

**PROJECT: 124578 UT TO MILL SWAMP**

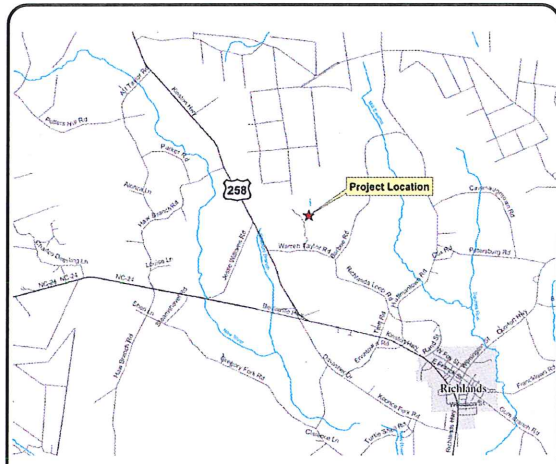
**NORTH CAROLINA  
ECOSYSTEM ENHANCEMENT PROGRAM**

**ONSLOW COUNTY**

**LOCATION: APPROX. 3 MILES NORTHWEST OF THE TOWN OF RICHLANDS**

**TYPE OF WORK: AS-BUILT PLANS FOR STREAM AND  
WETLAND RESTORATION AND ENHANCEMENT**

STATE	BAKER PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
NC	124578	1	14

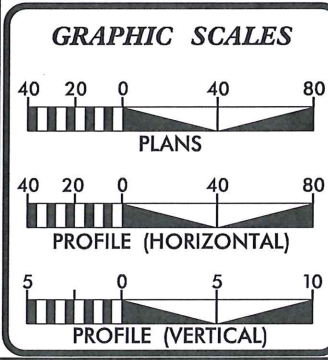
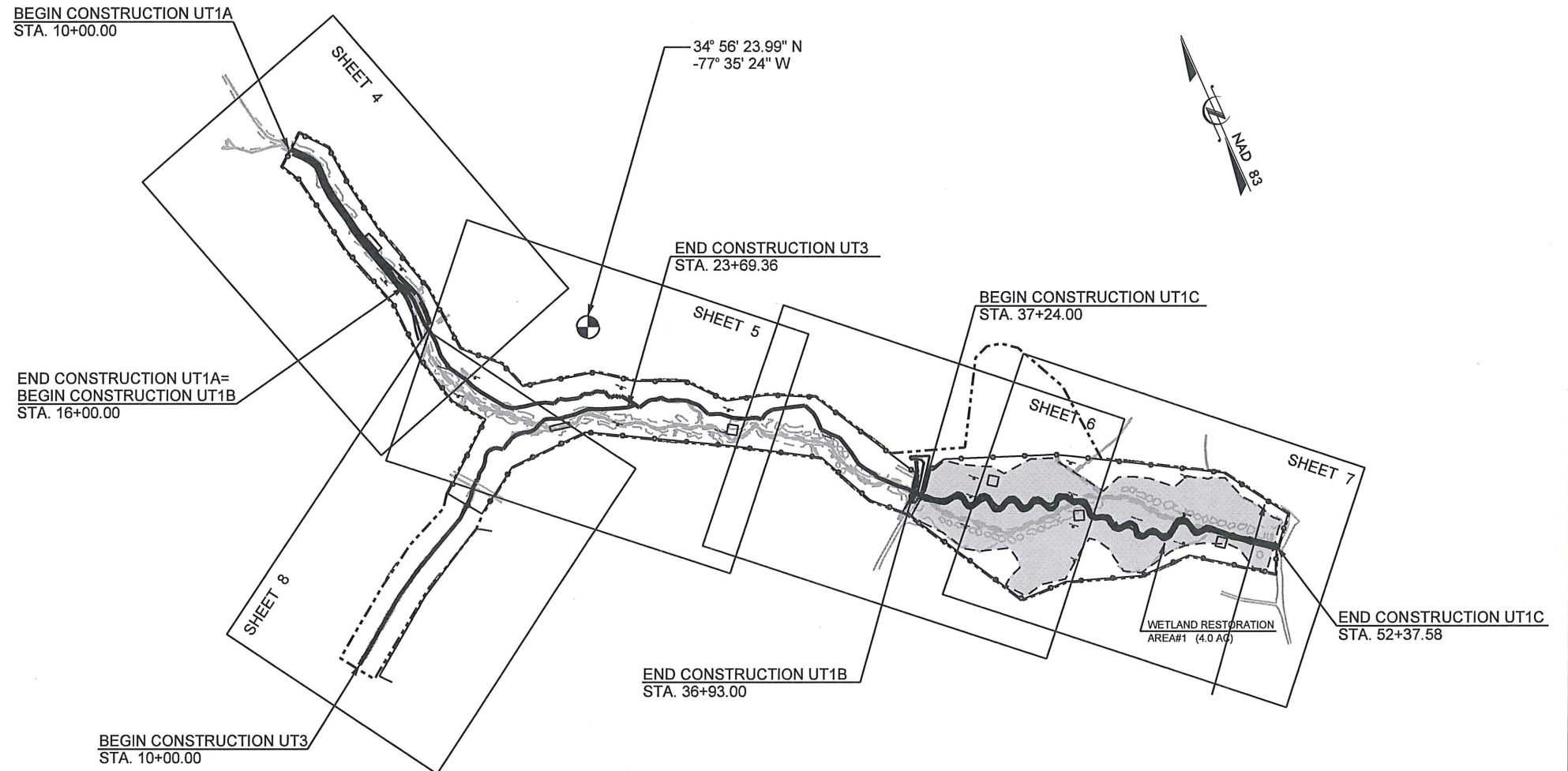


**VICINITY MAP**  
N.T.S

INDEX OF SHEETS	
1...	TITLE SHEET
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NCEP ID NO. 95019

DWQ PROJECT #20120916  
PCN APPLICATION RECORDED 01/03/13  
APPROVAL DATE 02/08/13



**PROJECT SUMMARY**

EXISTING STREAM LENGTH UT1 (TOTAL) =	4,081 FEET
AS-BUILT ENHANCEMENT STREAM LENGTH UT1A =	600 FEET
AS-BUILT RESTORATION STREAM LENGTH UT1B =	2,093 FEET
AS-BUILT RESTORATION STREAM LENGTH UT1C =	1,513 FEET
AS-BUILT STREAM LENGTH UT3 =	1,369 FEET
AS-BUILT WETLAND RESTORATION AREA #1 (RIPARIAN) =	4.0 ACRES

PREPARED FOR THE OFFICE OF:

NCDENR  
ECOSYSTEM ENHANCEMENT PROGRAM  
1652 MAIL SERVICE CENTER  
RALEIGH, NC 27699-1652

**Ecosystem Enhancement PROGRAM**

NCEP CONTACT: KRISTIN MIGUEZ  
PROJECT MANAGER

PREPARED IN THE OFFICE OF:

**Baker**

Michael Baker Engineering Inc.  
8000 Regency Parkway, Suite 600  
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WILLIAM SCOTT HUNT, III, PE  
PROJECT ENGINEER

KAYNE VAN STELL  
PROJECT MANAGER

JUNE 2013  
COMPLETION DATE:

**PROJECT ENGINEER**

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL  
22967  
09.19.2013  
WILLIAM SCOTT HUNT, III  
P.E.

SIGNATURE:

2/26/03

**STREAM CONVENTIONAL SYMBOLS**  
SUPERCEDES SHEET 1-B

- ROOT WAD
- LOG VANE
- LOG WEIR
- LOG ROLLER
- GRADE CONTROL LOG JAM
- PERMANENT STREAM CROSSING
- VEG PLOT
- CONSERVATION EASEMENT
- 210 -- EXISTING MAJOR CONTOUR
- - - - EXISTING MINOR CONTOUR
- - - - - LIMITS OF DISTURBANCE
- DITCH PLUG
- CHANNEL FILL
- BAKER CONTROL POINT
- FLOW GAUGE
- WELL PIN
- PHOTO POINT

**GENERAL NOTES**

- CONSTRUCTION BEGAN IN APRIL 2013 AND WAS COMPLETED JUNE 2013.
- VEGETATION PLANTING WAS COMPLETED IN JUNE 2013.

PROJECT REFERENCE NO. <b>124578</b>	SHEET NO. <b>1-A</b>
PROJECT ENGINEER	
Michael Baker Engineering Inc. 6000 Regency Parkway, Suite 600 Cary, NORTH CAROLINA 27518 Phone: 919.483.5488 Fax: 919.483.5490 License #: F-1084	

**STANDARD SPECIFICATIONS**

**NORTH CAROLINA**  
**EROSION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL**  
**MARCH 2009**

- 6.06 TEMPORARY GRAVEL CONSTRUCTION ENTRANCE
- 6.60 TEMPORARY SEDIMENT TRAP
- 6.62 TEMPORARY SILT FENCE
- 6.63 TEMPORARY ROCK DAM
- 6.70 TEMPORARY STREAM CROSSING

**VEGETATION SELECTION**

The following table lists the vegetation selection for the project site. Total planting area was approximately 12 acres based on areas disturbed during construction. Actual placement of species and densities were determined prior to site planting and vary based on apparent wetness of planting locations per the vegetation specialist.

Botanical Name	Common Name	% Planted by Species	Total Number of Stems
<b>Headwater Riparian Buffer Plantings - Overstory</b>			
<b>9' x 12' spacing - 403 stems/Acre</b>			
<i>Fraxinus pennsylvanica</i>	Green Ash	10%	200
<i>Quercus michauxii</i>	Swamp Chestnut Oak	20%	400
<i>Nyssa biflora</i>	Swamp Black Gum	25%	500
<i>Liriodendron tulipifera</i>	Tulip Poplar	10%	200
<i>Quercus lyrata</i>	Overcup Oak	15%	300
<i>Quercus nigra</i>	Water Oak	20%	400
<b>Understory Headwater Riparian Buffer Plantings - Understory</b>			
<b>18' x 15' spacing - 161 stems/Acre</b>			
<i>Clethra alnifolia</i>	Sweet Pepperbush	15%	120
<i>Cyrilla racemiflora</i>	Titi	20%	160
<i>Itea virginica</i>	Sweetspire	15%	120
<i>Magnolia virginiana</i>	Sweet Bay Magnolia	15%	120
<i>Lyonia lucida</i>	Fetterbush	20%	160
<i>Persea palustris</i>	Red bay	15%	120
<b>Riparian Wetland Buffer Plantings - Overstory</b>			
<b>9' x 12' spacing - 403 stems/Acre</b>			
<i>Liriodendron tulipifera</i>	Tulip Poplar	15%	480
<i>Nyssa biflora</i>	Swamp Black Gum	15%	480
<i>Quercus michauxii</i>	Swamp Chestnut Oak	15%	480
<i>Quercus lyrata</i>	Overcup Oak	15%	480
<i>Quercus nigra</i>	Water Oak	15%	240
<i>Quercus phellos</i>	Willow Oak	7.5%	240
<i>Quercus pagoda</i>	Cherrybark Oak	7.5%	320
<i>Ulmus americana</i>	American Elm	15%	480
<b>Riparian Wetland Buffer Plantings - Understory</b>			
<b>18' x 15' spacing - 161 stems/Acre</b>			
<i>Cyrilla racemiflora</i>	Titi	20%	260
<i>Itea virginica</i>	Sweetspire	10%	130
<i>Leucothoe racemosa</i>	Swamp Doghobble	10%	130
<i>Carpinus caroliniana</i>	Ironwood	15%	190
<i>Magnolia virginiana</i>	Sweet Bay Magnolia	20%	258
<i>Persea palustris</i>	Red bay	10%	130
<i>Vaccinium corymbosum</i>	Highbush Blueberry	15%	190
<b>Riparian Live Stake Plantings (Reach UT1c)</b>			
<i>Cephalanthus occidentalis</i>	Buttonbush	0%	None
<i>Salix nigra</i>	Black Willow	0%	None
<i>Salix sericea</i>	Silky Willow	0%	None
<i>Sambucus canadensis</i>	Elderberry	0%	None

Note: Riparian Live Stakes will be planted as needed in the Fall (dormant season) of 2013

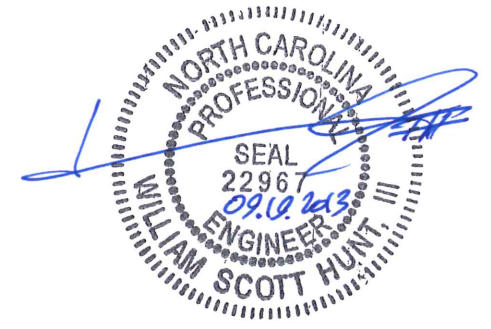
The following table lists temporary seed mix for the project site. All disturbed areas were stabilized using mulch and temporary seed as defined in the construction specifications.

