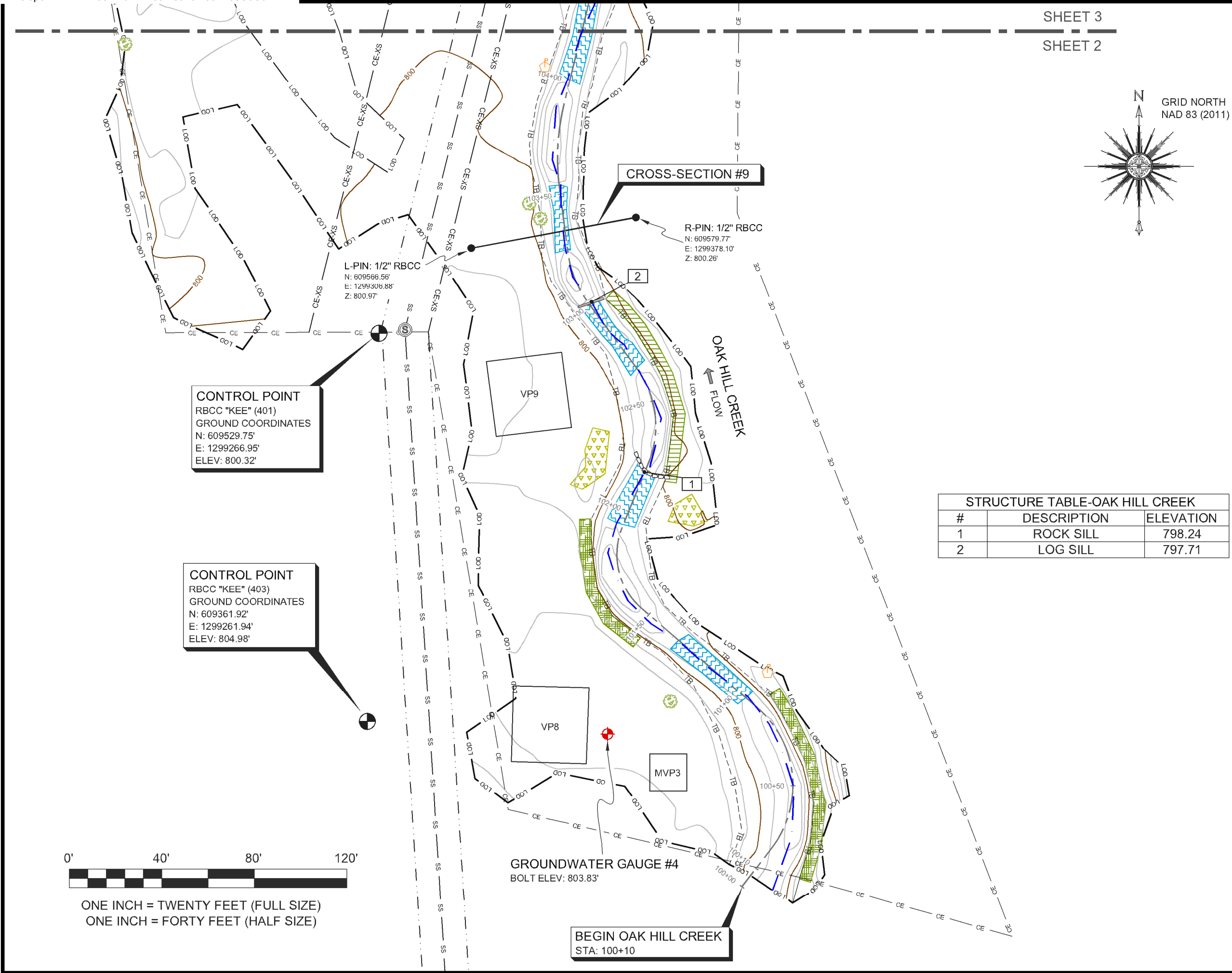
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JOB: #2201013-AB	SHEET SIZE: 11" X 17" (HALF SIZE)

#	DATE	REVISIONS

SHEET:
1 OF **23**

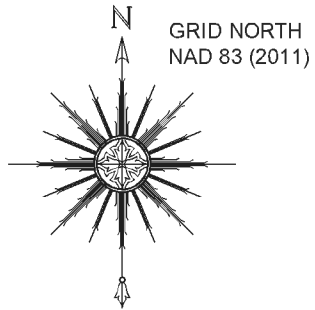


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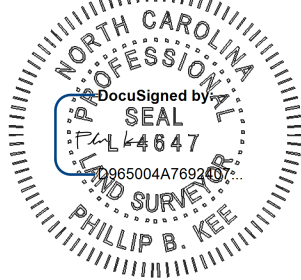


SHEET 3

SHEET 2



SEAL:



NOTE: SEE SHEET 1 FOR
SURVEYOR'S NOTES, LEGEND &
STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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AN AS-BUILT SURVEY FOR:
**WILDLANDS
ENGINEERING, INC**

SPO FILE NOS. 36-CR & 36-CS
DMS SITE ID NO. 100120

PROJECT:
**OAK HILL DAIRY
MITIGATION SITE**

SHEET TITLE:
**BEGIN
OAK HILL CREEK**

TOWNSHIP: CHERRYVILLE	COUNTY: GASTON	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: PBK	SURVEY BY: KP, AC, JR, CB, DP

SCALE: AS SHOWN	SURVEY DATE: 04/22/22
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JOB: #2201013-AB	SHEET SIZE: 11" X 17" (HALF SIZE)
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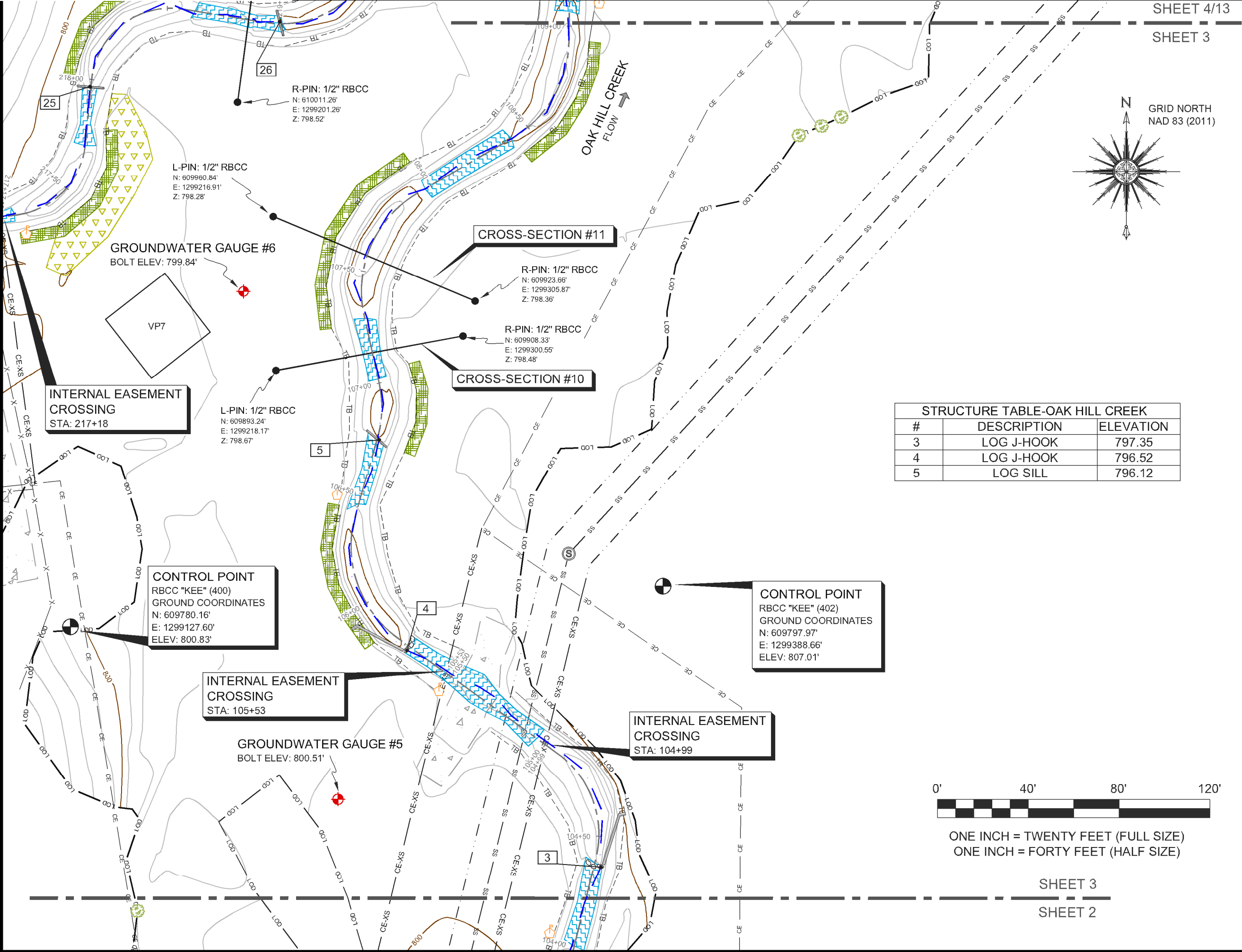
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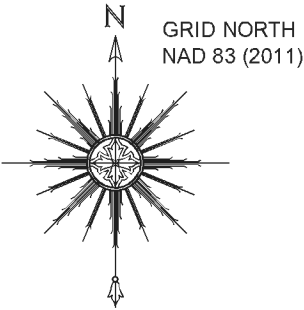
2 OF 23



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SHEET 4/13
SHEET 3

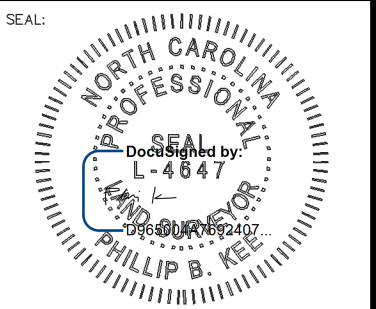


STRUCTURE TABLE-OAK HILL CREEK		
#	DESCRIPTION	ELEVATION
3	LOG J-HOOK	797.35
4	LOG J-HOOK	796.52
5	LOG SILL	796.12



ONE INCH = TWENTY FEET (FULL SIZE)
ONE INCH = FORTY FEET (HALF SIZE)

SHEET 3
SHEET 2



NOTE: SEE SHEET 1 FOR
SURVEYOR'S NOTES, LEGEND &
STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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**WILDLANDS
ENGINEERING, INC**

SPO FILE NOS. 36-CR & 36-CS
DMS SITE ID NO. 100120

PROJECT:
**OAK HILL DAIRY
MITIGATION SITE**

SHEET TITLE:
OAK HILL CREEK

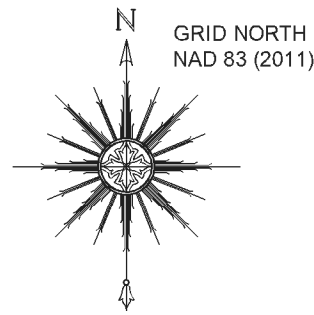
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DRAWN BY: NH	CHECKED BY: PBK	SURVEY BY: KP, AC, JR, CB, DP
SCALE: AS SHOWN	SURVEY DATE: 04/22/22	
JOB: #2201013-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	
#	DATE	REVISIONS

SHEET:

3 OF 23



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GRID NORTH
NAD 83 (2011)

CONTROL POINT
RBCC "KEE" (306)
GROUND COORDINATES
N: 610346.17'
E: 1299232.63'
ELEV: 810.30'

STRUCTURE TABLE-OAK HILL CREEK		
#	DESCRIPTION	ELEVATION
6	LOG J-HOOK	794.58
7	LOG J-HOOK	793.76
8	LOG J-HOOK	792.20
9	LOG SILL	791.49

CROSS-SECTION #13

L-PIN: 1/2" RBCC
N: 610389.81'
E: 1299505.01'
Z: 794.82'

L-PIN: 1/2" RBCC
N: 610384.13'
E: 1299500.20'
Z: 794.875'

CROSS-SECTION #12

R-PIN: 1/2" RBCC
N: 610417.96'
E: 1299603.58'
Z: 794.41'

R-PIN: 1/2" RBCC
N: 610333.72'
E: 1299616.91'
Z: 794.67'

VP1

OAK HILL CREEK
FLOW

GROUNDWATER GAUGE #8
BOLT ELEV: 796.84'

INTERSECTION
OAK HILL CREEK
STA: 110+23
END UT1
STA: 221+11

GROUNDWATER GAUGE #7
BOLT ELEV: 798.95'

L-PIN: 1/2" RBCC
N: 610083.26'
E: 1299210.85'
Z: 798.16'

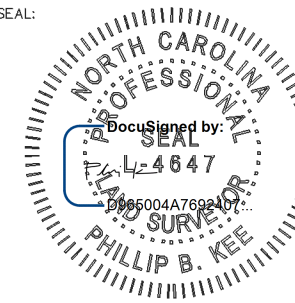
CROSS-SECTION #8

UT1
FLOW →



ONE INCH = TWENTY FEET (FULL SIZE)
ONE INCH = FORTY FEET (HALF SIZE)

SHEET 4/13
SHEET 3



NOTE: SEE SHEET 1 FOR
SURVEYOR'S NOTES, LEGEND &
STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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AN AS-BUILT SURVEY FOR:
WILDLANDS
ENGINEERING, INC

SPO FILE NOS. 36-CR & 36-CS
DMS SITE ID NO. 100120

PROJECT:
OAK HILL DAIRY
MITIGATION SITE

SHEET TITLE:
OAK HILL CREEK

TOWNSHIP: CHERRYVILLE	COUNTY: GASTON	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: PBK	SURVEY BY: KP, AC, JR, CB, DP

