

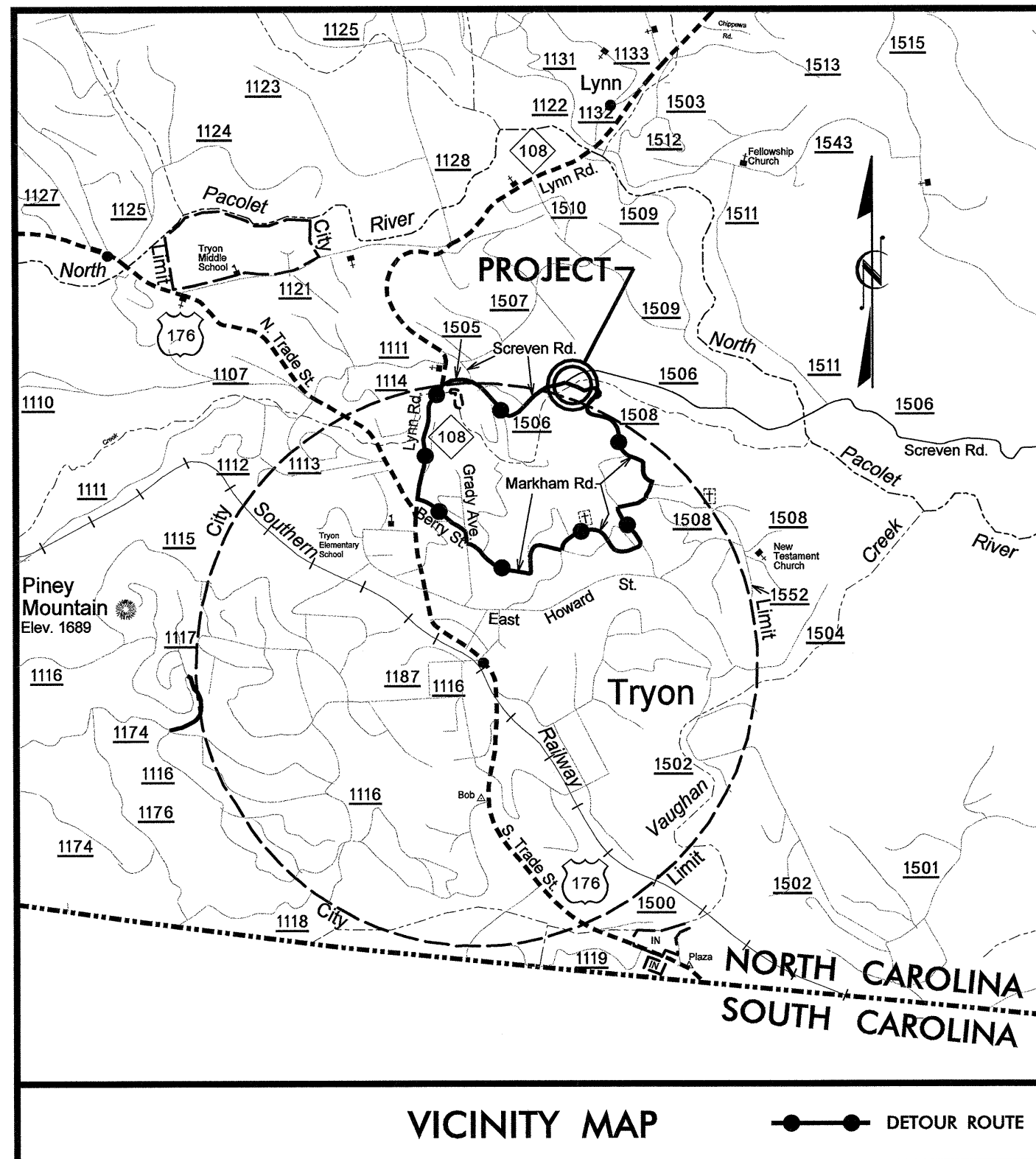
0 97/088/4997

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
POLK COUNTY

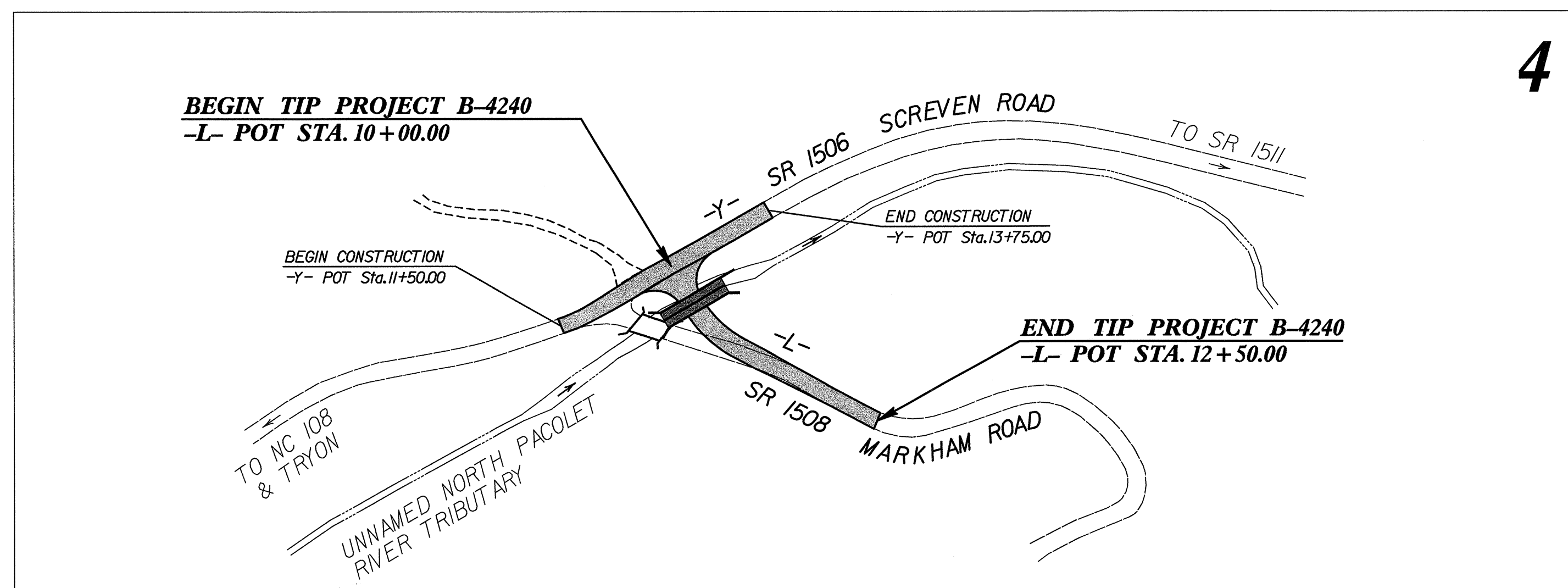
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4240	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33583.1.1	BRZ-1508 (3)	PE	
33583.2.1	BRZ-1508 (3)	RW, UTILITIES	
33583.3.1	BRZ-1508 (3)	CONSTRUCTION	

TIP PROJECT: B-4240



LOCATION: BRIDGE #193 OVER UNNAMED NORTH PACOLET RIVER TRIBUTARY ON SR 1508 (MARKHAM ROAD) AND APPROACHES

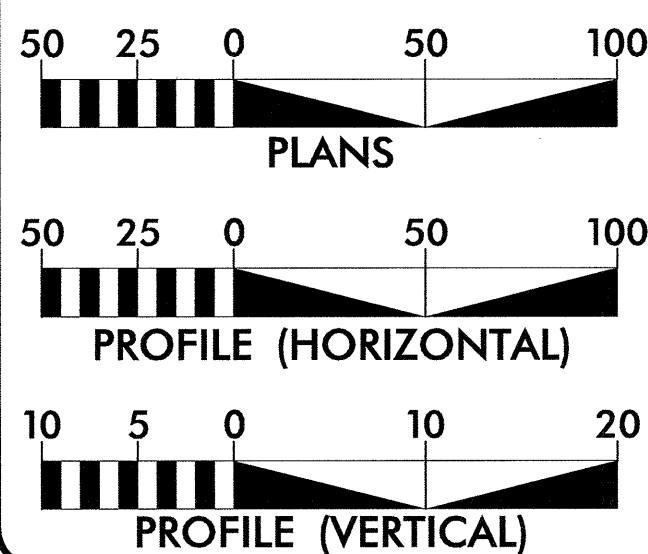
TYPE OF WORK: GRADING, DRAINAGE, PAVING, GUARDRAIL, AND CULVERT



CONTRACT: C201473

NCDOT CONTACT:
B. DOUG TAYLOR, PE
ROADWAY DESIGN UNIT -
ENGINEERING COORDINATION

GRAPHIC SCALES



DESIGN DATA

ADT 2005 = 526
ADT 2025 = 700
DHV = 10 %
D = 60 %
T = 3 % *
V = 20 MPH
* (TTST 1% + DUAL 2%)

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4240 = 0.047 mi
TOTAL LENGTH TIP PROJECT B-4240 = 0.047 mi

Prepared For:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh, NC 27610

By:
MA ENGINEERING CONSULTANTS, INC.
598 E. CHATHAM STREET, SUITE 137
CARY, NORTH CAROLINA 27511
(919) 297-0220

2002 STANDARD SPECIFICATIONS

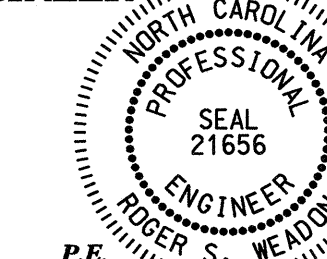
RIGHT OF WAY DATE:
MARCH 18, 2005

LETTING DATE:
MAY 16, 2006

R.W. PORTER JR., P.E.
PROJECT ENGINEER

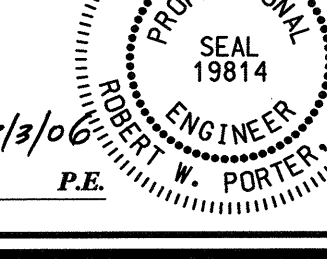
D.M. WAINWRIGHT, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER



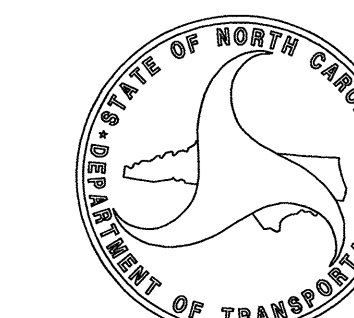
Signature: *Roger S. Weardon* 3/3/06 P.E.

ROADWAY DESIGN ENGINEER



Signature: *Robert W. Porter, Jr.* 3/3/06 P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA



Signature: *Robert W. Porter, Jr.*
STATE HIGHWAY DESIGN ENGINEER

03/03/2006 5:16:05 PM \\ProJ\b4240-rdy-tsh.dgn

PROJECT REFERENCE NO. B-4240	SHEET NO. 1-A
598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221	

SHEET NUMBER	INDEX OF SHEETS SHEET
1	TITLE SHEET
1-A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS
1-B	CONVENTIONAL SYMBOLS
1-C	SURVEY CONTROL SHEET
2	PAVEMENT SCHEDULE, TYPICAL SECTIONS, AND WEDGING DETAILS
2-A THRU 2-D	DETAIL OF GUARDRAIL INSTALLATION
2-E	DETAIL OF STANDARD TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC
3	SUMMARY OF QUANTITIES
3-A	SUMMARIES OF EARTHWORK, PAVEMENT REMOVAL, DRAINAGE, AND GUARDRAIL
4	PLAN AND PROFILE SHEET
TCP-1 THRU TCP-9	TRAFFIC CONTROL PLANS
EC-1 THRU EC-5	EROSION CONTROL PLANS
SIGN-1 THRU SIGN-3	SIGNING PLANS
UC-1 THRU UC-3	UTILITY CONSTRUCTION PLANS
UD-1 THRU UD-2	UTILITIES BY OTHERS PLANS
X-1 THRU X-5	CROSS-SECTIONS
C-1 THRU C-5	CULVERT PLANS

GENERAL NOTES:

2002 SPECIFICATIONS
EFFECTIVE: 01-15-02
REVISED: 05-14-03

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 II.

THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE AREAS IN THE PLANS DESIGNATED SAFETY CLEARING. THE LIMITS ARE AS SHOWN AND THE CLEARING AND GRUBBING IS CONSIDERED A PART OF THE LUMP SUM ITEM FOR "CLEARING AND GRUBBING".

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 AND EARTH 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.

SUBSURFACE PLANS:

NO SUBSURFACE PLANS ARE AVAILABLE ON THIS PROJECT. THE CONTRACTOR SHOULD MAKE HIS OWN INVESTIGATION AS TO THE SUBSURFACE CONDITIONS.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE:

DUKE POWER - ELECTRICITY TOWN OF TRYON - WATER / SEWER PSNC - GAS
 ALLTEL - TELEPHONE CHARTER COMMUNICATIONS - CABLE TV
 FENDRICH INDUSTRIES - STILLING BASIN (PARCEL 1)

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.

