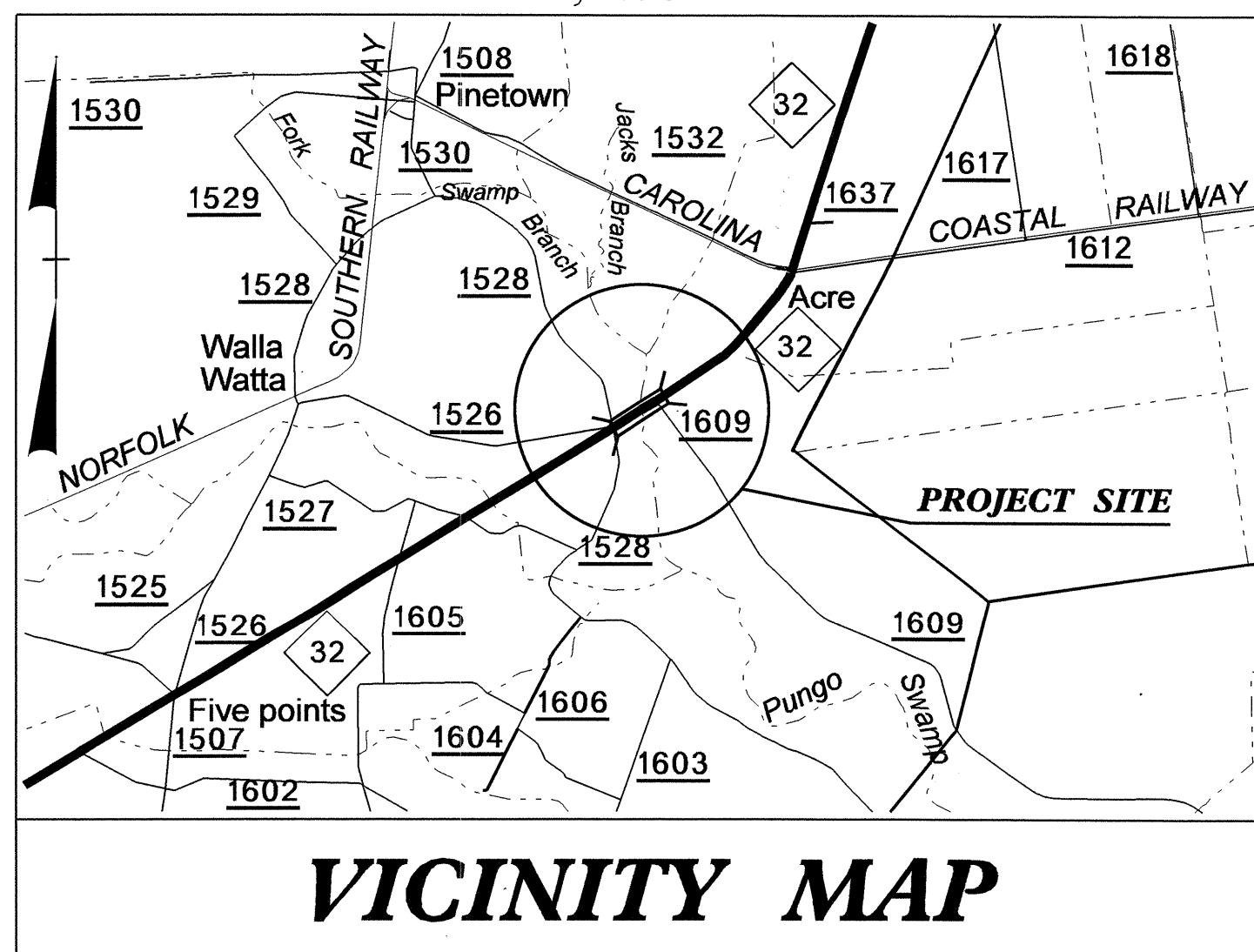


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See Sheet 1-A For Index of Sheets  
See Sheet 1-B For Conventional Symbols



STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**BEAUFORT COUNTY**

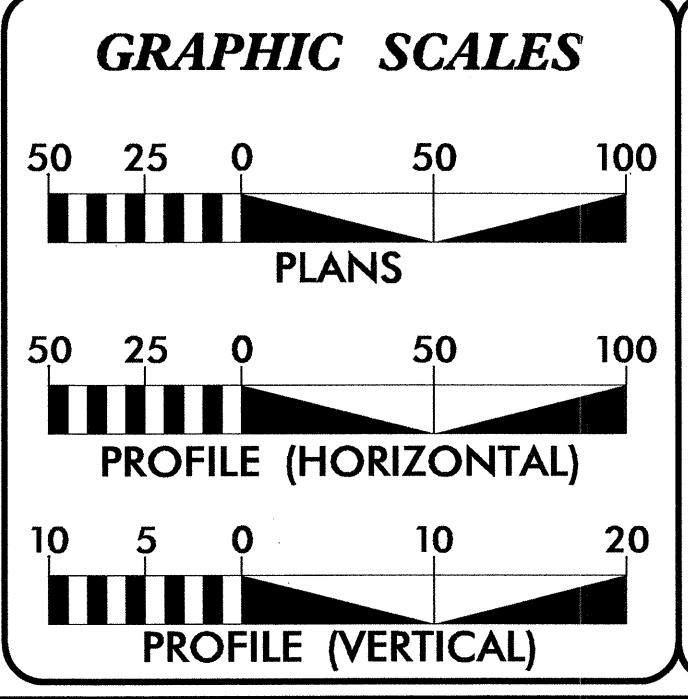
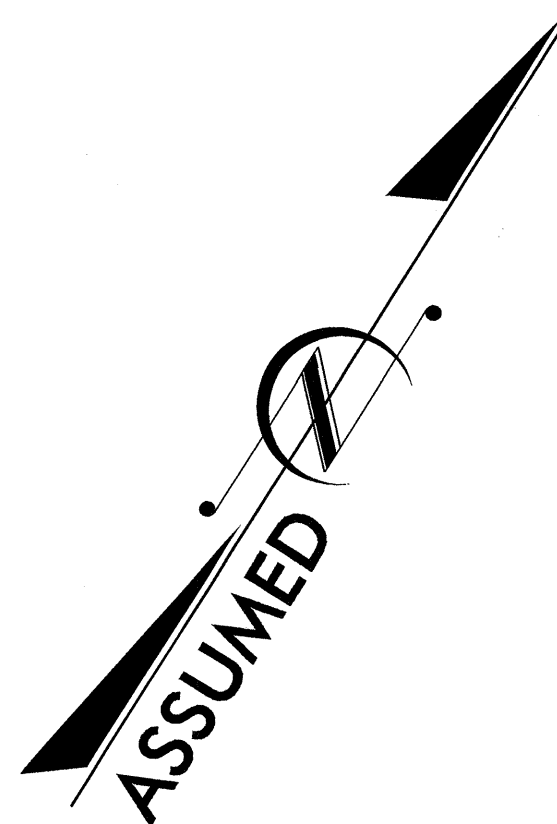
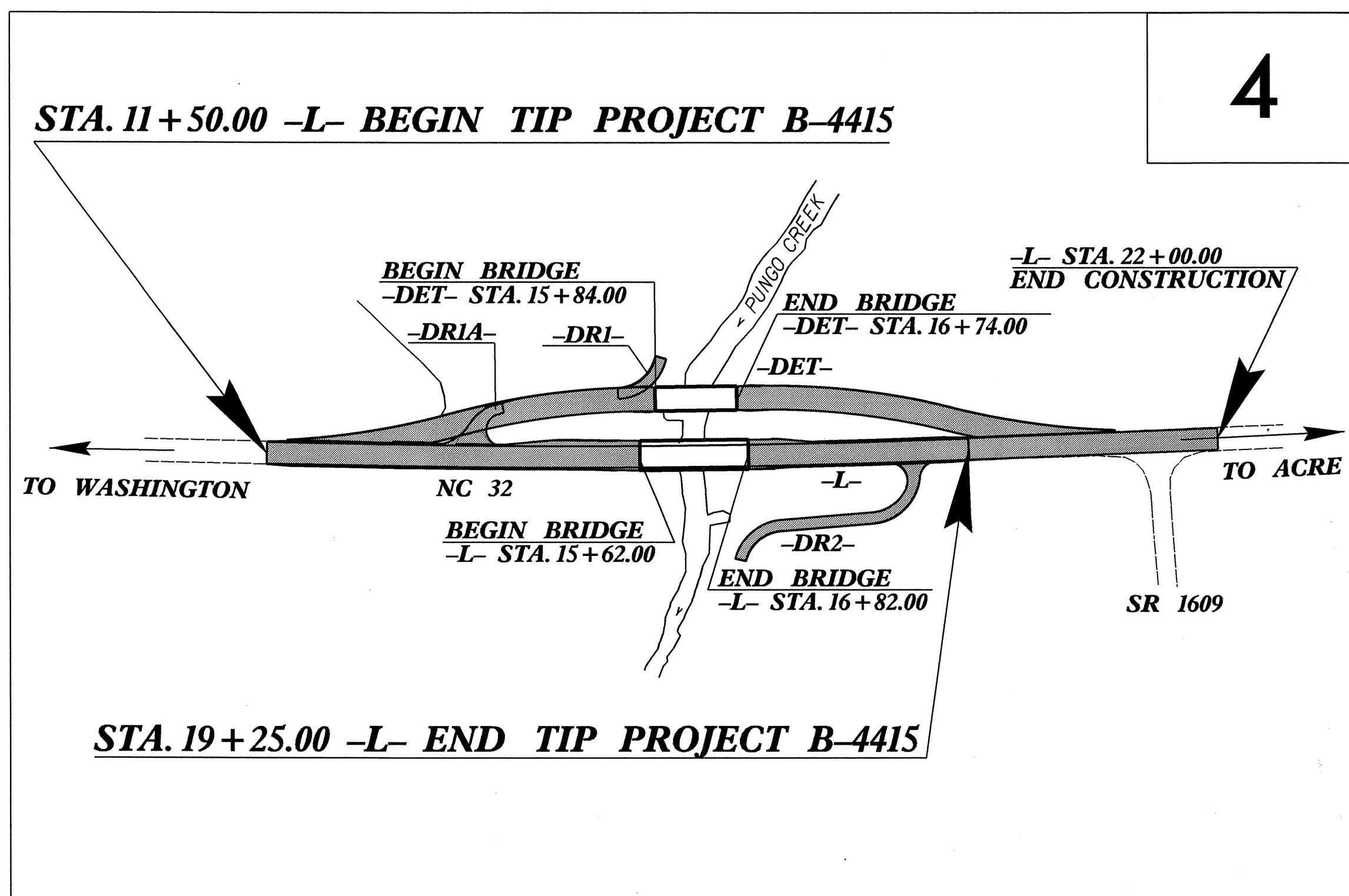
LOCATION: BRIDGE NO. 21 OVER PUNGO CREEK ON NC 32

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4415	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33691.1.1	BRSTP-32(5)	P.E.	
33691.2.1	BRSTP-32(5)	ROW, UTIL.	
33691.3.1	BRSTP-32(5)	CONST	

TIP PROJECT: B-4415

CONTRACT: C202727



**DESIGN DATA**

ADT 2011 = 3,981

ADT 2031 = 6,212

DHV = 10 %

D = 60 %

T = 4 % \*

V = 60 MPH

V (DETOUR) = 50 MPH

FUNC CLASS = RURAL MAJOR COLLECTOR

REGIONAL TIER

\* (TTST 1% + DUAL 3%)

**PROJECT LENGTH**

LENGTH OF ROADWAY TIP PROJECT B-4415 = 0.124 MILES

LENGTH OF STRUCTURE TIP PROJECT B-4415 = 0.023 MILES

TOTAL LENGTH OF TIP PROJECT B-4415 = 0.147 MILES

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

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: **BRENDA MOORE, P.E.**  
PROJECT ENGINEER  
NOVEMBER 19, 2010

LETTING DATE: **THAD F. DUNCAN, P.E.**  
PROJECT DESIGN ENGINEER  
January 17, 2012

**HYDRAULICS ENGINEER**

*W. Galen Carr*  
SIGNATURE

**ROADWAY DESIGN ENGINEER**

8/18/11  
*Thad F. Duncan*  
SIGNATURE

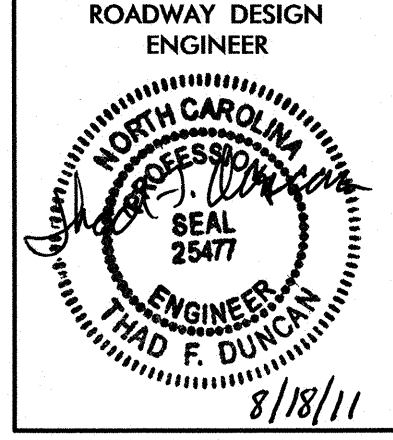
SEAL 022000  
W. GALEN CARR  
ENGINEER  
NORTH CAROLINA

SEAL 25477  
THAD F. DUNCAN  
ENGINEER  
NORTH CAROLINA

**DIVISION OF HIGHWAYS**  
STATE OF NORTH CAROLINA

*Art McMillan*  
STATE HIGHWAY DESIGN ENGINEER

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\$\$\$\$\$USERNAME\$\$\$\$\$



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 THRU 2-A	PAVEMENT SCHEDULE, TYPICAL SECTIONS, AND WEDGING DETAILS
2-B THRU 2-C	METHOD OF PIPE INSTALLATION DETAILS
2-D	ANCHORAGE FOR FRAMES
2-E	TEMPORARY 1" STEEL COVER OVER DRAINAGE STRUCTURE
3	SUMMARY OF QUANTITIES
3-A	SUMMARY OF DRAINAGE QUANTITIES
3-B	SUMMARY OF EARTHWORK, GUARDRAIL SUMMARY, AND SUMMARY OF EXISTING ASPHALT/CONCRETE PAVEMENT REMOVAL
4 THRU 5	PLAN SHEETS
6 THRU 7	PROFILE SHEETS
TMP-1 THRU TMP-6	TRANSPORTATION MANAGEMENT PLANS
PMP-1 THRU PMP-2	PAVEMENT MARKING PLANS
EC-1 THRU EC-7	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-7	CROSS-SECTIONS
S-1 THRU S-24	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 Tri County Telecom, Beaufort County Water, and Washington Electric Utilities  
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
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 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	
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
840.24	Frames and Narrow Slot Sag Grates
840.27	Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.29	Frames and Narrow Slot Flat Grates
840.31	Concrete Junction Box - 12" thru 66" Pipe
840.32	Brick Junction Box - 12" thru 66" Pipe
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.45	Precast Drainage Structure
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
862.04	Anchoring End of Guardrail - B-77 and B-83 Anchor Units
876.01	Rip Rap in Channels

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

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	⊙
Property Corner	⊙
Property Monument	⊙
Parcel/Sequence Number	(23)
Existing Fence Line	-x-x-x-
Proposed Woven Wire Fence	-o-o-o-
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 Drainage / Utility 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	-----
Proposed Slope Stakes Fill	-----
Proposed Wheel Chair Ramp	-----
Existing Metal Guardrail	-----
Proposed Guardrail	-----
Existing Cable Guiderail	-----
Proposed Cable Guiderail	-----
Equality Symbol	⊕
Pavement Removal	▭

**VEGETATION:**

Single Tree	⊙
Single Shrub	⊙
Hedge	-----
Woods Line	-----
Orchard	-----
Vineyard	-----

