

09/08/09

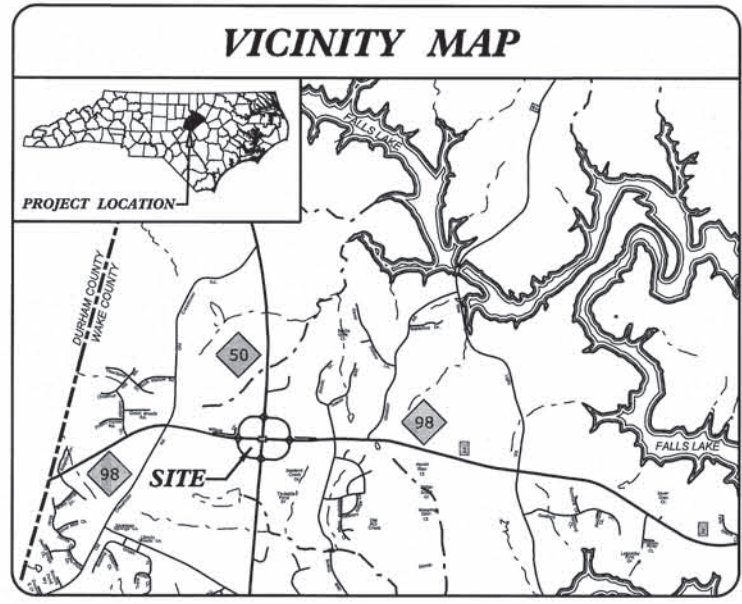
See Sheet I-A For Index of Sheets  
See Sheet I-B For Conventional Plan Sheet Symbols

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**WAKE COUNTY**

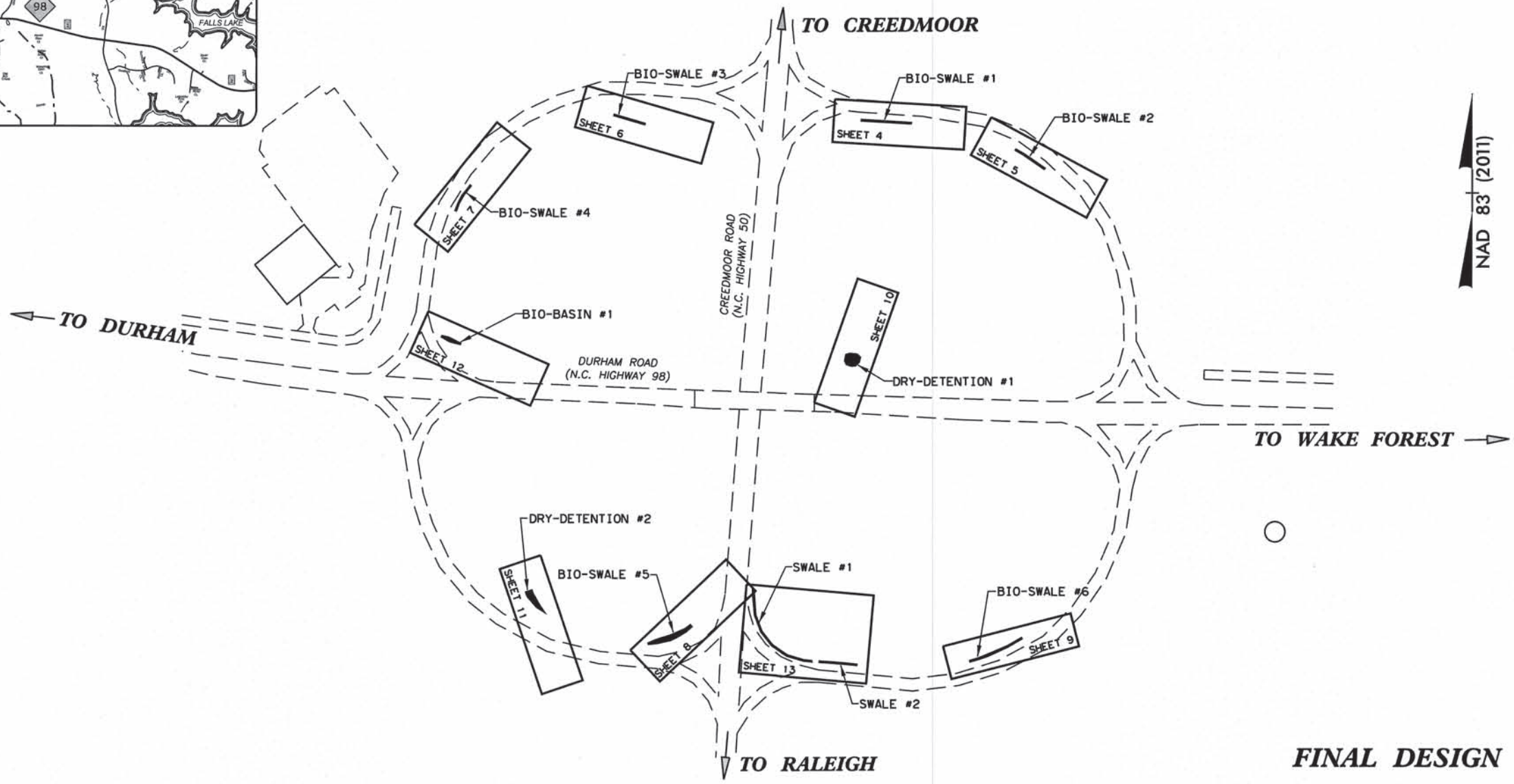
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-4436EG	1	21
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34625.2.FR53	STP-0050(15)		

TIP PROJECT: R-4436EG



**LOCATION: NC 50 (CREEDMOOR RD) AND NC 98 (DURHAM RD) INTERCHANGE**

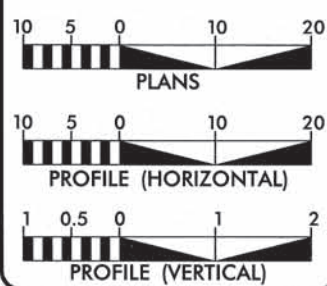
**TYPE OF WORK: RETROFIT STORMWATER CONTROL MEASURES (SWALES, BIO-SWALES, AND DRY-DETENTION BASINS) INCLUDING; GRADING, DRAINAGE, RIP RAP PLACEMENT, EROSION CONTROL, UNDERDRAINS, BIO-MEDIA**



**FINAL DESIGN PLANS**

CONTRACT: 34625.2.FR53

**GRAPHIC SCALES**



**NCDOT CONTACT:**

BRIAN LIPSCOMB, PE  
HIGHWAY STORMWATER PROGRAM

**REVISION SCHEDULE:**

30% DESIGN SUBMITTAL 10-1-2014  
90% DESIGN SUBMITTAL 11-7-2014  
FINAL DESIGN SUBMITTAL 12-15-2014



104 Gillespie Street  
Fayetteville, NC 28301  
Ph: 910.486.0700 Fax: 910.486.8900  
www.callsignengineers.com  
NC Firm License No. C-3485

2012 STANDARD SPECIFICATIONS

C. HEATH WADSWORTH, PE  
PROJECT ENGINEER

C. HEATH WADSWORTH, PE  
PROJECT DESIGN ENGINEER

**HYDRAULICS ENGINEER**



SIGNATURE: *C. Heath Wadsworth* P.E.



\$\$\$\$\$ SYSTEM \$\$\$\$\$  
\$\$\$\$\$ DGN \$\$\$\$\$  
\$\$\$\$\$ USER NAME \$\$\$\$\$



PROJECT REFERENCE NO. <b>R-4436EG</b>	SHEET NO. <b>I-A</b>
HYDRAULICS ENGINEER	

## INDEX OF SHEETS

<u>SHEET NUMBER</u>	<u>SHEET DESCRIPTION</u>
1	TITLE SHEET
1-A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS
1-B	CONVENTIONAL SYMBOLS
2-A	DETAILS
2-B	DETAILS
2-C	SURVEY CONTROL
3	SUMMARY OF QUANTITIES
4	BIO-SWALE 1 PLAN & PROFILE SHEET
5	BIO-SWALE 2 PLAN & PROFILE SHEET
6	BIO-SWALE 3 PLAN & PROFILE SHEET
7	BIO-SWALE 4 PLAN & PROFILE SHEET
8	BIO-SWALE 5 PLAN & PROFILE SHEET
9	BIO-SWALE 6 PLAN & PROFILE SHEET
10	DRY-DETENTION BASIN 1 PLAN SHEET
11	DRY-DETENTION BASIN 2 PLAN & PROFILE SHEET
12	BIO-BASIN 1 PLAN SHEET
13	SWALE 1 AND 2 PLAN SHEET
EC-01	EROSION CONTROL PLAN
EC-02	EROSION CONTROL PLAN
EC-03	EROSION CONTROL DETAILS
TC-01	TRAFFIC CONTROL PLAN

## STANDARD DRAWINGS

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

<u>STD. NO.</u>	<u>TITLE</u>
200.02	METHOD OF CLEARING II
300.01	METHOD OF PIPE INSTALLATION
816.04	MARKERS FOR DRAINAGE STRUCTURE AND CONC PAD
838.01	CONC. ENDWALL FOR SINGLE AND DOUBLE PIPE CULVERTS - 15" THRU 36" PIPE 90° SKEW
838.80	PRECAST ENDWALLS - 12" THRU 72" PIPE 90° SKEW
840.18	(USE FOR CONC. APRON DETAIL - RETAIN EXISTING GRATE) CONC. GRATED DROP INLET TYPE 'B'
840.25	ANCHORAGE FOR FRAMES - BRICK, CONC., OR PRECAST
850.01	CONC. PAVED DITCHES
876.03	DRAINAGE DITCHES WITH CLASS 'A' RIP RAP

## GENERAL NOTES

1. SPECIFICATIONS: NCDOT STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES (JANUARY 2012)
2. GRADING: THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATIONS OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. GRADES LINES MAY BE ADJUSTED AT THEIR BEGINNING AND ENDING AND AT STRUCTURES AS DIRECTED BY NCDOT IN ORDER TO SECURE A PROPER TIE-IN.
3. SUBSURFACE PLANS: NO SUBSURFACE PLANS ARE AVAILABLE ON THIS PROJECT. THE CONTRACTOR SHOULD MAKE HIS OWN INVESTIGATION AS TO THE SUBSURFACE CONDITIONS.

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 104 Gillespie Street  
 Fayetteville, NC 28301  
 Ph: 910.486.0700 Fax: 910.486.8900  
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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	○ 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	-----
Proposed Wetland Boundary	-----
Existing Endangered Animal Boundary	-----
Existing Endangered Plant Boundary	-----
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 CA 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	-----
Bridge Wing Wall, Head Wall and End Wall	-----
MINOR:	
Head and End Wall	-----
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	----- A/G Water

## 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	----- A/G Gas

## SANITARY SEWER:

Sanitary Sewer Manhole	⊕
Sanitary Sewer Cleanout	⊕
U/G Sanitary Sewer Line	-----
Above Ground Sanitary Sewer	----- A/G 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.

