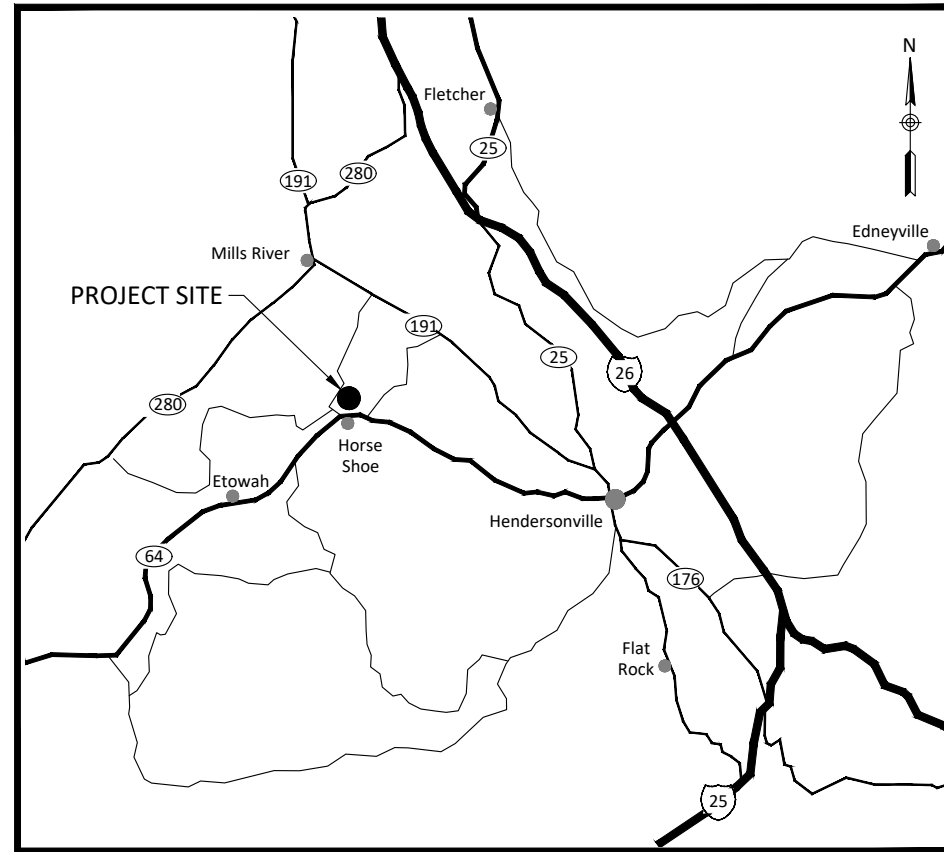


Banner Farm Mitigation Site Record Drawings

Henderson County, North Carolina

for NCDEQ

Division of Mitigation Services



Vicinity Map
Not to Scale



**RECORD DRAWINGS ISSUED
APRIL 18, 2022**

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UT 2	1.3.1-1.3.4
Wetland Grading Plan	2.1-2.5
Planting	3.1-3.5

Project Directory

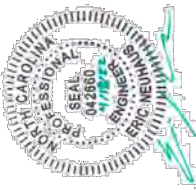
Engineering:
Wildlands Engineering, Inc
License No. F-0831
167-B Haywood Road
Asheville, NC 28806
Eric Neuhaus, PE
865-207-8835

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

Owner:
NCDEQ
Division of Mitigation Services
1652 Mail Service Center
Raleigh, NC 27699
Matthew Reid
828-231-7912

DMS Project No. 100062

French Broad River Basin
HUC 06010105
NCDWR#: 20181032
USACE Action ID:
SAW-2018-01153



Banner Farm Mitigation Site Record Drawings
Henderson County, North Carolina

Title Sheet

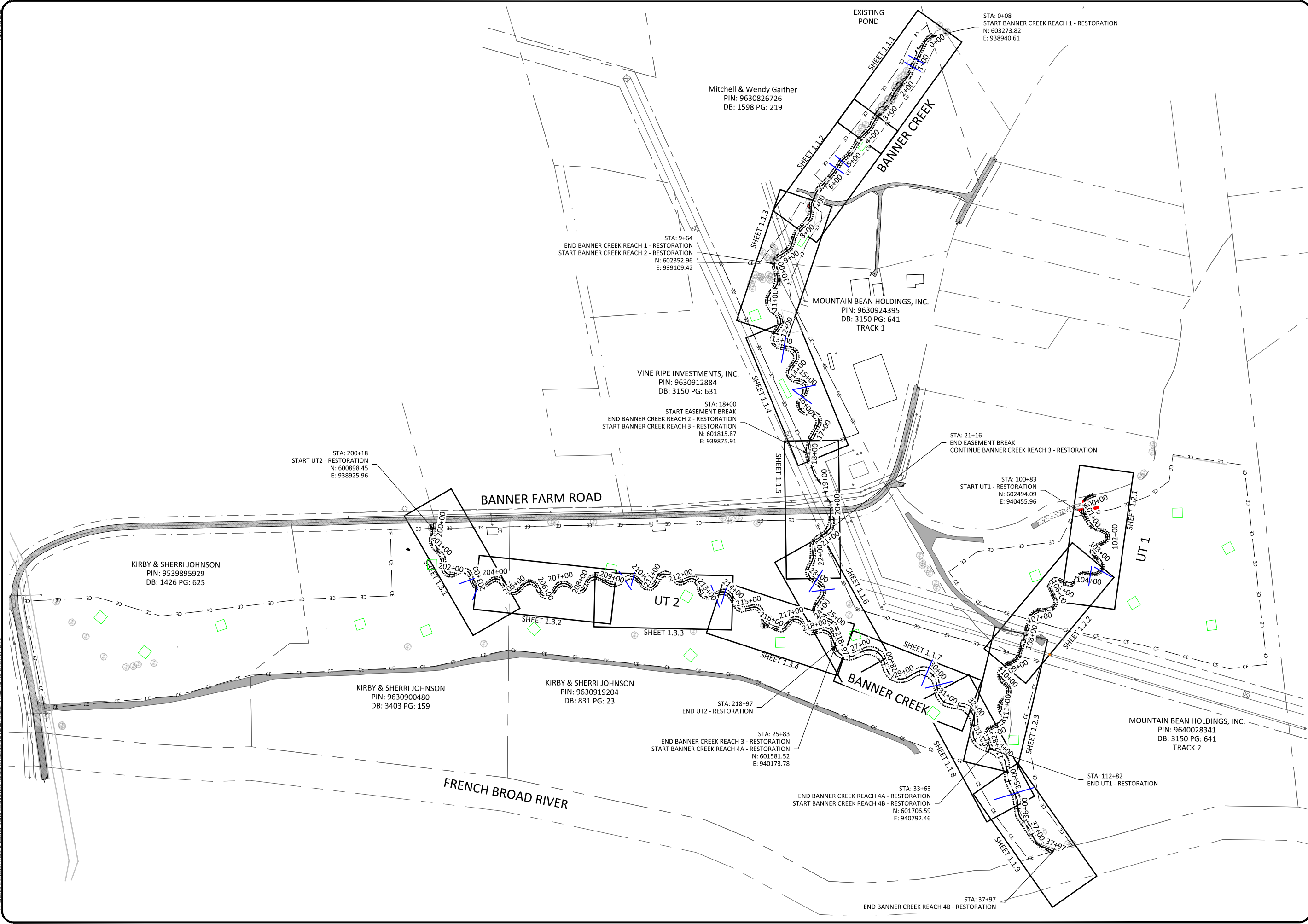
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Job Number: W021752
Project Engineer: EN
Drawn By: JH
Checked By: JK

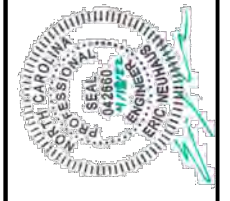
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Banner Farm Mitigation Site Record Drawings
Henderson County, North Carolina

Project Overview

Revisions:

No.	Description

Date: 04-18-22
Job Number: W02172
Project Engineer: EN
Drawn By: JH
Checked By: JK

0.2

Sheet

Pre-construction Features

- Recorded Conservation Easement
- Pre-construction Property Boundary
- Pre-construction Overhead Wire/Utility
- Pre-construction Utility Right-of-Way
- Pre-construction Road Right-of-Way
- Pre-construction Pole/Utility Tower/Guy Wire
- Pre-construction tree
- Pre-construction Jurisdictionally Delineated Wetlands
- Pre-construction Asphalt Roads

Design Features

- Stream Design Alignment
- Design Grading Contour 5' Major
- Design Grading Contour 1' Major
- Design Bankfull
- Design Culvert
- Design Brush Toe
- Design Riffle
- Design Log Sill
- Design Rock Sill
- Design Log J-Hook
- Design Cover Log

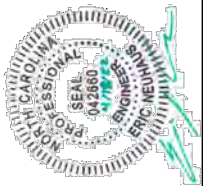
As-Built Features

- As-Built Thalweg
- As-Built Bankfull
- As-Built Major Contour
- As-Built Minor Contour
- As-Built Cross Section
- As-Built Culvert
- As-Built Log Sill
- As-Built Rock Sill
- As-Built Log J-Hook
- As-Built Cover Log
- As-Built Brush Toe
- As-Built Boulder Toe
- As-Built Riffle
- As-Built Crossing
- As-Built Soil Bed Farm Road

Monitoring Features

- As-Built Vegetation Monitoring Plot
- Crest Gage
- Groundwater Gage
- Barotroll
- Photo Point

NOTE:
Deviations shown in red.



Banner Farm Mitigation Site Record Drawings

Henderson County, North Carolina

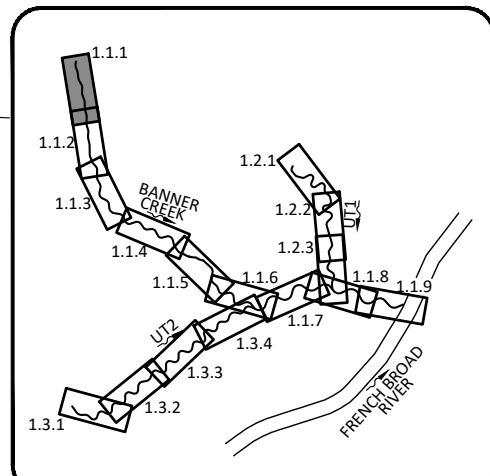
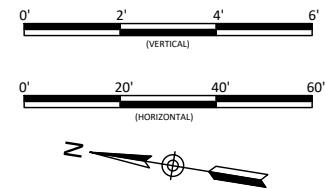
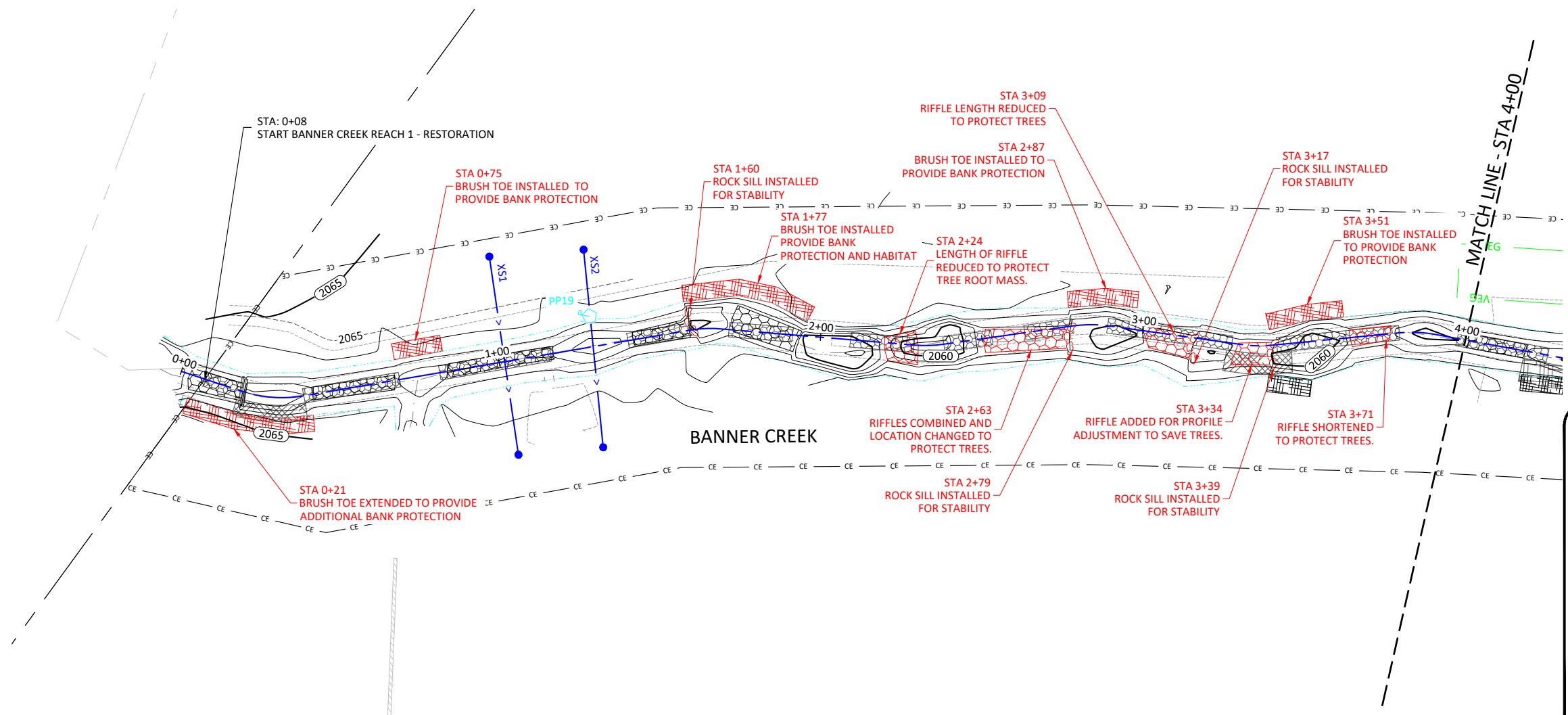
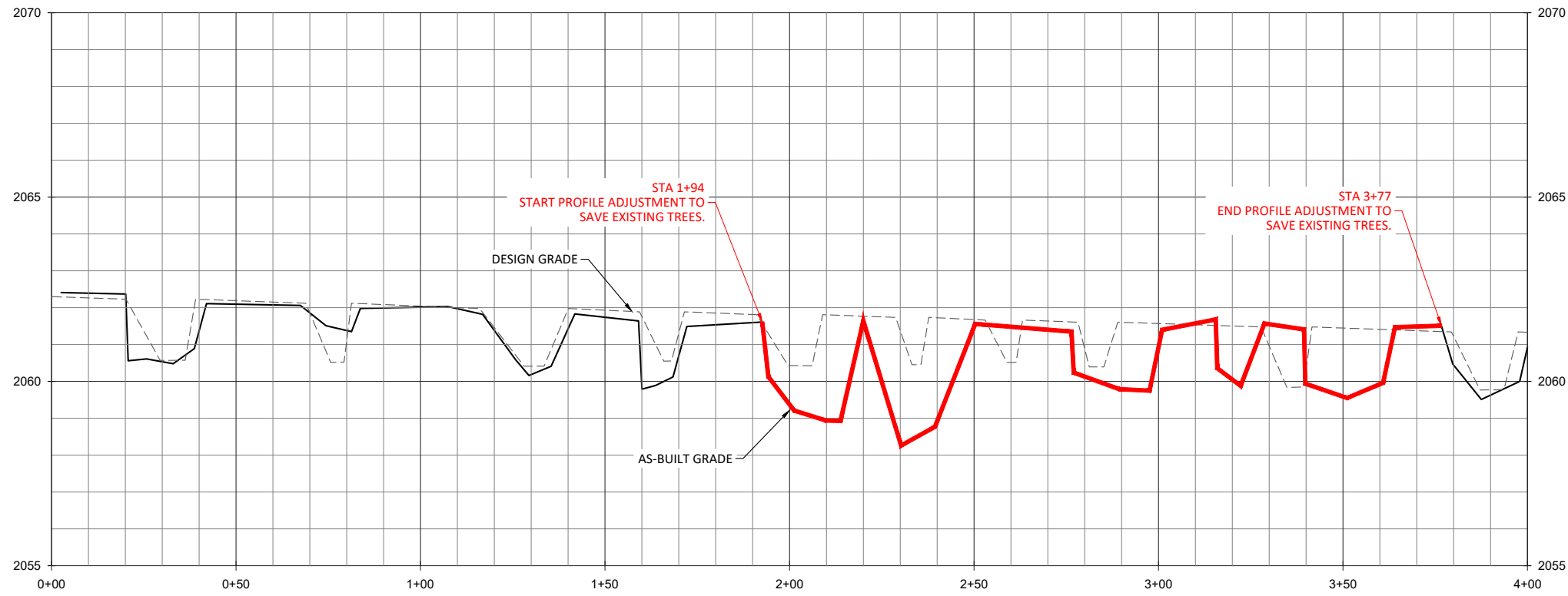
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Checked By:	JK

