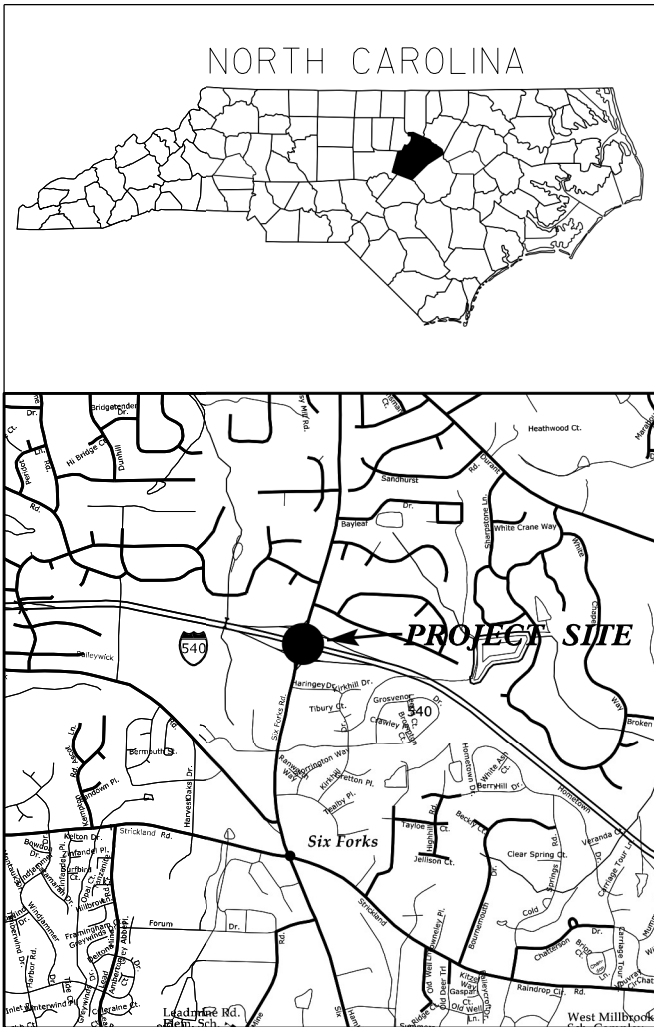


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 2/25/2016  
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 Wesley\_Owens

**CONTRACT: 34625.2.54**      **TIP PROJECT: R-4436 EH**

See Sheet 1-A For Index of Sheets



VICINITY MAP

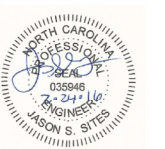
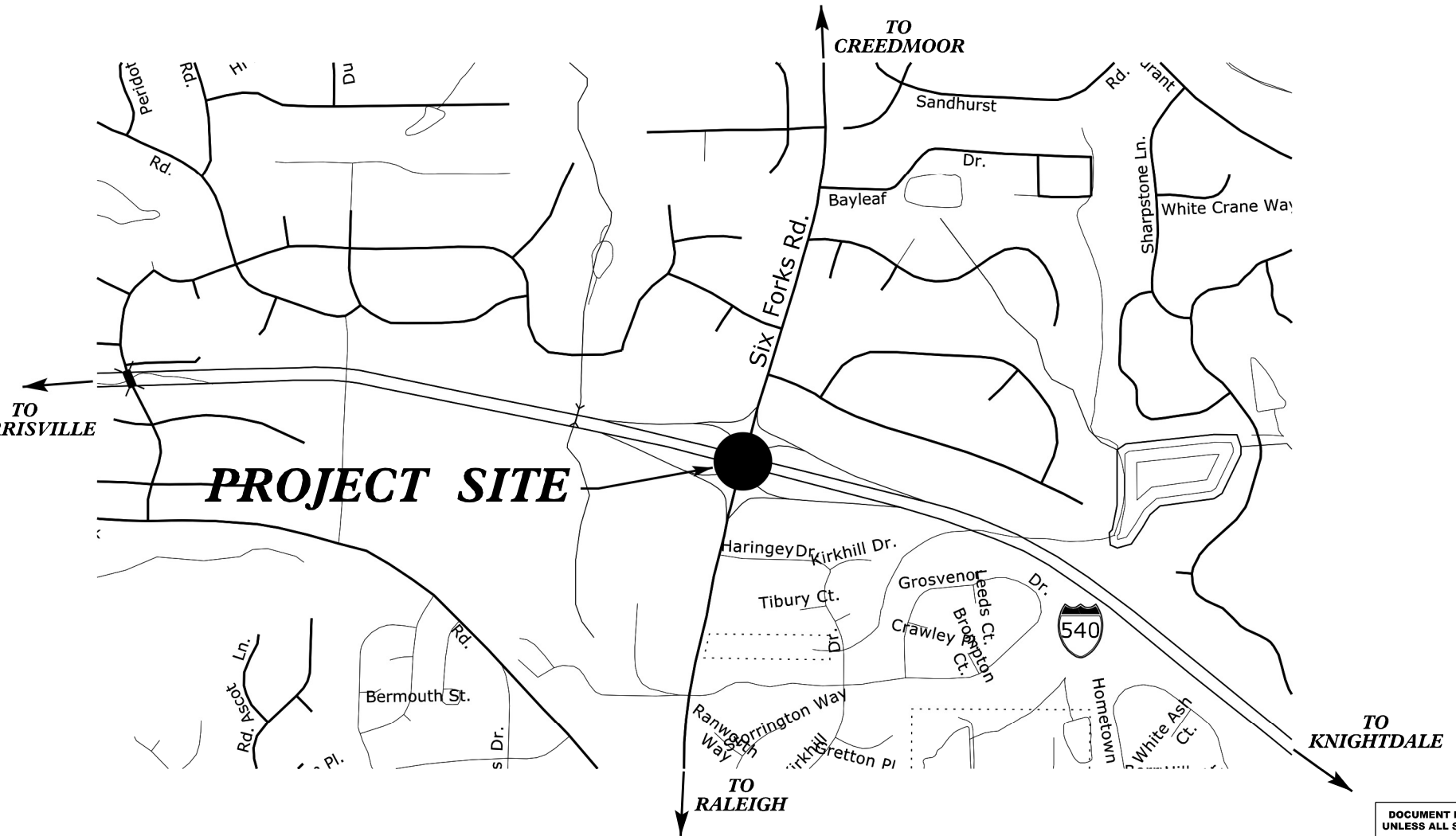
STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS  


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**WAKE COUNTY**

**LOCATION: INTERSTATE 540 AND SIX FORKS ROAD INTERCHANGE**

**TYPE OF WORK: GRADING, STORM DRAINAGE, STORMWATER DRY DETENTION BASIN,  
 FILTRATION BASIN, FILTRATION SWALE, EROSION CONTROL,  
 AND SEEDING & MULCHING**



DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-4436EH	1	14
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34625.2.54	STP-0540(036)	CONSTRUCTION	

**GRAPHIC SCALES**

SCALE VARIES  
SEE PLANS



LETTING DATE:  
MARCH 30, 2016



AECOM  
 License Number F-0342  
 1600 Perimeter Park Drive  
 Morrisville, North Carolina 27560  
 TELEPHONE (919) 461-1100 FAX (919) 461-1415

JASON SITES, PE  
PROJECT ENGINEER

PROJECT DESIGN ENGINEER

**HYDRAULICS ENGINEER**

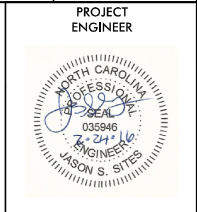
SIGNATURE: \_\_\_\_\_ P.E.

NCDOT CONTACT  
 BRIAN LIPSCOMB, P.E.  
 HIGHWAY STORMWATER PROGRAM

**DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA  
HYDRAULICS UNIT  
STORMWATER GROUP**



PROJECT ENGINEER



**INDEX OF SHEETS**

SHEET NUMBER	SHEET DESCRIPTION
1	TITLE SHEET
1-A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS
1-B	CONVENTIONAL SYMBOLS
1-C	SURVEY CONTROL
2-A	DRY DETENTION BASIN OUTLET STRUCTURE
2-B	BMP DETAILS 1
2-C	BMP DETAILS 2
2-D	UNDERDRAINS
3	SUMMARY OF QUANTITIES
4	PLAN SHEET, NORTH BMPS
5	PLAN SHEET, SOUTH BMPS
6	PLAN SHEET, FILTER SWALE
EC-1	EROSION CONTROL PLANS
TC-1	TRAFFIC CONTROL PLANS

**CONSTRUCTION SEQUENCE NOTES**

- PROJECT REQUIRES A PRE-CONSTRUCTION CONFERENCE PRIOR TO INITIATING ANY EARTH DISTURBANCE ACTIVITIES.
- ESTABLISH STAGING AND LAYDOWN AREA AND CONSTRUCT GRAVEL CONSTRUCTION ENTRANCE TO SERVICE THE STAGING AND LAYDOWN AREA. INSTALL SAFETY FENCE AS SHOWN ON THE PLANS.
  - FOR CONSTRUCTION IN EACH QUADRANT (GRASSSED FILTRATION BASINS AND DRY DETENTION BASIN):
    - INSTALL INLET PROTECTION AT EXISTING INLETS.
    - CONSTRUCT TEMPORARY SEDIMENT CONTROL FENCE AROUND PERIMETER OF QUADRANT, AS SHOWN ON PLANS OR DIRECTED BY ENGINEER. GAPS MAY BE PROVIDED FOR ACCESS AND FENCE REMOVED AND REPLACED AS NEEDED FOR CONSTRUCTION.
    - CONSTRUCT BMP.
    - AFTER BMP IS CONSTRUCTED AND VEGETATION IS ESTABLISHED, CONSTRUCT CURB CUTS, DITCHES AND PREFORMED SCOUR HOLES AS SHOWN ON THE PLANS.
  - FOR CONSTRUCTION OF THE FILTER SWALES:
    - CONSTRUCT GRAVEL CONSTRUCTION ENTRANCE.
    - INSTALL TEMPORARY DIVERSION DITCH PARALLEL TO THE CONSTRUCTION AREA TO DIVERT UPSTREAM FLOWS.
    - INSTALL TEMPORARY SILT FENCE AND ROCK SILT CHECK DAM.
    - CONSTRUCT FILTER SWALES.
  - FOLLOW SEEDING/MULCHING GUIDELINES ON THE PLANS TO STABILIZE ALL REMAINING DISTURBED SURFACES, BACKFILL TEMPORARY DIVERSION DITCH.
  - INSPECT ALL INLETS, PIPES AND OUTLETS FOR SEDIMENT AND REMOVE SEDIMENT AS REQUIRED.
  - REMOVE ALL REMAINING TEMPORARY EROSION CONTROL MEASURES AFTER PERMANENT PERENNIAL VEGETATION IS ESTABLISHED.

**EROSION CONTROL NOTES**

- ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH NCDOT STANDARDS, SPECIFICATIONS, AND DETAILS, LATEST VERSION.
- CONTRACTOR SHALL MAINTAIN ALL EROSION CONTROL MEASURES DURING THE LIFE OF THE PROJECT UNLESS OTHERWISE INDICATED ON THE PLANS OR DIRECTED BY NCDOT INSPECTOR.
- CONTRACTOR SHALL CONSTRUCT DIVERSION DITCHES AS NECESSARY TO ENSURE THAT ALL SEDIMENT IS DIRECTED INTO EROSION CONTROL MEASURES.
- CUT AND FILL SLOPES SHALL BE STABILIZED WITHIN 14 DAYS OF ANY PHASE OF GRADING. SLOPES 3:1 OR STEEPER SHALL BE STABILIZED WITHIN 7 DAYS.
- ALL STREETS ADJACENT TO THIS PROJECT SHALL REMAIN CLEAN AT ALL TIMES OR A WASH STATION MAY BE REQUIRED.
- IF USED, SILT FENCE SHALL BE MAINTAINED ON THE SITE UNTIL ALL SITE WORK IS COMPLETED AND THE FINAL SITE INSPECTION IS SCHEDULED.
- RESEED OF PERMANENT GROUND COVER WILL BE ESTABLISHED IN 15 WORKING DAYS OR 30 CALENDAR DAYS, WHICH EVER IS SHORTER.
- EROSION CONTROL MATTING SHALL BE STRAW MATTING. USE STD. DWG. 1631.01 FOR MATTING INSTALLATION.
- PROVIDE GRAVEL CONSTRUCTION ENTRANCE PER 1607.01 AS NEEDED TO PREVENT TRACKING OFFSITE.

**SURVEY**

LOCATIONS AND ELEVATIONS SHOULD BE FIELD VERIFIED. CONSULT WITH ENGINEER IF SIGNIFICANT DEVIATIONS FROM THE PLAN ARE REQUIRED.

**UTILITIES**

THE CONTRACTOR SHOULD MAKE HIS OWN INVESTIGATIONS AS TO THE LOCATION OF UTILITIES. EXISTING UTILITIES AND STRUCTURES (UNDERGROUND, SURFACE, OR OVERHEAD) ARE INDICATED ONLY TO THE THE EXTENT THAT SUCH INFORMATION WAS KNOWN, MADE AVAILABLE TO, OR DISCOVERED BY THE ENGINEER IN PREPARING THE DRAWINGS. THE LOCATIONS, CONFIGURATIONS, AND ELEVATIONS OF SUBSURFACE FACILITIES AND UTILITIES ARE APPROXIMATE, AND NOT ALL UTILITIES AND FACILITIES MAY BE INDICATED.

**2012 ROADWAY ENGLISH STANDARD DRAWINGS**

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" HIGHWAY DESIGN BRANCH - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., JANUARY, 2012 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED PART OF THESE PLANS.

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.02	METHOD OF CLEARING - METHOD II
DIVISION 3 - PIPE CULVERTS	
300.01	METHOD OF PIPE INSTALLATION
DIVISION 8 - INCIDENTALS	
840.66	DRAINAGE STRUCTURE STEPS
876.02	GUIDE FOR RIP RAP AT PIPE OUTLETS
DIVISION 16 - EROSION CONTROL AND ROADSIDE DEVELOPMENT	
1607.01	GRAVEL CONSTRUCTION ENTRANCE
1630.05	TEMPORARY DIVERSION
1631.01	MATTING INSTALLATION
1632.03	ROCK INLET SEDIMENT TRAP TYPE C
1633.01	TEMPORARY ROCK SILT CHECK TYPE A

**GENERAL NOTES**

**GRADING:**

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED OR FUTURE SURFACING AT GRADE POINTS SHOWN ON THE PLANS. GRADE LINES MAY BE ADJUSTED AT THEIR BEGINNING AND ENDING AND AT STRUCTURES AS DIRECTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

**CLEARING:**

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.

**SIDE ROADS:**

THE CONTRACTOR WILL BE REQUIRED TO DO ALL NECESSARY WORK TO PROVIDE SUITABLE CONNECTIONS WITH ALL ROADS, STREETS, AND DRIVES ENTERING THIS PROJECT. THIS WORK WILL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR THE PARTICULAR ITEMS INVOLVED.

**COMPOST BLANKET:**

- FOR BMPS IN EACH QUADRANT (FILTRATION BASINS IN NW, NE, AND SW AND DETENTION BASIN IN SE), PROVIDE COMPOST BLANKET ON ALL DISTURBED SURFACES NOT COVERED BY SOD.
- PROVIDE COMPOST BLANKET IN FILTER SWALE AREA AS SHOWN ON SHEET 6.
- COMPOST BLANKETS MUST MEET THE REQUIREMENT IN SPECIAL PROVISIONS.

**SEEDBED PREPARATION**

- CHISEL COMPACTED AREAS AND SPREAD TOPSOIL 3 INCHES DEEP OVER ADVERSE SOIL CONDITIONS IF AVAILABLE.
- RIP THE ENTIRE AREA TO 6 INCHES DEPTH.
- REMOVE ALL LOOSE ROCK, ROOTS AND OTHER OBSTRUCTIONS LEAVING SURFACES REASONABLY SMOOTH AND UNIFORM.
- APPLY AGRICULTURAL LIME, FERTILIZER, AND SUPERPHOSPHATE UNIFORMLY AND MIX WITH SOIL (SEE BELOW\*).
- CONTINUE TILLAGE UNTIL A WELL-PULVERIZED, FIRM, REASONABLY UNIFORM SEEDBED IS PREPARED 4 TO 6 INCHES DEEP.
- SEED A FRESHLY PREPARED SEEDBED AND COVER SEED LIGHTLY WITH SEEDING EQUIPMENT OR CULTIPACK AFTER SEEDING.
- MULCH IMMEDIATELY AFTER SEEDING AND ANCHOR MULCH.
- INSPECT ALL SEEDED AREAS AND MAKE ALL NECESSARY REPAIRS OR RESEEDINGS WITHIN THE PLANTING SEASON, IF POSSIBLE. IF STAND SHOULD BE OVER 70% DAMAGED, REESTABLISH FOLLOWING ORIGINAL LIME, FERTILIZER AND SEEDING RATES.
- CONSULT CONSERVATION INSPECTOR ON MAINTENANCE TREATMENT AND FERTILIZATION AFTER PERMANENT COVER IS ESTABLISHED.

\*APPLY: AGRICULTURAL LIMESTONE - 2 TONS/ACRE (34 TONS/ACRE ON CLAY SOILS)  
 FERTILIZER - 1,000 LBS/ACRE - 10-10-10  
 SUPERPHOSPHATE - 500 LBS/ACRE - 20%  
 MULCH - 2 TONS/ACRE - SMALL GRAIN STRAW  
 ANCHOR - ASPHALT EMULSION @ 300 GAL. ACRE

**MAINTENANCE PLAN**

- ALL EROSION AND SEDIMENTATION CONTROL PRACTICES WILL BE CHECKED FOR STABILITY AND OPERATION FOLLOWING EVERY RUNOFF-PRODUCING RAINFALL BUT IN NO CASE LESS THAN ONCE A WEEK. ANY NEEDED REPAIRS WILL BE MADE IMMEDIATELY TO MAINTAIN ALL PRACTICES AS DESIGNED.
- SEDIMENT WILL BE REMOVED FROM BEHIND THE SILT FENCE WHEN IT BECOMES ABOUT 6-INCHES DEEP AT THE FENCE. THE SILT FENCE WILL BE REPAIRED AS NECESSARY TO MAINTAIN A BARRIER.
- INLET PROTECTION DEVICES SHALL BE INSPECTED AFTER EVERY RAINFALL EVENT. DAMAGED SILT FENCE SHALL BE REPLACED AND GRAVEL SHALL BE CLEANED OR REPLACED WHEN INLET NO LONGER DRAINS PROPERLY.

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STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

# CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale

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

### BOUNDARIES AND PROPERTY:

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Existing Iron Pin	⊙ EIP
Property Corner	-----
Property Monument	⊠ ECM
Parcel/Sequence Number	Ⓜ 123
Existing Fence Line	-x-x-x-
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-
Known Soil Contamination: Area or Site	☠
Potential Soil Contamination: Area or Site	☠?

