STREAM RESTORATION **BRANCH** RMILE FOU

REVISIONS:

H.D.: NAD83 (NCSP) JE PID: 5701

TOWN OF BILTMORE FOREST UT FOURMILE BRANCH STREAM RESTORATION

BUNCOMBE COUNTY, NORTH CAROLINA

USACE ACTION ID NO.: 2022-01264 NCDWR WQC NO.: 2022-0767

PF	ROJECT DIRECTORY	
LANDOWNER JOHN BRACKET, LAURA WERNE		
	2 HEMLOCK DRIVE BILTMORE FOREST, NC 28803	
PROJECT OWNER	TOWN OF BILTMORE FOREST	
Sorth carding	HARRY BUCKNER PUBLIC WORKS DIRECTOR HBUCKNER@BILTMOREFOREST.ORG	
ENGINEER	JENNINGS ENVIRONMENTAL PLLC	
Jennings Environmental	GREG JENNINGS, PHD, PE PRESIDENT GREG@JENNINGSENV.COM (919) 600-4790	
SURVEYOR	BEN PATTON LAND SURVEYING PLLC	
BPLS Ben Patton Land Surveying	BEN PATTON, PLS PRESIDENT BEN@BPSURVEYING.COM (828) 559-8004	

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FINAL DRAWING RELEASED FOR CONSTRUCTION MAY 3, 2023

GENERAL PROJECT NOTES AND SPECIFICATIONS

- DEFINITIONS:
- 1.1. CONSTRUCTION DOCUMENTS: THE CONTRACT AND APPLICABLE DRAWINGS, DETAILS, SPECIFICATIONS, PERMIT(S), AND/OR ANY OTHER DOCUMENTS (MEETING MINUTES, PUNCH LISTS, BID TABS, ETC.) FOR COMPLETE INFORMATION ABOUT THE REQUIRED WORK. ANY ONE OF THESE PARTS OF THE MAY NOT CONTAIN ALL OF THE INFORMATION REQUIRED TO COMPLETE THE PROJECT WORK.
- 1.2. PROJECT OWNER: TOWN OF BILTMORE FOREST
- ENGINEER: JENNINGS ENVIRONMENTAL PLLC 2. THE WORK ON THIS PROJECT SHALL ADHERE TO THE FOLLOWING
- SPECIFICATIONS, STANDARDS AND/OR REGULATIONS: 2.1. NC DEMLR'S "EROSION AND SEDIMENT CONTROL PLANNING
- AND DESIGN MANUAL" (2013) 2.2. NC DEMLR'S CONSTRUCTION GENERAL PERMIT NUMBER
- NCG01000 GENERAL, REGIONAL AND SPECIAL CONDITIONS OF USACE'S
- 404 NATIONWIDE PERMIT NUMBER 27 GENERAL AND SPECIAL CONDITIONS OF NCDWR'S 401 WATER
- QUALITY CERTIFICATION 4134 2.5. THE CONSTRUCTION DOCUMENTS
- 3. NOT ALL EXISTING UTILITIES ARE SHOWN. SOME LOCATIONS MAY BE ARE APPROXIMATE. THE CONTRACTOR IS RESPONSIBLE FOR ALL UTILITY LOCATION AND COORDINATION. ANY UTILITIES SHOWN ON THE CONSTRUCTION DOCUMENTS ARE FOR INFORMATIONAL PURPOSES ONLY AND IN NO WAY RELIEVES THE CONTRACTOR FROM COORDINATING, VERIFYING AND PROTECTING EXISTING UTILITIES. ALL UTILITIES SHALL BE PROTECTED AND REMAIN ACTIVE UNLESS OTHERWISE NOTED.
- 4. THE BUILDER IS RESPONSIBLE FOR THE PROJECT AREA UNTIL COMPLETION AND FINAL ACCEPTANCE BY THE PROJECT OWNER. THE BUILDER SHALL TAKE ALL PRECAUTIONS NECESSARY AND SHALL BEAR ALL RISK OF LOSS OR DAMAGE. THE CONTRACTOR WILL FURNISH ALL NECESSARY EQUIPMENT, TOOLS, LABOR, TRANSPORTATION, AND SUPERVISION TO COMPLETE THE WORK ACCORDING TO THESE SPECIFICATIONS AND APPLICABLE FEDERAL, STATE AND LOCAL LAWS AND REGULATIONS. THE BUILDER SHALL CONFINE ALL ACTIVITIES, INCLUDING EQUIPMENT STORAGE, TO THE LIMITS OF DISTURBANCE, STAGING AREAS, AND DESIGNATED CONSTRUCTION ACCESS POINTS.
- THE MANNER IN WHICH THE BUILDER DEALS WITH PEOPLE AND THEIR PROPERTIES WHILE PERFORMING THIS WORK IS EXTREMELY IMPORTANT TO THE TOWN. THEREFORE, THE BUILDER AND THE BUILDER'S REPRESENTATIVES SHALL MANIFEST A SPIRIT OF FRIENDLINESS AND COOPERATION WHEN DEALING WITH PROPERTY OWNERS AND THE GENERAL PUBLIC WHILE PERFORMING WORK UNDER THIS SPECIFICATION.
- 6. EXTREME CARE AND DILIGENCE SHALL BE EXERCISED BY THE CONTRACTOR TO ASSURE THE SAFETY OF PERSONS, ANIMALS, AND PROPERTY. IF AT ANY TIME PROJECT OWNER DETERMINES THAT THE BUILDER'S METHODS OR EQUIPMENT ARE INADEQUATE FOR SECURING THE SAFETY OF THE CONTRACTOR'S EMPLOYEES OR THE PUBLIC, THE DESIGNATED REPRESENTATIVE MAY DIRECT THE CONTRACTOR TO TAKE SPECIFIC ACTIONS TO ENSURE SAFETY. THE CONTRACTOR SHALL IMPROVE METHODS AS DEEMED APPROPRIATE BY THE DESIGNATED REPRESENTATIVE WITHOUT ADDITIONAL COST TO THE PROJECT OWNER, SO AS TO ASSURE COMPLIANCE WITH SAFETY CONCERNS. FAILURE OF THE DESIGNATED REPRESENTATIVE TO MAKE THIS DEMAND SHALL NOT RELIEVE THE BUILDER OF ANY OBLIGATION TO ENSURE THE SAFE CONDUCT OF ITS WORK.
- THE BUILDER SHALL MAINTAIN ALL LIGHTS, GUARDS, SIGNS, TEMPORARY PASSAGES, OR OTHER PRECAUTIONS NECESSARY FOR THE SAFETY OF ALL PERSONS. THE BUILDER SHALL ABIDE BY ALL SAFETY RULES AND CONSTRUCTION CONDITIONS REQUIRED BY 22. CONSTRUCTION EQUIPMENT TRACKS AND ACCESS PATHS SHALL BE GOVERNMENTAL AUTHORITIES AND OTHER ENTITIES, INCLUDING RAILROADS, SO THE PUBLIC IS SAFEGUARDED FROM ACCIDENTS AND DELAYS. GUARDS AND FLAGS REQUIRED BY GOVERNMENTAL OR RAILROAD AUTHORITIES SHALL BE PROVIDED AT THE BUILDER'S EXPENSE, UNLESS DIRECTED OTHERWISE BY THE DESIGNATED REPRESENTATIVE. CONTRACTOR SHALL AT NO TIME COMPROMISE EITHER SAFETY OR ENVIRONMENTAL REQUIREMENTS.
- 8. THE BUILDER SHALL ONLY USE ACCESS POINTS, ACCESS PATHS AND STAGING AREAS SHOWN ON THE DRAWINGS. ANY ALTERNATE ACCESS PLANNED BY THE CONTRACTOR SHALL BE APPROVED BY THE ENGINEER AND PROJECT OWNER PRIOR TO USE. ANY NEW ACCESS ROUTES OR STAGING AREAS NEEDED FOR STREAM RESTORATION ACTIVITIES MUST FIRST BE FLAGGED AND MAPPED FOR EVALUATION AND WRITTEN APPROVAL MUST BE OBTAINED PRIOR TO ANY DISTURBANCE ACTIVITIES.

