



MONITORING YEAR 0 ANNUAL REPORT FINAL

May 2023

LAUREL VALLEY MITIGATION SITE

Burke County, NC
Catawba River Basin
HUC 03050101

DMS Project No. 100140

NCDEQ Contract No. 7875-02

DMS RFP No. 16-007875 (*Issued: May 6, 2019*)

USACE Action ID No. SAW-2020-00053

DWR Project No. 20200018

Data Collection Dates: November 2022 – January 2023

PREPARED FOR:



NC Department of Environmental Quality Division of Mitigation Services

1652 Mail Service Center
Raleigh, NC 27699-1652



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

August 22, 2023

Regulatory Division

SUBJECT: NCIRT Review and USACE Approval of the NCDMS Laurel Valley Mitigation Plan Addendum / Burke County/ SAW-2020-00053/ NCDMS Project # 100140

Mr. Paul Wiesner
North Carolina Division of Mitigation Services

Dear Mr. Wiesner:

This letter is to inform you that the Wilmington District, Corps of Engineers (Corps) has reviewed the proposed Mitigation Plan Addendum and Modification request for the Laurel Valley mitigation site (Action ID SAW-2020-00053), dated March 2023. The Laurel Valley site is in the Catawba River Basin (Hydrologic Unit Code 03050101), southwest of the intersection of Mt. Home Church Road and Laurelwood Road, approximately 3.5 miles southeast of Morganton, in Burke County, NC.

In accordance with Sec. 332.8(g)(2) of the Federal Mitigation Rule, the proposed Addendum was provided to the North Carolina Interagency Review Team (NCIRT) for review and comment on June 20, 2023. IRT members' review acknowledgement and response of no comments are included in the corresponding transmittal email.

Based on our review, we have determined that no major concerns have been identified with the proposed Addendum, which is considered approved with this correspondence. This letter provides approval for the Addendum, but this does not guarantee that the project will generate the adjusted amount of mitigation credit. As you are aware, unforeseen issues may arise during monitoring of the project that may lead to reduced credit. The attached credit release schedule has been updated to reflect the change in total stream credit proposed to be generated on the site. Please ensure that future credit release requests utilize the updated credit release schedule.

Please note that this electronic copy provided to you via email is your official copy. Should you wish to receive a paper copy of this correspondence, please contact us.

Thank you for your time and cooperation. If you have any questions, please contact Mr. Steve Kichefski by email at steven.l.kichefski@usace.army.mil or by phone at (828) 271-7980, extension 4234.

Sincerely,

A handwritten signature in blue ink, appearing to read "Todd Tugwell".

Todd Tugwell
Chief, Mitigation Branch

Enclosure

cc (by email):
NCIRT Distribution List



September 20, 2023
ATTN: Erin B. Davis
Mitigation Specialist, Regulatory Division
U.S. Army Corps of Engineers, Wilmington District

RE: Notice of Mitigation Plan Addendum Approval & Initial Credit Release
Laurel Valley Mitigation Site – Burke County
Catawba River Basin Cataloging Unit 03050101
DMS Project ID #100140
USACE ACTION ID SAW-2020-00053
DWR # 20200018

Dear Erin Davis,

Wildlands Engineering, Inc. (Wildlands) has reviewed the Interagency Review Team's (IRT) comments from the Monitoring Year 0 (MY0) Report for the Laurel Valley Mitigation Site. The IRT's comments and Wildlands' responses are noted below.

IRT Comments:

Mitigation Plan Addendum and Modification Request:

Maria Polizzi, DWR

1. *I have no issues with the Mitigation Plan addendum.*

Wildlands Response: Noted

Dave McHenry, WRC

1. *No comments on the addendum.*

Wildlands Response: Noted

Erin Davis, USACE

1. *DMS' questions/comments regarding the proposed Addendum and MY0 Report (comment #5) provided clarity and transparency, which was helpful for this review and understanding the modification request.*

Wildlands Response: Noted

As-built Drawings and MYO Report:

Maria Polizzi, DWR

1. *As-built plans show numerous substitutions of brush toe for cover logs. Can you explain why this change was needed?*

Wildlands Response: Site clearing did not produce the anticipated amount of required brush to construct the brush toes as designed. Rather than seeking brush outside the site limits, logs generated on site were utilized as cover logs. Cover logs provide bank stability, refuge habitat, and undercut banks, consistent with the goals of brush toe as designed.

2. *Based on Photo Point 3 the crossing at UT1-Reach 1 does not appear to be embedded per plan.*

Wildlands Response: Photo Point 3 is of the upstream side of the existing driveway crossing. This crossing was not designed or installed by Wildlands and was approved to remain as part of the mitigation plan. As much water as possible was backed up the pipe via the next head of riffle grade to facilitate aquatic organism passage, while retaining similar flow conditions of the crossings.

3. *I like the layout of the longitudinal profiles; these are much easier to read than others I have seen.*

Wildlands Response: Noted

Dave McHenry, WRC

1. *I don't have appreciable comments on YR 0 report. But what stands out to me is the apparently wide scour and/or excavated pools of culvert outlets at ~ sta. 101 and ~ sta. 206+40. I have seen this on a few projects lately, versus restoring a more natural channel width, and I realize engineers may be trying to minimize the risk associated with existing pipes that are retained. So, it's probably just worth watching (as I am planning, as possible) to gage that sediment deposition, lateral scour, and or pool outlet lowering don't develop over the years. The UT at 101 is small too. Fortunately, these culverts are backwatered.*

Wildlands Response: The pools were already over widened at the site downstream of the existing culverts that are referenced in the comments. Shallow fill on banks in a plunge pool downstream of a culvert is an unstable scenario that will result in downstream sediment inputs. Banks were stabilized with brush toes creating roughness, and upstream sediments along with vegetation will adjust the pool width over time if needed.

Erin Davis, USACE

1. *Section 2 and Table 10 both state that the veg survey was completed in January 2023 and that construction planting of the site was completed in March 2023. How was the veg survey done before the completion of site planting?*

Wildlands Response: The majority of the site, including all permanent and mobile vegetation plots were planted prior to the January vegetation survey. A few small areas were not planted until March due to a supply shortage of trees.

2. *There were numerous bank treatment changes from brush toe to cover logs. On other projects we have observed that cover logs can become displaced or eroded behind. Are these concerns based on the number of substitutions and size of the stream reaches? Also, based on the redline it appears that in some channel bends include a cover log sandwiched between brush toe sections, is this accurate?*

Wildlands Response: Site clearing did not produce the anticipated amount of required brush to construct the brush toes as designed. Rather than seeking brush outside the site limits, logs generated on site were utilized as cover logs. Cover logs provide bank stability, refuge habitat, and undercut banks, consistent with the goals of brush toe as designed. Wildlands has worked to improve the design and implementation of cover logs as bank revetment based on previous failures. On larger channels with longer pool arc lengths, brush toe was installed upstream and downstream of the cover log where the log is keyed to the banks. Wildlands has found these short sections of bank are vulnerable to instability and have implemented this on other similar projects with success.

3. *DWR made a mitigation plan comment (#25) about impacts and potential mortality of existing trees proposed to remain along designed stream channels. Since the three sections of channel realignment were done in order to save trees, please track mature tree survival in these areas through monitoring.*

Wildlands Response: Upstream and downstream mature tree photo points of the three channel realignment areas will be included in the annual monitoring report photologs throughout the monitoring period (MY1 – MY7). Each mature tree photo point will be mapped using GPS and documented in the Current Condition Plan View (CCPV) Maps beginning in MY1.

4. *DWR previously asked whether outlet stabilizations included rock placement and Wildlands responded no except for the floodplain pool (comment/response #28). Were non-hardened options considered for wetland/floodplain outlets along UT1 and UT2? Please include photos of rock sills and rock outlet stabilizations added along UT1 (Sta. 206+96 & Sta. 224+05) in MY1 report.*

Wildlands Response: Non-hardened options were considered but there were field concerns about head cuts at the outlets based on slope and flow. Rock sills were installed in lieu of using rip rap or similar rock cover to provide grade control while continuing to enhance wet weather drainage habitat. As requested, a photo will be taken of the rock sills along the drainage swale on UT1 at STA 206+96 and the outlet stabilization at STA 224+05 and included in the MY1 report.

5. *Why was the plunge pool depth not modified downstream of the existing crossing at Sta. 101 along East Prong Hunting Creek? Is the mid channel bar in this area shown in PP19 a concern?*

Wildlands Response: The plunge pool downstream of the crossing was not modified because it's existing depth and length were reasonably within the proposed plan (1113.8' proposed vs 1113.4' in field). The material/elevation lacking on the glide will be provided via upstream sediments. Grade control was provided at the head of riffle at station 102+22, providing a depositional area behind it. The mid-channel bar is a result of upstream sediments from a very actively eroding section of channel off property. The restored section of East Prong Hunting Creek is intended to process these sediments out onto the floodplain, but it may take multiple out of bank events. Wildlands will continue to monitor the mid-channel bar as the project moves into monitoring.

6. *Please include a photo of the new French drain installed along CE and driveway boundary in the MY1 report.*

Wildlands Response: Photos of the French drain will be included in the MY1 report.

7. *The project fencing is shown in the middle of the utility corridor where the easements overlap. Has the extent of veg maintenance area been clearly marked inside the fence line? Per Wildlands response to USACE mitigation plan comment #34, CE signs were to be installed.*

Wildlands Response: Conservation easement signs have been placed along the utility easement boundary and photos will be included in the MY1 report.

A copy of these NCIRT comments and our response letter will be included in the MY1 report. Please let me know if you have any questions.

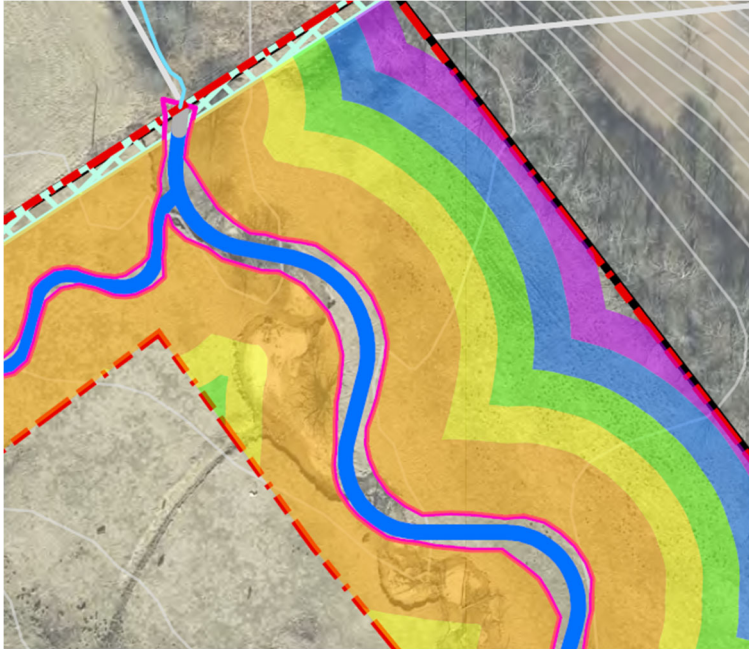
Sincerely,



Eric Neuhaus, PE

Project Manager

eneuhaus@wildlandseng.com



MITIGATION PLAN Addendum

Revised Draft for IRT Review

March 2022

LAUREL VALLEY MITIGATION SITE

Burke County, NC
NCDEQ Contract No. 7875-02
DMS ID No. 100140

Catawba River Basin
HUC 03050101

USACE Action ID No. SAW-2020-00053
RFP #: 16-007875 (Issued 5/6/2019)
DWR#: 20200018

PREPARED FOR:



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

PREPARED BY:



Wildlands Engineering, Inc.

1430 South Mint Street, Suite 104

Charlotte, NC 28203

Phone: (704) 332-7754

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

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

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

Contributing Staff:

Eric Neuhaus, PE, *Project Manager*
Shawn Wilkerson, *Principal in Charge*
Win Taylor, PWS, *Wetland Delineation*
Emily Reinicker, PE *Quality Assurance*

Jacob Wiseman, PE, CFM, *Assistant Project Manager*
Jeff Keaton, PE *Quality Assurance*
Noyes Harrigan, EI, CFM, *Field Assessment*

Table of Contents

Executive Summary	4
11.0 Determination of Credits	5
1.1 Determination of Credits Overview.....	5
1.2 Credit Calculations for Non-Standard Buffer Widths	5

TABLES

Revised Table 21: Project Asset Table 6

APPENDICES

Revised Appendix 12 Buffer Width Credit Adjustment

Executive Summary

Wildlands Engineering was contracted by the North Carolina Division of Mitigation Services (DMS) to provide stream and wetland credits in the Catawba River Basin HUC 03050101. Restoration and preservation of Site streams was approved to provide 4,836.307 stream credits within the final approved mitigation plan dated March 2022. Approved mitigation plan crediting included a credit loss of -256.640 for lack of buffers and a credit gain of 361.480 for additional buffers, resulting in a net change in credits of +104.840. All crediting adjustments were developed using the Non-Standard Buffer Width Calculation tool provided by the Wilmington District USACE included within the approved mitigation plan Appendix 12.

Based on site conditions during construction, slight adjustments to UT1 Reach 2 and UT2 bankfull alignments were made to preserve trees and/or conform the proposed streams to the existing valleys. Additionally, detail and attention were paid to areas of limited buffer, and top of bank locations were adjusted slightly to ensure the full required 30-feet. The typical sections were still maintained within these areas and overall design intent was maintained. All areas of deviation from design are shown in the included Mitigation Site Record Drawings and outlined in the baseline monitoring report.

Wildlands completed grading and earthwork construction in October 2022 and a-built surveys were completed in January 2023. The survey included developing an as-built topographic surface; as well as surveying the as-built channel centerlines and top of banks. Upon receipt of the as-built data, surveyed stream top of bank locations were used to determine credit employing the Non-Standard Buffer Width Calculation tool provided by the Wilmington District USACE. Identical versions of the tool were used for the approved mitigation plan and as-built/baseline reports. Results from the tool indicated that small changes made during construction reduced credit loss to -234.350 while increasing credit gain to 367.080. The as-built net change in credits totaled +132.730. Baseline crediting approved within the mitigation plan was held consistent within the buffer tool calculation. Total as-built crediting at the Site was determined as 4,864.197, which is 27.890 credits beyond the approved mitigation plan crediting. To acquire these additional assets, Wildlands has included this mitigation plan addendum, including a revised Section 11.0 – Determination of credits and a revised Table 21 – Project Asset Table. Revised crediting, including the Buffer Calculation Summary sheet and associated Figure are included in Appendix F.

11.0 Determination of Credits

1.1 Determination of Credits Overview

Mitigation credits presented in Table 21 are projections based upon the proposed design.

The credit ratios proposed for the Site have been developed in consultation with the NCIRT as summarized in the included meeting minutes (Appendix 6 of the approved Mitigation Plan).

1. The requested stream restoration credit ratio is 1:1 for mitigation activities that include reconstruction of the channels to a stable form and connection of the channels to the adjacent floodplain. This level of effort will occur on East Prong Hunting Creek Reach 1 and Reach 2, UT1 Reach 2, and UT2.
2. UT1 Reach 1 is proposed for preservation credit at a 15:1 ratio. Proposed work along this reach includes establishing the conservation easement and invasive species removal.

The credit release schedule is provided in Appendix 11 of the approved Mitigation Plan.

1.2 Credit Calculations for Non-Standard Buffer Widths

To calculate functional uplift credit adjustments, the latest published version of the Wilmington District Stream Buffer Credit Calculator from the USACE was utilized. To perform this calculation, GIS analysis was performed to determine the area (in square feet) of ideal buffer zones and actual buffer zones around the Project stream. Minimum standard buffer widths are measured from the top of bank (30 feet in the mountain county of Burke). The ideal buffers are the maximum potential size (in square feet) of each buffer zone measured around all creditable stream reaches, calculated using GIS, including areas outside of the easement. The actual buffer is the square feet in each buffer zone, as measured by GIS, excluding non-forested areas, all other credit type (e.g., wetland, nutrient offset, buffer), easement exceptions, open water, areas failing to meet the vegetation performance standard, etc. The stream lengths, mitigation type, ideal buffer, and actual buffer are all entered into the calculator. This data is processed, and the resulting credit amounts are totaled for the whole project. Based on the credit analysis, the Buffer Credit Calculator computed a net gain of +132.730 credits; therefore, the total adjusted SMUs for the Project is 4,864.197. Revised Appendix 12 contains details of the Non-Standard Buffer width calculation including the credit calculator spreadsheet result and buffer credit calculation figure.

Revised Table 1: Project Asset Table

Project Components									
Project Component or Reach ID	Existing Footage/Acreage	Approved Mitigation Plan Footage/Acreage ¹	As-Built Footage/Acreage ¹	Mitigation Category	Restoration Level	Priority Level	Mitigation Ratio	Approved Mitigation Plan Crediting	Addendum/ (MY) Mitigation Plan Crediting
East Prong Hunting Creek Reach 1	416	498	498.000	Warm	R	P1, P2	1	498.000	498.000
East Prong Hunting Creek Reach 2	912	686	686.000	Warm	R	P1, P2	1	686.000	686.000
UT1 Reach 1	457	457	457.000	Warm	P	N/A	15	30.467	30.467
UT1 Reach 2	1,633	1,975	1987.360	Warm	R	P1, P2	1	1,975.000	1975.000
UT2	1,470	1,542	1546.450	Warm	R	P1, P2	1	1,542.000	1542.000
Total Stream	4,888	5158	5174.810						

As Built Project Crediting							
Restoration Level	Stream			Riparian Wetland		Non-Rip Wetland	Coastal Marsh
	Warm	Cool	Cold	Riverine	Non-Riv		
Restoration	4,701.000						
Re-establishment							
Rehabilitation							
Enhancement							
Enhancement I							
Enhancement II							
Creation							
Preservation	30.467						
Totals	4,731.467						

Project Credit Adjustments ²	
Type	SMUs
Total Base SMU	4,731.467
Credit Loss in Required Buffer	-234.350
Credit Gain in Required Buffer	367.080
Net Change in Credit Buffers	132.730
Total Adjusted SMUs	4864.197

- Notes: 1. Crossing lengths have been removed from restoration footage.
 2. Credit adjustment for Non-standard Buffer Width calculation using the Wilmington District Stream Buffer Credit Calculator issued by USACE 9/4/2020. See attached documentation and exhibit for more information.

REVISED APPENDIX 12
Buffer Width Credit Adjustment

Wilmington District Stream Buffer Credit Calculator

Site Name:	Laurel Valley
USACE Action ID:	
NCDWR Project Number:	
Sponsor:	
Number of Exempt Terminal Stream Ends ¹ :	4
County:	Burke
Minimum Required Buffer Width ² :	30

Mitigation Type	Mitigation Ratio Multiplier ³	Creditable Stream Length ⁴	Include in Buffer Calculations	Baseline Stream Credit	Buffered Stream Length	Credit From Buffered Streams
Restoration (1:1)	1	4701	Yes	4701.00	4701.00	4701.00
Enhancement I (1.5:1)	1.5					
Enhancement II (2.5:1)	2.5					
Preservation (5:1)	5		No			
Other (7.5:1)	7.5					
Other (10:1)	10					
Custom Ratio 1	15	457	Yes	30.47	457.00	30.47
Custom Ratio 2						
Custom Ratio 3						
Custom Ratio 4						
Custom Ratio 5						
Totals		5158.00		4731.47	5158.00	4731.47

Buffer Width Zone (feet from Ordinary High Water Mark)

Buffer Zones	less than 15 feet	>15 to 20 feet	>20 to 25 feet	>25 to 30 feet	>30 to 50 feet	>50 to 75 feet	>75 to 100 feet	>100 to 125 feet	>125 to 150 feet
Max Possible Buffer (square feet) ⁵	156153	52679	52993	53307	216368	260255	260569	260883	277525
Ideal Buffer (square feet) ⁶	156460.58	51739.93	51389.37	51092.30	199706.07	243537.35	240983.45	240780.08	241724.72
Actual Buffer (square feet) ⁷	148723.19	48664.92	47996.47	47167.21	117037.33	41610.33	25479.01	21819.61	16148.24
Zone Multiplier	50%	20%	15%	15%	9%	7%	6%	5%	3%
Buffer Credit Equivalent	2365.73	946.29	709.72	709.72	425.83	331.20	283.89	236.57	141.94
Percent of Ideal Buffer	95%	95%	95%	94%	59%	17%	11%	9%	7%
Credit Adjustment	-106.79	-46.69	-37.62	-43.26	249.56	56.59	30.02	21.44	9.48

Total Baseline Credit	Credit Loss in Required Buffer	Credit Gain for Additional Buffer	Net Change in Credit from Buffers	Total Credit
4731.47	-234.35	367.08	132.73	4864.19

¹Number of terminal stream ends, including all points where streams enter or exit parcel boundaries. This does not include internal crossings. The District/NCIRT must approve the number of allowable/exempt terminal ends.

²Minimum standard buffer width measured from the top of bank (50 feet in piedmont and coastal plain counties or 30 feet in mountain counties)

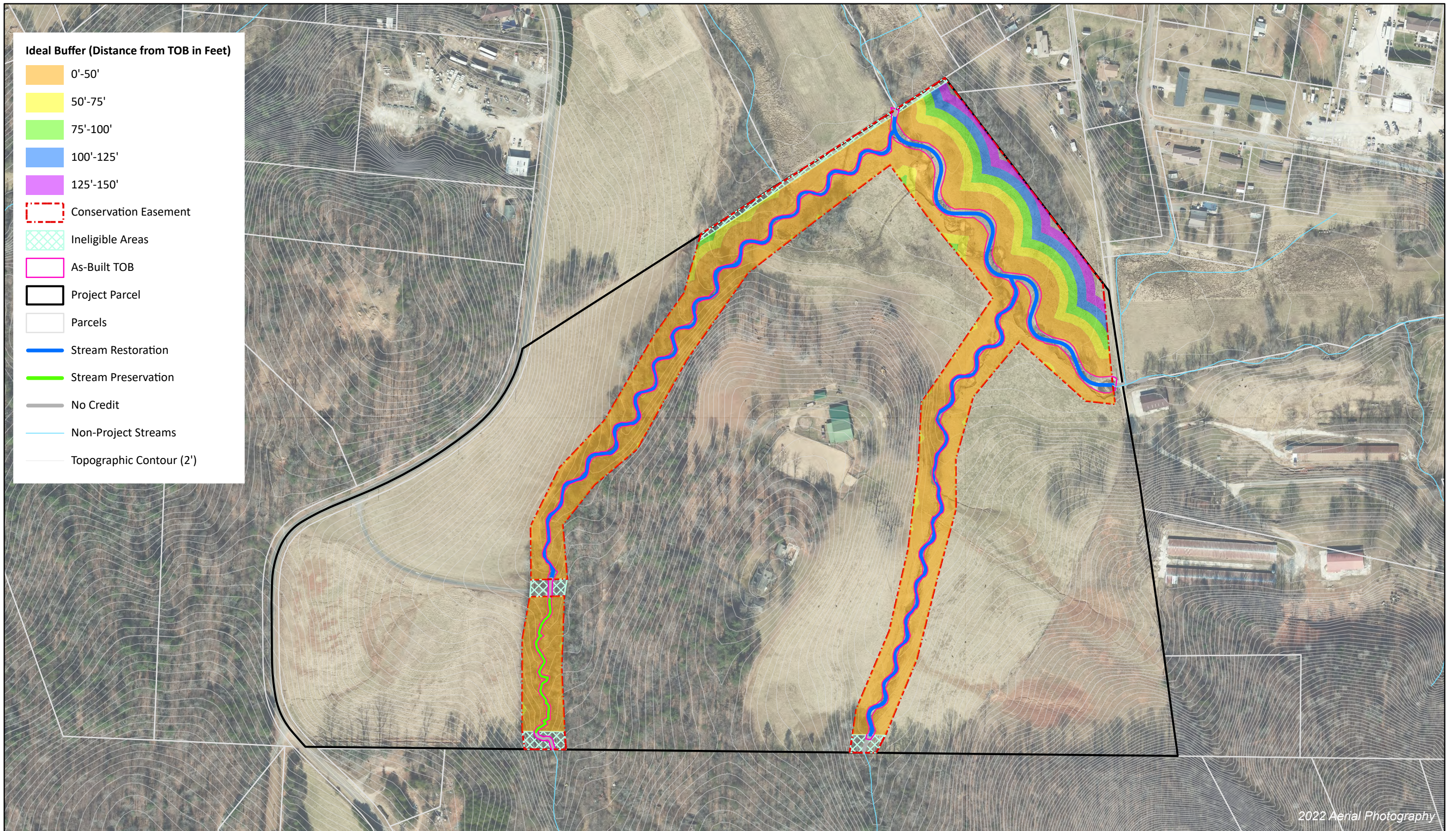
³Use the Custom Ratio fields to enter non-standard ratios, which are equal to the number of feet in the feet-to-credit mitigation ratio (e.g., for a preservation ratio of 8 feet to 1 credit, the multiplier would be 8).

⁴Equal to the number of feet of stream in each Mitigation Type. If stream reaches are not creditable, they should be excluded from this measurement, even if they fall within the easement.

⁵This amount is the maximum buffer area possible based on the linear footage of stream length if channel were perfectly straight with full buffer width and no internal crossings. This number is not used in calculations, but is provided as a reference.

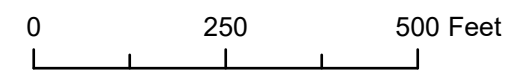
⁶Maximum potential size (in square feet) of each buffer zone measured around all creditable stream reaches, calculated using GIS, including areas outside of the easement. The inner zone (0-15') should be measured from the top of the OHWM or the edge of the average stream width if OHWM is not known. Non-creditable stream reaches within the easement should be removed prior to calculating this area with GIS.

⁷Square feet in each buffer zone, as measured by GIS, excluding non-forested areas, all other credit type (e.g., wetland, nutrient offset, buffer), easement exceptions, open water, areas failing to meet the vegetation performance standard, etc. Additional credit is given to 150 feet in buffer width, so areas within the easement that are more than 150 feet from creditable streams should not be included in this measurement. Non-creditable stream reaches within the easement should be removed prior to calculating this area with GIS.



- Ideal Buffer (Distance from TOB in Feet)**
- 0'-50'
 - 50'-75'
 - 75'-100'
 - 100'-125'
 - 125'-150'
 - Conservation Easement
 - Ineligible Areas
 - As-Built TOB
 - Project Parcel
 - Parcels
 - Stream Restoration
 - Stream Preservation
 - No Credit
 - Non-Project Streams
 - Topographic Contour (2')

2022 Aerial Photography



Buffer Credit Calculations
 Laurel Valley Mitigation Site
 DMS Project No. 100140

Burke County, NC



NORTH CAROLINA
Environmental Quality

ROY COOPER

Governor

ELIZABETH S. BISER

Secretary

MARC RECKTENWALD

Director

May 5, 2023

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

Subject: Laurel Valley Mitigation Site
Task 6 - Draft Baseline (MY0) Report and As Built Drawings
Catawba River Basin Cataloging Unit 03050101
DMS Project ID #100140
USACE ACTION ID SAW-2020-00053
DWR # 20200018

Dear Kristi,

Baseline Report and Drawings

The NC Division of Mitigation Services (DMS) has reviewed the Draft Baseline (MY0) Report and As Built Drawings for the Laurel Valley Site. Following are DMS's comments on this deliverable:

Please include the Mitigation Plan Addendum request in the Mitigation Plan, either as an Appendix or before the main body of the report (up front).

Table 1 (Project Quantities and Credits) – Add existing LF and Priority Levels columns; please omit any unneeded colors. It would be preferable if you could just use the MP addendum version of this table here; the additional buffer credits gain/ loss, and net result all need to be in this table as your MP addendum table shows.

Table 2 (Goals, Performance Criteria, and Functional Improvements) – Please add re-verification of wetlands at MY7 per IRT review letter dated 10/27/2021 (K. Browning comment).

Table 2 (Goals, Performance Criteria, and Functional Improvements) and CCPV – Please add a gauge or trail camera in Mitigation Plan Wetland F (left bank UT1 around 218+00-220+00) per IRT review letter dated 10/27/2021 (E. Davis comment), to demonstrate a sustained hydrological connection.

Section 2.1 (bulleted changes below) –

- STA: 217+57 – STA: 217+92 – Alignment altered to save adjacent mature trees. Length of alignment deviation is 33.36 linear feet (LF).
- STA: 308+60 – STA: 309+12 – Alignment adjusted to preserve existing trees. Length of alignment deviation is 45.40 LF.
- STA: 310+48 – STA: 310+88 – Alignment altered to protect existing mature trees. Length of alignment deviation is 37.05 LF.



North Carolina Department of Environmental Quality | Division of Mitigation Services
217 West Jones Street | 1652 Mail Service Center | Raleigh, North Carolina 27699-1652
919.707.8976

These are the 3 segments where alignment changed; in addition to the lengths of 'alignment deviations', please list the net change in lengths realized by these changes, for each segment.

Section 2.1.7 Fencing Plan – Since recent land use removing cattle from project pasture areas has dictated changes in the fencing needs (i.e., removal) for the project, can Wildlands briefly discuss what land use changes are expected in the near term (hay, agriculture, etc.) and how Wildlands plans to adjust their monitoring approach to ensuring the integrity of the easement? Assuming these fields will be mowed or maintained in some way, without fencing, there is a legitimate risk of scalloping. Does Wildlands plan to add any signage or non-livestock boundary fencing in these areas? If mowing or other encroachments occur, how does Wildlands plan to remedy this? Please discuss in this section and clarify.

Photo Points – Please make sure during the monitoring period that photos of the culverts from both sides are shown (PP3, PP4, and PP13), to show potential perching (typically at the outlet) and/or debris jamming (typically at the inlet).

Vegetation Plot Data Tables – Can a lighter shade of green perhaps be used; the dark green does not allow very good visibility of the text (either hard copy or PDF).

Mitigation Plan Addendum

- It is not entirely clear where the additional credits (+44.390) are originating; Wildlands mentions the three minor realignments, and resurveying channel center lines and tops of banks, but it is not clear precisely where on the project the additional credits come from. Please provide more details or clarification.
- Please note that despite the additional credits being sought, Wildlands is not pursuing a contract amendment with DMS.
- Credit Table / Project Credit Adjustments – Total Adjusted SMUs should be 4,880.697, not 4,880.690.

MYO Boundary Inspection

The MYO DMS boundary inspection was conducted on March 14, 2023. The inspection was conducted in accordance with the DMS Property Checklist which included an office review and a site visit to document site conditions. The entire easement boundary was inspected during the site visit to validate easement integrity and identify any potential issues on the site. The report letter is attached to this email and summarizes those inspection results. Site photos and locations are shown on the attached kmz map.

Please respond to me regarding the action items in the letter; if more time is needed to address anything please indicate a plan and timeline for resolution.

Digital Support Files

- Please remove the parking access symbols, or rename to “temporary parking location”, or similar as these are unplatted areas outside the conservation easement. Access or long term permission should not be implied.
- Please verify that the construction of the As-built fence located within the utility ROW and fencing located outside of easement has been approved by landowner.
- Please re-submit x-section features, each cross section must have a unique identifier There are currently 3 x-section 1's included in the submission.



- The project streams as submitted do not currently reflect the proposed assets; resubmit these features to reflect the project segment and linear feet as characterized in the quantities and credits table.

Please submit two final hard copies, in addition to a flash drive or CD with a PDF of the report and all digital support files (addressing any comments) in the correct file structure. Please include a copy of your response letter, inserted inside the front cover of each hard copy report (and included in the final PDF).

If you have any questions, please contact me at (828) 545-7057 or email me at harry.tsomides@ncdenr.gov.

Sincerely,



Harry Tsomides, Project Manager
NCDEQ – Division of Mitigation Services



North Carolina Department of Environmental Quality | Division of Mitigation Services
217 West Jones Street | 1652 Mail Service Center | Raleigh, North Carolina 27699-1652
919.707.8976



NORTH CAROLINA
Environmental Quality

ROY COOPER

Governor

ELIZABETH S. BISER

Secretary

MARC RECKTENWALD

Director

March 21, 2023

Harry Tsomides
Project Manager
NCDEQ-DMS
Asheville Regional Office
2090 U.S. 70 Highway
Swannanoa, NC 28778-8211
Cell: (828) 545-7057

Subject: Conservation Easement Inspection Report – MY0 Site
Laurel Valley - Burke County
DMS ID No. 100140

Harry,

The MY0 DMS boundary inspection was conducted on March 14, 2023. The inspection was conducted in accordance with the DMS Property Checklist which included an office review and a site visit to document site conditions. The entire easement boundary was inspected during the site visit to validate easement integrity and identify any potential issues on the site. This report summarizes those inspection results. Site photos and locations are shown on the attached kmz map.

Office Review:

- An approved utility corridor (non credit generating) is located in the northwest corner of the site. The overhead wires are shown outside CE on the plat and As-built.

Field Inspection:

- The rebar at corner #2 was topped with a plastic surveyor cap and missing the stamped aluminum monument cap.
- Corners 3, 4 & 5 were missing marker posts.
- In-line marker spacing met specification, but the adjacent fields are in hay production and lack an established mow line.
- A fallen tree has damaged the fence near corner #30.
- Adjacent ditch construction is in-progress upgradient of corner #32.
- No encroachments were observed.

Action Items

- Install aluminum monument cap at corner #2.
- Install corner marker posts at corners #3, 4 & 5.
- The mow line is not well established along the adjacent fields. Coordinate with landowner and install any supplemental marking necessary to prevent scallop mowing.
- Repair fence damaged by the fallen tree near corner #30.
- Coordinate with the landowner to ensure no encroachment occurs due to the active ditch construction near corner #32.



North Carolina Department of Environmental Quality | Division of Mitigation Services
217 West Jones Street | 1652 Mail Service Center | Raleigh, North Carolina 27699-1652
919.707.8976

Let me know if you have any questions or need additional information.

Sincerely,

Kelly Phillips

Property Specialist

NCDEQ-DMS

610 East Center Avenue, Suite 301

Mooreville, NC 28115

Cell: (919) 723-7565

cc: R:\EEP PROJECT LIBRARY FILES\PROJECT DELIVERABLES(REPORTS)\FD PROJECTS\Laurel Valley
7875-02 (#100140)\4_Task 2_ConsEasement\DMS Easement Inspections\MY0



North Carolina Department of Environmental Quality | Division of Mitigation Services
217 West Jones Street | 1652 Mail Service Center | Raleigh, North Carolina 27699-1652
919.707.8976



June 2, 2023

ATTN: Harry Tsomides
Project Manager
NCDEQ – Division of Mitigation Services
Asheville Regional Office
2090 U.S. 70 Highway
Swannanoa, NC 28778-8211

RE: Laurel Valley Mitigation Site
Task 6 - Draft Baseline (MY0) Report and As Built Drawings
Catawba River Basin Cataloging Unit 03050101
DMS Project ID #100140
USACE ACTION ID SAW-2020-00053
DWR # 20200018

Dear Mr. Harry Tsomides,

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

DMS Comments, Harry Tsomides:

Baseline Report and Drawings:

1. *Please include the Mitigation Plan Addendum request in the Mitigation Plan, either as an Appendix or before the main body of the report (up front).*

Wildlands Response: The Mitigation Plan Addendum is now included before the main body of the report.

2. *Table 1 (Project Quantities and Credits) – Add existing LF and Priority Levels columns; please omit any unneeded colors. It would be preferable if you could just use the MP addendum version of this table here; the additional buffer credits gain/ loss, and net result all need to be in this table as your MP addendum table shows.*

Wildlands Response: Table 1 has been updated to reflect the MP addendum version.

3. *Table 2 (Goals, Performance Criteria, and Functional Improvements) – Please add re-verification of wetlands at MY7 per IRT review letter dated 10/27/2021 (K. Browning comment).*

Wildlands Response: Wetland re-verification in MY7 has been added to Table 2 of the report.

4. *Table 2 (Goals, Performance Criteria, and Functional Improvements) and CCPV – Please add a gauge or trail camera in Mitigation Plan Wetland F (left bank UT1 around 218+00-220+00) per IRT review letter dated 10/27/2021 (E. Davis comment), to demonstrate a sustained hydrological connection.*

Wildlands Response: Table 2 has been revised to include the installation of a trail camera in Wetland F, near photo point 10 (PP10), during MY1 to show a sustained hydrologic connection throughout the monitoring years. The location of the camera will be recorded with GPS and added to the CCPV map in the MY1 report.

5. *Section 2.1 (bulleted changes below) –*

- *STA: 217+57 – STA: 217+92 – Alignment altered to save adjacent mature trees. Length of alignment deviation is 33.36 linear feet (LF).*
- *STA: 308+60 – STA: 309+12 – Alignment adjusted to preserve existing trees. Length of alignment deviation is 45.40 LF.*
- *STA: 310+48 – STA: 310+88 – Alignment altered to protect existing mature trees. Length of alignment deviation is 37.05 LF.*

There are the 3 segments where alignment changed; in addition to the lengths of ‘alignment deviations’, please list the net change in lengths realized by these changes, for each segment.

Wildlands Response: The bulleted changes above in Section 2.1 were updated to include the loss of LF for each alignment deviation. However, it should be noted that lengths recorded for UT1 Reach 2 and UT2 in the Site’s original Mitigation Plan were recorded incorrectly. The Mitigation Plan’s lengths were recorded as 14 LF shorter than they should have been for each reach. This is why the as-built lengths are recorded as longer than the Mitigation Plan even though there were linear footage losses on the reaches due to alignment deviations. Text describing this inconsistency was included in Section 2 of the Monitoring Year 0 Annual Report (2023).

6. *Section 2.1.7 Fencing Plan – Since recent land use removing cattle from project pasture areas has dictated changes in the fencing needs (i.e., removal) for the project, can Wildlands briefly discuss what land use changes are expected in the near term (hay, agriculture, etc.) and how Wildlands plans to adjust their monitoring approach to ensuring the integrity of the easement? Assuming these fields will be mowed or maintained in some way, without fencing, there is a legitimate risk of scalloping. Does Wildlands plan to add any signage or non-livestock boundary fencing in these areas? If mowing or other encroachments occur, how does Wildlands plan to remedy this? Please discuss in this section and clarify.*

Wildlands Response: Language was added to Section 2.1.7 to address the change in agricultural land use at the Site, potential encroachments, and potential remediation as necessary.

7. *Photo Points – Please make sure during the monitoring period that photos of the culverts from both sides are shown (PP3, PP4, and PP13), to show potential perching (typically at the outlet) and/or debris jamming (typically at the inlet).*

Wildlands Response: PP3 and PP4 are the inlet and outlet, respectively, of the same culvert. In MY1, a photo point will be added at the inlet of the culvert of PP13. A

representative photo will be taken at this new photo point in future monitoring reports MY1 – MY7.

8. *Vegetation Plot Data Tables – Can a lighter shade of green perhaps be used; the dark green does not allow very good visibility of the text (either hard copy or PDF).*

Wildlands Response: The colors on the Vegetation Plot Tables are consistent with the Shiny App output. In past monitoring reports, Wildlands has been advised to leave colors as is produced by the Shiny App.

Mitigation Plan Addendum:

1. *It is not entirely clear where the additional credits (+44.390) are originating; Wildlands mentions the three minor realignments, and resurveying channel center lines and tops of banks, but it is not clear precisely where on the project the additional credits come from. Please provide more details or clarification.*

Wildlands Response: To simplify additional crediting, Wildlands defaulted baseline crediting to the approved mitigation plan values. The additional crediting proposed within the addendum (+27.890) is the result of reducing the areas under the minimum buffer during project development and construction which reduced the overall negative crediting calculated within the Wilmington District Stream Buffer Credit Calculator from USACE. Differences in proposed and as-built bankfull locations are shown in the record drawings (Appendix E).

2. *Please note that despite the additional credits being sought, Wildlands is not pursuing a contract amendment with DMS.*

Wildlands Response: Wildlands is not pursuing a contract amendment with DMS.

3. *Credit Table / Project Credit Adjustments – Total Adjusted SMUs should be 4,880.697, not 4,880.690.*

Wildlands Response: Table 1 was updated with revised crediting.

MY0 Boundary Inspection:

The MY0 DMS boundary inspection was conducted on March 14, 2023. The inspection was conducted in accordance with the DMS Property Checklist which included an office review and a site visit to document site conditions. The entire easement boundary was inspected during the site visit to validate easement integrity and identify any potential issues on the site. The report letter is attached to this email and summarizes those inspection results. Site photos and locations are shown on the attached kmz map.

1. *Please respond to me regarding the action items in the letter; if more time is needed to address anything please indicate a plan and timeline for resolution.*

Wildlands Response: Wildlands has included our responses to the action items in the boundary inspection report after our Digital Support File responses below.

Digital Support Files:

1. *Please remove the parking access symbols, or rename to “temporary parking location”, or similar as these are unplatted areas outside the conservation easement. Access or long-term permission should not be implied.*

Wildlands Response: The parking access symbols have been removed from CCPV maps.

2. *Please verify that the construction of the As-built fence located within the utility ROW and fencing located outside of easement has been approved by landowner.*

Wildlands Response: As-built fence located within the utility ROW and outside the conservation easement was approved by the landowner. When the property was sold, Wildlands met and negotiated new closed loop sections of fence based on the new property owner’s agricultural needs.

3. *Please re-submit x-section features, each cross section must have a unique identifier. There are currently 3 x-section 1’s included in the submission.*

Wildlands Response: On Thursday May 25, 2023, Kristi Suggs (Wildlands) contacted Melonie Allen (DMS) to inquire about this comment. It seems that somehow two of the cross-sections in the digital file that DMS’ GIS program was reading were missing a second digit in the cross-sections’ name. The correct name for the cross-sections were XS10 and XS11. During this conversation, Ms. Allen was able to correct the cross-section name in the file that DMS’ had; therefore, no additional rectification is needed.

4. *The project streams as submitted do not currently reflect the proposed assets; resubmit these features to reflect the project segment and linear feet as characterized in the quantities and credits table.*

Wildlands Response: The project’s stream features have been updated to reflect the project segment, asset type, and linear footage that are characterized in the quantities and credits table.

DMS Comments, Kelly Phillips:

Conservation Easement Inspection Report Action Items:

1. *Install aluminum monument cap at corner #2.*

Wildlands Response: Corner #2 is a common property corner with DB 740, Pg1512, BD 1891, PG719 (Tract 1) and DB1509, PG133. This property corner was either missing or damaged during boundary survey. The surveyor reset the property corner with a rebar and cap as described in the legend on the recorded plat and Exhibit A of the Conservation Easement Area A. This corner would not have an aluminum State of NC conservation easement cap as all existing property corners will not have conservation easement caps.

2. *Install corner marker posts at corners #3, 4 & 5.*

Wildlands Response: Marking post signage has been set at corners 3, 4, and 5. Photos of the marker signage are included below.



Boundary Marker #3



Boundary Marker #4



Boundary Marker #5

3. *The mow line is not well established along the adjacent fields. Coordinate with landowner and install any supplemental marking necessary to prevent scallop mowing.*

Wildlands Response: Wildlands will work with the landowner to establish a mowing line to prevent encroachment. If needed, Wildlands will install additional posts, tape, and/or signage to prevent scallop mowing.

4. *Repair fence damaged by the fallen tree near corner #30.*

Wildlands Response: The fallen tree has been cleared from the fence. See the photo below. A fencing repair is scheduled to be completed by August 1. No livestock or animals are contained within the area where the fence is currently damaged. Wildlands will provide photos in the MY1 report of the completed fence repair.



5. *Coordinate with the landowner to ensure no encroachment occurs due to the active ditch construction near corner #32.*

Wildlands Response: Wildlands spoke with the landowner. A French drain is being installed along the driveway and stops outside the conservation easement. The small, excavated ditch will be filled and revegetated as part of the French drain installation. Wildlands will provide photos in the MY1 report of the completed French drain.

As requested, Wildlands has included two (2) hard copies, a .pdf copy of the final report, and a full final electronic submittal of the support files. A copy of the MY0 DMS boundary inspection

report, the DMS comment letter for the draft Baseline (MY0) Report and Record Drawings, and our response letter have been included inside the front cover of each report's hard copy, as well. Please let me know if you have any questions.

Sincerely,

A handwritten signature in blue ink that reads "Kristi Suggs". The signature is written in a cursive style with a large initial 'K' and a long, sweeping underline.

Kristi Suggs

Senior Environmental Scientist

ksuggs@wildlandseng.com

PREPARED BY:



Wildlands Engineering, Inc.

167-B Haywood Road
Asheville, NC 28806

Phone: 828.774.5547

LAUREL VALLEY MITIGATION SITE
Monitoring Year 0 Annual Report

TABLE OF CONTENTS

Section 1: PROJECT OVERVIEW	1-1
1.1 Project Quantities and Credits	1-1
1.2 Project Goals and Objectives	1-2
1.3 Project Attributes.....	1-5
Section 2: As-Built Condition (Baseline)	2-6
2.1 As-Built/Record Drawings	2-7
2.1.1 East Prong Hunting Creek Reach 1.....	2-7
2.1.2 East Prong Hunting Creek Reach 2.....	2-7
2.1.3 UT1 Reach 1	2-7
2.1.4 UT1 Reach 2	2-7
2.1.5 UT2	2-8
2.1.6 Vegetation Planting List & Plan.....	2-8
2.1.7 Fencing Plan	2-9
2.1.8 Monitoring Components.....	2-9
Section 3: Monitoring Year 0 Data Assessment	3-9
3.1 Vegetative Assessment	3-9
3.2 Vegetation Areas of Concern	3-9
3.3 Encroachment	3-10
3.4 Stream Assessment.....	3-10
3.5 Stream Areas of Concern	3-10
3.6 Hydrology Assessment.....	3-10
3.7 Adaptive Management Plan.....	3-10
3.8 Monitoring Year 0 Summary	3-10
Section 4: METHODOLOGY.....	4-1
Section 5: REFERENCES	5-1

TABLES

Table 1: Project Quantities and Credits	1-1
Table 2: Goals, Performance Criteria, and Functional Improvements	1-2
Table 3: Project Attributes.....	1-5

FIGURES

Figure 1	Current Condition Plan View (Key)
Figures 1a-1b	Current Condition Plan View

APPENDICES

Appendix A	Visual Assessment Data
Table 4a-b	Visual Stream Morphology Stability Assessment Table
Table 5	Vegetation Condition Assessment Table
	Stream Photographs
	Vegetation Plot Photographs

Appendix B	Vegetation Plot Data
Table 6	Vegetation Plot Data
Table 7	Vegetation Performance Standards Summary Table
Appendix C	Stream Geomorphology Data
	Cross-Section Plots
	Longitudinal Profile
Table 8a-b	Baseline Stream Data Summary
Table 9	Cross-Section Morphology Monitoring Summary
Appendix D	Project Timeline and Contact Information
Table 10	Project Activity and Reporting History
Table 11	Project Contact Table
Appendix E	Record Drawings and Sealed As-built Survey

Section 1: PROJECT OVERVIEW

The Laurel Valley Mitigation Site (Site) is in Burke County, approximately 3.5 miles southeast of Morganton. The Site is within the NC Division of Mitigation Services (DMS) Hunting Creek targeted local watershed Hydrologic Unit Code (HUC) 03050101060050 and the NC Division of Water Resources (DWR) Subbasin 03-08-31. The Site will provide stream mitigation units (SMUs) in the Catawba River Basin HUC 03050101 (Catawba 01). Table 3 presents information related to the project attributes.

1.1 Project Quantities and Credits

Mitigation work within the Site included the restoration and preservation of approximately 5,175 linear feet (LF) of perennial stream channel and enhanced and preserved up to an additional 120 LF of riparian buffer in areas across the Site. As outlined in the Laurel Valley Mitigation Plan Addendum (Wildlands, 2023), this will generate 4,864.197 SMUs for the Catawba 01. 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 Component	Existing Footage /Acreage	Approved Mitigation Plan Footage /Acreage*	As-built Footage / Acreage*	Mitigation Category	Restoration Level	Priority Level	Mitigation Ratio (X:1)	Approved Mitigation Plan Crediting	Addendum / MYO Mitigation Plan Crediting
Stream									
East Prong Hunting Creek R1	416.000	498.000	498.000	Warm	R	P1, P2	1.0	498.000	498.000
East Prong Hunting Creek R2	912.000	686.000	686.000	Warm	R	P1, P2	1.0	686.000	686.000
UT1 R1	457.000	457.000	457.000	Warm	P	N/A	15.0	30.467	30.467
UT1 R2	1,633.000	1,975.000	1,987.360	Warm	R	P1, P2	1.0	1,975.000	1,975.000
UT2	1,470.000	1,542.000	1,546.450	Warm	R	P1, P2	1.0	1,542.000	1,542.000
Total Stream LF	4,888.000	5,158.000	5,174.810						

Table 1: Project Quantities and Credits

PROJECT CREDITS						
Restoration Level	Stream			Riparian Wetland		Non-Rip
	Warm	Cool	Cold	Riverine	Non-Riverine	Wetland
Restoration	4,701.000					
Re-establishment						
Rehabilitation (1:1 & 1.5:1)						
Enhancement						

Table 1: Project Quantities and Credits

PROJECT CREDITS						
Restoration Level	Stream			Riparian Wetland		Non-Rip
	Warm	Cool	Cold	Riverine	Non-Riverine	Wetland
Enhancement I						
Enhancement II						
Creation						
Preservation	30.467					
Total	4,731.467					

Table 1: Project Quantities and Credits

PROJECT CREDIT ADJUSTMENTS**	
Type	SMUs
Total Base SMU	4,731.467
Credit Loss in Required Buffer	-234.350
Credit gain in Required Buffer	367.080
Net Change in Credit Buffers	132.730
Total Adjusted SMUs	4,864.197

* Crossing lengths and utility easement have been removed from restoration and preservation footage.

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

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
Exclude livestock from stream channels.	Install livestock fencing as needed to exclude livestock from stream channels, wetlands, and riparian areas, or remove livestock from adjacent fields.	Reduce direct fecal coliform and nutrient inputs to the Site streams. Eliminate hoof shear on the stream bed and banks, which will reduce stream bank erosion and fine sediments in the stream channel. Eliminate cattle trampling of wetlands.	Prevent easement encroachments.	Semi-annual visual inspections.	No evidence of livestock with conservation easements.

Table 2: Goals, Performance Criteria, and Functional Improvements

Goal	Objective/ Treatment	Likely Functional Uplift	Performance Criteria	Measurement	Cumulative Monitoring Results
Restore and enhance native floodplain vegetation.	Convert active cattle pasture to forested riparian buffers along all Site streams, which will slow and treat sediment laden runoff from adjacent pastures before entering streams. Protect and enhance existing forested riparian buffers. Treat invasive species.	Reduce sediment inputs from pasture runoff. Reduce floodplain velocities and increase retention of flood flows on the floodplain, decrease direct runoff, and increase storage and nutrient cycling. Increase shading of stream channels, which will increase dissolved oxygen. Provide a source of LWD and organic material to Site streams for continued habitat. Support all stream functions.	320 stems per acre at MY3; 260 planted stems per acre at MY5 and a height of 7 ft within riparian zones or 4 ft in wetland planting zones; 210 stems per acre at MY7 with a height of 10 ft in riparian zones or 7 ft in height in wetland planting zones. ^{1,2} Woody shrub species are not subject to height requirements.	Ten (10) permanent and two (2) 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.	In MY0, all twelve (12) vegetation plots met interim MY3 density requirements. No invasive species were observed within project area.
Improve the stability of stream channels.	Reconstruct stream channels slated for restoration with stable dimensions and appropriate depth relative to the existing floodplain and riparian wetland areas. Add bank revetments and instream structures to protect restored streams	Reduce sediment inputs from bank erosion. Increase floodplain engagement, decreasing runoff and increasing infiltration. Decrease instream shear stresses. Diversify available habitats.	ER over 1.4 for B-type and 2.2 for C-type channels and BHR below 1.2 with visual assessments showing progression towards stability. ³	Eleven (11) Cross-sections will be assessed during MY1, MY2, MY3, MY5, and MY7 and visual inspections will be assessed annually.	All eleven (11) cross-sections show streams are stable and functioning as designed. ERs are over 2.2 and BHRs are below 1.2.



