STATE	BAKER PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
NC	162039	1	19

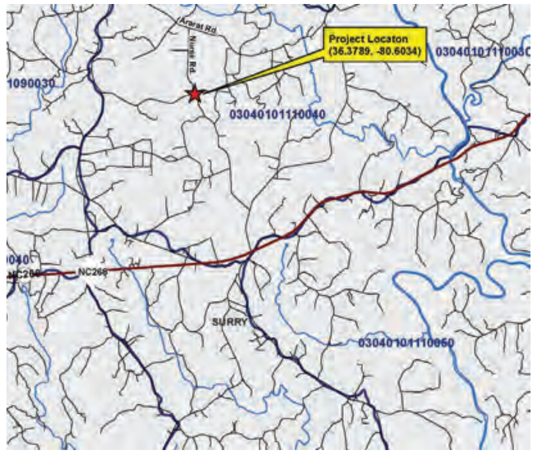
PROJECT: 162039 WHITTIER CREEK

NORTH CAROLINA
DIVISION OF MITIGATION SERVICES

SURRY COUNTY

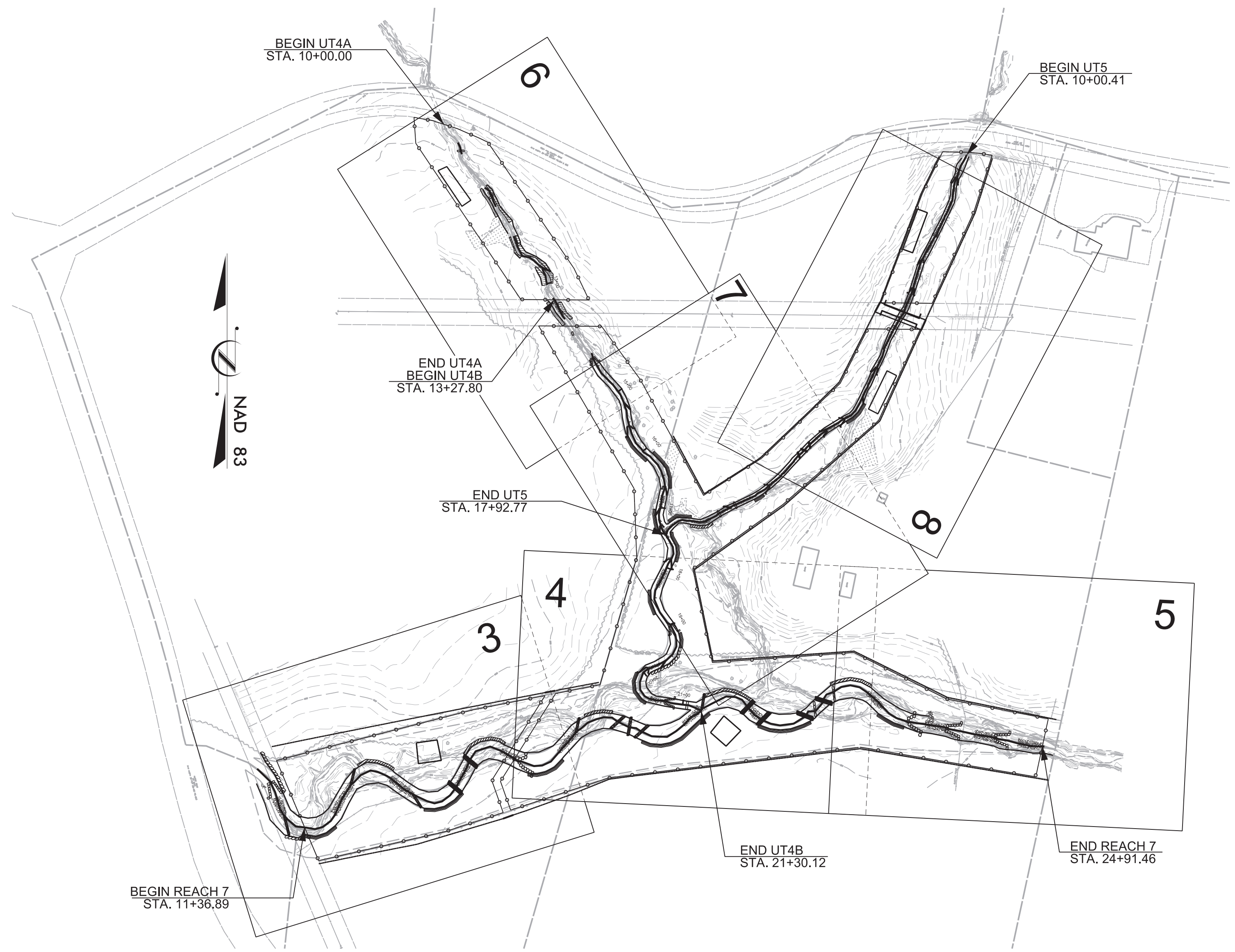
LOCATION: ROCK HILL CHURCH ROAD & NURSE ROAD

TYPE OF WORK: AS – BUILT PLAN



VICINITY MAP

INDEX OF SHEETS



NCDMS ID NO. 100020

GRAPHIC SCALES

20 0 20 40
PLANS

20 0 20 40
PROFILE (HORIZONTAL)

5 0 10 20
PROFILE (VERTICAL)

REACH SUMMARY

REACH	AS–BUILT LENGTHS	
UT4A	327.80	LF
UT4B	753.57	LF
UT5	747.21	LF
R7	1,342.56	LF

PREPARED FOR THE OFFICE OF:

NCDEQ
DIVISION OF MITIGATION SERVICES
1652 MAIL SERVICE CENTER
RALEIGH, NC 27699–1652

CONTACT: MATTHEW REID
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

SPRING 2020
LETTING DATE:

KATHLEEN M. MCKEITHAN, PE
PROJECT ENGINEER

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028432 ENGINEER KATHLEEN M. MCKEITHAN

2/22/2022

DocuSigned by:
Kathleen M. McKeithan
247E84DF4161473...
P.E.
SIGNATURE:

2/26/03

STREAM CONVENTIONAL SYMBOLS

SUPERCEDES SHEET 1-B

- J-HOOK VANE
- ROCK VANE
- OUTLET PROTECTION
- ROCK CROSS VANE
- DOUBLE DROP ROCK CROSS VANE
- SINGLE WING DEFLECTOR
- DOUBLE WING DEFLECTOR
- TEMPORARY SILT CHECK
- ROOT WAD
- GRADE CONTROL LOG J-HOOK VANE
- LOG VANE
- LOG WEIR
- LOG CROSS VANE
- LOG ROLLER
- GRADE CONTROL LOG JAM
- CONSTRUCTED RIFFLE
- BOULDER CLUSTER
- BOULDER STEP
- S — SAFETY FENCE
- TF — TAPE FENCE
- FP — 100 YEAR FLOOD PLAIN
- CE — CONSERVATION EASEMENT
- PHOTO POINT
- MONITORING WELL
- FLOW GAUGE
- IN-STREAM GAUGE
- 435 — EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- LIMITS OF DISTURBANCE
- PROPERTY LINE
- FOOT BRIDGE
- TEMPORARY STREAM CROSSING
- ROCK FORD STREAM CROSSING
- TRANSPLANTED VEGETATION
- TREE REMOVAL
- TREE PROTECTION
- CHANNEL PLUG
- CHANNEL FILL
- BRUSH TOE WITH LIVE STAKES
- GEOLIFT WITH BRUSH TOE
- PROPOSED WETLAND RESTORATION
- PROPOSED WETLAND ENHANCEMENT
- WLB — JURISDICTIONAL WETLAND BOUNDARY

**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
6.62 TEMPORARY SILT FENCE
6.63 TEMPORARY ROCK DAM

PROJECT REFERENCE NO.	SHEET NO.
162039	1-A

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028432 ENGINEER KATHLEEN M. MCKEITHAN

DocuSigned by: Kathleen M. McKeithan 247E84DF4161473...

APPROVED BY:

2/22/2022

DATE:

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

NCDMS ID NO. 100020

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, 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 SUMMER OF 2020.
4. CONTRACTOR SHOULD CALL NORTH CAROLINA "ONE-CALL" BEFORE EXCAVATION STARTS. (1-800-632-4949)
5. ALL ON-SITE ALLUVIUM SHALL BE HARVESTED AND STOCKPILED PRIOR TO FILLING ABANDONED CHANNELS.
6. 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.
7. ALL DISTURBED EMBANKMENTS SHALL BE MATTED WITH COIR FIBER MATTING OR AS DIRECTED BY THE ENGINEER.
8. ALL STREAM BANKS SHALL BE LIVE STAKED.
9. UNLESS THE ALIGNMENT IS BEING ALTERED, THE EXISTING CHANNEL DIMENSIONS ARE TO REMAIN UNLESS OTHERWISE NOTED.
10. CONTRACTOR WILL ENSURE THAT FENCING IS INSTALLED OUTSIDE THE CONSERVATION EASEMENT AS SHOWN ON THE PLANS BUT NO MORE THAN 1' OUTSIDE.
11. 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.

PLANTING PLAN VEGETATION SELECTION

Scientific Name	Common Name	% Planted by Species	Wetland Tolerance
All Buffer Plantings at 680 stems/acre using 8' X 8' spacing Riparian Zone – Overstory Species			
Betula nigra	River Birch	10%	FACW
Juglans nigra	Black Walnut	5%	FACU
Platanus occidentalis	Sycamore	14%	FACW
Liriodendron tulipifera	Tulip Poplar	14%	FACU
Fraxinus pennsylvanica	Green Ash	5%	FACW
Quercus lyrata	Overcup Oak	10%	OBL
Quercus phellos	Willow Oak	10%	FAC
Ulmus americana	American Elm	5%	FACW
Diospyros virginiana	Persimmon	5%	FAC
Nyssa sylvatica	Blackgum	1%	FAC
Quercus michauxii	Swamp Chestnut Oak	1%	FACW
Celtis laevigata	Sugarberry	1%	FACW

Riparian Zone – Overstory Species			
Betula nigra	River Birch	10%	FACW
Juglans nigra	Black Walnut	5%	FACU
Platanus occidentalis	Sycamore	15%	FACW
Liriodendron tulipifera	Tulip Poplar	15%	FACU
Fraxinus pennsylvanica	Green Ash	5%	FACW
Quercus lyrata	Overcup Oak	10%	OBL
Quercus phellos	Willow Oak	10%	FAC
Ulmus americana	American Elm	5%	FACW
Diospyros virginiana	Persimmon	5%	FAC
.			
Hamamelis virginiana	Witch Hazel	5%	FACU
Lindera benzoin	Spicebush	5%	FAC
Carpinus caroliniana	American Hornbeam	5%	FAC
Acer negundo	Box Elder	5%	FAC
Amelanchier arborea	Serviceberry	1%	FAC

Permanent seed mixtures for the project site shall be planted throughout the floodplain and riparian buffer areas except the vernal pools. Permanent seed mixtures shall be applied with temporary seed, as defined in the construction specifications.

Scientific Name	Common Name	Percent of Mixture	Seeding Density (lbs/acre)	Wetness Tolerance
Agrostis alba	Redtop	10%	1.5	FACW
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

TEMPORARY SEEDING SELECTION AND APPLICATION RATES

Common Name	Scientific Name	Application Time	Application Rate	Total (lbs/acre)
Cereal rye	*Secale cereale*	Sept - March	3 lb/1,000 sq ft.	130 lbs/acre
Browntop millet	*Panicum ramosum*	April - Aug	1 lb/1,000 sq ft.	44 lbs/acre

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mcneely

2/26/03

PROJECT REFERENCE NO.	SHEET NO.
162039	I-B
NCDMS ID NO. 100020	

NORTH CAROLINA PROFESSIONAL SEAL 028432 ENGINEER KATHLEEN M. MCKEITHAN

DocuSigned by: Kathleen M. McKeithan

APPROVED BY:

2/22/2022

DATE:

*S.U.E = SUBSURFACE UTILITY ENGINEER

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL SYMBOLS

BOUNDARIES AND PROPERTY:

Item	Symbol
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:

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

HYDROLOGY:

Item	Symbol
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:

Item	Symbol
Standard Gauge	CSX TRANSPORTATION
RR Signal Milepost	MILEPOST 35
Switch	SWITCH
RR Abandoned	
RR Dismantled	

RIGHT OF WAY:

Item	Symbol
Baseline Control Point	
Existing Right of Way Marker	
Existing Right of Way Line	
Proposed Right of Way Line	R/W
Proposed Right of Way Line with Iron Pin and Cap Marker	R/W
Proposed Right of Way Line with Concrete or Granite Marker	R/W
Existing Control of Access	C/A
Proposed Control of Access	C/A
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:

Item	Symbol
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:

Item	Symbol
Single Tree	
Single Shrub	
Hedge	
Woods Line	
Orchard	
Vineyard	Vineyard

EXISTING STRUCTURES:

MAJOR:

Item	Symbol
Bridge, Tunnel or Box Culvert	CONC
Bridge Wing Wall, Head Wall and End Wall	CONC WW

MINOR:

Item	Symbol
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:

Item	Symbol
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:

Item	Symbol
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:

Item	Symbol
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:

Item	Symbol
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:

Item	Symbol
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:

Item	Symbol
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:

Item	Symbol
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.