### 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	-JS-
Buffer Zone 1	-BZ 1-
Buffer Zone 2	-BZ 2-
Flow Arrow	←
Disappearing Stream	→
Spring	⊙
Wetland	⊠
Proposed Lateral, Tail, Head Ditch	-----
False Sump	⊠

### RAILROADS:

Standard Gauge	-----
RR Signal Milepost	Ⓜ
Switch	⊠
RR Abandoned	-----
RR Dismantled	-----

### RIGHT OF WAY:

Baseline Control Point	◆
Existing Right of Way Marker	△
Existing Right of Way Line	-----
Proposed Right of Way Line	Ⓜ
Proposed Right of Way Line with Iron Pin and Cap Marker	Ⓜ
Proposed Right of Way Line with Concrete or Granite RW Marker	Ⓜ
Proposed Control of Access Line with Concrete C/A Marker	Ⓜ
Existing Control of Access	Ⓜ
Proposed Control of Access	Ⓜ
Existing Easement Line	-E-
Proposed Temporary Construction Easement	-E-
Proposed Temporary Drainage Easement	-TDE-
Proposed Permanent Drainage Easement	-PDE-
Proposed Permanent Drainage / Utility Easement	-DUE-
Proposed Permanent Utility Easement	-PUE-
Proposed Temporary Utility Easement	-TUE-
Proposed Aerial Utility Easement	-AUE-
Proposed Permanent Easement with Iron Pin and Cap Marker	◆

### ROADS AND RELATED FEATURES:

Existing Edge of Pavement	-----
Existing Curb	-----
Proposed Slope Stakes Cut	-C-
Proposed Slope Stakes Fill	-F-
Proposed Curb 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	CONC
Bridge Wing Wall, Head Wall and End Wall	CONC WW
MINOR:	
Head and End Wall	CONC HW
Pipe Culvert	-----
Footbridge	-----
Drainage Box: Catch Basin, DI or JB	CB
Paved Ditch Gutter	-----
Storm Sewer Manhole	Ⓞ
Storm Sewer	-S-

### 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	-P-
Designated U/G Power Line (S.U.E.*)	-P-

### 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	-T-
Designated U/G Telephone Cable (S.U.E.*)	-T-
Recorded U/G Telephone Conduit	-TC-
Designated U/G Telephone Conduit (S.U.E.*)	-TC-
Recorded U/G Fiber Optics Cable	-T FO-
Designated U/G Fiber Optics Cable (S.U.E.*)	-T FO-

### WATER:

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

### TV:

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

### GAS:

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

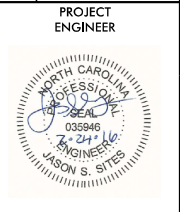
### SANITARY SEWER:

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

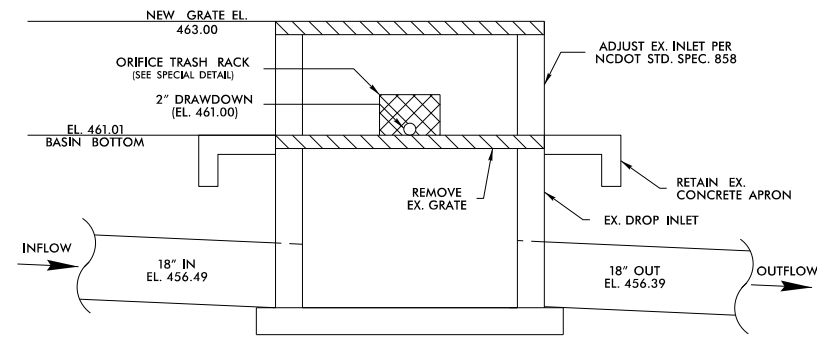
### MISCELLANEOUS:

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

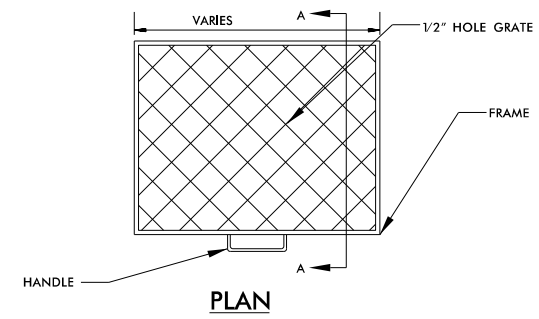




# DRY DETENTION BASIN OUTLET STRUCTURE

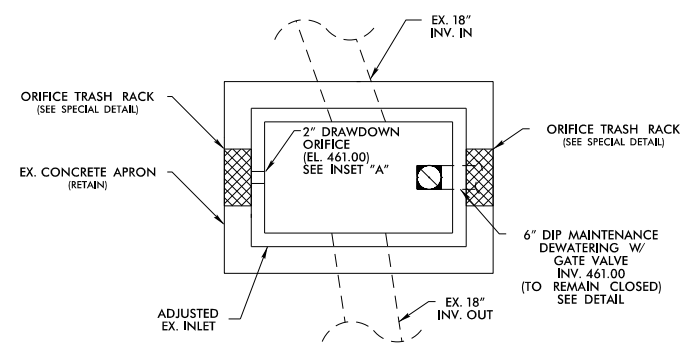
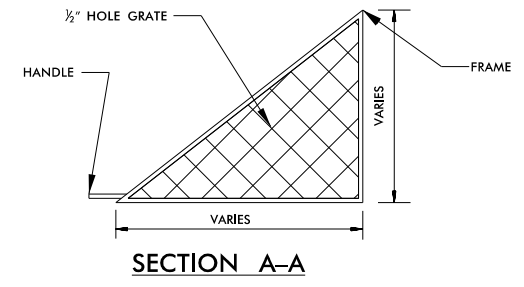


**WEST ELEVATION**  
N.T.S.



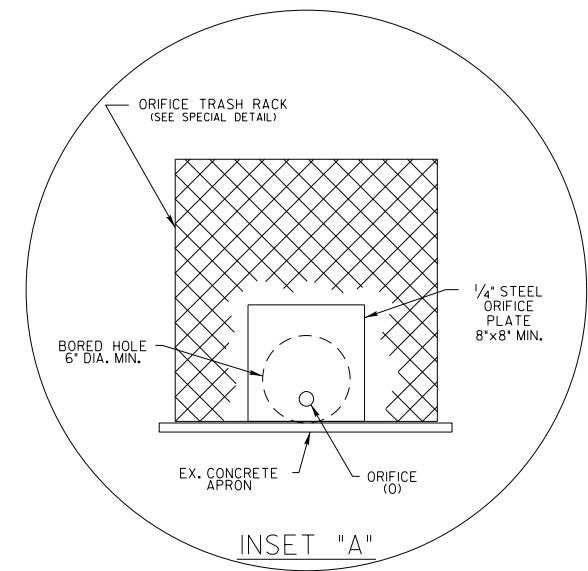
**REMOVEABLE ORIFICE TRASH RACK**  
N.T.S.

- ORIFICE TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A \*\* BEAD.
  2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 862.04 FOR ANCHORING PROCEDURE.
  3. REMOVEABLE ORIFICE TRASH RACK SHALL BE ATTACHED TO CONCRETE BOX BY HINGE OR SLIDE RAIL SYSTEM. RACK AND HARDWARE SHALL BE ALUMINUM OR GALVANIZED IN ACCORDANCE WITH ASTM A-153.

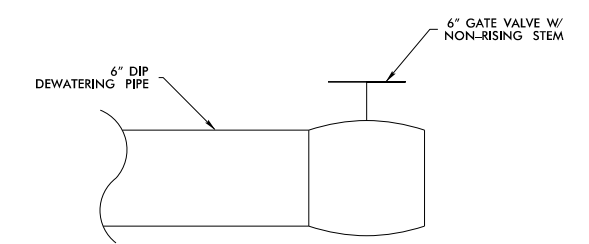


**PLAN VIEW**  
N.T.S. (GRATE NOT SHOWN FOR CLARITY)

- NOTES
1. ALL FRAME AND GRATE ADJUSTMENTS SHALL MEET ALL APPLICABLE STANDARDS OF SECTION 858, NCDOT STANDARD SPECIFICATIONS.
  2. MAINTAIN EXISTING CONCRETE APRON. REPAIR IF NECESSARY IF DAMAGED DURING EXISTING INLET ADJUSTMENT.
  3. GATE VALVES FOR MAINTENANCE AND SHOULD REMAIN CLOSED DURING NORMAL OPERATION.
  4. MAX. PONDING DEPTH 2.0 FT. (WSEL 463.0)



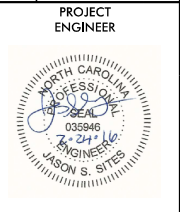
**INSET "A"**



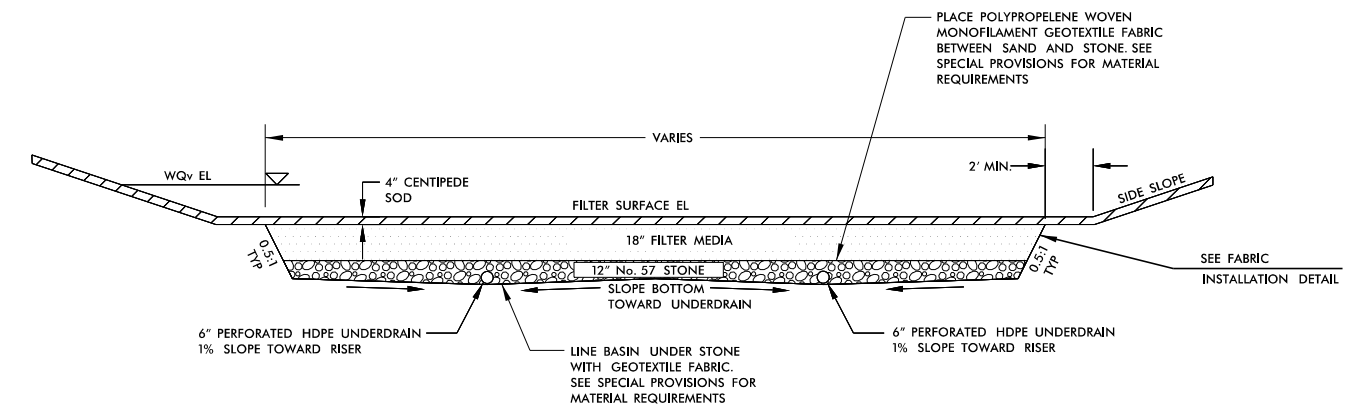
**6" DIP MAINTENANCE DEWATERING**  
N.T.S.

- NOTE
1. DEWATERING PIPE TO PENETRATE INLET SIDEWALL AND TERMINATE INSIDE TRASH RACK.

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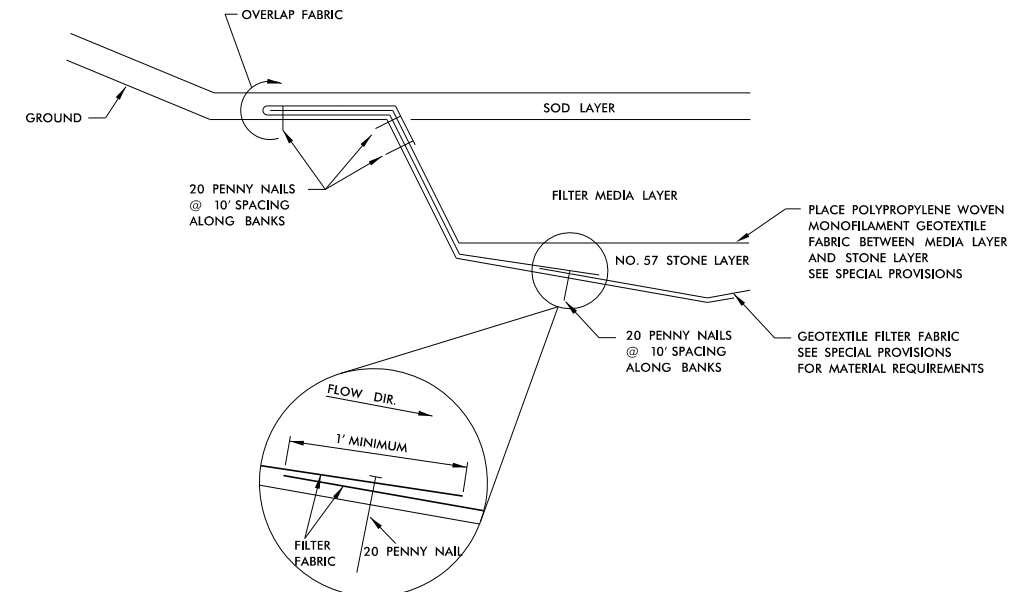


# BMP DETAILS 1



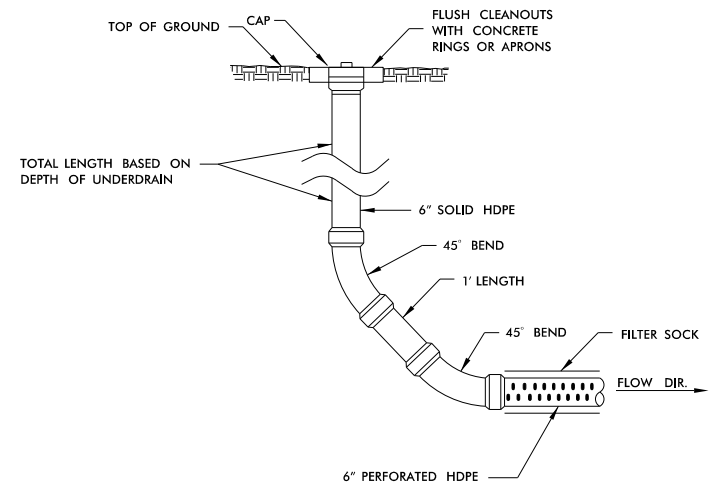
**TYPICAL SECTION - FILTER BASIN MEDIA**  
N.T.S.

- NOTES:
- SEE FILTRATION BASIN MEDIA IN SPECIAL PROVISIONS.
  - STONE TO BE STD. SIZE #57 (DIVISION 10 SECTION 1005), WASHED.
  - DO NOT PLACE FILTER MEDIA DIRECTLY AGAINST PREFORMED SCOUR HOLE.



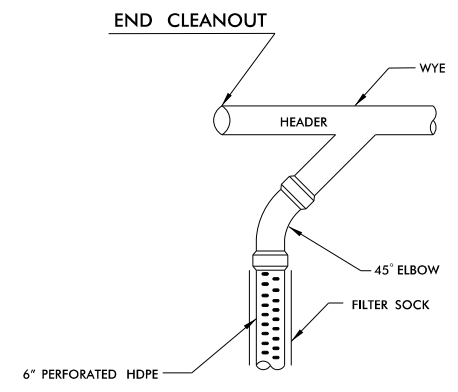
- NOTES:
- FABRIC LINING AND DIVIDING FABRIC SHOULD BOTH EXTEND A MINIMUM OF 2' BEYOND THE ENGINEERED SOIL MEDIA.
  - LINING FABRIC SHOULD BE FOLDED BACK TO OVERLAP DIVIDING FABRIC AND SECURED WITH 20 PENNY NAILS TO ENSURE SEALING THE STONE FROM SOIL.
  - FABRIC SHOULD BE LAYED IN A WAY TO PREVENT WATER FROM FLOWING BETWEEN OVERLAPPED PIECES. (SEE BLOWUP)
  - FABRIC SHOULD BE OVERLAPPED A MINIMUM OF 12 INCHES AND SECURED WITH NAILS.
  - NO OVERLAPPING SHOULD OCCUR UNDER DRAIN PIPES.

**FABRIC INSTALLATION DETAIL**  
N.T.S.



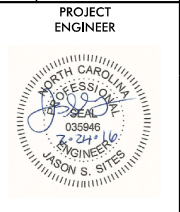
- NOTES:
- ONLY UNDERDRAIN PIPE (LOCATED BENEATH FILTER MEDIA) SHOULD BE PERFORATED.
  - PROVIDE THREADED SCREW CAP.
  - FOR FILTER SWALE APPLICATION PROVIDE WYE CONNECTION AS NEEDED FOR CONNECTION TO SOLID OUTLET PIPE.

**END CLEANOUT DETAIL**  
N.T.S.

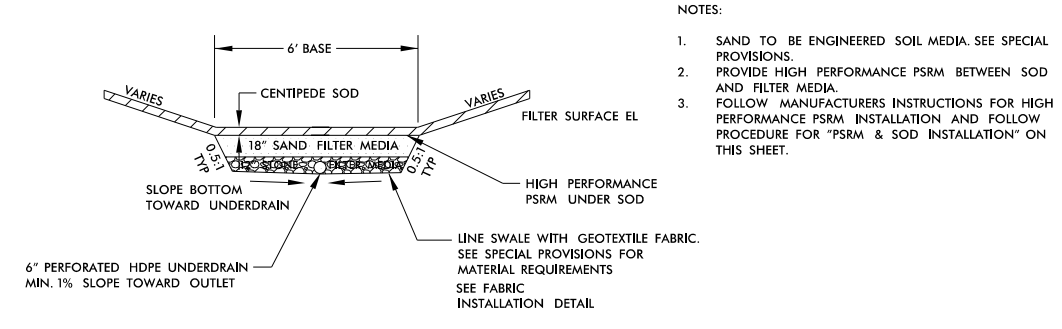


**HEADER CONNECTION DETAIL**  
N.T.S.

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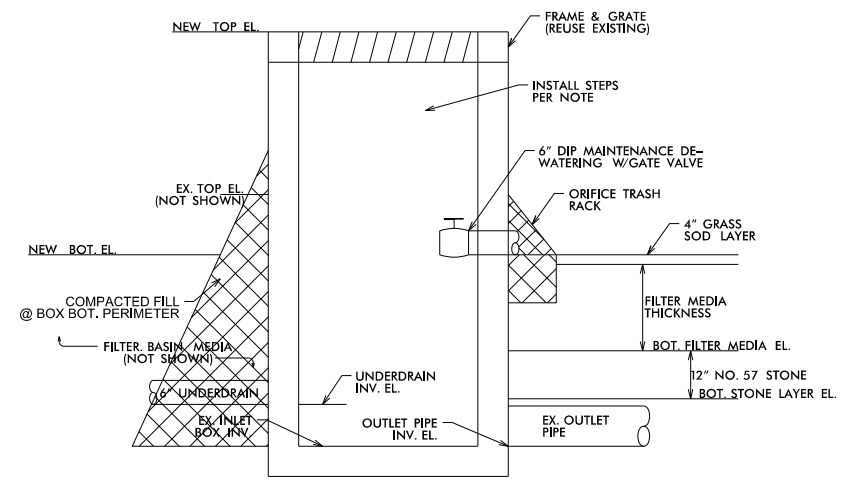
### BMP DETAILS 2



TYPICAL SECTION - FILTER SWALE MEDIA

N.T.S.

