

09/08/11

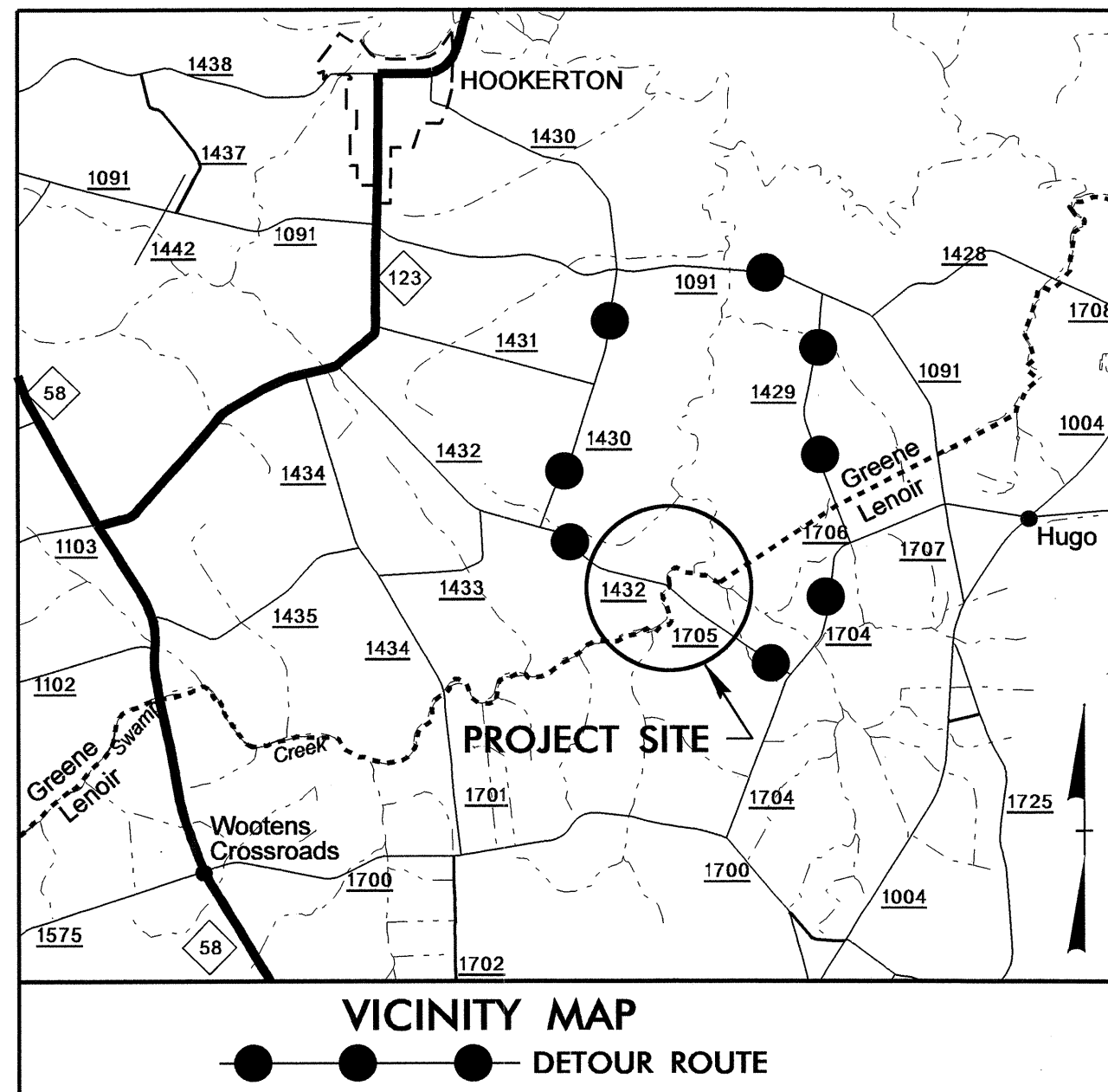
See Sheet 1-A For Index of Sheets

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4533	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33752.1.1	BRZ-1432(3)	PE	
33752.2.1	BRZ-1432(3)	RW, UTILITIES	
33752.3.1	BRZ-1432(3)	CONST	

TIP PROJECT: B-4533

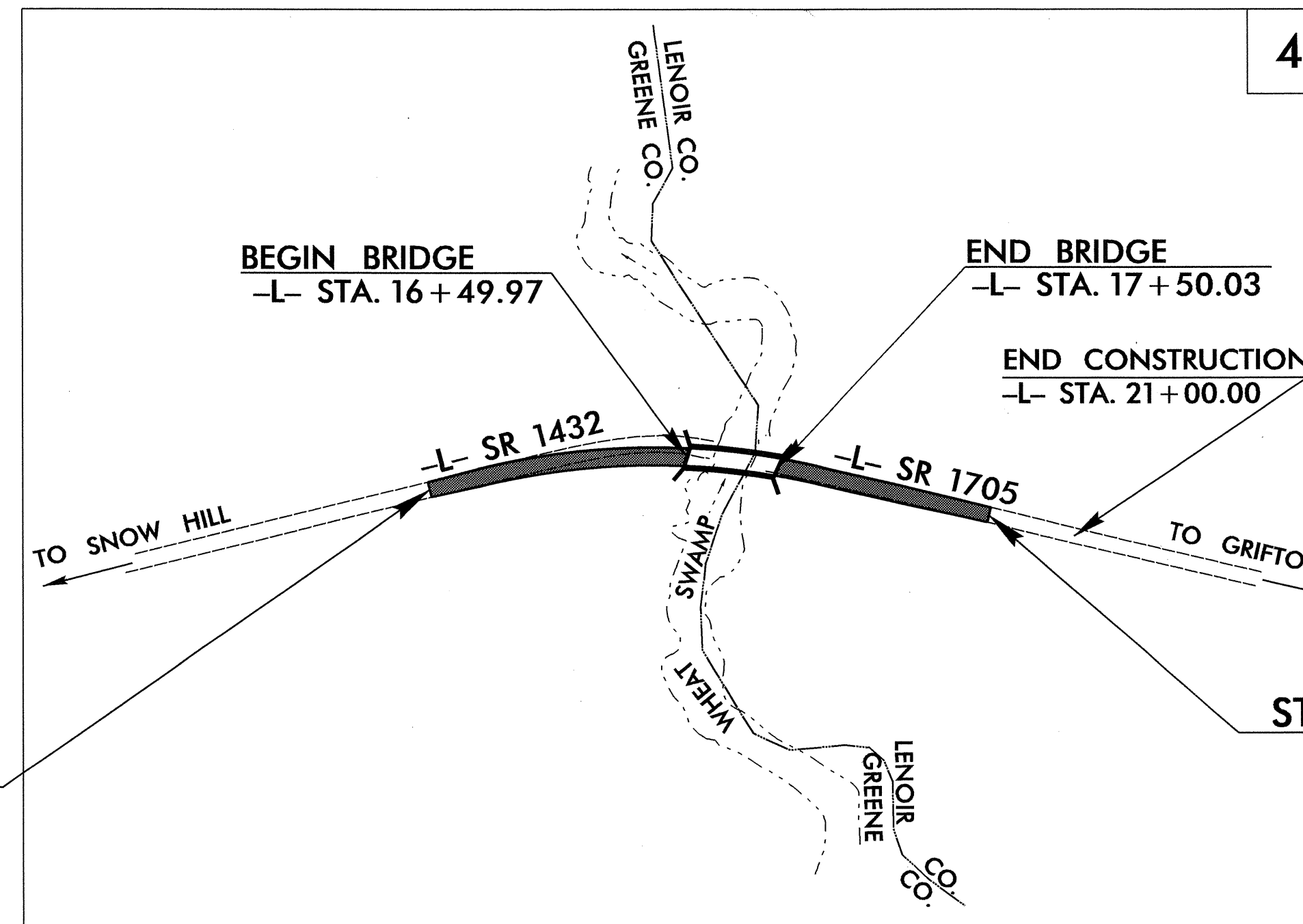
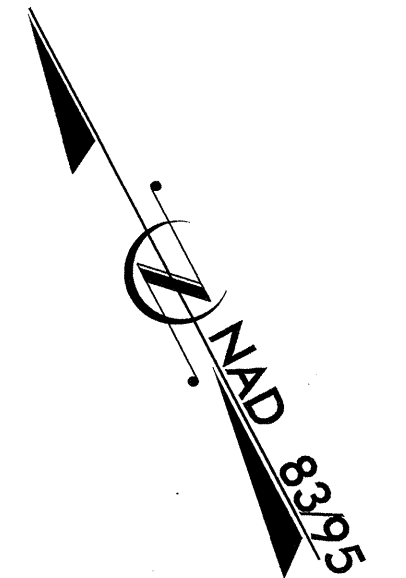
CONTRACT: C202731



# GREENE AND LENOIR COUNTIES

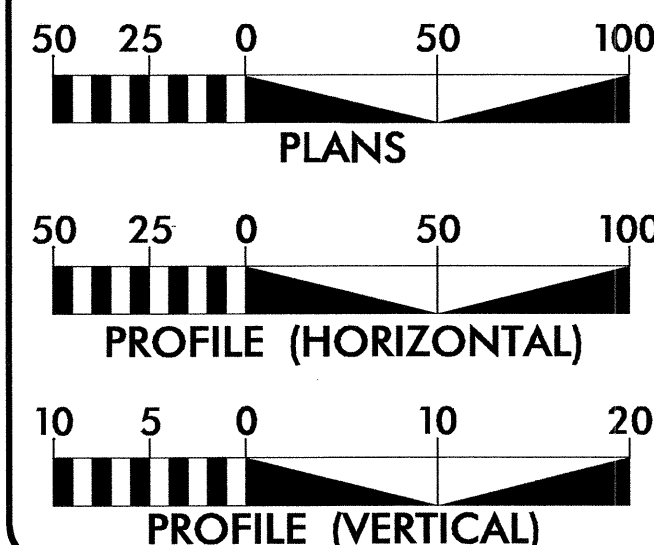
**LOCATION: BRIDGE NO. 48 OVER WHEAT SWAMP CREEK  
ON SR 1432**

**TYPE OF WORK: GRADING, PAVING, DRAINAGE, AND STRUCTURE**



STA. 13+50.00 -L- BEGIN TIP PROJECT B-4533

**GRAPHIC SCALES**



**DESIGN DATA**

ADT 2011 = 637  
ADT 2031 = 1230  
DHV = 10 %  
D = 60 %  
T = 3 % \*  
V = 60 MPH  
\* (TTST 1% + DUAL 2%)  
FUNC. CLASS. = LOCAL RURAL  
SUB-REGIONAL TIER

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT B-4533 = 0.104 MILE  
LENGTH STRUCTURE TIP PROJECT B-4533 = 0.019 MILE  
TOTAL LENGTH TIP PROJECT B-4533 = 0.123 MILE

