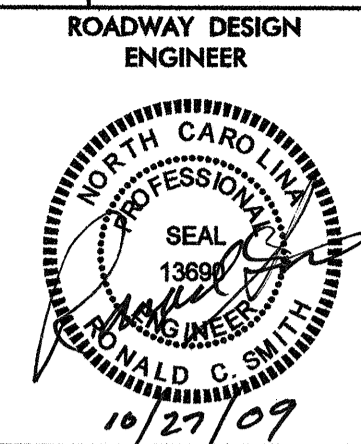


8/17/99



SHEET NUMBER	SHEET
1	TITLE SHEET
1-A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS
1-B	CONVENTIONAL SYMBOLS
1-C	SURVEY CONTROL SHEET
2	PAVEMENT SCHEDULE, TYPICAL SECTIONS, AND WEDGING DETAILS
2-A	DETAIL FOR ANCHORAGE OF FRAMES
2-B	BICYCLE SAFE STEEL FRAME AND GRATES
2-C	METHOD OF PIPE INSTALLATION
2-D	METHOD OF PIPE INSTALLATION
2-E THRU 2-F	LIGHTWEIGHT AGGREGATE FILL EMBANKMENT
2-G	EMBANKMENT MONITORING DETAIL
2-H	BRIDGE APPROACH FILLS
3	SUMMARY OF QUANTITIES
3-A	SUMMARY OF GUARDRAIL, EARTHWORK SUMMARY, AND ASPHALT PAVEMENT REMOVAL SUMMARY
3-B	SUMMARY OF DRAINAGE QUANTITIES
4	PLAN SHEET
5	PROFILE SHEET
TCP-1	TRAFFIC CONTROL PLANS
EC-1 THRU EC-5	EROSION CONTROL PLANS
UC-1 THRU UC-2	UTILITIES CONSTRUCTION PLANS
UO-1 THRU UO-2	UTILITIES BY OTHERS
X-1 THRU X-7	CROSS-SECTIONS
S-1 THRU S-25	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.

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.

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 CT&T, NC Public Power, Chowan County
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

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 3 - PIPE CULVERTS	
310.10	Driveway Pipe Construction
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 8 - INCIDENTALS	
815.03	Pipe Underdrain and Blind Drain
840.00	Concrete Base Pad for Drainage Structures
840.35	Traffic Bearing Grated Drop Inlet - For Cast Iron Double Frame and Grates
840.46	Traffic Bearing Precast Drainage Structure
840.66	Drainage Structure Steps
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

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	□ EDM
Parcel/Sequence Number	123
Existing Fence Line	-x-x-x-
Proposed Woven Wire Fence	○
Proposed Chain Link Fence	□
Proposed Barbed Wire Fence	◇
Existing Wetland Boundary	-WLB-
Proposed Wetland Boundary	-WLB-
Existing Endangered Animal Boundary	-EAB-
Existing Endangered Plant Boundary	-EPB-

BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or UG Tank Cap	○
Sign	○ S
Well	○ W
Small Mine	⊗
Foundation	□
Area Outline	□
Cemetery	⊕
Building	□
School	□
Church	⊕
Dam	⊕

HYDROLOGY:

Stream or Body of Water	_____
Hydro, Pool or Reservoir	□
Jurisdictional Stream	-JS-
Buffer Zone 1	-BZ 1-
Buffer Zone 2	-BZ 2-
Flow Arrow	←
Disappearing Stream	→
Spring	○
Wetland	⊕
Proposed Lateral, Tail, Head Ditch	← FLOW
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 Utility Easement	-PUE-
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	□ 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	⊗
UG Power Cable Hand Hole	⊕
H-Frame Pole	●
Recorded UG Power Line	-P-
Designated UG Power Line (S.U.E.*)	-P-

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

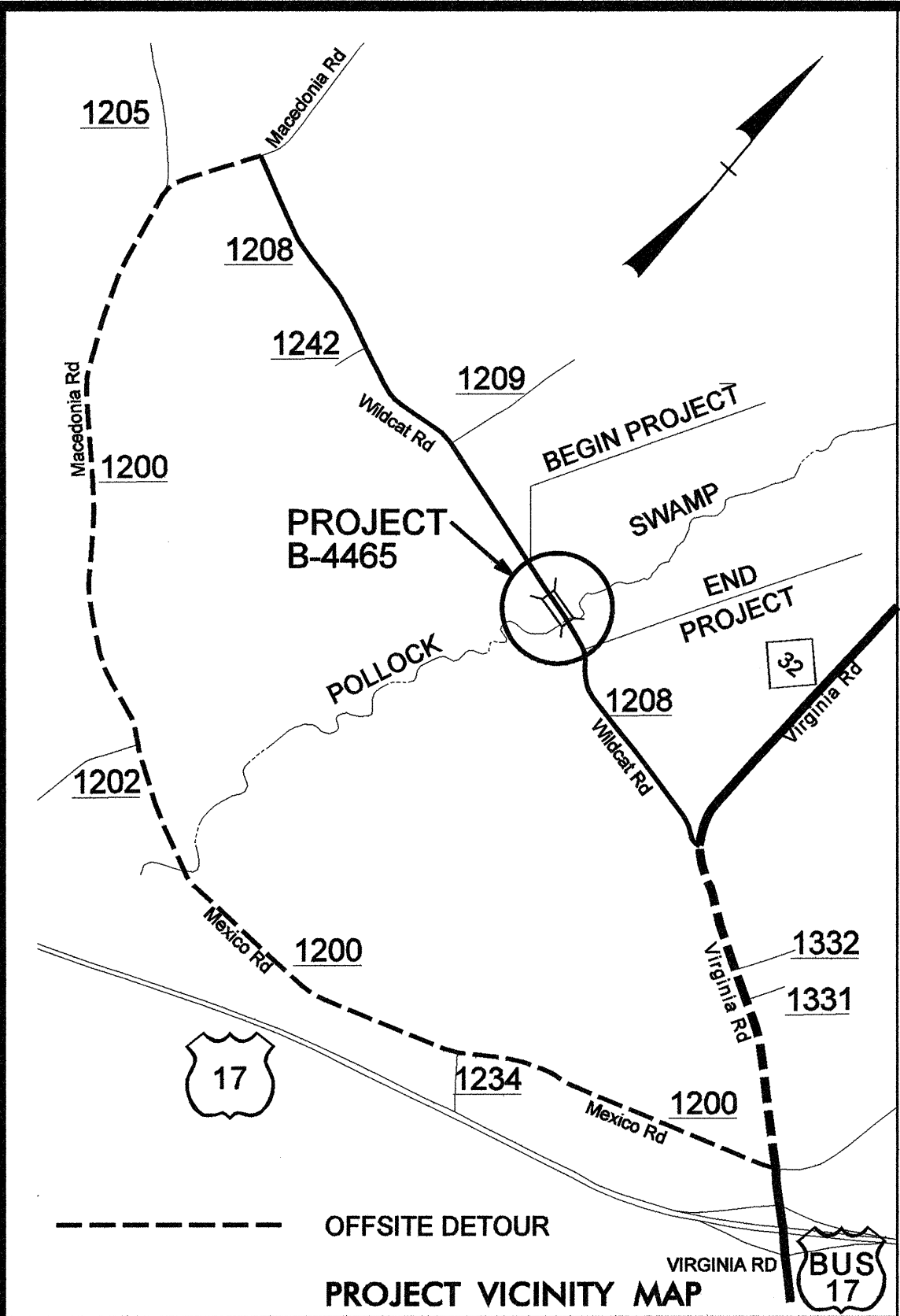
SANITARY SEWER:

Sanitary Sewer Manhole	⊕
Sanitary Sewer Cleanout	⊕
UG 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 UG Line	-UTIL-
UG Tank; Water, Gas, Oil	□
A/G Tank; Water, Gas, Oil	□
UG Test Hole (S.U.E.*)	⊕
Abandoned According to Utility Records	AATUR
End of Information	E.O.I.

SURVEY CONTROL SHEET B-4465



CONTROL DATA

BL	POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
B44651	GPS MON	B4465-1	859899.0340	2694843.6890	17.05'	OUTSIDE PROJECT LIMITS	
B44652	GPS MON	B4465-2	859584.3280	2695892.6270	10.23'	OUTSIDE PROJECT LIMITS	
BL3		BL-3	859315.0630	2696905.4370	1.12'	23+43.19	18.84 LT
BL4		BL-4	859083.6670	2697436.4360	9.20'	29+19.51	19.92 LT

BEGIN TIP PROJECT B-4465

-L- STA 17+25.00

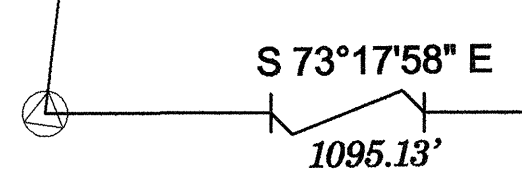
LOCALIZED PROJECT COORDINATES
 N = 859,475.2636
 E = 2,696,307.9471

END TIP PROJECT B-4465

-L- STA 30+00.00

LOCALIZED PROJECT COORDINATES
 N = 859,010.5279
 E = 2,697,477.8353

NCDOT GPS STATION "B4465-1"
 LOCALIZED PROJECT COORDINATES
 N = 859,899.0340
 E = 2,694,843.6890

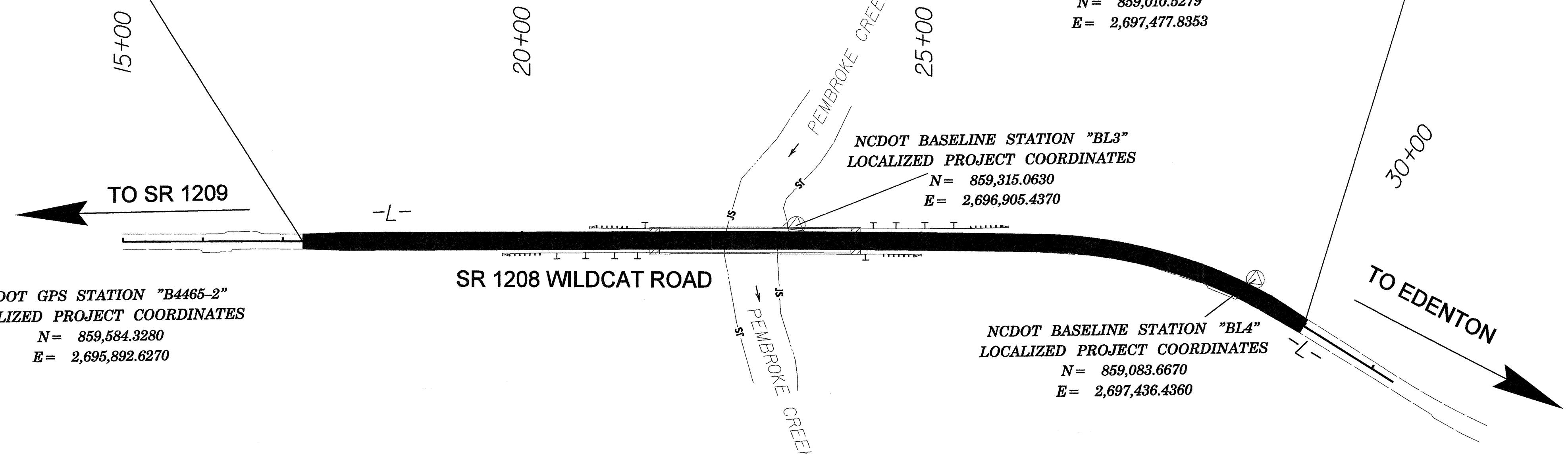


NCDOT GPS STATION "B4465-2"
 LOCALIZED PROJECT COORDINATES
 N = 859,584.3280
 E = 2,695,892.6270

NCDOT BASELINE STATION "BL3"
 LOCALIZED PROJECT COORDINATES
 N = 859,315.0630
 E = 2,696,905.4370

NCDOT BASELINE STATION "BL4"
 LOCALIZED PROJECT COORDINATES
 N = 859,083.6670
 E = 2,697,436.4360

NC GRID
 NAD 83/95



BENCHMARK DATA

```

*****
BM10      ELEVATION = 1.82'
N 859336      E 2697013
L STATION 24+40 71' LEFT
RR SPIKE IN 10" BLACK GUM
*****
BM11      ELEVATION = 1.99'
N 859420      E 2696720
L STATION 21+36 65' LEFT
RR SPIKE SET IN 12" BLACK GUM
*****

```

DATUM DESCRIPTION


THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B4465-2" WITH NAD 83/95 STATE PLANE GRID COORDINATES OF NORTHING: 859584.328(±) EASTING: 2695892.627(±) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.9999845 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B4465-2" TO -L- STATION 17+25.00 IS N 75°17'10" W 429.40 (±) ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

NOTES:

- THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING [HTTP://WWW.NCDOT.ORG/DOH/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT](http://www.ncdot.org/DOH/Preconstruct/Highway/Location/Project)
- FILE: b4465_ls_control_080808.txt
- SITE CALIBRATION PARAMETERS HAVE NOT BEEN DETERMINED 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 UTILIZING GLOBAL POSITIONING SYSTEM, BY RTK METHOD FROM PROJECT B-3435.