TOPOGRAPHIC NOTES AND SPECIFICATIONS

- 9. A DETAILED TOPOGRAPHIC AND TREE SURVEY OF THE WORK AREA WAS COMPLETED BY BEN PATTON SURVEYING PLLC IN OCTOBER 2021. ADDITIONAL SITE DATA AND BASE DRAWINGS WERE CURATED BY JENNINGS ENVIRONMENTAL PLLC.
- 10. HORIZONTAL DATUM IS NAD83(2011) & VERTICAL DATUM IS NAVD88. ALL COORDINATES ARE BASED ON NAD83(2011) AND ALL ELEVATIONS ARE BASED ON NAVD88.
- 11. THE DESIGN ELEVATIONS AND GRADES SHOWN IN THE DRAWINGS ARE BASED ON THE EXISTING GROUND SURFACE FROM THE OCTOBER 2021 SURVEY FROM WHICH ALL COMPUTATIONS OF CUT AND FILL ARE BASED. SLIGHT DISCREPANCIES BETWEEN THE SURVEYED EXITING GROUND SURFACE AND FIELD CONDITIONS AT THE TIME OF CONSTRUCTION CAN RESULT IN VARIATIONS OF TOTAL EXCAVATED QUANTITIES. THESE VARIATIONS SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.

QUANTITIES AND MATERIALS SPECIFICATIONS

- 12. THE BUILDER SHALL FURNISH ALL MATERIALS NECESSARY TO COMPLETE THE PROPOSED WORK UNLESS OTHER PROVISIONS HAVE BEEN AGREED UPON PRIOR TO CONSTRUCTION. THE BUILDER SHALL DELIVER ALL MATERIALS TO THE DESIGNATED ACCESS POINTS AND STAGING AREAS. MATERIAL QUANTITIES, DIMENSIONS AND SIZES SHALL CONFORM TO THE NOTES AND SPECIFICATIONS PROVIDED IN THE CONSTRUCTION DOCUMENTS. THE ENGINEER MAY INSPECT AND APPROVE ALL MATERIALS PRIOR TO CONSTRUCTION. IF MATERIALS DO NOT MEET THE MINIMUM REQUIREMENTS SPECIFIED IN THE CONSTRUCTION DOCUMENTS, THE ENGINEER SHALL REJECT THE MATERIALS.
- 13. COSTS INCURRED DUE TO PROJECT DELAYS RESULTING FROM FAILURE OF THE BUILDER TO MEET THE REQUIREMENTS OF THE CONSTRUCTION DOCUMENTS SHALL BE THE EXPENSE OF THE BUILDER. QUANTITIES LISTED ARE ESTIMATES ONLY AND SHALL BE CONFIRMED BY THE BUILDER.
- 14. THE EROSION CONTROL MEASURES DEPICTED ON THE DRAWINGS SHALL BE INSTALLED AS NEEDED TO KEEP ALL SEDIMENT ON SITE AND OUT OF STREAMS AND WETLANDS. ADDITIONAL EROSION

- CONTROL MEASURES (ABOVE THOSE SHOWN ON THE DRAWINGS) MAY BE REQUIRED IN ORDER TO KEEP ALL SEDIMENT ON SITE AND OUT OF STREAMS AND WETLANDS.
- 15. ANY ADDITIONAL GRADING OTHER THAN WHAT IS SHOWN ON THE PLANS SHALL REQUIRE PRIOR APPROVAL FROM THE ENGINEER AND
- 16. THE USE OF ANY BRAND NAMES/MANUFACTURERS OR MODELS IS INTENDED SOLELY TO DENOTE THE QUALITY STANDARD OF THE DESIRED PRODUCT. ANY USE OF BRAND NAMES IS NOT INTENDED TO RESTRICT BIDDERS TO A SPECIFIC BRAND, MAKE, MANUFACTURER, OR NAME. THE BRAND NAMES / MANUFACTURERS OF MODELS ARE INTENDED TO CONVEY THE GENERAL STYLE, TYPE, CHARACTER, AND QUALITY OF PRODUCT. EQUIVALENT PRODUCTS WILL BE ACCEPTABLE IF THE PROJECT OWNER OR ENGINEER HAS GIVEN APPROVAL OF THE SPECIFIC PRODUCT IN WRITING.
- 17. THE BUILDER SHALL BE RESPONSIBLE FOR LOCATING AND PROVIDING STORAGE AREAS FOR CONSTRUCTION MATERIALS AND EQUIPMENT. THE MATERIAL AND EQUIPMENT STORAGE SHALL COMPLY WITH THE CONSTRUCTION DOCUMENTS AND ALL LOCAL, STATE AND FEDERAL REGULATIONS THROUGHOUT THE CONSTRUCTION PERIOD. THE BUILDER SHALL RESTORE THE STORAGE AREA TO ITS ORIGINAL (OR BETTER) CONDITION UPON COMPLETION OF THE PROJECT OR UPON SUCH TIME AS DIRECTED
- BY THE ENGINEER AND PROJECT OWNER. 18. THE BUILDER SHALL WARRANTY ALL MATERIALS AND WORKMANSHIP FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF ACCEPTANCE OF BY THE PROJECT OWNER AND SHALL REPLACE ANY PORTIONS THAT FAIL DUE TO FAULTY MATERIALS OR WORKMANSHIP, AT NO ADDITIONAL COST TO THE PROJECT OWNER. A SIX (6) MONTH AND ELEVEN (11) MONTH INSPECTION WILL BE PERFORMED DURING THE WARRANTY PERIOD. THE BUILDER SHALL IMMEDIATELY REPAIR ALL ITEMS DETERMINED BY THE PROJECT OWNER OR AUTHORIZED REPRESENTATIVE TO BE DEFECTIVE UPON NOTIFICATION. THE BUILDER SHALL IMMEDIATELY REPAIR OR REPLACE FAILED ITEMS UPON NOTIFICATION BY THE PROJECT OWNER. SEASONALLY INSTALLED ITEMS SHALL BE REPAIRED OR REPLACED DURING THE NEXT AVAILABLE INSTALLATION PERIOD. ITEMS REPAIRED OR REPLACED UNDER THIS PROVISION SHALL HAVE AN ADDITIONAL ONE (1) YEAR WARRANTY PERIOD FROM THE NEW DATE OF ACCEPTANCE. AREAS AND/OR OTHER WORK DISTURBED WHILE ACCESSING AND/OR REPAIRING/REPLACING WARRANTY COVERED ITEMS SHALL BE STABILIZED.

