

09/08/99

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

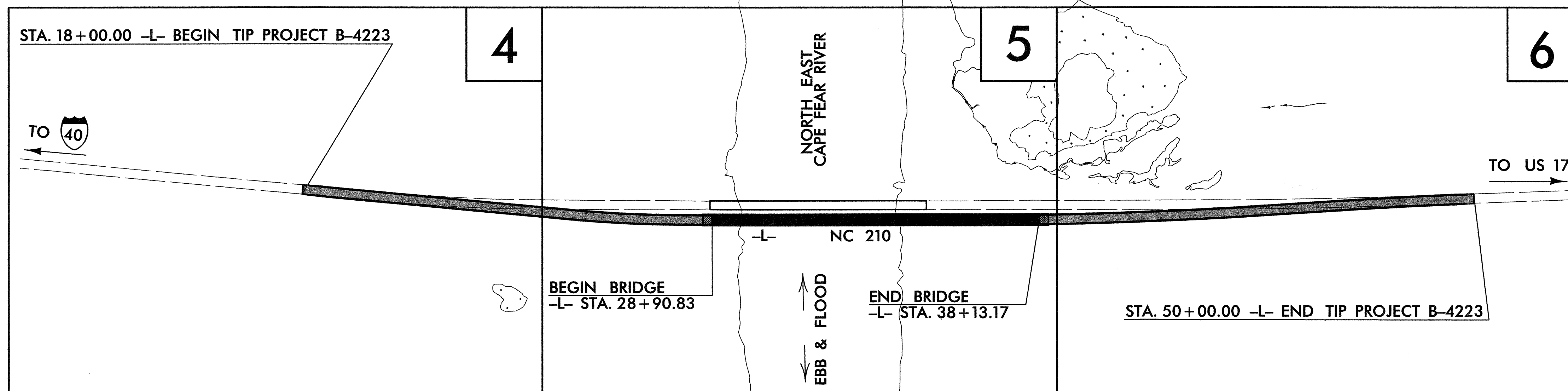
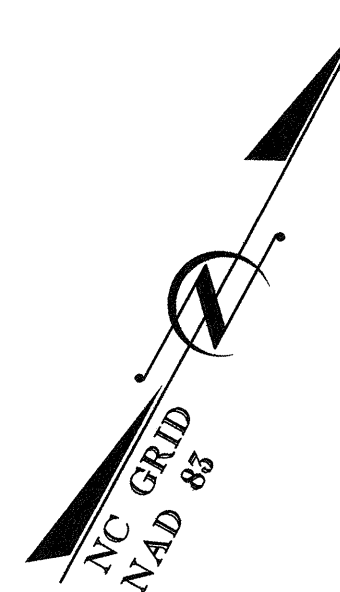
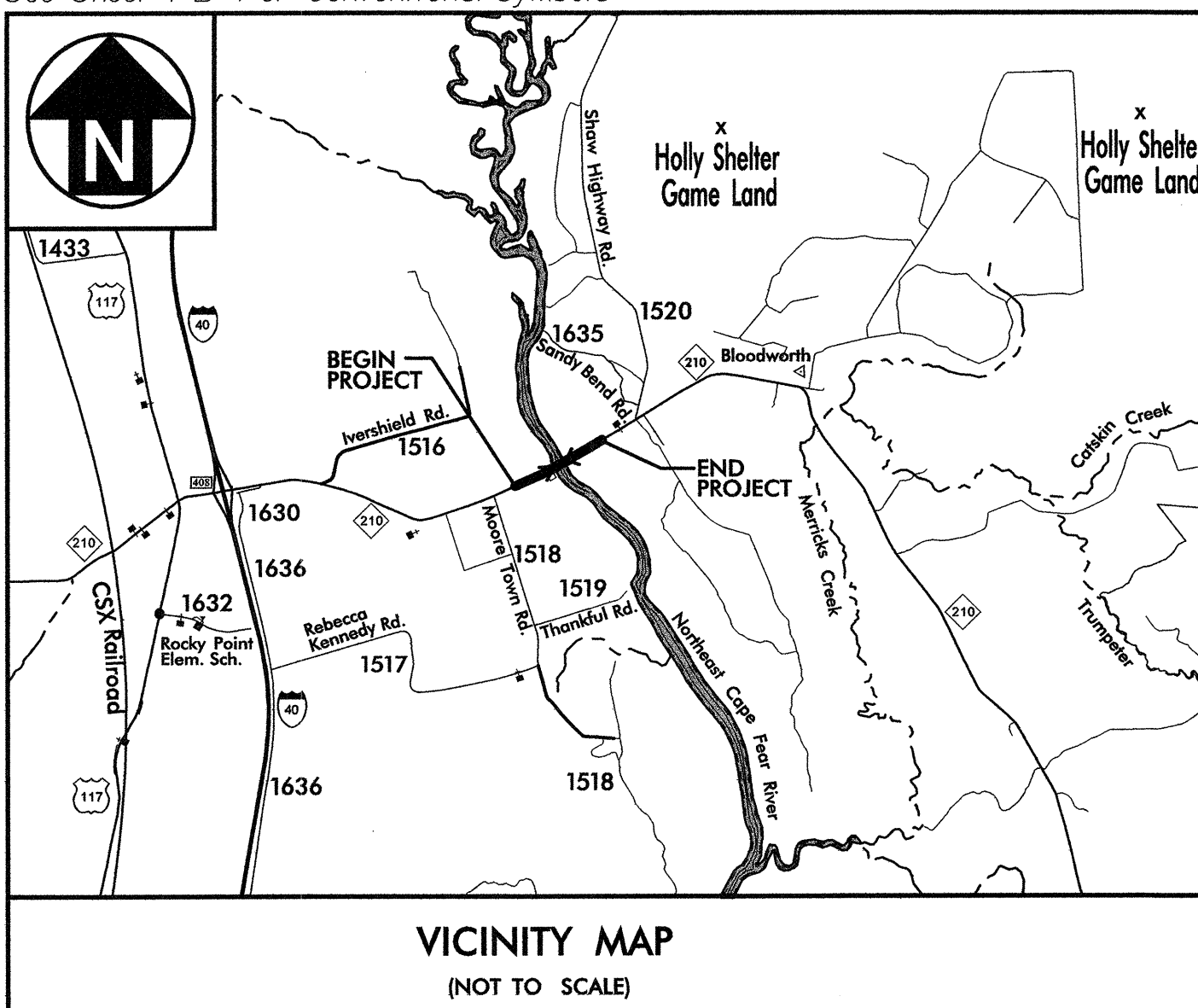
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4223	1	
WBS NO.	F.A. PROJ. NO.	DESCRIPTION	
33567.1.1	BRSTP-0210(4)	P.E.	
33567.2.1	BRSTP-0210(4)	R.O.W., UTIL.	
33567.3.1	BRSTP-0210(4)	CONST.	

**PENDER COUNTY**

LOCATION: BRIDGE NO. 21 ON NC 210 OVER  
NORTHEAST CAPE FEAR RIVER

TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURE

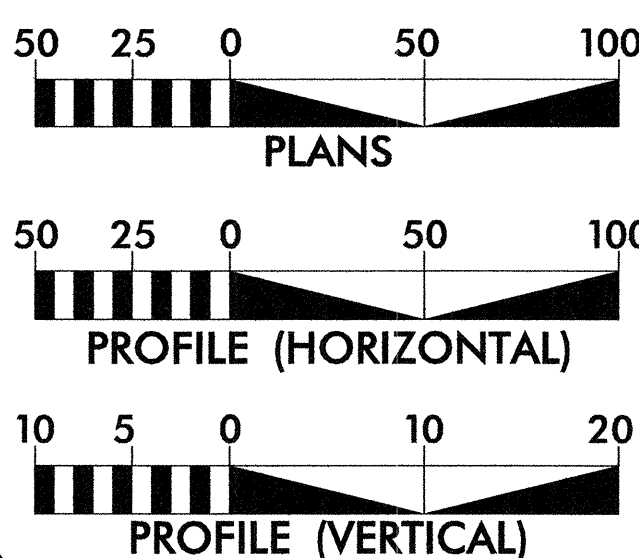


TIP PROJECT: B-4223

CONTRACT: C201483

**MULKEY**  
ENGINEERS & CONSULTANTS  
PO Box 33127  
RALEIGH, N.C. 27636  
(919) 851-1918  
(919) 851-1918 (FAX)  
WWW.MULKEYINC.COM

GRAPHIC SCALES



DESIGN DATA

ADT 2006 = 4,100  
ADT 2026 = 7,600  
DHV = 14 %  
D = 65 %  
T = 10 % \*  
V = 60 MPH  
\* TTST 4% DUAL 6%  
FUNC CLASS = MAJOR RURAL COLLECTOR

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4223 = 0.431 MILES  
LENGTH STRUCTURE TIP PROJECT B-4223 = 0.175 MILES  
TOTAL LENGTH STATE TIP PROJECT B-4223 = 0.606 MILES

Prepared in the Office of:  
**MULKEY**  
ENGINEERS & CONSULTANTS

FOR THE NORTH CAROLINA DEPT. OF TRANSPORTATION

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:  
APRIL 15, 2005

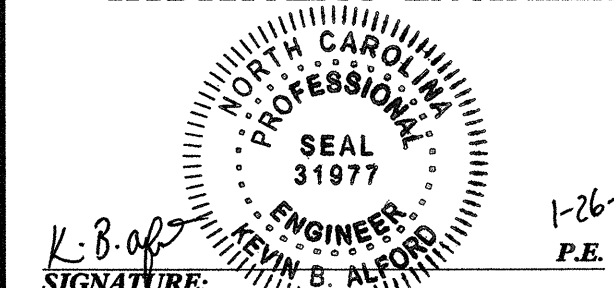
LETTING DATE:  
MAY 15, 2007

NCDOT CONTACT: CATHY HOUSER, PE

TIM JORDAN, PE  
MULKEY E & C  
PROJECT MANAGER

KEVIN ALFORD, PE  
MULKEY E & C  
HYDRAULICS ENGINEER

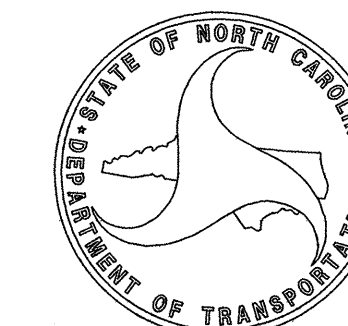
HYDRAULICS ENGINEER



ROADWAY DESIGN ENGINEER



DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA



*cut miller* P.E.  
STATE HIGHWAY DESIGN ENGINEER

1/24/2007  
F:\Roadway\Proj\B4223\_rdy\_tsh.dgn  
7:43:49 PM

PROJECT REFERENCE NO. B-4223	SHEET NO. 1-A
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

# INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARDS

EFF. 07-18-06

Sheet #	Description
1	Title Sheet
1-A	Index of Sheets, General Notes, and List of Standards
1-B	Conventional Symbols
1-C	Survey Control Sheet
2	Pavement Schedule, Wedging Detail, and Typical Sections
2-A	Typical Sections
2-B	Temporary Shoring Detail
2-C	Temporary Anchor Unit Type W-Beam Detail
2-D	DETAIL OF ANCHORAGE FOR FRAME
3	Summary of Quantities
3-A	List of Pipe, Endwalls, Etc. (For Pipes 48" & Under)
3-B	Guardrail Summary, Summary of Earthwork in Cubic Yards, Summary of Pavement Removal
3-C	Parcel Index Sheet
4 thru 6	Plan
7 thru 8	Profile
TCP-1 thru TCP-8	Traffic Control Plans
PM-1 thru PM-4	Pavement Marking Plans
EC-1 thru EC-9	Erosion Control Plans
RF-1 thru RF-2	Re-Forestation Plans
SIGN-1 thru SIGN-3	Signing Plans
UC-1 thru UC-7	Utility Construction Plans
UO-1 thru UO-4	Utilities by Others Plans
X-1	Cross-Section Summary Sheet
X-2 thru X-12	Cross-Sections
S-1 thru S-64	Structure Plans

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

**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 NOT SHOWN ON THE PLANS WILL BE PAID FOR AT THE CONTRACT PRICE FOR "TEMPORARY SHORING" OR "TEMPORARY SHORING-BARRIER SUPPORTED" DEPENDING UPON THE LOCATION OF THE SHORING.

**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 FOUR COUNTY ELECTRIC MEMBERSHIP CO., STAR TELEPHONE MEMBERSHIP CO., PROGRESS ENERGY.  
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 STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch -N. C. Department of Transportation - Raleigh, N. C., Dated July 18, 2006 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
<b>DIVISION 2 - EARTHWORK</b>	
200.03	Method of Clearing - Method III
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
<b>DIVISION 3 - PIPE CULVERTS</b>	
300.01	Method of Pipe Installation - Method 'A'
310.10	Driveway Pipe Construction
<b>DIVISION 4 - MAJOR STRUCTURES</b>	
422.10	Reinforced Bridge Approach Fills
<b>DIVISION 5 - SUBGRADE, BASES AND SHOULDERS</b>	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
<b>DIVISION 6 - ASPHALT BASES AND PAVEMENTS</b>	
654.01	Pavement Repairs
<b>DIVISION 8 - INCIDENTALS</b>	
815.03	Pipe Underdrain and Blind Drain
840.00	Concrete Base Pad for Drainage Structures
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.25	Anchorage for Frames - Brick or Concrete
840.27	Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.29	Frames and Narrow Slot Flat Grates
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
840.72	Pipe Collar
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
866.02	Woven Wire Fence - with Wood Post
876.02	Guide for Rip Rap at Pipe Outlets

2/9/2007 10:50 AM C:\pwork\2006\NT\006\_B-4223\_Design\Roadway\Proj\N4223\_06\_18h.dgn

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**MULKEY**  
ENGINEERS & CONSULTANTS  
PO Box 38127  
RALEIGH, N.C. 27636  
(919) 851-1912  
(919) 851-1913 (FAX)  
WWW.MULKEYINC.COM

PROJECT REFERENCE NO. B-4223	SHEET NO. 1-B
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

# CONVENTIONAL PLAN SHEET SYMBOLS

\*S.U.E. = *Subsurface Utility Engineering*

## BOUNDARIES AND PROPERTY:

State Line	—————
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Existing Iron Pin	○ EP
Property Corner	-----x
Property Monument	□ ECM
Parcel/Sequence Number	123
Existing Fence Line	x-x-x-x-x
Proposed Woven Wire Fence	○
Proposed Chain Link Fence	□
Proposed Barbed Wire Fence	◇
Existing Wetland Boundary	-WLB-
Proposed Wetland Boundary	-WLB-
Existing High Quality Wetland Boundary	-HQ WLB-
Existing Endangered Animal Boundary	-EAB-
Existing Endangered Plant Boundary	-EPB-

## BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or U/G 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	□
River Basin Buffer	-RBB-
Flow Arrow	←
Disappearing Stream	→
Spring	○
Swamp Marsh	⚡
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	———R/W———
Proposed Right of Way Line with Iron Pin and Cap Marker	———R/W———▲
Proposed Right of Way Line with Concrete or Granite Marker	———R/W———▲
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	-PUJ-

## 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
Curb Cut for Future Wheel Chair Ramp	CCFR
Existing Metal Guardrail	—T—T—T—
Proposed Guardrail	—T—T—T—
Existing Cable Guiderail	—□—□—□—
Proposed Cable Guiderail	—□—□—□—
Equaility 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	⊗
U/G Power Cable Hand Hole	□
H-Frame Pole	●
Recorded U/G Power Line	——— P
Designated U/G Power Line (S.U.E.*)	----- P

## TELEPHONE:

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

## WATER:

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

## TV:

TV Satellite Dish	⊕
TV Pedestal	□
TV Tower	⊗
U/G TV Cable Hand Hole	□
Recorded U/G TV Cable	——— TV
Designated U/G TV Cable (S.U.E.*)	----- TV
Recorded U/G Fiber Optic Cable	——— TV FO
Designated U/G Fiber Optic Cable (S.U.E.*)	----- TV FO

## GAS:

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

## SANITARY SEWER:

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

## MISCELLANEOUS:

Utility Pole	●
Utility Pole with Base	□
Utility Located Object	○
Utility Traffic Signal Box	⊕
Utility Unknown U/G Line	——— 2UTL
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.

