

# ASHEVILLE WATER TREATMENT PLANT (AVL WTP) RIVER BANK RESTORATION

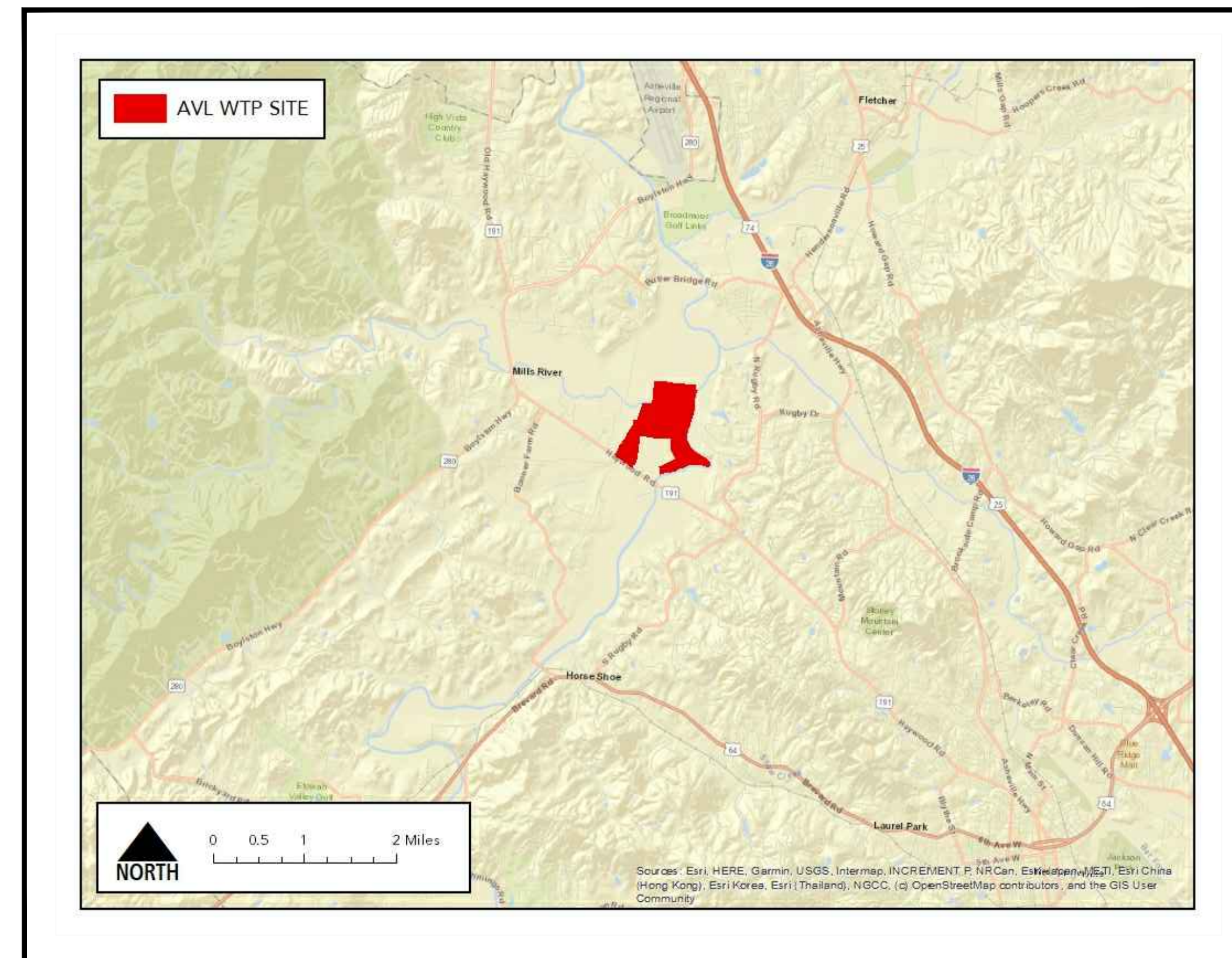
HENDERSON COUNTY, NORTH CAROLINA

USACE ACTION ID: TBD

MILLS RIVER PARTNERSHIP CONTRACT #:

## PROJECT DIRECTORY

OWNER	CITY OF ASHEVILLE WATER AUTHORITY
	DAVID MELTON CITY OF ASHEVILLE, WATER RESOURCES DIRECTOR (828) 259-5957 DMELTON@ASHEVILLENC.GOV
SPONSOR	MILLS RIVER PARTNERSHIP
	MARIA WISE EXECUTIVE DIRECTOR (828) 708-7388 MARIA.MILLSRIVERPARTNERSHIP@GMAIL.COM
ENGINEER	JENNINGS ENVIRONMENTAL PLLC
	GREG JENNINGS, PHD, PE PRESIDENT (919) 600-4790 GREG@JENNINGSENV.COM



## SHEET INDEX

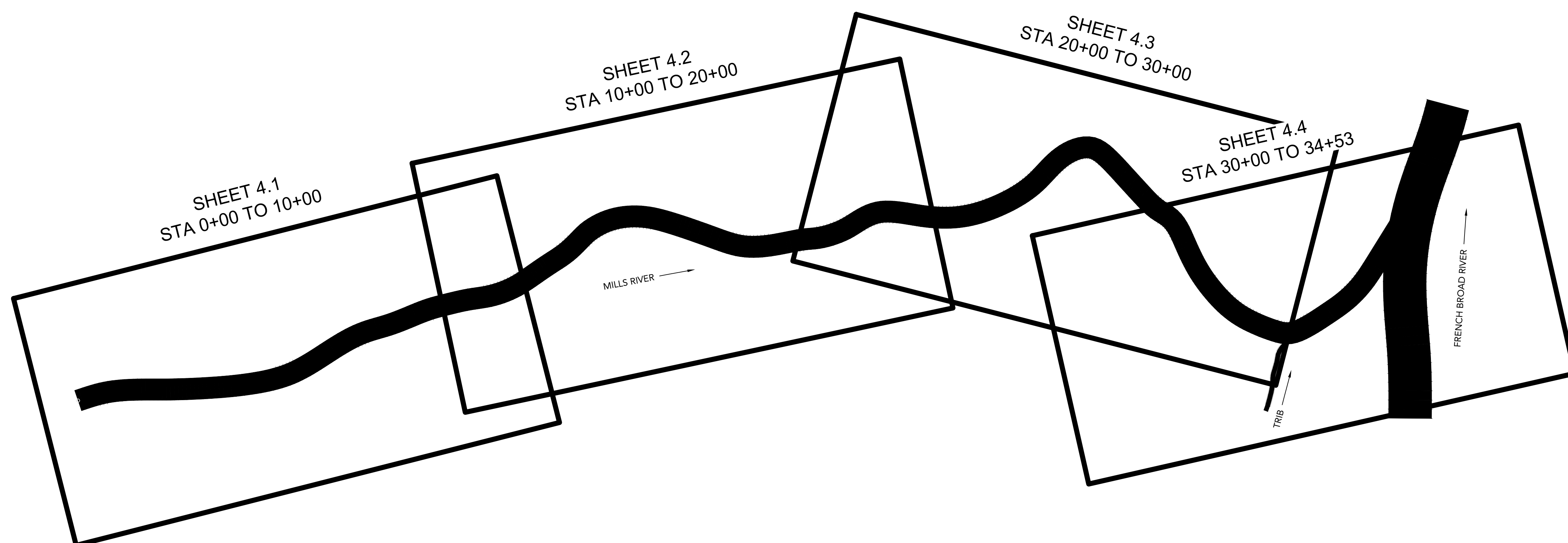
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**PERMIT DRAWING  
NOT RELEASED FOR CONSTRUCTION  
APRIL 22, 2021**

PERMIT  
DRAWING

REVISIONS:

DATE: 04/22/2021  
PLOT SIZE: 24" x 36"  
AS NOTED  
H.D.: NAD83 (SCSP)  
V.D.: NAVD88  
JE PID: 2703



GENERAL PROJECT SPECIFICATION AND NOTES

1. DEFINITIONS:
  - 1.1. CONSTRUCTION DOCUMENTS: THE CONTRACT AND APPLICABLE DRAWINGS, DETAILS, SPECIFICATIONS, PERMITS, 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: CITY OF ASHEVILLE WATER AUTHORITY
  - 1.3. PROJECT SPONSOR: MILLS RIVER PARTNERSHIP
  - 1.4. ENGINEER: JENNINGS ENVIRONMENTAL PLLC
2. THE WORK ON THIS PROJECT SHALL ADHERE TO THE FOLLOWING SPECIFICATIONS, STANDARDS AND/OR REGULATIONS:
  - 2.1. NC DEQ'S "EROSION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL" (2013)
  - 2.2. GENERAL AND SPECIAL CONDITIONS OF USACE'S 404 NATIONWIDE PERMIT NUMBERS 13 AND 27
  - 2.3. GENERAL AND SPECIAL CONDITIONS OF NCDEQ'S 401 WATER QUALITY CERTIFICATION
  - 2.4. THE CONSTRUCTION DOCUMENTS
3. NOT ALL EXISTING UTILITIES ARE SHOWN. SOME LOCATIONS MAY BE 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.
4. ALL UTILITIES SHALL BE PROTECTED AND REMAIN ACTIVE UNLESS OTHERWISE NOTED.
5. THE CONTRACTOR IS RESPONSIBLE FOR THE PROJECT AREA UNTIL COMPLETION AND FINAL ACCEPTANCE BY THE ENGINEER AND PROJECT OWNER. THE CONTRACTOR SHALL CONFINE ALL ACTIVITIES, INCLUDING EQUIPMENT STORAGE, TO THE LIMITS OF DISTURBANCE, STAGING AREAS, AND DESIGNATED CONSTRUCTION ACCESS POINTS.
6. THE MANNER IN WHICH THE CONTRACTOR DEALS WITH PEOPLE AND THEIR PROPERTIES WHILE PERFORMING THIS WORK IS EXTREMELY IMPORTANT. THEREFORE, THE CONTRACTOR AND THE CONTRACTOR'S REPRESENTATIVES SHALL MANIFEST A SPIRIT OF FRIENDLINESS AND COOPERATION WHEN DEALING WITH PROPERTY OWNERS AND THE GENERAL PUBLIC WHILE PERFORMING WORK ON THE SITE.

7. EXTREME CARE AND DILIGENCE SHALL BE EXERCISED BY THE CONTRACTOR TO ASSURE THE SAFETY OF PERSONS, ANIMALS, AND PROPERTY. IF AT ANY TIME PG DETERMINES THAT THE CONTRACTOR'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 CONTRACTOR OF ANY OBLIGATION TO ENSURE THE SAFE CONDUCT OF ITS WORK.
8. THE CONTRACTOR SHALL MAINTAIN ALL LIGHTS, GUARDS, SIGNS, TEMPORARY PASSAGES, OR OTHER PRECAUTIONS NECESSARY FOR THE SAFETY OF ALL PERSONS. THE CONTRACTOR SHALL ABIDE BY ALL SAFETY RULES AND CONSTRUCTION CONDITIONS REQUIRED BY 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 CONTRACTOR'S EXPENSE, UNLESS DIRECTED OTHERWISE BY THE DESIGNATED REPRESENTATIVE. CONTRACTOR SHALL AT NO TIME COMPROMISE EITHER SAFETY OR ENVIRONMENTAL REQUIREMENTS.
9. THE CONTRACTOR SHALL ONLY USE 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.
10. NO NON-PERMITTED FILL IN WETLANDS MAY OCCUR. ALL EXCESS SOILS FROM EMBANKMENT EXCAVATION AND CHANNEL WORK SHALL BE PLACED IN DESIGNATED AREAS ON THE SITE.
11. SITE SHOULD BE "STORM READY" AT THE END OF EACH WORK DAY AND WORK WEEK.

12. THE CONTRACTOR SHALL MAINTAIN ALL LIGHTS, GUARDS, SIGNS, TEMPORARY PASSAGES, OR OTHER PRECAUTIONS NECESSARY FOR THE SAFETY OF ALL PERSONS. THE CONTRACTOR SHALL ABIDE BY ALL SAFETY RULES AND CONSTRUCTION CONDITIONS REQUIRED BY 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 CONTRACTOR'S EXPENSE, UNLESS DIRECTED OTHERWISE BY THE DESIGNATED REPRESENTATIVE. CONTRACTOR SHALL AT NO TIME COMPROMISE EITHER SAFETY OR ENVIRONMENTAL REQUIREMENTS.
13. HORIZONTAL DATUM IS NAD83(2011) & VERTICAL DATUM IS NAVD88. ALL COORDINATES ARE BASED ON NAD83(2011) AND ALL ELEVATIONS ARE BASED ON NAVD88.
14. EXISTING GROUND SURFACES ARE BASED ON NCEM'S 0L1 LIDAR DATASET AND ONSITE CONTROL ESTABLISHED BY TURNER LAND SURVEYING TO CLASS A ACCURACY.

TOPOGRAPHIC SPECIFICATIONS AND NOTES

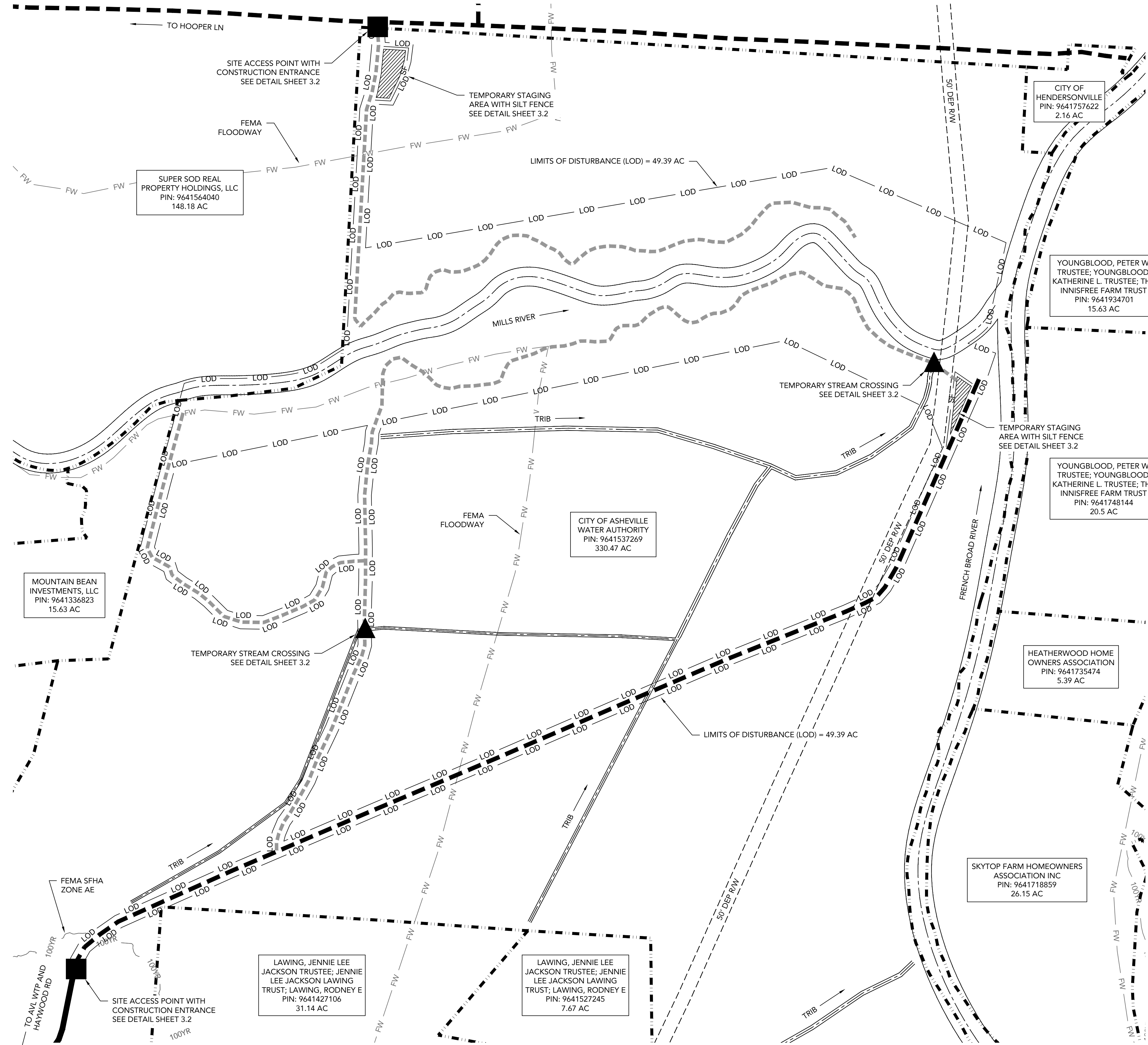
QUANTITIES AND MATERIALS SPECIFICATIONS

15. THE CONTRACTOR SHALL FURNISH ALL MATERIALS NECESSARY TO COMPLETE THE PROPOSED WORK UNLESS OTHER PROVISIONS HAVE BEEN AGREED UPON PRIOR TO CONSTRUCTION. THE CONTRACTOR 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.
16. COSTS INCURRED DUE TO PROJECT DELAYS RESULTING FROM FAILURE OF THE CONTRACTOR TO MEET THE REQUIREMENTS OF THE CONSTRUCTION DOCUMENTS SHALL BE THE EXPENSE OF THE CONTRACTOR. QUANTITIES LISTED ARE ESTIMATES ONLY AND SHALL BE CONFIRMED BY THE CONTRACTOR.
17. 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. THE CONTRACTOR SHALL OBTAIN APPROVAL FROM THE PROJECT OWNER AND ENGINEER PRIOR TO INSTALLATION OF ADDITIONAL EROSION CONTROL MEASURES.
18. ANY ADDITIONAL GRADING OTHER THAN WHAT IS SHOWN ON THE PLANS SHALL REQUIRE PRIOR APPROVAL FROM THE PROJECT OWNER AND ENGINEER.
19. 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.
20. THE CONTRACTOR 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 CONTRACTOR SHALL