STREAM RESTORATION NOTES AND **SPECIFICATIONS**

- 19. FIELD CONDITIONS AND PROJECT VARIABILITY MAY REQUIRE ADAPTATION OF THE DRAWINGS AND/OR DETAILS PROVIDED IN THE CONSTRUCTION DOCUMENTS DEPENDING ON SITE CONDITIONS OR PROJECT NEEDS. MINOR VARIATION(S) OR ADAPTATION(S) OF THE PROPOSED WORK SHOWN ON THE DRAWINGS AND/OR DETAILS ARE CONSIDERED INCIDENTAL TO THE
- 20. THE BUILDER SHALL MARK THE LIMITS OF CLEARING FOR ACCESS STAGING AND GRADING OPERATIONS FOR VERIFICATION OF INTENT BY THE ENGINEER AND THE TOWN. SOME MINOR ADJUSTMENT OF THE ACCESS ROUTES AND STAGING AREAS MAY BE REQUIRED TO PRESERVE TREES OR MINIMIZE IMPACT TO TREES THE ENGINEER AND PROJECT OWNER MUST APPROVE ALL TREE REMOVAL OPERATIONS. WHERE PRACTICABLE, EXISTING TREES AND VEGETATION SHOULD BE LEFT IN PLACE TO FACILITATE NATURAL REGENERATION AND SOIL STABILIZATION.
- 21. THE BUILDER SHALL MINIMIZE, TO THE MAXIMUM EXTENT POSSIBLE, IMPACTS TO THE ADJACENT TREES.
- GRADED AND RE-CONTOURED AFTER CONSTRUCTION TO PREVENT RILL AND GULLY EROSION.
- 23. THE BUILDER SHALL USE AN EXCAVATOR WITH A HYDRAULIC THUMB TO INSTALL IN-STREAM STRUCTURES.
- 24. DESIGN ELEVATIONS AT THE UPSTREAM AND DOWNSTREAM EXTENTS OF THE WORK AND IN THE VICINITY OF TRIBUTARIES AND CONFLUENCES MAY NEED TO BE ADJUSTED TO MEET FIELD CONDITIONS. ADJUSTMENTS SHALL BE MADE IN CONJUNCTION WITH THE ENGINEER AND ARE CONSIDERED INCIDENTAL TO CONSTRUCTION.
- 25. CHANNEL REALIGNMENT WORK SHALL BE COMPLETED AND STABILIZED PRIOR TO ALLOWING FLOW TO ENTER INTO THE NEWLY CONSTRUCTED STREAM CHANNEL. THE BUILDER SHALL NOT OPEN UP MORE THAN 150 FEET OF CHANNEL WITHOUT EROSION CONTROL MATTING IN PLACE OR BY APPROVAL OF THE ENGINEER. IF THE CHANNEL REALIGNMENT WORK IS NOT COMPLETED PRIOR TO ABANDONING THE OLD CHANNEL, A TEMPORARY SYSTEM SHALL BE USED ACCORDING THE APPROVED E&SC PLAN AND DETAILS. IN-LINE CHANNEL WORK SHALL UTILIZE THE TEMPORARY PUMP AROUND SYSTEM AT ALL TIMES.
- 26. STREAM RESTORATION WORK SHALL BE IMPLEMENTED BY FIRST GRADING THE FLOODPLAIN ADJACENT TO THE CHANNEL TO THE ELEVATIONS AND GRADES SPECIFIED IN THE DRAWINGS. THE DESIGN CHANNEL SHALL THEN BE EXCAVATED TO THE DESIGN CHANNEL CROSS-SECTION GEOMETRY AND LONGITUDINAL PROFILE SHOWN IN THE DRAWINGS AND DETAILS. ANY TEMPORARY STOCKPILING OR DOUBLE HANDLING OF EXCESS EARTH NECESSARY TO BUILD THE CHANNEL SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.
- 27. BANKFULL CHANNEL DIMENSION TOLERANCES WILL BE HELD TO THE DIMENSIONS SHOWN ON THE DESIGN CHANNEL SECTIONS. ELEVATIONS SHALL BE CONSTRUCTED WITHIN 0.1' (VERTICAL) WIDTHS AND DEPTHS MUST FALL WITHIN RANGES SHOWN IN THE PLANSHEETS. CHANNEL CROSS-SECTION DIMENSIONS SHALL BE WITHIN 0.2' (HORIZONTAL).
- 28. IF THE EXISTING GROUND IS LESS THAN 0.2' HIGHER THAN THE PROPOSED BANKFULL ELEVATION, IT IS NOT NECESSARY TO EXCAVATE TO THE PROPOSED ELEVATIONS AND GRADES IN THE CONSTRUCTION DOCUMENTS.
- 29. IN-STREAM STRUCTURES SHALL BE INSTALLED AS THE CHANNEL IS BEING CONSTRUCTED. INSTREAM STRUCTURES SHALL BE FINISHED TO A SMOOTH SURFACE IN ACCORDANCE WITH THE LINES, GRADES AND ELEVATIONS SHOWN IN THE CONSTRUCTION DOCUMENTS. THE FINISHED STRUCTURE SLOPES AND PROFILE ELEVATIONS SHALL BE WITHIN 0.1' (VERTICAL) OF THE CONSTRUCTION DOCUMENTS.
- 30. FILTER FABRIC SHALL BE USED FOR IN-STREAM STRUCTURES. ALL FILTER FABRIC SHALL BE 80Z. NONWOVEN GEOTEXTILE UNLESS OTHERWISE SPECIFIED IN STRUCTURE DETAILS OR SPECIFICATIONS. FILTER FABRIC SHALL BE TRIMMED TIGHT TO THE SURFACE OF THE STRUCTURE AND SHOULD NOT BE OBSERVED BY VISUAL INSPECTION.
- 1. BOULDER STRUCTURES SHALL BE CONSTRUCTED FROM BOULDERS THAT ARE CUBICAL OR RECTANGULAR IN SHAPE AND SIZED ACCORDING TO THE STRUCTURE DETAILS.
- 32. AFTER THE STRUCTURE IS COMPLETE AND FLOW IS RESTORED TO THE CHANNEL, SOME ADJUSTMENT TO THE STRUCTURE OR

ADDITIONAL STABILIZATION MEASURE MAY BE NECESSARY TO ACHIEVE THE DESIRED FUNCTION.

