

See Sheet 1-A For Index of Sheets  
See Sheet 1-B For Symbology

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

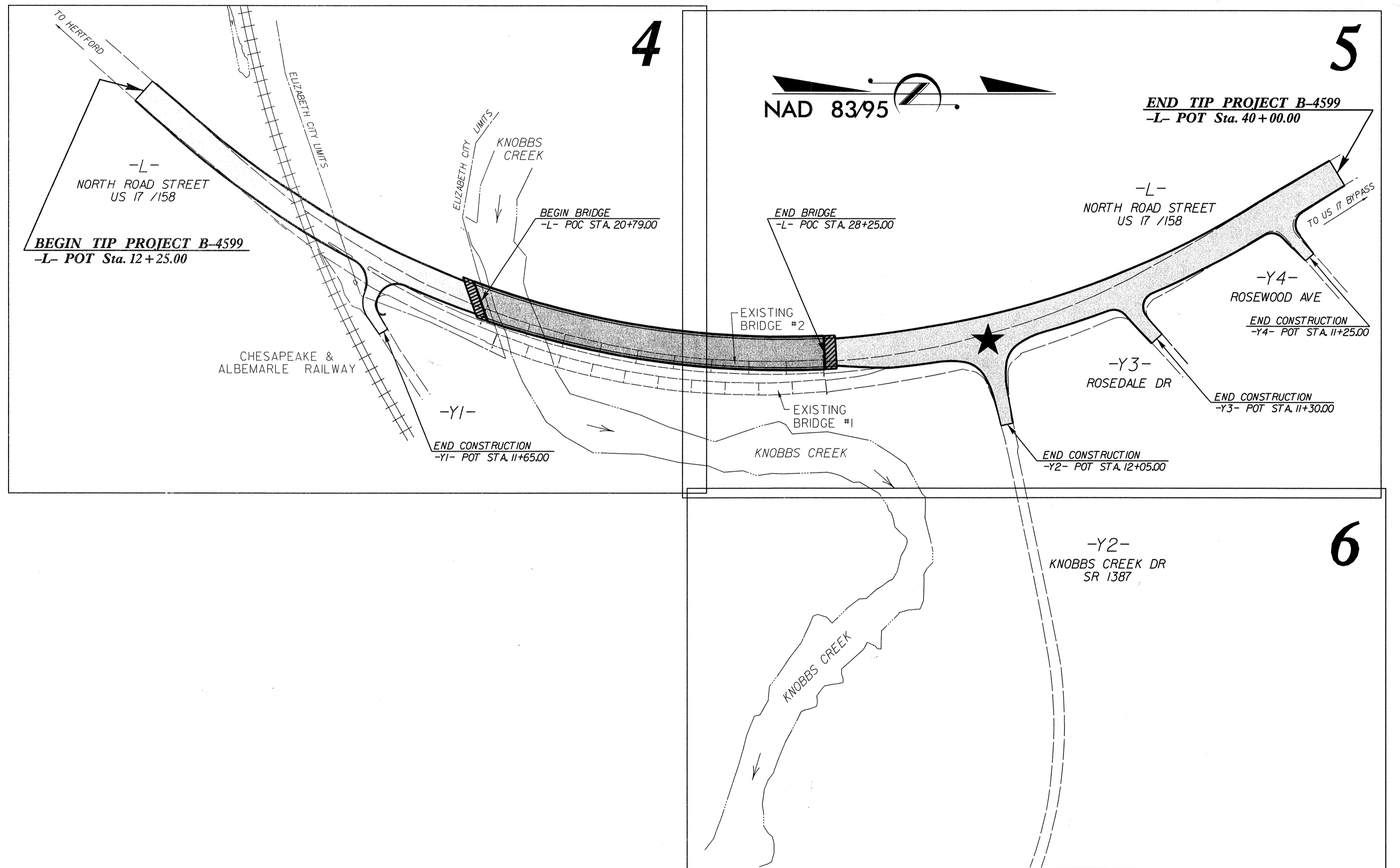
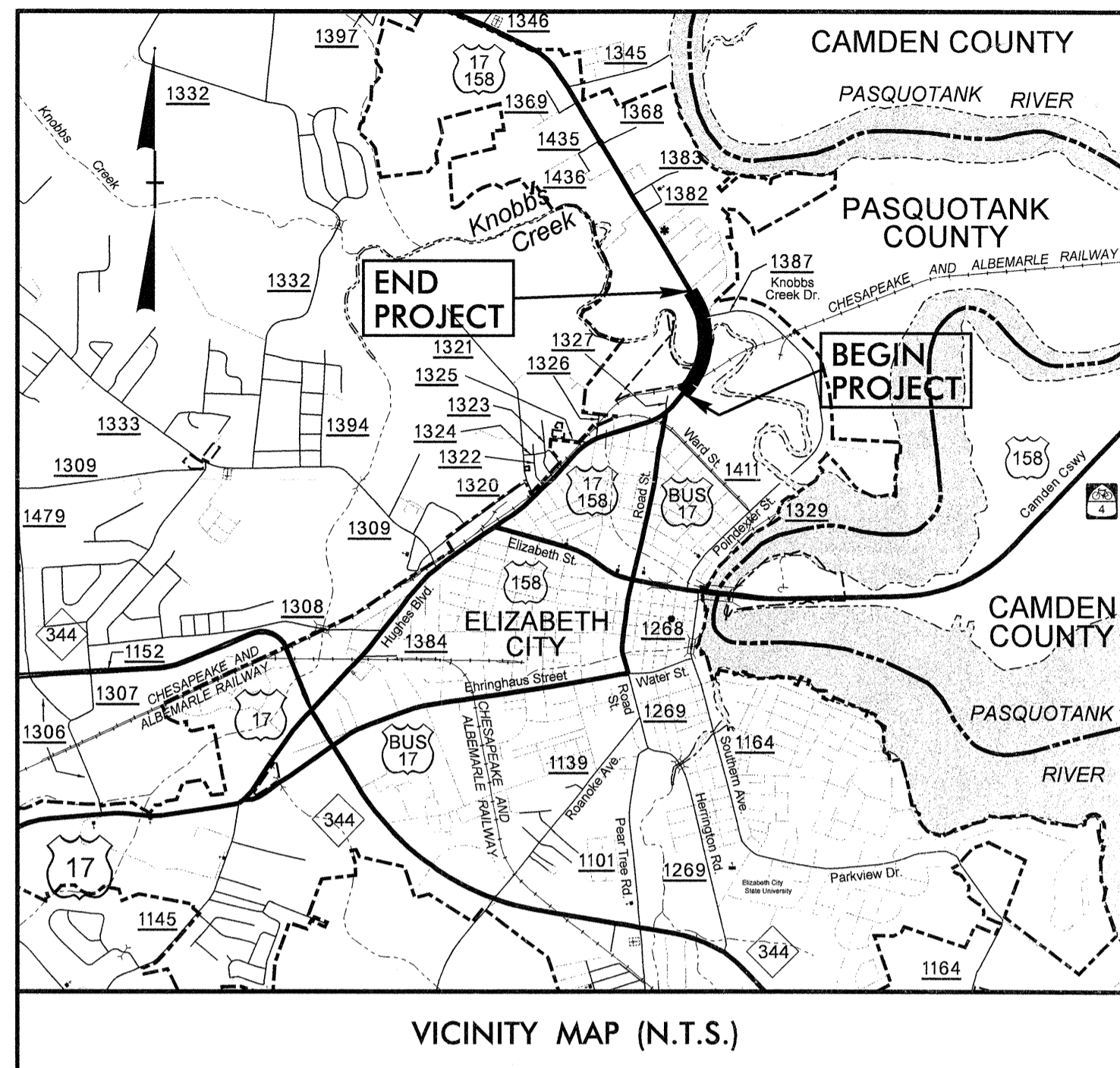
**PASQUOTANK COUNTY**

**LOCATION: BRIDGES 1 & 2 OVER KNOBBS CREEK ON US 17 / US 158.**

**TYPE OF WORK: GRADING, DRAINAGE, PAVING, SIGNAL, & STRUCTURE.**

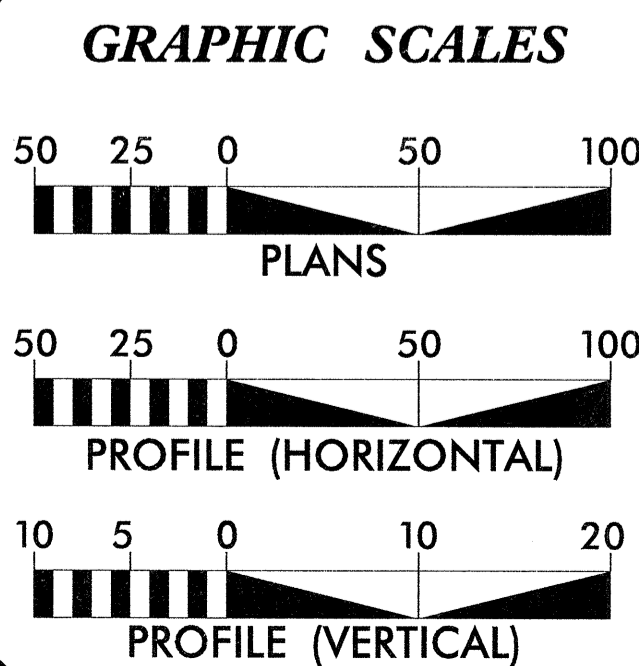
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4599	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33791.1.1	BRSTP-17(41)	PE	
33791.2.1	BRSTP-17(41)	R/W, UTILITIES	
33791.3.1	BRSTP-17(41)	CONSTRUCTION	

**TIP PROJECT: B-4599**



★ UPGRADE SIGNAL

**NCDOT CONTACT:**  
**BRENDA L. MOORE, PE**  
PROJECT ENGINEER  
ENGINEERING COORDINATION SECTION  
ROADWAY DESIGN UNIT



**DESIGN DATA**

ADT 2012 =	41,600
ADT 2032 =	59,400
DHV =	10 %
D =	60 %
T =	7 % *
V =	50 MPH
* (TTST 4% + DUAL 3%)	
FUNC. CLASS = URBAN PRINCIPAL ARTERIAL STATEWIDE TIER	

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT B-4599	=	0.385 mile
LENGTH STRUCTURE TIP PROJECT B-4599	=	0.141 mile
TOTAL LENGTH TIP PROJECT B-4599	=	0.526 mile

Prepared For:  
**DIVISION OF HIGHWAYS**  
1000 Birch Ridge Dr., Raleigh NC, 27610  
By:  
**M A Engineering Consultants, Inc.**  
598 East Chatham Street - Suite 137  
Cary, NC 27511  
Phone: 919.297.0220 Fax: 919.297.0221

2012 STANDARD SPECIFICATIONS

**RIGHT OF WAY DATE:**  
JANUARY 15, 2010

**LETTING DATE:**  
JUNE 19, 2012

**ROBERT W. PORTER, JR. PE**  
PROJECT ENGINEER

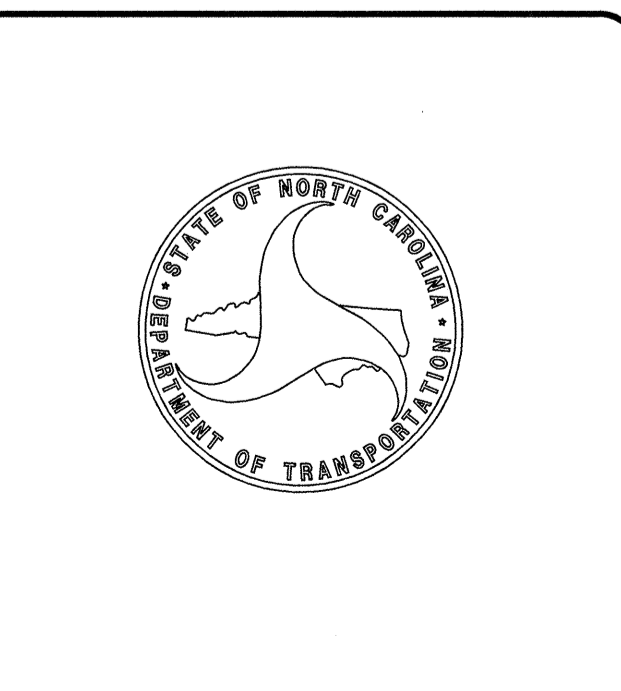
**KEVIN S. HUTCHENS**  
PROJECT DESIGN ENGINEER

**HYDRAULICS ENGINEER**

*Robert W. Porter, Jr.* 3/23/12 P.E.  
SIGNATURE: ROBERT W. PORTER, JR.

**ROADWAY DESIGN ENGINEER**

3-23-2012  
*Robert W. Porter, Jr.* P.E.  
SIGNATURE: ROBERT W. PORTER, JR.



3/23/2012 F:\Fogdwdwg\proj\B4599\_rdy\_tsh.dgn 10:06:03 AM

**CONTRACT: C202823**

GENERAL NOTES: 2012 SPECIFICATIONS  
EFFECTIVE: 01-17-12  
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 MODIFIED METHOD - 11. SEE SPECIAL PROVISION AND SPECIAL DETAIL ON SHEET 2-H.

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.

DRIVEWAYS:  
DRIVEWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. 848.02 USING 3' RADII OR RADII AS SHOWN ON THE PLANS. LOCATIONS OF DRIVES WILL BE AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

STREET TURNOUT:  
STREET RETURNS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 848.04 USING THE RADII NOTED ON PLANS.

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".

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:  
GAS - PIEDMONT NATURAL GAS  
POWER - DOMINION POWER, CITY OF ELIZABETH CITY  
TELEPHONE - CENTURYLINK  
CABLE - TIME WARNER  
WATER & SEWER - CITY OF ELIZABETH CITY

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.

2012 ROADWAY ENGLISH STANDARD DRAWINGS EFFECTIVE: 01-17-12  
REVISED:

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C.. Dated January, 2012 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
<b>DIVISION 2 - EARTHWORK</b>	
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
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
840.01	Brick Catch Basin - 12" thru 54" Pipe
840.02	Concrete Catch Basin - 12" thru 54" Pipe
840.03	Frame, Grates and Hood - for Use on Standard Catch Basin
840.14	Concrete Drop Inlet - 12" thru 30" Pipe
840.15	Brick Drop Inlet - 12" thru 30" Pipe
840.16	Drop Inlet Frame and Grates - for use with Std. Dwg 840.14 and 840.15
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.25	Anchorage for Frames - Brick or Concrete or Precast
840.27	Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.29	Frames and Narrow Slot Flat Grates
840.30	Driveway Drop Inlet
840.45	Precast Drainage Structure
840.54	Manhole Frame and Cover
840.66	Drainage Structure Steps
846.01	Concrete Curb, Gutter and Curb & Gutter
848.02	Driveway Turnout - Radius Type
848.04	Street Turnout
852.01	Concrete Islands
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
876.02	Guide for Rip Rap at Pipe Outlets

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PMP-1 THRU PMP-3	PAVEMENT MARKING PLANS
EC-1 THRU EC-7	EROSION CONTROL PLANS
SIG-1 THRU SIG-25	SIGNAL PLANS
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UO-1 THRU UO-4	UTILITIES BY OTHERS PLANS
X-1A	CROSS-SECTION SUMMARY
X-1 THRU X-18	CROSS-SECTIONS
S-1 THRU S-125	STRUCTURE PLANS

PROJECT REFERENCE NO. B-4599	SHEET NO. 1-A
ROADWAY DESIGN ENGINEER	
M A Engineering Consultants, Inc. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221	

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

# CONVENTIONAL PLAN SHEET SYMBOLS

*Note: Not to Scale*

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

**BOUNDARIES AND PROPERTY:**

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Existing Iron Pin	○ EIP
Property Corner	-----*
Property Monument	□ ECM
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
Known Soil Contamination: Area or Site	☠ ☠
Potential Soil Contamination: Area or Site	☠ ?

**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	○ MILEPOST 35
Switch	□ SWITCH
RR Abandoned	-----
RR Dismantled	-----

**RIGHT OF WAY:**

Baseline Control Point	◆
Existing Right of Way Marker	△
Existing Right of Way Line	-----
Proposed Right of Way Line	-----
Proposed Right of Way Line with Iron Pin and Cap Marker	-----
Proposed Right of Way Line with Concrete or Granite Marker	-----
Existing Control of Access	○
Proposed Control of Access	○
Existing Easement Line	--- E
Proposed Temporary Construction Easement	--- E
Proposed Temporary Drainage Easement	--- TDE
Proposed Permanent Drainage Easement	--- PDE
Proposed Permanent Drainage / Utility Easement	--- DUE
Proposed Permanent Utility Easement	--- PUE
Proposed Temporary Utility Easement	--- TUE
Proposed Aerial Utility Easement	--- AUE
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 Curb Ramp	○ CR
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	--- CONC WW ---
MINOR:	
Head and End Wall	--- CONC HW ---
Pipe Culvert	-----
Footbridge	-----
Drainage Box: Catch Basin, DI or JB	□ CB
Paved Ditch Gutter	-----
Storm Sewer Manhole	○
Storm Sewer	-----

**UTILITIES:**

POWER:	
Existing Power Pole	●
Proposed Power Pole	○
Existing Joint Use Pole	●
Proposed Joint Use Pole	○
Power Manhole	○
Power Line Tower	□
Power Transformer	□
U/G Power Cable Hand Hole	○
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.*)	-----

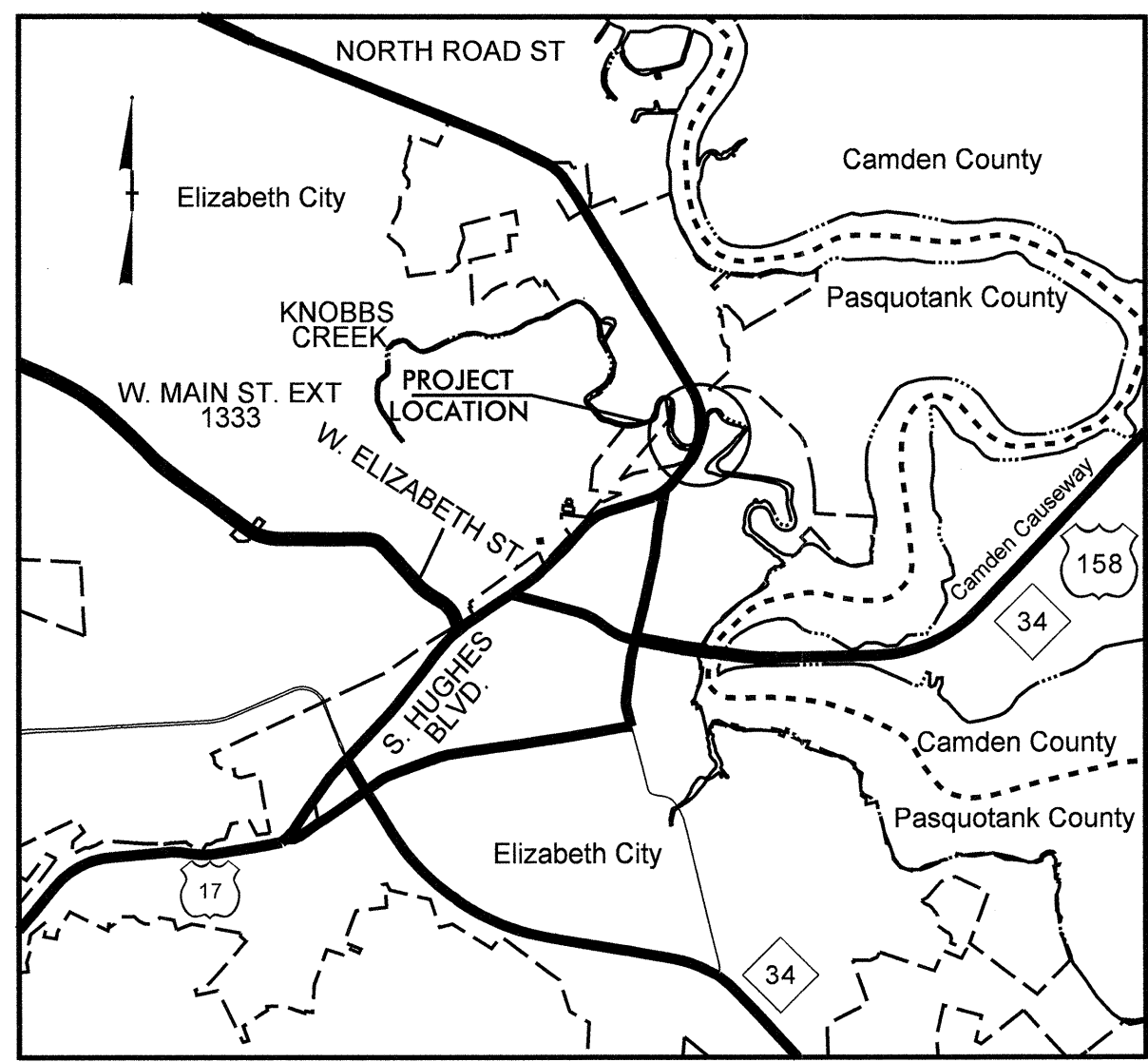
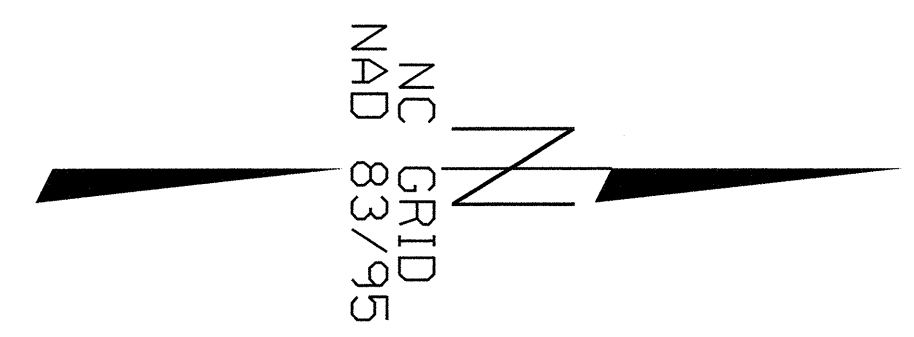
**MISCELLANEOUS:**

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

# SURVEY CONTROL SHEET B-4599

## CONTROL DATA

BL POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
B45991	GPS MON (B4599-1)	943734.1890	2818674.1430	5.56	OUTSIDE PROJECT LIMITS	
B45992	GPS MON (B4599-2)	944619.1830	2819513.3330	4.57	17+55.30	67.70 RT
BL3	(BL-3)	944955.8830	2819686.4370	4.88	21+18.91	90.72 RT
BL4	(BL-4)	945695.3130	2819786.7630	4.45	28+35.98	90.01 RT
BL5	(BL-5)	946076.4930	2819753.9890	4.73	31+99.58	111.89 RT
BL6	(BL-6)	946323.8810	2819529.1390	3.86	34+97.94	26.16 LT



**VICINITY MAP**

**NCDOT GPS STATION "B4599-1"**  
**LOCALIZED PROJECT COORDINATES**  
 N = 943,734.1890  
 E = 2,818,674.1430

**BEGIN TIP PROJECT B-4599**  
**-L- POT Sta. 12+40.00**  
**LOCALIZED PROJECT COORDINATES**  
 N = 944,238.6351  
 E = 2,819,148.7887

**NCDOT GPS STATION "B4599-2"**  
**LOCALIZED PROJECT COORDINATES**  
 N = 944,619.1830  
 E = 2,819,513.3330

**BENCHMARK DATA**

BM10	ELEVATION - 4.95
N 944459	E 2819503
BL STATION 15+96 102 RIGHT	

### DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B4599-1" WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF NORTHING: 943,734.189 (US FT) EASTING: 2,818,674.143 (US FT) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 1.00004923 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B4599-1" TO -L- STATION 12+40.00 IS N 43°15'23.9" E 692.64 ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

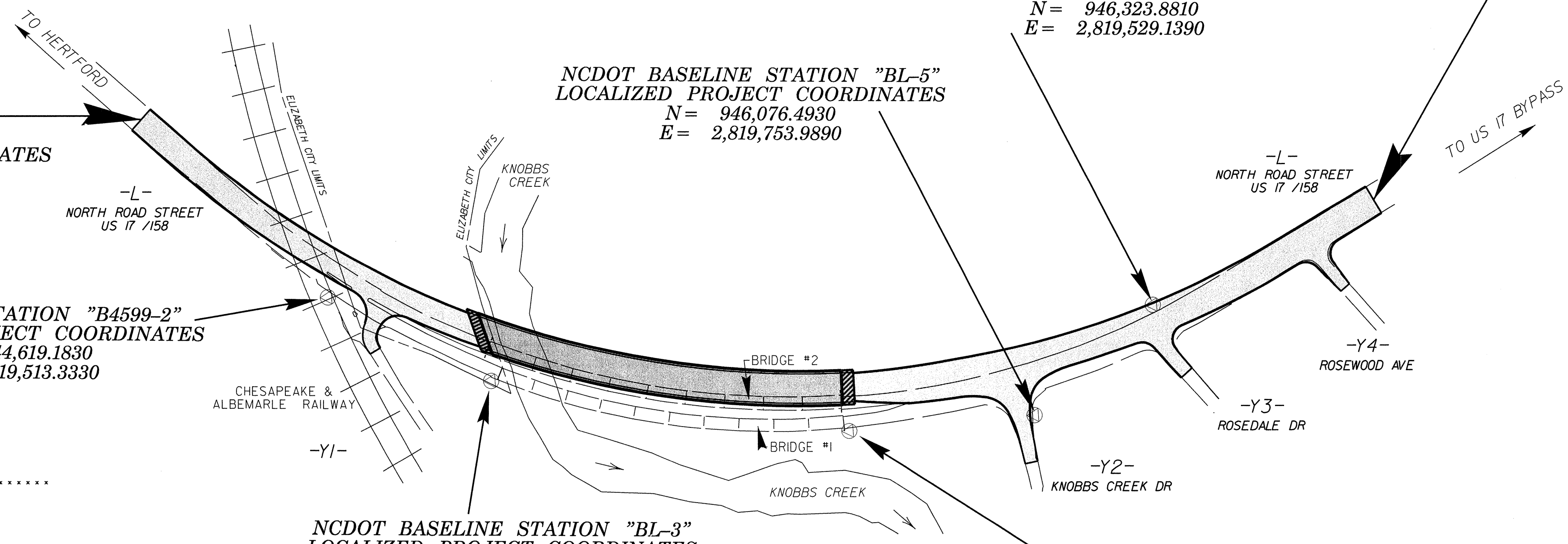
**NCDOT BASELINE STATION "BL-6"**  
**LOCALIZED PROJECT COORDINATES**  
 N = 946,323.8810  
 E = 2,819,529.1390

**NCDOT BASELINE STATION "BL-5"**  
**LOCALIZED PROJECT COORDINATES**  
 N = 946,076.4930  
 E = 2,819,753.9890

**NCDOT BASELINE STATION "BL-3"**  
**LOCALIZED PROJECT COORDINATES**  
 N = 944,955.8830  
 E = 2,819,686.4370

**NCDOT BASELINE STATION "BL-4"**  
**LOCALIZED PROJECT COORDINATES**  
 N = 945,695.3130  
 E = 2,819,786.7630

**END TIP PROJECT B-4599**  
**-L- POT Sta. 40+00.00**  
**LOCALIZED PROJECT COORDINATES**  
 N = 946,774.4122  
 E = 2,819,313.9301



**NOTES:**

1. 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/)

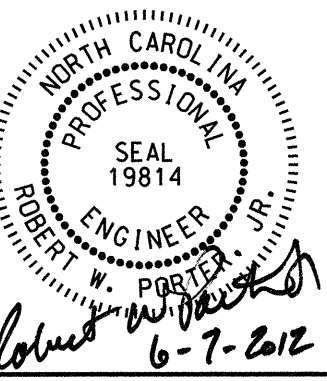
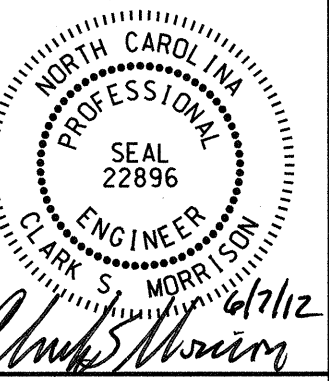
THE FILES TO BE FOUND ARE AS FOLLOWS:  
 TIP B4599\_LS\_CONTROL\_090511.TXT

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.

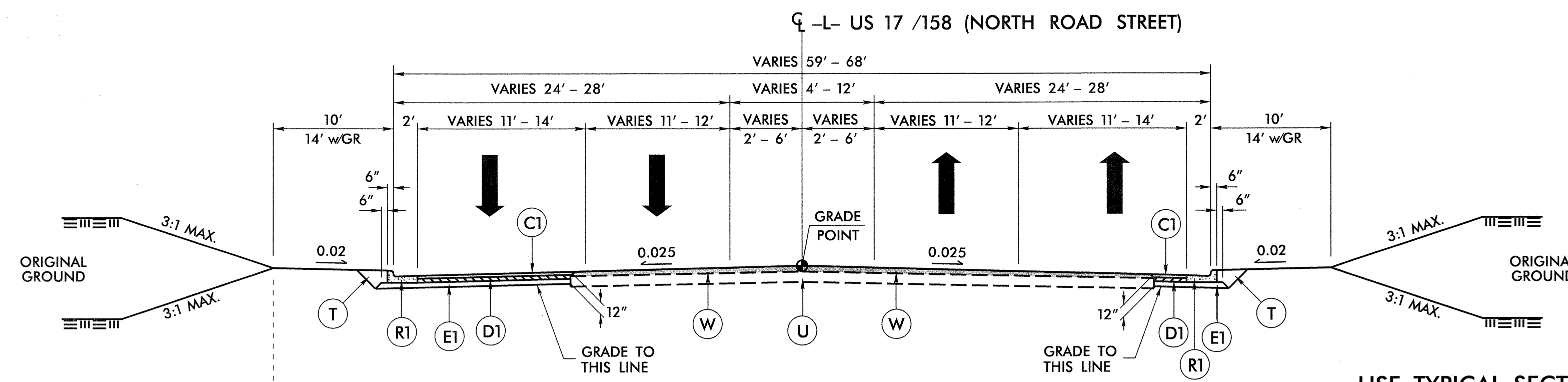
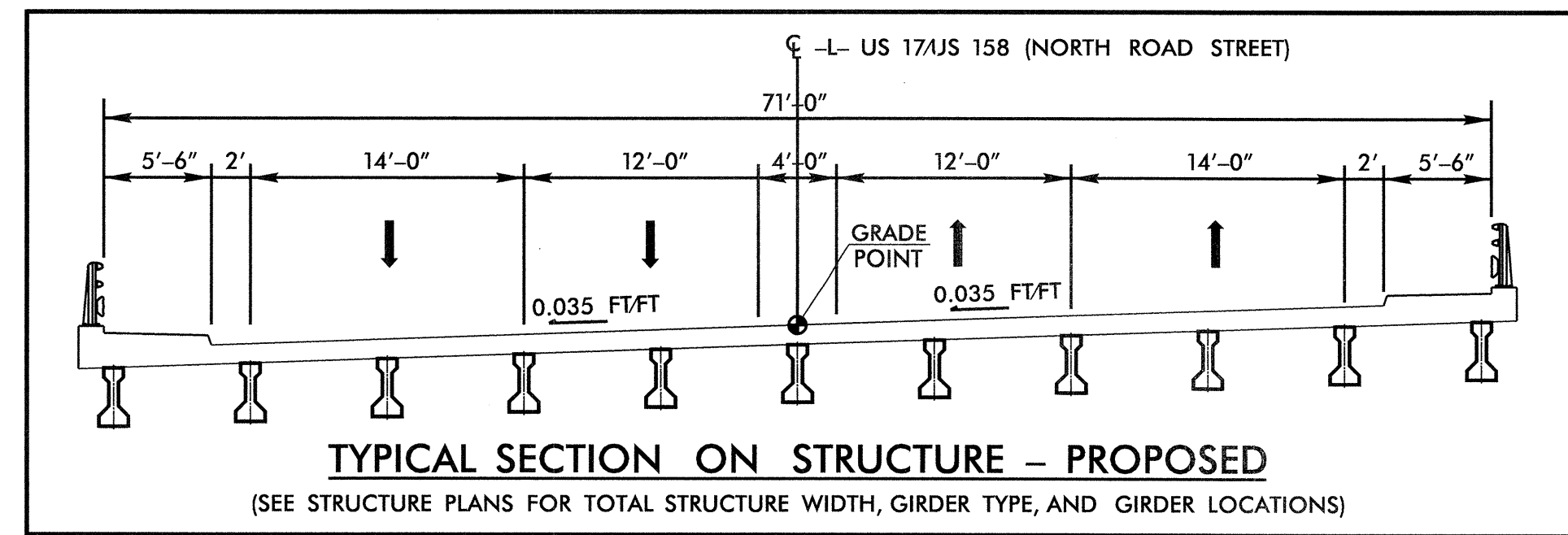
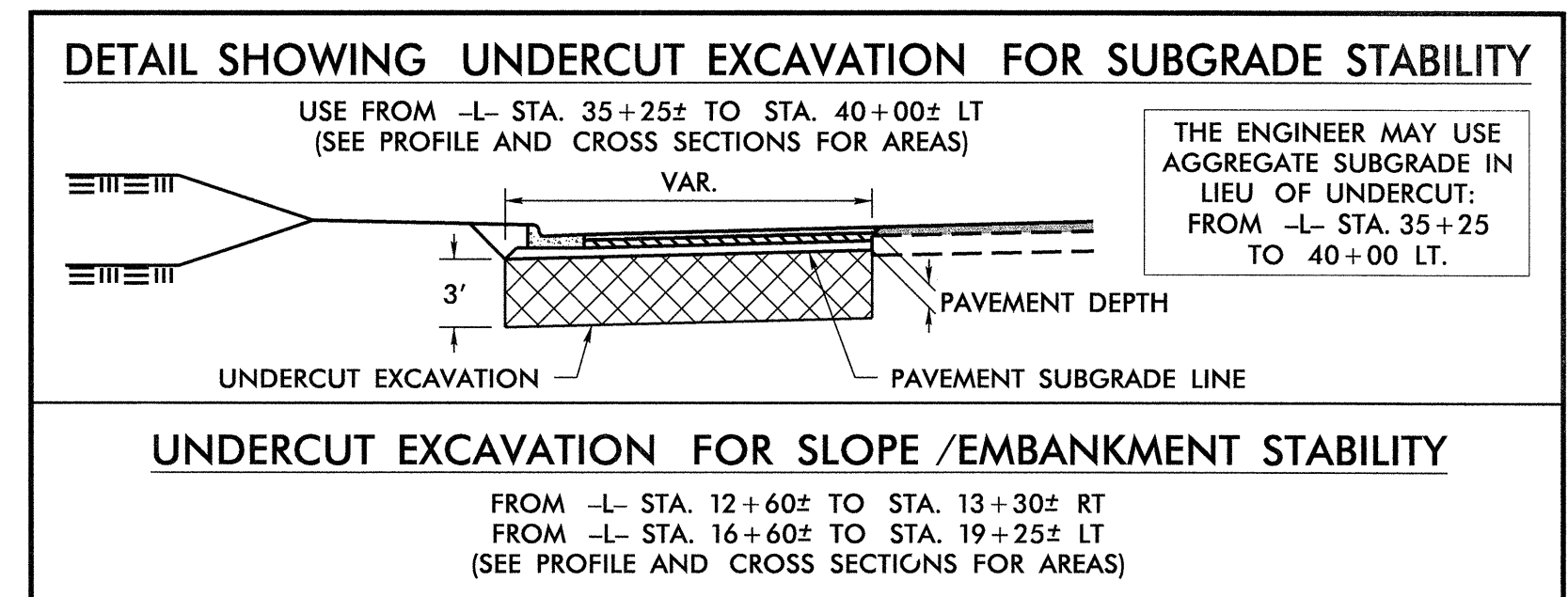
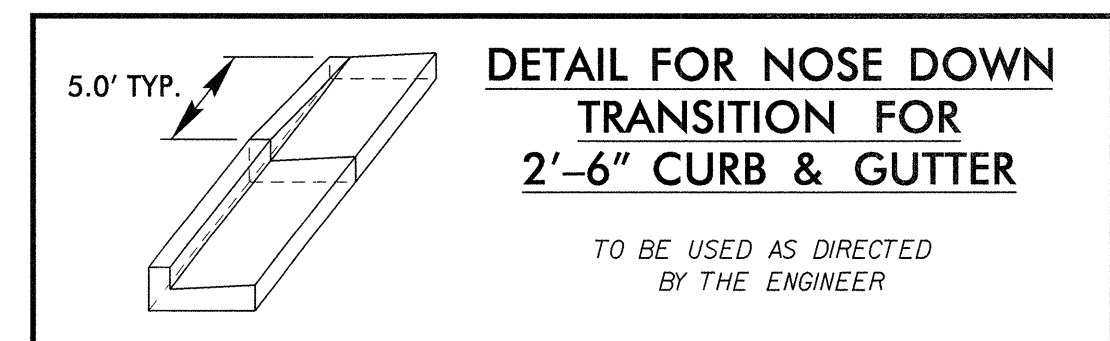
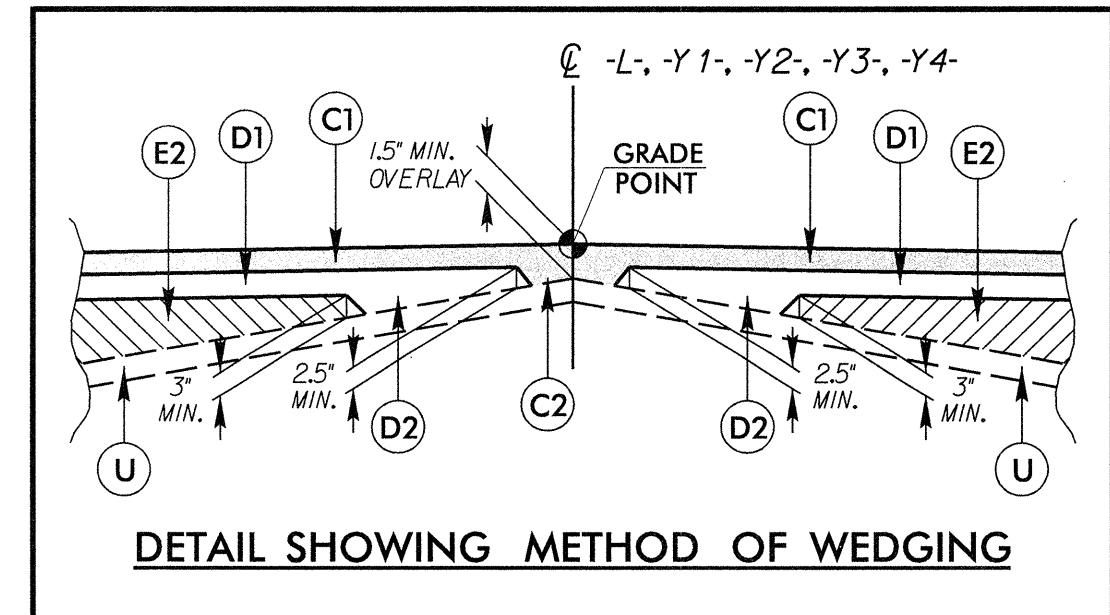
PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM. NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION