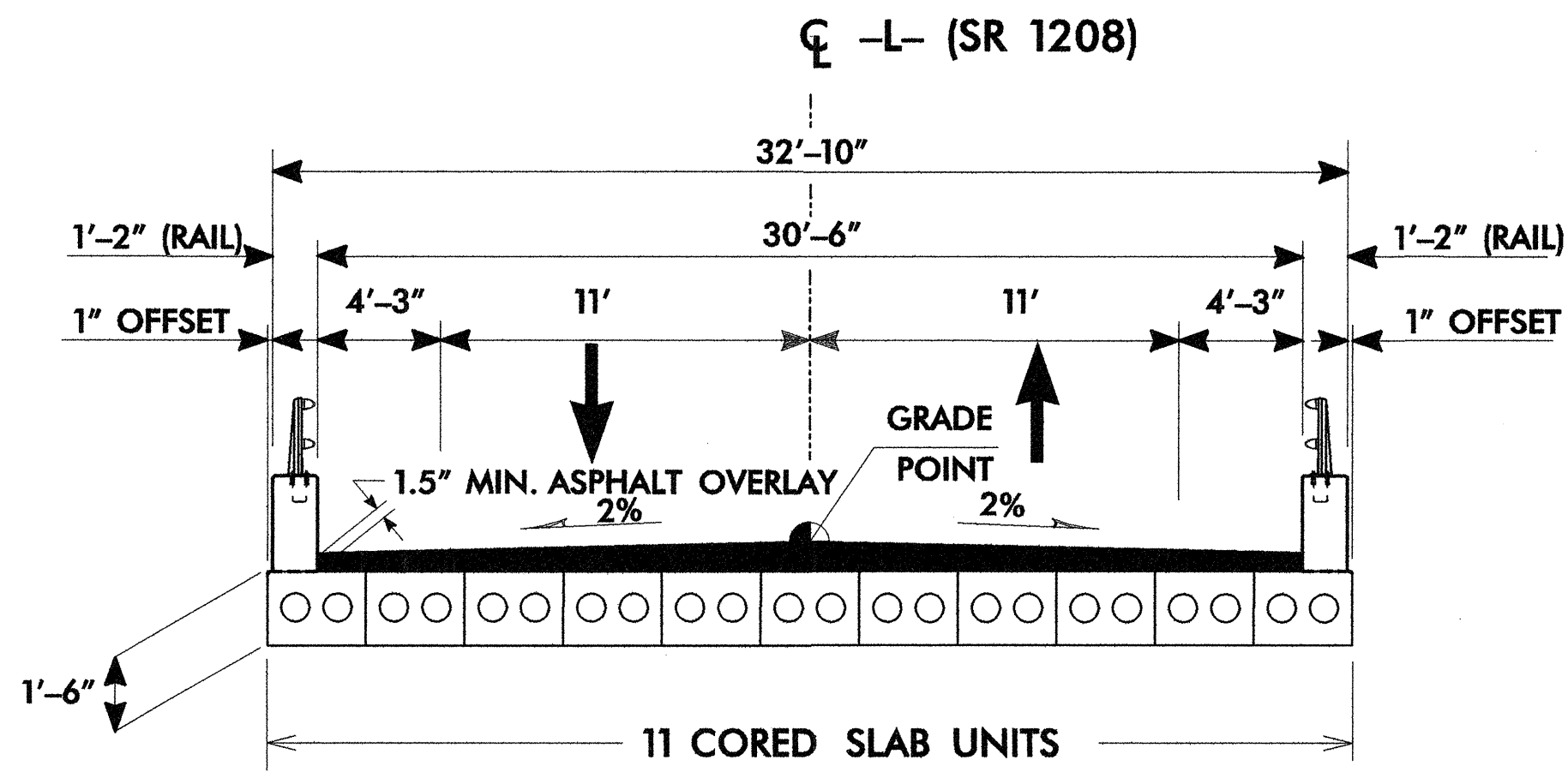
NOTE: DRAWING NOT TO SCALE

6/2/09

PROJECT REFERENCE NO. B-4465	SHEET NO. 2
ROADWAY DESIGN ENGINEER NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 13690 10/26/09	PAVEMENT DESIGN ENGINEER NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 22896 10/26/09
 DRMP ENGINEERS - PLANNERS - SCIENTISTS 17509 EAST INDEPENDENCE BLVD., SUITE 105 CHARLOTTE, NORTH CAROLINA 28227 (704) 332-2289 NC LICENSE NO. C-2203	

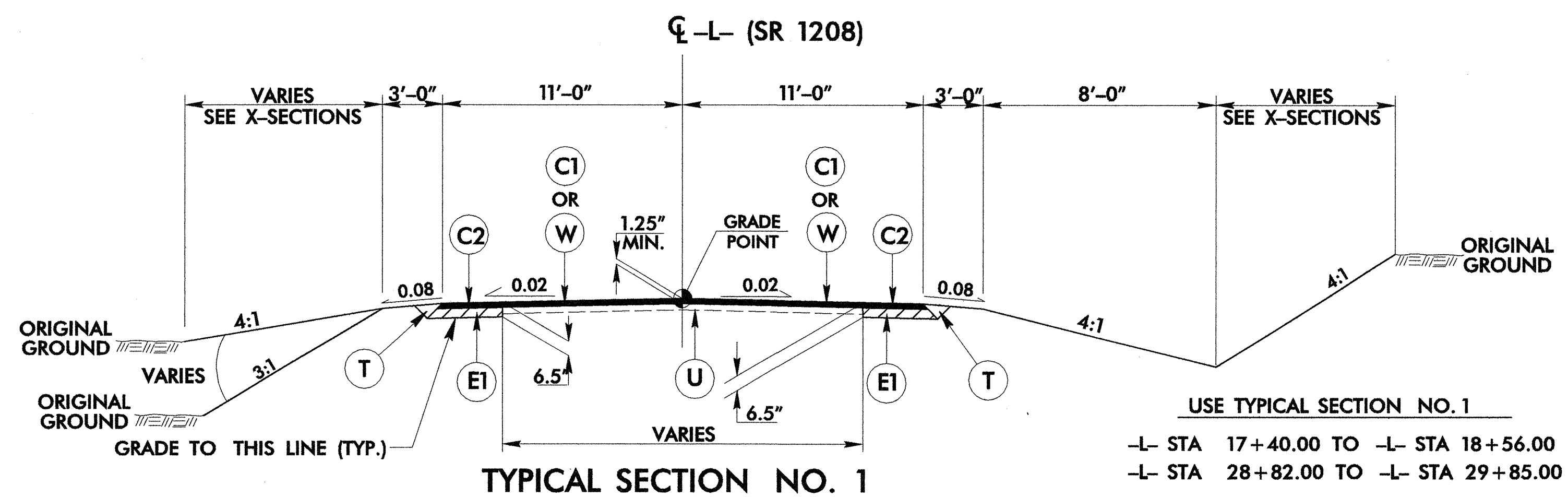
PAVEMENT SCHEDULE	
C1	PROP. APPROX. 1.25" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 137.5 LBS. PER SQ. YD.
C2	PROP. APPROX. 2.5" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 137.5 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 1.0" IN DEPTH OR GREATER THAN 1.5" IN DEPTH.
E1	PROP. APPROX. 4.0" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 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 5.5" IN DEPTH.
J1	PROP. 8.0" AGGREGATE BASE COURSE
P1	PRIME COAT AT THE RATE OF 0.35 GAL. PER SQ. YD.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	WEDGING. (SEE WEDGING DETAIL, THIS SHEET)

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



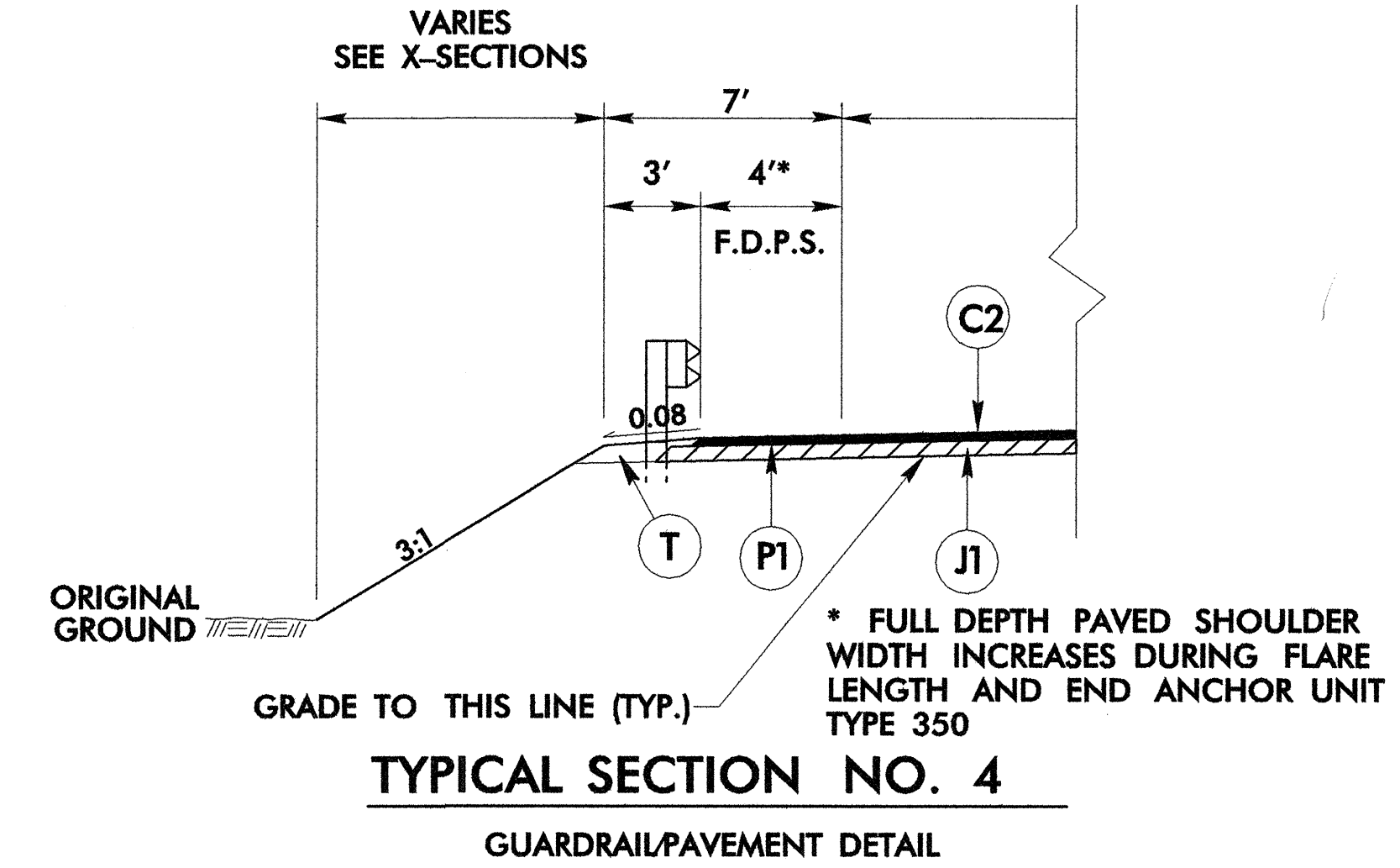
TYPICAL SECTION NO. 3
SEE STRUCTURE PLANS FOR DETAILS

USE TYPICAL SECTION NO. 3
 -L- STA 21+70.94 (BEGIN BRIDGE) TO
 -L- STA 24+13.06 (END BRIDGE)



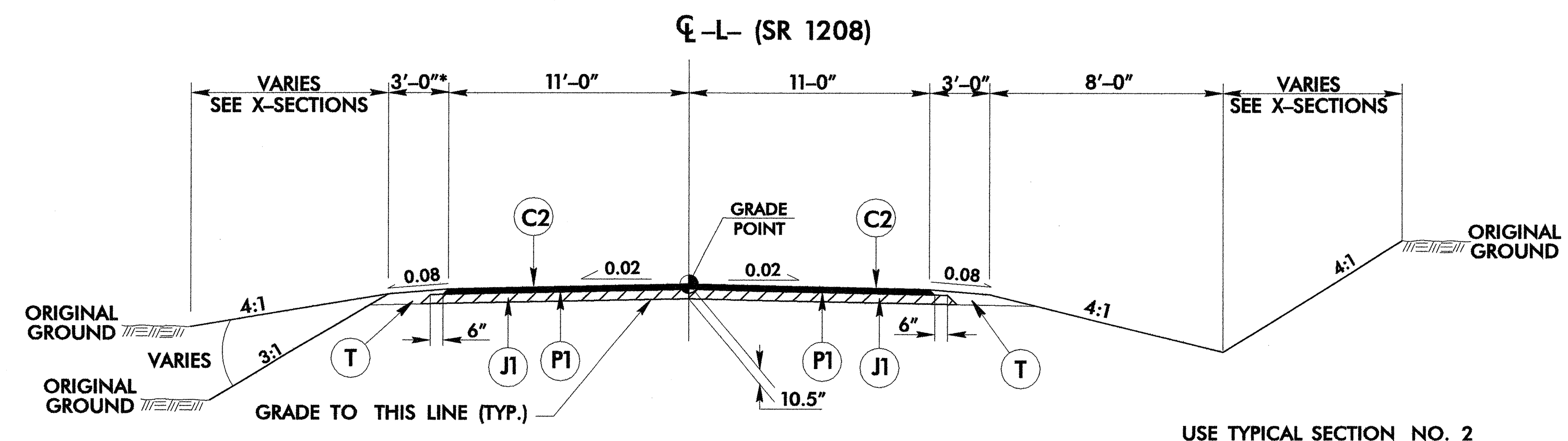
TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1
 -L- STA 17+40.00 TO -L- STA 18+56.00
 -L- STA 28+82.00 TO -L- STA 29+85.00



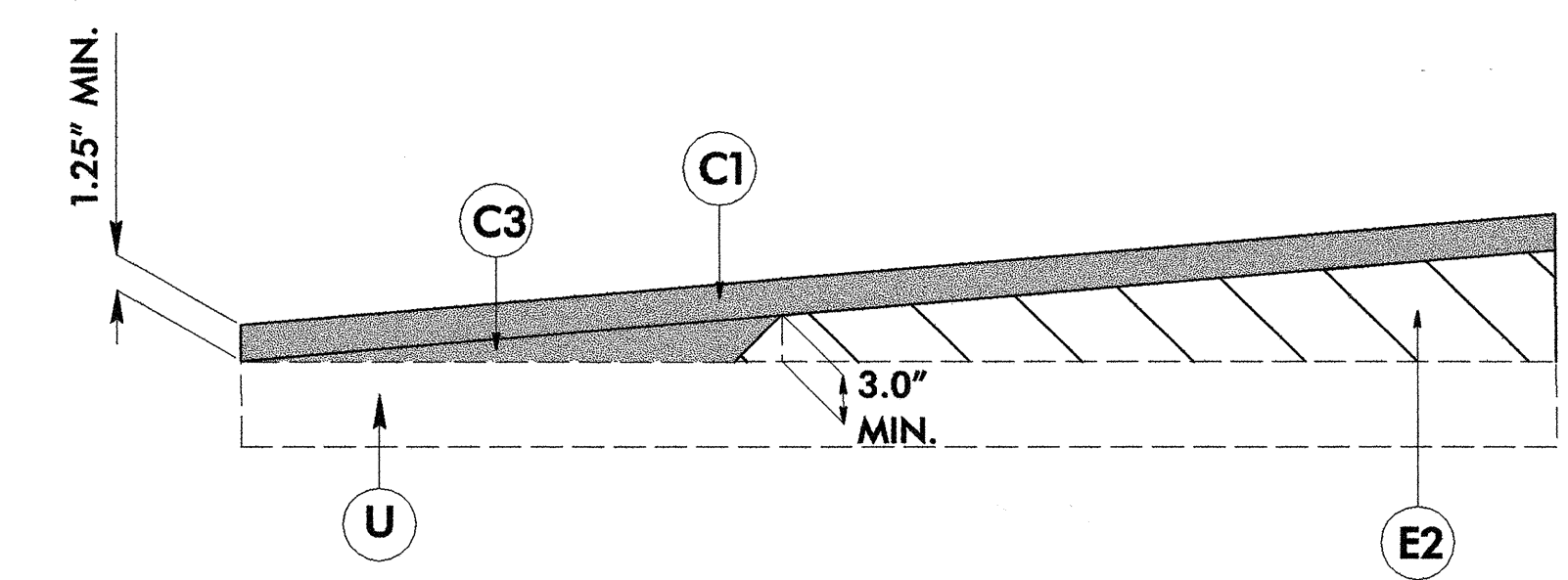
TYPICAL SECTION NO. 4
GUARDRAIL/PAVEMENT DETAIL

TRANSITION FROM TYPICAL SECTION NO. 1 TO EXISTING (INCLUDES FEATHERING)
 -L- STA 17+25.00 (BEGIN PROJECT) TO -L- STA 17+40.00
 -L- STA 29+85.00 TO -L- STA 30+00.00 (END PROJECT)