**EXISTING STRUCTURES:**

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

**UTILITIES:**

POWER:	
Existing Power Pole	⊙
Proposed Power Pole	⊙
Existing Joint Use Pole	⊙
Proposed Joint Use Pole	⊙
Power Manhole	⊙
Power Line Tower	⊙
Power Transformer	⊙
U/G Power Cable Hand Hole	⊙
H-Frame Pole	⊙
Recorded U/G Power Line	-----
Designated U/G Power Line (S.U.E.*)	-----

**TELEPHONE:**

Existing Telephone Pole	⊙
Proposed Telephone Pole	⊙
Telephone Manhole	⊙
Telephone Booth	⊙
Telephone Pedestal	⊙
Telephone Cell Tower	⊙
U/G Telephone Cable Hand Hole	⊙
Recorded U/G Telephone Cable	-----
Designated U/G Telephone Cable (S.U.E.*)	-----
Recorded U/G Telephone Conduit	-----
Designated U/G Telephone Conduit (S.U.E.*)	-----
Recorded U/G Fiber Optics Cable	-----
Designated U/G Fiber Optics Cable (S.U.E.*)	-----

**WATER:**

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

**TV:**

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

**GAS:**

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

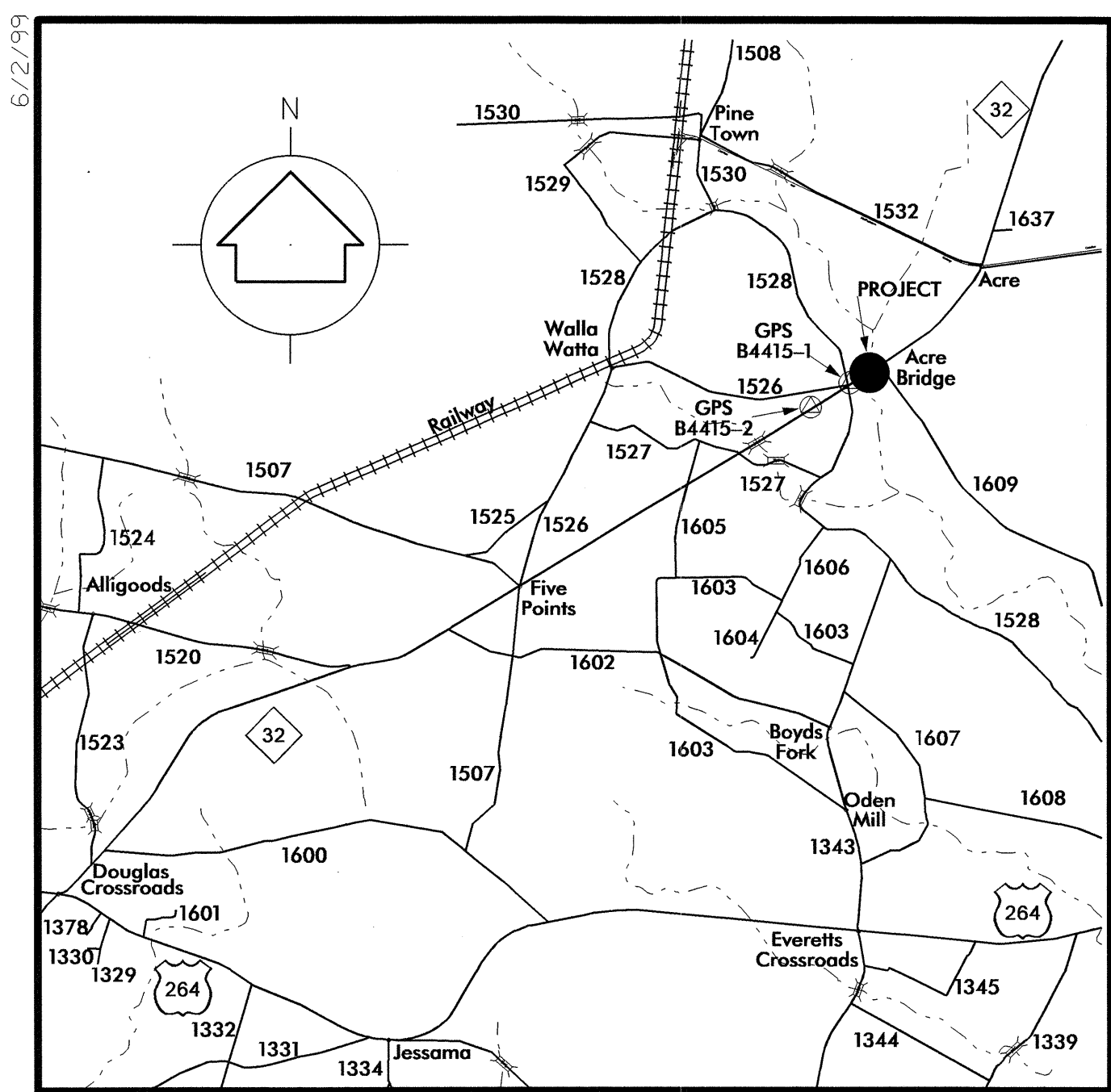
**SANITARY SEWER:**

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

**MISCELLANEOUS:**

Utility Pole	⊙
Utility Pole with Base	⊙
Utility Located Object	⊙
Utility Traffic Signal Box	⊙
Utility Unknown U/G Line	-----
U/G Tank; Water, Gas, Oil	▭
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.

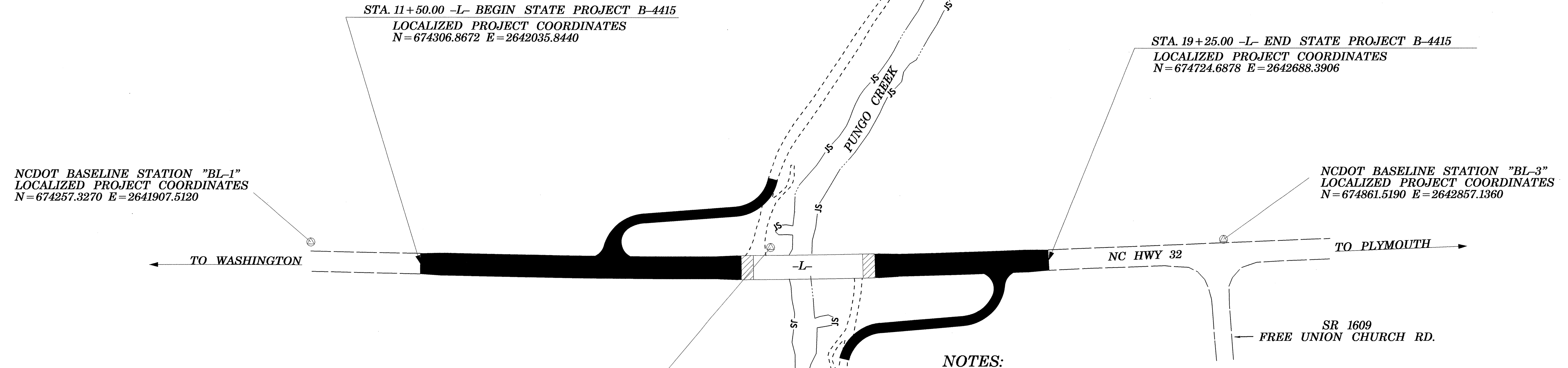
# SURVEY CONTROL SHEET B-4415



VICINITY MAP

BL	POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
1	BL-1		674257.3270	2641907.5120	23.17	10+14.57	24.10 LT
2	BL-2		674555.1620	2642389.9470	21.18	15+82.25	24.85 LT
3	BL-3		674861.5190	2642857.1360	24.03	21+41.58	17.04 LT

ALIGN	STATION	ROW MARKER PERMANENT EASEMENT-E OFFSET	NORTH	EAST	TYPE	STATION	L NORTH	EAST
L	10+00.00	66.00	674172.7138	2641941.7224				
L	10+00.00	50.00	674186.4001	2641933.4347	POT	10+00.00	674229.1696	2641907.5355
L	16+38.00	69.00	674506.8203	2642487.8903	PC	12+89.14	674378.9389	2642154.8618
L	16+40.00	80.00	674498.7126	2642495.5862	PT	18+95.53	674707.9821	2642664.1181
L	16+95.00	115.00	674499.9177	2642561.2026	POT	22+86.53	674929.6576	2642986.2013
L	17+00.00	67.68	674542.1812	2642539.3303				
L	17+25.00	110.00	674520.8306	2642583.7244				
L	17+25.00	67.25	674556.4372	2642560.0689				
L	20+50.00	66.03	674741.1634	2642828.7960				



**DATUM DESCRIPTION**

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON ASSUMED COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "BL-1"

NORTHING: 674257.327(ft)    EASTING: 2641907.512(ft)  
ELEVATION: 23.16(ft)

THE BEARING AND HORIZONTAL GROUND DISTANCE FROM "BL-1" TO -L- STATION 11+50.00 IS  
N 68°53'30.6" E 137.56(ft)

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 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:  
B4415\_LS\_CONTROL\_090312.TXT
  - SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.
  - ⊙ INDICATES CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.  
PROJECT CONTROL ESTABLISHED USING ASSUMED COORDINATES.

NOTE: DRAWING NOT TO SCALE

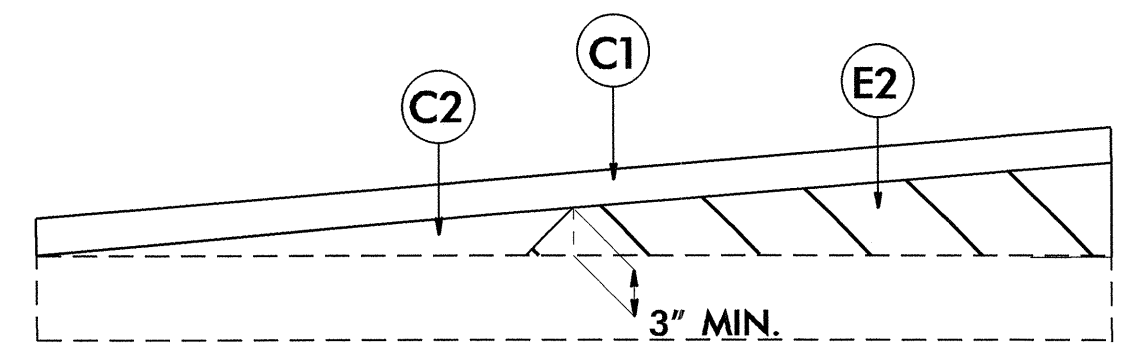
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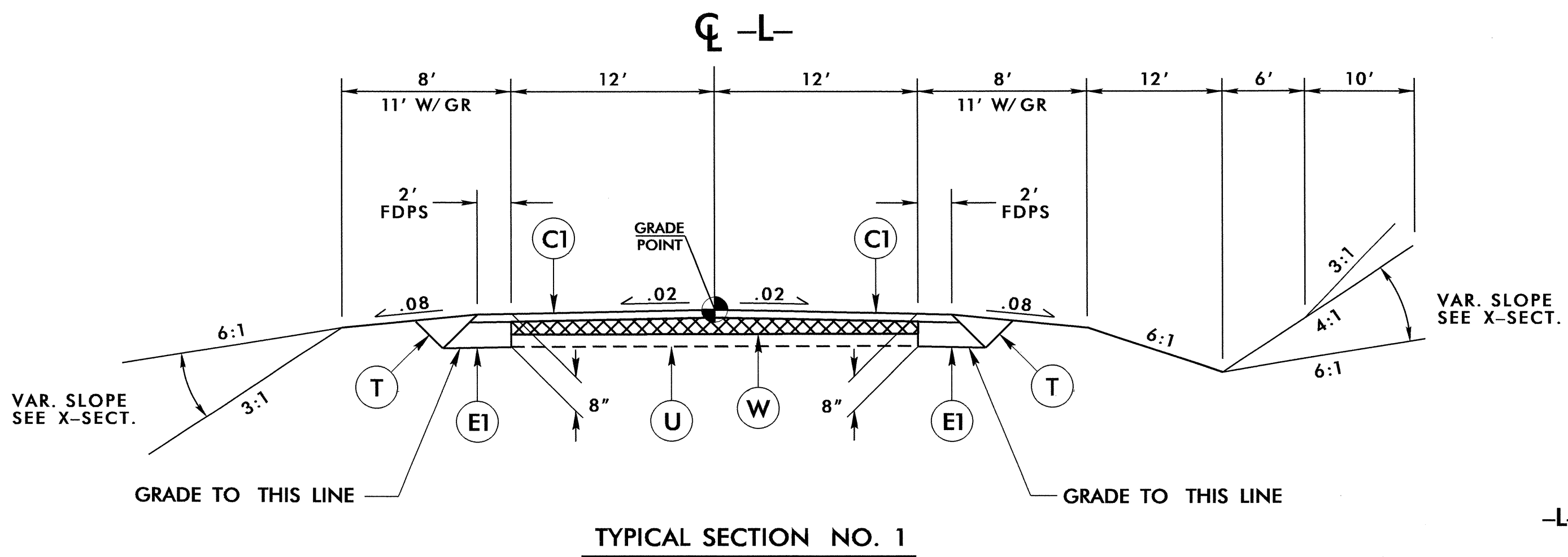
PROJECT REFERENCE NO. B-4415	SHEET NO. 2
ROADWAY DESIGN ENGINEER THAD F. DUNCAN 8/18/11	PAVEMENT DESIGN ENGINEER CLARK S. MORRISON 8/17/11

PAVEMENT SCHEDULE (FINAL PAVEMENT DESIGN)	
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 TO EXCEED 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.
J1	PROP. 6" AGGREGATE BASE COURSE.
P1	PRIME COAT AT THE RATE OF 0.35 GAL. PER SQ. YD.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	VARIABLE DEPTH ASPHALT PAVEMENT.