NOTE: DRAWING NOT TO SCALE

PROJECT REFERENCE NO. <b>B-4599</b>	SHEET NO. <b>2</b>
ROADWAY DESIGN ENGINEER 	PAVEMENT DESIGN ENGINEER 
<b>M A Engineering Consultants, Inc.</b> 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221	

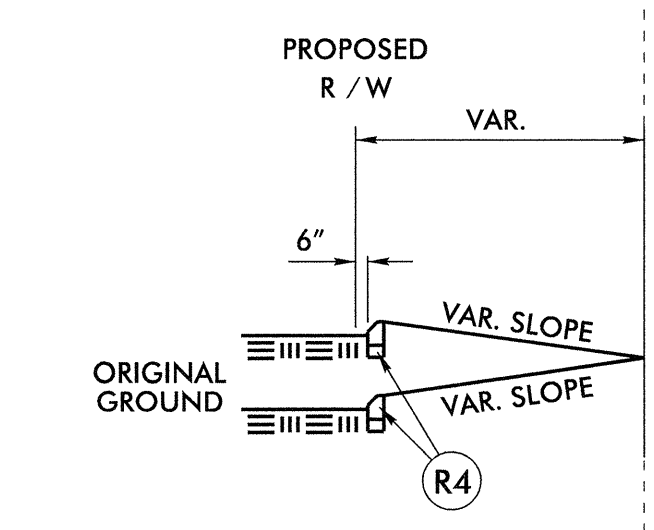
PAVEMENT SCHEDULE	
C1	PROP. APPROX. 3.0" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS PER SQUARE YARD IN EACH OF TWO LAYERS.
C2	PROP. VARIABLE DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS PER SQUARE YARD PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 1.5" OR GREATER THAN 2.0" IN DEPTH.
D1	PROP. APPROX. 4.0" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS PER SQUARE YARD.
D2	PROP. VARIABLE DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS PER SQUARE YARD PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2.5" OR GREATER THAN 4.0" IN DEPTH.
E1	PROP. APPROX. 5.0" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 570 LBS PER SQUARE YARD.
E2	PROP. VARIABLE DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS PER SQUARE YARD PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 3.0" OR GREATER THAN 5.5" IN DEPTH.
R1	2'-6" CONCRETE CURB AND GUTTER
R2	2'-0" CONCRETE VALLEY GUTTER
R3	NON-MOUNTABLE 6" MONOLITHIC CONCRETE ISLAND (SEE DETAIL 2-K)
R4	8" x 18" CONCRETE CURB
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAIL THIS SHEET)

PAVEMENT EDGE SLOPES AND TRENCH SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

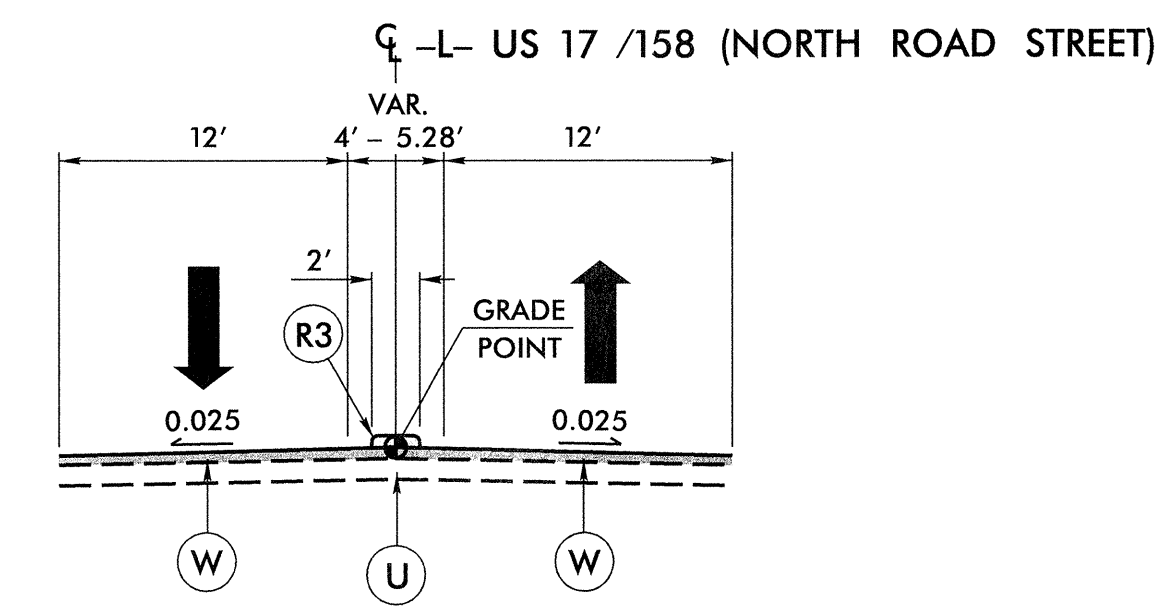


**TYPICAL SECTION NO. 1**

**USE TYPICAL SECTION NO. 1:**  
FROM -L- STA. 12+40.00 TO STA. 19+00.00  
FROM -L- STA. 31+00.00 TO STA. 40+00.00

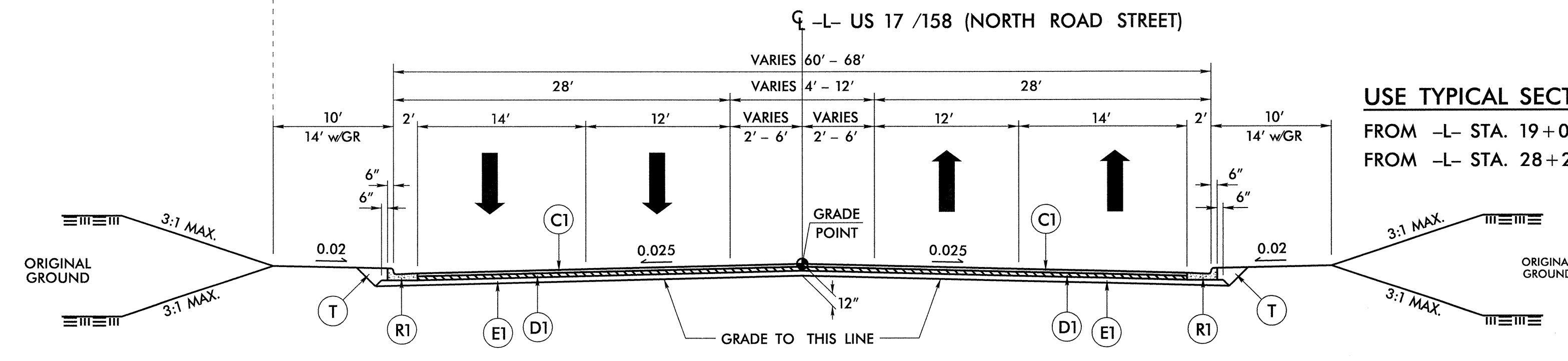


**CHANNELIZATION DETAIL**  
SEE PLANS FOR LOCATIONS



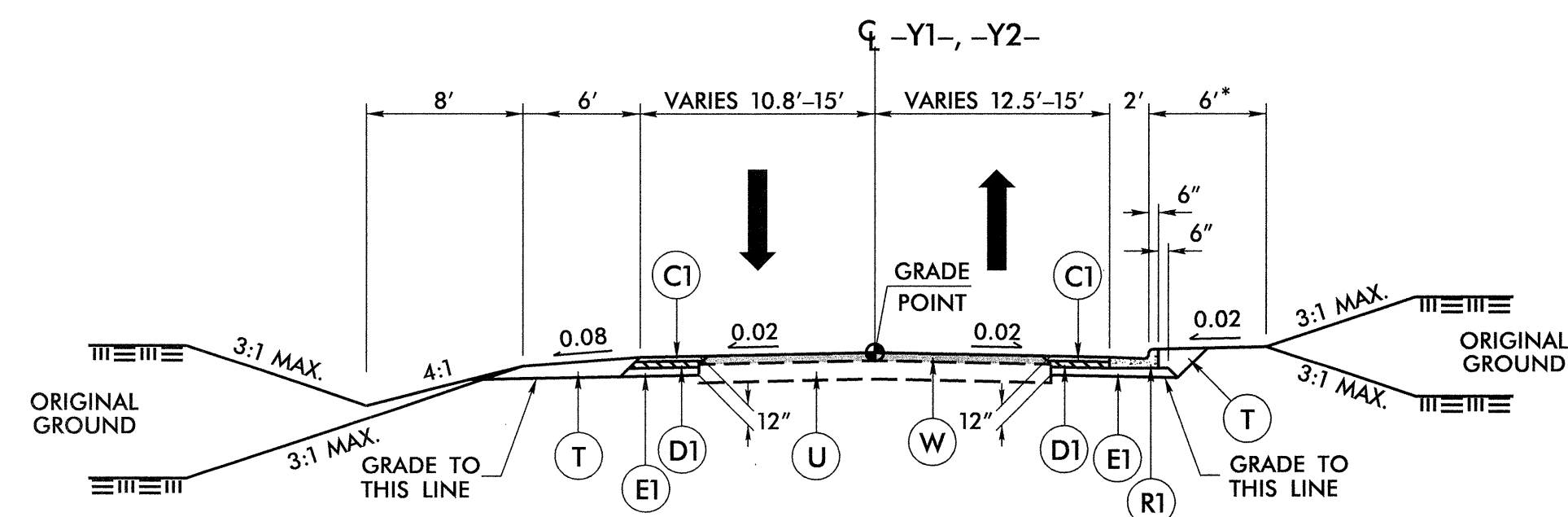
**PARTIAL TYPICAL SECTION NO. 1A**

**MILL UP TO 1.5\"/>
**RESURFACE 1.5\"/>
**USE PARTIAL TYPICAL SECTION NO. 1A IN CONJUNCTION WITH TYPICAL SECTION 1:**  
FROM -L- STA. 15+30.00 TO STA. 16+33.00 CL  
FROM -L- STA. 16+76.00 TO STA. 17+80.00 CL****



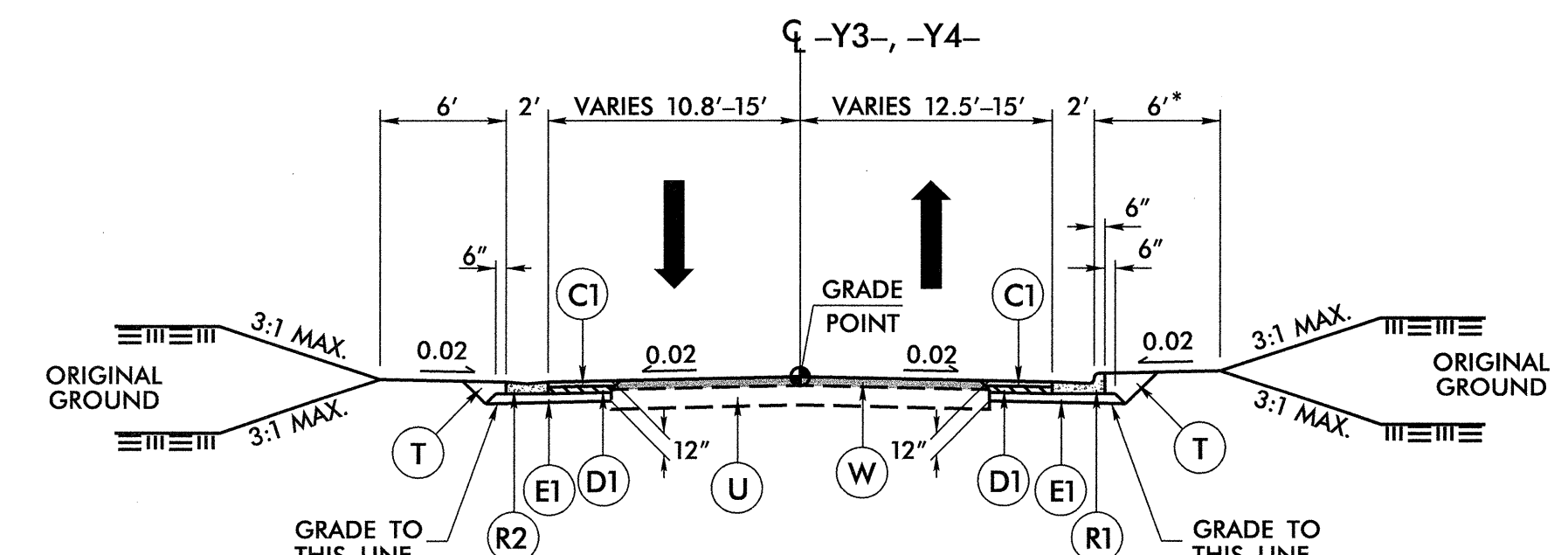
**TYPICAL SECTION NO. 2**

**USE TYPICAL SECTION NO. 2:**  
FROM -L- STA. 19+00.00 TO STA. 20+79.00 (BEGIN BRIDGE)  
FROM -L- STA. 28+25.00 (END BRIDGE) TO STA. 31+00.00



**TYPICAL SECTION NO. 3**

**USE TYPICAL SECTION NO. 3:**  
FROM -Y1- STA. 10+28.00 TO STA. 11+65.00  
FROM -Y2- STA. 10+32.00 TO STA. 12+05.00



**TYPICAL SECTION NO. 4**

**USE TYPICAL SECTION NO. 4:**  
FROM -Y3- STA. 10+32.00 TO STA. 11+30.00  
FROM -Y4- STA. 10+32.55 TO STA. 11+25.00

**NOTES (TYPICALS #3 & #4):**

2'-6" CURB & GUTTER, 2' VALLEY GUTTER, OR SHOULDER SECTION CAN BE USED ON EITHER RIGHT OR LEFT SIDE OF TYPICAL SECTION 3 OR 4 AS REQUIRED, AS SHOWN ON PLAN SHEETS 4 & 5.

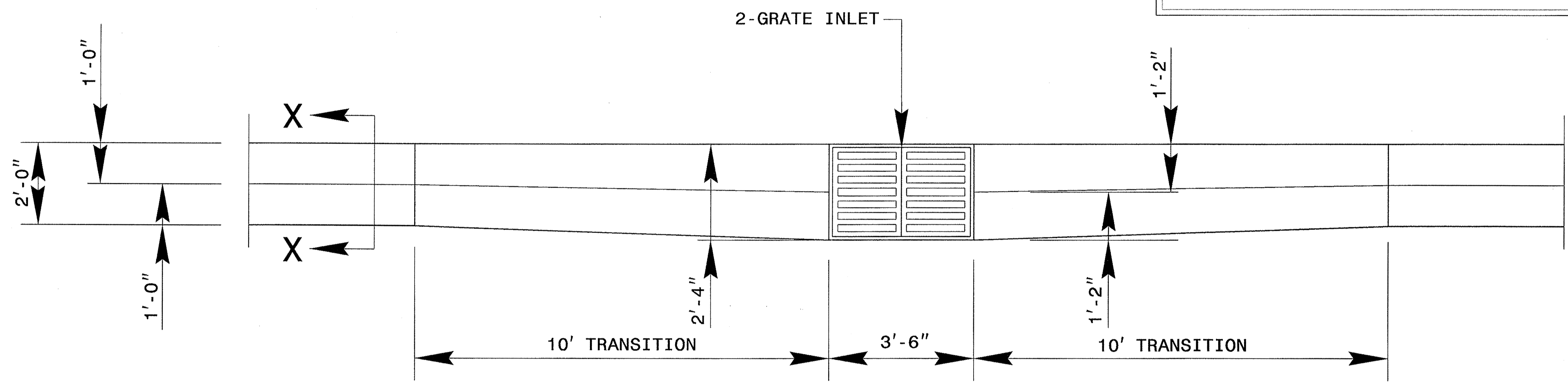
\* - USE 10' BERM WITHIN INTERSECTION RADII.

**MILL UP TO 1.5\"/>
**FROM -Y1- STA. 11+60.00 TO STA. 11+65.00**  
**FROM -Y2- STA. 12+00.00 TO STA. 12+05.00**  
**FROM -Y3- STA. 11+25.00 TO STA. 11+30.00**  
**FROM -Y4- STA. 11+20.00 TO STA. 11+25.00****

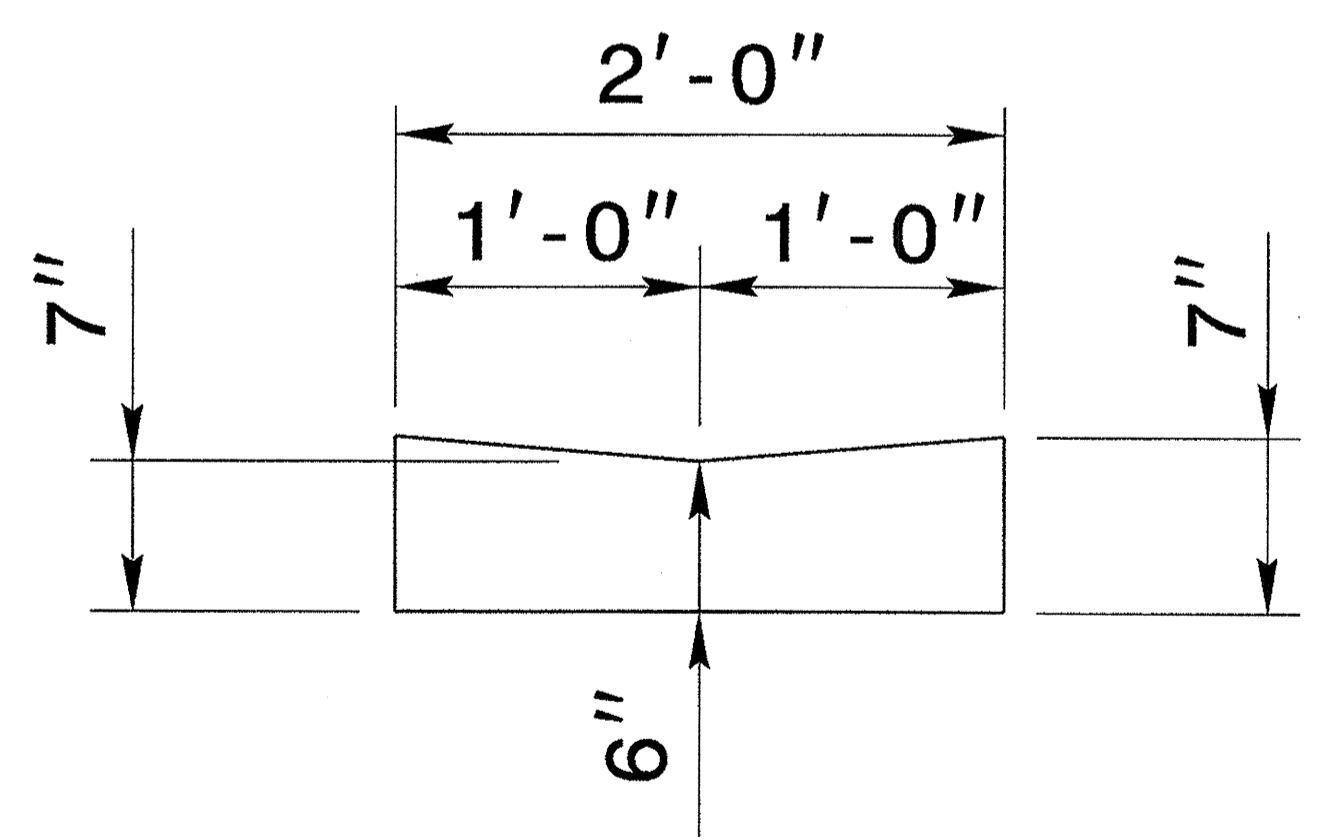
5/14/99

**GENERAL NOTES:**

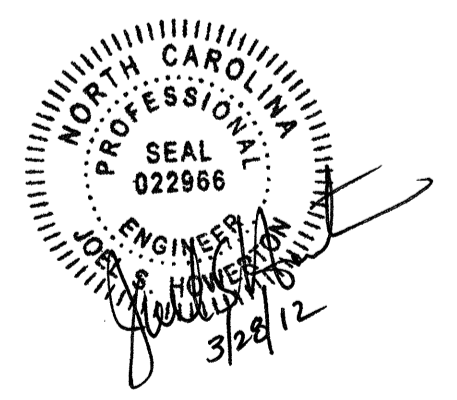
- PLACE CONTRACTION JOINTS AT 10' INTERVALS, EXCEPT THAT A 15' SPACING MAY BE USED WHEN A MACHINE IS USED OR WHEN SATISFACTORY SUPPORT FOR THE FACE FORM CAN BE OBTAINED WITHOUT THE USE OF TEMPLATES AT 10' INTERVALS.
- JOINT SPACING MAY BE ALTERED IF REQUIRED BY THE ENGINEER.
- CONTRACTION JOINTS MAY BE INSTALLED WITH THE USE OF TEMPLATES OR FORMED BY OTHER APPROVED METHODS.
- CONSTRUCT NON-TEMPLATE FORMED JOINTS A MIN. OF 1½" DEEP.
- FILL ALL CONSTRUCTION JOINTS, EXCEPT IN 8"x6" MEDIAN CURB, WITH JOINT FILLER AND SEALER.
- SPACE EXPANSION JOINTS AT 90' INTERVALS AND ADJACENT TO ALL RIGID OBJECTS.



**2-GI IN VALLELY GUTTER PLAN VIEW**



**VALLEY GUTTER SECTION X-X**



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**2-GI IN VALLEY GUTTER**

ORIGINAL BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
 MODIFIED BY: rnbritt DATE: 02-20-12  
 CHECKED BY: *[Signature]* DATE: 2/2/12  
 FILE SPEC: \\faxis/english/misc/2gi\_in\_valley\_gutter.dgn

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

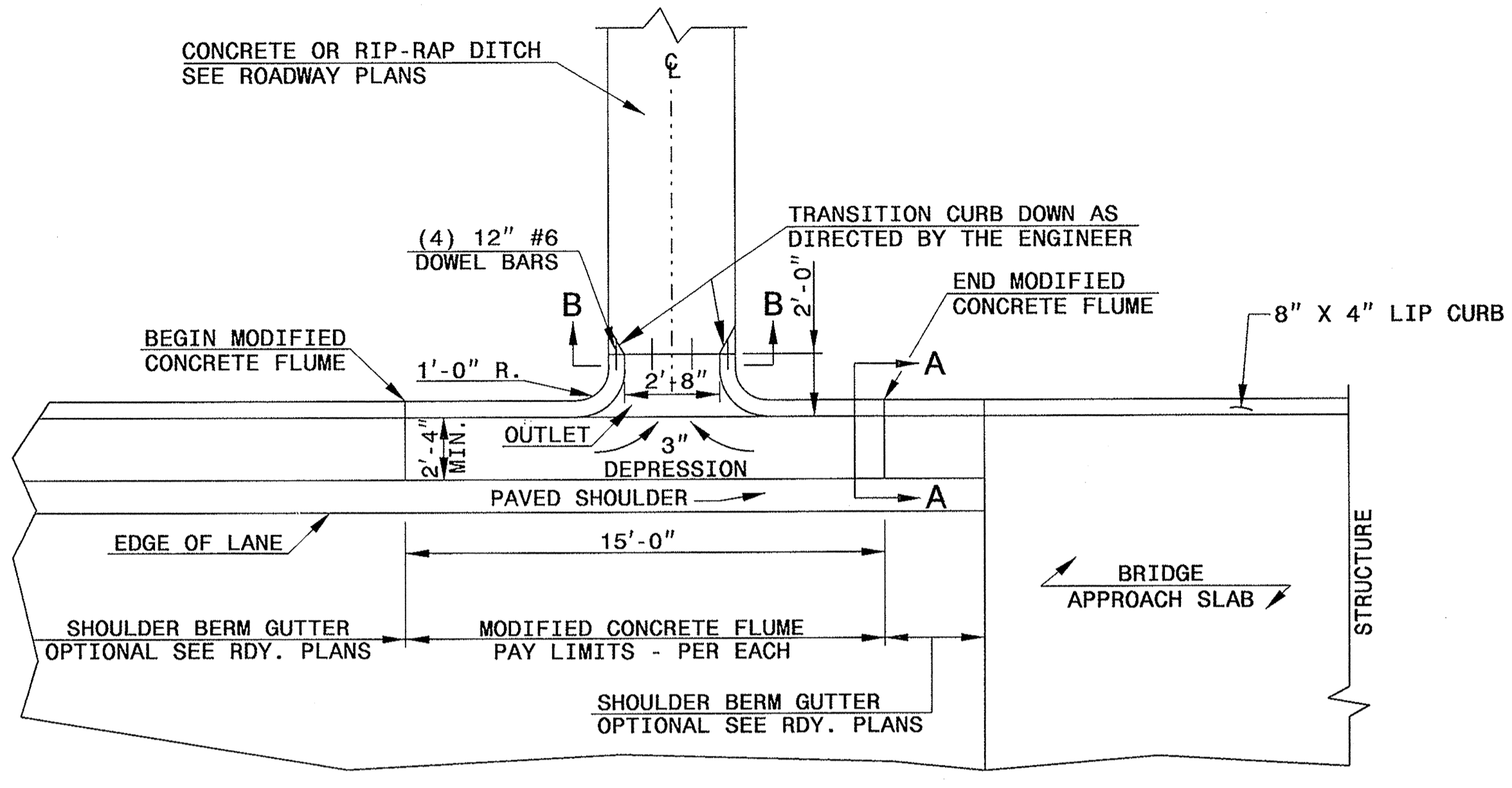
ENGLISH DETAIL DRAWING FOR  
**MODIFIED CONCRETE FLUME**  
WITH CONCRETE OR RIP-RAP DITCH

SHEET 1 OF 1  
MODFLMDTCH

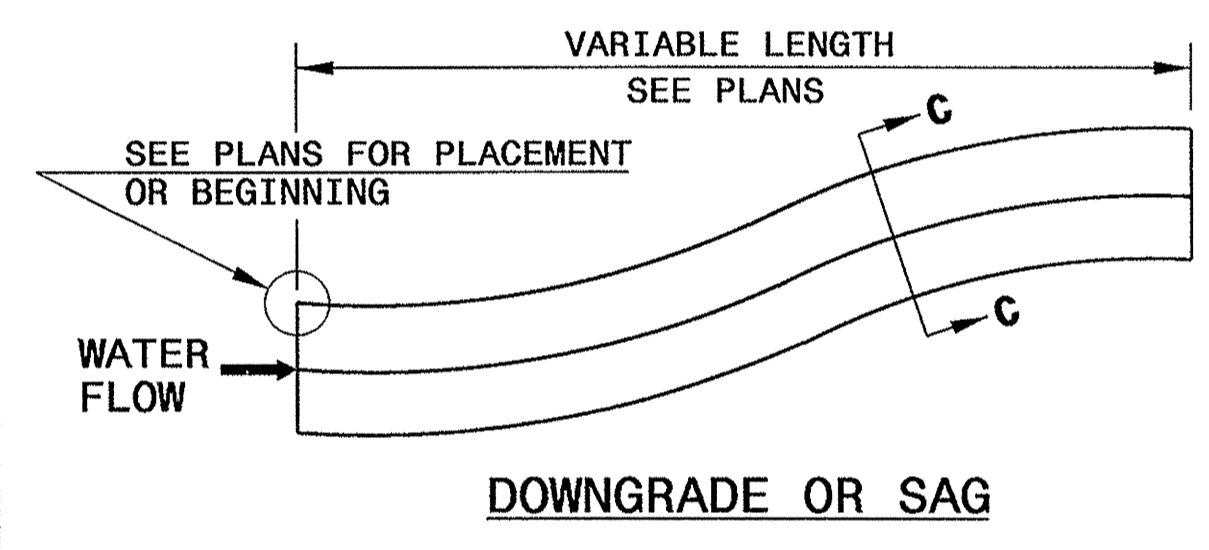
STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR  
**MODIFIED CONCRETE FLUME**  
WITH CONCRETE OR RIP-RAP DITCH

