

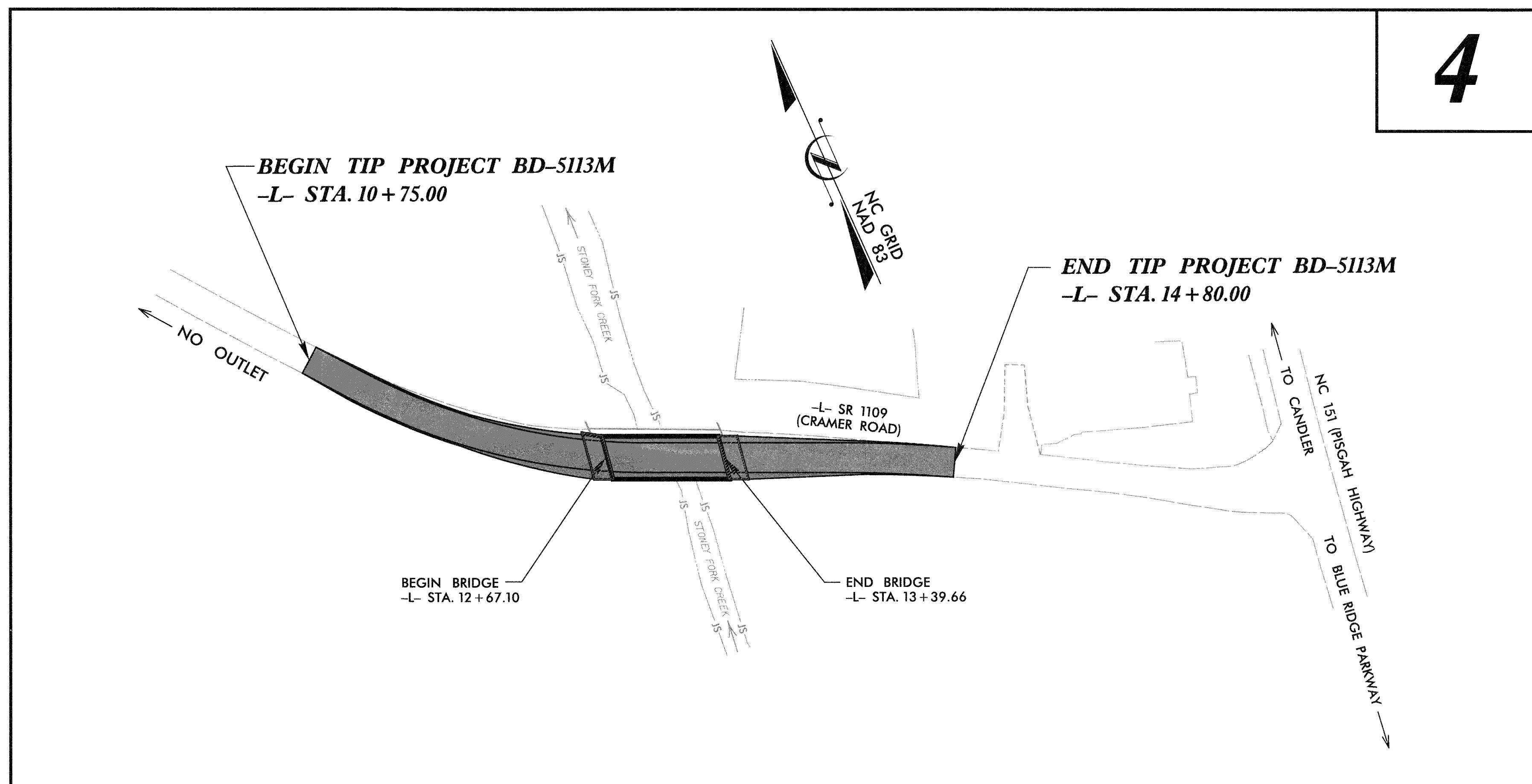
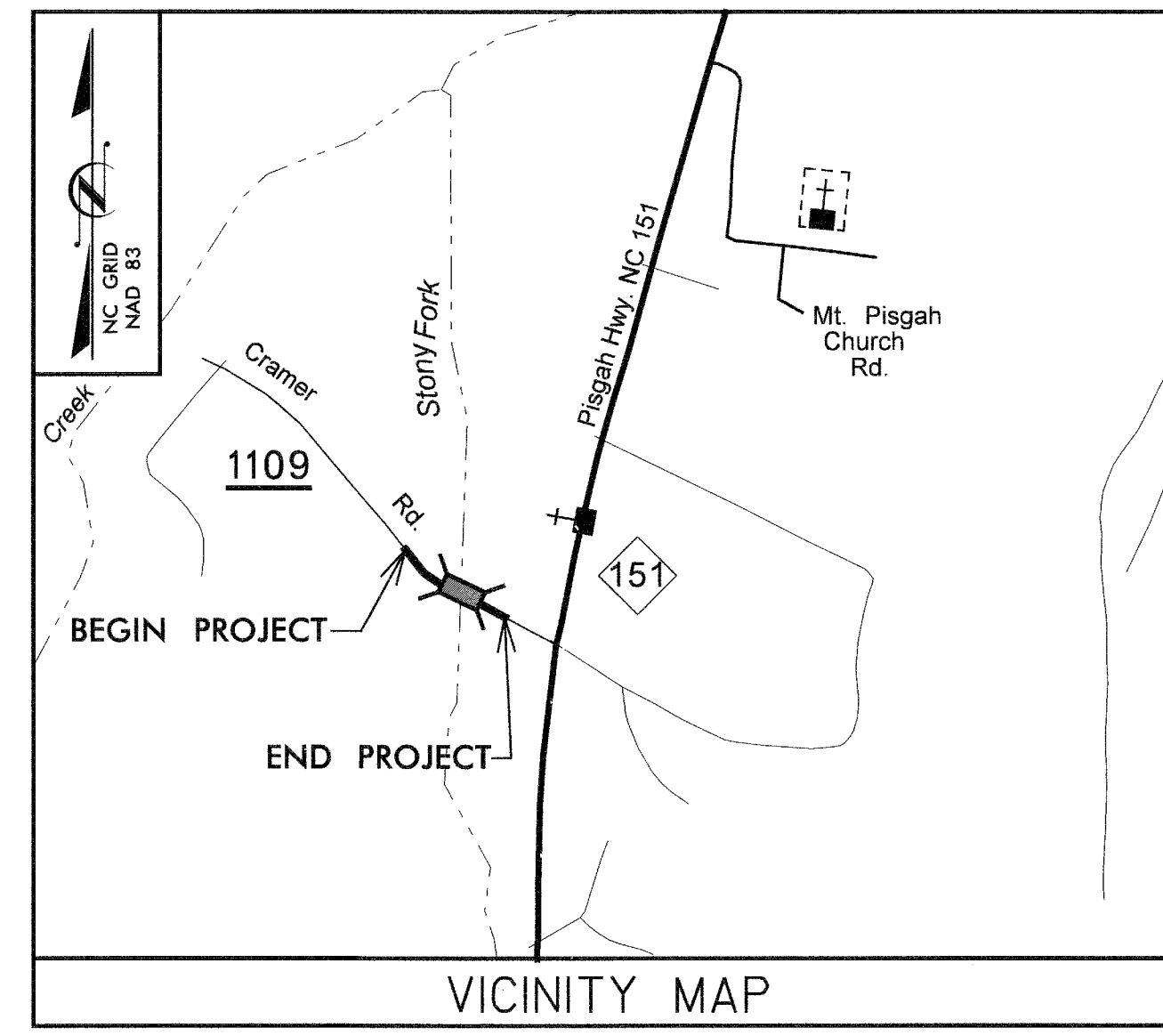
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BD-5113M	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
45359.1.13	BRZ-1109(12)	PE	
45359.2.13	BRZ-1109(12)	RW	
45359.3.13	BRZ-1109(12)	CONST.	

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BUNCOMBE COUNTY

LOCATION: BRIDGE NO. 651 OVER STONEY FORK CREEK
ON SR 1109 (PISGAH VIEW ROAD)

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



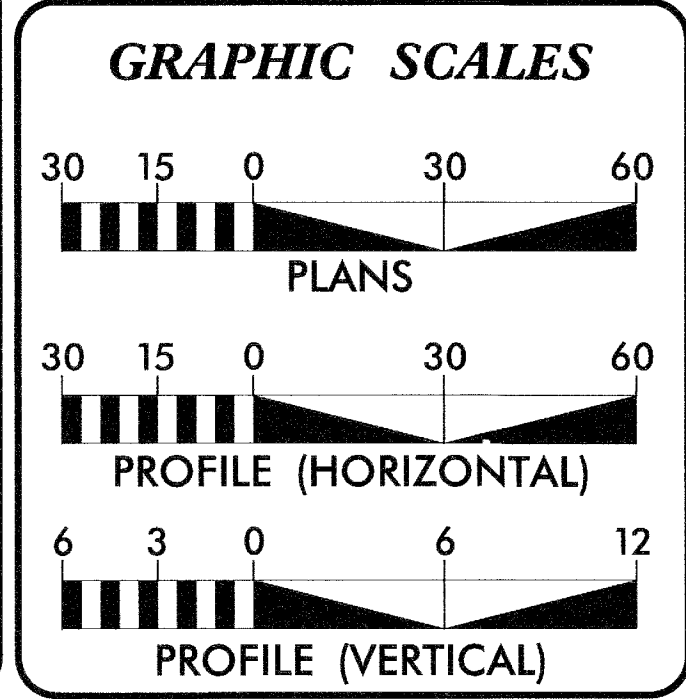
4

V&M
Vaughn & Melton
Consulting Engineers

Charlotte, North Carolina 704-337-0488
Tri-Cities, Tennessee 423-467-8401
Knoxville, Tennessee 865-546-5800
Middlesboro, Kentucky 606-246-6600
Asheville, North Carolina 828-253-2796
Spartanburg, South Carolina 864-574-4775

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CONTRACT: DM00078 TIP PROJECT: BD-5113M



DESIGN DATA

ADT 2010 = 230
ADT 2025 = 380
V = 35 MPH
FUNC CLASS = LOCAL

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT BD-5113M = 0.063 MI
LENGTH STRUCTURE TIP PROJECT BD-5113M = 0.014 MI
TOTAL LENGTH OF TIP PROJECT BD-5113M = 0.077 MI

Prepared In the Office of:
VAUGHN & MELTON
1318-F PATTON AVE.
ASHEVILLE NC, 28806
FOR THE NORTH CAROLINA DIVISION OF HIGHWAYS

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
FEBRUARY 8, 2013

LETTING DATE:
MARCH 5, 2014

HARDY WILLIS, PE
PROJECT ENGINEER

AARON CARVER, PE
PROJECT DESIGN ENGINEER

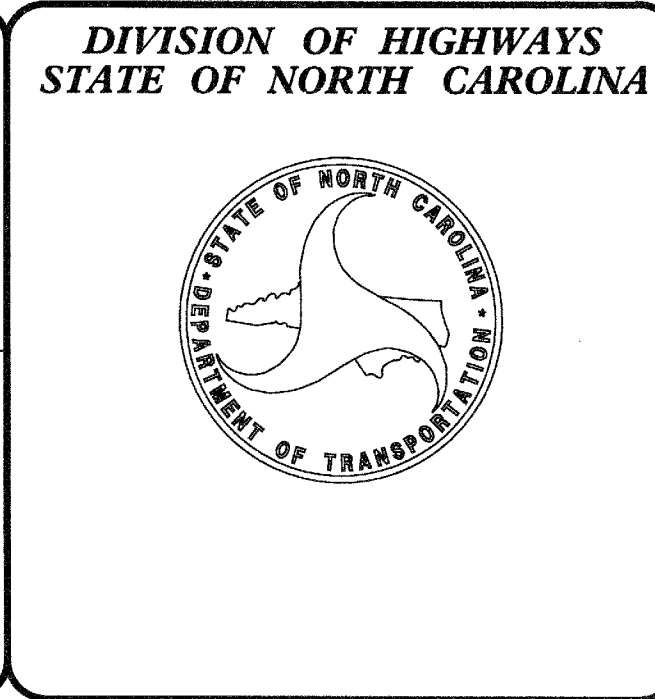
NCDOT CONTACT:
PAUL SPROUSE, PE
DIVISION 13 - BRIDGE MANAGER

HYDRAULICS ENGINEER

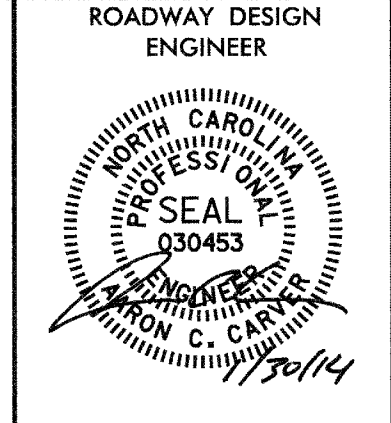
Bradley S. Ridmore, PE
SIGNATURE: 10/11/2013

ROADWAY DESIGN ENGINEER

10/11/13
SIGNATURE: P.E.



\$\$\$\$\$SYTIME\$\$\$\$\$
\$\$\$\$\$DCN\$\$\$\$\$
\$\$\$\$\$USERNAME\$\$\$\$\$



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	STRUCTURE ANCHOR UNIT DETAILS
3-A	SUMMARY OF DRAINAGE QUANTITIES, SUMMARY OF GUARDRAIL, AND ASPHALT PAVEMENT REMOVAL SUMMARY
3-B	EARTHWORK SUMMARY
4	PLAN AND PROFILE SHEET
TMP-1 THRU TMP-4	TRAFFIC MANAGEMENT PLANS
SIG-1	SIGNAL PLAN
EC-1 THRU EC-5	EROSION CONTROL PLANS
X-0	CROSS-SECTION SUMMARY
X-1 THRU X-4	CROSS-SECTIONS
S-1 THRU S-22	STRUCTURE PLANS
FAPUWFE	UNOUMCDAOUTCWP

GENERAL NOTES: 2012 SPECIFICATIONS EFFECTIVE: 01-17-12

GRADE LINE:
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.

SUPERELEVATION:
ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04 USING THE RATE OF SUPERELEVATION AND RUNOFF SHOWN ON THE PLANS. SUPERELEVATION IS TO BE REVOLVED ABOUT THE GRADE POINTS SHOWN ON THE TYPICAL SECTIONS.

SHOULDER CONSTRUCTION:
ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.01.

UNDERDRAINS:
UNDERDRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 815.03 AT LOCATIONS DIRECTED BY THE ENGINEER.

GUARDRAIL:
THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER PRIOR TO ORDERING GUARDRAIL MATERIAL.

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.

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: NONE.

RIGHT-OF-WAY MARKERS:
ALL RIGHT-OF-WAY MARKERS ON THIS PROJECT SHALL BE PLACED BY CONTRACT.

2012 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated January 17, 2012 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 Superelevation - Two Lane Pavement
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation - Method 'A'
DIVISION 4 - MAJOR STRUCTURES	
422.11	Bridge Approach Fills
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 8 - INCIDENTALS	
815.03	Pipe Underdrain and Blind Drain
840.25	Anchorage for Frames
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.37	Steel Grate and Frame
840.46	Traffic Bearing Precast Drainage Structure
840.66	Drainage Structure Steps
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
862.01	Guardrail Placement
862.02	Guardrail Installation
876.02	Guide for Rip Rap at Pipe Outlets

11/30/14
 030453
 NORTH CAROLINA
 PROFESSIONAL ENGINEER

Note: Not to Scale

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

State Line	_____
County Line	_____
Township Line	_____
City Line	_____
Reservation Line	_____
Property Line	_____
Existing Iron Pin	○ EP
Property Corner	_____
Property Monument	□ ECM
Parcel/Sequence Number	⑩ 23
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	_____
Switch	_____
RR Abandoned	_____
RR Dismantled	_____

RIGHT OF WAY:

Baseline Control Point	_____
Existing Right of Way Marker	_____
Existing Right of Way Line	_____
Proposed Right of Way Line	_____
Proposed Right of Way Line with Iron Pin and Cap Marker	_____
Proposed Right of Way Line with Concrete or Granite Marker	_____
Existing Control of Access	_____
Proposed Control of Access	_____
Existing Easement Line	_____
Proposed Temporary Construction Easement	_____
Proposed Temporary Drainage Easement	_____
Proposed Permanent Drainage Easement	_____
Proposed Permanent Utility Easement	_____

ROADS AND RELATED FEATURES:

Existing Edge of Pavement	_____
Existing Curb	_____
Proposed Slope Stakes Cut	_____
Proposed Slope Stakes Fill	_____
Proposed Wheel Chair Ramp	_____
Proposed Wheel Chair Ramp Curb Cut	_____
Curb Cut for Future Wheel Chair Ramp	_____
Existing Metal Guardrail	_____
Proposed Guardrail	_____
Existing Cable Guiderail	_____
Proposed Cable Guiderail	_____
Equality Symbol	_____
Pavement Removal	_____

VEGETATION:

Single Tree	_____
Single Shrub	_____
Hedge	_____
Woods Line	_____
Orchard	_____
Vineyard	_____

EXISTING STRUCTURES:

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

UTILITIES:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

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

MISCELLANEOUS:

Utility Pole	_____
Utility Pole with Base	_____
Utility Located Object	_____
Utility Traffic Signal Box	_____
Utility Unknown U/G Line	_____
U/G Tank; Water, Gas, Oil	_____
A/G Tank; Water, Gas, Oil	_____
U/G Test Hole (S.U.E.*)	_____
Abandoned According to Utility Records	_____
End of Information	_____

3/15/06

6/2/09

SURVEY CONTROL SHEET BD-5113M

PROJECT REFERENCE NO.	SHEET NO.
45359.3.13	1C
Location and Surveys	

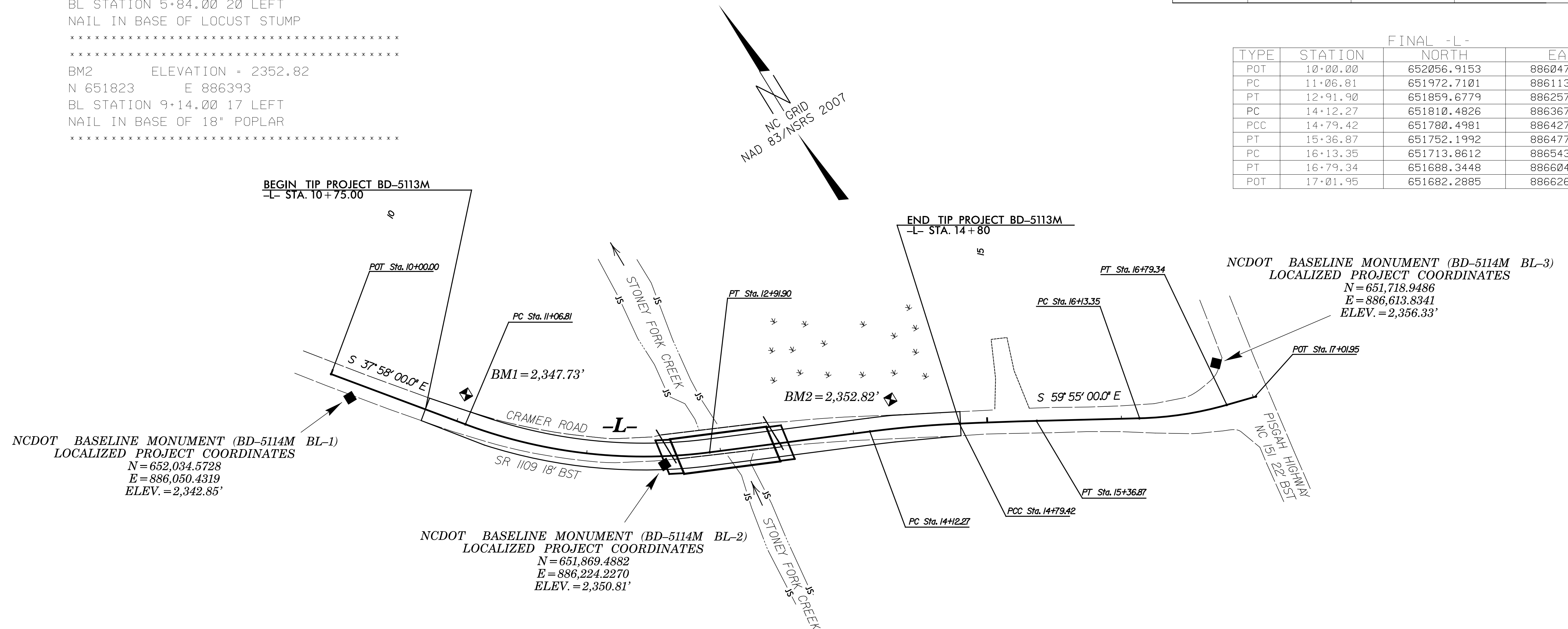
BL POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
1	BL-1	652034.5728	886050.4319	2342.85	10+19.30	11.59 RT
2	BL-2	651869.4882	886224.2270	2350.81	12+57.93	6.26 RT
3	BL-3	651718.9486	886613.8341	2356.33	16+80.25	32.01 LT

ROW MARKER CONCRETE OR GRANITE-E				
ALIGN	STATION	OFFSET	NORTH	EAST
L	10+75.00	22.50	651983.9456	886076.0969
L	10+75.00	-22.50	652011.6297	886111.5735
L	11+06.85	-40.00	651997.3150	886144.9417
L	12+00.00	45.00	651871.5262	886151.4007
L	12+91.94	-40.00	651896.1841	886274.0170
L	13+50.00	45.00	651794.8779	886292.2632
L	14+12.30	-35.00	651842.4266	886381.8200
L	14+50.00	40.00	651758.5742	886383.4953
L	14+79.45	22.50	651760.8066	886416.6930
L	14+79.45	-22.50	651800.1895	886438.4642

 BM1 ELEVATION = 2347.73
 N 651991 E 886125
 BL STATION 5+84.00 20 LEFT
 NAIL IN BASE OF LOCUST STUMP

 BM2 ELEVATION = 2352.82
 N 651823 E 886393
 BL STATION 9+14.00 17 LEFT
 NAIL IN BASE OF 18" POPLAR

FINAL -L-			
TYPE	STATION	NORTH	EAST
POT	10+00.00	652056.9153	886047.6950
PC	11+06.81	651972.7101	886113.4045
PT	12+91.90	651859.6779	886257.6678
PC	14+12.27	651810.4826	886367.5167
PCC	14+79.42	651780.4981	886427.5786
PT	15+36.87	651752.1992	886477.5787
PC	16+13.35	651713.8612	886543.7597
PT	16+79.34	651688.3448	886604.4241
POT	17+01.95	651682.2885	886626.2013



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "100651 BL-3" WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF NORTHING: 651718.9486(±) EASTING: 886613.8341(±) ELEVATION: 2356.33(±)

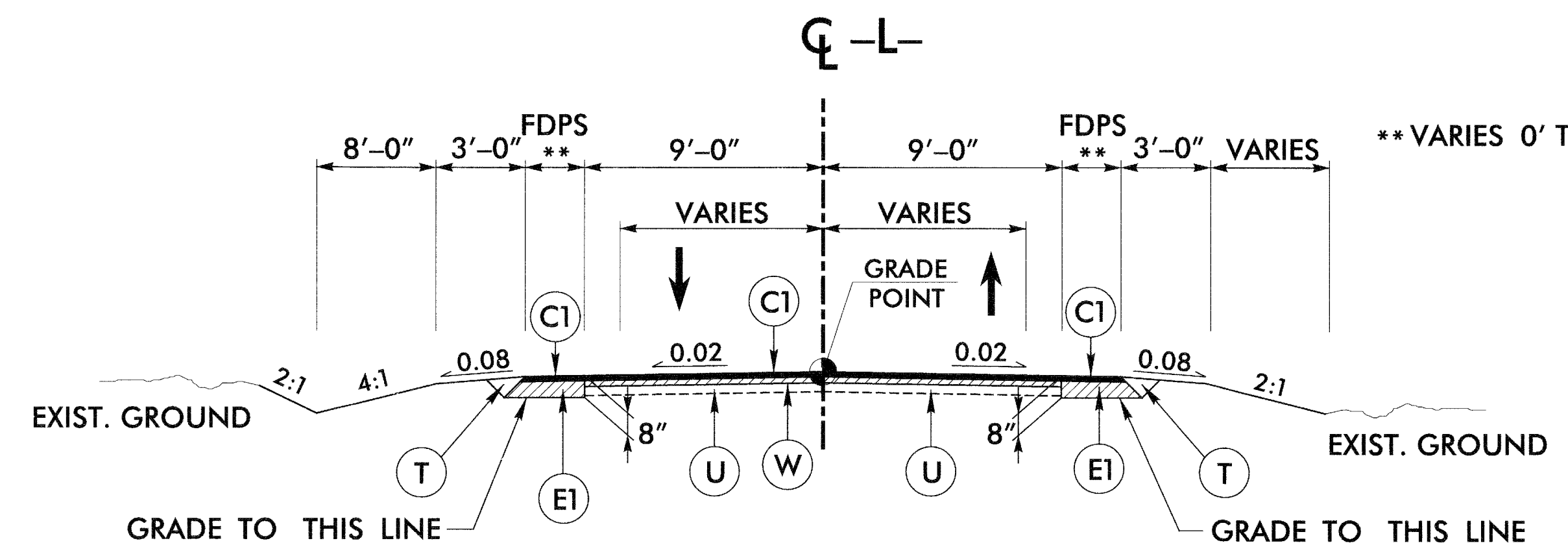
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999772793

THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "100651 BL-3" TO -L- STATION 10+00.00 IS N 59°09'51" W 659.34'

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

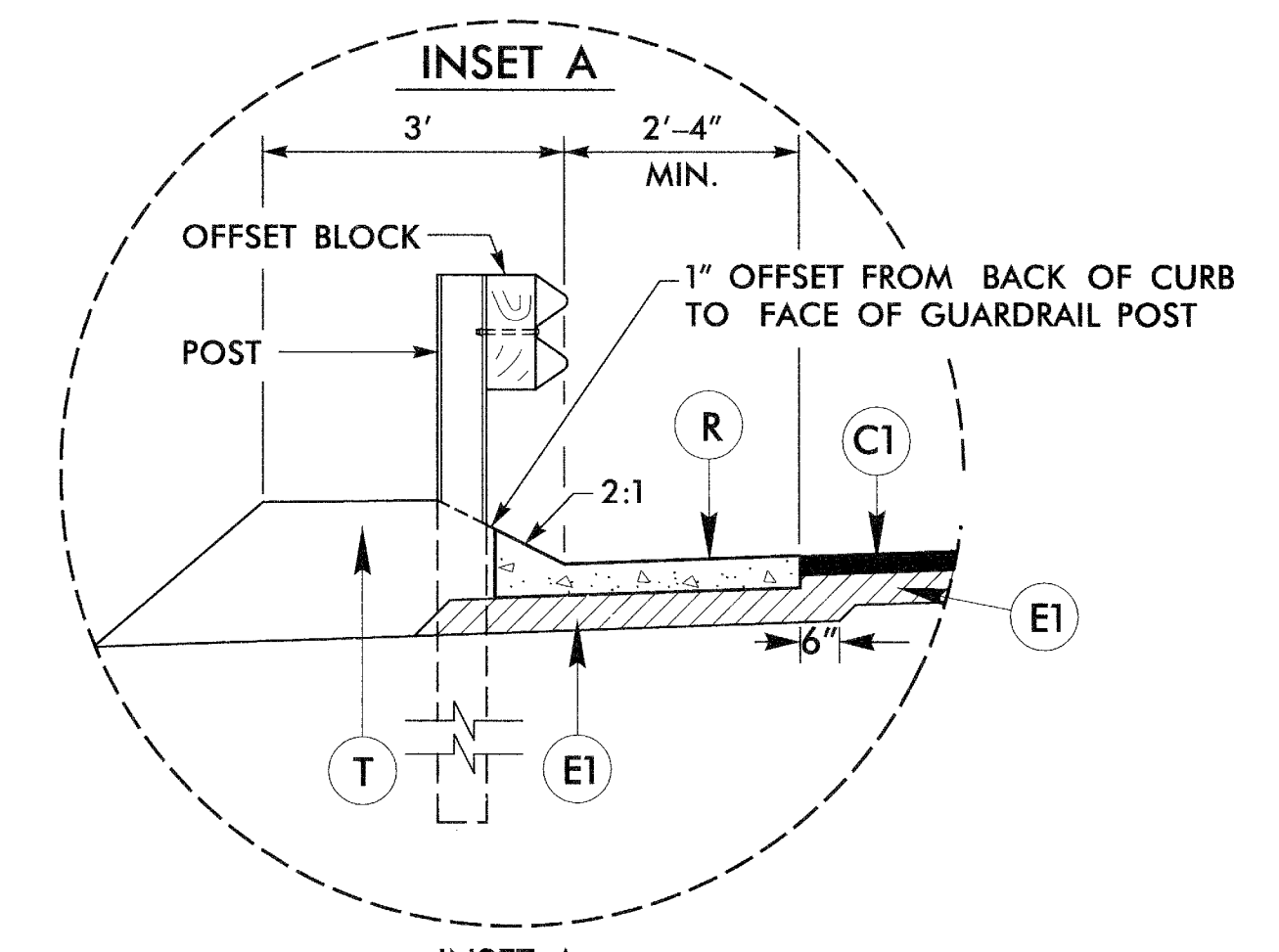
- NOTES:**
- THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:
[HTTP://WWW.NCDOT.ORG/DOH/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/](http://www.ncdot.org/doh/preconstruct/highway/location/project/)
 THE FILES TO BE FOUND ARE AS FOLLOWS:
 100651_LS_CONTROL_130123.TXT
 - 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 NGS ONLINE POSITIONING SERVICE (OPUS)

NOTE: DRAWING NOT TO SCALE

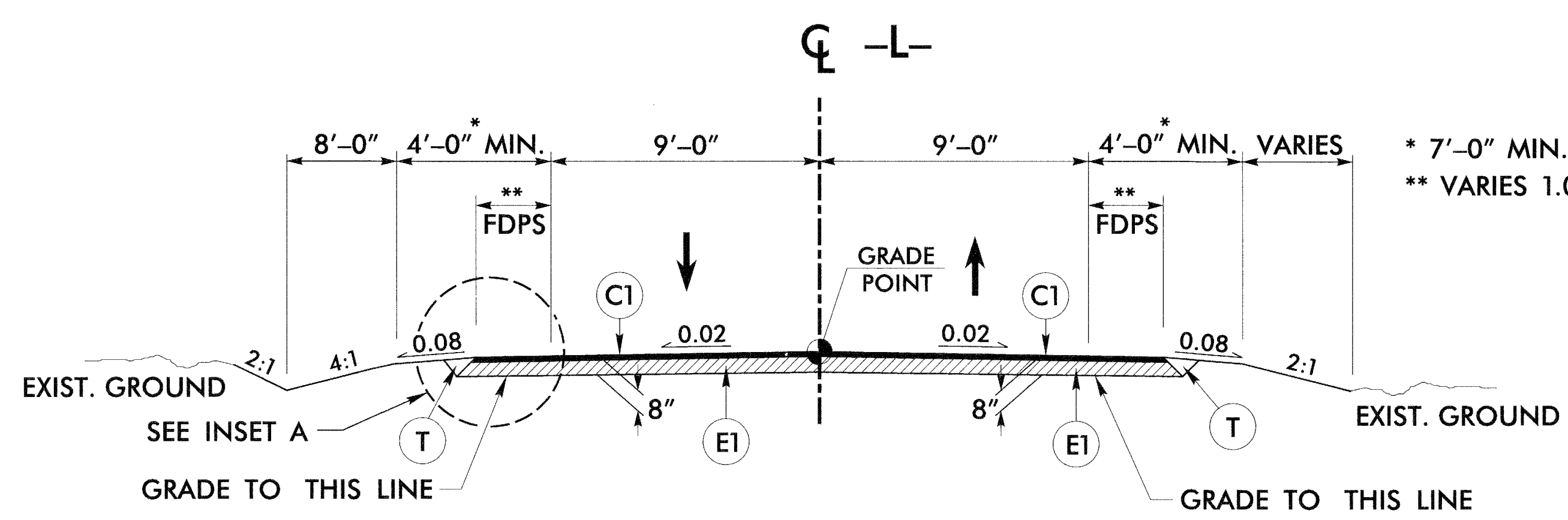


TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1
 -L- STA. 10+75.00 (BEGIN PROJECT) TO 11+25.00

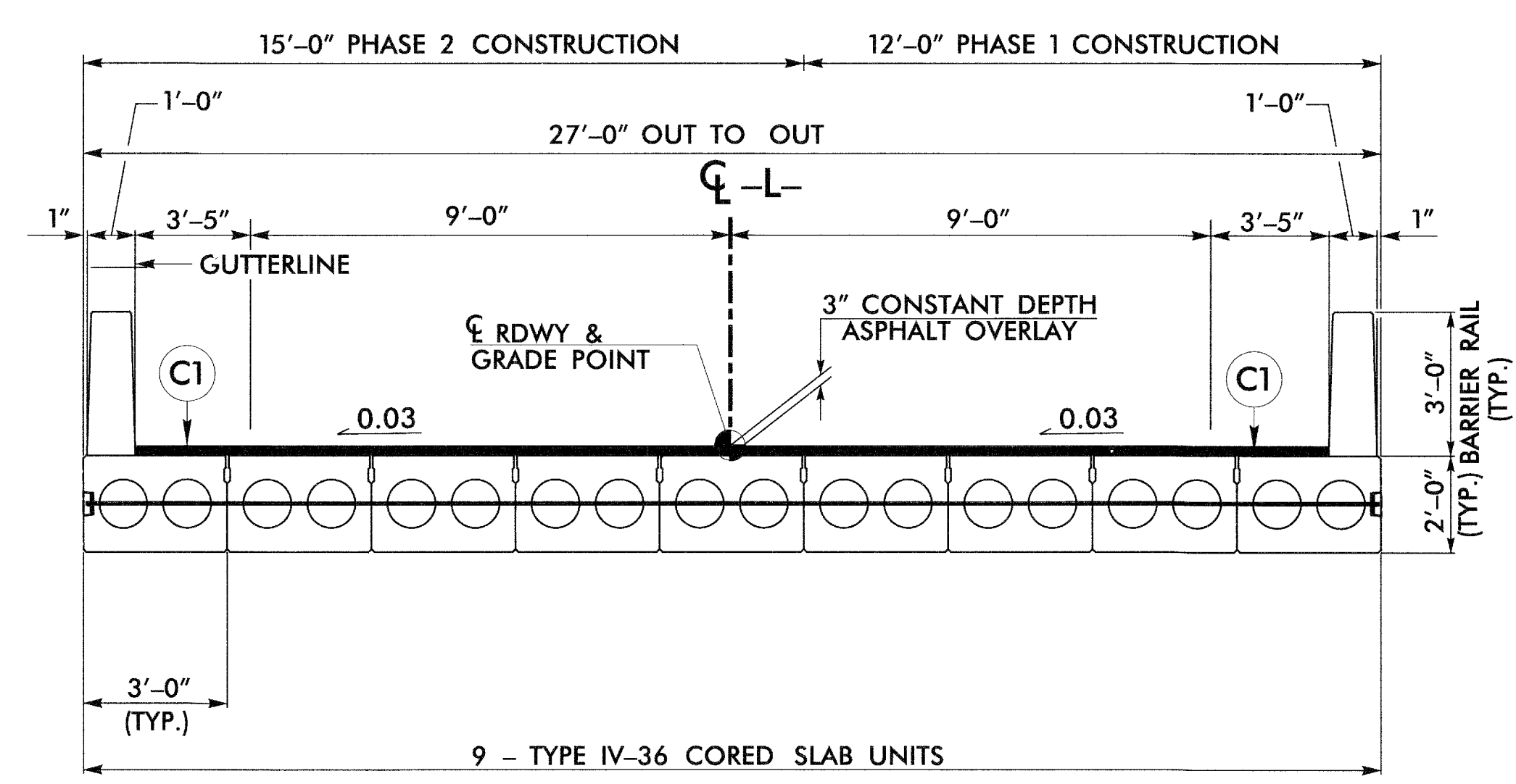
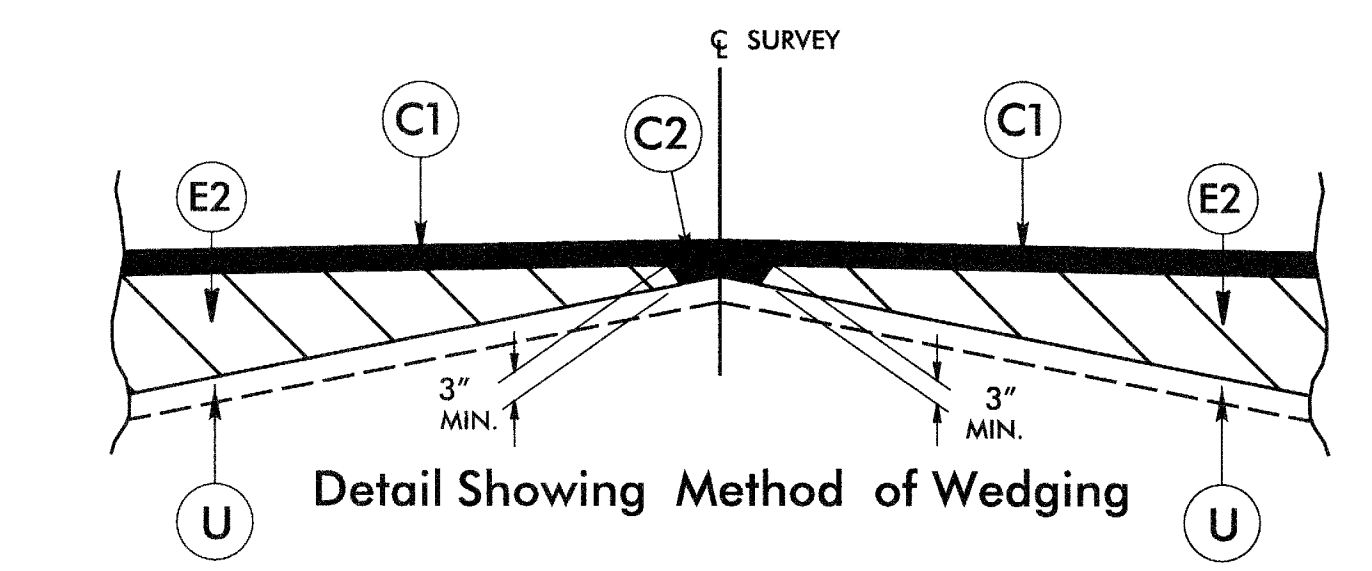
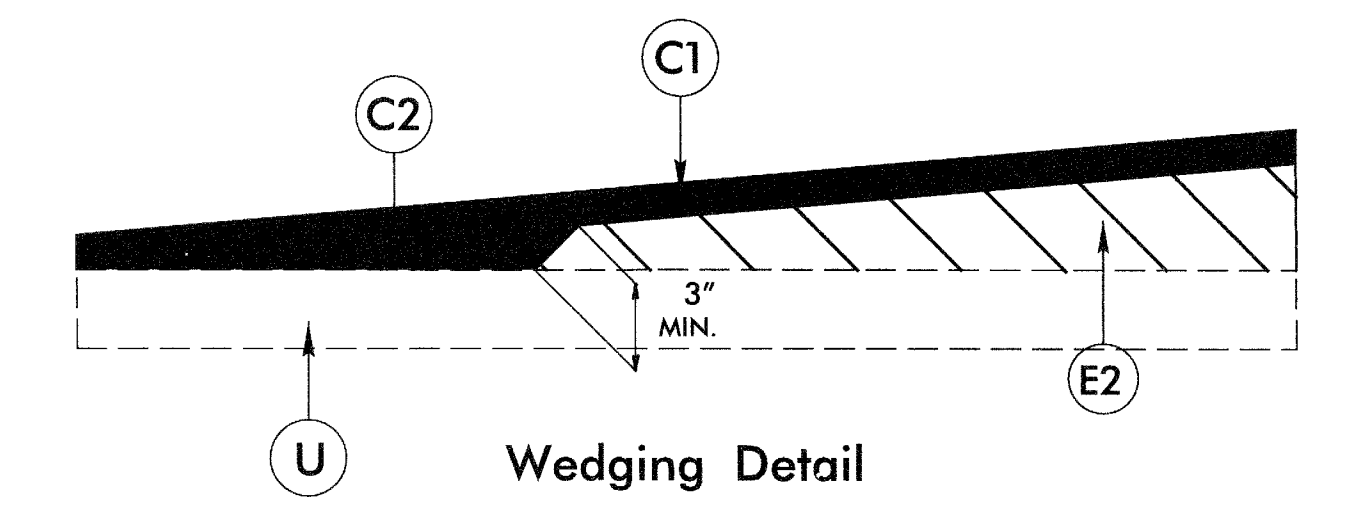


INSET A
 -L- STA. 12+29 LT TO (BEGIN APPROACH SLAB)



TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2
 * 7'-0" MIN. WITH GUARDRAIL
 ** VARIES 1.0' TO 5.4' FULL DEPTH PAVED SHOULDER
 -L- STA. 11+25.00 TO 12+67.10 (BEGIN BRIDGE)
 -L- STA. 13+39.66 (END BRIDGE) TO STA. 14+80.00 (END PROJECT)



TYPICAL SECTION NO. 3

NOTE: SEE TRAFFIC CONTROL PLANS FOR FURTHER INFORMATION REGARDING THE PHASES FOR CONSTRUCTION

USE TYPICAL SECTION NO. 3
 -L- STA. 12+67.10 (BEGIN BRIDGE) TO
 -L- STA. 13+39.66 (END BRIDGE)

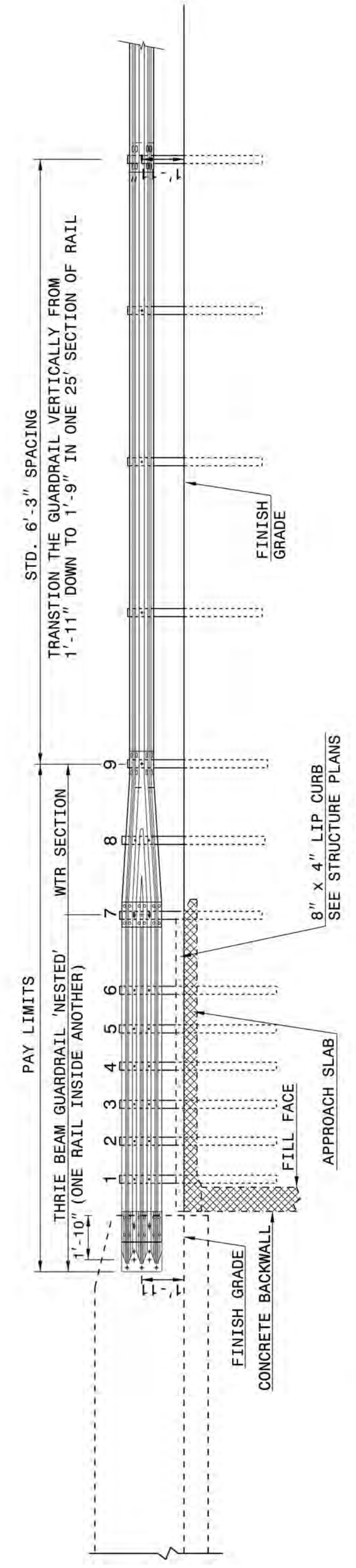
PAVEMENT SCHEDULE	
C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO 1 1/2" LAYERS.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 1 1/2" IN DEPTH.
E1	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5 1/2" IN DEPTH.
R	SHOULDER BERM GUTTER (NCDOT STANDARD 846.01)
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	PROPOSED WEDGING (SEE APPROPRIATE DETAILS)

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

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

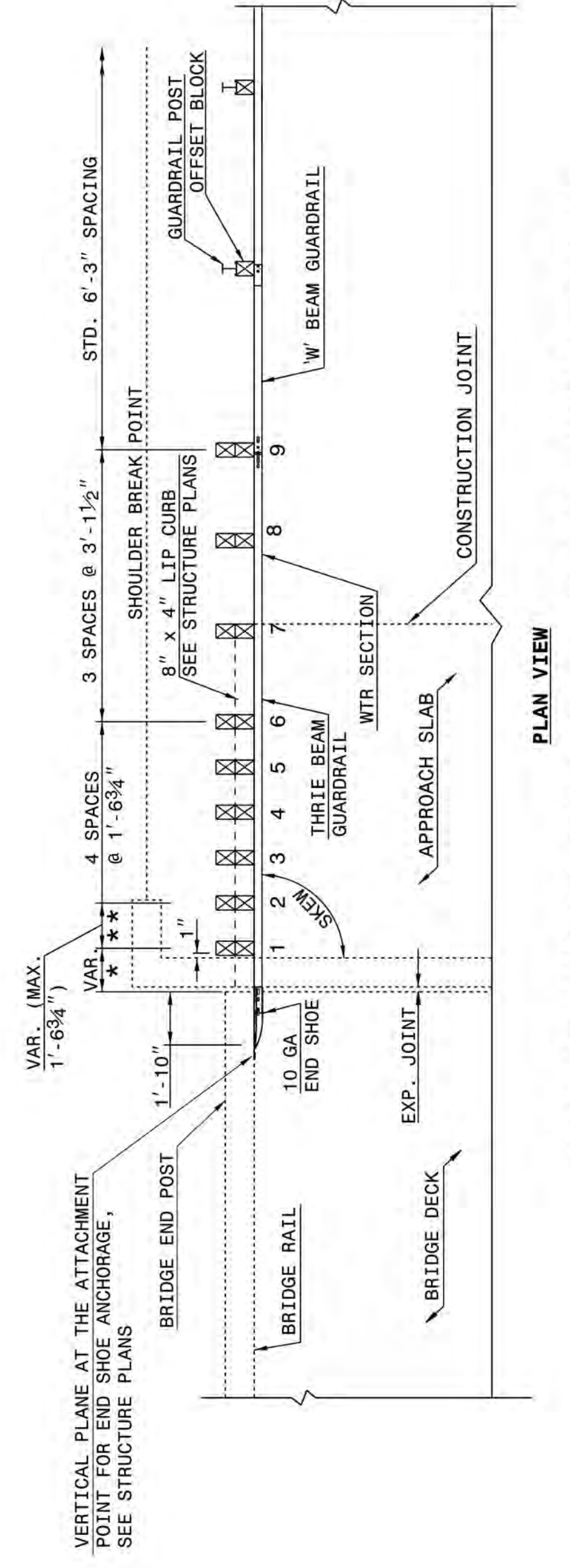
ENGLISH DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
RAIL ON BRIDGE - SUB REGIONAL TIER

SHEET 2 OF 7
862d03



ELEVATION

NOTE:
 **POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
 *THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 1'1/2". IF CONCRETE BACKWALL IS NOT PRESENT.
 -SHOULDER BERM GUTTER MUST BE INSTALLED TO THE LIMITS 8" x 4" LIP CURB IS SHOWN IF ANCHOR UNIT IS NOT ADJACENT TO AN APPROACH SLAB.
 -MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER).
 -LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.
 -SEE SHEET 5 FOR POST SECTIONS 1 THRU 9.



GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE - SUB REGIONAL TIER

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

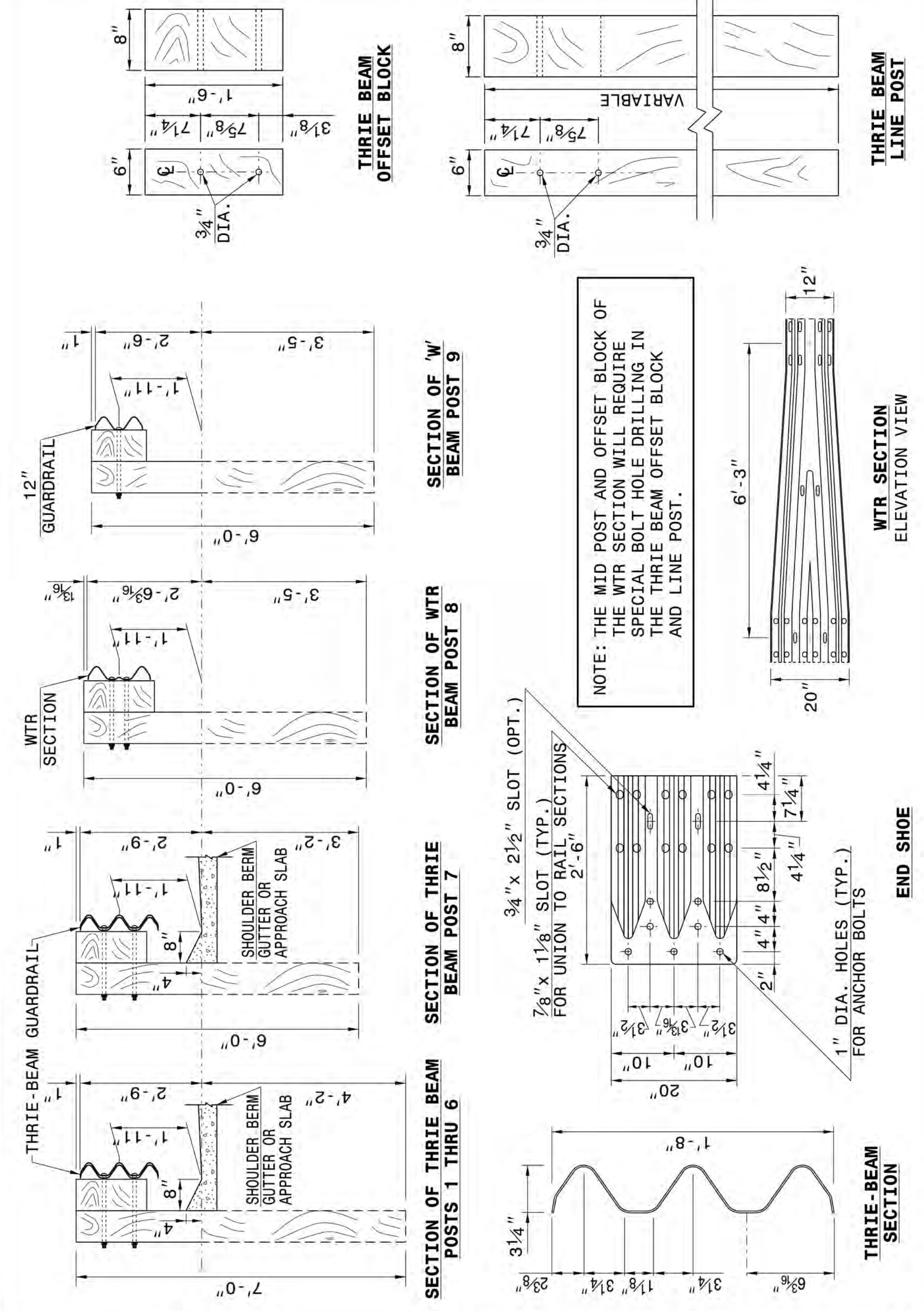
ENGLISH DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE - SUB REGIONAL TIER

SHEET 2 OF 7
862d03

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

ENGLISH DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
RAIL ON BRIDGE - SUB REGIONAL TIER

SHEET 3 OF 7
862d03



NOTE: THE MID POST AND OFFSET BLOCK OF THE WTR SECTION WILL REQUIRE SPECIAL BOLT HOLE DRILLING IN THE THRIE BEAM OFFSET BLOCK AND LINE POST.

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

ENGLISH DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
GUARDRAIL ANCHOR UNIT, TYPE III

SHEET 3 OF 7
862d03

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

SEE TITLE BLOCK

ORIGINAL BY: J HOWERTON DATE: 06-22-12
 MODIFIED BY: DATE:
 CHECKED BY: DATE:
 FILE SPEC.: DATE:

DIVISION OF HIGHWAYS
 STATE OF NORTH CAROLINA

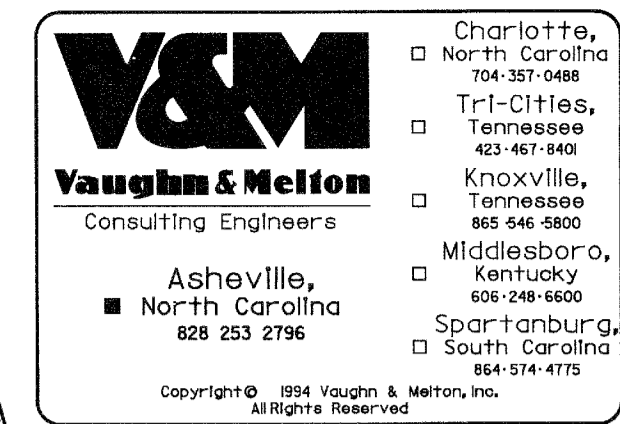
SUMMARY OF EARTHWORK

IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	UNDERCUT	EMBT + %	BORROW	WASTE
SUMMARY NO.1					
-L- STA. 10+75 TO STA. 12+67.10 (BEG. BRIDGE)	3		337	334	
SUBTOTAL SUMMARY NO.1	3		337	334	
SUMMARY NO.2					
-L- STA. 13+39.66 (END BRIDGE) TO STA. 14+80	30		92	62	
SUBTOTAL SUMMARY NO.2	30		92	62	
PROJECT SUBTOTAL	33		429	396	
EST. 5% FOR REPLACING TOP SOIL ON BORROW PITS				20	
GRAND TOTAL	33		429	416	
SAY	35			420	

CONTINGENCY ITEMS:
 INCIDENTAL STONE = 50 TONS
 UNDERCUT EXCAVATION = 50 CY
 SELECT GRANULAR MATERIAL = 50 CY
 CLASS IV SUBGRADE STABILIZATION = 50 TONS
 GEOTEXTILE FOR SOIL STABILIZATION = 50 SY

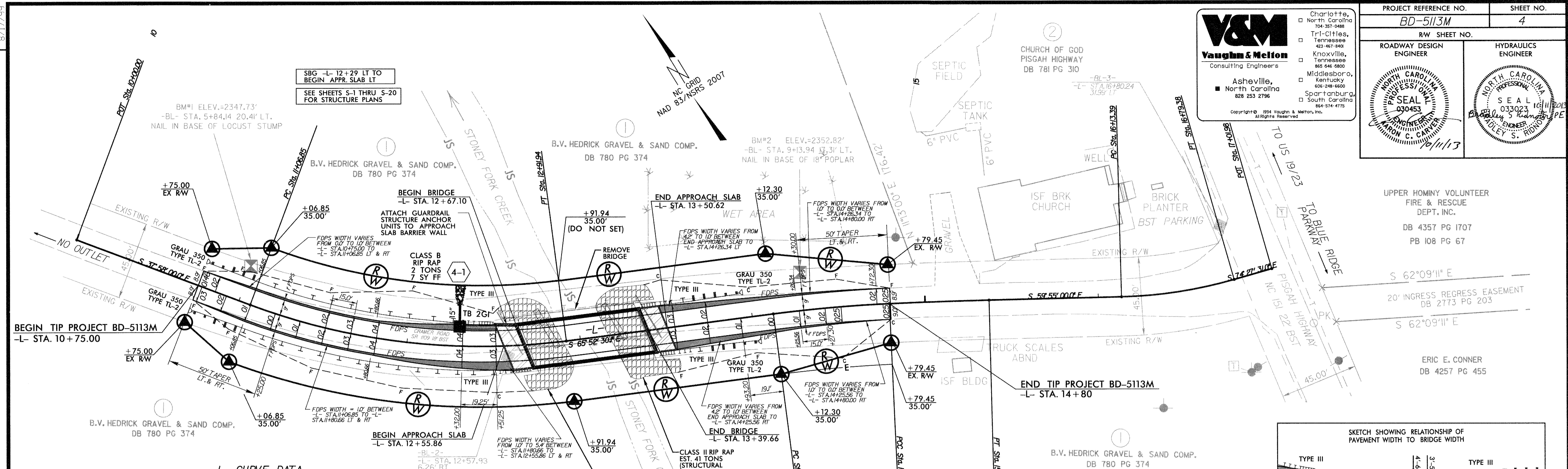
Approximate quantities only. Unclassified excavation, borrow excavation, fine grading, clearing and grubbing, and removal of existing pavement will be paid for at the contract lump sum price for "grading".



PROJECT REFERENCE NO. BD-5113M	SHEET NO. 4
RW SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	SEAL

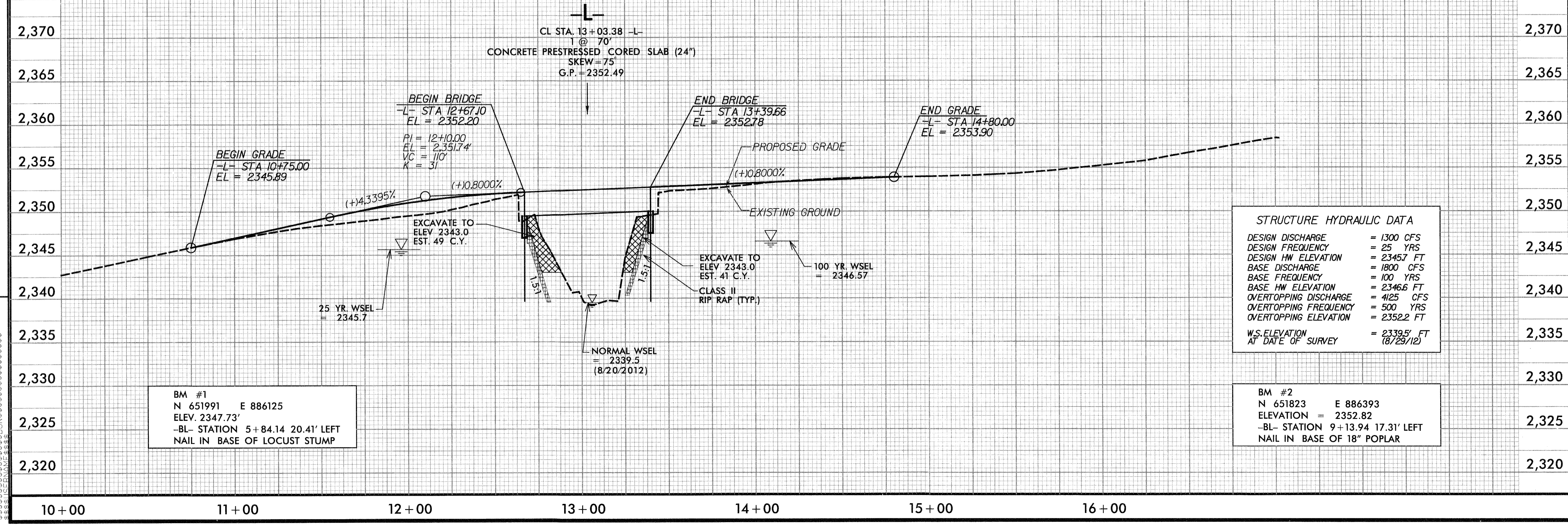
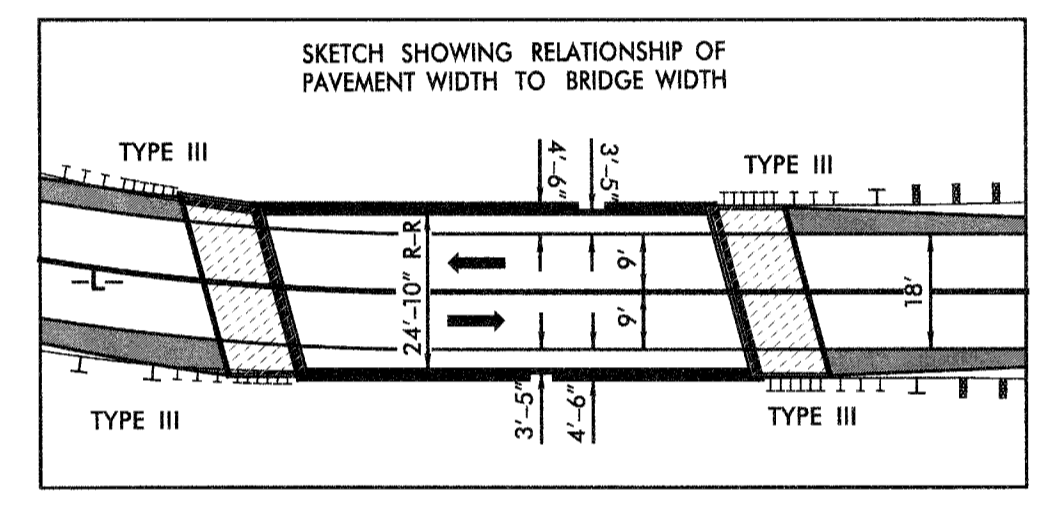
UPPER HOMINY VOLUNTEER
FIRE & RESCUE
DEPT. INC.
DB 4357 PG 1707
PB 108 PG 67

ERIC E. CONNER
DB 4257 PG 455



-L- CURVE DATA

PI Sta 12+01.27 Δ = 27° 54' 30.1" (LT) D = 15° 04' 40.2" L = 185.10' T = 94.42' R = 380.00' SE = 0.04 RO = 60	PI Sta 14+45.90 Δ = 4° 48' 33.4" (RT) D = 7° 09' 43.1" L = 67.15' T = 33.59' R = 800.00' SE = 0.02 RO = 38.2	PI Sta 15+08.18 Δ = 1° 08' 56.7" (RT) D = 2° 00' 00.0" L = 57.45' T = 28.73' R = 2,864.79'	PI Sta 16+46.56 Δ = 14° 32' 31.0" (LT) D = 22° 02' 12.6" L = 65.99' T = 33.17' R = 260.00'
------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------



STRUCTURE HYDRAULIC DATA

DESIGN DISCHARGE	= 1300 CFS
DESIGN FREQUENCY	= 25 YRS
DESIGN HW ELEVATION	= 2345.7 FT
BASE DISCHARGE	= 1800 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 2346.6 FT
OVERTOPPING DISCHARGE	= 4125 CFS
OVERTOPPING FREQUENCY	= 500 YRS
OVERTOPPING ELEVATION	= 2352.2 FT
W.S. ELEVATION AT DATE OF SURVEY	= 2339.5' FT (8/29/12)

BM #1
N 651991 E 886125
ELEV. 2347.73'
-BL- STATION 5+84.14 20.41' LEFT
NAIL IN BASE OF LOCUST STUMP

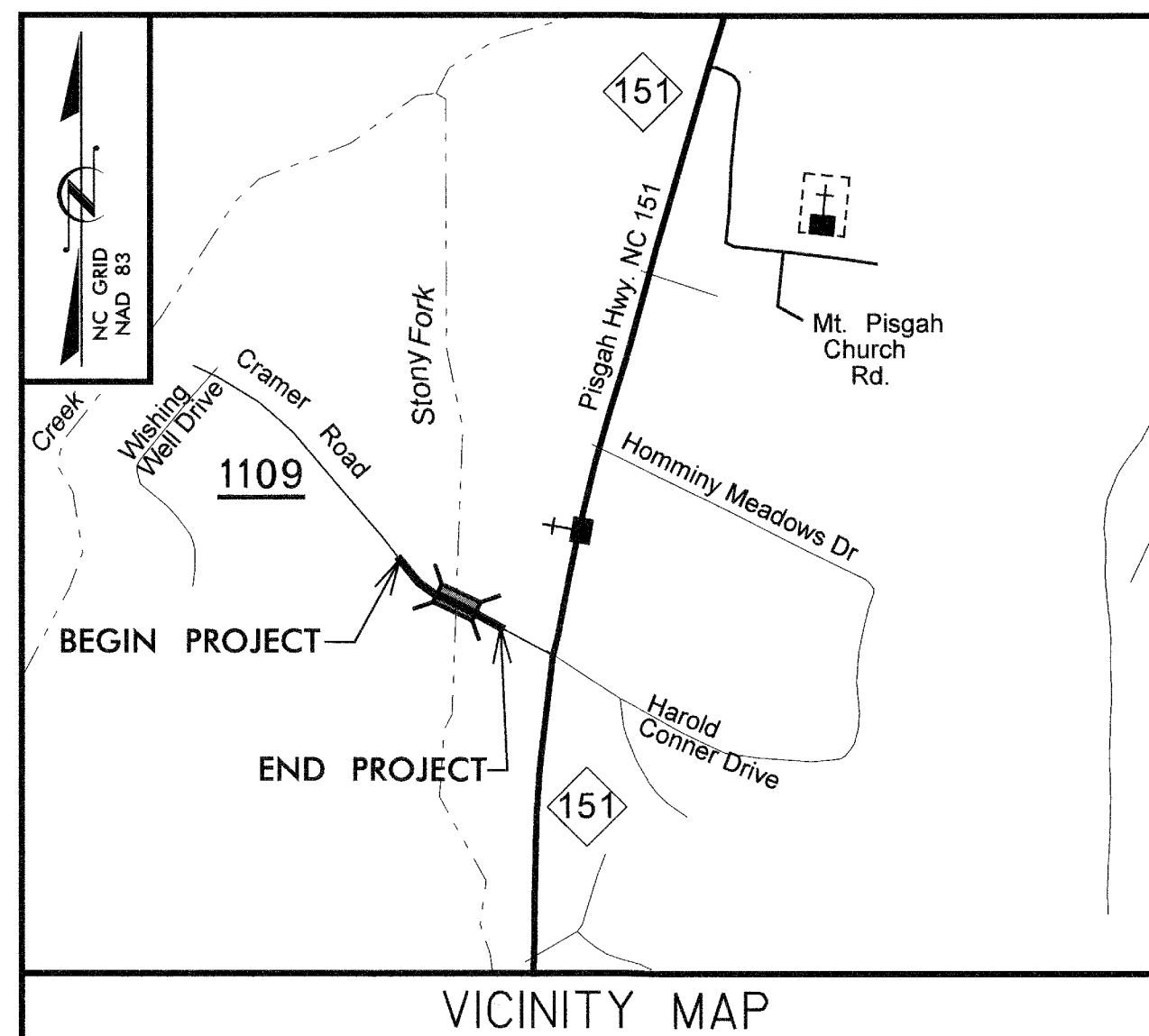
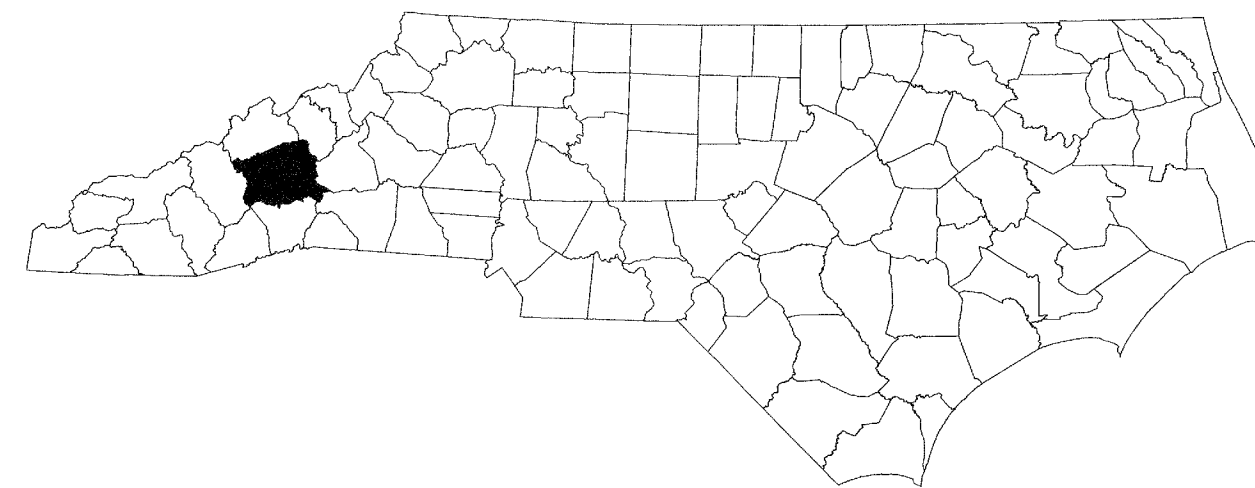
BM #2
N 651823 E 886393
ELEVATION = 2352.82
-BL- STATION 9+13.94 17.31' LEFT
NAIL IN BASE OF 18" POPLAR

8/17/99
 REVISIONS
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STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSPORTATION MANAGEMENT PLAN

**BUNCOMBE COUNTY
DIVISION 13**



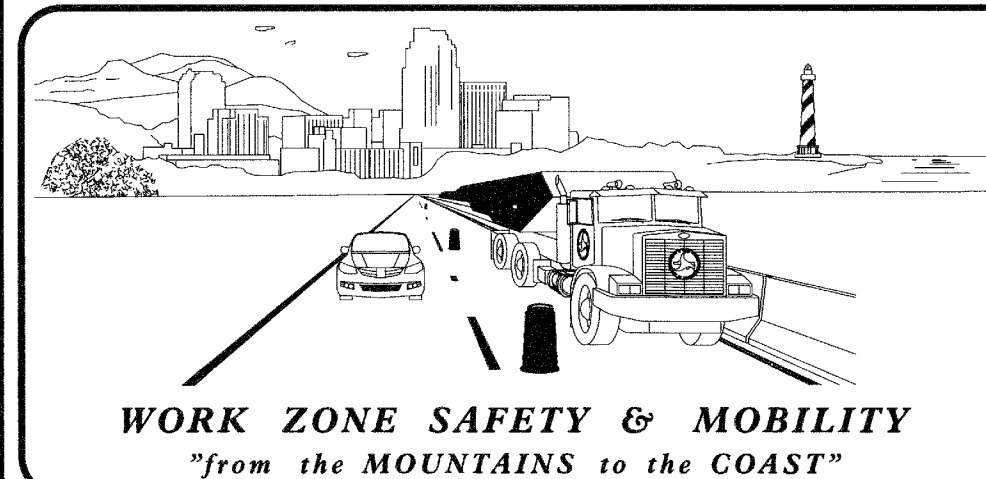
**LOCATION: BRIDGE NO. 651 OVER STONEY FORK CREEK
ON SR 1109 (CRAMER ROAD)**

INDEX OF SHEETS

<u>SHEET NO.</u>	<u>TITLE</u>
TMP-1	TITLE SHEET, AND INDEX OF SHEETS
TMP-1A	LIST OF APPLICABLE ROADWAY STANDARD DRAWINGS, LEGEND, AND TEMPORARY PAVEMENT MARKING
TMP-1B	TRANSPORTATION OPERATIONS PLAN: (MANAGEMENT STRATEGIES, GENERAL NOTES AND LOCAL NOTES)
TMP-2	TEMPORARY TRAFFIC CONTROL PHASING
TMP-3	TEMPORARY TRAFFIC CONTROL PHASE I DETAIL
TMP-4	TEMPORARY TRAFFIC CONTROL PHASE II DETAIL
SIG-1	TEMPORARY TRAFFIC SIGNAL PLAN

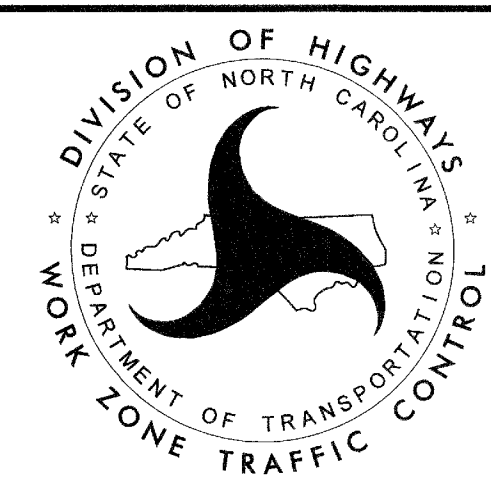
SHEET NO.
TMP-1

SYSTEMS
DESIGN
CONSTRUCTION
SERVICES



N.C.D.O.T. WORK ZONE TRAFFIC CONTROL
1580 MAIL SERVICE CENTER (MSC) RALEIGH, NC 27699-1580
1020 BIRCH RIDGE DRIVE, RALEIGH, NC 27610 (DELIVERY)
PHONE: (919) 250-4094 FAX: (919) 250-4098

J. S. BOURNE, P.E. STATE TRAFFIC MANAGEMENT ENGINEER
LLOYD D. BROWN, P.E. TRAFFIC CONTROL PROJECT ENGINEER
AARON C. CARVER, P.E. TRAFFIC CONTROL PROJECT DESIGN ENGINEER
AARON C. CARVER, P.E. TRAFFIC CONTROL DESIGN ENGINEER



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PROJECT ENGINEER LLOYD D. BROWN, P.E.
DESIGN ENGINEER AARON CARVER, P.E.