ROADWAY ENGLISH STANDARD DRAWINGS EFF. 01-15-02
REV. 11-23-04

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated January 15, 2002 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.02	Method of Clearing - Method II
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superlevation - Two Lane Pavement
225.06	Method of Grading Sight Distance at Intersections
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation - Method 'A'
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 6 - ASPHALT BASES AND PAVEMENTS	
654.01	Pavement Repairs
DIVISION 8 - INCIDENTALS	
815.03	Pipe Underdrain and Blind Drain
862.01	Guardrail Placement
876.04	Drainage Ditches with Class 'B' Rip Rap

Note: Not to Scale

*S.U.E. = Subsurface Utility Engineering

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Existing Iron Pin	○ 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-

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	□
Jurisdictional Stream	-JS-
Buffer Zone 1	-BZ 1-
Buffer Zone 2	-BZ 2-
Flow Arrow	←
Disappearing Stream	→
Spring	○
Swamp Marsh	▬
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 Utility Easement	-PUE-

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	-----
Proposed Guardrail	-----
Existing Cable Guiderail	-----
Proposed Cable Guiderail	-----
Equality Symbol	⊕
Pavement Removal	▨

VEGETATION:

Single Tree	⊕
Single Shrub	⊕
Hedge	-----
Woods Line	-----
Orchard	⊕
Vineyard	▨ Vineyard

EXISTING STRUCTURES:

MAJOR:	
Bridge, Tunnel or Box Culvert	▬ CONC
Bridge Wing Wall, Head Wall and End Wall	▬ CONC WW
MINOR:	
Head and End Wall	▬ CONC HW
Pipe Culvert	▬
Footbridge	▬
Drainage Box: Catch Basin, DI or JB	□ CB
Paved Ditch Gutter	-----
Storm Sewer Manhole	⊕
Storm Sewer	-S-

UTILITIES:

POWER:	
Existing Power Pole	●
Proposed Power Pole	○
Existing Joint Use Pole	●
Proposed Joint Use Pole	○
Power Manhole	⊕
Power Line Tower	⊗
Power Transformer	⊗
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	-TUL-
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.

10/25/05

SURVEY CONTROL SHEET B-4240

 BM1 ELEVATION = 933.04
 N 550470 E 1033961
 Y STATION 10+43 15 RIGHT
 60D NAIL IN POWER POLE

 BM2 ELEVATION = 933.37
 N 550471 E 1034130
 Y STATION 11+90 69 RIGHT
 60D NAIL IN SWEET GUM TREE

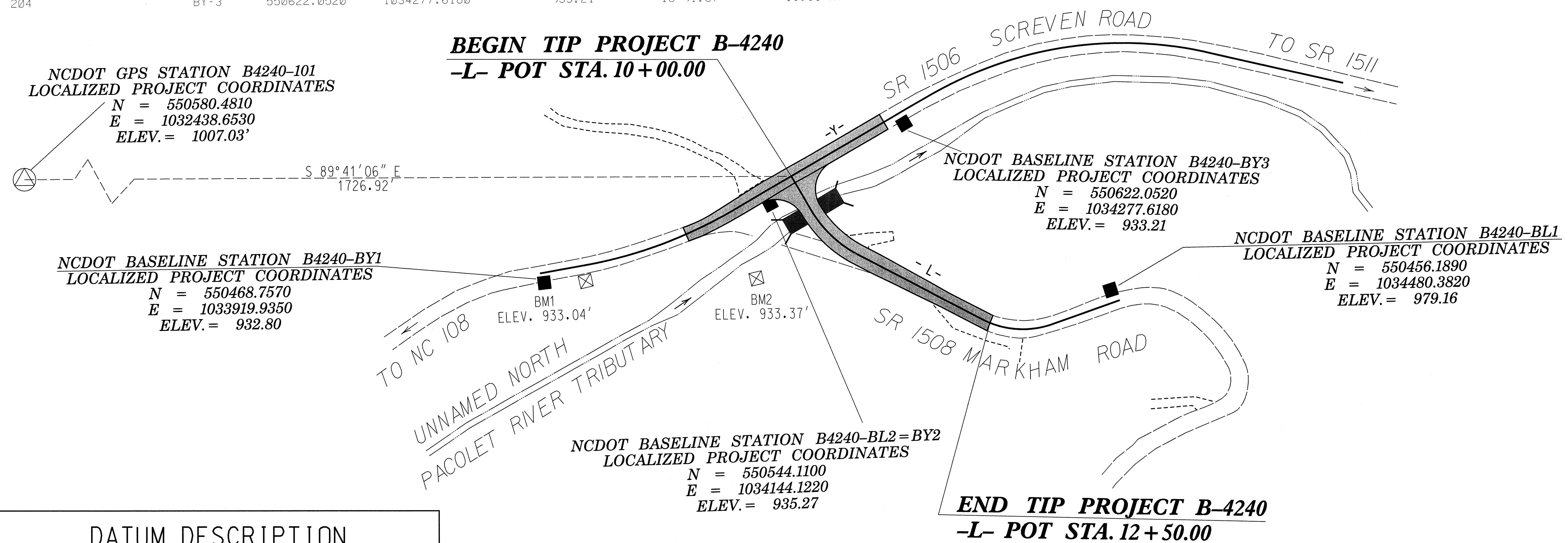
THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:
[HTTP://WWW.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/](http://www.doh.dot.state.nc.us/preconstruct/highway/location/project/)
 THE FILES TO BE FOUND ARE AS FOLLOWS:
 B4240_LS_CONTROL_060203.TXT



⊗ INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.
 PROJECT CONTROL ESTABLISHED USING GLOBAL (OPUS) POSITIONING SYSTEM.

BL	POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
	206	BL-1	550456.1890	1034480.3820	979.16	13+78.67	12.41 LT
	203	BL-2	550544.1100	1034144.1220	935.27	10+12.63	31.97 RT

BY	POINT	DESC.	NORTH	EAST	ELEVATION	Y STATION	OFFSET
	200	BY-1	550468.7570	1033919.9350	932.80	10+02.45	9.68 RT
	202	BY-2	550544.1100	1034144.1220	935.27	12+37.00	12.75 RT
	204	BY-3	550622.0520	1034277.6180	933.21	13+91.57	11.11 RT



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B4240 GPS-101" WITH NAD 1983 STATE PLANE GRID COORDINATES OF
 NORTHING: 550580.4810(ft) EASTING: 1032438.6530(ft)
 THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99987275
 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B4240 GPS-101" TO -L- STATION 10+00.00 IS
 S 89°41'06" E 1726.92'

ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
 VERTICAL DATUM USED IS NAVD 88

⊗ INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.
 PROJECT CONTROL ESTABLISHED USING NCDOT MONUMENT (GPS B4240-101)

NOTE: DRAWING NOT TO SCALE

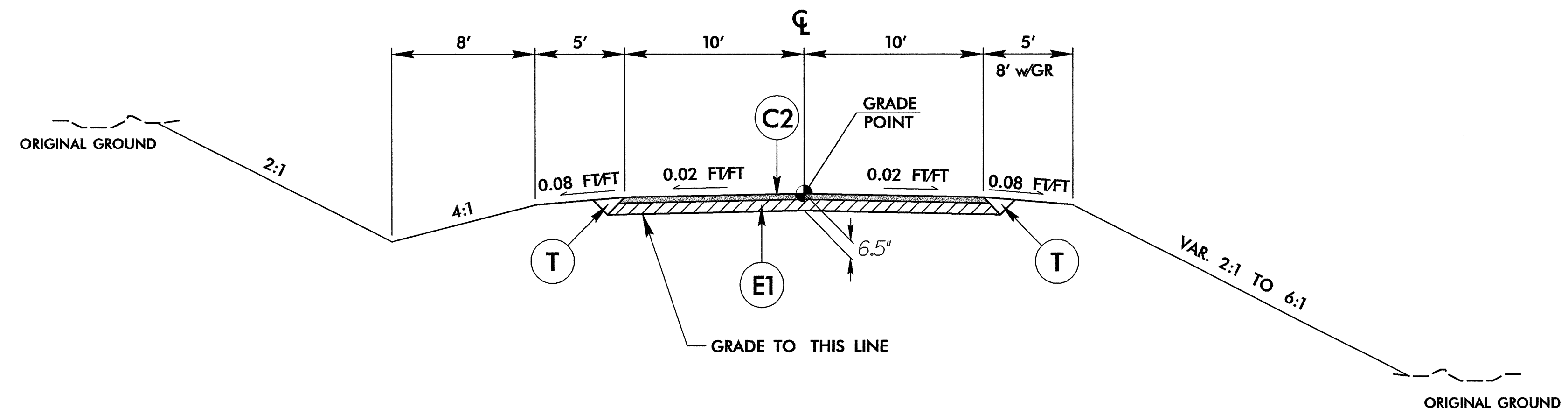
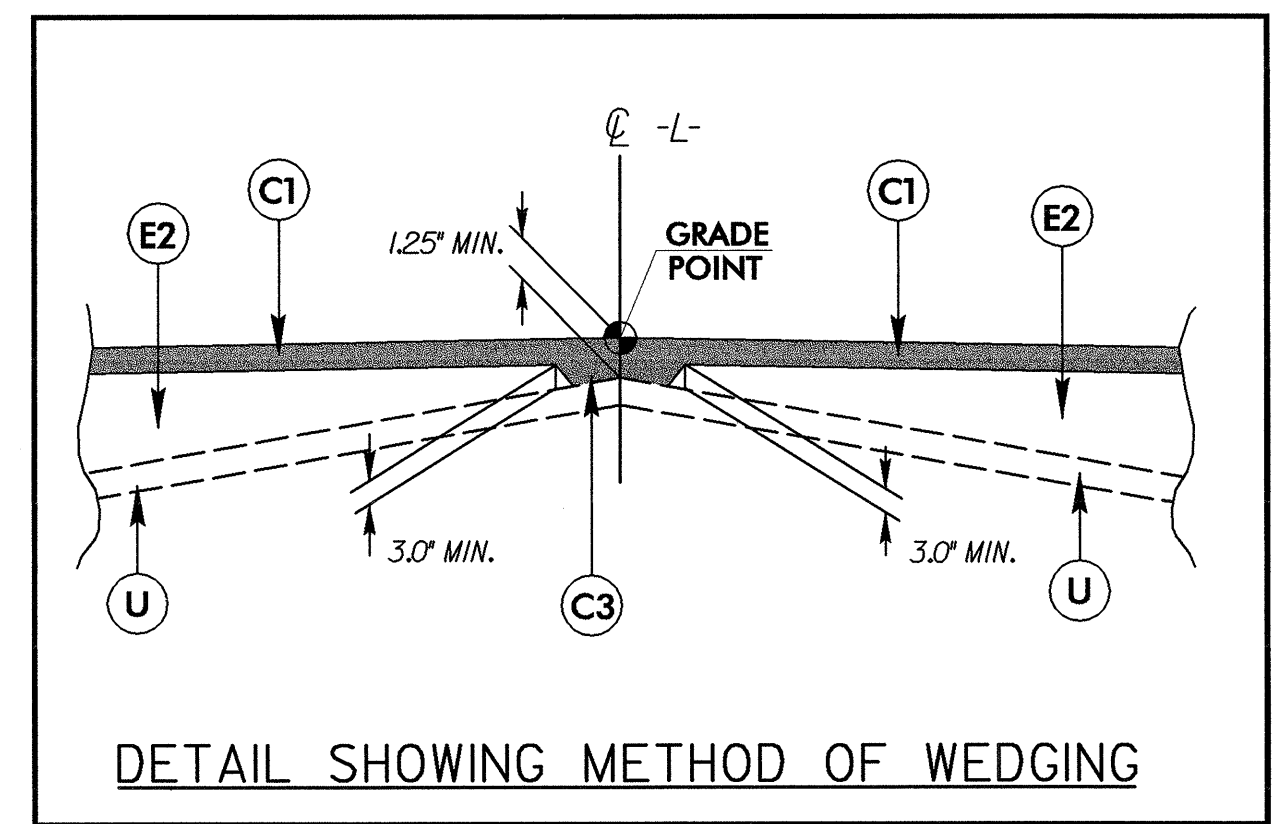
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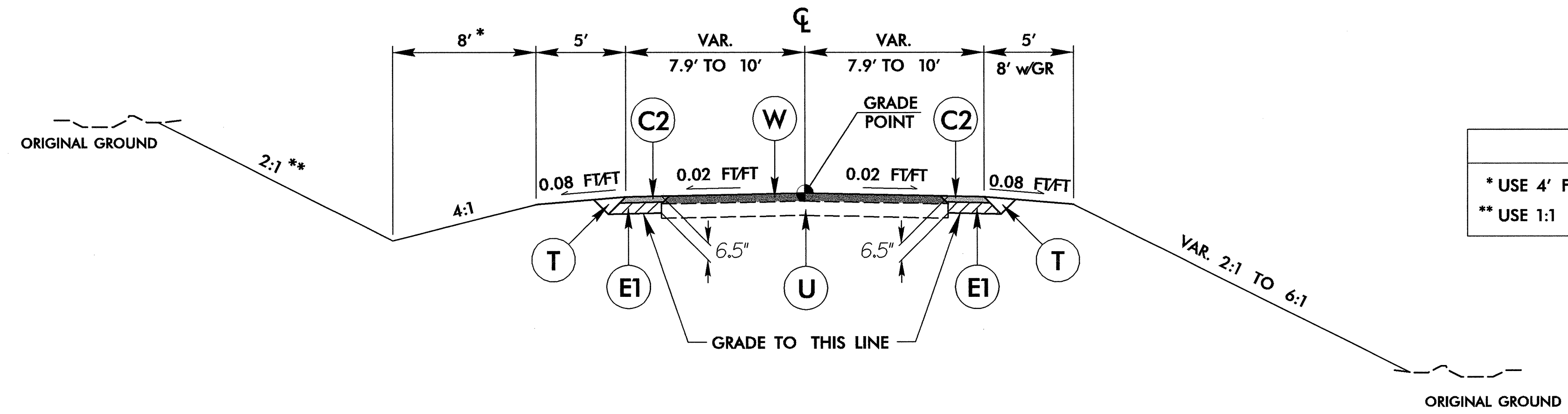
PROJECT REFERENCE NO. B-4240	SHEET NO. 2
RW SHEET NO.	
ROADWAY DESIGN ENGINEER NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 19814 ROBERT W. PETER, JR.	PAVEMENT DESIGN ENGINEER NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 22898 CLARK S. MORRISON
598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221	