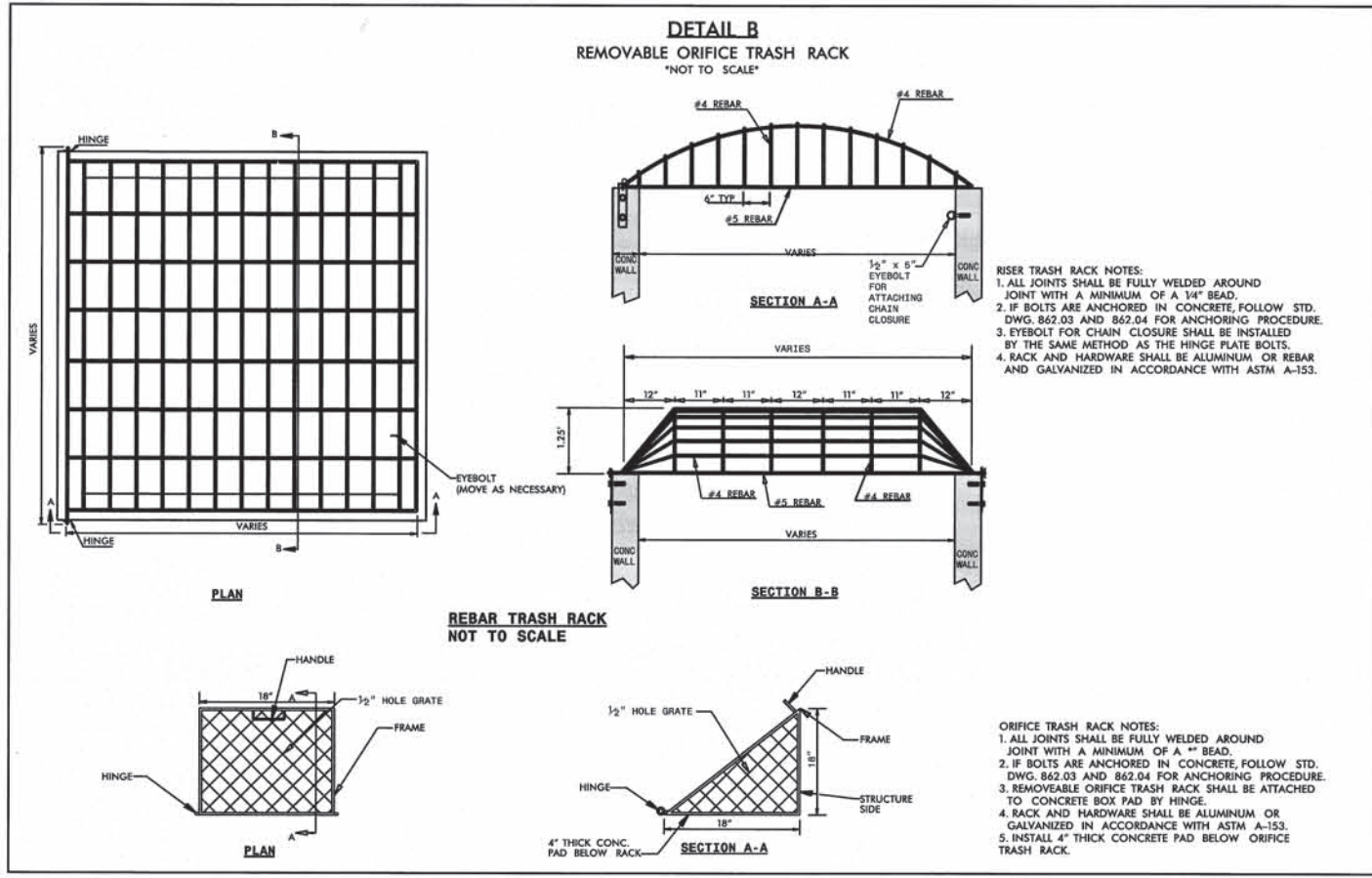






# DETAILS

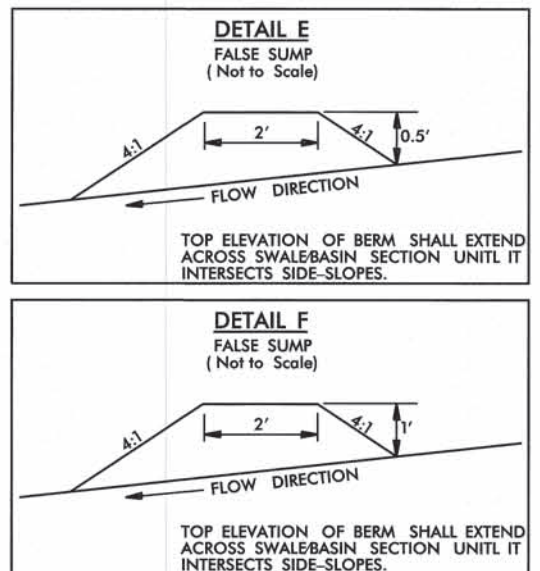
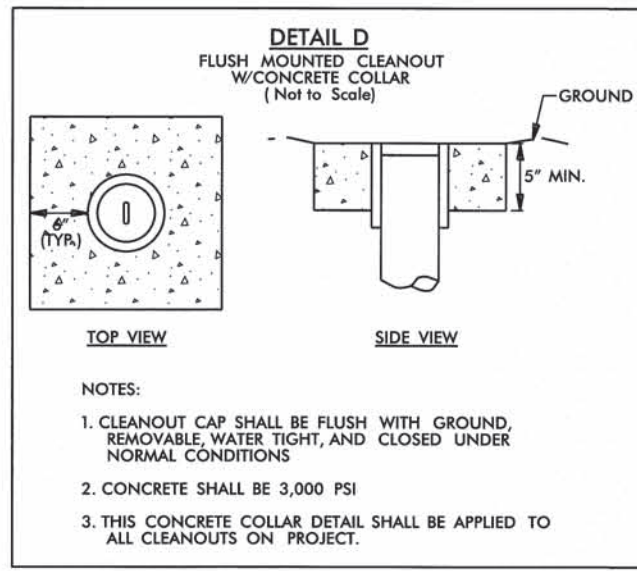
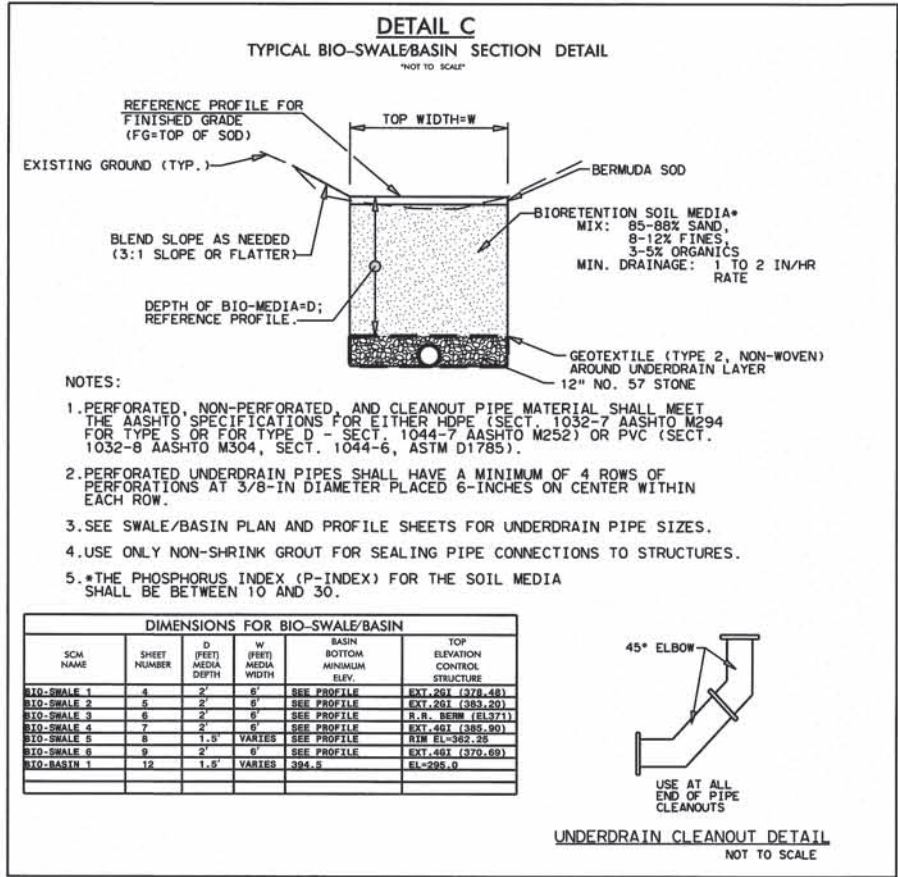
PROJECT REFERENCE NO. <b>R-4436EG</b>	SHEET NO. <b>2-B</b>
RW SHEET NO.	
HYDRAULICS ENGINEER	
<b>CALL SIGN ENGINEERS</b>	
104 Gillespie Street Fayetteville, NC 28301 Ph: 910.486.0700 Fax: 910.486.8900 www.callsignengineers.com NC Firm License No. C-3485	



### PERMANENT SOIL REINFORCEMENT MATTING NOTES

**NOTES:**

1. FOR MATTING LOCATION AND TYPICAL SECTION DETAIL, REFER TO SHEETS 5, 8, AND 13.
2. THE MATTING SHALL BE INSTALLED ACCORDING TO SPECIFICATIONS AND GUIDELINES PROVIDED BY THE MANUFACTURER, AS WELL AS GENERAL GUIDELINES PROVIDED IN THE PROJECT SPECIFICATIONS, SPECIAL PROVISIONS, AND DETAILS.
3. THE MATTING MATERIAL, ANCHORING METHOD, AND INSTALLATION PLAN SHALL BE APPROVED BY NCDOT PRIOR TO INSTALLATION.
4. THE MATTING SHALL BE PLACED SO THAT IT PROPERLY OVERLAPS IN A DIRECTION WHICH FACES DOWNSTREAM (SIMILAR TO A SHINGLED ROOF) SO THAT WATER FLOW DOES NOT UNDERMINE THE CONNECTIONS BETWEEN MAT SECTIONS.



REVISIONS

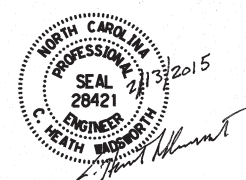
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# SUMMARY OF QUANTITIES

PROJECT REFERENCE NO.	SHEET NO.
R-4436EG	3
RW SHEET NO.	
HYDRAULICS ENGINEER	
	

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 104 Gillespie Street  
 Fayetteville, NC 28301  
 Ph: 910.486.0700 Fax: 910.486.8900  
 www.callsignengineers.com  
 NC Firm License No. C-3495

## SUMMARY FOR TOTAL PROJECT (COMBINED)

Estimated Quantities for Total Project

Line Item	Sec No.	Description	Quantity	Unit
1	800	Mobilization	1	LS
2	200	Clearing and Grubbing	1	LS
3	801	Construction Staking	1	LS
4	225	Unclassified Excavation	595	CY
5	226	Grading	1	LS
6	PSP-1	Select Fill (Bio-retention Soil Media)	305	CY
7	838	Endwall	0.7	CY
8	250	Remove Ext. Pavement (Conc. Ditch)	818	SY
9	840	Install Concrete Apron (2GI)	2	EA
10	840	Install Concrete Apron (4GI)	3	EA
11	850	4" Concrete Paved Ditch	6	SY
12	840	Drainage Structure (Includes anti-floatation)	3	EA
13	310	15" R.C. Pipe	18	LF
14	305	6" Drainage Pipe (Perforated)	507	LF
15	305	6" Drainage Pipe (Non-Perforated)	261	LF
16	PSP-2	Concrete Cleanout Flush Mount	9	EA
17	PSP-3	Trash Rack (Riser)	3	EA
18	PSP-4	Trash Rack (Orifice Drawdown, Includes concrete pad)	2	EA
19	1515	6" Drawdown Valve	2	EA
20	876	Plain Rip Rap, Class A	85	Ton
21	876	Plain Rip Rap, Class B	17	Ton
22	1610	Sediment Control Stone, Standard No. 57	228	Ton
23	876	Geotextile for Drainage (Type 2, Non-woven)	882	SY
24	PSP-5	3-D Geotextile (Permanent Soil Reinforcement Mat)	431	SY
25	816	Drain Markers	11	EA
26	1664	Sodding (Bermuda)	2,214	SY
27	1664	Watering	50	1000 Gal
28	1660	Seeding & Mulcing	2.4	ACR
29	1605	Temporary Silt Fence	551	LF
30	1610	Stone for Erosion Control, Class 'A'	58	Ton
31	1610	Stone for Erosion Control, Class 'B'	8	Ton
32	1610	Stone for Erosion Control, Sediment Control Stone, No. 57	12	Ton
33	876	Geotextile for Erosion Control (Type 2, Non-woven)	280	SY
34	Std. Specs.	Traffic Control	1	LS

## ESTIMATED QUANTITY BREAKDOWN FOR EACH PROJECT SITE

BIO-SWALE 1				BIO-SWALE 2				BIO-SWALE 3			
CLEARING & GRUBBING	1	LS		CLEARING & GRUBBING	1	LS		CLEARING & GRUBBING	1	LS	
UNC. EXCAVATION	78	CY		EXCAVATION	60	CY		EXCAVATION	56	CY	
GRADING	1	LS		GRADING	1	LS		GRADING	1	LS	
BIO SOIL MEDIA	52	CY		BIO SOIL MEDIA	36	CY		BIO SOIL MEDIA	34	CY	
REMOVE EXT. PAVEMENT (CONC. DITCH)	25	SY		REMOVE EXT. PAVEMENT (CONC. DITCH)	95	SY		REMOVE EXT. PAVEMENT (CONC. DITCH)	71	SY	
INSTALL CONC. APRON	1	EA		INSTALL CONC. APRON	1	EA		CONC. PAVED DITCH	6	SY	
DRAINAGE PIPE - PERF.	105	LF		DRAINAGE PIPE - PERF.	72	LF		DRAINAGE PIPE - PERF.	69	LF	
DRAINAGE PIPE - NONPERF.	21	LF		DRAINAGE PIPE - NONPERF.	37	LF		DRAINAGE PIPE - NONPERF.	49	LF	
CONC. CLEANOUT FLUSH MOUNT	1	EA		CONC. CLEANOUT FLUSH MOUNT	1	EA		CONC. CLEANOUT FLUSH MOUNT	1	EA	
SED. CONTROL STONE 57	35	TON		SED. CONTROL STONE 57	25	TON		RIP RAP A	13	TON	
GEOTEXTILE FOR DRAINAGE	100	SY		GEOTEXTILE FOR DRAINAGE	70	SY		SED. CONTROL STONE 57	24	TON	
DRAIN MARKERS	2	EA		3-D GEOTEXTILE	58	SY		GEOTEXTILE FOR DRAINAGE	95	SY	
SODDING	140	SY		DRAIN MARKERS	2	EA		DRAIN MARKERS	1	EA	
WATER	5	1000 GAL		SODDING	287	SY		SODDING	225	SY	
SEEDING & MULCHING	0.20	ACR		WATER	5	1000 GAL		WATER	5	1000 GAL	
STONE FOR E.C. 'A'	2.5	TON		SEEDING & MULCHING	0.20	ACR		SEEDING & MULCHING	0.20	ACR	
STONE FOR E.C. '57'	0.9	TON		STONE FOR E.C. 'A'	3.6	TON		TEMP. SILT FENCE	125	LF	
				STONE FOR E.C. '57'	1.2	TON		STONE FOR E.C. 'A'	7.5	TON	
								STONE FOR E.C. 'B'	4.0	TON	
								STONE FOR E.C. '57'	0.6	TON	
								GEOTEXTILE FOR E.C.	70	SY	

BIO-SWALE 4				BIO-SWALE 5				BIO-SWALE 6			
CLEARING & GRUBBING	1	LS		CLEARING & GRUBBING	1	LS		CLEARING & GRUBBING	1	LS	
EXCAVATION	50	CY		EXCAVATION	77	CY		EXCAVATION	151	CY	
GRADING	1	LS		GRADING	1	LS		GRADING	1	LS	
BIO SOIL MEDIA	32	CY		BIO SOIL MEDIA	60	CY		BIO SOIL MEDIA	59	CY	
REMOVE EXT. PAVEMENT (CONC. DITCH)	54	SY		REMOVE EXT. PAVEMENT (CONC. DITCH)	123	SY		REMOVE EXT. PAVEMENT (CONC. DITCH)	134	SY	
INSTALL CONC. APRON	1	EA		DRAINAGE PIPE - PERF.	65	LF		INSTALL CONC. APRON	1	EA	
DRAINAGE PIPE - PERF.	57	LF		DRAINAGE PIPE - NONPERF.	45	LF		DRAINAGE PIPE - PERF.	103	LF	
DRAINAGE PIPE - NONPERF.	28	LF		CONC. CLEANOUT FLUSH MOUNT	2	EA		DRAINAGE PIPE - NONPERF.	46	LF	
CONC. CLEANOUT FLUSH MOUNT	1	EA		DRAINAGE STRUCT.	1	EA		CONC. CLEANOUT FLUSH MOUNT	1	EA	
RIP RAP A	18	TON		TRASH RACK	1	EA		RIP RAP A	30	TON	
SED. CONTROL STONE 57	21	TON		RIP RAP A	13	TON		SED. CONTROL STONE 57	40	TON	
GEOTEXTILE FOR DRAINAGE	105	SY		SED. CONTROL STONE 57	54	TON		CONC. CLEANOUT FLUSH MOUNT	1	EA	
DRAIN MARKERS	1	EA		GEOTEXTILE FOR DRAINAGE	162	SY		RIP RAP A	30	TON	
SODDING	130	SY		3-D GEOTEXTILE	65	SY		SED. CONTROL STONE 57	40	TON	
WATER	5	1000 GAL		DRAIN MARKERS	2	EA		GEOTEXTILE FOR DRAINAGE	175	SY	
SEEDING & MULCHING	0.20	ACR		SODDING	302	SY		DRAIN MARKERS	2	EA	
STONE FOR E.C. 'A'	3.6	TON		WATER	5	1000 GAL		SODDING	375	SY	
STONE FOR E.C. '57'	1.2	TON		SEEDING & MULCHING	0.35	ACR		WATER	5	1000 GAL	
				TEMP. SILT FENCE	230	LF		SEEDING & MULCHING	0.15	ACR	
				STONE FOR E.C. 'A'	5.0	TON		STONE FOR E.C. 'A'	3.6	TON	
				STONE FOR E.C. '57'	2.0	TON		STONE FOR E.C. '57'	1.2	TON	

BIO-BASIN 1				DRY DETENTION 1				DRY DETENTION 2			
CLEARING & GRUBBING	1	LS		CLEARING & GRUBBING	1	LS		CLEARING & GRUBBING	1	LS	
EXCAVATION	81	CY		GRADING	1	LS		EXCAVATION	42	CY	
GRADING	1	LS		DRAINAGE STRUCT.	1	EA		GRADING	1	LS	
BIO SOIL MEDIA	32	CY		TRASH RACK	1	EA		ENDWALLS	0.7	CY	
REMOVE EXT. PAVEMENT (CONC. DITCH)	40	SY		ORIFICE TRASH RACK	1	EA		REMOVE EXT. PAVEMENT (CONC. DITCH)	57	SY	
INSTALL CONC. APRON	1	EA		6" GATE VALVE	1	EA		15" PIPE CULVERT	18	LF	
DRAINAGE PIPE - PERF.	36	LF		RIP RAP A	2	TON		DRAINAGE STRUCT.	1	EA	
DRAINAGE PIPE - NONPERF.	35	LF		GEOTEXTILE FOR DRAINAGE	40	SY		TRASH RACK	1	EA	
CONC. CLEANOUT FLUSH MOUNT	2	EA		SEEDING & MULCHING	0.3	ACR		ORIFICE TRASH RACK	1	EA	
RIP RAP A	10	TON		STONE FOR E.C. 'A'	12.5	TON		6" GATE VALVE	1	EA	
SED. CONTROL STONE 57	29	TON		STONE FOR E.C. '57'	2	TON		RIP RAP B	17	TON	
GEOTEXTILE FOR DRAINAGE	95	SY		GEOTEXTILE FOR E.C.	70	SY		GEOTEXTILE FOR DRAINAGE	40	SY	
DRAIN MARKERS	1	EA						SODDING	205	SY	
SODDING	220	SY						WATER	5	1000 GAL	
WATER	5	1000 GAL						SEEDING & MULCHING	0.20	ACR	
SEEDING & MULCHING	0.30	ACR						TEMP. SILT FENCE	100	LF	
TEMP. SILT FENCE	96	LF						STONE FOR E.C. 'A'	7.5	TON	
STONE FOR E.C. 'A'	10.0	TON						STONE FOR E.C. 'B'	4.0	TON	
STONE FOR E.C. '57'	0.9	TON						STONE FOR E.C. '57'	0.6	TON	
GEOTEXTILE FOR E.C.	70	SY						GEOTEXTILE FOR E.C.	70	SY	

SWALE 1		
GRADING	1	LS
REMOVE EXT. PAVEMENT (CONC. DITCH)	160	SY
INSTALL CONC. APRON	1	EA
3-D GEOTEXTILE	225	SY
SODDING	240	SY
WATER	5	1000 GAL
SEEDING & MULCHING	0.15	ACR
STONE FOR E.C. 'A'	2.5	TON
STONE FOR E.C. '57'	0.9	TON

SWALE 2		
GRADING	1	LS
REMOVE EXT. PAVEMENT (CONC. DITCH)	59	SY
3-D GEOTEXTILE	83	SY
SODDING	90	SY
WATER	5	1000 GAL
SEEDING & MULCHING	0.1	ACR

