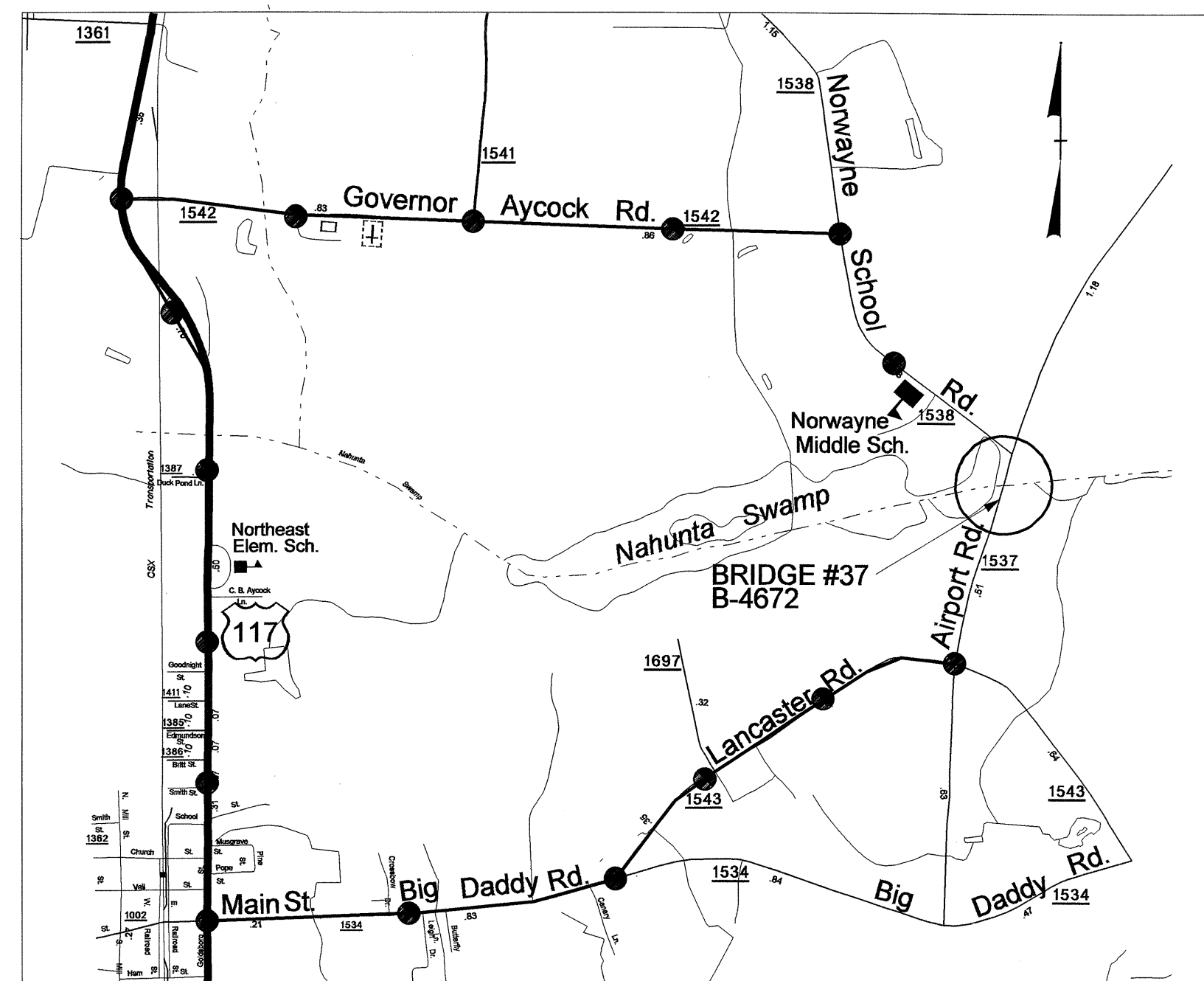


09/28/09

TIP PROJECT: B-4672

CONTRACT: C202272

See Sheet 1-A For Index of Sheets  
See Sheet 1-B for Conventional Symbols



VICINITY MAP SHOWING LOCATION OF PROJECT B-4672  
OFFSITE DETOUR

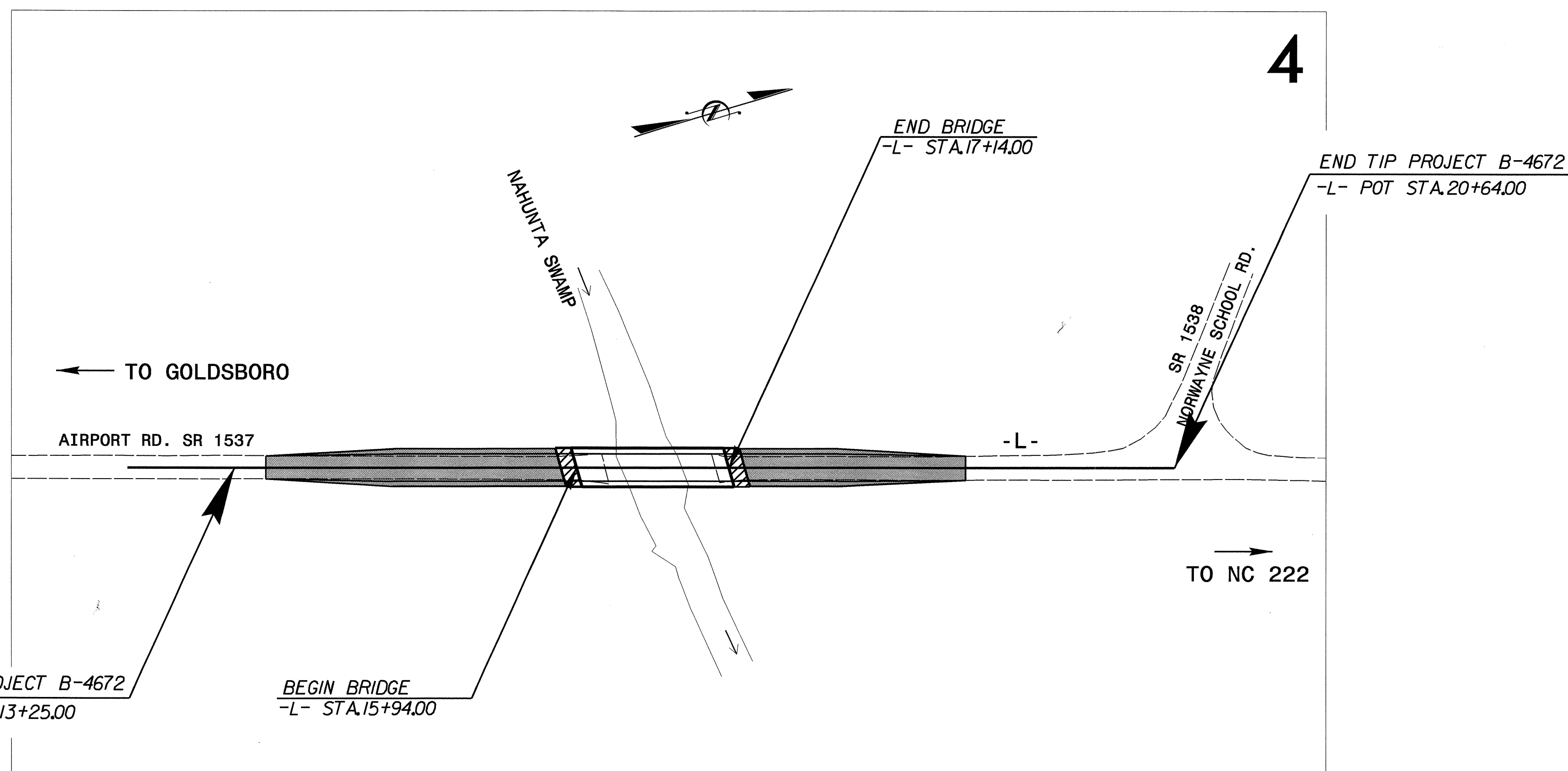
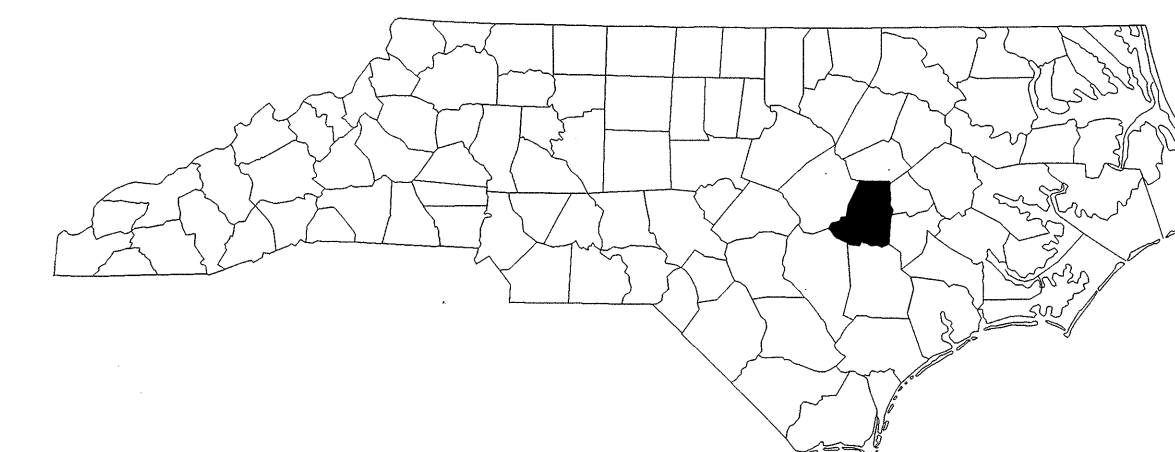
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**WAYNE COUNTY**

**LOCATION: BRIDGE NO. 37 ON SR 1537 (AIRPORT RD.)  
OVER NAHUNTA SWAMP**

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

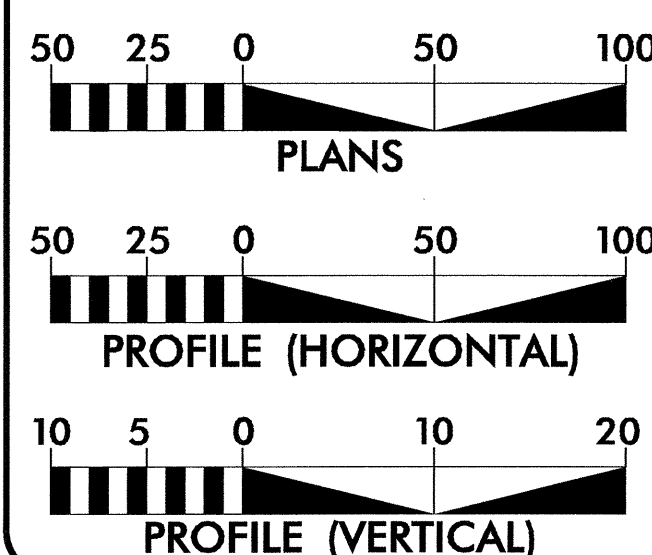
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4672	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33827.1.1	BRZ-1537(4)	P.E.	
33827.2.1	BRZ-1537(4)	RW & UTIL	
33827.3.1	BRZ-1537(4)	CONST.	