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

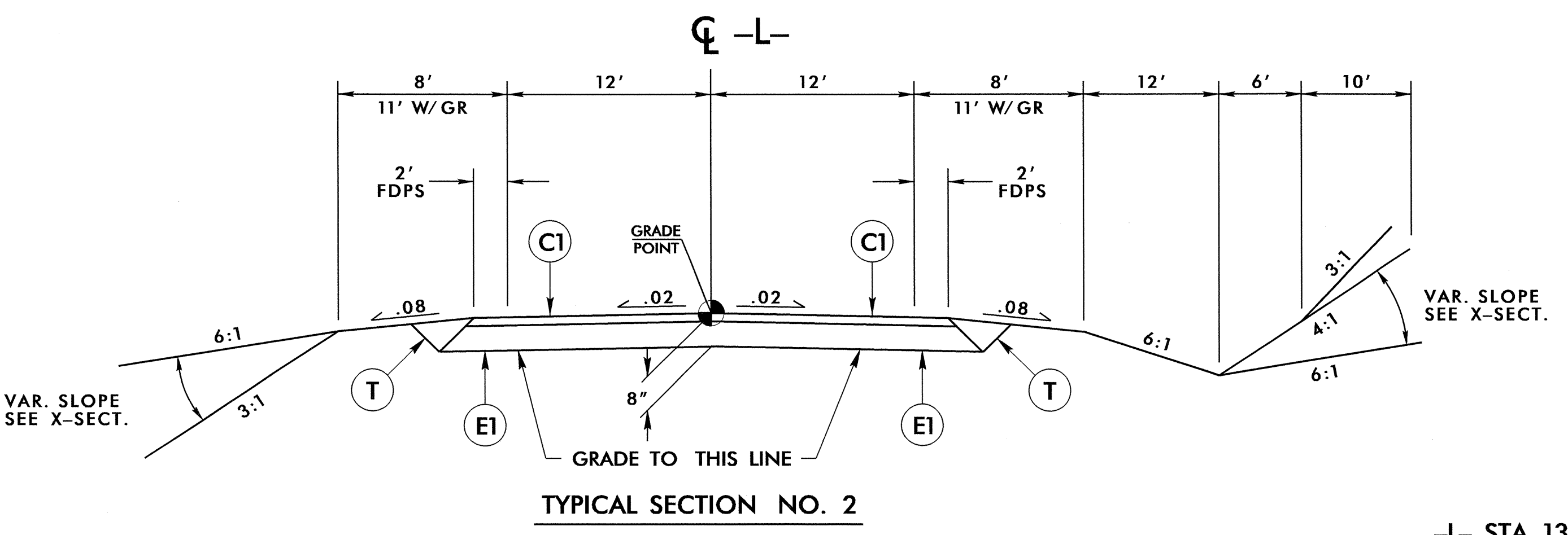


Wedging Detail For Resurfacing  
Use With Typical Section No. 1



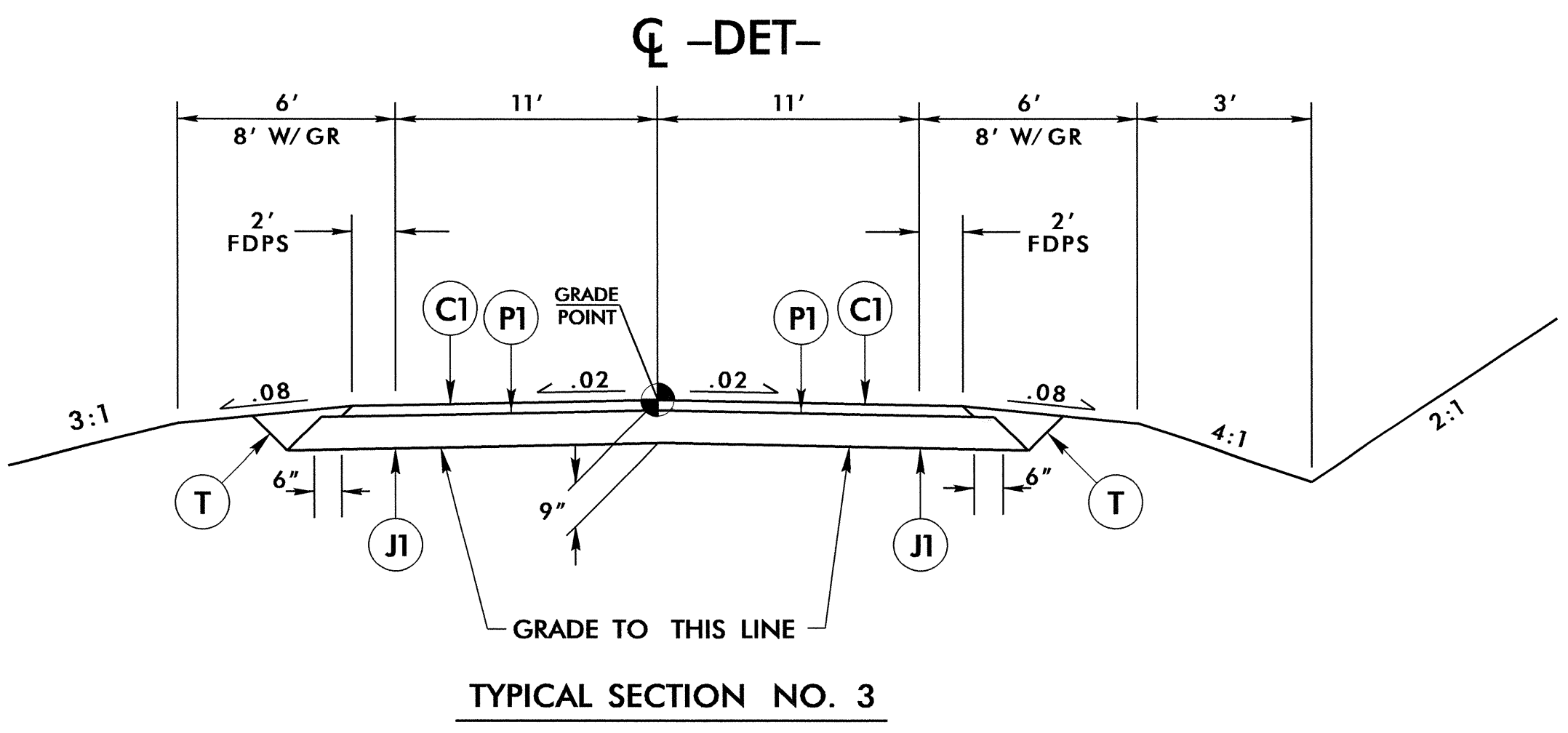
TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1  
-L- STA. 11+50.00 TO -L- STA. 13+30.00



TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2  
-L- STA. 13+30.00 TO -L- STA. 15+62.00 (BEGIN BRIDGE)  
-L- STA. 16+82.00 (END BRIDGE) TO -L- STA. 19+25.00



TYPICAL SECTION NO. 3

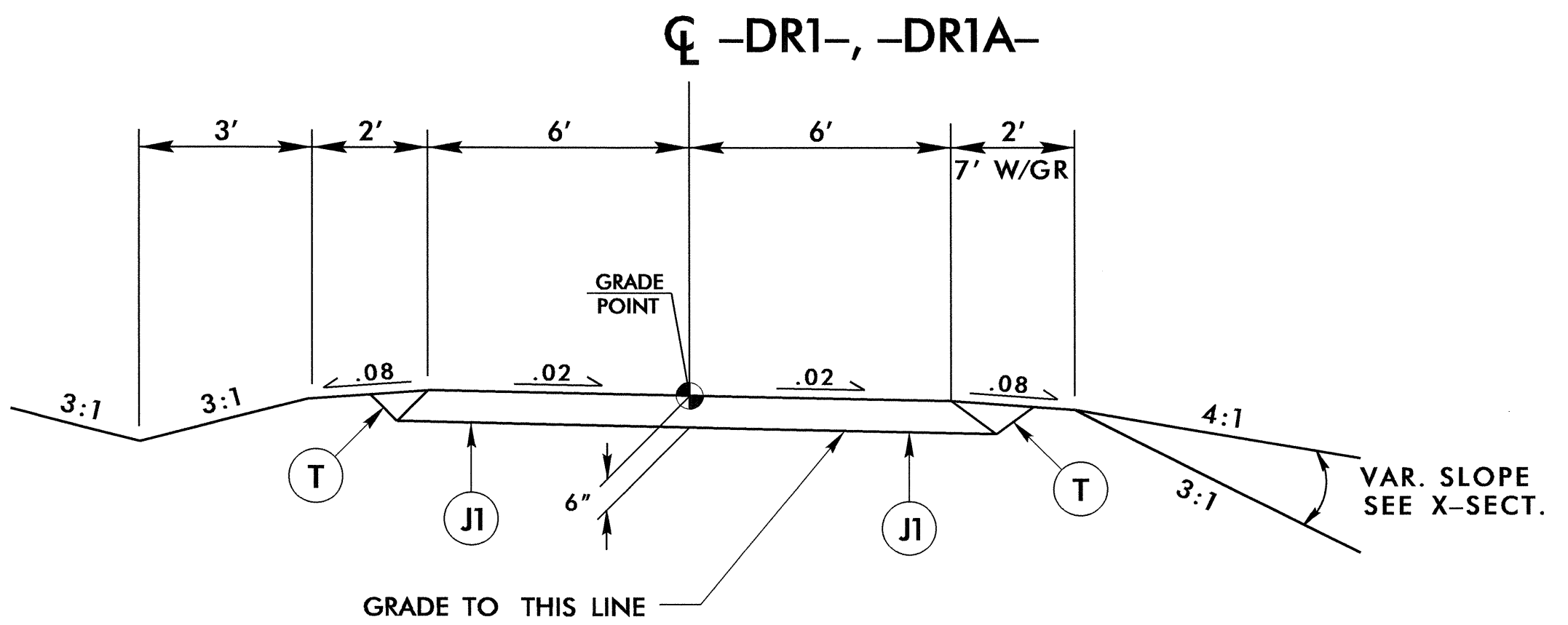
USE TYPICAL SECTION NO. 3  
-DET- STA. 12+63.84 TO -DET- STA. 15+84.00 (BEGIN BRIDGE)  
-DET- STA. 16+74.00 (END BRIDGE) TO -DET- STA. 20+02.87

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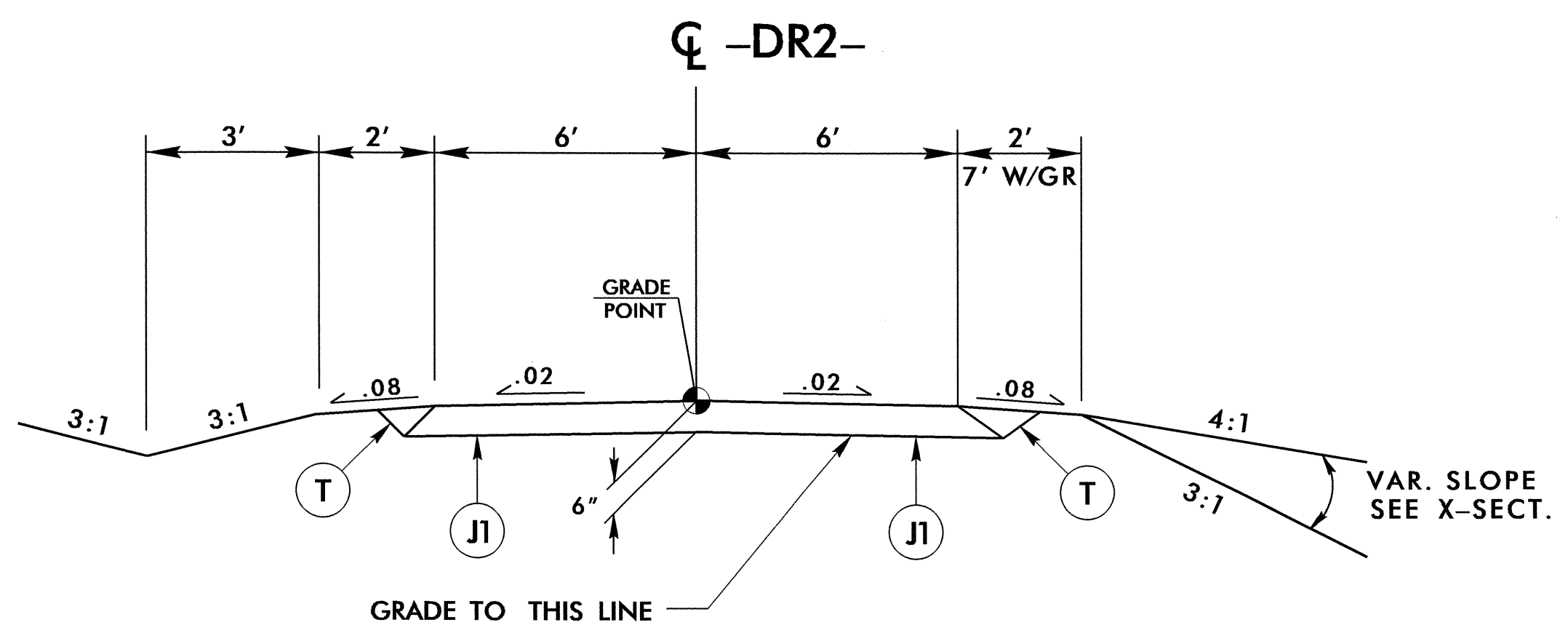
PROJECT REFERENCE NO. B-4415	SHEET NO. 2-A
ROADWAY DESIGN ENGINEER THAD F. DUNCAN SEAL 25477 8/18/11	PAVEMENT DESIGN ENGINEER CLARK S. MORRISON SEAL 22896 8/17/11

PAVEMENT SCHEDULE (FINAL PAVEMENT DESIGN)	
C1	3" S9.5B
J1	6" ABC
T	EARTH MATERIAL



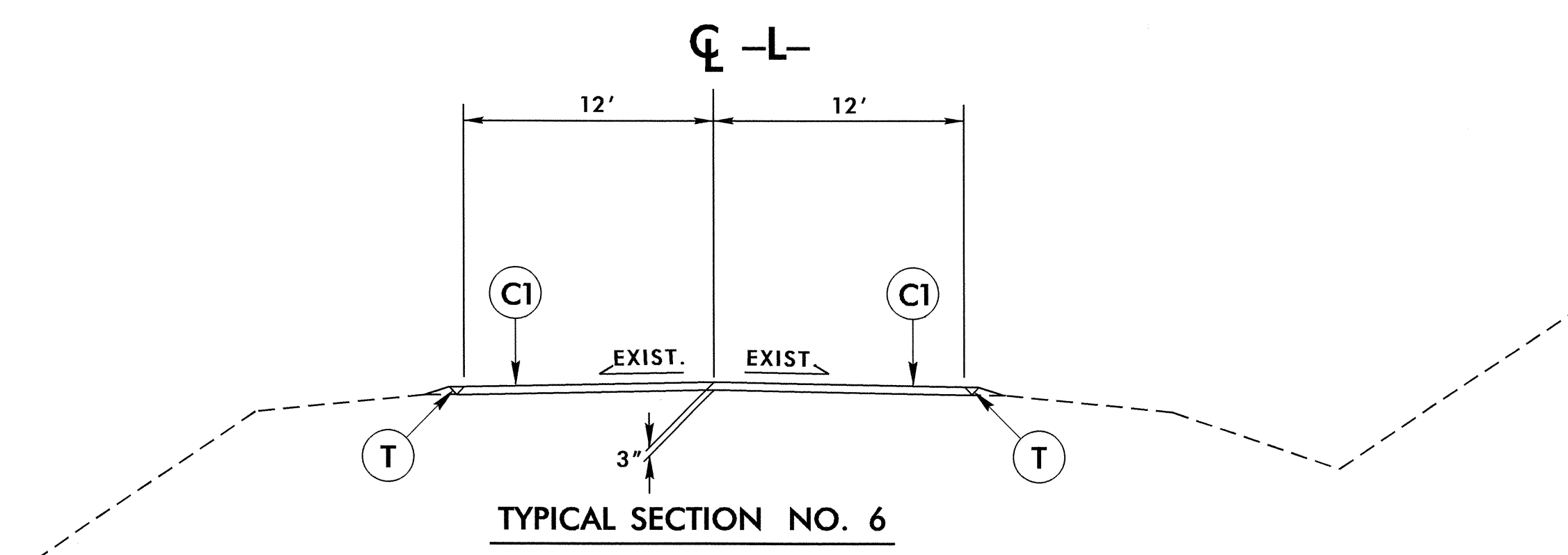
TYPICAL SECTION NO. 4

USE TYPICAL SECTION NO. 4  
 USE GRASS ONLY  
 -DR1- STA. 10+00.00 TO -DR1- STA. 10+45.00  
 USE ABC  
 -DR1- STA. 10+45.00 TO -DR1- STA. 10+66.54  
 -DR1A- STA. 10+00.00 TO -DR1A- STA. 10+62.43