Table 2: Goals, Performance Criteria, and Functional Improvements

Goal	Objective/ Treatment	Likely Functional Uplift	Performance Criteria	Measurement	Cumulative Monitoring Results
Improve instream habitat.	Install habitat features such as constructed steps, cover logs, and brush toes on restored reaches. Added woody material/ LWD to channel beds. Construct pools of varying depth.	Increase and diversify available habitats for macroinvertebrates, fish, and amphibians. Promote aquatic species migration and recolonization from refugia, leading to colonization and increase in biodiversity over time. Add complexity including LWD to the streams. ³	There is no required performance standard for this metric.	Semi-annual visual inspections.	N/A
Increase stream, floodplain, and riparian wetland hydrologic interaction.	Reconstruct stream channels with designed bankfull dimensions and appropriate depth relative to the existing floodplain; thereby, restoring the hydrologic connectivity of the streams with the riparian floodplain and wetland areas.	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 for UT1, UT2, and East Prong Hunting Creek. There are no required performance criteria for the crest gage located downstream of the project Site's boundary or for the trail camera that will be installed in Wetland F (in MY1). Wetlands will be re-verified at MY7.	Four pressure transducers to record flow elevations and durations were installed. Only the three transducers located within the project Site are subject to performance criteria (CG1, CG2, CG3). The measurement of CG4 is only to show that flow is continuing within the off-site resource. A trail camera will also be installed within Wetland F to monitor wetland hydrologic connectivity.	Reported in MY1
Permanently protect the project Site from harmful uses.	Establish a conservation easement on the Site. Exclude livestock from Site streams and remove pasture from the riparian buffer.	Protect Site from encroachment on the riparian corridor and direct impact to streams and wetlands. Support all stream functions.	Prevent easement encroachment.	Visually inspect the perimeter of the Site to ensure no easement encroachment is occurring.	No unapproved easement encroachments were observed.

¹ Increased inundation will inhibit some woody species growth and some of these areas may have increased herbaceous and scrub/shrub vegetation; therefore, a reduced vegetation height performance standard has been applied.

² All volunteer stems and/or supplemental plantings must be present in the plot for 2 years before being counted towards vegetation performance criteria.

³ BHR = bank height ratio, ER = entrenchment ratio, and LWD = large woody debris

1.3 Project Attributes

The project Site is bordered by an active farm comprised of cattle pastures, barns, and a residence. Based on historic aerials from 1947 to 2016, East Prong Hunting Creek and UT2 have existed in their same approximate location and with the same pattern for over 72 years. Aerials show that UT1 historically flowed into East Prong Hunting Creek within the project Site and was rerouted sometime between 1976 and 1984. Agricultural management of open pastures remained consistent between 1947 and 2016, with a brief period between 1976 and 1984 when pastures were fallow. Table 3 below and Tables 8a – 8b in Appendix C present additional information on pre-restoration conditions.

Table 3: Project Attributes

PROJECT INFORMATION			
Project Name	Laurel Valley Mitigation Site	County	Burke County
Project Area (acres)	14	Project Coordinates	35.702772, -81.642614
PROJECT WATERSHED SUMMARY INFORMATION			
Physiographic Province	Piedmont	River Basin	Catawba River
USGS HUC 8-digit	03050101	USGS HUC 14-digit	03050101060050
DWR Sub-basin	03-08-31	Land Use Classification	Forested (62%), agriculture (17%), developed (16%)
Project Drainage Area (acres)	1,274	Percentage of Impervious Area	2%
RESTORATION TRIBUTARY SUMMARY INFORMATION			
Parameters	East Prong Hunting Creek	UT1	UT2
Pre-project length (feet)	1,328	2,090	1,470
Post-project (feet)	1,184	2,444	1,546
Valley confinement (Confined, moderately confined, unconfined)	Unconfined	Moderately confined	Moderately confined
Drainage area (acres)	1,274	136	155
Perennial, Intermittent, Ephemeral	Perennial	Perennial	Perennial
DWR Water Quality Classification	WS-IV	WS-IV	WS-IV
Dominant Stream Classification (existing)	C5, B5c	B5c, G5c	B4, B4c
Dominant Stream Classification (proposed)	C4	C4	C4
Dominant Evolutionary class (Simon) if applicable	V. Aggradation and widening	IV. Degradation and widening	IV. Degradation and widening
REGULATORY CONSIDERATIONS			
Parameters	Applicable?	Resolved?	Supporting Documentation
Water of the United States - Section 404	Yes	Yes	USACE Action ID No. SAW-2020-00053
Water of the United States - Section 401	Yes	Yes	DWR # 2020-0018
Endangered Species Act	Yes	Yes	

Table 3: Project Attributes

Historic Preservation Act	Yes	Yes	Categorical Exclusion in Mitigation Plan (Wildlands, 2022)	
FEMA Floodplain Compliance	No	N/A	N/A	
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)	0.020	2.784	0.003	0.069
Wetland Type	Riverine	Riverine	Riverine	Riverine
Mapped Soil Series	Arkaqua Loam	Arkaqua Loam	Fairview Sandy Clam Loam	Fairview Sandy Clay Loam
Drainage Class	Poorly drained	Poorly drained	Well drained	Well drained
Soil Hydric Status	No	No	No	No
Source of Hydrology	Groundwater/Overbank	Groundwater/Overbank	Groundwater	Groundwater
Restoration or enhancement method	None	None	None	None
Parameters	Wetland E	Wetland F	Wetland G	
Pre-project area (acres)	0.948	0.701	0.095	
Wetland Type	Riverine	Riverine	Riverine	
Mapped Soil Series	Arkaqua Loam, Fairview Sandy Clay Loam	Colvard Sandy Loam, Fairview Sandy Clay Loam	Colvard Sandy Loam	
Drainage Class	Poorly drained, Well drained	Well drained, Well drained	Well drained	
Soil Hydric Status	No	No	No	
Source of Hydrology	Groundwater/Overbank	Groundwater/Overbank	Groundwater	
Restoration or enhancement method	None	None	None	

Section 2: As-Built Condition (Baseline)

The Site construction was completed in October 2022, and as-built surveys were completed in January 2023. 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. Monitoring device installation and vegetative data collection were completed in January 2023. However, the post-construction planting at the Site was completed in March 2023.

Slight adjustments during the construction of UT1 Reach 2 and UT2 resulted in a loss of 1.640 LF and 9.550 LF on the reaches, respectively. However, the as-built lengths for UT1 Reach 2 and UT2 are longer than the proposed lengths in the project’s original Mitigation Plan (Wildlands, 2022). This is due to a

discrepancy in the lengths recorded for UT1 Reach 2 and UT2 in the Project Asset Table (Table 21) in the Mitigation Plan (2022). The lengths were recorded as follows:

- UT1 Reach 2 was recorded as 1,975 LF, but it should have been 1,989 LF, which is a difference of 14 LF.
- UT2 was recorded as 1,542 LF, but it should have been 1,556 LF, which is also a difference of 14 LF.

Therefore, the total length that was recorded as part of the Mitigation Plan (Wildlands, 2022) was 28 LF shorter than what was proposed in the design plans, so the loss of 11.190 LF from the alignment deviations still yields a net length of 16.810 LF at as-built.

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 East Prong Hunting Creek Reach 1

- STA: 100+96 – STA: 101+02 – Boulder toe added for overland flow stabilization.
- STA: 100+98 – STA: 102+22 – Plunge pool depth was not modified downstream of existing stream crossing.

2.1.2 East Prong Hunting Creek Reach 2

- STA: 106+52 – STA: 106+73 – Cover log replaced brush toe for undercut bank, pool habitat.
- STA: 109+50 – STA: 109+76 – Cover log replaced brush toe for undercut bank, pool habitat.
- STA: 111+64 – As-built outlet ditch stabilized with rock sill and rock outlet stabilization for additional grade control.

2.1.3 UT1 Reach 1

- 54-inch corrugated metal pipe (CMP) inlet invert elevation of 1142.05 and an outlet invert elevation of 1141.93

2.1.4 UT1 Reach 2

- STA: 207+05 – STA: 206+59 – Brush toe added for stream bank stabilization at the existing culvert outlet.
- STA: 206+96 – Rock sills added for additional stabilization.
- STA: 207+02 – Boulder sill relocated to adjacent outlet to prevent overland flow erosion.
- STA: 209+29 – Cover log replaced brush toe for undercut bank pool habitat.
- STA: 209+69 – Two rock sills added to capture floodplain runoff.
- STA: 209+90 – Cover log replaced brush toe for undercut bank pool habitat.
- STA: 214+34 – STA: 214+54 – Boulder toe added for stream bank reinforcement.
- STA: 216+47 – Cover log replaced brush toe for undercut bank pool habitat.
- STA: 217+57 – STA: 217+92 – Alignment altered to save adjacent mature trees. Length of alignment deviation is 33.36 linear feet (LF); a loss of 1.64 LF.
- STA: 218+94 and STA: 220+17 – Log sill added for bed stability.
- STA: 224+05 – Stabilization added at existing wetland outlet.



2.1.5 UT2

- STA: 300+00 – Log j-hook added to protect left bank above culvert crossing.
- STA: 300+58 – STA: 300+71 – Brush toe added to stabilize stream bank.
- STA: 304+72 – Rock sill removed due to installation of angled log riffle with adequate grade control.
- STA: 304+83 and STA: 307+45 – Cover log replaced brush toe for undercut bank pool habitat.
- STA: 308+38 – Rock outlet stabilization added to capture floodplain runoff and rock sills added for additional stabilization.
- STA: 308+60 – Log sill added to stabilize stream bed.
- STA: 308+60 – STA: 309+12 – Alignment adjusted to preserve existing trees. Length of alignment deviation is 45.40 LF; a loss of 6.6 LF.
- STA: 309+03 – Log sill relocated upstream to STA 308+60 based on field conditions.
- STA: 310+48 – STA: 310+88 – Alignment altered to protect existing mature trees. Length of alignment deviation is 37.05 LF; a loss of 2.95 LF.
- STA: 311+84 – J-hook replaced by rock sill to allow for cover log installation.
- STA: 312+07 – Cover log replaced brush toe for undercut bank pool habitat.

2.1.6 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, 2022), so no approval for the inclusion of the species is needed.

Open Buffer Planting Zone

Trees

- Boxelder (*Acer negundo*) and cucumber tree (*Magnolia acuminata*) were not planted.
- Sycamore (*Platanus occidentalis*) density increased from 15% to 16%.
- River birch (*Betula nigra*), red mulberry (*Morus rubra*), and sourwood (*Oxydendrum arboreum*) density increased from 5% to 6%.
- American beech (*Fagus grandifolia*), bitternut hickory (*Carya cordiformis*), white oak (*Quercus alba*), northern red oak (*Quercus rubra*), and slippery elm (*Ulmus rubra*) density increased from 10% to 11%.

Small Trees / Shrubs

- Sweetshrub (*Calycanthus floridus*) was added at a density of 1%.

Wetland Planting Zone

Trees

- Boxelder was not planted.

Small Trees/Shrubs

- Silky dogwood (*Cornus amomum*) was added at a density of 5%.

Riparian Corridor Planting Zone

- No deviations from design.

Partially Vegetated Buffer Zone

- No deviations from design.



Planting Plan

- No deviations from design.

2.1.7 Fencing Plan

As-built changes to the proposed fencing plan that was provided in the Site's Mitigation Plan (Wildlands, 2022) were redesigned during construction based on a change in land use specifications from the new landowner when the property was sold. Cattle are no longer on-site, and the new landowner's horses are restricted from accessing the conservation easement by fencing installed during construction and existing fencing. In the locations where cattle were removed, fields will be used for hay. A mow line will be established with the property owner to prevent encroachment. Additional marking or non-livestock fence will be considered if there is repeated encroachment. See Sheet 3.0 in the record drawings for the fence location.

2.1.8 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.

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, 2022). Performance criteria for vegetation, stream, and hydrologic assessment are located in Section 1.2 Table 2: Goals, Performance Criteria, and Functional Improvements. The first annual monitoring assessment (MY1) will be completed in the fall/winter of 2023, 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 2029.

3.1 Vegetative Assessment

The MY0 vegetative survey was completed in January 2023. Vegetation monitoring resulted in a stem density range from 526 to 729 planted stems per acre which is well above the interim requirement of 320 stems per acre required at MY3. Average stem density was 644 planted stems per acre. All 10 permanent and 2 mobile vegetation plots met the MY3 interim success criteria and are on track to meet MY7 success criteria of 210 stems per acre. 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 including herbicide applications were implemented prior and during construction to prevent the spread of invasive species that could compete with planted native species. In August 2022, approximately 50 linear feet of UT2 was chemically treated in-stream for a small population of marsh dewflower (*Murdannia keisak*), and fescue (*Festuca* sp.) was chemically treated during construction in areas outside the limits of disturbance.

Preservation areas along UT1 Reach 1 were assessed for invasive species populations prior to construction and at baseline conditions. No substantial populations, mature species, or seed sources were observed; therefore, no treatment was conducted. Throughout the seven-year monitoring period, Wildlands will continue to monitor for the presence of invasive species populations within the



preservation area of UT1 Reach 1 and treat as needed. Invasive species will continue to be monitored, mapped, and controlled across the Site as necessary throughout the monitoring period.

3.3 Encroachment

As discussed, and approved in the Site’s Mitigation Plan (Wildlands, 2022), a utility easement, along the northwest side of the property, lies within the conservation easement. No stream nor buffer credit is being sought for any part of the project that lies within the utility easement. The utility easement supersedes the conservation easement and allows for utility and vegetation maintenance. Since this easement overlap was approved, moving forward it will not be considered as an easement encroachment violation; therefore, no easement violations were noted during the as-built review of the Site.

3.4 Stream Assessment

Morphological surveys for MY0 were conducted in November 2022. All streams within the Site are stable and functioning as designed. All 11 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. Refer to Appendix A for the Visual Stream Morphology Stability Assessment Table and Stream Photographs. Refer to Appendix C for Stream Geomorphology Data.

3.5 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.

3.6 Hydrology Assessment

Crest gages (CG) were installed on East Prong Hunting Creek, UT1, and UT2 to monitor bankfull events. An off-site automated transducer (CG4) was also installed on an adjacent parcel to monitor baseflow hydrology and large flow events of an off-site hydrologic resource. No performance criteria are associated with CG4; however, the on-site gages (CG1 – CG3) are required to meet the performance standards outlined in Table 2. Hydrologic 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, 2022). No adaptive management implementation is needed at this time.

3.8 Monitoring Year 0 Summary

Overall, the Site 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. In-stream vegetation and fescue were treated prior to and during construction and the presence of invasive species is minimal. All vegetative species of concern will continue to be assessed and treated, as needed, throughout the seven-year post-construction monitoring period.

Summary information and data related to the performance of various projects and monitoring elements can be found in the tables and figures in the report appendices. All raw data supporting the tables and figures are included in the digital submittal.



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, 2022). 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. 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

- Doll, B.A., Grabow, G.L., Hall, K.A., Halley, J., Harman, W.A., Jennings, G.D., and Wise, D.E. 2003. Stream Restoration: A Natural Channel Design Handbook.
- Lee, Michael T., Peet, Robert K., Steven D., Wentworth, Thomas R. 2008. CVS-EEP Protocol for Recording Vegetation Version 4.2. Retrieved: <http://cvs.bio.unc.edu/protocol/cvs-eeep-protocol-v4.2-lev1-5.pdf>.
- North Carolina Division of Mitigation Services (NCDMS). 2020. Vegetation Data Entry Tool and Vegetation Plot Data Table. Raleigh, NC. https://ncdms.shinyapps.io/Veg_Table_Tool/
- North Carolina Division of Mitigation Services (NCDMS). 2007. Catawba River Basin Restoration Priorities (RBRP). Raleigh, NC.
- NC DMS and Interagency Review Team (IRT) Technical Workgroup. 2018. Standard Measurement of the BHR Monitoring Parameter. Raleigh, NC.
- North Carolina Division of Water Quality (NCDWQ). 2011. Surface Water Classifications. <http://deq.nc.gov/about/divisions/water-resources/planning/classification-standards/classifications>
- North Carolina Geological Survey (NCGS). 2017. NCGS Publications. <https://deq.nc.gov/about/divisions/energy-mineral-land-resources/north-carolina-geological-survey/interactive-geologic-maps>
- North Carolina Geologic Survey (NCGS). 1985. Geologic Map of North Carolina: Raleigh, North Carolina Department of Natural Resources and Community Development, Geological Survey Section, scale 1:500,00, in color.
- North Carolina Interagency Review Team (NCIRT). 2016. Wilmington District Stream and Wetland Compensatory Mitigation Update. Accessed at: <https://saw-reg.usace.army.mil/PN/2016/Wilmington-District-Mitigation-Update.pdf>
- Natural Resources Conservation Service (NRCS). Web Soil Survey of Burke County. <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>
- Rosgen, D.L. 1996. Applied River Morphology. Pagosa Springs, CO: Wildland Hydrology Books
- Rosgen, D. L. 1994. A classification of natural rivers. *Catena* 22:169-199.
- Schafale, M.P. 2012. Classification of the Natural Communities of North Carolina, Fourth Approximation. North Carolina Natural Heritage Program, Raleigh, North Carolina.
- Simon, A. 1989. A model of channel response in disturbed alluvial channels. *Earth Surface Processes and Landforms* 14(1):11-26.
- US Army Corps of Engineers (USACE). 2018. Wilmington District Buffer Credit Calculator (Updated 1/19/2018).
- Wildlands Engineering, Inc. (Wildlands). 2023. Laurel Valley Mitigation Project Mitigation Plan Addendum. DMS, Raleigh, NC.
- Wildlands. 2022. Laurel Valley Mitigation Project Mitigation Plan. DMS, Raleigh, NC.



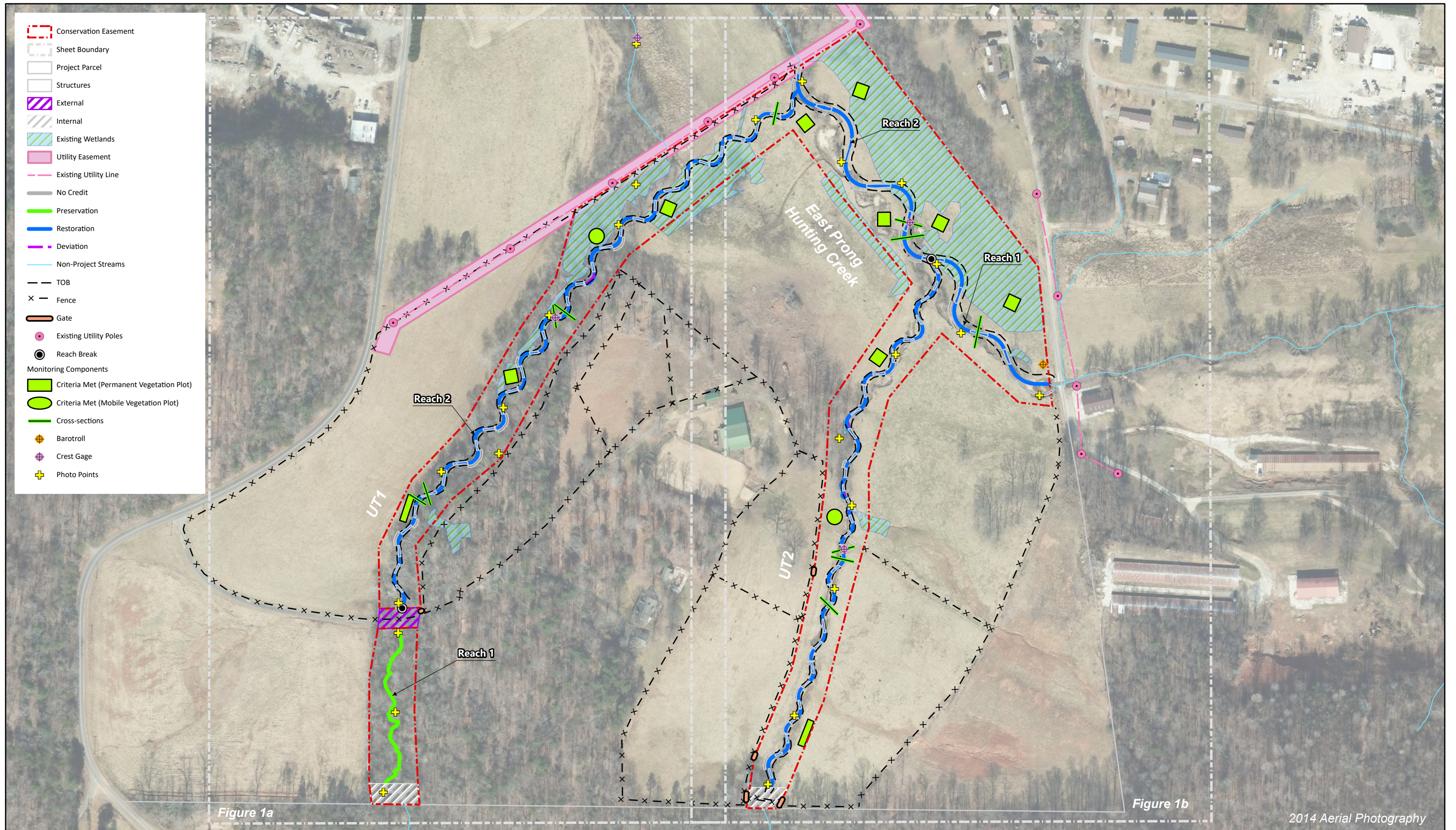


Figure 1a

Figure 1b

2014 Aerial Photography

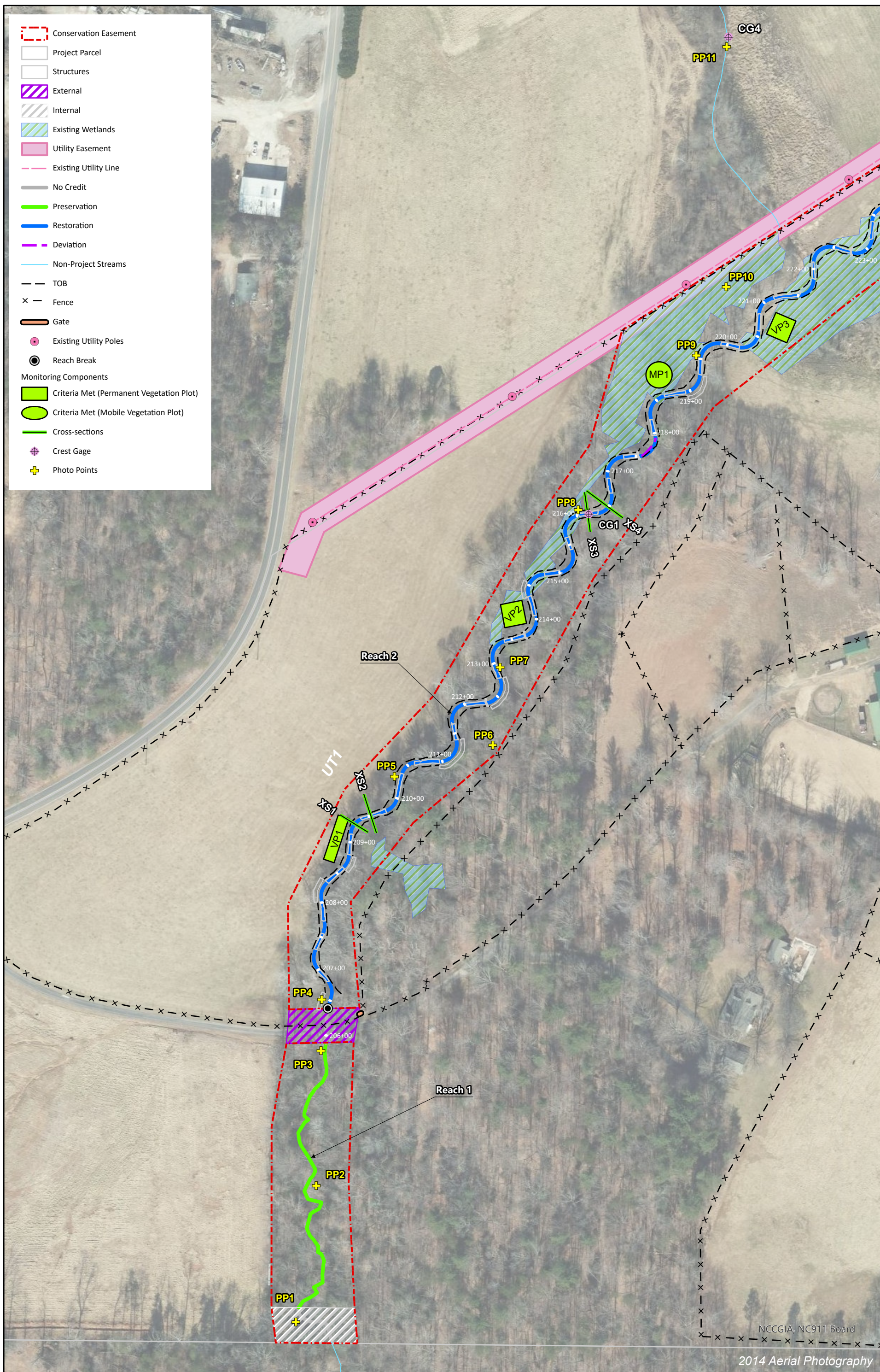
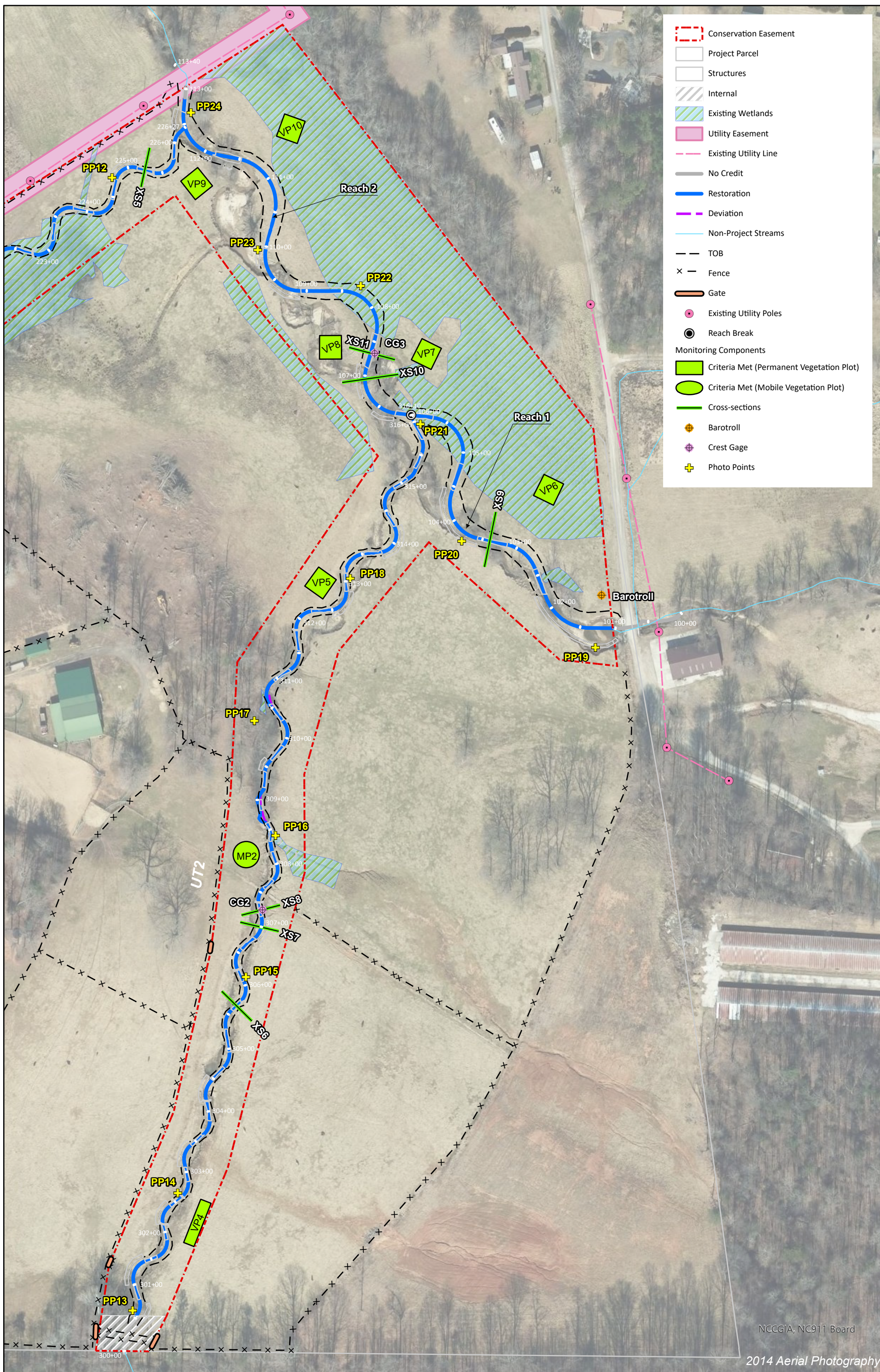


Figure 1a Current Condition Plan View
 Laurel Valley Mitigation Site
 DMS Project No. 100140
 Monitoring Year 0 - 2023
 Burke County, NC



NCCGIA, NC911 Board

2014 Aerial Photography

Figure 1b Current Condition Plan View
 Laurel Valley Mitigation Site
 DMS Project No. 100140
 Monitoring Year 0 - 2023
 Burke County, NC

Appendix A
Visual Assessment Data

Table 4a. Visual Stream Morphology Stability Assessment Table

Laurel Valley Mitigation Site
 DMS Project No. 100140
 Monitoring Year 0 - 2023

East Prong Hunting Creek Reach 1 Date Last Assessed: 2/20/2023

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	498
					Assessed Bank Length	996
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 NOT 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		NA
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%.	3	3		100%

East Prong Hunting Creek Reach 2 Date Last Assessed: 2/20/2023

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	686
					Assessed Bank Length	1,372
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 NOT 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.	4	4		100%
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%.	5	5		100%

Table 4b. Visual Stream Morphology Stability Assessment Table

Laurel Valley Mitigation Site
 DMS Project No. 100140
 Monitoring Year 0 - 2023

UT1 Reach 2 Date Last Assessed: 2/20/2023

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	1,975
					Assessed Bank Length	3,950
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 NOT 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.	21	21		100%
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%.	13	13		100%

UT2 Date Last Assessed: 2/20/2023

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	1,542
					Assessed Bank Length	3,084
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 NOT 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.	21	21		100%
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%.	13	13		100%

Table 5. Vegetation Condition Assessment Table

Laurel Valley Mitigation Site
 DMS Project No. 100140
 Monitoring Year 0 - 2023

Planted Acreage 13.09

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

Visual assessment was completed February 20 , 2023.

Easement Acreage 14.16

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	

Visual assessment was completed February 20 , 2023.

Stream Photographs
Monitoring Year 0



PP1 – view upstream—UT1 Reach 1 (2/20/2023)



PP1 – view downstream—UT1 Reach 1 (2/20/2023)



PP2 – view upstream—UT1 Reach 1 (2/20/2023)



PP2 – view downstream—UT1 Reach 1 (2/20/2023)



PP3 – view upstream—UT1 Reach 1 (2/20/2023)



PP3 – view downstream—UT1 Reach 1 (2/20/2023)



PP4 – view upstream—UT1 Reach 2 (2/20/2023)



PP4 – view downstream—UT1 Reach 2 (2/20/2023)



PP5 – view upstream—UT1 Reach 2 (2/20/2023)



PP5 – view downstream—UT1 Reach 2 (2/20/2023)



PP6 – view North—UT1 Reach 2 (2/20/2023)



PP6 – view South—UT1 Reach 2 (2/20/2023)



PP6 – view East—UT1 Reach 2 (2/20/2023)



PP6 – view West—UT1 Reach 2 (2/20/2023)



PP7 – view upstream—UT1 Reach 2 (2/20/2023)



PP7 – view downstream—UT1 Reach 2 (2/20/2023)



PP8 – view upstream—UT1 Reach 2 (2/20/2023)



PP8 – view downstream—UT1 Reach 2 (2/20/2023)



PP9 – view upstream—UT1 Reach 2 (2/20/2023)



PP9 – view downstream—UT1 Reach 2 (2/20/2023)



PP10 – view North—UT1 Reach 2 (2/20/2023)



PP10 – view South—UT1 Reach 2 (2/20/2023)



PP10 – view East—UT1 Reach 2 (2/20/2023)



PP10 – view West—UT1 Reach 2 (2/20/2023)



PP11 – view upstream—Downstream of project (2/20/2023)



PP11 – view downstream—Downstream of project (2/20/2023)



PP12 – view upstream—UT1 Reach 2 (2/20/2023)



PP12 – view downstream—UT1 Reach 2 (2/20/2023)



PP13 – view upstream—UT2 (2/20/2023)



PP13 – view downstream—UT2 (2/20/2023)



PP14 – view upstream—UT2 (2/20/2023)



PP14 – view downstream—UT2 (2/20/2023)



PP15 – view upstream—UT2 (2/20/2023)



PP15 – view downstream—UT2 (2/20/2023)



PP16 – view upstream—UT2 (2/20/2023)



PP16 – view upstream of wetland—UT2 (2/20/2023)



PP16 – view downstream—UT2 (2/20/2023)



PP17 – view North—UT2 (2/20/2023)



PP17 – view South— UT2 (2/20/2023)



PP17 – view East—UT2 (2/20/2023)



PP17 – view West— UT2 (2/20/2023)



PP18 – view upstream—UT2 (2/20/2023)



PP18 – view downstream—UT2 (2/20/2023)



PP19 – view upstream—E. Prong Hunting CRK R1 (2/20/2023)



PP19 – view downstream— E. Prong Hunting CRK R1 (2/20/2023)



PP20 – view upstream—E. Prong Hunting CRK R1 (2/20/2023)



PP20 – view downstream—E. Prong Hunting CRK R1 (2/20/2023)



PP21 – view upstream—E. Prong Hunting CRK R1 (2/20/2023)



PP21 – view downstream—E. Prong Hunting CRK R2 (2/20/2023)



PP21 – view upstream—UT2 (2/20/2023)



PP22 – view upstream—E. Prong Hunting CRK R2 (2/20/2023)



PP22 – view downstream—E. Prong Hunting CRK R2 (2/20/2023)



PP23 – view upstream—E. Prong Hunting CRK R2 (2/20/2023)



PP23 – view downstream—E. Prong Hunting CRK R2 (2/20/2023)



PP24 – view upstream—E. Prong Hunting CRK R2 (2/20/2023)



PP24 – view downstream—E. Prong Hunting CRK R2 (2/20/2023)

Vegetation Plot Photographs
Monitoring Year 0



Permanent Vegetation Plot 1 (1/19/2023)



Permanent Vegetation Plot 2 (1/19/2023)



Permanent Vegetation Plot 3 (1/19/2023)



Permanent Vegetation Plot 4 (1/19/2023)



Permanent Vegetation Plot 5 (1/19/2023)



Permanent Vegetation Plot 6 (1/19/2023)



Permanent Vegetation Plot 7 (1/19/2023)



Permanent Vegetation Plot 8 (1/19/2023)



Permanent Vegetation Plot 9 (1/19/2023)



Permanent Vegetation Plot 10 (1/19/2023)



Mobile Vegetation Plot 1 (1/19/2023)



Mobile Vegetation Plot 2 (1/19/2023)

Appendix B
Vegetation Plot Data

Table 6. Vegetation Plot Data

Laurel Valley Mitigation Site
DMS Project No. 100140
Monitoring Year 0 - 2023

Planted Acreage	13
Date of Initial Plant	2023-01-10
Date(s) of Supplemental Plant(s)	NA
Date(s) Mowing	NA
Date of Current Survey	2023-01-19
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/Shrub	Indicator Status	Veg Plot 1 F		Veg Plot 2 F		Veg Plot 3 F		Veg Plot 4 F		Veg Plot 5 F		Veg Plot 6 F	
					Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	<i>Alnus serrulata</i>	hazel alder	Tree	OBL					1	1					1	1
	<i>Amelanchier canadensis</i>	Canadian serviceberry	Tree	FAC	1	1										
	<i>Betula nigra</i>	river birch	Tree	FACW	2	2	2	2	1	1	1	1			1	1
	<i>Calycanthus floridus</i>	eastern sweetshrub	Shrub	FACU	1	1					1	1				
	<i>Carya cordiformis</i>	bitternut hickory	Tree	FACU	1	1					2	2	2	2		
	<i>Celtis laevigata</i>	sugarberry	Tree	FACW			3	3	2	2					1	1
	<i>Cephalanthus occidentalis</i>	common buttonbush	Shrub	OBL					1	1					1	1
	<i>Cornus amomum</i>	silky dogwood	Shrub	FACW			1	1								
	<i>Cornus florida</i>	flowering dogwood	Tree	FACU	1	1					1	1				
	<i>Euonymus americanus</i>	bursting-heart	Shrub	FAC	1	1							1	1		
	<i>Fagus grandifolia</i>	American beech	Tree	FACU	1	1					1	1	2	2		
	<i>Hamamelis virginiana</i>	American witchhazel	Tree	FACU	1	1					1	1				
	<i>Lindera benzoin</i>	northern spicebush	Tree	FAC			1	1	1	1	1	1	1	1		
	<i>Morus rubra</i>	red mulberry	Tree	FACU							1	1	2	2		
	<i>Oxydendrum arboreum</i>	sourwood	Shrub	UPL	2	2					2	2				
	<i>Platanus occidentalis</i>	American sycamore	Tree	FACW	3	3	3	3	1	1	3	3	3	3	3	3
	<i>Quercus alba</i>	white oak	Tree	FACU	1	1					1	1	2	2		
	<i>Quercus rubra</i>	northern red oak	Tree	FACU	2	2					1	1	1	1		
<i>Salix nigra</i>	black willow	Tree	OBL			3	3	2	2					3	3	
<i>Salix sericea</i>	silky willow	Shrub	OBL			1	1	1	1					1	1	
<i>Sambucus canadensis</i>	American black elderberry	Tree						1	1	1	1			1	1	
<i>Ulmus americana</i>	American elm	Tree	FACW			2	2	4	4					3	3	
<i>Ulmus rubra</i>	slippery elm	Tree	FAC			1	1					2	2	2	2	
Sum	Performance Standard				18	18	17	17	15	15	18	18	16	16	15	15
Mitigation Plan Performance Standard	Current Year Stem Count					18		17		15		18		16		15
	Stems/Acre					729		688		607		729		648		607
	Species Count					13		9		10		13		9		9
	Dominant Species Composition (%)					17		18		27		17		19		20
	Average Plot Height (ft.)					1		1		1		1		1		1
	% Invasives					0		0		0		0		0		0
Post Mitigation Plan Performance Standard	Current Year Stem Count					18		17		15		18		16		15
	Stems/Acre					729		688		607		729		648		607
	Species Count					13		9		10		13		9		9
	Dominant Species Composition (%)					17		18		27		17		19		20
	Average Plot Height (ft.)					1		1		1		1		1		1
	% 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.
4). Species listed as a "shrub" are not subject to height requirements.

Table 6. Vegetation Plot Data

Laurel Valley Mitigation Site

DMS Project No. 100140

Monitoring Year 0 - 2023

Planted Acreage	13
Date of Initial Plant	2023-01-10
Date(s) of Supplemental Plant(s)	NA
Date(s) Mowing	NA
Date of Current Survey	2023-01-19
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/Shrub	Indicator Status	Veg Plot 7 F		Veg Plot 8 F		Veg Plot 9 F		Veg Plot 10 F		Veg Plot 1 R	Veg Plot 2 R
					Planted	Total	Planted	Total	Planted	Total	Planted	Total	Total	Total
Species Included in Approved Mitigation Plan	<i>Alnus serrulata</i>	hazel alder	Tree	OBL	1	1	1	1					1	
	<i>Amelanchier canadensis</i>	Canadian serviceberry	Tree	FAC										
	<i>Betula nigra</i>	river birch	Tree	FACW	2	2	1	1						
	<i>Calycanthus floridus</i>	eastern sweetshrub	Shrub	FACU										
	<i>Carya cordiformis</i>	bitternut hickory	Tree	FACU										4
	<i>Celtis laevigata</i>	sugarberry	Tree	FACW	2	2	2	2	3	3	3	3		
	<i>Cephalanthus occidentalis</i>	common buttonbush	Shrub	OBL	1	1	1	1	1	1	1	1	1	
	<i>Cornus amomum</i>	silky dogwood	Shrub	FACW	2	2	1	1	1	1	2	2		
	<i>Cornus florida</i>	flowering dogwood	Tree	FACU										
	<i>Euonymus americanus</i>	bursting-heart	Shrub	FAC										
	<i>Fagus grandifolia</i>	American beech	Tree	FACU										1
	<i>Hamamelis virginiana</i>	American witchhazel	Tree	FACU										1
	<i>Lindera benzoin</i>	northern spicebush	Tree	FAC	1	1							2	
	<i>Morus rubra</i>	red mulberry	Tree	FACU										
	<i>Oxydendrum arboreum</i>	sourwood	Shrub	UPL										
	<i>Platanus occidentalis</i>	American sycamore	Tree	FACW	1	1	4	4	3	3	3	3	4	4
	<i>Quercus alba</i>	white oak	Tree	FACU										
	<i>Quercus rubra</i>	northern red oak	Tree	FACU										2
<i>Salix nigra</i>	black willow	Tree	OBL	3	3	3	3	3	3	3	3			
<i>Salix sericea</i>	silky willow	Shrub	OBL	1	1							1		
<i>Sambucus canadensis</i>	American black elderberry	Tree		1	1								2	
<i>Ulmus americana</i>	American elm	Tree	FACW	1	1	4	4	4	4	4	4	4	1	
<i>Ulmus rubra</i>	slippery elm	Tree	FAC											
Sum	Performance Standard				16	16	17	17	15	15	16	16	13	15
Mitigation Plan Performance Standard	Current Year Stem Count					16		17		15		16	13	15
	Stems/Acre					648		688		607		648	526	607
	Species Count					11		8		6		6	6	7
	Dominant Species Composition (%)					19		24		27		25	31	27
	Average Plot Height (ft.)					1		1		1		1	1	0
	% Invasives					0		0		0		0	0	0
Post Mitigation Plan Performance Standard	Current Year Stem Count					16		17		15		16	13	15
	Stems/Acre					648		688		607		648	526	607
	Species Count					11		8		6		6	6	7
	Dominant Species Composition (%)					19		24		27		25	31	27
	Average Plot Height (ft.)					1		1		1		1	1	0
	% 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.

4). Species listed as a "shrub" are not subject to height requirements.

Table 7. Vegetation Plot Data

Laurel Valley Mitigation Site

DMS Project No. 100140

Monitoring Year 0 - 2023

Vegetation Performance Standards Summary Table												
	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	729	1	13	0	688	1	9	0	607	1	10	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	729	1	13	0	648	1	9	0	607	1	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	648	1	11	0	688	1	8	0	607	1	6	0
	Veg Plot 10 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	1	6	0	526	1	6	0	607	0	7	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

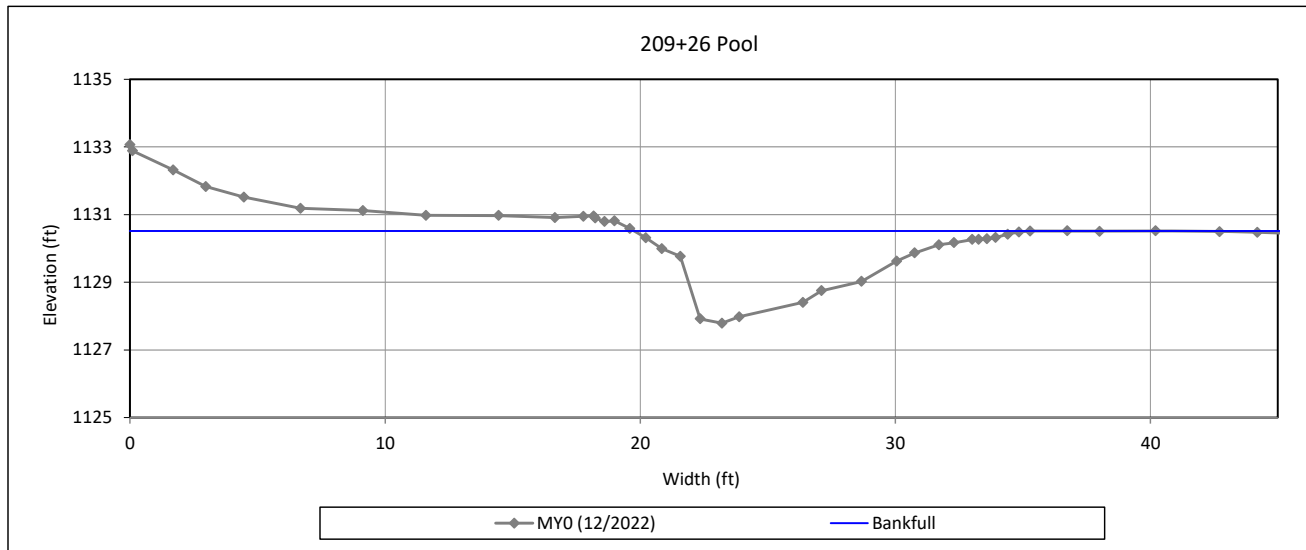
Cross-Section Plots

Laurel Valley Mitigation Site

DMS Project No. 100140

Monitoring Year 0 - 2023

Cross-Section 1-UT1 Reach 2



Bankfull Dimensions

19.2	x-section area (ft.sq.)
15.5	width (ft)
1.2	mean depth (ft)
2.7	max depth (ft)
17.3	wetted perimeter (ft)
1.1	hydraulic radius (ft)
12.5	width-depth ratio

Survey Date: 11/2022

Field Crew: Kee Mapping & Surveying



View Downstream

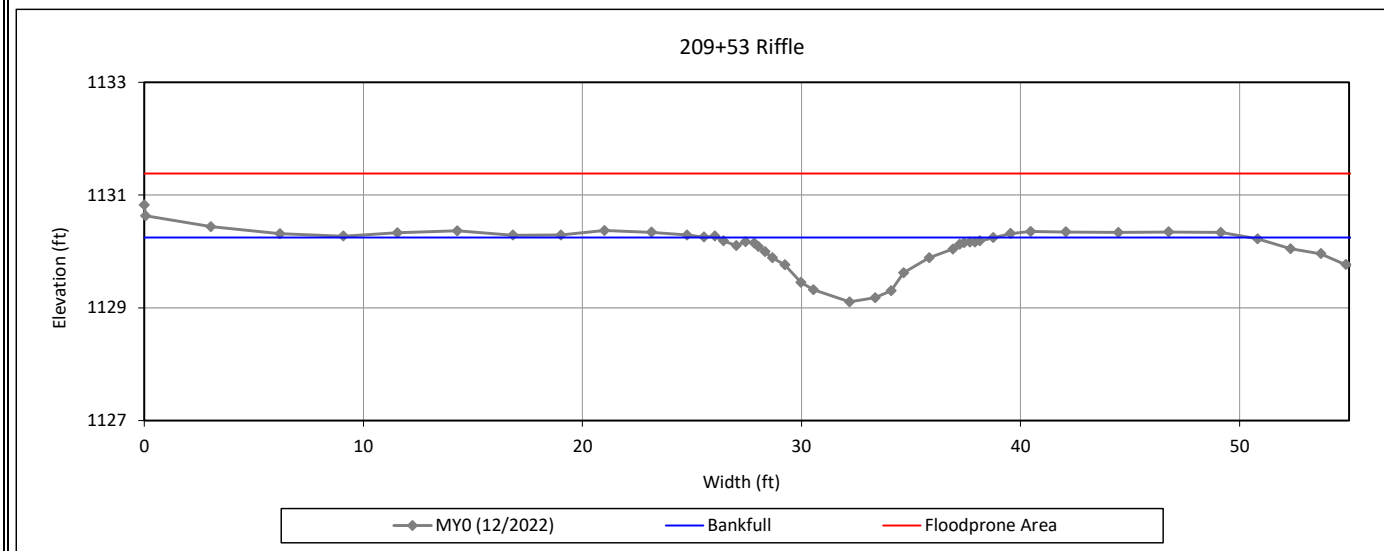
Cross-Section Plots

Laurel Valley Mitigation Site

DMS Project No. 100140

Monitoring Year 0 - 2023

Cross-Section 2-UT1 Reach 2



Bankfull Dimensions

6.7	x-section area (ft.sq.)
12.6	width (ft)
0.5	mean depth (ft)
1.1	max depth (ft)
12.9	wetted perimeter (ft)
0.5	hydraulic radius (ft)
23.6	width-depth ratio
57.6	W flood prone area (ft)
4.6	entrenchment ratio
1.0	low bank height ratio

Survey Date: 11/2022

Field Crew: Kee Mapping & Surveying



View Downstream

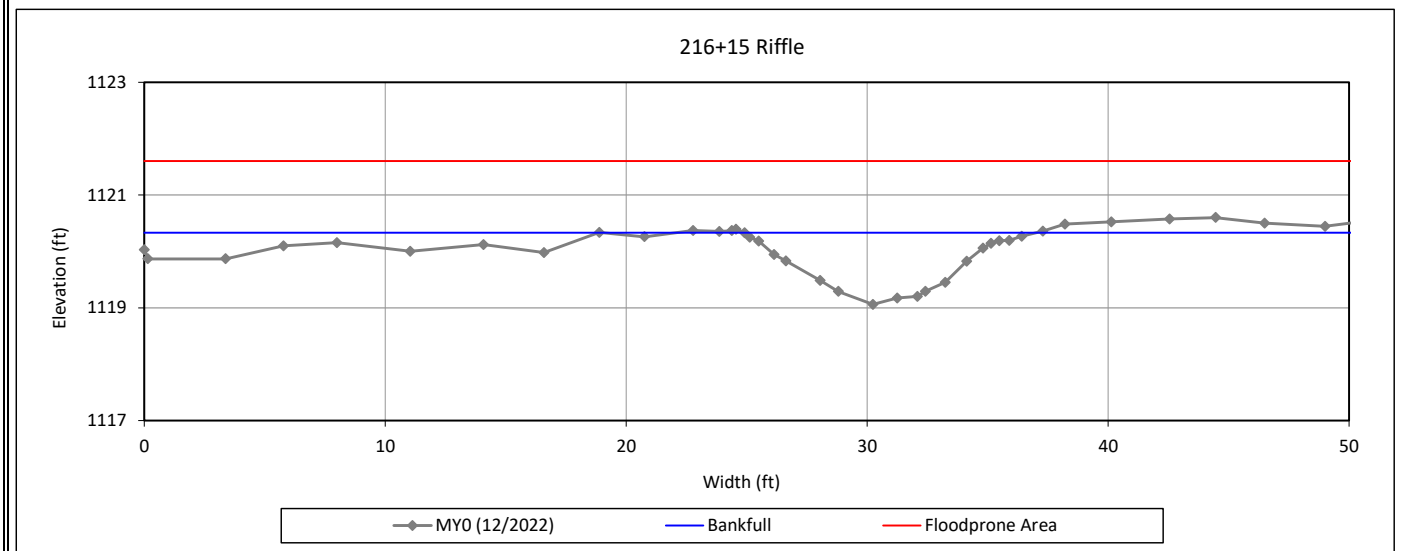
Cross-Section Plots

Laurel Valley Mitigation Site

DMS Project No. 100140

Monitoring Year 0 - 2023

Cross-Section 3-UT1 Reach 2



Bankfull Dimensions

8.2	x-section area (ft.sq.)
12.1	width (ft)
0.7	mean depth (ft)
1.3	max depth (ft)
12.4	wetted perimeter (ft)
0.7	hydraulic radius (ft)
17.8	width-depth ratio
56.4	W flood prone area (ft)
4.7	entrenchment ratio
1.0	low bank height ratio