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Banner Farm Mitigation Site Record Drawings
Henderson County, North Carolina

Stream Plan and Profile
Banner Creek

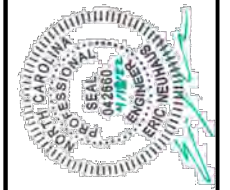
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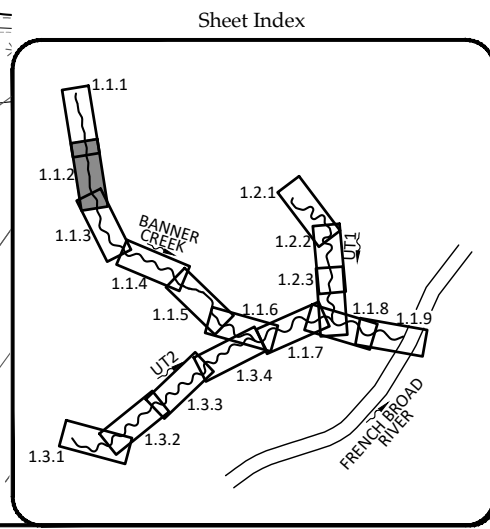
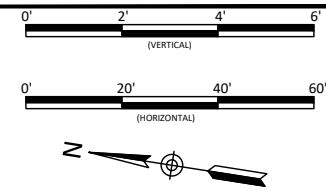
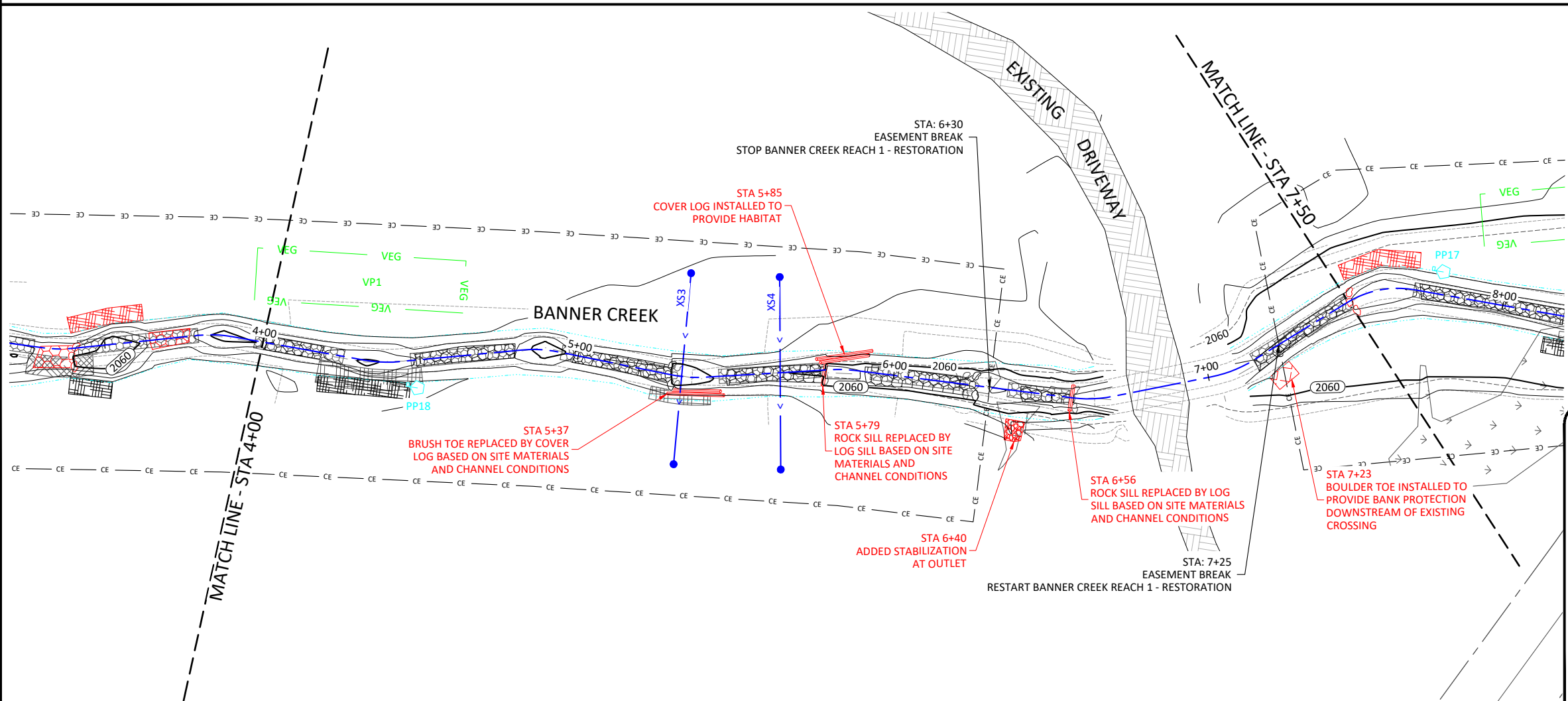
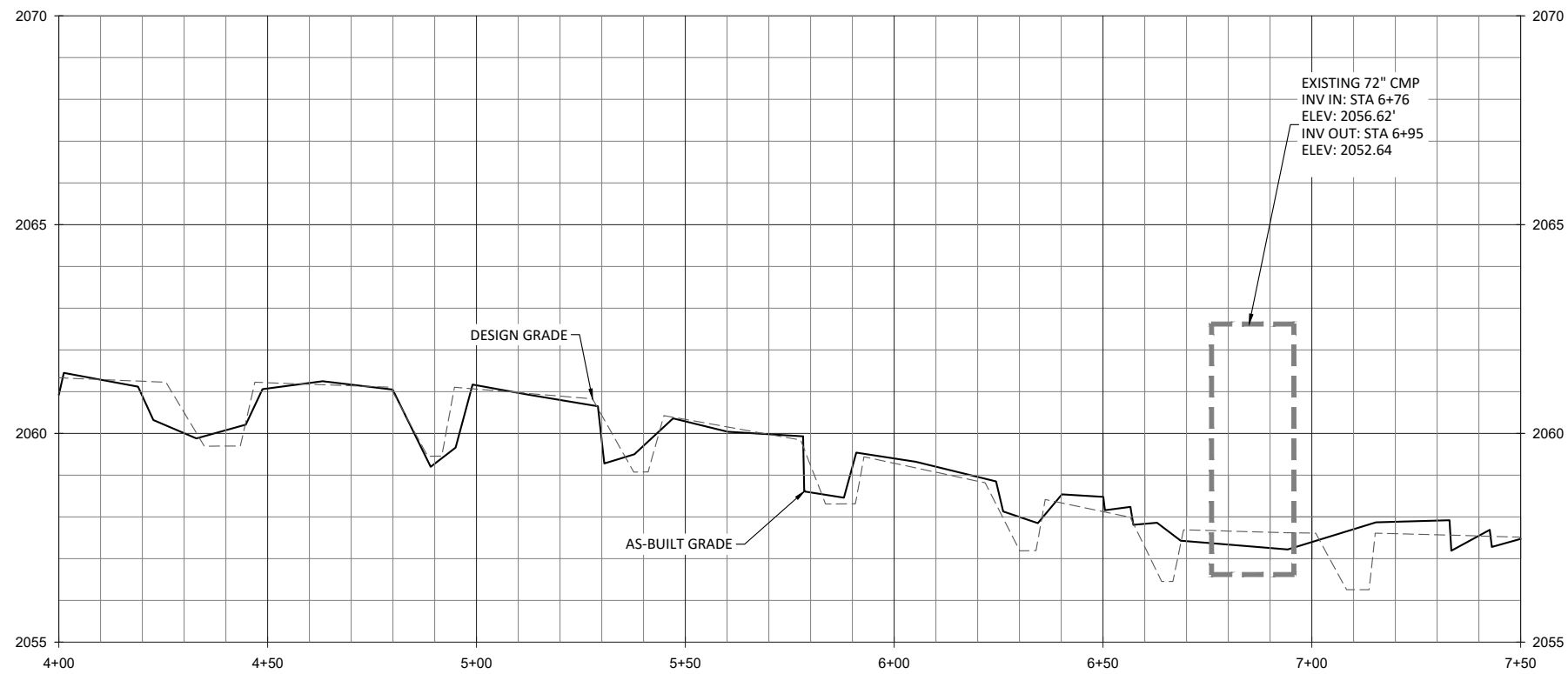
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Banner Farm Mitigation Site Record Drawings

Henderson County, North Carolina

Stream Plan and Profile

Banner Creek

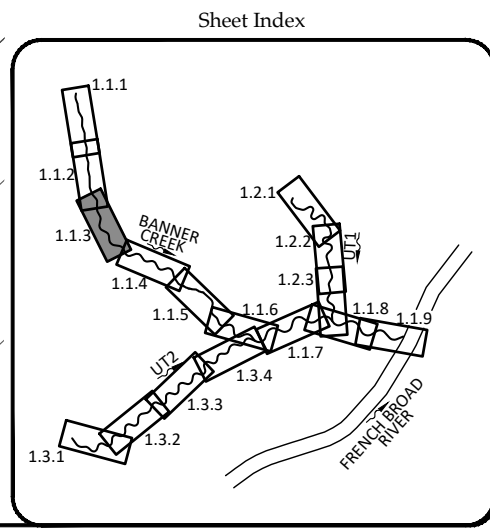
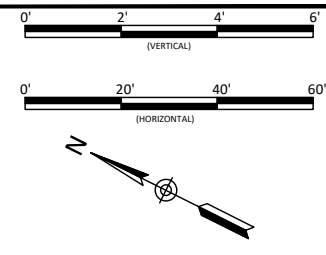
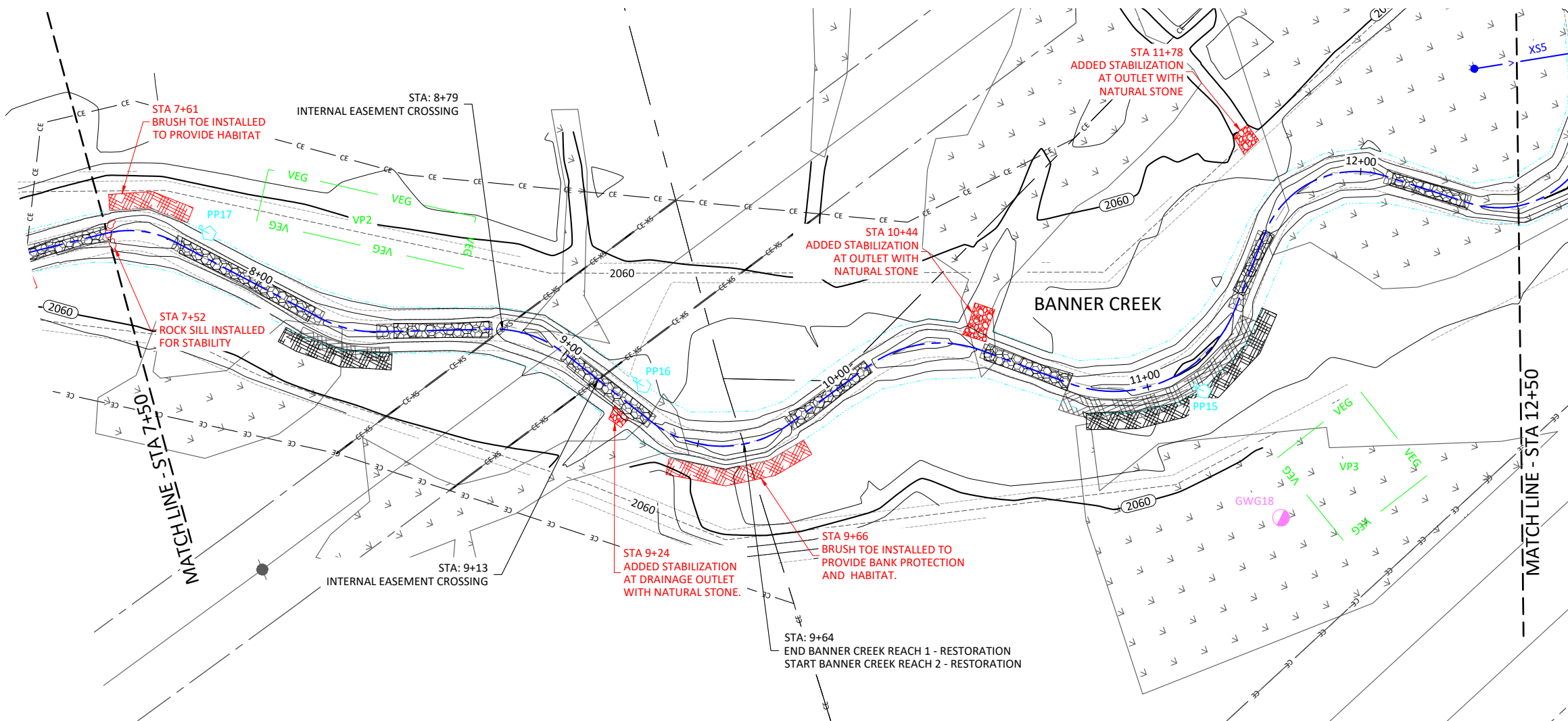
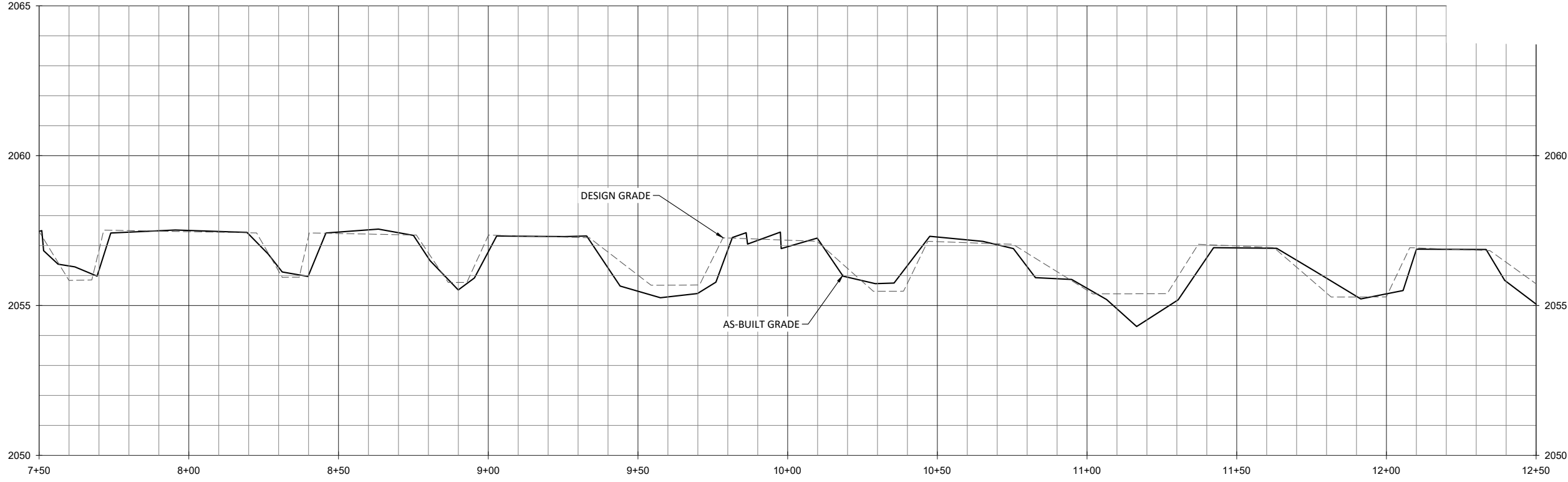
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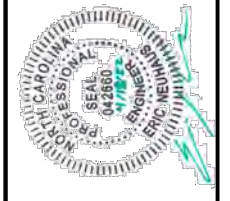
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Banner Farm Mitigation Site Record Drawings
Henderson County, North Carolina
 Stream Plan and Profile
 Banner Creek