Asheville, North Carolina 828-253-2796
Charlotte, North Carolina 704-351-0488

APPROVED: *[Signature]*
DATE: 10/11/13

SEAL

TIP PROJECT: BD-5113M

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS SHOWN IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - 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
1101.01	WORK ZONE ADVANCE WARNING SIGNS
1101.02	TEMPORARY LANE CLOSURES
1101.05	WORK ZONE VEHICLE ACCESSES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1110.02	PORTABLE WORK ZONE SIGNS
1115.01	FLASHING ARROW PANELS
1130.01	DRUMS
1135.01	CONES
1145.01	BARRICADES
1150.01	FLAGGING DEVICES
1180.01	SKINNY-DRUM
1205.01	PAVEMENT MARKINGS - LINE TYPES & OFFSETS
1205.04	PAVEMENT MARKINGS - INTERSECTIONS
1205.08	PAVEMENT MARKINGS - SYMBOLS & WORD MESSAGES
1205.12	PAVEMENT MARKINGS - BRIDGES
1261.01	GUARDRAIL & BARRIER DELINEATOR SPACING
1261.02	GUARDRAIL & BARRIER DELINEATOR TYPES
1262.01	GUARDRAIL END DELINEATION

LEGEND

GENERAL

- DIRECTION OF TRAFFIC FLOW
- DIRECTION OF PEDESTRIAN TRAFFIC FLOW
- EXIST. PVMT.
- NORTH ARROW
- PROPOSED PVMT.
- WORK AREA
- TEMPORARY PAVEMENT

TEMPORARY PAVEMENT MARKING

SYMBOL	DESCRIPTION
PA	WHITE EDGE LINE (4")
PI	YELLOW DOUBLE CENTER (4")
T4	TAPE STOP BAR (24"WHITE)

TRAFFIC CONTROL DEVICES

- BARRICADE (TYPE III)
- CONE
- DRUM SKINNY DRUM TUBULAR MARKER
- TEMPORARY CRASH CUSHION
- FLASHING ARROW PANEL (TYPE C)
- FLAGGER
- LAW ENFORCEMENT
- TRUCK MOUNTED IMPACT ATTENUATOR (TMIA)
- CHANGEABLE MESSAGE SIGN

TEMPORARY SIGNING

- PORTABLE SIGN
- STATIONARY SIGN
- STATIONARY OR PORTABLE SIGN

SIGNALS

- EXISTING
- PROPOSED
- TEMPORARY
- PORTABLE TRAFFIC SIGNAL

PAVEMENT MARKINGS

- EXISTING LINES
- TEMPORARY LINES

PAVEMENT MARKING SYMBOLS

- PAVEMENT MARKING SYMBOLS

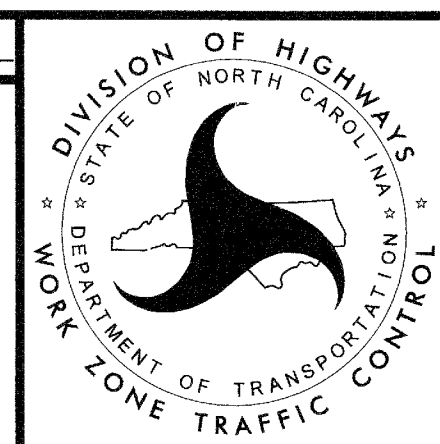
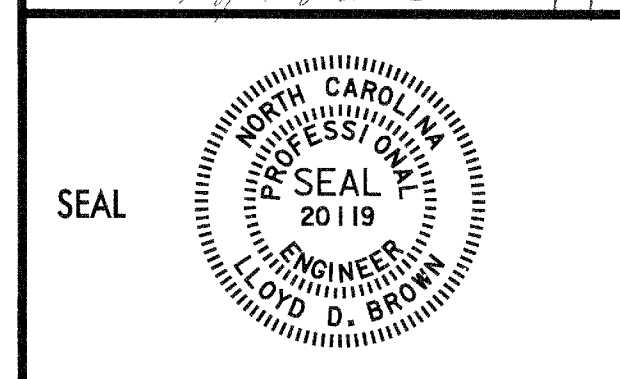
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ROADWAY STANDARD DRAWINGS & LEGEND

GENERAL NOTES / LOCAL NOTES

CHANGES MAY BE REQUIRED WHEN PHYSICAL DIMENSIONS IN THE DETAIL DRAWINGS, STANDARD DETAILS, AND ROADWAY DETAILS ARE NOT ATTAINABLE TO MEET FIELD CONDITIONS OR RESULT IN DUPLICATE OR UNDESIRED OVERLAPPING OF DEVICES. MODIFICATION MAY INCLUDE: MOVING, SUPPLEMENTING, COVERING, OR REMOVAL OF DEVICES AS DIRECTED BY THE ENGINEER.

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT EXCEPT WHEN OTHERWISE NOTED IN THE PLAN OR DIRECTED BY THE ENGINEER.

LANE AND SHOULDER CLOSURE REQUIREMENTS

- A) REMOVE LANE CLOSURE DEVICES FROM THE LANE WHEN WORK IS NOT BEING PERFORMED BEHIND THE LANE CLOSURE OR WHEN A LANE CLOSURE IS NO LONGER NEEDED OR AS DIRECTED BY THE ENGINEER.
- B) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN 15 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN SHOULDER USING ROADWAY STANDARD DRAWING NO. 1101.04 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL OR A LANE CLOSURE IS INSTALLED.
- C) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING ON THE SHOULDER ADJACENT TO AN UNDIVIDED FACILITY AND WITHIN 5 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN TRAVEL LANE USING ROADWAY STANDARD DRAWING NO. 1101.02 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL.

WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING ON THE SHOULDER ADJACENT TO A DIVIDED FACILITY AND WITHIN 10 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN TRAVEL LANE USING ROADWAY STANDARD DRAWING NO. 1101.02 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL.
- D) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN A LANE OF TRAVEL OF AN UNDIVIDED OR DIVIDED FACILITY, CLOSE THE LANE ACCORDING TO THE TRAFFIC CONTROL PLANS, ROADWAY STANDARD DRAWINGS, OR AS DIRECTED BY THE ENGINEER. CONDUCT THE WORK SO THAT ALL PERSONNEL AND/OR EQUIPMENT REMAIN WITHIN THE CLOSED TRAVEL LANE.
- E) DO NOT WORK SIMULTANEOUSLY WITHIN 15 FT ON BOTH SIDES OF AN OPEN TRAVELWAY, RAMP, OR LOOP WITHIN THE SAME LOCATION UNLESS PROTECTED WITH GUARDRAIL OR BARRIER.

PAVEMENT EDGE DROP OFF REQUIREMENTS

- F) BACKFILL AT A 6:1 SLOPE UP TO THE EDGE AND ELEVATION OF EXISTING PAVEMENT IN AREAS ADJACENT TO AN OPENED TRAVEL LANE THAT HAS AN EDGE OF PAVEMENT DROP-OFF AS FOLLOWS:

BACKFILL DROP-OFFS THAT EXCEED 2 INCHES ON ROADWAYS WITH POSTED SPEED LIMITS OF 45 MPH OR GREATER.

BACKFILL DROP-OFFS THAT EXCEED 3 INCHES ON ROADWAYS WITH POSTED SPEED LIMITS LESS THAN 45 MPH.

BACKFILL WITH SUITABLE COMPACTED MATERIAL, AS APPROVED BY THE ENGINEER, AT NO EXPENSE TO THE DEPARTMENT.

- G) DO NOT EXCEED A DIFFERENCE OF 2 INCHES IN ELEVATION BETWEEN OPEN LANES OF TRAFFIC FOR NOMINAL LIFTS OF 1.5 INCHES. INSTALL ADVANCE WARNING "UNEVEN LANES" SIGNS (W8-11) IN ADVANCE AND A MINIMUM OF EVERY HALF MILE THROUGHOUT THE UNEVEN AREA.

TRAFFIC PATTERN ALTERATIONS

- H) NOTIFY THE ENGINEER TWENTY ONE (21) CALENDAR DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION.

SIGNING

- I) INSTALL ADVANCE WORK ZONE WARNING SIGNS WHEN WORK IS WITHIN 40 FT FROM THE EDGE OF TRAVEL LANE AND NO MORE THAN THREE (3) DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.
- J) ENSURE ALL NECESSARY SIGNING IS IN PLACE PRIOR TO ALTERING ANY TRAFFIC PATTERN.
- K) INSTALL BLACK ON ORANGE "DIP" SIGNS (W8-2) AND/OR "BUMP" SIGNS (W8-1) 100 ft IN ADVANCE OF THE UNEVEN AREA, OR AS DIRECTED BY THE ENGINEER.

TRAFFIC CONTROL DEVICES

- L) WHEN LANE CLOSURES ARE NOT IN EFFECT SPACE CHANNELIZING DEVICES IN WORK AREAS NO GREATER IN FEET THAN TWICE THE POSTED SPEED LIMIT (MPH) EXCEPT, 10 FT ON-CENTER IN RADII, AND 3 FT OFF THE EDGE OF AN OPEN TRAVELWAY. REFER TO STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES SECTIONS 1130 (DRUMS), 1135 (CONES) AND 1180 (SKINNY DRUMS) FOR ADDITIONAL REQUIREMENTS.
- M) PLACE ADDITIONAL SETS OF THREE CHANNELIZATION DEVICES PERPENDICULAR TO THE EDGE OF TRAVELWAY ON 500 FT CENTERS WHEN OPENED LANES ARE CLOSED TO TRAFFIC.

PAVEMENT MARKING

- N) INSTALL TEMPORARY PAVEMENT MARKINGS ON INTERIM LAYERS OF PAVEMENT AS FOLLOWS:

ROAD NAME	MARKING	MARKER
-L- SR 1109 (CRAMER ROAD)	PAINT	NONE

- O) PLACE ONE APPLICATION OF PAINT FOR TEMPORARY TRAFFIC PATTERNS. PLACE A SECOND APPLICATION OF PAINT SIX (6) MONTHS AFTER THE INITIAL APPLICATION AND EVERY SIX MONTHS AS DIRECTED BY THE ENGINEER.
- P) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.
- Q) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS BY THE END OF EACH DAY'S OPERATION.

MISCELLANEOUS

- R) IN THE EVENT A TIE-IN CANNOT BE MADE IN ONE DAY'S TIME, BRING THE TIE-IN AREA TO AN APPROPRIATE ROADWAY ELEVATION AS DETERMINED BY THE ENGINEER. PLACE BLACK ON ORANGE "LOOSE GRAVEL" SIGNS (W8-7) AND BLACK ON ORANGE "PAVEMENT ENDS" SIGNS (W8-3) 100 ft AND 200 ft RESPECTIVELY IN ADVANCE OF THE UNEVEN AREAS. USE DRUMS TO DELINEATE THE EDGE OF ROADWAY ALONG UNPAVED AREAS.

MANAGEMENT STRATEGIES

TRAFFIC WILL BE MAINTAINED ON THE EXISTING ROAD, BUT REDUCED TO ONE LANE USING TEMPORARY SIGNALS AND PAVEMENT MARKINGS AS NEW ALIGNMENT IS CONSTRUCTED. PHASE 2 SHOWS TRAFFIC SHIFTED TO ONE LANE ON THE NEW ALIGNMENT USING TEMPORARY SIGNALS AND PAVEMENT MARKINGS WHILE THE REMAINDER IS CONSTRUCTED. A FLAGGING OPERATION WILL BE USED TO CONSTRUCT THE NEW TIE-INS.

LOCAL NOTES:

- 1) EMERGENCY VEHICLE ACCESS MUST BE MAINTAINED AT ALL TIMES.
- 2) NOTIFY THE BUNCOMBE COUNTY SCHOOL BOARD 30 DAYS BEFORE ANY LANE CLOSURES.

Charlotte, North Carolina 704-393-0488
Tri-Cities, Tennessee 423-467-8408
Knoxville, Tennessee 865-546-5800
Middlesboro, Kentucky 606-248-6600
Spartanburg, South Carolina 864-514-4775

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APPROVED: DATE: 10/11/13

SEAL

TRANSPORTATION OPERATIONS PLAN
(MANAGEMENT STRATEGIES & GENERAL NOTES)

\$\$\$\$\$ SYSTEMS TIME\$\$\$\$\$
\$\$\$\$\$ 10/11/13 10:58 AM\$\$\$\$\$
\$\$\$\$\$ BUNCOMBE COUNTY\$\$\$\$\$
\$\$\$\$\$ PROJECT: BD-5113M\$\$\$\$\$
\$\$\$\$\$ SHEET: TMP-1B\$\$\$\$\$
\$\$\$\$\$ USER: MAMMIS\$\$\$\$\$

PROJECT PHASING

PHASE I

- STEP 1: - ERECT WORK ZONE ADVANCED WARNING SIGNS USING DETAIL DRAWINGS FOR WORK ZONE SIGNS. (SEE RDWY STD. 1101.01)
- INSTALL PORTABLE TRAFFIC SIGNALS AS REQUIRED IN THE SIGNAL PLANS (SEE SHEET SIG-1).

NOTE: STEP 2 SHALL BE COMPLETED IN A CONTINUOUS OPERATION.

- STEP 2: USING RDWY STD 1101.02 SHEET 1 OF 15 AND FLAGGERS, PERFORM THE FOLLOWING ON SR 1338:
- REMOVE AS NECESSARY EXISTING PAVEMENT MARKINGS, AND PLACE TEMPORARY PAVEMENT MARKINGS (PAINT), FROM -L- STA. 9+95 +/- TO -L- STA. 15+57 +/- . (SEE TMP-3)
 - REMOVE EXISTING BRIDGE RAIL (RIGHT SIDE), SAW CUT AND REMOVE RIGHT SIDE OF EXISTING BRIDGE TO LIMIT SHOWN (SEE SECTION B-B, TMP-3) AND INSTALL TEMPORARY GUARDRAIL FROM -L- STA. 12+48 +/- TO -L- STA. 13+60 +/- . (SEE TMP-3)
 - ACTIVATE PORTABLE TRAFFIC SIGNALS AND DIRECT SR 1109 (CRAMER ROAD) TRAFFIC INTO A ONE LANE, TWO WAY PATTERN IN THE EXISTING WESTBOUND LANE OF SR 1109 (CRAMER ROAD). (SEE TMP-3)

STEP 3: - INSTALL TEMPORARY SHORING AS FOLLOWS:

- INSTALL TEMPORARY SHORING NO. 1 BEHIND TEMPORARY GUARDRAIL FROM -L- STA. 12+56 +/- TO -L- STA. 12+83 +/- . (SEE TMP-3)
- INSTALL TEMPORARY SHORING NO. 2 BEHIND TEMPORARY GUARDRAIL FROM -L- STA. 13+25 +/- TO -L- STA. 13+50 +/- . (SEE TMP-3)

STEP 4: - CONSTRUCT -L- (SR 1109 CRAMER ROAD) FROM STA 10+75 TO STA 14+80 EASTBOUND LANE (RIGHT SIDE) EXCLUDING FINAL PAVEMENT LAYER.

- CONSTRUCT STRUCTURES PER THE STRUCTURE PLANS STAGE 1.

PHASE II

NOTE: STEP 1 SHALL BE COMPLETED IN A CONTINUOUS OPERATION.

STEP 1: USING RDWY STD 1101.02 SHEET 1 OF 15 AND FLAGGERS, PERFORM THE FOLLOWING ON SR 1338:

- REMOVE, AS NECESSARY, PAVEMENT MARKINGS PLACED IN STEP 2, PHASE I AND PLACE TEMPORARY PAVEMENT MARKINGS (PAINT) FROM -L- STA. 10+25 +/- TO -L- STA. 15+30 +/- . (SEE TMP-4)
- INSTALL TEMPORARY GUARDRAIL FROM -L- STA. 12+47 +/- TO -L- STA. 13+58 +/- (SEE SECTION DETAILS AND PLAN, TMP-4) AND REMOVE GUARDRAIL PLACED IN STEP 2, PHASE I.
- ACTIVATE PORTABLE TRAFFIC SIGNALS AND DIRECT SR 1109 (CRAMER ROAD) TRAFFIC INTO A ONE LANE, TWO-WAY PATTERN IN THE EASTBOUND LANE OF SR 1109 (CRAMER ROAD). (SEE TMP-4)

STEP 2: - REMOVE WESTBOUND SIDE OF EXISTING STRUCTURE (SEE STRUCTURE PLANS).

- REMOVE TEMPORARY SHORING PLACED IN STEP 3, PHASE I.

STEP 3: - CONSTRUCT -L- (SR 1109 CRAMER ROAD) FROM STA 10+75 TO STA 14+80 WESTBOUND LANE EXCLUDING FINAL PAVEMENT LAYER.

- CONSTRUCT STRUCTURES PER THE STRUCTURE PLANS STAGE 2.

STEP 4: - USING RDWY STD 1101.02 SHEET 1 OF 15 AND FLAGGERS, CONSTRUCT GUARDRAIL, REMOVE TEMPORARY GUARDRAIL PLACED IN STEP 1, PHASE II, PLACE THE FINAL LAYER OF SURFACE COURSE, AND THE FINAL PAVEMENT MARKINGS (PAINT) ON THE ENTIRE PROJECT.

STEP 5: - REMOVE ALL TEMPORARY TRAFFIC CONTROL DEVICES AND SIGNALS.

- OPEN SR 1109 (CRAMER ROAD) TO 2-LANE, 2-WAY TRAFFIC.

SYSTEMS
 DON
 CRYSTAL
 SYSTEMS

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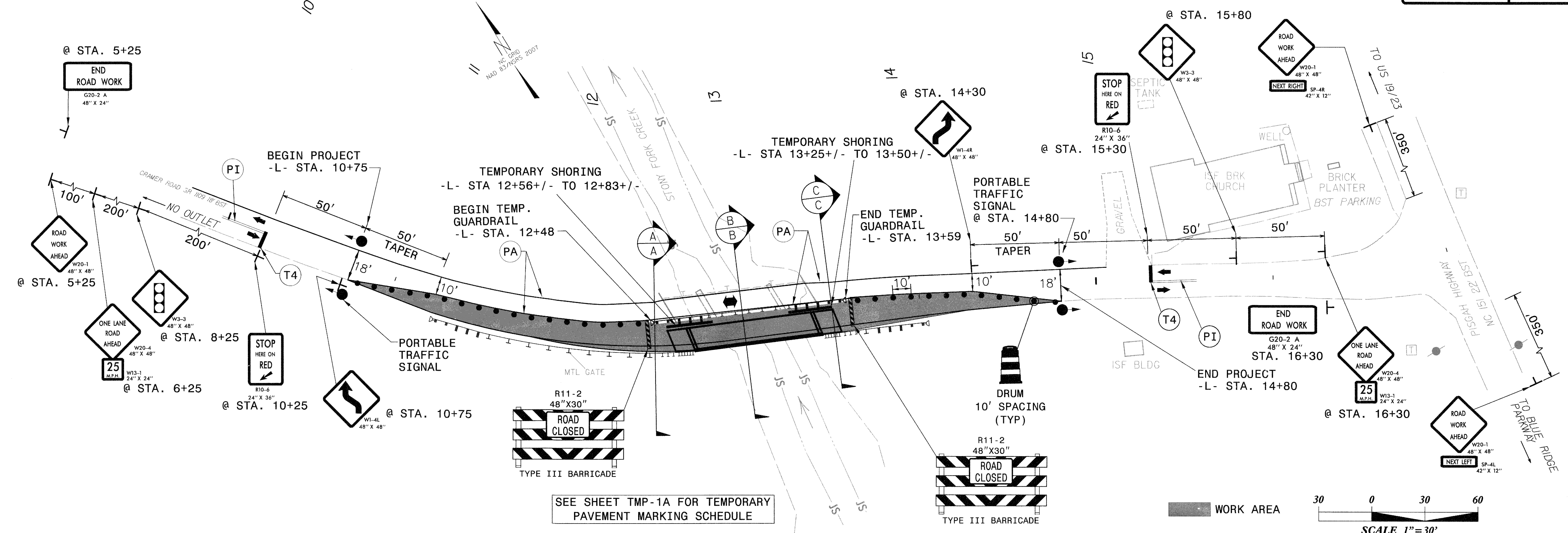
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SEAL

NORTH CAROLINA
 PROFESSIONAL
 ENGINEER
 20119
 LLOYD D. BROWN

DIVISION OF HIGHWAYS
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 WORK ZONE TRAFFIC CONTROL

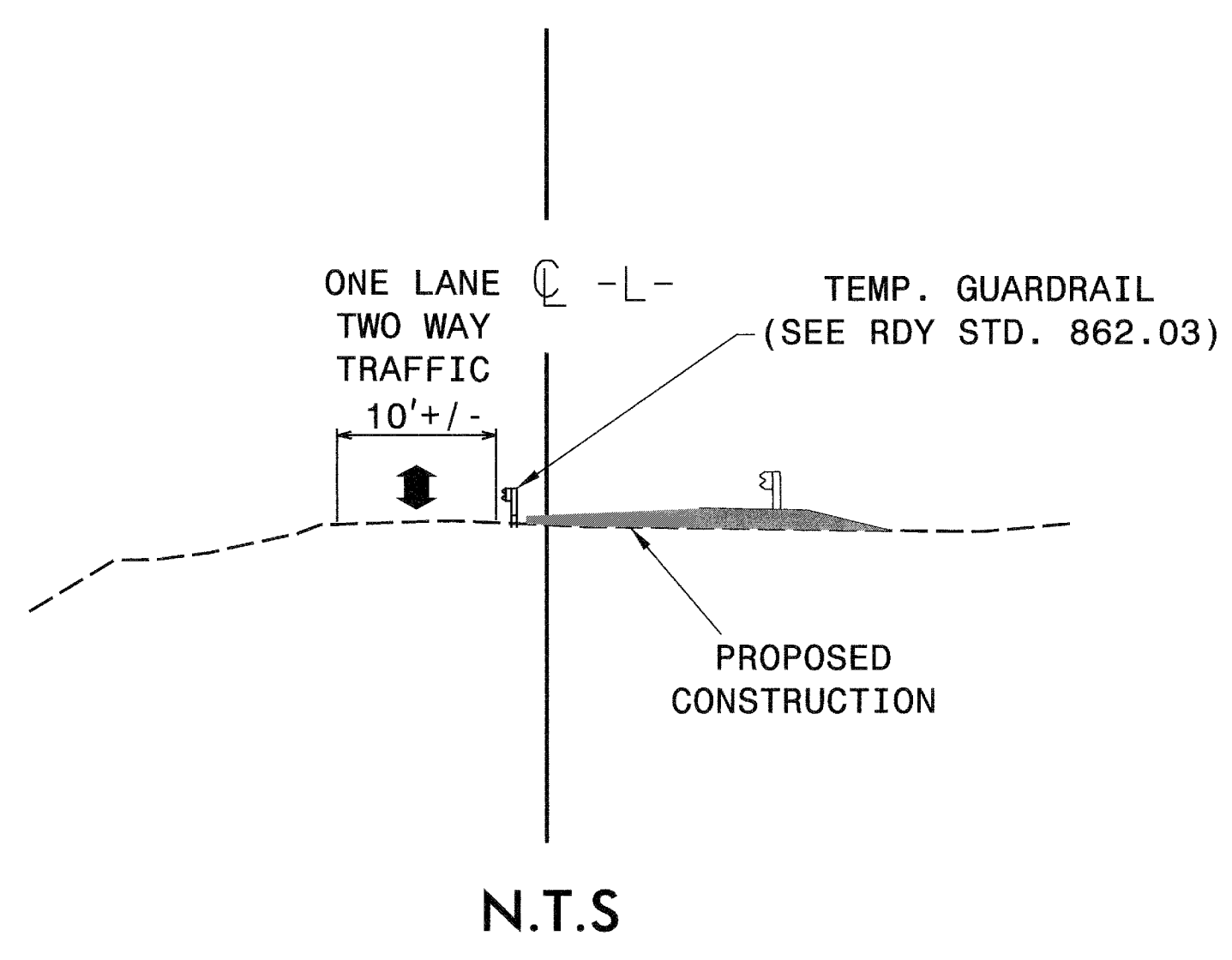
PHASING



SEE SHEET TMP-1A FOR TEMPORARY PAVEMENT MARKING SCHEDULE

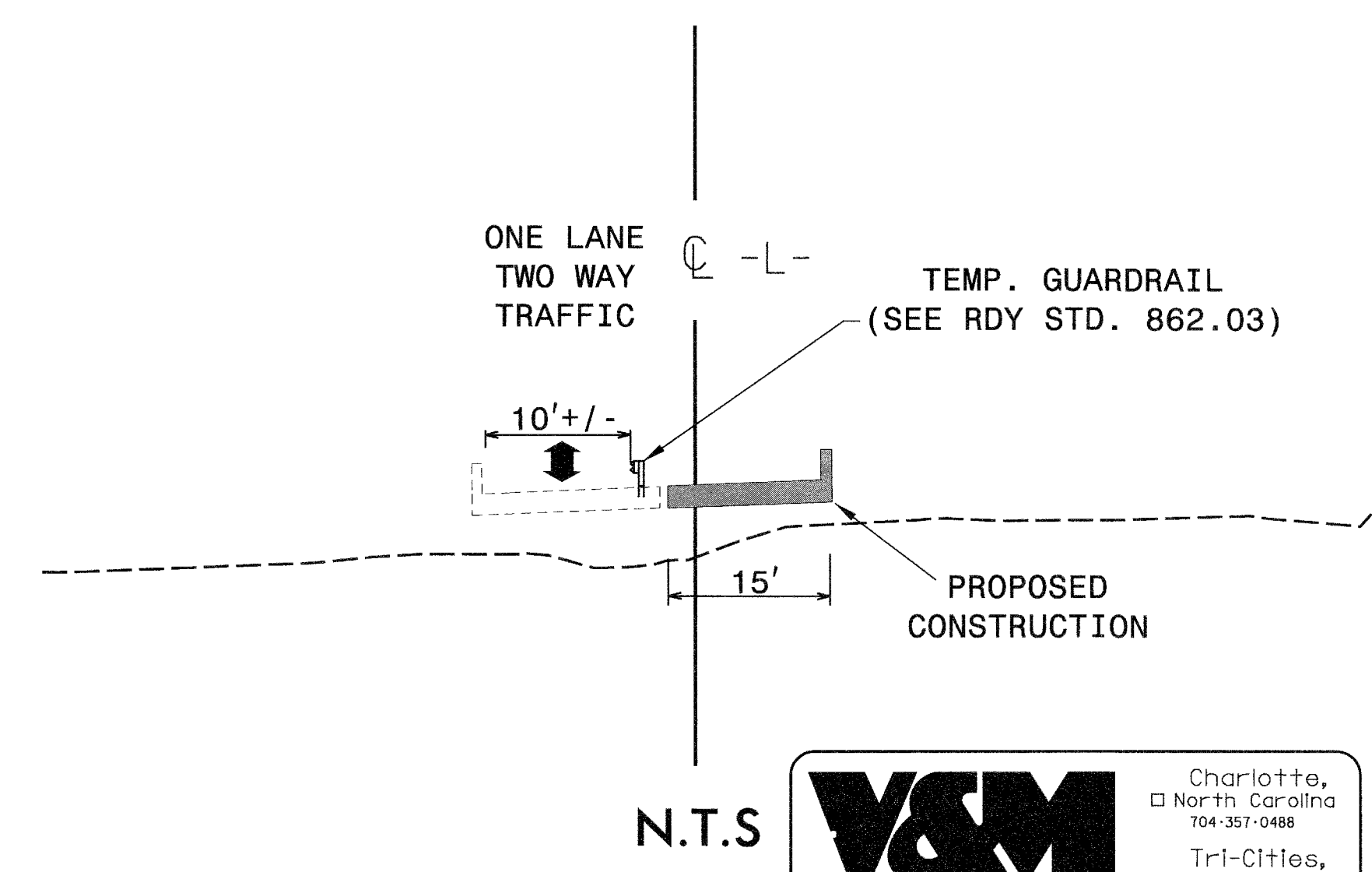
SECTION A-A

-L- STA 12+50



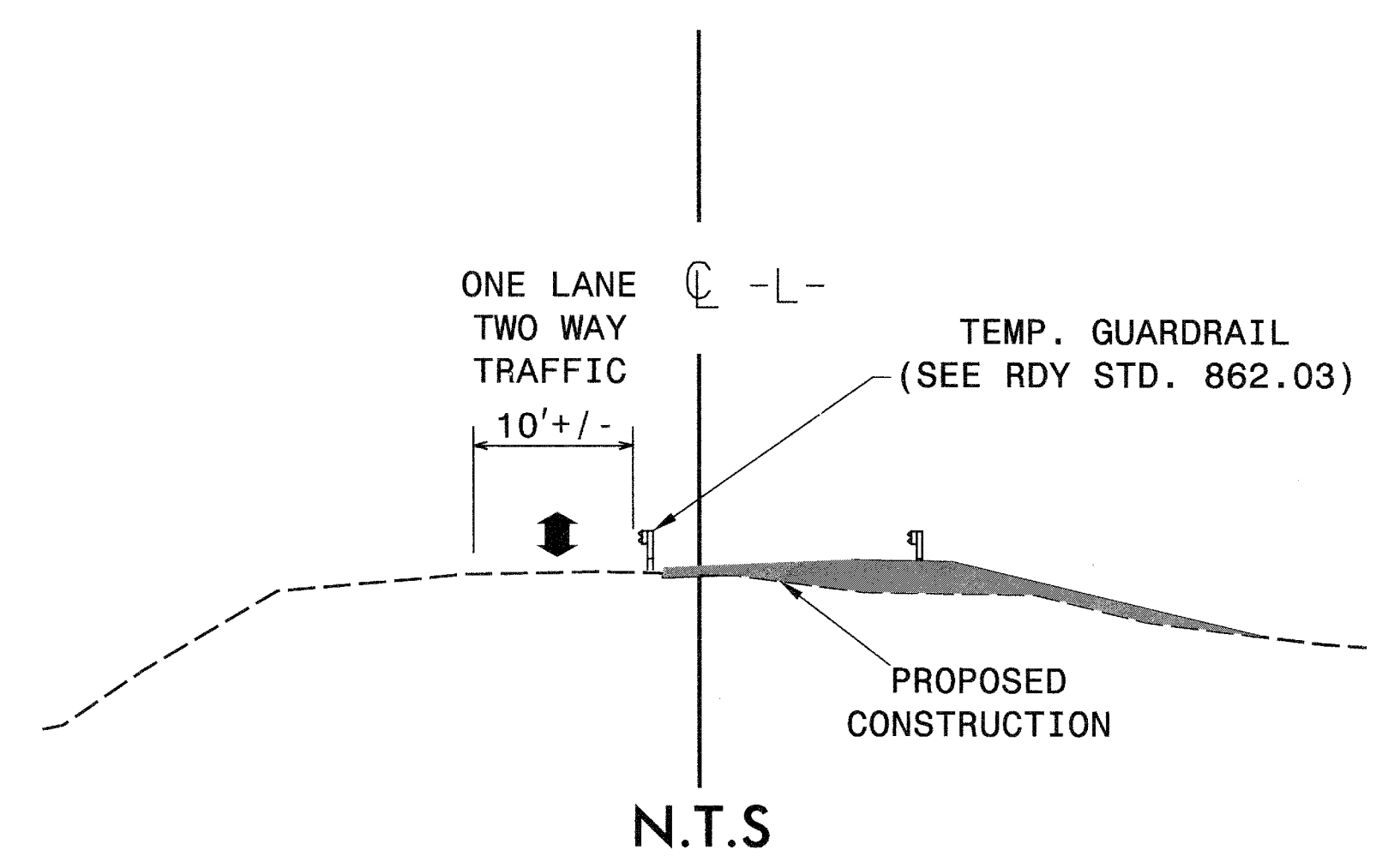
SECTION B-B

-L- STA 13+00



SECTION C-C

-L- STA 13+50



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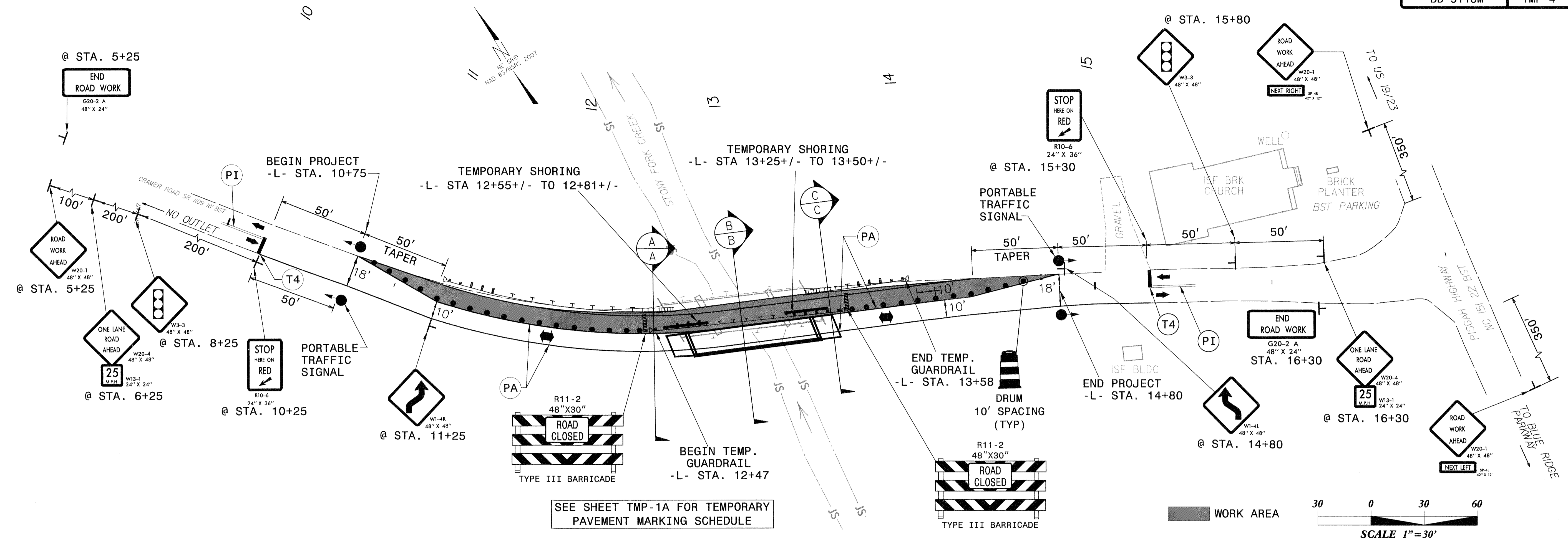
SEAL

Professional Engineer
 License No. 10119
 LLOYD D. BROWN

DIVISION OF HIGHWAYS
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 WORK ZONE TRAFFIC CONTROL

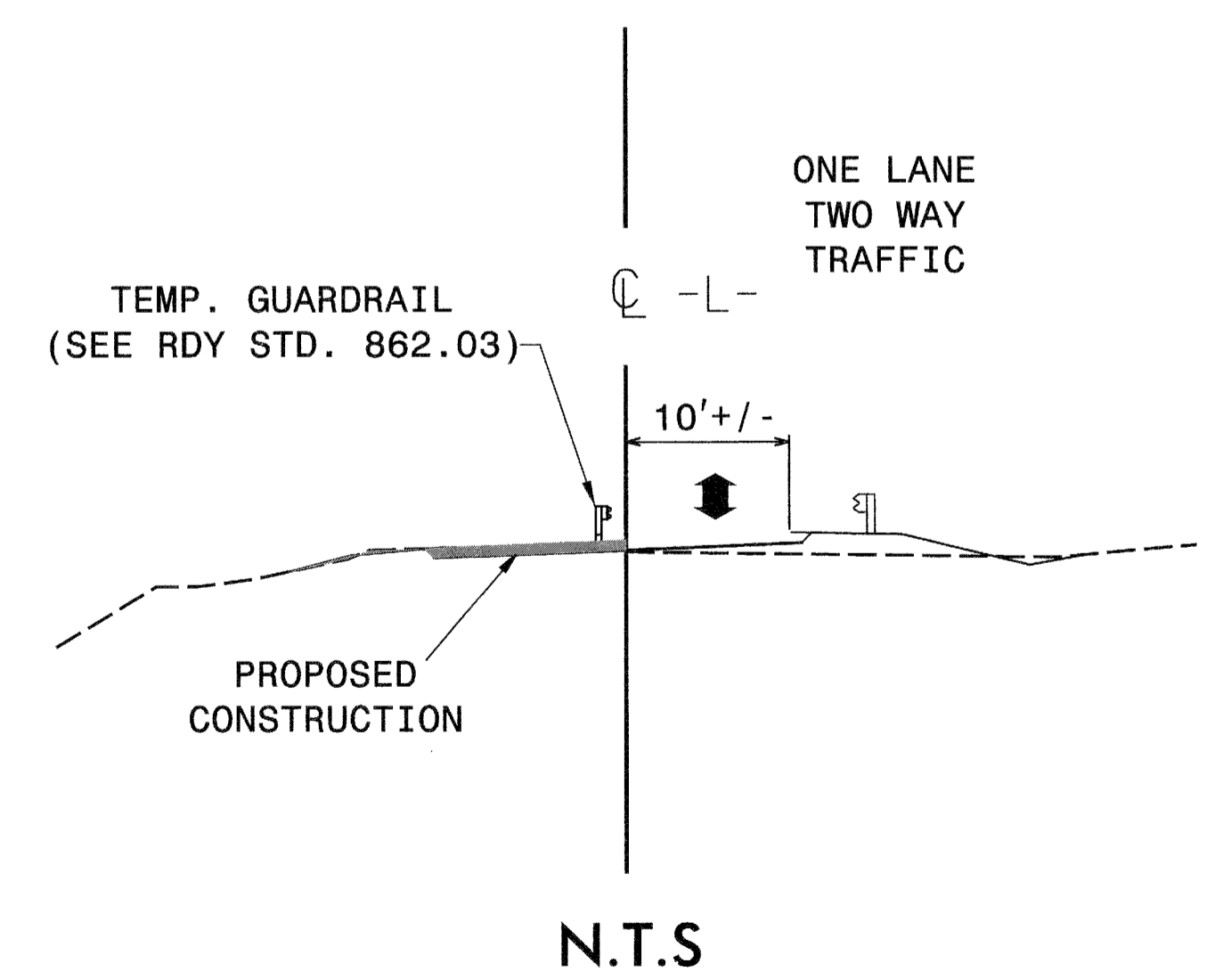
PHASE 1

SYSTEMS
 CONSTRUCTION
 SYSTEMS
 SYSTEMS



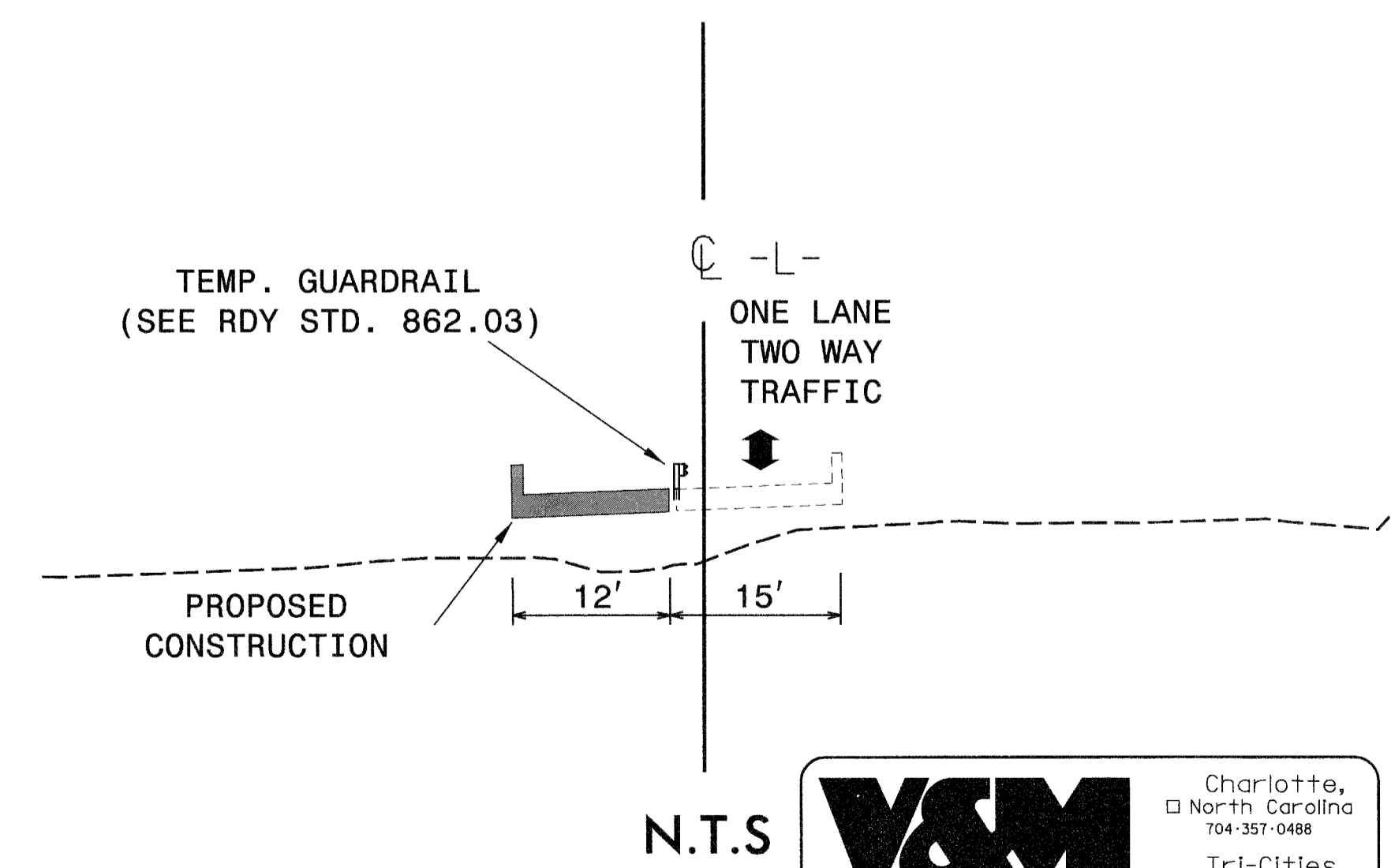
SECTION A-A

-L- STA 12+50



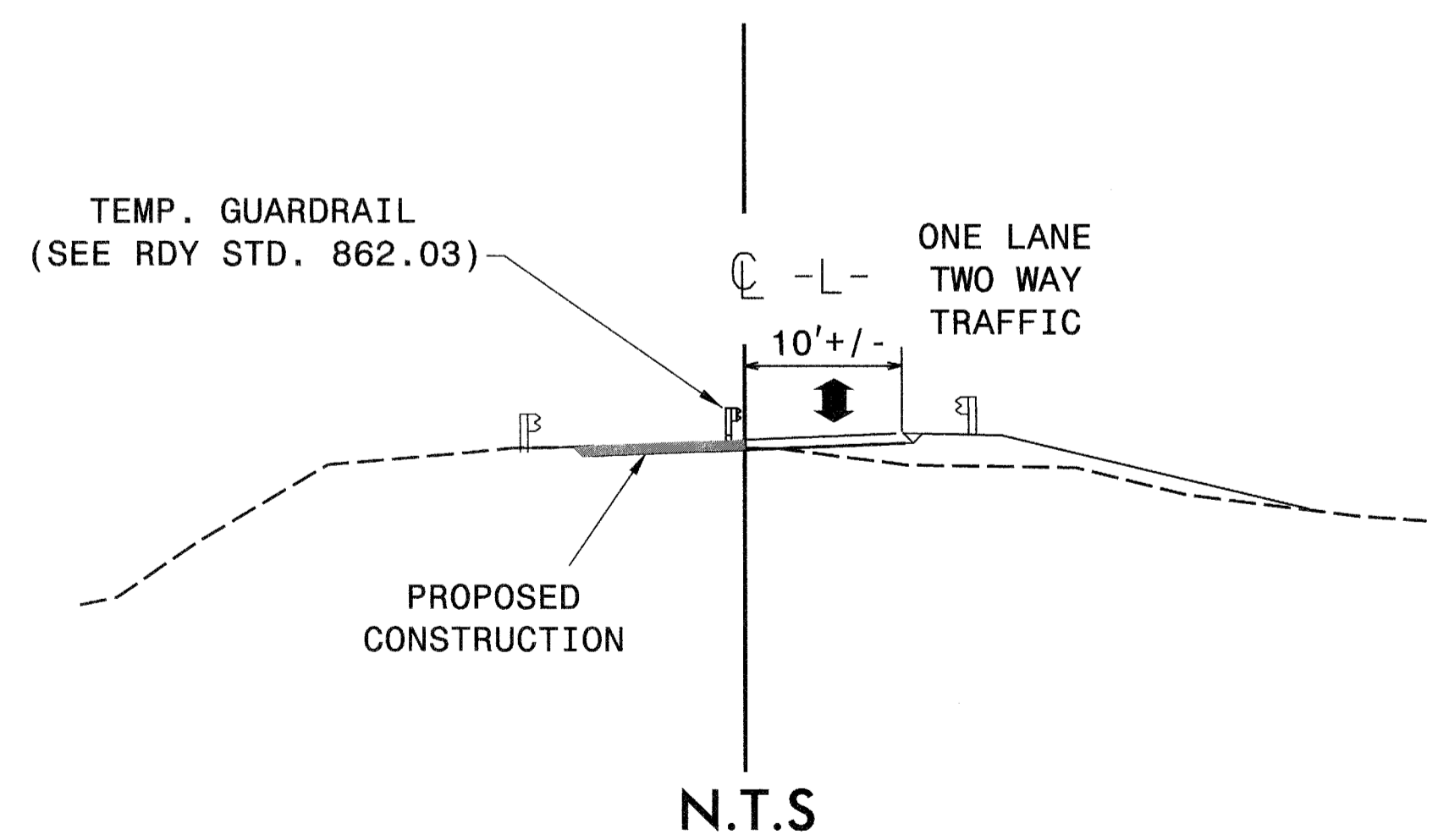
SECTION B-B

-L- STA 13+00



SECTION C-C

-L- STA 13+50



V&M
Vaughn & Melton
 Consulting Engineers

Charlotte, North Carolina 704-357-0488
 Tri-Cities, Tennessee 423-467-8401
 Knoxville, Tennessee 865-546-5800
 Middlesboro, Kentucky 606-248-6600
 Spartanburg, South Carolina 864-574-4775

Asheville, North Carolina 828-253-2796

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APPROVED: *[Signature]* DATE: 10/11/13

SEAL

PROFESSIONAL ENGINEER
 LLOYD D. BROWN
 20119

DIVISION OF HIGHWAYS
 DEPARTMENT OF TRANSPORTATION
 WORK ZONE TRAFFIC CONTROL

PHASE II

\$\$\$\$\$SYTIME\$\$\$\$\$
 \$\$\$SERVNAME\$\$\$

ROADSIDE ENVIRONMENTAL UNIT
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.
2012 STANDARD SPECIFICATIONS

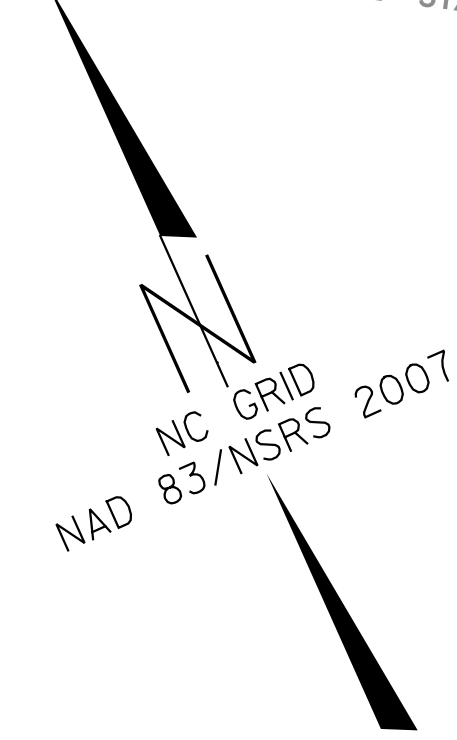
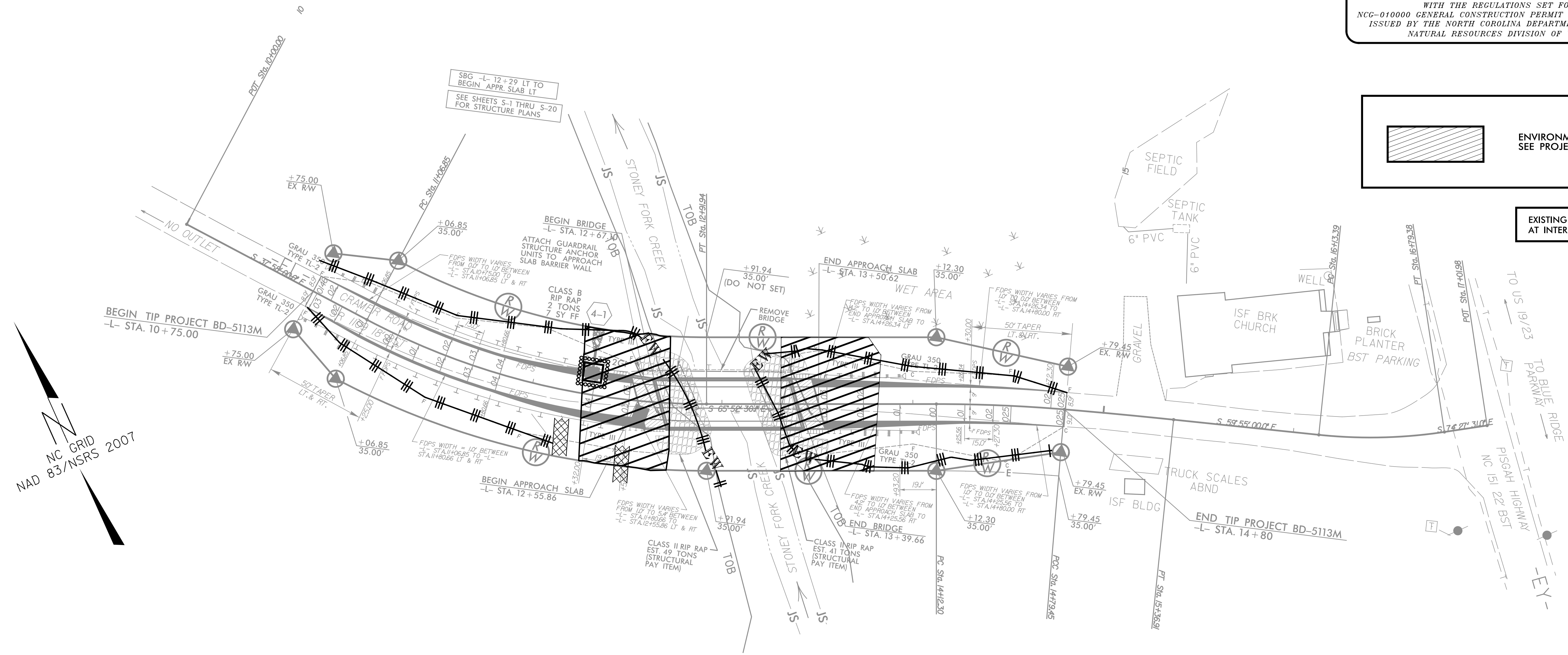
EROSION CONTROL PLAN

PROJECT REFERENCE NO. BD-5113M	SHEET NO. EC-1
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE REGULATIONS SET FORTH BY THE NCC-010000 GENERAL CONSTRUCTION PERMIT EFFECTIVE AUGUST 3, 2011 ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES DIVISION OF WATER QUALITY.

 ENVIRONMENTALLY SENSITIVE AREA
SEE PROJECT SPECIAL PROVISIONS

 EXISTING CONCRETE FOOTINGS AT INTERIOR BENTS TO REMAIN



Std. #	Description	Symbol
1605.01	Temporary Silt Fence	
1632.03	Rock Inlet Sediment Trap Type C	
1633.01	Temporary Rock Silt Check Type-A	
1633.02	Wattle / Coir Fiber Wattle	

Level III-A: Designer of Erosion and Sediment Control Plans
Garry L. Moore, P.L.S.
Date Issued: November 30, 2010
Date Expires: December 31, 2013
Certification Number: 235

NOTES: ANY DEVIATION FROM OPTIONS GIVEN WILL REQUIRE PRIOR APPROVAL BY ENGINEER.

ADDITIONAL EROSION CONTROL DEVICES MAY NEED TO BE INSTALLED AS DIRECTED BY THE ENGINEER.

PROJECT NO. BD-5113M
COUNTY BUNCOMBE
STATION: 13+03.505 -L-
REPLACES BRIDGE NO. 651

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE #651 ON SR 1109
OVER STONEY FORK CREEK

REVISIONS						SHEET NO. EC-1
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS 5
2			4			

PROJECT REFERENCE NO.	SHEET NO.
BD-5114M	EC-2
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

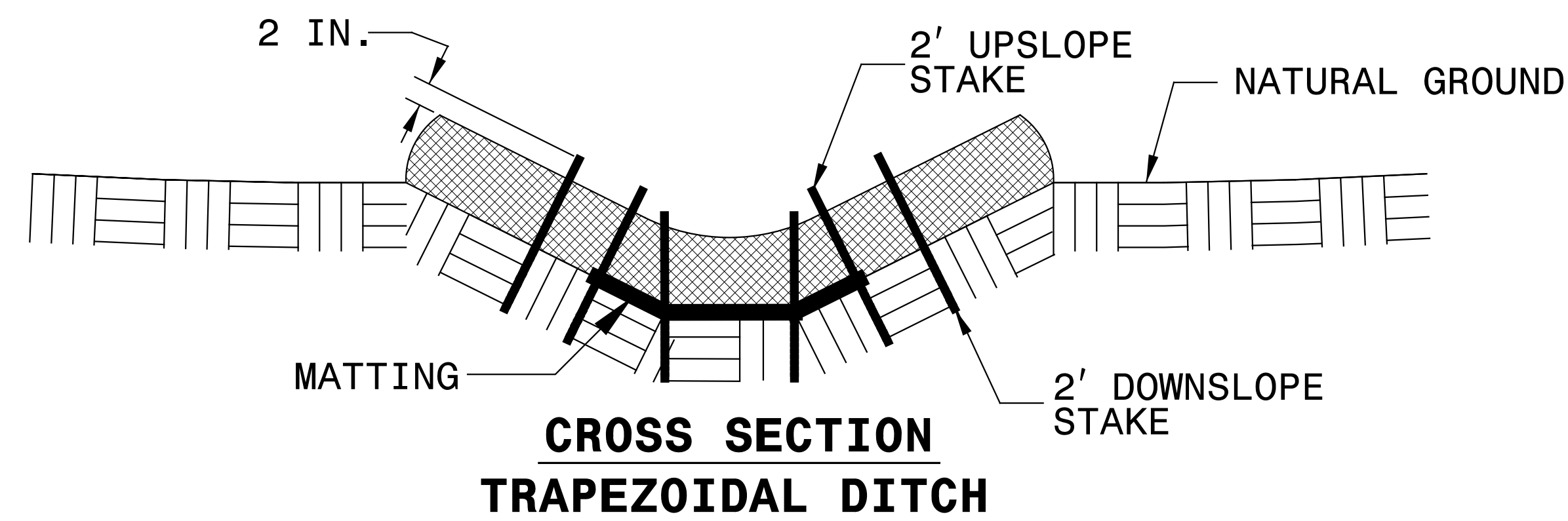
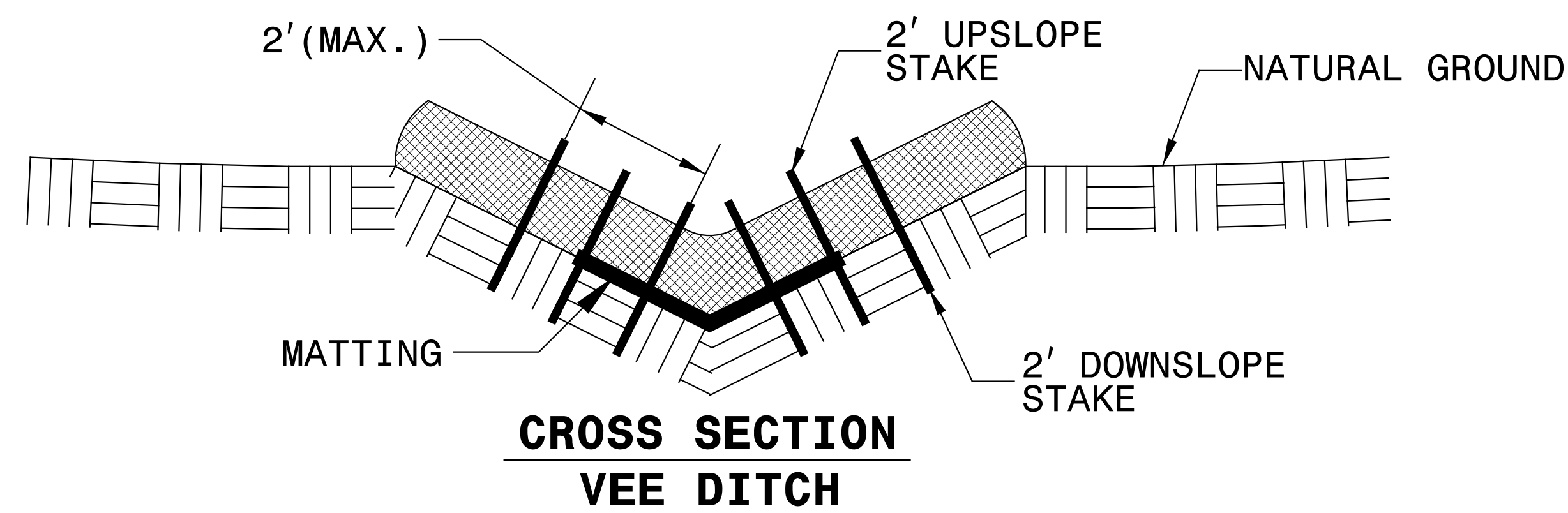
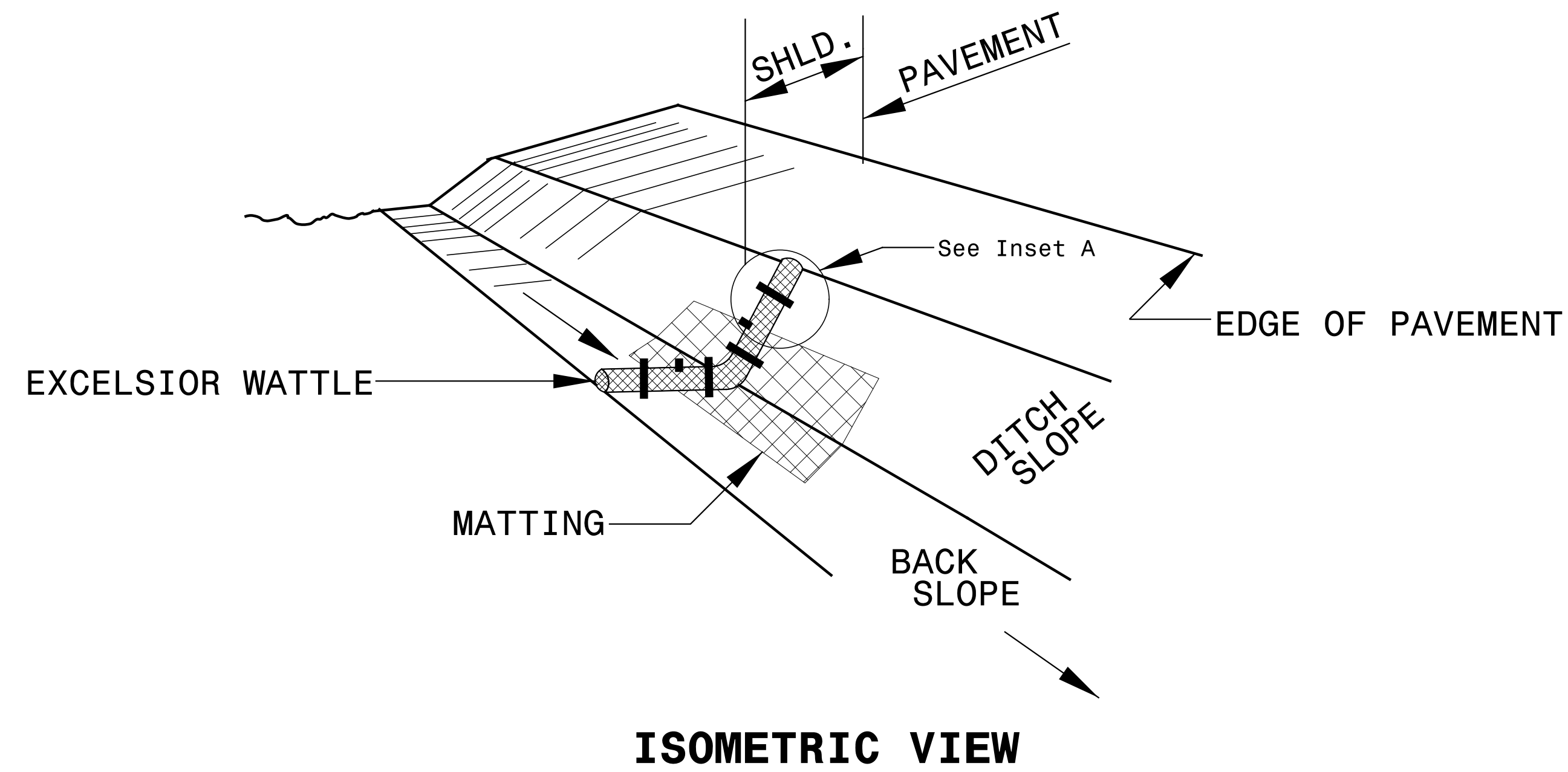
STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS

SOIL STABILIZATION TIMEFRAMES

<i>SITE DESCRIPTION</i>	<i>STABILIZATION TIME</i>	<i>TIMEFRAME EXCEPTIONS</i>
PERIMETER DIKES, SWALES, DITCHES, AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED.
SLOPES 3:1 OR FLATTER	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH.
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	NONE, EXCEPT FOR PERIMETERS AND HQW ZONES.

PROJECT REFERENCE NO. <i>BD-5113M</i>	SHEET NO. <i>EC-3</i>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

WATTLE DETAIL



NOTES:

USE MINIMUM 12 IN. DIAMETER EXCELSIOR WATTLE.

USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. CROSS SECTION.