Survey Date: 11/2022

Field Crew: Kee Mapping & Surveying



View Downstream

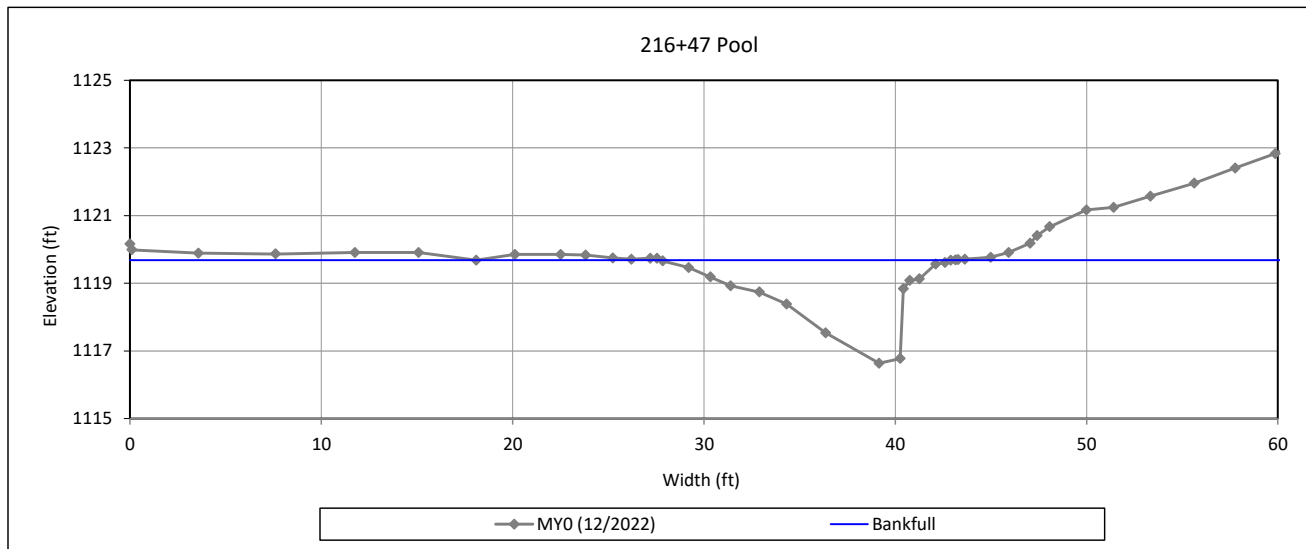
Cross-Section Plots

Laurel Valley Mitigation Site

DMS Project No. 100140

Monitoring Year 0 - 2023

Cross-Section 4-UT1 Reach 2



Bankfull Dimensions

19.4	x-section area (ft.sq.)
15.1	width (ft)
1.3	mean depth (ft)
3.1	max depth (ft)
17.7	wetted perimeter (ft)
1.1	hydraulic radius (ft)
11.8	width-depth ratio

Survey Date: 11/2022

Field Crew: Kee Mapping & Surveying



View Downstream

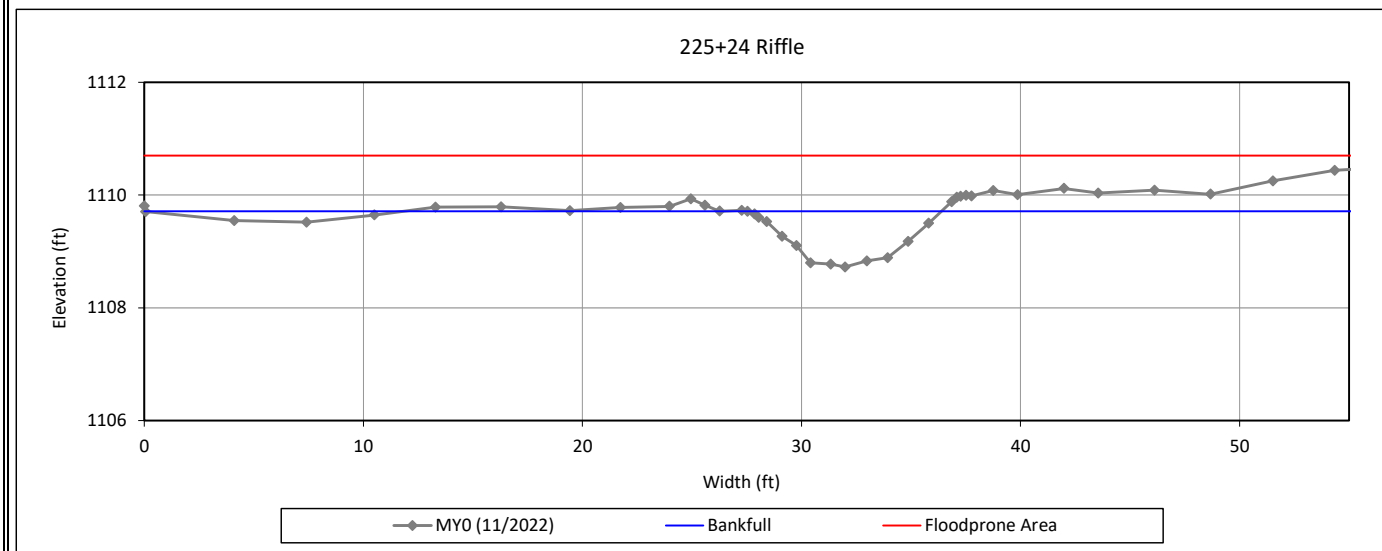
Cross-Section Plots

Laurel Valley Mitigation Site

DMS Project No. 100140

Monitoring Year 0 - 2023

Cross-Section 5-UT1 Reach 2



Bankfull Dimensions

5.4	x-section area (ft.sq.)
8.9	width (ft)
0.6	mean depth (ft)
1.0	max depth (ft)
9.2	wetted perimeter (ft)
0.6	hydraulic radius (ft)
14.5	width-depth ratio
56.5	W flood prone area (ft)
6.4	entrenchment ratio
1.0	low bank height ratio

Survey Date: 11/2022

Field Crew: Kee Mapping & Surveying



View Downstream

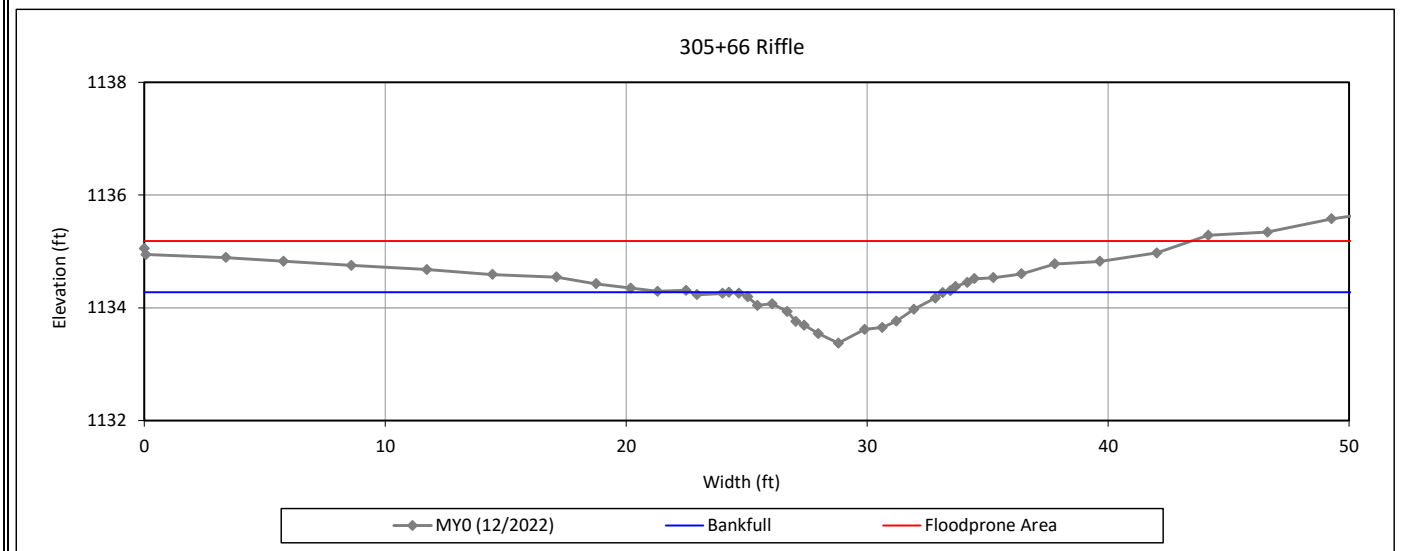
Cross-Section Plots

Laurel Valley Mitigation Site

DMS Project No. 100140

Monitoring Year 0 - 2023

Cross-Section 6-UT2



Bankfull Dimensions

3.9	x-section area (ft.sq.)
9.0	width (ft)
0.4	mean depth (ft)
0.9	max depth (ft)
9.2	wetted perimeter (ft)
0.4	hydraulic radius (ft)
20.3	width-depth ratio
43.4	W flood prone area (ft)
4.8	entrenchment ratio
1.0	low bank height ratio

Survey Date: 11/2022

Field Crew: Kee Mapping & Surveying



View Downstream

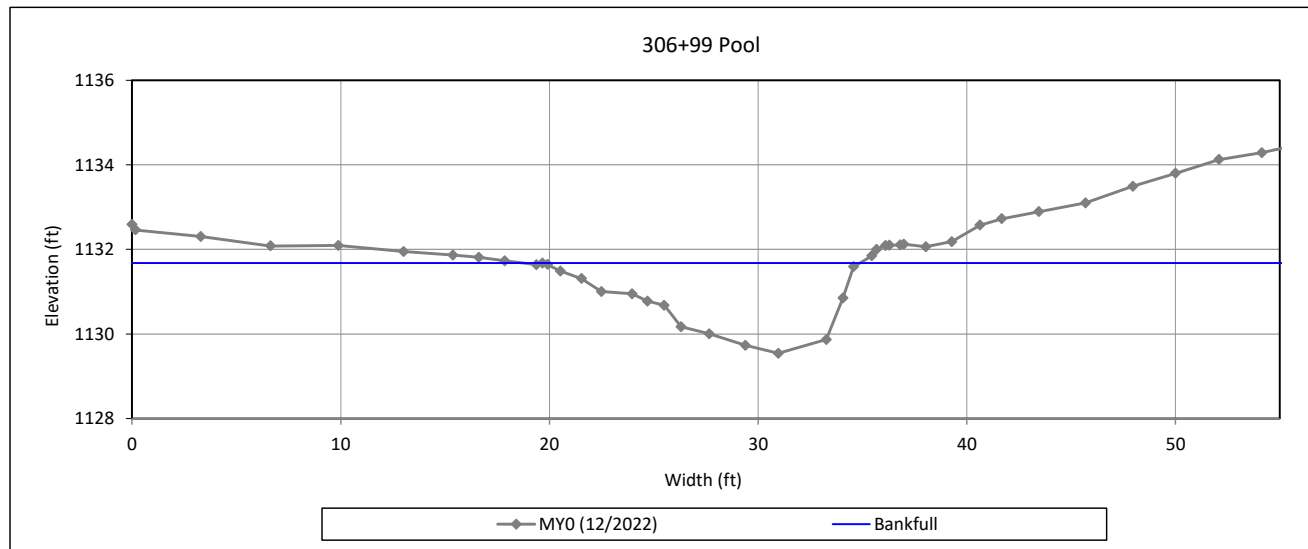
Cross-Section Plots

Laurel Valley Mitigation Site

DMS Project No. 100140

Monitoring Year 0 - 2023

Cross-Section 7-UT2



Bankfull Dimensions

18.6	x-section area (ft.sq.)
15.2	width (ft)
1.2	mean depth (ft)
2.1	max depth (ft)
16.4	wetted perimeter (ft)
1.1	hydraulic radius (ft)
12.4	width-depth ratio

Survey Date: 11/2022

Field Crew: Kee Mapping & Surveying



View Downstream

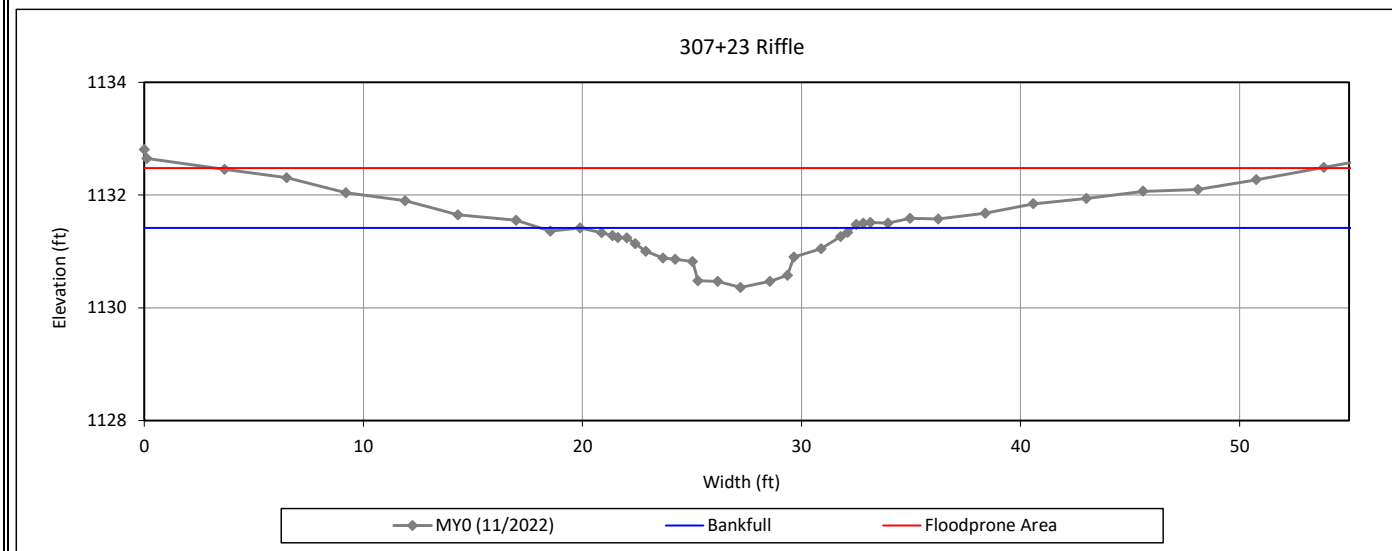
Cross-Section Plots

Laurel Valley Mitigation Site

DMS Project No. 100140

Monitoring Year 0 - 2023

Cross-Section 8-UT2



Bankfull Dimensions

6.8	x-section area (ft.sq.)
12.4	width (ft)
0.5	mean depth (ft)
1.1	max depth (ft)
12.9	wetted perimeter (ft)
0.5	hydraulic radius (ft)
22.8	width-depth ratio
50.4	W flood prone area (ft)
4.1	entrenchment ratio
1.0	low bank height ratio

Survey Date: 11/2022

Field Crew: Kee Mapping & Surveying



View Downstream

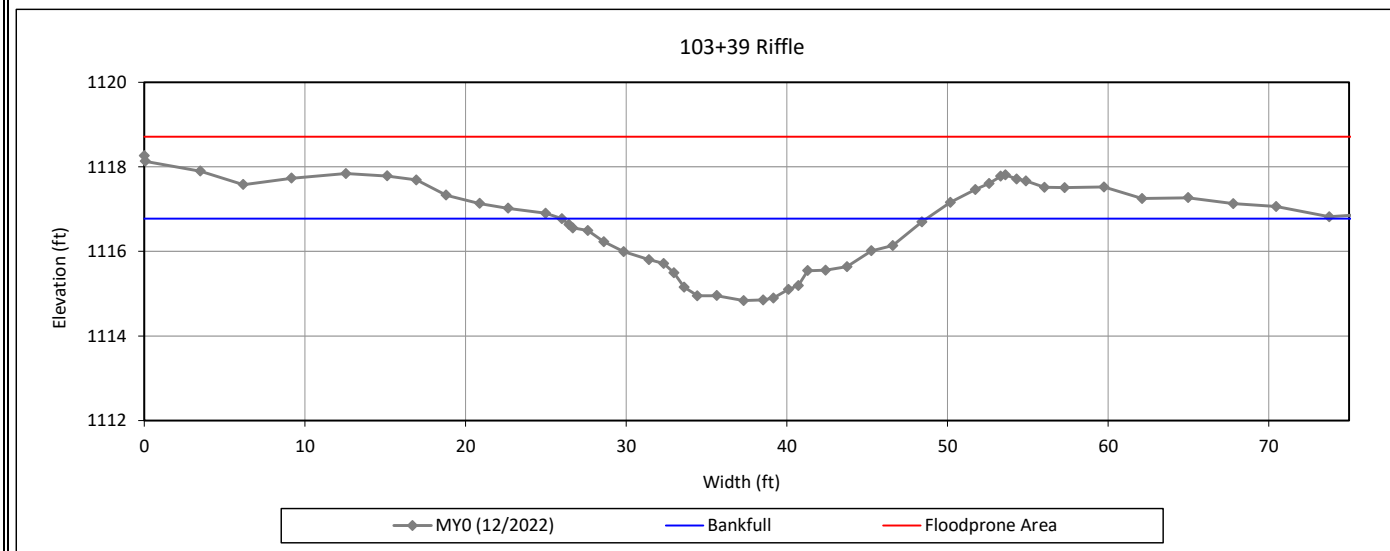
Cross-Section Plots

Laurel Valley Mitigation Site

DMS Project No. 100140

Monitoring Year 0 - 2023

Cross-Section 9-East Prong Hunting Creek Reach 1



Bankfull Dimensions

25.2	x-section area (ft.sq.)
22.7	width (ft)
1.1	mean depth (ft)
1.9	max depth (ft)
23.2	wetted perimeter (ft)
1.1	hydraulic radius (ft)
20.4	width-depth ratio
79.2	W flood prone area (ft)
3.5	entrenchment ratio
1.0	low bank height ratio

Survey Date: 11/2022

Field Crew: Kee Mapping & Surveying



View Downstream

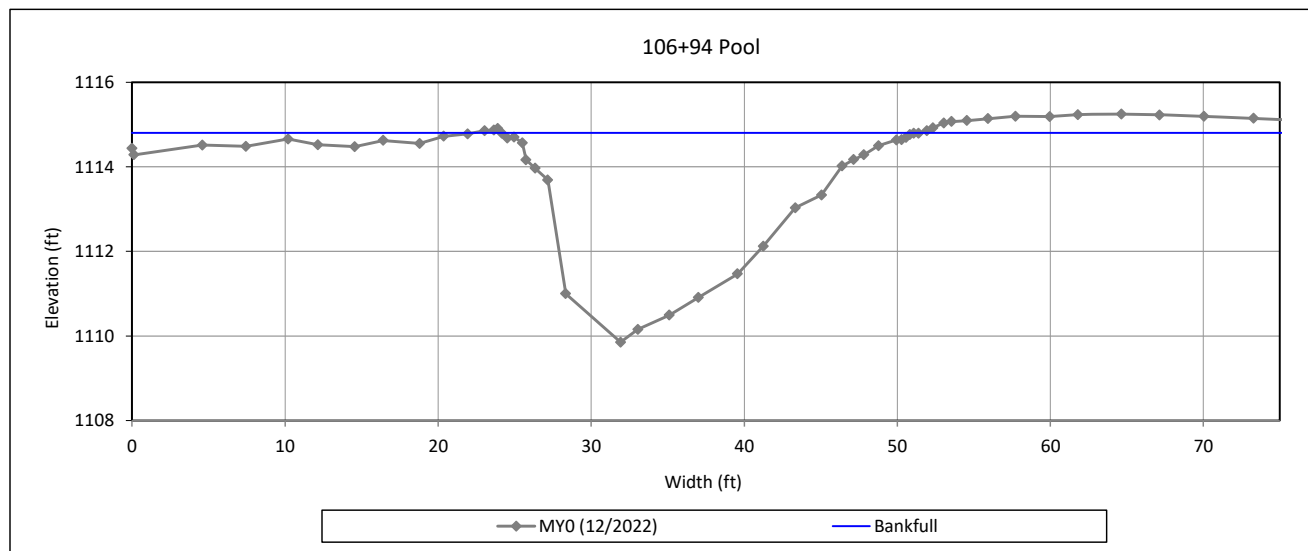
Cross-Section Plots

Laurel Valley Mitigation Site

DMS Project No. 100140

Monitoring Year 0 - 2023

Cross-Section 10-East Prong Hunting Creek Reach 2



Bankfull Dimensions

67.3	x-section area (ft.sq.)
27.2	width (ft)
2.5	mean depth (ft)
4.9	max depth (ft)
30.3	wetted perimeter (ft)
2.2	hydraulic radius (ft)
11.0	width-depth ratio

Survey Date: 11/2022

Field Crew: Kee Mapping & Surveying



View Downstream

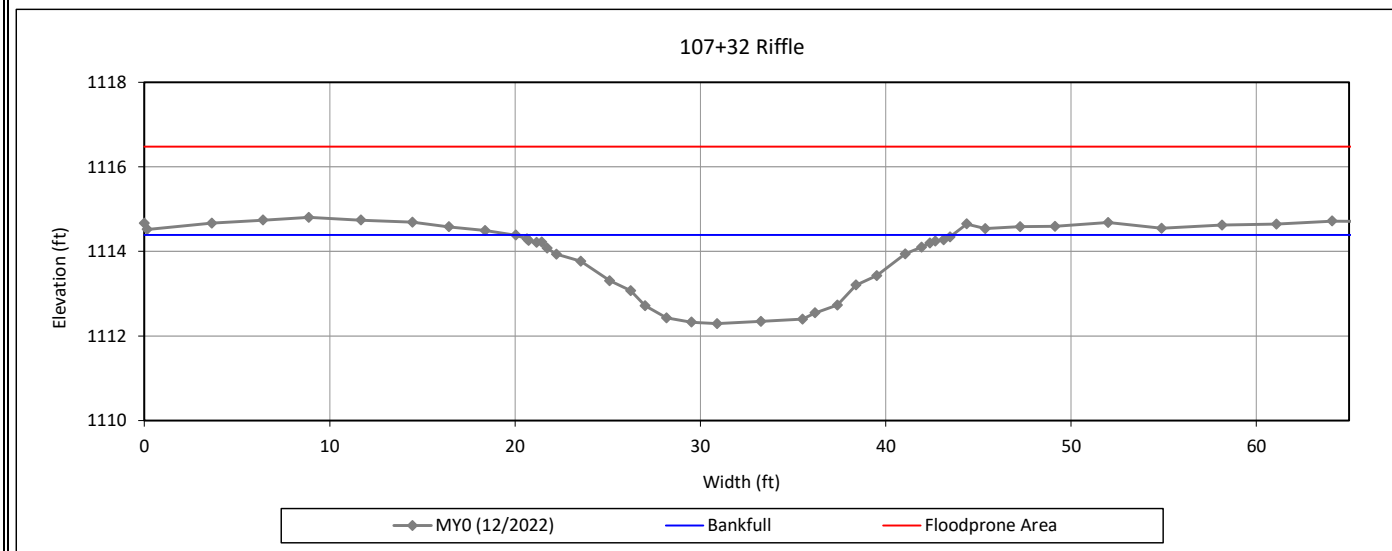
Cross-Section Plots

Laurel Valley Mitigation Site

DMS Project No. 100140

Monitoring Year 0 - 2023

Cross-Section 11-East Prong Hunting Creek Reach 2



Bankfull Dimensions

29.7	x-section area (ft.sq.)
23.6	width (ft)
1.3	mean depth (ft)
2.1	max depth (ft)
24.1	wetted perimeter (ft)
1.2	hydraulic radius (ft)
18.7	width-depth ratio
66.9	W flood prone area (ft)
2.8	entrenchment ratio
1.0	low bank height ratio

Survey Date: 11/2022

Field Crew: Kee Mapping & Surveying



View Downstream

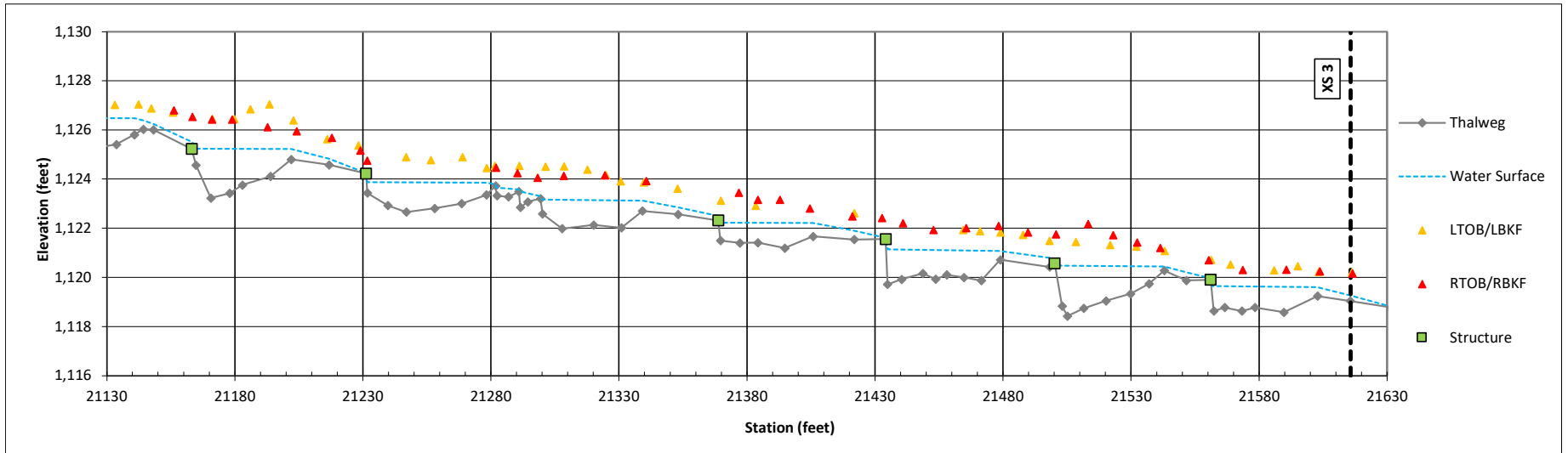
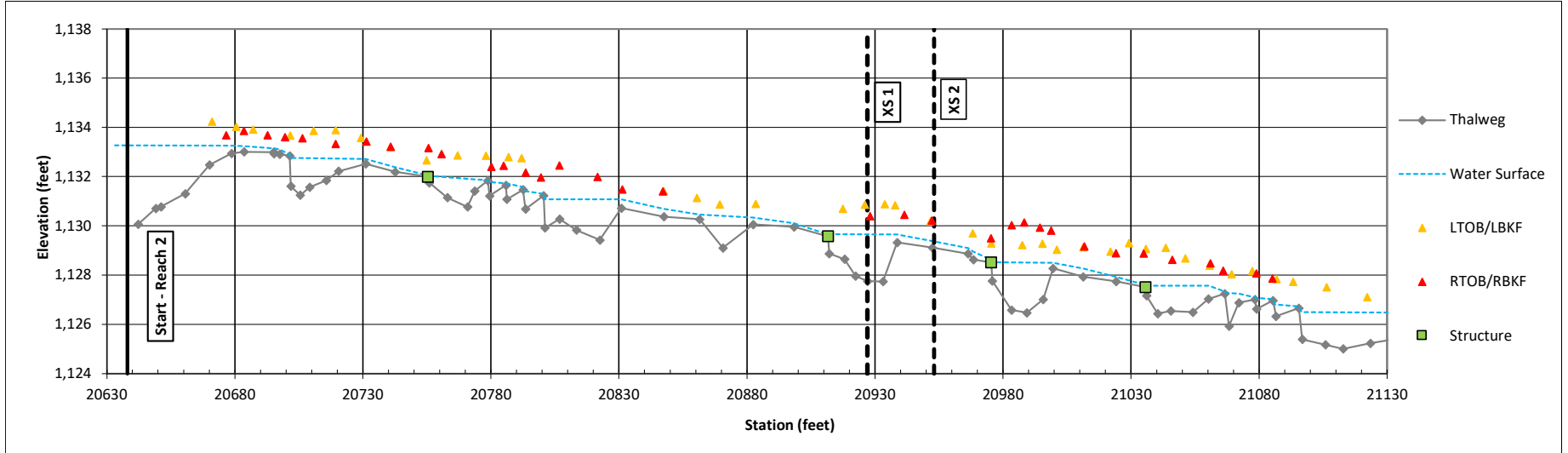
Longitudinal Profile Plots

Laurel Valley Mitigation Site

DMS Project No. 100140

Monitoring Year 0 - 2023

UT1 Reach 2 (STA 206+38 to 226+27)



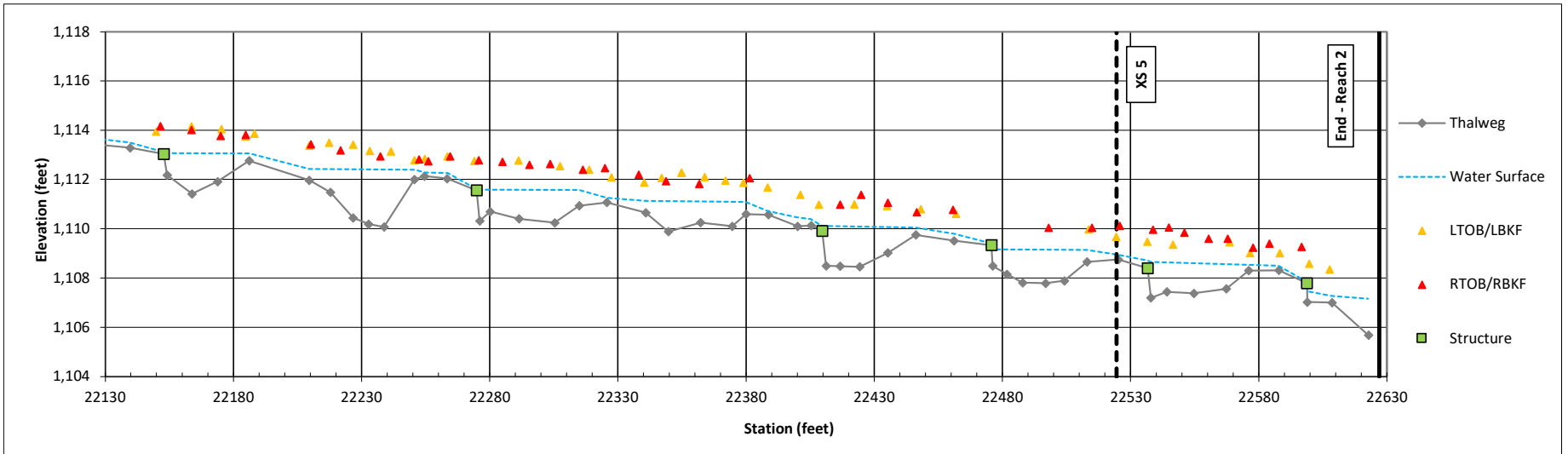
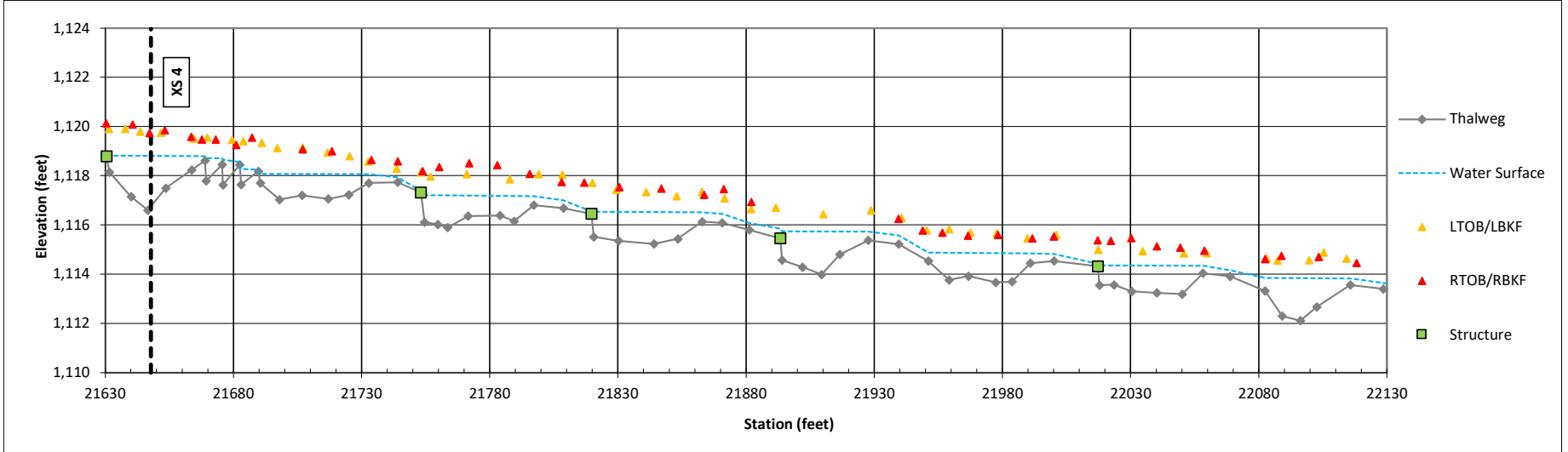
Longitudinal Profile Plots

Laurel Valley Mitigation Site

DMS Project No. 100140

Monitoring Year 0 - 2023

UT1 Reach 2 (STA 206+38 to 226+27)



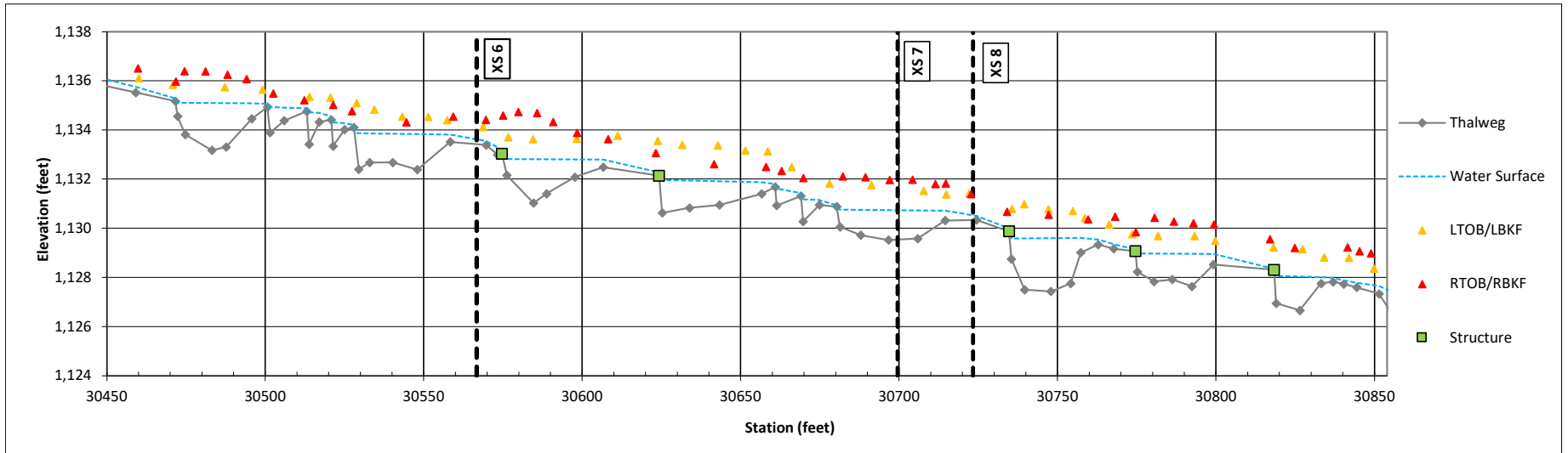
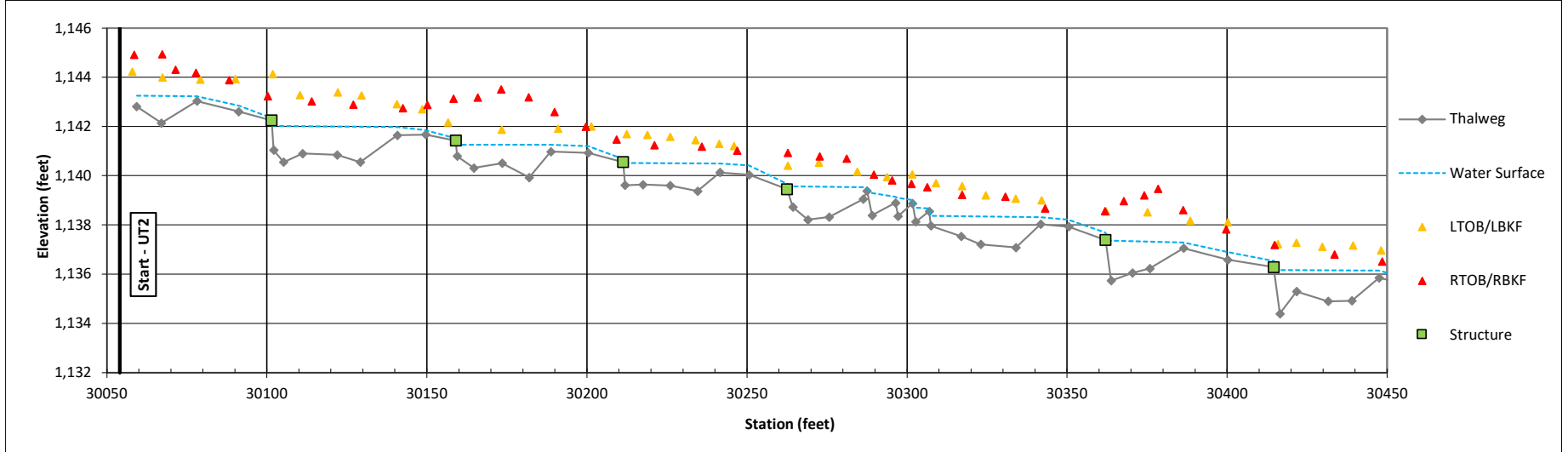
Longitudinal Profile Plots

Laurel Valley Mitigation Site

DMS Project No. 100140

Monitoring Year 0 - 2023

UT2 (STA 300+54 to 316+10)



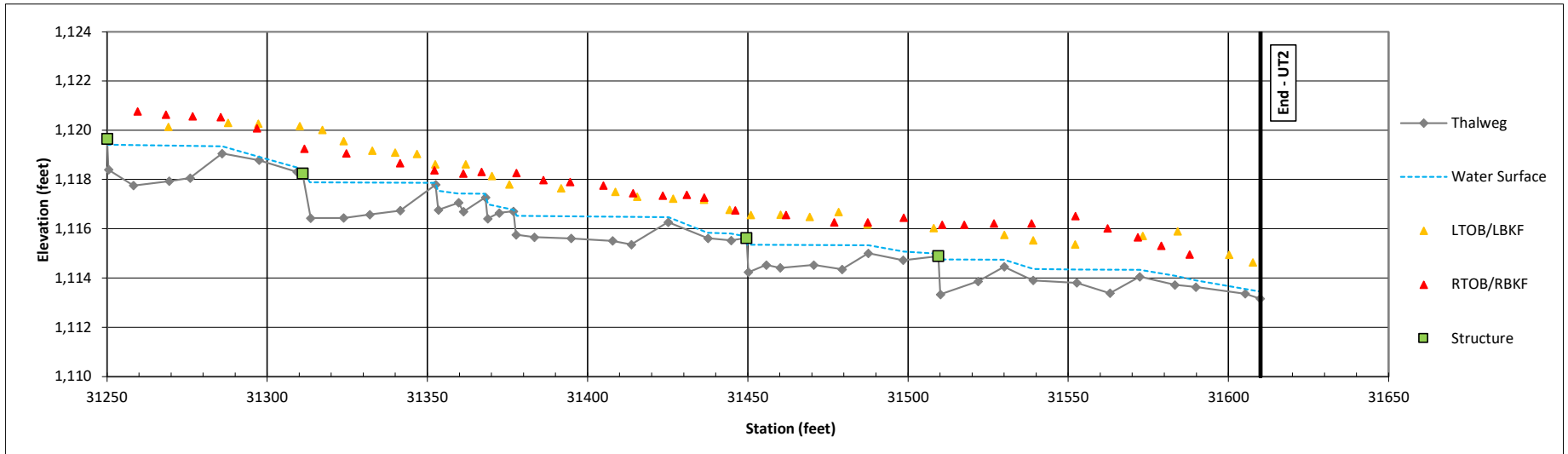
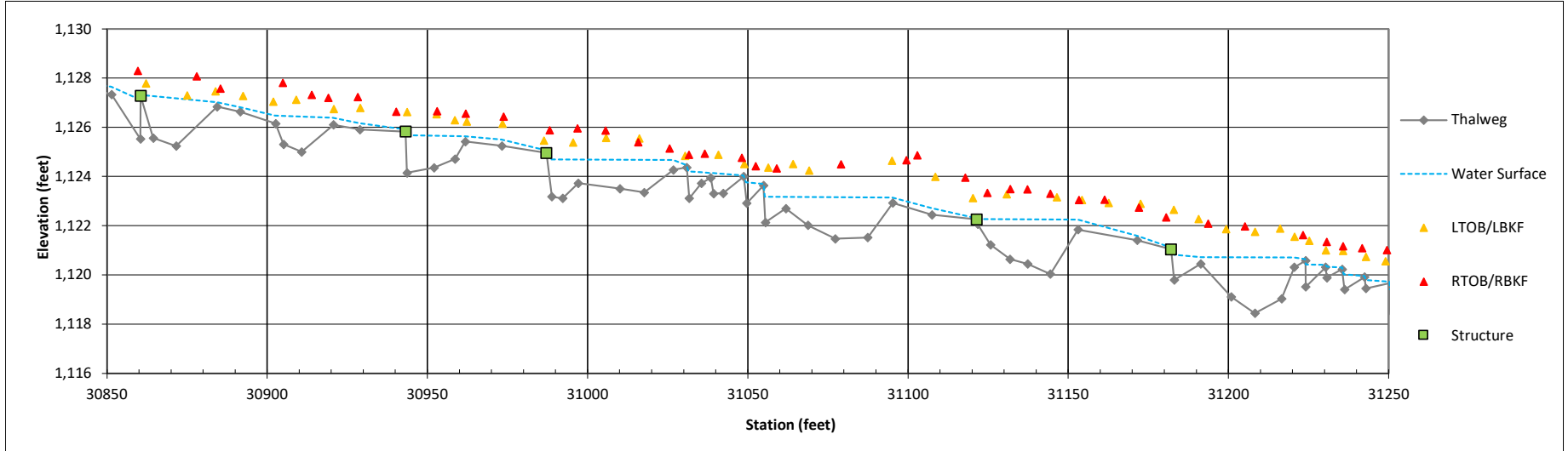
Longitudinal Profile Plots

Laurel Valley Mitigation Site

DMS Project No. 100140

Monitoring Year 0 - 2023

UT2 (STA 300+54 to 316+10)



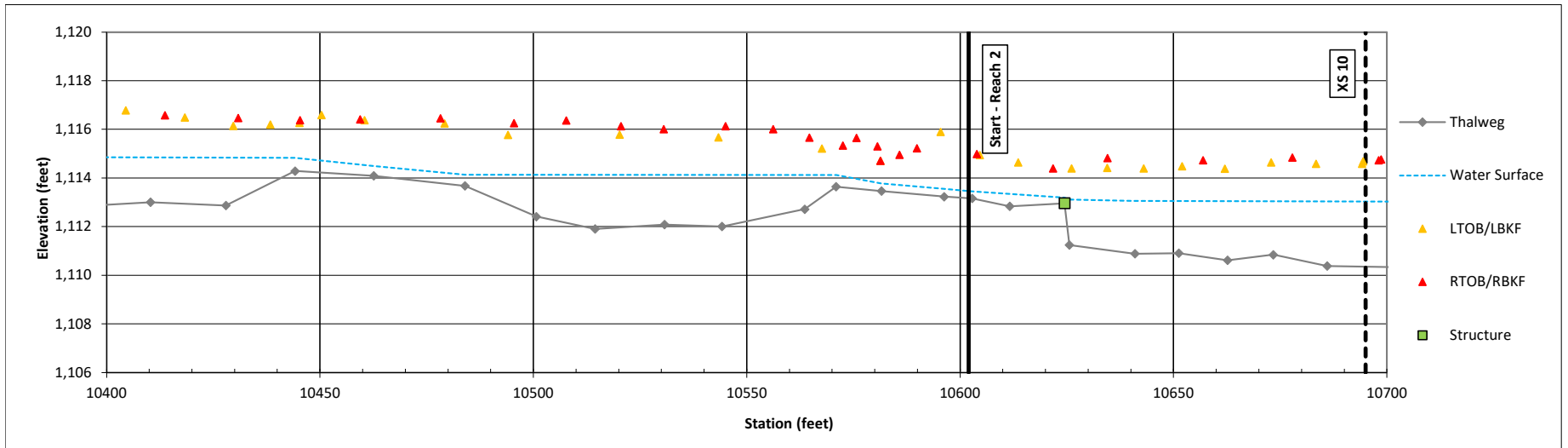
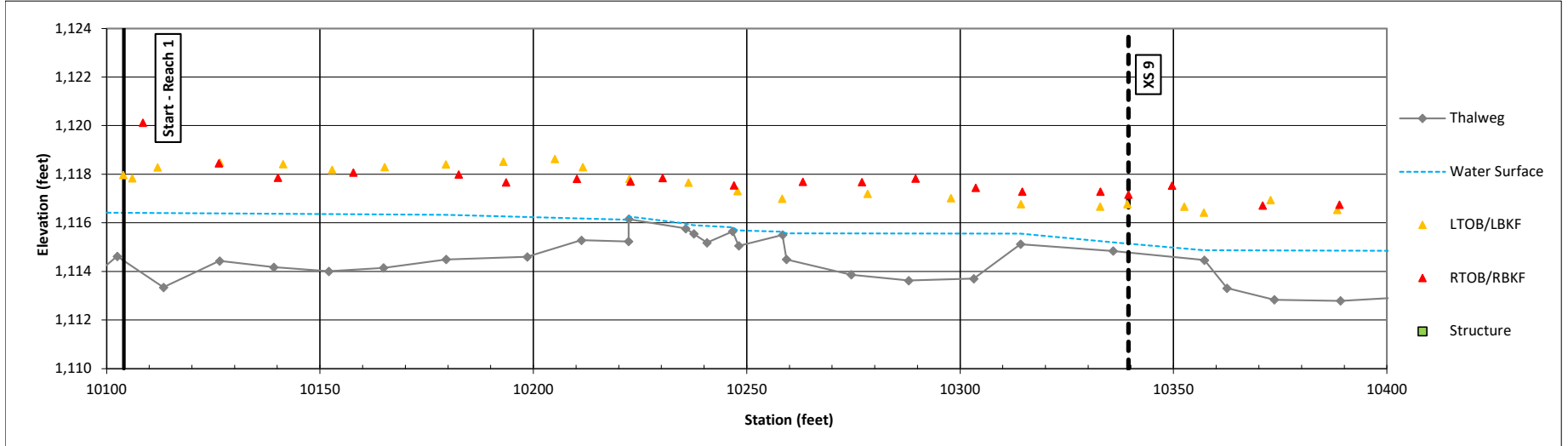
Longitudinal Profile Plots

Laurel Valley Mitigation Site

DMS Project No. 100140

Monitoring Year 0 - 2023

East Prong Hunting Creek (STA 101+04 to 112+88)



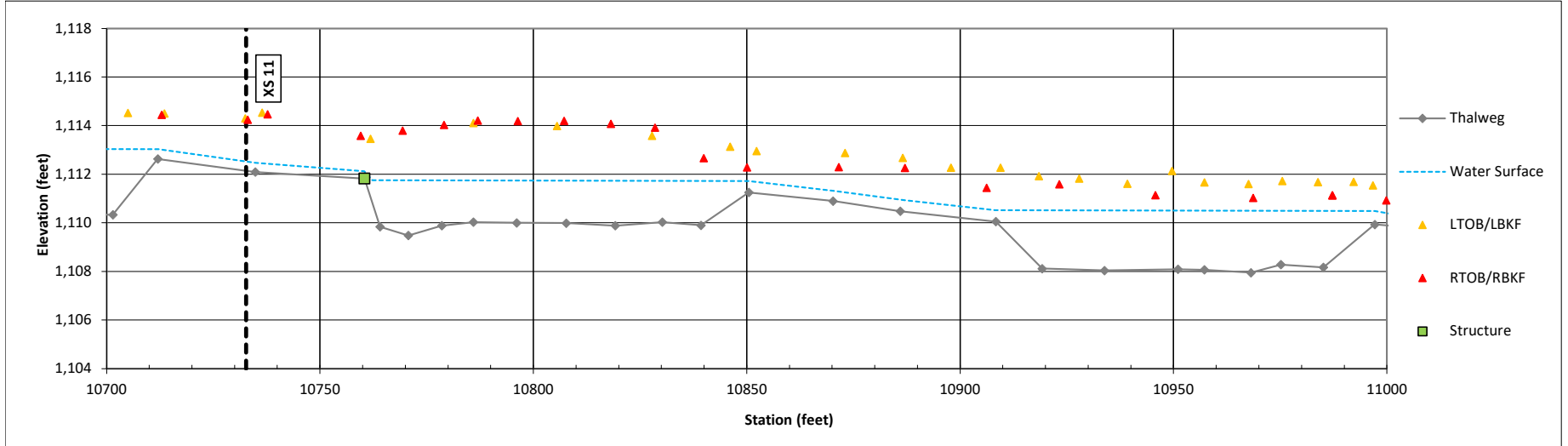
Longitudinal Profile Plots

Laurel Valley Mitigation Site

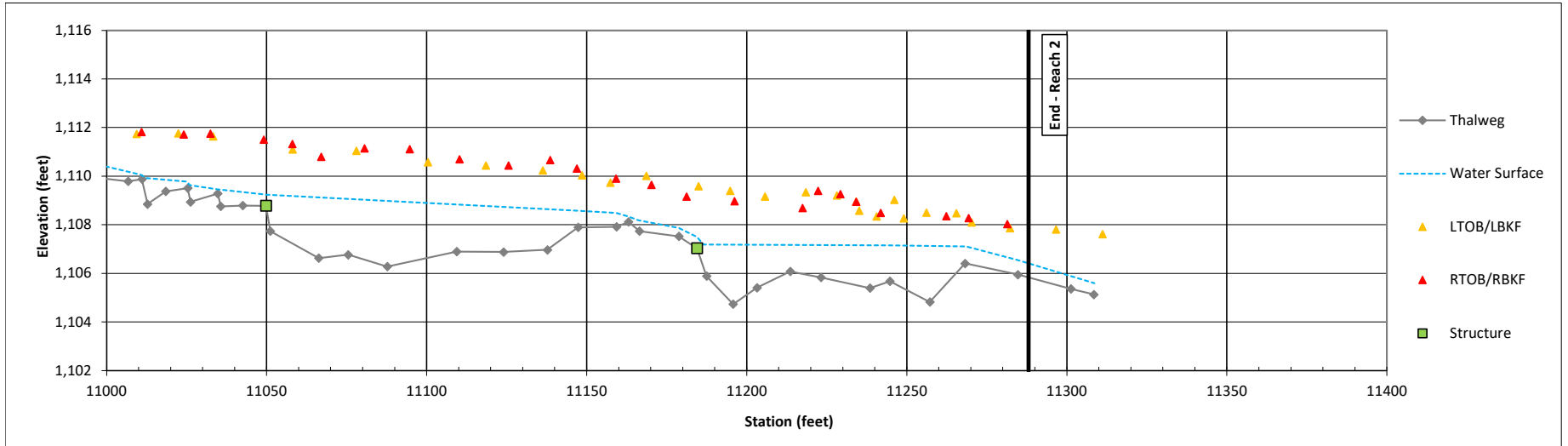
DMS Project No. 100140

Monitoring Year 0 - 2023

East Prong Hunting Creek (STA 101+04 to 112+88)



Survey Date 11/2022



Survey Date 11/2022

Table 8a. Baseline Stream Data Summary

Laurel Valley Mitigation Site

DMS Project No. 100140

Monitoring Year 0 - 2023

	PRE-EXISTING CONDITIONS		DESIGN		MONITORING BASELINE (MY0)		
Parameter	East Prong Hunting Creek Reach 1						
Riffle Only	Min	Max	Min	Max	Min	Max	n
Bankfull Width (ft)	20.1 - 23.5		24.5		22.7		1
Floodprone Width (ft)	225.0		54.0	123.0	79.2		1
Bankfull Mean Depth	1.3 - 1.5		1.3		1.1		1
Bankfull Max Depth	2.3		1.6	2.0	1.9		1
Bankfull Cross Sectional Area (ft ²)	29.1 - 30.8		33.0		25.2		1
Width/Depth Ratio	13.8 - 18.0		18.0		20.4		1
Entrenchment Ratio	2.0 - 4.1		2.2	5.0	3.5		1
Bank Height Ratio	1.6 - 2.0		1.0 - 1.1		1.0		1
Max part size (mm) mobilized at bankfull	0.95		> 2.0		--		
Rosgen Classification	C5/B5c		C4		C		
Bankfull Discharge (cfs)	116-129		116.0		71.4		
Sinuosity	1.2		1.2		1.2		
Water Surface Slope (ft/ft)	0.0074		0.0060		0.0058		
Other	--		--		--		
Parameter	East Prong Hunting Creek Reach 2						
Riffle Only	Min	Max	Min	Max	Min	Max	n
Bankfull Width (ft)	20.1 - 23.5		24.5		23.6		1
Floodprone Width (ft)	46.0		54.0	123.0	66.9		1
Bankfull Mean Depth	1.3 - 1.5		2.0		1.3		1
Bankfull Max Depth	2.0		1.6	2.0	2.1		1
Bankfull Cross Sectional Area (ft ²)	29.1 - 30.8		33.0		29.7		1
Width/Depth Ratio	13.8 - 18.0		18.0		18.7		1
Entrenchment Ratio	2.0 - 4.1		2.2	5.0	2.8		1
Bank Height Ratio	1.6 - 2.0		1.0 - 1.1		1.0		1
Max part size (mm) mobilized at bankfull	0.95		> 2.0		--		
Rosgen Classification	C5/B5c		C4		C		
Bankfull Discharge (cfs)	116-129		129.0		108.2		
Sinuosity	1.2		1.2		1.2		
Water Surface Slope (ft/ft)	0.0074		0.0090		0.0096		
Other	--		--		--		

Note: Entrenchment Ratio for the baseline/monitoring parameters are based on the width of the cross-section, in lieu of assuming the width across the floodplain.

