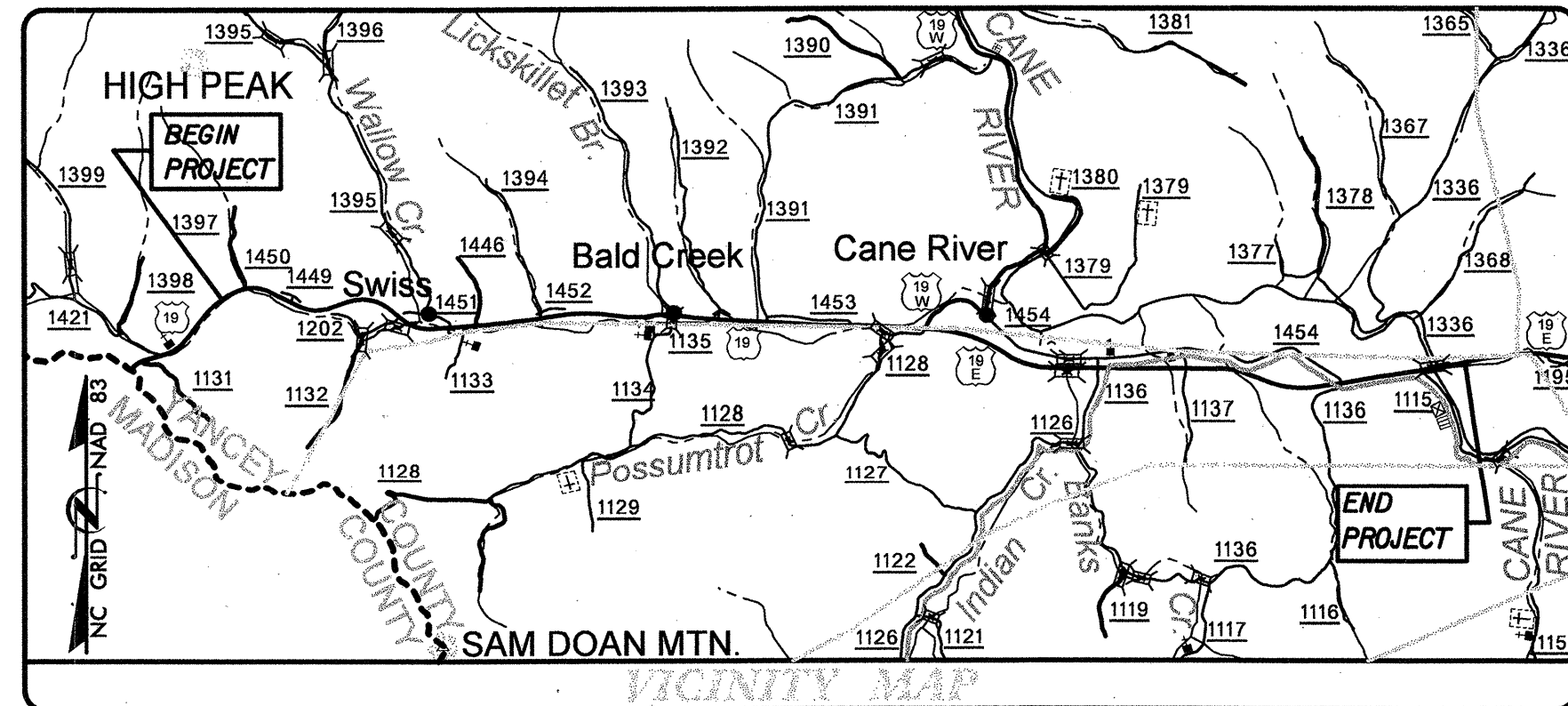


CONTRACT: 201372B  
 TIP PROJECT: R-2518B

See Sheet 1-A For Index of Sheets



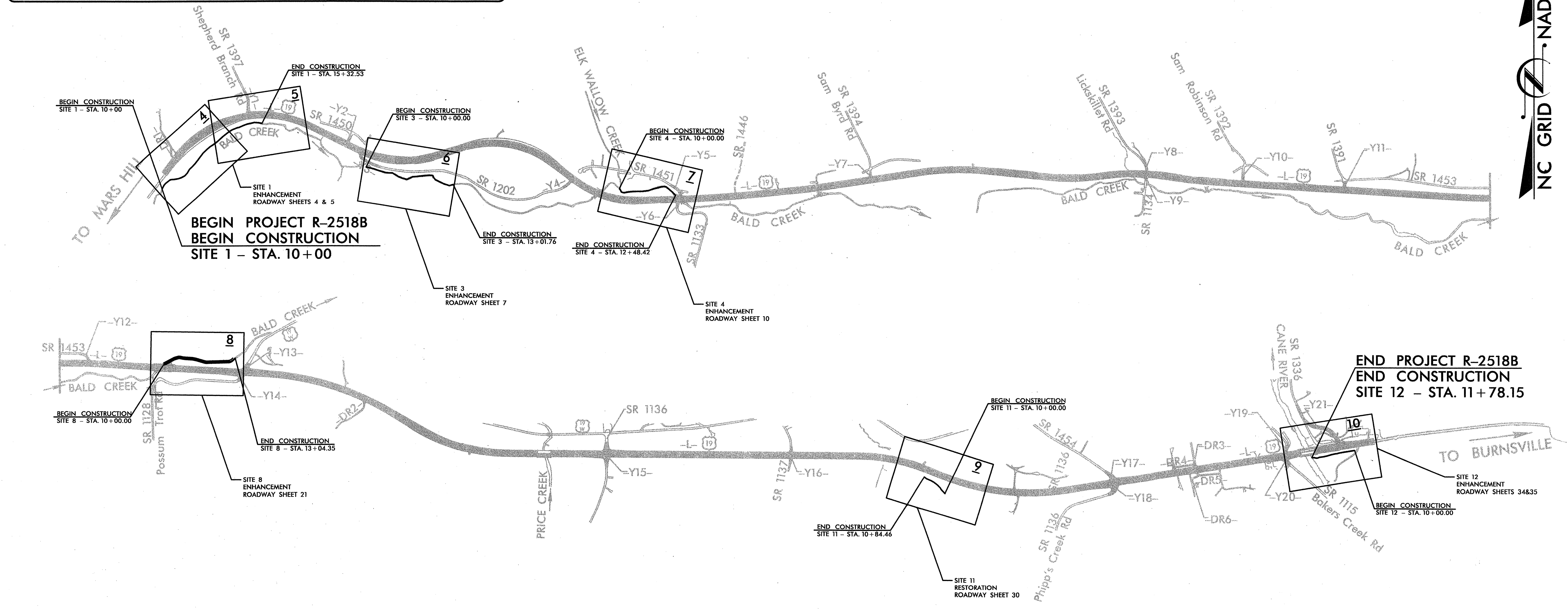
STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS  
**YANCEY COUNTY**

LOCATION: US 19 FROM EAST OF THE MADISON COUNTY LINE TO SR 1336

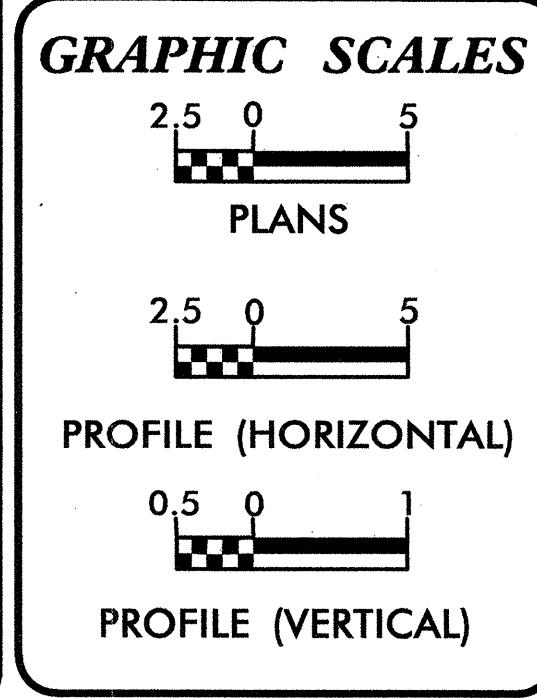
TYPE OF WORK: STREAM MITIGATION  
 (ENHANCEMENT AND RESTORATION)

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2518B	OSM-1	26
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34445.1.1		PE	
34445.2.3		R / W	
34445.4.2		CONST	

ALL DIMENSIONS IN THESE PLANS ARE IN METERS



ORIGINAL ROADWAY PLANS DEVELOPED BY TGS ENGINEERS - CARY, NC



**PROJECT LENGTH**

MITIGATION SITE	MITIGATION TYPE	LENGTH
SITE 1	ENHANCEMENT	533 m
SITE 3	ENHANCEMENT	301 m
SITE 4	ENHANCEMENT	248 m
SITE 8	ENHANCEMENT	304 m
SITE 11	RESTORATION	85 m
SITE 12	ENHANCEMENT/RESTORATION	178 m

Prepared In the Office of:

**Baker**  
 Baker Engineering NY, Inc.  
 8000 Regency Parkway  
 Suite 200  
 Cary, NORTH CAROLINA 27518  
 Phone: 919.463.5488  
 Fax: 919.463.5490

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: \_\_\_\_\_

LETTING DATE: \_\_\_\_\_

1-16-08

HYDRAULICS ENGINEER

SIGNATURE: \_\_\_\_\_ P.E.

DIVISION OF HIGHWAYS  
 STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER \_\_\_\_\_ P.E.

DEPARTMENT OF TRANSPORTATION  
 FEDERAL HIGHWAY ADMINISTRATION

APPROVED \_\_\_\_\_ DATE \_\_\_\_\_  
 DIVISION ADMINISTRATOR

NC GRID NAD 83

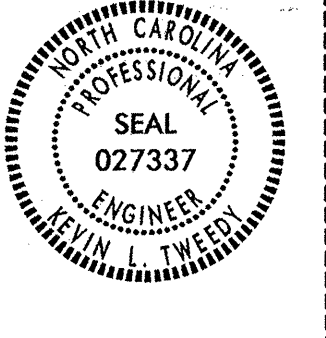

## GENERAL NOTES

1. THE CONTRACTOR IS RESPONSIBLE FOR JOB SITE SAFETY.
2. SUBSURFACE PLANS ARE NOT AVAILABLE; THEREFORE, THE CONTRACTOR WILL BE REQUIRED TO LOCATE UTILITIES AND PROTECT FROM DAMAGE.
3. GRADING SHOULD INCLUDE SMOOTH TRANSITIONS.
4. CONTRACTOR WILL BE REQUIRED TO PUMP BASE STREAM FLOW AROUND AREA WHERE CONSTRUCTION WILL OCCUR IN THE ACTIVE STREAM CHANNEL.

**Baker**

Baker Engineering NY, Inc.  
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Cary, NORTH CAROLINA 27518  
Phone: 919.463.5488  
Fax: 919.463.5490



PROJECT REFERENCE NO. <b>R2518B</b>	SHEET NO. <b>OSM-1A</b>
PROJECT ENGINEER	
	
APPROVED BY:  <b>1-16-08</b> DATE:	
CONST.REV.	
R /W REV.	



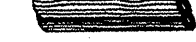
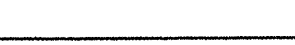

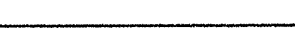


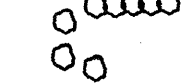


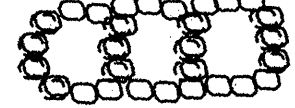


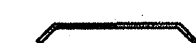

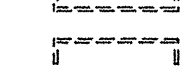

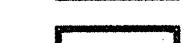
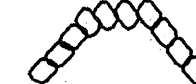
## INDEX OF SHEETS

- 1 TITLE SHEET
- 1A INDEX OF SHEETS  
SYMBOLGY - BAKER ENGINEERING  
GENERAL NOTES, STANDARD DRAWINGS  
STREAM DESIGN PARAMETERS
- 1B SYMBOLOGY - NCDOT  
2 TO 2B TYPICAL RIFFLE AND POOL CROSS SECTIONS  
TYPICAL STRUCTURE PLACEMENT  
CROSS VANE TYPICAL  
STRUCTURE DETAILS
- 3 SUMMARY OF QUANTITIES
- 3A EARTHWORK SUMMARY  
CONSTRUCTION SEQUENCE
- 4 TO 10 PLAN VIEW OF EXISTING CONDITIONS  
AND PROPOSED STREAM DESIGN  
SITE 8, 11, AND 12 PROFILES  
SITE 8, 11, AND 12 CROSS SECTIONS