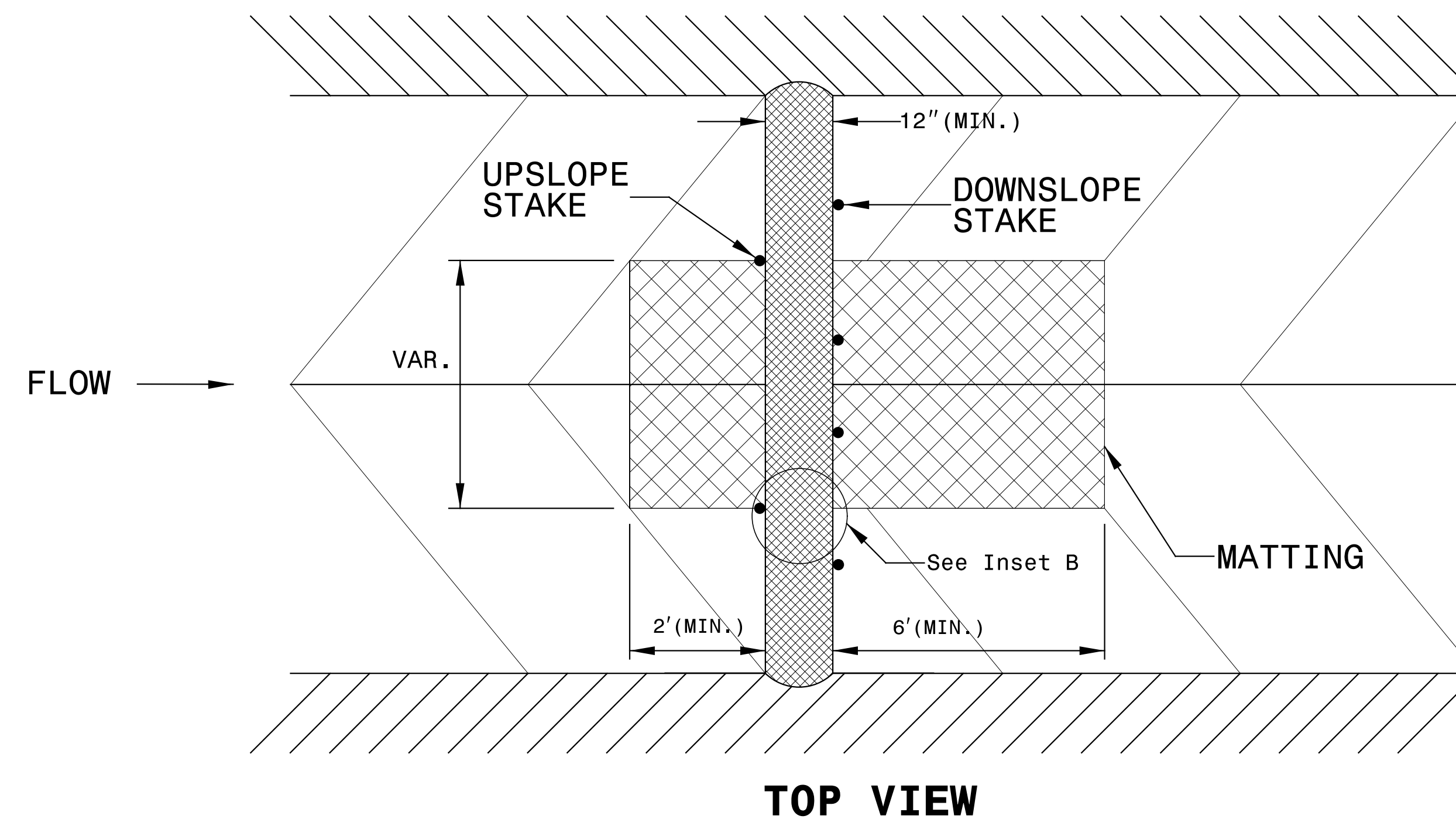
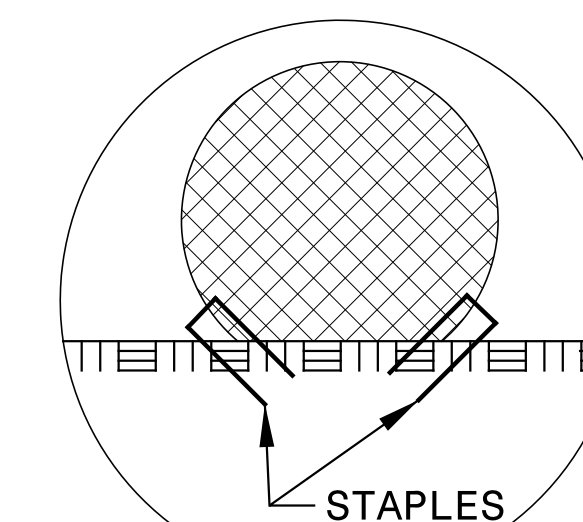
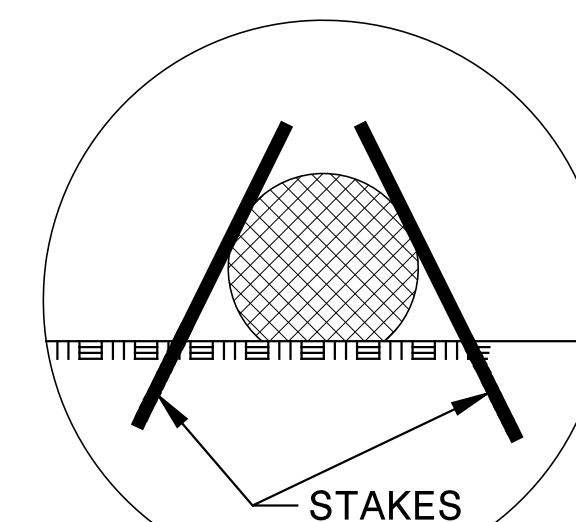
ONLY INSTALL WATTLE(S) TO A HEIGHT IN DITCH SO FLOW WILL NOT WASH AROUND WATTLE AND SCOUR DITCH SLOPES AND AS DIRECTED.

INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO BOTTOM OF DITCH.

PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12" IN LENGTH.

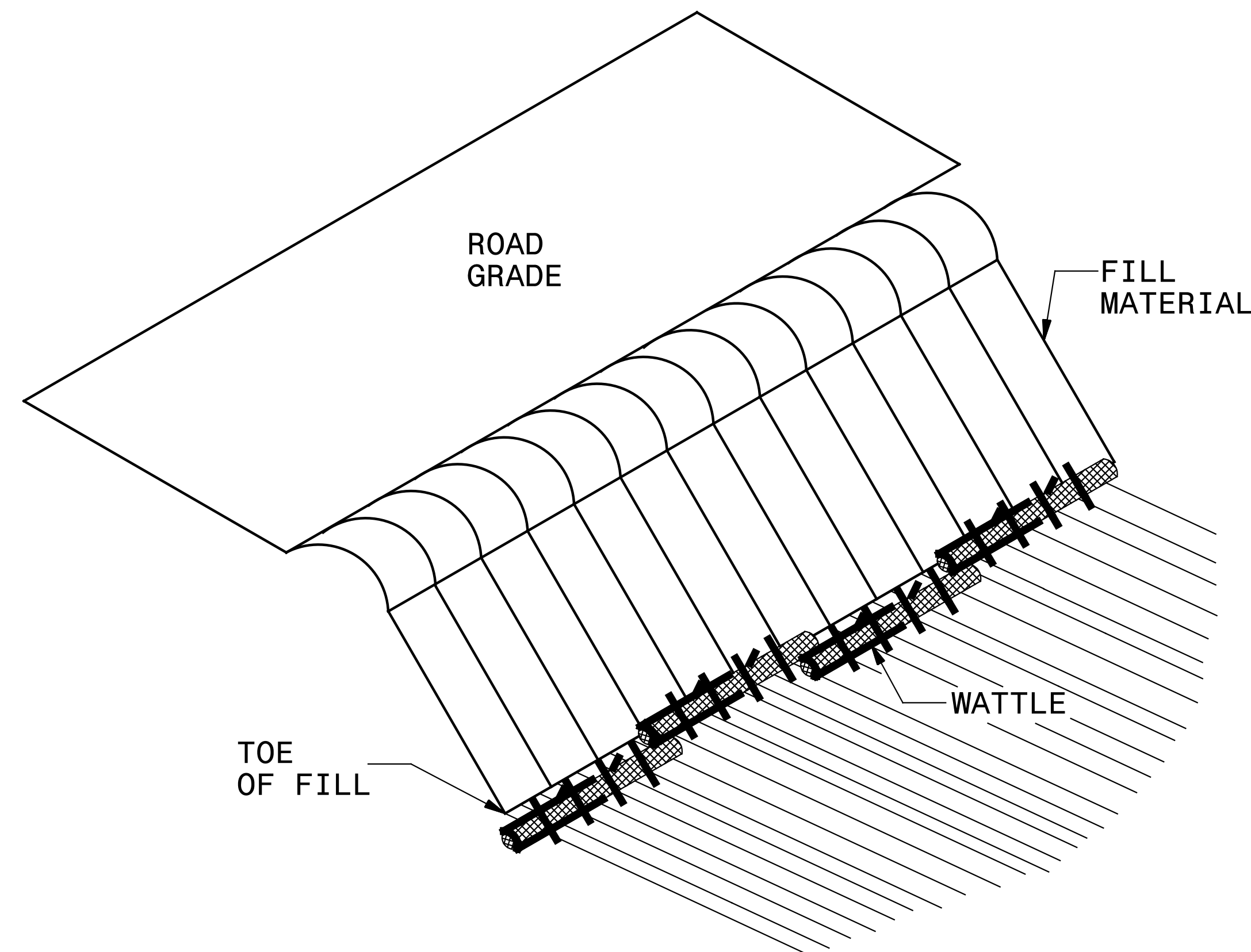
INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

INSTALL MATTING IN ACCORDANCE WITH SECTION 1631 OF THE STANDARD SPECIFICATIONS.

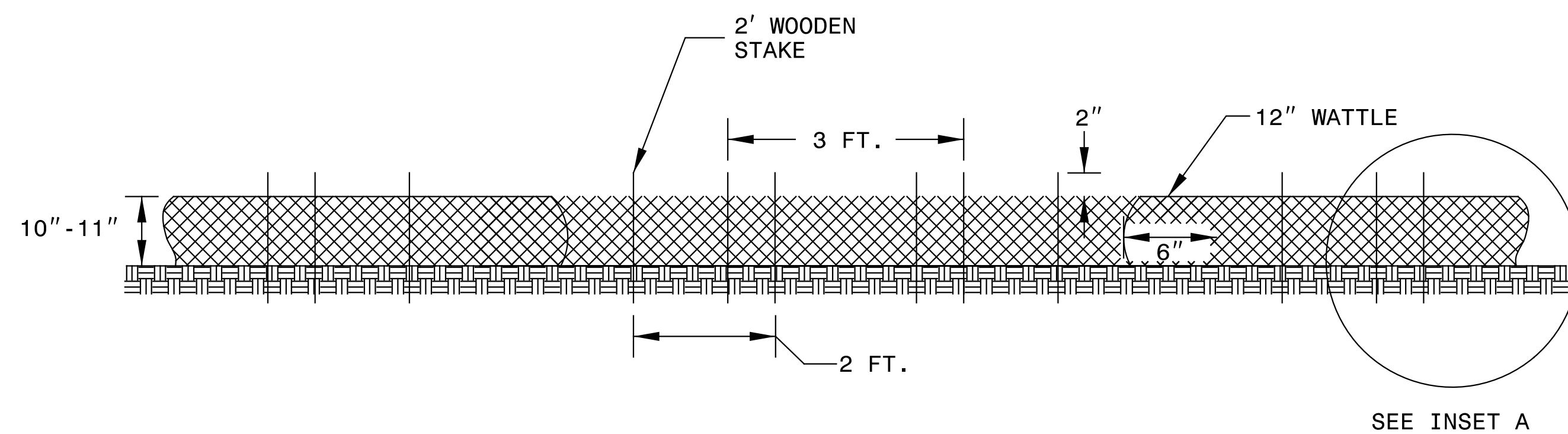


PROJECT REFERENCE NO.	SHEET NO.
BD-5113M	EC-4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

WATTLE BARRIER DETAIL



ISOMETRIC VIEW



FRONT VIEW

NOTES:

USE MINIMUM 12 IN. DIAMETER EXCELSIOR WATTLE AND LENGTH OF 10 FT.

EXCAVATE A 1 TO 2 INCH TRENCH FOR WATTLE TO BE PLACED.

DO NOT PLACE WATTLES ON TOE OF SLOPE.

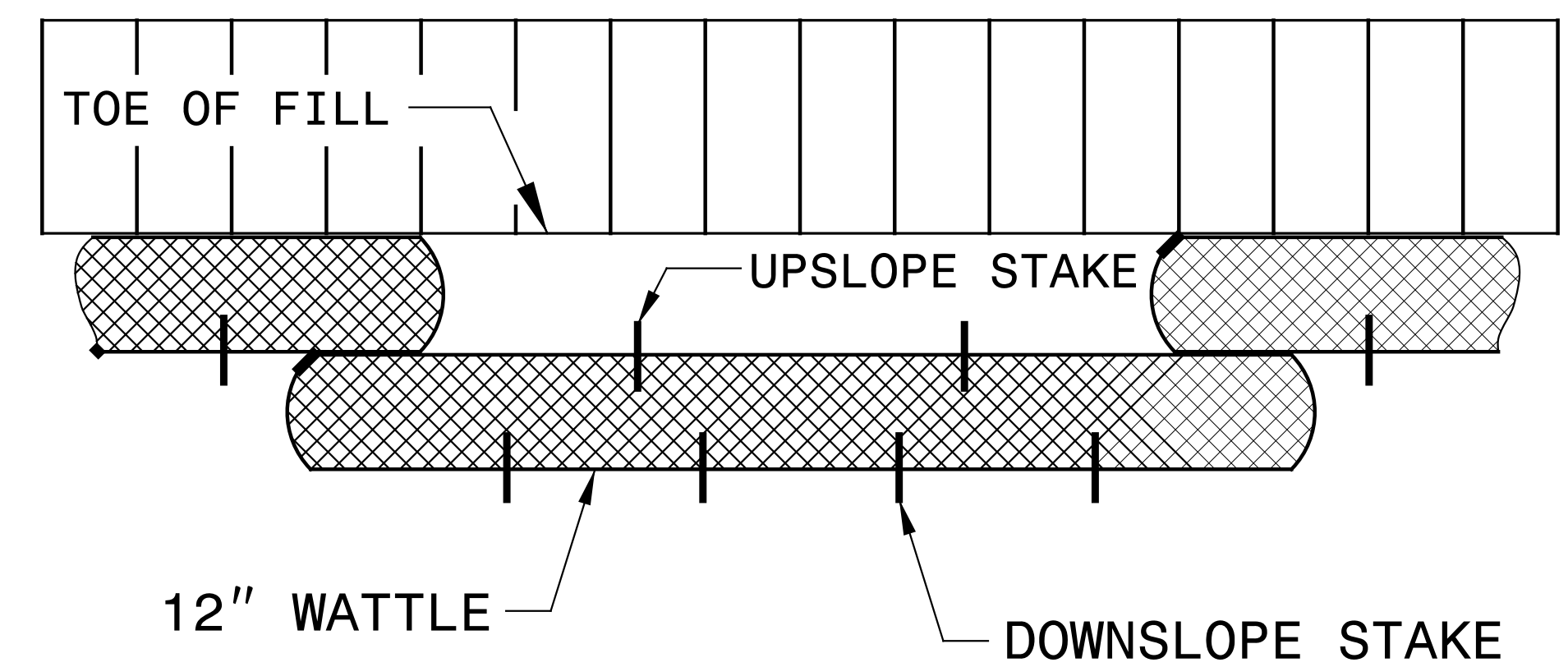
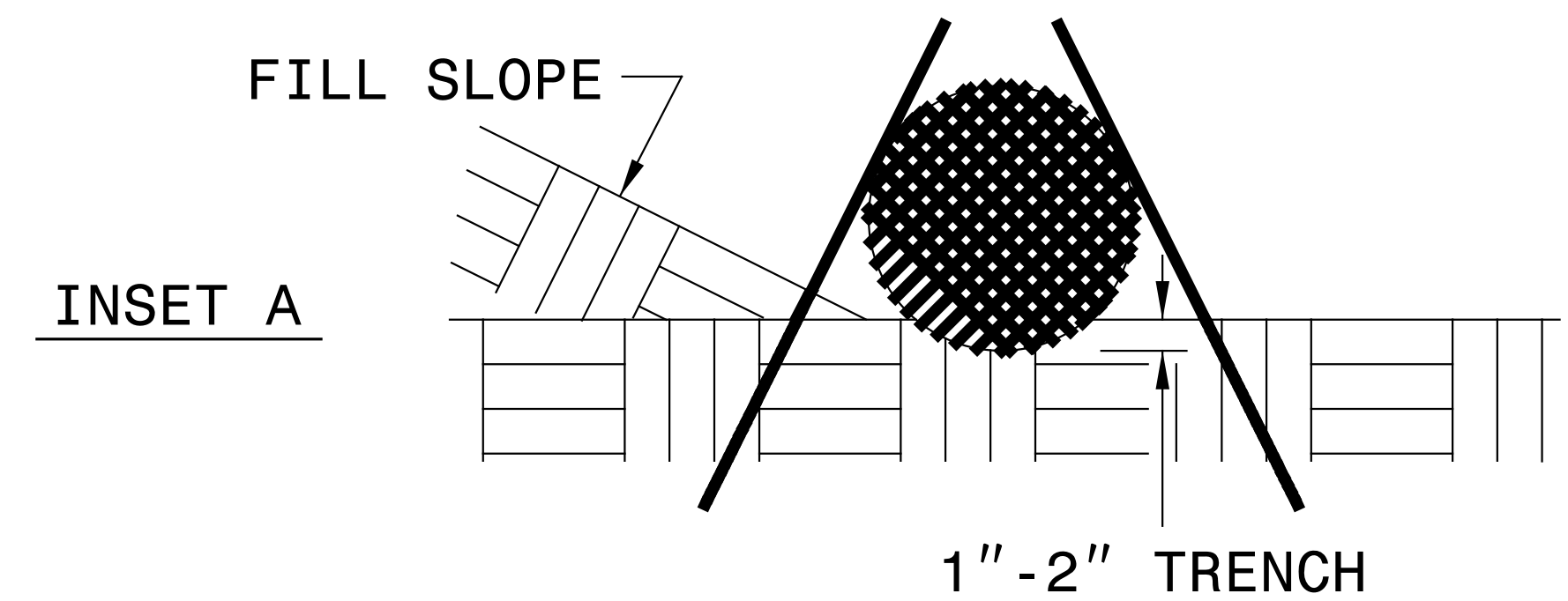
USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.

INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO GROUND.

PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12" IN LENGTH.

INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

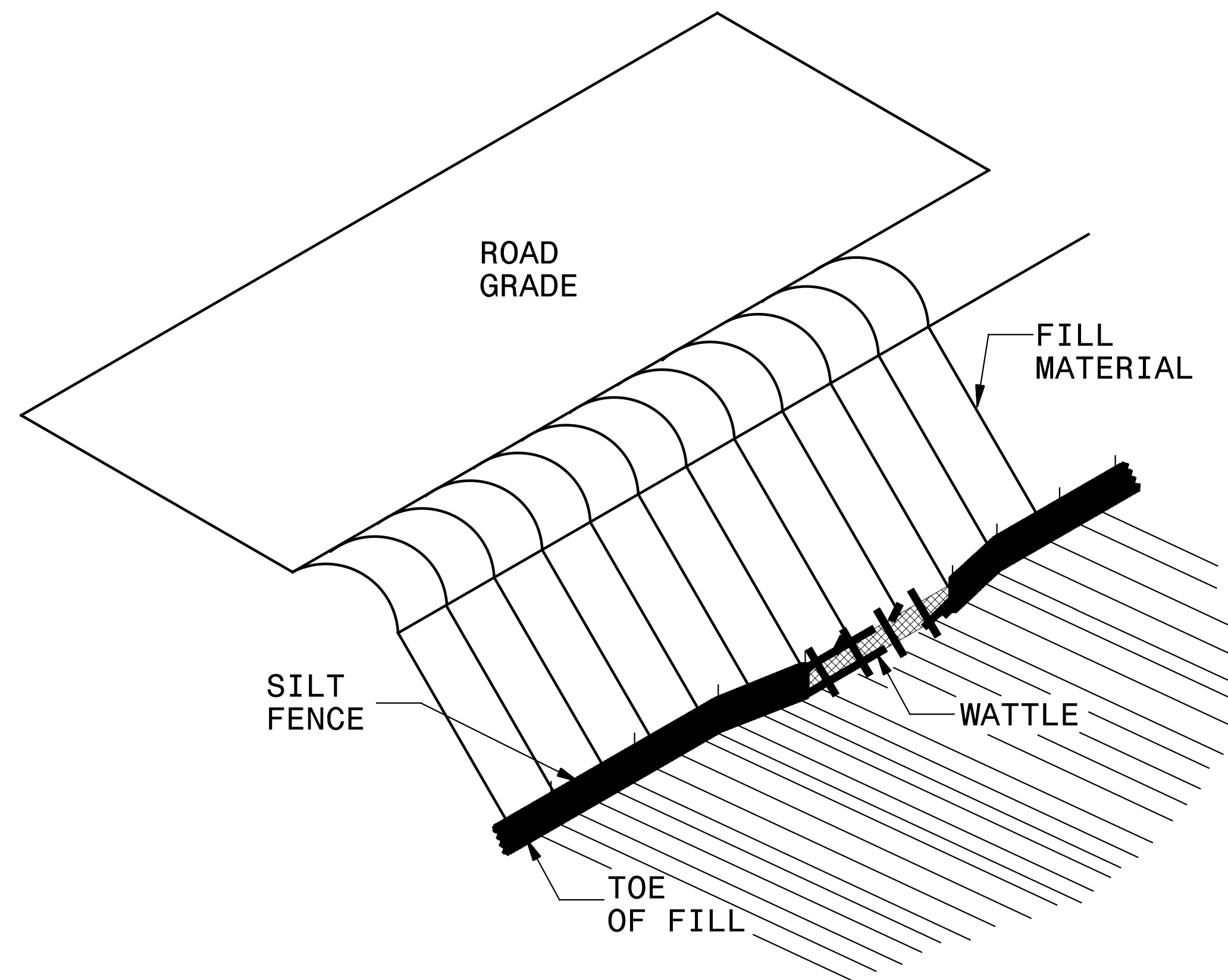
FOR BREAKS ALONG LARGE SLOPES, USE MAXIMUM SPACING OF 20 FT.



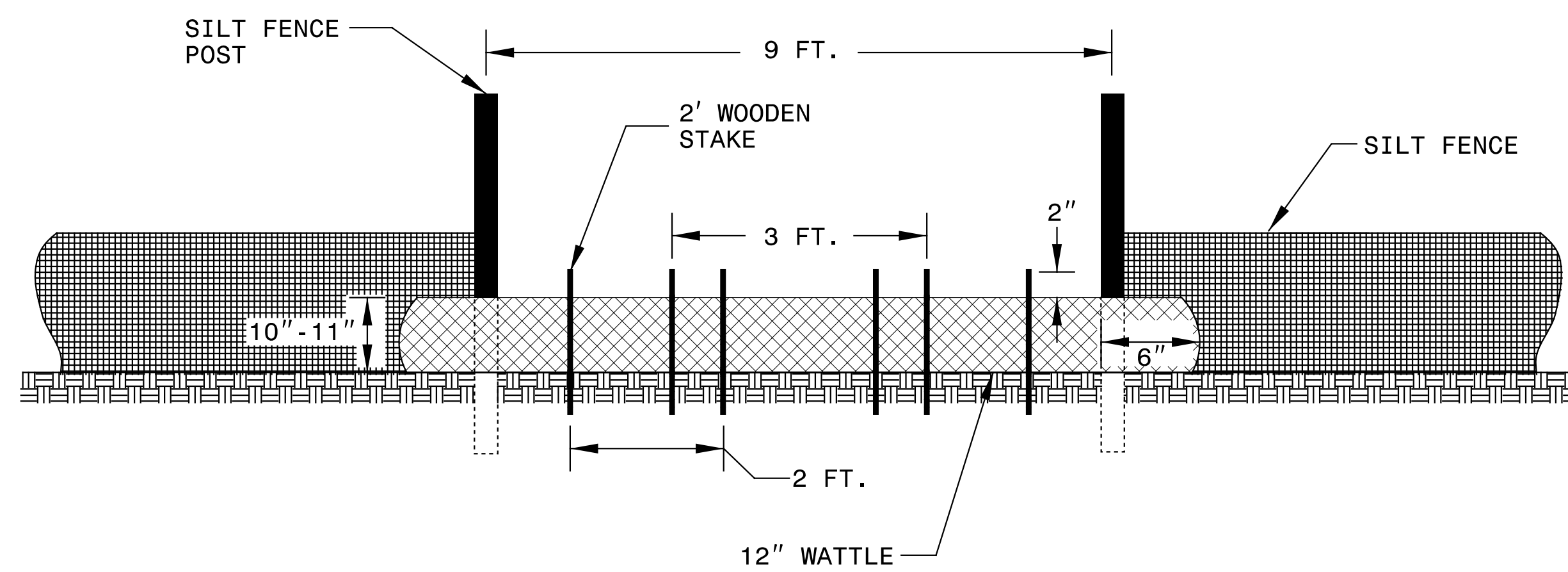
TOP VIEW

SILT FENCE WATTLE BREAK DETAIL

PROJECT REFERENCE NO. BD-5113M	SHEET NO. EC-5
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



ISOMETRIC VIEW

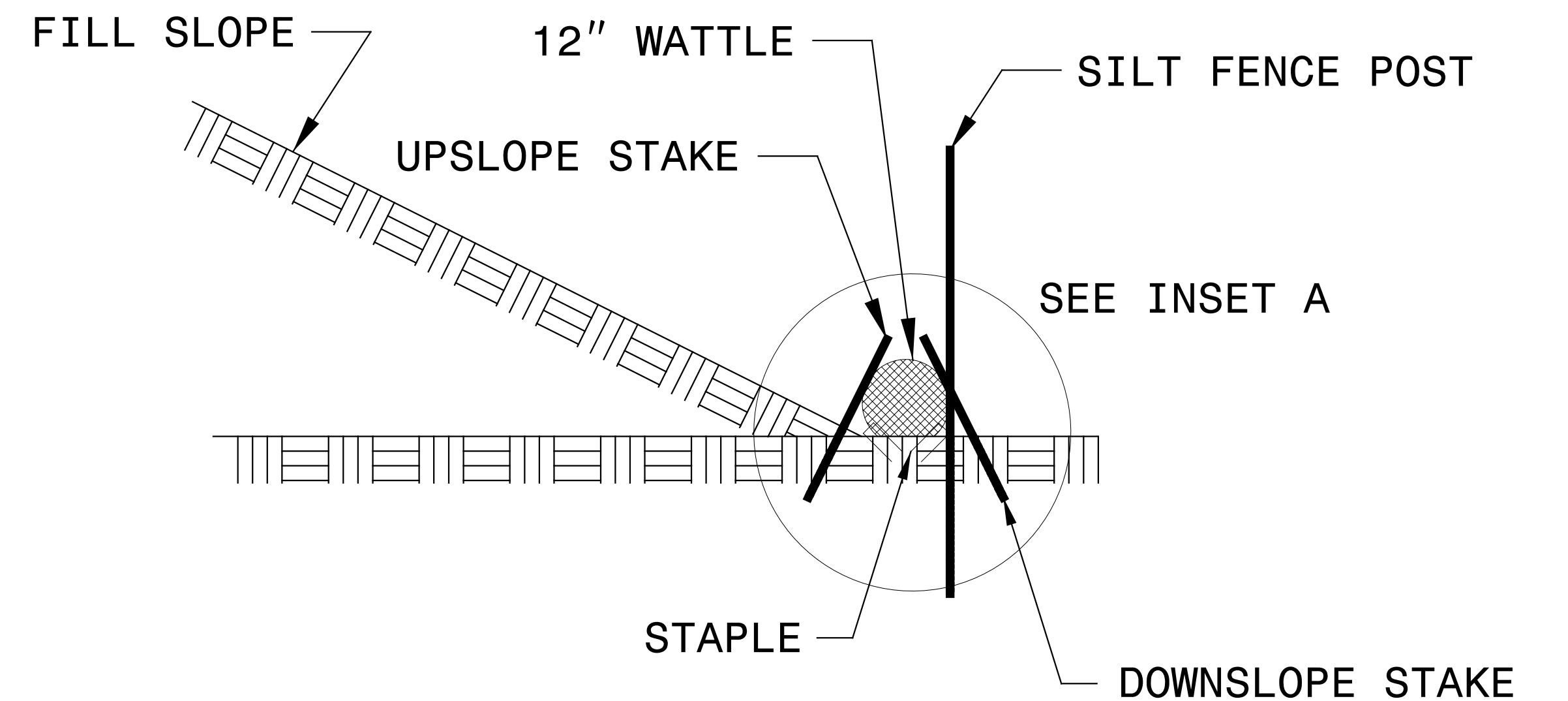
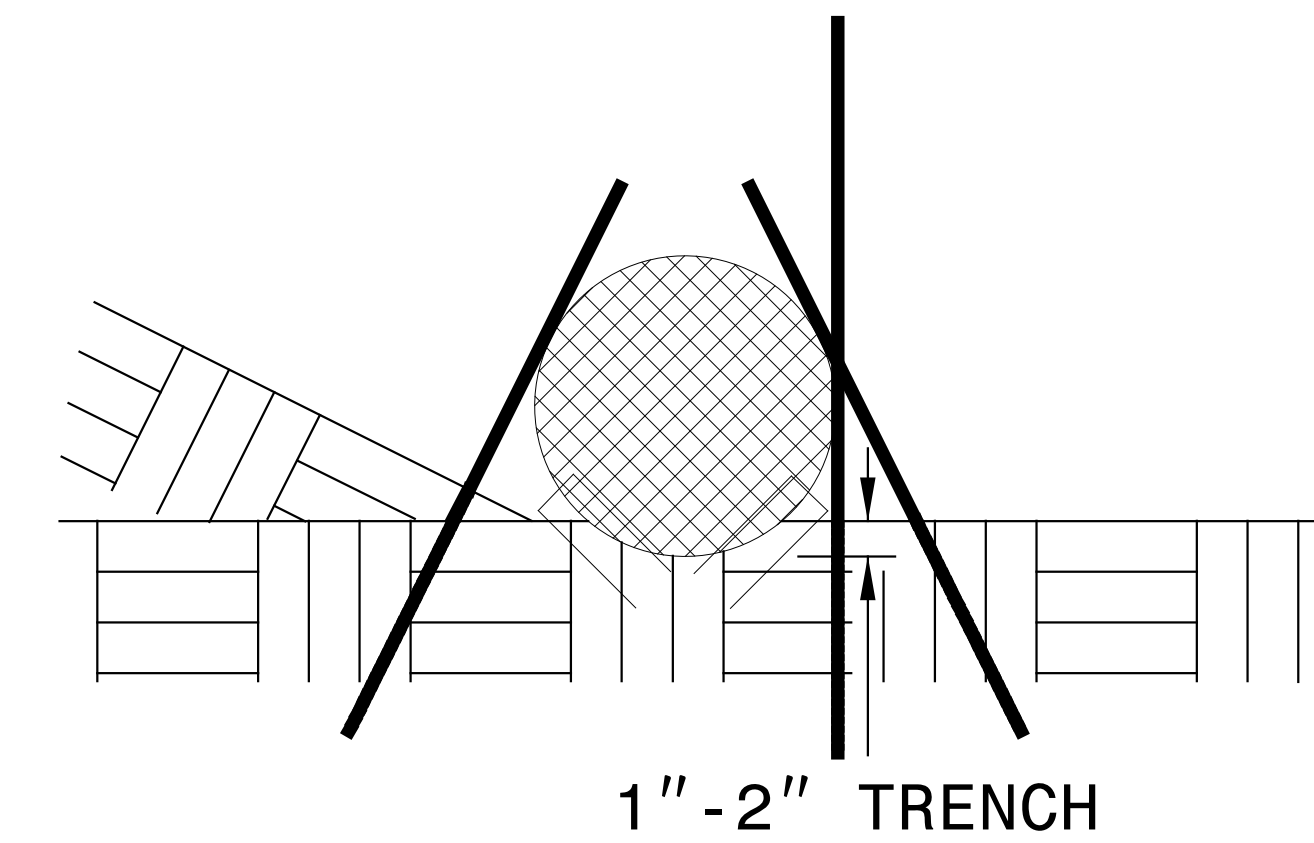


VIEW FROM SLOPE

NOTES:

- USE MINIMUM 12 IN. DIAMETER EXCELSIOR WATTLE AND LENGTH OF 10 FT.
- EXCAVATE A 1 TO 2 INCH TRENCH FOR WATTLE TO BE PLACED.
- DO NOT PLACE WATTLE ON TOE OF SLOPE.
- USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.
- INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO GROUND.
- PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12" IN LENGTH.
- INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.
- WATTLE INSTALLATION CAN BE ON OUTSIDE OF THE SILT FENCE AS DIRECTED.
- INSTALL TEMPORARY SILT FENCE IN ACCORDANCE WITH SECTION 1605 OF THE STANDARD SPECIFICATIONS.

INSET A



SIDE VIEW

DIVISION OF HIGHWAYS
 STATE OF NORTH CAROLINA

CROSS SECTION SUMMARY
 IN CUBIC YARDS

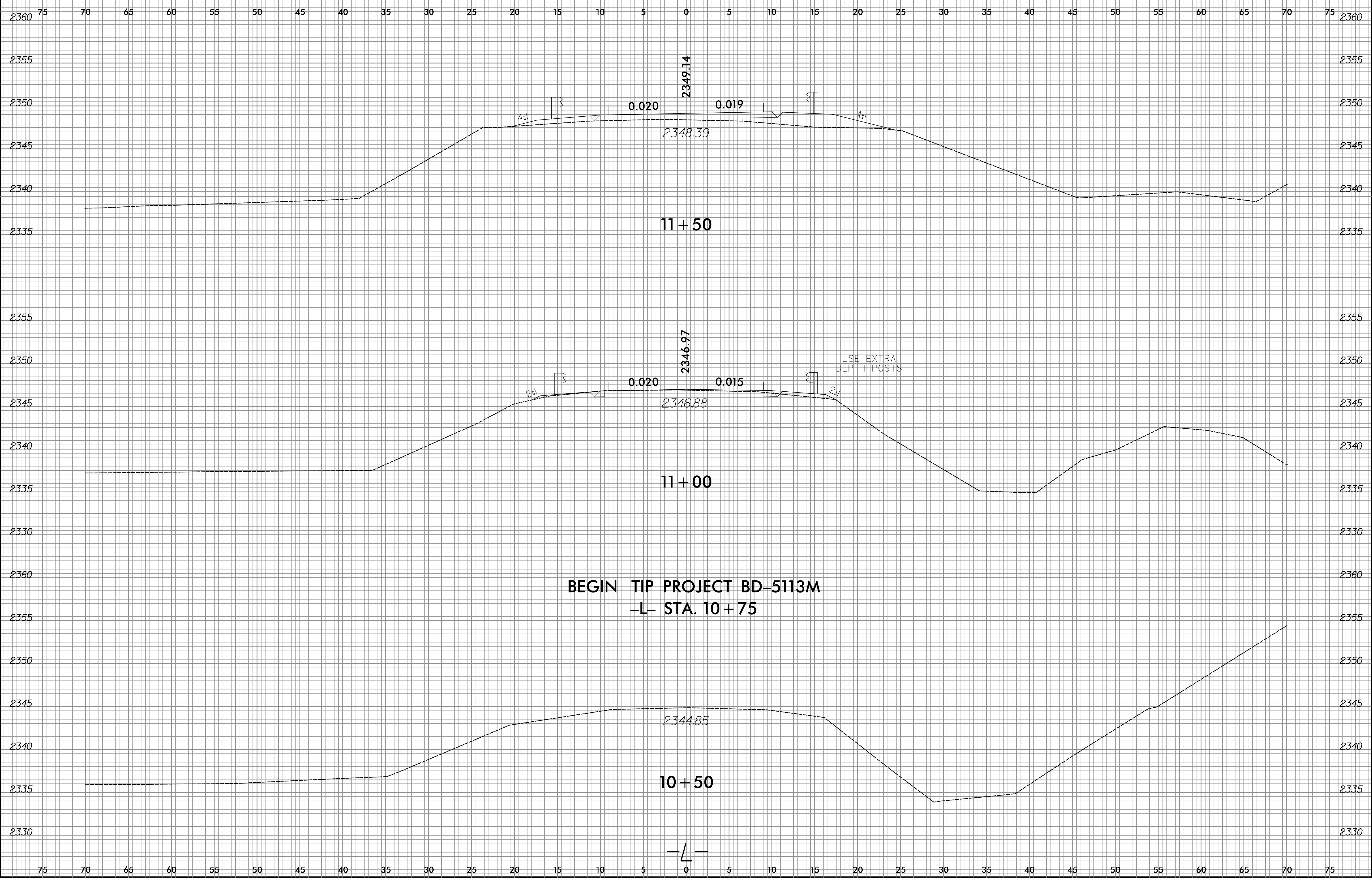


-L- LOCATION	UNCLASSIFIED EXCAVATION	EMBT
10+75	0	0
11+00	0	0
11+50	0	39
12+00	0	125
12+50	2	113
12+67.10 BEGIN BRIDGE	1	16
13+39.66 END BRIDGE	0	0
13+50	0	17
14+00	0	51
14+50	14	11
14+80	16	1

NOTE: EMBANKMENT COLUMN DOES NOT INCLUDE BACKFILL FOR UNDERCUT.

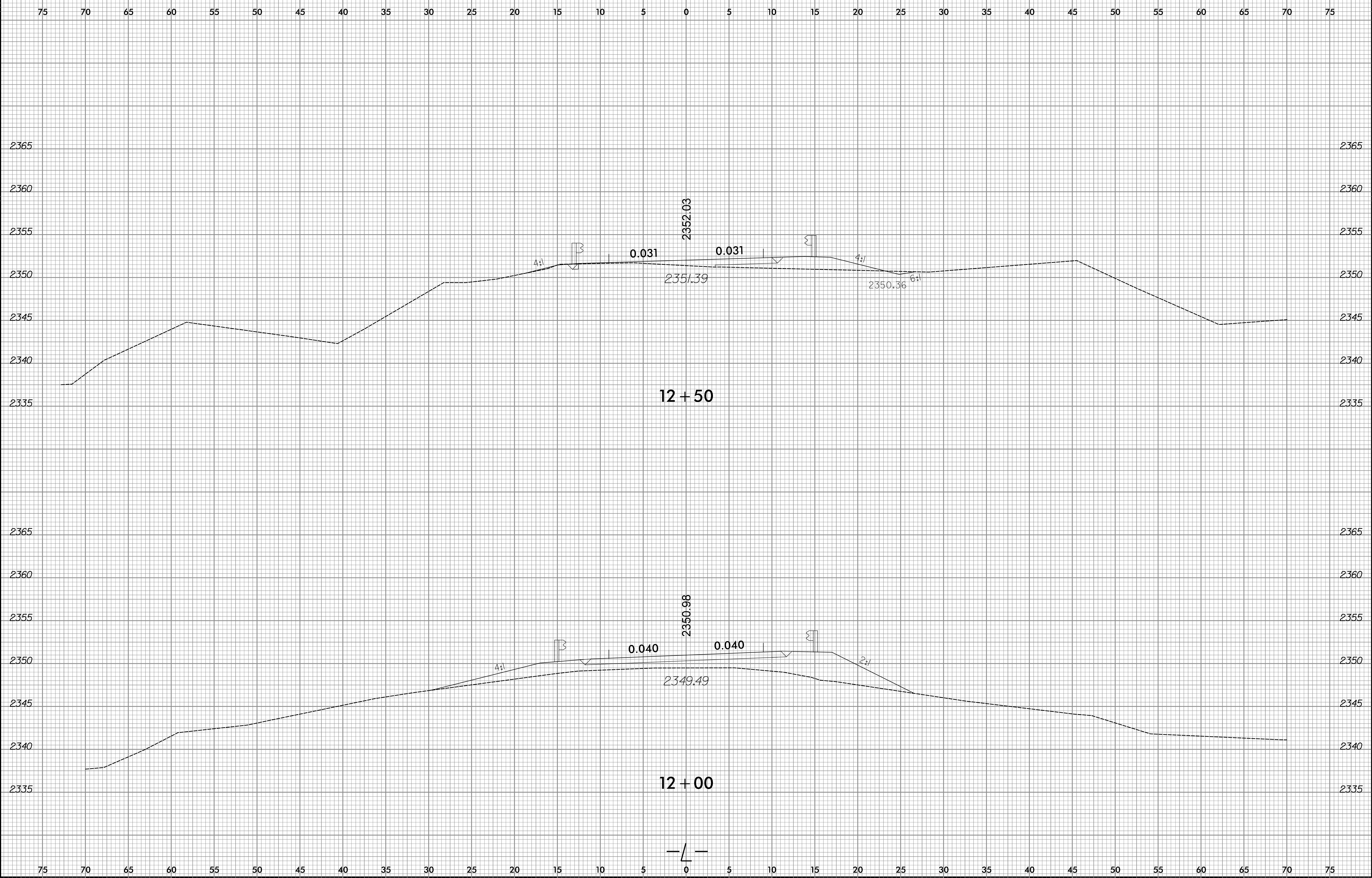
Approximate quantities only. Unclassified excavation, borrow excavation, fine grading, clearing and grubbing, and removal of existing pavement will be paid for at the contract lump sum price for "grading".

8/23/99

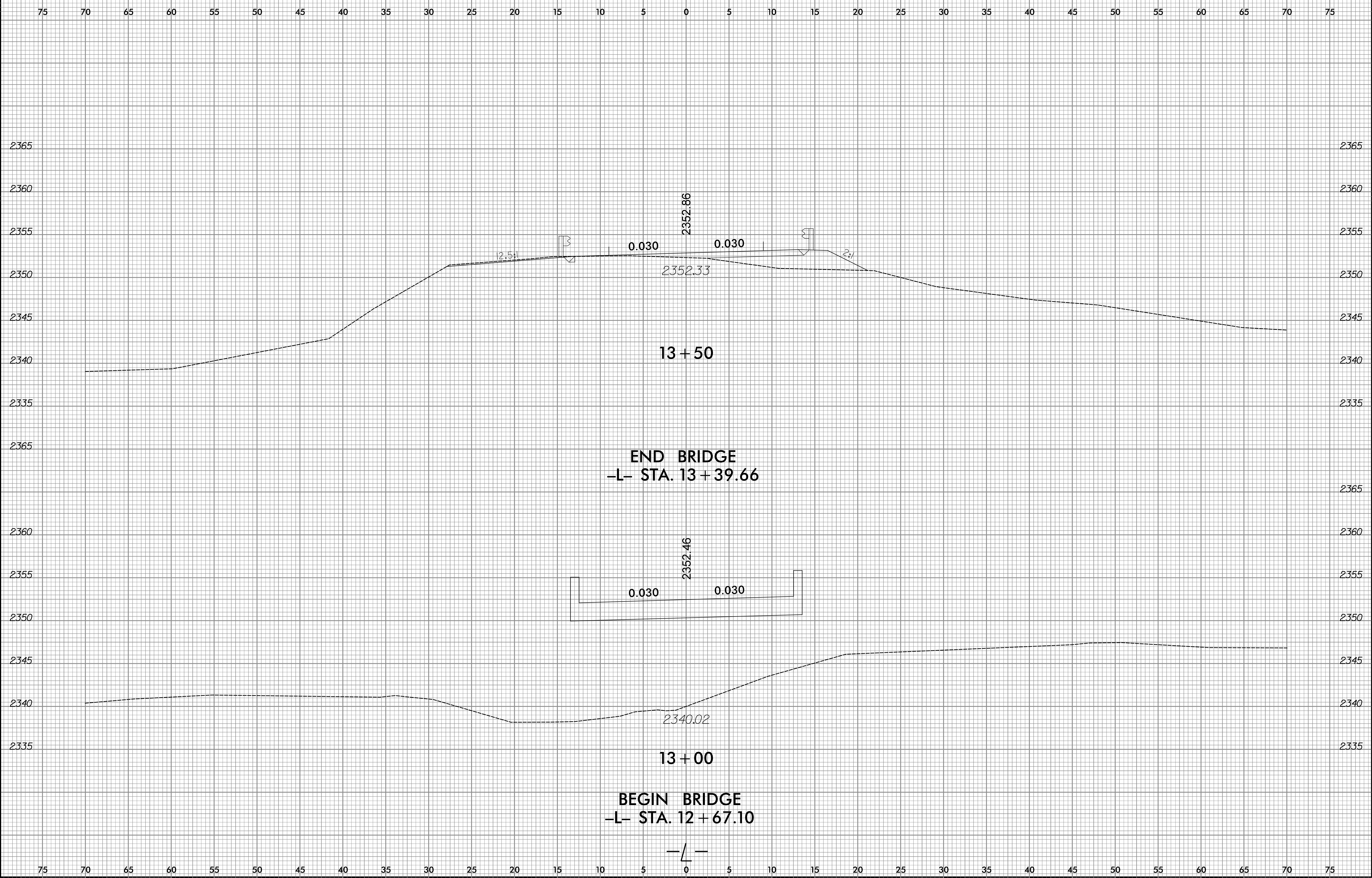


8/23/99

8/23/99

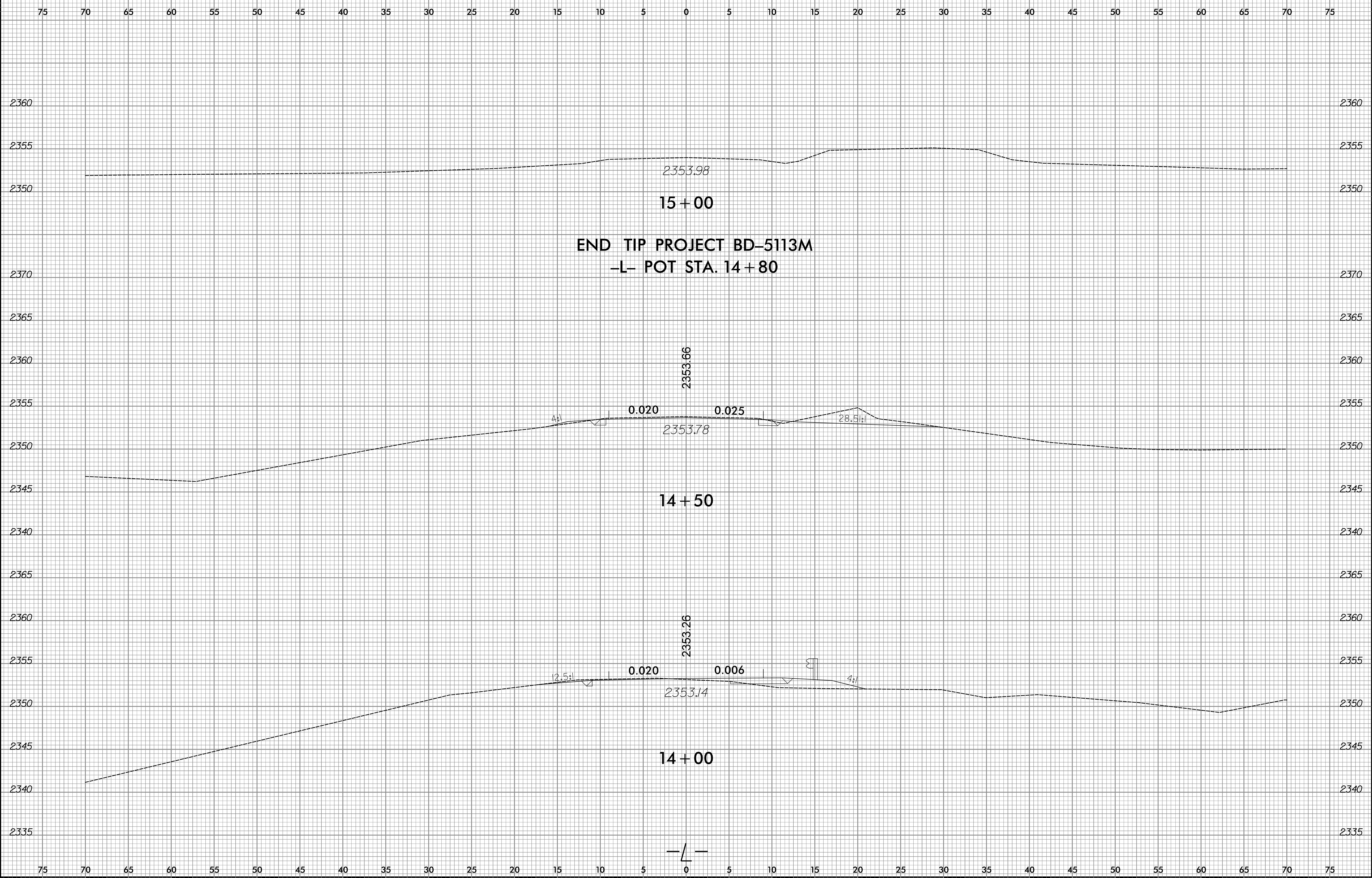


8/23/99



8/23/99

8/23/99



TIP NO: BD-5113M

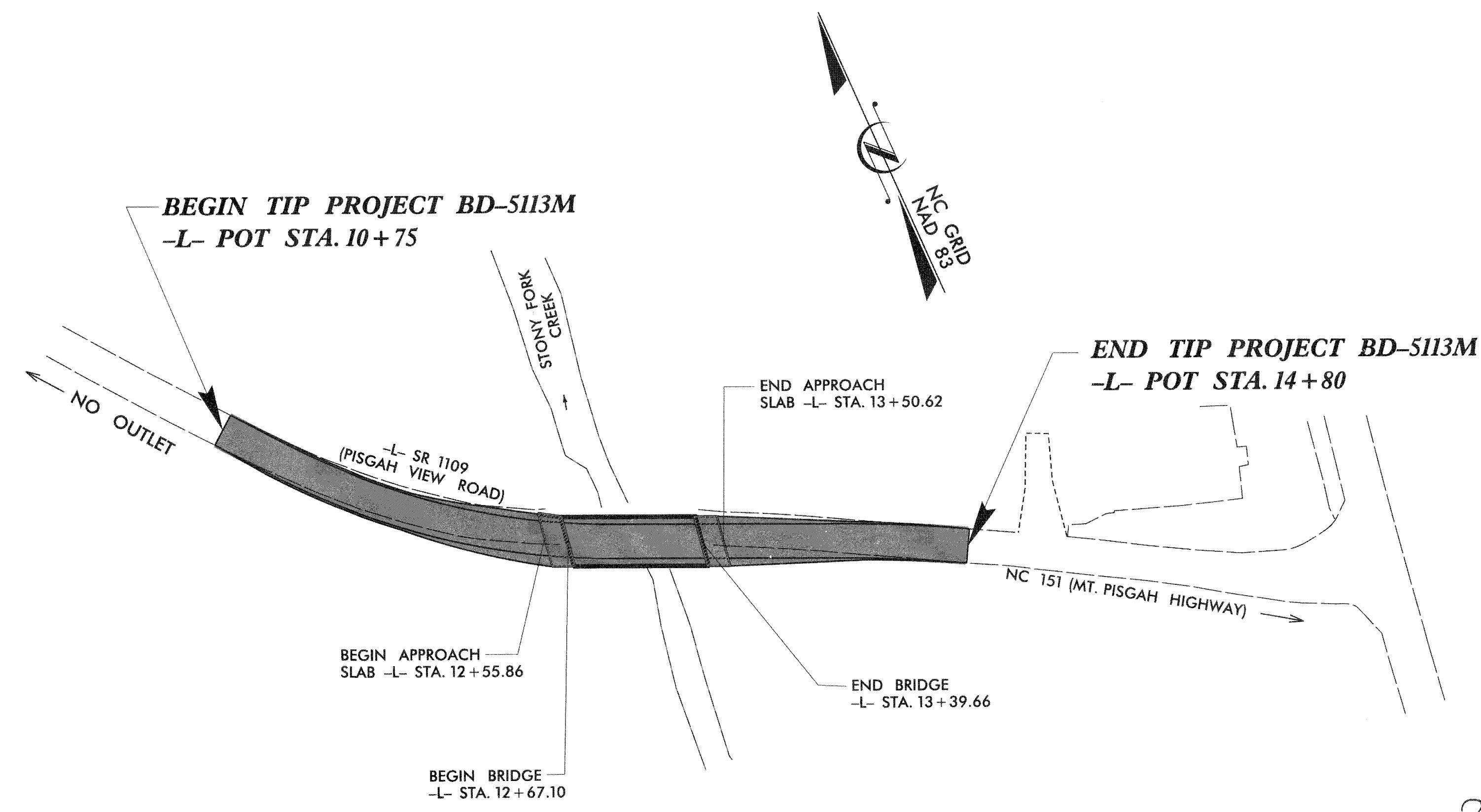
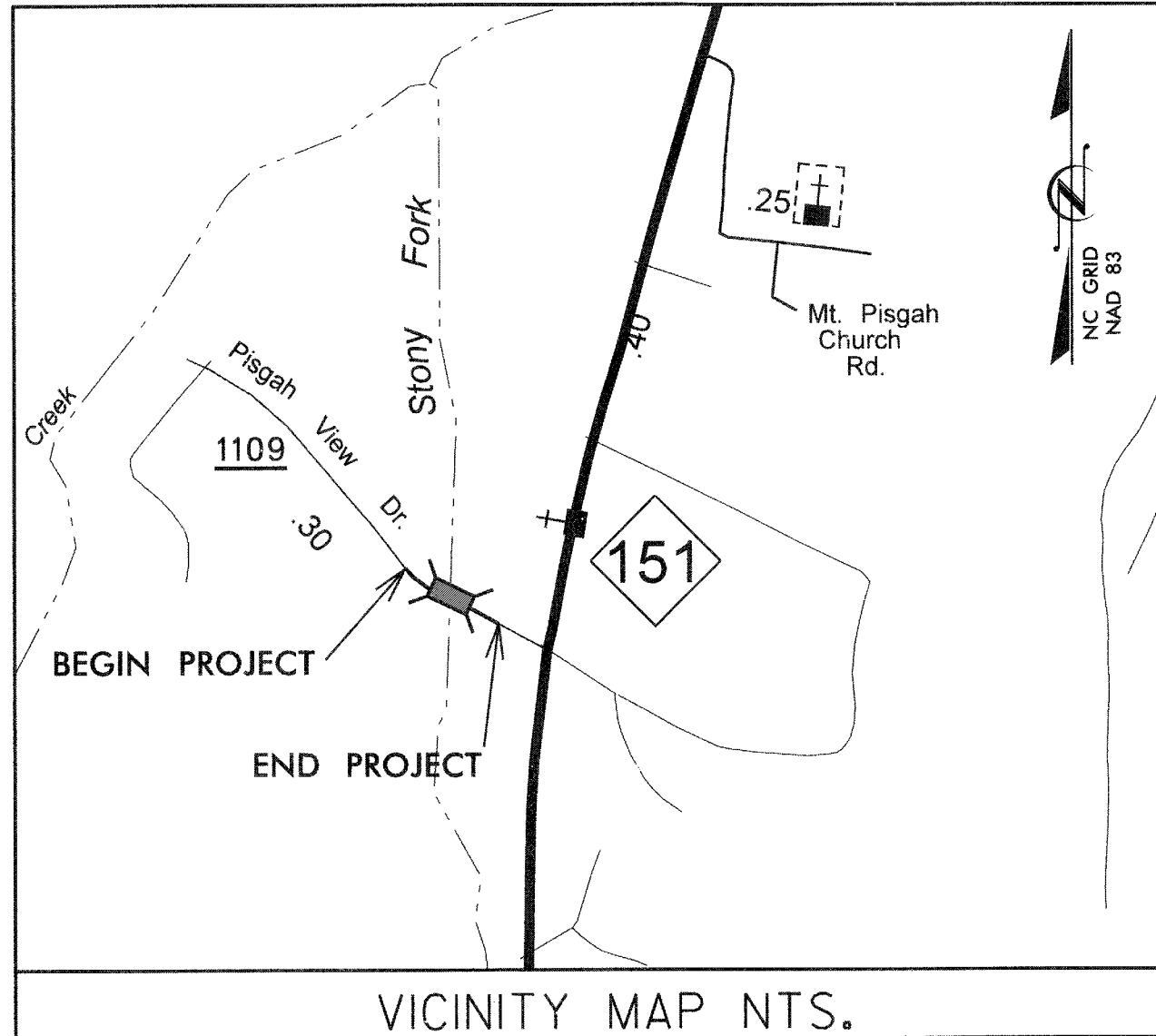
CONTRACT: DM00078

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BD-5113M		22
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
45359.1.13	BRZ-1109(12)	PE	
45359.2.13	BRZ-1109(12)	RW	
45359.3.13	BRZ-1109(12)	CONST.	

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BUNCOMBE COUNTY

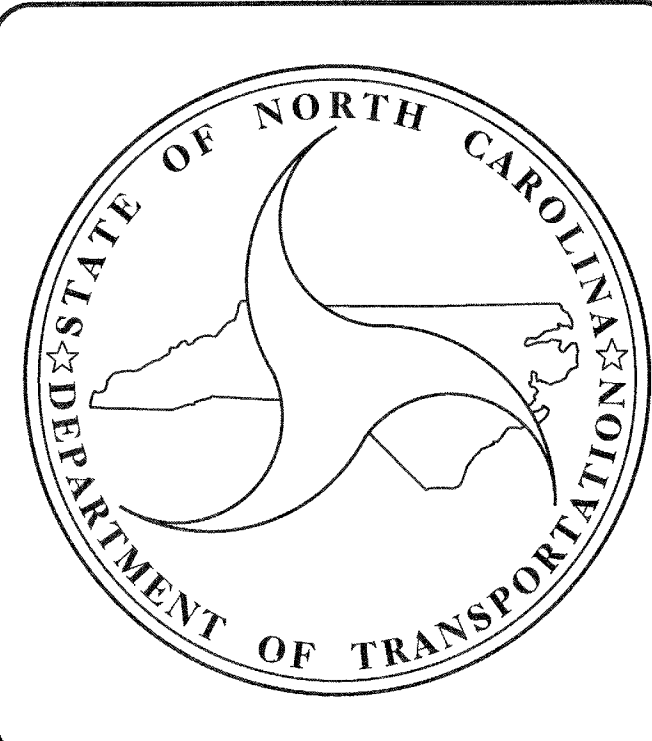
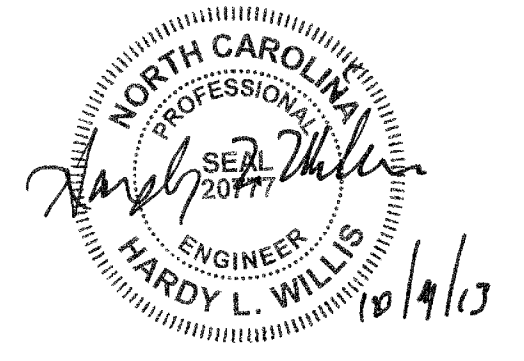
BRIDGE NO. 651 OVER STONY FORK CREEK
ON SR 1109 (PISGAH VIEW ROAD)



STRUCTURES

Charlotte, North Carolina 704-357-0488
Tri-Cities, Tennessee 423-467-8401
Knoxville, Tennessee 865-546-5800
Asheville, North Carolina 828-253-2796
Middlesboro, Kentucky 606-248-6600
Spartanburg, South Carolina 864-574-4775

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DESIGN DATA

ADT 2010 = 230
ADT 2025 = 380

T = %
V = 35 MPH

FUNC CLASS = LOCAL

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT BD-5113M = 0.063 MI
LENGTH STRUCTURE TIP PROJECT BD-5113M = 0.014 MI
TOTAL LENGTH OF TIP PROJECT BD-5113M = 0.077 MI

Prepared In the Office of:
VAUGHN & MELTON
1318-F PATTON AVE.
ASHEVILLE, NC, 28806
FOR THE NORTH CAROLINA DIVISION OF HIGHWAYS

2012 STANDARD SPECIFICATIONS

LETTING DATE :
MARCH 5, 2014

HARDY WILLIS, PE
PROJECT ENGINEER

RYAN SHIPMAN, E. I.
PROJECT DESIGN ENGINEER

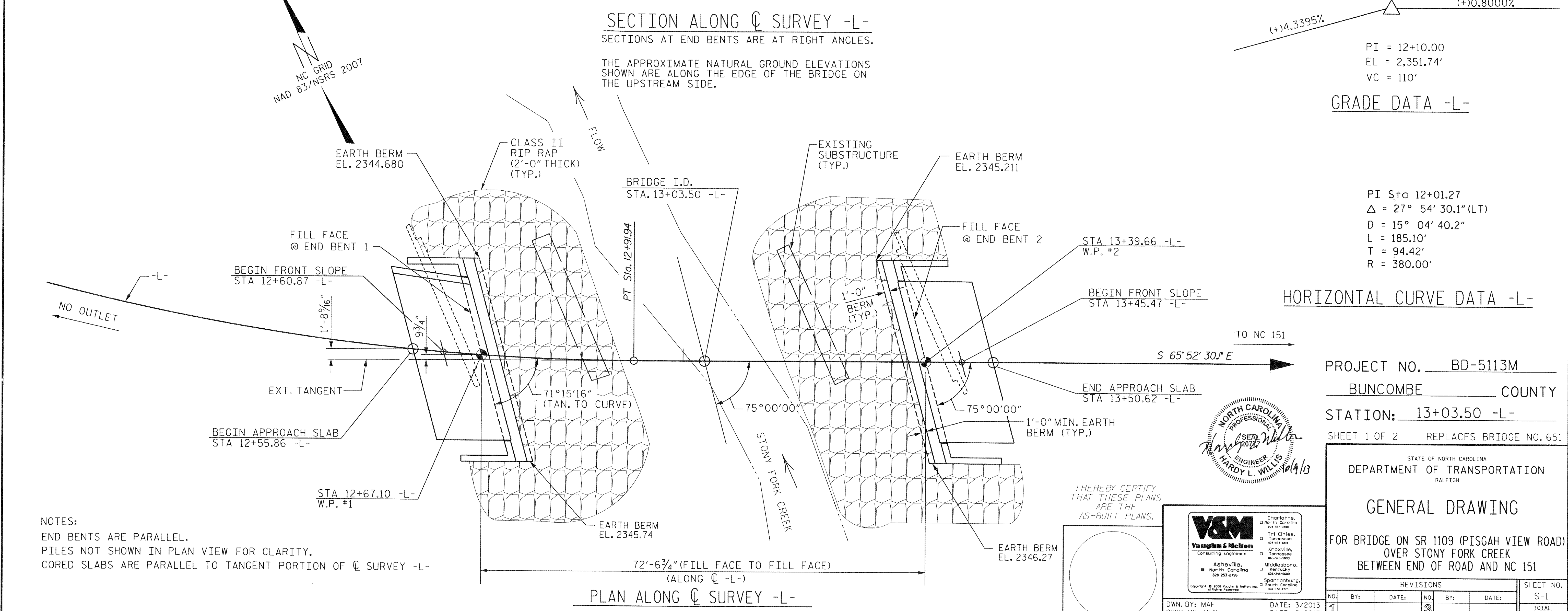
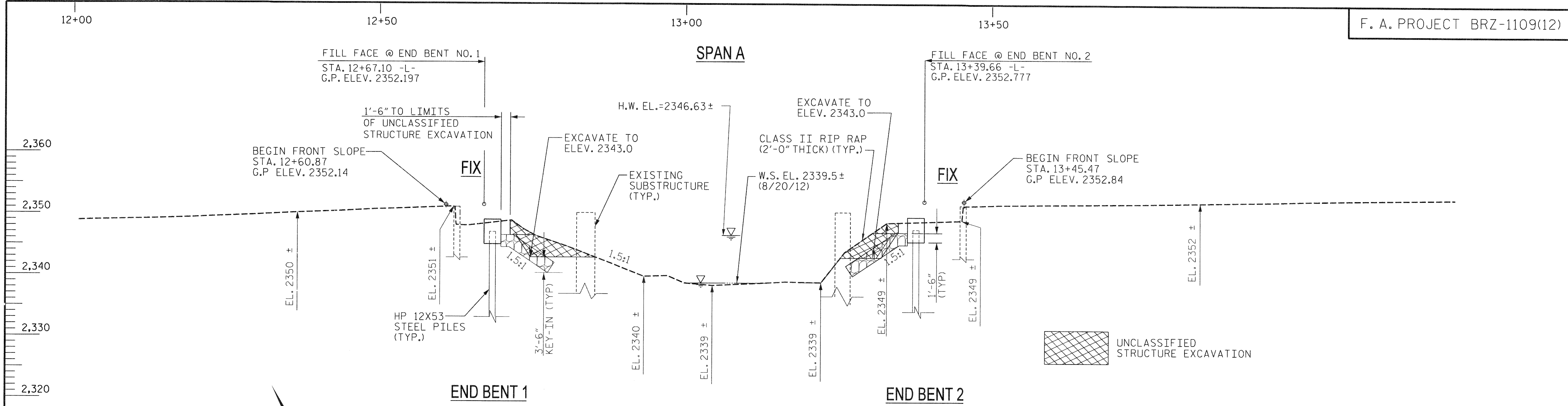
STRUCTURES MANAGEMENT UNIT
1000 BIRCH RIDGE DR.
RALEIGH, N.C. 27610

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

PAUL SPROUSE P.E.
STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED DIVISION ADMINISTRATOR DATE



NOTES:
END BENTS ARE PARALLEL.
PILES NOT SHOWN IN PLAN VIEW FOR CLARITY.
CORED SLABS ARE PARALLEL TO TANGENT PORTION OF Q SURVEY -L-



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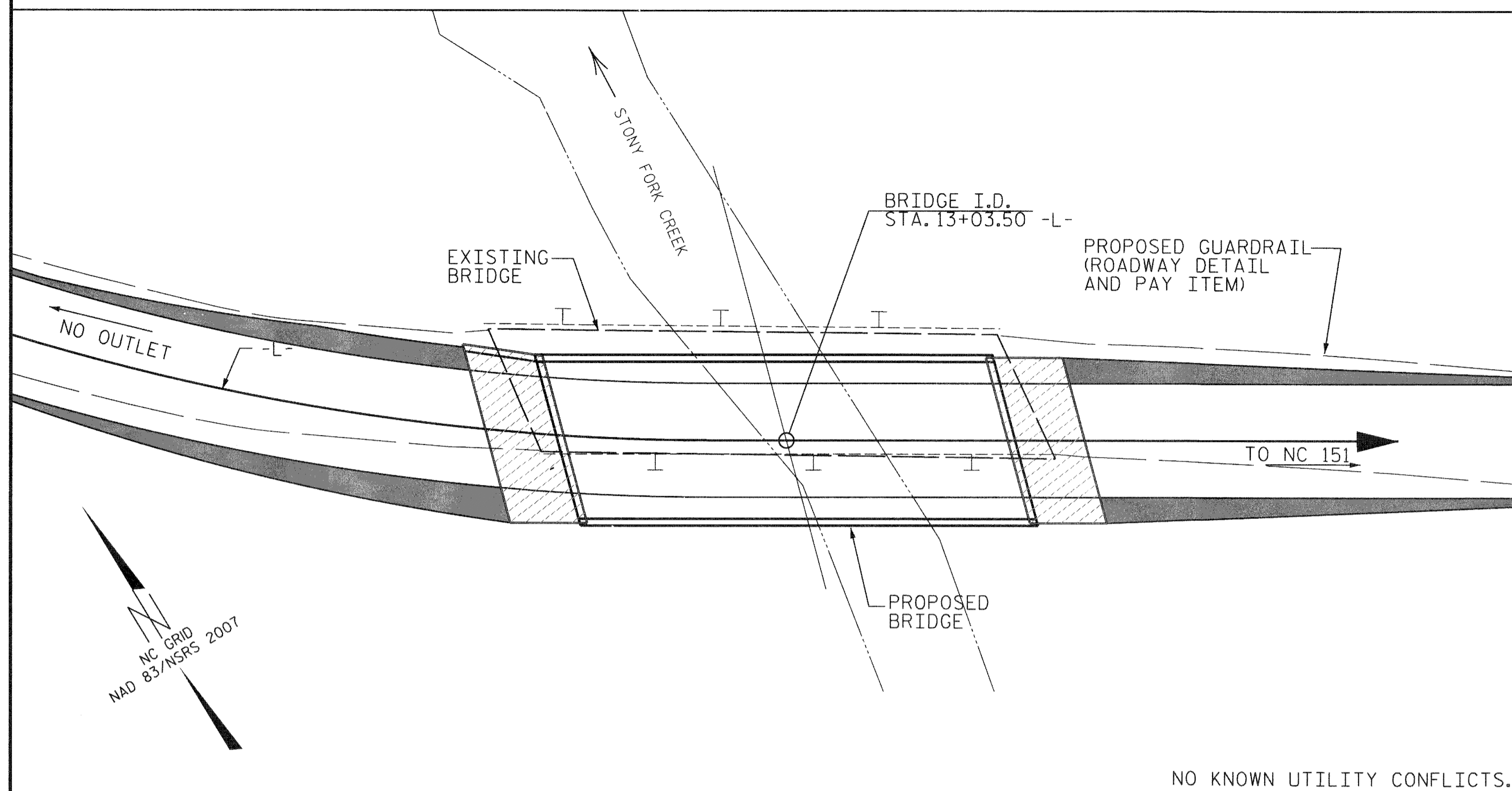
Charlotte, NC
Tri-Cities, TN
Knoxville, TN
Middleboro, MA
Asheville, NC
North Carolina
South Carolina

I HEREBY CERTIFY THAT THESE PLANS ARE THE AS-BUILT PLANS.