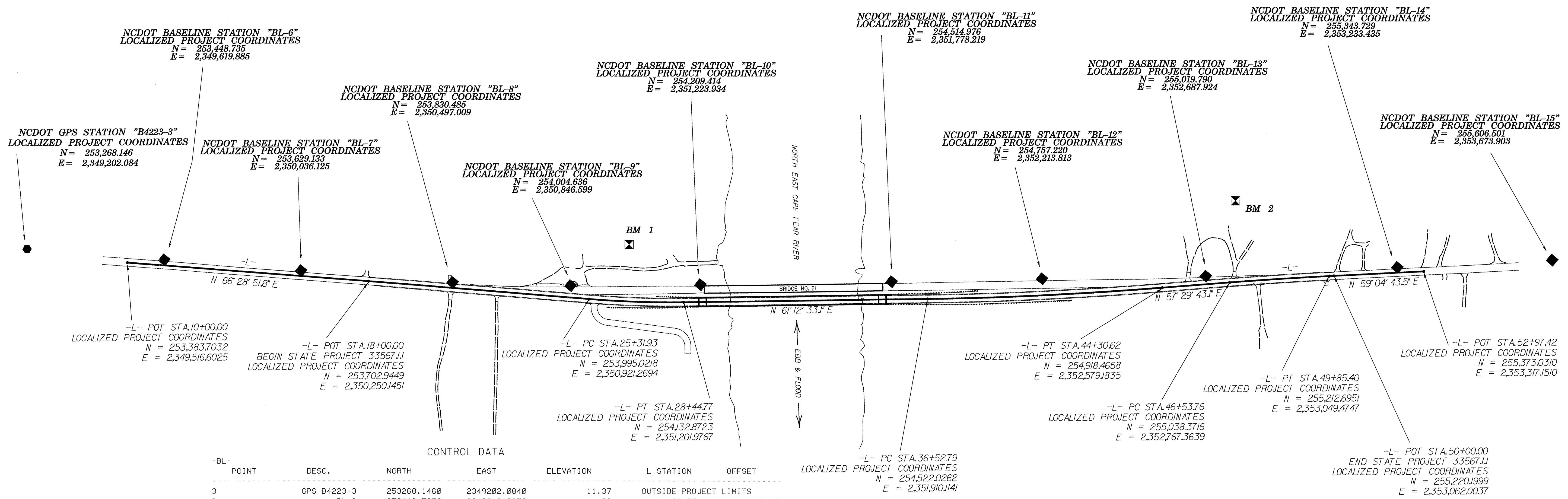
# SURVEY CONTROL SHEET

PROJECT REFERENCE NO.	SHEET NO.
B-4223	1-C
Location and Surveys	



NCDOT GPS STATION "B4223-4"  
LOCALIZED PROJECT COORDINATES  
N = 255,780.022  
E = 2,354,029.385

NCDOT GPS STATION "B4223-5"  
LOCALIZED PROJECT COORDINATES  
N = 256,349.022  
E = 2,354,980.547



CONTROL DATA

-BL-	POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
	3	GPS B4223-3	253268.1460	2349202.0840	11.37	OUTSIDE PROJECT LIMITS	
	6	BL-6	253448.7350	2349619.8850	11.68	11+20.65	18.41 LT
	7	BL-7	253629.1330	2350036.1250	11.27	15+74.30	17.72 LT
	8	BL-8	253830.4850	2350497.0090	9.28	20+77.25	18.43 LT
	9	BL-9	254004.6360	2350846.5990	11.37	24+67.30	38.61 LT
	10	BL-10	254209.4140	2351223.9340	22.99	29+00.87	56.50 LT
	11	BL-11	254514.9760	2351778.2190	22.63	35+33.80	57.34 LT
	12	BL-12	254757.2200	2352213.8130	8.24	40+33.99	53.83 LT
	13	BL-13	255019.7900	2352687.9240	6.82	45+76.78	27.02 LT
	14	BL-14	255343.7290	2353233.4350	14.33	52+10.54	17.88 LT
	15	BL-15	255606.5010	2353673.9030	12.68	OUTSIDE PROJECT LIMITS	

NCDOT GPS STATION "B4223-2"  
LOCALIZED PROJECT COORDINATES  
N = 252,133.472  
E = 2,349,565.347

### DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B-4223-3"  
WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF  
NORTHING: 253268.146(ft) EASTING: 2349202.084(ft)  
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999973219  
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B-4223-3" TO L- STATION 18+00.00 IS  
N 67° 28' 06" E 1,134.67 ft.  
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES  
VERTICAL DATUM USED IS NAVD 88

```

*****
BM1 ELEVATION = 7.54
N 254216 E 2350954
L STATION 26+57 187 LEFT
RAILROAD SPIKE SET IN 18" OAK
*****
BM2 ELEVATION = 7.26
N 255286 E 2352658
L STATION 46+94 268 LEFT
RAILROAD SPIKE SET IN 15" GUM
*****
    
```

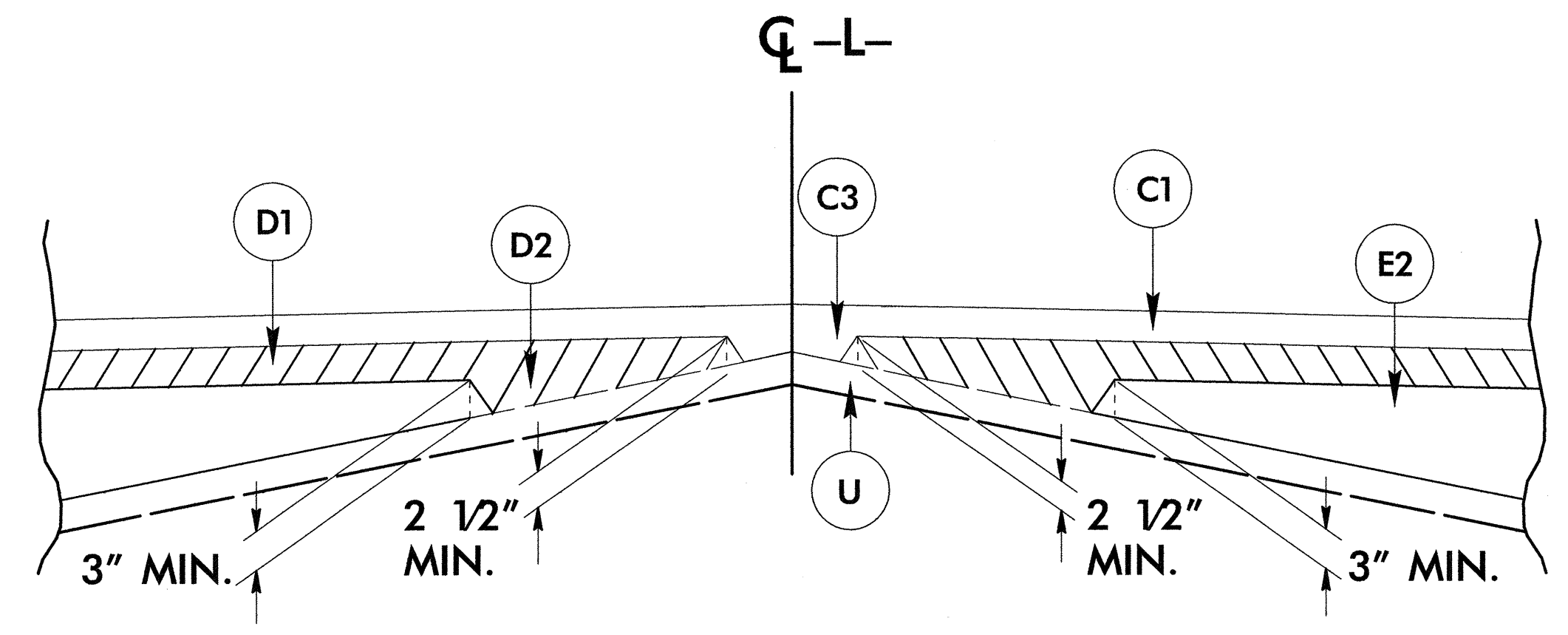
### NOTES:

THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:  
[HTTP://WWW.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT](http://www.doh.dot.state.nc.us/preconstruct/highway/location/project)  
FILE NAME: b4223\_ls\_control\_050114.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 EXISTING HARN MONUMENTS NAD 83/95  
BY THE NCDOT LOCATION AND SURVEYS UNIT.  
NOTE: DRAWING NOT TO SCALE

6/2/09 1/24/2007 1:44:35 PM R:\Roadway\Info\B4223-Cor-Final.dwg

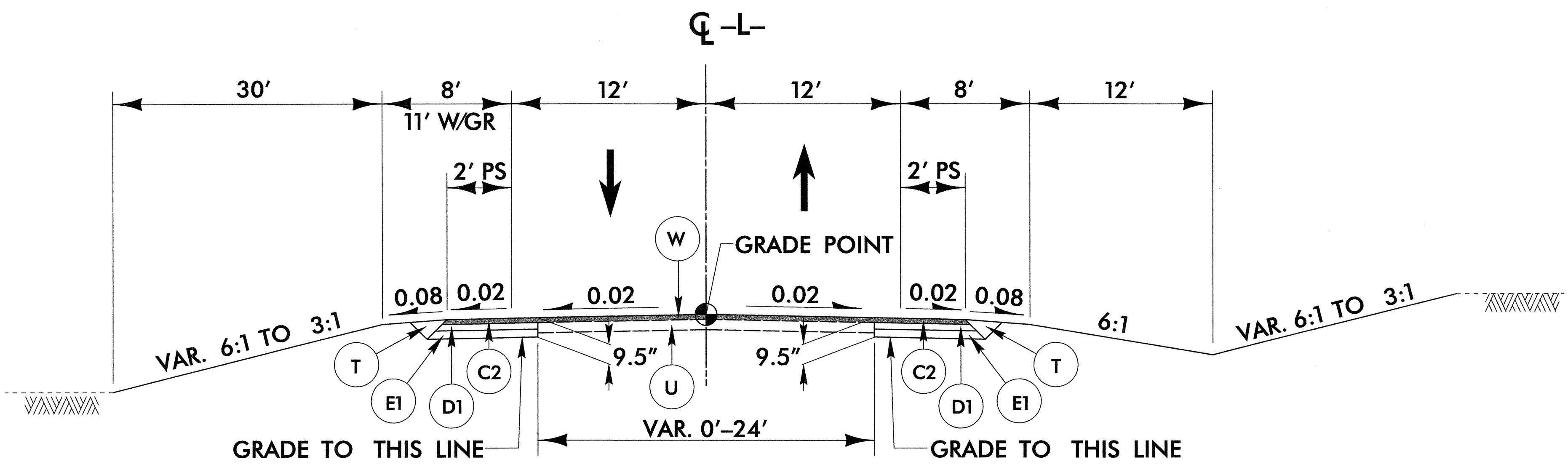
PAVEMENT SCHEDULE	
C1	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S 9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S 9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S 9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.
D1	PROP. APPROX. 2½" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 2½" IN DEPTH OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 4" 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 5½" IN DEPTH.
J1	6" AGGREGATE BASE COURSE
J2	8" AGGREGATE BASE COURSE
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	WEDGING (SEE WEDGING DETAIL)

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



**DETAIL SHOWING METHOD OF WEDGING**

USE IN CONJUNCTION WITH TYPICAL SECTION NO. 1



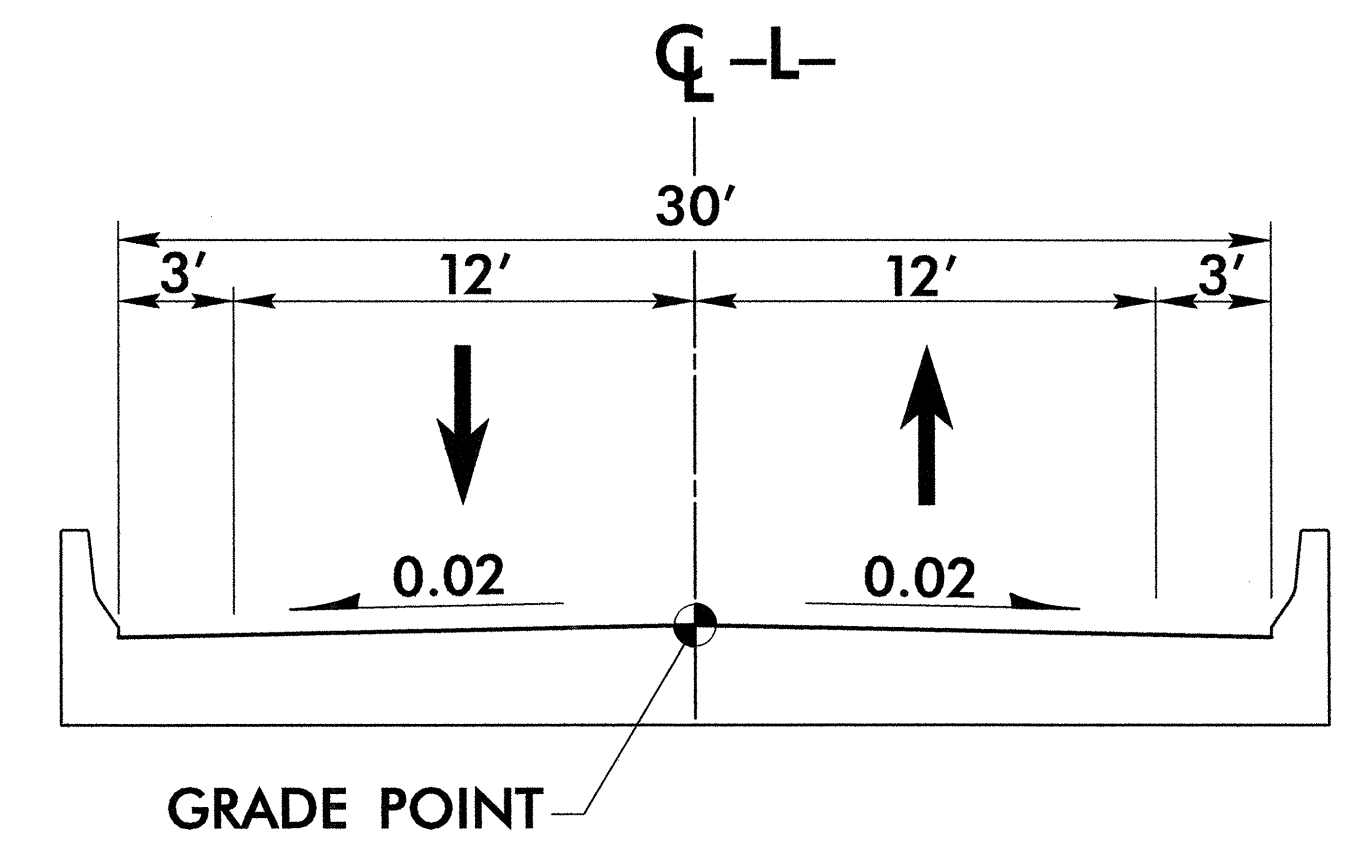
**TYPICAL SECTION NO. 1**

USE TYPICAL SECTION NO. 1  
AT THE FOLLOWING LOCATIONS

TRANSITION FROM EXISTING TO T.S. NO. 1 FROM  
-L- STA. 18+00.00 TO STA. 18+50.00

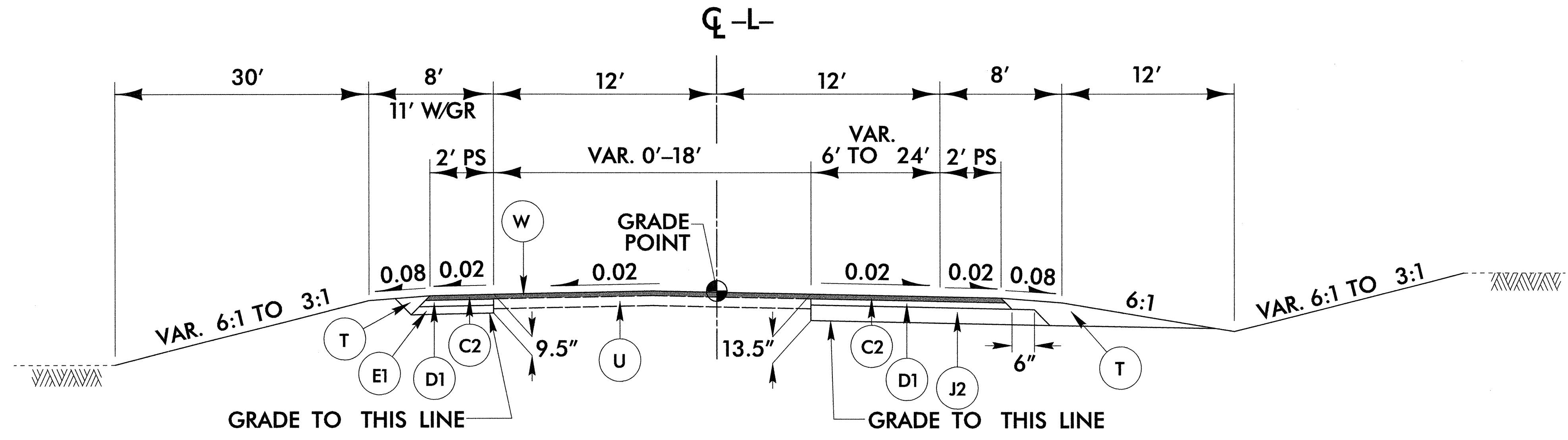
-L- STA. 18+50.00 TO STA. 22+75.00  
-L- STA. 46+75.00 TO STA. 49+50.00