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 1.25" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 137.5 LBS PER SQUARE YARD.
C2	PROP. APPROX. 2.50" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 137.5 LBS PER SQUARE YARD IN EACH OF TWO LAYERS.
C3	PROP. VARIABLE DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS PER SQUARE YARD PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 1.0" OR GREATER THAN 1.5" IN DEPTH.
E1	PROP. APPROX. 4.0" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS PER SQUARE YARD.
E2	PROP. VARIABLE DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, 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.
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL THIS SHEET)

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



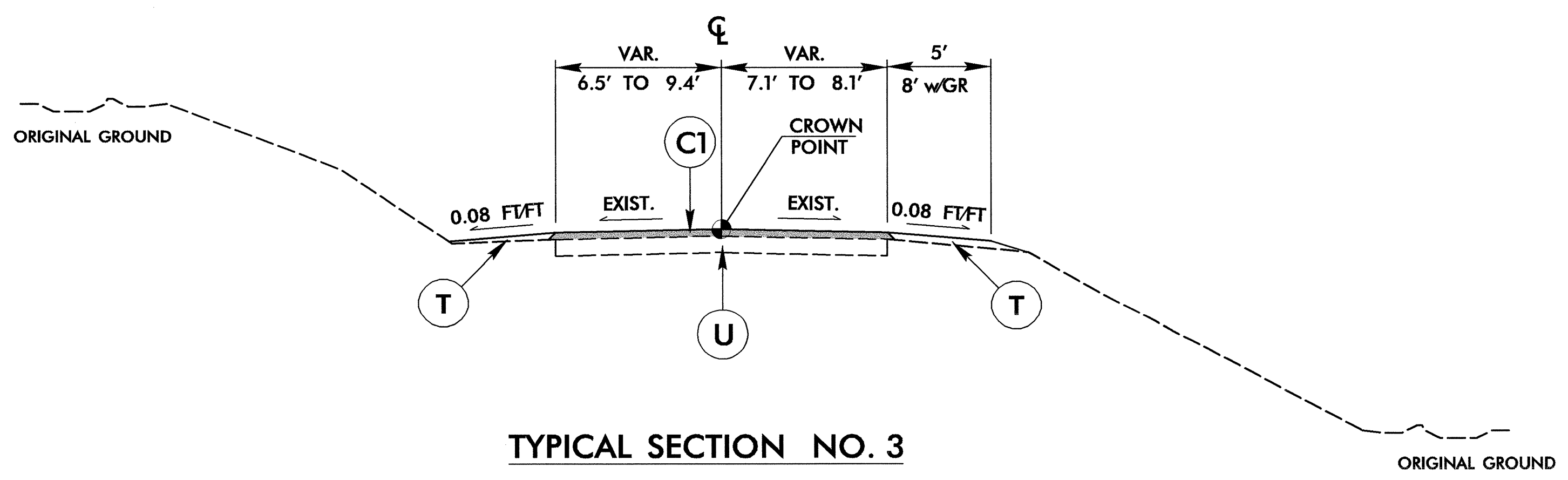
TYPICAL SECTION NO. 1
FROM -L- STA. 10+07.45 TO STA. 10+80+/-



TYPICAL SECTION NO. 2
FROM -L- STA. 10+80+/- TO STA. 12+00.00

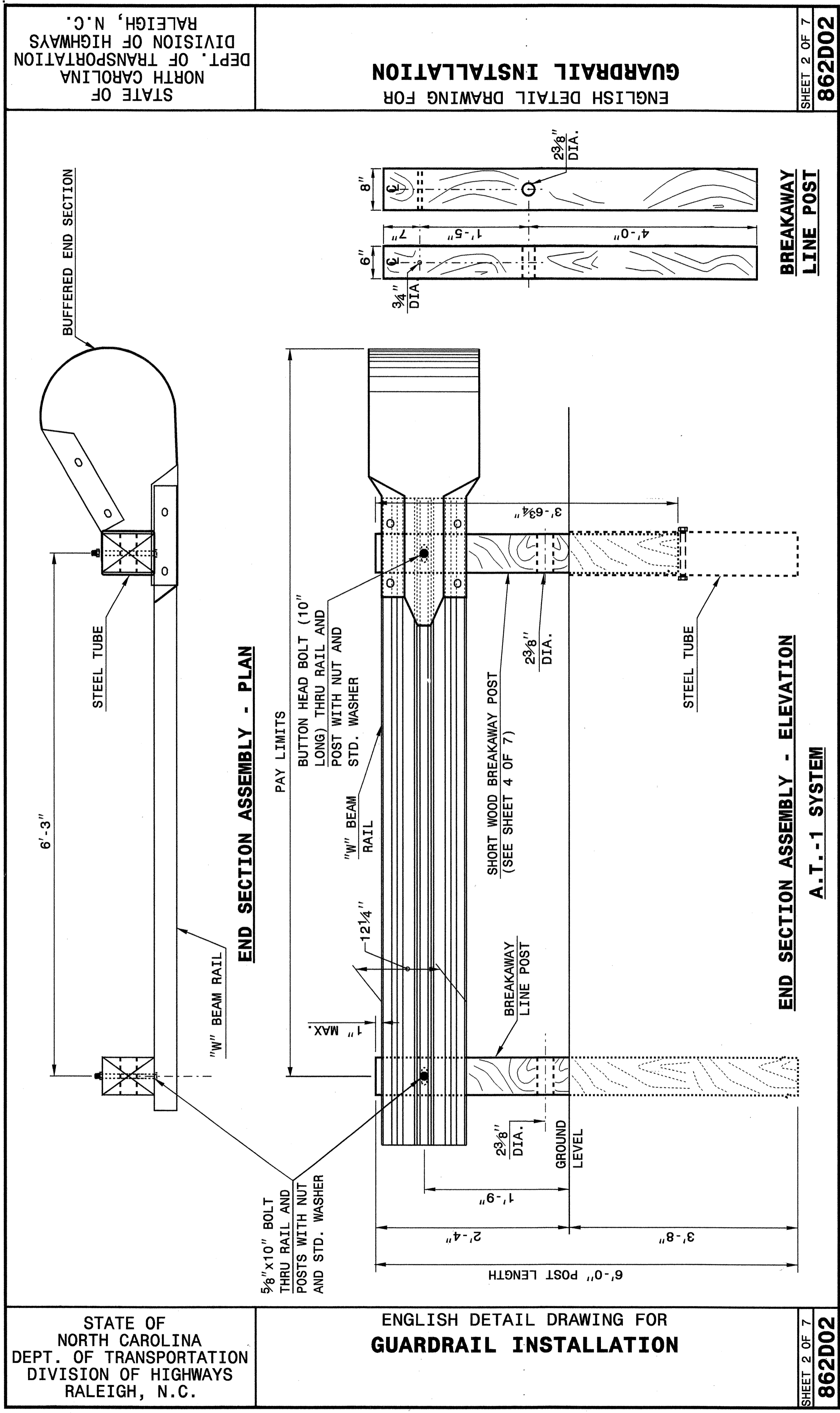
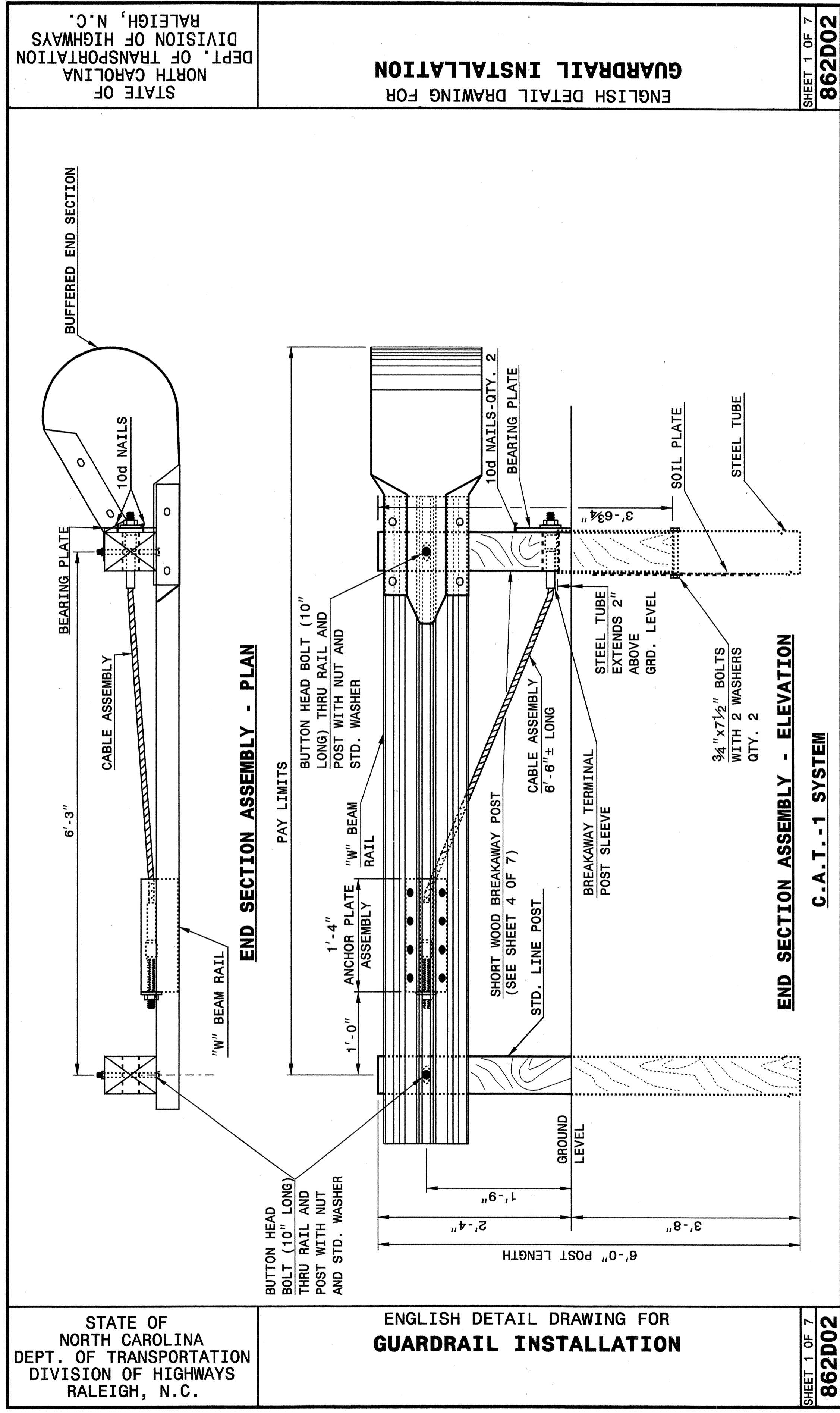
BLEND TO EXISTING (SEE CROSS SECTIONS):
FROM -L- STA. 12+00.00 TO STA. 12+50.00

- NOTES**
- * USE 4' FROM -L- STA. 11+25.00 RT. TO 11+75.00 RT.
 - ** USE 1:1 FROM -L- STA. 11+25.00 RT. TO 11+75.00 RT.