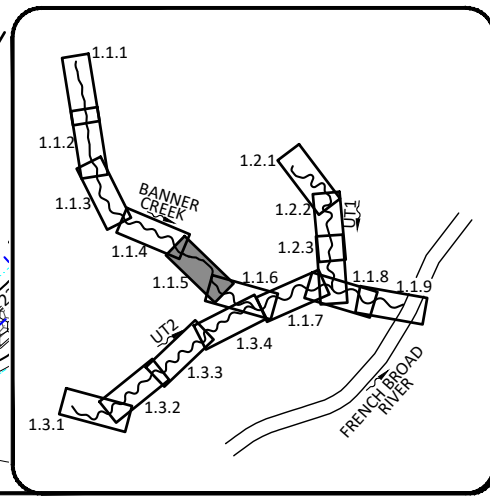
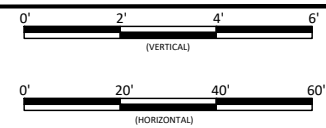
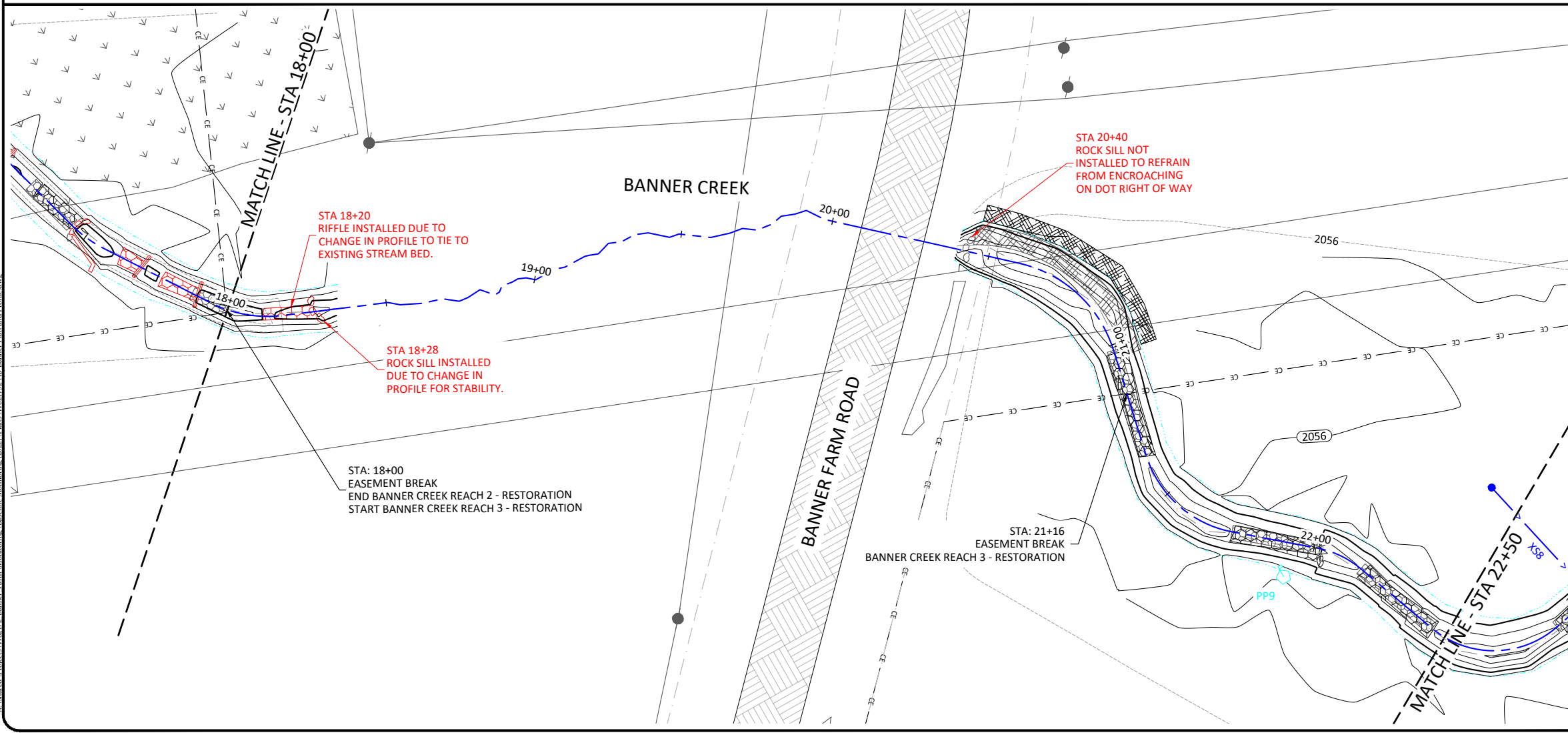
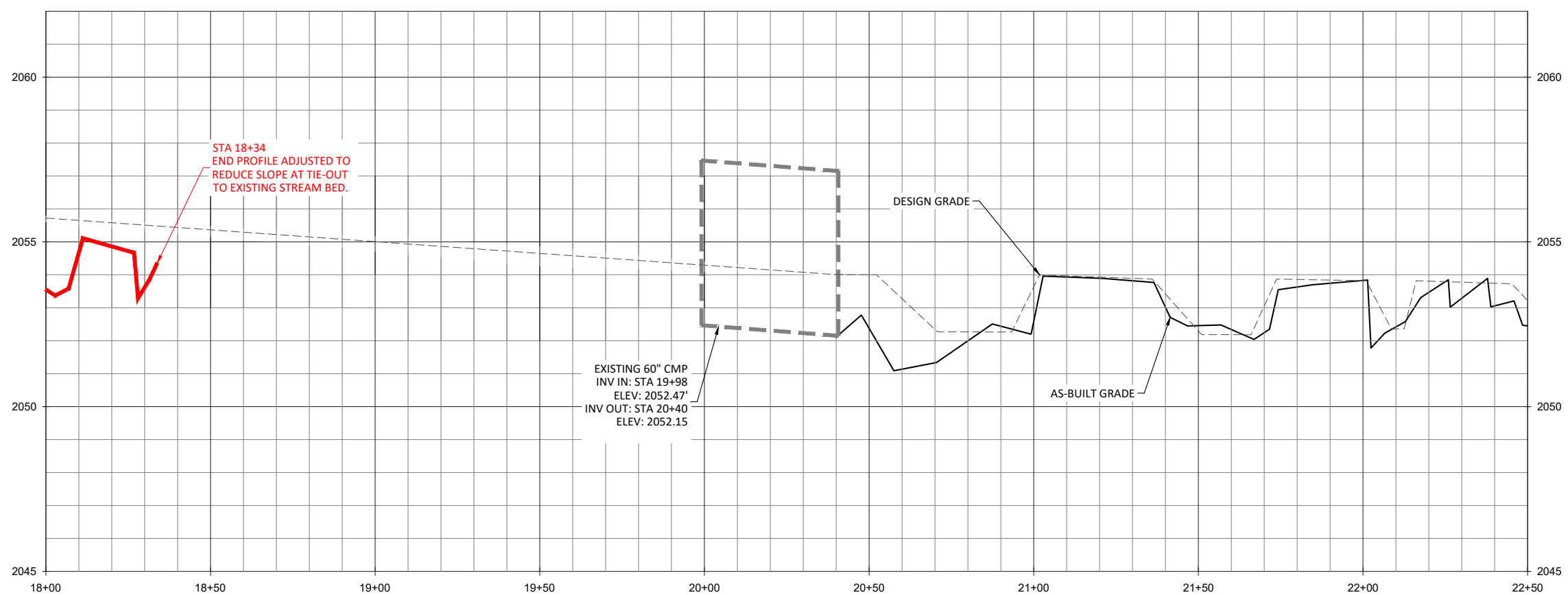
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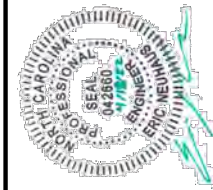
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Banner Farm Mitigation Site Record Drawings
Henderson County, North Carolina

Stream Plan and Profile
Banner Creek

Revisions:

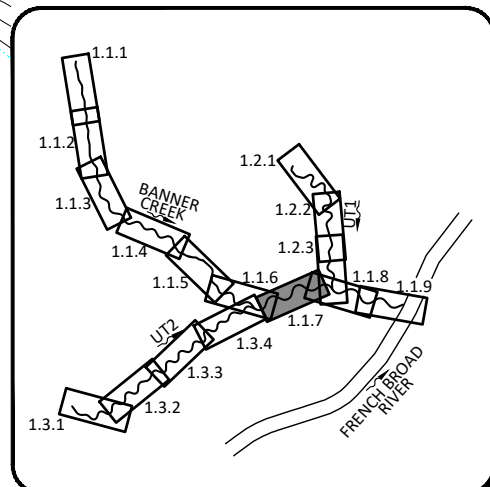
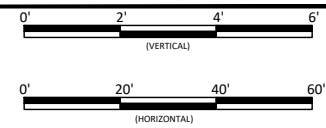
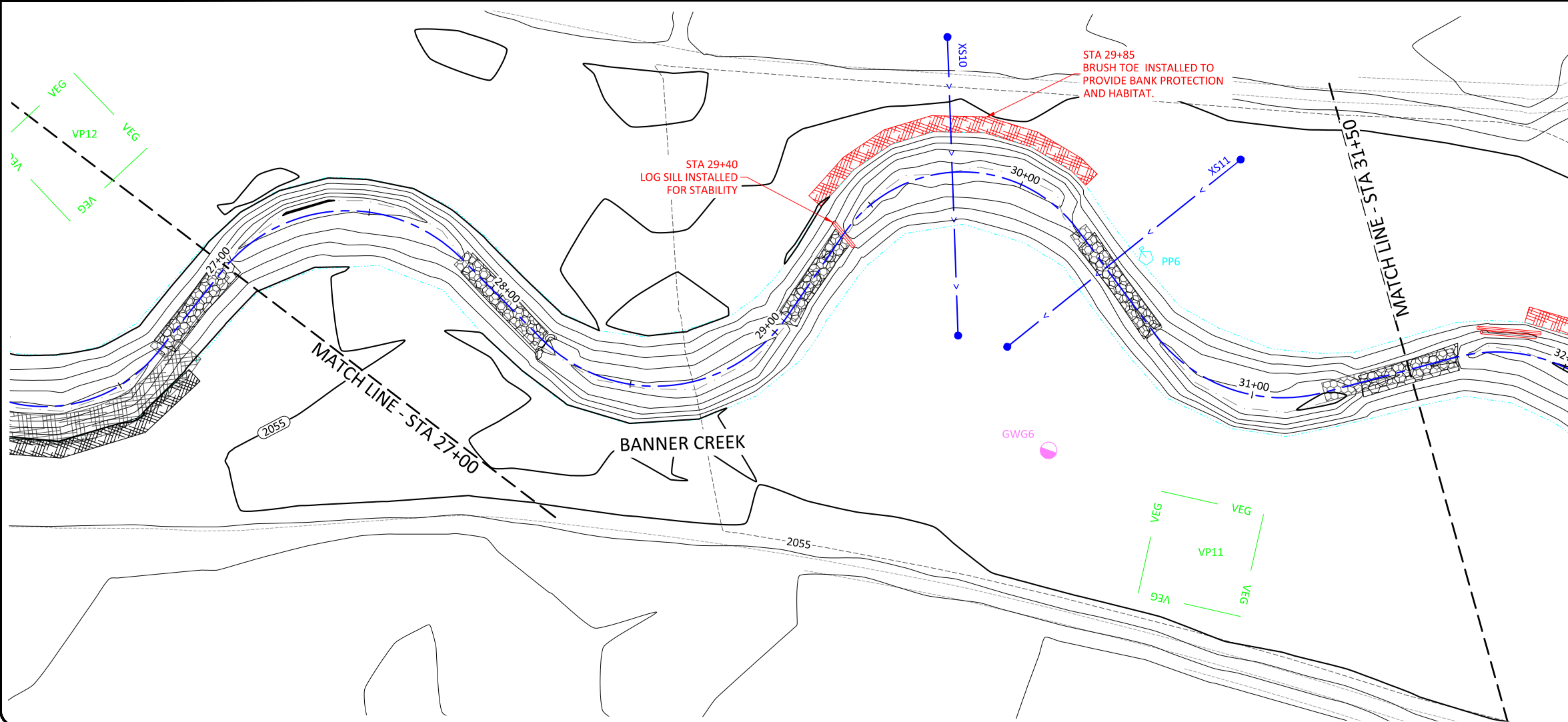
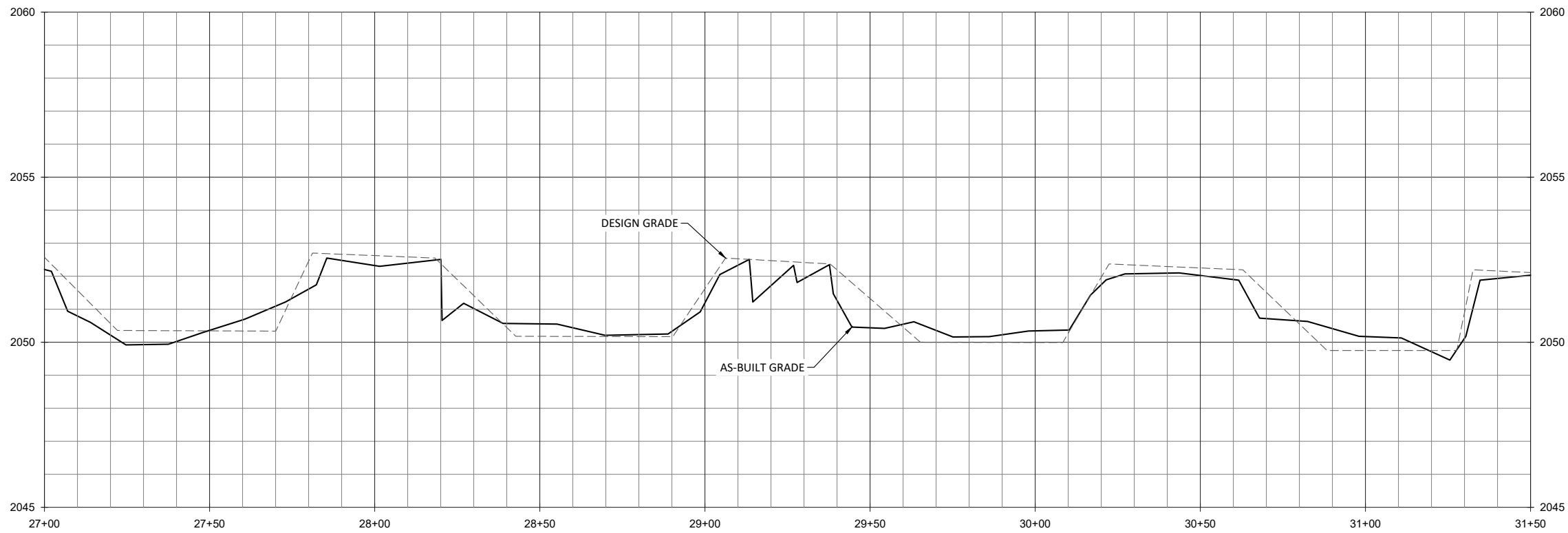
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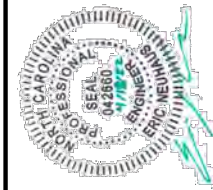
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Banner Farm Mitigation Site Record Drawings
Henderson County, North Carolina
Stream Plan and Profile
Banner Creek