TRANSITION FROM T.S. NO. 1 TO EXISTING FROM  
-L- STA. 49+50.00 TO STA. 50+00.00



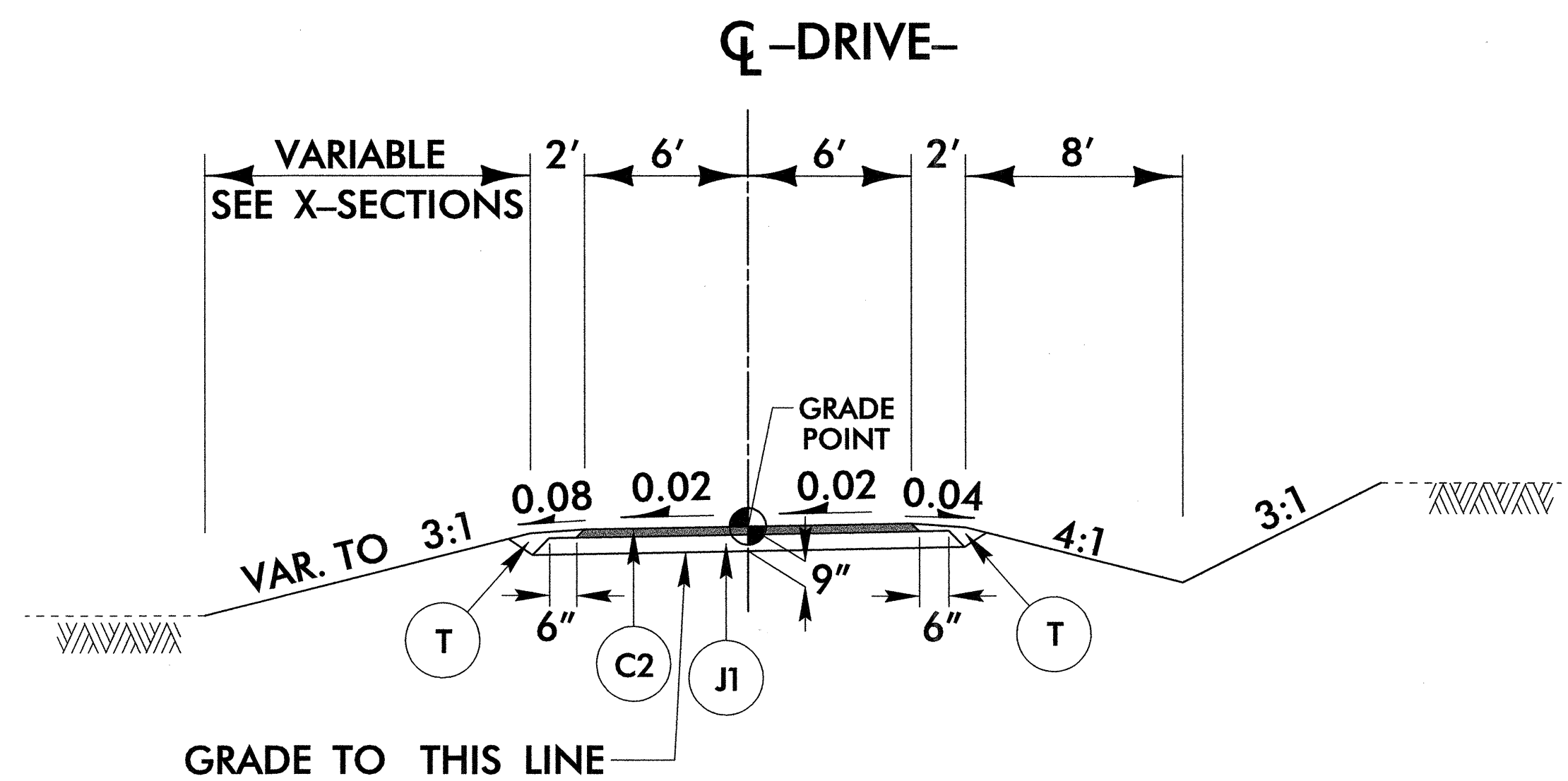
**DETAIL OF BRIDGE**

-L- STA 28+90.83 TO STA 38+13.17



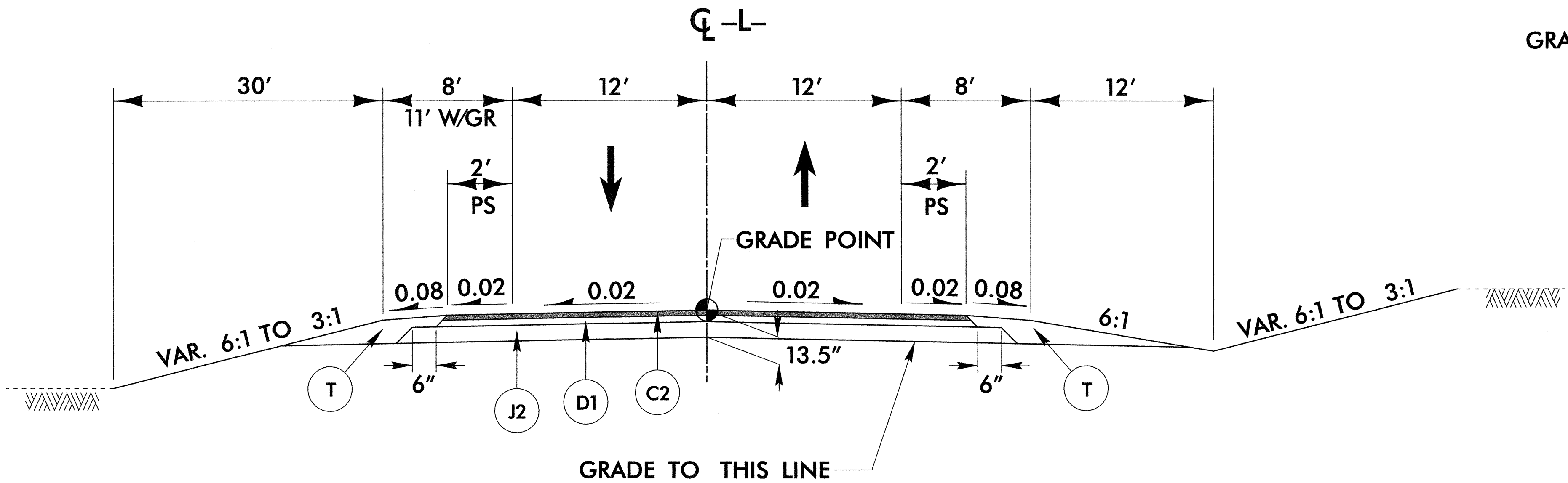
**TYPICAL SECTION NO. 2**

USE TYPICAL SECTION NO. 2  
AT THE FOLLOWING LOCATIONS  
-L- STA. 22+75.00 TO STA. 25+25.00  
-L- STA. 43+25.00 TO STA. 46+75.00



**TYPICAL SECTION NO. 3**

USE TYPICAL SECTION NO. 3  
AT THE FOLLOWING LOCATIONS  
-DRIVE- STA. 10+12.00 TO STA. 12+00.00



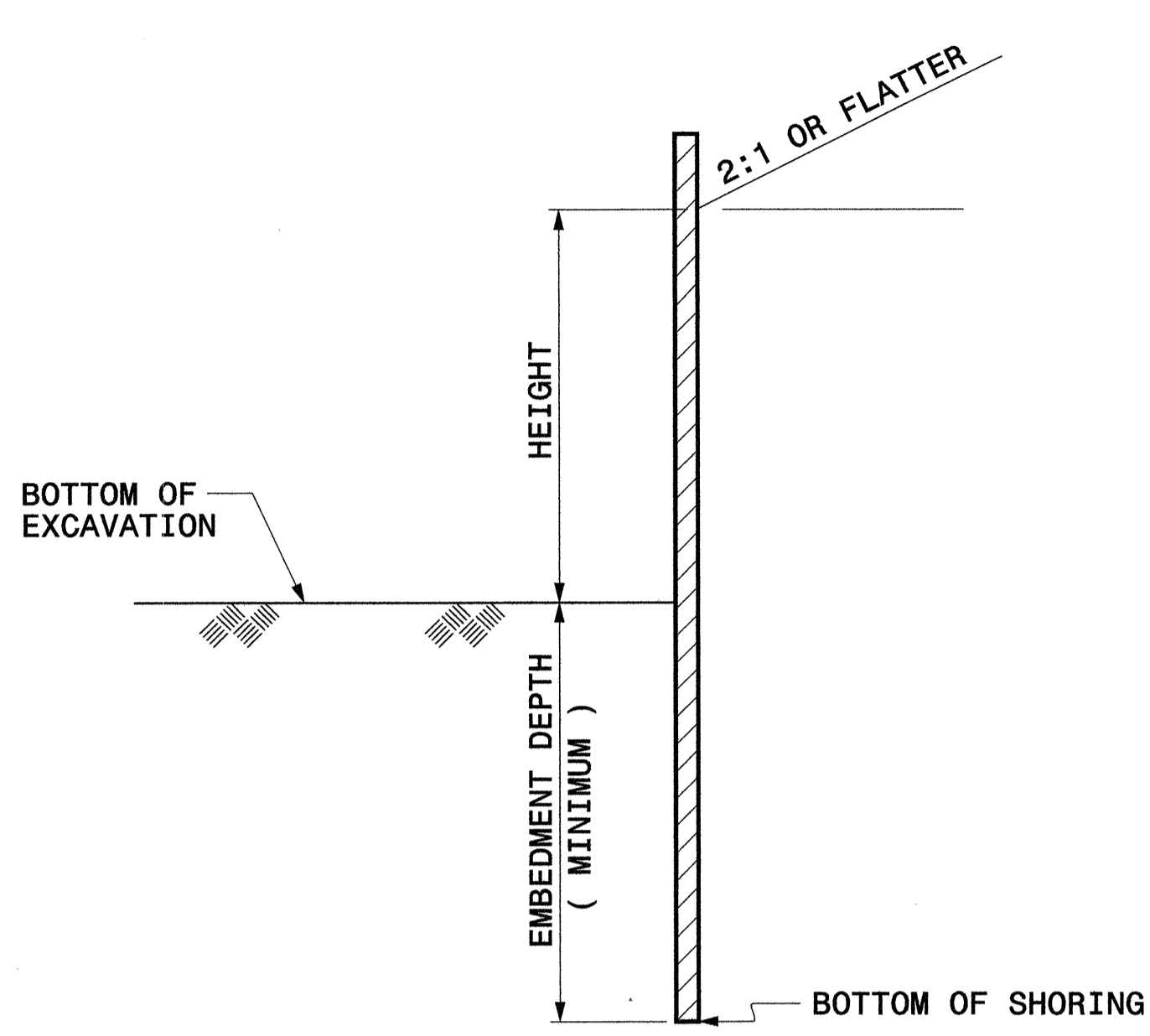
**TYPICAL SECTION NO. 3**

USE TYPICAL SECTION NO. 3  
AT THE FOLLOWING LOCATIONS  
-L- STA. 25+25.00 TO STA. 28+90.83 (BEGIN BRIDGE)  
-L- STA. 38+13.17 (END BRIDGE) TO STA. 43+25.00

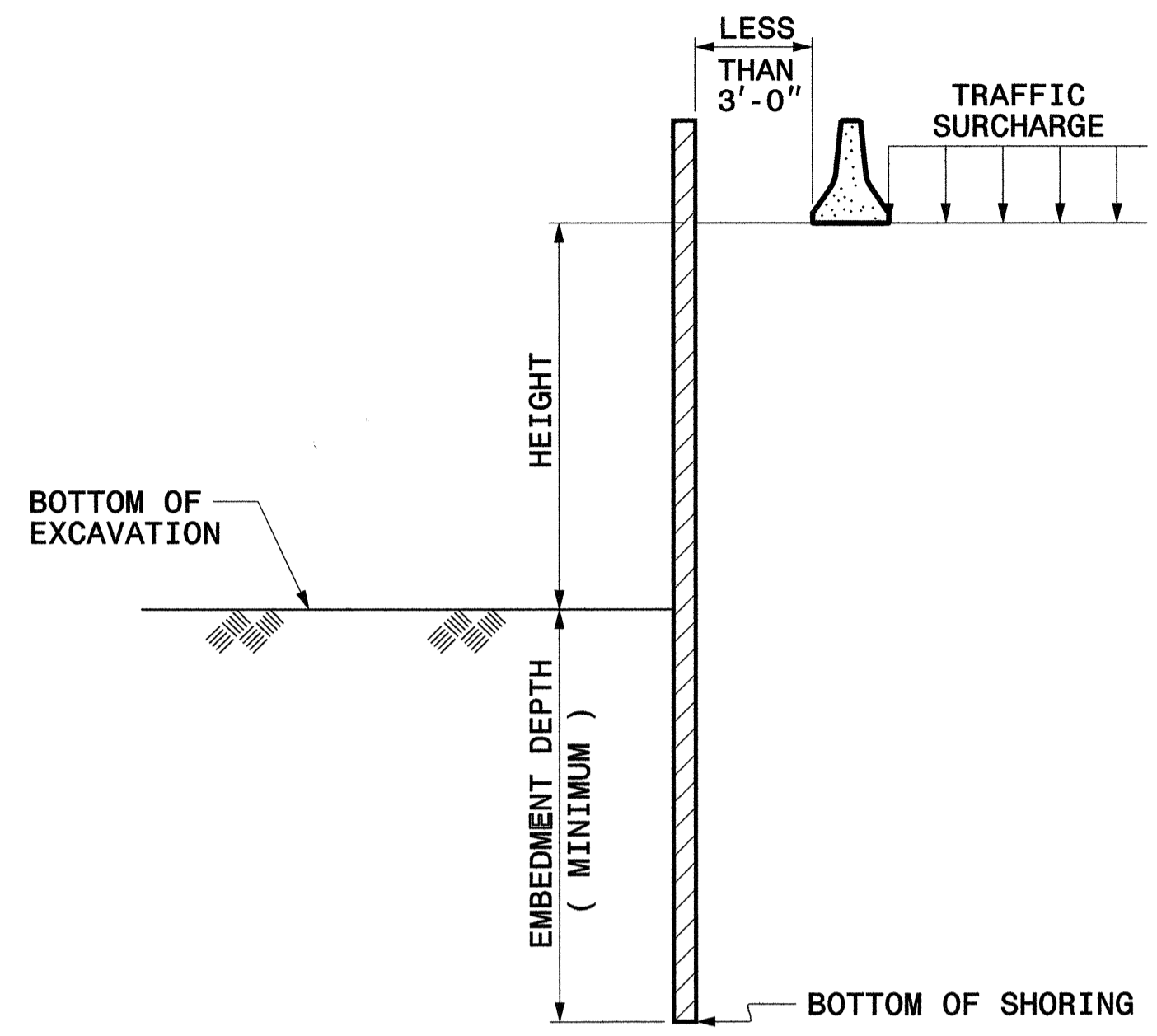
PAVEMENT SCHEDULE	
C2	3" ASPHALT CONCRETE SURFACE COURSE, TYPE S 9.5B
D1	2 1/2" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B
E1	4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B
J1	6" AGGREGATE BASE COURSE
J2	6" AGGREGATE BASE COURSE
T	EARTH MATERIAL

NOTE: ALL PAVEMENT EDGE SLOPES ARE W UNLESS OTHERWISE SHOWN.

5/14/99



**TEMPORARY SHORING**  
(SLOPING OR LEVEL WITH TRAFFIC SURCHARGE, NO BARRIER IMPACT)



**TEMPORARY SHORING - BARRIER SUPPORTED**  
(LEVEL WITH TRAFFIC SURCHARGE, WITH BARRIER IMPACT)

**NOTES**

FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE SPECIAL PROVISIONS.

SELECT THE APPROPRIATE STANDARD SHORING DESIGN FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC IN LIEU OF SUBMITTING CONTRACTOR SHORING DESIGN. USE STANDARD SHORING DESIGN ONLY WHEN ALL OF THE FOLLOWING CRITERIA ARE MET:

- MAXIMUM HEIGHT OF SHORING EXCAVATION IS 11 FEET
- GROUNDWATER TABLE IS NOT ABOVE BOTTOM OF THE EXCAVATION
- BACKFILL SLOPE IS 2:1 OR FLATTER
- TRAFFIC SURCHARGE EQUAL TO 240 PSF
- SOLDIER PILE SPACING OF 6 FEET
- TIMBER LAGGING SHALL HAVE A MINIMUM THICKNESS OF 3 INCHES

SUBMIT "STANDARD SHORING SELECTION" FORM TO ENGINEER PRIOR TO CONSTRUCTION OF SHORING.

DO NOT USE THE STANDARD SHORING DESIGNS WHEN VERY SOFT SOIL OR MUCK IS PRESENT WITHIN THE SHORING EMBEDMENT ZONE.

CONTRACTOR MUST VERIFY LOCATION OF GROUNDWATER TABLE PRIOR TO CONSTRUCTION OF SHORING.

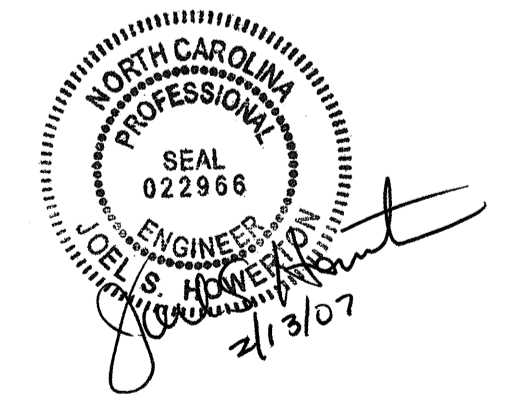
THE CONTRACTOR HAS THE OPTION OF USING SOLDIER PILES SET IN DRILLED HOLES WITH A SHORTENED LENGTH EQUAL TO 75% OF THE EMBEDMENT DEPTHS SHOWN IN THE TABLE. FOR DRILLING REQUIREMENTS, SEE TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC SPECIAL PROVISION.

IF DESIGN EMBEDMENT DEPTH IS NOT ACHIEVED, THEN NOTIFY THE ENGINEER IMMEDIATELY.

**GROUNDWATER TABLE CONDITIONS**

- 1) WHEN WATER TABLE IS ABOVE THE BOTTOM OF EXCAVATION, SUBMIT CONTRACTOR SHORING DESIGN TO THE ENGINEER FOR APPROVAL.
- 2) WHEN WATER TABLE IS BELOW THE BOTTOM OF EXCAVATION AND ABOVE THE BOTTOM OF SHORING, USE "WATER TABLE" CASE.
- 3) WHEN WATER TABLE IS BELOW BOTTOM OF SHORING, USE "NO WATER TABLE" CASE.

CASE	HEIGHT (FT)	TEMPORARY SHORING					TEMPORARY SHORING - BARRIER SUPPORTED				
		CANTILEVER SHEETING		DRIVEN SOLDIER PILE			CANTILEVER SHEETING		DRIVEN SOLDIER PILE		
		MINIMUM EMBEDMENT DEPTH (FT)	MINIMUM SECTION MODULUS (IN <sup>3</sup> / FT OF WALL)	MINIMUM EMBEDMENT DEPTH (FT)			MINIMUM EMBEDMENT DEPTH (FT)	MINIMUM SECTION MODULUS (IN <sup>3</sup> / FT OF WALL)	MINIMUM EMBEDMENT DEPTH (FT)		
		HP 10x42	HP 12x53	HP 14x73			HP 10x42	HP 12x53	HP 14x73		
"NO WATER TABLE"	< 6	7.5	3.0	8.0	8.0	8.0	11.0	10.0	9.5	9.5	9.5
	7	8.5	4.5	9.5	9.5	9.5	12.0	12.0	10.5	10.5	10.5
	8	10.0	6.5	10.5	10.5	10.5	12.5	14.0	11.5	11.5	11.5
	9	11.0	9.5	--	12.0	12.0	13.5	16.5	--	12.5	12.5
	10	12.5	13.0	--	--	13.5	14.0	19.5	--	13.5	13.5
	11	13.5	17.0	--	--	14.5	15.0	22.5	--	--	14.5
"WATER TABLE"	< 6	11.5	4.5	11.5	11.5	11.5	16.0	12.0	13.0	13.0	13.0
	7	13.0	7.0	13.0	13.0	13.0	17.0	14.5	14.5	14.5	14.5
	8	15.0	10.0	--	15.0	15.0	18.0	17.0	--	15.5	15.5
	9	17.0	14.0	--	17.0	17.0	19.0	20.0	--	17.0	17.0
	10	18.5	19.5	--	--	18.5	20.0	23.5	--	--	18.5
	11	20.5	26.0	--	--	--	21.0	28.0	--	--	20.0