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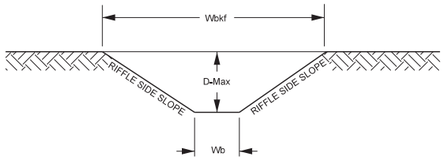
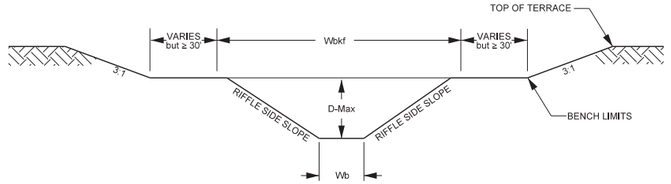
2/26/03

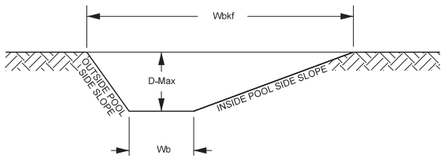
TYPICAL RIFFLE, POOL, AND BANKFULL BENCH CROSS SECTIONS



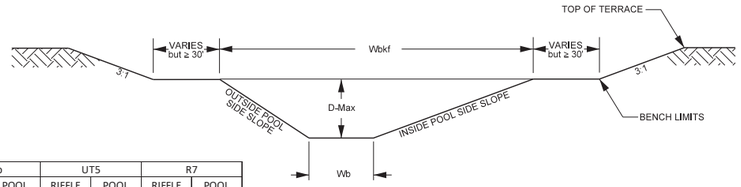
RIFFLE



RIFFLE WITH BANKFULL BENCH



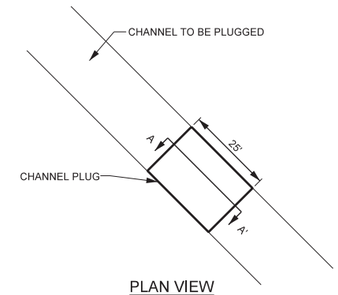
POOL



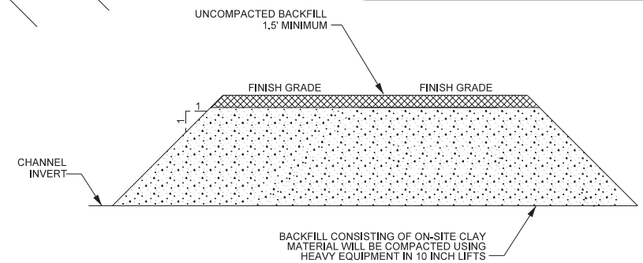
POOL WITH BANKFULL BENCH

	UT4a		UT4b		UT5		R7	
	RIFFLE	POOL	RIFFLE	POOL	RIFFLE	POOL	RIFFLE	POOL
WIDTH OF BANKFULL (Wbkf)	11.0	15.0	12.7	18.0	8.1	10.5	22.2	30.0
MAXIMUM DETPH (Dmax)	1.2	2.0	1.2	2.5	1.2	1.5	2.3	4.0
W/D (Wbkf/Dbkf)	12.2	N/A	12.7	N/A	13.0	N/A	12.3	N/A
BANKFULL AREA (Abkf)	10.0	18.0	13.0	26.3	5.0	9.0	41.0	75.0
BOTTOM WIDTH (Wb)	6.3	3.0	7.9	3.0	5.0	1.5	12.8	6.0
RIFFLE SIDE SLOPE (X:1)	2.0	N/A	2.0	N/A	2.0	N/A	2.0	N/A
INSIDE POOL SIDE SLOPE	N/A	3.0	N/A	3.0	N/A	3.0	N/A	4.0
OUTSIDE POOL SIDE SLOPE	N/A	3.0	N/A	3.0	N/A	3.0	N/A	2.0

CHANNEL PLUG



PLAN VIEW



NOTE:
1. BACKFILL CONSISTING OF ON-SITE CLAY MATERIAL WILL BE COMPACTED USING HEAVY EQUIPMENT IN 10 INCH LIFTS.
2. THE REMAINDER OF THE EXISTING CHANNEL TO BE PLUGGED WILL BE COMPLETED FILLED TO THE NEW TOP-OF-BANK ELEVATION.

PROJECT REFERENCE NO.	SHEET NO.
162039	2

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028432 ENGINEER KATHLEEN M MCKEITHAN

DocuSigned by: Kathleen M. McKeithan 247E84DF4161473...

APPROVED BY:

2/22/2022

DATE:

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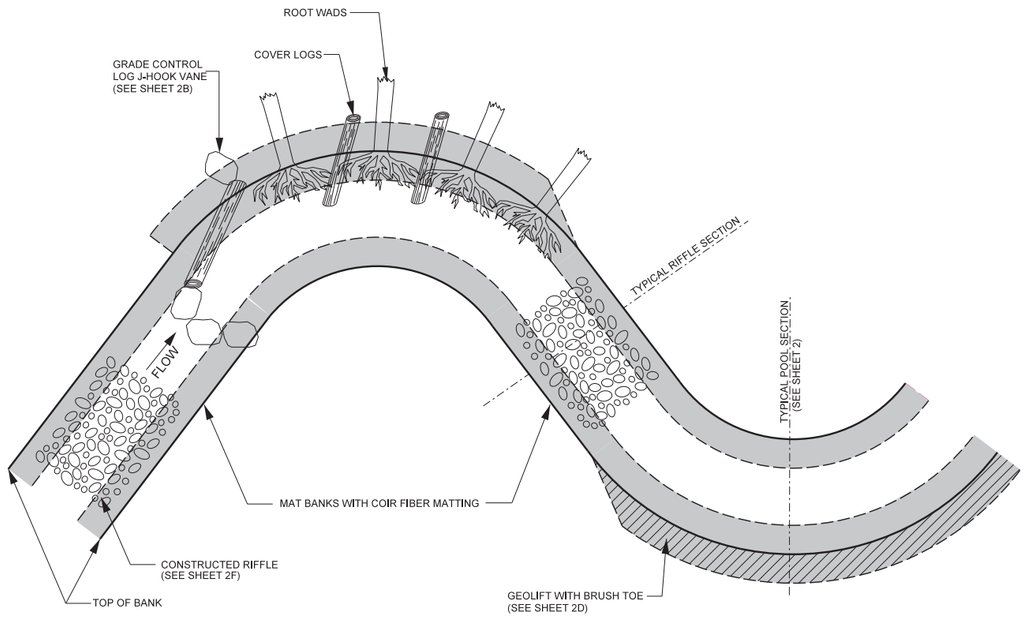
License #: F-1084

NCDMS ID NO. 100020

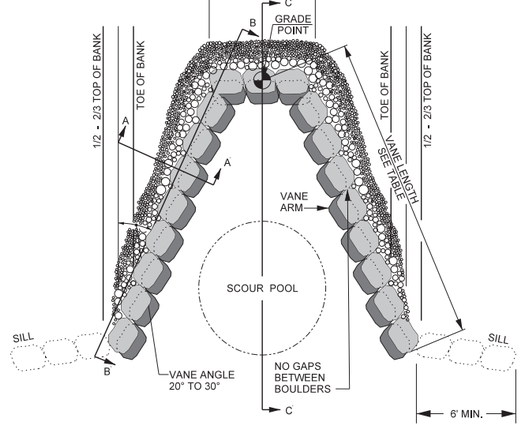
TYPICAL STRUCTURE PLACEMENT



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

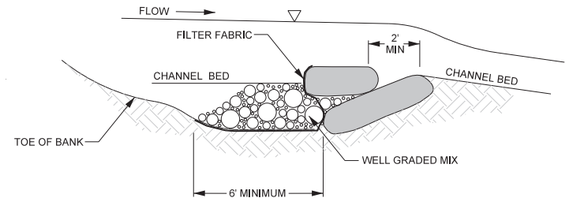


PLAN VIEW

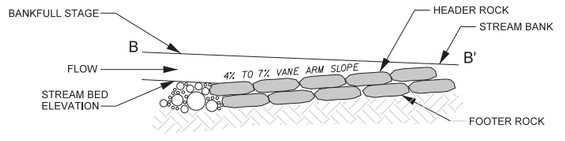
REACH	VANE LENGTH	BOULDER SIZE
UT4A	9'	1'x2'x3'
UT4B	10'	1'x2'x3'
UT5	7'	1'x2'x3'
REACH 7	18'	2'x3'x4'

NOTES FOR ALL VANE STRUCTURES:

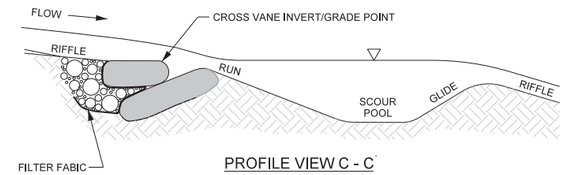
1. INSTALL FILTER FABRIC FOR DRAINAGE BEGINNING AT THE MIDDLE OF THE HEADER ROCKS AND EXTEND DOWNWARD TO THE DEPTH OF THE BOTTOM FOOTER ROCK, AND THEN UPSTREAM TO A MINIMUM OF SIX FEET.
2. DIG A TRENCH BELOW THE BED FOR FOOTER ROCKS AND PLACE FILL ON UPSTREAM SIDE OF VANE ARM, BETWEEN THE ARM AND STREAMBANK.
3. CONSTRUCT ANGLE AND SLOPE SPECIFICATIONS AS SHOWN.
4. BACKFILL VANE ARMS AND INVERT WITH A WELL GRADED MIX OF CLASS B, A, AND #57 STONE.
5. ON-SITE ALLUVIUM SHALL BE INCORPORATED INTO THE STONE BACKFILL WHERE AVAILABLE.
6. BOULDER SILL MUST BE A MINIMUM OF 6' AND WILL INCLUDE FOOTER ROCKS.



SECTION A - A'



PROFILE VIEW B - B'
VANE ARM



PROFILE VIEW C - C'

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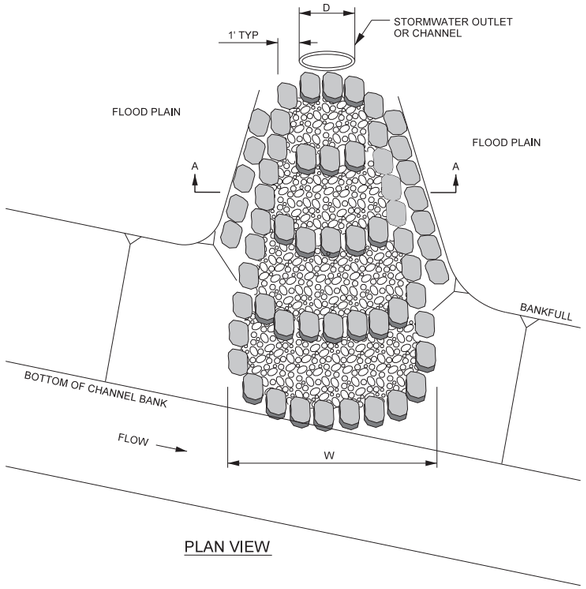
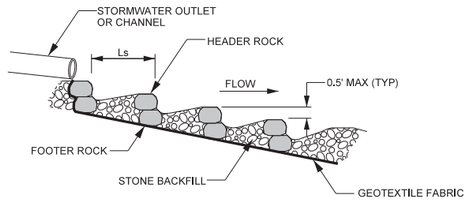
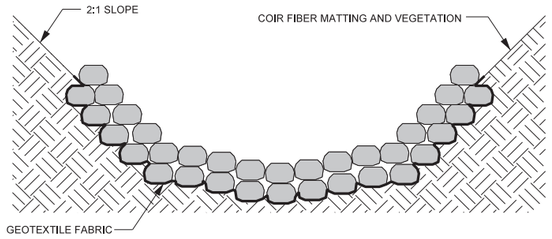
OUTLET PROTECTION



PLAN VIEW

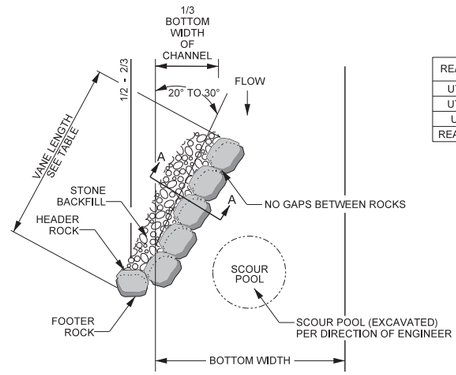


PROFILE VIEW



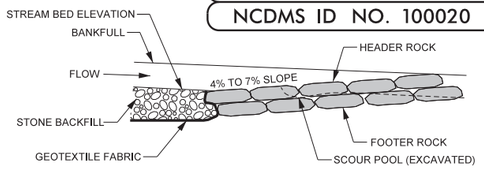
CROSS SECTION A - A

ROCK VANE



REACH	VANE LENGTH	BOULDER SIZE
UT4A	9'	1'x2'x3'
UT4B	10'	1'x2'x3'
UT5	7'	1'x2'x3'
REACH 7	18'	2'x3'x4'

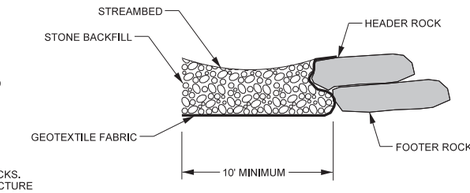
PLAN VIEW



PROFILE VIEW

NOTES FOR ALL VANE STRUCTURES:

1. 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 TEN FEET.
2. DIG A TRENCH BELOW THE BED FOR FOOTER ROCKS AND PLACE FILL ON UPSTREAM SIDE OF VANE ARM, BETWEEN THE ARM AND STREAMBANK.
3. START AT BANK AND PLACE FOOTER ROCKS FIRST AND THEN HEADER (TOP) ROCK.
4. CONTINUE WITH STRUCTURE, FOLLOWING ANGLE AND SLOPE SPECIFICATIONS.
5. AN EXTRA ROCK CAN BE PLACED IN SCOUR POOL FOR HABITAT IMPROVEMENT.
6. USE HAND PLACED STONE TO FILL GAPS ON UPSTREAM SIDE OF HEADER AND FOOTER ROCKS.
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 OF THE TOP OF THE HEADER ROCK. INCORPORATE ON-SITE ALLUVIUM WHERE AVAILABLE.
8. START SLOPE AT 2/3 TO 3/4 TIMES THE BANKFULL STAGE.



SECTION A - A

PROJECT REFERENCE NO.	SHEET NO.
162039	2A

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028432 ENGINEER KATHLEEN M MCKEITHAN

DocuSigned by: Kathleen M. McKeithan 247E84DF4161473...

