STATE	BAKER PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
NC	166680	1	24

NORTH CAROLINA
DIVISION OF MITIGATION SERVICES

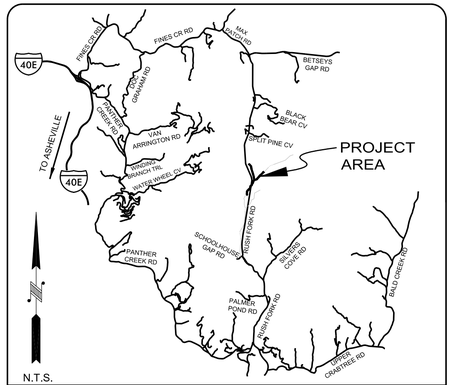
HAYWOOD COUNTY

LOCATION: FROM EXIT 24 ON INTERSTATE 40, TRAVEL NORTH FOR 5.75 MILES ON NC HWY 209 RUSH FORK ROAD

TYPE OF WORK: RECORD DRAWINGS

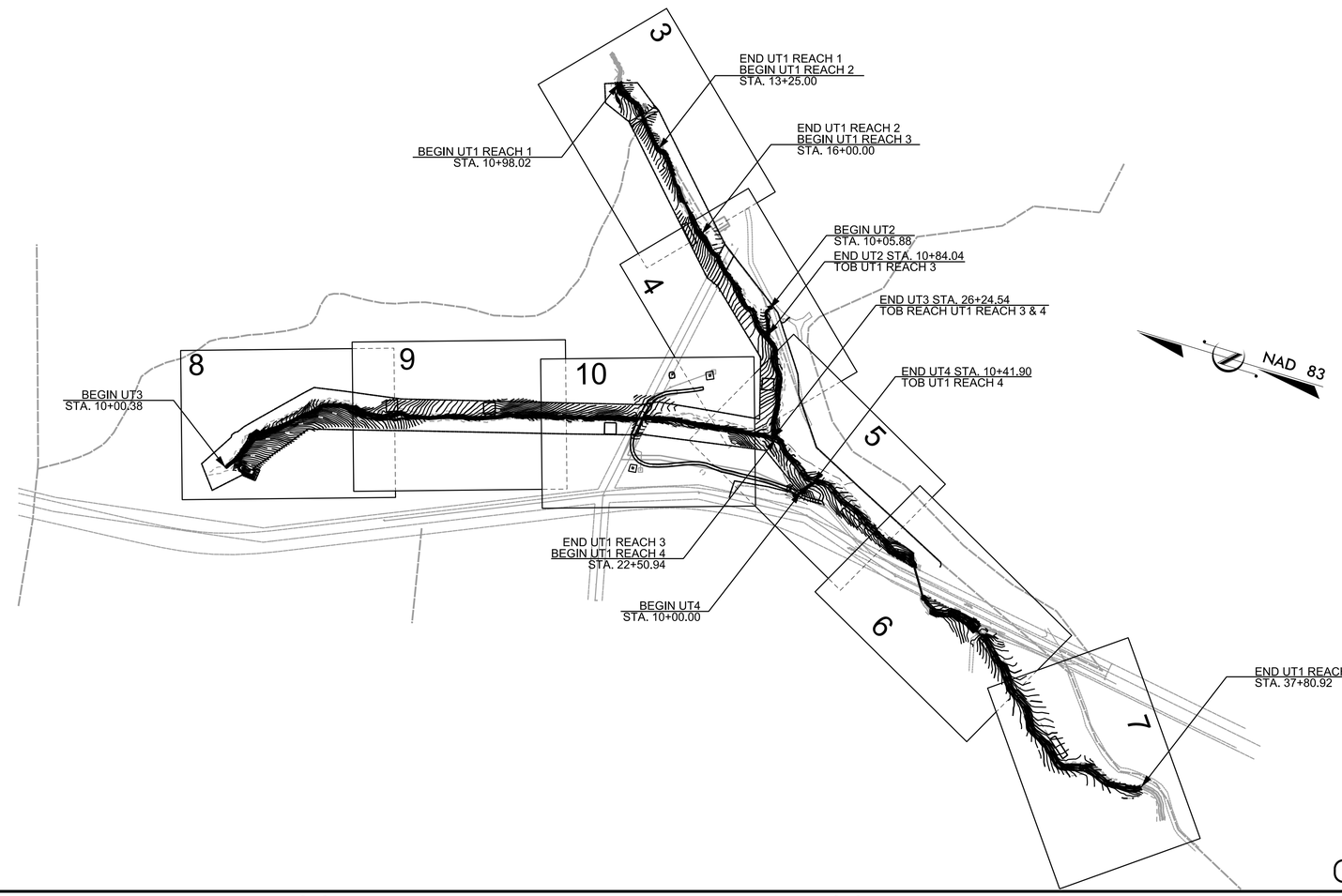
UT to RUSH FORK

PROJECT: 166680



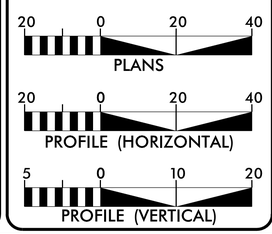
VICINITY MAP

INDEX OF SHEETS



NCDMS ID NO. 100068

GRAPHIC SCALES



MITIGATION SUMMARY

REACH	STREAM RESTORATION	STREAM ENHANCEMENT I	STREAM ENHANCEMENT II
UT1 R1	0	206.41	0
UT1 R2	0	0	275.00
UT1 R3	0	600.86	0
UT1 R4	1224.37	0	0
UT2	0	0	78.16
UT3	1577.53	0	0
UT4	41.90	0	0
TOTAL	2843.80	807.27	353.16

PREPARED FOR THE OFFICE OF:

NCDEQ
NC DIVISION OF MITIGATION SERVICES
217 WEST JONES STREET, SUTIE 3000a
RALEIGH, NC 27603

CONTACT: PAUL WIESNER
PROJECT MANAGER

Michael Baker INTERNATIONAL
Michael Baker Engineering Inc.
8000 Regency Parkway, Suite 600
Cary, NORTH CAROLINA 27518
Phone: 919.463.5488
Fax: 919.463.5490
License #: F-1084

LETTING DATE:

KATHLEEN M. MCKEITHAN, PE
PROJECT ENGINEER

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028432 ENGINEER KATHLEEN M. MCKEITHAN

SIGNATURE: *P.E.*

2/26/03

STREAM CONVENTIONAL SYMBOLS

SUPERCEDES SHEET 1-B

- J-HOOK VANE
- GRADE CONTROL J-HOOK VANE
- ROCK VANE
- OUTLET PROTECTION
- ROCK CROSS VANE
- DOUBLE DROP ROCK CROSS VANE
- LOG AND ROCK STEP / POOL
- TEMPORARY ROCK DAM
- ROOT WAD
- LOG J-HOOK VANE
- GRADE CONTROL LOG J-HOOK VANE
- LOG VANE
- LOG STEP
- LOG CROSS VANE
- LOG ROLLER
- CONSTRUCTED RIFFLE
- BOULDER CLUSTER
- BOULDER STEP
- SAFETY FENCE
- TF — TAPE FENCE
- WLB — JURISDICTIONAL WETLAND BOUNDARY

- FP — 100 YEAR FLOOD PLAIN
- CE — CONSERVATION EASEMENT
- 435 — EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- LIMITS OF DISTURBANCE
- PROPERTY LINE
- FOOT BRIDGE
- TEMPORARY STREAM CROSSING
- PERMANENT STREAM CROSSING
- TRANSPLANTED VEGETATION
- TREE REMOVAL
- TREE PROTECTION
- DITCH PLUG
- CHANNEL FILL
- SOD MAT WITH WOOD TOE
- GEOLIFT WITH BRUSH TOE
- ROOT WAD REVETMENT WITH LIVE BRUSH
- BOULDER TOE PROTECTION
- PROPOSED WETLAND RE-ESTABLISHMENT
- PROPOSED WETLAND ENHANCEMENT
- PROPOSED WETLAND REHABILITATION

- MONITORING WELL
- RAIN GAUGE
- CREST GAUGE
- IN STREAM FLOW GAUGE

**NOTE: ALL ITEMS ABOVE MAY NOT BE USED ON THIS PROJECT

STANDARD SPECIFICATIONS

NORTH CAROLINA
EROSION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL
MARCH 2009 (REV 2013)

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

PROJECT REFERENCE NO.	SHEET NO.
166680	1-A

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028432 ENGINEER KATHLEEN M MCKETHAN

APPROVED BY:

DATE:

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Phone: 919.463.5488
Fax: 919.463.5490
License #: F-1084

NCDMS ID NO. 100068

GENERAL NOTES

1. THE CONTRACTOR IS REQUIRED TO INSTALL IN-STREAM STRUCTURES USING A TRACK HOE WITH A HYDRAULIC THUMB OF SUFFICIENT SIZE TO PLACE BOULDERS (3'x2'x2'), LOGS AND ROOTWADS.
2. WORK IS BEING PERFORMED AS AN ENVIRONMENTAL RESTORATION PLAN. THE CONTRACTOR SHOULD MAKE ALL REASONABLE EFFORTS TO REDUCE SEDIMENT LOSS AND MINIMIZE DISTURBANCE OF THE SITE WHILE PERFORMING THE CONSTRUCTION WORK.
3. CONSTRUCTION IS SCHEDULED FOR THE SPRING OF 2020.
4. CONTRACTOR SHOULD CALL NORTH CAROLINA "ONE-CALL" BEFORE EXCAVATION STARTS. (1-800-632-4949)
5. BOULDER SIZES FOR IN-STREAM STRUCTURES SHALL BE A MINIMUM OF 3'x2'x1' AND CAN BE CHANGED PER STRUCTURE OR THE DIRECTION OF THE ENGINEER.
6. ALL ON-SITE ALLUVIUM SHALL BE HARVESTED AND STOCKPILED PRIOR TO FILLING ABANDONED CHANNELS.
7. TOPSOIL SHALL BE EXCAVATED TO A DEPTH OF 8" AND STOCKPILED SEPARATELY FROM UNDERCUT SOIL. 8" OF TOPSOIL SHALL BE PLACED ON ALL BANKFULL BENCHES AND AS DIRECTED BY THE ENGINEER.
8. ALL DISTURBED EMBANKMENTS SHALL BE MATTED WITH COIR FIBER MATTING OR AS DIRECTED BY THE ENGINEER.
9. ALL STREAM BANKS SHALL BE LIVE STAKED.
10. UNLESS THE ALIGNMENT IS BEING ALTERED, THE EXISTING CHANNEL DIMENSIONS ARE TO REMAIN UNLESS OTHERWISE NOTED.
11. CONTRACTOR WILL ENSURE THAT FENCING IS INSTALLED ON OR OUTSIDE THE CONSERVATION EASEMENT AS SHOWN ON THE PLANS BUT NO MORE THAN 1' OUTSIDE.
12. WHERE PROPOSED FENCE CROSSES EXISTING STREAMS, THE CONTRACTOR SHALL UTILIZE A SECTION OF BREAK AWAY FENCE, A FLOOD GATE, OR ELECTRIFIED CHAINS AS DIRECTED BY THE ENGINEER.
13. ANY BORROW OR WASTE ASSOCIATED WITH THIS PROJECT MUST COME FROM OR GO TO A PERMITTED SITE AND/OR FACILITY.

VEGETATION SELECTION

Proposed Bare-Root and Live Stake Species
UT to Rush Fork Mitigation Project - NCDMS Project No. 100068

Botanical Name	Common Name	% Planted by Species	Wetland Tolerance
All Buffer Plantings at 680 stems/acre using 8' X 8' spacing			
General Riparian Zone – Overstory/Canopy Species			
Betula nigra	River Birch	10%	FACW
Platanus occidentalis	Sycamore	10%	FACW
Liriodendron tulipifera	Tulip Poplar	10%	FACU
Betula lenta	Sweet Birch	10%	FAC
Quercus alba	White Oak	10%	FACU
Tilia americana	American Basswood	0%	FACU
Aesculus flava	Yellow Buckeye	7.5%	FACU
Nyssa sylvatica	Blackgum	5%	FAC
Fraxinus americana	White Ash	5%	FACU
Diospyros virginiana	Persimmon	7.5%	FAC
Ulmus americana	American Elm	5%	FACW
General Riparian Zone – Understory/Shrub Species			
Rhododendron maximum	Rosebay	0%	FAC
Lindera benzoin	Spicebush	2.5%	FAC
Ilex verticillata	Winterberry	5%	FACW
Carpinus caroliniana	American Hornbeam	5%	FAC
Sambucus canadensis	Elderberry	2.5%	FAC
Magnolia tripetala	Umbrella Tree	0%	FACU
Halesia carolina	Carolina Silverbell	5%	FAC

Wetland Zone – Overstory/Canopy Species			
Betula nigra	River Birch	15%	FACW
Platanus occidentalis	Sycamore	15%	FACW
Betula alleghaniensis	Yellow Birch	10%	FAC
Quercus imbricaria	Shingle Oak	5%	FAC
Nyssa sylvatica	Blackgum	5%	FAC
Acer negundo	Box Elder	5%	FAC
Fraxinus pennsylvanica	Green Ash	5%	FACW
Ulmus americana	American Elm	5%	FACW
Wetland Zone – Understory/Shrub Species			
Alnus serrulata	Tag Alder	15%	OBL
Ilex verticillata	Winterberry	5%	FACW
Lindera benzoin	Spicebush	5%	FAC
Cephalanthus occidentalis	Buttonbush	2.5%	OBL
Cornus amomum	Silky Dogwood	2.5%	FACW
Xanthorhiza simplicissima	Yellow-root	2.5%	FACW
Aronia arbutifolia	Red Chokeberry	2.5%	FACW
Streambank Live Stake Plantings			
Salix sericea	Silky Willow	25%	OBL
Sambucus canadensis	Elderberry	20%	FACW
Cephalanthus occidentalis	Buttonbush	10%	OBL
Cornus amomum	Silky Dogwood	25%	FACW
Salix nigra	Black Willow	20%	OBL

Proposed Permanent Seed Mixture
UT to Rush Fork Stream Mitigation Project – NCDMS Project No. 100068

Botanical Name	Common Name	% Planted by Species	Density (lbs/ac)	Wetland Tolerance
Agrostis perennans	Autumn Bentgrass	10%	1.5	FACU
Elymus virginicus	Virginia Wildrye	15%	2.25	FACW
Panicum virgatum	Switchgrass	15%	2.25	FAC
Tripsacum dactyloides	Eastern Gamma Grass	5%	0.75	FACW
Polygonum pennsylvanicum	Pennsylvania Smartweed	5%	0.75	FACW
Schizachyrium scoparium	Little Blue Stem	5%	0.75	FACU
Juncus effusus	Soft Rush	5%	0.75	FACW
Bidens frondosa (or aristosa)	Beggars Tick	5%	0.75	FACW
Coreopsis lanceolata	Lance-Leaved Tick Seed	10%	1.5	FACU
Dichanthelium clandestinum	Tioga Deer Tongue	15%	2.25	FAC
Andropogon gerardii	Big Blue Stem	5%	0.75	FAC
Sorghastrum nutans	Indian Grass	5%	0.75	FACU
	Total	**100%**	**15**	

Note: Final species selection may change due to refinement of site conditions or to availability at the time of planting. If species substitution is required, the planting Contractor will submit a revised planting list to Baker for approval prior to the procurement of plant stock.

PERCETAGES SHOWN IN RED ARE THE CONSTRUCTED PLANTED PERCENTATGE.

6/6/2022
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mcarey

2/26/03

PROJECT REFERENCE NO.	SHEET NO.
166680	1-B
NCDMS ID NO. 100068	

NORTH CAROLINA PROFESSIONAL SEAL 039201 ENGINEER JACOB M BYERS

APPROVED BY:

DATE:

*S.U.E = SUBSURFACE UTILITY ENGINEER

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL SYMBOLS

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign — S
- Well — W
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1 — BZ 1
- Buffer Zone 2 — BZ 2
- Flow Arrow
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

- Standard Gauge — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch — 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 — RW
- Proposed Right of Way Line with Iron Pin and Cap Marker — RW
- Proposed Right of Way Line with Concrete or Granite Marker — RW
- Existing Control of Access — CA
- Proposed Control of Access — CA
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Utility Easement — PUE
- Proposed Temporary Utility Easement — TUE
- Proposed Permanent Easement with Iron Pin and Cap Marker

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Wheel Chair Ramp — WCR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

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

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole — HH
- H-Frame Pole
- Recorded U/G Power Line — P
- Designated U/G Power Line (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Booth
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — HH
- Recorded U/G Telephone Cable — T
- Designated U/G Telephone Cable (S.U.E.*) — T
- Recorded U/G Telephone Conduit — TC
- Designated U/G Telephone Conduit (S.U.E.*) — TC
- Recorded U/G Fiber Optics Cable — T FO
- Designated U/G Fiber Optics Cable (S.U.E.*) — T FO

WATER:

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

TV:

- TV Satellite Dish
- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- Recorded U/G TV Cable — TV
- Designated U/G TV Cable (S.U.E.*) — TV
- Recorded U/G Fiber Optic Cable — TV FO
- Designated U/G Fiber Optic Cable (S.U.E.*) — TV FO

GAS:

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

SANITARY SEWER:

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

MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line — ?UTL
- 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.