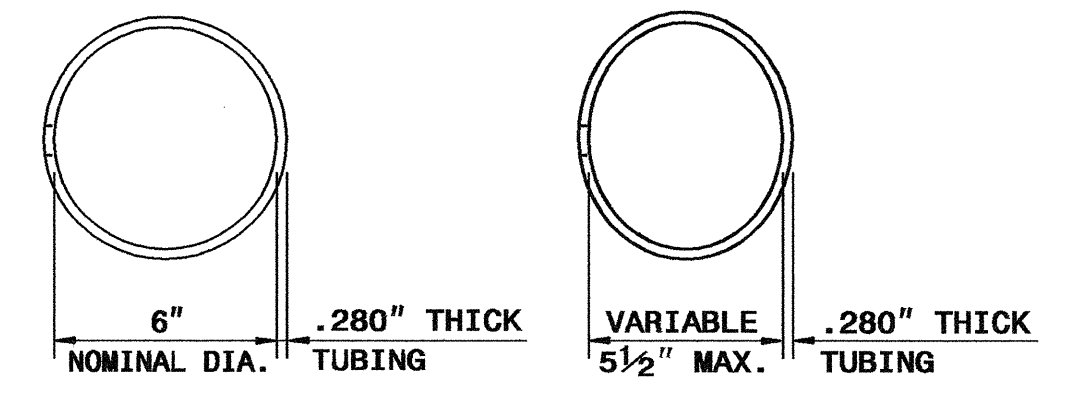
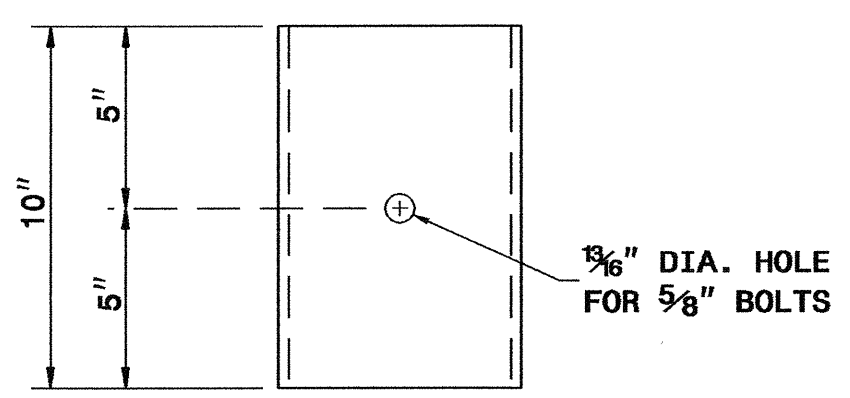
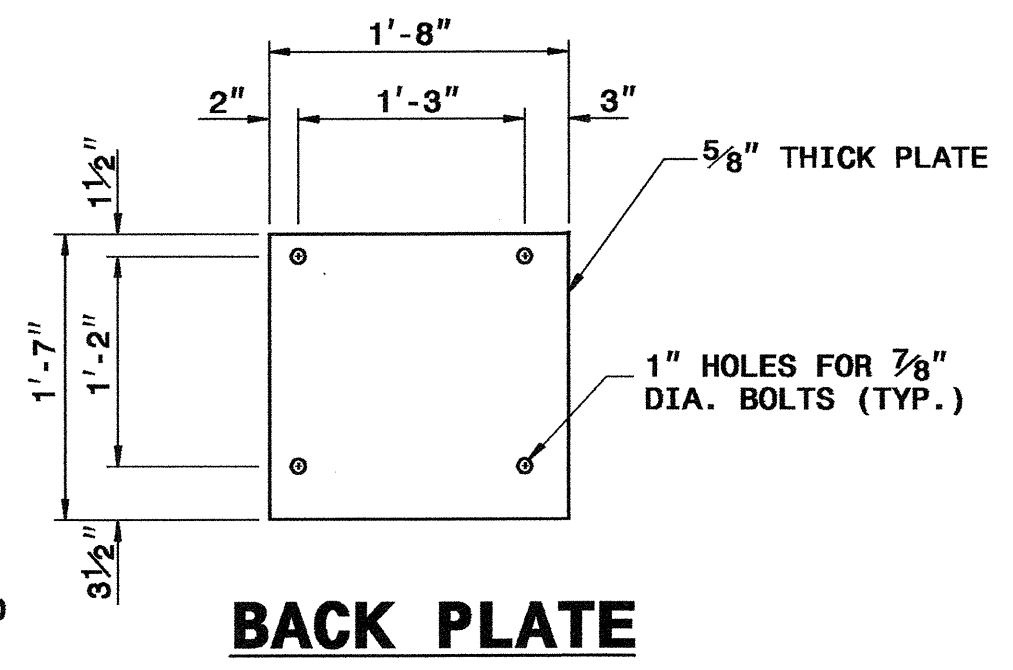
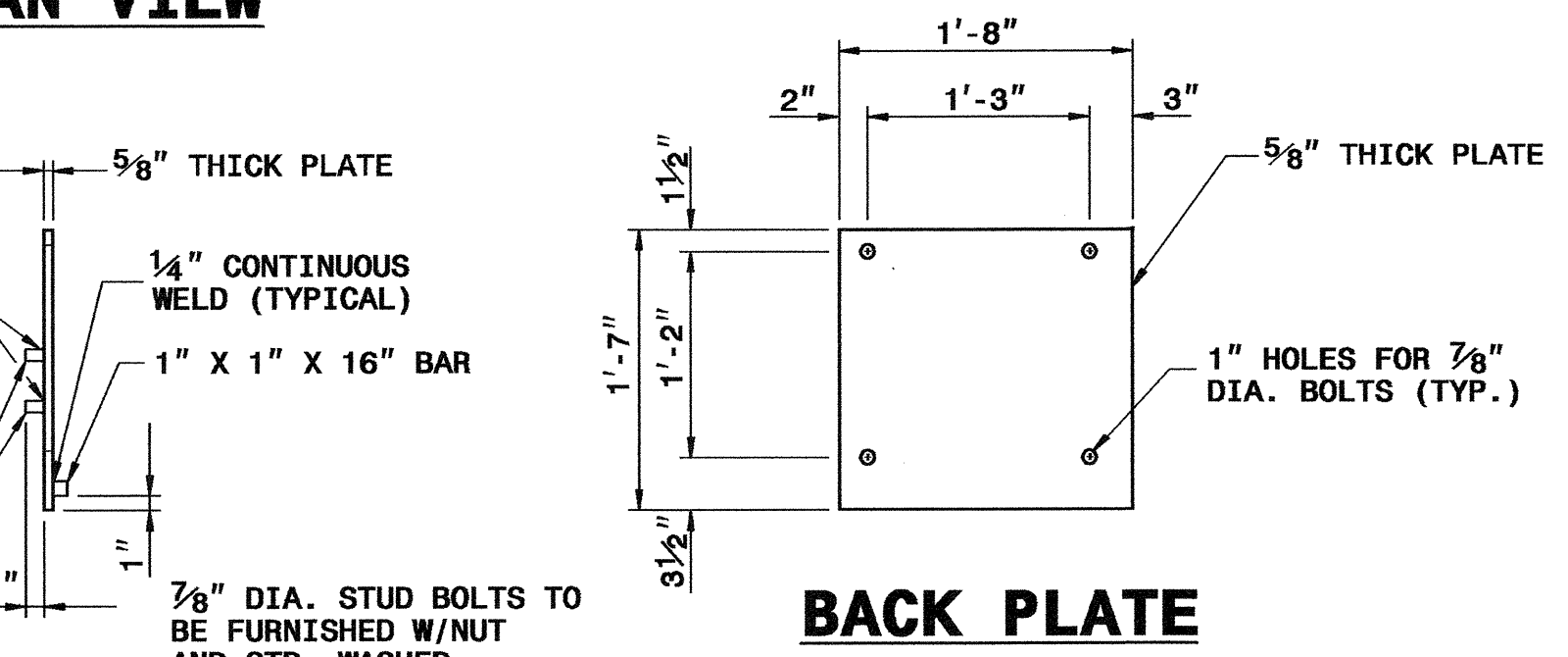
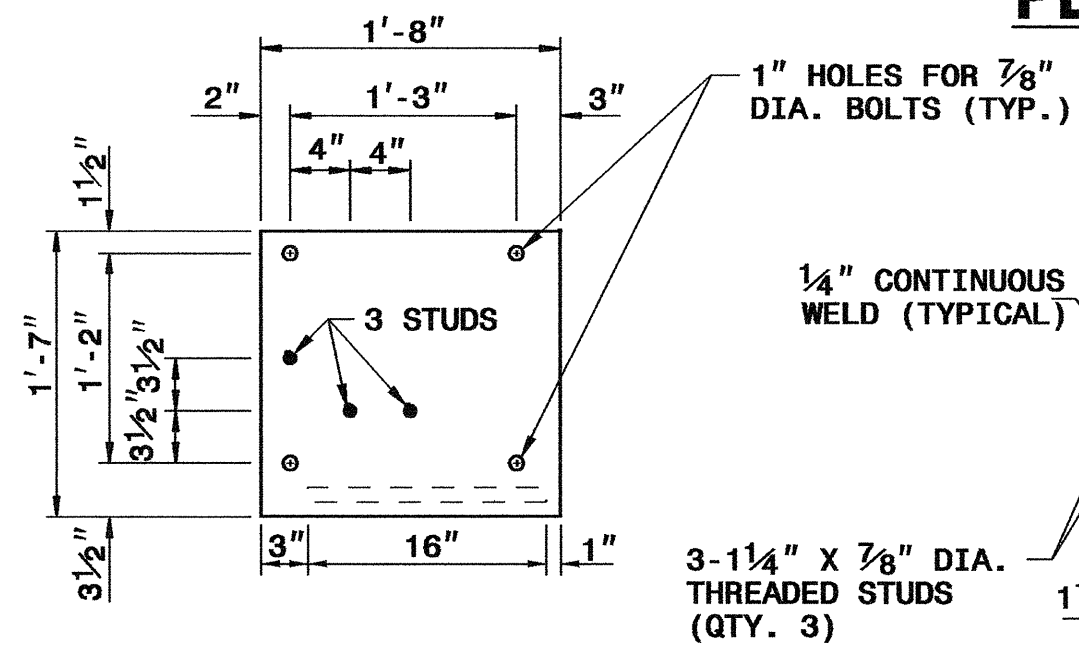
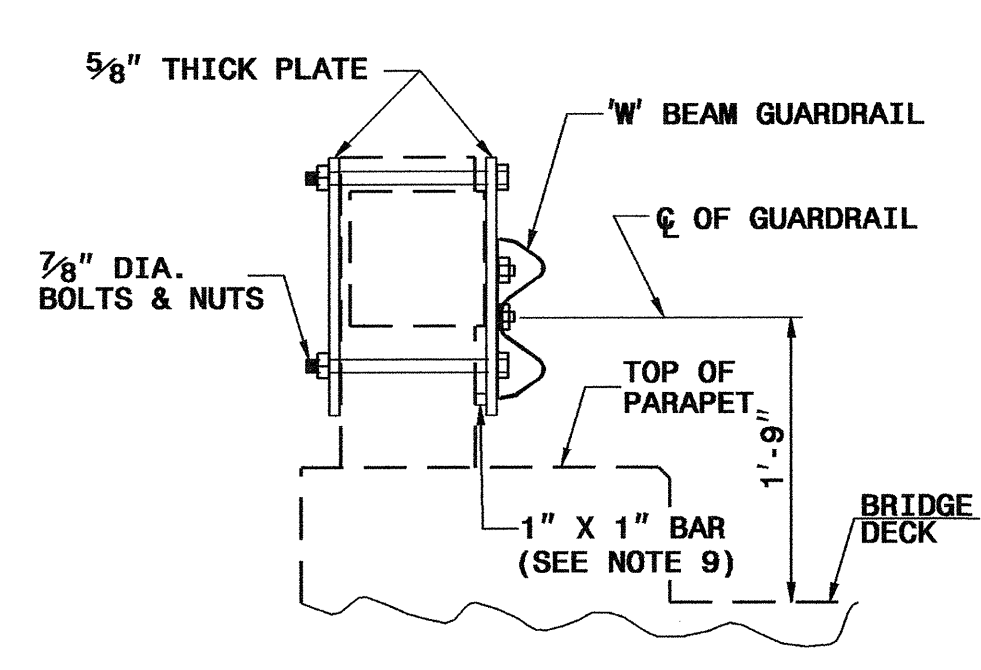
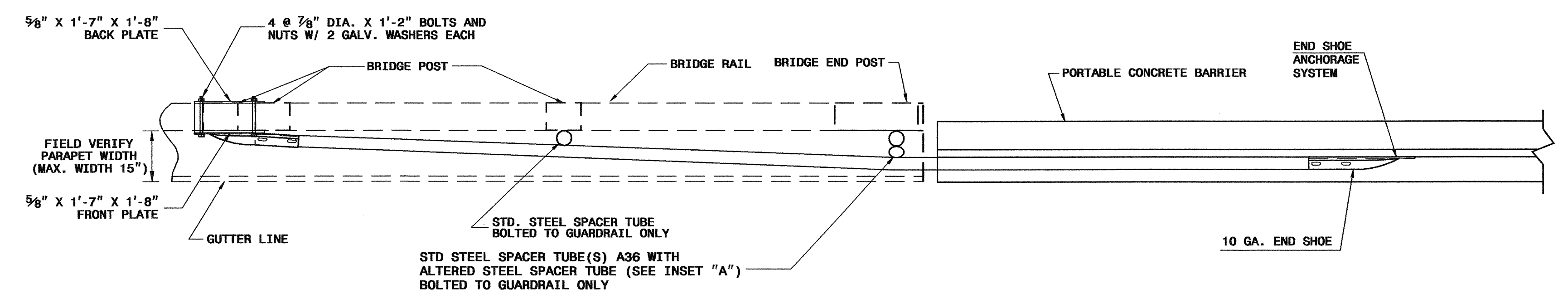
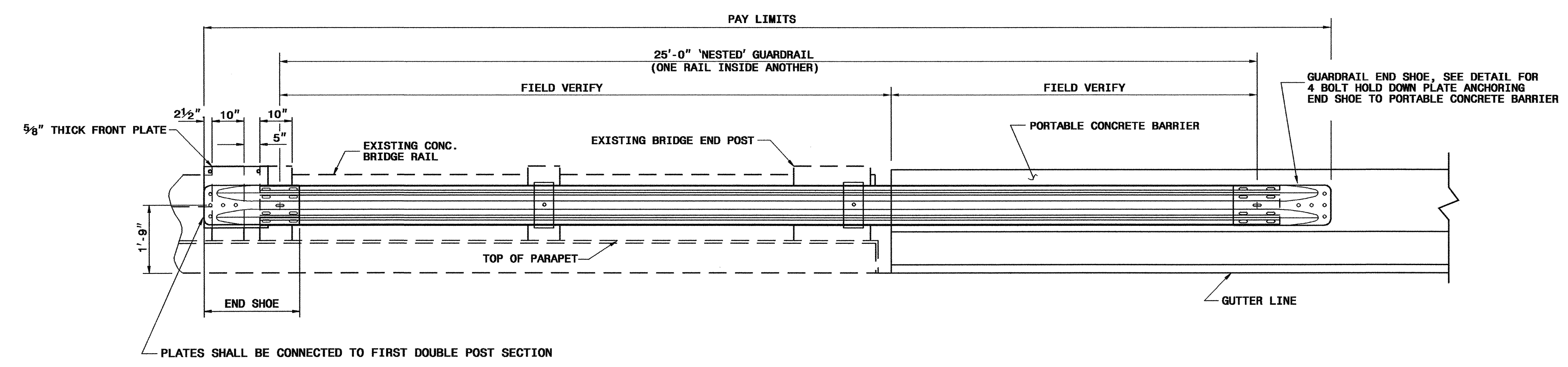


**DESIGN SERVICES UNIT  
STANDARDS AND SPECIAL DESIGN**  
Office 919-250-4128 FAX 919-250-4119

**STANDARD TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC**

ORIGINAL BY: nbritt DATE: 04-29-04  
 MODIFIED BY: nbritt DATE: 2/12/07  
 CHECKED BY: nbritt DATE: 2/12/07  
 FILE SPEC.: details/nbritt/english/misc/tempshoring.dgn

1/30/2007 10:58:26 AM G:\p\p\p\2004\13.00 B-4223 Detail\Roadway\Fr\2\B-4223\_r.dwg:typ.dgn



**STEEL SPACER TUBE**

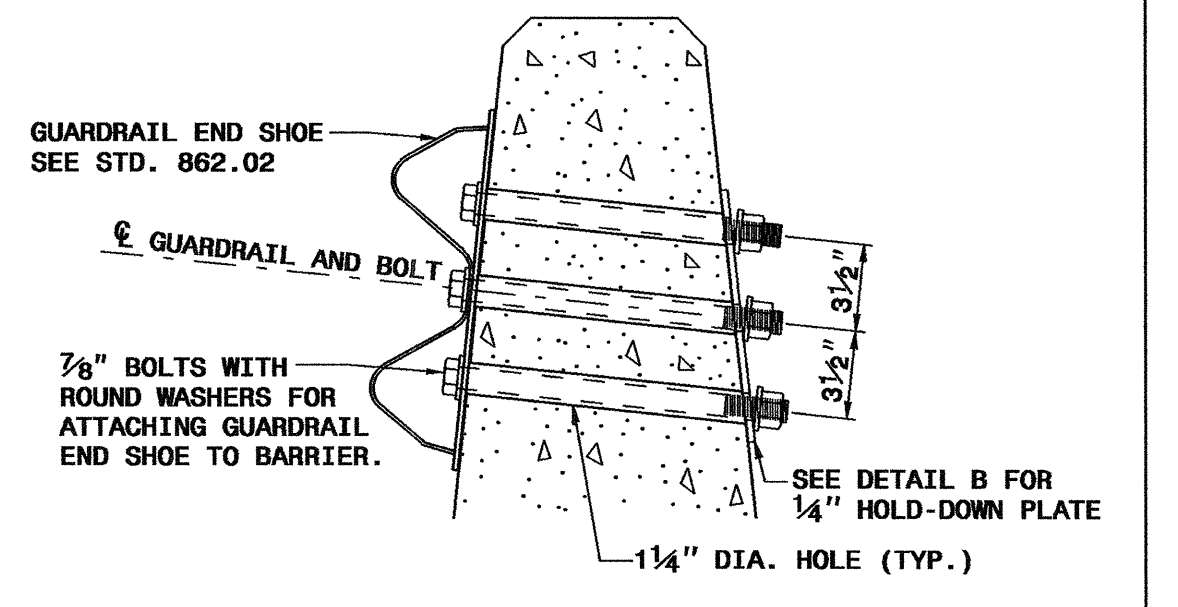
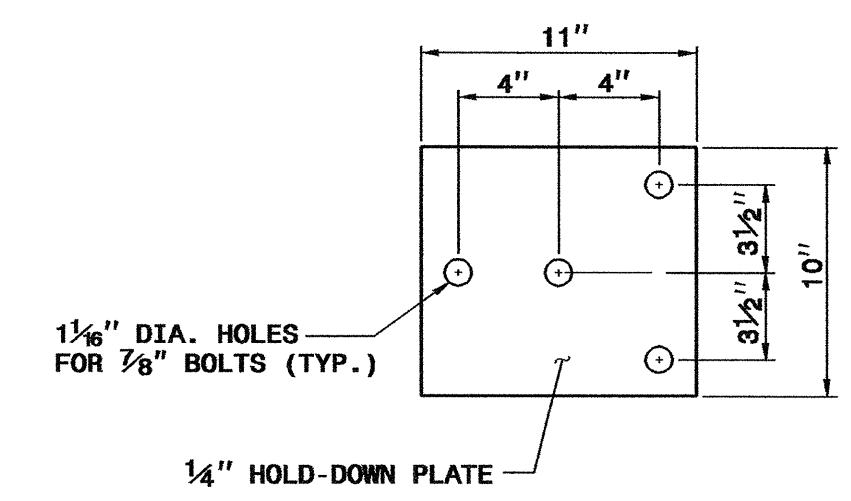
- GENERAL NOTES:**
1. USE NUTS, BOLTS, AND WASHERS CONFORMING TO THE REQUIREMENTS OF A.S.T.M. A-307 AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF STAND. SPECS.
  2. TAP NUTS FOR THE 7/8" DIA. STUDS AND BOLTS AFTER GALVANIZING SEE A.S.T.M. A-563.
  3. USE PLATES AND TUBES CONFORMING TO THE REQUIREMENTS OF A.S.T.M. A-36 AND GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH SECTION 1076 OF STAND. SPECS.
  4. ADDITIONAL FIELD HOLES MAY BE DRILLED IN STEEL RAIL AS DIRECTED BY THE ENGINEER.
  5. INSTALL FACE OF GUARDRAIL AS NEAR AS POSSIBLE TO PLUMB WITH THE PARAPET FACE AT BRIDGE END POST SPACER TUBE LOCATION BY USING STANDARD OR ALTERED SPACER TUBES OR A COMBINATION THEREOF OR AS DIRECTED BY THE ENGINEER. FOR VERY SMALL PARAPET WIDTHS, GUARDRAIL MAY BE INSTALLED AGAINST BRIDGE RAIL WITHOUT SPACER TUBES.
  6. DO NOT DRILL BRIDGE RAIL IN ORDER TO INSTALL GUARDRAIL ANCHOR UNIT.
  7. KEEP TOE OF PORTABLE CONCRETE BARRIER FLUSH WITH FACE OF PARAPET.
  8. ATTACH 1" X 1" BAR AND THREADED STUDS TO PLATE WITH 1/4" WELDS ALL AROUND.
  9. 1" X 1" BAR MAY NOT BE NEEDED ON BRIDGE RAILS WHERE FACE OF RAIL DOES NOT PROJECT BEYOND FACE OF POST.