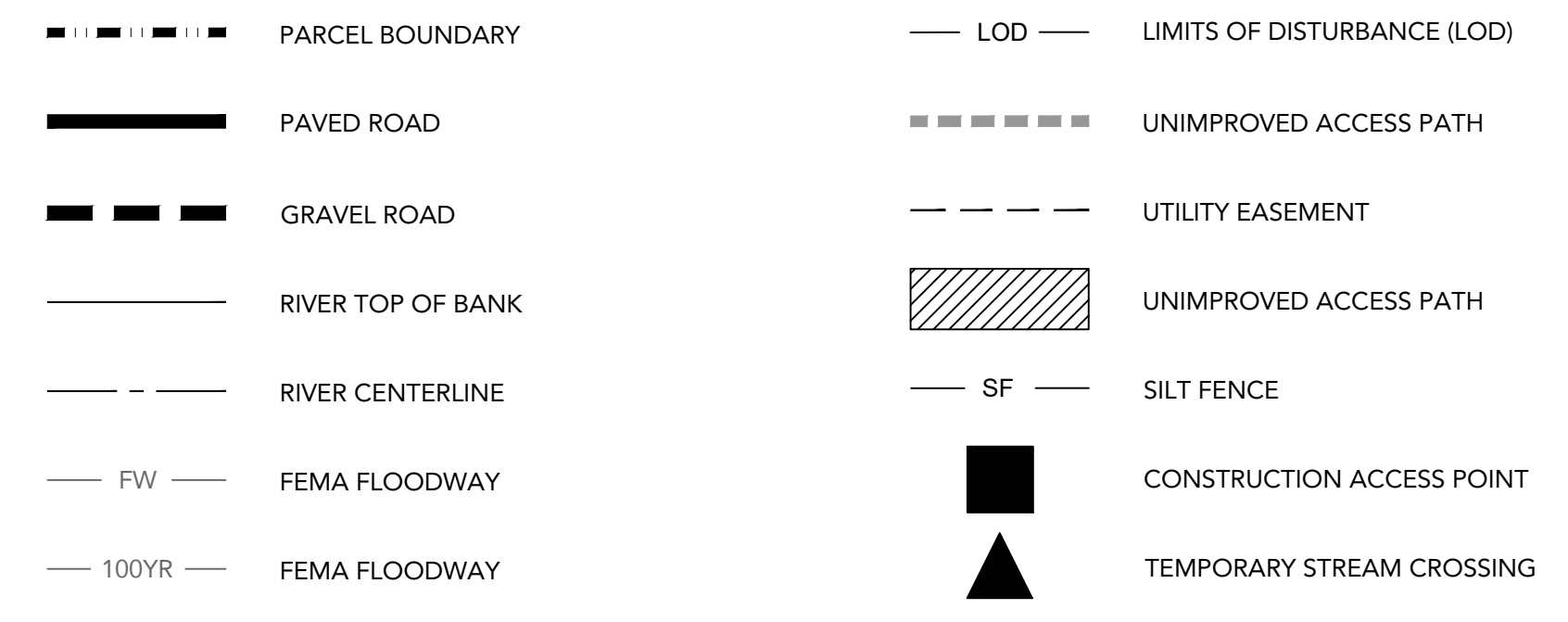
RESTORE THE STORAGE AREA TO ITS ORIGINAL (OR BETTER) CONDITION UPON COMPLETION OF THE PROJECT OR UPON SUCH TIME AS DIRECTED BY THE PROJECT OWNER AND ENGINEER. SUCH RESTORATION SHALL BE AT NO ADDITIONAL COST TO THE PROJECT OWNER. THE CONTRACTOR SHALL WARRANTY ALL MATERIALS AND WORKMANSHIP FOR A PERIOD 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 CONTRACTOR SHALL IMMEDIATELY REPAIR ALL ITEMS DETERMINED BY THE PROJECT OWNER OR AUTHORIZED REPRESENTATIVE TO BE DEFECTIVE UPON NOTIFICATION. THE CONTRACTOR 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.

PERMIT DRAWING

REVISIONS:
DATE: 04/22/2021
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1" = 150'
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### EROSION & SEDIMENTATION CONTROL PLAN LINES AND SYMBOLS

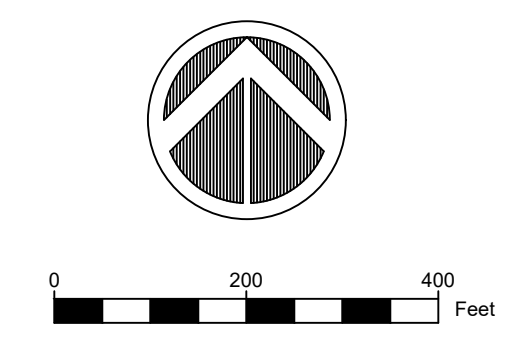


#### EROSION AND SEDIMENTATION CONTROL NOTES AND SPECIFICATIONS

- ALL CONSTRUCTION ACTIVITIES SHALL ADHERE TO THE CONDITIONS AND REQUIREMENTS OF NCDENR'S NG01 CONSTRUCTION GENERAL PERMIT.
- ALL TREES, UTILITIES AND OTHER SITE FEATURES SHALL BE PROTECTED UNLESS MARKED FOR REMOVAL OR RELOCATION.
- EQUIPMENT SHALL BE WELL-MAINTAINED, CLEANED PRIOR TO MOBILIZATION, AND CHECKED DAILY FOR LEAKS OF PETROLEUM PRODUCTS. FUELING OPERATIONS SHALL BE PERFORMED IN A CONTAINED AREA AWAY FROM SURFACE WATER.
- ALL WORK IN OR ADJACENT TO STREAMS SHALL BE CONDUCTED SUCH THAT THE FLOWING STREAM DOES NOT COME IN CONTACT WITH THE DISTURBED WORK AREA.
- CONSTRUCT A TEMPORARY IN-STREAM DIVERSION USING GRAVEL AND COBBLE FROM THE RIVER BED TO CREATE A BERM DIVERTS FLOW AROUND THE THE WORK AREA SUCH THAT IN-STREAM FLOWS DO NOT INTERACT WITH DISTURBED EARTH AND CONSTRUCTION MATERIALS. SEE DETAIL SHEET 3.2.
- CONSTRUCTION SHALL BE TIMED TO OCCUR DURING TIMES OF LOW FLOW.
- CONSTRUCTION SCHEDULING AND STAGING SHALL BE TIMED TO MINIMIZE THE AMOUNT OF TIME SPENT WORKING IN THE RIVER CHANNEL.
- THE RIVERBANKS, IN-STREAM STRUCTURES AND WORK AREA MUST BE STABILIZED AT THE END OF EACH DAY BEFORE THE TEMPORARY BERMS ARE REMOVED AND FLOW IS RETURNED THE FULL CHANNEL.

#### CONSTRUCTION SEQUENCE

- OBTAIN AND REVIEW THE AVL WTP MILLS RIVER BANK STABILIZATION PROJECT EROSION AND SEDIMENTATION CONTROL PLAN AND ALL OTHER APPLICABLE PERMITS.
- FLAG THE WORK LIMITS AND STAKE OUT THE LIMITS OF DISTURBANCE (LOD) OF THE PROJECT. THE TOTAL PROJECT LOD IS 49.39 AC.
- LOCATE ALL UNDERGROUND UTILITIES WITHIN THE WORK AREA.
- NOTIFY INSPECTOR FROM DEQ REGIONAL OFFICE PRIOR TO DISTURBANCE.
- POST CERTIFICATE OF APPROVAL FOR LAND DISTURBANCE AT SITE.
- INSTALL RAIN GAUGE AND PREPARE INSPECTION FORMS.
- HOLD PRE-CONSTRUCTION MEETING WITH THE PERMITTEE, ENGINEER AND CONTRACTOR PRIOR TO STARTING ANY LAND DISTURBING ACTIVITIES.
- INSTALL CONSTRUCTION ENTRANCES AT THE DESIGNATED CONSTRUCTION ACCESS POINTS AS SHOWN ON THIS SHEET AND IN THE DETAIL ON SHEET 3.2. INSTALL SILT FENCE ALONG THE DOWN SLOPE SIDE OF THE STAGING AREA AS SHOWN IN THE DETAIL ON SHEET 3.2.
- INSPECT EROSION PREVENTION AND SEDIMENT CONTROL BMPS DAILY AND AFTER SIGNIFICANT RAINFALL EVENTS. MAKE NEEDED REPAIRS IMMEDIATELY. KEEP ALL LOGS AND RECORDS UP-TO-DATE.
- ACQUIRE AND STORE MATERIALS FOR SITE (E.G. ROCK, LOGS, EROSION CONTROL MATTING AND FILTER FABRICS) IN THE TEMPORARY STAGING AREAS.
- CLEAR EXISTING VEGETATION REQUIRED TO COMPLETE THE WORK TAKING CARE NOT TO DISTURB DESIRABLE VEGETATION TO REMAIN INTACT.
- GRADE THE RIVER BANKS AND INSTALL BANK STABILIZATION STRUCTURES ACCORDING TO THE PLANS AND DETAILS. WHEN POSSIBLE, PERFORM WORK FROM THE RIVER BANKS TO MINIMIZE TIME SPENT WORKING IN THE CHANNEL.
- INSTALL TEMPORARY SEEDING, PERMANENT SEEDING AND EROSION CONTROL MATTING ON ALL DISTURBED RIVER BANKS AND GRADED SLOPES AS SHOWN ON SHEETS 5.2 AND 6.1.
- INSTALL TEMPORARY AND PERMANENT SEEDING AND MULCH TO ALL AREAS DISTURBED FOR CONSTRUCTION ACCESS AS SHOWN ON SHEET 6.1.
- ONCE THE WORK AREA IS STABILIZED AND CONSTRUCTION ACTIVITIES ARE COMPLETED, REMOVE AND DISPOSE OF ALL NON-BIODEGRADABLE EROSION AND SEDIMENTATION CONTROL BMPS.
- NOTIFY PERMITTEE AND THE ENGINEER FOR A FINAL INSPECTION AND WALK THROUGH TO VERIFY FINAL STABILIZATION OF THE SITE.
- WHEN SEASONALLY APPROPRIATE, INSTALL PERMANENT PLANTINGS ON RIVER BANKS AND WITHIN THE RIPARIAN ZONE AS SHOWN ON SHEETS 5.2 AND 6.1.



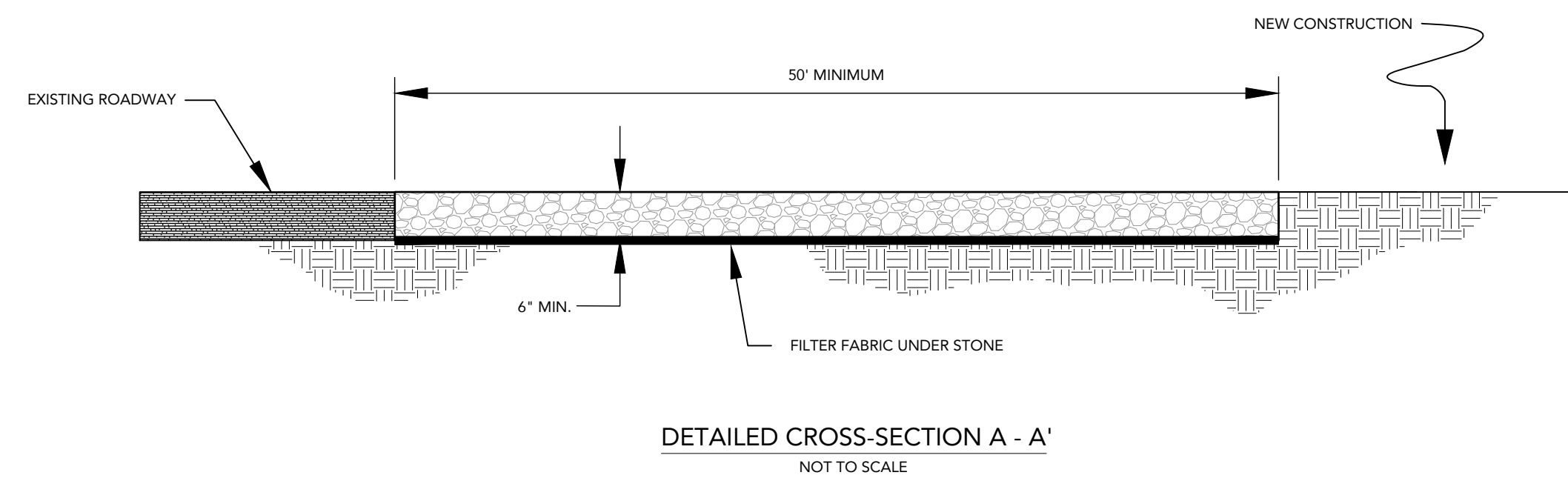
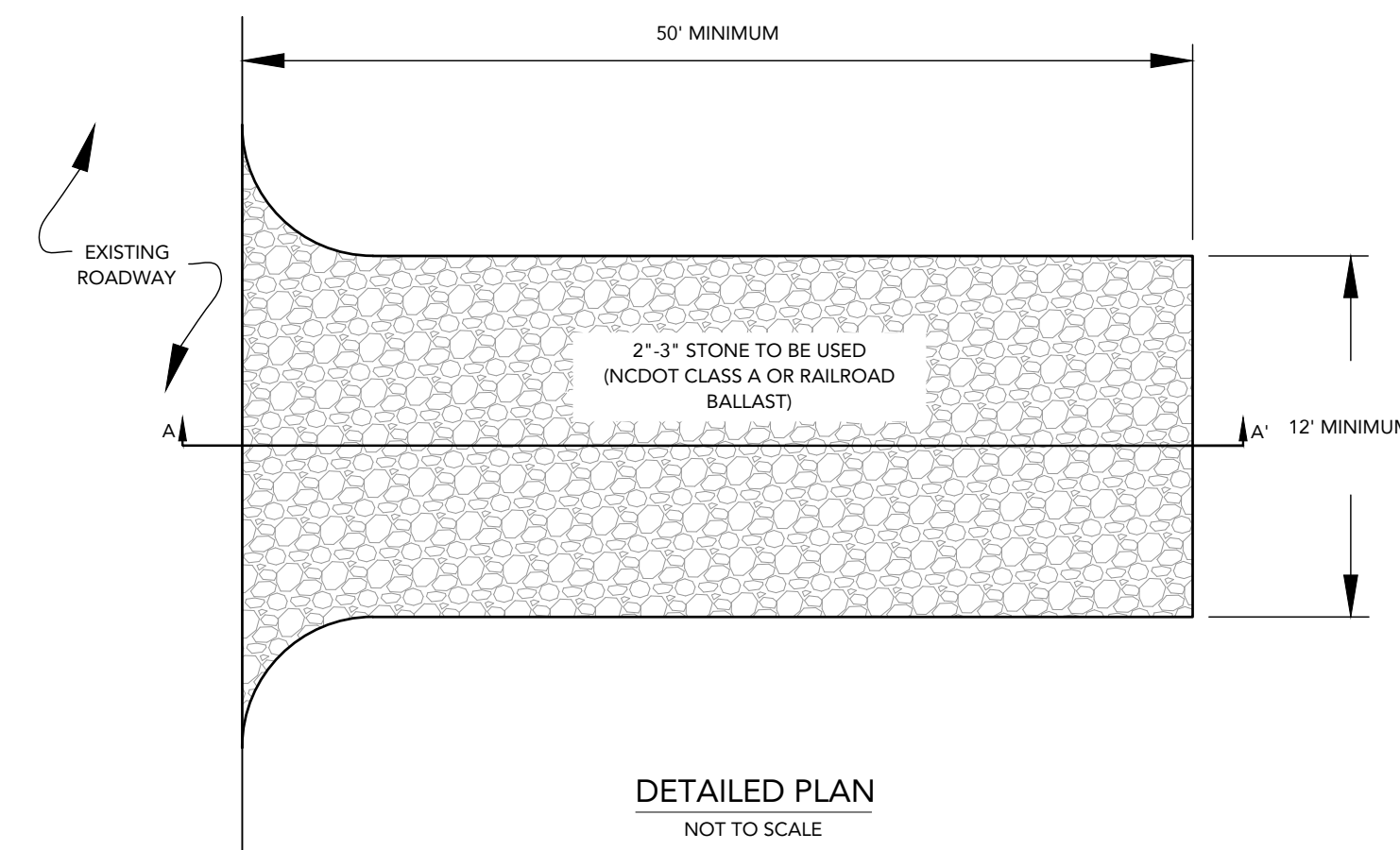
#### PERMIT DRAWING