RESURFACE WITH (C1) :
FROM -Y- STA. 11+50.00 TO STA. 13+75.00
USE MINIMUM SHOULDER WIDTH AS SHOWN FOR GUARDRAIL LOCATIONS.
REGRADE ALL OTHER SHOULDERS AS DIRECTED BY THE ENGINEER.

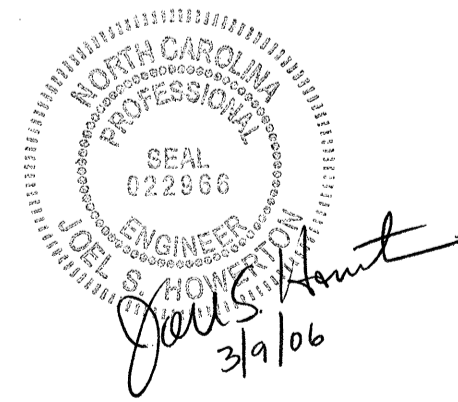
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**PROJECT SERVICES UNIT
STANDARDS AND SPECIAL DESIGN**
Office 919-250-4128 FAX 919-250-4119

SEE PLATE FOR TITLE

ORIGINAL BY: 2002 STD.862.02 DATE:
MODIFIED BY: E.E. WARD DATE: 02-09-03
CHECKED BY: *[Signature]* DATE: 10/2/04
FILE SPEC.: /usr/stds/02todetail/eng/1sh/86202/86202.dgn



19-OCT-2004 11:38
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enward

19-OCT-2004 11:39
 W:\Special Details\ericward\stds\02\stds to Special Details\english\862d02\0862d02.dgn
 ericward AT 05212260

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.	ENGLISH DETAIL DRAWING FOR GUARDRAIL INSTALLATION	STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.	ENGLISH DETAIL DRAWING FOR GUARDRAIL INSTALLATION
<div style="display: flex; justify-content: space-between;"> <div data-bbox="404 1471 683 1713"> <p>TRAFFIC FLOW →</p> <p>SEE NOTE 'B'</p> <p>DOUBLE FACE GUARDRAIL</p> </div> <div data-bbox="404 1209 683 1391"> <p>SEE NOTE 'B'</p> <p>W6" STEEL POST WITH Routed OFFSET BLOCK</p> </div> <div data-bbox="404 907 683 1108"> <p>TRAFFIC FLOW →</p> <p>8" WOOD POST WITH WOOD OFFSET BLOCK</p> </div> <div data-bbox="404 604 683 806"> <p>SEE NOTE 'B'</p> <p>16G COMMON NAIL</p> </div> <div data-bbox="404 262 683 544"> <p>SEE NOTE 'B'</p> <p>STEEL GUARDRAIL POST</p> </div> <div data-bbox="404 100 683 241"> <p>SEE NOTE 'B'</p> <p>WOOD GUARDRAIL POST WITH WOOD OFFSET BLOCK</p> </div> </div> <div style="text-align: center; margin-top: 20px;"> <p>ISOMETRIC VIEWS</p> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div data-bbox="714 1471 1429 1713"> <p>SEE NOTE 'A'</p> <p>FRONT</p> </div> <div data-bbox="714 1209 1429 1391"> <p>SEE NOTE 'A'</p> <p>SIDE</p> </div> <div data-bbox="714 907 1429 1108"> <p>SEE NOTE 'A'</p> <p>FRONT</p> </div> <div data-bbox="714 604 1429 806"> <p>SEE NOTE 'A'</p> <p>SIDE</p> </div> </div> <div style="margin-top: 20px;"> <p>TRAFFIC FLOW →</p> <p>PLAN</p> </div> <div style="margin-top: 20px;"> <p>SEE NOTE 'A'</p> <p>FRONT</p> </div> <div style="margin-top: 20px;"> <p>SEE NOTE 'A'</p> <p>SIDE</p> </div> <div style="margin-top: 20px;"> <p>SEE NOTE 'A'</p> <p>FRONT</p> </div> <div style="margin-top: 20px;"> <p>SEE NOTE 'A'</p> <p>SIDE</p> </div>		SHEET 3 OF 7 862D02	
<p>NOTES: A - 3/8" DIA. BUTTON HEAD SPLICE BOLT 1 1/4" LONG (8 REQ. PER SPLICE JOINT). B - 5/8" DIA. BUTTON HEAD BOLT 7 1/2"/9" LONG WITH NUT FOR BOLTING 6"/8" Routed OFFSET BLOCK TO STEEL POSTS OR 5/8" DIA. BUTTON HEAD BOLT 18" LONG WITH STD. WASHER UNDER NUT FOR BOLTING TO WOOD POSTS (1 REQ. PER LOCATION) C - FIELD PUNCHING OF HOLES INTO GUARDRAIL SHALL BE AS DIRECTED BY THE ENGINEER.</p> <p align="center">TYPICAL GUARDRAIL AND GUARDRAIL POST ALTERNATIVES</p>		SHEET 3 OF 7 862D02	

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.	ENGLISH DETAIL DRAWING FOR GUARDRAIL INSTALLATION	STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.	ENGLISH DETAIL DRAWING FOR GUARDRAIL INSTALLATION
<div style="display: flex; justify-content: space-around; margin-bottom: 20px;"> <div data-bbox="1522 1310 1802 1512"> <p>SEE NOTE 'A'</p> <p>STANDARD LINE POST</p> </div> <div data-bbox="1522 1108 1802 1310"> <p>SEE NOTE 'A'</p> <p>SHORT WOOD BREAKAWAY POST</p> </div> <div data-bbox="1522 907 1802 1108"> <p>SEE NOTE 'A'</p> <p>WOOD OFFSET BLOCK (FOR WOOD POSTS)</p> </div> <div data-bbox="1522 705 1802 907"> <p>SEE NOTE 'A'</p> <p>SOIL PLATE</p> </div> <div data-bbox="1522 504 1802 705"> <p>SEE NOTE 'A'</p> <p>STEEL TUBE</p> </div> <div data-bbox="1522 302 1802 504"> <p>SEE NOTE 'A'</p> <p>BEARING PLATE</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-bottom: 20px;"> <div data-bbox="1833 1310 2113 1512"> <p>SEE NOTE 'A'</p> <p>FRONT</p> </div> <div data-bbox="1833 1108 2113 1310"> <p>SEE NOTE 'A'</p> <p>SIDE</p> </div> <div data-bbox="1833 907 2113 1108"> <p>SEE NOTE 'A'</p> <p>FRONT</p> </div> <div data-bbox="1833 705 2113 907"> <p>SEE NOTE 'A'</p> <p>SIDE</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-bottom: 20px;"> <div data-bbox="2144 1310 2424 1512"> <p>SEE NOTE 'A'</p> <p>FRONT</p> </div> <div data-bbox="2144 1108 2424 1310"> <p>SEE NOTE 'A'</p> <p>SIDE</p> </div> <div data-bbox="2144 907 2424 1108"> <p>SEE NOTE 'A'</p> <p>FRONT</p> </div> <div data-bbox="2144 705 2424 907"> <p>SEE NOTE 'A'</p> <p>SIDE</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-bottom: 20px;"> <div data-bbox="2455 1310 2735 1512"> <p>SEE NOTE 'A'</p> <p>FRONT</p> </div> <div data-bbox="2455 1108 2735 1310"> <p>SEE NOTE 'A'</p> <p>SIDE</p> </div> <div data-bbox="2455 907 2735 1108"> <p>SEE NOTE 'A'</p> <p>FRONT</p> </div> <div data-bbox="2455 705 2735 907"> <p>SEE NOTE 'A'</p> <p>SIDE</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-bottom: 20px;"> <div data-bbox="2766 1310 3045 1512"> <p>SEE NOTE 'A'</p> <p>FRONT</p> </div> <div data-bbox="2766 1108 3045 1310"> <p>SEE NOTE 'A'</p> <p>SIDE</p> </div> <div data-bbox="2766 907 3045 1108"> <p>SEE NOTE 'A'</p> <p>FRONT</p> </div> <div data-bbox="2766 705 3045 907"> <p>SEE NOTE 'A'</p> <p>SIDE</p> </div> </div>		SHEET 4 OF 7 862D02	
<p>NOTES: A - 3/8" DIA. BUTTON HEAD SPLICE BOLT 1 1/4" LONG (8 REQ. PER SPLICE JOINT). B - 5/8" DIA. BUTTON HEAD BOLT 7 1/2"/9" LONG WITH NUT FOR BOLTING 6"/8" Routed OFFSET BLOCK TO STEEL POSTS OR 5/8" DIA. BUTTON HEAD BOLT 18" LONG WITH STD. WASHER UNDER NUT FOR BOLTING TO WOOD POSTS (1 REQ. PER LOCATION) C - FIELD PUNCHING OF HOLES INTO GUARDRAIL SHALL BE AS DIRECTED BY THE ENGINEER.</p> <p align="center">TYPICAL GUARDRAIL AND GUARDRAIL POST ALTERNATIVES</p>		SHEET 4 OF 7 862D02	

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SEE PLATE FOR TITLE

ORIGINAL BY: 2002 STD. 862.02 DATE:
 MODIFIED BY: E.E. WARD DATE: 02-09-03
 CHECKED BY: *Eric Ward* DATE: 10/21/04
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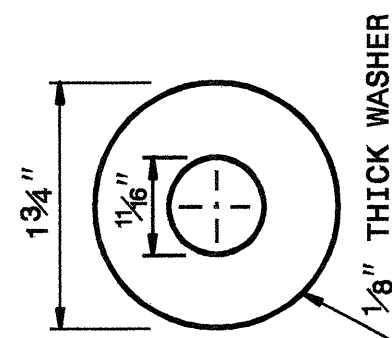
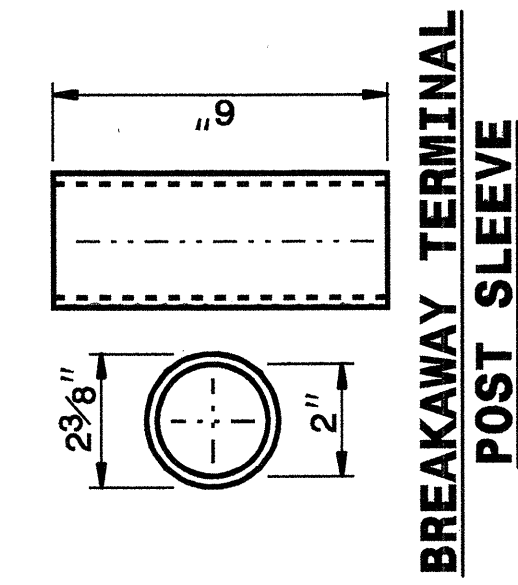