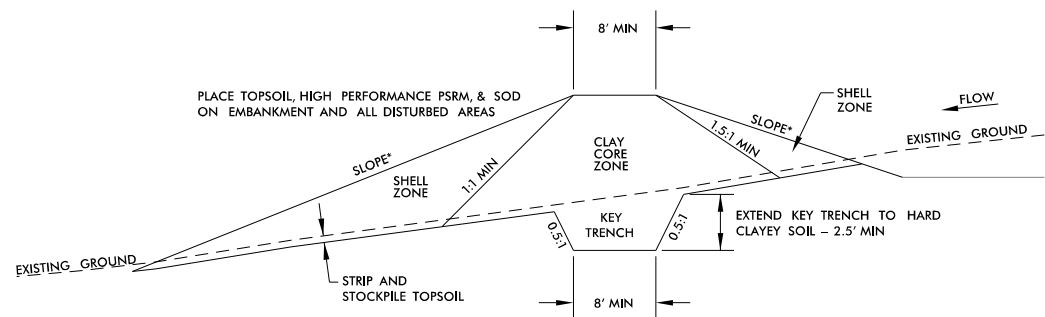
- NOTES:
- SAND TO BE ENGINEERED SOIL MEDIA. SEE SPECIAL PROVISIONS.
  - PROVIDE HIGH PERFORMANCE PSRM BETWEEN SOD AND FILTER MEDIA.
  - FOLLOW MANUFACTURERS INSTRUCTIONS FOR HIGH PERFORMANCE PSRM INSTALLATION AND FOLLOW PROCEDURE FOR "PSRM & SOD INSTALLATION" ON THIS SHEET.



FILTRATION BASIN OUTLET STRUCTURE DETAIL MODIFIED EX. DROP INLET

N.T.S.

- NOTES:
- REMOVE EX. FRAME & GRATE AND REUSE ON EXTENDED INLET.
  - ADJUST EX. INLET PER NCDOT STD. SPECIFICATION 858.
  - 6" DIP MAINTENANCE DEWATERING PIPE SHALL BE AT NEW BASIN BOTTOM EL. 6" GATE VALVE SHALL HAVE NON-RISING STEM.
  - PROVIDE WATER TIGHT CONNECTIONS ON ALL OUTLET STRUCTURE PENETRATIONS.
  - INSTALL STEPS IN EXTENDED INLET PORTION IN ALIGNMENT WITH EX. STEPS (IF PRESENT) IN ACCORDANCE WITH STD. 840.66 AT 12' ON CENTER.
  - FOR UNDERDRAIN, USE SOLID (NON-PERFORATED) PIPE OUTSIDE OF FILTER.
  - EXISTING INLET PIPES TO INLET BOXES (IF PRESENT) ARE NOT SHOWN.
  - SEE FILTER BASIN MEDIA DETAIL SHEET 2-C.

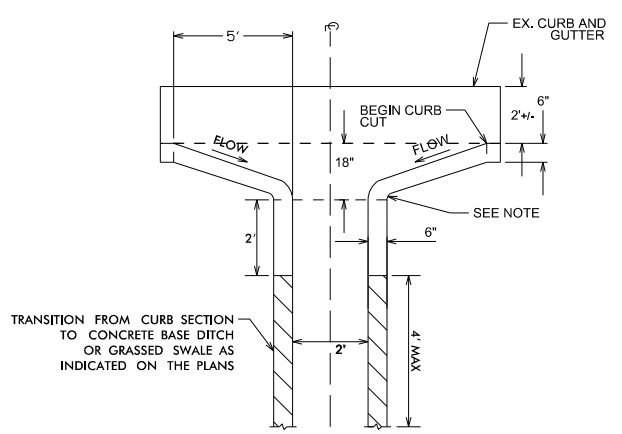


TYPICAL SECTION - FILTER SWALE TRANSITION BERM

N.T.S.

\*SEE PROFILE SHEET 4C FOR SLOPE

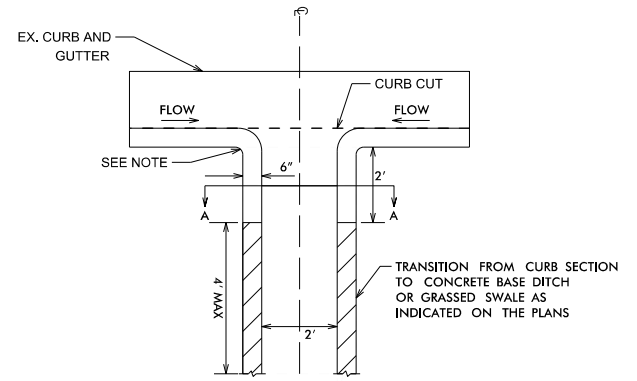
BASIN REF.	STRUCTURE NO.	EX. TOP EL.	NEW TOP EL.	NEW BASIN BOTTOM EL.	BOTTOM FILTER MEDIA EL.	MEDIA FILTER THICKNESS	BOTTOM STONE EL.	UNDERDRAIN INVERT	EX. INLET BOX INVERT	EX. OUTLET PIPE INVERT
NW	120	458.50	459.75	458.50	456.90	15.6"	455.90	455.90	455.80	455.80
NE	126	459.28	460.67	459.00	457.17	18"	456.17	456.17	452.36	452.36
SW	102	461.87	463.82	461.00	459.17	18"	458.17	458.17	456.39	456.39



CURB CUT INLET DETAIL W/TAPER (TYPE 'A')

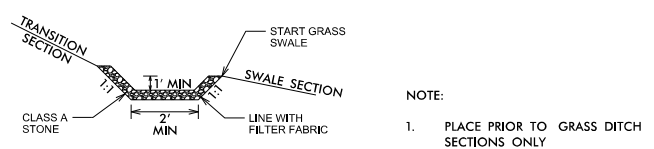
N.T.S.

- NOTES:
- PROVIDE RADIUS ON CURB AS NEEDED FOR SMOOTH, ROUNDED TRANSITION.
  - SEE SCHEDULE FOR MINIMUM SLOPE BEHIND CURB LINE



CURB CUT INLET DETAIL (TYPE 'B')

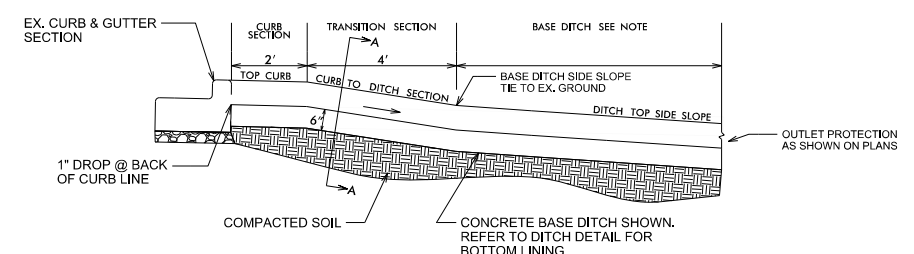
N.T.S.



RIPRAP TROUGH

N.T.S.

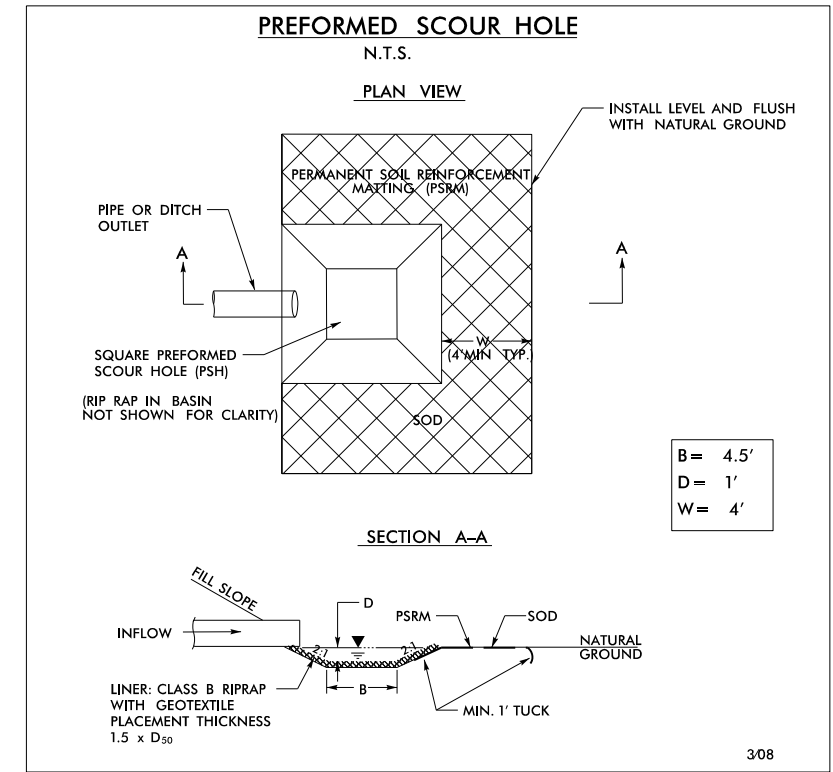
- NOTE:
- PLACE PRIOR TO GRASS DITCH SECTIONS ONLY



CURB CUT TO BASE DITCH

N.T.S.

- NOTES:
- PROVIDE RIPRAP TROUGH PRIOR TO GRASS DITCH SECTIONS ONLY.
  - SEE SCHEDULE FOR MINIMUM SLOPE BEHIND CURB LINE.



PREFORMED SCOUR HOLE

N.T.S.

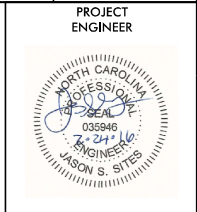
- INSTALL LEVEL AND FLUSH WITH NATURAL GROUND
- PERMANENT SOIL REINFORCEMENT MATTING (PSRM)
- PIPE OR DITCH OUTLET
- SQUARE PREFORMED SCOUR HOLE (PSH)
- (RIP RAP IN BASIN NOT SHOWN FOR CLARITY)
- SOD
- SECTION A-A
- INFLOW
- FILL SLOPE
- PSRM
- SOD
- NATURAL GROUND
- MIN. 1' TUCK
- LINER: CLASS B RIPRAP WITH GEOTEXTILE PLACEMENT THICKNESS 1.5 x D<sub>50</sub>
- B = 4.5'
- D = 1'
- W = 4'

MIN. SLOPE BEHIND CURB LINE

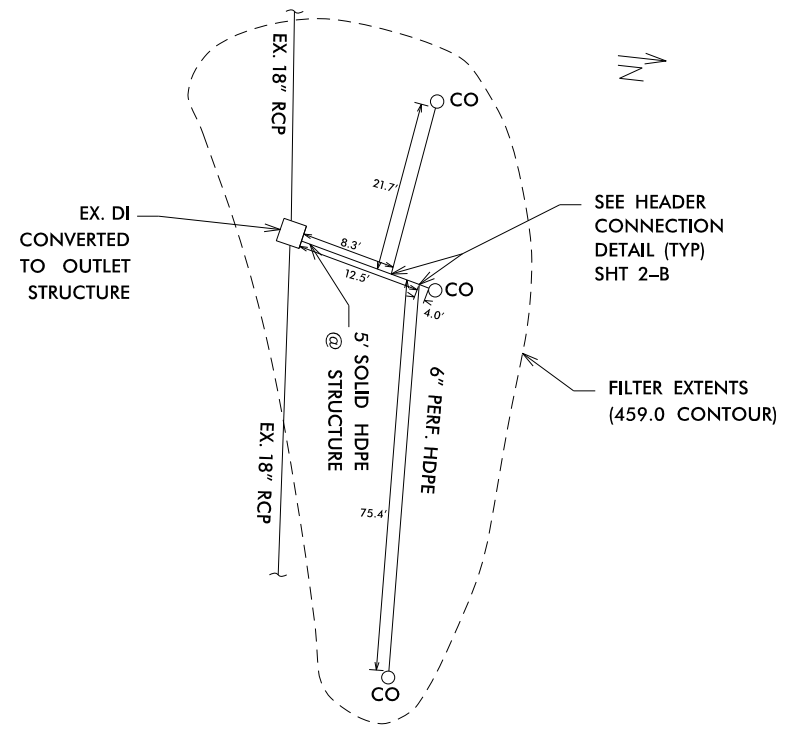
BASIN REF.	MIN. SLOPE
NW	6.5%
NE	5.0%
SW	1.0%
SE	7.0%

- PSRM & SOD INSTALLATION SEQUENCE:
- SCARIFY GROUND
  - LAY PSRM
  - FEATHER TOPSOIL OVER PSRM TO FILL VOIDS
  - LAY SOD & ANCHOR WITH WOOD STAKES

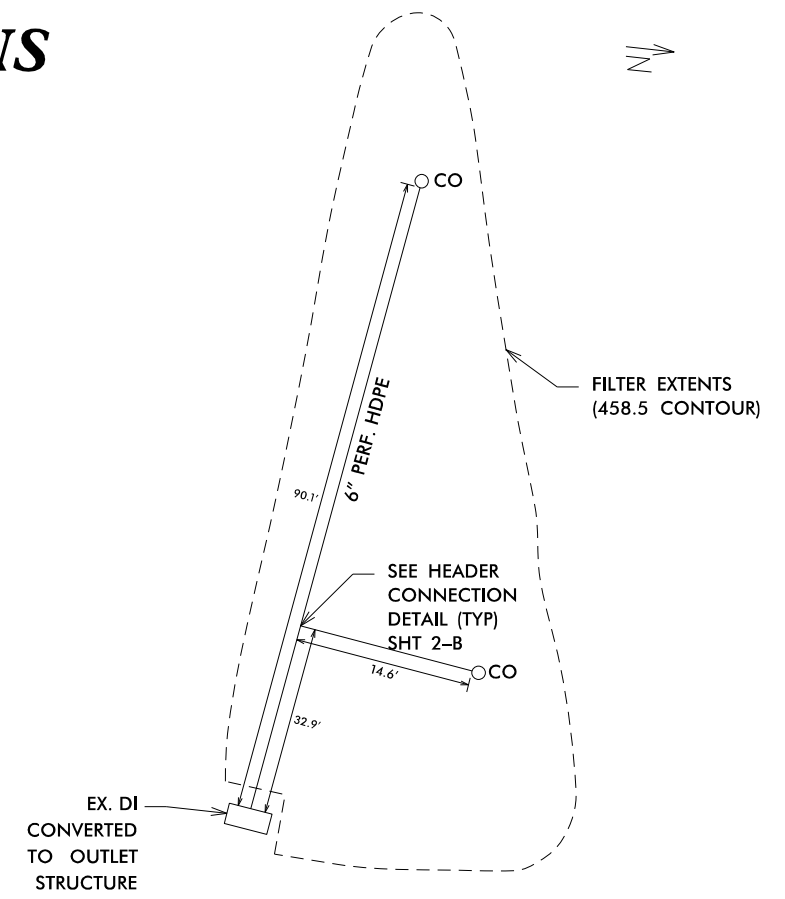
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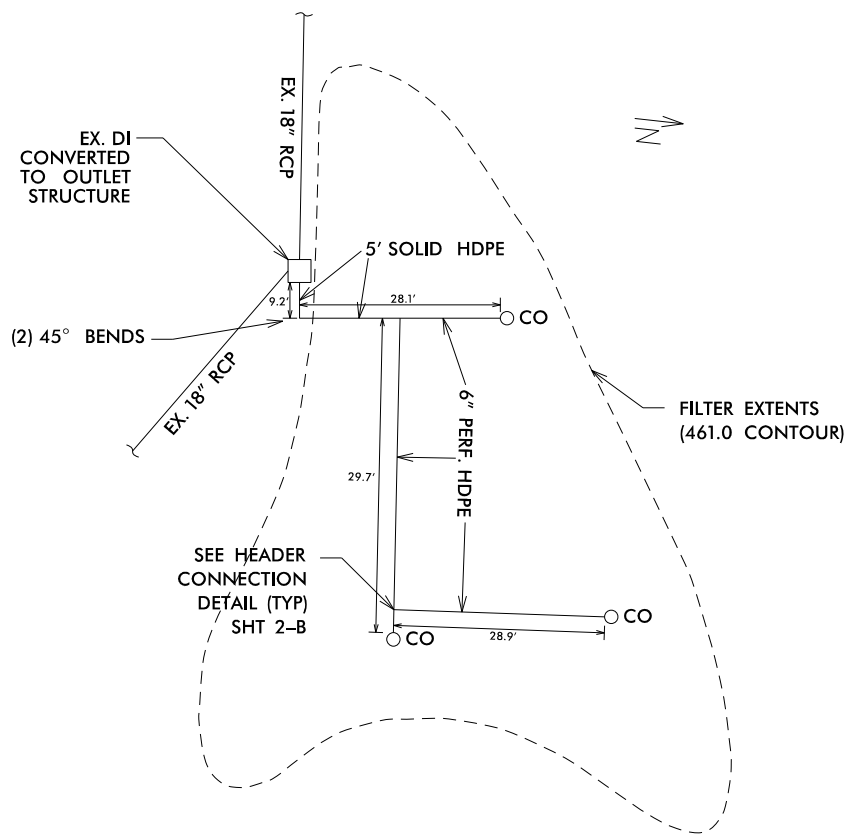
# UNDERDRAINS



**NE FILTER UNDERDRAIN DETAIL**  
N.T.S



**NW FILTER UNDERDRAIN DETAIL**  
N.T.S



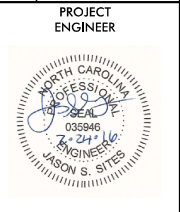
**SW FILTER UNDERDRAIN DETAIL**  
N.T.S

- NOTES:
1. NO FILTER MEDIA WILL BE PLACED UNDER PREFORMED SCOUR HOLE (NOT SHOWN)
  2. USE ONLY SOLID HDPE PIPE OUTSIDE OF FILTER MEDIA EXTENTS.