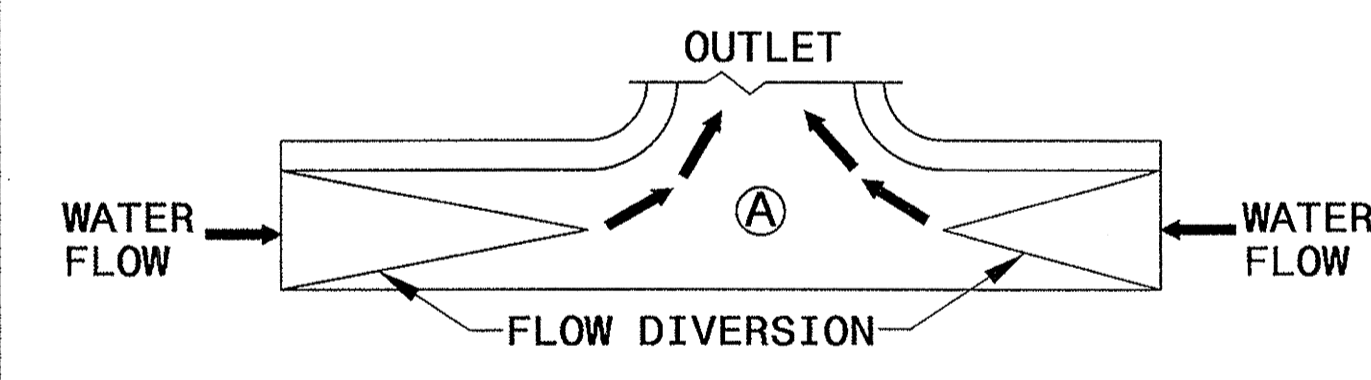
SHEET 1 OF 1  
MODFLMDTCH



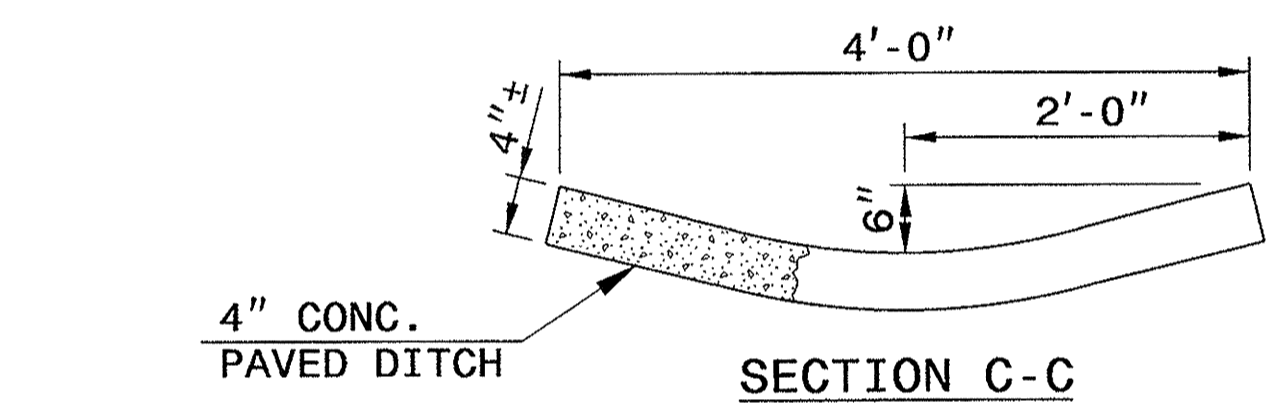
PLAN VIEW



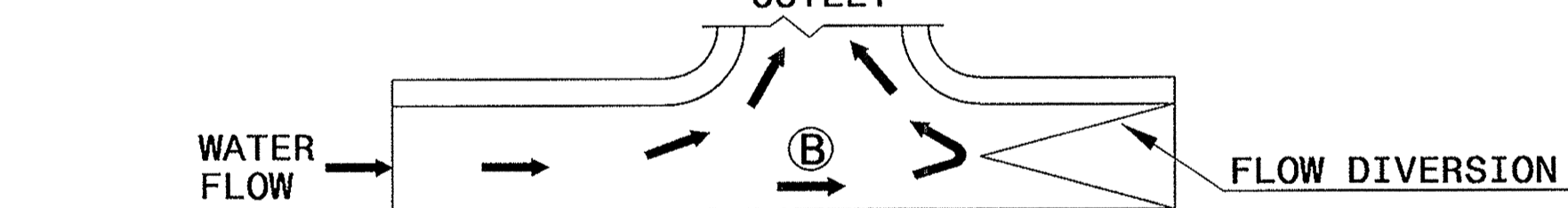
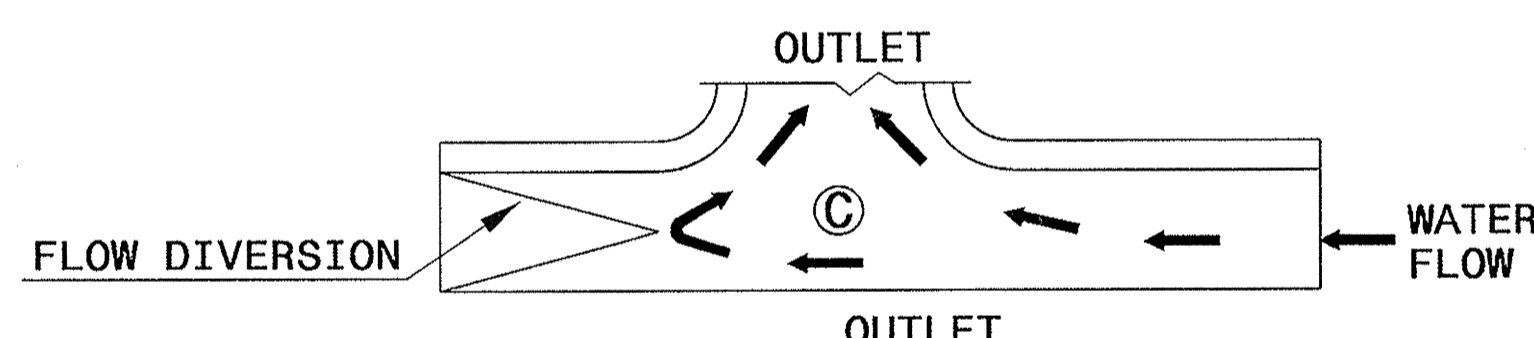
DOWNGRADE OR SAG



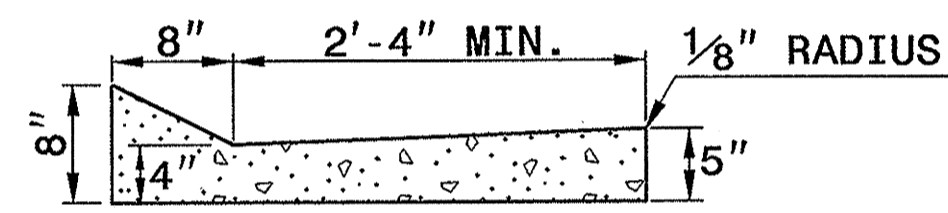
SAG



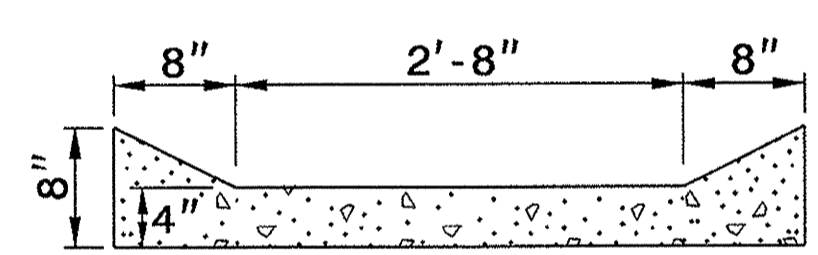
SECTION C-C



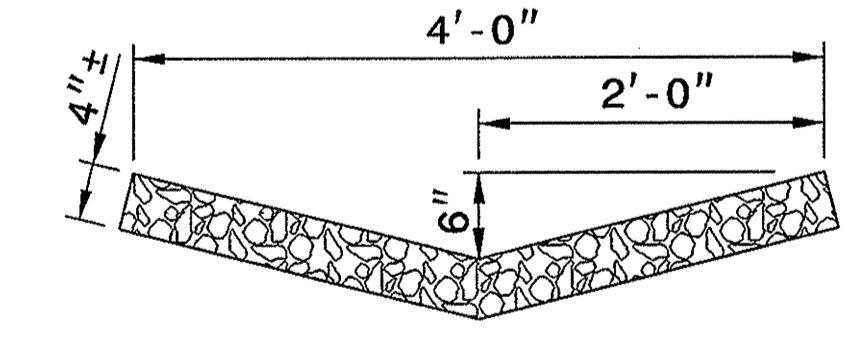
FLOW DIVERSION EXAMPLES



SECTION A-A

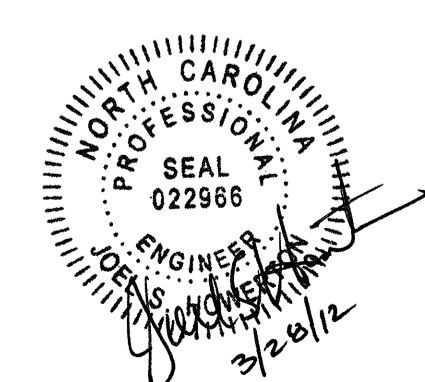


SECTION B-B



RIP-RAP LINED DITCH

- NOTES:
- CONSTRUCT MODIFIED CONCRETE FLUME AND SHOULDER BERM GUTTER IN ACCORDANCE WITH THIS DETAIL.
  - CONSTRUCT CONCRETE DITCH IN ACCORDANCE WITH STD. DWG. NO. 850.01.
  - CONSTRUCT RIP RAP LINED DITCH IN ACCORDANCE WITH THIS DETAIL, IF CALLED FOR IN PLANS.
  - CONCRETE OR RIP RAP LINED DITCH SHALL BE THE TYPE AND LENGTH SPECIFIED BY THE ROADWAY PLANS. THE DITCH SHALL TERMINATE AS SHOWN ON THE PLANS. IF NO TERMINATION IS INDICATED PLACE RIP-RAP AT THE END OF THE DITCH AS INDICATED BY STD. DWG. 876.02 FOR AN 18" PIPE. TRANSITIONS FROM THE DITCH TO TERMINATION SHALL BE AS DIRECTED BY THE ENGINEER.
  - MODIFICATIONS SHALL BE AS DICTATED BY SITE CONDITIONS AND DIRECTED BY THE ENGINEER.

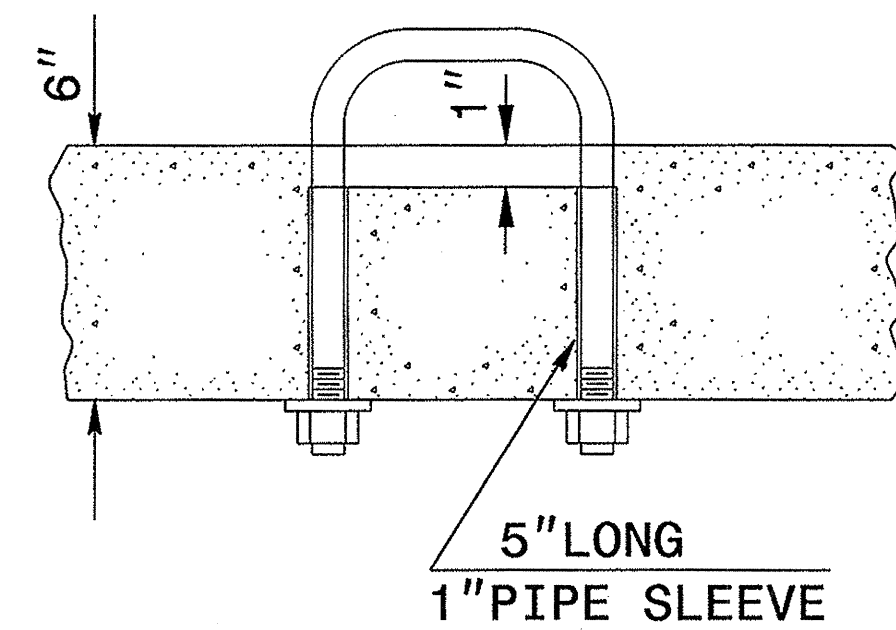


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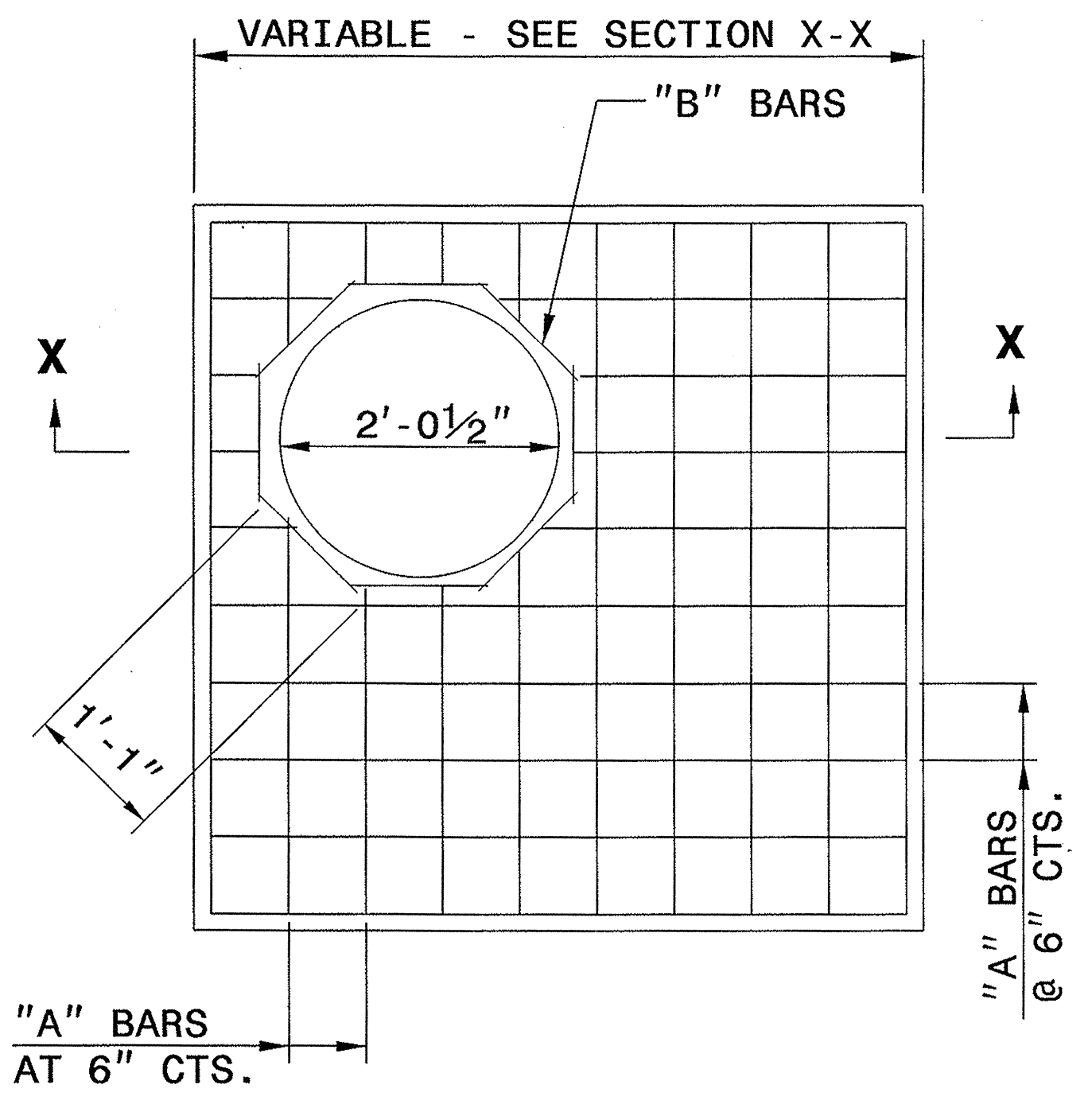
**SEE PLATE FOR TITLE**

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MODIFIED BY: E.E. Ward DATE: July 2004  
CHECKED BY: [Signature] DATE: 2/17/12  
FILE SPEC.: @details\stand\modifiedflume.dgn

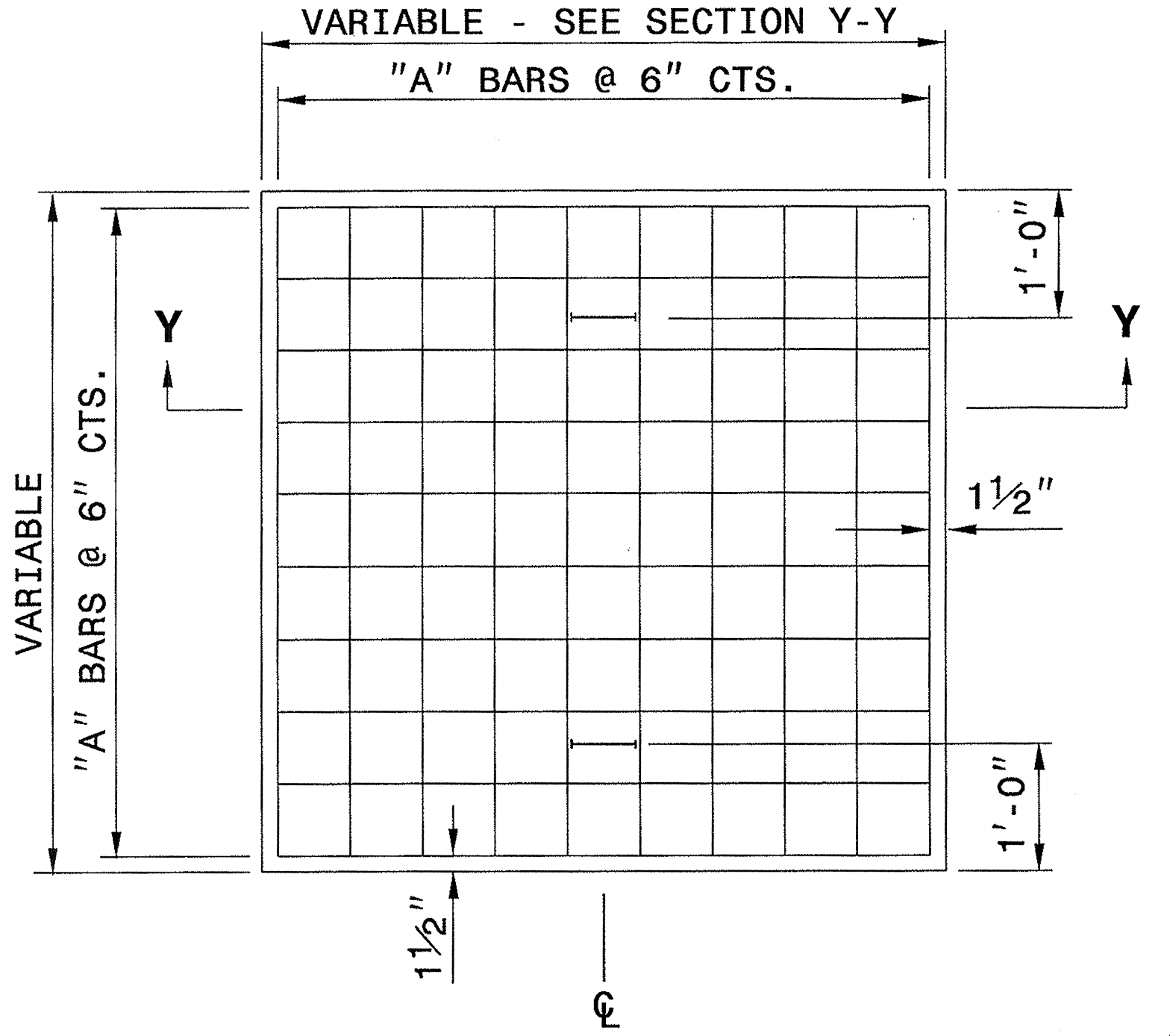
I:\FEB-2012\_09\24  
S:\con\cnc\contracts\Special Details\entoward\usr\details\stand\modifiedflume.dgn  
\$\$\$\$\$USERNAME\$\$\$\$\$



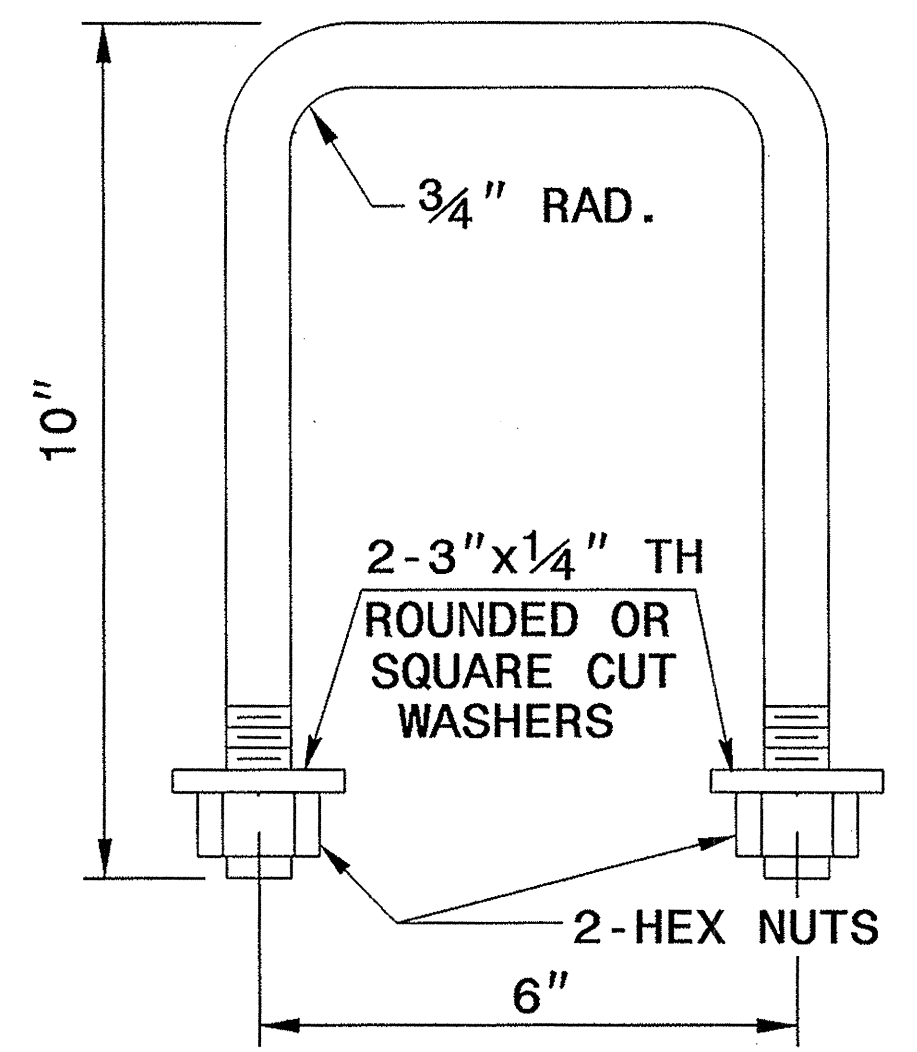
**PARTIAL SECTION**



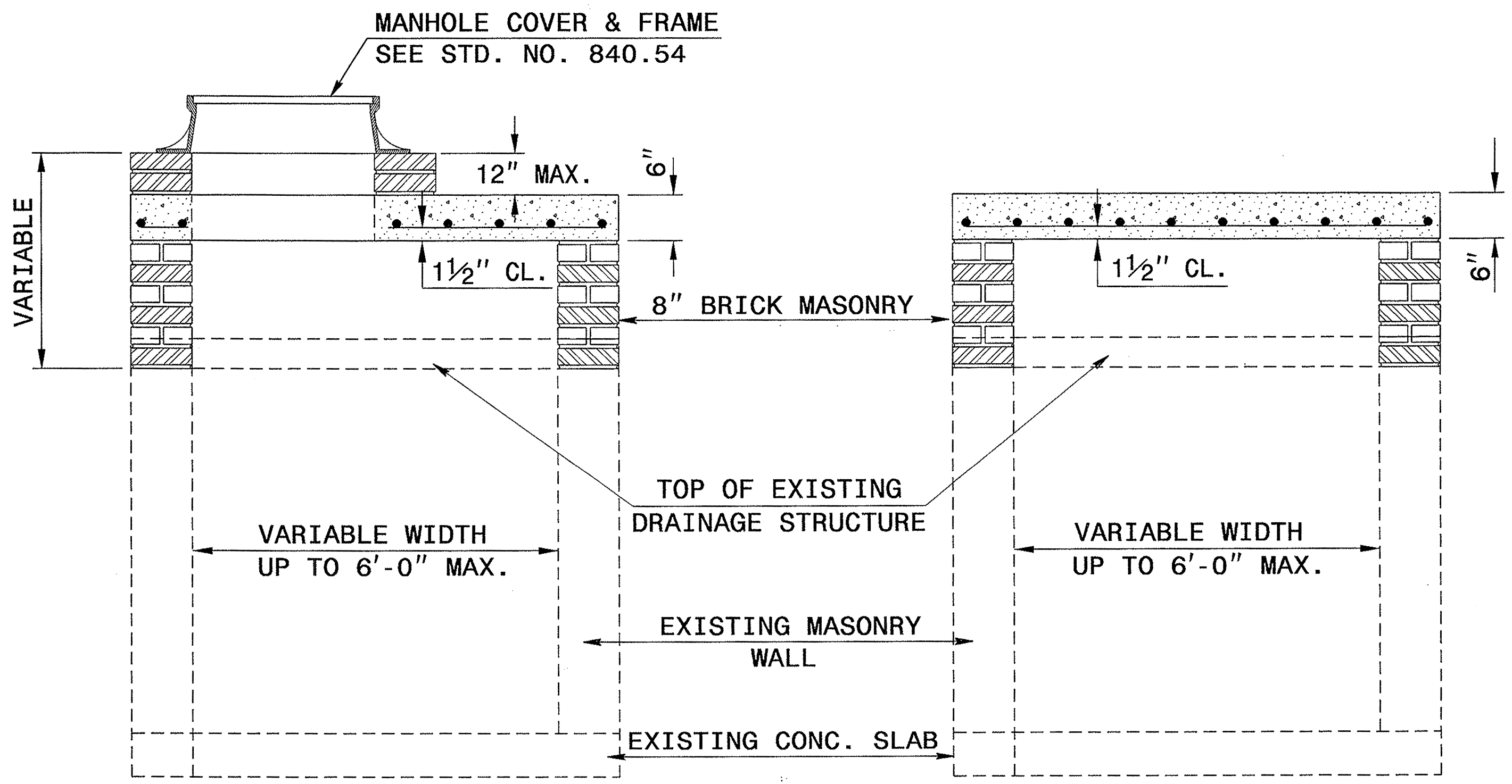
**PLAN**



**PLAN**



**DETAIL OF HANDLE**



**SECTION X-X**

**SECTION Y-Y**

**GENERAL NOTES:**

CONSTRUCT IN ACCORDANCE WITH SECTION 859 OF THE STANDARD SPECIFICATIONS.

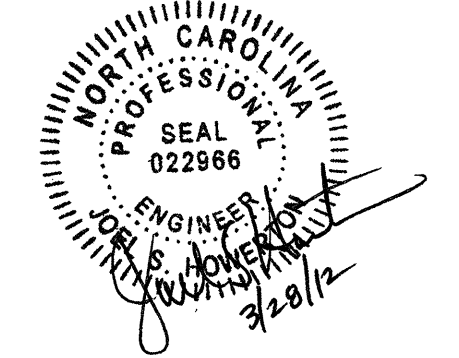
THE DIMENSIONS FOR THE EXISTING BOXES ARE APPROXIMATE AND MAY VARY SLIGHTLY.

DETAIL INTENDED FOR NON-TRAFFIC BEARING DRAINAGE STRUCTURES.

**BILL OF MATERIALS**

REINFORCING STEEL				
CODE	SIZE	QTY.	LENGTH	REINF. STEEL LBS.
A	#4	20	4'-6"	60.12
B	#4	8	1'-1"	5.79
TOTAL				65.91 *
MASONRY				CU YDS
TOP SLAB CONCRETE CLASS "B"				.4326 *
BRICK MASONRY PER FT HT (MIN)				.4111

**\* NOTE:**  
QUANTITIES BASED ON 3'-6" X 3'-6" DRAINAGE STRUCTURE. ADJUST QUANTITIES FOR LARGER STRUCTURES AND MANHOLE CONSTRUCTION.



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**DETAIL TO CONVERT EXISTING DROP INLET OR CATCH BASIN TO JUNCTION BOX (MANHOLE OPTIONAL)**

ORIGINAL BY: T.S.S. DATE: NOV. 1997  
 MODIFIED BY: T.S.S. DATE: FEB. 2000  
 CHECKED BY: [Signature] DATE: 3/1/12  
 FILE SPEC.: d6174:usr/details/stand/boxtojb.dgn

I7-FEB-2012 09:21 S:\Contracts\Special Details\ericward\usr\details\boxtojb.dgn \$\$\$USERNAME\$\$\$



GEOTECHNICAL ENGINEER ENGINEER

SEAL 022246

Switt O. Nields 11/19/11

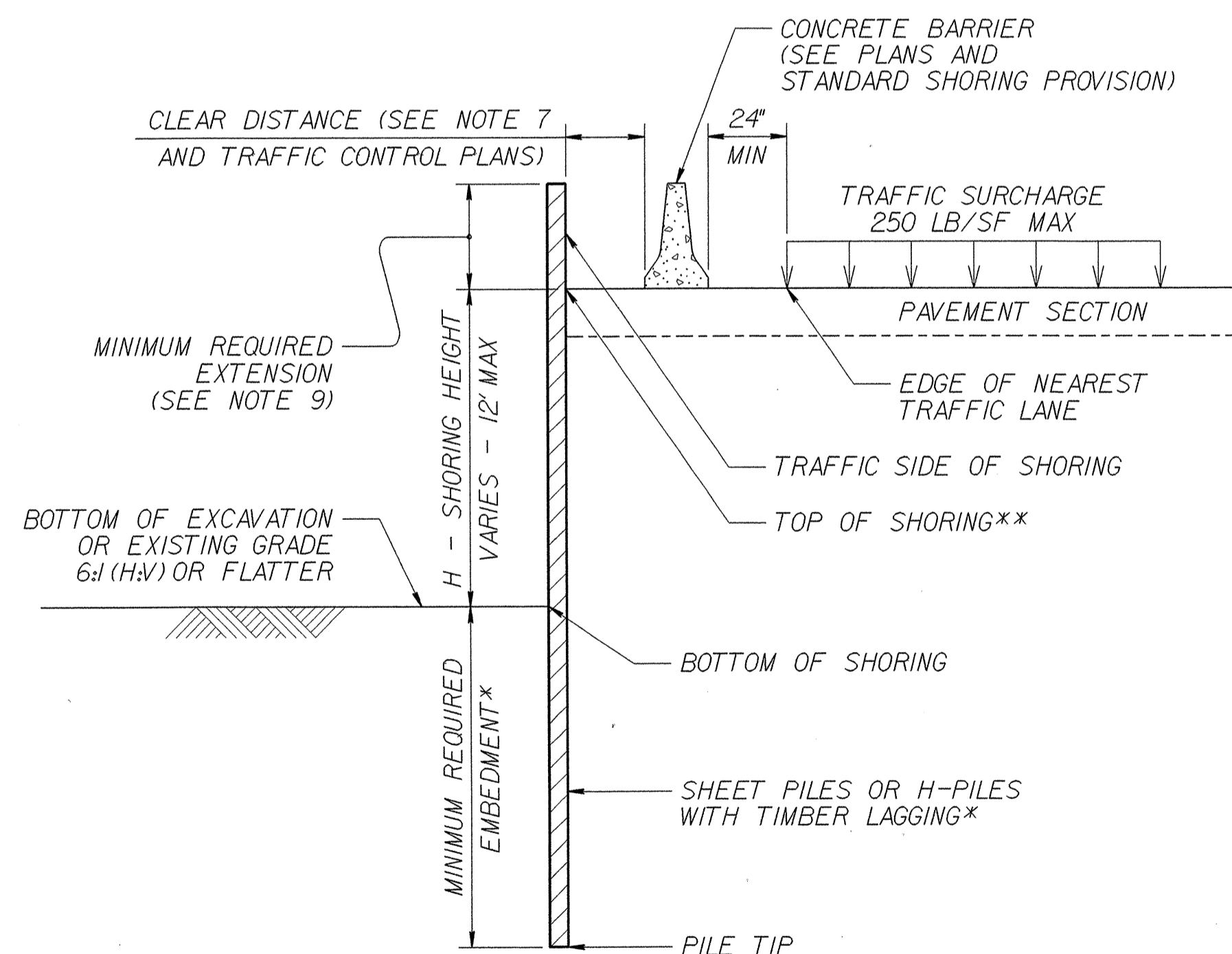
GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT						SURCHARGE CASE WITH TRAFFIC IMPACT					
		SHEET PILES		H-PILES WITH TIMBER LAGGING			SHEET PILES		H-PILES WITH TIMBER LAGGING				
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN <sup>3</sup> /FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)			MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN <sup>3</sup> /FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)				
		HP 10x42	HP 12x53	HP 14x73			HP 10x42	HP 12x53	HP 14x73				
GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP	< 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		
GROUNDWATER ELEVATION BELOW PILE TIP	< 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		
12	15.0	21.5	--	--	16.0	16.0	25.5	--	--	15.5			