**NOTES FOR 4 BOLT HOLD DOWN PLATE**

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD DOWN PLATE AND 4 - 7/8" DIA. BOLTS WITH NUTS AND WASHERS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL. THE 1/4" DIA. HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



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

**TEMPORARY ANCHOR UNIT TYPE W-BEAM**

ORIGINAL BY: E.E. WARD DATE: 4-03  
MODIFIED BY: E.E. WARD DATE: 8-04  
CHECKED BY: [Signature] DATE: 2/2/07  
FILE SPEC.: \\ybr\detailed\stand\862stds\anc.dgn

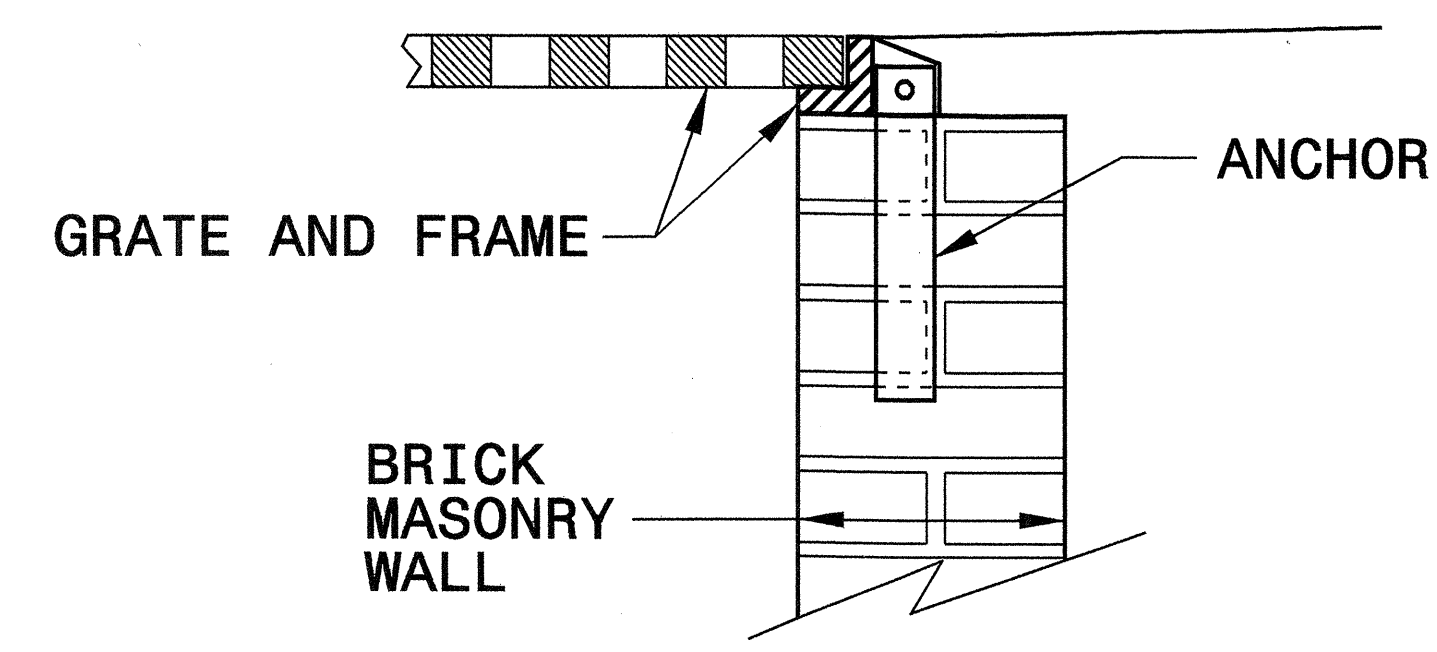
5/14/99 4/12/2006 2:34:32 PM G:\p\sect\2004\NT3.00 B-4223 Design\Record\Proc\B4223.cdw.txd.dgn



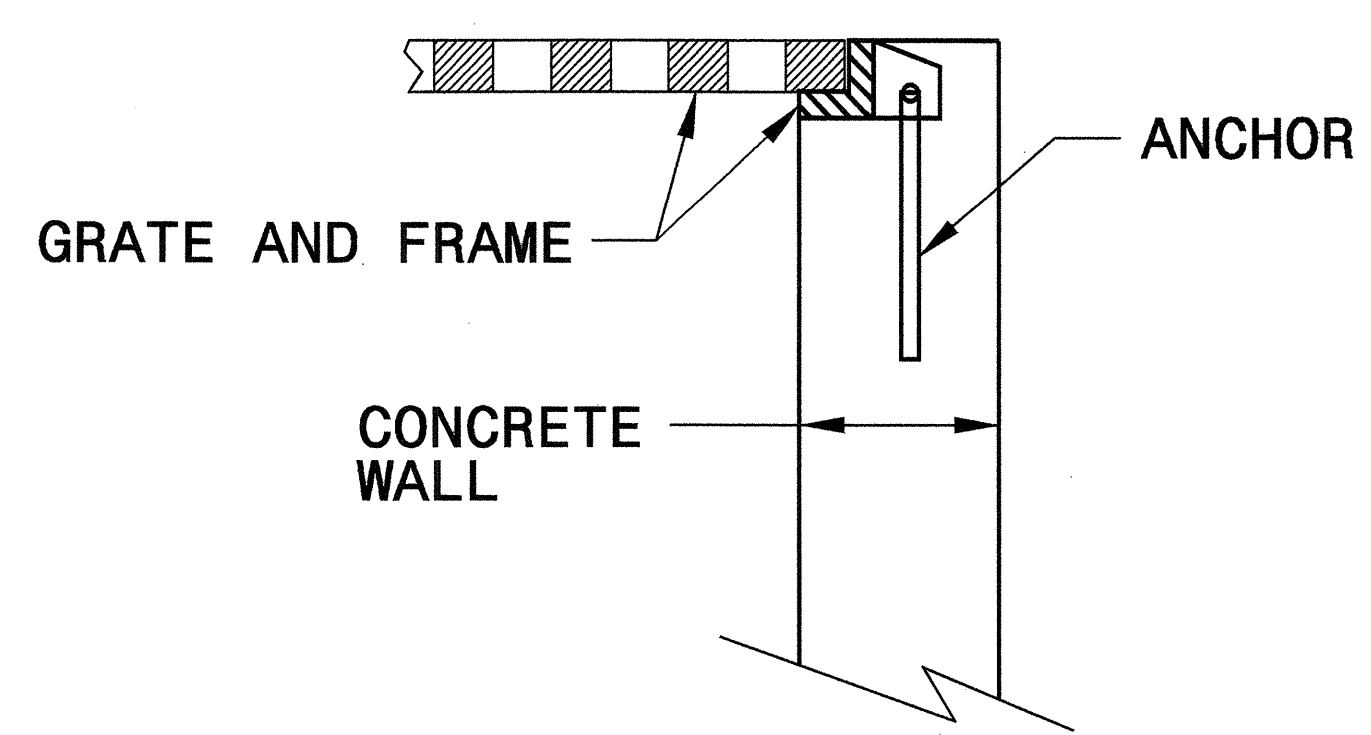
STATE OF NORTH CAROLINA  
 DEPT. OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 RALEIGH, N.C.

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

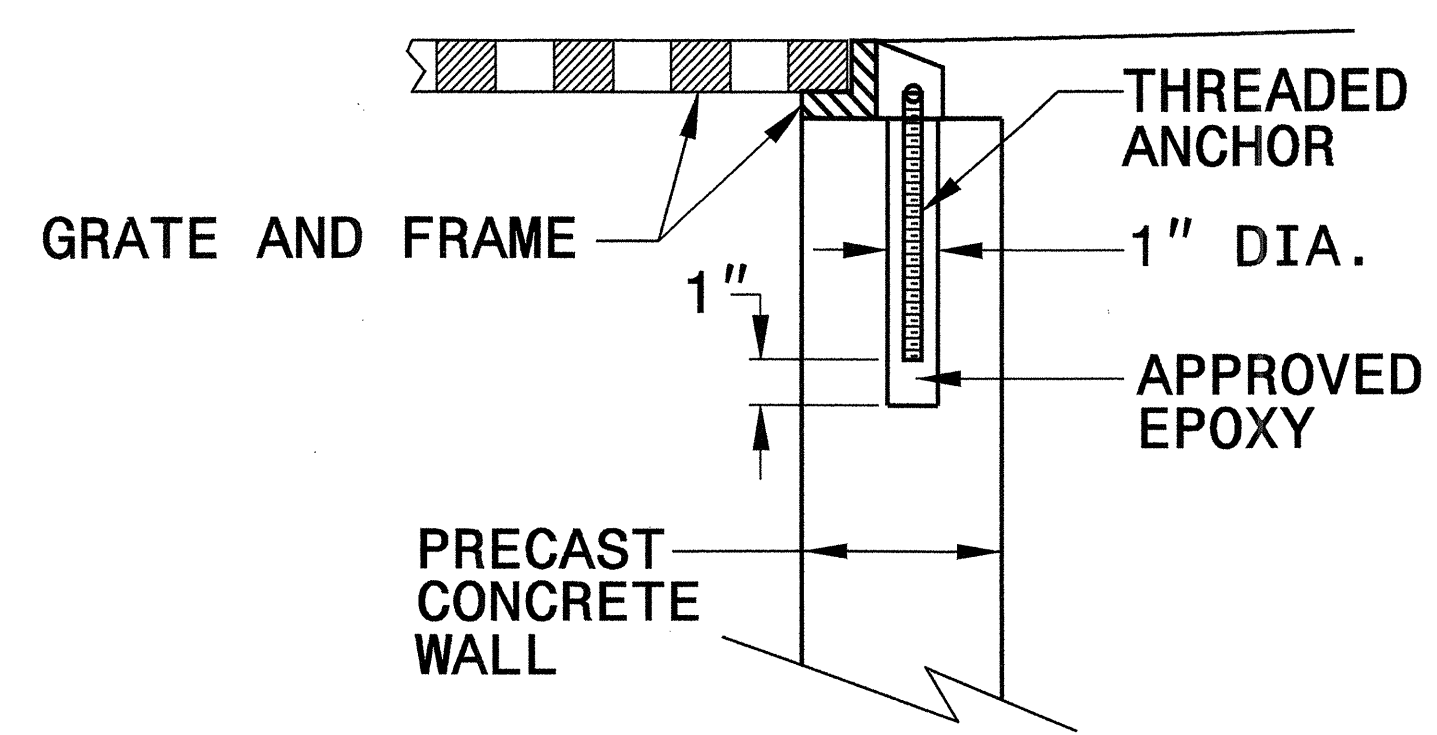
SHEET 1 OF 1  
**840D25**



**BRICK MASONRY CONSTRUCTION**



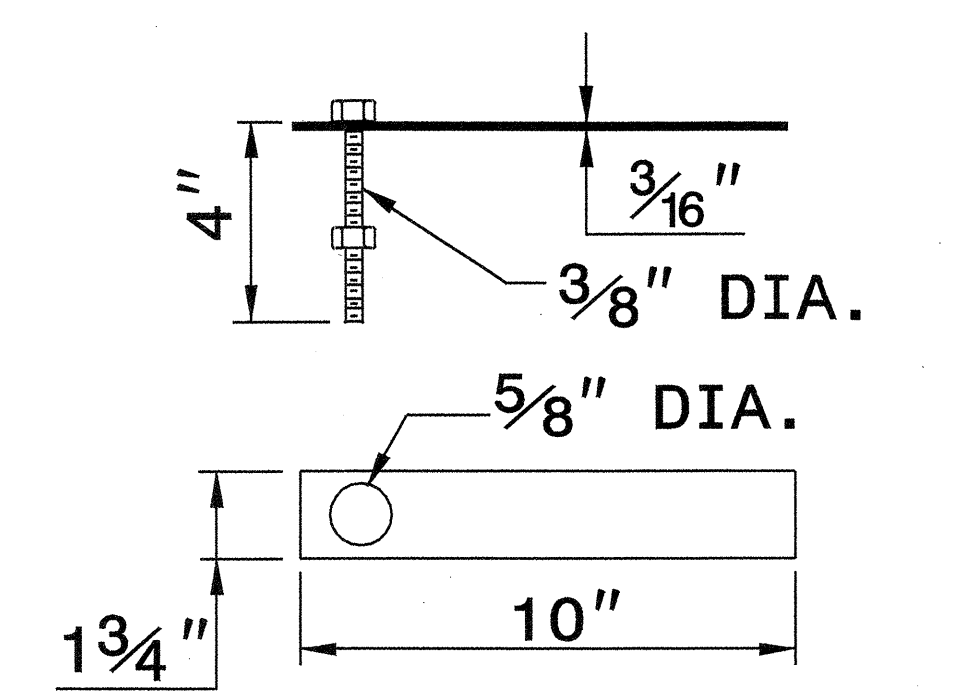
**CONCRETE CONSTRUCTION**



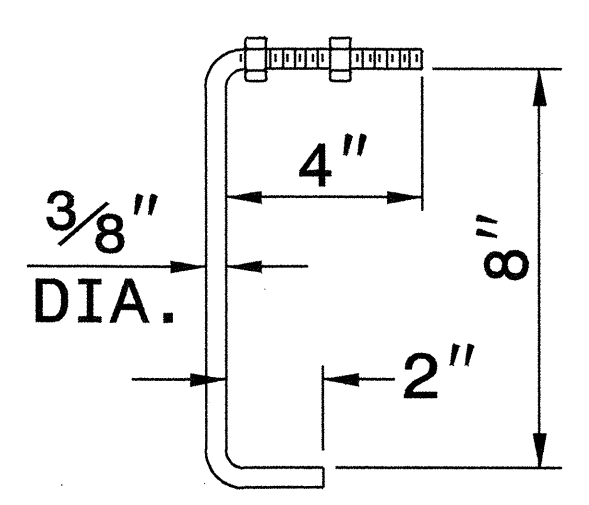
**PRECAST CONCRETE CONSTRUCTION**

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

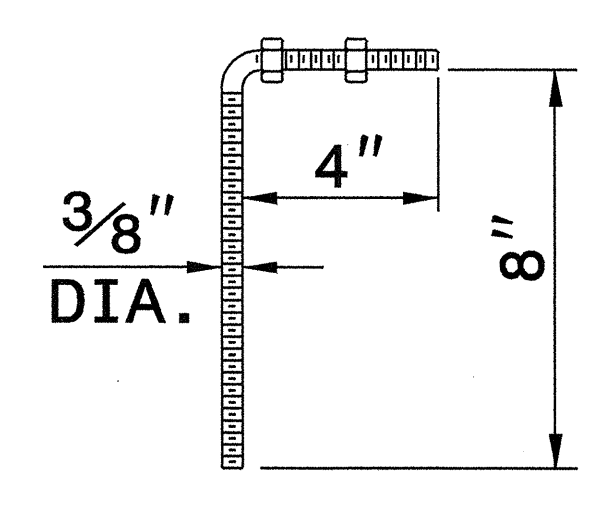
NOTE:  
 CONSTRUCT GRATED DROP INLET TO COINCIDE WITH NORMAL OR SUPERELEVATED SHOULDER OR PAVEMENT SLOPE.