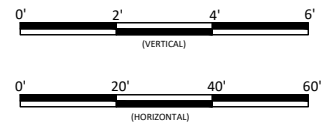
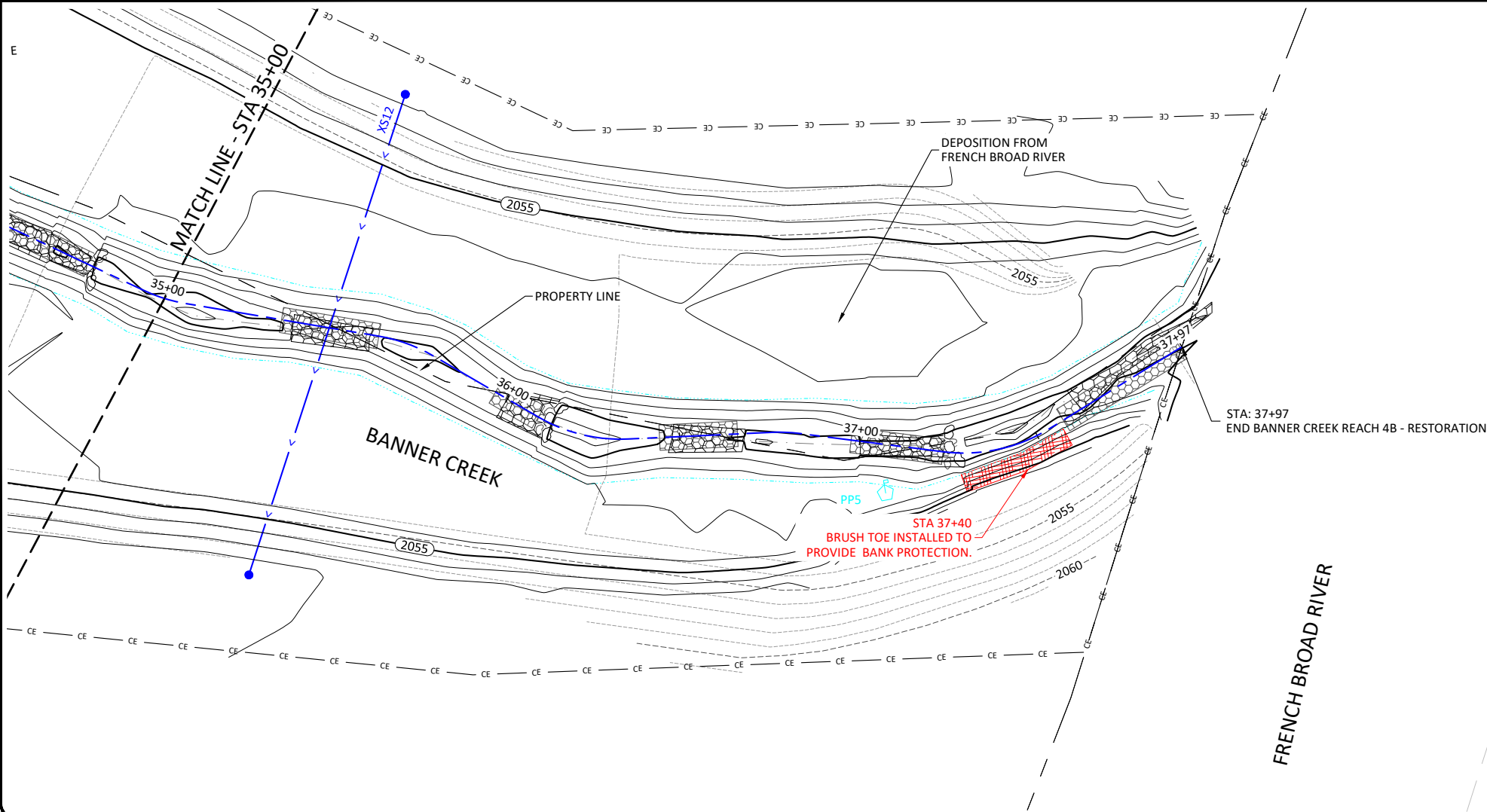
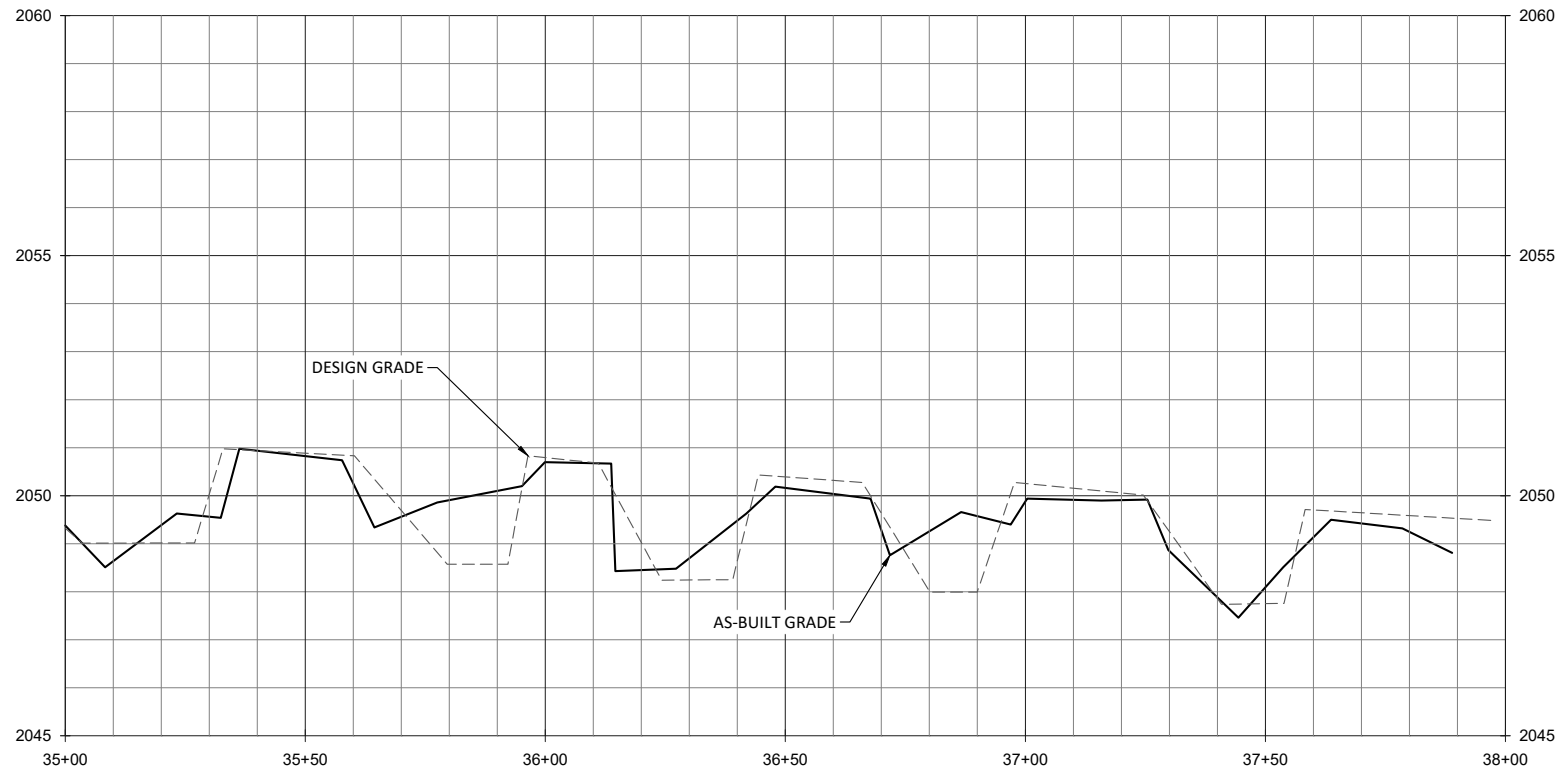
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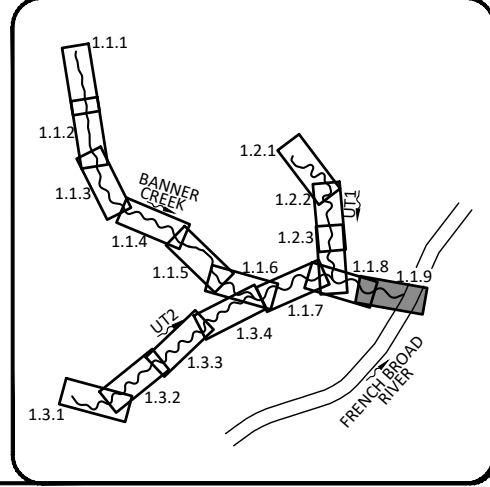
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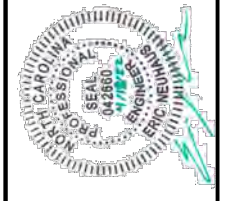
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Sheet Index



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Banner Farm Mitigation Site Record Drawings
Henderson County, North Carolina
 Stream Plan and Profile
 Banner Creek

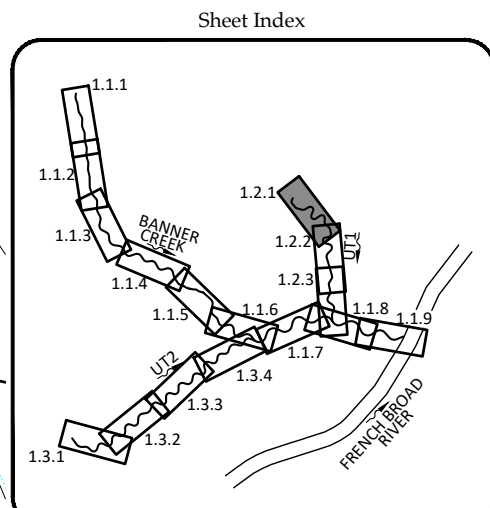
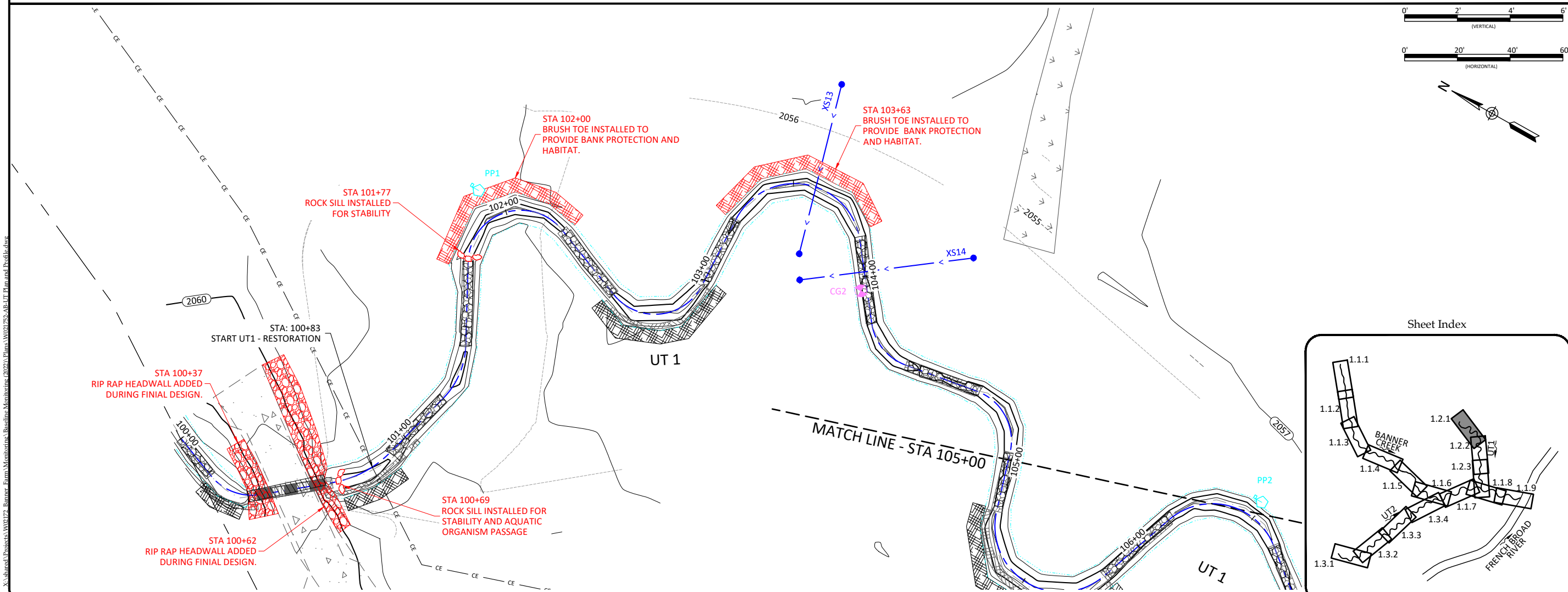
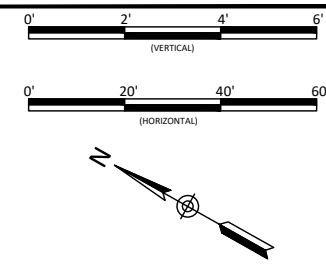
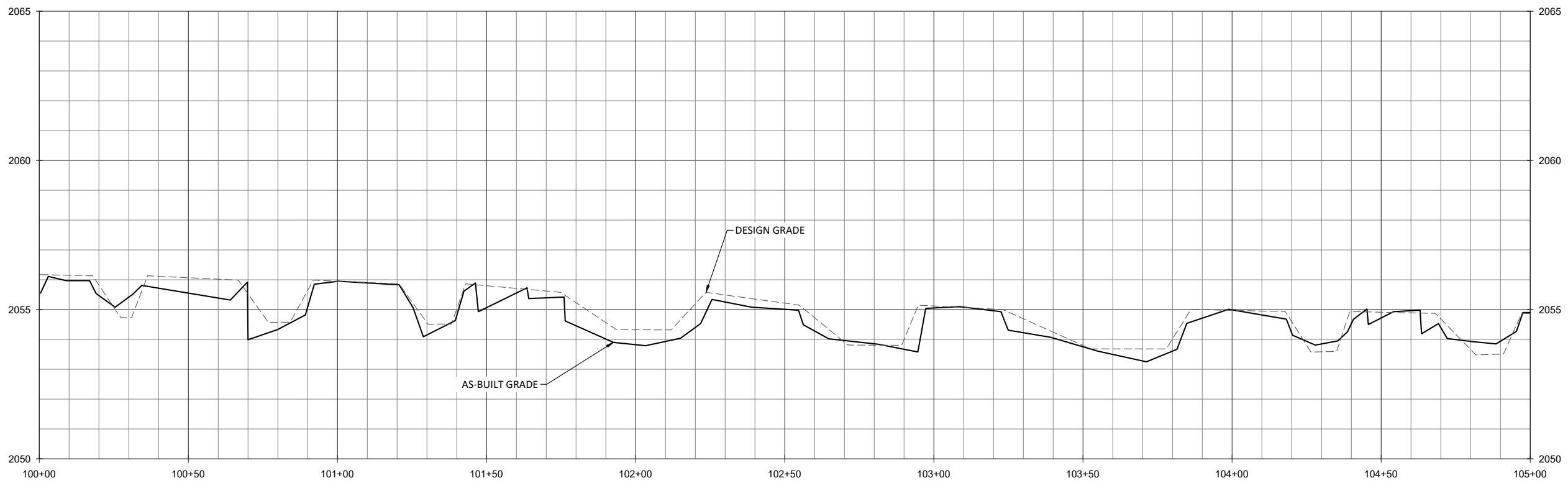
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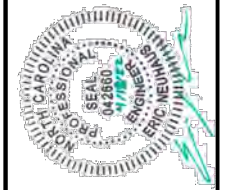
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Henderson County, North Carolina