Prepared in the Office of:  
**DIVISION OF HIGHWAYS**

1000 Birch Ridge Dr., Raleigh NC, 27610

2006 STANDARD SPECIFICATIONS

**RIGHT OF WAY DATE:**  
NOVEMBER 17, 2010

**LETTING DATE:**  
NOVEMBER 15, 2011

**BRENDA MOORE, PE**  
PROJECT ENGINEER

**KATRINA N. WASHINGTON, PE**  
PROJECT DESIGN ENGINEER

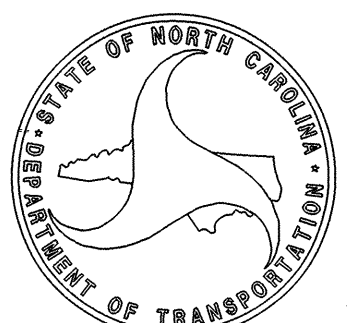
**HYDRAULICS ENGINEER**

*Joseph R. Moore*  
SIGNATURE: 8/18/11

**ROADWAY DESIGN ENGINEER**

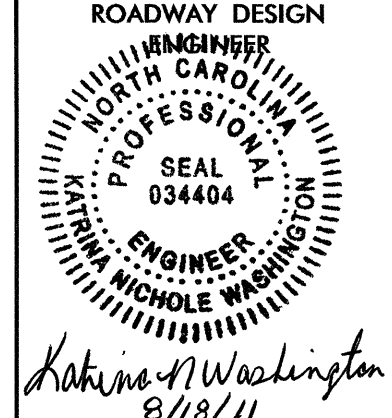
*Katrina N. Washington*  
SIGNATURE: 8/18/11

**DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA**



*Art McMiller*  
P.E.  
STATE HIGHWAY DESIGN ENGINEER

09-AUG-2011 11:33 P:\roadway\p\01\B4533\Fdy - fsh.dgn \$\$\$USERNAME\$\$\$



SHEET NUMBER	SHEET
	INDEX OF SHEETS
1	TITLE SHEET
1-A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS
1-B	CONVENTIONAL SYMBOLS
1-C THRU 1-D	SURVEY CONTROL SHEETS
2	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
2-A THRU 2-B	METHOD OF PIPE INSTALLATION
2-C	ANCHORAGE FOR FRAMES
3	SUMMARY OF QUANTITIES
3-A	LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48 INCHES & UNDER)
3-B	SUMMARY OF EARTHWORK, SUMMARY OF EXISTING ASPHALT PAVEMENT REMOVAL, AND GUARDRAIL SUMMARY
4	PLAN SHEET
5	PROFILE SHEET
TMP-1	TRANSPORTATION MANAGEMENT PLANS
EC-1 THRU EC-5	EROSION CONTROL PLANS
RF-1	REFORESTATION PLANS
UC-1 THRU UC-3	UTILITY CONSTRUCTION PLANS
UO-1 THRU UO-2	UTILITIES BY OTHERS PLANS
X-1A	CROSS-SECTION SUMMARY
X-1 THRU X-6	CROSS-SECTIONS
S-1 THRU S-20	STRUCTURE PLANS

**GENERAL NOTES:**

2006 SPECIFICATIONS  
EFFECTIVE: 07-18-06  
REVISED: 07-30-08

**GRADING AND SURFACING OR RESURFACING AND WIDENING:**  
THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. WHERE NO GRADE LINES ARE SHOWN, THE PROFILES SHOWN DENOTE THE TOP ELEVATION OF THE EXISTING PAVEMENT ALONG THE CENTER LINE OF SURVEY ON WHICH THE PROPOSED RESURFACING WILL BE PLACED. GRADE LINES MAY BE ADJUSTED 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 III.

**SUPERELEVATION:**  
ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04 USING THE RATE OF SUPERELEVATION AND RUNOFF SHOWN ON THE PLANS. SUPERELEVATION IS TO BE REVOLVED ABOUT THE GRADE POINTS SHOWN ON THE TYPICAL SECTIONS.

**SHOULDER CONSTRUCTION:**  
ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.01.

**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.

**UNDERDRAINS:**  
UNDERDRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 815.03 AT LOCATIONS DIRECTED BY THE ENGINEER.

**GUARDRAIL:**  
THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER PRIOR TO ORDERING GUARDRAIL MATERIAL.

**TEMPORARY SHORING:**  
SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC WILL BE PAID FOR AS "EXTRA WORK" IN ACCORDANCE WITH SECTION 104-7.

**SUBSURFACE PLANS:**  
NO SUBSURFACE PLANS ARE AVAILABLE ON THIS PROJECT. THE CONTRACTOR SHOULD MAKE HIS OWN INVESTIGATION AS TO THE SUBSURFACE CONDITIONS.

**END BENTS:**  
THE ENGINEER SHALL CHECK THE STRUCTURE END BENT PLANS, DETAILS, AND CROSS-SECTION PRIOR TO SETTING OF THE SLOPE STAKES FOR THE EMBANKMENT OR EXCAVATION APPROACHING A BRIDGE.

**UTILITIES:**  
UTILITY OWNERS ON THIS PROJECT ARE GREENE COUNTY PUBLIC WORKS. ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS, EXCEPT AS SHOWN ON THE PLANS.

**RIGHT-OF-WAY MARKERS:**  
ALL RIGHT-OF-WAY MARKERS ON THIS PROJECT SHALL BE PLACED BY OTHERS.

2006 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., Dated July 18, 2006 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
<b>DIVISION 2 - EARTHWORK</b>	
200.03	Method of Clearing - Method III
225.04	Method of Obtaining Superelevation - Two Lane Pavement
<b>DIVISION 3 - PIPE CULVERTS</b>	
310.10	Driveway Pipe Construction
<b>DIVISION 4 - MAJOR STRUCTURES</b>	
422.10	Reinforced Bridge Approach Fills
<b>DIVISION 5 - SUBGRADE, BASES AND SHOULDERS</b>	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
<b>DIVISION 6 - ASPHALT BASES AND PAVEMENTS</b>	
654.01	Pavement Repairs
<b>DIVISION 8 - INCIDENTALS</b>	
815.03	Pipe Underdrain and Blind Drain
840.00	Concrete Base Pad for Drainage Structures
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.46	Traffic Bearing Precast Drainage Structure
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
876.02	Guide for Rip Rap at Pipe Outlets

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	□ EDM
Parcel/Sequence Number	②③
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-

**BUILDINGS AND OTHER CULTURE:**

Gas Pump Vent or U/G Tank Cap	○
Sign	○
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	▭
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 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 Permanent Easement with Iron Pin and Cap Marker	◆

**ROADS AND RELATED FEATURES:**

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

**VEGETATION:**

Single Tree	⊕
Single Shrub	⊕
Hedge	-----
Woods Line	-----
Orchard	⊕
Vineyard	▭

**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	-W-
Designated U/G Water Line (S.U.E.*)	-W-
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-

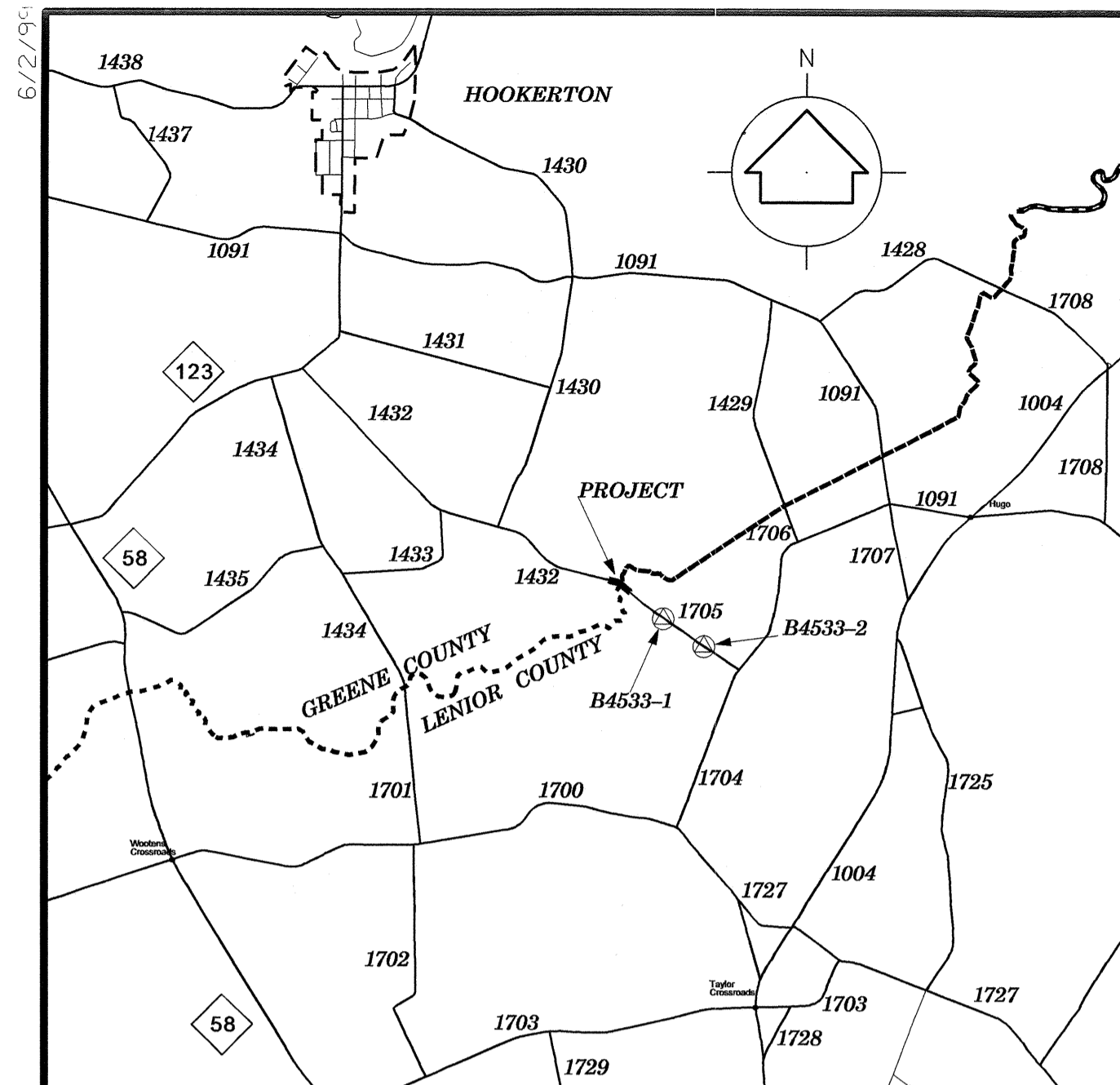
**SANITARY SEWER:**

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:**

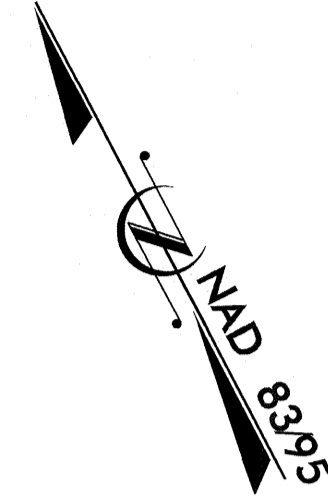
Utility Pole	●
Utility Pole with Base	□
Utility Located Object	○
Utility Traffic Signal Box	⊕
Utility Unknown U/G Line	-TUTL-
U/G Tank; Water, Gas, Oil	▭
A/G Tank; Water, Gas, Oil	▭
U/G Test Hole (S.U.E.*)	⊕
Abandoned According to Utility Records	AATUR
End of Information	E.O.I.