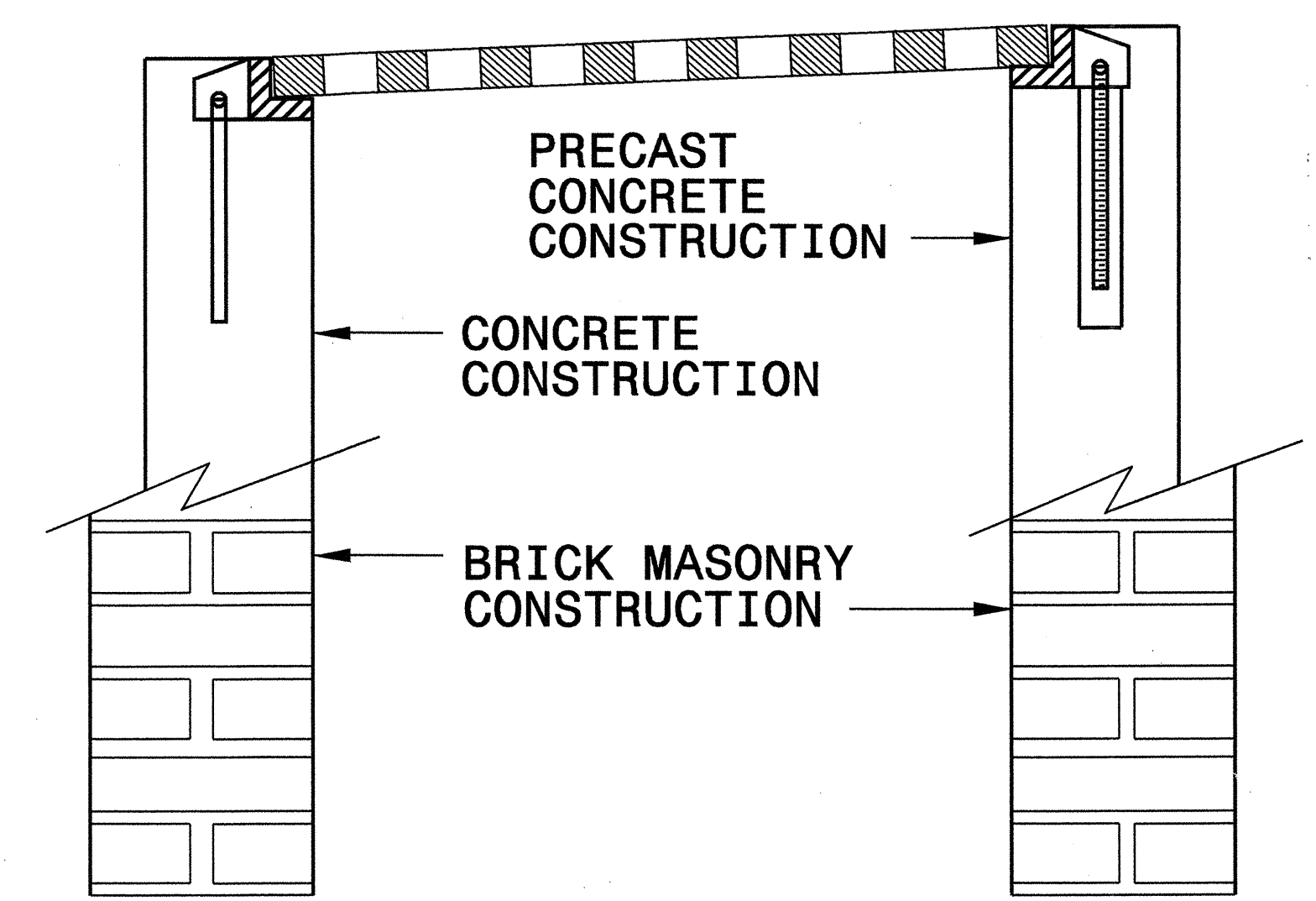
**MASONRY ANCHOR**  
 3/8" DIA. BOLT WITH PLATE



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



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



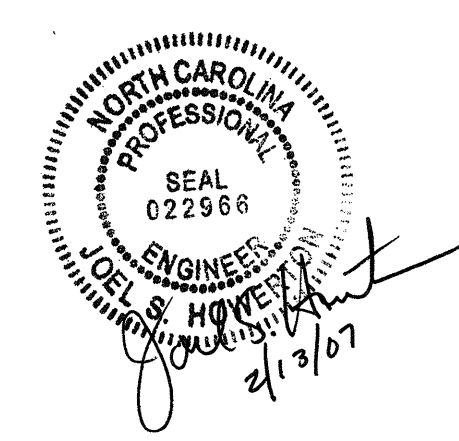
**FRAME AND GRATE INSTALLATION FOR NORMAL CROWN AND SUPERELEVATED SECTIONS**

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**

27 SEP 2006 09:01  
 S:\Contracts\Projects\Special Details\stds\06 Stds to Special Details\840D25 Anchorage for Frames\0840d25.dgn  
 AT F:\3222\33  
 ericward



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

**SEE PLATE FOR TITLE**

ORIGINAL BY: 2006 STD 840.25 DATE: 07/18/06  
 MODIFIED BY: E.E. WARD DATE: 9/25/06  
 CHECKED BY: *E.E. Ward* DATE: 9/27/06  
 FILE SPEC.:

# SUMMARY OF QUANTITIES

ItemNumber	Sec #	Quantity	Unit	Description
000100000-N	800	Lump Sum		MOBILIZATION
000400000-N	801	Lump Sum		CONSTRUCTION SURVEYING
002900000-N	SP	Lump Sum		REINFORCED BRIDGE APPROACH FILL, STATION ***** (33+52.00)
004300000-N	226	Lump Sum		GRADING
005000000-E	226	1	ACR	SUPPLEMENTARY CLEARING & GRUB- BING
005700000-E	226	1,629	CY	UNDERCUT EXCAVATION
013400000-E	240	1,100	CY	DRAINAGE DITCH EXCAVATION
019500000-E	265	3,700	CY	SELECT GRANULAR MATERIAL
019600000-E	270	600	SY	FABRIC FOR SOIL STABILIZATION
020600000-E	SP	7,400	SF	TEMPORARY SHORING - BARRIER SUPPORTED
031800000-E	300	185	TON	FOUNDATION CONDITIONING MATE- RIAL, MINOR STRS
034300000-E	310	132	LF	15" SIDE DRAIN PIPE
034400000-E	310	40	LF	18" SIDE DRAIN PIPE
034500000-E	310	76	LF	24" SIDE DRAIN PIPE
036600000-E	310	108	LF	15" RC PIPE CULVERTS, CLASS III
037200000-E	310	168	LF	18" RC PIPE CULVERTS, CLASS III
066000000-E	310	32	LF	***BIT COAT CS PIPE CULVERTS, TYPE A ***** THICK (15", 0.064")
066000000-E	310	204	LF	***BIT COAT CS PIPE CULVERTS, TYPE A ***** THICK (18", 0.064")
068000000-E	310	2	EA	*** BIT COAT CS PIPE ELBOWS, TYPE A ***** THICK (15", 0.064")
068000000-E	310	4	EA	*** BIT COAT CS PIPE ELBOWS, TYPE A ***** THICK (18", 0.064")
099500000-E	340	175	LF	PIPE REMOVAL
099600000-N	350	1	EA	PIPE CLEAN-OUT
112100000-E	520	2,115	TON	AGGREGATE BASE COURSE
122000000-E	545	300	TON	INCIDENTAL STONE BASE
133000000-E	607	135	SY	INCIDENTAL MILLING
148900000-E	610	350	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B
149800000-E	610	1,400	TON	ASPHALT CONC INTERMEDIATE COURSE, TYPE 119.0B
151900000-E	610	1,300	TON	ASPHALT CONC SURFACE COURSE, TYPE S9.5B
156000000-E	620	160	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 64-22
169300000-E	654	100	TON	ASPHALT PLANT MIX, PAVEMENT REPAIR
202200000-E	815	25	CY	SUBDRAIN EXCAVATION
203300000-E	815	20	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)
225300000-E	840	2	CY	PIPE COLLARS
228600000-N	840	7	EA	MASONRY DRAINAGE STRUCTURES
230800000-E	840	5	LF	MASONRY DRAINAGE STRUCTURES
236700000-N	840	7	EA	FRAME WITH TWO GRATES, STD 840.29
253500000-E	846	225	LF	***X *** CONCRETE CURB (8" X 18")
255600000-E	846	815	LF	SHOULDER BERM GUTTER
303000000-E	862	787.5	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
336000000-E	863	1,950	LF	REMOVE EXISTING GUARDRAIL

ItemNumber	Sec #	Quantity	Unit	Description
338700000-N	862	2	EA	GUARDRAIL ANCHOR UNITS, TYPE ***** TEMPORARY (W-BEAM)
350300000-E	866	185	LF	WOVEN WIRE FENCE, 47" FABRIC
350900000-E	866	9	EA	4" TIMBER FENCE POSTS, 7-6" LONG
351500000-E	866	7	EA	5" TIMBER FENCE POSTS, 8-0" LONG
364900000-E	876	10	TON	RIP RAP, CLASS B
365600000-E	876	1,985	SY	FILTER FABRIC FOR DRAINAGE
365900000-N	SP	1	EA	PREFORMED SCOUR HOLES WITH LEVEL SPREADER APRON
402500000-E	901	24	SF	CONTRACTOR FURNISHED, TYPE *** SIGN (D)
407200000-E	903	73	LF	SUPPORTS, 3-LB STEEL U-CHANNEL
409600000-N	904	2	EA	SIGN ERECTION, TYPE D
415500000-N	907	2	EA	DISPOSAL OF SIGN SYSTEM, U- CHANNEL
440000000-E	1110	244	SF	WORK ZONE SIGNS (STATIONARY)
440500000-E	1110	138	SF	WORK ZONE SIGNS (PORTABLE)
441000000-E	1110	20	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)
443000000-N	1130	80	EA	DRUMS
443500000-N	1135	50	EA	CONES
444500000-E	1145	72	LF	BARRICADES (TYPE III)
445500000-N	1150	60	MD	FLAGGER
446500000-N	1160	2	EA	TEMPORARY CRASH CUSHIONS
447000000-N	1160	1	EA	RESET TEMPORARY CRASH CUSHIONS
448000000-N	1165	2	EA	TMIA
448500000-E	1170	527	LF	PORTABLE CONCRETE BARRIER
450000000-E	1170	438	LF	RESET PORTABLE CONCRETE BAR- RIER
465000000-N	1251	44	EA	TEMPORARY RAISED PAVEMENT MARKERS

ItemNumber	Sec #	Quantity	Unit	Description
468500000-E	1205	4,458	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 90 MILS)
468600000-E	1205	4,458	LF	THERMOPLASTIC PAVEMENT MARKING LINES (4", 120 MILS)
477000000-E	1205	3,884	LF	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (1)
481000000-E	1205	39,600	LF	PAINT PAVEMENT MARKING LINES (4")
485000000-E	1205	400	LF	REMOVAL OF PAVEMENT MARKING LINES (4")
490000000-N	1251	12	EA	PERMANENT RAISED PAVEMENT MARKERS
490500000-N	1253	28	EA	SNOWPLOWABLE PAVEMENT MARKERS
532620000-E	1510	2,217	LF	12" WATER LINE
555800000-E	1515	1	EA	12" VALVE
564900000-N	1515	1	EA	RECONNECT WATER METER
567200000-N	1515	2	EA	RELOCATE FIRE HYDRANT
580400000-E	1530	2,160	LF	ABANDON 12" UTILITY PIPE
587170000-E	1550	1,550	LF	TRENCHLESS INSTALLATION OF 12" IN SOIL
587171000-E	1550	100	LF	TRENCHLESS INSTALLATION OF 12" NOT IN SOIL
600000000-E	1605	3,260	LF	TEMPORARY SILT FENCE
600600000-E	1610	100	TON	STONE FOR EROSION CONTROL, CLASS A
600900000-E	1610	400	TON	STONE FOR EROSION CONTROL, CLASS B
601200000-E	1610	815	TON	SEDIMENT CONTROL STONE
601500000-E	1615	4	ACR	TEMPORARY MULCHING
601800000-E	1620	150	LB	SEED FOR TEMPORARY SEEDING
602100000-E	1620	0.75	TON	FERTILIZER FOR TEMPORARY SEED- ING
602400000-E	1622	140	LF	TEMPORARY SLOPE DRAINS
602700000-N	1622	4	EA	INLET PROTECTION AT TEMPORARY SLOPE DRAINS
602900000-E	SP	2,260	LF	SAFETY FENCE
603000000-E	1630	1,150	CY	SILT EXCAVATION
603600000-E	1631	2,850	SY	MATting FOR EROSION CONTROL
603700000-E	SP	15	SY	COIR FIBER MAT
604200000-E	1632	755	LF	1/4" HARDWARE CLOTH
604800000-E	SP	220	SY	FLOATING TURBIDITY CURTAIN
607000000-N	SP	36	EA	SPECIAL STILLING BASINS
607103000-E	SP	360	LF	COIR FIBER BAFFLES
607105000-E	SP	1	EA	*** SKIMMER (2")
607105000-E	SP	1	EA	*** SKIMMER (2-1/2")
608400000-E	1660	8	ACR	SEEDING & MULCHING
608700000-E	1660	2.5	ACR	MOWING
609000000-E	1661	50	LB	SEED FOR REPAIR SEEDING
609300000-E	1661	0.25	TON	FERTILIZER FOR REPAIR SEEDING
609600000-E	1662	100	LB	SEED FOR SUPPLEMENTAL SEEDING
610800000-E	1665	5.75	TON	FERTILIZER TOPDRESSING
611400000-N	SP	2.5	HR	SPECIALIZED HAND MOWING
611700000-N	SP	8	EA	RESPONSE FOR EROSION CONTROL
612300000-E	1670	0.2	ACR	REFORESTATION
612900000-E	1670	1	ACR	WETLAND REFORESTATION
613500000-E	SP	1	ACR	GENERIC EROSION CONTROL ITEM DISKING
613500000-E	SP	1	ACR	GENERIC EROSION CONTROL ITEM RIPPING



DIVISION OF HIGHWAYS  
 STATE OF NORTH CAROLINA

**GUARDRAIL SUMMARY**

"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

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH		W		ANCHORS						IMPACT ATTENUATOR TYPE 350			REMARKS							
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	GRAU 350	TYPE III	TYPE W-BEAM TEMP	EA	G	NG											
-L-	27+41.33	28+78.83	LT	137.50'				28+90.83	8'	11'																				1950 LF OF GUARDRAIL REMOVAL	
-L-	25+91.33	28+78.83	RT	287.50'				28+90.83	8'	11'																				BREAK FOR DRIVE	
-L-	38+25.17	41+25.17	LT	300.00'				38+25.17	8'	11'																					
-L-	38+25.17	41+50.17	RT	325.00'				40+25	8'	11'																					
-L-	29+13.92 35+04.44		LT																											SEE TRAFFIC CONTROL PLANS	
LESS ANCHOR DEDUCTIONS																															
GRAU-350 4 @ 50' =				- 200.00'																											
TYPE III 4 @ 18.75' =				- 75.00'																											
TOTAL				775'																											
SAY				787.50'																											

(5 ADDITIONAL GUARDRAIL POSTS)

**SUMMARY OF EARTHWORK  
 IN CUBIC YARDS**

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT + %	BORROW	WASTE
-L-					
18+00.00 TO 28+90.83	1,419		13,788	13,455	1,086
BRIDGE					
-L-					
38+13.17 TO 50+00.00	569	1,029	13,878	13,309	1,029
SUBTOTAL	1,988	1,029	27,666	26,764	2,115
-DRIVE-					
10+12.00 TO 14+00.00			1,680	1,680	
SUBTOTAL			1,680	1,680	
MITIGATION EXCAVATION					
34+40.00 TO 41+00.00	26,000				26,000
SUBTOTAL	26,000				26,000
PROJECT TOTAL	27,988	1,029	29,346	28,444	28,115
LOSS DUE TO CLEARING AND GRUBBING	-200			200	
EST. SHOULDER MATERIAL			813	813	
ADDITIONAL UNDERCUT		600	750	750	600
PROJECT TOTAL	27,788	1,629	30,909	30,207	28,715
5% TO REPLACE BORROW				1,520	
GRAND TOTAL	27,788			31,727	
SAY	28,100			32,100	

EST. DDE = 1,100 CY  
 EST. SELECT GRANULAR MATERIAL = 3,700 SY  
 EST. FABRIC FOR SOIL STABILIZATION = 600 SY

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.

**SUMMARY OF PAVEMENT REMOVAL  
 IN SQUARE YARDS**

LOCATION	ASPHALT REMOVAL	ASPHALT BREAK UP	CONCRETE REMOVAL	CONCRETE BREAK UP
-L- 19+50 TO 22+75	107.26			
-L- 22+75 TO 24+25	476.70			
-L- 24+25 TO 27+34		422.70		
-L- 25+60 TO 29+14	632.60			
-L- 34+04 TO 38+00	851.09			
-L- 38+00 TO 43+25		1,277.38		
-L- 41+22 TO 48+60	658.56			
TOTAL	2,726.21	1,700.09		
SAY	2,750	1,725		

NOTE: Approximate quantities only. Unclassified excavation, Borrow Excavation, Shoulder Borrow, Fine Grading, Clearing and Grubbing, Breaking of Existing Pavement and Removal of Existing Pavement will be paid for at the contract Lump Sum price for "Grading".

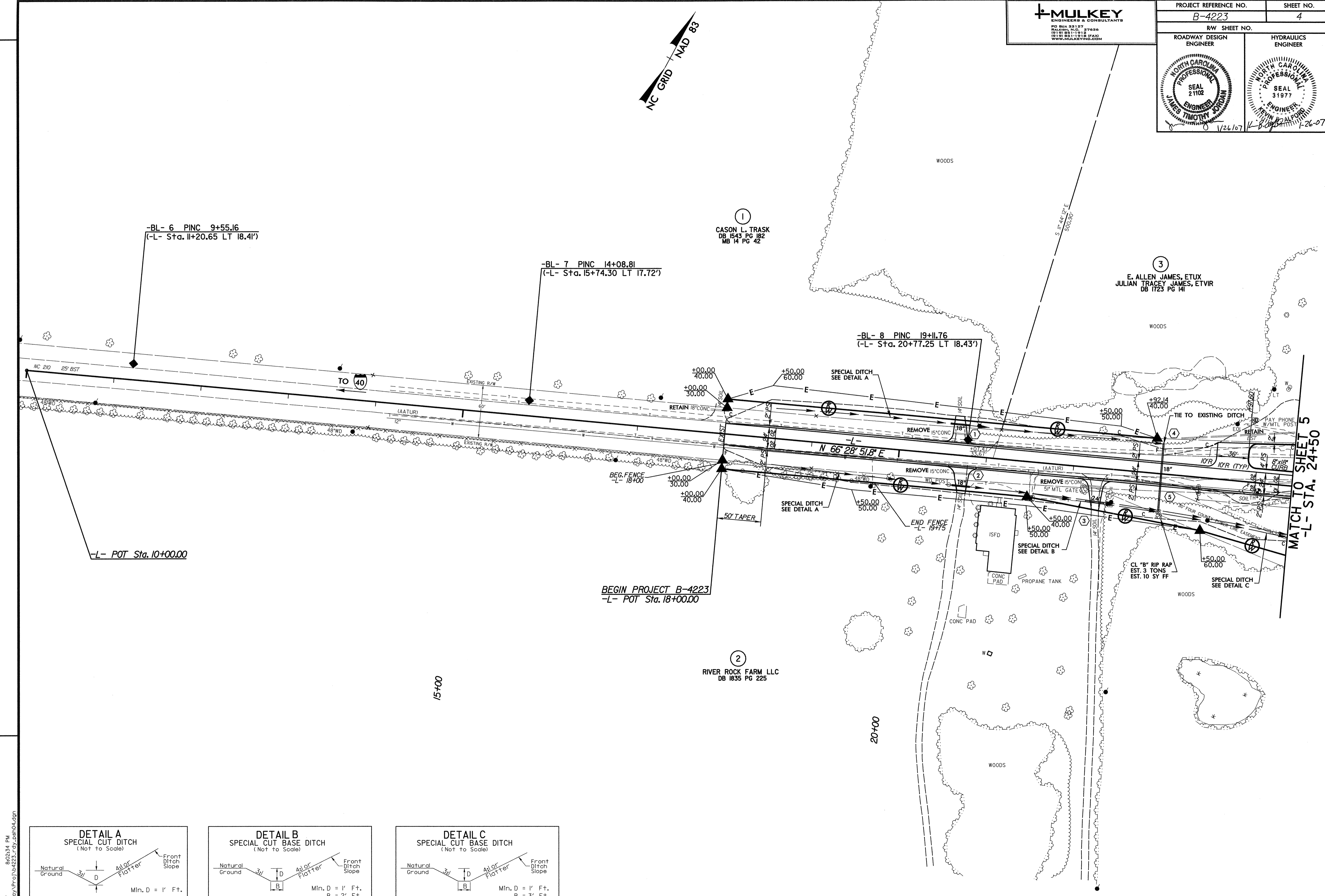
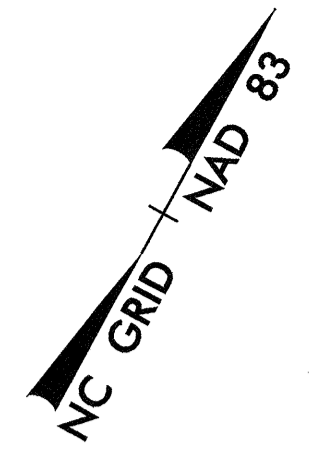
DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA

**PARCEL INDEX SHEET**

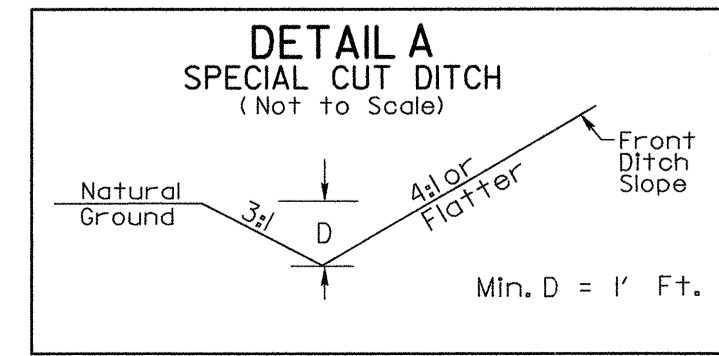
**MULKEY**  
ENGINEERS & CONSULTANTS  
PO Box 33157  
Raleigh, NC 27626  
919 851-1912  
919 851-1918 (FAX)  
WWW.MULKEYINC.COM

PROJECT REFERENCE NO.	SHEET NO.
B-4223	3-C
RW SHEET NO.	