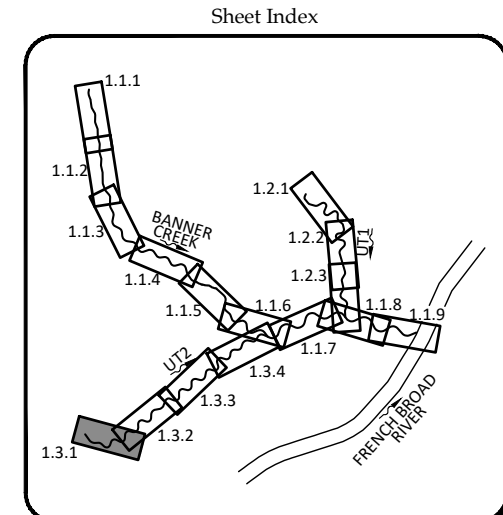
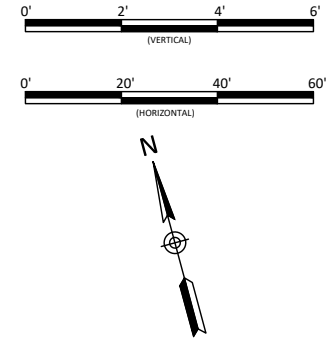
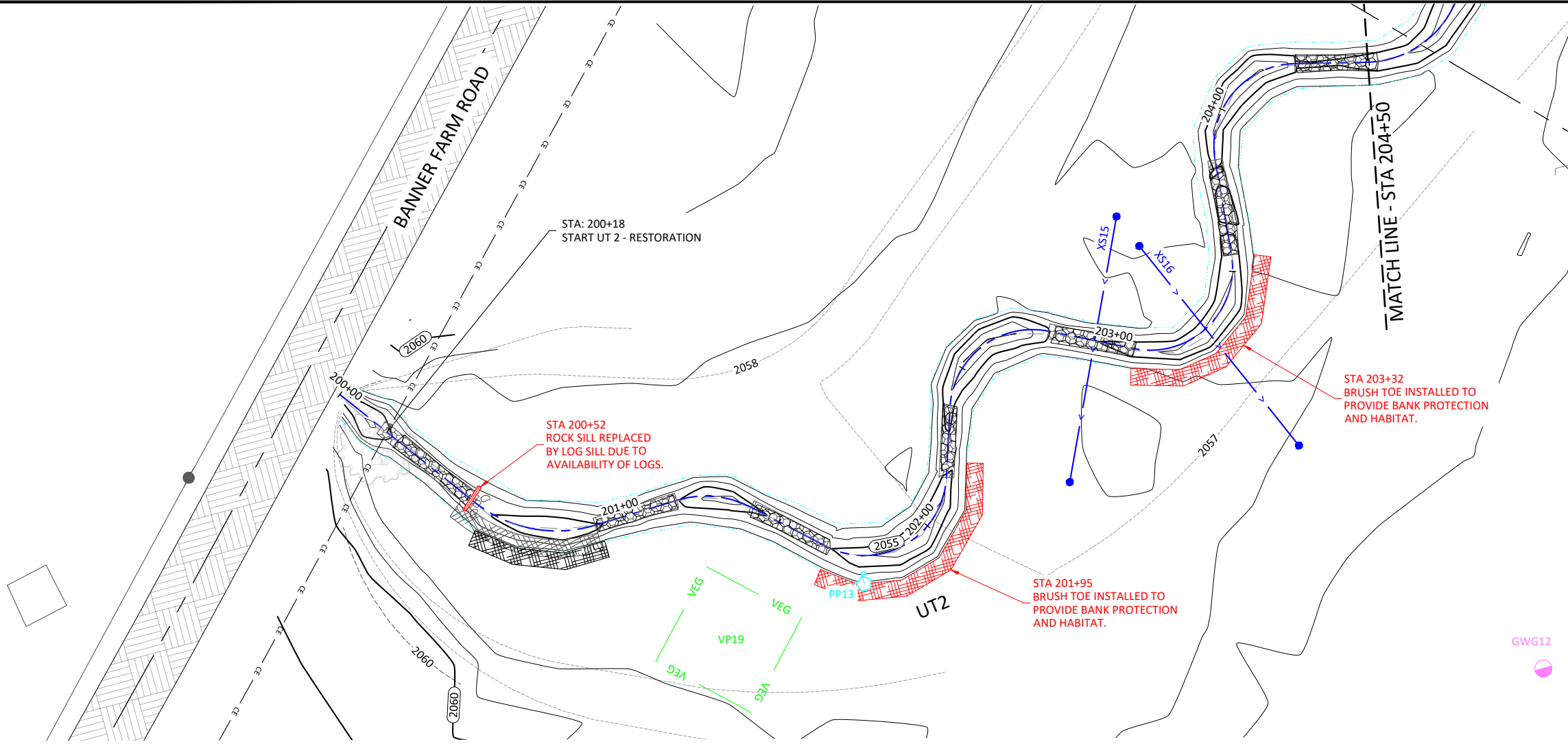
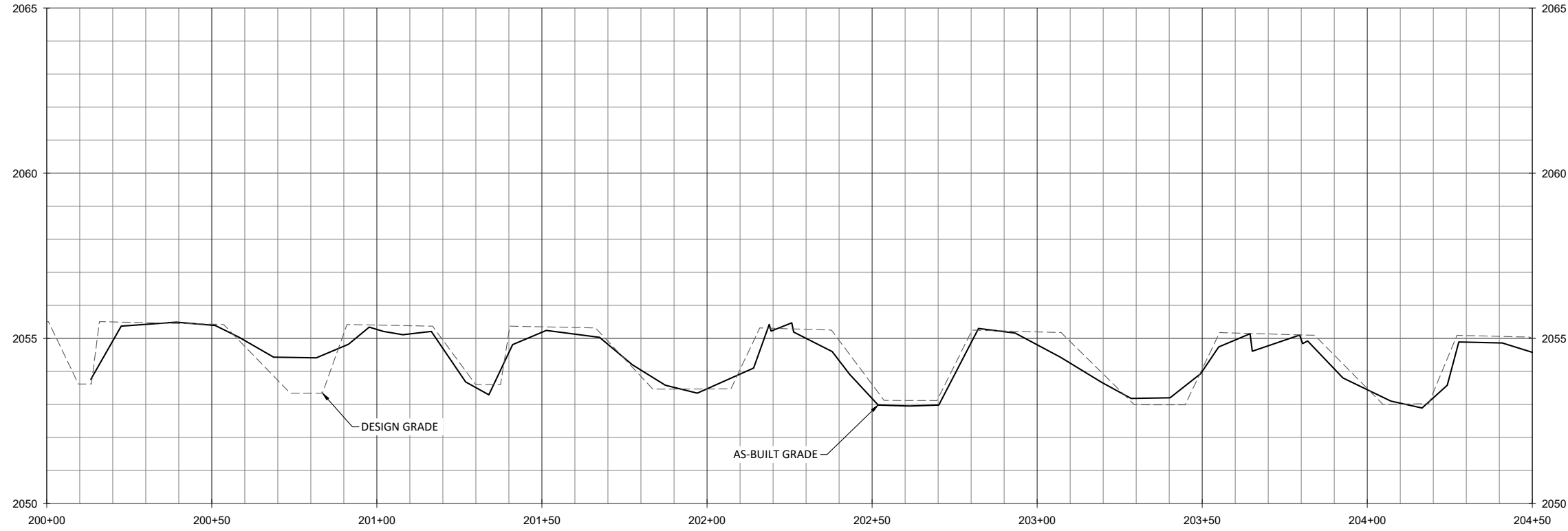
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 UT1

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Checked By:	JK

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Banner Farm Mitigation Site Record Drawings
Henderson County, North Carolina

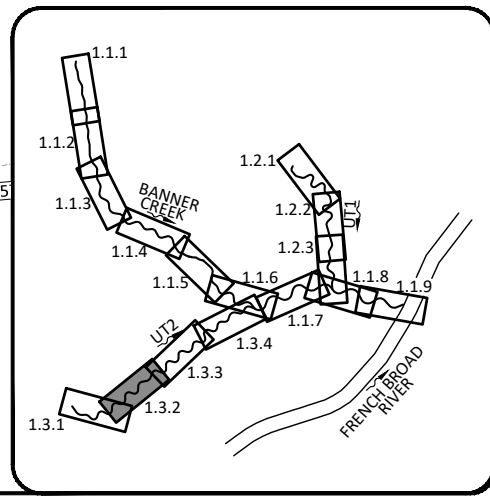
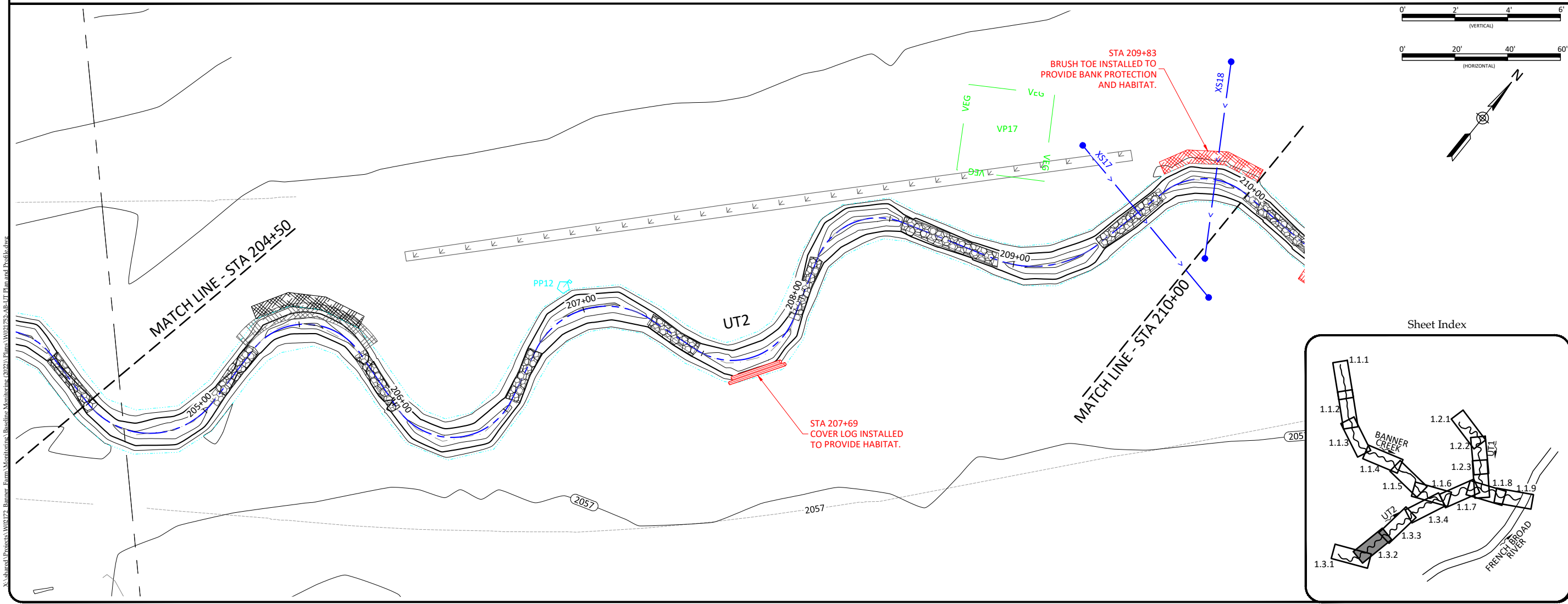
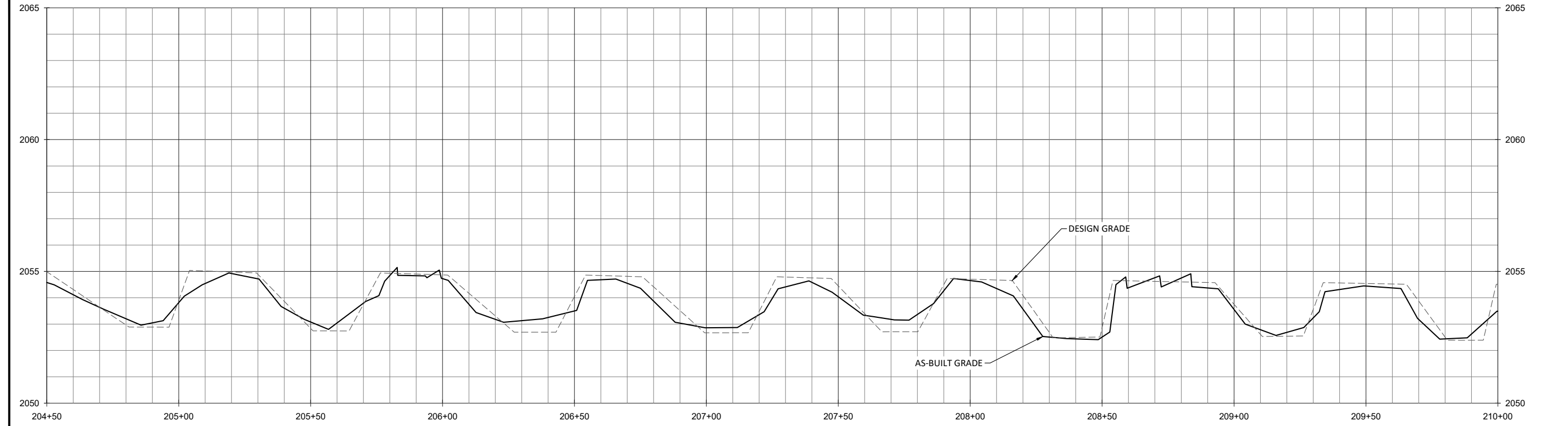
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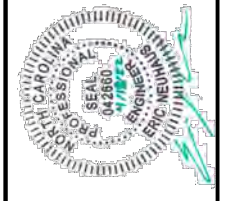
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 Drawn By: JH
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April 18, 2022



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Banner Farm Mitigation Site Record Drawings
Henderson County, North Carolina
 Stream Plan and Profile
 UT2

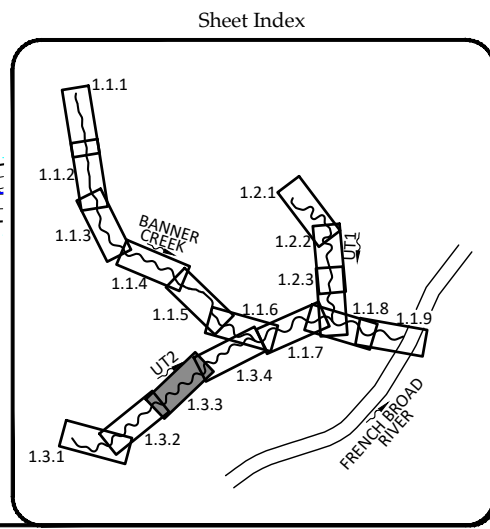
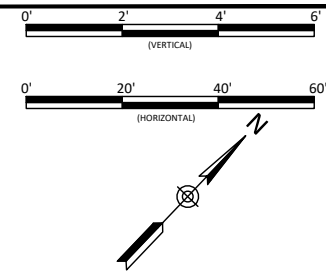
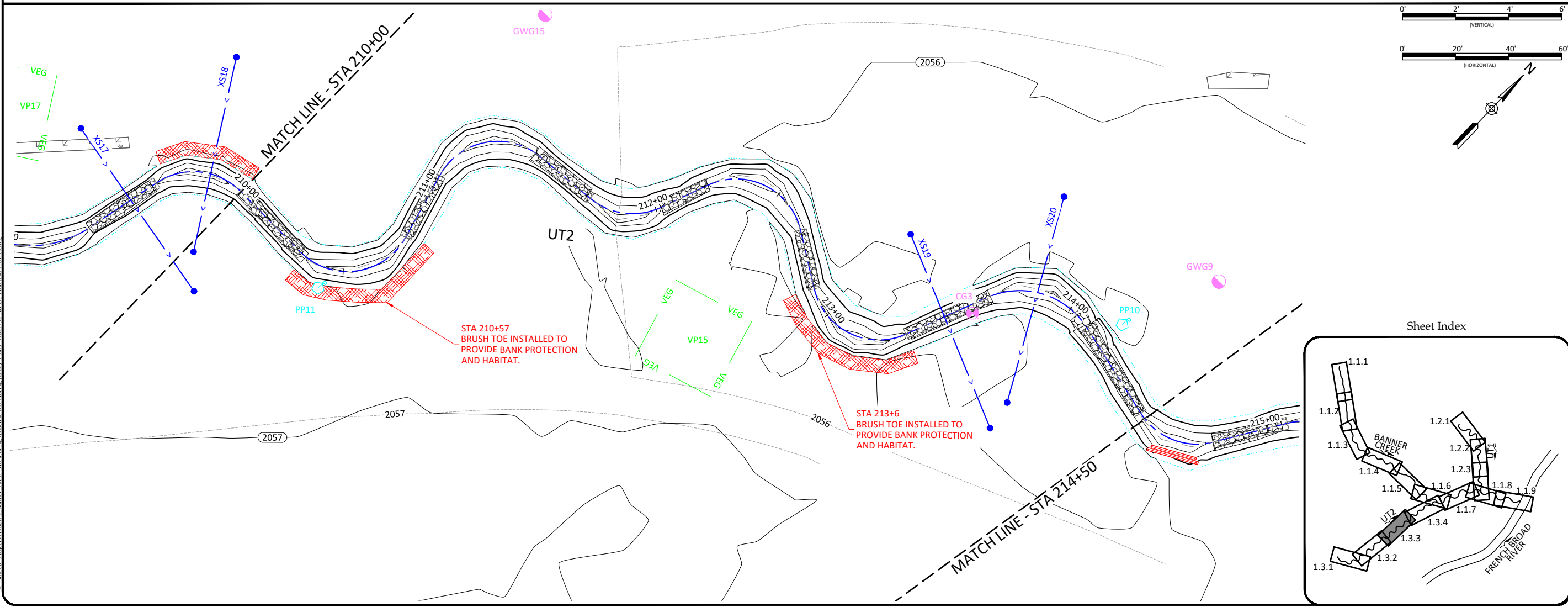
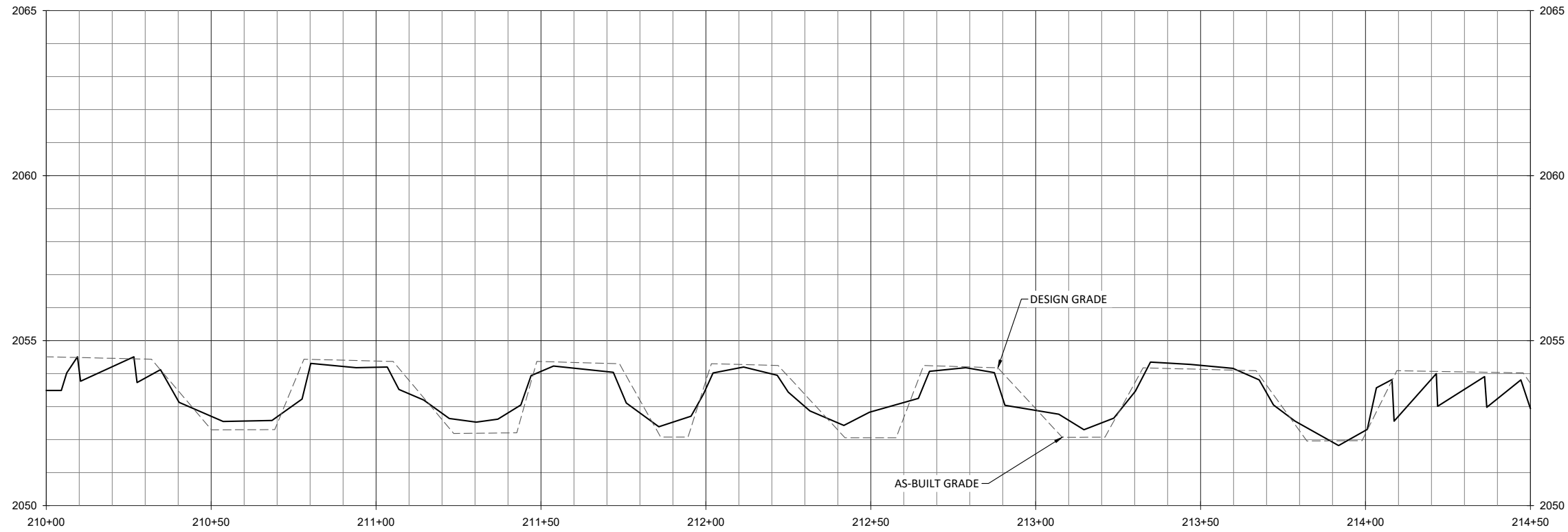
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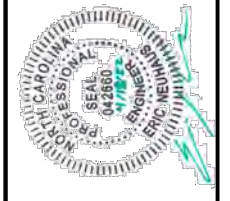
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Banner Farm Mitigation Site Record Drawings
Henderson County, North Carolina