Planting Dates	Species Name	Rate (lbs./acre)
September to March	Rye Grain (Cool Season)	130
April to August	Browntop Millet (Warm Season)	40

Permanent herbaceous seed mixtures for the project site were planted throughout the floodplain and riparian buffer areas. Permanent seed mixtures were applied with temporary seed, as defined in the construction specifications.

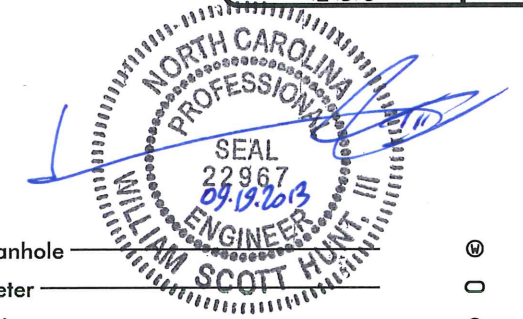
Scientific Name	Common Name	% Planted By Species	Total lbs per Acre	Wetland Tolerance
<i>Andropogon gerardii</i>	Big blue stem	10%	1.50	FAC
<i>Andropogon glomeratus</i>	Bushy blue stem	10%	1.50	FACW+
<i>Carex lupulina</i>	Hop sedge	10%	2.25	OBL
<i>Carex vulpinoidea</i>	Fox sedge	10%	2.25	OBL
<i>Elymus virginicus</i>	Virginia wild rye	10%	1.50	FAC
<i>Juncus effusus</i>	Soft rush	15%	2.25	FACW+
<i>Panicum virgatum</i>	Switchgrass	10%	1.50	FAC+
<i>Polygonum pensylvanicum</i>	Smartweed	5%	0.75	FACW
<i>Schizachyrium scoparium</i>	Little blue stem	10%	0.75	FACU
<i>Sorghastrum nutans</i>	Indiangrass	10%	0.75	FACU
<b>Total</b>		<b>100%</b>	<b>15.0</b>	

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# STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS CONVENTIONAL SYMBOLS

\*S.U.E = SUBSURFACE UTILITY ENGINEER



**BOUNDARIES AND PROPERTY:**

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Existing Iron Pin	○
Property Corner	-----
Property Monument	□
Parcel/Sequence Number	②
Existing Fence Line	-x-x-x-
Proposed Woven Wire Fence	○
Proposed Chain Link Fence	□
Proposed Barbed Wire Fence	◇
Existing Wetland Boundary	-----
Proposed Wetland Boundary	-----
Existing Endangered Animal Boundary	-----
Existing Endangered Plant Boundary	-----

**BUILDINGS AND OTHER CULTURE:**

Gas Pump Vent or U/G Tank Cap	○
Sign	○
Well	○
Small Mine	✕
Foundation	□
Area Outline	□
Cemetery	↑
Building	□
School	□
Church	□
Dam	-----

**HYDROLOGY:**

Stream or Body of Water	-----
Hydro, Pool or Reservoir	□
Jurisdictional Stream	-----
Buffer Zone 1	-----
Buffer Zone 2	-----
Flow Arrow	←
Disappearing Stream	-----
Spring	○
Wetland	-----
Proposed Lateral, Tail, Head Ditch	-----
False Sump	-----

**RAILROADS:**

Standard Gauge	-----
RR Signal Milepost	○
Switch	□
RR Abandoned	-----
RR Dismantled	-----

**RIGHT OF WAY:**

Baseline Control Point	◆
Existing Right of Way Marker	△
Existing Right of Way Line	-----
Proposed Right of Way Line	-----
Proposed Right of Way Line with Iron Pin and Cap Marker	-----
Proposed Right of Way Line with Concrete or Granite Marker	-----
Existing Control of Access	-----
Proposed Control of Access	-----
Existing Easement Line	-----
Proposed Temporary Construction Easement	-----
Proposed Temporary Drainage Easement	-----
Proposed Permanent Drainage Easement	-----
Proposed Permanent Utility Easement	-----
Proposed Temporary Utility Easement	-----
Proposed Permanent Easement with Iron Pin and Cap Marker	-----

**ROADS AND RELATED FEATURES:**

Existing Edge of Pavement	-----
Existing Curb	-----
Proposed Slope Stakes Cut	-----
Proposed Slope Stakes Fill	-----
Proposed Wheel Chair Ramp	-----
Existing Metal Guardrail	-----
Proposed Guardrail	-----
Existing Cable Guiderail	-----
Proposed Cable Guiderail	-----
Equality Symbol	⊕
Pavement Removal	XXXX

**VEGETATION:**

Single Tree	○
Single Shrub	○
Hedge	-----
Woods Line	-----
Orchard	-----
Vineyard	-----

**EXISTING STRUCTURES:**

MAJOR:	
Bridge, Tunnel or Box Culvert	-----
Bridge Wing Wall, Head Wall and End Wall	-----
MINOR:	
Head and End Wall	-----
Pipe Culvert	-----
Footbridge	-----
Drainage Box: Catch Basin, DI or JB	□
Paved Ditch Gutter	-----
Storm Sewer Manhole	○
Storm Sewer	-----

**UTILITIES:**

POWER:	
Existing Power Pole	○
Proposed Power Pole	○
Existing Joint Use Pole	○
Proposed Joint Use Pole	○
Power Manhole	○
Power Line Tower	□
Power Transformer	□
U/G Power Cable Hand Hole	□
H-Frame Pole	○
Recorded U/G Power Line	-----
Designated U/G Power Line (S.U.E.*)	-----

**TELEPHONE:**

Existing Telephone Pole	○
Proposed Telephone Pole	○
Telephone Manhole	○
Telephone Booth	□
Telephone Pedestal	□
Telephone Cell Tower	□
U/G Telephone Cable Hand Hole	□
Recorded U/G Telephone Cable	-----
Designated U/G Telephone Cable (S.U.E.*)	-----
Recorded U/G Telephone Conduit	-----
Designated U/G Telephone Conduit (S.U.E.*)	-----
Recorded U/G Fiber Optics Cable	-----
Designated U/G Fiber Optics Cable (S.U.E.*)	-----

**WATER:**

Water Manhole	○
Water Meter	○
Water Valve	○
Water Hydrant	○
Recorded U/G Water Line	-----
Designated U/G Water Line (S.U.E.*)	-----
Above Ground Water Line	-----

**TV:**

TV Satellite Dish	○
TV Pedestal	□
TV Tower	○
U/G TV Cable Hand Hole	□
Recorded U/G TV Cable	-----
Designated U/G TV Cable (S.U.E.*)	-----
Recorded U/G Fiber Optic Cable	-----
Designated U/G Fiber Optic Cable (S.U.E.*)	-----

**GAS:**

Gas Valve	◇
Gas Meter	○
Recorded U/G Gas Line	-----
Designated U/G Gas Line (S.U.E.*)	-----
Above Ground Gas Line	-----

**SANITARY SEWER:**

Sanitary Sewer Manhole	○
Sanitary Sewer Cleanout	○
U/G Sanitary Sewer Line	-----
Above Ground Sanitary Sewer	-----
Recorded SS Forced Main Line	-----
Designated SS Forced Main Line (S.U.E.*)	-----

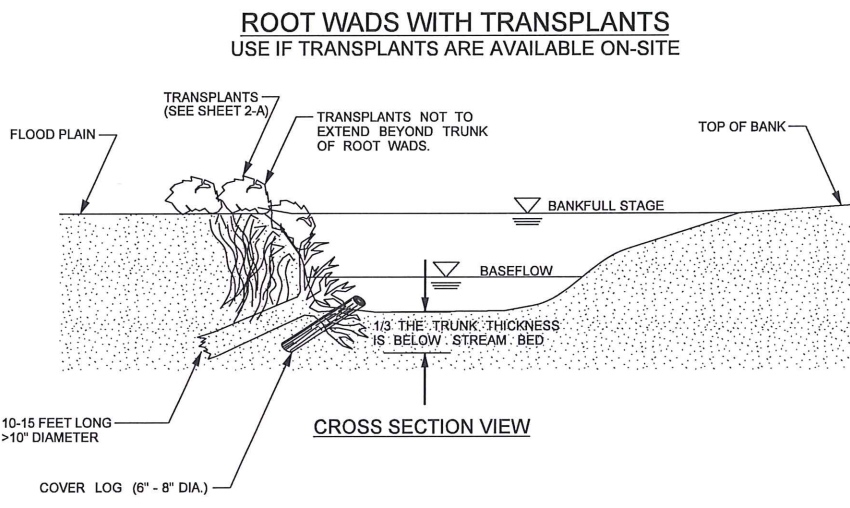
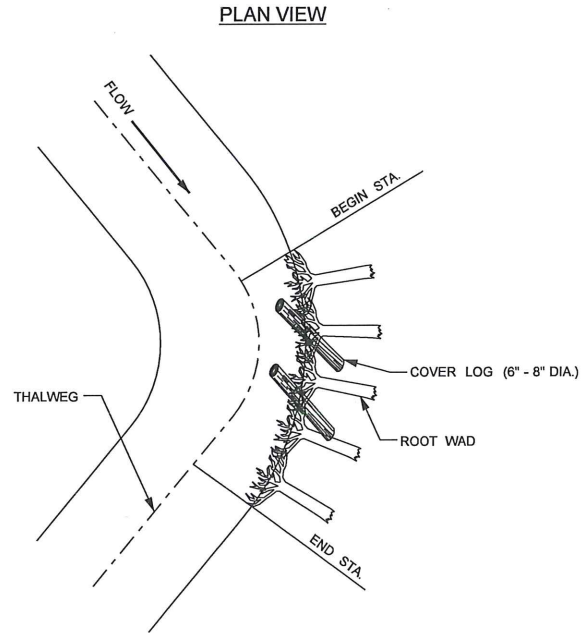
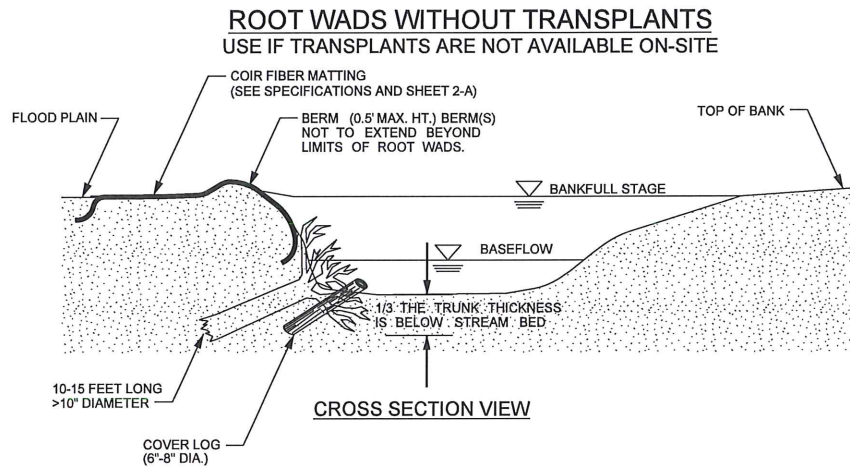
**MISCELLANEOUS:**

Utility Pole	○
Utility Pole with Base	□
Utility Located Object	○
Utility Traffic Signal Box	□
Utility Unknown U/G Line	-----
U/G Tank; Water, Gas, Oil	□
A/G Tank; Water, Gas, Oil	□
U/G Test Hole (S.U.E.*)	○
Abandoned According to Utility Records	AATUR
End of Information	E.O.I.