- 33. THE CONSTRUCTED CHANNEL SHALL BE STABILIZED AS SOON AS POSSIBLE BY TEMPORARY AND PERMANENT SEEDING, ADDING STRAW MULCH TO BARE SOIL AND INSTALLING EROSION CONTROL MATTING FROM THE TOE OF THE BANKFULL CHANNEL TO THE FLOODPLAIN GRADING LIMITS. PRIOR TO INSTALLING THE EROSION CONTROL MATTING, PREPARE THE SOIL SURFACE BY LOOSENING 4" OF SOIL OR APPLYING 4" OF TOPSOIL TO THE PROPOSED ELEVATIONS AND APPLY SEED AND THEN STRAW MULCH. SEED SHALL BE BROADCAST EVENLY OF THE AREA USING A BROADCAST SPREADER PRIOR TO COVERING WITH THE EROSION CONTROL MATTING. INSTALL MATTING IN ACCORDANCE WITH THE DETAIL INCLUDED IN THE CONSTRUCTION DOCUMENTS. MATTING MATERIAL USED FOR STREAMSIDE STABILIZATION MUST BE CERTIFIED WEED-FREE STRAW OR OTHER NATURAL WEED-FREE / NON-PROPAGATING VEGETATIVE MATERIALS. REWORKING OF AREAS THAT DO NOT ESTABLISH VEGETATION OR BECOME UNSTABLE SHALL BE NECESSARY IN THE MATTING SEPARATES FROM THE SOIL.
- 34. ANY AREA DISTURBED BY THE BUILDER SHALL BE PROMPTLY STABILIZED FOR INTERIM AND PERMANENT PURPOSES CONSISTENT WITH STORMWATER BEST MANAGEMENT PRACTICES. STABILIZATION INCLUDES RE-VEGETATION OF ANY EXPOSED SOILS. MULCH SHALL BE SPREAD TO COVER DISTURBED CHANNEL AND FLOODPLAIN AREAS. MULCH SHALL BE KEPT OUT OF THE CROWNS OF SHRUBS AND GROUND COVER.

EXISTING SITE FEATURES

STREAM RESTORATION PLAN FEATURES

	PARCEL BOUNDARY	\otimes	UTILITY	— LOD —	LIMITS OF DISTURBANCE (LOD)		DESIGN CHANNEL PLUG
—— R/W ——	RIGHT OF WAY	•	NAIL WITH BLUE FLAGGING		DESIGN MAJOR CONTOUR		DESIGN CONSTRUCTED RIFFLI
——·2085 — —	EXISTING MAJOR CONTOUR		FIRE HYDRANT		DESIGN MINOR CONTOUR		DESIGN BOULDER RIFFLE
	EXISTING MINOR CONTOUR		SEWER MANHOLE		DESIGN STREAM BANKFULL		DESIGN BOULDER STEP
==:==:=	EXISTING CULVERT	D	STORMWATER MANHOLE		DESIGN STREAM CENTERLINE	*******	DESIGN TOE PROTECTION
	EXISTING STREAM	(3)	DECIDUOUS TREE		DESIGN GRADING LIMITS		DESIGN BOULDER WALL
			CONIFEROUS TREE	— FPT —	DESIGN FLOODPLAIN TOE		



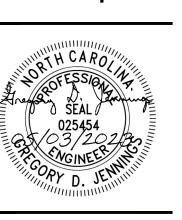
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FINAL **DRAWING**

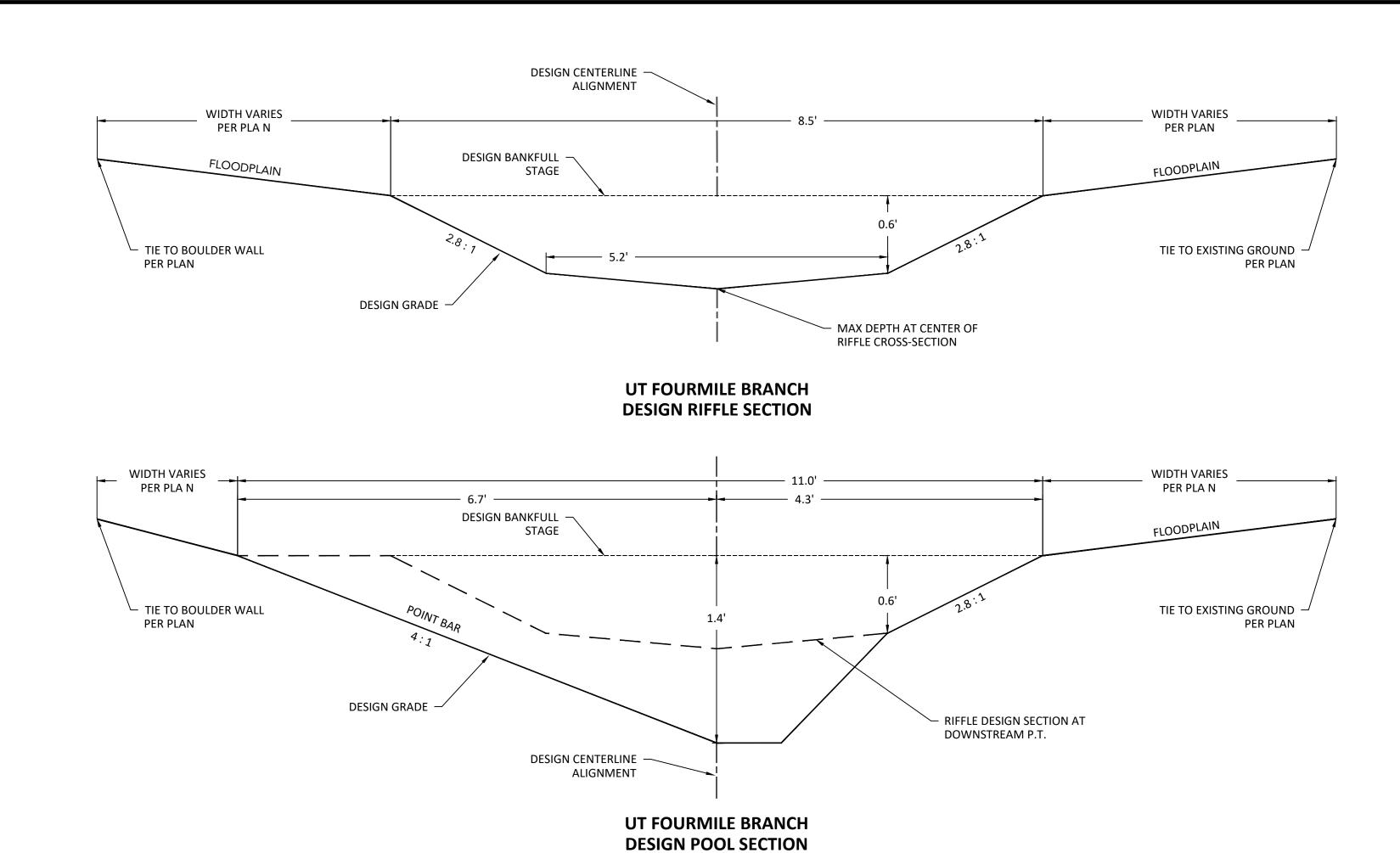
REVISIONS:

DATE: 05/03/2023 PLOT SIZE: 24" x 36" H.D.: NAD83 (NCSP) V.D.: NAVD88

JE PID: 5701

DESIGN CHANNEL SECTION SPECIFICATIONS

- CONSTRUCT THE DESIGN CHANNEL SECTION TO THE LINES, ELEVATIONS AND GRADES SHOWN ON THE DRAWINGS AND DETAILS.
- 2. CHANNEL CONSTRUCTION WORK SHALL BE IMPLEMENTED BY FIRST GRADING THE FLOODPLAIN ADJACENT TO THE CHANNEL TO THE DESIGN ELEVATIONS AND GRADES SPECIFIED IN THE DRAWINGS AND DETAILS. THE DESIGN CHANNEL SHALL THEN BE EXCAVATED TO THE DESIGN CHANNEL GEOMETRY AND PROFILE. THIS CHANNEL WORK SHALL BE DONE WITH LOW GROUND PRESSURE TRACK EQUIPMENT. DRAWINGS PROVIDE DIMENSIONS, ELEVATIONS AND SLOPES TO AID IN CONSTRUCTION OF THE CHANNEL. THE THALWEG (CENTERLINE) CAN FIRST BE EXCAVATED TO THE ELEVATION SPECIFIED IN THE PROFILE. EXCAVATION OF THE SIDE SLOPES AND FINE GRADING OF THE CHANNEL SHALL THEN BE PREFORMED. ANY TEMPORARY STOCKPILING OR DOUBLE HANDLING OF EXCESS EARTH NECESSARY TO BUILD THE CHANNEL SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.
- 3. BANKFULL CHANNEL DIMENSIONS WILL BE HELD TO THE DIMENSIONS SHOWN IN THE DESIGN CHANNEL SECTION DETAIL ON THIS SHEET. ELEVATIONS AND DEPTHS SHALL BE CONSTRUCTED TO WITHIN 0.1' (VERTICAL). CHANNEL WIDTHS AND OTHER HORIZONTAL (X,Y) DIMENSIONS SHALL BE WITHIN 0.2'.
- 4. IN-STREAM STRUCTURES SHALL BE INSTALLED AS THE CHANNEL IS BEING CONSTRUCTED. INSTREAM STRUCTURES SHALL BE FINISHED TO A SMOOTH SURFACE IN ACCORDANCE WITH THE LINES, GRADES AND ELEVATIONS SHOWN IN THE DRAWINGS AND DETAILS. THE FINISHED STRUCTURE SLOPES AND ELEVATIONS SHALL BE WITHIN 0.1' (VERTICAL) OF THE DRAWINGS AND DETAILS.
- 5. INSTALL EROSION CONTROL MATTING ON THE ENTIRE FLOODPLAIN.



SECTIONS

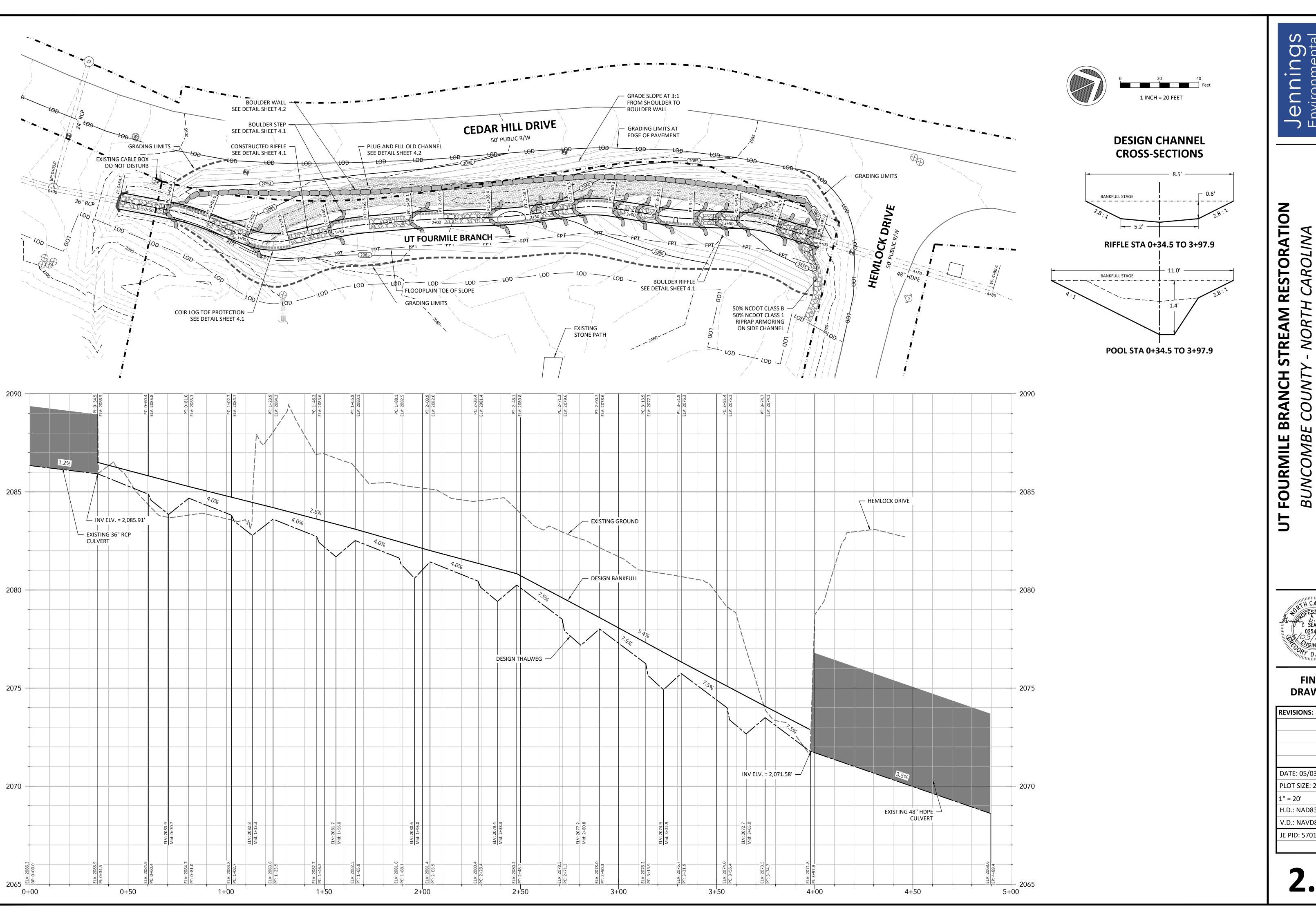
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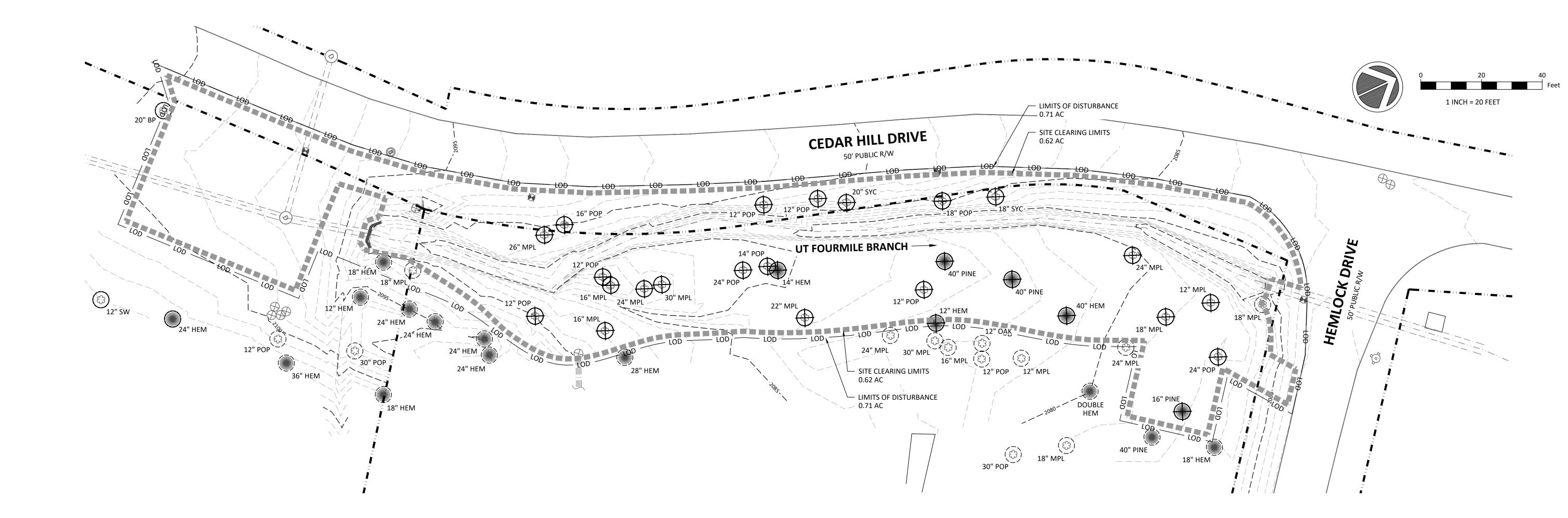
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FINAL DRAWING