THIS PROJECT HAS BEEN DESIGNED  
USING NCDOT SUB REGIONAL TIER  
DESIGN GUIDELINES FOR BRIDGE PROJECTS

THERE IS NO CONTROL OF ACCESS ON THE PROJECT.

**GRAPHIC SCALES**



**DESIGN DATA**

ADT 2010 = 4134  
ADT 2030 = 6800  
DHV = 10 %  
D = 60 %  
T = 4 % \*  
V = 60 MPH  
FUNC CLASS = RURAL LOCAL  
\* TTST 1% DUAL 3%

**PROJECT LENGTH**

LENGTH OF ROADWAY TIP PROJECT B-4672 = 0.117 miles  
LENGTH OF STRUCTURE TIP PROJECT B-4672 = 0.023 miles  
TOTAL LENGTH OF TIP PROJECT B-4672 = 0.140 miles

Prepared In the Office of:  
**DIVISION OF HIGHWAYS**  
1000 Birch Ridge Dr., Raleigh NC, 27610

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:  
FEBRUARY 20, 2009

LETTING DATE:  
February 16, 2010

TONY HOUSER, PE  
PROJECT ENGINEER

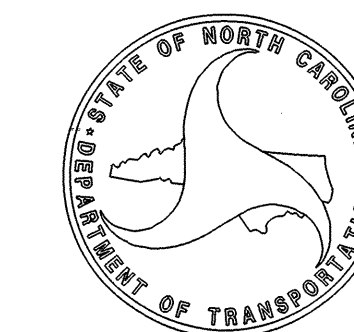
LEE ANN MOORE  
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

Professional Engineer Seal for Tony Houser, No. 25472, dated 11/20/09.

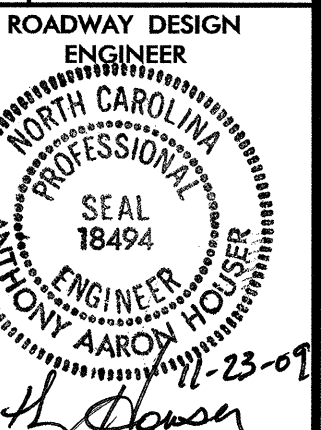
Professional Engineer Seal for Lee Ann Moore, No. 18494, dated 11-23-09.

DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA



Professional Engineer Seal for Lee Ann Moore, No. 18494, dated 11-23-09.

18-NOV-2009 15:52  
F:\roadway\proj\B-4672\_rdy\_tsh.dgn  
\$\$\$\$\$USERNAME\$\$\$\$\$



**INDEX OF SHEETS**

SHEET NUMBER	SHEET
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS
1B	CONVENTIONAL SYMBOLS
1C	SURVEY CONTROL SHEET
2	PAVEMENT SCHEDULE, TYPICAL SECTIONS, DETAIL OF ASPHALT WEARING SURFACE ON APPROACH SLABS, AND BRIDGE TYPICAL
2A	DETAIL OF ANCHORAGE FOR FRAMES
2B THRU 2C	DETAIL OF METHOD FOR PIPE INSTALLATION
3	SUMMARY OF QUANTITIES
3A	SUMMARY OF EARTHWORK, SUMMARY OF PAVEMENT REMOVAL, DRAINAGE SUMMARY, AND GUARDRAIL SUMMARY
4	PLAN SHEET
5	PROFILE SHEET
TCP-1 THRU TCP-3	TRAFFIC CONTROL PLANS
SD-1	SPECIAL SIGN DESIGN
PMP-1 THRU PMP-2	PAVEMENT MARKING PLANS
EC-1 THRU EC-4	EROSION CONTROL PLANS
RF-1	REFORESTATION PLANS
UD-1 THRU UD-2	UTILITIES BY OTHERS
X-A	CROSS SECTION SUMMARY
X-1 THRU X-5	CROSS SECTIONS
S-1 THRU S-21	STRUCTURE PLANS

**GENERAL NOTES**

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

GRADE LINE:  
GRADING AND SURFACING:  
THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. 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 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.

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  
Tri County EMC - Power (Distribution)  
Embarq-Telephone  
Belfast-Patetown Sanitary District - Water  
ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

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

**2006 ROADWAY ENGLISH STANDARD DRAWINGS**

EFF. 07-18-06  
REV. 01-02-07

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
DIVISION 2 - EARTHWORK	
200.03	Method of Clearing - Method III
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
DIVISION 4 - MAJOR STRUCTURES	
422.10	Reinforced Bridge Approach Fills
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 8 - INCIDENTALS	
806.01	Concrete Right-of-Way Marker
806.02	Granite Right-of-Way Marker
815.03	Pipe Underdrain and Blind Drain
840.00	Concrete Base Pad for Drainage Structures
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.22	Frames and Wide Slot Sag Grates
840.27	Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.45	Precast Drainage Structure
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units

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	○ EP
Property Corner	-----
Property Monument	□ ECM
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	○
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 Marker	○
Existing Control of Access	○
Proposed Control of Access	○
Existing Easement Line	-----
Proposed Temporary Construction Easement	-----
Proposed Temporary Drainage Easement	-----
Proposed Permanent Drainage Easement	-----
Proposed Permanent Utility Easement	-----
Proposed Temporary Utility Easement	-----
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	▨
<b>VEGETATION:</b>	
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	-----

**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	PH
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	PH
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	PH
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	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	-----
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 B4672

## BASELINE DATA

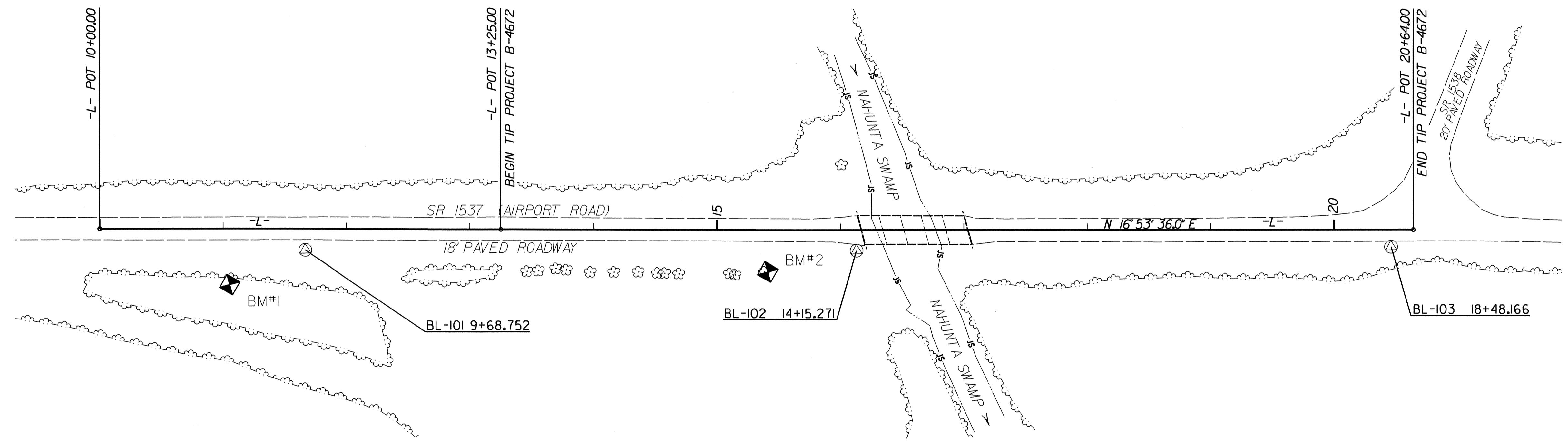
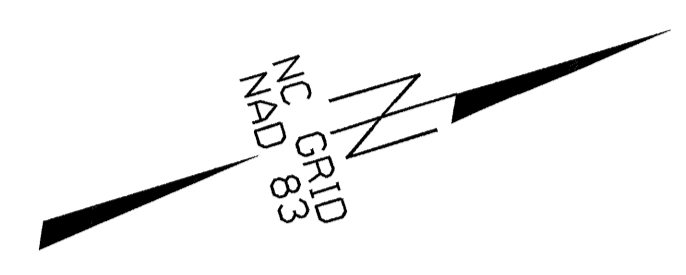
BL POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
1	GPS B4672-1	641923.8410	2312659.6530	101.88	OUTSIDE PROJECT LIMITS	
101	BL-101	642361.9540	2312826.3420	95.61	11+66.56	17.28 RT
102	BL-102	642789.2960	2312955.7940	95.48	16+13.08	16.96 RT
103	BL-103	643204.3630	2313078.7480	95.14	OUTSIDE PROJECT LIMITS	
104	BL-104	643756.3890	2313272.8560	96.90	OUTSIDE PROJECT LIMITS	

TL POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
200	T1-200	642811.4010	2312796.8670	89.47	15+88.04	141.53 LT
201	T1-201	642809.7390	2312857.1950	90.26	16+03.98	83.32 LT
A102	BL-102	642789.2960	2312955.7940	95.48	16+13.08	16.96 RT
202	T1-202	642817.3890	2313031.8210	91.15	16+62.05	81.55 RT
203	T1-203	642824.5430	2313121.4160	93.40	16+94.93	165.20 RT

## BENCHMARK DATA

\*\*\*\*\*  
 BM #1 ELEVATION = 96.97  
 N 642295 E 2312835  
 L STATION 11+05 45 RIGHT  
 RR SPIKE IN BASE OF 20" PINE  
 \*\*\*\*\*  
 BM #2 ELEVATION = 89.44  
 N 642715 E 2312951  
 L STATION 15+41 34 RIGHT  
 RR SPIKE IN BASE OF 12" MAPLE  
 \*\*\*\*\*  
 BM #3 ELEVATION = 96.16  
 N 643731 E 2313286  
 L STATION 20+18  
 N 22° 34' 23.1" E DIST 595.23  
 RR SPIKE IN BASE OF 10" OAK  
 \*\*\*\*\*



### 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:  
 B4672\_LS\_CONTROL\_080822.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 USER SERVICE (OPUS)