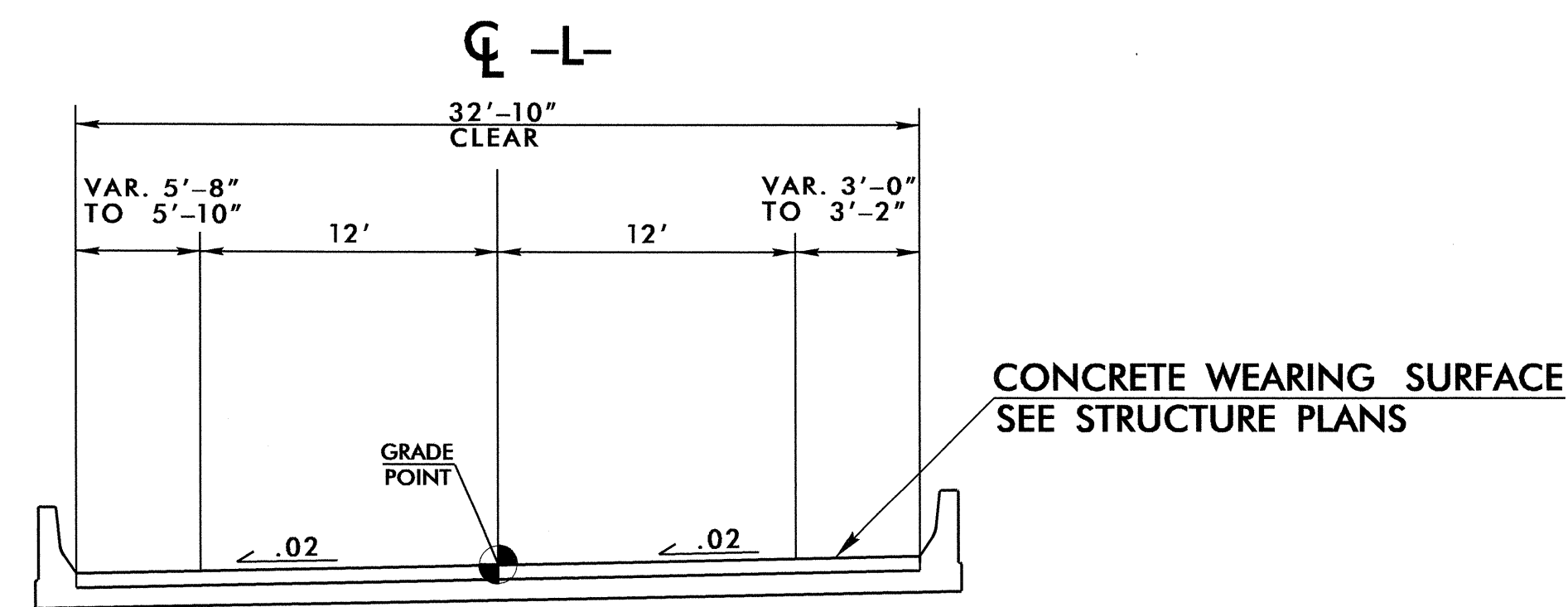
TYPICAL SECTION NO. 5

USE TYPICAL SECTION NO. 5  
 USE ABC  
 -DR2- STA. 10+12.03 TO -DR2- STA. 12+25.00  
 USE GRASS ONLY  
 -DR2- STA. 12+25.00 TO -DR2- STA. 12+63.15



TYPICAL SECTION NO. 6

USE TYPICAL SECTION NO. 6  
 -L- STA. 19+25.00 TO -L- STA. 22+00.00



BRIDGE TYPICAL SECTION NO. 1

USE BRIDGE TYPICAL SECTION NO. 1  
 -L- STA. 15+62.00 TO -L- STA. 16+82.00

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**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.  
 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.

**LEGEND:**  
 - - - - - 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.**

**7-06**

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

**RIGID PIPE**

SHEET 2 OF 3  
**300D01**

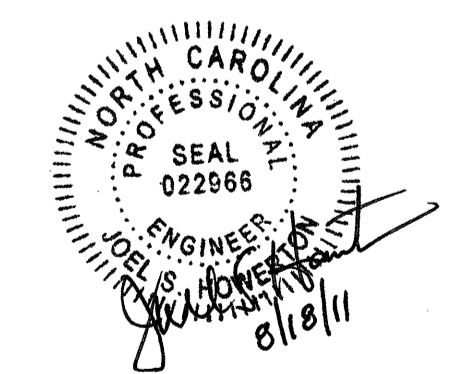
**GENERAL NOTES:**  
 I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.  
 O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.  
 H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.  
 TAKE CARE TO FULLY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

**LEGEND:**  
 - - - - - 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.

**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: DATE:   
 CHECKED BY: DATE: 7/20/09  
 FILE SPE/ericward/stds/stdstodetail/30001/0300d01.dgn



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

SHEET 3 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	Maximum Height of Cover (feet) 12 10 8
12	12	204	286
15	12	162	204
18	12	135	169
21	12	115	145
24	12	100	126
30	12	79	100
36	12	65	83
42	12	55	70
48	12	48	61
54	12	54	77
60	12	69	90
66	12		81
72	12		74
78	12		78
84	12		81
			69

Round Corrugated Aluminum Pipe 2 2/3 x 1/2 corrugation **			
Diameter (inches)	Minimum cover (inches)	Maximum cover (Ga) 16	Maximum Height of Cover (feet) 12 10 8
12	12	123	155
15	12	98	123
18	12	81	102
21	12	69	87
24	12	60	76
27	12	67	85
30	12	60	76
36	12	50	60
42	12	50	60
48	12	52	60
54	12	46	50
60	12		50
66	12		51
72	12		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

**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

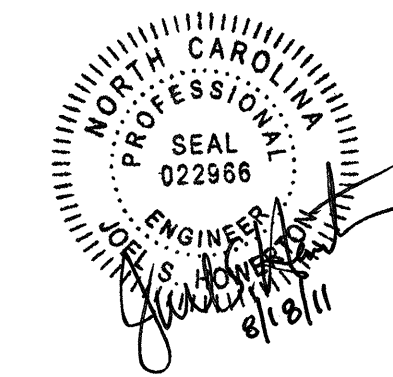
STATE OF NORTH CAROLINA  
 DEPT. OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 RALEIGH, N.C.

7-06

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

FILL HEIGHT TABLES

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: 7/30/09  
 CHECKED BY: [Signature] DATE: 7/30/09  
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STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

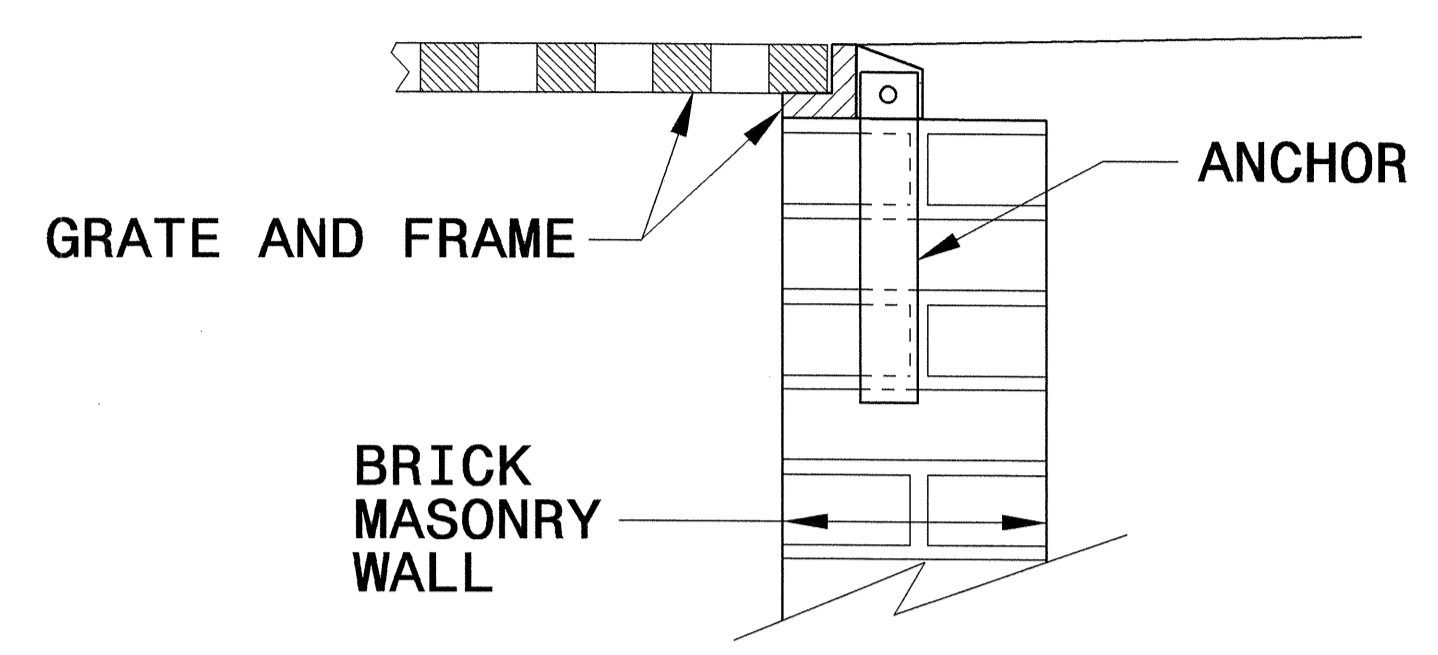
ENGLISH DETAIL DRAWING FOR  
**ANCHORAGE FOR FRAMES**  
BRICK/CONCRETE/PRECAST CONCRETE

SHEET 1 OF 1  
**840D25**

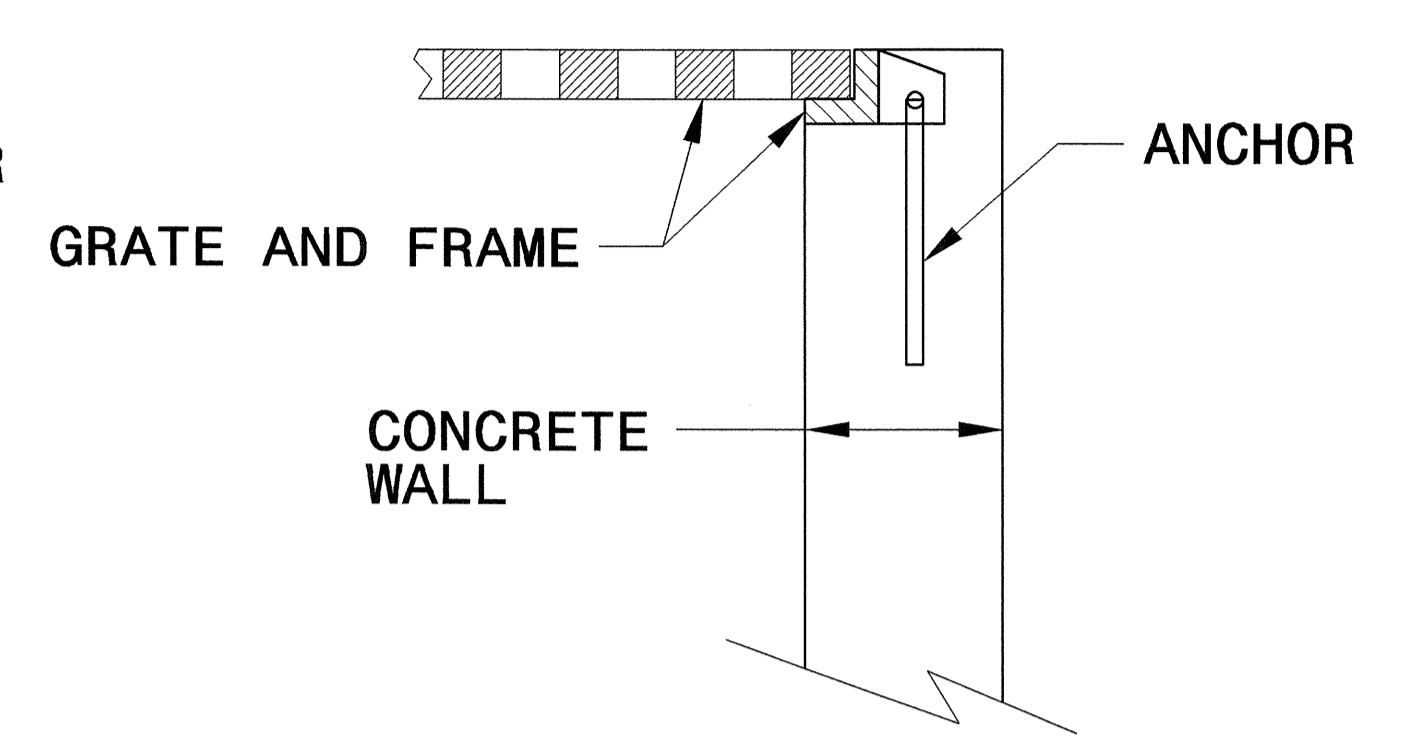
STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