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### ROOT WADS

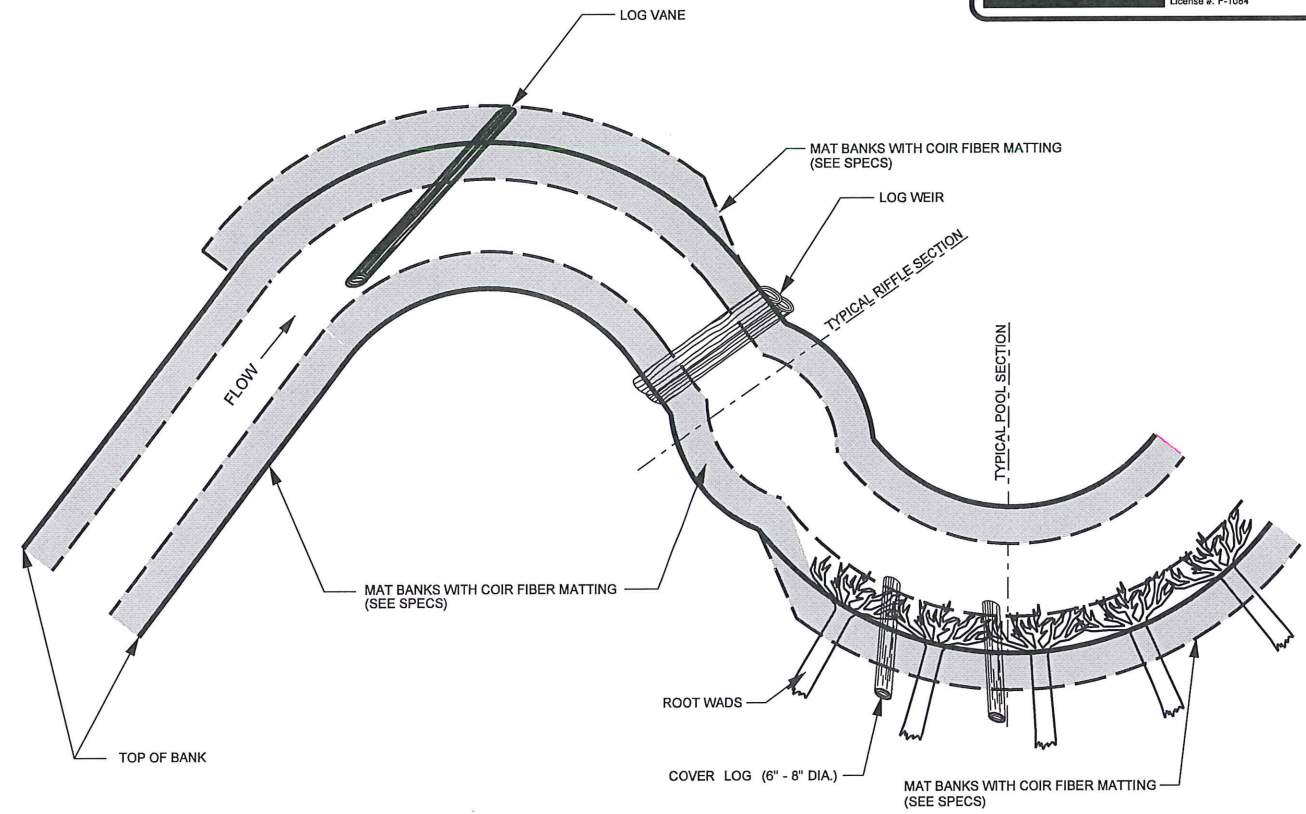


- NOTES:**
1. INSTALLATION USING THE TRENCHING METHOD REQUIRES THAT A TRENCH BE EXCAVATED FOR THE LOG PORTION OF THE ROOT WAD. ONE-THIRD OF THE ROOT WAD SHOULD REMAIN BELOW NORMAL BASE FLOW CONDITIONS OR CHANNEL BOTTOM.
  2. THE NUMBER OF ROOTWADS ESTIMATED MAY VARY DEPENDING ON THE ROOTMASS SIZE. IN GENERAL, ROOTWADS SHOULD PROTECT THE OUTER MEANDER BEND AS SHOWN. SEE STRUCTURE TABLE FOR APPROXIMATE STATION AND LOCATION.
  3. INSTALL COVER LOGS BETWEEN ROOTWADS TO PROVIDE HABITAT ONLY WHEN AVAILABLE FROM ON-SITE HARVESTING.

### TYPICAL STRUCTURE PLACEMENT

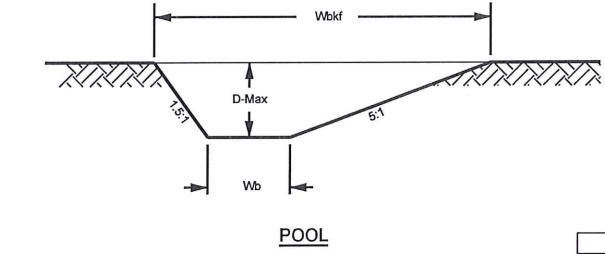
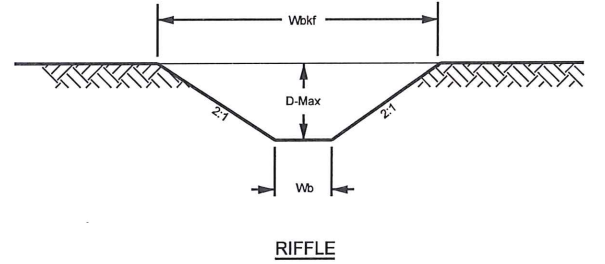
- STRUCTURE NOTES:**
1. GENERALLY LOG WEIRS, ROOT WADS, LOG VANES AND COIR FIBER MATTING WILL BE INSTALLED IN THE LOCATION AND SEQUENCE AS SHOWN.
  2. ADDITIONAL STRUCTURES OR CHANGES TO STRUCTURE LOCATIONS MAY BE MADE BY THE DESIGN ENGINEER DURING CONSTRUCTION.

- NOTES:**
1. COIR FIBER MATTING TO BE INSTALLED ON ALL RESTORED STREAMBANKS EXCEPT ON POINT BARS.
  2. IF ROOT WADS DO NOT COVER ENTIRE SLOPE ON OUTSIDE OF MEANDER BENDS, COIR FIBER MATTING IS NEEDED.
  3. ROOT WADS SHALL BE ANGLED APPROXIMATELY 90° TOWARDS THE STREAMBANK.



BAKER PROJECT REFERENCE NO. <b>124578</b>	SHEET NO. <b>2</b>
PROJECT ENGINEER	
<b>Baker</b>	
<small>Michael Baker Engineering Inc. 8000 Regency Parkway, Suite 600 Cary, NORTH CAROLINA 27518 Phone: 919.463.5488 Fax: 919.463.6480 License #: F-1084</small>	

### TYPICAL RIFFLE, POOL CROSS SECTIONS - WELL DEFINED CHANNEL

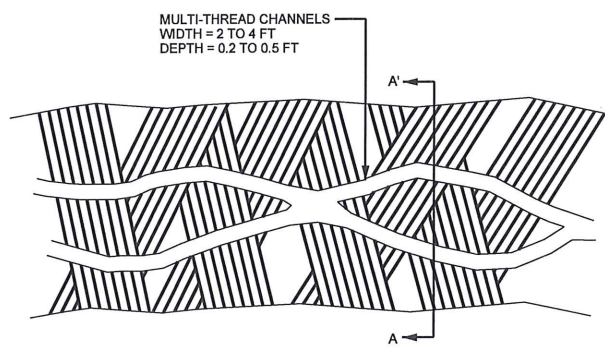
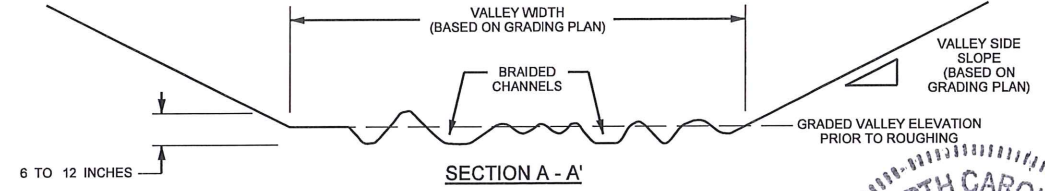


UT1C		
RIFFLE	POOL	
10.3	14.3	WIDTH OF BANKFULL (Wbkf)
1.0	1.6	MAXIMUM DEPTH (D-Max)
14.0	14.0	WIDTH TO DEPTH RATIO (Wbkf / D)
7.6	14.6	BANKFULL AREA (Abkf)
5.5	3.9	BOTTOM WIDTH (Wb)

- NOTES:**
1. DURING CONSTRUCTION CORNERS OF DESIGN CHANNEL WILL BE ROUNDED AND A THALWEG WILL BE SHAPED PER THE DETAILS AND SPECIFICATIONS.
  2. POOLS SHOWN ABOVE ARE LEFT POOLS ONLY.
  3. REACH UT1A AND UT1B WILL BE CONSTRUCTED PER THE PROPOSED GRADING PLAN AND AS SHOWN ON TYPE 2 VALLEY DETAIL.

### TYPE 2 VALLEY

(FOR MODERATELY DEFINED CHANNEL FORMS)



PLAN VIEW OF MICROTOPOGRAPHIC PATTERN

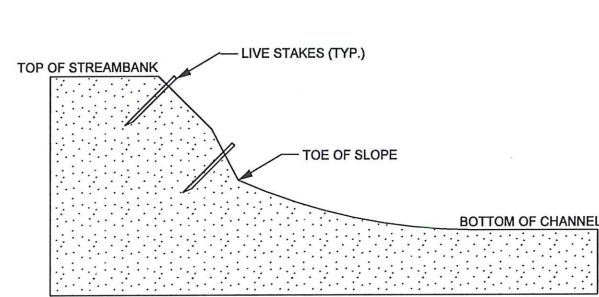


- NOTES:**
1. GRADE VALLEY TO DESIGN CONTOURS SHOWN ON GRADING PLAN.
  2. MICROTOPOGRAPHY IS TYPICALLY CREATED USING STANDARD TILLAGE EQUIPMENT CONFIGURED TO FORM MOUNDS AND FURROWS OF APPROPRIATE SIZE. ALTERNATIVE CONSTRUCTION METHODS SHALL BE APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION.
  3. MULTI-THREAD CHANNEL ALIGNMENT WILL BE LOCATED BY ENGINEER FOLLOWING COMPLETION OF THE CHANNEL FILL AND MICROTOPOGRAPHIC ROUGHING.
  4. MULTI-THREAD CHANNELS WILL BE SHAPED TO FORM SMOOTH TRANSITIONS.
  5. UPON COMPLETION OF BRAIDED CHANNEL FEATURES, APPLY MULCH TEMPORARY SEED, AND PERMANENT SEED TO THE CONSTRUCTED VALLEY ACCORDING TO SEDIMENT AND EROSION CONTROL SPECIFICATIONS.

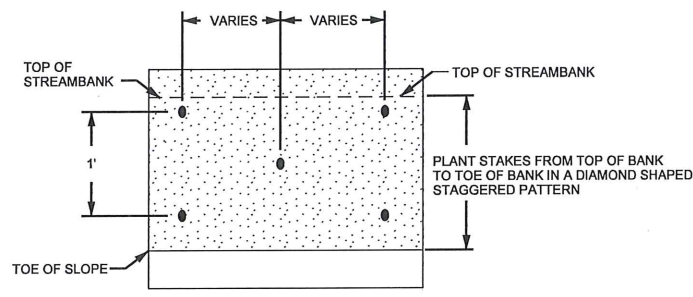
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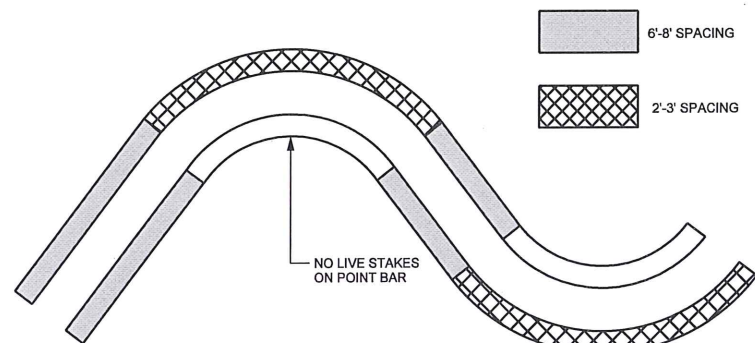
### LIVE STAKING



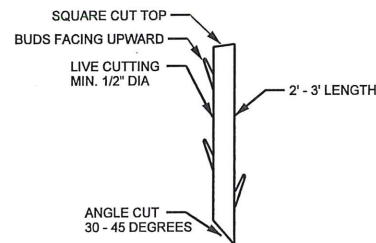
CROSS SECTION VIEW



PLAN VIEW



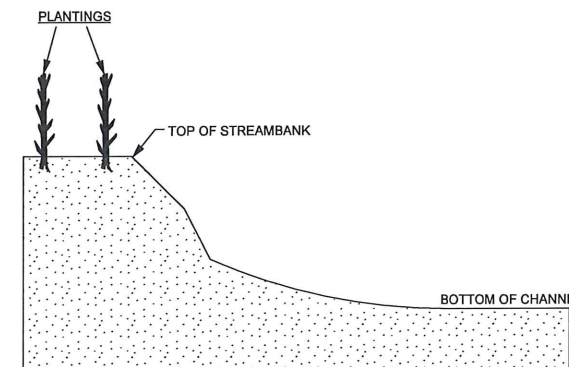
PLAN VIEW



LIVE STAKE DETAIL

- NOTES:**
1. STAKES PRODUCED FROM ON-SITE SHOULD BE CUT AND INSTALLED ON THE SAME DAY.
  2. DO NOT INSTALL STAKES THAT HAVE BEEN SPLIT.
  3. STAKES MUST BE INSTALLED WITH BUDS POINTING UPWARDS.
  4. STAKES SHOULD BE INSTALLED PERPENDICULAR TO BANK.
  5. STAKES SHOULD BE 1/2 TO 2 INCHES IN DIAMETER AND 2 TO 3 FT LONG.
  6. STAKES SHOULD BE INSTALLED LEAVING 1/5 OF STAKE ABOVE GROUND.
  7. DO NOT LIVE STAKE POINT BARS ALONG MEANDER BENDS.