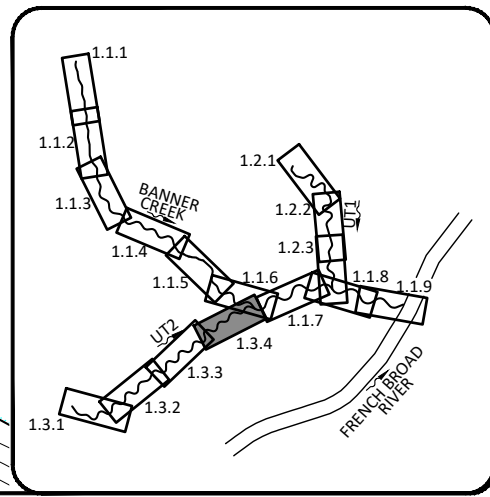
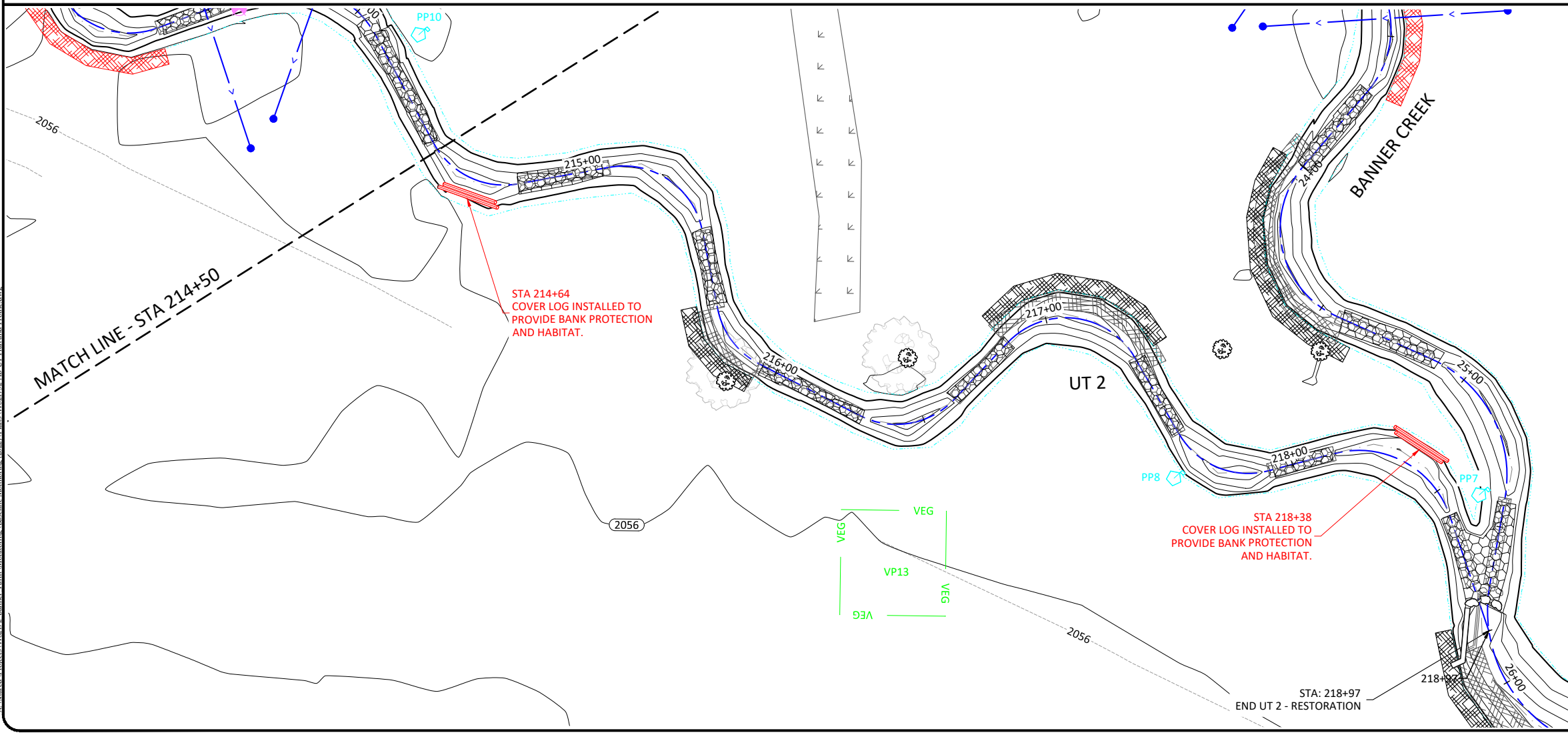
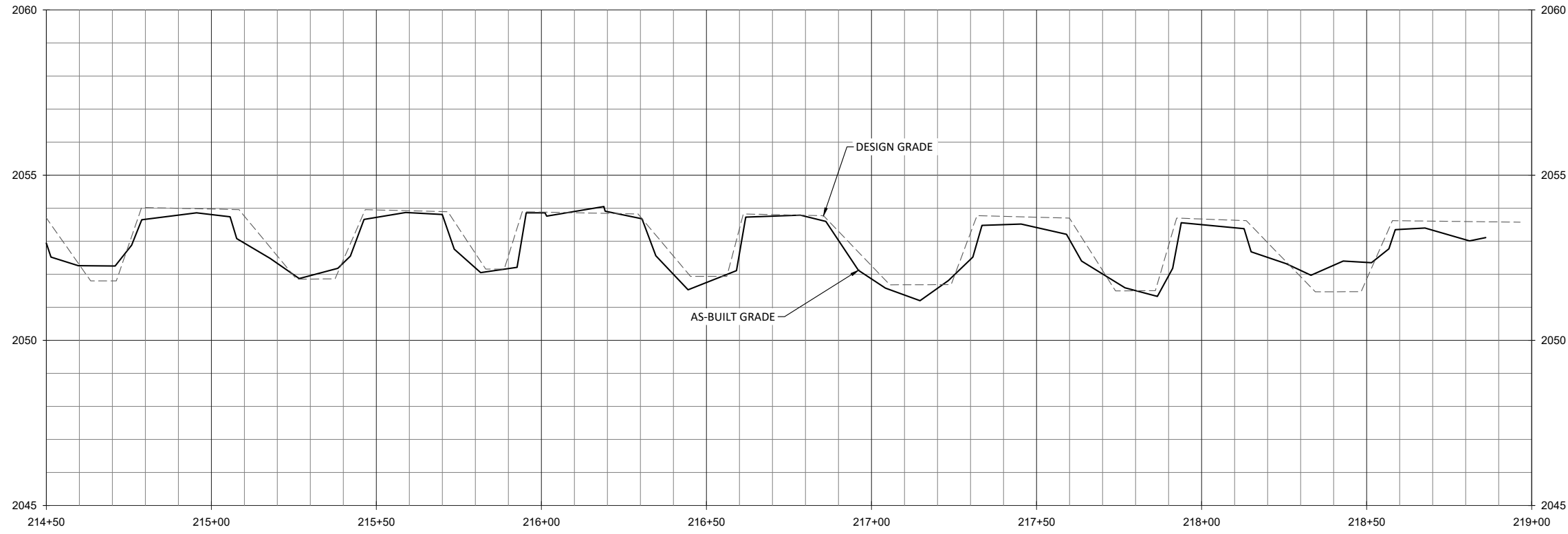
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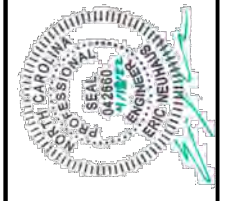
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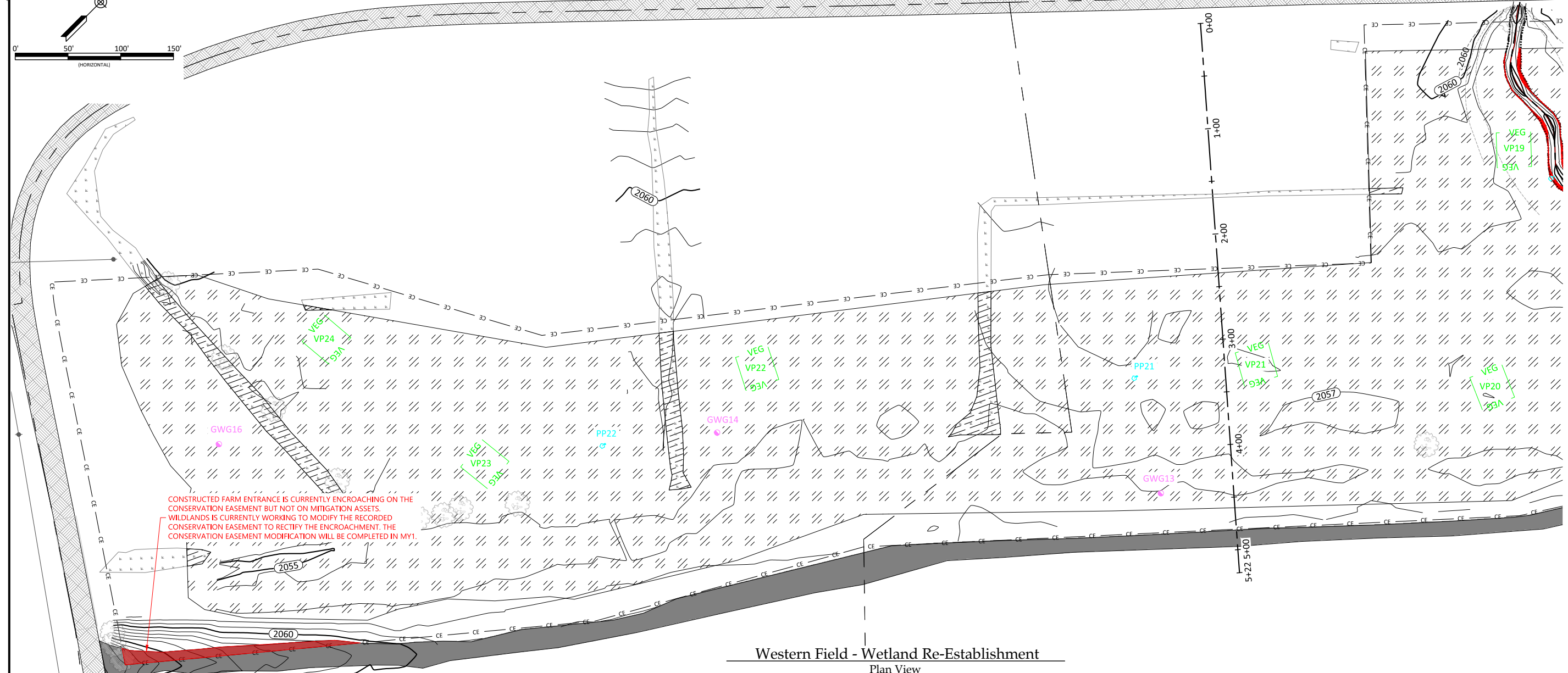
Banner Farm Mitigation Site Record Drawings
Henderson County, North Carolina
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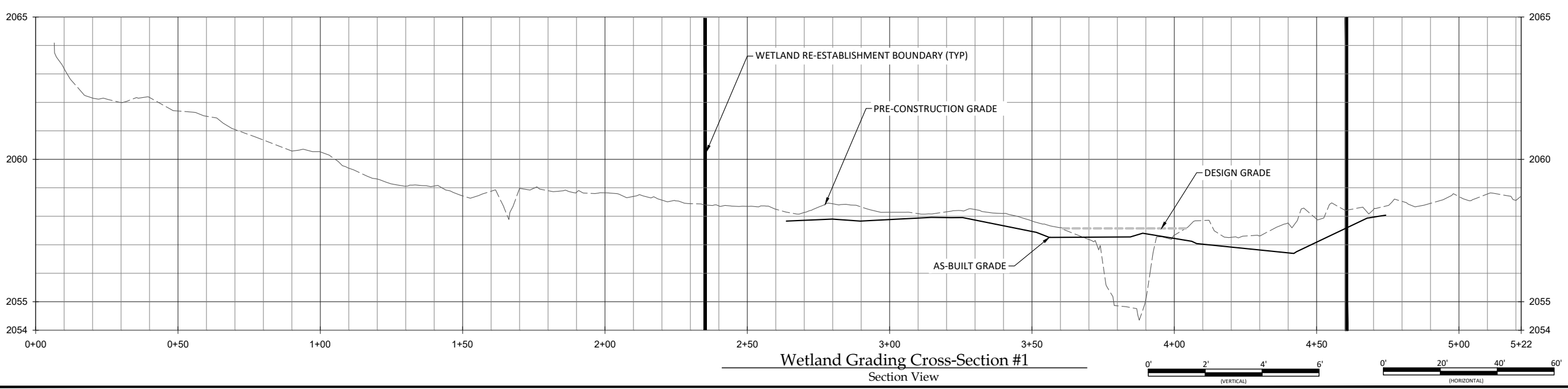
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April 18, 2022



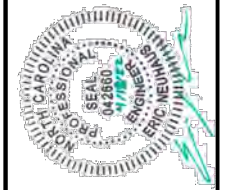
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Western Field - Wetland Re-Establishment
Plan View



Wetland Grading Cross-Section #1
Section View

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Banner Farm Mitigation Site Record Drawings
Henderson County, North Carolina

Western Field
Wetland Grading Plan

Revisions:

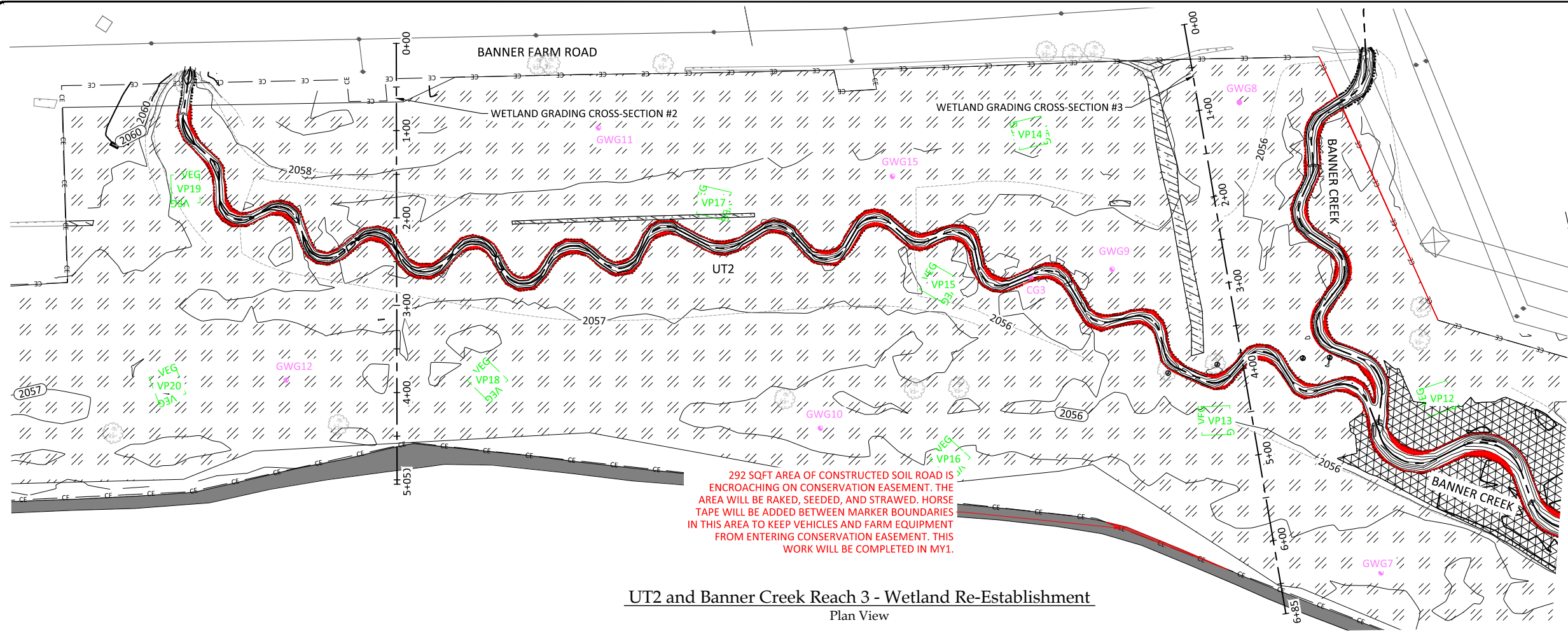
Date: 04-18-22
Job Number: W021792
Project Engineer: EN
Drawn By: JH
Checked By: JK