**DATUM DESCRIPTION**

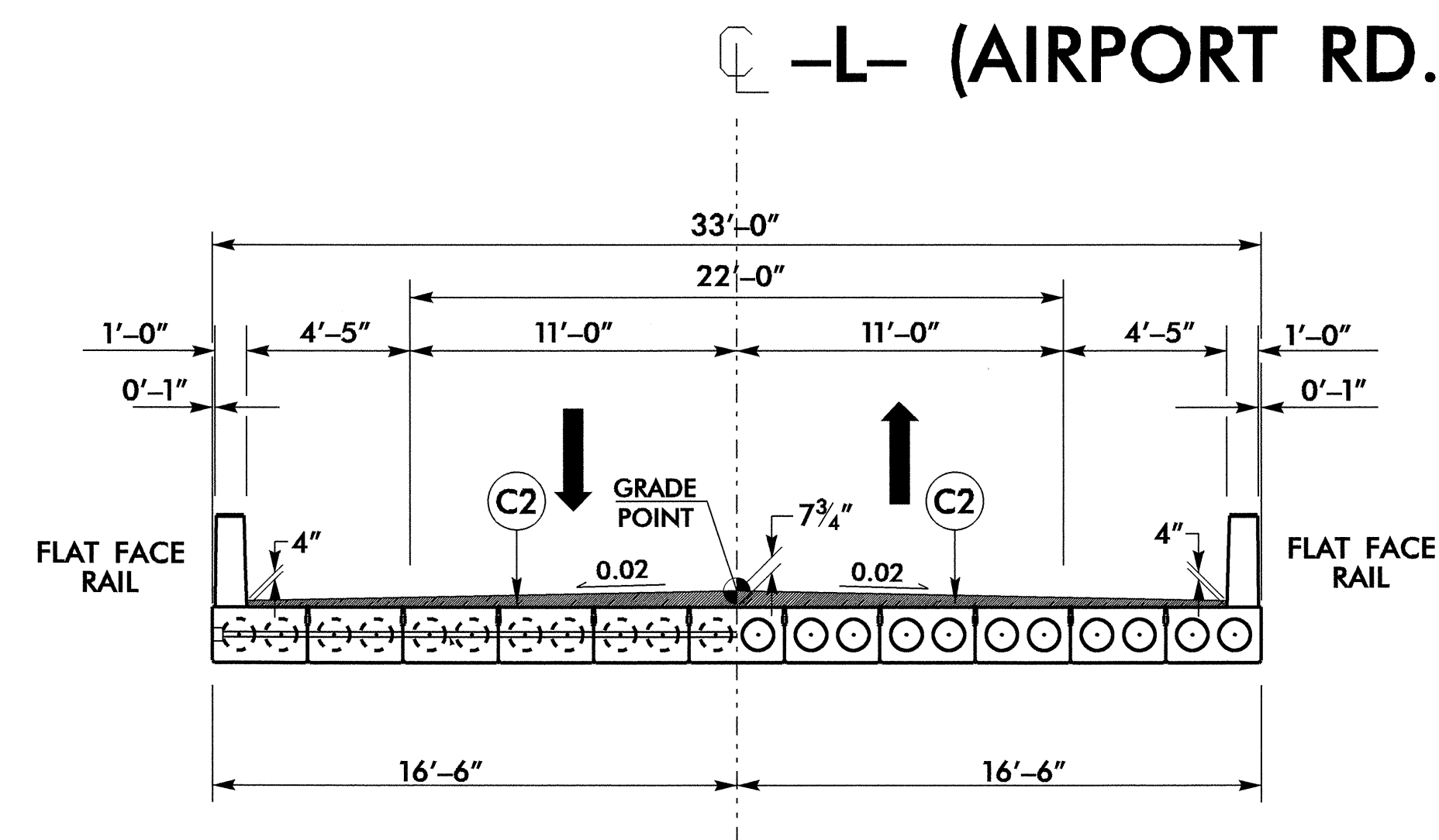
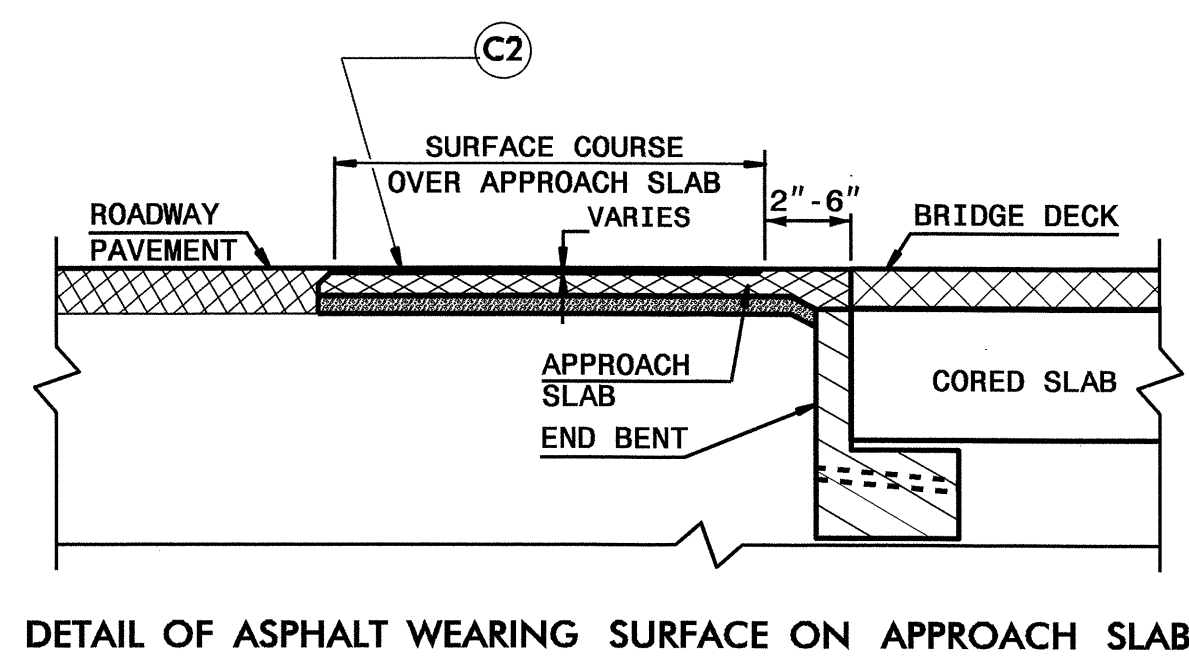
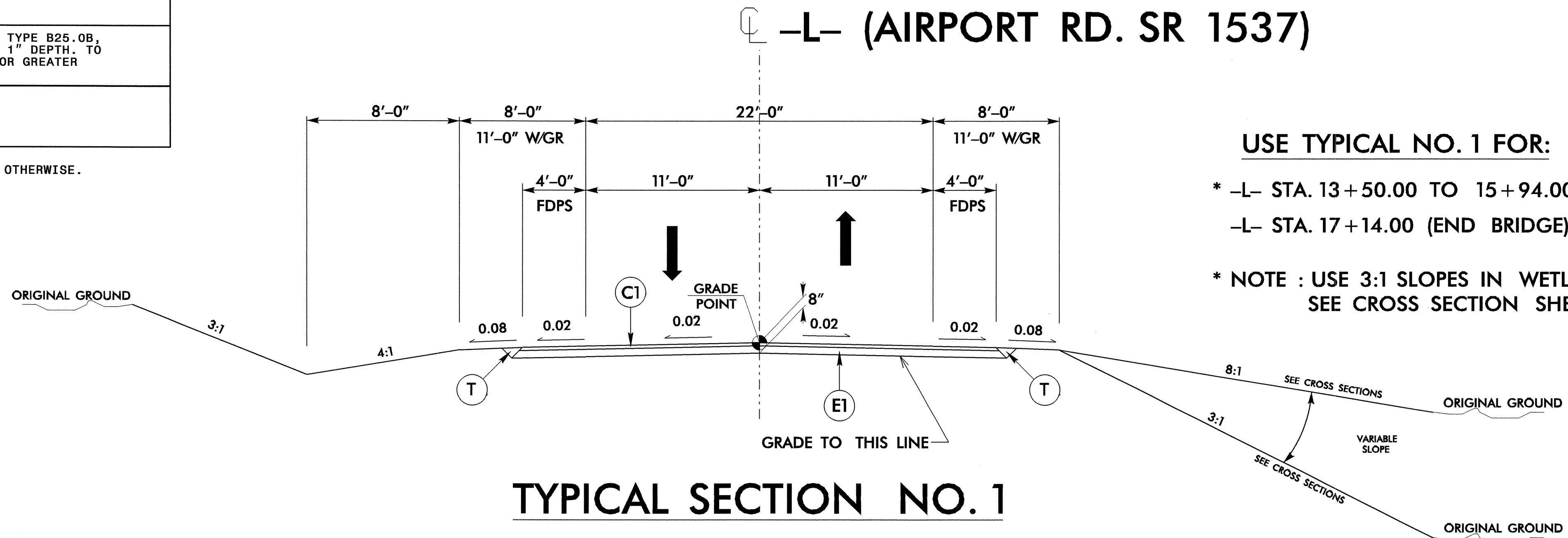
THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "GPS B4672-1" WITH NAD 83 STATE PLANE GRID COORDINATES OF NORTHING: 641923.841(FT) EASTING: 2312659.653(FT) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99988331 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "GPS B4672-1" TO -L- STATION 13+25.00 IS N 18° 15' 25.5" E 626.27 FT ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

6/22/99  
 10-SEP-2009 14:06  
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 \$\$\$\$NCPRIAM\$\$\$\$

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 1 1/2" OR GREATER THAN 2" IN DEPTH.
E1	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5 1/2" IN DEPTH.
T	EARTH MATERIAL.