REVISIONS:

DATE: 04/22/2021  
 PLOT SIZE: 24" x 36"  
 1" = 200'  
 H.D.: NAD83 (SCSP)  
 V.D.: NAVD88  
 JE PID: 2703

STANDARD CONSTRUCTION ENTRANCE NOTES

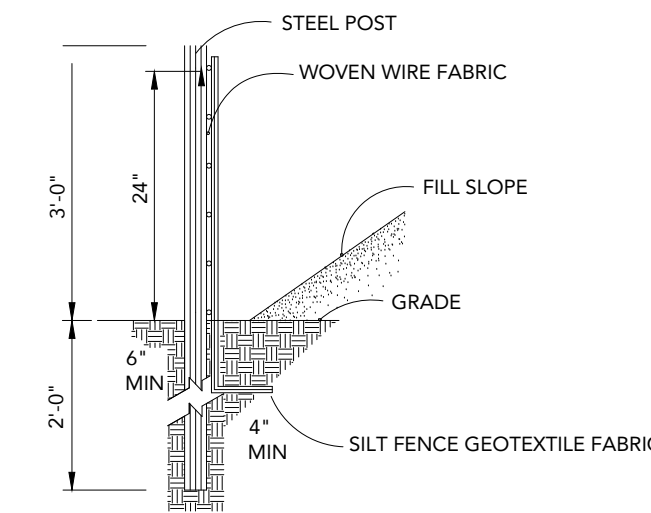
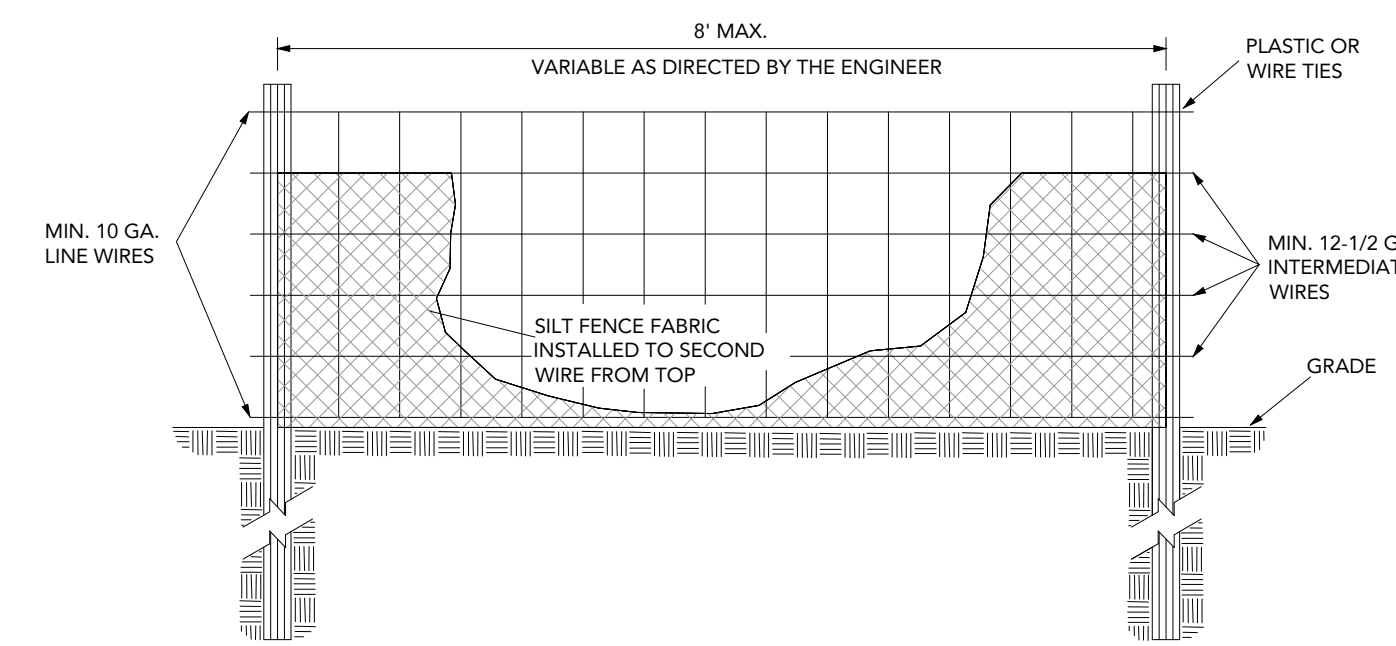
- CLEAR THE ENTRANCE AND EXIT AREA OF ALL VEGETATION ROOTS, AND OTHER OBJECTABLE MATERIAL AND PROPERLY GRADE THE AREA.
- PLACE THE 2'-3" STONE TO THE SPECIFIC GRADE AND DIMENSIONS SHOWN ON THE PLAND AND SMOOTH IT.
- USE GEOTEXTILE FABRICS TO IMPROVE STABILITY OF THE FOUNDATION IN LOCATIONS SUBJECT TO SEEPAGE OR A HIGH WATER TABLE.
- INSTALL SILT FENCE OR TREE PROTECTION FENCE UP TO ENSURE CONSTRUCTION ENTRANCE IS USED.
- IF CONSTRUCTION ON THE SITES ARE SUCH THAT THE MUD IS NOT REMOVED BY THE VEHICLE TRAVELING OVER THE STONE, THEN THE LENGTH OF THE CONSTRUCTION ENTRANCE SHALL BE INCREASED.
- SEE SECTION 6.06.1 OF NC DEMLR'S EROSION AND SEDIMENT CONTROL DESIGN MANUAL (2013) FOR ADDITIONAL INFORMATION, NOTES AND SPECIFICATIONS.



STANDARD CONSTRUCTION ENTRANCE DETAIL

TEMPORARY SILT FENCE NOTES

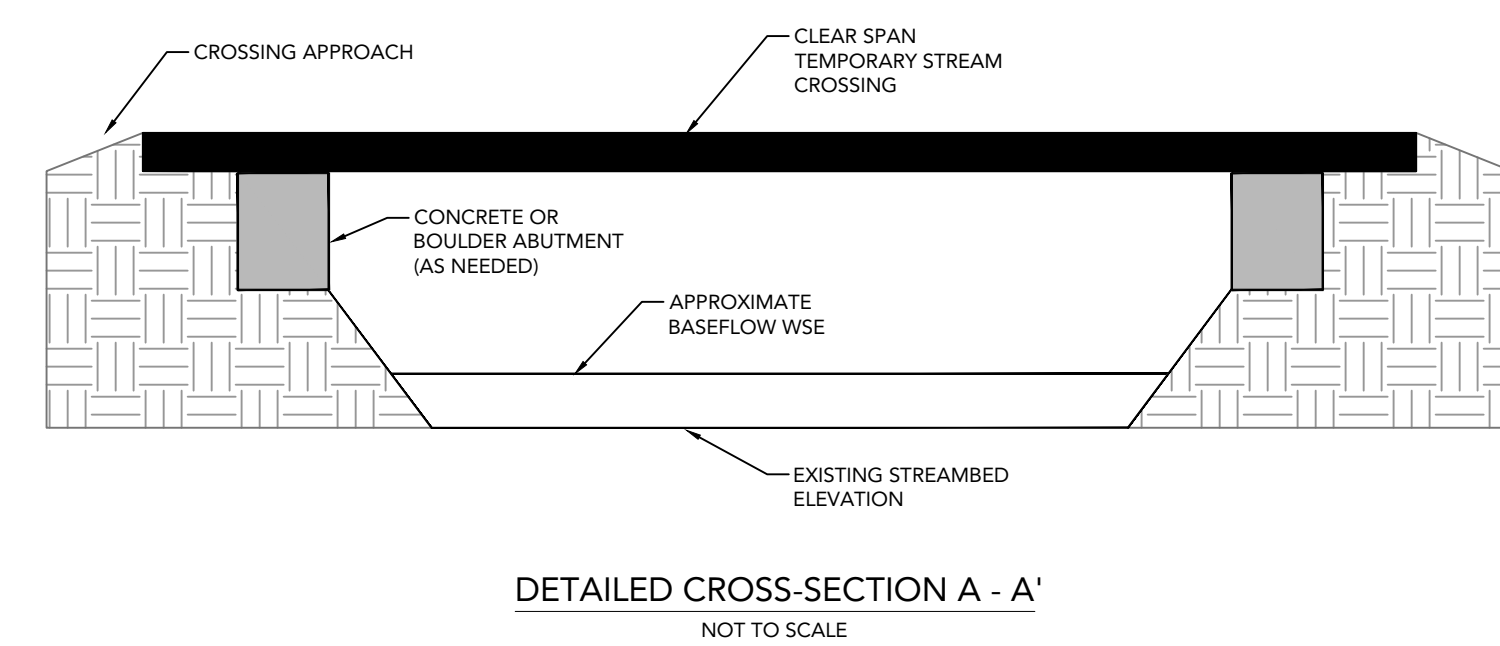
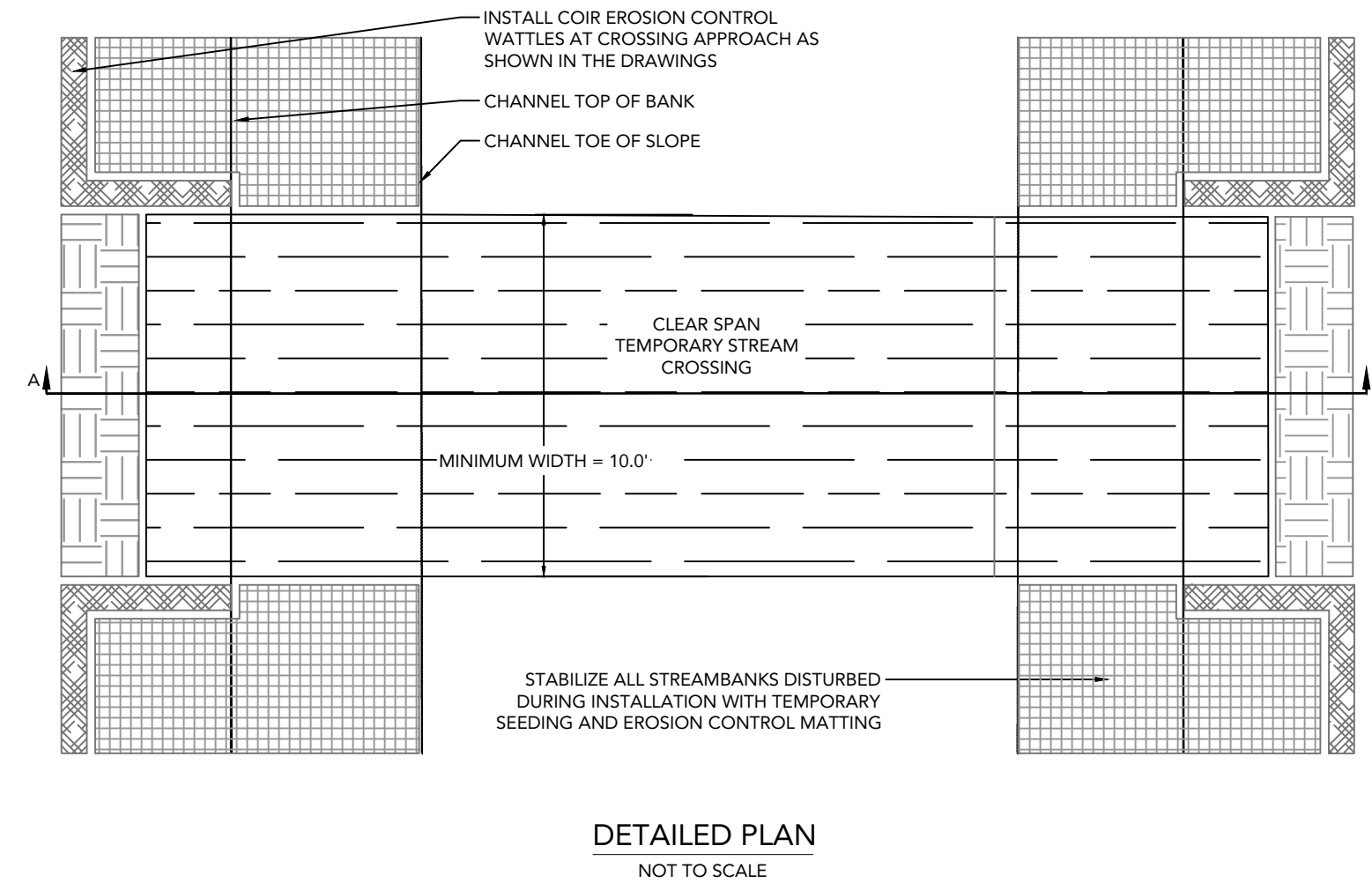
- CONSTRUCT THE SILT FENCE WITH STANDARD STRENGTH OR EXTRA STRENGTH SYNTHETIC FILTER FABRICS.
- SUPPORT THE STANDARD STRENGTH FILTER FABRIC BY WIRE MESH FASTENED SECURELY TO THE UPSLOPE SIDE OF THE POSTS. EXTEND THE WIRE MESH SUPPORT TO THE BOTTOM THE TRENCH. FASTEN THE WIRE REINFORCEMENT, THEN FABRIC ON THE UPSLOPE SIDE OF THE FENCE POST. WIRE OR PLASTIC ZIP TIES SHOULD HAVE A MINIMUM 50 POUND TENSILE STRENGTH.
- WHEN A WIRE MESH SUPPORT FENCE IS USED, SPACE POSTS A MAXIMUM OF 8 FT APART. SUPPORT POSTS SHOULD BE DRIVEN SECURELY INTO THE GROUND A MINIMUM OF 2 FT.
- EXTRA STRENGTH FILTER FABRIC WITH 6 FT POST SPACINGS DOES NOT REQUIRE WIRE MESH SUPPORT FENCE.
- EXCAVATE A TRENCH APPROXIMATELY 4 INCHES WIDE AND 8 INCHES DEEP ALONG THE PROPOSE LINE OF POSTS AND UPSLOPE OF THE BARRIER.
- PLACE 12 INCHES OF FABRIC ALONG THE BOTTOM AND SIDE OF THE TRENCH.
- BACKFILL THE TRENCH WITH SOIL PLACED OVER THE FILTER FABRIC AND COMPACT. THOROUGH COMPACTION OF THE BACKFILL IS CRITICAL TO SILT FENCE PERFORMANCE.
- DO NOT ATTACH FILTER FABRIC TO EXISTING TREES.
- CONSTRUCTION SITE RUNOFF SHALL NOT RUN PARALLEL WITH THE FENCE.
- END OF SILT FENCE NEEDS TO BE TURNED UP HILL.
- SEE SECTION 6.62.1 OF NC DEMLR'S EROSION AND SEDIMENT CONTROL DESIGN MANUAL (2013) FOR ADDITIONAL INFORMATION, NOTES AND SPECIFICATIONS.