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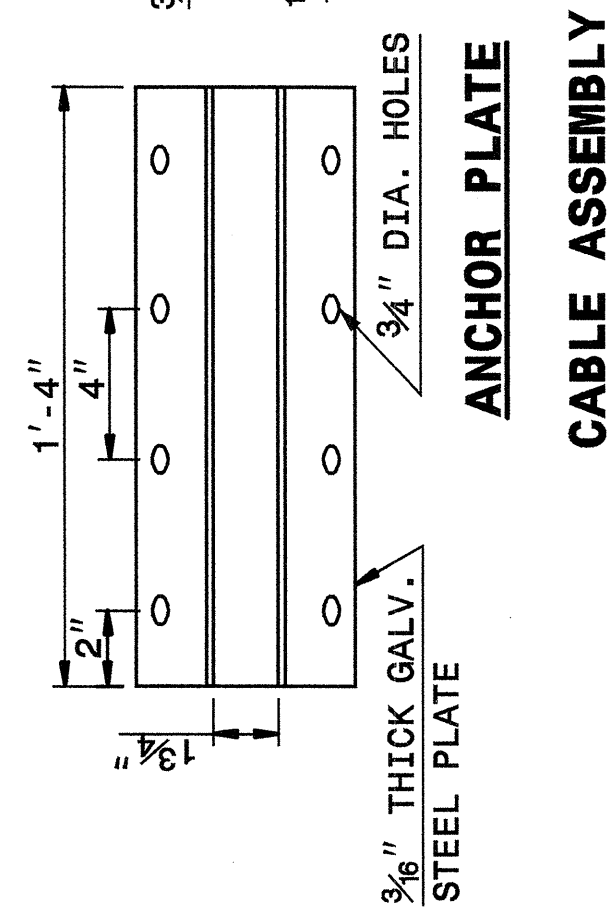
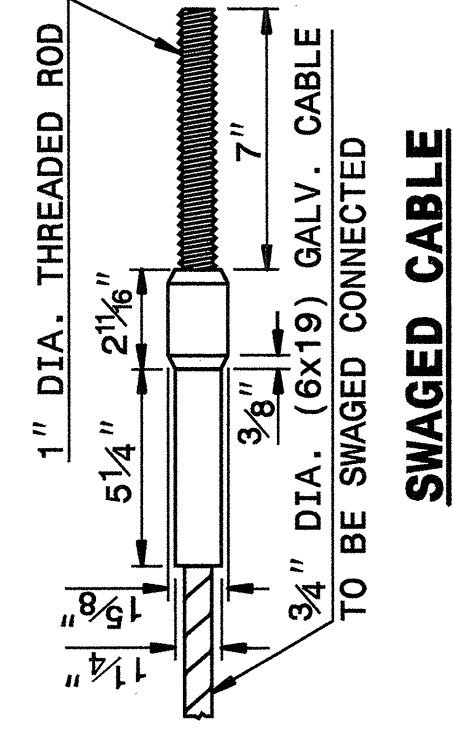
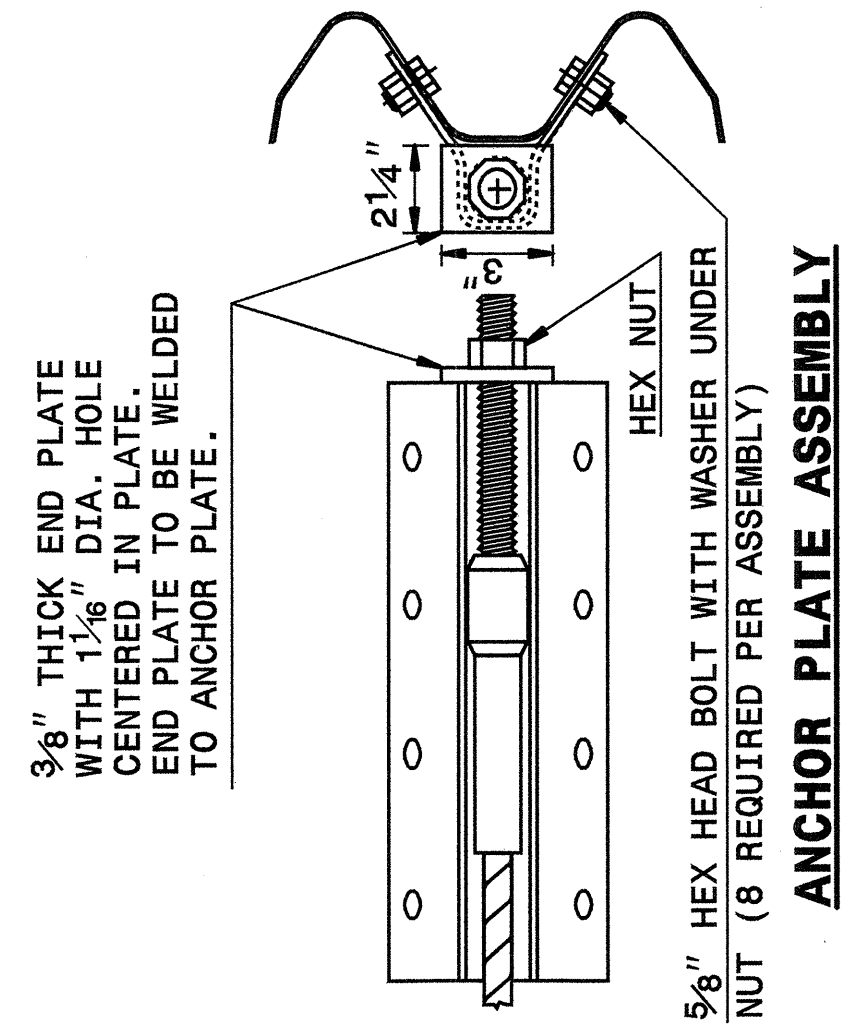
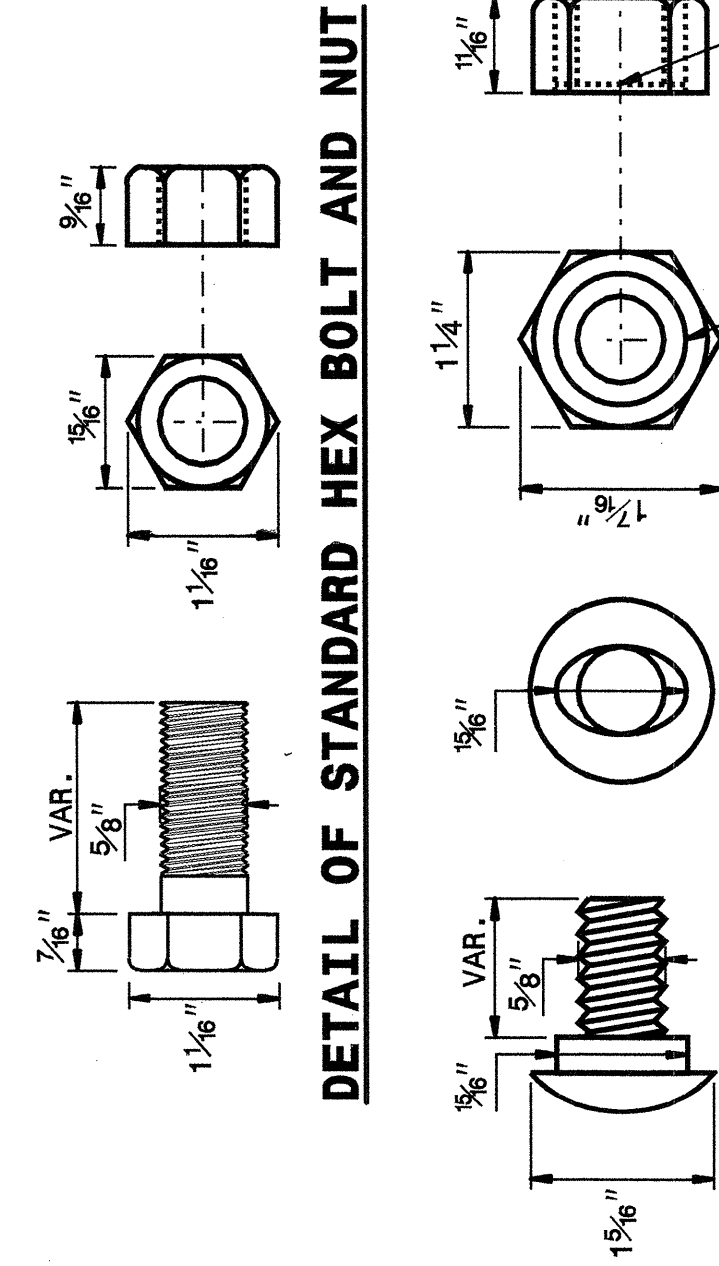
STATE OF NORTH CAROLINA
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 RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 5 OF 7
862D02



DETAIL OF STANDARD WASHER
 STANDARD WASHER: TYPICAL USE UNDER NUT WITH WOOD POST



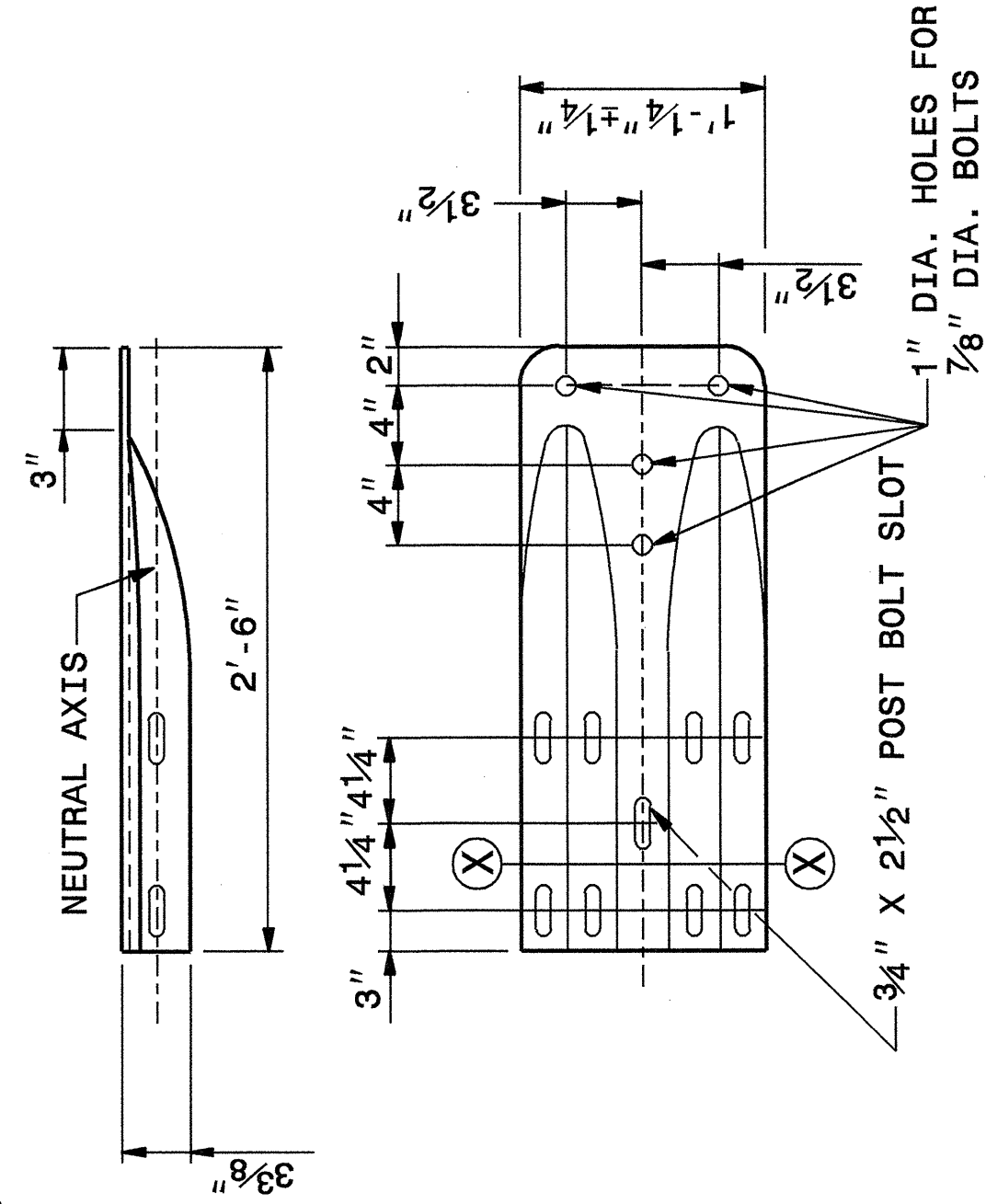
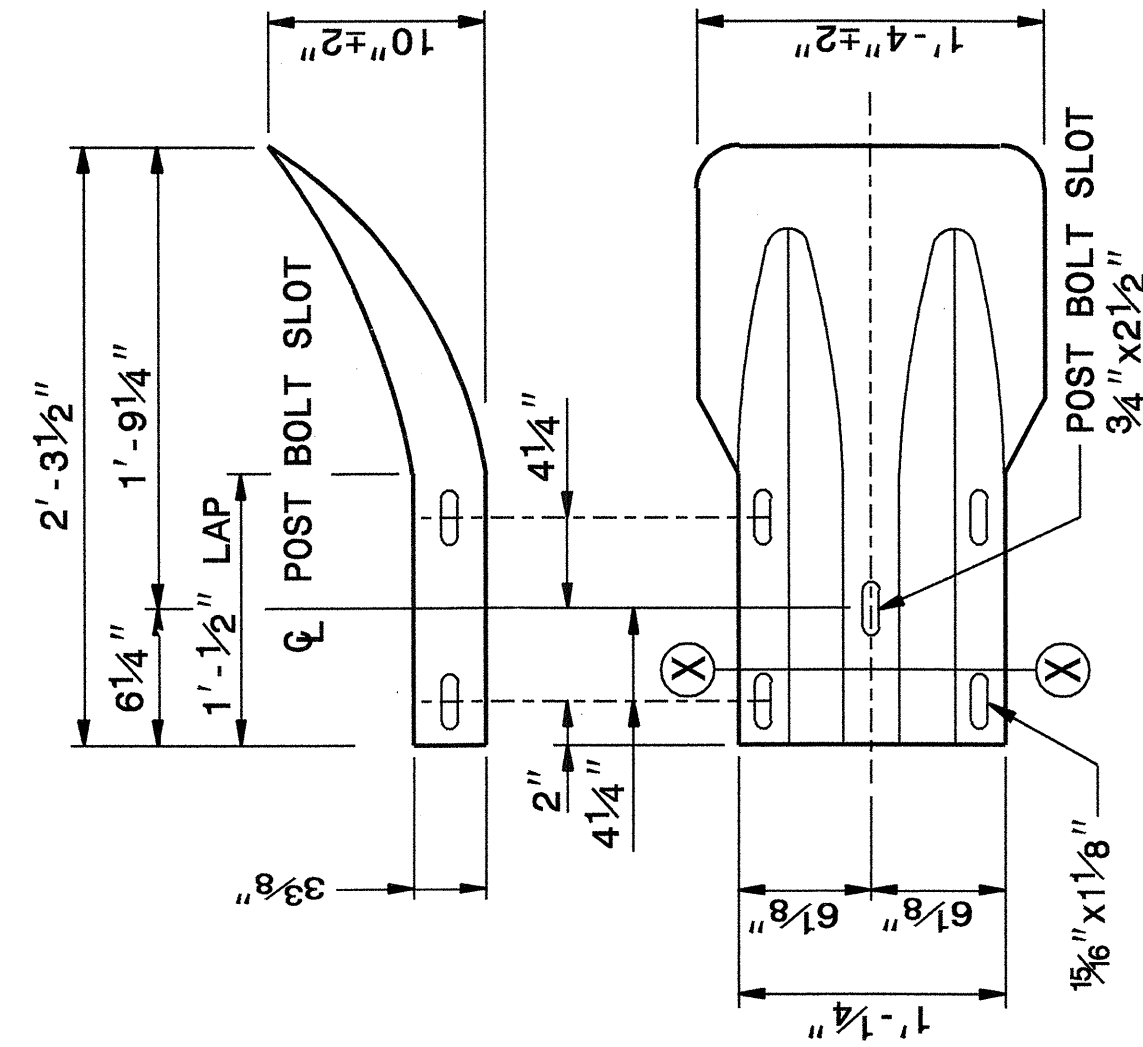
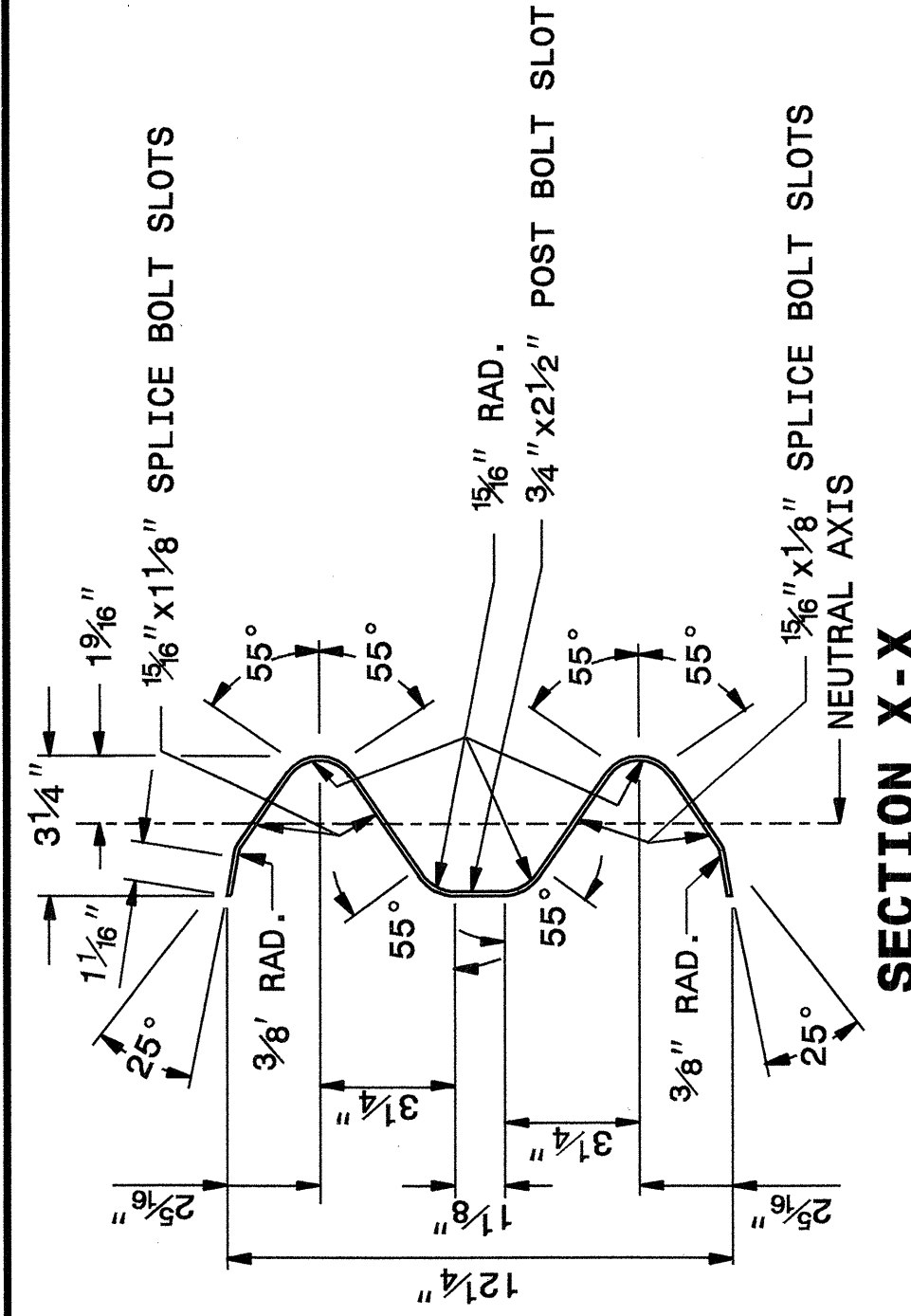
SYSTEM PARTS