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



8/17/99

REVISIONS

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

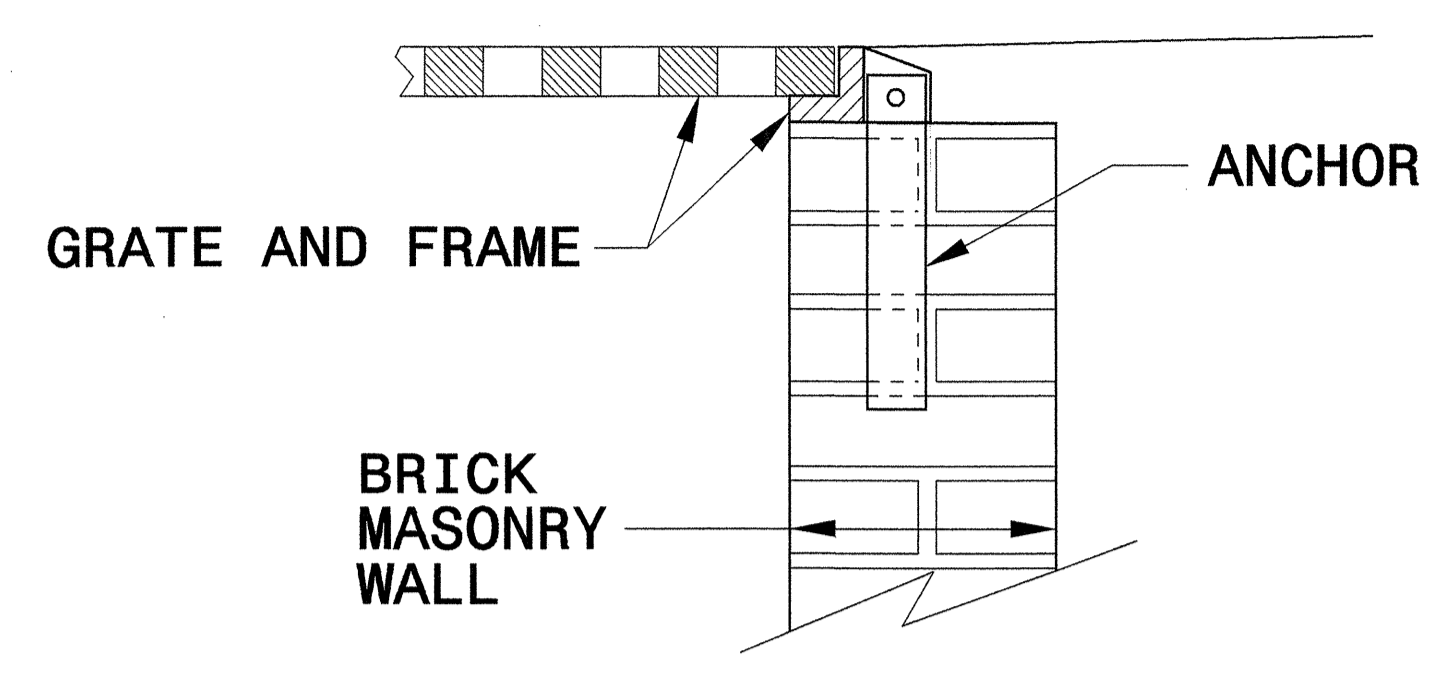
ENGLISH DETAIL DRAWING FOR  
**ANCHORAGE FOR FRAMES**  
BRICK/CONCRETE/PRECAST CONCRETE

SHEET 1 OF 1  
**840D25**

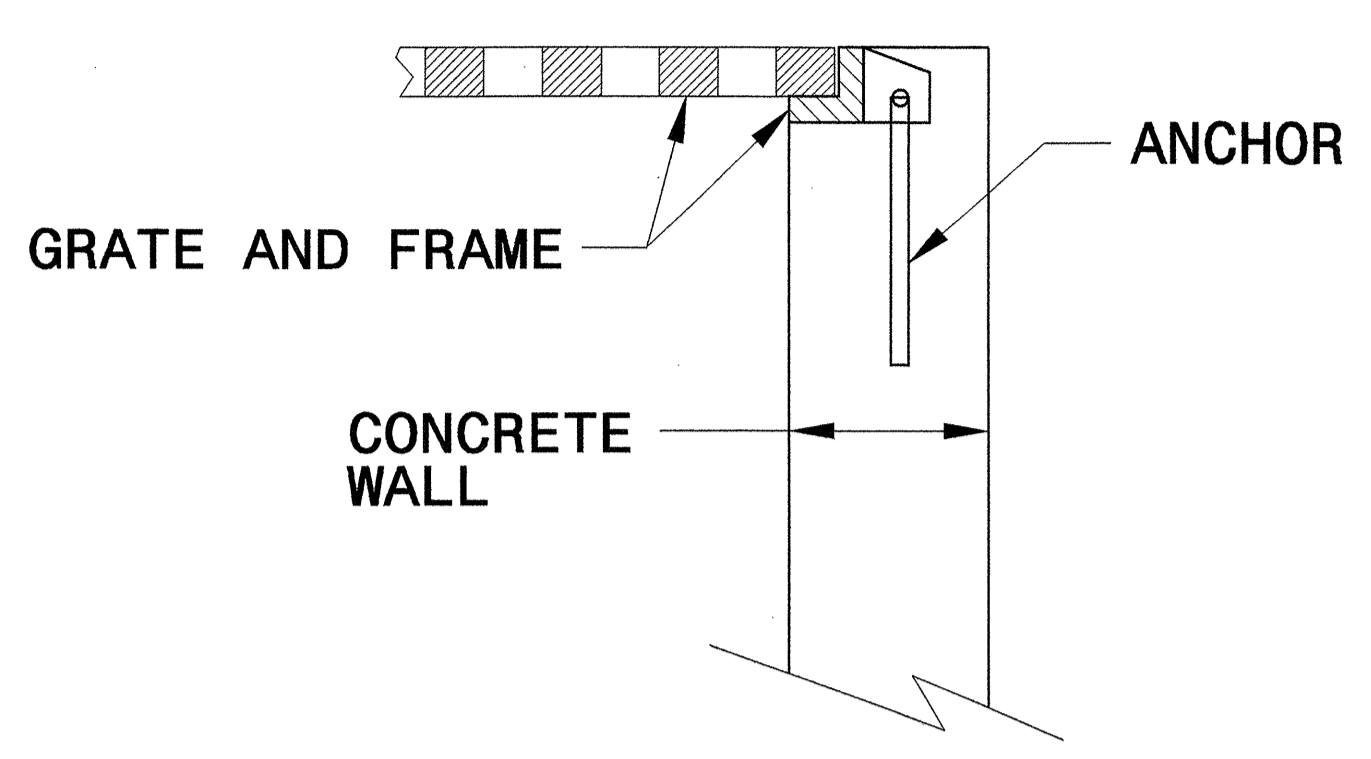
STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