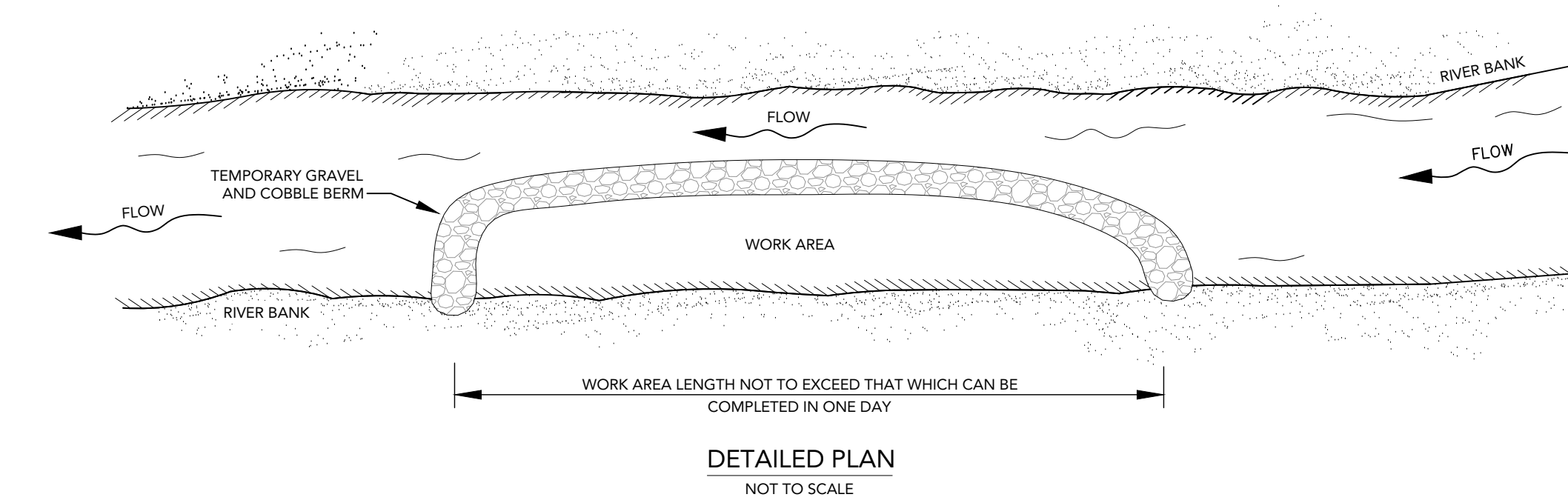
TEMPORARY SILT FENCE DETAIL

TEMPORARY STREAM CROSSING NOTES

- ALL TEMPORARY STREAM CROSSING WORK SHALL TAKE PLACE DURING DRY WORKING CONDITIONS. THE CONTRACTOR SHALL MINIMIZE THE EXPORT OF SEDIMENT TO ADJACENT SURFACE WATERS TO THE MAXIMUM EXTENT PRACTICABLE.
- THE CONTRACTOR SHALL SELECT A STRUCTURE AND MATERIAL FOR THE CROSSING THAT IS SUFFICIENT TO SUPPORT ALL EQUIPMENT (LOADED) ON THE SITE.
- KEEP CLEARING AND EXCAVATION OF THE STREAMBANKS AND BED AND APPROACH SECTIONS TO A MINIMUM.
- THE CROSSING SHALL PROVIDE A CLEAR SPAN OF THE CHANNEL WITH SMOOTH TRANSITIONS ON INGRESS AND EGRESS POINTS.
- KEEP STREAM CROSSING AT RIGHT ANGLES TO THE STREAM FLOW.
- ALIGN ROAD APPROACHES WITH THE CENTERLINE OF THE CROSSING FOR A MINIMUM DISTANCE OF 30 FT. RAISE ABUTMENTS AND CULVERT FILLS A MINIMUM OF 1 FT ABOVE THE ADJOINING APPROACH SECTION TO PREVENT EROSION FROM SURFACE RUNOFF AND TO ALLOW FLOOD FLOWS AROUND THE STRUCTURE.
- ALL STREAMBANKS AND BED MATERIAL DISTURBED DURING INSTALLATION OF THE CROSSING SHALL BE STABILIZED WITH TEMPORARY SEEDING AND EROSION CONTROL MATTING OR RIPRAP. COIR EROSION CONTROL WATTLES SHALL BE INSTALLED AT ALL INGRESS AND EGRESS POINTS AS SHOWN IN THE DRAWINGS.
- REMOVE TEMPORARY STREAM CROSSINGS IMMEDIATELY WHEN THEY ARE NO LONGER NEEDED. RESTORE THE STREAM CHANNEL TO ITS ORIGINAL CROSS-SECTION, AND SMOOTH AND APPROPRIATELY STABILIZE ALL DISTURBED AREAS.
- RE-DRESSING OF CHANNEL AND BANKFULL BENCH/FLOODPLAIN WILL LIKELY BE REQUIRED FOLLOWING REMOVAL OF THE CROSSING AND SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.
- SEE SECTION 6.70.1 OF NC DEMLR'S EROSION AND SEDIMENT CONTROL DESIGN MANUAL (2013) FOR ADDITIONAL INFORMATION, NOTES AND SPECIFICATIONS.



TEMPORARY STREAM CROSSING DETAIL



TEMPORARY IN-STREAM DIVERSION NOTES

- ALL WORK IN OR ADJACENT TO STREAMS SHALL BE CONDUCTED SUCH THAT THE FLOWING STREAM DOES NOT COME IN CONTACT WITH THE DISTURBED WORK AREA.
- CONSTRUCT A TEMPORARY IN-STREAM DIVERSION USING GRAVEL AND COBBLE FROM THE RIVER BED TO CREATE A BERM. DIVERTS FLOW AROUND THE WORK AREA SUCH THAT IN-STREAM FLOWS DO NOT INTERACT WITH DISTURBED EARTH AND CONSTRUCTION MATERIALS.
- CONSTRUCTION SHALL BE TIMED TO OCCUR DURING TIMES OF LOW FLOW.
- CONSTRUCTION SCHEDULING AND STAGING SHALL BE TIMED TO MINIMIZE THE AMOUNT OF TIME SPENT WORKING IN THE RIVER CHANNEL.
- THE RIVERBANKS, IN-STREAM STRUCTURES AND WORK AREA MUST BE STABILIZED AT THE END OF EACH DAY BEFORE THE TEMPORARY BERMS ARE REMOVED AND FLOW IS RETURNED TO THE FULL CHANNEL.

TEMPORARY IN-STREAM DIVERSION DETAIL

PERMIT  
DRAWING

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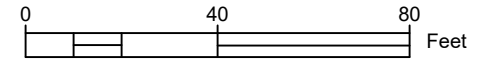
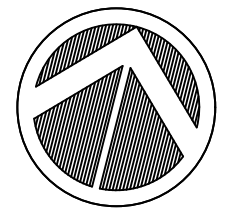
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AVL WTP MILLS RIVER BANK RESTORATION  
HENDERSON COUNTY - NORTH CAROLINA

RIVER BANK RESTORATION PLAN STA 0+00 TO 10+00



RIVER BANK RESTORATION PLAN LEGEND

---	LOD	PARCEL BOUNDARY		BOULDER TOE REVETMENT
---	---	EXISTING MAJOR CONTOUR		TOE WOOD REVETMENT
---	---	EXISTING MINOR CONTOUR		SOIL LIFTS
---	---	RIVER TOP OF BANK		RIVER BANK GRADING
---	- - -	RIVER CENTERLINE		LEVEE BREACH AREA
---	---	GRADING LIMITS		DEBRIS REMOVAL
---	FW	FEMA FLOODWAY		
---	- - - - -	UTILITY EASEMENT		
---	OHE	OVERHEAD ELECTRICAL (OHE)		

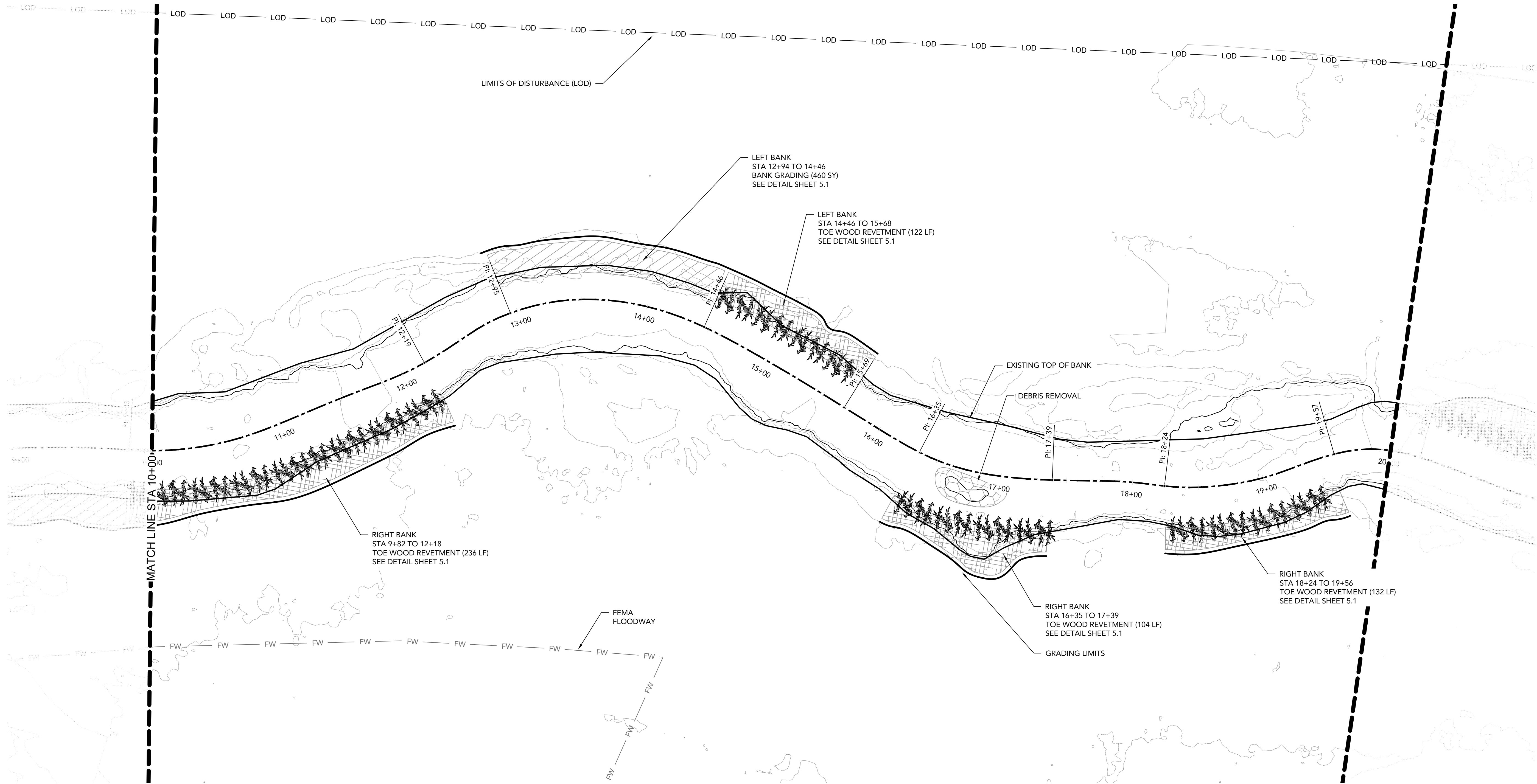
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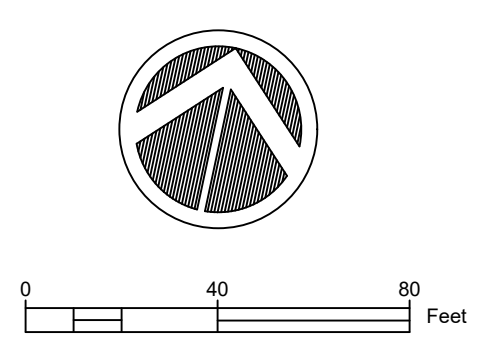
**AVL WTP MILLS RIVER BANK RESTORATION  
HENDERSON COUNTY - NORTH CAROLINA**

RIVER BANK RESTORATION PLAN STA 10+00 TO 20+00



**RIVER BANK RESTORATION PLAN LEGEND**

— LOD —	LIMITS OF DISTURBANCE		BOULDER TOE REVETMENT
— — — —	EXISTING MAJOR CONTOUR		TOE WOOD REVETMENT
— — — —	EXISTING MINOR CONTOUR		SOIL LIFTS
— — — —	RIVER TOP OF BANK		RIVER BANK GRADING
— — — —	RIVER CENTERLINE		LEVEE BREECH AREA
— — — —	GRADING LIMITS		DEBRIS REMOVAL
— FW —	FEMA FLOODWAY		
— — — —	UTILITY EASEMENT		
— OHE —	OVERHEAD ELECTRICAL (OHE)		



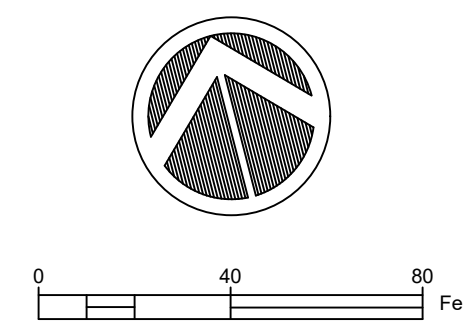
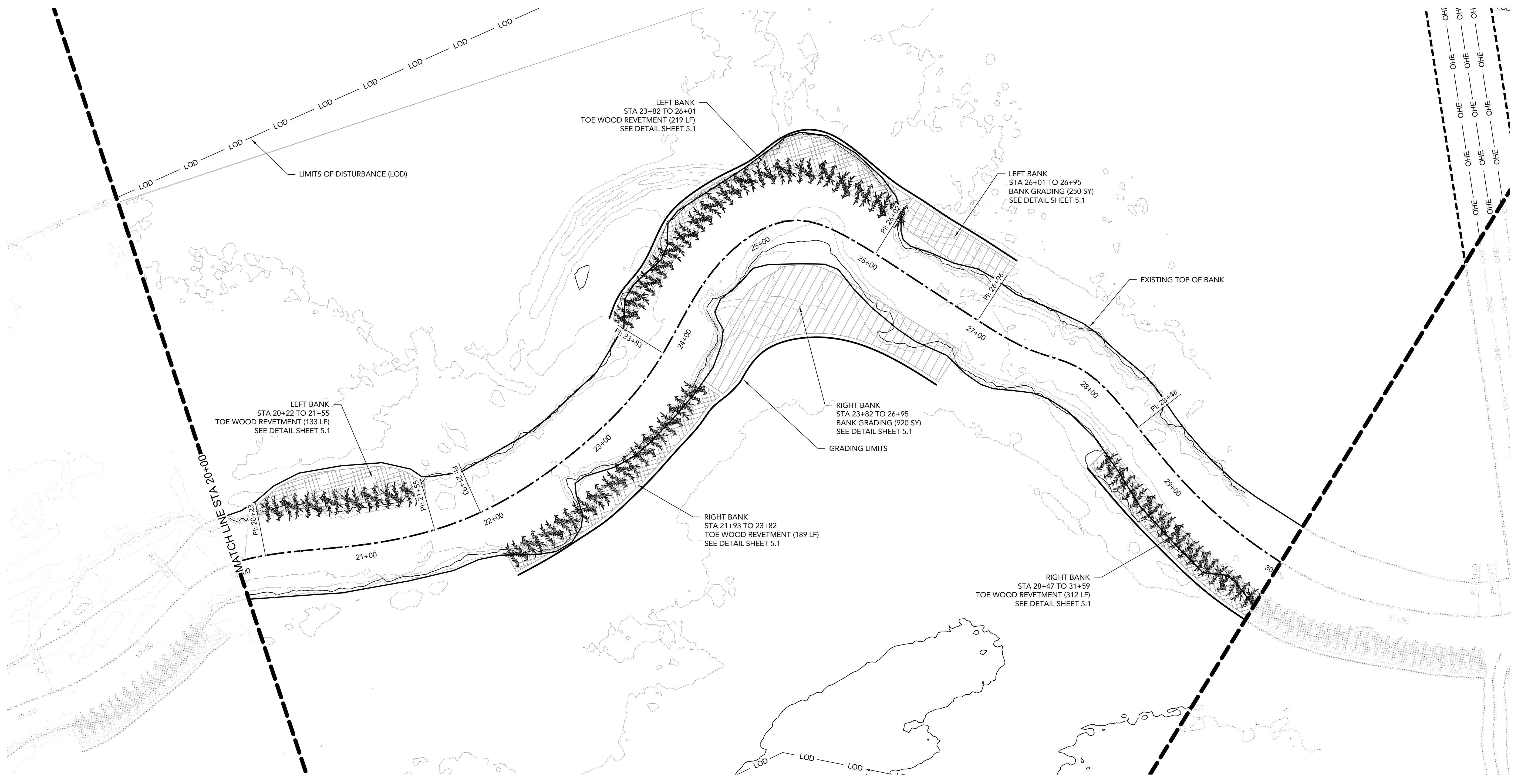
**PERMIT  
DRAWING**

REVISIONS:


DATE: 04/22/2021  
PLOT SIZE: 24" x 36"  
1" = 40'  
H.D.: NAD83 (SCSP)  
V.D.: NAVD88  
JE PID: 2703

**AVL WTP MILLS RIVER BANK RESTORATION  
HENDERSON COUNTY - NORTH CAROLINA**

RIVER BANK RESTORATION PLAN STA 20+00 TO 30+00



**RIVER BANK RESTORATION PLAN LEGEND**

- |                        |                           |                       |
|------------------------|---------------------------|-----------------------|
| LOD                    | LIMITS OF DISTURBANCE     | BOULDER TOE REVETMENT |
| EXISTING MAJOR CONTOUR |                           | TOE WOOD REVETMENT    |
| EXISTING MINOR CONTOUR |                           | SOIL LIFTS            |
| RIVER TOP OF BANK      |                           | RIVER BANK GRADING    |
| RIVER CENTERLINE       |                           | LEVEE BREECH AREA     |
| GRADING LIMITS         |                           | DEBRIS REMOVAL        |
| FW                     | FEMA FLOODWAY             |                       |
| UTILITY EASEMENT       |                           |                       |
| OHE                    | OVERHEAD ELECTRICAL (OHE) |                       |