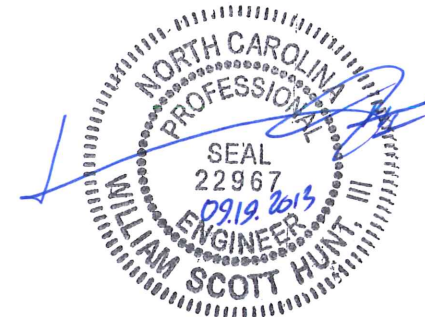
### PLANTING SPECIFICATIONS



CROSS SECTION VIEW OF BARE ROOT PLANTING

- NOTES:**
1. PLANT BARE ROOT SHRUBS AND TREES TO THE WIDTH OF THE BUFFER/PLANTING ZONE AS SHOWN ON THE PLANS.
  2. ALLOW FOR 6-10 FEET BETWEEN PLANTINGS, DEPENDING ON SIZE.
  3. LOOSEN COMPACTED SOIL.
  4. PLANT IN HOLES MADE BY A MATTOCK, DIBBLE, PLANTING BAR, OR OTHER APPROVED MEANS.
  5. PLANT IN HOLES DEEP AND WIDE ENOUGH TO ALLOW THE ROOTS TO SPREAD OUT AND DOWN WITHOUT J-ROOTING.
  6. KEEP ROOTS MOIST WHILE DISTRIBUTING OR WAITING TO PLANT BY MEANS OF WET CANVAS, BURLAP, OR STRAW.
  7. HEEL-IN PLANTS IN MOIST SOIL OR SAWDUST IF NOT PROMPTLY PLANTED UPON ARRIVAL TO PROJECT SITE.

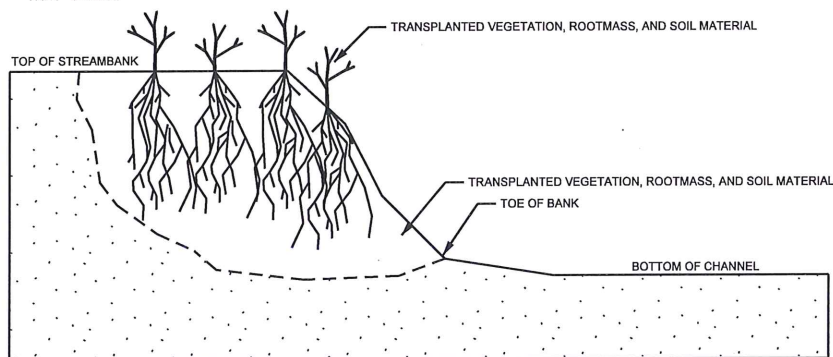
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PROJECT ENGINEER	
<b>Baker</b>	
<small>Michael Baker Engineering Inc. 8000 Regency Parkway, Suite 600 Cary, NORTH CAROLINA 27518 Phone: 919.463.5488 Fax: 919.463.6490 License #: F-1034</small>	



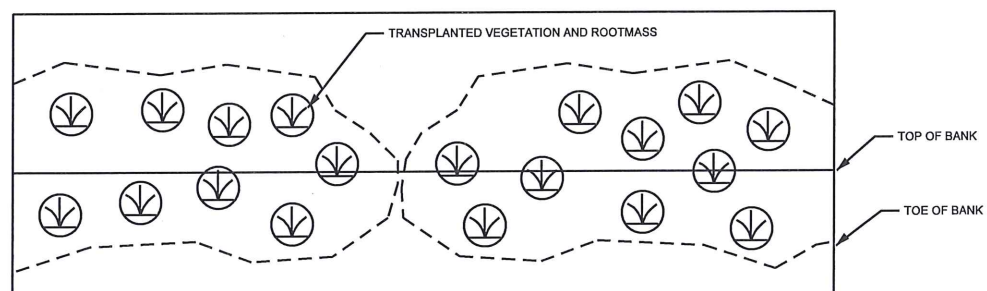
### TRANSPLANTED VEGETATION

**NOTES:**

1. EXCAVATE A HOLE IN THE BANK TO BE STABILIZED THAT WILL ACCOMMODATE THE SIZE OF TRANSPLANT TO BE PLACED. BEGIN EXCAVATION AT THE TOE OF THE BANK.
2. EXCAVATE TRANSPLANT USING A FRONT END LOADER. EXCAVATE THE ENTIRE ROOT MASS AND AS MUCH ADDITIONAL SOIL MATERIAL AS POSSIBLE. IF ENTIRE ROOT MASS CAN NOT BE EXCAVATED IN ONE BUCKET LOAD, THE TRANSPLANT IS TOO LARGE AND ANOTHER SHOULD BE SELECTED.
3. PLACE TRANSPLANT IN THE BANK TO BE STABILIZED SO THAT VEGETATION IS ORIENTATED VERTICALLY.
4. FILL IN ANY HOLES AROUND THE TRANSPLANT AND COMPACT.
5. ANY LOOSE SOIL LEFT IN THE STREAM SHOULD BE REMOVED.
6. PLACE MULTIPLE TRANSPLANTS CLOSE TOGETHER SUCH THAT THEY TOUCH.

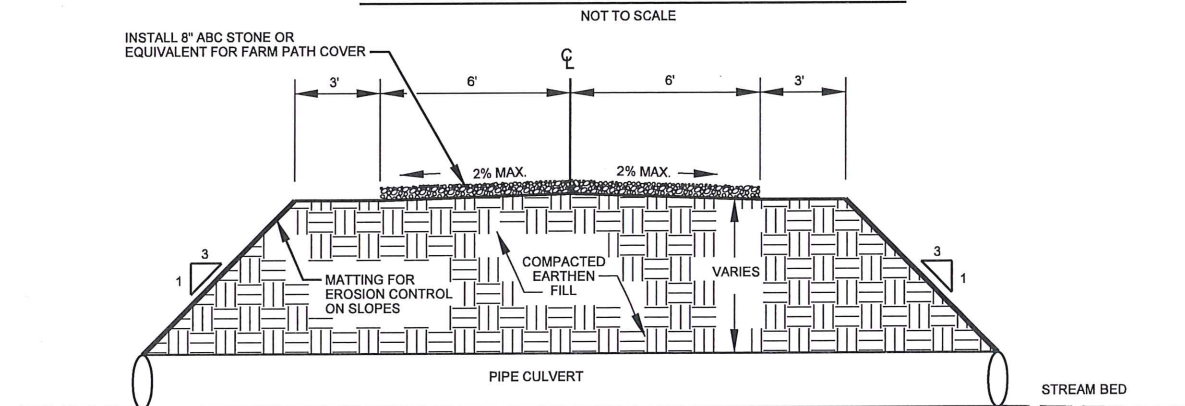


CROSS SECTION VIEW



PLAN VIEW

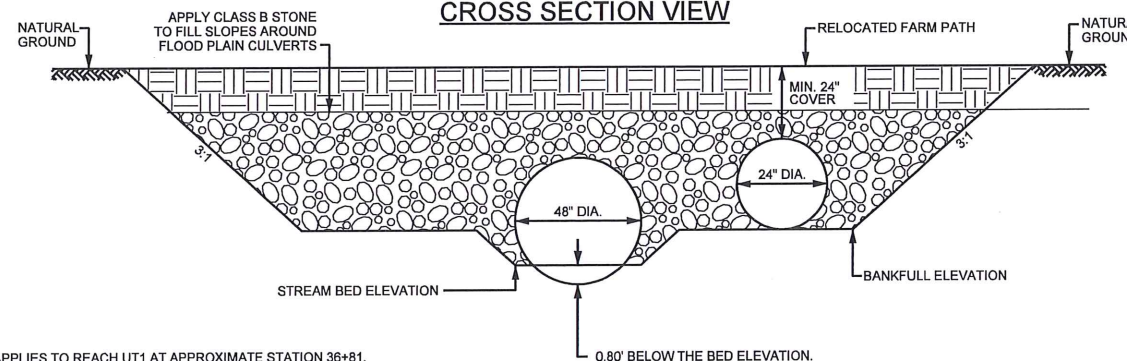
### PERMANENT ROAD CULVERT CROSSING



**NOTES:**

1. INSTALL PIPE CULVERT IN ACCORDANCE WITH DETAIL SPECIFICATIONS.
2. INSTALL COIR FIBER MATTING FOR EROSION CONTROL ALONG FILL SLOPES.

### CROSS SECTION VIEW




**NOTES:**

1. TYPICAL SECTION APPLIES TO REACH UT1 AT APPROXIMATE STATION 36+81.
2. CULVERTS ARE TO BE EVENLY SPACED.
3. MINIMUM OF 24" COVER FOR ALL PIPES.

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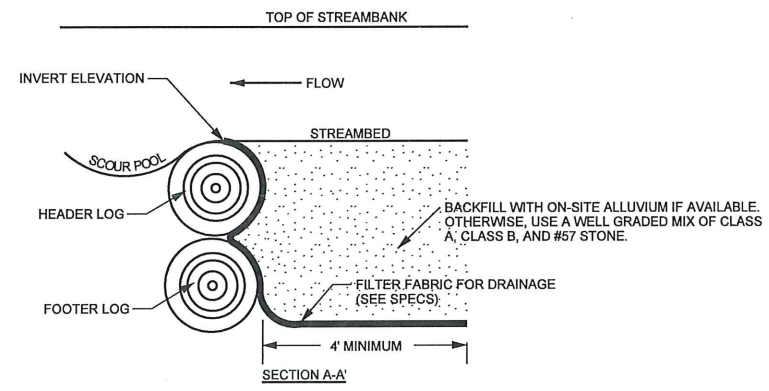
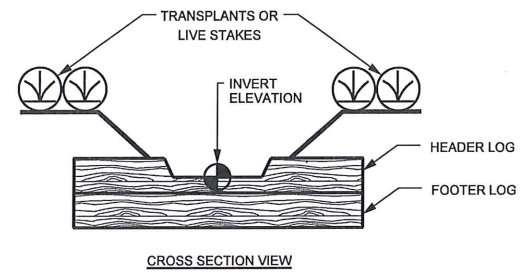
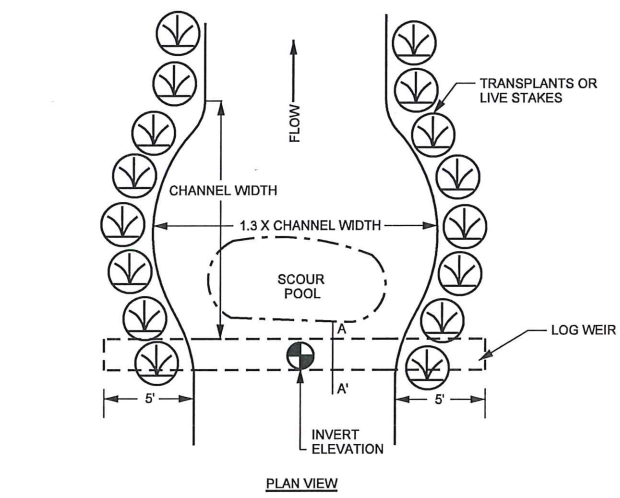
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BAKER PROJECT REFERENCE NO. <b>124578</b>	SHEET NO. <b>2-B</b>
PROJECT ENGINEER	
 Michael Baker Engineering Inc. 8500 Regency Parkway, Suite 600 Cary, NORTH CAROLINA 27518 Phone: 919.463.5488 Fax: 919.463.5400 License #: F-1094	