# SURVEY CONTROL SHEET B-4533



VICINITY MAP

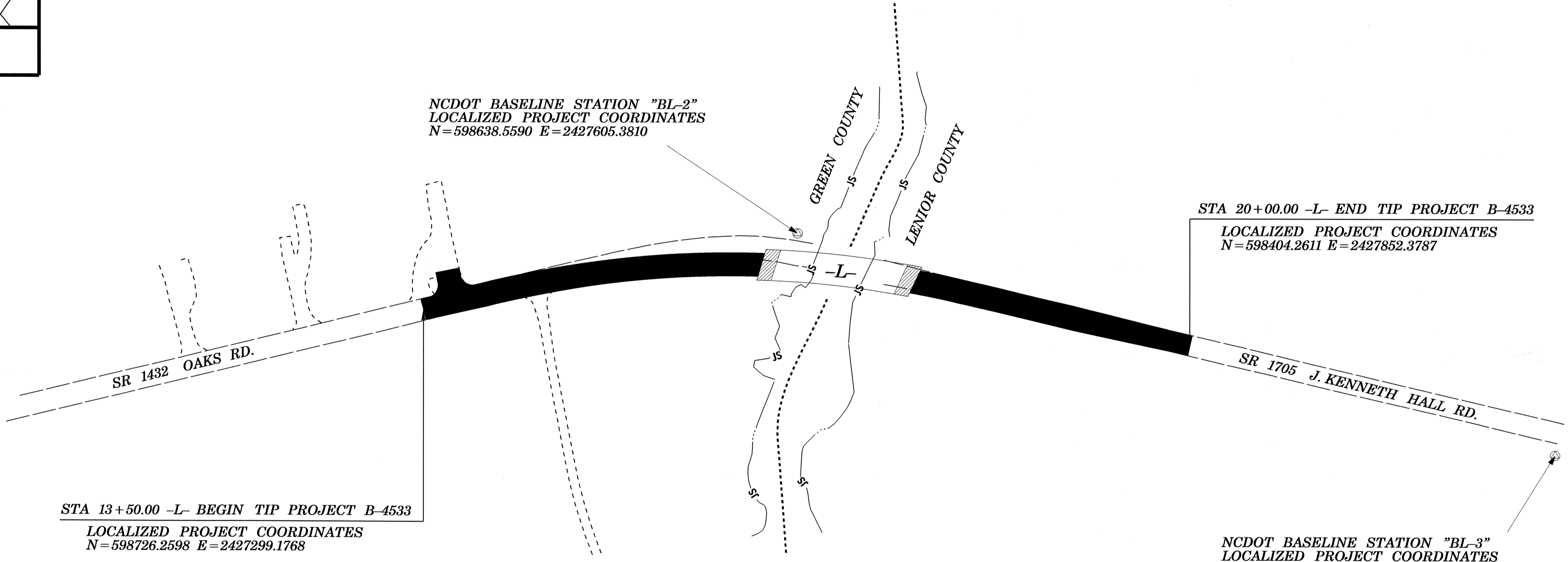
BL	POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
1	BL-1		598796.6320	2426904.8860	49.55	OUTSIDE PROJECT LIMITS	
2	BL-2		598638.5590	2427605.3810	43.37	16+63.88	27.77 LT
3	BL-3		598182.9720	2428080.4360	43.01	23+17.23	18.55 RT



NCDOT BASELINE STATION "BL-1"  
LOCALIZED PROJECT COORDINATES  
N = 598796.6320 E = 2426904.8860

NCDOT BASELINE STATION "BL-2"  
LOCALIZED PROJECT COORDINATES  
N = 598638.5590 E = 2427605.3810

STA 20+00.00 -L- END TIP PROJECT B-4533  
LOCALIZED PROJECT COORDINATES  
N = 598404.2611 E = 2427852.3787



STA 13+50.00 -L- BEGIN TIP PROJECT B-4533  
LOCALIZED PROJECT COORDINATES  
N = 598726.2598 E = 2427299.1768

NCDOT BASELINE STATION "BL-3"  
LOCALIZED PROJECT COORDINATES  
N = 598182.9720 E = 2428080.4360

**NOTES:**

1. THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:  
[HTTP://WWW.NCDOT.ORG/DOH/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/](http://www.ncdot.org/doh/preconstruct/highway/location/project/)

THE FILES TO BE FOUND ARE AS FOLLOWS:  
B4533\_LS\_CONTROL\_081015.TXT

SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

⊗ INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.  
PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.  
NETWORK ESTABLISHED FROM NGS ONLINE POSITIONING SERVICE (OPUS)

**DATUM DESCRIPTION**  
THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "GPS B4533-1"  
WITH NAD 83/95 STATE PLANE GRID COORDINATES OF  
NORTHING: 597663.641(ft) EASTING: 2428792.012(ft)  
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99987757  
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "GPS B4533-1" TO -L- STATION 13+50.00 IS  
N 54°33'22.5" W 1832.41 (ft)  
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES  
VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

02-AUG-2010 09:30 NAD83 B4533.LS-1c\_081015.dgn

# SURVEY CONTROL SHEET B-4533

PROJECT REFERENCE NO. B-4533	SHEET NO. I-D
Location and Surveys	

PRELIMINARY RW MONUMENT OFFSETS AND COORDINATES

ALIGN	STATION	OFFSET	NORTH	EAST
L	13+50.00	30.00	598697.1241	2427292.0277
L	13+50.00	50.00	598677.7023	2427287.2621
L	13+80.61	-30.00	598748.1011	2427336.0540
L	13+80.61	-40.00	598757.8130	2427338.4371
L	14+09.02	-40.00	598751.0428	2427366.0286
L	14+09.02	50.00	598663.6363	2427344.5784
L	15+75.00	-60.00	598711.1837	2427538.2521
L	16+86.00	-60.00	598653.4990	2427642.2299
L	16+86.00	-38.38	598635.3325	2427630.5054
L	17+50.00	-40.00	598598.1953	2427686.2881
L	17+50.00	-31.66	598591.5549	2427681.2404
L	18+01.61	-40.00	598564.1519	2427728.3057
L	18+01.61	50.00	598496.0119	2427669.5100
L	19+00.00	30.00	598446.8764	2427757.0690
L	19+00.00	50.00	598431.7341	2427744.0033
L	19+50.00	-30.00	598459.6387	2427834.1217
L	19+50.00	-40.00	598467.2098	2427840.6546

-L- CENTERLINE COORDINATES

TYPE	STATION	NORTH	EAST
POT	10+00.00	598809.6660	2426959.2600
PC	14+09.02	598712.1959	2427356.4936
PT	18+01.61	598533.8675	2427702.1743
POT	23+21.64	598194.1379	2428095.8961

### DATUM DESCRIPTION

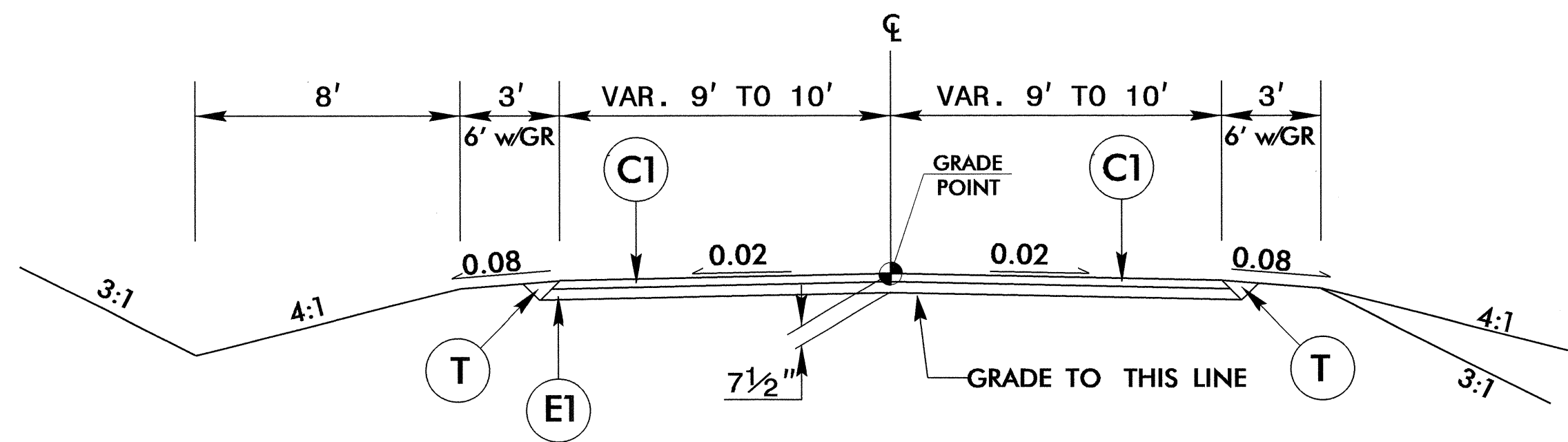
THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "GPS B4533-1" WITH NAD 83/95 STATE PLANE GRID COORDINATES OF  
 NORTHING: 597663.641(fft) EASTING: 2428792.012(fft)  
 THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99987757  
 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "GPS B4533-1" TO -L- STATION 13+50.00 IS  
 N 54°33'22.5" W 1832.41 (fft)  
 ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES  
 VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

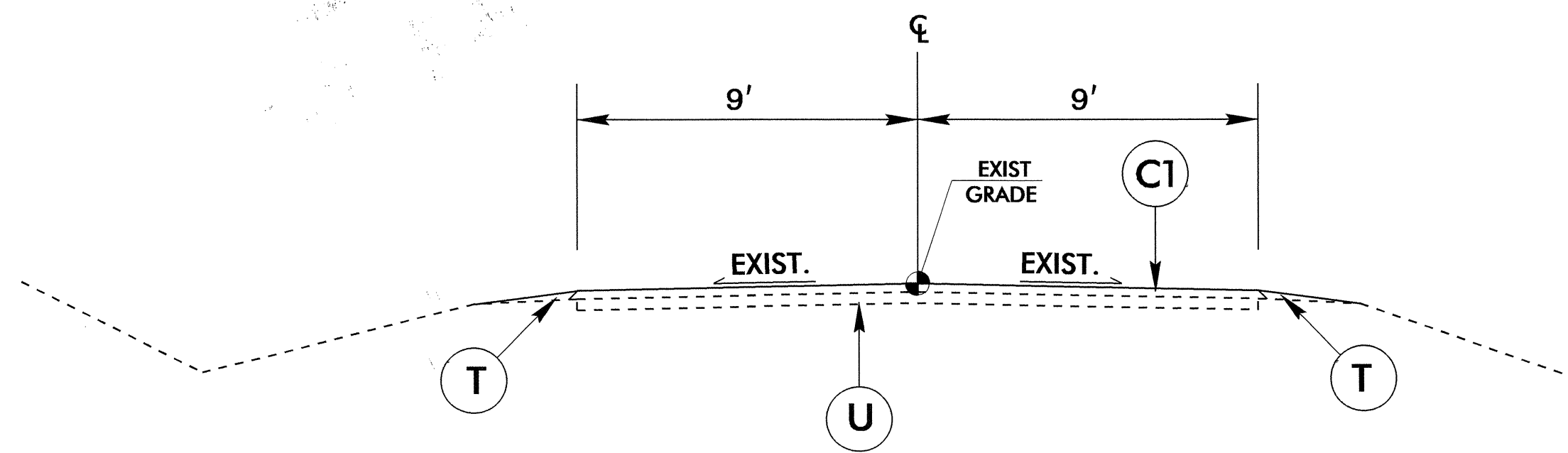
6/2/99

PAVEMENT SCHEDULE (FINAL PAVEMENT DESIGN)	
C1	PROP. APPROX. 2.5" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 137.5 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C2	PROP. APPROX. 3.5" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 128.3 LBS. PER SQ. YD. TO BE PLACED IN THREE LAYERS.
E1	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.