SHEET 5 OF 7
862D02

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

ENGLISH DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 6 OF 7
862D02



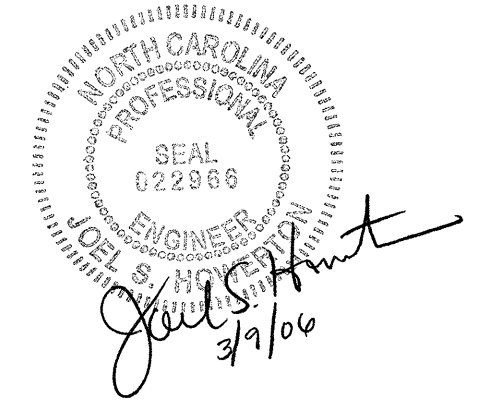
SYSTEM PARTS - GENERAL USE

SHEET 6 OF 7
862D02

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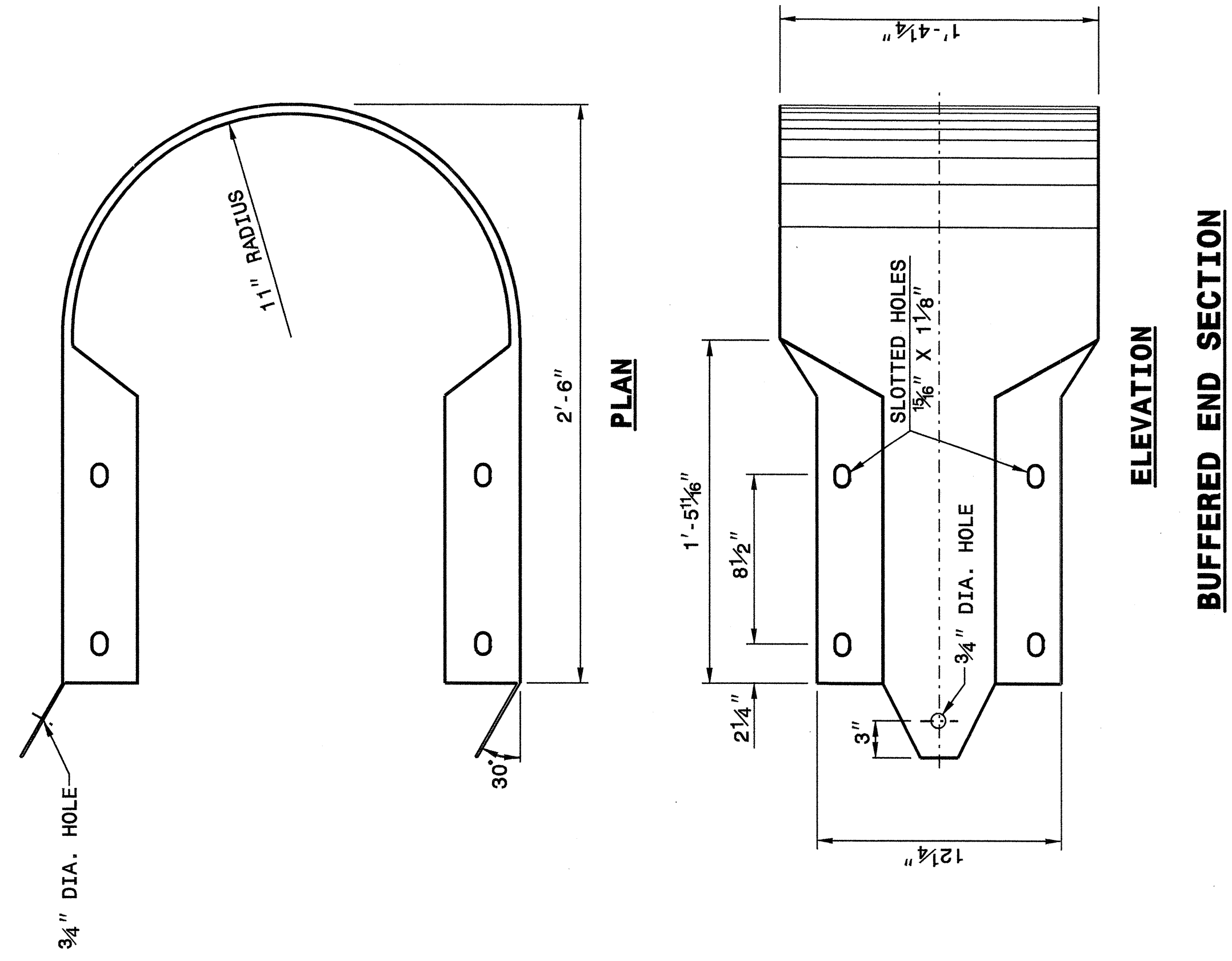
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 MODIFIED BY: E.E. WARD DATE: 02-09-03
 CHECKED BY: Eric Ward DATE: 10/21/04
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STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

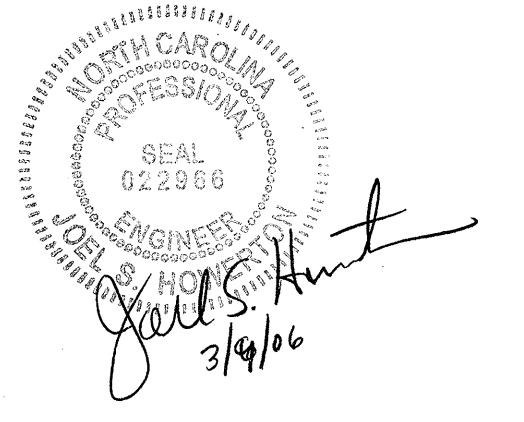
SHEET 7 OF 7
862D02



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

ENGLISH DETAIL DRAWING FOR
GUARDRAIL INSTALLATION

SHEET 7 OF 7
862D02



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SEE PLATE FOR TITLE

ORIGINAL BY: 2002 STD.862.02 DATE: _____
 MODIFIED BY: E.E. WARD DATE: 02-09-03
 CHECKED BY: *Joe S. Hunt* DATE: 10/21/04
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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