SCALE: AS SHOWN	SURVEY DATE: 04/22/22
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JOB: #2201013-AB	SHEET SIZE: 11" X 17" (HALF SIZE)
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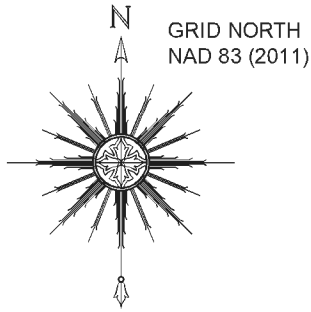
#	DATE	REVISIONS

SHEET:

4 OF 23



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SHEET 6

SHEET 5/14

STRUCTURE TABLE-OAK HILL CREEK		
#	DESCRIPTION	ELEVATION
10	LOG J-HOOK	790.38
11	LOG SILL	789.96
12	LOG J-HOOK	789.49
13	ROCK SILL	789.00

CONTROL POINT
RBCC "KEE" (305)
GROUND COORDINATES
N: 610644.12'
E: 1299468.06'
ELEV: 802.20'

INTERSECTION
OAK HILL CREEK
STA: 118+99
END UT3
STA: 302+85

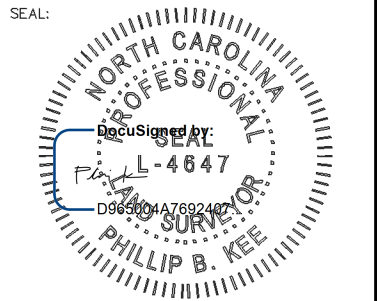
INTERSECTION
OAK HILL CREEK
STA: 115+24
END UT2
STA: 4+89

R-PIN: 1/2" RBCC
N: 610817.43'
E: 1299742.90'
Z: 791.42'

GROUNDWATER GAUGE #10
BOLT ELEV: 793.14'

GROUNDWATER GAUGE #9
BOLT ELEV: 794.31'

48" CPP
INV IN: 790.97'
INV OUT: 790.45'



NOTE: SEE SHEET 1 FOR
SURVEYOR'S NOTES, LEGEND &
STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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AN AS-BUILT SURVEY FOR:
**WILDLANDS
ENGINEERING, INC**

SPO FILE NOS. 36-CR & 36-CS
DMS SITE ID NO. 100120

PROJECT:
**OAK HILL DAIRY
MITIGATION SITE**

SHEET TITLE:
OAK HILL CREEK

TOWNSHIP: CHERRYVILLE	COUNTY: GASTON	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: PBK	SURVEY BY: KP, AC, JR, CB, DP

SCALE:
AS SHOWN

SURVEY DATE:
04/22/22

JOB:
#2201013-AB

SHEET SIZE:
11" X 17" (HALF SIZE)

#	DATE	REVISIONS
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SHEET:

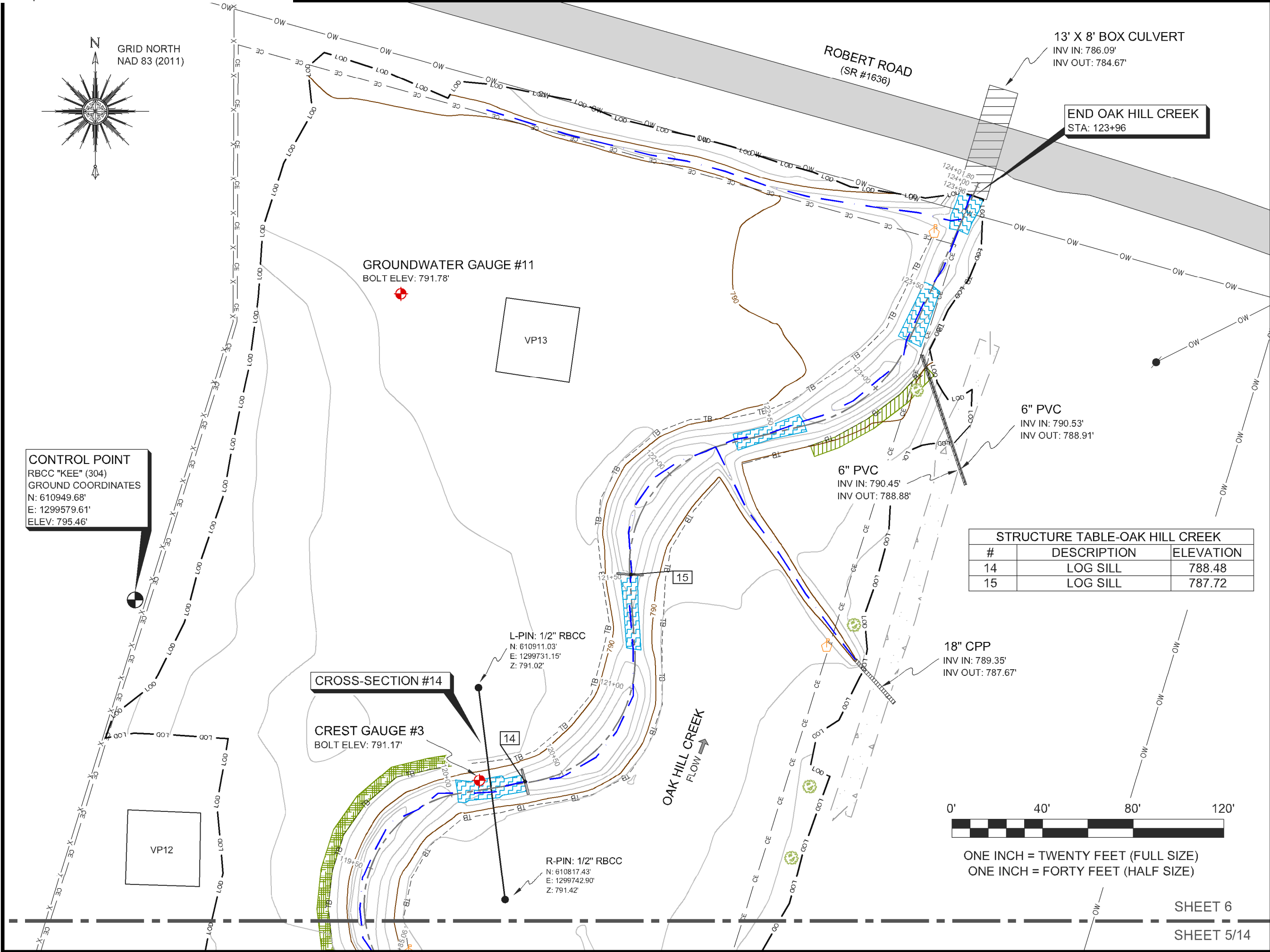
5 OF 23



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ONE INCH = FORTY FEET (HALF SIZE)



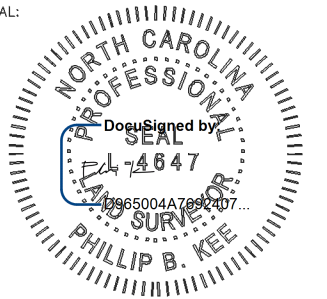
STRUCTURE TABLE-OAK HILL CREEK		
#	DESCRIPTION	ELEVATION
14	LOG SILL	788.48
15	LOG SILL	787.72



ONE INCH = TWENTY FEET (FULL SIZE)
ONE INCH = FORTY FEET (HALF SIZE)

SHEET 6
SHEET 5/14

SEAL:



NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NOS. 36-CR & 36-CS
DMS SITE ID NO. 100120

PROJECT:
OAK HILL DAIRY MITIGATION SITE

SHEET TITLE:
END OAK HILL CREEK

TOWNSHIP: CHERRYVILLE	COUNTY: GASTON	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: PBK	SURVEY BY: KP, AC, JR, CB, DP

SCALE: AS SHOWN
SURVEY DATE: 04/22/22

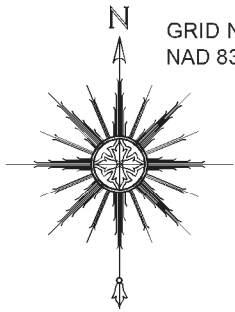
JOB: #2201013-AB		SHEET SIZE: 11" X 17" (HALF SIZE)	
#	DATE	REVISIONS	

SHEET:

6 OF 23



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ROY EAKER ROAD
(SR #1634)

BEGIN UT1
STA: 200+05

CONTROL POINT
RBCC "KEE" (311)
GROUND COORDINATES
N: 610116.93'
E: 1297759.67'
ELEV: 817.41'

L-PIN: 1/2" RBCC
N: 610096.90'
E: 1297756.69'
Z: 814.95'

CROSS-SECTION #1

R-PIN: 1/2" RBCC
N: 610202.47'
E: 1297869.94'
Z: 816.20'

R-PIN: 1/2" RBCC
N: 610198.37'
E: 1297871.61'
Z: 815.92'

CREST GAUGE #1
BOLT ELEV: 812.24'

INTERSECTION
UT1
STA: 202+23
END UT1A
STA: 304+91

CROSS-SECTION #2

L-PIN: 1/2" RBCC
N: 610222.31'
E: 1297912.11'
Z: 814.74'

L-PIN: 1/2" RBCC
N: 610193.04'
E: 1297923.57'
Z: 813.30'

INTERSECTION
UT1
STA: 203+56
END UT1B
STA: 3+10

CROSS-SECTION #3

R-PIN: 1/2" RBCC
N: 610026.11'
E: 1297787.32'
Z: 811.43'

BEGIN UT1B
STA: 00+00

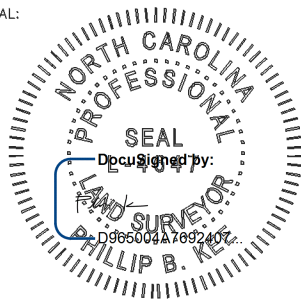
UT1B
FLOW

STRUCTURE TABLE-UT1		
#	DESCRIPTION	ELEVATION
16	LOG J-HOOK	807.34



ONE INCH = TWENTY FEET (FULL SIZE)
ONE INCH = FORTY FEET (HALF SIZE)

SEAL:



NOTE: SEE SHEET 1 FOR
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STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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AN AS-BUILT SURVEY FOR:
**WILDLANDS
ENGINEERING, INC**

SPO FILE NOS. 36-CR & 36-CS
DMS SITE ID NO. 100120

PROJECT:
**OAK HILL DAIRY
MITIGATION SITE**

SHEET TITLE:
BEGIN UT1

TOWNSHIP: CHERRYVILLE	COUNTY: GASTON	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: PBK	SURVEY BY: KP, AC, JR, CB, DP
SCALE: AS SHOWN	SURVEY DATE: 04/22/22	
JOB: #2201013-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

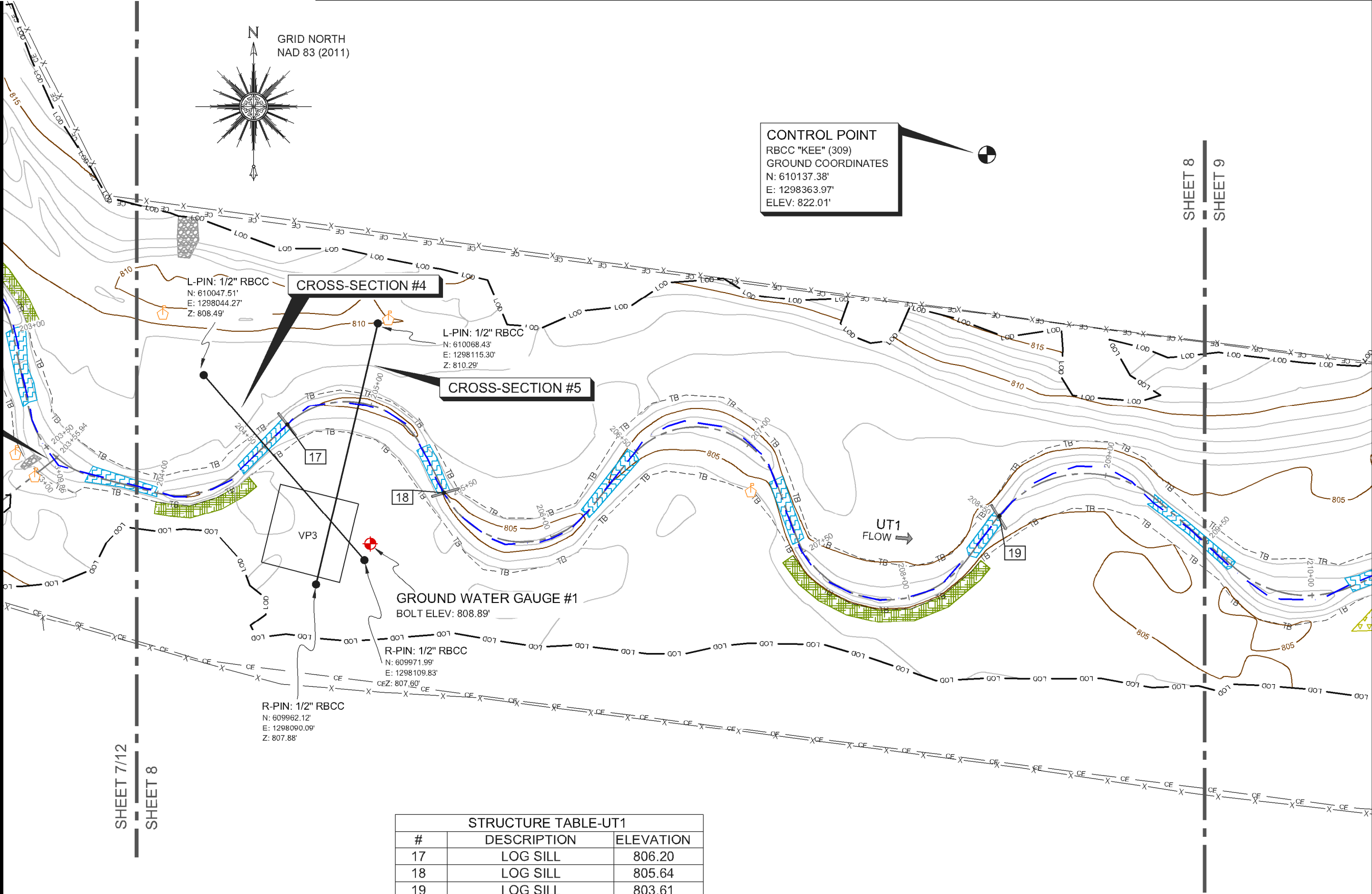
#	DATE	REVISIONS

SHEET:

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STRUCTURE TABLE-UT1		
#	DESCRIPTION	ELEVATION
17	LOG SILL	806.20
18	LOG SILL	805.64
19	LOG SILL	803.61



ONE INCH = TWENTY FEET (FULL SIZE)
ONE INCH = FORTY FEET (HALF SIZE)

SEAL:

NOTE: SEE SHEET 1 FOR
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STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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SPO FILE NOS. 36-CR & 36-CS
DMS SITE ID NO. 100120

PROJECT:
**OAK HILL DAIRY
MITIGATION SITE**

SHEET TITLE:
UT1

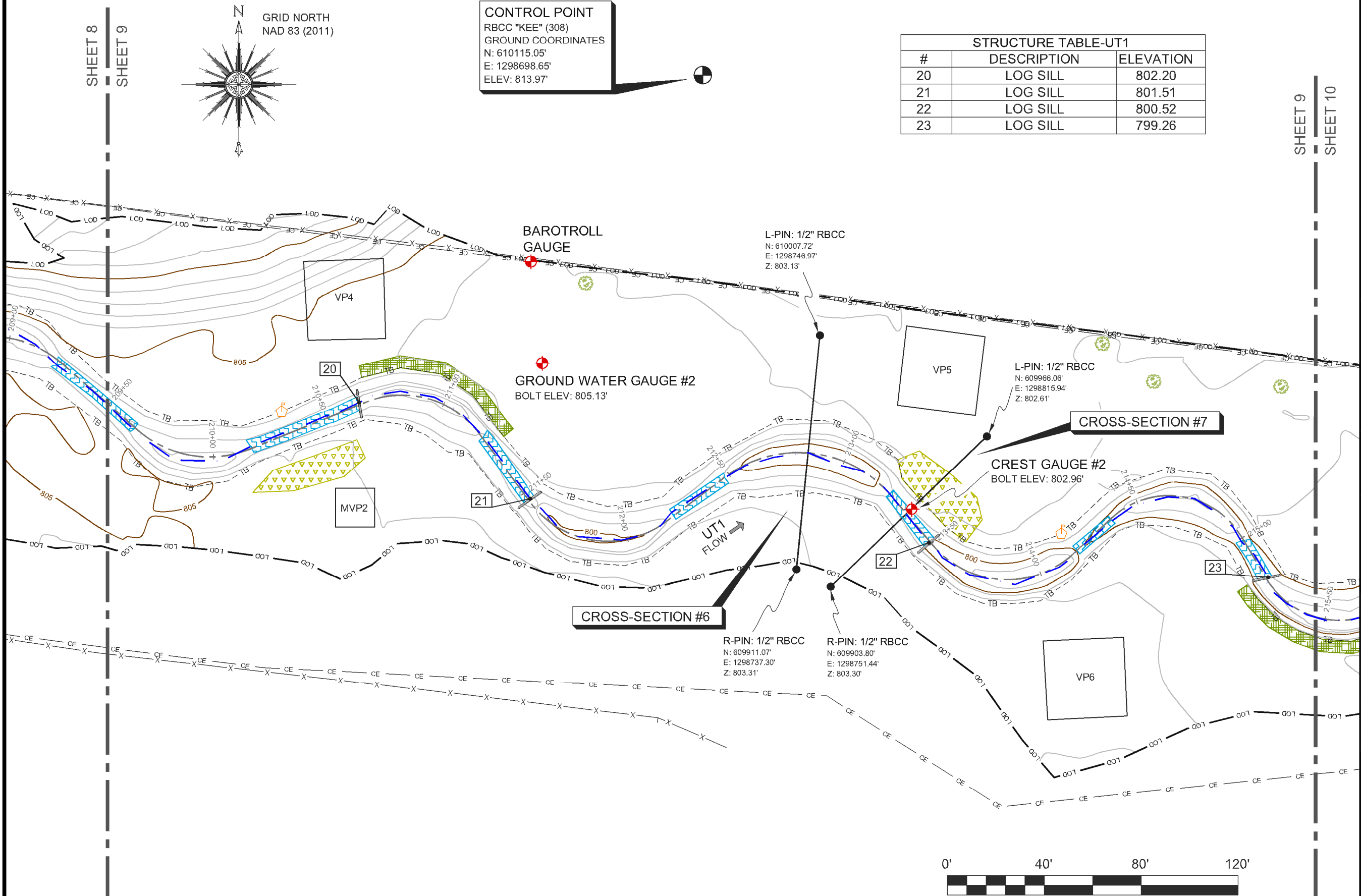
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DRAWN BY: NH	CHECKED BY: PBK	SURVEY BY: KP, AC, JR, CB, DP
SCALE: AS SHOWN	SURVEY DATE: 04/22/22	
JOB: #2201013-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	
#	DATE	REVISIONS

SHEET:

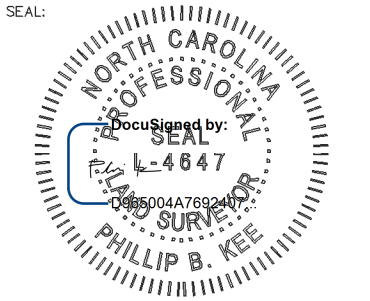
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ONE INCH = FORTY FEET (HALF SIZE)



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SURVEYOR'S NOTES, LEGEND &
STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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**WILDLANDS
ENGINEERING, INC**

SPO FILE NOS. 36-CR & 36-CS
DMS SITE ID NO. 100120

PROJECT:
**OAK HILL DAIRY
MITIGATION SITE**

SHEET TITLE:
UT1

TOWNSHIP: CHERRYVILLE	COUNTY: GASTON	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: PBK	SURVEY BY: KP, AC, JR, CB, DP

SCALE:
AS SHOWN

SURVEY DATE:
04/22/22

JOB:
#2201013-AB

SHEET SIZE:
11" X 17" (HALF SIZE)

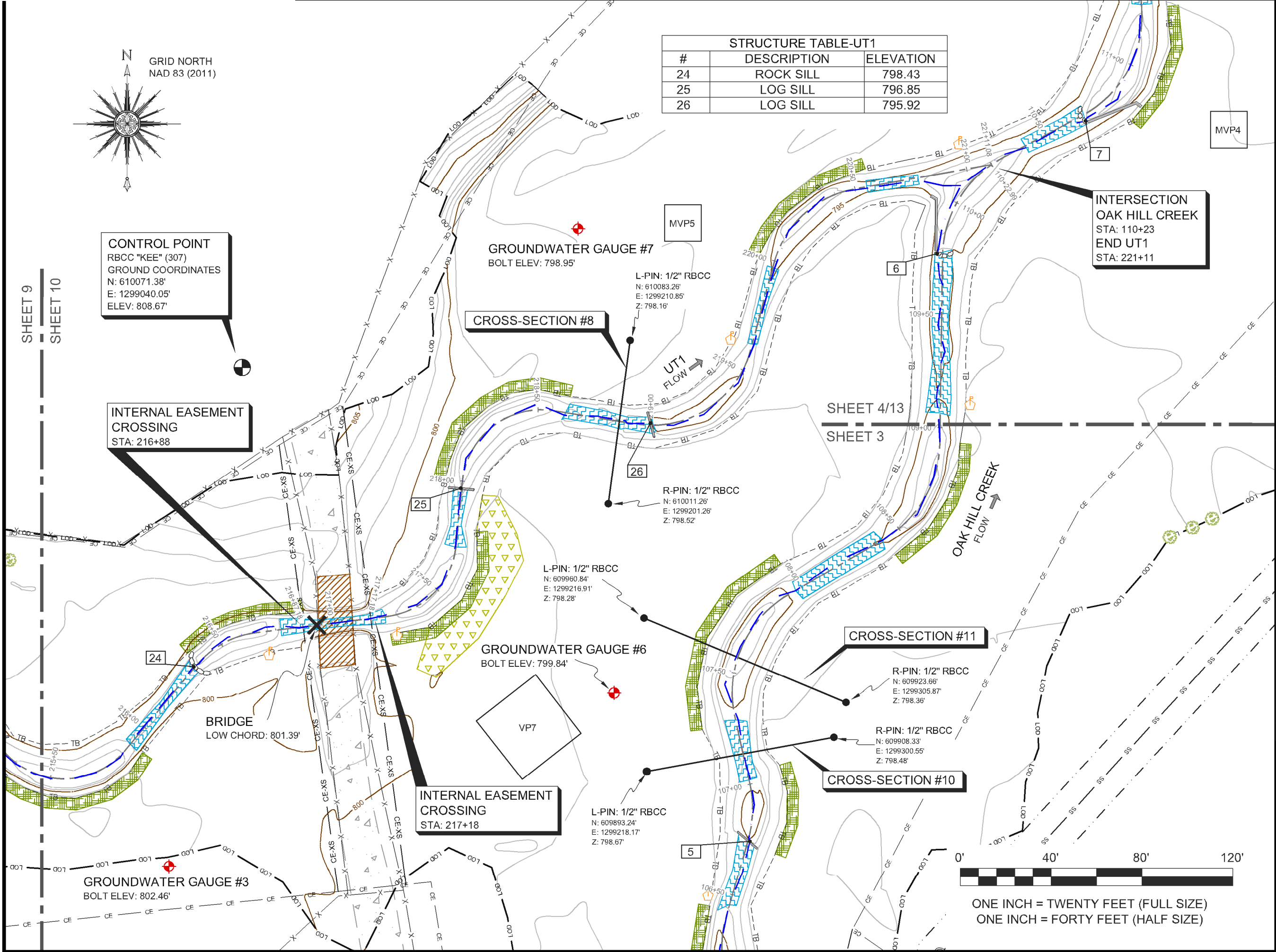
#	DATE	REVISIONS

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SEAL:

NORTH CAROLINA PROFESSIONAL SURVEYOR
DocuSigned by:
L-4647
00000447682207
PHILLIP B. KEE

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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WILDLANDS ENGINEERING, INC

SPO FILE NOS. 36-CR & 36-CS
DMS SITE ID NO. 100120

PROJECT:
OAK HILL DAIRY MITIGATION SITE

SHEET TITLE:
END UT1

TOWNSHIP:	COUNTY:	STATE:
CHERRYVILLE	GASTON	NORTH CAROLINA

DRAWN BY:	CHECKED BY:	SURVEY BY:
NH	PBK	KP, AC, JR, CB, DP

SCALE:	SURVEY DATE:
AS SHOWN	04/22/22

JOB:	SHEET SIZE:
#2201013-AB	11" X 17" (HALF SIZE)

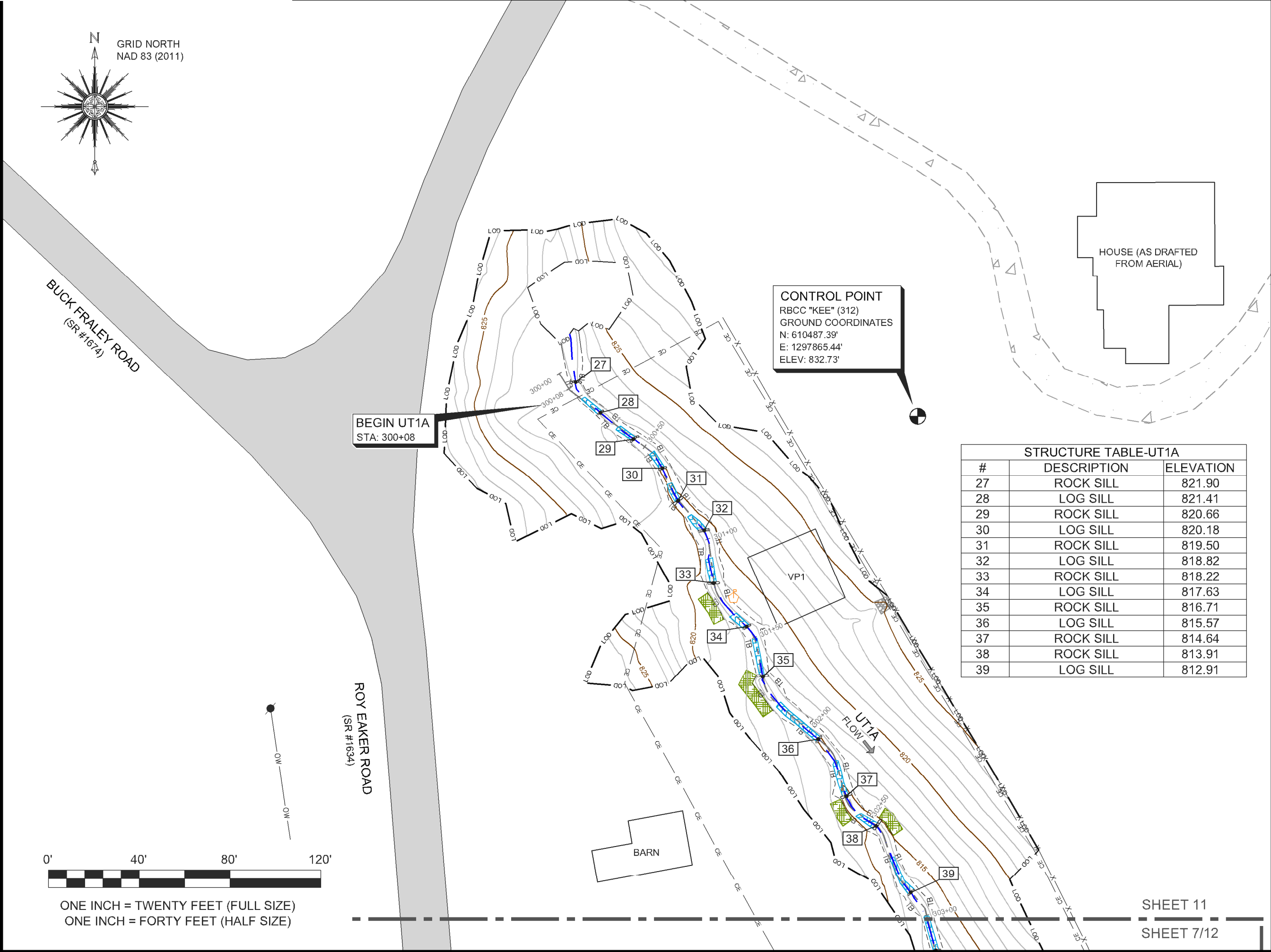
#	DATE	REVISIONS

SHEET:

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SEAL:

DocuSigned by:
L-4647
09650047897407

NOTE: SEE SHEET 1 FOR
SURVEYOR'S NOTES, LEGEND &
STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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**WILDLANDS
ENGINEERING, INC**

SPO FILE NOS. 36-CR & 36-CS
DMS SITE ID NO. 100120

PROJECT:

**OAK HILL DAIRY
MITIGATION SITE**

SHEET TITLE:

BEGIN UT1A

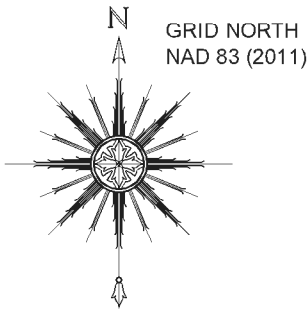
TOWNSHIP: CHERRYVILLE	COUNTY: GASTON	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: PBK	SURVEY BY: KP, AC, JR, CB, DP
SCALE: AS SHOWN	SURVEY DATE: 04/22/22	
JOB: #2201013-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	
#	DATE	REVISIONS

SHEET:

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ROY EAKER ROAD
(SR #1634)

STRUCTURE TABLE-UT1A		
#	DESCRIPTION	ELEVATION
40	LOG SILL	811.86
41	LOG SILL	810.66
42	ROCK SILL	809.85
43	ROCK SILL	809.03
44	ROCK SILL	808.85
45	LOG SILL	808.23

CONTROL POINT
RBCC "KEE" (311)
GROUND COORDINATES
N: 610116.93'
E: 1297759.67'
ELEV: 817.41'

CROSS-SECTION #1

R-PIN: 1/2" RBCC
N: 610202.47'
E: 1297869.94'
Z: 816.20'
R-PIN: 1/2" RBCC
N: 610198.37'
E: 1297871.61'
Z: 815.92'

CROSS-SECTION #2

L-PIN: 1/2" RBCC
N: 610222.31'
E: 1297912.11'
Z: 814.74'

CREST GAUGE #1
BOLT ELEV: 812.24'

INTERSECTION
UT1
STA: 202+23
END UT1A
STA: 304+91

L-PIN: 1/2" RBCC
N: 610096.90'
E: 1297756.69'
Z: 814.95'

BEGIN UT1
STA: 200+05

INTERSECTION
UT1
STA: 203+56
END UT1B
STA: 3+10

CROSS-SECTION #3

R-PIN: 1/2" RBCC
N: 610026.11'
E: 1297787.32'
Z: 811.43'

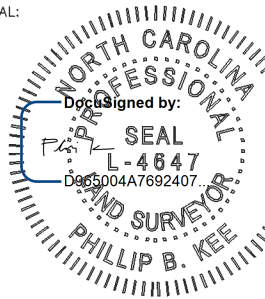
BEGIN UT1B
STA: 00+00

UT1B
FLOW



ONE INCH = TWENTY FEET (FULL SIZE)
ONE INCH = FORTY FEET (HALF SIZE)

SEAL:



NOTE: SEE SHEET 1 FOR
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STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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**WILDLANDS
ENGINEERING, INC**

SPO FILE NOS. 36-CR & 36-CS
DMS SITE ID NO. 100120

PROJECT:
**OAK HILL DAIRY
MITIGATION SITE**

SHEET TITLE:
END UT1A
&
UT1B

TOWNSHIP: CHERRYVILLE COUNTY: GASTON STATE: NORTH CAROLINA

DRAWN BY: NH CHECKED BY: PBK SURVEY BY: KP, AC, JR, CB, DP

SCALE: AS SHOWN SURVEY DATE: 04/22/22

JOB: #2201013-AB SHEET SIZE: 11" X 17" (HALF SIZE)

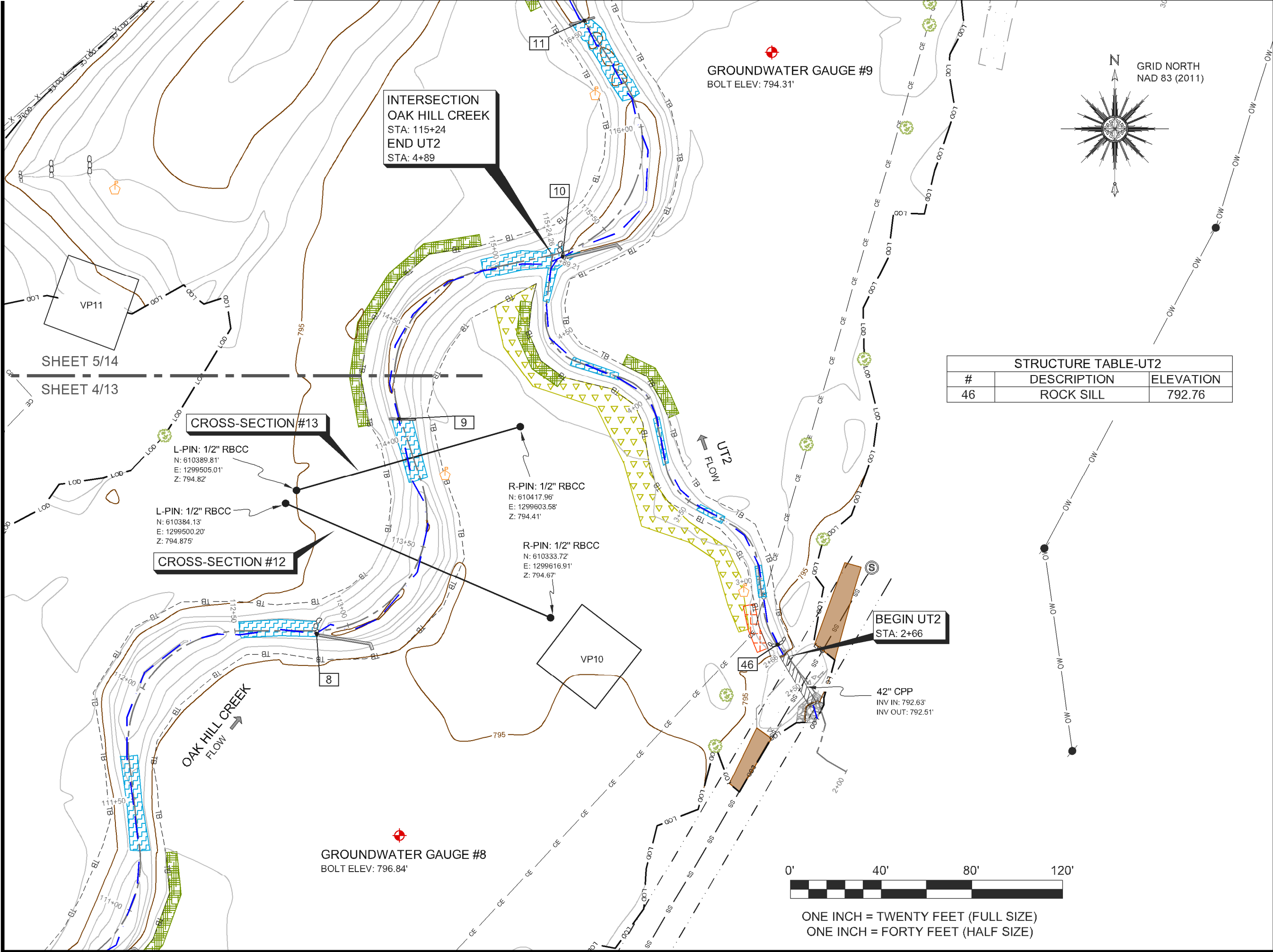
#	DATE	REVISIONS

SHEET:

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SEAL:

NORTH CAROLINA PROFESSIONAL SEAL
DocuSigned by:
L-4647
0005004A7692407
PHILLIP B. KEE

NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NOS. 36-CR & 36-CS
DMS SITE ID NO. 100120

PROJECT:
OAK HILL DAIRY MITIGATION SITE

SHEET TITLE:
UT2

TOWNSHIP:	COUNTY:	STATE:
CHERRYVILLE	GASTON	NORTH CAROLINA

DRAWN BY:	CHECKED BY:	SURVEY BY:
NH	PBK	KP, AC, JR, CB, DP

SCALE:	SURVEY DATE:
AS SHOWN	04/22/22

JOB:	SHEET SIZE:
#2201013-AB	11" X 17" (HALF SIZE)

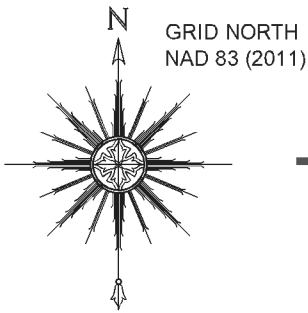
#	DATE	REVISIONS

SHEET:

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SHEET 6

SHEET 5/14

CONTROL POINT
RBCC "KEE" (305)
GROUND COORDINATES
N: 610644.12'
E: 1299468.06'
ELEV: 802.20'

**INTERSECTION
OAK HILL CREEK**
STA: 118+99
END UT3
STA: 302+85

**INTERSECTION
OAK HILL CREEK**
STA: 115+24
END UT2
STA: 4+89

R-PIN: 1/2" RBCC
N: 610817.43'
E: 1299742.90'
Z: 791.42'

GROUNDWATER GAUGE #10
BOLT ELEV: 793.14'

BEGIN UT3
STA: 300+31

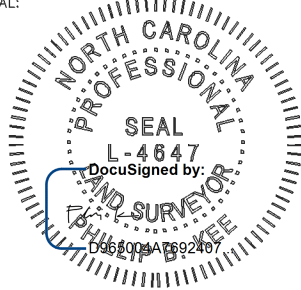
GROUNDWATER GAUGE #9
BOLT ELEV: 794.31'

STRUCTURE TABLE-UT3		
#	DESCRIPTION	ELEVATION
47	ROCK SILL	791.00



ONE INCH = TWENTY FEET (FULL SIZE)
ONE INCH = FORTY FEET (HALF SIZE)

SEAL:



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SPO FILE NOS. 36-CR & 36-CS
DMS SITE ID NO. 100120

PROJECT:
**OAK HILL DAIRY
MITIGATION SITE**

SHEET TITLE:
UT3

TOWNSHIP: CHERRYVILLE	COUNTY: GASTON	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: PBK	SURVEY BY: KP, AC, JR, CB, DP

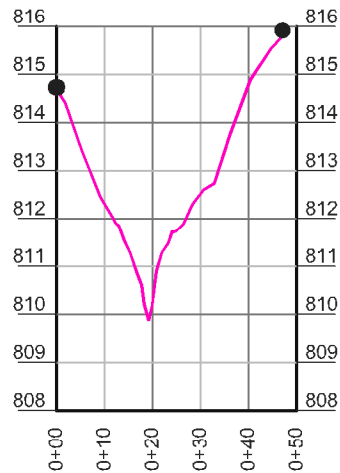
SCALE: AS SHOWN		SURVEY DATE: 04/22/22	
JOB: #2201013-AB		SHEET SIZE: 11" X 17" (HALF SIZE)	
#	DATE	REVISIONS	

SHEET:

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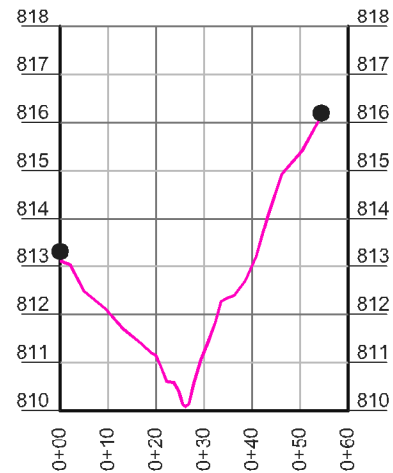


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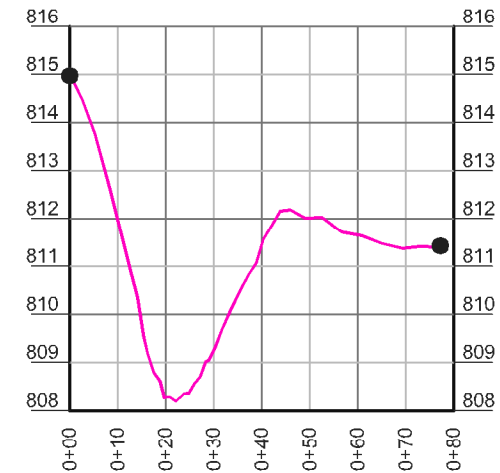
CROSS-SECTION #1 -UT1A

HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



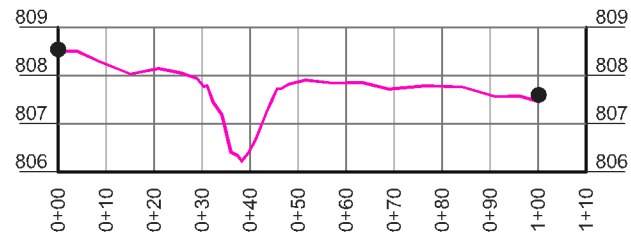
CROSS-SECTION #2 -UT1A

HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



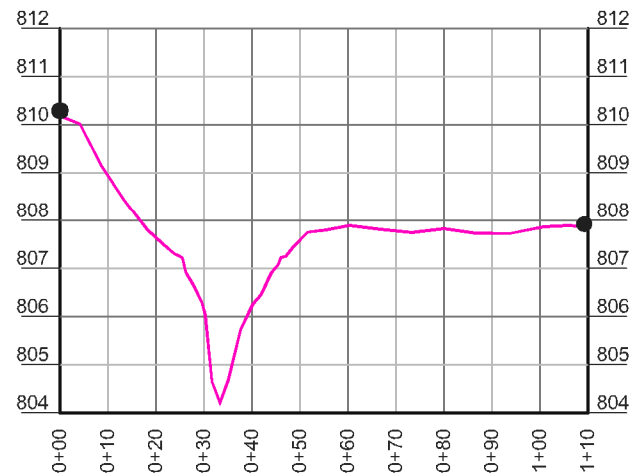
CROSS-SECTION #3 -UT1

HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



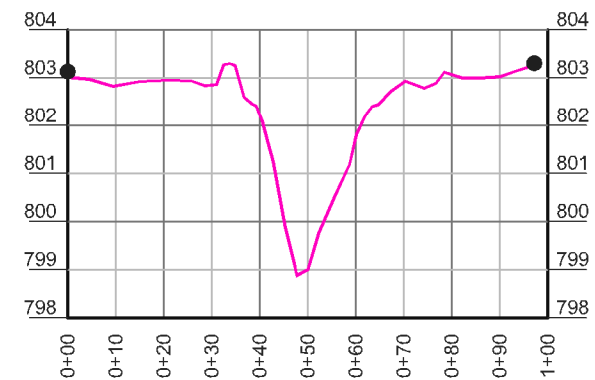
CROSS-SECTION #4 -UT1

HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



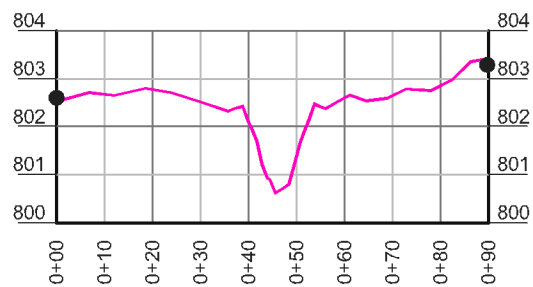
CROSS-SECTION #5 -UT1

HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



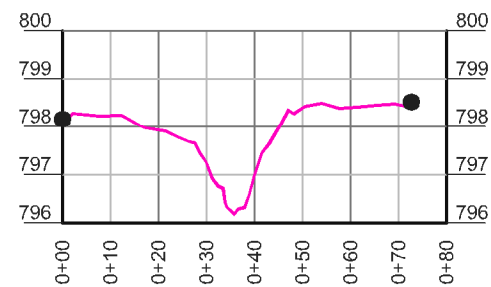
CROSS-SECTION #6 -UT1

HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



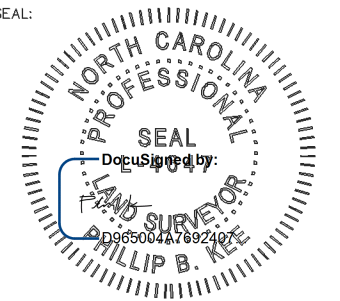
CROSS-SECTION #7 -UT1

HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



CROSS-SECTION #8 -UT1

HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



NOTE: SEE SHEET 1 FOR
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STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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AN AS-BUILT SURVEY FOR:
WILDLANDS
ENGINEERING, INC

SPO FILE NOS. 36-CR & 36-CS
DMS SITE ID NO. 100120

PROJECT:
OAK HILL DAIRY
MITIGATION SITE

SHEET TITLE:
CROSS-SECTION #
1-8

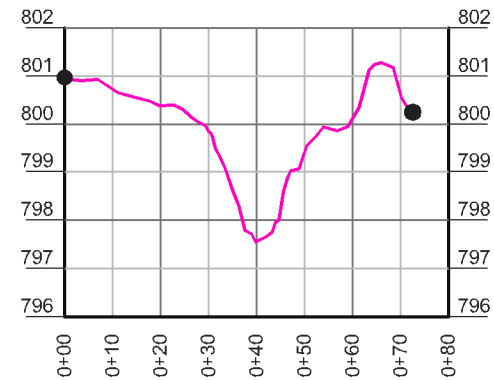
TOWNSHIP: CHERRYVILLE		COUNTY: GASTON	STATE: NORTH CAROLINA
DRAWN BY: NH		CHECKED BY: PBK	SURVEY BY: KP, AC, JR, CB, DP
SCALE: AS SHOWN		SURVEY DATE: 04/22/22	
JOB: #2201013-AB		SHEET SIZE: 11" X 17" (HALF SIZE)	
#	DATE	REVISIONS	

SHEET:

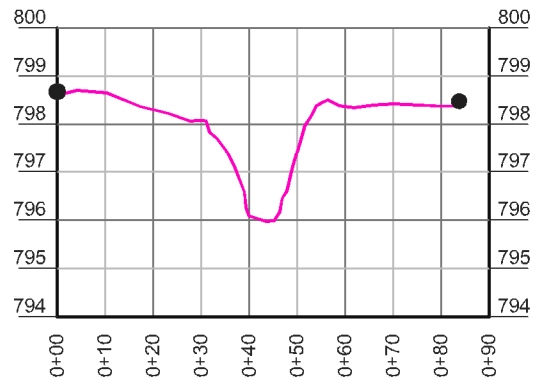
15 OF 23



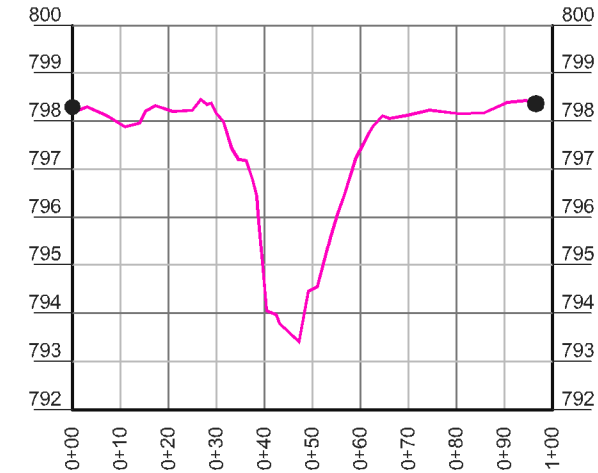
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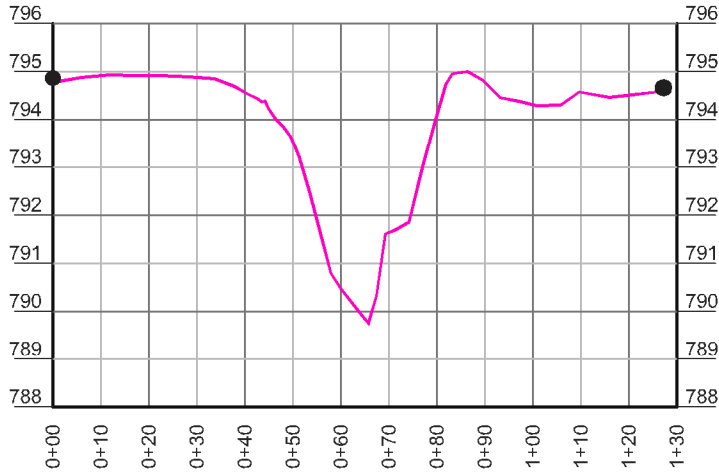
CROSS-SECTION #9 -OAK HILL CREEK
HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



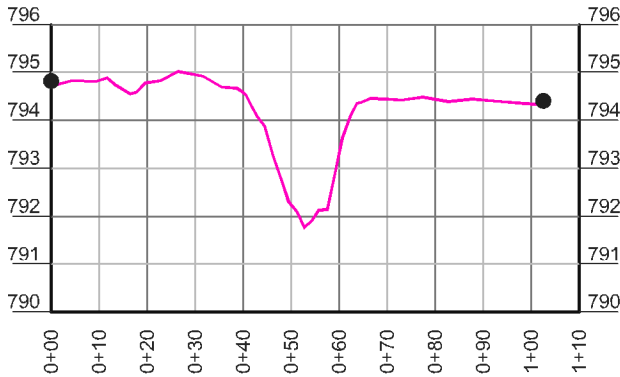
CROSS-SECTION #10 -OAK HILL CREEK
HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



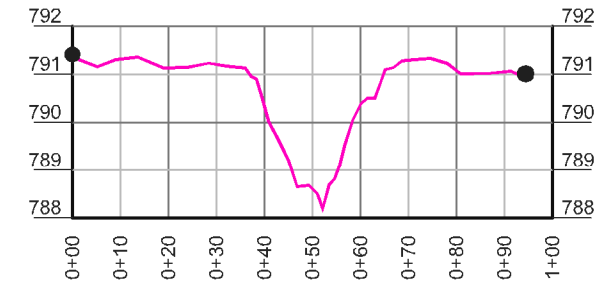
CROSS-SECTION #11 -OAK HILL CREEK
HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



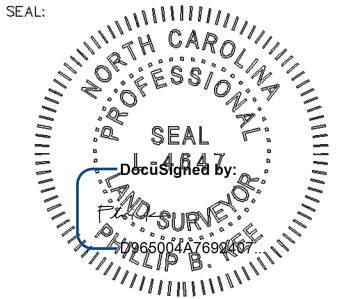
CROSS-SECTION #12 -OAK HILL CREEK
HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



CROSS-SECTION #13 -OAK HILL CREEK
HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



CROSS-SECTION #14 -OAK HILL CREEK
HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



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STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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AN AS-BUILT SURVEY FOR:
**WILDLANDS
ENGINEERING, INC**

SPO FILE NOS. 36-CR & 36-CS
DMS SITE ID NO. 100120

PROJECT:
**OAK HILL DAIRY
MITIGATION SITE**

SHEET TITLE:
**CROSS-SECTION #
9-14**

TOWNSHIP: CHERRYVILLE	COUNTY: GASTON	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: PBK	SURVEY BY: KP, AC, JR, CB, DP

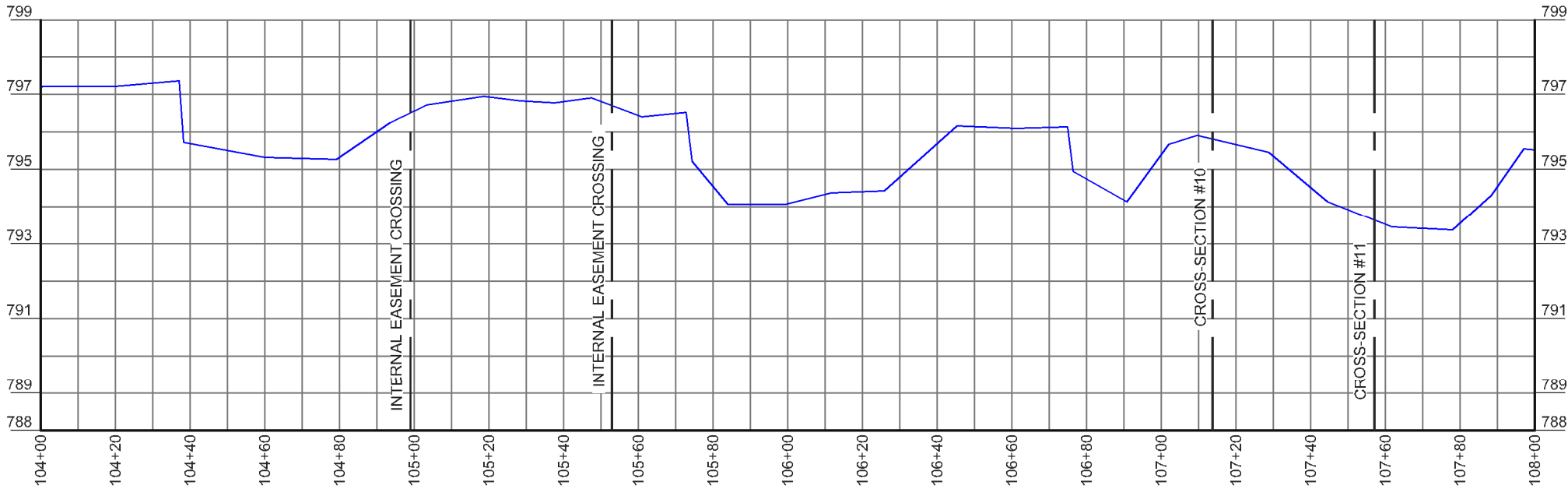
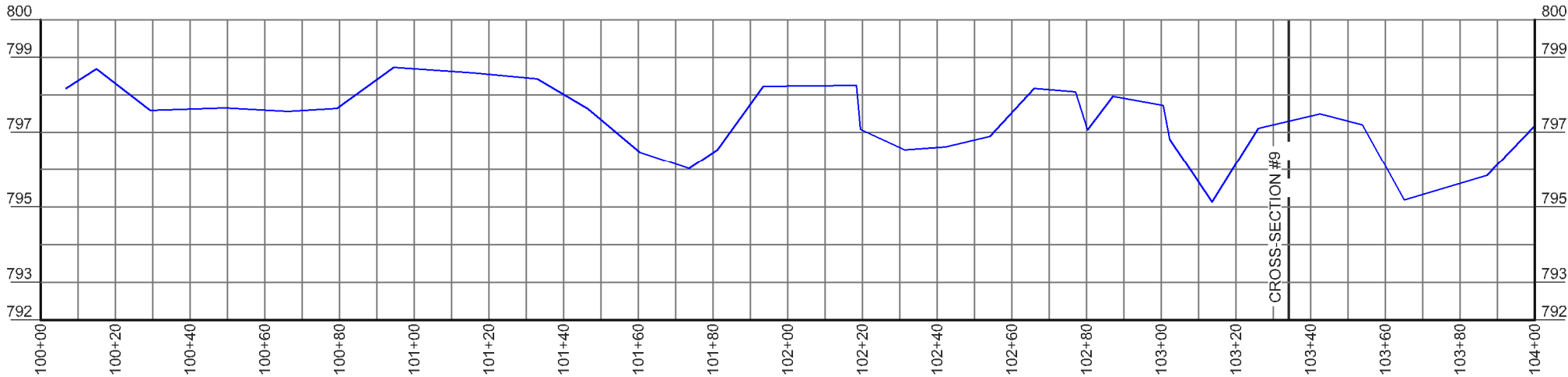
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AS SHOWN