**MINIMUM REQUIRED EMBEDMENT AND SECTION MODULUS**

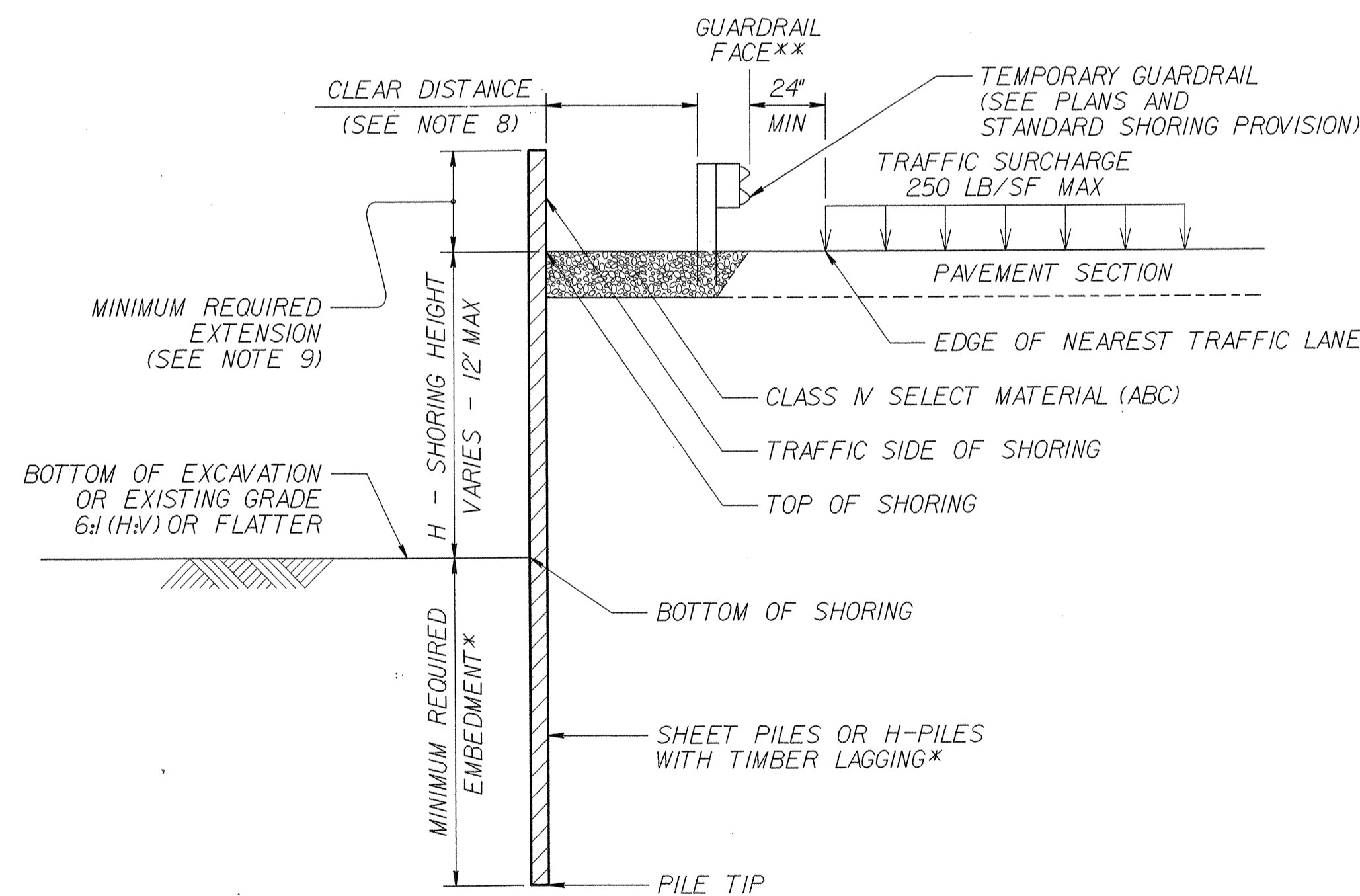
**\*DO NOT USE H-PILES WITH TIMBER LAGGING FOR GROUNDWATER CONDITION, SHORING HEIGHT AND H-PILE SIZE SHOWN IF MINIMUM REQUIRED EMBEDMENT IS "--".**

**NOTES:**

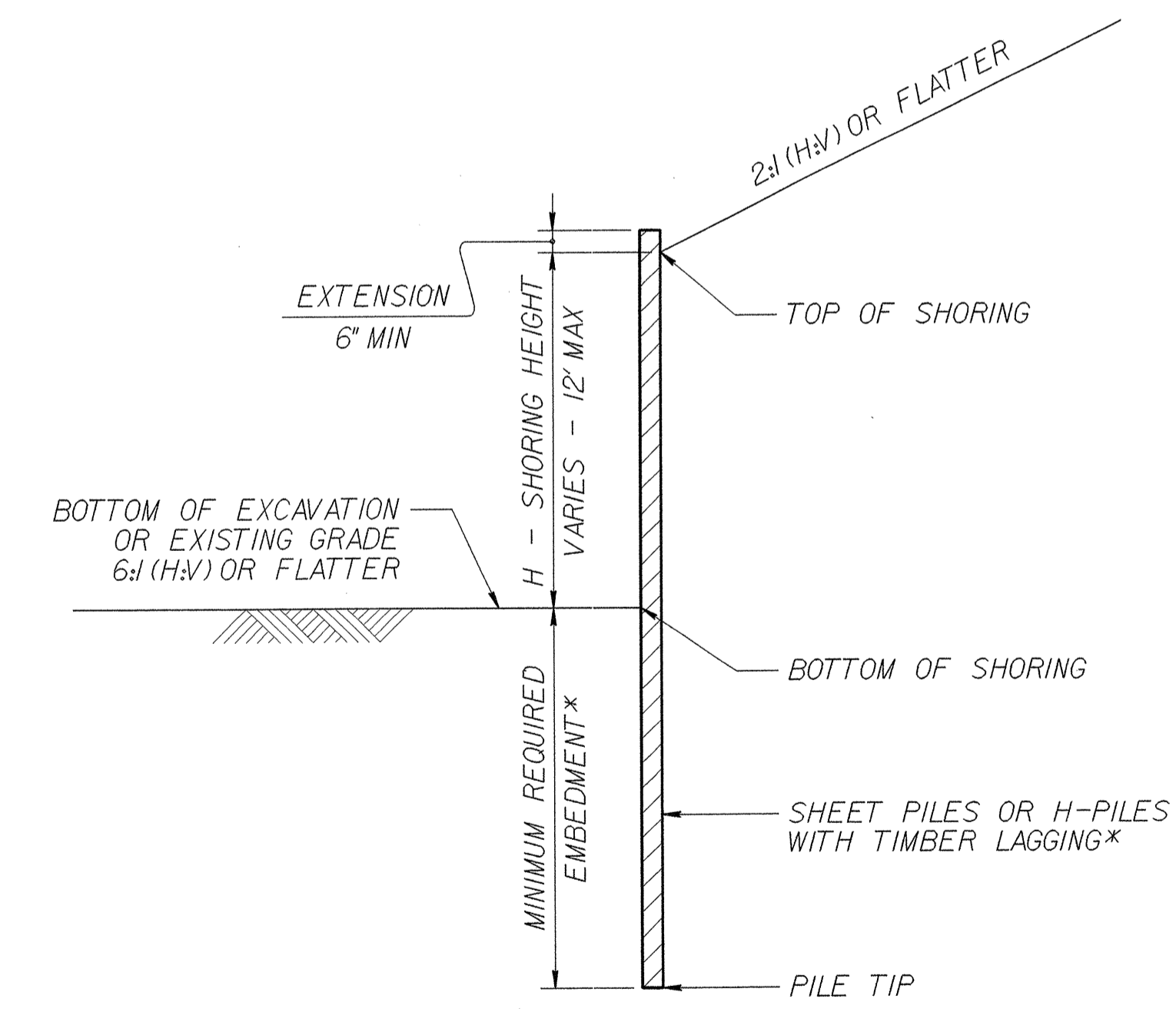
- AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY SHORING AS NOTED IN THE PLANS.
- FOR STANDARD TEMPORARY SHORING, SEE STANDARD SHORING PROVISION.
- STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:  
UNIT WEIGHT,  $\gamma = 120$  LB/CF  
FRICTION ANGLE,  $\phi = 30$  DEGREES  
COHESION,  $c = 0$  LB/SF
- DO NOT USE STANDARD TEMPORARY SHORING IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
- DO NOT USE STANDARD TEMPORARY SHORING WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS WITHIN THE EMBEDMENT DEPTH.
- USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, USE "GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP" FOR GROUNDWATER CONDITION. DO NOT USE STANDARD TEMPORARY SHORING IF GROUNDWATER IS ABOVE BOTTOM OF SHORING.
- AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN THE MINIMUM REQUIRED FOR CONCRETE BARRIER, SET BARRIER NEXT TO AND UP AGAINST TRAFFIC SIDE OF PILES AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
- AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN 4' FOR TEMPORARY GUARDRAIL, ATTACH GUARDRAIL TO TRAFFIC SIDE OF PILES AS SHOWN IN THE PLANS AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
- MINIMUM REQUIRED EXTENSION IS 6' FOR "SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT" AND 32' FOR "SURCHARGE CASE WITH TRAFFIC IMPACT".
- MINIMUM REQUIRED EMBEDMENT FOR H-PILES WITH TIMBER LAGGING IS BASED ON DRIVEN H-PILES AT MAXIMUM 6' SPACING. AT THE CONTRACTOR'S OPTION, EMBEDMENT DEPTHS MAY BE REDUCED BY 25% FOR DRILLED-IN H-PILES.
- SUBMIT A "STANDARD TEMPORARY SHORING SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY SHORING CONSTRUCTION. UP TO 3 SHORING LOCATIONS MAY BE INCLUDED ON EACH FORM.
- CONTACT THE ENGINEER IF PILES DO NOT ATTAIN THE MINIMUM REQUIRED EMBEDMENT.



**CONCRETE BARRIER**  
\*\*TOP OF SHORING = EDGE OF PAVEMENT

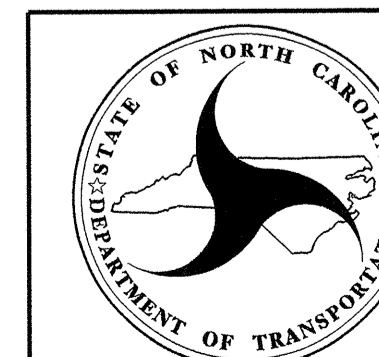


**TEMPORARY GUARDRAIL**  
\*\*GUARDRAIL FACE = EDGE OF PAVEMENT



**STANDARD TEMPORARY SHORING (SLOPE CASE)**  
\*SEE TABLE ABOVE.

**STANDARD TEMPORARY SHORING (SURCHARGE CASE)**  
\*SEE TABLE ABOVE.



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RALEIGH

STANDARD DRAWING NO. 1801.01

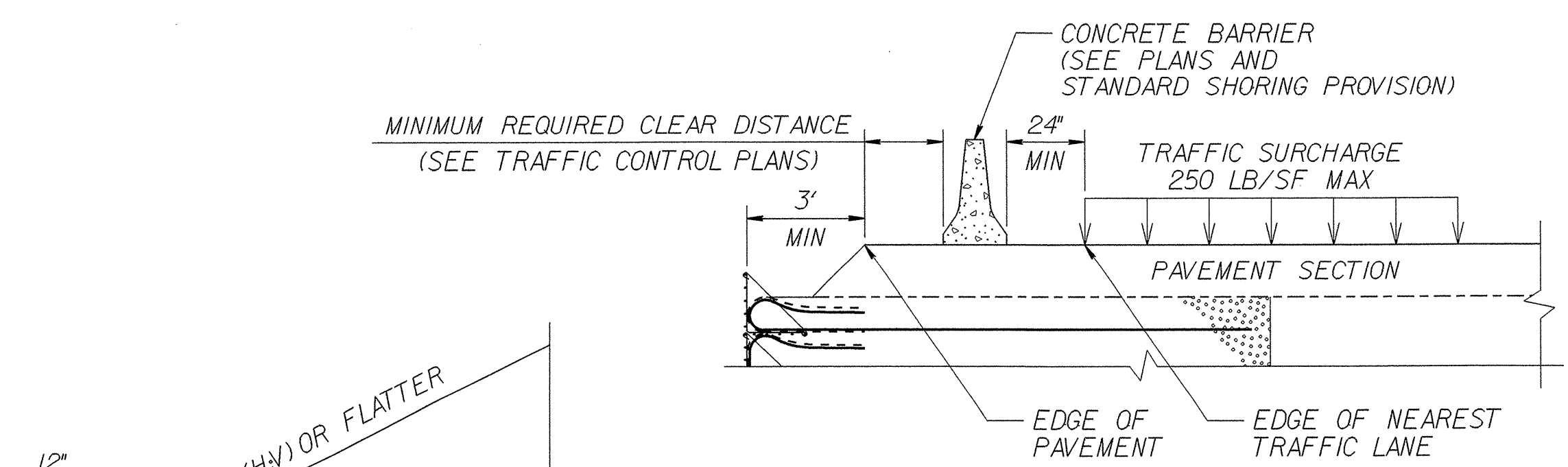
STANDARD TEMPORARY SHORING

DATE: 1-17-12

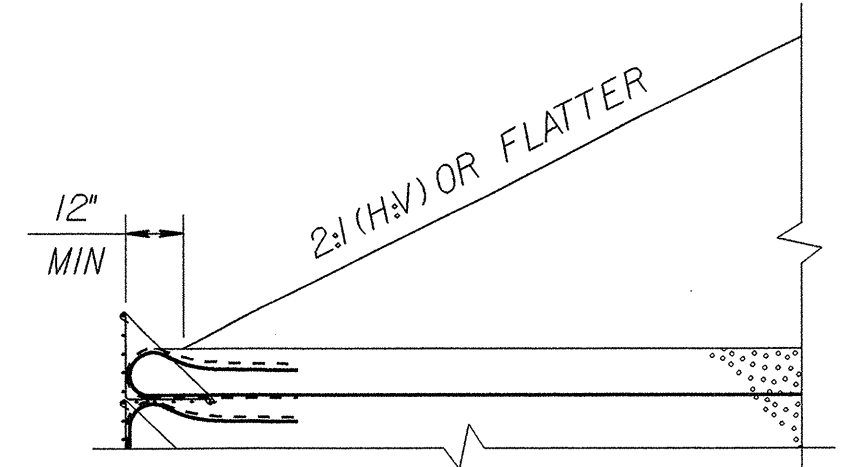


Scott A. Hadden 11/19/11  
SIGNATURE DATE

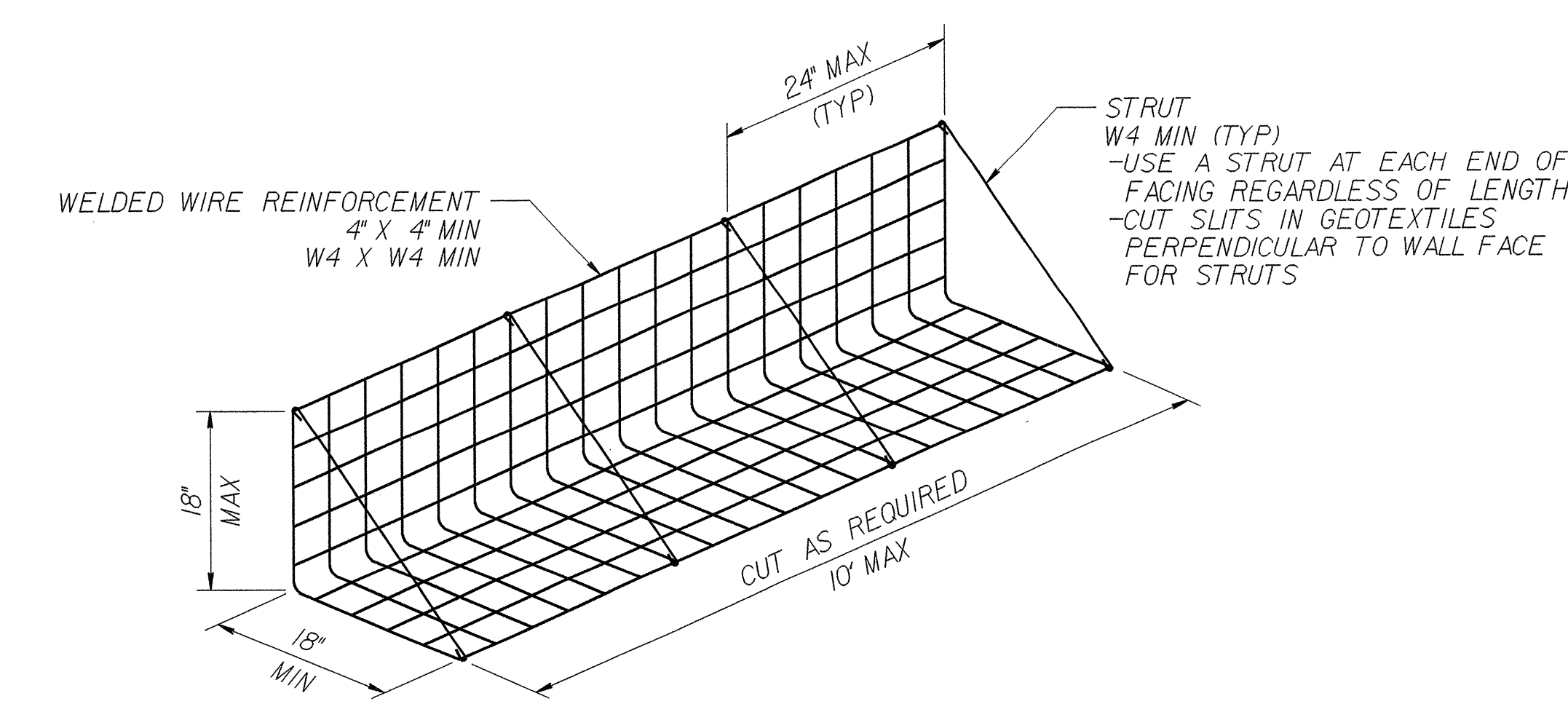
SIGNATURE DATE



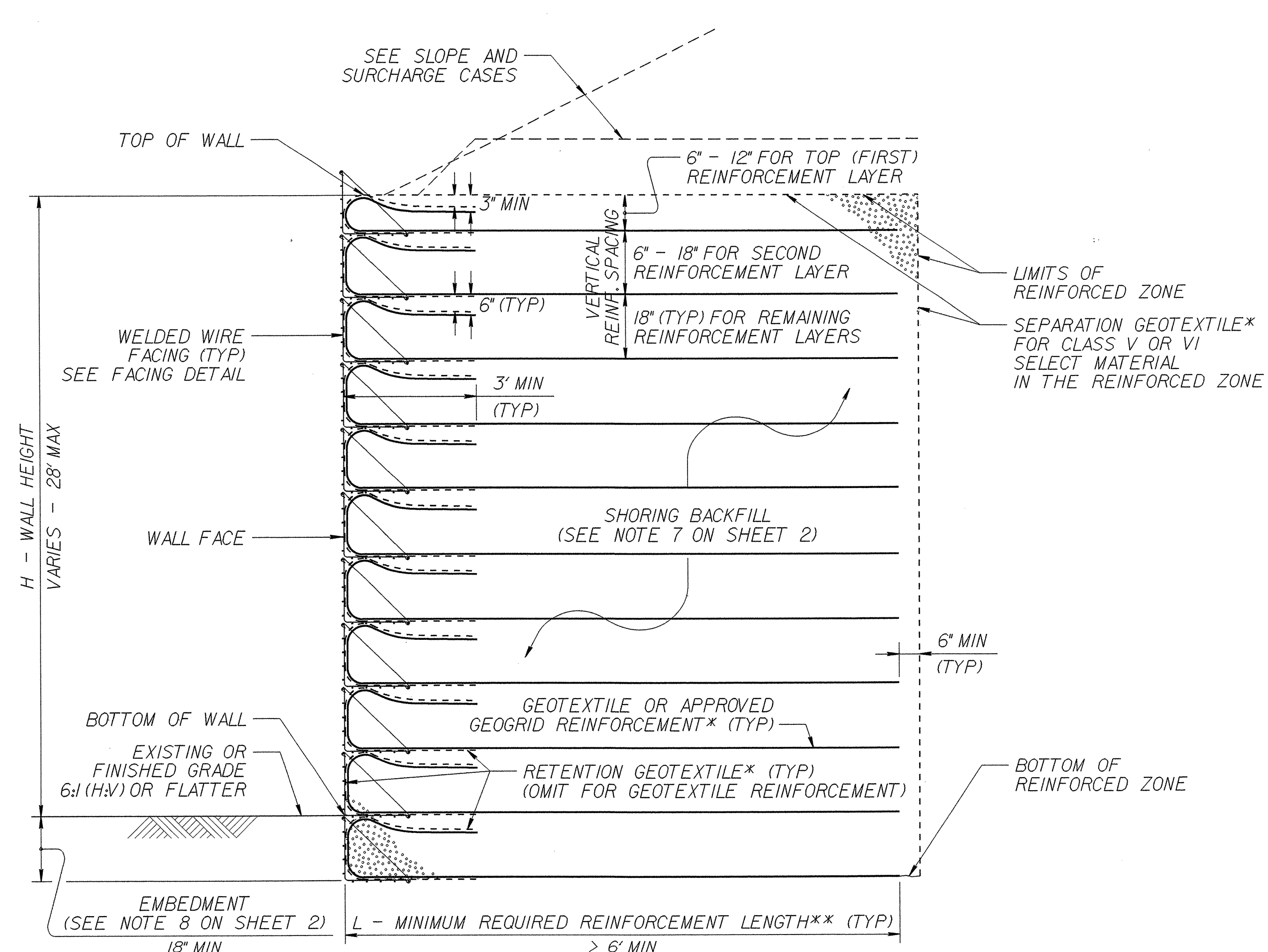
**SURCHARGE CASE**



**SLOPE CASE**

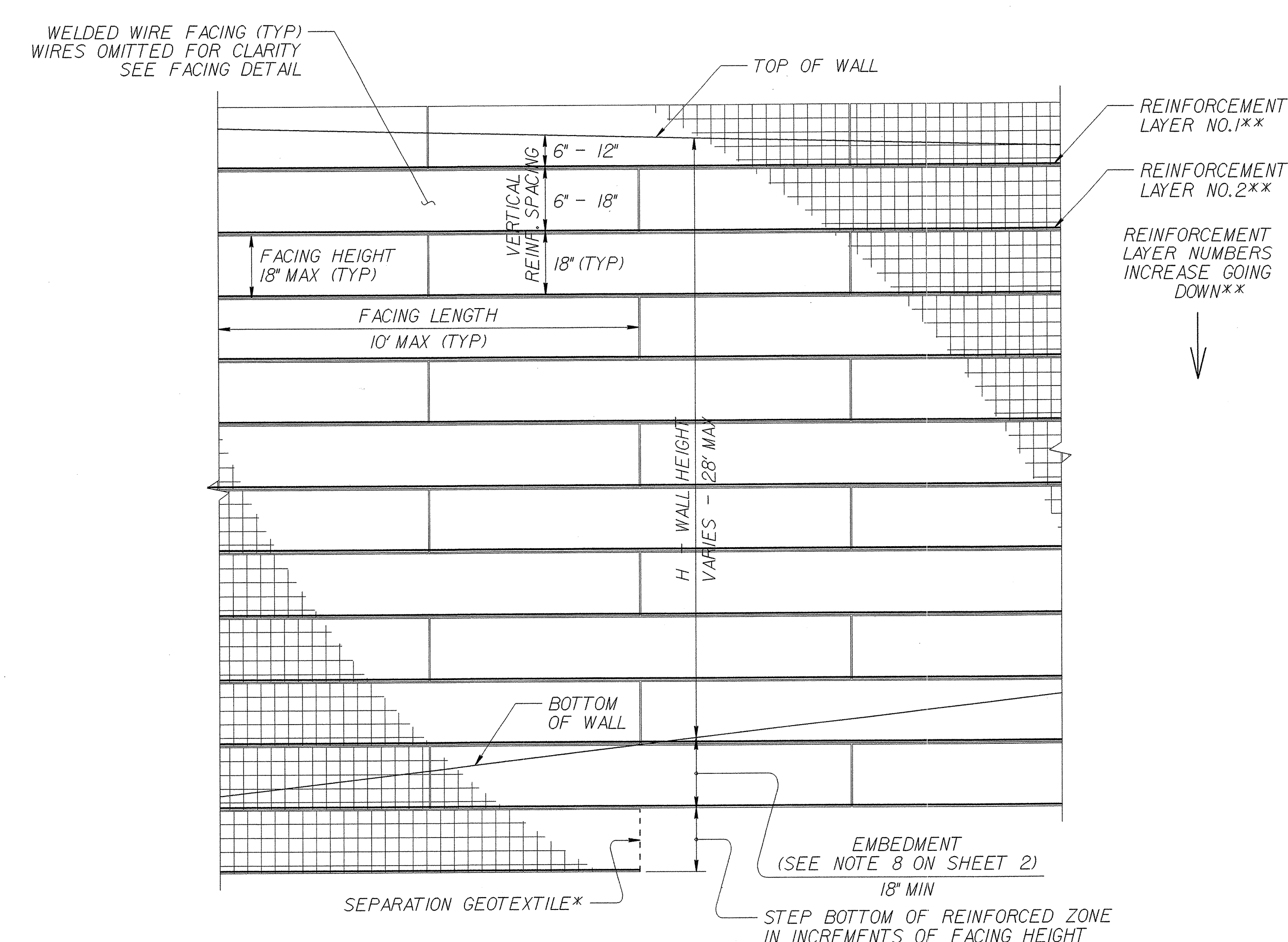


**FACING DETAIL**



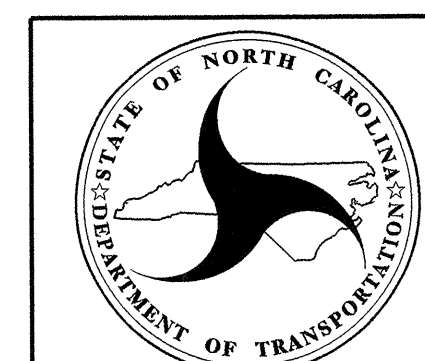
**STANDARD TEMPORARY WALL**

(FOR STANDARD TEMPORARY WALLS ON STRUCTURES, SEE TEMPORARY WALL ON STRUCTURE DETAIL ON SHEET 2.)  
\*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.  
\*\*SEE REINFORCEMENT TABLES ON SHEET 3.



**STANDARD TEMPORARY WALL - PARTIAL ELEVATION**

\*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.  
\*\*SEE REINFORCEMENT TABLES ON SHEET 3.

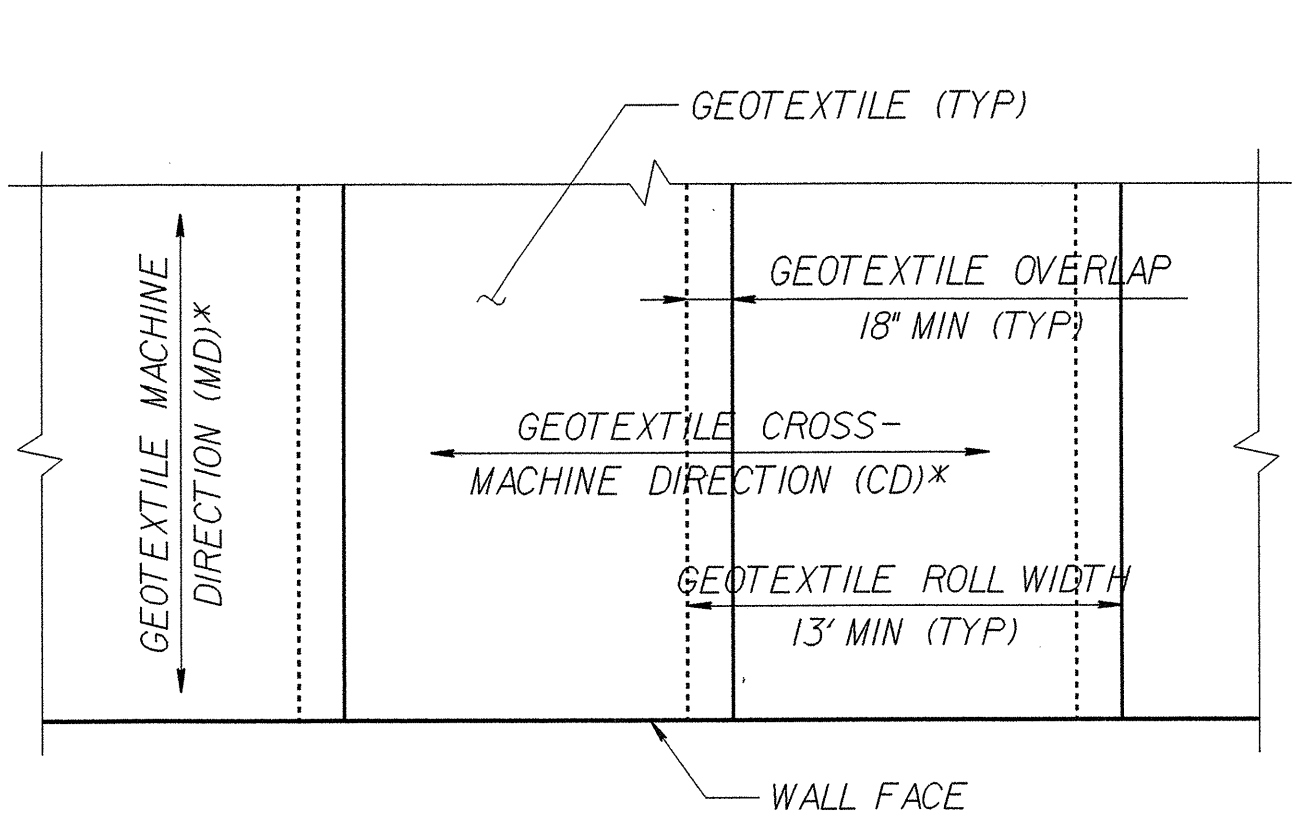


**GEOTECHNICAL ENGINEERING UNIT**  
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

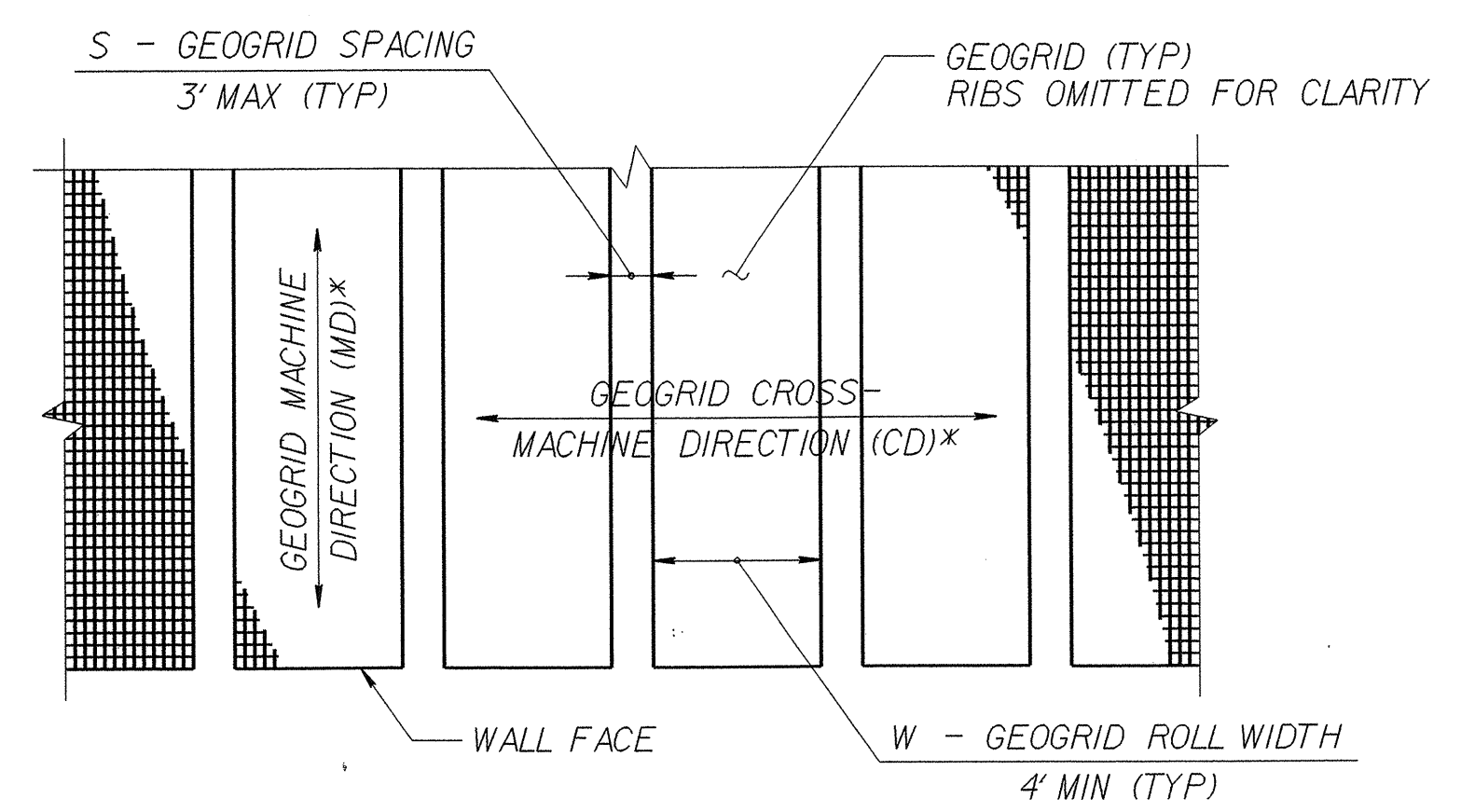
STANDARD DRAWING NO. 1801.02

STANDARD TEMPORARY WALL  
Sheet 1 of 3

DATE: 1-17-12



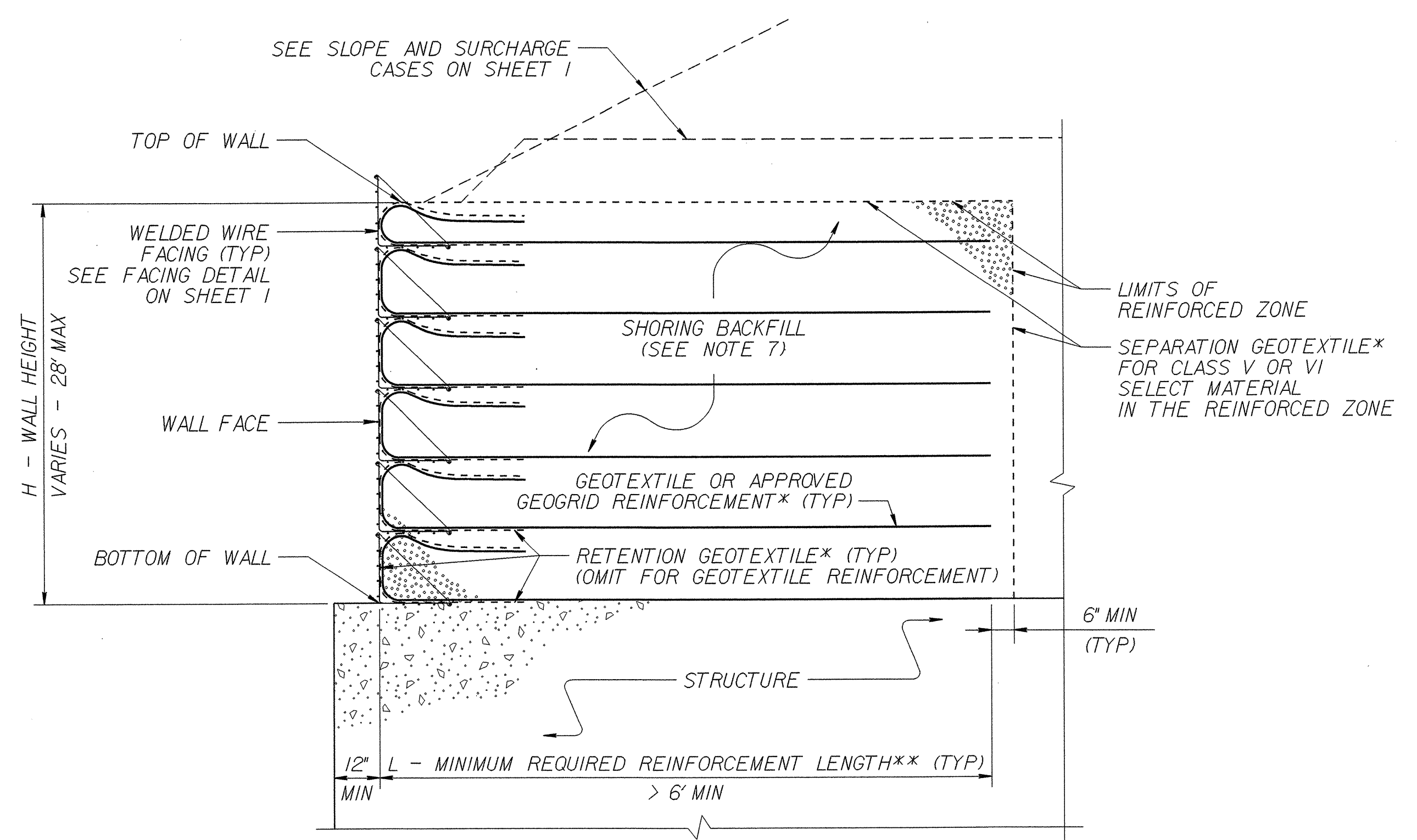
**GEOTEXTILE PLACEMENT**  
(100% COVERAGE MIN FOR GEOTEXTILE REINFORCEMENT)



**GEOGRID PLACEMENT**  
(80% COVERAGE MIN FOR GEOGRID REINFORCEMENT -  $\frac{W}{W+S} \times 100 \geq 80\%$ , SEE NOTE 11)

**GEOSYNTHETIC PLACEMENT DETAILS**

(PLAN VIEW)  
\*SEE NOTE 12.