5/24/2022
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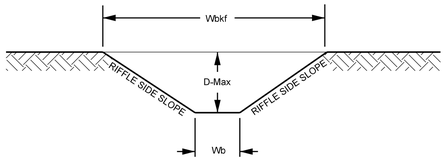
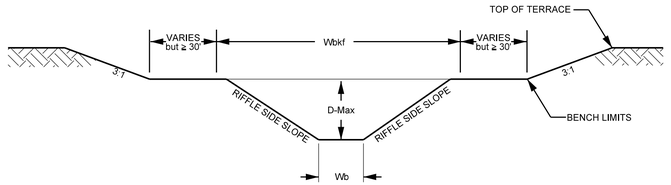
revised 02/02/00

2/26/03

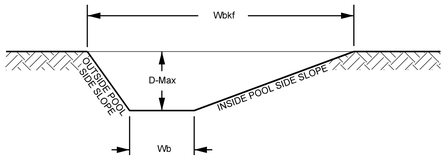
TYPICAL RIFFLE, POOL, AND BANKFULL BENCH CROSS SECTIONS



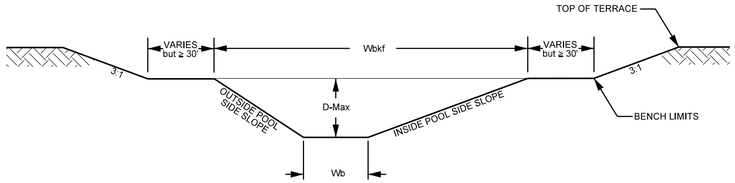
RIFFLE or PLUNGE POOL



RIFFLE WITH BANKFULL BENCH



POOL (MEANDER)



POOL WITH BANKFULL BENCH

	UT1 R1, R2, & R3 UPPER 10+00 - 19+50		UT1 R3 LOWER 19+50 - 22+61		UT1 R4 UPPER 22+61 - 28+00		UT1 R4 LOWER 28+00 - 37+95		UT2		UT3 UPPER 11+50 - 16+50		UT3 LOWER 16+50 - 26+45		UT4	
	RIFFLE	POOL	RIFFLE	POOL	RIFFLE	POOL	RIFFLE	POOL	RIFFLE	POOL	RIFFLE	POOL	RIFFLE	POOL	RIFFLE	POOL
WIDTH OF BANKFULL (Wbkf)	9.00	11.50	10.00	12.50	12.50	16.50	13.00	17.50	4.50	6.60	7.50	10.00	8.50	12.00	5.80	7.50
AVERAGE DEPTH	0.65	1.11	0.70	1.40	0.90	1.70	0.95	1.80	0.45	0.70	0.57	1.10	0.65	1.30	0.45	0.70
MAXIMUM DEPTH (Dmax)	0.80	1.50	1.00	2.00	1.20	2.50	1.30	2.50	0.60	1.00	0.70	1.70	0.85	1.80	0.50	1.00
W/D (Wbkf/Dbkf)	13.80	10.40	14.30	9.20	13.90	9.50	13.70	9.80	13.00	9.50	13.10	8.90	13.10	9.50	12.90	10.30
BANKFULL AREA (Abkf)	5.90	12.80	7.00	17.00	11.30	28.80	12.10	31.30	2.20	4.60	4.30	11.20	6.00	15.10	2.60	5.50
BOTTOM WIDTH (Wb)	5.80	5.50	5.00	4.50	8.10	6.50	8.50	7.50	4.00	2.60	4.70	3.20	4.90	4.80	3.60	3.50
RIFFLE SIDE SLOPE (X:1)	2.00	N/A	2.00	N/A	2.00	N/A	2.00	N/A	2.00	N/A	2.00	N/A	2.00	N/A	2.00	N/A
INSIDE POOL SIDE SLOPE	N/A	2.00	N/A	2.00	N/A	2.00	N/A	2.00	N/A	2.00	N/A	2.00	N/A	2.00	N/A	2.00
OUTSIDE POOL SIDE SLOPE	N/A	2.00	N/A	2.00	N/A	2.00	N/A	2.00	N/A	2.00	N/A	2.00	N/A	2.00	N/A	2.00

PROJECT REFERENCE NO.	SHEET NO.
166680	2

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028432 ENGINEER KATHLEEN M MCKENNA

APPROVED BY:

DATE:

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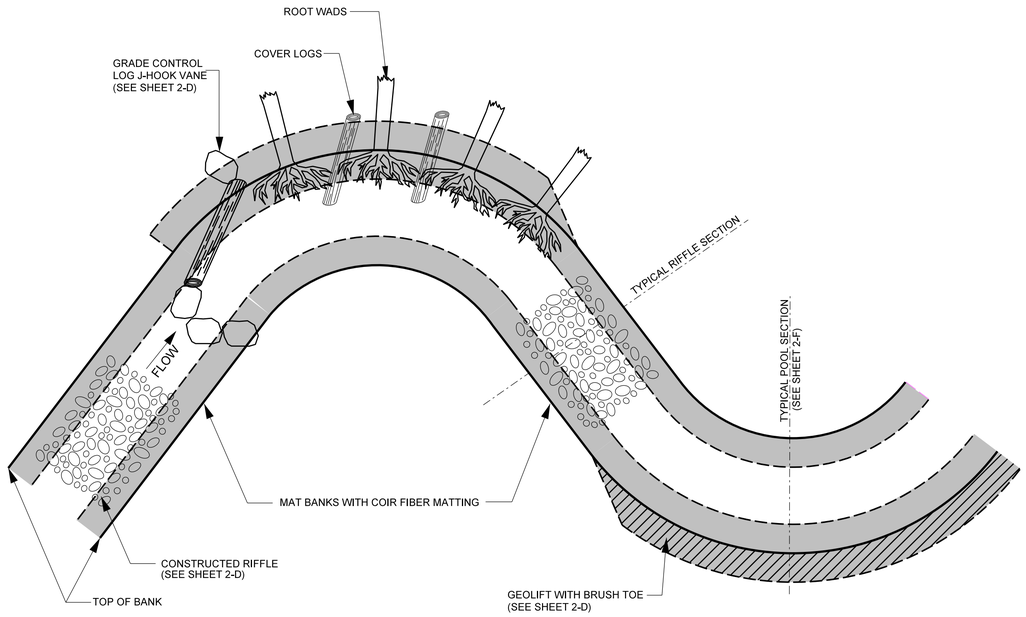
Fax: 919.463.5490
License #: F-1084

NCDMS ID NO. 100068

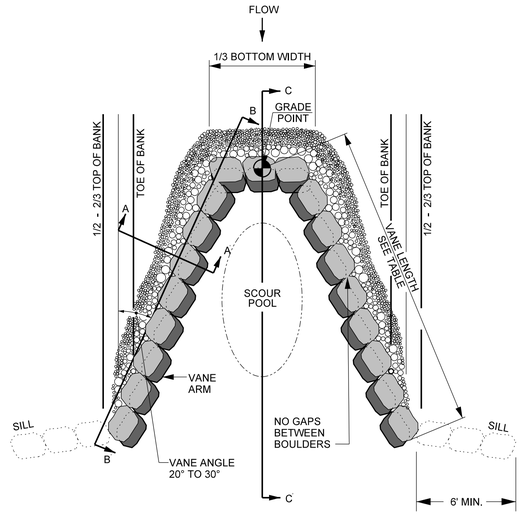
TYPICAL STRUCTURE PLACEMENT



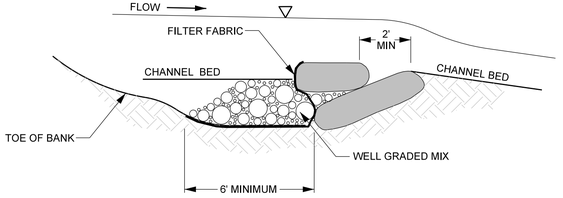
STRUCTURE NOTES:

1. GENERALLY CONSTRUCTED RIFFLES, ROOT WADS, LOG VANES AND COIR FIBER MATTING WILL BE INSTALLED IN THE LOCATION AND SEQUENCE AS SHOWN.
2. ANY CHANGES TO NUMBER OR LOCATION OF STRUCTURES DURING CONSTRUCTION MUST BE APPROVED BY THE DESIGN ENGINEER.
3. COIR FIBER MATTING TO BE INSTALLED ON ALL RESTORED STREAMBANKS, FLOODPLAIN BENCHING, AND TERRACE SLOPES AS DESCRIBED IN THE TECHNICAL SPECIFICATIONS.
4. ROOTWADS MAY BE REPLACED WITH GEOLIFT.

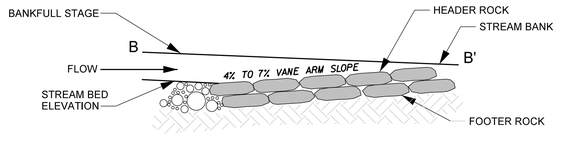
ROCK CROSS VANE



PLAN VIEW



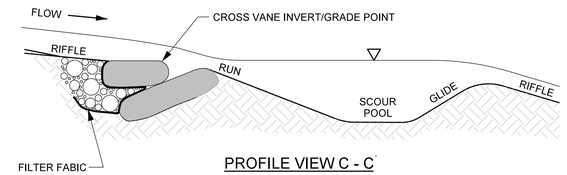
SECTION A - A'



PROFILE VIEW B - B'
VANE ARM

NOTES FOR ALL VANE STRUCTURES:

1. DIG A TRENCH BELOW THE BED FOR FOOTER ROCKS.
2. START AT BANK AND PLACE FOOTER ROCKS FIRST AND THEN HEADER (TOP) ROCK.
3. CONSTRUCT ANGLE AND SLOPE SPECIFICATIONS AS SHOWN.
4. AN EXTRA ROCK CAN BE PLACED IN SCOUR POOL FOR HABITAT IMPROVEMENT.
5. USE HAND PLACED STONE TO FILL GAPS ON UPSTREAM SIDE OF HEADER AND FOOTER ROCKS.
6. INSTALL GEOTEXTILE FABRIC BEGINNING AT THE TOP OF THE HEADER ROCKS AND EXTEND DOWNWARD TO THE DEPTH OF THE BOTTOM FOOTER ROCK, AND THEN UPSTREAM TO A MINIMUM OF SIX FEET.
7. AFTER ALL STONE BACKFILL HAS BEEN PLACED, FILL IN THE UPSTREAM SIDE OF THE STRUCTURE WITH WELL GRADED MIX OF CLASS B, CLASS A, & #57 STONE TO THE ELEVATION 2"-4" BELOW THE THE HEADER ROCK. INCORPORATE ON-SITE ALLUVIUM WHERE AVAILABLE. FILL SHOULD BE CONCAVE BEHIND THE VANE ARM TO ALLOW POOLING OF FLOW.
8. ON-SITE ALLUVIUM SHALL BE INCORPORATED INTO THE STONE BACKFILL WHERE AVAILABLE.
9. START SLOPE AT 2/3 TO 3/4 TIMES THE BANKFULL STAGE.
10. ALL REACHES, BOULDER SIZE 1' x 2' x 3' TO 2' x 2' x 4'.



PROFILE VIEW C - C'

2/26/03

PROJECT REFERENCE NO.	SHEET NO.
166680	2A

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 039201 ENGINEER JACOB M RYERS

APPROVED BY:

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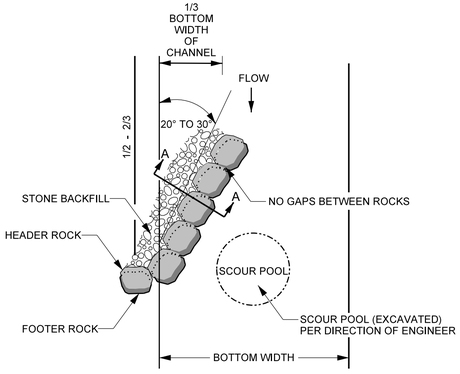
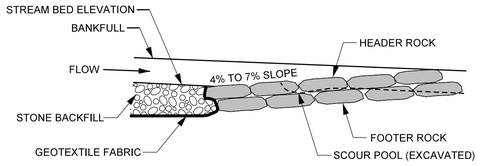
NCDMS ID NO. 100068

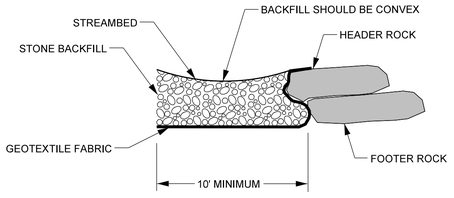
ROCK VANE



PLAN VIEW



PROFILE VIEW

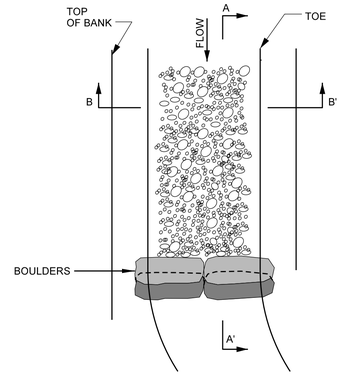


SECTION A - A

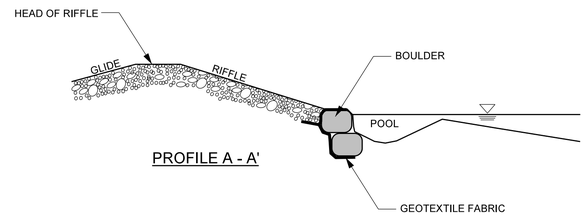
NOTES FOR ALL VANE STRUCTURES:

1. DIG A TRENCH BELOW THE BED FOR FOOTER ROCKS.
2. START AT BANK AND PLACE FOOTER ROCKS FIRST AND THEN HEADER (TOP) ROCK.
3. CONTINUE WITH STRUCTURE, FOLLOWING ANGLE AND SLOPE SPECIFICATIONS.
4. AN EXTRA ROCK CAN BE PLACED IN SCOUR POOL FOR HABITAT IMPROVEMENT.
5. USE HAND PLACED STONE TO FILL GAPS ON UPSTREAM SIDE OF HEADER AND FOOTER ROCKS.
6. INSTALL GEOTEXTILE FABRIC BEGINNING AT THE TOP OF THE HEADER ROCKS AND EXTEND DOWNWARD TO THE DEPTH OF THE BOTTOM FOOTER ROCK, AND THEN UPSTREAM TO A MINIMUM OF SIX FEET.
7. AFTER ALL STONE BACKFILL HAS BEEN PLACED, FILL IN THE UPSTREAM SIDE OF THE STRUCTURE WITH WELL GRADED MIX OF CLASS B, CLASS A, & #57 STONE TO THE ELEVATION 2"-4" BELOW THE THE HEADER ROCK. INCORPORATE ON-SITE ALLUVIUM WHERE AVAILABLE. FILL SHOULD BE CONCAVE BEHIND THE VANE ARM TO ALLOW POOLING OF FLOW.
8. START SLOPE AT 2/3 TO 3/4 TIMES THE BANKFULL STAGE.
9. ALL REACHES, BOULDER SIZE 1' x 2' x 3' TO 2' x 2' x 4'.