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

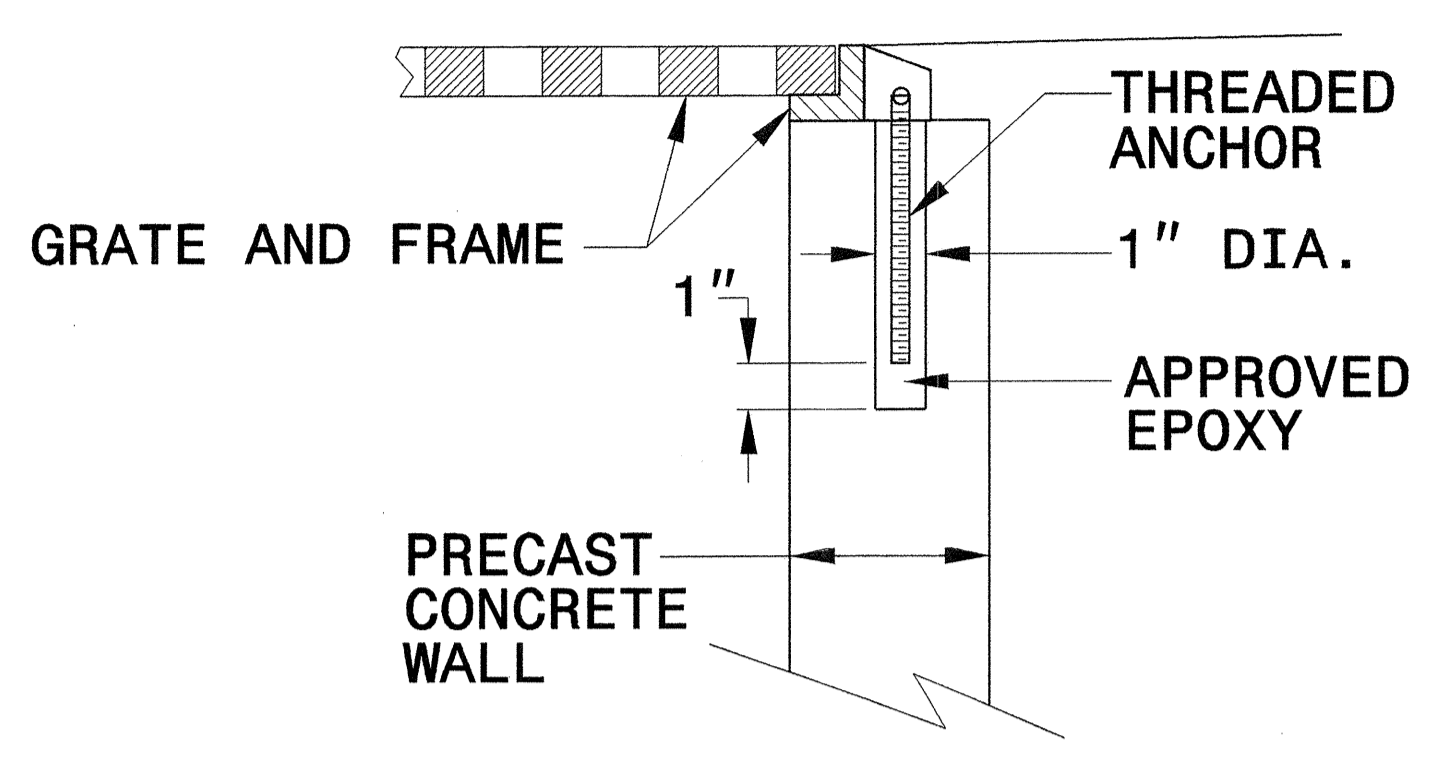
SHEET 1 OF 1  
**840D25**



**BRICK MASONRY CONSTRUCTION**



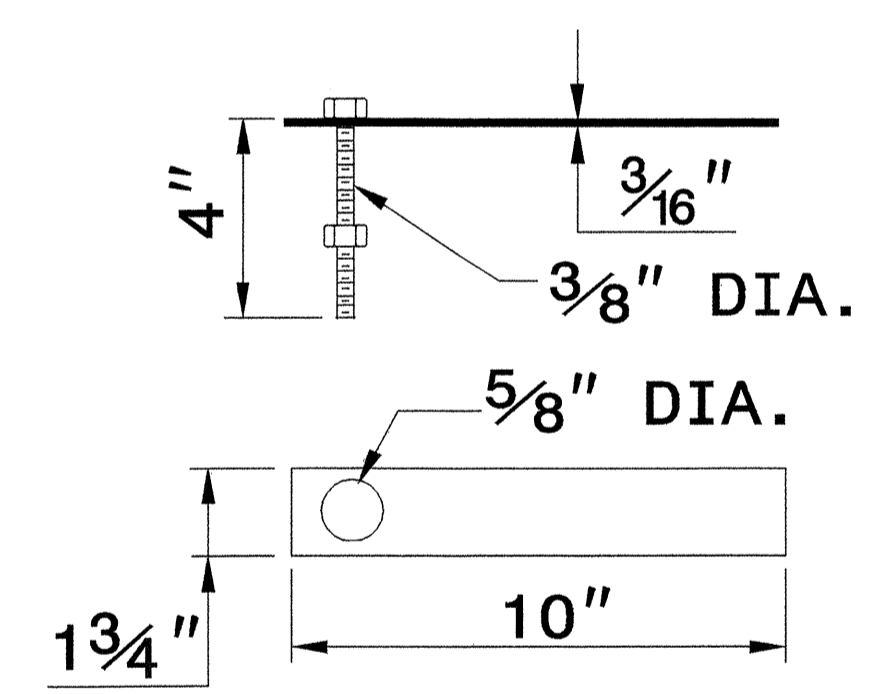
**CONCRETE CONSTRUCTION**



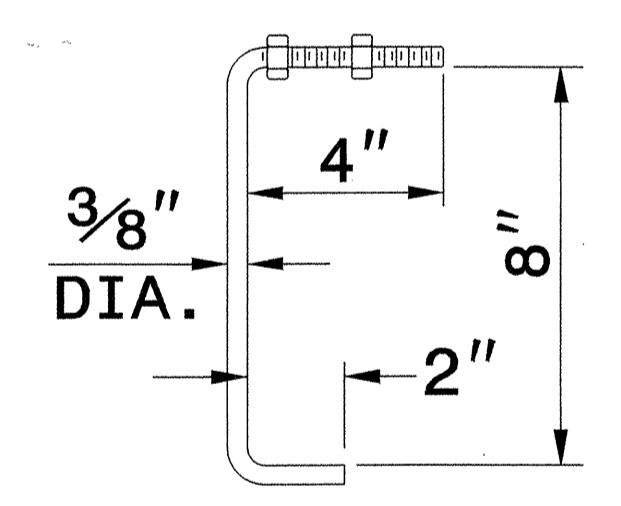
**PRECAST CONCRETE CONSTRUCTION**

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

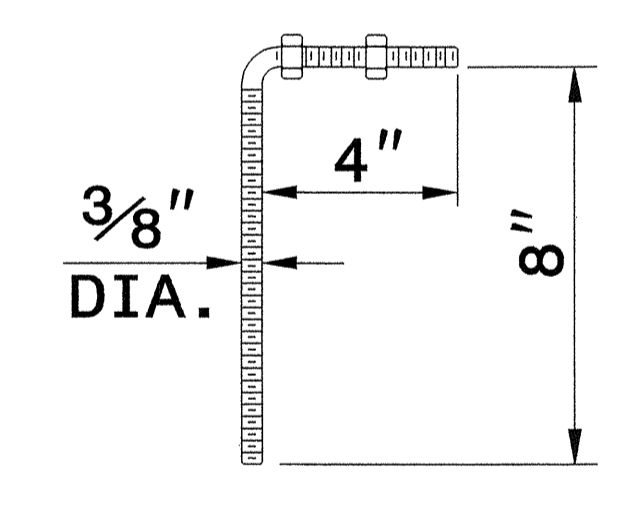
NOTE:  
CONSTRUCT GRATED DROP INLET TO COINCIDE WITH NORMAL OR SUPERELEVATED SHOULDER OR PAVEMENT SLOPE.



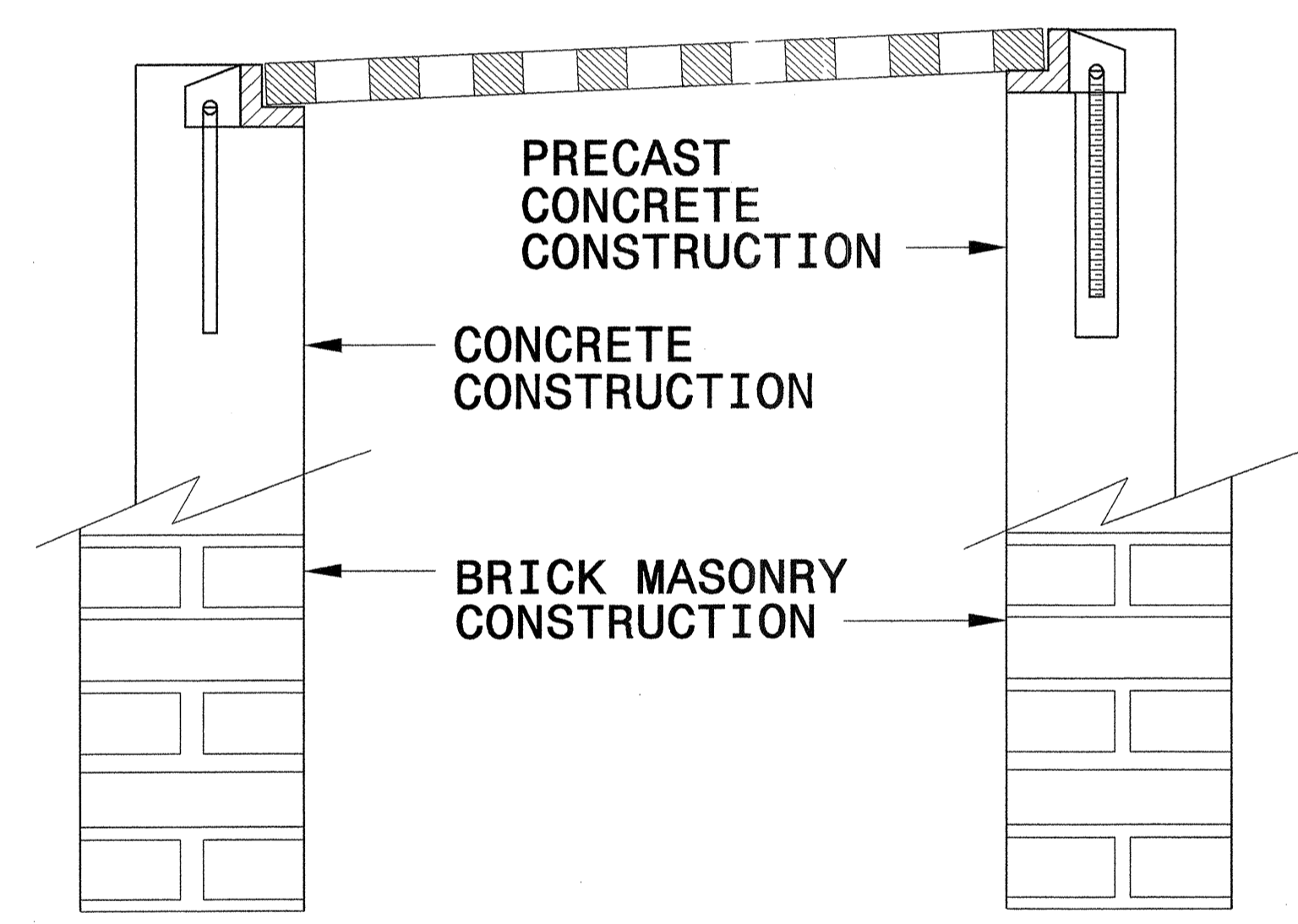
**MASONRY ANCHOR**  
3/8" DIA. BOLT WITH PLATE



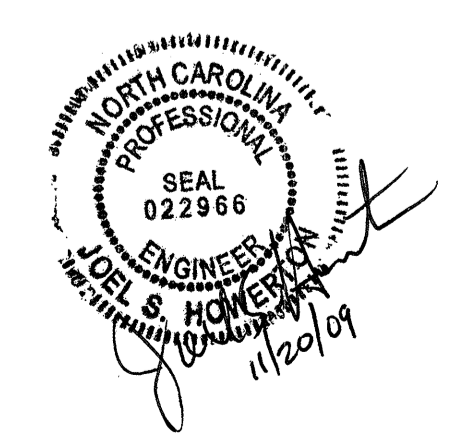
**CONCRETE ANCHOR**  
3/8" DIA. BENT BAR



**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**

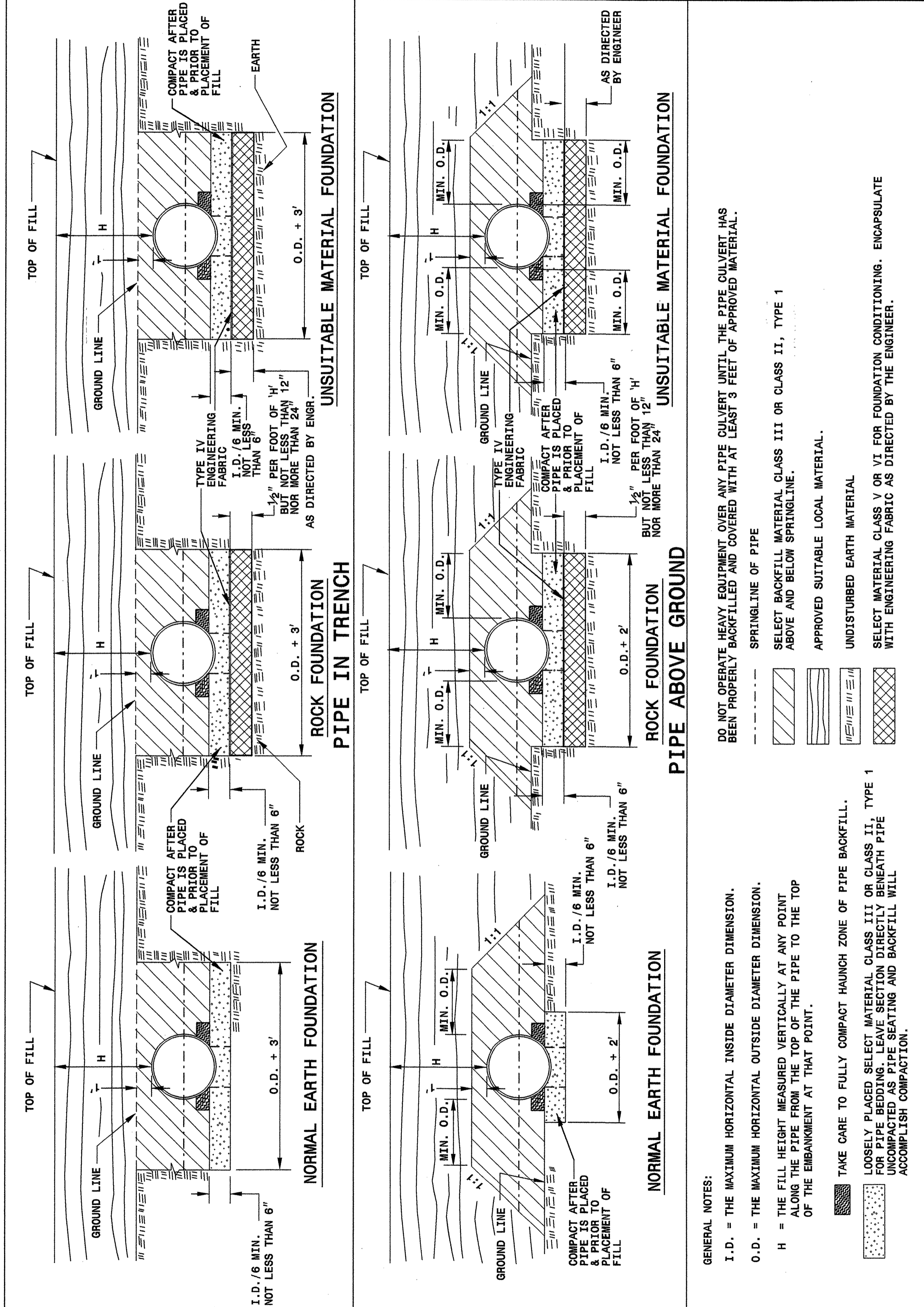
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 MODIFIED BY: Z. E. WARD DATE: 9/25/06  
 CHECKED BY: *[Signature]* DATE: 11/13/06  
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SERIAL...  
SERIAL...