APPROVED BY:

2/22/2022

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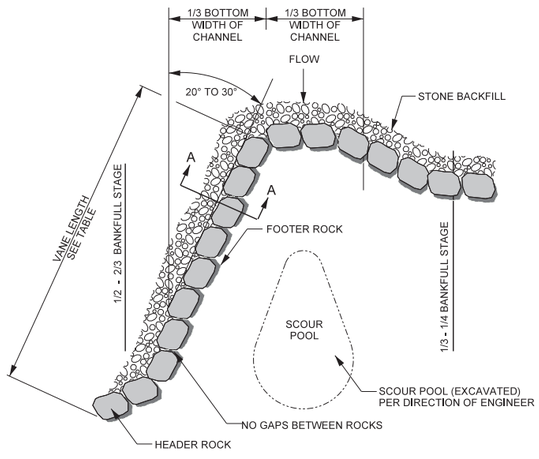
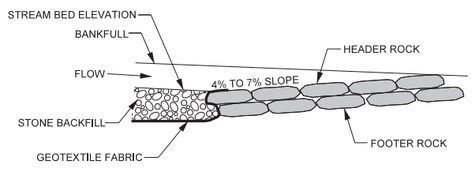
NCDMS ID NO. 100020

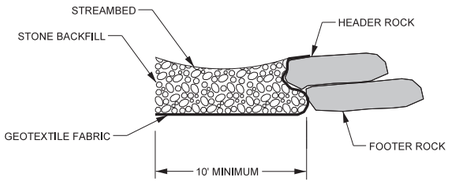
GRADE CONTROL J-HOOK VANE



PLAN VIEW



PROFILE VIEW



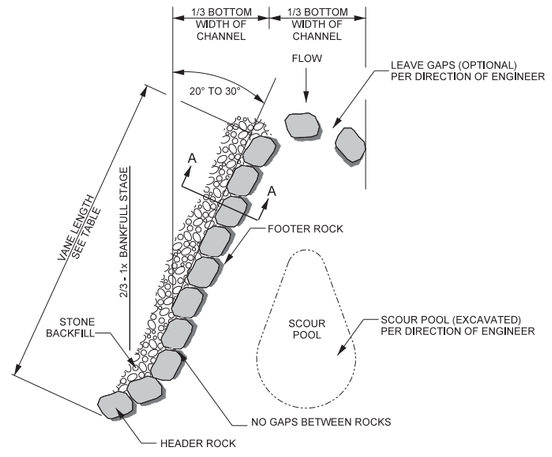
SECTION A - A

NOTES FOR ALL VANE STRUCTURES:

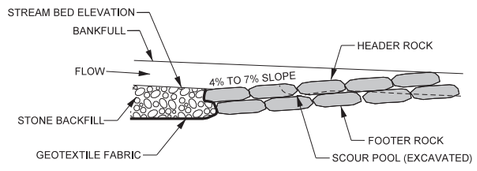
1. INSTALL FILTER FABRIC FOR DRAINAGE BEGINNING AT THE MIDDLE OF THE HEADER ROCKS AND EXTEND DOWNWARD TO THE DEPTH OF THE BOTTOM FOOTER ROCK, AND THEN UPSTREAM TO A MINIMUM OF SIX FEET.
2. DIG A TRENCH BELOW THE BED FOR FOOTER ROCKS AND PLACE FILL ON UPSTREAM SIDE OF VANE ARM, BETWEEN THE ARM AND STREAMBANK.
3. CONSTRUCT ANGLE AND SLOPE SPECIFICATIONS AS SHOWN.
4. BACKFILL VANE ARMS AND INVERT WITH A WELL GRADED MIX OF CLASS B, A, AND #57 STONE.
5. ON-SITE ALLUVIUM SHALL BE INCORPORATED INTO THE STONE BACKFILL WHERE AVAILABLE.
6. BOULDER SILL MUST BE A MINIMUM OF 6'.

REACH	VANE LENGTH	BOULDER SIZE
UT4A	9'	1'x2'x3'
UT4B	10'	1'x2'x3'
UT5	7'	1'x2'x3'
REACH 7	18'	2'x3'x4'

J-HOOK VANE

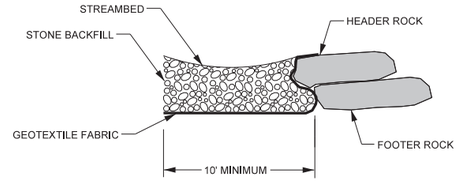


PLAN VIEW



PROFILE VIEW

REACH	VANE LENGTH	BOULDER SIZE
UT4A	9'	1'x2'x3'
UT4B	10'	1'x2'x3'
UT5	7'	1'x2'x3'
REACH 7	18'	2'x3'x4'



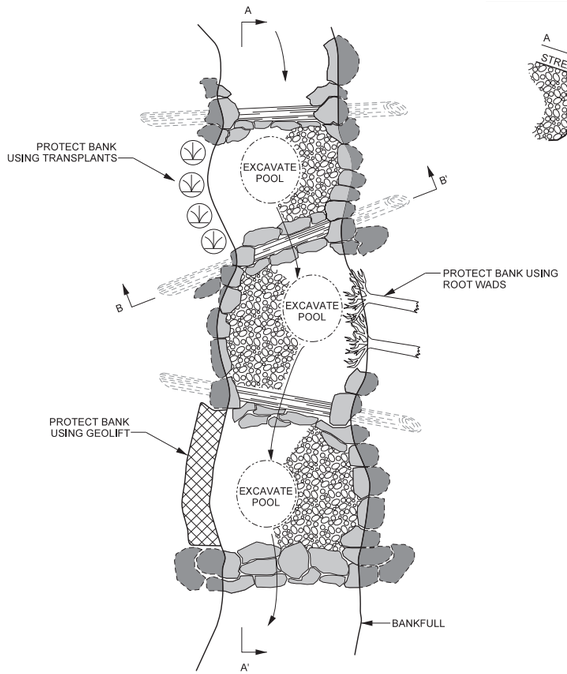
SECTION A - A

NOTES FOR ALL VANE STRUCTURES:

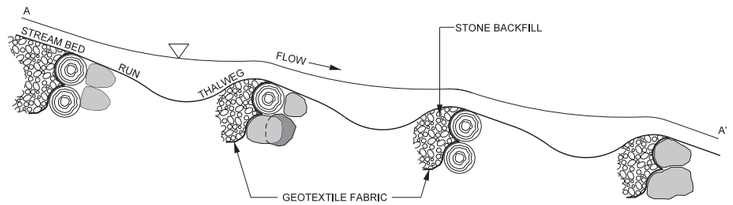
1. INSTALL GEOTEXTILE FABRIC BEGINNING AT THE TOP OF THE HEADER ROCKS AND EXTEND DOWNWARD TO THE DEPTH OF THE BOTTOM FOOTER ROCK, AND THEN UPSTREAM TO A MINIMUM OF TEN FEET.
2. DIG A TRENCH BELOW THE BED FOR FOOTER ROCKS AND PLACE FILL ON UPSTREAM SIDE OF VANE ARM, BETWEEN THE ARM AND STREAMBANK.
3. START AT BANK AND PLACE FOOTER ROCKS FIRST AND THEN HEADER (TOP) ROCK.
4. CONTINUE WITH STRUCTURE, FOLLOWING ANGLE AND SLOPE SPECIFICATIONS.
5. AN EXTRA ROCK CAN BE PLACED IN SCOUR POOL FOR HABITAT IMPROVEMENT.
6. USE HAND PLACED STONE TO FILL GAPS ON UPSTREAM SIDE OF HEADER AND FOOTER ROCKS.
7. AFTER ALL STONE BACKFILL HAS BEEN PLACED, FILL IN THE UPSTREAM SIDE OF THE STRUCTURE WITH ON-SITE ALLUVIUM TO THE ELEVATION OF THE TOP OF THE HEADER ROCK.

2/26/03

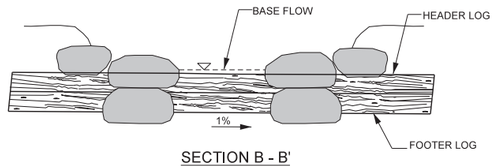
LOG AND ROCK STEP / POOL



PLAN VIEW



SECTION A - A'



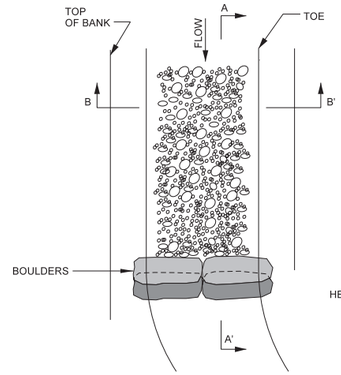
SECTION B - B'

REACH	BOULDER SIZE
UT4A	1'x2'x3'
UT4B	1'x2'x3'
UT5	1'x2'x3'
REACH 7	2'x3'x4'

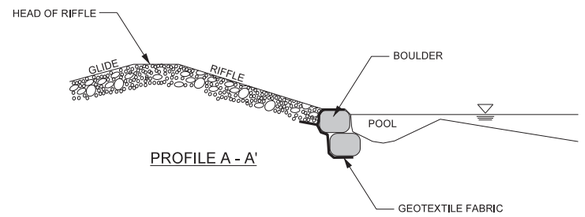
NOTES:

1. LOGS SHOULD BE AT LEAST 10" IN DIAMETER, RELATIVELY STRAIGHT, HARDWOOD, AND RECENTLY HARVESTED AND EXTENDING INTO THE BANK 5' 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 PLACED ON TOP OF HEADER LOG FOR ANCHORING.
5. 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.

BOULDER STEP



PLAN VIEW



PROFILE A - A'

NOTES:

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

REACH	BOULDER SIZE
UT4A	1'x2'x3'
UT4B	1'x2'x3'
UT5	1'x2'x3'
REACH 7	2'x3'x4'

PROJECT REFERENCE NO.	SHEET NO.
162039	2B

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028432 ENGINEER KATHLEEN M MCKEITHAN

DocuSigned by: Kathleen M. McKeithan 247E84DF4161473...

APPROVED BY:

2/22/2022

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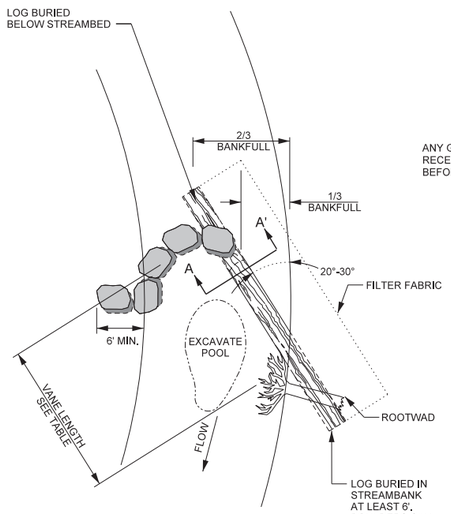
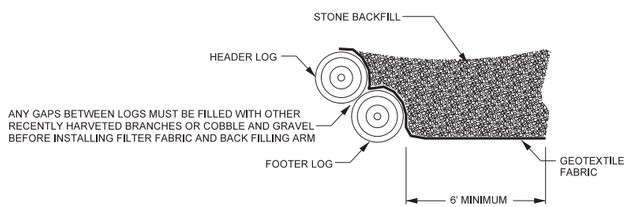
License #: F-1084

NCDMS ID NO. 100020

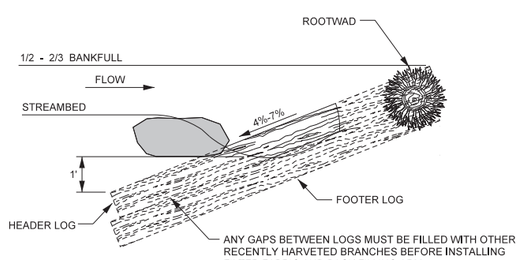
GRADE CONTROL LOG J-HOOK VANE



PLAN VIEW



SECTION A - A'



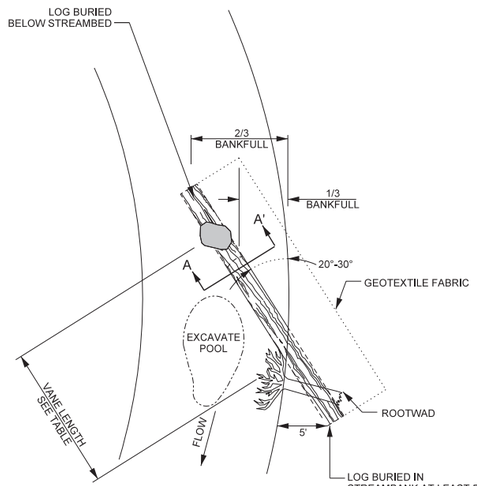
PROFILE VIEW

NOTES:

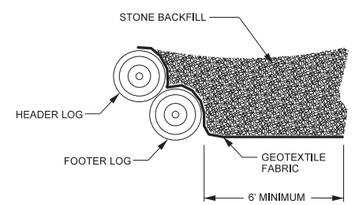
1. LOGS SHOULD BE AT LEAST 10" IN DIAMETER, RELATIVELY STRAIGHT, HARDWOOD, RECENTLY HARVESTED, AND FOOTERED.
2. BOULDERS MUST BE OF SUFFICIENT SIZE TO ANCHOR LOGS.
3. SOIL SHOULD BE COMPACTED WELL AROUND BURIED PORTIONS OF LOG.
4. ROOTWADS SHOULD BE PLACED BENEATH THE HEADER LOG AND PLACED SO THAT IT 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.

REACH	VANE LENGTH	BOULDER SIZE
UT4A	9'	1'x2'x3'
UT4B	10'	1'x2'x3'
UT5	7'	1'x2'x3'
REACH 7	18'	2'x3'x4'

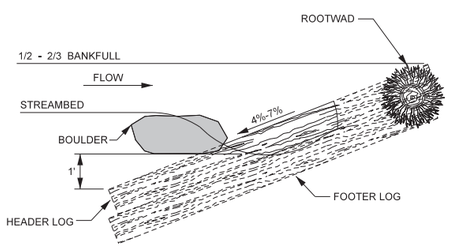
LOG VANE



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. 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.