BOULDER STEP



PLAN VIEW

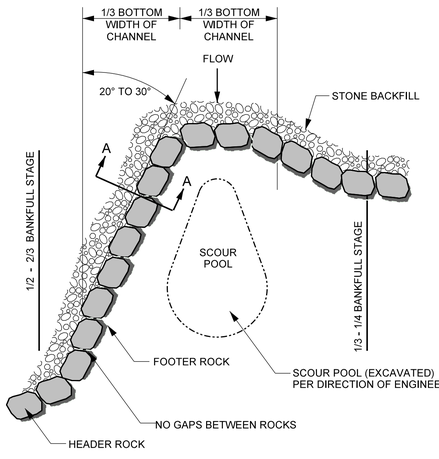


PROFILE A - A'

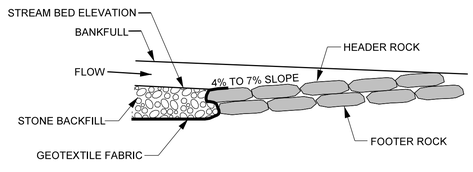
NOTES:

1. HEADER AND FOOTER BOULDERS MUST BE AT LEAST 1' X 2' X 3'.
2. FOOTERS SHALL BE INSTALLED SUCH THAT 1/4 TO 1/3 OF THE LENGTH IS DOWNSTREAM OF THE HEADER.
3. SOIL SHALL BE WELL COMPACTED AROUND BURIED PORTION OF FOOTERS WITH THE BUCKET OF EXCAVATOR.
4. INSTALL NON-WOVEN FILTER FABRIC UNDERNEATH FOOTER BOULDERS.
5. UNDERCUT THE RIFFLE ELEVATION 12 INCHES TO ALLOW FOR A LAYER OF STONE.
6. INSTALL EROSION CONTROL MATTING ALONG COMPLETED BANKS SUCH THAT THE EROSION CONTROL MATTING AT THE TOE OF THE BANK EXTENDS DOWN TO THE UNDERCUT ELEVATION.
7. FILL TRENCH WITH GRADED MIX OF CLASS A, CLASS B, AND #57 STONE TO THE BED ELEVATION OF THE CHANNEL.
8. BOULDER STEPS MUST BE EXTENDED TO A MINIMUM OF 2' INTO THE BANK. USE SILL BOULDERS IF NECESSARY.
9. THALWEG AND STEP INVERT WILL BE CONCAVE AND SHAPED PER DIRECTION OF THE DESIGNER.
10. ALL REACHES, BOULDER SIZE 1' x 2' x 3' TO 2' x 2' x 4'.

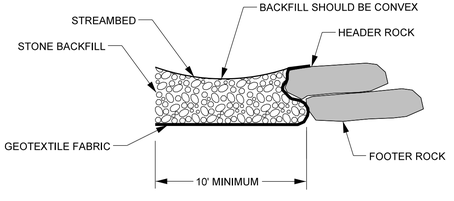
GRADE CONTROL ROCK J-HOOK VANE



PLAN VIEW



PROFILE VIEW

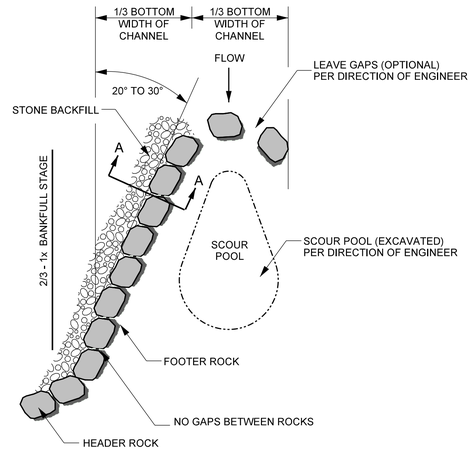


SECTION A - A

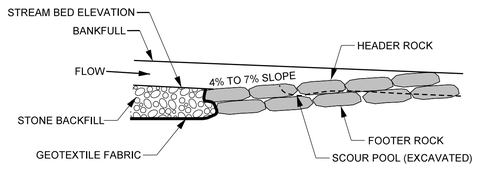
NOTES FOR ALL VANE STRUCTURES:

1. DIG A TRENCH BELOW THE BED FOR FOOTER ROCKS.
2. START AT BANK AND PLACE FOOTER ROCKS FIRST AND THEN HEADER (TOP) ROCK.
3. CONTINUE WITH STRUCTURE, FOLLOWING ANGLE AND SLOPE SPECIFICATIONS.
4. AN EXTRA ROCK CAN BE PLACED IN SCOUR POOL FOR HABITAT IMPROVEMENT.
5. USE HAND PLACED STONE TO FILL GAPS ON UPSTREAM SIDE OF HEADER AND FOOTER ROCKS.
6. INSTALL GEOTEXTILE FABRIC BEGINNING AT THE TOP OF THE HEADER ROCKS AND EXTEND DOWNWARD TO THE DEPTH OF THE BOTTOM FOOTER ROCK, AND THEN UPSTREAM TO A MINIMUM OF SIX FEET.
7. AFTER ALL STONE BACKFILL HAS BEEN PLACED, FILL IN THE UPSTREAM SIDE OF THE STRUCTURE WITH WELL GRADED MIX OF CLASS B, CLASS A, & #57 STONE TO THE ELEVATION 2"-4" BELOW THE THE HEADER ROCK. INCORPORATE ON-SITE ALLUVIUM WHERE AVAILABLE. FILL SHOULD BE CONCAVE BEHIND THE VANE ARM TO ALLOW POOLING OF FLOW.
8. START SLOPE AT 2/3 TO 3/4 TIMES THE BANKFULL STAGE.
9. ALL REACHES, BOULDER SIZE 1' x 2' x 3' TO 2' x 2' x 4'.

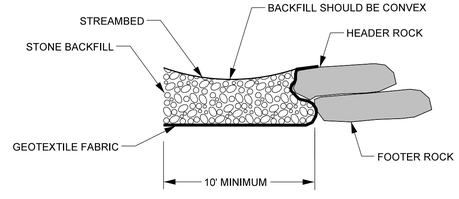
ROCK J-HOOK VANE



PLAN VIEW



PROFILE VIEW



SECTION A - A

NOTES FOR ALL VANE STRUCTURES:

1. DIG A TRENCH BELOW THE BED FOR FOOTER ROCKS.
2. START AT BANK AND PLACE FOOTER ROCKS FIRST AND THEN HEADER (TOP) ROCK.
3. CONTINUE WITH STRUCTURE, FOLLOWING ANGLE AND SLOPE SPECIFICATIONS.
4. AN EXTRA ROCK CAN BE PLACED IN SCOUR POOL FOR HABITAT IMPROVEMENT.
5. USE HAND PLACED STONE TO FILL GAPS ON UPSTREAM SIDE OF HEADER AND FOOTER ROCKS.
6. INSTALL GEOTEXTILE FABRIC BEGINNING AT THE TOP OF THE HEADER ROCKS AND EXTEND DOWNWARD TO THE DEPTH OF THE BOTTOM FOOTER ROCK, AND THEN UPSTREAM TO A MINIMUM OF SIX FEET.
7. AFTER ALL STONE BACKFILL HAS BEEN PLACED, FILL IN THE UPSTREAM SIDE OF THE STRUCTURE WITH WELL GRADED MIX OF CLASS B, CLASS A, & #57 STONE TO THE ELEVATION 2"-4" BELOW THE THE HEADER ROCK. INCORPORATE ON-SITE ALLUVIUM WHERE AVAILABLE. FILL SHOULD BE CONCAVE BEHIND THE VANE ARM TO ALLOW POOLING OF FLOW.
8. START SLOPE AT 2/3 TO 3/4 TIMES THE BANKFULL STAGE.
9. ALL REACHES, BOULDER SIZE 1' x 2' x 3' TO 2' x 2' x 4'.

5/24/2022
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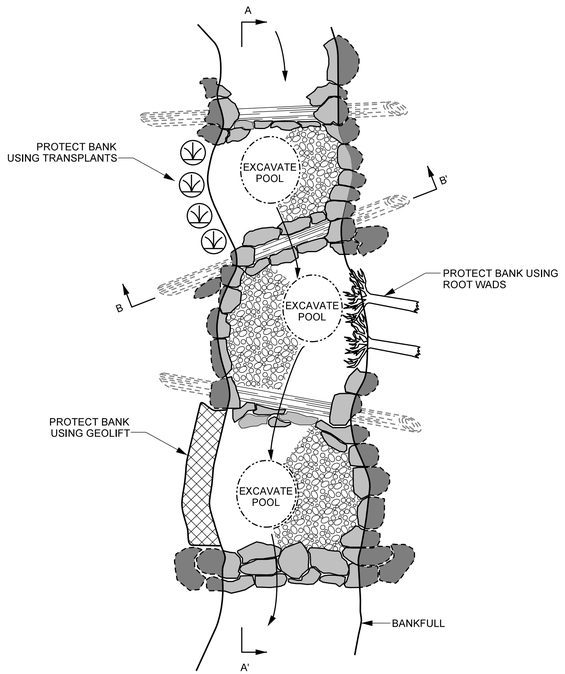
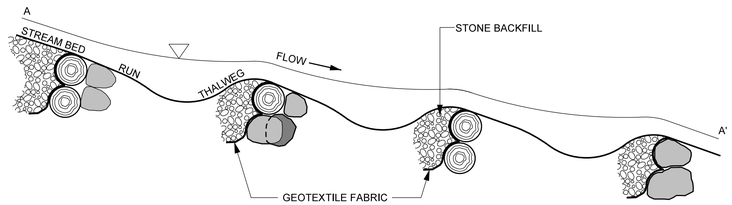
2/26/03

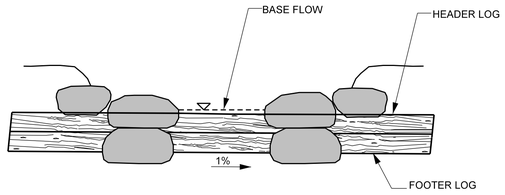
LOG AND ROCK STEP / POOL



PLAN VIEW



SECTION A - A'



SECTION B - B'

NOTES:

1. LOGS SHOULD BE AT LEAST 8" IN DIAMETER, RELATIVELY STRAIGHT, HARDWOOD, AND RECENTLY HARVESTED AND EXTENDING INTO THE BANK 3' ON EACH SIDE.
2. SOIL SHOULD BE COMPACTED WELL AROUND BURIED PORTIONS OF LOG.
3. GEOTEXTILE FABRIC SHOULD BE NAILED TO THE LOG BELOW THE BACKFILL.
4. BOULDERS SHOULD BE 1' X 2' X 3' AND PLACED ON TOP OF HEADER LOG FOR ANCHORING.
5. TOEWOOD OR TRANSPLANTS CAN BE USED INSTEAD OF BOUDERS, PER DIRECTION OF ENGINEER.
6. AFTER ALL STONE BACKFILL HAS BEEN PLACED, FILL IN THE UPSTREAM SIDE OF THE STRUCTURE WITH WELL GRADED MIX OF CLASS B, CLASS A, & #57 STONE TO THE ELEVATION OF THE TOP OF THE HEADER ROCK. INCORPORATE ON-SITE ALLUVIUM WHERE AVAILABLE.

PROJECT REFERENCE NO.	SHEET NO.
166680	2B

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 039201 ENGINEER JACOB M RYERSE

APPROVED BY:

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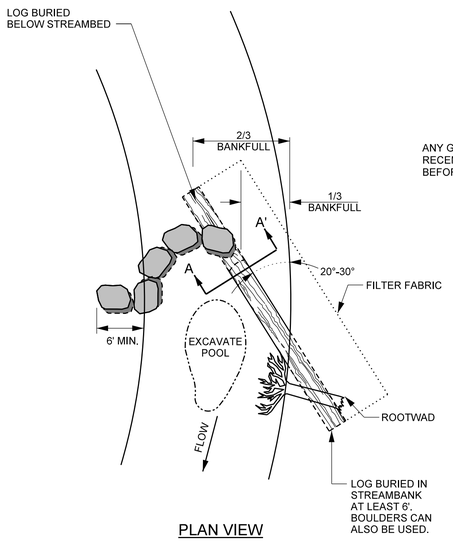
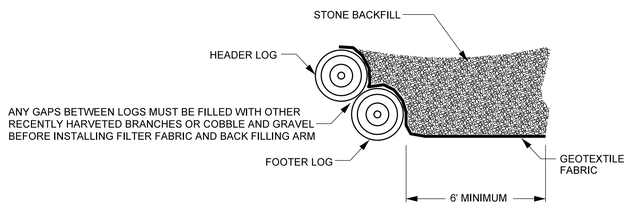
License #: F-1084

NCDMS ID NO. 100068

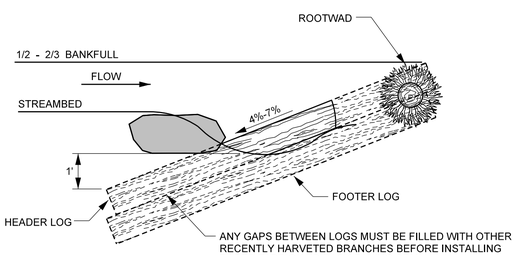
GRADE CONTROL LOG J-HOOK VANE



PLAN VIEW



SECTION A - A'

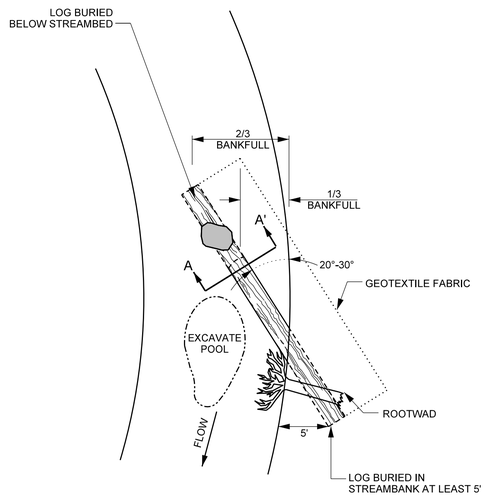


PROFILE VIEW

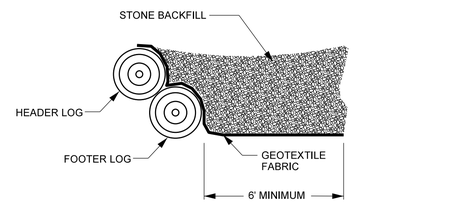
NOTES:

1. LOGS SHOULD BE AT LEAST 10" IN DIAMETER, RELATIVELY STRAIGHT, HARDWOOD, RECENTLY HARVESTED, AND FOOTERED.
2. BOULDERS MUST BE AT LEAST 2' x 2' x 1'.
3. SOIL SHOULD BE COMPACTED WELL AROUND BURIED PORTIONS OF LOG.
4. ROOTWADS SHOULD BE PLACED BENEATH THE HEADER LOG AND PLACED SO THAT IT LOCKS THE HEADER LOG INTO THE BANK, SEE ROOTWAD DETAIL.
5. BOULDERS SHOULD BE PLACED ON TOP OF HEADER LOG FOR ACHORING.
6. HEADER BOULDERS TO BE PLACED 0.5 TO 0.75 FEET APART.
7. FILTER FABRIC SHOULD BE NAILED TO THE LOG BELOW THE BACKFILL.
8. TRANSPLANTS OR BOULDERS CAN BE USED INSTEAD OF ROOWADS, PER DIRECTION OF ENGINEER.
9. BOULDER SILL MUST BE A MINIMUM OF 6'.
10. AFTER ALL STONE BACKFILL HAS BEEN PLACED, FILL IN THE UPSTREAM SIDE OF THE STRUCTURE WITH WELL GRADED MIX OF CLASS B, CLASS A, & #57 STONE TO THE ELEVATION OF THE TOP OF THE HEADER ROCK. INCORPORATE ON-SITE ALLUVIUM WHERE AVAILABLE.

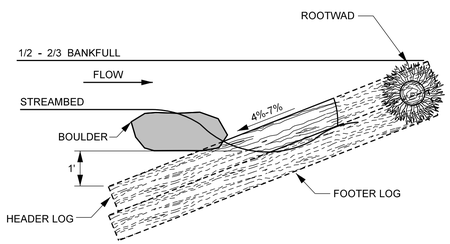
LOG VANE



PLAN VIEW



SECTION A - A'



PROFILE VIEW

NOTES:

1. LOGS SHOULD BE AT LEAST 10" IN DIAMETER, RELATIVELY STRAIGHT, HARDWOOD, AND RECENTLY HARVESTED.
2. BOULDERS MUST BE OF SUFFICIENT SIZE TO ANCHOR LOGS.
3. SOIL SHOULD BE COMPACTED WELL AROUND BURIED PORTIONS OF LOGS.
4. ROOTWADS SHOULD BE PLACED BENEATH THE HEADER LOG AND PLACED SO THAT IT LOCKS THE HEADER LOG INTO THE BANK, SEE ROOTWAD DETAIL.
5. BOULDER SHOULD BE PLACED ON TOP OF HEADER LOG FOR ANCHORING.
6. GEOTEXTILE FABRIC SHOULD BE NAILED TO THE LOG BELOW THE BACKFILL.
7. TOEWOOD OR TRANSPLANTS CAN BE USED INSTEAD OF ROOTWADS, PER DIRECTION OF ENGINEER.
8. AFTER ALL STONE BACKFILL HAS BEEN PLACED, FILL IN THE UPSTREAM SIDE OF THE STRUCTURE WITH WELL GRADED MIX OF CLASS B, CLASS A, & #57 STONE TO THE ELEVATION OF THE TOP OF THE HEADER ROCK. INCORPORATE ON-SITE ALLUVIUM WHERE AVAILABLE.