DATE: 05/03/2023 PLOT SIZE: 24" x 36"

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SITE PREPARATION PLAN SPECIFICATIONS

- ALL TREES, UTILITIES AND OTHER SITE FEATURES SHALL BE PROTECTED UNLESS MARKED FOR REMOVAL OR RELOCATION.
- 4. FLAG THE WORK LIMITS, STAKE OUT THE EXTENTS OF THE PROPOSED WORK AND MARK ALL TREES AND VEGETATION WITHIN THE CLEARING LIMITS THAT MUST BE REMOVED TO COMPLETE THE WORK
- 5. THE ENGINEER AND PROJECT OWNER MUST APPROVE ALL TREES MARKED FOR REMOVAL.
- 6. ALL LOGS AND WOODY DEBRIS GENERATED DURING SITE CLEARING AND TREE REMOVAL OPERATIONS MUST BE REMOVED FROM THE SITE

SITE PREPARATION PLAN FEATURES

LIMITS OF DISTURBANCE (LOD)

CLEARING LIMITS

DECIDUOUS TREE

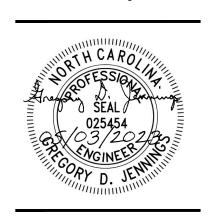
CONIFEROUS TREE

TREE TO REMAIN

TREE REMOVAL



JT FOURMILE BRANCH STREAM RESTORATION BUNCOMBE COUNTY - NORTH CAROLINA



FINAL DRAWING

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PLOT SIZE: 24" x 36"
1" = 20'

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GENERAL RE-VEGETATION AND PLANTING NOTES

- PROCUREMENT OF PLANT/SEED STOCK.
- LARGER NATIVE TREE SPECIES TO BE PRESERVED WILL BE IDENTIFIED PRIOR TO CONSTRUCTION ACTIVITIES.
- 3. ALL DISTURBED AREAS WILL BE STABILIZED USING TEMPORARY AND PERMANENT SEEDING AS DEFINED IN THE SEEDING SCHEDULE AND THE APPROVED E&SC PLANS.
- 4. SUPPLEMENTAL PLANTING ACTIVITIES MAY BE REQUIRED WITHIN THE PROJECT BOUNDARY.

TEMPORARY SEEDING AND MULCHING NOTES

- 5. TEMPORARY SEEDING AND MULCHING SHALL BE APPLIED TO ALL AREAS AND ACCESS ROUTES DISTURBED DURING CONSTRUCTION.
- 6. ALL SEED AND SEED VARIETIES MUST BE FREE OF STATE AND FEDERALLY LISTED NOXIOUS WEED SEED AND INVASIVE SPECIES. 7. ALL DISTURBED AREAS WILL BE SEEDED WITH TEMPORARY SEED
- AND MULCHED WITH WHEAT STRAW. SEEDING WILL BE PERFORMED USING A BROADCAST SPREADER. OTHER METHODS MAY BE USED BUT MUST BE APPROVED BY ENGINEER IN ADVANCE OF INSTALLATION.
- 8. MAINTENANCE OF SEEDED AREAS SHALL CONSIST OF WATERING, WEED AND PEST CONTROL, FERTILIZATION, EROSION REPAIR, 15. PERMANENT AND TEMPORARY SEEDING AND MULCHING SHALL BE RE-SEEDING, AND INCIDENTAL OPERATIONS AS NECESSARY TO ESTABLISH A HEALTHY, VIGOROUS, WEED FREE AND DISEASE FEE UNIFORM STAND OF GRASS. ALL AREAS WHICH FAIL TO SHOW A UNIFORM STAND OF GRASS FOR ANY REASON SHALL BE TREATED REPEATEDLY UNTIL A UNIFORM STAND OF AT LEAST 90% COVERAGE IS ATTAINED WITH NO BARE AREA GREATER THAN FIVE SQUARE FEET.

PERMANENT SEEDING NOTES

- 9. PERMANENT SEEDING SHALL OCCUR IN CONJUNCTION WITH TEMPORARY SEEDING WHERE APPLICABLE. IDEALLY, PERMANENT SEEDING SHALL OCCUR DURING THE PLANTING SEASON FOR EACH SEED TYPE. AREAS FERTILIZED FOR TEMPORARY SEEDING SHALL BE SUFFICIENTLY FERTILIZED FOR PERMANENT SEEDING; ADDITIONAL FERTILIZER IS NOT REQUIRED FOR PERMANENT SEEDING.
- 10. ALL SEED AND SEED VARIETIES MUST BE FREE OF STATE AND FEDERALLY LISTED NOXIOUS WEED SEED AND INVASIVE SPECIES.
- 11. THE CONTRACTOR SHALL LOOSEN THE SOIL TO A MINIMUM DEPTH OF 4-INCHES AND GRADE TO A SMOOTH, EVEN SURFACE WITH A LOOSE, UNIFORMLY FINE TEXTURE. THE AREAS TO BE SEEDED ARE THEN TO BE ROLLED AND RAKED TO REMOVE RIDGES AND FILL DEPRESSIONS TO MEET FINISH GRADES. THE CONTRACTOR IS TO LIMIT SUB GRADE AND FINISH GRADE PREPARATION TO AREAS THAT WILL BE PLANTED IMMEDIATELY. PREPARED AREAS ARE TO BE RESTORED IF ERODED OR OTHERWISE DISTURBED AFTER FINE GRADING AND BEFORE PLANTING.
- 12. SEED SHALL BE SOWN WITH A SPREADER OR A SEEDING MACHINE. SEED IS NOT TO BE BROADCAST OR DROPPED WHEN WIND VELOCITY EXCEEDS 5 MPH. SEED SHALL BE EVENLY DISTRIBUTED BY SOWING IN TWO DIRECTIONS AT RIGHT ANGLES TO EACH OTHER. WET SEED OR SEED THAT IS MOLDY OR OTHERWISE DAMAGED IN TRANSIT OR STORAGE IS NOT TO BE USED. AFTER BEGIN SOWN, THE SEED SHALL BE RAKED INTO THE TOP 1/4 INCH OF THE TOPSOIL, LIGHTLY ROLLED, AND WATERED WITH FINE SPRAY.