REACH	VANE LENGTH	BOULDER SIZE
UT4A	9'	1'x2'x3'
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UT5	7'	1'x2'x3'
REACH 7	18'	2'x3'x4'

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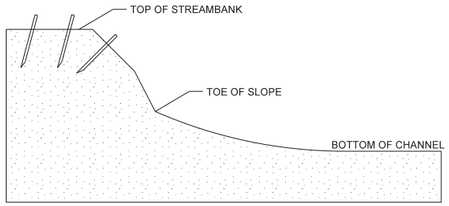
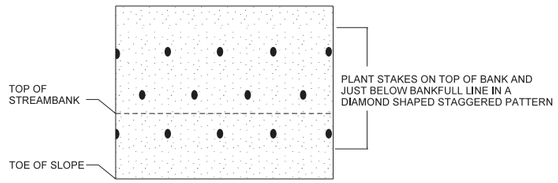
2/26/03

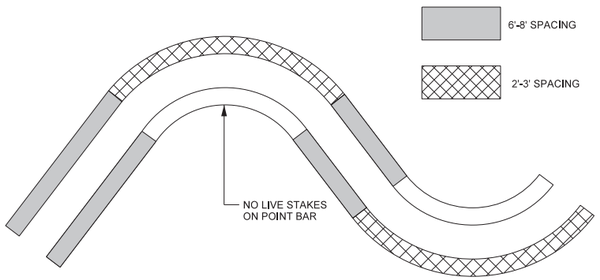
LIVE STAKING



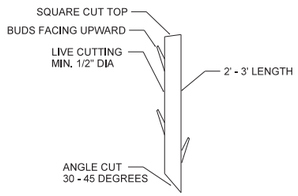
CROSS SECTION VIEW



PLAN VIEW



PLAN VIEW

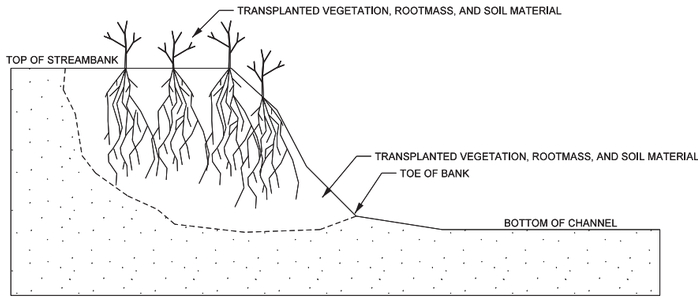


LIVE STAKE DETAIL

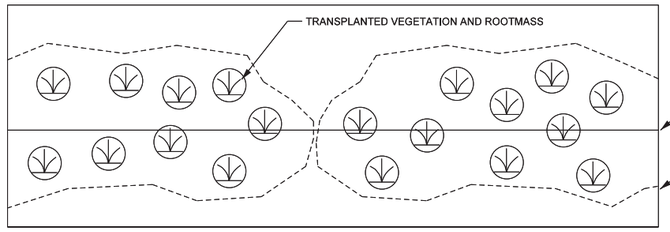
NOTES:

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.
162039	2C

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028432 ENGINEER KATHLEEN M MCKEITHAN

DocuSigned by: Kathleen M. McKeithan 247E84DF4161473...

APPROVED BY:

2/22/2022

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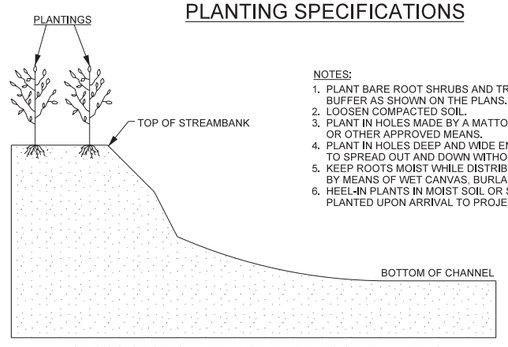
License #: F-1084

NCDMS ID NO. 100020

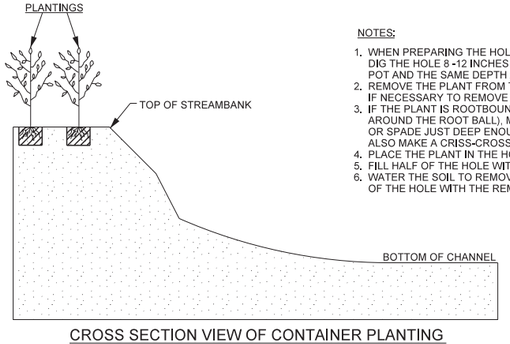
PLANTING SPECIFICATIONS



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.

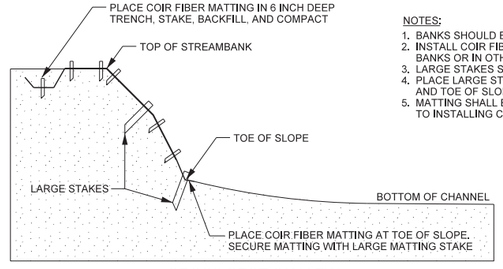


CROSS SECTION VIEW OF CONTAINER PLANTING

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



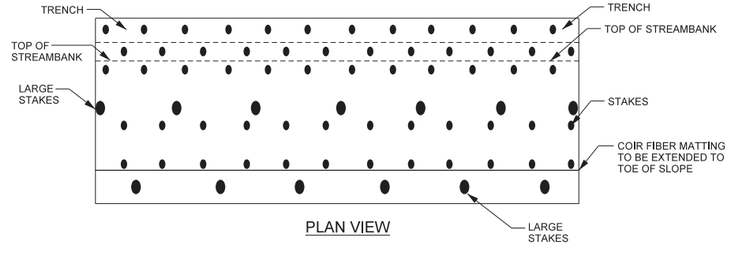
CROSS SECTION VIEW

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.

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)

K:\(202)\162039_Whittier_Creek\Design\As-Built\Plans\162039_ASB-PSH-02C.dgn

PROJECT REFERENCE NO.	SHEET NO.
162039	2D

PROJECT ENGINEER

DocuSigned by:
Kathleen M. McKeithan
247E84DF4161473...

APPROVED BY:

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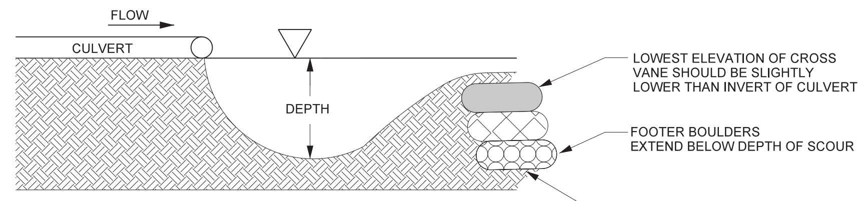
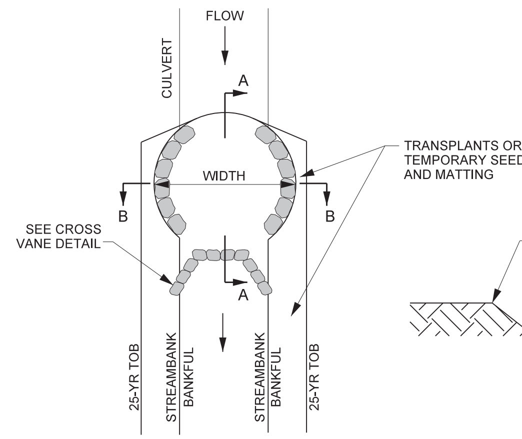
NCDMS ID NO. 100020

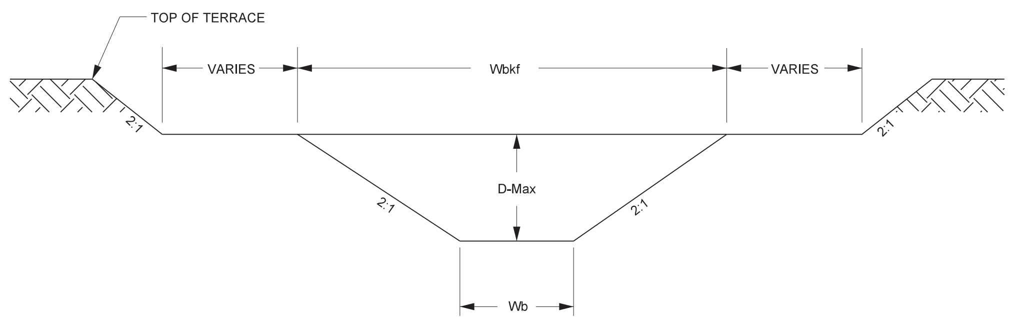
PLUNGE POOL



SECTION A - A



PLAN VIEW

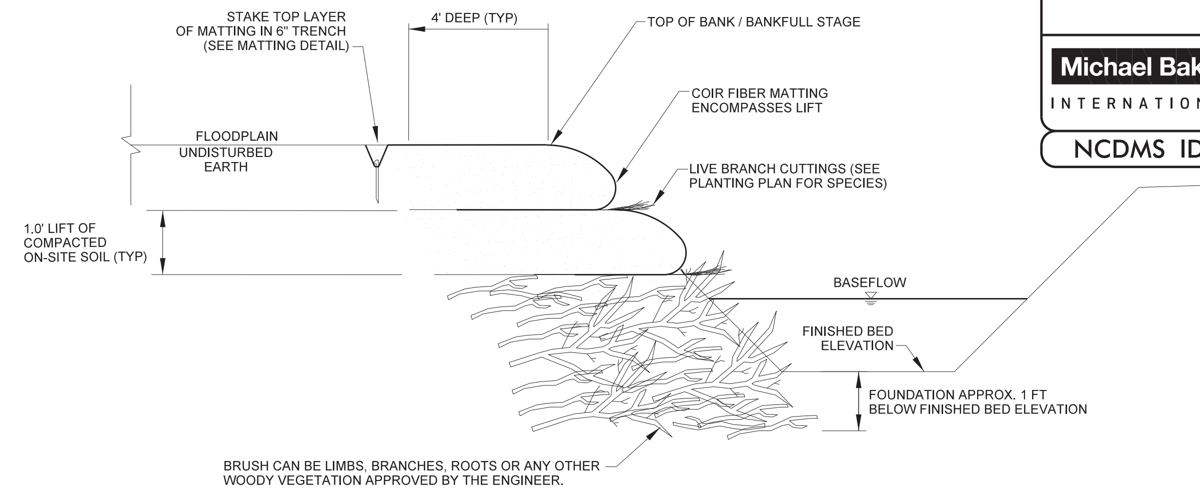


SECTION B - B

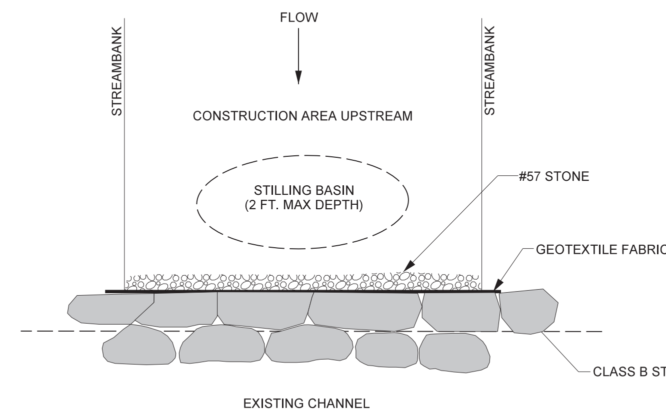
GEOLIFT WITH BRUSH TOE

NOTES:

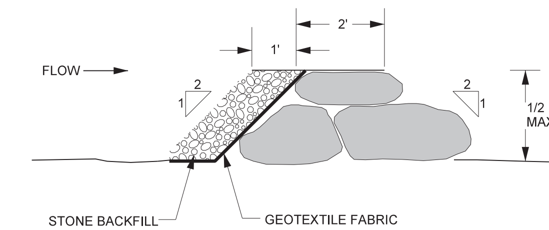
1. LIVE BRANCH CUTTINGS SHALL BE THE SAME SPECIES AS THE LIVE STAKES AND SHALL BE INSTALLED DURING VEGETATION DORMANCY. IF CONSTRUCTION OCCURS OUTSIDE OF DORMANT SEASON, CONTRACTOR SHALL CONSULT WITH DESIGNER.
2. LIVE BRANCH CUTTINGS SHALL BE INSTALLED AT A DENSITY OF 20-30 CUTTINGS PER LINEAR FOOT AND 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.
4. WHEN GEOLIFTS ARE BUILT ABOVE ROOTWAD CLUSTER, USE LARGE STONE BACKFILL BEHIND ROOT MASS TO BUILT FOUNDATION.
5. CLASS I STONE MAY BE USED AT THE DIRECTION OF THE ENGINEER TO BUILD THE FOUNDATION IN LIEU OF BRUSH MATERIAL.



ROCK DAM



PLAN VIEW

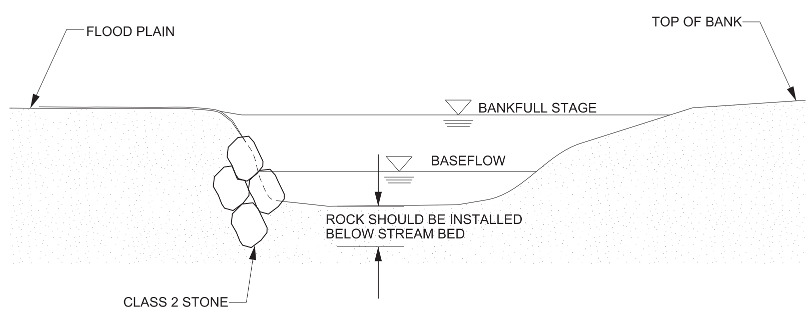


CROSS SECTION

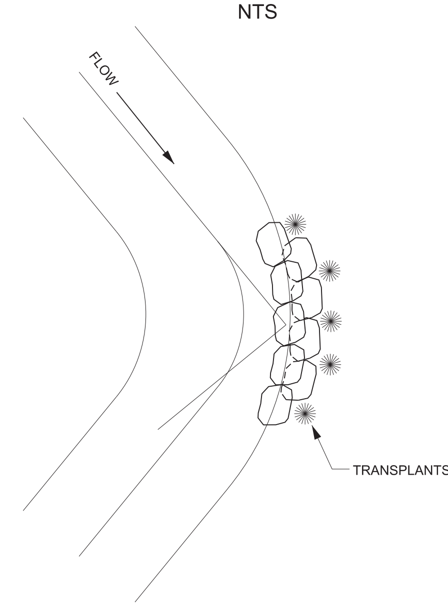
NOTES:
CLEAN OUT STILLING BASIN OF TRAPPED SEDIMENT PRIOR TO REMOVAL.