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 jlower-ton HI P5237501

5/14/99

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  
 SHEET 1 OF 3  
**300D01**



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  
 SHEET 1 OF 3  
**300D01**

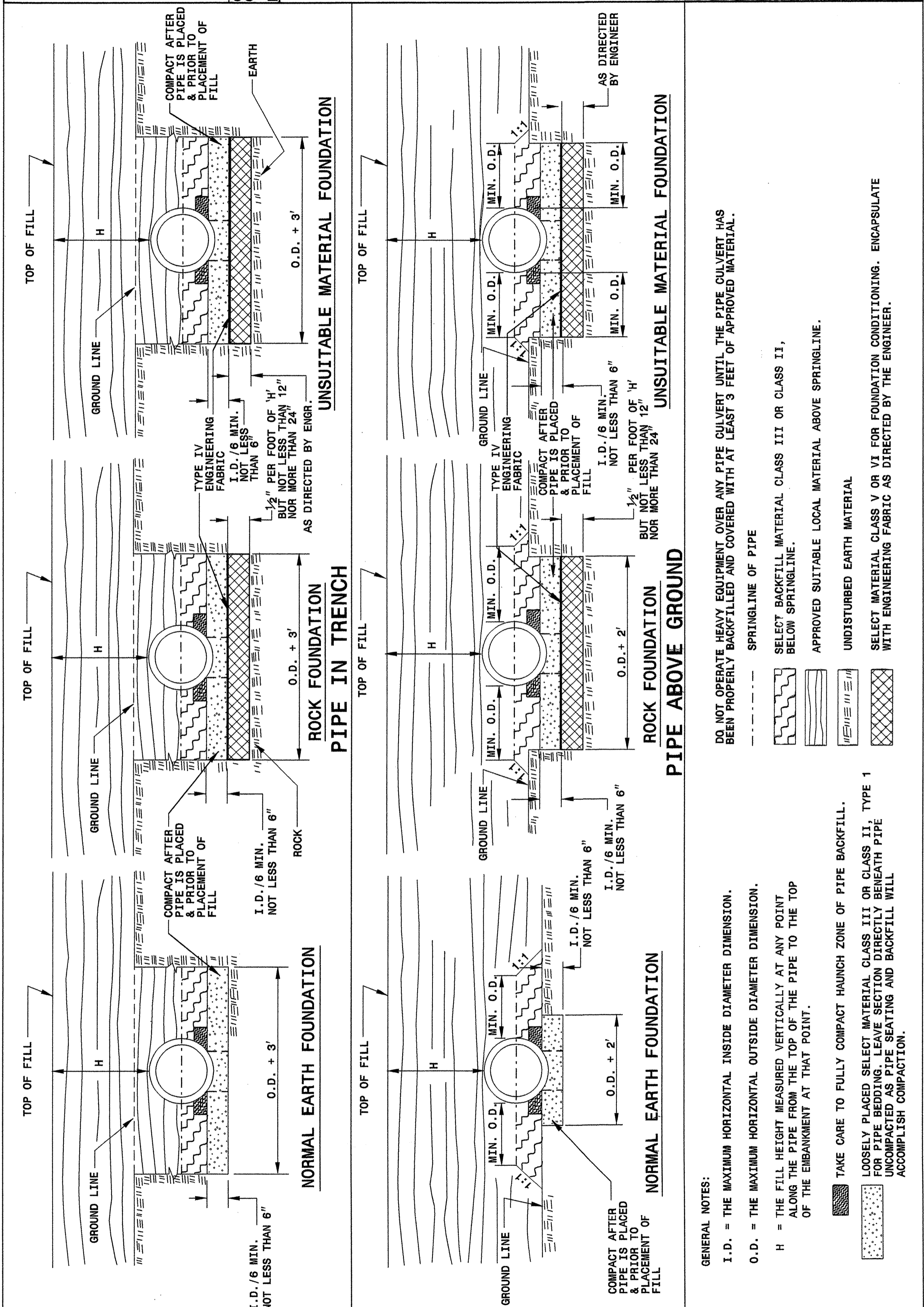
**GENERAL NOTES:**  
 I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.  
 O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.  
 H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.

--- 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.

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.

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  
 SHEET 2 OF 3  
**300D01**

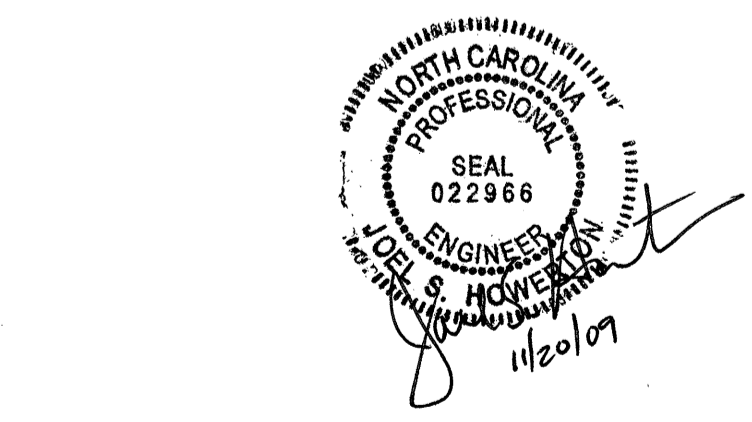


STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. **7-06**  
**ENGLISH DETAIL DRAWING FOR METHOD OF PIPE INSTALLATION**  
 RIGID PIPE  
 SHEET 2 OF 3  
**300D01**

**GENERAL NOTES:**  
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--- SPRINGLINE OF PIPE  
 SELECT BACKFILL MATERIAL CLASS III OR CLASS II, BELOW SPRINGLINE.  
 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.

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.



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

**SEE PLATE FOR TITLE**

ORIGINAL BY: K Kempf DATE: 5-15-09  
 MODIFIED BY: DATE:   
 CHECKED BY: *Joseph S. Howerton* DATE: 7/20/09  
 FILE SPEC: s:\verward\stds\stdstodetails\30001\0300d01.dgn

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

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

FILL HEIGHT TABLES

**FLEXIBLE PIPE**

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

Diameter (inches)	Minimum cover (inches)	Maximum Height of Cover (feet)			
		16 (Ga)	14	12	8
12	12	204	266		
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
48	12	48	61	87	113
54	12		54	77	100
60	12			69	90
66	12				81
72	12				74
78	12				91
84	12				81
					69

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

Diameter (inches)	Minimum cover (inches)	Maximum Height of Cover (feet)			
		16 (Ga)	14	12	8
12	12	123	155	216	281
15	12	98	123	174	224
18	12	81	102	144	187
21	12	69	87	123	160
24	12	60	76	108	139
27	12		67	95	123
30	12		60	85	111
36	12		50	71	92
42	12			60	78
48	12			52	68
54	12			46	50
60	12				50
66	12				62
72	12				51
					41

- HDPE \* \* (Minimum fill) 2' for pipe diameters ≥ 12" and ≤ 60"  
 \* \* (Maximum fill) 20' for pipe diameters ≤ 24"  
 17' for pipe diameters ≥ 30" and ≤ 60"
- PVC \* \* (Minimum fill) 2' for pipe diameters ≥ 12" and ≤ 36"  
 \* \* (Maximum fill) 30' for pipe diameters ≥ 12" and ≤ 36"

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

**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 LRF Direct Design Method)

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

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

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

- CSP - AASHTO M36
- 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

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

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

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

FILL HEIGHT TABLES

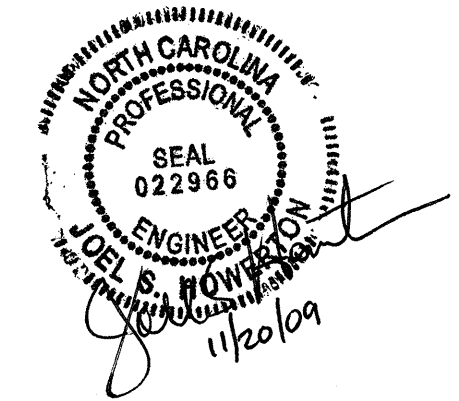
SHEET 3 OF 3  
**300D01**

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  
 MODIFIED BY: *[Signature]* DATE: *[Signature]*  
 CHECKED BY: *[Signature]* DATE: 7/30/09  
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STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