5/24/2022
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2/26/03

PROJECT REFERENCE NO.	SHEET NO.
166680	2C

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028432 ENGINEER KATHLEEN M MCKENNA

APPROVED BY:

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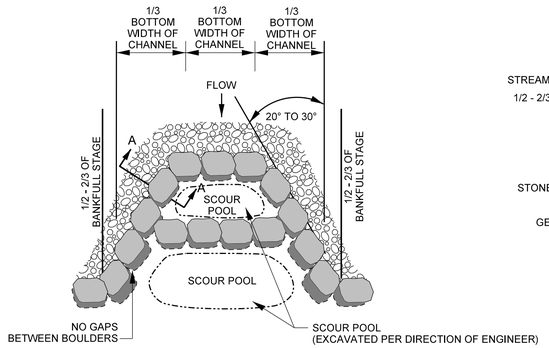
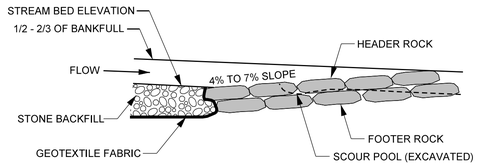
License #: F-1084

NCDMS ID NO. 100068

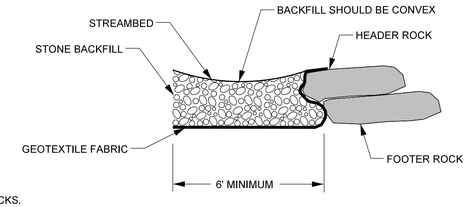
ROCK DOUBLE DROP CROSS VANE



PLAN VIEW



PROFILE VIEW

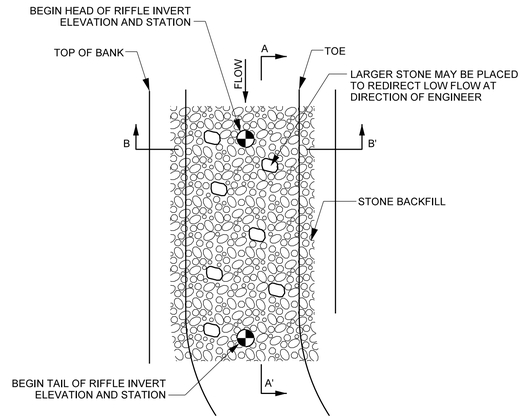


SECTION A - A

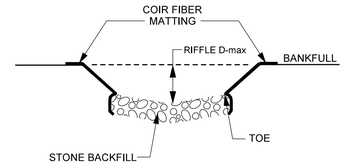
NOTES FOR ALL VANE STRUCTURES:

1. DIG A TRENCH BELOW THE BED FOR FOOTER ROCKS.
2. START AT BANK AND PLACE FOOTER ROCKS FIRST AND THEN HEADER (TOP) ROCK.
3. CONTINUE WITH STRUCTURE, FOLLOWING ANGLE AND SLOPE SPECIFICATIONS.
4. AN EXTRA ROCK CAN BE PLACED IN SCOUR POOL FOR HABITAT IMPROVEMENT.
5. USE HAND PLACED STONE TO FILL GAPS ON UPSTREAM SIDE OF HEADER AND FOOTER ROCKS.
6. INSTALL GEOTEXTILE FABRIC BEGINNING AT THE TOP OF THE HEADER ROCKS AND EXTEND DOWNWARD TO THE DEPTH OF THE BOTTOM FOOTER ROCK, AND THEN UPSTREAM TO A MINIMUM OF SIX FEET.
7. AFTER ALL STONE BACKFILL HAS BEEN PLACED, FILL IN THE UPSTREAM SIDE OF THE STRUCTURE WITH WELL GRADED MIX OF CLASS B, CLASS A, & #57 STONE TO THE ELEVATION 2"-4" BELOW THE THE HEADER ROCK. INCORPORATE ON-SITE ALLUVIUM WHERE AVAILABLE. FILL SHOULD BE CONCAVE BEHIND THE VANE ARM TO ALLOW POOLING OF FLOW.
8. START SLOPE AT 2/3 TO 3/4 TIMES THE BANKFULL STAGE.
9. ALL REACHES, BOULDER SIZE 1' x 2' x 3' TO 2' x 2' x 4'.

CONSTRUCTED RIFFLE



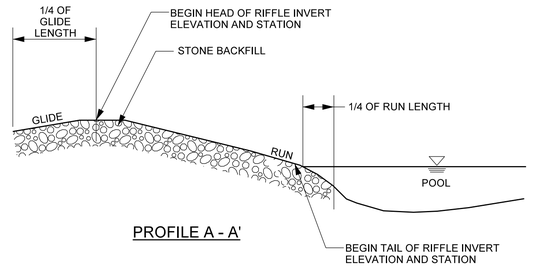
PLAN VIEW



SECTION B - B'

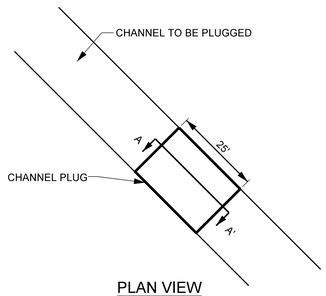
NOTES:

1. UNDERCUT CHANNEL BED ELEVATION AS NEEDED TO ALLOW FOR LAYERS OF STONE TO ACHIEVE FINAL GRADE.
2. INSTALL COIR FIBER MATTING ALONG COMPLETED BANKS SUCH THAT THE EROSION CONTROL MATTING AT THE TOE OF THE BANK EXTENDS DOWN TO THE UNDERCUT ELEVATION.
3. INSTALL STONE BACKFILL, COMPACTED TO GRADE.
4. FINAL CHANNEL BED SHAPE SHOULD HAVE THE ELEVATION OF THE BED 0.2 FT DEEPER IN THE CENTER THAN AT THE EDGES.
5. STONE BACKFILL SHALL CONSIST OF 10% CLASS I, 20% CLASS B, 40% CLASS A, AND 30% ON-SITE ALLUVIUM BY VOLUME OR #57 STONE.
6. CONSTRUCTED RIFFLES SHALL BE 12" THICK.
7. LARGER CLASS I & B STONES MAY EXTEND ABOVE THE BED SURFACE, BUT NO HIGHER THAN HALF BANKFULL AND SHOULD PROVIDE A "NATURAL LOOK". ENGINEER SHALL HAVE FINAL APPROVAL OF EXTENDING ROCK.
8. SATURATED WOODY DEBRIS THAT IS EXISTING WITHIN THE CHANNEL CAN BE RELOCATED INTO THE NEW RIFFLE AREAS.



PROFILE A - A'

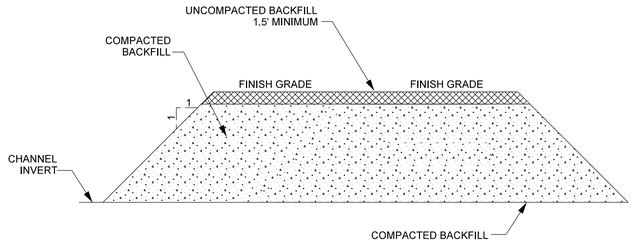
CHANNEL PLUG



PLAN VIEW

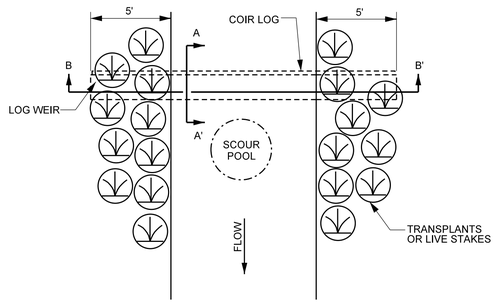
NOTES:

1. COMPACT BACKFILL USING ON-SITE HEAVY EQUIPMENT IN 10 INCH LIFTS.
2. BACKFILL OF PLUGS SHOULD INCORPORATE ANY OF-SITE CLAY AVAILABLE.

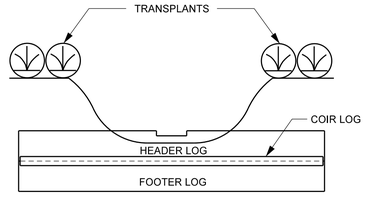


SECTION A - A'

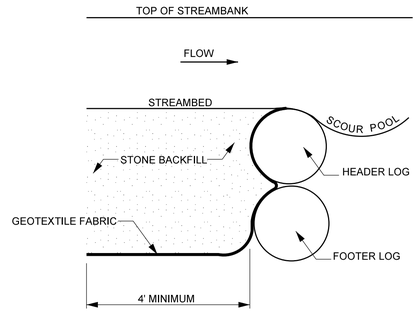
LOG DROP



PLAN VIEW



CROSS SECTION VIEW B - B'



SECTION A - A'

NOTES:

1. LOGS SHOULD BE AT LEAST 10 INCHES IN DIAMETER, RELATIVELY STRAIGHT, HARDWOOD, AND RECENTLY HARVESTED.
2. TOP OF HEADER LOG SHOULD BE SET AT SAME ELEVATION AS THE STREAMBED.
3. USE GEOTEXTILE FABRIC WITH COIR LOGS TO SEAL GAPS BETWEEN LOGS.
4. PLACE TRANSPLANTS ALONG BANKS TO PROTECT AGAINST BANK EROSION.
5. THE HEADER LOG SHOULD BE NOTCHED 2 - 3 INCHES DEEP IN THE CENTER AND FOR 20 - 30% OF THE CHANNEL WIDTH.

5/24/2022
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mcgarr

2/26/03

PROJECT REFERENCE NO.	SHEET NO.
166680	2D

PROJECT ENGINEER

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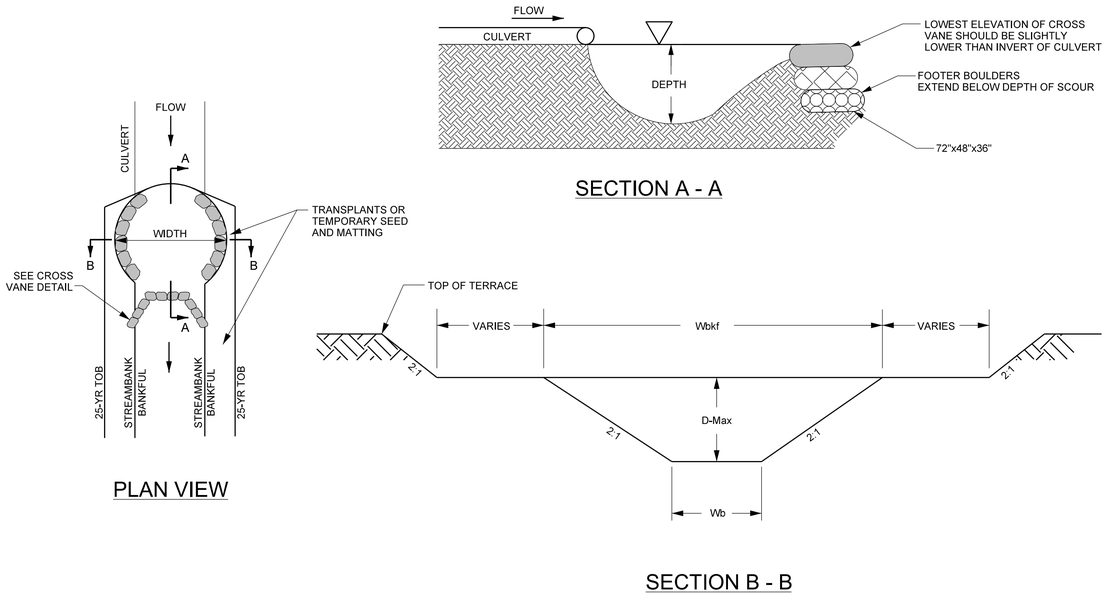
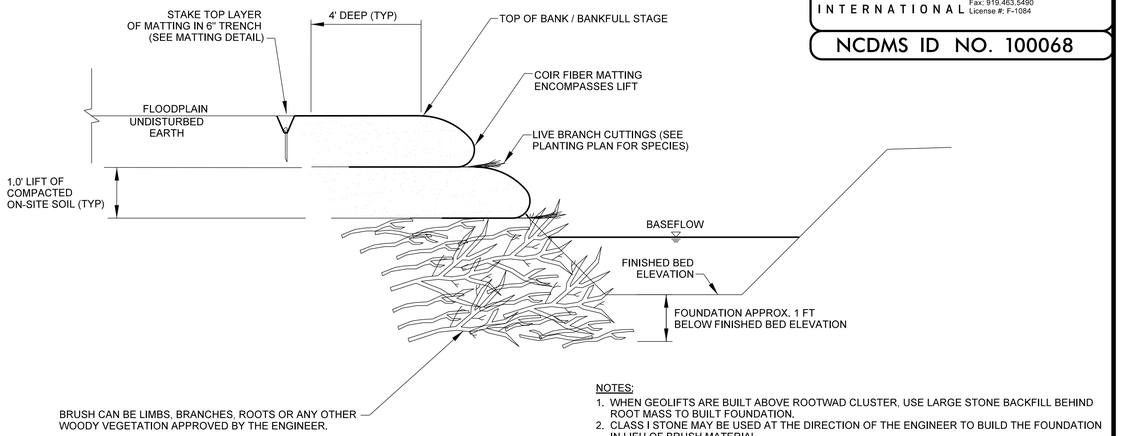
NCDMS ID NO. 100068

PLUNGE POOL



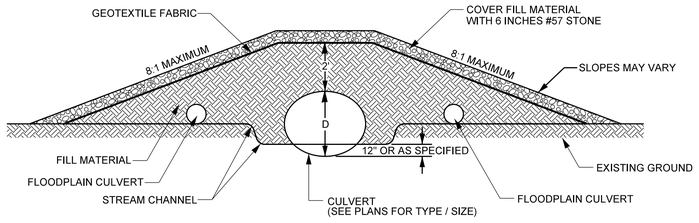
GEOLIFT WITH BRUSH TOE

NOTES:
1. LIVE BRANCH CUTTINGS SHALL BE THE SAME SPECIES AS THE LIVE STAKES AND SHALL BE INSTALLED DURING VEGETATION DORMANCY.
2. LIVE BRANCH CUTTINGS SHALL BE INSTALLED AT A DENSITY OF 20-30 CUTTINGS PER LINEAR FOOT AND A MAXIMUM DIAMETER OF 2.5 INCHES.
3. NUMBER OF SOIL LIFTS MAY VARY. IN GENERAL LIFTS SHALL EXTEND TO THE TOP OF BANK OR BANKFULL STAGE.



NOTES:
1. WHEN GEOLIFTS ARE BUILT ABOVE ROOTWAD CLUSTER, USE LARGE STONE BACKFILL BEHIND ROOT MASS TO BUILT FOUNDATION.
2. CLASS I STONE MAY BE USED AT THE DIRECTION OF THE ENGINEER TO BUILD THE FOUNDATION IN LIEU OF BRUSH MATERIAL.