TYPICAL SECTION NO. 2

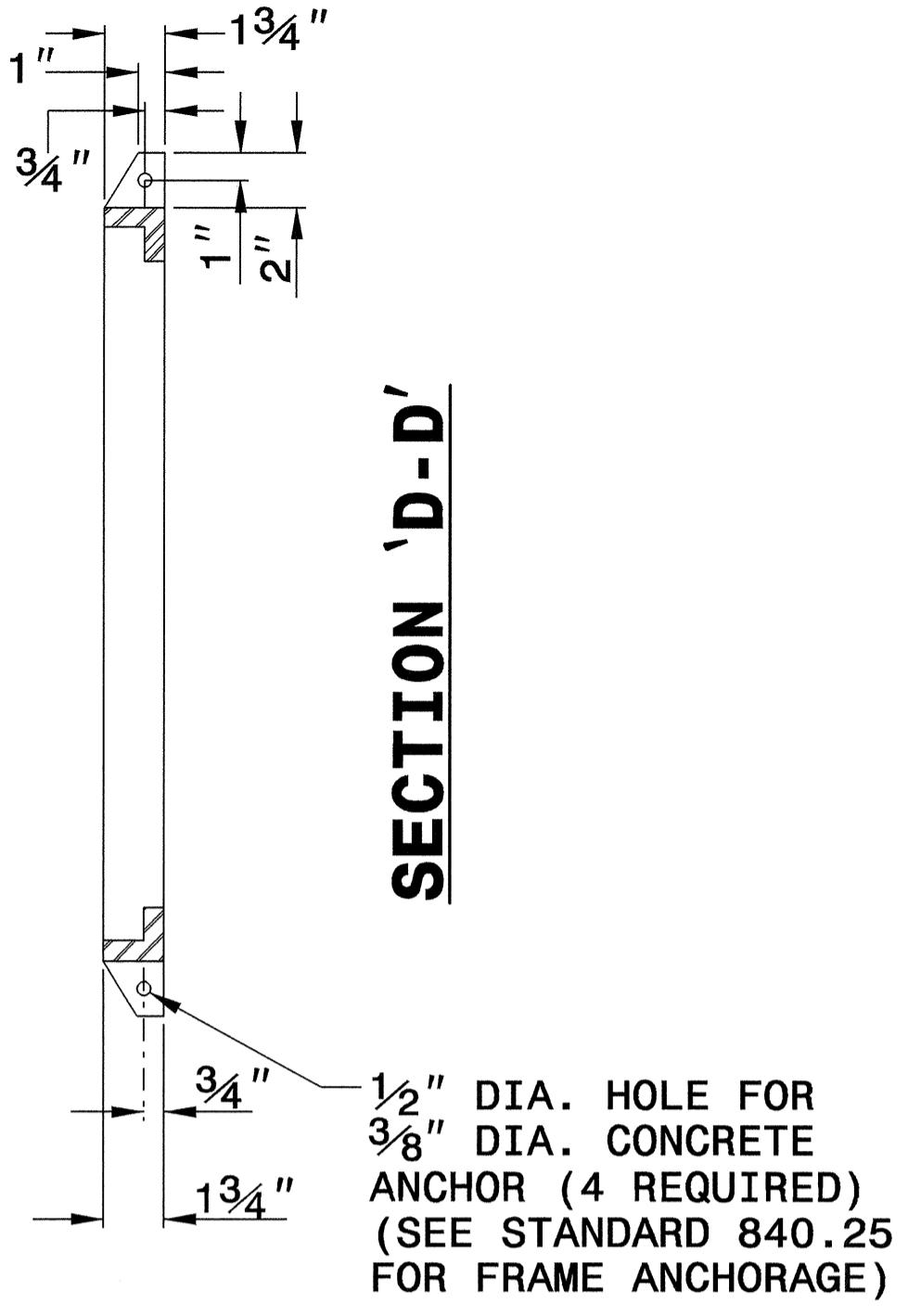
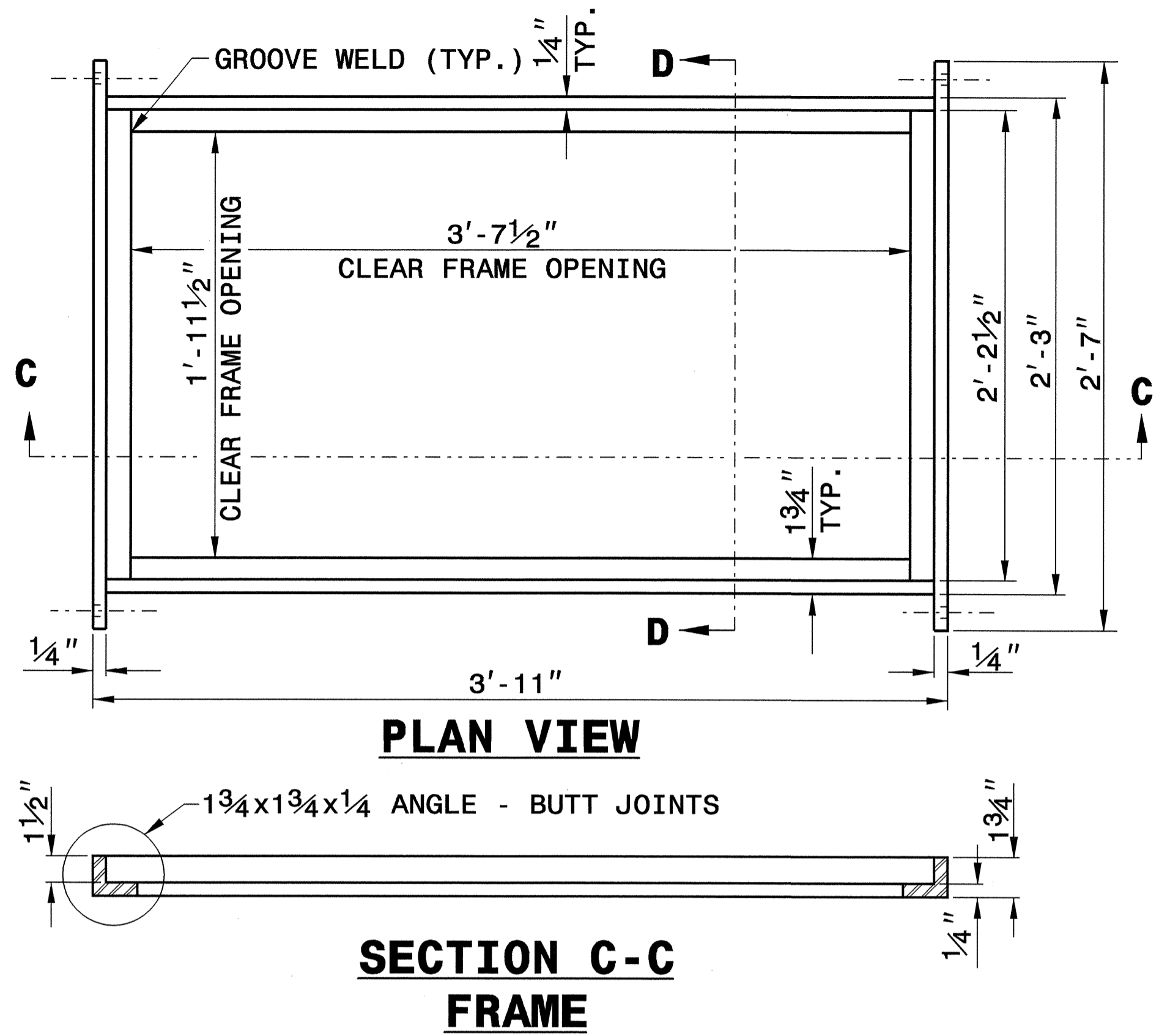
USE TYPICAL SECTION NO. 2
 -L- STA 18+56.00 TO -L- STA 21+70.94 (BEGIN BRIDGE)
 -L- STA 24+13.06 (END BRIDGE) TO -L- STA 28+82.00



W - Wedging Detail

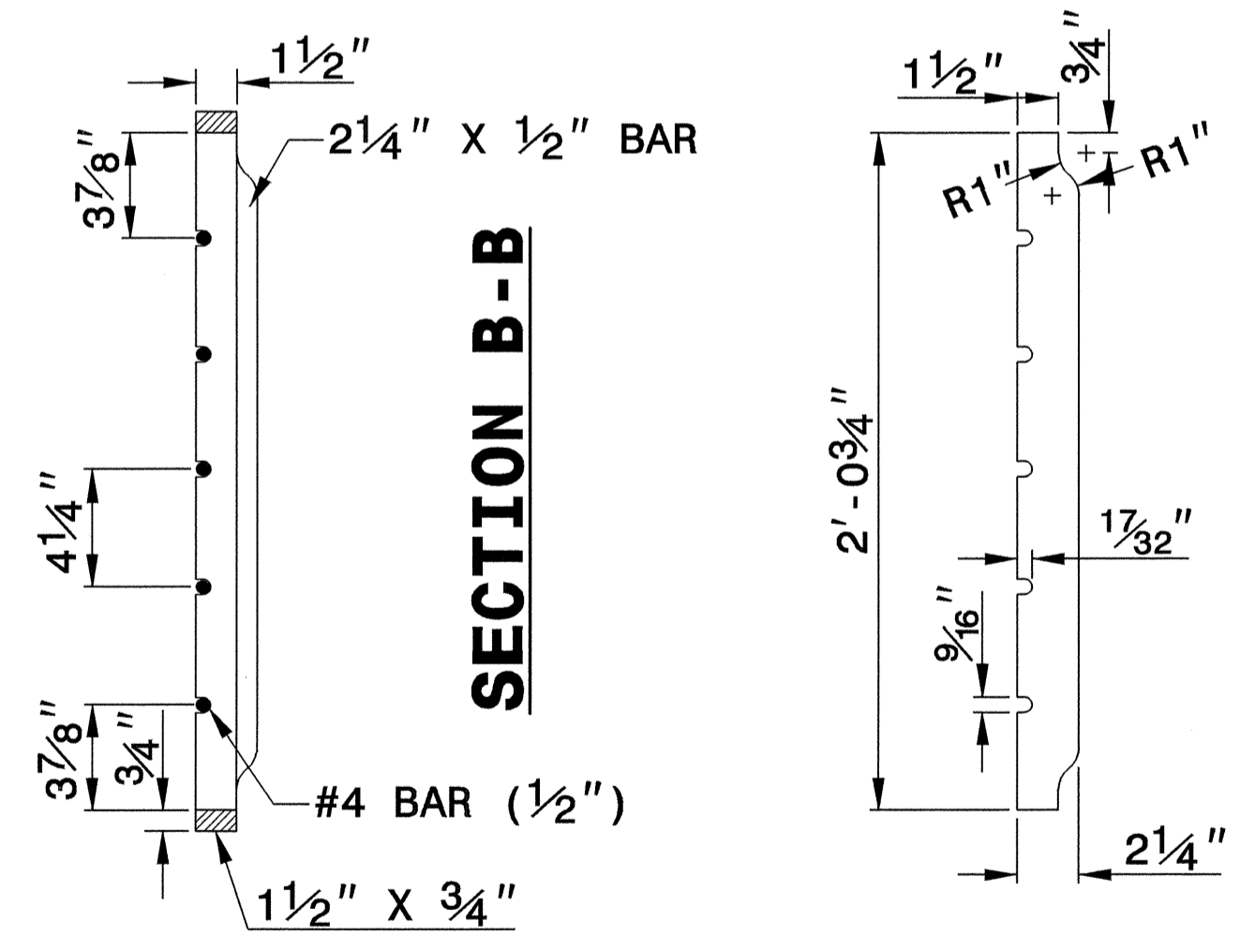
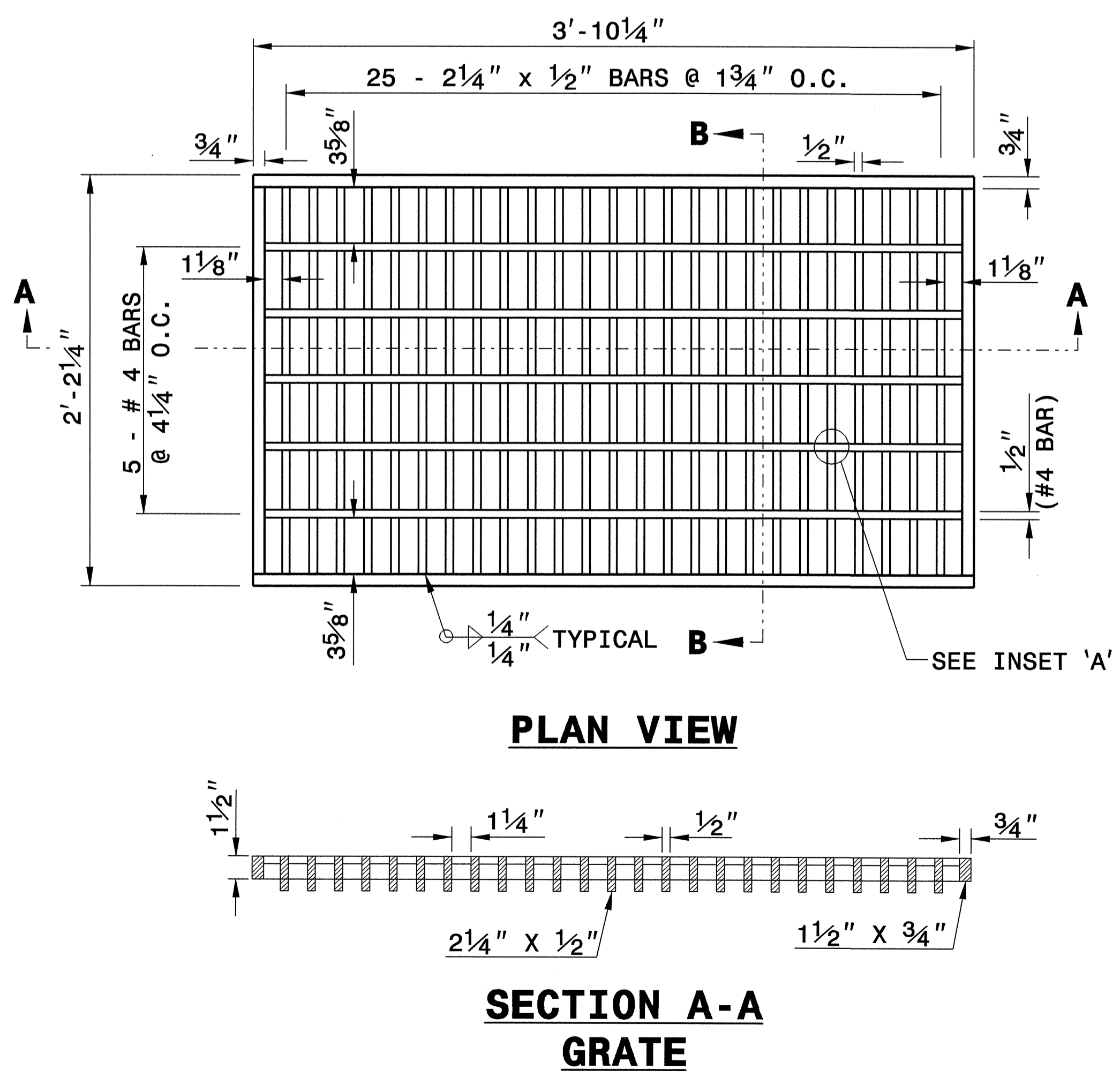
* 7' WITH GUARDRAIL FULL DEPTH PAVED SHOULDER BETWEEN GUARDRAIL AND EOP. (SEE TYPICAL SECTION 4)