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

S-1
TOTAL SHEETS 22

BM#2, 60 D NAIL IN BASE OF 18" POPLAR, BL STA. 9+13.94 17.31' LT., ELEV. 2352.82



LOCATION SKETCH

NO KNOWN UTILITY CONFLICTS.

GENERAL NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE "STANDARD NOTES" SHEET

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

THE EXISTING STRUCTURE, CONSISTING OF A THREE SPAN, 81-FOOT LONG TIMBER DECK ON STEEL BEAMS, 12.9 FEET WIDE, ON TIMBER END BENTS AND TIMBER PIERS, AND LOCATED AT THE PROPOSED STRUCTURE, SHALL BE REMOVED. HOWEVER, THE TWO EXISTING ABOVE GROUND CONCRETE PIER FOOTINGS SHALL BE LEFT IN PLACE. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW THE LEGAL LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE FURTHER DETERIORATE, THIS LOAD LIMITATION MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH HEC 18, "EVALUATING SCOUR AT BRIDGES", MAY 2001.

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 25 FT. EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

ASPHALT WEARING SURFACE IS INCLUDED IN ROADWAY QUANTITY ON ROADWAY PLANS.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 13+03.50."

THE CONTRACTOR SHALL PROVIDE INDEPENDENT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE BARS FROM WHICH THE SAMPLES ARE TAKEN MUST THEN BE SPLICED WITH REPLACEMENT BARS OF THE SIZE AND LENGTH OF THE SAMPLE, PLUS A MINIMUM LAP SPLICE OF THIRTY BAR DIAMETERS. PAYMENT FOR THE SAMPLES OF REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 95 TONS PER PILE.

DRIVE PILES AT END BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 158 TONS PER PILE.

STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT NO. 1. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 95 TONS PER PILE.

DRIVE PILES AT END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 158 TONS PER PILE.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 20,000 TO 25,000 FT-LBS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT 1. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.

HYDRAULIC DATA

DESIGN DISCHARGE	= 1300 CFS
DESIGN FREQUENCY	= 25 YRS
DESIGN HW ELEVATION	= 2345.7 FT
BASE DISCHARGE	= 1800 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 2346.57 FT

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 4125 CFS
OVERTOPPING FREQUENCY	= 500(+YRS)
OVERTOPPING ELEVATION	= 2352.2 FT
DRAINAGE AREA	= 5.1 SQ. MI

TOTAL BILL OF MATERIAL													
	REMOVAL OF EXISTING STRUCTURE	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	HP 12 X 53 STEEL PILES		VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" x 2'-0" PRESTRESSED CONCRETE CORED SLAB UNIT	
						NO.	LIN. FT.					NO.	LIN. FT.
SUPERSTRUCTURE	LUMP SUM	LUMP SUM	CU. YARDS	LUMP SUM				140.26			LUMP SUM	9	630.0
END BENT 1		LUMP SUM	19.4		2363	5	113		118	125			
END BENT 2		LUMP SUM	19.4		2365	5	100		129	137			
TOTAL	LUMP SUM	LUMP SUM	38.8	LUMP SUM	4728	10	213	140.26	247	262	LUMP SUM	9	630.0



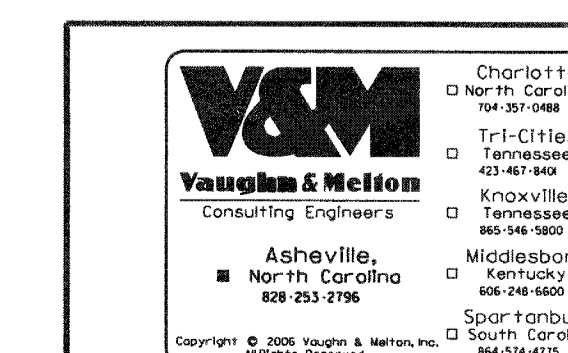
PROJECT NO. BD-5113M
BUNCOMBE COUNTY
 STATION: 13+03.50 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

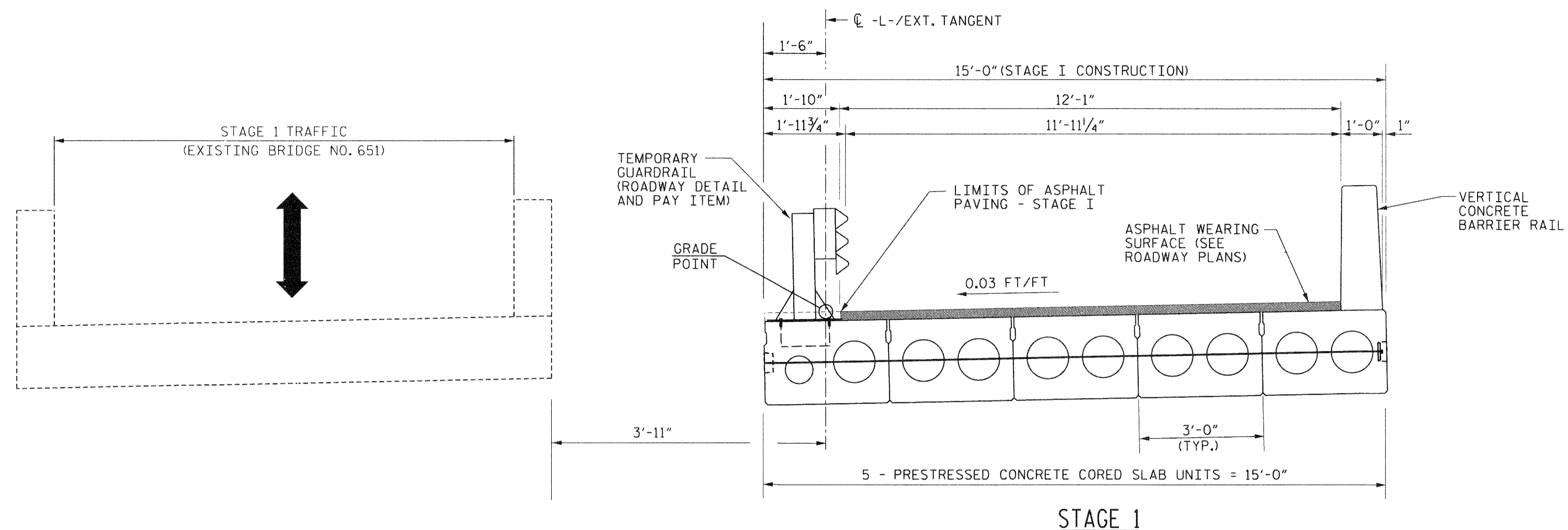
GENERAL DRAWING

FOR BRIDGE ON SR 1109 (PISGAH VIEW ROAD)
 OVER STONY FORK CREEK
 BETWEEN END OF ROAD AND NC 151

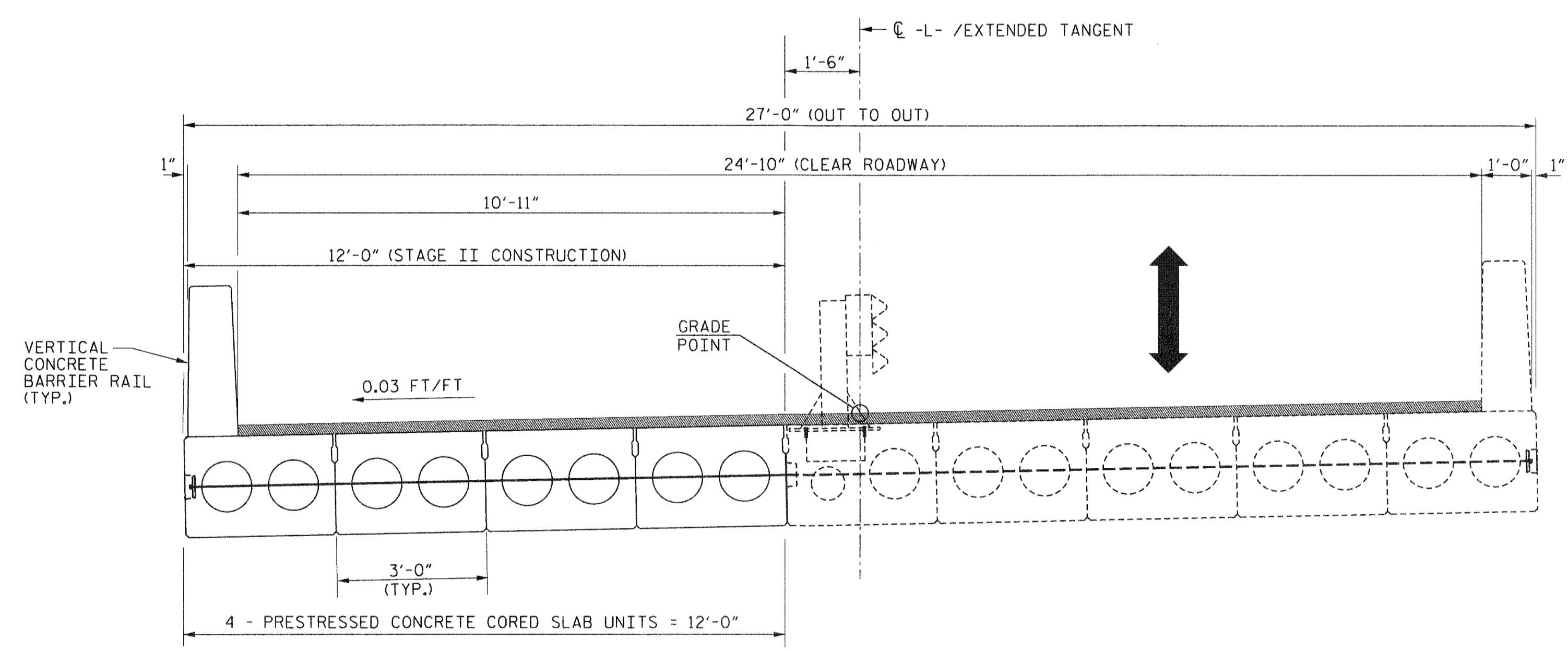


DWN. BY: MAF DATE: 3/2013
 CHD. BY: HLW DATE: 3/2013
 DES. EGR. OF RECORD: RTS DATE: 3/2013

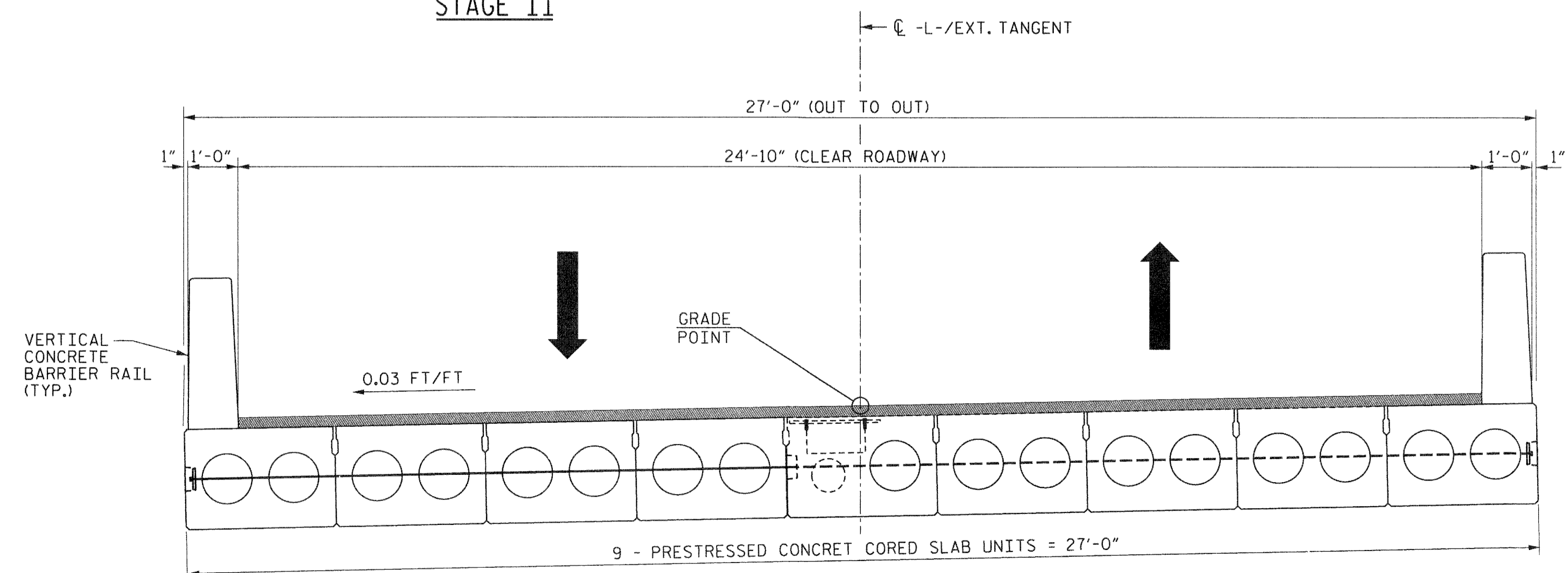
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-2
2			4			TOTAL SHEETS 22



STAGE I

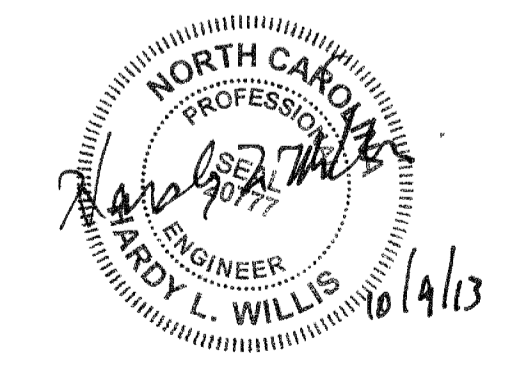


STAGE II



STAGE III

NOTES
 FOR TEMPORARY GUARDRAIL DETAILS, SEE "ANCHORAGE DETAILS FOR TEMPORARY GUARDRAIL ANCHOR ASSEMBLY FOR TYPE IV CORED SLAB UNIT" SHEET S-10.
 FOR PHASING OF TRAFFIC AND OTHER DETAILS, SEE TRAFFIC MANAGEMENT PLANS.



PROJECT NO. BD-5113M
BUNCOMBE COUNTY
 STATION: 13+03.50 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

CONSTRUCTION STAGING

V&M
 Vaughan & Melton
 Consulting Engineers

Charlotte, NC 28208
 Tri-Cities, Tennessee 423-467-8400
 Knoxville, Tennessee 865-594-3800
 Asheville, North Carolina 828-253-2796
 Middleboro, Kentucky 606-248-6600
 Spartanburg, South Carolina 864-594-8770

DWN. BY: MAF DATE: 3/2013
 CHKD. BY: HLW DATE: 3/2013
 DES. EGR. OF RECORD: RTS DATE: 3/2013

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

TOTAL SHEETS: 22

LOAD AND RESISTANCE FACTOR RATING (LRFD) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93(Inv)	N/A	1	1.014	--	1.75	0.269	1.04	70'	EL	34.482	0.608	1.1	70'	EL	3.448	0.80	0.269	1.01	70'	EL	34.482		
	HL-93(0pr)	N/A	--	1.355	--	1.35	0.269	1.35	70'	EL	34.482	0.608	1.43	70'	EL	3.448	N/A	--	--	--	--	--		
	HS-20(Inv)	36.000	2	1.315	47.356	1.75	0.269	1.36	70'	EL	34.482	0.608	1.38	70'	EL	3.448	0.80	0.269	1.32	70'	EL	34.482		
	HS-20(0pr)	36.000	--	1.757	63.236	1.35	0.269	1.76	70'	EL	34.482	0.608	1.79	70'	EL	3.448	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SV	SNSH	13.500	--	2.938	39.656	1.4	0.269	3.78	70'	EL	34.482	0.608	4.12	70'	EL	3.448	0.80	0.269	2.94	70'	EL	34.482	
		SNGARBS2	20.000	--	2.203	44.052	1.4	0.269	2.84	70'	EL	34.482	0.608	2.93	70'	EL	3.448	0.80	0.269	2.20	70'	EL	34.482	
		SNAGRIS2	22.000	--	2.092	46.016	1.4	0.269	2.69	70'	EL	34.482	0.608	2.72	70'	EL	3.448	0.80	0.269	2.09	70'	EL	34.482	
		SNCOTTS3	27.250	--	1.462	39.844	1.4	0.269	1.88	70'	EL	34.482	0.608	2.06	70'	EL	3.448	0.80	0.269	1.46	70'	EL	34.482	
		SNAGGRS4	34.925	--	1.227	42.856	1.4	0.269	1.58	70'	EL	34.482	0.608	1.71	70'	EL	3.448	0.80	0.269	1.23	70'	EL	34.482	
		SNS5A	35.550	--	1.2	42.646	1.4	0.269	1.54	70'	EL	34.482	0.608	1.73	70'	EL	3.448	0.80	0.269	1.20	70'	EL	34.482	
		SNS6A	39.950	--	1.103	44.058	1.4	0.269	1.42	70'	EL	34.482	0.608	1.58	70'	EL	3.448	0.80	0.269	1.10	70'	EL	34.482	
	SNS7B	42.000	--	1.05	44.113	1.4	0.269	1.35	70'	EL	34.482	0.608	1.55	70'	EL	3.448	0.80	0.269	1.05	70'	EL	34.482		
	TTST	TNAGRIT3	33.000	--	1.345	44.401	1.4	0.269	1.73	70'	EL	34.482	0.608	1.88	70'	EL	3.448	0.80	0.269	1.35	70'	EL	34.482	
		TNT4A	33.075	--	1.352	44.717	1.4	0.269	1.74	70'	EL	34.482	0.608	1.83	70'	EL	3.448	0.80	0.269	1.35	70'	EL	34.482	
		TNT6A	41.600	--	1.108	46.073	1.4	0.269	1.43	70'	EL	34.482	0.608	1.65	70'	EL	3.448	0.80	0.269	1.11	70'	EL	34.482	
		TNT7A	42.000	--	1.114	46.794	1.4	0.269	1.43	70'	EL	34.482	0.608	1.62	70'	EL	3.448	0.80	0.269	1.11	70'	EL	34.482	
		TNT7B	42.000	--	1.155	48.526	1.4	0.269	1.49	70'	EL	34.482	0.608	1.51	70'	EL	3.448	0.80	0.269	1.16	70'	EL	34.482	
		TNAGRIT4	43.000	--	1.097	47.174	1.4	0.269	1.41	70'	EL	34.482	0.608	1.46	70'	EL	3.448	0.80	0.269	1.10	70'	EL	34.482	
TNAGT5A		45.000	--	1.033	46.505	1.4	0.269	1.33	70'	EL	34.482	0.608	1.45	70'	EL	3.448	0.80	0.269	1.03	70'	EL	34.482		
TNAGT5B	45.000	3	1.02	45.905	1.4	0.269	1.31	70'	EL	34.482	0.608	1.39	70'	EL	3.448	0.80	0.269	1.02	70'	EL	34.482			

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ_{DC}	γ_{DW}
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

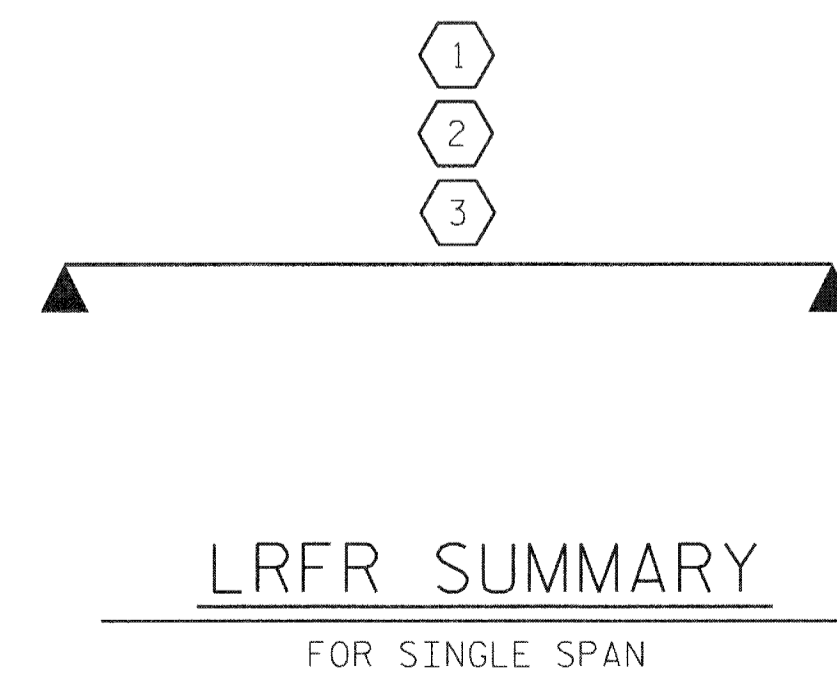
NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.
ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

- 1.
- 2.
- 3.
- 4.

#	CONTROLLING LOAD RATING
1	DESIGN LOAD RATING (HL-93)
2	DESIGN LOAD RATING (HS-20)
3	LEGAL LOAD RATING **
** SEE CHART FOR VEHICLE TYPE	
GIRDER LOCATION	
I - INTERIOR GIRDER EL - EXTERIOR LEFT GIRDER ER - EXTERIOR RIGHT GIRDER	



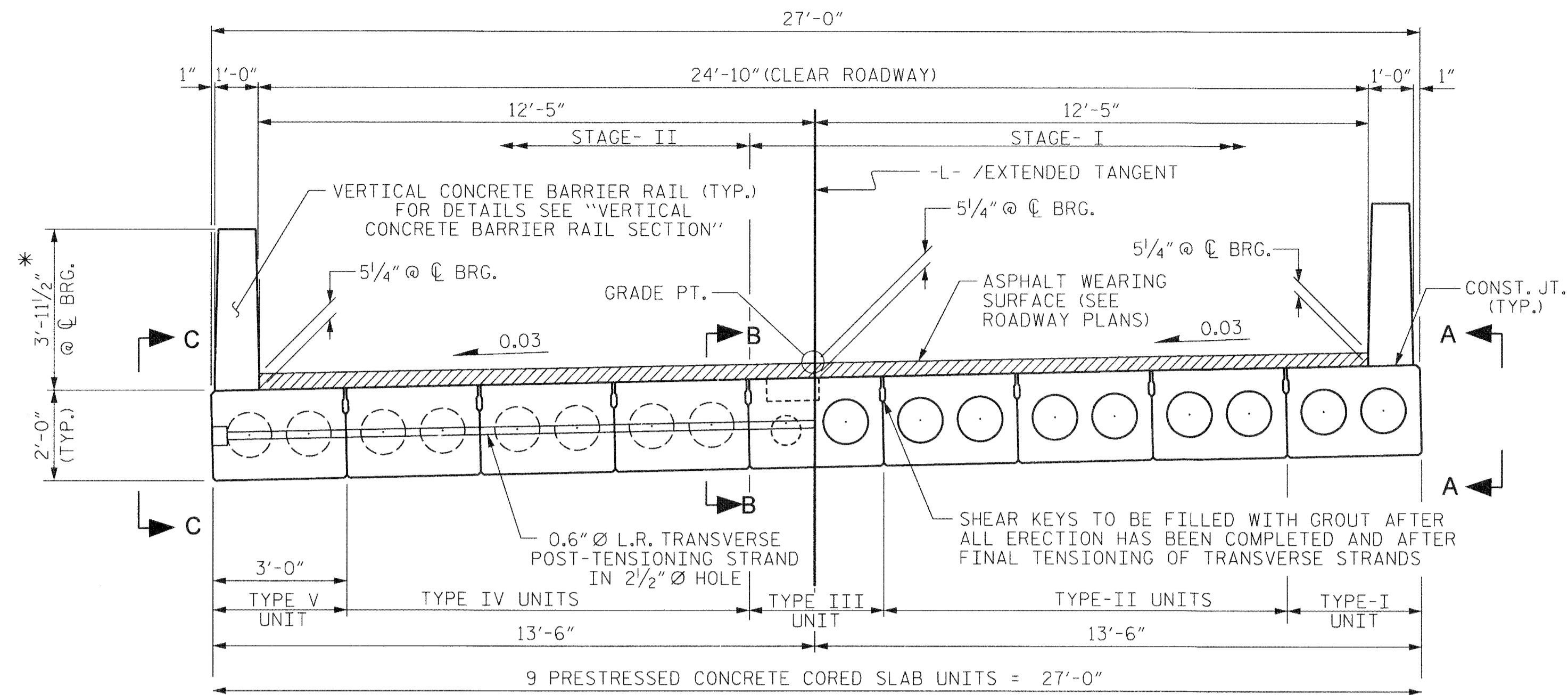
PROJECT NO. BD-5113M
BUNCOMBE COUNTY
STATION: 13+03.50

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
LRFR SUMMARY FOR
70' CORED SLAB UNIT
75° SKEW & 105° SKEW
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			22

ASSEMBLED BY : MAF DATE : 3/13
CHECKED BY : HLW DATE : 3/13
DRAWN BY : CVC 6/10
CHECKED BY : DNS 6/10



HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

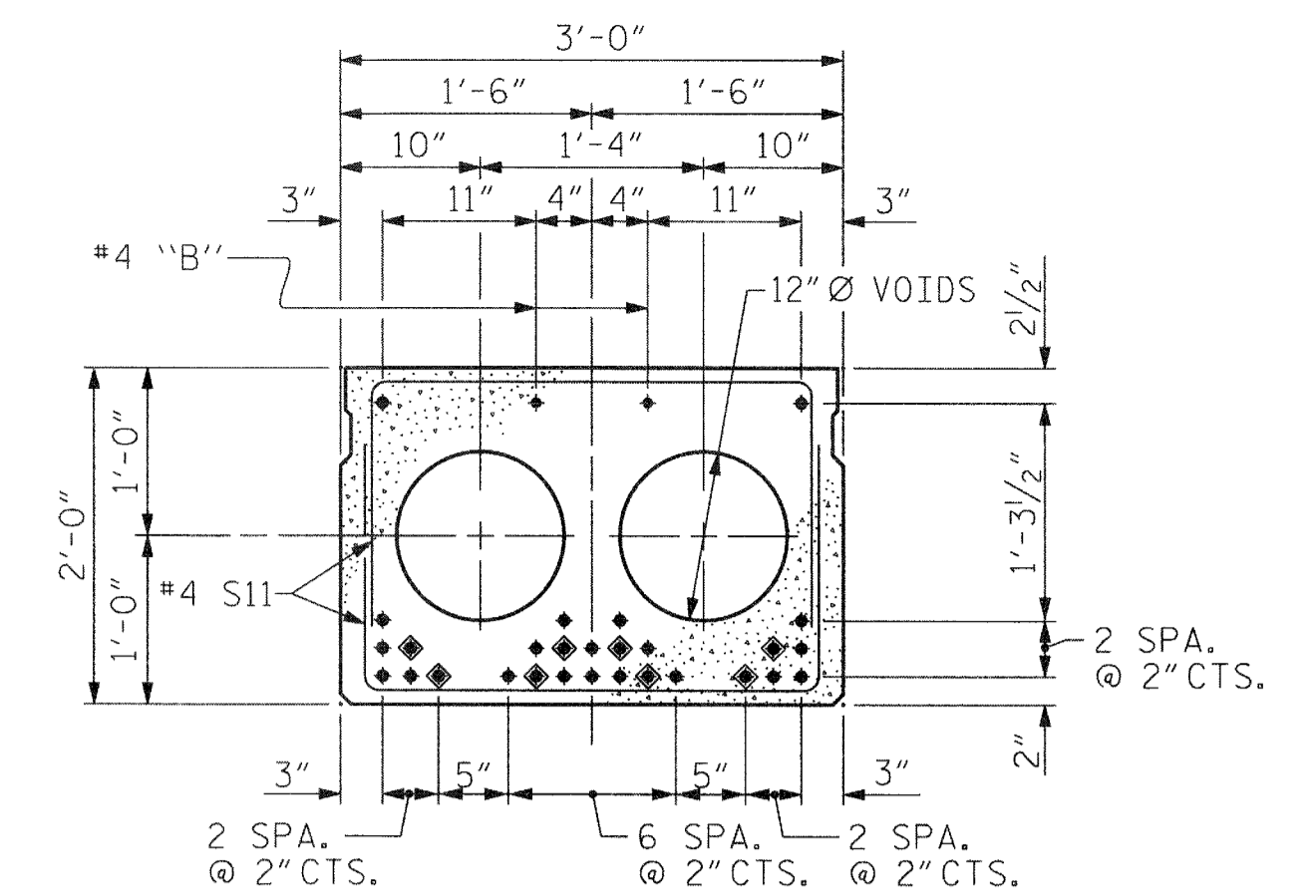
TYPICAL SECTION

HALF SECTION
THROUGH VOIDS

* - THE MAXIMUM BARRIER RAIL HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE BARRIER RAIL AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE BARRIER RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR RAIL HEIGHT DETAILS AND ASPHALT THICKNESS, SEE THE "VERTICAL CONCRETE BARRIER RAIL SECTION" DETAIL.

◆ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 12'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

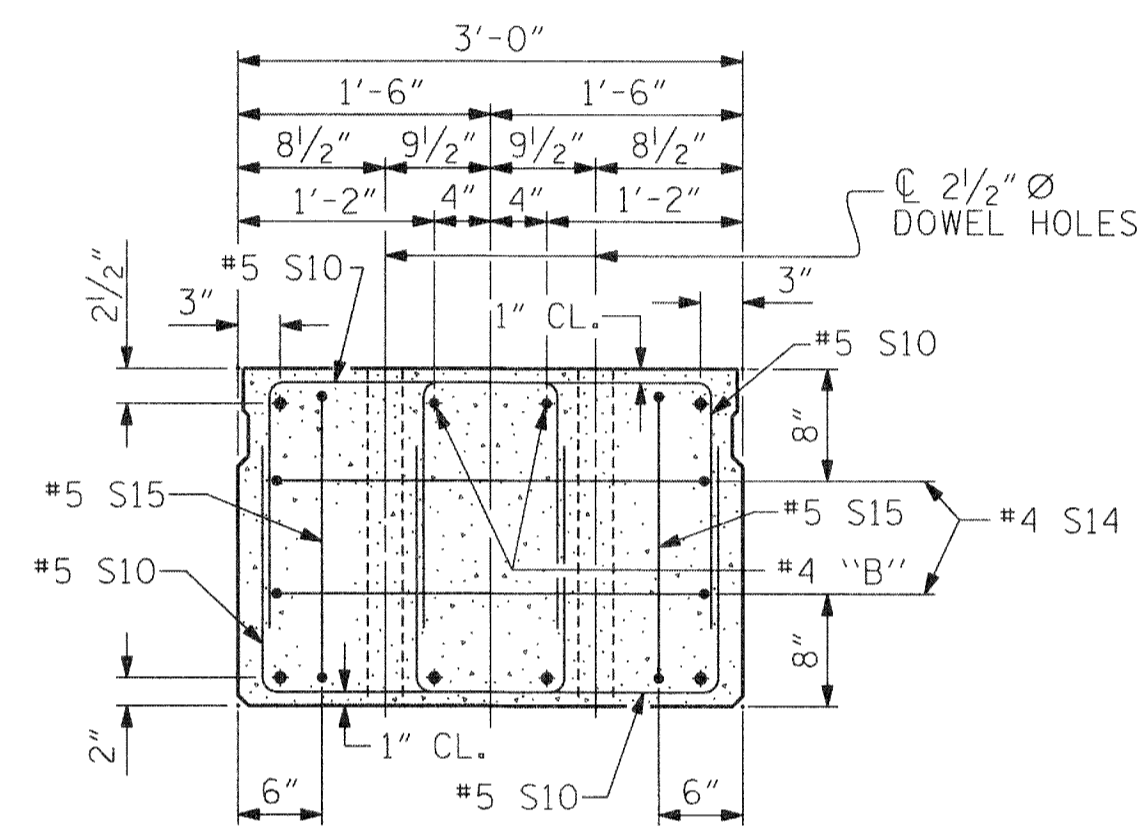
DEBONDING LEGEND



INTERIOR SLAB SECTION (70' UNIT)
(28 STRANDS REQUIRED)

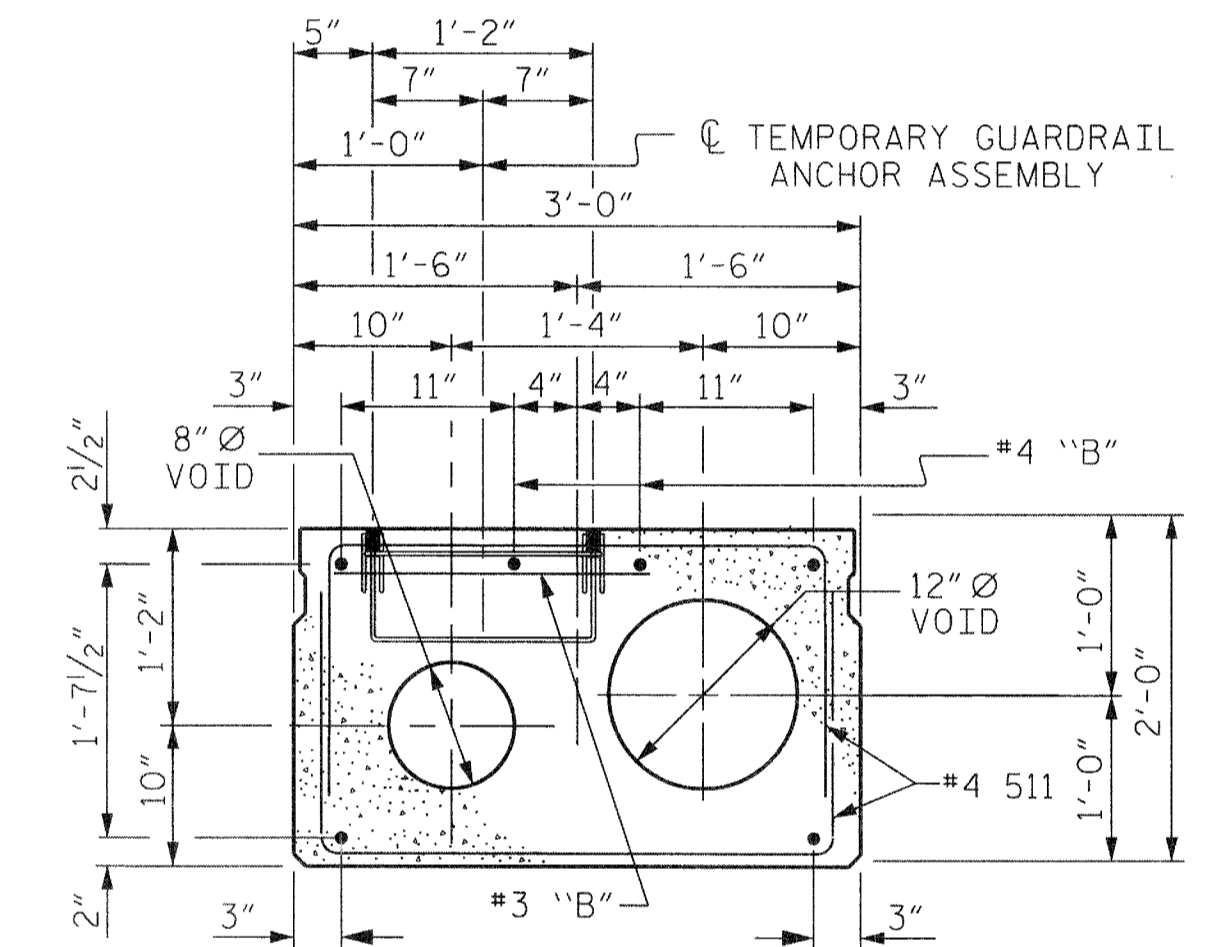
0.6" Ø LOW RELAXATION STRAND LAYOUT

(TYPE I, II, IV & V)



END ELEVATION

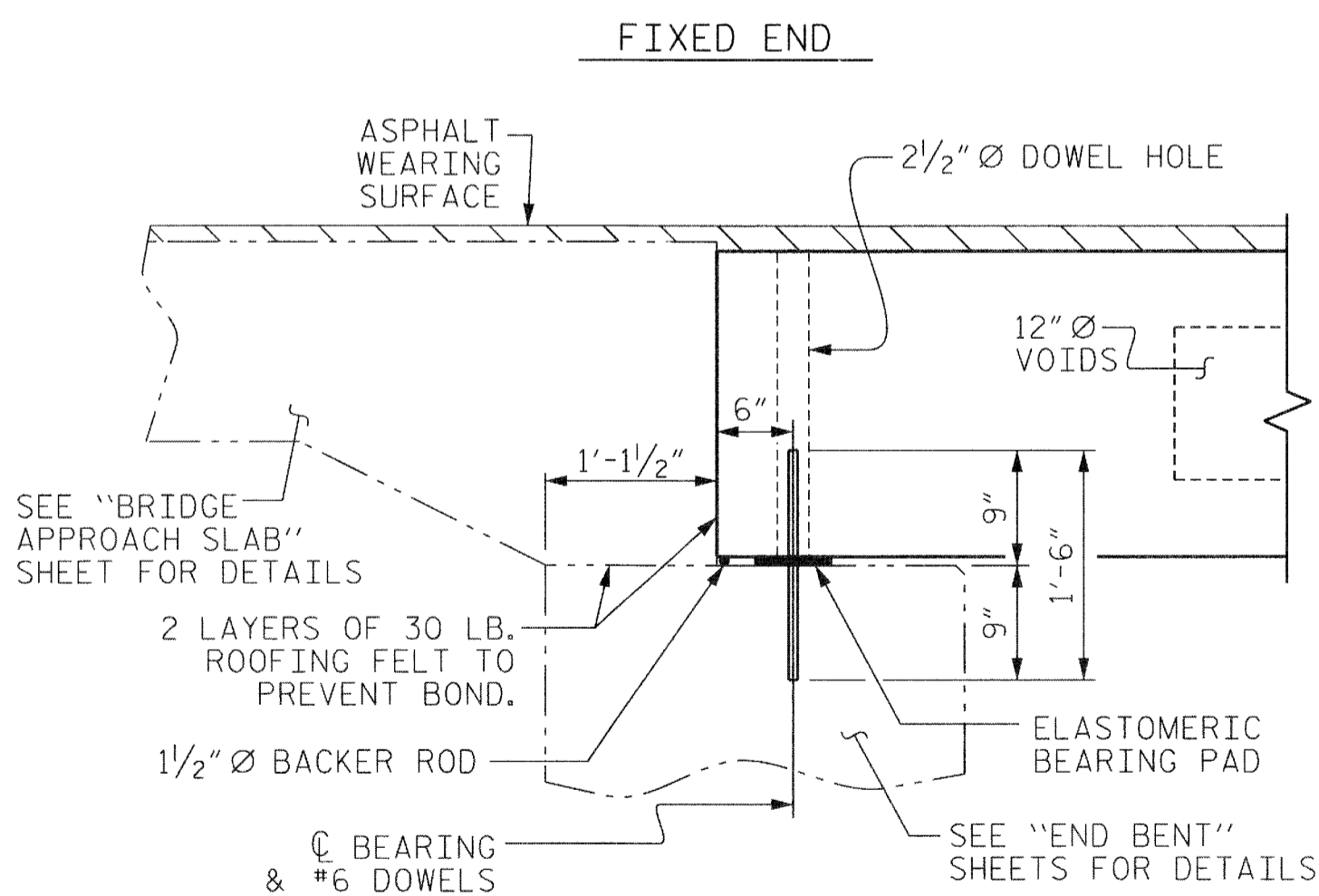
SHOWING PLACEMENT OF DOUBLE STIRRUPS AND LOCATION OF DOWEL HOLES. (STRAND LAYOUT NOT SHOWN.) INTERIOR SLAB UNIT SHOWN-EXTERIOR SLAB UNIT SIMILAR EXCEPT SHEAR KEY LOCATION.



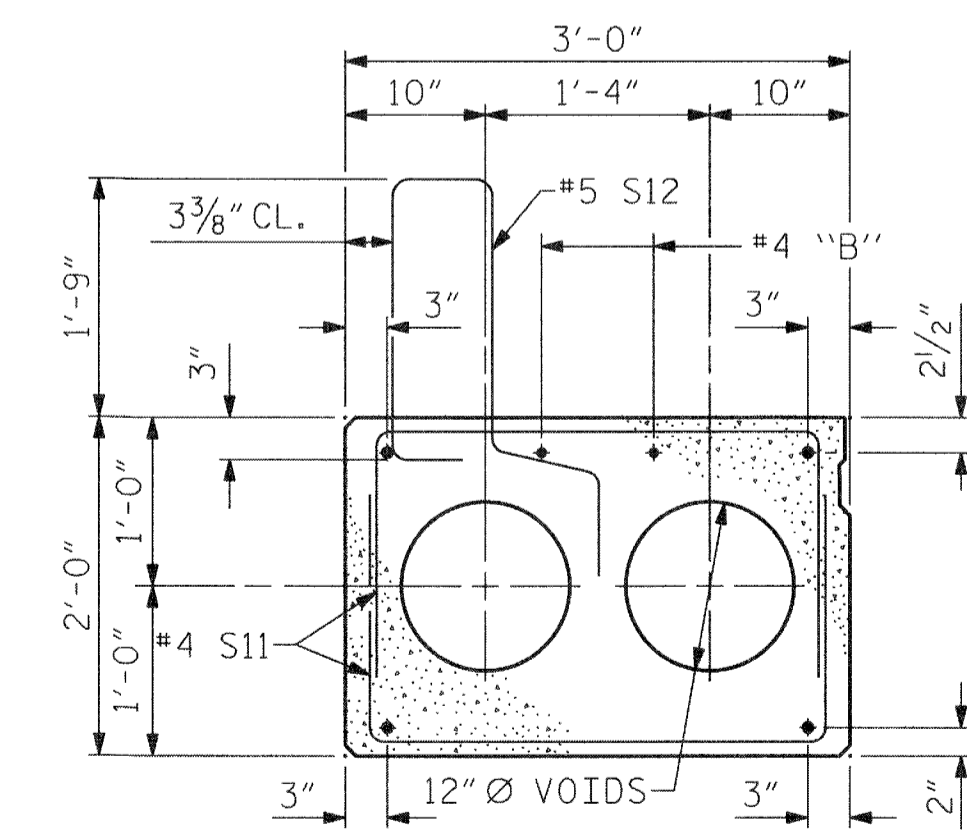
INTERIOR SLAB SECTION
TYPE III

(FOR PRESTRESSED STRAND LAYOUT, SEE "INTERIOR SLAB SECTION - TYPE I, II, IV & V")

FOR TEMPORARY GUARDRAIL ANCHOR ASSEMBLY LOCATION, SEE SECTION OF ANCHOR ASSEMBLY LOCATION ON "ANCHORAGE DETAILS FOR TEMPORARY GUARDRAIL ANCHOR ASSEMBLY FOR TYPE IV CORED SLAB UNIT" SHEET.

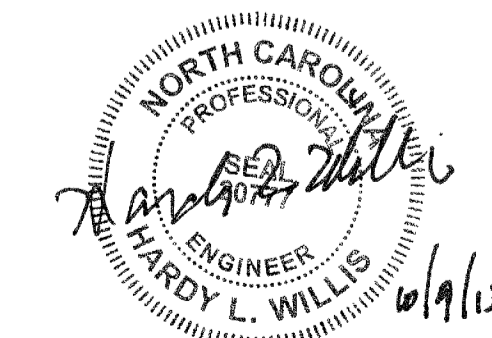


SECTION AT END BENT



EXTERIOR SLAB SECTION

(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)

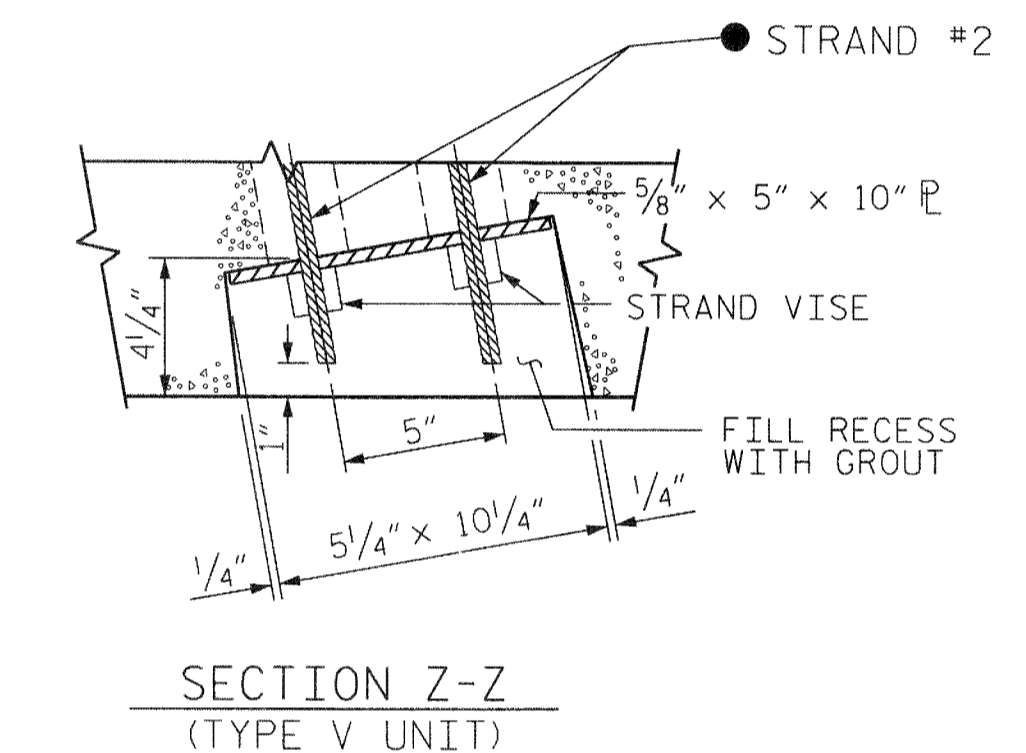
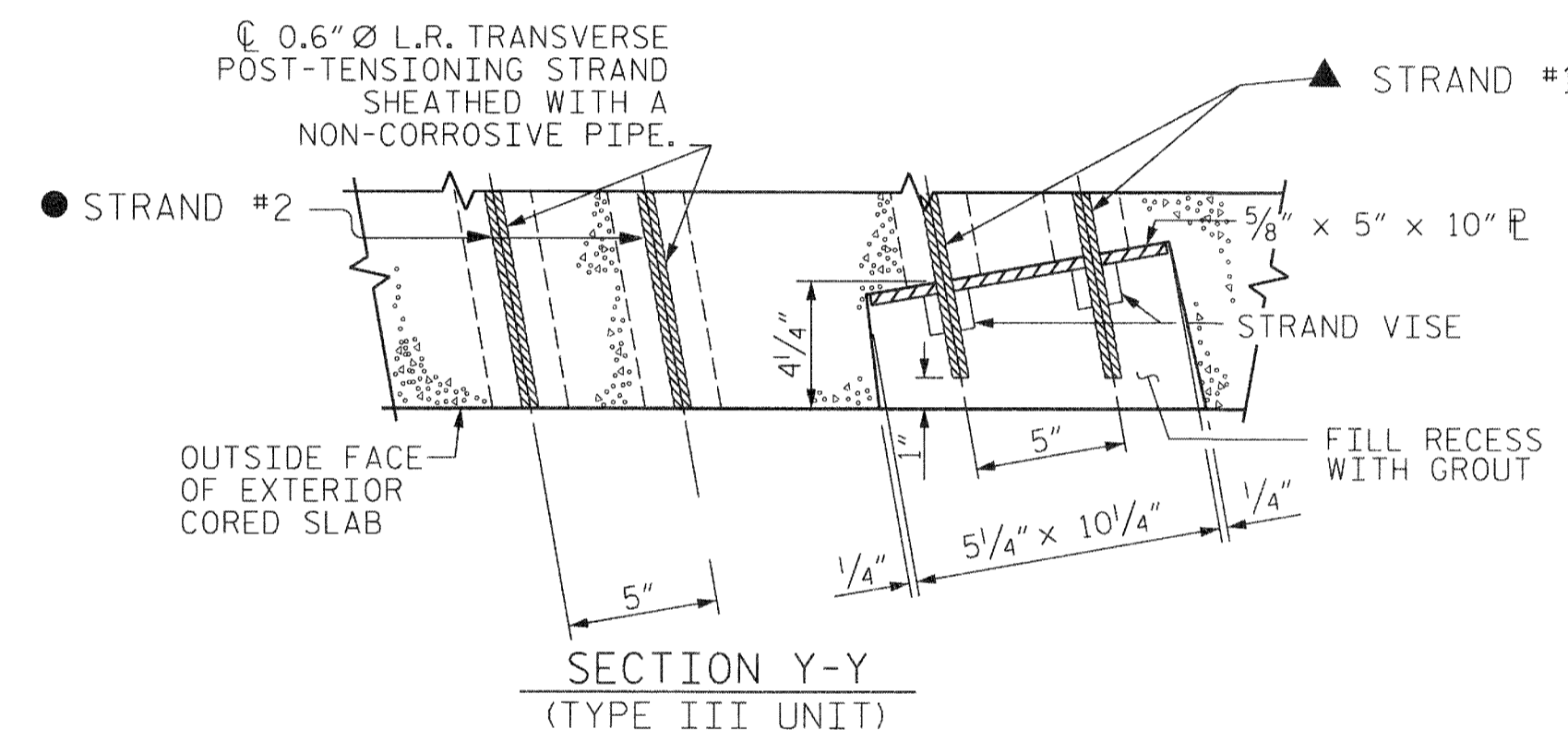
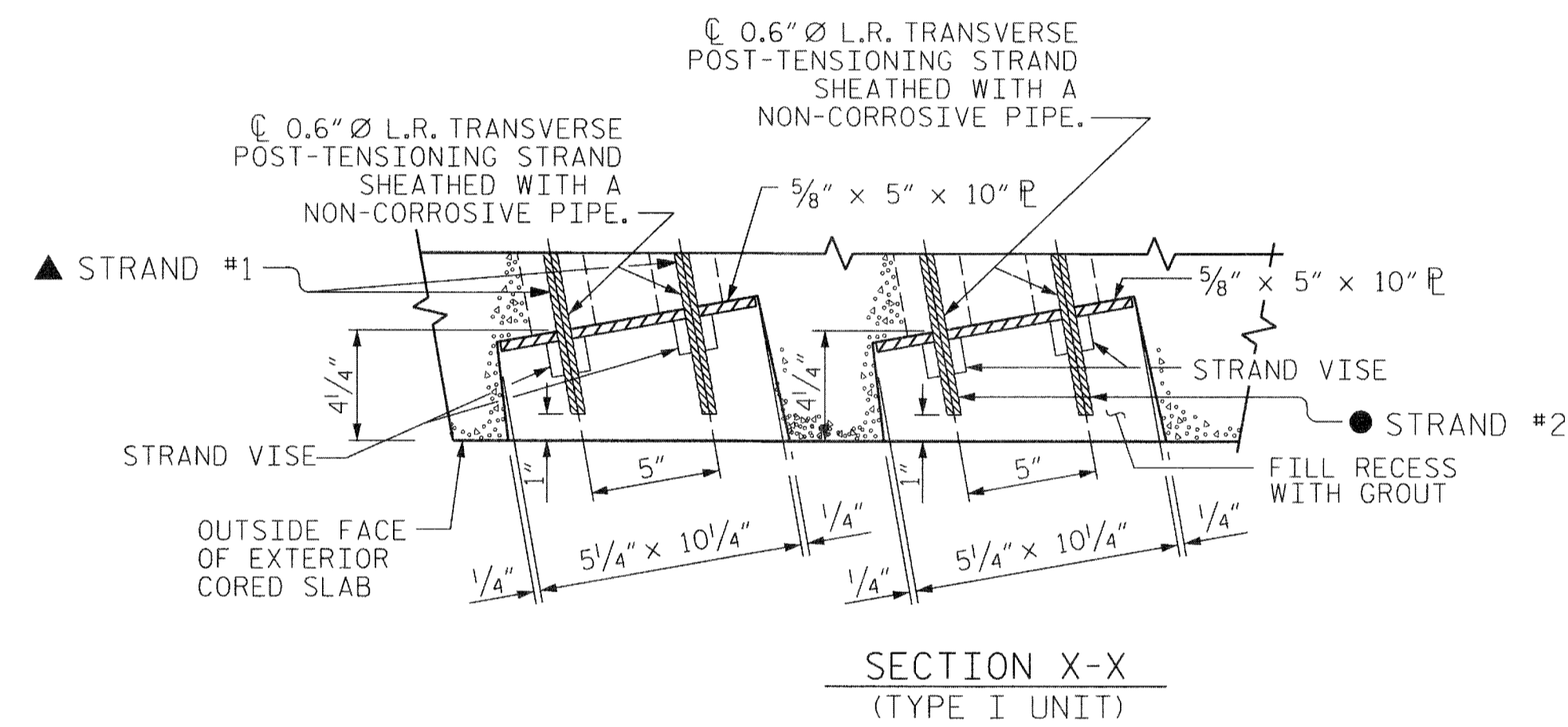
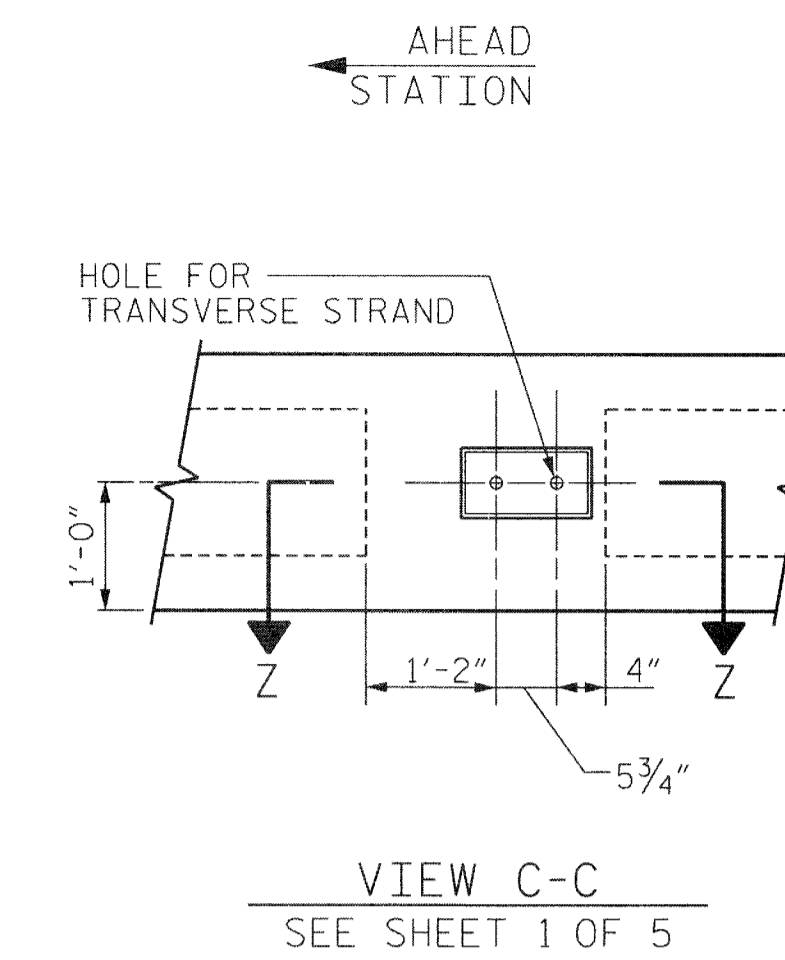
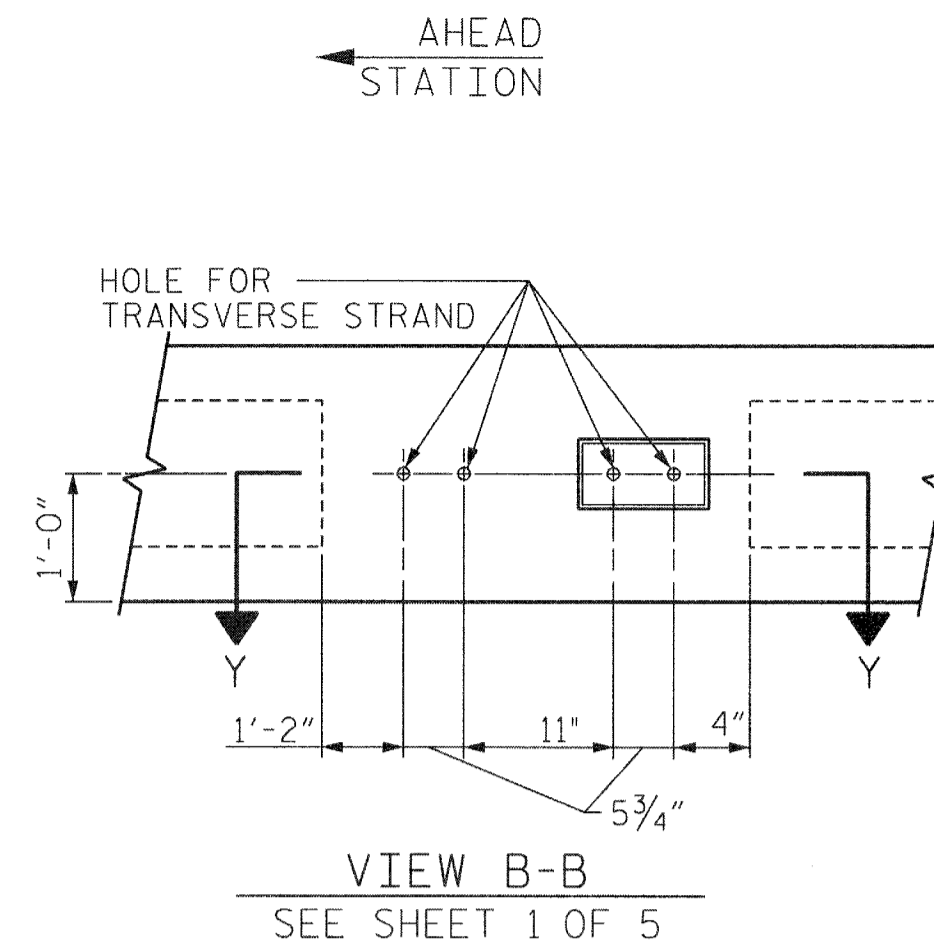
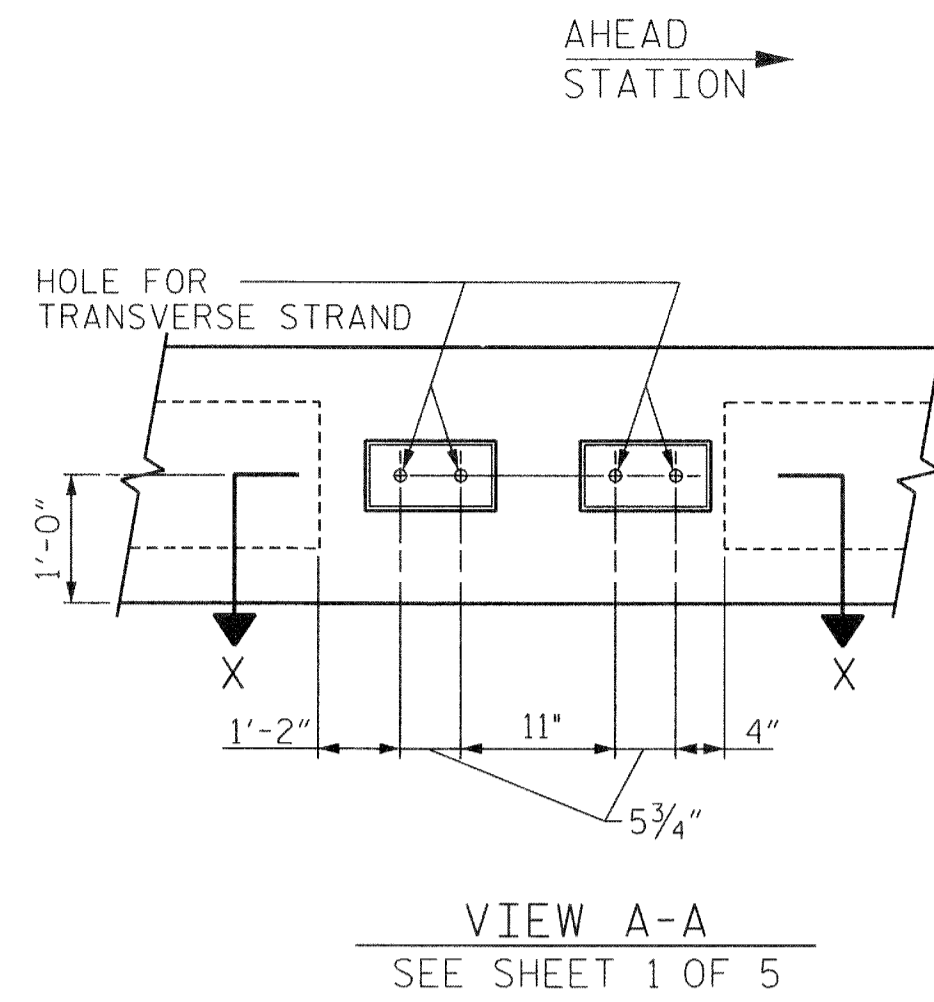


ASSEMBLED BY :	MAF	DATE :	3/13
CHECKED BY :	HLW	DATE :	3/13
DRAWN BY :	MAA	6/10	REV. 12/11
CHECKED BY :	MKT	7/10	MAA/AAC

PROJECT NO. BD-5113M
BUNCOMBE COUNTY
 STATION: 13+03.50 -L-

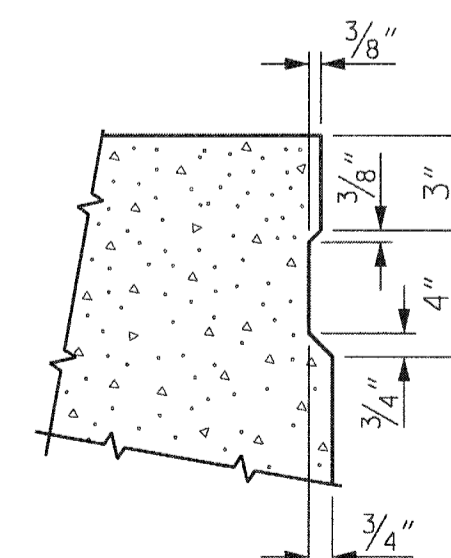
SHEET 1 OF 5

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD					
3'-0" X 2'-0" PRESTRESSED CONCRETE CORED SLAB UNIT					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-5
					TOTAL SHEETS 22

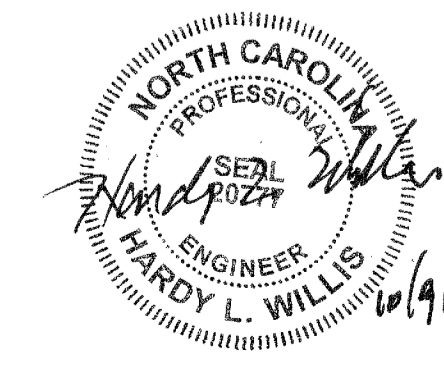


▲ STRANDS #1 GO THROUGH 5 CORED SLAB UNITS (TO BE TENSIONED DURING STAGE I CONSTRUCTION). ● STRANDS #2 GO THROUGH ALL 9 CORED SLAB UNITS (TO BE TENSIONED DURING STAGE II CONSTRUCTION).

GROUTED RECESS AT END OF POST-TENSIONED STRAND



SHEAR KEY DETAIL
NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR CORED SLABS.