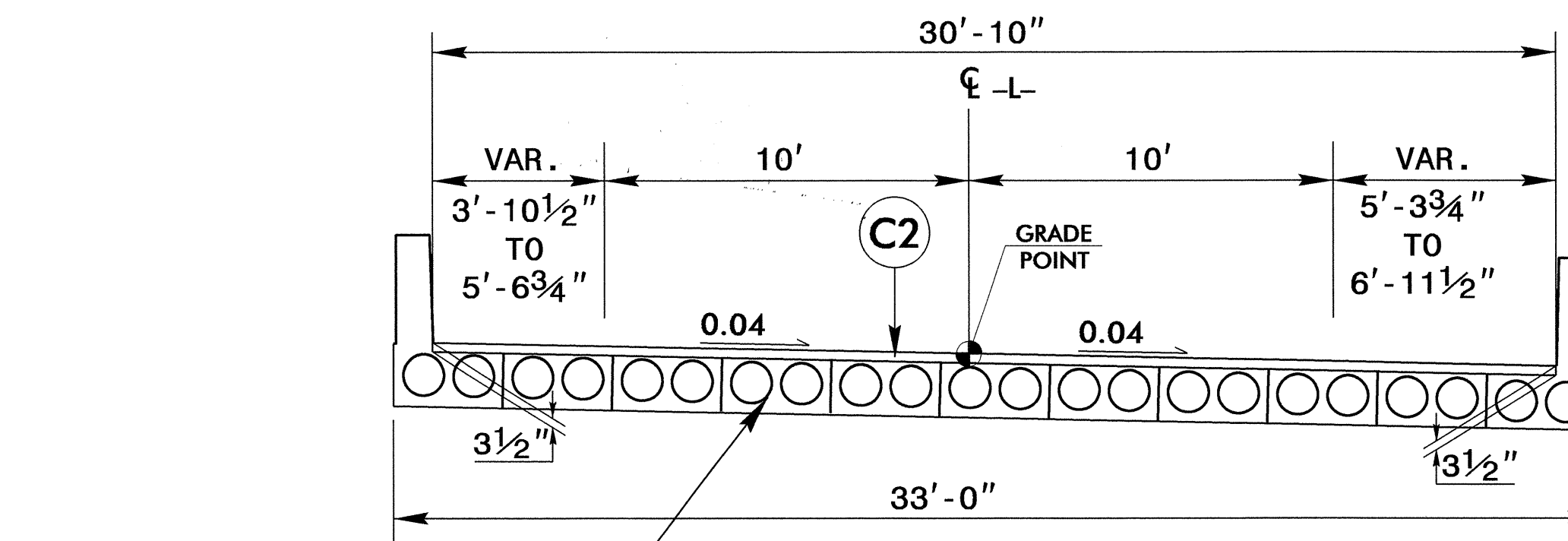
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



TYPICAL SECTION NO. 1



TYPICAL SECTION NO. 2



PROPOSED CORED SLAB BRIDGE  
(STRUCTURE PAY ITEM)

TYPICAL SECTION NO. 3

PROJECT REFERENCE NO. B-4533	SHEET NO. 2
ROADWAY DESIGN ENGINEER <i>Robert N. Washington</i>	PAVEMENT DESIGN ENGINEER <i>Clark S. Morrison</i>

USE TYPICAL SECTION NO. 1  
 -L- STA. 13+50.00 TO STA. 16+49.97 (BEGIN BRIDGE)  
 -L- STA. 17+50.03 (END BRIDGE) TO STA. 20+00.00

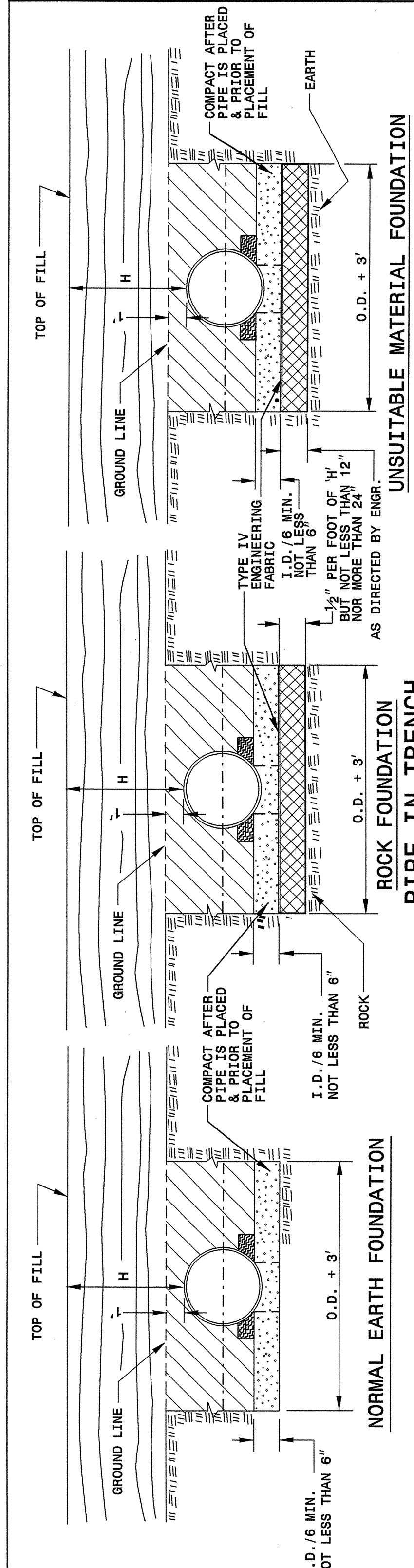
USE TYPICAL SECTION NO. 2  
 RESURFACE EXISTING PAVEMENT  
 -L- STA. 20+00.00 TO 21+00.00

USE TYPICAL SECTION NO. 3  
 -L- STA. 16+49.97 (BEGIN BRIDGE) TO STA. 17+50.03 (END BRIDGE)

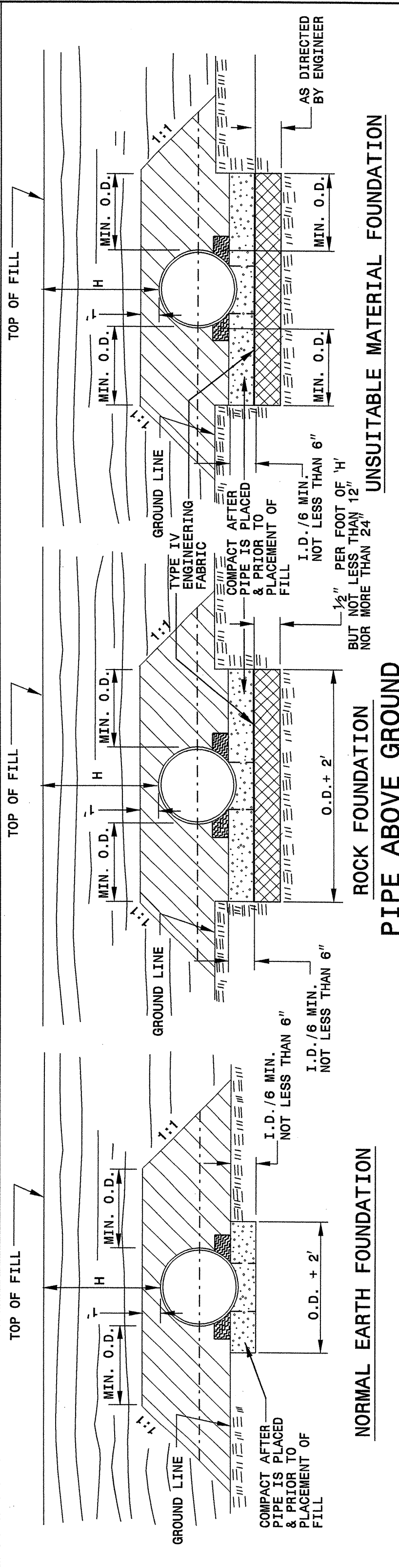
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 jhowerton AT P5237501

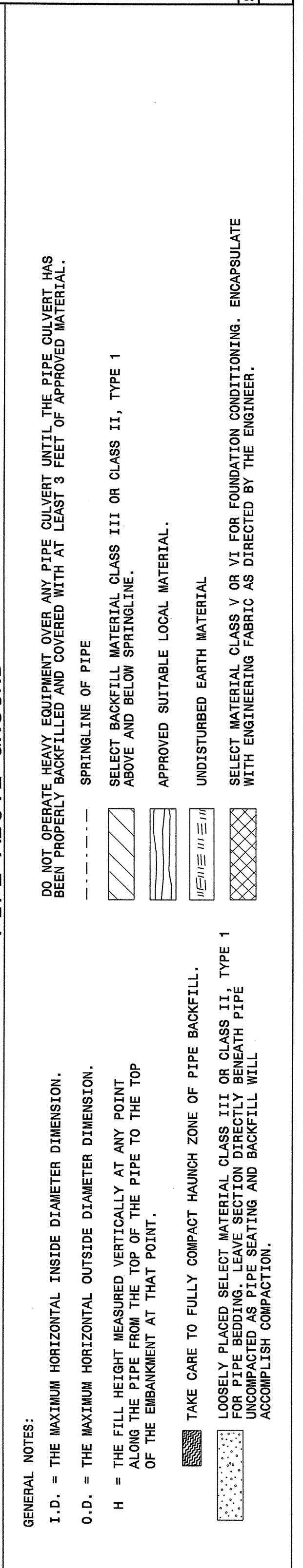
STATE OF NORTH CAROLINA  
 DEPT. OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 RALEIGH, N.C.