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

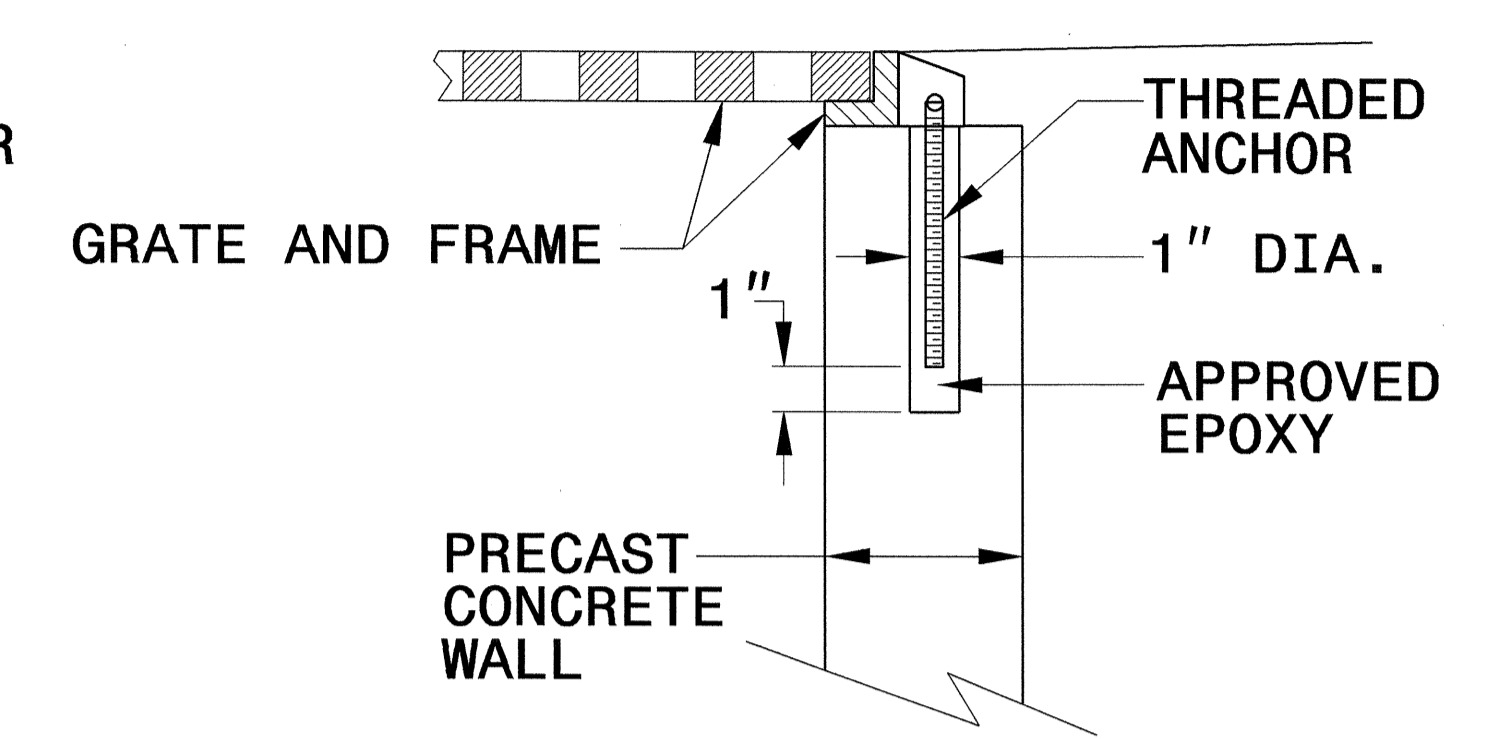
SHEET 1 OF 1  
**840D25**



**BRICK MASONRY CONSTRUCTION**



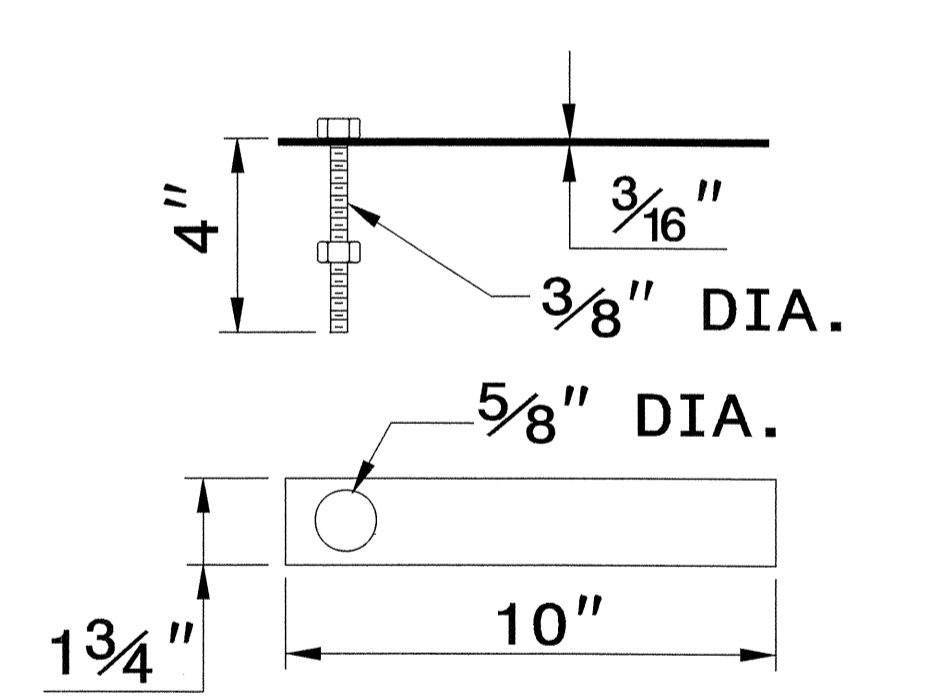
**CONCRETE CONSTRUCTION**



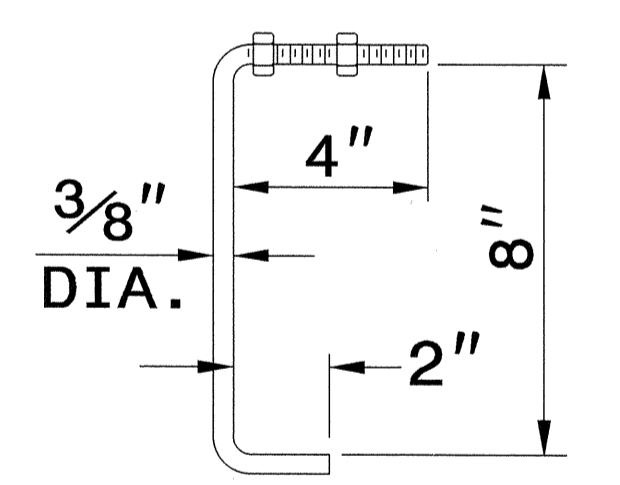
**PRECAST CONCRETE CONSTRUCTION**

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

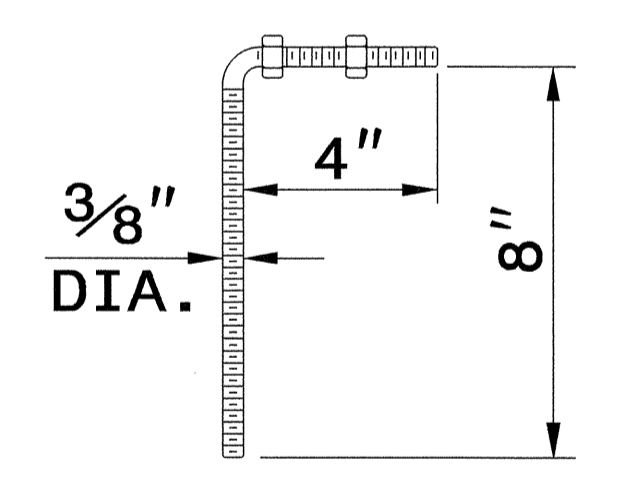
NOTE:  
CONSTRUCT GRATED DROP INLET TO COINCIDE WITH NORMAL OR SUPERELEVATED SHOULDER OR PAVEMENT SLOPE.



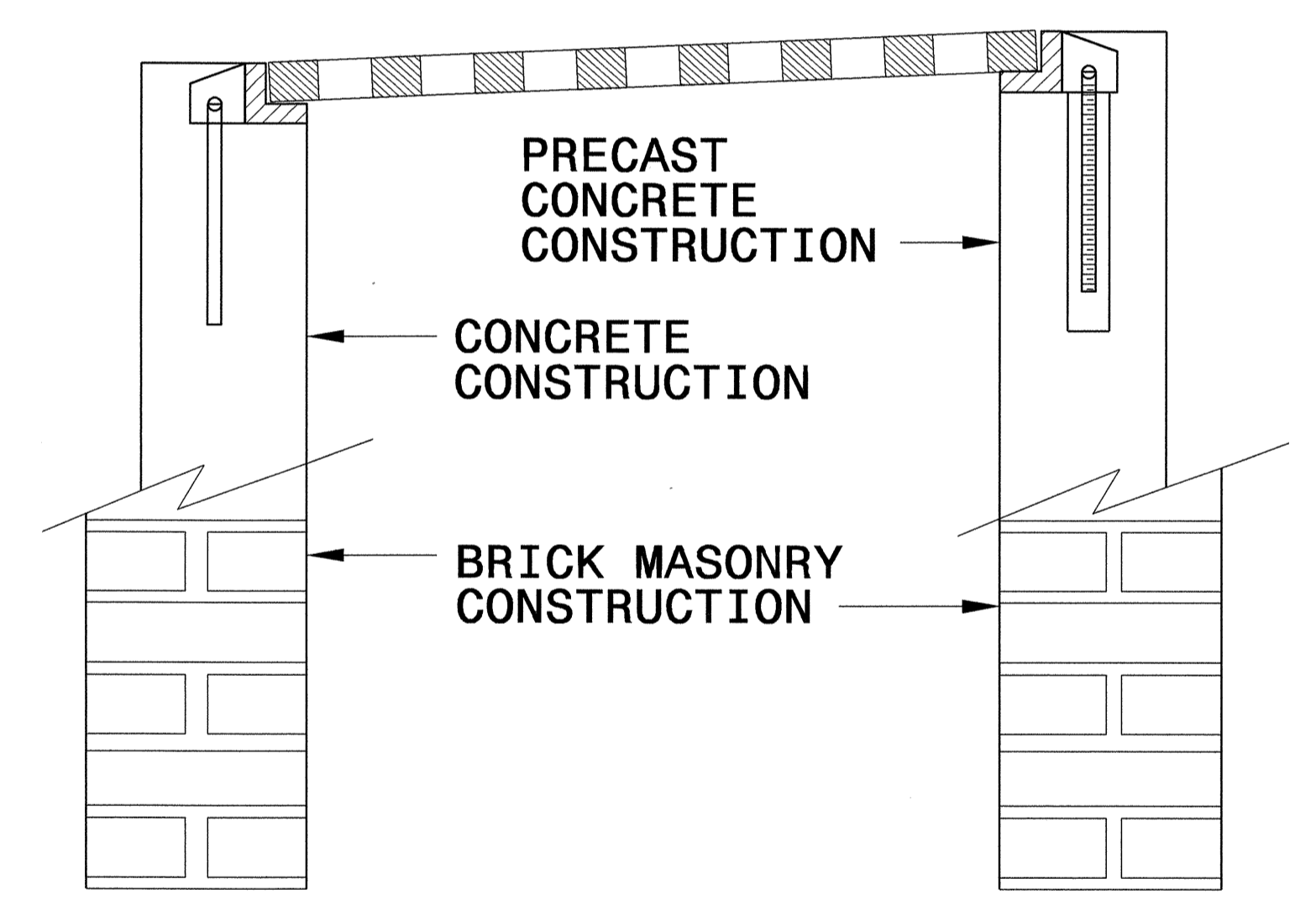
**MASONRY ANCHOR**  
3/8" DIA. BOLT WITH PLATE



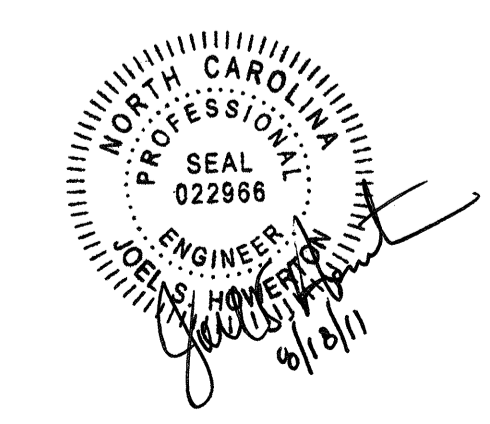
**CONCRETE ANCHOR**  
3/8" DIA. BENT BAR



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



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

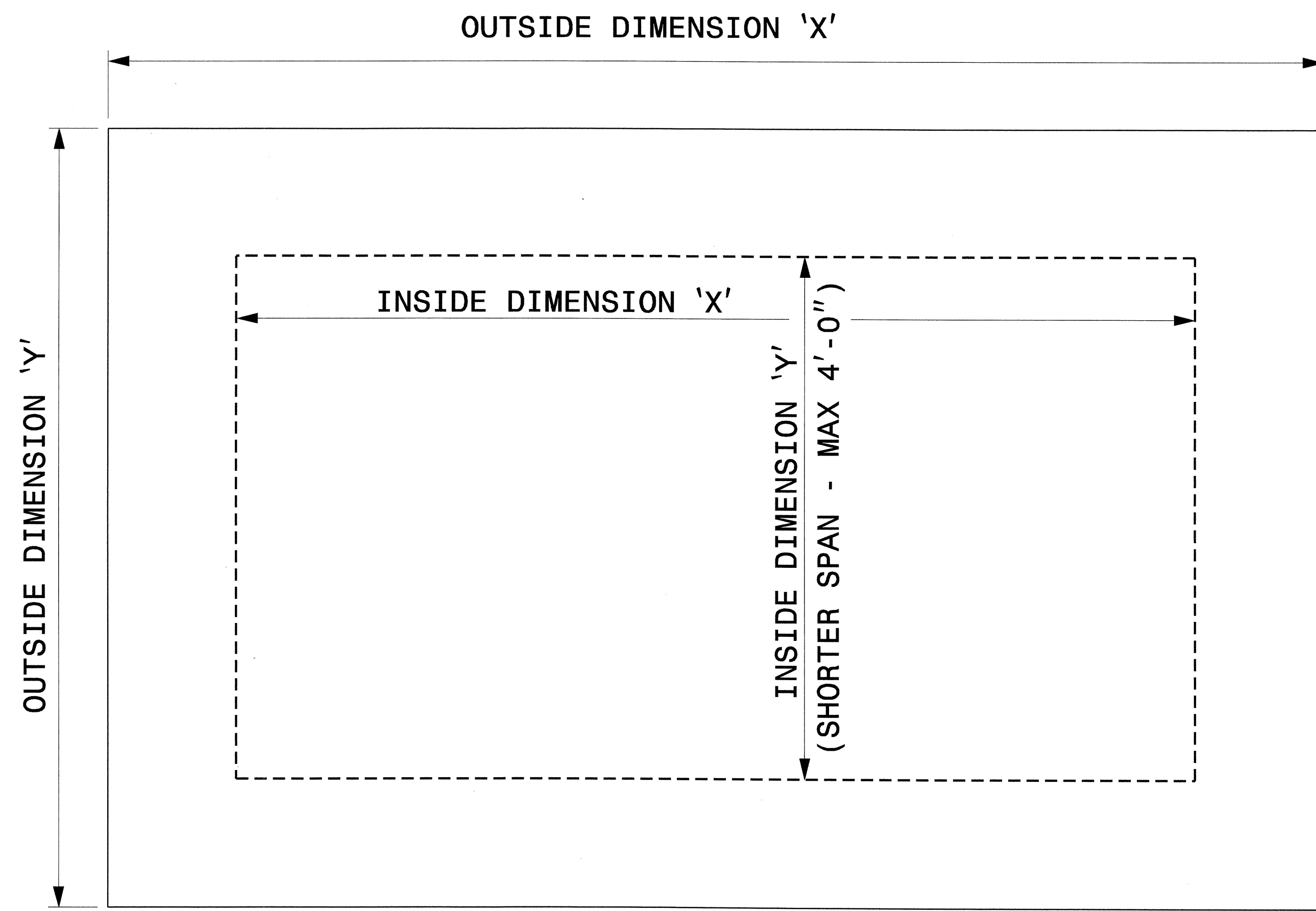


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Office 919-250-4128 FAX 919-250-4119