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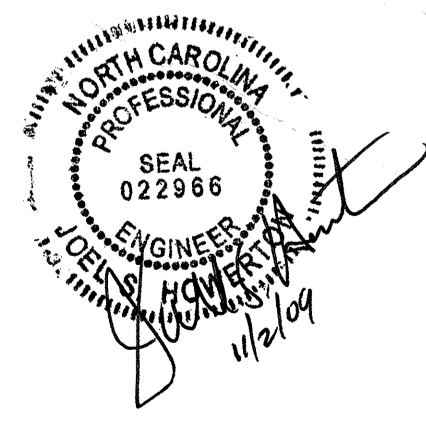
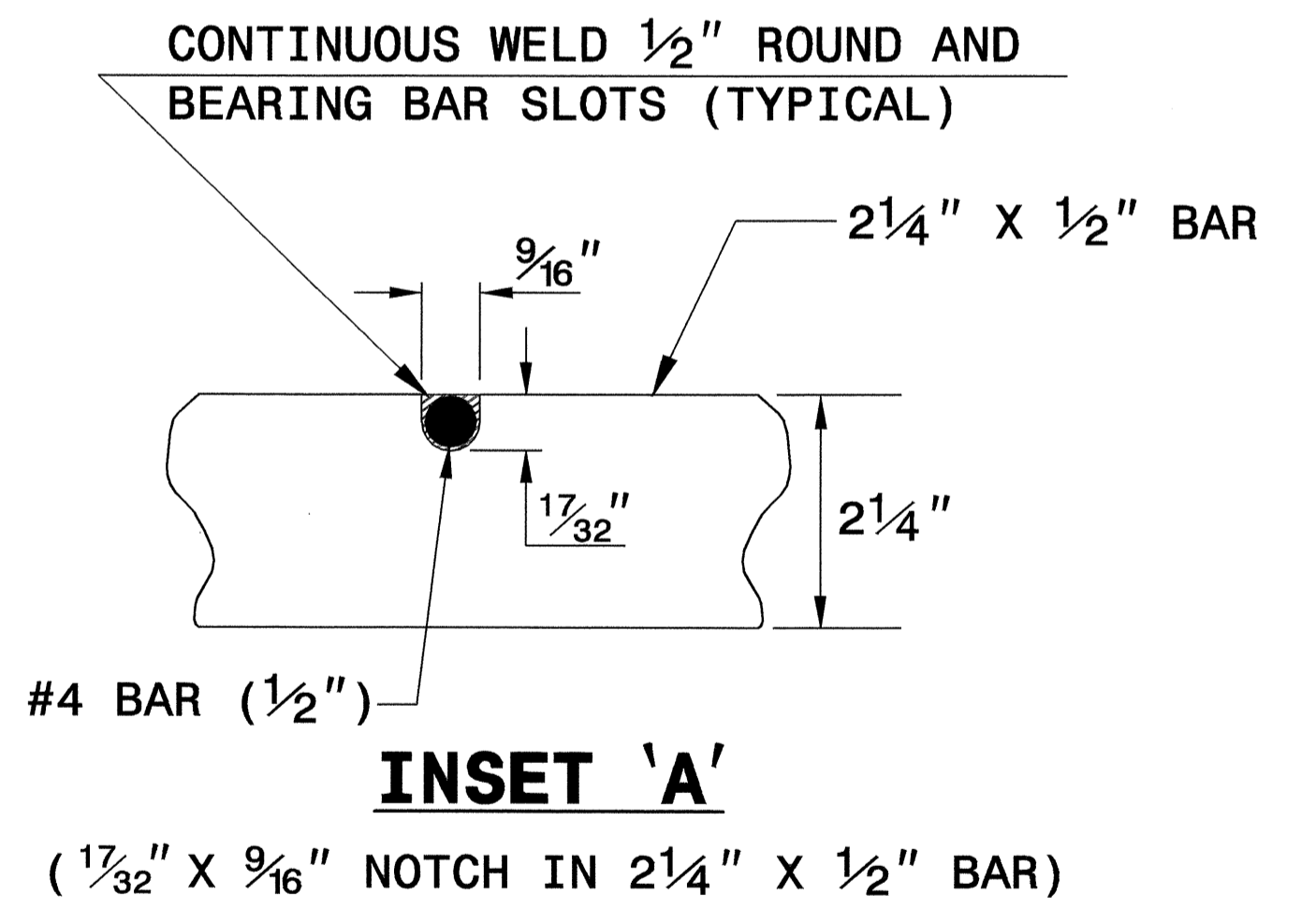


NOTES:

- HOT DIP GALVANIZE FRAME AND GRATE IN ACCORDANCE WITH ASTM DESIGNATION A-123 AND AASHTO M-111.
- GRATE SHOULD MEET HS-20 LOADING.
- PROVIDE STEEL CONFORMING TO THE REQUIREMENTS OF A.S.T.M. DESIGNATION A-36.
- WELD IN ACCORDANCE WITH THE ANSI/AASHTO/AWS D1.5 WELDING CODE. SEAL WELD ALL CONNECTIONS ALONG TOP AND BOTTOM HORIZONTAL SEAMS OF CONNECTIONS IN ADDITION TO ANY REQUIRED STRUCTURAL WELDS.
- SEE DETAIL DRAWING 840D25 FOR FRAME ANCHORAGE.



DETAIL OF BEARING BAR



REVISED 10-10-02
FOR HS-20 LOADING

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

**BICYCLE SAFE
STEEL GRATE AND FRAME**

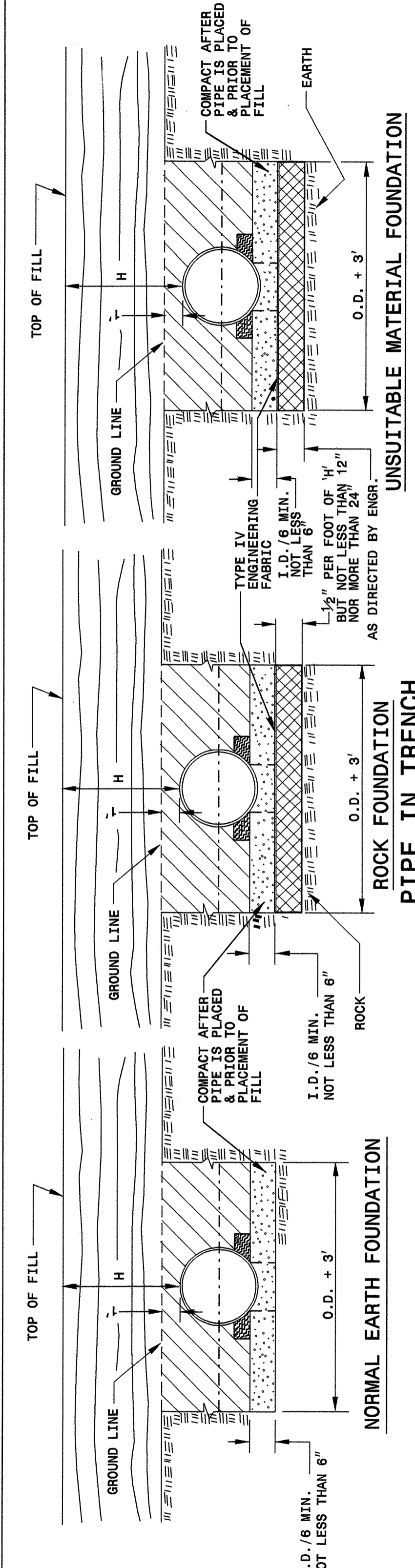
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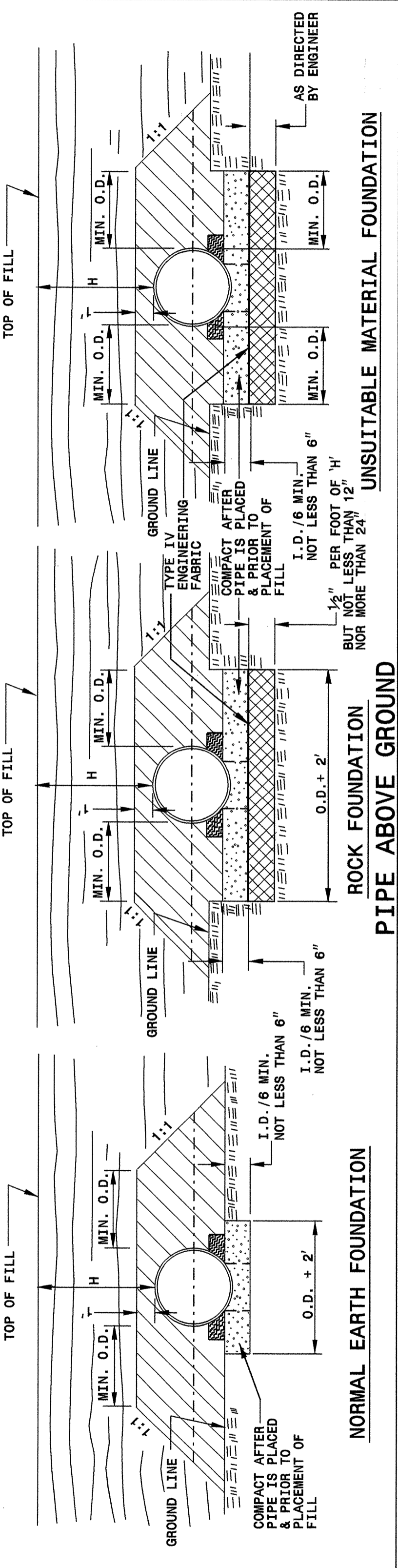
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STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.



ENGLISH DETAIL DRAWING FOR METHOD OF PIPE INSTALLATION FLEXIBLE PIPE SHEET 1 OF 3 300D01

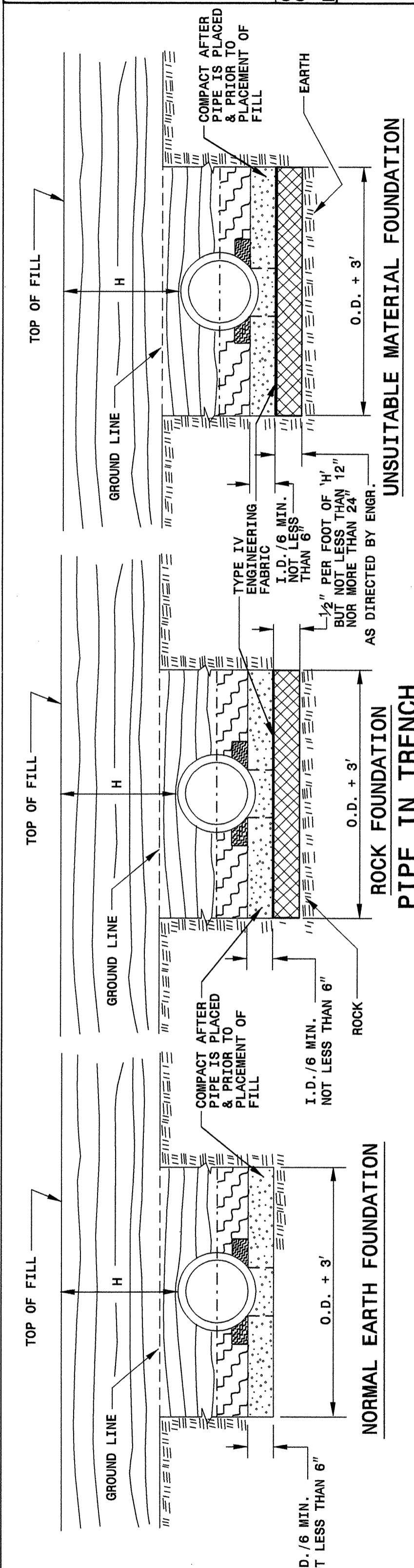


GENERAL NOTES:
 I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.
 O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.
 H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.
 TAKE CARE TO FULLY COMPACT HAUNCH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

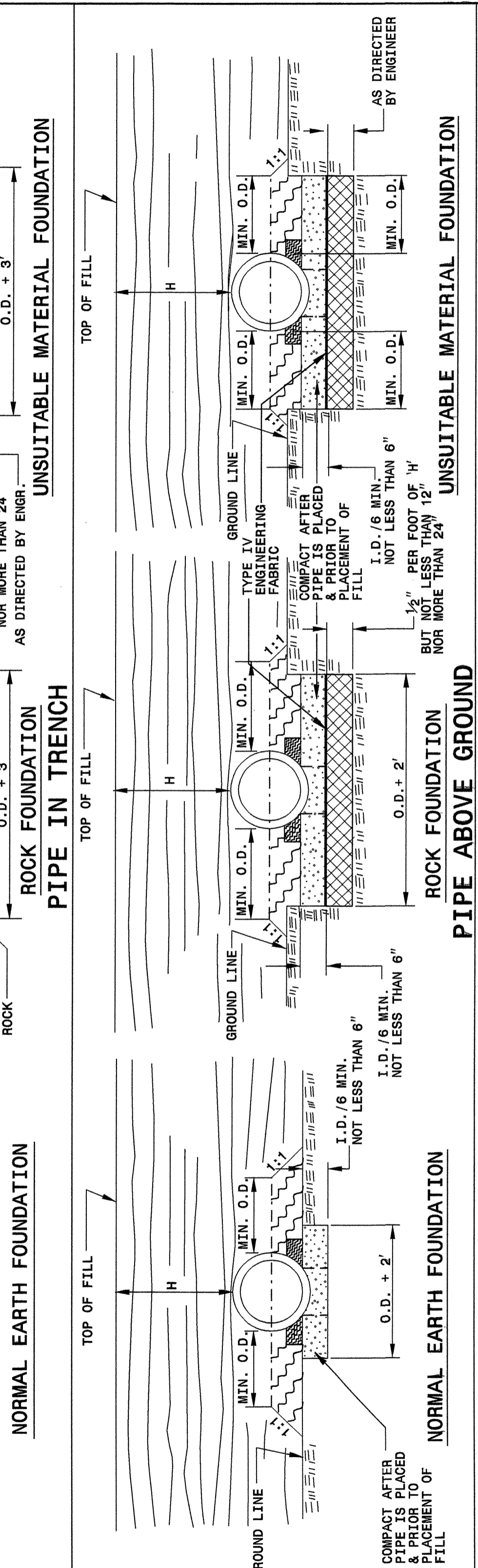
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

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.



ENGLISH DETAIL DRAWING FOR METHOD OF PIPE INSTALLATION RIGID PIPE SHEET 2 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.
 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.
 SPRINGLINE OF PIPE
 SELECT BACKFILL MATERIAL CLASS III OR CLASS II, TYPE 1 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.

