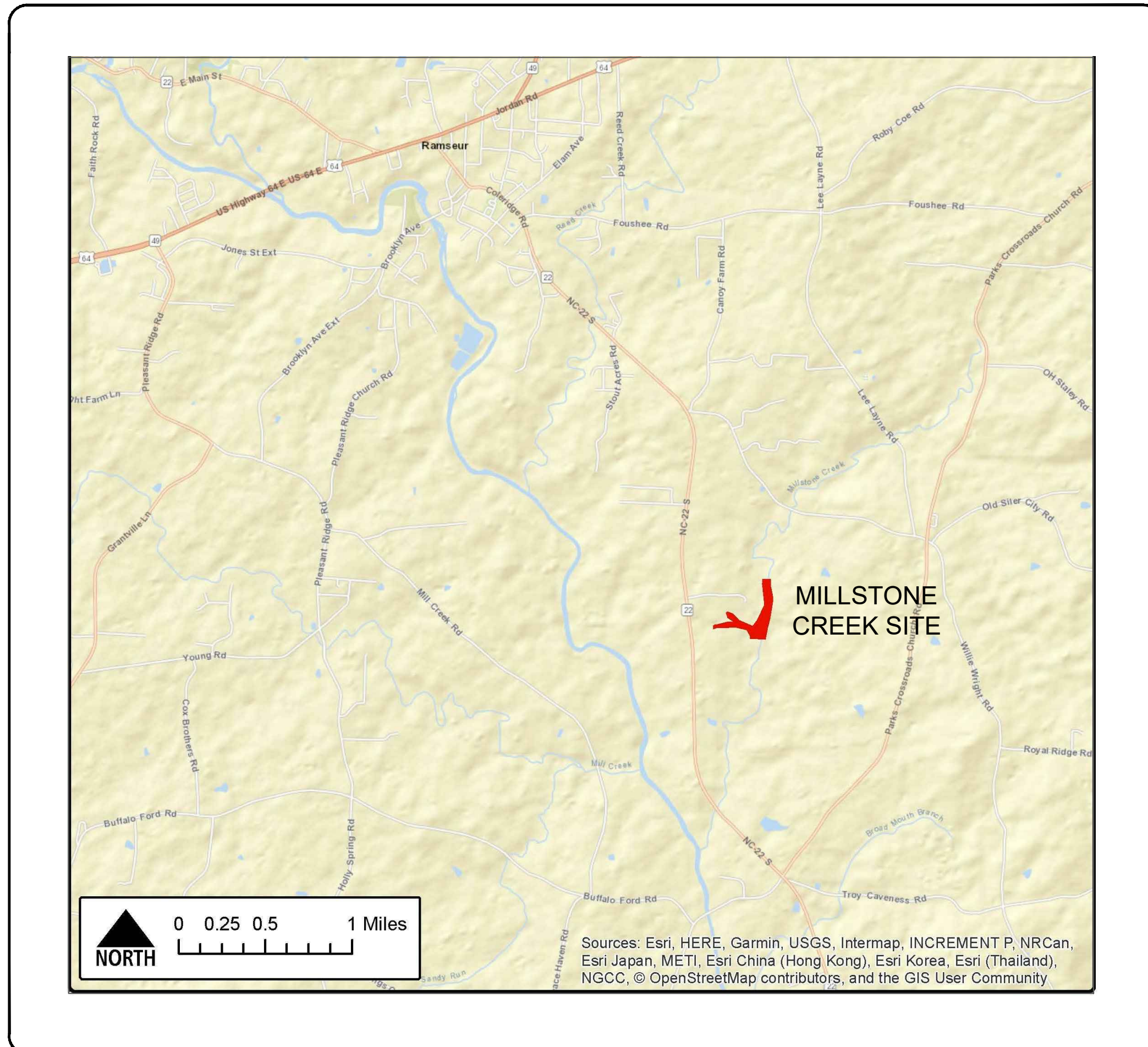


NC DEPARTMENT OF ENVIRONMENTAL QUALITY - DIVISION OF MITIGATION SERVICES

MILLSTONE CREEK MITIGATION SITE - PHASE 1

RECORD DRAWINGS

RANDOLPH COUNTY, NORTH CAROLINA
SCO ID # 20-22021-01A; NCDMS IMS# 204; USACE AID: SAW-2019-01363
LAT: 35.696683 LONG: -79.623956



PROJECT DIRECTORY	
OWNER:	NORTH CAROLINA DIVISION OF MITIGATION SERVICES
	MELONIE ALLEN 217 WEST JONES STREET RALEIGH, NC 27603 919.707.8540 melonie.allen@ncdenr.gov
ENGINEER:	NORTH CAROLINA STATE UNIVERSITY
	BARBARA A. DOLL, PHD, PE CAMPUS BOX 7625 RALEIGH, NC 27695 919.515.5287 bdoll@ncsu.edu
	JONATHAN L. PAGE, PE CAMPUS BOX 7625 RALEIGH, NC 27695 919.515.8595 jlp@ncsu.edu
SURVEYOR:	TURNER LAND SURVEYING
	DAVID S. TURNER, PLS PO BOX 148 SWANNANOVA, NC 26778 919.827.0745
SHEET INDEX	
TITLE SHEET	1.1
PROJECT OVERVIEW	2.1
PLAN AND PROFILE SHEETS	4.1
RE-VEGETATION PLAN	5.1

I, DAVID S. TURNER, AS A DULY REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF NORTH CAROLINA, HEREBY CERTIFY THAT THE SURVEY DATA SHOWN ON THIS DRAWING, WAS OBTAINED UNDER MY SUPERVISION, IS AN ACCURATE AND COMPLETE REPRESENTATION OF WHAT WAS CONSTRUCTED IN THE FIELD, AND THAT THE PHYSICAL DIMENSIONS OR ELEVATIONS SHOWN THIS ARE AS-BUILT CONDITIONS EXCEPT WHERE OTHERWISE NOTED HEREON. WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS 2nd DAY OF FEBRUARY, 2022.

David S. Turner
 DAVID S. TURNER, P.L.S. #L-4551

I, DAVID S. TURNER, CERTIFY THAT THE AS-BUILT TOPOGRAPHIC SURVEY FOR THIS PROJECT WAS COMPLETED UNDER MY DIRECT AND RESPONSIBLE CHARGE AND TAKEN FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION; THAT THIS AS-BUILT TOPOGRAPHIC SURVEY WAS PERFORMED AT THE 95 PERCENT CONFIDENCE LEVEL TO MEET FEDERAL GEOGRAPHIC DATA COMMITTEE STANDARDS; THAT THIS SURVEY WAS PERFORMED TO MEET THE REQUIREMENTS FOR A TOPOGRAPHIC SURVEY TO THE HORIZONTAL ACCURACY OF CLASS A AND THE VERTICAL ACCURACY WHEN APPLICABLE TO CLASS C STANDARD, AND THAT THE ORIGINAL DATA WAS OBTAINED IN AUG-OCT 2021; THAT THE SURVEY WAS COMPLETED ON 8 OCTOBER 2021; AND ALL COORDINATES ARE BASED ON NAD83 (2011) AND ALL ELEVATIONS ARE BASED ON NAVD83. WITNESS MY ORIGINAL SIGNATURE, LICENSE NUMBER, AND SEAL THIS 2nd DAY OF FEBRUARY, 2022.

David S. Turner
 DAVID S. TURNER, P.L.S. #L-4551

**AS-BUILT & RECORD
 DRAWINGS
 JANUARY 28, 2022**

MILLSTONE CREEK
 NC DMS MITIGATION SITE
 RANDOLPH COUNTY, NC
 PHASE 1

TITLE

1.1



NC STATE

DRAWN: JLP, JLF	PROJECT: MILLSTONE CREEK	NAME: MITIGATION SITE	SCALE: AS NOTED
DESIGN: BAD, JLP			DATE: JANUARY 28, 2022
CHECK: BAD			
APPROVED: BAD			

SCO ID # 20-22021-01A
 PHASE # 1

STANDARD LINES AND SYMBOLS

PRECONSTRUCTION FEATURES

- EXISTING TOB
- EXISTING CONSERVATION EASEMENT
- EXISTING PROPERTY LINE
- EXISTING EASEMENT FENCING
- EXISTING WETLANDS
- EXISTING BUILDING FOOTPRINT
- EXISTING GATE

DESIGN FEATURES

- DESIGN REGENERATIVE STORMWATER CONVEYANCE
- DESIGN ENHANCEMENT 1
- DESIGN RESTORATION
- DESIGN WETLAND ENHANCEMENT
- DESIGN CHANNEL CENTERLINE
- DESIGN BANKFULL
- DESIGN LOG SILL
- DESIGN BRUSH TOE WITH SOIL GEOLIFT
- DESIGN LOG VANE WITH BOULDER J-HOOK
- DESIGN REGENERATIVE STORMWATER CONVEYANCE CHANNEL
- DESIGN LOG RIFFLE
- DESIGN CONSTRUCTED RIFFLE

AS-BUILT FEATURES

- AS-BUILT THALWEG
- AS-BUILT TOP OF BANK
- AS-BUILT SURVEY LIMIT
- AS-BUILT FENCE
- AS-BUILT GATE
- AS-BUILT CONTOURS
- TREELINE
- TREE
- AS-BUILT LOG SILL
- AS-BUILT BRUSH TOE WITH SOIL GEOLIFT
- AS-BUILT LOG VANE WITH BOULDER J-HOOK
- AS-BUILT FLOOD GATE

- AS-BUILT LOG RIFFLE
- AS-BUILT CONSTRUCTED RIFFLE
- AS-BUILT RIPRAP/STONE
- MONITORING CROSS SECTION
- VEG PLOT
- PHOTO POINT
- MONITORING WELL/ GROUNDWATER GAUGE
- CONTROL POINT