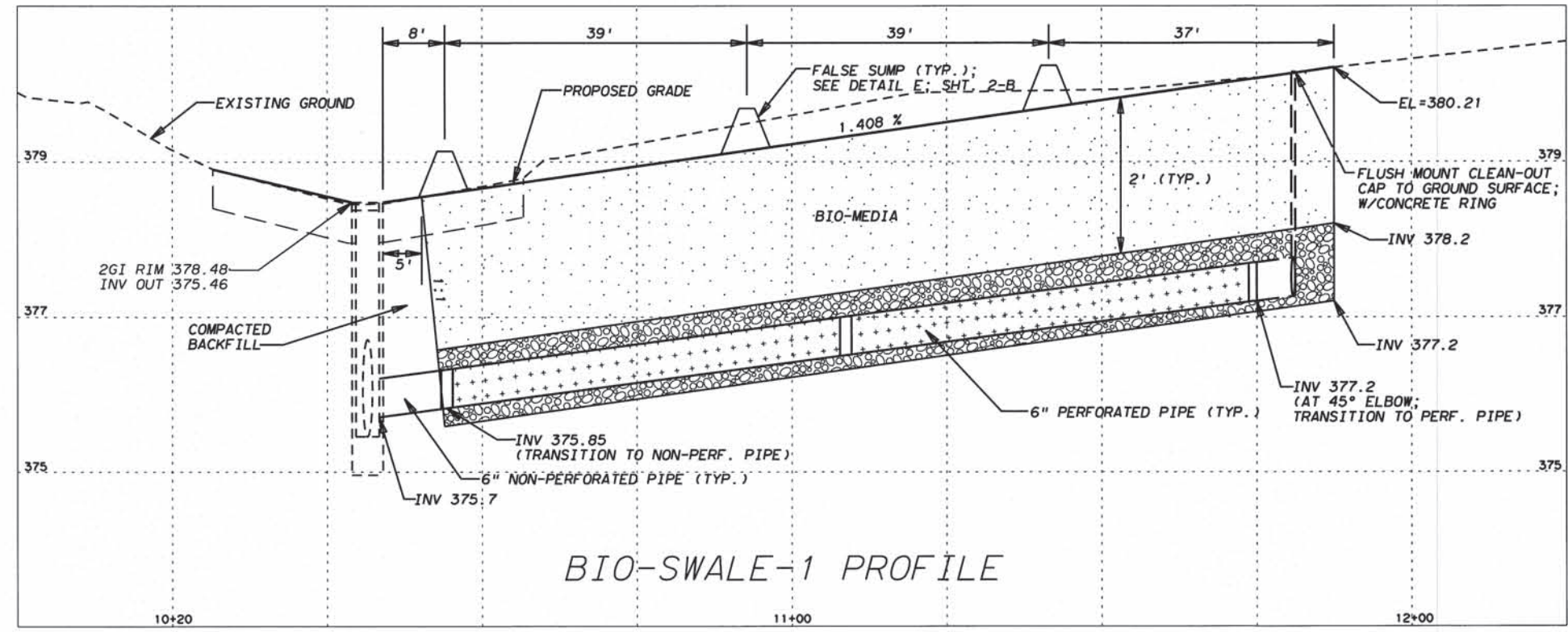
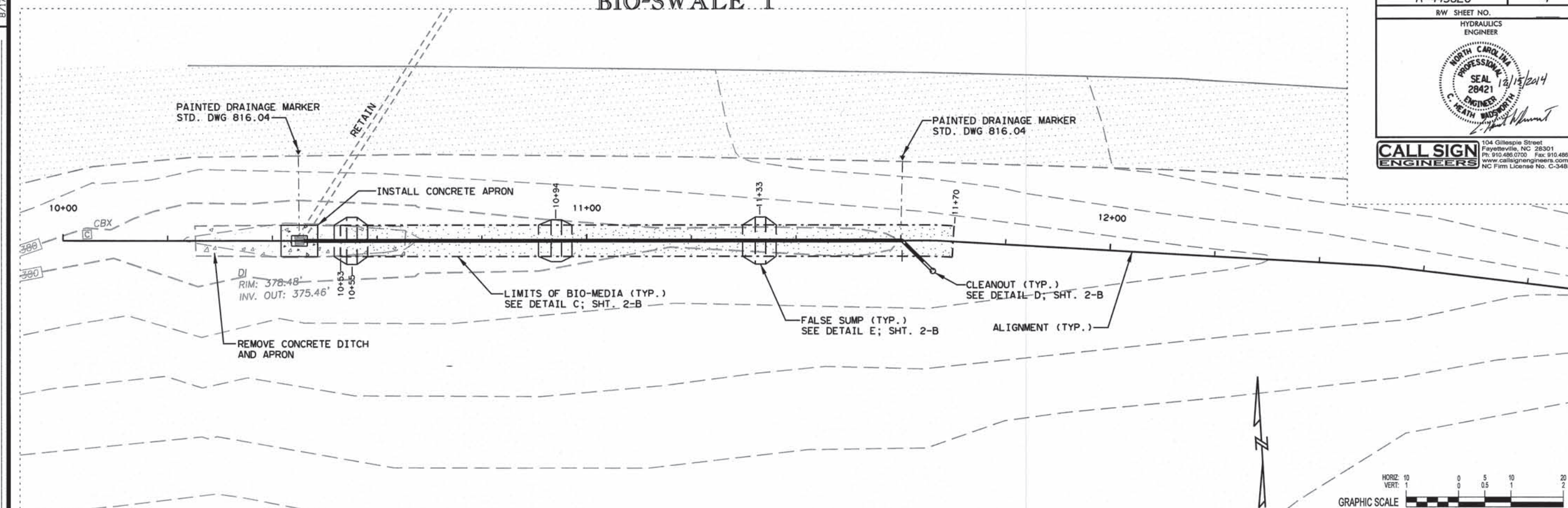
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 Fayetteville, NC 28301  
 Ph: 910.486.0700 Fax: 910.486.8900  
 www.callsignengineers.com  
 NC Firm License No. C-3495



# BIO-SWALE 1

PROJECT REFERENCE NO. <b>R-4436EG</b>	SHEET NO. <b>4</b>
RW SHEET NO. HYDRAULICS ENGINEER	
<b>CALL SIGN ENGINEERS</b> 104 Gillespie Street Fayetteville, NC 28301 Ph: 910.486.0700 Fax: 910.486.8900 www.callsignengineers.com NC Firm License No. C-3485	



BIO-SWALE-1 PROFILE

- NOTES:
1. SEE DETAIL C ON SHEET 2-B FOR BIO-SECTION DETAIL.
  2. SEE DETAIL D ON SHEET 2-B FOR FLUSH MOUNTED CLEANOUT DETAIL.
  3. SEE DETAIL E ON SHEET 2-B FOR FALSE SUMP DETAIL.

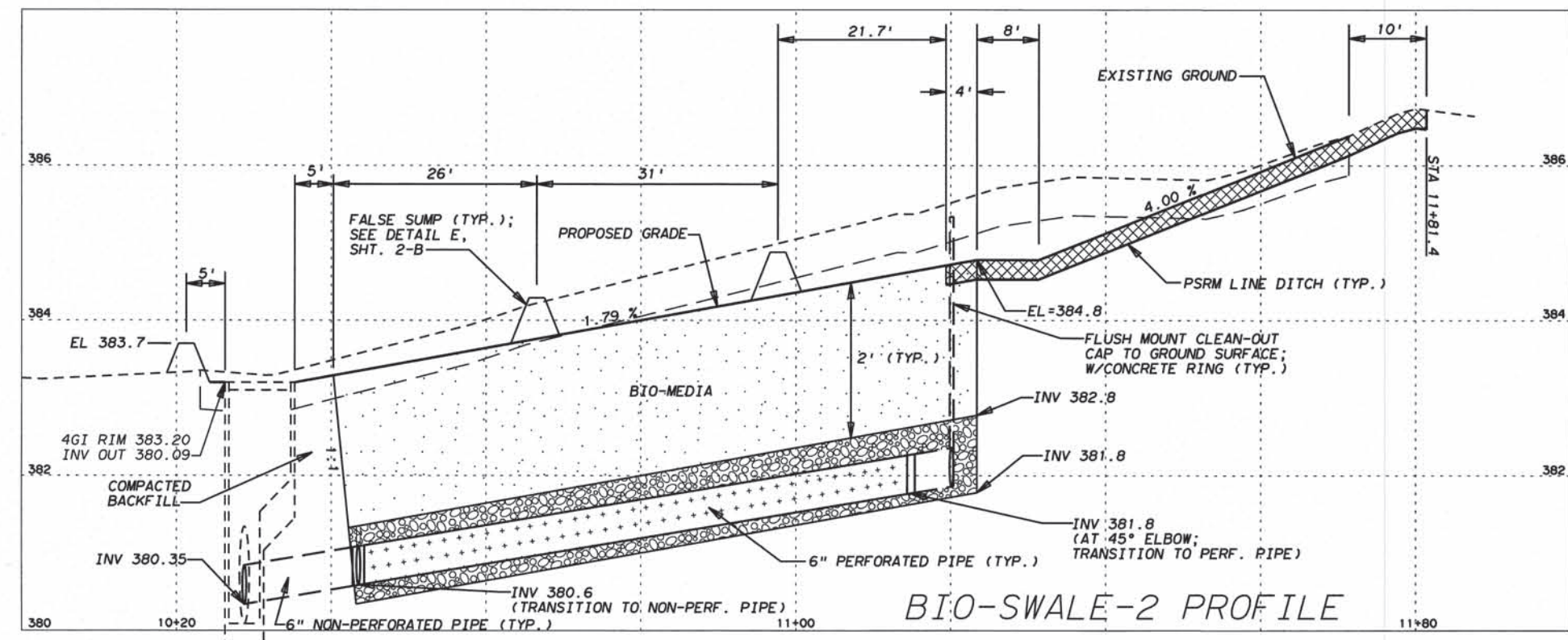
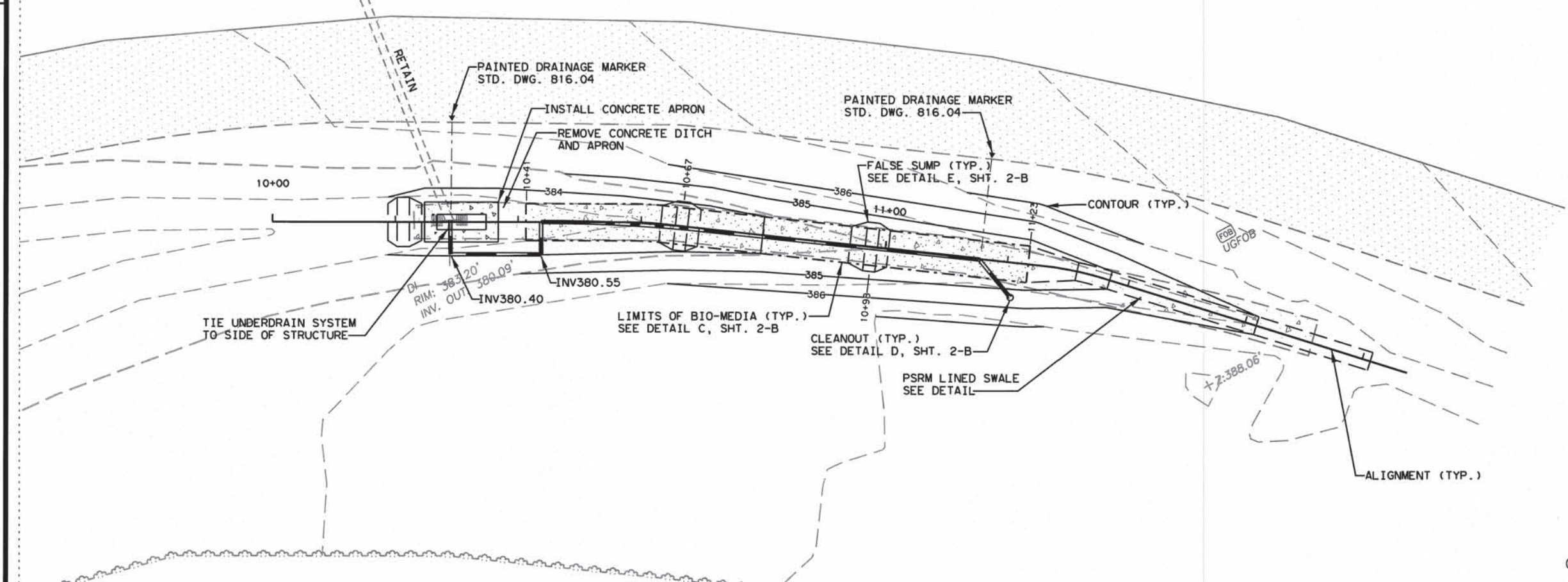
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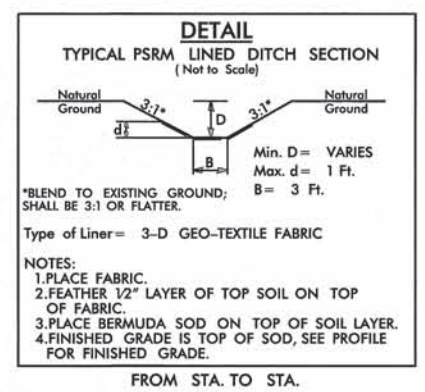


# BIO-SWALE 2

PROJECT REFERENCE NO. <b>R-4436EG</b>	SHEET NO. <b>5</b>
RW SHEET NO.	
HYDRAULICS ENGINEER	
<b>CALL SIGN ENGINEERS</b> 104 Gillespie Street Fayetteville, NC 28301 Ph: 910-486-0700 Fax: 910-486-8900 www.callsignengineers.com NC Firm License No. C-3485	



- NOTES:
1. SEE DETAIL C ON SHEET 2-B FOR BIO-SECTION DETAIL.
  2. SEE DETAIL D ON SHEET 2-B FOR FLUSH MOUNTED CLEANOUT DETAIL.
  3. SEE DETAIL E ON SHEET 2-B FOR FALSE SUMP DETAIL.