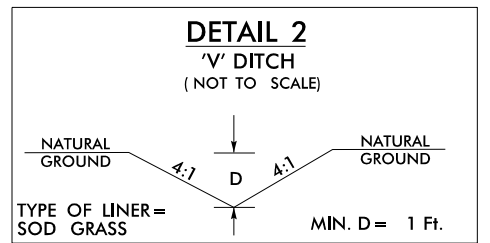
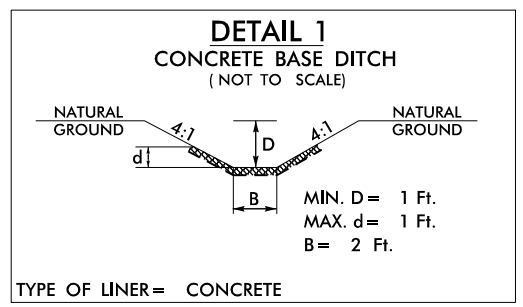
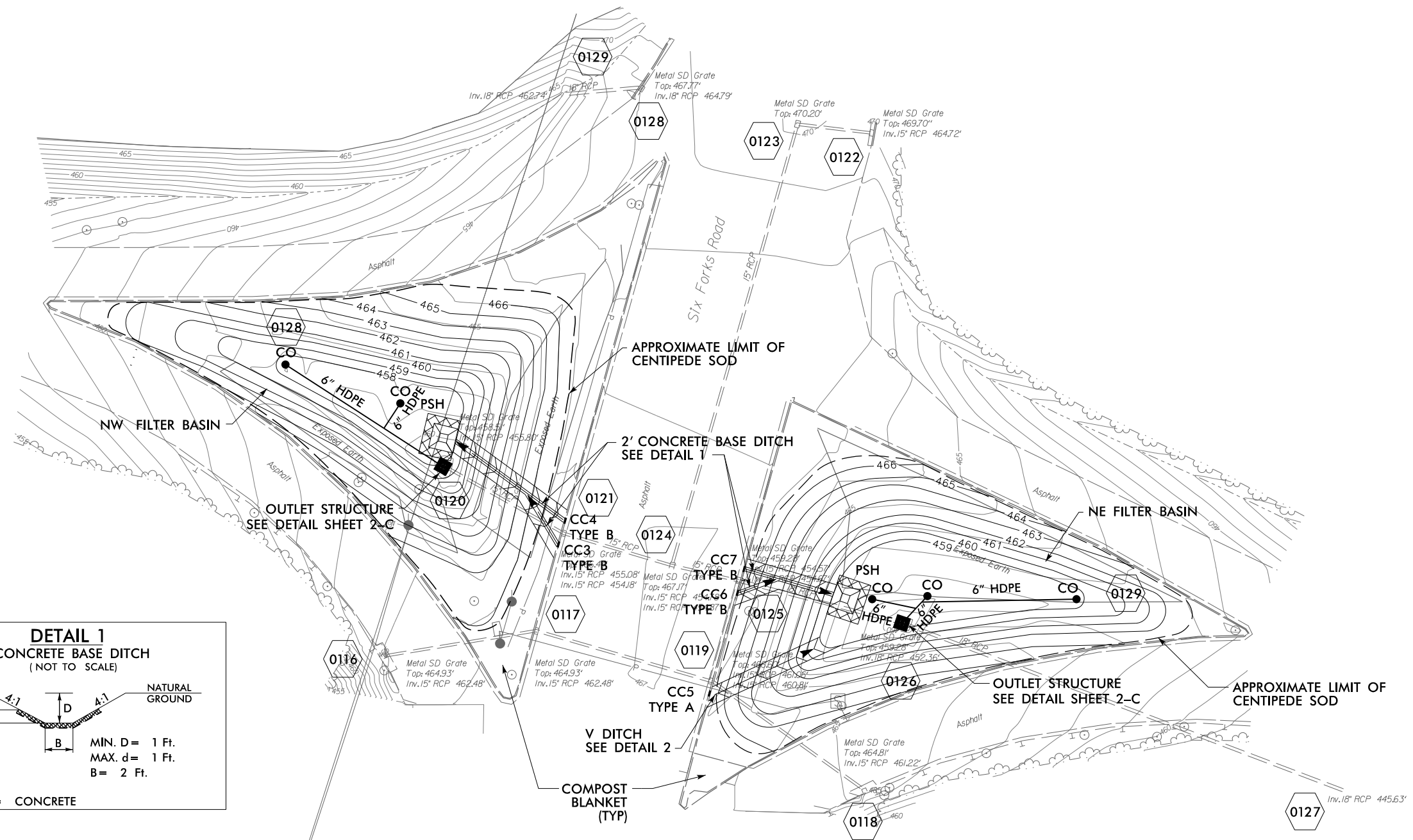
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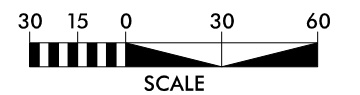




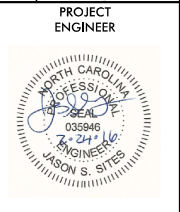
# NORTH BMPS



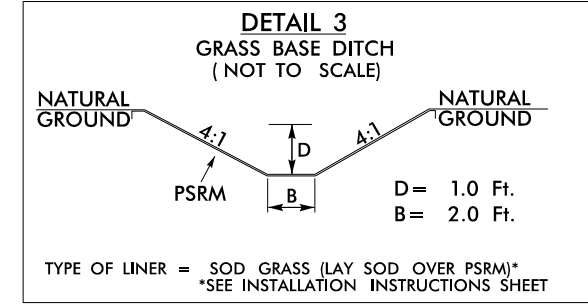
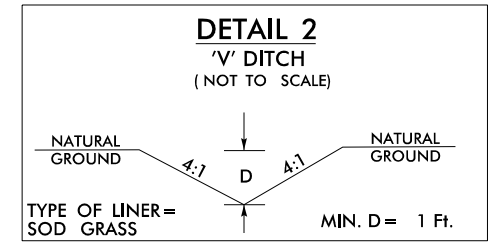
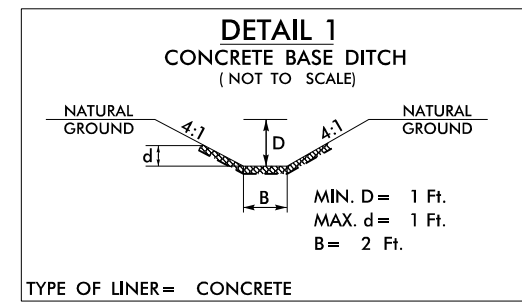
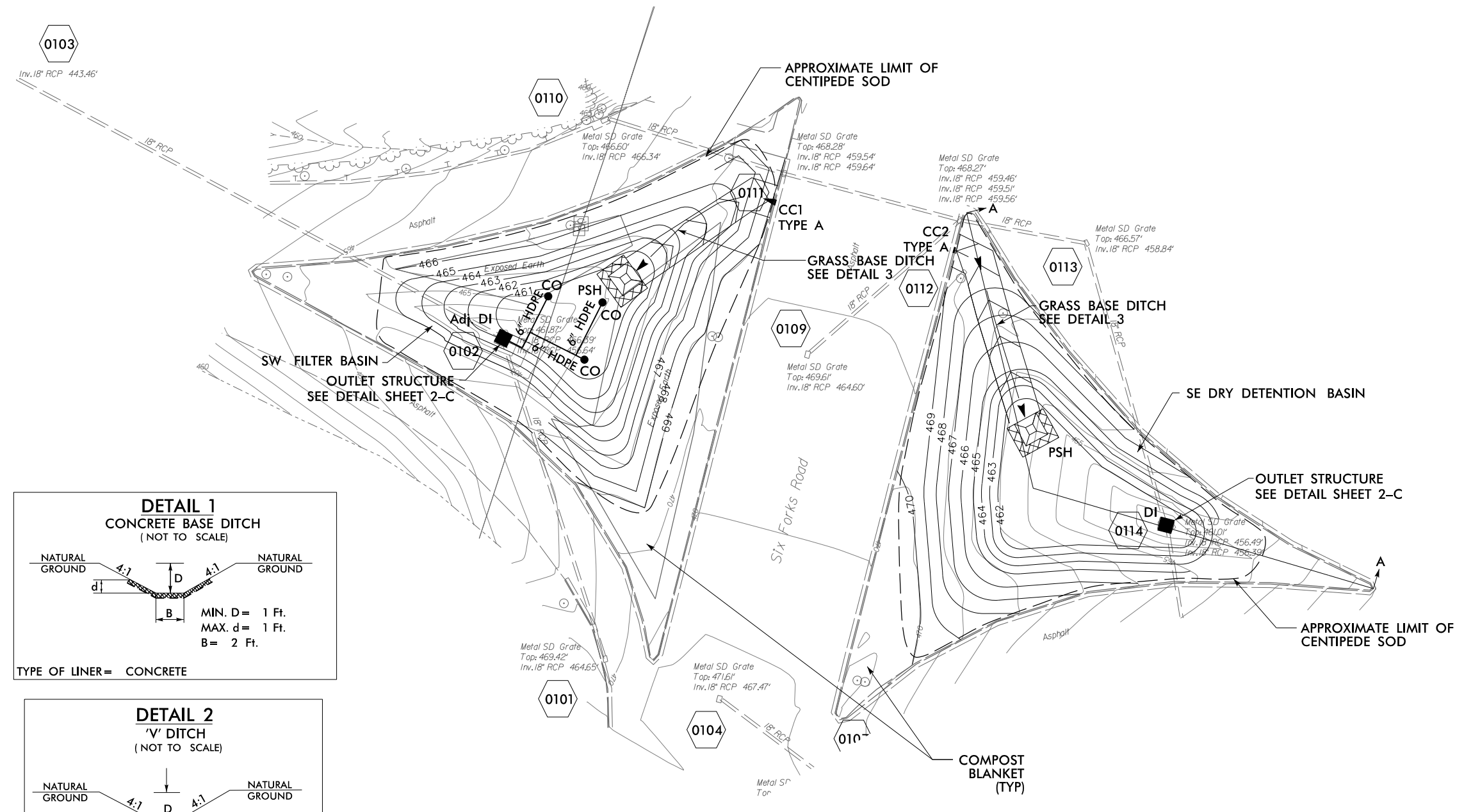
- NOTES:**
- SEE SHEET 2-C FOR CURB CUT DETAILS
  - SEE SHEET 2-D FOR UNDERDRAIN LAYOUT
  - SEE SHEET 2-B FOR FILTER BASIN DETAILS
  - SOD WILL BE PLACED ON ALL RE-GRADED SURFACES (EXTENT OF PROPOSED CONTOURS) UNLESS OTHERWISE NOTED
  - USE COMPOST BLANKET ON ALL SURFACES IN QUADRANT OUTSIDE OF LIMIT OF SOD.



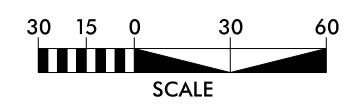
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# SOUTH BMPS

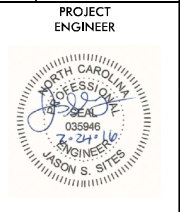


- NOTES:**
1. SEE SHEET 2-C FOR CURB CUT DETAILS
  2. SEE SHEET 2-D FOR UNDERDRAIN LAYOUT
  3. SEE SHEET 2-B FOR FILTER BASIN DETAILS
  4. SOD WILL BE PLACED ON ALL RE-GRADED SURFACES (EXTENT OF PROPOSED CONTOURS) UNLESS OTHERWISE NOTED
  5. USE COMPOST BLANKET ON ALL SURFACES IN QUADRANT OUTSIDE OF LIMIT OF SOD.

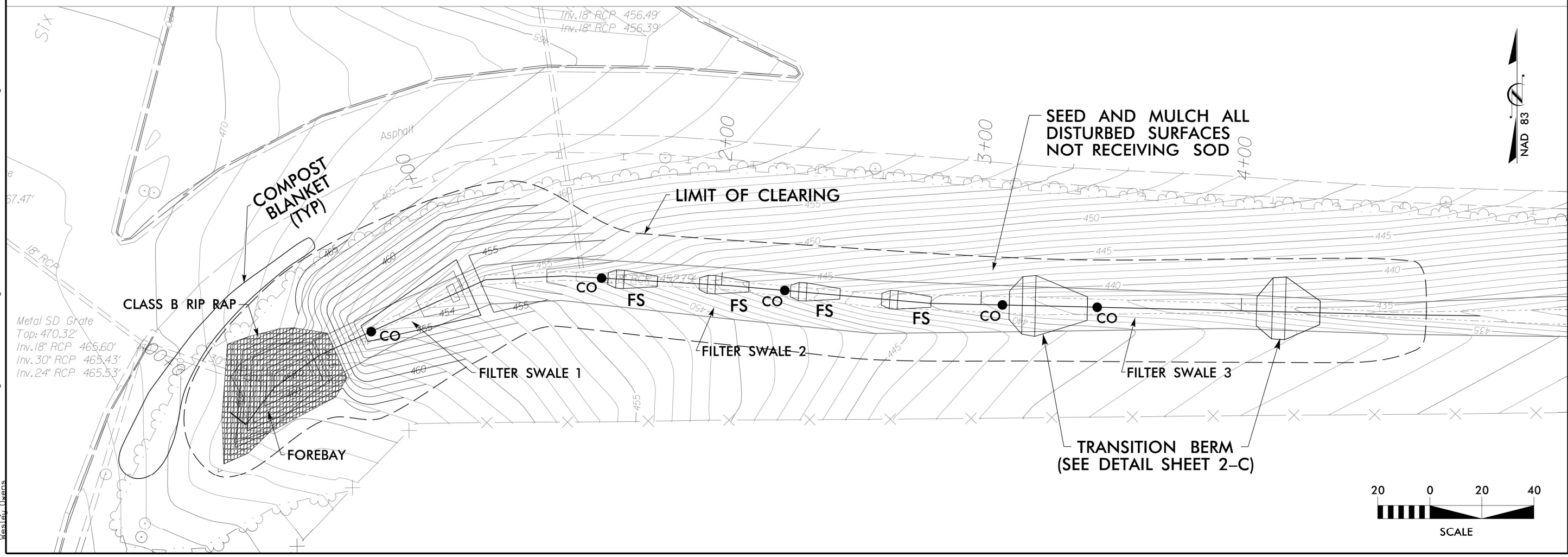
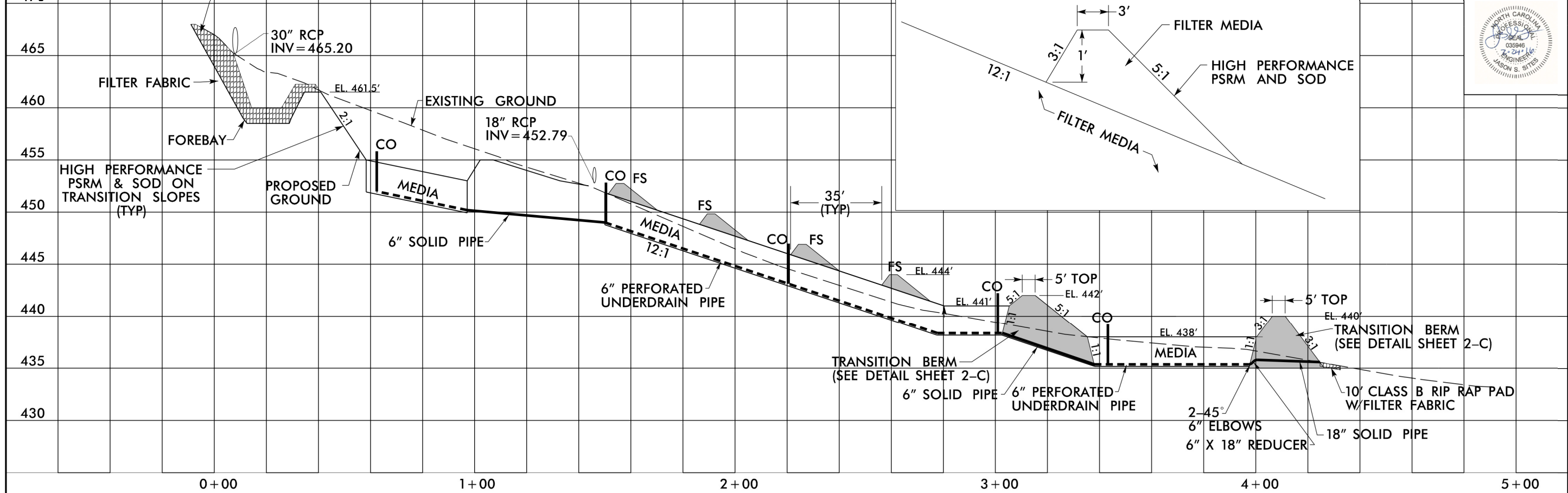


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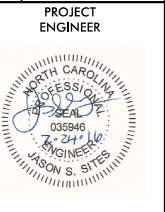


# FILTER SWALE



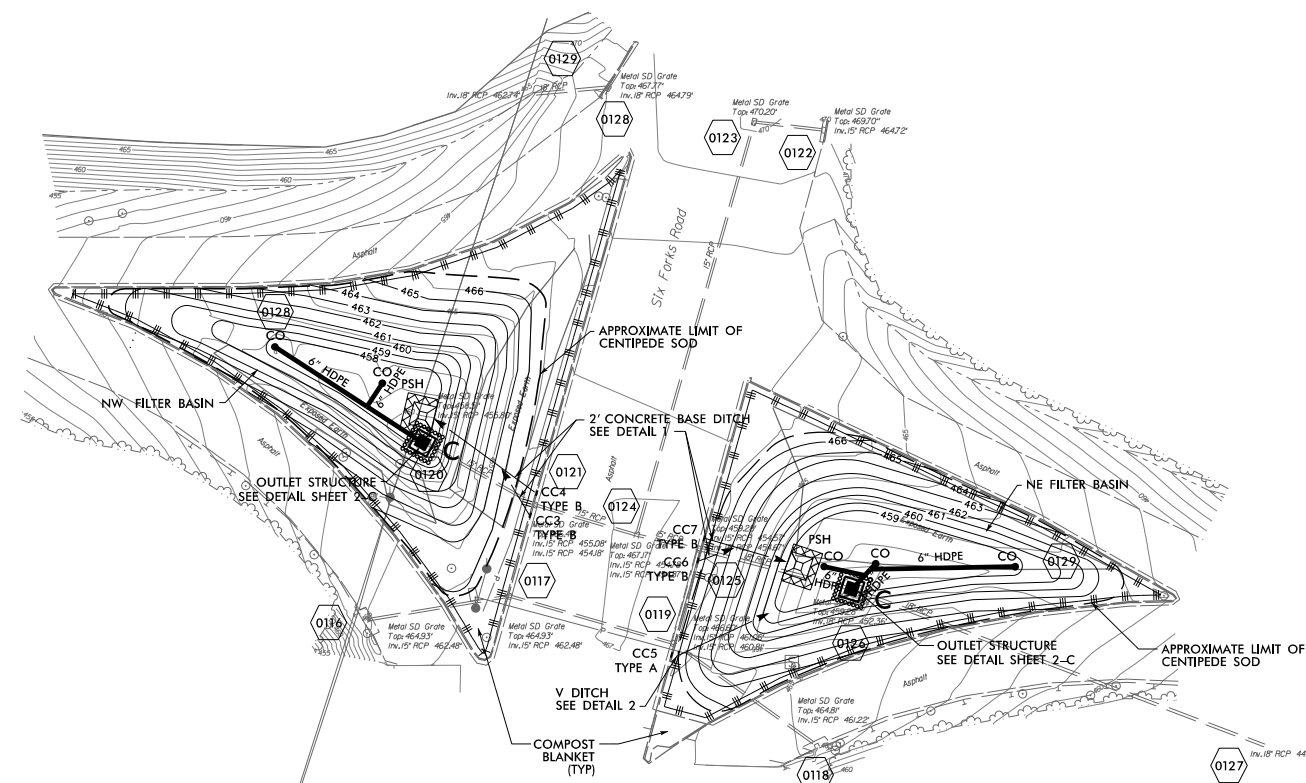
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# EROSION CONTROL PLAN