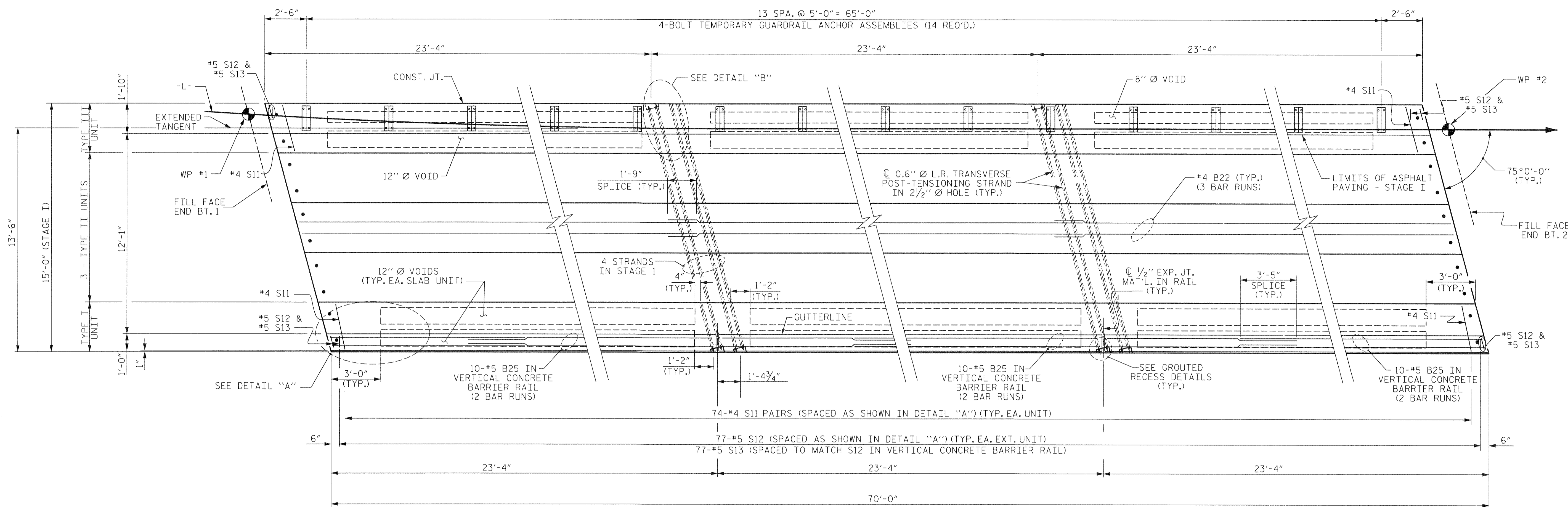


PROJECT NO. BD-5113M
BUNCOMBE COUNTY
 STATION: 13+03.50 -L-

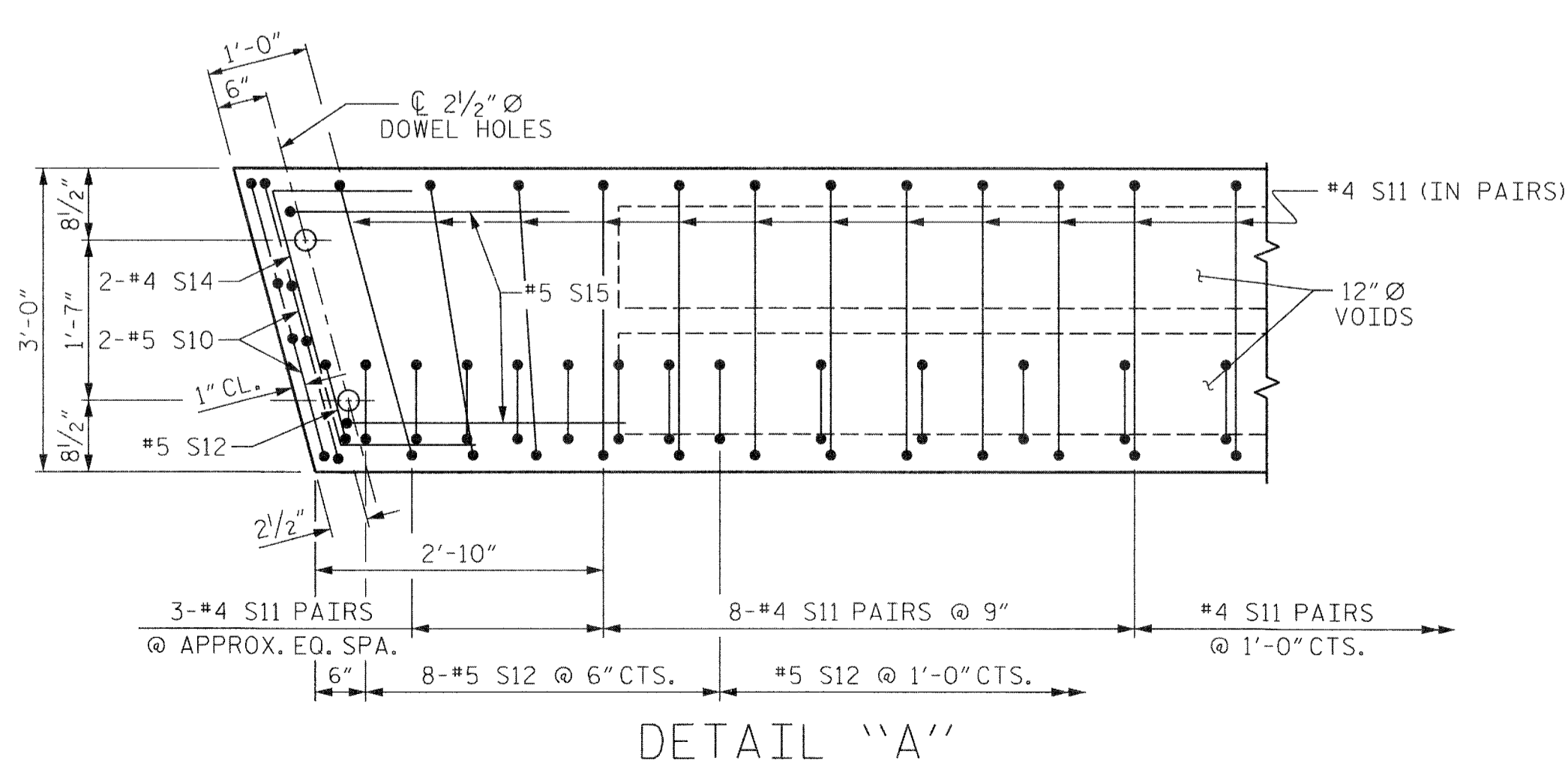
SHEET 2 OF 5

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH STANDARD 3'-0" X 2'-0" PRESTRESSED CONCRETE CORED SLAB UNIT					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S-6
TOTAL SHEETS					22

DRAWN BY :	MAF	DATE :	3/13
CHECKED BY :	HLW	DATE :	3/13

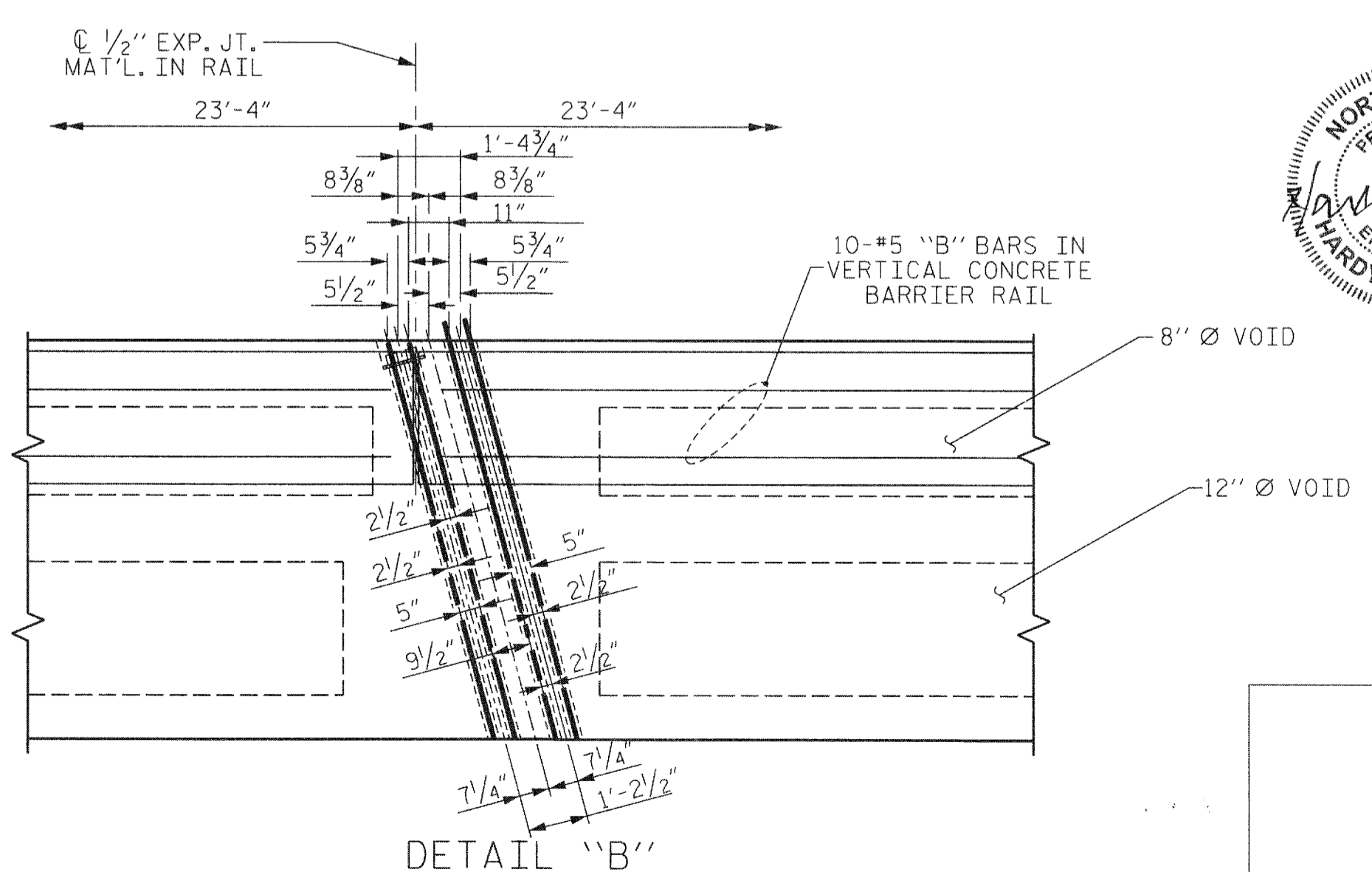


PLAN OF UNIT - STAGE I



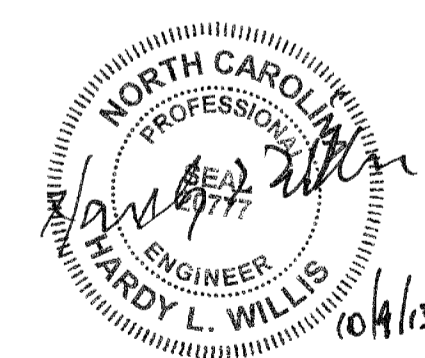
DETAIL "A"

NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S12 BARS.



DETAIL "B"

#4 S11 BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO GROUDED RECESS AND 2 1/2" Ø TRANSVERSE POST-TENSIONING STRAND HOLES



PROJECT NO. BD-5113M
BUNCOMBE COUNTY
 STATION: 13+03.50 -L-

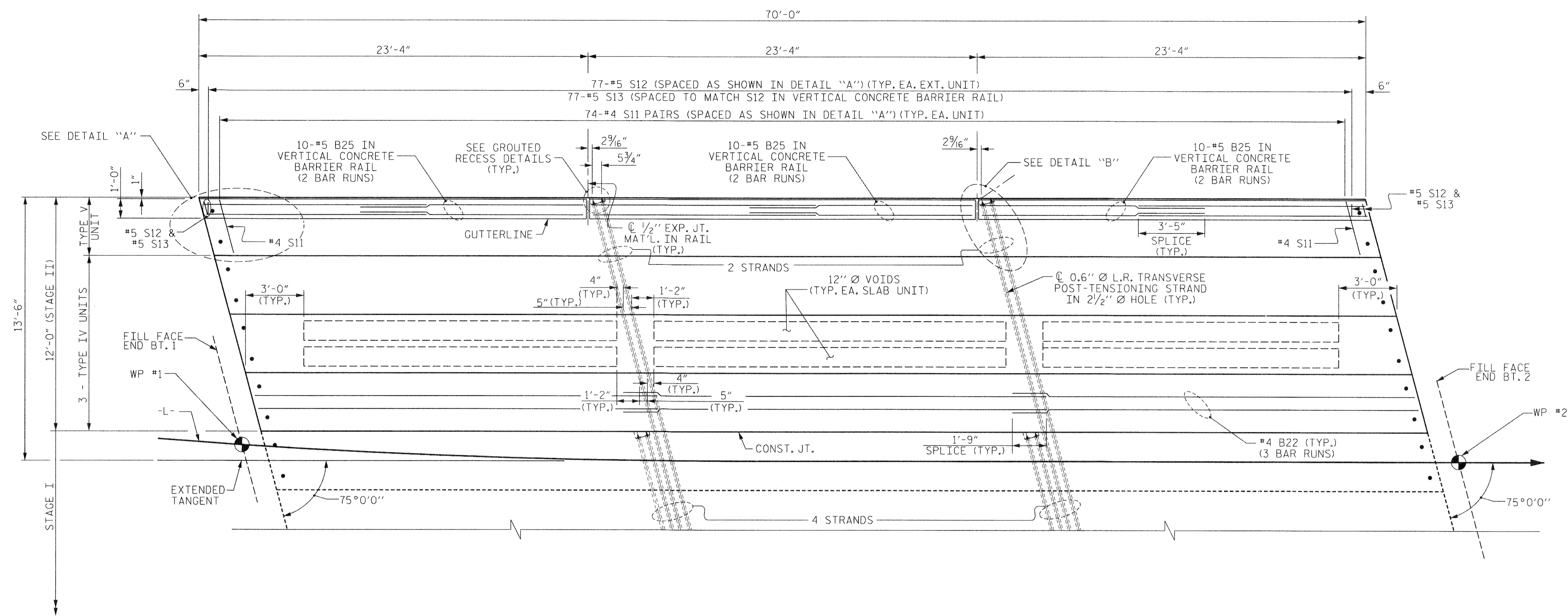
SHEET 4 OF 5

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 PLAN OF 70' UNIT
 24'-10" CLEAR ROADWAY
 75° SKEW
 STAGE I

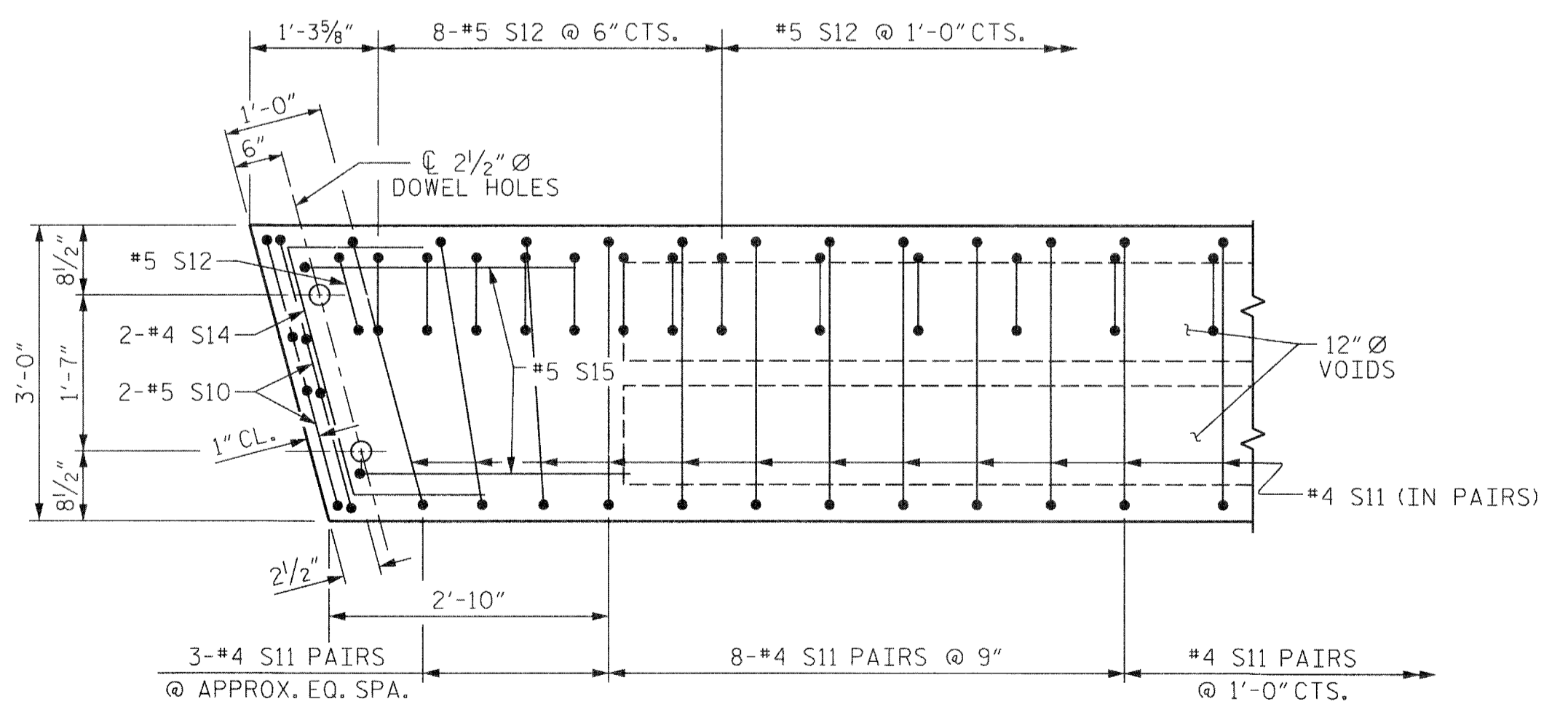
ASSEMBLED BY :	MAF	DATE :	3/13
CHECKED BY :	HLW	DATE :	3/13
DRAWN BY :	MAA 6/10	REV. 12/5/11	MAA/AAC
CHECKED BY :	MKT 7/10		

*****SYTIME*****
 *****SDGN*****
 *****USERNAME*****

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7	
1			3			TOTAL SHEETS	
2			4			22	

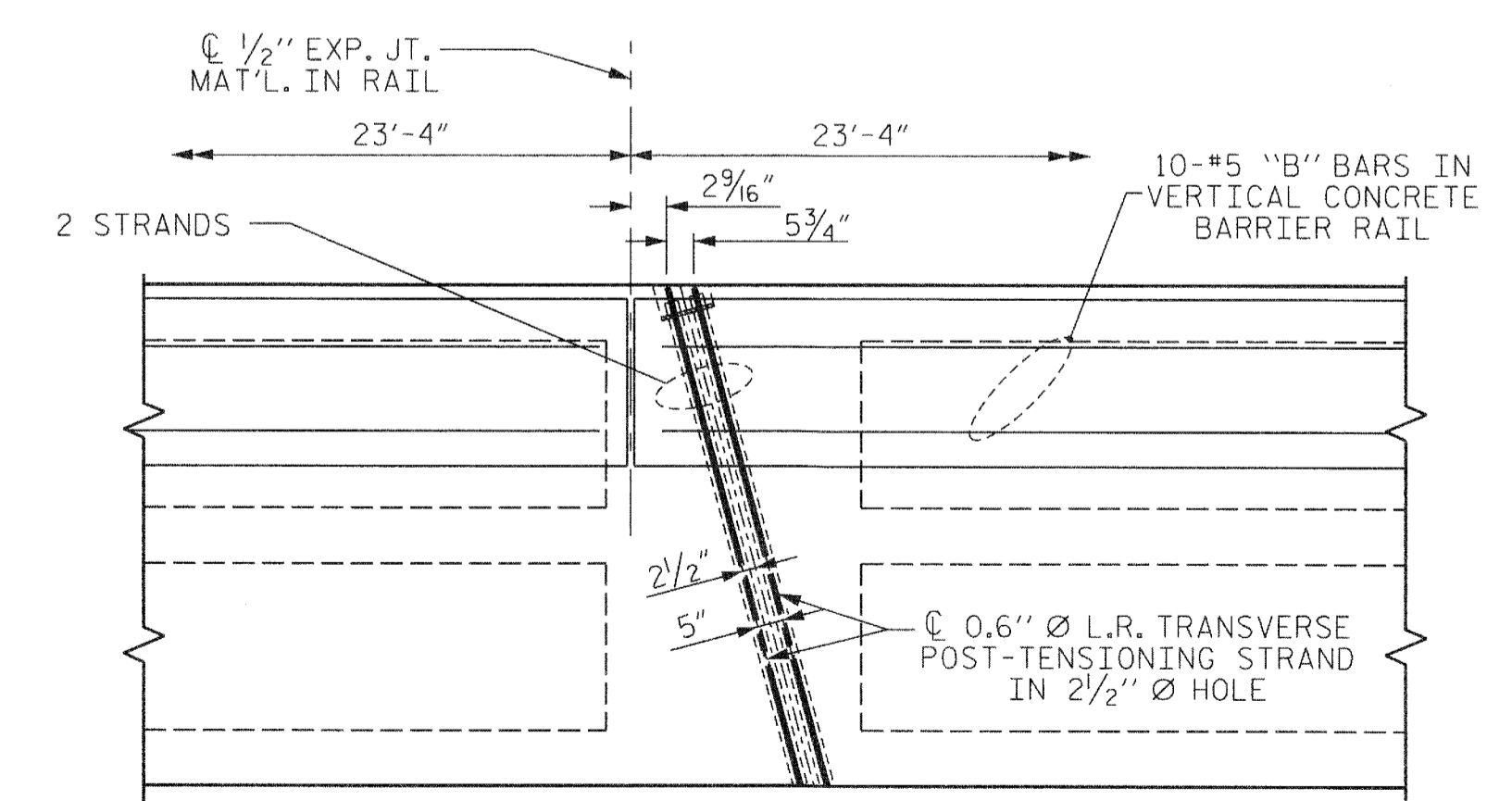


PLAN OF UNIT - STAGE II



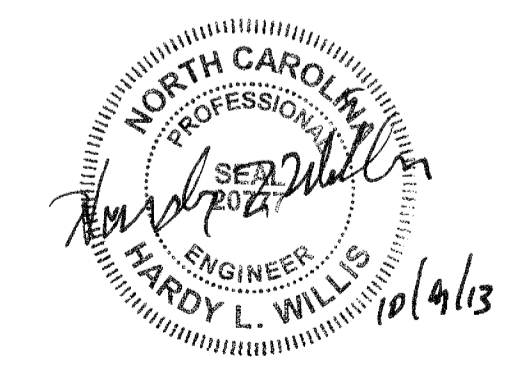
DETAIL "A"

NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S12 BARS.



DETAIL "B"

#4 S11 BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO GROUDED RECESS AND 2 1/2" Ø TRANSVERSE POST-TENSIONING STRAND HOLES



PROJECT NO. BD-5113M
BUNCOMBE COUNTY
 STATION: 13+03.50 -L-
 SHEET 4 OF 5

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 PLAN OF 70' UNIT
 24'-10" CLEAR ROADWAY
 75° SKEW
 STAGE II

ASSEMBLED BY :	MAF	DATE :	3/13
CHECKED BY :	HLW	DATE :	3/13
DRAWN BY :	MAA	6/10	REV. 12/5/11
CHECKED BY :	MKT	7/10	MAA/AAC

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8	
1			3			TOTAL SHEETS	
2			4			22	

*****SYTIME*****
 *****SDGN*****
 *****USERNAME*****

NOTES

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL CAST WITH THE CORED SLAB SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE CORED SLABS.

RECESSES FOR TRANSVERSE STRANDS SHALL BE GROUTED AFTER THE TENSIONING OF THE STRANDS.

THE 2 1/2" Ø DOWEL HOLES AT FIXED ENDS OF SLAB SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT.

THE BACKER RODS SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER, SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

WHEN CORED SLABS ARE CAST, AN INTERNAL HOLD-DOWN SYSTEM SHALL BE EMPLOYED TO PREVENT VOIDS FROM RISING OR MOVING SIDEWAYS. AT LEAST SIX WEEKS PRIOR TO CASTING CORED SLABS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND COMMENT, DETAILED DRAWINGS OF THE PROPOSED HOLD-DOWN SYSTEM. IN ADDITION TO STRUCTURAL DETAILS, LOCATION AND SPACING OF THE HOLD-DOWNS SHALL BE INDICATED.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE CORED SLAB UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN THE REQUIRED STRENGTH SHOWN IN THE "CONCRETE RELEASE STRENGTH" TABLE.

ALL REINFORCING STEEL IN VERTICAL CONCRETE BARRIER RAILS SHALL BE EPOXY COATED.

PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE CORED SLAB UNIT ENDS.

APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

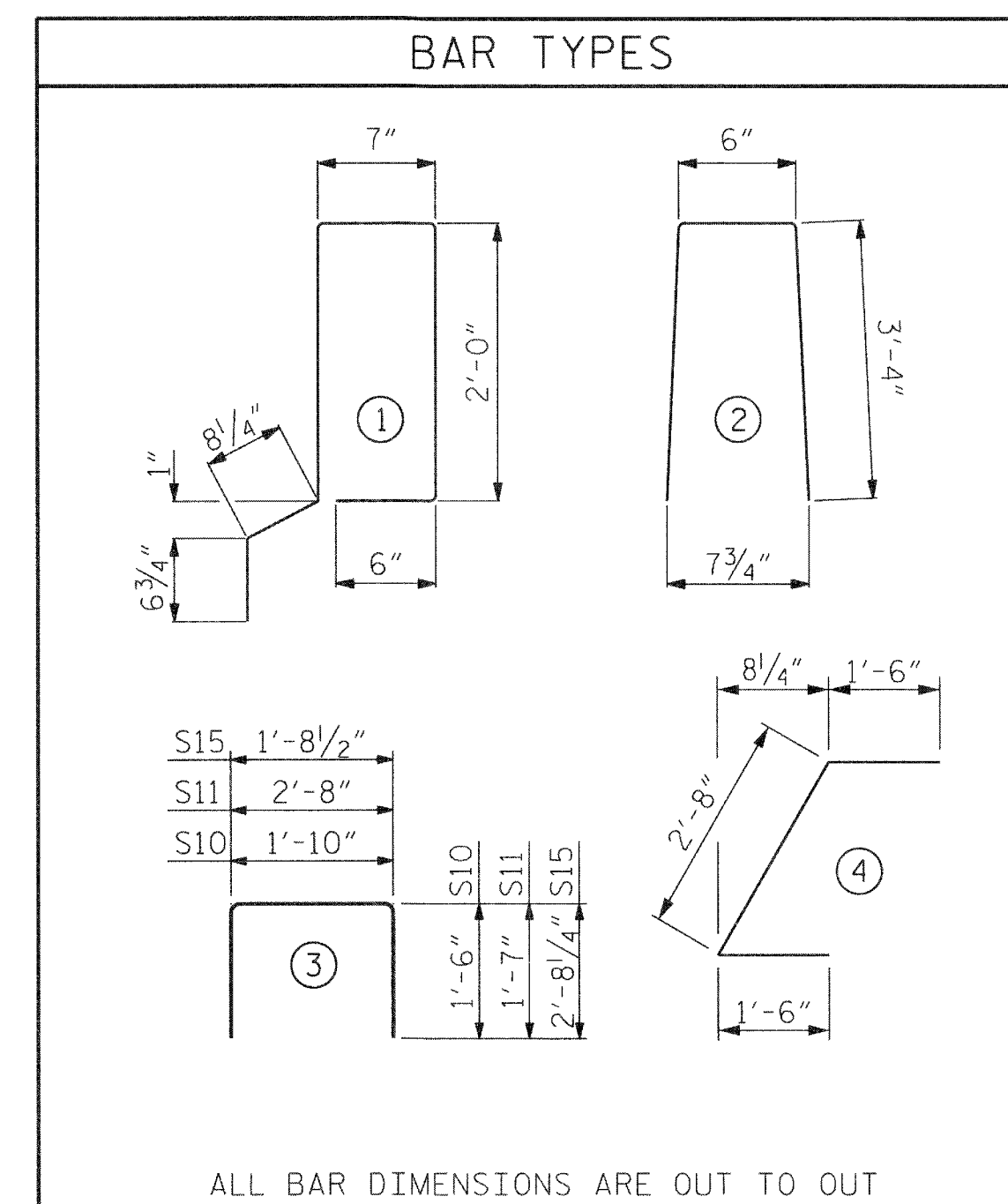
GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

TRANSVERSE POST TENSIONING OF THE CORED SLAB UNITS SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

MAINTAIN A SYMMETRIC TENSION FORCE BETWEEN EACH PAIR OF TRANSVERSE POST TENSIONING STRANDS IN THE DIAPHRAGM.

THE #4 S11 STIRRUPS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO THE GROUTED RECESS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

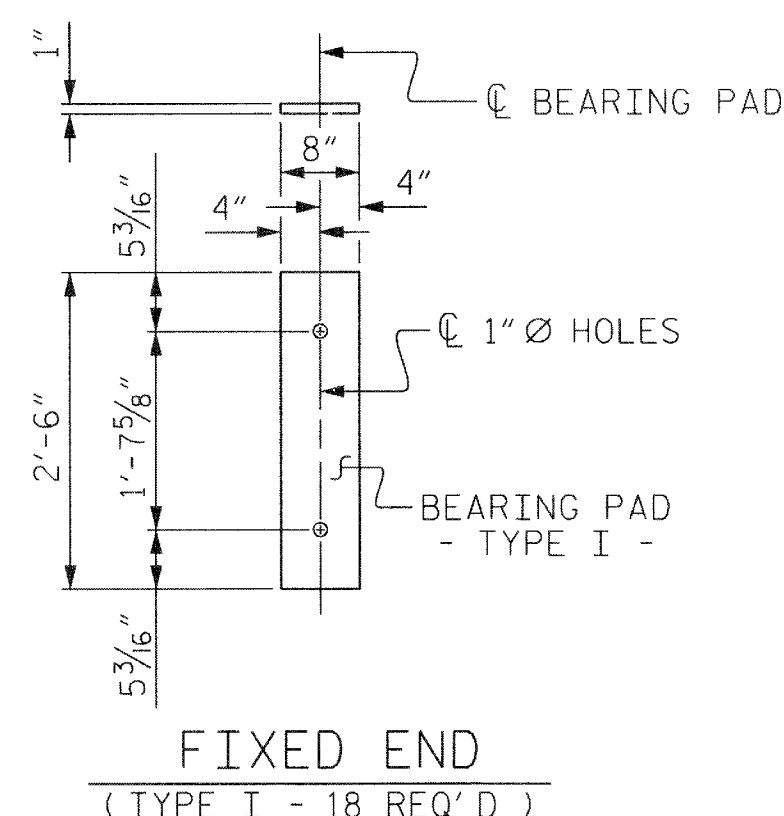


ALL BAR DIMENSIONS ARE OUT TO OUT

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT		
27' NC and SUPER ELEV	ASPHALT OVERLAY THICKNESS @ MID-SPAN	RAIL HEIGHT @ MID-SPAN
70' UNITS	1 3/4"	3'-8"

DEAD LOAD DEFLECTION AND CAMBER	
3'-0" X 2'-0"	
70' CORED SLAB UNIT	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	4 5/16" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	1 3/16" ↓
FINAL CAMBER	3 1/2" ↑

** INCLUDES FUTURE WEARING SURFACE



ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.

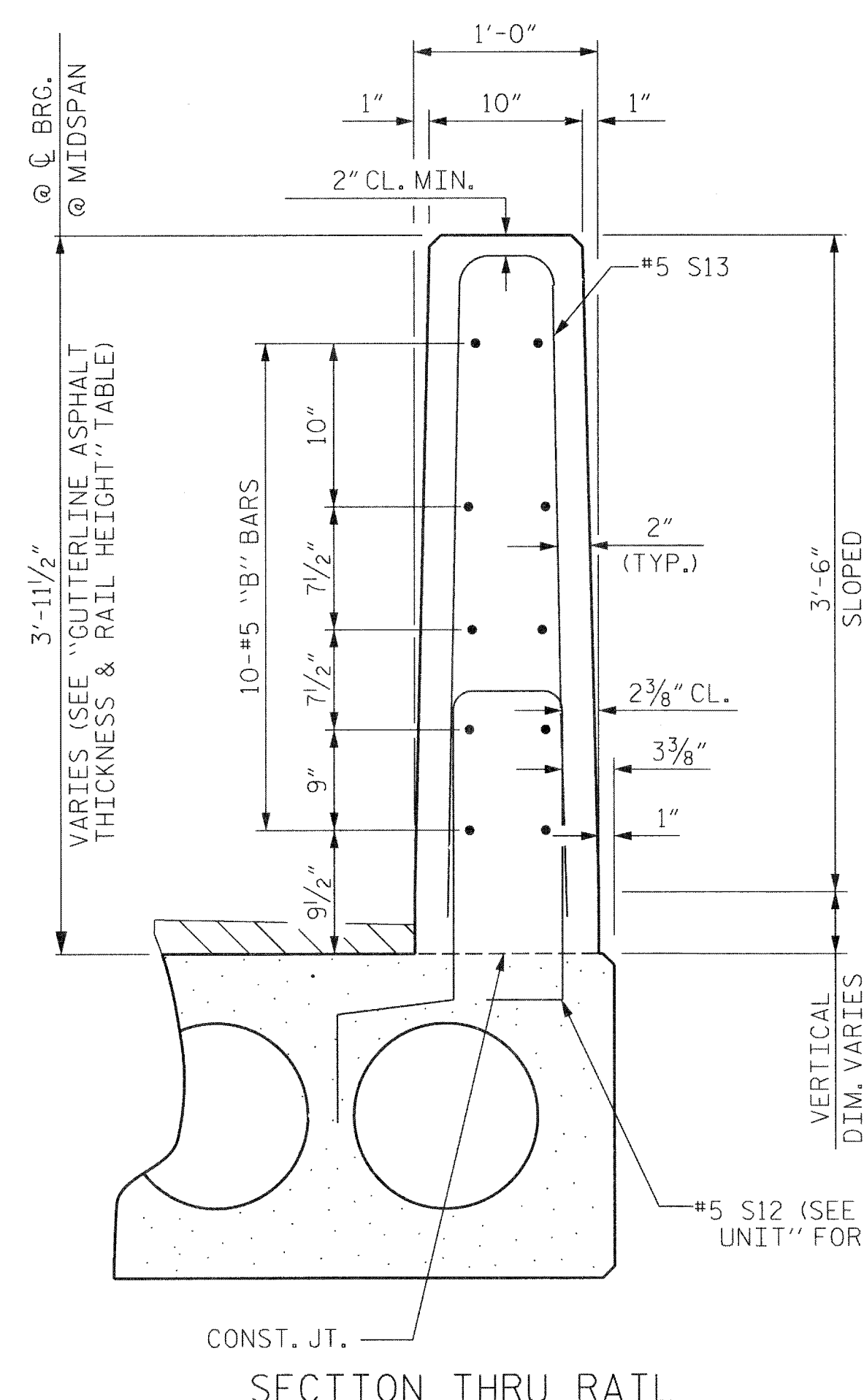
CORED SLABS REQUIRED			
70' UNIT	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR C.S.	2	70'-0"	140'-0"
INTERIOR C.S.	7	70'-0"	490'-0"
TOTAL			630'-0"

BILL OF MATERIAL FOR ONE 70' CORED SLAB UNIT							
BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT		INTERIOR UNIT	
				LENGTH	WEIGHT	LENGTH	WEIGHT
B22	6	#4	STR	24'-6"	98	24'-6"	98
S10	8	#5	3	4'-10"	40	4'-10"	40
S11	148	#4	3	5'-10"	577	5'-10"	577
*S12	79	#5	1	6'-4"	522		
S14	4	#4	4	5'-8"	15	5'-8"	15
S15	4	#5	3	7'-1"	30	7'-1"	30
REINFORCING STEEL				LBS.	760	LBS.	760
* EPOXY COATED REINFORCING STEEL				LBS.	522		
9000 P.S.I. CONCRETE				CU. YDS.	12.0	CU. YDS.	12.0
0.6" Ø L.R. STRANDS				No.	28		28

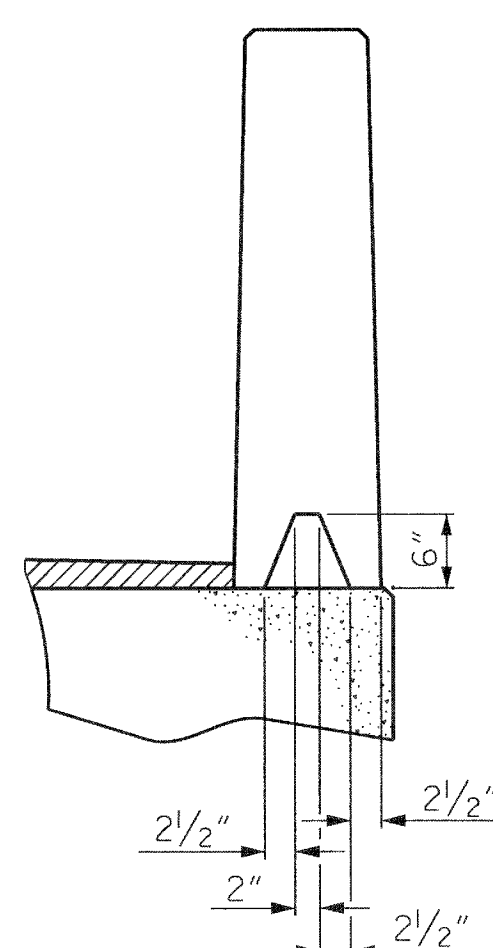
BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL						
BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
70' UNIT						
*B25	120	120	#5	STR	13'-8"	1711
*S13	158	158	#5	2	7'-2"	1181
* EPOXY COATED REINFORCING STEEL				LBS.		2892
CLASS AA CONCRETE				CU. YDS.		18.9
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN. FT.		140.26

CONCRETE RELEASE STRENGTH	
UNIT	PSI
70' UNITS	5500

GRADE 270 STRANDS	
AREA (SQUARE INCHES)	0.6" Ø L.R.
ULTIMATE STRENGTH (LBS. PER STRAND)	58,600
APPLIED PRESTRESS (LBS. PER STRAND)	43,950

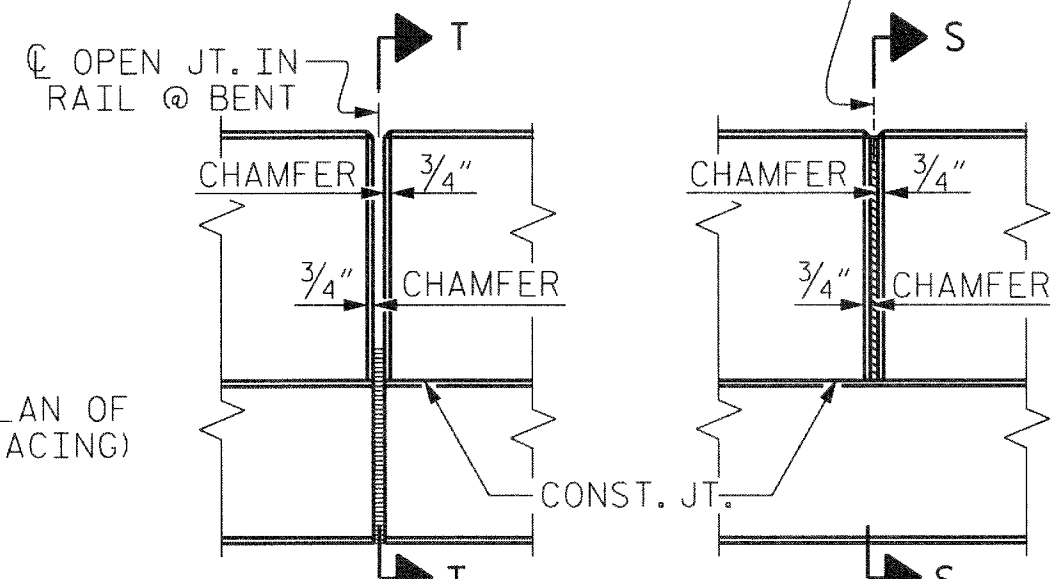


SECTION THRU RAIL

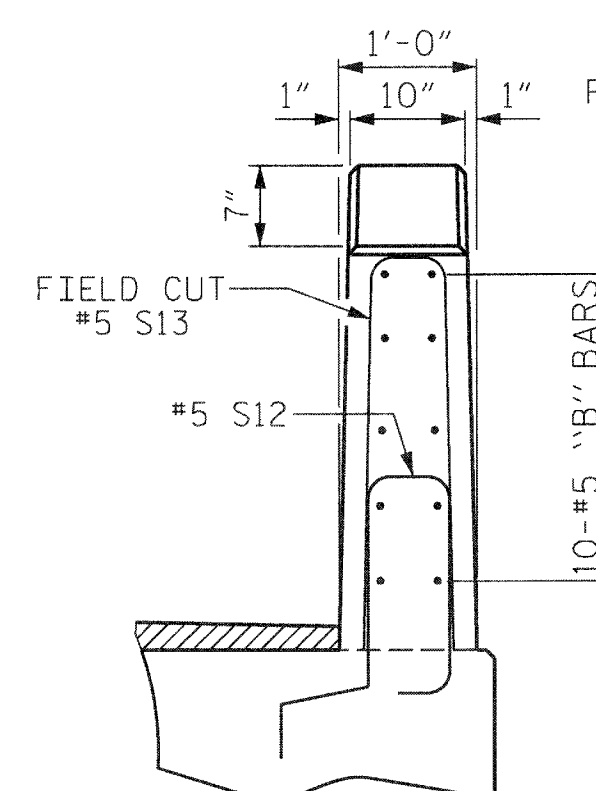


SECTION S-S AT DAM IN OPEN JOINT (THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)

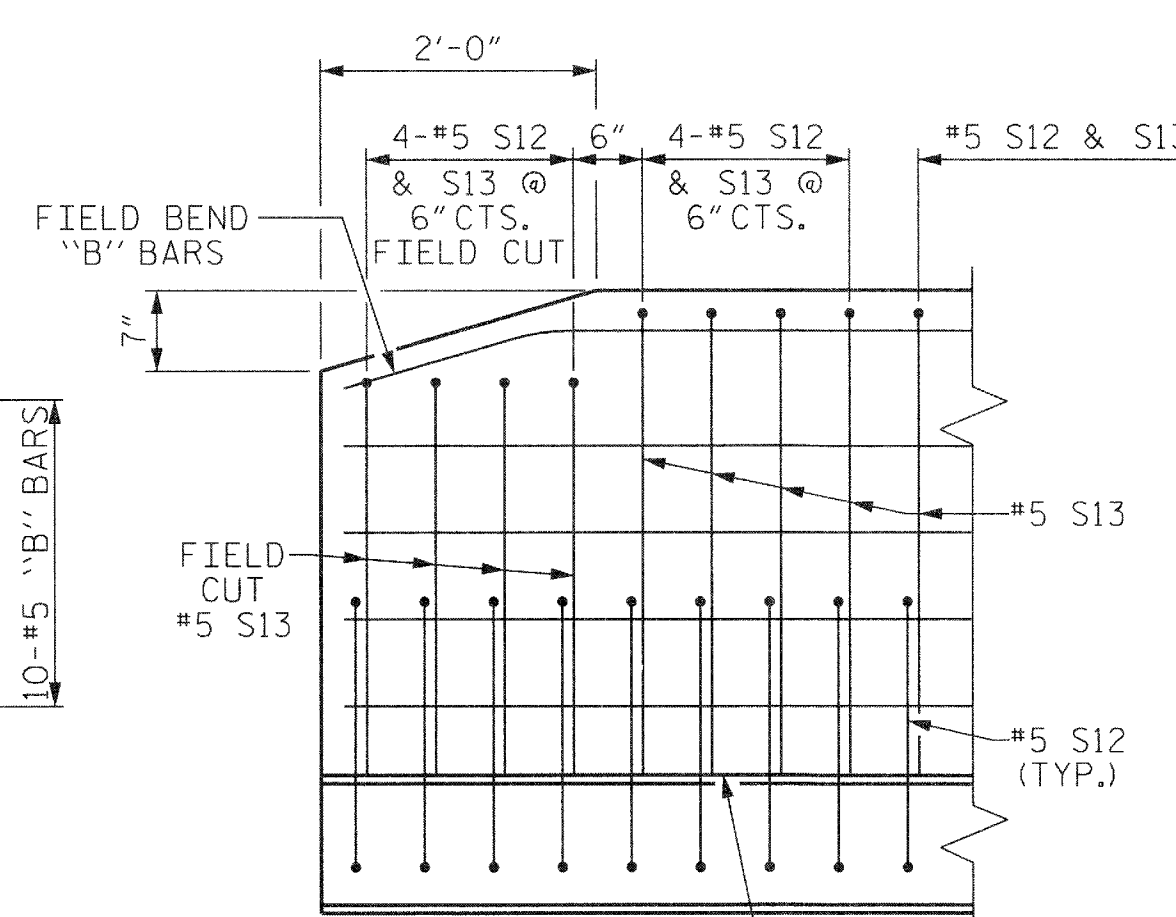
1/2" EXP. JT. MAT'L HELD IN PLACE WITH GALVANIZED NAILS. (NOTE: OMIT EXP. JT. MAT'L. WHEN SLIP FORM IS USED)



ELEVATION AT EXPANSION JOINTS



END VIEW



SIDE VIEW

END OF RAIL DETAILS

ASSEMBLED BY :	MAF	DATE :	3/13
CHECKED BY :	HLW	DATE :	3/13
DRAWN BY :	MAA 6/10	REV. 12/11	MAA/AAC
CHECKED BY :	MKT 7/10		

PROJECT NO. BD-5113M

BUNCOMBE COUNTY

STATION: 13+03.50 -L-

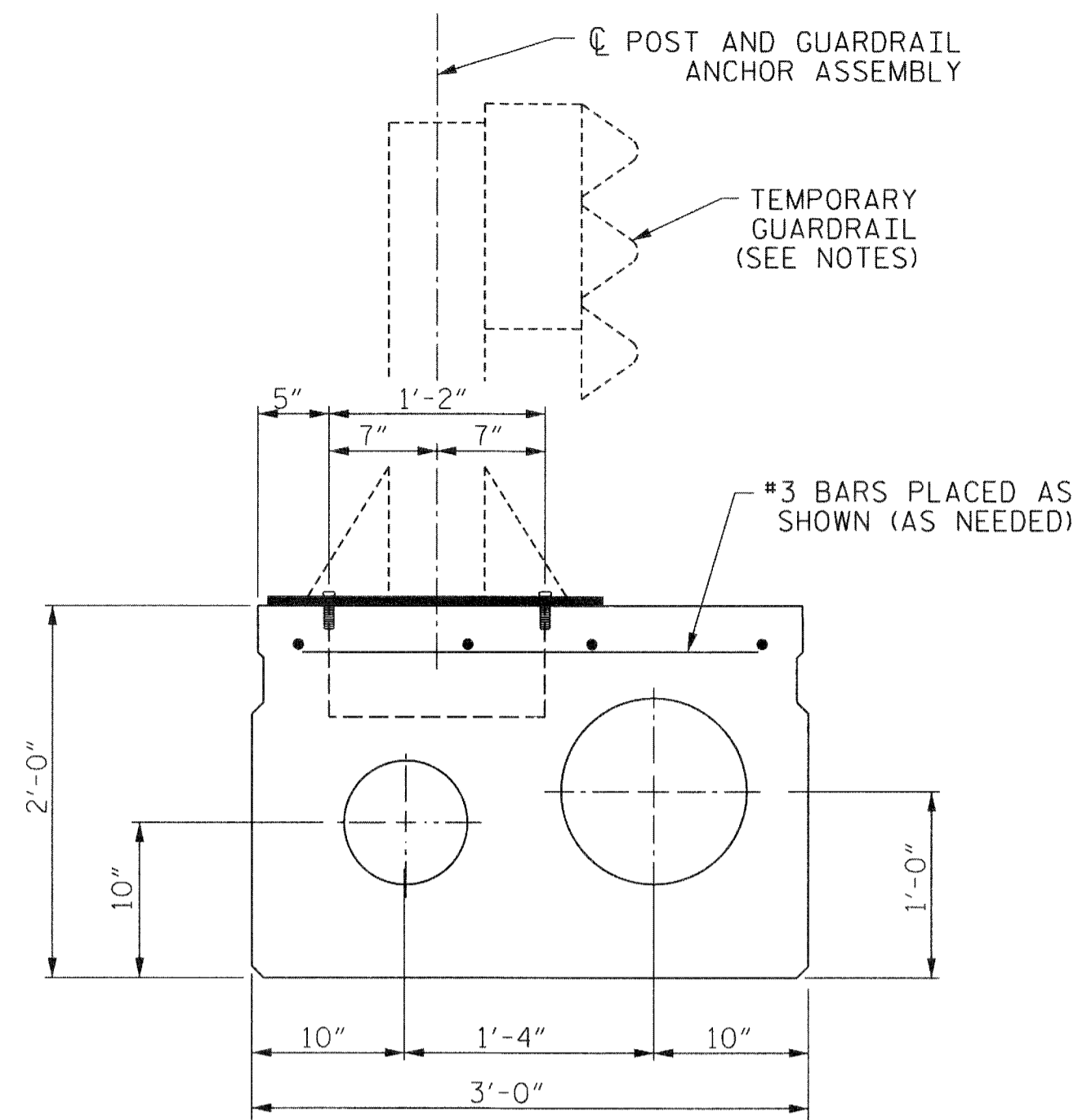
SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

3'-0" X 2'-0"
PRESTRESSED CONCRETE
CORED SLAB UNIT

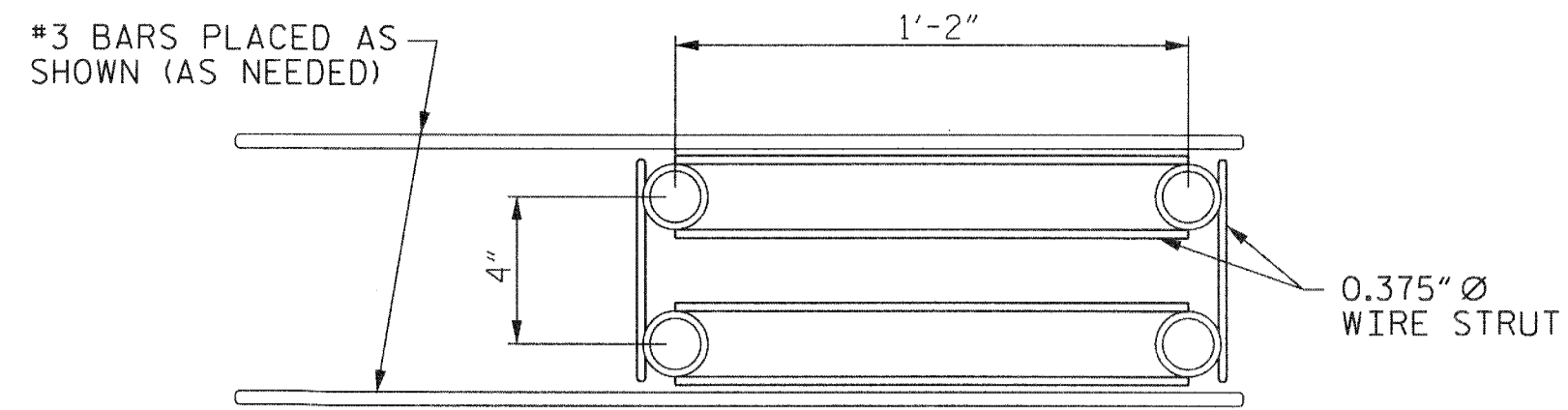
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS 22
2			4			

STD. NO. 24PCS3-27_75&105S

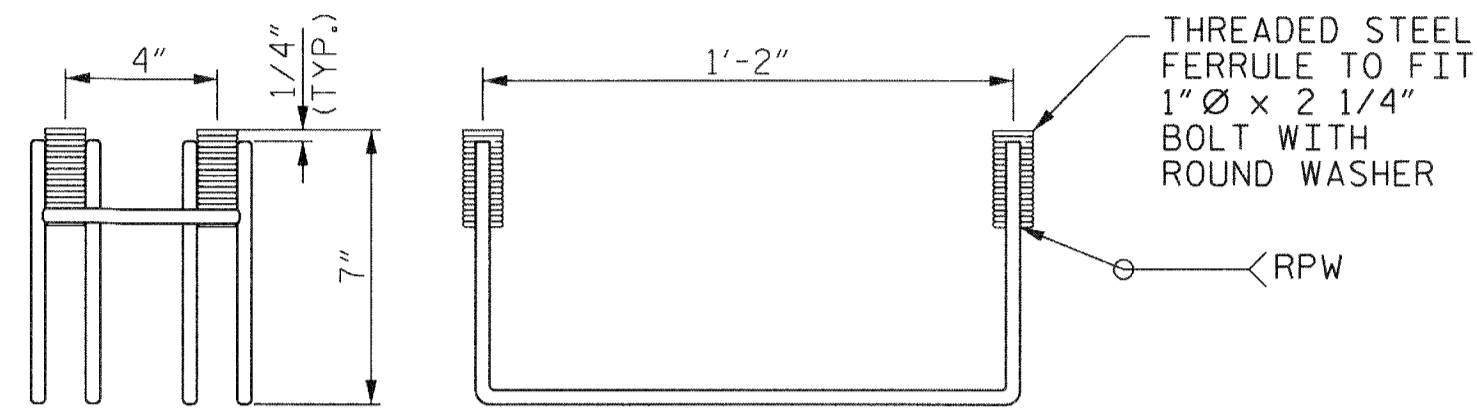


SECTION OF ANCHOR ASSEMBLY LOCATION

(TYPE IV UNIT - STAGE I)
 THE #3 BARS ARE INCIDENTAL AND THEIR COST SHALL BE INCLUDED IN THE PRICE BID FOR THE PRESTRESSED CONCRETE CORED SLABS.



PLAN



SIDE VIEW

ELEVATION

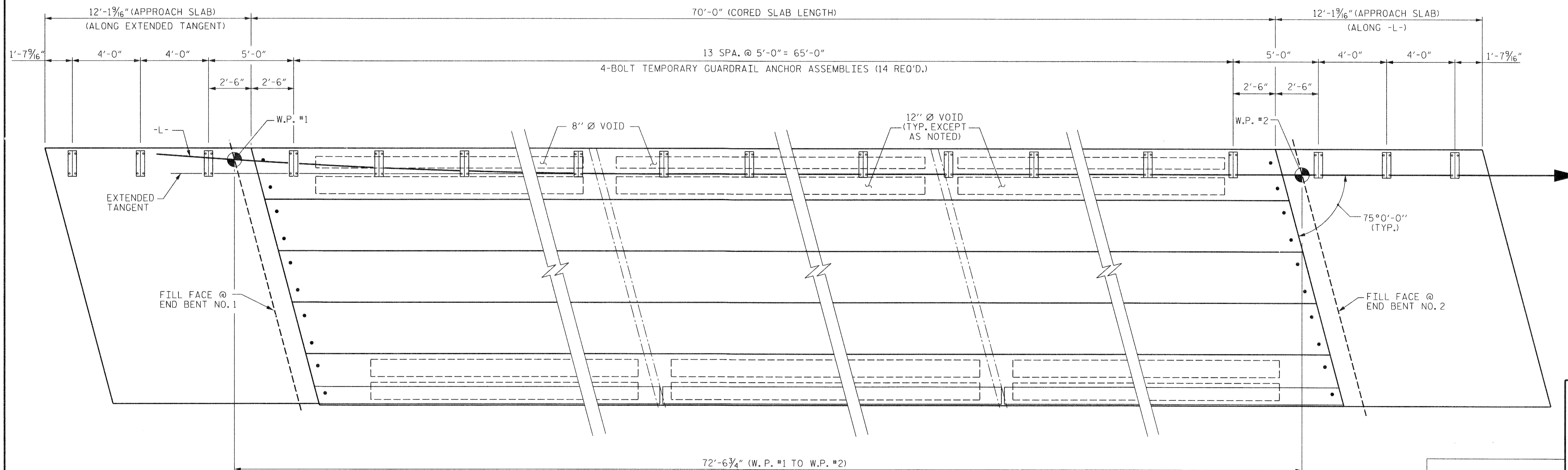
MINIMUM LENGTH OF THREADS IN INSERT (FERRULE): 2 1/2"

TEMPORARY GUARDRAIL ANCHOR ASSEMBLY

(14 ASSEMBLIES REQUIRED IN THE TYPE IV CORED SLAB UNITS)
 (6 ASSEMBLIES REQUIRED IN THE APPROACH SLABS)

NOTES

- THE TEMPORARY GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2 1/2".
 - 4 - 1" \varnothing X 2 1/4" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 1" \varnothing X 2 1/4" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)
 - WIRE STRUTS SHOWN IN THE TEMPORARY GUARDRAIL ANCHOR ASSEMBLY DETAIL ARE THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI.
- TEMPORARY GUARDRAIL ANCHOR ASSEMBLY WITH BOLTS SHALL BE ASSEMBLED IN THE SHOP. BOLT THREADS MAY BE RECUT AS NECESSARY TO ENSURE FIT.
- THE COST OF THE TEMPORARY GUARDRAIL ANCHOR ASSEMBLY COMPLETE IN PLACE SHALL BE INCLUDED, AS APPLICABLE, IN THE UNIT CONTRACT PRICE BID FOR 3'-0" X 2'-0" PRESTRESSED CONCRETE CORED SLAB OR LUMP SUM PRICE BID FOR APPROACH SLABS.
- FERRULES SHALL BE PLUGGED DURING CASTING OF THE CORED SLAB UNITS OR POURING OF APPROACH SLAB AS RECOMMENDED BY THE MANUFACTURER.
- AT THE CONTRACTOR'S OPTION, FERRULES WITH OPEN OR CLOSED ENDS MAY BE USED.
- PAYMENT FOR TEMPORARY GUARDRAIL, POST, AND POST BASE PLATES IS INCLUDED IN ROADWAY PAY ITEMS.



RAIL POST SPACING FOR TEMPORARY GUARDRAIL - STAGE I

PROJECT NO. BD-5113M
BUNCOMBE COUNTY
 STATION: 13+03.50 -L-

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
ANCHORAGE DETAILS FOR TEMPORARY GUARDRAIL ANCHOR ASSEMBLY FOR TYPE IV CORED SLAB UNIT - STAGE I					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-10
					TOTAL SHEETS 22

ASSEMBLED BY : MAF	DATE : 3/13
CHECKED BY : HLW	DATE : 3/13
DRAWN BY : DGE 5/09	REV. 12/11
CHECKED BY : BCH 6/09	MAA/AAC



NOTES

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

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

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 1/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

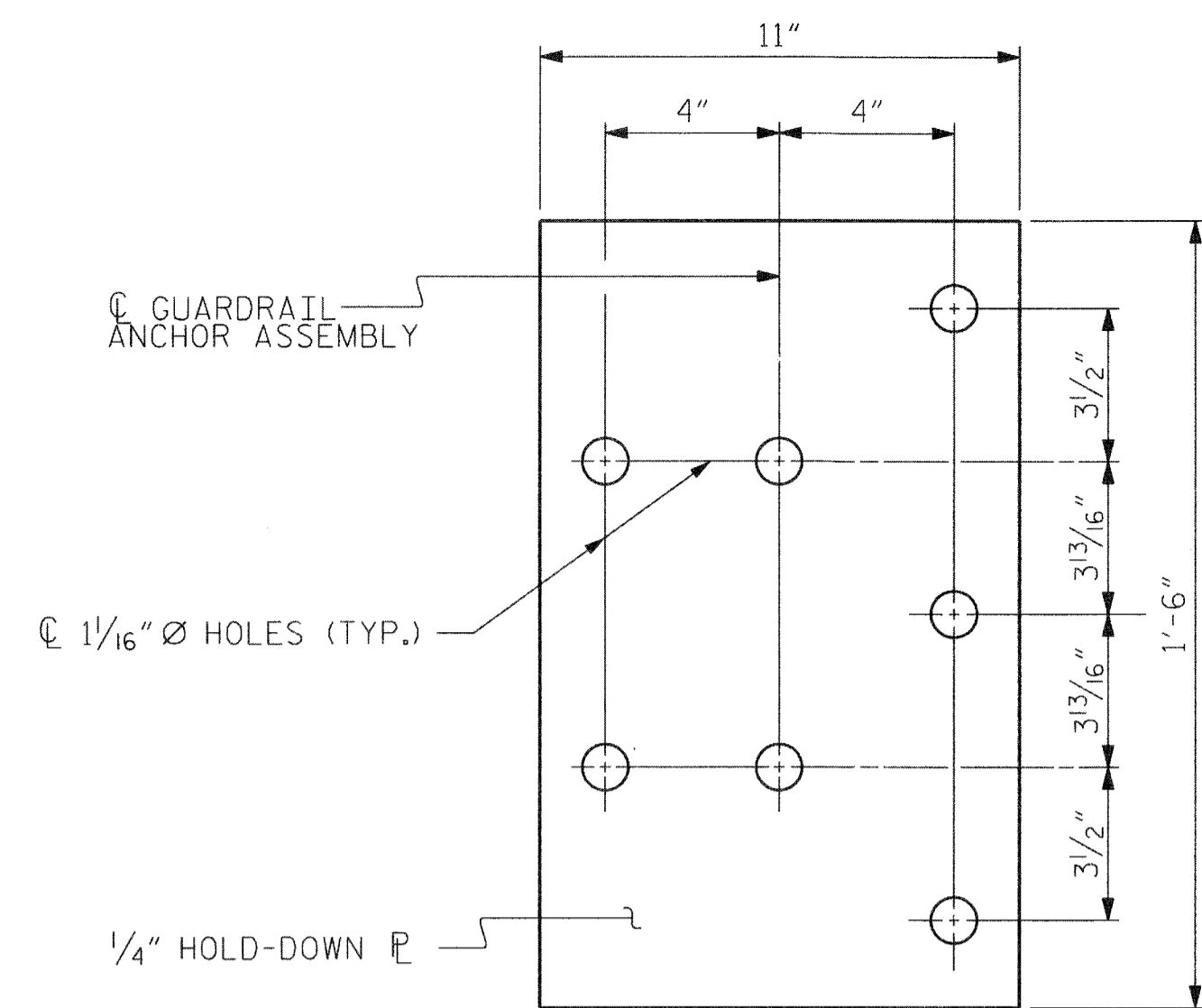
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR VERTICAL CONCRETE BARRIER RAIL.