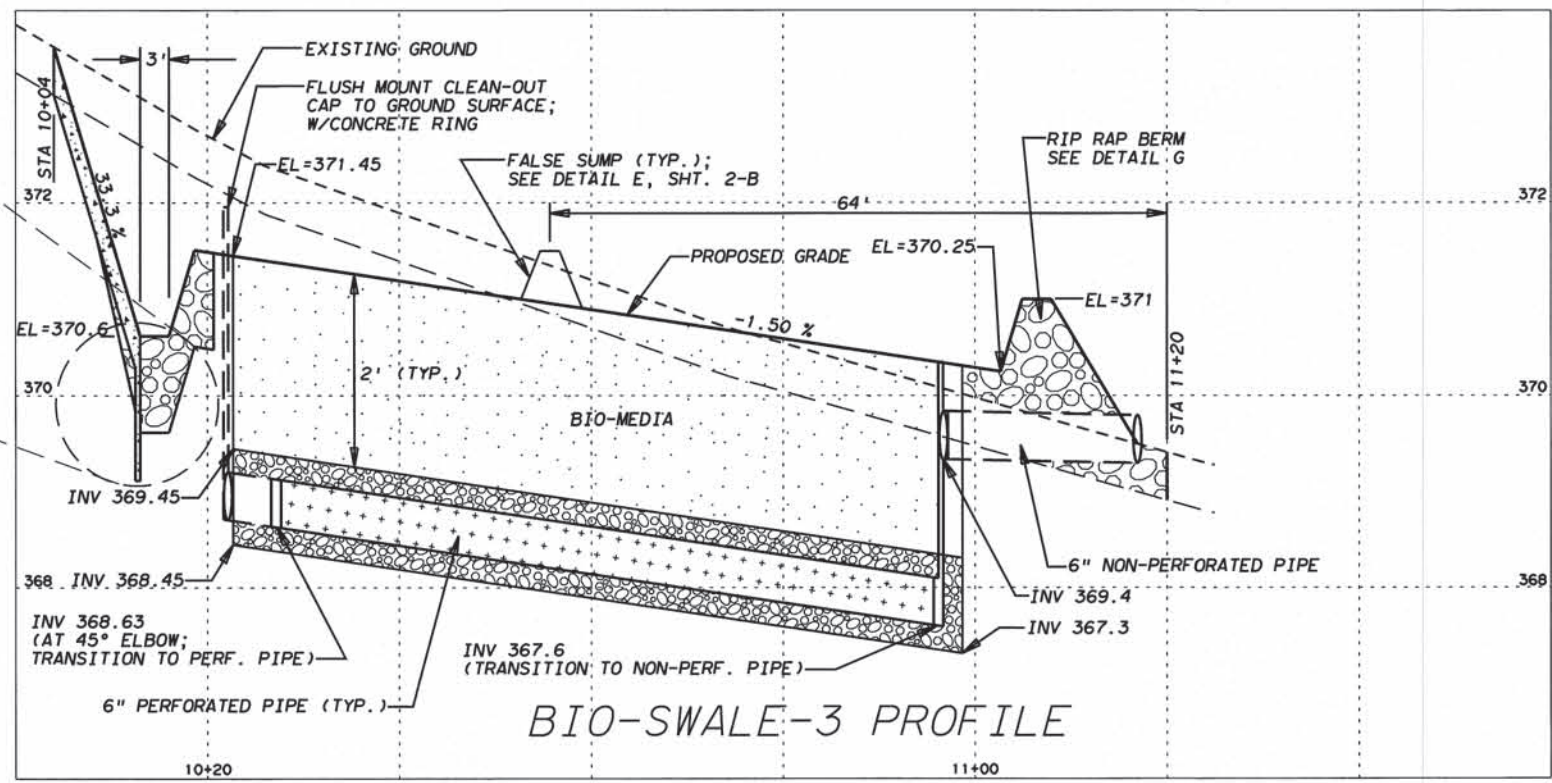
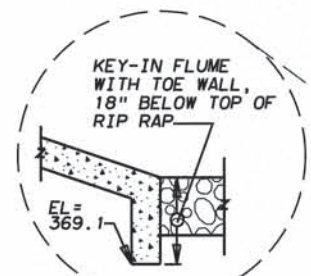
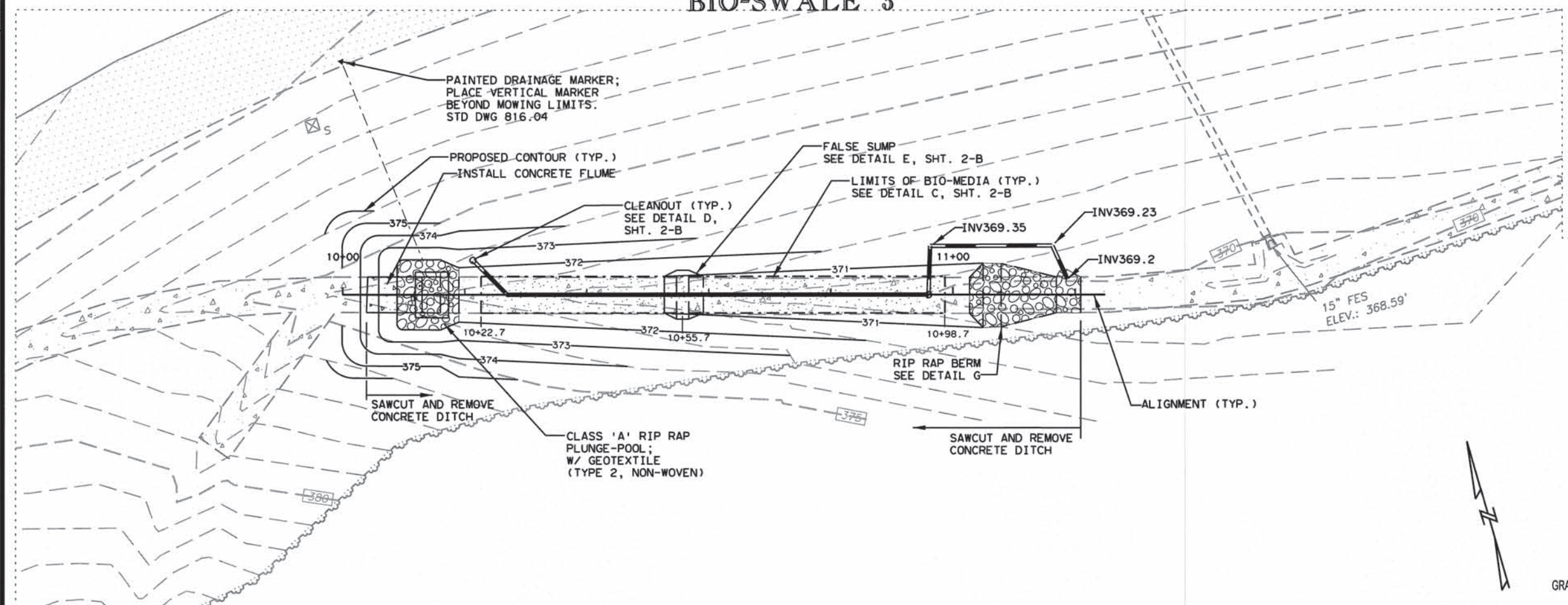
REVISIONS

SYSTEMS  
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 USER NAME



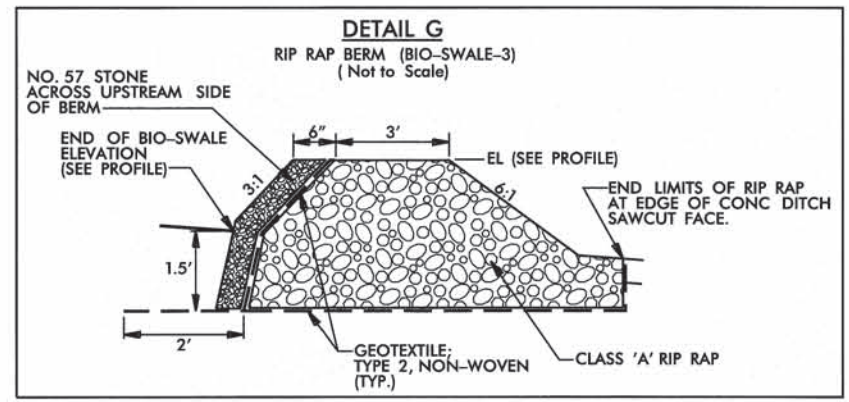
# BIO-SWALE 3

PROJECT REFERENCE NO. <b>R-4436EG</b>	SHEET NO. <b>6</b>
RW SHEET NO.	
HYDRAULICS ENGINEER	
<b>CALL SIGN ENGINEERS</b> <small>104 Gillespie Street          Fayetteville, NC 28301          Ph: 910.498.0700 Fax: 910.498.8000          www.callsignengineers.com          NC Firm License No. C-3485</small>	



**NOTES:**

1. SEE DETAIL C ON SHEET 2-B FOR BIO-SECTION DETAIL.
2. SEE DETAIL D ON SHEET 2-B FOR FLUSH MOUNTED CLEANOUT DETAIL.
3. SEE DETAIL E ON SHEET 2-B FOR FALSE SUMP DETAIL.



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 REVISIONS  
 SYSTEMS  
 USER

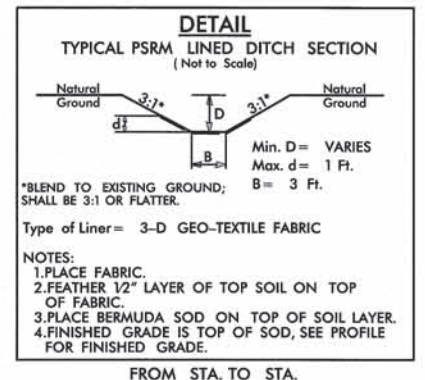
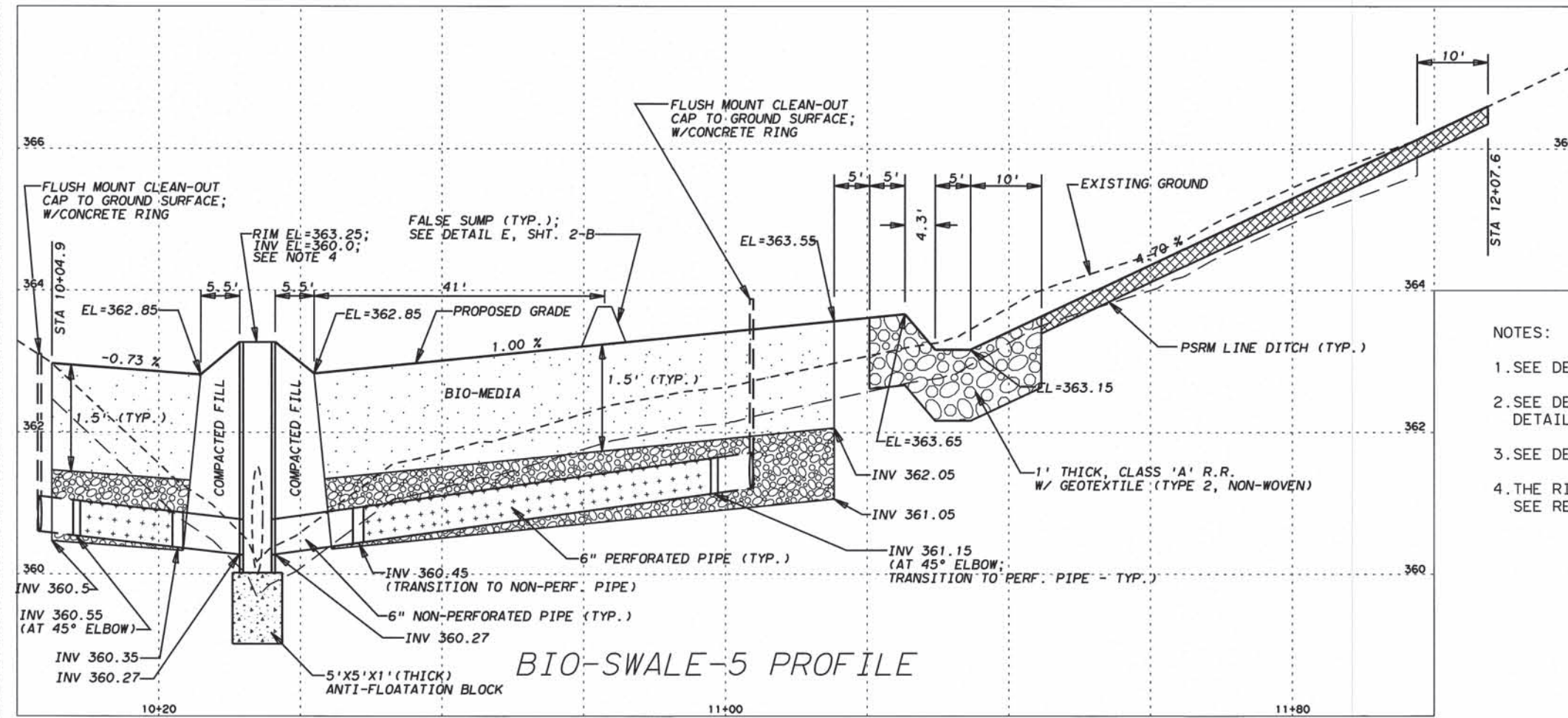
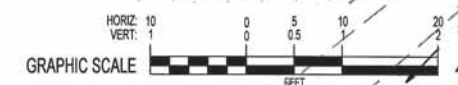
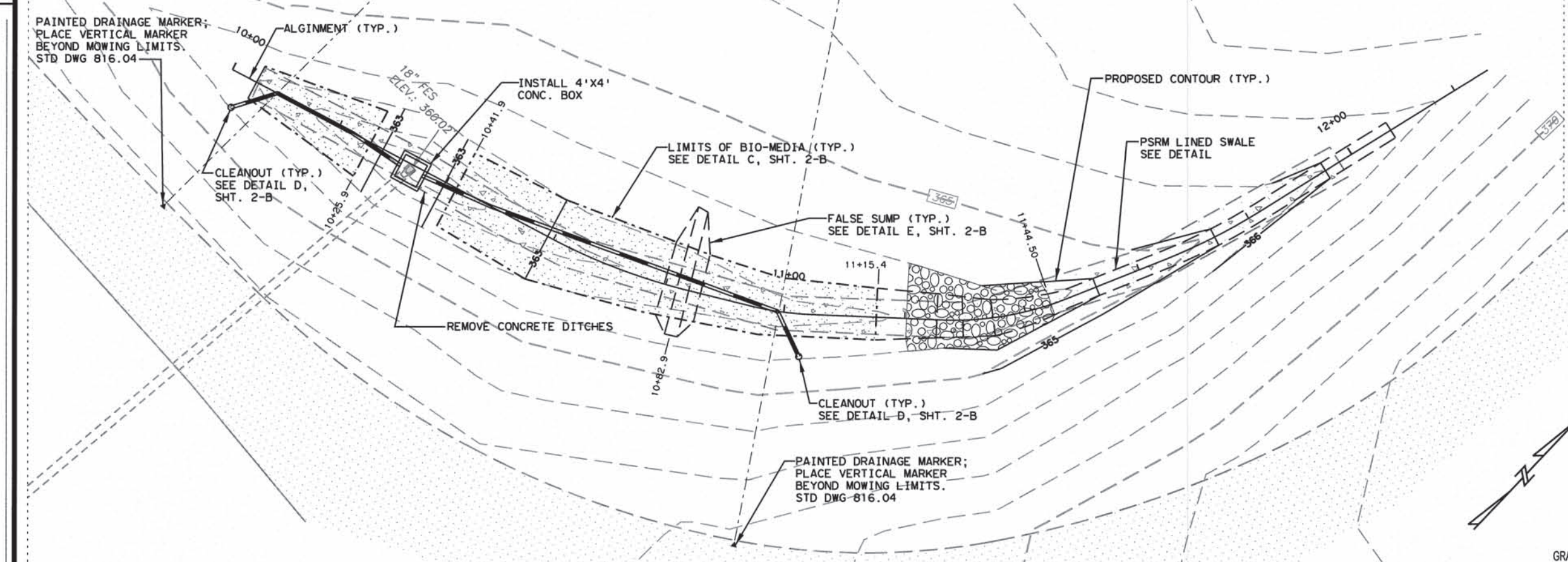






# BIO-SWALE 5

PROJECT REFERENCE NO. <b>R-4436EG</b>	SHEET NO. <b>8</b>
RW SHEET NO.	
HYDRAULICS ENGINEER	
<b>CALL SIGN ENGINEERS</b> 104 Gillespie Street Fayetteville, NC 28301 Ph: 910.488.0700 Fax: 910.488.8900 www.callsignengineers.com NC Firm License No. C-3485	



- NOTES:
1. SEE DETAIL C ON SHEET 2-B FOR BIO-SECTION DETAIL.
  2. SEE DETAIL D ON SHEET 2-B FOR FLUSH MOUNTED CLEANOUT DETAIL.
  3. SEE DETAIL E ON SHEET 2-B FOR FALSE SUMP DETAIL.
  4. THE RISER STRUCTURE SHALL INCLUDE A TRASH RACK. SEE REBAR TRASH RACK PORTION OF DETAIL B ON SHEET 2-B.