CONTROL POINTS

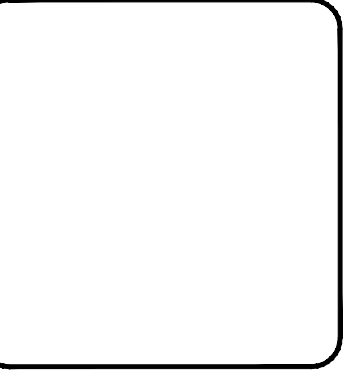
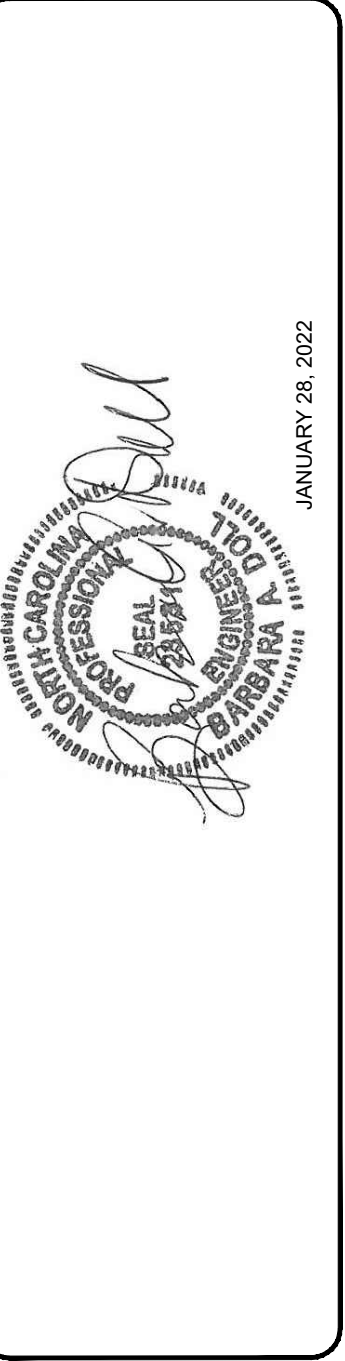
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2	709005.28	1814573.92	462.591	TLS#2NL
3	709098.44	1814902.49	443.691	TLS#3NL
4	708694.19	1815046.77	438.284	TLS#4NL
5	708593.88	1815321.16	431.151	TLS#5NL
6	709193.14	1815191.97	437.679	TLS#6NL
7	709060.41	1815494.85	442.400	TLS#7NL
9	709762.36	1815629.26	447.277	TLS#9NL
10	710108.00	1815387.34	439.149	TLS#10NL

NOTE: AS-BUILT SURVEY COMPLETED AUG-OCT 2021

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

MILLSTONE CREEK
NC DMS MITIGATION SITE
RANDOLPH COUNTY, NC
PHASE 1

PROJECT OVERVIEW 2.1

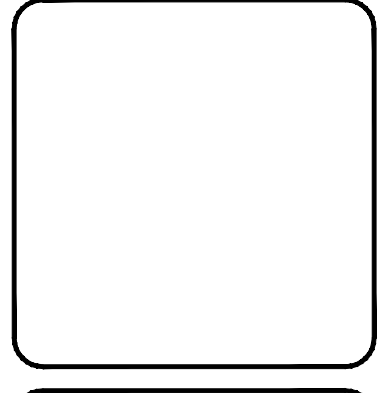
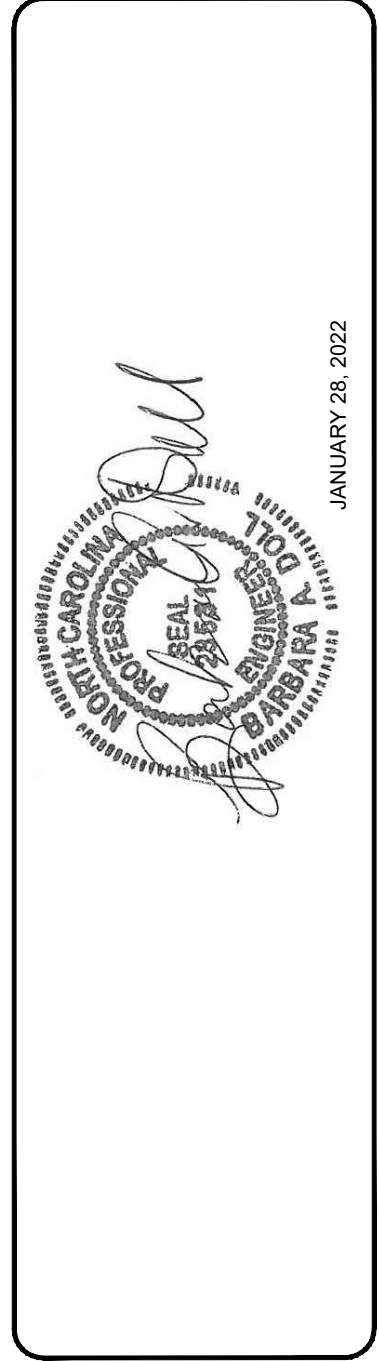


NC STATE

DRAWN: JLP, JLF	PROJECT: MILLSTONE CREEK
DESIGN: BAD, JLP	NAME: MITIGATION SITE
CHECK: BAD	SCALE: AS NOTED
APPROVED: BAD	DATE: JANUARY 28, 2022
SCO ID # 20-22021-01A	1
PHASE #	

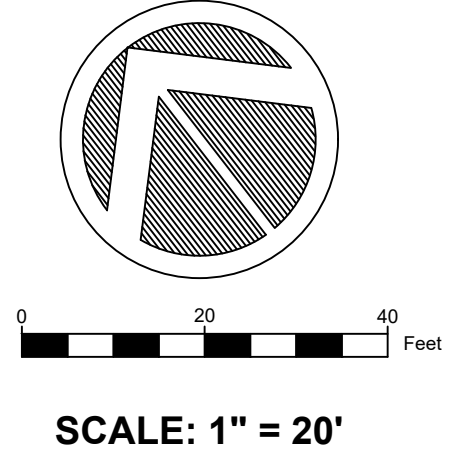
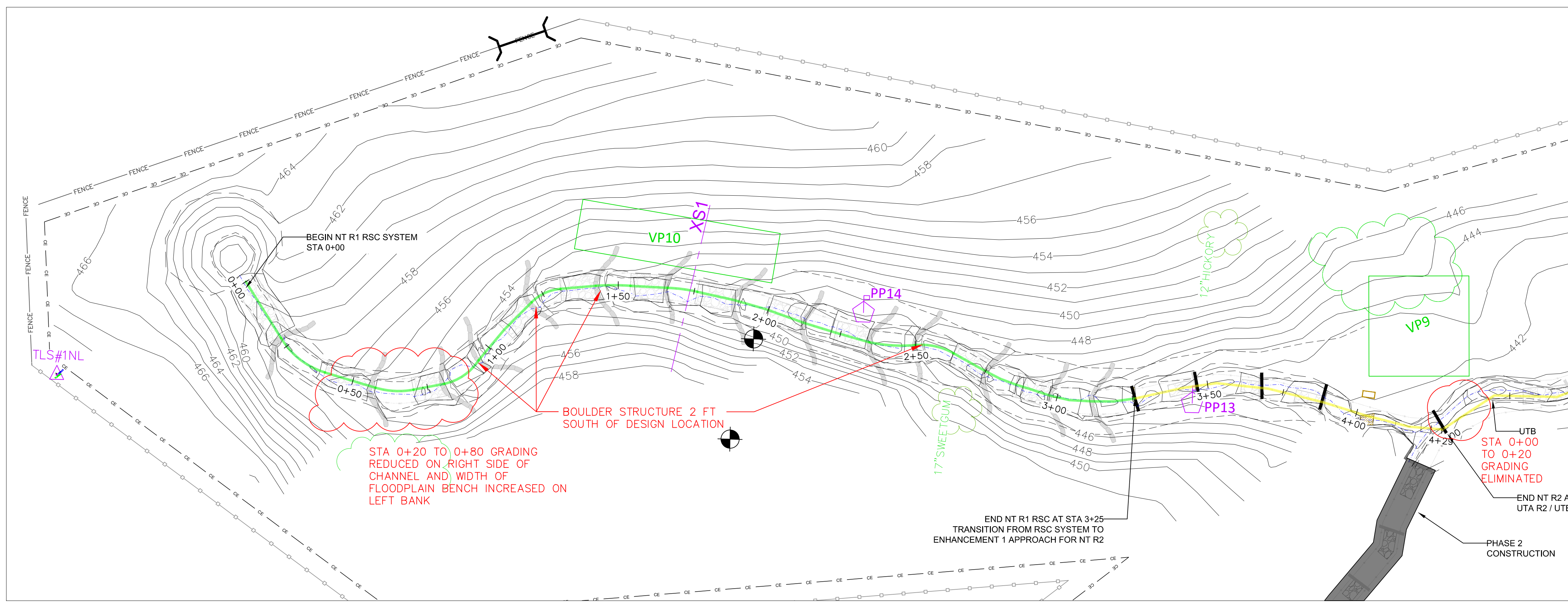