SURVEY DATE:
04/22/22

JOB:
#2201013-AB

SHEET SIZE:
11" X 17" (HALF SIZE)

DATE REVISIONS

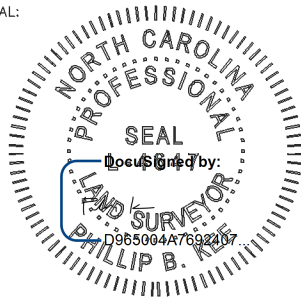


LONGITUDINAL PROFILE- OAK HILL CREEK
HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE

LEGEND

— THALWEG

SEAL:



NOTE: SEE SHEET 1 FOR
SURVEYOR'S NOTES, LEGEND &
STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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**WILDLANDS
ENGINEERING, INC**

SPO FILE NOS. 36-CR & 36-CS
DMS SITE ID NO. 100120

PROJECT:
**OAK HILL DAIRY
MITIGATION SITE**

SHEET TITLE:
LONGITUDINAL PROFILE:
OAK HILL CREEK
STA: 100+00-108+00

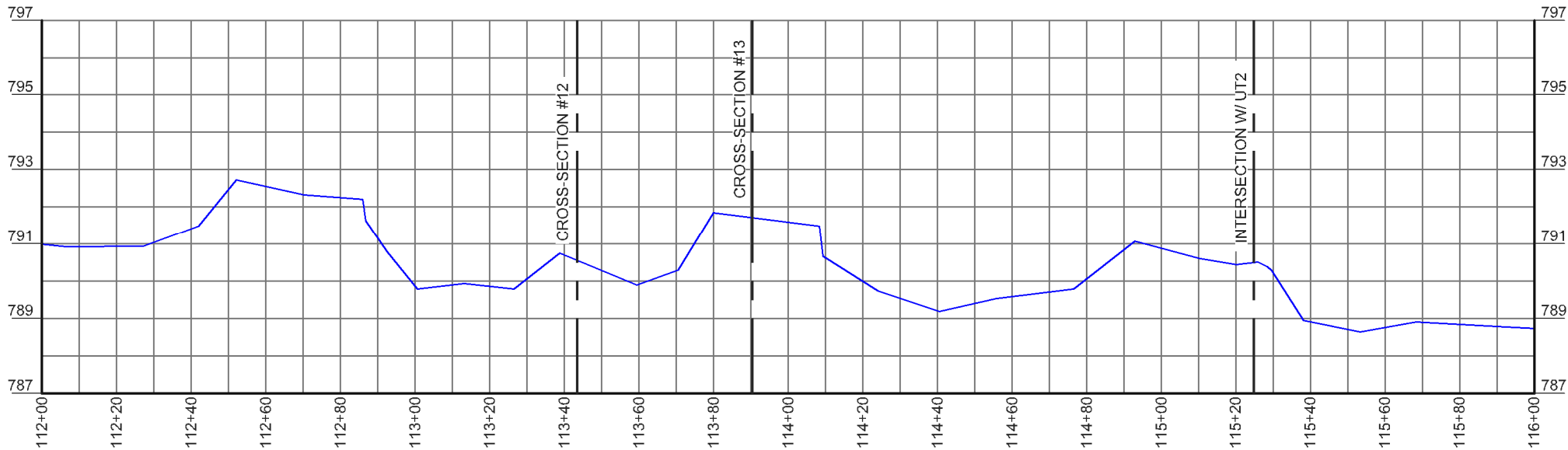
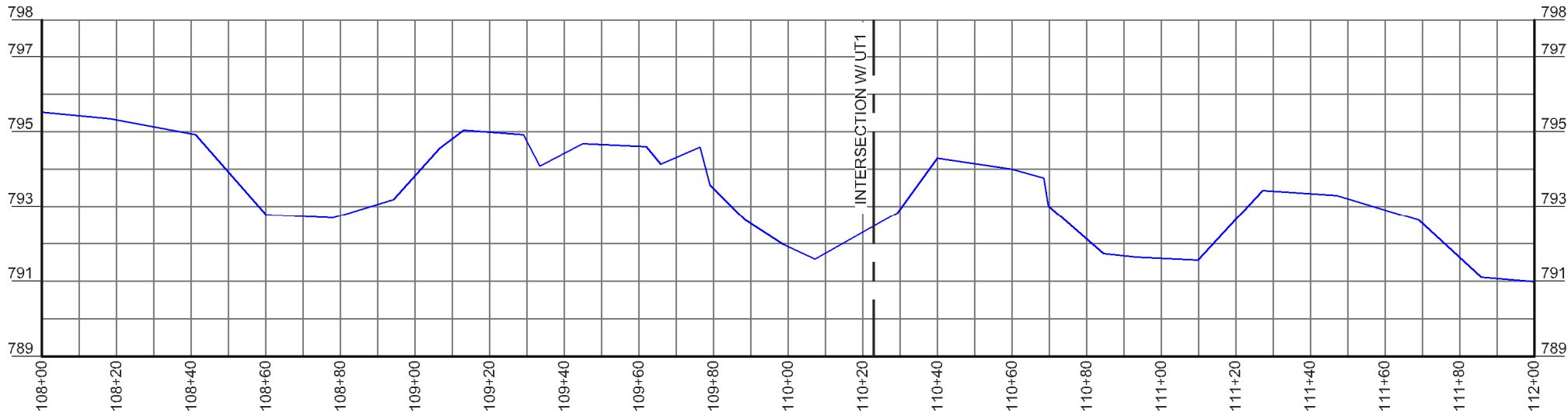
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DRAWN BY: NH	CHECKED BY: PBK	SURVEY BY: KP, AC, JR, CB, DP
SCALE: AS SHOWN	SURVEY DATE: 04/22/22	
JOB: #2201013-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	
#	DATE	REVISIONS

SHEET:

17 OF 23



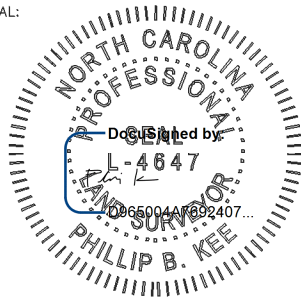
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LONGITUDINAL PROFILE- OAK HILL CREEK
HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



SEAL:



NOTE: SEE SHEET 1 FOR
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STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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ENGINEERING, INC

SPO FILE NOS. 36-CR & 36-CS
DMS SITE ID NO. 100120

PROJECT:
OAK HILL DAIRY
MITIGATION SITE

SHEET TITLE:
LONGITUDINAL PROFILE:
OAK HILL CREEK
STA: 108+00-116+00

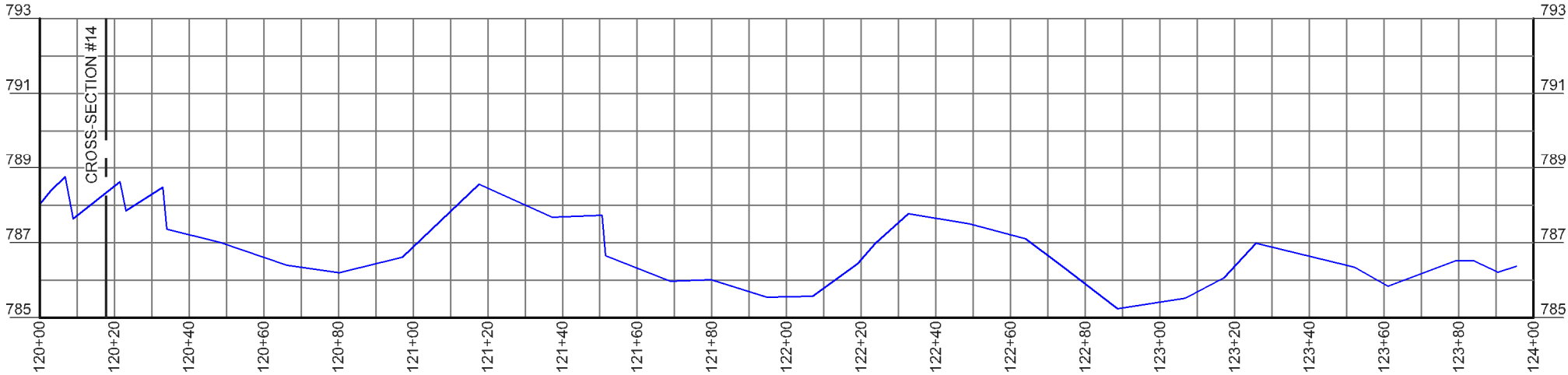
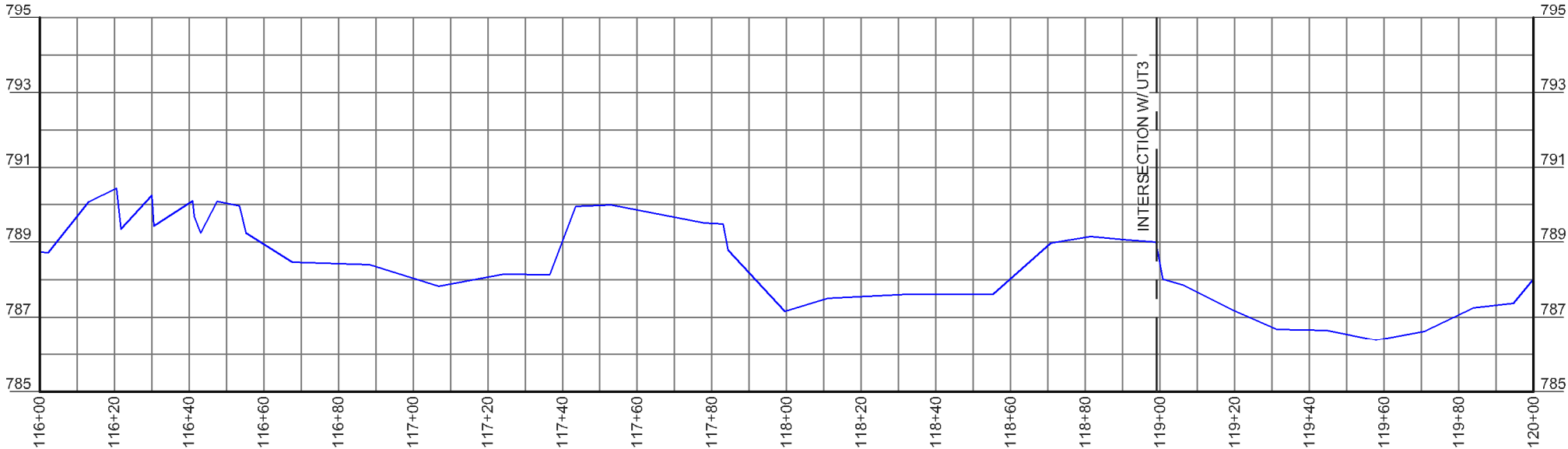
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DRAWN BY: NH	CHECKED BY: PBK	SURVEY BY: KP, AC, JR, CB, DP
SCALE: AS SHOWN	SURVEY DATE: 04/22/22	
JOB: #2201013-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	
#	DATE	REVISIONS

SHEET:

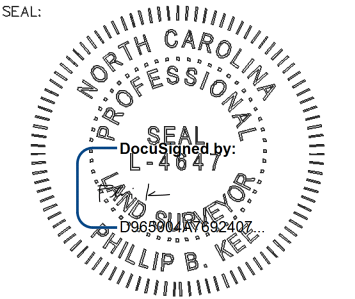
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LONGITUDINAL PROFILE- OAK HILL CREEK
HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



