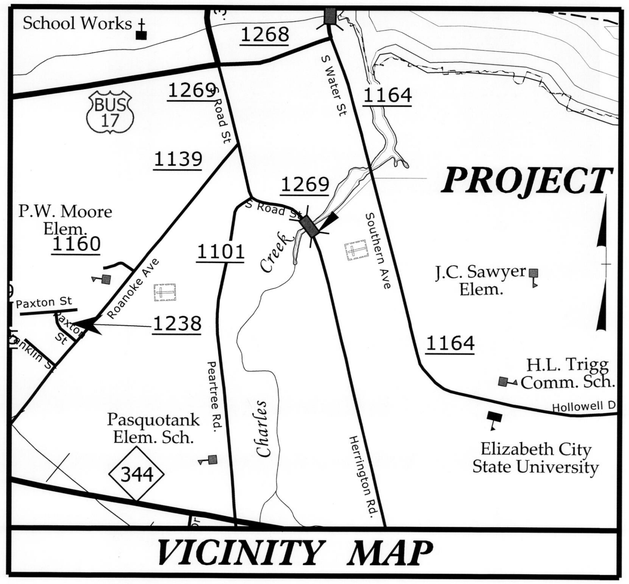
TIP PROJECT: BD-5101N

CONTRACT: DA00198

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



VICINITY MAP

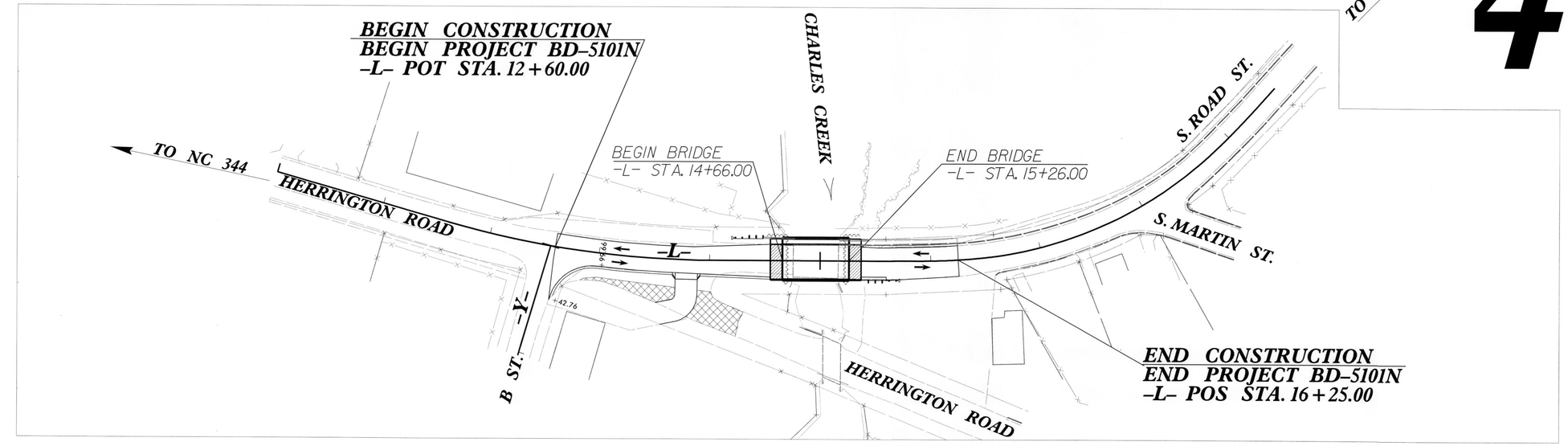
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PASQUOTANK COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BD-5101N	1	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
45347.1.15	BRSTP-1269(2)	P.E.	

LOCATION: BRIDGE NO. 18 OVER CHARLES CREEK ON NC 34

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



CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II MODIFIED. FIVE FEET BEYOND SLOPE LIMITS TO BE HAND CLEARED.
THIS PROJECT IS WITHIN ELIZABETH CITY MUNICIPAL BOUNDARIES.

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT BD-5101N	=	0.058 MILES
LENGTH STRUCTURE TIP PROJECT BD-5101N	=	0.011 MILES
TOTAL LENGTH TIP PROJECT BD-5101N	=	0.069 MILES

Prepared In the Office of:
CDM Smith
5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
AUGUST 1, 2013

LETTING DATE:
JUNE 18, 2014

DOUGLAS B. SAUNDERS, P.E.
PROJECT ENGINEER

DAVID J. CLODGO, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 38683 ENGINEER HELMIE Q.C. NGUYEN
SIGNATURE: P.E. 5/20/2014

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 14160 ENGINEER DOUGLAS B. SAUNDERS
SIGNATURE: P.E. 5/20/14

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PROJECT REFERENCE NO.	SHEET NO.
BD-5101N	1-A
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 14160 ENGINEER DOUGLAS SAUNDERS 5/20/14

CDM Smith
Camp Dresser & McKee
5400 Glenwood Avenue
Suite 300
Raleigh, NC 27612-3228
NC COA No. F-0412

INDEX OF SHEETS

SHEET NUMBER	TITLE
1	TITLE SHEET
1-A	INDEX OF SHEETS, GENERAL NOTES AND LIST OF STANDARDS
1-B	CONVENTIONAL SYMBOLS
2	TYPICAL SECTIONS AND PAVEMENT SCHEDULE
2-A THRU 2-B	STRUCTURE ANCHOR UNITS DETAIL
3-A	SUMMARY OF DRAINAGE QUANTITIES, SUMMARY OF GUARDRAIL, EARTHWORK SUMMARY
4	PLAN AND PROFILE SHEET
TMP-1	TRAFFIC MANAGEMENT PLAN
EC-1 THRU EC-3	EROSION CONTROL SHEETS
X-1	CROSS SECTION SUMMARY SHEET
X-2 THRU X-4	CROSS SECTIONS
S-1 THRU S-24	STRUCTURE PLANS

GENERAL NOTES

2012 SPECIFICATIONS
EFFECTIVE: 01-17-2012
REVISED: 07-30-2012

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 AND/OR STD. NO. 225.05 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 AND/OR STD. NO. 560.02

SIDE ROADS:

THE CONTRACTOR WILL BE REQUIRED TO DO ALL NECESSARY WORK TO PROVIDE SUITABLE CONNECTIONS WITH ALL ROADS, STREETS, AND DRIVES ENTERING THIS PROJECT. THIS WORK WILL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR THE PARTICULAR ITEMS INVOLVED.

DRIVEWAYS:

DRIVEWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 848.02 USING 3' RADII OR RADII AS SHOWN ON THE PLANS. LOCATIONS OF DRIVES WILL BE AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

STREET TURNOUT:

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

GUARDRAIL:

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

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

CENTURYLINK - TELEPHONE

CITY OF ELIZABETH CITY - WATER

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

RIGHT-OF-WAY MARKERS:

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

STANDARD DRAWINGS

EFF. 01-17-2012
REV. 10-30-2012

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, 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
DIVISION 4 - MAJOR STRUCTURES	
422.11	Reinforced Bridge Approach Fills - Sub Regional Tier
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 6 - ASPHALT BASES AND PAVEMENTS	
654.01	Pavement Repairs
DIVISION 8 - INCIDENTALS	
840.01	Brick Catch Basin - 12" thru 54" Pipe
840.02	Concrete Catch Basin - 12" thru 54" Pipe
840.03	Frame, Grates and Hood - for Use on Standard Catch Basin
840.36	Traffic Bearing Grated Drop Inlet - for Steel (840.37) 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
848.01	Concrete Sidewalk
848.03	Driveway Turnout - Drop Curb Type
848.04	Street Turnout
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units (Beg. March 2013 Letting use detail in lieu of Standard)
DIVISION 11 - WORK ZONE TRAFFIC CONTROL	
1101.01	Work Zone Advance Warning Signs
1101.02	Temporary Lane Closures
1101.03	Temporary Road Closures
1101.11	Traffic Control Design Tables
1110.01	Stationary Work Zone Signs
1130.01	Drum
1135.01	Cones
1145.01	Barricades
1150.01	Flagging Devices

12/05/11

PROJECT REFERENCE NO.	SHEET NO.
BD-5101N	1-B

Note: Not to Scale

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB
- Known Soil Contamination: Area or Site
- Potential Soil Contamination: Area or Site

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign — 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
- Wetland
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

- Standard Gauge — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch — SWITCH
- RR Abandoned
- RR Dismantled

RIGHT OF WAY:

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line — RW
- Proposed Right of Way Line with Iron Pin and Cap Marker — RW
- Proposed Right of Way Line with Concrete or Granite R/W Marker — RW
- Proposed Control of Access Line with Concrete C/A Marker — C/A
- Existing Control of Access — C/A
- Proposed Control of Access — C/A
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Drainage / Utility Easement — DUE
- Proposed Permanent Utility Easement — PUE
- Proposed Temporary Utility Easement — TUE
- Proposed Aerial Utility Easement — AUE
- Proposed Permanent Easement with Iron Pin and Cap Marker

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Curb Ramp — CR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — VINEYARD

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

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

MISCELLANEOUS:

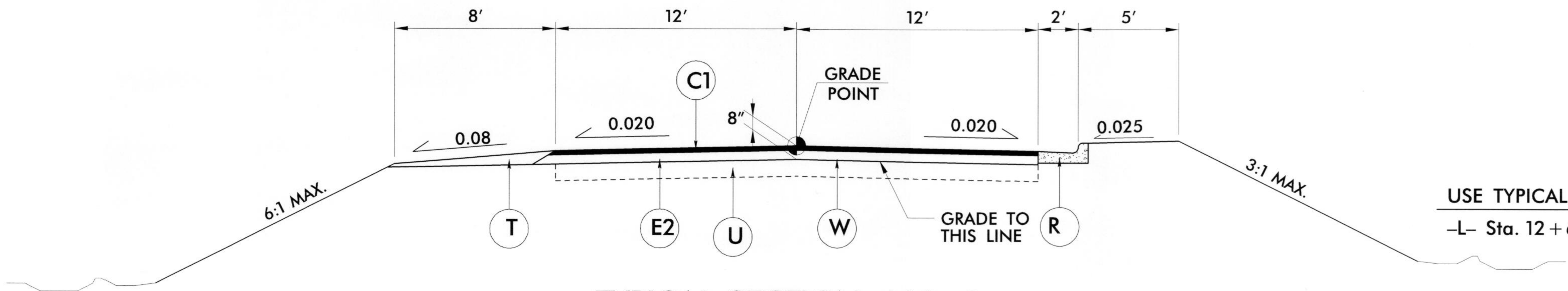
- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line — ?UTL
- U/G Tank; Water, Gas, Oil
- Underground Storage Tank, Approx. Loc. — UST
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- U/G Test Hole (S.U.E.*)
- Abandoned According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

PROJECT REFERENCE NO.	SHEET NO.
BD-5101N	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 14160 ENGINEER DOUGLAS B. SAUNDERS
5/20/14

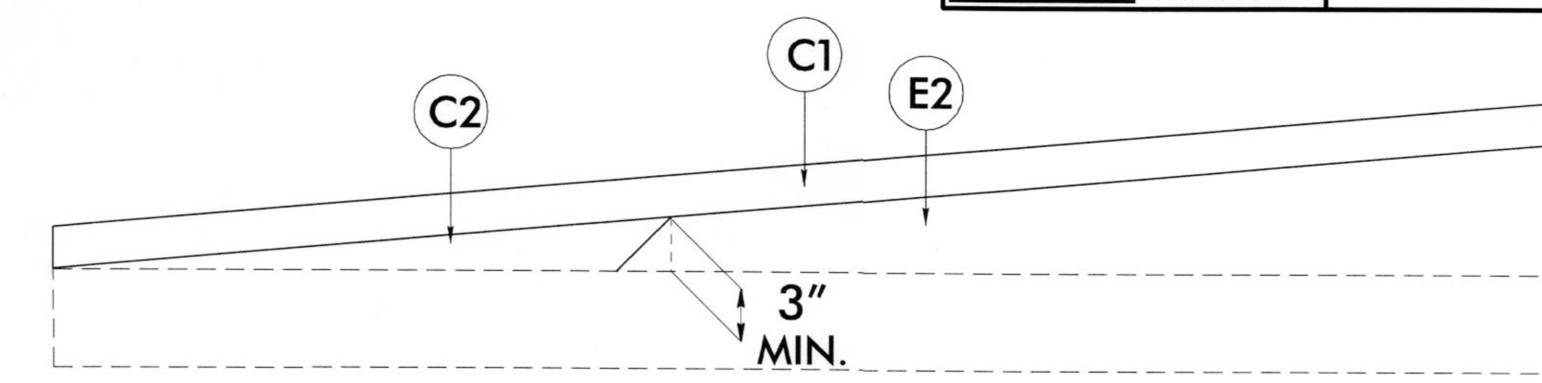
CDM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612-3228, NC COA No. F-0412

NC DEPARTMENT OF TRANSPORTATION
PAVEMENT MANAGEMENT UNIT
1593 MAIL SERVICE CENTER
RALEIGH, NC 27699-1593

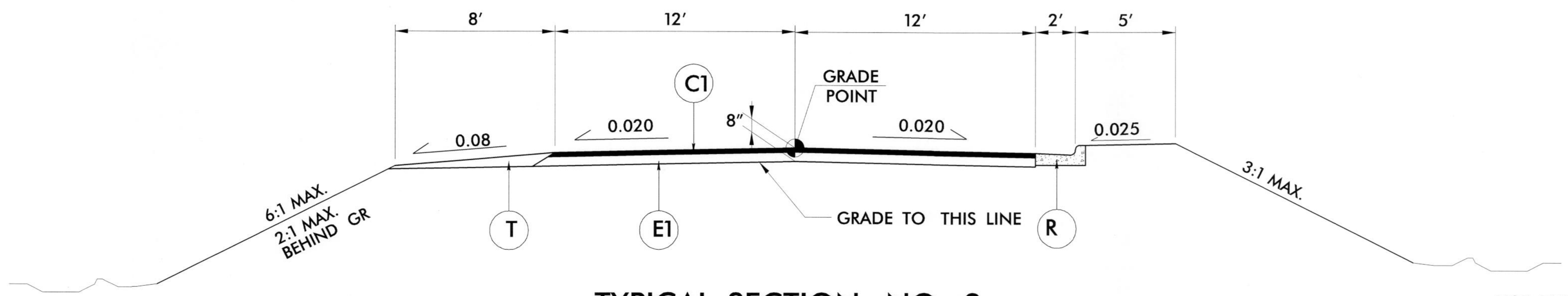


TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 2
-L- Sta. 12+60.00 TO Sta. 13+80.00

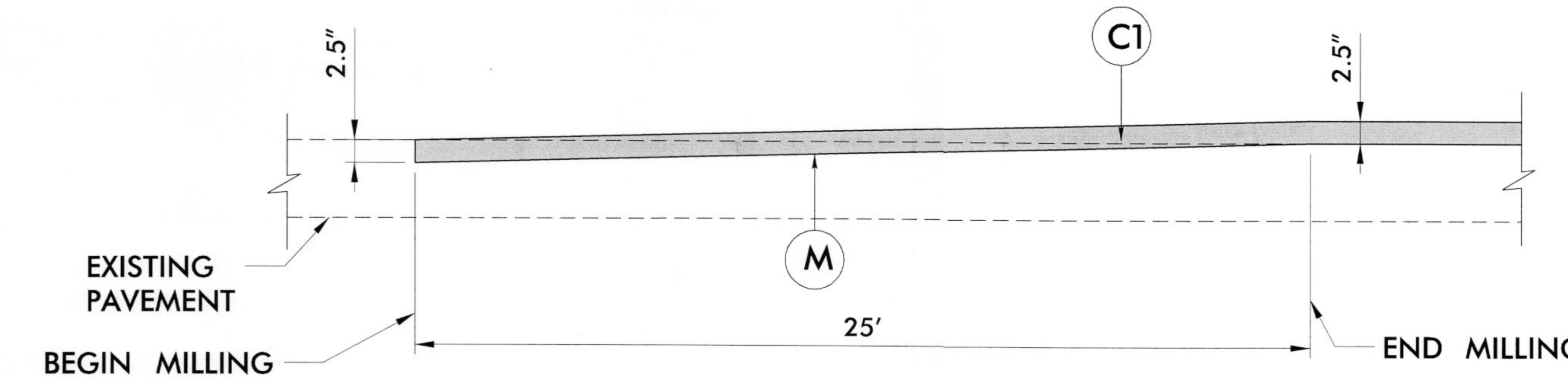


WEDGING DETAIL FOR RESURFACING



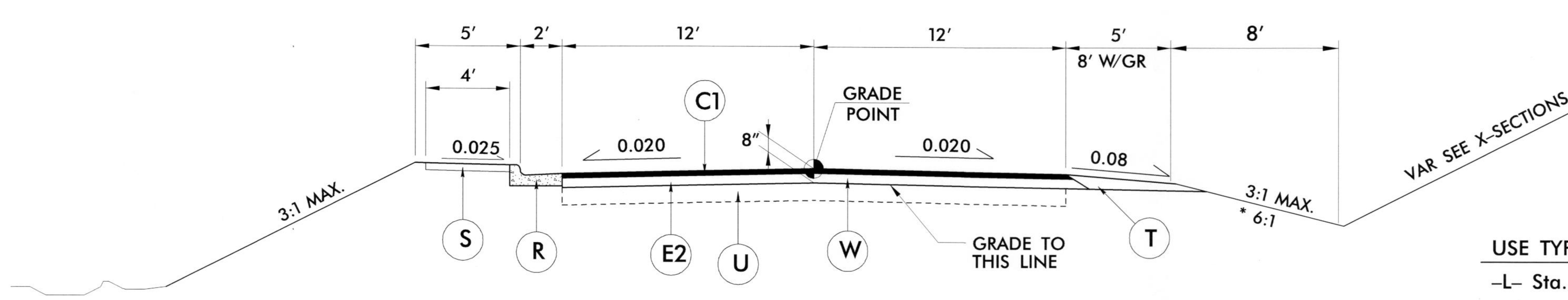
TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 3
-L- Sta. 13+80.00 TO Sta. 14+66.00 (BEGIN BRIDGE)