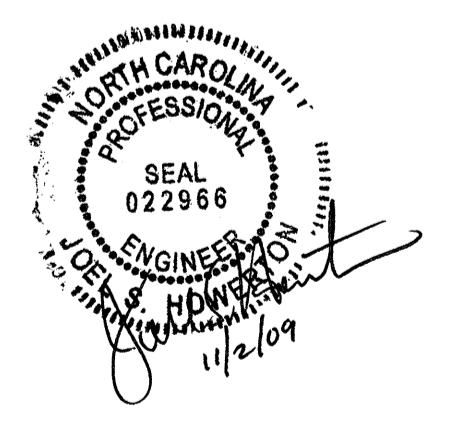
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR METHOD OF PIPE INSTALLATION RIGID PIPE SHEET 2 OF 3 300D01

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: DATE: 7/20/09
 FILE SPEC: s:\contracts\corps\special details\forward\stds\stdstodetail\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

SHEET 3 OF 3
300D01

FLEXIBLE PIPE

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

Diameter (inches)	Minimum cover (inches)	Maximum Height of Cover (feet)			
		(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
48	12	48	61	87	113
54	12	44	54	77	100
60	12	41	50	69	90
66	12	38	47	64	81
72	12	35	44	60	74
78	12	33	41	57	69
84	12	31	39	54	64

- HDPE * (Minimum fill) 2' for pipe diameters ≥ 12" and ≤ 60"
- * (Maximum fill) 20' for pipe diameters ≤ 24"
- 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 LRFD Direct Design Method)

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

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

Diameter (inches)	Minimum cover (inches)	Maximum Height of Cover (feet)			
		(Ga) 16	14	12	10 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	151
30	12	60	85	111	136
36	12	50	71	92	113
42	12	42	60	78	96
48	12	35	52	68	84
54	12	30	46	60	74
60	12	25	40	50	62
66	12	21	35	44	51
72	12	18	30	38	41

** 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

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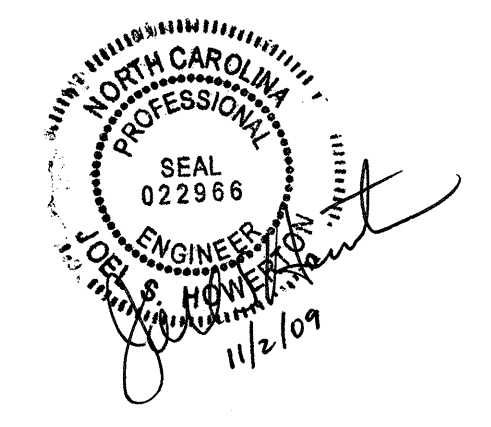
ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
 FILL HEIGHT TABLES

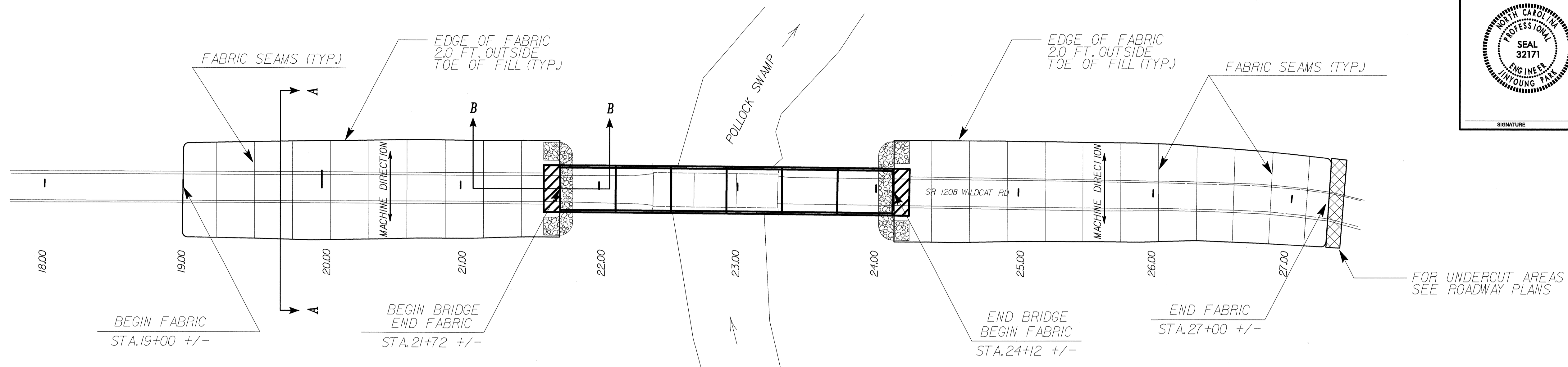
SHEET 3 OF 3
300D01

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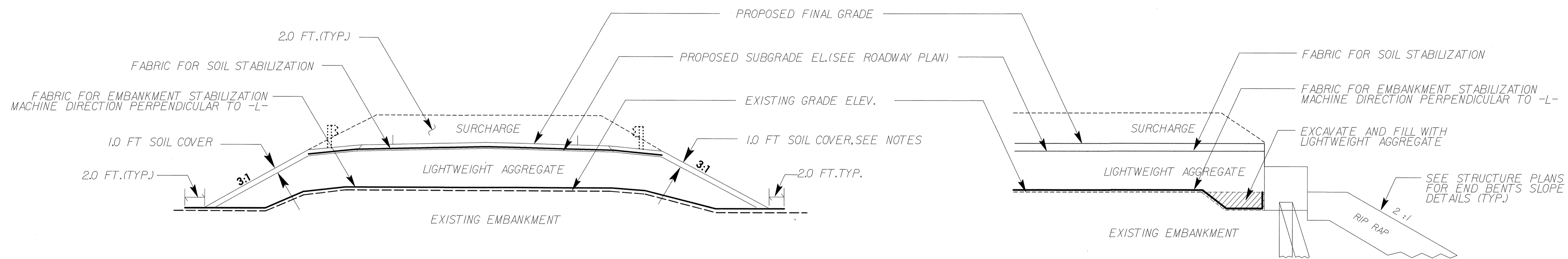
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ORIGINAL BY: K Kempf DATE: 5-15-09
 MODIFIED BY: *Joel S. Hower* DATE: *7/20/09*
 CHECKED BY: *Joel S. Hower* DATE: *7/20/09*
 FILE SPEC: *ericward/stds/stdstodetails/30001/0300d01.dgn*





FABRIC FOR EMBANKMENT STABILIZATION LAYOUT
N.T.S.



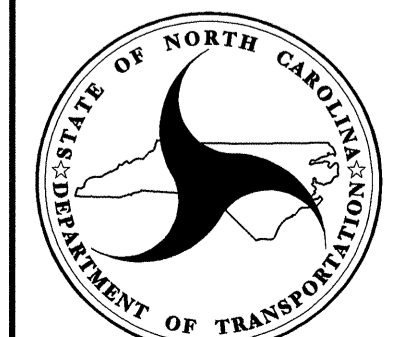
TYP. SECTION A-A
N.T.S.

END BENT SECTION B-B
N.T.S.

PREPARED BY: JYP DATE: 10/2009
REVIEWED BY: JRB DATE: 10/2009

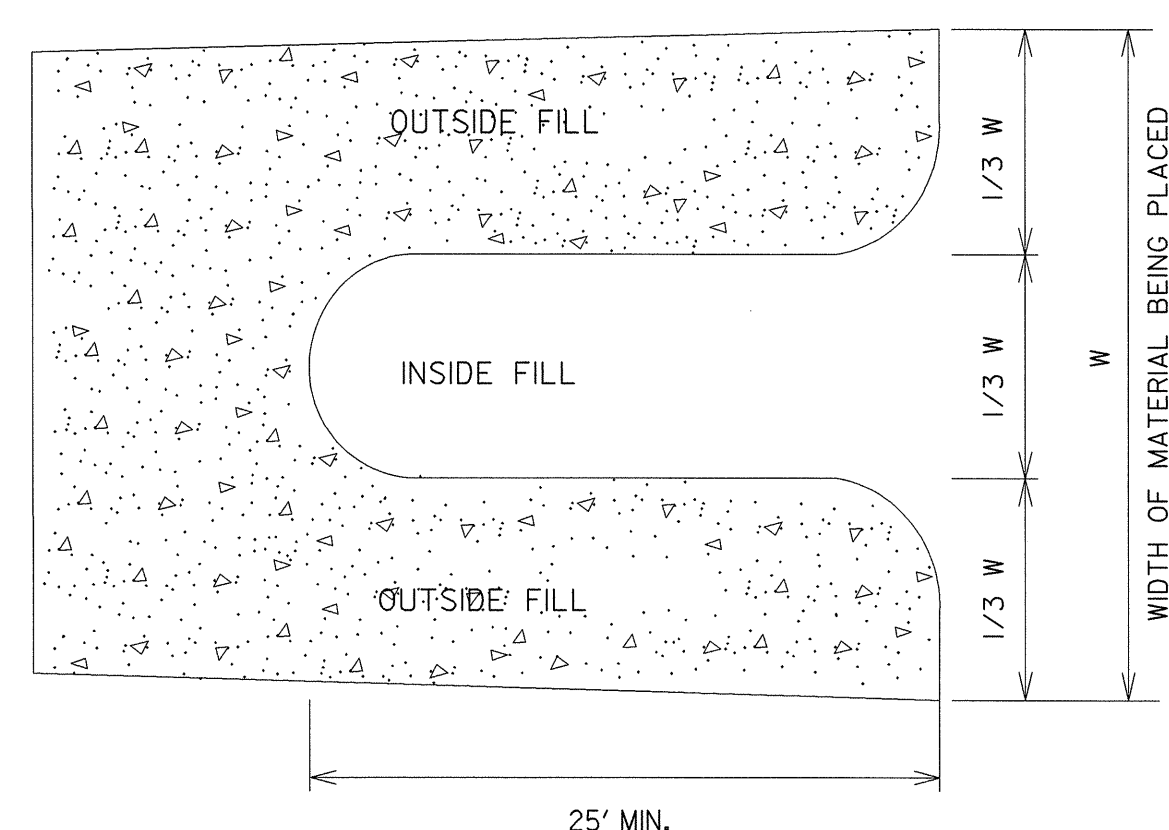
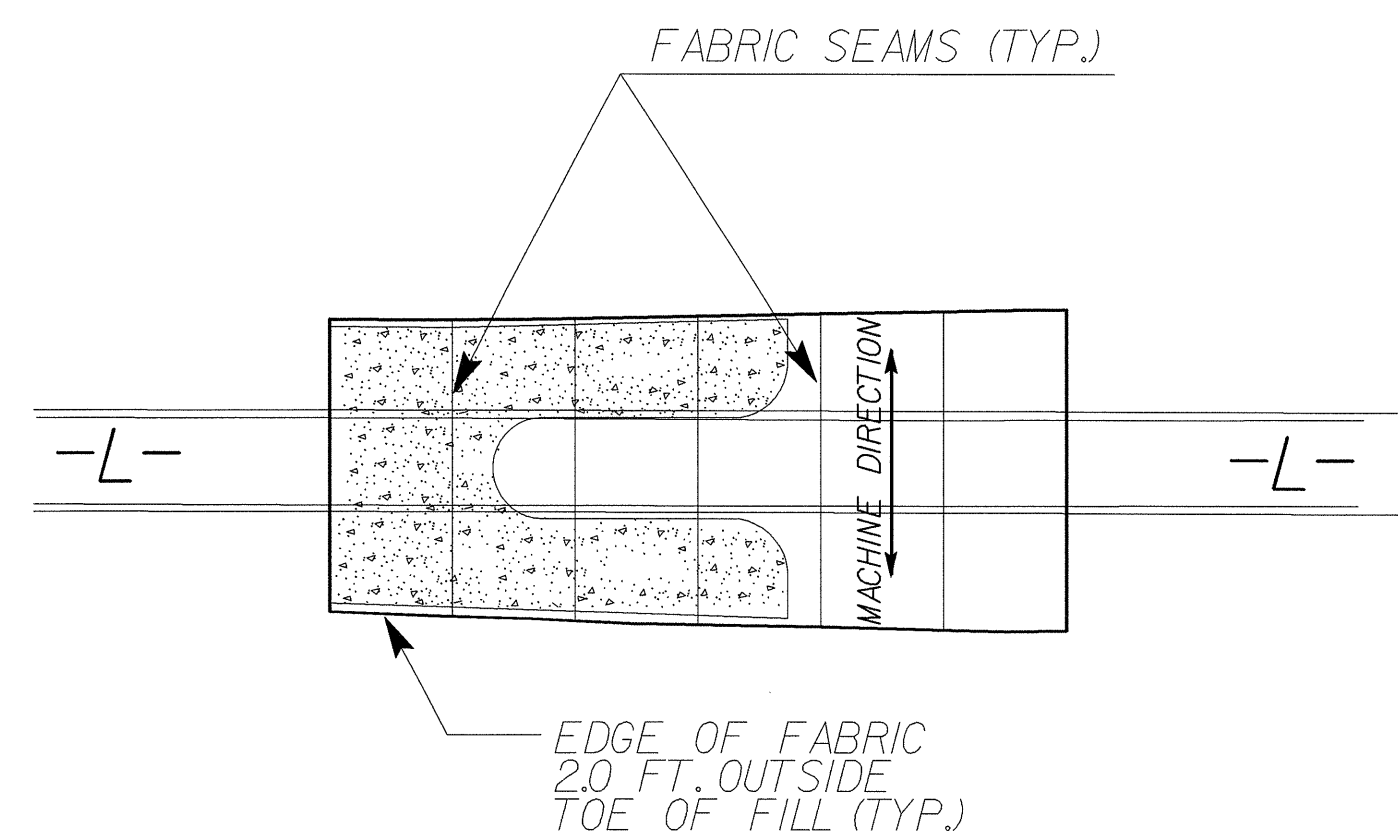
GEOTECHNICAL ENGINEERING UNIT
 EASTERN REGIONAL OFFICE
 WESTERN REGIONAL OFFICE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

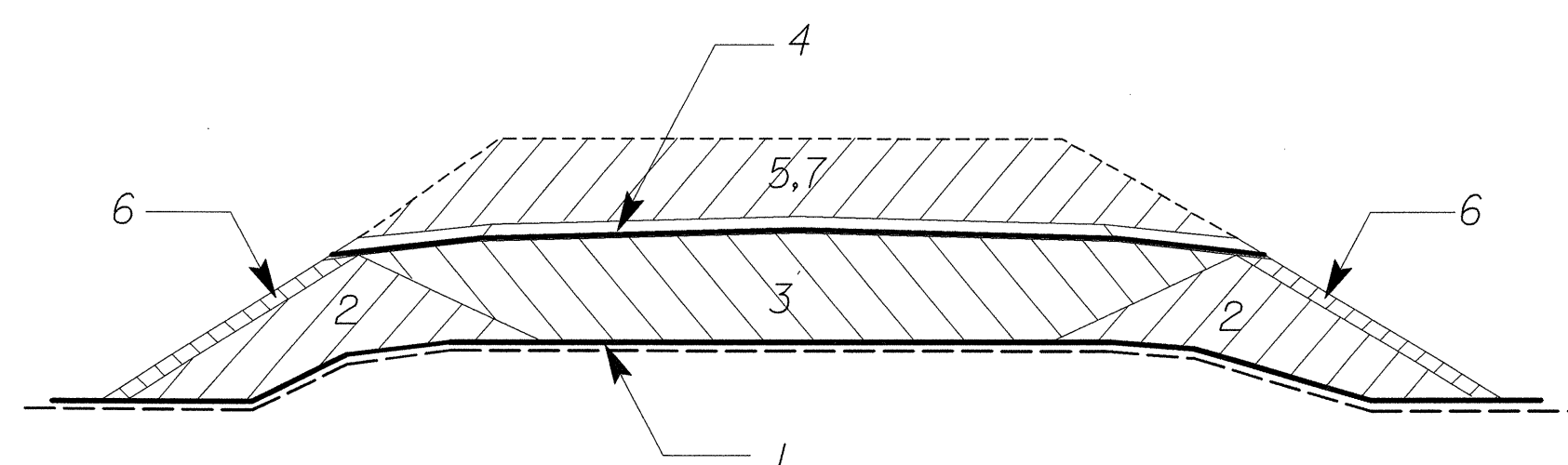


LIGHTWEIGHT AGGREGATE FILL EMBANKMENT

REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		



DETAIL OF FILL PLACEMENT
PLAN VIEW N.T.S.