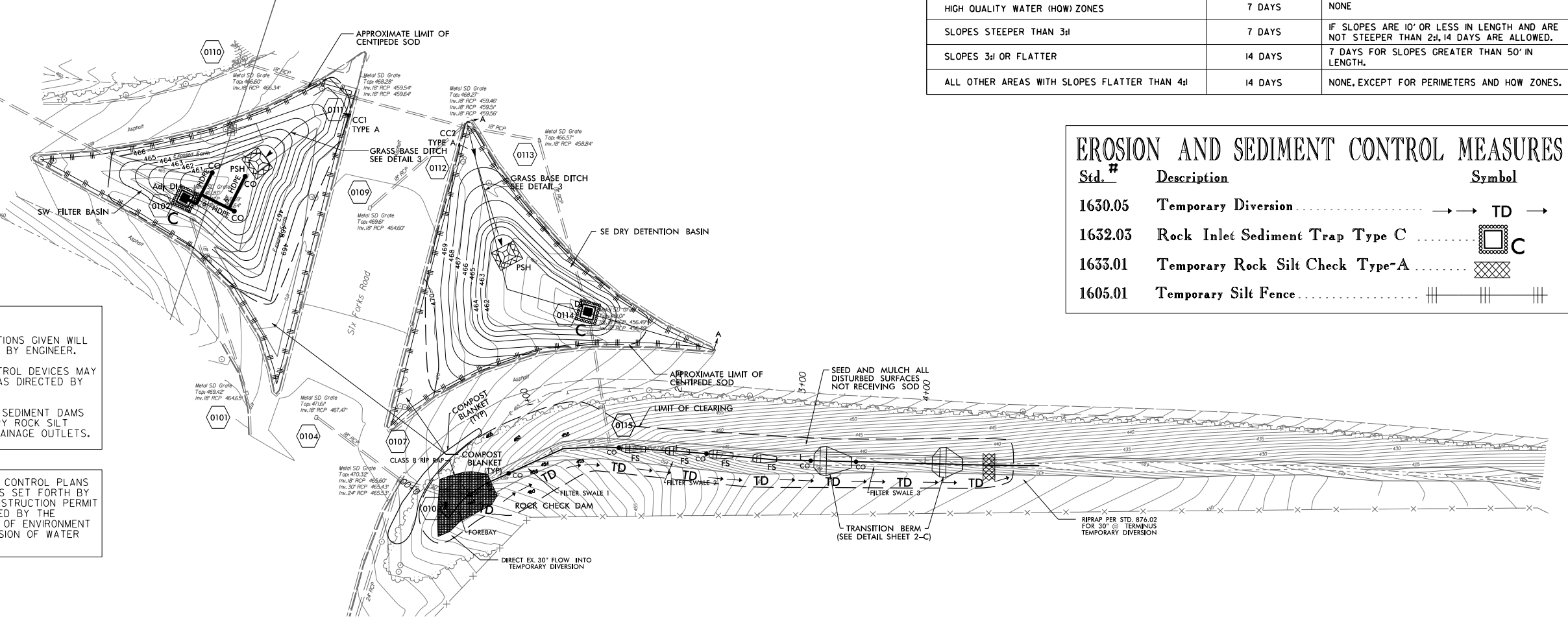
SEEDING SCHEDULE SHOULDERS, SIDE DITCHES, SLOPES (MAX. 3:1)

DATE	TYPE	PLANTING RATE
AUG 15-NOV 1	TALL FESCUE	300 LBS/ACRE
NOV 1-MAR 1	TALL FESCUE AND ABRUZZIRYE	300 LBS/ACRE
MAR 1-APR 15	TALL FESCUE	300 LBS/ACRE
APR 15-JUNE 20	HULLED COMMON BERMUDAGRASS	25 LBS/ACRE
JUNE 30-AUG 15	TALL FESCUE AND •••BROWNTOP MILLET •••OR SORGHUM-SUDAN HYBRIDS	35 LBS/ACRE
SLOPES (3:1 TO 2:1)		
DATE	TYPE	PLANTING RATE
MAR 1-JUN 1	SERICEA LESPEDEZA (SCARIFIED) AND	50 LBS/ACRE
MAR 1-APR 15	ADD TALL FESCUE	120 LBS/ACRE
MAR 1-JUNE 30	ADD WEEPING LOVEGRASS OR	10 LBS/ACRE
MAR 1-JUNE 30	ADD HULLED COMMON BERMUDAGRASS	25 LBS/ACRE
JUNE 1-SEP 1	•••TALL FESCUE AND •••BROWNTOP MILLET •••OR SORGHUM-SUDAN HYBRIDS	35 LBS/ACRE
SEP 1-MAR 1	SERICEA LESPEDEZA (UNHULLED-UNSCARIFIED) AND TALL FESCUE	70 LBS/ACRE
NOV 1-MAR 1	ADD ABRUZZIRYE	120 LBS/ACRE
CONSULT EROSION CONTROL ENGINEER OR SOIL CONSERVATION SERVICE FOR ADDITIONAL INFORMATION CONCERNING OTHER ALTERNATIVES FOR VEGETATION OF DENUDEED AREAS. THE ABOVE VEGETATION RATES ARE THOSE WHICH DO WELL UNDER LOCAL CONDITIONS; OTHER SEEDING RATES COMBINATIONS ARE POSSIBLE.		
•••TEMPORARY-RESEED ACCORDING TO OPTIMUM SEASON FOR DESIRED PERMANENT VEGETATION. DO NOT ALLOW TEMPORARY COVER TO GROW OVER 12 INCHES IN HEIGHT BEFORE MOWING, OTHERWISE FESCUE MAY BE SHADED OUT.		



## SOIL STABILIZATION TIMEFRAMES

SITE DESCRIPTION	STABILIZATION TIME	TIMEFRAME EXCEPTIONS
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HOW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED.
SLOPES 3:1 OR FLATTER	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH.
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	NONE, EXCEPT FOR PERIMETERS AND HOW ZONES.



NOTES:

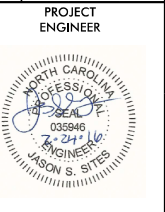
- ANY DEVIATION FROM OPTIONS GIVEN WILL REQUIRE PRIOR APPROVAL BY ENGINEER.
- ADDITIONAL EROSION CONTROL DEVICES MAY NEED TO BE INSTALLED AS DIRECTED BY ENGINEER.
- PLACE TEMPORARY ROCK SEDIMENT DAMS TYPE - B AND TEMPORARY ROCK SILT CHECKS TYPE - A AT DRAINAGE OUTLETS.

THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE REGULATIONS SET FORTH BY THE NCG-010000 GENERAL CONSTRUCTION PERMIT EFFECTIVE AUGUST 3, 2011 ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES DIVISION OF WATER QUALITY.

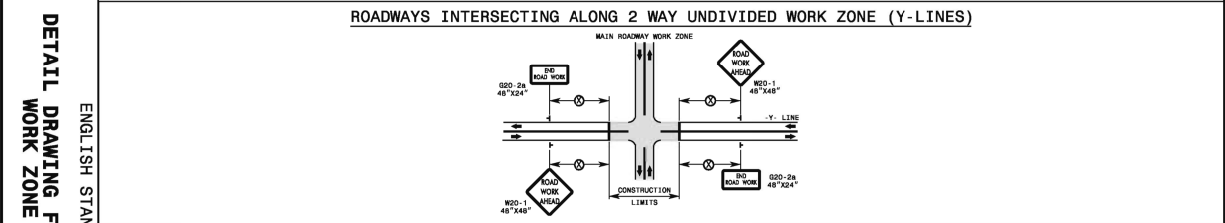
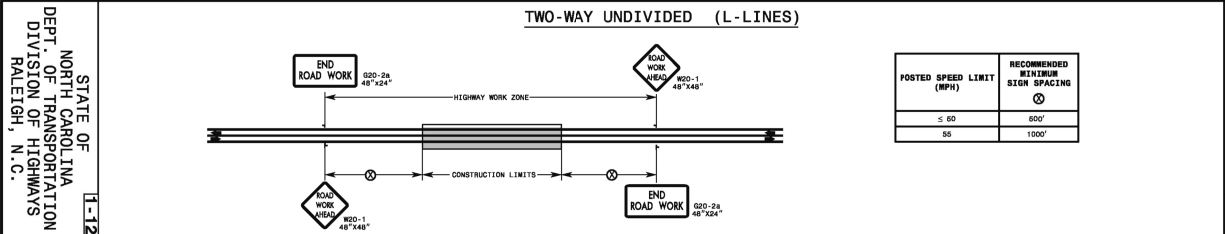
## EROSION AND SEDIMENT CONTROL MEASURES

Std. #	Description	Symbol
1630.05	Temporary Diversion	→ TD →
1632.03	Rock Inlet Sediment Trap Type C	□ C
1633.01	Temporary Rock Silt Check Type-A	▨
1605.01	Temporary Silt Fence	

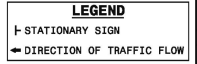
RIPRAP PER STD. 876.02 FOR 30" @ TERMINUS TEMPORARY DIVERSION



# TRAFFIC CONTROL PLAN

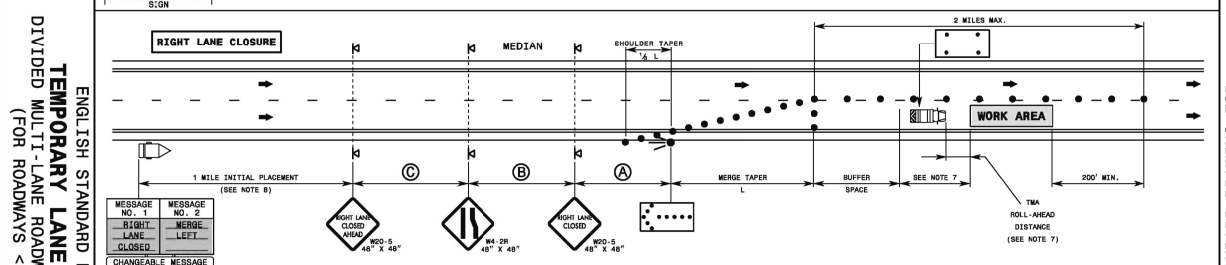
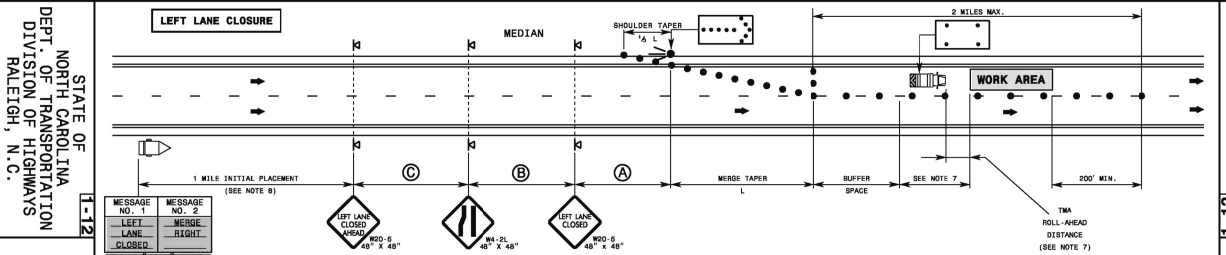


- GENERAL NOTES**
- USE FLUORESCENT ORANGE SHEETING (TYPE VII OR HIGHER) ON ALL ADVANCED WORK ZONE SIGNS, UNLESS COVERED.
  - DO NOT INSTALL ADVANCE WARNING SIGNS MORE THAN 3 DAYS PRIOR TO BEGINNING OF WORK, UNLESS COVERED.
  - SIGNS SHOWN ARE REQUIRED FOR WORK ZONES THAT WILL REMAIN IN EFFECT OVERNIGHT. FOR SHORT-TERM DAILY MAINTENANCE TYPE OPERATIONS, THIS SIGNING APPLICATION IS OPTIONAL; MAY USE ONLY APPLICABLE ROADWAY STANDARD DRAWINGS INSTEAD. HOWEVER, IF THIS SIGNING APPLICATION IS USED, SIGNS MAY BE PORTABLE MOUNTED.
  - ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE, FIELD ADJUST AS NECESSARY OR AS DIRECTED.
  - USE 3LB STEEL U-CHANNEL POST OR 4" X 4" WOOD POST FOR ALL WORK ZONE SIGNS. 3LB STEEL U-CHANNEL POSTS MUST MEET THE REQUIREMENTS OF STANDARD SPECIFICATION SECTION 1094-1 (B), MAY BE GALVANIZED STEEL, OR MAY BE PAINTED GREEN BY THE POST MANUFACTURER. SQUARE STEEL TUBING POSTS HAVING EQUIVALENT STRENGTH OF THE 3 LB STEEL U-CHANNEL POST ARE ALSO ACCEPTABLE FOR USE. ERECT SIGNS PER ROADWAY STANDARD DRAWING 1110.01. PAYMENT FOR WOOD POSTS, 3LB STEEL U-CHANNEL AND SQUARE STEEL TUBING POSTS WITH SIGNS WILL BE MADE ACCORDING TO STANDARD SPECIFICATION "WORK ZONE SIGNS" SECTION 1110.
  - WHEN NECESSARY, USE SPLICING IN ACCORDANCE WITH ROADWAY STANDARD DRAWING NO. 1110.01.
  - DO NOT BACK BRACE SIGN SUPPORTS.

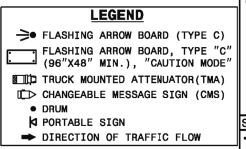


SHEET 3 OF 3  
1101.01

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.  
ENGLISH STANDARD DRAWING FOR  
**DETAIL DRAWING FOR TWO-WAY UNDIVIDED WORK ZONE WARNING SIGNS**  
SHEET 3 OF 3  
1101.01

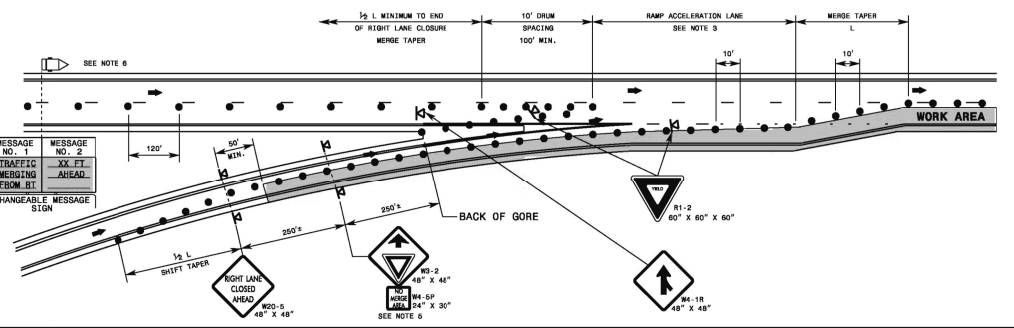
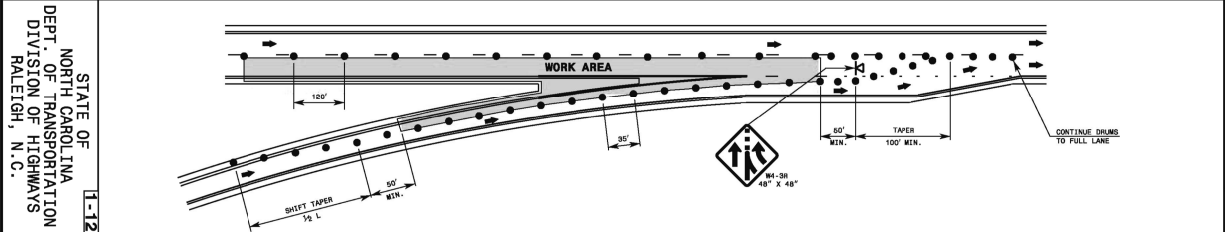


- GENERAL NOTES**
- IF NECESSARY USE THIS STD. FOR ONE-WAY CITY TYPE STREETS WHERE SIGNS MAY BE MOUNTED ON BOTH SIDES OF THE ROADWAY.
  - PLACE ARROW BOARDS ON THE SHOULDER (PAVED OR UNPAVED). PLACE ARROW BOARDS WITHIN THE TAPER IF SHOULDERS DO NOT EXIST. MEET THE REQUIREMENTS FOR STOPPING SIGHT DISTANCE AT THE ARROW BOARD LOCATION. IF NEEDED, EXTEND LANE CLOSURES AT THE BUFFER SPACE, SUCH THAT STOPPING SIGHT DISTANCE TO THE ARROW BOARD IS MET.
  - PLACE DRUMS IN TAPERS AT THE MAXIMUM SPACING EQUAL IN FEET TO THE POSTED SPEED LIMIT. PLACE DRUMS ALONG THE WORK AREA AT THE MAXIMUM SPACING EQUAL IN FEET TO 2 TIMES THE POSTED SPEED LIMIT.
  - REFER TO STD. 1101.11 FOR "L" DISTANCE, SIGN SPACING, AND BUFFER SPACE.
  - REFER TO STD. 1101.02 SHEETS 9 AND 10 FOR TREATMENT OF LANE CLOSURES THRU INTERCHANGES.
  - INSTALL LANE CLOSURES WITH THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE UPSTREAM SIDE OF TRAFFIC. REMOVE LANE CLOSURES AGAINST THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE DOWNSTREAM SIDE OF TRAFFIC.
  - POSITION THE TMA TO MAINTAIN A ROLL-AHEAD DISTANCE AS RECOMMENDED BY THE MANUFACTURER AND CONTINUOUSLY ADVANCE TMA'S AS WORK PROGRESSES.
  - PLACE CHANGEABLE MESSAGE SIGN (CMS) ON THE OUTSIDE OF THE TRAVELWAY AS DIRECTED BY THE ENGINEER. PLACE CMS APPROXIMATELY 1 MILE IN ADVANCE OF THE W4-5 SIGNS. IF TRAFFIC BACKS UP TO WHERE THE CMS IS INITIALLY PLACED, RELOCATE CMS 1/2 MILE IN ADVANCE OF ANTICIPATED BACKUP. CONTINUE TO MONITOR TRAFFIC, MOVE CMS APPROXIMATELY 1/2 MILE IN ADVANCE OF ANTICIPATED BACKUP.
  - DO NOT EXCEED A 2 MILE LANE CLOSURE LENGTH UNLESS OTHERWISE SHOWN IN THE TMP OR AS DIRECTED BY THE ENGINEER.