ROCK TOE PROTECTION

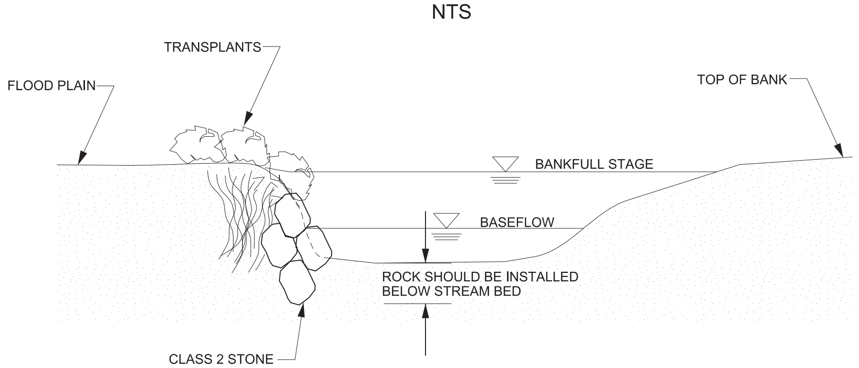
ROCK TOE PROTECTION
CROSS SECTION VIEW
NTS



ROCK TOE PROTECTION
PLAN VIEW
NTS



ROCK TOE PROTECTION WITH TRANSPLANTS
CROSS SECTION VIEW
NTS



NOTES:

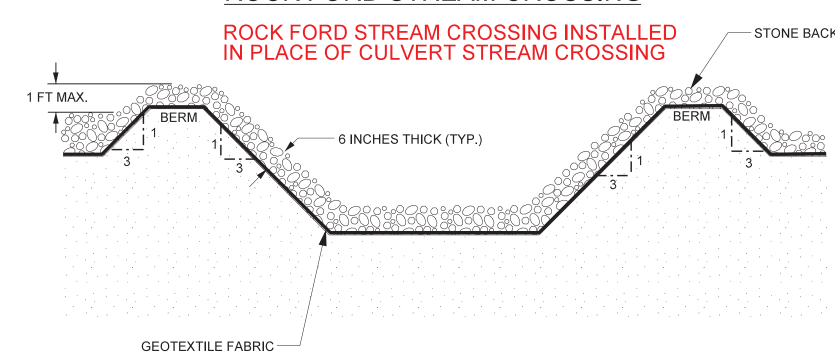
TRENCHING METHOD:
IF THE CLASS 2 CANNOT BE DRIVEN INTO THE BANK OR THE BANK NEEDS TO BE RECONSTRUCTED, THE TRENCHING METHOD SHOULD BE USED. THIS METHOD REQUIRES THAT A TRENCH BE EXCAVATED FOR THE CLASS 2. ONE-THIRD OF THE CLASS 2 SHOULD REMAIN BELOW NORMAL BASE FLOW CONDITIONS.

NOTES:

DRIVEN METHOD:
CLASS 2 SHOULD BE LAIN IN THE STREAMBED AND THEN DRIVEN INTO THE BANK WITH A HORIZONTAL AND DOWNWARD FORCE.

ROCK FORD STREAM CROSSING

ROCK FORD STREAM CROSSING INSTALLED IN PLACE OF CULVERT STREAM CROSSING

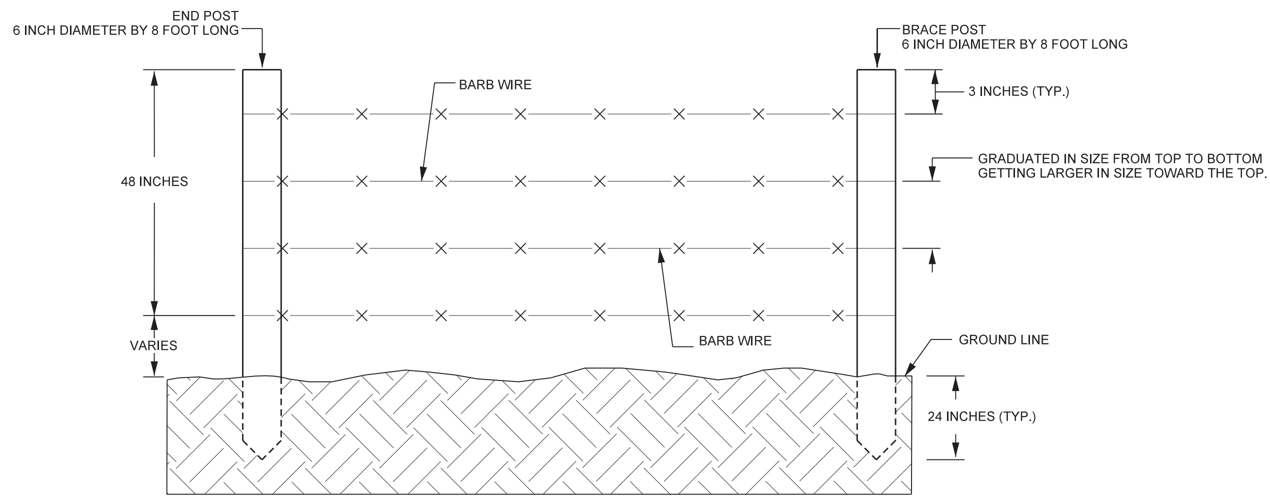


NOTES:

1. CONSTRUCT STREAM CROSSING WHEN FLOW IS LOW.
2. HAVE ALL NECESSARY MATERIALS AND EQUIPMENT ON-SITE BEFORE WORK BEGINS.
3. MINIMIZE CLEARING AND EXCAVATION OF STREAMBANKS. DO NOT EXCAVATE CHANNEL BOTTOM. COMPLETE ONE SIDE BEFORE STARTING ON THE OTHER SIDE.
4. INSTALL STREAM CROSSING AT RIGHT ANGLE TO THE FLOW.
5. GRADE SLOPES TO A 3:1 SLOPE. TRANSPLANT SOD FROM ORIGINAL STREAMBANK ONTO SIDE SLOPES.
6. MAINTAIN CROSSING SO THAT RUNOFF IN THE CONSTRUCTION ROAD DOES NOT ENTER EXISTING CHANNEL.
7. A STABILIZED PAD OF STONE BACKFILL, 6 INCHES THICK, LINED WITH GEOTEXTILE FABRIC SHALL BE USED OVER THE BERM AND ACCESS SLOPES.
8. WIDTH OF THE CROSSING SHALL BE SUFFICIENT TO ACCOMMODATE THE LARGEST VEHICLE CROSSING THE CHANNEL.
9. CONTRACTOR SHALL DETERMINE AN APPROPRIATE RAMP ANGLE ACCORDING TO EQUIPMENT UTILIZED.

2/26/03

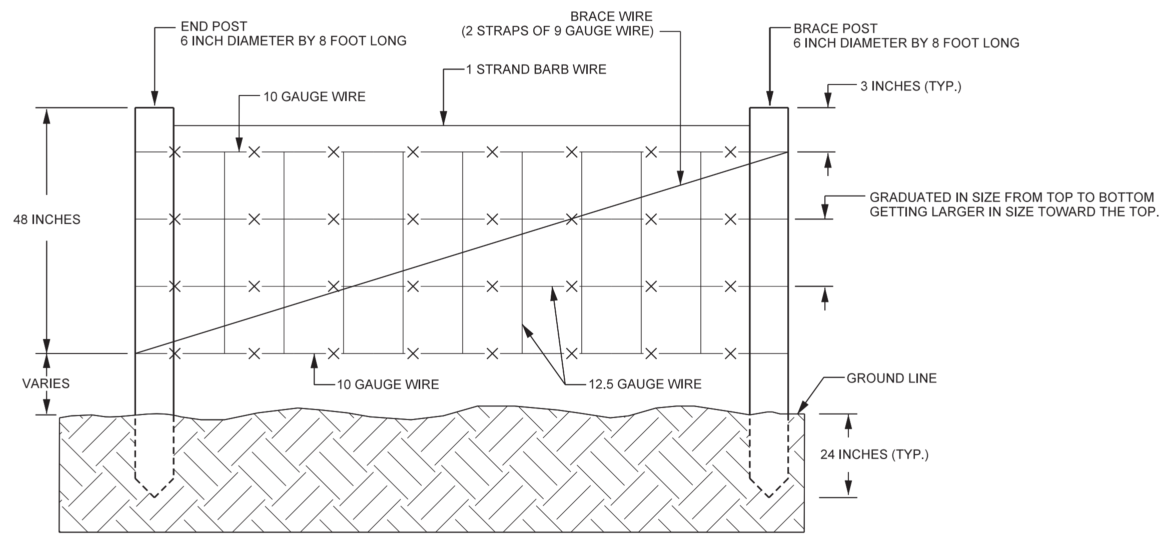
BARB WIRE FIELD FENCE



NOTE:

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

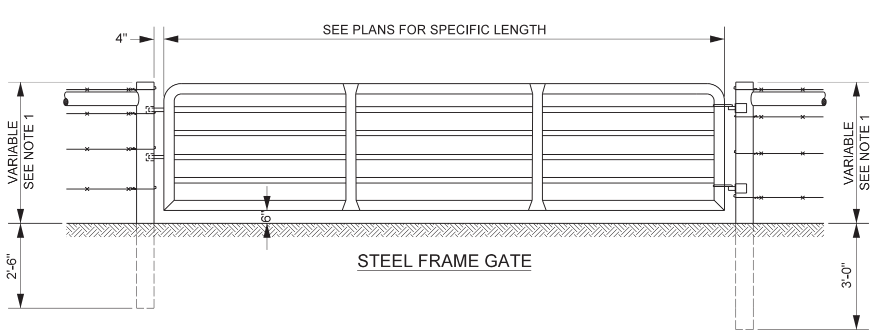
WOVEN WIRE FENCE



NOTE:

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

STEEL GATES

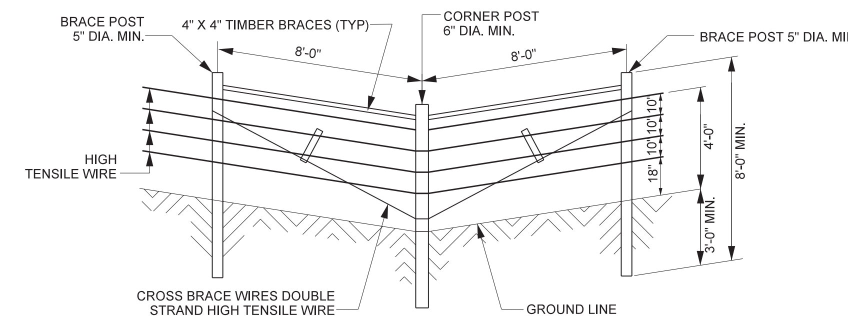


STEEL FRAME GATE

NOTES:

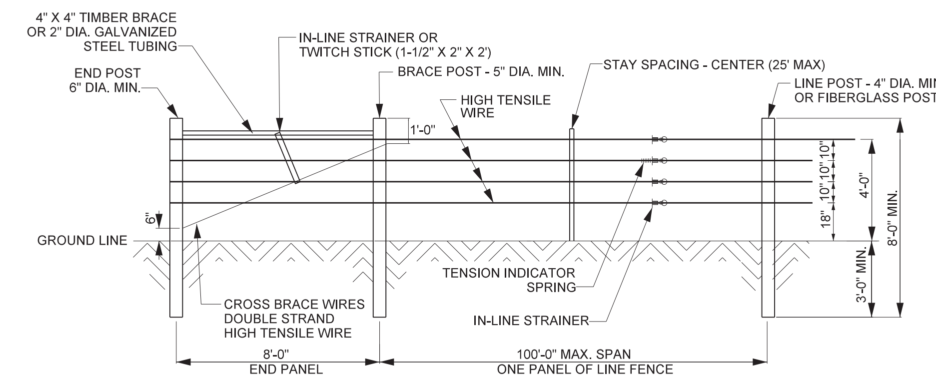
1. POST HEIGHT DIMENSION SHALL BE THE SAME AS REQUIRED FOR THE ADJACENT FENCE.
2. CONSTRUCT AN END OR STRESS PANEL, AS REQUIRED IN THE SPECIFICATION, ON EACH SIDE OF GATE.
3. HINGES AND LOCKS SHALL BE INSTALLED AS SPECIFIED BY GATE MANUFACTURER.

4 STRAND - HIGH TENSILE FENCING

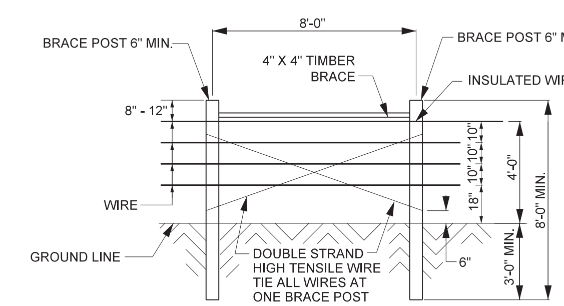


CORNER AND VERICAL CHANGE BRACING

INSTALL AT ALL POINTS WHERE FENCE ALIGNMENT CHANGES 15 DEGREES OR MORE

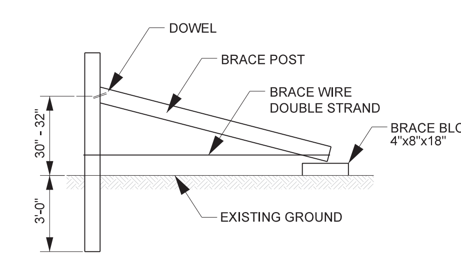


END ASSEMBLY AND LINE FENCE SECTION



PULL POST ASSEMBLY

PLACE IN FENCE LINE SO THAT MAXIMUM DISTANCE BETWEEN BRACED POSTS DOES NOT EXCEED 1320 FEET



CORNER OR END BRACE ASSEMBLY

OPTIONAL FIGURE 4

NOTES:

1. NOTCH POSTS 3/4" FOR 4" X 4" TIMBER BRACES.
2. DOWELS TO BE 1/2" DIA. X 5" PLAIN STEEL RODS. DRIVE DOWELS IN 7/16" DIA. HOLES, 2-1/2" INTO EACH POST AND TIMBER BRACE.
3. STAPLE CROSS-BRACE WIRES TO BRACE AND CORNER POSTS AT QUARTER POINTS OF THE POSTS.
4. HIGH TENSILE WIRE WILL BE NEW AND SMOOTH AND WILL MEET THE FOLLOWING 1) TENSILE STRENGTH - 110,000 PSI 2) GALVANIZING - TYPE III 3) GAGE - 12-1/2.
5. ALL CORNER POSTS, BRACE POSTS, BRACES, AND STAY SPACERS, SHALL BE PRESSURE TREATED. PRESSURE TREATMENT SHALL CONFORM TO FEDERAL SPECIFICATION TT-W-571. (1-1/4" LONG FOR HARD WOODS).
6. AT CORNER POSTS, STAPLE EACH WIRE AT QUARTER POINTS OF POSTS. AT BRACE POSTS, DOUBLE STAPLE EACH WIRE. AT LINE POSTS, SECURE EACH WIRE WITH STANDARD CLAMPS.
7. FIBERGLASS MAY BE USED FOR LINE POSTS. THESE WILL CONSIST OF MARBLE, FIBERGLASS, AND POLYMER RESINS WHICH HAVE BEEN TREATED BY THERMOSETTINGS (HEAT TREATMENT). POSTS MUST BE DRIVEN IN THE SOIL AT LEAST 18 INCHES.
8. 2" DIAMETER PIPE DIAGONAL BRACE MAY BE USED IN PLACE OF HORIZONTAL TIMBER BRACE AND DIAGONAL WIRES.
9. MINIMUM NET RETENTION OF CHROMATED COPPER ARSENATE (CCA) FOR WOOD FENCE POSTS SHALL BE 0.40 POUNDS PER CUBIC FOOT.
10. A SINGLE 12 FOOT LONG, 6 INCH MINIMUM DIAMETER POST MAY BE SUBSTITUTED FOR END PANEL, CORNER AND VERTICAL CHANGE BRACING, AND PULL POST ASSEMBLY. THE 12 FOOT LONG POSTS SHALL EXTEND A MINIMUM OF 7.5 FEET INTO THE GROUND AND BE BACKFILLED WITH GRAVEL.
11. FOR FURTHER DETAILS ON APPROVED METHODS OF FENCE INSTALLATION, SEE NATURAL RESOURCE SERVICE'S CONSERVATION PRACTICE MATERIALS AND CONSTRUCTION SPECIFICATIONS FOR FENCING (CODE 382) BY NRCS NORTH CAROLINA (FEBRUARY 2008).