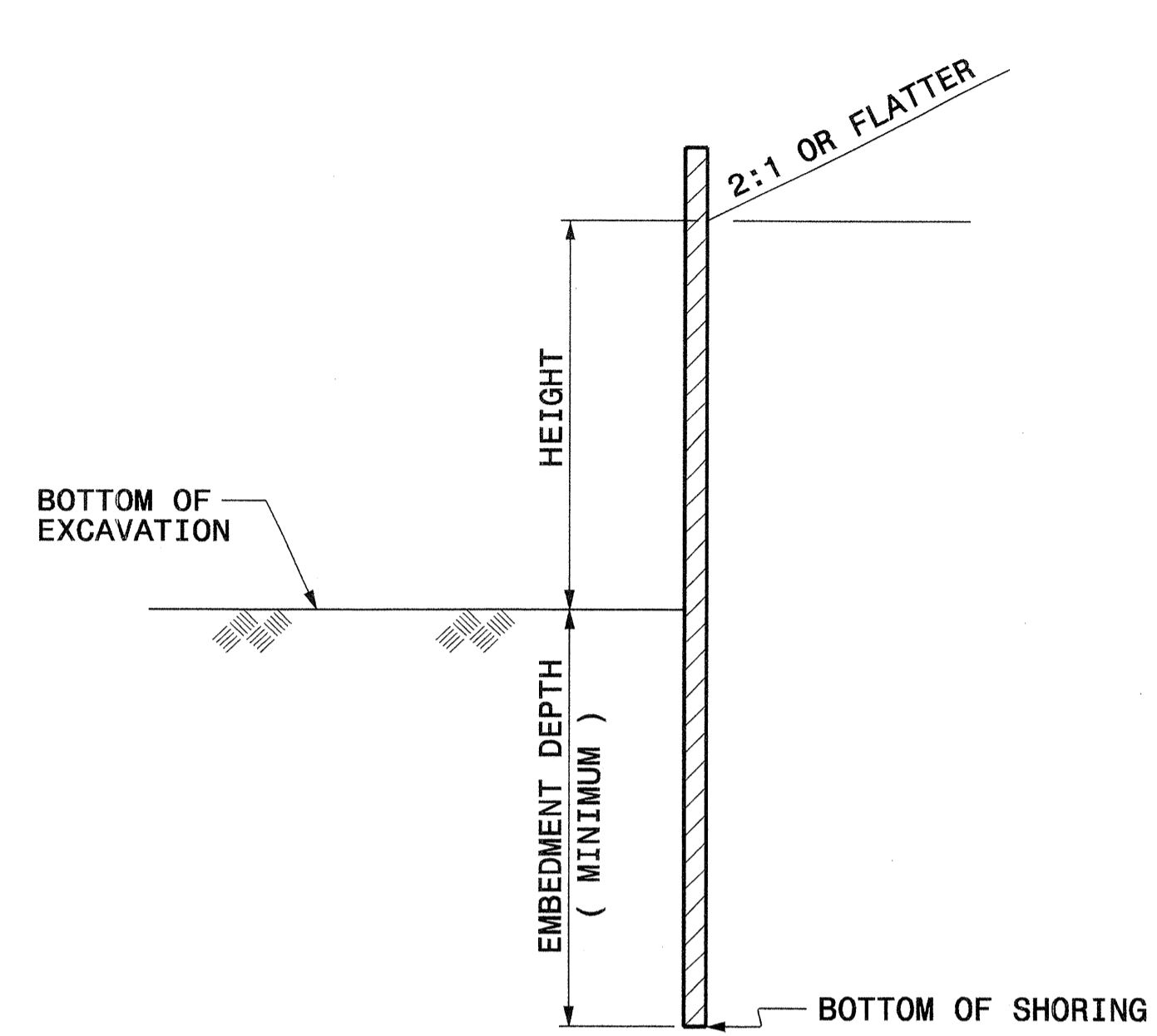
SUBMIT "STANDARD SHORING SELECTION" FORM TO ENGINEER PRIOR TO CONSTRUCTION OF SHORING.

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.

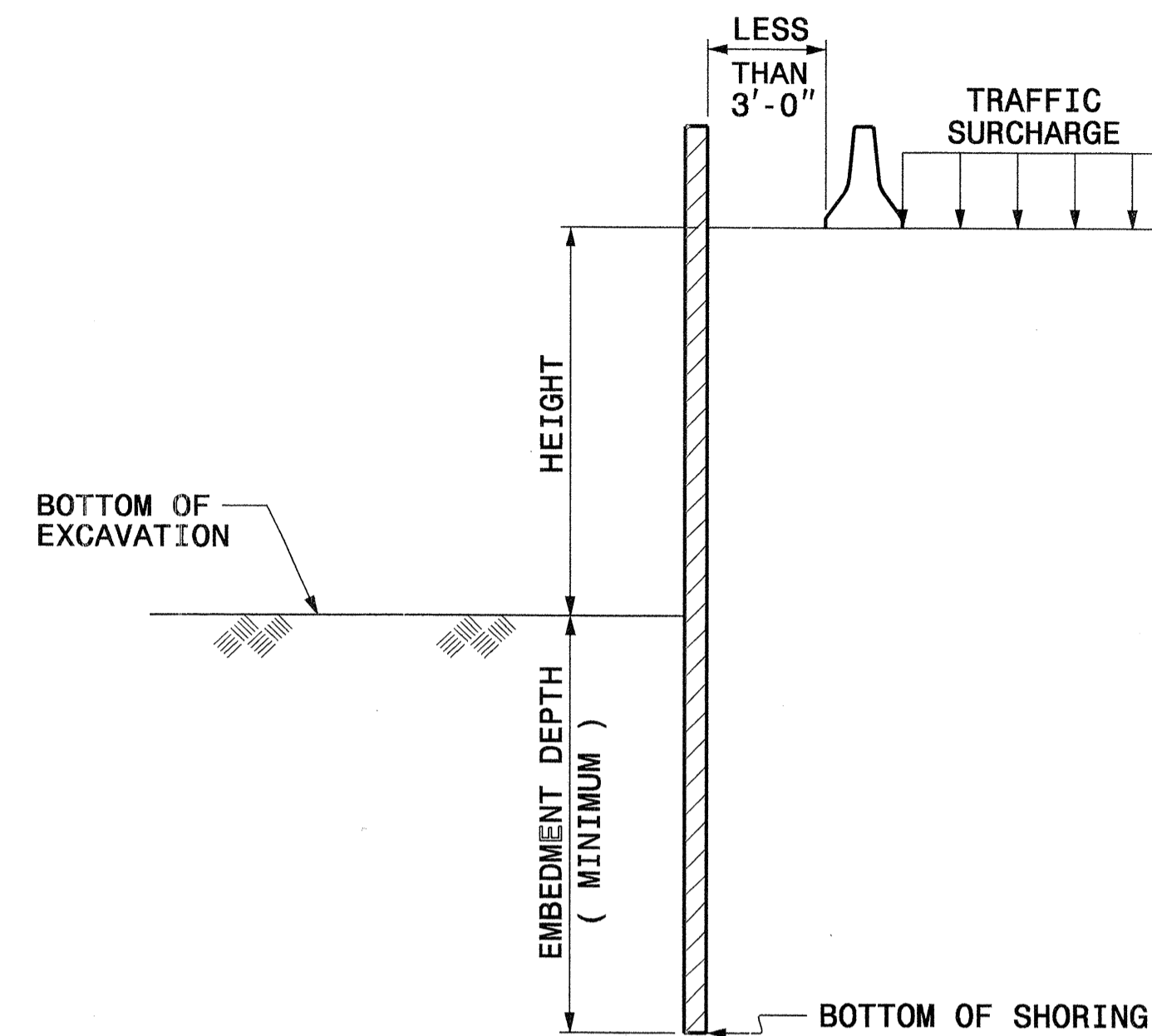
THE CONTRACTOR HAS THE OPTION OF USING SOLDIER PILES SET IN DRILLED HOLES WITH A SHORTENED LENGTH EQUAL TO 75% OF THE EMBEDMENT DEPTHS SHOWN IN THE TABLE. FOR DRILLING REQUIREMENTS, SEE TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC SPECIAL PROVISION.

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



TEMPORARY SHORING

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

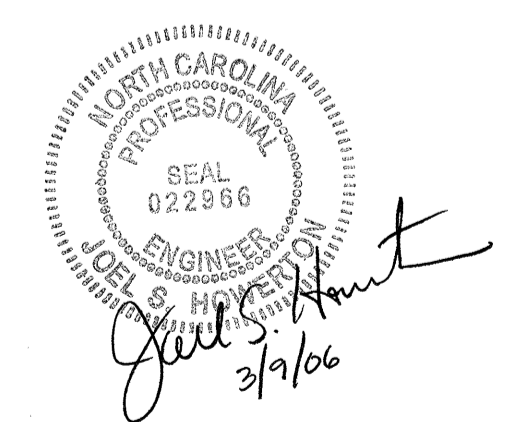


TEMPORARY SHORING - BARRIER SUPPORTED

(LEVEL WITH TRAFFIC SURCHARGE, WITH BARRIER IMPACT)

- 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 ³ / FT OF WALL)	MINIMUM EMBEDMENT DEPTH (FT)			MINIMUM EMBEDMENT DEPTH (FT)	MINIMUM SECTION MODULUS (IN ³ / 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
"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



PROJECT SERVICES UNIT
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STANDARD TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC

ORIGINAL BY: SOILS & FOUNDATIONS DATE: 10-2001
 MODIFIED BY: *Joe S. Hunt* DATE: 10/25/04
 CHECKED BY: *Joe S. Hunt* DATE: 10/25/04
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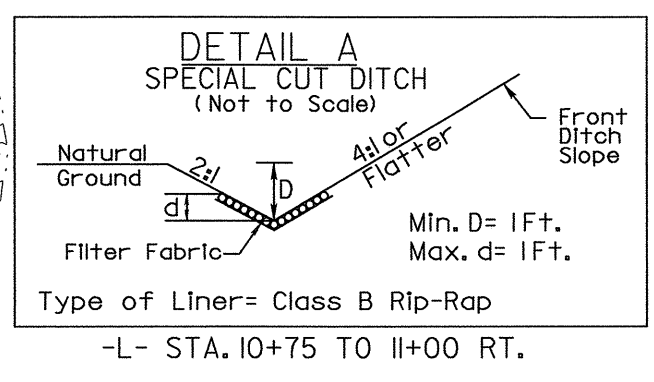
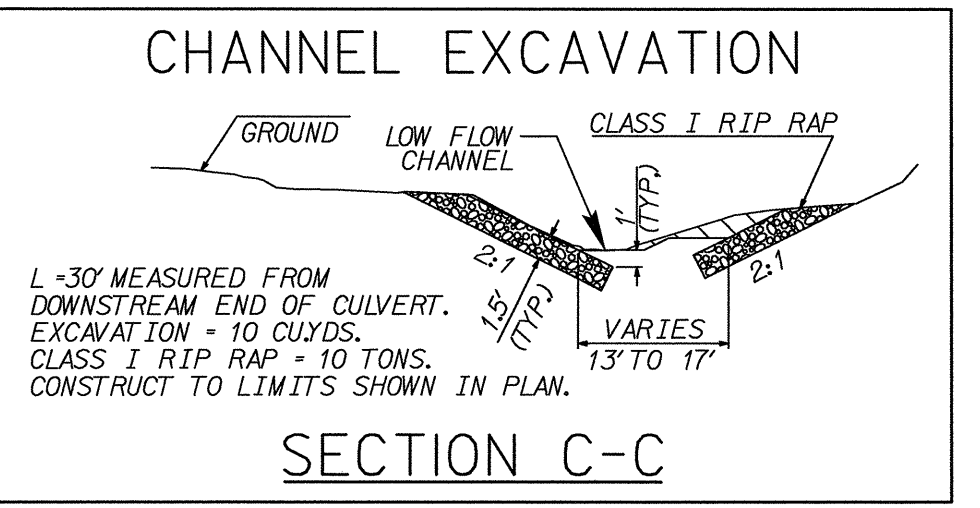
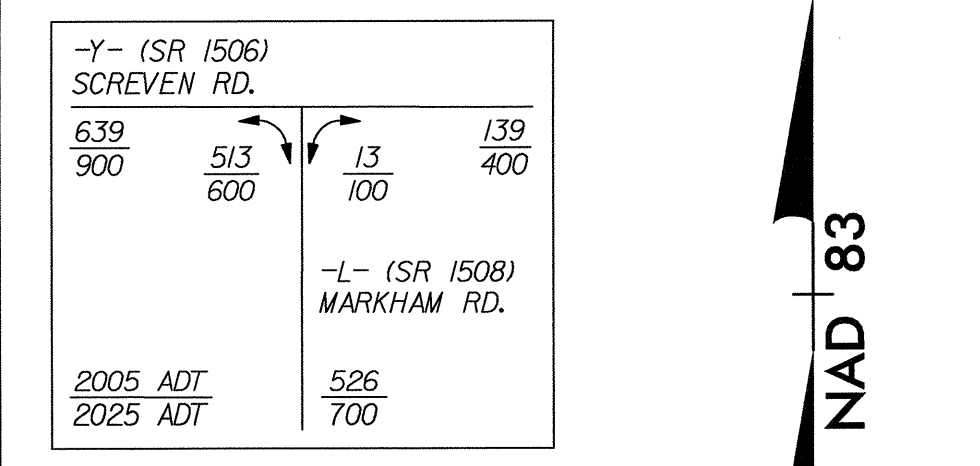
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF QUANTITIES