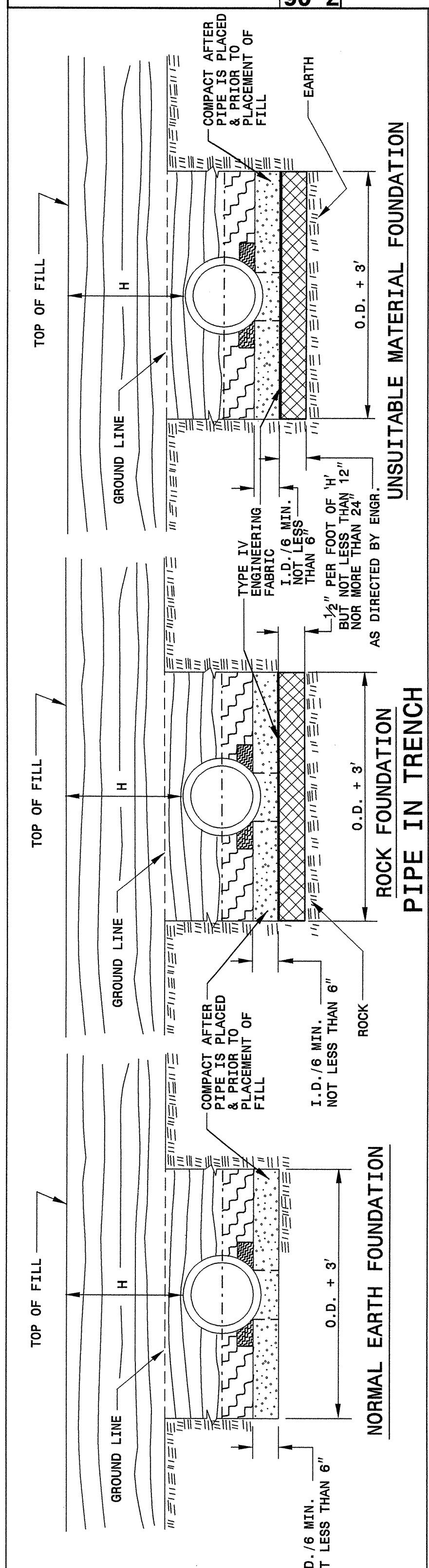
ENGLISH DETAIL DRAWING FOR  
**METHOD OF PIPE INSTALLATION**  
 FLEXIBLE PIPE



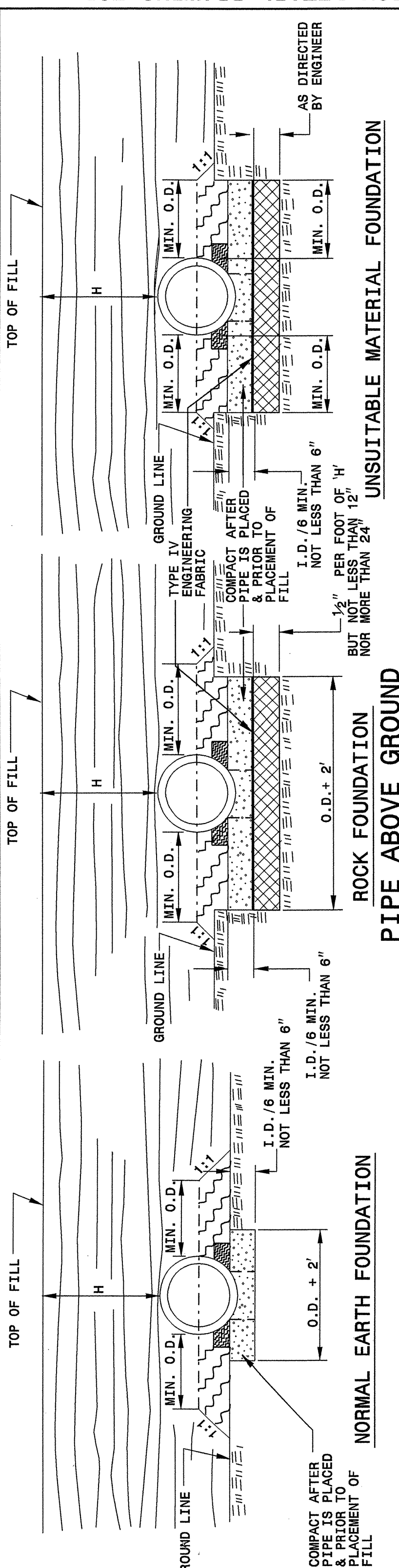
ENGLISH DETAIL DRAWING FOR  
**METHOD OF PIPE INSTALLATION**  
 FLEXIBLE PIPE



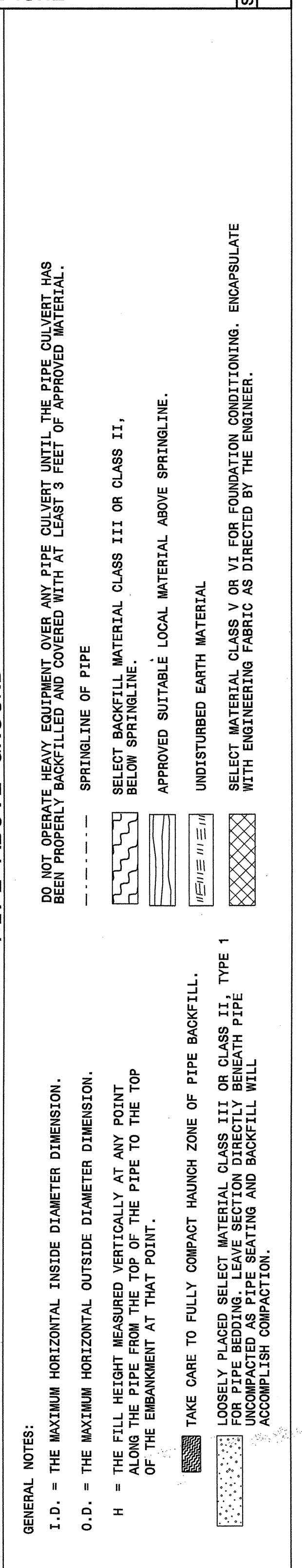
STATE OF NORTH CAROLINA  
 DEPT. OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 RALEIGH, N.C.



ENGLISH DETAIL DRAWING FOR  
**METHOD OF PIPE INSTALLATION**  
 RIGID PIPE



ENGLISH DETAIL DRAWING FOR  
**METHOD OF PIPE INSTALLATION**  
 RIGID PIPE



STATE OF NORTH CAROLINA  
 DEPT. OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 RALEIGH, N.C.

7-06  
 ENGLISH DETAIL DRAWING FOR  
**METHOD OF PIPE INSTALLATION**  
 FLEXIBLE PIPE

STATE OF NORTH CAROLINA  
 DEPT. OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 RALEIGH, N.C.

7-06  
 ENGLISH DETAIL DRAWING FOR  
**METHOD OF PIPE INSTALLATION**  
 RIGID PIPE

**GENERAL NOTES:**  
 I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.  
 O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.  
 H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.

DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE CULVERT UNTIL THE PIPE CULVERT HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.

--- SPRINGLINE OF PIPE  
 SELECT BACKFILL MATERIAL CLASS III OR CLASS II, TYPE 1 ABOVE AND BELOW SPRINGLINE.  
 APPROVED SUITABLE LOCAL MATERIAL.  
 UNDISTURBED EARTH MATERIAL  
 SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH ENGINEERING FABRIC AS DIRECTED BY THE ENGINEER.

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.  
 LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

**GENERAL NOTES:**  
 I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.  
 O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.  
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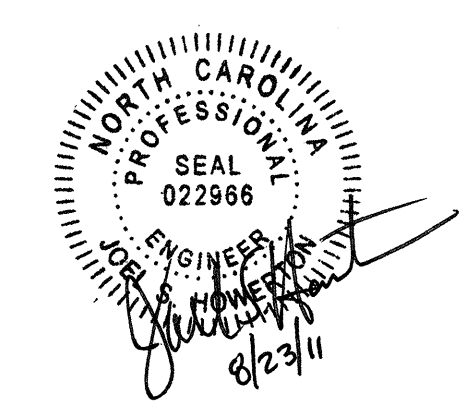
DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE CULVERT UNTIL THE PIPE CULVERT HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.

--- SPRINGLINE OF PIPE  
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 APPROVED SUITABLE LOCAL MATERIAL ABOVE SPRINGLINE.  
 UNDISTURBED EARTH MATERIAL  
 SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH ENGINEERING FABRIC AS DIRECTED BY THE ENGINEER.

**PROJECT SERVICES UNIT**  
**STANDARDS AND SPECIAL DESIGN**  
 Office 919-250-4128 FAX 919-250-4119

**SEE PLATE FOR TITLE**

ORIGINAL BY: KKempf DATE: 5-15-09  
 MODIFIED BY: [Signature] DATE: 7/29/09  
 CHECKED BY: [Signature] DATE: 7/29/09  
 FILE SPEC: erward/stds/stdsdetails/30001/0300d01.dgn



5/14/99

SHEET 1 OF 3  
**300D01**

SHEET 2 OF 3  
**300D01**

**FLEXIBLE PIPE**

Round Corrugated Steel Pipe  
2 2/3 x 1/2 corrugation \*\*

Diameter (inches)	Minimum cover (inches)	Maximum cover (Ga)	16	14	12	10	8
12	12	204	256				
15	12	162	204				
18	12	135	169	239			
21	12	115	145	204			
24	12	100	126	178			
30	12	79	100	142			
36	12	65	83	117	152		
42	12	55	70	100	130	160	
48	12	48	61	87	113	139	
54	12	42	54	77	100	123	
60	12	36	46	69	90	111	
66	12	30	38	55	81	100	
72	12	24	30	44	74	91	
78	12	18	24	36	67	81	
84	12	12	18	24	60	74	69

Round Corrugated Aluminum Pipe  
2 2/3 x 1/2 corrugation \*\*

Diameter (inches)	Minimum cover (inches)	Maximum cover (Ga)	16	14	12	10	8
12	12	123	155	218	281	344	
15	12	98	123	174	224	275	
18	12	81	102	144	187	228	
21	12	69	87	123	160	195	
24	12	60	76	108	139	171	
27	12	51	67	95	123	151	
30	12	42	60	85	111	136	
36	12	36	50	71	92	113	
42	12	30	42	60	78	96	
48	12	24	36	52	68	84	
54	12	18	30	46	50	74	
60	12	12	24	36	50	62	
66	12	12	18	24	46	51	
72	12	12	12	18	41	41	

**ENGLISH DETAIL DRAWING FOR METHOD OF PIPE INSTALLATION**

FILL HEIGHT TABLES

STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

7-06

**ENGLISH DETAIL DRAWING FOR METHOD OF PIPE INSTALLATION**

FILL HEIGHT TABLES

STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

7-06

\*\* FOR DIFFERENT CORRUGATIONS AND ARCH PIPES REFER TO ROADWAY DESIGN MANUAL OR MANUFACTURERS SPECIFICATION.