NOTE: SEE SHEET 1 FOR SURVEYOR'S NOTES, LEGEND & STATEMENT OF CERTIFICATION

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

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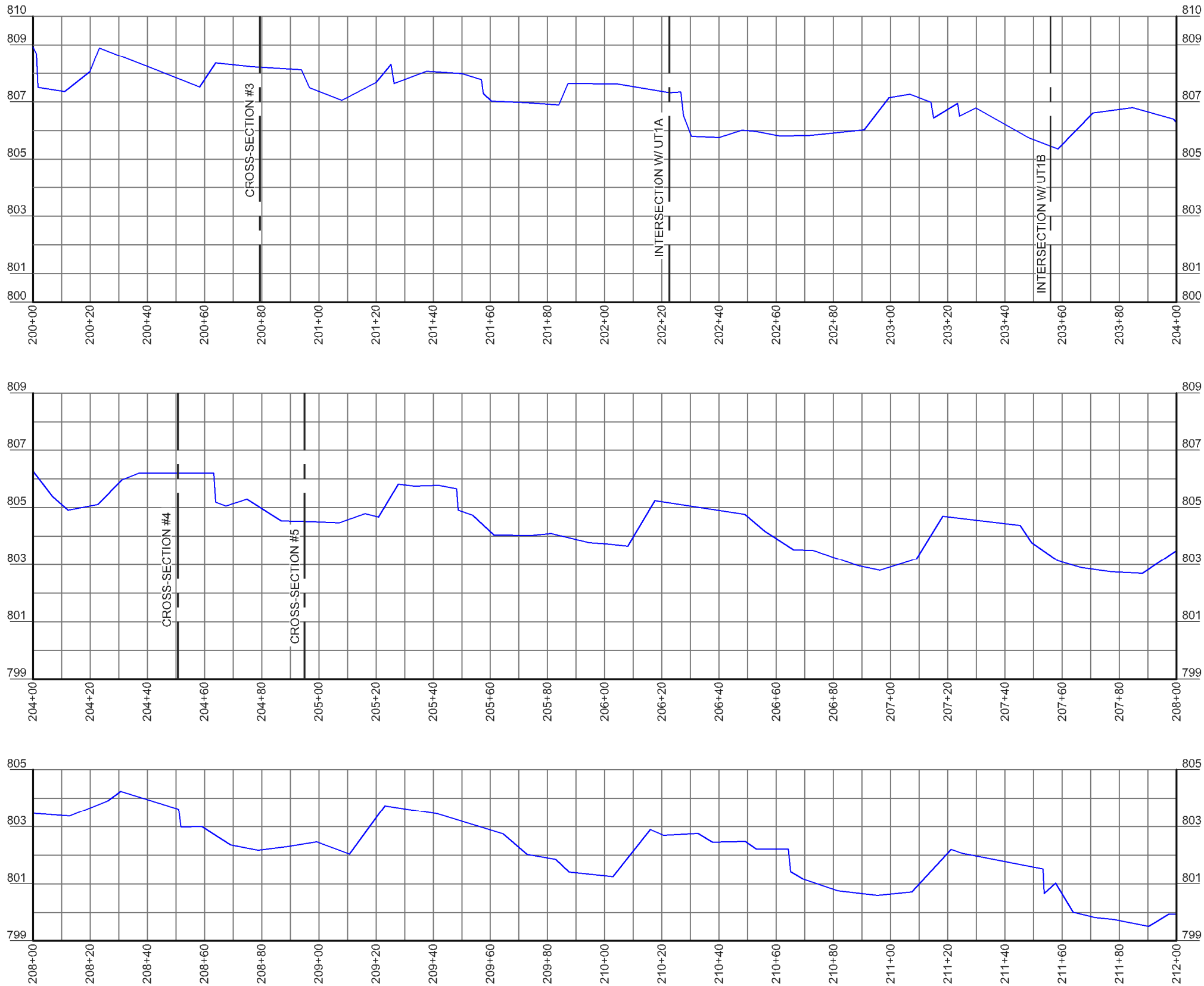
SPO FILE NOS. 36-CR & 36-CS
DMS SITE ID NO. 100120

PROJECT:
OAK HILL DAIRY MITIGATION SITE

SHEET TITLE:
LONGITUDINAL PROFILE:
OAK HILL CREEK
STA: 116+00-124+00

TOWNSHIP: CHERRYVILLE	COUNTY: GASTON	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: PBK	SURVEY BY: KP, AC, JR, CB, DP
SCALE: AS SHOWN	SURVEY DATE: 04/22/22	
JOB: #2201013-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	
#	DATE	REVISIONS

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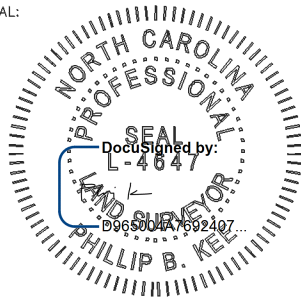


LONGITUDINAL PROFILE- UT1
HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE

LEGEND

— THALWEG

SEAL:



NOTE: SEE SHEET 1 FOR
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STATEMENT OF CERTIFICATION

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CONTOUR INTERVAL: 1 FOOT

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SPO FILE NOS. 36-CR & 36-CS
DMS SITE ID NO. 100120

PROJECT:
**OAK HILL DAIRY
MITIGATION SITE**

SHEET TITLE:
LONGITUDINAL PROFILE:
UT1
STA: 200+00-212+00

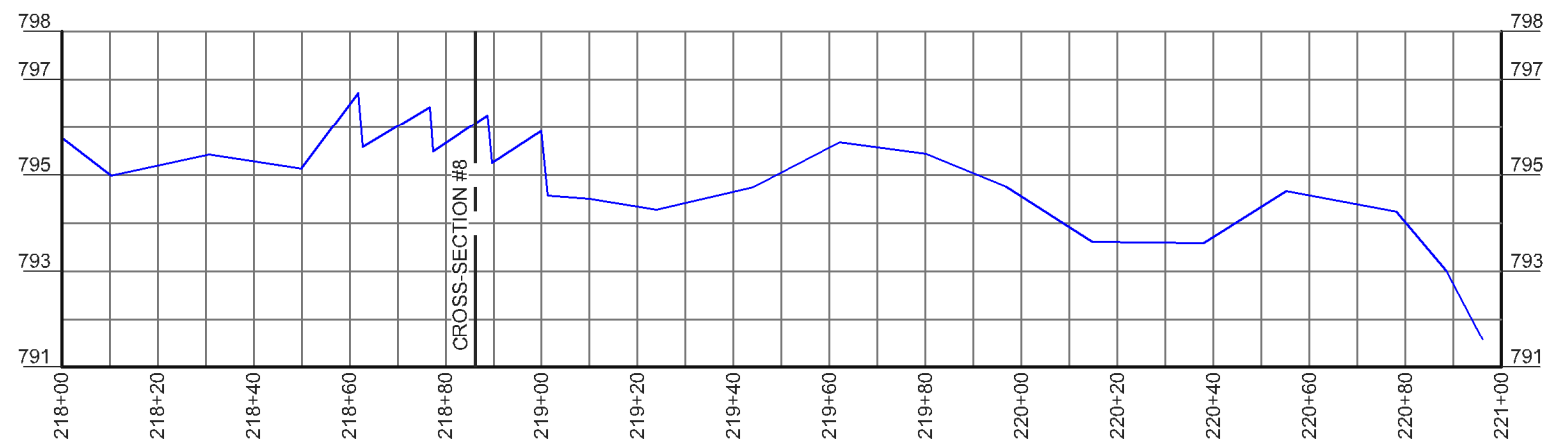
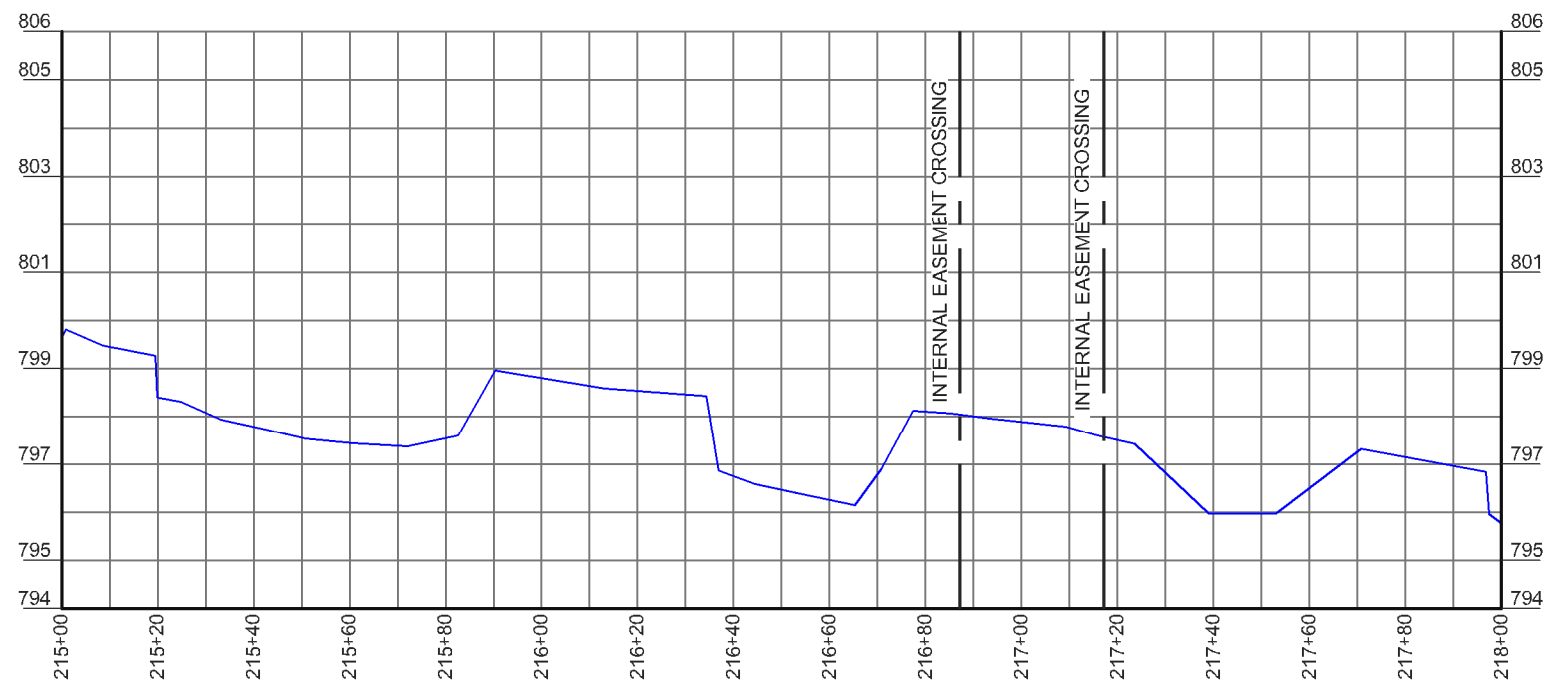
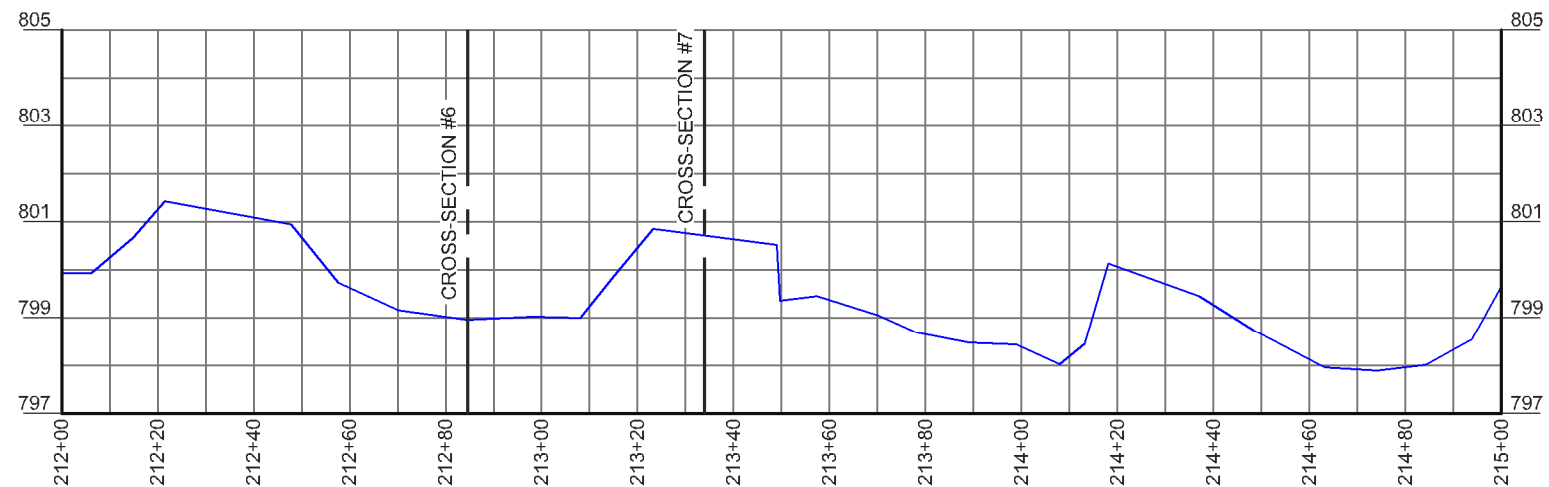
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#	DATE	REVISIONS

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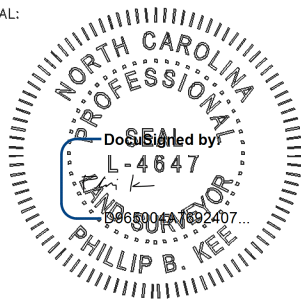
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LONGITUDINAL PROFILE- UT1
HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE

LEGEND

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SPO FILE NOS. 36-CR & 36-CS
DMS SITE ID NO. 100120