(--): Data was not provided, N/A: Not Applicable

Table 8b. Baseline Stream Data Summary

Laurel Valley Mitigation Site

DMS Project No. 100140

Monitoring Year 0 - 2023

	PRE-EXISTING CONDITIONS		DESIGN		MONITORING BASELINE (MY0)		
Parameter	UT1 Reach 2						
Riffle Only	Min	Max	Min	Max	Min	Max	n
Bankfull Width (ft)	7.3	11.4	11.0		8.9	12.6	3
Floodprone Width (ft)	8.0	22.0	24.0	55.0	56.4	57.6	3
Bankfull Mean Depth	0.8	1.1	0.7		0.5	0.7	3
Bankfull Max Depth	1.2	1.3	0.9	1.1	1.0	1.3	3
Bankfull Cross Sectional Area (ft ²)	7.4	8.8	8.0		5.4	8.2	3
Width/Depth Ratio	6.7	14.3	15.0		14.5	23.6	3
Entrenchment Ratio	1.1	2.0	2.2	5.0	4.6	6.4	3
Bank Height Ratio	1.6	1.9	1.0 - 1.1		1.0		3
Max part size (mm) mobilized at bankfull	0.77		> 2.0		--		
Rosgen Classification	B5c/ G5c		C4		C		
Bankfull Discharge (cfs)	22.0-25.4		29.0		22.9-34.9		
Sinuosity	1.2		1.2		1.2		
Water Surface Slope (ft/ft)	0.0088		0.0140		0.0130		
Other	--		--		--		
Parameter	UT2						
Riffle Only	Min	Max	Min	Max	Min	Max	n
Bankfull Width (ft)	7.6	14.5	11.0		9.0	12.4	2
Floodprone Width (ft)	23.5		24.0	55.0	43.4	50.4	2
Bankfull Mean Depth	0.8	0.9	1.0		0.4	0.5	2
Bankfull Max Depth	1.3	1.6	0.9	1.1	0.9	1.1	2
Bankfull Cross Sectional Area (ft ²)	6.9	8.4	8.0		3.9	6.8	2
Width/Depth Ratio	8.4	18.7	15.0		20.3	22.8	2
Entrenchment Ratio	1.3 - 3.1		2.2	5.0	4.1	4.8	2
Bank Height Ratio	1.3	1.6	1.0 - 1.1		1.0		2
Max part size (mm) mobilized at bankfull	3.80		> 2.0		--		
Rosgen Classification	B4c		C4		C		
Bankfull Discharge (cfs)	28.3-29.9		33.0		20.5-35.2		
Sinuosity	1.2		1.2		1.2		
Water Surface Slope (ft/ft)	0.0180		0.0185		0.0193		
Other	--		--		--		

Note: Entrenchment Ratio for the baseline/monitoring parameters are based on the width of the cross-section, in lieu of assuming the width across the floodplain.

(--): Data was not provided, N/A: Not Applicable

Table 9. Cross-Section Morphology Monitoring Summary

Laurel Valley Mitigation Site

DMS Project No. 100140

Monitoring Year 0 - 2023

	UT1 Reach 2																							
	Cross-Section 1 (Pool)						Cross-Section 2 (Riffle)						Cross-Section 3 (Riffle)						Cross-Section 4 (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	1130.5						1130.2						1120.3						1119.7					
Bank Height Ratio - Based on AB Bankfull ¹ Area	---						1.0						1.0						---					
Thalweg Elevation	1127.8						1129.1						1119.1						1116.6					
LTOB ² Elevation	1130.5						1130.2						1120.3						1119.7					
LTOB ² Max Depth (ft)	2.7						1.1						1.3						3.1					
LTOB ² Cross Sectional Area (ft ²)	19.2						6.7						8.2						19.4					
	UT1 Reach 2						UT2																	
	Cross-Section 5 (Riffle)						Cross-Section 6 (Riffle)						Cross-Section 7 (Pool)						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	1109.7						1134.3						1131.7						1131.4					
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.0						1.0						---						1.0					
Thalweg Elevation	1108.7						1133.4						1129.5						1130.4					
LTOB ² Elevation	1109.7						1134.3						1131.7						1131.4					
LTOB ² Max Depth (ft)	1.0						0.9						2.1						1.1					
LTOB ² Cross Sectional Area (ft ²)	5.4						3.9						18.6						6.8					
	East Prong Hunting Creek Reach 1						East Prong Hunting Creek Reach 2																	
	Cross-Section 9 (Riffle)						Cross-Section 10 (Pool)						Cross-Section 11 (Riffle)											
	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	1116.8						1114.8						1114.4											
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.0						---						1.0											
Thalweg Elevation	1114.8						1109.9						1112.3											
LTOB ² Elevation	1116.8						1114.8						1114.4											
LTOB ² Max Depth (ft)	1.9						4.9						2.1											
LTOB ² Cross Sectional Area (ft ²)	25.2						67.3						29.7											

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 recoded and tracked above as LTOB max depth.

Appendix D

Project Timeline and Contact Information

Table 10. Project Activity and Reporting History

Laurel Valley Mitigation Site
 DMS Project No. 100140
Monitoring Year 0 - 2022

Activity or Deliverable		Data Collection Complete	Task Completion or Deliverable Submission
Project Instituted		NA	November 2019
Mitigation Plan Approved		NA	March 2022
Construction (Grading) Completed		NA	October 2022
Planting Completed		NA	March 2023
As-Built Survey Completed		October 2022	January 2023
Baseline Monitoring Document (Year 0)	Stream Survey	November 2022	May 2023
	Vegetation Survey	January 2023	
Year 1 Monitoring	Stream Survey	2023	December 2023
	Vegetation Survey	2023	
Year 2 Monitoring	Stream Survey	2024	December 2024
	Vegetation Survey	2024	
Year 3 Monitoring	Stream Survey	2025	December 2025
	Vegetation Survey	2025	
Year 4 Monitoring			
Year 5 Monitoring	Stream Survey	2027	December 2027
	Vegetation Survey	2027	
Year 6 Monitoring			
Year 7 Monitoring	Stream Survey	2029	December 2029
	Vegetation Survey	2029	

Table 11. Project Contact Table

Laurel Valley Mitigation Site
 DMS Project No. 100140
Monitoring Year 0 - 2022

Designer Eric Neuhaus, PE	Wildlands Engineering, Inc. 167-B Haywood Rd Asheville, NC 28806 828.774.5547
Construction Contractor	Wildlands Construction, Inc. 1430 S. Mint St., Suite 104 Charlotte, NC 28203
Planting Contractor	Bruton Natural Systems, Inc. PO Box 1197 Fremont, NC 27830
Monitoring Performers Monitoring, POC	Wildlands Engineering, Inc. Kristi Suggs 704.332.7754

Appendix E

Record Drawings and Sealed As-Built Survey

Laurel Valley Mitigation Site Record Drawing

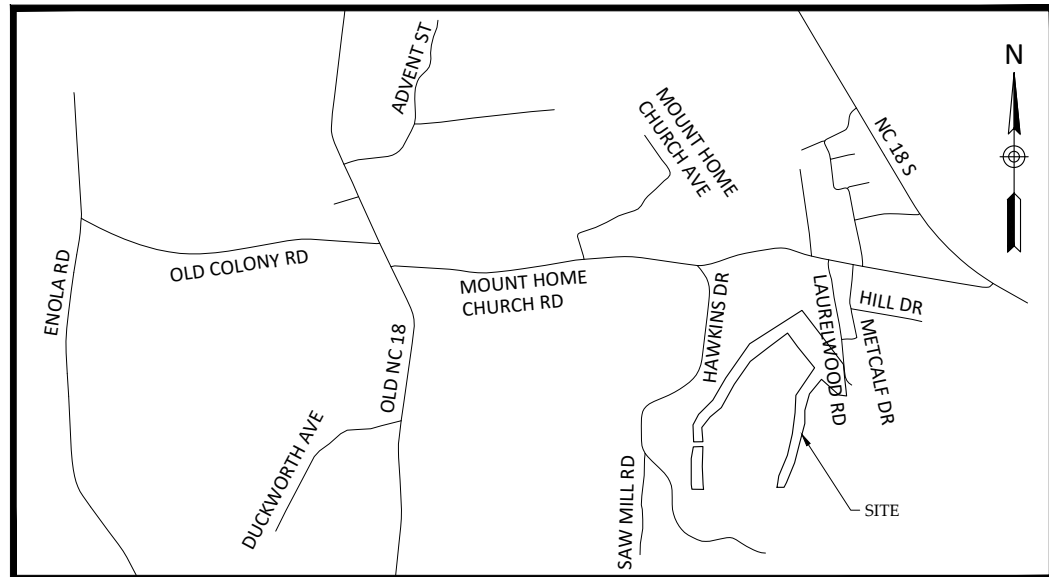
Record Drawing

Burke County, North Carolina

Catawba River Basin 03050101

for
NCDEQ

Division of Mitigation Services



Vicinity Map
Not to Scale



**RECORD DRAWINGS
ISSUED: APRIL 4, 2023**

Stream Origins

Stream	Latitude	Longitude
EAST PRONG HUNTING CREEK	N35° 42' 08.00"	W81° 38' 29.62"
UT1	N35° 41' 57.58"	W81° 38' 48.12"
UT2	N35° 41' 57.72"	W81° 38' 37.66"

Sheet Index

Title Sheet	0.1
Project Overview	0.2
General Notes and Symbols	0.3
Stream Plan and Profile	
East Prong Hunting Creek	1.1.1 - 1.1.3
UT1	1.2.1 - 1.2.6
UT2	1.3.1 - 1.3.4
Planting Plan	
Planting Tables	2.1
Planting Plan	2.2 - 2.5
Fencing Plan	3.0

Project Directory

Engineering:
Wildlands Engineering, Inc
License No. F-0831
167-B Haywood Rd
Asheville, NC 28806
Eric Neuhaus, Project Engineer

Owner:
NCDEQ
1652 Mail Service Center
Raleigh, NC 27699
Harry Tsomides
(828) 545-7057

Surveying:
Kee Mapping and Surveying, PA
P.O. Box 2566
Asheville, NC 28802
Phillip B. Kee, PLS
828-575-9021

DMS Project No. 100140
NCDEQ Contract No. 7575-02

USACE Action ID
No. SAW-2020-00053
NC DWR No. 20200018

Laurel Valley Mitigation Site Record Drawing
Burke County, North Carolina

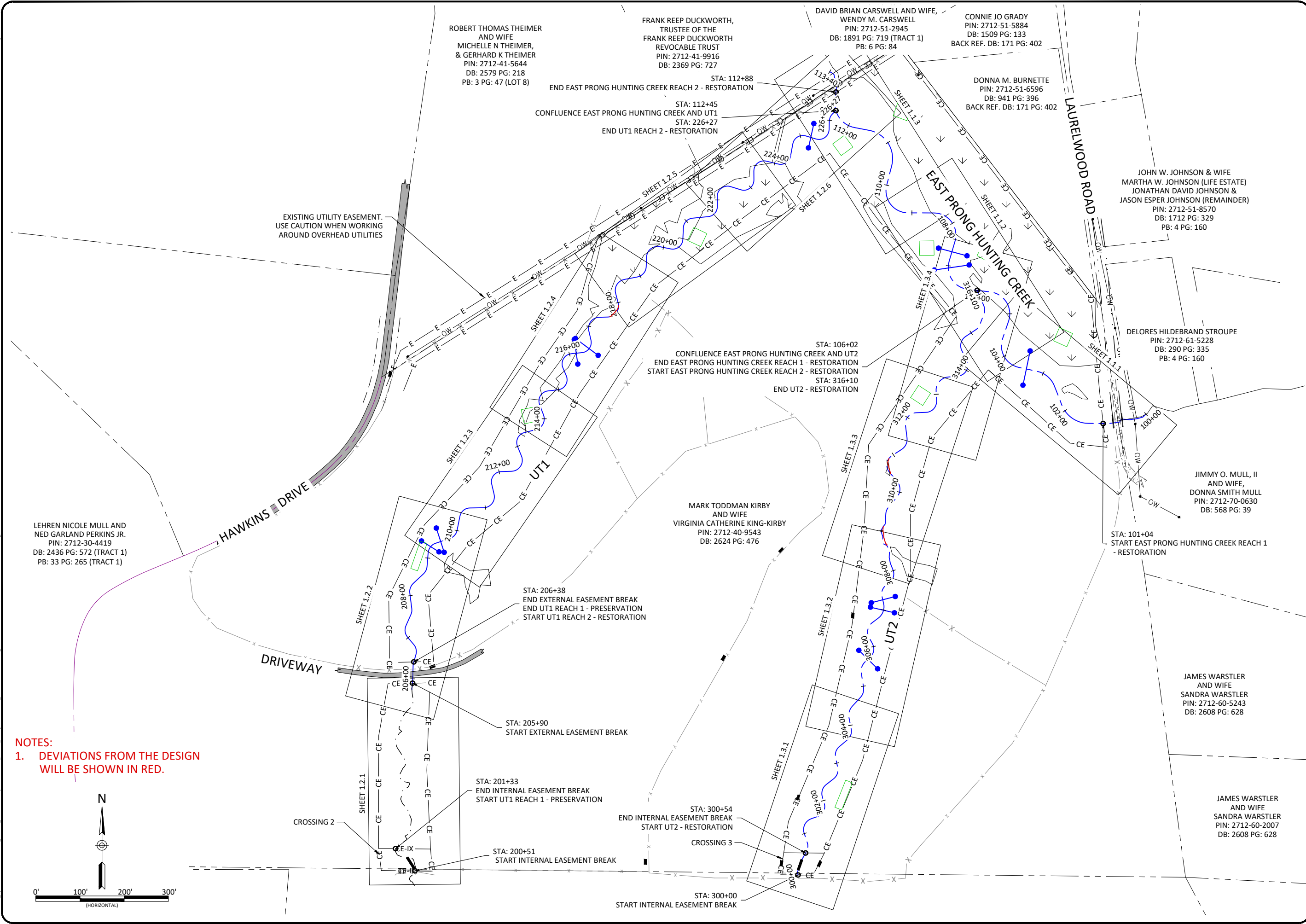
Title Sheet

Revisions:

Date: April 4, 2023
Job Number: W02187
Project Engineer: EN
Drawn By: CAW
Checked By: IK

0.1

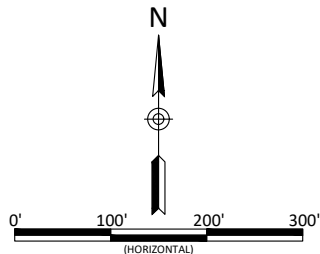
April 4, 2023
\\EgnytoDrive\wildlandsengineering\Shared\Projects\W02187_Laurel_Valley\Monitoring\Baseline\Monitoring\Plans\As-Built\Set1\Plans\02187-Overview.dwg



EXISTING UTILITY EASEMENT.
USE CAUTION WHEN WORKING
AROUND OVERHEAD UTILITIES

LEHREN NICOLE MULL AND
NED GARLAND PERKINS JR.
PIN: 2712-30-4419
DB: 2436 PG: 572 (TRACT 1)
PB: 33 PG: 265 (TRACT 1)

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



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

Professional Seal
Professional Engineer
No. 042660
Exp. 12/31/2024

Laurel Valley Mitigation Site Record Drawing
Burke County, North Carolina

Project Overview

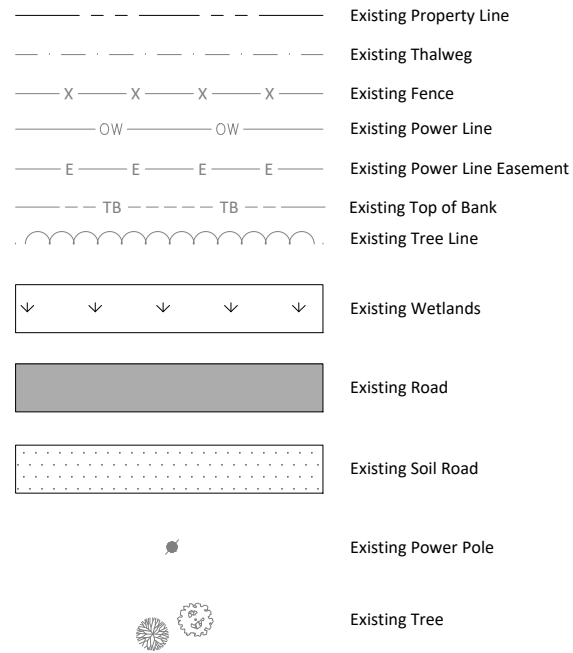
Date	Revisions
April 4, 2023	
W02187	
EN	
CAW	
JK	

Date: April 4, 2023
Job Number: W02187
Project Engineer: EN
Drawn By: CAW
Checked By: JK

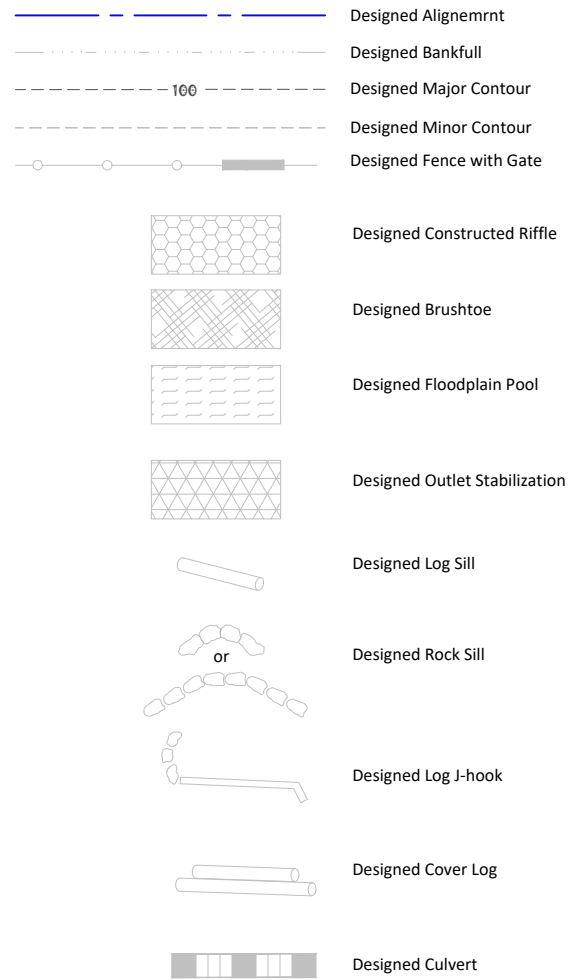
0.2

Sheet

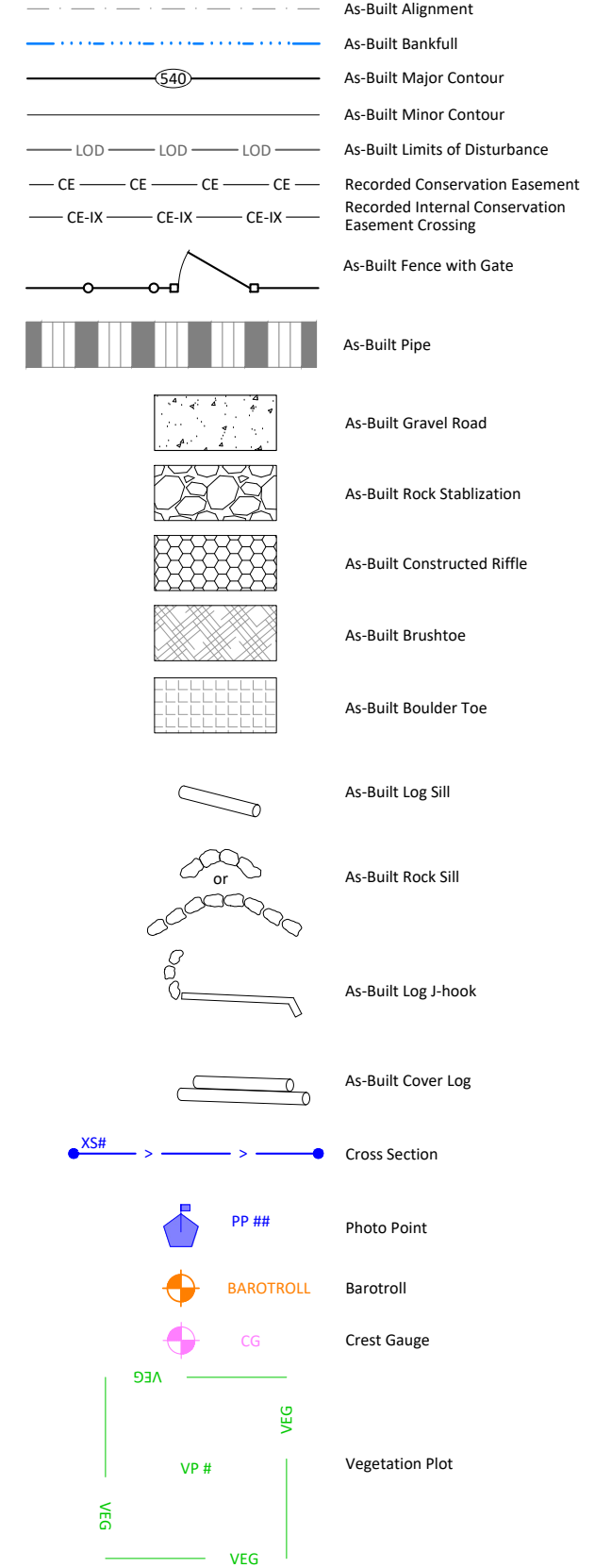
Existing Features



Designed Features and Structures



As-Built Features and Structures

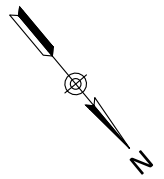
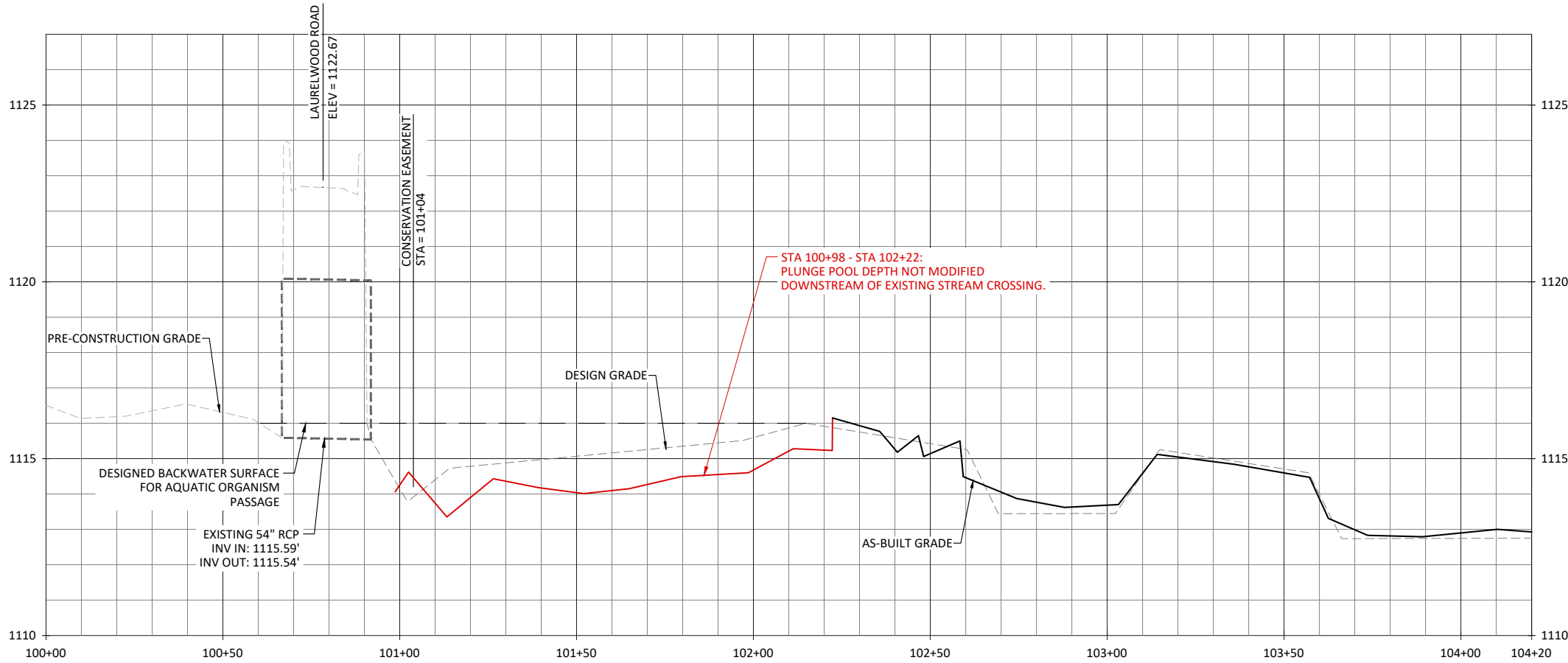


Survey Reference:

- Survey Dates:
 - Existing Conditions Survey: 09/2020
 - Boundary Survey: 01/2021
 - As-Built Survey: 10/31/2022 - 1/9/2023
- Easement Reference: "Conservation Easement Survey for the State of North Carolina, Division of Mitigation Services, Project Name: "Laurel Valley Site", SPO File No. 12-EL, DMS Site ID No. 100140", dated 8/30/31, Prepared By Kee Mapping Mapping and Surveying, Recorded in the Burke County North Carolina Register of Deeds on 09/15/2021 in Deed Book 2570, Page 123 and Plat Book 57, Page 69.
- Map Reference: "An As-Built Survey for Wildlands Engineering, Inc., The State Of North Carolina NCDEQ Department of Mitigation Services "Laurel Valley Site", Burke County, North Carolina", surveyed between the dates of 10/31/2022-01/09/2023 and prepared by Kee Mapping and Surveying on February 23, 2023.

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

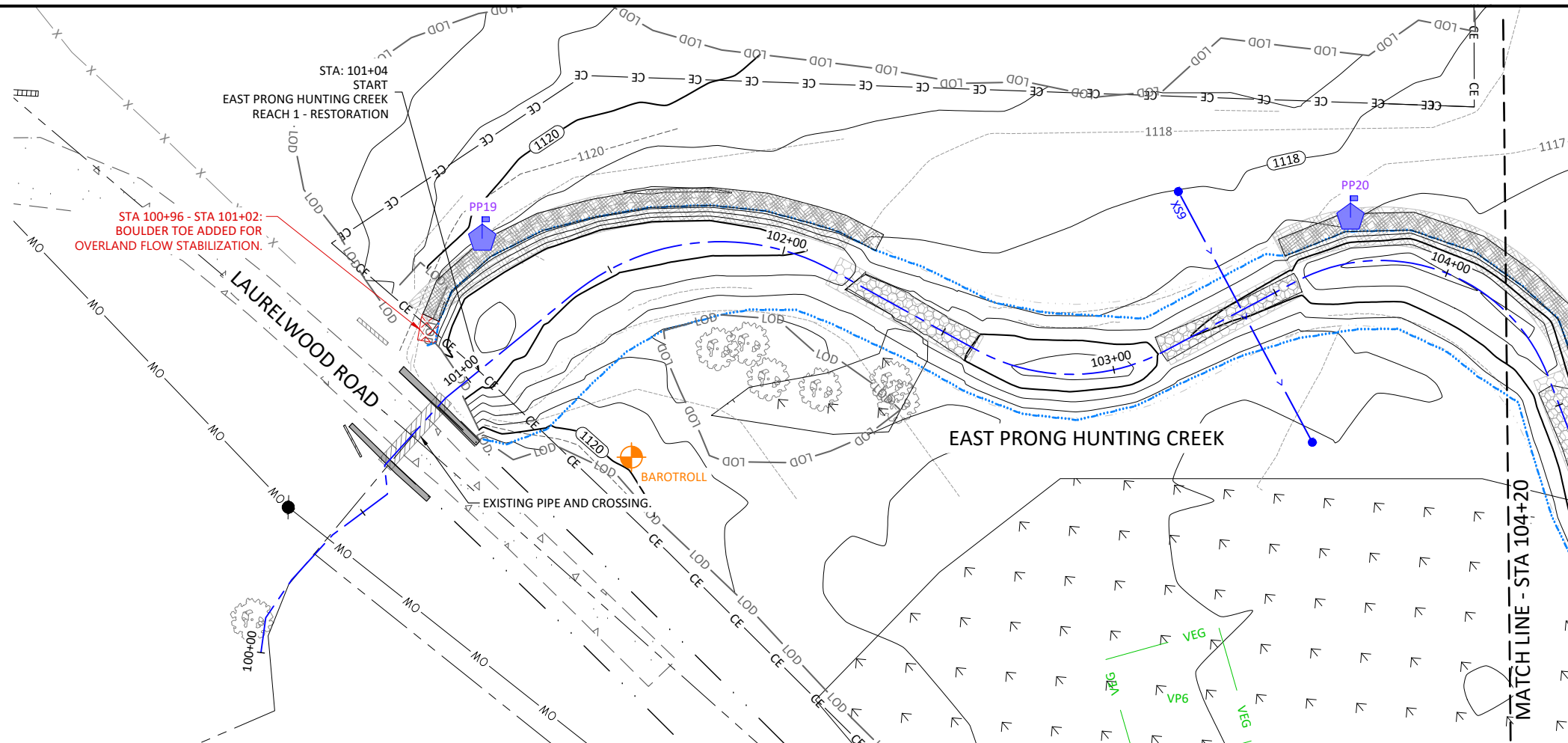
April 4, 2023



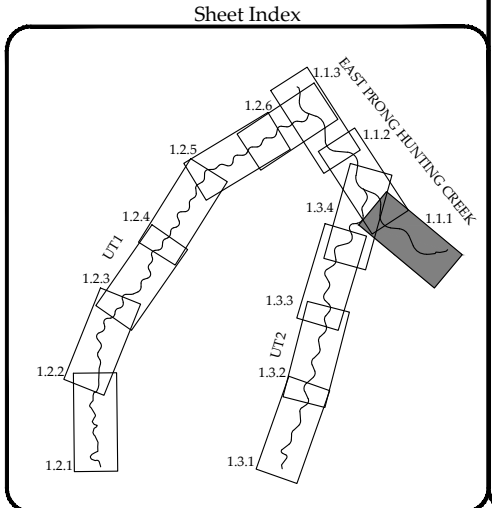
WILDLANDS
ENGINEERING
167-B Haywood Rd
Asheville, NC 28806
Tel: 828.774.5547
License No. F-0831



Laurel Valley Mitigation Site Record Drawing
Burke County, North Carolina
East Prong Hunting Creek
Stream Plan and Profile



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



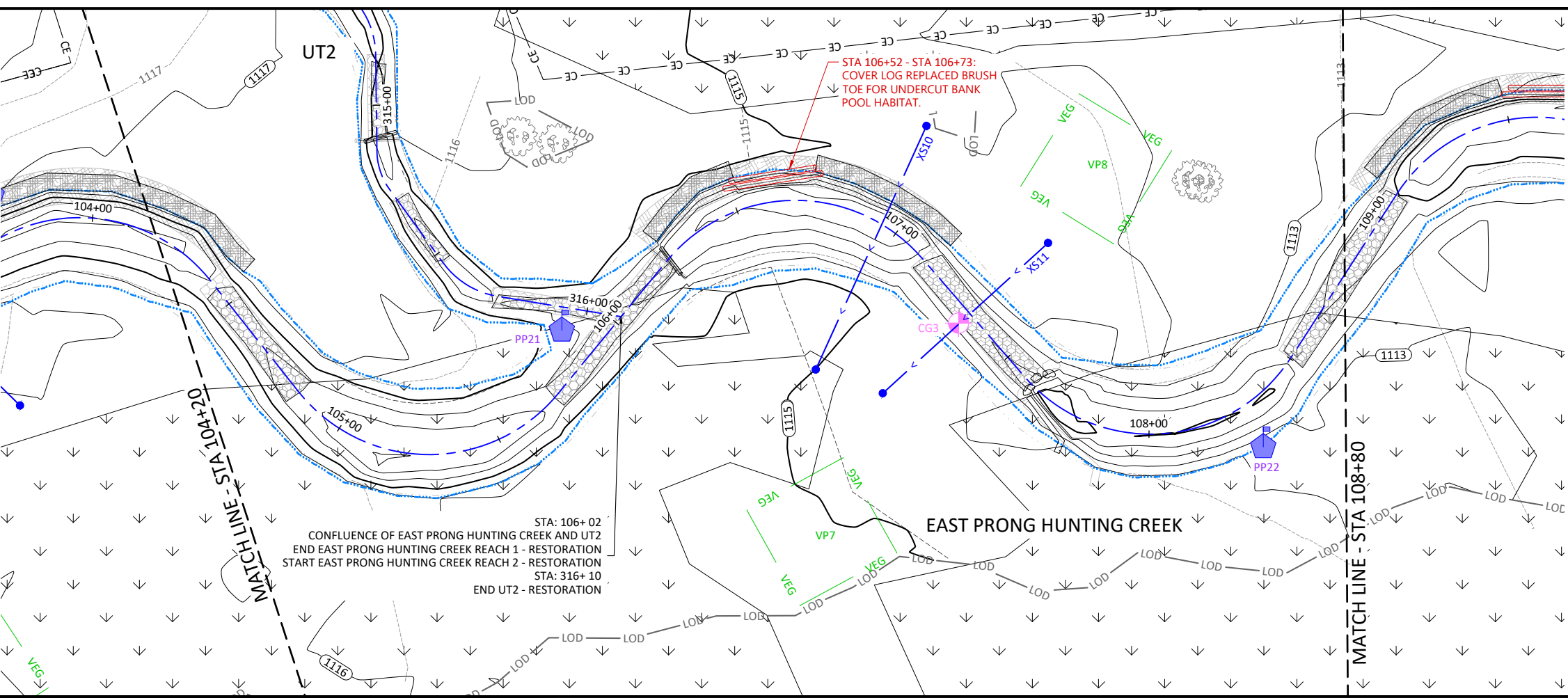
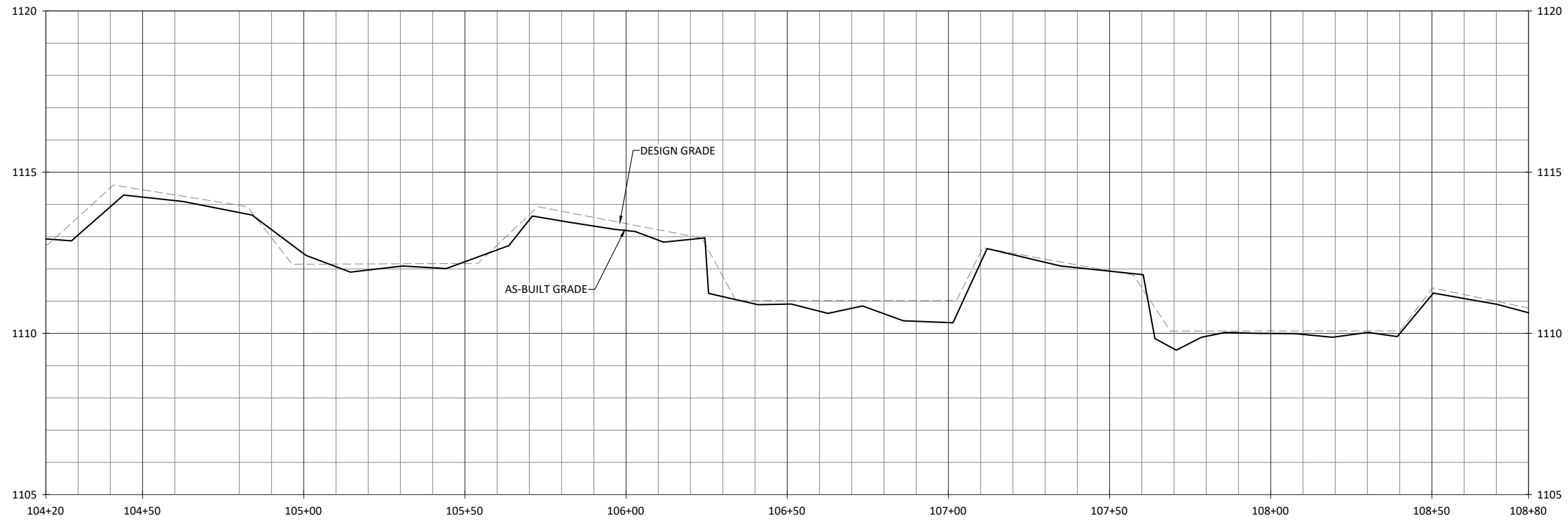
Revisions:	

Date: April 4, 2023
Job Number: W02187
Project Engineer: EN
Drawn By: CAW
Checked By: JK

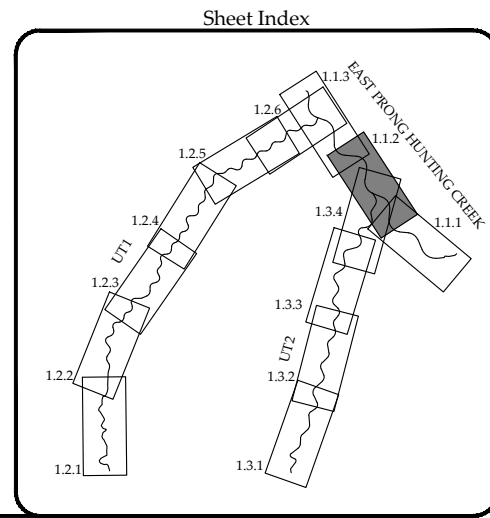
1.1.1

Sheet

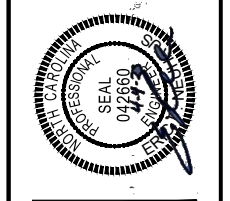
\\EgnytoDrive\wildlandsengineering\Shared\Projects\W02187_Laurel_Valley\Monitoring\Baseline\Monitoring_Plans\As-Built_Set\Plans\02187_Profile.dwg



- NOTES:
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.
 2. AS-BUILT INFORMATION FOR UT2 IS ADDRESSED ON SHEETS 1.3.1 THROUGH 1.3.4.



Laurel Valley Mitigation Site Record Drawing
 Burke County, North Carolina
 East Prong Hunting Creek
 Stream Plan and Profile

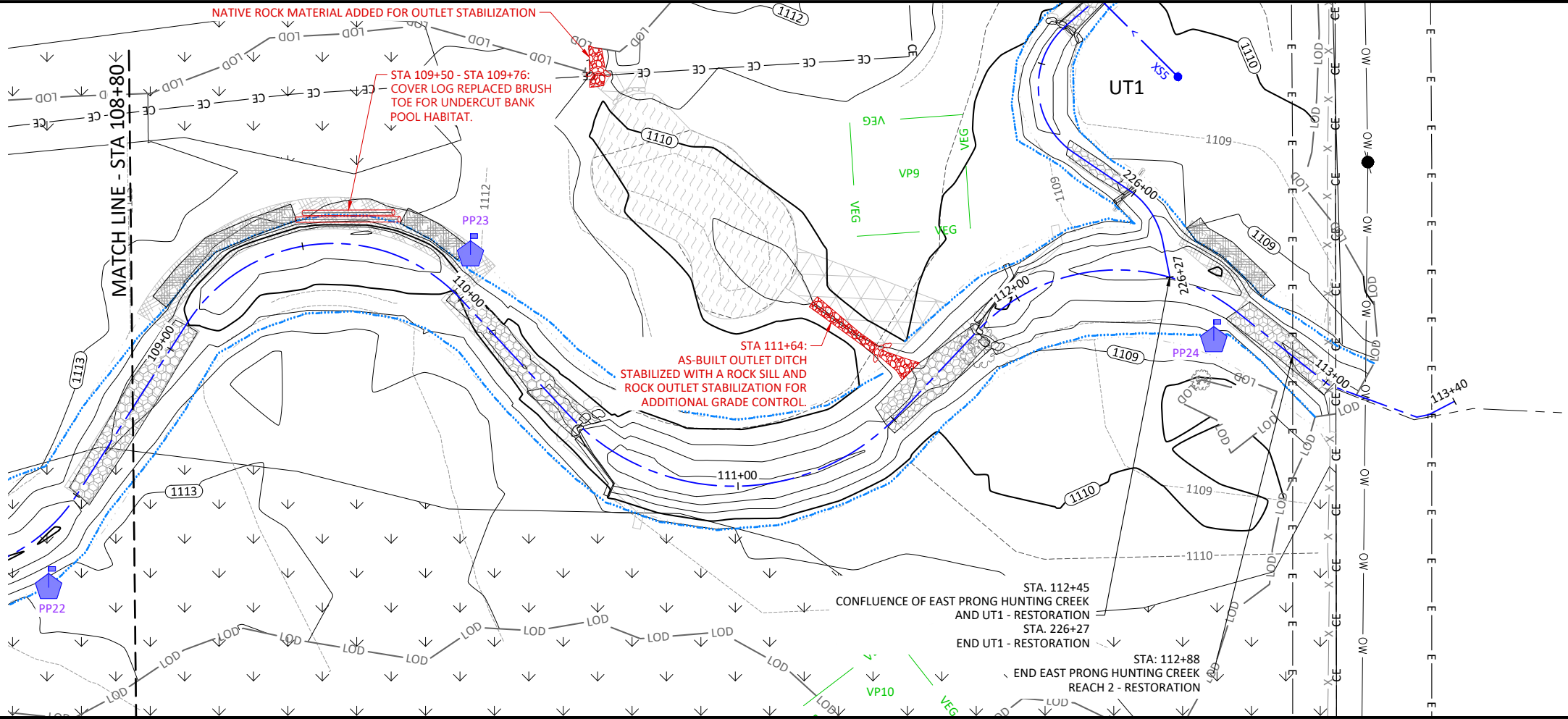
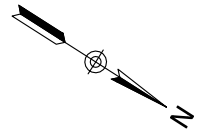
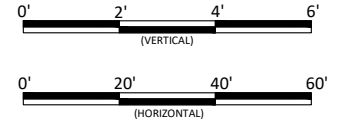
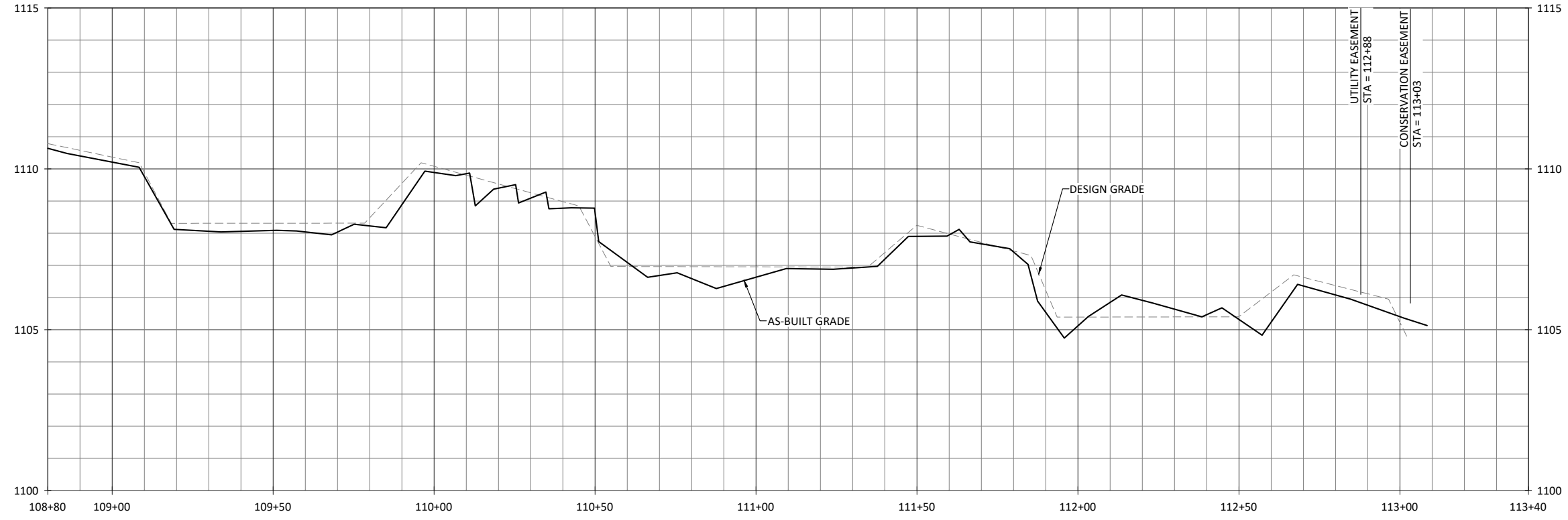


Revisions:	

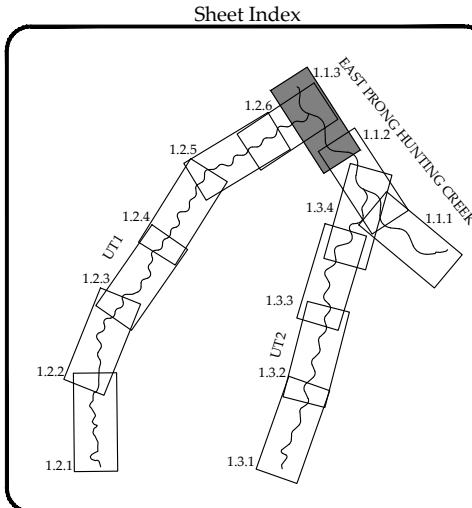
Date: April 4, 2023
 Job Number: W02187
 Project Engineer: EN
 Drawn By: CAW
 Checked By: JK

1.1.2

Sheet



- NOTES:
 1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.
 2. AS-BUILT INFORMATION FOR UT1 IS ADDRESSED ON SHEETS 1.2.1 THROUGH 1.2.6.