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

- CSP - AASHTO M86
- CAAP - AASHTO M196
- HDPE - AASHTO M294
- PVC - ASTM F949 or AASHTO M304

NOTES: FILL HEIGHTS SHOWN WERE CALCULATED USING AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

1' MINIMUM COVER FOR ALL SIDE DRAIN PIPE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS

**RIGID PIPE**

- RCP - \* (Minimum fill) 1' for Class IV & CLASS V  
2' for Class III & Class II

- \* (Maximum fill) 10' - Class II pipe  
20' - Class III pipe  
30' - Class IV pipe  
40' - Class V pipe

(For fills > 40' & < 80' use LRFD Direct Design Method)

\* FILL HEIGHT IS MEASURED FROM THE TOP OF THE PIPE TO THE BOTTOM OF THE PAVEMENT STRUCTURE

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

- RCP - AASHTO M170

NOTES: FILL HEIGHTS SHOWN WERE CALCULATED USING AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

1' MINIMUM COVER FOR ALL SIDE DRAIN PIPE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS

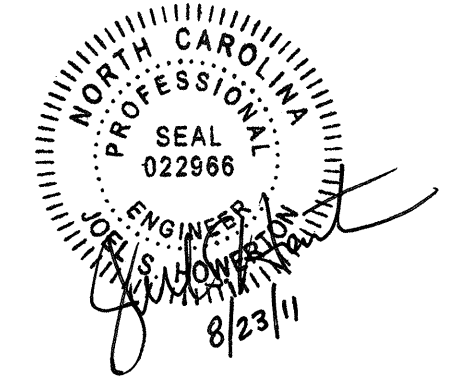
SHEET 3 OF 3  
**300D01**

SHEET 3 OF 3  
**300D01**

**PROJECT SERVICES UNIT  
STANDARDS AND SPECIAL DESIGN**  
Office 919-250-4128 FAX 919-250-4119

**SEE PLATE FOR TITLE**

ORIGINAL BY: KKempf DATE: 5-15-09  
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STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

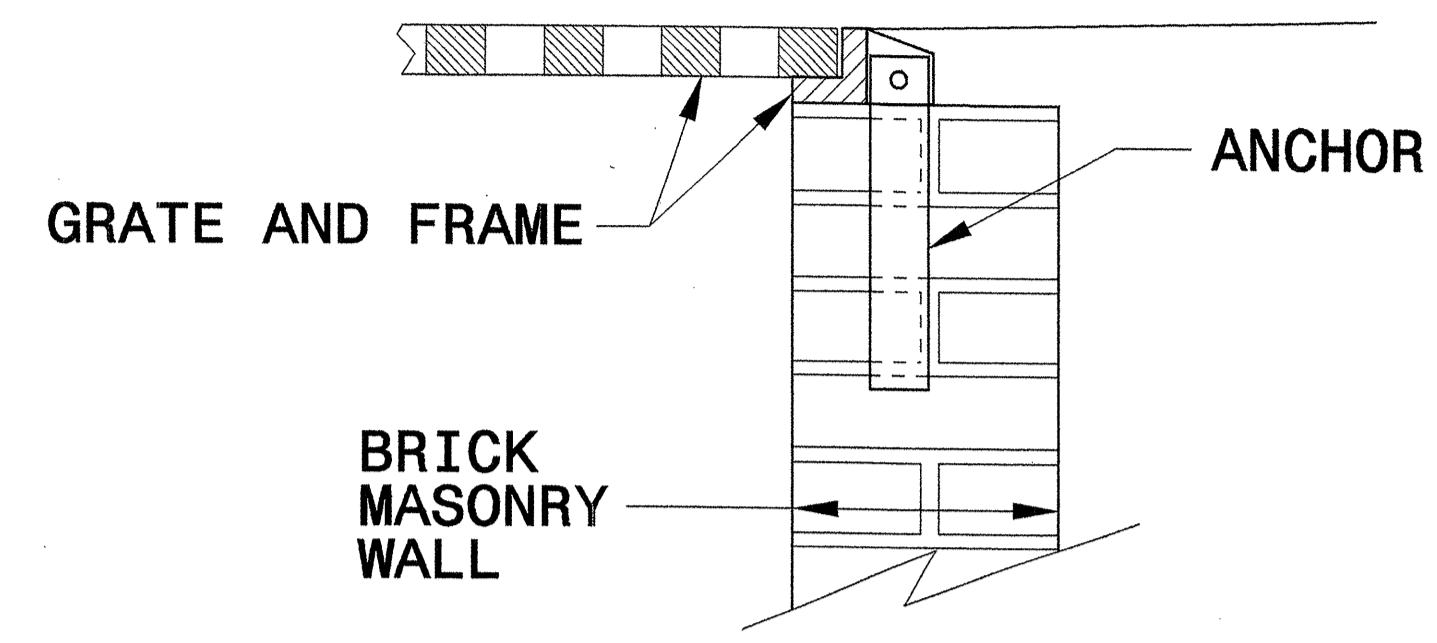
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**ANCHORAGE FOR FRAMES**  
BRICK/CONCRETE/PRECAST CONCRETE

SHEET 1 OF 1  
**840D25**

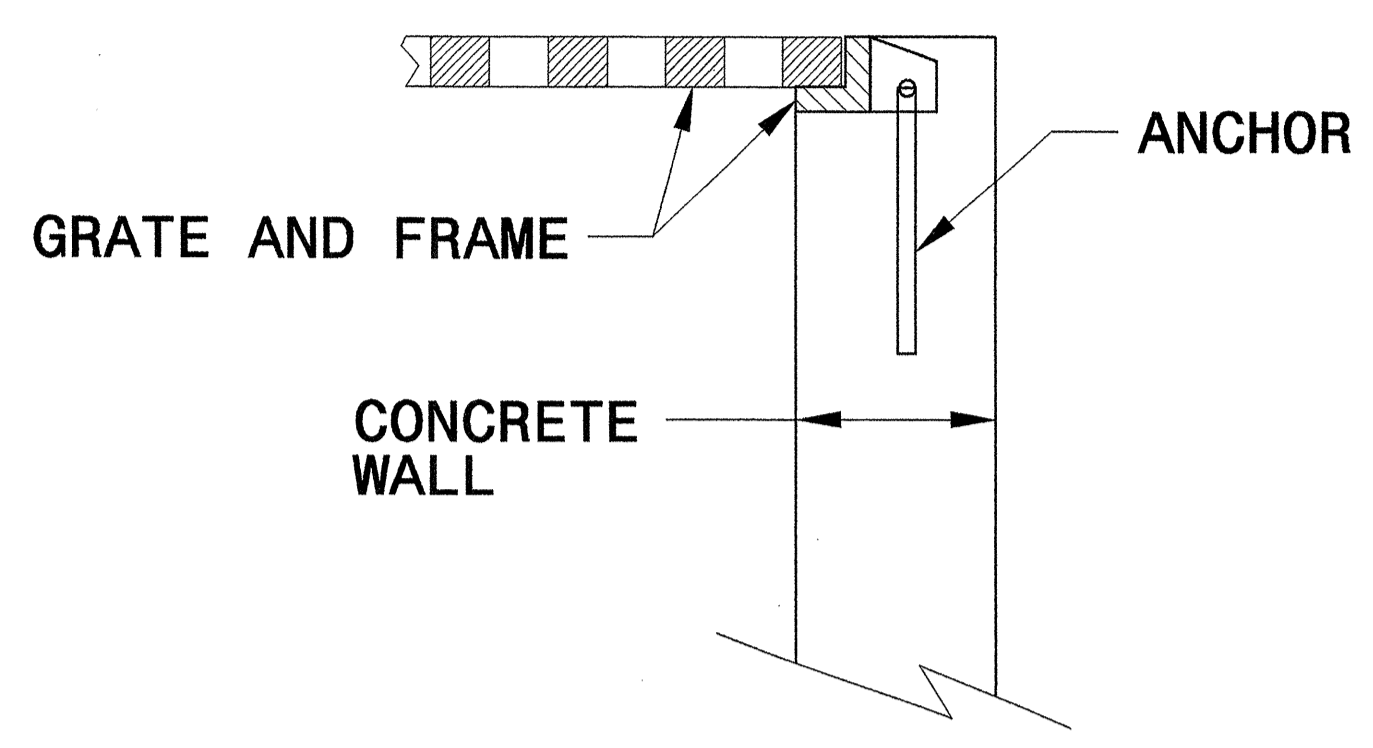
STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR  
**ANCHORAGE FOR FRAMES**  
BRICK/CONCRETE/PRECAST CONCRETE