## STREAM DESIGN PARAMETERS

1. site name	Site 1	Site 3	Site 4	Site 8	Site 11	Site 12
2. stream type	B3	B3	C4	E4/C4	B4	B4
3. drainage area (sq. mi)	3.80	4.20	8.40	17.10	1.40	0.70
4. bankfull width (ft)	mean: 16 range: ---	mean: 21 range: ---	mean: 25.2 range: ---	mean: 30 range: ---	mean: 14.5 range: ---	mean: 11.8 range: ---
5. bankfull mean depth (ft)	mean: 1.23 range: ---	mean: 1.62 range: ---	mean: 2 range: ---	mean: 2.5 range: ---	mean: 1 range: ---	mean: 0.8 range: ---
6. width/depth ratio	mean: 13 range: ---	mean: 13 range: ---	mean: 14 range: ---	mean: 12 range: ---	mean: 14 range: ---	mean: 14 range: ---
7. bankfull cross-sectional area (sq. ft)	mean: 19.7 range: ---	mean: 34 range: ---	mean: 50 range: ---	mean: 75 range: ---	mean: 15 range: ---	mean: 10 range: ---
8. bankfull mean velocity (ft/sec)	mean: 4.7 range: ---	mean: 6.5 range: ---	mean: 4.6 range: ---	mean: 4 range: ---	mean: 5.1 range: ---	mean: 4.3 range: ---
9. bankfull discharge (cfs)	mean: 93 range: ---	mean: 226 range: ---	mean: 241 range: ---	mean: 279 range: ---	mean: 75 range: ---	mean: 48 range: ---
10. bankfull max depth (ft)	mean: 1.8 range: ---	mean: 2.2 range: ---	mean: 2.6 range: ---	mean: 3.6 range: ---	mean: 3 range: ---	mean: 1.1 range: ---
11. width of floodprone area (ft)	mean: 30 range: 25 - 35	mean: 50 range: 30 - 70	mean: >50.0 range: ---	mean: >80.0 range: ---	mean: 43 range: ---	mean: 35 range: ---
12. entrenchment ratio	mean: 1.6 range: 1.4 - 1.9	mean: 2.35 range: 1.4 - 3.3	mean: >3.0 range: ---	mean: >3.2 range: ---	mean: 3 range: ---	mean: 3 range: ---
13. meander length (ft) *	mean: NA range: ---	mean: NA range: ---	mean: NA range: ---	mean: NA range: ---	mean: NA range: ---	mean: NA range: ---
14. ratio of meander length to bankfull width *	mean: NA range: ---	mean: NA range: ---	mean: NA range: ---	mean: NA range: ---	mean: NA range: ---	mean: NA range: ---
15. radius of curvature (ft) *	mean: NA range: ---	mean: NA range: ---	mean: NA range: ---	mean: NA range: ---	mean: NA range: ---	mean: NA range: ---
16. ratio of radius of curvature to bankfull width *	mean: NA range: ---	mean: NA range: ---	mean: NA range: ---	mean: NA range: ---	mean: NA range: ---	mean: NA range: ---
17. belt width (ft) *	mean: NA range: ---	mean: NA range: ---	mean: NA range: ---	mean: NA range: ---	mean: NA range: ---	mean: NA range: ---
18. meander width ratio *	mean: NA range: ---	mean: NA range: ---	mean: NA range: ---	mean: NA range: ---	mean: NA range: ---	mean: NA range: ---
19. sinuosity (stream length/valley length)	mean: 1.03 range: ---	mean: 1.04 range: ---	mean: 1.11 range: ---	mean: 1.03 range: ---	mean: 1.01 range: ---	mean: 1.01 range: ---
20. valley slope (ft/ft)	mean: 0.025 range: ---	mean: 0.032 range: ---	mean: 0.013 range: ---	mean: 0.006 range: ---	mean: 0.023 range: ---	mean: 0.02 range: ---
21. average slope (ft/ft)	mean: 0.024 range: ---	mean: 0.031 range: ---	mean: 0.012 range: ---	mean: 0.0057 range: ---	mean: 0.023 range: ---	mean: 0.02 range: ---
22. Pool slope (ft/ft)	mean: 0.001 range: ---	mean: 0.001 range: ---	mean: 0.001 range: ---	mean: 0.0001 range: ---	mean: 0.001 range: ---	mean: 0.001 range: ---
23. Ratio of pool slope to average slope	mean: 0.04 range: ---	mean: 0.03 range: ---	mean: 0.08 range: ---	mean: 0.02 range: ---	mean: 0.04 range: ---	mean: 0.05 range: ---
24. maximum pool depth	mean: 3 range: ---	mean: 3.5 range: ---	mean: 4.5 range: ---	mean: 5.5 range: ---	mean: 2.3 range: ---	mean: 2 range: ---
25. ratio of pool depth to average bankfull depth	mean: 2.4 range: ---	mean: 2.2 range: ---	mean: 2.3 range: ---	mean: 2.2 range: ---	mean: 2.3 range: ---	mean: 2.5 range: ---
26. pool width	mean: 19 range: ---	mean: 26 range: ---	mean: 32 range: ---	mean: 40 range: ---	mean: 18.8 range: ---	mean: 15.3 range: ---
27. ratio of pool width to bankfull width	mean: 1.2 range: ---	mean: 1.2 range: ---	mean: 1.3 range: ---	mean: 1.3 range: ---	mean: 1.3 range: ---	mean: 1.3 range: ---
28. pool to pool spacing (ft) *	mean: NA range: ---	mean: NA range: ---	mean: NA range: ---	mean: 97.5 range: 75 - 120	mean: NA range: ---	mean: NA range: ---
29. ratio of pool to pool spacing to bankfull width *	mean: NA range: ---	mean: NA range: ---	mean: NA range: ---	mean: 3.25 range: 2.5 - 4	mean: NA range: ---	mean: NA range: ---
30. ratio of lowest bank height to bankfull height (or max bankfull depth)	mean: 1 range: 1 - 1.2	mean: 1 range: 1 - 1.2	mean: 1 range: 1 - 1.3	mean: 1 range: 1 - 1.2	mean: 1 range: 1 - 1.2	mean: 1 range: 1 - 1.2

## STREAM CONVENTIONAL SYMBOLS SUPERCEDES SHEET 1B

	LOG VANE		BOULDER CLUSTER
	LOG WEIR		SILT FENCE
	ROOT WAD		SAFETY FENCE
	LOG CROSS VANE		CONSERVATION EASEMENT
	J-HOOK		TRANSPLANTED VEGETATION
	ROCK VANE		ROCK STEP POOL
	TEMPORARY SILT CHECK		SINGLE WING DEFLECTOR
	FOOT BRIDGE		DOUBLE WING DEFLECTOR
	TEMPORARY STREAM CROSSING		SMB
	PERMANENT STREAM CROSSING		
	ROCK CROSS VANE		

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

3:18B\Design\F-16-08\Plans\OSM-1A.dgn



Note: Not to Scale

\*S.U.E. = Subsurface Utility Engineering

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

# CONVENTIONAL PLAN SHEET SYMBOLS

## BOUNDARIES AND PROPERTY:

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Existing Iron Pin	○
Property Corner	-----
Property Monument	□
Parcel/Sequence Number	①23
Existing Fence Line	-----
Proposed Woven Wire Fence	-----
Proposed Chain Link Fence	-----
Proposed Barbed Wire Fence	-----
Existing Wetland Boundary	-----
Proposed Wetland Boundary	-----
Existing High Quality Wetland Boundary	-----
Existing Endangered Animal Boundary	-----
Existing Endangered Plant Boundary	-----

## BUILDINGS AND OTHER CULTURE:

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

## HYDROLOGY:

Stream or Body of Water	-----
Hydro, Pool or Reservoir	-----
Jurisdictional Stream	-----
River Basin Buffer	-----
Flow Arrow	-----
Disappearing Stream	-----
Spring	-----
Swamp Marsh	-----
Proposed Lateral, Tail, Head Ditch	-----
False Sump	-----

## RAILROADS:

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

## RIGHT OF WAY:

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

## ROADS AND RELATED FEATURES:

Existing Edge of Pavement	-----
Existing Curb	-----
Proposed Slope Stakes Cut	-----
Proposed Slope Stakes Fill	-----
Proposed Wheel Chair Ramp	-----
Curb Cut for Future Wheel Chair Ramp	-----
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	-----

## EXISTING STRUCTURES:

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

## UTILITIES:

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

## TELEPHONE:

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

## WATER:

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

## TV:

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

## GAS:

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

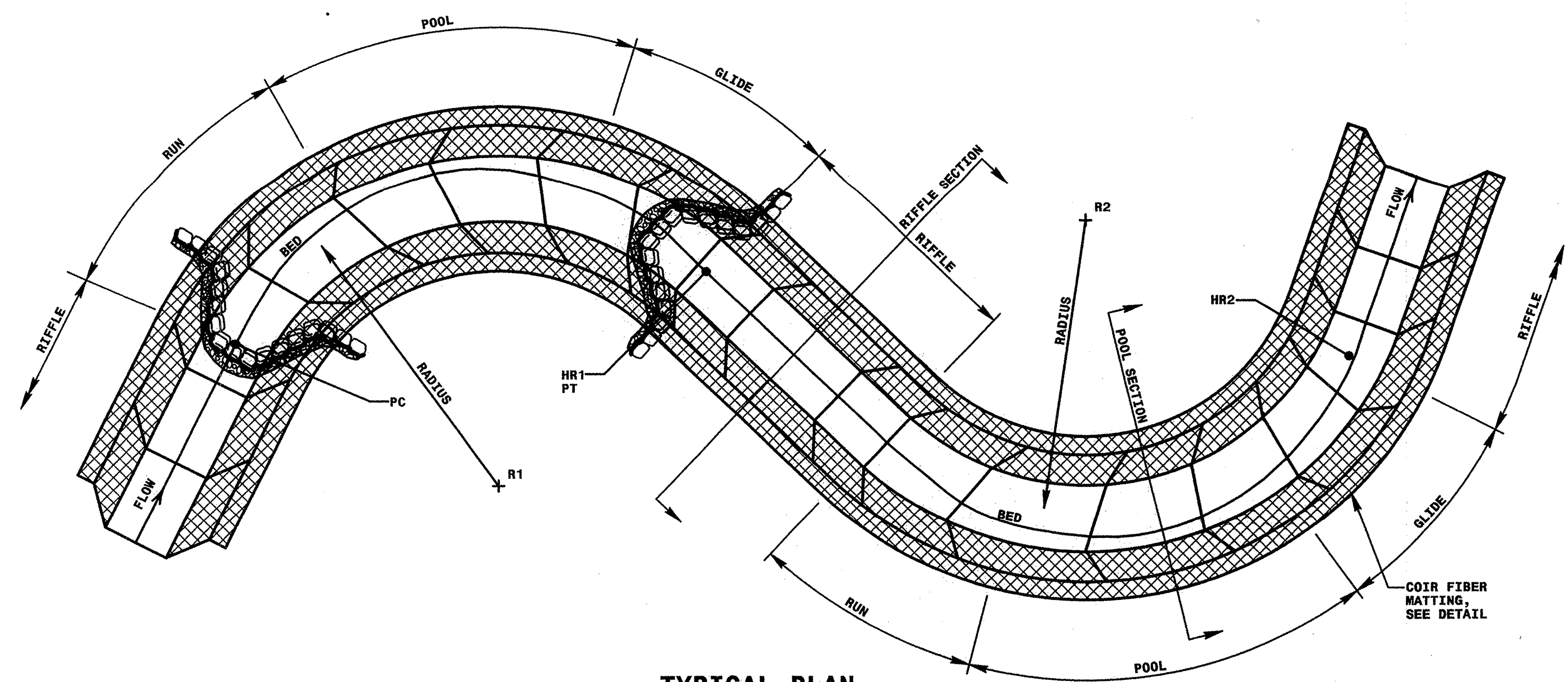
## SANITARY SEWER:

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

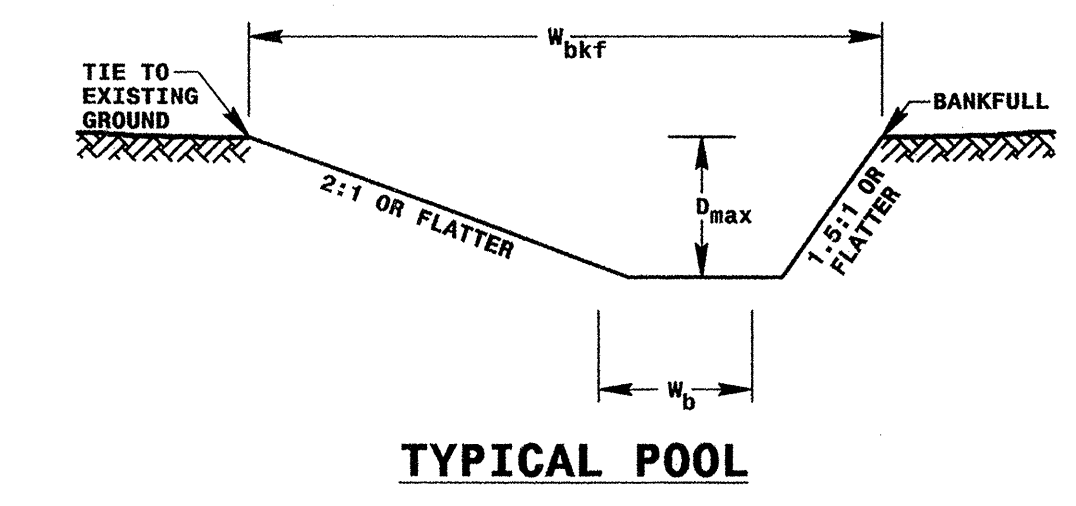
## MISCELLANEOUS:

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

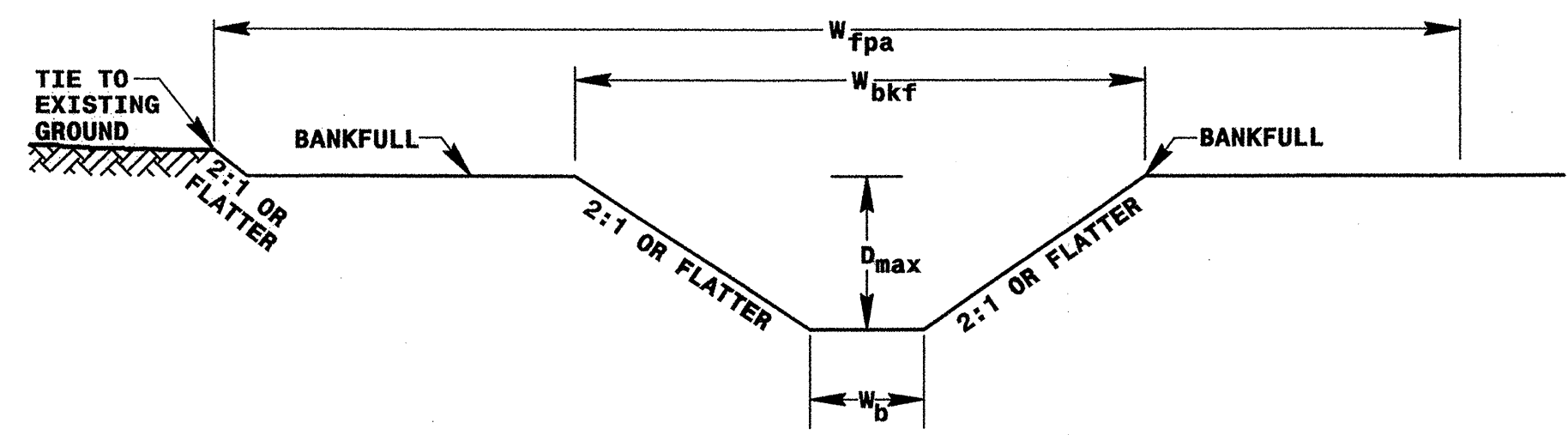
**CHANNEL TYPICAL DETAIL**  
NOT TO SCALE



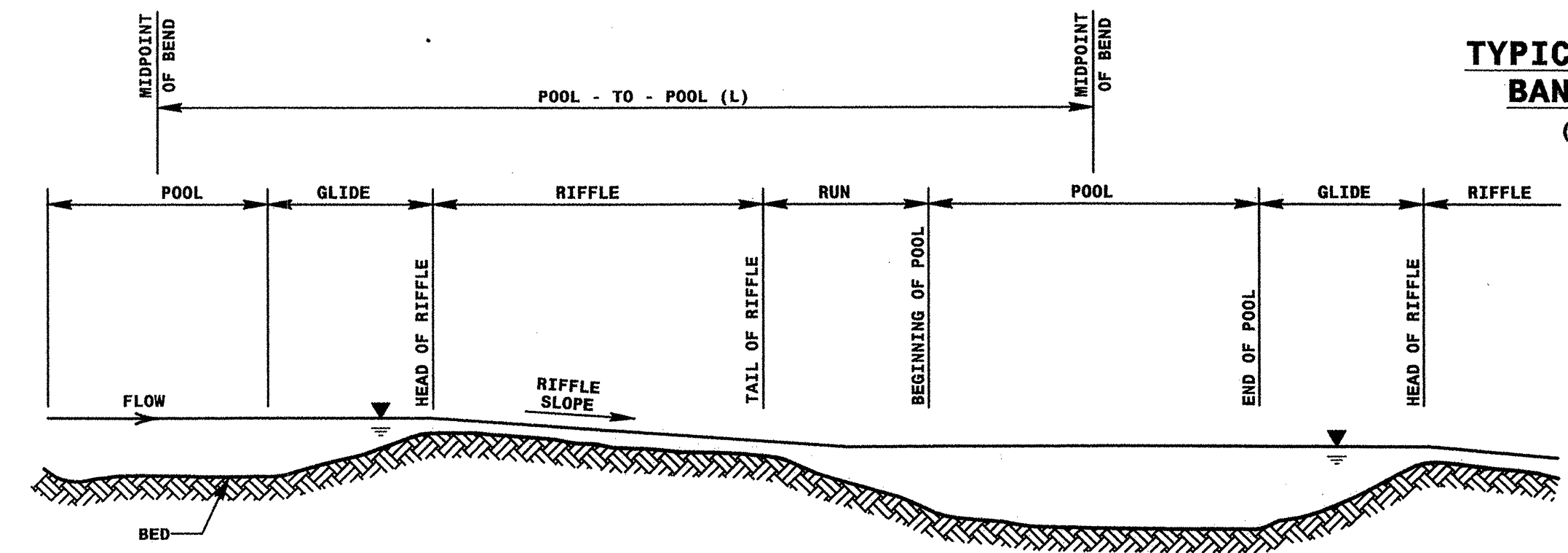
**TYPICAL PLAN**



**TYPICAL POOL**



**TYPICAL RIFFLE WITH BANKFULL BENCH**  
(SITE 11 AND 12)



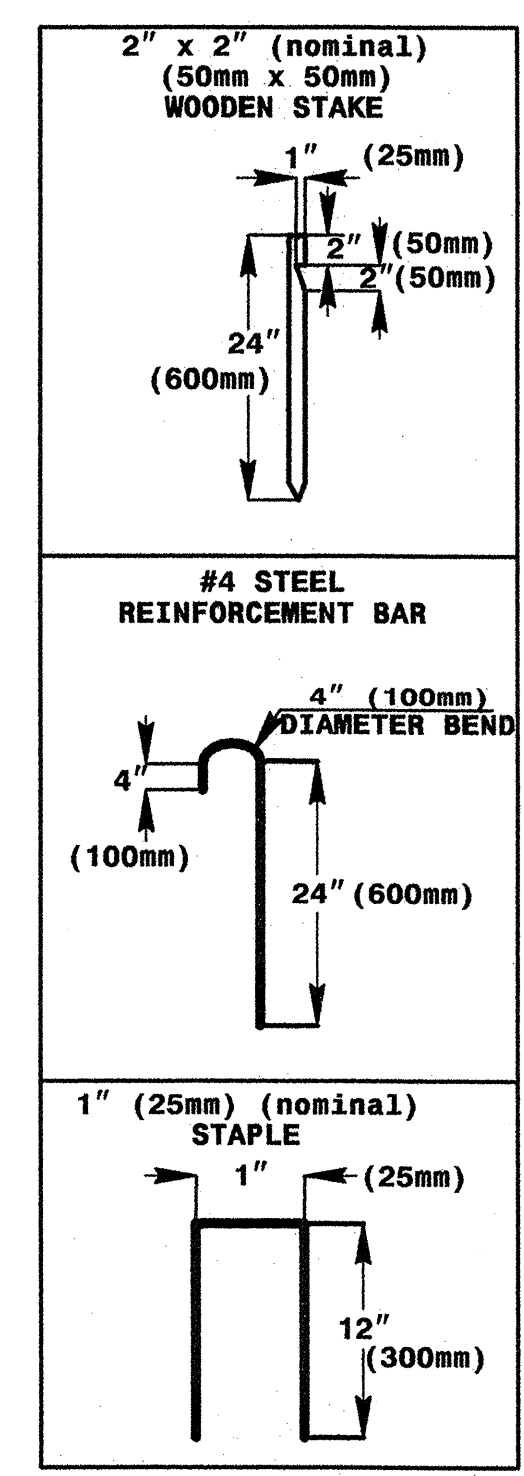
**TYPICAL PROFILE**

REACH	RIFFLE				POOL				Width/Depth Ratio
	W <sub>bkf</sub>	D <sub>max</sub>	W <sub>b</sub>	W <sub>fpa</sub>	W <sub>bkf</sub>	D <sub>max</sub>	W <sub>b</sub>	W <sub>fpa</sub>	
SITE 1	4.88	0.55	2.35	9.14	5.79	0.91	1.22	9.14	13
SITE 3	6.40	0.67	3.08	15.24	7.92	1.07	2.59	15.24	13
SITE 4	7.68	0.79	3.72	>15.2	9.75	1.37	2.90	>15.2	14
SITE 8	9.14	1.10	3.72	>24.4	12.19	1.68	3.81	>24.4	12
SITE 11	4.42	0.40	2.35	13.11	5.73	0.70	1.37	13.11	14
SITE 12	3.60	0.34	1.92	10.67	4.66	0.61	1.52	10.67	14

W<sub>bkf</sub> = BANKFULL WIDTH  
D<sub>max</sub> = MAXIMUM DEPTH  
W<sub>b</sub> = BOTTOM WIDTH  
W<sub>fpa</sub> = FLOOD PRONE AREA WIDTH

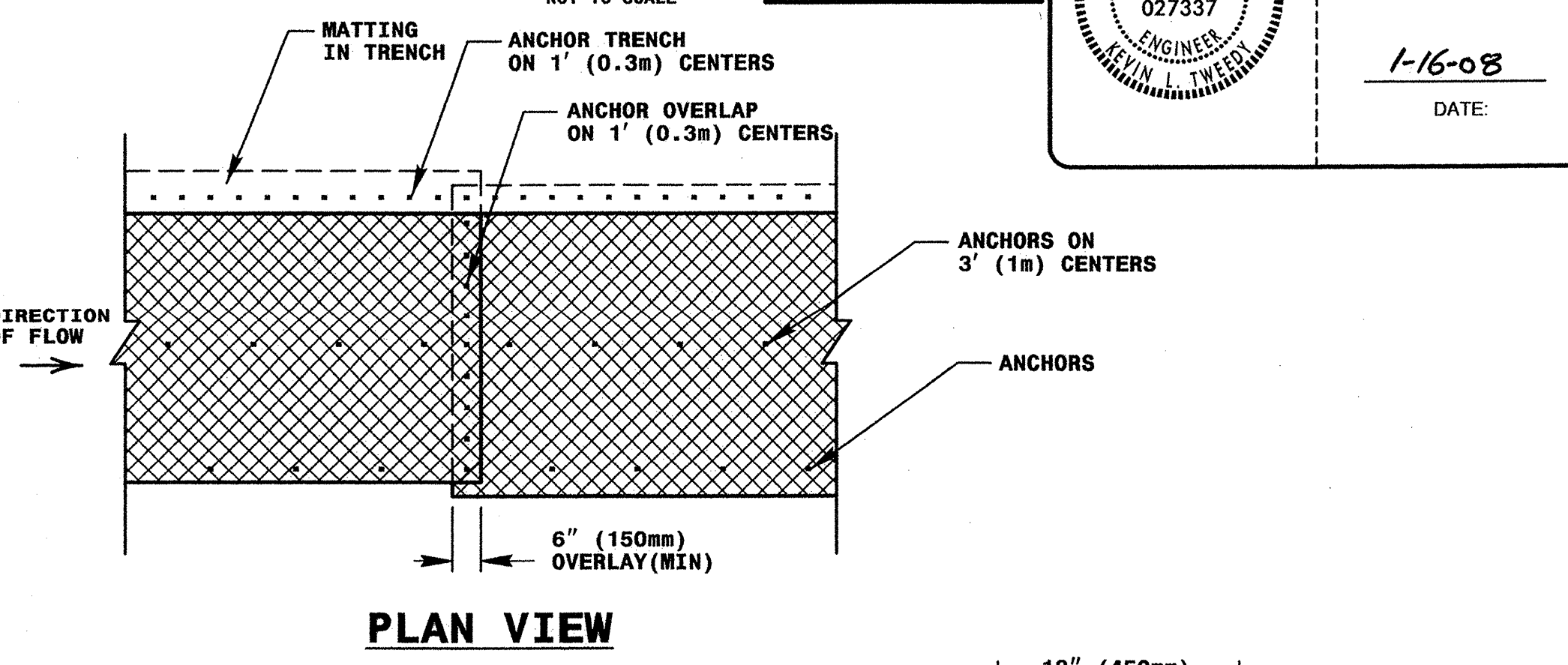
NOTES:  
1. THE COORDINATES FOR EACH CENTER OF RADIUS (EX. "R1", "R2") ARE INDICATED ON THE PLAN SHEETS.

**COIR FIBER MATTING DETAIL**  
NOT TO SCALE

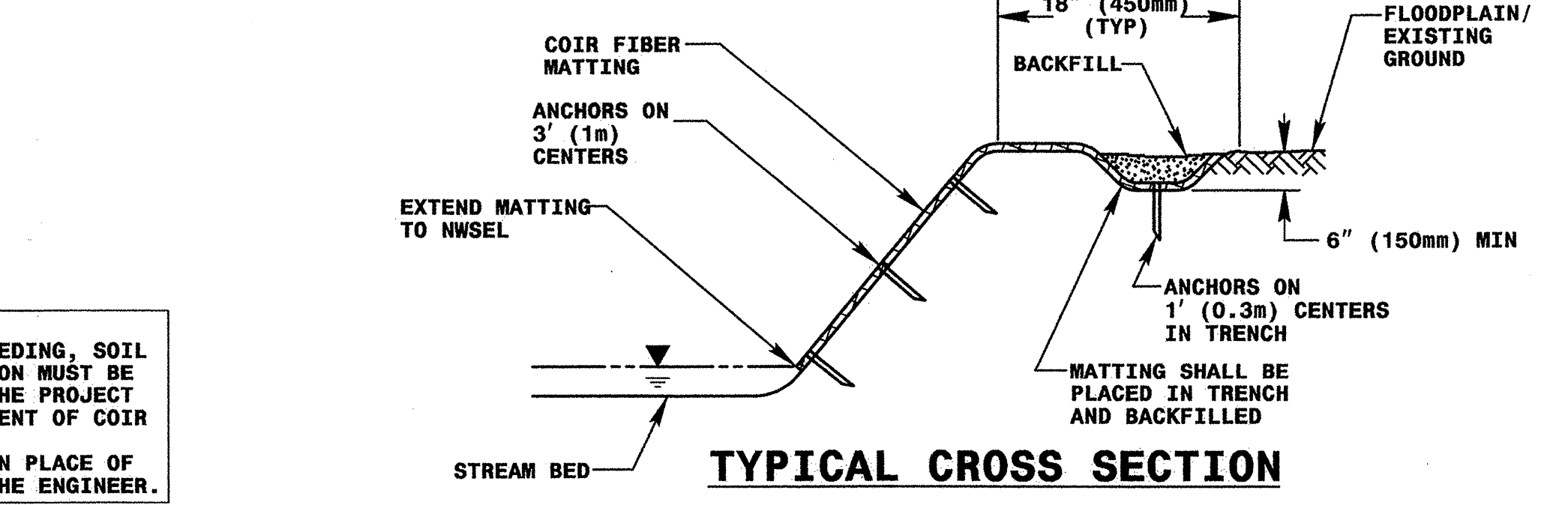


**ANCHOR OPTIONS**

NOTES:  
1. IN AREAS TO BE MATTED, ALL SEEDING, SOIL AMENDMENTS, AND SOIL PREPARATION MUST BE COMPLETED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS PRIOR TO PLACEMENT OF COIR FIBER MATTING.  
2. REBAR OR STAPLES MAY BE USED IN PLACE OF WOODEN STAKES AS DIRECTED BY THE ENGINEER.