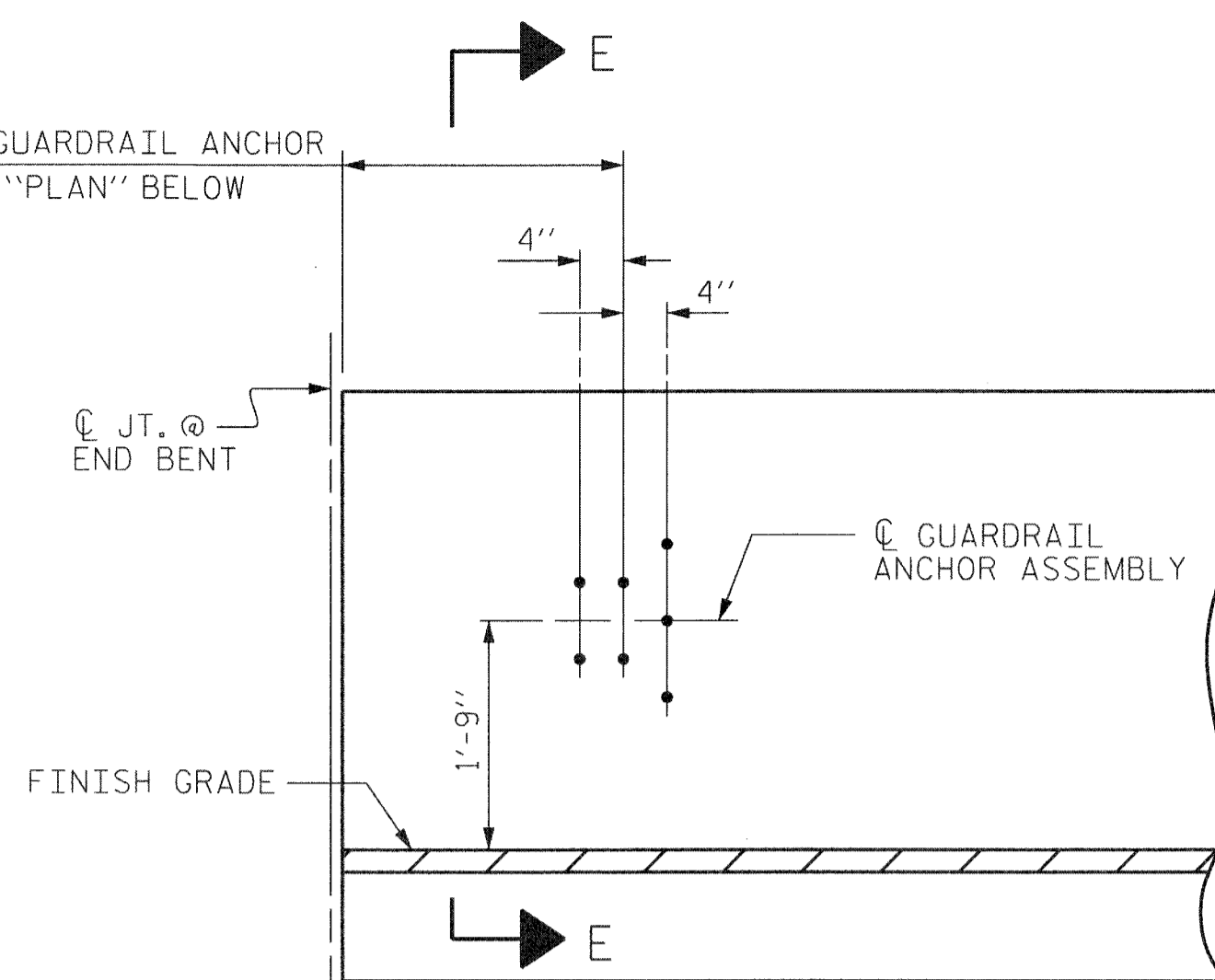
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

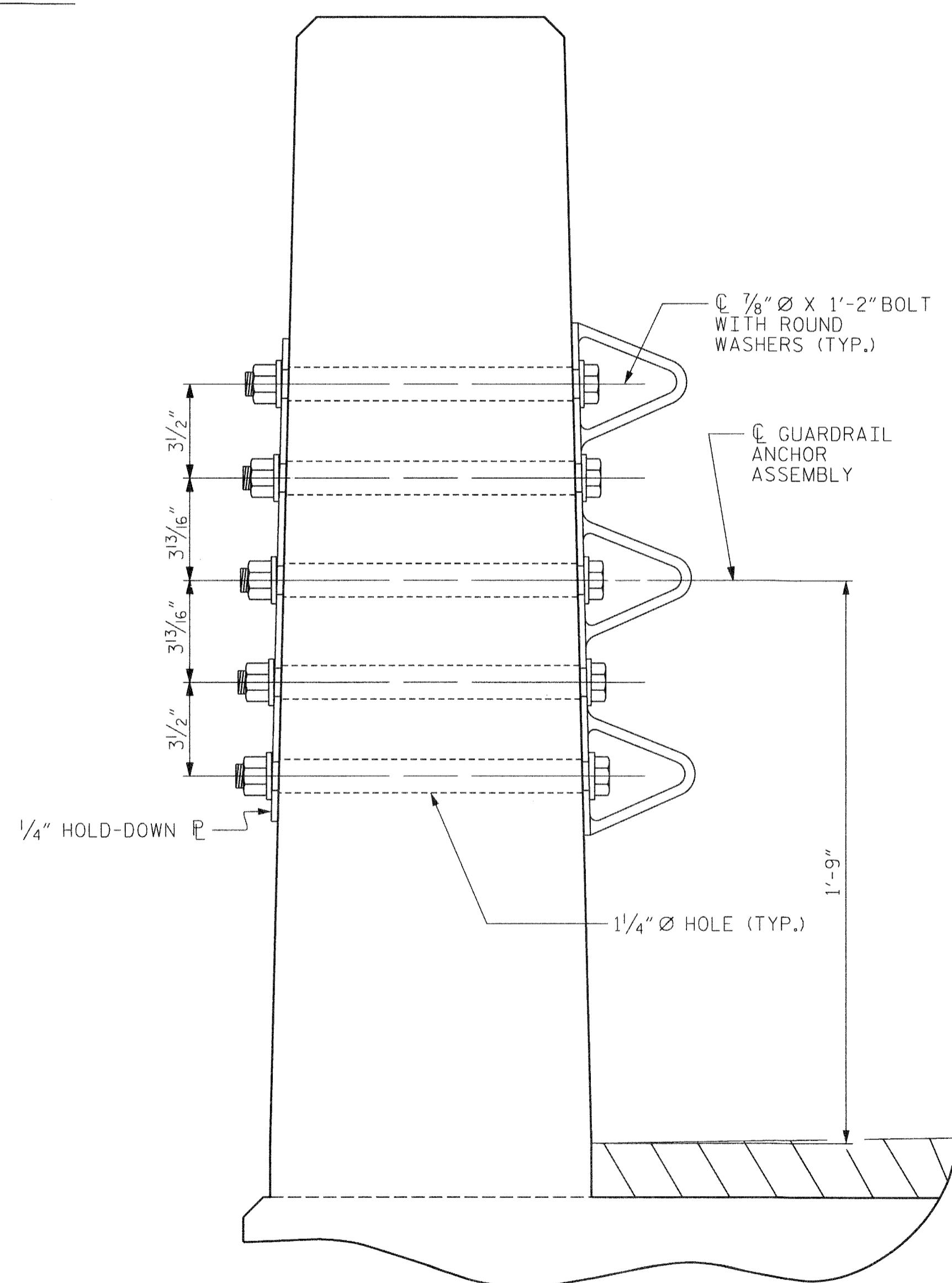


PLAN

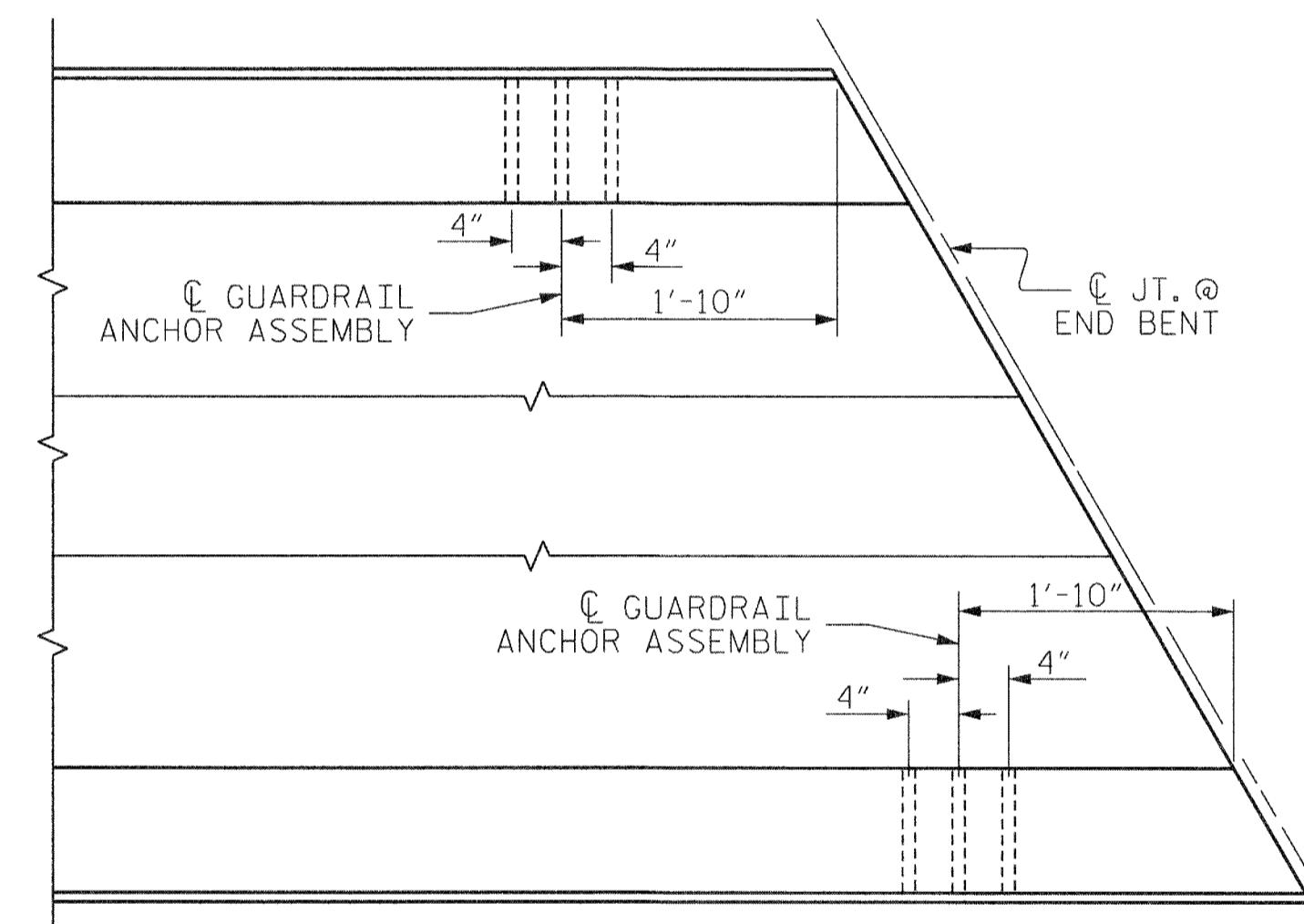
FOR LOCATION OF GUARDRAIL ANCHOR ASSEMBLY, SEE "PLAN" BELOW



ELEVATION



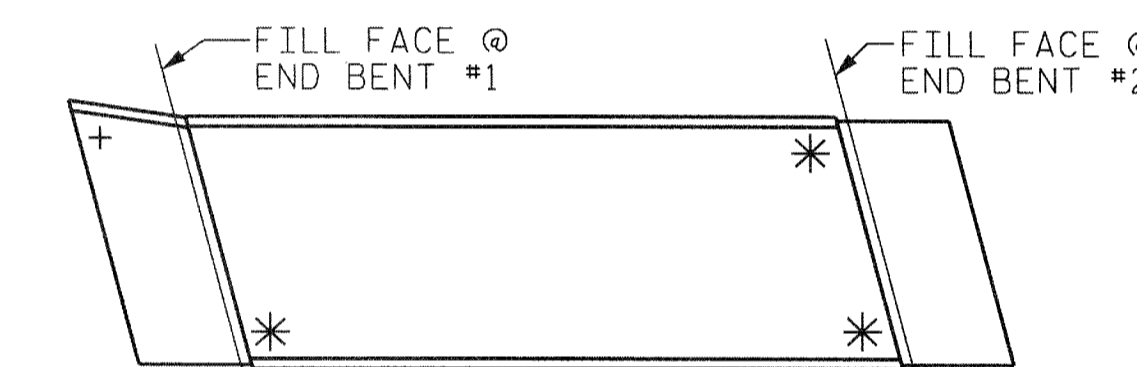
SECTION E-E
GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

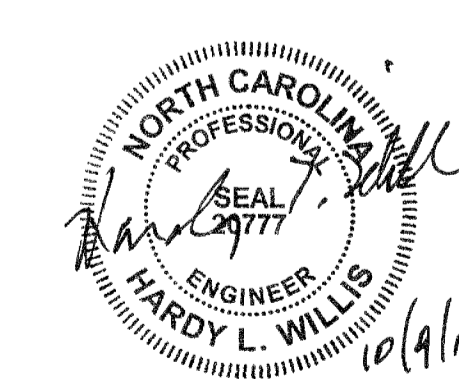
END BENT #2 SHOWN, END BENT #1 SIMILAR.



SKETCH SHOWING POINTS OF ATTACHMENT

* DENOTES GUARDRAIL ANCHOR ASSEMBLY
+ SEE SHEET S-21 FOR ATTACHMENT & ANCHOR ASSEMBLY DETAILS

PROJECT NO. BD-5113M
BUNCOMBE COUNTY
STATION: 13+03.50 -L-



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
GUARDRAIL ANCHORAGE
FOR VERTICAL CONCRETE
BARRIER RAIL

ASSEMBLED BY : MAF	DATE : 3/13
CHECKED BY : HLW	DATE : 3/13
DRAWN BY : MAA 5/10	ADDED 5/6/10
CHECKED BY : GM 5/10	REV. 10/1/11 MAA/GM
	REV. 12/5/11 MAA/GM

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11	
1			3			TOTAL SHEETS	
2			4			22	

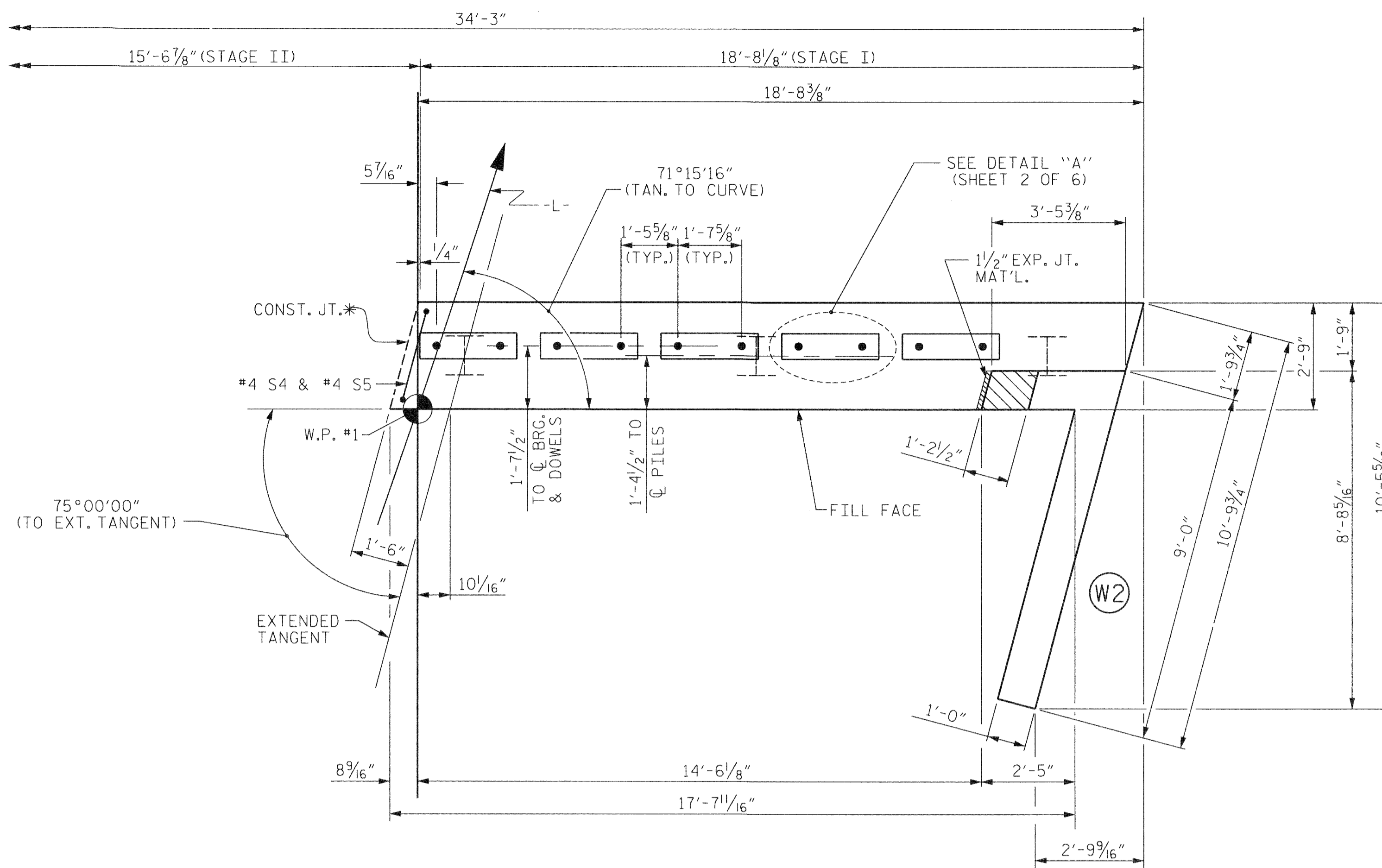
NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

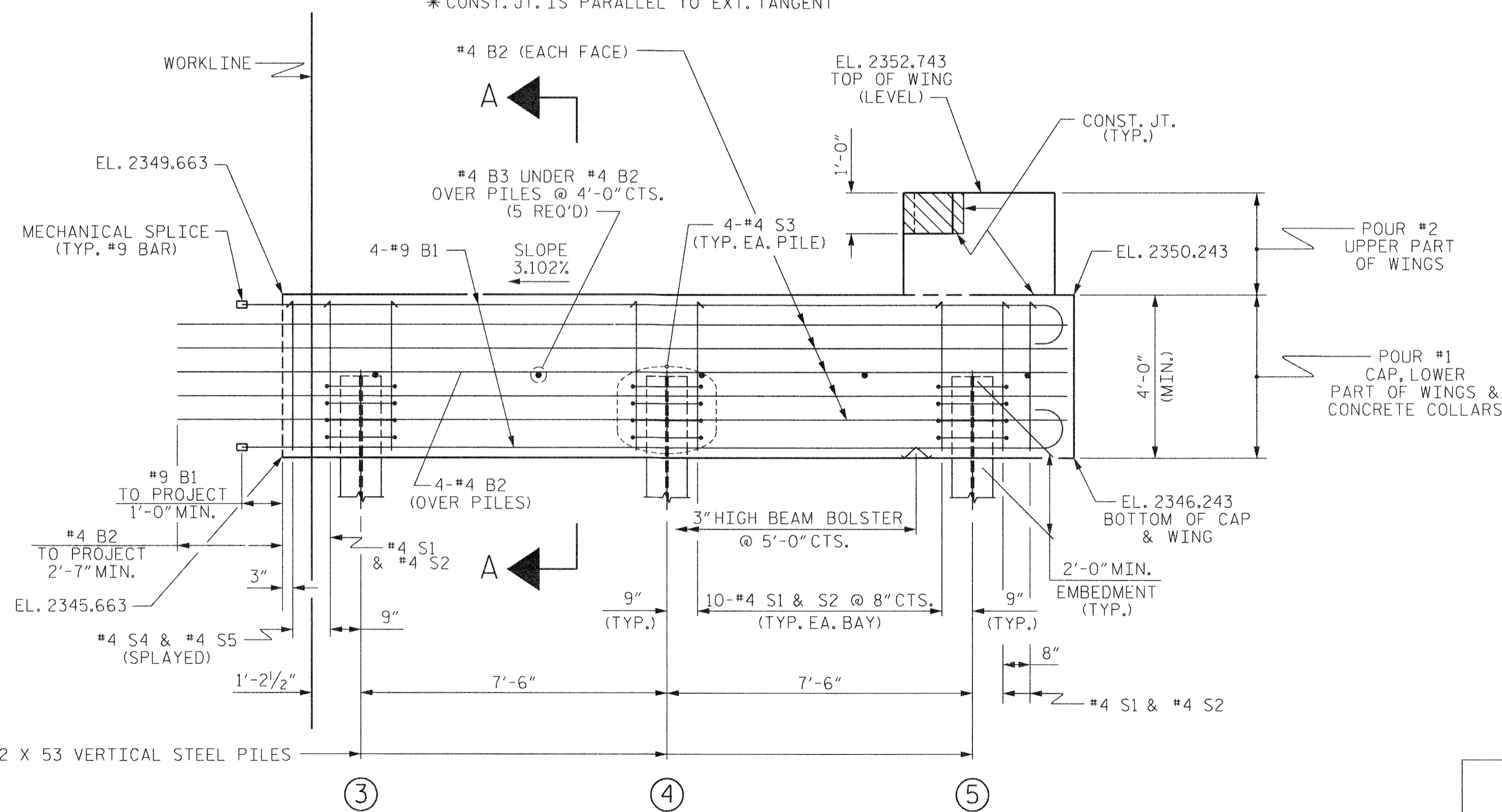
FOR PILE SPLICE DETAILS, SEE SHEET 6 OF 6.

FOR WING DETAILS, SEE SHEET 5 OF 6.



PLAN

* CONST. JT. IS PARALLEL TO EXT. TANGENT



ELEVATION

WINGS NOT SHOWN FOR CLARITY. FOR SECTION A-A, SEE SHEET 2 OF 6.
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 6 OF 6.

TOP OF PILE ELEVATIONS	
③	2347.711
④	2347.944
⑤	2348.177

PROJECT NO. BD-5113M
BUNCOMBE COUNTY
STATION: 13+03.50

SHEET 1 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT No. 1
STAGE I

REVISIONS

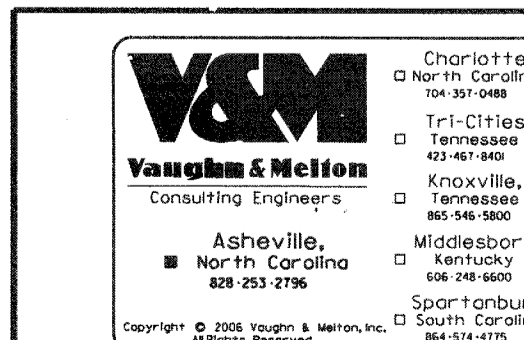
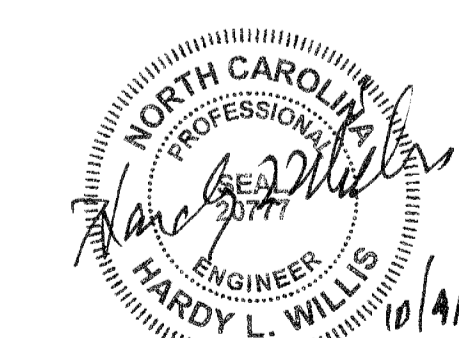
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO.

S-12

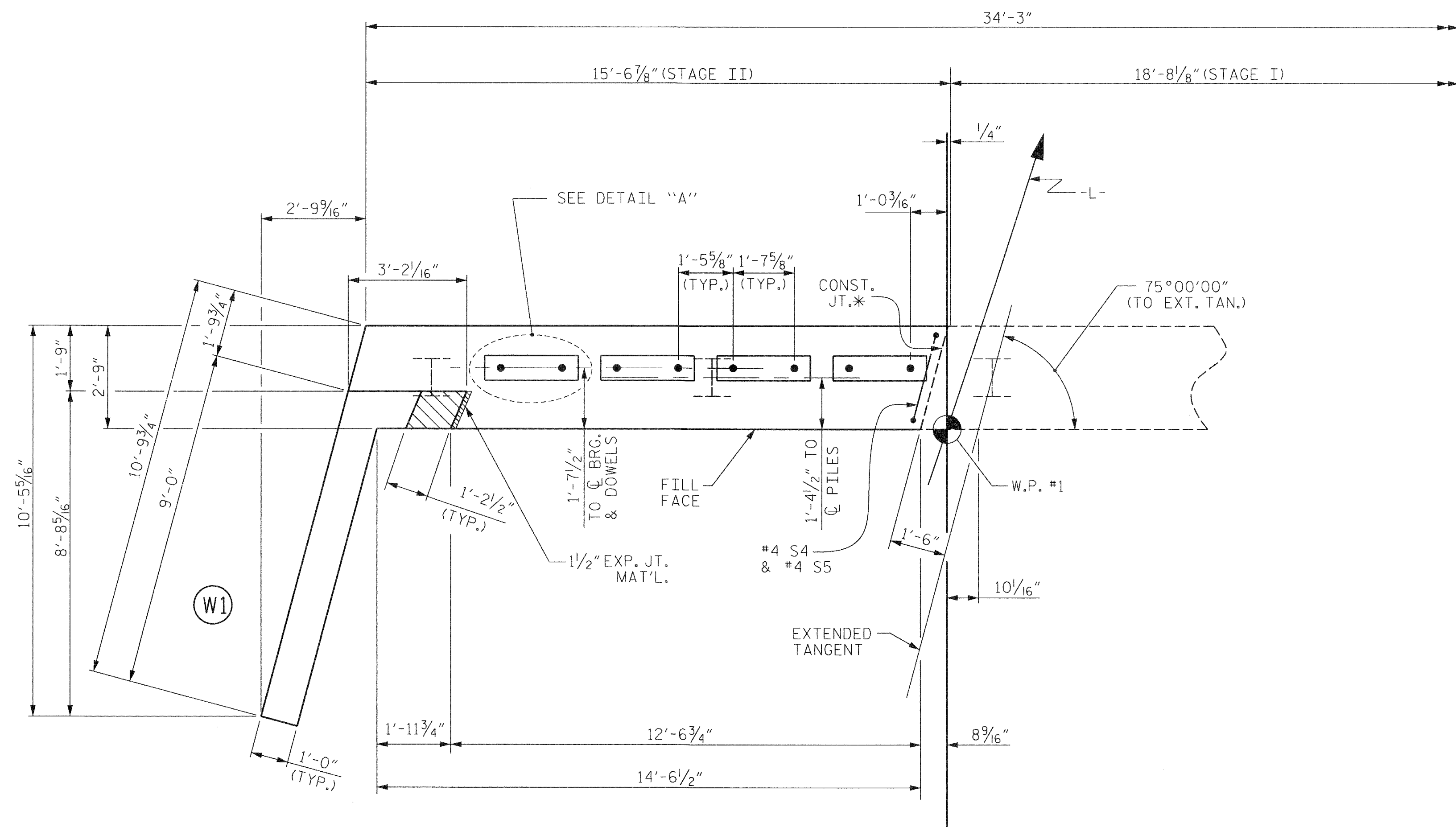
TOTAL SHEETS

22



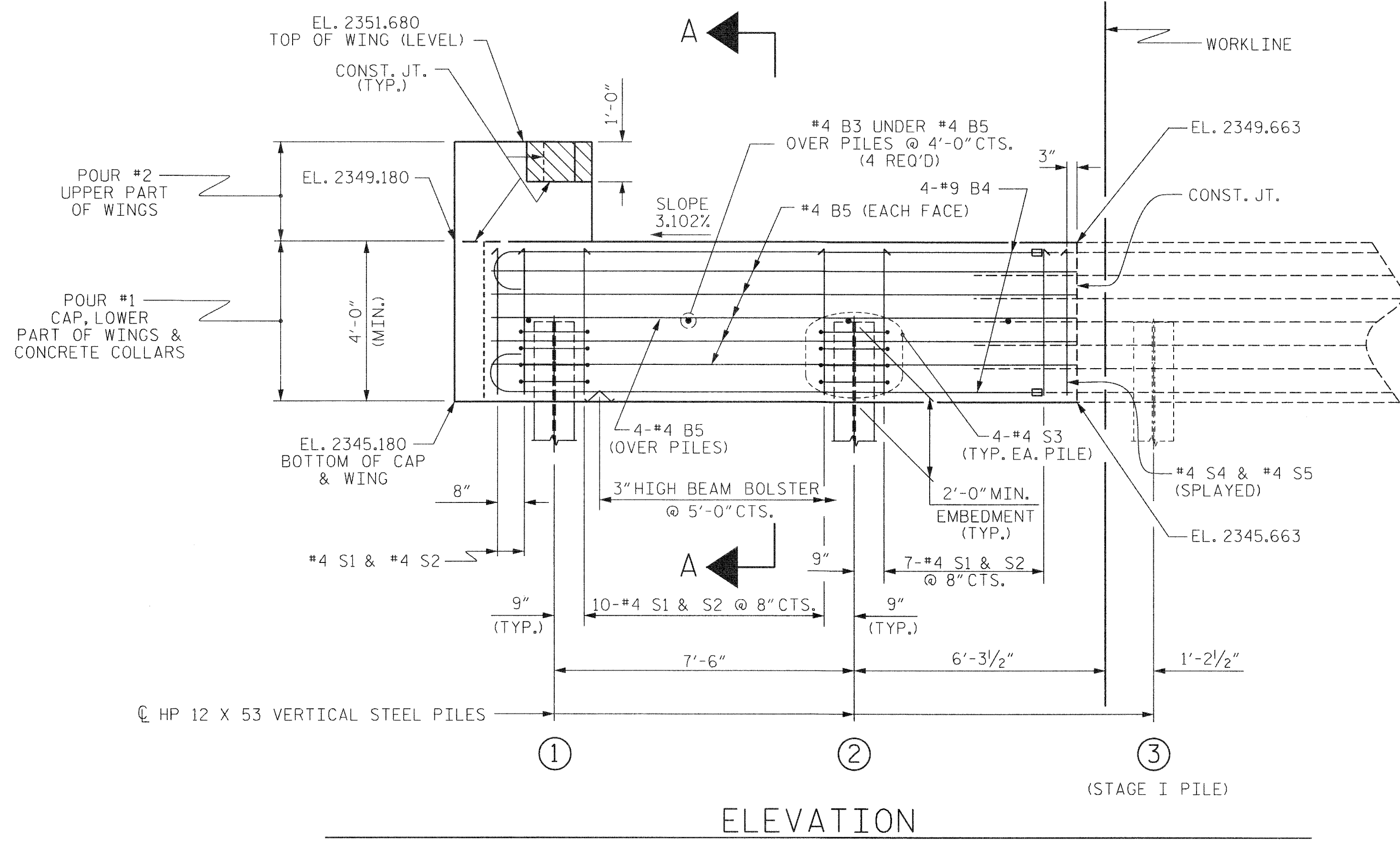
ASSEMBLED BY : MAF DATE : 3/13
CHECKED BY : HLW DATE : 3/13
DRAWN BY : WJH 12/11
CHECKED BY : AAC 12/11

DWN. BY: MAF DATE: 3/2013
CHKD. BY: HLW DATE: 3/2013
DES. EGR. OF RECORD: RTS DATE: 3/2013

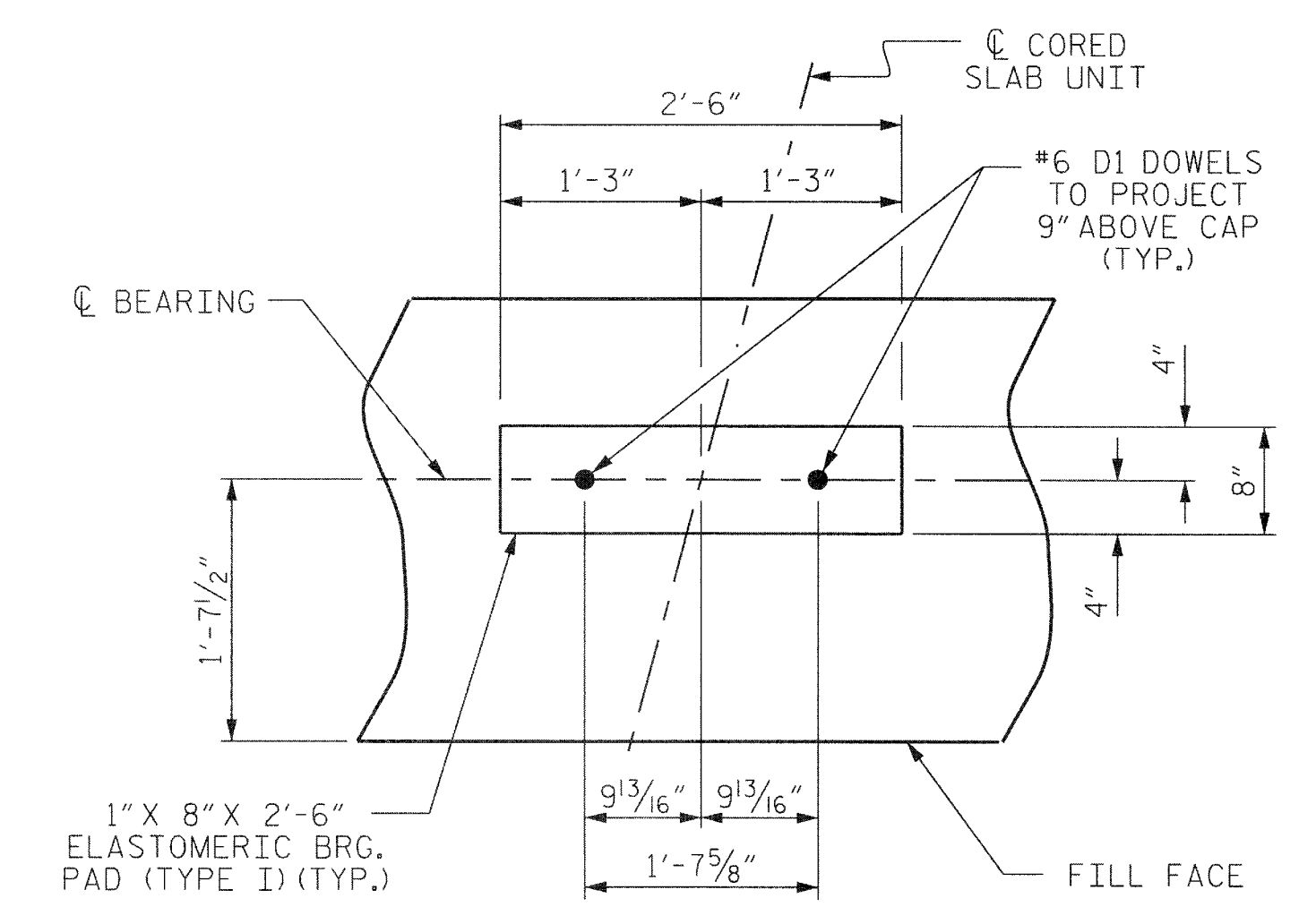


PLAN

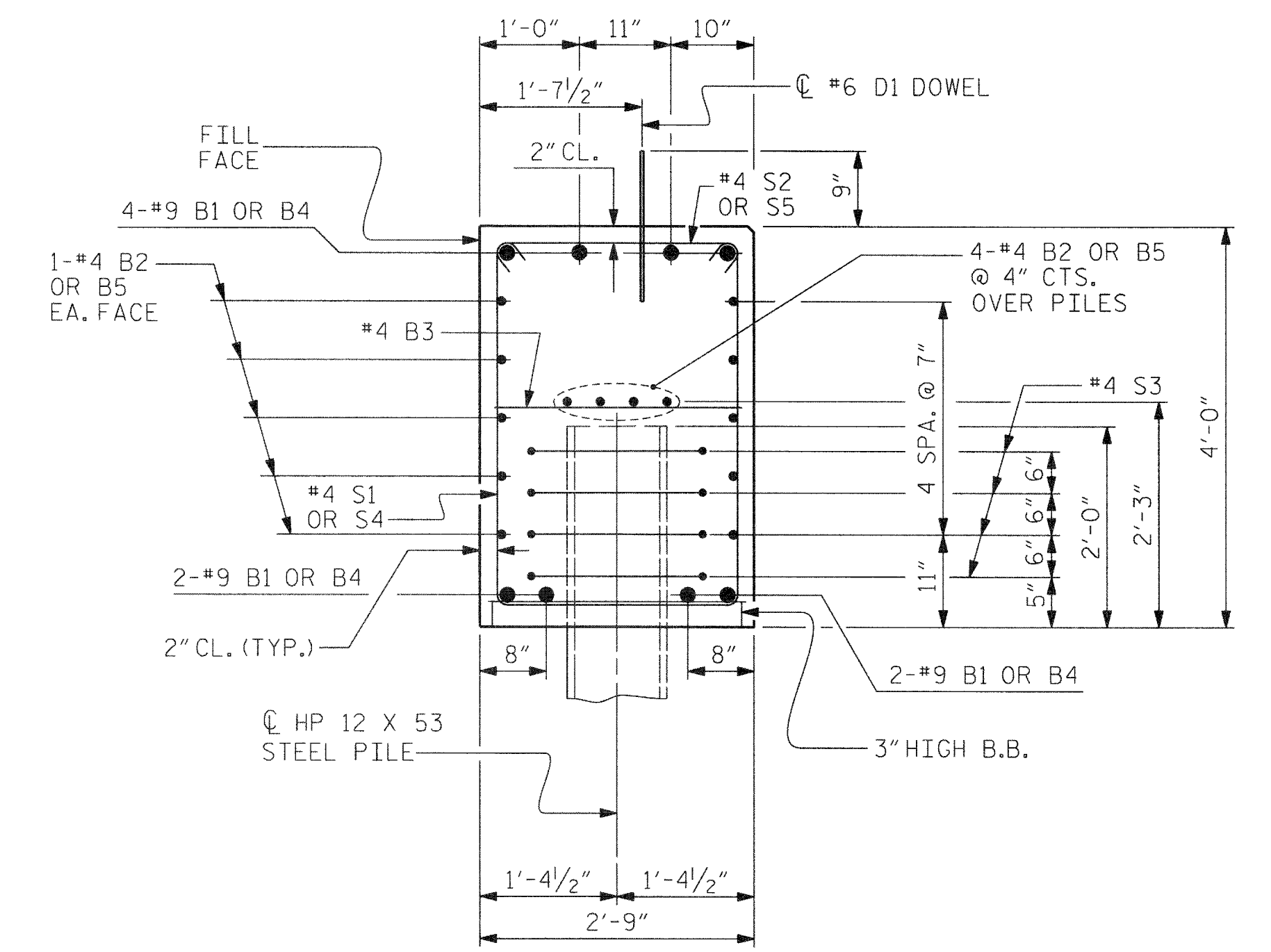
* CONST. JT. IS PARALLEL TO EXT. TANGENT



ELEVATION



DETAIL "A"



SECTION A-A

(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL," SHEET 6 OF 6)

TOP OF PILE ELEVATIONS	
①	2347.246
②	2347.479



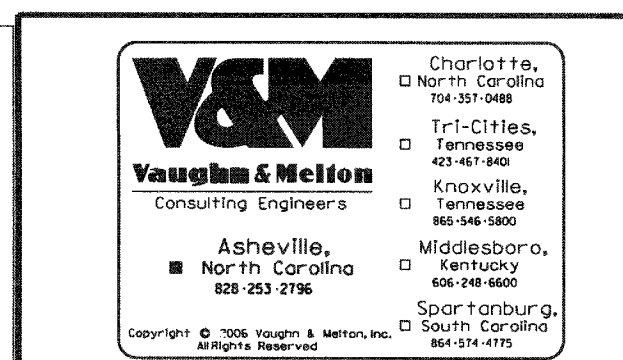
PROJECT NO. BD-5113M
BUNCOMBE COUNTY
 STATION: 13+03.50

SHEET 2 OF 6

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT No. 1
 STAGE II

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			22

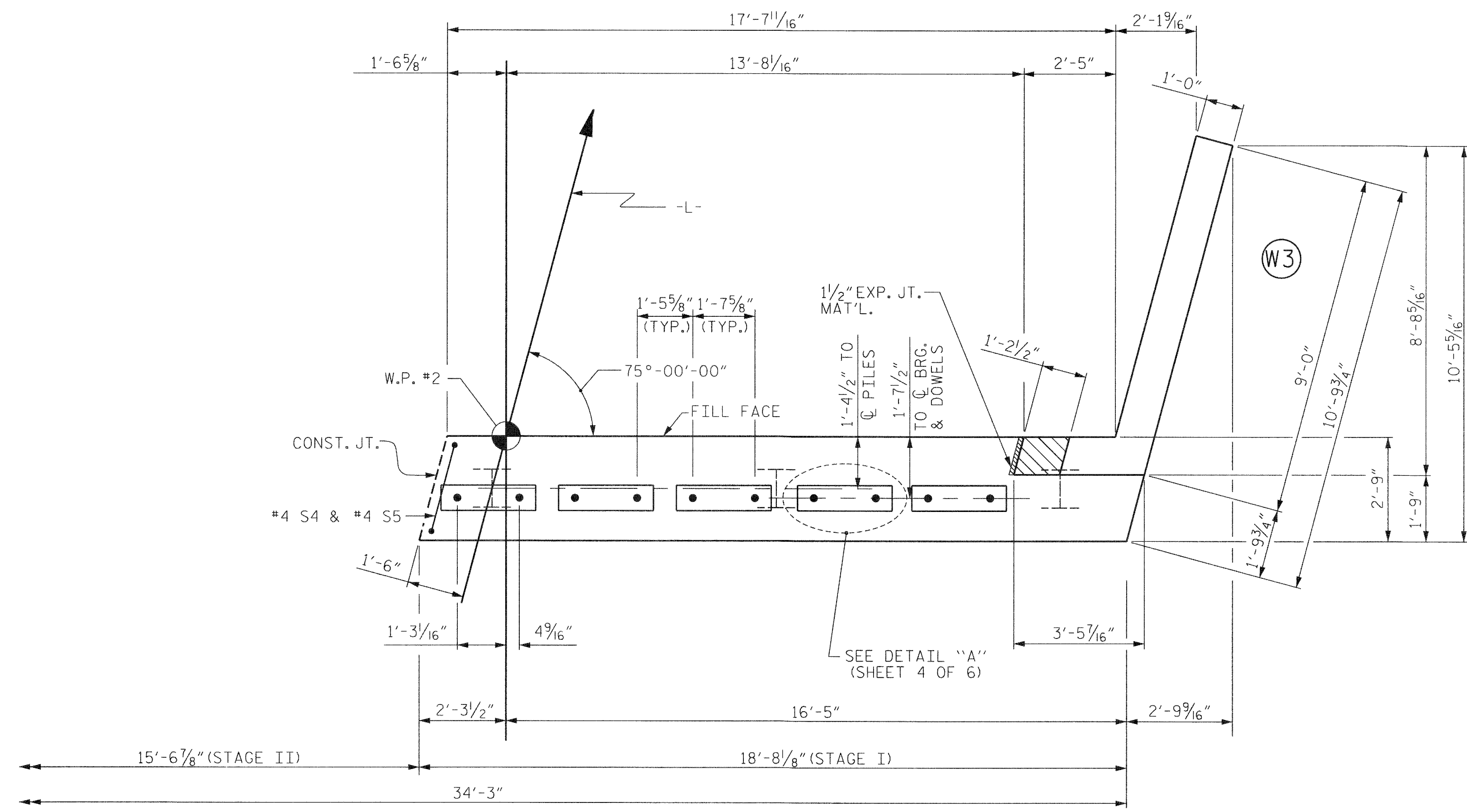


DWN. BY: MAF DATE: 3/2013
 CHKD. BY: HLW DATE: 3/2013
 DES. EGR. OF RECORD: RTS DATE: 3/2013

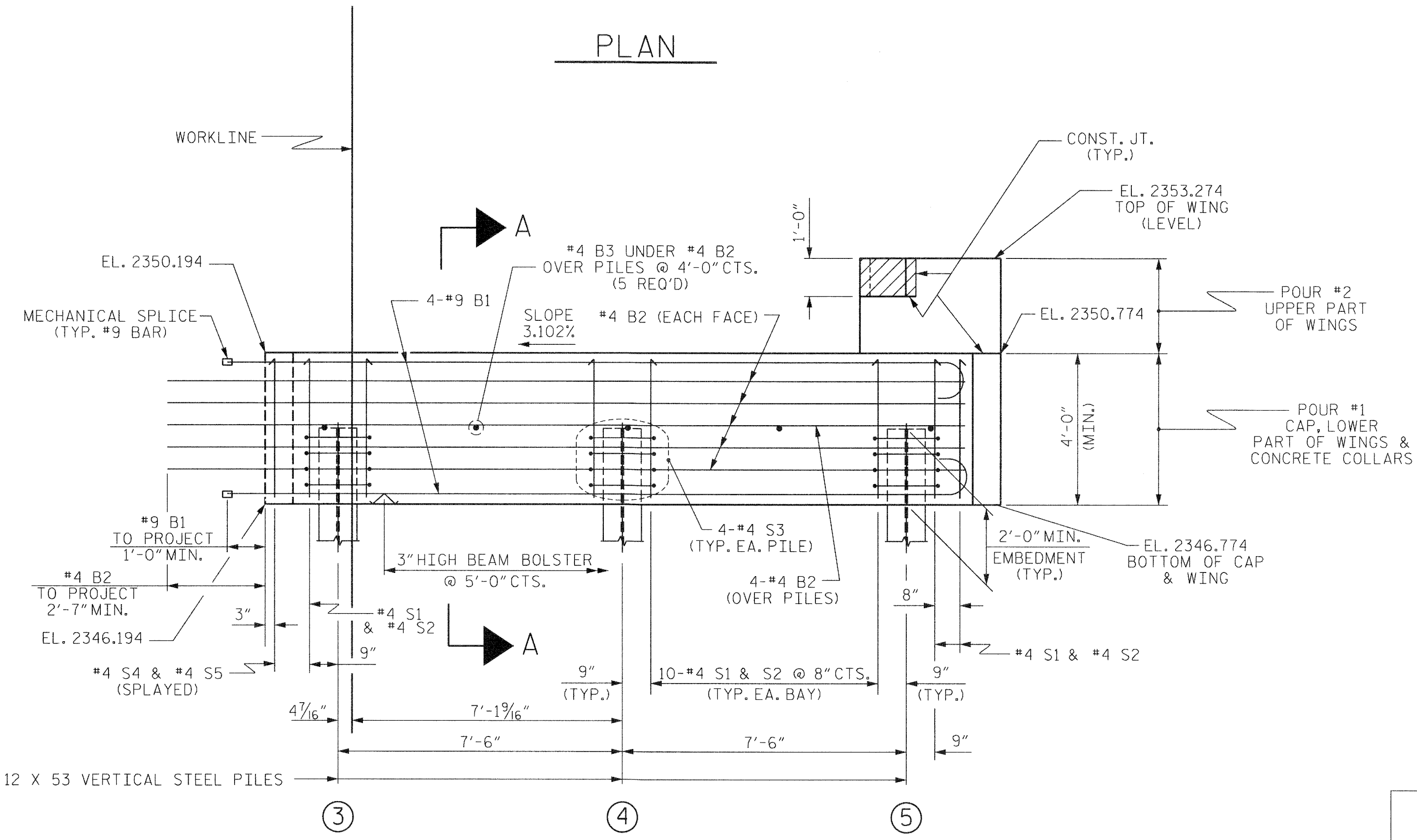
ASSEMBLED BY: MAF DATE: 3/13
 CHECKED BY: HLW DATE: 3/13
 DRAWN BY: WJH 12/11
 CHECKED BY: AAC 12/11

*****SYTIME*****
 *****DGN*****
 *****USER*****

STD. NO. EB_27_75S4



PLAN



ELEVATION

WINGS NOT SHOWN FOR CLARITY.
 FOR SECTION A-A, SEE SHEET 4 OF 6.
 CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
 SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 6 OF 6.

NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.
 THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE VERTICAL CONCRETE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.
 FOR PILE SPLICE DETAILS, SEE SHEET 6 OF 6.
 FOR WING DETAILS, SEE SHEET 5 OF 6.

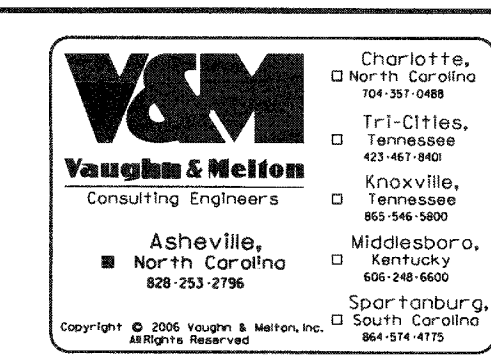
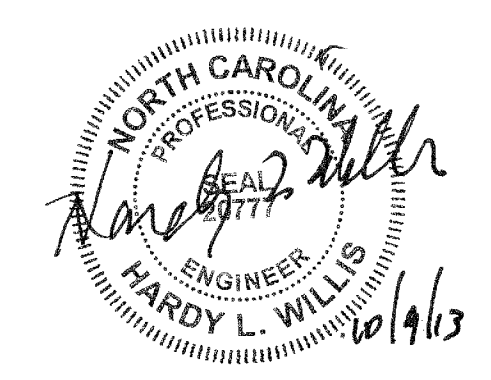
TOP OF PILE ELEVATIONS	
③	2348.242
④	2348.475
⑤	2348.708

PROJECT NO. BD-5113M
BUNCOMBE COUNTY
 STATION: 13+03.50

SHEET 3 OF 6

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

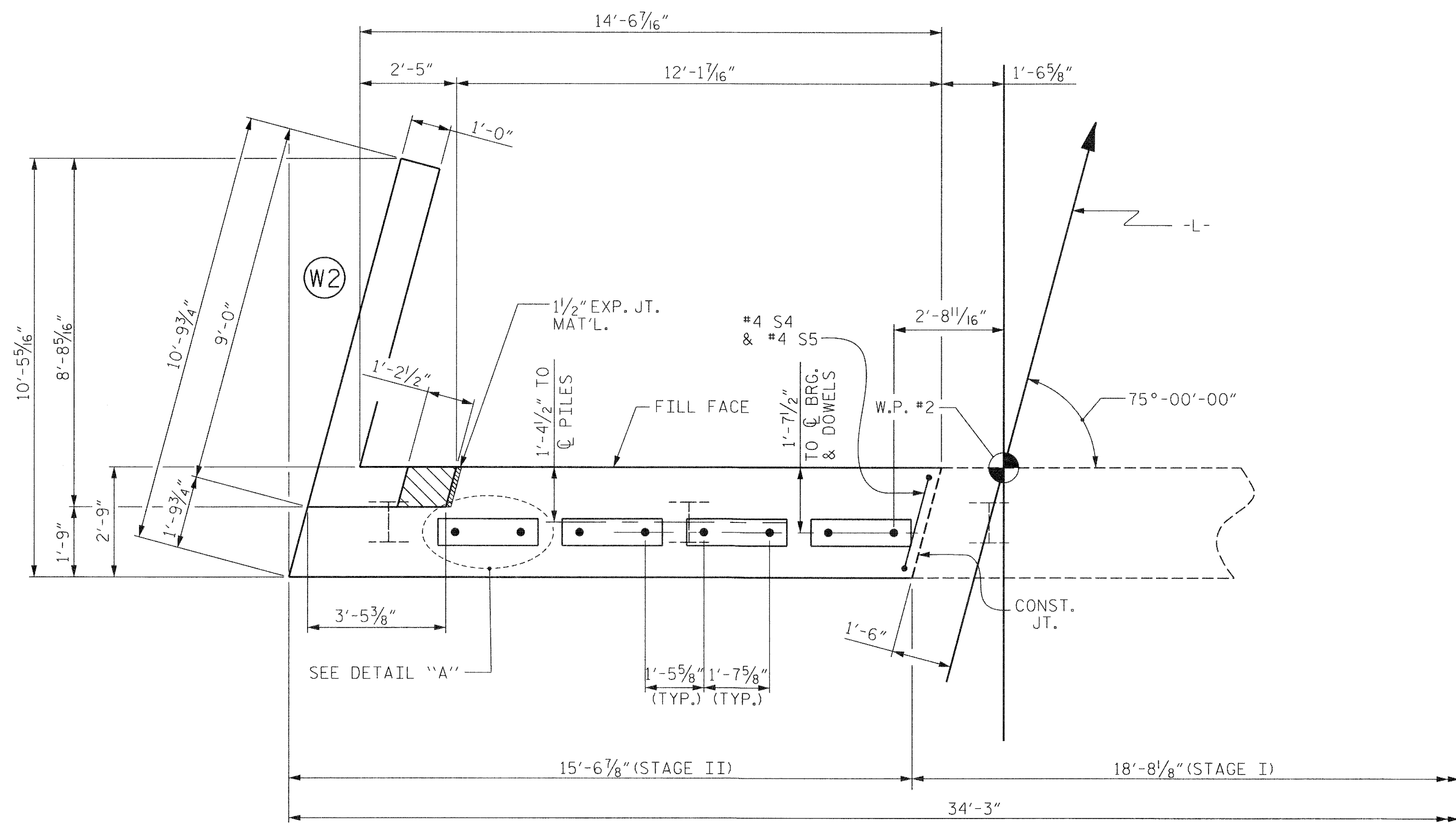
SUBSTRUCTURE
 END BENT No. 2
 STAGE I



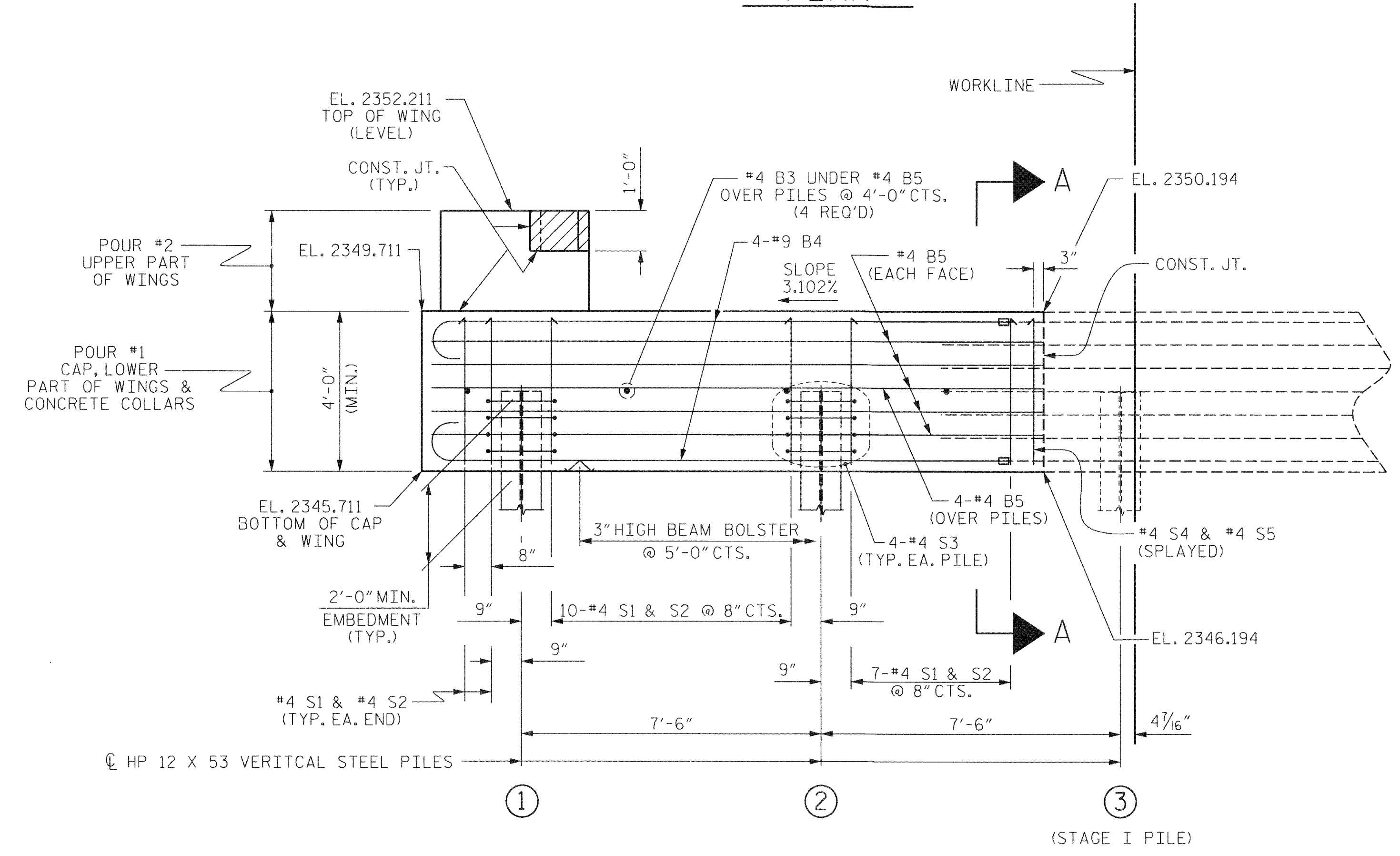
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14	
1			3			TOTAL SHEETS	
2			4			22	

ASSEMBLED BY : MAF DATE : 3/13
 CHECKED BY : HLW DATE : 3/13
 DRAWN BY : WJH 12/11
 CHECKED BY : AAC 12/11

DWN, BY: MAF DATE: 3/2013
 CHKD, BY: HLW DATE: 3/2013
 DES. EGR. OF RECORD: RTS DATE: 3/2013

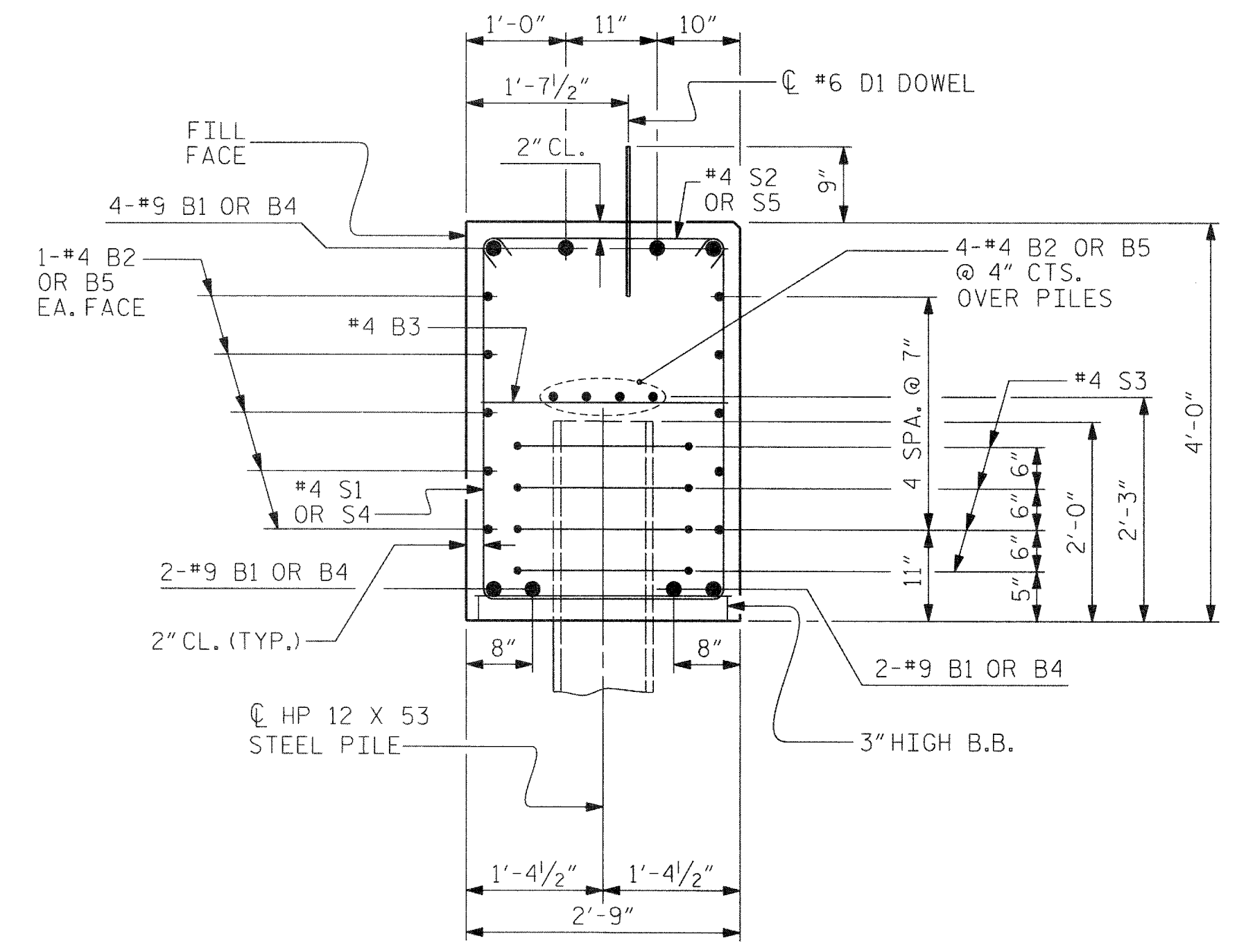
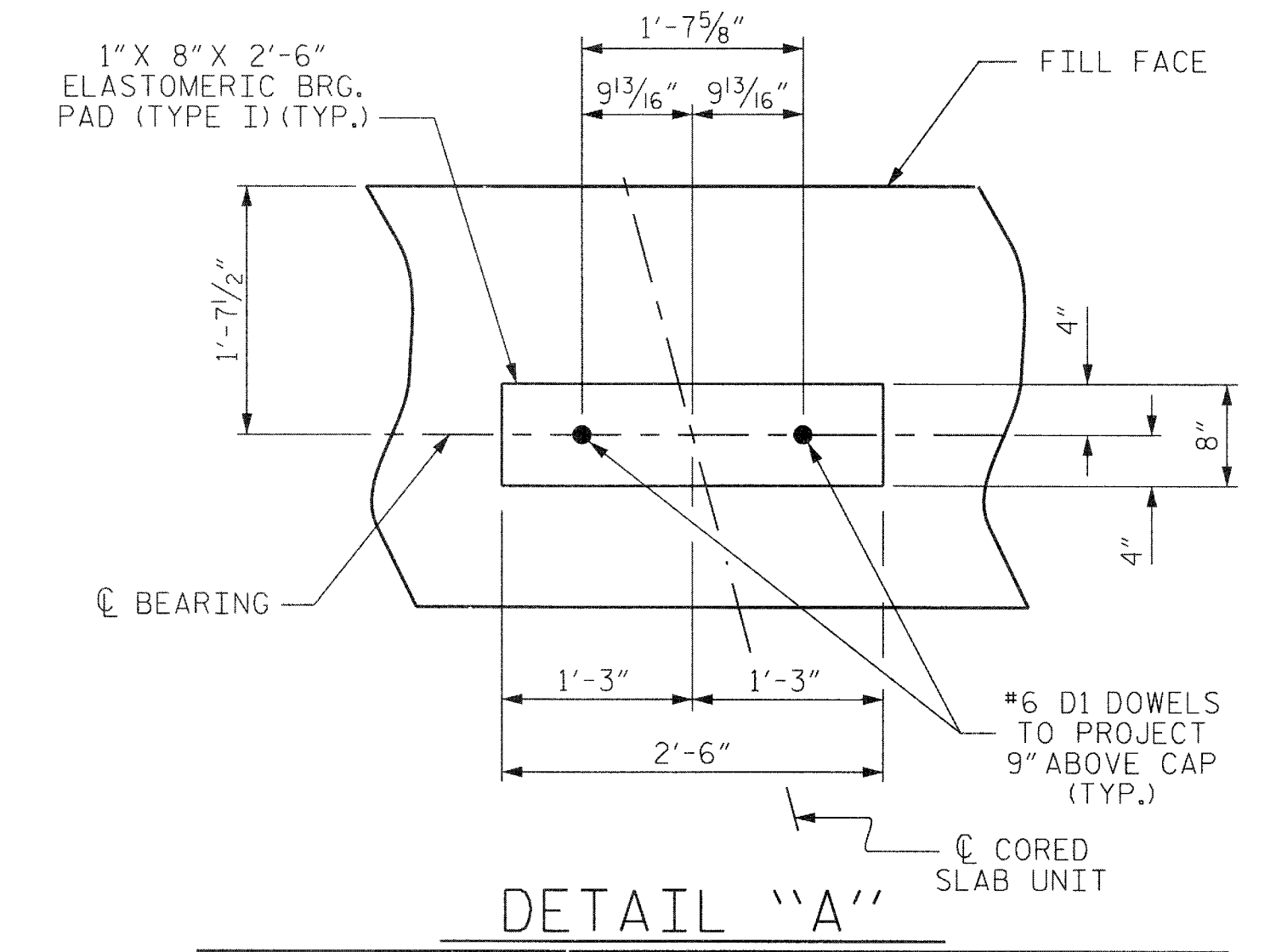


PLAN



ELEVATION

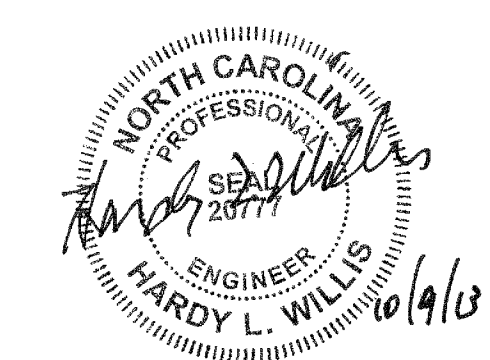
WINGS NOT SHOWN FOR CLARITY.
 CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.
 SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 6 OF 6.