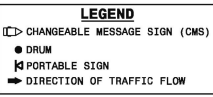


SHEET 3 OF 15  
1101.02

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.  
ENGLISH STANDARD DRAWING FOR  
**TEMPORARY LANE CLOSURES DIVIDED MULTI-LANE ROADWAY - 1 LANE CLOSED (FOR ROADWAYS < 60 MPH)**  
SHEET 3 OF 15  
1101.02

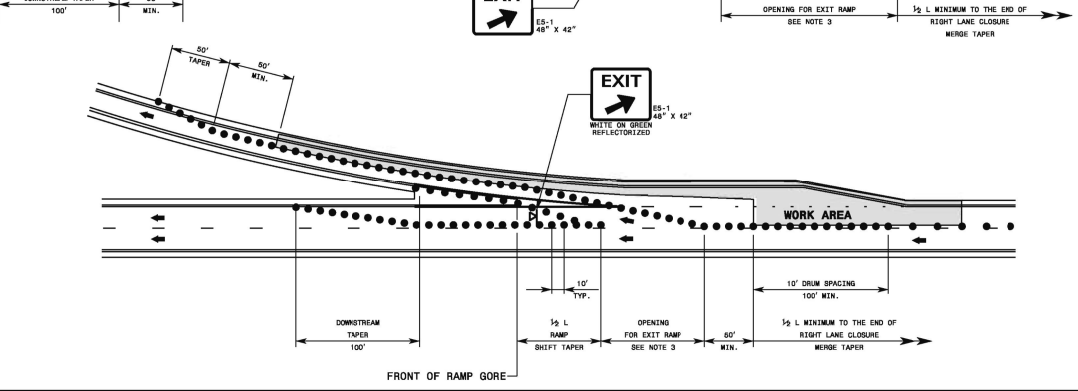
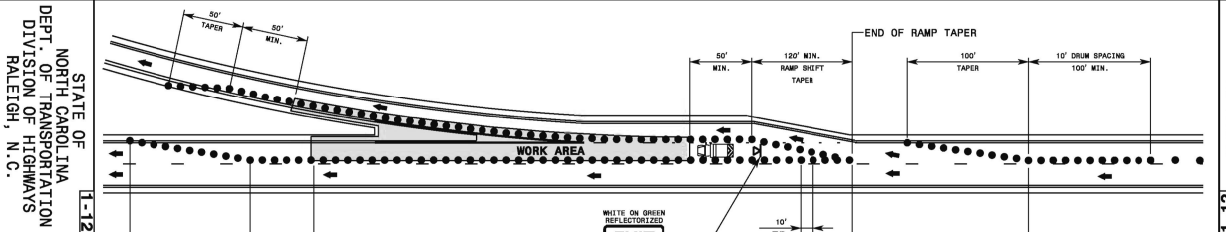


- GENERAL NOTES**
- USE THE ABOVE DETAILS IN CONJUNCTION WITH A RIGHT LANE CLOSURE AS SHOWN ON ROADWAY STD. 1101.02 SHEET 3.
  - MOUNT SIGNS SHOWN A MINIMUM OF 5 FEET ABOVE THE PAVEMENT ELEVATION.
  - IF EXISTING ACCELERATION DISTANCE OR A MINIMUM OF 400' ACCELERATION DISTANCE CANNOT BE PROVIDED, CLOSE RAMP AS DIRECTED BY THE ENGINEER.
  - CLOSE THE RIGHT LANE SUFFICIENTLY IN ADVANCE TO STABILIZE MOTOR VEHICLE TRAFFIC FLOW BEFORE THE MERGE AS SHOWN ON STD. 1101.02 SHEET 3.
  - INSTALL W4-5P BELOW THE YIELD AHEAD SIGN (AS SHOWN) TO ALERT MOTORISTS IF THE ACCELERATION DISTANCE HAS BEEN REDUCED.
  - COORDINATE WITH THE ENGINEER FOR LOCATION OF CMS.

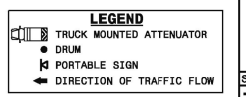


SHEET 9 OF 15  
1101.02

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.  
ENGLISH STANDARD DRAWING FOR  
**TEMPORARY LANE CLOSURES RIGHT LANE CLOSURES THRU ENTRANCE RAMP**  
SHEET 9 OF 15  
1101.02



- GENERAL NOTES**
- USE THE ABOVE DETAILS IN CONJUNCTION WITH A RIGHT LANE CLOSURE AS SHOWN ON STD. 1101.02 SHEET 3.
  - MOUNT EXIT SIGNS A MINIMUM OF 5 FEET ABOVE THE PAVEMENT ELEVATION.
  - USE EXISTING RAMP OPENING LENGTH, BUT NO LESS THAN 1/2 ORIGINAL LENGTH. CONSIDER CLOSING RAMP IF 1/2 ORIGINAL LENGTH CANNOT BE OBTAINED, AS DIRECTED BY THE ENGINEER.



SHEET 10 OF 15  
1101.02

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.  
ENGLISH STANDARD DRAWING FOR  
**TEMPORARY LANE CLOSURES RIGHT LANE CLOSURES THRU EXIT RAMP**  
SHEET 10 OF 15  
1101.02

See Sheet I-A For Index of Sheets  
See Sheet I-B For Conventional Plan Sheet Symbols

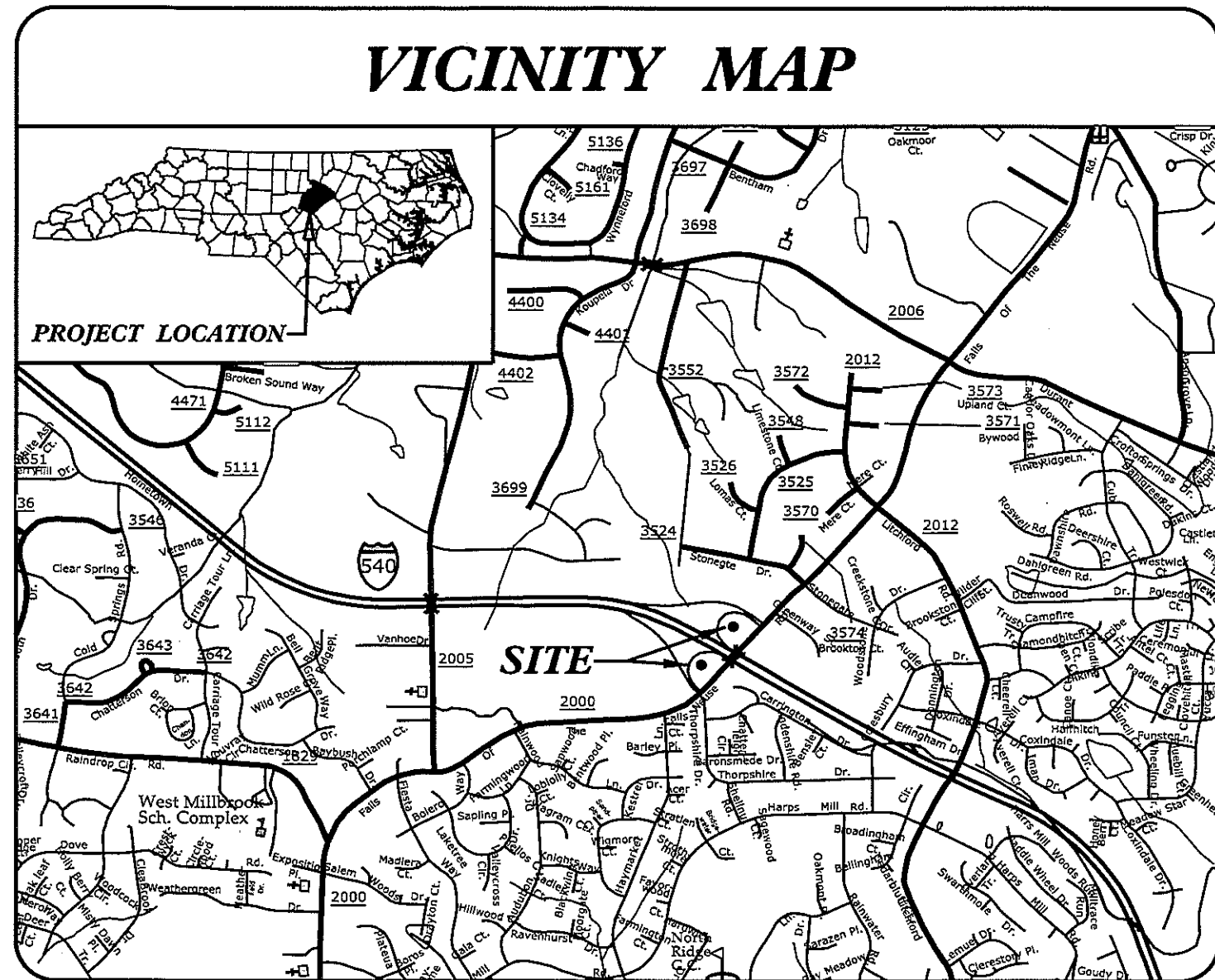
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**WAKE COUNTY**

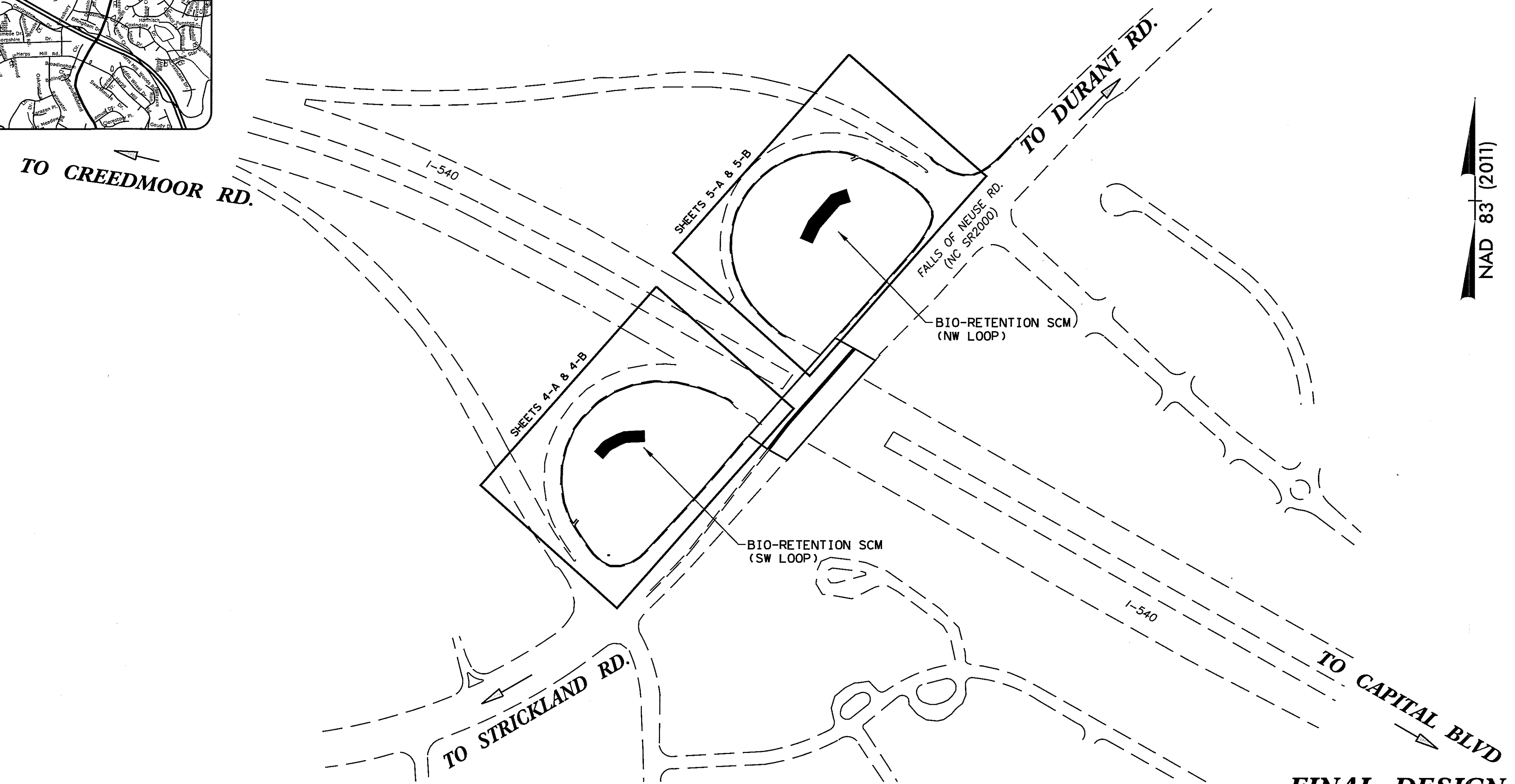
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-4436E1	1	16
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
WBS: 34625.2.56	STPNHP-0540(034)		

TIP PROJECT: R-4436E1

CONTRACT: 34625.2.56

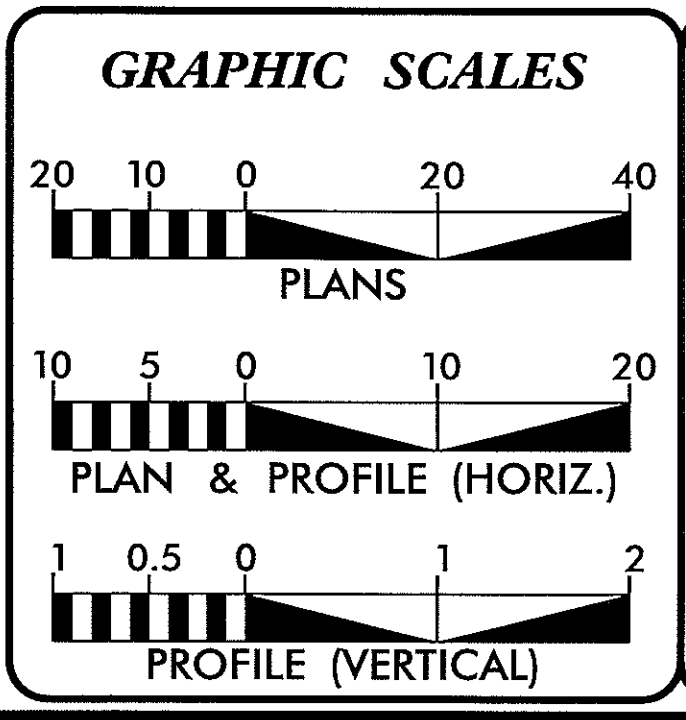


**LOCATION: I-540 AND SR2000 (FALLS OF NEUSE RD) INTERCHANGE**  
**TYPE OF WORK: RETROFIT STORMWATER CONTROL MEASURES (SWALES, AND BIO-RETENTION BASINS) INCLUDING; GRADING, DRAINAGE, RIP RAP PLACEMENT, EROSION CONTROL, UNDERDRAINS, BIO-MEDIA**



NAD 83 (2011)

**FINAL DESIGN PLANS**



**NCDOT CONTACT:**  
BRIAN LIPSCOMB, PE  
HIGHWAY STORMWATER PROGRAM

**REVISION SCHEDULE:**  
30% DESIGN SUBMITTAL 09-30-2015  
90% DESIGN SUBMITTAL 12-16-2015  
FINAL DESIGN SUBMITTAL 2-11-2016

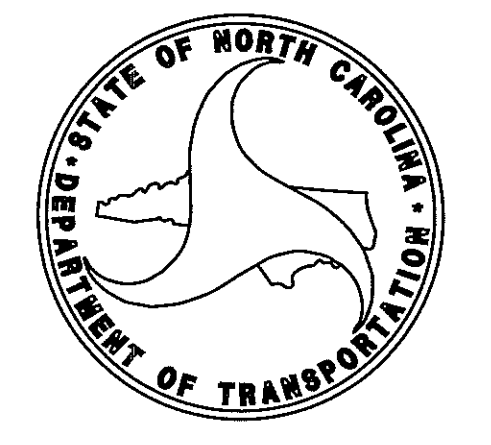
**Draper Aden Associates**  
Engineering • Surveying • Environmental Services  
230 Donaldson Street, Suite 500A  
Fayetteville, NC 28301  
Ph: 910.486.0700 Fax: 910.486.8900  
NC Firm License No. C-0861

2012 STANDARD SPECIFICATIONS  
**LETTING DATE**  
MARCH 23, 2016

**C. HEATH WADSWORTH, PE**  
PROJECT ENGINEER  
**C. HEATH WADSWORTH, PE**  
PROJECT DESIGN ENGINEER

**HYDRAULICS ENGINEER**

**NORTH CAROLINA PROFESSIONAL SEAL 28421**  
C. HEATH WADSWORTH  
2016  
SIGNATURE: *[Signature]* P.E.



\$\$\$\$\$SYTIME\$\$\$\$\$  
\$\$\$\$\$DGN\$\$\$\$\$  
\$\$\$\$\$SERNAME\$\$\$\$\$





STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale

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

BOUNDARIES AND PROPERTY:

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Existing Iron Pin	○ EIP
Property Corner	-----*
Property Monument	□ ECM
Parcel/Sequence Number	⑫
Existing Fence Line	-x-x-x-
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---
Known Soil Contamination: Area or Site	☠
Potential Soil Contamination: Area or Site	?

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:

Standard Gauge	-----
RR Signal Milepost	○ MILEPOST 35
Switch	□ SWITCH
RR Abandoned	-----
RR Dismantled	-----

RIGHT OF WAY:

Baseline Control Point	◆
Existing Right of Way Marker	△
Existing Right of Way Line	-----
Proposed Right of Way Line	○
Proposed Right of Way Line with Iron Pin and Cap Marker	○
Proposed Right of Way Line with Concrete or Granite RW Marker	○
Proposed Control of Access Line with Concrete C/A Marker	○
Existing Control of Access	○
Proposed Control of Access	○
Existing Easement Line	---E---
Proposed Temporary Construction Easement	---E---
Proposed Temporary Drainage Easement	---TDE---
Proposed Permanent Drainage Easement	---PDE---
Proposed Permanent Drainage / Utility Easement	---DUE---
Proposed Permanent Utility Easement	---PUE---
Proposed Temporary Utility Easement	---TUE---
Proposed Aerial Utility Easement	---AUE---
Proposed Permanent Easement with Iron Pin and Cap Marker	◆

ROADS AND RELATED FEATURES:

Existing Edge of Pavement	-----
Existing Curb	-----
Proposed Slope Stakes Cut	---C---
Proposed Slope Stakes Fill	---F---
Proposed Curb Ramp	○ CR
Existing Metal Guardrail	-----
Proposed Guardrail	-----
Existing Cable Guiderail	-----
Proposed Cable Guiderail	-----
Equality Symbol	⊕
Pavement Removal	⊗
Single Tree	⊕
Single Shrub	⊕
Hedge	-----
Woods Line	-----

VEGETATION:

Orchard	⊕
Vineyard	□ Vineyard

EXISTING STRUCTURES:

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

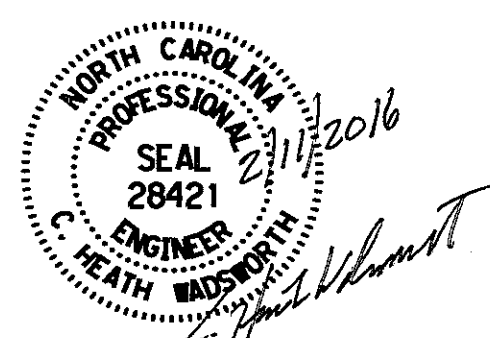
Sanitary Sewer Manhole	⊕
Sanitary Sewer Cleanout	⊕
U/G Sanitary Sewer Line	-----
Above Ground Sanitary Sewer	-----
Recorded SS Forced Main Line	-----
Designated SS Forced Main Line (S.U.E.*)	-----

MISCELLANEOUS:

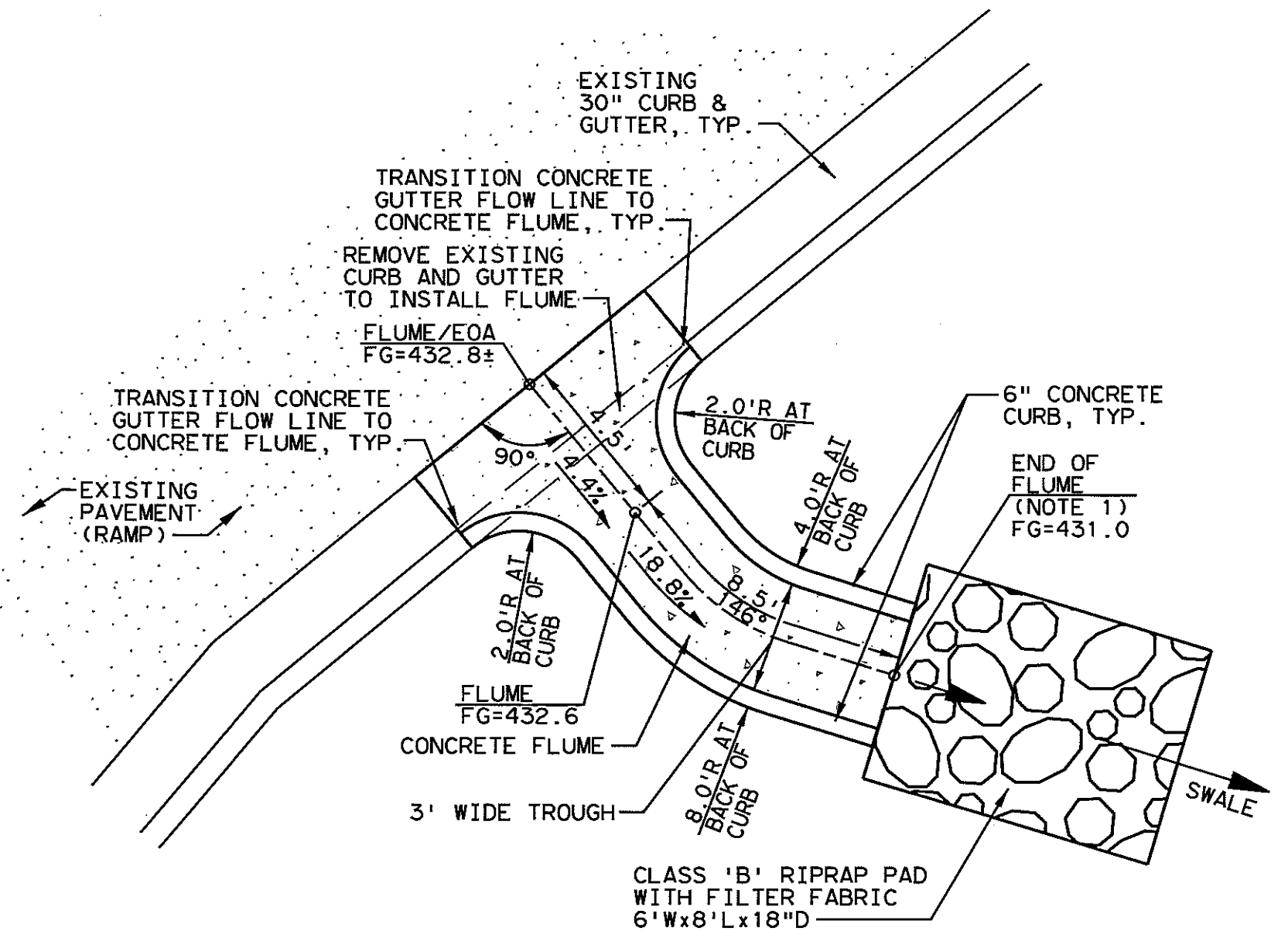
Utility Pole	●
Utility Pole with Base	□
Utility Located Object	○
Utility Traffic Signal Box	⊕
Utility Unknown U/G Line	-----
U/G Tank; Water, Gas, Oil	□
Underground Storage Tank, Approx. Loc.	⊕
A/G Tank; Water, Gas, Oil	□
Geoenvironmental Boring	⊕
U/G Test Hole (S.U.E.*)	⊕
Abandoned According to Utility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



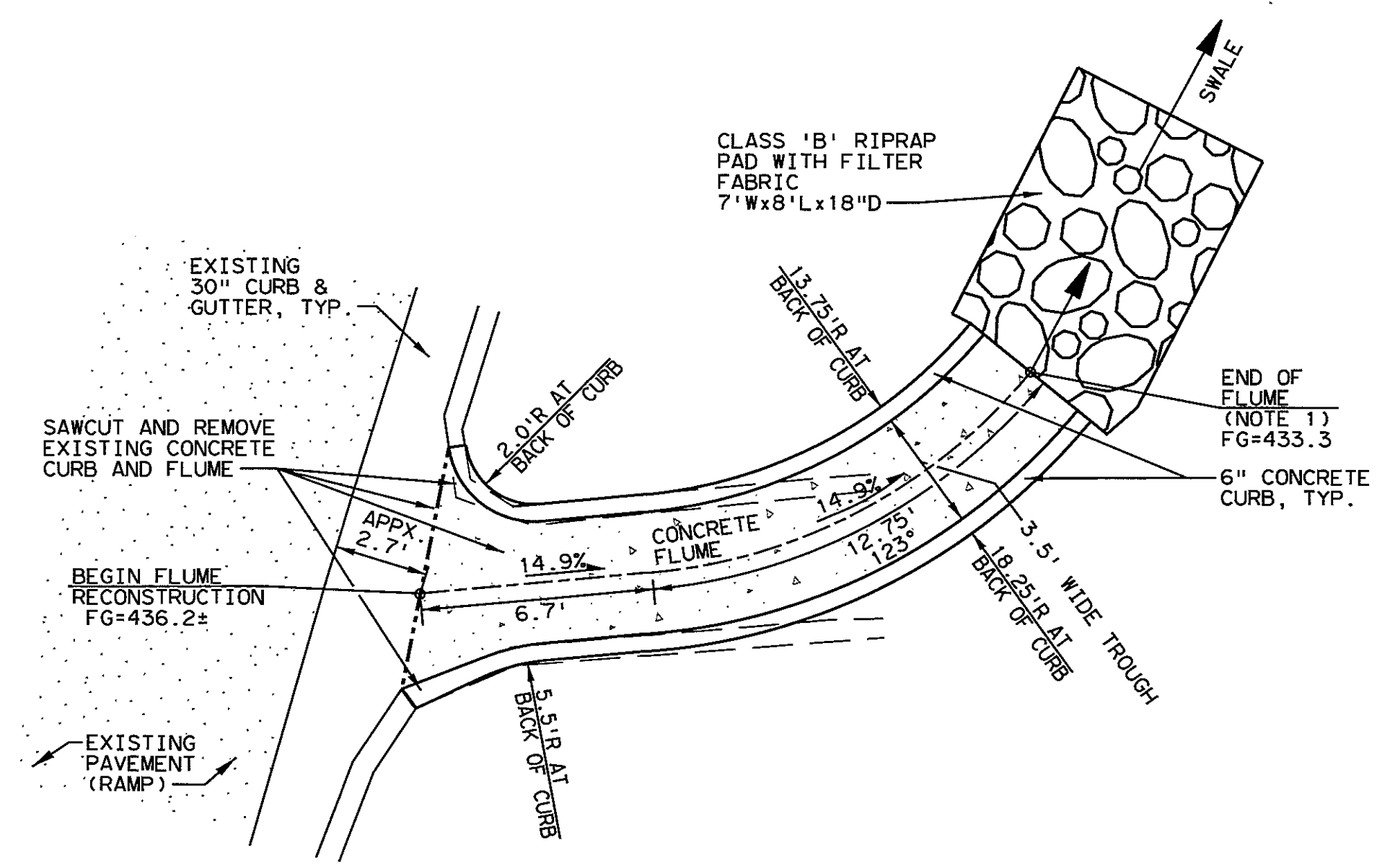
# DETAILS

PROJECT REFERENCE NO. <b>R-4436E1</b>	SHEET NO. <b>2-B</b>
RW SHEET NO.	
HYDRAULICS ENGINEER	
	

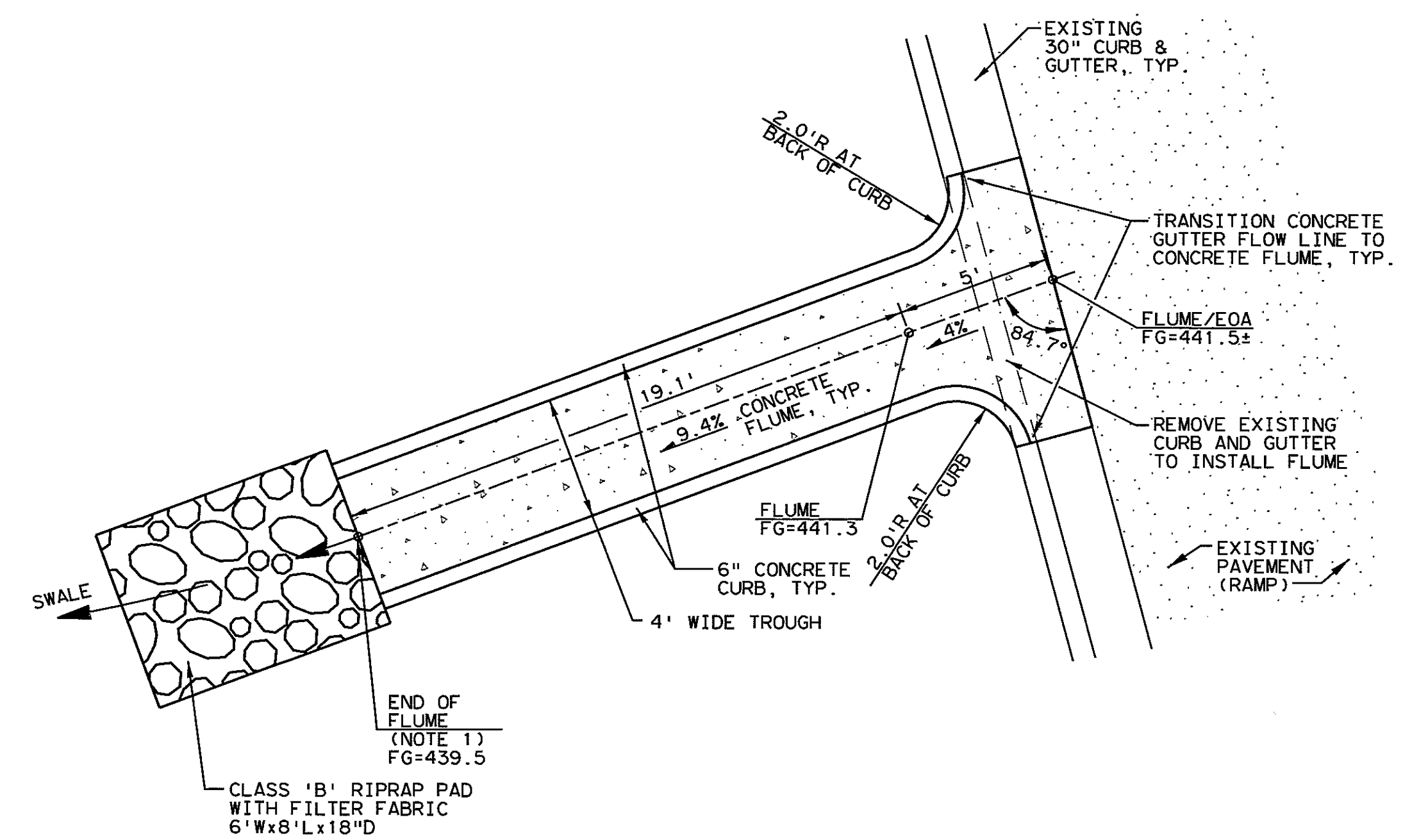
**Draper Aden Associates**  
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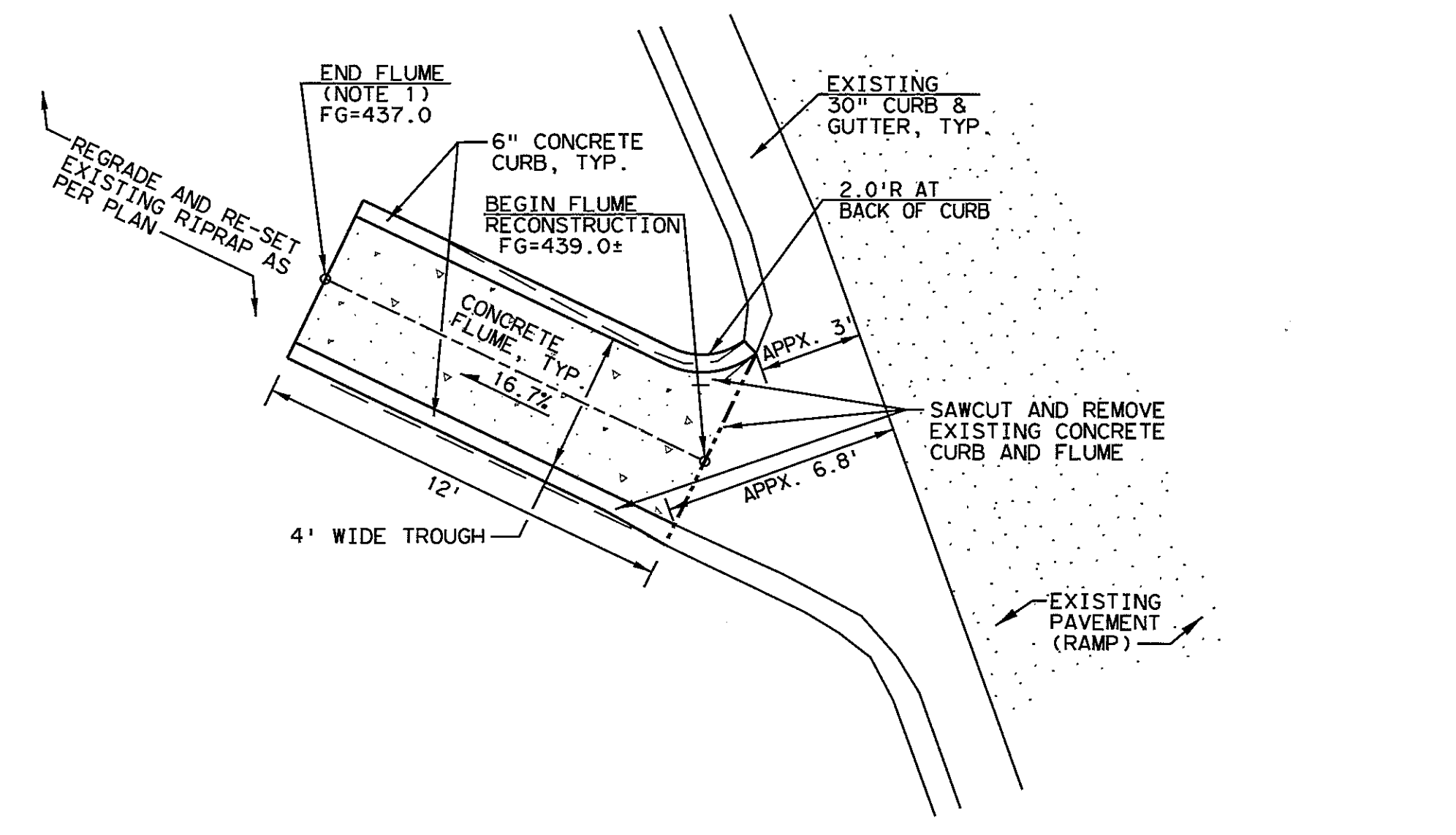
CONCRETE FLUME PLAN - SW LOOP (NEW)  
NOT TO SCALE



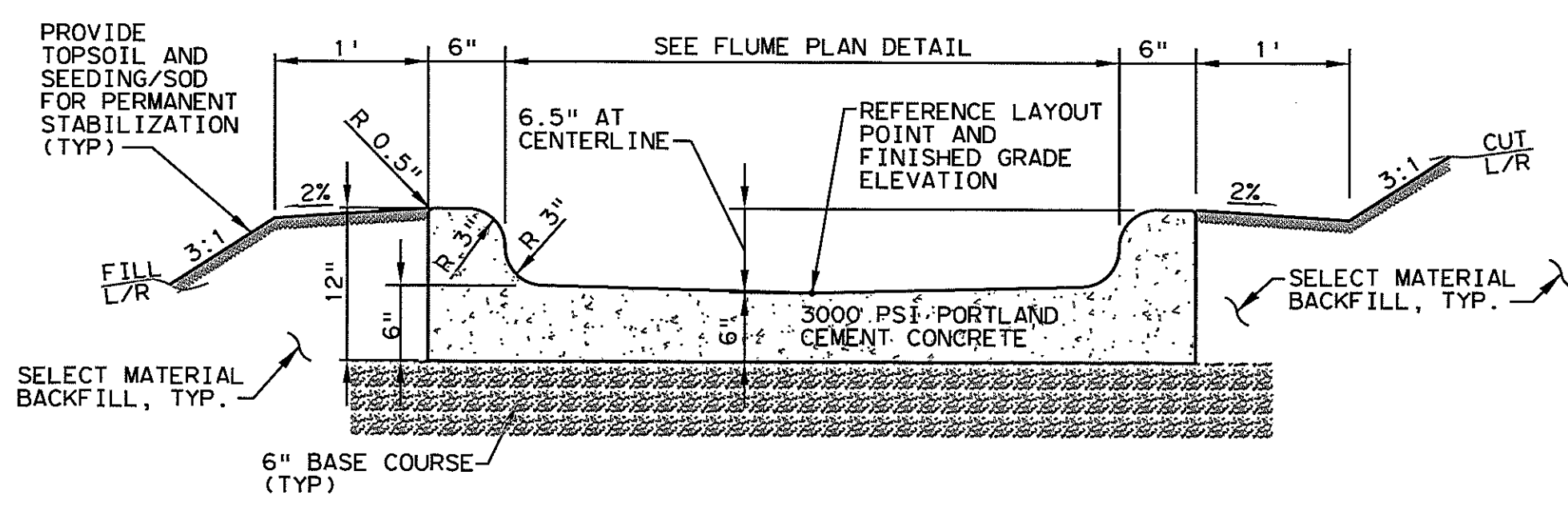
CONCRETE FLUME PLAN - SW LOOP (RECONSTRUCT EXISTING)  
NOT TO SCALE



CONCRETE FLUME PLAN - NW LOOP (NEW)  
NOT TO SCALE



CONCRETE FLUME PLAN - NW LOOP (RECONSTRUCT EXISTING)  
NOT TO SCALE



CONCRETE FLUME - TYPICAL SECTION  
NOT TO SCALE

- NOTES:
1. RIPRAP SHALL BE PLACE SUCH THAT ITS TOP FINISH GRADE ELEVATION SHALL BE 1.5" BELOW THE FINISH GRADE ELEVATION OF THE FLUME TERMINATION. RIPRAP SHALL BE INSTALLED DOWN-SLOPE SUCH THAT THE FINISH GRADE ELEVATION WILL ACCOMMODATE POSITIVE DRAINAGE.
  2. DIMENSIONS SHOWN ARE HORIZONTAL. ADJUSTMENTS MAY BE REQUIRED BASED ON GRADES AS INDICATED ON GRADING PLANS.
  3. GROOVE JOINTS EVERY 10 FEET.
  4. EXPANSION JOINTS EVERY 30 FEET.
  5. ADJUST EARTH SLOPES TO GRADING PLAN AS REQUIRED.