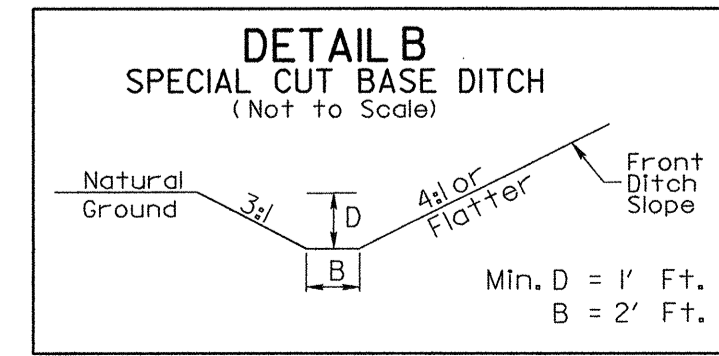
PARCEL NO.	SHEET NO.	PROPERTY OWNERS NAME
1	4	CASON L. TRASK
2	4	RIVER ROCK FARM LLC
3	4, 5	E. ALLEN JAMES, ETUX; JULIAN TRACEY JAMES, ETVIR
4	4	HALL FAMILY PROPERTIES OF WILMINGTON, LLC
5	5, 6	RANDALL M. BOSTIC, ETAL
6	5, 6	WESLEY M. WILLIAMS
7	6	HUBERT HARREL, ETUX
8	6	LARRY MOORE
9	6	LINA MAE CARTER HATCH
10	6	KATRINA L. ROBINSON



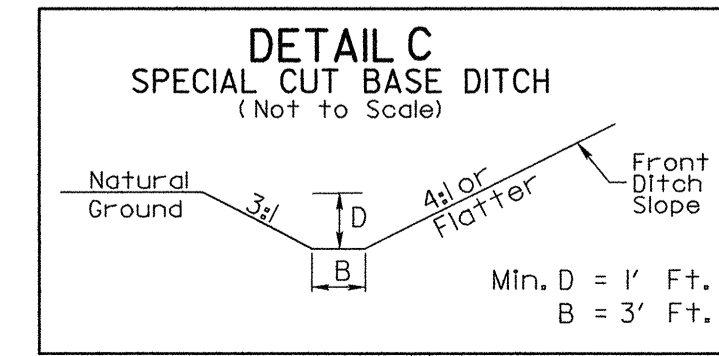
REVISIONS



-L- STA 18+50 TO 21+50 RT  
-L- STA 18+50 TO 23+00 LT



-L- STA 21+50 TO 23+00 RT



-L- STA 23+00 TO 24+50 RT

MATCH TO SHEET 5  
-L- STA. 24+50

FOR -L- PROFILE SEE SHEET 7

1/24/2007 8:02:34 PM  
R:\Roadway\Projects\B4223\rdy\_pst04.dgn

**-L-**

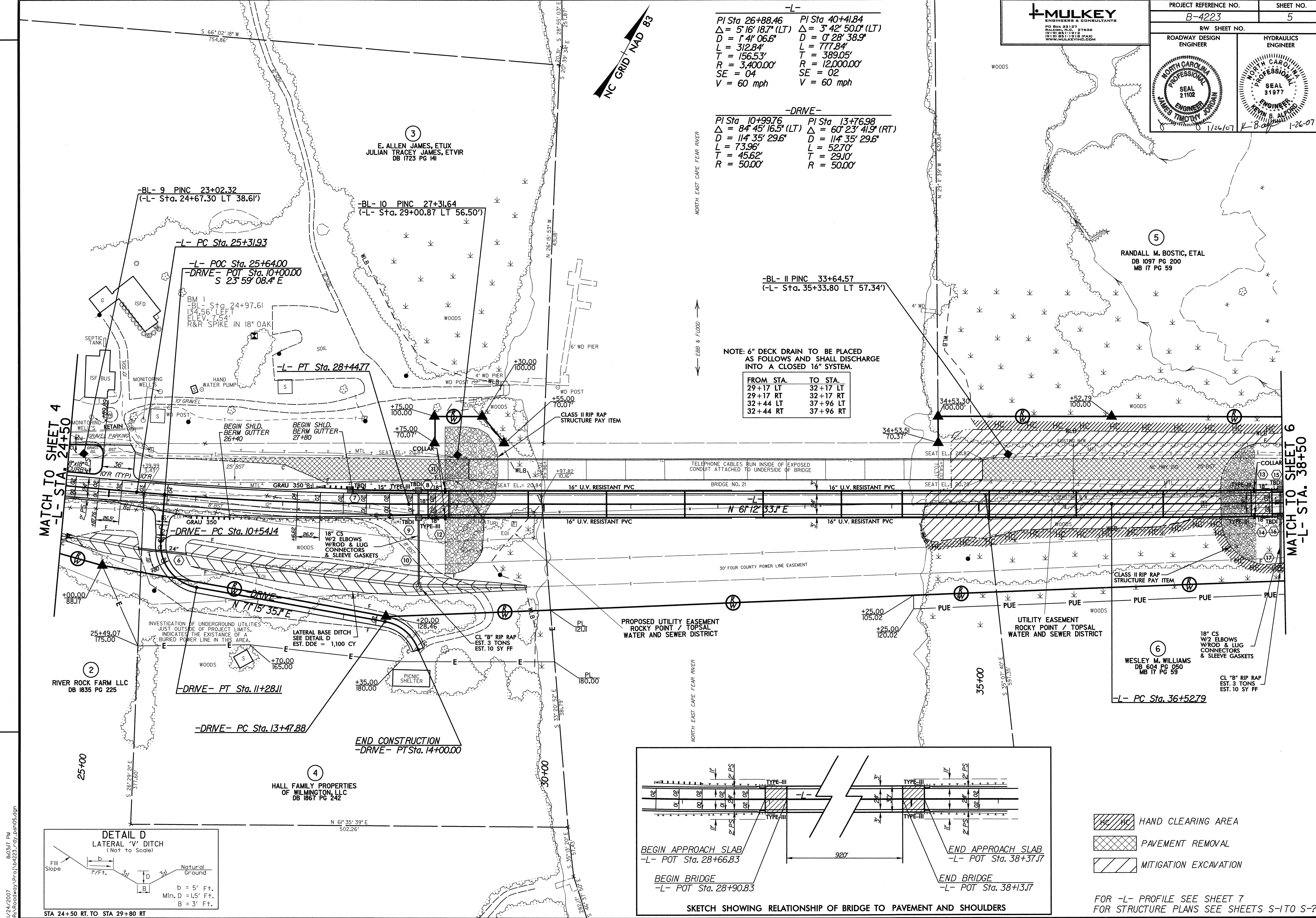
PI Sta 26+88.46	PI Sta 40+41.84
$\Delta = 5' 16' 18.7''$ (LT)	$\Delta = 3' 42' 50.0''$ (LT)
D = 1' 41' 06.6"	D = 0' 28' 38.9"
L = 312.84'	L = 777.84'
T = 156.53'	T = 389.05'
R = 3,400.00'	R = 12,000.00'
SE = 04	SE = 02
V = 60 mph	V = 60 mph

**-DRIVE-**

PI Sta 10+99.76	PI Sta 13+76.98
$\Delta = 84' 45' 16.5''$ (LT)	$\Delta = 60' 23' 41.9''$ (RT)
D = 114' 35' 29.6"	D = 114' 35' 29.6"
L = 73.96'	L = 52.70'
T = 45.62'	T = 29.10'
R = 50.00'	R = 50.00'

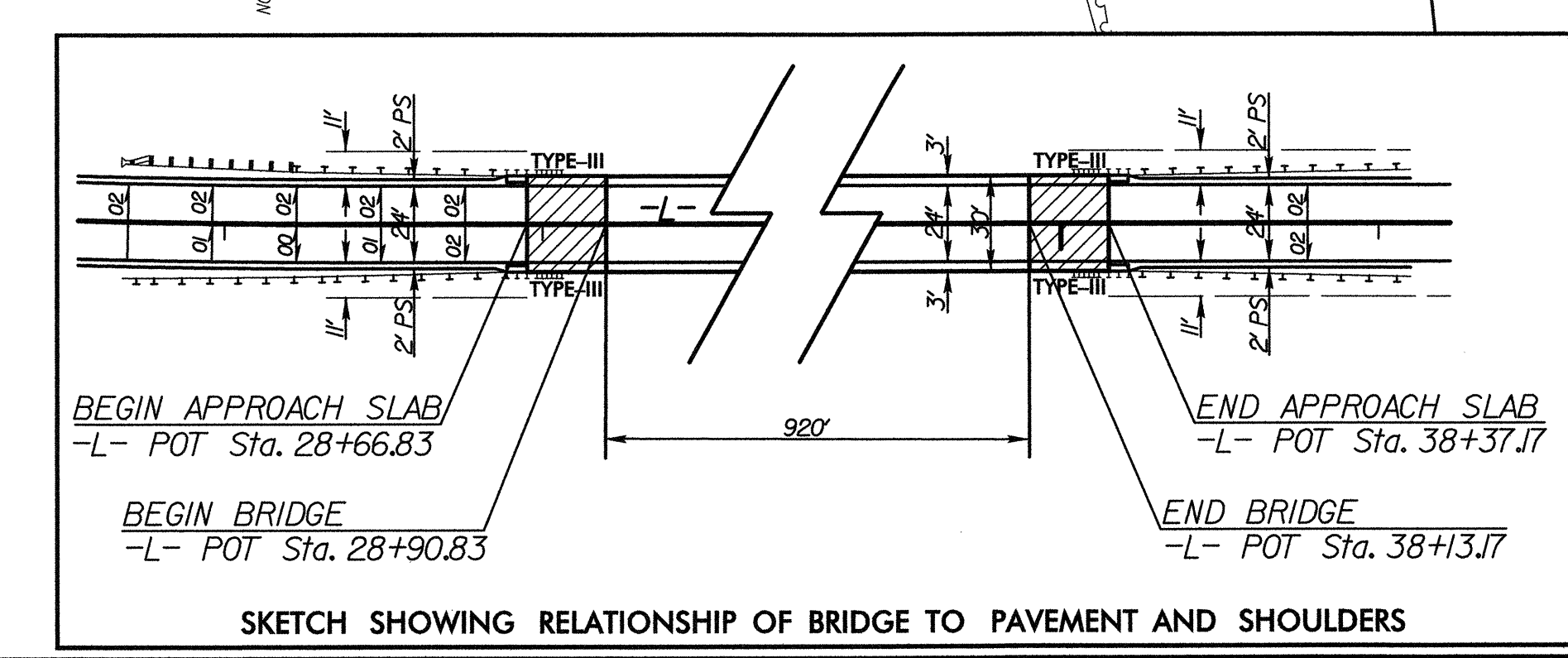
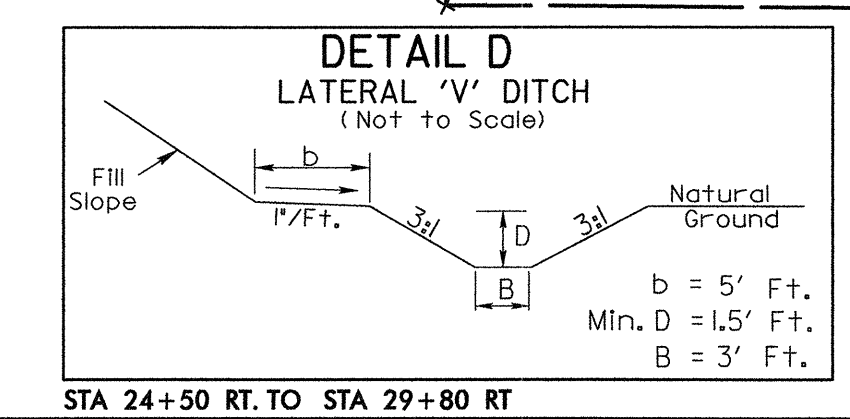
NOTE: 6" DECK DRAIN TO BE PLACED AS FOLLOWS AND SHALL DISCHARGE INTO A CLOSED 16" SYSTEM.

FROM STA.	TO STA.
29+17 LT	32+17 LT
29+17 RT	32+17 RT
32+44 LT	37+96 LT
32+44 RT	37+96 RT



MATCH TO SHEET 4  
-L- STA. 24+50

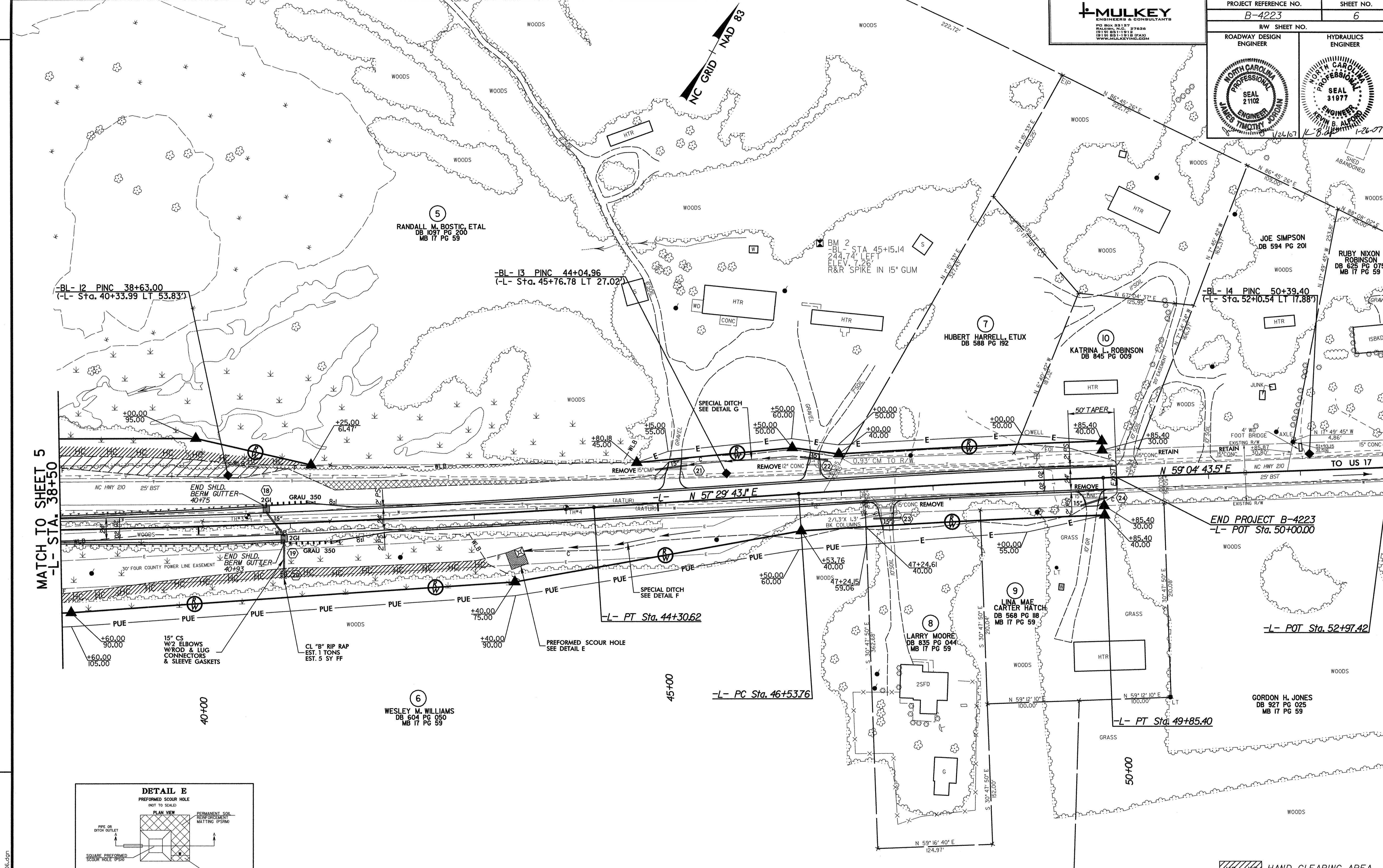
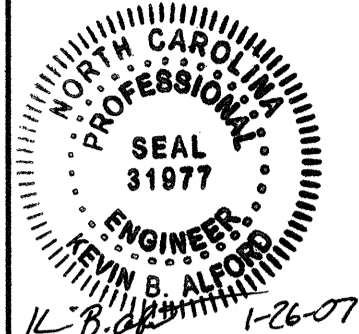
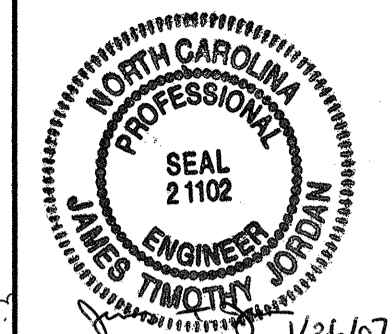
MATCH TO SHEET 6  
-L- STA. 38+50