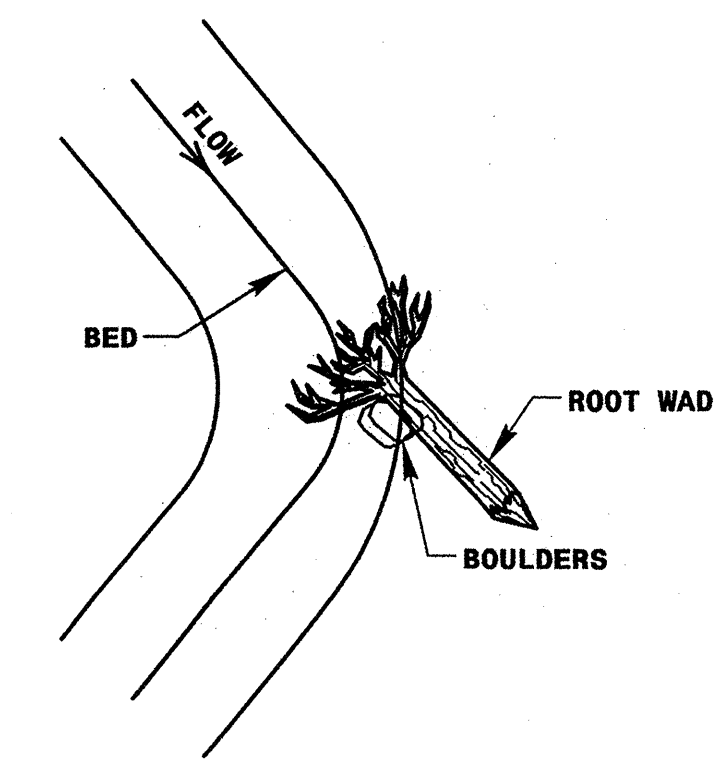


**PLAN VIEW**

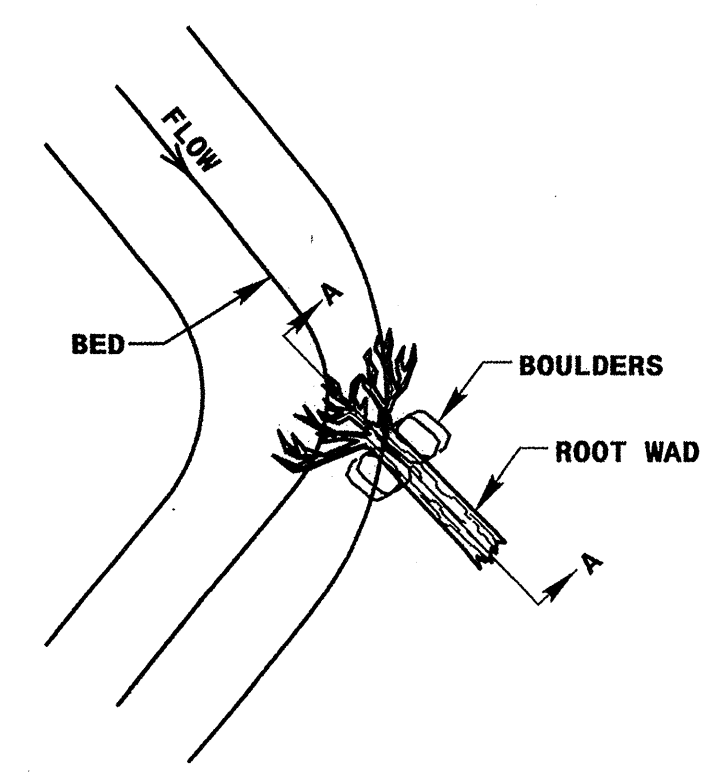


**TYPICAL CROSS SECTION**

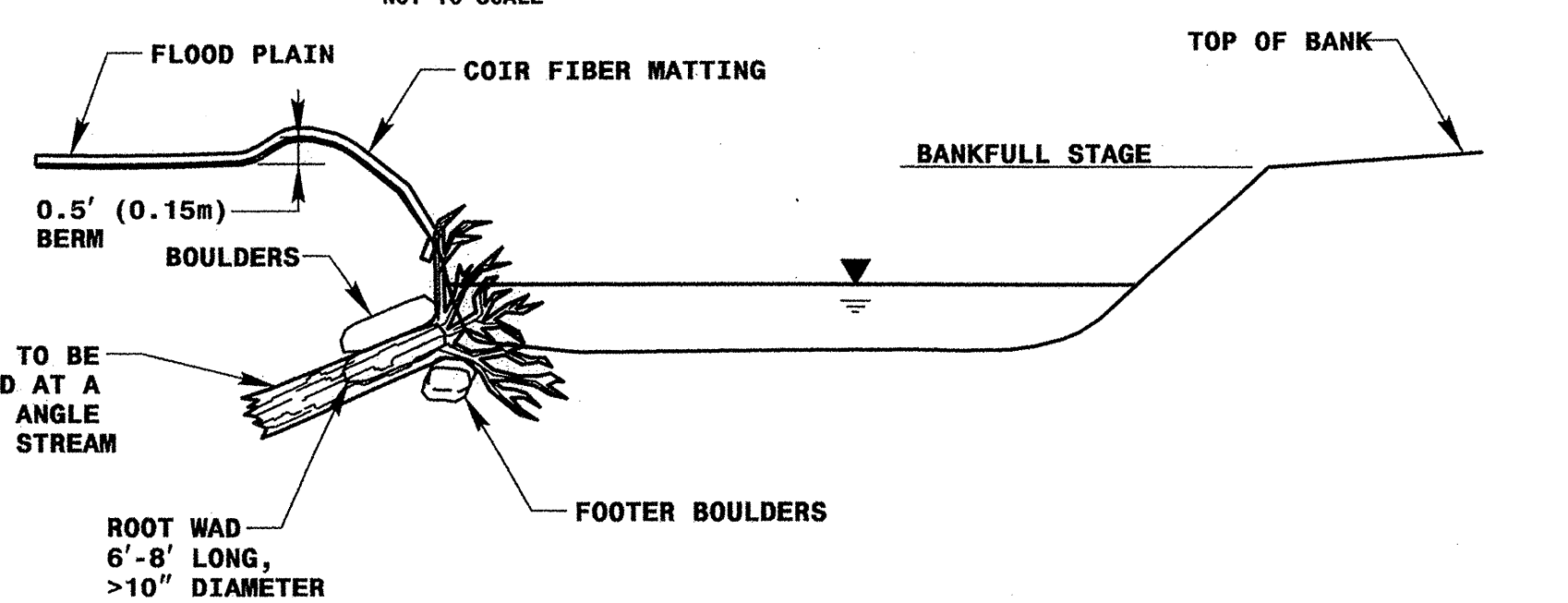
**ROOT WAD DETAIL**  
NOT TO SCALE



**PLAN VIEW DRIVE POINT METHOD**



**PLAN VIEW TRENCHING METHOD**



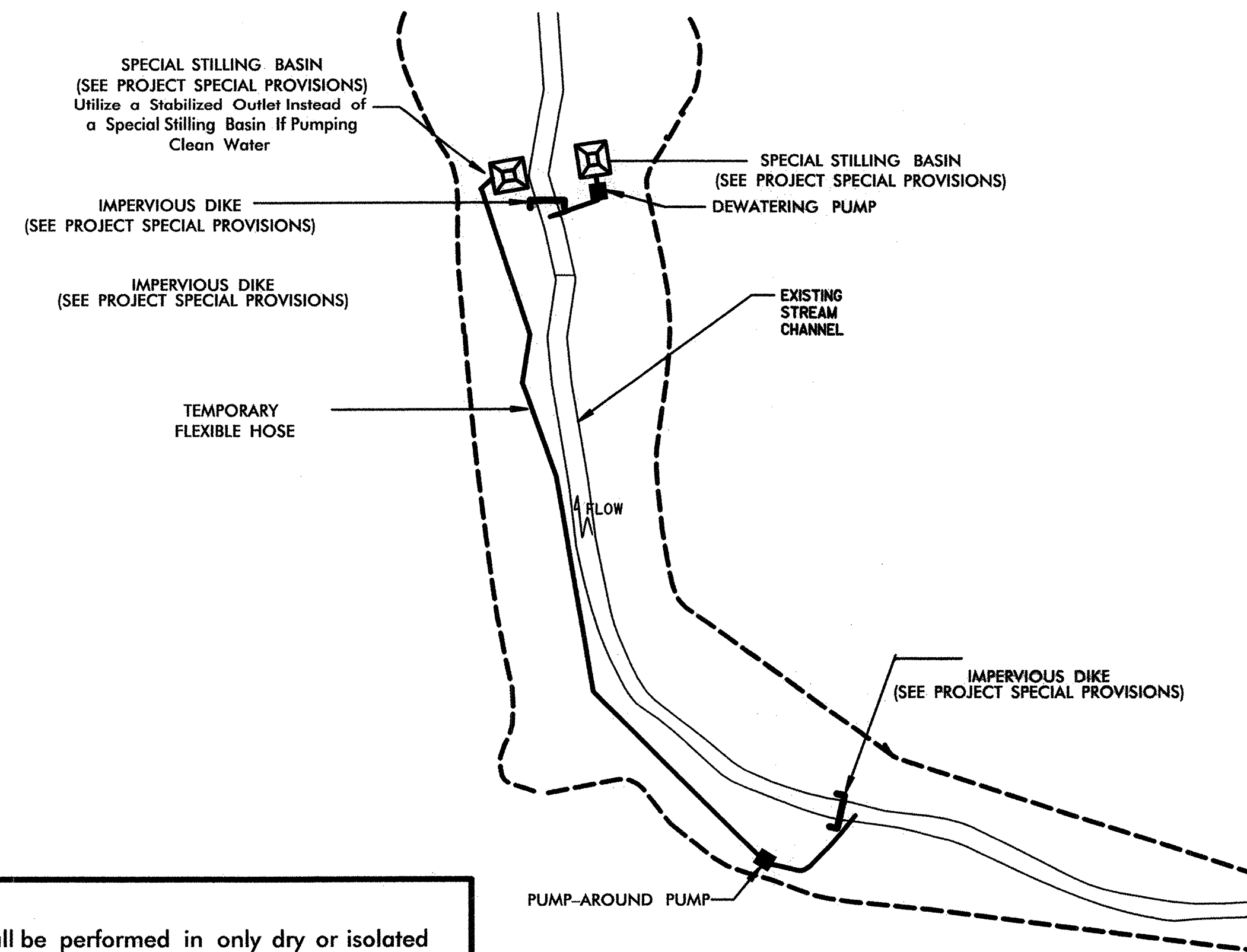
**SECTION A-A**

NOTES:  
ORIENT ROOT WADS SO THAT THE STREAM FLOW MEETS THE ROOT WAD STRAIGHT ON, DEFLECTING THE WATER AWAY FROM THE BANK.  
METHODS OF INSTALLATION:  
DRIVE POINT METHOD:  
SHARPEN THE END OF THE LOG BEFORE "DRIVING" AT A DOWNWARD ANGLE INTO THE BANK. BOULDER SHOULD BE PLACED ON EACH SIDE OF THE ROOT WAD TO PIN IT IN PLACE. THE BOULDERS SHALL BE APPROXIMATELY 2 X 2 X 3. ONE-THIRD OF THE ROOT WAD SHOULD REMAIN BELOW NORMAL BASE FLOW CONDITIONS.  
TRENCHING METHOD:  
IF THE ROOT WAD 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 LOG PORTION OF THE ROOT WAD. IN THIS CASE, FOOTER BOULDERS SHOULD BE INSTALLED UNDERNEATH THE ROOT WAD IN A TRENCH EXCAVATED PARALLEL TO THE BANK AND WELL BELOW THE STREAM BED. BOULDERS SHOULD BE PLACED ON EACH SIDE OF THE ROOTWAD TO PIN IT IN PLACE. THE BOULDERS SHOULD BE APPROXIMATELY 2 X 2 X 3. ONE-THIRD OF THE ROOT WAD SHOULD REMAIN BELOW NORMAL BASE FLOW CONDITIONS.