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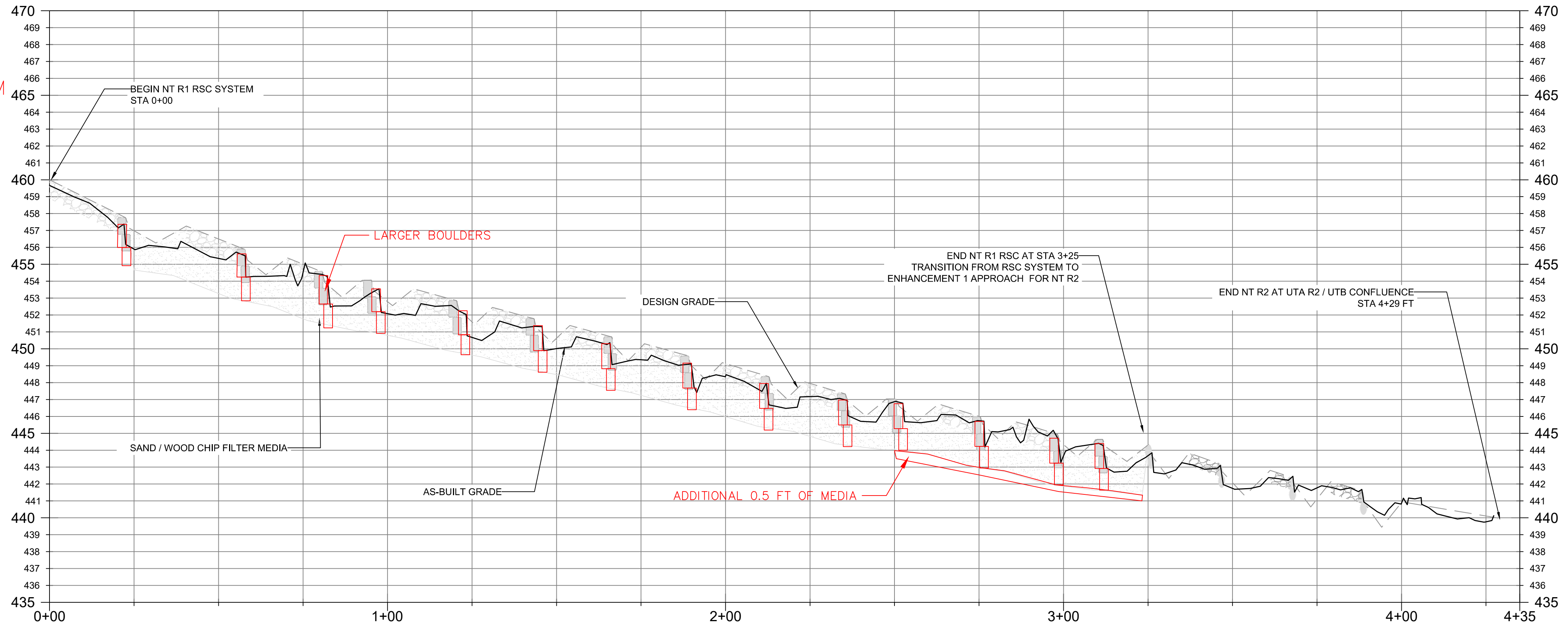


NC STATE

PROJECT NAME:	MILLSTONE CREEK
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- NOTES:
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 2. BOULDERS ARE LARGER THAN SPECIFIED AND EXTEND TO THE BOTTOM OF THE MEDIA TRENCH. AN ADDITIONAL 0.5 FT OF MEDIA WAS ADDED FROM STA 2+50 TO STA 3+25 TO COMPENSATE FOR THE LOSS IN MEDIA VOLUME DUE TO THE LARGER BOULDERS

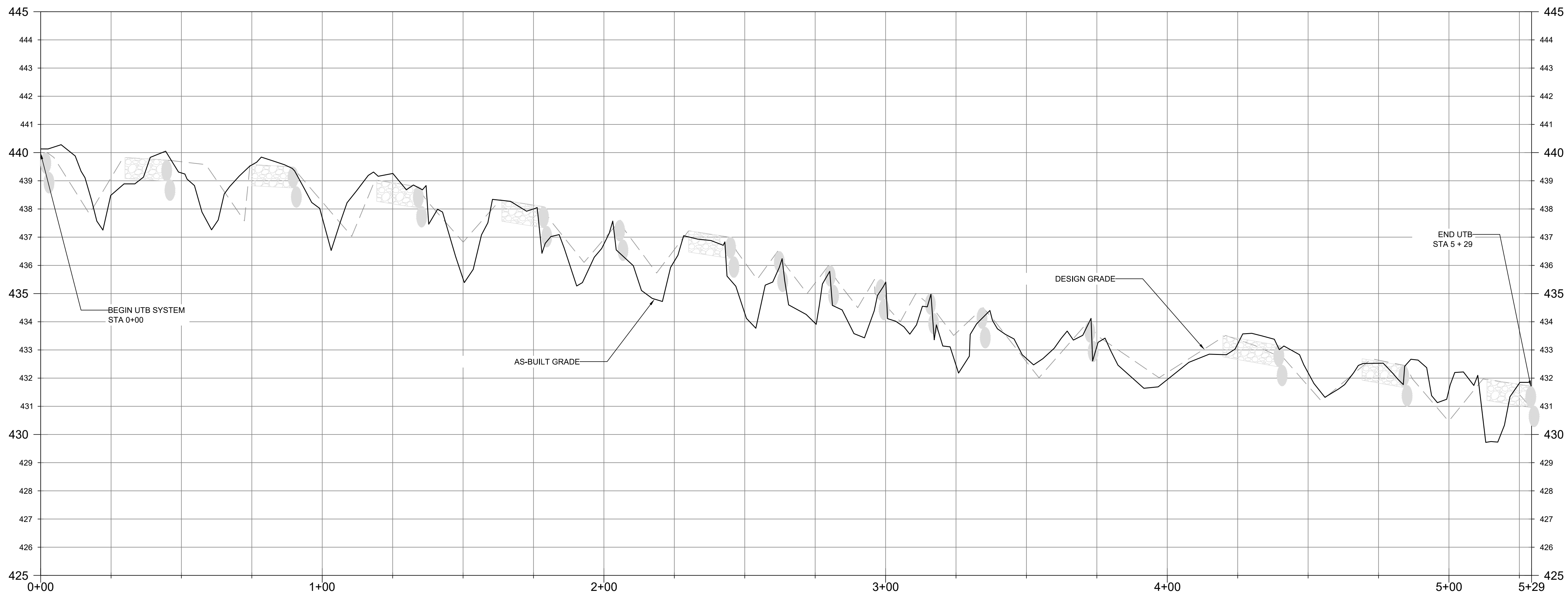
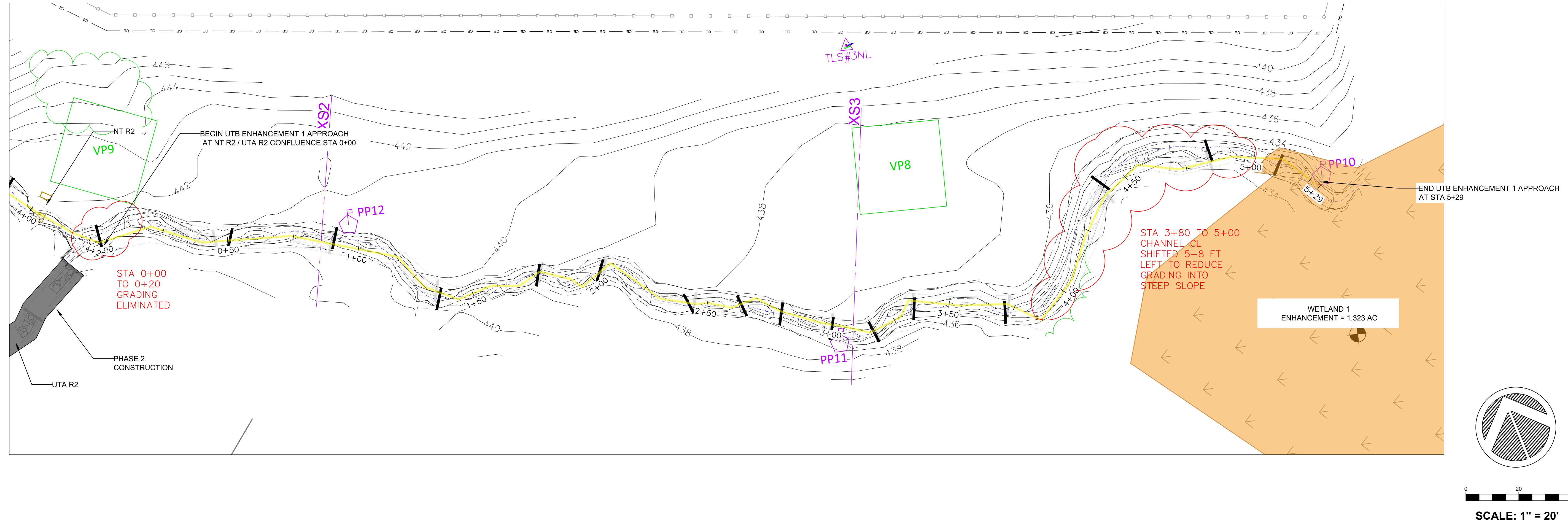