SEEDED AREAS ON STREAMBANKS SHALL BE PROTECTED WITH COIF

ZONE 1: STREAMBANK

PLANTINGS SCHEDULE SHALL BE PLANTED IN OFFSET ROWS AT A DENSITY OF 4,840 STEMS PER ACRE (3.0' O.C.) FROM TOE OF THE RESTORED CHANNEL TO 3.0' OUTSIDE THE BANKFULL STAGE. HERBACEOUS PLUGS SHALL BE PLANTED ALONG THE TOE OF THE CHANNEL IN THE OUTSIDE OF THE POOL MEANDER BENDS. PERMANENT AND TEMPORARY SEEDING AND MULCHING SHALL BE APPLIED TO ALL GRADED STREAMBANKS.

ZONE 2: RIPARIAN BUFFER

14. WOODY SPECIES LISTED IN THE PLANTING SCHEDULE SHALL BE PLANTED IN OFFSET ROWS AT A DENSITY OF 440 STEMS PER ACRE (10.0' O.C.) FROM 3.0' OUTSIDE THE BANKFULL STAGE TO THE GRADING LIMITS. EXACT PLACEMENT OF THE SPECIES SHALL BE DETERMINED BY THE BUILDERS'S VEGETATION SPECIALIST PRIOR TO SITE PLANTING AND BASED ON THE WETNESS CONDITIONS OF PLANTING LOCATIONS. PERMANENT AND TEMPORARY SEEDING AND MULCHING SHALL BE APPLIED TO ALL DISTURBED AREAS.

ZONE 3: UPLAND SEEDING

APPLIED TO ALL DISTURBED UPLAND AREAS.

VEGETATION PLAN FEATURES

ZONE 3: UPLAND

ZONE 1: STREAMBANK

ZONE 2: RIPARIAN BUFFER

ROOT GROWTH.

BUFFER WIDTH

10.0' O.C.

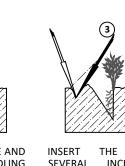
VARIES



HERBACEOUS

REMOVE THE DIBBLE AND THE SOIL TO THE FULL ROOTS DEEP INTO THE DEPTH OF THE BLADE PLANTING HOLE. PULL AND PULL BACK ON THE THE SEEDLING BACK UP HANDLE TO OPENT THE TO THE CORRECT PLANTING HOLE, DO NOT PLANTING DEPTH, THE ROCK THE SHOVEL BACK ROOT COLLAR SHOULD BE AND FORTH AS THIS 1" - 3" BELOW THE SOIL CAUSES THE SOIL IN THE SURFACE, GENTLY SHAKE PLANTING HOLE TO BE THE SEEDLING TO ALLOW COMPACTED, INHIBITING THE ROOTS TO STRAIGHTEN OUT. DO NOT TWIST OR SPIN THE SEEDLING OR LEAVE THE

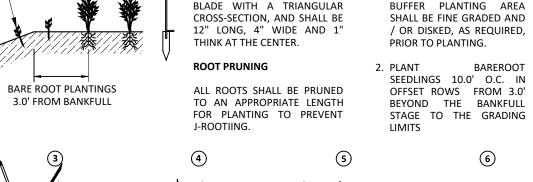
ROOTS J-ROOTED.



3.0' FROM BANKFULL

BARE ROOT SEEDLING

STRAIGHT DOWN INTO PUSH THE SEEDLING SEVERAL INCHES IN TO THE FULL DEPTH OF FRONT OF THE SEEDLING AND PUSH THE BLADE HALFWAY INTO THE SOIL. TWIST AND PUSH THE HANDLE FORWARD TO CLOSE THE TOP OF THE PLANTING HOLE TO HOLD THE SEEDLING IN PLACE.



PUSH THE DIBBLE DOWN

THE BLADE.

BARE ROOT DETAILS

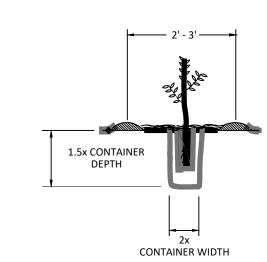
PLANTING BAR SHALL HAVE A

POCKETS AROUND THE

PULLBACK ON THE HANDLE TO CLOSE THE CLOSE AND FIRM UP THE BOTTOM OF THE OPENING WITH YOUR PLANTING HOLE. THEN HEEL. BE CAREFUL TO PUSH FORWARD TO AVOID DAMAGING THE CLOSE THE TOP SEEDING. ELIMINATING

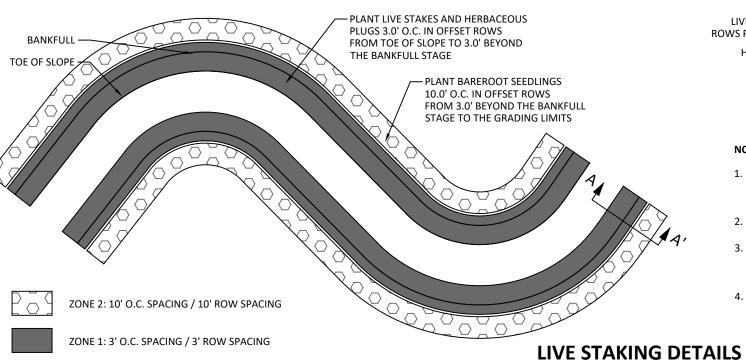
1. ALL SOILS WITHIN THE

BAREROOT

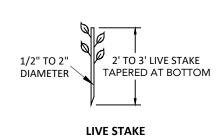


- 1. PLANTS SHALL HAVE BEEN GROWN IN A CONTAINER LONG ENOUGH FOR THE ROOT SYSTEM TO HAVE DEVELOPED SUFFICIENTLY TO HOLD ITS SOIL TOGETHER ONCE REMOVED FROM THE CONTAINER.
- 2. PLANTS WILL NEED TO BE WATERED REGULARLY AND PLACED IN SHADY CONDITIONS UNTIL PLANTING OCCURS.
- 3. THE DIAMETER OF THE PLANTING PITS FOR EACH PLANT SHOULD BE AT LEAST TWO TIMES THE DIAMETER OF THE ROOT MASS. SCARIFY THE PLANTING PIT PRIOR TO EACH PLANT INSTALLATION.
- 4. SET PLANTS UPRIGHT IN THE CENTER OF THE PIT. THE BOTTOM OF THE ROOT MASS SHOULD BE RESTING ON UNDISTURBED SOIL.
- 5. PLACE BACKFILL AROUND BASE AND SIDES OF ROOT MASS, AND WORK EACH LAYER TO SETTLE BACKFILL AND TO ELIMINATE VOIDS AND AIR POCKETS. WHEN PIT IS APPROXIMATELY ? FULL. WATER THOROUGHLY BEFORE PLACING REMAINDER OF THE BACKFILL. WATER AGAIN AFTER PLACING FINAL LAYER OF BACKFILL.