PROJECT REFERENCE NO.	SHEET NO.
162039	2E

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028432 KATHLEEN M. McKEITHAN

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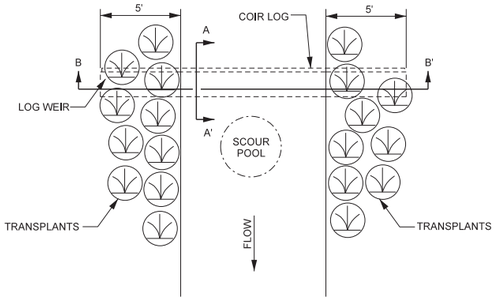
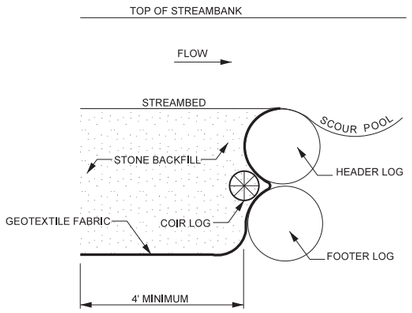
2/26/03

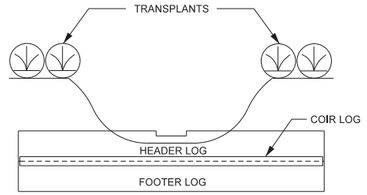
LOG DROP



PLAN VIEW



SECTION A - A'

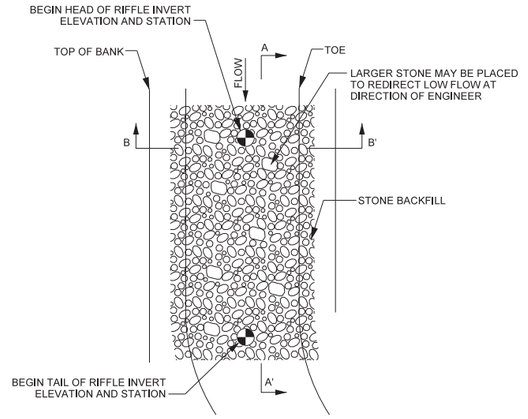


CROSS SECTION VIEW B - B'

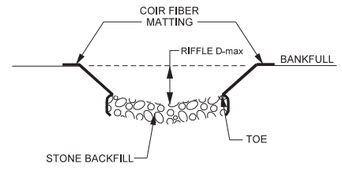
NOTES:

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. DIAMETER OF COIR LOG SHOULD BE APPROXIMATELY 1/2 DIAMETER OF LOGS.
4. USE GEOTEXTILE FABRIC WITH COIR LOGS TO SEAL GAPS BETWEEN LOGS.
5. PLACE TRANSPLANTS ALONG BANKS TO PROTECT AGAINST BANK EROSION.
6. THE HEADER LOG SHOULD BE NOTCHED 2 - 3 INCHES DEEP IN THE CENTER AND FOR 20 - 30% OF THE CHANNEL WIDTH.

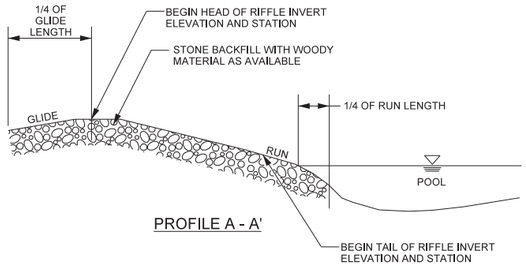
CONSTRUCTED RIFFLE



PLAN VIEW



SECTION B - B'



PROFILE A - A'

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 BE ROUNDED, SMOOTH, AND CONCAVE, WITH THE ELEVATION OF THE BED 0.2 FT DEEPER IN THE CENTER THAN AT THE EDGES.
5. CONSTRUCTED RIFFLES SHALL BE 12" THICK.
6. CHANNEL BED SHALL INCLUDE WOODY MATERIAL AS AVAILABLE ON-SITE LAYERED IN WITH STONE BACKFILL.

REACH	STONE BACKFILL MIX
APPLIES TO ALL REACHES	10% CLASS I RIPRAP 20% CLASS B RIPRAP 40% CLASS A RIPRAP 30% ON-SITE ALLUVIUM

PROJECT REFERENCE NO.	SHEET NO.
162039	2F

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028432 ENGINEER KATHLEEN M MCKEITHAN

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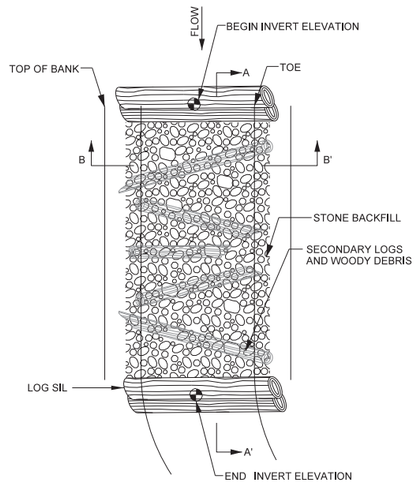
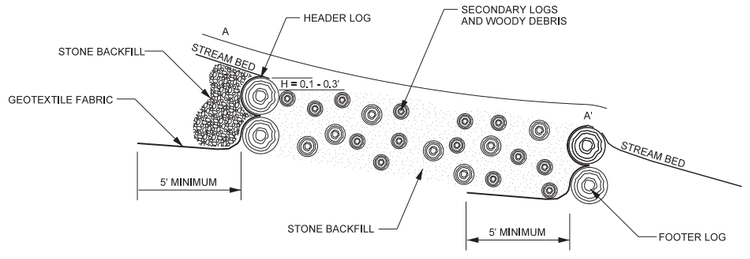
NCDMS ID NO. 100020

CONSTRUCTED RIFFLE WITH WOOD

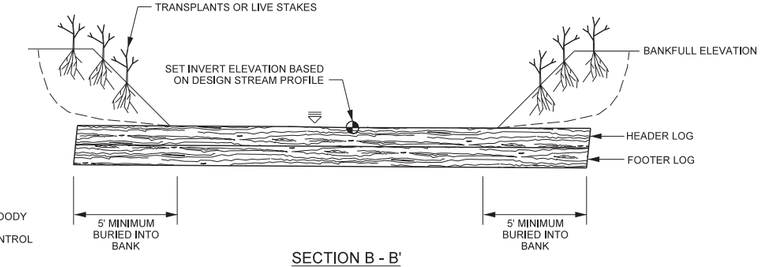
CONSTRUCTED RIFFLE WITH WOOD
INSTALLED IN PLACE OF
GRADE CONTROL LOG JAM



PLAN VIEW



SECTION A - A'



SECTION B - B'

NOTES:

1. UNDERCUT CHANNEL BED ELEVATION AS NEEDED TO ALLOW FOR LAYERS OF STONE AND WOODY MATERIAL 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 BE ROUNDED, SMOOTH, AND CONCAVE, WITH THE ELEVATION OF THE BED 0.2 FT DEEPER IN THE CENTER THAN AT THE EDGES.
5. CONSTRUCTED RIFFLES SHALL BE 12" THICK.
6. CHANNEL BED SHALL INCLUDE WOODY MATERIAL AS AVAILABLE ON-SITE LAYERED IN WITH STONE BACKFILL.

2/22/2022
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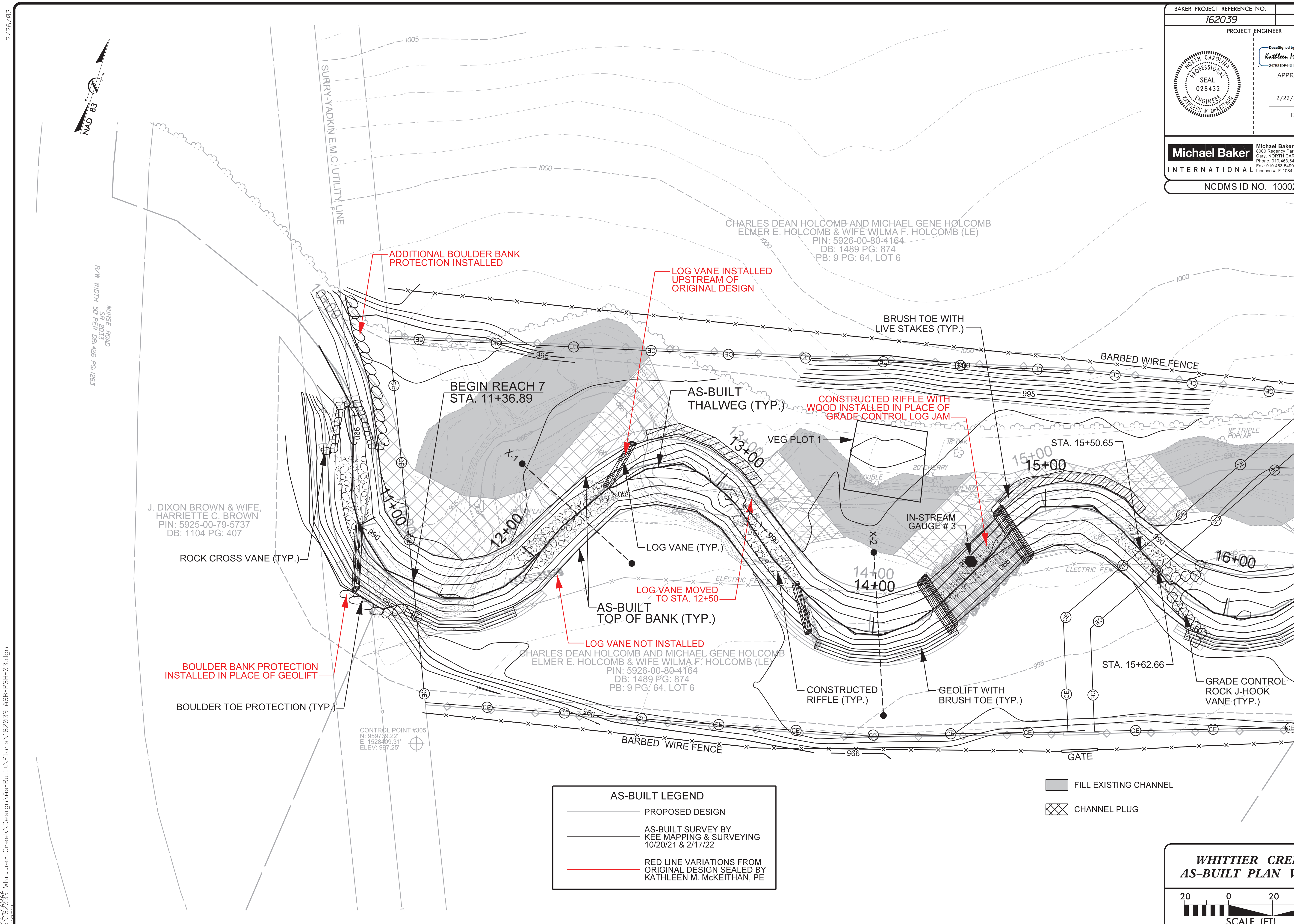
NAD 83
SURRY-YADKIN E.M.C. UTILITY LINE
NURSE ROAD
SR 2033
R/W WIDTH 50' PER DB 426 PG 1263
CHARLES DEAN HOLCOMB AND MICHAEL GENE HOLCOMB
ELMER E. HOLCOMB & WIFE WILMA F. HOLCOMB (LE)
PIN: 5926-00-80-4164
DB: 1489 PG: 874
PB: 9 PG: 64, LOT 6
ADDITIONAL BOULDER BANK PROTECTION INSTALLED
LOG VANE INSTALLED UPSTREAM OF ORIGINAL DESIGN
BRUSH TOE WITH LIVE STAKES (TYP.)
BARBED WIRE FENCE
BEGIN REACH 7
STA. 11+36.89
AS-BUILT THALWEG (TYP.)
CONSTRUCTED RIFFLE WITH WOOD INSTALLED IN PLACE OF GRADE CONTROL LOG JAM
VEG PLOT 1
STA. 15+50.65
13+00
15+00
11+00
12+00
14+00
16+00
X-1
X-2
J. DIXON BROWN & WIFE,
HARRIETTE C. BROWN
PIN: 5925-00-79-5737
DB: 1104 PG: 407
ROCK CROSS VANE (TYP.)
LOG VANE (TYP.)
IN-STREAM GAUGE # 3
LOG VANE MOVED TO STA. 12+50
AS-BUILT TOP OF BANK (TYP.)
LOG VANE NOT INSTALLED
ELECTRIC FENCE
CHARLES DEAN HOLCOMB AND MICHAEL GENE HOLCOMB
ELMER E. HOLCOMB & WIFE WILMA F. HOLCOMB (LE)
PIN: 5926-00-80-4164
DB: 1489 PG: 874
PB: 9 PG: 64, LOT 6
BOULDER BANK PROTECTION INSTALLED IN PLACE OF GEOLIFT
BOULDER TOE PROTECTION (TYP.)
CONSTRUCTED RIFFLE (TYP.)
GEOLIFT WITH BRUSH TOE (TYP.)
STA. 15+62.66
GRADE CONTROL ROCK J-HOOK VANE (TYP.)
CONTROL POINT #305
N: 959739.22'
E: 1528409.31'
ELEV: 997.25'
BARBED WIRE FENCE
GATE
MATCH LINE - SEE SHEET 4
1005
1000
995
990