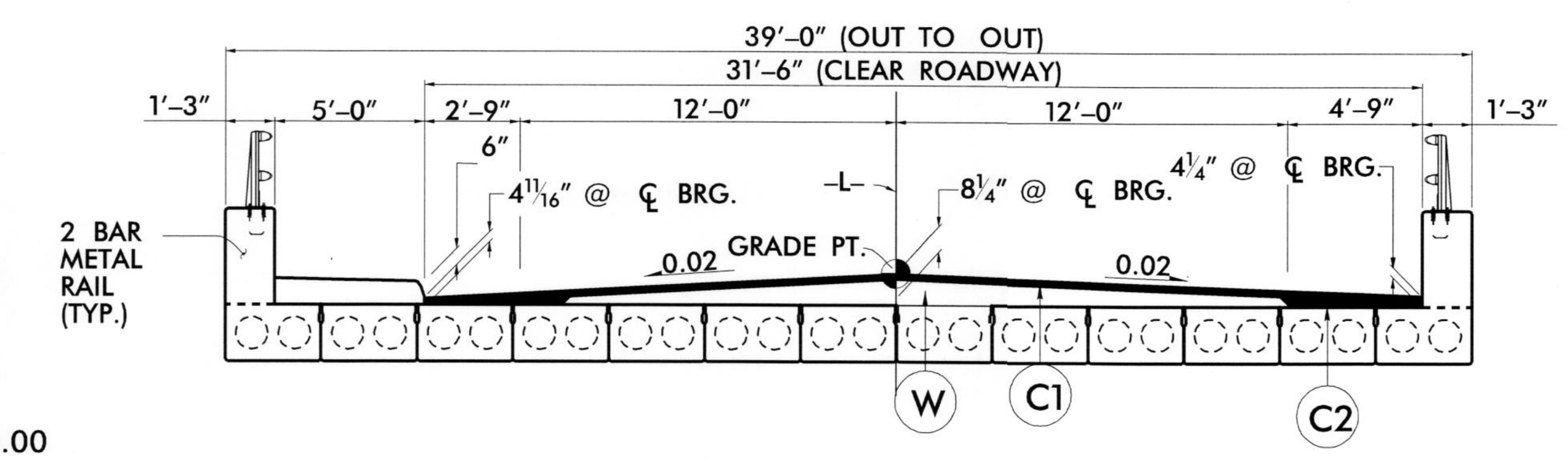
MILLING DETAIL (VIEW ALONG ROAD ℄)

NOT TO SCALE
NOTE: END MILLING WHERE PROPOSED GRADE IS 2.5" ABOVE EXISTING PAVEMENT



TYPICAL SECTION NO. 3

USE TYPICAL SECTION NO. 4
-L- Sta. 15+26.00 (END BRIDGE) TO Sta. 16+25.00
* 6:1 -L- STA. 16+00.00 TO 16+25.00



TYPICAL SECTION ON STRUCTURE

PAVEMENT SCHEDULE

ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION
C1	PROPOSED APPROXIMATE 2.5 IN. ASPHALT SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 137.50 LBS/SY.	S	4 IN. CONCRETE SIDEWALK		
C2	PROP. VAR. DEPTH ASPHALT CONC. SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS/SY/IN. IN LIFTS NOT LESS THAN 1.0 IN. NOR GREATER THAN 1.5 IN.	T	EARTH MATERIAL		
E1	PROP. APPROX. 5.5 IN. ASPHALT BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 627 LBS/SY.	M	MILLING (SEE MILLING DETAIL ABOVE)		
E2	PROP. VAR. DEPTH ASPHALT BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS/SY/IN LIFTS NOT LESS THAN 3 IN. NOR GREATER THAN 5.5 IN.	U	EXISTING PAVEMENT		
R	2'-6" CURB & GUTTER	W	WEDGING (SEE WEDGE DETAIL ABOVE)		

NOTES :

PAVEMENT EDGES ARE 1:1 UNLESS OTHERWISE NOTED.

6/2/99
5/20/2014 11:09:07 AM
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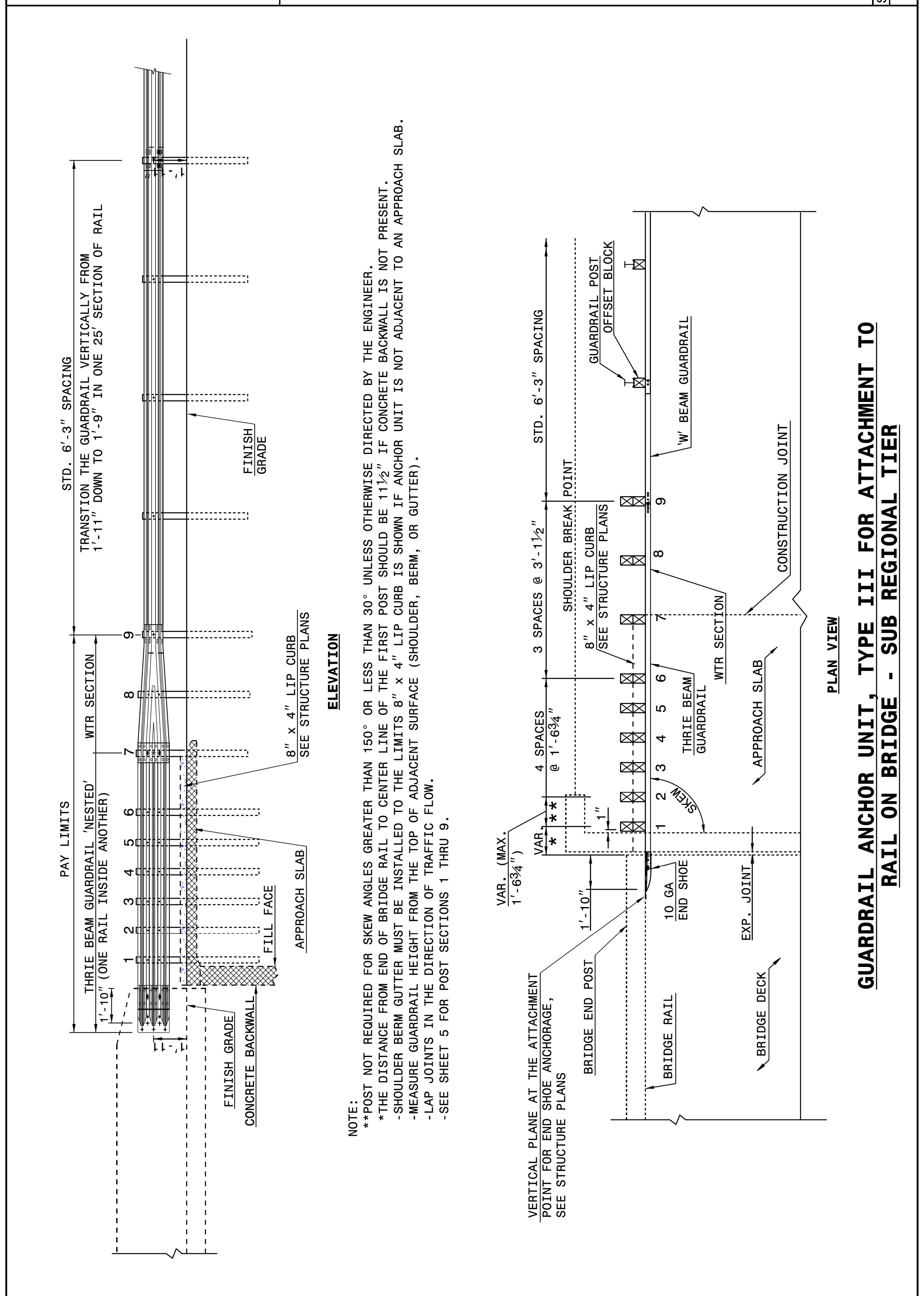
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.
ENGLISH DETAIL DRAWING FOR STRUCTURE ANCHOR UNITS GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO RAIL ON BRIDGE - SUB REGIONAL TIER
SHEET 2 OF 7 862d03

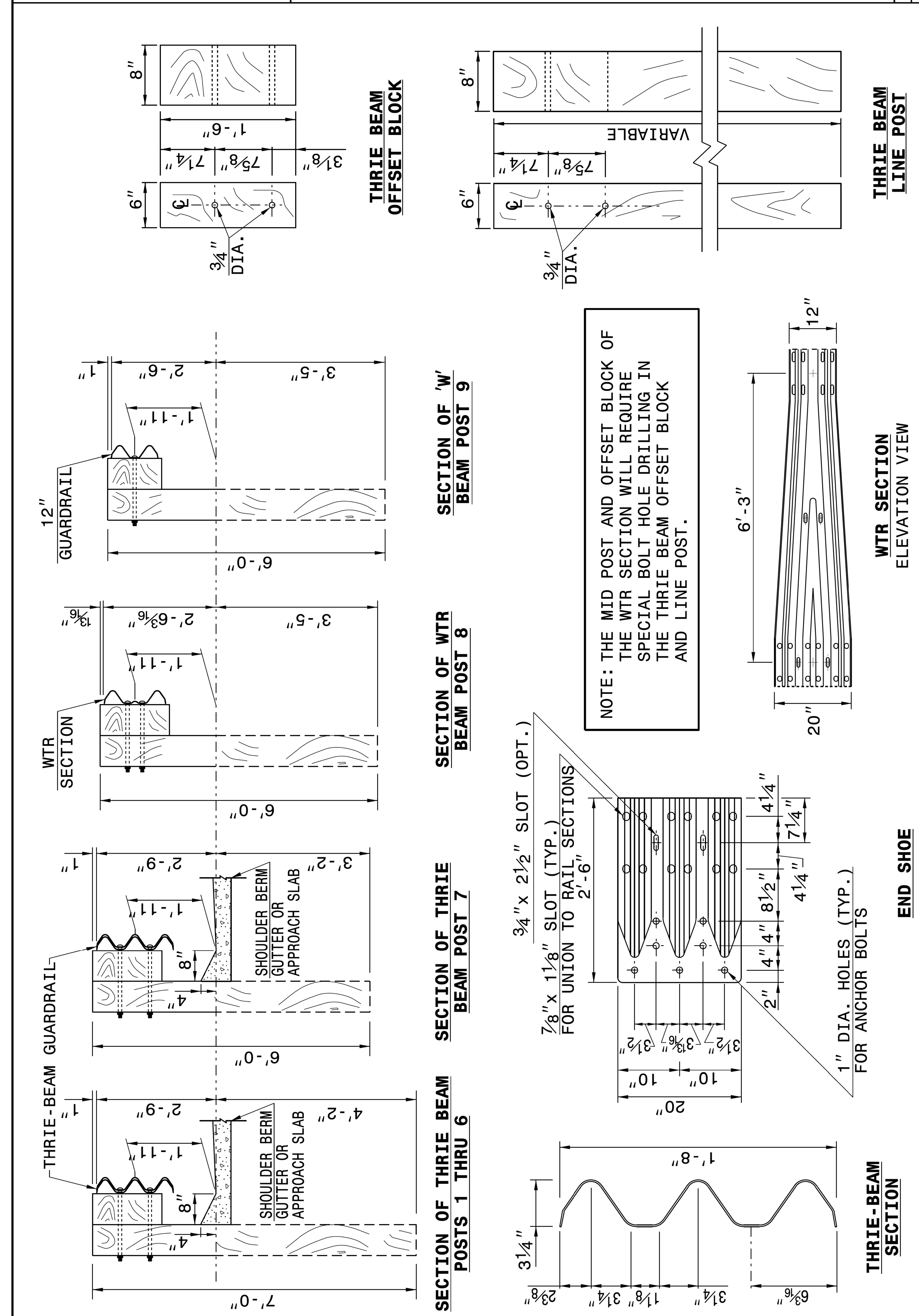


STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
STRUCTURE ANCHOR UNITS
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 GUARDRAIL ANCHOR UNIT, TYPE III
SHEET 3 OF 7 862d03



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.:

PROJECT REFERENCE NO.	SHEET NO.
BD-5101N	2-8

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

SEE TITLE BLOCK

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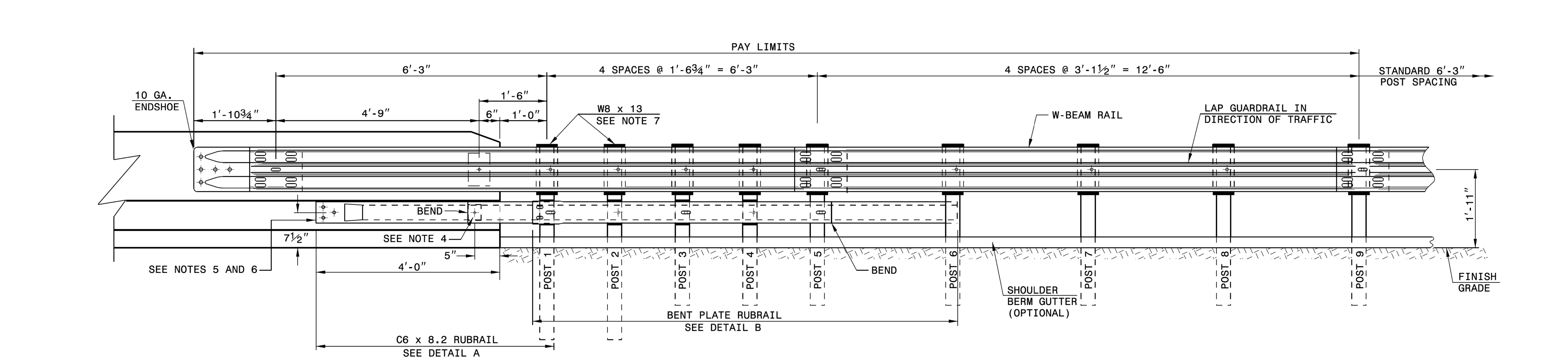
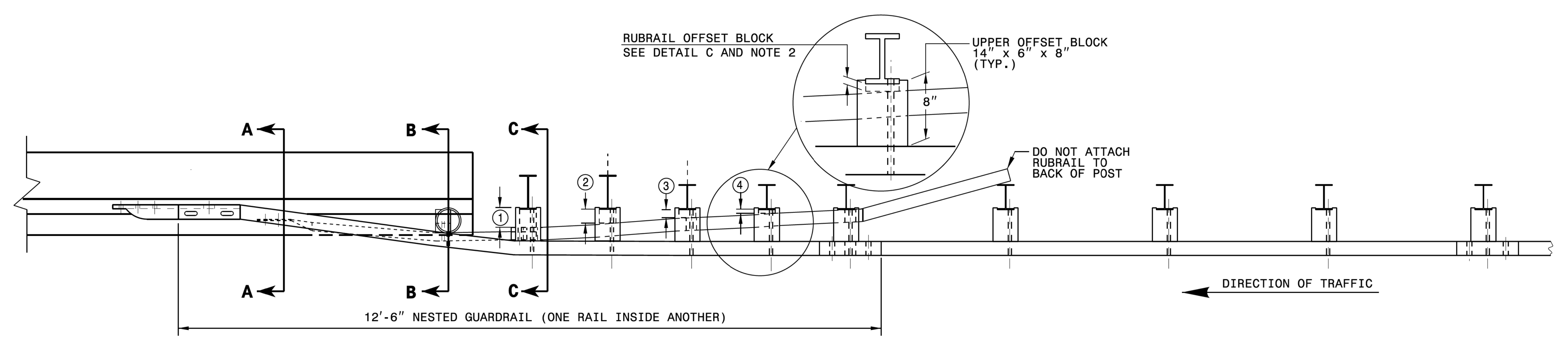
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.:



ELEVATION

GENERAL NOTES:
1) POSTS 1 THROUGH 5 REQUIRE AN ADDITIONAL HOLE TO ATTACH LOWER BLOCKOUTS AND/OR RUBRAIL.
2) RUBRAIL BLOCKOUTS LOCATED ON POSTS 1 THROUGH 4 ARE OFFSET DRILLED AND SECURED WITH 5⁄8" BUTTONHEAD BOLTS (SEE CHART FOR BOLT LENGTHS). SECURE BLOCKS ONLY TO POSTS 2 AND 4. SECURE RUBRAIL AND BLOCKOUTS TO POSTS 1 AND 3. RUBRAIL IS SECURED TO POST 5 WITH A 5⁄8" x 4½" BUTTONHEAD BOLT. RUBRAIL IS FLARED TO BACK OF POST 6 AND NOT SECURED.
3) STEEL SPACER TUBE IS A SCHEDULE 40 GALVANIZED PIPE 6" INSIDE DIAMETER x 9" LONG. ATTACH TUBE TO GUARDRAIL ONLY WITH 5⁄8" x 1¼" LONG BUTTONHEAD BOLT AND RECTANGULAR PLATE WASHER.
4) SEE DETAIL D FOR SLOPED RUBRAIL BLOCKOUT. BLOCKOUT IS ATTACHED TO RAIL ELEMENT ONLY. USE 3⁄8" x 3" LAG BOLT WITH FLAT WASHER.
5) SHOP FABRICATE THE C6 x 8.2 RUBRAIL END TO BE CONSISTENT WITH THE SLOPE OF THE F SHAPE AND ATTACH FLUSH WITH THE SLOPED TOE OF THE BARRIER OR BRIDGE RAIL.
6) ANCHORAGE:
   (a) AT EXISTING BRIDGE RAIL AND NEW OR EXISTING BARRIERS, ANCHOR RUBRAIL USING THREE 5⁄8" x 6" CHEMICALLY ANCHORED BOLTS WITH WASHERS. MAXIMUM PROJECTION FOR BOLTS IS ½".
   (b) AT EXISTING BRIDGE RAIL AND NEW OR EXISTING BARRIERS, ANCHOR THE W-BEAM END SHOE USING A 4 BOLT HOLD DOWN PLATE (SEE STD. DWG. 862.04). A 4 BOLT INSERT ASSEMBLY IS ALLOWED ON PRECAST REINFORCED CONCRETE BARRIER (SEE STD. DWG. 857.01). INSTALL THE W-BEAM END SHOE BEHIND THE NESTED W-BEAM ELEMENTS.
   (c) AT NEW BRIDGE RAIL, ANCHOR THE W-BEAM END SHOE AND RUBRAIL AS DETAILED ON THE STRUCTURE PLANS.
7) POSTS 1 AND 2 ARE W8 x 13, 7'-6" LONG. ALL OTHER POSTS IN THE ANCHOR UNIT ARE W6 x 8.5.