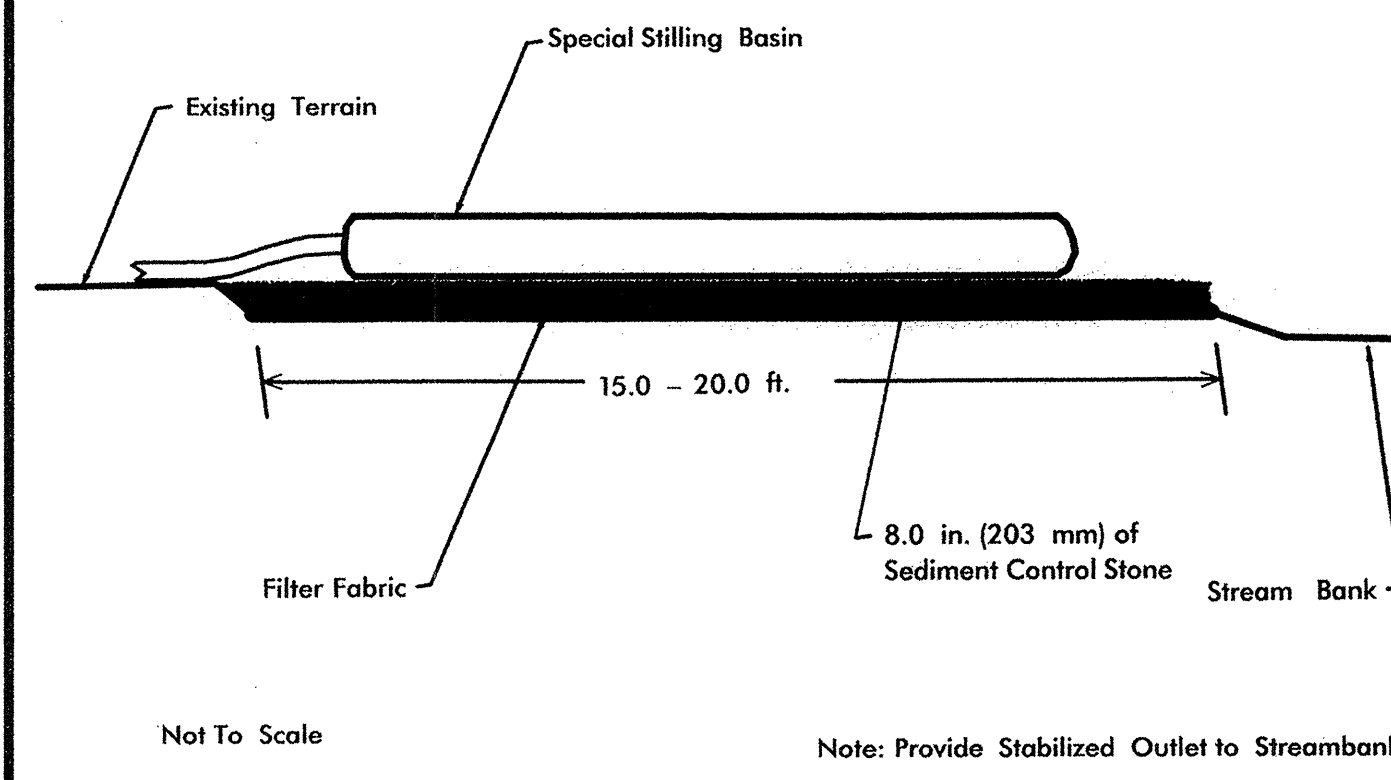


### EXAMPLE OF PUMP-AROUND OPERATION



- NOTES:**
- 1) All excavation shall be performed in only dry or isolated sections of channel.
  - 2) Impervious dikes are to be used to isolate work from stream flow when necessary.
  - 3) All graded areas shall be stabilized within 24 hours.
  - 4) Maintenance of stream flow operations shall be incidental to the work. This includes polyethylene sheeting, diversion pipes, pumps and hoses.
  - 5) Pumps and hoses shall be of sufficient size to dewater the work area.

### SPECIAL STILLING BASIN WITH ROCK PAD



### SEQUENCE OF CONSTRUCTION FOR TYPICAL WORK AREA

1. INSTALL SPECIAL STILLING BASIN(S)..
2. INSTALL UPSTREAM PUMP AND TEMPORARY FLEXIBLE HOSE.
3. PLACE UPSTREAM IMPERVIOUS DIKE AND BEGIN PUMPING OPERATIONS FOR STREAM DIVERSION.
4. PLACE DOWNSTREAM IMPERVIOUS DIKE AND PUMPING APPARATUS. DEWATER ENTRAPPED AREA. AREA TO BE DEWATERED SHALL BE EQUAL TO ONE DAY'S WORK.
5. PERFORM STREAM RESTORATION WORK IN ACCORDANCE WITH THE PLANS.
6. EXCAVATE ANY ACCUMULATED SILT AND DEWATER BEFORE REMOVAL OF IMPERVIOUS DIKES. REMOVE IMPERVIOUS DIKES, PUMPS, AND TEMPORARY FLEXIBLE HOSE. (DOWNSTREAM IMPERVIOUS DIKES FIRST).
7. ALL GRADING AND STABILIZATION MUST BE COMPLETED IN ONE DAY WITHIN THE PUMP AROUND AREAS BETWEEN THE IMPERVIOUS DIKES. THE IMPERVIOUS DIKE LOCATIONS AS SHOWN ON THIS SHEET ONLY SHOW THE UPPER AND LOWER EXTENT OF WORK FOR EACH STREAM SEGMENT. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE LOCATION OF THE IMPERVIOUS DIKE(S) FOR EACH DAY'S WORK.
8. REMOVE SPECIAL STILLING BASIN(S) AND BACKFILL. STABILIZE DISTURBED AREA WITH SEED AND MULCH.

### ROCK VANE DETAIL

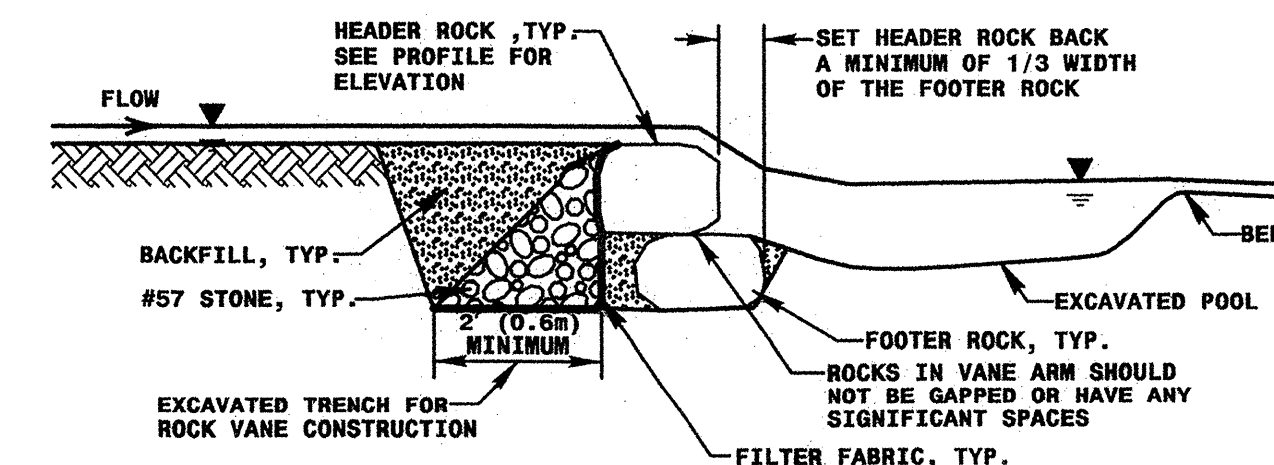
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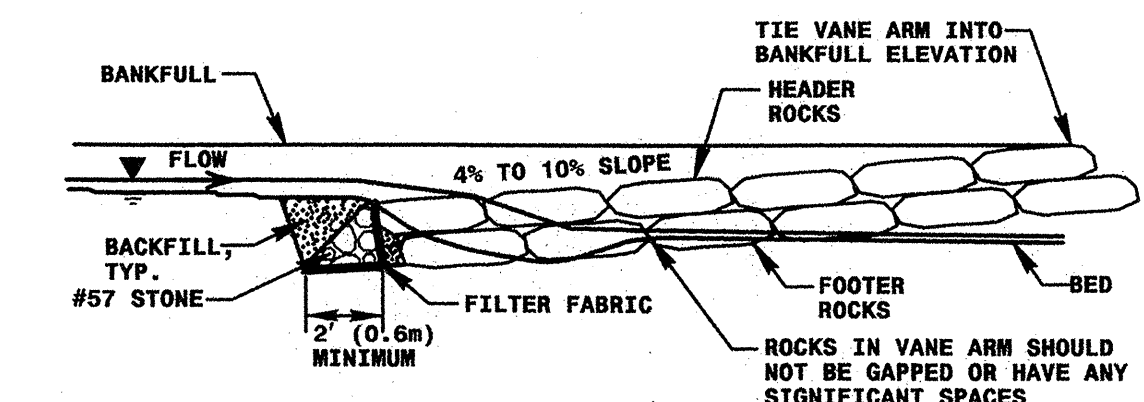
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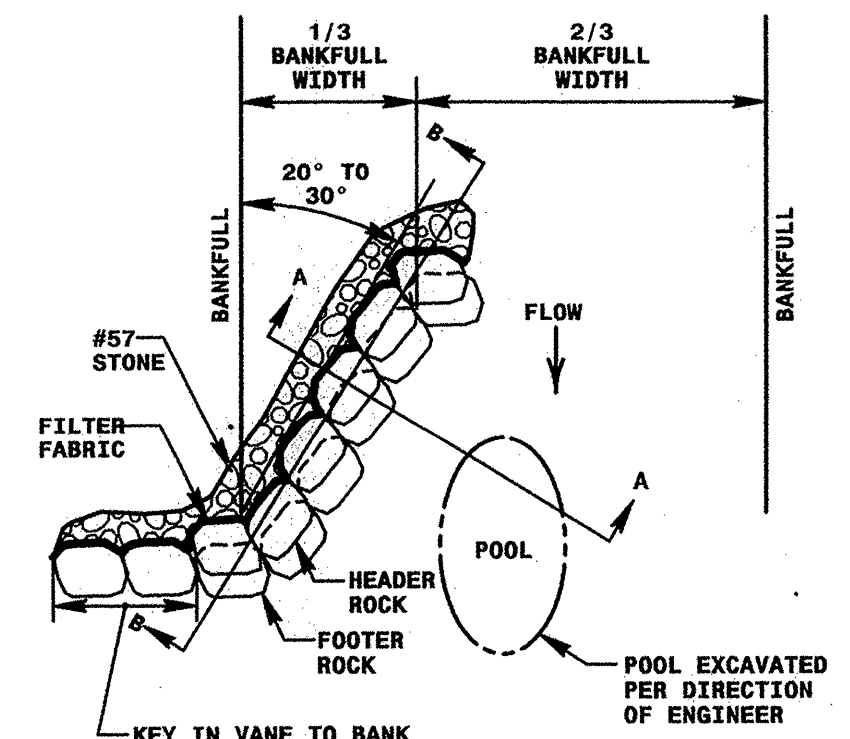
PROJECT REFERENCE NO. <b>R2518B</b>	SHEET NO. <b>OSM-2B</b>
PROJECT ENGINEER	
APPROVED BY: <i>[Signature]</i>	
DATE: <b>1-16-08</b>	
CONST.REV.	
R /W REV.	



SECTION A-A



SECTION B-B



PLAN VIEW

- NOTES:**
1. DEEPEST PART OF POOL TO BE IN LINE WITH WHERE VANE ARM TIES INTO BANKFULL.
  2. DO NOT EXCAVATE POOL TOO CLOSE TO FOOTER BOULDERS.
  3. CLASS "A" STONE CAN BE USED TO REDUCE VOIDS BETWEEN HEADERS AND FOOTERS.
  4. COMPACT BACKFILL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.
  5. POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.

SITE	BOULDER DIMENSIONS (FT)(M)		
	HEIGHT	LENGTH	WIDTH
1,3,4,11,12	2 (0.6)	4 (1.2)	3 (0.9)
8	3 (0.9)	5 (1.5)	4 (1.2)

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PROJECT ENGINEER	
APPROVED BY: 	
DATE: <b>1-16-08</b>	
CONST.REV.	
R /W REV.	

**SUMMARY OF QUANTITIES**

DESC	SECT	QUANTITY	UNIT	ITEM DESCRIPTION
6133000000-N	SP	1	LS	Construction Surveying for Mitigation
6133000000-N	SP	1	LS	Grading for Mitigation
1077000000-M	SP	140	MTON	No. 57 Stone
3656000000-M	876	900	SM	Filter Fabric for Drainage
6133000000-N	SP	1	LS	Diversion Pumping for Mitigation
3651000000-M	SP	575	MTON	Boulders
3642000000-M	876	160	MTON	Plain Rip Rap, Class A
3649000000-M	876	100	MTON	Plain Rip Rap, Class B
6133000000-N	SP	5	EACH	Rootwads

**CONSTRUCTION SEQUENCE**

The Contractor is responsible for following the sequence of construction in accordance with the plans and provisions, as directed by the Engineer. Construction shall proceed in the following manner unless otherwise directed by the Engineer.

The length of stream that is isolated as a daily work area is left to Contractor's discretion in accordance with the following provisions:

1. All project operations will comply with the provided Sediment and Erosion Control Plan.
2. The project consists of six stream sites (Sites 1, 3, 4, 8, 11, and 12). Once work begins on a stream site, the Contractor must complete that site before moving work crews and equipment to a different stream site.
3. Before water is turned into the new channel, each reach of stream must be a completed work product, i.e. all bank and channel modifications, including excavation, grading, and fill, and all bioengineering treatments (with the exception of live staking which may be deferred until all bank and channel work is completed) must be finished as called for in the plans and as directed by the Engineer.
4. Completion of the entire bank stabilization work on both sides of the channel will be required prior to the initiation of the next section of channel construction.