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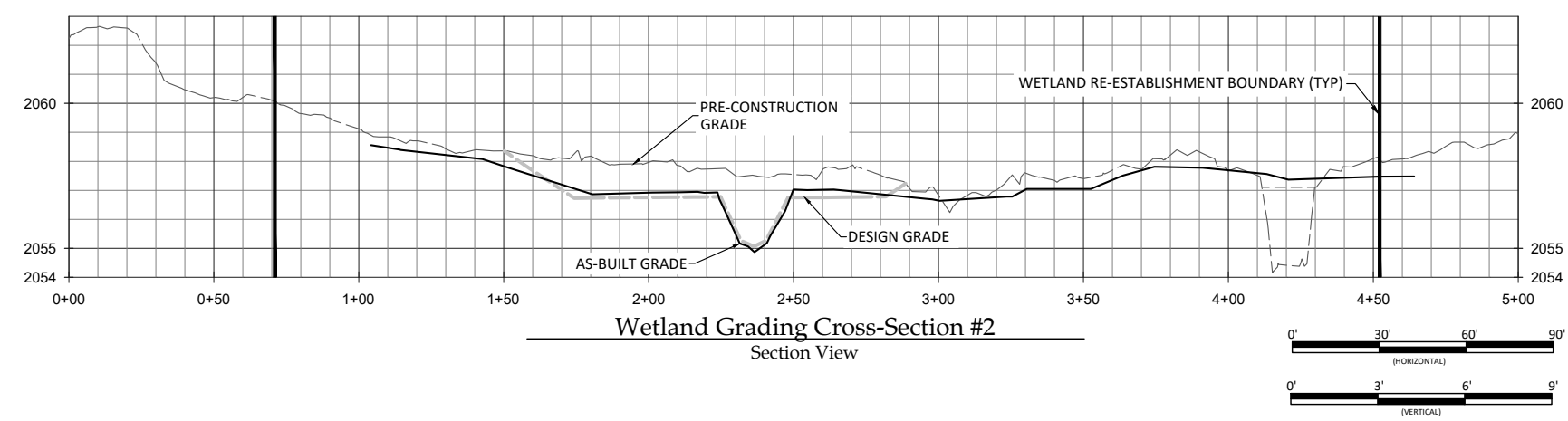
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April 18, 2022

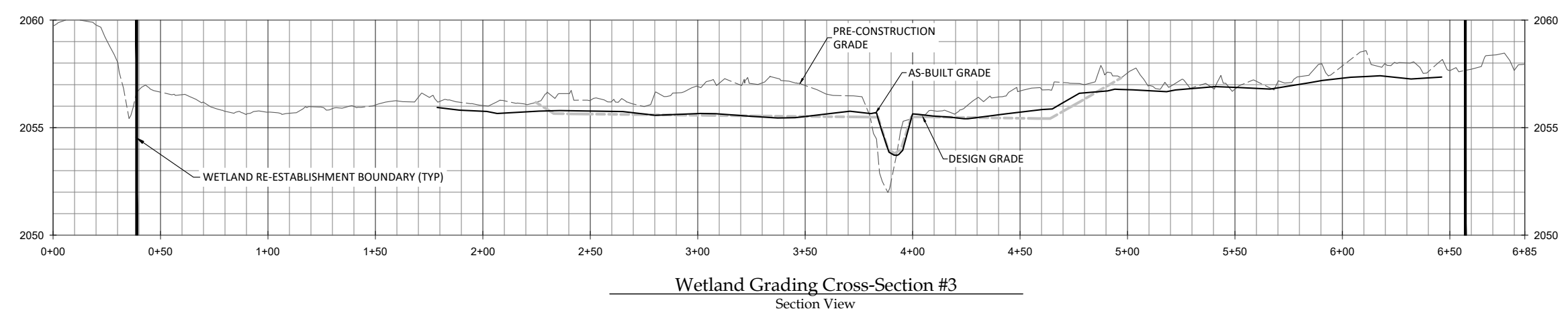
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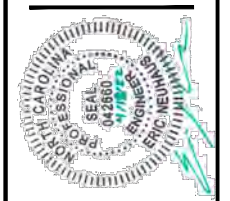
UT2 and Banner Creek Reach 3 - Wetland Re-Establishment
Plan View



Wetland Grading Cross-Section #2
Section View

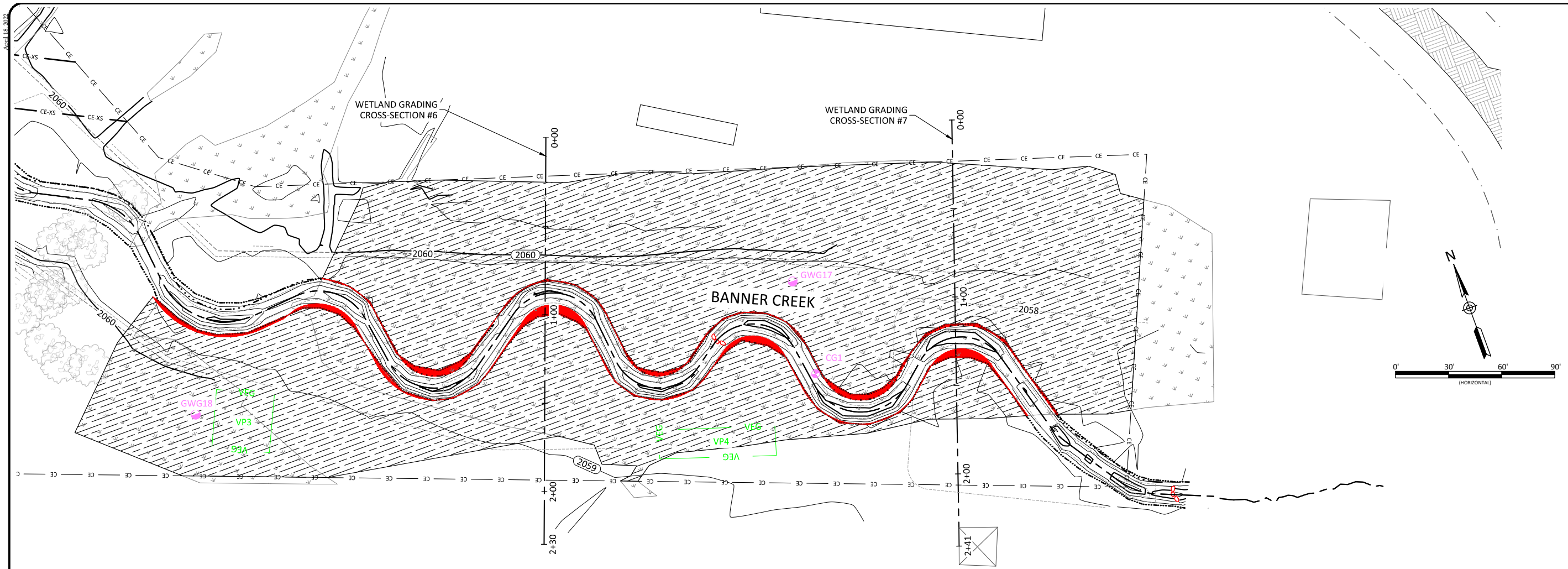


Wetland Grading Cross-Section #3
Section View

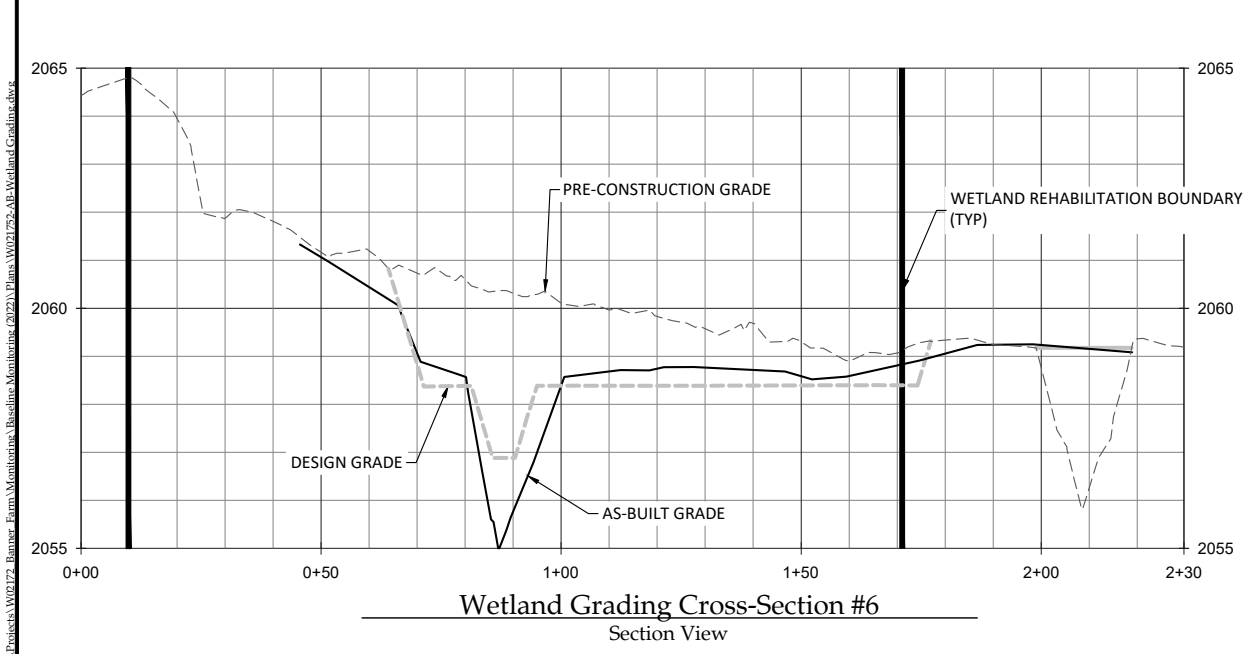


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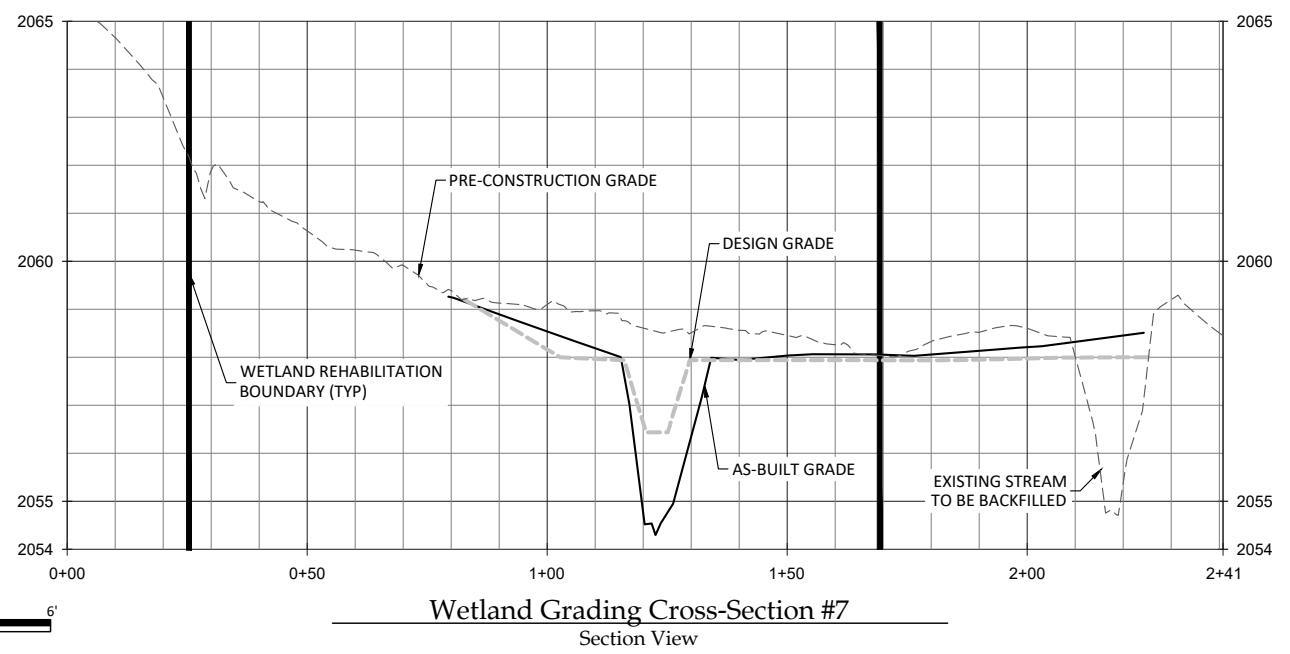
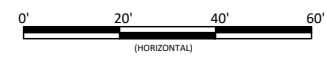
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Job Number: W021722
Project Engineer: EN
Drawn By: JH
Checked By: JK



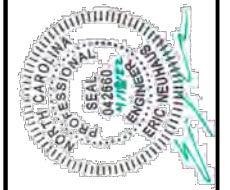
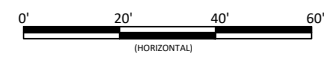
Banner Creek Reach 2 - Wetland Rehabilitation
Plan View



Wetland Grading Cross-Section #6
Section View



Wetland Grading Cross-Section #7
Section View

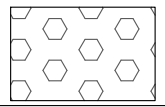


Revisions:

Date: 04-18-22
Job Number: W021792
Project Engineer: EN
Drawn By: JH
Checked By: JK

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 W021722
 EN
 JH
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Open Area Buffer Planting

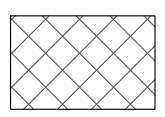


Open Buffer Planting Zone Trees							
Bare Root							
Species	Common Name	Max Spacing	Indiv. Spacing	Min. Caliper Size	Stratum	# of Stems	Wetland Indicator
<i>Nyssa sylvatica</i>	Black Gum	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	5%	FAC
<i>Platanus occidentalis</i>	Sycamore	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	15%	FACW
<i>Betula nigra</i>	River Birch	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	12%	FACW
<i>Liriodendron tulipifera</i>	Tulip Poplar	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	10%	FACU
<i>Fraxinus pennsylvanica</i>	Green Ash	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	4%	FACW
<i>Prunus serotina</i>	Black Cherry	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	9%	FACU
<i>Quercus rubra</i>	Red Oak	12ft.	6-12 ft.	0.25"-1.0"	Canopy	10%	FACU
<i>Betula lenta</i>	Sweet Birch	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	8%	FACU
<i>Quercus falcata</i>	Southern Red Oak	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	10%	FACU
<i>Diospyros virginiana</i>	Persimmon	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	5%	FAC
<i>Fagus grandifolia</i>	American Beech	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	2%	FACU
Total						-90%	82%
Alternates							
<i>Acer saccharinum</i>	Silver Maple	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	-0% 8%	FACW
<i>Halesia caroliniana</i>	Carolina Silverbell	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	0%	FAC
<i>Fraxinus americana</i>	White Ash	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	0%	FACU
Total						-0%	8%

Open Buffer Planting Zone Small Trees / Shrubs							
Bare Root							
Species	Common Name	Max Spacing	Indiv. Spacing	Min. Caliper Size	Stratum	# of Stems	Wetland Indicator
<i>Alnus serrulata</i>	Tag Alder	12 ft.	6-12 ft.	0.25"-1.0"	Sub-Canopy	2%	OBL
<i>Hamamelis virginiana</i>	Witch Hazel	12 ft.	6-12 ft.	0.25"-1.0"	Sub-Canopy	2%	FACU
<i>Cornus florida</i>	Flowering Dogwood	12 ft.	6-12 ft.	0.25"-1.0"	Sub-Canopy	2%	FACU
<i>Lindera benzoin</i>	Spicebush	12 ft.	6-12 ft.	0.25"-1.0"	Shrub	2%	FAC
<i>Amelanchier arborea</i>	Serviceberry	12 ft.	6-12 ft.	0.25"-1.0"	Shrub	2%	FAC
Total						10%	

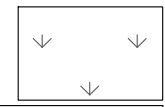
Notes:
 Transplants from on-site to be used at Designer's discretion for streambank and floodplain planting.
 Percentages of each species may be varied at Designer's discretion but shall not exceed 20% per each species.
 Designer may substitute container plantings or other plantings for bare roots.

Partially Vegetated Buffer Area Planting



Notes:
 used open area buffer planting list and percentages.