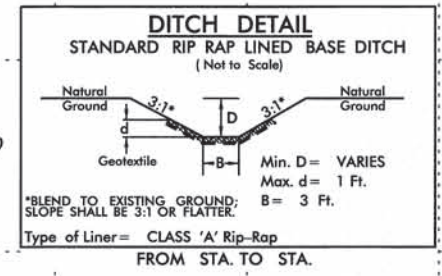
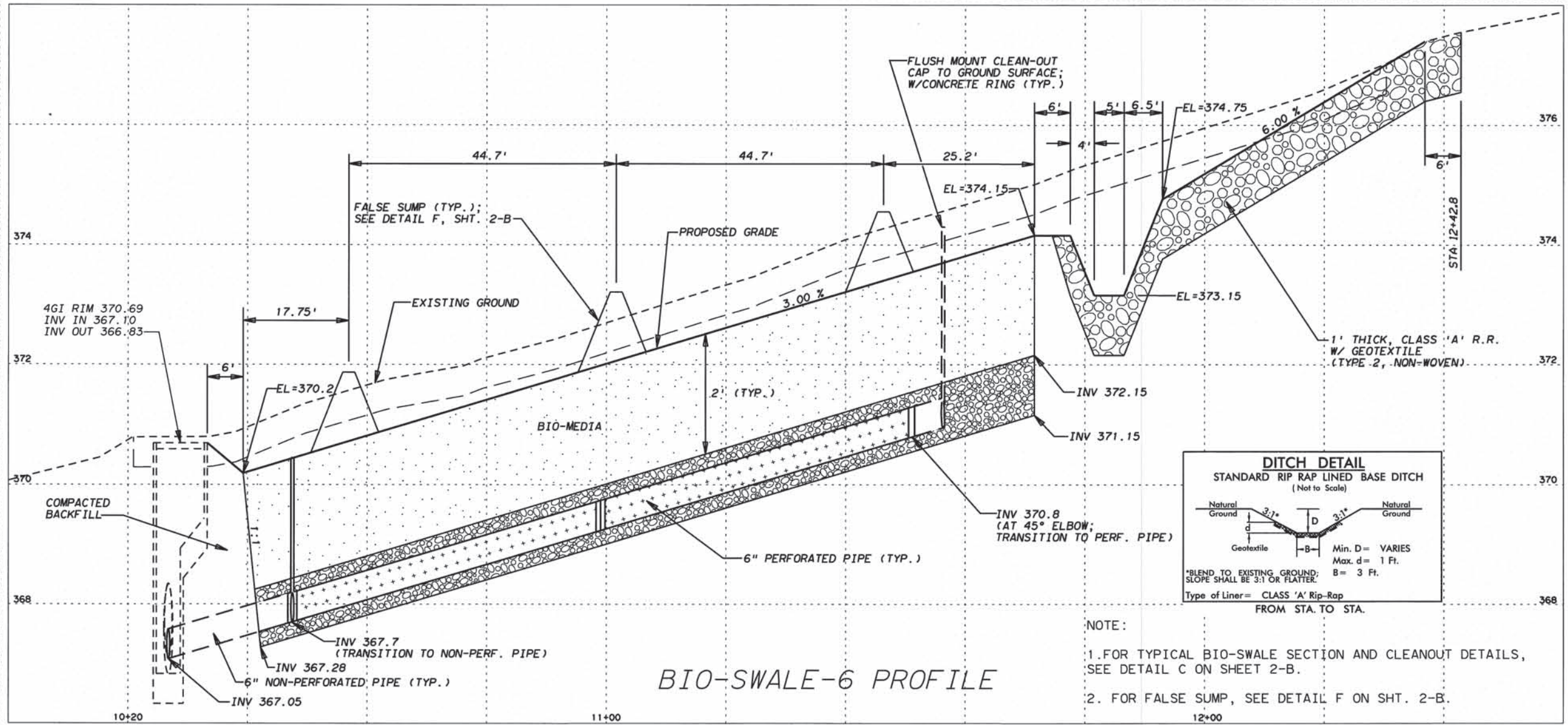
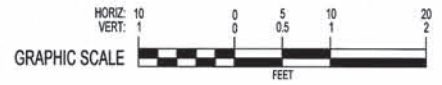
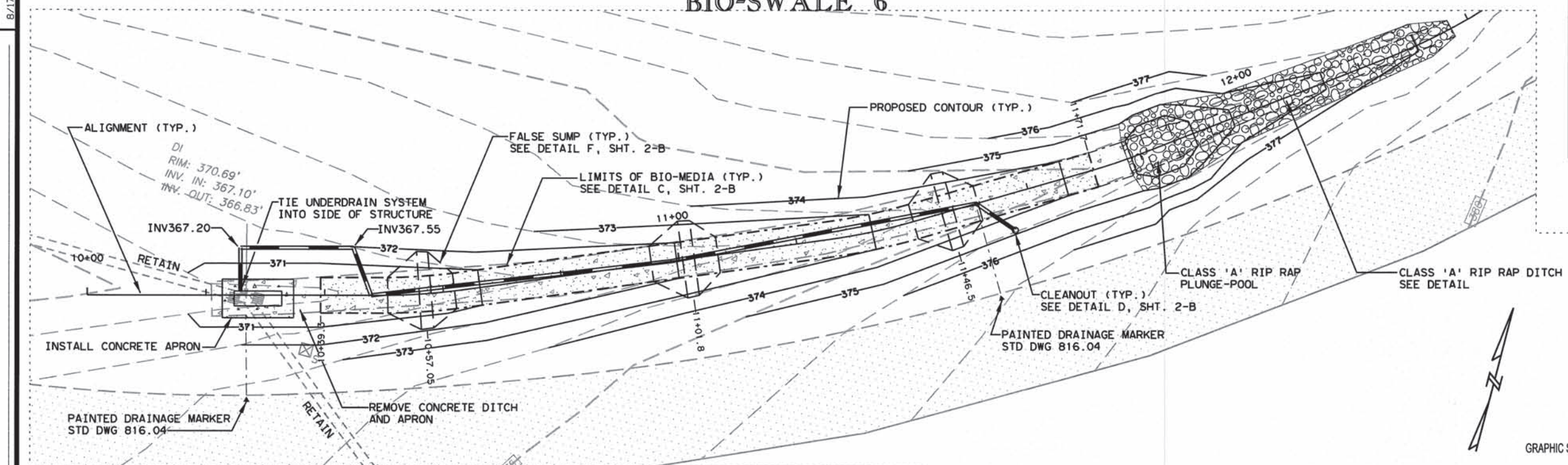
BIO-SWALE-5 PROFILE

8/17/99  
REVISIONS  
SYSTEMS  
USE



# BIO-SWALE 6

PROJECT REFERENCE NO. <b>R-4436EG</b>	SHEET NO. <b>9</b>
RW SHEET NO.	
HYDRAULICS ENGINEER	
<b>CALL SIGN ENGINEERS</b> 104 Gillespie Street Fayetteville, NC 28301 Ph: 910.486.0700 Fax: 910.486.8909 www.callsignengineers.com NC Firm License No. C-3485	



- NOTE:
- FOR TYPICAL BIO-SWALE SECTION AND CLEANOUT DETAILS, SEE DETAIL C ON SHEET 2-B.
  - FOR FALSE SUMP, SEE DETAIL F ON SHT. 2-B.

BIO-SWALE-6 PROFILE

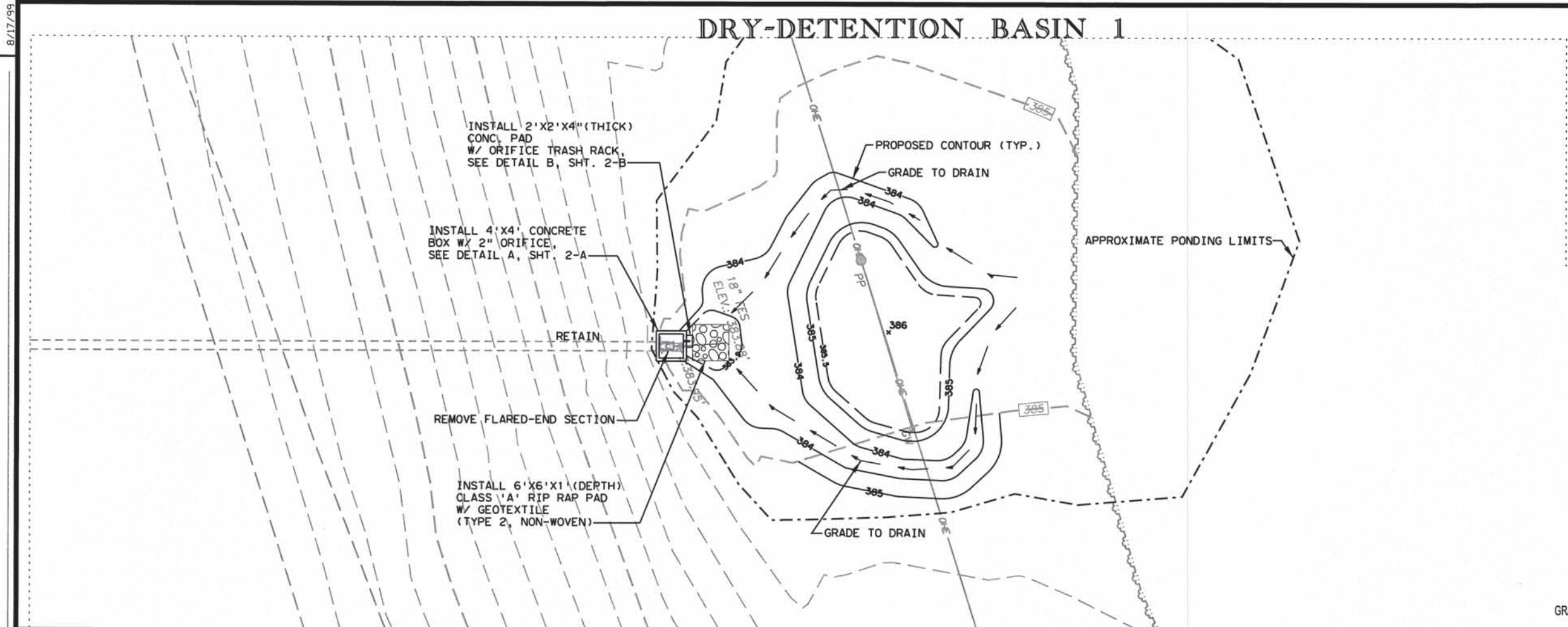
REVISIONS

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# DRY-DETECTION BASIN 1

PROJECT REFERENCE NO. <b>R-4436EG</b>	SHEET NO. <b>10</b>
RW SHEET NO.	
HYDRAULICS ENGINEER	
<b>CALL SIGN ENGINEERS</b> <small>104 Gillespie Street Fayetteville, NC 28301 Ph: 910.486.0700 Fax: 910.486.8900 www.callsignengineers.com NC Firm License No. C-3485</small>	



INSTALL 2'X2'X4" (THICK)  
CONC. PAD  
W/ ORIFICE TRASH RACK,  
SEE DETAIL B, SHT. 2-B

INSTALL 4'X4' CONCRETE  
BOX W/ 2" ORIFICE,  
SEE DETAIL A, SHT. 2-A

RETAIN

REMOVE FLARED-END SECTION

INSTALL 6'X6'X1' (DEPTH)  
CLASS 'A' RIP RAP PAD  
W/ GEOTEXTILE  
(TYPE 2, NON-WOVEN)

PROPOSED CONTOUR (TYP.)

GRADE TO DRAIN

APPROXIMATE PONDING LIMITS

GRADE TO DRAIN



REVISIONS

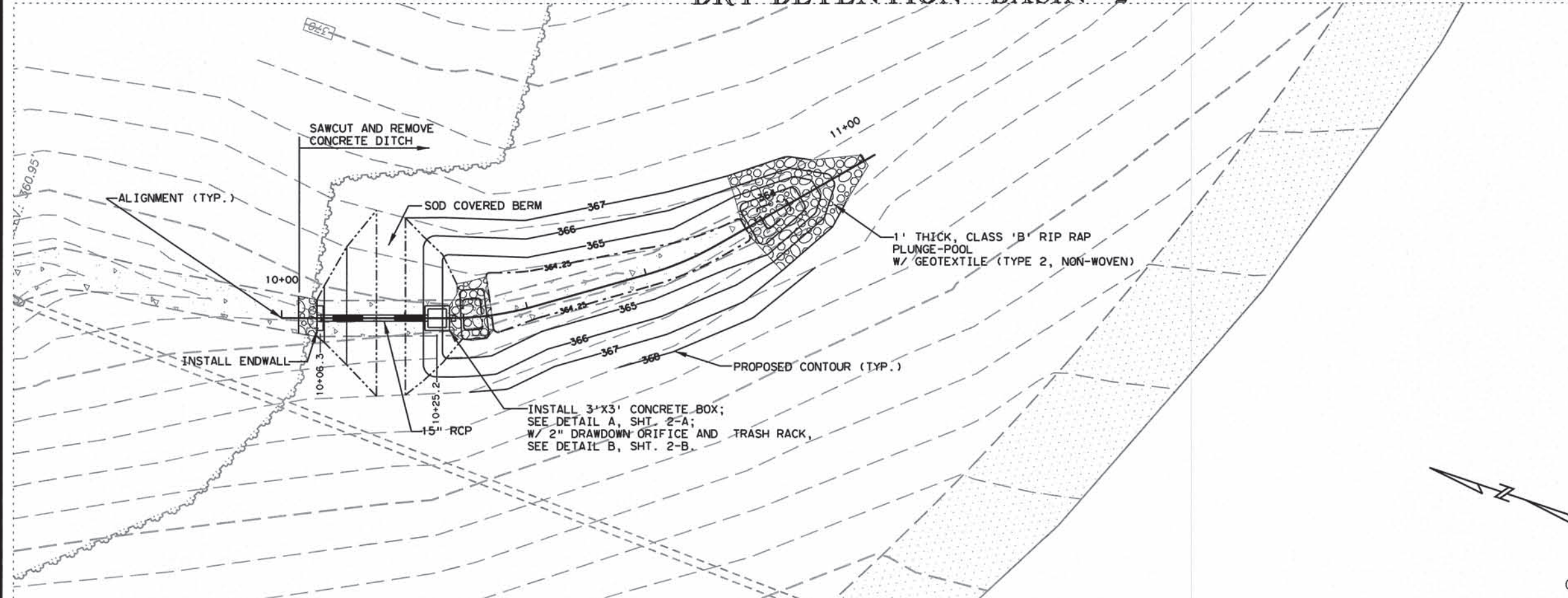
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\*\*\*\*\*SYTIME\*\*\*\*\*  
\*\*\*\*\*ADGN\*\*\*\*\*  
\*\*\*\*\*ENGINEER\*\*\*\*\*

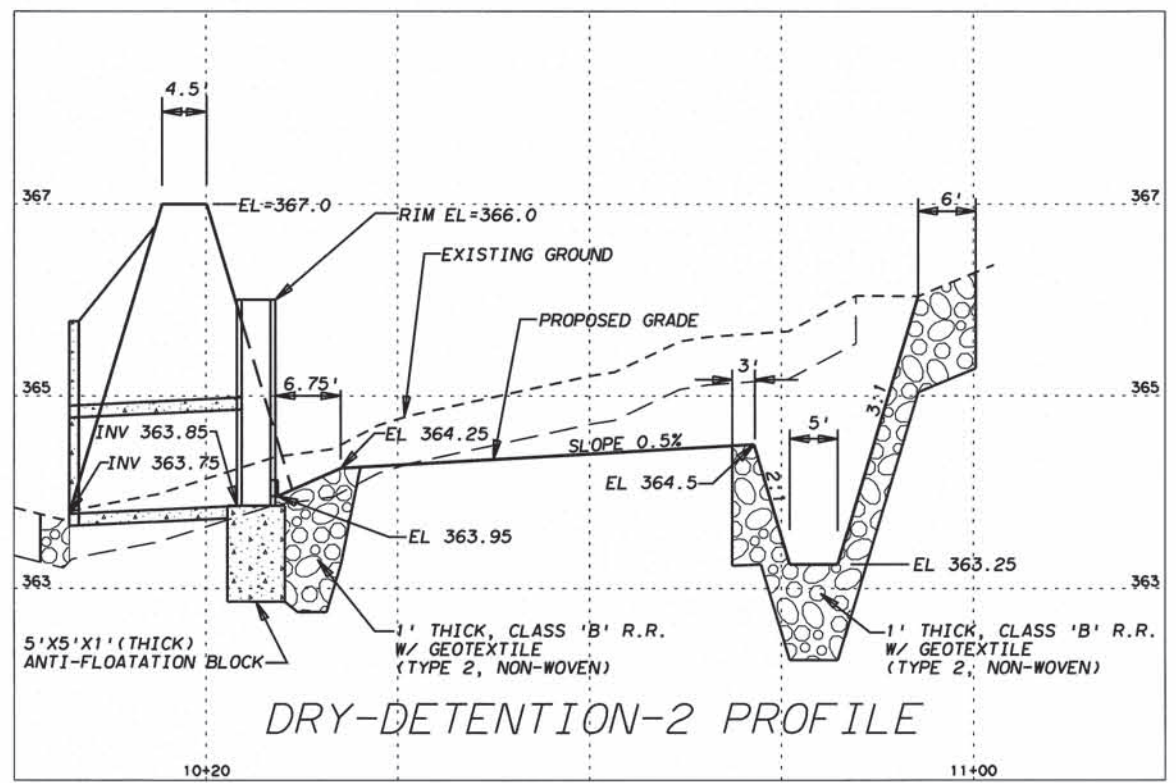
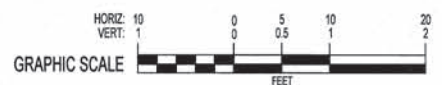


# DRY-DETENTION BASIN 2

PROJECT REFERENCE NO. <b>R-4436EG</b>	SHEET NO. <b>11</b>
RW SHEET NO.	
HYDRAULICS ENGINEER	
<b>CALL SIGN ENGINEERS</b> <small>104 Gillespie Street          Fayetteville, NC 28301          Ph: 910.485.0700 Fax: 910.485.8900          www.callsignengineers.com          NC Firm License No. C-3485</small>	