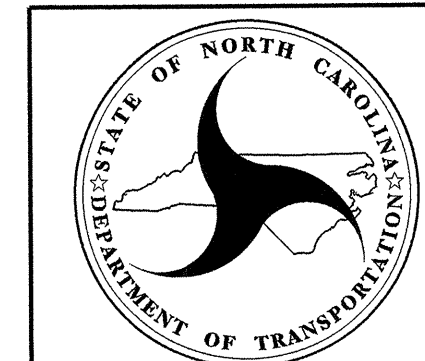
**TEMPORARY WALL ON STRUCTURE DETAIL**  
\*SEE GEOSYNTHETIC PLACEMENT DETAILS.  
\*\*SEE REINFORCEMENT TABLES ON SHEET 3.

**NOTES:**

- AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY WALLS AS NOTED IN THE PLANS.
- FOR STANDARD TEMPORARY WALLS, SEE STANDARD SHORING PROVISION.
- STANDARD TEMPORARY WALLS ARE BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:  
 UNIT WEIGHT,  $\gamma = 120$  LB/CF  
 FRICTION ANGLE,  $\phi = 30$  DEGREES  
 COHESION,  $c = 0$  LB/SF
- DO NOT USE STANDARD TEMPORARY WALLS IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
- DO NOT USE STANDARD TEMPORARY WALLS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW TEMPORARY WALLS.
- USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, ASSUME GROUNDWATER DEPTH IS LESS THAN 7' BELOW BOTTOM OF REINFORCED ZONE. DO NOT USE STANDARD TEMPORARY WALLS IF GROUNDWATER IS ABOVE BOTTOM OF REINFORCED ZONE.
- DO NOT USE A-2-4 SOIL FOR STANDARD TEMPORARY WALLS AROUND CULVERTS OR IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS FOR SLOPE CASES. DO NOT USE CLASS VI SELECT MATERIAL IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS WITH GEOTEXTILE REINFORCEMENT.
- EMBEDMENT IS NOT REQUIRED FOR STANDARD TEMPORARY WALLS ON STRUCTURES OR ROCK AS DETERMINED BY THE ENGINEER.
- DO NOT USE MORE THAN 4 DIFFERENT REINFORCEMENT STRENGTHS FOR EACH STANDARD TEMPORARY WALL.
- GEOGRIDS ARE APPROVED FOR SHORT-TERM DESIGN STRENGTHS FOR A 3-YEAR DESIGN LIFE IN THE MACHINE DIRECTION (MD) AND CROSS-MACHINE DIRECTION (CD) BASED ON MATERIAL TYPE. FOR DETAILS OF APPROVED GEOGRIDS AND SHORT-TERM DESIGN STRENGTHS, SEE [www.ncdot.org/doh/operations/materials/soils/gep.html](http://www.ncdot.org/doh/operations/materials/soils/gep.html) DEFINE MATERIAL TYPE FROM THE WEBSITE ABOVE FOR SHORING BACKFILL AS FOLLOWS:

MATERIAL TYPE	SHORING BACKFILL
BORROW	A-2-4 SOIL
FINE AGGREGATE	CLASS II, TYPE I OR CLASS III SELECT MATERIAL
COARSE AGGREGATE	CLASS V OR VI SELECT MATERIAL

- FOR GEOGRID REINFORCEMENT WITH LESS THAN 100% COVERAGE, STAGGER REINFORCEMENT SO GEOGRIDS ARE CENTERED OVER GAPS IN THE REINFORCEMENT LAYER BELOW.
- AT THE CONTRACTOR'S OPTION, REINFORCEMENT MAY BE INSTALLED WITH THE MD PARALLEL TO THE WALL FACE IF BOTH THE FOLLOWING CONDITIONS OCCUR:  
 - W (REINFORCEMENT ROLL WIDTH)  $\geq$  L (MINIMUM REQUIRED REINFORCEMENT LENGTH) + 4.5' AND  
 - REINFORCEMENT STRENGTH IN CD  $\geq$  MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD.
- SUBMIT A "STANDARD TEMPORARY WALL SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY WALL CONSTRUCTION.
- DO NOT PLACE SHORING BACKFILL OR REINFORCEMENT UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.
- FOR STANDARD TEMPORARY WALLS WITH PILE FOUNDATIONS IN THE REINFORCED ZONE, DRIVE PILES THROUGH REINFORCEMENT AFTER CONSTRUCTING TEMPORARY WALLS.
- DO NOT SPLICE OR OVERLAP REINFORCEMENT SO SEAMS ARE PARALLEL TO THE WALL FACE.
- CONTACT THE ENGINEER WHEN EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS, PAVEMENTS, PIPES, INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT.
- FOR STANDARD TEMPORARY WALLS WITH INTERIOR ANGLES LESS THAN 90 DEGREES, WRAP GEOSYNTHETICS AT ACUTE CORNERS AS DIRECTED BY THE ENGINEER.
- FOR STANDARD TEMPORARY WALLS WITH TOP OF WALL WITHIN 5' OF FINISHED GRADE, REMOVE TOP FACING AND INCORPORATE TOP REINFORCEMENT LAYER INTO FILL WHEN PLACING FILL IN FRONT OF WALL.

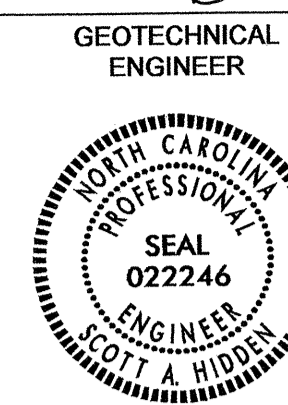


**GEOTECHNICAL ENGINEERING UNIT**  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD DRAWING NO. 1801.02

STANDARD TEMPORARY WALL  
 Sheet 2 of 3

DATE: 1-17-12



Scott A. Hadden 4/18/11  
 SIGNATURE DATE

SLOPE OR SURCHARGE CASE	GROUNDWATER DEPTH BELOW BOTTOM OF REINFORCED ZONE (SEE NOTE 6 ON SHEET 2) (FT)	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)	H - WALL HEIGHT (FT)																								
			< 4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
SLOPE CASE	> 0	CLASS II, TYPE I, CLASS III, CLASS V OR CLASS VI SELECT MATERIAL	6	6	7	8	9	11	12	13	13	14	15	16	17	18	19	20	21	22	23	24	24	25	26	27	27
SURCHARGE CASE	> 0 TO 7 FOR H < 20' > 0 TO 10 FOR H ≥ 20'	ALL SHORING BACKFILL TYPES	6	7	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	16	17	18	18	19	20	20	21
		A-2-4 SOIL	6	6	7	8	8	9	9	10	11	11	12	12	13	14	14	15	15	16	16	17	17	18	19	19	20
		CLASS II, TYPE I OR CLASS III SELECT MATERIAL	6	6	7	7	8	8	9	10	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	18	19
	> 7 FOR H < 20' > 10 FOR H ≥ 20'	CLASS V OR CLASS VI SELECT MATERIAL	6	6	7	7	7	8	8	9	9	10	10	11	11	12	12	13	13	14	14	15	16	16	17	18	18

**L - MINIMUM REQUIRED REINFORCEMENT LENGTH (FT)**  
 (FOR ALL REINFORCEMENT TYPES)

WALL HEIGHT (H) + EMBEDMENT (FT)	NUMBER OF REINFORCEMENT LAYERS*
2.5 - 4	3
4 - 5.5	4
5.5 - 7	5
7 - 8.5	6
8.5 - 10	7
10 - 11.5	8
11.5 - 13	9
13 - 14.5	10
14.5 - 16	11
16 - 17.5	12
17.5 - 19	13
19 - 20.5	14
20.5 - 22	15
22 - 23.5	16
23.5 - 25	17
25 - 26.5	18
26.5 - 28	19
28 - 29.5	20

\*BASED ON VERTICAL REINFORCEMENT SPACING SHOWN ON SHEET 1.

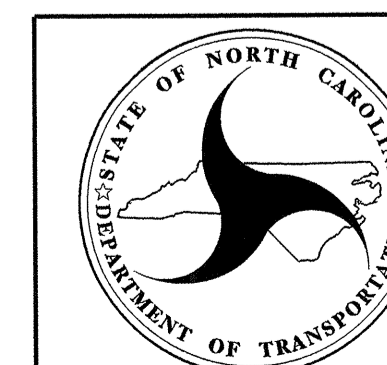
REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL	A-2-4 SOIL	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL
1	2400	2400	2400	2400	2400
2	2400	2400	2400	2400	2400
3	2400	2400	2400	2400	2400
4	2400	2400	2500	2400	2400
5	2500	2400	3000	2400	2400
6	3000	2400	3500	2800	2400
7	3500	2700	4000	3200	2600
8	4000	3100	4500	3600	2900
9	4500	3500	5000	4000	3200
10	5000	3900	5500	4400	3500
11	5500	4300	6000	4800	3800
12	6000	4700	6500	5200	4100
13	6500	5100	7000	5600	4400
14	7000	5400	7500	6000	4700
15	7500	5800	8000	6400	5000
16	8000	6200	8500	6800	5300
17	8500	6600	9000	7200	5600
18	9000	7000	9500	7600	5900
19	9500	7400	10000	8000	6200
20	10000	7800	10500	8400	6500

**GEOTEXTILE REINFORCEMENT  
 ULTIMATE TENSILE STRENGTH (LB/FT)**

REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL	A-2-4 SOIL	CLASS II, TYPE I OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL
1	240	200	340	290	240
2	380	310	520	430	350
3	530	420	700	570	460
4	690	550	870	720	570
5	860	690	1050	860	680
6	1030	830	1220	1000	790
7	1200	970	1400	1150	900
8	1370	1110	1580	1290	1010
9	1550	1240	1750	1430	1120
10	1720	1380	1930	1580	1230
11	1890	1520	2100	1720	1340
12	2060	1660	2280	1860	1450
13	2240	1800	2450	2010	1560
14	2410	1940	2630	2150	1670
15	2580	2080	2800	2290	1780
16	2750	2220	2980	2440	1890
17	2930	2360	3160	2580	2000
18	3100	2500	3330	2720	2110
19	3270	2640	3510	2860	2220
20	3440	2780	3690	3000	2330

**GEOGRID REINFORCEMENT  
 SHORT-TERM DESIGN STRENGTH (LB/FT)**  
 (SEE NOTE 10 ON SHEET 2.)

**MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD**  
 (SEE NOTE 9 ON SHEET 2.)  
 \*SEE PARTIAL ELEVATION ON SHEET 1 FOR REINFORCEMENT LAYER NUMBERING.



**GEOTECHNICAL ENGINEERING UNIT**  
 STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

STANDARD DRAWING NO. 1801.02

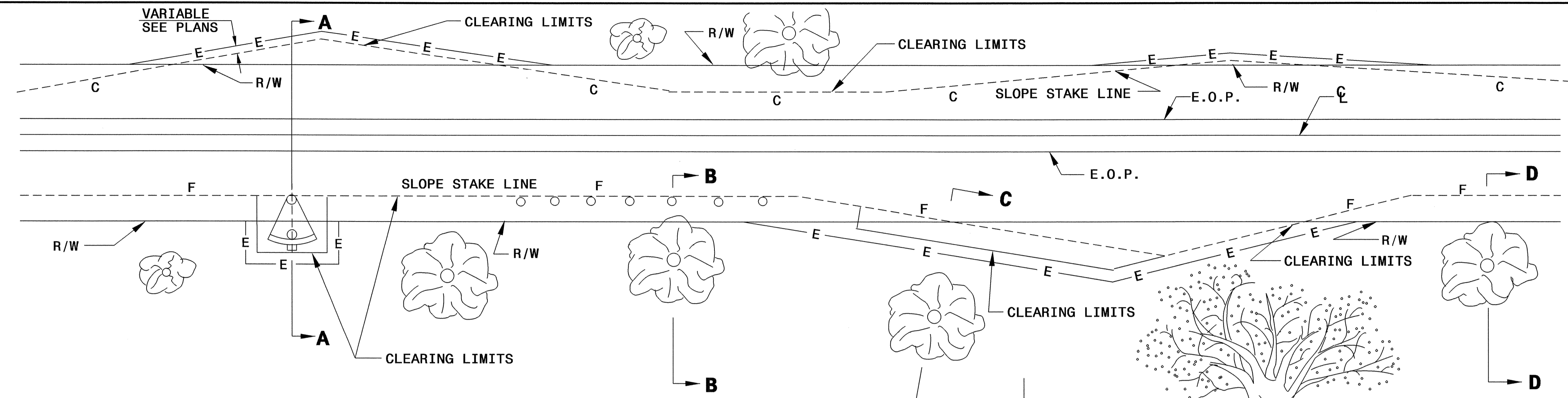
STANDARD TEMPORARY WALL  
 Sheet 3 of 3

DATE: 1-17-12

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

ENGLISH DETAIL DRAWING FOR  
**METHOD OF CLEARING**  
 MODIFIED METHOD - II

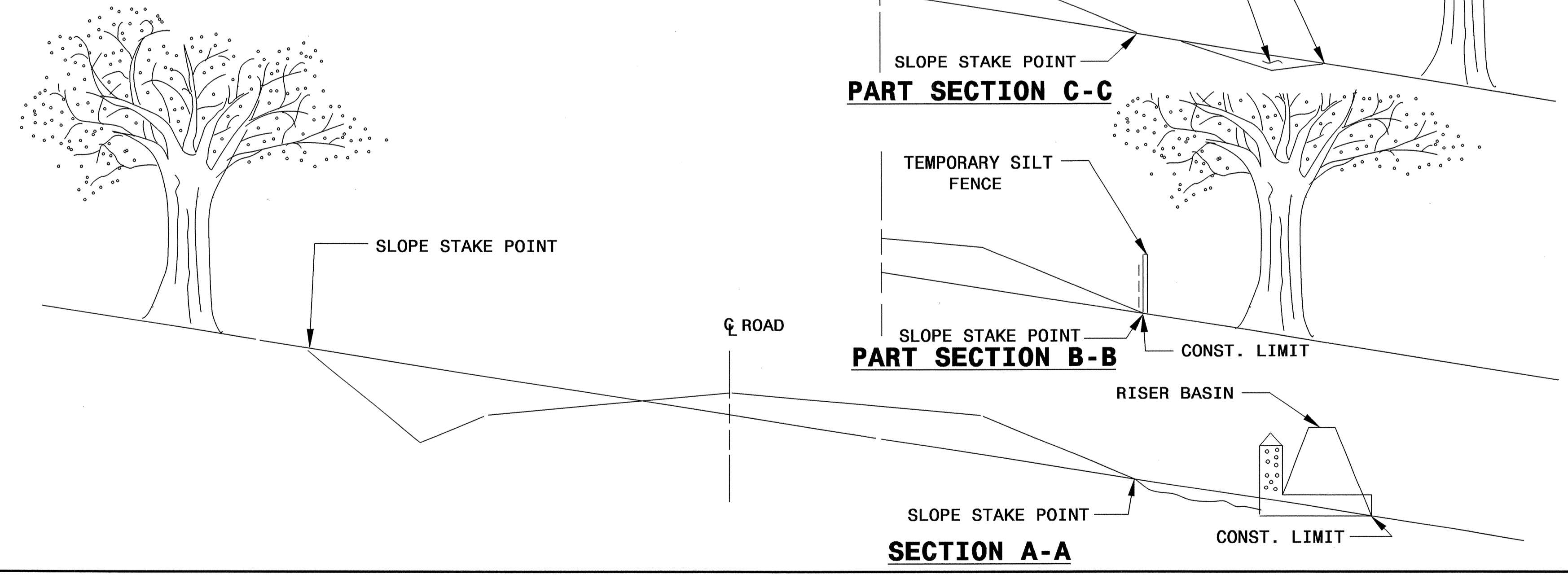
SHEET 1 OF 1  
**200d02**



**GENERAL NOTES:**

1. REMOVE TREES OUTSIDE THE CLEARING LIMIT WHEN, IN THE OPINION OF THE ENGINEER, THE UTILITY OF A TREE WILL BE DESTROYED BY THE CONSTRUCTION OR THE CLEARING OPERATION.
2. CLEAR IN ACCORDANCE WITH THIS STANDARD EXCEPT WHERE ADDITIONAL CLEARING IS REQUIRED FOR SAFETY AS SHOWN ON THE PLANS.
3. FOR SECTIONS WITH WIDE MEDIANS WHERE TREES ARE TO REMAIN, CLEAR THE MEDIAN SIDE IN THE SAME MANNER AS ON THE OUTSIDE.
4. HAND CLEAR AS NEEDED TO 5' OUTSIDE THE SLOPE STAKE LINES FOR INSTALLATION OF EROSION CONTROL DEVICES.

**CLEAR TO SLOPE STAKE LINE OR CONSTRUCTION LIMITS**



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

ENGLISH DETAIL DRAWING FOR  
**METHOD OF CLEARING**  
 MODIFIED METHOD - II

SHEET 1 OF 1  
**200d02**

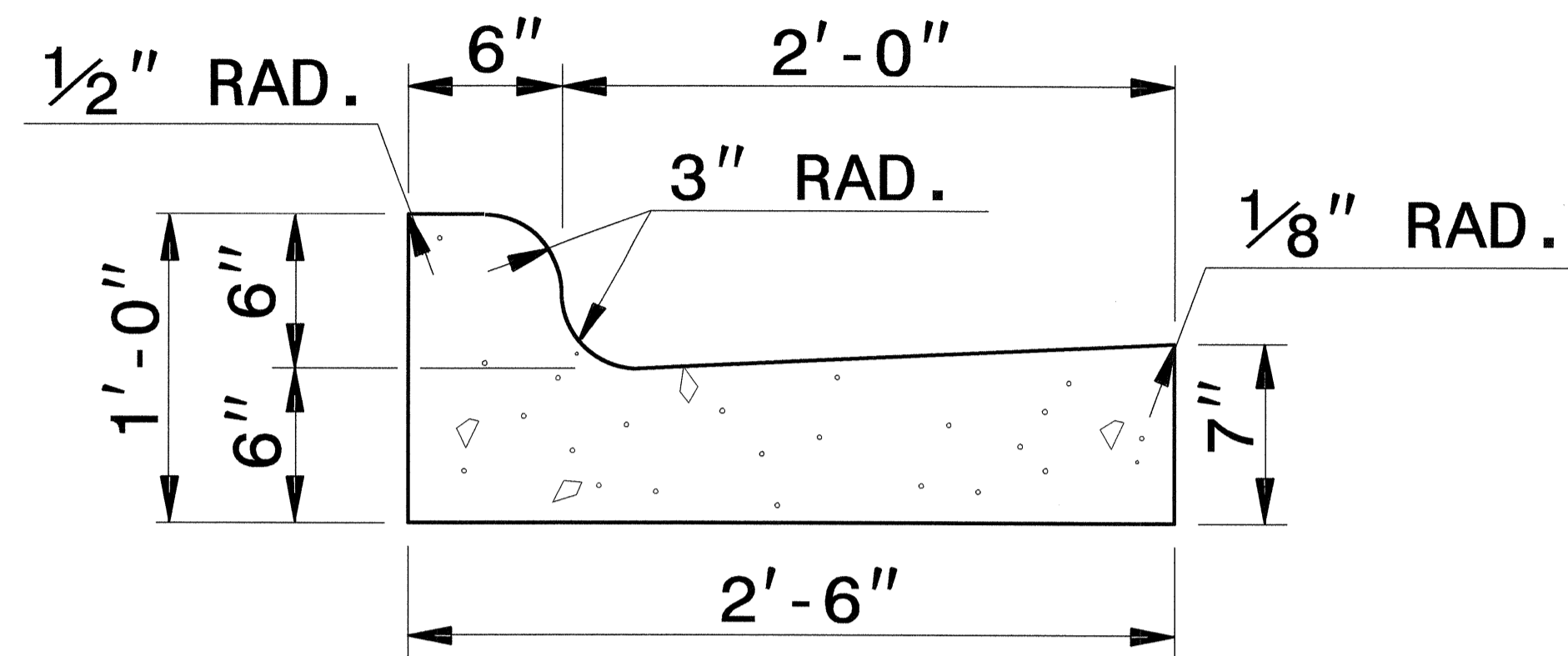


**CONTRACT STANDARDS & DEVELOPMENT UNIT**  
**STANDARDS AND SPECIAL DESIGN**  
 Office 919-250-4128 FAX 919-250-4119

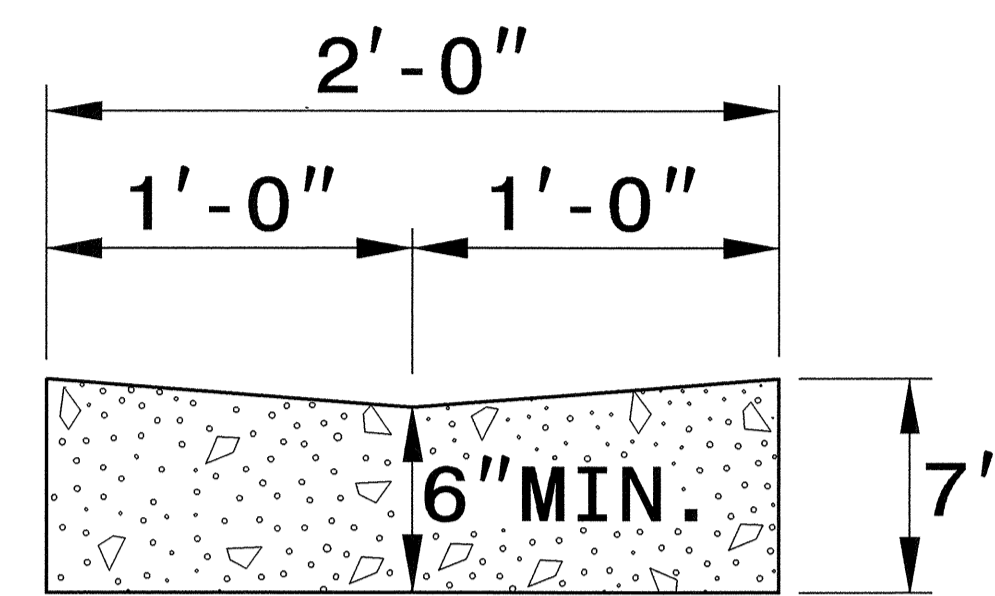
**SEE TITLE BLOCK**

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MODIFIED BY:	DATE:
CHECKED BY:	DATE:
FILE SPEC.:	

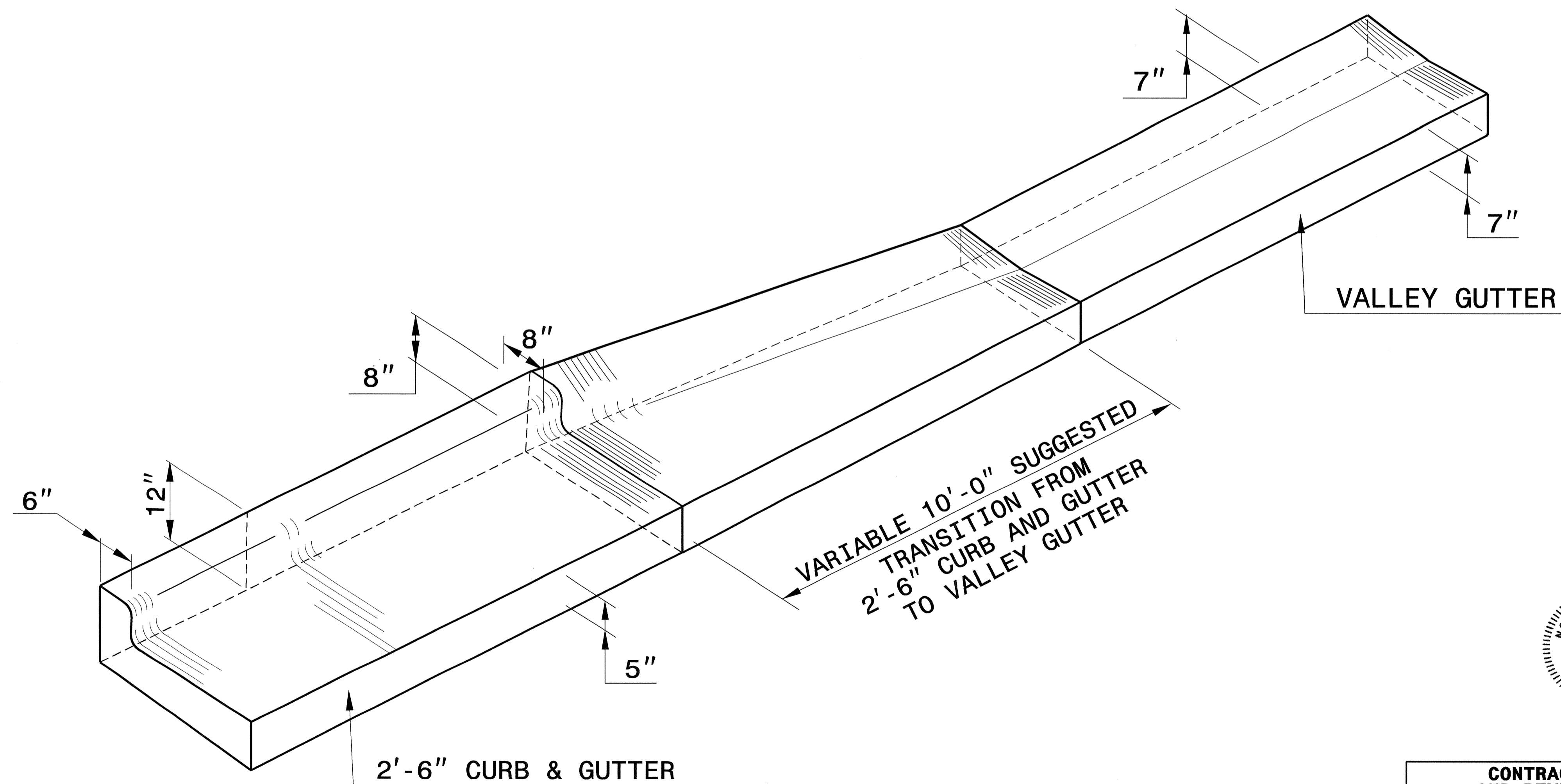
\*NOTE: SEE STD. DWG. 846.01  
FOR GENERAL NOTES



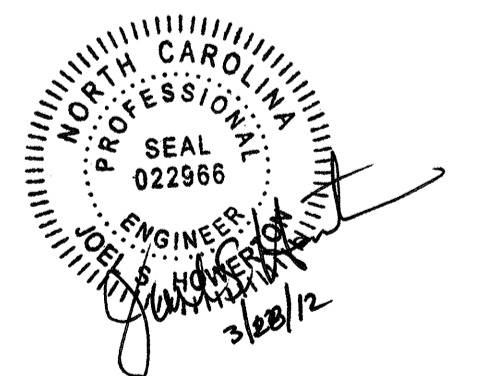
**2'-6" CURB AND GUTTER**



**VALLEY GUTTER**

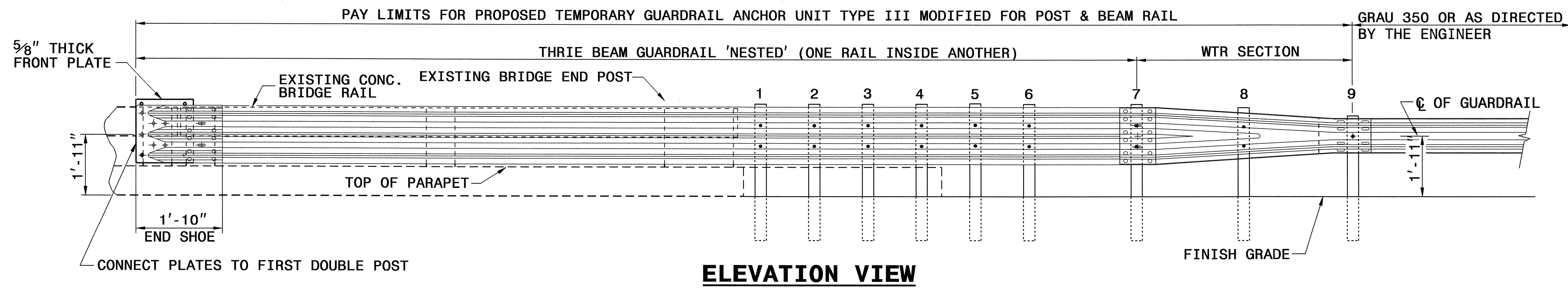


**ISOMETRIC VIEW OF TRANSITION**

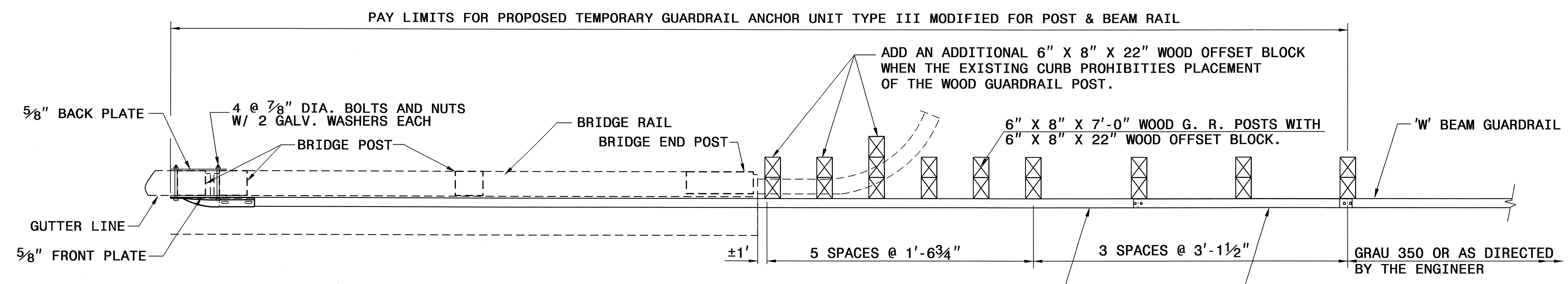


<b>CONTRACT STANDARDS AND DEVELOPMENT UNIT</b>	
Office 919-707-6950	FAX 919-250-4119
<b>TRANSITION FROM 2'-6" CURB AND GUTTER TO VALLEY GUTTER</b>	
ORIGINAL BY: T.S. SPELL	DATE: FEB. 4, 2009
MODIFIED BY: <i>[Signature]</i>	DATE: <i>[Signature]</i>
CHECKED BY: <i>[Signature]</i>	DATE: 3/22/12
FILE SPEC.: <i>[Signature]</i>	DATE: <i>[Signature]</i>