NC STATE

PROJECT:	MILLSTONE CREEK
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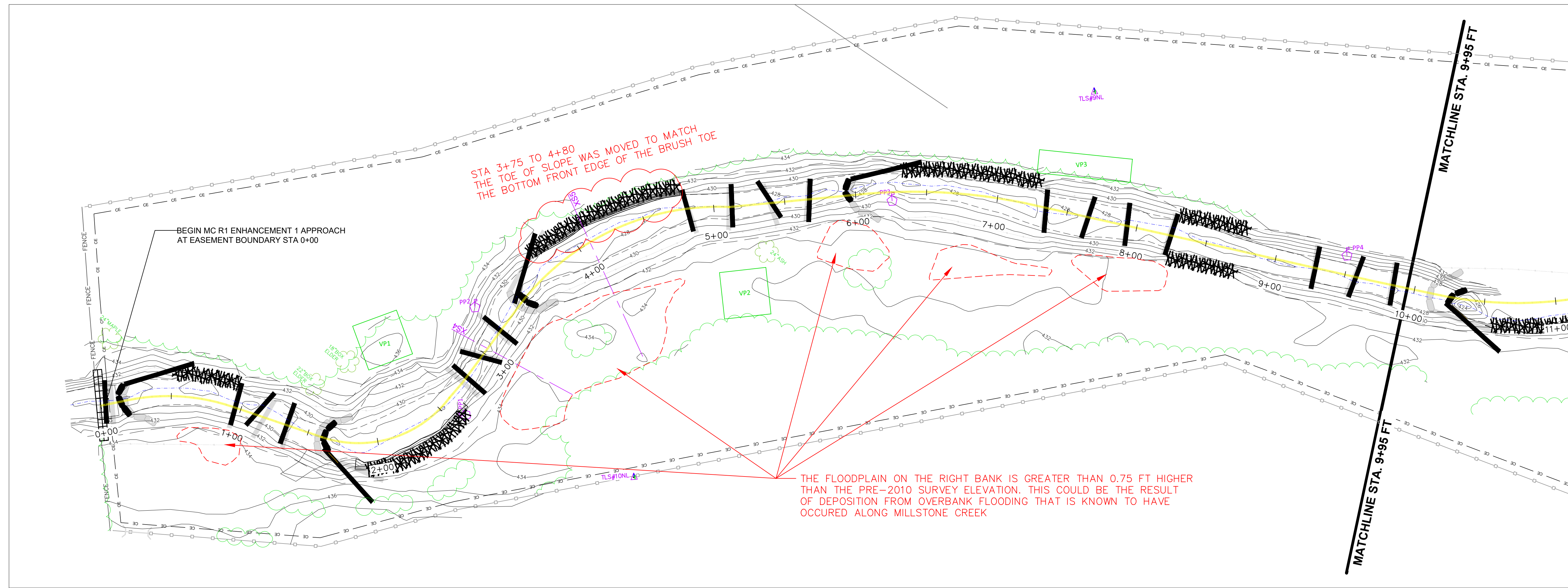
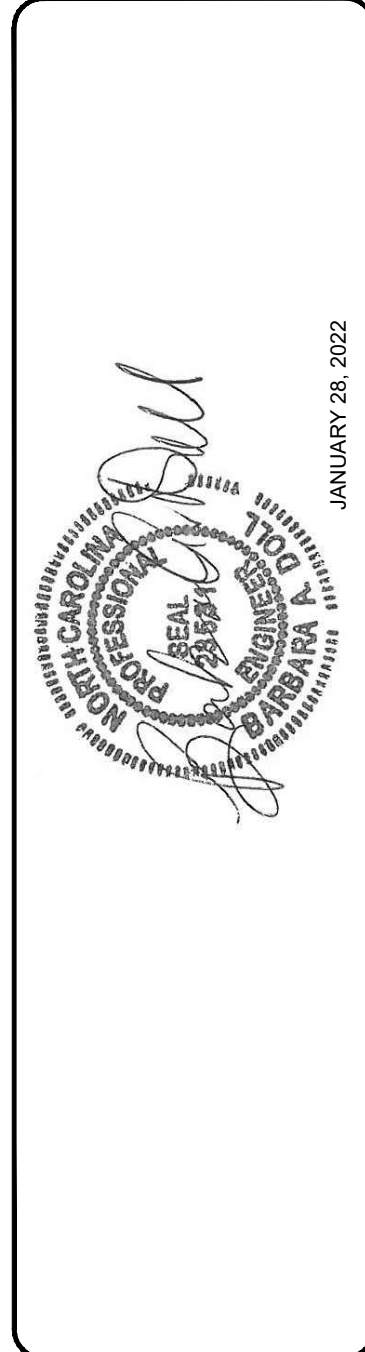
MILLSTONE CREEK
NC DMS MITIGATION SITE
RANDOLPH COUNTY, NC
PHASE 1

UTB: PLAN - PROFILE

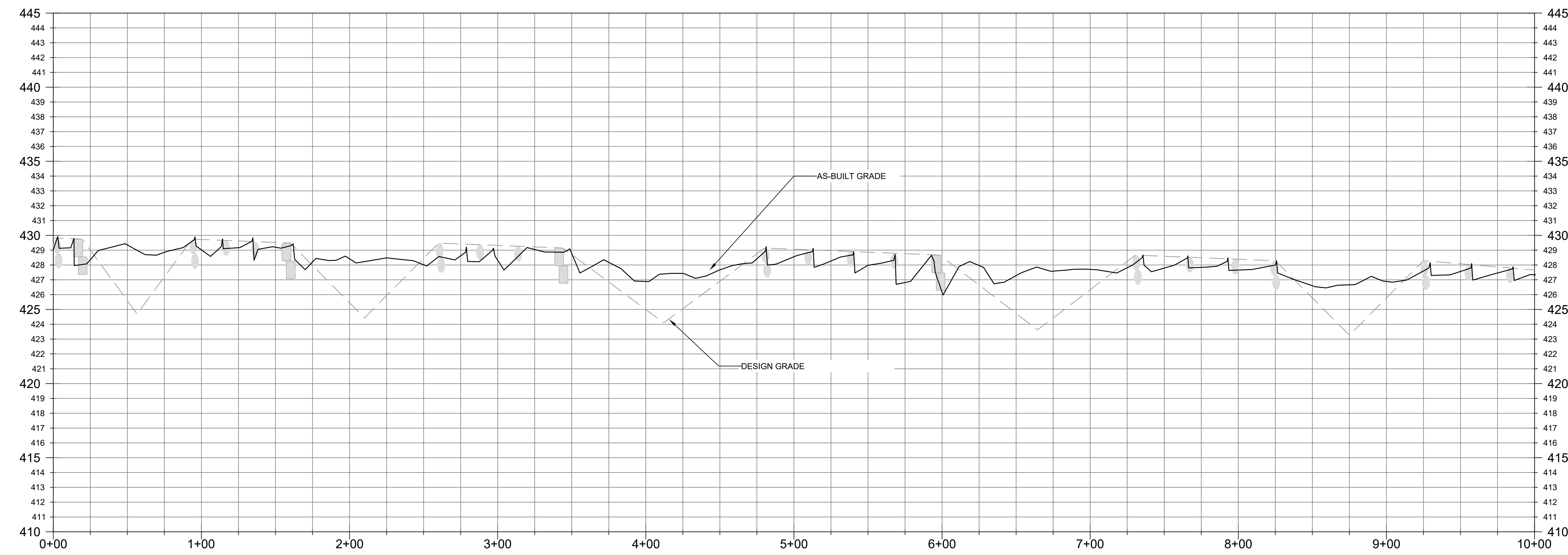
JANUARY 28, 2022

NC STATE

PROJECT NAME:	MILLSTONE CREEK
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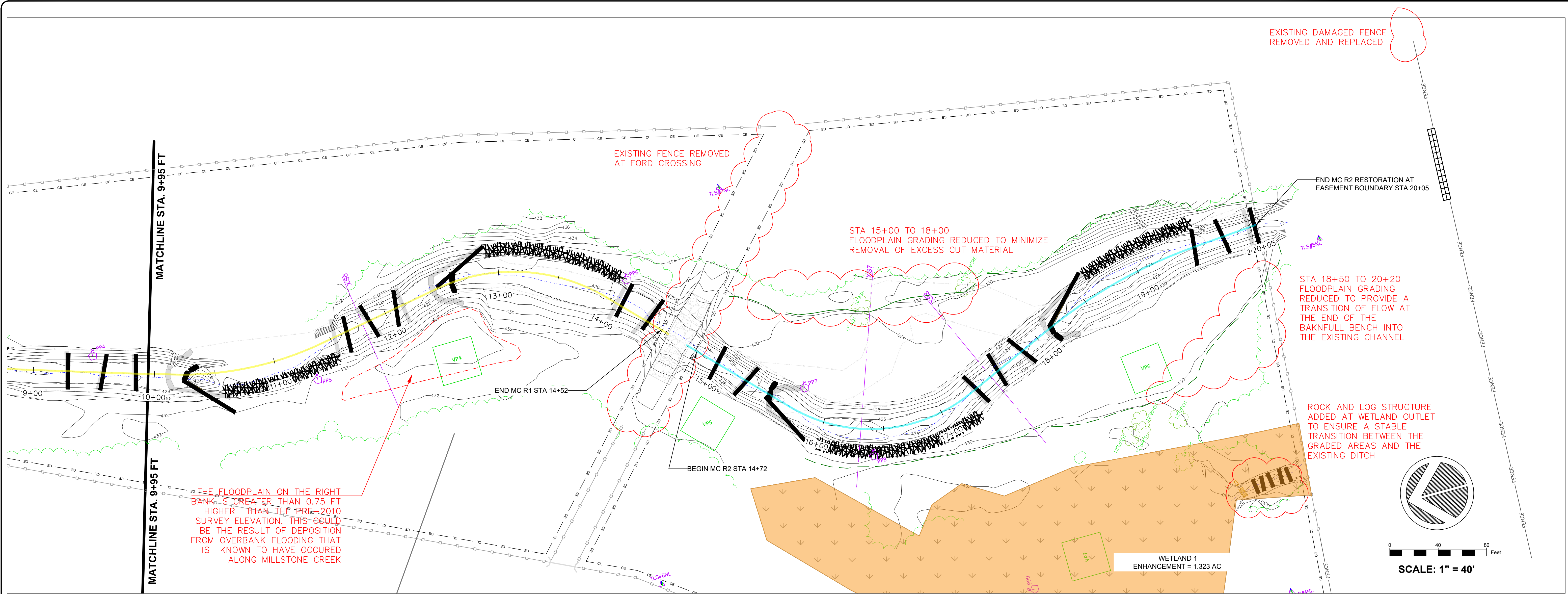