The following general provisions will apply to each stream reach:

1. Layout location of the new stream channel, construction easement limits, and set grade stakes. The Engineer must inspect and approve all layout work before construction may begin.
2. Mobilize equipment and materials to the site.
3. Set up staging areas, construction entrances, and safety fences.
4. Open construction area shall be minimized - the Contractor shall not begin more work than can be completed in a day.
5. The Contractor shall work in the dry. Pump-around operations will be required.
6. Apply mulch, temporary, and permanent seeding as work areas are completed and approved by the Engineer.
7. Repair construction entrances and demobilize equipment from the site.

The following provisions are provided for each stream site:

**Site 1**

1. Install pump-around operations as required to construct in-stream structures in the dry.
2. Beginning at the upstream end of the reach, begin installing structures and stabilizing banks as indicated on the plans.
3. Remove pump-around operations and ensure compliance with the sediment and erosion control plan prior to leaving the site.

**Site 3**

1. Install pump-around operations from station 11+25 to 12+25.
2. Install structures and reconstruct streambanks as indicated on the plans from station 11+50 to 12+00.
3. Install pump-around operations from station 12+00 to 13+00. Contractor shall begin installing structures at the downstream end and working upstream.
4. Remove pump-around operations and ensure compliance with the sediment and erosion control plan prior to leaving the site.

**Site 4**

1. Remove guy wire at station 10+30 and relocate to outside the right of way limits.
2. Install pump-around operations as required to construct in-stream structures in the dry.
3. Contractor will be required to work from the right streambank from station 10+00 to 11+50. Begin installing in-stream structures at the upstream end and moving downstream.
4. At approximate station 12+00, Contractor shall install rock vane and root wads from the left streambank.
5. Remove pump-around operations and ensure compliance with the sediment and erosion control plan prior to leaving the site.

**Site 8**

1. Contractor shall begin by excavating bench limits as indicated on the plans.
2. Install pump-around operations as required to construct in-stream structures in the dry.
3. Contractor shall begin installing in-stream structures and coir fiber matting at the upstream end and working downstream.
4. Remove pump around operations and ensure compliance with the sediment and erosion control plan prior to leaving the site.

**Site 11**



1. Contractor shall begin by excavating bench limits as indicated on the plans.
2. Excavate new channel segment from station 10+40 to 10+84. Install in-stream structures and erosion control matting in the dry.
3. Begin pump-around operations from station 10+00 to 10+84.
4. Connect the new channel segment to the existing channel at approximate station 10+40. Once connected, immediately fill old abandoned channel downstream of station 10+40.
5. Install in-stream structures from station 10+00 to 10+40.
6. Remove pump-around operations and ensure compliance with the sediment and erosion control plan prior to leaving the site.

**Site 12**

1. Contractor shall begin by excavating bench limits as indicated on the plans.
2. Install pump-around operations as required to construct in-stream structures in the dry.
3. Begin installation of in-stream structures as indicated on the plans from the upstream end of the site to downstream.
4. Remove pump-around operations and ensure compliance with the sediment and erosion control plan prior to leaving the site.

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**METRIC**  
 CONST.REV.  
 R /W REV.

PROJECT REFERENCE NO. **R2518B** SHEET NO. **OSM-3A**  
 PROJECT ENGINEER  
  
 APPROVED BY:   
 DATE: **1-16-08**

**EARTHWORK SUMMARY FOR MITIGATION**

IN CUBIC METERS

LINE	STATION TO STATION		MITIGATION	EXCAVATION	MITIGATION EMBANK + %	MITIGATION BORROW	MITIGATION TOTAL WASTE
			TOTAL UNCLASS.	UNDERCUT			
SITE 8	10+00	13+04.35	2403		27	0	2376
SITE 11	10+00	10+84.46	1350		0	0	1350
SITE 12	10+00	11+78.15	216		0	0	216
<b>TOTAL</b>			<b>3969</b>		<b>27</b>	<b>0</b>	<b>3942</b>
Waste in lieu of borrow							
<b>GRAND TOTAL</b>			<b>3969</b>		<b>27</b>	<b>0</b>	<b>3942</b>
<b>SAY</b>			<b>4000</b>		<b>30</b>	<b>0</b>	<b>3970</b>



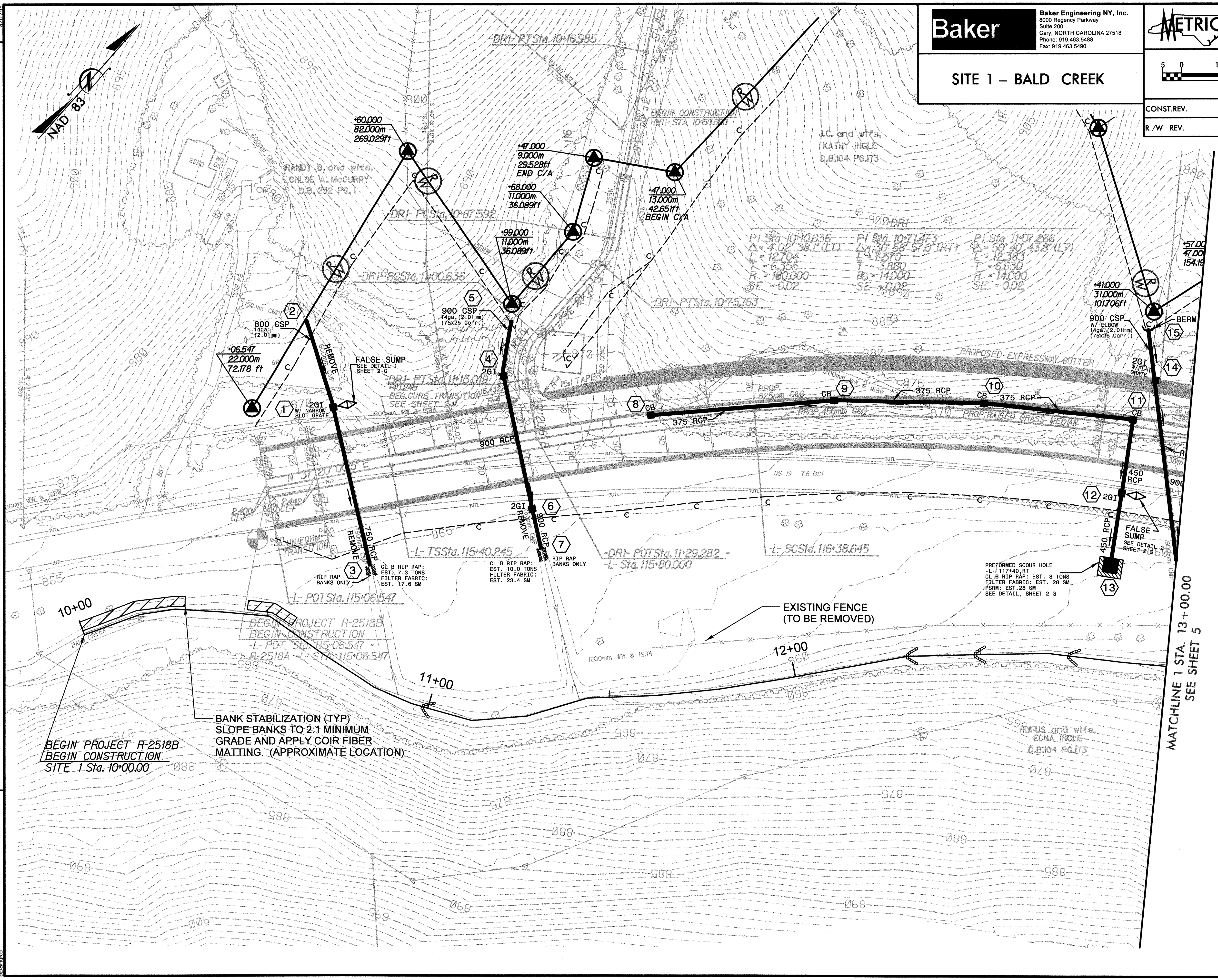
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**SITE 1 - BALD CREEK**

**METRIC**

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BUCK PROJECT REFERENCE NO. <b>R2518B</b>	SHEET NO. <b>OSM-4</b>
PROJECT ENGINEER	
APPROVED BY: 	
DATE: 1-16-08	



REVISIONS

MATCHLINE 1 STA. 13+00.00  
 SEE SHEET 5

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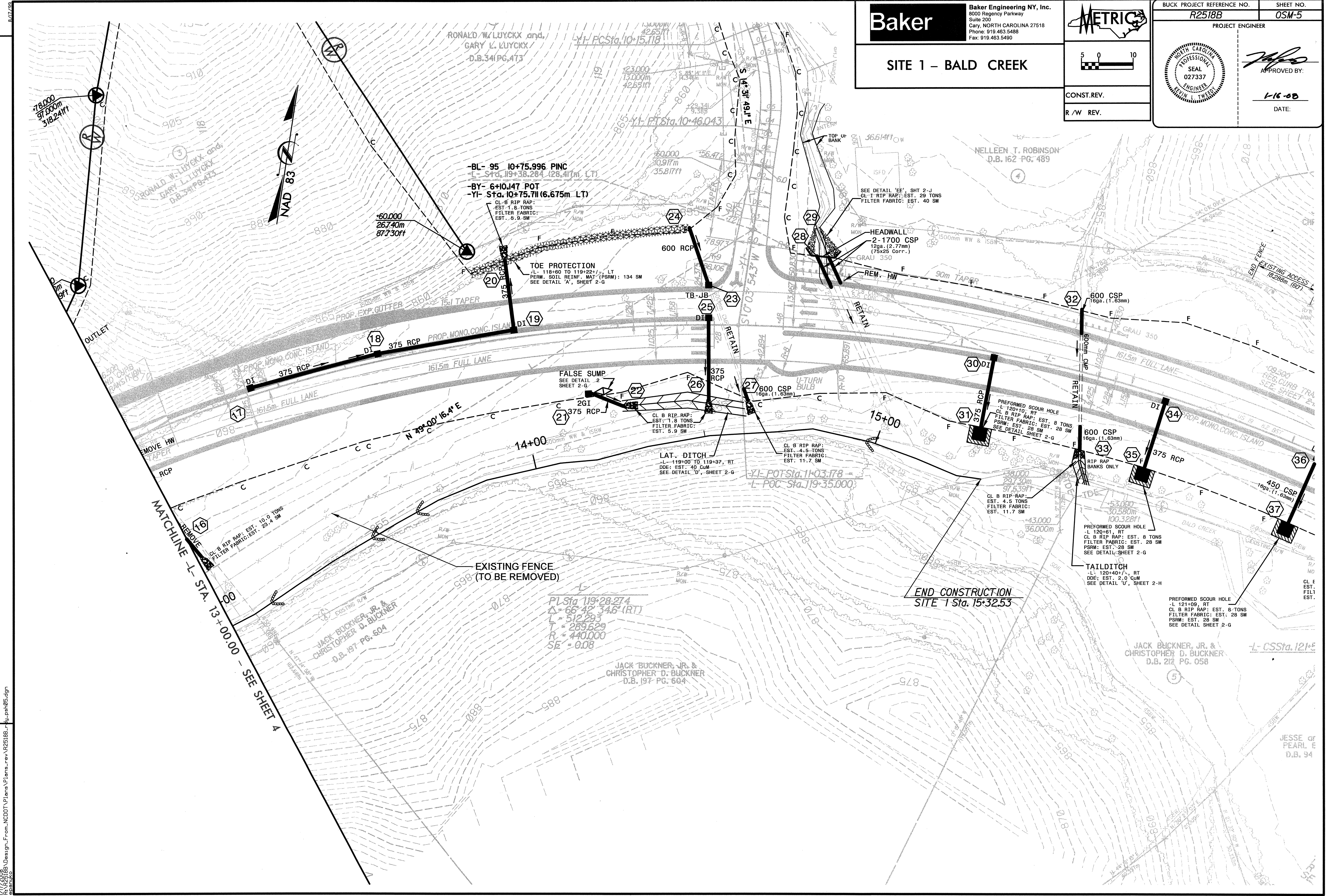
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PROJECT ENGINEER	
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**SITE 1 - BALD CREEK**

CONST. REV.
R/W REV.