PLAN

GUARDRAIL ANCHOR UNIT TYPE B-77

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

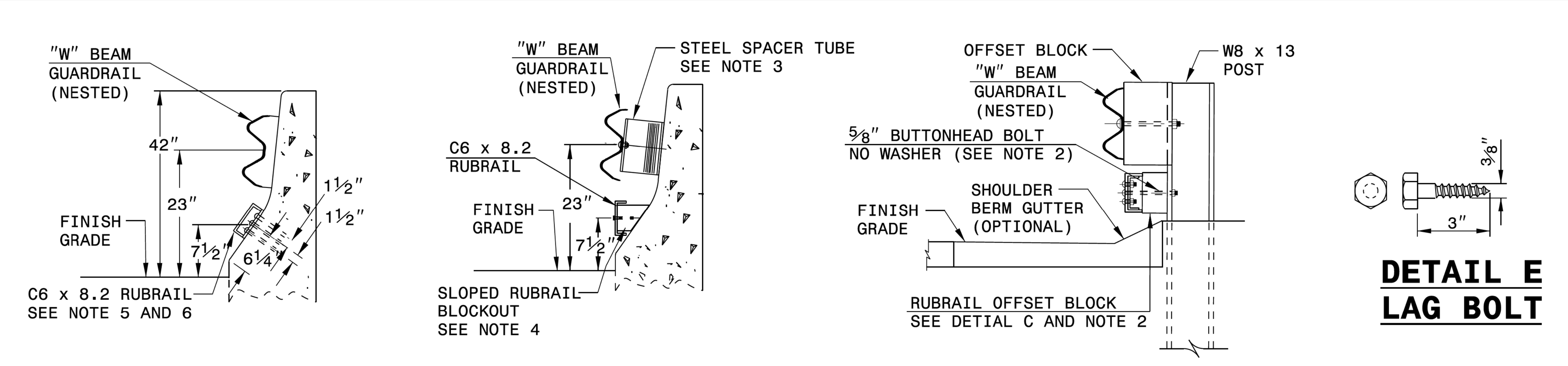
ENGLISH DETAIL DRAWING FOR
STRUCTURE ANCHOR UNIT
GUARDRAIL ANCHOR UNIT TYPE B-77
FOR F-SHAPE BARRIER

SHEET 4 OF 7
862D03

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

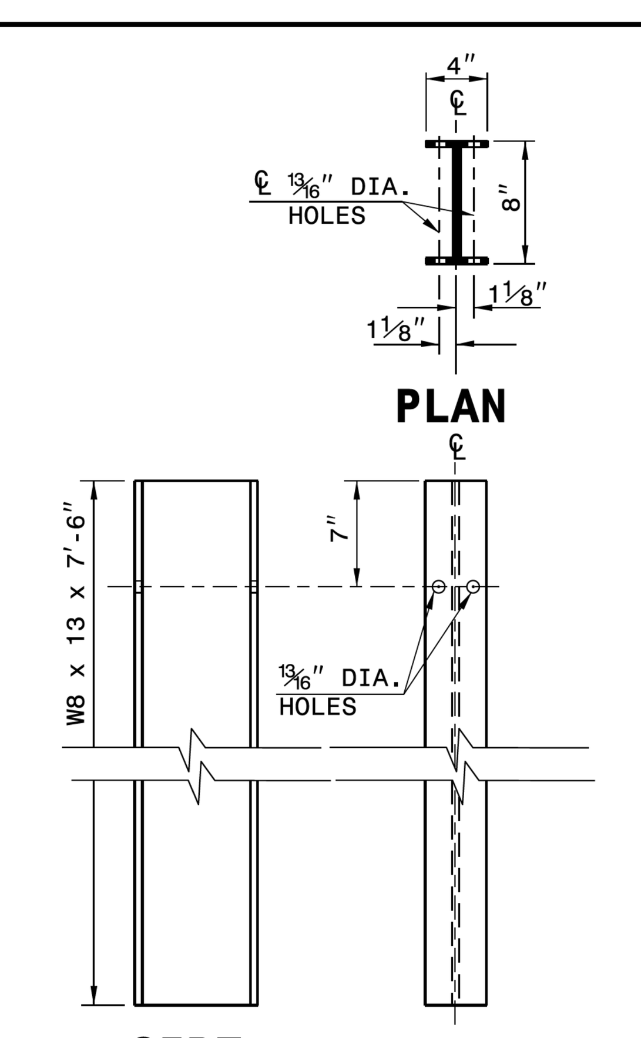
ENGLISH DETAIL DRAWING FOR
GUARDRAIL ANCHOR UNIT
GUARDRAIL ANCHOR UNIT TYPE B-77
FOR F-SHAPE BARRIER

SHEET 4 OF 7
862D03



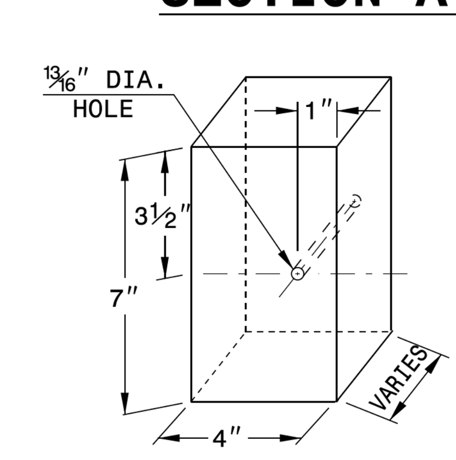
SECTION A-A **SECTION B-B** **SECTION C-C**

DETAIL E
LAG BOLT



SIDE **FRONT**

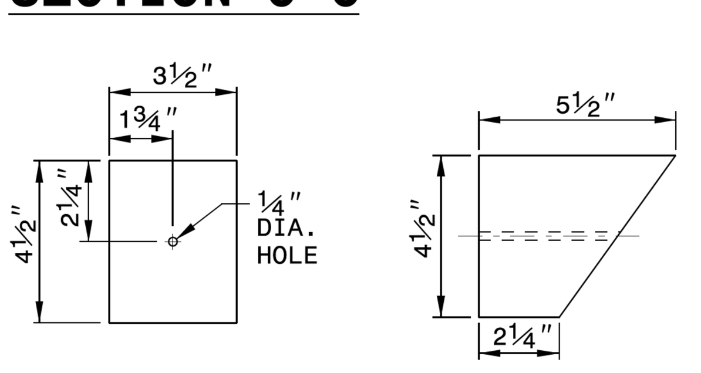
DETAIL F STEEL POST
"W8 X 13 X 7'-6"



RUBRAIL BLOCKS 7" HIGH x 4" WIDE		
POST	THICKNESS	BOLT LENGTH
1	4¼"	9"
2	3¼"	5"*
3	2"	6"
4	1"	3"*

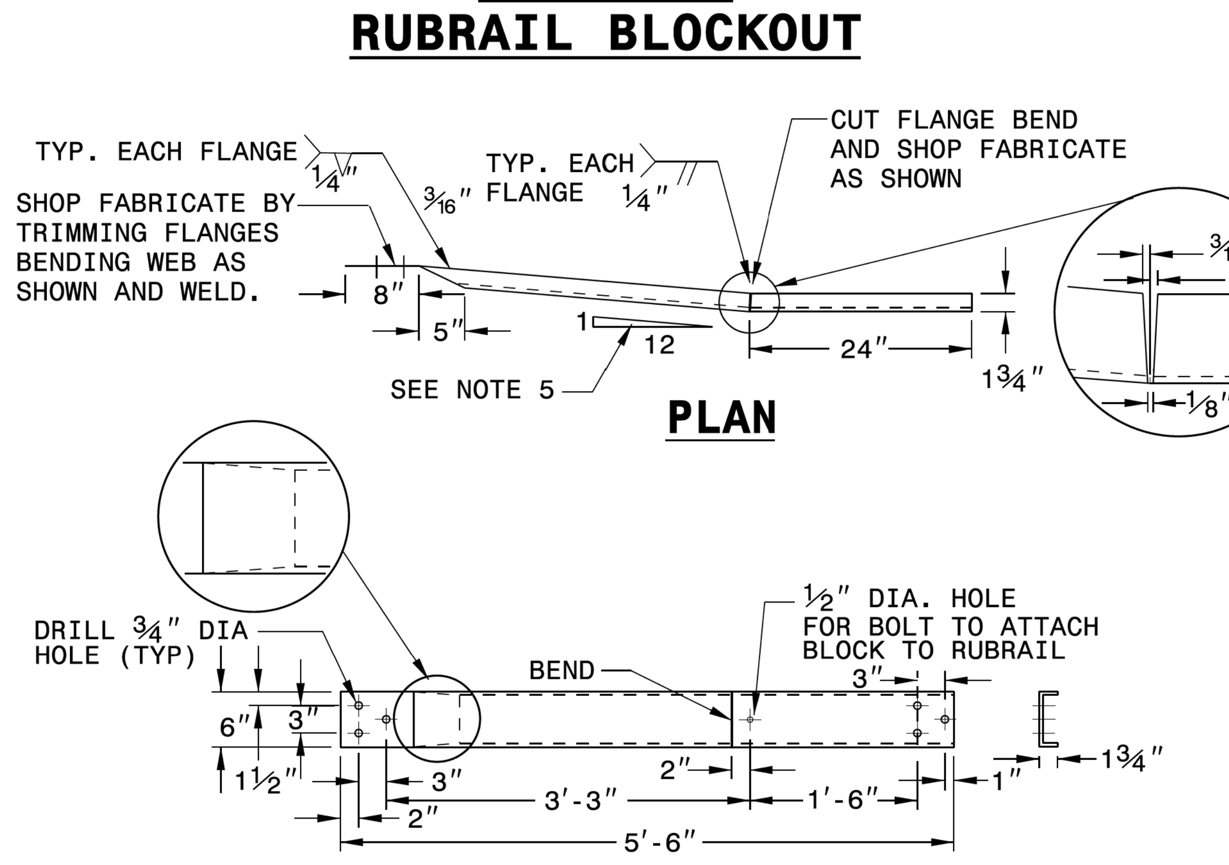
* BOLTS FOR POSTS 2 AND 4 ARE USED TO ATTACH BLOCK TO POST. RUBRAIL NOT ATTACHED TO BLOCK.

DETAIL C
RUBRAIL BLOCKOUT



FRONT **SIDE**

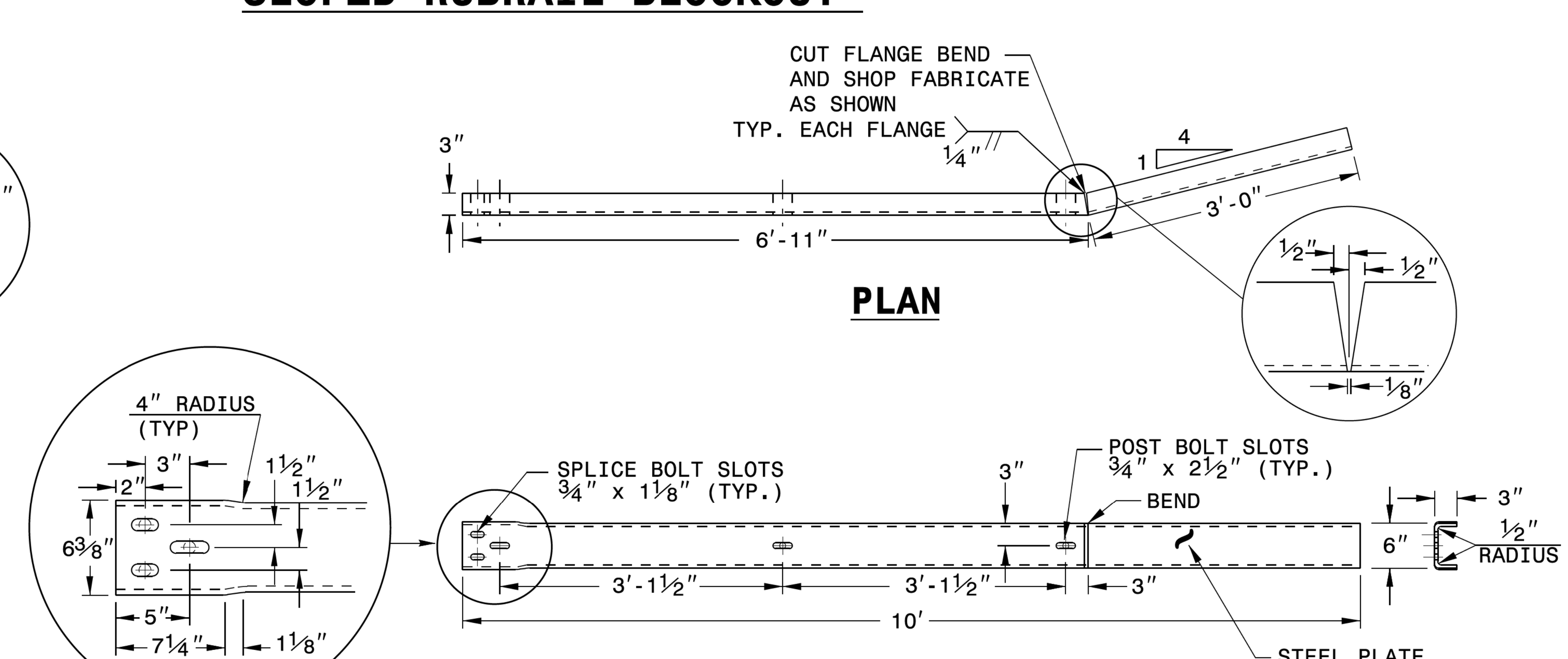
DETAIL D
SLOPED RUBRAIL BLOCKOUT



PLAN

ELEVATION

DETAIL A
C6 x 8.2 RUBRAIL



PLAN

ELEVATION

DETAIL B
BENT PLATE RUBRAIL

GUARDRAIL ANCHOR UNIT TYPE B-77

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

ENGLISH DETAIL DRAWING FOR
STRUCTURE ANCHOR UNIT
GUARDRAIL ANCHOR UNIT TYPE B-77
FOR F-SHAPE BARRIER

SHEET 5 OF 7
862D03

SHEET 5 OF 7
862D03

COMPUTED BY:	D. CLODGO	DATE:	5-2014
CHECKED BY:	D. SAUNDERS	DATE:	5-2014

PROJECT REFERENCE NO.	SHEET NO.
BD-5101N	3-A

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48" & UNDER)

STATION	LOCATION (LT, RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL
-L- 15+73.44	LT	401		4.1			
		401	402		0.8	0.6	
-L- 15+55.00	LT	402		4.3			
		402	OUT		0.6	0.5	
-L- 15+55.00	RT	403		4.1			
		403	402		1.1	0.6	
SHEET TOTALS							

STRUCTURE (FROM–TO)	SIDE DRAIN PIPE (RCP, CSP, CAAP, HDPE, or PVC) 12"	15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	C.S. PIPE 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109
401																				
401–402																				
402																				
402–OUT																				
403																				
403–402																				
SHEET TOTALS																				

STRUCTURE (FROM–TO)	R.C. PIPE CLASS III 12"	15"	18"	24"	30"	36"	42"	48"	R.C. PIPE CLASS IV 12"	15"	18"	24"	30"	36"	42"	48"
401																
401–402		16														
402																
402–OUT			20													
403																
403–402		28														
SHEET TOTALS		44	20													

STRUCTURE (FROM–TO)	48" WELDED STEEL (0.625" THICK) TRENCHLESS INSTALLATION	36" WELDED STEEL (0.625" THICK) TRENCHLESS INSTALLATION	***" RC PIPE CULVERTS, CONTRACTOR DESIGN	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. YARDS R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES *TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL 'B') PER EACH (0' THRU 5.0')	LIN. FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G
401								1			1	1		
401–402														
402								1			1			1
402–OUT														
403								1						
403–402														
SHEET TOTALS								3			2	1		1

STRUCTURE (FROM–TO)	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN	D.I. STD. 840.14 OR STD. 840.15	D.I. FRAME AND GRATE STD. 840.16	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR 840.27	G.D.I. TYPE "D" STD. 840.19 OR 840.28	G.D.I FRAME WITH TWO GRATES STD. 840.20	G.D.I FRAME WITH TWO GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH GRATE STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	J.B. STD. 840.31 OR 840.32	T.B.J.D. STD. 840.34	T.B.J.D. STD. 840.46	M.H. FRAME AND COVER STD. 840.54	PARALLEL PIPE END SECTION STD. 310.02	OPEN THROAT CATCH BASIN STD. 840.04 OR 840.05	SPING BOX STD. 540.41	DRY DETENTION OUTLET CONTROL STR. SHEETS 2-BC AND 2-BE	T.B.G.D.I. STD. 840.36	T.B.D.I. FRAME WITH TWO GRATES STD. 840.37		ADJUST CB	ADJUST C.B/M.H.	CONVERT TO C.B.	SIDE DRAIN PIPE ELBOWS NO. & SIZE	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	CONC. COLLARS CL. "B" C.Y. STD. 840.72	PIPE REMOVAL LIN. FT.	REMARKS
401																														
401–402																														
402																														
402–OUT																													53	
403																				1	1									
403–402																														
SHEET TOTALS																				1	1								53	

ABBREVIATIONS

C.B.	CATCH BASIN
N.D.I.	NARROW DROP INLET
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
G.D.I. (N.S.)	GRATED DROP INLET (NARROW SLOT)
J.B.	JUNCTION BOX
M.H.	MANHOLE
T.B.D.I.	TRAFFIC BEARING ROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL.
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.
W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.
G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH STRAIGHT	LENGTH SHOP CURVED	LENGTH DOUBLE FACED	WARRANT POINT APPROACH END	WARRANT POINT TRAILING END	"N" DIST. FROM E.O.L.	TOTAL SHOULDER WIDTH	FLARE LENGTH APPROACH END	FLARE LENGTH TRAILING END	W APPROACH END	W TRAILING END	ANCHORS XI MOD	XI	GRAU 350 TYPE II	M-350	XIII	CAT-1	VI MOD	BIC	TYPE III	IMPACT ATTENUATOR TYPE 350 NO.	PERMITTED G	NG				REMARKS
-L-	14+16.00	14+66.00	LT.	50.00				14+67.00	4	7		25.00		1.00			1						1							
-L-	15+26.00	15+76.00	RT.	50.00				15+25.00	4	7		25.00		1.00			1						1							
			SUBTOTAL	100.00													2						2							
			TOTAL	12.50													2						2							
			SAY	12.50																										
			ADDITIONAL GUARDRAIL POSTS:	3																										

ANCHOR UNIT DEDUCTION
GRAU350 Type II: 2 @ 25.00 = 50.00
TYPE III: 2 @ 18.75 = 37.50
TOTAL: 87.50

REMOVAL OF EXISTING ASPHALT PAVEMENT

LINE	STATION	STATION	LOCATION	LENGTH OR AREA	WIDTH	SQUARE YARDS
-L-	12+87	13+69	RT	705.35		78.37
-L-	13+86	15+01	RT	3136.58		348.51
-L-	15+19	15+85	RT	2085.64		231.74
					TOTAL	658.62
					SAY	660

SUMMARY OF EARTHWORK

STATION	STATION	UNCL. EXCAV.	EMBANK. +%	BORROW	WASTE
-L- 12+60.00	-L- 14+66.00 (BRIDGE)	5	200	195	0
SUBTOTALS:		5	200	195	0
-L- 15+26.00 (BRIDGE)	-L- 16+25.00	3	22	19	0
SUBTOTALS:		3	22	19	0
TOTAL		8	222	214	0
MATERIAL FOR SHOULDER CONSTRUCTION			30	30	
LOSS DUE TO CLEARING AND GRUBBING					
PROJECT TOTALS:		8	252	244	0
EST. 5% TO REPL. TOP SOIL ON BORROW PIT				13	
GRAND TOTALS:				257	
SAY:				270	