Wetland Planting

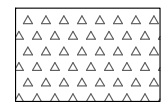


Wetland Planting Zone Trees							
Bare Root							
Species	Common Name	Max Spacing	Indiv. Spacing	Min. Caliper Size	Stratum	# of Stems	Wetland Indicator
<i>Platanus occidentalis</i>	Sycamore	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	15%	FACW
<i>Betula nigra</i>	River Birch	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	-15% 15.5%	FACW
<i>Liriodendron tulipifera</i>	Tulip Poplar	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	-15% 5%	FACU
<i>Diospyros virginiana</i>	Persimmon	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	5%	FAC
<i>Acer negundo</i>	Box elder	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	-15% 15.5%	FAC
<i>Nyssa sylvatica</i>	Black gum	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	10%	FAC
<i>Salix nigra</i>	Black Willow	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	15%	OBL
Total						-90%	76%
Alternates							
<i>Acer saccharinum</i>	Silver Maple	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	0%	FACW
<i>Acer Rubrum</i>	Red Maple	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	0%	FAC
<i>Ulmus americana</i>	American elm	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	-0% 10%	FACW
Total						-0%	10%

Wetland Planting Zone Small Trees/Shrubs							
Bare Root							
Species	Common Name	Max Spacing	Indiv. Spacing	Min. Caliper Size	Stratum	# of Stems	Wetland Indicator
<i>Alnus serrulata</i>	Tag Alder	12 ft.	6-12 ft.	0.25"-1.0"	Sub-Canopy	-2% 3.5%	OBL
<i>Carpinus caroliniana</i>	Ironwood	12 ft.	6-12 ft.	0.25"-1.0"	Shrub	2%	FAC
<i>Lindera benzoin</i>	Spicebush	12 ft.	6-12 ft.	0.25"-1.0"	Shrub	-2% 2.5%	FAC
<i>Asimina triloba</i>	Pawpaw	12 ft.	6-12 ft.	0.25"-1.0"	Sub-Canopy	2%	FAC
<i>Leucothoe fontanesiana</i>	Mountain doghobble	12 ft.	6-12 ft.	0.25"-1.0"	Shrub	1%	FACW
<i>Ilex opaca</i>	American Holly	12 ft.	6-12 ft.	0.25"-1.0"	shrub	-1% 2%	FACW
<i>Sambucus canadensis</i>	Elderberry	12 ft.	6-12 ft.	0.25"-1.0"	shrub	2%	FAC
Total						-10%	14%

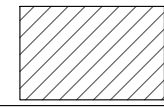
Notes:
 Transplants from on-site to be used at Designer's discretion for streambank and floodplain planting.
 Percentages of each species may be varied at Designer's discretion but shall not exceed 20% per each species.
 Designer may substitute container plantings or other plantings for bare roots.

Rivercane Planting



Rivercane Planting Zone							
Bare Root							
Species	Common Name	Max Spacing	Indiv. Spacing	Min. Size	Stratum	% of Stems	Wetland Indicator
<i>Arundinaria gigantea</i>	Rivercane	8 ft.	6-8 ft.	0.5"-1.5" cal.	Shrub	100%	FACW

Riparian Corridor Planting (Streambanks)



Streambank Planting Zone							
Live Stakes							
Species	Common Name	Max Spacing	Indiv. Spacing	Min. Size	Stratum	% of Stems	Wetland Indicator
<i>Salix nigra</i>	Black Willow	8 ft.	6-8 ft.	0.5"-1.5" cal.	Shrub	-10% 11%	OBL
<i>Cornus amomum</i>	Silky Dogwood	8 ft.	6-8 ft.	0.5"-1.5" cal.	Shrub	20%	FACW
<i>Salix sericea</i>	Silky Willow	8 ft.	6-8 ft.	0.5"-1.5" cal.	Shrub	20%	OBL
<i>Physocarpus opulifolius</i>	Ninebark	8 ft.	6-8 ft.	0.5"-1.5" cal.	Shrub	20%	FACW
<i>Cephalothus occidentalis</i>	Buttonbush	8 ft.	6-8 ft.	0.5"-1.5" cal.	Shrub	-15% 14.5%	OBL
<i>Sambucus canadensis</i>	Elderberry	8 ft.	6-8 ft.	0.5"-1.5" cal.	Shrub	-15% 15.5%	FAC
Total						100%	
Herbaceous Plugs							
<i>Juncus effusus</i>	Common Rush	5 ft.	3-5 ft.	1.0"-2.0" plug	Herb	40%	FACW
<i>Carex alata</i>	Broadwing Sedge	5 ft.	3-5 ft.	1.0"-2.0" plug	Herb	20%	OBL
<i>Carex lurida</i>	Lurid Sedge	5 ft.	3-5 ft.	1.0"-2.0" plug	Herb	20%	OBL
<i>Scirpus cyperinus</i>	Woolgrass	5 ft.	3-5 ft.	1.0"-2.0" plug	Herb	20%	FACW
Total						100%	

Note: See detail for Live Staking instructions on streambanks.

Permanent Seeding

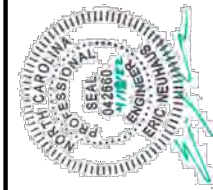
Riparian Seeding - Open Canopy						
Pure Live Seed (20 lbs/ acre)						
Approved Date	Species Name	Common Name	Stratum	Density (lbs/acre)	Wetland Indicator	
All Year	<i>Panicum rigidulum</i>	Redtop Panicgrass	Herb	1.0	FACW	
All Year	<i>Panicum virgatum</i>	Switchgrass	Herb	1.0	FAC	
All Year	<i>Chasmanthium latifolium</i>	River Oats	Herb	1.0	FACU	
All Year	<i>Rudbeckia hirta</i>	Blackeyed Susan	Herb	1.0	FACU	
All Year	<i>Coreopsis lanceolata</i>	Lanceleaf Coreopsis	Herb	1.0	FACU	
All Year	<i>Carex vulpinoidea</i>	Fox Sedge	Herb	2.0	OBL	
All Year	<i>Panicum clandestinum</i>	Deertongue	Herb	4.0	FAC	
All Year	<i>Elymus virginicus</i>	Virginia Wild Rye	Herb	4.0	FACW	
All Year	<i>Sorghastrum nutans</i>	Indiangrass	Herb	3.0	FACU	
All Year	<i>Bidens aristosa</i>	Bur-Marigold	Herb	1.0	FACW	
All Year	<i>Helianthus angustifolius</i>	Swamp Sunflower	Herb	1.0	FACW	

Wetland Seeding - Open Canopy						
Pure Live Seed (20 lbs/ acre)						
Approved Date	Species Name	Common Name	Stratum	Density (lbs/acre)	Wetland Indicator	
All Year	<i>Panicum rigidulum</i>	Redtop Panicgrass	Herb	3.0	FACW	
All Year	<i>Chasmanthium latifolium</i>	River Oats	Herb	2.0	FACU	
All Year	<i>Carex vulpinoidea</i>	Fox Sedge	Herb	2.0	OBL	
All Year	<i>Elymus virginicus</i>	Virginia Wild Rye	Herb	4.0	FACW	
All Year	<i>Helianthus angustifolius</i>	Swamp Sunflower	Herb	3.0	FACW	
All Year	<i>Glyceria septentrionalis</i>	Eastern Manna Grass	Herb	3.0	OBL	
All Year	<i>Glyceria striata</i>	Fowl Manna Grass	Herb	3.0	OBL	

Pasture Seeding

Pasture 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

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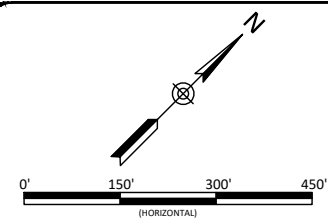


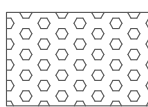
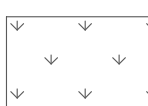

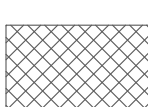

Banner Farm Mitigation Site Record Drawings
 Henderson County, North Carolina
 Planting List

Revisions:							
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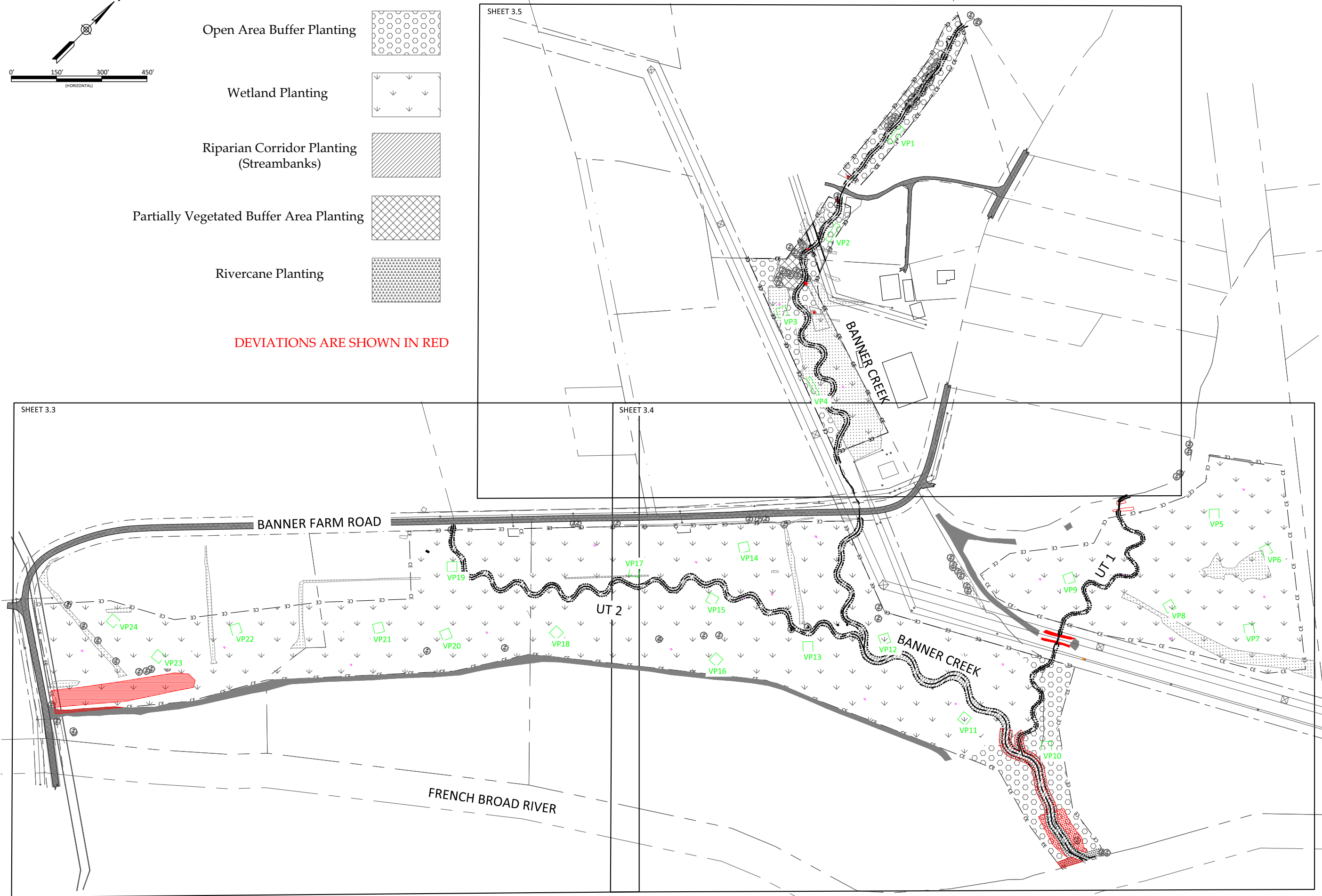
Date: 04-18-22
 Job Number: W021722
 Project Engineer: EN
 Drawn By: JH
 Checked By: JK

April 18, 2022
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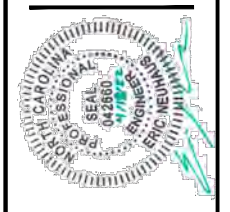


- Open Area Buffer Planting 
- Wetland Planting 
- Riparian Corridor Planting (Streambanks) 
- Partially Vegetated Buffer Area Planting 
- Rivercane Planting 

DEVIATIONS ARE SHOWN IN RED



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Banner Farm Mitigation Site Record Drawings
 Henderson County, North Carolina

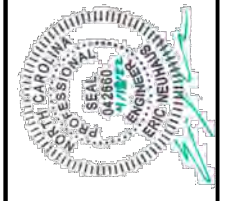
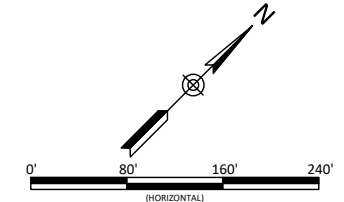
Planting Overview
 Planting Plan

Revisions:

Date: 04-18-22
 Job Number: W02172
 Project Engineer: EN
 Drawn By: JH
 Checked By: JK

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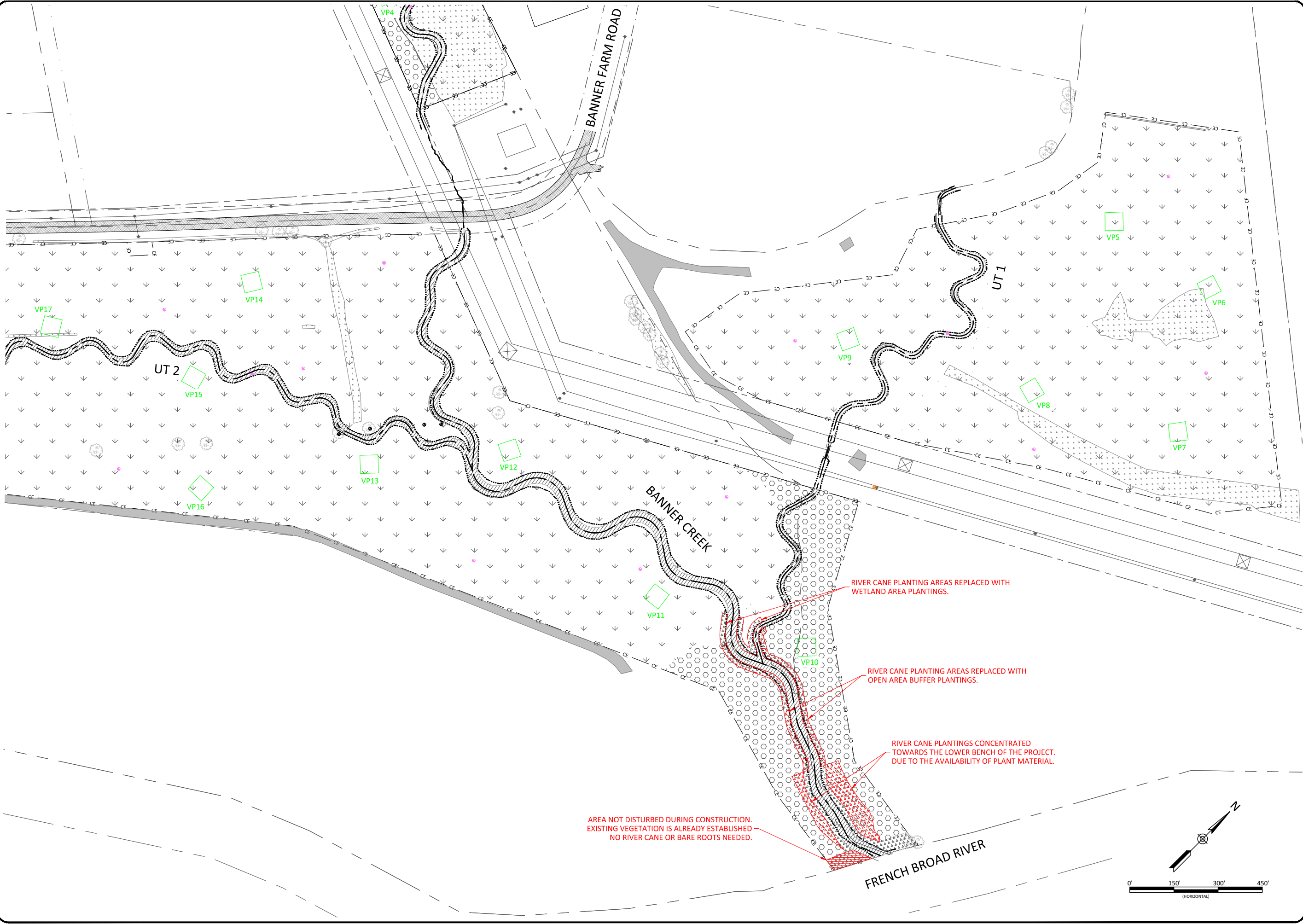
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Banner Farm Mitigation Site Record Drawings
Henderson County, North Carolina
 Wetland and UT2
 Planting Plan

Revisions:

Date:	04-18-22
Job Number:	W02172
Project Engineer:	EN
Drawn By:	JH
Checked By:	JK



Banner Farm Mitigation Site Record Drawings
Henderson County, North Carolina

Wetland UT1, UT2, and Banner Creek
 Planting Plan

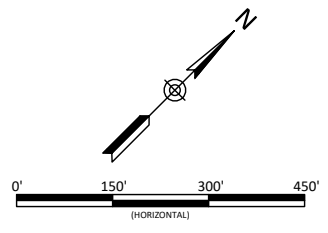
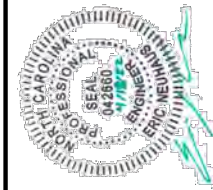
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Job Number:	W021792
Project Engineer:	EN
Drawn By:	JH
Checked By:	JK

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Drawn By:	JH
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Banner Farm Mitigation Site Record Drawings
Henderson County, North Carolina

Banner Creek Reach 2



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