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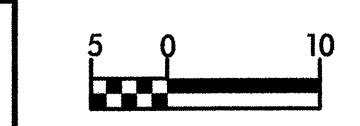


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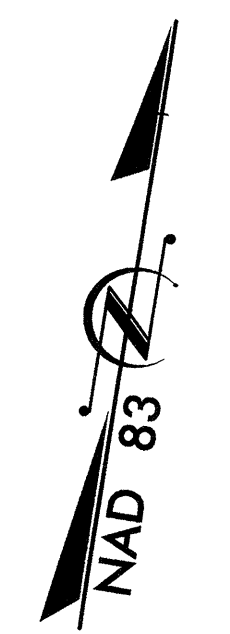
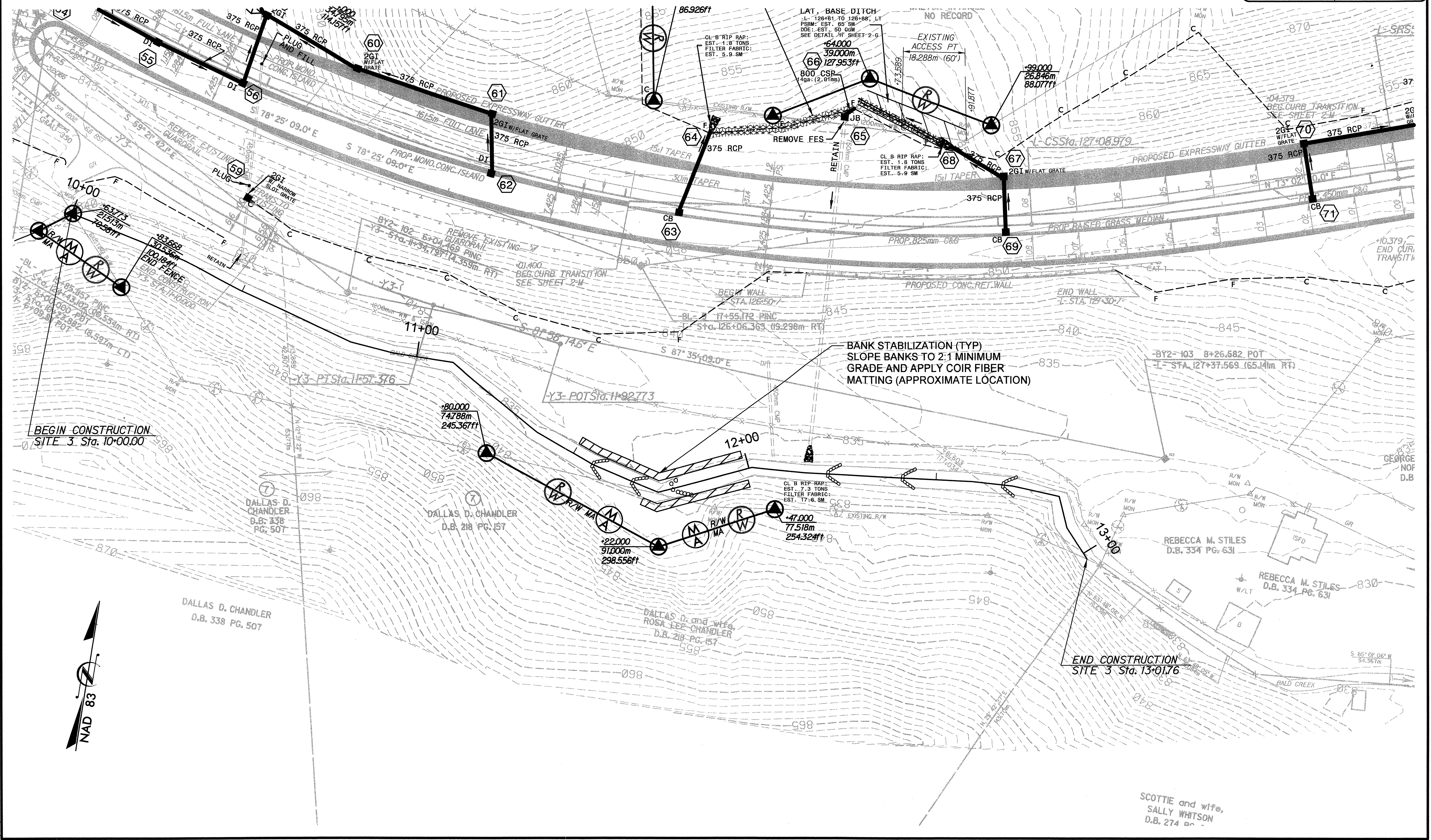
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APPROVED BY: <i>[Signature]</i>	
DATE: <b>1-16-08</b>	

**SITE 3 - BALD CREEK**



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R/W REV.

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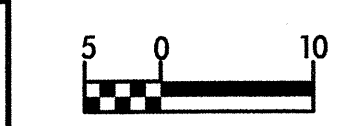


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SCOTTIE and wife,  
SALLY WHITSON  
D.B. 274 PG. 157



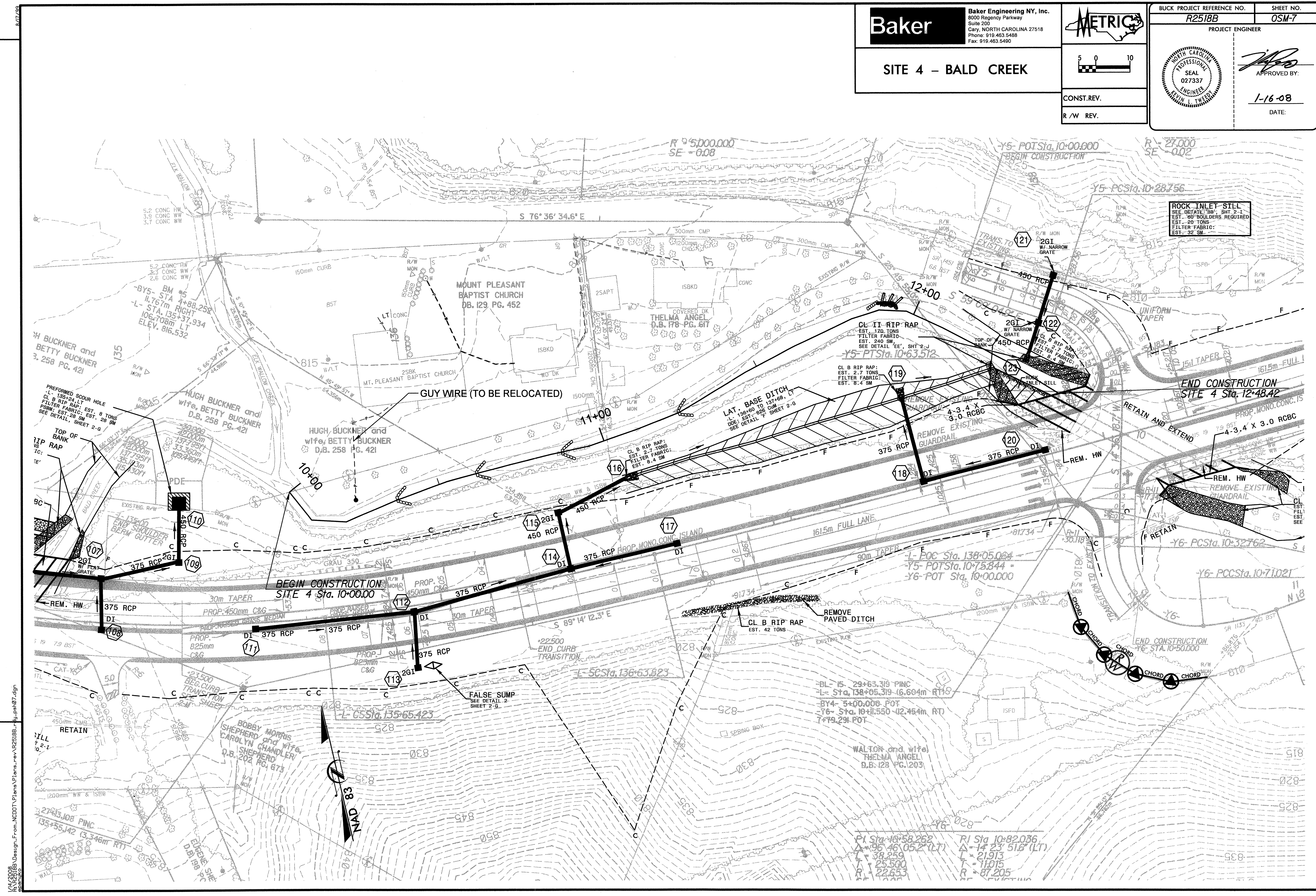
**SITE 4 - BALD CREEK**



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R/W REV.

**ROCK INLET STILL**  
SEE DETAIL 'BB', SHT 2-1  
EST. 80' BOULDERS REQUIRED  
EST. 20 TONS  
FILTER FABRIC:  
EST. 32 SM

REVISIONS

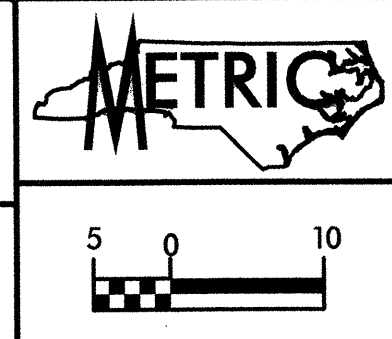


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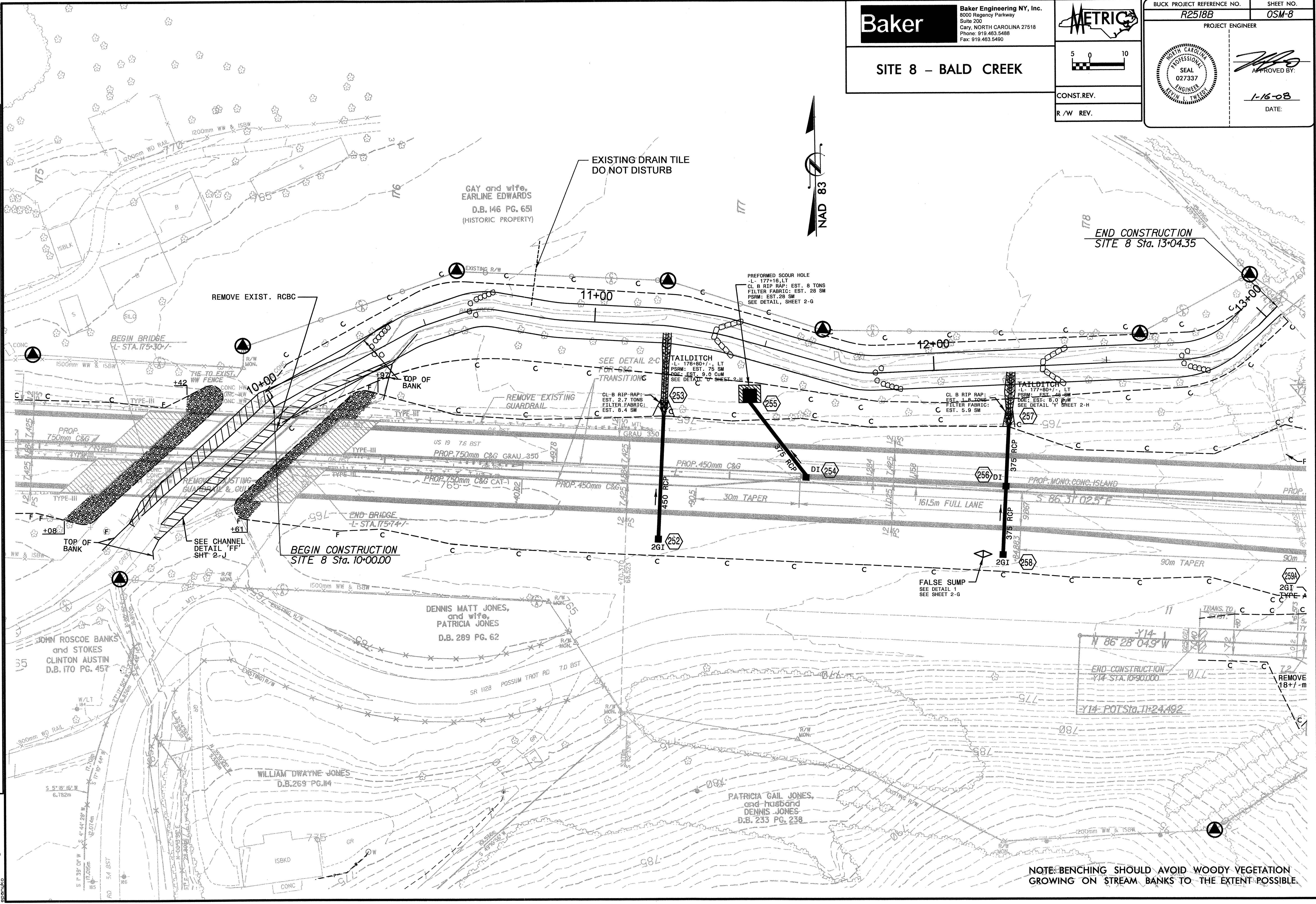
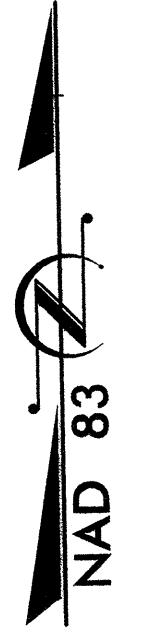
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**SITE 8 - BALD CREEK**



REVISIONS

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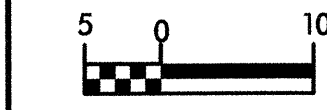
NOTE: BENCHING SHOULD AVOID WOODY VEGETATION GROWING ON STREAM BANKS TO THE EXTENT POSSIBLE.



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**SITE 11 - PHIPPS CREEK**



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BUCK PROJECT REFERENCE NO. SHEET NO.