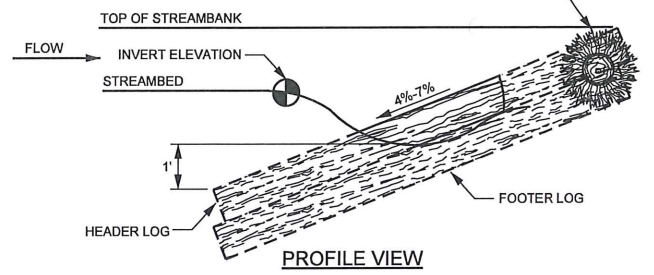
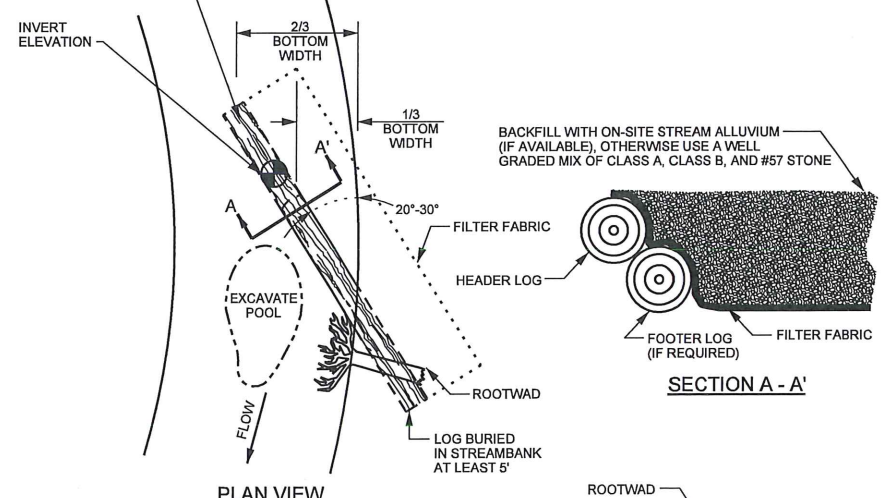


**LOG WEIR**



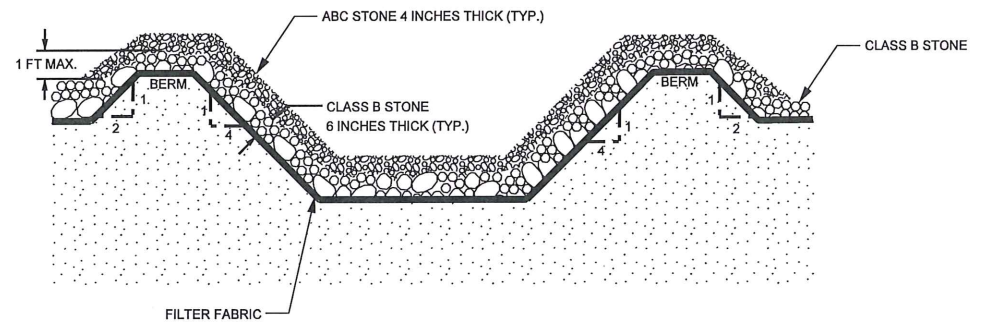
- NOTES:**
- LOGS SHOULD BE AT LEAST 12 INCHES IN DIAMETER, RELATIVELY STRAIGHT, HARDWOOD, AND RECENTLY HARVESTED.
  - LOGS >24 INCHES IN DIAMETER MAY BE USED ALONE WITHOUT AN ADDITIONAL LOG. FILTER FABRIC SHOULD STILL BE USED TO SEAL AROUND LOG.
  - PLACE FOOTER LOGS FIRST AND THEN HEADER (TOP) LOG. SET HEADER LOG AT A MAXIMUM OF 3 INCHES ABOVE THE INVERT ELEVATION.
  - CUT A NOTCH IN THE HEADER LOG APPROXIMATELY 30% OF THE CHANNEL BOTTOM WIDTH AND EXTENDING DOWN TO THE INVERT ELEVATION. NOTCH SHALL NOT EXCEED 3 INCHES IN DEPTH.
  - USE FILTER FABRIC FOR DRAINAGE TO SEAL GAPS BETWEEN LOGS.
  - PLACE TRANSPLANTS FROM TOE OF STREAMBANK TO TOP OF STREAMBANK.

**LOG VANE**



- NOTES:**
- LOGS SHOULD BE AT LEAST 10" IN DIAMETER, RELATIVELY STRAIGHT, HARDWOOD, AND RECENTLY HARVESTED.
  - SOIL SHOULD BE COMPACTED WELL AROUND BURIED PORTIONS OF LOG.
  - ROOTWADS SHOULD BE PLACED BENEATH THE HEADER LOG AND PLACED SO THAT IT LOCKS THE HEADER LOG INTO THE BANK. SEE ROOTWAD DETAIL.
  - FILTER FABRIC SHOULD BE NAILED TO THE LOG BELOW THE BACKFILL.

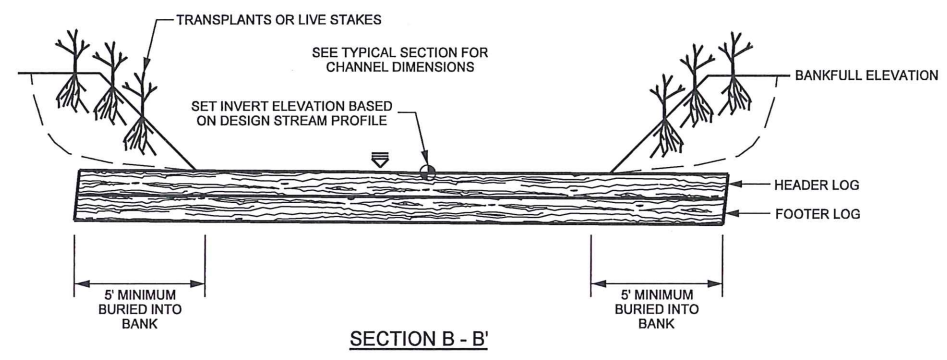
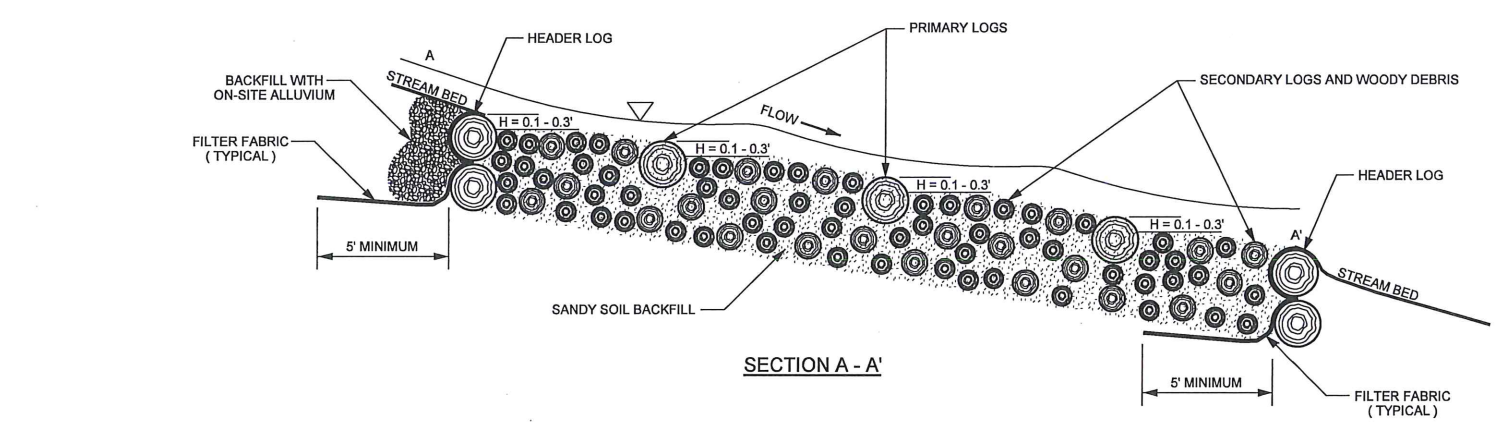
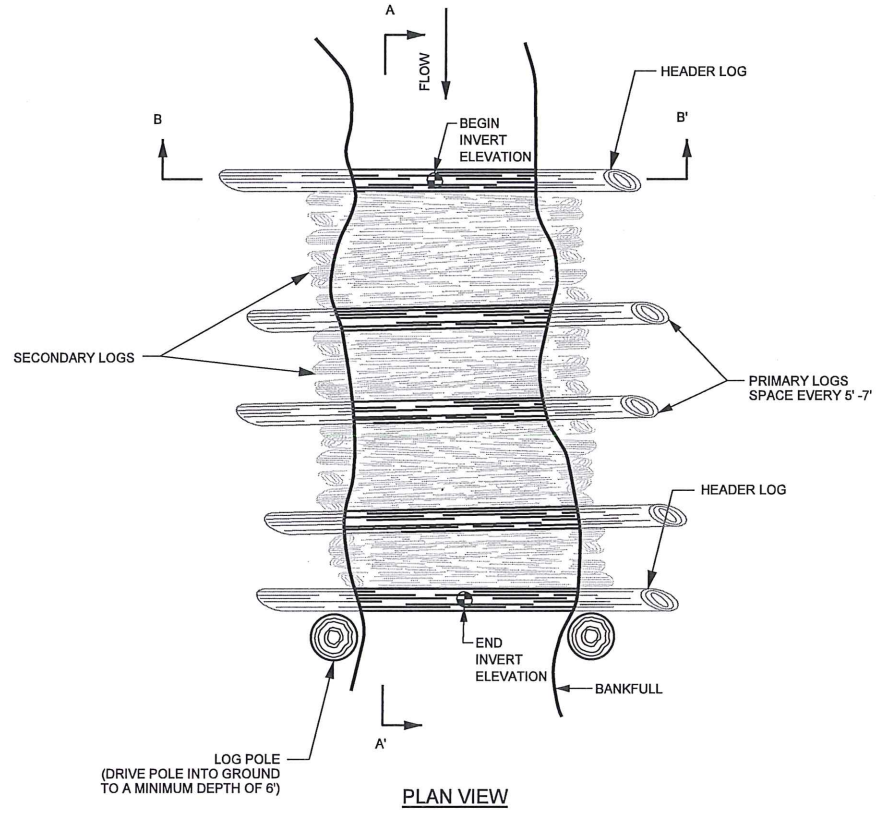
**PERMANENT FORD STREAM CROSSING**



- NOTES:**
- CONSTRUCT STREAM CROSSING WHEN FLOW IS LOW.
  - HAVE ALL NECESSARY MATERIALS AND EQUIPMENT ON-SITE BEFORE WORK BEGINS.
  - MINIMIZE CLEARING AND EXCAVATION OF STREAMBANKS. DO NOT EXCAVATE CHANNEL BOTTOM. COMPLETE ONE SIDE BEFORE STARTING ON THE OTHER SIDE.
  - INSTALL STREAM CROSSING AT RIGHT ANGLE TO THE FLOW.
  - GRADE SLOPES TO A 4:1 SLOPE. TRANSPLANT SOD FROM ORIGINAL STREAMBANK ONTO SIDE SLOPES.
  - MAINTAIN CROSSING SO THAT RUNOFF IN THE CONSTRUCTION ROAD DOES NOT ENTER EXISTING CHANNEL.
  - A STABILIZED PAD OF CLASS B STONE, 1 FOOT THICK, LINED WITH FILTER FABRIC FOR DRAINAGE SHALL BE USED OVER THE BERM AND ACCESS SLOPES. ABC STONE APPROXIMATELY 4 INCHES THICK ADDED TO TOP LAYER.
  - WIDTH OF THE CROSSING SHALL BE SUFFICIENT TO ACCOMMODATE THE LARGEST VEHICLE CROSSING THE CHANNEL.
  - CONTRACTOR SHALL DETERMINE AN APPROPRIATE RAMP ANGLE ACCORDING TO EQUIPMENT UTILIZED.