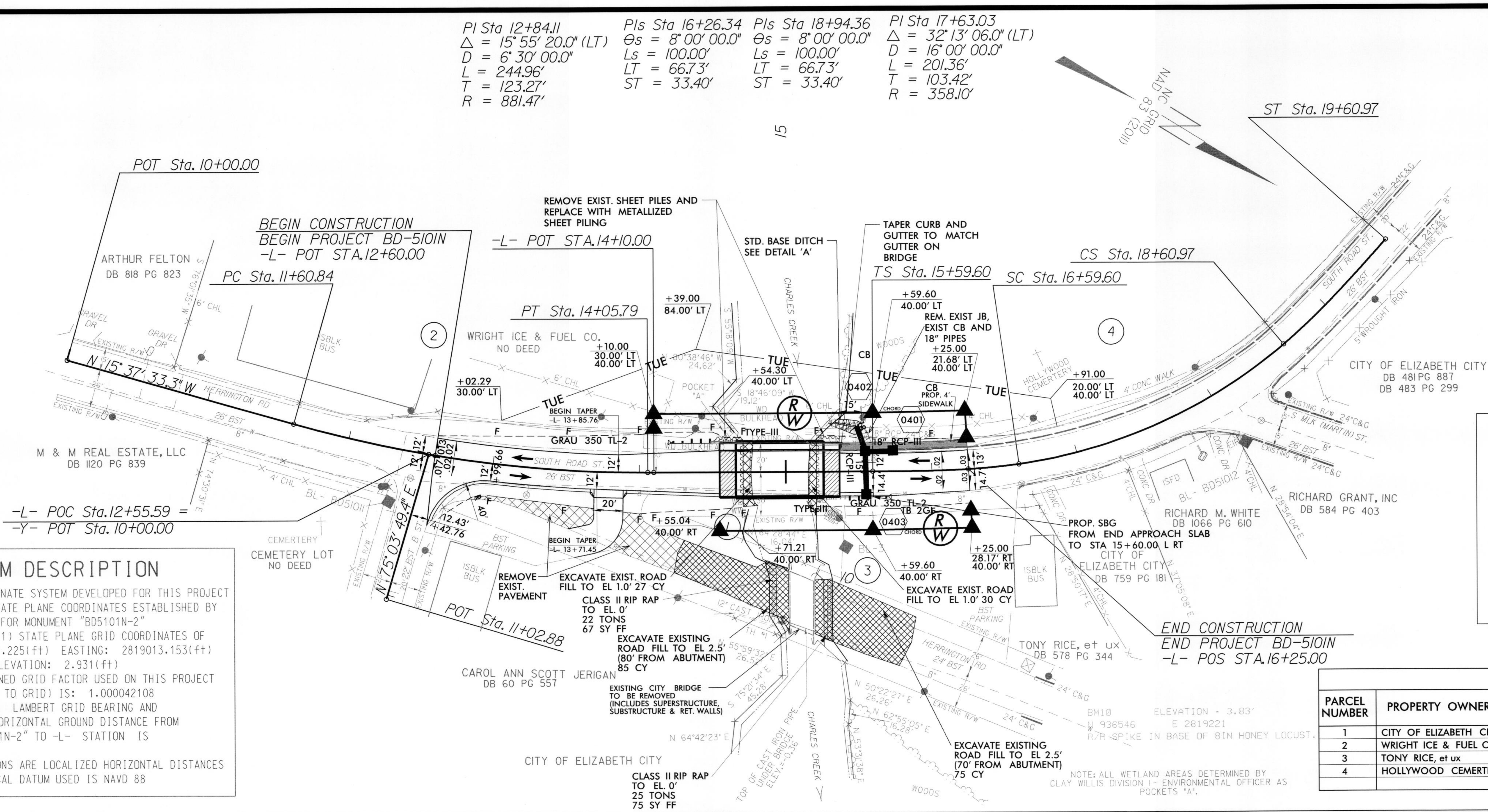
Approximate quantities only. Unclassified Excavation, Borrow Excavation, Shoulder Borrow, Clearing and Grubbing, and Removal of Existing Pavement will be paid for at the contract lump sum price for "Grading".

Earthwork quantities are calculated by the Roadway Design Unit. These earthwork quantities are based in part on subsurface data provided by the Geotechnical Engineering Unit.

PROJECT REFERENCE NO.	SHEET NO.
BD-5101N	4
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

CDM Smith



PI Sta 12+84.11
△ = 15° 55' 20.0" (LT)
D = 6° 30' 00.0"
L = 244.96'
T = 123.27'
R = 881.47'
PIs Sta 16+26.34
θs = 8° 00' 00.0"
Ls = 100.00'
LT = 66.73'
ST = 33.40'
PIs Sta 18+94.36
θs = 8° 00' 00.0"
Ls = 100.00'
LT = 66.73'
ST = 33.40'
PI Sta 17+63.03
△ = 32° 13' 06.0" (LT)
D = 16° 00' 00.0"
L = 201.36'
T = 103.42'
R = 358.10'
POT Sta. 10+00.00
BEGIN CONSTRUCTION
BEGIN PROJECT BD-5101N
-L- POT STA.12+60.00
PC Sta. 11+60.84
-L- POT STA.14+10.00
PT Sta. 14+05.79
TS Sta. 15+59.60
SC Sta. 16+59.60
CS Sta. 18+60.97
ST Sta. 19+60.97
ARTHUR FELTON
DB 818 PG 823
WRIGHT ICE & FUEL CO.
NO DEED
M & M REAL ESTATE, LLC
DB 1120 PG 839
-L- POC Sta.12+55.59 =
-Y- POT Sta. 10+00.00
POT Sta. 11+02.88
CEMETERY LOT
NO DEED
CAROL ANN SCOTT JERIGAN
DB 60 PG 557
CITY OF ELIZABETH CITY
CITY OF ELIZABETH CITY
DB 481 PG 887
DB 483 PG 299
RICHARD GRANT, INC
DB 584 PG 403
RICHARD M. WHITE
DB 1066 PG 610
CITY OF ELIZABETH CITY
DB 759 PG 181
TONY RICE, et ux
DB 578 PG 344
REMOVE EXIST. SHEET PILES AND REPLACE WITH METALLIZED SHEET PILING
STD. BASE DITCH SEE DETAIL 'A'
TAPER CURB AND GUTTER TO MATCH GUTTER ON BRIDGE
REM. EXIST JB, EXIST CB AND 18" PIPES
PROP. SBG FROM END APPROACH SLAB TO STA 15+60.00 -L RT
END CONSTRUCTION
END PROJECT BD-5101N
-L- POS STA.16+25.00
REMOVE EXIST. PAVEMENT
EXCAVATE EXIST. ROAD FILL TO EL 1.0' 27 CY
CLASS II RIP RAP TO EL 0' 22 TONS 67 SY FF
EXCAVATE EXISTING ROAD FILL TO EL 2.5' (80' FROM ABUTMENT) 85 CY
EXISTING CITY BRIDGE TO BE REMOVED (INCLUDES SUPERSTRUCTURE, SUBSTRUCTURE & RET. WALLS)
CLASS II RIP RAP TO EL 0' 25 TONS 75 SY FF
EXCAVATE EXIST. ROAD FILL TO EL 1.0' 30 CY
EXCAVATE EXISTING ROAD FILL TO EL 2.5' (70' FROM ABUTMENT) 75 CY
NOTE: ALL WETLAND AREAS DETERMINED BY CLAY WILLIS DIVISION 1 - ENVIRONMENTAL OFFICER AS POCKETS "A".

DATUM DESCRIPTION

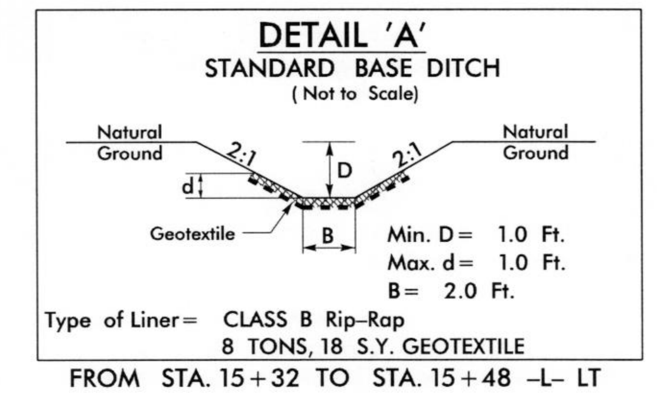
THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "BD5101N-2"

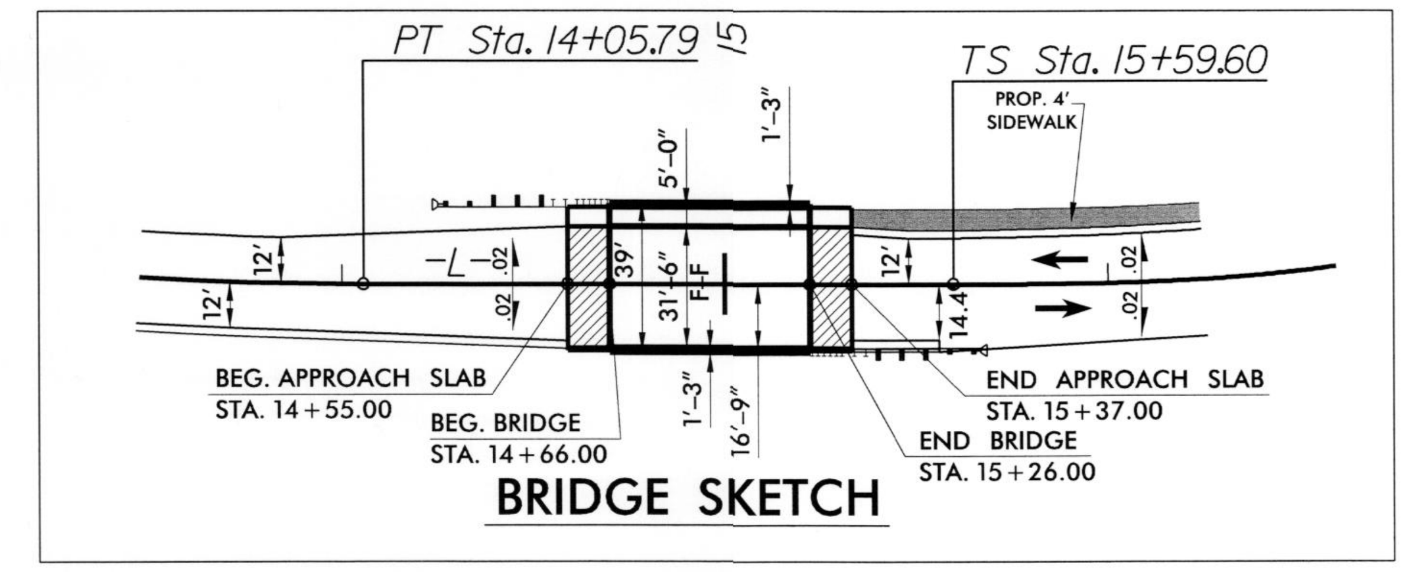
WITH NAD 83 (2011) STATE PLANE GRID COORDINATES OF NORTHING: 936594.225(ft) EASTING: 2819013.153(ft) ELEVATION: 2.931(ft)

THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 1.000042108

THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "BD5101N-2" TO -L- STATION IS

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



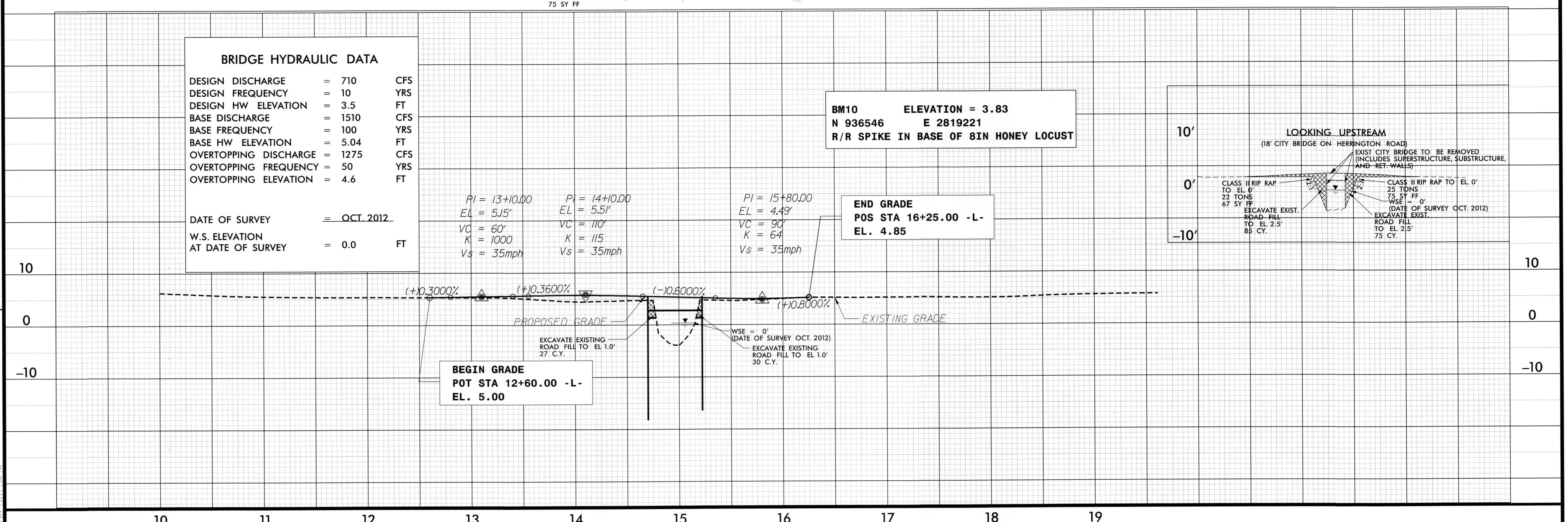


RIGHT OF WAY AREA DATA							
PARCEL NUMBER	PROPERTY OWNERS NAMES	TOTAL AREA	AREA TAKEN	AREA REMAINING	CONST. EASEMENT	PERMENANT DRAINAGE EASEMENT	TEMPORARY UTILITY EASEMENT
1	CITY OF ELIZABETH CITY	1,963.89 SF	297.62 SF	1,666.27 SF			
2	WRIGHT ICE & FUEL CO.	1.649 Ac.	485.03 SF	1.638 Ac.			4,428.69 SF
3	TONY RICE, et ux	0.453 Ac.	1,614.60 SF	0.416 Ac.			
4	HOLLYWOOD CEMERTERY	21.724 Ac.	3,156.77 SF	21.651 Ac.			6,413.64 SF

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	710	CFS
DESIGN FREQUENCY	=	10	YRS
DESIGN HW ELEVATION	=	3.5	FT
BASE DISCHARGE	=	1510	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	5.04	FT
OVERTOPPING DISCHARGE	=	1275	CFS
OVERTOPPING FREQUENCY	=	50	YRS
OVERTOPPING ELEVATION	=	4.6	FT
DATE OF SURVEY	=	OCT. 2012	
W.S. ELEVATION AT DATE OF SURVEY	=	0.0	FT

BM10 ELEVATION = 3.83
N 936546 E 2819221
R/R SPIKE IN BASE OF 8IN HONEY LOCUST



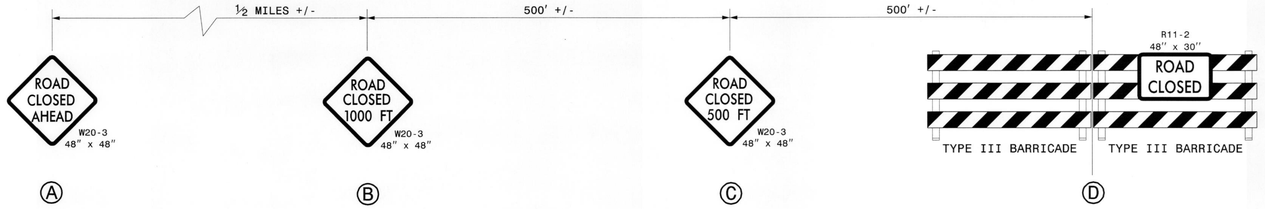
PI = 13+10.00
EL = 5.15'
VC = 60'
K = 1000
Vs = 35mph
PI = 14+10.00
EL = 5.51'
VC = 110'
K = 115
Vs = 35mph
PI = 15+80.00
EL = 4.49'
VC = 90'
K = 64
Vs = 35mph
END GRADE
POS STA 16+25.00 -L-
EL. 4.85
(+)0.3000%
(+)0.3600%
(-)0.6000%
(+)0.8000%
PROPOSED GRADE
EXISTING GRADE
EXCAVATE EXISTING ROAD FILL TO EL 1.0' 27 C.Y.
WSE = 0' (DATE OF SURVEY OCT. 2012)
EXCAVATE EXISTING ROAD FILL TO EL 1.0' 30 C.Y.
BEGIN GRADE
POT STA 12+60.00 -L-
EL. 5.00
LOOKING UPSTREAM
(18' CITY BRIDGE ON HERRINGTON ROAD)
EXIST CITY BRIDGE TO BE REMOVED (INCLUDES SUPERSTRUCTURE, SUBSTRUCTURE, AND RET. WALLS)
CLASS II RIP RAP TO EL 0' 22 TONS 67 SY FF
CLASS II RIP RAP TO EL 0' 25 TONS 75 SY FF
EXCAVATE EXIST. ROAD FILL TO EL 2.5' 85 CY.
EXCAVATE EXIST. ROAD FILL TO EL 2.5' 75 CY.
10
0
-10
10
11
12
13
14
15
16
17
18
19

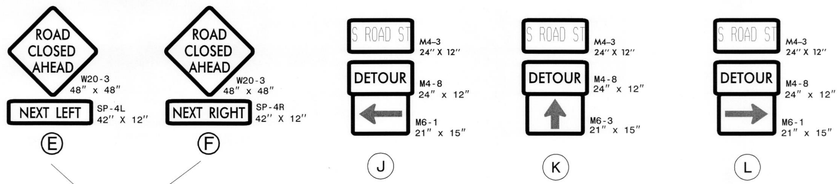
REVISIONS

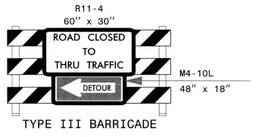
03/19/14 - RW REVISION: ADDED TUE TO PARCELS 2 AND 4. DJC

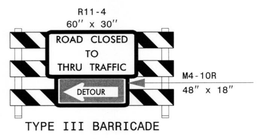
5/20/2014 R:\Hydraulics\BD-5101N_RDY_PSH_04.dgn