R2518B OSM-9

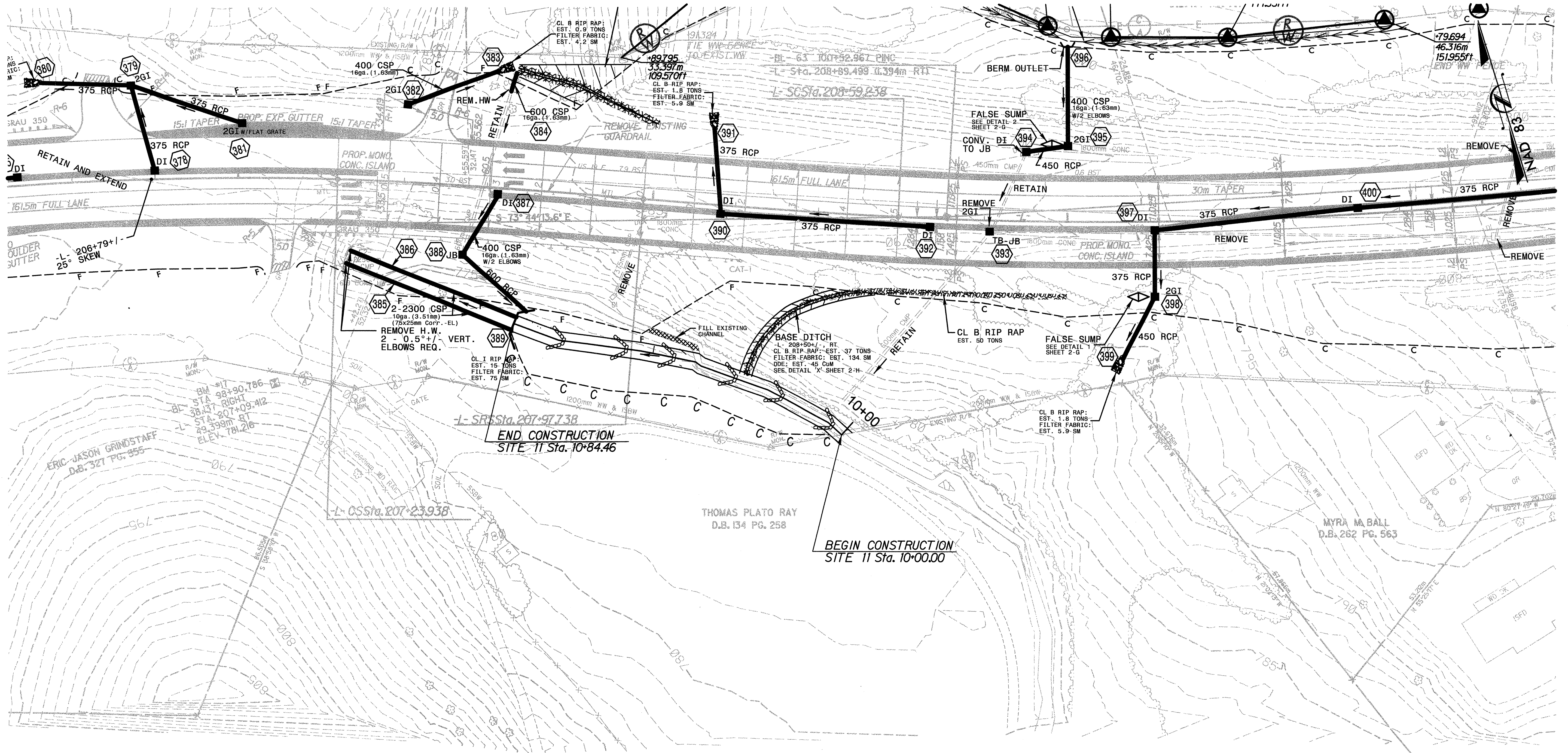
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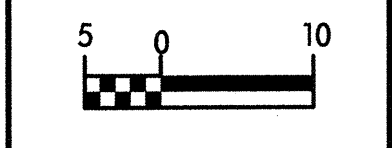
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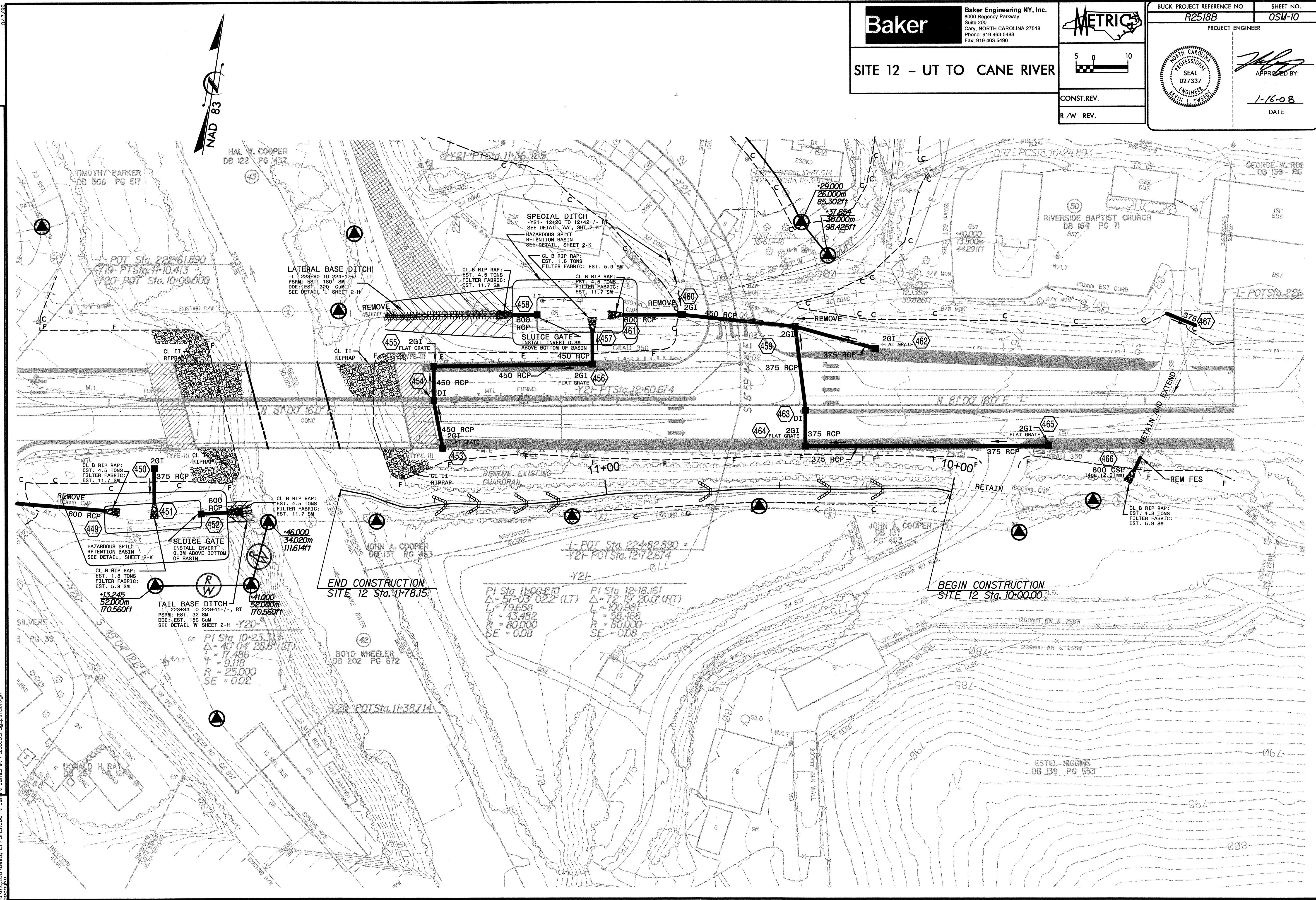
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APPROVED BY:  
  
DATE: **1-16-08**



**SITE 12 - UT TO CANE RIVER**


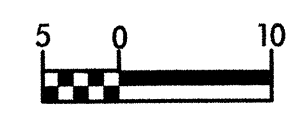

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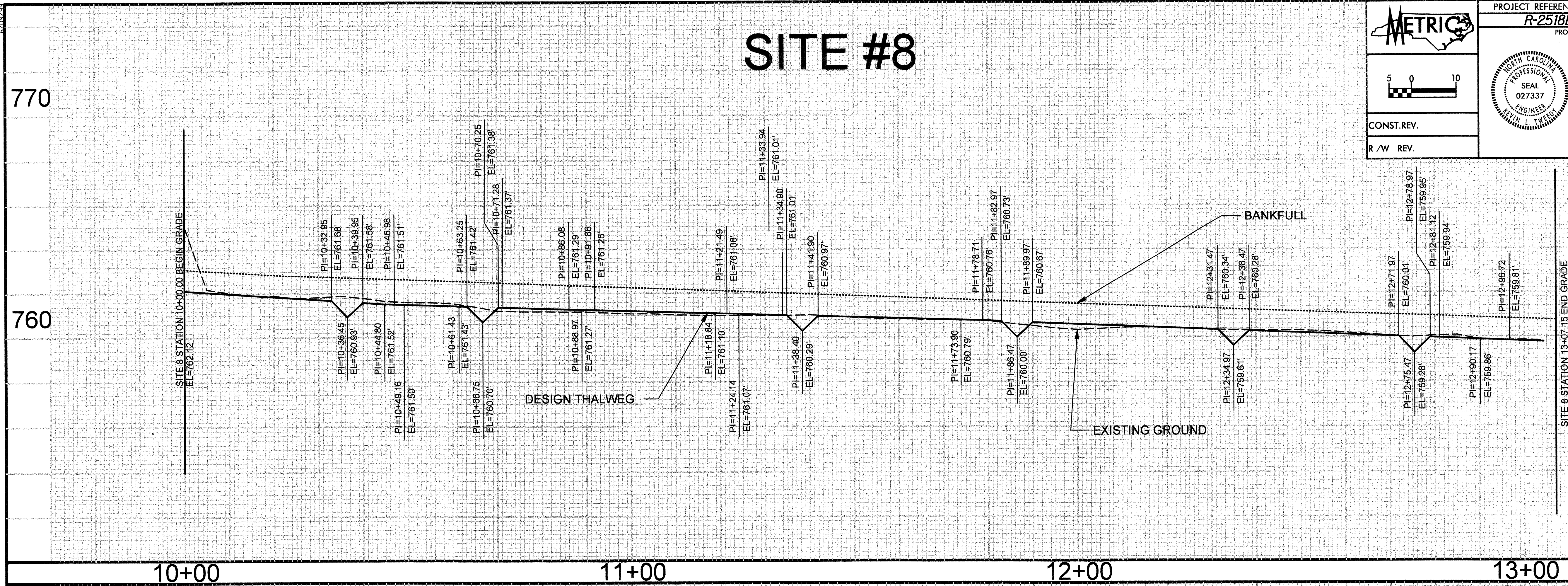
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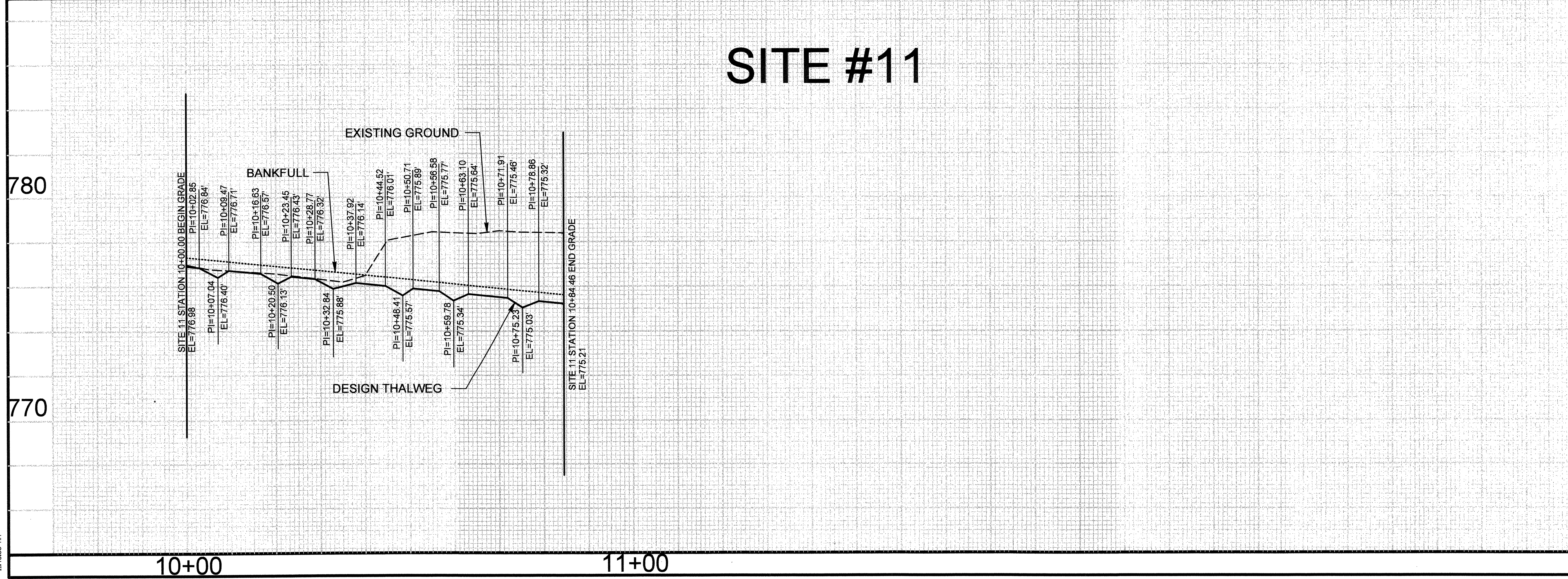


	PROJECT REFERENCE NO.	SHEET NO.
	R-2518B	OSM-11
		
CONST. REV.		
R / W REV.		DATE: 1-6-08

# SITE #8




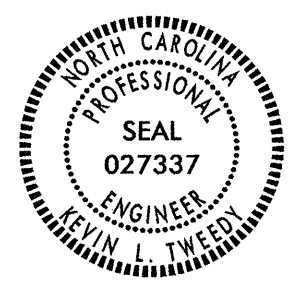

# SITE #11



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# SITE #12

	PROJECT REFERENCE NO.	SHEET NO.
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