Laurel Valley Mitigation Site Record Drawing
 Burke County, North Carolina
 East Prong Hunting Creek
 Stream Plan and Profile

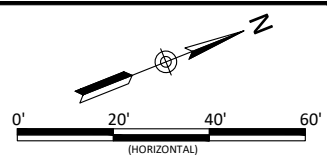
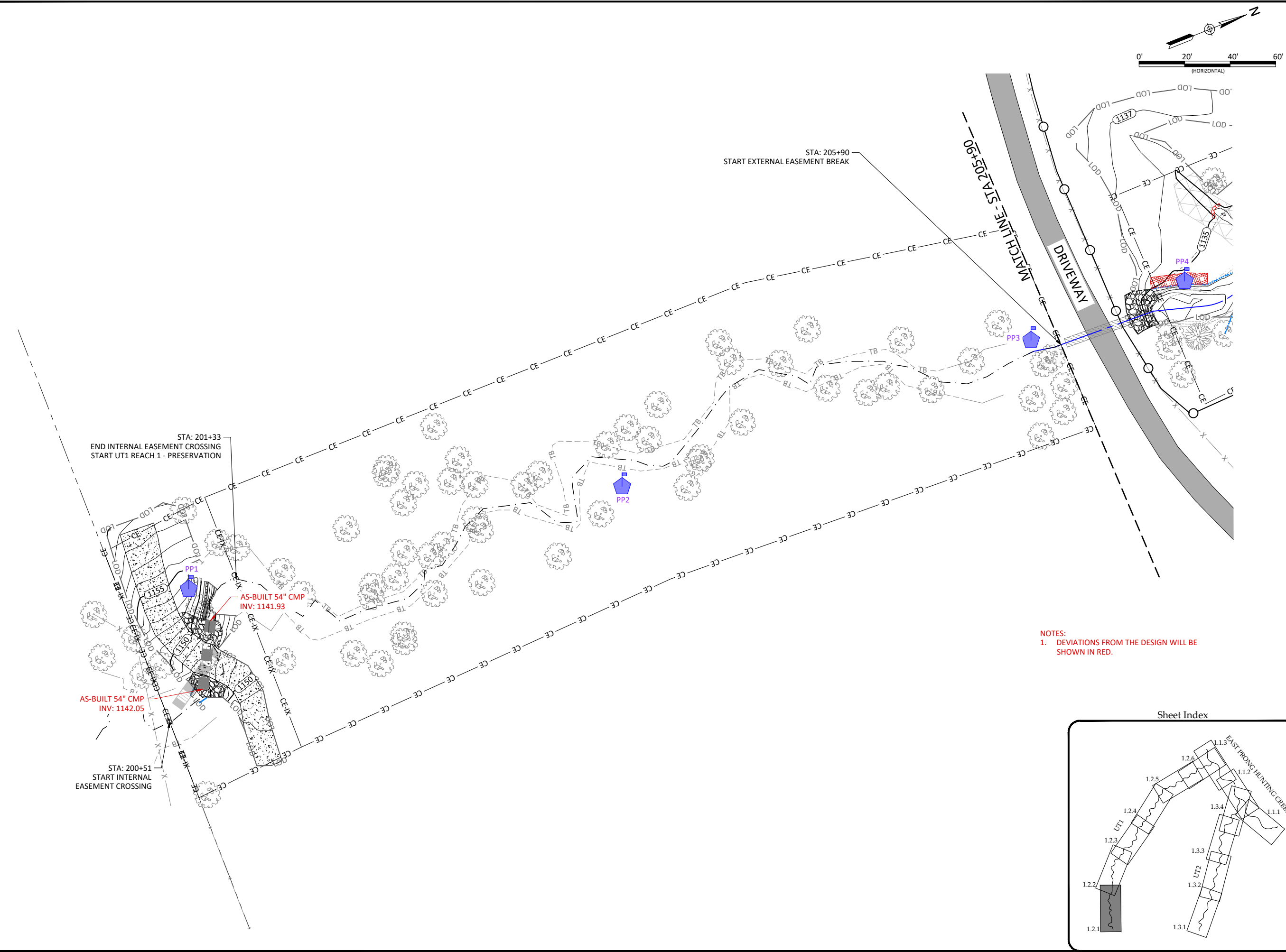


Revisions:	

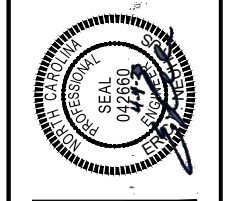
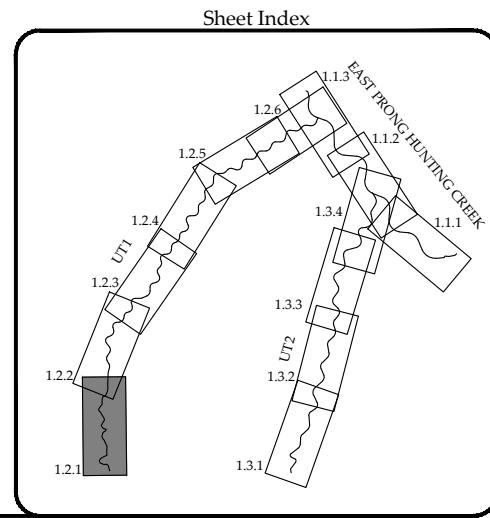
Date: April 4, 2023
 Job Number: W02187
 Project Engineer: EN
 Drawn By: CAW
 Checked By: IK

1.1.3

Sheet



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

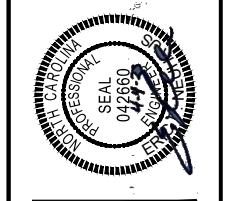
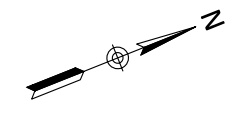
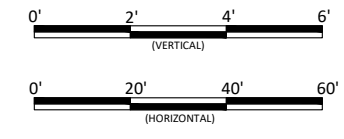
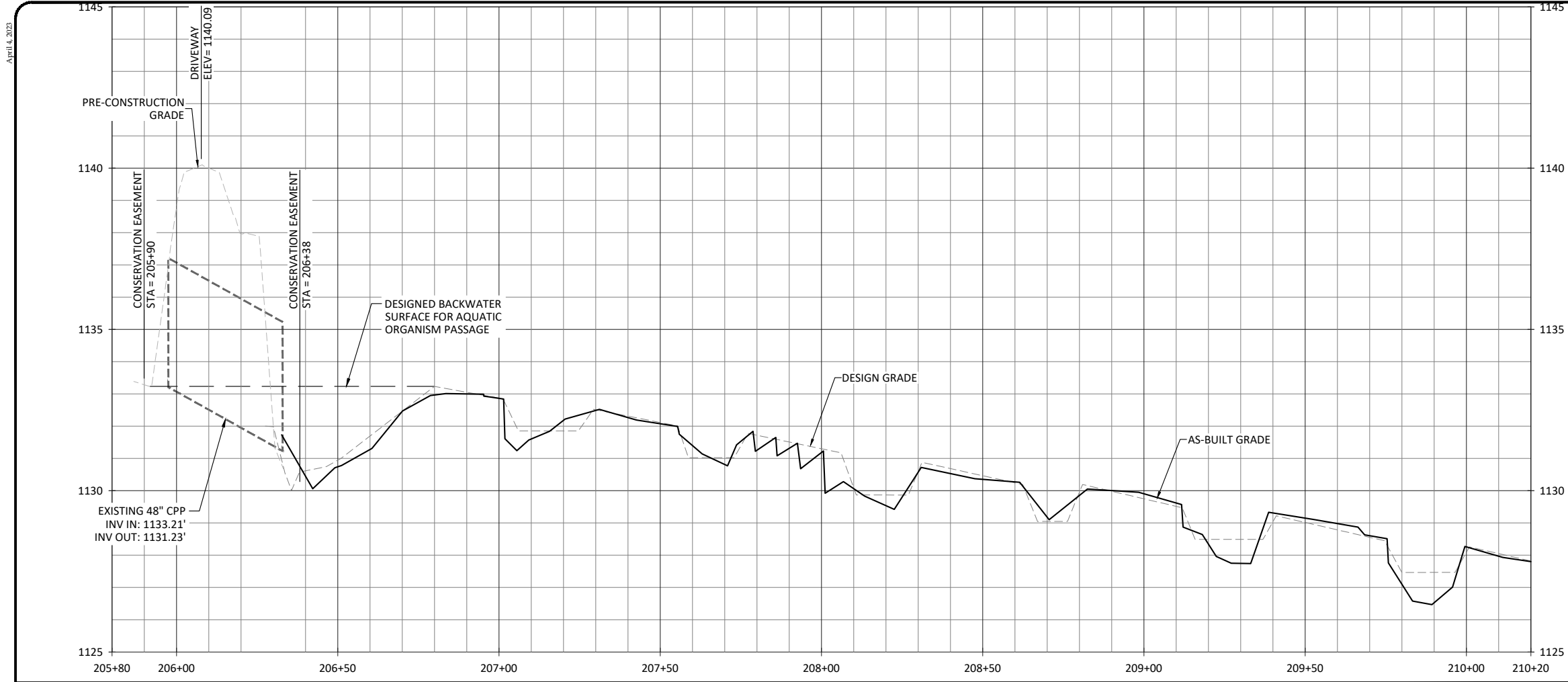


Laurel Valley Mitigation Site Record Drawing
 Burke County, North Carolina

UT1
 Stream Plan and Profile

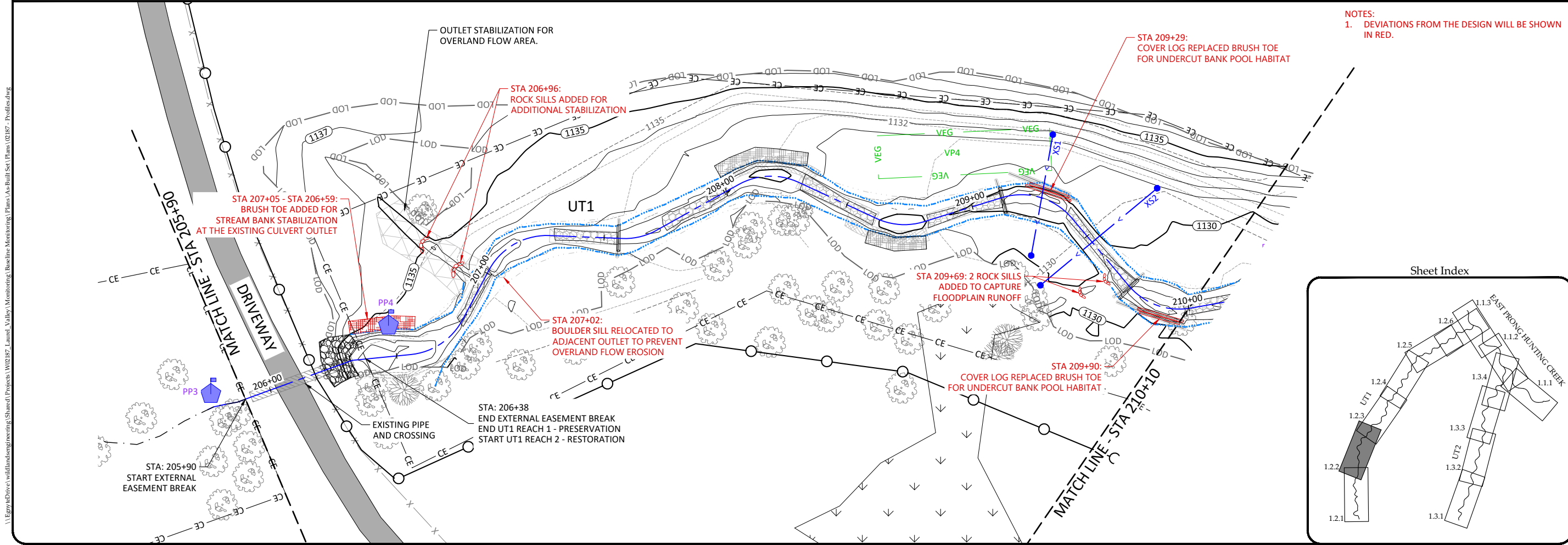
Date:	April 4, 2023
Job Number:	W02187
Project Engineer:	EN
Drawn By:	CAW
Checked By:	JK
Revisions:	

1.2.1

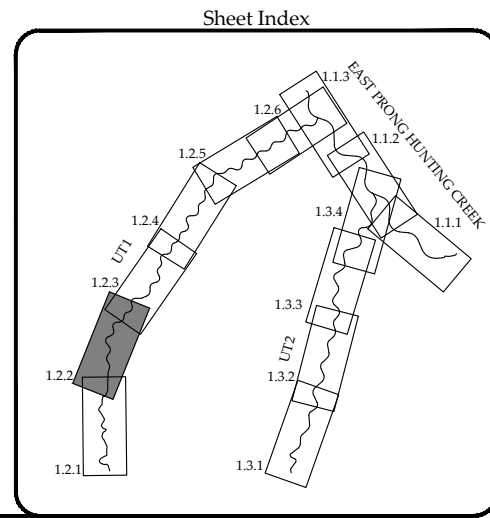


Laurel Valley Mitigation Site Record Drawing
Burke County, North Carolina

UT1
Stream Plan and Profile



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



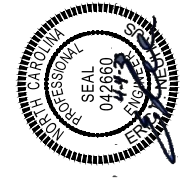
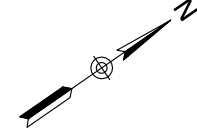
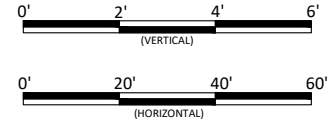
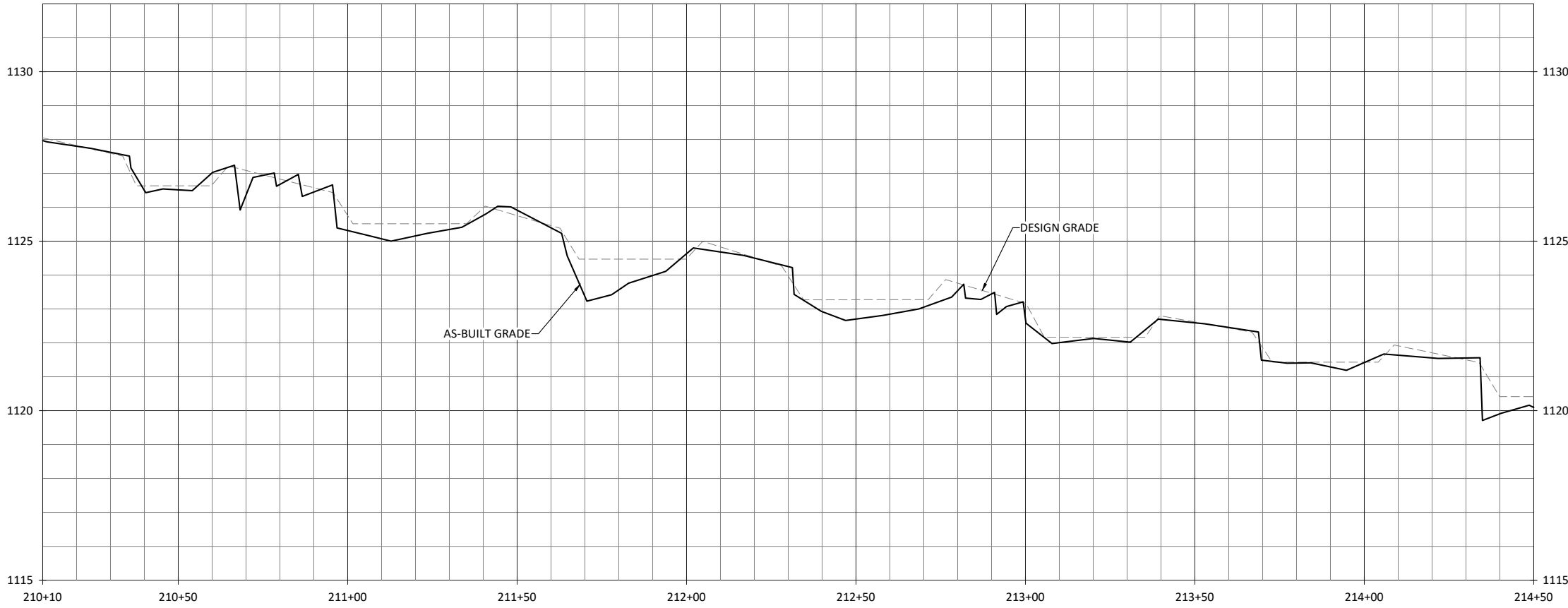
Revisions:

Date: April 4, 2023
 Job Number: W02187
 Project Engineer: EN
 Drawn By: CAW
 Checked By: JK

1.2.2

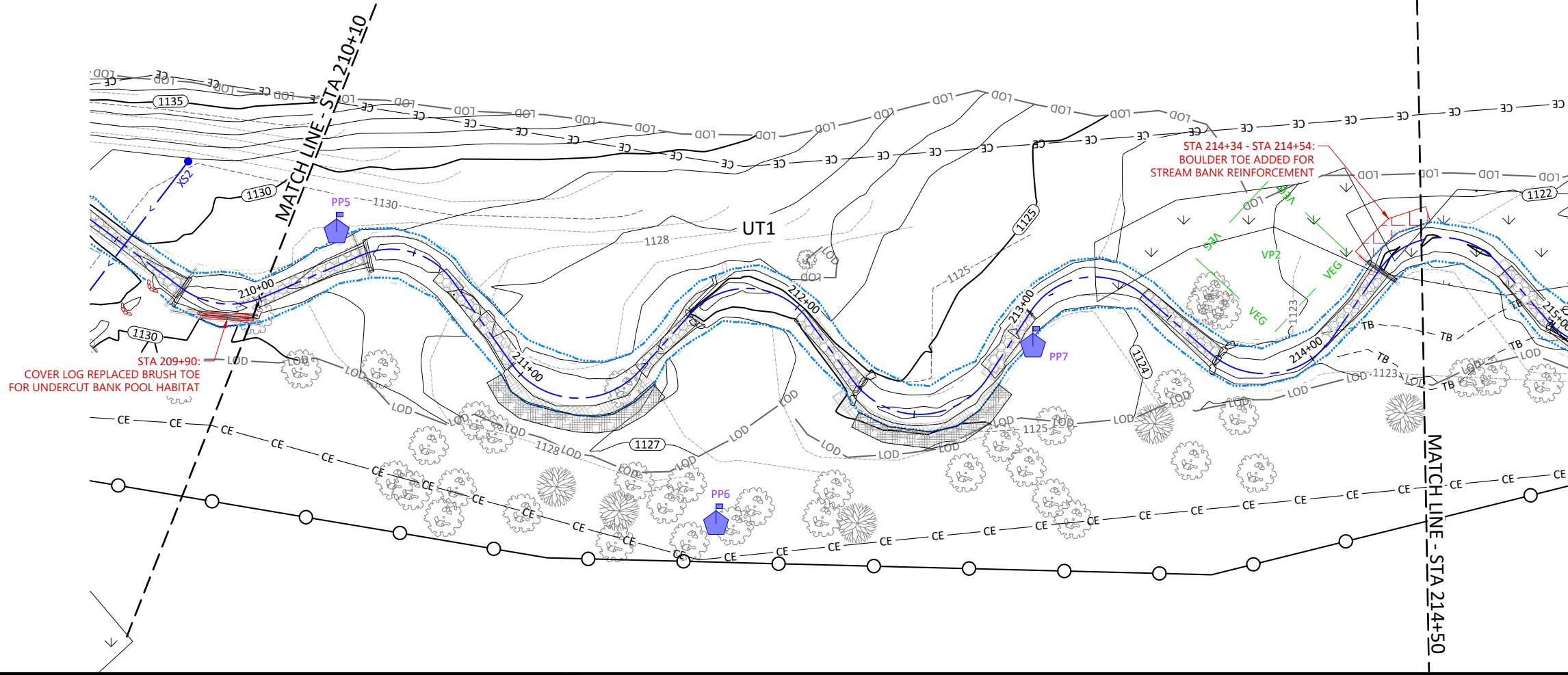
Sheet

April 4, 2023
 \\EgnytoDrive\wildlandsengineering\Shared\Projects\W02187_Laurel_Valley\Monitoring\Baseline Monitoring\Plans\As-Built Set\Plans\02187_Profile.dwg

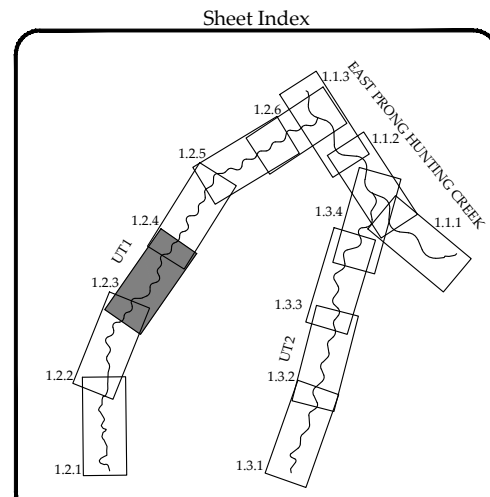


Laurel Valley Mitigation Site Record Drawing
Burke County, North Carolina

UT1
Stream Plan and Profile



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

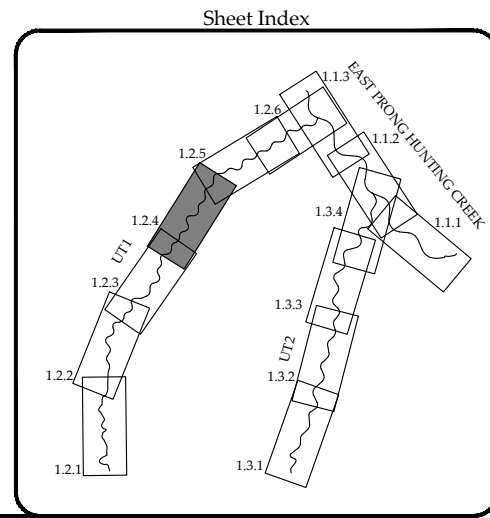
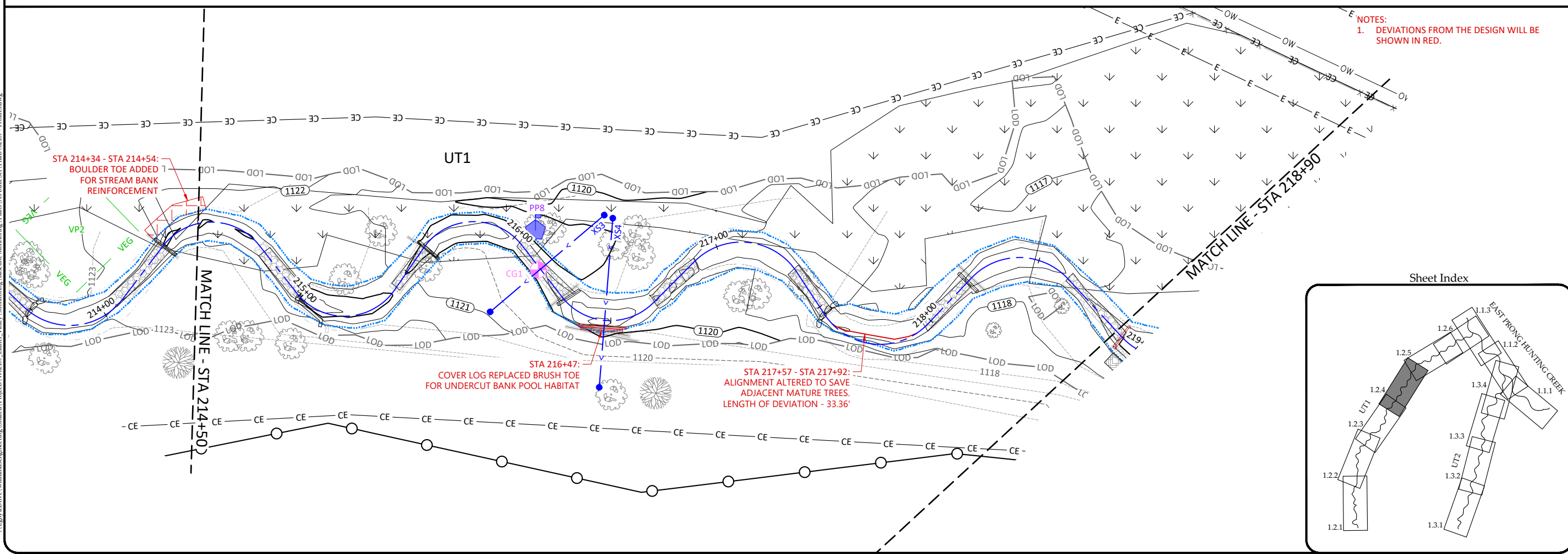
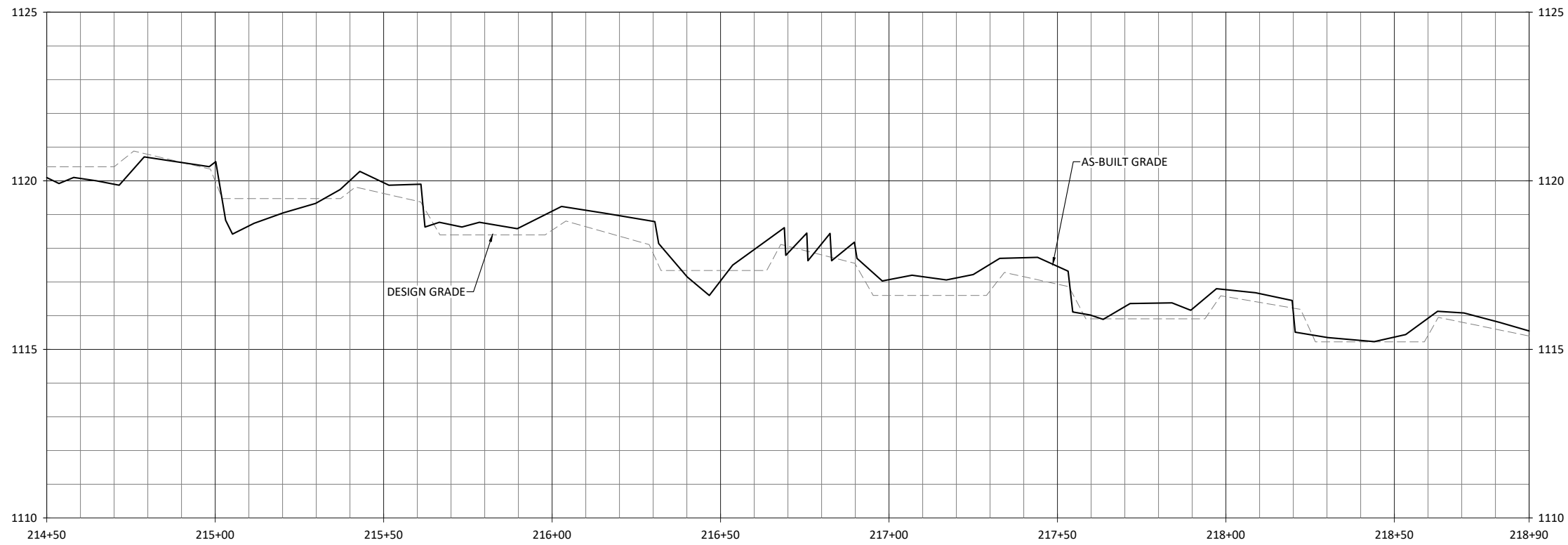


Date:	April 4, 2023
Job Number:	W02187
Project Engineer:	EN
Drawn By:	CAW
Checked By:	JK

1.2.3

Sheet

April 4, 2023
\\EgnytoDrive\w\wildlandengineering\Shared\Projects\W02187_Laurel_Valley_Monitoring\Baseline_Monitoring_Plans\As-Built_Set\Plans\02187_Profiles.dwg



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

Professional Seal
Professional Engineer
Seal No. 042660
Exp. Date 12/31/2024

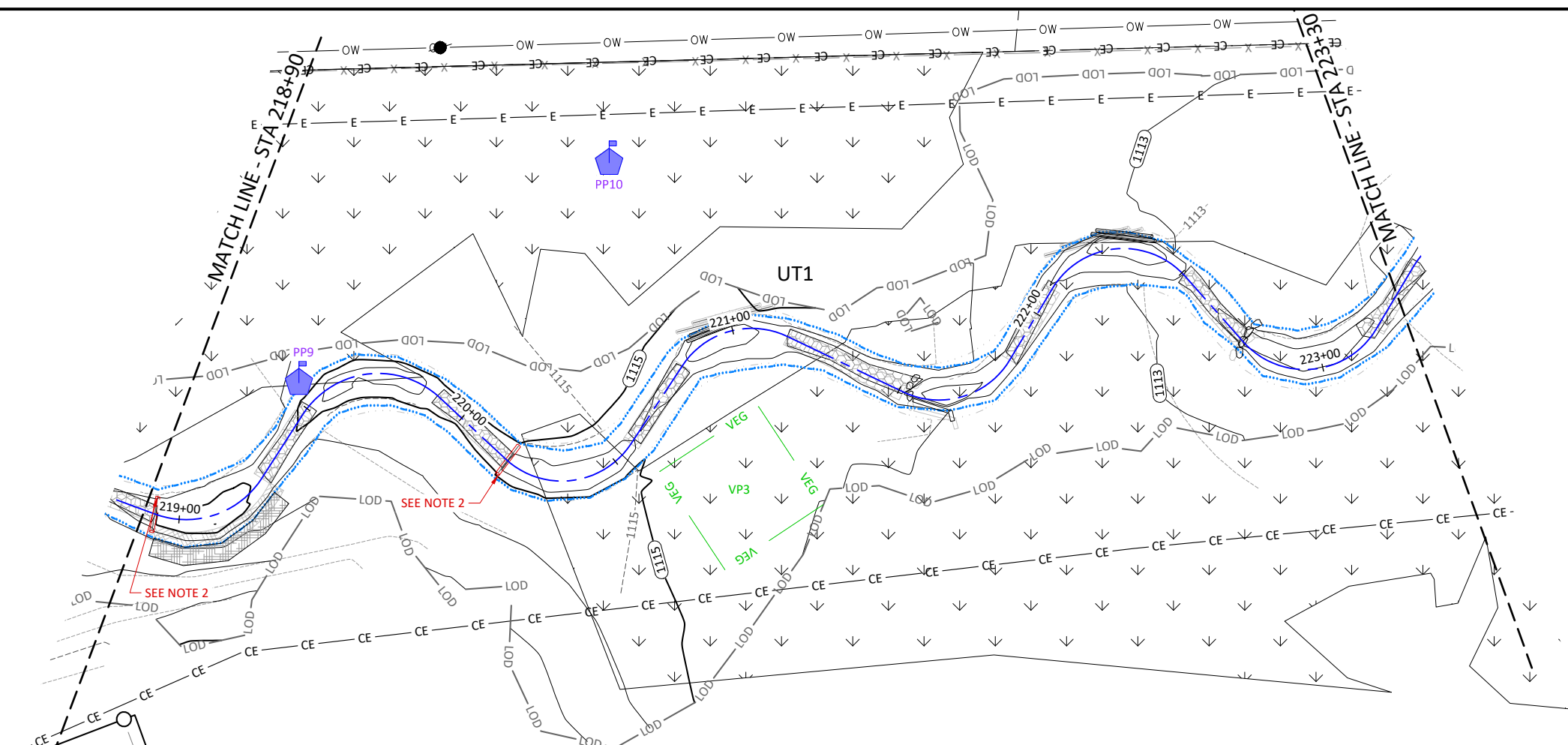
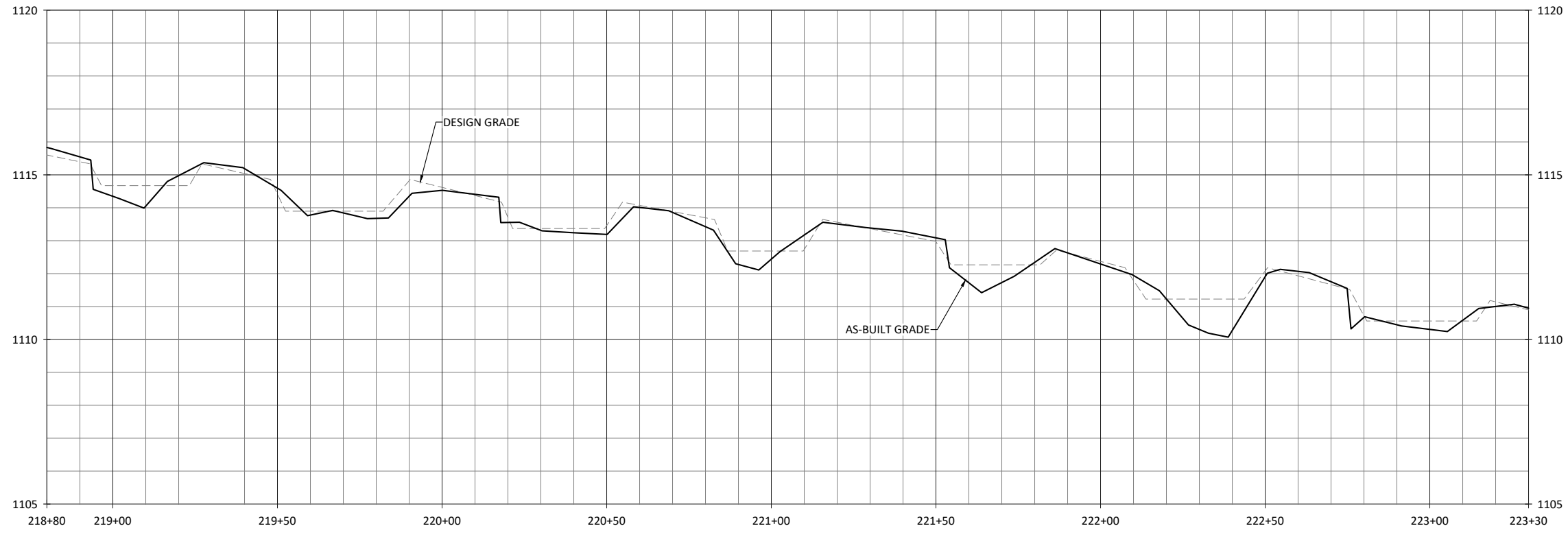
Laurel Valley Mitigation Site Record Drawing
Burke County, North Carolina

UT1
Stream Plan and Profile

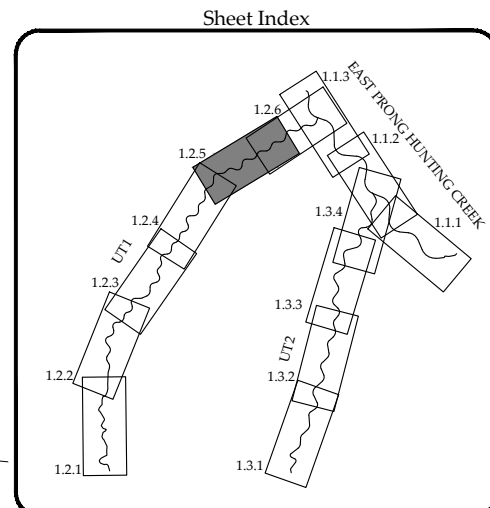
Revisions:
Lowered Profile - 8-18-22

Date: April 4, 2023
Job Number: W02187
Project Engineer: EN
Drawn By: CAW
Checked By: IK

1.2.4
Sheet



- NOTES:
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.
 2. STA 218+94 AND STA 220+17: LOG SILL ADDED FOR BED STABILITY



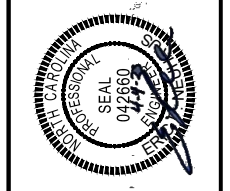
Laurel Valley Mitigation Site Record Drawing
Burke County, North Carolina

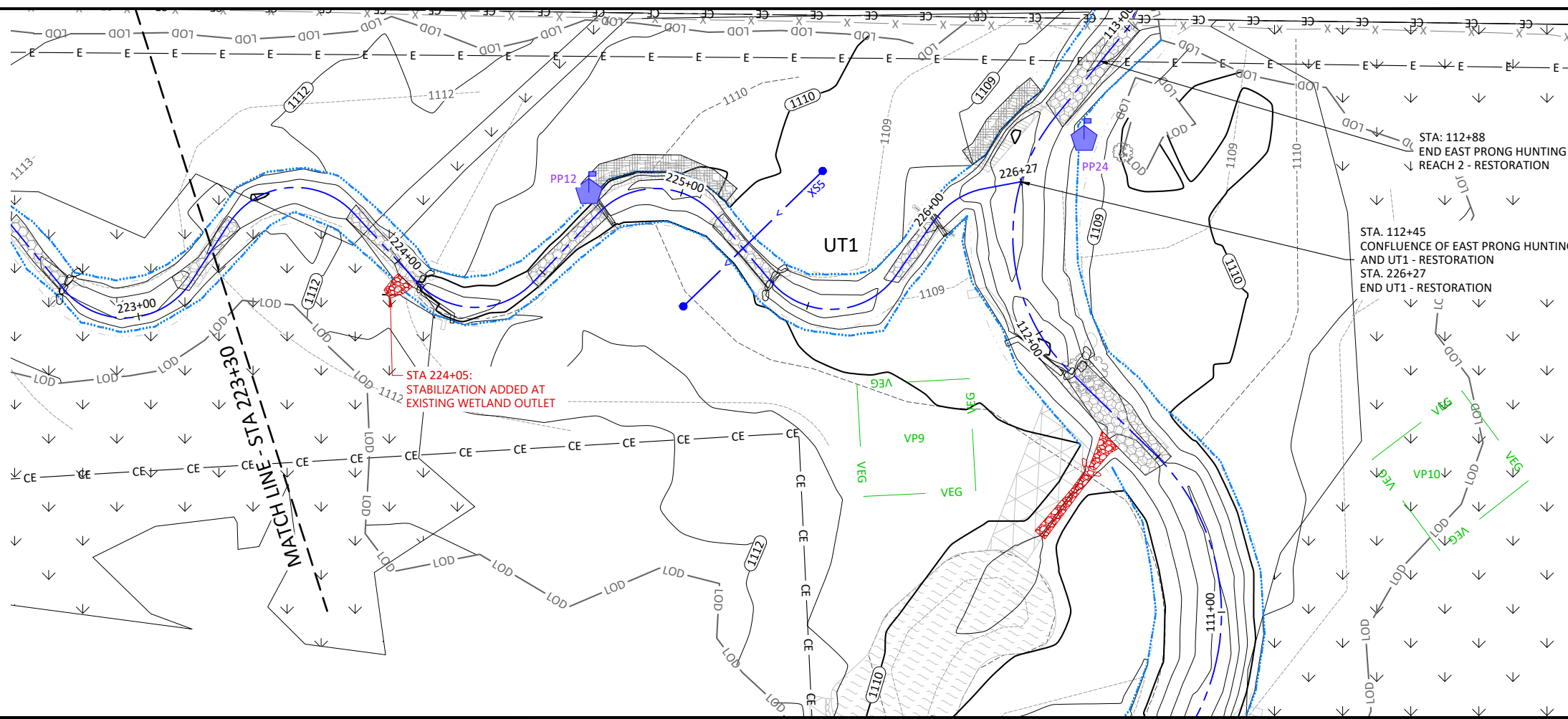
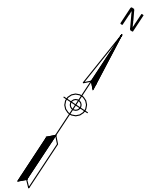
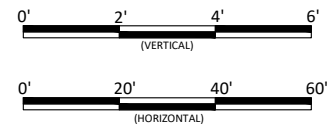
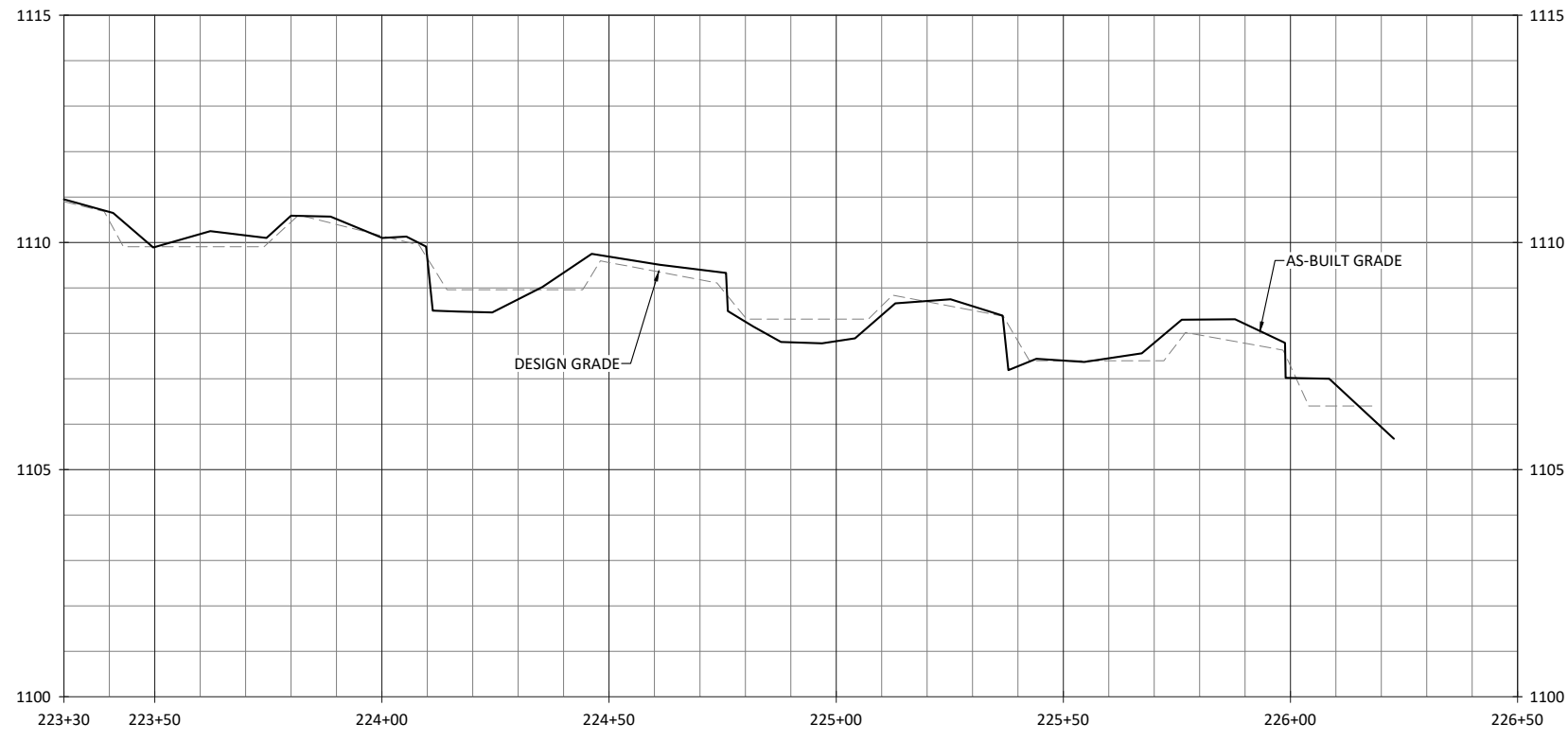
UT1
Stream Plan and Profile

Revisions:

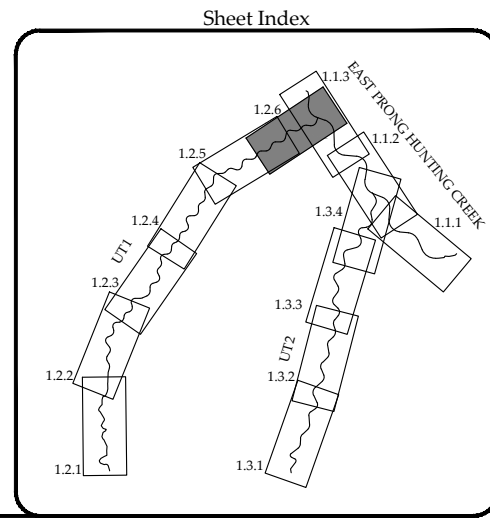
Date:	April 4, 2023
Job Number:	W02187
Project Engineer:	EN CAV
Drawn By:	CAW
Checked By:	JK

1.2.5
Sheet





- NOTES:**
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.
 2. AS-BUILT INFORMATION FOR EAST PRONG HUNTING CREEK IS ADDRESSED ON SHEETS 1.1.1 THROUGH 1.1.3.



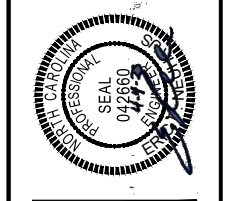
Laurel Valley Mitigation Site Record Drawing
Burke County, North Carolina

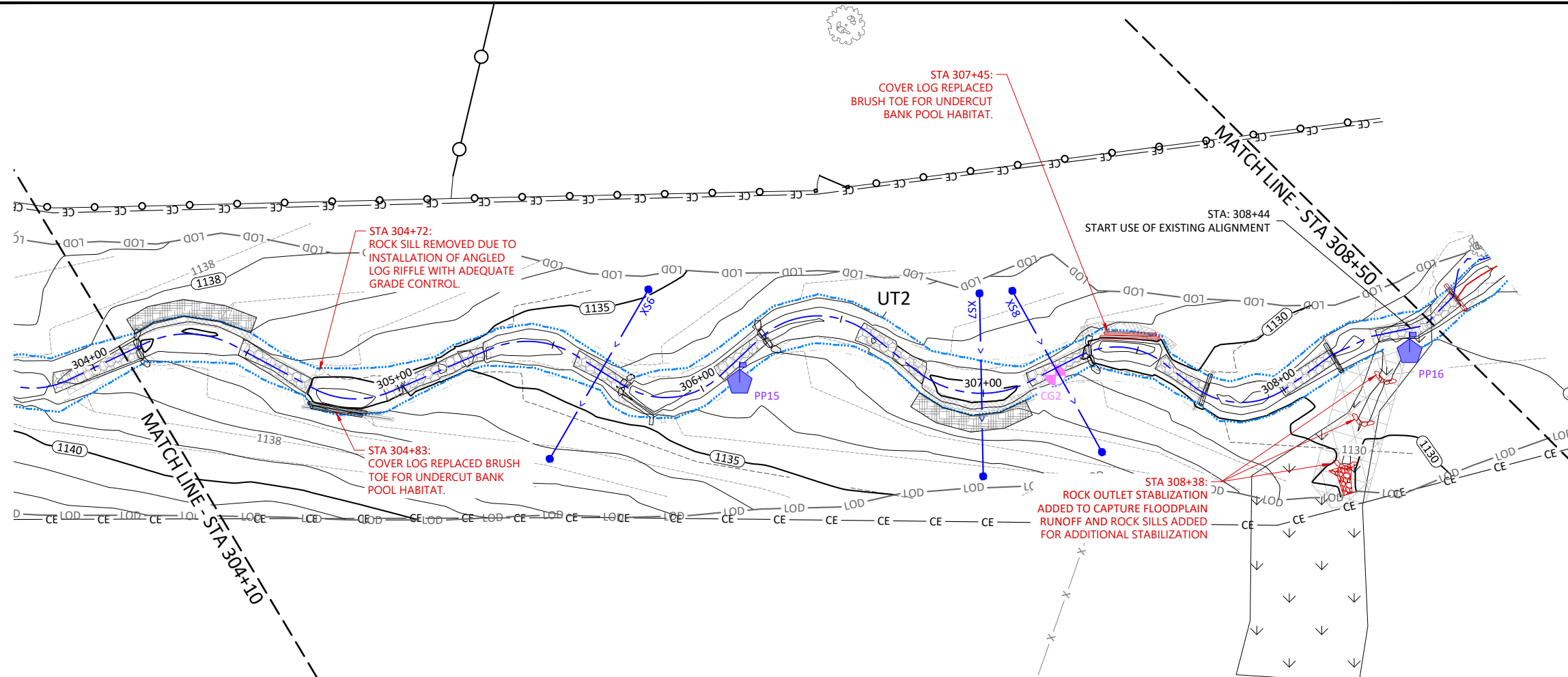
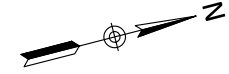
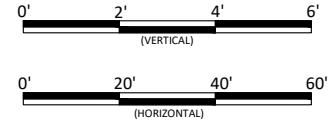
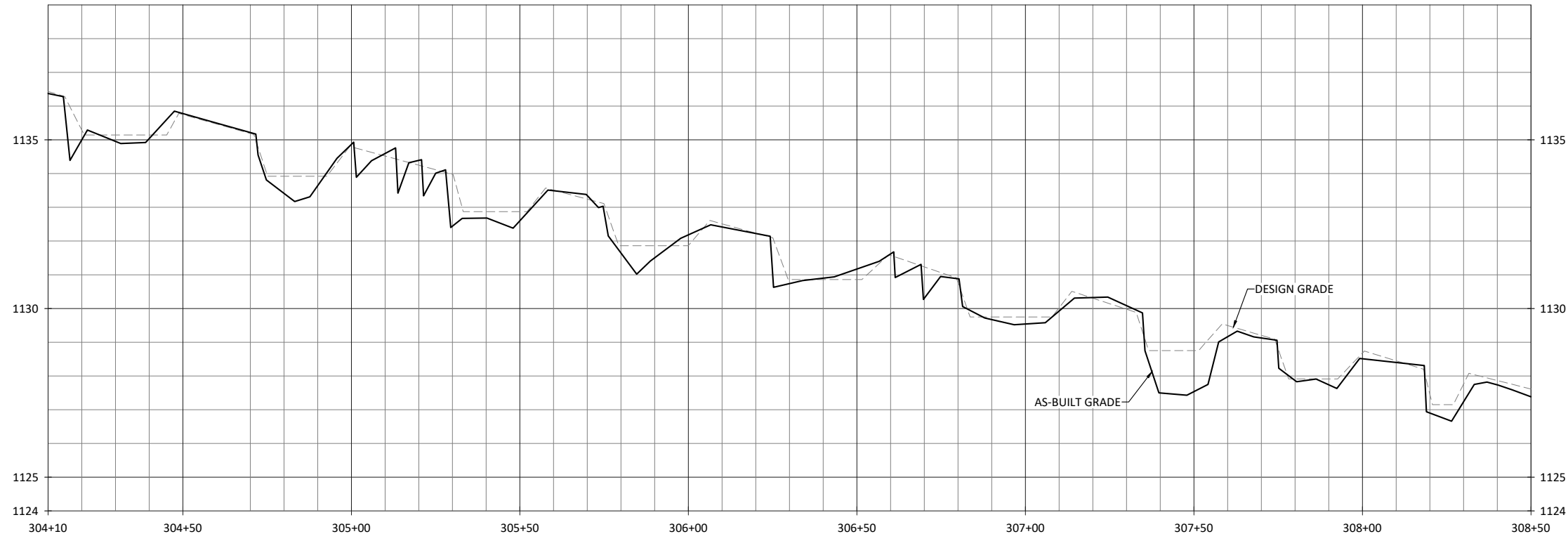
UT1
Stream Plan and Profile

Revisions:	

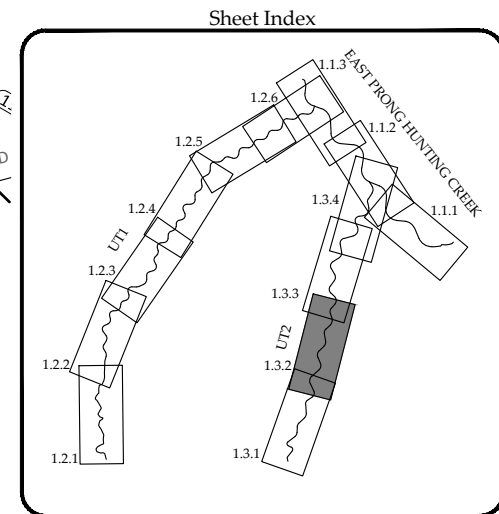
Date: April 4, 2023
Job Number: W02187
Project Engineer: EN
Drawn By: CAW
Checked By: JK

1.2.6





- NOTES:
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.
 2. SEE SHT 3.0, FOR AS-BUILT FENCE ALIGNMENT.