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### GRADE CONTROL LOG JAM

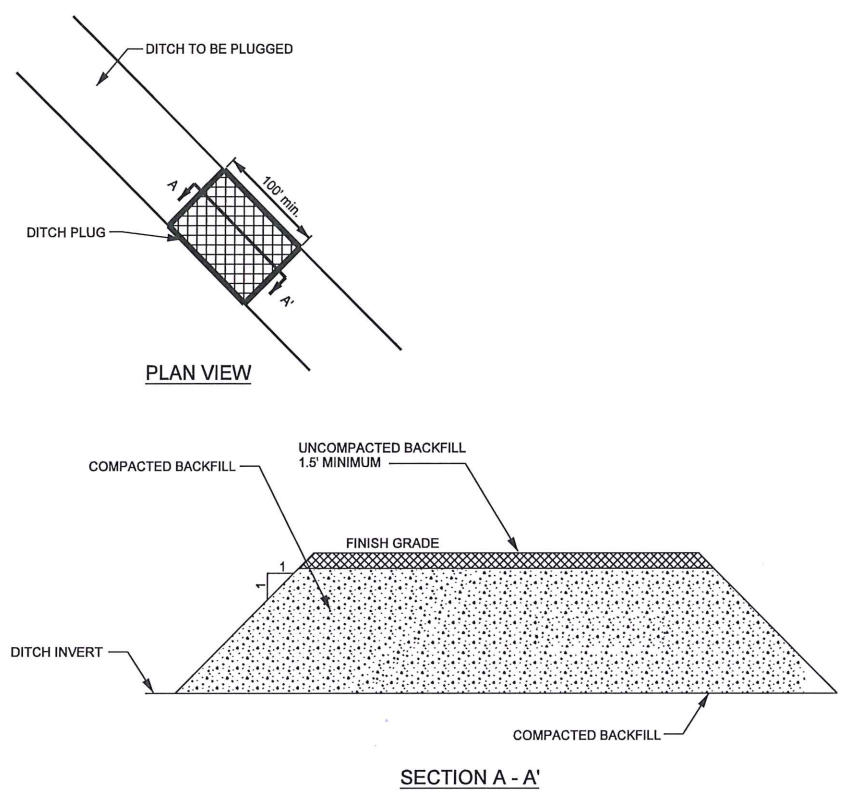


- NOTES:**
1. PRIMARY LOGS SHOULD BE AT LEAST 10" OR MORE IN DIAMETER, RELATIVELY STRAIGHT, HARDWOOD PREFERRED, AND RECENTLY HARVESTED AND EXTENDING INTO THE BANK 5' ON EACH SIDE.
  2. SECONDARY LOGS SHOULD BE AT LEAST 1" IN DIAMETER AND NO LARGER THAN 10", AND EXTEND INTO THE BANK 2 FEET ON EACH SIDE. WOOD MATERIAL SHALL BE VARYING DIAMETER TO ALLOW MATERIAL TO BE COMPACTED.
  3. VERTICAL POSTS SHOULD BE AT LEAST 10" IN DIAMETER AND SHOULD BE DRIVEN INTO THE GROUND A MINIMUM OF 6'.
  4. FILTER FABRIC SHOULD BE NAILED TO THE HEADER LOG BELOW THE BACKFILL.
  5. ROOTWADS AND COIR FIBER MATTING CAN BE USED INSTEAD OF TRANSPLANTS OR LIVE STAKES, PER DIRECTION OF ENGINEER.
  6. AFTER TRENCH HAS BEEN EXCAVATED A LAYER OF SECONDARY LOGS AND WOODY DEBRIS SHOULD BE PLACED WITH MINIMAL GAPS. A LAYER OF ON-SITE ALLUVIUM SHOULD BE APPLIED TO FILL VOIDS BETWEEN SECONDARY LOGS BEFORE ADDITIONAL LAYERS ARE PLACED.

BAKER PROJECT REFERENCE NO. <b>124578</b>	SHEET NO. <b>2-C</b>
PROJECT ENGINEER	
<b>Baker</b>	
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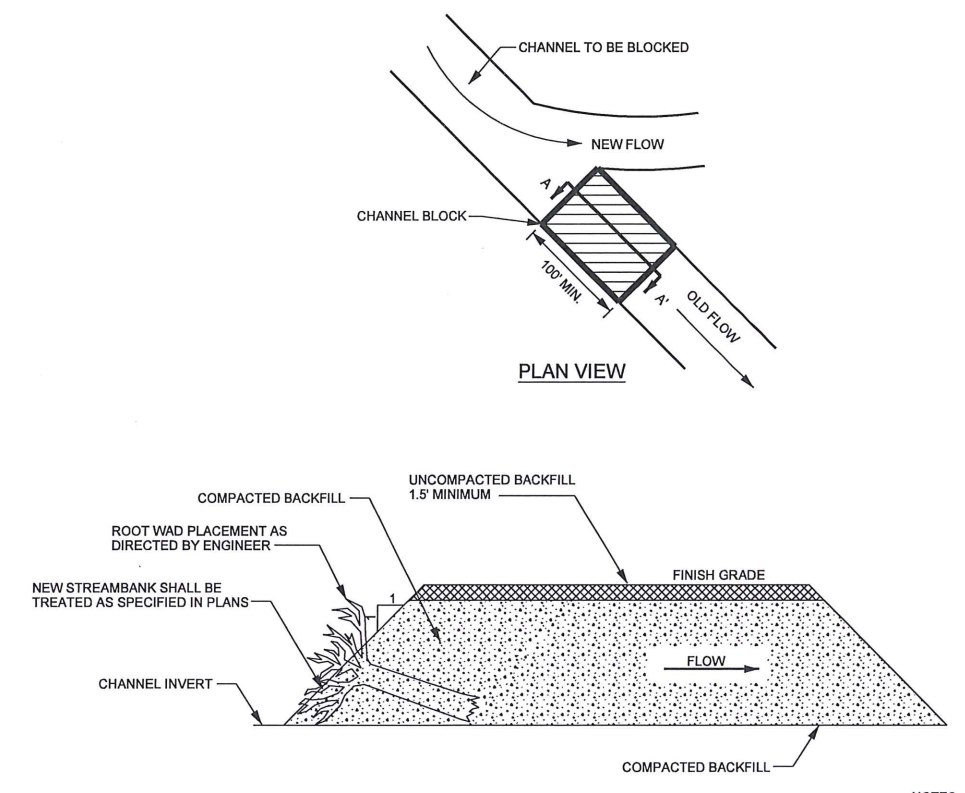


### DITCH PLUG



- NOTES:**
1. COMPACT BACKFILL USING ON-SITE HEAVY EQUIPMENT IN 10 INCH LIFTS.
  2. FILL DITCH TO TOP OF BANKS OR AS DIRECTED BY ENGINEER.

### CHANNEL BLOCK



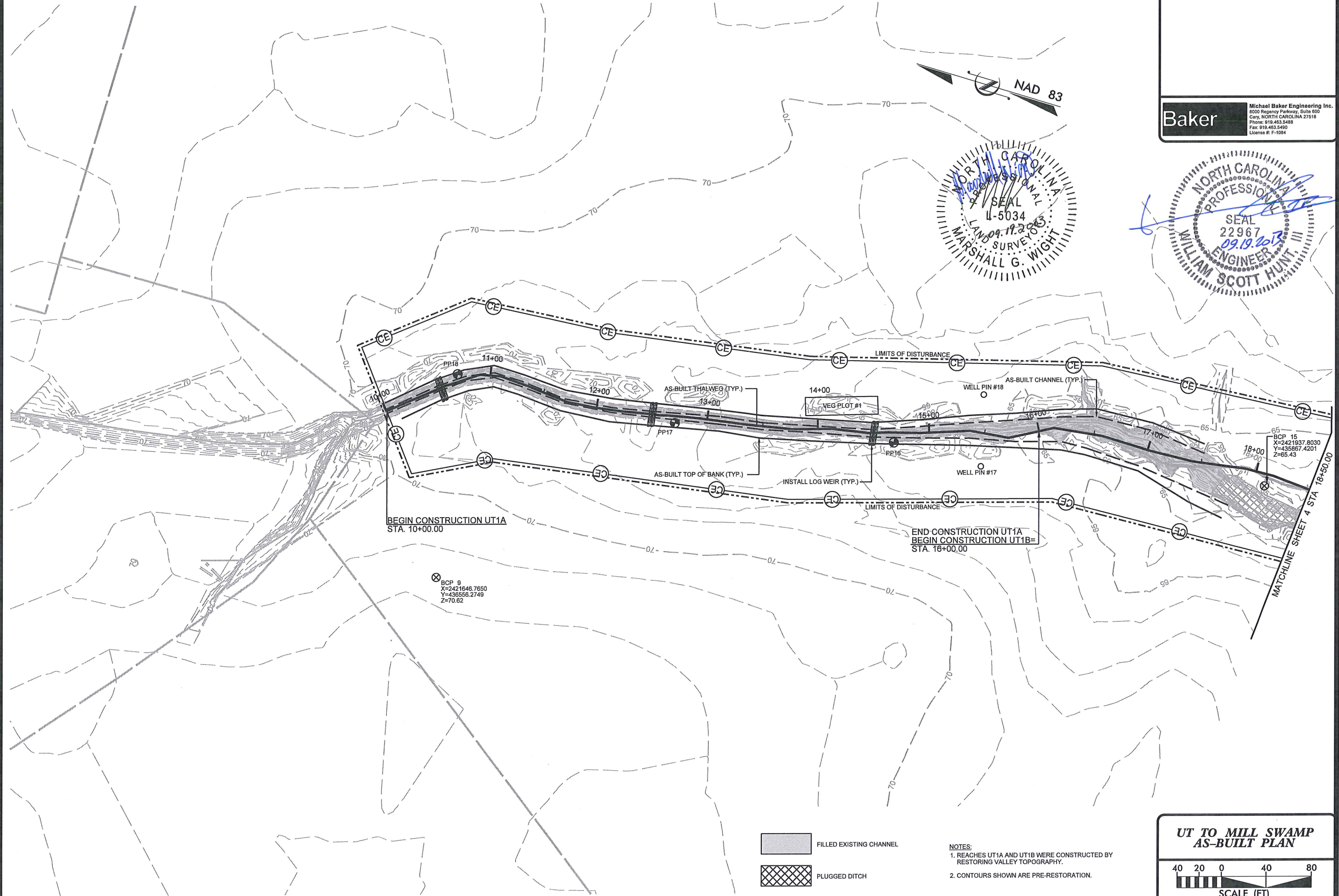
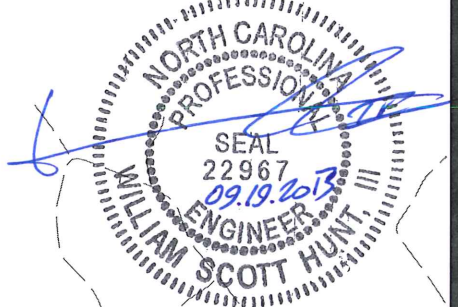
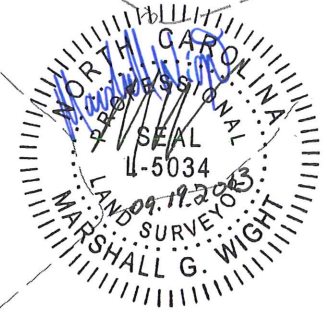
- NOTES:**
1. COMPACT BACKFILL USING ON-SITE HEAVY EQUIPMENT IN 10 INCH LIFTS.
  2. FILL DITCH TO TOP OF BANKS OR AS DIRECTED BY ENGINEER.

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BAKER PROJECT REFERENCE NO. <b>124578</b>	SHEET NO. <b>3</b>
PROJECT ENGINEER	
	
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BEGIN CONSTRUCTION UT1A  
STA. 10+00.00

END CONSTRUCTION UT1A  
BEGIN CONSTRUCTION UT1B=  
STA. 16+00.00


BCP 9  
X=2421648.7650  
Y=436558.2749  
Z=70.62

BCP 15  
X=2421937.8030  
Y=435867.4201  
Z=65.43

	FILLED EXISTING CHANNEL
	PLUGGED DITCH

- NOTES:
1. REACHES UT1A AND UT1B WERE CONSTRUCTED BY RESTORING VALLEY TOPOGRAPHY.
  2. CONTOURS SHOWN ARE PRE-RESTORATION.