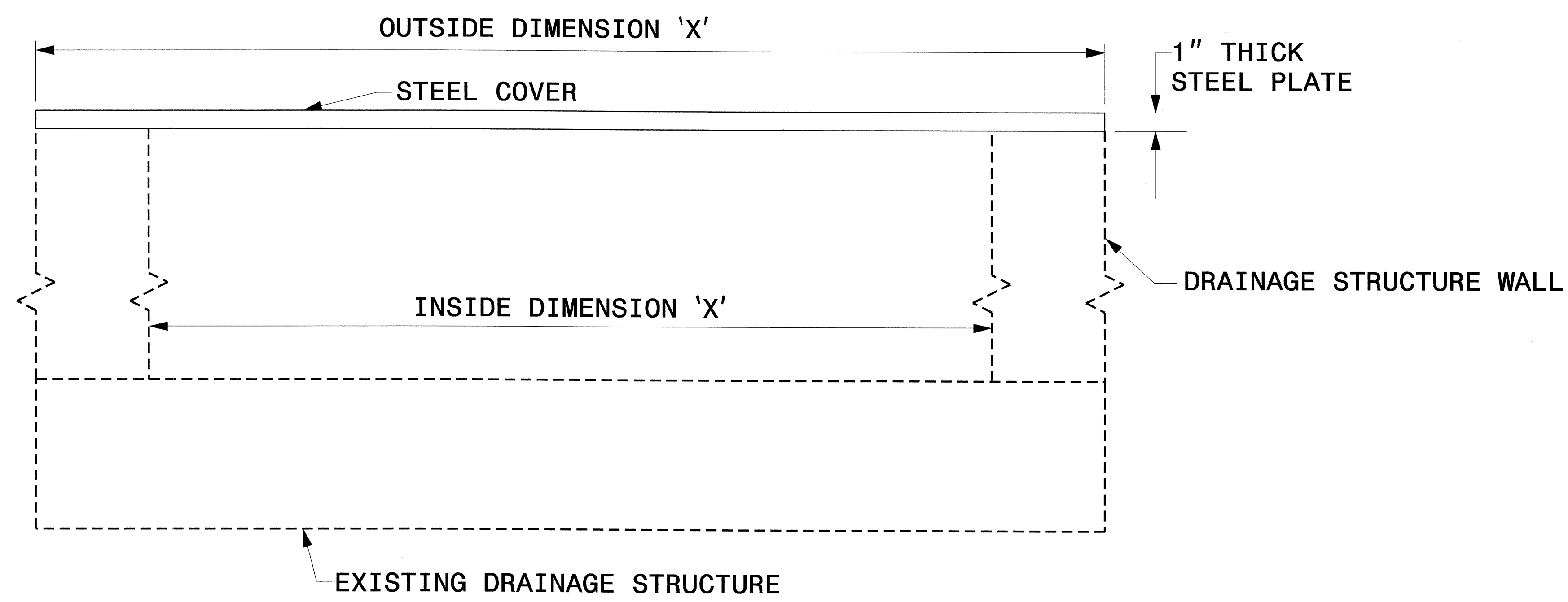
**SEE PLATE FOR TITLE**

ORIGINAL BY: 2006 STD 840.25 DATE: 07/18/06  
MODIFIED BY: E.E. WARD DATE: 9/25/06  
CHECKED BY: DATE:  
FILE SPEC.:

SYSTEMS  
DESIGN  
USER NAME



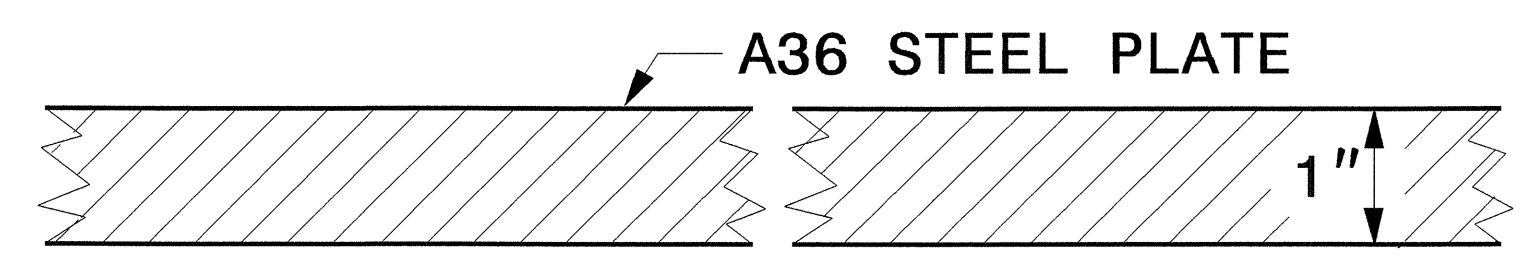
**PLAN VIEWS**



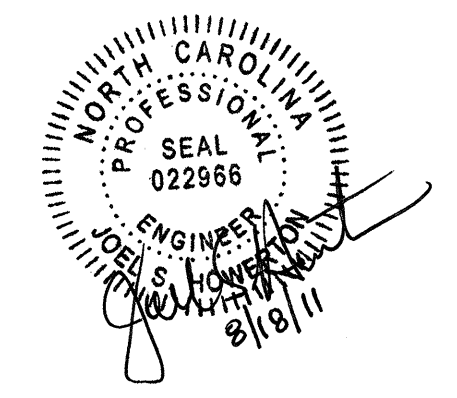
**ELEVATION VIEWS**

**GENERAL NOTES:**

- USE GRADE A36 STEEL
- STEEL COVERS ARE FOR TEMPORARY USE DURING PHASE CONSTRUCTION.
- PLACE FILL DIRECTLY OVER THE STEEL PLATES.
- SEE ROADWAY PLANS AND PROVISIONS FOR LOCATIONS
- QUANTITIES TO BE PAID FOR AT THE UNIT PRICE BID PER EACH.



**SECTION VIEW OF STEEL TOP PLATE**



**CONTRACT STANDARDS AND DEVELOPMENT UNIT**  
Office 919-707-6950 FAX 919-250-4119

**DETAIL OF TEMPORARY 1" STEEL COVER OVER DRAINAGE STRUCTURE**

ORIGINAL BY: *rnbritt* DATE: 04-29-04  
 MODIFIED BY: *Joel S. Britt* DATE: 8/10/11  
 CHECKED BY: *Joel S. Britt* DATE: 8/10/11  
 FILE SPEC.: details/nbritt/english/misc/steelcover.dgn

16-AUG-2011 10:58  
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 5/14/99

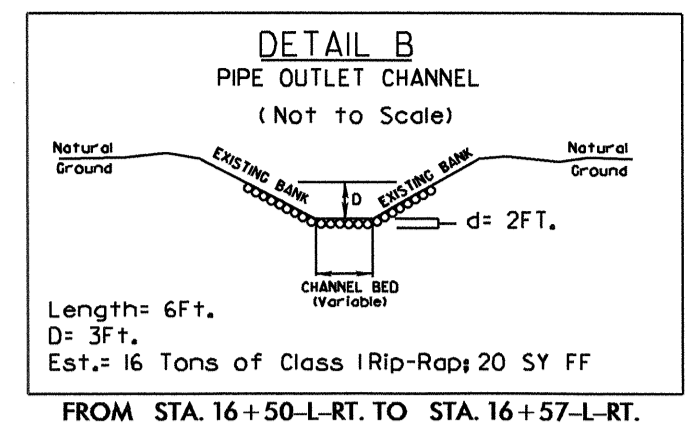
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS  
**SUMMARY OF QUANTITIES**

ItemNumber	Sec #	Quantity	Unit	Description	ItemNumber	Sec #	Quantity	Unit	Description
000010000-N	800	Lump Sum		MOBILIZATION					
000040000-N	801	Lump Sum		CONSTRUCTION SURVEYING					
002900000-N	SP	Lump Sum		REINFORCED BRIDGE APPROACH FILL, STATION ***** (16+22)	465000000-N	1251	151	EA	TEMPORARY RAISED PAVEMENT MARKERS
004300000-N	226	Lump Sum		GRADING	481000000-E	1205	31,686	LF	PAINT PAVEMENT MARKING LINES (4")
005000000-E	226	1	ACR	SUPPLEMENTARY CLEARING & GRUB- BING	485000000-E	1205	8,250	LF	REMOVAL OF PAVEMENT MARKING LINES (4")
005700000-E	226	300	CY	UNDERCUT EXCAVATION	532620000-E	1510	870	LF	12" WATER LINE
019500000-E	SP	300	CY	SELECT GRANULAR MATERIAL	555800000-E	1515	2	EA	12" VALVE
019600000-E	270	3,220	SY	FABRIC FOR SOIL STABILIZATION	580400000-E	1530	866	LF	ABANDON 12" UTILITY PIPE
031800000-E	SP	84	TON	FOUNDATION CONDITIONING MATE- RIAL, MINOR STRS	587170000-E	1550	693	LF	TRENCHLESS INSTALLATION OF 12" IN SOIL
032000000-E	SP	190	SY	FOUNDATION CONDITIONING FABRIC	587171000-E	1550	77	LF	TRENCHLESS INSTALLATION OF 12" NOT IN SOIL
033520000-E	SP	40	LF	15" DRAINAGE PIPE	600000000-E	1605	2,875	LF	TEMPORARY SILT FENCE
033530000-E	SP	52	LF	18" DRAINAGE PIPE	600600000-E	1610	360	TON	STONE FOR EROSION CONTROL, CLASS A
033540000-E	SP	160	LF	24" DRAINAGE PIPE	600900000-E	1610	275	TON	STONE FOR EROSION CONTROL, CLASS B
033560000-E	SP	316	LF	36" DRAINAGE PIPE	601200000-E	1610	300	TON	SEDIMENT CONTROL STONE
033585000-E	SP	2	EA	*** DRAINAGE PIPE ELBOWS (15")	601500000-E	1615	3	ACR	TEMPORARY MULCHING
099500000-E	340	189	LF	PIPE REMOVAL	601800000-E	1620	150	LB	SEED FOR TEMPORARY SEEDING
111000000-E	510	400	TON	STABILIZER AGGREGATE	602100000-E	1620	0.5	TON	FERTILIZER FOR TEMPORARY SEED- ING
112100000-E	520	939	TON	AGGREGATE BASE COURSE	602400000-E	1622	365	LF	TEMPORARY SLOPE DRAINS
122000000-E	545	100	TON	INCIDENTAL STONE BASE	602700000-N	1622	11	EA	INLET PROTECTION AT TEMPORARY SLOPE DRAINS
127500000-E	600	683.2	GAL	PRIME COAT	602900000-E	SP	200	LF	SAFETY FENCE
148900000-E	610	440	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B	603000000-E	1630	460	CY	SILT EXCAVATION
151900000-E	610	820	TON	ASPHALT CONC SURFACE COURSE, TYPE S9.5B	603600000-E	1631	2,300	SY	MATting FOR EROSION CONTROL
157500000-E	SP	70	TON	ASPHALT BINDER FOR PLANT MIX	603700000-E	SP	10	SY	COIR FIBER MAT
202200000-E	SP	22.4	CY	SUBDRAIN EXCAVATION	604200000-E	1632	755	LF	1/4" HARDWARE CLOTH
203300000-E	SP	16.8	CY	SUBDRAIN FINE AGGREGATE	604800000-E	SP	200	SY	FLOATING TURBIDITY CURTAIN
204400000-E	SP	100	LF	6" PERFORATED SUBDRAIN PIPE	6071012000-E	SP	150	LF	COIR FIBER WATTLE
207000000-N	SP	1	EA	SUBDRAIN PIPE OUTLETS	6071020000-E	SP	40	LB	POLYACRYLAMIDE (PAM)
207700000-E	SP	6	LF	6" OUTLET PIPE (SUBDRAINS)					
219000000-N	828	1	EA	TEMPORARY STEEL PLATE COVERS FOR MASONRY DRAINAGE STRUCTURE	6071030000-E	SP	115	LF	COIR FIBER BAFFLE
228600000-N	840	5	EA	MASONRY DRAINAGE STRUCTURES	608400000-E	1660	3	ACR	SEEDING & MULCHING
230800000-E	840	2.02	LF	MASONRY DRAINAGE STRUCTURES	608700000-E	1660	3	ACR	MOWING
236600000-N	840	2	EA	FRAME WITH TWO GRATES, STD 840.24	609000000-E	1661	50	LB	SEED FOR REPAIR SEEDING
236700000-N	840	2	EA	FRAME WITH TWO GRATES, STD 840.29	609300000-E	1661	0.25	TON	FERTILIZER FOR REPAIR SEEDING
255600000-E	846	126	LF	SHOULDER BERM GUTTER	609600000-E	1662	100	LB	SEED FOR SUPPLEMENTAL SEEDING
303000000-E	862	600	LF	STEEL BM GUARDRAIL	610800000-E	1665	3	TON	FERTILIZER TOPDRESSING
315000000-N	862	5	EA	ADDITIONAL GUARDRAIL POSTS	611450000-N	SP	10	MHR	SPECIALIZED HAND MOWING
327000000-N	SP	4	EA	GUARDRAIL ANCHOR UNITS, TYPE 350	611700000-N	SP	25	EA	RESPONSE FOR EROSION CONTROL
331700000-N	862	4	EA	GUARDRAIL ANCHOR UNITS, TYPE B-77	612300000-E	1670	0.75	ACR	REFORESTATION
338000000-E	862	325	LF	TEMPORARY STEEL BM GUARDRAIL					
338700000-N	862	4	EA	GUARDRAIL ANCHOR UNITS, TYPE ***** TEMPORARY (B-77)					
338910000-N	SP	5	EA	GUARDRAIL ANCHOR UNITS, TYPE 350 TEMPORARY					
362800000-E	876	60	TON	RIP RAP, CLASS I					
365600000-E	876	520	SY	FILTER FABRIC FOR DRAINAGE					
365900000-N	SP	1	EA	PREFORMED SCOUR HOLES WITH LEVEL SPREADER APRON					
440000000-E	1110	224	SF	WORK ZONE SIGNS (STATIONARY)					
440500000-E	1110	96	SF	WORK ZONE SIGNS (PORTABLE)					
441000000-E	1110	42	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)					
443000000-N	1130	30	EA	DRUMS					
444500000-E	1145	48	LF	BARRICADES (TYPE III)					
445500000-N	1150	42	MD	FLAGGER					

5/28/09  
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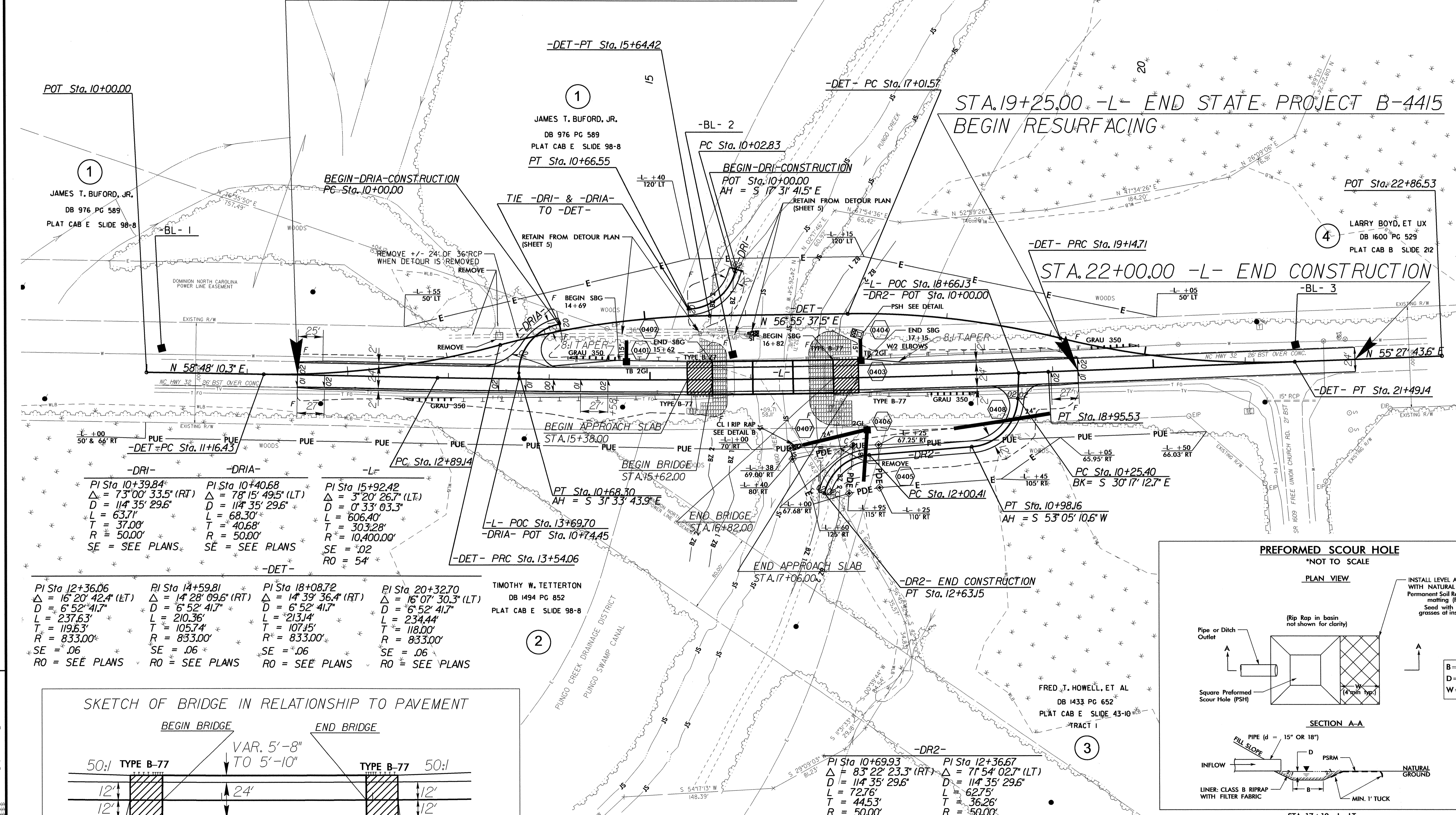