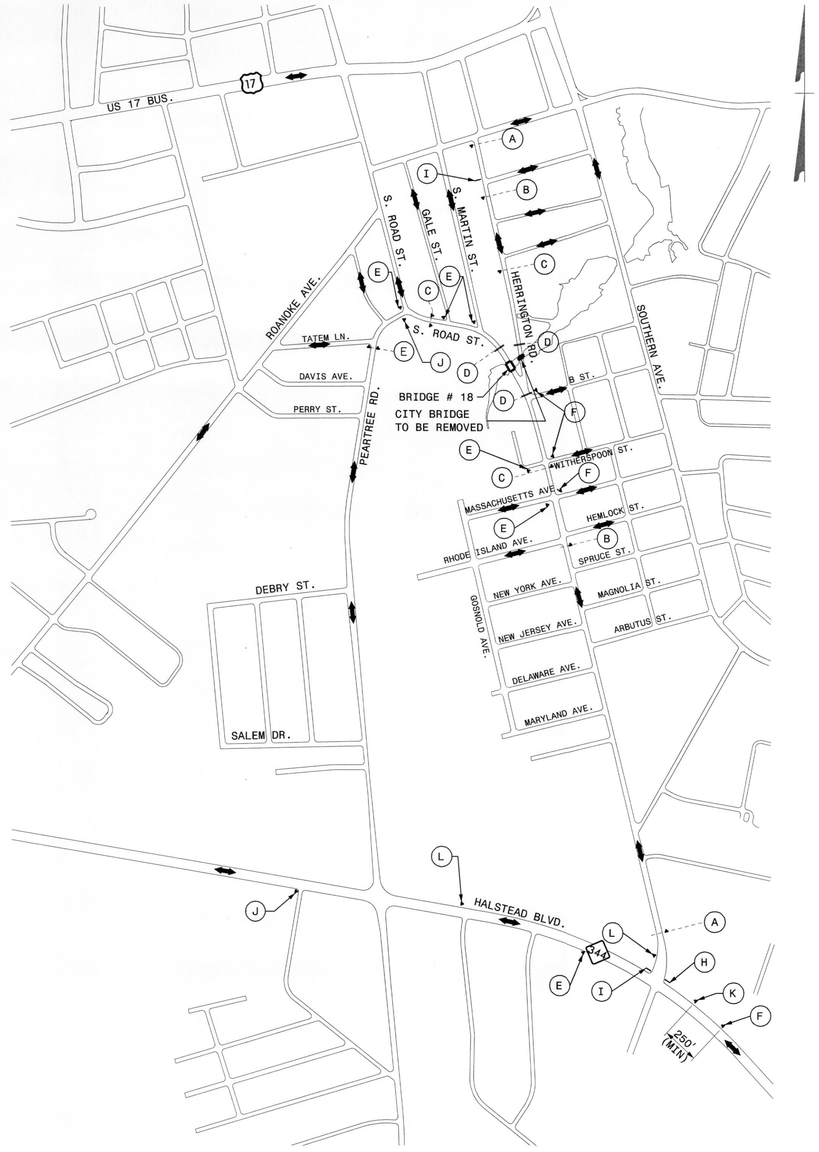
PROJ. REFERENCE NO.	SHEET NO.
BD-5101N	TMP-1











STATIONARY SIGN	
⟷	TWO WAY TRAFFIC FLOW
▨	BARRICADE (TYPE III)
⊢	STATIONARY SIGN

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS APPEAR 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
1101.03	TEMPORARY ROAD CLOSURES
1101.04	TEMPORARY SHOULDER CLOSURES
1110.01	STATIONARY WORK ZONE SIGNS
1110.02	PORTABLE WORK ZONE SIGNS
1135.01	CONES
1145.01	BARRICADES
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO-LANE AND MULTI-LANE ROADWAYS
1205.12	PAVEMENT MARKINGS - BRIDGES
1250.01	RAISED PAVEMENT MARKERS - INSTALLATION SPACING
1251.01	RAISED PAVEMENT MARKERS - PERMANENT AND TEMPORARY
1261.01	GUARDRAIL AND BARRIER DELINEATORS - INSTALLATION SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATORS - TYPES AND MOUNTING
1262.01	GUARDRAIL END DELINEATION

GENERAL NOTES

1. INSTALLATION OF TEMPORARY ROUTE MARKERS, DESTINATION SIGNS, AND ANY NECESSARY MODIFICATIONS TO EXISTING OR PROPOSED REGULATORY OR WARNING SIGNS WILL BE MADE BY OTHERS (STATE FORCES) UNLESS OTHERWISE DESIGNATED IN PLANS. PROVIDE A MINIMUM 21 CALENDAR DAY NOTICE TO STATE FORCES BEFORE A ROADWAY IS CLOSED TO TRAFFIC SUCH THAT THE NECESSARY PROVISIONS CAN BE MADE TO INFORM LOCAL EMERGENCY AND LAW ENFORCEMENT PERSONNEL, SCHOOLS, OR ANY OTHER PARTIES AFFECTED BY THE ROAD CLOSURE.
2. INSTALL SIGNS BEFORE THE BARRICADES WHEN CLOSING THE ROADWAY TO TRAFFIC. REMOVE BARRICADES BEFORE SIGNS WHEN OPENING THE ROADAY TO TRAFFIC. INSTALL / REMOVE SIGNS ANDD BARRICADES WITHIN THE SAME CALENDAR DAY.
3. POSITION WING BARRICADES ON THE SHOULDERS AND SLOPE THE STRIPES DOWNWARD IN THE DIRECTION TOWARD WHICH TRAFFIC MUST TURN IN DETOURING.
4. USE ADDITIONAL TYPE III BARRICADES IN STAGGERED LOCATIONS SUPPLEMENTED WITH SIGN R11-4 "ROAD CLOSED TO THRU TRAFFIC" IN THE EVENT THAT TRAFFIC MUST BE MAINTAINED BEYOND THE DETOUR POINT.
5. SEE STANDARD SPECIFICATION 1089-1 FOR WORK ZONE SIGNS.
6. SEE STANDARD SPECIFICATION 1089-1 FOR WORK ZONE SIGN SUPPORTS.

CDM Smith
Camp Dresser & McKee
5400 Glenwood Avenue
Suite 300
Raleigh, NC 27612-3228
NC COA No. F-0412

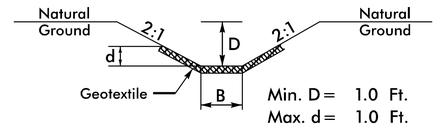
APPROVED: Douglas B. Saunders DATE: 5/29/14

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 14160 ENGINEER DOUGLAS B. SAUNDERS

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

ROAD CLOSURE HERRINGTON ROAD AND SOUTH ROAD STREET



PROJECT REFERENCE NO.	SHEET NO.
BD-5101N	EC-1

Prepared by:

MI ENGINEERING, PLLC
Designed by: Melanie Nguyen, PE
Level III: Designer of Erosion and Sediment Control Plans
Certification Number: 3223 - Expires: 12/31/2015
1011 SCHAUB DRIVE, SUITE 100
RALEIGH, NC 27606
919-851-6606 (PH)
919-851-6645 (F)

2012 STANDARD SPECIFICATIONS

EROSION CONTROL PLAN

Min. D = 1.0 Ft.
Max. d = 1.0 Ft.
B = 2.0 Ft.

Type of Liner = CLASS B Rip-Rap
8 TONS, 18 S.Y. GEOTEXTILE

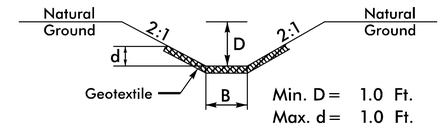
FROM STA. 15+32 TO STA. 15+48 -L- LT

Std. #	Description	Symbol	QUANTITY
1605.01	High Vis Temporary Silt Fence	━■━■━■━	1100 LF
1632.03	Rock Inlet Sediment Trap Type C	⧈	3 EA.
SP	Coir Fiber Wattle Barrier	)	130 LF

SITE DESCRIPTION	STABILIZATION TIME	TIMEFRAME EXCEPTIONS
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.

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 REFERENCE NO.	SHEET NO.
BD-5101N	EC-2

Prepared by:

MI ENGINEERING, PLLC
Designed by: Melanie Nguyen, PE
Level III: Designer of Erosion and Sediment Control Plans
Certification Number: 3223 - Expires: 12/31/2015
1011 SCHAUB DRIVE, SUITE 100
RALEIGH, NC 27606
919-851-6606 (PH)
919-851-6645 (F)
2012 STANDARD SPECIFICATIONS

REVISIONS

8/17/99

EROSION CONTROL PLAN

Std. #	Description	Symbol	QUANTITY
1605.01	High Vis Temporary Silt Fence	—■—■—■—	1100 LF
1632.03	Rock Inlet Sediment Trap Type C	▣	3 EA.
SP	Coir Fiber Wattle Barrier	)	130 LF

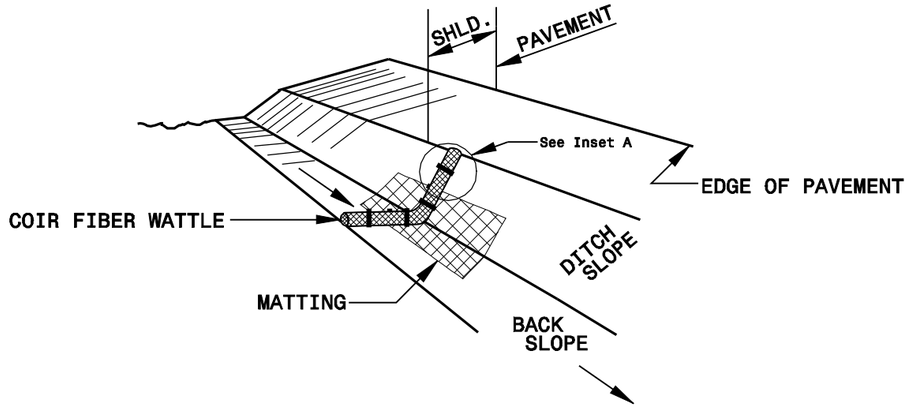
SITE DESCRIPTION	STABILIZATION TIME	TIMEFRAME EXCEPTIONS
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED.
SLOPES 3:1 OR FLATTER	14 DAYS	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.

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

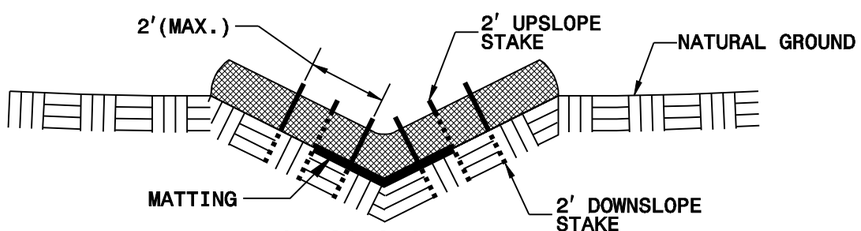
ADDITIONAL EROSION CONTROL DEVICES MAY NEED TO BE INSTALLED AS DIRECTED BY THE ENGINEER.

PROJECT REFERENCE NO.	SHEET NO.
X-XXXX	EC-2G
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

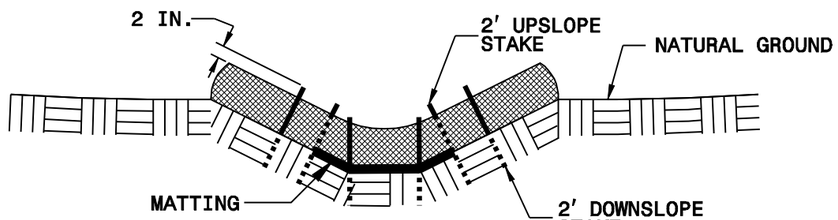
COIR FIBER WATTLE DETAIL



ISOMETRIC VIEW



CROSS SECTION VEE DITCH



CROSS SECTION TRAPEZOIDAL DITCH

NOTES:

USE MINIMUM 12 IN. DIAMETER COIR FIBER (COCONUT FIBER) WATTLE.

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

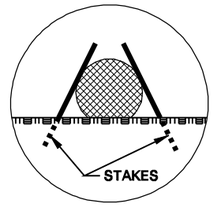
ONLY INSTALL WATTLE(S) TO A HEIGHT IN DITCH SO FLOW WILL NOT WASH AROUND WATTLE AND SCOUR DITCH SLOPES AND AS DIRECTED.

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

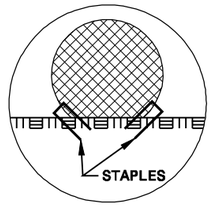
PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12" IN LENGTH.

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

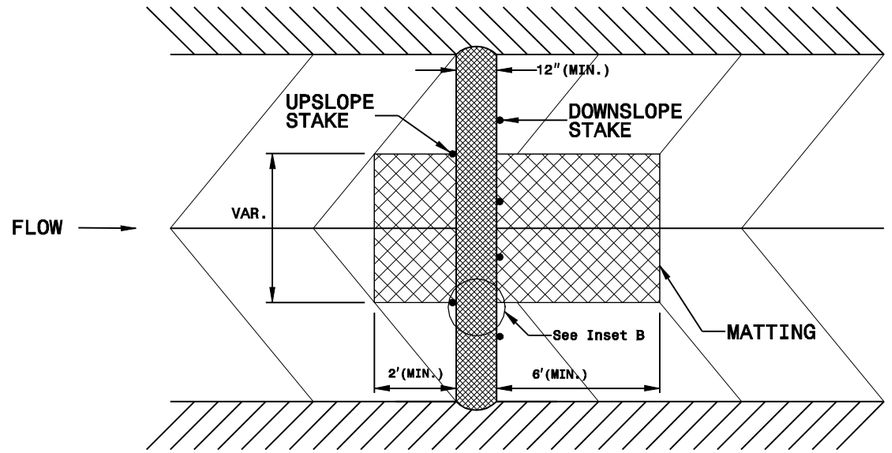
INSTALL MATTING IN ACCORDANCE WITH SECTION 1631 OF THE STANDARD SPECIFICATIONS.



INSET A

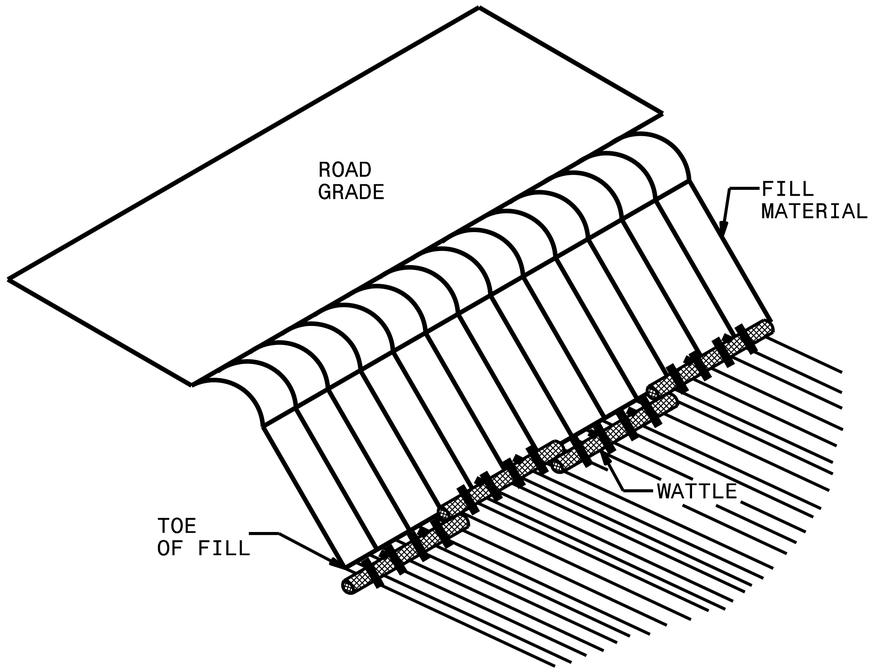


INSET B



TOP VIEW

COIR FIBER WATTLE BARRIER DETAIL



ISOMETRIC VIEW

NOTES:

USE MINIMUM 18 IN. NOMINAL DIAMETER COIR FIBER (COCONUT) WATTLE AND LENGTH OF 10 FT.

EXCAVATE A 2 TO 3 INCH TRENCH FOR WATTLE TO BE PLACED.

DO NOT PLACE WATTLES ON TOE OF SLOPE.

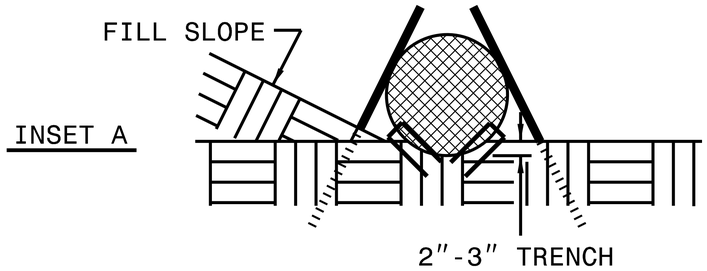
USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.

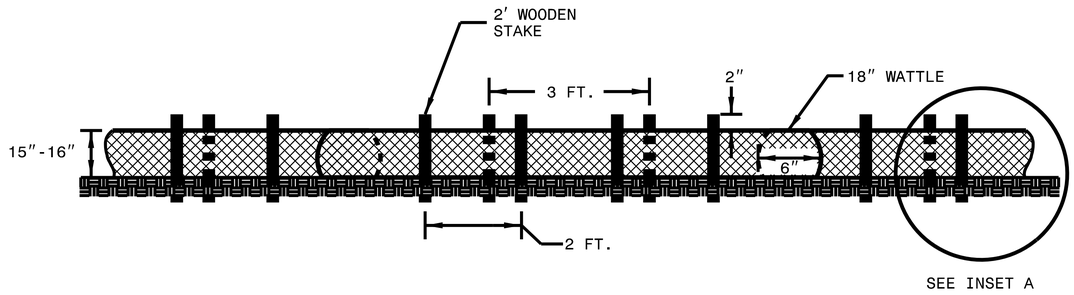
INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO GROUND.