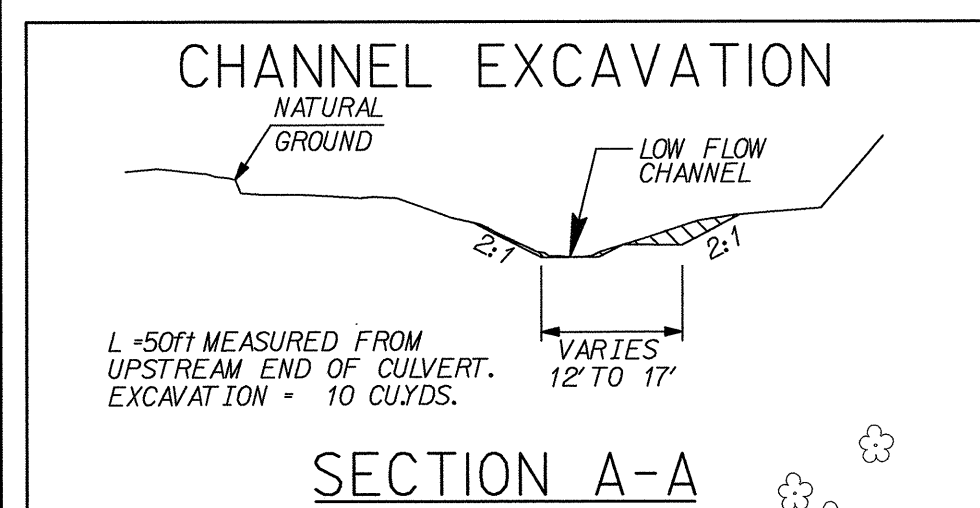
STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS ROADWAY SUMMARY OF QUANTITIES FOR CONTRACT - C201473														
ItemNumber	Sec #	Quantity	Unit	Description	ItemNumber	Sec #	Quantity	Unit	Description	ItemNumber	Sec #	Quantity	Unit	Description
0000100000-N	800	Lump Sum		MOBILIZATION	315000000-N	862	5	EA	ADDITIONAL GUARDRAIL POSTS	531800000-E	1505	37	TON	PAVEMENT REPAIR FOR UTILITY WORK
0050000000-E	226	1	ACR	SUPPLEMENTARY CLEARING & GRUBBING	321000000-N	862	2	EA	GUARDRAIL ANCHOR UNITS, TYPE CAT-1	541400000-E	1510	3	LF	3/4" COPPER WATER PIPE, TYPE K
0057000000-E	226	200	CY	UNDERCUT EXCAVATION	327000000-N	SP	2	EA	GUARDRAIL ANCHOR UNITS, TYPE 350	543200000-E	1510	211	LF	2" PVC WATER PIPE, SDR ***** (SDR 13.5, 31# WP)
0063000000-N	SP	Lump Sum		GRADING	338000000-E	862	75	LF	TEMPORARY STEEL BM GUARDRAIL	551000000-E	1510	1	EA	3/4" CORPORATION STOP
0080000000-E	SP	250	TON	CLASS IV SUBGRADE STABILIZATION	3389100000-N	SP	2	EA	GUARDRAIL ANCHOR UNITS, TYPE 350 TEMPORARY	558200000-E	1510	1	EA	***X*** TAPPING SADDLE (2" X 3/4")
0106000000-E	230	1,000	CY	BORROW EXCAVATION	3628000000-E	876	10	TON	PLAIN RIP RAP, CLASS I	5690000000-E	1520	392	LF	*** PVC SEWER PIPE, SDR ** (10", SDR 21)
0195000000-E	265	200	CY	SELECT GRANULAR MATERIAL	3649000000-E	876	9	TON	PLAIN RIP RAP, CLASS B	5690000000-E	1520	30	LF	*** PVC SEWER PIPE, SDR ** (4", SDR 21)
0196000000-E	270	200	SY	FABRIC FOR SOIL STABILIZATION	3656000000-E	876	390	SY	FILTER FABRIC FOR DRAINAGE	5768000000-N	1520	2	EA	SANITARY SEWER CLEAN-OUT
0199000000-E	SP	400	SF	TEMPORARY SHORING	4025000000-E	901	22.5	SF	CONTRACTOR FURNISHED, TYPE *** SIGN (E)	5775000000-E	1525	2	EA	4' DIA PRECAST CONC SEWER MANHOLE 0'-6" DEPTH
0318000000-E	300	6	TON	FOUNDATION CONDITIONING MATERIAL, MINOR STRS	4072000000-E	903	53	LF	SUPPORTS, 3-LB STEEL U-CHANNEL	5780000000-E	1525	8	LF	PRECAST CONC MANHOLE WALL, * DIA, OVER 6' HT (4')
0378000000-E	310	52	LF	24" RC PIPE CULVERTS, CLASS III	4102000000-N	904	4	EA	SIGN ERECTION, TYPE E	5792000000-E	SP	201	LF	REMOVE ABANDONED *** PIPE (10')
0995000000-E	340	42	LF	PIPE REMOVAL	4155000000-N	907	11	EA	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	5798000000-E	1530	96	LF	FILL OR REMOVE ABANDONED *** PIPE, ***** (10", VC SEWER)
1220000000-E	545	200	TON	INCIDENTAL STONE BASE	4412000000-E	SP	495	SF	WORK ZONE SIGNS (STATIONARY)	5798000000-E	1530	103	LF	FILL OR REMOVE ABANDONED *** PIPE, ***** (12", DI SEWER)
1489000000-E	610	90	TON	ASPHALT CONC BASE COURSE, TYPE B25.0B	4412100000-E	SP	138	SF	WORK ZONE SIGNS (PORTABLE)	5816000000-N	1530	1	EA	BREAK DOWN, PLUG, & FILL ABANDONED UTILITY MANHOLE
1525000000-E	SP	110	TON	ASPHALT CONC SURFACE COURSE, TYPE SF9.5A	4412200000-E	SP	45	SF	WORK ZONE SIGNS (BARRICADE MOUNTED)	5882000000-N	SP	1	EA	GENERIC UTILITY ITEM 4' DIA PRECAST CONCRETE FALSE BOTTOM MANHOLE, 0'-6" DEPTH
1560000000-E	620	12	TON	ASPHALT BINDER FOR PLANT MIX, GRADE PG 64-22	4430000000-N	1130	20	EA	DRUMS	5882000000-N	SP	1	EA	GENERIC UTILITY ITEM FIRE HYDRANT EXTENSION
1693000000-E	654	50	TON	ASPHALT PLANT MIX, PAVEMENT REPAIR	4435000000-N	1135	20	EA	CONES	5888000000-E	SP	37	LF	GENERIC UTILITY ITEM 12" DIA RIGID RESTAINED JOINT SEWER PIPE, PC 350
2022000000-E	815	45	CY	SUBDRAIN EXCAVATION	4446100000-E	SP	60	LF	BARRICADES (TYPE III)	6000000000-E	1605	550	LF	TEMPORARY SILT FENCE
2033000000-E	815	34	CY	SUBDRAIN FINE AGGREGATE	4450000000-N	1150	128	HR	FLAGGER	6006000000-E	1610	130	TON	STONE FOR EROSION CONTROL, CLASS A
2044000000-E	815	200	LF	6" PERFORATED SUBDRAIN PIPE	4810000000-E	1205	3,820	LF	PAINT PAVEMENT MARKING LINES (4")	6009000000-E	1610	80	TON	STONE FOR EROSION CONTROL, CLASS B
2055000000-E	815	6	EA	6" SUBDRAIN PIPE WYES, TEES, & ELBOWS	4835000000-E	1205	30	LF	PAINT PAVEMENT MARKING LINES (24")	6012000000-E	1610	100	TON	SEDIMENT CONTROL STONE
2066000000-N	815	1	EA	CONCRETE PAD FOR SUBDRAIN PIPE OUTLET	4905000000-N	1253	14	EA	SNOWPLOWABLE PAVEMENT MARKERS	6015000000-E	1615	0.5	ACR	TEMPORARY MULCHING
2077000000-E	815	6	LF	6" OUTLET PIPE (SUBDRAINS)	5300000000-E	1505	25	TON	FOUNDATION CONDITIONING MATERIAL, UTILITIES CLASS ***** (VI)	6018000000-E	1620	50	LB	SEED FOR TEMPORARY SEEDING
3030000000-E	862	37.5	LF	STEEL BM GUARDRAIL	5306000000-E	SP	25	TON	BEDDING MATERIAL, UTILITIES CLASS ***** (VI)	6021000000-E	1620	0.25	TON	FERTILIZER FOR TEMPORARY SEEDING
3045000000-E	862	125	LF	STEEL BM GUARDRAIL, SHOP CURVED						6029000000-E	SP	200	LF	SAFETY FENCE
										6030000000-E	1630	185	CY	SILT EXCAVATION
										6036000000-E	1631	145	SY	MATTING FOR EROSION CONTROL
										6038000000-E	SP	70	SY	PERMANENT SOIL REINFORCEMENT MAT
										6070000000-N	SP	3	EA	SPECIAL STILLING BASINS
										6084000000-E	1660	1	ACR	SEEDING & MULCHING
										6087000000-E	1660	0.5	ACR	MOWING
										6090000000-E	1661	50	LB	SEED FOR REPAIR SEEDING
										6093000000-E	1661	0.25	TON	FERTILIZER FOR REPAIR SEEDING
										6096000000-E	1662	50	LB	SEED FOR SUPPLEMENTAL SEEDING
										6108000000-E	1665	0.5	TON	FERTILIZER TOPDRESSING
										6111000000-E	SP	555	LF	IMPERVIOUS DIKE
										6114000000-N	SP	2	HR	SPECIALIZED HAND MOWING
										6132000000-N	SP	8	EA	GENERIC EROSION CONTROL ITEM RESPONSE FOR EROSION CONTROL

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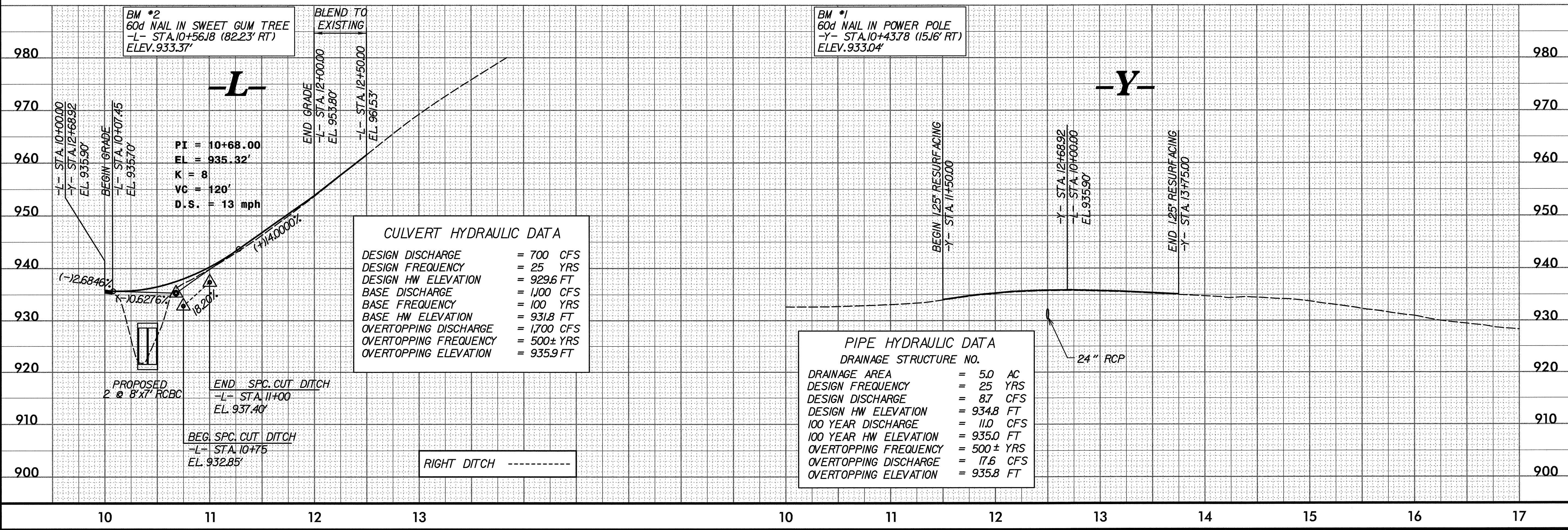
PROJECT REFERENCE NO. B-4240	SHEET NO. 4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 19814 ROGER W. POTTORUS 9-3-06	HYDRAULICS ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 21656 ROGER S. WEADON 3/1/06
MA Engineering CONSULTANTS, INC. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221	



-L- PI Sta 10+71.64 Δ = 32' 16" 18.7" (LT) D = 49' 49" 20.7" L = 64.77' T = 33.27' R = 115.00' RO = 60' SE = 0.04 ft/ft D.S. = 20 mph	-L- PI Sta 12+79.62 Δ = 46' 46" 57.0" (LT) D = 65' 51" 26.0" L = 71.04' T = 37.63' R = 87.00'
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-Y- PI Sta 11+25.28 Δ = 19' 55" 46.3" (LT) D = 12' 43" 56.6" L = 156.53' T = 79.06' R = 450.00'	-Y- PI Sta 15+76.38 Δ = 42' 47" 39.2" (RT) D = 15' 04" 40.2" L = 283.82' T = 148.90' R = 380.00'
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