**UT TO MILL SWAMP  
AS-BUILT PLAN**



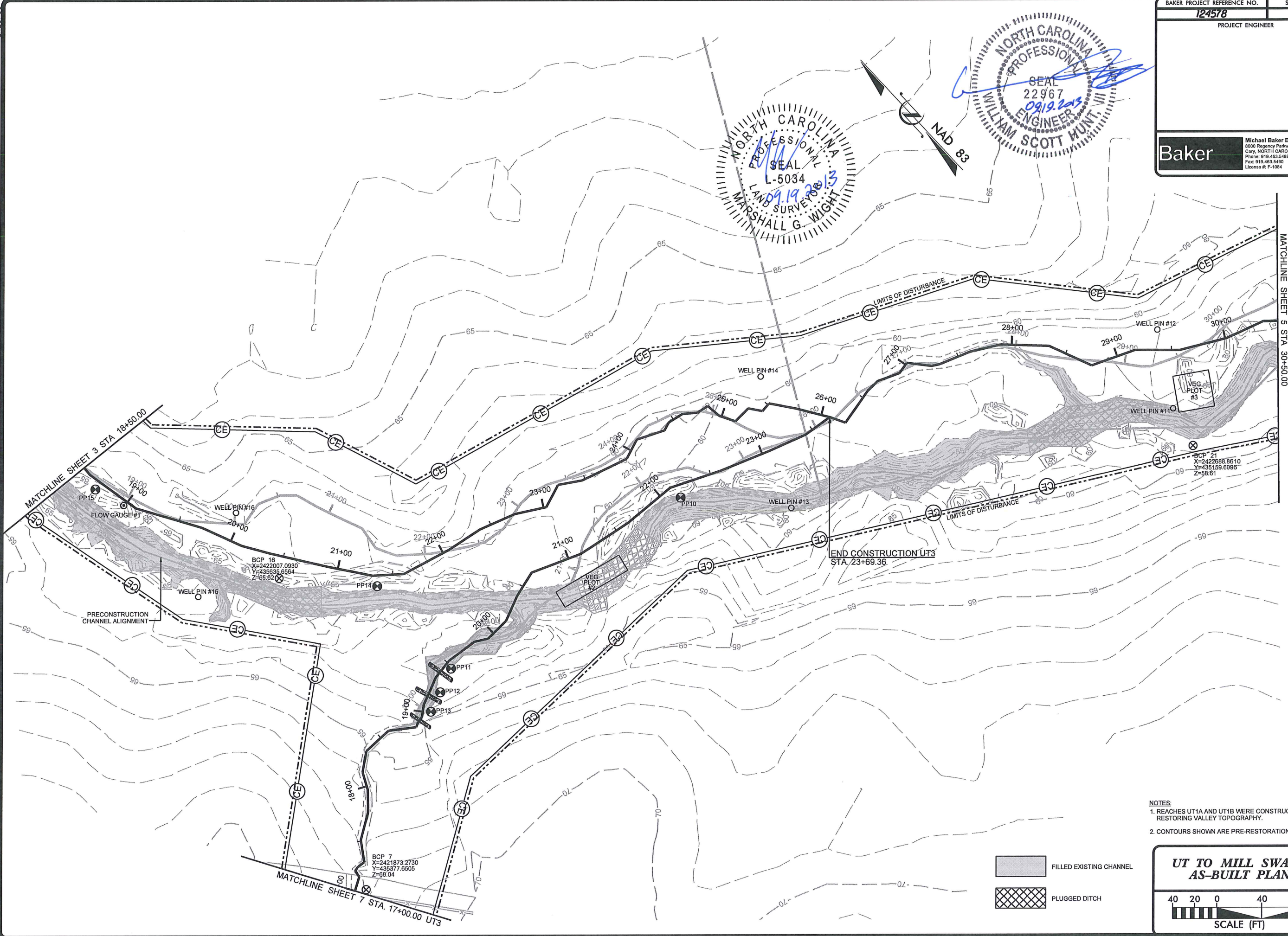
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BAKER PROJECT REFERENCE NO.	SHEET NO.
124578	4
PROJECT ENGINEER	



- NOTES:
1. REACHES UT1A AND UT1B WERE CONSTRUCTED BY RESTORING VALLEY TOPOGRAPHY.
  2. CONTOURS SHOWN ARE PRE-RESTORATION.

	FILLED EXISTING CHANNEL
	PLUGGED DITCH

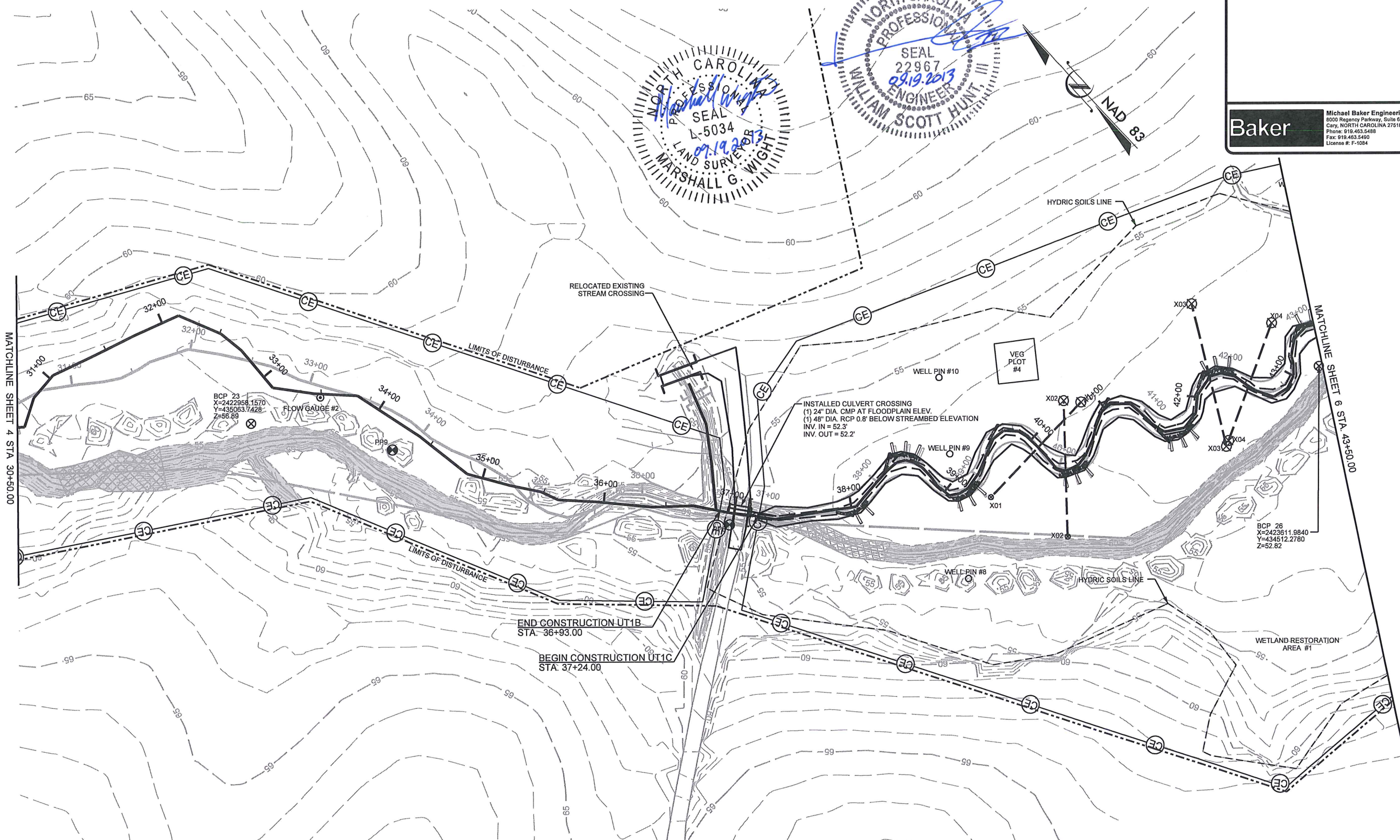
**UT TO MILL SWAMP AS-BUILT PLAN**

SCALE (FT)

2/26/03

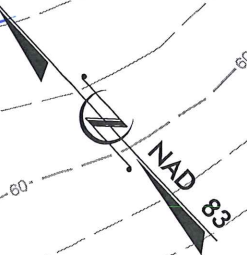
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PROJECT ENGINEER	
<b>Baker</b>	
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NORTH CAROLINA PROFESSIONAL SEAL  
 22967  
 02.19.2013  
 ENGINEER  
 WILLIAM SCOTT HUNT

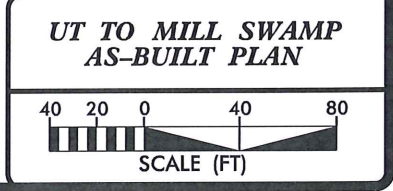
NORTH CAROLINA PROFESSIONAL SEAL  
 L-5034  
 07.19.2013  
 LAND SURVEYOR  
 MARSHALL G. WIGHT



**NOTES:**

- REACHES UT1A AND UT1B WERE CONSTRUCTED BY RESTORING VALLEY TOPOGRAPHY.
- CONTOURS SHOWN ARE PRE-RESTORATION.

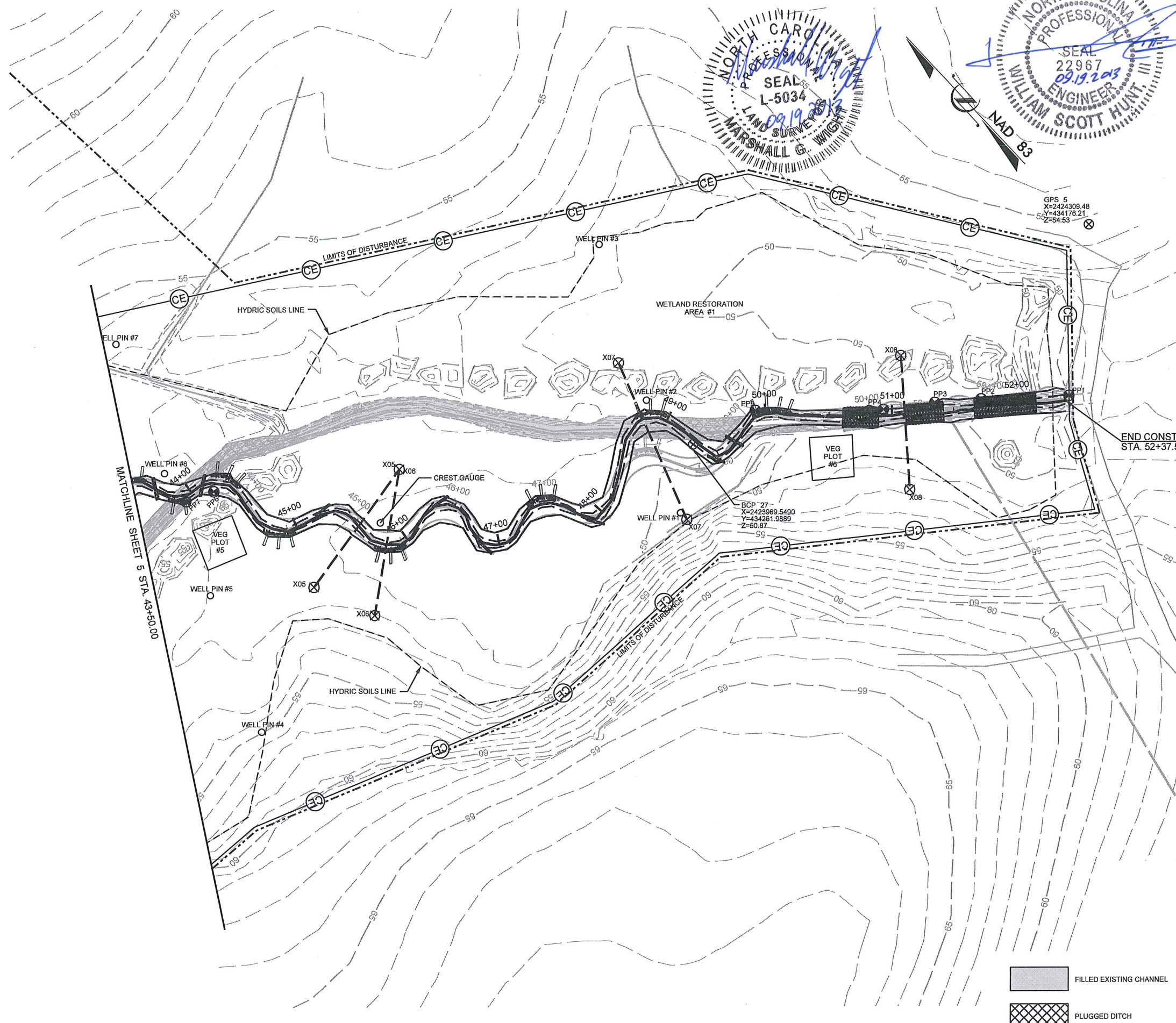
[Solid Grey Box] FILLED EXISTING CHANNEL  
 [Cross-hatched Box] PLUGGED DITCH