REVISIONS



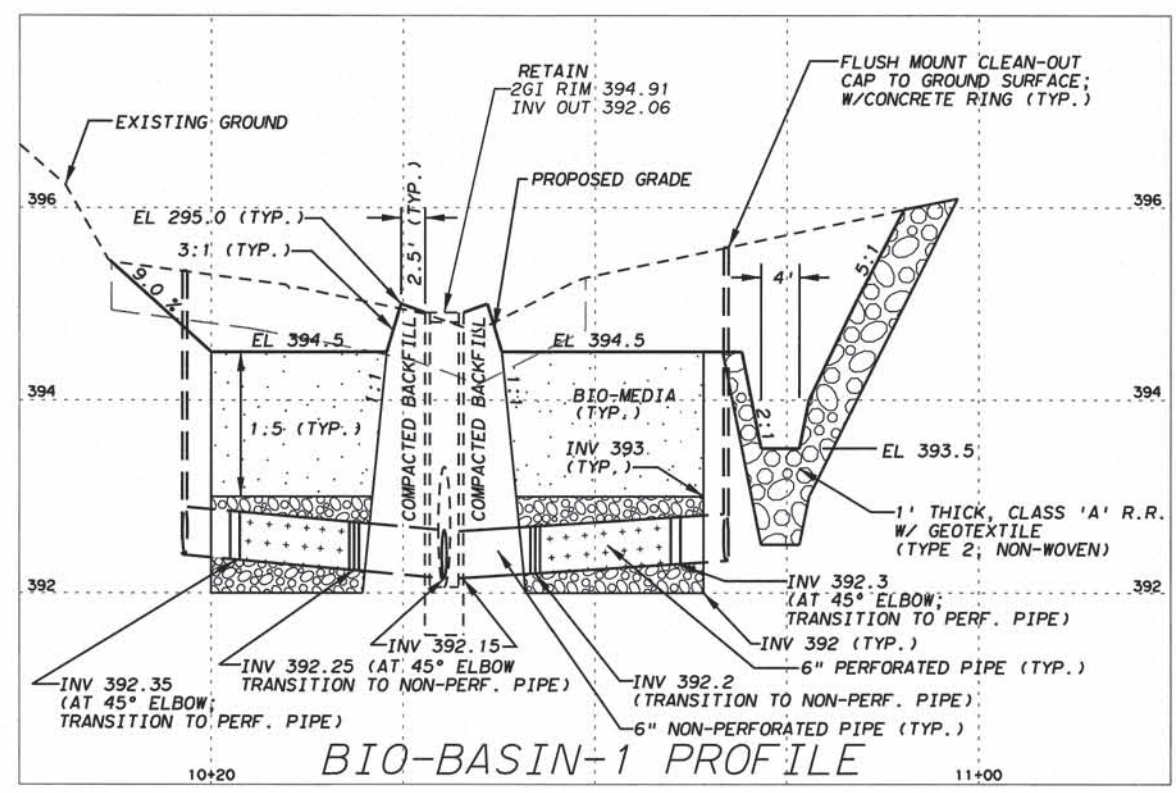
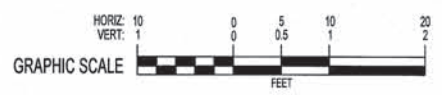
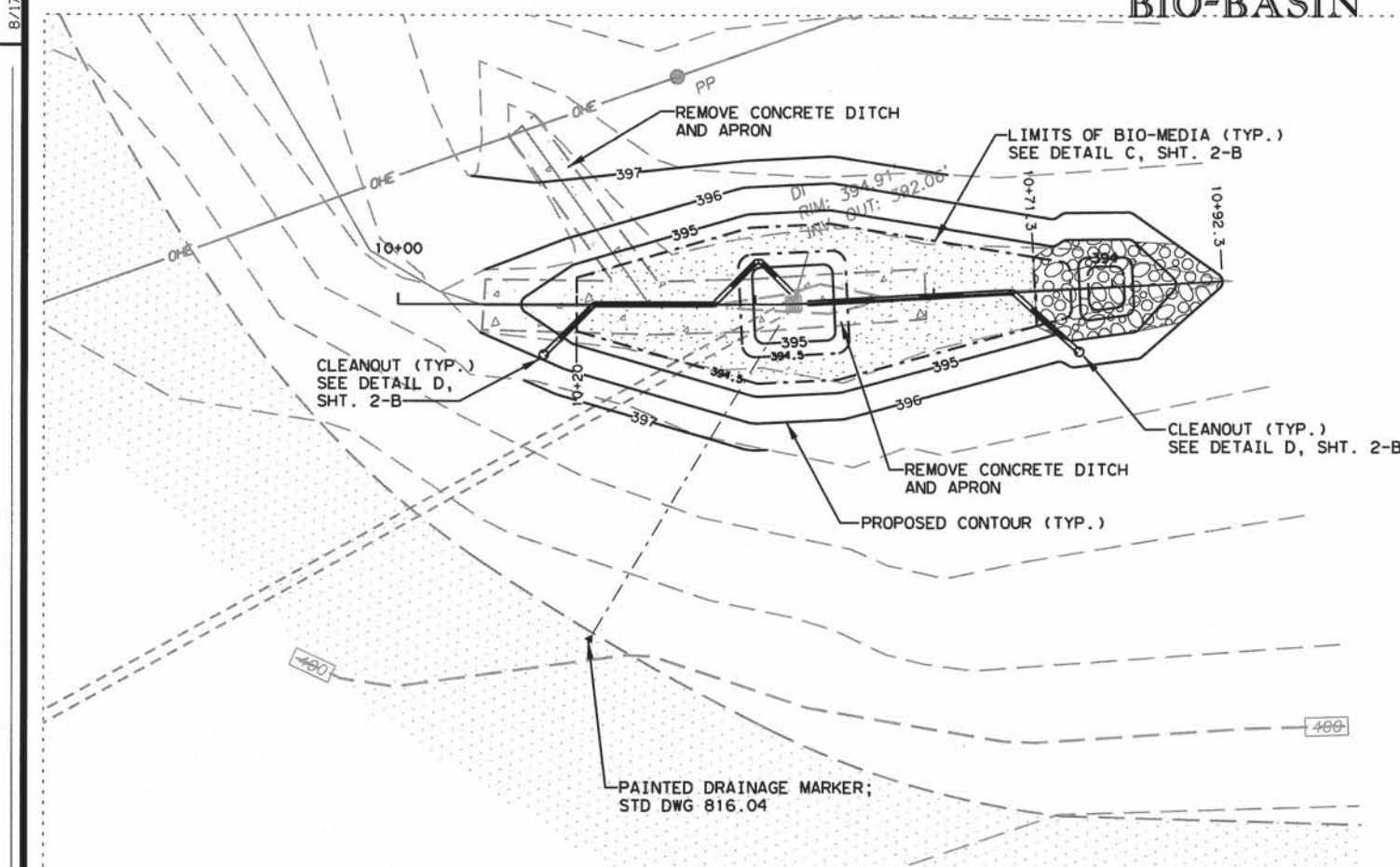
**DRY-DETENTION-2 PROFILE**

SYSTEMTIME: 11/15/2014 10:00:00 AM  
 USER: keithb  
 PROJECT: R-4436EG  
 SHEET: 11



# BIO-BASIN 1

PROJECT REFERENCE NO. <b>R-4436EG</b>	SHEET NO. <b>12</b>
RW SHEET NO.	
HYDRAULICS ENGINEER	
<b>CALL SIGN ENGINEERS</b> 104 Gillespie Street Fayetteville, NC 28301 Ph: 910.486.0700 Fax: 910.486.8009 www.callsignengineers.com NC Firm License No. C-3485	



- NOTES:
1. SEE DETAIL C ON SHEET 2-B FOR BIO-SECTION DETAIL.
  2. SEE DETAIL D ON SHEET 2-B FOR FLUSH MOUNTED CLEANOUT DETAIL.

REVISIONS

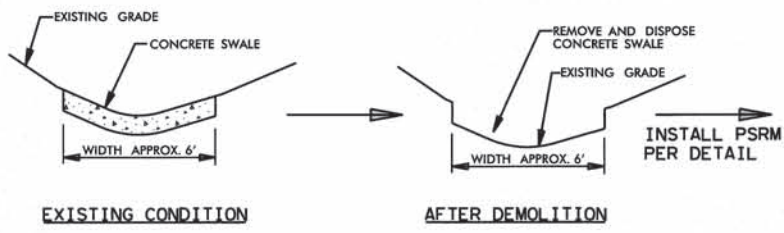
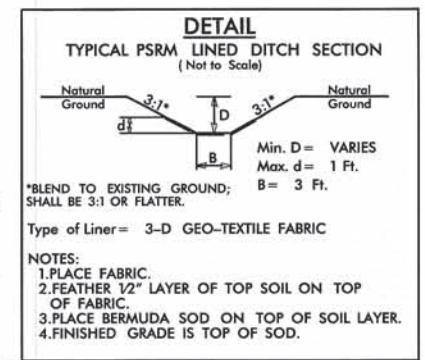
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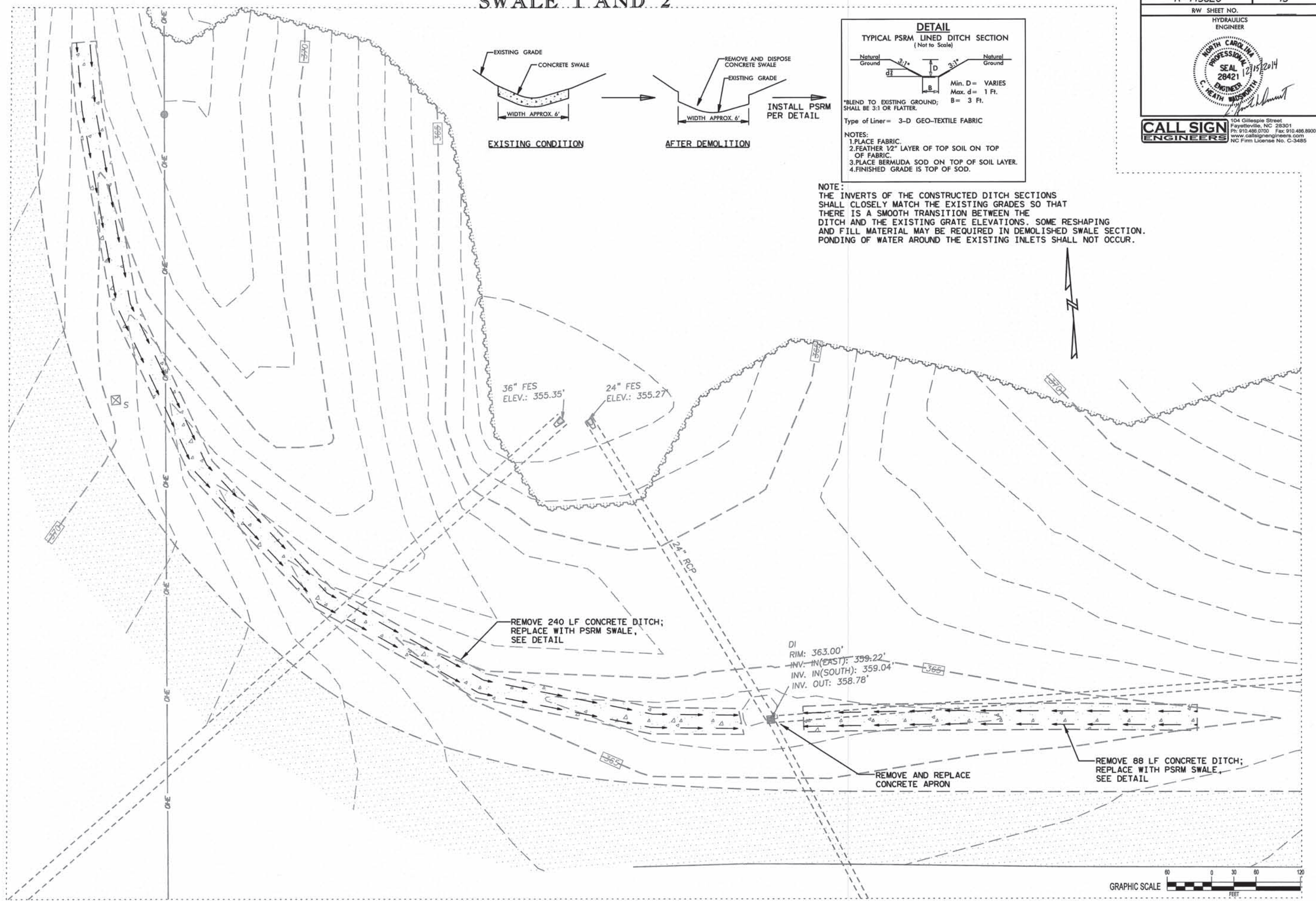
# SWALE 1 AND 2

PROJECT REFERENCE NO. <b>R-4436EG</b>	SHEET NO. <b>13</b>
RW SHEET NO.	
HYDRAULICS ENGINEER	

**CALL SIGN ENGINEERS**  
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 Ph: 910.498.0700 Fax: 910.498.8900  
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NOTE:  
 THE INVERTS OF THE CONSTRUCTED DITCH SECTIONS SHALL CLOSELY MATCH THE EXISTING GRADES SO THAT THERE IS A SMOOTH TRANSITION BETWEEN THE DITCH AND THE EXISTING GRADE ELEVATIONS. SOME RESHAPING AND FILL MATERIAL MAY BE REQUIRED IN DEMOLISHED SWALE SECTION. PONDING OF WATER AROUND THE EXISTING INLETS SHALL NOT OCCUR.



REVISIONS  
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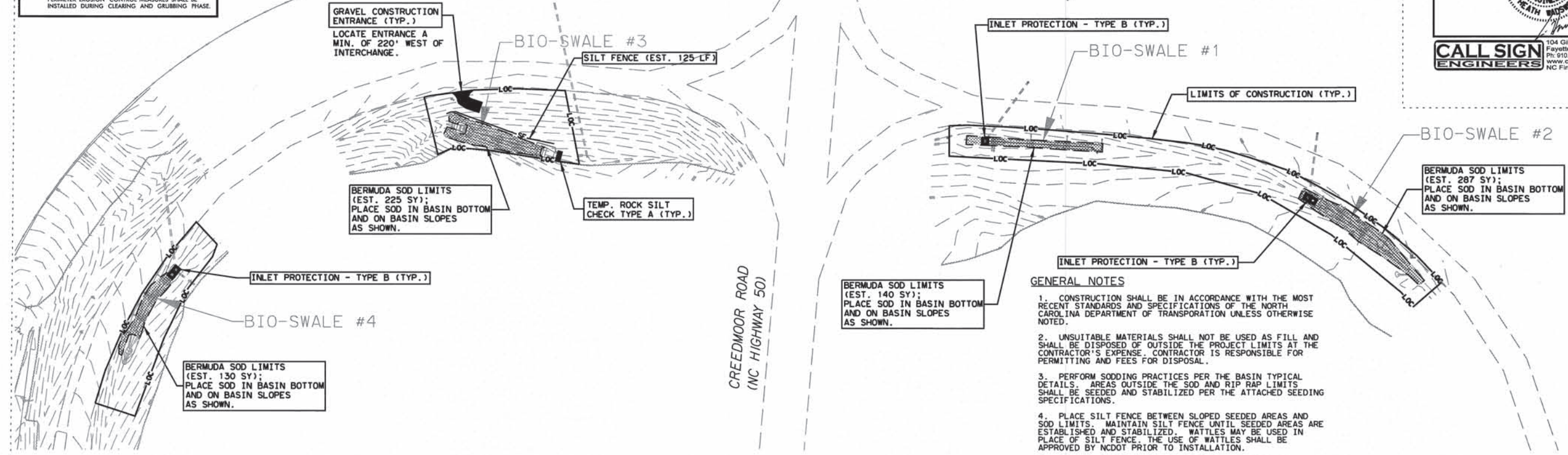
# EROSION CONTROL PLAN

PROJECT REFERENCE NO. <b>R-4436EG</b>	SHEET NO. <b>EC-01</b>
RW SHEET NO.	
HYDRAULICS ENGINEER	
	
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**NOTES:** ANY DEVIATION FROM OPTIONS GIVEN WILL REQUIRE PRIOR APPROVAL BY ENGINEER.

ADDITIONAL EROSION CONTROL DEVICES MAY NEED TO BE INSTALLED AS DIRECTED BY THE ENGINEER.