1. LAY FABRIC FOR EMBANKMENT STABILIZATION IN CONTINUOUS STRIPS, SEW FABRICS TOGETHER.
2. CONSTRUCT OUTSIDE FILL WITH LIGHTWEIGHT AGGREGATE.
3. CONSTRUCT INSIDE FILL WITH LIGHTWEIGHT AGGREGATE AND MAINTAIN ELEVATION FOR TWO MONTHS BEFORE BUILDING SURCHARGE.
4. LAY FABRIC FOR SOIL STABILIZATION.
5. CONSTRUCT 2 FEET SURCHARGE WITH BORROW MATERIAL, BEGIN SURCHARGE WAITING PERIOD.
6. BUILD SOIL COVER AS DIRECTED BY THE ENGINEER.
7. AT END OF WAITING PERIOD, REMOVE BORROW MATERIAL, ESTABLISH SUBGRADE WITH LIGHTWEIGHT AGGREGATE.

SEQUENCE OF CONSTRUCTION
SECTION VIEW N.T.S.

NOTES

SCARIFY THE EXISTING PAVEMENT STRUCTURE FROM STA. 19+00 +/- TO STA. 21+72 +/- AND FROM STA. 24+12 +/- TO STA. 27+00 +/- BEFORE PLACING FABRIC FOR EMBANKMENT STABILIZATION. THIS WORK IS INCIDENTAL TO THE PAYMENT FOR LIGHTWEIGHT AGGREGATE.

PLACE FABRIC FOR EMBANKMENT STABILIZATION FROM -L- STA. 19+00 +/- TO STA. 21+72 +/- AND FROM -L- STA. 24+12 +/- TO STA. 27+00 +/- AS SHOWN IN THE PLAN OR AS DIRECTED BY THE ENGINEER.

AT FABRIC LOCATIONS, ALL STUMPS SHALL BE CUT CLOSE TO THE GROUND AND/OR WATER SURFACE. GRUBBING IS NOT TO BE PERFORMED IN THE FABRIC PLACEMENT AREAS.

BUILD PROPOSED EMBANKMENT WITH LIGHTWEIGHT AGGREGATE UP TO THE SUBGRADE ELEVATION SHOWN IN THE ROADWAY PLAN OR AS DIRECTED BY THE ENGINEER.

MAINTAIN THE LIGHTWEIGHT AGGREGATE ELEVATION FOR TWO MONTHS BEFORE BUILDING SURCHARGE OR AS DIRECTED BY THE ENGINEER.

PLACE FABRIC FOR SOIL STABILIZATION (SEPARATION FABRIC) BETWEEN THE LIGHTWEIGHT FILL EMBANKMENT AND SURCHARGE MATERIAL AS SHOWN IN THE PLAN OR AS DIRECTED BY THE ENGINEER.

BUILD SURCHARGE TO AN ELEVATION 2.0 FT ABOVE THE SUBGRADE OF THE FINAL ROADWAY SECTION ON TOP OF THE FABRIC FOR SOIL STABILIZATION AND MAINTAIN THE SURCHARGE ELEVATION.

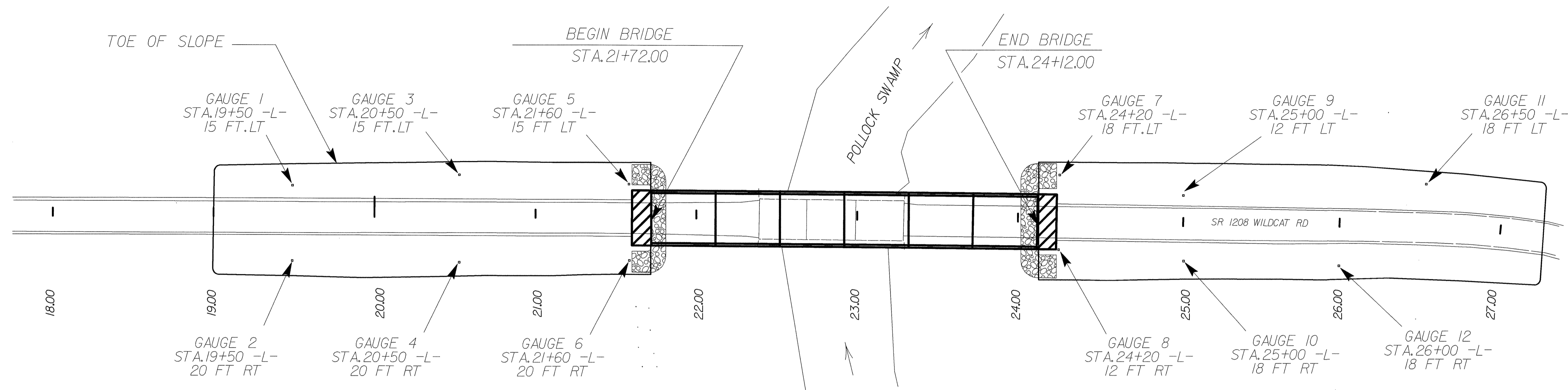
REMOVE SURCHARGE AFTER SEVEN MONTHS OF SURCHARGE WAITING PERIOD OR AS DIRECTED BY THE ENGINEER.

ESTABLISH SUBGRADE WITH LIGHTWEIGHT AGGREGATE AFTER REMOVING SURCHARGE.

REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		



SIGNATURE DATE SIGNATURE



SETTLEMENT GAUGE LOCATIONS
PLAN VIEW, N.T.S

NOTES

THE USE OF EITHER THE WOOD BASE OR THE STEEL BASE SETTLEMENT GAUGE SHALL BE THE CONTRACTOR'S OPTION.

SETTLEMENT GAUGES SHALL BE INSTALLED BEFORE ANY FILL IS PLACED.

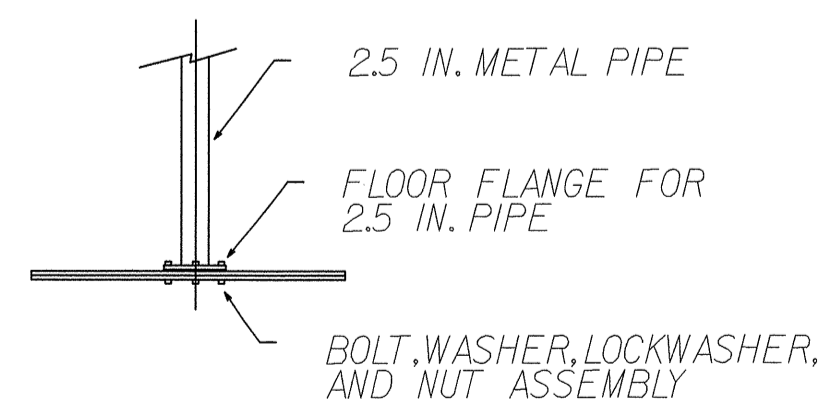
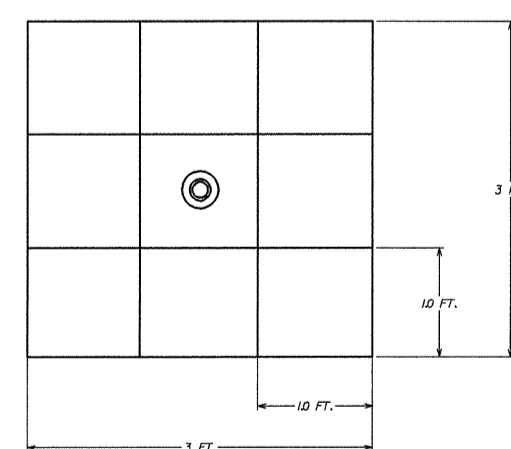
SETTLEMENT GAUGE ELEVATIONS ARE TO BE DETERMINED AND RECORDED WEEKLY BY THE RESIDENT ENGINEER.

THE INITIAL ELEVATION OF THE SETTLEMENT GAUGE PLATE (AT TOP OF PLATE) SHALL BE DETERMINED AT THE TIME OF INSTALLATION ALONG WITH THE EMBANKMENT ELEVATION. WHEN NEW SECTIONS OF THE PIPE ARE ADDED, ELEVATIONS SHALL BE RECORDED AT THE TOP OF EXISTING PIPE AND AT THE TOP OF THE NEW PIPE. THIS IS TO TAKE INTO ACCOUNT INTERIM SETTLEMENT, VARIABLE PIPE LENGTHS, AND THREAD LENGTHS IN COUPLING.

RESULTS OF SETTLEMENT GAUGE READINGS SHALL BE FORWARDED TO MR. K.J. KIM, EASTERN REGIONAL GEOTECHNICAL MANAGER, WITHIN THREE DAYS.

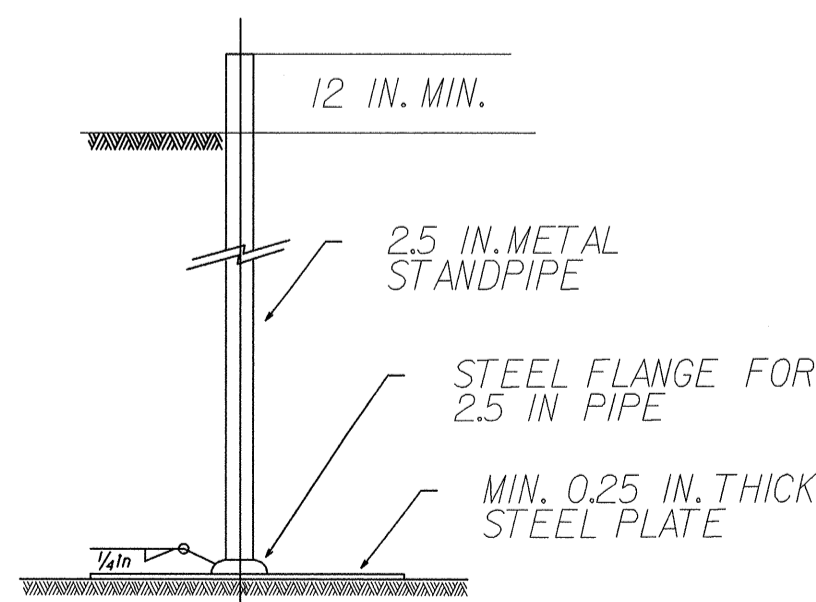
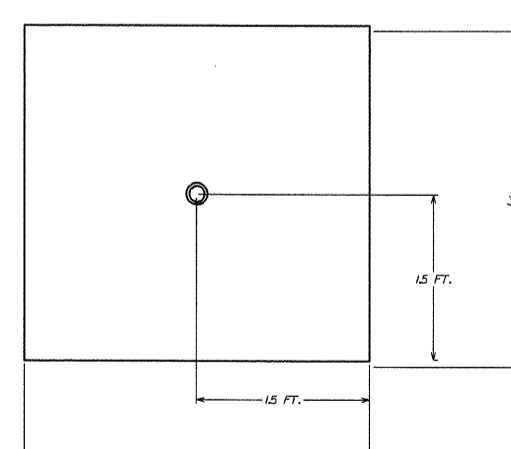
SETTLEMENT GAUGE LOCATIONS		
GAUGE NO.	STATION	OFFSET FROM -L-
1	19 + 50 +/-	15 FT. +/-, LT
2	19 + 50 +/-	20 FT. +/-, RT
3	20 + 50 +/-	15 FT. +/-, LT
4	20 + 50 +/-	20 FT. +/-, RT
5	21 + 60 +/-	15 FT. +/-, LT
6	21 + 60 +/-	20 FT. +/-, RT
7	24 + 20 +/-	18 FT. +/-, LT
8	24 + 20 +/-	12 FT. +/-, RT
9	25 + 00 +/-	12 FT. +/-, LT
10	25 + 00 +/-	18 FT. +/-, RT
11	26 + 50 +/-	18 FT. +/-, LT
12	26 + 00 +/-	18 FT. +/-, RT

QUANTITIES
SETTLEMENT GAUGES : 12



DETAIL OF WOOD BASE

SIX - 1 IN. X 1 FT. X 3 FT. PLANKS OF LUMBER OR TWO PIECES 1 IN. X 3 FT. X 3 FT. EXTERIOR GRADE PLYWOOD, SECURELY FASTENED AND THEN COATED WITH WOOD PRESERVATIVE



DETAIL OF STEEL BASE

SETTLEMENT GAUGE DETAILS

GEOTECHNICAL ENGINEERING UNIT
 EASTERN REGIONAL OFFICE
 WESTERN REGIONAL OFFICE

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

EMBANKMENT MONITORING DETAIL

REVISIONS

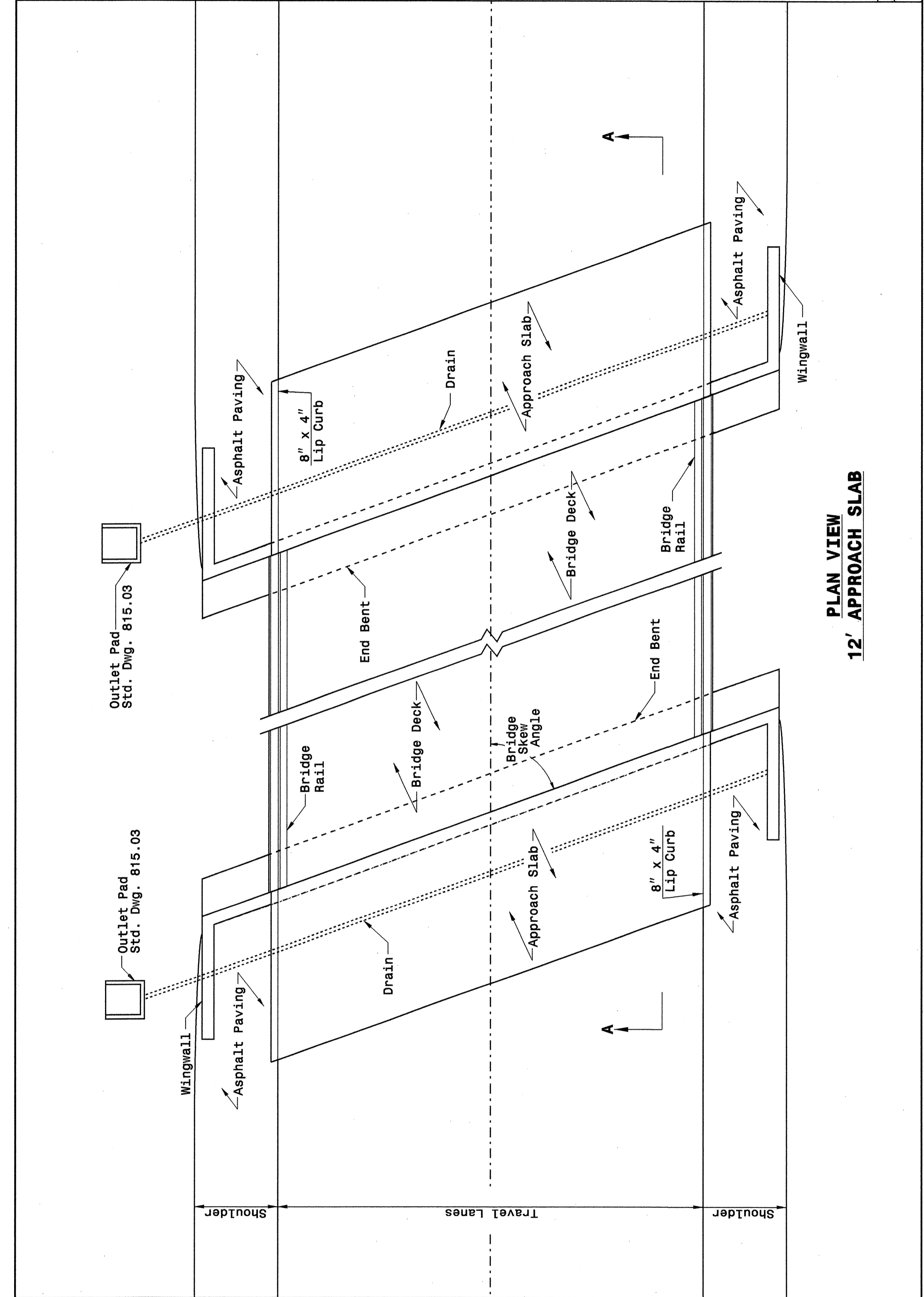
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PREPARED BY: JYP	DATE: 10/2009
REVIEWED BY: JRB	DATE: 10/2009