- NOTES:
1. DEVIATIONS FROM THE DESIGN WILL BE SHOWN IN RED
 2. ALL J-HOOKS WERE LOCATED AND ORIENTED ACCORDING TO THE DESIGN DETAIL NOT THE PLAN VIEW LOCATION
 3. ALL POOL DEPTHS WERE MODIFIED TO BE TWO (2) FT BELOW THE THALWEG FOR THE UPSTREAM PC DUE TO THE PRESENCE OF RUNNING SAND



DRAWN: JLP, JLP	PROJECT: MILLSTONE CREEK
DESIGN: BAD, JLP	NAME: MITIGATION SITE
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SCO ID # 20-22021-01A
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THE FLOODPLAIN ON THE RIGHT BANK IS GREATER THAN 0.75 FT HIGHER THAN THE PRE-2010 SURVEY ELEVATION. THIS COULD BE THE RESULT OF DEPOSITION FROM OVBANK FLOODING THAT IS KNOWN TO HAVE OCCURED ALONG MILLSTONE CREEK

EXISTING DAMAGED FENCE REMOVED AND REPLACED

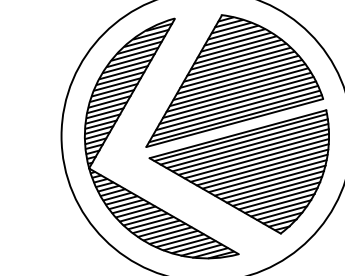
EXISTING FENCE REMOVED AT FORD CROSSING

STA 15+00 TO 18+00 FLOODPLAIN GRADING REDUCED TO MINIMIZE REMOVAL OF EXCESS CUT MATERIAL

STA 18+50 TO 20+20 FLOODPLAIN GRADING REDUCED TO PROVIDE A TRANSITION OF FLOW AT THE END OF THE BAKNFULL BENCH INTO THE EXISTING CHANNEL

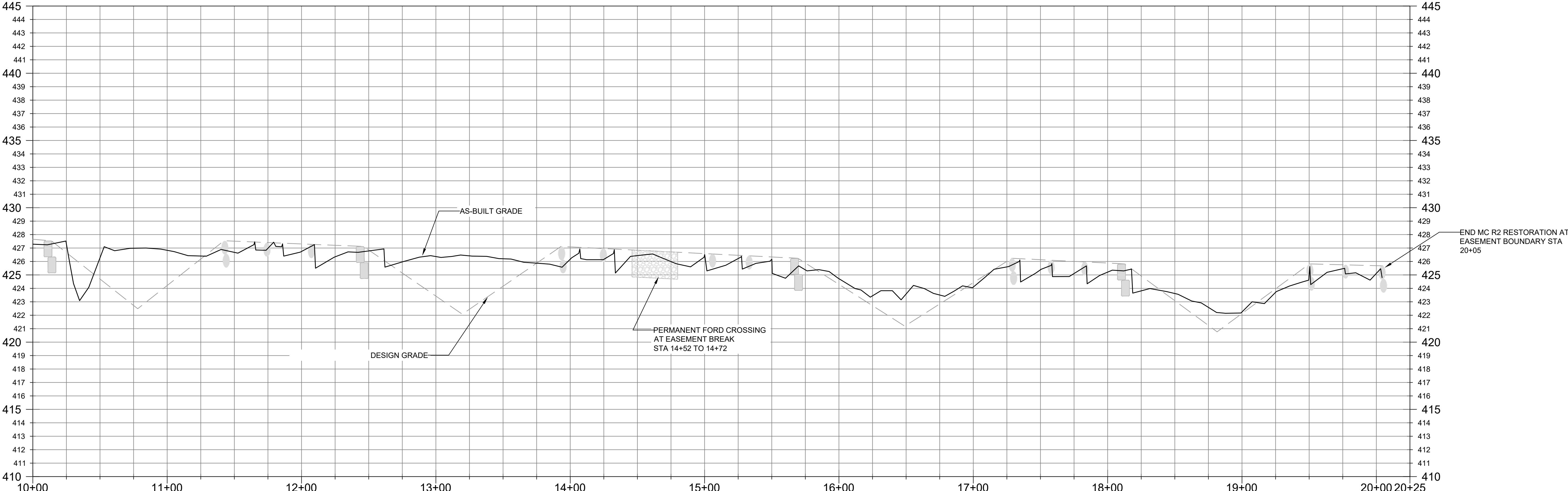
ROCK AND LOG STRUCTURE ADDED AT WETLAND OUTLET TO ENSURE A STABLE TRANSITION BETWEEN THE GRADED AREAS AND THE EXISTING DITCH

WETLAND 1 ENHANCEMENT = 1.323 AC

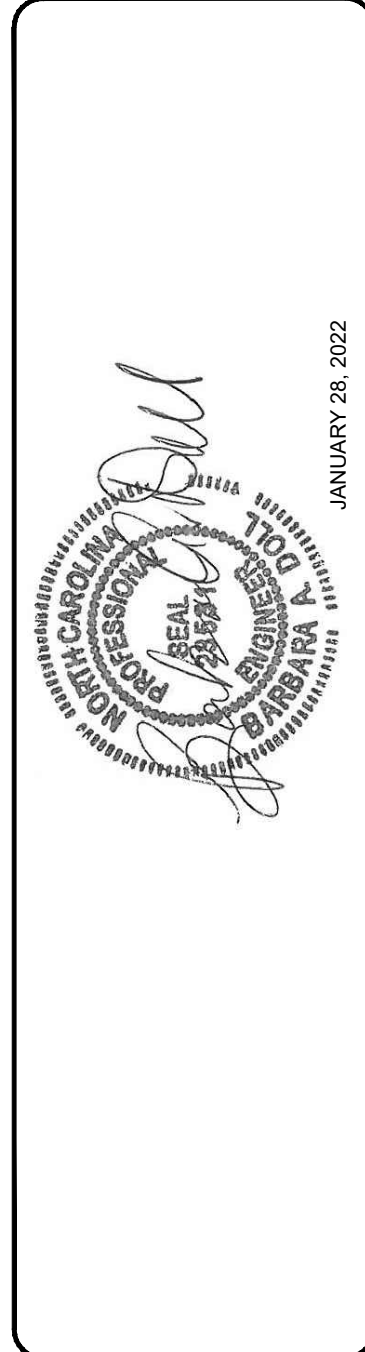


SCALE: 1" = 40'

- NOTES:
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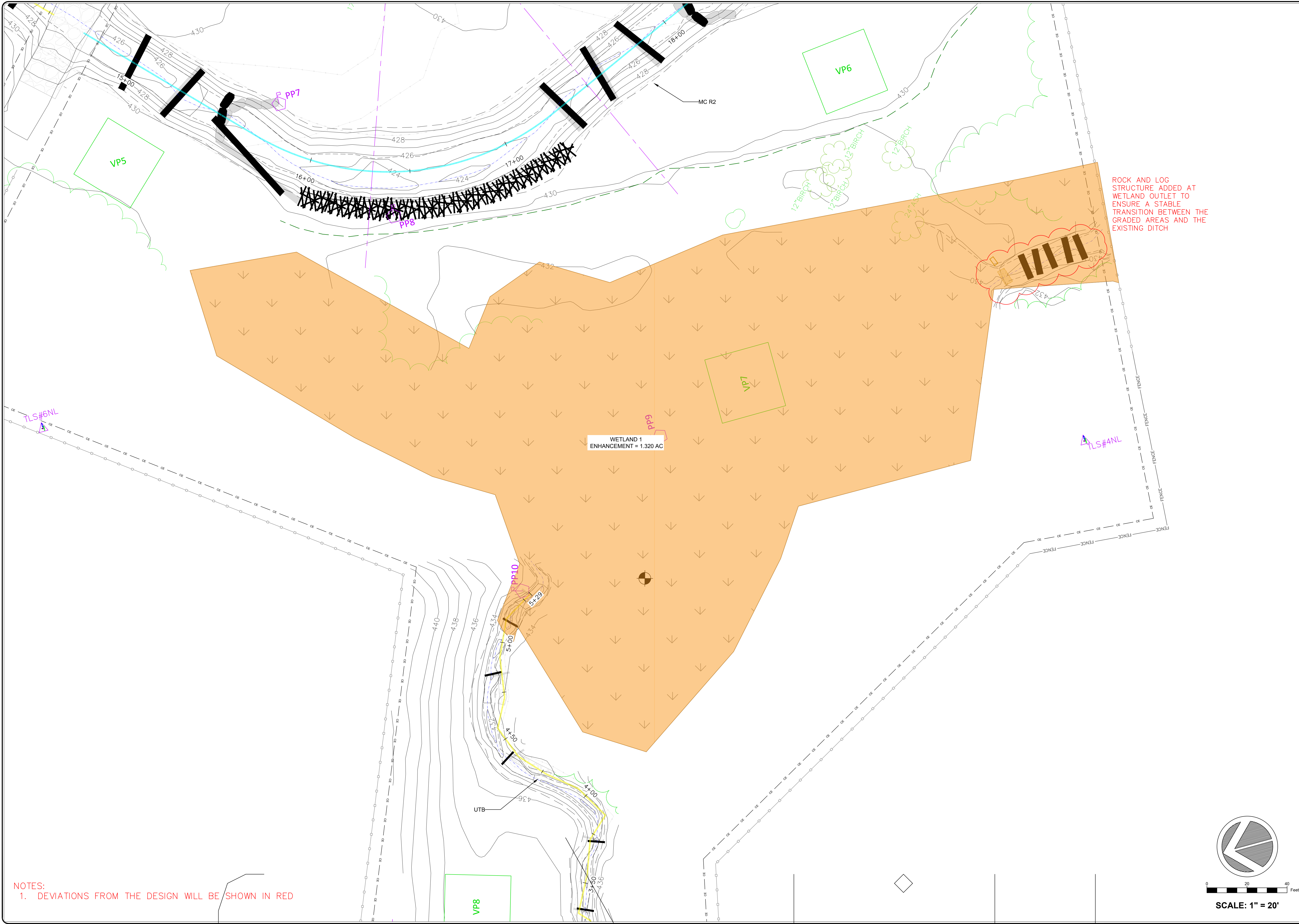