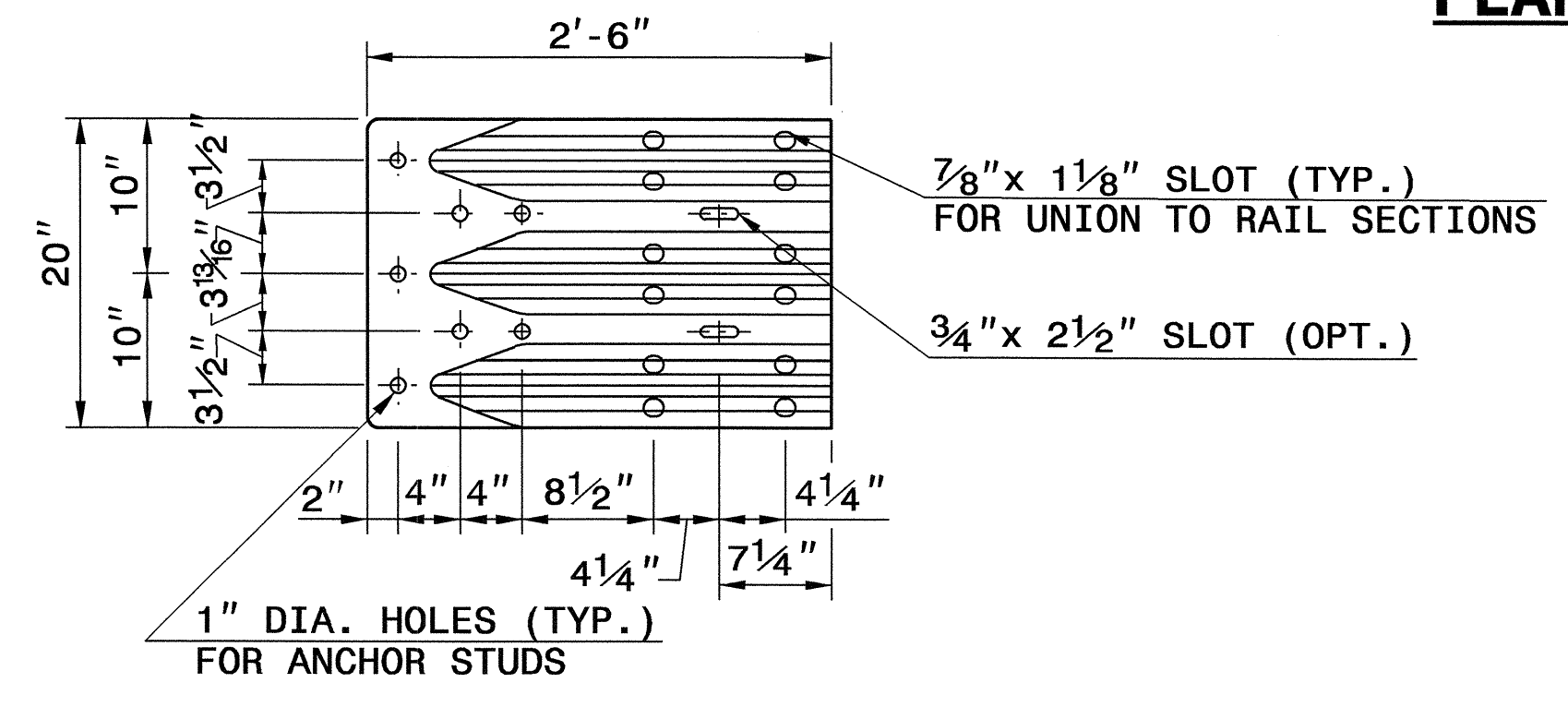
20-MAR-2012 14:54  
 S:\Contracts\Contrans\Special Details\vertical\usr\details\stand\vc&g transition sections.dgn  
 \$\$\$USERNAME\$\$\$



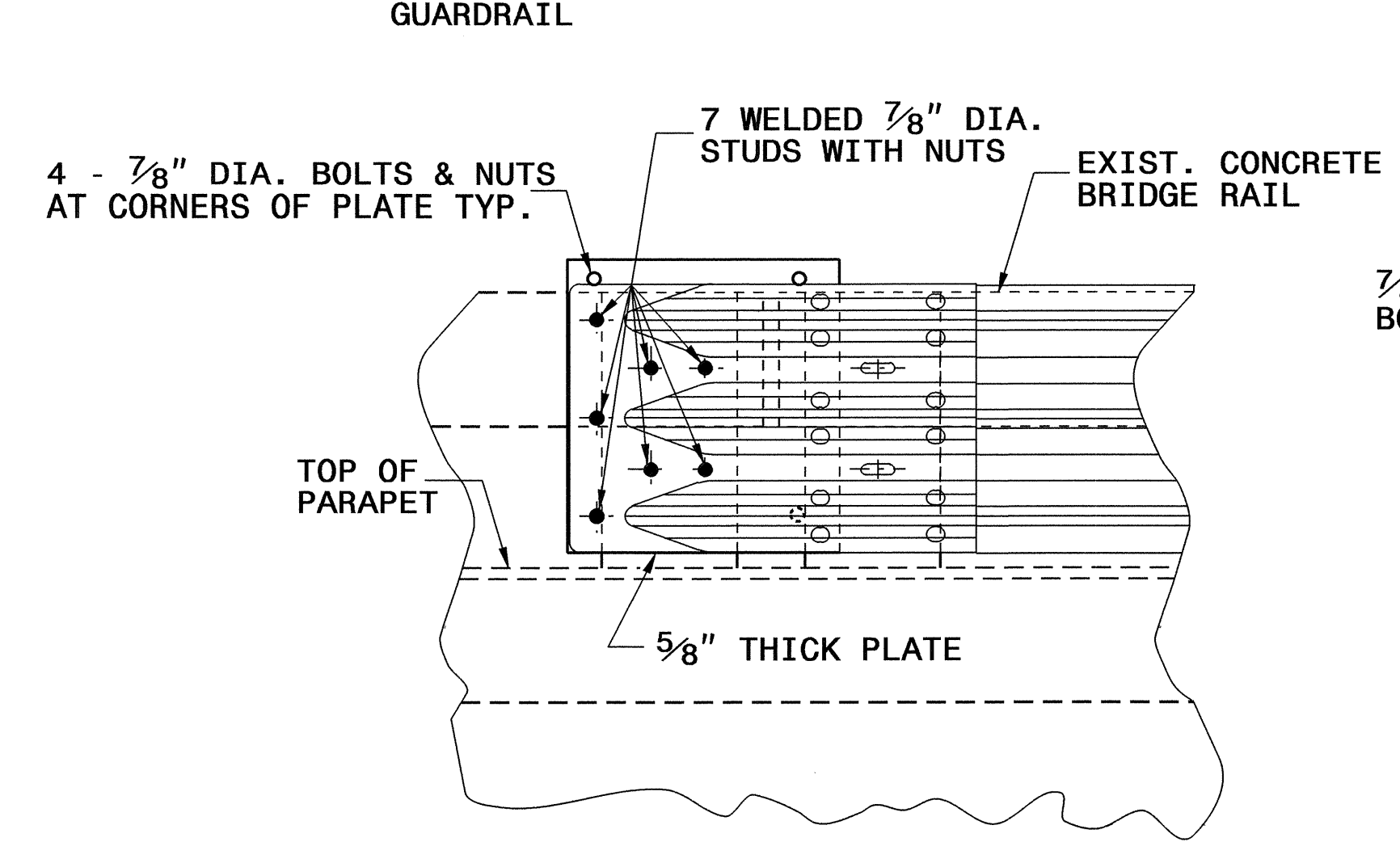
**ELEVATION VIEW**



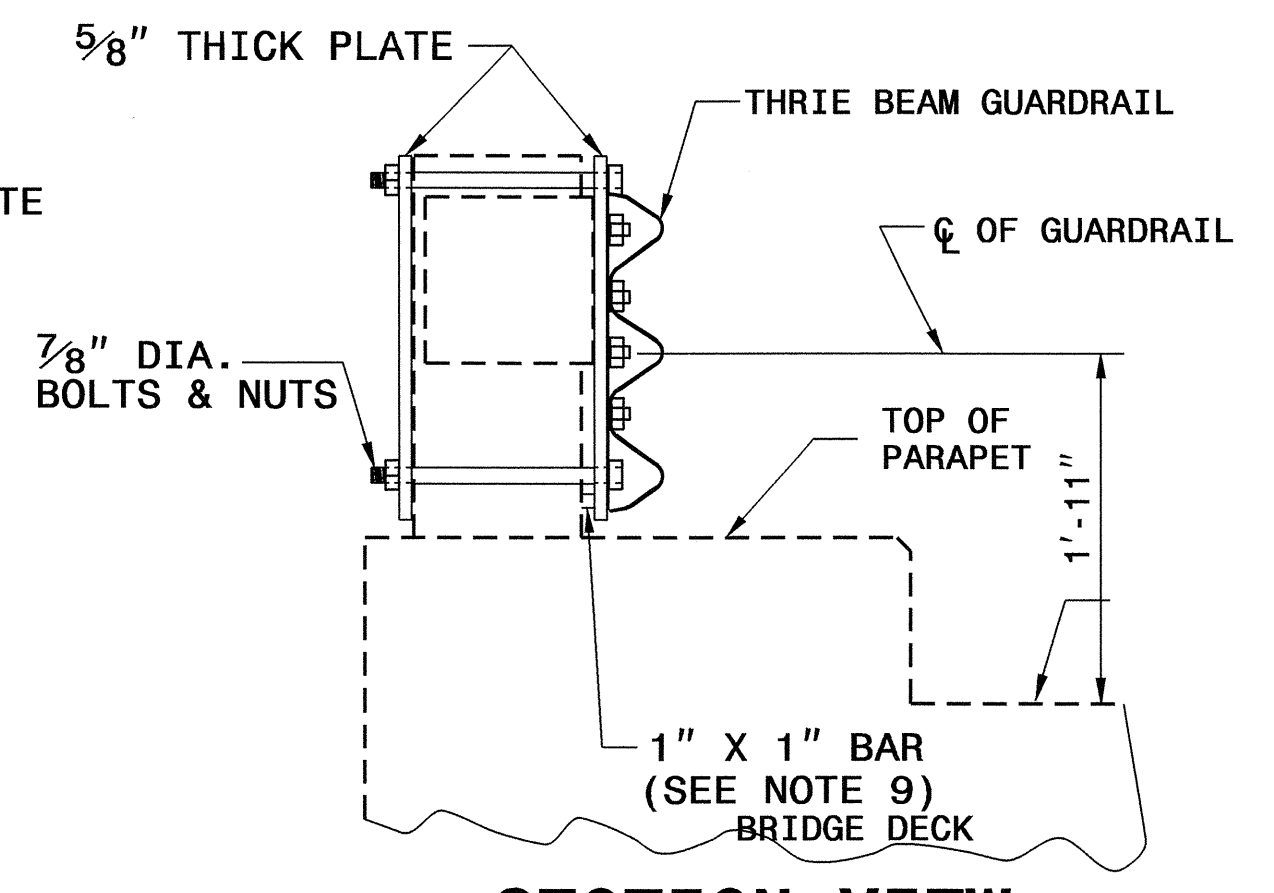
**PLAN VIEW**



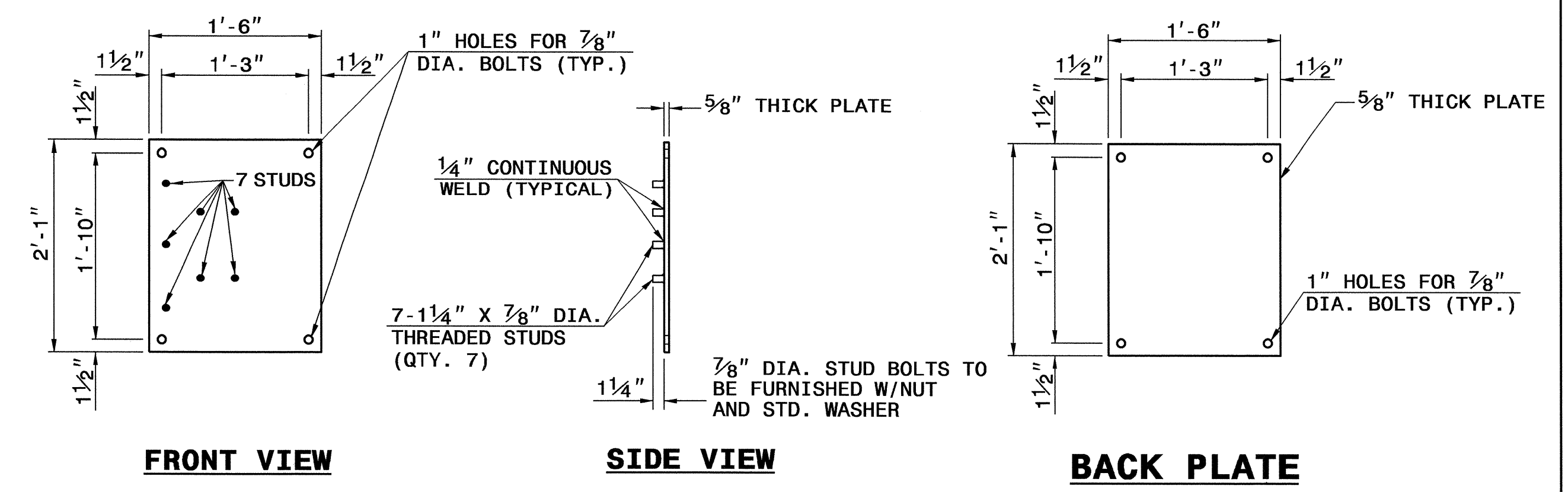
**END SHOE**



**ELEVATION VIEW**



**SECTION VIEW**



**FRONT VIEW**

**SIDE VIEW**

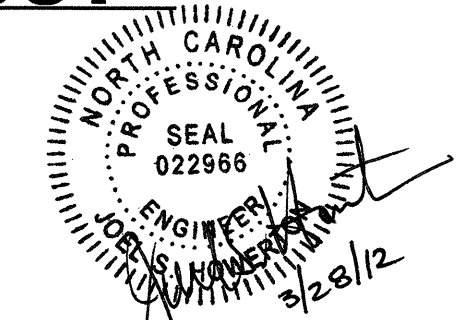
**BACK PLATE**

**FRONT PLATE**

**BRIDGE PLATES**

**GUARDRAIL ATTACHMENT TO BRIDGE POST**

- 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. DO NOT DRILL BRIDGE RAIL IN ORDER TO INSTALL GUARDRAIL ANCHOR UNIT.
  6. USE THIS DETAIL ONLY FOR BRIGES WITH POST AND BEAM TYPE RAIL.
  7. ATTACH 1" X 1" BAR AND THREADED STUDS TO PLATE WITH 1/4" WELDS ALL AROUND.
  8. 1" X 1" BAR MAY NOT BE NEEDED ON BRIDGE RAILS WHERE FACE OF RAIL DOES NOT PROJECT BEYOND FACE OF POST.
  9. PROVIDE SHOP DRAWINGS OF THE PLATES TO THE ENGINEER FOR APPROVAL BEFORE FABRICATING THE PLATES.
  10. LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
  11. SEE ROADWAY STANDARD DRAWING 862.03 SHEET 4 FOR ADDITIONAL INFORMATION ON THE TYPE III ANCHOR UNIT.

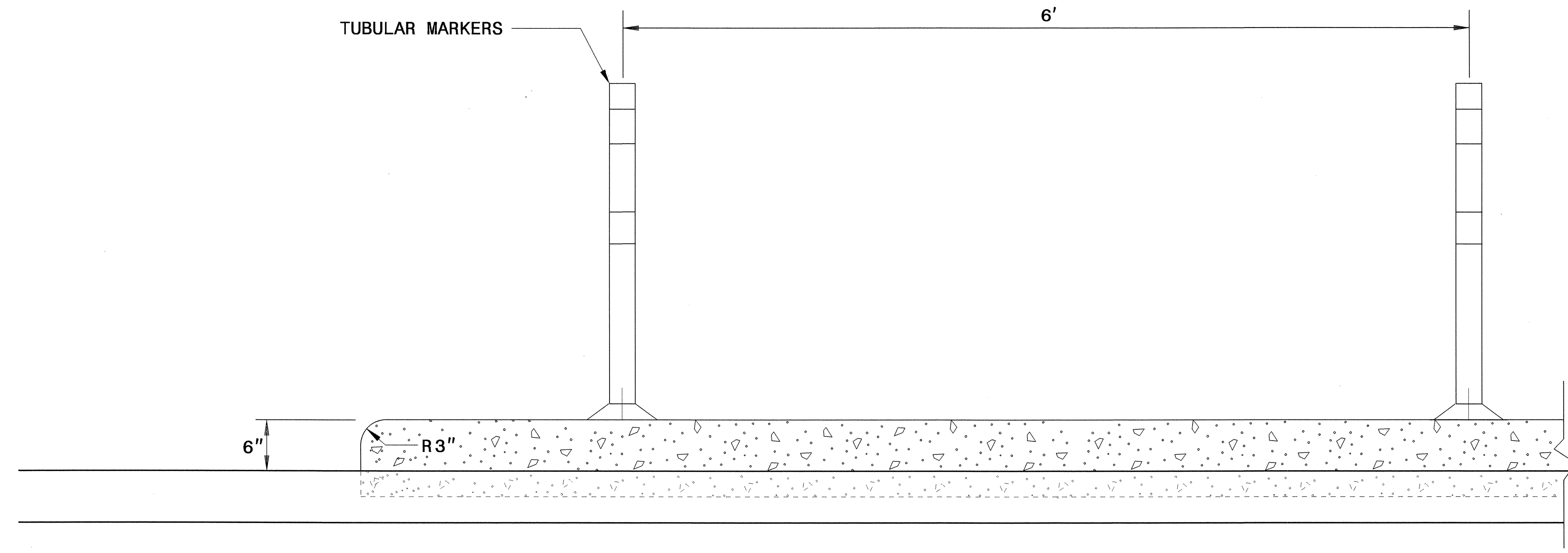


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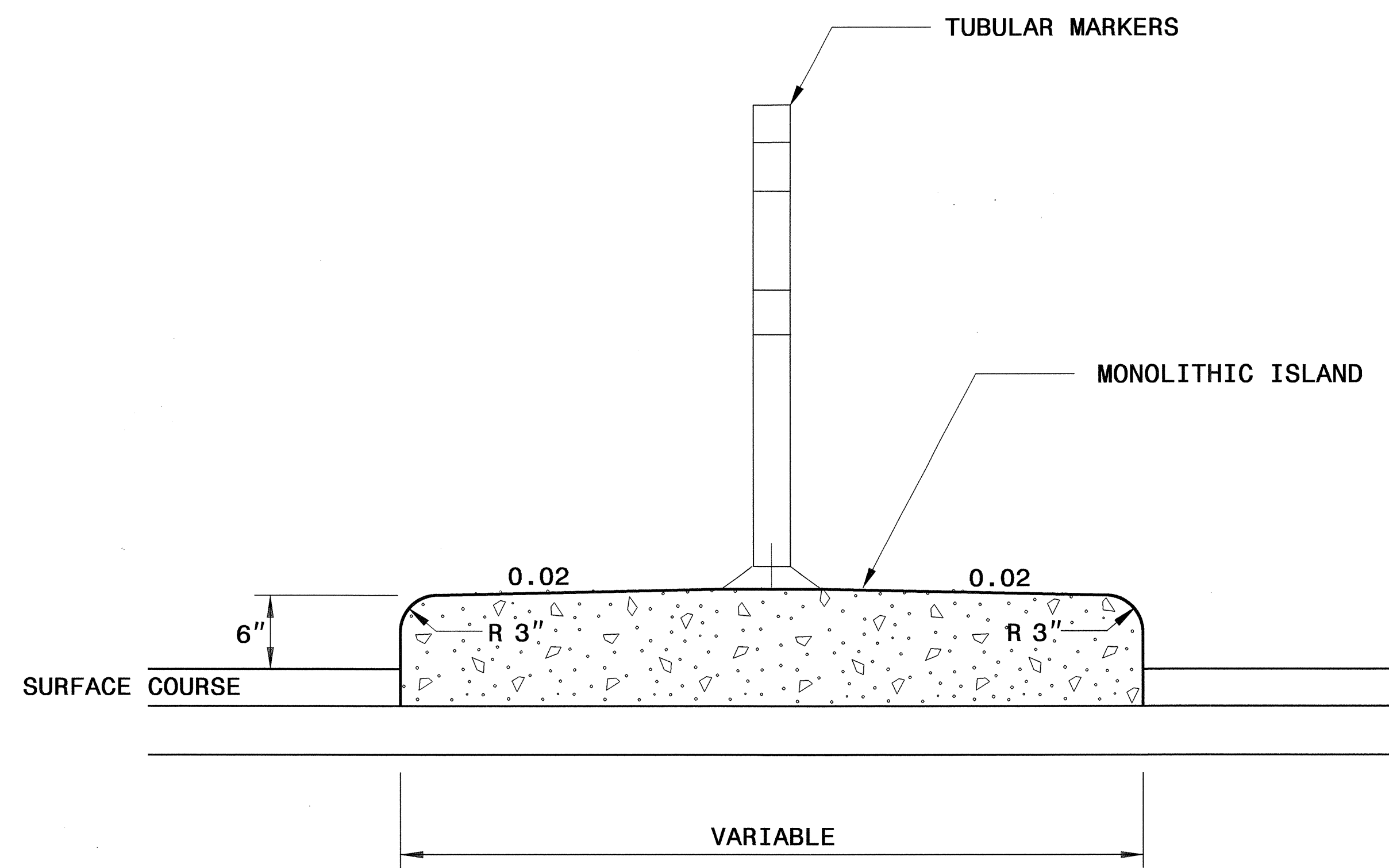
**TEMPORARY GUARDRAIL ANCHOR UNIT TYPE III MODIFIED FOR POST & BEAM RAIL**

ORIGINAL BY: C.O. CUEVAS	DATE: 12-00
MODIFIED BY: E.E. WARD	DATE: 02-04
CHECKED BY: <i>Joseph M. Ward</i>	DATE: 3/27/12
FILE SPEC.: <i>usr\details\stand\bp11.dgn</i>	

15-MAR-2012 15:16 C:\CONTRACTS\Special\_Details\review\usr\details\stand\bp 111 original.dgn

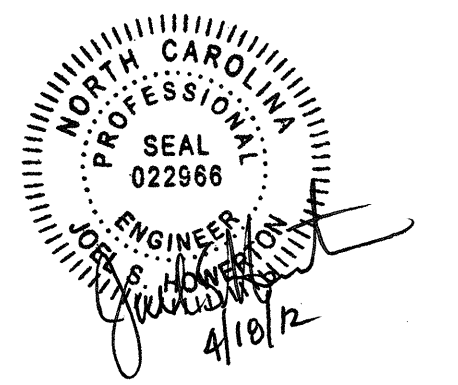


**ELEVATION VIEW**



**SECTION VIEW**

**NOTE:**  
SEE ROADWAY PLANS FOR ISLAND DIMENSIONS AND PAVEMENT DESIGN.  
REFER TO SECTION 1266 OF THE STANDARD SPECIFICATION FOR TUBULAR MARKERS.



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

**KEYED IN NON-MOUNTABLE MONOLITHIC ISLAND**

ORIGINAL BY: T.S. SPELL DATE: 9-2-00  
 MODIFIED BY: [Signature] DATE: [Blank]  
 CHECKED BY: [Signature] DATE: 4/17/12  
 FILE SPEC.: SPELL/DETAILS/STAND/KEYED-IN-ISLAND.DGN



STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C202823				
ItemNumber	Sec #	Quantity	Unit	Description
0000100000-N	800	Lump Sum		MOBILIZATION
0029000000-N	SP	Lump Sum		REINFORCED BRIDGE APPROACH FILL, STATION ***** (24+52.00)
0036000000-E	225	3,900	CY	UNDERCUT EXCAVATION
0050000000-E	226	1	ACR	SUPPLEMENTARY CLEARING & GRUB-BING
0063000000-N	SP	Lump Sum		GRADING
0106000000-E	230	8,000	CY	BORROW EXCAVATION
0134000000-E	240	490	CY	DRAINAGE DITCH EXCAVATION
0194000000-E	SP	5,400	CY	SELECT GRANULAR MATERIAL, CLASS III
0196000000-E	270	1,700	SY	GEOTEXTILE FOR SOIL STABILIZATION
0199000000-E	SP	4,600	SF	TEMPORARY SHORING
0318000000-E	300	430	TON	FOUNDATION CONDITIONING MATERIAL, MINOR STRUCTURES
0320000000-E	300	1,330	SY	FOUNDATION CONDITIONING GEOTEXTILE
0342000000-E	310	8	LF	*** SIDE DRAIN PIPE (12")
0343000000-E	310	320	LF	15" SIDE DRAIN PIPE
0366000000-E	310	700	LF	15" RC PIPE CULVERTS, CLASS III
0372000000-E	310	256	LF	18" RC PIPE CULVERTS, CLASS III
0384000000-E	310	28	LF	30" RC PIPE CULVERTS, CLASS III
0536000000-E	310	72	LF	*** HDPE PIPE CULVERTS (10")
0995000000-E	340	614	LF	PIPE REMOVAL
1220000000-E	545	60	TON	INCIDENTAL STONE BASE
1330000000-E	607	780	SY	INCIDENTAL MILLING
1491000000-E	610	3,753	TON	ASPHALT CONC BASE COURSE, TYPE B25.0C
1503000000-E	610	2,954	TON	ASPHALT CONC INTERMEDIATE COURSE, TYPE I19.0C

SUMMARY OF QUANTITIES - B-4599

ItemNumber	Sec #	Quantity	Unit	Description
1523000000-E	610	2,717	TON	ASPHALT CONC SURFACE COURSE, TYPE S9.5C
1575000000-E	620	470	TON	ASPHALT BINDER FOR PLANT MIX
1693000000-E	654	191	TON	ASPHALT PLANT MIX, PAVEMENT REPAIR
2022000000-E	815	450	CY	SUBDRAIN EXCAVATION
2033000000-E	815	340	CY	SUBDRAIN FINE AGGREGATE
2044000000-E	815	2,000	LF	6" PERFORATED SUBDRAIN PIPE
2070000000-N	815	4	EA	SUBDRAIN PIPE OUTLET
2077000000-E	815	24	LF	6" OUTLET PIPE
2286000000-N	840	20	EA	MASONRY DRAINAGE STRUCTURES
2308000000-E	840	10	LF	MASONRY DRAINAGE STRUCTURES
2355000000-N	840	2	EA	FRAME WITH GRATE, STD 840.29
2364000000-N	840	3	EA	FRAME WITH TWO GRATES, STD 840.16
2374000000-N	840	4	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (E)
2374000000-N	840	4	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (F)
2374000000-N	840	3	EA	FRAME WITH GRATE & HOOD, STD 840.03, TYPE ** (G)
2396000000-N	840	1	EA	FRAME WITH COVER, STD 840.54
2418000000-E	SP	125	LF	FRAME WITH GRATES, DRIVEWAY DROP INLET
2535000000-E	846	570	LF	***X*** CONCRETE CURB (8" X 18")
2549000000-E	846	4,110	LF	2'-6" CONCRETE CURB & GUTTER
2570000000-N	SP	5	EA	MODIFIED CONCRETE FLUME
2580000000-E	846	90	LF	CONCRETE VALLEY GUTTER
2612000000-E	848	190	SY	6" CONCRETE DRIVEWAY
2738000000-E	SP	50	SY	GENERIC PAVING ITEM 6" KEYED IN NON-MOUNTABLE MONOLITHIC ISLAND

ItemNumber	Sec #	Quantity	Unit	Description
2830000000-N	858	5	EA	ADJUSTMENT OF MANHOLES
2893000000-N	859	1	EA	CONVERT EXISTING CATCH BASIN TO JUNCTION BOX WITH MANHOLE
3030000000-E	862	287.5	LF	STEEL BM GUARDRAIL
3150000000-N	862	10	EA	ADDITIONAL GUARDRAIL POSTS
3215000000-N	862	2	EA	GUARDRAIL ANCHOR UNITS, TYPE III
3270000000-N	SP	2	EA	GUARDRAIL ANCHOR UNITS, TYPE 350
3380000000-E	862	212.5	LF	TEMPORARY STEEL BM GUARDRAIL
3387000000-N	862	1	EA	TEMPORARY GUARDRAIL ANCHOR UNITS, TYPE ***** (III MOD FOR POST & BEAM RAIL)
3389100000-N	SP	2	EA	TEMPORARY GUARDRAIL ANCHOR UNITS, TYPE 350
3503000000-E	866	270	LF	WOVEN WIRE FENCE, 47" FABRIC
3509000000-E	866	20	EA	4" TIMBER FENCE POSTS, 7'-6" LONG
3515000000-E	866	10	EA	5" TIMBER FENCE POSTS, 8'-0" LONG
3649000000-E	876	20	TON	RIP RAP, CLASS B
3656000000-E	876	515	SY	GEOTEXTILE FOR DRAINAGE
3659000000-N	SP	2	EA	PREFORMED SCOUR HOLES WITH LEVEL SPREADER APRON
4400000000-E	1110	272	SF	WORK ZONE SIGNS (STATIONARY)
4405000000-E	1110	288	SF	WORK ZONE SIGNS (PORTABLE)
4410000000-E	1110	72	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)
4415000000-N	1115	2	EA	FLASHING ARROW BOARD
4430000000-N	1130	160	EA	DRUMS
4445000000-E	1145	96	LF	BARRICADES (TYPE III)
4450000000-N	1150	1,440	HR	FLAGGER
4465000000-N	1160	2	EA	TEMPORARY CRASH CUSHIONS
4480000000-N	1165	2	EA	TMA

ItemNumber	Sec #	Quantity	Unit	Description
4490000000-E	1170	1,215	LF	PORTABLE CONCRETE BARRIER (ANCHORED)
4507000000-E	1170	100	LF	WATER FILLED BARRIER
4508000000-E	1170	100	LF	RESET WATER FILLED BARRIER
4510000000-N	SP	160	HR	LAW ENFORCEMENT
4520000000-N	1266	35	EA	TUBULAR MARKERS (FIXED)
4650000000-N	1251	247	EA	TEMPORARY RAISED PAVEMENT MARKERS
4695000000-E	1205	400	LF	THERMOPLASTIC PAVEMENT MARKING LINES (8", 90 MILS)
4710000000-E	1205	288	LF	THERMOPLASTIC PAVEMENT MARKING LINES (24", 120 MILS)
4721000000-E	1205	10	EA	THERMOPLASTIC PAVEMENT MARKING CHARACTER (120 MILS)
4725000000-E	1205	18	EA	THERMOPLASTIC PAVEMENT MARKING SYMBOL (90 MILS)
4770000000-E	1205	1,688	LF	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (II)
4770000000-E	1205	1,575	LF	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (4") (IV)
4785000000-E	1205	550	LF	COLD APPLIED PLASTIC PAVEMENT MARKING LINES, TYPE ** (12") (II)
4810000000-E	1205	38,072	LF	PAINT PAVEMENT MARKING LINES (4")
4820000000-E	1205	720	LF	PAINT PAVEMENT MARKING LINES (8")
4830000000-E	1205	480	LF	PAINT PAVEMENT MARKING LINES (16")
4835000000-E	1205	1,248	LF	PAINT PAVEMENT MARKING LINES (24")
4840000000-N	1205	24	EA	PAINT PAVEMENT MARKING CHARACTER
4845000000-N	1205	46	EA	PAINT PAVEMENT MARKING SYMBOL
4847000000-E	1205	4,154	LF	POLYUREA PAVEMENT MARKING LINES (4", *****) (HIGHLY REFLECTIVE ELEMENTS)
4905000000-N	1253	70	EA	SNOWPLOWABLE PAVEMENT MARKERS

ItemNumber	Sec #	Quantity	Unit	Description
5255000000-N	1413	Lump Sum		PORTABLE LIGHTING
5325200000-E	1510	80	LF	2" WATER LINE
5325800000-E	1510	855	LF	8" WATER LINE
5326200000-E	1510	2,040	LF	12" WATER LINE
5327000000-E	1510	40	LF	20" WATER LINE
5536000000-E	1515	1	EA	2" VALVE
5546000000-E	1515	4	EA	8" VALVE
5558000000-E	1515	2	EA	12" VALVE
5606000000-E	1515	2	EA	2" BLOW OFF
5648000000-N	1515	10	EA	RELOCATE WATER METER
5672000000-N	1515	1	EA	RELOCATE FIRE HYDRANT
5691300000-E	1520	80	LF	8" SANITARY GRAVITY SEWER
5800000000-E	1530	2,300	LF	ABANDON 6" UTILITY PIPE
5801000000-E	1530	2,100	LF	ABANDON 8" UTILITY PIPE
5812000000-E	1530	1,980	LF	ABANDON 20" UTILITY PIPE
5871500000-E	1550	327	LF	TRENCHLESS INSTALLATION OF 8" IN SOIL
5871510000-E	1550	37	LF	TRENCHLESS INSTALLATION OF 8" NOT IN SOIL
5871700000-E	1550	819	LF	TRENCHLESS INSTALLATION OF 12" IN SOIL
5871710000-E	1550	91	LF	TRENCHLESS INSTALLATION OF 12" NOT IN SOIL
5882000000-N	SP	5	EA	GENERIC UTILITY ITEM SANITARY SEWER CLEAN-OUT
5882000000-N	SP	5	EA	GENERIC UTILITY ITEM SANITARY SEWER CLEAN-OUT AND SERVICE LINE
6000000000-E	1605	5,210	LF	TEMPORARY SILT FENCE
6006000000-E	1610	225	TON	STONE FOR EROSION CONTROL, CLASS A
6009000000-E	1610	190	TON	STONE FOR EROSION CONTROL, CLASS B
6012000000-E	1610	300	TON	SEDIMENT CONTROL STONE

ItemNumber	Sec #	Quantity	Unit	Description
6015000000-E	1615	9	ACR	TEMPORARY MULCHING
6018000000-E	1620	300	LB	SEED FOR TEMPORARY SEEDING
6021000000-E	1620	1.25	TON	FERTILIZER FOR TEMPORARY SEEDING
6024000000-E	1622	325	LF	TEMPORARY SLOPE DRAINS
6029000000-E	SP	1,125	LF	SAFETY FENCE
6030000000-E	1630	530	CY	SILT EXCAVATION
6036000000-E	1631	1,600	SY	MATting FOR EROSION CONTROL
6037000000-E	SP	20	SY	COIR FIBER MAT
6042000000-E	1632	1,210	LF	1/4" HARDWARE CLOTH
6048000000-E	SP	500	SY	FLOATING TURBIDITY CURTAIN
6071010000-E	SP	20	LF	WATTLE
6071020000-E	SP	5	LB	POLYACRYLAMIDE (PAM)
6071030000-E	1640	200	LF	COIR FIBER BAFFLE
6084000000-E	1660	7.5	ACR	SEEDING & MULCHING
6087000000-E	1660	5	ACR	MOWING
6090000000-E	1661	100	LB	SEED FOR REPAIR SEEDING
6093000000-E	1661	0.25	TON	FERTILIZER FOR REPAIR SEEDING
6096000000-E	1662	200	LB	SEED FOR SUPPLEMENTAL SEEDING
6108000000-E	1665	6	TON	FERTILIZER TOPDRESSING
6114500000-N	1667	10	MHR	SPECIALIZED HAND MOWING
6117000000-N	SP	18	EA	RESPONSE FOR EROSION CONTROL
7060000000-E	1705	1,940	LF	SIGNAL CABLE
7120000000-E	1705	18	EA	VEHICLE SIGNAL HEAD (12", 3 SECTION)
7132000000-E	1705	6	EA	VEHICLE SIGNAL HEAD (12", 4 SECTION)
7252000000-E	1710	600	LF	MESSENGER CABLE (1/4")
7264000000-E	1710	140	LF	MESSENGER CABLE (3/8")
7279000000-E	1715	720	LF	TRACER WIRE