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

ENGLISH DETAIL DRAWING FOR
BRIDGE APPROACH FILLS
CORED SLAB & BOX BEAM BRIDGES
SUB REGIONAL TIER

SHEET 1 OF 2
422D11



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

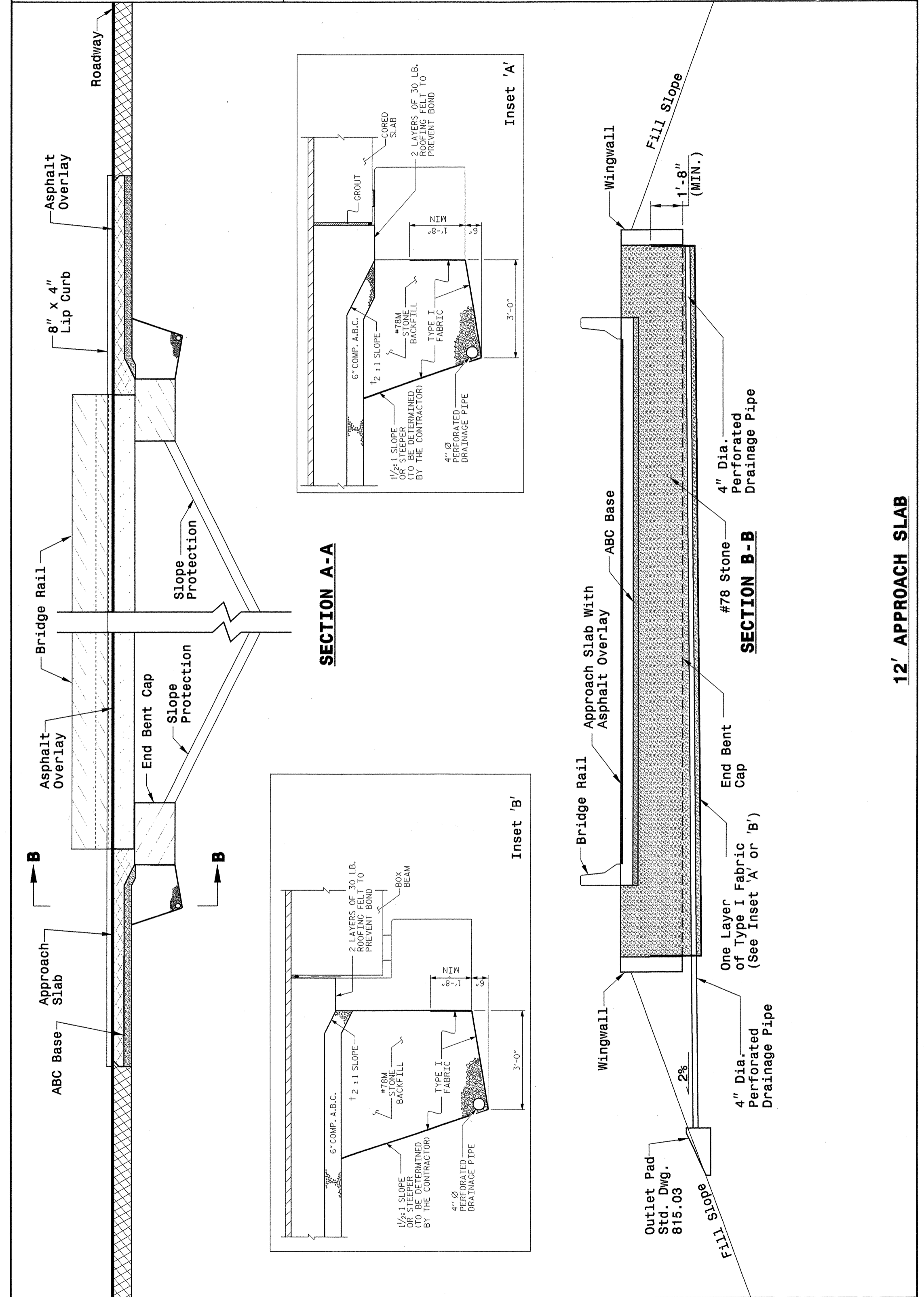
ENGLISH DETAIL DRAWING FOR
BRIDGE APPROACH FILLS
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SHEET 1 OF 2
422D11

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

ENGLISH DETAIL DRAWING FOR
BRIDGE APPROACH FILLS
CORED SLAB & BOX BEAM BRIDGES
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SHEET 2 OF 2
422D11



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

ENGLISH DETAIL DRAWING FOR
BRIDGE APPROACH FILLS
CORED SLAB & BOX BEAM BRIDGES
SUB REGIONAL TIER

SHEET 2 OF 2
422D11

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

BRIDGE APPROACH FILLS
CORED SLAB & BOX BEAM BRIDGES
SUB REGIONAL TIER

ORIGINAL BY: K. A. Kempf DATE: 6-10-08
MODIFIED BY: *[Signature]* DATE: *[Blank]*
CHECKED BY: *[Signature]* DATE: 2/16/09
FILE SPEC.: k Kempf/english/bridge approach fills.dgn



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF QUANTITIES

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C202270

ItemNumber	Sec #	Quantity	Unit	Description
000100000-N	800	Lump Sum		MOBILIZATION
000100000-E	200	Lump Sum		CLEARING & GRUBBING .. ACRE(S)
000800000-E	200	1	ACR	SUPPLEMENTARY CLEARING & GRUBBING
002200000-E	225	1,550	CY	UNCLASSIFIED EXCAVATION
003000000-N	SP	Lump Sum		BRIDGE APPROACH FILL - SUB REGIONAL TIER, STATION ***** (22+92)
003600000-E	225	450	CY	UNDERCUT EXCAVATION
010600000-E	230	5,200	CY	BORROW EXCAVATION
012700000-N	SP	12	EA	EMBANKMENT SETTLEMENT GAUGES
013400000-E	240	11	CY	DRAINAGE DITCH EXCAVATION
017700000-E	250	2,040	SY	BREAKING OF EXISTING ASPHALT PAVEMENT
019600000-E	270	4,100	SY	FABRIC FOR SOIL STABILIZATION
023400000-E	SP	400	CY	GENERIC GRADING ITEM SELECT GRANULAR MATERIAL, CLASS III
024100000-E	SP	4,500	SY	GENERIC GRADING ITEM FABRIC FOR EMBANKMENT STABILIZATION
025500000-E	SP	3,300	TON	GENERIC GRADING ITEM LIGHTWEIGHT AGGREGATE
032000000-E	SP	150	SY	FOUNDATION CONDITIONING FABRIC
033000000-E	SP	28	TON	GENERIC DRAINAGE ITEM FOUNDATION COND MATERIAL MINOR STRS
033520000-E	SP	44	LF	15" DRAINAGE PIPE
098600000-E	SP	20	LF	GENERIC PIPE ITEM 15" SIDE DRAIN PIPE
099500000-E	340	20	LF	PIPE REMOVAL
101100000-N	500	Lump Sum		FINE GRADING
112100000-E	520	1,136	TON	AGGREGATE BASE COURSE
122000000-E	545	10	TON	INCIDENTAL STONE BASE
127500000-E	600	823	GAL	PRIME COAT
148900000-E	610	70	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B

ItemNumber	Sec #	Quantity	Unit	Description
152500000-E	610	380	TON	ASPHALT CONC SURFACE COURSE, TYPE SF9.5A
156000000-E	620	30	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 64-22
202200000-E	815	23	CY	SUBDRAIN EXCAVATION
203300000-E	815	17	CY	SUBDRAIN FINE AGGREGATE
204400000-E	815	100	LF	6" PERFORATED SUBDRAIN PIPE
205500000-E	815	3	EA	6" SUBDRAIN PIPE WYES, TEES, & ELBOWS
206600000-N	815	1	EA	CONCRETE PAD FOR SUBDRAIN PIPE OUTLET
207700000-E	815	6	LF	6" OUTLET PIPE (SUBDRAINS)
228600000-N	840	2	EA	MASONRY DRAINAGE STRUCTURES
247300000-N	SP	2	EA	GENERIC DRAINAGE ITEM BICYCLE SAFE STEEL GRATE & FRAME
255600000-E	846	28	LF	SHOULDER BERM GUTTER
303000000-E	862	350	LF	STEEL BM GUARDRAIL
315000000-N	862	5	EA	ADDITIONAL GUARDRAIL POSTS
321500000-N	862	4	EA	GUARDRAIL ANCHOR UNITS, TYPE III
327000000-N	SP	4	EA	GUARDRAIL ANCHOR UNITS, TYPE 350
364900000-E	876	5	TON	RIP RAP, CLASS B
365600000-E	876	510	SY	FILTER FABRIC FOR DRAINAGE
440000000-E	1110	231	SF	WORK ZONE SIGNS (STATIONARY)
441000000-E	1110	94	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)
444500000-E	1145	96	LF	BARRICADES (TYPE III)
532560000-E	1510	1,292	LF	6" WATER LINE
554000000-E	1515	2	EA	6" VALVE
564900000-N	1515	1	EA	RECONNECT WATER METER
567200000-N	1515	1	EA	RELOCATE FIRE HYDRANT
580000000-E	1530	1,275	LF	ABANDON 6" UTILITY PIPE

ItemNumber	Sec #	Quantity	Unit	Description
587140000-E	1550	482	LF	TRENCHLESS INSTALLATION OF 6" IN SOIL
587141000-E	1550	482	LF	TRENCHLESS INSTALLATION OF 6" NOT IN SOIL
588200000-N	SP	2	EA	GENERIC UTILITY ITEM 6" INSERT GATE VALVE & VALVE BOX, 150#WP
600000000-E	1605	2,900	LF	TEMPORARY SILT FENCE
600600000-E	1610	225	TON	STONE FOR EROSION CONTROL, CLASS A
600900000-E	1610	165	TON	STONE FOR EROSION CONTROL, CLASS B
601200000-E	1610	225	TON	SEDIMENT CONTROL STONE
601500000-E	1615	3.5	ACR	TEMPORARY MULCHING
601800000-E	1620	100	LB	SEED FOR TEMPORARY SEEDING
602100000-E	1620	0.5	TON	FERTILIZER FOR TEMPORARY SEEDING
602400000-E	1622	200	LF	TEMPORARY SLOPE DRAINS
602700000-N	1622	4	EA	INLET PROTECTION AT TEMPORARY SLOPE DRAINS
602900000-E	SP	5,750	LF	SAFETY FENCE
603000000-E	1630	150	CY	SILT EXCAVATION
603600000-E	1631	6,300	SY	MATting FOR EROSION CONTROL
603700000-E	SP	10	SY	COIR FIBER MAT
603800000-E	SP	220	SY	PERMANENT SOIL REINFORCEMENT MAT
604200000-E	1632	850	LF	1/4" HARDWARE CLOTH
604800000-E	SP	50	SY	FLOATING TURBIDITY CURTAIN
607101000-E	SP	60	LF	WATTLE
607102000-E	SP	15	LB	POLYACRYLAMIDE (PAM)
607103000-E	SP	200	LF	COIR FIBER BAFFLES
608400000-E	1660	5	ACR	SEEDING & MULCHING
608700000-E	1660	1.5	ACR	MOWING
609000000-E	1661	50	LB	SEED FOR REPAIR SEEDING
609300000-E	1661	0.25	TON	FERTILIZER FOR REPAIR SEEDING
609600000-E	1662	75	LB	SEED FOR SUPPLEMENTAL SEEDING
610800000-E	1665	2	TON	FERTILIZER TOPDRESSING
611450000-N	SP	12	MHR	SPECIALIZED HAND MOWING
611700000-N	SP	12	EA	RESPONSE FOR EROSION CONTROL

5/28/99

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COMPUTED BY: RCS DATE: 10/26/09
 CHECKED BY: AMT DATE: 10/26/09

PROJECT NO. SHEET NO.
 B-4465 3-A

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

SUMMARY OF EARTHWORK

Station	Station	TOTAL UNCLASS. EXCAV.	UNDERCUT	Embank. +%	Borrow	Waste
17+25.00	21+70.94 (BEG. BRIDGE)	3		1733	1730	0
SUBTOTAL:		3		1733	1730	0
24+13.06 (END BRIDGE)	30+00.00	26	250	4563	4537	0
SUBTOTAL:		26	250	4563	4537	0
SUMMARIES SUBTOTAL:		29	250	6296	6267	0
EST. LOSS DUE TO CLEARING & GRUBBING		0				
ADD. UNDERCUT (GEOTECH RECOMMENDED)			200			
SHOULDER AND FILL SLOPE MATERIAL (GEOTECH)					800	0
SURCHARGE EART MATERIAL (GEOTECH)				1950	1950	0
REDUCTION FOR LIGHTWEIGHT AGGREGATE					-4074	
PROJECT TOTALS:		29	450	8246	4943	0
EST. 5% FOR REPLACING TOP SOIL ON BORROW PITS					247	
SURCHARGE REOMOVAL		1500				
GRAND TOTALS:		1529	450		5190	
SAY:		1550	450		5200	

SUMMARY OF PAVEMENT REMOVAL/BREAKING

LINE	STATION TO STATION	LOC	ASPHALT REMOVAL (SY)	ASPHALT BREAKING (SY)	CONCRETE REMOVAL (SY)	CONCRETE BREAKING (SY)
-L-	18+56 TO 19+50	LT/RT		196.06		
-L-	19+50 TO 21+71	LT/RT		457.20		
-L-	21+71 TO 22+39	LT/RT		147.38		
-L-	23+29 TO 24+13	LT/RT		174.9		
-L-	24+13 TO 28+20	LT/RT		898.26		
-L-	28+20 TO 28+82	LT/RT		156.59		
GRAND TOTAL:				2030.39		
SAY:				2040		

ESTIMATED DDE = 11 CY

NOTE: EARTHWORK QUANTITIES ARE CALCULATED BY THE ROADWAY DESIGN UNIT. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.