MILLSTONE CREEK
NC DMS MITIGATION SITE
RANDOLPH COUNTY, NC
PHASE 1



NC STATE

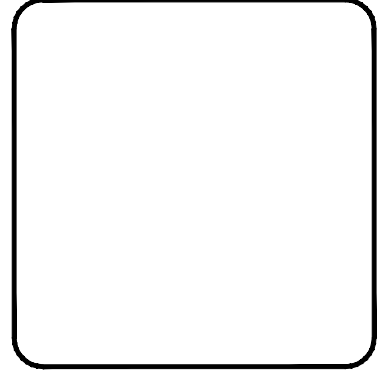
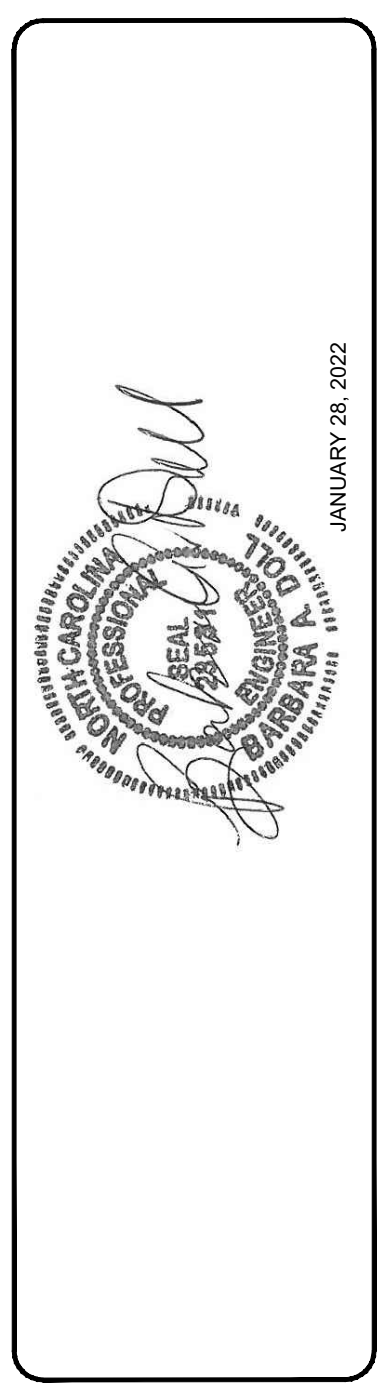
PROJECT NAME:	MILLSTONE CREEK MITIGATION SITE
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PHASE #	1



ROCK AND LOG
STRUCTURE ADDED AT
WETLAND OUTLET TO
ENSURE A STABLE
TRANSITION BETWEEN THE
GRADED AREAS AND THE
EXISTING DITCH

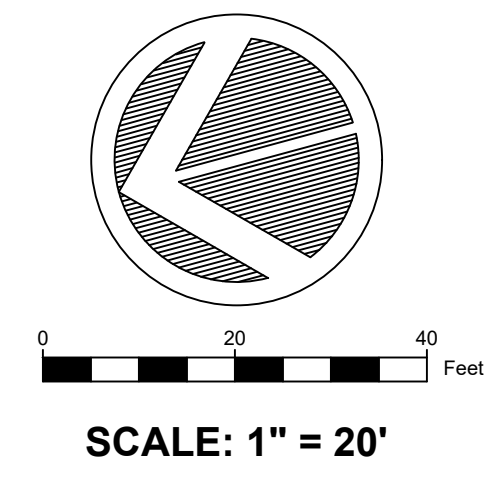
WETLAND 1
ENHANCEMENT = 1.320 AC

NOTES:
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NC STATE

PROJECT	MILLSTONE CREEK
NAME	MITIGATION SITE
SCALE	AS NOTED
DATE	JANUARY 28, 2022
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Temporary Seeding Schedule and Rates		
Date	Type	Application Rate (lbs/acre)
Jan 1 – May 1	Rye Grain	120
	Ground Agricultural Limestone	2,000
	10-10-10 Fertilizer	750
	Straw Mulch	4,000
May 1 – Aug 15	German Millet	40
	Ground Agricultural Limestone	2,000
	10-10-10 Fertilizer	750
	Straw Mulch	4,000
Aug 15 – Dec 30	Rye Grain	120
	Ground Agricultural Limestone	2,000
	10-10-10 Fertilizer	750
	Straw Mulch	4,000

Permanent Seeding Rates		
Wetland Seed Mix – 20 lbs per acre		
Species	Common Name	Percent
<i>Bidens aristosa</i>	Showy tickseed	7
<i>Carex vulpinoidea</i>	Fox sedge	12
<i>Dichanthelium clandestinum</i>	Deertongue	8
<i>Elymus virginicus</i>	Virginia wildrye	20
<i>Juncus effusus</i>	Soft rush	4
<i>Panicum dichotomiflorum</i>	Smooth panicgrass	14
<i>Panicum rigidulum</i>	Redtop panicgrass	8
<i>Panicum virgatum</i>	Switchgrass	23
<i>Polygonum pensylvanicum</i>	Pennsylvania smartweed	2
<i>Sparganium americanum</i>	Eastern bur reed	2
		100

Streambank and Floodplain Seed Mix – 20 lbs per acre		
Species	Common Name	Percent
<i>Agrostis perennans</i>	Autumn bentgrass	15
<i>Andropogon gerardii</i>	Big bluestem	10
<i>Coreopsis lanceolata</i>	Lanceleaf coreopsis	10
<i>Elymus virginicus</i>	Virginia wildrye	20
<i>Juncus effusus</i>	Soft rush	5
<i>Panicum virgatum</i>	Switchgrass	15
<i>Rudbeckia hirta</i>	Blackeyed susan	10
<i>Schizachyrium scoparium</i>	Little bluestem	5
<i>Sorghastrum nutans</i>	Indian grass	5
<i>Tripsacum dactyloides</i>	Eastern gamagrass	5
		100

Upland Hardwood Forest – 20 lbs per acre		
Species	Common Name	Percent
<i>Achillea millefolium</i>	Common yarrow	10
<i>Agrostis perennans</i>	Autumn bentgrass	6
<i>Asclepias tuberosa</i>	Butterfly weed	1
<i>Bidens aristosa</i>	Showy tickseed sunflower	11
<i>Chamaecrista fasciculata</i>	Partridge pea	10
<i>Coreopsis lanceolata</i>	Lance-leaf coreopsis	10
<i>Echinacea purpurea</i>	Purple coneflower	4
<i>Elymus virginicus</i>	Virginia wildrye	6
<i>Gaillardia pulchella</i>	Indian blanket	8
<i>Helianthus angustifolius</i>	Swamp sunflower	2
<i>Helianthus maximiliani</i>	Maximilian's sunflower	2
<i>Monarda punctata</i>	Spotted beebalm	2
<i>Rudbeckia hirta</i>	Blackeyed susan	6
<i>Schizachyrium scoparium</i>	Little bluestem	4
<i>Sorghastrum nutans</i>	Indian grass	6
<i>Symphotrichum pilosum</i>	Heath aster	1
<i>Tridens flavus</i>	Purpletop	4
<i>Tripsacum dactyloides</i>	Eastern gamagrass	6
<i>Verbena hastata</i>	Blue vervain	1
		100

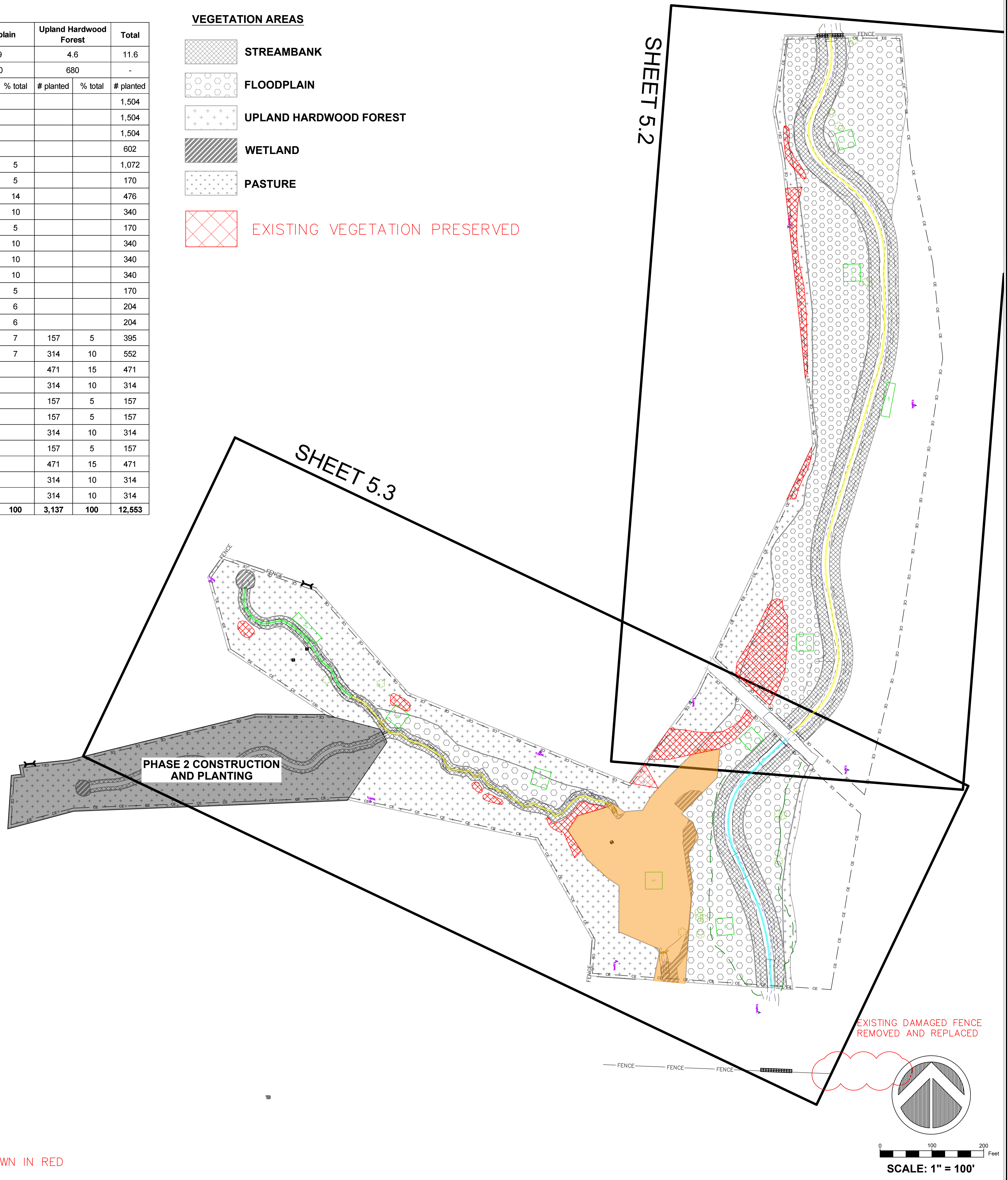
Pasture Seed Mix – 60 lbs per acre		
Species	Common Name	Percent
<i>Dactylis glomerata</i>	Orchard Grass	50
<i>Schedonorus phoenix</i>	KY 31 Tall Fescue	50
		100