**PERMIT  
DRAWING**

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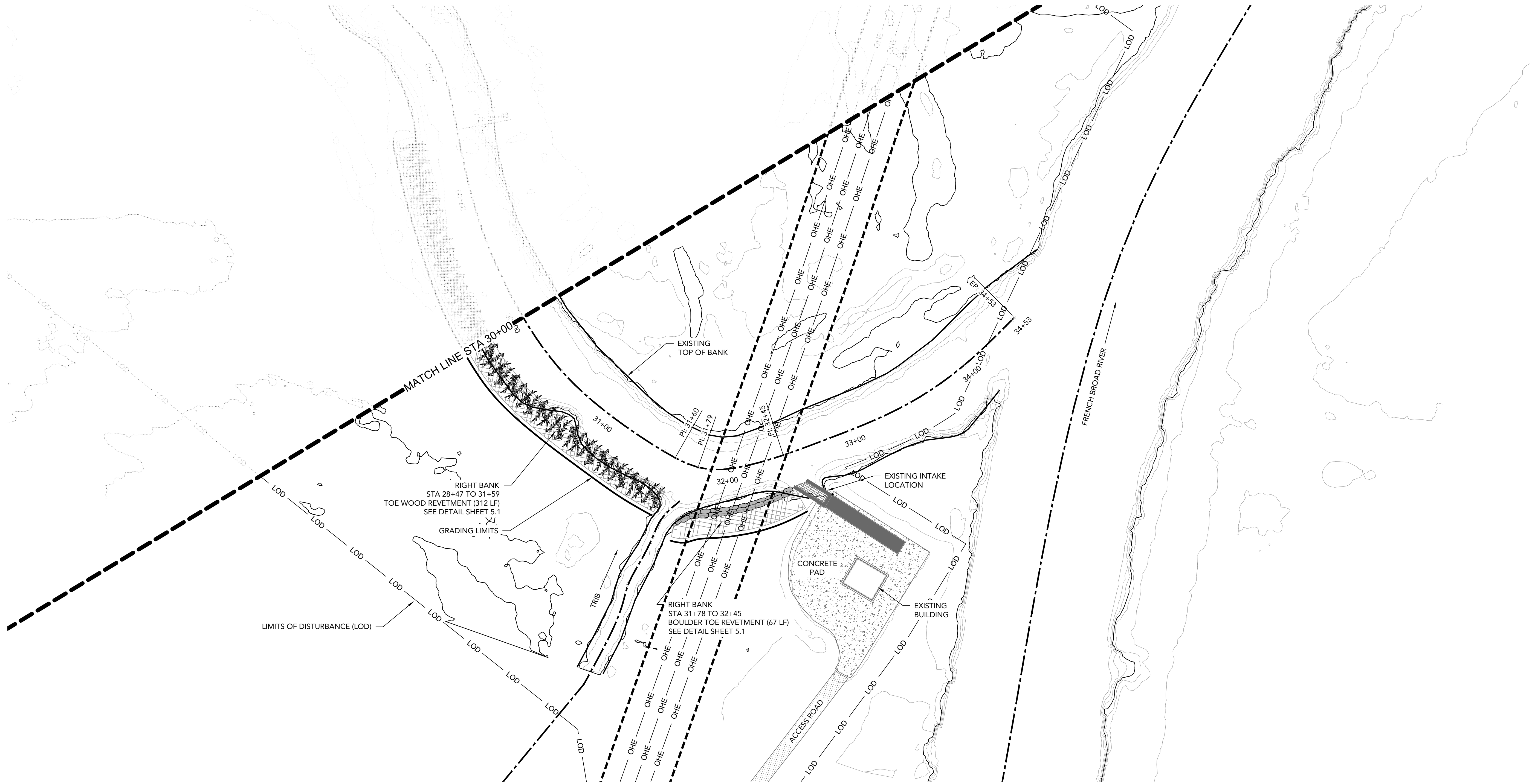
AVL WTP MILLS RIVER BANK RESTORATION  
HENDERSON COUNTY - NORTH CAROLINA

RIVER BANK RESTORATION PLAN STA 30+00 TO 34+53

PERMIT  
DRAWING

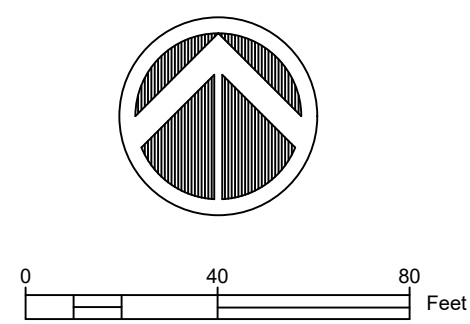
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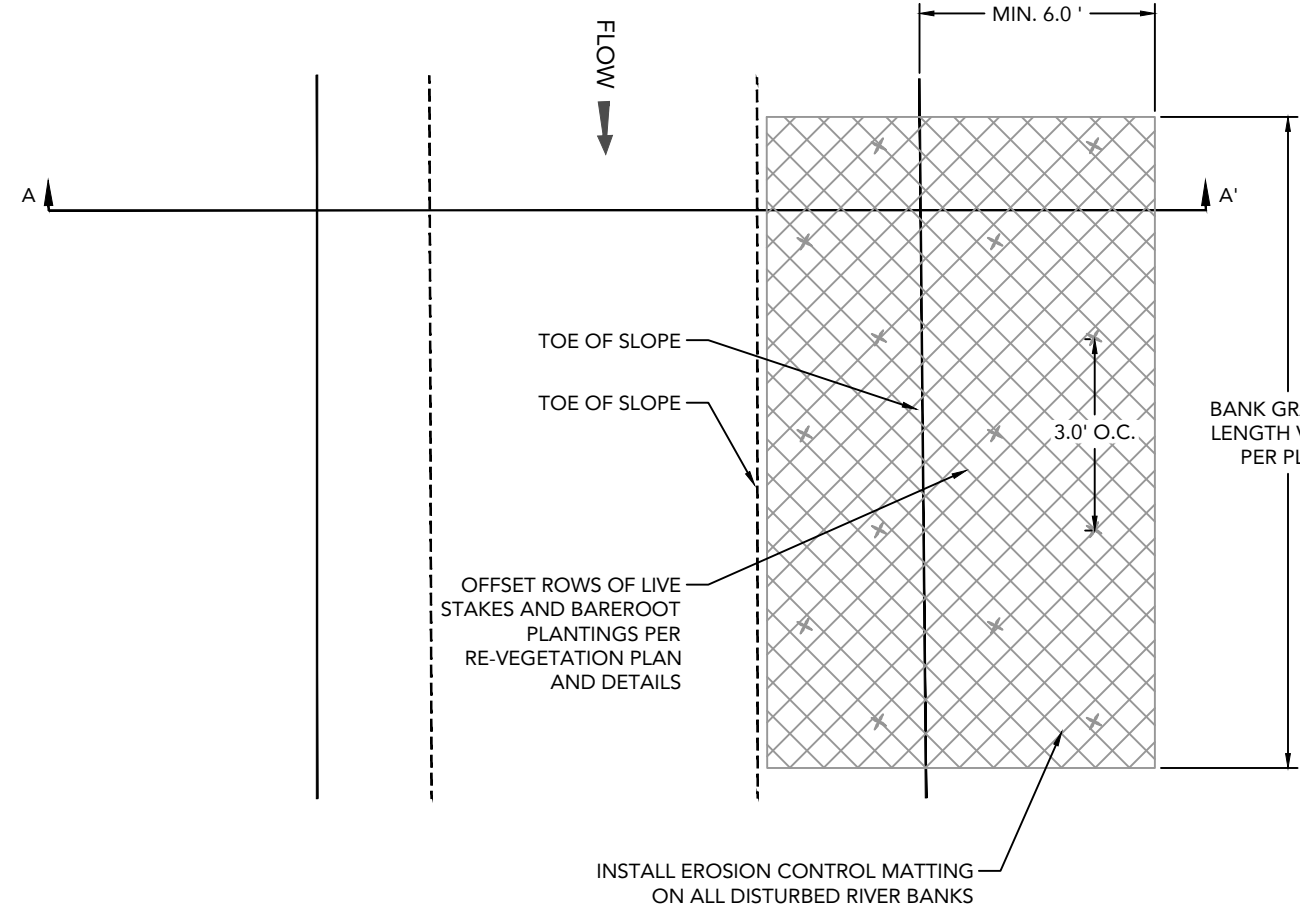
RIVER BANK RESTORATION PLAN LEGEND

- |           |                           |  |                       |
|-----------|---------------------------|--|-----------------------|
| — LOD —   | LIMITS OF DISTURBANCE     |  | BOULDER TOE REVETMENT |
| — — — — — | EXISTING MAJOR CONTOUR    |  | TOE WOOD REVETMENT    |
| — — — — — | EXISTING MINOR CONTOUR    |  | SOIL LIFTS            |
| — — — — — | RIVER TOP OF BANK         |  | RIVER BANK GRADING    |
| — — — — — | RIVER CENTERLINE          |  | LEVEE BREACH AREA     |
| — — — — — | GRADING LIMITS            |  | DEBRIS REMOVAL        |
| — FW —    | FEMA FLOODWAY             |  |                       |
| — — — — — | UTILITY EASEMENT          |  |                       |
| — OHE —   | OVERHEAD ELECTRICAL (OHE) |  |                       |

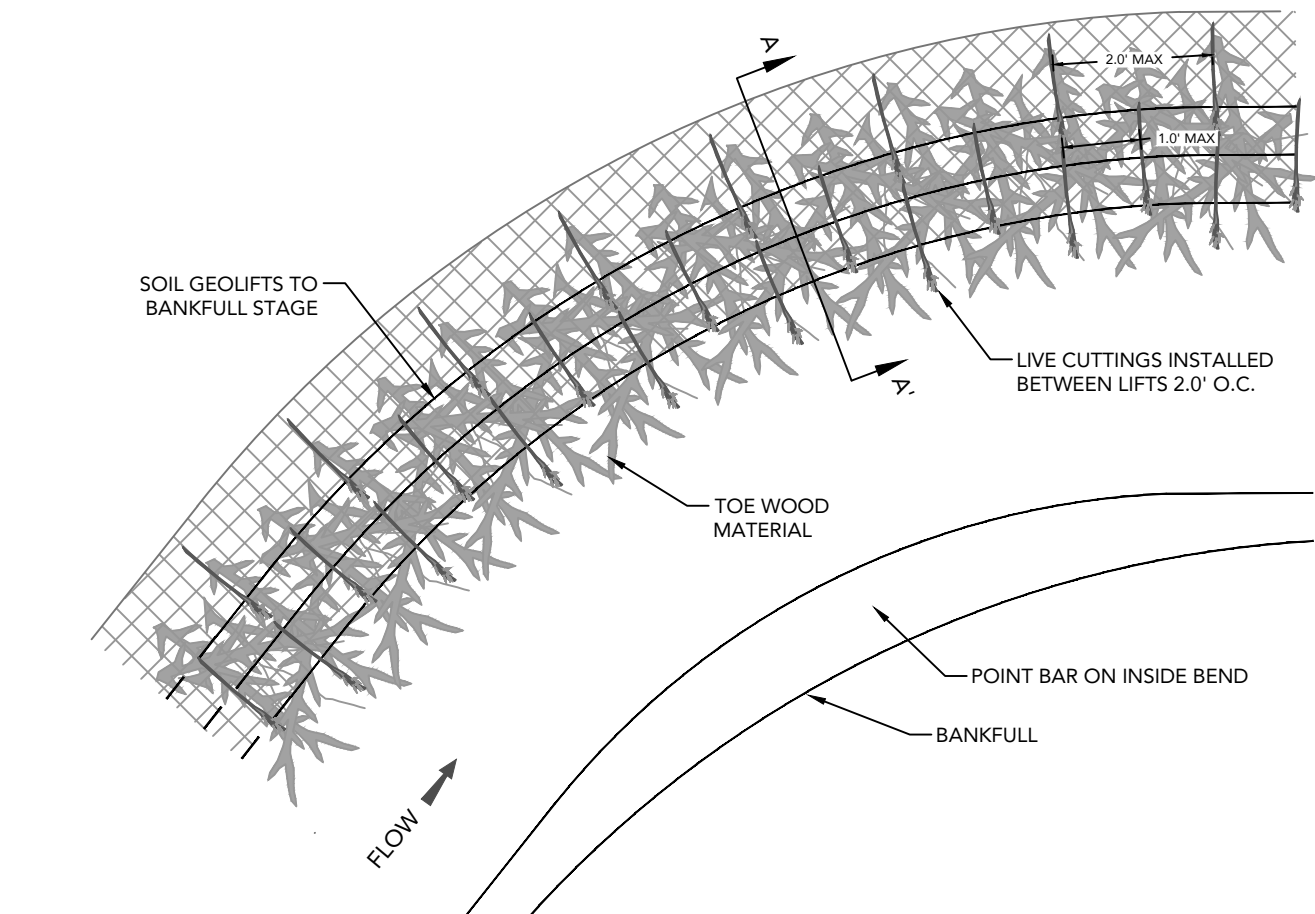


### RIVER BANK GRADING NOTES

1. BANK GRADING AREAS ALONG THE MILLS RIVER HAVE BEEN IDENTIFIED IN THE DRAWINGS. THE LENGTH AND EXTENT OF THE BANK GRADING AREAS VARIES WITHIN THE SITE. FOUR (4) PROPOSED BANK GRADING LOCATIONS ARE SHOWN ON THE PLANSHEETS.
2. ALL BANK GRADING WORK SHALL TAKE PLACE DURING DRY WORKING CONDITIONS. THE CONTRACTOR SHALL MINIMIZE THE EXPORT OF SEDIMENT TO ADJACENT SURFACE WATERS TO THE MAXIMUM EXTENT PRACTICABLE BY USING ADDITIONAL E88C MEASURES AS NEEDED OR AS DIRECTED BY THE ENGINEER ONSITE.
3. FOR IMPLEMENTATION, THE CONTRACTOR SHALL GRADE THE RIVER BANK FROM THE EXISTING TOE OF SLOPE AT 3:1 TO THE ELEVATIONS AND GRADES MATCHING THE SURROUNDING AREA. ALL EXCAVATE MATERIAL SHALL HAULED AND PLACED IN DESIGNATED FILL AREAS ONSITE.
4. IF RIVER BANK MATERIAL IS NOT SUITABLE FOR PLANTING AND RE-VEGETATION, 2" TO 3" OF TOPSOIL SHALL BE INSTALLED IN THE BANK GRADING AREA.
5. TRANSPLANTS AVAILABLE ONSITE MAY BE INSTALLED IN THE TOPSOIL AS DIRECTED BY THE ENGINEER ON SITE.
6. THE SURFACE OF THIS FEATURE SHALL BE FINISHED TO A SMOOTH AND COMPACT SURFACE IN ACCORDANCE WITH THE LINES, GRADES, AND CROSS-SECTIONS OR ELEVATIONS SHOWN ON THE DRAWINGS.
7. STABILIZATION OF THE WORK AREA WITH TEMPORARY AND PERMANENT SEEDING AND MULCHING IS REQUIRED FOLLOWING GRADING OF THE RIVER BANK. INSTALL WOODY PLANTING AND VEGETATION AS SHOWN ON SHEET 5.1.