FABRIC FOR SOIL STABILIZATION = 4,100 SY
 FABRIC FOR EMBANKMENT STABILIZATION = 4,500 SY
 SELECT GRANULAR MATERIAL = 400 CY

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL
 TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
 FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.
 W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.
 G = GATING IMPACT ATTENUATOR TYPE 350
 NG = NON-GATING IMPACT ATTENUATOR TYPE 350

GUARDRAIL SUMMARY

LINE	BEG. STA.	END STA.	LOC.	LENGTH			WARRANT POINT		"N" DIST FROM E.O.L.	TOTAL SHLDR WIDTH	FLARE LENGTH		W		ANCHORS						IMP. ATTEN. TYPE 350			REMOVE EXISTING GRDRAIL	REMARKS			
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPR. END	TRAIL. END			APPR. END	TRAIL. END	APPR. END	TRAIL. END	III	XI	GRAU 350	M-350	XII	CAT-1	B-77	EA	G			NG		
-L-	19+58.44	21+70.94	RT	212.50			21+71	21+71	4'-3"	7'	142.75		2'-10"			1		1										
-L-	20+83.44	21+70.94	LT	87.50					4'-3"	7'		18.75		0'-4"		1		1										
-L-	24+13.06	25+00.56	RT	87.50				24+13	4'-3"	7'		18.75		0'-4"		1		1										
-L-	24+13.06	26+25.56	LT	212.50			24+13		4'-3"	7'	142.75		2'-10"			1		1										
SUBTOTAL				600.00																								

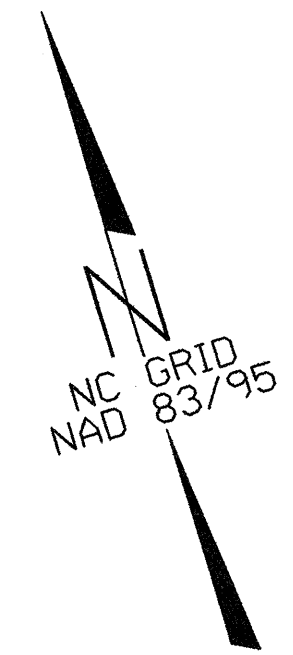
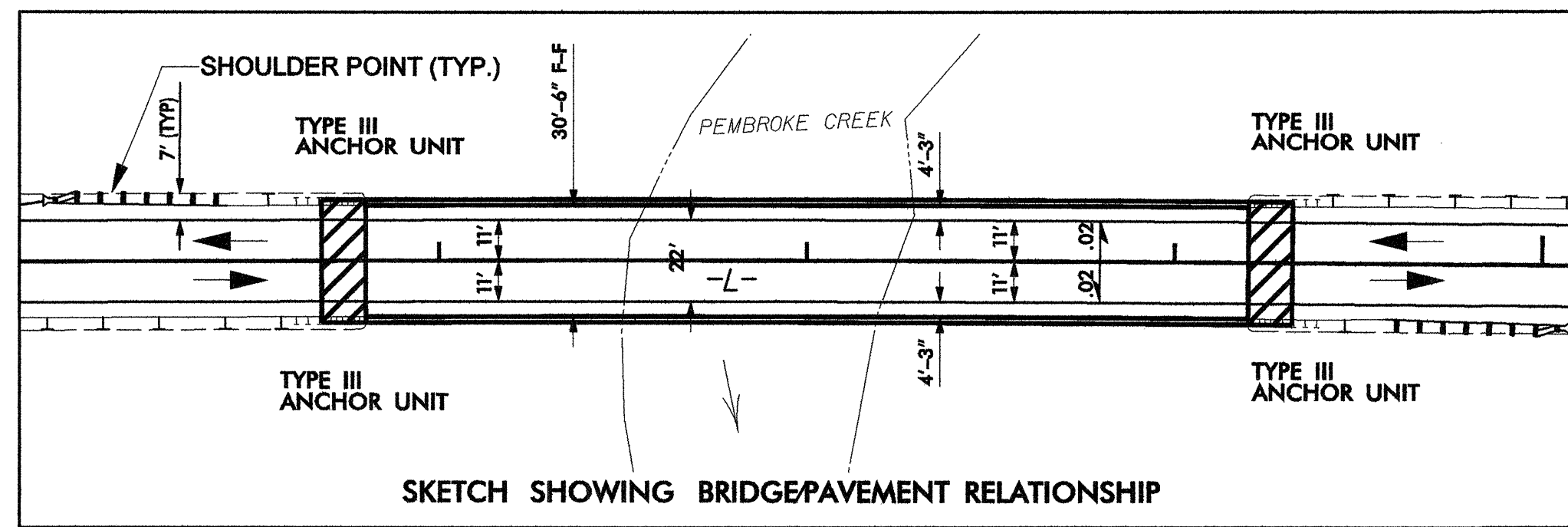
ANCHOR UNIT DEDUCTIONS			
GRAU 350	=	4 x 50	= -200.00
TYPE III	=	4 x 18.75	= -75.00
TOTAL			325.00
SAY			350.00

(5 ADDITIONAL GUARDRAIL POST)

DRMP
ENGINEERS • PLANNERS • SCIENTISTS

DYER, RIDDLE, MILLS & PRECOURT, INC.
 7506 EAST INDEPENDENCE BLVD., S-105
 CHARLOTTE, NC 28227
 704-332-2289 NC LICENSE NO. C-2213

8/17/99

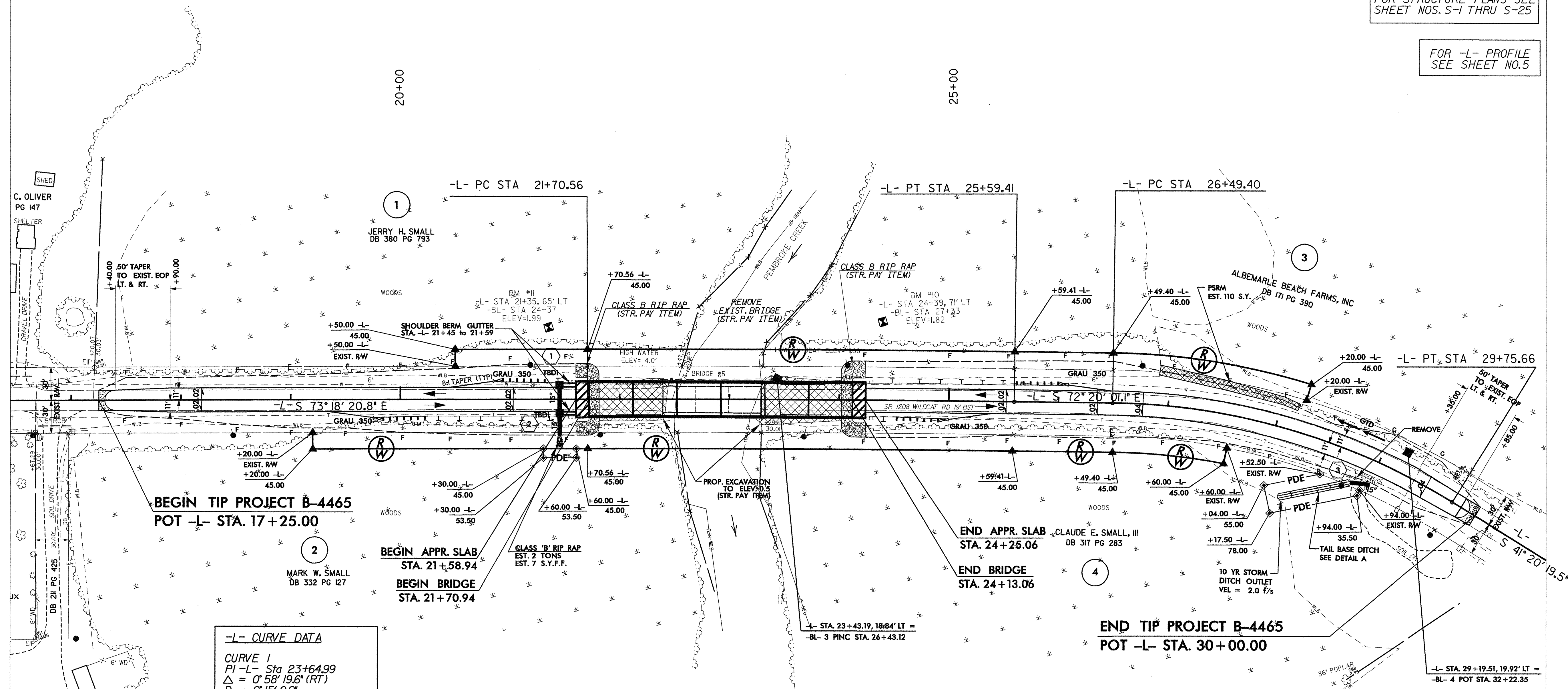


PROJECT REFERENCE NO. B-4465	SHEET NO. 4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 13690 10/26/09	HYDRAULICS ENGINEER NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 21656 10/26/09

FOR STRUCTURE PLANS SEE SHEET NOS. S-1 THRU S-25

FOR -L- PROFILE SEE SHEET NO.5

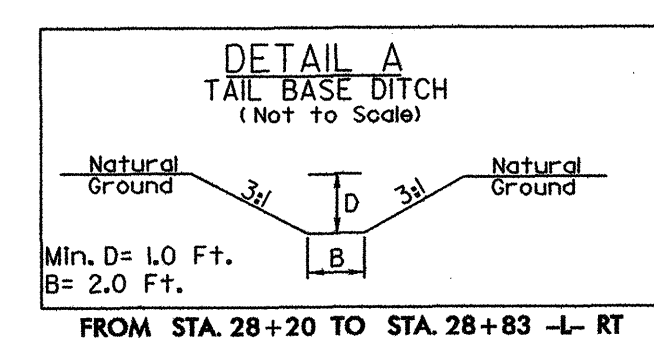
REVISIONS



-L- CURVE DATA

CURVE 1
 PI -L- Sta 23+64.99
 $\Delta = 0^\circ 58' 19.8''$ (RT)
 $D = 0' 15'' 0.0''$
 $L = 388.85'$
 $T = 194.43'$
 $R = 22,918.31'$
 $e = NC$
 DESIGN SPEED = 50 MPH

CURVE 2
 PI -L- Sta 28+16.63
 $\Delta = 30^\circ 59' 41.6''$ (RT)
 $D = 9' 29' 59.9''$
 $L = 326.26'$
 $T = 167.23'$
 $R = 603.11'$
 $e = 0.04$
 RUNOFF = 124'
 DESIGN SPEED = 40 MPH



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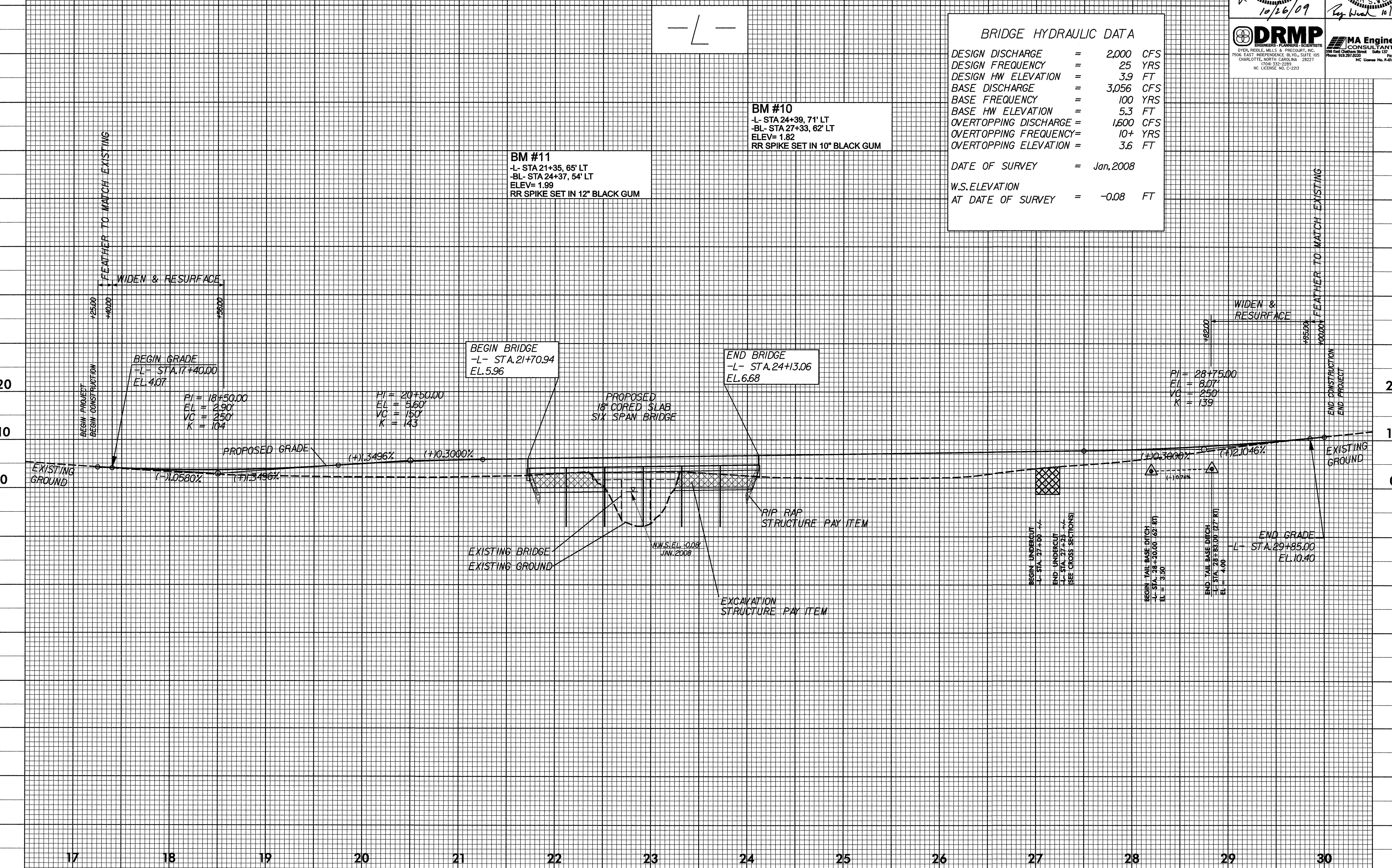
5/14/09

PROJECT REFERENCE NO. B-4465	SHEET NO. 5
ROADWAY DESIGN ENGINEER SEAL 13690 10/26/09	HYDRAULICS ENGINEER SEAL 21656 10/26/09
DRMP ENGINEERS, PLANNERS, ARCHITECTS 7506 EAST WINDSORFORD BLVD., SUITE 105 CHARLOTTE, NORTH CAROLINA 28227 TEL: 704.332.2255 NC LICENSE NO. C-233	MA Engineering CONSULTANTS, INC. 598 East Chatham Street, Suite 137, Cary, NC 27511 Phone: 919.257.6230 NC License No. E-2160

BRIDGE HYDRAULIC DATA	
DESIGN DISCHARGE	= 2,000 CFS
DESIGN FREQUENCY	= 25 YRS
DESIGN HW ELEVATION	= 3.9 FT
BASE DISCHARGE	= 3,056 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 5.3 FT
OVERTOPPING DISCHARGE	= 1,600 CFS
OVERTOPPING FREQUENCY	= 10+ YRS
OVERTOPPING ELEVATION	= 3.6 FT
DATE OF SURVEY	= Jan, 2008
W.S. ELEVATION AT DATE OF SURVEY	= -0.08 FT

BM #10
 -L- STA 24+39, 71' LT
 -BL- STA 27+33, 62' LT
 ELEV= 1.82
 RR SPIKE SET IN 10" BLACK GUM

BM #11
 -L- STA 21+35, 65' LT
 -BL- STA 24+37, 54' LT
 ELEV= 1.99
 RR SPIKE SET IN 12" BLACK GUM



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1:10/14/09 PJP
10/26/2009