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

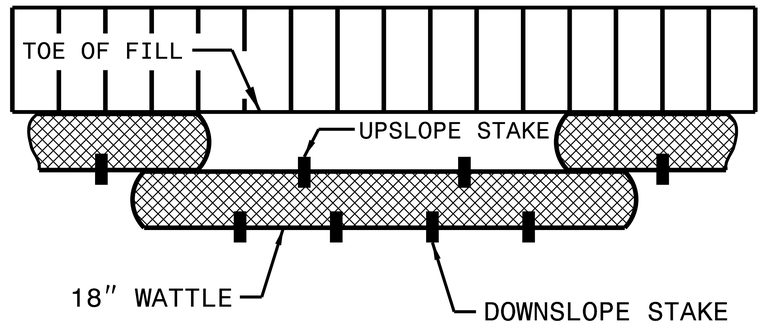
INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

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





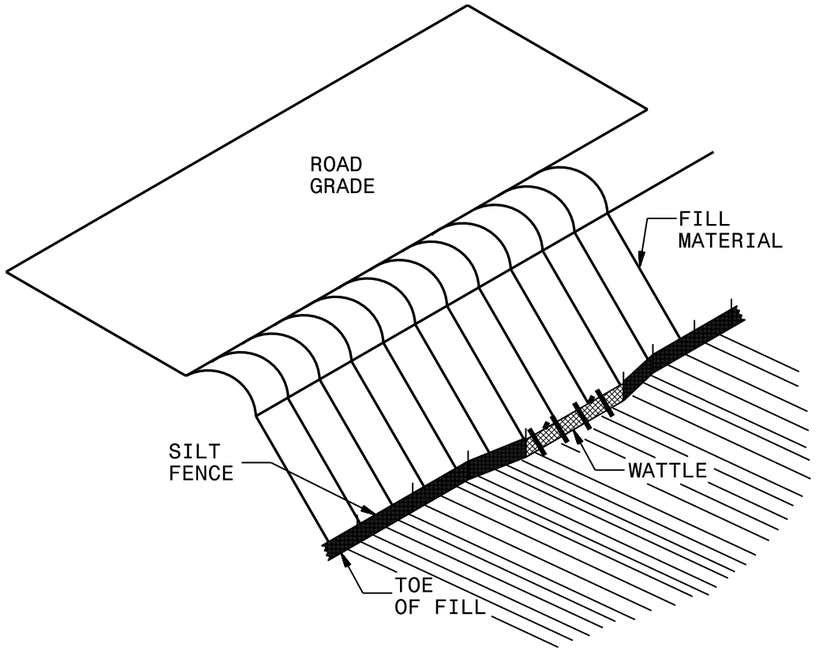
FRONT VIEW



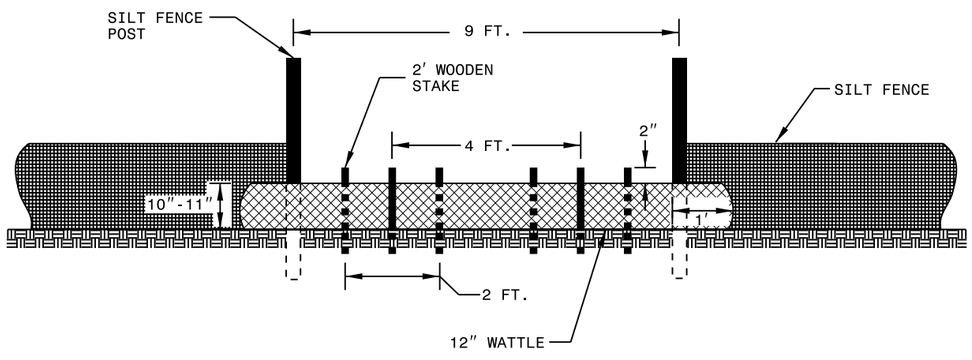
TOP VIEW

SILT FENCE COIR FIBER WATTLE BREAK DETAIL

PROJECT REFERENCE NO.	SHEET NO.
X-XXXX	EC-2G
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



ISOMETRIC VIEW



VIEW FROM SLOPE

NOTES:

USE MINIMUM 12 IN. DIAMETER COIR FIBER (COCONUT FIBER) 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.

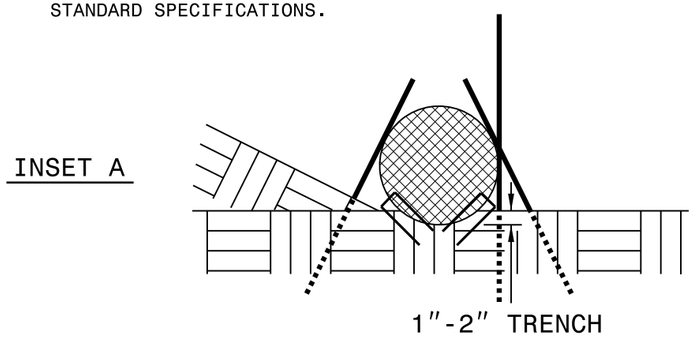
INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO GROUND.

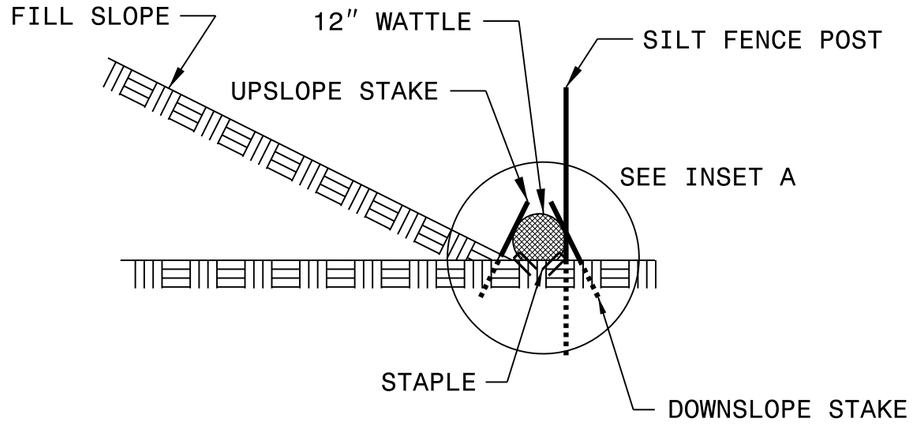
PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12″ IN LENGTH.

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.





SIDE VIEW

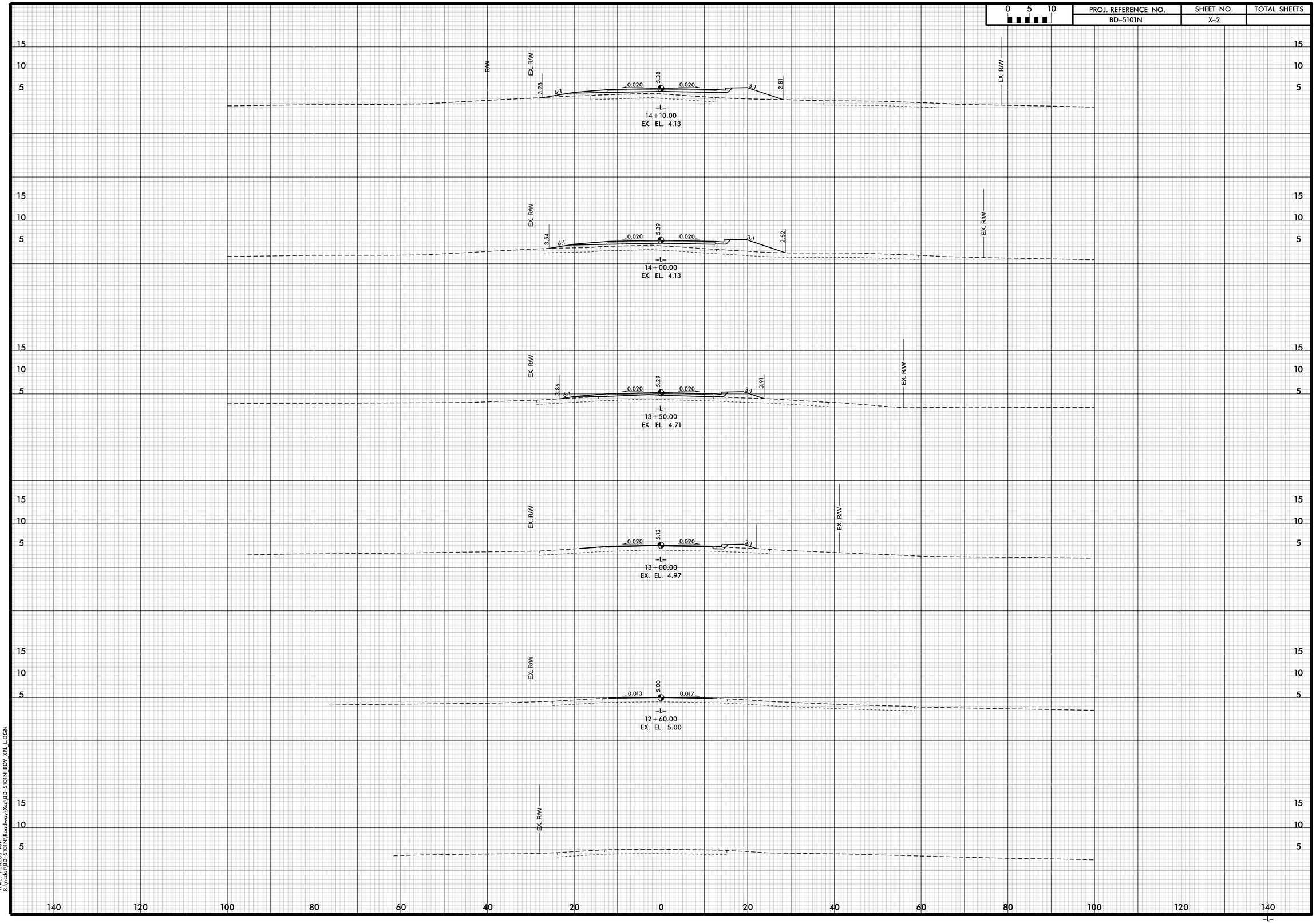
STATE OF NORTH CAROLINA
NCDOT RAIL DIVISION

CROSS-SECTION SUMMARY

NOTE: EMBANKMENT COLUMN DOES NOT INCLUDE BACKFILL FOR UNDERCUT

Station L	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
12+60.00	0	0
13+00.00	0	4
13+50.00	1	14
14+00.00	0	56
14+10.00	0	18
14+50.00	3	58
14+55.00	1	4
15+26.00	0	0
15+50.00	1	6
16+00.00	1	8
16+25.00	1	3

0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
	BD-5101N	X-2	



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TIME: 11:10:33 AM
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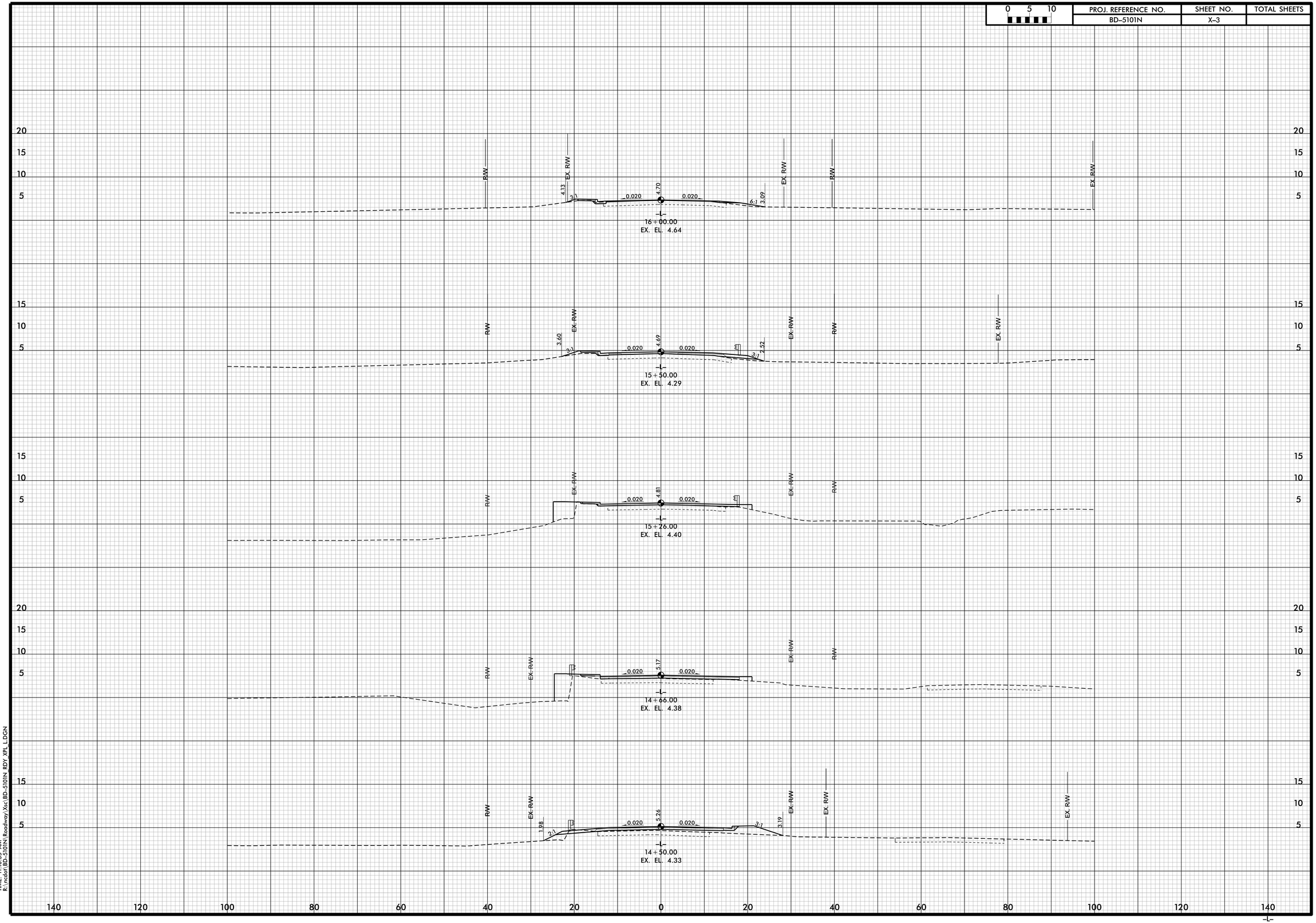
0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
	BD-5101N	X-3	



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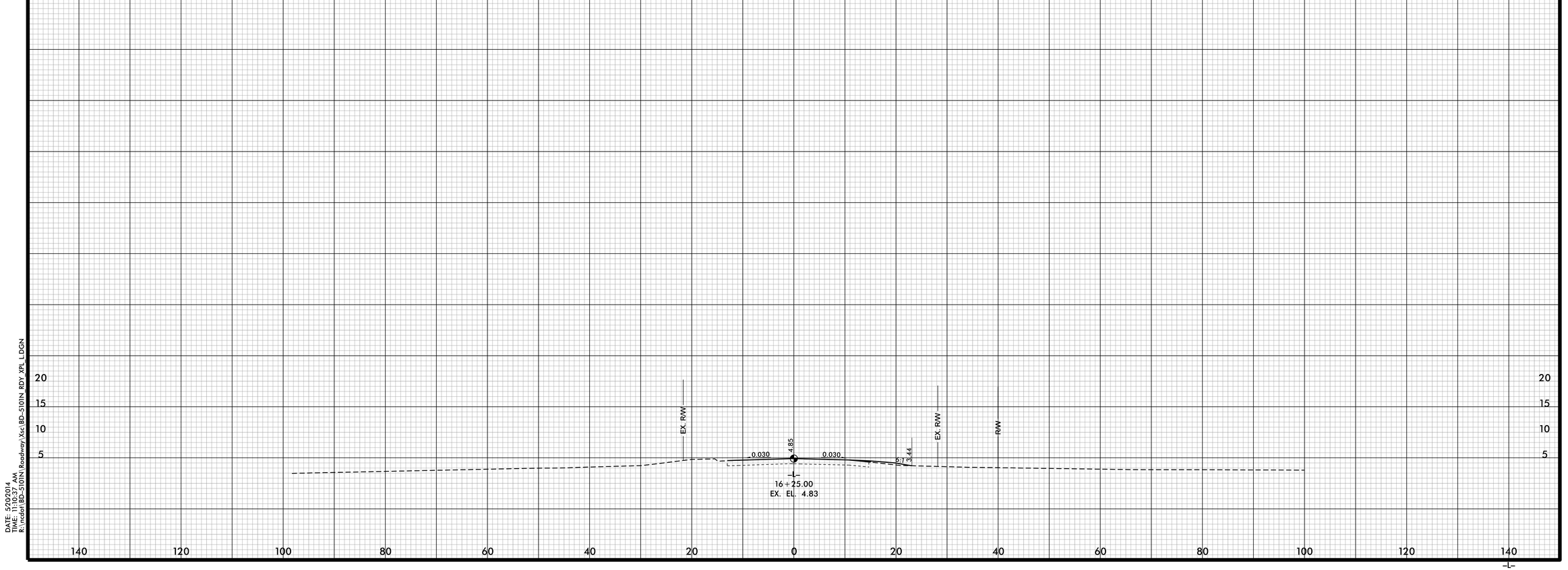
-L-

0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
	BD-5101N	X-4	



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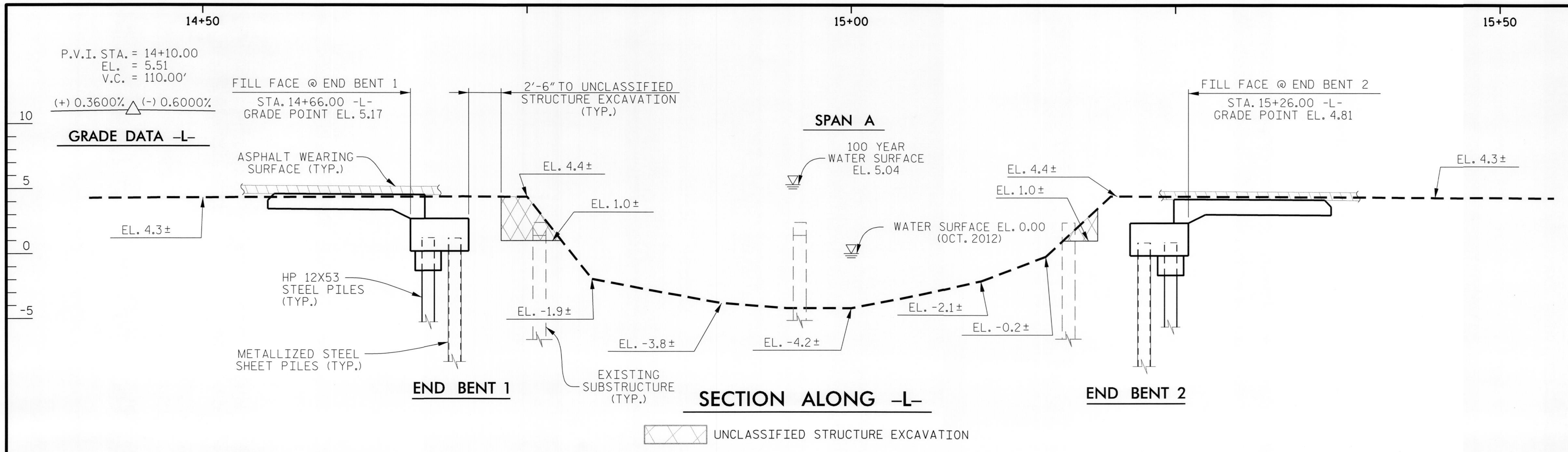
F.A. PROJECT No.: BRSTP-1269(2)