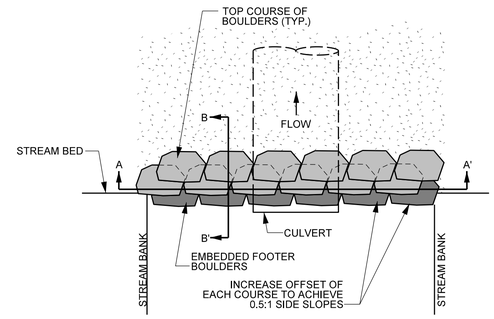
PERMANENT STREAM CROSSING

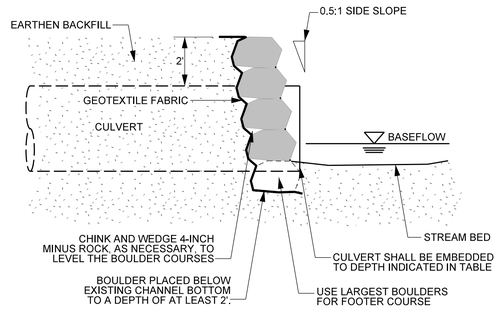


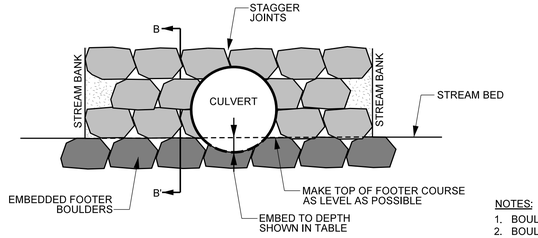
CROSS SECTION VIEW

NOTES:
1. SIZE DIMENSIONS SHOWN ON PLANS.
2. APPLY SUFFICIENT FILL (2' MIN) OVER CULVERT TO PREVENT COLLAPSE.
3. STABILIZE SIDE SLOPES WITH EROSION CONTROL MATTING AND FILL AROUND CULVERTS WITH CLASS II STONE.
4. INSTALL HEADWALLS AND ENDWALLS AS SHOWN ON THE PLANS AND IN THE DETAILS.
5. PRIMARY CULVERT SHOULD BE INSTALLED 12" OR AS SPECIFIED BELOW CHANNEL ELEVATION.

BOULDER HEADWALL / ENDWALL







REACH	BOULDER SIZE	CULVERT SIZE	EMBEDMENT
UT1-R1	1'x2'x2'	4 FT	12 IN
UT1-R4	1'x2'x2'	5 FT	12 IN
UT3	1'x2'x2'	4 FT	9.6 IN
UT4	1'x1'x1'	3 FT	12 IN

NOTES:
1. BOULDERS SHALL BE TOUCHING SO THAT VOID SPACE IS MINIMIZED.
2. BOULDERS SHOULD EXTEND BELOW SCOUR DEPTH. FOOTER BOULDERS SHALL BE AT LEAST 2' BELOW THE EXISTING BED
3. GEOTEXTILE MATTING SHOULD BE PLACED BETWEEN BOULDERS AND SOIL.
4. BOULDERS SHOULD BE BACKFILLED AND COMPACTED. VOID SPACE BETWEEN FABRIC AND BOULDER OR ROCK FILL MATERIAL, SHOULD BE MINIMIZED.
5. BOULDERS SHOULD NOT BE HIGHER THAN THE TOP OF CROSSING ELEVATION.
6. FILTER FABRIC SHOULD BE PLACED BEHIND BOULDERS, BURIED BELOW BOULDER DEPTH, AND EXTEND INTO THE BANK.

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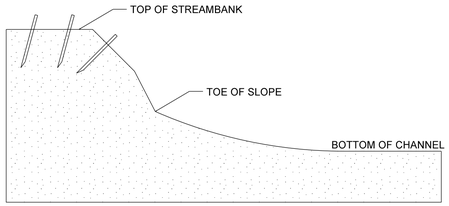
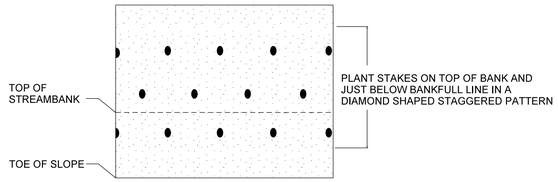
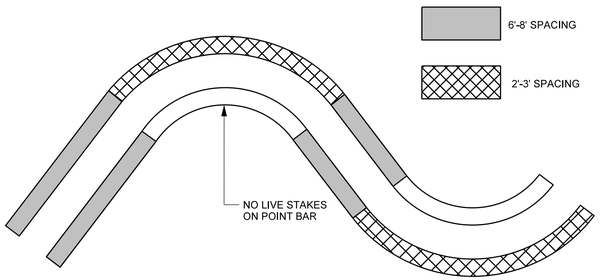
LIVE STAKING



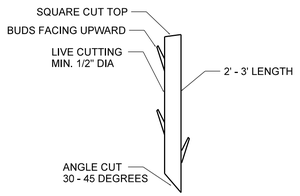
CROSS SECTION VIEW



PLAN VIEW



PLAN VIEW

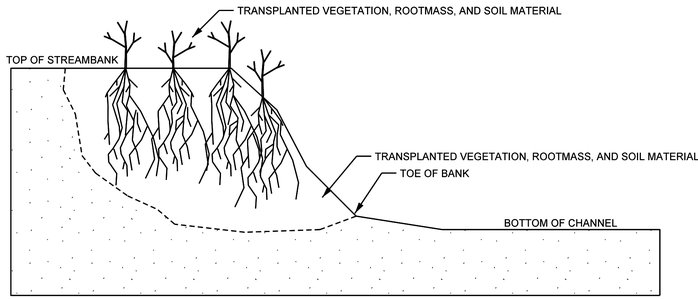


LIVE STAKE DETAIL

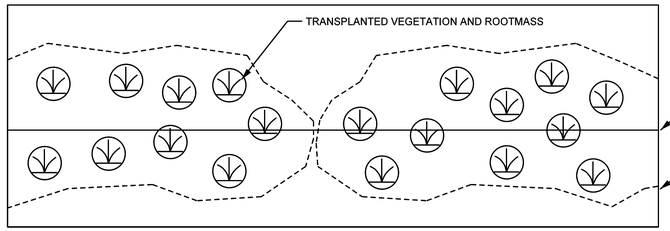
NOTES:

1. STAKES 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.

TRANSPLANTED VEGETATION



CROSS SECTION VIEW



PLAN VIEW

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 EXCAVATE 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.

PROJECT REFERENCE NO.	SHEET NO.
166680	2E

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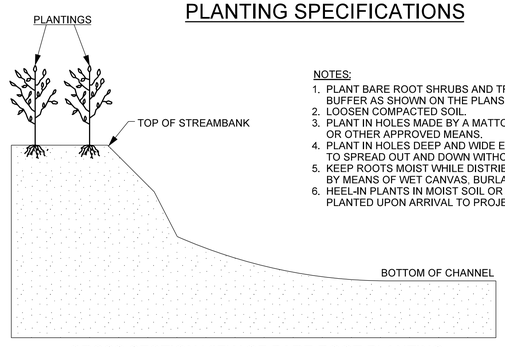
NCDMS ID NO. 100068

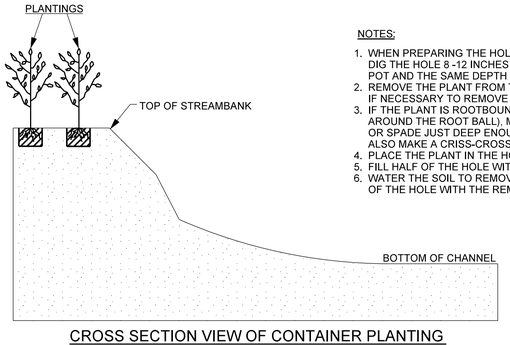
PLANTING SPECIFICATIONS



CROSS SECTION VIEW OF BARE ROOT PLANTING

NOTES:

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

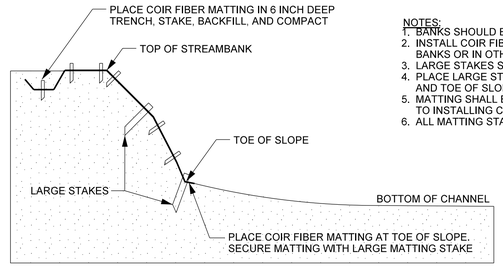


CROSS SECTION VIEW OF CONTAINER PLANTING

NOTES:

1. WHEN PREPARING THE HOLE FOR A POTTED PLANT OR SHRUB DIG THE HOLE 8 -12 INCHES LARGER THAN THE DIAMETER OF THE POT AND THE SAME DEPTH AS THE POT.
2. REMOVE THE PLANT FROM THE POT. LAY THE PLANT ON ITS SIDE IF NECESSARY TO REMOVE THE POT.
3. IF THE PLANT IS ROOTBOUND (ROOTS GROWING IN A SPIRAL AROUND THE ROOT BALL), MAKE VERTICAL CUTS WITH A KNIFE OR SPADE JUST DEEP ENOUGH TO CUT THE NET OF ROOTS. ALSO MAKE A CRISS-CROSS CUT ACROSS THE BOTTOM OF THE BALL.
4. PLACE THE PLANT IN THE HOLE.
5. FILL HALF OF THE HOLE WITH SOIL (SAME SOIL REMOVED FOR BACKFILL).
6. WATER THE SOIL TO REMOVE AIR POCKETS AND FILL THE REST OF THE HOLE WITH THE REMAINING SOIL.

COIR FIBER MATTING



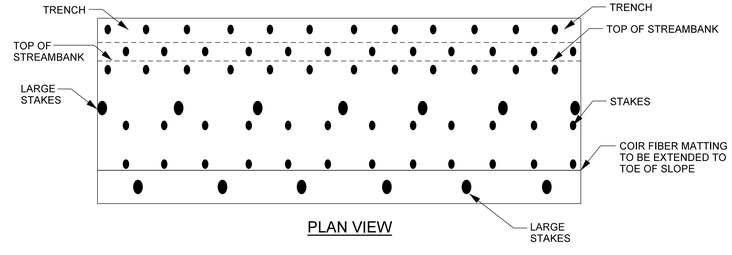
CROSS SECTION VIEW

NOTES:

1. BANKS SHOULD BE SEEDED PRIOR TO PLACEMENT OF MATTING.
2. INSTALL COIR FIBER MATTING PER SPECIFICATIONS ALONG STREAM BANKS OR IN OTHERS LOCATIONS SPECIFIED BY ENGINEER.
3. LARGE STAKES SHOULD NOT BE SPACED FURTHER THAN 36" APART.
4. PLACE LARGE STAKES ALONG ALL SEAMS, IN THE CENTER OF BANK, AND TOE OF SLOPE.
5. MATTING SHALL BE PLACED ON BANKS, STAKED, AND TRENCHED PRIOR TO INSTALLING CONSTRUCTED RIFFLE MATERIAL.
6. ALL MATTING STAKES MUST BE 100% BIODEGRADABLE.

TYPICAL LARGE MATTING STAKE

LEG LENGTH	17.00 IN (43.18 CM) (TAPERED TO POINT)
WIDTH	1.5 IN (3.81 CM)
THICKNESS	1.5 IN (3.81 CM)



PLAN VIEW

TYPICAL SMALL MATTING STAKE

LEG LENGTH	11.00 IN (27.94 CM)
HEAD WIDTH	1.25 IN (3.18 CM)
HEAD THICKNESS	0.40 IN (1.02 CM)
LEG WIDTH	0.60 IN (1.52 CM) (TAPERED TO POINT)
LEG THICKNESS	0.40 IN (1.02 CM)
TOTAL LENGTH	12.00 IN (30.48 CM)

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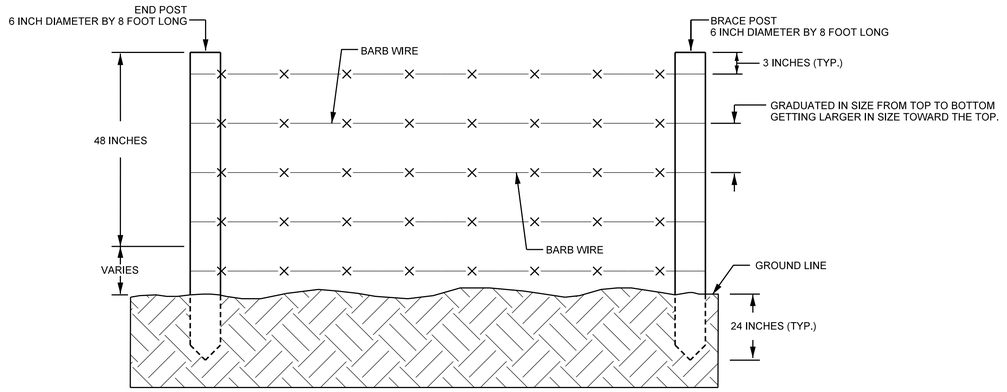
BARB WIRE FIELD FENCE

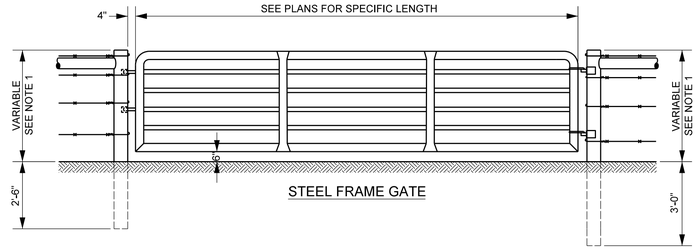


NOTE:

1. END POSTS SHALL BE INSTALLED AT A SPACING OF 10-15 FEET.

2. ALL FENCING AND FENCE POSTS SHOULD BE SET 1-2 FEET OUTSIDE OF THE CONSERVATION EASEMENT FOR FENCE LINE MAINTENANCE (LIKE HERBICIDE SPRAYING).

STEEL GATES



STEEL FRAME GATE

NOTES:

1. POST HEIGHT DIMENSION SHALL BE THE SAME AS REQUIRED FOR THE ADJACENT FENCE.
2. CONSTRUCT AN END OR STRESS PANEL, AS REQUIRED IN THE SPECIFICATION, ON EACH SIDE OF GATE.
3. HINGES AND LOCKS SHALL BE INSTALLED AS SPECIFIED BY GATE MANUFACTURER.

PROJECT REFERENCE NO.	SHEET NO.
166680	2F

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NCDMS ID NO. 100068

5/24/2022
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2/26/03

BAKER PROJECT REFERENCE NO.	SHEET NO.
166680	3

PROJECT ENGINEER

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License #: F-1084

NCDMS ID NO. 100068

NAD 83

BEGIN UT1 REACH 1
STA. 10+98.02

2 - 8' GATES INSTALLED
IN PLACE OF 16' GATE

WE KIRK
FARMS NORTH, LLC
PIN: 8731-33-5998
DB: 838 PG: 400, TRACT IV
REFERENCE: DB: 562 PG: 286, TRACT II
AND DB: 158 PG: 305
PC: C SL: 6260

18" CMP
INV IN: 3048.07'
INV OUT: 3046.94'

48" CMP
INV IN: 3046.47'
INV OUT: 3045.36'

CONTROL POINT #305
GROUND COORDINATES
N: 713456.03'
E: 830566.09'
ELEV: 3065.15'

STA. 12+12.58

STA. 12+33.15

BOULDER STEP (TYP.)

ROCK DOUBLE DROP CROSS VANE (TYP.)

END UT1 REACH 1
BEGIN UT1 REACH 2
STA. 13+25.00

LOG AND ROCK STEP POOL (TYP.)

BARBED WIRE FENCE (TYP.)

AS-BUILT THALWEG (TYP.)

ROCK CROSS VANE (TYP.)

GRADE CONTROL ROCK J-HOOK VANE (TYP.)

BOULDER STEP INSTALLED
IN PLACE OF LOG DROP

4' GATE

18" CMP
INV IN: 3047.95'
INV OUT: 3046.90'

2 - 8' GATES INSTALLED
IN PLACE OF 16' GATE

4' GATE

CREST GAUGE #2

AS-BUILT
TOP OF BANK (TYP.)

DESIGN
THALWEG (TYP.)

VEG PLOT 5

MATCH LINE – SEE SHEET 4

CONTROL POINT #304
GROUND COORDINATES
N: 713312.24'
E: 830259.50'
ELEV: 3038.02'

ANNE PALMER
FAMILY PROPERTIES, L.P.
PIN: 8721-72-6837
DB: 489 PG: 1683

WE KIRK
FARMS NORTH, LLC
PIN: 8731-33-5998
DB: 838 PG: 400, TRACT IV
REFERENCE: DB: 562 PG: 286, TRACT II
AND DB: 158 PG: 305
PC: C SL: 6260

RECORD DRAWING LEGEND

- PROPOSED DESIGN
- AS-BUILT SURVEY BY KEE MAPPING & SURVEYING 4/14/22
- RED LINE VARIATIONS FROM ORIGINAL DESIGN SUBMITTED WITH THE MITIGATION PLAN

FILL EXISTING CHANNEL

CHANNEL PLUG

UT to RUSH FORK
UT1
RECORD DRAWING

20 0 20 40
SCALE (FT)

5/24/2022
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mgray

2/26/03

BAKER PROJECT REFERENCE NO.	SHEET NO.
166680	4

PROJECT ENGINEER

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NAD 83

WE KIRK
FARMS NORTH, LLC
PIN: 8731-33-5998
DB: 838 PG: 400, TRACT IV
REFERENCE: DB: 562 PG: 286, TRACT II
AND DB: 158 PG: 305
PC: C SL: 6260

WE KIRK
PIN: 8730-09-3258
DB: 838 PG: 404
REFERENCE: DB: 562 PG: 286, TRACT II
AND DB: 158 PG: 305
PC: C SL: 6260 & PC: C SL: 7314

SOUTHERN APPALACHIAN
HIGHLANDS CONSERVANCY
(CONSERVATION EASEMENT)
DB: 917 PG: 978
PC: C SL: 7314

BEGIN UT2
STA. 10+05.88
12" CMP
INV IN: 2997.97'
15" CPP
INV OUT: 2996.61'

EXISTING GATE REHUNG
IN THIS LOCATION
NOT IN ORIGINAL DESIGN

END UT2 STA. 10+84.04
TOB UT1 REACH 3

AS-BUILT
THALWEG (TYP.)