SUMMARY OF QUANTITIES - B-4599

ItemNumber	Sec #	Quantity	Unit	Description
730000000-E	1715	585	LF	UNPAVED TRENCHING (*****) (1, 2")
730010000-E	1715	10	LF	UNPAVED TRENCHING FOR TEMP- ORARY LEAD-IN
730100000-E	1715	920	LF	DIRECTIONAL DRILL (*****) (1, 2")
732400000-N	1716	5	EA	JUNCTION BOX (STANDARD SIZE)
734800000-N	1716	6	EA	JUNCTION BOX (OVER-SIZED, HEA- VY DUTY)
736000000-N	1720	2	EA	WOOD POLE
737200000-N	1721	8	EA	GUY ASSEMBLY
740800000-E	1722	1	EA	1" RISER WITH WEATHERHEAD
742000000-E	1722	2	EA	2" RISER WITH WEATHERHEAD
743200000-E	1722	2	EA	2" RISER WITH HEAT SHRINK TUBING
744400000-E	1725	520	LF	INDUCTIVE LOOP SAWCUT
745600000-E	1726	2,360	LF	LEAD-IN CABLE (*****) (14-2)
748500000-N	SP	3	EA	WIRELESS MAGNETIC SENSOR VEHI- CLE DETECTOR SYSTEM
751600000-E	1730	2,450	LF	COMMUNICATIONS CABLE (**FIBER) (12)
754000000-N	1731	2	EA	SPLICE ENCLOSURE
755200000-N	1731	1	EA	INTERCONNECT CENTER
758800000-N	SP	2	EA	METAL POLE WITH SINGLE MAST ARM
759000000-N	SP	1	EA	METAL POLE WITH DUAL MAST ARM
761300000-N	SP	3	EA	SOIL TEST
761410000-E	SP	21	CY	DRILLED PIER FOUNDATION
763100000-N	SP	3	EA	MAST ARM WITH METAL POLE DE- SIGN
768400000-N	1750	1	EA	SIGNAL CABINET FOUNDATION
775600000-N	1751	1	EA	CONTROLLER WITH CABINET (TYPE 2070L, BASE MOUNTED)
778000000-N	1751	1	EA	DETECTOR CARD (TYPE 2070L)
790100000-N	1753	1	EA	CABINET BASE EXTENDER

ItemNumber	Sec #	Quantity	Unit	Description
798000000-N	SP	4	EA	GENERIC SIGNAL ITEM RELOCATE OPTICAL PREEMPTION DETECTOR
798000000-N	SP	1	EA	GENERIC SIGNAL ITEM RELOCATE OPTICAL PREEMPTION PHASE SELECTOR

COMPUTED BY: KSH DATE: 12 / 12 / 2011  
 CHECKED BY: RWP DATE: 06 / 07 / 2012

STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS

PROJECT REFERENCE NO. B-4599 SHEET NO. 3-A  
**M A Engineering Consultants, Inc.**  
 598 East Chatham Street Suite 137 Cary, NC 27511  
 Phone: 919.297.0220 Fax: 919.297.0221

**SUMMARY OF EARTHWORK**  
 IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT+%	BORROW	WASTE
<b>PHASE 1</b>					
-L- LT. 12+25.00 TO 20+79.00 (BEGIN BRIDGE)	146		1,970	1,824	
-L- LT. 16+60 +/- TO 19+25 +/-		2,239	2,911	2,911	2,239
-L- LT. 28+25.00 (END BRIDGE) TO 40+00.00	853		2,292	1,439	
-L- LT. 35+25 TO 40+00.00		411	534	534	411
<b>TOTAL (PHASE 1)</b>	<b>999</b>	<b>2,650</b>	<b>7,707</b>	<b>6,708</b>	<b>2,650</b>
<b>PHASE 2</b>					
-L- CL-RT. 19+00.00 TO 20+79.00 (BEGIN BRIDGE)			655	655	
-L- CL-RT. 28+25.00 (END BRIDGE) TO 33+50.00			1,134	1,134	
<b>TOTAL (PHASE 2)</b>			<b>1,789</b>	<b>1,789</b>	
<b>PHASE 3</b>					
-L- RT. 12+25.00 TO 20+79.00 (BEGIN BRIDGE)	18		1,192	1,174	
-L- RT. 12+60 +/- TO 13+30 +/-		241	313	313	241
-Y1- 10+50.00 TO 11+65.00	38		33		5
-L- RT. 28+25.00 (END BRIDGE) TO 40+00.00	11		1,200	1,189	
-Y2- 10+75.00 TO 12+05.00	6		190	184	
-Y3- 10+50.00 TO 11+30.00	52		27		25
-Y4- 10+50.00 TO 11+25.00	18		25	7	
<b>SUBTOTAL (PHASE 3)</b>	<b>143</b>	<b>241</b>	<b>2,980</b>	<b>2,867</b>	<b>271</b>
WASTE (FROM PHASE 1) TO REPLACE BORROW				-30	-30
<b>TOTAL (PHASE 3)</b>	<b>143</b>	<b>241</b>	<b>2,980</b>	<b>2,837</b>	<b>241</b>
<b>TOTAL (PHASE 1 + PHASE 2 + PHASE 3)</b>	<b>1,142</b>	<b>2,891</b>	<b>12,476</b>	<b>11,334</b>	<b>2,891</b>
EST. LOSS DUE TO CLEARING & GRUBBING*	NA			NA	
ADDITIONAL UNDERCUT (CONTINGENCY)		1,000	1,300	1,300	1,000
USE SELECT GRANULAR MATERIAL, CLASS III IN LIEU OF BACKFILL FOR UNDERCUT			-5,058	-5,058	
<b>PROJECT TOTAL</b>	<b>1,142</b>	<b>3,891</b>	<b>8,718</b>	<b>7,576</b>	<b>3,891</b>
ESTIMATED 5% TO REPLACE TOPSOIL ON BORROW PIT				379	
<b>GRAND TOTAL (CY)</b>	<b>1,142</b>	<b>3,891</b>	<b>8,718</b>	<b>7,955</b>	<b>3,891</b>
SAY (CY)	1,200	3,900		8,000	

(ITEMS BELOW ARE PER 'GEOTECHNICAL REPORT - DESIGN AND CONSTRUCTION RECOMMENDATIONS' LETTER DATED JANUARY 31, 2012)  
 SELECT GRANULAR MATERIAL (CLASS III) = 5,400 CY (3,700 CY BACKFILL FOR UNDERCUT + 1,700 CY CONTINGENCY)  
 ESTIMATED GEOTEXTILE FOR SOIL STABILIZATION = 1,600 SY (900 SY FOR UNDERCUT AREAS + 700 SY CONTINGENCY)  
 \* NO SIGNIFICANT LOSS OF UNCLASSIFIED EXCAVATION IS ANTICIPATED DUE TO CLEARING AND GRUBBING  
 (ITEMS BELOW ARE PER 'GEOTECHNICAL REPORT ADDENDUM - DESIGN AND CONSTRUCTION RECOMMENDATIONS' LETTER DATED JUNE 7, 2012)  
 ESTIMATED SHALLOW UNDERCUT = 150 CY (CONTINGENCY)  
 ESTIMATED CLASS IV SUBGRADE STABILIZATION = 250 TONS (CONTINGENCY)

APPROXIMATE QUANTITIES ONLY. CLEARING AND GRUBBING, UNCLASSIFIED EXCAVATION, FINE GRADING, REMOVAL OF EXISTING PAVEMENT, AND BREAKING OF EXISTING ASPHALT PAVEMENT WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR "GRADING".

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- STA. 15+21.57 TO 17+08.62 RT	180			
-L-/-Y1- STA. 17+01.58 TO 18+47.20 RT	635			
-Y1- STA. 11+00.00 TO 11+26.72 RT	12			
-L- STA. 19+00.00 TO 20+00.00 (LT LANES)	275			
-L- STA. 20+00.00 TO 20+94.70 (LT LANES)		280		
-L- STA. 18+77.68 TO 21+33.09 (RT LANES)	699			
-L- STA. 28+21.96 TO 29+60.47 (LT LANES)		387		
-L- STA. 29+60.47 TO 31+00.00 (LT LANES)	432			
-L- STA. 28+24.84 TO 31+00.00 (RT LANES)	912			
-L-/-Y2- STA. 31+00.00 TO 12+05.00 RT	98			
-L-/-Y2-/-Y3- STA. 31+87.10 TO 34+67.54 RT	680			
-L-/-Y3- STA. 35+04.00 TO 36+77.37 RT/LT	134			
<b>GRAND TOTAL (SY)</b>	<b>4,057</b>	<b>667</b>		
SAY (SY)	4,060	670		

**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 SHOULDER 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	TEMP. GRAU 350	TEMP. TYPE III	NO.	G	NG								
-L-	19+17	21+07	RT	193.75					VAR.	14' BERM	175'	NA	3.5'	NA	1	1													
-L-	28+25	30+61	LT	231.25					VAR.	14' BERM	212.5	NA	4.25'	NA	1	1													
<b>SUBTOTAL (LF)</b>				<b>425.00</b>											<b>2</b>	<b>2</b>													
<b>LESS ANCHORS (LF)</b>				<b>137.50</b>											<b>50</b>	<b>18.75</b>													
<b>TOTAL (LF)</b>				<b>287.50 LF</b>											<b>100</b>	<b>37.5</b>													
												<b>ADDITIONAL GUARDRAIL POSTS: 10 EA</b>																	
<b>TEMPORARY GUARDRAIL</b>												<b>TEMPORARY GUARDRAIL</b>												<b>TEMPORARY GUARDRAIL</b>					
-L-	18+60	21+34	EXIST. NBL (LT)	281.25																				(PHASE 2) SEE TCP PLANS FOR LOCATION					
-L-	20+00	20+50	PROP. GR (RT)																					(PHASE 3) SEE TCP PLANS FOR LOCATION (USE WITH PROP. GR)					
<b>SUBTOTAL (TEMP. GUARDRAIL) (LF)</b>				<b>281.25</b>																									
<b>LESS ANCHORS (TEMP.) (LF)</b>				<b>68.75</b>																									
<b>TOTAL (TEMP. GUARDRAIL) (LF)</b>				<b>212.50 LF</b>																									
												<b>TOTAL ANCHORS (TEMP.) (EA)</b>						<b>2*</b>	<b>1</b>									<b>*NO DEDUCTION FOR ONE TEMPORARY GRAU-350, THIS ANCHOR USED WITH PROPOSED GUARDRAIL.</b>	
												<b>ANCHOR UNIT LENGTH (TEMP.) (LF)</b>						<b>50</b>	<b>18.75</b>										
												<b>DEDUCTION PER TYPE (LF)</b>						<b>50*</b>	<b>18.75</b>										
												<b>TOTAL DEDUCTION (TEMP.) (LF)</b>								<b>68.75</b>									

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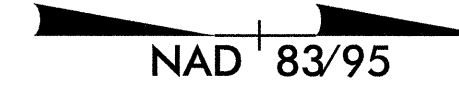


SEE SHEETS 7 & 8 FOR -L- PROFILE  
SEE SHEET 8 FOR -YI- PROFILE  
DRIVEWAY RADII 10' UNLESS SHOWN OTHERWISE.

FOR STRUCTURE PLANS, SEE SHEETS S-1 THRU S-125

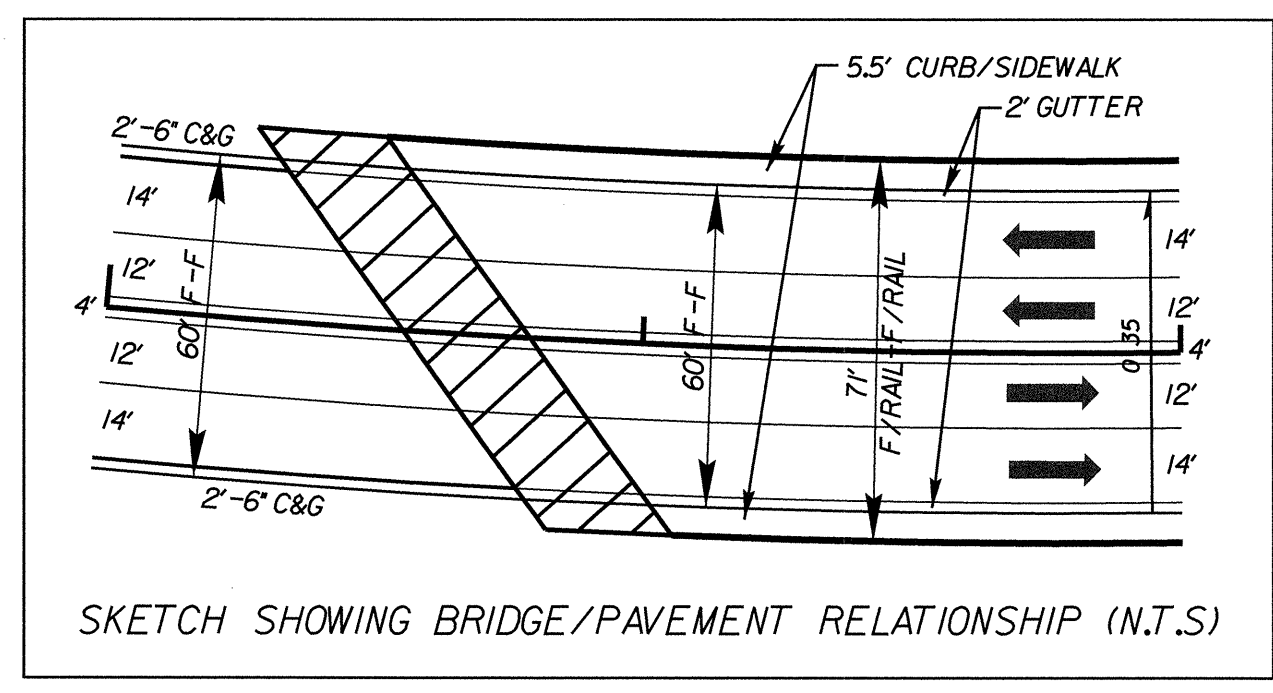
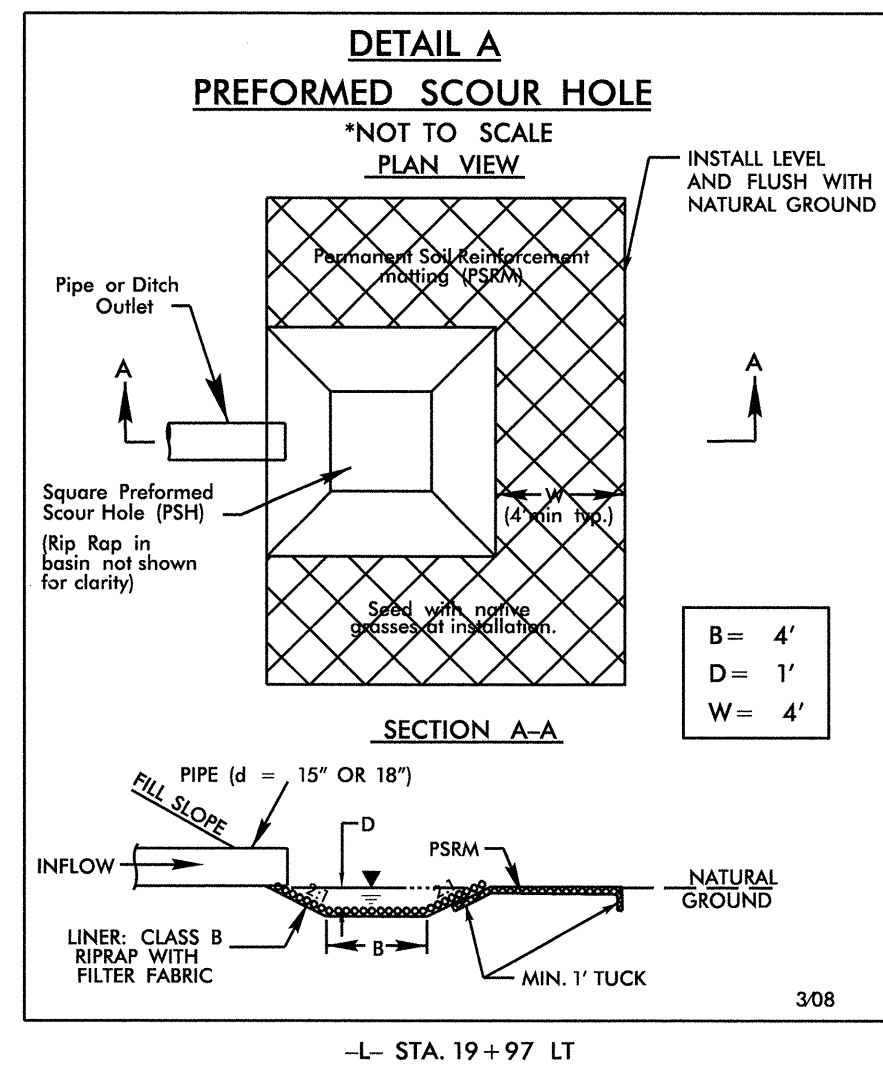
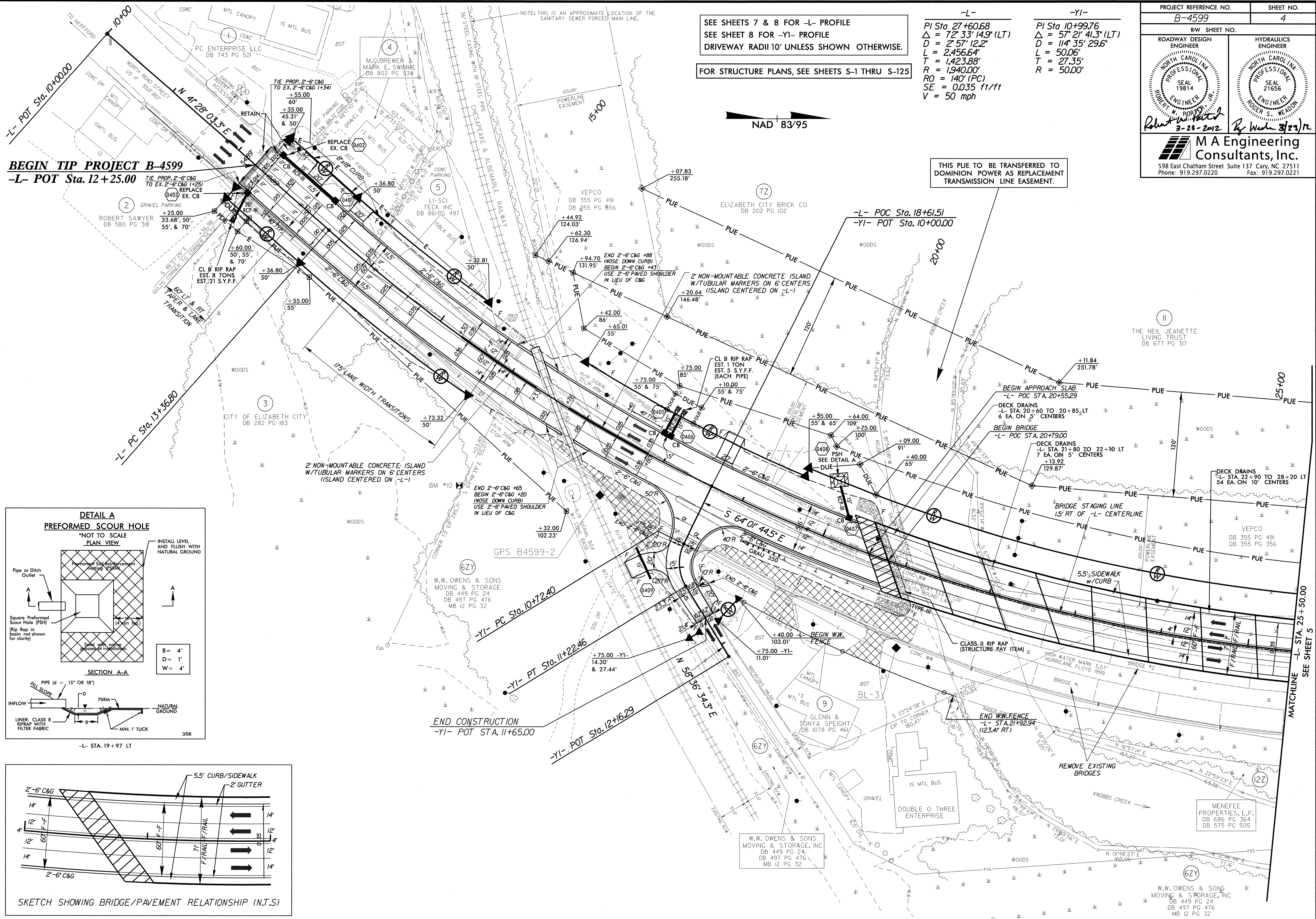
-L-  
 $PI\ Sta\ 27+60.68$   
 $\Delta = 72' 33" 14.9" (LT)$   
 $D = 2' 57" 12.2"$   
 $L = 2,456.64'$   
 $T = 1,423.88'$   
 $R = 1,940.00'$   
 $RO = 140' (PC)$   
 $SE = 0.035\ ft/ft$   
 $V = 50\ mph$

-YI-  
 $PI\ Sta\ 10+99.76$   
 $\Delta = 57' 21" 41.3" (LT)$   
 $D = 114' 35" 29.6"$   
 $L = 50.06'$   
 $T = 27.35'$   
 $R = 50.00'$



THIS PUE TO BE TRANSFERRED TO DOMINION POWER AS REPLACEMENT TRANSMISSION LINE EASEMENT.

**BEGIN TIP PROJECT B-4599**  
-L- POT Sta. 12+25.00

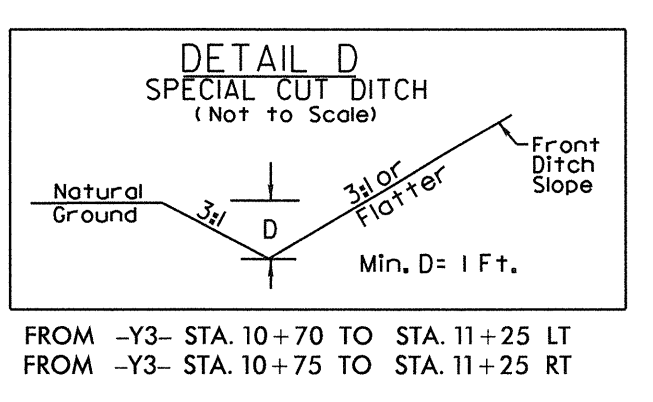
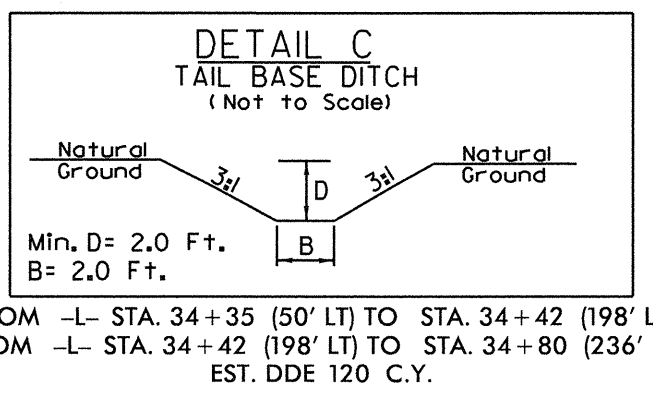
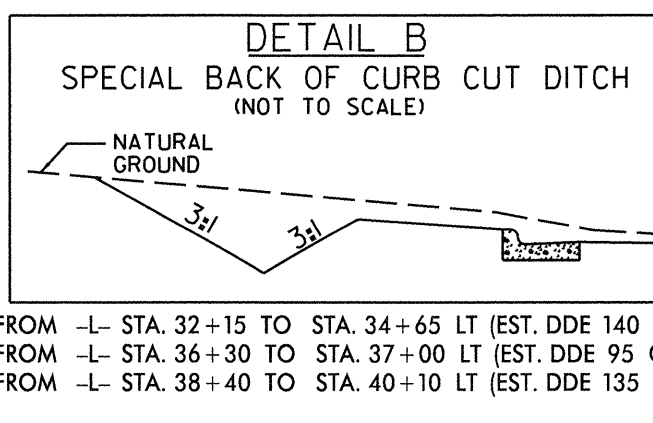
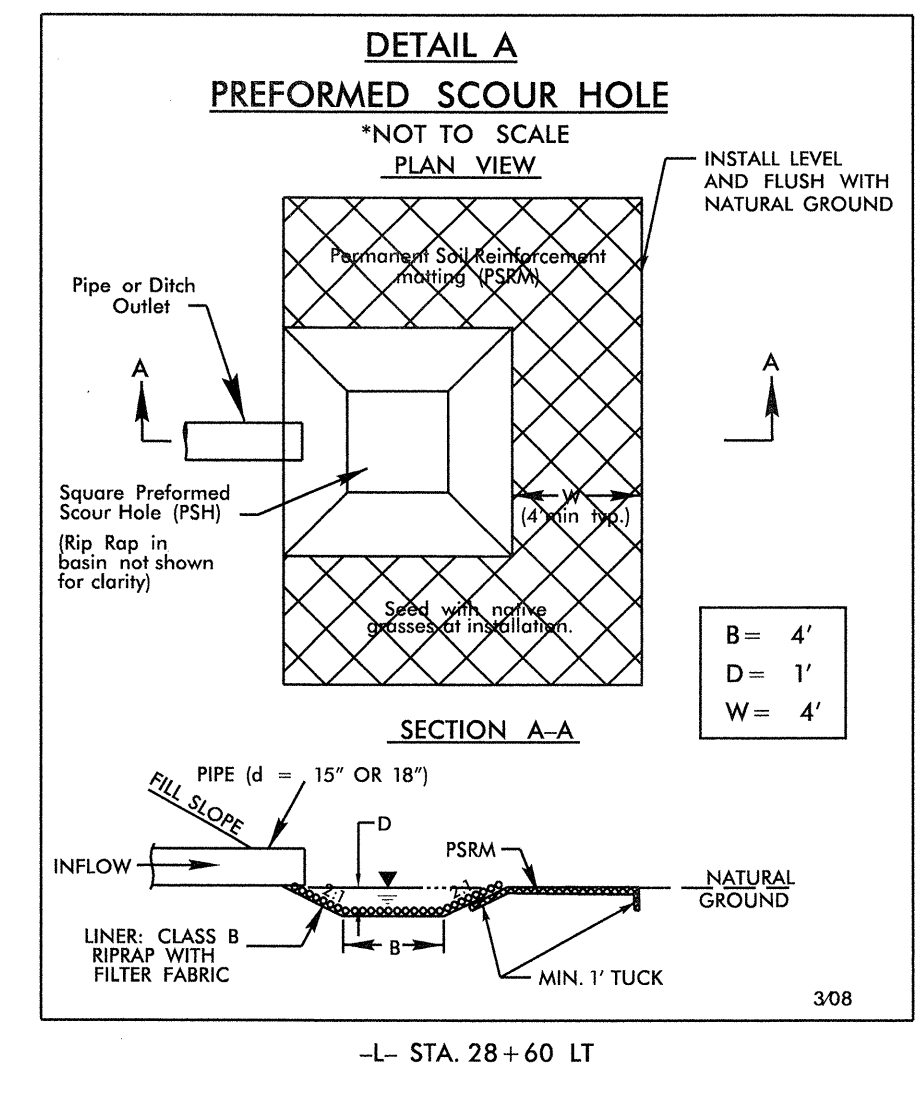
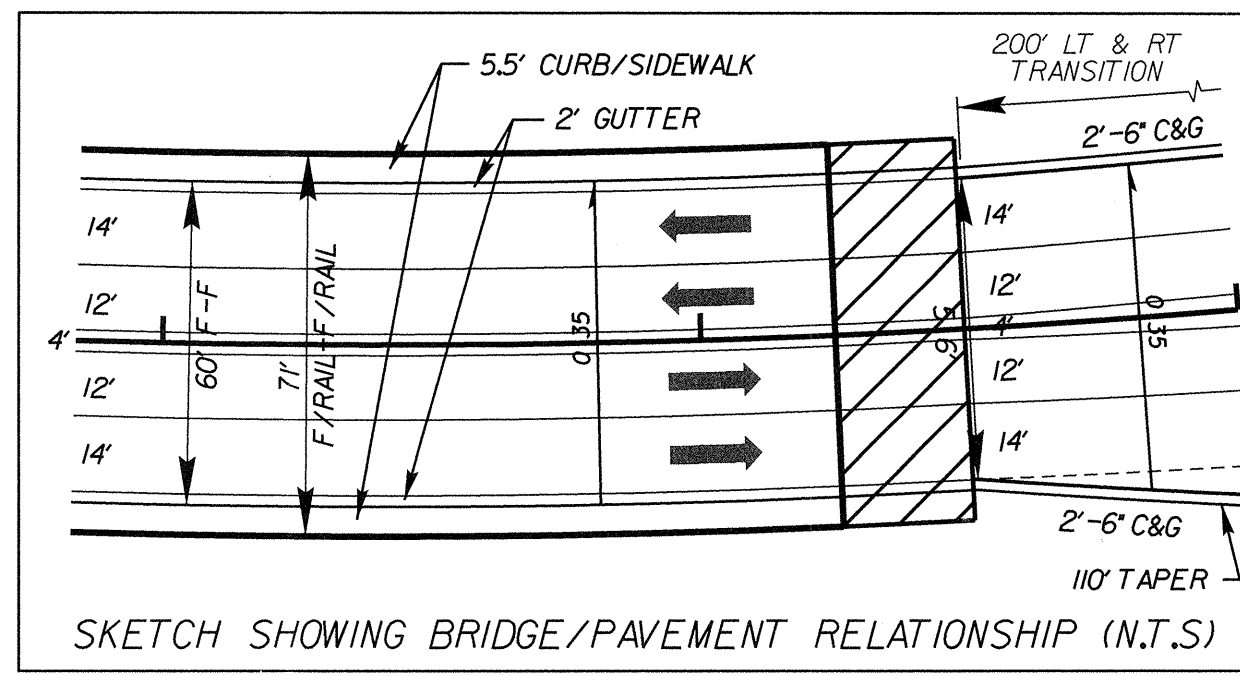


REVISIONS

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8/17/09



SEE SHEETS 7 & 8 FOR -L- PROFILE  
SEE SHEET 8 FOR -Y2-, -Y3-, & -Y4- PROFILES  
DRIVEWAY RADII 10' UNLESS SHOWN OTHERWISE.

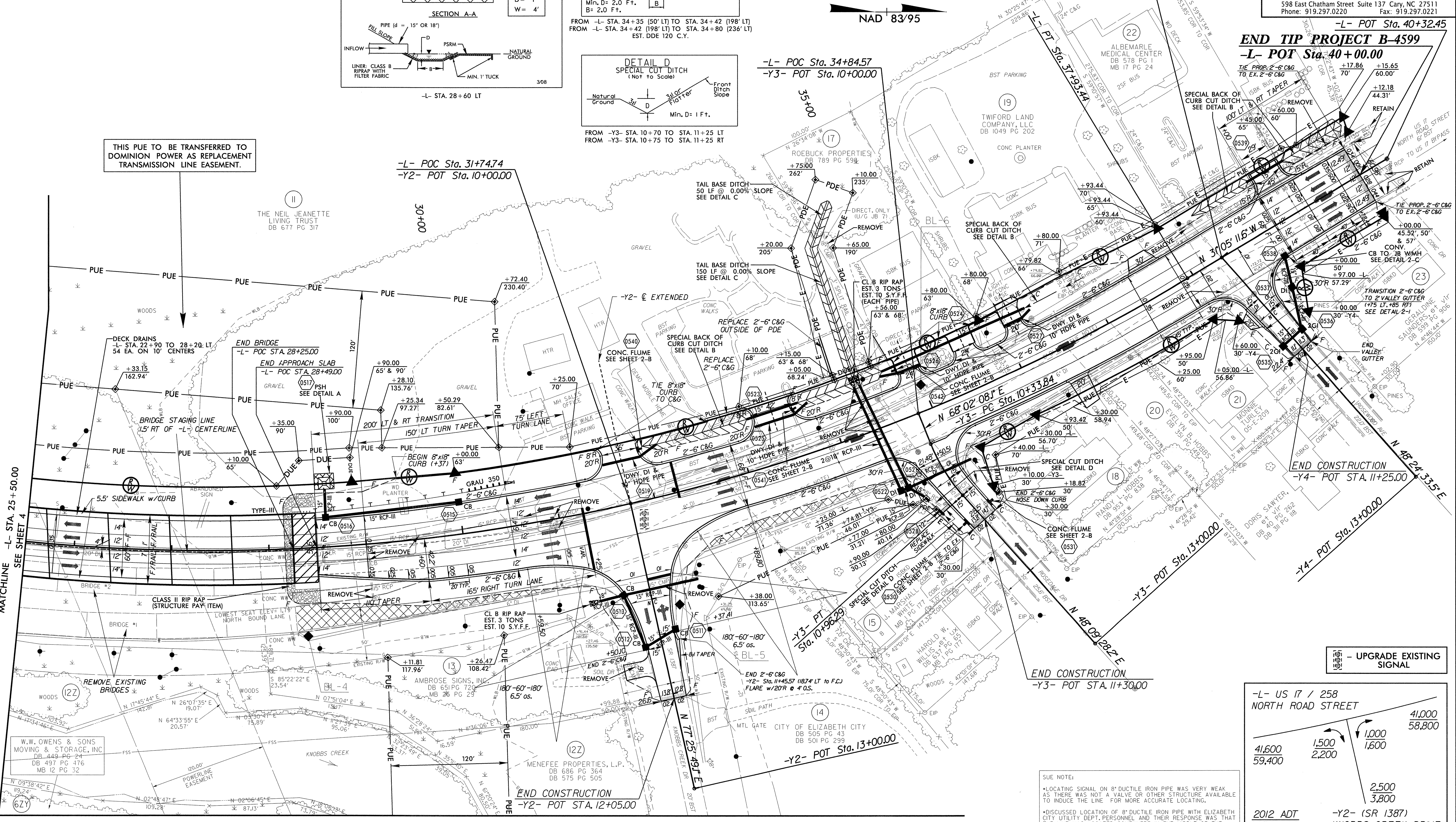
FOR STRUCTURE PLANS, SEE SHEETS S-1 THRU S-125

THE ENGINEER MAY USE AGGREGATE SUBGRADE IN LIEU OF UNDERCUT:  
FROM -L- STA. 35+25 TO 40+00 LT.