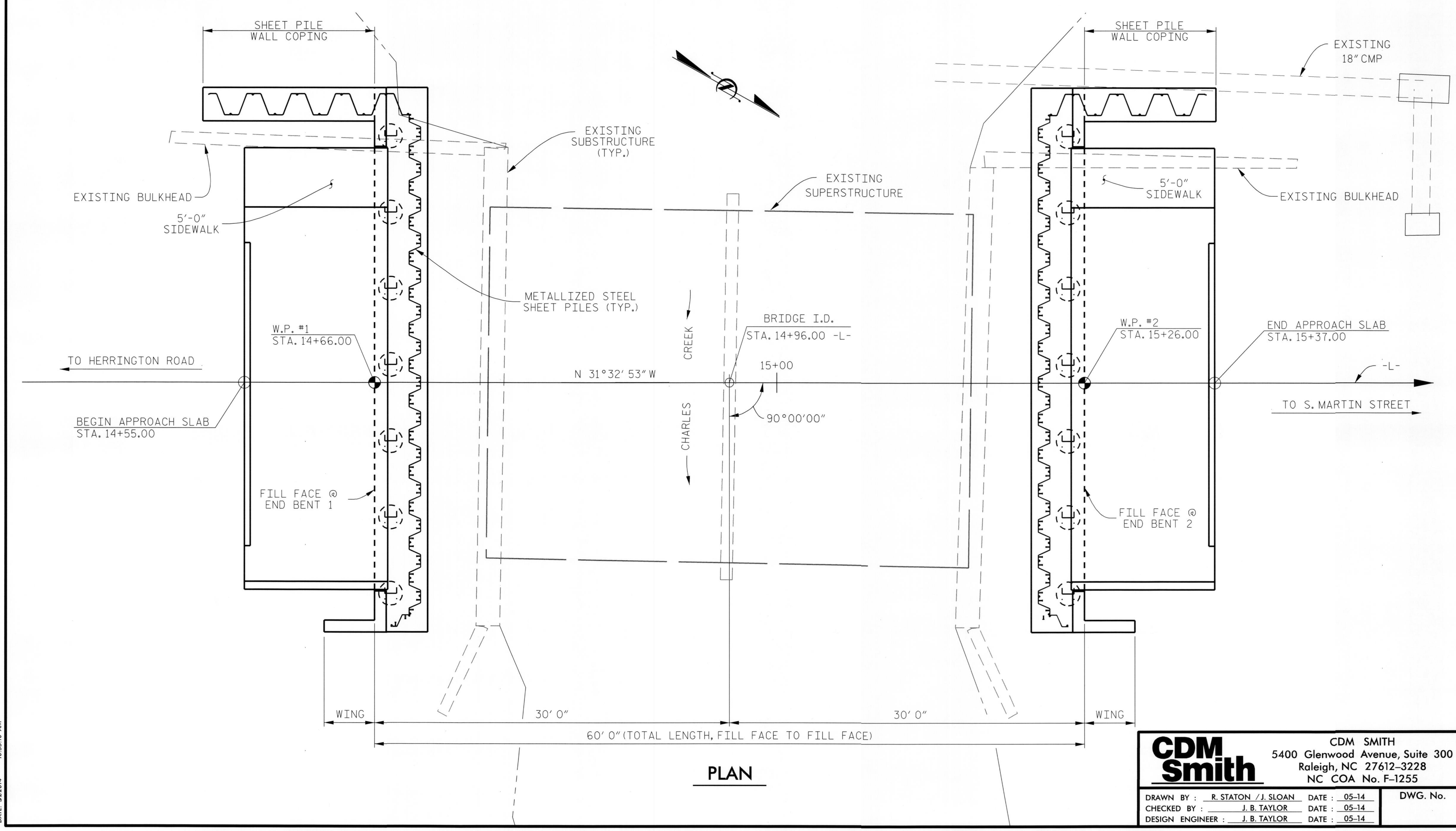
HYDRAULIC DATA

DESIGN DISCHARGE	= 710 CFS
FREQUENCY OF DESIGN FLOOD	= 10 YEARS
DESIGN HIGH WATER ELEVATION	= 3.5 FT.
DRAINAGE AREA	= 3.0 SQ. MI.
BASE DISCHARGE (Q100)	= 1,510 CFS
BASE HIGH WATER ELEVATION	= 5.04 FT.

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 1,275 CFS
FREQUENCY OF OVERTOPPING FLOOD	= 50 YEARS
OVERTOPPING FLOOD ELEVATION	= 4.6 FT.

OVERTOPPING AT PROPOSED SAG AT STA. 15+74 -L-. PROPOSED DESIGN MAINTAINS EXISTING HYDRAULIC LEVEL OF SERVICE.



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

PROJECT NO. BD-5101N

PASQUOTANK COUNTY

STATION: 14+96.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE OVER CHARLES CREEK ON NC 34 (-L-) BETWEEN HERRINGTON ROAD AND S. MARTIN STREET

CDM Smith
CDM SMITH
5400 Glenwood Avenue, Suite 300
Raleigh, NC 27612-3228
NC COA No. F-1255

DRAWN BY :	R. STATON / J. SLOAN	DATE :	05-14
CHECKED BY :	J. B. TAYLOR	DATE :	05-14
DESIGN ENGINEER :	J. B. TAYLOR	DATE :	05-14

DWG. No.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 33698 JOSHUA B. TAYLOR
05-02-14

REVISIONS

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

SHEET No. S-1

TOTAL SHEETS

FILE: R:\nodot\BD-5101N\Structures\PLANS\BD5101N_GD_01.dgn
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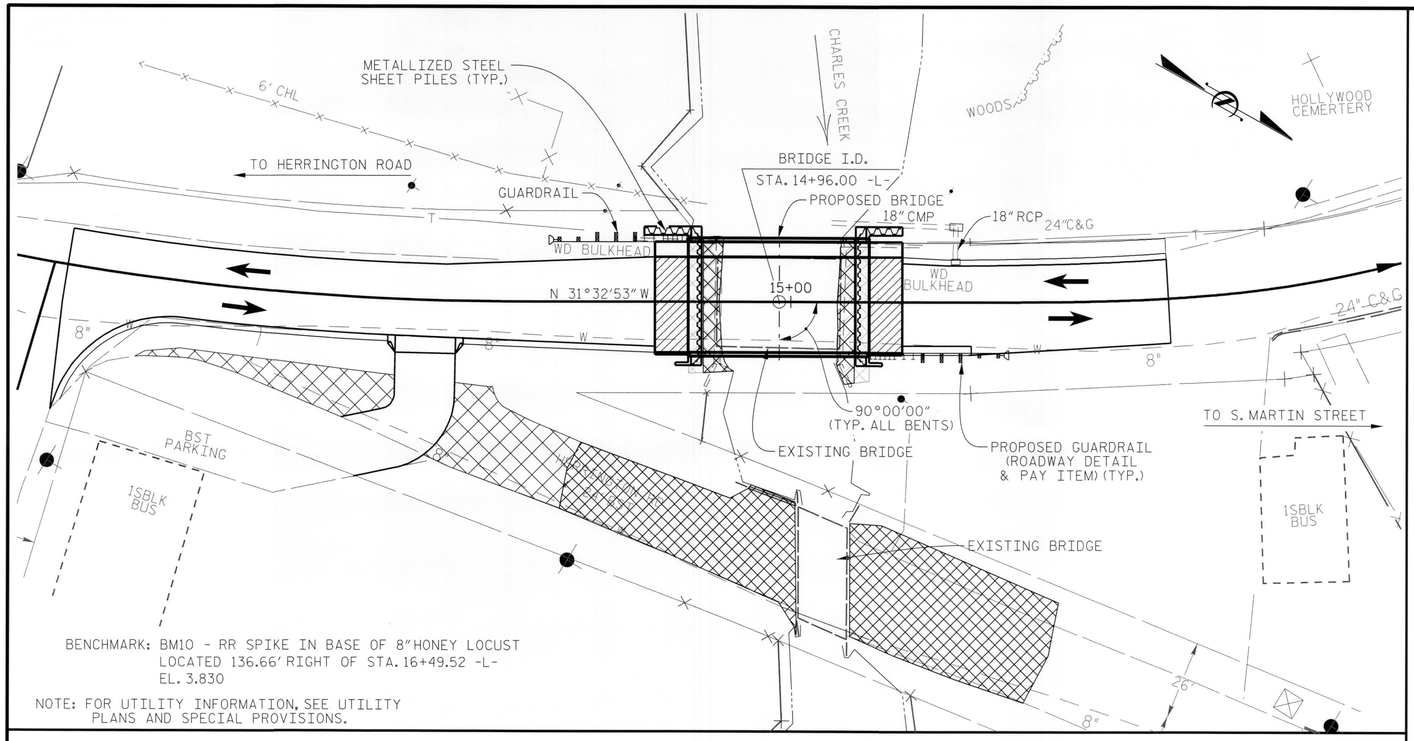


BENCHMARK: BM10 - RR SPIKE IN BASE OF 8" HONEY LOCUST
LOCATED 136.66' RIGHT OF STA. 16+49.52 -L-
EL. 3.830

NOTE: FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

LOCATION SKETCH

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE @ STA. 14+96.00 -L-	PDA TESTING	UNCLASSIFIED STRUCTURE EXCAVATION @ STA. 14+96.00 -L-	CLASS AA CONCRETE	BRIDGE APPROACH SLABS @ STA. 14+96.00 -L-	EPOXY COATED REINFORCING STEEL	HP 12 x 53 STEEL PILES		PILE REDRIVES	METALLIZED STEEL SHEET PILES		1'-3" x 2'-6" CONCRETE PARAPET	2 BAR METAL RAIL	ELASTOMERIC BEARINGS	3'-0" x 1'-9" PRESTRESSED CONCRETE CORED SLABS	
	LUMP SUM	EACH	LUMP SUM	CU. YDS.	LUMP SUM	LBS.	No.	LIN. FT.	EACH	No.	SQ. FT.	LIN. FT.	LIN. FT.	LUMP SUM	No.	LIN. FT.
SUPERSTRUCTURE	-	-	-	8.8	LUMP SUM	376	-	-	-	-	-	115.5	100.5	LUMP SUM	13	750.75
END BENT 1	-	-	LUMP SUM	23.2	-	3047	7	665	-	40	3335	-	-	-	-	-
END BENT 2	-	-	LUMP SUM	22.9	-	3018	7	665	-	38	3050	-	-	-	-	-
TOTAL	LUMP SUM	1	LUMP SUM	54.9	LUMP SUM	6441	14	1330	1	78	6385	115.5	100.5	LUMP SUM	13	750.75

FOUNDATION NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NOS. 1 AND 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 85 TONS PER PILE.

DRIVE PILES AT END BENT NOS. 1 AND 2 TO A REQUIRED DRIVING RESISTANCE OF 142 TONS PER PILE.

INSTALL PILES AT END BENT NOS. 1 AND 2 TO A TIP ELEVATION NO HIGHER THAN -70 FT.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 40,000 TO 45,000 FT-LBS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT NOS. 1 AND 2.

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.

TESTING THE FIRST PRODUCTION PILE AT AN END BENT WITH THE PDA DURING DRIVING IS REQUIRED. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS AND FOR PILE DRIVING CRITERIA, SEE PILE DRIVING CRITERIA PROVISION.

THE SCOUR CRITICAL ELEVATION FOR VERTICAL ABUTMENTS AT END BENT 1 AND END BENT 2 IS ELEVATION -9.0 FEET. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

STEEL SHEET PILES INSTALLED PARALLEL TO AND EMBEDDED IN THE END BENT CAP AT END BENT NO. 1 AND END BENT NO. 2 SHALL BE INSTALLED TO A SHEETING TIP ELEVATION OF -48.0 FEET.

STEEL SHEET PILES INSTALLED PARALLEL TO THE ROADWAY AT END BENT NO. 1 AND END BENT NO. 2 SHALL BE INSTALLED TO A SHEETING TIP OF -66.0 FEET.

STEEL SHEET PILING INSTALLED PARALLEL TO AND EMBEDDED IN THE END BENT CAP AT END BENT NO. 1 AND END BENT NO. 2 SHALL HAVE A MINIMUM SECTION MODULUS OF 30.2 IN3/FT.

STEEL SHEET PILING INSTALLED PARALLEL TO THE ROADWAY AT END BENT NO. 1 AND END BENT NO. 2 SHALL HAVE A MINIMUM SECTION MODULUS OF 80.2 IN3/FT.

THE CORED SLAB UNIT SUPERSTRUCTURE ACTS AS A BRACE BETWEEN THE SHEET PILE WALLS PARALLEL TO AND EMBEDDED IN THE END BENT CAP AT END BENT NO. 1 AND END BENT NO. 2. AT THE SCOUR CRITICAL ELEVATION, THE AASHTO LRFD STRENGTH LIMIT STATE BRACE LOAD IS 9.6 KIPS/FOOT OF WALL.

GENERAL NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

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

THE EXISTING 2 SPAN STRUCTURE (2 @ 20'-0") WITH 6 LINES OF STEEL I-BEAMS AT 5'-0" SPACES SUPPORTING REINFORCED CONCRETE DECK WITH 30'-0" CLEAR ROADWAY WIDTH ON TIMBER CAP AND TIMBER PILES SHALL BE REMOVED. IN ADDITION, BULKHEADS AND BULKHEAD SUPPORT PILES SHALL BE REMOVED AND INCLUDED IN THE LUMP SUM PAY ITEM FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 14+96.00 -L-".

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 MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 3.0 FT. BEYOND EACH SIDE OF THE PROPOSED STRUCTURE WIDTH 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.

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.

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

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

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.

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 14+96.00 -L-.

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.

FOR METALLIZED STEEL SHEET PILES, SEE SPECIAL PROVISIONS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

ALL METALLIZED SURFACES SHALL RECEIVE A SEAL COATING AS SPECIFIED IN THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).

CLASS AA CONCRETE SHALL BE USED IN ALL CAST-IN-PLACE BENT CAPS AND SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR. FOR CALCIUM NITRITE CORROSION INHIBITOR, SEE SPECIAL PROVISIONS.

ALL BAR SUPPORTS USED IN THE PARAPET, SIDEWALK, AND BENT CAPS AND ALL INCIDENTAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

THE CONCRETE IN THE END BENT CAPS OF END BENTS NO. 1 & 2 SHALL CONTAIN SILICA FUME. SILICA FUME SHALL BE SUBSTITUTED FOR 5% OF THE PORTLAND CEMENT BY WEIGHT. IF THE OPTION OF ARTICLE 1024-1 OF THE STANDARD SPECIFICATIONS TO PARTIALLY SUBSTITUTE CLASS F FLY ASH FOR PORTLAND CEMENT IS EXERCISED, THEN THE RATE OF FLY ASH SUBSTITUTION SHALL BE REDUCED TO 1.0 LB OF FLY ASH PER 1.0 LB. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

PROJECT NO. BD-5101N

PASQUOTANK COUNTY

STATION: 14+96.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE OVER CHARLES CREEK ON NC 34 (-L-) BETWEEN HERRINGTON ROAD AND S. MARTIN STREET

CDM Smith
CDM SMITH
5400 Glenwood Avenue, Suite 300
Raleigh, NC 27612-3228
NC COA No. F-1255

DRAWN BY : R. STATON / J. SLOAN DATE : 05-14
CHECKED BY : J. B. TAYLOR DATE : 05-14
DESIGN ENGINEER : J. B. TAYLOR DATE : 05-14

DWG. No.

NORTH CAROLINA PROFESSIONAL SEAL 33698 ENGINEER JOSHUA B. TAYLOR
05/28/14

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

FILE: R:\model\BD-5101N\Structure\PLANS\BD5101N_GD_02.dgn
DATE: 5/28/2014 12:27:50 PM

LOAD AND RESISTANCE FACTOR RATING (LRFR) 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						
							LIVE-LOAD FACTORS (γ_{LL})	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)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	1	1.10	--	1.75	0.275	1.10	A	EL	28.375	0.517	1.14	A	EL	2.838	0.80	0.275	1.16	A	EL	28.375	
		HL-93 (OPERATING)	N/A	--	1.42	--	1.35	0.275	1.42	A	EL	28.375	0.517	1.48	A	EL	2.838	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	2	1.39	49.902	1.75	0.275	1.39	A	EL	28.375	0.517	1.39	A	EL	2.838	0.80	0.275	1.47	A	EL	28.375	
		HS-20 (OPERATING)	36.000	--	1.80	64.688	1.35	0.275	1.80	A	EL	28.375	0.517	1.80	A	EL	2.838	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500	--	3.13	42.188	1.40	0.275	3.69	A	EL	28.375	0.517	4.02	A	EL	2.838	0.80	0.275	3.13	A	EL	28.375	
		SNGARBS2	20.000	--	2.41	48.129	1.40	0.275	2.84	A	EL	28.375	0.517	2.90	A	EL	2.838	0.80	0.275	2.41	A	EL	28.375	
		SNAGRIS2	22.000	--	2.31	50.887	1.40	0.275	2.73	A	EL	28.375	0.517	2.70	A	EL	2.838	0.80	0.275	2.31	A	EL	28.375	
		SNCOTTS3	27.250	--	1.56	42.436	1.40	0.275	1.84	A	EL	28.375	0.517	2.01	A	EL	2.838	0.80	0.275	1.56	A	EL	28.375	
		SNAGGRS4	34.925	--	1.33	46.480	1.40	0.275	1.57	A	EL	28.375	0.517	1.69	A	EL	2.838	0.80	0.275	1.33	A	EL	28.375	
		SNS5A	35.550	--	1.30	46.194	1.40	0.275	1.53	A	EL	28.375	0.517	1.73	A	EL	2.838	0.80	0.275	1.30	A	EL	28.375	
		SNS6A	39.950	--	1.20	48.136	1.40	0.275	1.42	A	EL	28.375	0.517	1.59	A	EL	2.838	0.80	0.275	1.20	A	EL	28.375	
		SNS7B	42.000	--	1.15	48.213	1.40	0.275	1.36	A	EL	28.375	0.517	1.57	A	EL	2.838	0.80	0.275	1.15	A	EL	28.375	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000	--	1.47	48.613	1.40	0.275	1.74	A	EL	28.375	0.517	1.88	A	EL	2.838	0.80	0.275	1.47	A	EL	28.375	
		TNT4A	33.075	--	1.48	49.055	1.40	0.275	1.75	A	EL	28.375	0.517	1.82	A	EL	2.838	0.80	0.275	1.48	A	EL	28.375	
		TNT6A	41.600	--	1.23	50.967	1.40	0.275	1.45	A	EL	28.375	0.517	1.70	A	EL	2.838	0.80	0.275	1.23	A	EL	28.375	
		TNT7A	42.000	--	1.24	51.999	1.40	0.275	1.46	A	EL	28.375	0.517	1.63	A	EL	2.838	0.80	0.275	1.24	A	EL	28.375	
		TNT7B	42.000	--	1.29	54.296	1.40	0.275	1.53	A	EL	28.375	0.517	1.53	A	EL	2.838	0.80	0.275	1.29	A	EL	28.375	
		TNAGRIT4	43.000	--	1.22	52.545	1.40	0.275	1.44	A	EL	28.375	0.517	1.47	A	EL	2.838	0.80	0.275	1.22	A	EL	28.375	
		TNAGT5A	45.000	--	1.15	51.584	1.40	0.275	1.35	A	EL	28.375	0.517	1.48	A	EL	2.838	0.80	0.275	1.15	A	EL	28.375	
		TNAGT5B	45.000	3	1.13	50.729	1.40	0.275	1.33	A	EL	28.375	0.517	1.40	A	EL	2.838	0.80	0.275	1.13	A	EL	28.375	

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.