AS-BUILT LEGEND

	PROPOSED DESIGN
	AS-BUILT SURVEY BY KEE MAPPING & SURVEYING 10/20/21 & 2/17/22
	RED LINE VARIATIONS FROM ORIGINAL DESIGN SEALED BY KATHLEEN M. McKEITHAN, PE

FILL EXISTING CHANNEL

CHANNEL PLUG

BAKER PROJECT REFERENCE NO. 162039 | SHEET NO. 3

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 028432 KATHLEEN M. McKEITHAN

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License #: F-1084

NCDMS ID NO. 100020

WHITTIER CREEK AS-BUILT PLAN VIEW

SCALE (FT) 20 0 20 40

2/26/03

AS-BUILT LEGEND

- PROPOSED DESIGN
- AS-BUILT SURVEY BY KEE MAPPING & SURVEYING 10/20/21 & 2/17/22
- RED LINE VARIATIONS FROM ORIGINAL DESIGN SEALED BY KATHLEEN M. McKEITHAN, PE

BAKER PROJECT REFERENCE NO.	SHEET NO.
162039	4

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028432 ENGINEER KATHLEEN M McKEITHAN

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APPROVED BY:

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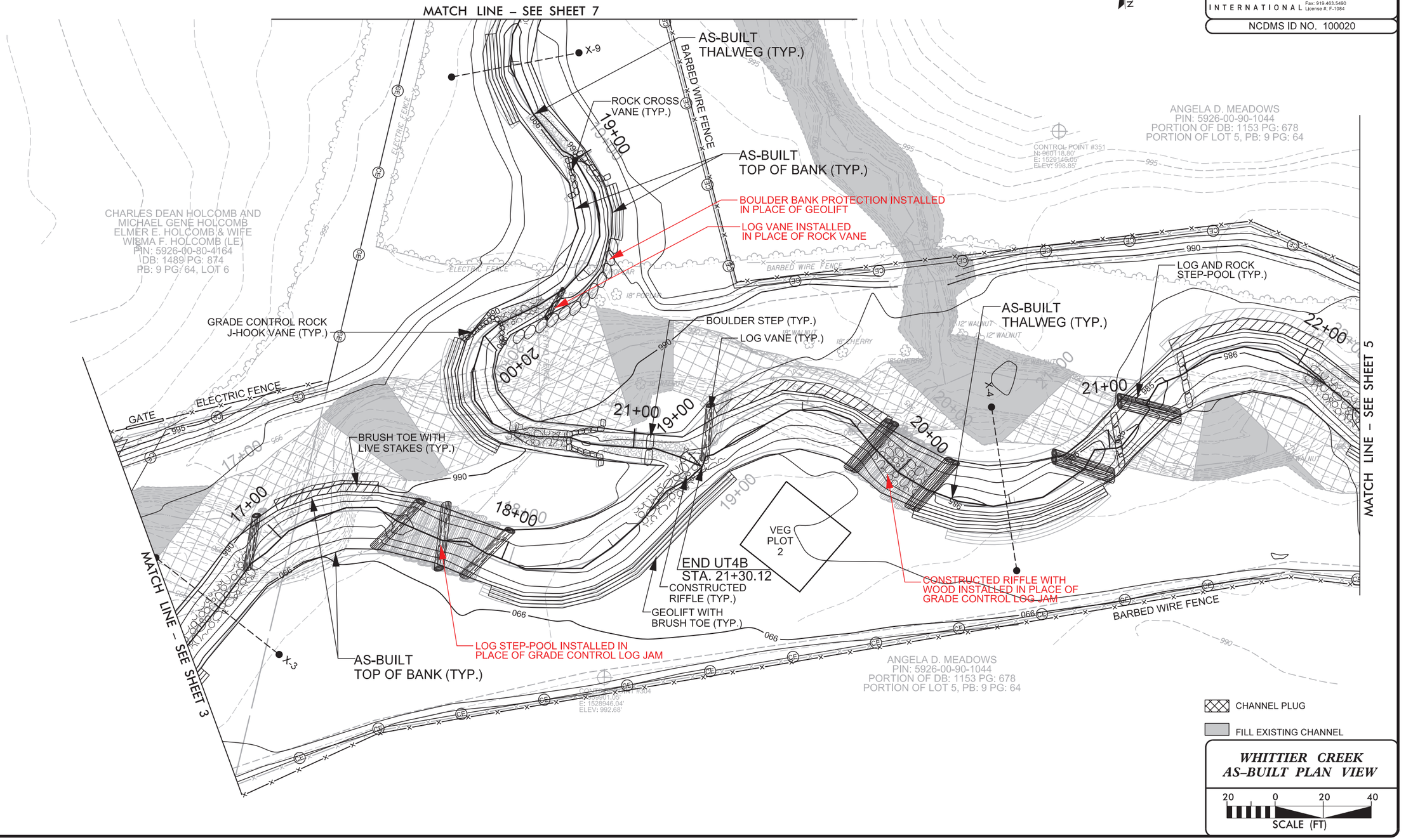
NCDMS ID NO. 100020

NAD 83



CHANNEL PLUG

FILL EXISTING CHANNEL

WHITTIER CREEK AS–BUILT PLAN VIEW

20 0 20 40
SCALE (FT)

2/22/2022
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mcgee

2/26/03

BAKER PROJECT REFERENCE NO.	SHEET NO.
162039	5

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028432 ENGINEER KATHLEEN M McKEITHAN

DocuSigned by: Kathleen M. McKeithan 247E84DF4161473...

APPROVED BY:

2/22/2022

DATE:

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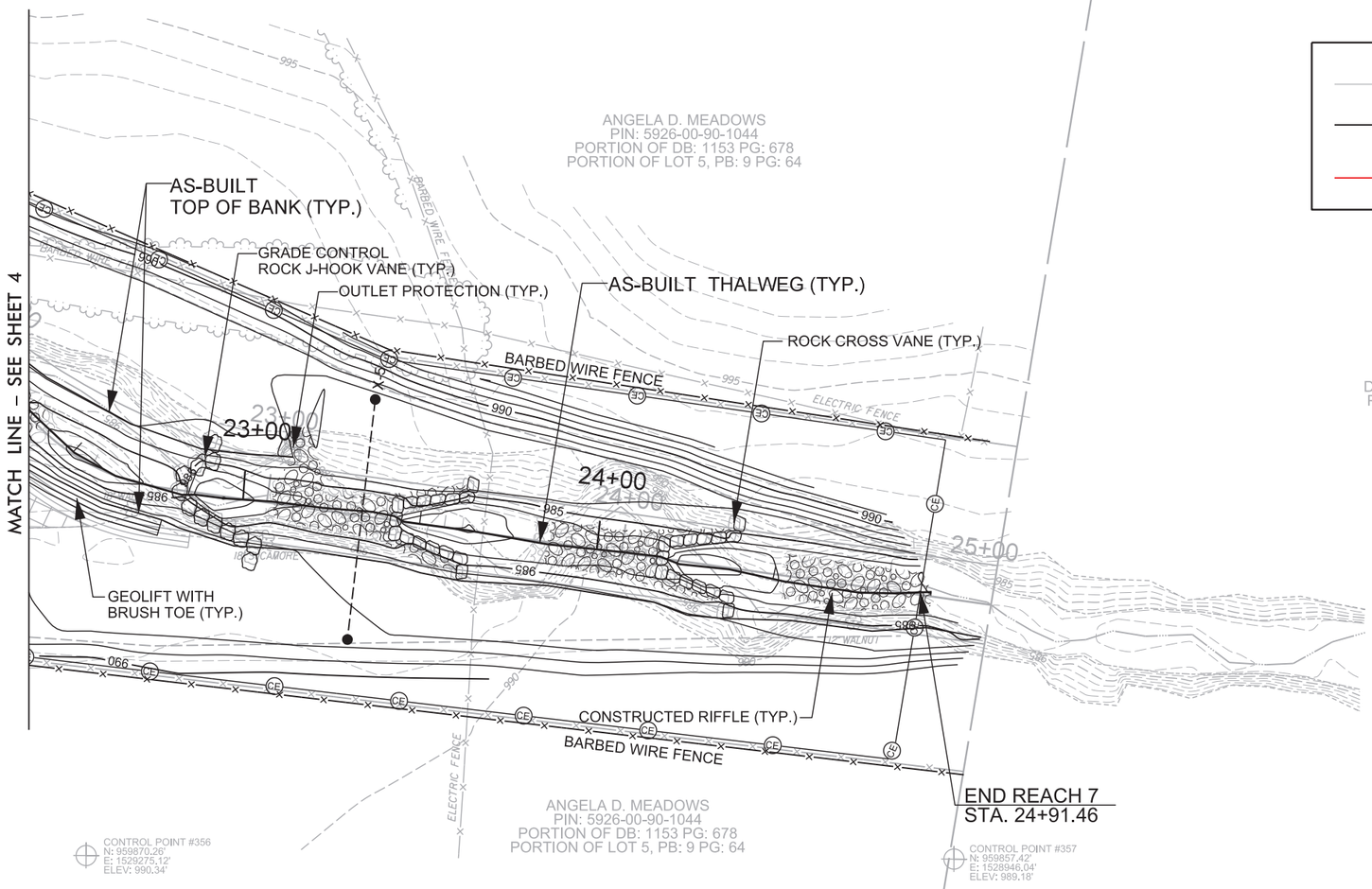
Phone: 919.463.5488
Fax: 919.463.5490
License #: F-1084

NCDMS ID NO. 100020

NAD 83

AS-BUILT LEGEND

- PROPOSED DESIGN
- AS-BUILT SURVEY BY KEE MAPPING & SURVEYING 10/20/21 & 2/17/22
- RED LINE VARIATIONS FROM ORIGINAL DESIGN SEALED BY KATHLEEN M. McKEITHAN, PE



FILL EXISTING CHANNEL

CHANNEL PLUG

WHITTIER CREEK AS-BUILT PLAN VIEW

20 0 20 40
SCALE (FT)

3/22/2022
R:\162039_Whittier_Creek\Design\As-Built\Plans\162039_ASB-PSH-05.dgn
mcasey

2/26/03

BAKER PROJECT REFERENCE NO.	SHEET NO.
162039	6

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028432 ENGINEER KATHLEEN M McKEITHAN

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AS-BUILT LEGEND

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- RED LINE VARIATIONS FROM ORIGINAL DESIGN SEALED BY KATHLEEN M. McKEITHAN, PE

NAD 83

FRANCES F. ATKINS
CLAYTON FULK (LE)
PIN: 5926-00-91-0590
DB: 1218 PG: 345, TRACT 2
PB: 9 PG: 64, LOT 2

ROCK HILL CHURCH ROAD
SR 2034
R/W WIDTH 50' PER DB:854 PG:654 & 656

CHARLES DEAN HOLCOMB AND MICHAEL GENE HOLCOMB
ELMER E. HOLCOMB & WIFE WILMA F. HOLCOMB (LE)
PIN: 5926-00-80-4164
DB: 1489 PG: 874
PB: 9 PG: 64, LOT 6

AS-BUILT TOP OF BANK (TYP.)

BOULDER STEP (TYP.)

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

AS-BUILT THALWEG (TYP.)

X-6

EXCAVATE BANKFULL BENCH

VEG PLOT 3

LOG VANE INSTALLED IN PLACE OF J-HOOK VANE

SLOPE BANKS AT 3:1

BEGIN UT4A
STA. 10+00.00

END UT4A
BEGIN UT4B
STA. 13+27.80

13+76.55

MATCH LINE – SEE SHEET 7

CONTROL POINT #501
N: 960892.43'
E: 1528483.53'
ELEV: 1013.19'

CONTROL POINT #301
N: 960656.92'
E: 1528646.29'
ELEV: 1006.49'

SURRY-YADKIN E.M.C. UTILITY LINE

CHARLES DEAN HOLCOMB AND MICHAEL GENE HOLCOMB
ELMER E. HOLCOMB & WIFE WILMA F. HOLCOMB (LE)
PIN: 5926-00-80-4164
DB: 1489 PG: 874
PB: 9 PG: 64, LOT 6

FILL EXISTING CHANNEL

CHANNEL PLUG

WHITTIER CREEK AS-BUILT PLAN VIEW

20 0 20 40
SCALE (FT)

2/26/2003
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mcfall

2/26/03

BAKER PROJECT REFERENCE NO.	SHEET NO.
162039	7

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028432 ENGINEER KATHLEEN M McKEITHAN

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NCDMS ID NO. 100020

MATCH LINE – SEE SHEET 8

MATCH LINE – SEE SHEET 6

MATCH LINE – SEE SHEET 4

NAD 83

ROCK CROSS VANE (TYP.)

LOG STEP POOL (TYP.)

18" CEDAR

AS-BUILT THALWEG (TYP.)

LOG DROP INSTALLED IN PLACE OF BOULDER STEP

AS-BUILT TOP OF BANK (TYP.)

LOG VANE NOT INSTALLED

LOG VANE (TYP.)

CONSTRUCTED RIFFLE (TYP.)

BOULDER STEP (TYP.)

BRUSH TOE WITH LIVE STAKES (TYP.)

BARBED WIRE FENCE

ADDITIONAL LOG DROP INSTALLED

GRADE CONTROL ROCK J-HOOK VANE (TYP.)