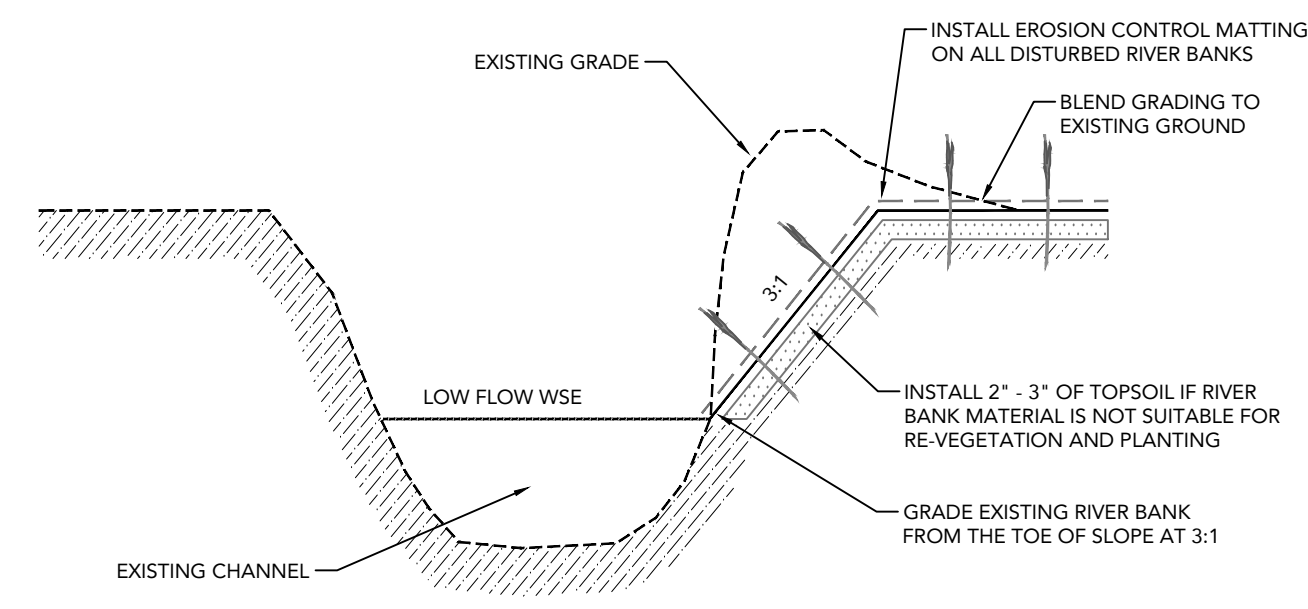
DETAILED PLAN  
NOT TO SCALE



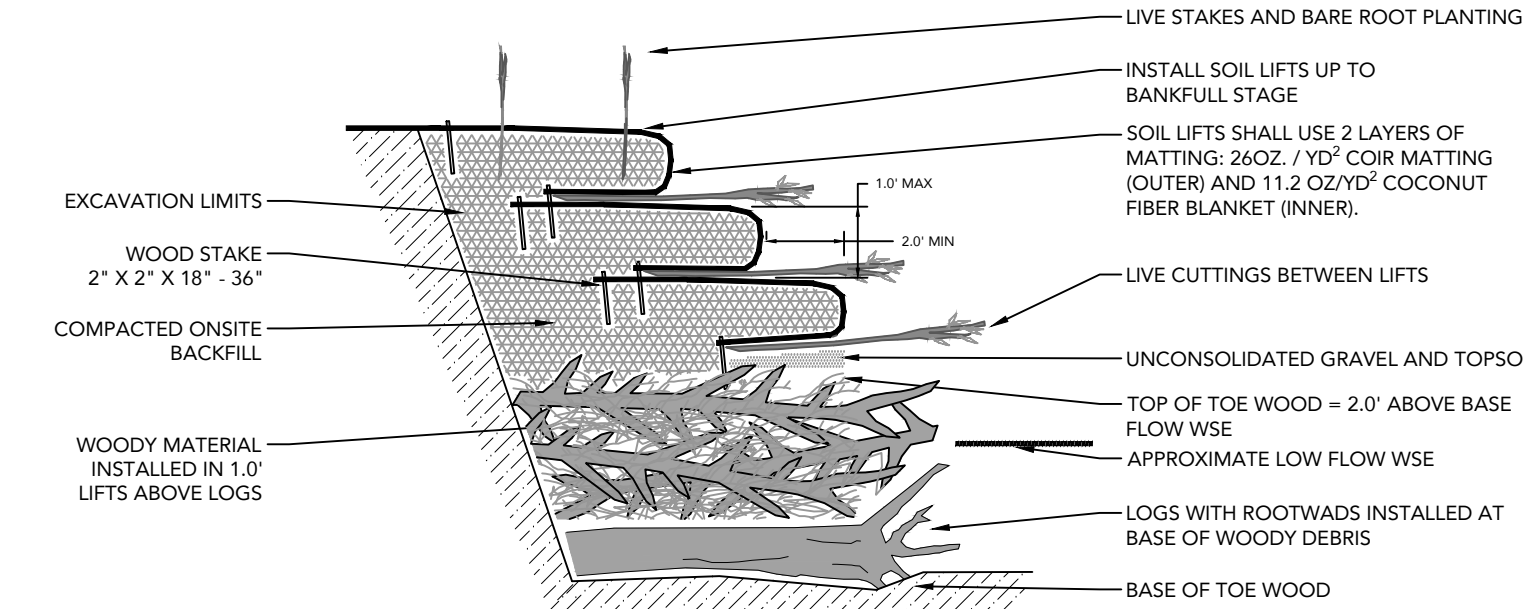
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### TOE WOOD NOTES

1. WOODY MATERIAL USED IN THE TOE WOOD STRUCTURE SHALL CONSIST OF LOGS, LARGE BRANCHES AND WOODY DEBRIS RANGING IN DIAMETER FROM 1" TO 12". LARGE VOIDS SHALL BE FILLED WITH FINE WOODY MATERIAL AND DEBRIS. ALL MATERIALS ARE TO BE APPROVED BY THE ENGINEER. A LAYER OF LOGS WITH WOODY WADS INTACT SHALL BE INSTALLED ALONG THE BASE OF THE STRUCTURE. WOODY MATERIAL SHALL BE INSTALLED IN 1.0' LIFTS. EACH LIFT SHALL BE COMPACTED WITH THE EXCAVATOR BUCKET AND COVERED WITH A LAYER OF ALLUVIUM OR MIXED SOIL AND GRAVEL TO FORM A DENSE LAYER OF WOODY MATERIAL AND ALLUVIUM TO LINES, ELEVATIONS AND GRADES IN THE DRAWINGS.
2. UNCONSOLIDATED GRAVEL AND TOPSOIL SHALL BE INSTALLED ABOVE WOODY MATERIAL BEFORE THE LIVE CUTTINGS AND SOIL LIFTS ARE INSTALLED.
3. PLACE LAYER OF LIVE CUTTINGS (MIN. 4' LENGTH) A 2.0' O.C. ON THE GRAVEL AND TOPSOIL SUCH THAT APPROXIMATELY 6 INCHES TO 1 FOOT OF EACH LIVE BRANCH WILL BE EXPOSED AND THE REMAINDER (2' TO 4') OF EACH LIVE BRANCH WILL BE COVERED BY THE SOIL LIFT. LIVE BRANCHES SHALL BE OF THE SPECIES SPECIFIED FOR LIVE STAKES OR APPROVED BY THE ENGINEER.
4. INSTALL SOIL LIFTS FROM THE LIVE CUTTINGS UP TO THE BANKFULL STAGE. LIFTS SHALL NOT EXCEED 1.0' THICKNESS. LIFTS SHALL INCLUDE ALL SOIL PREPARATION, TEMPORARY AND PERMANENT SEEDING AND MULCH. SOIL LIFTS SHALL USE 2 LAYERS OF MATTING: 26OZ./YD<sup>2</sup> COIR MATTING (OUTER) AND 11.2 OZ/YD<sup>2</sup> COCONUT FIBER BLANKET (INNER). EROSION CONTROL MATTING USED FOR SOIL LIFTS SHALL BE MADE OF 100% NATURAL FIBERS AND MATERIALS AND BE BIODEGRADABLE UNDER NORMAL CLIMATE CONDITIONS. EROSION CONTROL MATTING CONTAINING PLASTICS OR PLASTIC BASED MATERIALS SHALL NOT BE USED.
5. PLACE SOIL BACKFILL UP TO THE LIFT HEIGHT SPECIFIED OF NO GREATER THAN 1.0 FT BEING CAREFUL NOT TO PUSH/PULL OR TEAR THE FABRIC PREVIOUSLY PLACED.
6. REPEAT STEPS #3, #4 AND #5 AS NEEDED TO INSTALL SOIL LIFTS UP TO THE BANKFULL STAGE.
7. THE SURFACE OF THIS STRUCTURE SHALL BE FINISHED TO A SMOOTH AND COMPACT SURFACE IN ACCORDANCE WITH THE LINES, GRADES, AND CROSS-SECTIONS OR ELEVATIONS SHOWN ON THE DRAWINGS. THE DEGREE OF FINISH FOR ELEVATIONS SHALL BE WITHIN 0.1 FT OF THE GRADES AND ELEVATIONS INDICATED OR APPROVED BY THE ENGINEER.
8. RE-DRESSING OF CHANNEL AND BANKFULL BENCH/FLOODPLAIN WILL LIKELY BE REQUIRED FOLLOWING INSTALLATION OF IN-STREAM STRUCTURES AND SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.



DETAILED SECTION A - A  
NOT TO SCALE



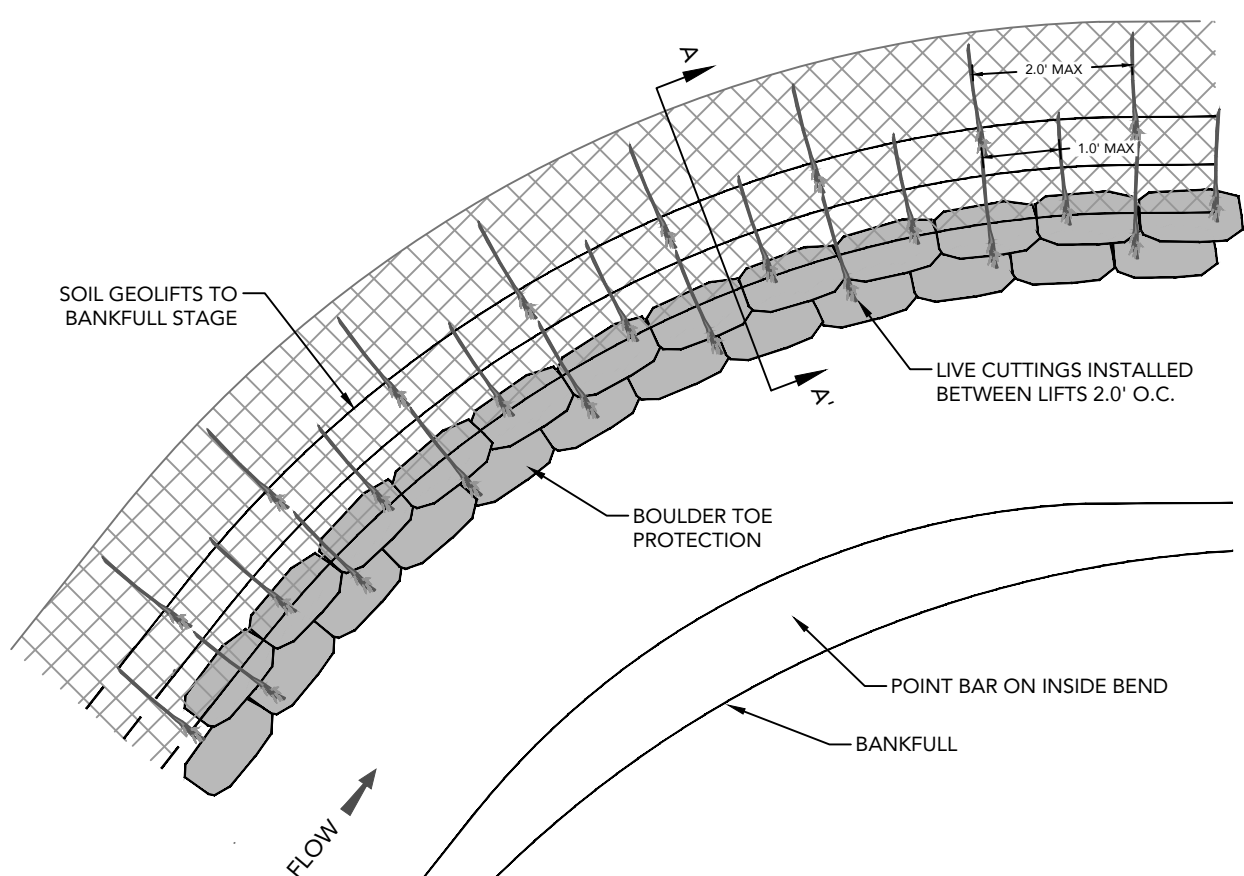
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### TOE WOOD DETAIL

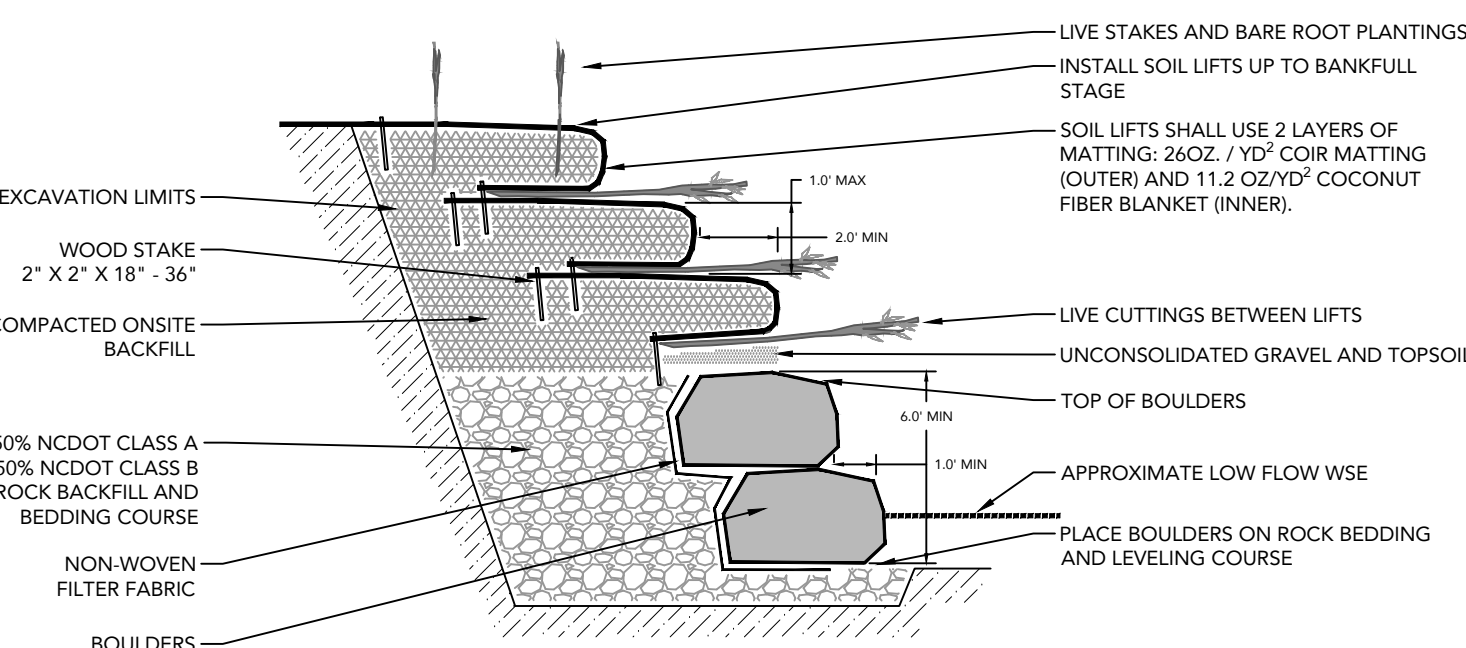
### RIVER BANK GRADING DETAIL

### BOULDER TOE NOTES

1. ALL BOULDERS SHALL BE STRUCTURAL STONE, CUBICAL OR RECTANGULAR IN SHAPE. BOULDERS AVAILABLE ONSITE MAY BE USED IF APPROVED BY THE ENGINEER. BOULDERS SHALL BE 3.0' X 5.0' X 2.5' (W X L X H) +/- 0.5'. THE MINIMUM ACCEPTABLE BOULDER THICKNESS (H) IS 2.0'. BOULDERS LONGER (L) THAN 5.5' WILL BE ACCEPTED.
2. A BEDDING COURSE CONSISTING OF 50% NCDOT CLASS B AND 50% NCDOT CLASS A SHALL BE INSTALLED BELOW THE FIRST ROW OF BOULDERS. IF BEDROCK IS ENCOUNTERED ONSITE, THE FIRST LIFT OF BOULDERS SHALL BE PLACED DIRECTLY ON THE BEDROCK. ALL BOULDERS SHALL FIT TIGHTLY TOGETHER. INSTALL EACH LIFT OF BOULDERS WITH A 0.5' SETBACK FROM THE FRONT EDGE OF THE PREVIOUS LIFT OF BOULDERS.
3. UNCONSOLIDATED GRAVEL AND TOPSOIL SHALL BE INSTALLED AS A LEVELING COURSE THE ABOVE BOULDERS BEFORE THE LIVE CUTTINGS AND SOIL LIFTS ARE INSTALLED.
4. PLACE LAYER OF LIVE CUTTINGS (MIN. 4' LENGTH) A 1.0' O.C. ON THE GRAVEL AND TOPSOIL SUCH THAT APPROXIMATELY 6 INCHES TO 1 FOOT OF EACH LIVE BRANCH WILL BE EXPOSED AND THE REMAINDER (2' TO 4') OF EACH LIVE BRANCH WILL BE COVERED BY THE SOIL LIFT. LIVE BRANCHES SHALL BE OF THE SPECIES SPECIFIED FOR LIVE STAKES OR APPROVED BY THE ENGINEER.
5. INSTALL SOIL LIFTS FROM THE LIVE CUTTINGS UP TO THE BANKFULL STAGE. LIFTS SHALL NOT EXCEED 1.0' THICKNESS. LIFTS SHALL INCLUDE ALL SOIL PREPARATION, TEMPORARY AND PERMANENT SEEDING AND MULCH. SOIL LIFTS SHALL USE 2 LAYERS OF MATTING: 26OZ./YD<sup>2</sup> COIR MATTING (OUTER) AND 11.2 OZ/YD<sup>2</sup> COCONUT FIBER BLANKET (INNER). EROSION CONTROL MATTING USED FOR SOIL LIFTS SHALL BE MADE OF 100% NATURAL FIBERS AND MATERIALS AND BE BIODEGRADABLE UNDER NORMAL CLIMATE CONDITIONS. EROSION CONTROL MATTING CONTAINING PLASTICS OR PLASTIC BASED MATERIALS SHALL NOT BE USED.
6. PLACE SOIL BACKFILL UP TO THE LIFT HEIGHT SPECIFIED OF NO GREATER THAN 1.0 FT BEING CAREFUL NOT TO PUSH/PULL OR TEAR THE FABRIC PREVIOUSLY PLACED.
7. REPEAT STEPS #4, #5 AND #6 AS NEEDED TO INSTALL SOIL LIFTS UP TO THE BANKFULL STAGE.
8. THE SURFACE OF THIS STRUCTURE SHALL BE FINISHED TO A SMOOTH AND COMPACT SURFACE IN ACCORDANCE WITH THE LINES, GRADES, AND CROSS-SECTIONS OR ELEVATIONS SHOWN ON THE DRAWINGS. THE DEGREE OF FINISH FOR ELEVATIONS SHALL BE WITHIN 0.1 FT OF THE GRADES AND ELEVATIONS INDICATED OR APPROVED BY THE ENGINEER.
9. RE-DRESSING OF CHANNEL AND BANKFULL BENCH/FLOODPLAIN WILL LIKELY BE REQUIRED FOLLOWING INSTALLATION OF IN-STREAM STRUCTURES AND SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.