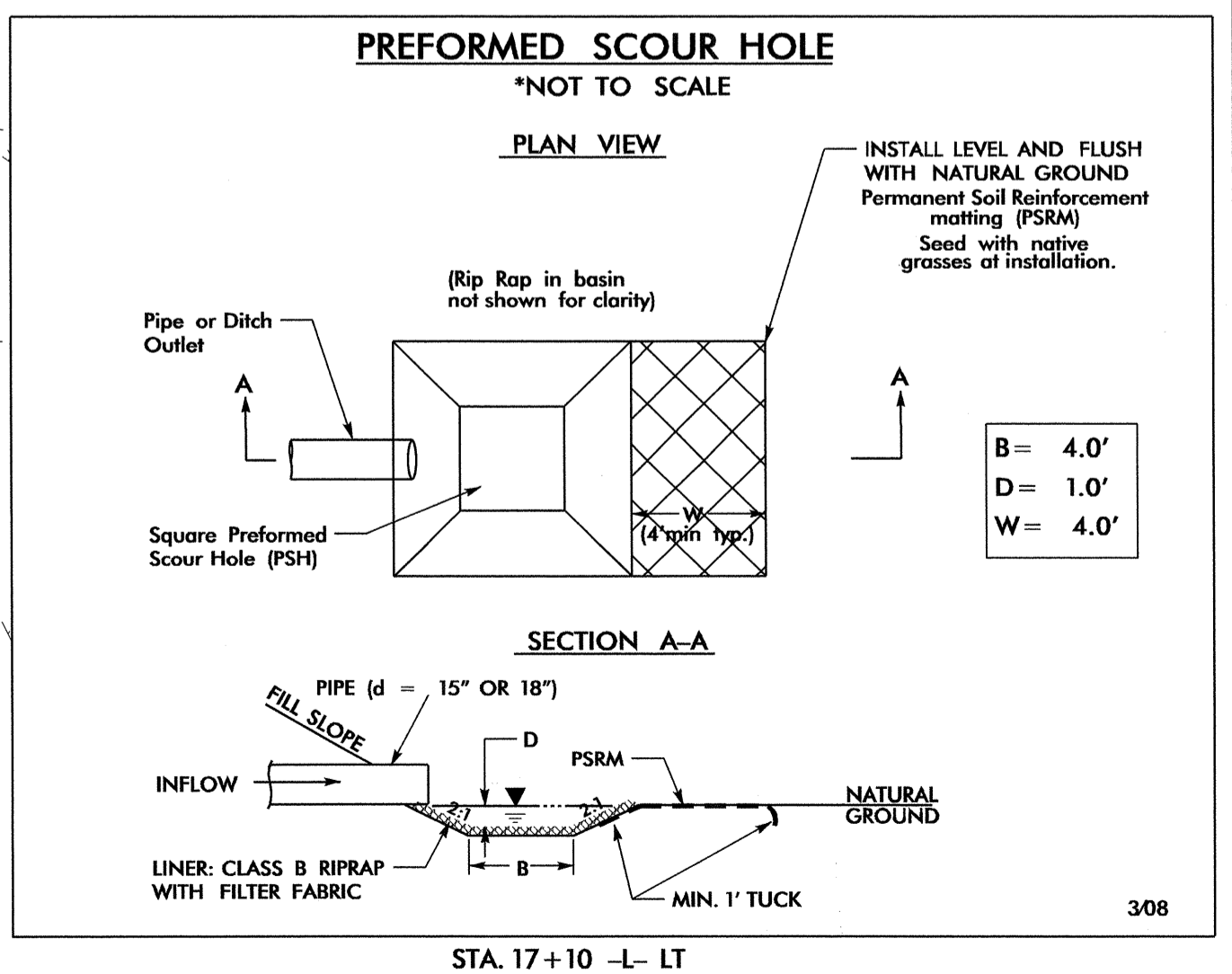
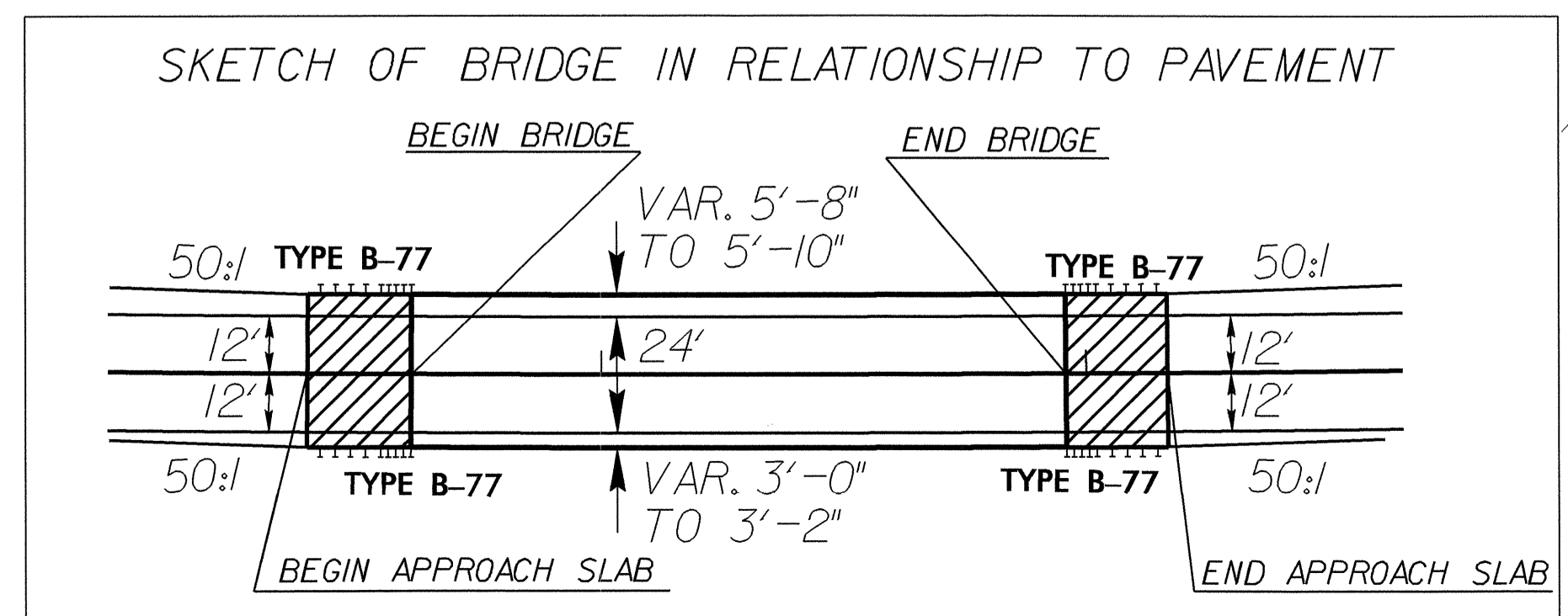
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STA. 19+25.00 -L- END STATE PROJECT B-4415  
BEGIN RESURFACING

STA. 22+00.00 -L- END CONSTRUCTION



-DRI-		-DRIA-		-L-	
PI Sta 10+39.84	PI Sta 10+40.68	PI Sta 15+92.42	PI Sta 20+32.70	PI Sta 12+36.06	RI Sta 14+59.81
$\Delta = 73^{\circ}00'33.5"$ (RT)	$\Delta = 78^{\circ}15'49.5"$ (LT)	$\Delta = 3^{\circ}20'26.7"$ (LT)	$\Delta = 16^{\circ}07'30.3"$ (LT)	$\Delta = 16^{\circ}20'42.4"$ (LT)	$\Delta = 14^{\circ}28'09.6"$ (RT)
D = 114'35'29.6"	D = 114'35'29.6"	D = 0'33'03.3"	D = 6'52'41.7"	D = 6'52'41.7"	D = 6'52'41.7"
L = 63.71'	L = 68.30'	L = 606.40'	L = 234.44'	L = 237.63'	L = 210.36'
T = 37.00'	T = 40.68'	T = 303.28'	T = 118.00'	T = 119.63'	T = 105.74'
R = 50.00'	R = 50.00'	R = 10,400.00'	R = 833.00'	R = 833.00'	R = 833.00'
SE = SEE PLANS	SE = SEE PLANS	SE = .02	SE = .06	SE = .06	SE = .06
RO = SEE PLANS	RO = SEE PLANS	RO = 54'	RO = SEE PLANS	RO = SEE PLANS	RO = SEE PLANS



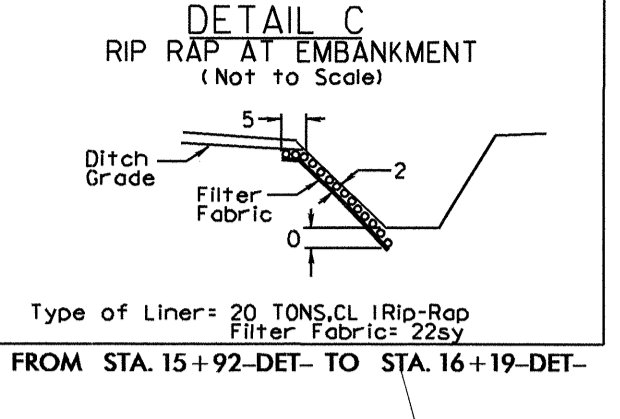
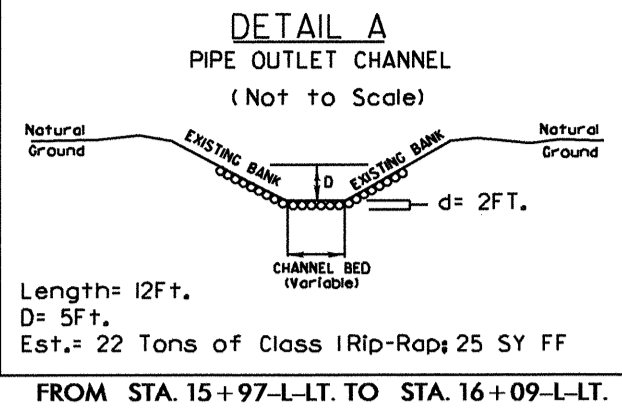
FOR -L- PROFILE SEE SHEET 6  
FOR -DRI-, -DRIA- & -DR2- PROFILE SEE SHEET 7  
FOR -DET- PLAN VIEW SEE SHEET 5  
FOR STRUCTURES SEE SHEET S1 TO S24

REVISIONS

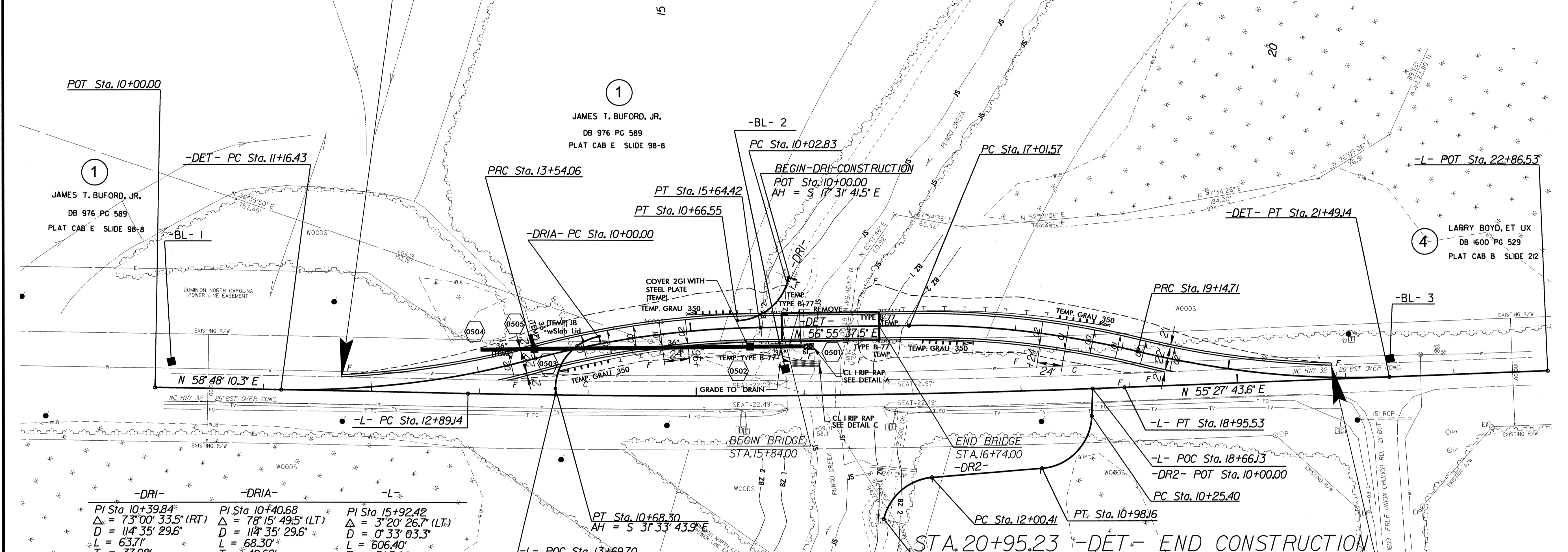
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8/17/99