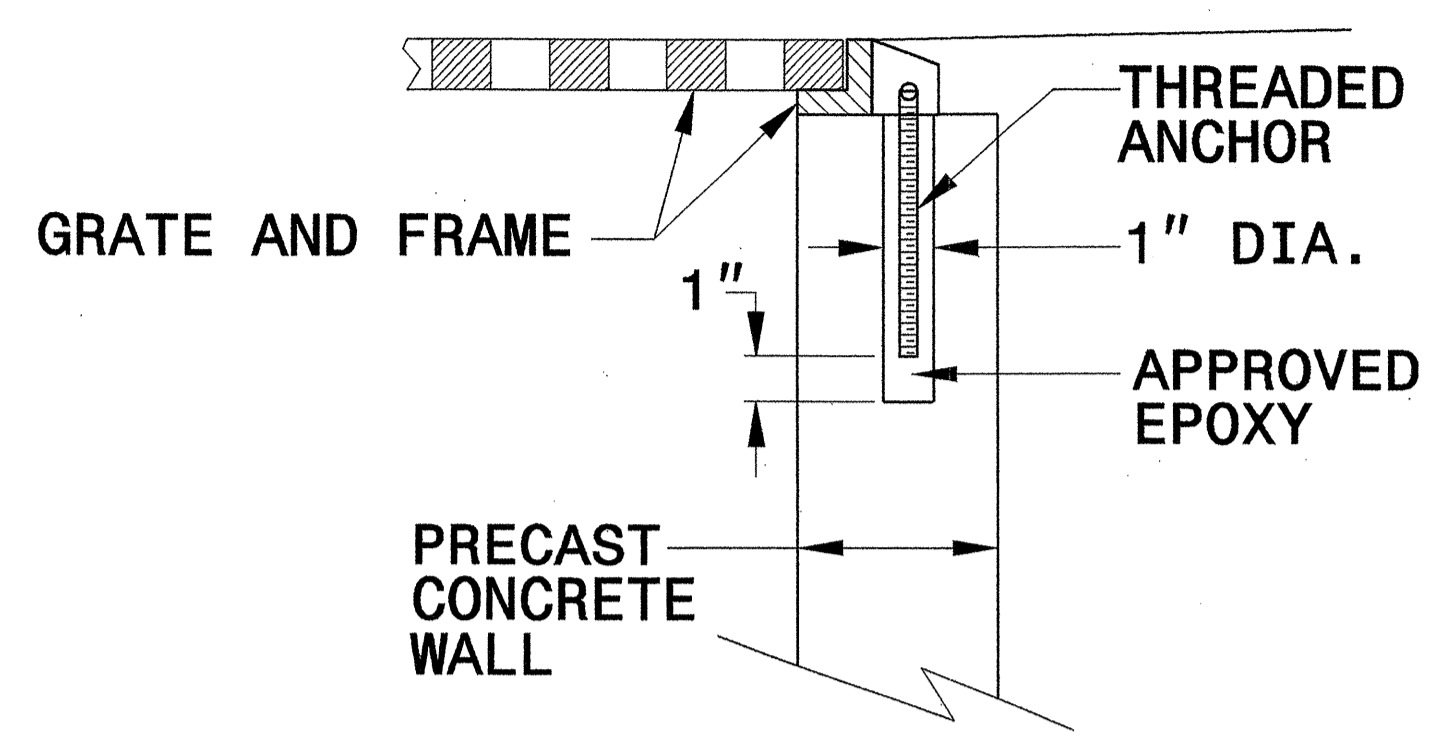
SHEET 1 OF 1  
**840D25**



**BRICK MASONRY CONSTRUCTION**



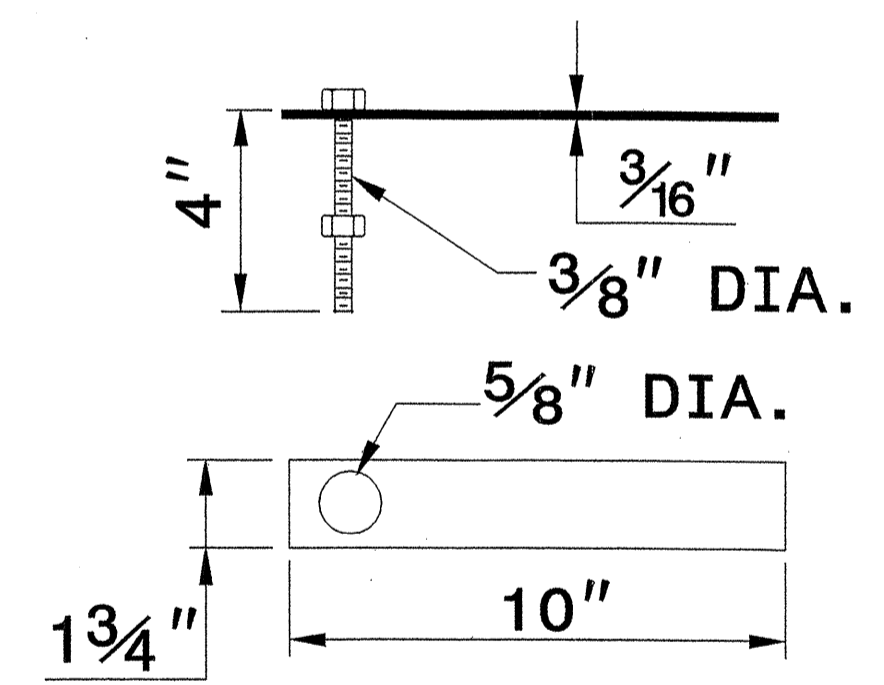
**CONCRETE CONSTRUCTION**



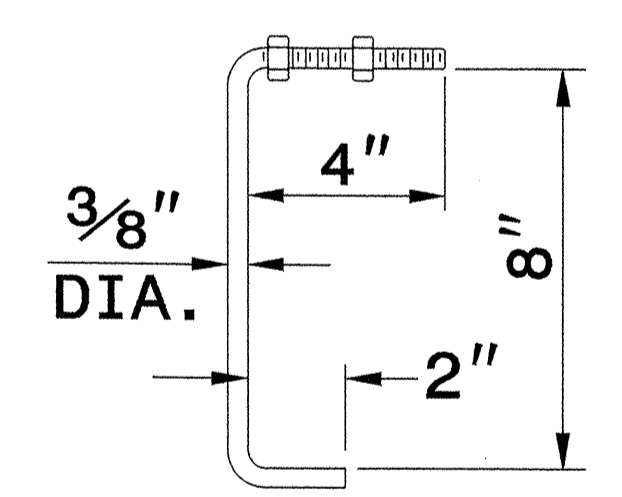
**PRECAST CONCRETE CONSTRUCTION**

**DETAIL SHOWING ANCHORAGE OF FRAME FOR GRATED DROP INLET**

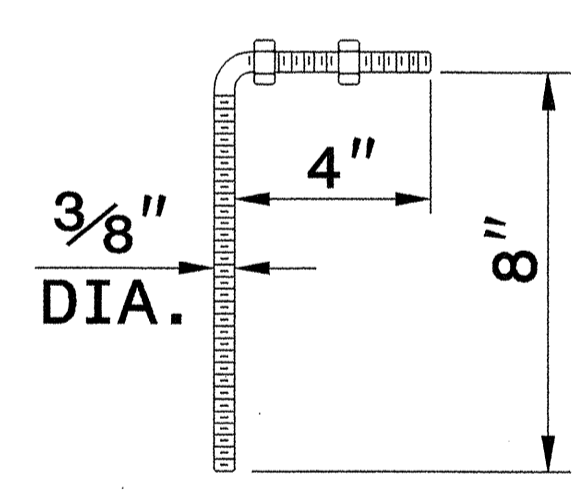
NOTE:  
CONSTRUCT GRATED DROP INLET TO COINCIDE WITH NORMAL OR SUPERELEVATED SHOULDER OR PAVEMENT SLOPE.



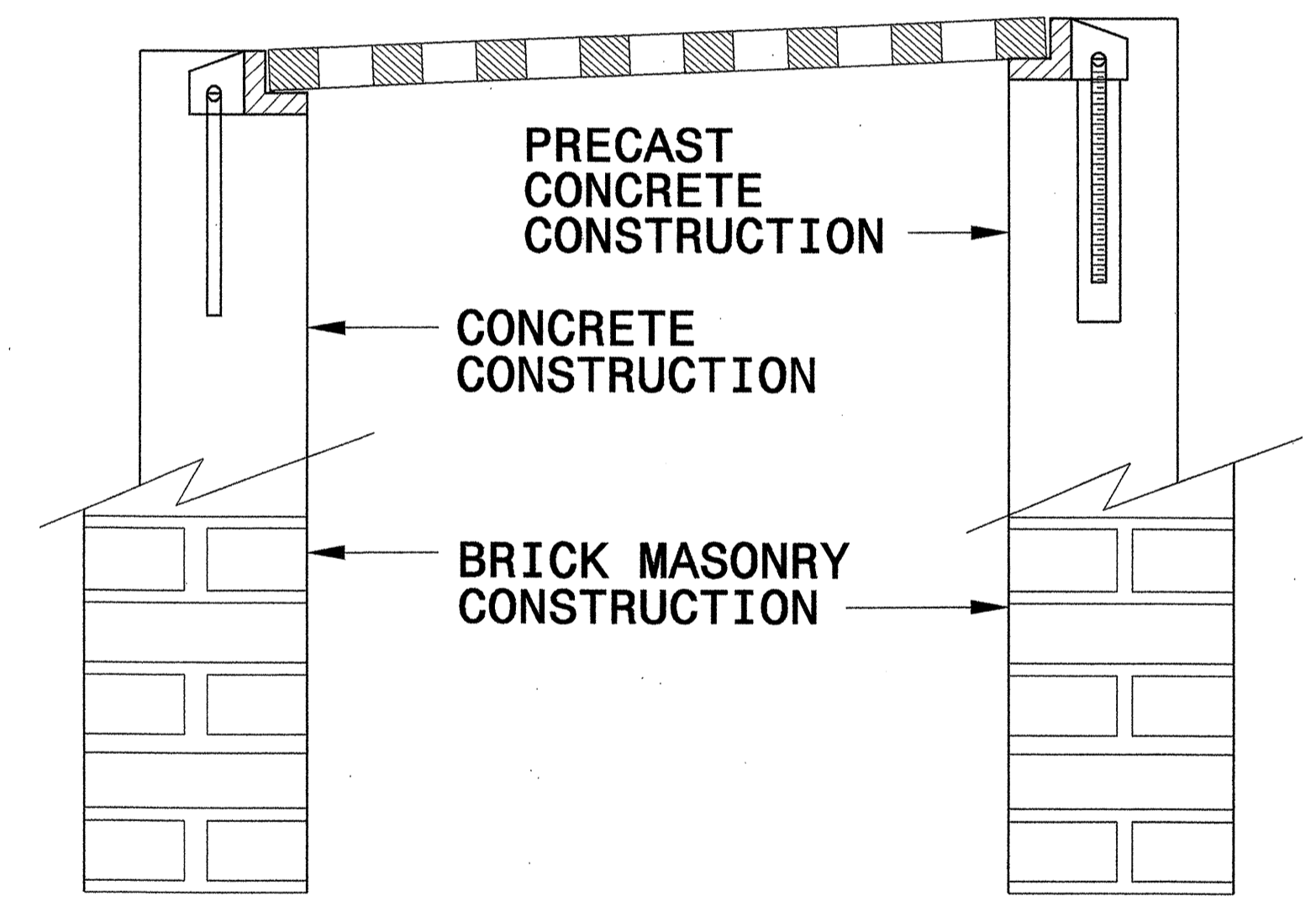
**MASONRY ANCHOR**  
3/8" DIA. BOLT WITH PLATE



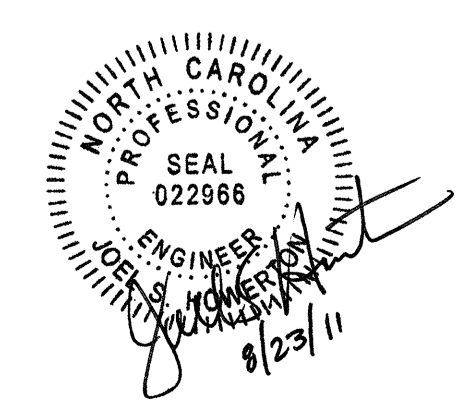
**CONCRETE ANCHOR**  
3/8" DIA. BENT BAR



**PRECAST CONCRETE ANCHOR**  
3/8" DIA. BENT BAR



**FRAME AND GRATE INSTALLATION FOR NORMAL CROWN AND SUPERELEVATED SECTIONS**



PROJECT SERVICES UNIT  
STANDARDS AND SPECIAL DESIGN  
Office 919-250-4128 FAX 919-250-4119

**SEE PLATE FOR TITLE**

ORIGINAL BY: 2006 STD 840.25 DATE: 07/18/06  
MODIFIED BY: E.E. WARD DATE: 9/25/06  
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8/17/99

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS  
ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C202731