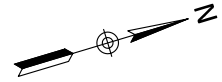
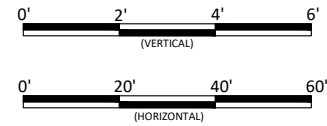
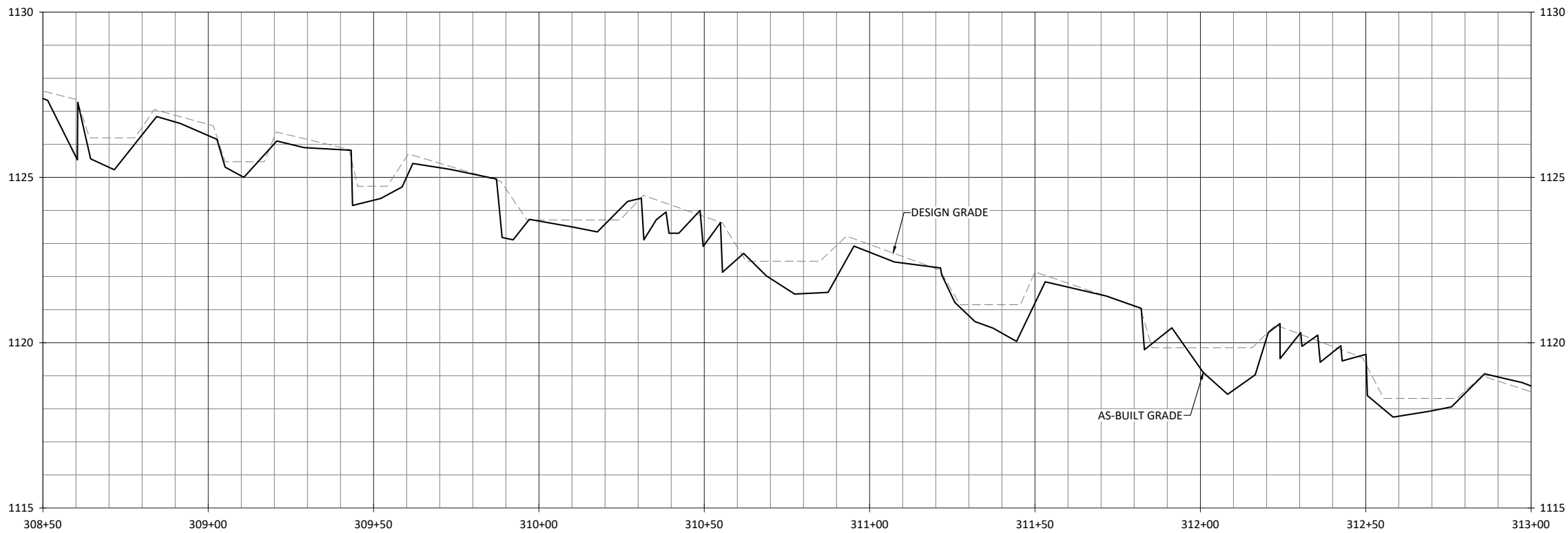


Laurel Valley Mitigation Site Record Drawing
Burke County, North Carolina

UT2
Stream Plan and Profile

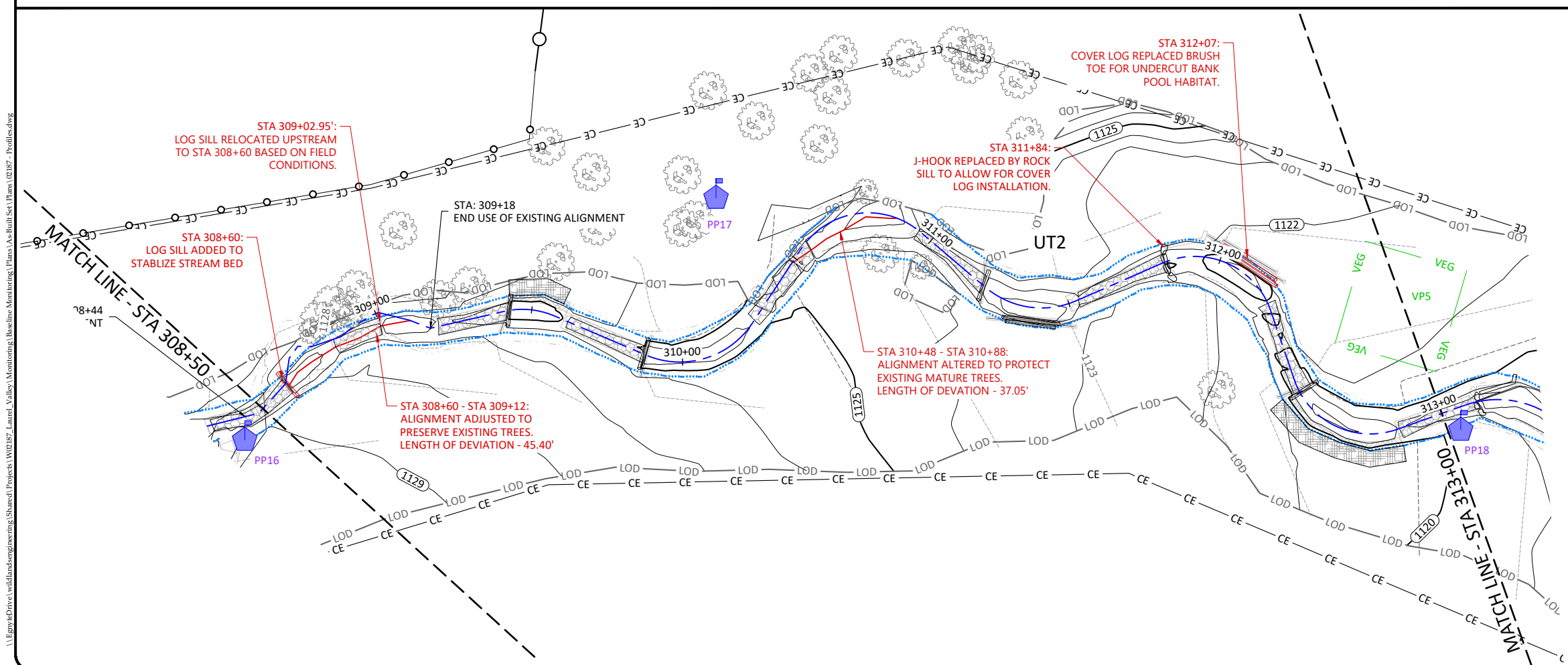
Date	Revisions
April 4, 2023	
Job Number: W02187	
Project Engineer: EN	
Drawn By: CAW	
Checked By: IK	

1.3.2

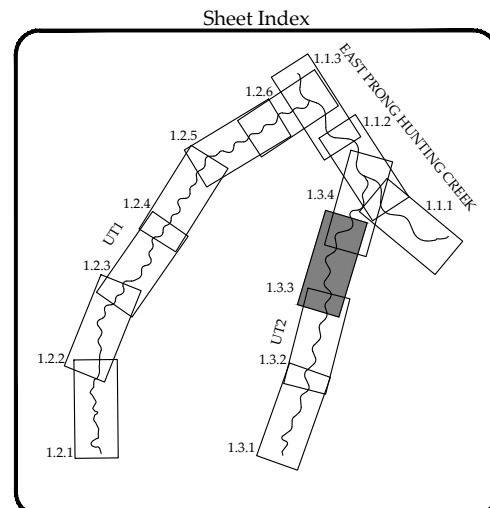


Laurel Valley Mitigation Site Record Drawing
 Burke County, North Carolina

UT2
 Stream Plan and Profile



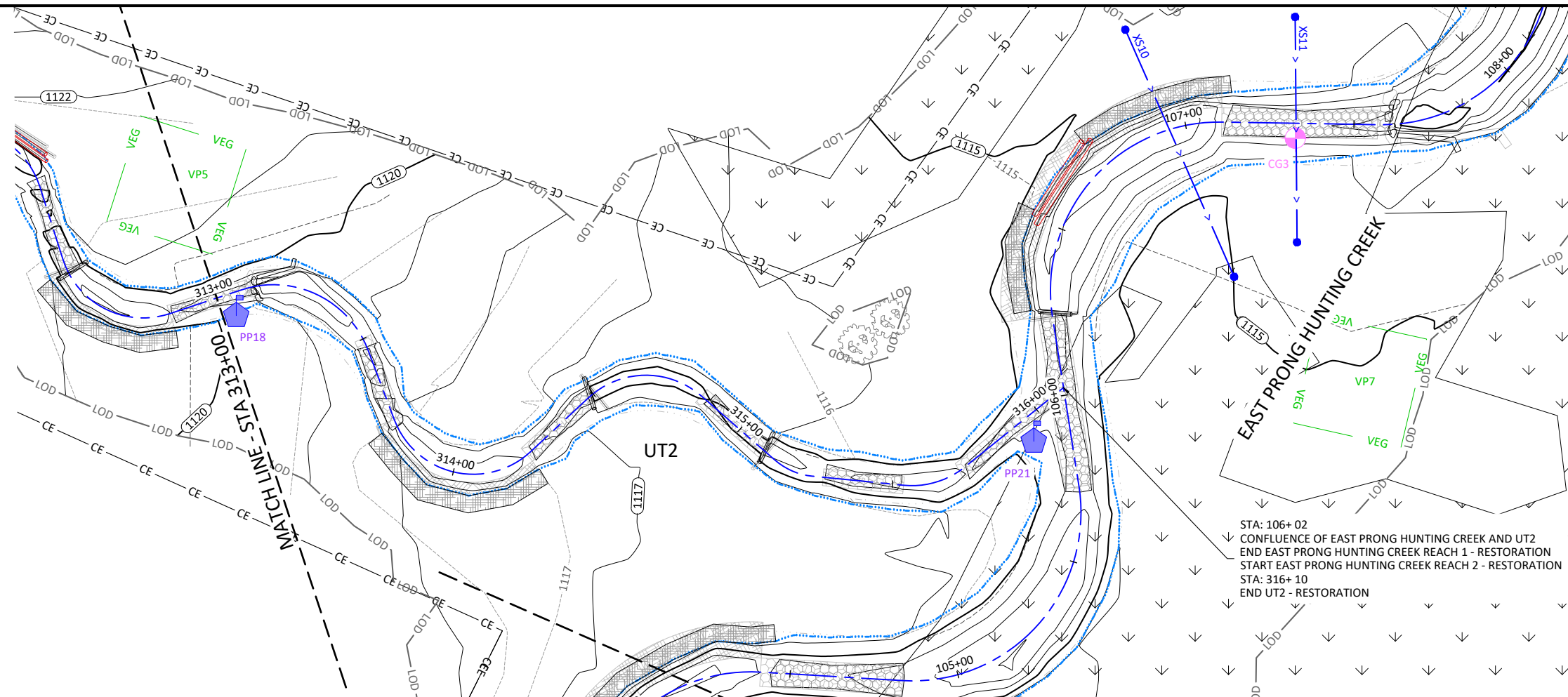
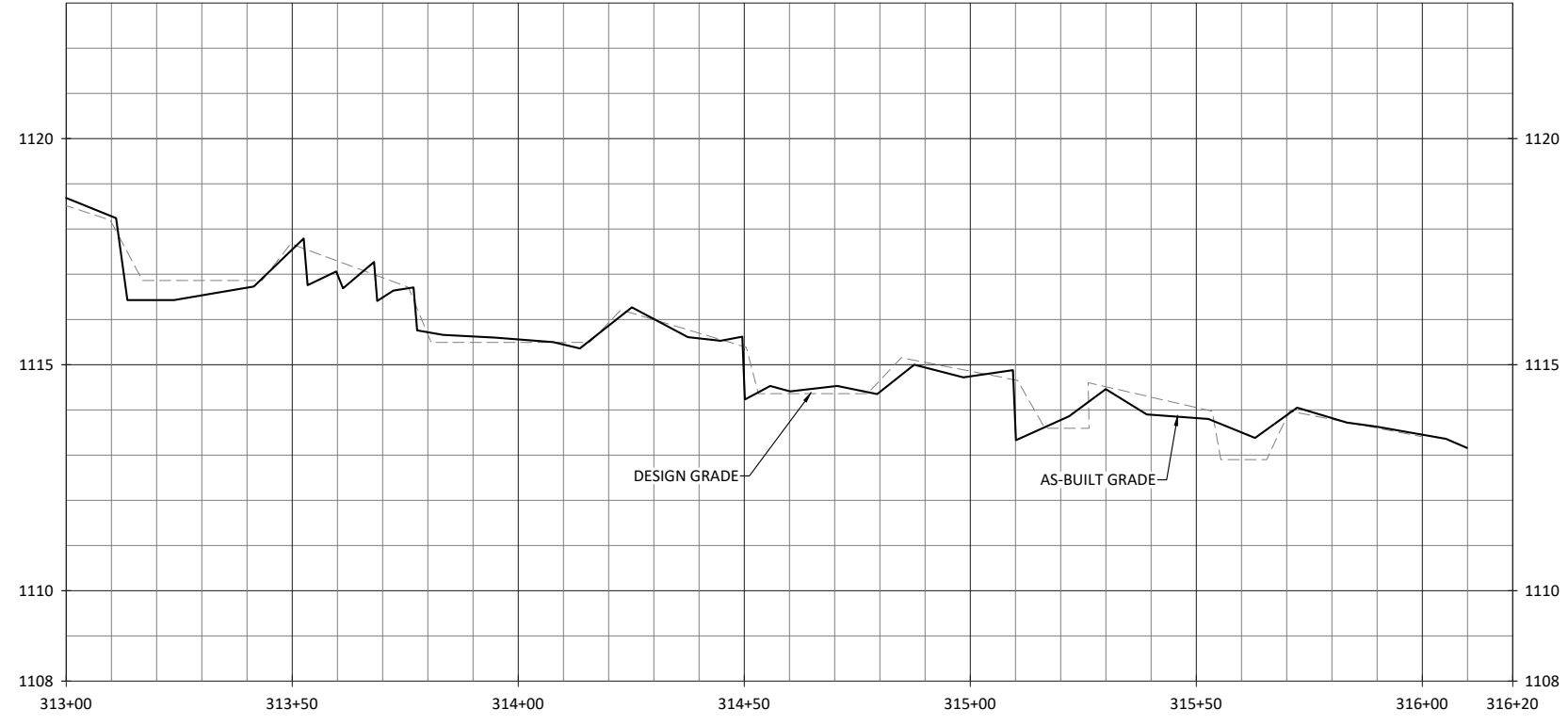
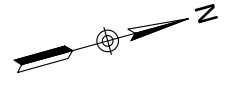
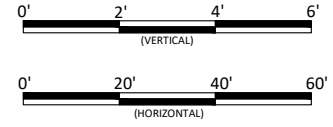
- NOTES:
 1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.
 2. SEE SHT 3.0, FOR AS-BUILT FENCE ALIGNMENT.



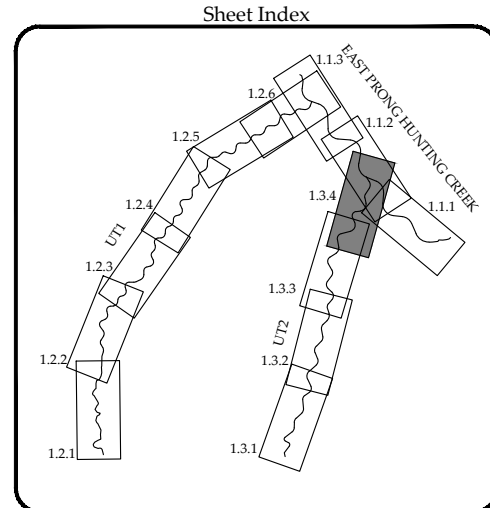
Revisions:

Date: April 4, 2023
 Job Number: W02187
 Project Engineer: EN
 Drawn By: CAV
 Checked By: JK

1.3.3



- NOTES:**
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.
 2. AS-BUILT INFORMATION FOR EAST PRONG HUNTING CREEK IS ADDRESSED ON SHEETS 1.1.1 THROUGH 1.1.3.



STA: 106+02
 CONFLUENCE OF EAST PRONG HUNTING CREEK AND UT2
 END EAST PRONG HUNTING CREEK REACH 1 - RESTORATION
 START EAST PRONG HUNTING CREEK REACH 2 - RESTORATION
 STA: 316+10
 END UT2 - RESTORATION

Laurel Valley Mitigation Site Record Drawing
 Burke County, North Carolina



UT2
 Stream Plan and Profile

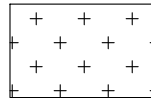
Revisions:

Date: April 4, 2023
 Job Number: W02187
 Project Engineer: EN
 Drawn By: CAW
 Checked By: JK

1.3.4

April 4, 2023
 \\EgnythDrive\wildlandengineering\Shared\Projects\W02187_Laurel_Valley\Monitoring\Baseline Monitoring\Plans\As-Built\Set 1\Plans\02187 - Planting.dwg

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	5%
<i>Platanus occidentalis</i>	Sycamore	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FACW	15% 16%
<i>Betula nigra</i>	River Birch	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FACW	5% 6%
<i>Morus rubra</i>	Red Mulberry	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FACU	5% 6%
<i>Oxydendrum arboreum</i>	Sourwood	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	UPL	5% 6%
<i>Fagus grandifolia</i>	American Beech	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FACU	10% 11%
<i>Carya cordiformis</i>	Bitternut Hickory	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FACU	10% 11%
<i>Quercus alba</i>	White Oak	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FACU	10% 11%
<i>Quercus rubra</i>	Northern Red Oak	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FACU	10% 11%
<i>Ulmus rubra</i>	Slippery Elm	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FAC	10% 11%
<i>Magnolia acuminata</i>	Cucumber-Tree	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FACU	5%
Total							90% 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>Euonymus americanus</i>	Strawberry Bush	12 ft.	6-12 ft.	0.25"-1.0"	Shrub	FAC	2%
<i>Hamamelis virginiana</i>	Witch Hazel	12 ft.	6-12 ft.	0.25"-1.0"	Sub-Canopy	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>	sweetshrub	12 ft.	6-12 ft.	0.25"-1.0"	Shrub	FACU	1%
Total							10% 11%

- Notes:
 (1) Substitute species: American Basswood and Sweetshrub
 (2) Transplants from on-site may have been used at Designer's discretion for streambank and floodplain planting.
 (3) Percentages of each species may have been varied at Designer's discretion but did not exceed 20% per each species.
 (4) Designer may have substituted container plantings or other plantings for bare roots.

Utility Easement Planting



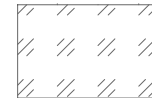
- Notes:
 (1) Wetland Planting Zones Small Tree/Shrubs were used to plant the Utility Easement

Temporary Seeding

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

- Notes:
 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	5%
<i>Salix nigra</i>	Black Willow	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FAC	18%
<i>Ulmus americana</i>	American Elm	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FACW	17%
<i>Acer-negundo</i>	Boxelder	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FAC	5%
<i>Celtis laevigata</i>	Sugarberry	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FACW	15%
Total							75% 70%

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	5%
<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"	Sub-Canopy	OBL	5%
<i>Sambucus canadensis</i>	Elderberry	12 ft.	6-12 ft.	0.25"-1.0"	Shrub	FAC	5%
<i>Salix sericea</i>	Silky Willow	12 ft.	6-12 ft.	0.25"-1.0"	Sub-Canopy	OBL	5%
<i>Cornus amomum</i>	Silky Dogwood	12 ft.	6-12 ft.	0.25"-1.0"	Shrub	FACW	5%
Total							25% 30%

- Notes:
 (1) Substitute species: Silky Dogwood and Carolina Silverbell
 (2) Transplants from on-site may have been used at Designer's discretion for streambank and floodplain planting.
 (3) Percentages of each species may have been varied at Designer's discretion but did not exceed 20% per each species.
 (4) Designer may have substituted container plantings or other plantings for bare roots.
 (5) Wetland Planting Zone Small Tree/Shrubs were used to plant the Utility Easement

Partially Vegetated Buffer Area Planting



Partially Vegetated 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	10%
<i>Euonymus americana</i>	Strawberry Bush	12 ft.	6-12 ft.	0.25"-1.0"	Shrub	FAC	10%
<i>Lindera benzoin</i>	Spicebush	12 ft.	6-12 ft.	0.25"-1.0"	Sub-Canopy	FAC	10%
<i>Fagus grandifolia</i>	American Beech	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FACU	10%
<i>Ulmus rubra</i>	Slippery Elm	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FAC	10%
<i>Hamamelis virginiana</i>	Witchhazel	12 ft.	6-12 ft.	0.25"-1.0"	Sub-Canopy	FACU	10%
<i>Calycanthus floridus</i>	Sweetshrub	12 ft.	6-12 ft.	0.25"-1.0"	Shrub	FACU	10%
<i>Cornus florida</i>	Flowering Dogwood	12 ft.	6-12 ft.	0.25"-1.0"	Sub-Canopy	FACU	10%
<i>Asimina triloba</i>	Pawpaw	12 ft.	6-12 ft.	0.25"-1.0"	Sub-Canopy	FAC	10%
<i>Quercus rubra</i>	Northern Red Oak	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	FACU	5%
<i>Ilex opaca</i>	American Holly	12 ft.	6-12 ft.	0.25"-1.0"	Sub-Canopy	FACU	5%
Total							100%

Riparian Corridor Planting (Streambanks)



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	50% 45%
<i>Cornus amomum</i>	Silky Dogwood	8 ft.	6-8 ft.	0.5"-1.5" cal.	Shrub	FACW	10% 13%
<i>Salix sericea</i>	Silky Willow	8 ft.	6-8 ft.	0.5"-1.5" cal.	Shrub	OBL	10% 21%
<i>Cephalanthus occidentalis</i>	Buttonbush	8 ft.	6-8 ft.	0.5"-1.5" cal.	Shrub	OBL	10%
<i>Sambucus canadensis</i>	Elderberry	8 ft.	6-8 ft.	0.5"-1.5" cal.	Shrub	FAC	10% 11%
Total							100%
Herbaceous Plugs							
Species	Common Name	Max Spacing	Indiv. Spacing	Min. Size	Stratum	Wetland Indicator	% of Stems
<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 (20 lbs/ acre)					
Approved Date	Species Name	Common Name	Stratum	Wetland Indicator	Density (lbs/acre)
All Year	<i>Schizachyrium scoparium</i>	Little Bluestem	Herb	FACU	3.0
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>Panicum clandestinum</i>	Deertongue	Herb	FAC	2.0
All Year	<i>Elymus virginicus</i>	Virginia Wild Rye	Herb	FACW	3.0
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 (20 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>Carex frankii</i>	Frank's Sedge	Herb	OBL	2.0
All Year	<i>Elymus virginicus</i>	Virginia Wild Rye	Herb	FACW	3.0
All Year	<i>Bidens aristosa</i>	Bur-Marigold	Herb	FACW	2.0
All Year	<i>Panicum ergatum</i>	Switchgrass	Herb	FAC	2.0
All Year	<i>Juncus effusus</i>	Common Rush	Herb	OBL	2.0
All Year	<i>Panicum dichotomiflorum</i>	Smooth Panicgrass	Herb	FACW	2.0
All Year	<i>Tripsacum dactyloides</i>	Eastern Gamagrass	Herb	FACW	1.0
All Year	<i>Peltandra virginica</i>	Arrow Arum	Herb	OBL	1.0

- Notes:
 (1) Permanent seeding was applied in all disturbed areas within Conservation Easement.

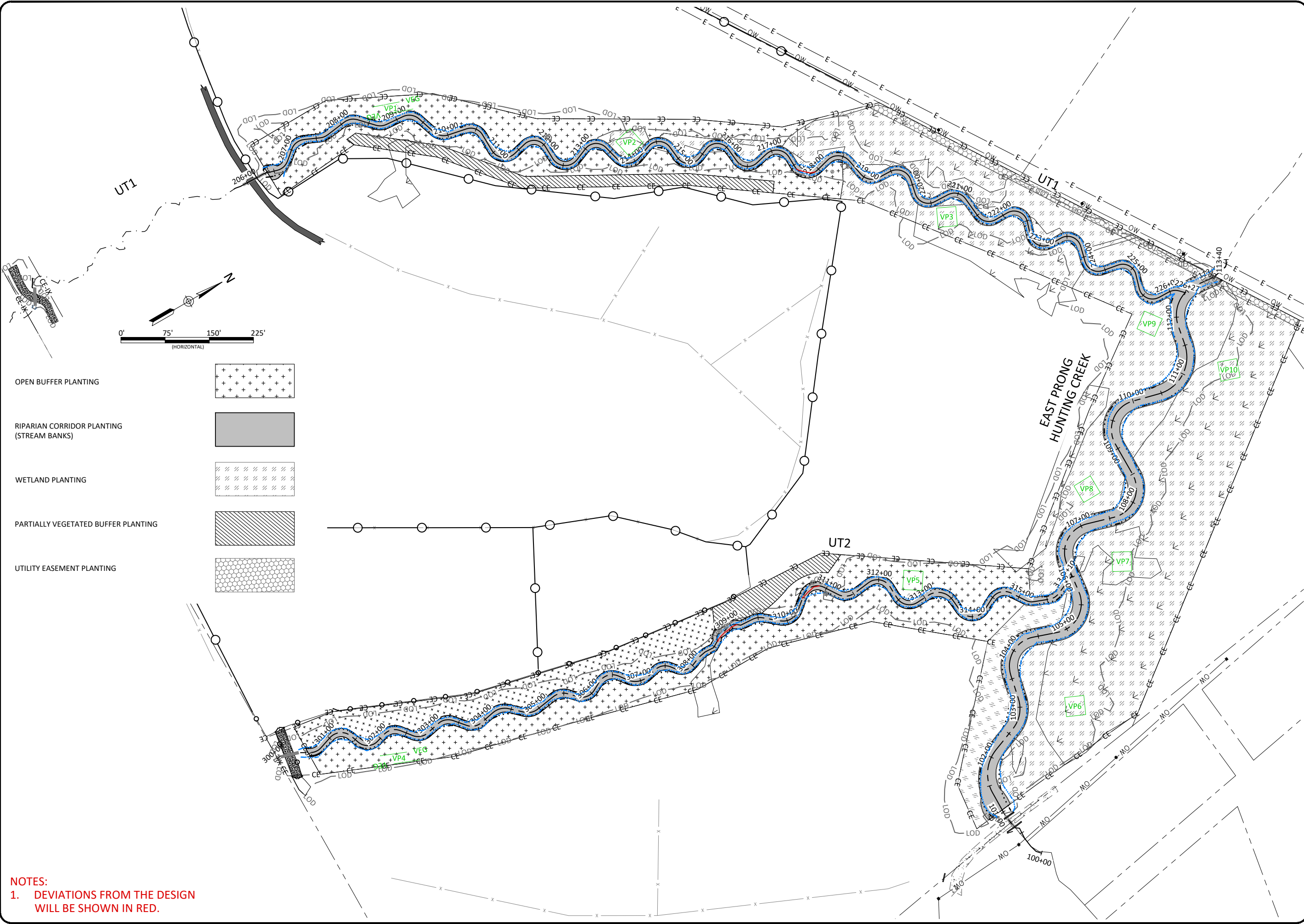
Stabilization Seeding

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) Stabilization Seeding for grading outside Conservation Easement, utility easements, and stream crossings was applied.
 (2) Temporary seed and mulch with all permanent seed was applied.

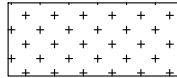
- NOTES:
 1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.





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

OPEN BUFFER PLANTING



RIPARIAN CORRIDOR PLANTING (STREAM BANKS)



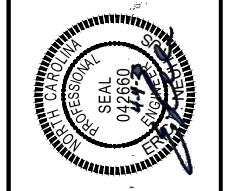
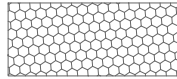
WETLAND PLANTING



PARTIALLY VEGETATED BUFFER PLANTING



UTILITY EASEMENT PLANTING



Laurel Valley Mitigation Site Record Drawing
 Burke County, North Carolina

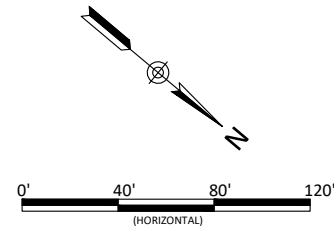
Planting Plan Overview

Revisions:

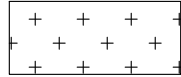
Date: April 4, 2023
 Job Number: W02187
 Project Engineer: EN
 Drawn By: CAW
 Checked By: IK

2.2

April 4, 2023
\\EgnytoDrive\wildlandsengineering\Shared\Projects\W02187_Laurel_Valley\Monitoring\Baseline\Monitoring\Plans\As-Built\Set1\Plans\02187_Planting.dwg



OPEN BUFFER PLANTING



RIPARIAN CORRIDOR PLANTING (STREAM BANKS)



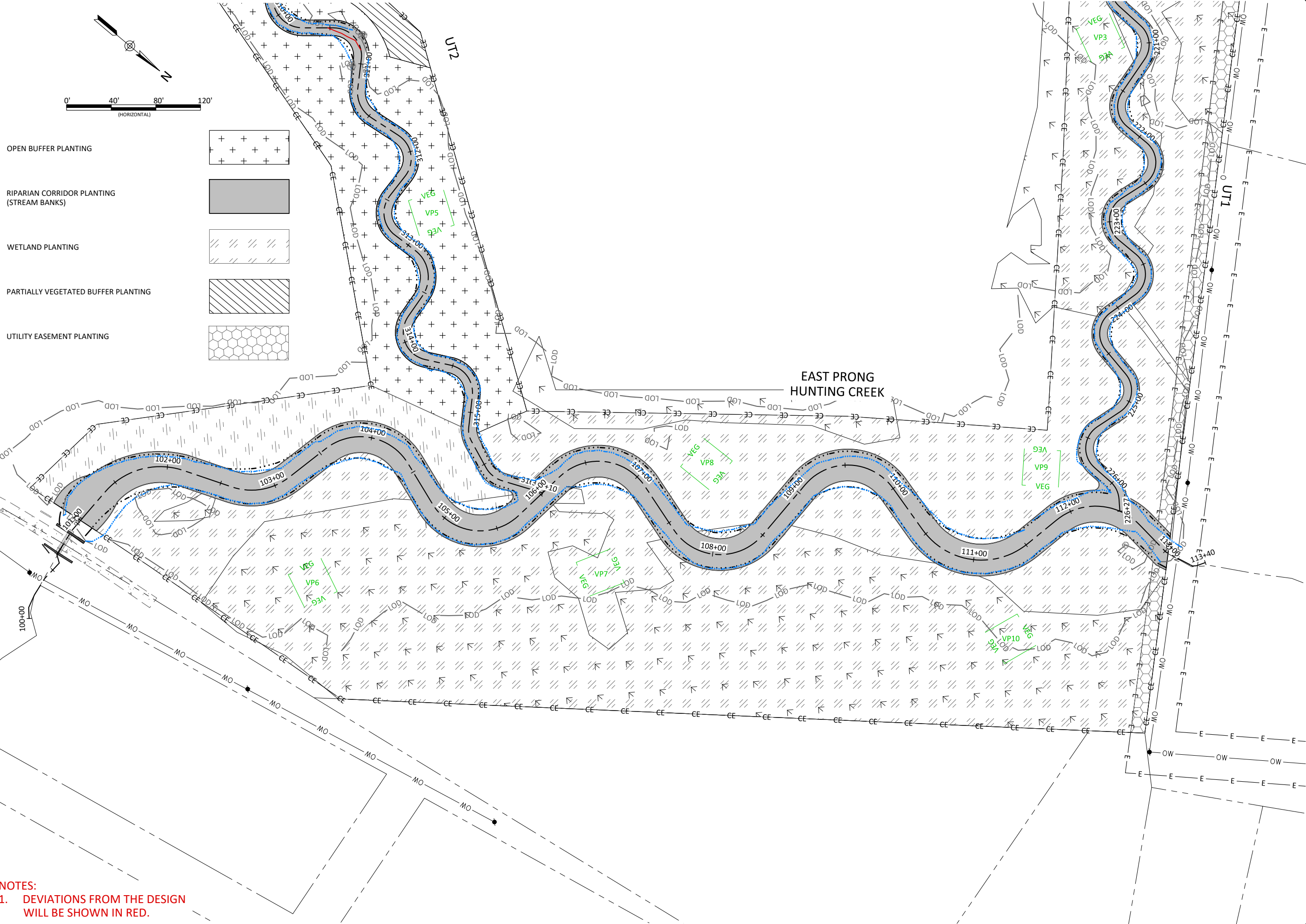
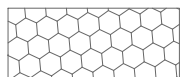
WETLAND PLANTING



PARTIALLY VEGETATED BUFFER PLANTING



UTILITY EASEMENT PLANTING



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



Laurel Valley Mitigation Site Record Drawing
Burke County, North Carolina

East Prong Hunting Creek Planting

Revisions:

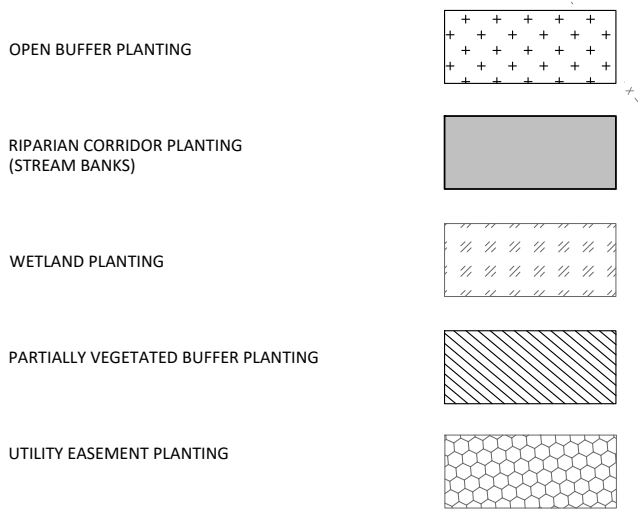
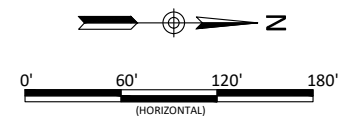
Date: April 4, 2023
Job Number: W02187
Project Engineer: EN
Drawn By: CAW
Checked By: IK

2.3

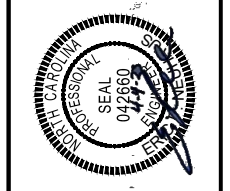
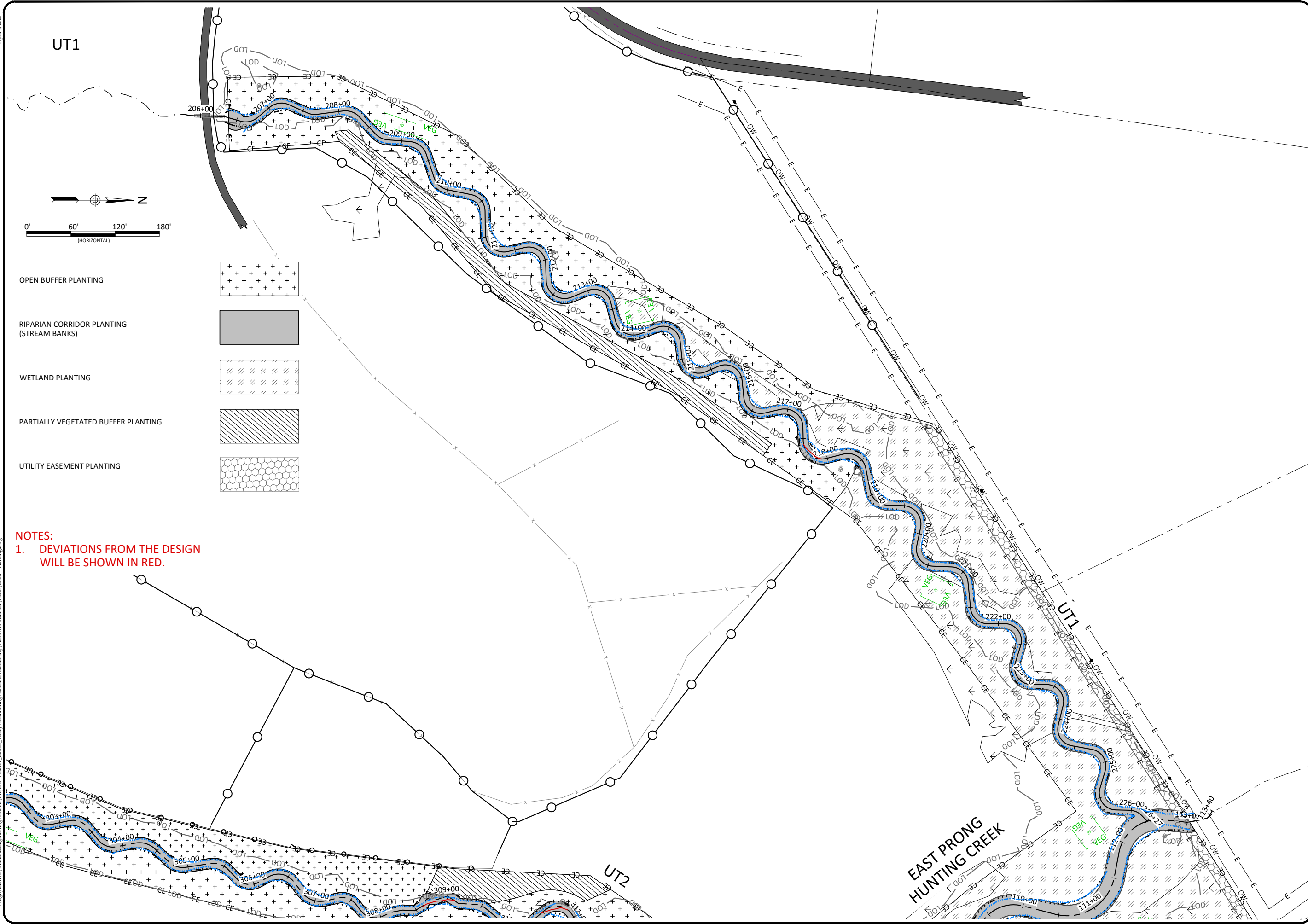
Sheet

April 4, 2023
\\Epm\drive\wildlandengineering\Shared\Projects\W02187_Laurel_Valley\Monitoring\Baseline\Monitoring\Plans\As-Built\Set\Plans\Q2187_Planting.dwg

UT1



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



Laurel Valley Mitigation Site Record Drawing
Burke County, North Carolina

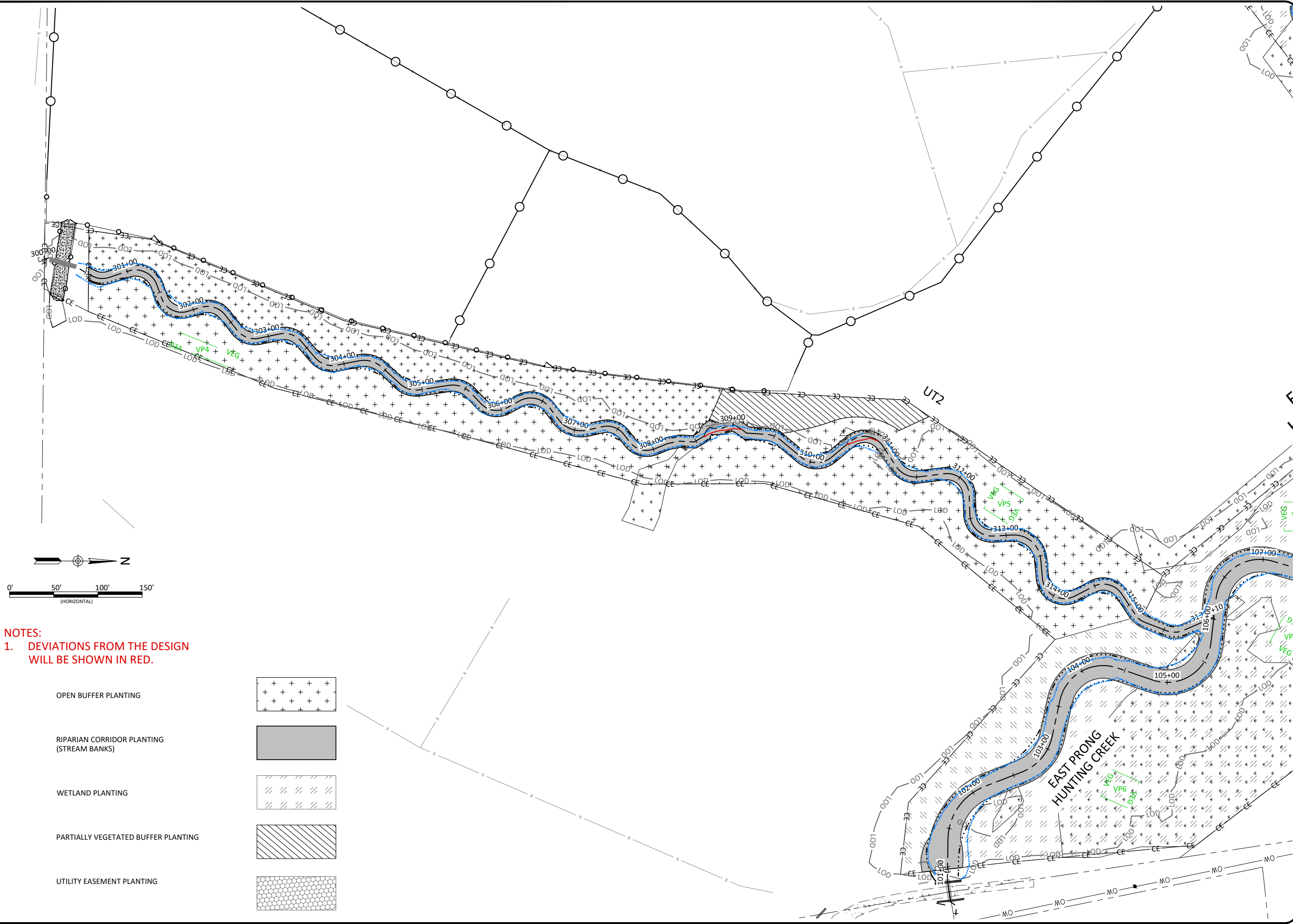
UT1 Planting

Revisions:

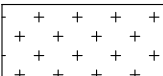




Date: April 4, 2023
Job Number: W02187
Project Engineer: EN
Drawn By: CAW
Checked By: IK

2.4

Sheet



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

- OPEN BUFFER PLANTING 
- RIPARIAN CORRIDOR PLANTING (STREAM BANKS) 
- WETLAND PLANTING 
- PARTIALLY VEGETATED BUFFER PLANTING 
- UTILITY EASEMENT PLANTING 

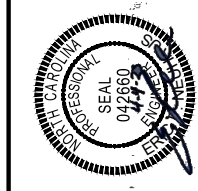
Laurel Valley Mitigation Site Record Drawing
 Burke County, North Carolina

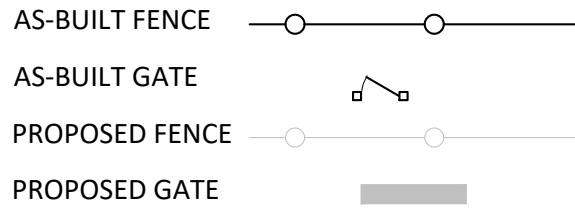
UT2 Planting

Revisions:

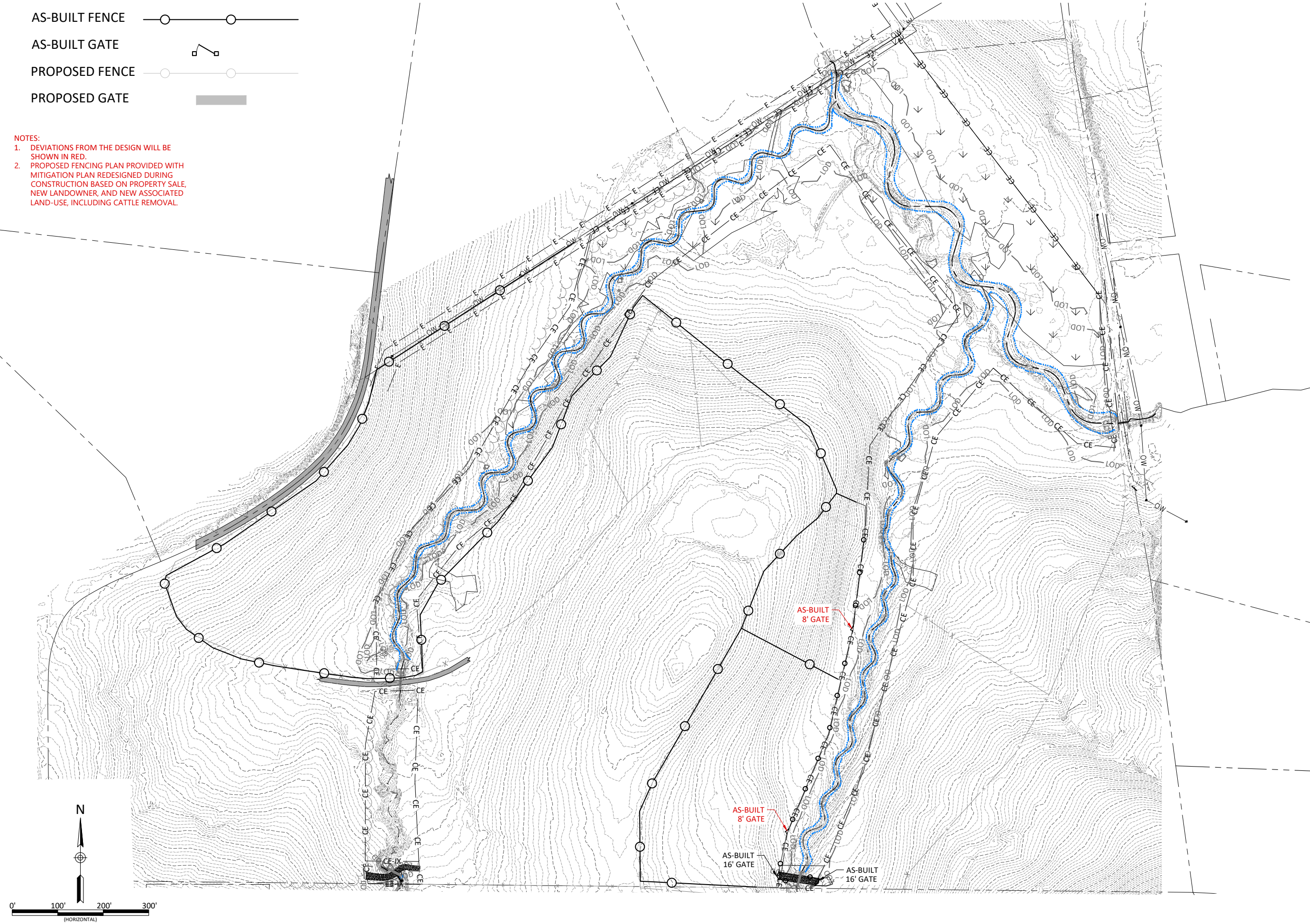
Date: April 4, 2023
 Job Number: W02187
 Project Engineer: EN
 Drawn By: CAW
 Checked By: IK

2.5





- NOTES:**
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED.
 2. PROPOSED FENCING PLAN PROVIDED WITH MITIGATION PLAN REDESIGNED DURING CONSTRUCTION BASED ON PROPERTY SALE, NEW LANDOWNER, AND NEW ASSOCIATED LAND-USE, INCLUDING CATTLE REMOVAL.

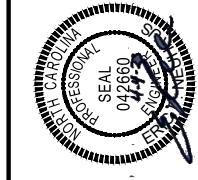


Laurel Valley Mitigation Site Record Drawing
 Burke County, North Carolina

Fencing Plan
 Farm Plan

Date:	April 4, 2023
Job Number:	W02187
Project Engineer:	EN
Drawn By:	CAW
Checked By:	JK

3.0



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 10/31/22-01/09/23; 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 AUGUST 31, 2020 BY PHILLIP B. KEE, NC PLS (LICENSE #4647).

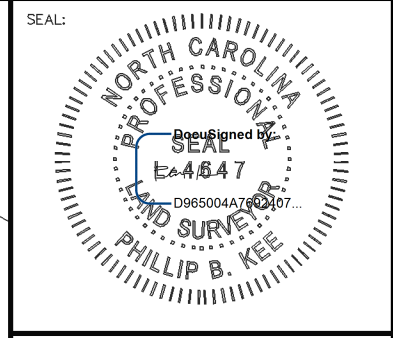
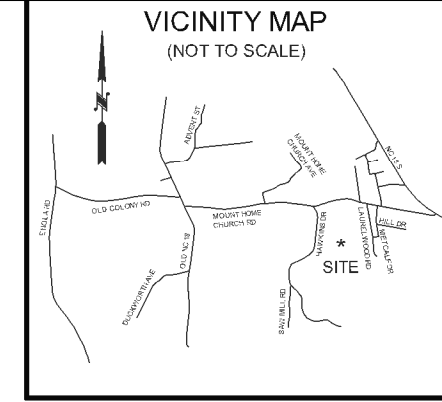
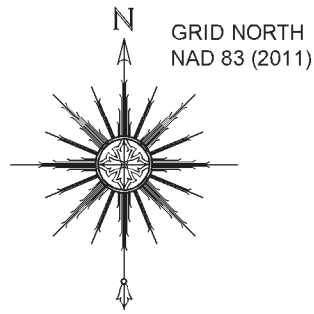
WITNESS MY ORIGINAL SIGNATURE, LICENSE NUMBER, AND SEAL THIS 23RD DAY OF FEBRUARY, 2023, A.D.

DocuSigned by:

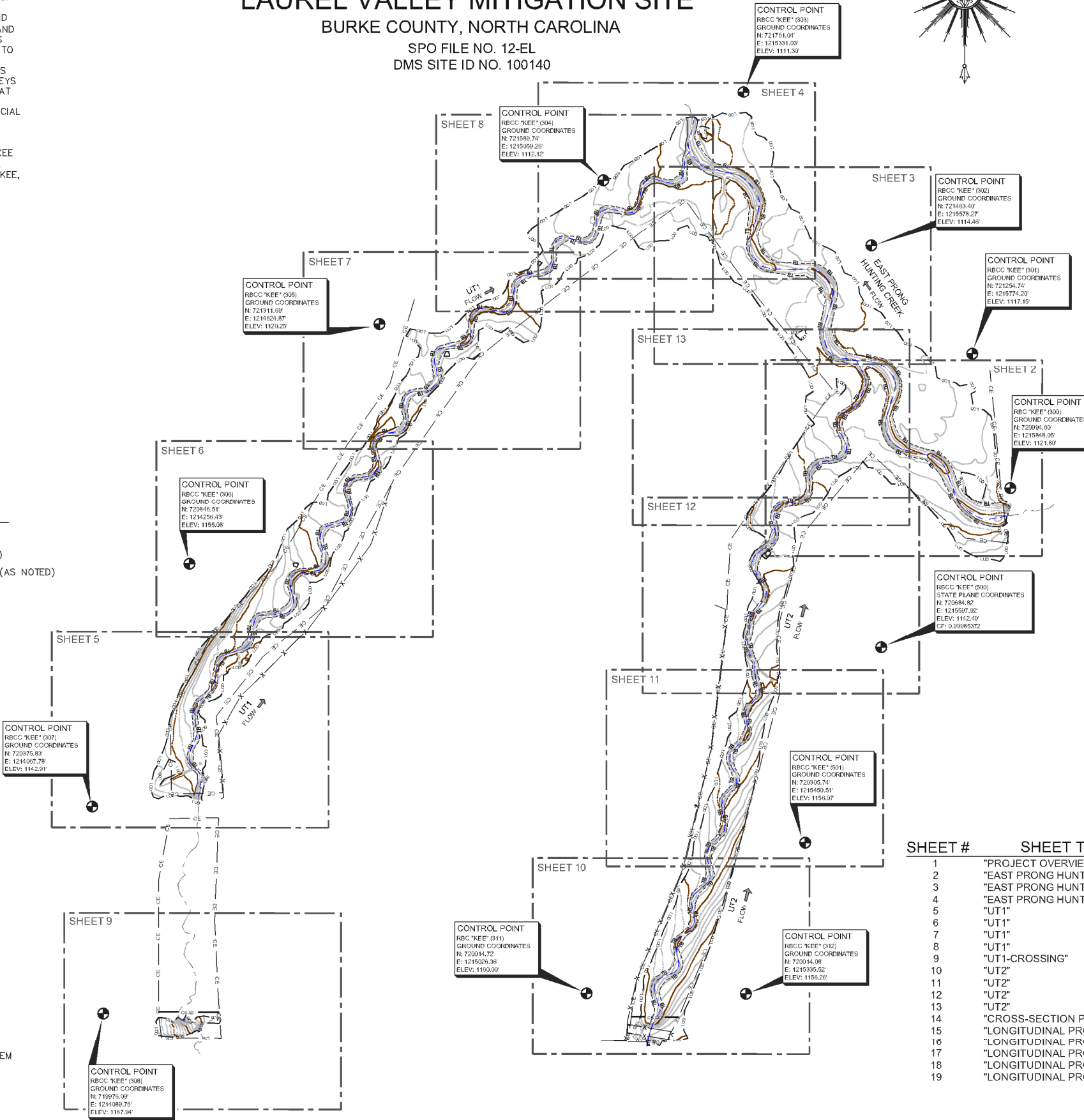
D965004A7692407
PHILLIP B. KEE, PLS L-4647

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

THE STATE OF NORTH CAROLINA,
NCDEQ: DEPARTMENT OF MITIGATION SERVICES
"LAUREL VALLEY MITIGATION SITE"
BURKE COUNTY, NORTH CAROLINA
SPO FILE NO. 12-EL
DMS SITE ID NO. 100140



LEGEND	
	STRUCTURE NUMBER
	1/2" RBCC (CROSS-SECTION REBAR)
	5/8" RBC W/ "KEE" CONTROL CAP (AS NOTED)
	GAUGE (AS NOTED)
	PHOTO POINT
	DECIDUOUS TREE
	LOG SILL
	ROCK SILL
	COVER LOG
	LOG J-HOOK
	MOBILE VEGETATION PLOT
	BOULDER TOE
	BRUSH TOE
	RIFFLE
	SOIL ROADBED
	RIP RAP
	GRAVEL
	MINOR CONTOUR
	MAJOR CONTOUR
	LIMITS OF DISTURBANCE
	THALWEG
	DESIGN CENTERLINE
	TOP OF BANK
	FENCE
	CONSERVATION EASEMENT
	INTERNAL EASEMENT CROSSING
	REBAR W/ CAP
	REBAR W/ CAP SET IN CONCRETE
	ELEVATION
	NORTH AMERICAN VERTICAL DATUM
	NORTH AMERICAN DATUM
	NATIONAL SPATIAL REFERENCE SYSTEM
	CORRUGATED METAL PIPE
	CORRUGATED PLASTIC PIPE
	VEGETATION PLOT
	STATION



- 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, LAUREL VALLEY SITE" AND RECORDED IN PB: 57 PG: 69 DATED AUGUST 31, 2021, RECORDED IN THE BURKE COUNTY REGISTRY.
 - BURKE COUNTY GIS WEBSITE USED TO IDENTIFY ADJOINING PROPERTY OWNERS.
 - BY GRAPHIC DETERMINATION, NO PORTION OF THE SUBJECT PROPERTY APPEARS TO LIE WITHIN A SPECIAL FLOOD HAZARD AREA (SFHA) AS DETERMINED BY THE FIRM MAP# 3710271200J & 371027000J DATED 09/05/07.
 - 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 FOR PLAN AND PROFILES IS BASED OFF OF FINAL PLANS AND UPON STREAM THALWEG LOCATED DURING THE AS-BUILT SURVEY BETWEEN THE DATES OF 10/31/22-11/24/22. BEGIN AND END STATIONING LOCATION WAS PROVIDED BY WILDLANDS ENGINEERING, INC.
 - CONTOUR INTERVAL: 1 FOOT
VERTICAL DATUM: NAVD 88
 - AREA OF LIMITS OF DISTURBANCE: 9.68 ACRES

SHEET #	SHEET TITLE
1	"PROJECT OVERVIEW"
2	"EAST PRONG HUNTING CREEK"
3	"EAST PRONG HUNTING CREEK"
4	"EAST PRONG HUNTING CREEK"
5	"UT1"
6	"UT1"
7	"UT1"
8	"UT1"
9	"UT1-CROSSING"
10	"UT2"
11	"UT2"
12	"UT2"
13	"UT2"
14	"CROSS-SECTION PROFILES # 1-11"
15	"LONGITUDINAL PROFILE: EAST PRONG HUNTING CREEK STA: 100+00-112+50"
16	"LONGITUDINAL PROFILE: UT 1 STA: 200+00-210+00"
17	"LONGITUDINAL PROFILE: UT 1 STA: 210+00-220+10"
18	"LONGITUDINAL PROFILE: UT 2 STA: 300+00-308+00"
19	"LONGITUDINAL PROFILE: UT 2 STA: 308+00-316+40"

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NO. 12-EL
DMS SITE ID NO. 100140

PROJECT:
LAUREL VALLEY MITIGATION SITE

SHEET TITLE:
PROJECT OVERVIEW

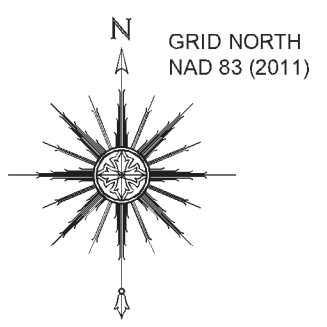
TOWNSHIP:	COUNTY:	STATE:
MORGANTON	BURKE	NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: NL/PBK/HJL	SURVEY BY: KP, NH, MB
SCALE: NOT TO SCALE	SURVEY DATE: 02/23/23	
JOB: #2210106-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	
#	DATE	REVISIONS

SHEET:
1 OF 19

Kee
MAPPING & SURVEYING
P.O. Box 2566
Asheville, NC 28802
(828) 575-9021
www.keemap.com
License # C-3039