- HAND CLEARING AREA
- PAVEMENT REMOVAL
- MITIGATION EXCAVATION

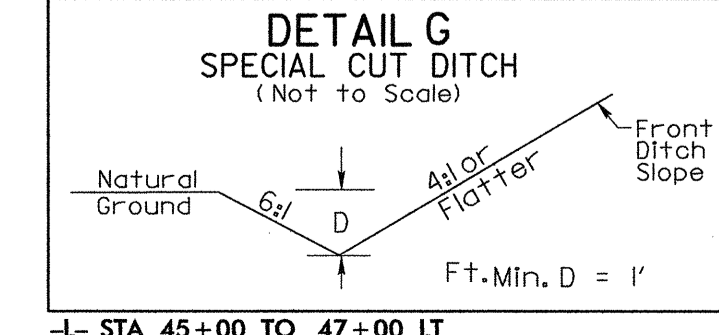
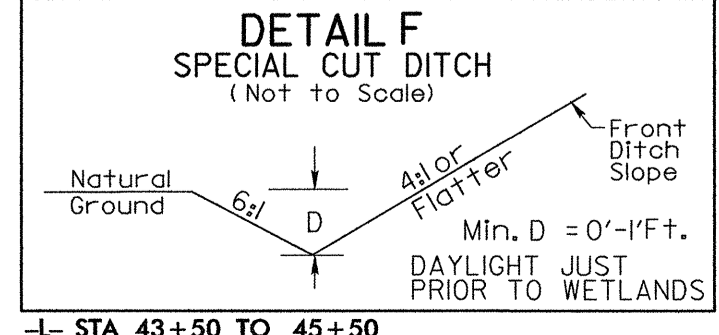
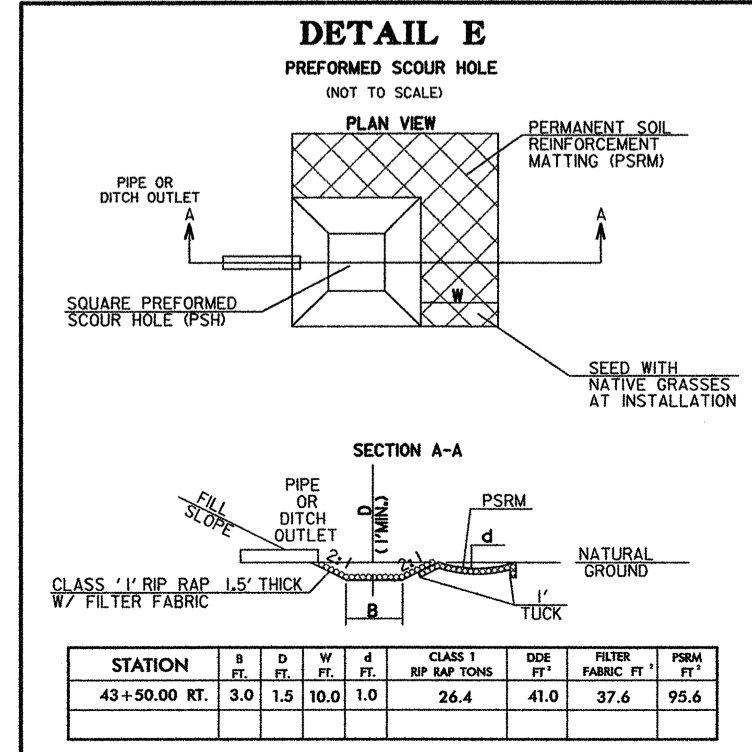
FOR -L- PROFILE SEE SHEET 7  
FOR STRUCTURE PLANS SEE SHEETS S-1 TO S-??

1/24/2007  
RA:Roadway/Proj/D4223\_rsy\_pdr05.dgn  
8:03:11 PM



REVISIONS

MATCH TO SHEET 5  
 -L- STA. 38+50



-L-  
 PI Sta 40+41.84 Δ = 3° 42' 50.0" (LT)  
 D = 0' 28' 38.9"  
 L = 777.84'  
 T = 389.05'  
 R = 12,000.00'  
 SE = 02  
 V = 60 mph

PI Sta 48+19.59 Δ = 1° 35' 00.4" (RT)  
 D = 0' 28' 38.9"  
 L = 331.64'  
 T = 165.83'  
 R = 12,000.00'  
 SE = 02  
 V = 60 mph

HAND CLEARING AREA  
 PAVEMENT REMOVAL  
 MITIGATION EXCAVATION

1/24/2007  
 B04603.PM  
 R:\Roadway\Proj\B-4223\_rdy\_psh06.dgn

FOR -L- PROFILE SEE SHEET 8



-BL- 6  
EL = 11.68'  
8" REBAR WITH CAP

-BL- 7  
EL = 11.27'  
8" REBAR WITH CAP

-BL- 8  
EL = 9.28'  
8" REBAR WITH CAP



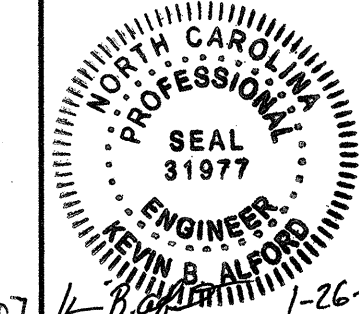
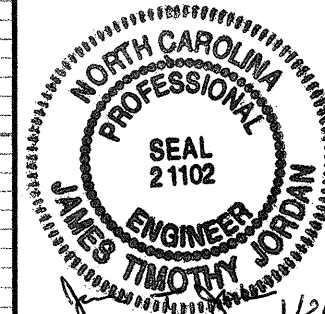
PROJECT REFERENCE NO.  
B-4223

SHEET NO.  
7

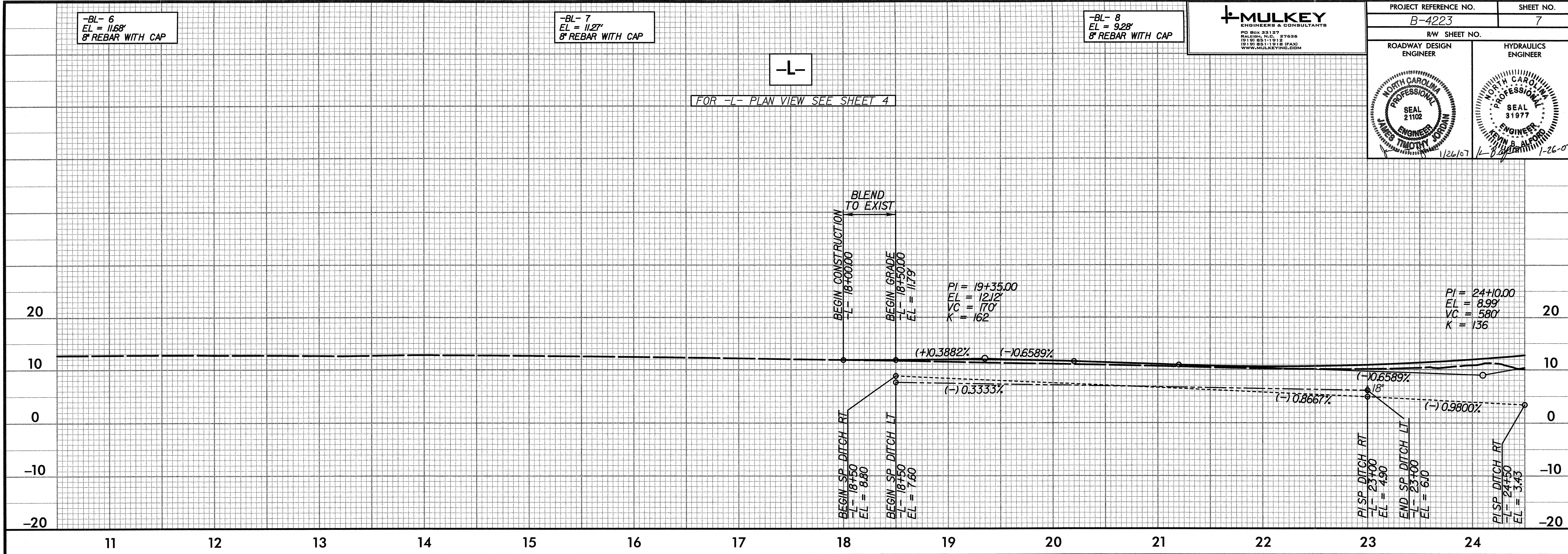
RW SHEET NO.

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER



-L-  
FOR -L- PLAN VIEW SEE SHEET 4



-BL- 9  
EL = 11.37'  
8" REBAR WITH CAP

BM-1 EL = 7.54'  
N=254216 E=2350954  
-BL- STA. 24+98.00 135' LT  
-L- STA 26+57.12 187.4082' LT  
RAILROAD SPIKE SET IN BASE OF 18" OAK TREE.

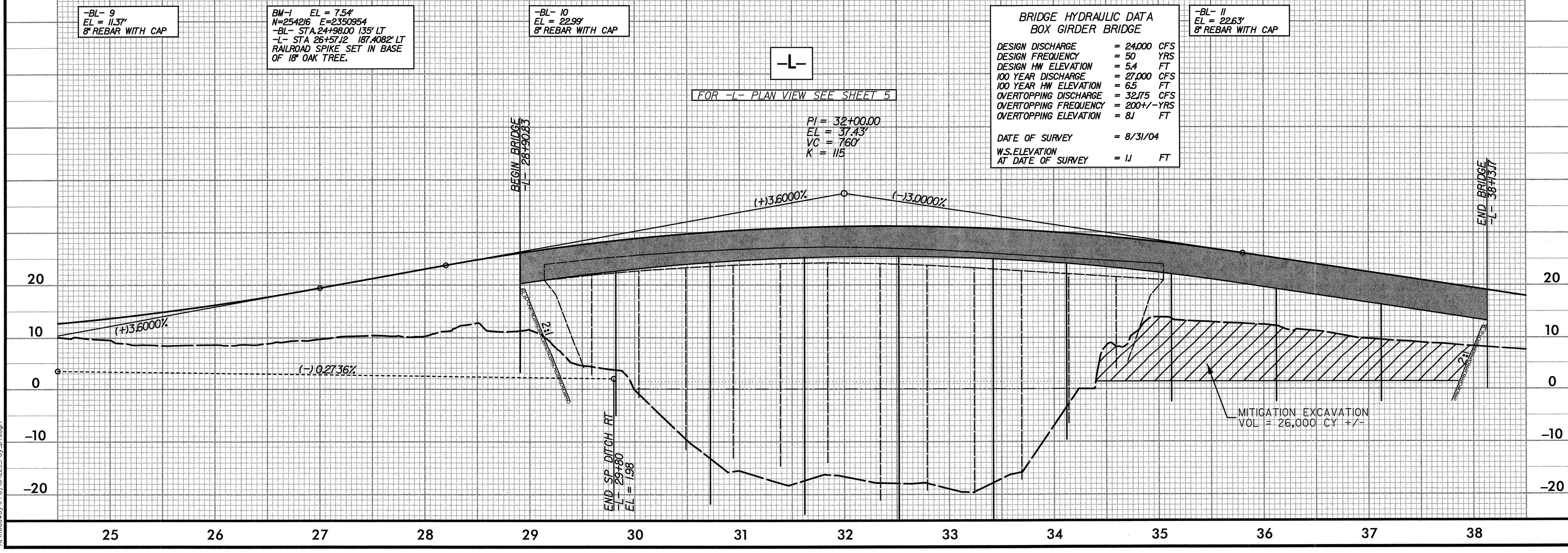
-BL- 10  
EL = 22.99'  
8" REBAR WITH CAP

-BL- 11  
EL = 22.63'  
8" REBAR WITH CAP

BRIDGE HYDRAULIC DATA  
BOX GIRDER BRIDGE

DESIGN DISCHARGE	= 24,000 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 5.4 FT
100 YEAR DISCHARGE	= 27,000 CFS
100 YEAR HW ELEVATION	= 6.5 FT
OVERTOPPING DISCHARGE	= 32,175 CFS
OVERTOPPING FREQUENCY	= 200+/- YRS
OVERTOPPING ELEVATION	= 8.1 FT
DATE OF SURVEY	= 8/31/04
W.S. ELEVATION AT DATE OF SURVEY	= 11 FT

-L-  
FOR -L- PLAN VIEW SEE SHEET 5



1/24/2007 8:44:52 PM  
RA:\Roadway\Pro\B-4223\_rdy\_pfl.dgn

-BL- 12  
EL = 8.24'  
8" REBAR WITH CAP

-BL- 13  
EL = 6.82'  
8" REBAR WITH CAP

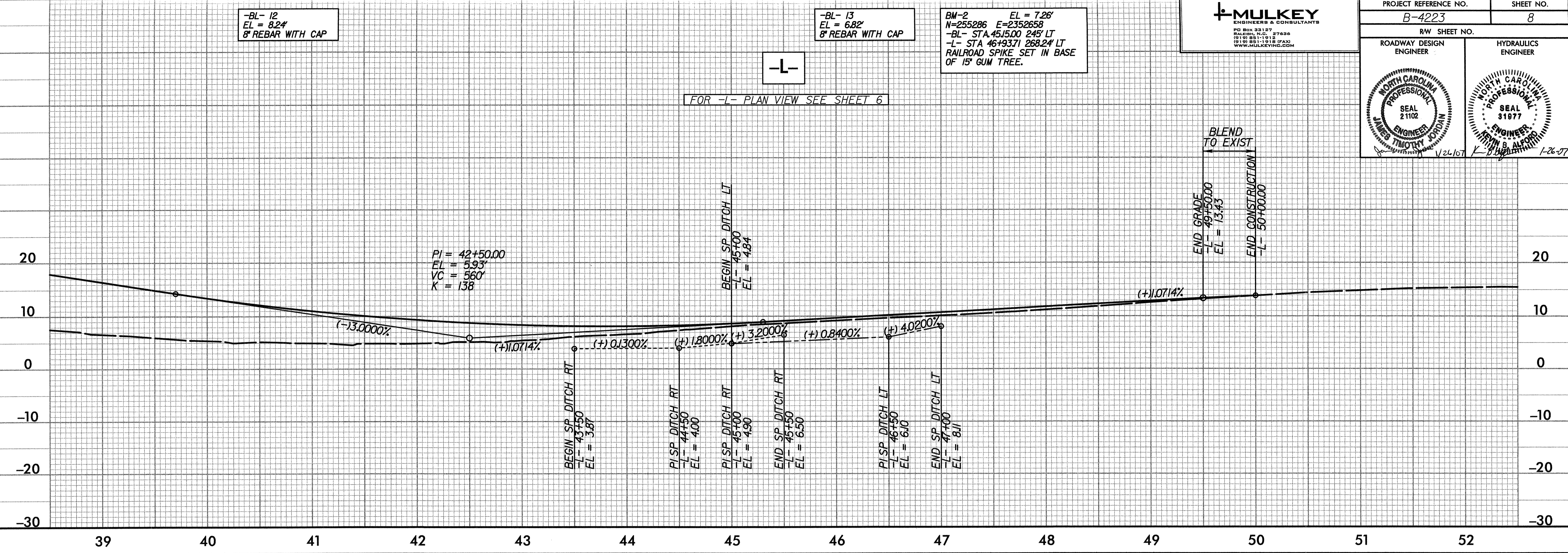
BM-2 EL = 7.26'  
N=255286 E=2352658  
-BL- STA 45+50.00 245' LT  
-L- STA 46+93.71 268.24' LT  
RAILROAD SPIKE SET IN BASE  
OF 15' GUM TREE.

**MULKEY**  
ENGINEERS & CONSULTANTS  
PO Box 33157  
RALEIGH, N.C. 27636  
(919) 881-1912  
(919) 881-1918 (FAX)  
WWW.MULKEYINC.COM

PROJECT REFERENCE NO. B-4223	SHEET NO. 8
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

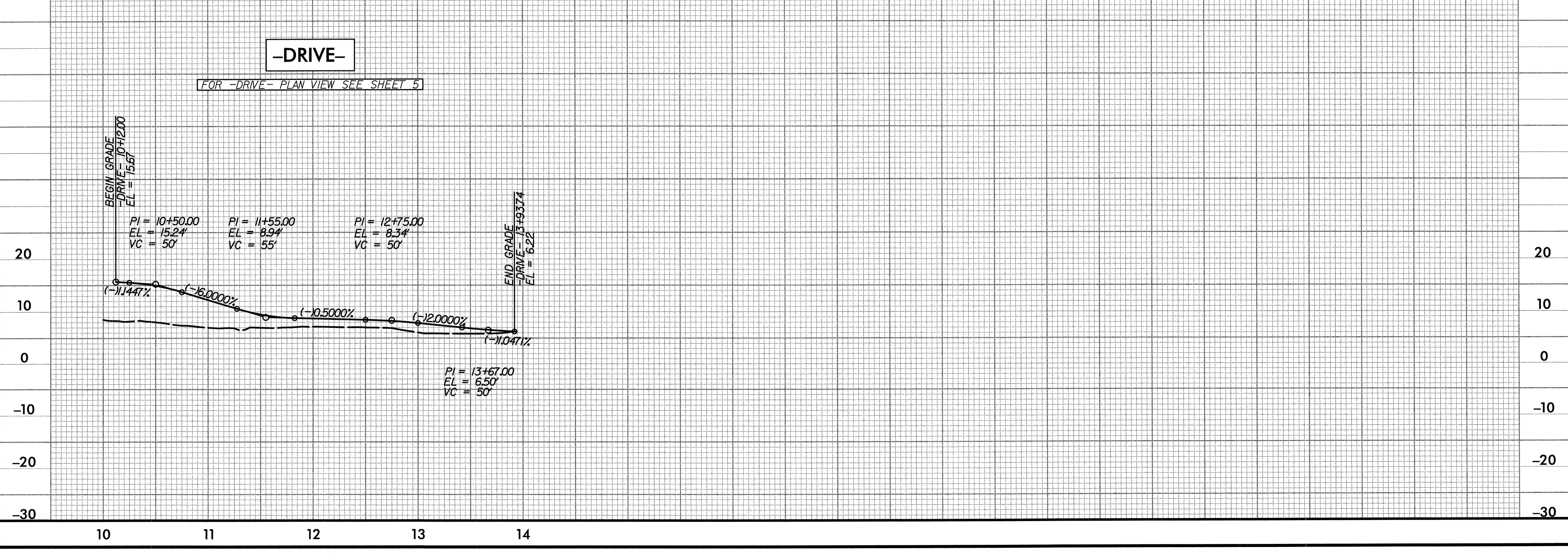
-L-

FOR -L- PLAN VIEW SEE SHEET 6



-DRIVE-

FOR -DRIVE- PLAN VIEW SEE SHEET 5



1/24/2007 8:42:05 PM  
R:\Roadway\Proj\B-4223\_r01.dwg