**NOTE:** PERIMETER EROSION CONTROL MEASURES SHALL BE INSTALLED DURING CLEARING AND GRUBBING PHASE.



- GENERAL NOTES**
- CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE MOST RECENT STANDARDS AND SPECIFICATIONS OF THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UNLESS OTHERWISE NOTED.
  - UNSUITABLE MATERIALS SHALL NOT BE USED AS FILL AND SHALL BE DISPOSED OF OUTSIDE THE PROJECT LIMITS AT THE CONTRACTOR'S EXPENSE. CONTRACTOR IS RESPONSIBLE FOR PERMITTING AND FEES FOR DISPOSAL.
  - PERFORM SODDING PRACTICES PER THE BASIN TYPICAL DETAILS. AREAS OUTSIDE THE SOD AND RIP RAP LIMITS SHALL BE SEEDED AND STABILIZED PER THE ATTACHED SEEDING SPECIFICATIONS.
  - PLACE SILT FENCE BETWEEN SLOPED SEEDED AREAS AND SOD LIMITS. MAINTAIN SILT FENCE UNTIL SEEDED AREAS ARE ESTABLISHED AND STABILIZED. WATTLES MAY BE USED IN PLACE OF SILT FENCE. THE USE OF WATTLES SHALL BE APPROVED BY NCDOT PRIOR TO INSTALLATION.
  - PROVIDE A GRAVEL CONSTRUCTION ENTRANCE FOR ALL STOCKPILE AREAS.

**CONSTRUCTION SEQUENCE**

- THE CONTRACTOR SHALL NOTIFY NCDOT SEVEN (7) DAYS BEFORE COMMENCING ANY LAND DISTURBING ACTIVITY.
- INSTALL APPLICABLE EROSION AND SEDIMENT CONTROL MEASURES PRIOR TO THE ONSET OF ANY LAND DISTURBING ACTIVITY.
- INSTALL APPLICABLE SEDIMENT CONTROL MEASURES INCLUDING:
  - EXCAVATED, ROCK PIPE, AND INLET PROTECTION MEASURES.
  - CHECK DAMS WITH WEIRS.
- INSTALL APPLICABLE TEMPORARY AND/OR PERMANENT EROSION CONTROL MEASURES FOR DISTURBED AREAS, AS REQUIRED, INCLUDING:
  - PERMANENT AND TEMPORARY SEEDED AS REQUIRED, AND SOD ACCORDING TO PLANS.
- CLEAR AND PERFORM EARTHWORK TO ESTABLISH DITCHES, BIO-BASINS, DETENTION BASINS, AND NEW INLET STRUCTURES AS INDICATED ON PLANS. ADJUST AND/OR INSTALL EROSION AND SEDIMENTATION CONTROL MEASURES AS WORK PROGRESSES. CHECK AND MAINTAIN MEASURES. INSTALL PERMANENT SEED/SOD WITH FERTILIZER, MULCH AND ANCHOR AND RECS AS NECESSARY, OR PROVIDE TEMPORARY SEEDED UNTIL PERMANENT SEEDED/VEGETATION CAN BE INSTALLED.
- IMMEDIATELY AFTER CONSTRUCTION OF FINAL GRADES, INSTALL PERMANENT SEED/SOD WITH FERTILIZER, AND MULCHING.
- MAINTAIN ALL EROSION CONTROL MEASURES AS NEEDED.
- PROVIDE TEMPORARY PERMANENT SEEDED, AND/OR GROUND COVER PER GUIDANCE OF THE SEEDING SPECIFICATIONS.
- CONTRACTOR SHALL INSPECT ALL DEVICES DAILY AND AFTER EVERY RAIN AND SHALL MAINTAIN THE DEVICES ACCORDING TO THE NORTH CAROLINA EROSION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL.
- AFTER DISTURBED AREAS ARE STABILIZED, THE CONTRACTOR SHALL REMOVE THE TEMPORARY DEVICES AND PROPERLY DISPOSE OF THE TRAPPED SEDIMENT. CONTRACTOR SHALL STABILIZE THE AREAS DISTURBED DURING THE REMOVAL OPERATION BY PLACING PERMANENT VEGETATION IN ALL DISTURBED AREAS.

**DRAINAGE**

- DEWATERING:** THE CONTRACTOR SHALL AT ALL TIMES PROVIDE AND MAINTAIN AMPLE MEANS AND EQUIPMENT WITH WHICH TO REMOVE AND PROPERLY DISPOSE OF ANY AND ALL WATER ENTERING THE EXCAVATION OR OTHER PARTS OF THE WORK AND KEEP ALL EXCAVATIONS DRY UNTIL SUCH TIME AS PIPE LAYING AND GRADING IS COMPLETED. NO WATER SHALL BE ALLOWED TO RISE AROUND THE PIPE IN UNBACKFILLED TRENCHES NOR SHALL IT BE ALLOWED TO RISE OVER MASONRY UNTIL THE CONCRETE OR MORTAR HAS SET (MINIMUM 24 HOURS). THE CONTRACTOR SHALL PUMP OR DRAIN SEDIMENT-LADEN WATER THROUGH SEDIMENT BAG(S) PRIOR TO DISCHARGE TO ADJACENT PROPERTY OR OTHER CONSTRUCTION (SEE DETAILS).

**UTILITIES**

- PIPE BEDDING THROUGH THE BERM SHALL NOT BE PLACED ON GRANULAR BEDDING MATERIAL. BACKFILL PIPE TRENCH WITH WELL COMPACTED CLAYEY MATERIAL UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- ALL STORM DRAINAGE PIPES SHALL BE RCP CLASS III UNLESS OTHERWISE NOTED ON THE PLANS.
- THE CONTRACTOR SHALL CONTACT THE LOCATOR AT 811 OR 1-800-632-4949 BEFORE COMMENCING ANY WORK. THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UNDERGROUND UTILITIES WHETHER INDICATED ON THE DRAWINGS OR NOT. THE CONTRACTOR WILL ASSURE THE PRESENCE ONSITE OF A REPRESENTATIVE OF THE GAS COMPANY WHEN WORKING IN THE VICINITY OF ANY GAS MAINS.

**STABILIZATION REQUIREMENTS:**

Stabilization for this project shall comply with the time frame guidelines as specified 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. Temporary or permanent ground cover stabilization shall occur within 7 calendar days from the last land-disturbing activity, with the following exceptions in which temporary or permanent ground cover shall be provided in 14 calendar days from the last land-disturbing activity:

- Slopes between 2:1 and 3:1, with a slope length of 10 ft. or less
- Slopes 3:1 or flatter, with a slope of length of 50 ft. or less
- Slopes 4:1 or flatter

The stabilization timeframe for High Quality Water (HQW) Zones shall be 7 calendar days with no exceptions for slope grades or lengths. High Quality Water Zones (HQW) Zones are defined by North Carolina Administrative Code 15A NCAC 04A.0105 (25). Temporary and permanent ground cover stabilization shall be achieved in accordance with the provisions in this contract and as directed.

**SEEDING AND MULCHING:**

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined. All rates are in pounds per acre.

All Roadway Areas			
March 1 - August 31		September 1 - February 28	
50#	Tall Fescue	50#	Tall Fescue
10#	Centipede	10#	Centipede
25#	Bermudagrass (hulled)	35#	Bermudagrass (unhulled)
500#	Fertilizer	500#	Fertilizer
4000#	Limestone	4000#	Limestone
Waste and Borrow Locations			
March 1 - August 31		September 1 - February 28	
75#	Tall Fescue	75#	Tall Fescue
25#	Bermudagrass (hulled)	35#	Bermudagrass (unhulled)
500#	Fertilizer	500#	Fertilizer
4000#	Limestone	4000#	Limestone

Note: 50# of Bahiagrass may be substituted for either Centipede or Bermudagrass only upon Engineer's request.

Approved Tall Fescue Cultivars

2 <sup>nd</sup> Millennium	Duster	Magellan	Rendition
Avenger	Endeavor	Masterpiece	Scorpion
Barlexas	Escalade	Matador	Shelby
Barlexas II	Falcon II, III, IV & V	Matador GT	Sigma
Barrera	Fidelity	Millennium	Silverstar
Barrington	Finesse II	Montauk	Southern Choice II
Biltmore	Firebird	Mustang 3	Steson
Bingo	Focus	Olympic Gold	Tarheel
Bravo	Grande II	Padre	Titan Ltd
Cayenne	Greenkeeper	Paraiso	Titanium
Chapel Hill	Greystone	Picasso	Tomahawk
Chesapeake	Inferno	Piedmont	Tacer
Constitution	Justice	Pure Gold	Trooper
Chipper	Jaguar 3	Prospect	Turbo
Conrado	Kalahari	Quest	Ultimate
Coyote	Kentucky 31	Rebel Exeda	Watchdog
Davinci	Kitty Hawk	Rebel Sentry	Wolfpack
Dynasty	Kitty Hawk 2000	Regiment II	
Dominion	Lexington	Rembrandt	

On cut and fill slopes 2:1 or steeper Centipede shall be applied at the rate of 5 pounds per acre and add 20# of Sericea Lespedeza from January 1 - December 31.

Fertilizer shall be 10-20-20 analysis. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis and as directed.

**TEMPORARY SEEDING:**

Fertilizer shall be the same analysis as specified for Seeding and Mulching and applied at the rate of 400 pounds and seeded at the rate of 500 pounds per acre. Sweet Sudan Grass, German Millet or Browntop Millet shall be used in summer months and Rye Grain during the remainder of the year. The Engineer will determine the exact dates for using each kind of seed.

**FERTILIZER TOPDRESSING:**

Fertilizer used for topdressing on all roadway areas except slopes 2:1 and steeper shall be 10-20-20 grade and shall be applied at the rate of 500 pounds per acre. A different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 10-20-20 analysis and as directed.






Fertilizer used for topdressing on slopes 2:1 and steeper and waste and borrow areas shall be 16-8-8 grade and shall be applied at the rate of 500 pounds per acre. A different analysis of fertilizer may be used provided the 2-1-1 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 16-8-8 analysis and as directed.

**SUPPLEMENTAL SEEDING:**

The kinds of seed and proportions shall be the same as specified for Seeding and Mulching, with the exception that no centipede seed will be used in the seed mix for supplemental seeding. The rate of application for supplemental seeding may vary from 25# to 75# per acre. The actual rate per acre will be determined prior to the time of topdressing and the Contractor will be notified in writing of the rate per acre, total quantity needed, and areas on which to apply the supplemental seed. Minimum tillage equipment, consisting of a sod seeder shall be used for incorporating seed into the soil as to prevent disturbance of existing vegetation. A clodbuster (ball and chain) may be used where degree of slope prevents the use of a sod seeder.

**MOWING:**

The minimum mowing height on this project shall be 4 inches.

Sed. #	Description	Symbol
1605.01	Temporary Silt Fence	-SF-
1607.01	Gravel Construction Entrance	
1632.02	Rock Inlet Sediment Trap - Type B	
1633.01	Temporary Rock Silt Check Type-A	
1638.02	Rock Pipe Inlet Sediment Trap Type-B	
SP	Bermuda Sod	

**ROADSIDE ENVIRONMENTAL UNIT  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, NC  
2012 STANDARD SPECIFICATIONS**



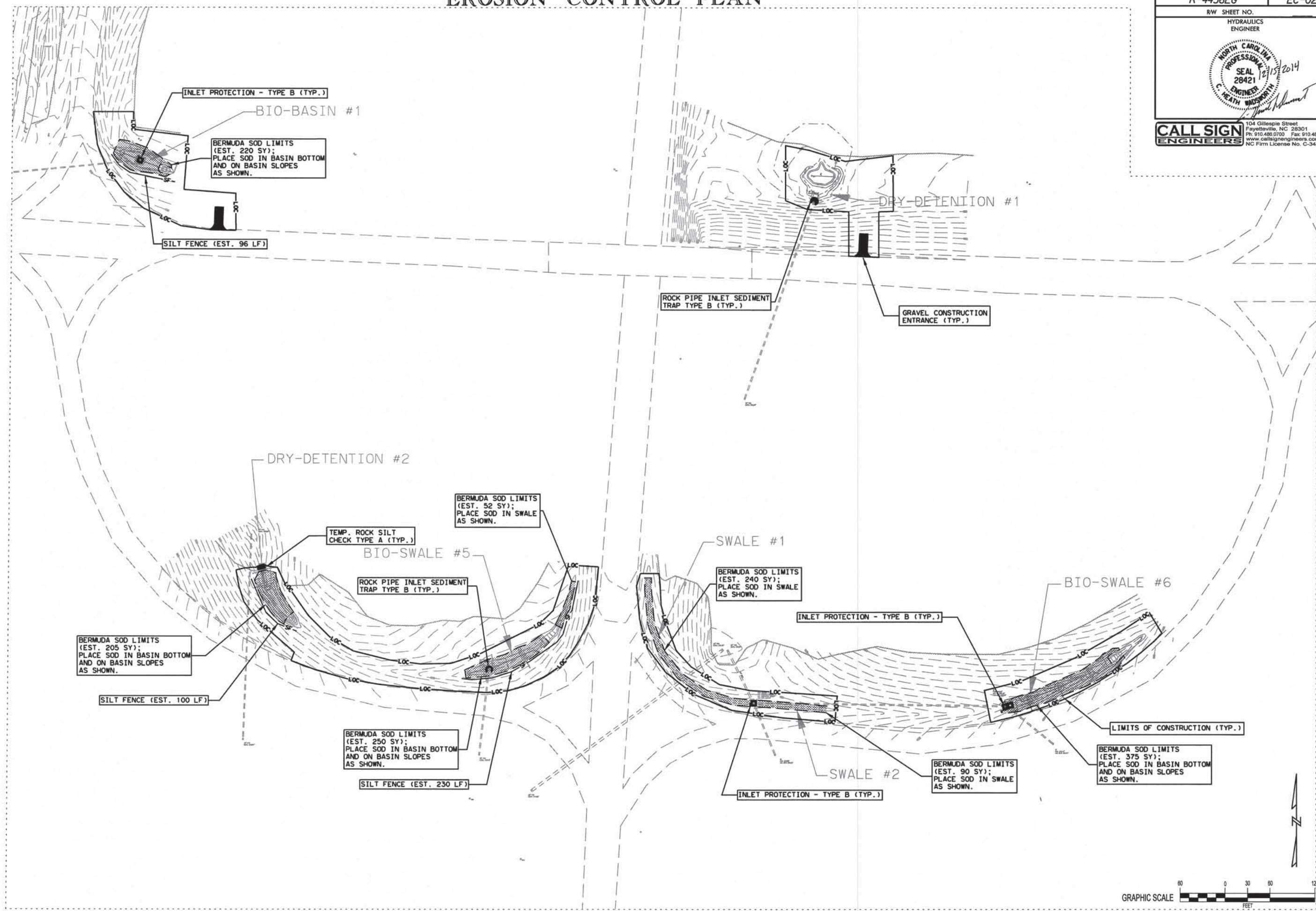
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DATE



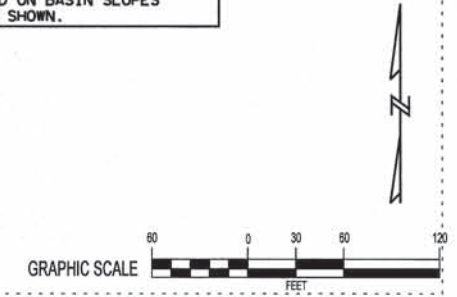
# EROSION CONTROL PLAN

PROJECT REFERENCE NO. <b>R-4436EG</b>	SHEET NO. <b>EC-02</b>
RW SHEET NO.	
HYDRAULICS ENGINEER	
	
<b>CALL SIGN ENGINEERS</b> 104 Gillespie Street Fayetteville, NC 28301 Ph: 910.486.0700 Fax: 910.486.6900 www.callsignengineers.com NC Firm License No. C-3485	



REVISIONS

SYSTEM: \$\$\$\$  
 USER: \$\$\$\$  
 DATE: \$\$\$\$  
 TIME: \$\$\$\$

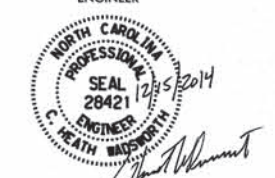




# EROSION CONTROL DETAILS

PROJECT REFERENCE NO. R-4436EG SHEET NO. EC-03

RW SHEET NO. HYDRAULICS ENGINEER



CALL SIGN ENGINEERS  
104 Gillespie Street  
Fayetteville, NC 28301  
Ph 910.486.0700 Fax 910.486.8900  
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STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR TEMPORARY SILT FENCE

NOTES:  
USE WIRE A MINIMUM OF 32" IN WIDTH AND WITH A MINIMUM OF 6 LINE WIRES WITH 12" STAY SPACING.  
USE FILTRATION GEOTEXTILE A MINIMUM OF 36" IN WIDTH AND FASTEN ADEQUATELY TO THE WIRE AS DIRECTED.  
PROVIDE 5'-0" STEEL POST OF THE SELF-FASTENER ANGLE STEEL TYPE.  
FOR MECHANICAL SLICING METHOD INSTALLATION, GEOTEXTILE SHALL BE A MAXIMUM OF 18" ABOVE GROUND SURFACE.