SHEET 3

SHEET 2/13

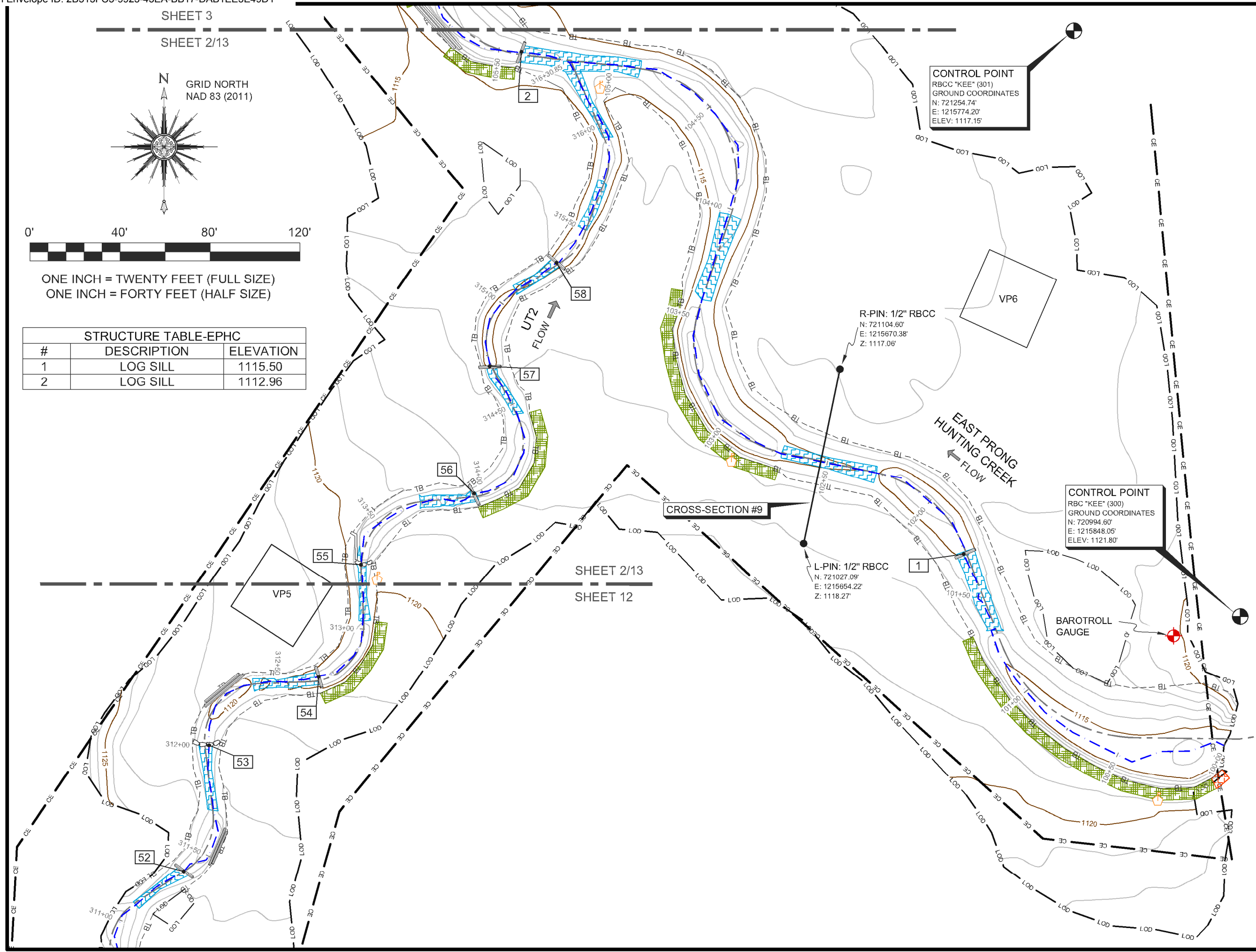


GRID NORTH
NAD 83 (2011)

0' 40' 80' 120'

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

STRUCTURE TABLE-EPHC		
#	DESCRIPTION	ELEVATION
1	LOG SILL	1115.50
2	LOG SILL	1112.96



CONTROL POINT
RBCC "KEE" (301)
GROUND COORDINATES
N: 721254.74'
E: 1215774.20'
ELEV: 1117.15'

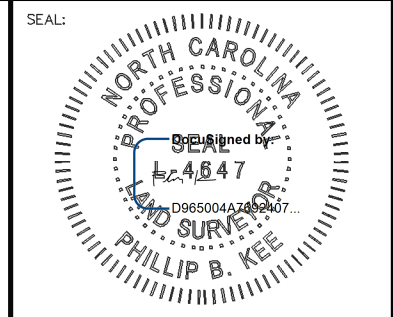
R-PIN: 1/2" RBCC
N: 721104.60'
E: 1215670.38'
Z: 1117.06'

CONTROL POINT
RBC "KEE" (300)
GROUND COORDINATES
N: 720994.60'
E: 1215848.05'
ELEV: 1121.80'

L-PIN: 1/2" RBCC
N: 721027.09'
E: 1215654.22'
Z: 1118.27'

SHEET 2/13

SHEET 12



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

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NO. 12-EL
DMS SITE ID NO. 100140

PROJECT:
LAUREL VALLEY MITIGATION SITE

SHEET TITLE:
EAST PRONG HUNTING CREEK

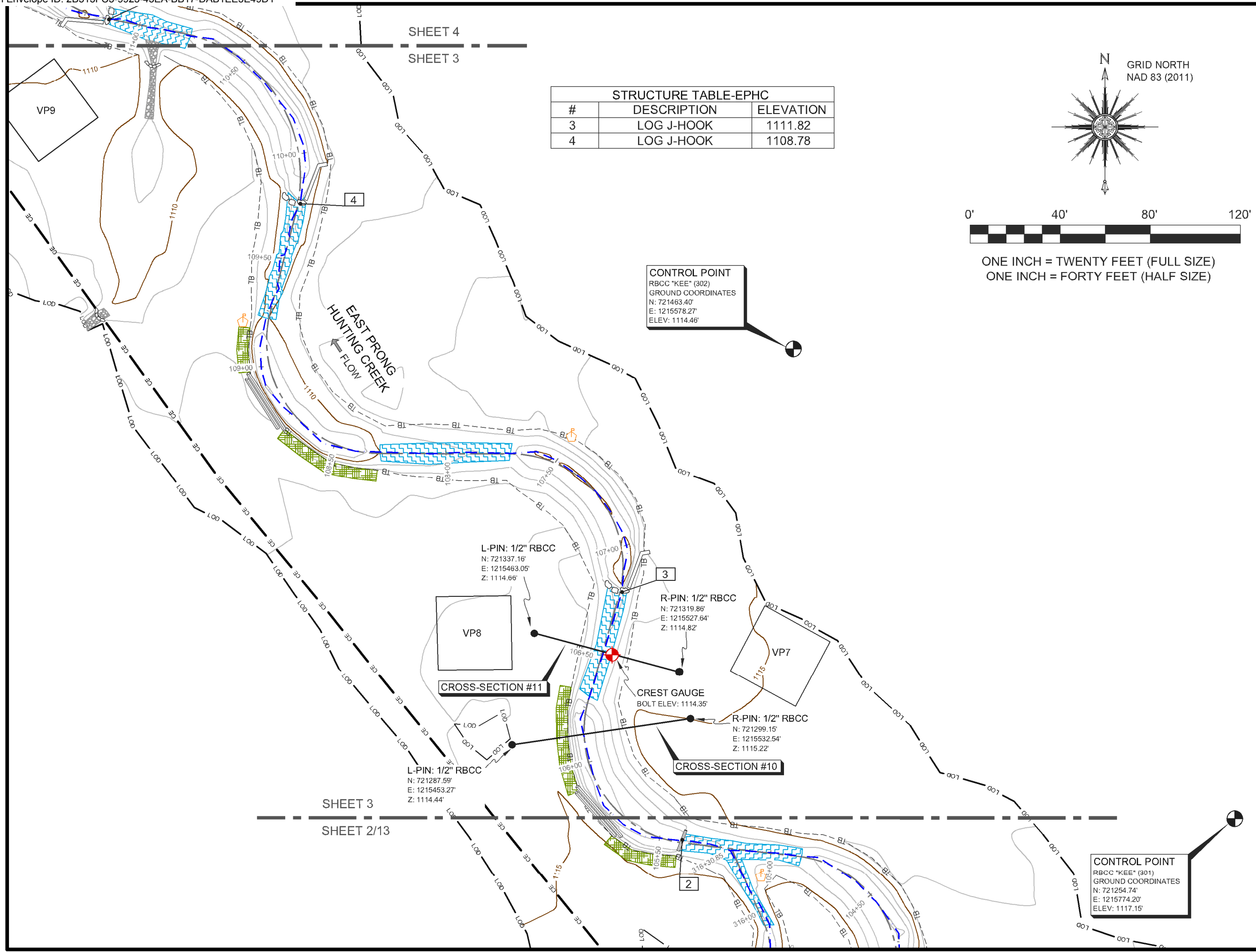
TOWNSHIP: MORGANTON	COUNTY: BURKE	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: NL/PBK/HJL	SURVEY BY: KP, NH, MB
SCALE: AS SHOWN	SURVEY DATE: 02/23/23	
JOB: #2210106-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	

#	DATE	REVISIONS

SHEET:
2 OF 19



P.O. Box 2566
Asheville, NC 28802
(828) 575-9021
www.keemap.com
License # C-3039



STRUCTURE TABLE-EPHC		
#	DESCRIPTION	ELEVATION
3	LOG J-HOOK	1111.82
4	LOG J-HOOK	1108.78

CONTROL POINT
 RBCC "KEE" (302)
 GROUND COORDINATES
 N: 721463.40'
 E: 1215578.27'
 ELEV: 1114.46'

L-PIN: 1/2" RBCC
 N: 721337.16'
 E: 1215463.05'
 Z: 1114.66'

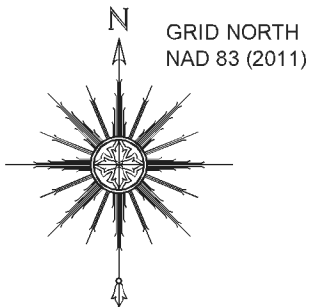
R-PIN: 1/2" RBCC
 N: 721319.86'
 E: 1215527.64'
 Z: 1114.82'

R-PIN: 1/2" RBCC
 N: 721299.15'
 E: 1215532.54'
 Z: 1115.22'

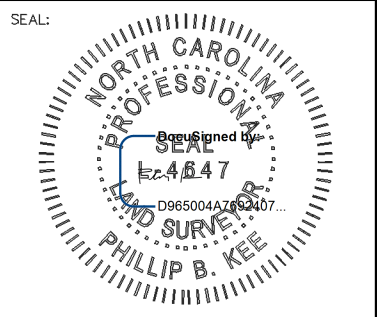
L-PIN: 1/2" RBCC
 N: 721287.59'
 E: 1215453.27'
 Z: 1114.44'

CREST GAUGE
 BOLT ELEV: 1114.35'

CONTROL POINT
 RBCC "KEE" (301)
 GROUND COORDINATES
 N: 721254.74'
 E: 1215774.20'
 ELEV: 1117.15'



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



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

ELEVATION DATUM: NAVD 88
 CONTOUR INTERVAL: 1 FOOT

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NO. 12-EL
 DMS SITE ID NO. 100140

PROJECT:
LAUREL VALLEY MITIGATION SITE

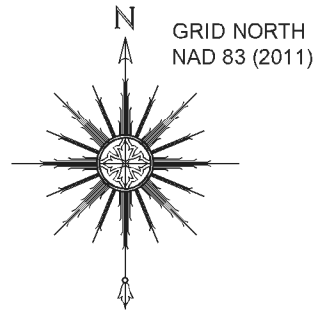
SHEET TITLE:
EAST PRONG HUNTING CREEK

TOWNSHIP: MORGANTON	COUNTY: BURKE	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: NL/PBK/HJL	SURVEY BY: KP, NH, MB
SCALE: AS SHOWN	SURVEY DATE: 02/23/23	
JOB: #2210106-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	
#	DATE	REVISIONS

SHEET:
3 OF 19



P.O. Box 2566
 Asheville, NC 28802
 (828) 575-9021
 www.keemap.com
 License # C-3039



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

STRUCTURE TABLE-EPHC		
#	DESCRIPTION	ELEVATION
5	LOG J-HOOK	1107.03

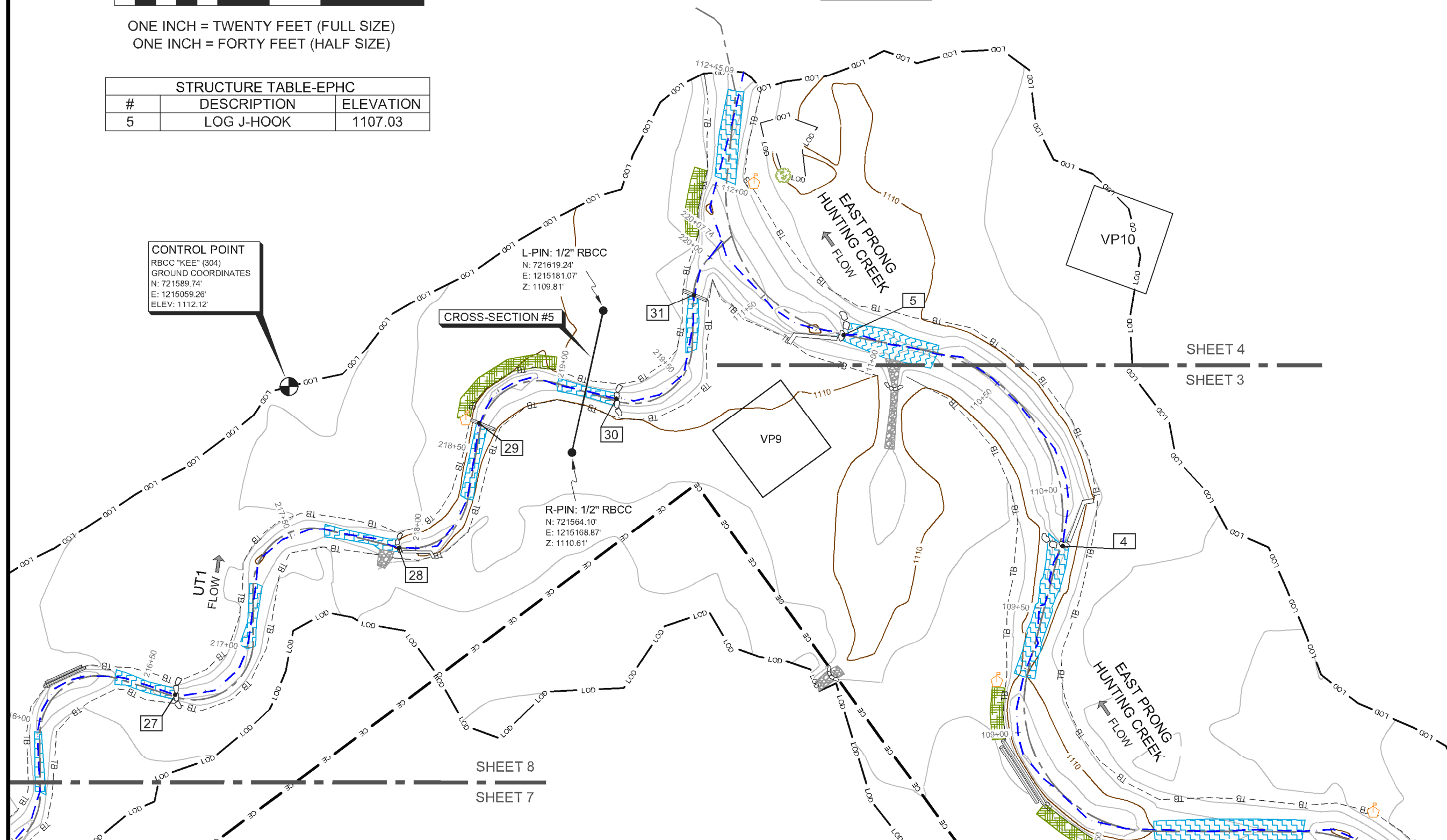
CONTROL POINT
RBCC "KEE" (303)
GROUND COORDINATES
N: 721761.04'
E: 1215331.03'
ELEV: 1111.30'

CONTROL POINT
RBCC "KEE" (304)
GROUND COORDINATES
N: 721589.74'
E: 1215059.26'
ELEV: 1112.12'

L-PIN: 1/2" RBCC
N: 721619.24'
E: 1215181.07'
Z: 1109.81'

R-PIN: 1/2" RBCC
N: 721564.10'
E: 1215168.87'
Z: 1110.61'

CROSS-SECTION #5

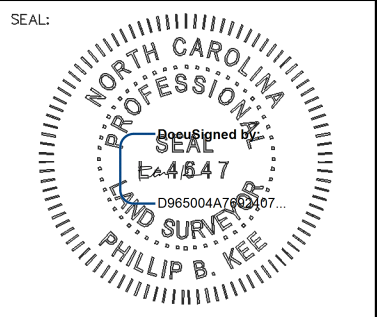


SHEET 4

SHEET 3

SHEET 8

SHEET 7



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

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NO. 12-EL
DMS SITE ID NO. 100140

PROJECT:
LAUREL VALLEY MITIGATION SITE

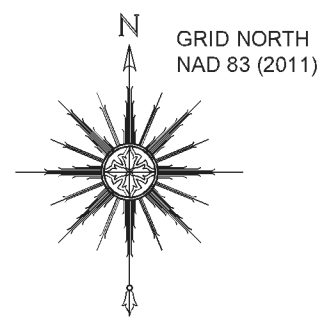
SHEET TITLE:
EAST PRONG HUNTING CREEK

TOWNSHIP: MORGANTON	COUNTY: BURKE	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: NL/PBK/HJL	SURVEY BY: KP, NH, MB
SCALE: AS SHOWN	SURVEY DATE: 02/23/23	
JOB: #2210106-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	
#	DATE	REVISIONS

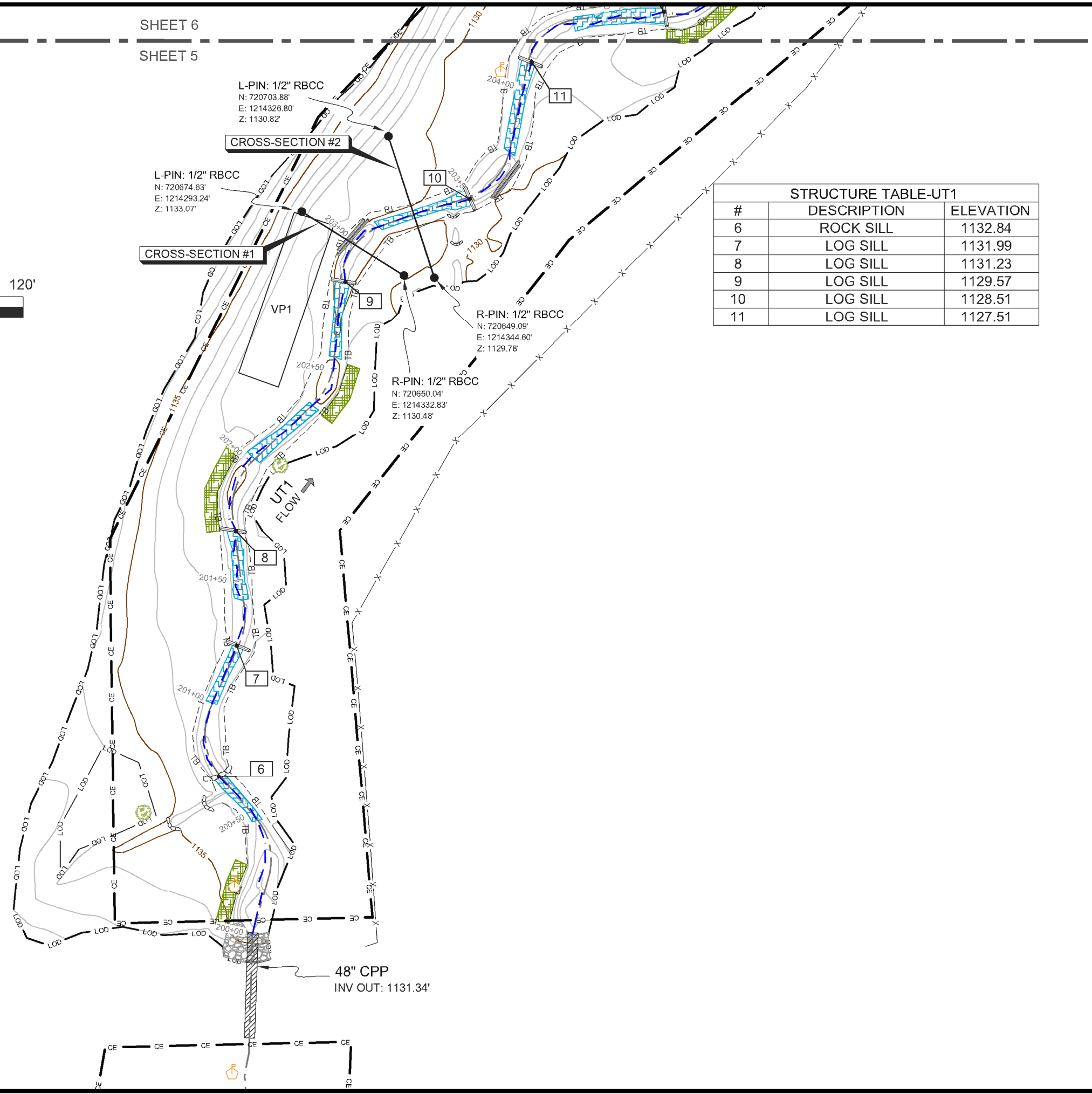
4 OF 19



P.O. Box 2566
Asheville, NC 28802
(828) 575-9021
www.keemap.com
License # C-3039



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



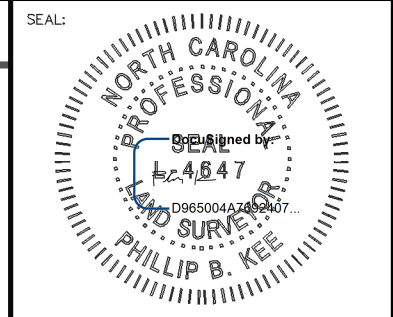
L-PIN: 1/2" RBCC
N: 720703.88'
E: 1214326.80'
Z: 1130.82'

L-PIN: 1/2" RBCC
N: 720674.63'
E: 1214293.24'
Z: 1133.07'

R-PIN: 1/2" RBCC
N: 720649.09'
E: 1214344.60'
Z: 1129.78'

R-PIN: 1/2" RBCC
N: 720650.04'
E: 1214332.83'
Z: 1130.48'

STRUCTURE TABLE-UT1		
#	DESCRIPTION	ELEVATION
6	ROCK SILL	1132.84
7	LOG SILL	1131.99
8	LOG SILL	1131.23
9	LOG SILL	1129.57
10	LOG SILL	1128.51
11	LOG SILL	1127.51



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

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NO. 12-EL
DMS SITE ID NO. 100140

PROJECT:
LAUREL VALLEY MITIGATION SITE

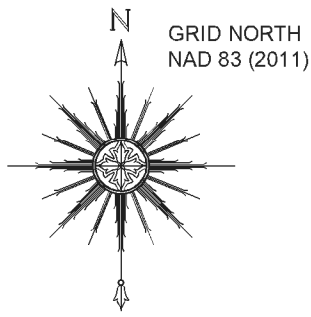
SHEET TITLE:
UT1

TOWNSHIP: MORGANTON	COUNTY: BURKE	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: NL/PBK/HJL	SURVEY BY: KP, NH, MB
SCALE: AS SHOWN	SURVEY DATE: 02/23/23	
JOB: #2210106-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	
#	DATE	REVISIONS

SHEET:
5 OF 19

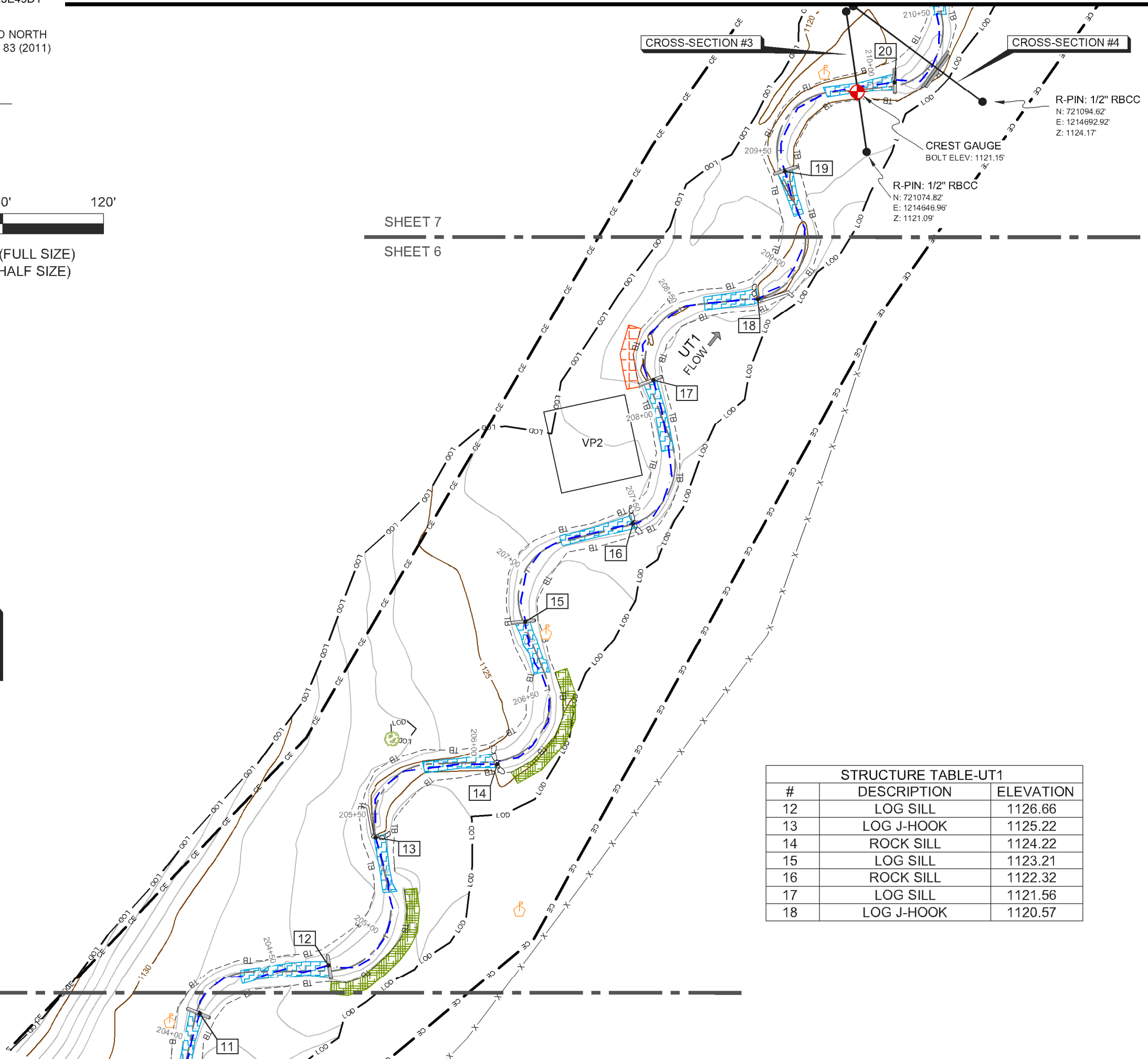


P.O. Box 2566
Asheville, NC 28802
(828) 575-9021
www.keemap.com
License # C-3039



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

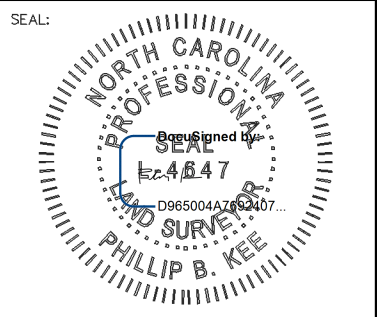
CONTROL POINT
RBCC "KEE" (306)
GROUND COORDINATES
N: 720846.51'
E: 1214256.43'
ELEV: 1155.08'



SHEET 7
SHEET 6

SHEET 6
SHEET 5

STRUCTURE TABLE-UT1		
#	DESCRIPTION	ELEVATION
12	LOG SILL	1126.66
13	LOG J-HOOK	1125.22
14	ROCK SILL	1124.22
15	LOG SILL	1123.21
16	ROCK SILL	1122.32
17	LOG SILL	1121.56
18	LOG J-HOOK	1120.57



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

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NO. 12-EL
DMS SITE ID NO. 100140

PROJECT:
LAUREL VALLEY MITIGATION SITE

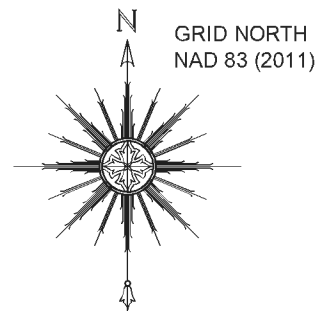
SHEET TITLE:
UT1

TOWNSHIP: MORGANTON	COUNTY: BURKE	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: NL/PBK/HJL	SURVEY BY: KP, NH, MB
SCALE: AS SHOWN	SURVEY DATE: 02/23/23	
JOB: #2210106-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	
#	DATE	REVISIONS

SHEET:
6 OF 19



P.O. Box 2566
Asheville, NC 28802
(828) 575-9021
www.keemap.com
License # C-3039



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

CONTROL POINT
RBCC "KEE" (305)
GROUND COORDINATES
N: 721311.69'
E: 1214624.87'
ELEV: 1120.25'

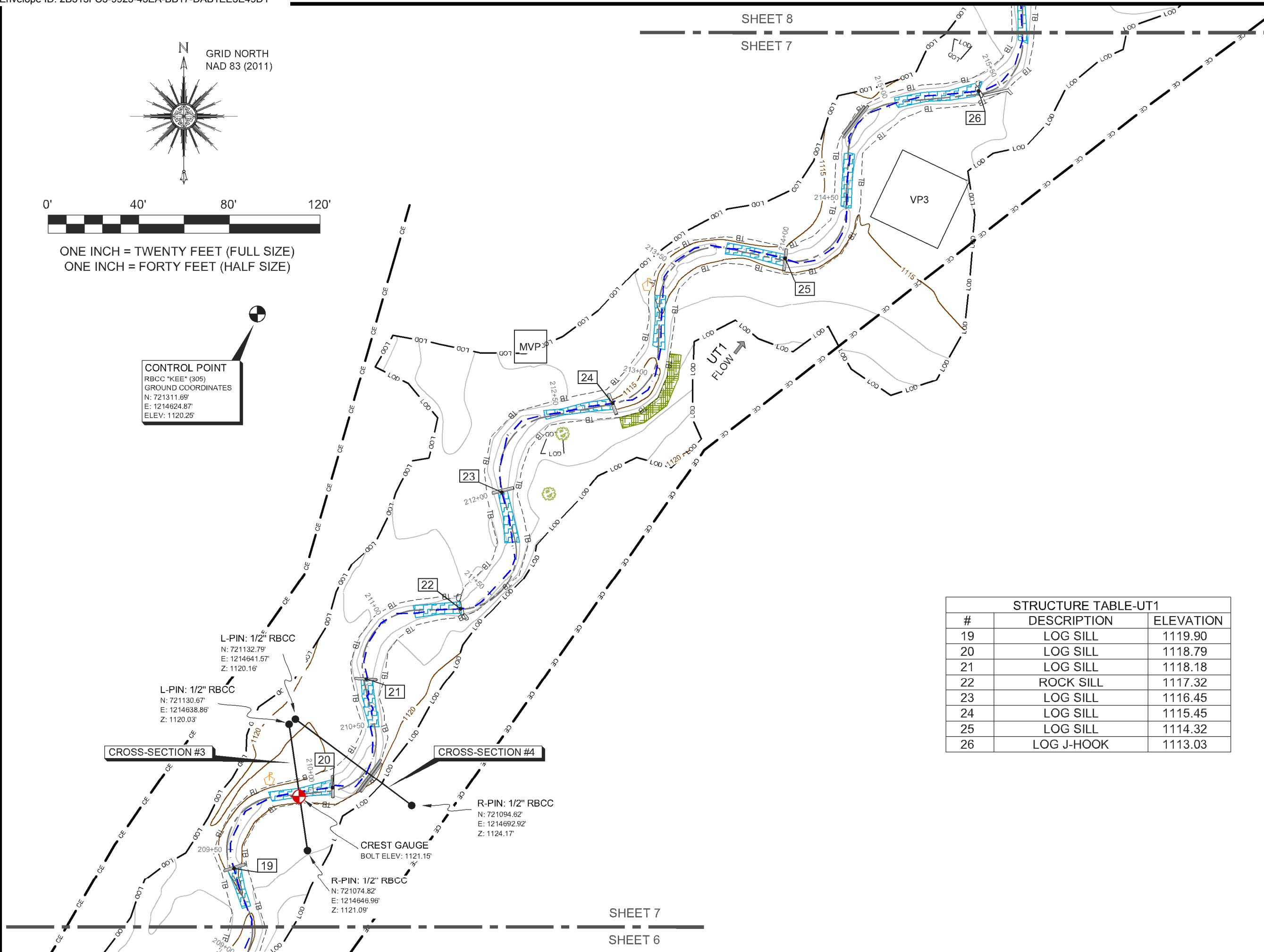
L-PIN: 1/2" RBCC
N: 721132.79'
E: 1214641.57'
Z: 1120.16'

L-PIN: 1/2" RBCC
N: 721130.67'
E: 1214638.86'
Z: 1120.03'

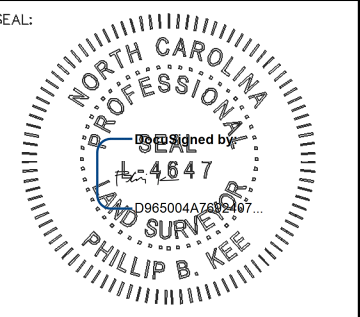
R-PIN: 1/2" RBCC
N: 721094.62'
E: 1214692.92'
Z: 1124.17'

R-PIN: 1/2" RBCC
N: 721074.82'
E: 1214646.96'
Z: 1121.09'

CREST GAUGE
BOLT ELEV: 1121.15'



STRUCTURE TABLE-UT1		
#	DESCRIPTION	ELEVATION
19	LOG SILL	1119.90
20	LOG SILL	1118.79
21	LOG SILL	1118.18
22	ROCK SILL	1117.32
23	LOG SILL	1116.45
24	LOG SILL	1115.45
25	LOG SILL	1114.32
26	LOG J-HOOK	1113.03



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

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NO. 12-EL
DMS SITE ID NO. 100140

PROJECT:
LAUREL VALLEY MITIGATION SITE

SHEET TITLE:
UT1

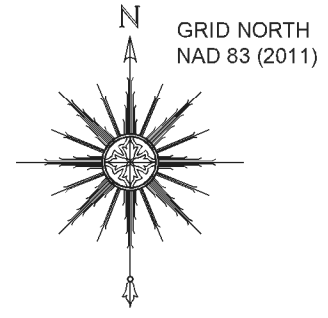
TOWNSHIP: MORGANTON	COUNTY: BURKE	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: NL/PBK/HJL	SURVEY BY: KP, NH, MB
SCALE: AS SHOWN	SURVEY DATE: 02/23/23	
JOB: #2210106-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	
#	DATE	REVISIONS

SHEET:
7 OF 19



P.O. Box 2566
Asheville, NC 28802
(828) 575-9021
www.keemap.com
License # C-3039

SHEET 7
SHEET 6



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

STRUCTURE TABLE-UT1		
#	DESCRIPTION	ELEVATION
27	ROCK SILL	1111.55
28	LOG J-HOOK	1109.91
29	LOG SILL	1109.33
30	ROCK SILL	1108.39
31	LOG SILL	1107.79

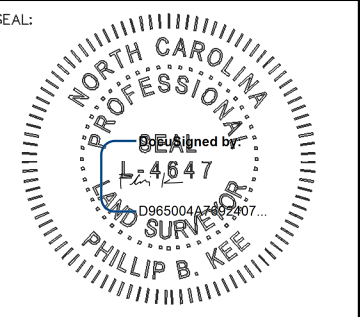
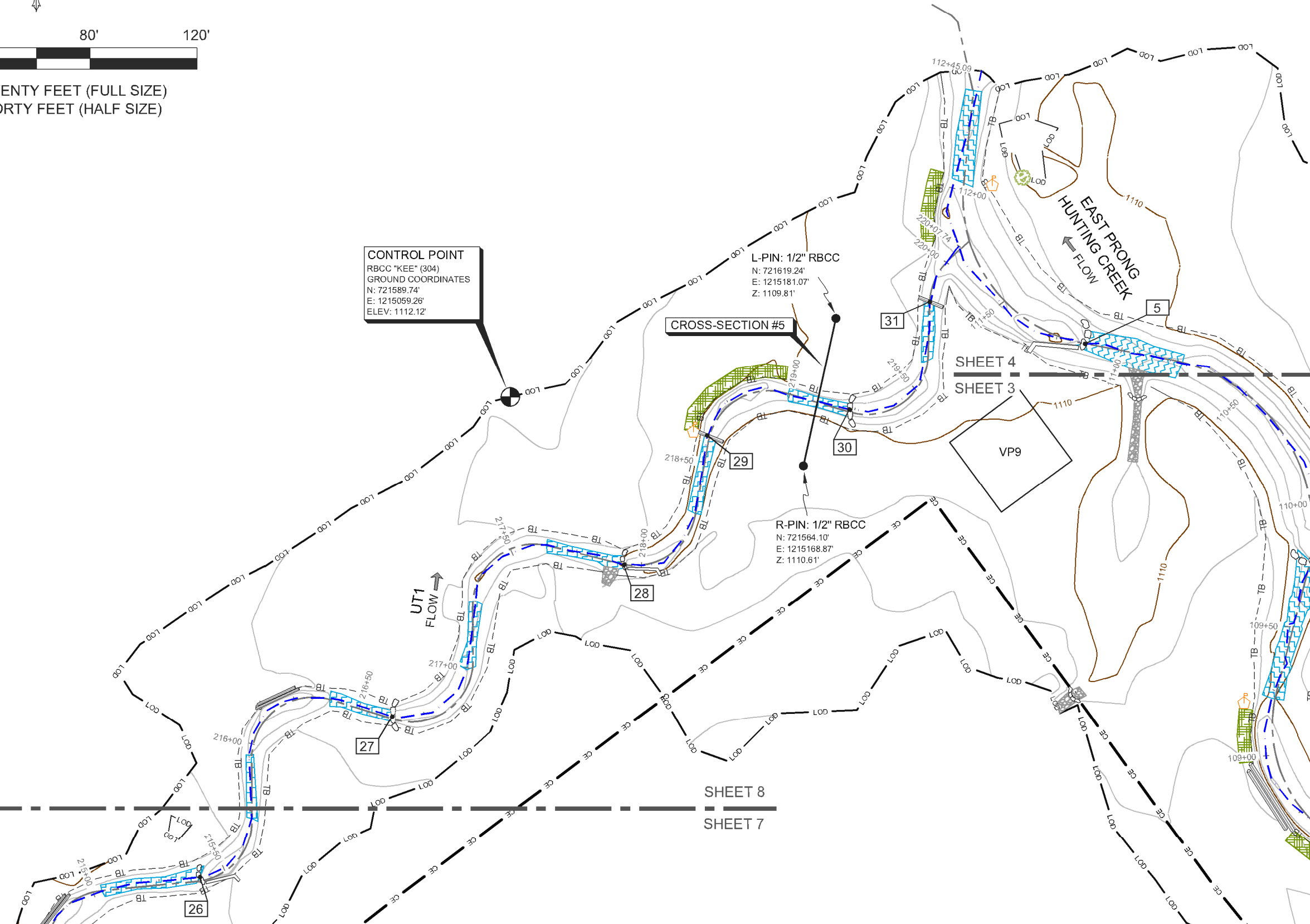
CONTROL POINT
RBCC "KEE" (303)
GROUND COORDINATES
N: 721761.04'
E: 1215331.03'
ELEV: 1111.30'

CONTROL POINT
RBCC "KEE" (304)
GROUND COORDINATES
N: 721589.74'
E: 1215059.26'
ELEV: 1112.12'

L-PIN: 1/2" RBCC
N: 721619.24'
E: 1215181.07'
Z: 1109.81'

R-PIN: 1/2" RBCC
N: 721564.10'
E: 1215168.87'
Z: 1110.61'

CROSS-SECTION #5



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

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NO. 12-EL
DMS SITE ID NO. 100140

PROJECT:
LAUREL VALLEY MITIGATION SITE

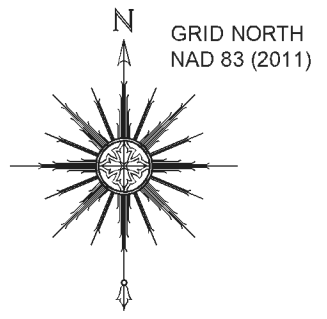
SHEET TITLE:
UT1

TOWNSHIP: MORGANTON	COUNTY: BURKE	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: NL/PBK/HJL	SURVEY BY: KP, NH, MB
SCALE: AS SHOWN	SURVEY DATE: 02/23/23	
JOB: #2210106-AB	SHEET SIZE: 11" x 17" (HALF SIZE)	
#	DATE	REVISIONS

SHEET:
8 OF 19

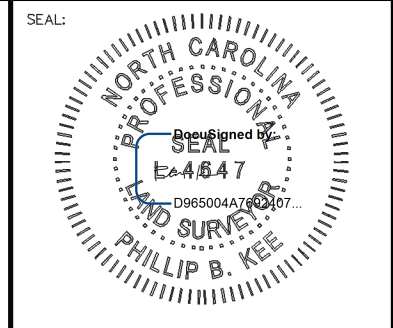
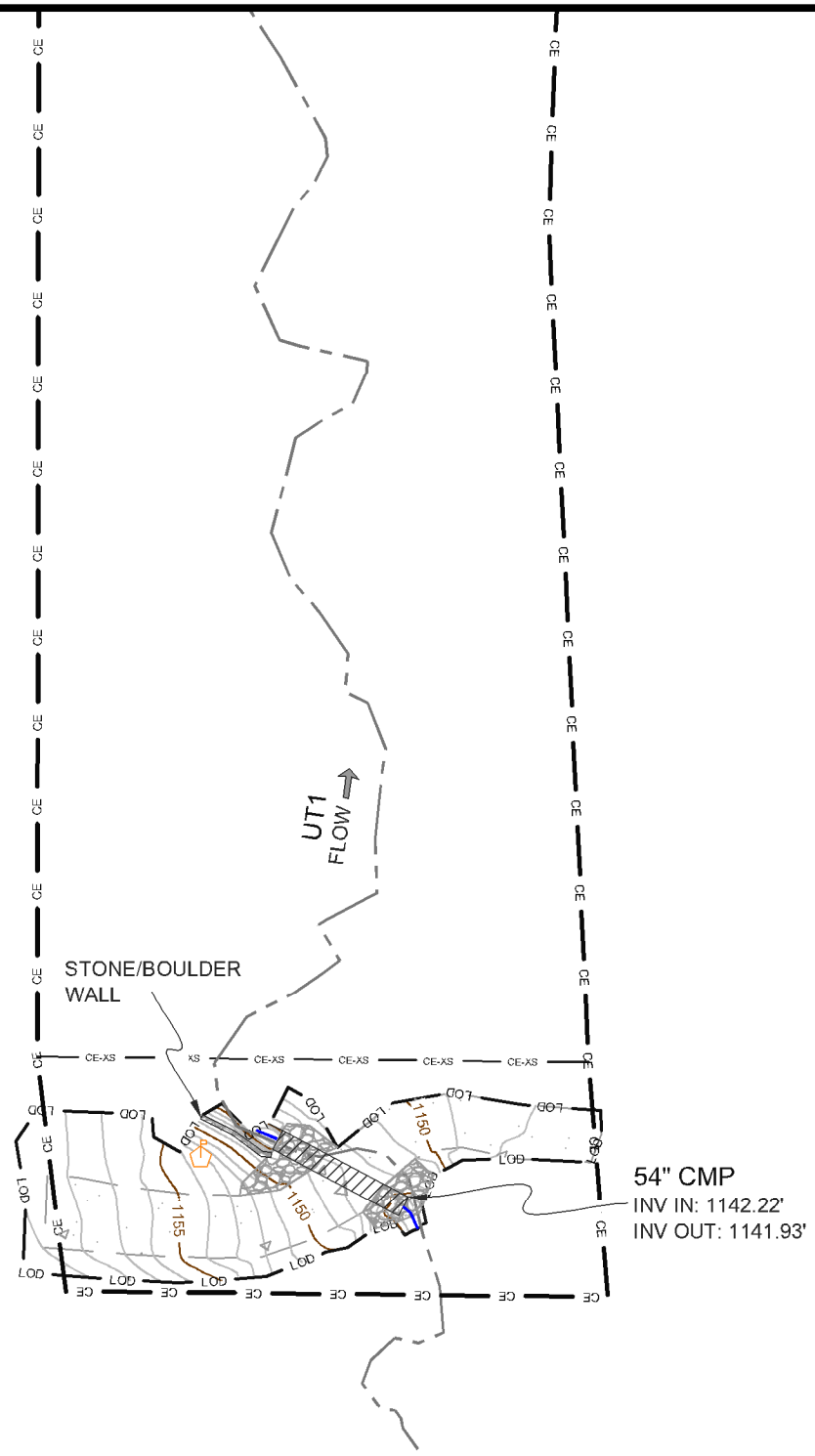


P.O. Box 2566
Asheville, NC 28802
(828) 575-9021
www.keemap.com
License # C-3039



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

CONTROL POINT
RBCC "KEE" (308)
GROUND COORDINATES
N: 719976.09'
E: 1214089.76'
ELEV: 1167.94'



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

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NO. 12-EL
DMS SITE ID NO. 100140

PROJECT:
LAUREL VALLEY MITIGATION SITE

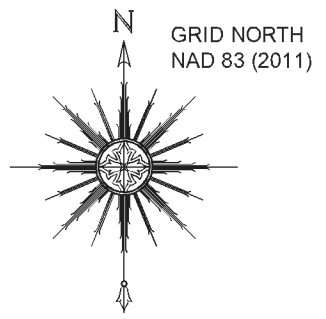
SHEET TITLE:
UT1-CROSSING

TOWNSHIP: MORGANTON	COUNTY: BURKE	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: NL/PBK/HJL	SURVEY BY: KP, NH, MB
SCALE: AS SHOWN	SURVEY DATE: 02/23/23	
JOB: #2210106-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	
#	DATE	REVISIONS

SHEET:
9 OF 19



P.O. Box 2566
Asheville, NC 28802
(828) 575-9021
www.keemap.com
License # C-3039

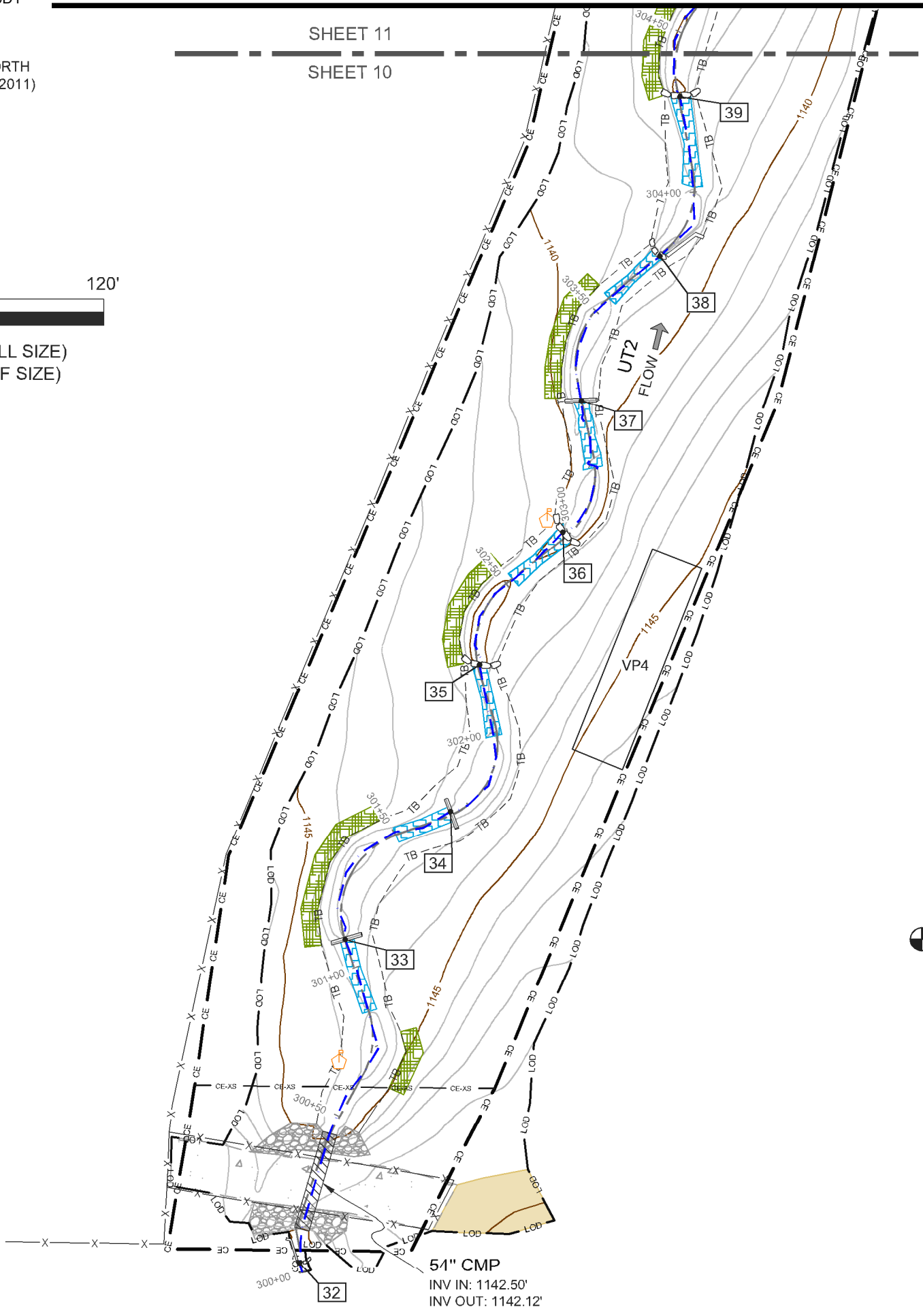


ONE INCH = TWENTY FEET (FULL SIZE)
ONE INCH = FORTY FEET (HALF SIZE)

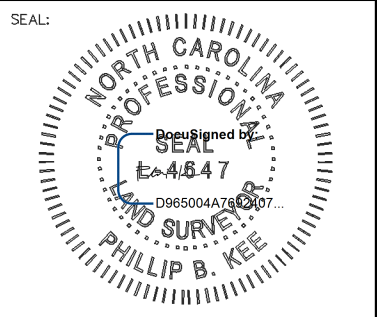
CONTROL POINT
RBC "KEE" (311)
GROUND COORDINATES
N: 720014.72'
E: 1215026.36'
ELEV: 1160.00'



CONTROL POINT
RBCC "KEE" (312)
GROUND COORDINATES
N: 720014.08'
E: 1215335.52'
ELEV: 1156.26'



STRUCTURE TABLE-UT2		
#	DESCRIPTION	ELEVATION
32	LOG J-HOOK	1144.53
33	LOG SILL	1142.24
34	LOG SILL	1141.43
35	ROCK SILL	1140.55
36	ROCK SILL	1139.45
37	LOG SILL	1138.55
38	LOG J-HOOK	1137.39
39	ROCK SILL	1136.28



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

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NO. 12-EL
DMS SITE ID NO. 100140

PROJECT:
LAUREL VALLEY MITIGATION SITE

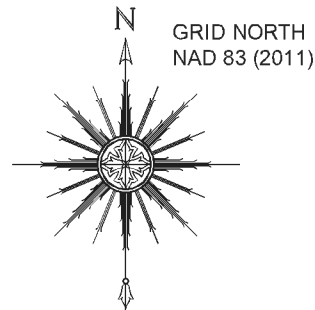
SHEET TITLE:
UT2

TOWNSHIP: MORGANTON	COUNTY: BURKE	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: NL/PBK/HJL	SURVEY BY: KP, NH, MB
SCALE: AS SHOWN	SURVEY DATE: 02/23/23	
JOB: #2210106-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	
#	DATE	REVISIONS