BARBED WIRE FENCE (TYP.)

ROCK SILL INSTALLED
IN PLACE OF LOG DROP

12' GATE

STA. 16+78.69

STA. 17+28.77

LOG AND ROCK STEP POOL (TYP.)

IN STREAM
FLOW GAUGE #2

BOULDER STEP (TYP.)

LOG DROP (TYP.)

MATCH LINE – SEE SHEET 3

MATCH LINE STA. – SEE SHEET 5

VEG
PLOT 5

VEG
PLOT
6

END UT1 REACH 2
BEGIN UT1 REACH 3
STA. 16+00.00

4' GATE

AS-BUILT
TOP OF BANK (TYP.)

ROCK CROSS VANE (TYP.)

4' GATE INSTALLED
NOT IN ORIGINAL
DESIGN

ANNE PALMER
FAMILY PROPERTIES, L.P.
PIN: 8721-72-6837
DB: 489 PG: 1683

GRADE CONTROL ROCK
J-HOOK VANE (TYP.)

CONFLUENCE STATION
UT1 REACH3 STA.19+54.61=
UT2 STA. 10+92.40

4' GATE

BARBED WIRE FENCE (TYP.)

RECORD DRAWING LEGEND

- PROPOSED DESIGN
- AS-BUILT SURVEY BY KEE MAPPING & SURVEYING 4/14/22
- RED LINE VARIATIONS FROM ORIGINAL DESIGN SUBMITTED WITH THE MITIGATION PLAN

FILL EXISTING CHANNEL

CHANNEL PLUG

UT to RUSH FORK
UT1
RECORD DRAWING

20 0 20 40
SCALE (FT)

5/31/2022
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2/26/03

BAKER PROJECT REFERENCE NO.	SHEET NO.
166680	5

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WE KIRK
PIN: 8730-09-3258
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SOUTHERN APPALACHIAN
HIGHLANDS CONSERVANCY
(CONSERVATION EASEMENT)
DB: 917 PG: 978
PC: C SL: 7314

NAD 83

MATCH LINE – SEE SHEET 4

VEG PLOT 6

ROCK SILL INSTALLED
IN PLACE OF LOG DROP

ROCK CROSS VANE (TYP.)

AS-BUILT THALWEG (TYP.)

END UT1 REACH 3
BEGIN UT1 REACH 4
STA. 22+50.94 =
CONFLUENCE STATION
UT3 STA. 26+33.50

LOG DROP INSTALLED
NOT IN ORIGINAL DESIGN

BOULDER STEP (TYP.)

CONFLUENCE STATION
UT1 REACH 4 STA. 24+19.91=
UT4 STA. 10+50.55

END UT4 STA. 10+41.90
TOB UT1 REACH 4

BARBED WIRE FENCE (TYP.)

LOG DROP (TYP.)

ROCK VANE (TYP.)

GRADE CONTROL ROCK
J-HOOK VANE (TYP.)

VEG PLOT 3

MATCH LINE – SEE SHEET 6

MATCH LINE – SEE SHEET 10

END UT3 STA. 26+24.54
TOB REACH UT1 REACH 3 & 4

BARBED WIRE FENCE (TYP.)

ANNE PALMER
FAMILY
PROPERTIES, L.P.
PIN: 8721-72-6837
DB: 489 PG: 1683

CONTROL POINT #500
STATE PLANE COORDINATES
N: 712855.04'
E: 829608.53'
ELEV: 2989.63'

RELOCATED ACCESS ROAD

PIN: 8721-72-6837

BEGIN UT4
STA. 10+00.00

AS-BUILT
TOP OF BANK (TYP.)

IN STREAM FLOW GAUGE #3
INV IN: 2967.76'
INV OUT: 2965.26'
(BROKEN)

36" CMP
INV IN: 2969.41'
INV OUT: 2967.17'

2 - 8' GATES INSTALLED
IN PLACE OF 16' GATE

NCDOT R/W

NC HWY 209
RUSH FORK ROAD

ELECTRIC FENCE

FILL EXISTING CHANNEL

CHANNEL PLUG

RECORD DRAWING LEGEND

- PROPOSED DESIGN
- AS-BUILT SURVEY BY KEE MAPPING & SURVEYING 4/14/22
- RED LINE VARIATIONS FROM ORIGINAL DESIGN SUBMITTED WITH THE MITIGATION PLAN

UT to RUSH FORK
UT1 & UT4
RECORD DRAWING

20 0 20 40
SCALE (FT)

5/31/2022
N:\projects\166680_Rush_Fork\Design\As-Built\Plans\166680_ASB-PSH_05.dgn
mcgarr

2/26/03

BAKER PROJECT REFERENCE NO.	SHEET NO.
166680	6

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028432 ENGINEER KATHLEEN W MCKITHAN

APPROVED BY:

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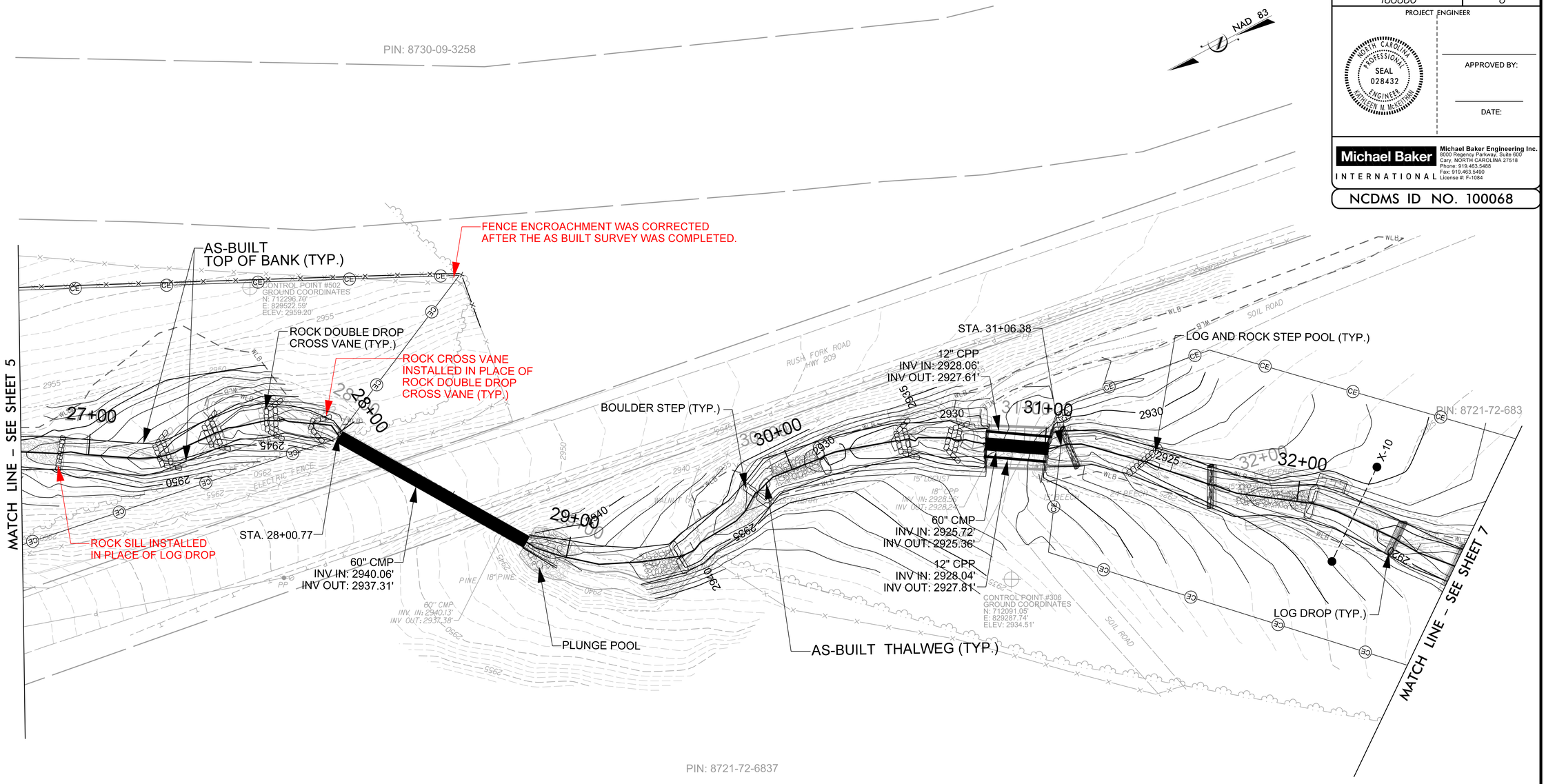
License #: F-1084

NCDMS ID NO. 100068



PIN: 8721-72-6837

RECORD DRAWING LEGEND

- PROPOSED DESIGN
- AS-BUILT SURVEY BY KEE MAPPING & SURVEYING 4/14/22
- RED LINE VARIATIONS FROM ORIGINAL DESIGN SUBMITTED WITH THE MITIGATION PLAN

- FILL EXISTING CHANNEL
- CHANNEL PLUG

UT to RUSH FORK
UT1
RECORD DRAWING

20 0 20 40
SCALE (FT)

5/31/2022
K:\Projects\166680_Rush_Fork\Design\As-Built\Plans\166680_ASB-PSH_06.dgn

2/26/03

BAKER PROJECT REFERENCE NO.	SHEET NO.
166680	7

PROJECT ENGINEER

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License #: F-1084

NCDMS ID NO. 100068

NAD 83

END UT1 REACH 4
STA. 37+80.92

WE KIRK
PIN: 8730-09-3258
DB: 838 PG: 404
REFERENCE: DB: 562 PG: 286, TRACT II
AND DB: 158 PG: 305
PC: C SL: 6260 & PC: C SL: 7314

SOUTHERN APPALACHIAN
HIGHLANDS CONSERVANCY
(CONSERVATION EASEMENT)
DB: 917 PG: 978
PC: C SL: 7314

Soil road extinguished.

PIN: 8721-72-6837

PIN: 8721-72-6837

NCDOT R/W

SOIL ROAD

MATCH LINE – SEE SHEET 6

LOG DROP (TYP.)

ROCK CROSS VANE (TYP.)

LOG J-HOOK VANE INSTALLED
IN PLACE OF GRADE CONTROL
ROCK J-HOOK VANE

AS-BUILT THALWEG (TYP.)

AS-BUILT
TOP OF BANK (TYP.)

ROCK VANE (TYP.)

VEG PLOT
4

ROCK J-HOOK VANE (TYP.)

CREST
GAUGE #3

LOG VANE (TYP.)

BOULDER STEP (TYP.)

CONTROL POINT #307
GROUND COORDINATES
N: 711819.21'
E: 829041.22'
ELEV: 2917.97'

CONTROL POINT #308
GROUND COORDINATES
N: 711505.47'
E: 828898.77'
ELEV: 2918.81'

RECORD DRAWING LEGEND

- PROPOSED DESIGN
- AS-BUILT SURVEY BY KEE MAPPING & SURVEYING 4/14/22
- RED LINE VARIATIONS FROM ORIGINAL DESIGN SUBMITTED WITH THE MITIGATION PLAN

FILL EXISTING CHANNEL

CHANNEL PLUG

UT to RUSH FORK
UT1
RECORD DRAWING

20 0 20 40
SCALE (FT)

5/24/2022
K:\Projects\166680_Rush_Fork\Design\As-Built\Plans\166680_ASB-PSH_07.dgn

2/26/03

BAKER PROJECT REFERENCE NO.	SHEET NO.
166680	8

PROJECT ENGINEER

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NCDMS ID NO. 100068

NAD 83

ANNE PALMER
FAMILY PROPERTIES, L.P.
PIN: 8721-72-6837
DB: 489 PG: 1683

BARBED WIRE FENCE (TYP.)

ROCK J-HOOK VANE (TYP.)

BOULDER STEP (TYP.)

CREST GAUGE #1

LOG DROP (TYP.)

BOULDER BANK PROTECTION INSTALLED NOT IN ORIGINAL DESIGN

ROCK CROSS VANE (TYP.)

ROCK SILL INSTALLED IN PLACE OF LOG DROP

AS-BUILT TOP OF BANK (TYP.)

BEGIN UT3
STA. 10+00.38

STONE LINED OVERFLOW CHANNEL FOR BMP

10+00 11+00 12+00 13+00 14+00 15+

X-1 X-2

4' GATE

AS-BUILT THALWEG (TYP.)

BARBED WIRE FENCE (TYP.)

CONTROL POINT #302
GROUND COORDINATES
N: 713975.07'
E: 829341.61'
ELEV: 3058.92'

CONTROL POINT #303
GROUND COORDINATES
N: 714230.87'
E: 829121.90'
ELEV: 3097.41'

ANNE PALMER
FAMILY PROPERTIES, L.P.
PIN: 8721-72-6837
DB: 489 PG: 1683

MATCH LINE – SEE SHEET 9

RECORD DRAWING LEGEND

- PROPOSED DESIGN
- AS-BUILT SURVEY BY KEE MAPPING & SURVEYING 4/14/22
- RED LINE VARIATIONS FROM ORIGINAL DESIGN SUBMITTED WITH THE MITIGATION PLAN

- FILL EXISTING CHANNEL
- CHANNEL PLUG

UT to RUSH FORK
UT3
RECORD DRAWING

20 0 20 40
SCALE (FT)

5/24/2022
C:\Projects\166680_Rush_Fork\Design\As-Built\Plans\166680_ASB-PSH_08.dgn

2/26/03

BAKER PROJECT REFERENCE NO.	SHEET NO.
166680	9

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028432 ENGINEER KATHLEEN W MCKITHAN

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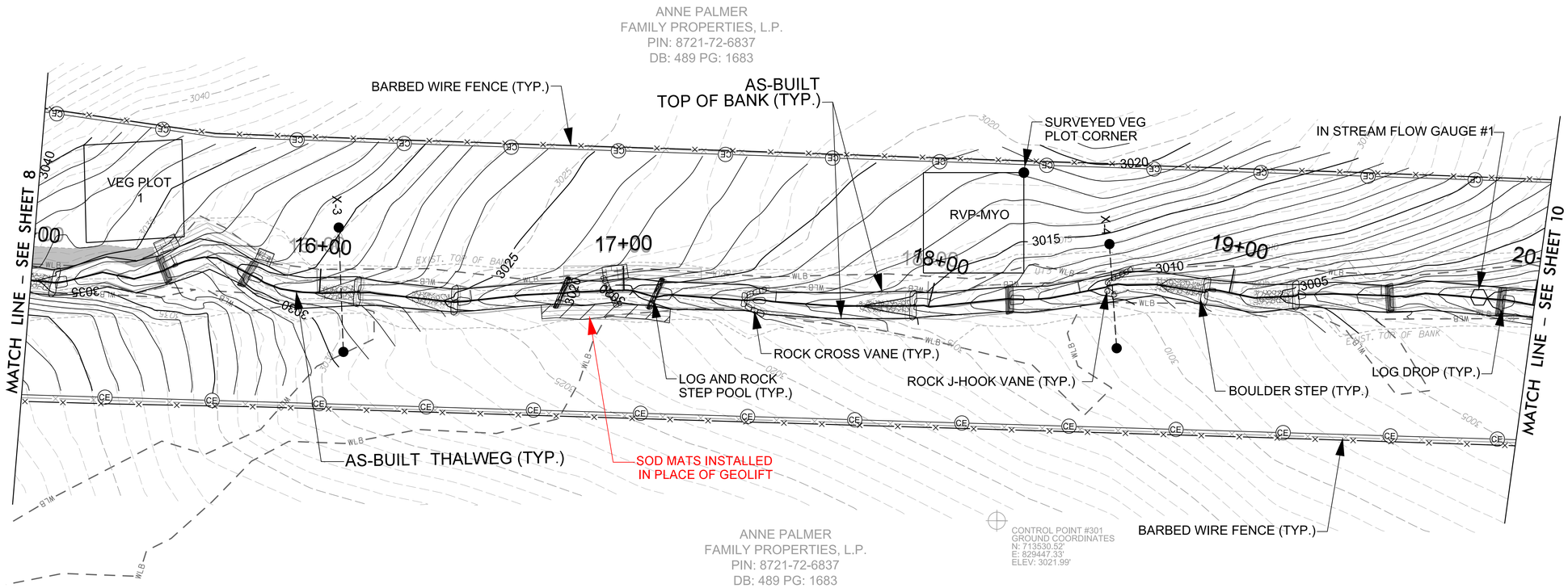
NCDMS ID NO. 100068