SECTION A-A

(CONCRETE COLLAR NOT SHOWN FOR CLARITY.
 SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 6 OF 6)

TOP OF PILE ELEVATIONS	
①	2347.777
②	2348.010



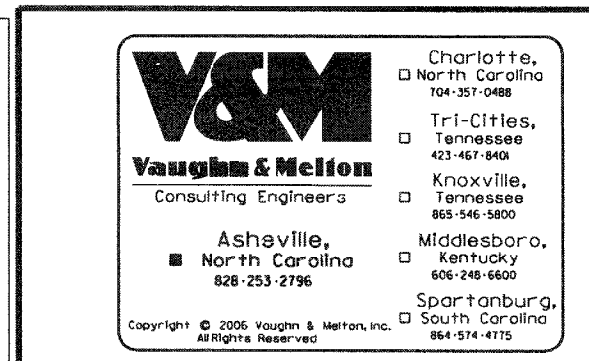
PROJECT NO. BD-5113M
BUNCOMBE COUNTY
 STATION: 13+03.50

SHEET 4 OF 6

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT No. 2
 STAGE II

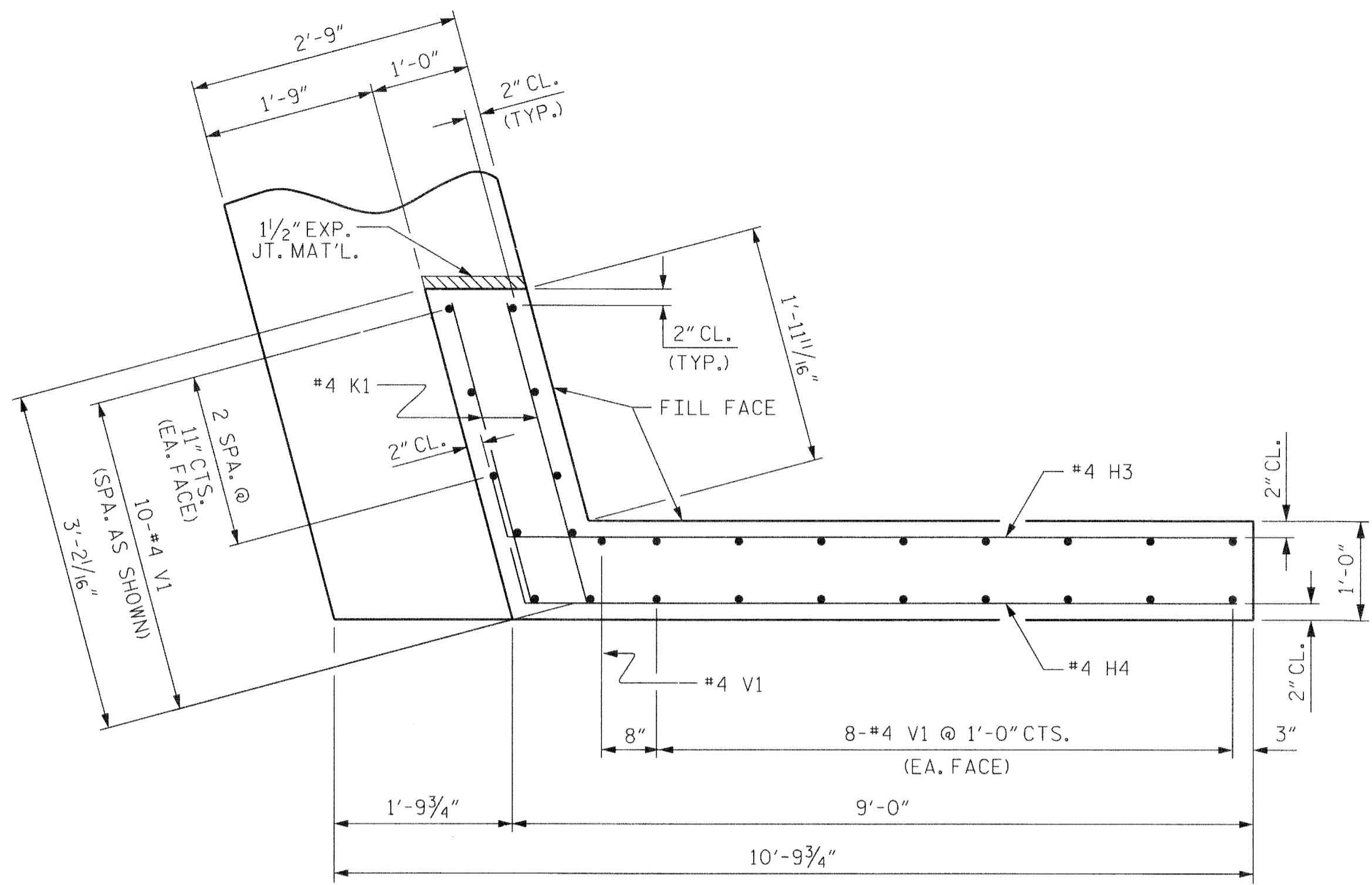
REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15	
1			3			TOTAL SHEETS	
2			4			22	



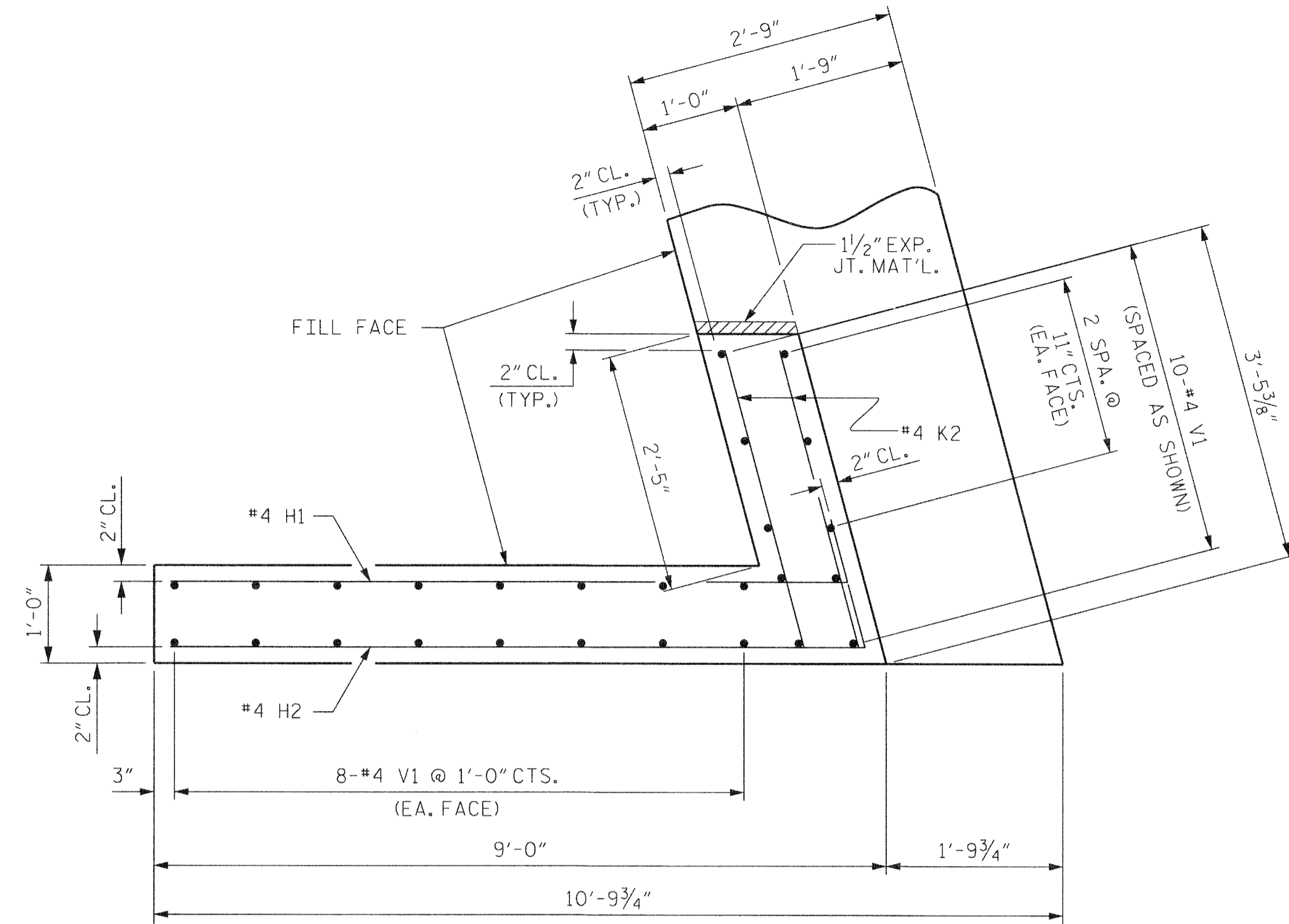
DWN. BY: MAF DATE: 3/2013
 CHKD. BY: HLW DATE: 3/2013
 DES. EGR. OF RECORD: RTS DATE: 3/2013

ASSEMBLED BY: MAF DATE: 3/13
 CHECKED BY: HLW DATE: 3/13
 DRAWN BY: WJH 12/11
 CHECKED BY: AAC 12/11

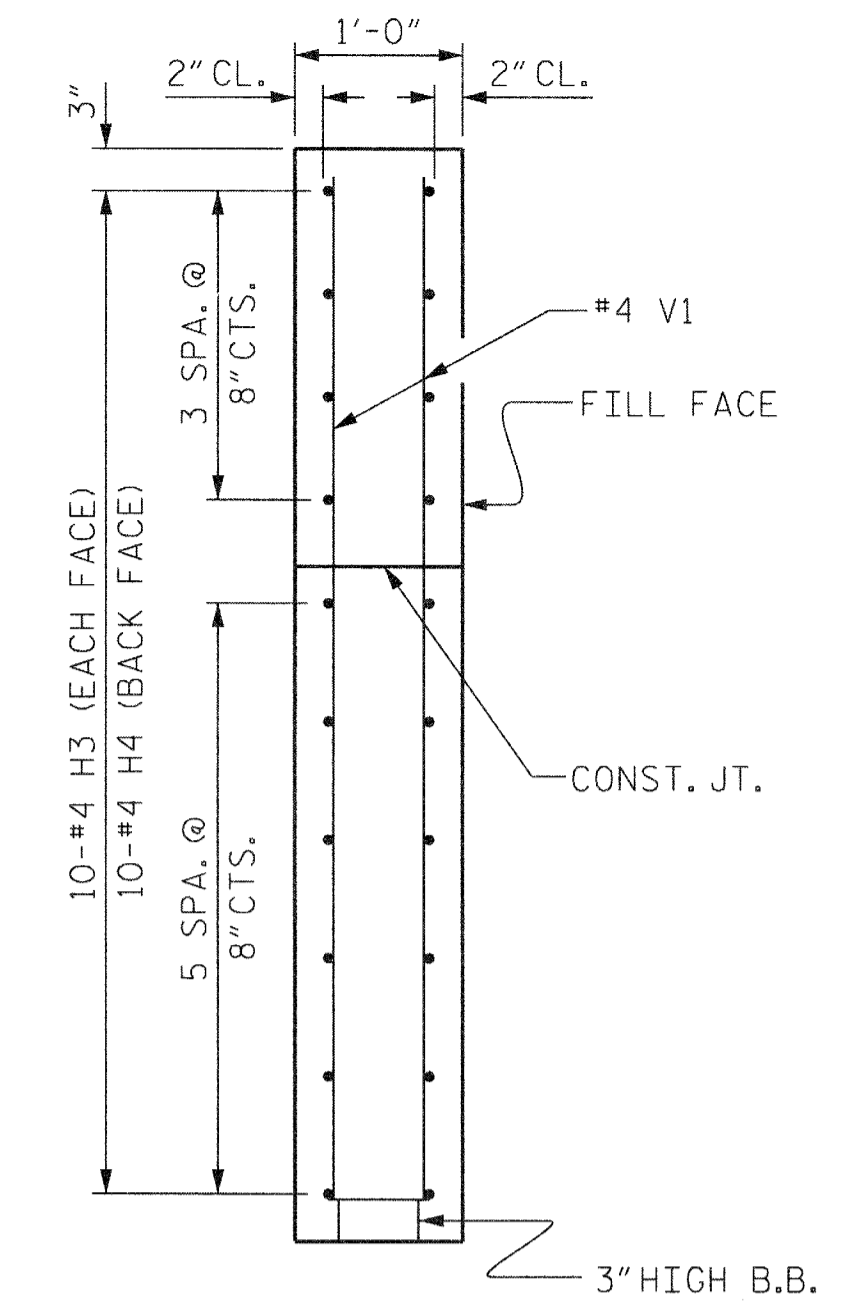
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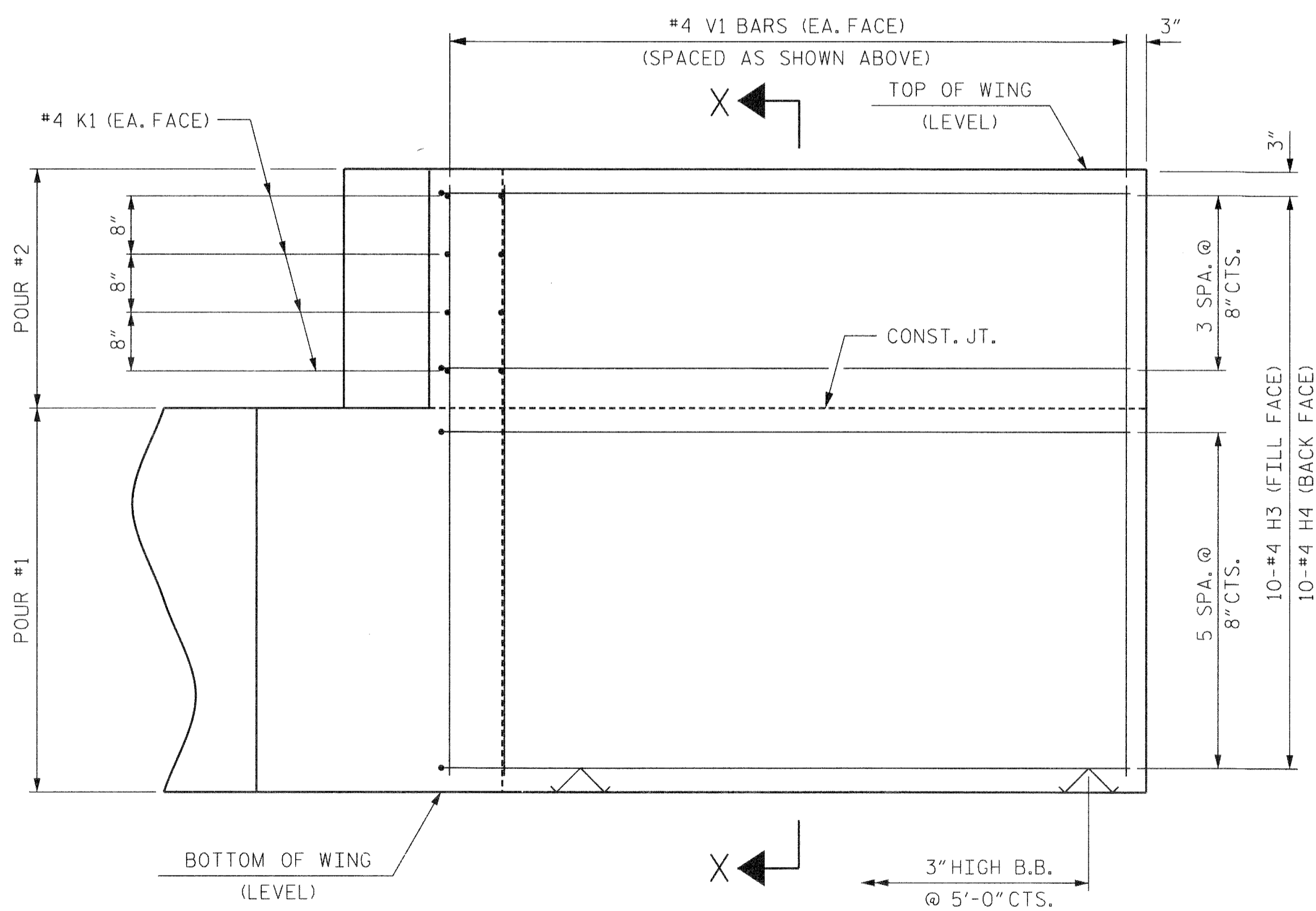
PLAN OF WING (W1)



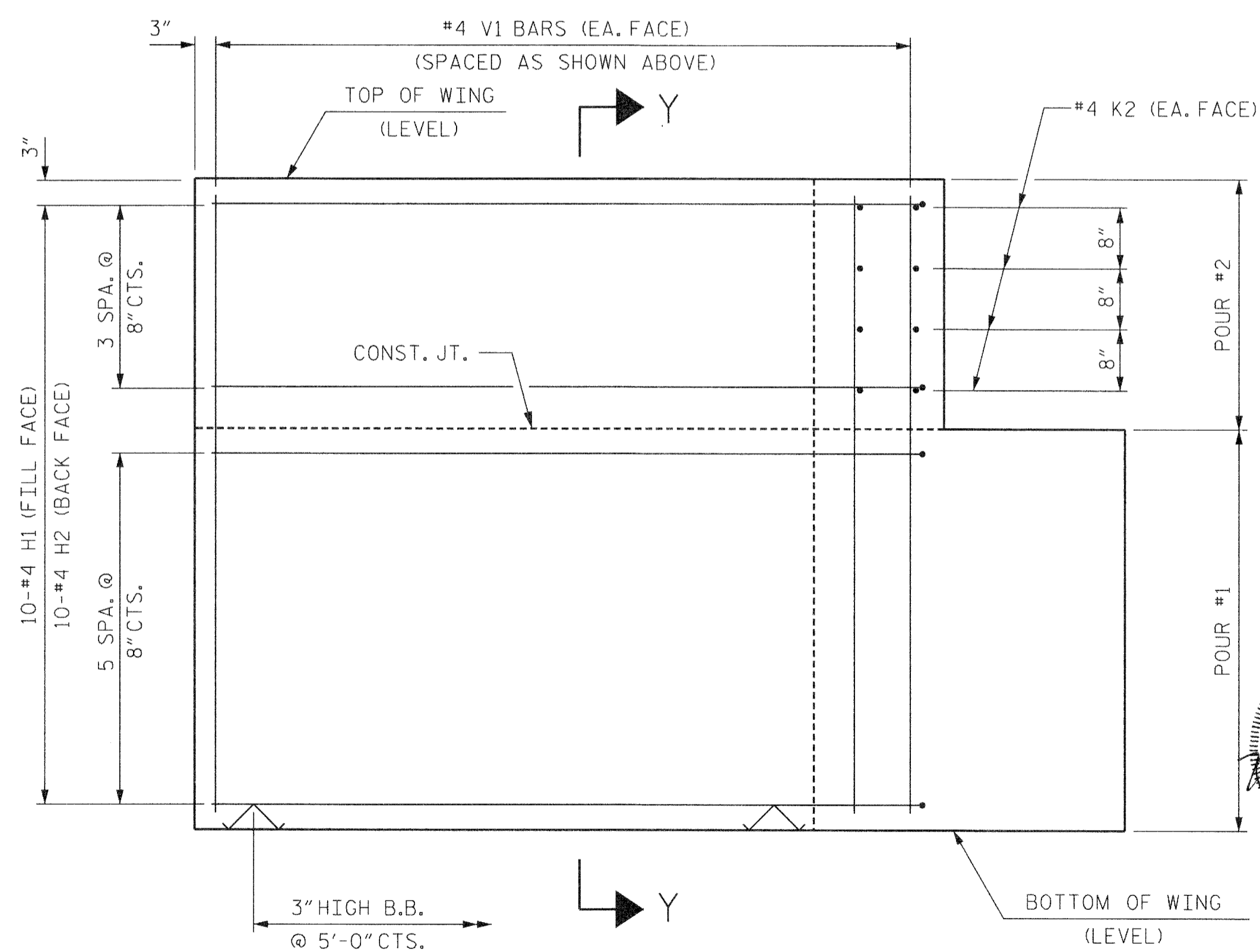
PLAN OF WING (W2)



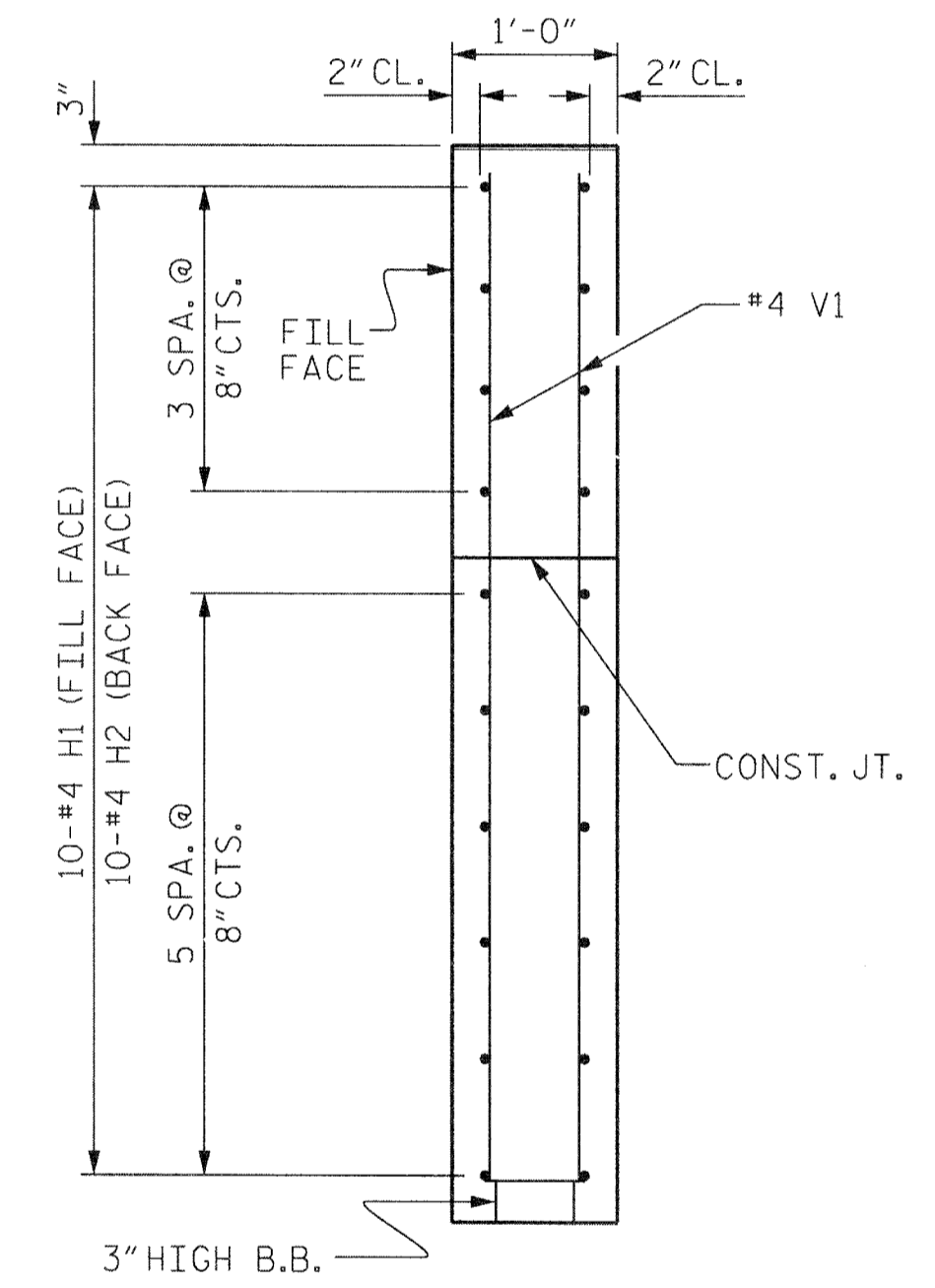
SECTION X-X



ELEVATION OF WING (W1)



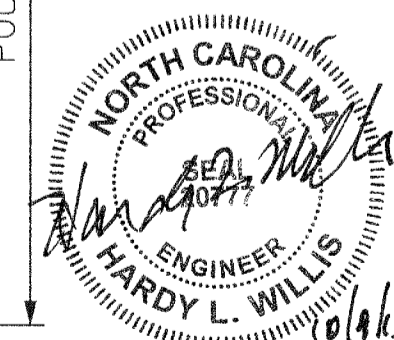
ELEVATION OF WING (W2)



SECTION Y-Y

PROJECT NO. BD-5113M
BUNCOMBE COUNTY
 STATION: 13+03.50

SHEET 5 OF 6

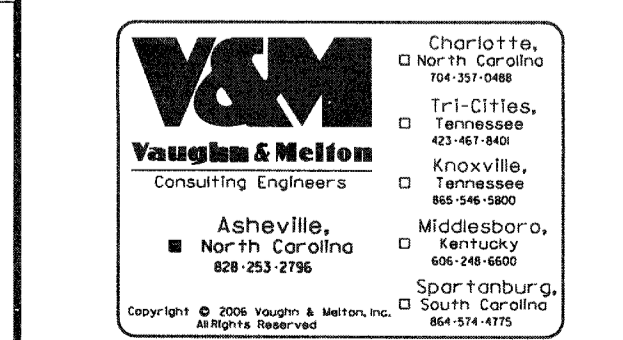


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT
 WING DETAILS

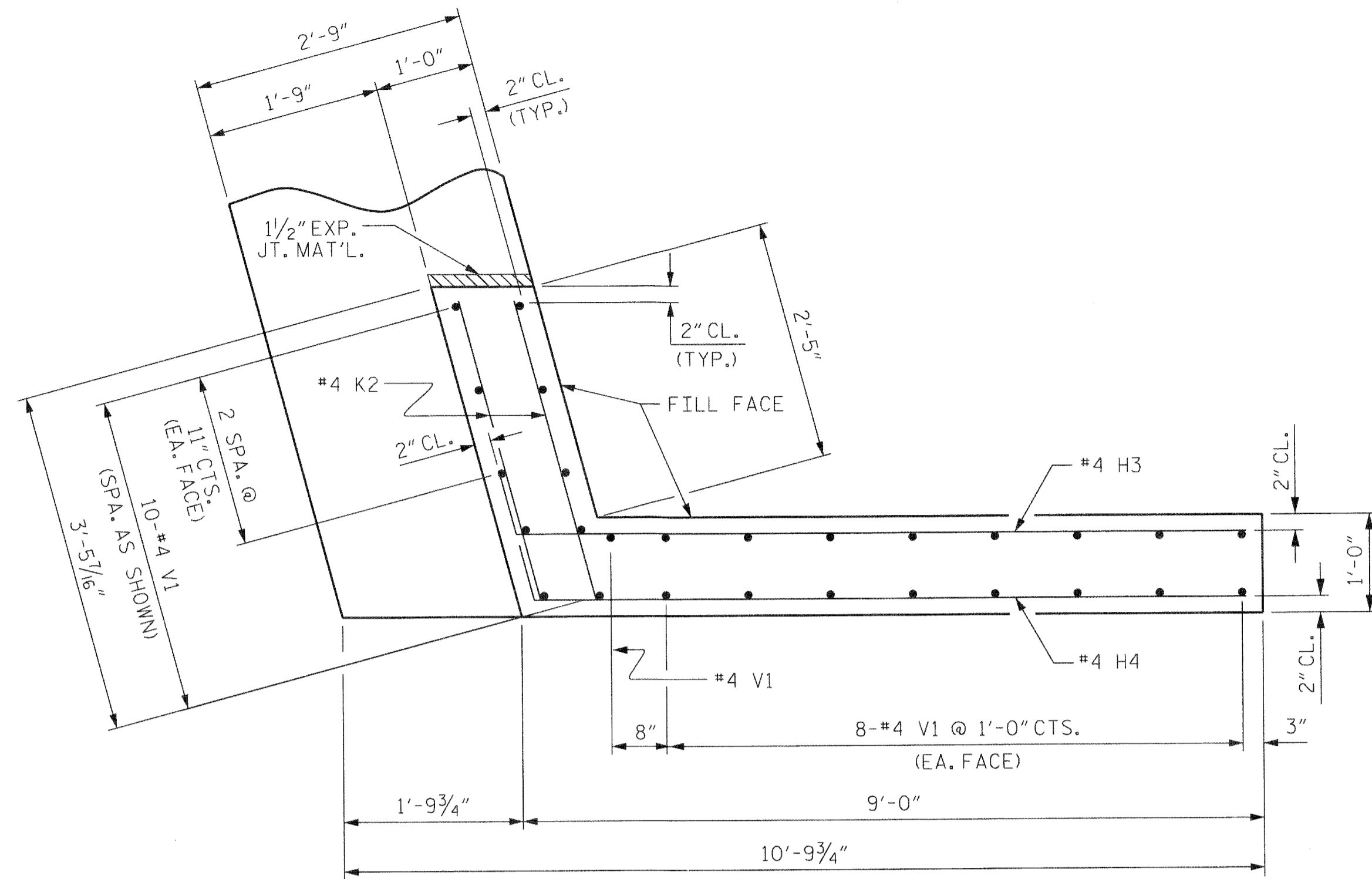
ASSEMBLED BY :	MAF	DATE :	3/13
CHECKED BY :	HLW	DATE :	3/13
DRAWN BY :	WJH 12/11		
CHECKED BY :	AAC 12/11		

WING DETAILS

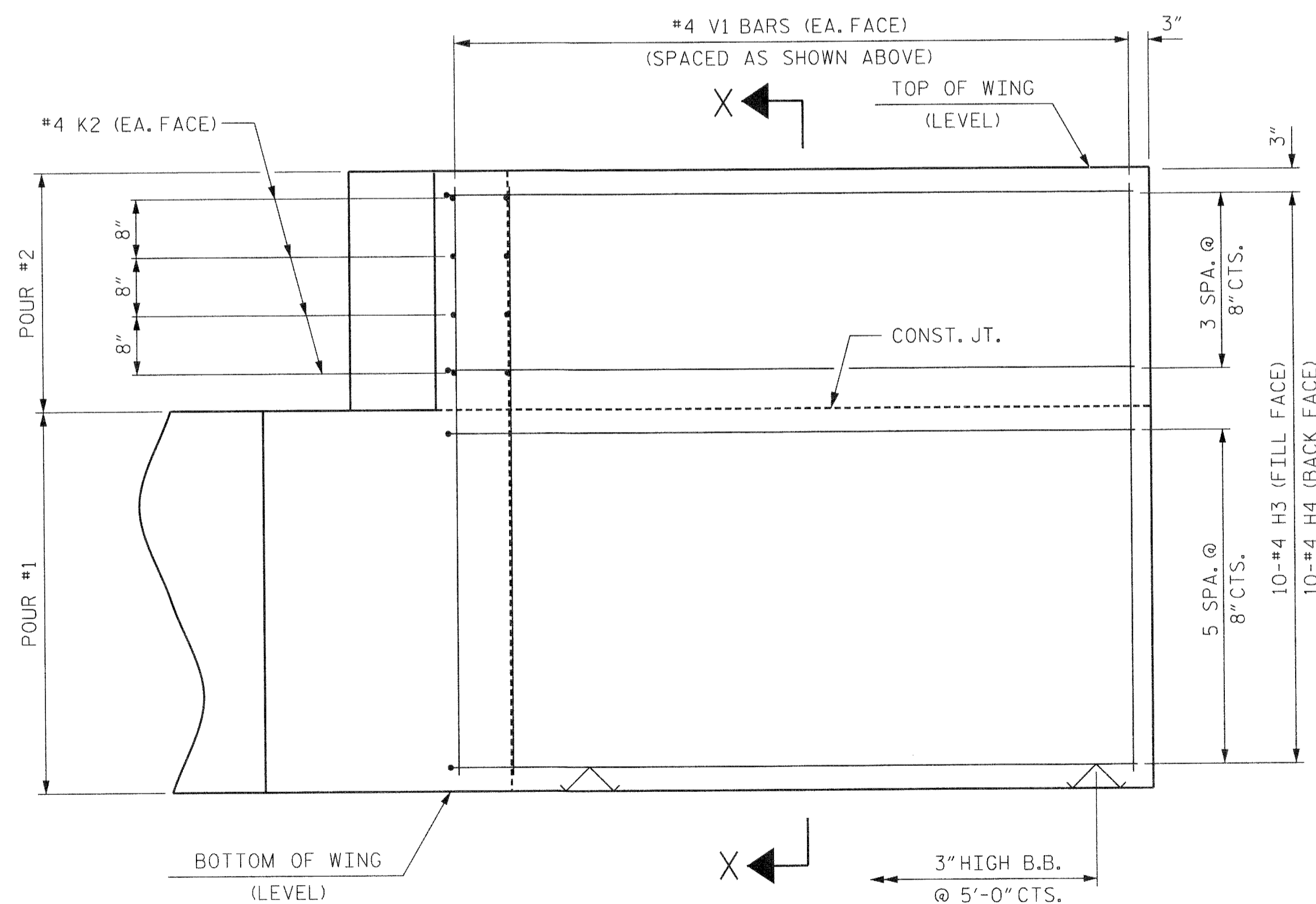


DWN. BY: MAF DATE: 3/2013
 CHKD. BY: HLW DATE: 3/2013
 DES. EGR. OF RECORD: RTS DATE: 3/2013

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16	
1			3			TOTAL SHEETS	
2			4			22	

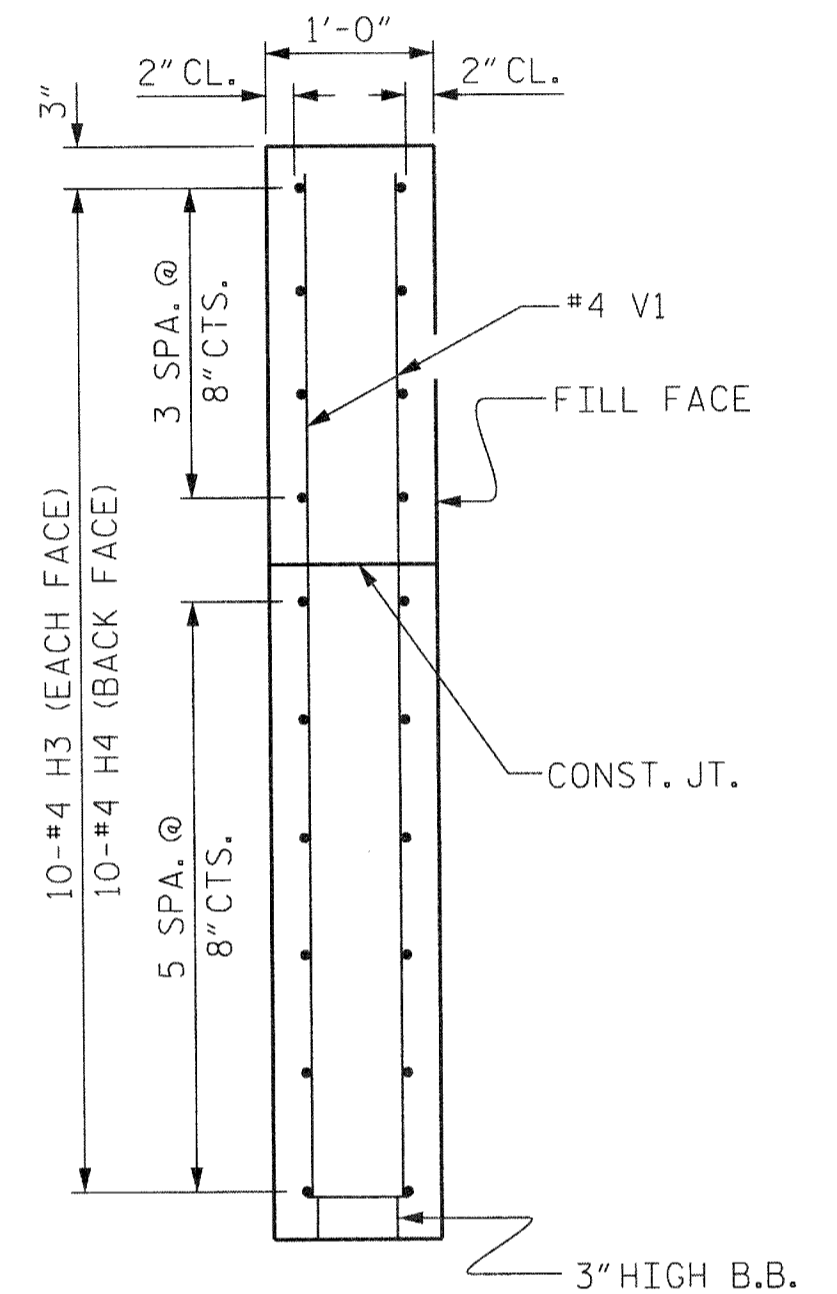


PLAN OF WING (W3)



ELEVATION OF WING (W3)

WING DETAILS



SECTION X-X



PROJECT NO. BD-5113M
BUNCOMBE COUNTY
 STATION: 13+03.50

SHEET 5 OF 6

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT
 WING DETAILS

REVISIONS

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

SHEET NO.	
S-17	TOTAL SHEETS
22	

V&M
 Vaughan & Melton
 Consulting Engineers

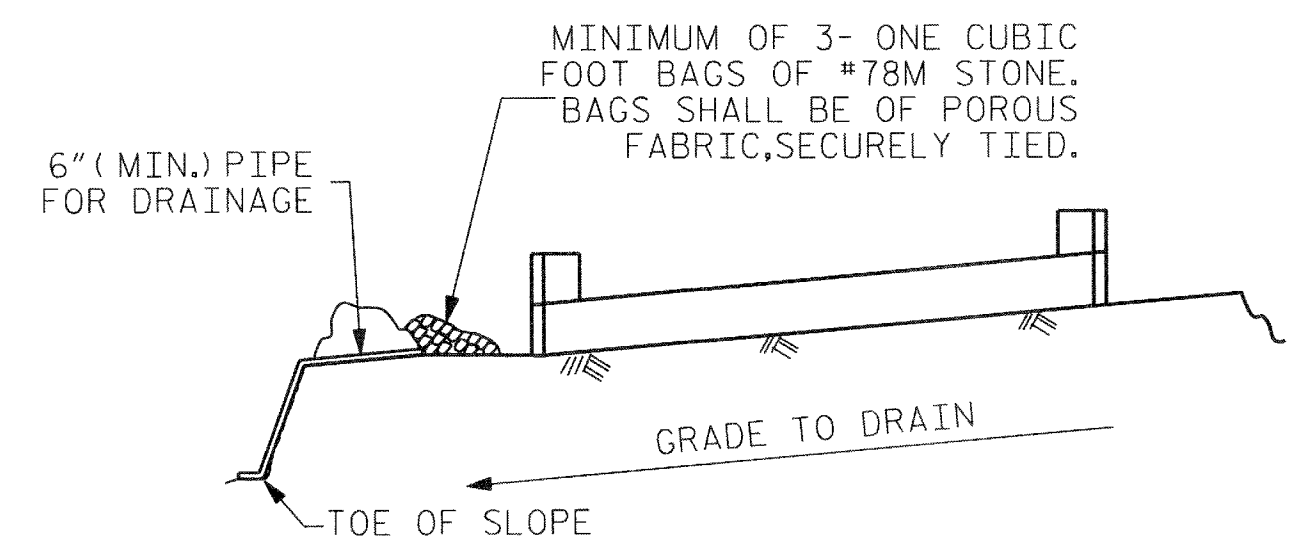
Charlotte, NC 28202-0408
 Tri-Cities, TN 38377-0408
 Knoxville, TN 37916-0408
 Middleboro, MA 01846-0408
 Asheville, NC 28801-0408
 North Carolina 828-253-2796
 South Carolina 864-514-4753

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DWN. BY: MAF DATE: 3/2013
 CHKD. BY: HLW DATE: 3/2013
 DES. EGR. OF RECORD: RTS DATE: 3/2013

ASSEMBLED BY : MAF	DATE : 3/13
CHECKED BY : HLW	DATE : 3/13
DRAWN BY : WJH	12/11
CHECKED BY : AAC	12/11

*****SYSTEMTIME*****
 *****DGN*****
 *****USERNAME*****

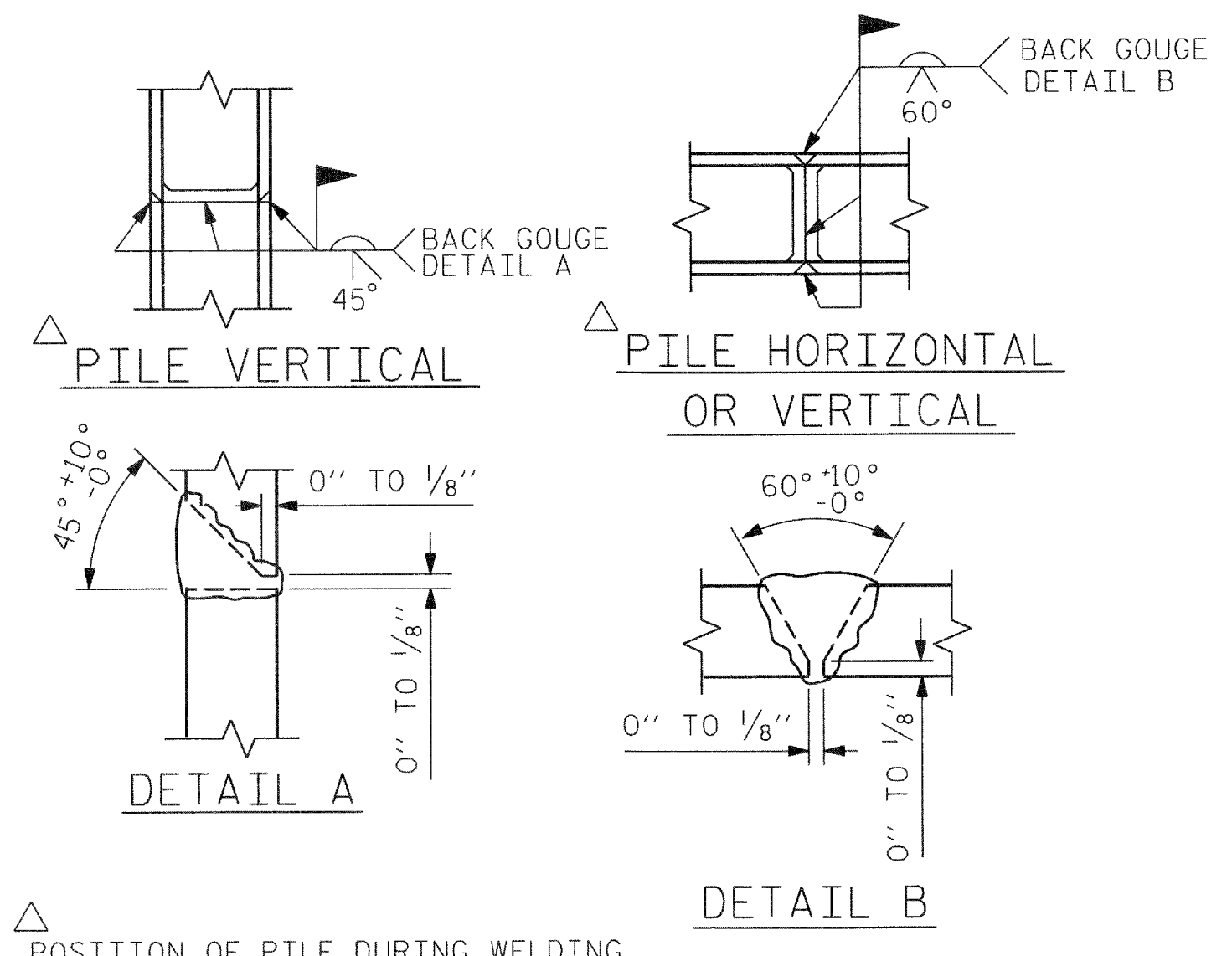


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

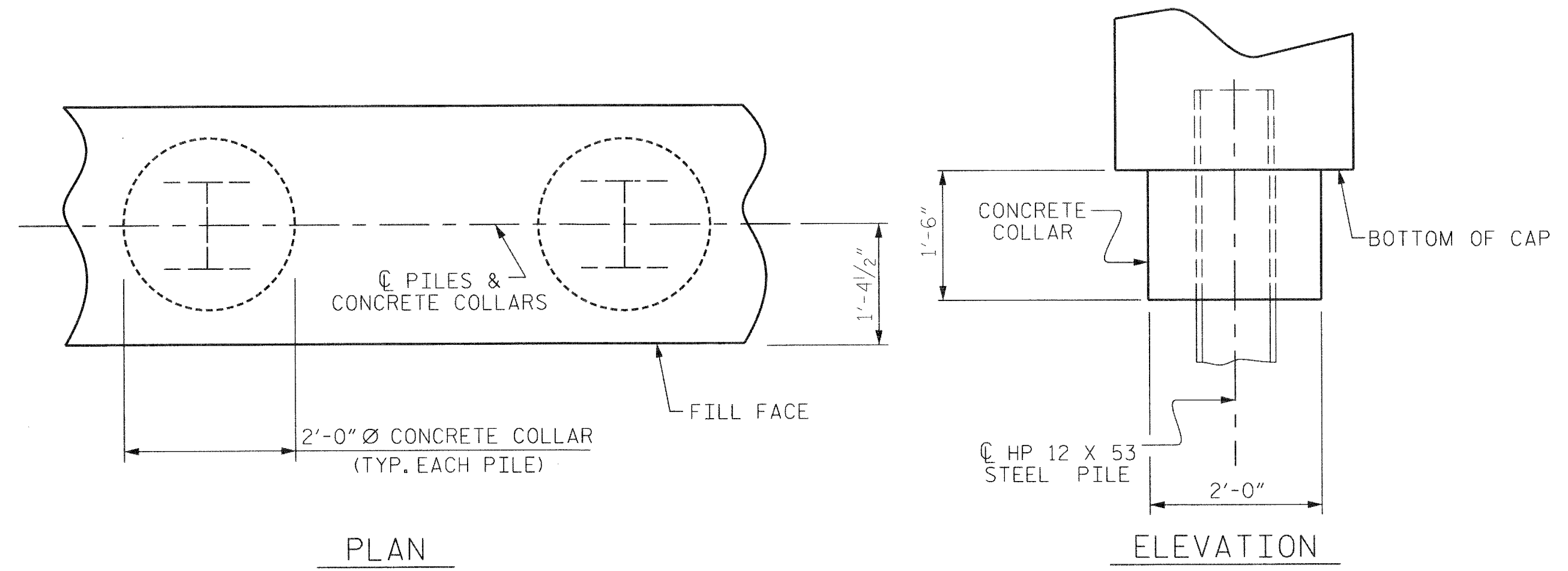
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

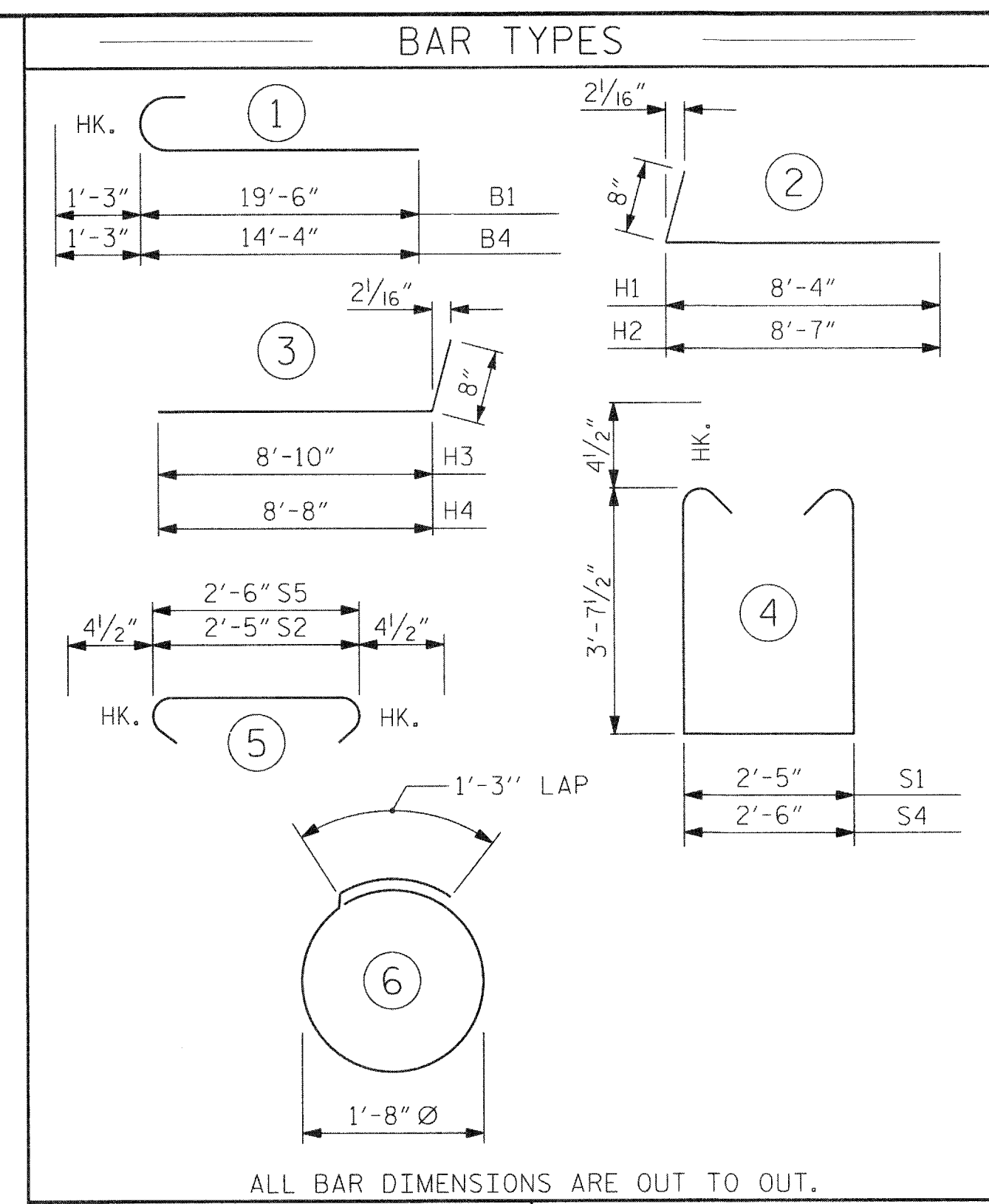
TEMPORARY DRAINAGE AT END BENT



PILE SPLICE DETAILS



CORROSION PROTECTION FOR STEEL PILES DETAIL
(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)



END BENT No. 1 HP 12 X 53 STEEL PILES NO: 5 LIN. FT.= 113		END BENT No. 2 HP 12 X 53 STEEL PILES NO: 5 LIN. FT.= 100	
-----------------------------------------------------------------	--	-----------------------------------------------------------------	--

BILL OF MATERIAL FOR ONE END BENT													
STAGE I					STAGE II								
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT		
B1	8	#9		20'-9"	564	B4	8	#9		15'-7"	424		
B2	14	#4	STR	21'-1"	197	B5	14	#4	STR	15'-2"	142		
B3	5	#4	STR	2'-5"	8	B3	4	#4	STR	2'-5"	6		
D1	10	#6	STR	1'-6"	23	D1	8	#6	STR	1'-6"	18		
EB1	H1	10	#4	2	9'-0"	60	EB2	H1	10	#4	2	9'-0"	60
EB1	H2	10	#4	2	9'-3"	62	EB2	H2	10	#4	2	9'-3"	62
EB2	H3	10	#4	3	9'-6"	63	EB1	H3	10	#4	3	9'-6"	63
EB2	H4	10	#4	3	9'-4"	62	EB1	H4	10	#4	3	9'-4"	62
EB1	K2	8	#4	STR	3'-0"	16	EB1	K1	8	#4	STR	2'-8"	14
EB2	K2	8	#4	STR	3'-0"	16	EB2	K2	8	#4	STR	3'-0"	16
S1	23	#4	4	10'-5"	160	S1	19	#4	4	10'-5"	132		
S2	23	#4	5	3'-2"	49	S2	19	#4	5	3'-2"	40		
S3	12	#4	6	6'-6"	52	S3	8	#4	6	6'-6"	35		
S4	1	#4	4	10'-6"	7	S4	1	#4	4	10'-6"	7		
S5	1	#4	5	3'-3"	2	S5	1	#4	5	3'-3"	2		
EB1	V1	26	#4	STR	6'-2"	107	EB1	V1	27	#4	STR	6'-2"	111
EB2	V1	27	#4	STR	6'-2"	111	EB2	V1	26	#4	STR	6'-2"	107
EB1 REINFORCING STEEL					1307 LBS.	EB1 REINFORCING STEEL					1056 LBS.		
EB2 REINFORCING STEEL					1314 LBS.	EB2 REINFORCING STEEL					1051 LBS.		
CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT, STAGE I)						CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT, STAGE II)							
POUR #1 CAP, LOWER PART OF WINGS & COLLARS					9.3 C.Y.	POUR #1 CAP, LOWER PART OF WINGS & COLLARS					7.9 C.Y.		
POUR #2 UPPER PART OF WINGS					1.1 C.Y.	POUR #2 UPPER PART OF WINGS					1.1 C.Y.		
TOTAL CLASS A CONCRETE (STAGE I)					10.4 C.Y.	TOTAL CLASS A CONCRETE (STAGE II)					9.0 C.Y.		

TOTAL BILL OF MATERIAL				
	CLASS A CONC. CU. YDS.	REINF. STEEL LBS.	HP 12x25 STEEL PILES	
			NO.	LIN. FT.
END BENT NO. 1	19.4	2363	5	113
END BENT NO. 2	19.4	2365	5	100
TOTAL	38.8	4728	10	213



PROJECT NO. BD-5113M
BUNCOMBE COUNTY
 STATION: 13+03.50

SHEET 6 OF 6
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT
 No. 1 & No. 2 DETAILS



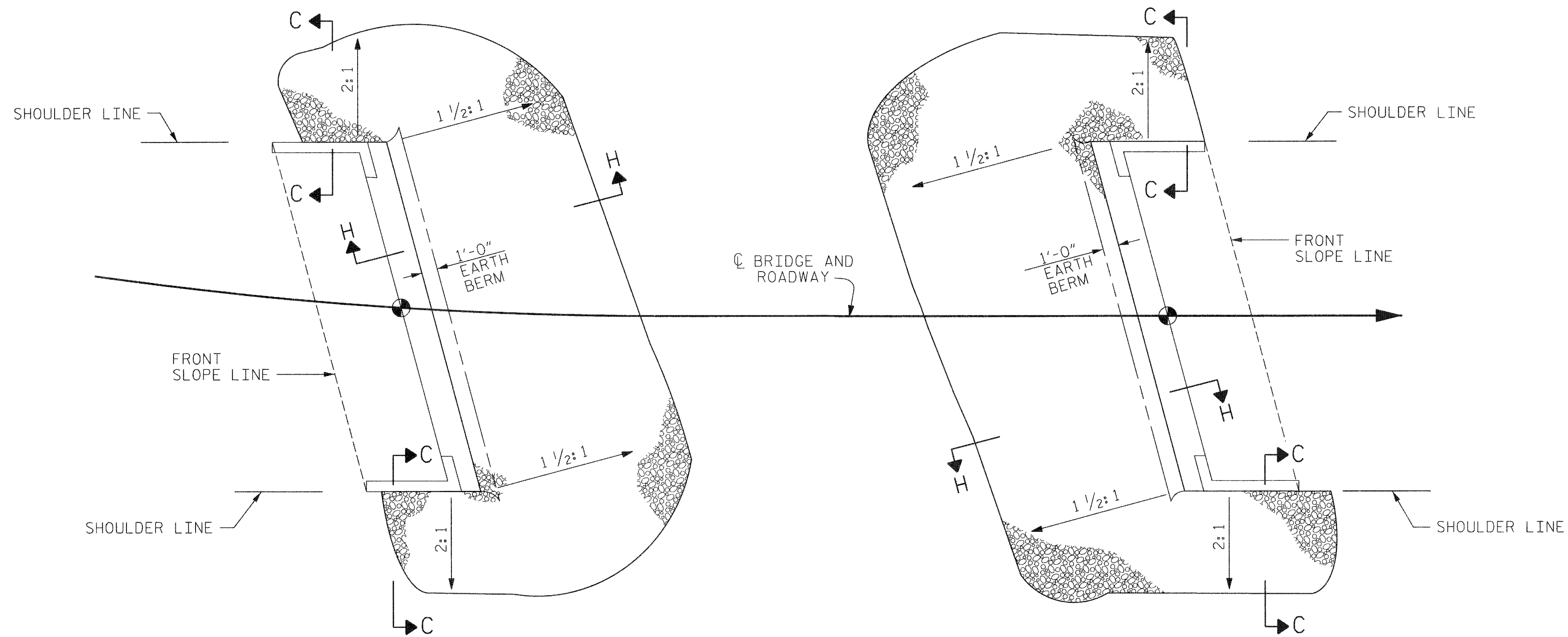
DWN. BY: MAF DATE: 3/2013
 CHKD. BY: HLW DATE: 3/2013
 DES. EOR. OF RECORD: RTS DATE: 3/2013

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS 22
2			4			

ASSEMBLED BY : MAF	DATE : 3/13
CHECKED BY : HLW	DATE : 3/13
DRAWN BY : WJH 12/11	
CHECKED BY : AAC 12/11	

*****SYTIME*****
 *****DCN*****
 *****USERNAME*****

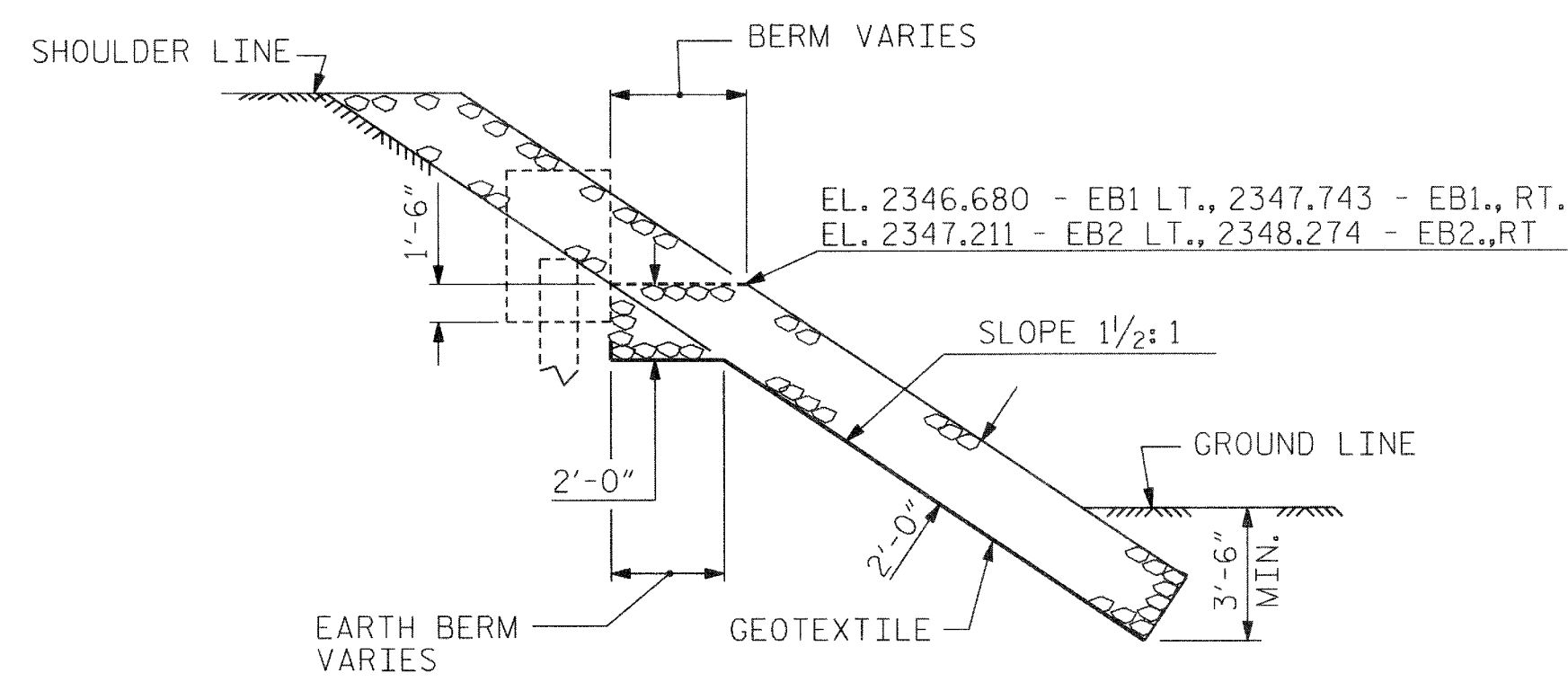
NOTES :
FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.



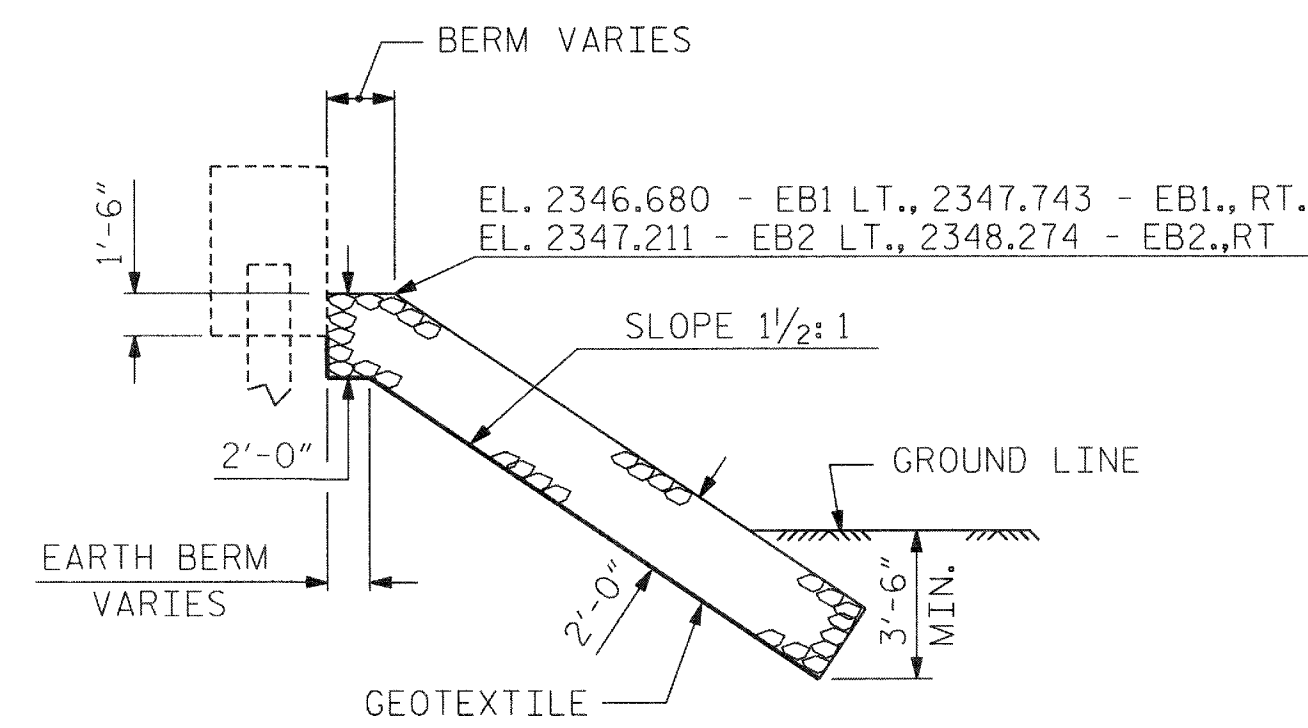
SHOULDER RIP RAP IS HIGHER THAN BERM RIP RAP

BERM RIP RAPPED

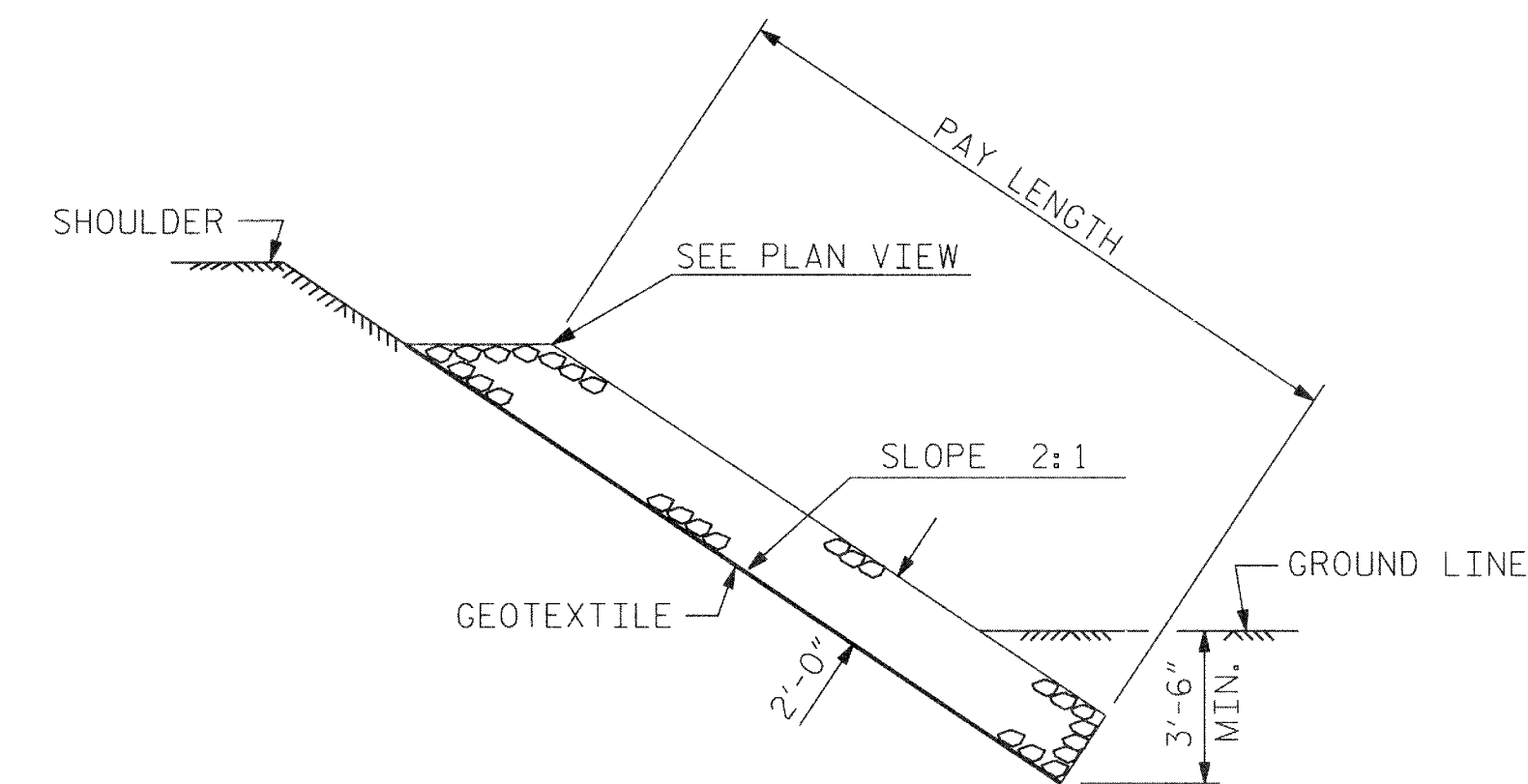
ESTIMATED QUANTITIES		
BRIDGE @ STA. 13+03.50 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	118	125
END BENT 2	129	137



SECTION H-H



SECTION C-C
BERM RIP RAPPED

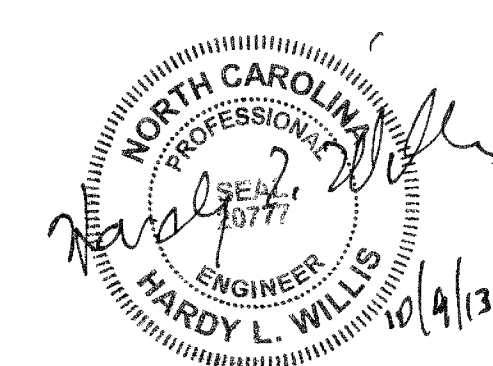


SECTION C-C

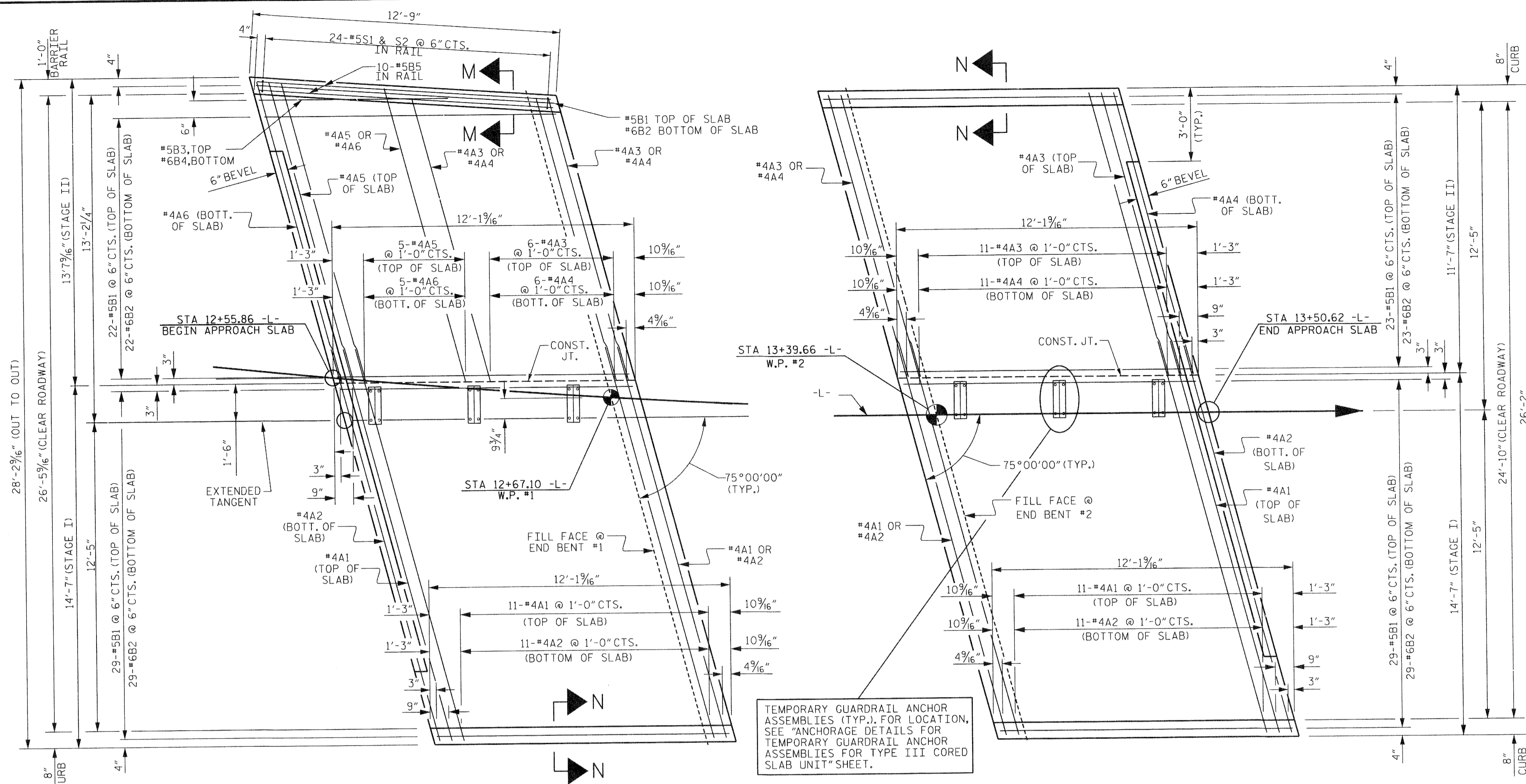
PROJECT NO. BD-5113M
BUNCOMBE COUNTY
STATION: 13+03.50 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
—RIP RAP DETAILS—

ASSEMBLED BY : MAF	DATE : 3/13
CHECKED BY : HLW	DATE : 3/13
DRAWN BY : REK 1/84	REV. 5/1/06R TLA/GM
CHECKED BY : RDU 1/84	REV. 10/1/11 MAA/GM
	REV. 12/21/11 MAA/GM



REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19	
1			3			TOTAL SHEETS	
2			4			22	



PLAN @ END BENT #1

PLAN @ END BENT #2

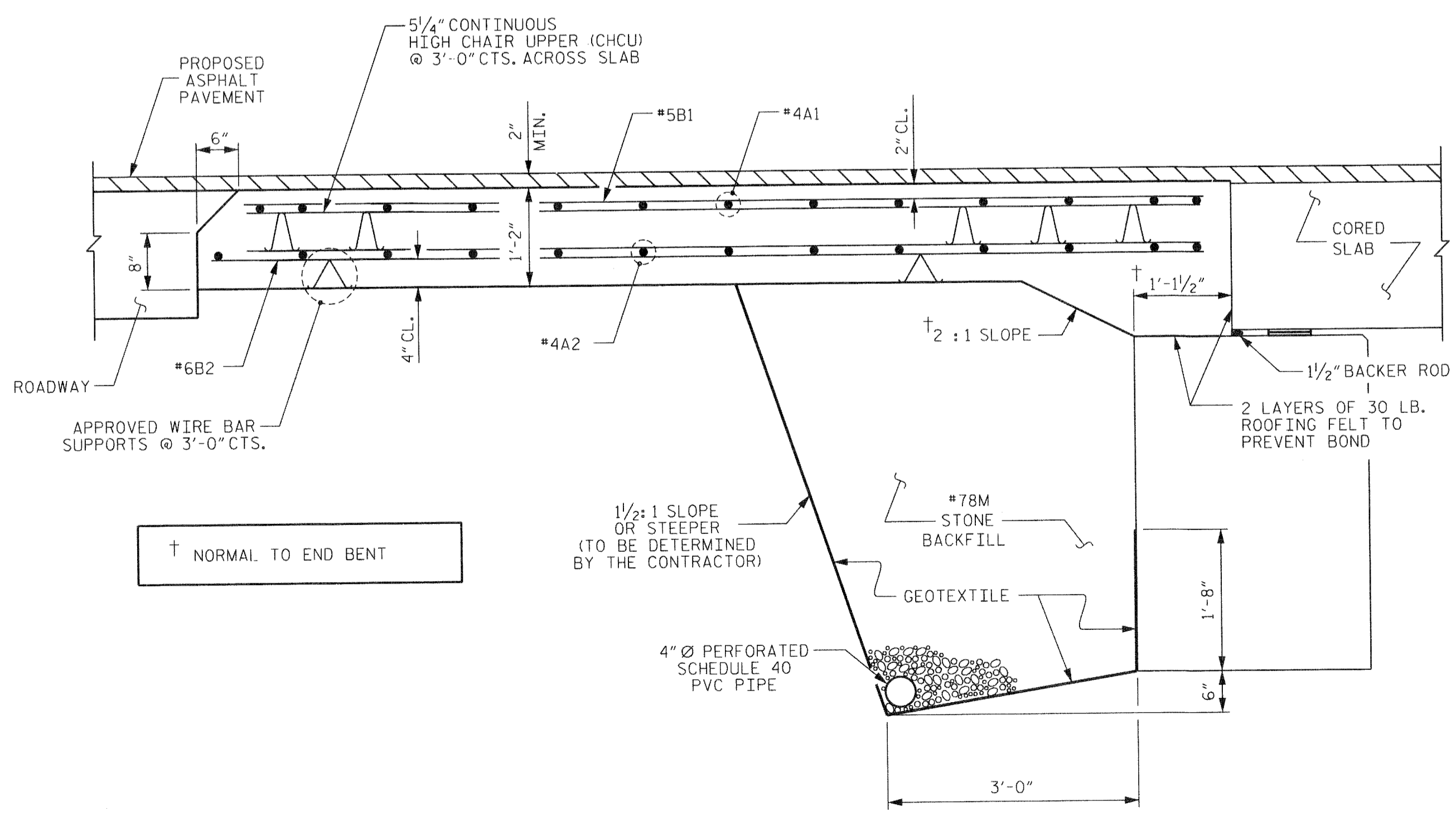
— BAR TYPES —

ALL BAR DIMENSIONS ARE OUT TO OUT.