1605.01

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ENGLISH STANDARD DRAWING FOR GRAVEL CONSTRUCTION ENTRANCE

NOTES:  
1. PROVIDE TURNING RADIUS SUFFICIENT TO ACCOMMODATE LARGE TRUCKS.  
2. LOCATE ENTRANCES TO PROVIDE FOR UTILIZATION BY ALL CONSTRUCTION VEHICLES.  
3. MUST BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR DIRECT FLOW OF MUD ONTO STREETS.  
4. ANY MATERIAL TRACKED ONTO THE ROADWAY MUST BE CLEANED UP IMMEDIATELY.  
5. LOCATE GRAVEL CONSTRUCTION ENTRANCE AT ALL POINTS OF INGRESS AND EGRESS UNTIL SITE IS STABILIZED. PROVIDE FREQUENT CHECKS OF THE DEVICE AND TIMELY MAINTENANCE.  
6. NUMBER AND LOCATION OF CONSTRUCTION ENTRANCES TO BE DETERMINED BY THE ENGINEER.  
7. USE CLASS 'A' STONE OR OTHER COARSE AGGREGATE APPROVED BY THE ENGINEER.  
8. INSTALL CONSTRUCTION ENTRANCES IN A WAY TO PREVENT VEHICLES FROM BYPASSING CONSTRUCTION ENTRANCE LEAVING PROJECT SITE.

NOTE: PLACE FILTRATION GEOTEXTILE BENEATH STONE

1607.01

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ENGLISH STANDARD DRAWING FOR ROCK INLET SEDIMENT TRAP TYPE B

NOTES:  
CLEAN SEDIMENT WHEN 1/2 FULL AND AS DIRECTED.  
USE NO. 5 OR NO. 57 STONE FOR SEDIMENT CONTROL STONE.  
USE CLASS A STONE FOR STRUCTURAL STONE.  
CONSTRUCT TOP OF BERM A MINIMUM OF ONE FOOT BELOW THE SHOULDER OR ANY DIVERSION POINT.

1632.02

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ENGLISH STANDARD DRAWING FOR TEMPORARY ROCK SILT CHECK TYPE A

NOTE:  
USE CLASS B EROSION CONTROL STONE FOR STRUCTURAL STONE.  
USE NO. 5 OR NO. 57 STONE FOR SEDIMENT CONTROL.

1633.01

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ENGLISH STANDARD DRAWING FOR ROCK PIPE INLET SEDIMENT TRAP TYPE B

NOTES:  
USE CLASS A EROSION CONTROL STONE FOR STRUCTURAL STONE.  
USE NO. 5 OR NO. 57 STONE FOR SEDIMENT CONTROL STONE.  
CONSTRUCT TOP OF BERM A MINIMUM OF ONE FOOT BELOW THE SHOULDER OR DIVERSION POINT.  
PROVIDE A TOTAL SEDIMENT TRAP VOLUME OF 3600± CUBIC FEET PER ACRE OF DISTURBED AREA. SOME OF THE REQUIRED VOLUME MAY BE PROVIDED BY UP OR DOWNSTREAM CONTROLS.

1635.02

REVISIONS

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



# TRAFFIC CONTROL PLAN

PROJECT REFERENCE NO. <b>R-4436EG</b>	SHEET NO. <b>TC-01</b>
RW SHEET NO. HYDRAULICS ENGINEER	
	
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### GENERAL NOTES

THE FOLLOWING GENERAL NOTES SHALL APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT, EXCEPT WHEN OTHERWISE NOTED IN THE PLAN, OR DIRECTED BY THE ENGINEER.

THE TRAFFIC CONTROL PLAN FOR THIS PROJECT CONSISTS OF STANDARD DETAIL DRAWINGS. THESE DRAWINGS ARE TYPICAL SITUATIONS AND SHOULD BE ADAPTED TO THE ACTUAL FIELD CONDITIONS, SUCH AS WHEN PHYSICAL DIMENSIONS ARE NOT ATTAINABLE, OR WHEN MORE THAN ONE DRAWING IS APPLIED SIMULTANEOUSLY RESULTING IN DUPLICATE SIGNING, OR UNDESIRABLE OVERLAPPING OF DEVICES. CONTRACTOR SHALL BE RESPONSIBLE FOR ADAPTING THE TRAFFIC CONTROL PLAN TO FIELD CONDITIONS TO PROVIDE SAFE AND EFFICIENT TRAFFIC MOVEMENT.

### SHOULDER CLOSURE REQUIREMENTS

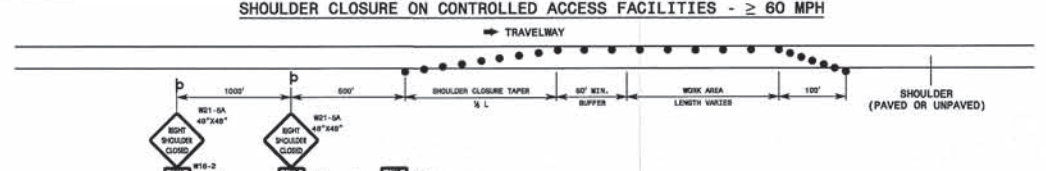
- A. SHOULDER CLOSURES SHALL BE REMOVED AS SOON AS PRACTICAL AFTER WORK BEHIND THE CLOSURE IS COMPLETED OR WHEN SHOULDER CLOSURE IS NO LONGER NEEDED.
- B. CONTRACTOR SHALL MAINTAIN EXISTING TRAFFIC PATTERNS AND LANE CONFIGURATIONS AT THE END OF EACH DAYS OPERATION AND DURING CONSTRUCTION INACTIVITY, EXCEPT AS OTHERWISE INDICATED IN THE PHASING PLAN.
- C. WHEN SHOULDER CLOSURES ARE NOT IN EFFECT, CHANNELIZING DEVICES IN WORK AREAS SHALL BE SPACED NO GREATER THAN TWICE THE POSTED SPEED LIMIT, EXCEPT 10-FEET ON CENTER IN RADII, AND SHALL BE SET 3' OFF THE EDGE OF AN EXISTING TRAVEL LANE.
- D. DURING SHOULDER CLOSURES, FLAGGERS SHALL BE USED WHEN DELIVERING MATERIALS TO LOCATIONS CLOSE TO THE PAVEMENT. FLAGGERS AND PROPER VEHICLE ACCESS TECHNIQUES SHALL BE USED FOR AREAS WHERE CONSTRUCTION TRAFFIC IS UTILIZING STANDARD CONSTRUCTION ENTRANCES.

### SIGNING

- E. EXISTING TRAFFIC SIGNAGE SHALL BE MOVED AND OTHERWISE MAINTAINED BY THE CONTRACTOR AS APPROPRIATE DURING CONSTRUCTION.
- F. ALL NECESSARY TRAFFIC CONTROL SIGNING SHALL BE IN PLACE PRIOR TO ALTERING ANY TRAFFIC PATTERN.

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### SHOULDER CLOSURE ON CONTROLLED ACCESS FACILITIES - ≥ 60 MPH

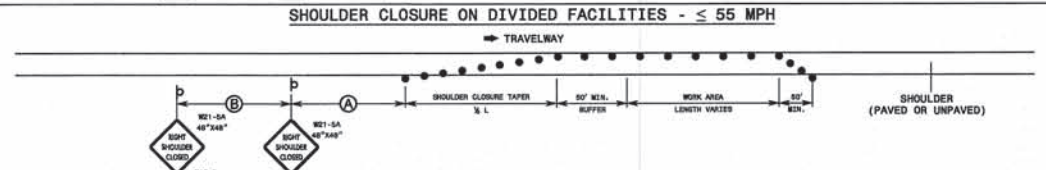


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### SHOULDER CLOSURE ON DIVIDED FACILITIES - ≤ 55 MPH

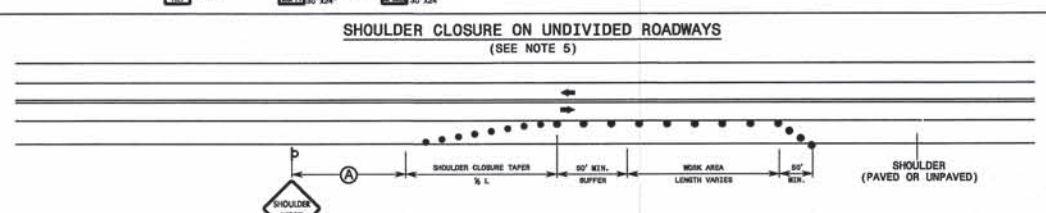


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### SHOULDER CLOSURE ON UNDIVIDED ROADWAYS (SEE NOTE 5)



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#### GENERAL NOTES

1. PLACE SHOULDER CLOSURE SIGNS ON THE SAME SIDE AS THE SHOULDER THAT IS CLOSED.
2. PLACE DRUMS IN THE SHOULDER TAPER AT THE MAXIMUM SPACING EQUAL IN FEET TO THE POSTED SPEED LIMIT. THE MAXIMUM SPACING OF DRUMS ALONG THE WORK AREA IS EQUAL IN FEET TO 2 TIMES THE POSTED SPEED LIMIT.
3. USE STATIONARY SIGNS FOR LONG TERM OPERATIONS (LONGER THAN 3 DAYS).
4. REFER TO STD. 1101.11 FOR "L" DISTANCE AND SIGN SPACING.
5. THE TWO-LANE, TWO-WAY DRAWING MAY BE APPLIED TO UNDIVIDED, MULTI-LANE FACILITIES.

#### LEGEND

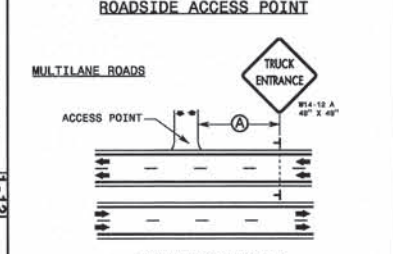
- DRUM
- ▭ STATIONARY OR PORTABLE SIGN
- DIRECTION OF TRAFFIC FLOW

ENGLISH STANDARD DRAWING FOR  
 TEMPORARY SHOULDER CLOSURES  
 SHEET 1 OF 1  
**1101.04**

ENGLISH STANDARD DRAWING FOR  
 TEMPORARY SHOULDER CLOSURES  
 SHEET 1 OF 1  
**1101.04**

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### ROADSIDE ACCESS POINT

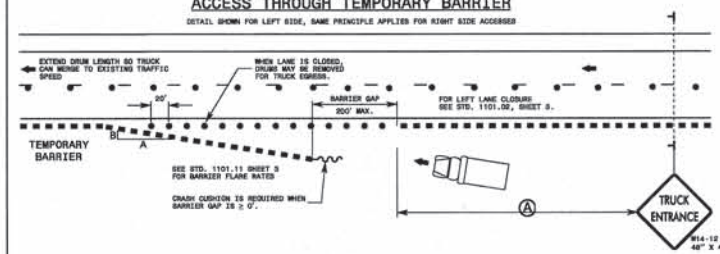


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### ACCESS THROUGH TEMPORARY BARRIER

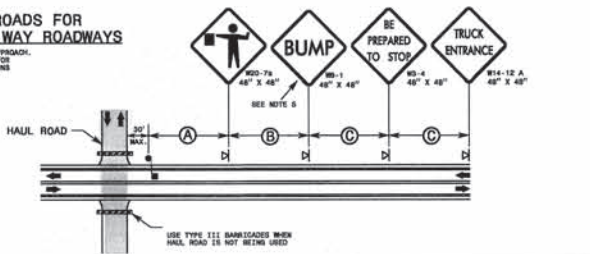


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### HAUL ROADS FOR 2-LANE, 2-WAY ROADWAYS



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#### GENERAL NOTES

1. MOUNT SIGNS ON BOTH LEFT AND RIGHT SIDES ON DIVIDED ROADWAYS. SIGNS ARE REQUIRED ONLY ON THE RIGHT SIDE OF THE ROADWAY FOR UNDIVIDED ROADWAYS.
2. PROVIDE MINIMUM STOPPING SIGHT DISTANCE FOR EACH FLAGGER LOCATION.
3. REFER TO STD. 1101.11 SHEETS 2 & 4 FOR STOPPING SIGHT DISTANCE AND SIGN SPACING.
4. UPON COMPLETION OF EACH HAULING OPERATION, REPAIR, SWEEP, AND RESTORE THE ROADWAY TO BE SAFELY TRAVERSABLE AT NORMAL OPERATING SPEEDS.
5. "BUMP" SIGNS (W3-1) ARE REQUIRED ONLY IF A BUMP OVER THE ROADWAY EXISTS AS A RESULT OF IMPLEMENTING THE HAUL ROAD. USE FLAGGERS AT ALL TIMES TO STOP TRAFFIC WHEN BUMPS ARE LOCATED ACROSS THE ROADWAY. CONSTRUCT BUMPS TO PROVIDE A SMOOTH TRANSITION FOR TRAFFIC CROSSING THEM. REMOVE BUMPS PRIOR TO ALLOWING TRAFFIC TO RESUME NORMAL OPERATING SPEEDS.
6. WHEN NOT SPECIFIED IN THE PLANS OR BY THE ENGINEER, PAYMENT FOR CONVENIENCE WILL NOT BE MADE FOR FLAGGERS.

#### LEGEND

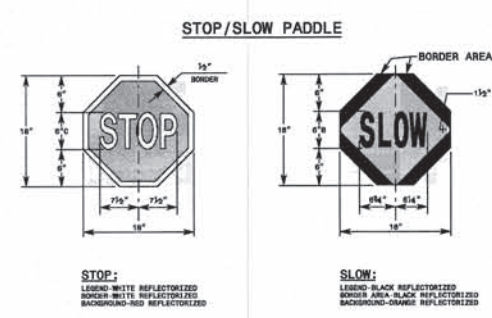
- ▭ PORTABLE CONCRETE BARRIER
- ▭ TEMPORARY CRASH CUSHION
- DRUM
- ▭ STATIONARY SIGN
- ▭ PORTABLE SIGN
- ▭ FLAGGER
- DIRECTION OF TRAFFIC FLOW

ENGLISH STANDARD DRAWING FOR  
 WORK ZONE VEHICLE ACCESSES  
 SHEET 1 OF 1  
**1101.05**

ENGLISH STANDARD DRAWING FOR  
 WORK ZONE VEHICLE ACCESSES  
 SHEET 1 OF 1  
**1101.05**

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### STOP/SLOW PADDLE

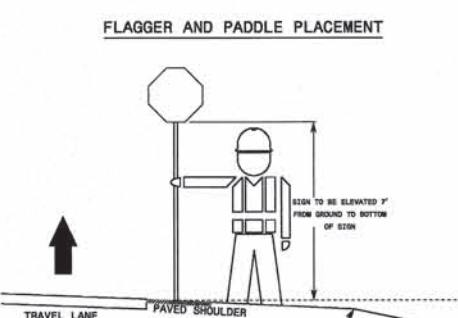


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### FLAGGER AND PADDLE PLACEMENT



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#### GENERAL NOTES

1. USE HAND SIGNALING DEVICES SUCH AS STOP-SLOW PADDLES, FLASHLIGHTS TO CONTROL TRAFFIC. USE STOP-SLOW PADDLES AS THE PRIMARY DEVICE.
2. FABRICATE STOP-SLOW PADDLES FROM SHEET METAL OR OTHER LIGHT SEMI RIGID MATERIAL. PROVIDE A RIGID HANDLE OF SUFFICIENT LENGTH SO THE PADDLE IS HELD AT 7 FEET ABOVE GROUND LEVEL.
3. PROVIDE STOPPING SIGHT DISTANCE TO EACH FLAGGER STATION (REFER TO STD. 1101.11 SHEET 2).
4. ILLUMINATE FLAGGER STATIONS DURING NIGHT OPERATIONS.
5. FOLLOW FLAGGER QUALIFICATIONS AND METHODS OF HAND-SIGNALING PROCEDURES IN ACCORDANCE WITH PART VI OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
6. ALL FLAGGERS MUST BE CERTIFIED BY AN NCDOT APPROVED SOURCE.

ENGLISH STANDARD DRAWING FOR  
 FLAGGERS  
 SHEET 1 OF 1  
**1150.01**

ENGLISH STANDARD DRAWING FOR  
 FLAGGERS  
 SHEET 1 OF 1  
**1150.01**

REVISIONS

8/17/99