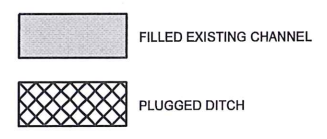
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PROJECT ENGINEER	



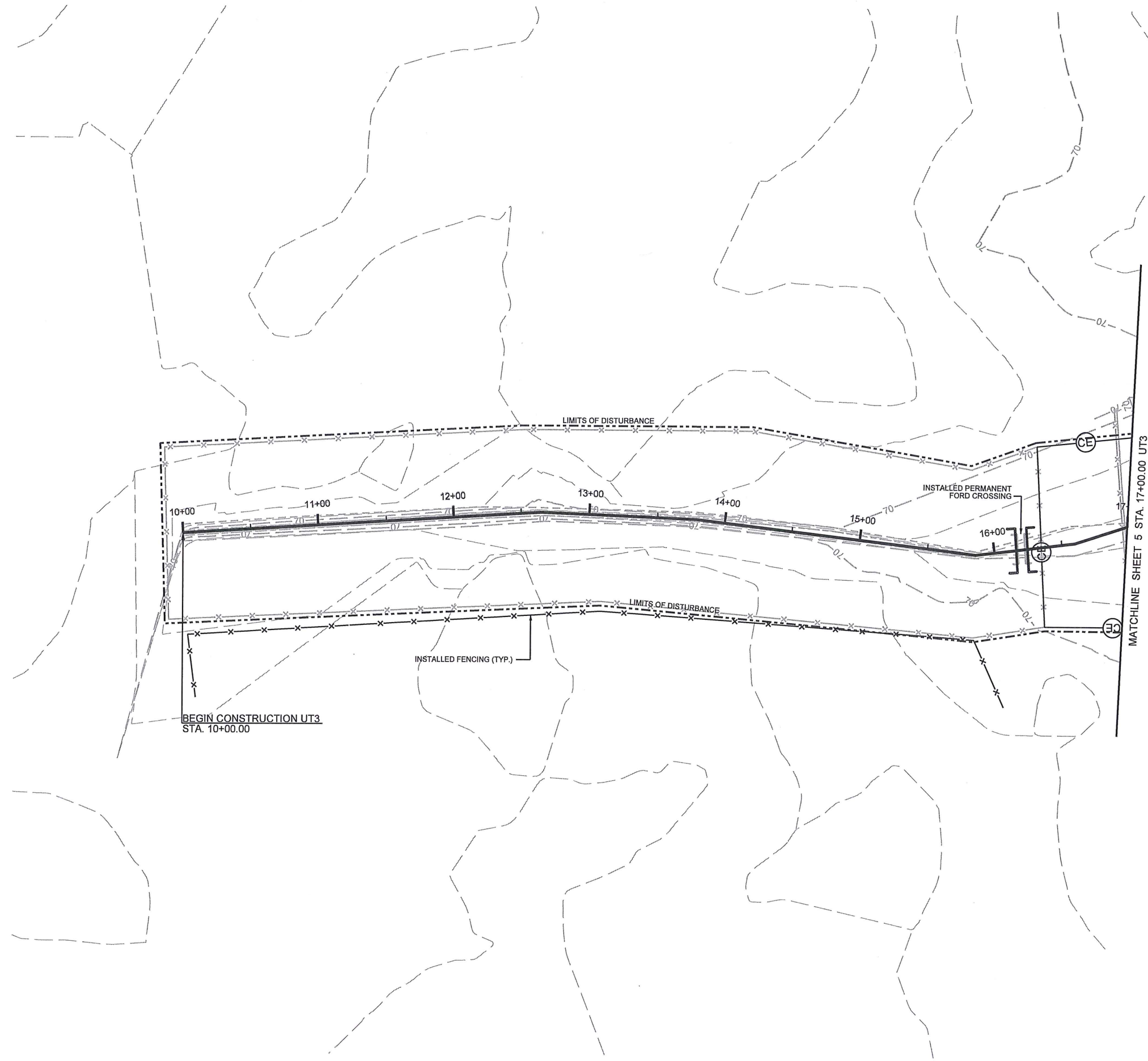
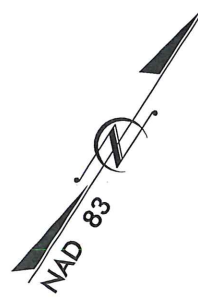
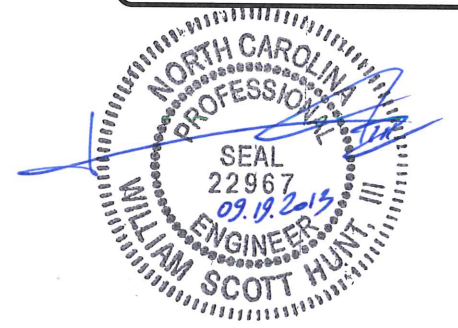
NOTES:  
 1. REACHES UT1A AND UT1B WERE CONSTRUCTED BY RESTORING VALLEY TOPOGRAPHY.  
 2. CONTOURS SHOWN ARE PRE-RESTORATION.



**UT TO MILL SWAMP AS-BUILT PLAN**

SCALE (FT)

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 8000 Regency Parkway, Suite 600  
 Cary, NORTH CAROLINA 27518  
 Phone: 919.483.5488  
 Fax: 919.483.5490  
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NOTE:  
 NO CONSTRUCTION ACTIVITIES WERE PERFORMED ALONG UT3  
 OTHER THAN FENCE INSTALLATION AND STREAM CROSSING  
 FROM STATION 10+00 TO 16+34.

**UT TO MILL SWAMP  
 AS-BUILT PLAN**

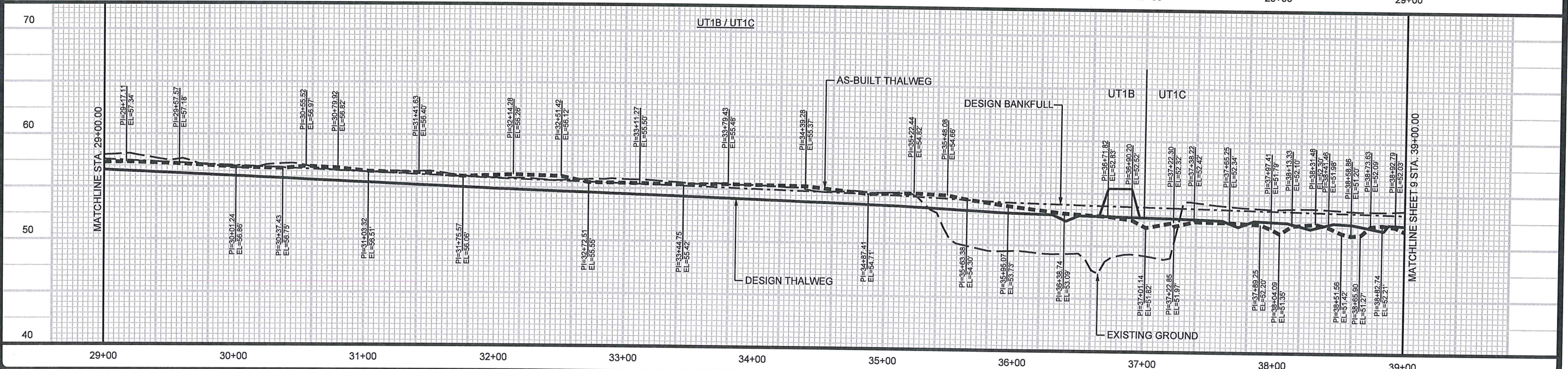
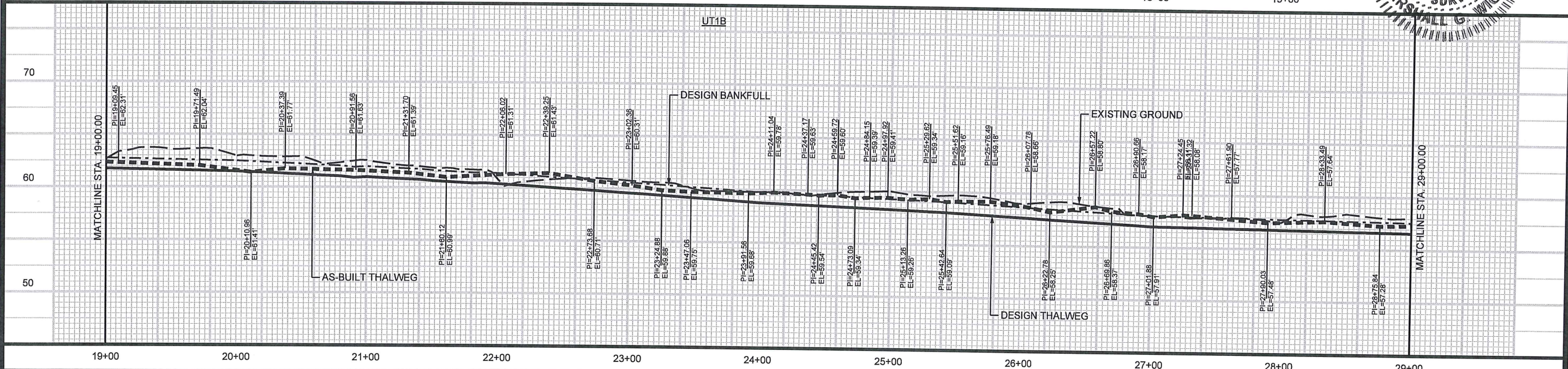
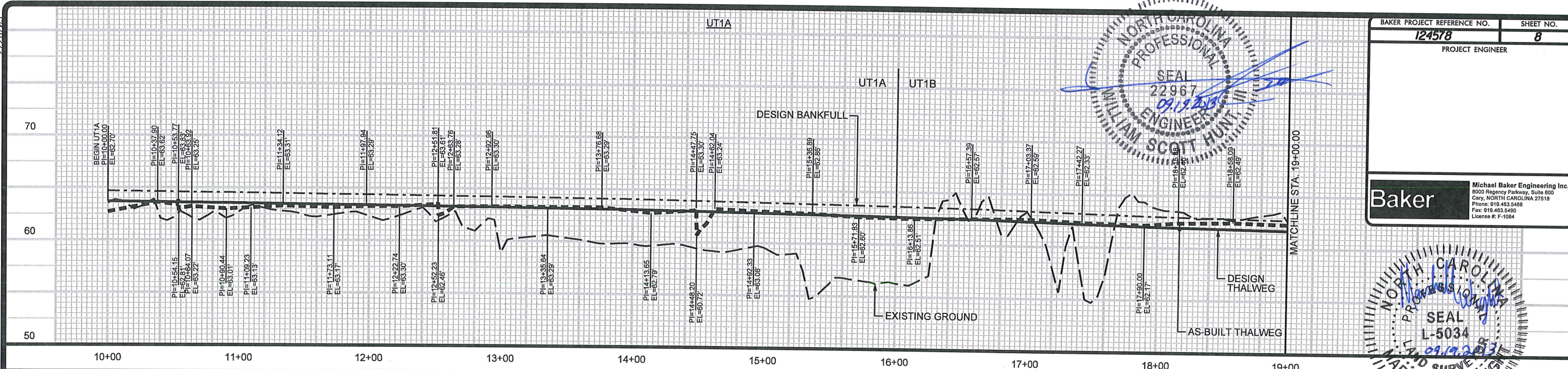
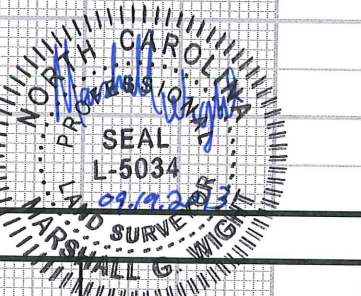
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