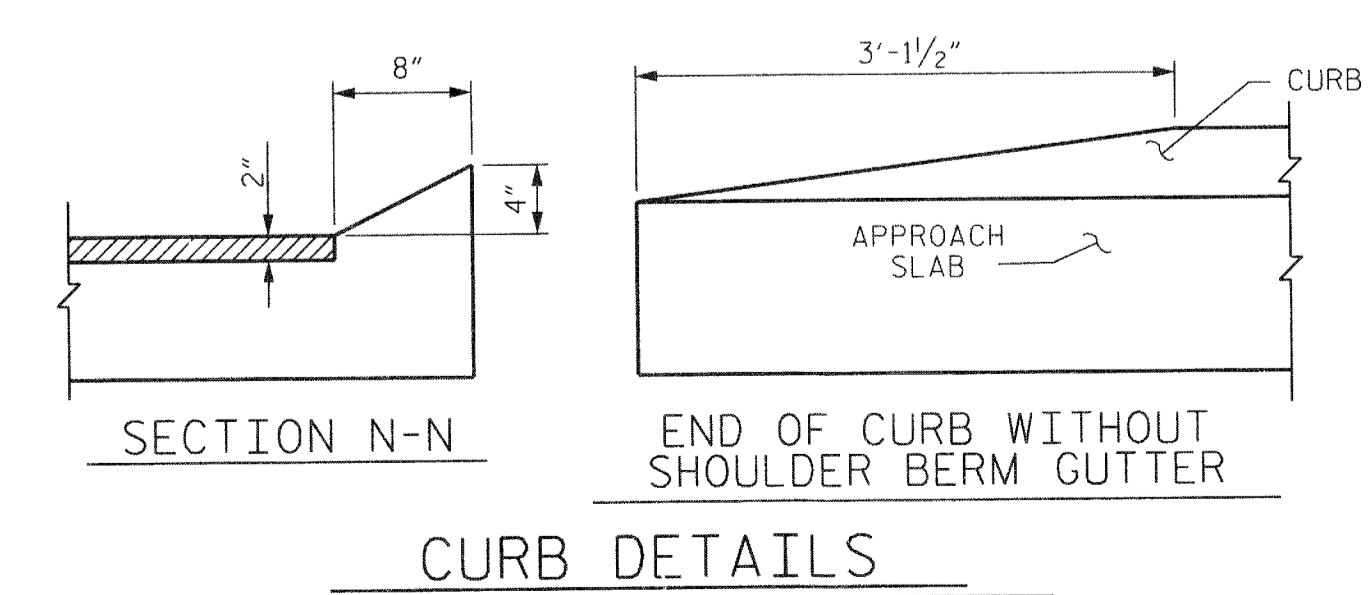
BILL OF MATERIAL						
APPROACH SLAB AT EB #1 STAGE I						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
*A1	13	#4	STR	17'-2"	149	
A2	13	#4	STR	16'-11"	147	
*B1	29	#5	STR	11'-1"	335	
B2	29	#6	STR	11'-7"	505	
REINFORCING STEEL					LBS.	652
* EPOXY COATED REINFORCING STEEL					LBS.	484
CLASS AA CONCRETE					C. Y.	9.3
APPROACH SLAB AT EB #1 STAGE II						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
*A3	7	#4	STR	11'-7"	54	
A4	7	#4	STR	11'-7"	54	
*A5	6	#4	STR	13'-5"	54	
A6	6	#4	STR	13'-5"	54	
*B1	23	#5	STR	11'-1"	266	
B2	23	#6	STR	11'-7"	400	
*B3	1	#5	STR	7'-9"	8	
B4	1	#6	STR	7'-9"	12	
*B5	10	#5	STR	11'-10"	123	
*S1	24	#5	1	5'-11"	148	
S2	24	#5	2	7'-2"	179	
REINFORCING STEEL					LBS.	520
* EPOXY COATED REINFORCING STEEL					LBS.	832
CLASS AA CONCRETE					C. Y.	9.5
APPROACH SLAB AT EB #2 STAGE I						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
*A1	13	#4	STR	17'-2"	149	
A2	13	#4	STR	16'-11"	147	
*B1	29	#5	STR	11'-1"	335	
B2	29	#6	STR	11'-7"	505	
REINFORCING STEEL					LBS.	652
* EPOXY COATED REINFORCING STEEL					LBS.	484
CLASS AA CONCRETE					C. Y.	9.1
APPROACH SLAB AT EB #2 STAGE II						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
*A3	13	#4	STR	11'-7"	101	
A4	13	#4	STR	11'-7"	101	
*B1	23	#5	STR	11'-1"	266	
B2	23	#6	STR	11'-7"	400	
REINFORCING STEEL					LBS.	501
* EPOXY COATED REINFORCING STEEL					LBS.	367
CLASS AA CONCRETE					C. Y.	7.2

SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"

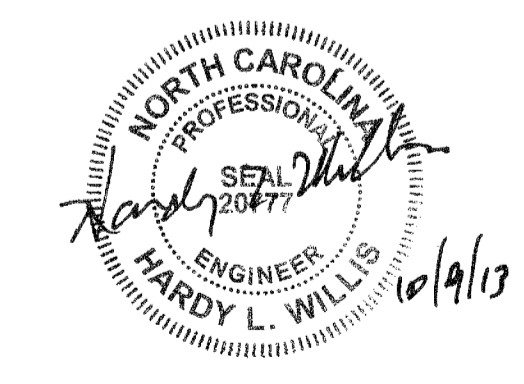
* THESE BARS ARE EPOXY COATED



SECTION THRU SLAB



CURB DETAILS



V&M
Vaughn & Melton
Consulting Engineers

Charlotte, NC
Tri-Cities, TN
Knoxville, TN
Middlesboro, KY
Spartanburg, SC

Asheville, NC
North Carolina
828-253-2796

PROJECT NO. BD-5113M
BUNCOMBE COUNTY
 STATION: 13+03.50 -L-
 SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 BRIDGE APPROACH SLAB
 FOR PRESTRESSED CONCRETE
 CORED SLAB UNIT
 (SUB-REGIONAL TIER)
 75° SKEW

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20	
1			3			TOTAL SHEETS	
2			4			22	

DWN. BY: MAF DATE: 3/2013
 CHKD. BY: HLW DATE: 3/2013
 DES. EGR. OF RECORD: RTS DATE: 3/2013

ASSEMBLED BY: MAF DATE: 3/13
 CHECKED BY: HLW DATE: 3/13
 DRAWN BY: SHS/MAA 5-09 REV. 12-11 MAA/AAC
 CHECKED BY: BCH 5-09

*****SYSTEM*****
 *****SDGN*****
 *****USER*****

NOTES

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

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

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

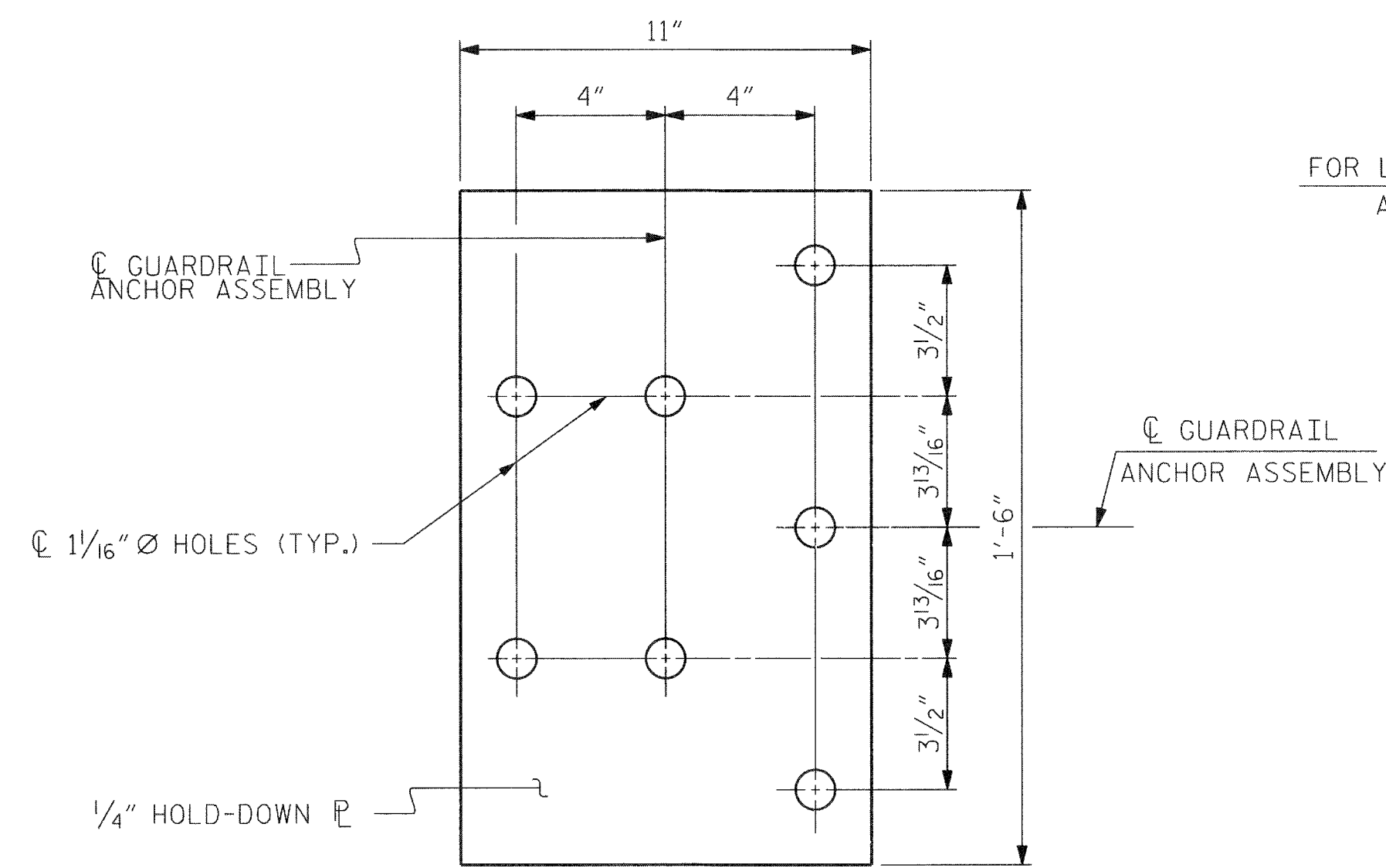
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE LUMP SUM CONTRACT PRICE BID FOR BRIDGE APPROACH SLABS.

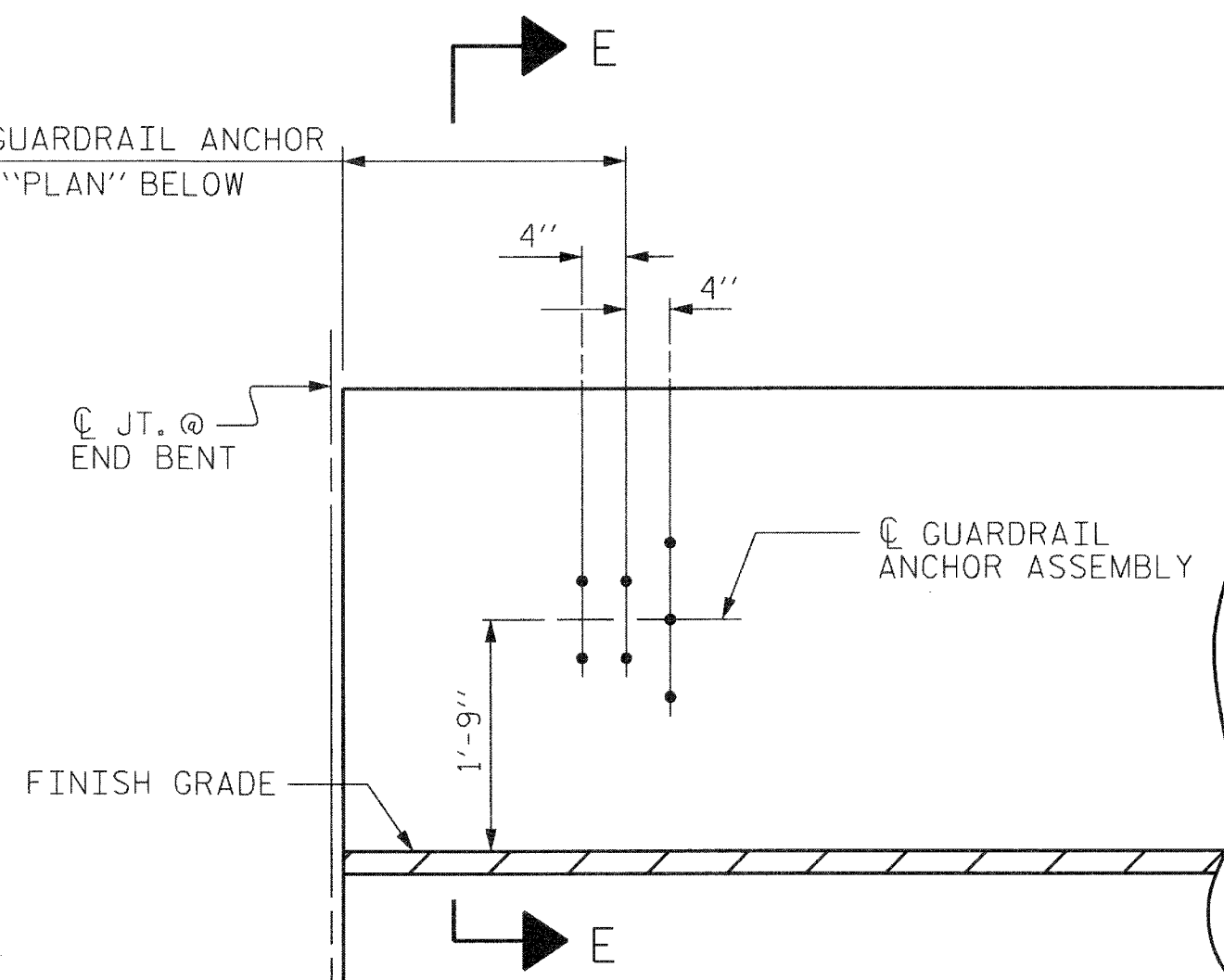
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

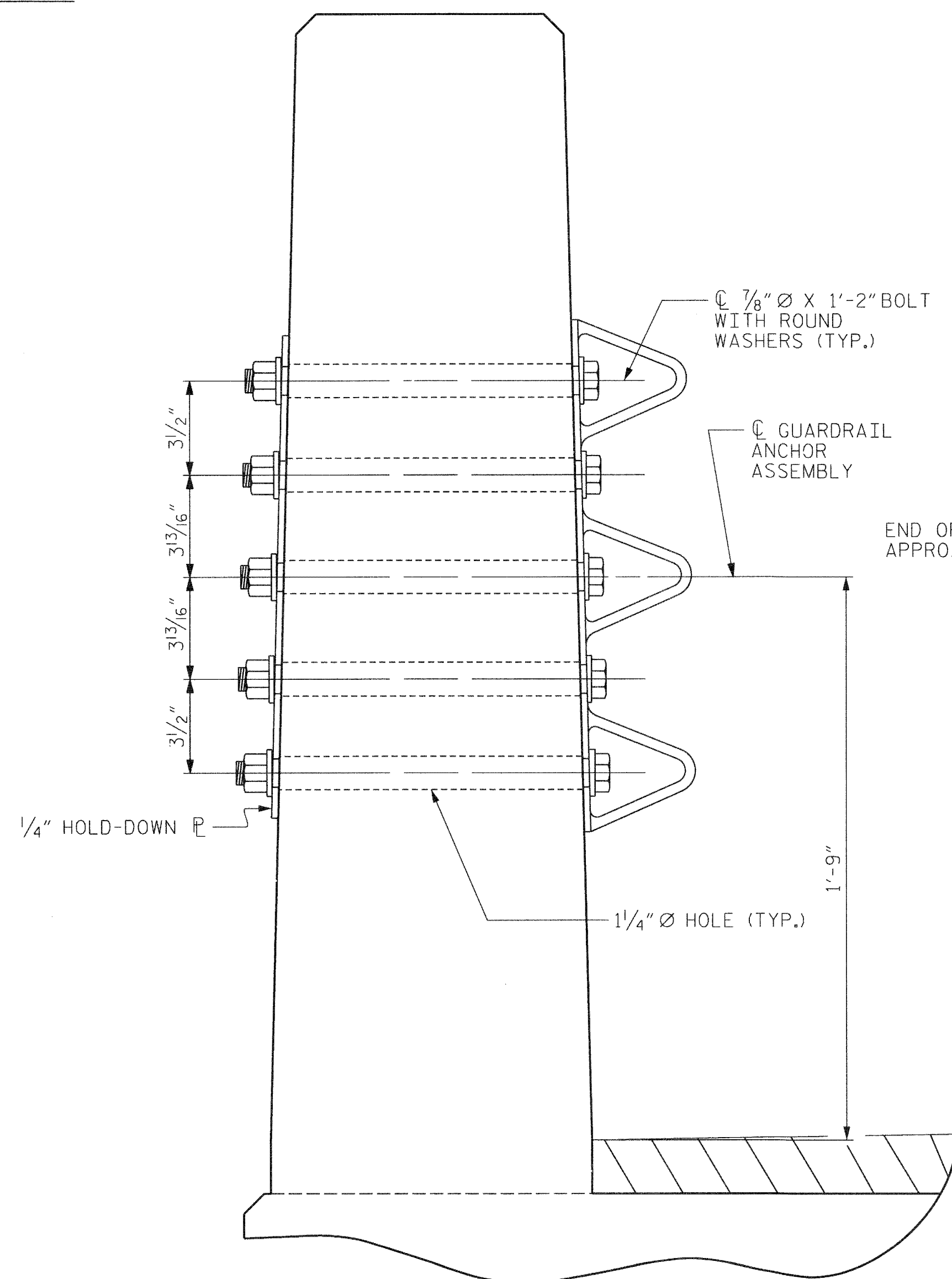


PLAN

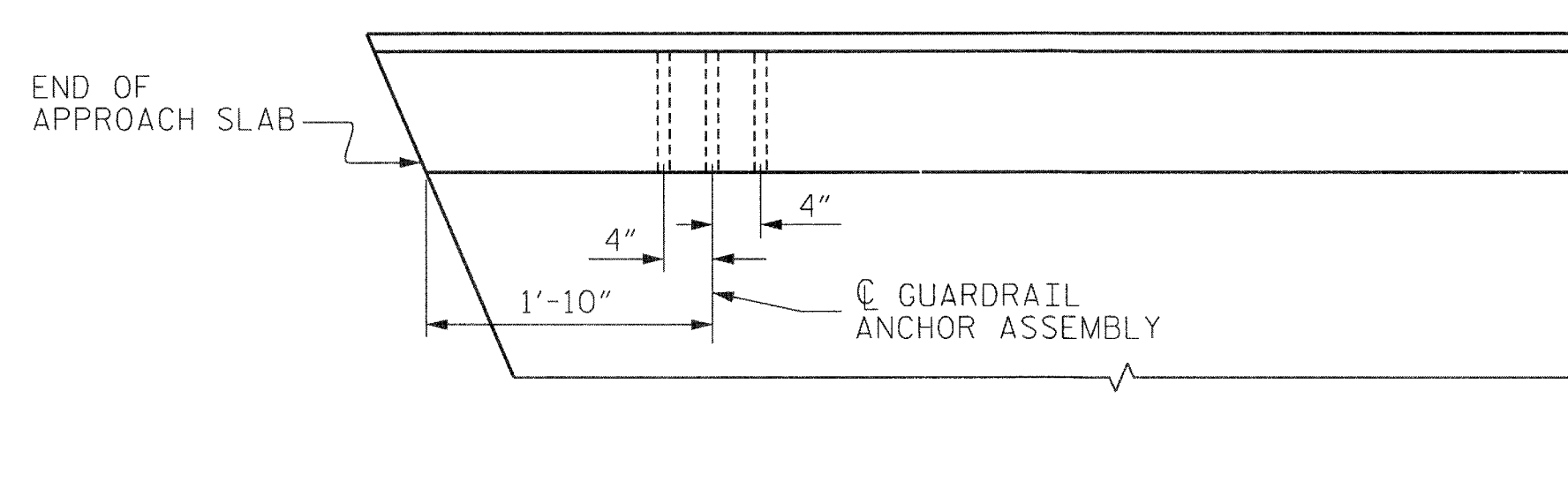
FOR LOCATION OF GUARDRAIL ANCHOR ASSEMBLY, SEE "PLAN" BELOW



ELEVATION



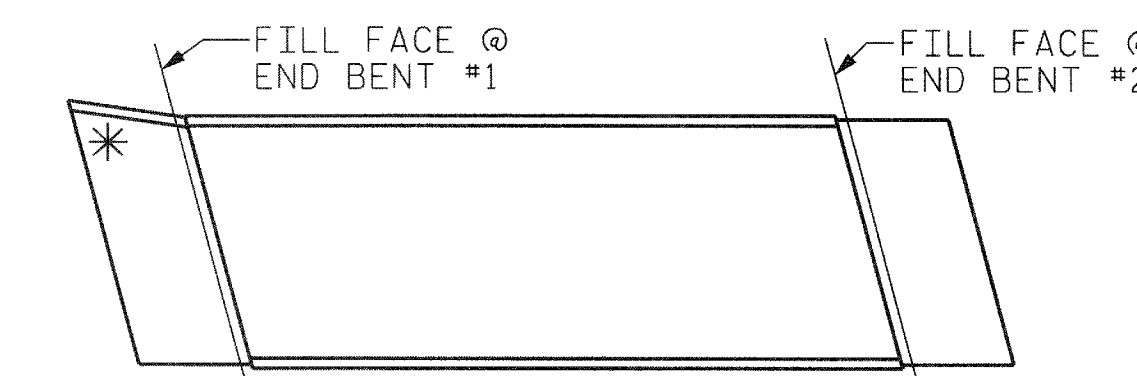
SECTION E-E
GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

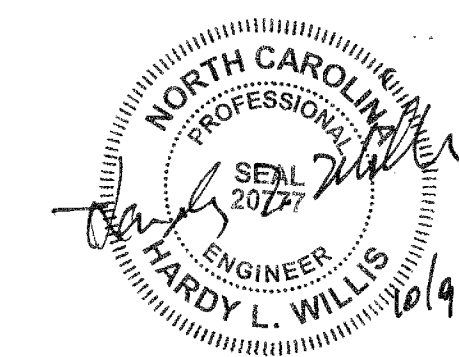
LOCATION OF ANCHORS FOR GUARDRAIL

APPROACH SLAB @ END BENT #1



SKETCH SHOWING POINTS OF ATTACHMENT

* DENOTES GUARDRAIL ANCHOR ASSEMBLY



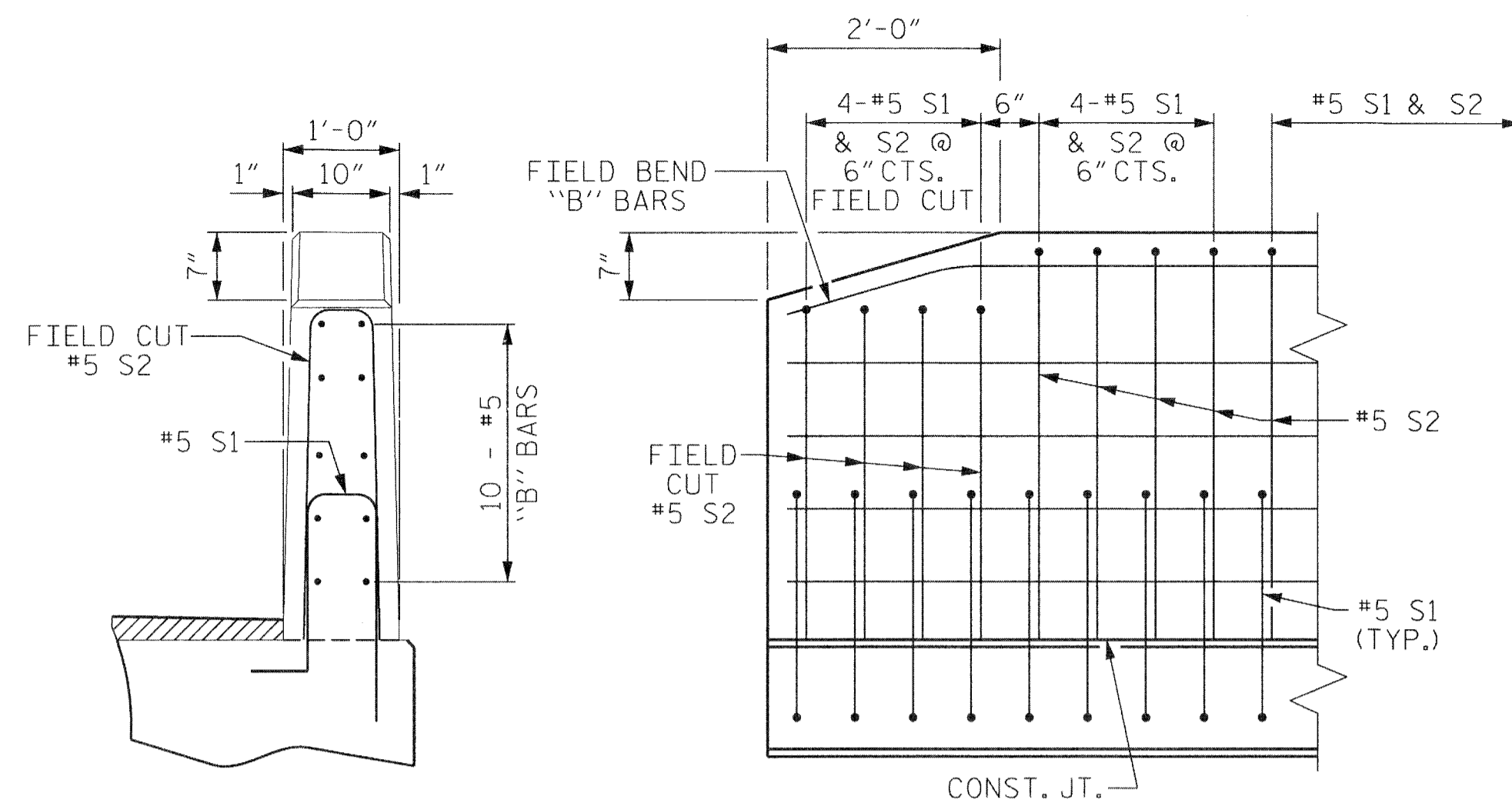
PROJECT NO. BD-5113M
BUNCOMBE COUNTY
 STATION: 13+03.50 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 BRIDGE APPROACH SLAB
 FOR PRESTRESSED CONCRETE
 CORED SLAB UNIT
 (SUB-REGIONAL TIER)
 75° SKEW

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21	
1			3			TOTAL SHEETS	
2			4			22	

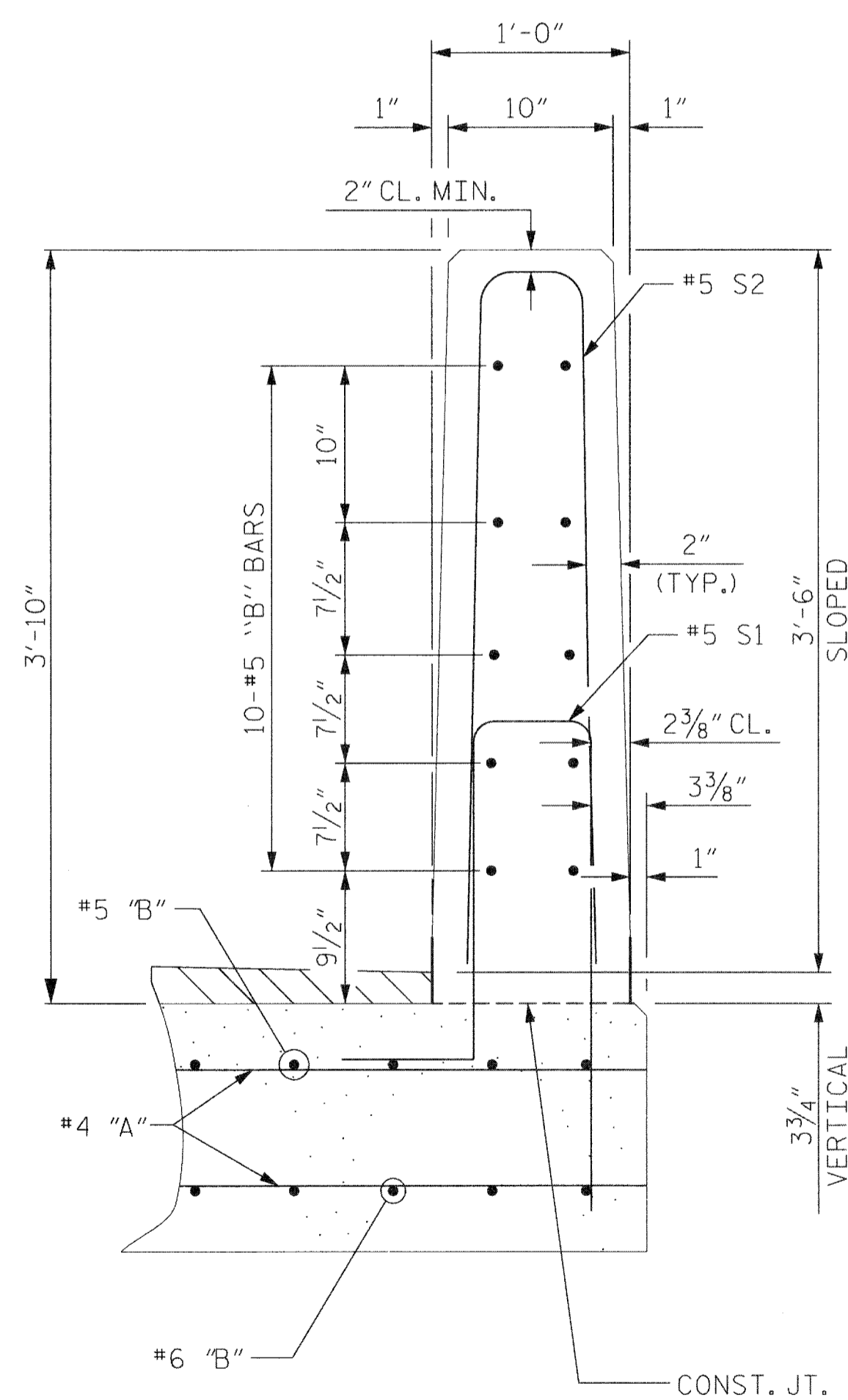
ASSEMBLED BY : MAF	DATE : 3/13
CHECKED BY : HLW	DATE : 3/13
DRAWN BY : MAA 5/10	ADDED 5/6/10
CHECKED BY : CM 5/10	REV. 10/1/11 MAA/GM
	REV. 12/5/11 MAA/GM



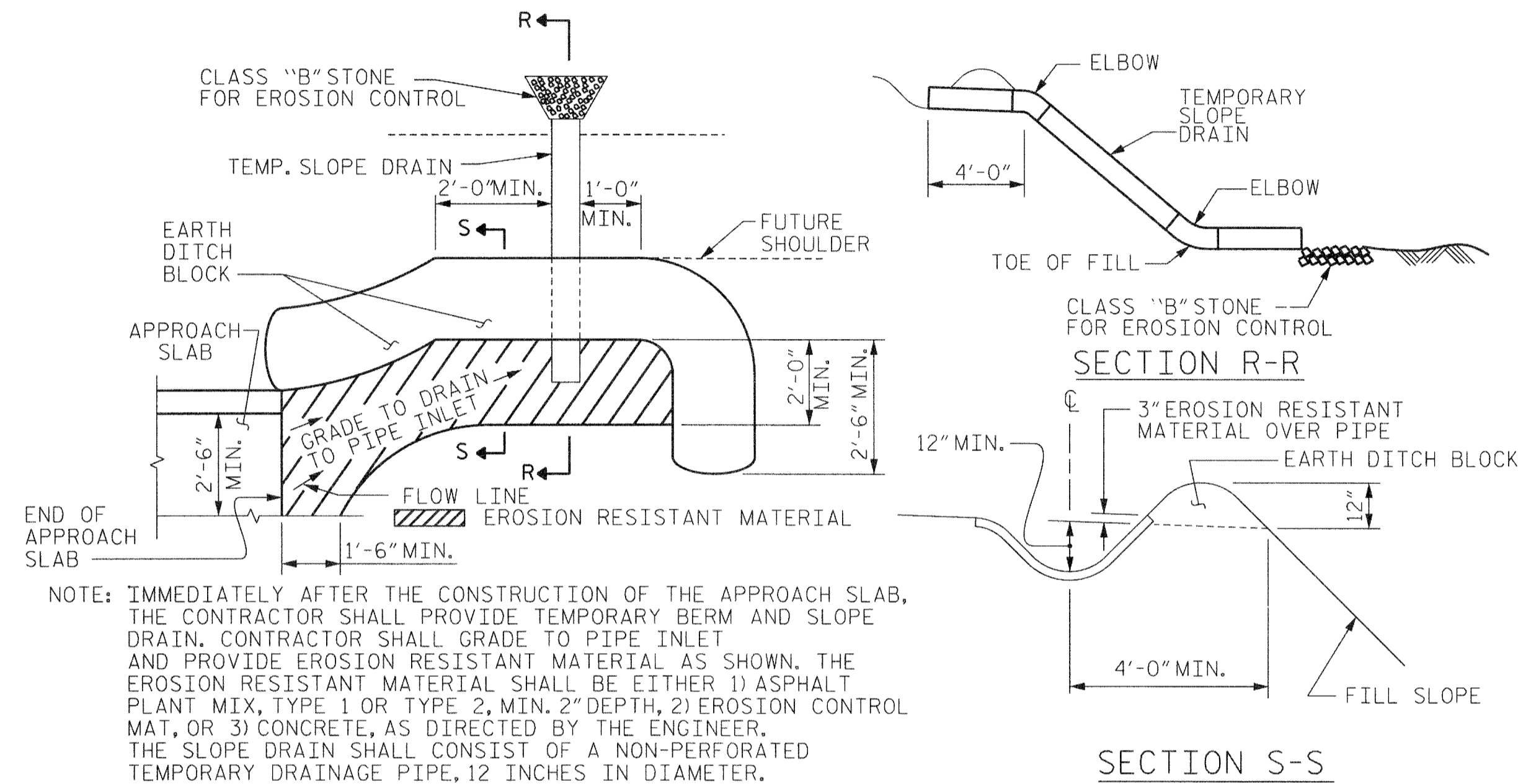
END VIEW

SIDE VIEW

END OF RAIL DETAILS

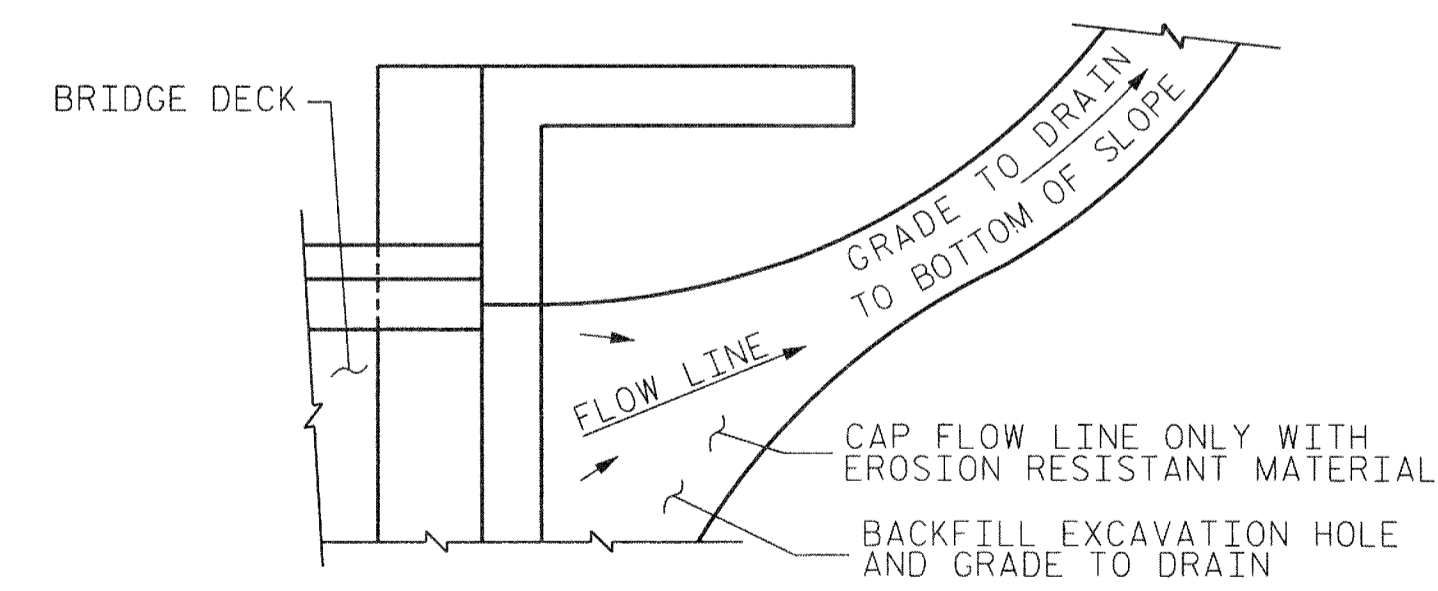


SECTION M-M
VERTICAL CONCRETE BARRIER RAIL SECTION



PLAN VIEW
TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO THE STRUCTURE. THE CONTRACTOR WILL BE REQUIRED TO REMOVE THESE MATERIALS PRIOR TO CONSTRUCTION OF THE APPROACH SLAB.

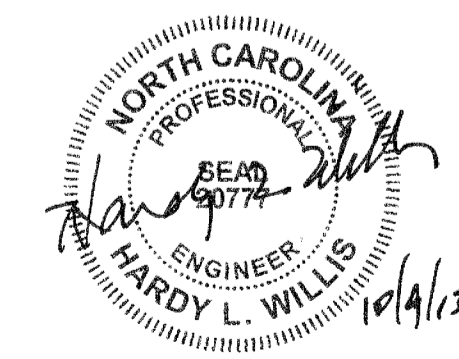
TEMPORARY DRAINAGE DETAIL

NOTES

- FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4" Ø DRAINAGE PIPE, AND #78M STONE BACKFILL, SEE ROADWAY PLANS.
- GEOTEXTILE SHALL BE TYPE 11N ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.
- #78M STONE BACKFILL (CLASS V SELECT MATERIAL) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.
- #78M STONE BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.
- FOR THE 4" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.
- AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.
- APPROACH SLAB GROOVING IS NOT REQUIRED.
- THE COST OF THE VERTICAL CONCRETE BARRIER RAIL ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LUMP SUM CONTRACT PRICE BID FOR BRIDGE APPROACH SLABS.

ASSEMBLED BY :	MAF	DATE :	3/13
CHECKED BY :	HLW	DATE :	3/13
DRAWN BY :	SHS/MAA 5-09	REV. 12-11	MAA/AAC
CHECKED BY :	BCH 5-09		

*****SYTIME*****
*****DCNS*****
*****USERNAME*****



PROJECT NO. BD-5113M
BUNCOMBE COUNTY
STATION: 13+03.50 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
BRIDGE APPROACH SLAB
FOR PRESTRESSED CONCRETE
CORED SLAB UNIT
(SUB-REGIONAL TIER)
75° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			22

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	-----	A.A.S.H.T.O. (CURRENT)
LIVE LOAD	-----	SEE PLANS
IMPACT ALLOWANCE	-----	SEE A.A.S.H.T.O.
STRESS IN EXTREME FIBER OF		
STRUCTURAL STEEL - AASHTO M270 GRADE 36	-	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	-	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	-	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION		
GRADE 60	--	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	-----	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	-----	SEE A.A.S.H.T.O.
STRUCTURAL TIMBER - TREATED OR		
UNTREATED - EXTREME FIBER STRESS	-----	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	-----	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	-----	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2006 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N.C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED 3/4" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1-1/2" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A 1/4" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A 1/4" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.
ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.
IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.
DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.
WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".
EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.
WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.
METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINIS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.

ENGLISH

JANUARY, 1990

STD. NO. SN

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE
SUBSURFACE INVESTIGATION

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PROJ. REFERENCE NO. 45359.1.13 BD-5113M F.A. PROJ. _____

COUNTY BUNCOMBE

PROJECT DESCRIPTION BRIDGE NO. 651 ON SR 1109 OVER STONEY FORK CREEK

SITE DESCRIPTION _____

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1901 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

PERSONNEL
P.Q. LOCKAMY
D.O. CHEEK
C.J. COFFEY

INVESTIGATED BY P.Q. LOCKAMY

CHECKED BY W.D. FRYE

SUBMITTED BY W.D. FRYE

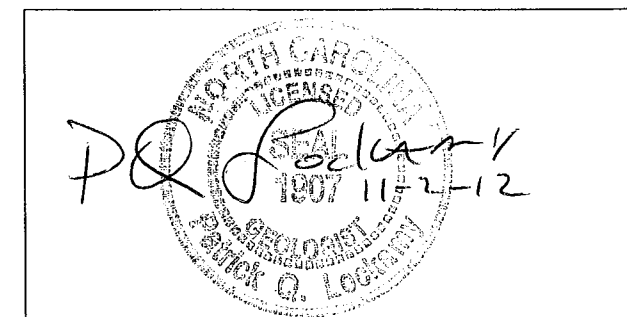
DATE 11.2.12

PROJECT: 45359.1.13 ID: BD-5113M

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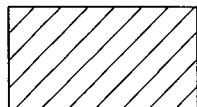
NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IS IT CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.



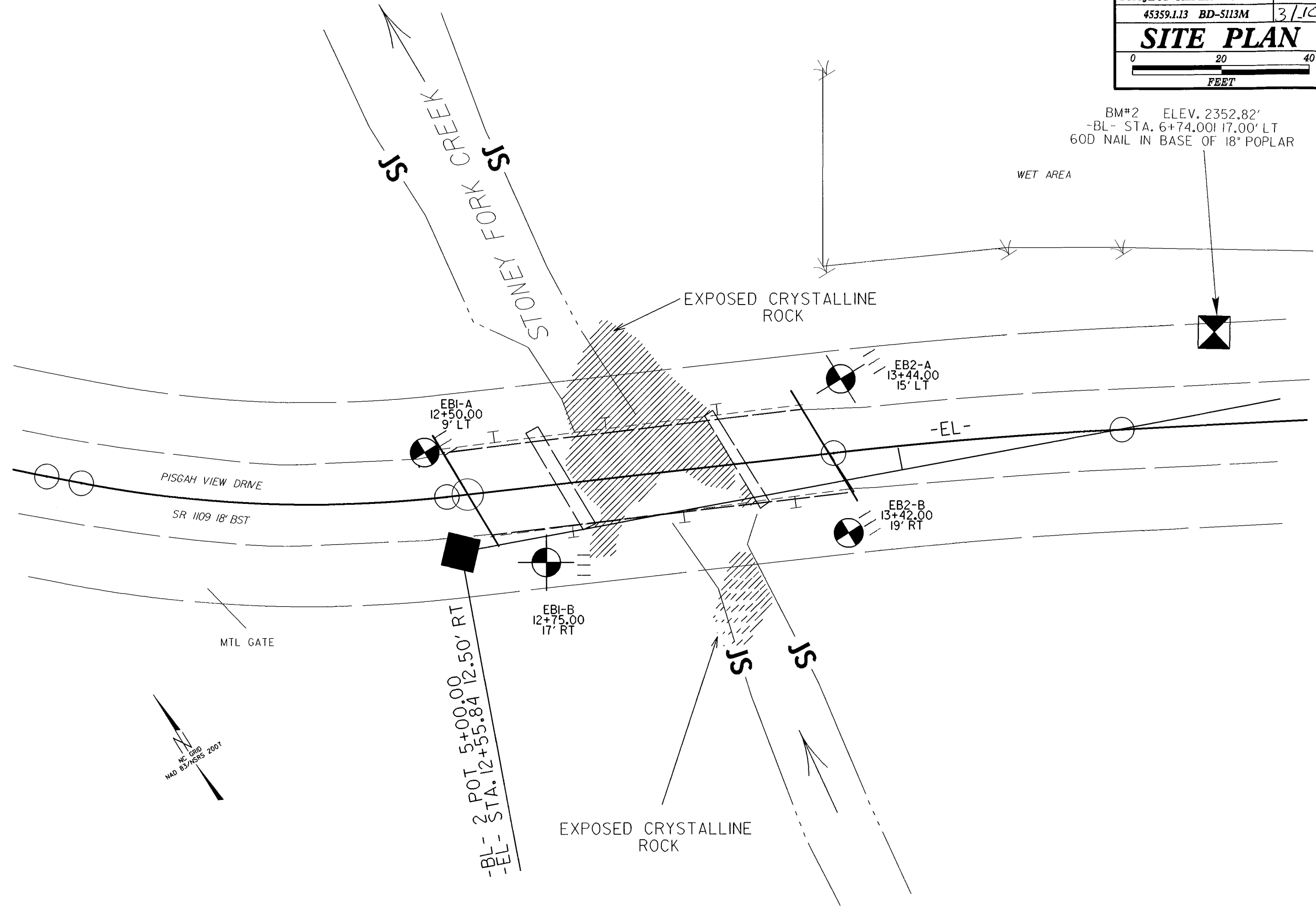
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, GRAY SILTY CLAY WITH INTERBEDDED FINE SAND LAYERS, MODY PLASTIC, A-7-6</i>	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 60 BLOWS PER FOOT IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS: WEATHERED ROCK (WR) CRYSTALLINE ROCK (CR) NON-CRYSTALLINE ROCK (NCR) COASTAL PLAIN SEDIMENTARY ROCK (CP)	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (IN OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 60 BLOWS. STRATA CORE RECOVERY (SCREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	WEATHERING	
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V SL.) ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. SLIGHT (SL.) ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. MODERATE (MOD.) SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK. MODERATELY SEVERE (MOD. SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i> SEVERE (SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, YIELDS SPT N VALUES > 100 BPF</i> VERY SEVERE (V SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i> COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIXES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	
COMPRESSION	PERCENTAGE OF MATERIAL	GROUND WATER	MISCELLANEOUS SYMBOLS
SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50	ORGANIC MATERIAL GRANULAR SOILS SILT-CLAY SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC >10% >20% HIGHLY 35% AND ABOVE	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES
CONSISTENCY OR DENSENESS	TEXTURE OR GRAIN SIZE	ABBREVIATIONS	EQUIPMENT USED ON SUBJECT PROJECT
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)	U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.76 2.00 0.42 0.25 0.075 0.053 BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE, SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.) GRAIN SIZE MM IN. 305 75 2.0 0.25 0.05 0.005	AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE. - COARSE DMT - DILATOMETER TEST OPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HI. - HIGHLY MED. - MEDIUM MICA. - MICACEOUS MOD. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL w - MOISTURE CONTENT V - VERY VST - VANE SHEAR TEST WEA. - WEATHERED ? - UNIT WEIGHT % - DRY UNIT WEIGHT	DRILL UNITS: <input type="checkbox"/> MOBILE B- <input type="checkbox"/> BK-51 <input type="checkbox"/> CME-45C <input checked="" type="checkbox"/> CME-55B <input type="checkbox"/> PORTABLE HOIST ADVANCING TOOLS: <input type="checkbox"/> CLAY BITS <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER <input type="checkbox"/> 8" HOLLOW AUGERS <input type="checkbox"/> HARD FACED FINGER BITS <input type="checkbox"/> TUNG-CARBIDE INSERTS <input checked="" type="checkbox"/> CASING <input checked="" type="checkbox"/> w/ ADVANCER <input checked="" type="checkbox"/> TRICONE 2 15/16 STEEL TEETH <input type="checkbox"/> TRICONE TUNG-CARB. <input checked="" type="checkbox"/> CORE BIT HAMMER TYPE: <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL CORE SIZE: <input type="checkbox"/> B <input checked="" type="checkbox"/> N XLW <input type="checkbox"/> H HAND TOOLS: <input type="checkbox"/> POST HOLE DIGGER <input type="checkbox"/> HAND AUGER <input type="checkbox"/> SOUNDING ROD <input type="checkbox"/> VANE SHEAR TEST
SOIL MOISTURE - CORRELATION OF TERMS	PLASTICITY	ROCK HARDNESS	INDURATION
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION LL - LIQUID LIMIT USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE PL - PLASTIC LIMIT SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE OM - OPTIMUM MOISTURE SOLID; AT OR NEAR OPTIMUM MOISTURE SL - SHRINKAGE LIMIT REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	NONPLASTIC PLASTICITY INDEX (PI) DRY STRENGTH VERY LOW SLIGHT MEDIUM HIGH 0-5 6-15 16-25 26 OR MORE	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS. MEDIUM HARD CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROOVED OR GOUGED EASILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY SOFT CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED EASILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED EASILY BY FINGER NAIL.	FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.
COLOR		FRACTURE SPACING	NOTES:
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.		TERM SPACING TERM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED > 4 FEET WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET MODERATELY CLOSE 1 TO 3 FEET THINLY BEDDED 0.16 - 1.5 FEET CLOSE 0.16 TO 1 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET	 EXPOSED CRYSTALLINE ROCK SEE PLAN VIEW

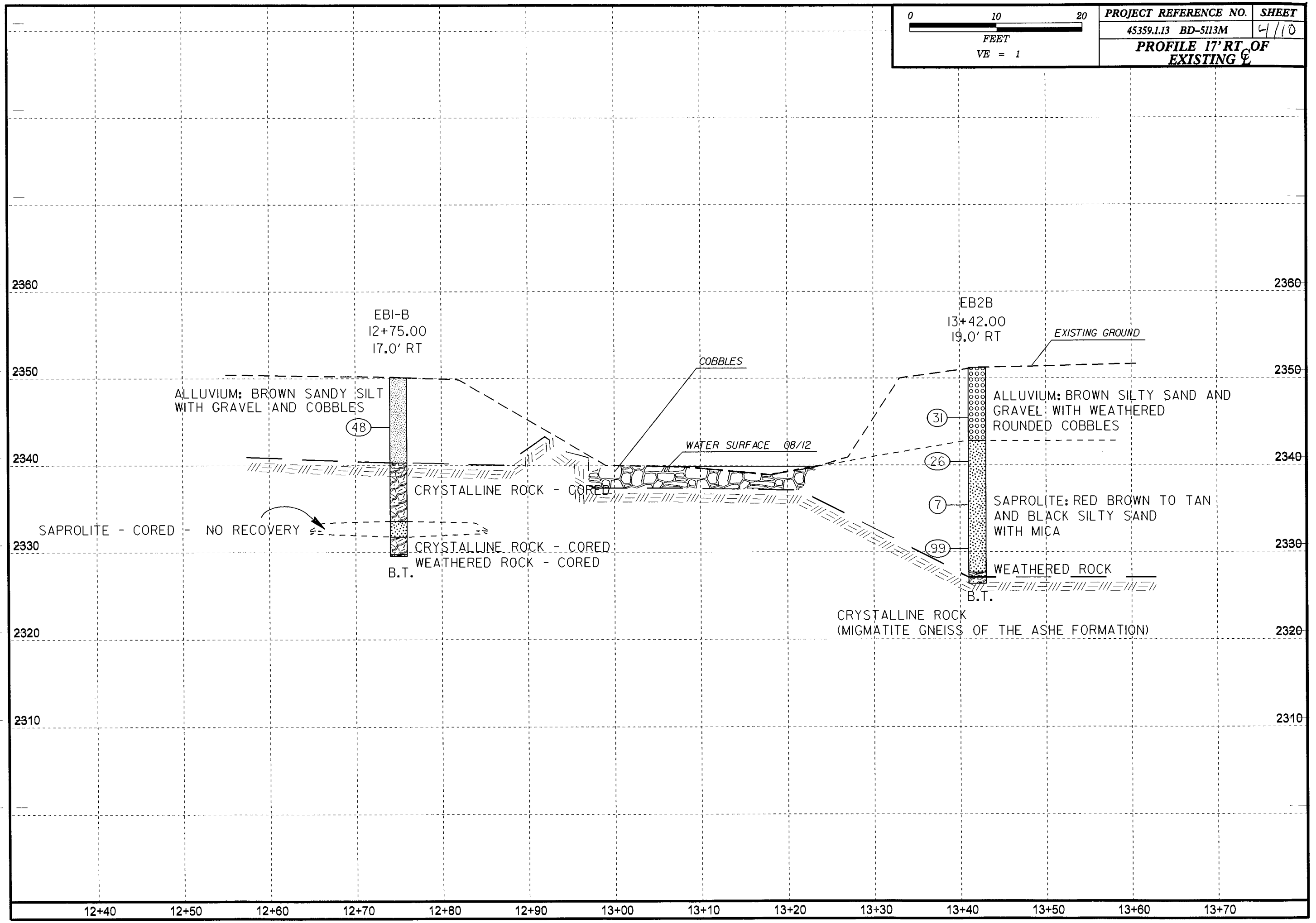
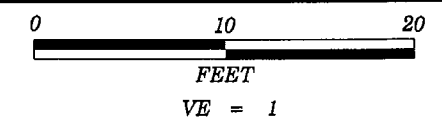
BM#2 ELEV. 2352.82'
 -BL- STA. 6+74.00| 17.00' LT
 60D NAIL IN BASE OF 18" POPLAR

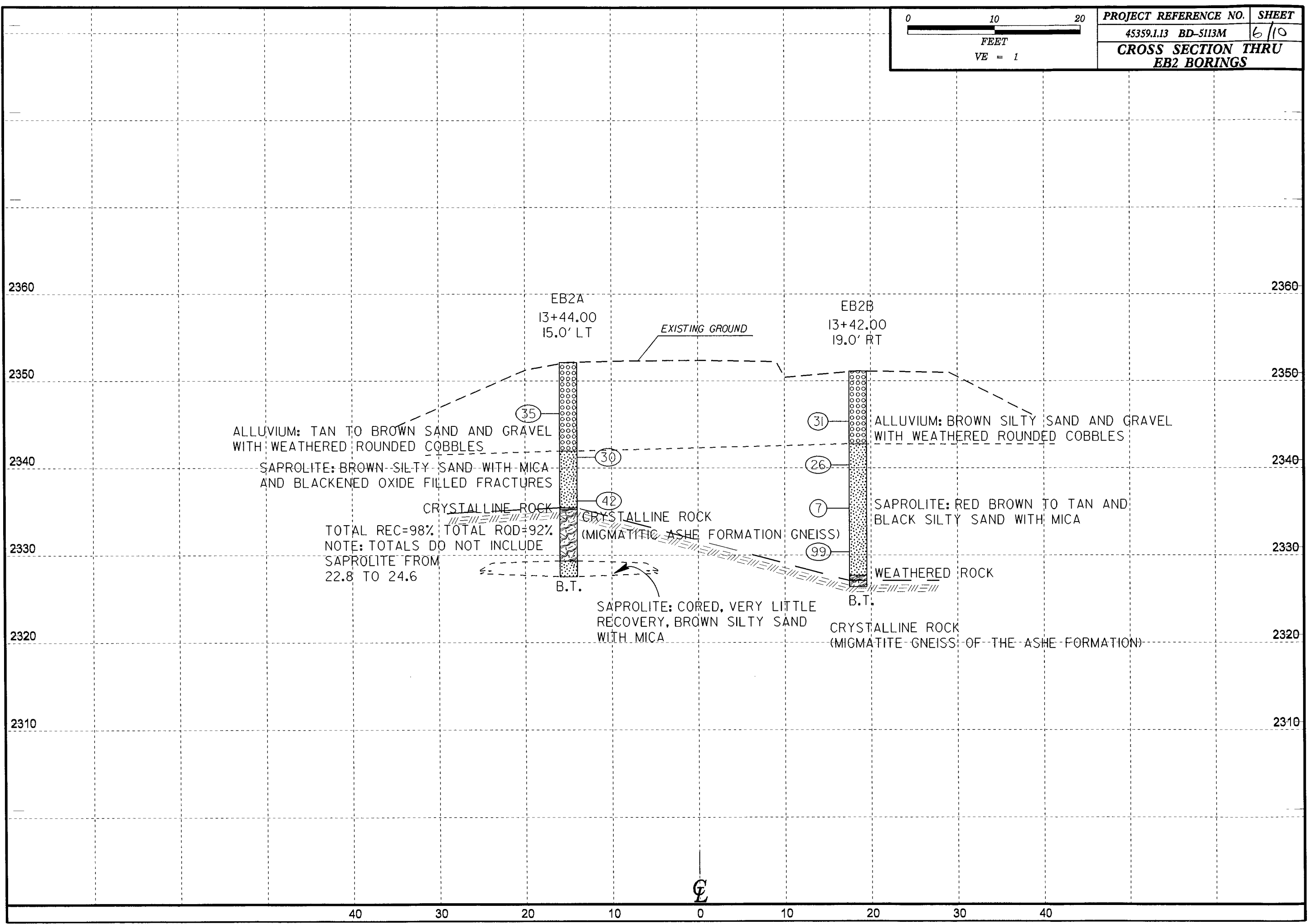
WET AREA



NC GRID
 MAD 83/NRPS 2007

-BL- 2 POT. 5+00.00 12.50' RT
 -EL- STA. 12+55.84





WBS 45359.1.13		TIP BD5113M		COUNTY BUNCOMBE		GEOLOGIST Lockamy, P. Q.									
SITE DESCRIPTION Br. 651 on SR-1109 over Stoney Fork Creek							GROUND WTR (ft)								
BORING NO. EB1A		STATION 12+50		OFFSET 9 ft LT		ALIGNMENT el									
COLLAR ELEV. 2,351.5 ft		TOTAL DEPTH 37.2 ft		NORTHING 651,891		EASTING 886,228									
DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009		DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic											
DRILLER Cheek, D. O.		START DATE 08/22/12		COMP. DATE 08/22/12		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2355															
2350														2,351.5	0.0
															Embankment: Brown sand and gravel with cobbles
2345	2,346.0	5.5	10	7	14										
2340	2,341.0	10.5	7	10	25									2,342.5	9.0
															Embankment: Red brown silty sand with rounded gravel and some clay
2335	2,336.0	15.5	6	6	6										
2330	2,331.0	20.5	2	4	5									2,333.5	18.0
															Saprolite: Brown, white or tan sandy silt
2325	2,326.0	25.5	2	3	3										
2320	2,321.0	30.5	3	4	5										
2315	2,316.0	35.5	100/2											2,317.2	34.3
	2,314.3	37.2	60/0											2,315.2	36.3
														2,314.3	37.2
															Crystalline Rock (Ashe Formation gneiss)
															Boring Terminated with Standard Penetration Test Refusal at Elevation 2,314.3 ft in crystalline rock

NCDOT BORE SINGLE BD5113M_GEO_BR651_BORINGS.GPJ NC_DOT_GDT_10/19/12

WBS 45359.1.13		TIP BD5113M		COUNTY BUNCOMBE		GEOLOGIST Lockamy, P. Q.									
SITE DESCRIPTION Br. 651 on SR-1109 over Stoney Fork Creek							GROUND WTR (ft)								
BORING NO. EB1B		STATION 12+75		OFFSET 17 ft RT		ALIGNMENT el									
COLLAR ELEV. 2,350.1 ft		TOTAL DEPTH 20.5 ft		NORTHING 651,857		EASTING 886,239									
DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009		DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic											
DRILLER Cheek, D. O.		START DATE 08/20/12		COMP. DATE 08/20/12		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2355															
2350														2,350.1	0.0
															Alluvium: Brown sandy silt with gravel and cobbles
2345	2,345.4	4.7	14	28	20										
2340														2,340.3	9.8
															crystalline rock - cored
2335														2,333.6	16.5
														2,331.8	18.3
															crystalline rock - cored
2330														2,329.8	20.3
														2,329.6	20.5
															Weathered Rock - cored
															Boring Terminated at Elevation 2,329.6 ft in a layer of weathered rock within crystalline rock

NCDOT BORE SINGLE BD5113M_GEO_BR651_BORINGS.GPJ NC_DOT_GDT_10/19/12

WBS 45359.1.13	TIP BD5113M	COUNTY BUNCOMBE	GEOLOGIST Lockamy, P. Q.
SITE DESCRIPTION Br. 651 on SR-1109 over Stoney Fork Creek			GROUND WTR (ft)
BORING NO. EB2A	STATION 13+44	OFFSET 15 ft LT	ALIGNMENT el
COLLAR ELEV. 2,352.2 ft	TOTAL DEPTH 24.6 ft	NORTHING 651,857	EASTING 886,316
DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Automatic
DRILLER Cheek, D. O.	START DATE 08/21/12	COMP. DATE 08/21/12	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2355														2,352.2 GROUND SURFACE	0.0
2350		2,347.3	4.9	9	21	14								Alluvium: Tan to brown sand and gravel with weathered rounded cobbles	
2345		2,342.3	9.9	12	14	16								Saprolite: Brown silty sand with mica and blackened oxide filled fractures	10.2
2340		2,337.3	14.9	6	8	34								Crystalline Rock	16.7
2335														Crystalline Rock (Migmatitic Ashe Formation Gneiss)	16.9
2330														Total Rec= 98% Total RQD=92% note: totals do not include saprolite from 22.8 to 24.6	22.8
														Saprolite: cored, very little recovery, brown silty sand with mica	24.6
														Boring Terminated at Elevation 2,327.6 ft in a layer of saprolitic silty sand with mica	

NCDOT BORE SINGLE BD5113M GEO_BR651_BORINGS.GPJ NC_DOT.GDT 10/19/12

WBS 45359.1.13	TIP BD5113M	COUNTY BUNCOMBE	GEOLOGIST Lockamy, P. Q.
SITE DESCRIPTION Br. 651 on SR-1109 over Stoney Fork Creek			GROUND WTR (ft)
BORING NO. EB2B	STATION 13+42	OFFSET 19 ft RT	ALIGNMENT el
COLLAR ELEV. 2,351.2 ft	TOTAL DEPTH 24.8 ft	NORTHING 651,827	EASTING 886,299
DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009		DRILL METHOD NW Casing w/ SPT	HAMMER TYPE Automatic
DRILLER Cheek, D. O.	START DATE 08/21/12	COMP. DATE 08/21/12	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2355														2,351.2 GROUND SURFACE	0.0
2350														Alluvium: brown silty sand and gravel with weathered rounded cobbles	
2345		2,346.4	4.8	8	17	14								saprolite: red brown to tan and black silty sand with mica	8.4
2340		2,341.4	9.8	13	15	11									
2335		2,336.4	14.8	3	1	6									
2330		2,331.4	19.8	10	15	84									
														weathered rock	23.5
														crystalline rock (migmatite gneiss of the Ashe Formation)	24.8
														Boring Terminated with Standard Penetration Test Refusal at Elevation 2,326.4 ft in crystalline gneiss (migmatite gneiss of Ashe Formation)	

NCDOT BORE SINGLE BD5113M GEO_BR651_BORINGS.GPJ NC_DOT.GDT 10/19/12

WBS 45359.1.13		TIP BD5113M		COUNTY BUNCOMBE		GEOLOGIST Lockamy, P. Q.						
SITE DESCRIPTION Br. 651 on SR-1109 over Stoney Fork Creek							GROUND WTR (ft)					
BORING NO. EB1B		STATION 12+75		OFFSET 17 ft RT		ALIGNMENT el						
COLLAR ELEV. 2,350.1 ft		TOTAL DEPTH 20.5 ft		NORTHING 651,857		EASTING 886,239						
DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009		DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic								
DRILLER Cheek, D. O.		START DATE 08/20/12		COMP. DATE 08/20/12		SURFACE WATER DEPTH N/A						
CORE SIZE nxwl		TOTAL RUN 10.9 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN ROD (ft) %	SAMP. NO.	STRATA REC. (ft) %	ROD (ft) %	L O G	DESCRIPTION AND REMARKS	DEPTH (ft)
2340.48	2340.8	9.6	0.9		(0.3)	(0.0)					Begin Coring @ 9.6 ft	9.6
	2338.6	10.5	5.0		33%	0%					9.6-10.5 alluvial cobbles.	9.6
					(4.8)	(2.8)					10.5-16.5 crystalline rock. Moderate to medium hard geniss. Foliation at 40 degrees.	16.5
2335	2334.6	15.5	5.0		96%	56%					16.5 - 18.3 saprolite - no recovery	18.3
					(2.7)	(1.0)					Moderately hard to hard. Most breaks are on foliation and are iron stained. A few breaks on foliation have thin layers of weathered in place soil with mica.	20.3
2330	2329.6	20.5			54%	20%					weathered rock - small recovery	20.3
											Boring Terminated at Elevation 2,329.6 ft in a layer of weathered rock within crystalline rock	20.5

NCDOT CORE SINGLE BD5113M_GEO_BR651_BORINGS.GPJ NC_DOT.GDT 10/22/12

WBS 45359.1.13		TIP BD5113M		COUNTY BUNCOMBE		GEOLOGIST Lockamy, P. Q.						
SITE DESCRIPTION Br. 651 on SR-1109 over Stoney Fork Creek							GROUND WTR (ft)					
BORING NO. EB2A		STATION 13+44		OFFSET 15 ft LT		ALIGNMENT el						
COLLAR ELEV. 2,352.2 ft		TOTAL DEPTH 24.6 ft		NORTHING 651,857		EASTING 886,316						
DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009		DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic								
DRILLER Cheek, D. O.		START DATE 08/21/12		COMP. DATE 08/21/12		SURFACE WATER DEPTH N/A						
CORE SIZE NXWL		TOTAL RUN 7.7 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN ROD (ft) %	SAMP. NO.	STRATA REC. (ft) %	ROD (ft) %	L O G	DESCRIPTION AND REMARKS	DEPTH (ft)
2335.28	2335.3	16.9	2.7		(2.6)	(2.6)					Begin Coring @ 16.9 ft	16.9
	2332.6	19.6	5.0		96%	96%					Crystalline Rock (Migmatitic Ashe Formation Gneiss) Total Rec= 98% Total RQD=92% note: totals do not include saprolite from 22.8 to 24.6	19.6
					(3.2)	(2.8)					one piece	22.8
2330	2327.6	24.6			64%	56%					one piece	24.6
											Saprolite: cored, very little recovery, brown silty sand with mica	24.6
											Boring Terminated at Elevation 2,327.6 ft in a layer of saprolitic silty sand with mica	24.6

NCDOT CORE SINGLE BD5113M_GEO_BR651_BORINGS.GPJ NC_DOT.GDT 10/22/12