ItemNumber	Sec #	Quantity	Unit	Description	ItemNumber	Sec #	Quantity	Unit	Description	ItemNumber	Sec #	Quantity	Unit	Description
0000100000-N	800	Lump Sum		MOBILIZATION	3030000000-E	862	187.5	LF	STEEL BM GUARDRAIL	6042000000-E	1632	260	LF	1/4" HARDWARE CLOTH
0000400000-N	801	Lump Sum		CONSTRUCTION SURVEYING	3150000000-N	862	5	EA	ADDITIONAL GUARDRAIL POSTS	6071030000-E	SP	75	LF	COIR FIBER BAFFLE
0029000000-N	SP	Lump Sum		REINFORCED BRIDGE APPROACH FILL, STATION ***** (17+00)	3215000000-N	862	4	EA	GUARDRAIL ANCHOR UNITS, TYPE III	6084000000-E	1660	1.5	ACR	SEEDING & MULCHING
0043000000-N	226	Lump Sum		GRADING	3270000000-N	SP	4	EA	GUARDRAIL ANCHOR UNITS, TYPE 350	6087000000-E	1660	1.5	ACR	MOWING
0050000000-E	226	1	ACR	SUPPLEMENTARY CLEARING & GRUB- BING	3569000000-E	867	265	LF	BARBED WIRE FENCE RESET	6090000000-E	1661	50	LB	SEED FOR REPAIR SEEDING
0057000000-E	226	300	CY	UNDERCUT EXCAVATION	3649000000-E	876	5	TON	RIP RAP, CLASS B	6093000000-E	1661	0.25	TON	FERTILIZER FOR REPAIR SEEDING
0195000000-E	SP	300	CY	SELECT GRANULAR MATERIAL	3656000000-E	876	460	SY	FILTER FABRIC FOR DRAINAGE	6096000000-E	1662	50	LB	SEED FOR SUPPLEMENTAL SEEDING
0196000000-E	270	400	SY	FABRIC FOR SOIL STABILIZATION	4400000000-E	1110	379	SF	WORK ZONE SIGNS (STATIONARY)	6108000000-E	1665	1.25	TON	FERTILIZER TOPDRESSING
0318000000-E	SP	6	TON	FOUNDATION CONDITIONING MATE- RIAL, MINOR STRS	4410000000-E	1110	94	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)	6114500000-N	SP	10	MHR	SPECIALIZED HAND MOWING
0320000000-E	SP	18	SY	FOUNDATION CONDITIONING FABRIC	4445000000-E	1145	64	LF	BARRICADES (TYPE III)	6117000000-N	SP	18	EA	RESPONSE FOR EROSION CONTROL
0335200000-E	SP	12	LF	15" DRAINAGE PIPE	5325200000-E	1510	185	LF	2" WATER LINE	6123000000-E	1670	0.1	ACR	REFORESTATION
0344000000-E	SP	32	LF	18" SIDE DRAIN PIPE	5606000000-E	1515	1	EA	2" BLOW OFF					
0995000000-E	340	21	LF	PIPE REMOVAL	5648000000-N	1515	4	EA	RELOCATE WATER METER					
1220000000-E	545	100	TON	INCIDENTAL STONE BASE	6000000000-E	1605	725	LF	TEMPORARY SILT FENCE					
1489000000-E	610	450	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B	6006000000-E	1610	225	TON	STONE FOR EROSION CONTROL, CLASS A					
1525000000-E	610	310	TON	ASPHALT CONC SURFACE COURSE, TYPE SF9.5A	6009000000-E	1610	45	TON	STONE FOR EROSION CONTROL, CLASS B					
1575000000-E	SP	45	TON	ASPHALT BINDER FOR PLANT MIX	6012000000-E	1610	60	TON	SEDIMENT CONTROL STONE					
1693000000-E	654	20	TON	ASPHALT PLANT MIX, PAVEMENT REPAIR	6015000000-E	1615	1.5	ACR	TEMPORARY MULCHING					
2022000000-E	SP	23	CY	SUBDRAIN EXCAVATION	6018000000-E	1620	100	LB	SEED FOR TEMPORARY SEEDING					
2033000000-E	SP	17	CY	SUBDRAIN FINE AGGREGATE	6021000000-E	1620	0.25	TON	FERTILIZER FOR TEMPORARY SEED- ING					
2044000000-E	SP	100	LF	6" PERFORATED SUBDRAIN PIPE	6024000000-E	1622	200	LF	TEMPORARY SLOPE DRAINS					
2070000000-N	SP	1	EA	SUBDRAIN PIPE OUTLETS	6027000000-N	1622	4	EA	INLET PROTECTION AT TEMPORARY SLOPE DRAINS					
2077000000-E	SP	6	LF	6" OUTLET PIPE (SUBDRAINS)	6029000000-E	SP	200	LF	SAFETY FENCE					
2286000000-N	840	1	EA	MASONRY DRAINAGE STRUCTURES	6030000000-E	1630	90	CY	SILT EXCAVATION					
2367000000-N	840	1	EA	FRAME WITH TWO GRATES, STD 840.29	6036000000-E	1631	2,300	SY	MATting FOR EROSION CONTROL					
2556000000-E	846	110	LF	SHOULDER BERM GUTTER	6037000000-E	SP	20	SY	COIR FIBER MAT					

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4533-ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C202731.dgn



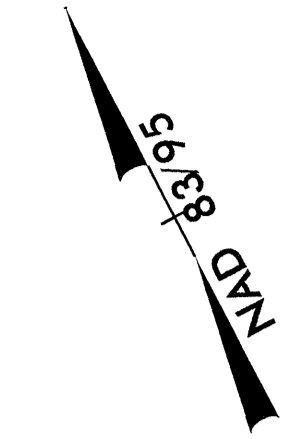


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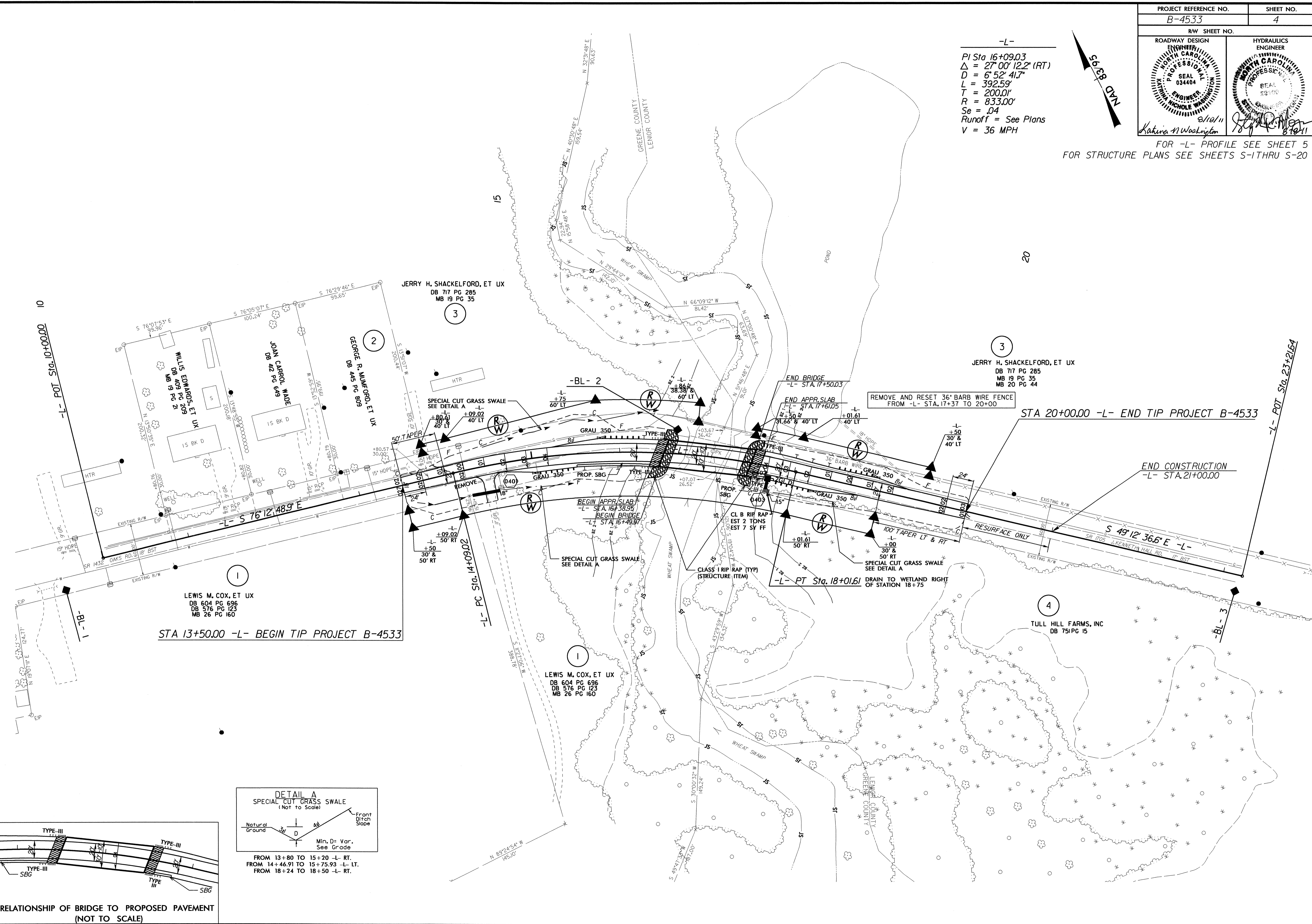
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ROADWAY DESIGN ENGINEER KATHARINE WOODLINGTON PROFESSIONAL SEAL 034404 8/10/11	HYDRAULICS ENGINEER SEAL 82100 8/10/11

-L-  
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 $\Delta = 27^{\circ}00'12.2" (RT)$   
 $D = 6^{\circ}52'41.7"$   
 $L = 392.59'$   
 $T = 200.01'$   
 $R = 833.00'$   
 $Se = .04$   
 Runoff = See Plans  
 $V = 36 \text{ MPH}$



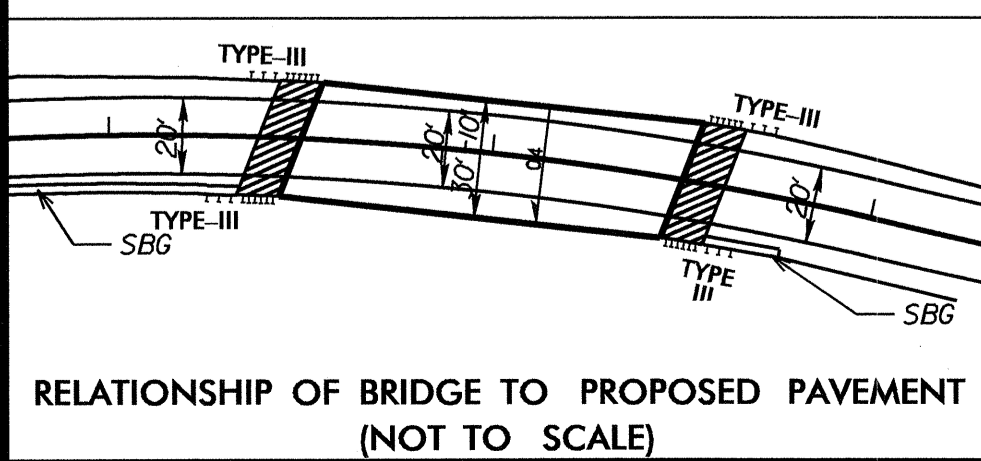
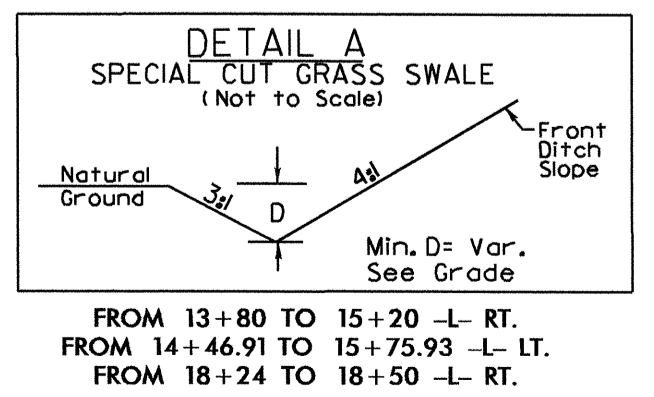
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 FOR STRUCTURE PLANS SEE SHEETS S-1 THRU S-20



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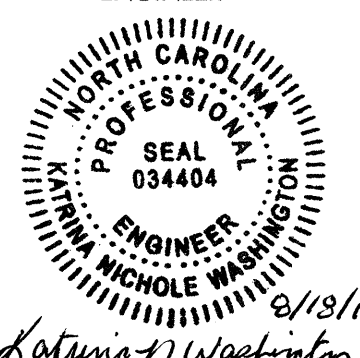
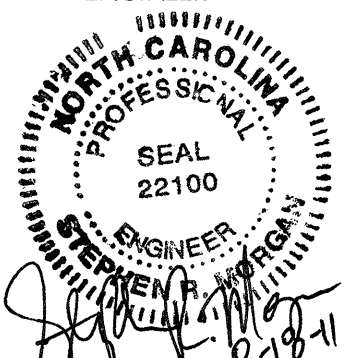
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END CONSTRUCTION  
 -L- STA. 21+00.00



5/14/99

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PROJECT REFERENCE NO. B-4533	SHEET NO. 5
ROADWAY DESIGN ENGINEER 	HYDRAULICS ENGINEER 
LEFT DITCH ----- RIGHT DITCH -----	