NAD 83



RECORD DRAWING LEGEND

- PROPOSED DESIGN
- AS-BUILT SURVEY BY KEE MAPPING & SURVEYING 4/14/22
- RED LINE VARIATIONS FROM ORIGINAL DESIGN SUBMITTED WITH THE MITIGATION PLAN

- FILL EXISTING CHANNEL
- CHANNEL PLUG

UT to RUSH FORK
UT3
RECORD DRAWING

20 0 20 40
SCALE (FT)

6/6/2022
K:\Projects\166680.Rush_Fork\Design\As-Built\Plans\166680_ASB-PSH_09.dgn

2/26/03

BAKER PROJECT REFERENCE NO.	SHEET NO.
166680	10

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028432 ENGINEER KATHLEEN W MCKITHAN

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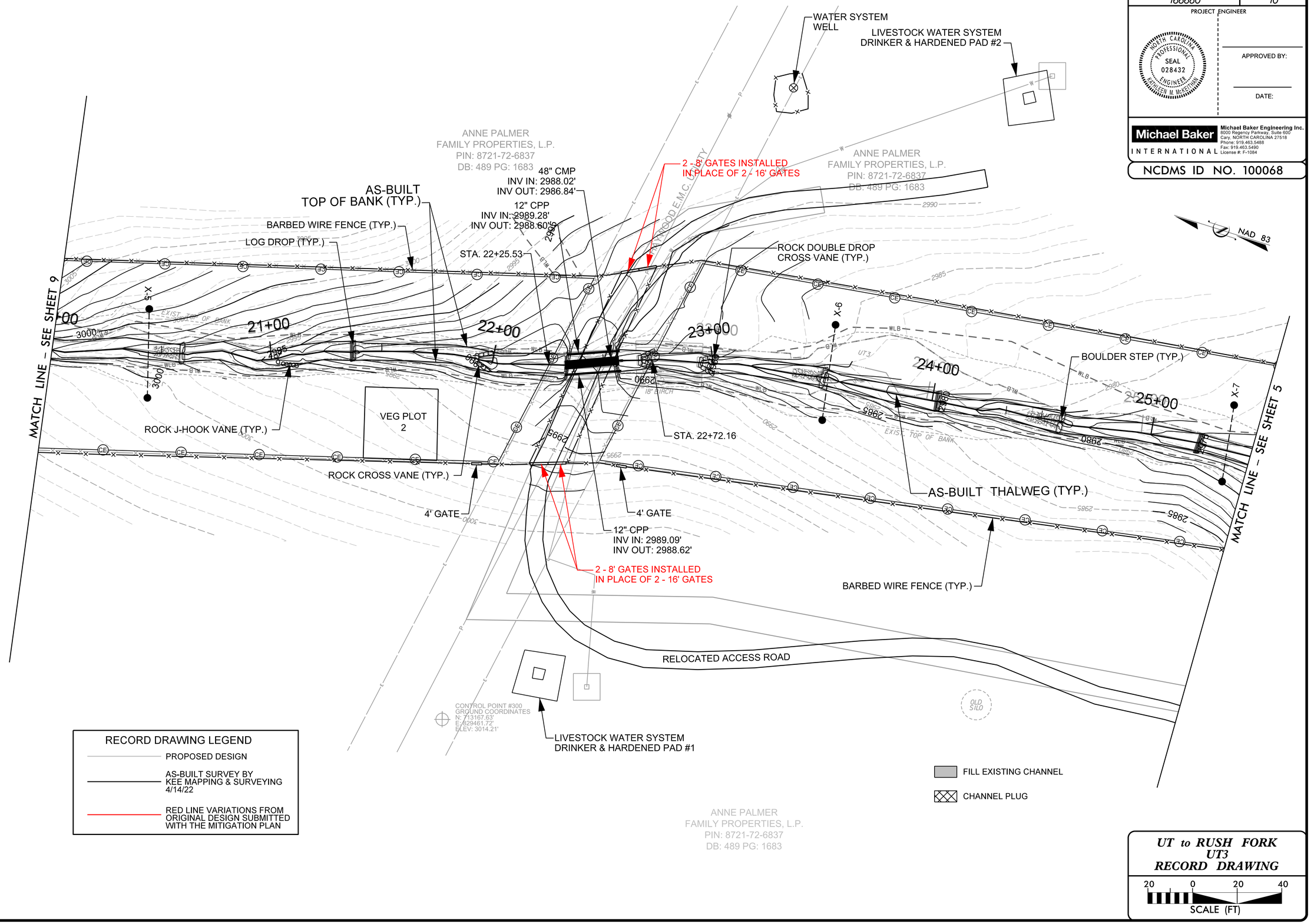
NCDMS ID NO. 100068



RECORD DRAWING LEGEND

- PROPOSED DESIGN
- AS-BUILT SURVEY BY KEE MAPPING & SURVEYING 4/14/22
- RED LINE VARIATIONS FROM ORIGINAL DESIGN SUBMITTED WITH THE MITIGATION PLAN

UT to RUSH FORK
UT3
RECORD DRAWING

20 0 20 40
SCALE (FT)

5/24/2022
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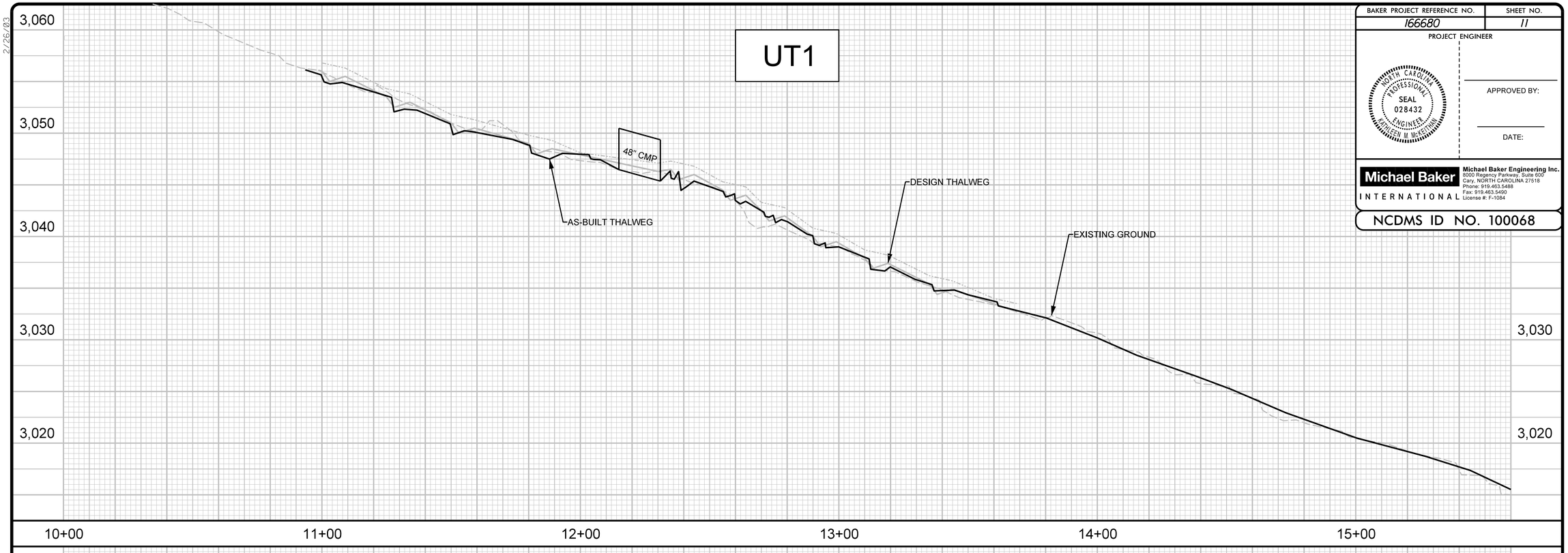
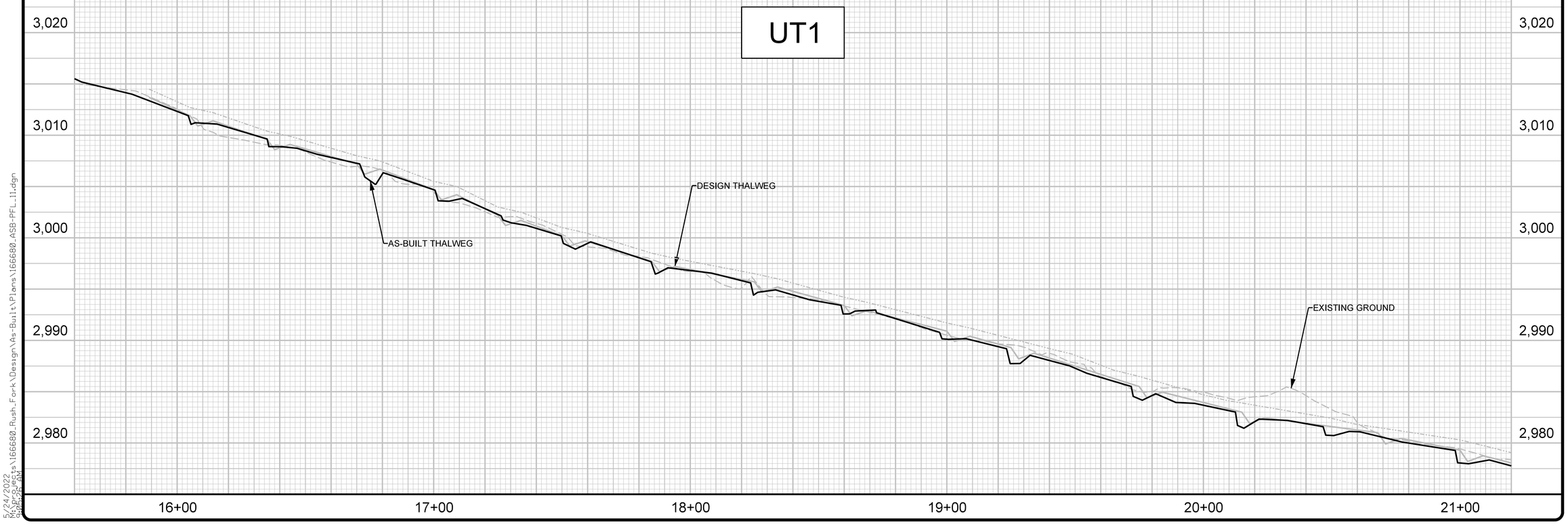
mcrae

2/26/03

UT1



UT1



BAKER PROJECT REFERENCE NO.	SHEET NO.
166680	11

PROJECT ENGINEER

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NCDMS ID NO. 100068

5/24/2022
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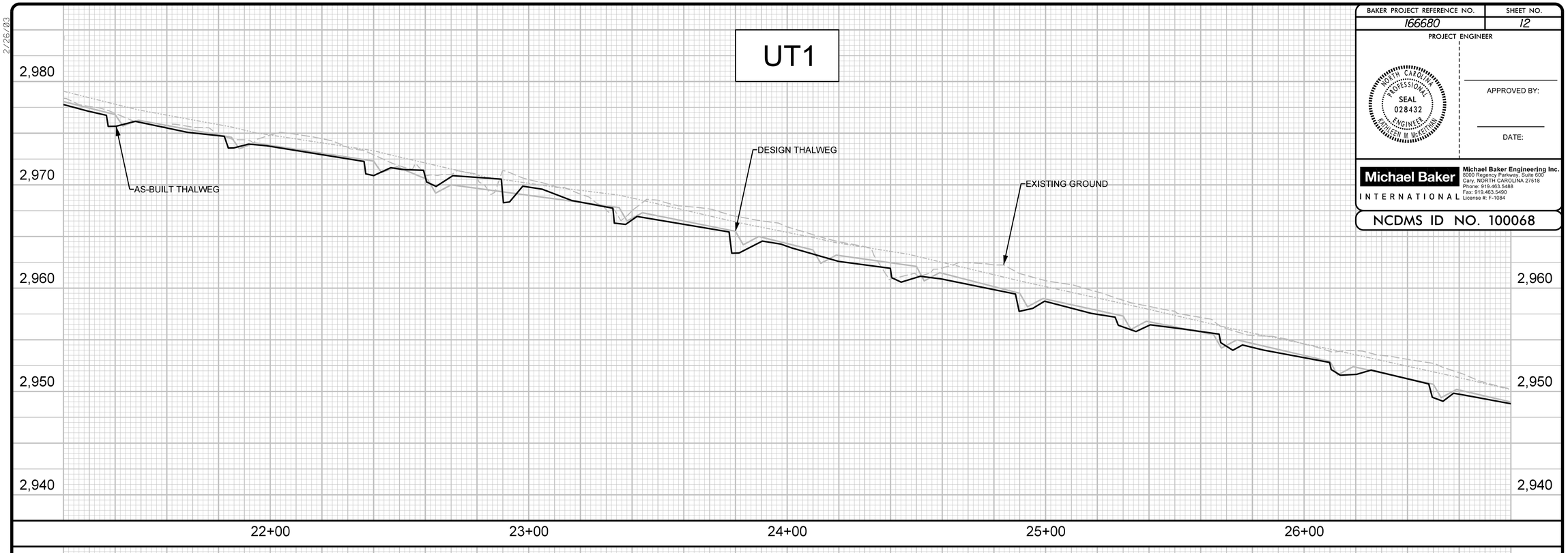
gjones 2:26 PM

2/26/03

UT1



BAKER PROJECT REFERENCE NO.	SHEET NO.
166680	12

PROJECT ENGINEER

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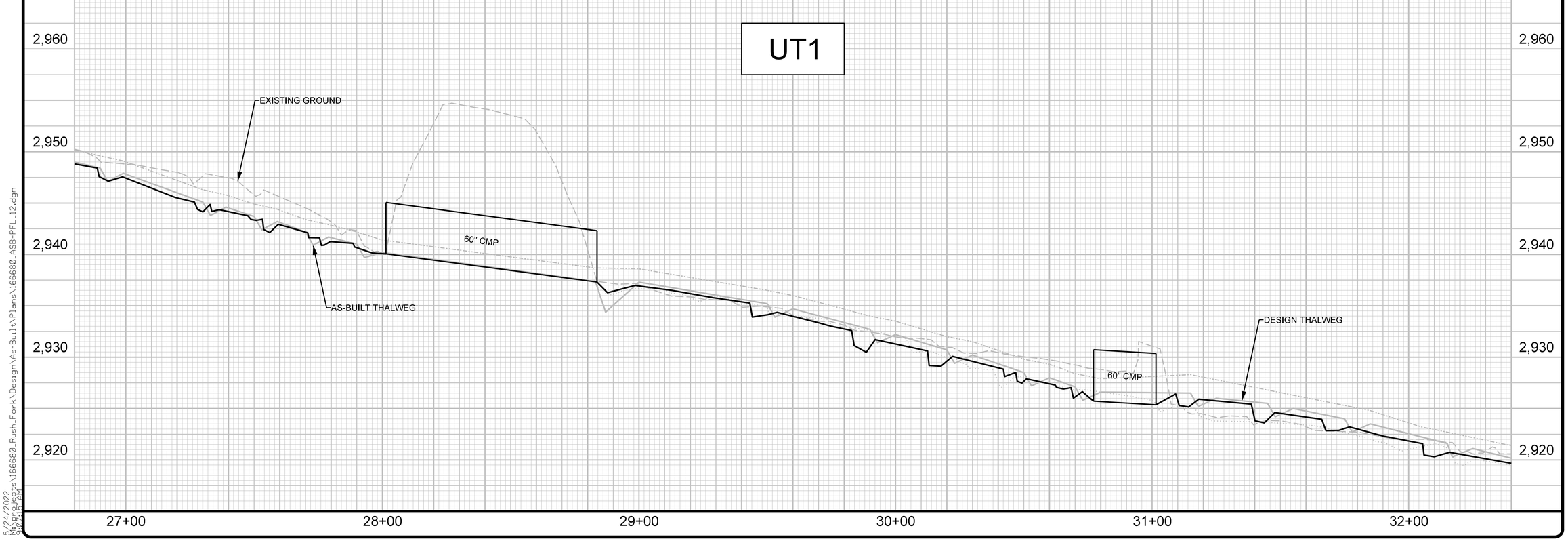
NCDMS ID NO. 100068