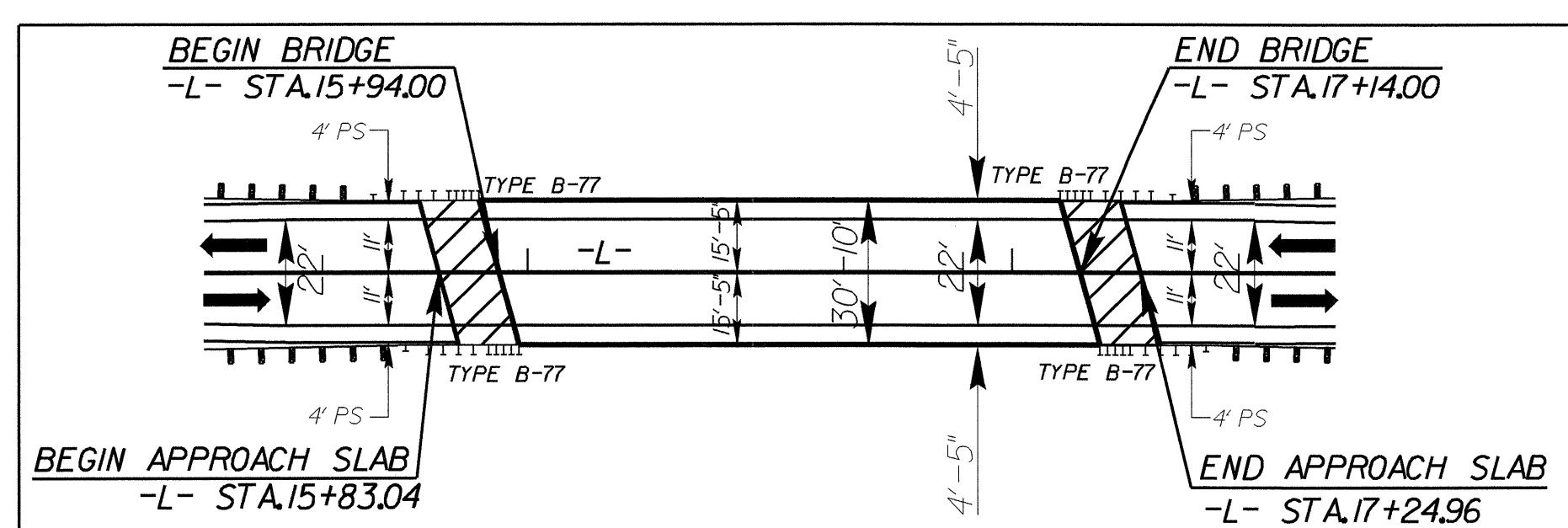
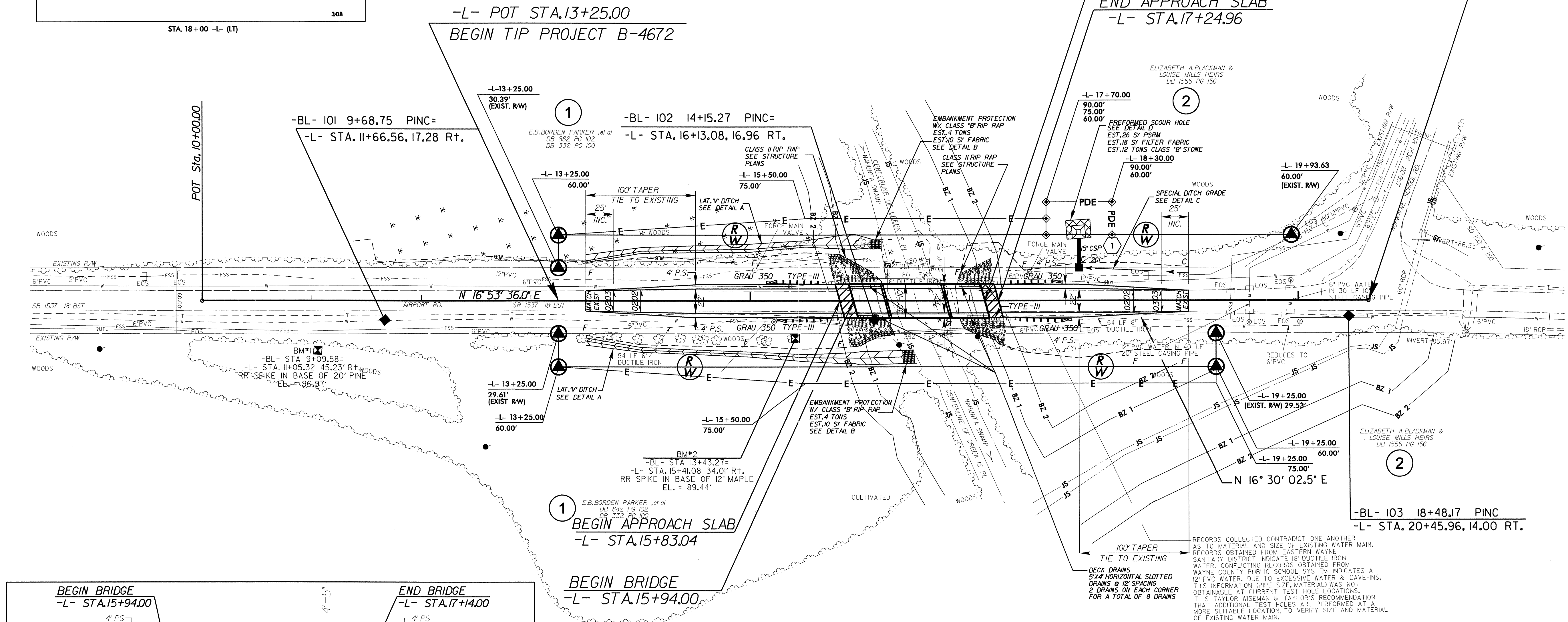
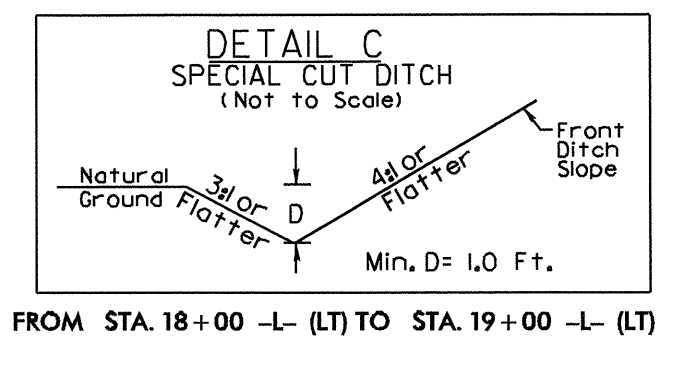
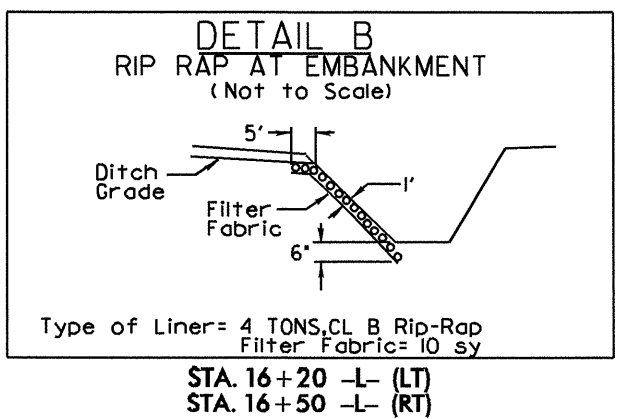
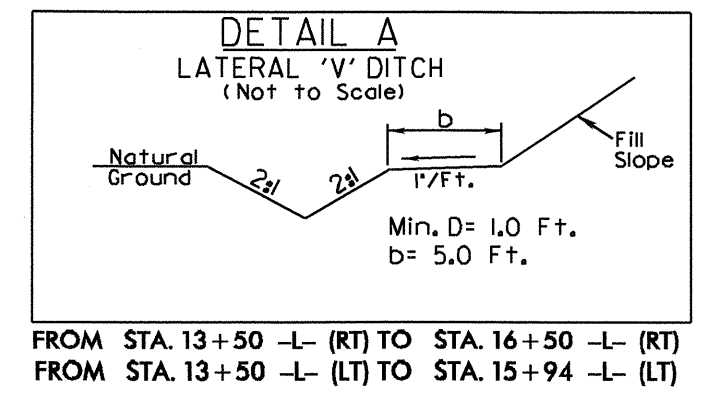
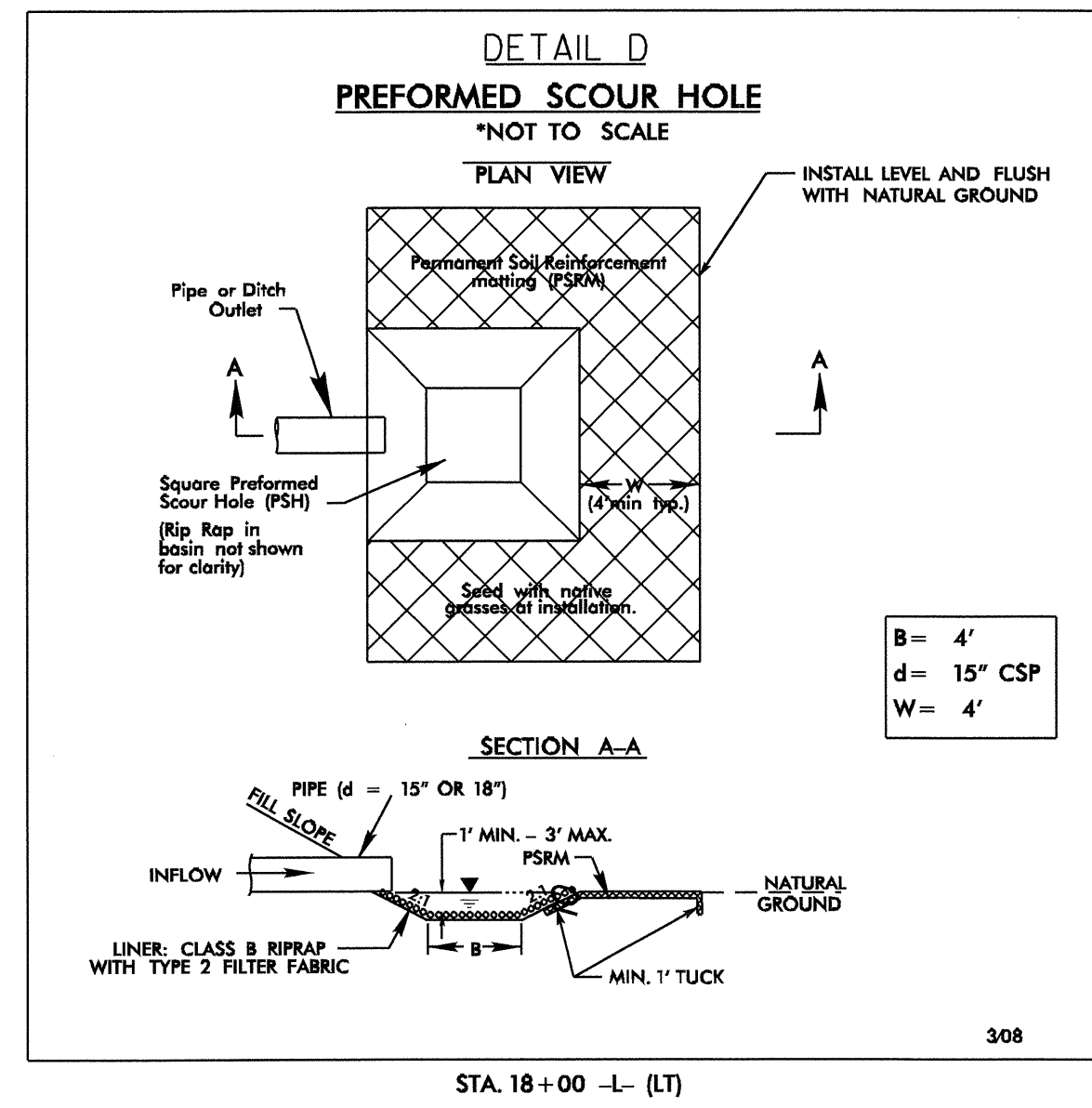
SUMMARY OF QUANTITIES