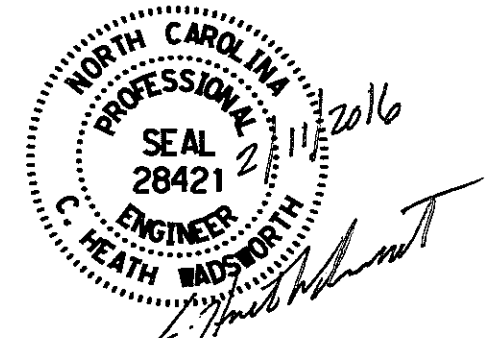
REVISIONS

8/17/99  
\$\$\$\$SYTIME\$\$\$\$  
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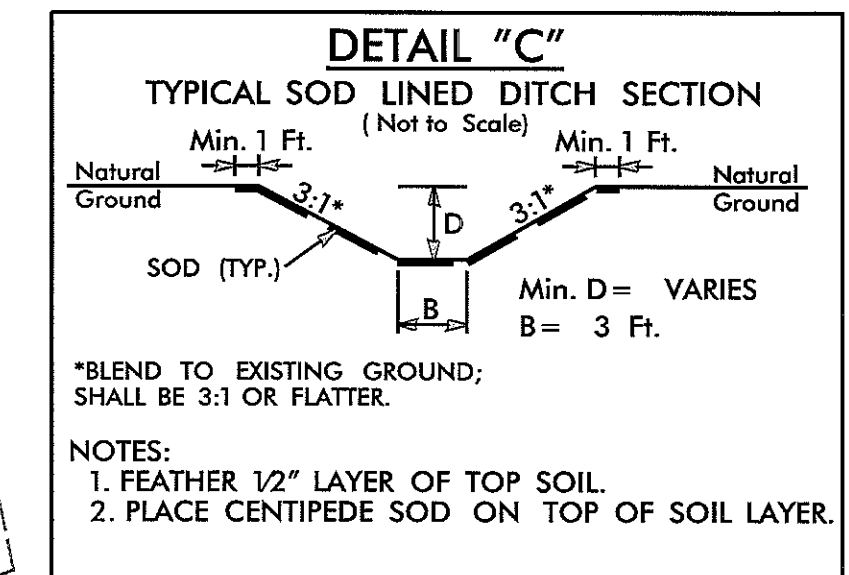




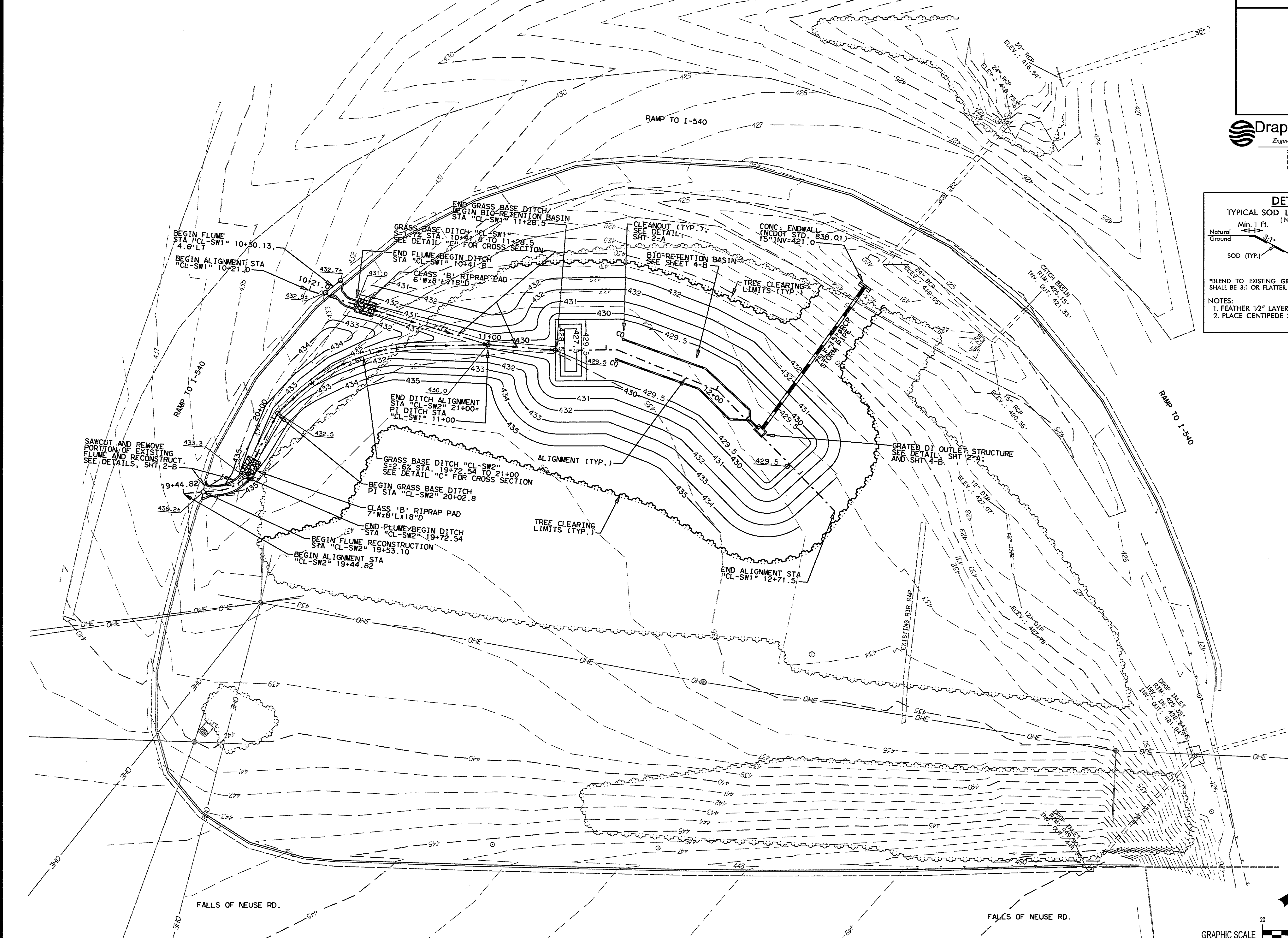
# SITE & GRADING PLAN - SW LOOP

PROJECT REFERENCE NO.	SHEET NO.
R-4436E1	4-A
RW SHEET NO.	
HYDRAULICS ENGINEER	
	

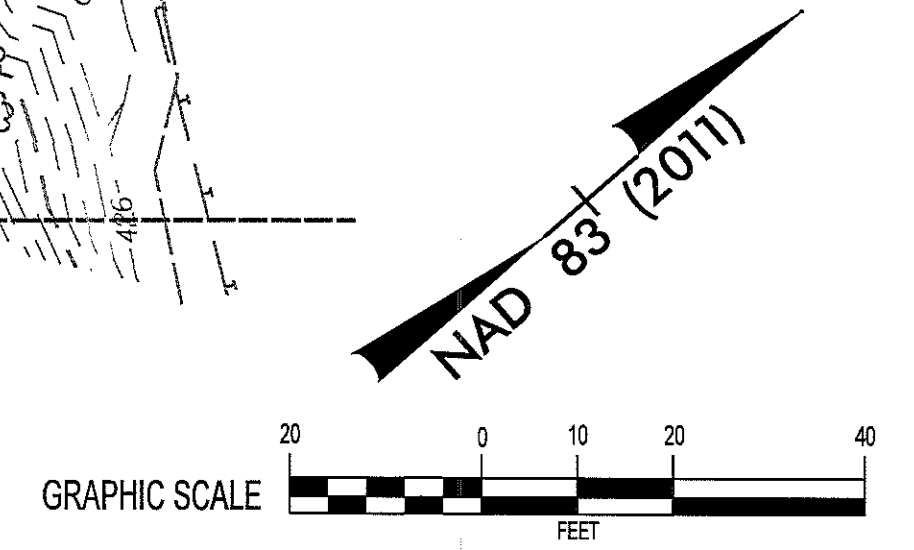
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 NC Firm License No. C-0961



REVISIONS



\$\$\$\$SYSTIME\$\$\$\$  
 \$\$\$DATE\$\$\$\$  
 \$\$\$DRAWN BY\$\$\$\$  
 \$\$\$CHECKED BY\$\$\$\$





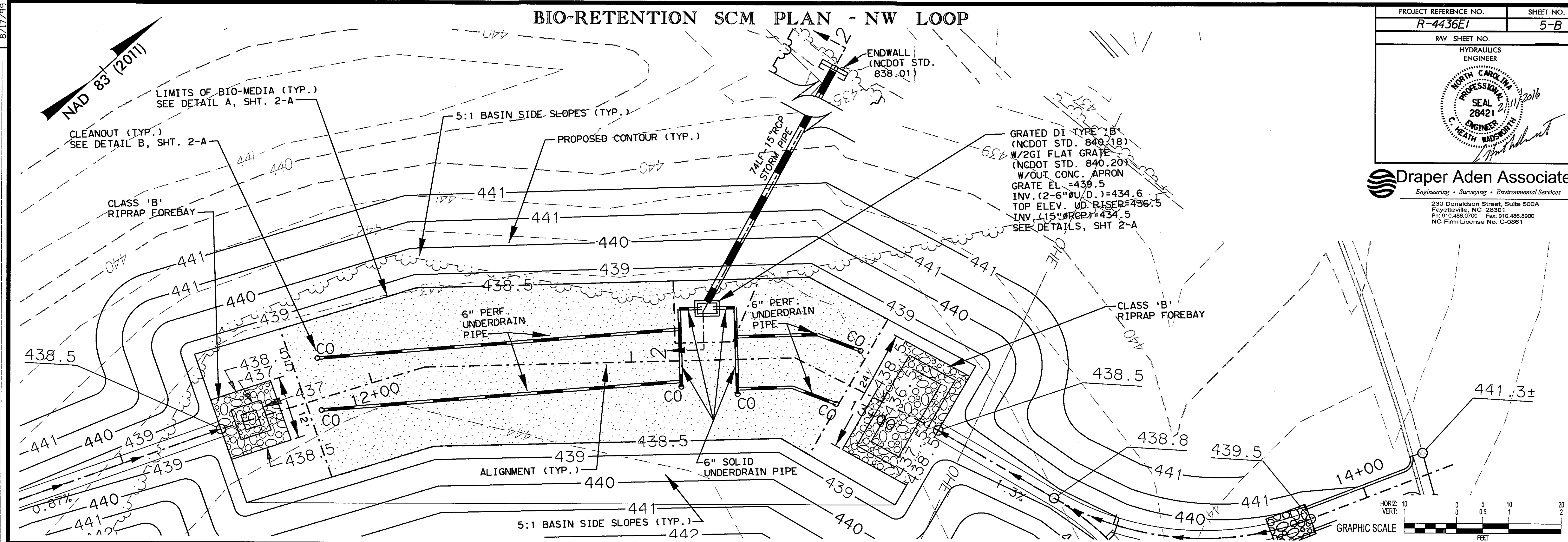




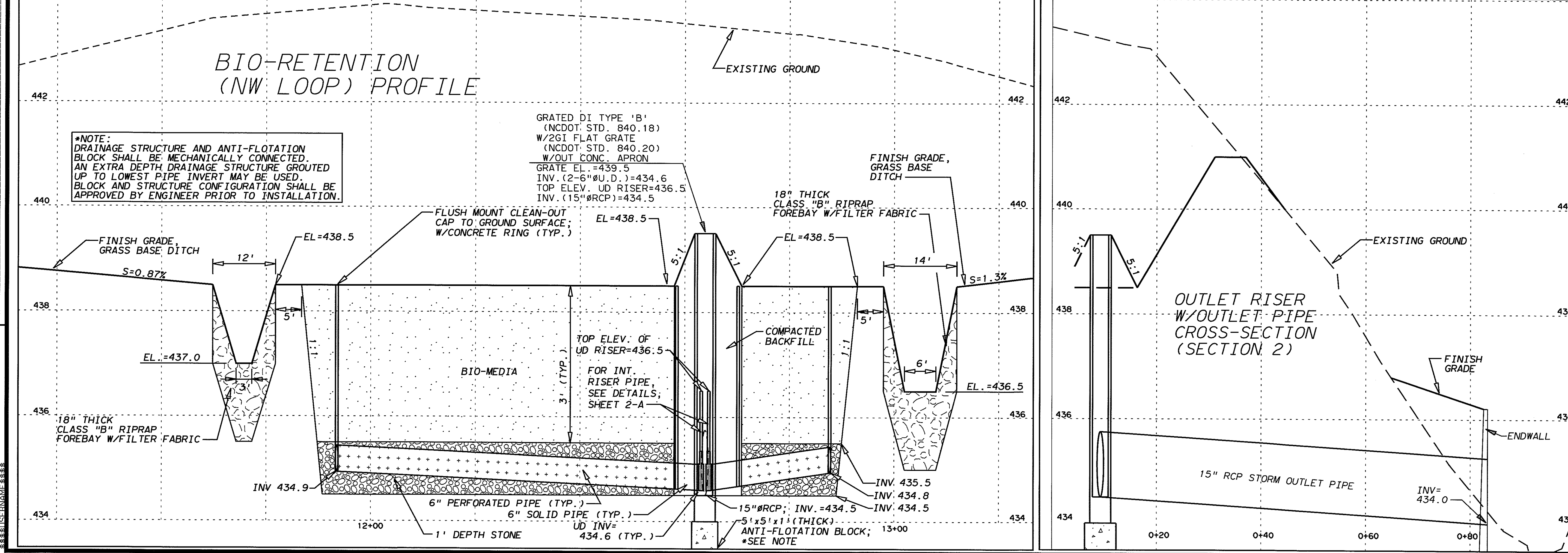
# BIO-RETENTION SCM PLAN - NW LOOP

PROJECT REFERENCE NO. <b>R-4436E1</b>	SHEET NO. <b>5-B</b>
RW SHEET NO.	
HYDRAULICS ENGINEER	

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 Fayetteville, NC 28301  
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## BIO-RETENTION (NW LOOP) PROFILE



**\*NOTE:**  
 DRAINAGE STRUCTURE AND ANTI-FLOTATION BLOCK SHALL BE MECHANICALLY CONNECTED. AN EXTRA DEPTH DRAINAGE STRUCTURE GROUDED UP TO LOWEST PIPE INVERT MAY BE USED. BLOCK AND STRUCTURE CONFIGURATION SHALL BE APPROVED BY ENGINEER PRIOR TO INSTALLATION.

GRATED DI TYPE 'B'  
 (NCDOT STD. 840.18)  
 W/2GI FLAT GRATE  
 (NCDOT STD. 840.20)  
 W/OUT CONC. APRON  
 GRATE EL.=439.5  
 INV. (2-6"ØU.D.)=434.6  
 TOP ELEV. UD RISER=436.5  
 INV. (15"ØRCP)=434.5

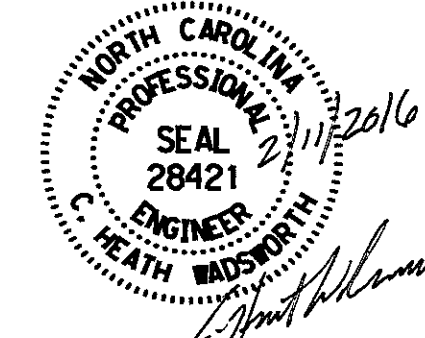
**OUTLET RISER W/OUTLET PIPE CROSS-SECTION (SECTION 2)**

REVISIONS

8/17/99

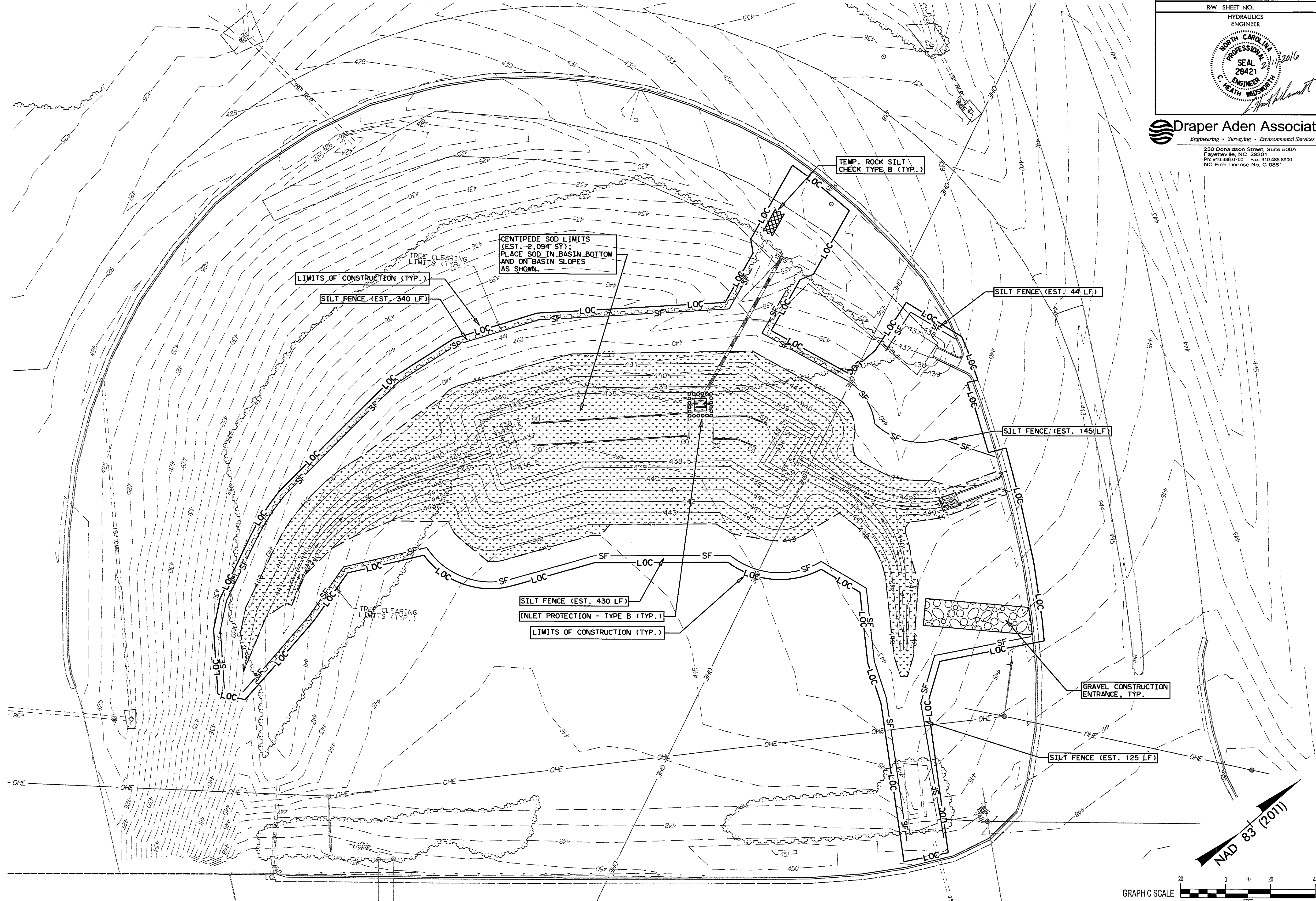


# EROSION CONTROL PLAN - NW LOOP

PROJECT REFERENCE NO. <b>R-4436E1</b>	SHEET NO. <b>EC-02</b>
RW SHEET NO.	
HYDRAULICS ENGINEER	
	

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REVISIONS  
 1. 08/17/11  
 2. 09/15/11  
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