STA. 11+72.65 -DET- BEGIN CONSTRUCTION



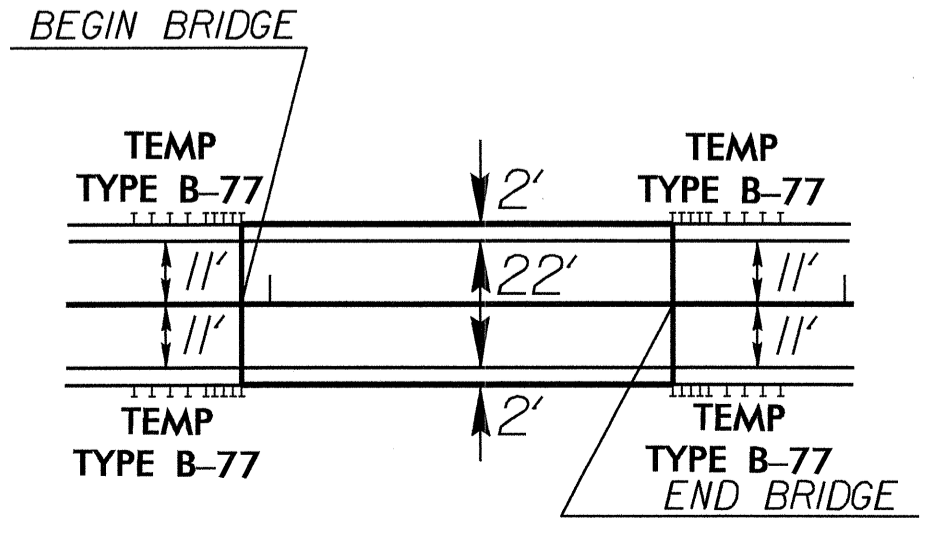
-DRI-	-DRIA-	-L-
PI Sta 10+39.84 Δ = 73° 00' 33.5" (RT) D = 114' 35" 29.6" L = 63.7' T = 37.00' R = 50.00' SE = SEE PLANS	PI Sta 10+40.68 Δ = 78° 15' 49.5" (LT) D = 114' 35" 29.6" L = 68.30' T = 40.68' R = 50.00' SE = SEE PLANS	PI Sta 15+92.42 Δ = 3° 20' 26.7" (LT) D = 0' 33" 03.3" L = 606.40' T = 303.28' R = 10,400.00' SE = .02 RO = 54'
PT Sta 10+68.30 AH = S 31° 33' 43.9" E		
-L- POC Sta. 13+69.70		
-DRIA- POT Sta. 10+74.45		

PI Sta 12+36.06	RI Sta 14+59.81	PI Sta 18+08.72	PI Sta 20+32.70
Δ = 16° 20' 42.4" (LT) D = 6' 52" 41.7" L = 237.63' T = 119.63' R = 833.00' SE = .02 RO = SEE PLANS	Δ = 14° 28' 09.6" (RT) D = 6' 52" 41.7" L = 210.36' T = 105.74' R = 833.00' SE = .02 RO = SEE PLANS	Δ = 14° 39' 36.4" (RT) D = 6' 52" 41.7" L = 213.14' T = 107.15' R = 833.00' SE = .02 RO = SEE PLANS	Δ = 16° 07' 30.3" (LT) D = 6' 52" 41.7" L = 234.44' T = 118.00' R = 833.00' SE = .02 RO = SEE PLANS

TIMOTHY W. TETTERTON  
 DB 1494 PG 852  
 PLAT CAB E SLIDE 98-B

-DR2- END CONSTRUCTION	-DR2-
PT Sta. 12+63.15	PI Sta 10+69.93 Δ = 83° 22' 23.3" (RT) D = 114' 35" 29.6" L = 72.76' T = 44.53' R = 50.00' SE = SEE PLANS
	PI Sta 12+36.67 Δ = 78° 54' 02.7" (LT) D = 114' 35" 29.6" L = 62.75' T = 36.26' R = 50.00' SE = SEE PLANS

SKETCH OF BRIDGE IN RELATIONSHIP TO PAVEMENT



RETAIN A PORTION OF -DET- FROM STA. 14+15.76 TO STA. 15+43.40 FOR -DRI- & -DRIA-

USE THIS SHEET FOR DETOUR CONSTRUCTION ONLY  
 FOR -L- PLAN VIEW SEE SHEET 4  
 FOR -DET- PROFILE SEE SHEET 6

REVISIONS

15-AUG-2011 10:08  
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5/28/11

STRUCTURE HYDRAULIC DATA

DESIGN DISCHARGE	= 3305	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 24.0	FT
BASE DISCHARGE	= 490	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 24.8	FT
OVERTOPPING DISCHARGE	= 2950	CFS
OVERTOPPING FREQUENCY	= 25	YRS
OVERTOPPING ELEVATION	= 23.2	FT

BEGIN GRADE STA. 11+50.00

EL = 24.82'

END GRADE STA. 19+25.00

EL = 24.56'  
BEGIN RESURFACING

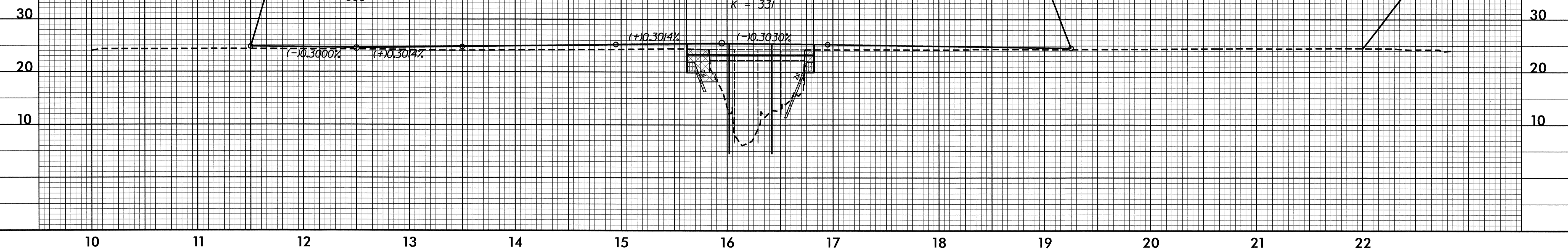
END RESURFACING STA. 22+00.00

BEGIN BRIDGE STA. 15+62.00

END BRIDGE STA. 16+82.00

PI = 12+50.00  
EL = 24.52'  
VC = 200'  
K = 333

PI = 15+95.00  
EL = 25.56'  
VC = 200'  
K = 331



**-DET-**

STRUCTURE HYDRAULIC DATA

DESIGN DISCHARGE	= 1300	CFS
DESIGN FREQUENCY	= 5	YRS
DESIGN HW ELEVATION	= 20	FT
BASE DISCHARGE	= NA	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= NA	FT
OVERTOPPING DISCHARGE	= NA	CFS
OVERTOPPING FREQUENCY	= NA	YRS
OVERTOPPING ELEVATION	= NA	FT

BEGIN GRADE STA. 12+63.84

EL = 23.92'

END GRADE STA. 20+02.87

EL = 24.20'

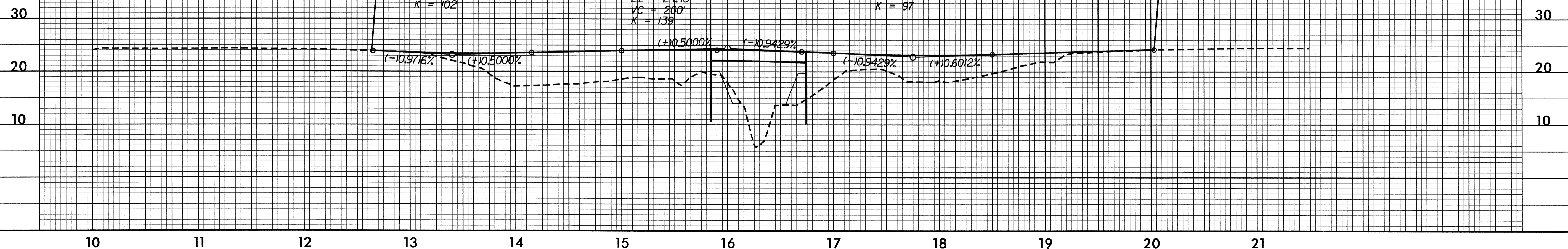
BEGIN BRIDGE STA. 15+84.00

END BRIDGE STA. 16+74.00

PI = 13+40.00  
EL = 23.18'  
VC = 150'  
K = 102

PI = 16+00.00  
EL = 24.48'  
VC = 200'  
K = 159

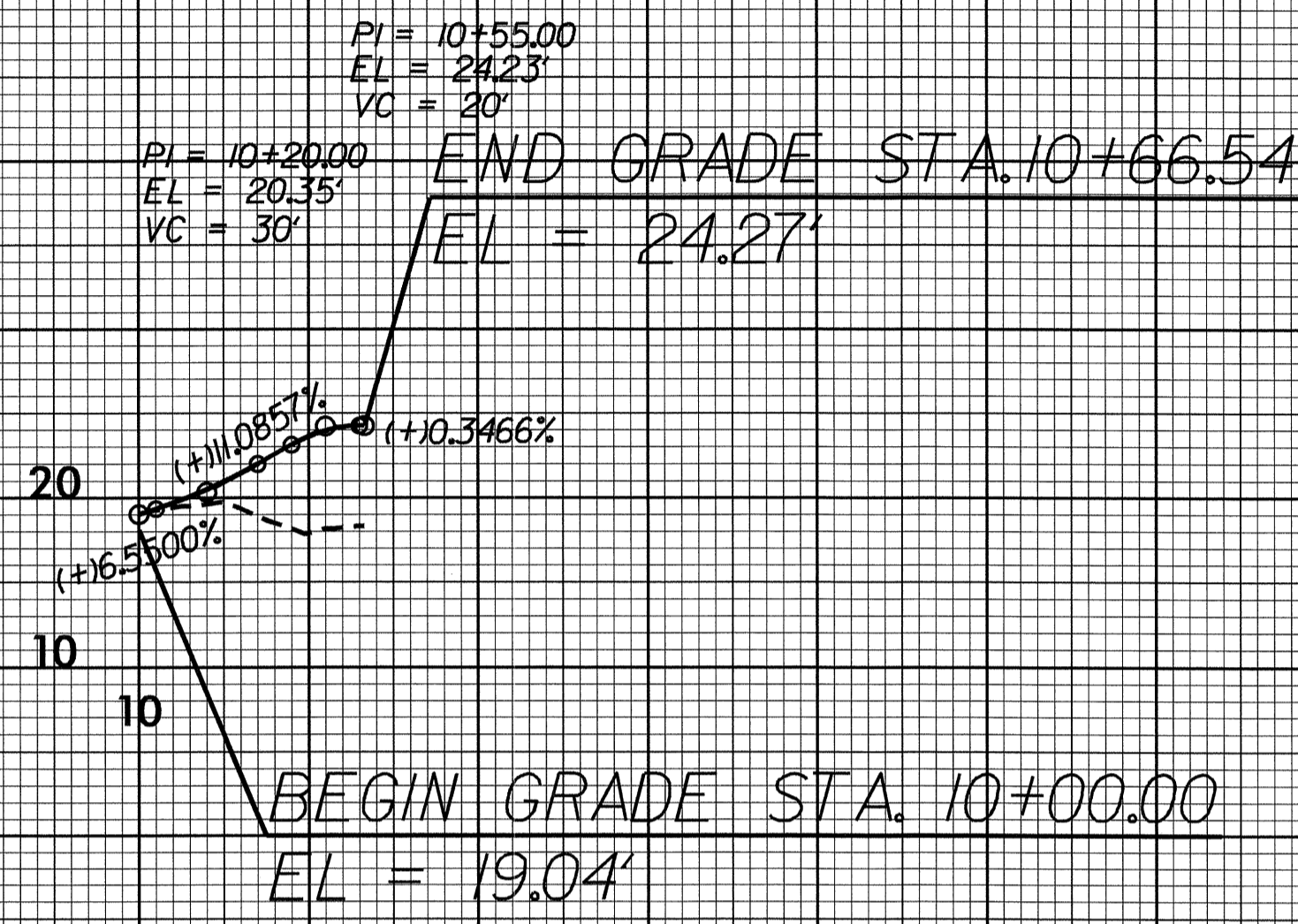
PI = 17+75.00  
EL = 22.83'  
VC = 150'  
K = 97



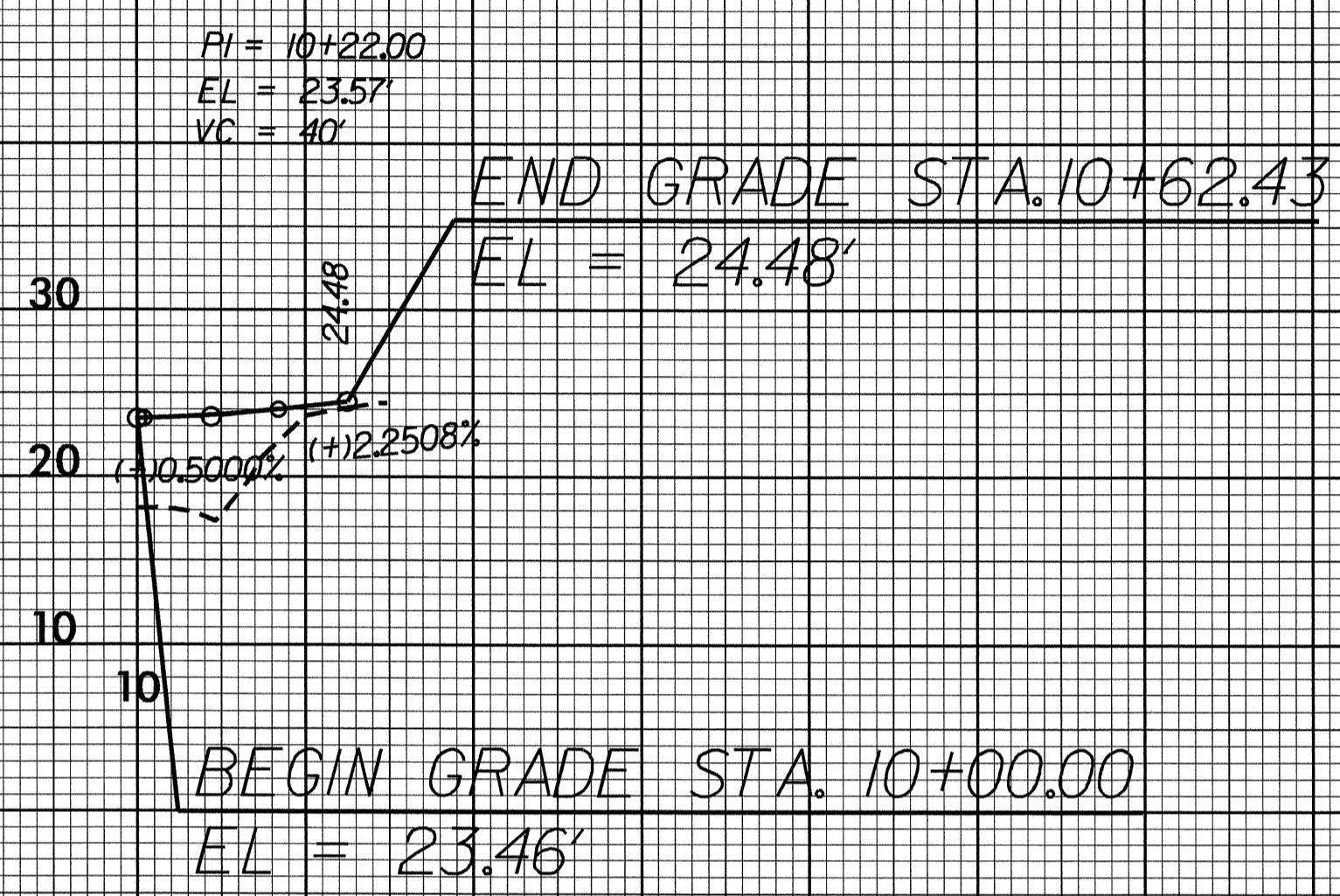
16-AUG-2011 07:36  
C:\p00d\p00\proj\B4415-rdy.p1.dgn



# -DR1-



# -DR1A-



# -DR2-