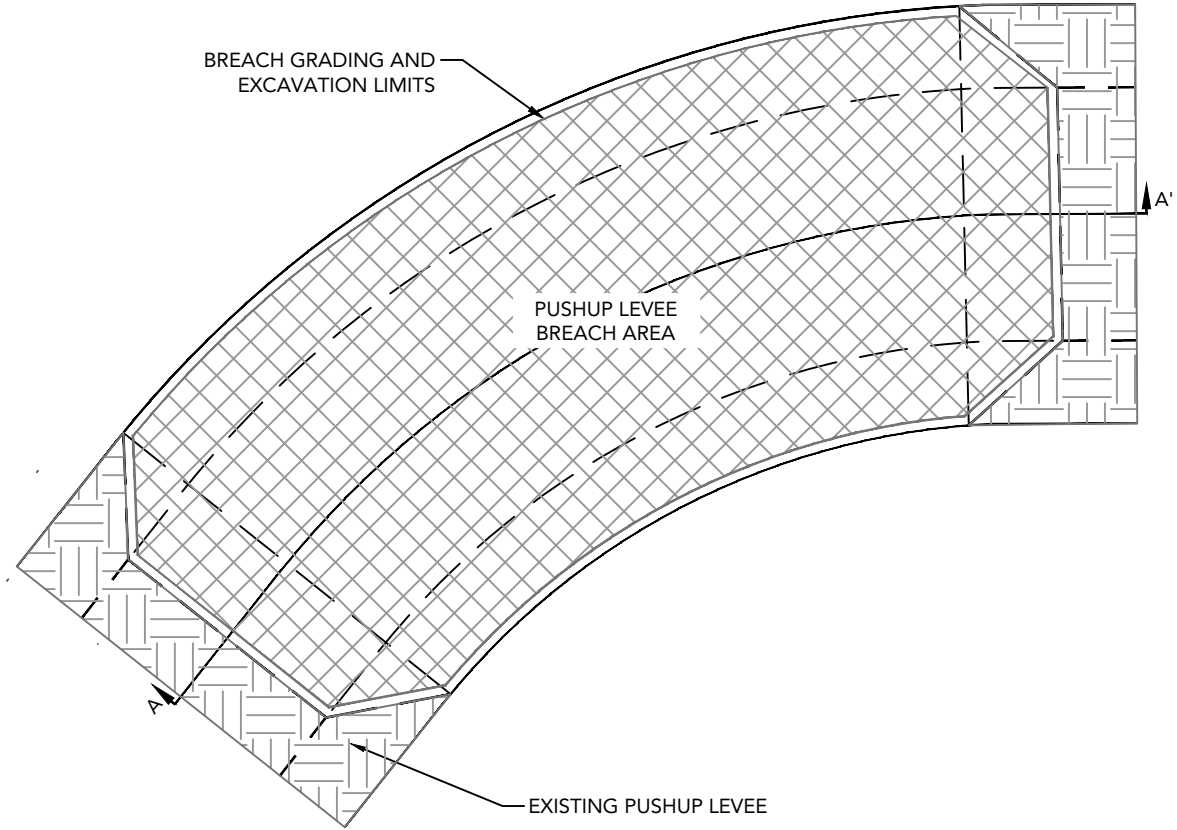


DETAILED PLAN  
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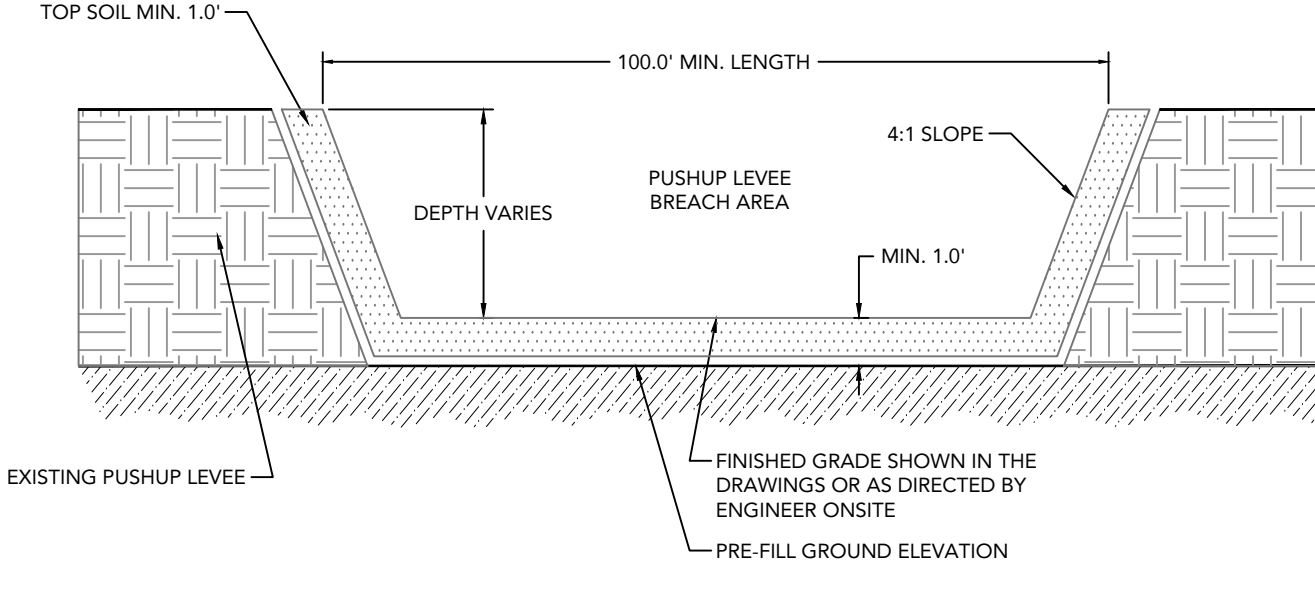
DETAILED SECTION A - A  
NOT TO SCALE

### BOULDER TOE DETAIL



### LEVEE BREACH NOTES

1. PUSHUP LEVEES ARE LOCATED ON THE PARCEL ALONG THE FRENCH BROAD RIVER. THE HEIGHT AND LENGTH OF THE LEVEES VARIES WITHIN THE SITE. FIVE PROPOSED BREACH LOCATIONS ARE SHOWN ON THE PLANSHEETS.
2. ALL LEVEE BREACH WORK SHALL TAKE PLACE DURING DRY WORKING CONDITIONS. THE CONTRACTOR SHALL MINIMIZE THE EXPORT OF SEDIMENT TO ADJACENT SURFACE WATERS TO THE MAXIMUM EXTENT PRACTICABLE BY USING ADDITIONAL E88C MEASURES AS NEEDED OR AS DIRECTED BY THE ENGINEER ONSITE.
3. FOR IMPLEMENTATION, THE CONTRACTOR SHALL EXCAVATE THE BREACH AREA BY CUTTING THE EXISTING LEVEE AT 4:1 SLOPE TO GRADES MATCHING THE SURROUNDING AREA. ALL EXCAVATE MATERIAL SHALL HAULED AND PLACED IN DESIGNATED FILL AREAS ONSITE.
4. TOP SOIL SUITABLE FOR ESTABLISHING NATIVE VEGETATION SHALL BE INSTALLED IN THE LEVEE BREACH AREA TO A MINIMUM DEPTH OF 1.0'.
5. TRANSPLANTS AVAILABLE ONSITE MAY BE INSTALLED IN THE TOP SOIL AS DIRECTED BY THE ENGINEER ON SITE.
6. THE SURFACE OF THIS FEATURE SHALL BE FINISHED TO A SMOOTH AND COMPACT SURFACE IN ACCORDANCE WITH THE LINES, GRADES, AND CROSS-SECTIONS OR ELEVATIONS SHOWN ON THE DRAWINGS.
7. STABILIZATION OF THE WORK AREA WITH TEMPORARY AND PERMANENT SEEDING AND MULCHING IS REQUIRED FOLLOWING EXCAVATION OF THE LEVEE BREACH AREA. INSTALL WOODY PLANTING AND VEGETATION AS SHOWN ON SHEET 5.1.

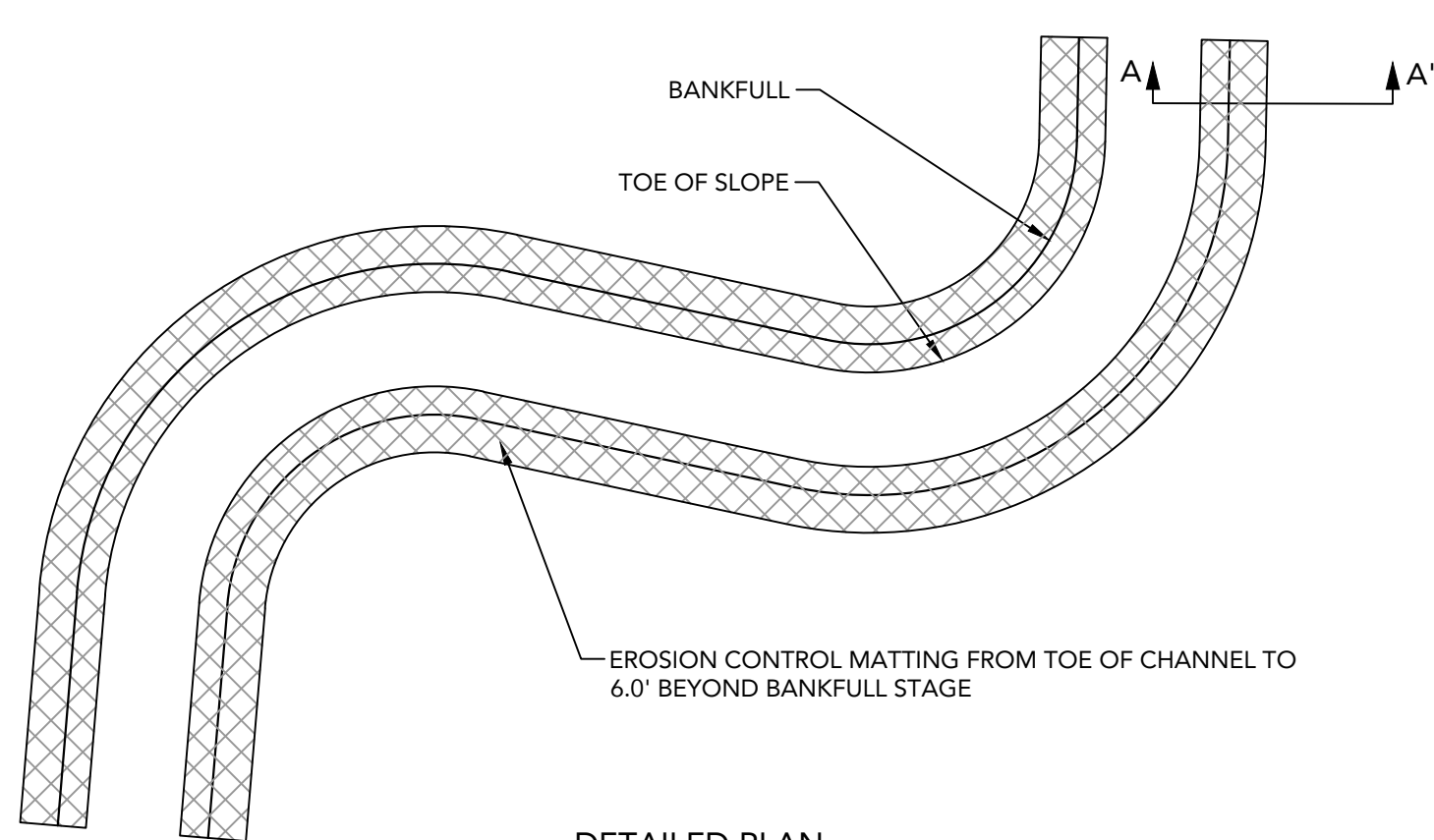


### LEVEE BREACH DETAIL

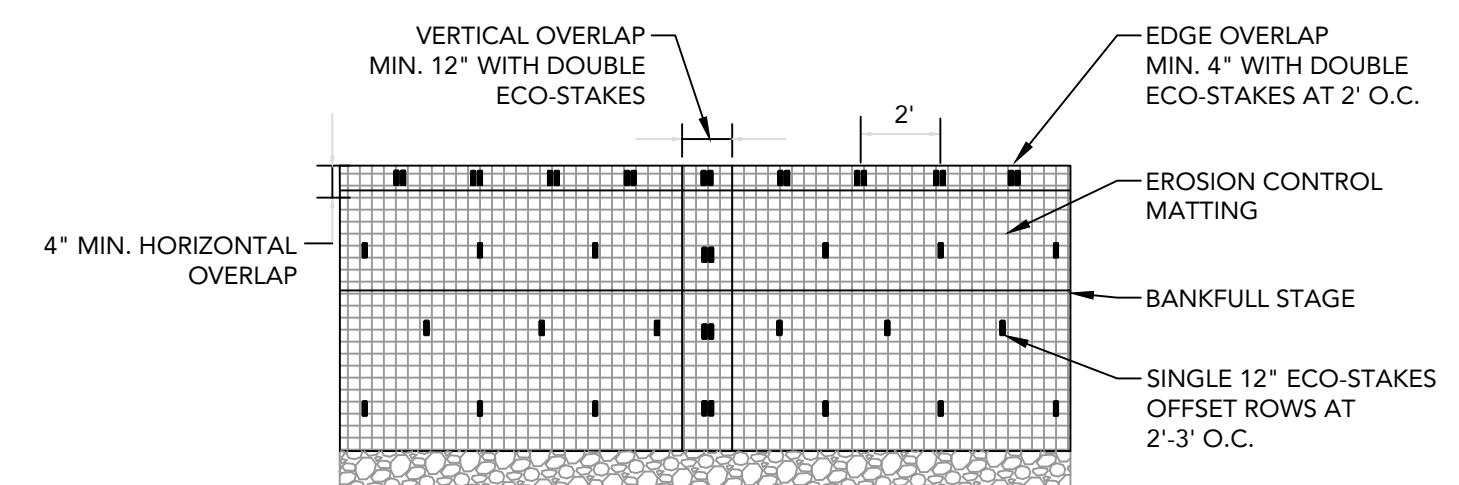
PERMIT DRAWING

REVISIONS:

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PLOT SIZE: 24" x 36"  
NTS  
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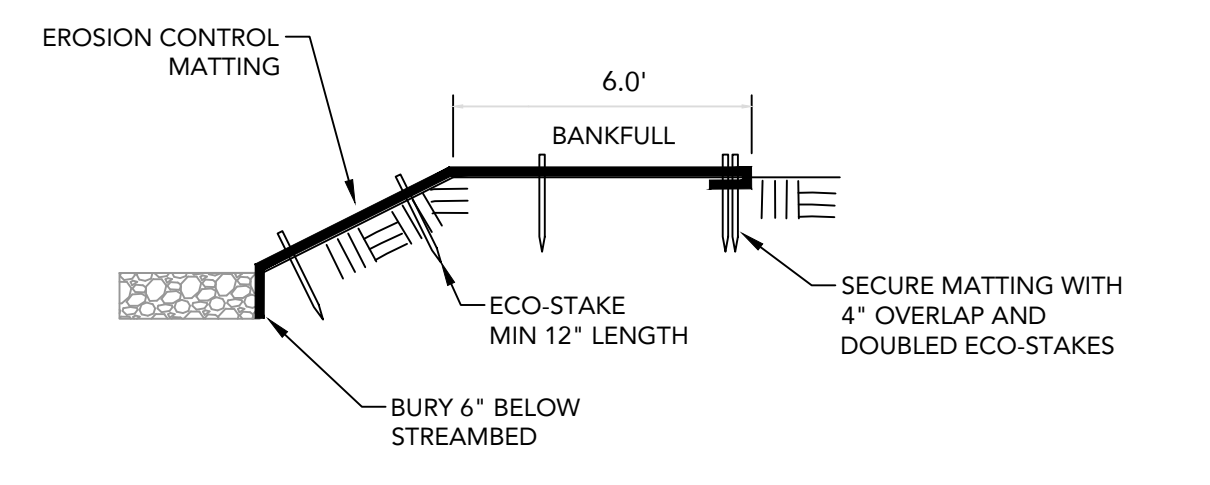
DETAILED PLAN  
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DETAILED STAKING PLAN  
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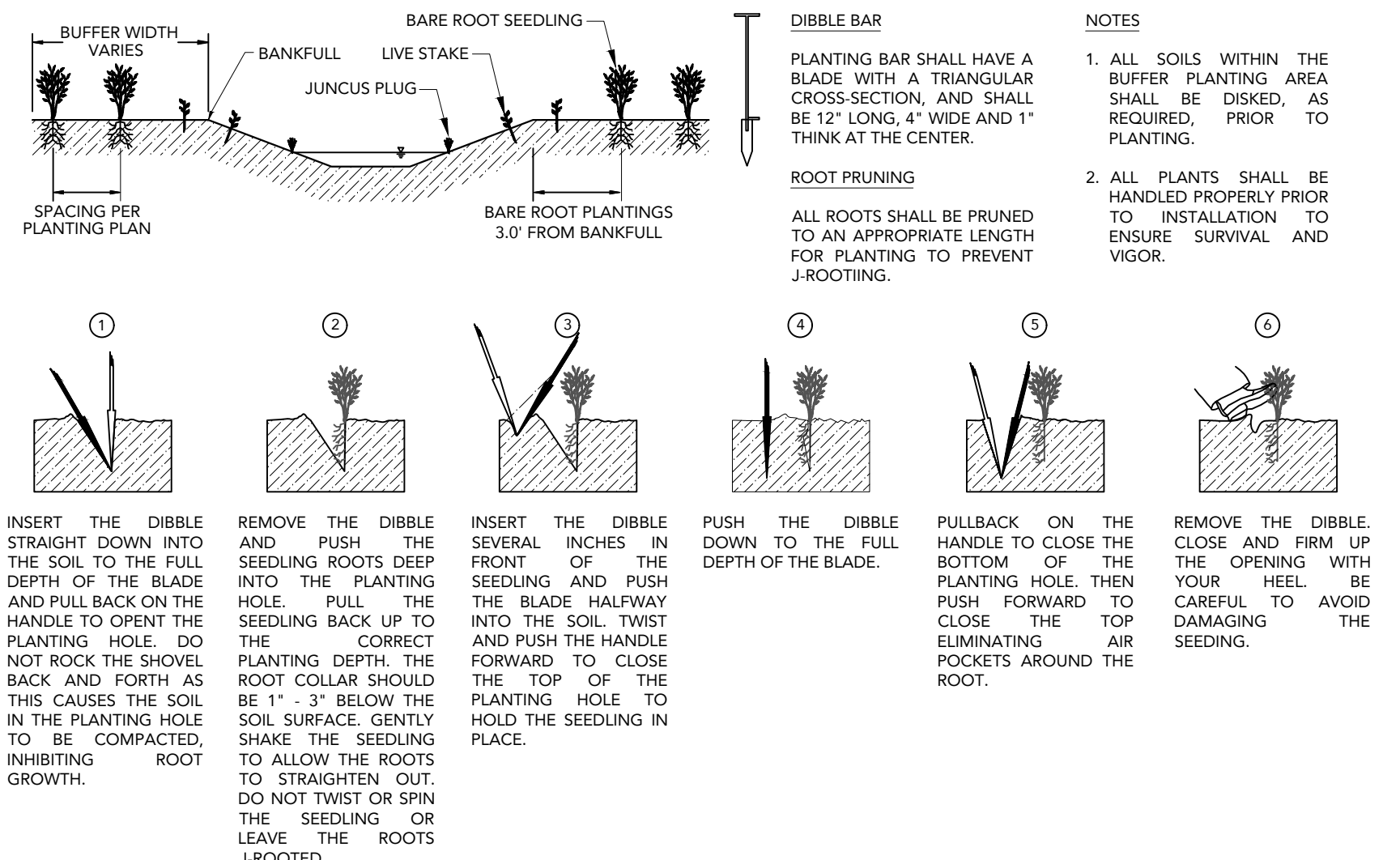
EROSION CONTROL MATTING NOTES

1. EROSION CONTROL MATTING IS USED TO PROTECT RECENTLY CONSTRUCTED STREAMBANKS FROM EROSION. THE MATTING WILL REMAIN INTACT WHILE THE BANK AND RIPARIAN VEGETATION MATURES, PROVIDING CRITICAL BANK PROTECTION.
2. BEFORE INSTALLING EROSION CONTROL MATTING, RAKE SOIL LEVEL, ADD TEMPORARY AND PERMANENT SEED, SOIL PREPARATION AND MULCH.
3. EROSION CONTROL MATTING SHALL BE PLACED ALONG THE LENGTH OF THE NEW CHANNEL FROM THE TOE OF SLOPE OUT TO A MINIMUM OF 6.0' BEYOND THE BANKFULL STAGE.
4. SECURE MATTING IN PLACE BY STAKING AND OVERLAPPING AT THE SEAMS WITH A SHINGLE-TYPE METHOD SUCH THAT THE OVERLAPPING PIECE IS IN THE SAME DIRECTION AND AS THE STREAM FLOW AS SHOWN IN THE DETAIL. ADDITIONAL STAKING SHALL BE APPLIED BY THE CONTRACTOR AT NO ADDITIONAL COST IF THE MATTING SEPARATES FROM THE SOIL MORE THAN ONE INCH UNDER A REASONABLE PULL.
5. EROSION CONTROL MATTING SHALL BE MADE OF 100% NATURAL FIBERS AND MATERIALS AND BE BIODEGRADABLE UNDER NORMAL CLIMATE CONDITIONS. EROSION CONTROL MATTING CONTAINING PLASTICS OR PLASTIC BASED MATERIALS SHALL NOT BE USED.

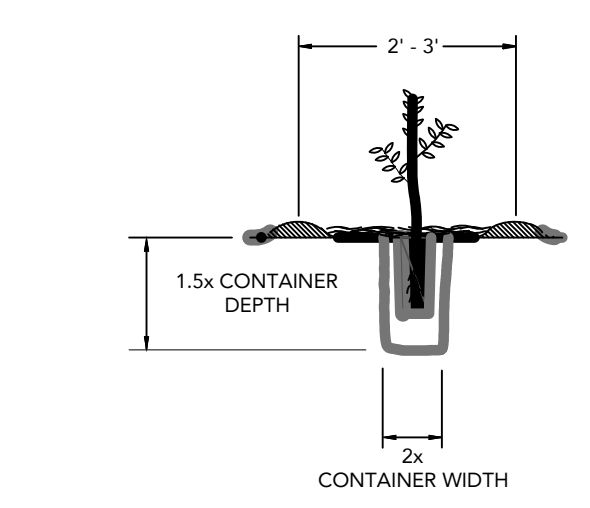


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EROSION CONTROL MATTING DETAIL



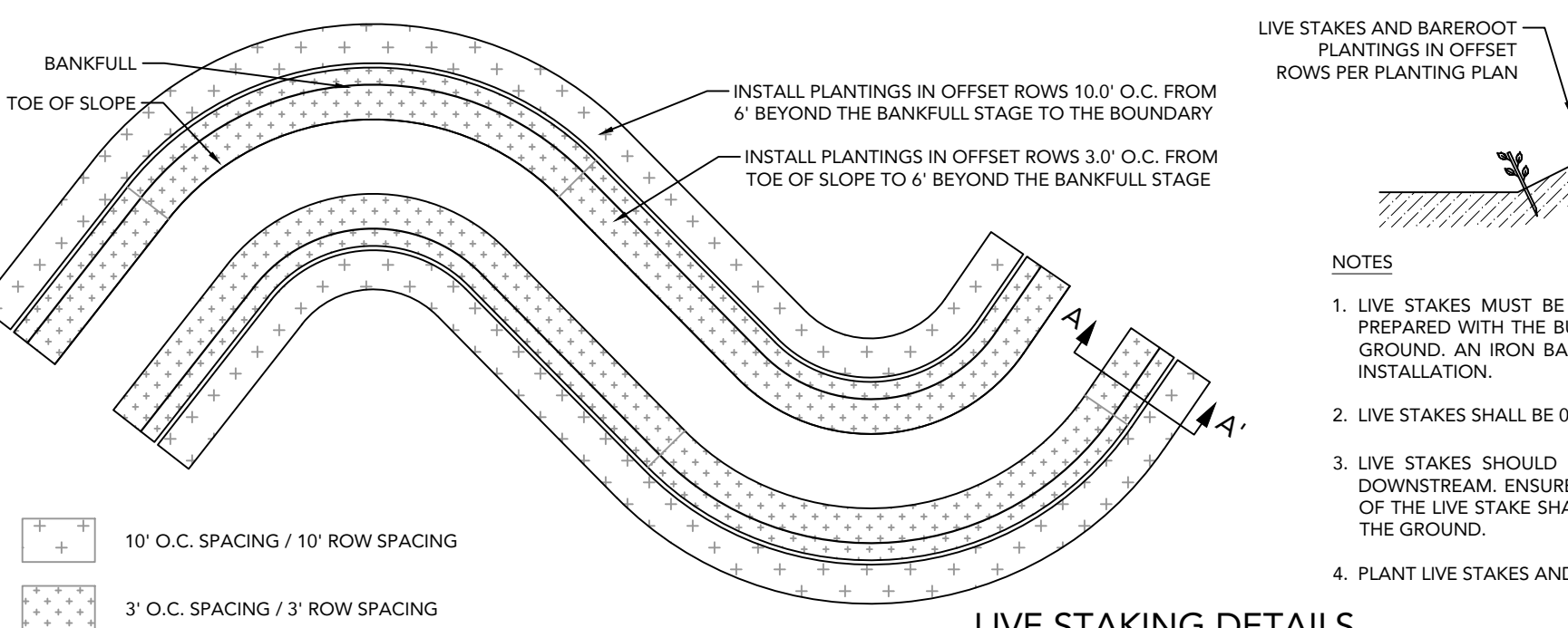
BARE ROOT DETAILS



CONTAINER PLANT DETAILS

- NOTES**
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 3/4 FULL, WATER THOROUGHLY BEFORE PLACING REMAINDER OF THE BACKFILL. WATER AGAIN AFTER PLACING FINAL LAYER OF BACKFILL.

CONTAINER PLANT DETAILS



LIVE STAKING DETAILS

RE-VEGETATION AND PLANTING DETAILS

AVL WTP MILLS RIVER BANK RESTORATION  
HENDERSON COUNTY - NORTH CAROLINA

RIVER BANK RESTORATION DETAILS 2

PERMIT DRAWING

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**INVASIVE SPECIES MANAGEMENT**

- WITHIN THE PROPOSED NCLWF CONSERVATION EASEMENT, REMOVE INVASIVE VEGETATION USING PHYSICAL AND MECHANICAL METHODS. APPLY A CUT STUMP HERBICIDE TREATMENT TO THE BASE OF ALL INVASIVE SPECIES REMOVED AND BURY THE PLANT MATERIAL ONSITE INCLUDING THE FOLLOWING SPECIES:
  - CHINESE PRIVET (*LIGUSTRUM SINENSE*)
  - ORIENTAL BITTERSWEET (*CELASTRUM ORBICULATUS*)

**LIVE STAKES, BARERROOTS AND CONTAINER PLANTING**

- SEE DETAIL SHEET 3.2 FOR DETAILED PLANTING NOTES AND INSTRUCTIONS. ZONE 1 AND ZONE 2 PLANTINGS SHALL BE INSTALLED AS LIVE STAKES OR BARERROOT STOCK DEPENDING ON AVAILABILITY. SPECIES LIST MAY BE ADJUSTED BY THE ENGINEER DEPENDING ON SPECIES AVAILABILITY. SEE THIS SHEET FOR DETAILED VEGETATION SCHEDULES.

**TEMPORARY SEEDING AND MULCHING**

- ALL SEED AND SEED VARIETIES MUST BE FREE OF STATE AND FEDERALLY LISTED NOXIOUS WEED SEED AND INVASIVE SPECIES.
- 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.
- MAINTENANCE OF SEEDED AREAS SHALL CONSIST OF WATERING, WEED AND PEST CONTROL, FERTILIZATION, EROSION REPAIR, RESEEDING, AND INCIDENTAL OPERATIONS AS NECESSARY TO ESTABLISH A HEALTHY, VIGOROUS, WEED FREE AND DISEASE FREE 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**

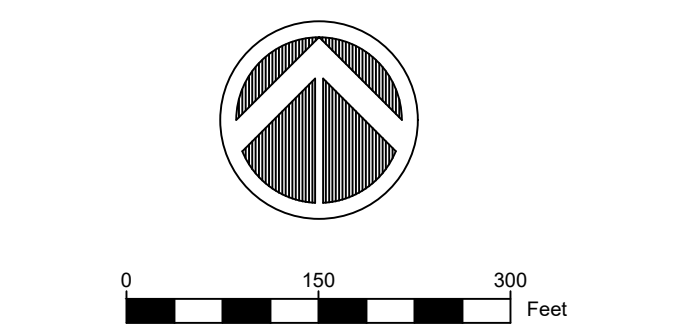
- PERMANENT SEEDING SHALL OCCUR IN CONJUNCTION WITH TEMPORARY SEEDING WHERE APPLICABLE. IDEALLY, PERMANENT SEEDING SHALL OCCUR DURING THE PLANTING SEASON FOR EACH SEED TYPE. AREAS FERTILIZED FOR TEMPORARY SEEDING SHALL BE SUFFICIENTLY FERTILIZED FOR PERMANENT SEEDING; ADDITIONAL FERTILIZER IS NOT REQUIRED FOR PERMANENT SEEDING.
- ALL SEED AND SEED VARIETIES MUST BE FREE OF STATE AND FEDERALLY LISTED NOXIOUS WEED SEED AND INVASIVE SPECIES.
- 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.
- 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 SOWING, THE SEED SHALL BE RAKED INTO THE TOP 1/4 INCH OF THE TOPSOIL, LIGHTLY ROLLED, AND WATERED WITH FINE SPRAY. SEEDED AREAS ON STREAM BANKS SHALL BE PROTECTED WITH COIR FIBER MATTING.

TEMPORARY SEEDING		
DATE	TYPE	APPLICATION RATE (LBS/AC)
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	50
	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 - 25 LBS / AC		
SPECIES	COMMON NAME	PERCENT
<i>Agrostis perennans</i>	AUTUMN BENTGRASS	15
<i>Andropogon gerardii</i>	BIG BLUESTEM	10
<i>Schizachyrium scoparium</i>	LITTLE BLUESTEM	5
<i>Monarda didyma</i>	SCARLET BEEBalm	10
<i>Dichanthelium clandestinum</i>	DEER-TONGUE WITCHGRASS	20
<i>Juncus effusus</i>	SOFT RUSH	5
<i>Tridens flavus</i>	PURPLE TOP	15
<i>Rudbeckia hirta</i>	BLACKEYED SUSAN	5
<i>Sorghastrum nutans</i>	INDIAN GRASS	5
<i>Helianthus angustifolius</i>	SWAMP SUNFLOWER	5
<i>Panicum anceps</i>	BEAKED PANICGRASS	5

ZONE 1 (3.0 AC) - STREAMBANK PLANTINGS - 3' O.C. (4,800 STEMS / AC)		
SPECIES	COMMON NAME	PERCENT
<i>Cornus amomum</i>	SILKY DOGWOOD	30%
<i>Salix sericea</i>	SILKY WILLOW	30%
<i>Sambucus canadensis</i>	ELBERBERRY	20%
<i>Alnus serrulata</i>	HAZEL ALDER	20%

ZONE 2 (28.0 AC) - FLOODPLAIN PLANTINGS - 10' O.C. (450 STEMS / AC)		
SPECIES	COMMON NAME	PERCENT
<i>Betula nigra</i>	RIVER BIRCH	20%
<i>Platanus occidentalis</i>	SYCAMORE	20%
<i>Liriodendron tulipifera</i>	TULIP POPLAR	10%
<i>Physocarpus opulifolius</i>	NINE BARK	10%
<i>Carpinus caroliniana</i>	AMERICAN HORNBEAM	10%
<i>Hamamelis virginiana</i>	WITCH HAZEL	10%
<i>Liriodendron tulipifera</i>	YELLOW POPLAR	10%
<i>Corylus americana</i>	AMERICAN HAZELNUT	10%



**RE-VEGETATION PLAN LEGEND**

- NCLWF EASEMENT (APPROX.)
- UTILITY EASEMENT
- RIVER CENTERLINE
- RIVER TOB OF BANK
- ZONE 1: RIVER BANK
- ZONE 2: FLOODPLAIN

**PERMIT DRAWING**

REVISIONS:

DATE: 04/22/2021  
PLOT SIZE: 24" x 36"  
AS NOTED  
H.D.: NAD83 (SCSP)  
V.D.: NAVD88  
JE PID: 2703