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

LOG VANE INSTALLED IN PLACE OF ROCK VANE

GEOLIFT WITH BRUSH TOE (TYP.)

LOG STEP POOL (TYP.)

ROCK J-HOOK VANE (TYP.)

END UT5
STA. 17+92.77

IN-STREAM GAUGE # 2

15+00

16+00

17+00

18+00

X-11

X-7

X-8

CONTROL POINT #300
N: 960297.06'
E: 1529217.20'
ELEV: 1010.47'

CONTROL POINT #302
N: 960463.27'
E: 1528735.15'
ELEV: 1001.42'

CONTROL POINT #303
N: 960229.10'
E: 1528902.26'
ELEV: 994.85'

CHARLES DEAN HOLCOMB AND
MICHAEL GENE HOLCOMB
ELMER E. HOLCOMB & WIFE
WILMA F. HOLCOMB (LE)
PIN: 5926-00-80-4164
DB: 1489 PG: 874
PB: 9 PG: 64, LOT 6

ANGELA D. MEADOWS
PIN: 5926-00-90-1044
PORTION OF DB: 1153 PG: 678
PORTION OF LOT 5, PB: 9 PG: 64

SHED

BARN

BARN

AS-BUILT LEGEND

PROPOSED DESIGN

AS-BUILT SURVEY BY KEE MAPPING & SURVEYING 10/20/21 & 2/17/22

RED LINE VARIATIONS FROM ORIGINAL DESIGN SEALED BY KATHLEEN M. McKEITHAN, PE

FILL EXISTING CHANNEL

CHANNEL PLUG

WHITTIER CREEK AS-BUILT PLAN VIEW

20 0 20 40
SCALE (FT)

2/22/2022
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mcgeu

2/26/03

BAKER PROJECT REFERENCE NO.	SHEET NO.
162039	8

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028432 ENGINEER KATHLEEN M. McKEITHAN

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NCDMS ID NO. 100020

NAD 83

ANGELA D. MEADOWS
PIN: 5926-00-90-5577
DB: 1332 PG: 199
PB: 24 PG: 57
PORTION OF LOT 5, PB: 9 PG: 64

DWELLING
CONCRETE
12" CMP
INV. IN: 1027.68'
INV. OUT: UNKNOWN
TEL PED
GRAVEL ROAD
SOIL ROAD
BARBED WIRE FENCE
ROCK HILL CHURCH ROAD SR 2014
SURRY-YADKIN E.M.C. UTILITY LINE
CONTROL POINT #350
N: 960577.74'
E: 1529412.86'
ELEV: 1014.58'
P
PP
1005
1010
1015
1020
1025

CONSTRUCTED RIFFLE (TYP.)
BOULDER STEP (TYP.)
ROCK CROSS VANE (TYP.)
AS-BUILT THALWEG (TYP.)
LOG DROP INSTALLED IN PLACE OF GRADE CONTROL J-HOOK VANE
BARBED WIRE FENCE
GATE
LOG DROP INSTALLED IN PLACE OF J-HOOK VANE
LOG VANE INSTALLED IN PLACE OF J-HOOK VANE
GRADE CONTROL ROCK J-HOOK VANE (TYP.)
GEOLIFT WITH BRUSH TOE (TYP.)
VEG PLOT 4
STA. 12+91.22
X-10
IN-STREAM GAUGE # 1
10+00
11+00
12+00
13+00
14+00
STA. 12+46.07
RVP-MY0
FIBER OPTIC CABLE MARKER
30" POPLAR
WOOD FENCE
CONCRETE HEADWALL
48" CMP
INV. IN: 1011.90'
INV. OUT: 1010.36'
RIP RAP OUTLET
36" RCP
INV. IN: 1014.05'
INV. OUT: 1012.93'
LOG DROP INSTALLED IN PLACE OF BOULDER STEP
LOG J-HOOK VANE INSTALLED IN PLACE OF GRADE CONTROL J-HOOK VANE
ROCK FORD STREAM CROSSING INSTALLED IN PLACE OF 48" RCP AND PLUNGE POOL
GATE
BARBED WIRE FENCE
LOG DROP INSTALLED IN PLACE OF BOULDER STEP
AS-BUILT TOP OF BANK (TYP.)
MATCH LINE - SEE SHEET 7
WLB
BKM

ANGELA D. MEADOWS
PIN: 5926-00-90-1044
PORTION OF DB: 1153 PG: 678
PORTION OF LOT 5, PB: 9 PG: 64

BEGIN UT5
STA. 10+00.41

FRANCES F. ATKINS
CLAYTON FULK (LE)
PIN: 5926-00-91-0590
DB: 1218 PG: 345, TRACT 2
PB: 9 PG: 64, LOT 2

FILL EXISTING CHANNEL

CHANNEL PLUG

AS-BUILT LEGEND

- PROPOSED DESIGN
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- RED LINE VARIATIONS FROM ORIGINAL DESIGN SEALED BY KATHLEEN M. McKEITHAN, PE

WHITTIER CREEK AS-BUILT PLAN VIEW

20 0 20 40
SCALE (FT)

2/22/2022
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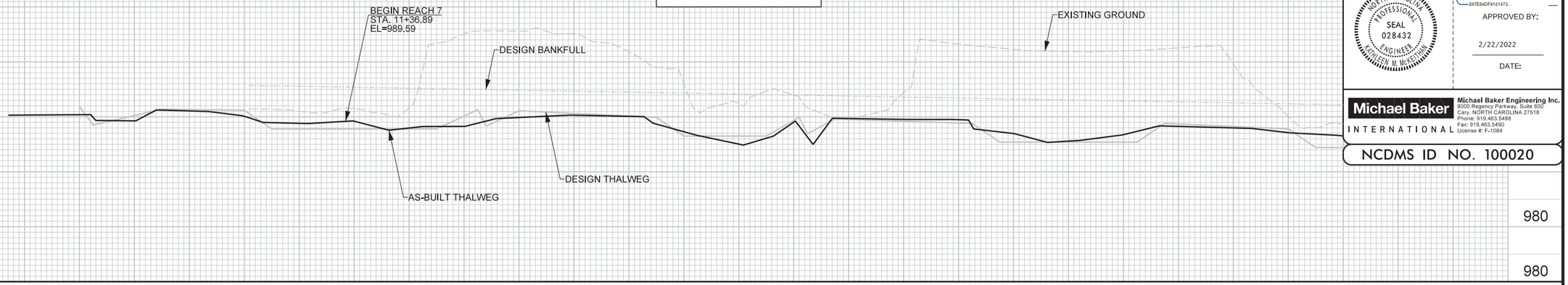
mcgee

2/26/03

REACH 7



BAKER PROJECT REFERENCE NO.	SHEET NO.
162039	9

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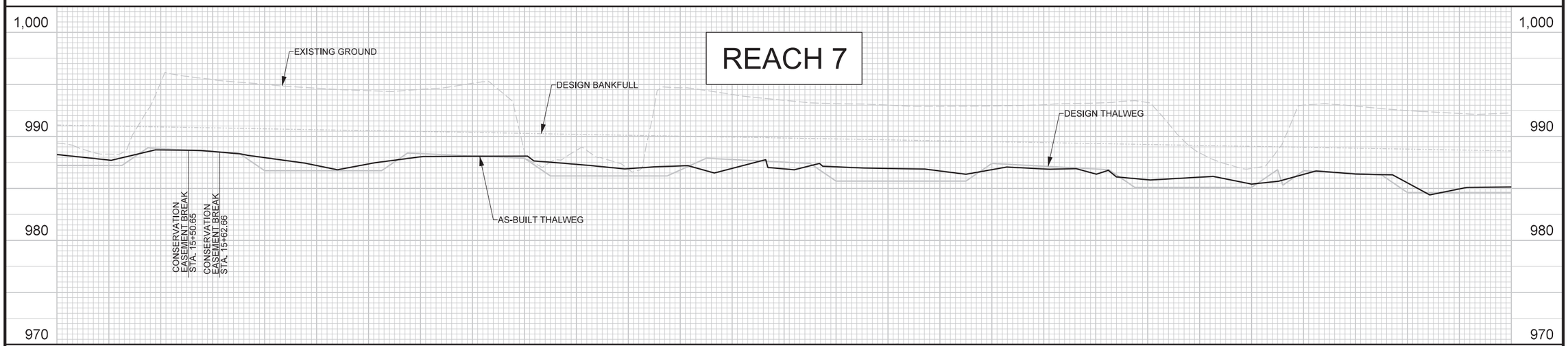
REACH 7



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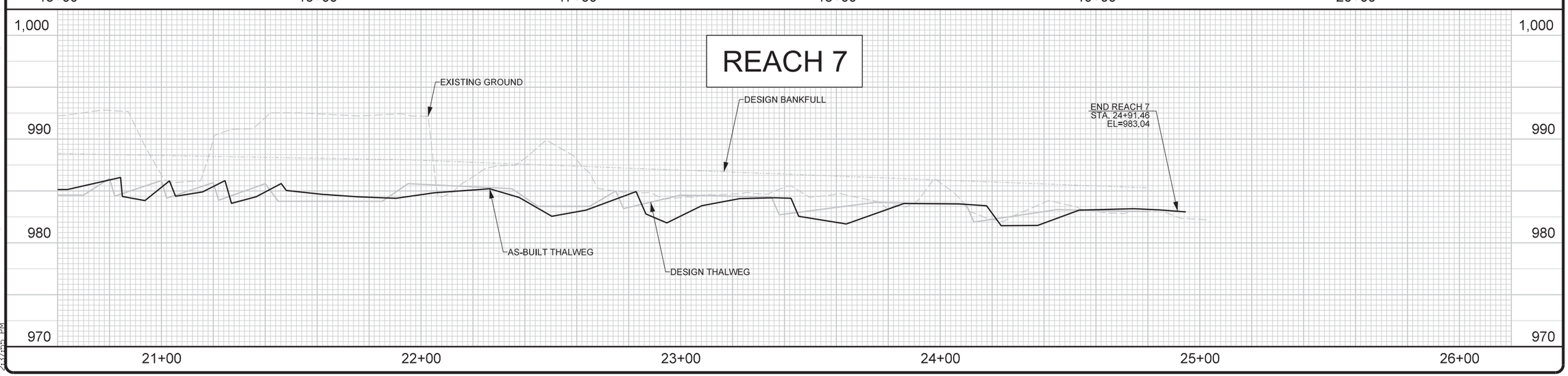

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2/26/03

BAKER PROJECT REFERENCE NO.	SHEET NO.
162039	10

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 028432 ENGINEER KATHLEEN M. McKEITHAN

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2/1/2022
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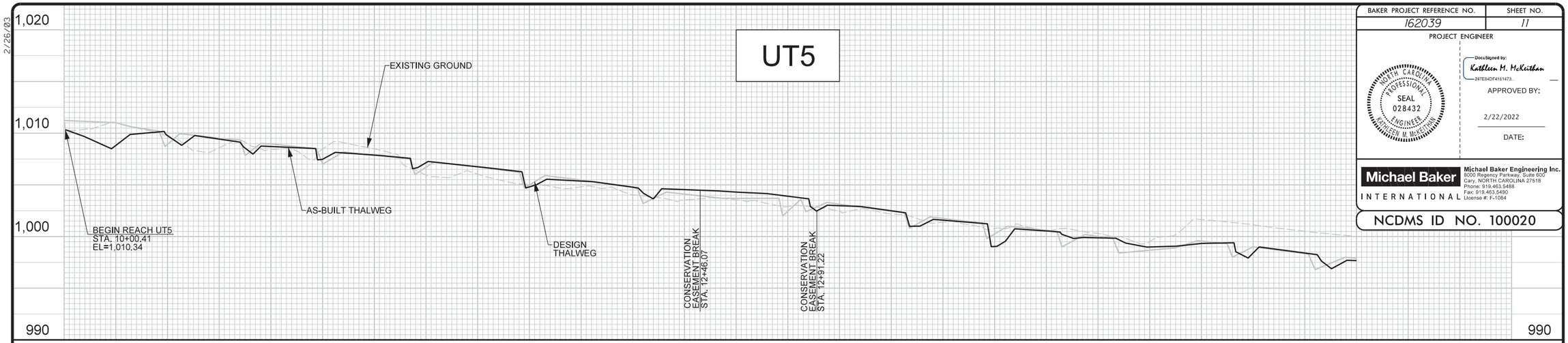
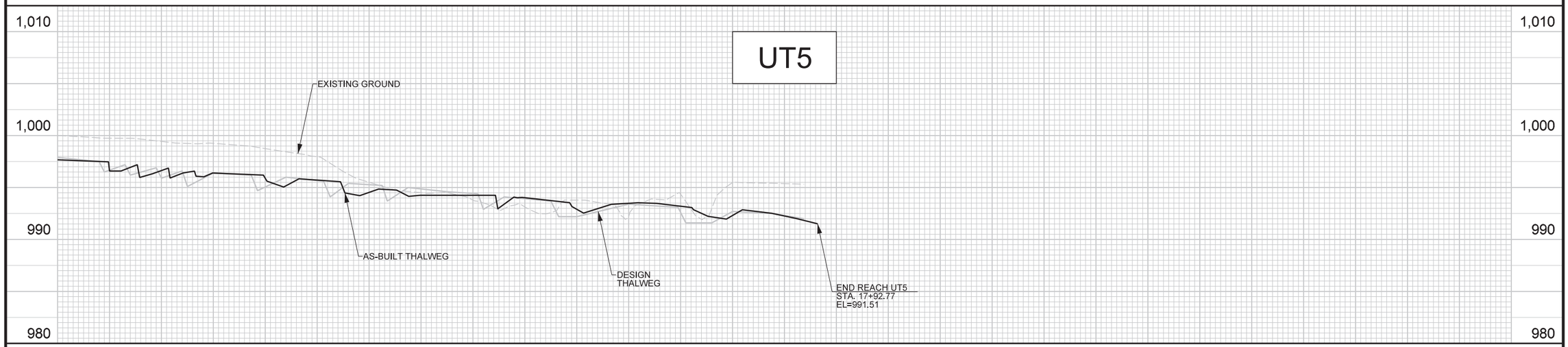
2/26/03





BAKER PROJECT REFERENCE NO.	SHEET NO.
162039	11

PROJECT ENGINEER

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2/3/2022
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