Vegetation Area	Streambank	Floodplain	Upland Hardwood Forest	Total
Area (acres)	2.1	4.9	4.6	11.6
Density	2,800	680	680	-
Species	# planted % total	# planted % total	# planted % total	# planted
*Silky dogwood (<i>Cornus amomum</i>)	1,504 25			1,504
*Silky willow (<i>Salix sericea</i>)	1,504 25			1,504
*Elderberry (<i>Sambucus canadensis</i>)	1,504 25			1,504
Yellowroot (<i>Xanthorhiza simplicissima</i>)	602 10			602
**Buttonbush (<i>Cephalanthus occidentalis</i>)	902 15	170 5		1,072
Tag alder (<i>Alnus serrulata</i>)		170 5		170
River Birch (<i>Betula nigra</i>)		476 14		476
Ironwood (<i>Carpinus caroliniana</i>)		340 10		340
Water oak (<i>Quercus nigra</i>)		170 5		170
Inkberry (<i>Ilex glabra</i>)		340 10		340
Tulip poplar (<i>Liriodendron tulipifera</i>)		340 10		340
Sycamore (<i>Plantanus occidentalis</i>)		340 10		340
Black gum (<i>Nyssa sylvatica</i>)		170 5		170
Swamp Chestnut Oak (<i>Quercus michauxii</i>)		204 6		204
Possumhaw (<i>Viburnum nudum</i>)		204 6		204
Willow oak (<i>Quercus phellos</i>)		238 7	157 5	395
Black Walnut (<i>Juglans nigra</i>)		238 7	314 10	552
White oak (<i>Quercus alba</i>)			471 15	471
Black Cherry (<i>Prunus serotina</i>)			314 10	314
Red Bud (<i>Cercis canadensis</i>)			157 5	157
Persimmon (<i>Diospyros virginiana</i>)			157 5	157
Overcup Oak (<i>Quercus lyrata</i>)			314 10	314
Sassafras (<i>Sassafras albidum</i>)			157 5	157
Red Oak (<i>Quercus rubra</i>)			471 15	471
Chestnut Oak (<i>Quercus prinus</i>)			314 10	314
American Beech (<i>Fagus grandifolia</i>)			314 10	314
Total	6,016 100	3,400 100	3,137 100	12,553

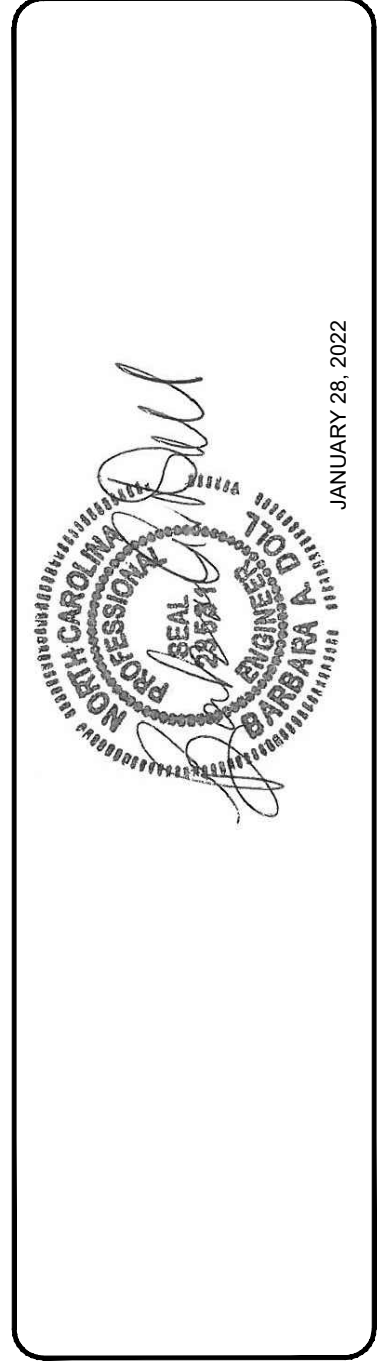
*Provide as live stakes
 **Provide as live stakes on streambanks and bareroot in floodplain zone

VEGETATION AREAS

-  **STREAMBANK**
-  **FLOODPLAIN**
-  **UPLAND HARDWOOD FOREST**
-  **WETLAND**
-  **PASTURE**
-  **EXISTING VEGETATION PRESERVED**



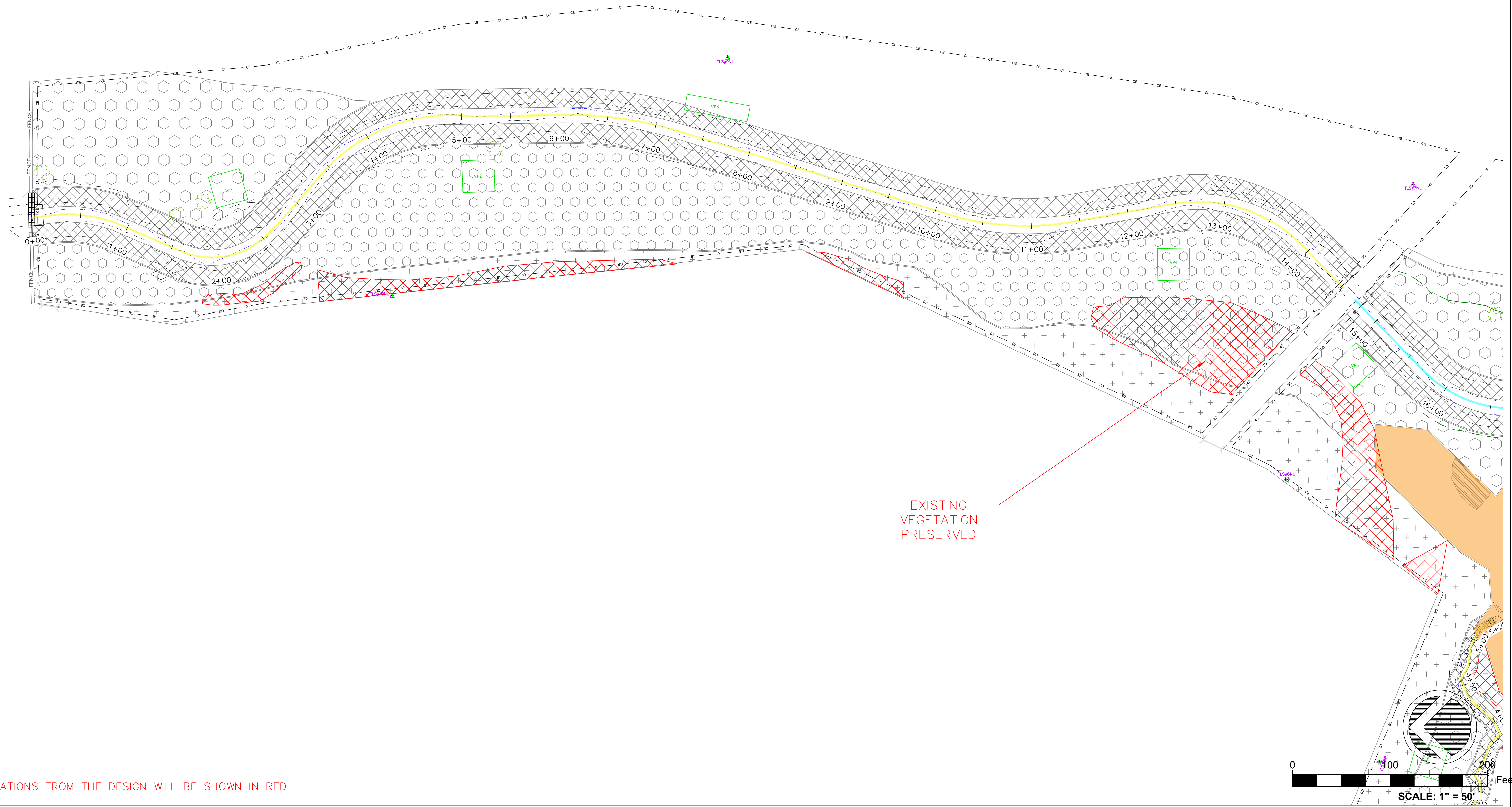
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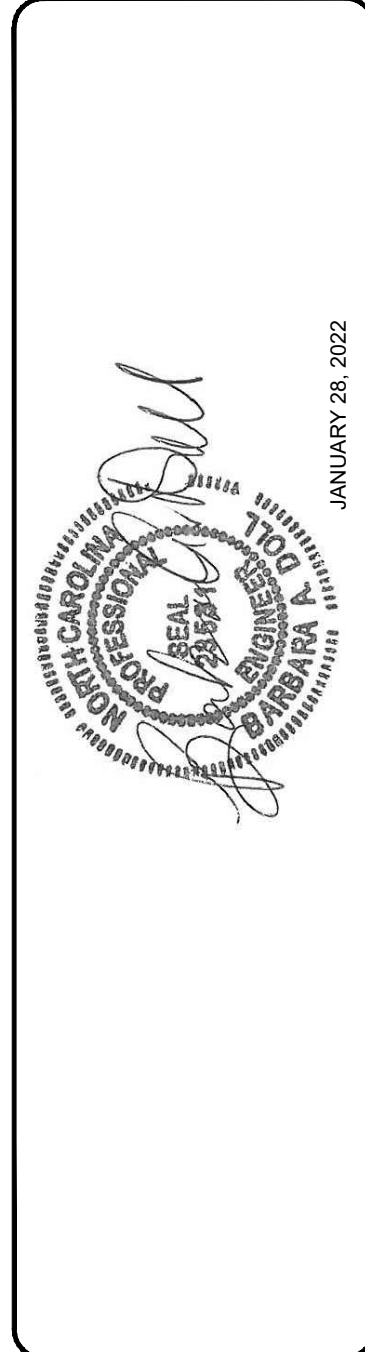
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SCALE:	AS NOTED
DATE:	JANUARY 28, 2022
DRAWN:	JLP, JLF
DESIGN:	BAD, JLP
CHECK:	BAD
APPROVED:	BAD
SCO ID #	20-22021-01A
PHASE #	1