PROJECT:
OAK HILL DAIRY
MITIGATION SITE

SHEET TITLE:
LONGITUDINAL PROFILE:
UT1
STA: 212+00-221+00

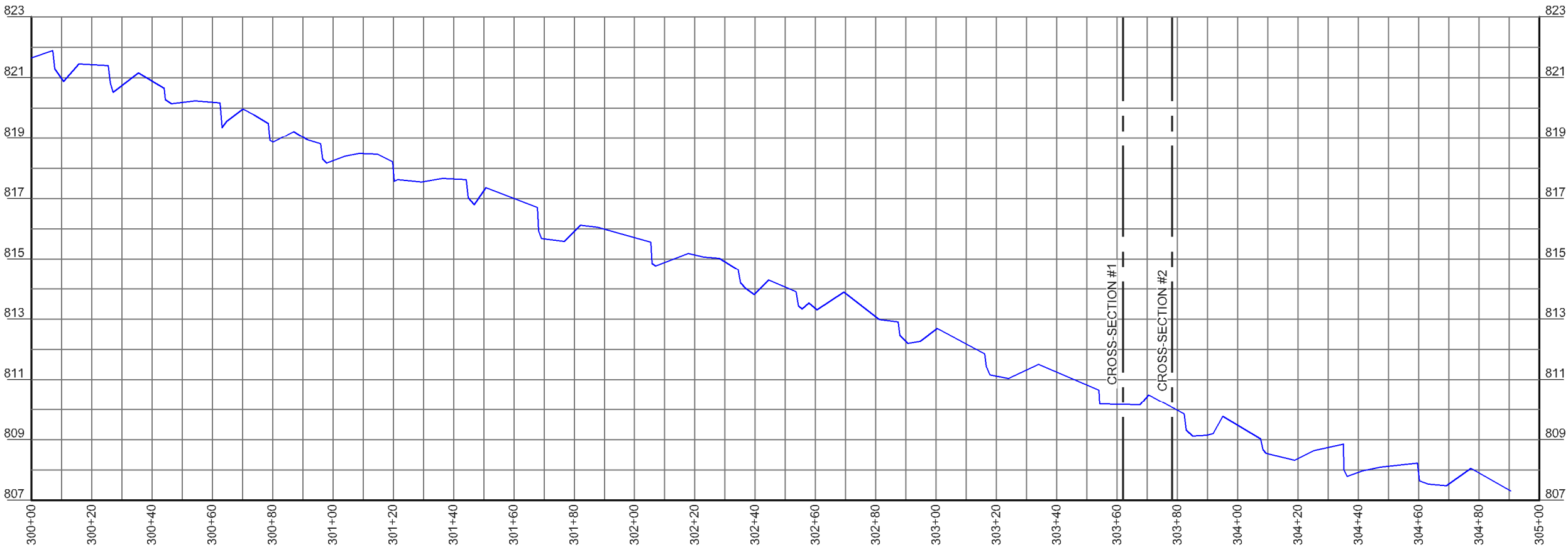
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JOB: #2201013-AB		SHEET SIZE: 11" X 17" (HALF SIZE)	
#	DATE	REVISIONS	

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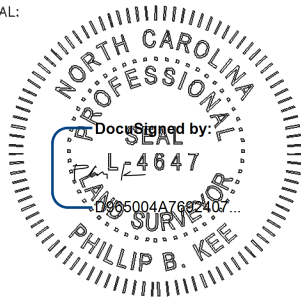


LONGITUDINAL PROFILE- UT1A
HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE

LEGEND

— THALWEG

SEAL:



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SPO FILE NOS. 36-CR & 36-CS
DMS SITE ID NO. 100120

PROJECT:
**OAK HILL DAIRY
MITIGATION SITE**

SHEET TITLE:
LONGITUDINAL PROFILE:
UT1A
STA: 300+00-305+00

TOWNSHIP: CHERRYVILLE	COUNTY: GASTON	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: PBK	SURVEY BY: KP, AC, JR, CB, DP
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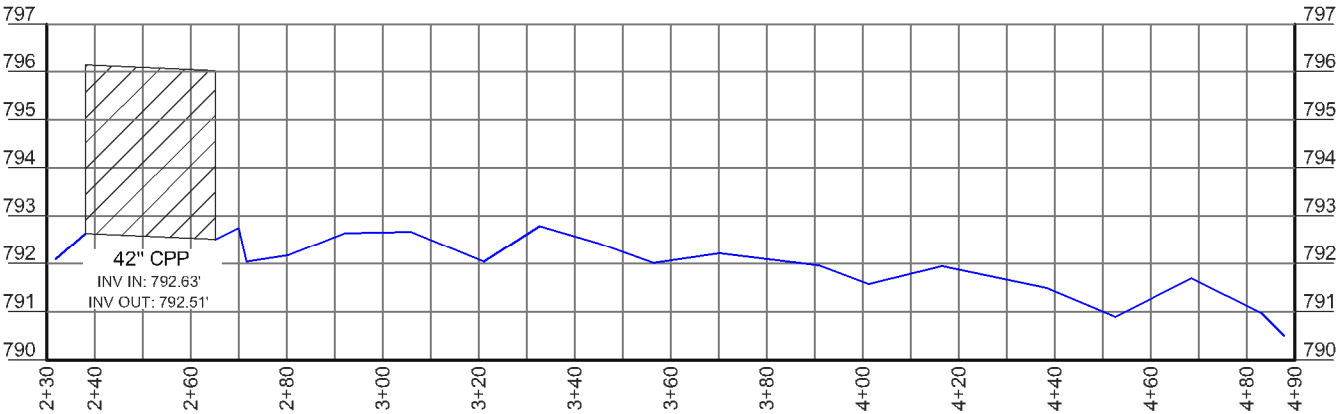
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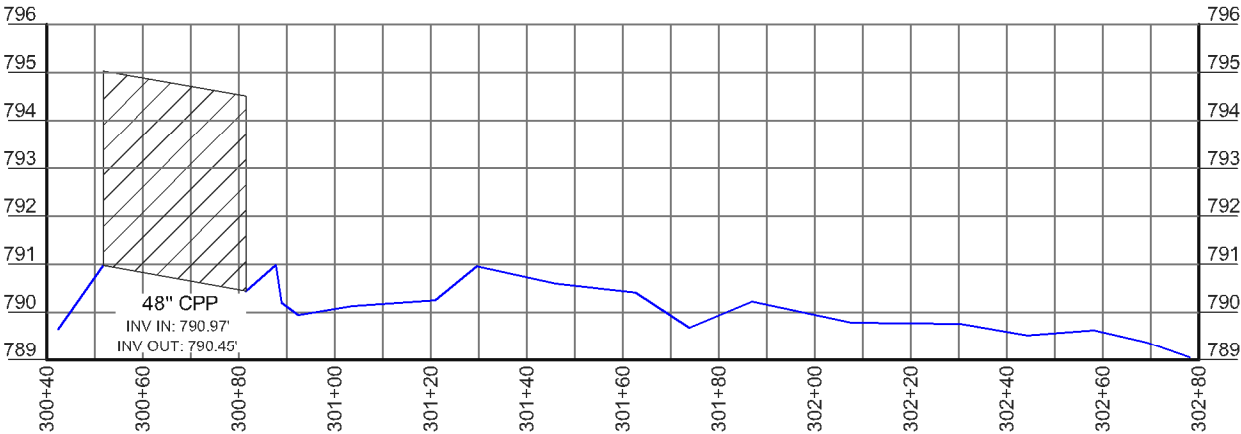
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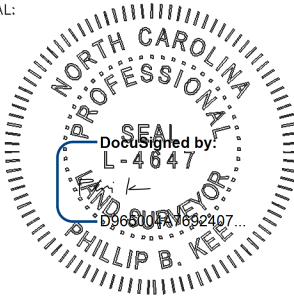
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HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



LONGITUDINAL PROFILE- UT3
HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



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SPO FILE NOS. 36-CR & 36-CS
DMS SITE ID NO. 100120

PROJECT:
**OAK HILL DAIRY
MITIGATION SITE**

SHEET TITLE:
LONGITUDINAL PROFILE:
UT2
STA: 2+30-4+90
UT3
STA: 300+40-302+80

TOWNSHIP: CHERRYVILLE	COUNTY: GASTON	STATE: NORTH CAROLINA
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SCALE: AS SHOWN	SURVEY DATE: 04/22/22	
JOB: #2201013-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	
#	DATE	REVISIONS

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Appendix F
Correspondence



To: DMS Technical Workgroup, DMS operations staff

From: Periann Russell, Division of Mitigation Services (DMS)

RE: Pebble count data requirements

Date: October 19, 2021

The DMS Technical Work Group met September 29, 2021 to discuss Interagency Review Team (IRT) and DMS requirements for collecting pebble count data as part of monitoring (MY0-MYx). Agreement was reached between all attending parties that pebble count data will not be required during the monitoring period for all future projects.

Sediment data and particle distribution will still be required for the mitigation plan as part of the proposed design explanation and justification.

Pebble counts and/or particle distributions currently being conducted by providers for annual monitoring may be discontinued at the discretion of the DMS project manager. If particle distribution was listed as a performance standard in the project mitigation plan, the provider is required to communicate the intent to cease data collection with the DMS project manager. The absence of pebble count data in future monitoring reports where pebble count data was listed as part of monitoring in the mitigation plan must be documented in the monitoring report. The September 29, 2021 Technical Work Group meeting may be cited as the source of the new policy.

The IRT reserves the right to request pebble count data/particle distributions if deemed necessary during the monitoring period.

Kristi Suggs

From: Reid, Matthew <matthew.reid@ncdenr.gov>
Sent: Wednesday, October 27, 2021 1:26 PM
To: Kristi Suggs
Cc: Mimi Caddell
Subject: RE: [External] FW: Pebble Count Data Requirements

I am absolutely OK with not doing pebble counts anymore!

As stated in the memo, please add a statement in the monitoring reports citing the policy.

Thanks!

Matthew Reid
Project Manager – Western Region
North Carolina Department of Environmental Quality
Division of Mitigation Services

828-231-7912 Mobile
matthew.reid@ncdenr.gov

Western DMS Field Office
5 Ravenscroft Dr
Suite 102
Asheville, NC 28801



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From: Kristi Suggs [mailto:ksuggs@wildlandseng.com]
Sent: Wednesday, October 27, 2021 1:24 PM
To: Reid, Matthew <matthew.reid@ncdenr.gov>
Cc: Mimi Caddell <mcaddell@wildlandseng.com>
Subject: [External] FW: Pebble Count Data Requirements

CAUTION: External email. Do not click links or open attachments unless you verify. Send all suspicious email as an attachment to [Report Spam](#).

Matthew,

Jason Lorch in our Raleigh Office forwarded this meeting memo to me. It says that conducting pebble counts for DMS monitoring (MY0 – MY7) projects is no longer needed as long as it has been okayed by the DMS PM. Moving forward, are you going to allow us to stop doing them on your projects? If so, will DBB projects be treated the same? Please let me know. Thank you!

Kristi

Kristi Suggs | *Senior Environmental Scientist*
O: 704.332.7754 x110 M: 704.579.4828

Wildlands Engineering, Inc.

1430 S. Mint St, Suite 104
Charlotte, NC 28203

From: Jason Lorch <jlorch@wildlandseng.com>
Sent: Monday, October 25, 2021 9:05 AM
To: Kristi Suggs <ksuggs@wildlandseng.com>
Subject: FW: Pebble Count Data Requirements

FYI!

Jason Lorch, GISP | *Senior Environmental Scientist*
O: 919.851.9986 x107 M: 919.413.1214

Wildlands Engineering, Inc.

312 West Millbrook Road, Suite 225
Raleigh, NC 27609

From: Russell, Periann <periann.russell@ncdenr.gov>
Sent: Thursday, October 21, 2021 10:05 AM
To: King, Scott <Scott.King@mbakerintl.com>; Catherine Manner <catherine@waterlandsolutions.com>; Tugwell, Todd J CIV USARMY CESAW (US) <Todd.J.Tugwell@usace.army.mil>; adam.spiller@kci.com; Brad Breslow <bbreslow@res.us>; Davis, Erin B <erin.davis@ncdenr.gov>; gginn@wolfcreekeng.com; grant lewis <glewis@axiomenvironmental.org>; Jeff Keaton <jkeaton@wildlandseng.com>; katie mckeithan <Katie.McKeithan@mbakerintl.com>; Kayne Van Stell <kayne@waterlandsolutions.com>; Kevin Tweedy <ktweedy@eprusa.net>; Reid, Matthew <matthew.reid@ncdenr.gov>; Ryan Smith <rsmith@imgroup.net>; Melia, Gregory <gregory.melia@ncdenr.gov>; Allen, Melonie <melonie.allen@ncdenr.gov>; Famularo, Joseph T <Joseph.Famularo@ncdenr.gov>; Rich@mogmit.com; Bryan Dick <Bryan.Dick@freese.com>; Ryan Medric <rmedric@res.us>; Kim Browning <Kimberly.D.Browning@usace.army.mil>; Kayne Van Stell <kayne@waterlandsolutions.com>; Worth Creech <worth@restorationsystems.com>; Jason Lorch <jlorch@wildlandseng.com>
Cc: Crocker, Lindsay <Lindsay.Crocker@ncdenr.gov>; Wiesner, Paul <paul.wiesner@ncdenr.gov>; Tsomides, Harry <harry.tsomides@ncdenr.gov>; Reid, Matthew <matthew.reid@ncdenr.gov>; Dow, Jeremiah J <jeremiah.dow@ncdenr.gov>; Horton, Jeffrey <jeffrey.horton@ncdenr.gov>; Ullman, Kirsten J <Kirsten.Ullman@NCDENR.gov>; Ackerman, Anjie <anjie.ackerman@ncdenr.gov>; Blackwell, Jamie D <james.blackwell@ncdenr.gov>; Xu, Lin <lin.xu@ncdenr.gov>; Mir, Danielle <Danielle.Mir@ncdenr.gov>; Corson, Kristie <kristie.corson@ncdenr.gov>; Russell, Periann <periann.russell@ncdenr.gov>; Sparks, Kimberly L <Kim.sparks@ncdenr.gov>
Subject: Pebble Count Data Requirements

Please review the attached memo documenting the agreed upon policy for pebble count data requirements.
Please reply (me only) to this email if accept that this memo represents (or misrepresents) our discussion on Sept 29.
Thank you.

Periann Russell
Geomorphologist
Division of Mitigation Services, Science and Analysis
NC Department of Environmental Quality

919 707 8306 office
919 208 1426 mobile
periann.russell@ncdenr.gov

Mailing: 1652 Mail Service Center Raleigh, NC 27699-1652
Physical: 217 West Jones Street Raleigh, NC 27603



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