-L-  
PI Sta 27+60.68  
Δ = 72' 33" 149' (LT)  
D = 2' 57" 122"  
L = 2,456.64'  
T = 1,423.88'  
R = 1,940.00'  
RO = 157.5' (PT)  
SE = 0.035 ft/ft  
V = 50 mph

PROJECT REFERENCE NO. B-4599 SHEET NO. 5  
RW SHEET NO.  
ROADWAY DESIGN ENGINEER: ROBERT W. PRATER, PROFESSIONAL ENGINEER, SEAL 19814  
HYDRAULICS ENGINEER: ROBERT S. WADSWORTH, PROFESSIONAL ENGINEER, SEAL 21656  
MA Engineering Consultants, Inc.  
598 East Chatham Street Suite 137 Cary, NC 27511  
Phone: 919.297.0220 Fax: 919.297.0221

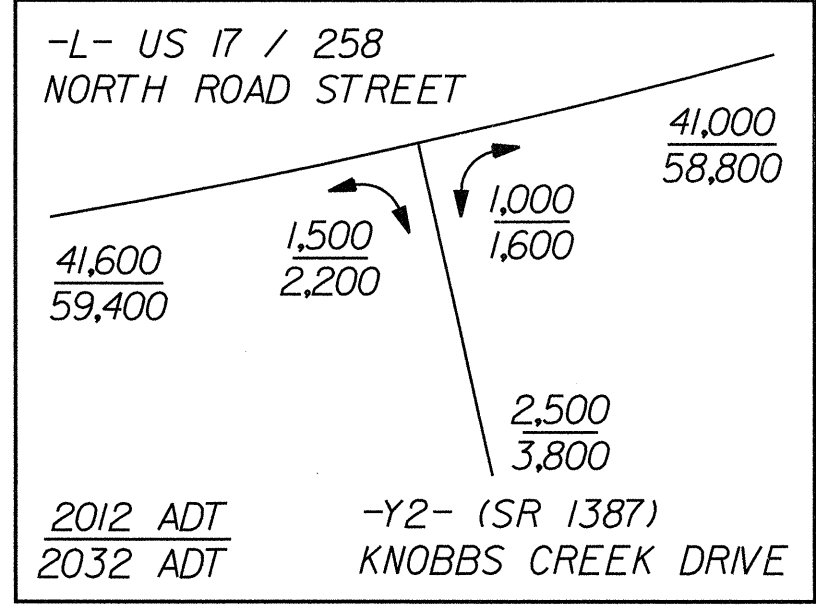
THIS PUE TO BE TRANSFERRED TO DOMINION POWER AS REPLACEMENT TRANSMISSION LINE EASEMENT.



MATCHLINE -L- STA. 25+50.00 SEE SHEET 4

MATCHLINE SEE SHEET 6

UPGRADE EXISTING SIGNAL



SUE NOTE:  
• LOCATING SIGNAL ON 8\"/>

REVISIONS

6/7/2012  
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W.W. OWENS & SONS  
MOVING & STORAGE, INC  
DB 449 PG 24  
DB 497 PG 476  
MB 12 PG 32

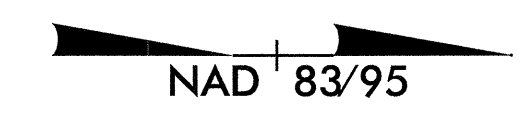
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THIS SHEET FOR  
RIGHT OF WAY  
PURPOSES ONLY.

**M A Engineering  
Consultants, Inc.**  
598 East Chatham Street Suite 137 Cary, NC 27511  
Phone: 919.297.0220 Fax: 919.297.0221

MATCHLINE SEE SHEET 5

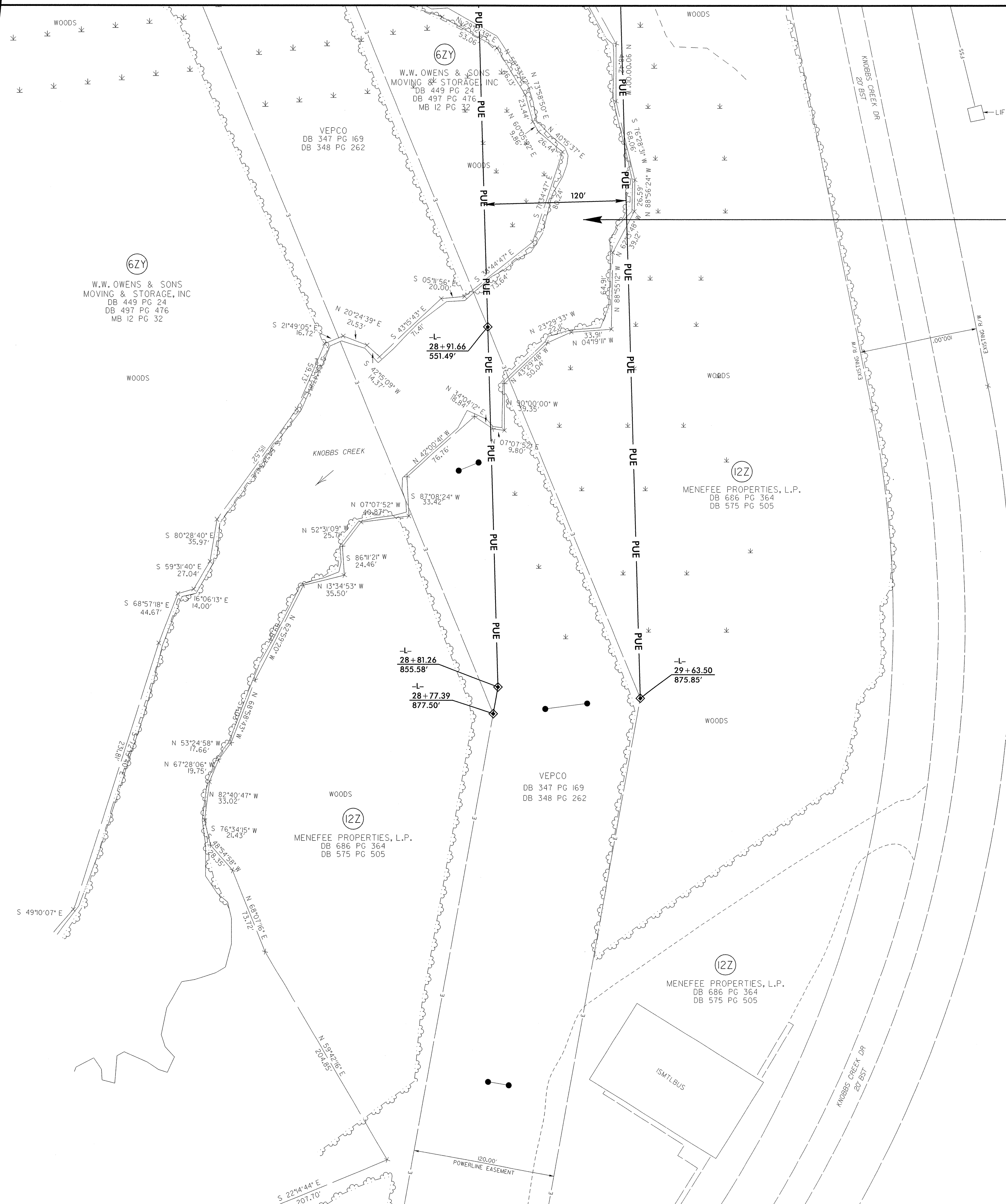
THIS PUE TO BE TRANSFERRED TO  
DOMINION POWER AS REPLACEMENT  
TRANSMISSION LINE EASEMENT.



REVISIONS

8/17/99

3/23/2012  
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5/28/09

BM #10  
RAILROAD SPIKE IN BASE OF 10" WHITE OAK  
-L- STA. 16+20.25 (141' RT)  
ELEV. 4.95'

### -L- US 17/158 (NORTH ROAD ST.)

EXISTING GROUND  
PROPOSED GRADE  
LEFT DITCH GRADE  
RIGHT DITCH GRADE  
UNDERCUT EXCAVATION

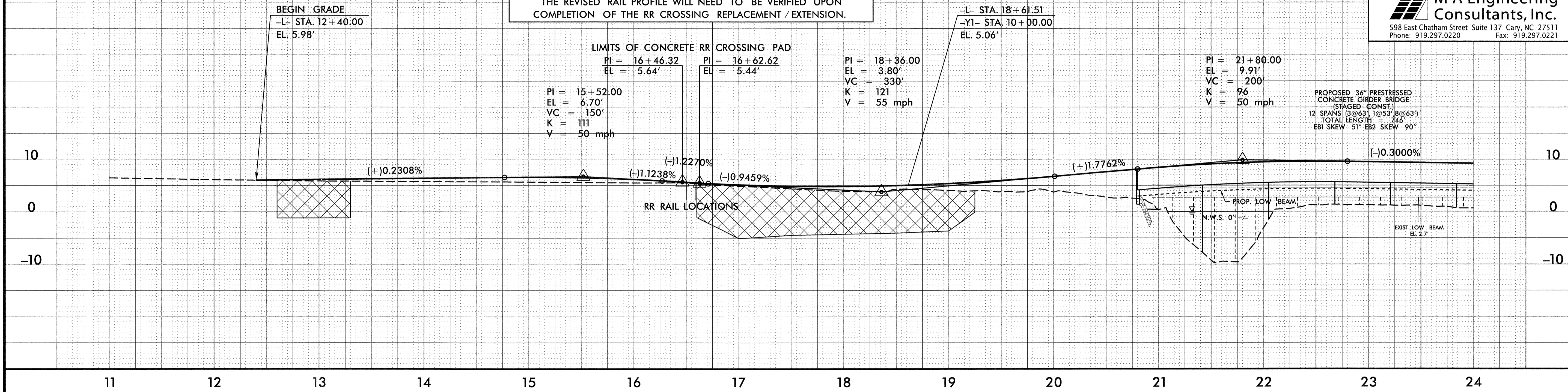
PROJECT REFERENCE NO. B-4599 SHEET NO. 7

ROADWAY DESIGN ENGINEER  
PROFESSIONAL SEAL 19814  
ROBERT W. PORTER  
6-7-2012

HYDRAULICS ENGINEER  
PROFESSIONAL SEAL 21656  
ROGER S. WEADON  
6/7/12

**M A Engineering Consultants, Inc.**  
598 East Chatham Street Suite 137 Cary, NC 27511  
Phone: 919.297.0220 Fax: 919.297.0221

NOTE: -L- PROFILE RAISED APPROX. 1.5" AT RR RAILS TO ACCOUNT FOR DIFFERENCE IN RR PROFILE DUE TO REPLACEMENT / EXTENSION OF RR CROSSING. THE 1.5" VALUE IS PRELIMINARY AND SUBJECT TO CHANGE. THE REVISED RAIL PROFILE WILL NEED TO BE VERIFIED UPON COMPLETION OF THE RR CROSSING REPLACEMENT / EXTENSION.



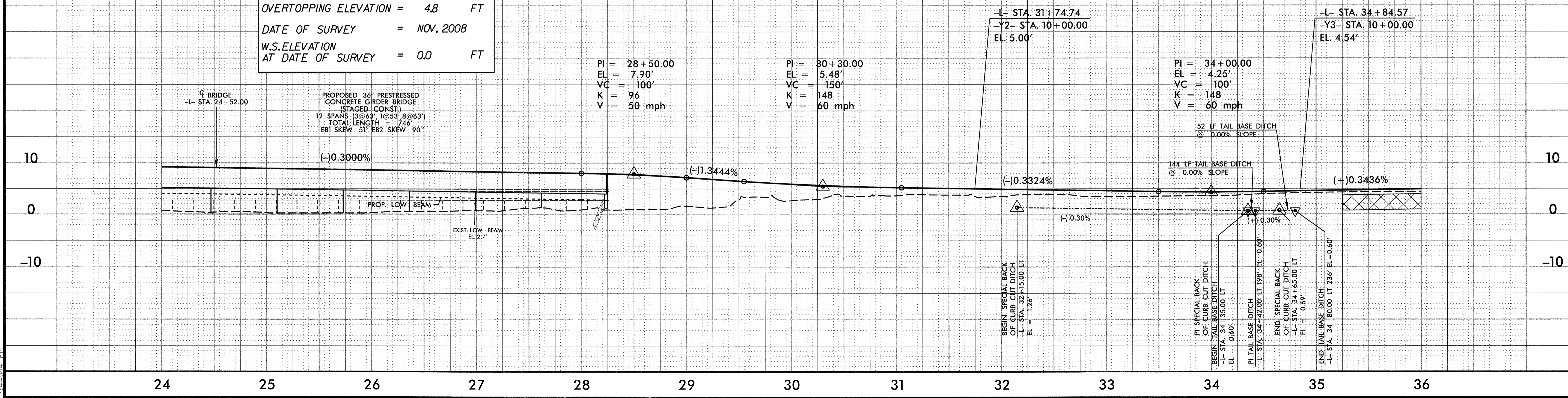
**BRIDGE HYDRAULIC DATA**

DESIGN DISCHARGE = 1670 CFS  
DESIGN FREQUENCY = 50 YRS  
DESIGN HW ELEVATION = 3.2 FT  
BASE DISCHARGE = 2140 CFS  
BASE FREQUENCY = 100 YRS  
BASE HW ELEVATION = 3.8 FT  
OVERTOPPING DISCHARGE = 3000 CFS  
OVERTOPPING FREQUENCY = 200+ YRS  
OVERTOPPING ELEVATION = 4.8 FT

DATE OF SURVEY = NOV, 2008  
W.S. ELEVATION AT DATE OF SURVEY = 0.0 FT

### -L- US 17/158 (NORTH ROAD ST.)

THE ENGINEER MAY USE AGGREGATE SUBGRADE IN LIEU OF UNDERCUT: FROM -L- STA. 35+25 TO 40+00 LT.

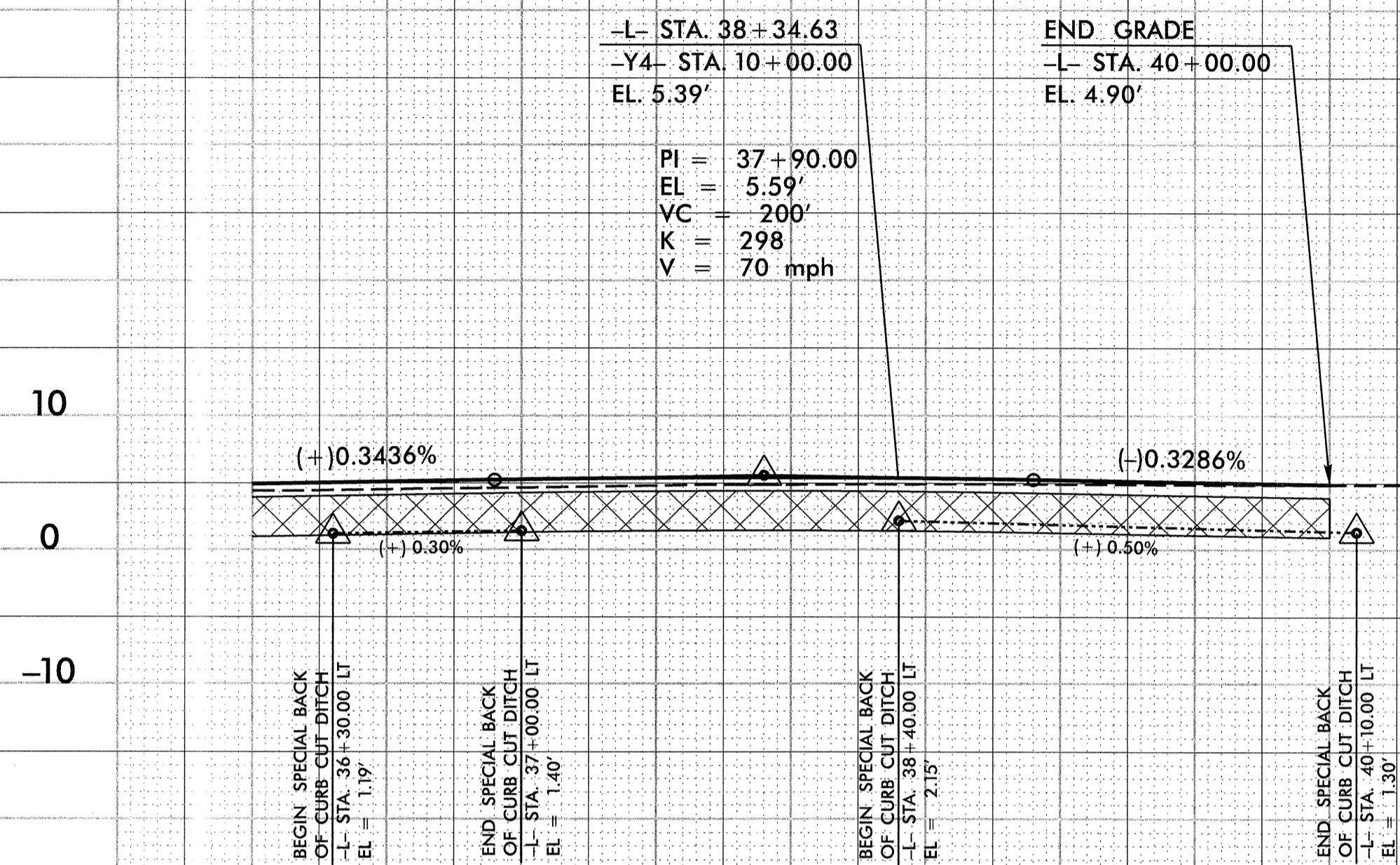


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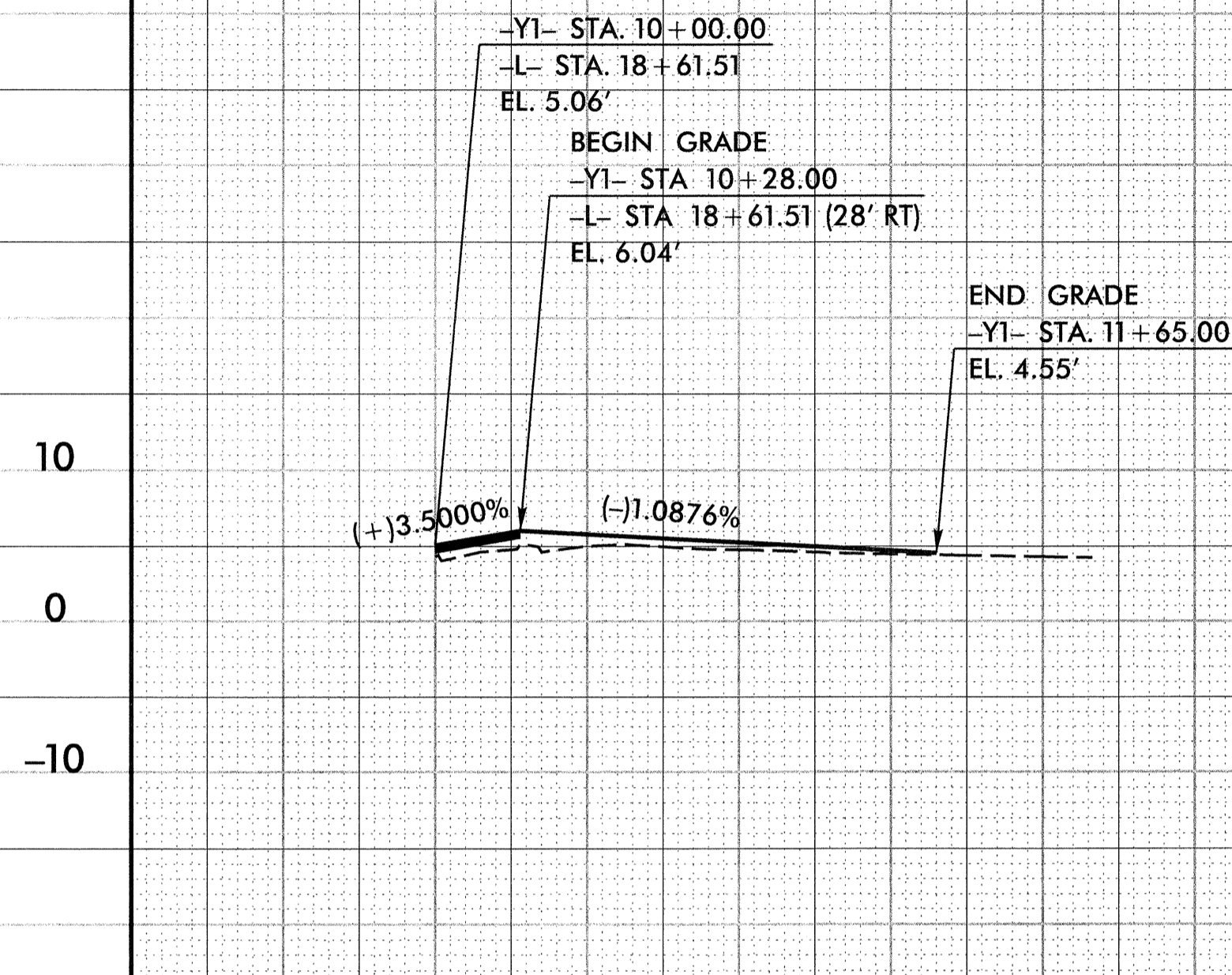
5/28/09

THE ENGINEER MAY USE AGGREGATE SUBGRADE IN LIEU OF UNDERCUT: FROM -L- STA. 35+25 TO 40+00 LT.

### -L- US 17 / 158 (NORTH ROAD ST.)



### -Y1-



EXISTING GROUND - - - - -  
 PROPOSED GRADE - - - - -  
 LEFT DITCH GRADE - - - - -  
 RIGHT DITCH GRADE - - - - -  
 UNDERCUT EXCAVATION [Cross-hatched pattern]

PROJECT REFERENCE NO. B-4599	SHEET NO. 8
ROADWAY DESIGN ENGINEER ROBERT S. WEADON PROFESSIONAL SEAL 19814 6-7-2012	HYDRAULICS ENGINEER ROBERT S. WEADON PROFESSIONAL SEAL 21656 6/7/12
 <b>M A Engineering Consultants, Inc.</b> 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221	

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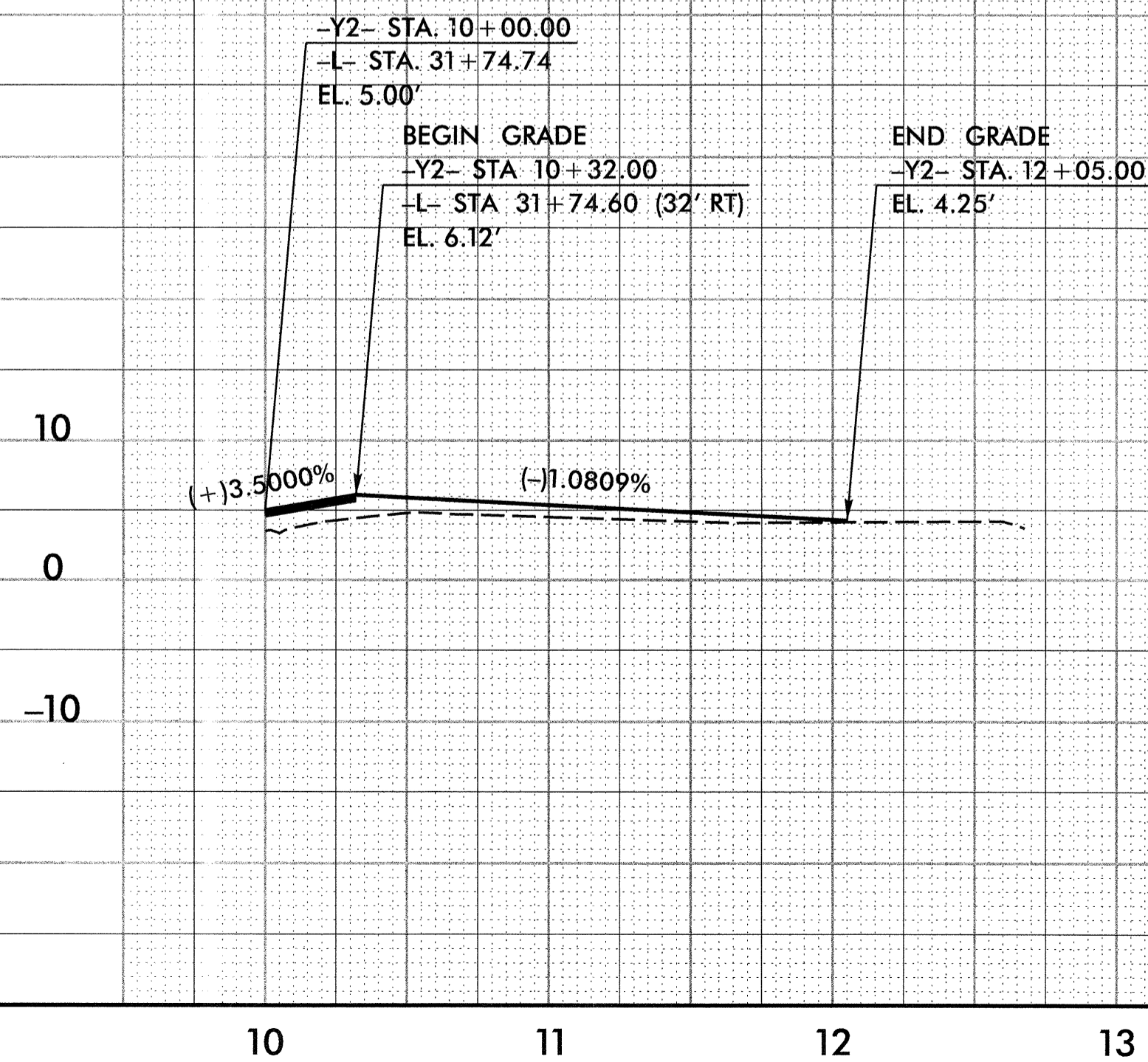
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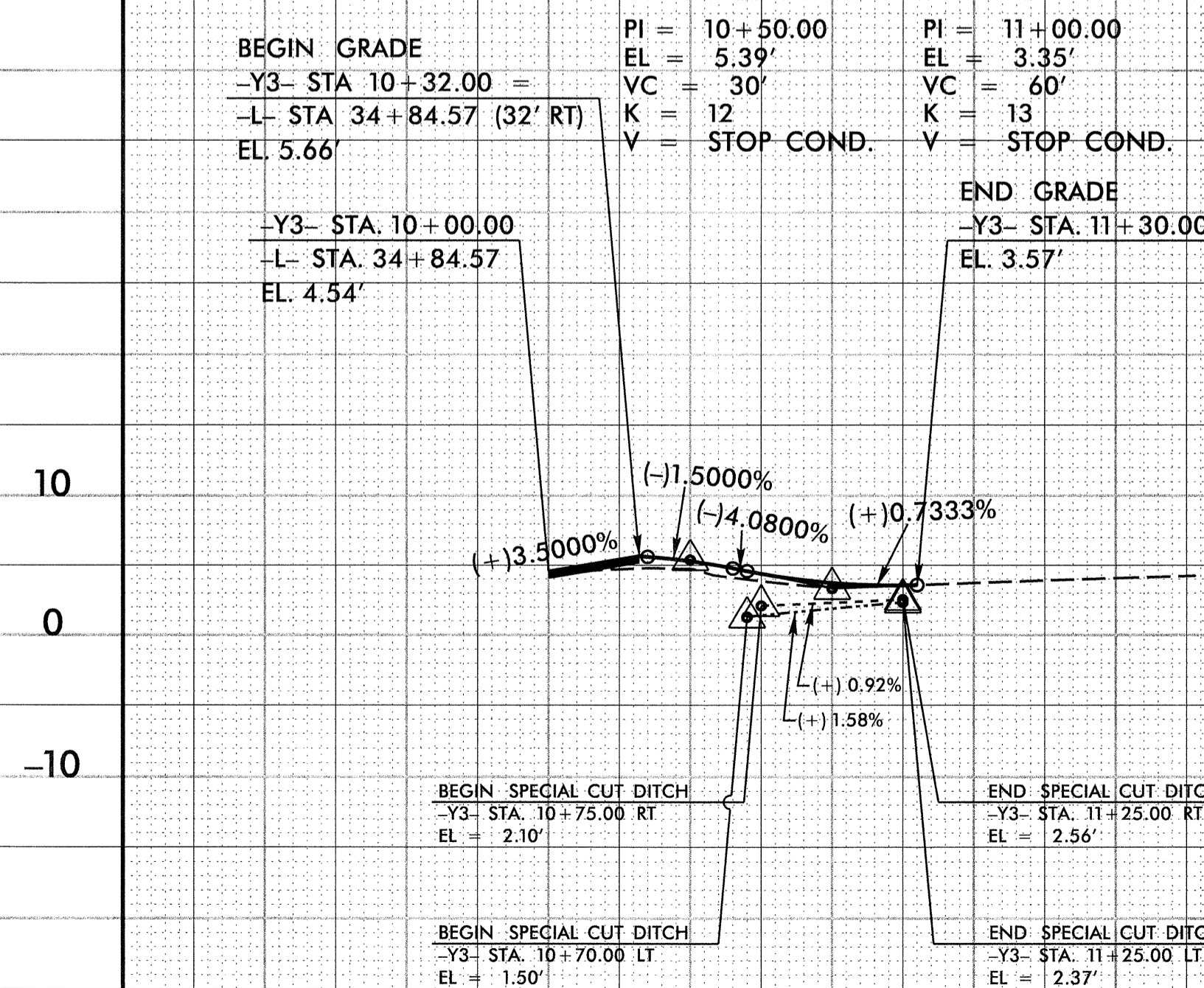
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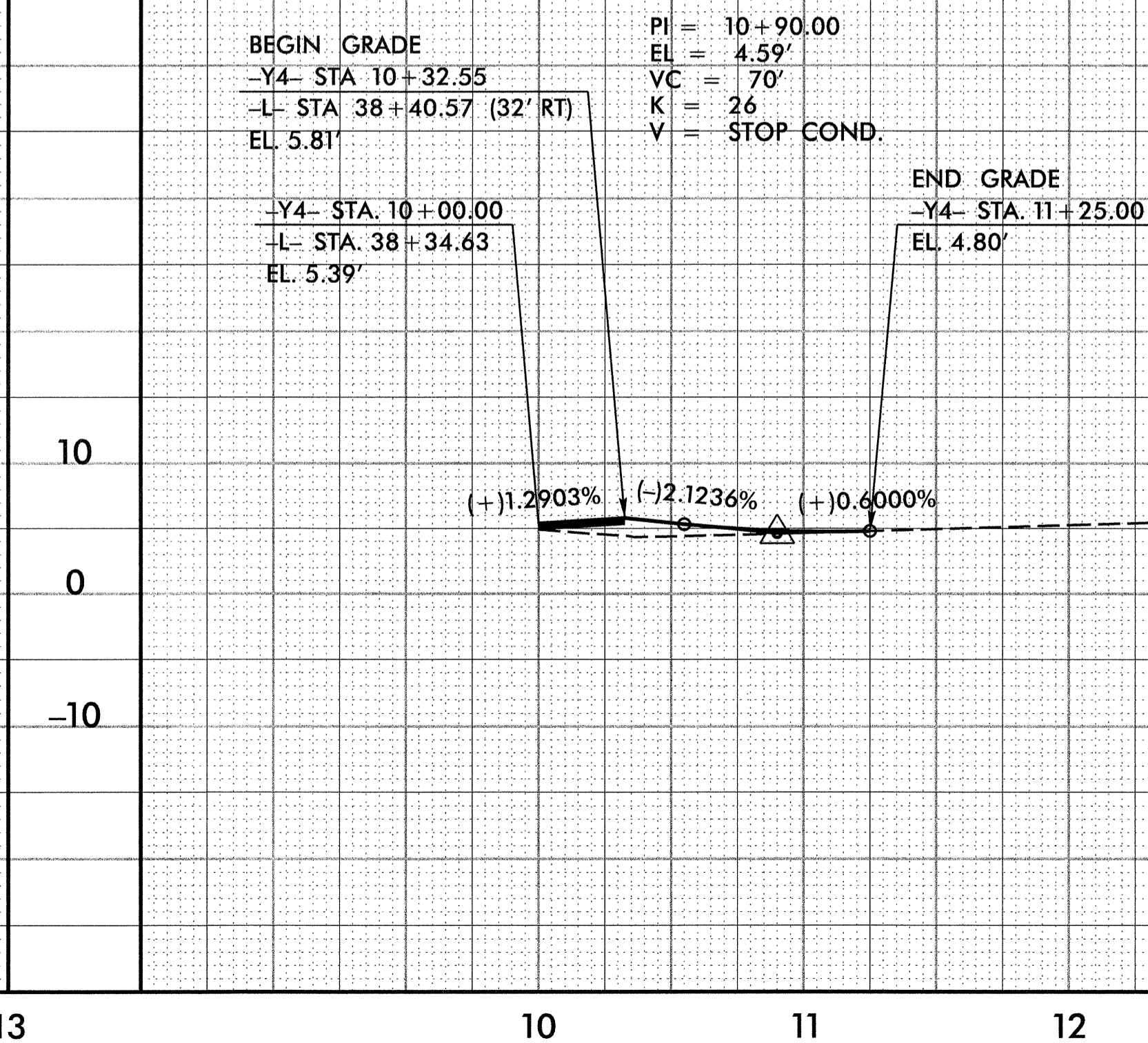
### -Y2- KNOBBS CREEK DR.



### -Y3- ROSEDALE DR.



### -Y4- ROSEWOOD AVE.



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