SHEET:
10 OF 19



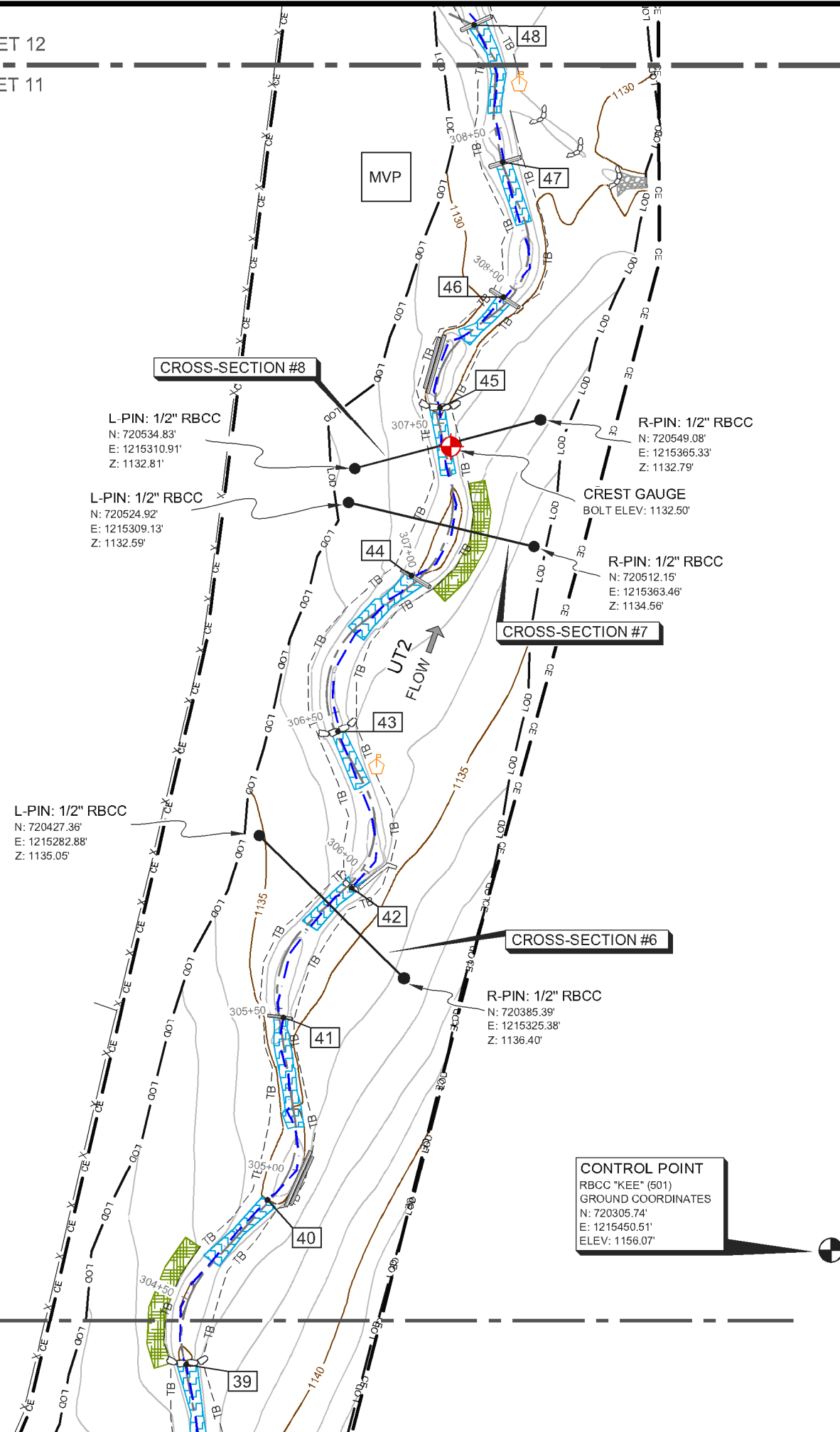
P.O. Box 2566
Asheville, NC 28802
(828) 575-9021
www.keemap.com
License # C-3039



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

STRUCTURE TABLE-UT2		
#	DESCRIPTION	ELEVATION
40	ROCK SILL	1135.17
41	LOG SILL	1134.11
42	LOG J-HOOK	1133.03
43	ROCK SILL	1132.14
44	LOG SILL	1130.88
45	ROCK SILL	1129.87
46	LOG SILL	1129.06
47	LOG SILL	1128.31

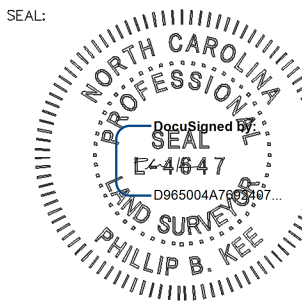
SHEET 12
SHEET 11



CONTROL POINT
RBCC "KEE" (501)
GROUND COORDINATES
N: 720305.74'
E: 1215450.51'
ELEV: 1156.07'

SHEET 11
SHEET 10

SEAL:



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

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NO. 12-EL
DMS SITE ID NO. 100140

PROJECT:
LAUREL VALLEY MITIGATION SITE

SHEET TITLE:
UT2

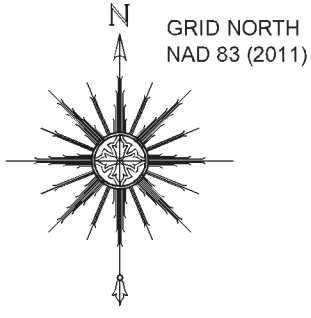
TOWNSHIP: MORGANTON	COUNTY: BURKE	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: NL/PBK/HJL	SURVEY BY: KP, NH, MB
SCALE: AS SHOWN	SURVEY DATE: 02/23/23	
JOB: #2210106-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	
#	DATE	REVISIONS

SHEET:

11 OF 19

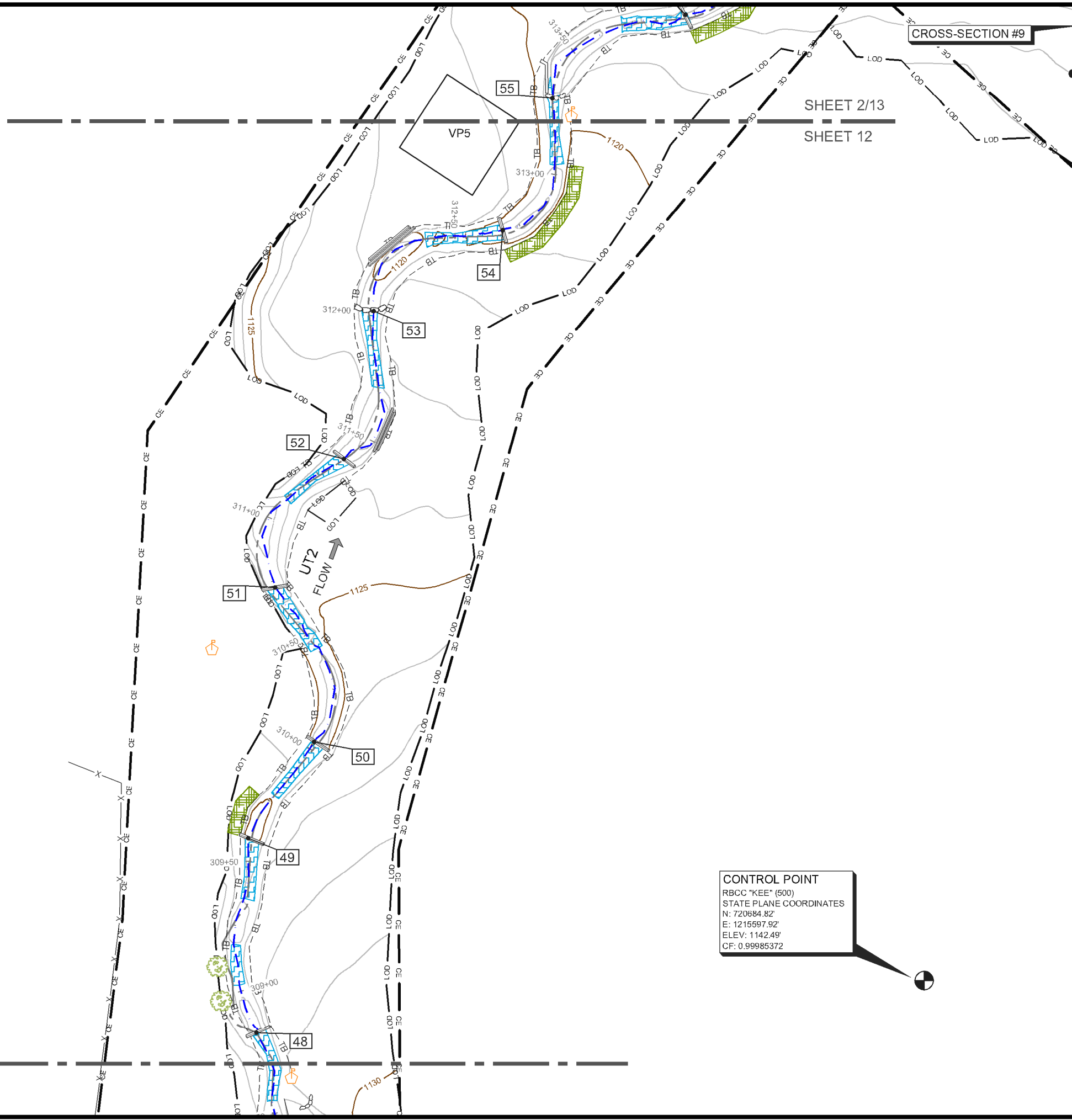


P.O. Box 2566
Asheville, NC 28802
(828) 575-9021
www.keemap.com
License # C-3039

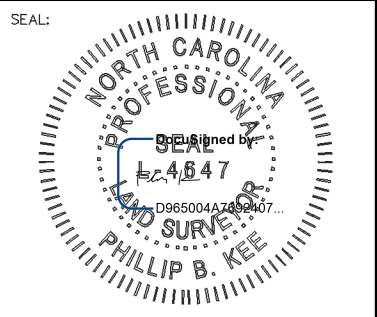


ONE INCH = TWENTY FEET (FULL SIZE)
ONE INCH = FORTY FEET (HALF SIZE)

STRUCTURE TABLE-UT2		
#	DESCRIPTION	ELEVATION
48	LOG SILL	1127.27
49	LOG SILL	1125.82
50	LOG SILL	1124.95
51	LOG SILL	1123.63
52	LOG SILL	1122.26
53	ROCK SILL	1121.04
54	LOG SILL	1119.65



CONTROL POINT
RBCC "KEE" (500)
STATE PLANE COORDINATES
N: 720684.82
E: 1215597.92
ELEV: 1142.49'
CF: 0.99985372



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

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NO. 12-EL
DMS SITE ID NO. 100140

PROJECT:
LAUREL VALLEY MITIGATION SITE

SHEET TITLE:
UT2

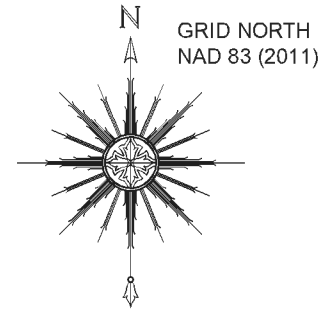
TOWNSHIP: MORGANTON	COUNTY: BURKE	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: NL/PBK/HJL	SURVEY BY: KP, NH, MB
SCALE: AS SHOWN	SURVEY DATE: 02/23/23	
JOB: #2210106-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	
#	DATE	REVISIONS

SHEET:
12 OF 19



P.O. Box 2566
Asheville, NC 28802
(828) 575-9021
www.keemap.com
License # C-3039

SHEET 12
SHEET 11

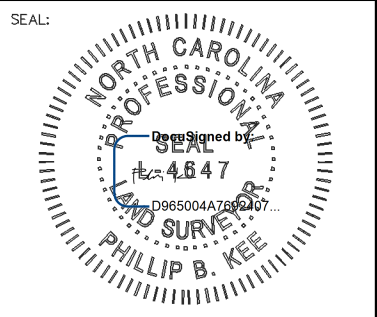
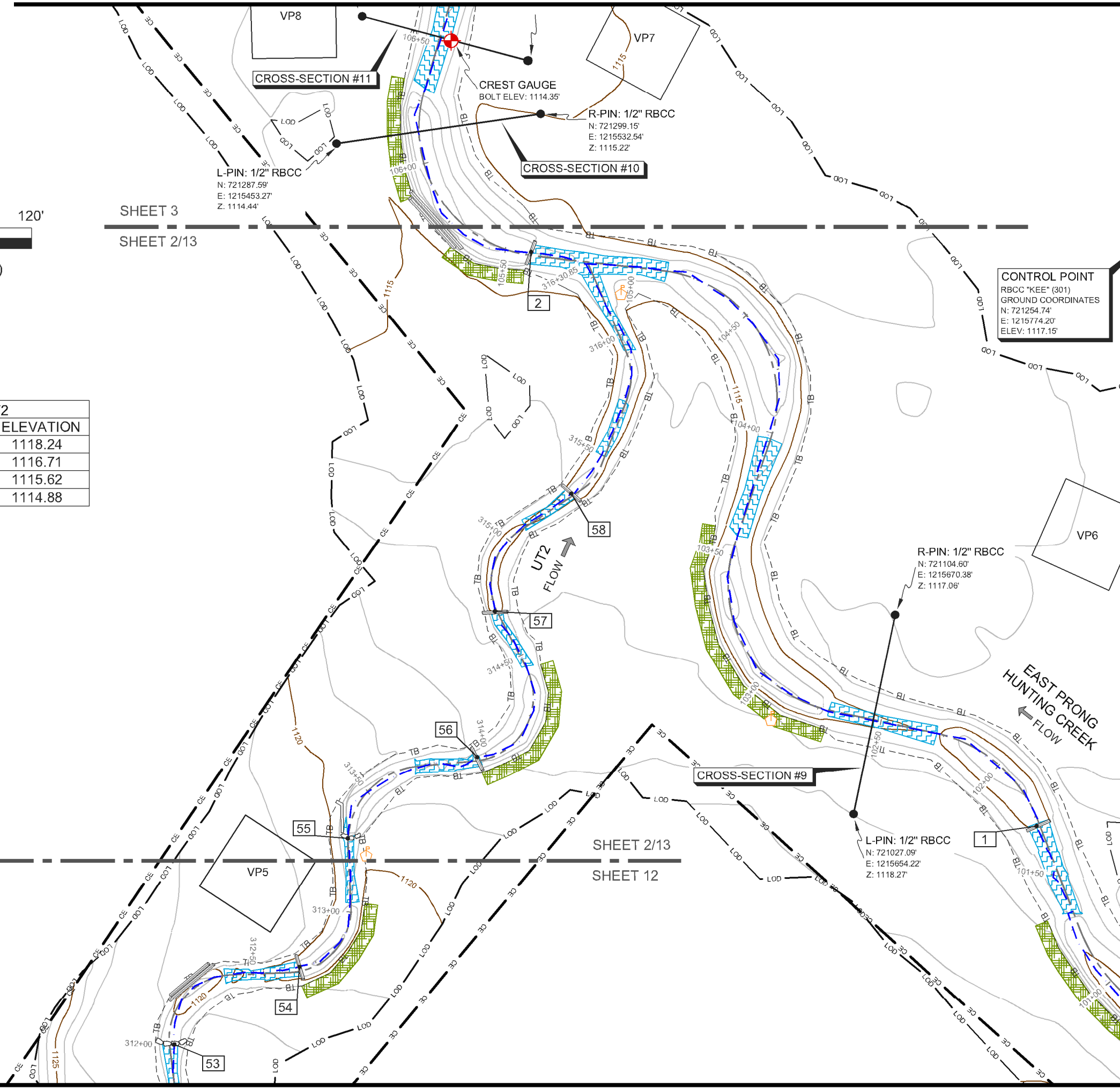


GRID NORTH
NAD 83 (2011)



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

STRUCTURE TABLE-UT2		
#	DESCRIPTION	ELEVATION
55	LOG J-HOOK	1118.24
56	LOG SILL	1116.71
57	LOG SILL	1115.62
58	LOG SILL	1114.88



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

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NO. 12-EL
DMS SITE ID NO. 100140

PROJECT:
LAUREL VALLEY MITIGATION SITE

SHEET TITLE:
UT2

TOWNSHIP: MORGANTON	COUNTY: BURKE	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: NL/PBK/HJL	SURVEY BY: KP, NH, MB
SCALE: AS SHOWN	SURVEY DATE: 02/23/23	
JOB: #2210106-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	
#	DATE	REVISIONS

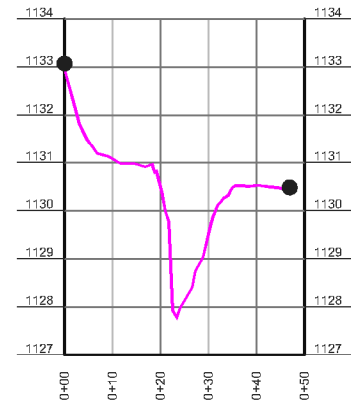
13 OF 19



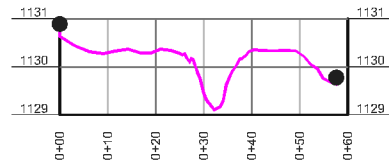
P.O. Box 2566
Asheville, NC 28802
(828) 575-9021
www.keemap.com
License # C-3039

LEGEND

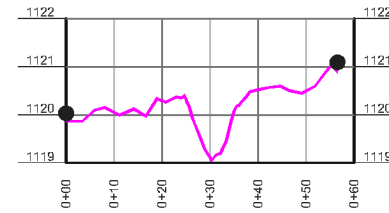
● CROSS-SECTION REBAR



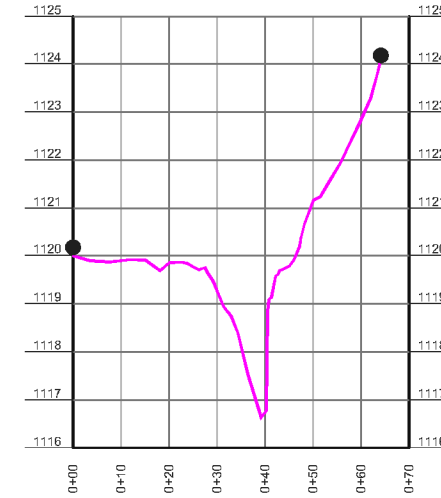
CROSS-SECTION #1 -UT1
 HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
 VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



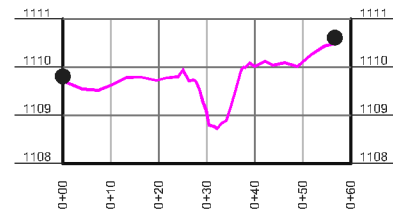
CROSS-SECTION #2 -UT2
 HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
 VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



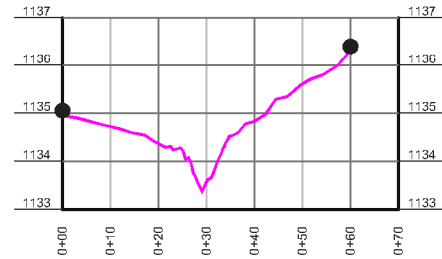
CROSS-SECTION #3 -UT3
 HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
 VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



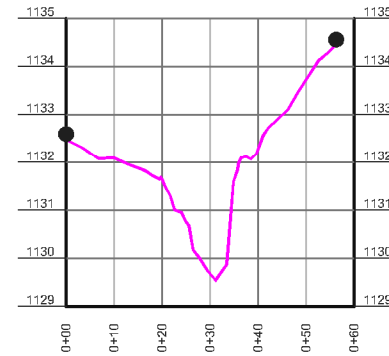
CROSS-SECTION #4 -UT1
 HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
 VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



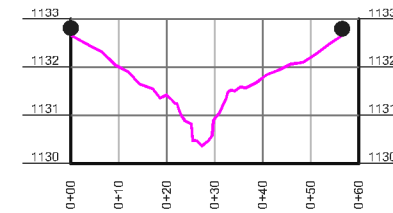
CROSS-SECTION #5 -UT1
 HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
 VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



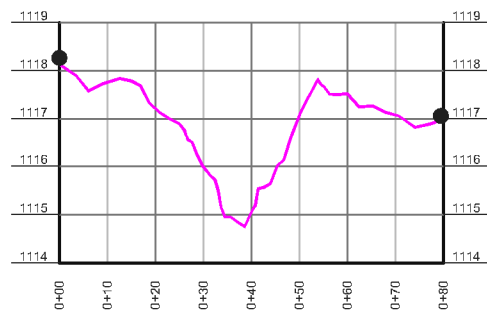
CROSS-SECTION #6 -UT2
 HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
 VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



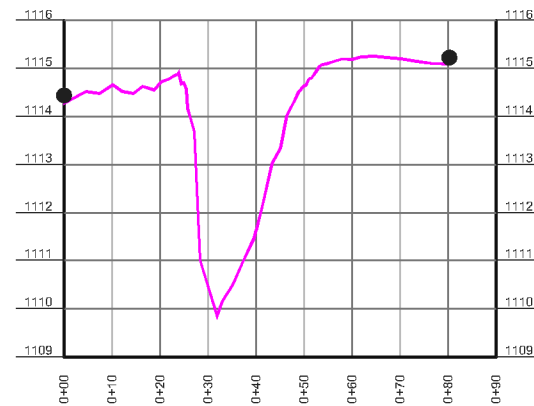
CROSS-SECTION #7 -UT2
 HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
 VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



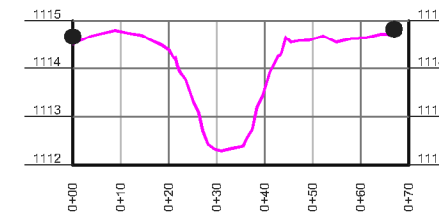
CROSS-SECTION #8 -UT2
 HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
 VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



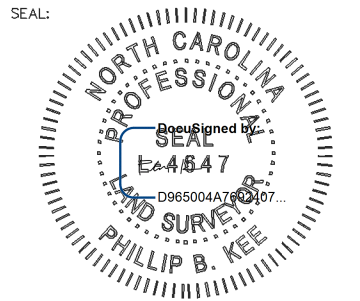
CROSS-SECTION #9 -EAST PRONG HUNTING CREEK
 HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
 VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE



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



CROSS-SECTION #11 -EAST PRONG HUNTING 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

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NO. 12-EL
 DMS SITE ID NO. 100140

PROJECT:
LAUREL VALLEY MITIGATION SITE

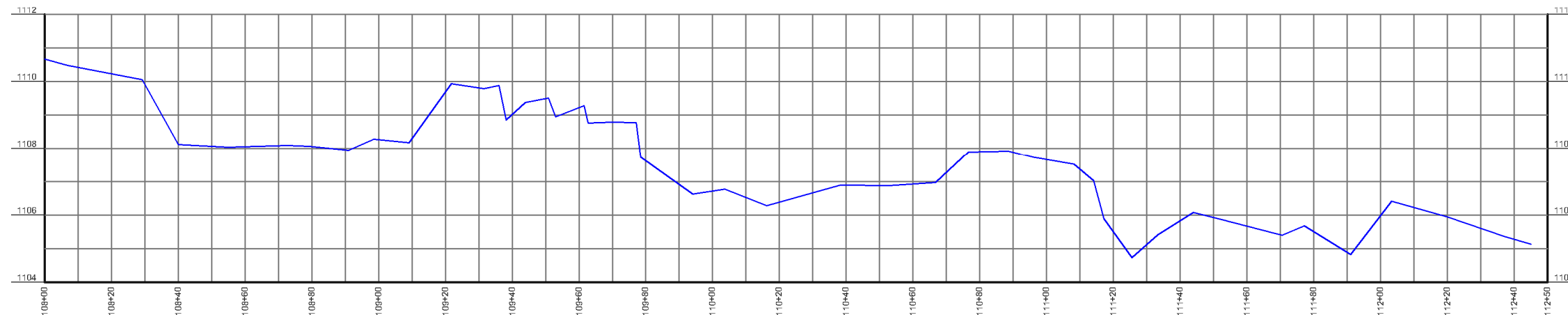
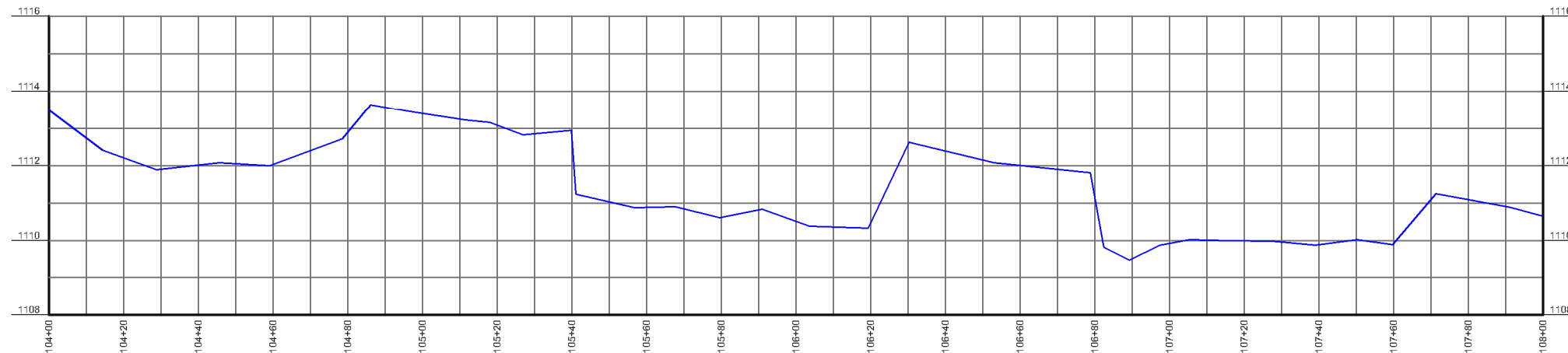
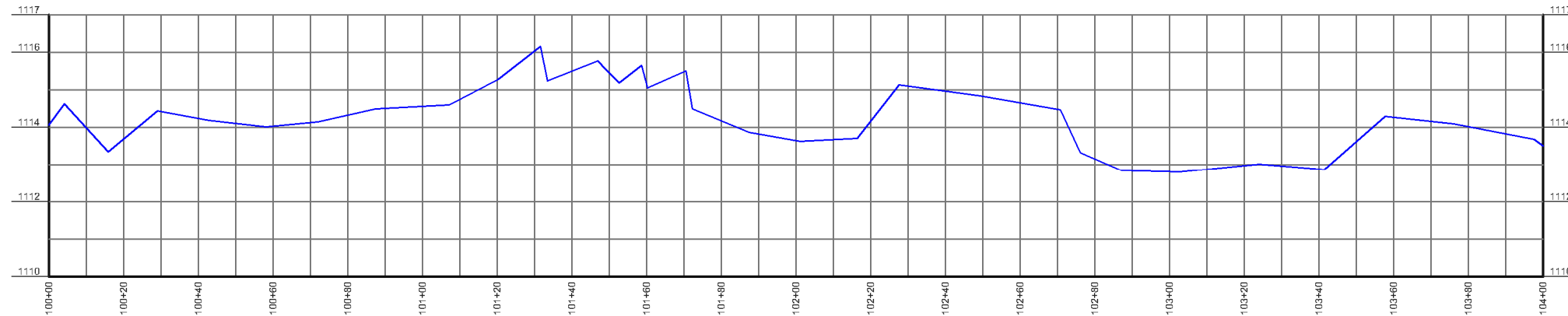
SHEET TITLE:
CROSS-SECTION PROFILES # 1-11

TOWNSHIP: MORGANTON	COUNTY: BURKE	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: NL/PBK/HJL	SURVEY BY: KP, NH, MB
SCALE: AS SHOWN	SURVEY DATE: 02/23/23	
JOB: #2210106-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	
#	DATE	REVISIONS

SHEET: **14** OF **19**



P.O. Box 2566
 Asheville, NC 28802
 (828) 575-9021
 www.keemap.com
 License # C-3039



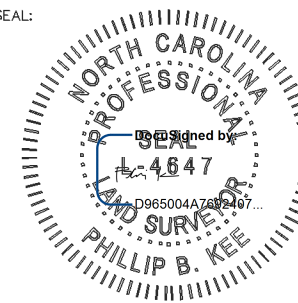
LONGITUDINAL PROFILE- EAST PRONG HUNTING CREEK (EPHC)

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

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NO. 12-EL
 DMS SITE ID NO. 100140

PROJECT:
LAUREL VALLEY MITIGATION SITE

SHEET TITLE:
 LONGITUDINAL PROFILE:
 EAST PRONG
 HUNTING CREEK
 STA: 100+00-112+50

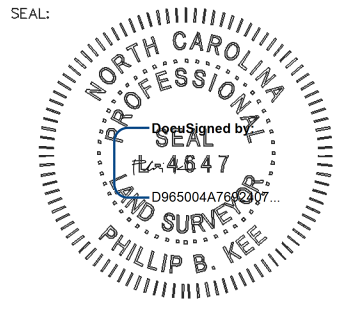
TOWNSHIP: MORGANTON	COUNTY: BURKE	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: NL/PBK/HJL	SURVEY BY: KP, NH, MB
SCALE: AS SHOWN	SURVEY DATE: 02/23/23	
JOB: #2210106-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	
#	DATE	REVISIONS

SHEET:

15 OF **19**



P.O. Box 2566
 Asheville, NC 28802
 (828) 575-9021
 www.keemap.com
 License # C-3039



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

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NO. 12-EL
DMS SITE ID NO. 100140

PROJECT:
LAUREL VALLEY MITIGATION SITE

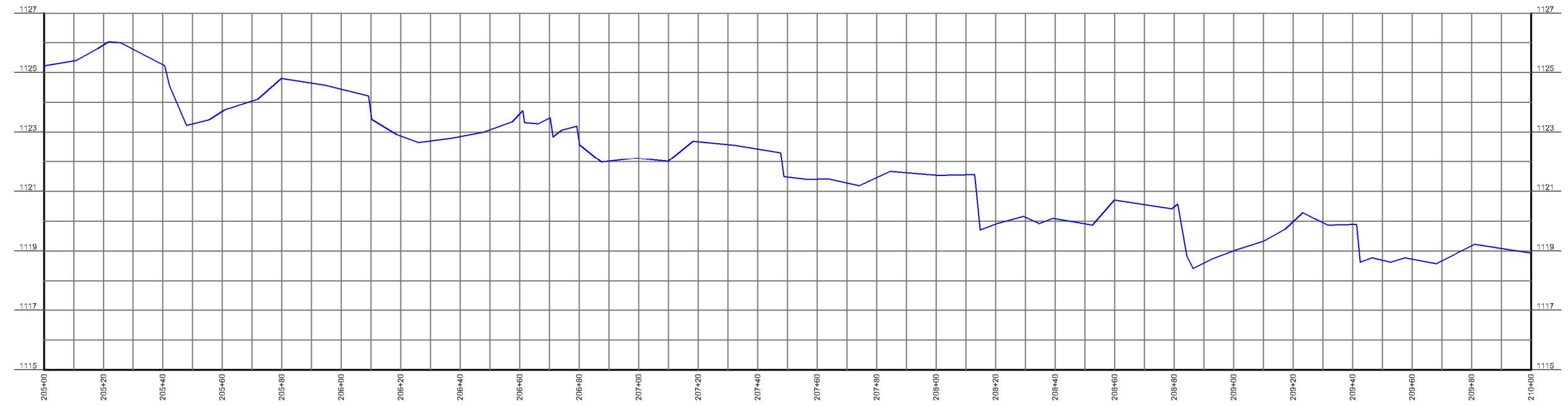
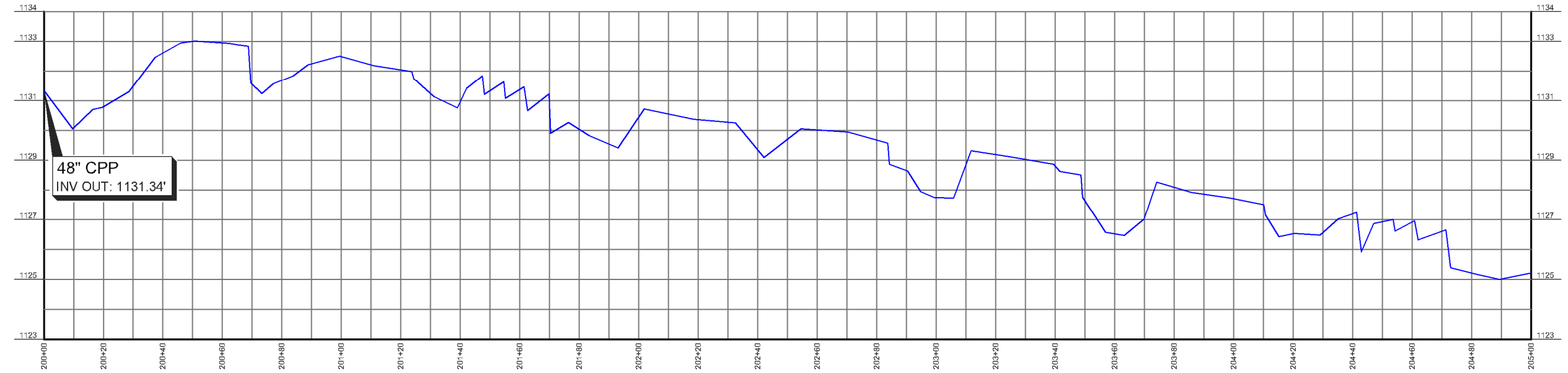
SHEET TITLE:
**LONGITUDINAL PROFILE:
UT1
STA: 200+00-210+00**

TOWNSHIP: MORGANTON	COUNTY: BURKE	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: NL/PBK/HJL	SURVEY BY: KP, NH, MB
SCALE: AS SHOWN	SURVEY DATE: 02/23/23	
JOB: #2210106-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	
#	DATE	REVISIONS

SHEET:
16 OF 19



P.O. Box 2566
Asheville, NC 28802
(828) 575-9021
www.keemap.com
License # C-3039

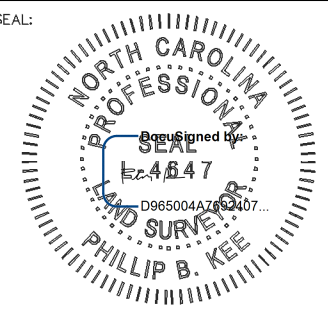


LONGITUDINAL PROFILE- UT1
HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE

LEGEND

— THALWEG

SEAL:



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

ELEVATION DATUM: NAVD 88
CONTOUR INTERVAL: 1 FOOT

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NO. 12-EL
DMS SITE ID NO. 100140

PROJECT:
LAUREL VALLEY MITIGATION SITE

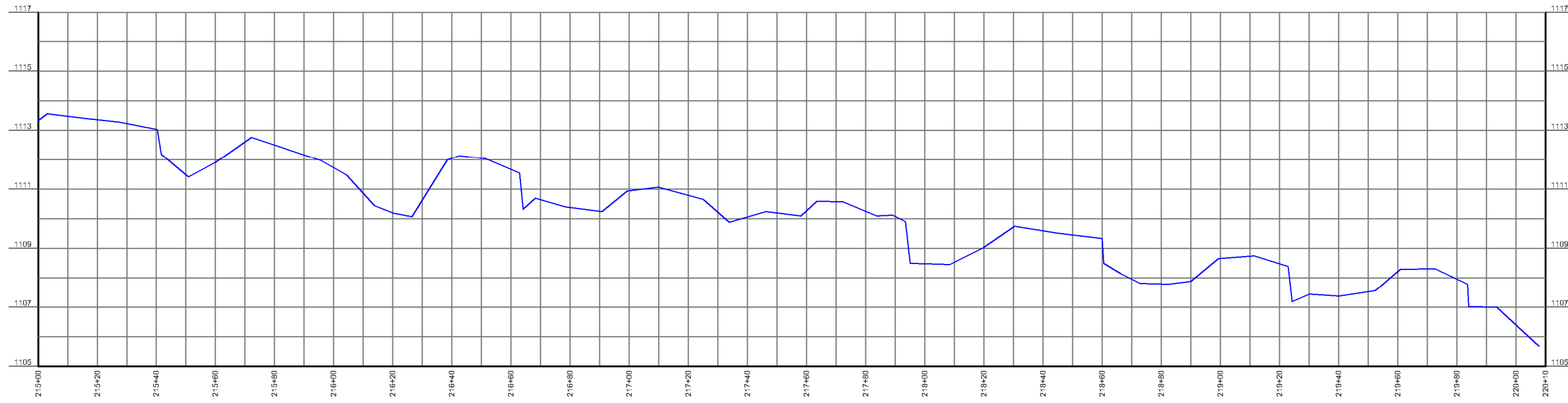
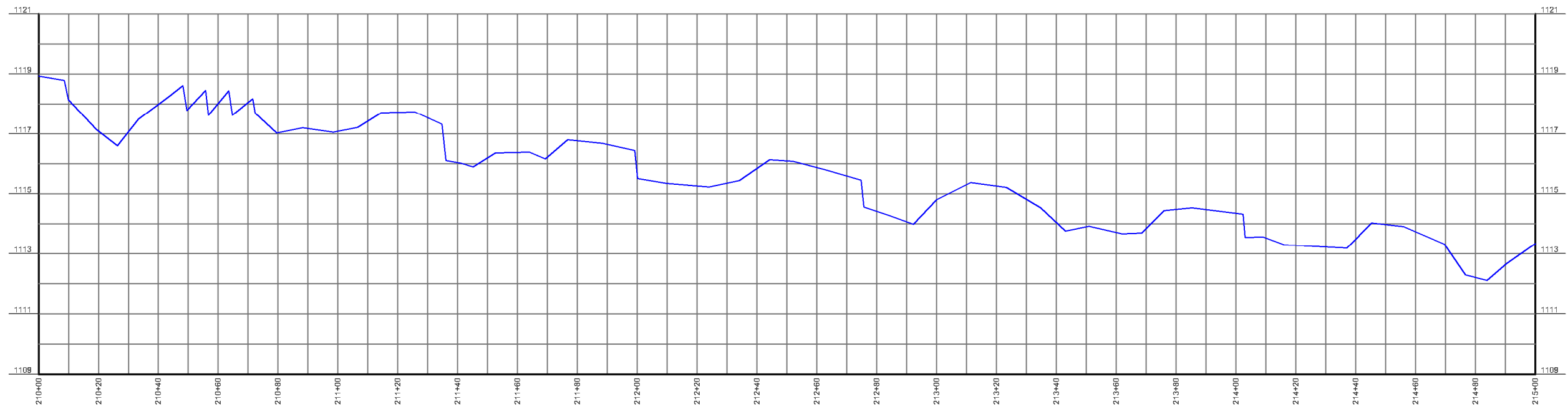
SHEET TITLE:
LONGITUDINAL PROFILE:
UT1
STA: 210+00-220+10

TOWNSHIP: MORGANTON	COUNTY: BURKE	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: NL/PBK/HJL	SURVEY BY: KP, NH, MB
SCALE: AS SHOWN	SURVEY DATE: 02/23/23	
JOB: #2210106-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	
#	DATE	REVISIONS

SHEET:
17 OF **19**



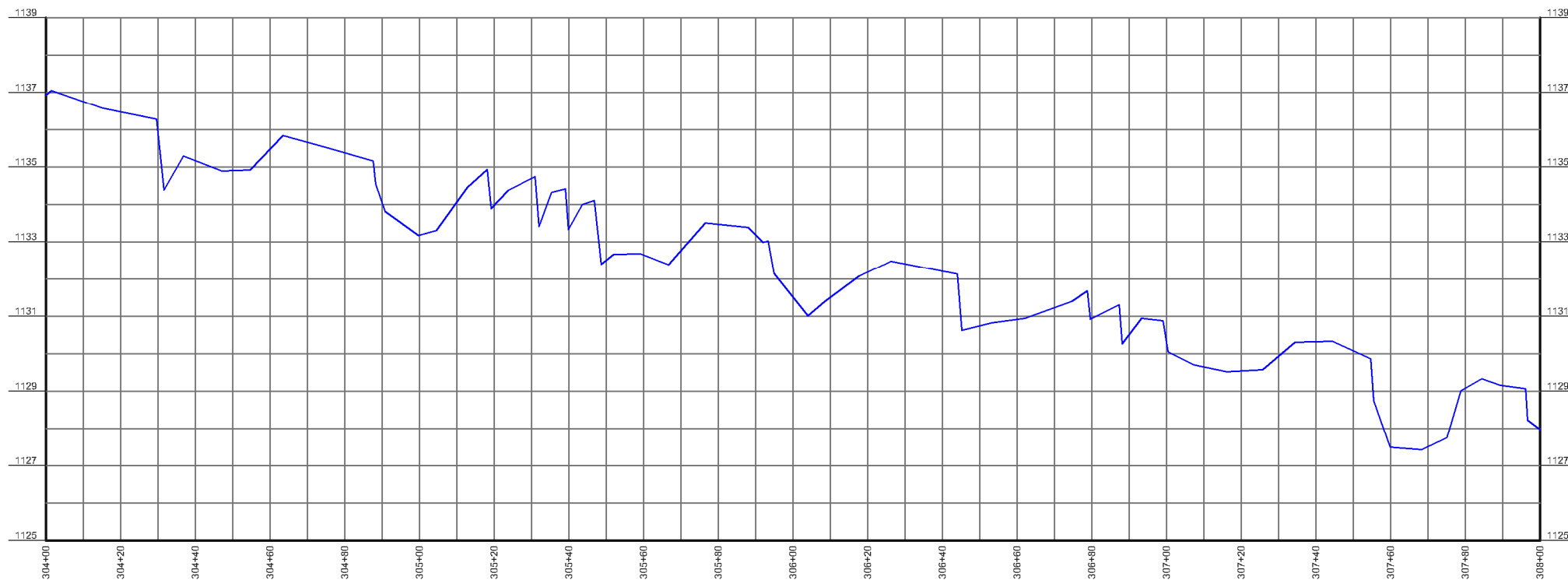
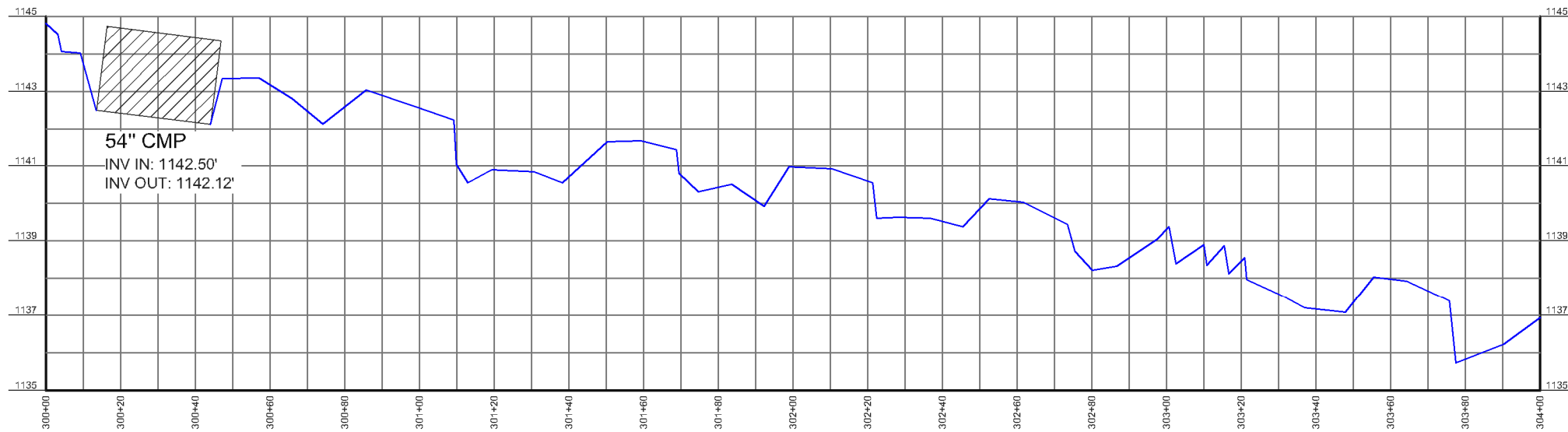
P.O. Box 2566
Asheville, NC 28802
(828) 575-9021
www.keemap.com
License # C-3039



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

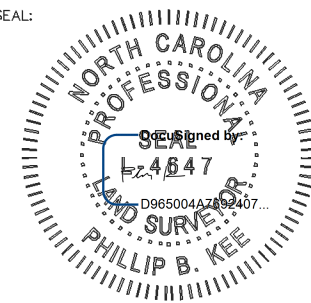


LONGITUDINAL PROFILE- UT2
 HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
 VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE

LEGEND

— THALWEG

SEAL:



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

ELEVATION DATUM: NAVD 88
 CONTOUR INTERVAL: 1 FOOT

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NO. 12-EL
 DMS SITE ID NO. 100140

PROJECT:
LAUREL VALLEY MITIGATION SITE

SHEET TITLE:
 LONGITUDINAL PROFILE:
 UT2
 STA: 300+00-308+00

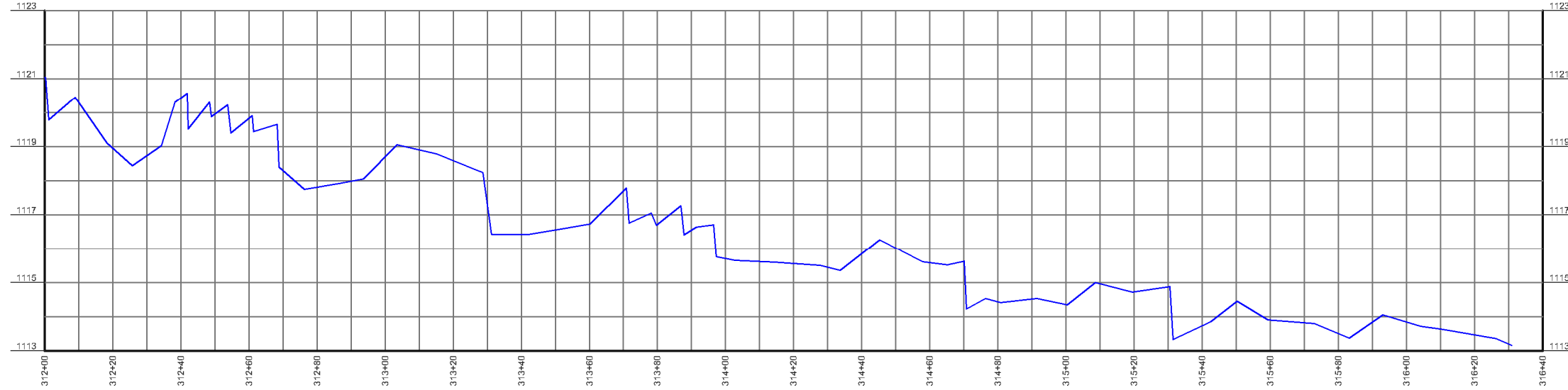
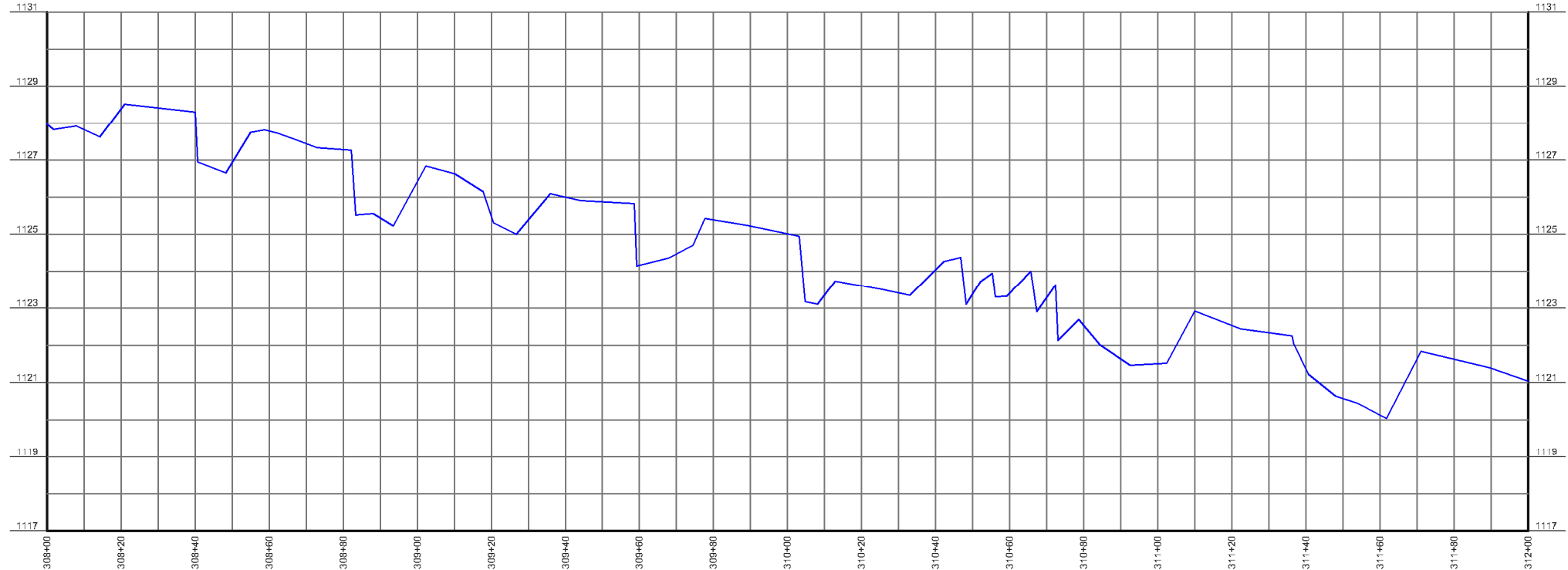
TOWNSHIP: MORGANTON	COUNTY: BURKE	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: NL/PBK/HJL	SURVEY BY: KP, NH, MB
SCALE: AS SHOWN	SURVEY DATE: 02/23/23	
JOB: #2210106-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	
#	DATE	REVISIONS

SHEET:

18 OF **19**



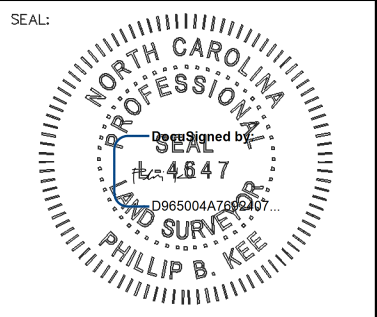
P.O. Box 2566
 Asheville, NC 28802
 (828) 575-9021
 www.keemap.com
 License # C-3039



LONGITUDINAL PROFILE- UT2
 HORIZONTAL SCALE: 1" = 20' FULL SIZE, 1" = 40' HALF SIZE
 VERTICAL SCALE: 1" = 2' FULL SIZE, 1" = 4' HALF SIZE

LEGEND

— THALWEG



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

ELEVATION DATUM: NAVD 88
 CONTOUR INTERVAL: 1 FOOT

THIS IS A TOPOGRAPHIC SURVEY FOR INFORMATIONAL AND DESIGN PURPOSES ONLY. IT SHOULD NOT BE USED FOR CONVEYANCE OR LEGAL PURPOSES.

AN AS-BUILT SURVEY FOR:
WILDLANDS ENGINEERING, INC

SPO FILE NO. 12-EL
 DMS SITE ID NO. 100140

PROJECT:
LAUREL VALLEY MITIGATION SITE

SHEET TITLE:
 LONGITUDINAL PROFILE:
 UT2
 STA: 308+00-316+40

TOWNSHIP: MORGANTON	COUNTY: BURKE	STATE: NORTH CAROLINA
DRAWN BY: NH	CHECKED BY: NL/PBK/HJL	SURVEY BY: KP, NH, MB
SCALE: AS SHOWN	SURVEY DATE: 02/23/23	
JOB: #2210106-AB	SHEET SIZE: 11" X 17" (HALF SIZE)	
#	DATE	REVISIONS

SHEET:
19 OF 19



P.O. Box 2566
 Asheville, NC 28802
 (828) 575-9021
 www.keemap.com
 License # C-3039