UT1



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gdot15 AM

2/26/03

UT1

BAKER PROJECT REFERENCE NO.	SHEET NO.
166680	13

PROJECT ENGINEER

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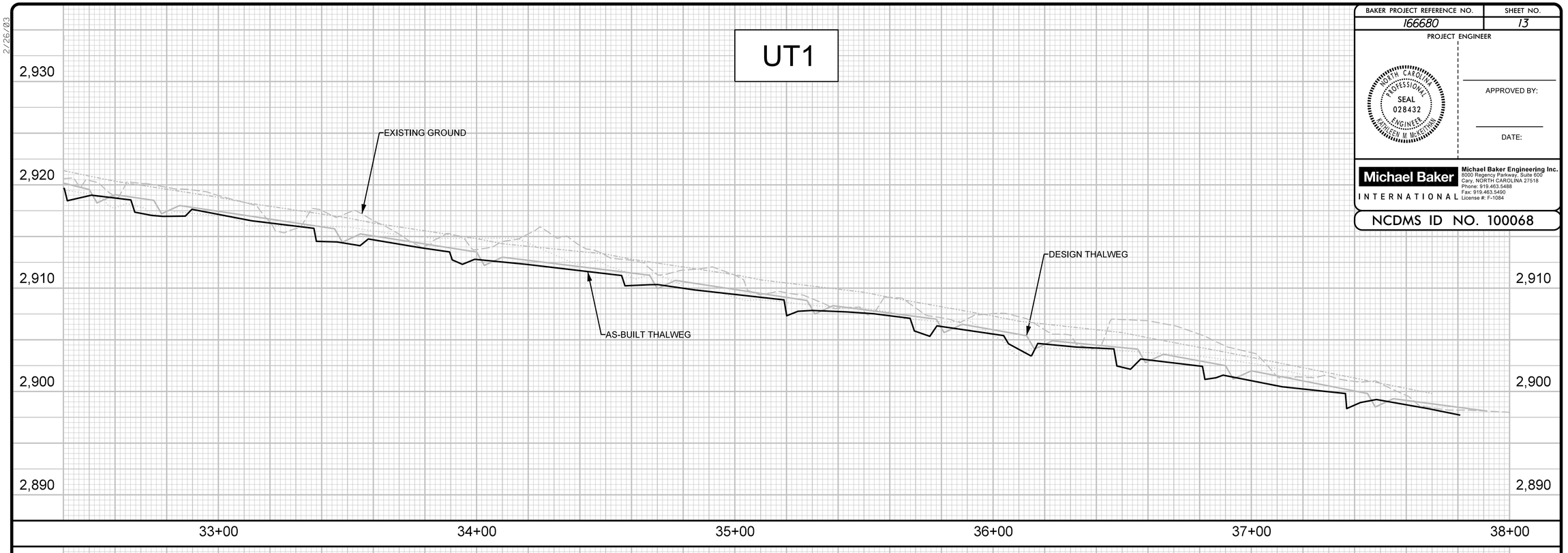
NCDMS ID NO. 100068



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gjohnson
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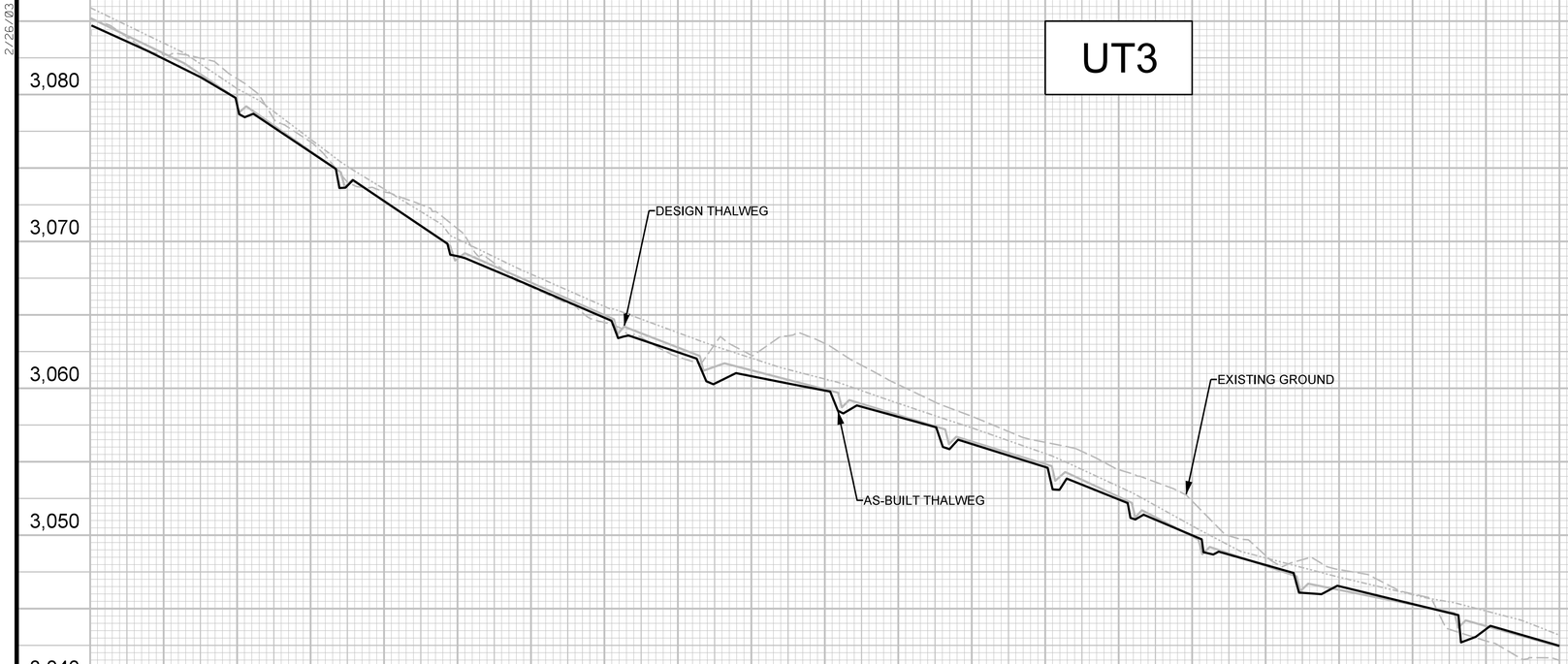
UT3



BAKER PROJECT REFERENCE NO.	SHEET NO.
166680	14

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028432 ENGINEER KATHLEEN M McKETHAN

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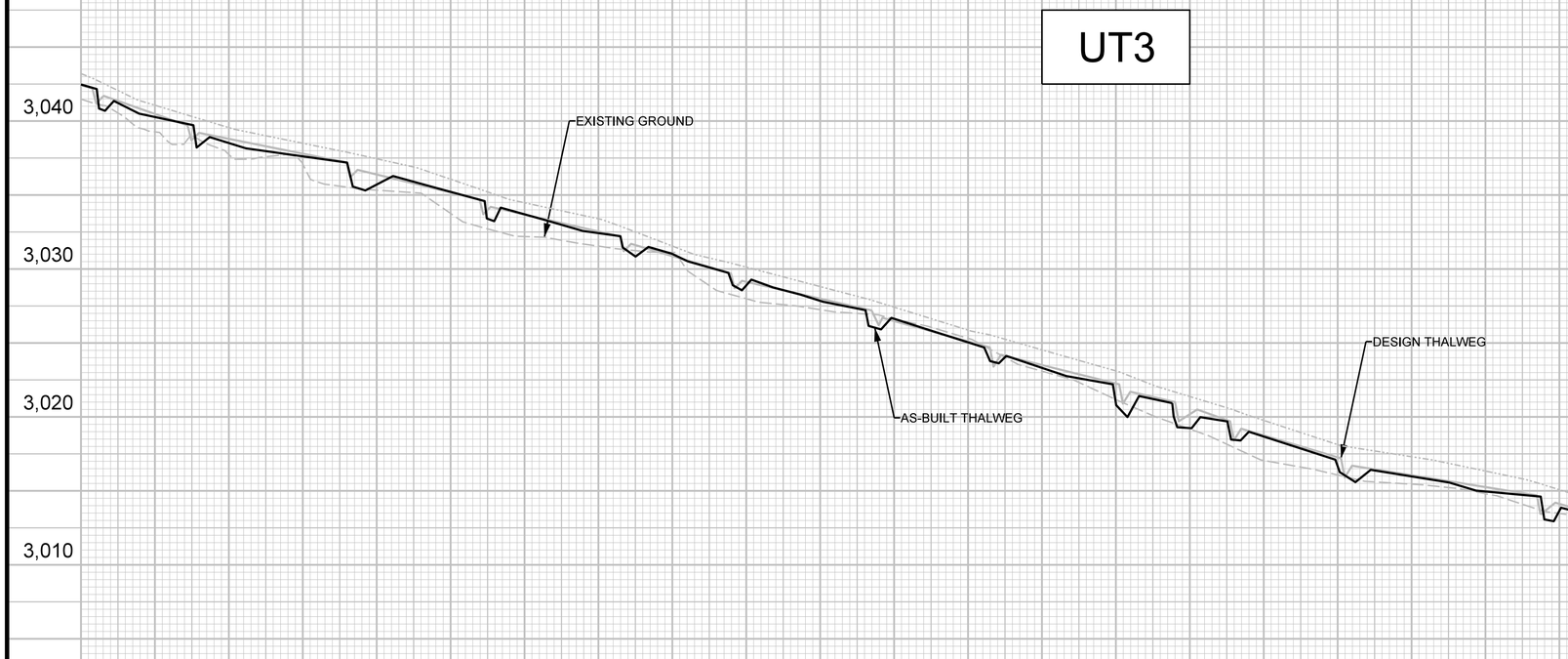
NCDMS ID NO. 100068

UT3



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2/26/03

UT3

3,010
3,000
2,990
2,980

19+00 20+00 21+00 22+00 23+00 24+00

BAKER PROJECT REFERENCE NO.	SHEET NO.
166680	15

PROJECT ENGINEER

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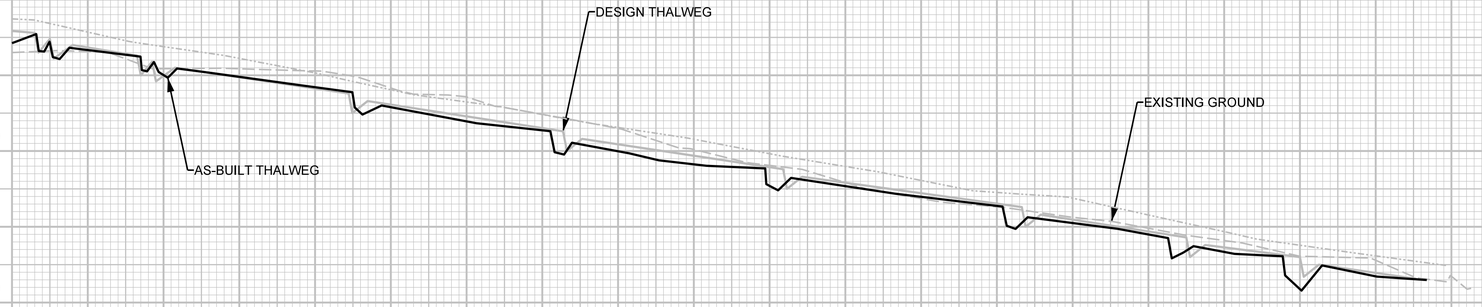
NCDMS ID NO. 100068

UT3



3,000
2,990
2,980
2,970
2,960

23+00 24+00 25+00 26+00

5/24/2022
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dlipscomb
9:23:59 AM

2/26/03

BAKER PROJECT REFERENCE NO. 166680 | SHEET NO. 16

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028432 ENGINEER KATHLEEN W. MCKITHAN

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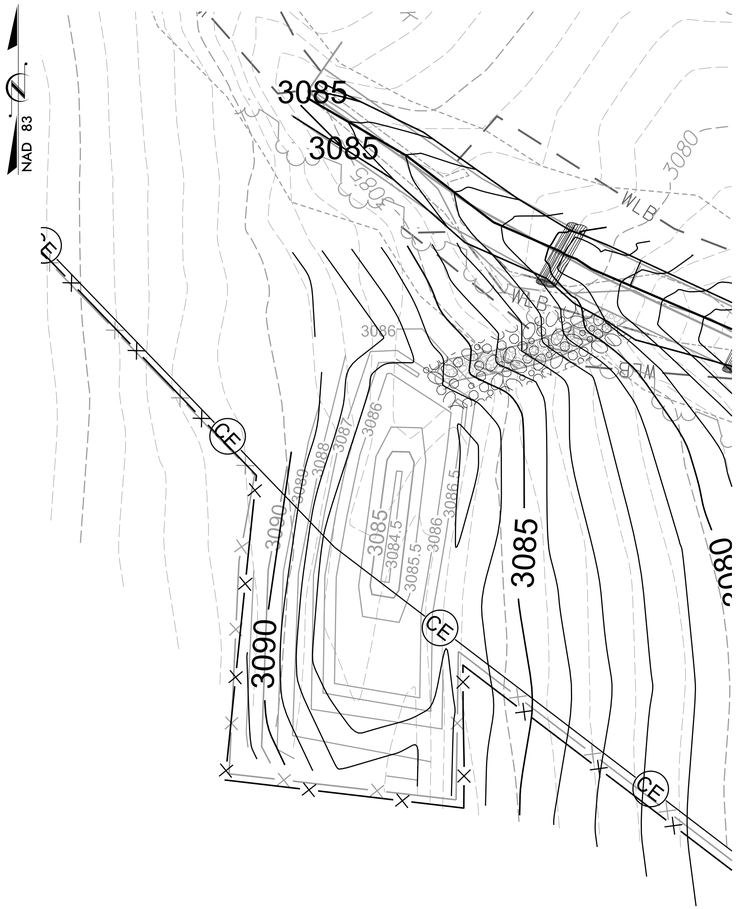

Proposed BMP Planted Species
UT to Rush Fork Mitigation Project - NCDMS Project No. 100068

Botanical Name	Common Name	% Planted by Species	Wetland Tolerance
Shallow Water Zone (50 Herbaceous Plants per 200 ft^2)			
Juncus effusus	Common Rush	10%	FACW
Peltandra virginica	Arrow Arum	10%	OBL
Pontederia cordata	Pickerelweed	10%	OBL
Sagittaria latifolia	Broadleaf Arrowhead	10%	OBL
Saururus cernuus	Lizard's Tail	10%	OBL
Scirpus cyperinus	Woolgrass	10%	FACW
Carex vulpinoidea	Fox Sedge	10%	OBL
Sparganium americanum	Bur-reed	10%	FAC
Carex lurida	Shallow Sedge	10%	OBL
Polygonum pensylvanicum	Smartweed	10%	FACW
Temporary Inundation Zone (8 shrubs per 200 ft^2)			
Alnus serrulata	Tag Alder	10%	OBL
Cephalanthus occidentalis	Buttonbush	10%	OBL
Cornus amomum	Silky Dogwood	10%	FACW
Ilex verticillata	Winterberry	10%	FACW
Rhododendron viscosum	Swamp Azalea	10%	FACW
Physocarpus opulifolius	Ninebark	10%	FACW
Sambucus canadensis	Elderberry	10%	FACW
Leucothoe fontanesiana	Highland Doghobble	10%	FACW
Vaccinium corymbosum	Highbush Blueberry	10%	FACW
Xanthorhiza simplicissima	Yellowroot	10%	FACW

Notes: -Final species selection may change due to refinement of site conditions or to availability at the time of planting. If species substitution is required, the planting Contractor will submit a revised planting list to Baker for approval prior to the procurement of plant stock.

-Shallow Water planting zone is from basin bottom to elevation 3085.5' while Temporary Inundation planting zone is from elevation 3085.5' to 3086.5'.

-Embankments and perimeter fill slopes will be planted with non-clumping turf grasses (no trees or woody shrubs).

UT to RUSH FORK AS - BUILT RECORD DRAWING

10 0 10 20
SCALE (FT)

5/24/2022
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mpeyton