CONTAINER PLANT DETAILS

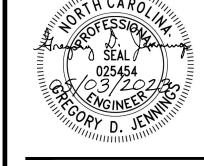


LIVE STAKES IN OFFSET -**ROWS PER PLANTING PLAN** HERBACEOUS PLUGS -SECTION A - A'



- 1. LIVE STAKES MUST BE DORMANT WHEN CUT. KEEP LIVE STAKES MOIST UNTIL PLANTING. THE STAKE SHOULD BE PREPARED WITH THE BUDS POINTED UP, AND THE BOTTOM SHOULD BE CUT AT AN ANGLE FOR INSERTION INTO THE GROUND. AN IRON BAR CAN BE USED TO MAKE A PILOT HOLE TO PREVENT BARK FROM BEING DAMAGED DURING INSTALLATION.
- 2. LIVE STAKES SHALL BE 0.5" 2" IN DIAMETER AND 2' 3' IN LENGTH.
- 3. LIVE STAKES SHOULD BE PLACED WITH $\frac{2}{3}$ TO $\frac{3}{4}$ OF THE LENGTH OF THE STAKE BELOW GROUND AND ANGLED DOWNSTREAM. ENSURE THE BASE OF THE LIVE STAKE WILL REACH THE WATER TABLE. AFTER INSTALLATION THE TOP OF THE LIVE STAKE SHALL BE PRUNED WITH A SQUARE CUT LEAVING NO LESS THAN 3" AND NO LESS THAN 6" ABOVE THE GROUND.
- 4. PLANT LIVE STAKES AND HERBACEOUS PLUGS IN OFFSET ROWS AND SPACINGS PER PLANTING PLAN.

RESTORATION AROLINA AM TRE/ S **BRANCH** RMILE S 0 B



FINAL DRAWING

REVISIONS:

DATE: 05/03/2023 PLOT SIZE: 24" x 36" 1" = 20' H.D.: NAD83 (NCSP) V.D.: NAVD88

JE PID: 5701

TEMPORARY SEEDING SCHEDULE

ALL DISTU	JRBED AREAS - TEMPORARY SEEDING	
DATE	ТҮРЕ	APP. RATE (LBS/AC)
	RYE GRAIN (Secale cereale)	120
	COMMON OATS (Avena sativ)	100
JAN 1 - MAY 1	GROUND AG. LIMESTONE	2,000
	10-10-10 FERTILIZER	750
	STRAW MULCH	4,000
	GERMAN MILLET (Setaria italica) 50	50
	COMMON OATS (Avena sati)	100
MAY 1 - AUGUST 1	GROUND AG. LIMESTONE	2,000
	10-10-10 FERTILIZER	750
	STRAW MULCH	4,000
	RYE GRAIN (Secale cereale) 120 WINTER WHEAT (Triticum aestivum) 100	120
		100
AUGUST 1 - DECEMBER 31	GROUND AG. LIMESTONE	2,000
	10-10-10 FERTILIZER	750
	STRAW MULCH	4,000

TOTAL TEMPORARY SEEDING AREA =

PERMANENT SEEDING SCHEDULE

ZONE 1	AND 2 - RIPARIAN SEEDING (25 LBS/AC)	
SPECIES	COMMON NAME	PERCENT
Agrostis hyemalis	WINTER BENTGRASS	0.5%
Agrostis perennans	UPLAND BENTGRASS	0.5%
Andropogon gerardii	BIG BLUESTEM	15.0%
Andropogon virginicus	BROOMSEDGE	0.5%
Coleataenia anceps	BEAKED PANICGRASS	1.0%
Coreopsis lanceolata	LANCELEAF COREOPSIS	1.0%
Dichanthelium dichotomiflorum	FALL PANICGRASS	0.5%
Elymus virginicus	VIRGINIA WILDRYE	34.0%
Juncus effusus	SOFT RUSH	0.5%
Panicum virgatum	SWITCHGRASS	13.0%
Pycnanthemum tenuifolium	NARROWLEAF MOUNTAINMINT	0.5%
Rudbeckia hirta	BLACKEYED SUSAN	0.5%
Schizachyrium scoparium	LITTLE BLUESTEM	10.0%
Solidago speciosa	SHOWY GOLDENROD	0.5%
Sorghastrum nutans	INDIAN GRASS	7.0%
Tradescantia subaspera	ZIGZAG SPIDERWORT	1.0%
Tripsacum dactyloides	EASTERN GAMAGRASS	12.0%
Zizia aurea	GOLDEN ZIZIA	2.0%
	TOTAL	100%

TOTAL ZONE 1 AND 2 SEEDING AREA =

Z	ONE 3 - UPLAND (25 LBS/AC)	
PECIES	COMMON NAME	PERCENT
estuca ovina	HARD FESCUE	50.0%
estuca arundinacea	TALL FESCUE	25.0%
oa pratensis	KENTUCKY BLUEGRASS	25.0%
	TOTAL	100%

TOTAL ZONE 3 SEEDING AREA =

WOODY PLANTINGS

ZONE 1 - STREAMBANK - 3' O.C. (4,840 STEMS/AC)		
SPECIES	COMMON NAME	% OF STEMS
	LIVE STAKES	
Cornus amomum	SILKY DOGWOOD	30%
Salix sericea	SILKY WILLOW	30%
Salix nigra	BLACK WILLOW	10%
Salix caroliniana	CAROLINA WILLOW	10%
Sambucus canadensis	ELBERBERRY	10%
Physocarpus opulifolius	NINEBARK	10%
	TOTAL	100%

TOTAL ZONE 1 PLANTING AREA =

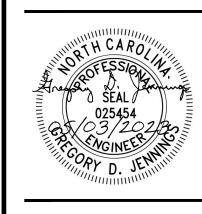
ZONE 2 - RIPARIAN BUFFER - 10' O.C. (440 STEMS/AC)			
SPECIES COMMON NAME % OF S			
	OVERSTORY		
Betula lenta	SWEET BIRCH	10%	
Betula alleghaniensis	YELLOW BIRCH	10%	
Betula nigra	RIVER BIRCH	10%	
Carya cordiformis	BITTERNUT HICKORY	10%	
Quercus marilandica	BLACKJACK OAK	10%	
Ceanothus americanus	NEW JERSEY TEA	5%	
Nyssa sylvatica	BLACK GUM	5%	
	UNDERSTORY	•	
Cephalanthus occidentalis	BUTTON BUSH	5%	
Alnus serrulata	HAZEL ALDER	5%	
Hamamelis virginiana	WITCH HAZEL	5%	
/accinium macrocarpon	AMERICAN CRANBERRY	5%	
/accinium altomontanum	BLUE RIDGE BLUEBERRY	5%	
/iburnum carolinianum	CAROLINA ARROWWOOD	5%	
/iburnum lantanoides	HOBBLEBUSH	5%	
/iburnum acerifolium	MAPLE-LEAF ARROWWOOD	5%	
	TOTAL	100%	

TOTAL ZONE 2 PLANTING AREA =



STREAM RESTORATION **BRANCH** BUN FOU

VEGETATION I



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