VEGETATION AREAS

-  **STREAMBANK**
-  **FLOODPLAIN**
-  **UPLAND HARDWOOD FOREST**
-  **WETLAND**
-  **PASTURE**
-  **EXISTING VEGETATION PRESERVED**



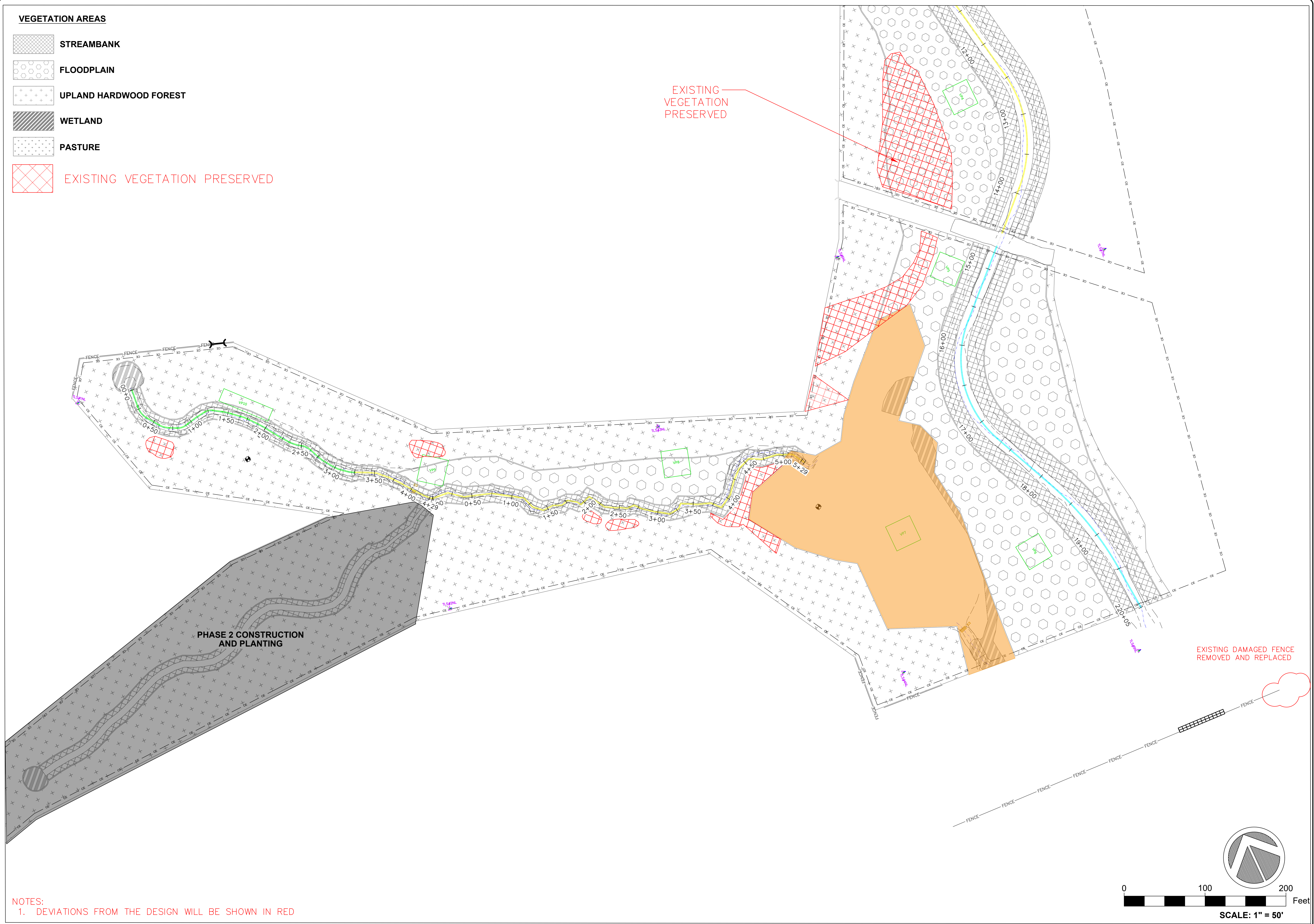
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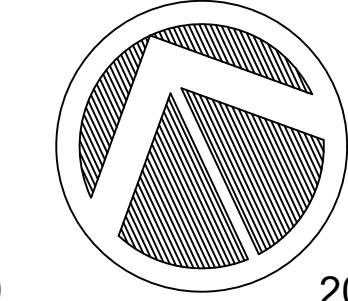
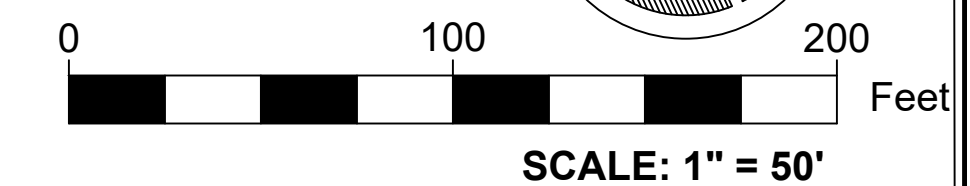
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DRAWN:	J.P. JELF
DESIGN:	BAD, J.P.
CHECK:	BAD
APPROVED:	BAD
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VEGETATION AREAS

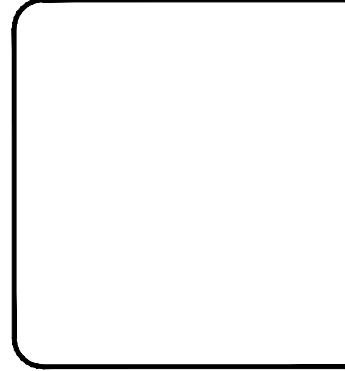
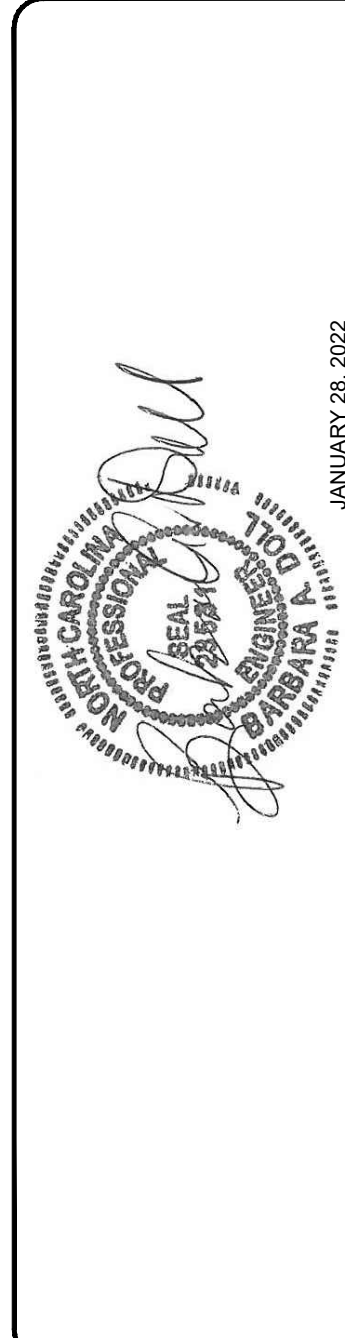
-  **STREAMBANK**
-  **FLOODPLAIN**
-  **UPLAND HARDWOOD FOREST**
-  **WETLAND**
-  **PASTURE**
-  **EXISTING VEGETATION PRESERVED**



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 NC DMS MITIGATION SITE
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NC STATE

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SCALE:	AS NOTED
DATE:	JANUARY 28, 2022
DRAWN:	J.P. JICK
DESIGN:	BAD, J.P.
CHECK:	BAD
APPROVED:	BAD
SCO ID #	20-22021-01A
PHASE #	1

VEGETATION PLAN 5.3

JANUARY 28, 2022