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS  
ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C202272

ItemNumber	Sec #	Quantity	Unit	Description
0000100000-N	800	Lump Sum		MOBILIZATION
0029000000-N	SP	Lump Sum		REINFORCED BRIDGE APPROACH FILL, STATION ***** (16+54.00 -L-)
0036000000-E	225	300	CY	UNDERCUT EXCAVATION
0043000000-N	226	Lump Sum		GRADING
0050000000-E	226	1	ACR	SUPPLEMENTARY CLEARING & GRUB-BING
0134000000-E	240	150	CY	DRAINAGE DITCH EXCAVATION
0195000000-E	265	300	CY	SELECT GRANULAR MATERIAL
0196000000-E	270	300	SY	FABRIC FOR SOIL STABILIZATION
0320000000-E	SP	10	SY	FOUNDATION CONDITIONING FABRIC
0330000000-E	SP	10	TON	GENERIC DRAINAGE ITEM FOUNDATION CONDITIONING MATERIAL, MINOR STRS
0335200000-E	SP	28	LF	15" DRAINAGE PIPE
1220000000-E	545	50	TON	INCIDENTAL STONE BASE
1489000000-E	610	390	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B
1519000000-E	610	230	TON	ASPHALT CONC SURFACE COURSE, TYPE S9.5B
1560000000-E	620	35	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 64-22
1693000000-E	654	25	TON	ASPHALT PLANT MIX, PAVEMENT REPAIR
2000000000-N	806	7	EA	RIGHT OF WAY MARKERS
2022000000-E	815	22.4	CY	SUBDRAIN EXCAVATION
2033000000-E	815	16.8	CY	SUBDRAIN FINE AGGREGATE
2044000000-E	815	100	LF	6" PERFORATED SUBDRAIN PIPE
2055000000-E	815	3	EA	6" SUBDRAIN PIPE WYES, TEES, & ELBOWS
2066000000-N	815	1	EA	CONCRETE PAD FOR SUBDRAIN PIPE OUTLET
2077000000-E	815	6	LF	6" OUTLET PIPE (SUBDRAINS)
2286000000-N	840	1	EA	MASONRY DRAINAGE STRUCTURES

ItemNumber	Sec #	Quantity	Unit	Description
2365000000-N	840	1	EA	FRAME WITH TWO GRATES, STD 840.22
3030000000-E	862	25	LF	STEEL BM GUARDRAIL
3150000000-N	862	2	EA	ADDITIONAL GUARDRAIL POSTS
3215000000-N	862	4	EA	GUARDRAIL ANCHOR UNITS, TYPE III
3270000000-N	SP	4	EA	GUARDRAIL ANCHOR UNITS, TYPE 350
3649000000-E	876	22	TON	RIP RAP, CLASS B
3656000000-E	876	540	SY	FILTER FABRIC FOR DRAINAGE
3659000000-N	SP	1	EA	PREFORMED SCOUR HOLES WITH LEVEL SPREADER APRON
4400000000-E	1110	480	SF	WORK ZONE SIGNS (STATIONARY)
4410000000-E	1110	90	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)
4445000000-E	1145	40	LF	BARRICADES (TYPE III)
4685000000-E	1205	1,100	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)
4686000000-E	1205	1,100	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)
4810000000-E	1205	44,620	LF	PAINT PAVEMENT MARKING LINES (4")
4830000000-E	1205	90	LF	PAINT PAVEMENT MARKING LINES (16")
4835000000-E	1205	170	LF	PAINT PAVEMENT MARKING LINES (24")
4840000000-N	1205	16	EA	PAINT PAVEMENT MARKING CHARACTER
4900000000-N	1251	7	EA	PERMANENT RAISED PAVEMENT MARKERS
6000000000-E	1605	1,000	LF	TEMPORARY SILT FENCE
6006000000-E	1610	225	TON	STONE FOR EROSION CONTROL, CLASS A
6009000000-E	1610	145	TON	STONE FOR EROSION CONTROL, CLASS B
6012000000-E	1610	115	TON	SEDIMENT CONTROL STONE
6015000000-E	1615	2	ACR	TEMPORARY MULCHING
6018000000-E	1620	100	LB	SEED FOR TEMPORARY SEEDING
6021000000-E	1620	1.25	TON	FERTILIZER FOR TEMPORARY SEEDING
6024000000-E	1622	200	LF	TEMPORARY SLOPE DRAINS
6027000000-N	1622	4	EA	INLET PROTECTION AT TEMPORARY SLOPE DRAINS
6029000000-E	SP	950	LF	SAFETY FENCE
6030000000-E	1630	320	CY	SILT EXCAVATION
6036000000-E	1631	1,650	SY	MATting FOR EROSION CONTROL
6037000000-E	SP	50	SY	COIR FIBER MAT
6042000000-E	1632	400	LF	1/4" HARDWARE CLOTH
6071030000-E	SP	150	LF	COIR FIBER BAFFLES
6071050000-E	SP	2	EA	*** SKIMMER (1-1/2")
6084000000-E	1660	5	ACR	SEEDING & MULCHING
6087000000-E	1660	1	ACR	MOWING
6090000000-E	1661	50	LB	SEED FOR REPAIR SEEDING
6093000000-E	1661	0.25	TON	FERTILIZER FOR REPAIR SEEDING
6096000000-E	1662	50	LB	SEED FOR SUPPLEMENTAL SEEDING
6108000000-E	1665	1	TON	FERTILIZER TOPDRESSING
6114500000-N	SP	12	MHR	SPECIALIZED HAND MOWING
6117000000-N	SP	12	EA	RESPONSE FOR EROSION CONTROL
6123000000-E	1670	0.5	ACR	REFORESTATION





NOTES:  
SEE SHEET 5 FOR -L- PROFILE

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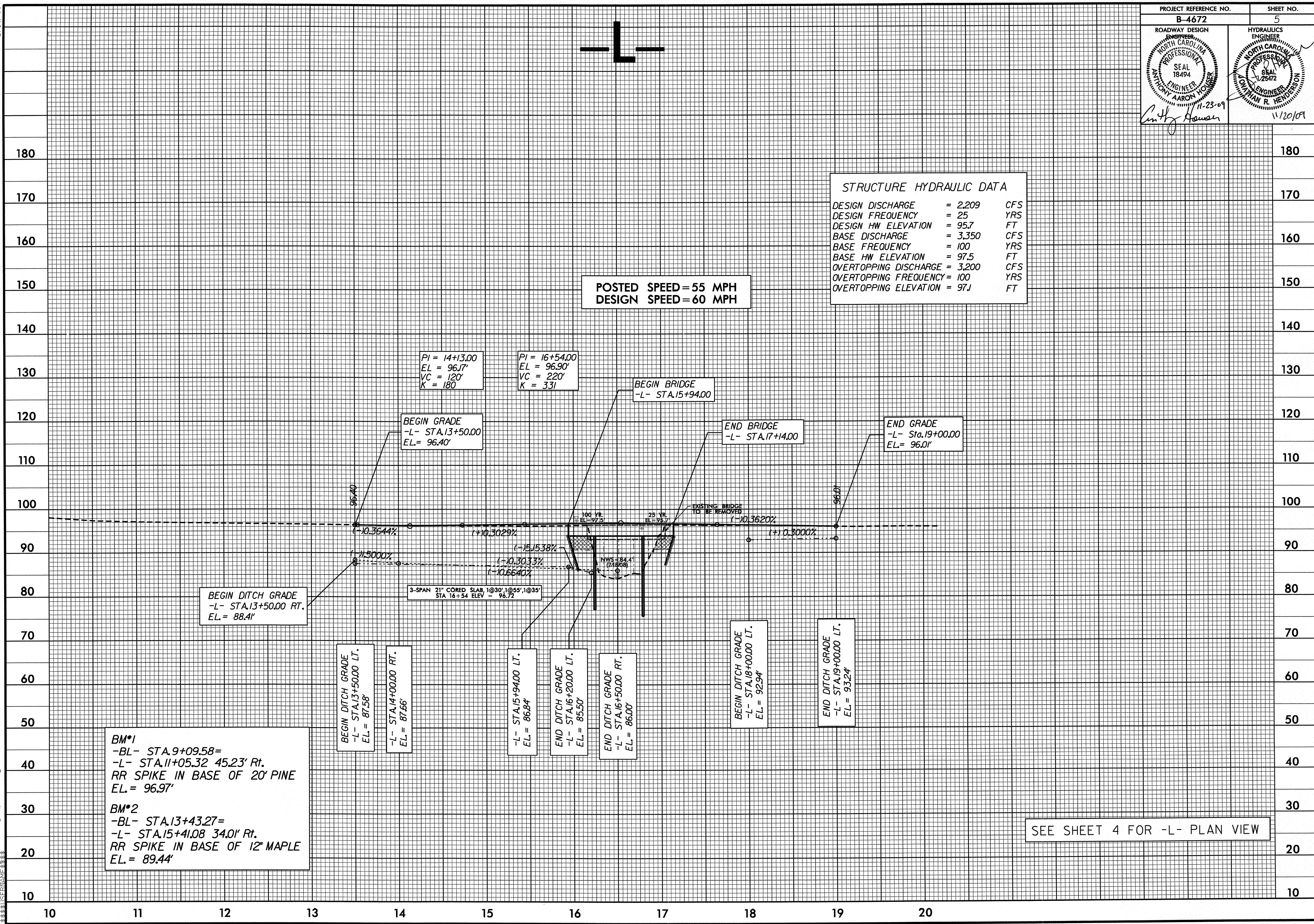
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PROJECT REFERENCE NO. <b>B-4672</b>	SHEET NO. <b>5</b>
ROADWAY DESIGN NORTH CAROLINA PROFESSIONAL SEAL 18494 ENGINEER ANTHONY AARON FOLGER 11-23-09	HYDRAULICS ENGINEERING NORTH CAROLINA PROFESSIONAL SEAL 25472 ENGINEER WALTER R. HEIDERSON 11/20/09

**STRUCTURE HYDRAULIC DATA**

DESIGN DISCHARGE	= 2,209	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 95.7	FT
BASE DISCHARGE	= 3,350	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 97.5	FT
OVERTOPPING DISCHARGE	= 3,200	CFS
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING ELEVATION	= 97J	FT

**POSTED SPEED = 55 MPH  
DESIGN SPEED = 60 MPH**



**BM\*1**  
-BL- STA.9+09.58=  
-L- STA.11+05.32 45.23' Rt.  
RR SPIKE IN BASE OF 20' PINE  
EL. = 96.97'

**BM\*2**  
-BL- STA.13+43.27=  
-L- STA.15+41.08 34.01' Rt.  
RR SPIKE IN BASE OF 12" MAPLE  
EL. = 89.44'

SEE SHEET 4 FOR -L- PLAN VIEW

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