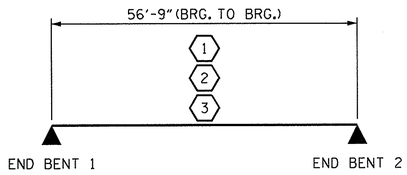
(#) CONTROLLING LOAD RATING

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



LRFR SUMMARY

PROJECT NO. BD-5101N
PASQUOTANK COUNTY
STATION: 14+96.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR PRESTRESSED CORED SLAB UNIT 90° SKEW
(NON-INTERSTATE TRAFFIC)

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

STD. NO. LRFR1

NORTH CAROLINA PROFESSIONAL SEAL 14045 ENGINEER TIMOTHY L. COGGINS
04/30/2014

ASSEMBLED BY : N. Ruffin	DATE : 4/10/14
CHECKED BY : T. L. COGGINS	DATE : 4/21/14
DRAWN BY : MAA 1/08	REV. 11/12/08RR MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/1/11 MAA/GM

30-APR-2014 14:42
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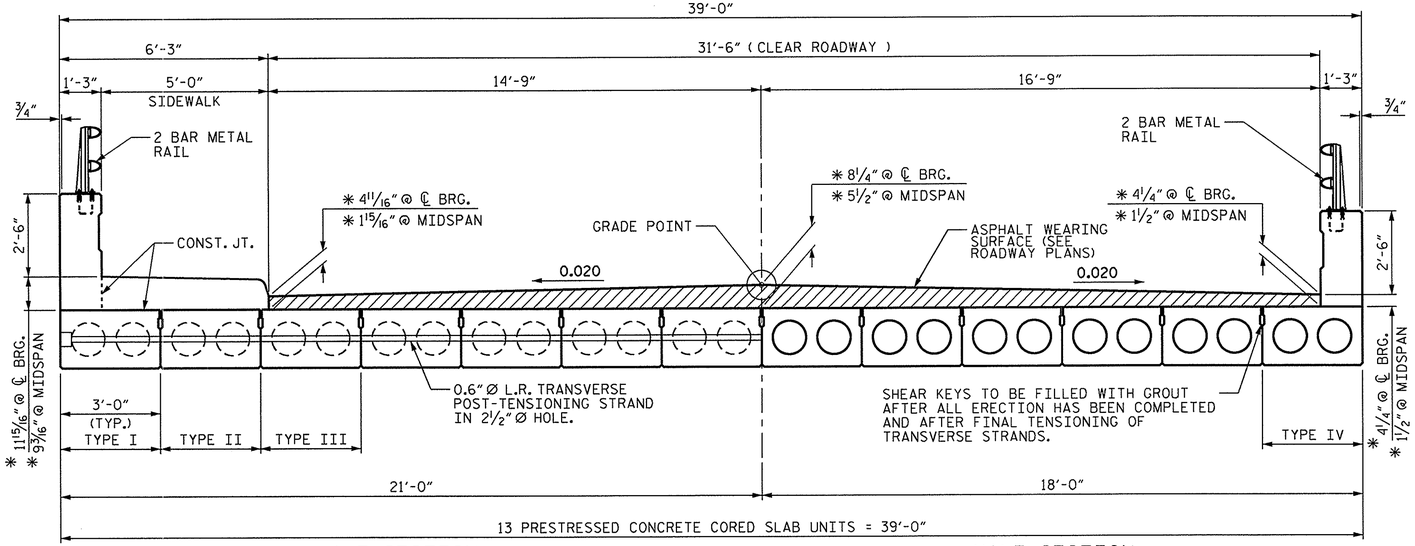


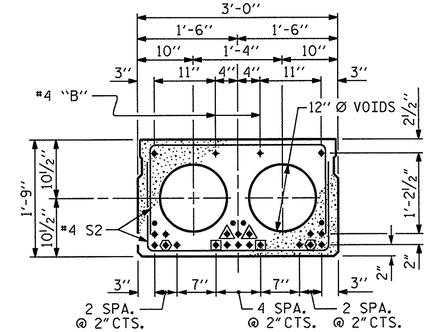
HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

HALF SECTION
THROUGH VOIDS

TYPICAL SECTION

* - THE MINIMUM AND MAXIMUM CONCRETE PARAPET HEIGHTS, SIDEWALK HEIGHT AND ASPHALT THICKNESSES ARE SHOWN. THE HEIGHT OF THE SIDEWALK, CONCRETE PARAPET AND ASPHALT WEARING SURFACE THICKNESSES VARY WHILE THE TOP OF THE CONCRETE PARAPET FOLLOWS THE PROFILE OF THE GUTTERLINE.

SECTION AT END BENT



TYPE III - INTERIOR SLAB SECTION
SPAN A (57'-9" UNIT)
(24 STRANDS REQUIRED)

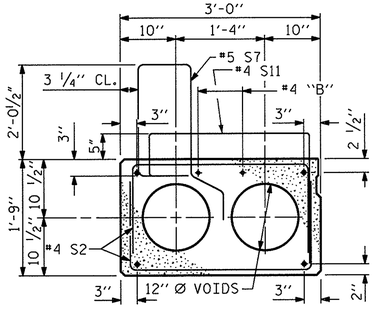
0.6" Ø LOW RELAXATION STRAND LAYOUT

▲ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 6'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

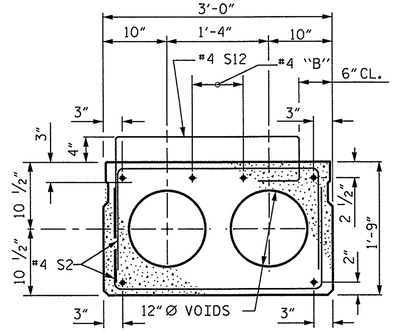
■ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 8'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

⬢ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 14'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

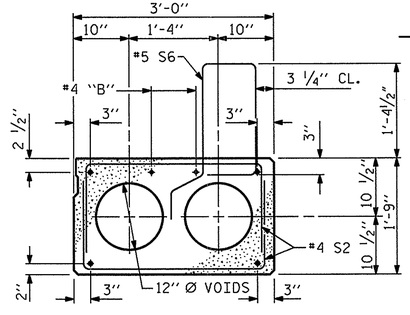
DEBONDING LEGEND



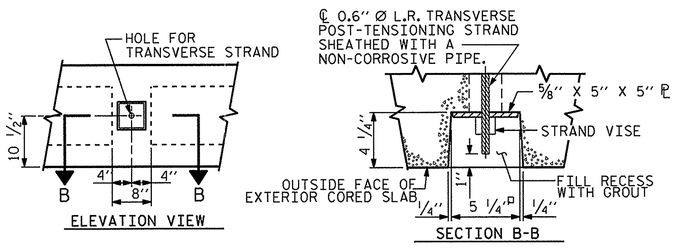
TYPE I - EXTERIOR SLAB SIDEWALK SECTION
(FOR PRESTRESSED STRAND LAYOUT, SEE TYPE III - INTERIOR SLAB SECTION)



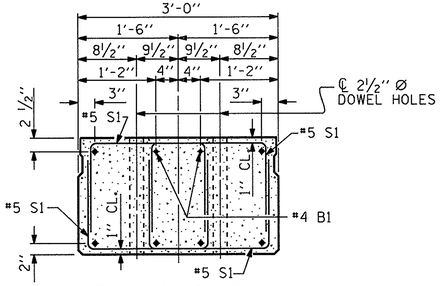
TYPE II - INTERIOR SLAB SIDEWALK SECTION
(FOR PRESTRESSED STRAND LAYOUT, SEE TYPE III - INTERIOR SLAB SECTION)



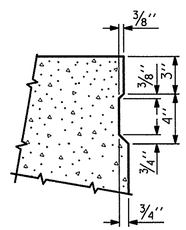
TYPE IV - EXTERIOR SLAB SECTION
(FOR PRESTRESSED STRAND LAYOUT, SEE TYPE III - INTERIOR SLAB SECTION)



GROUTED RECESS AT END OF POST-TENSIONED STRAND CORED SLABS



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



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

NORTH CAROLINA PROFESSIONAL SEAL 14045 ENGINEER TIMOTHY L. COGGINS
04/30/2014

PROJECT NO. BD-5101N
PASQUOTANK COUNTY
STATION: 14+96.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
3'-0" x 1'-9" PRESTRESSED CONCRETE CORED SLAB UNIT

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

DRAWN BY : N. Ruffin DATE : 4/10/14
CHECKED BY : T.L. COGGINS DATE : 4/21/14
DESIGN ENGINEER OF RECORD: N. RUFFIN DATE : 4/30/14

30-APR-2014 14:42
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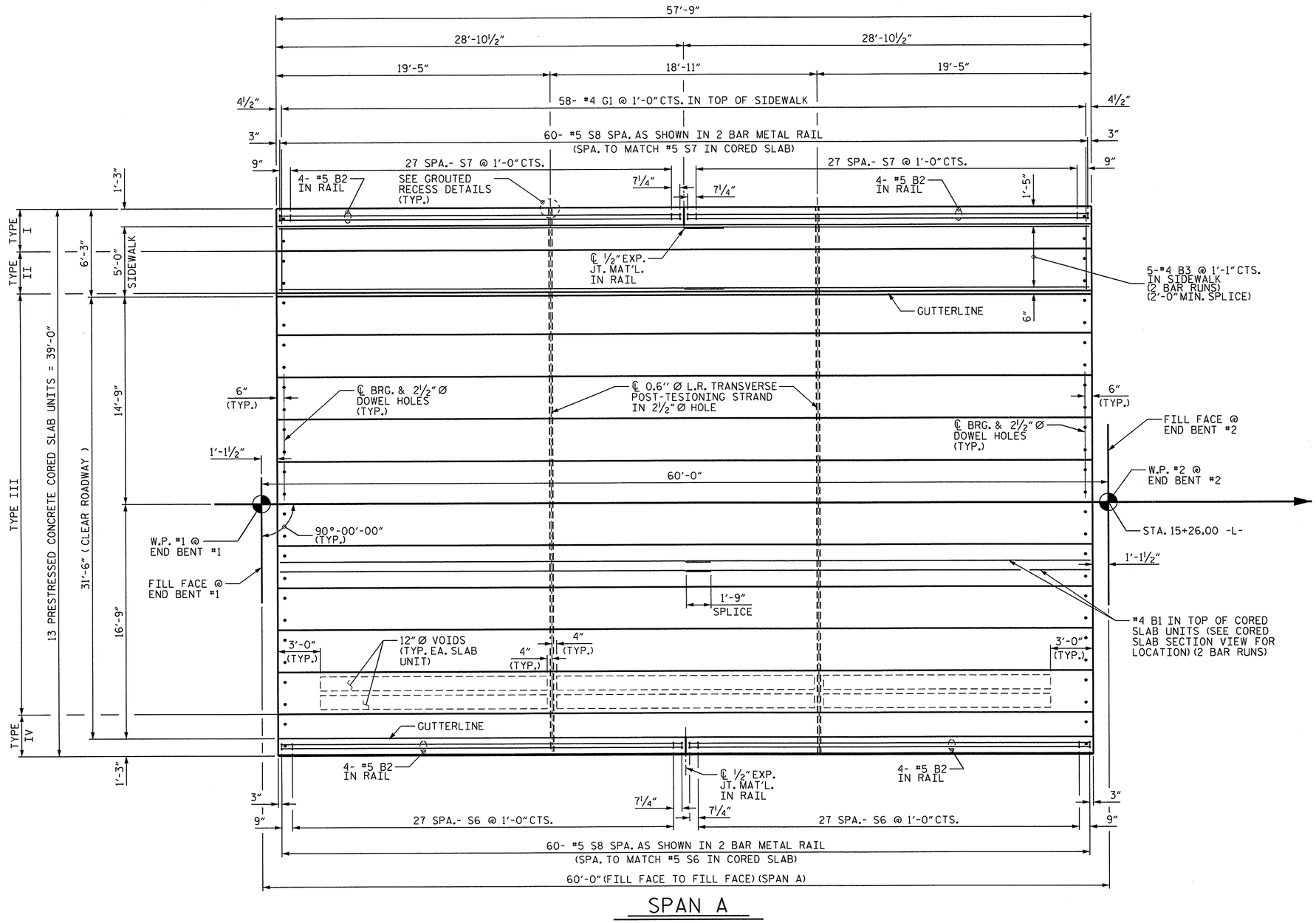
nruffin



SPAN A

PROJECT NO. BD-5101N

PASQUOTANK COUNTY

STATION: 14+96.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PLAN OF SPAN
SPAN A

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

NORTH CAROLINA PROFESSIONAL SEAL 14045 ENGINEER TIMOTHY L. COGGINS
04/30/2014

DRAWN BY : N. Ruffin DATE : 4/10/14
CHECKED BY : T. L. COGGINS DATE : 4/22/14
DESIGN ENGINEER OF RECORD: N. RUFFIN DATE : 4/30/14

30-APR-2014 14:42
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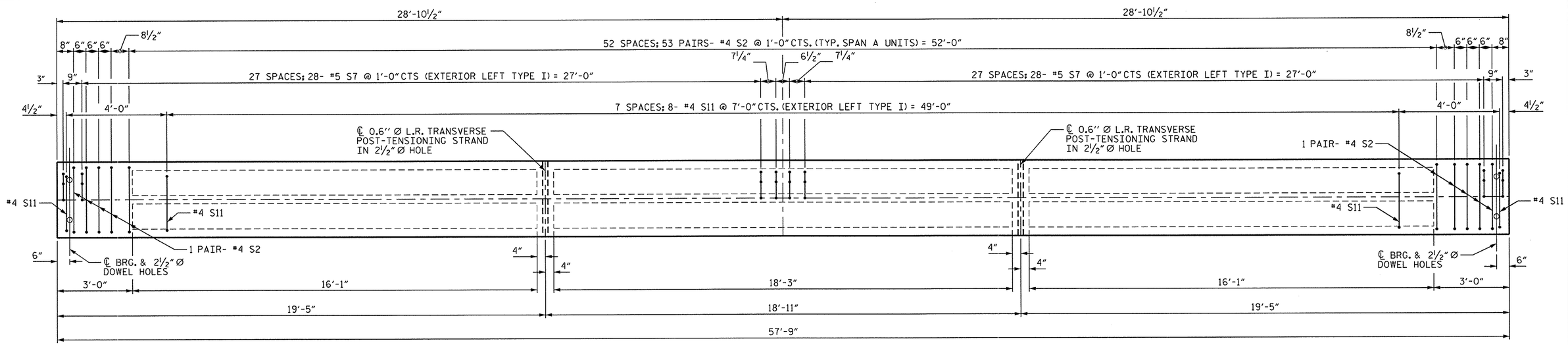
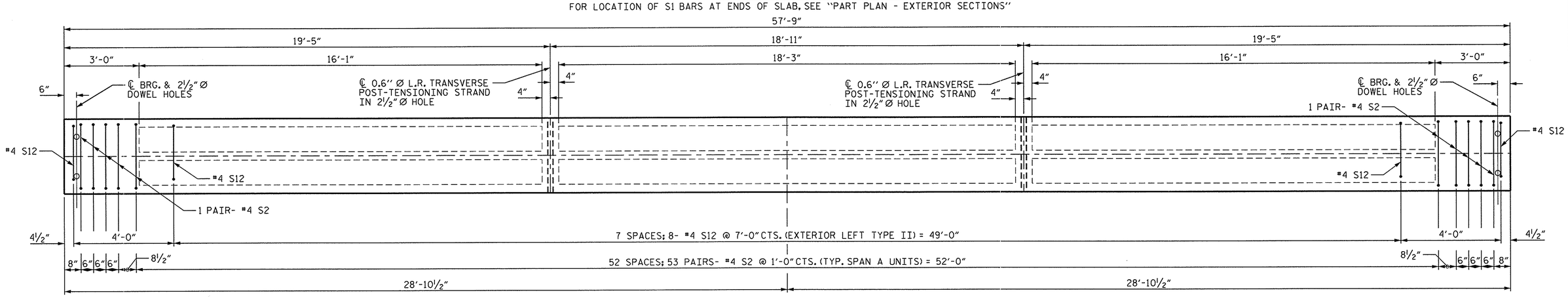
nruffin



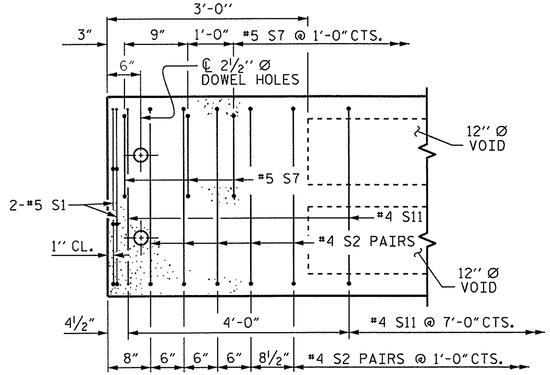
PLAN OF TYPE I CORED SLAB UNIT

FOR LOCATION OF S1 BARS AT ENDS OF SLAB, SEE "PART PLAN - EXTERIOR SECTIONS"



PLAN OF TYPE II CORED SLAB UNIT

FOR LOCATION OF S1 BARS AT ENDS OF SLAB, SEE "PART PLAN - EXTERIOR SECTIONS"



TYPE I EXTERIOR SECTION

TYPE II SIMILAR EXCEPT OMIT S7 BARS AND SUBSTITUTE #4 S11 BARS WITH #4 S12 BARS

PART PLAN - EXTERIOR SECTIONS

NORTH CAROLINA PROFESSIONAL SEAL 14045 ENGINEER TIMOTHY L. COGGINS
10/30/2014

PROJECT NO. BD-5101N

PASQUOTANK COUNTY

STATION: 14+96.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN
SPAN A
DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			

DRAWN BY :	N. Ruffin	DATE : 4/11/14
CHECKED BY :	T. L. COGGINS	DATE : 4/22/14
DESIGN ENGINEER OF RECORD:	N. RUFFIN	DATE : 4/30/14

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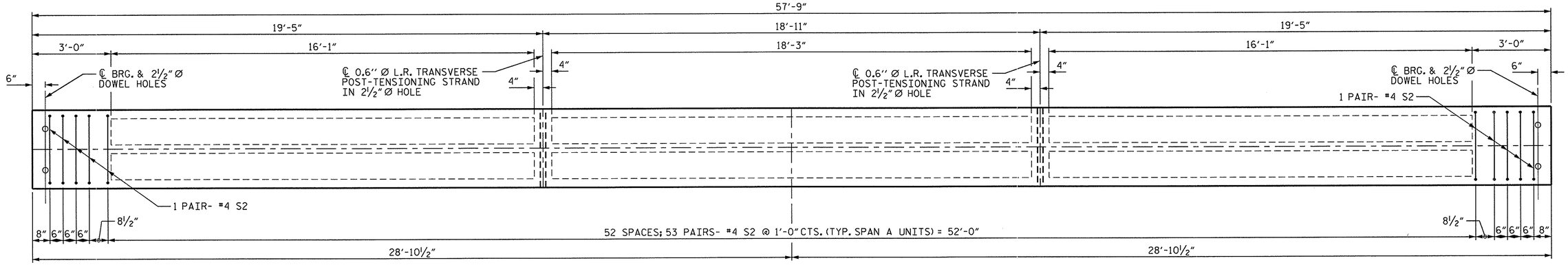
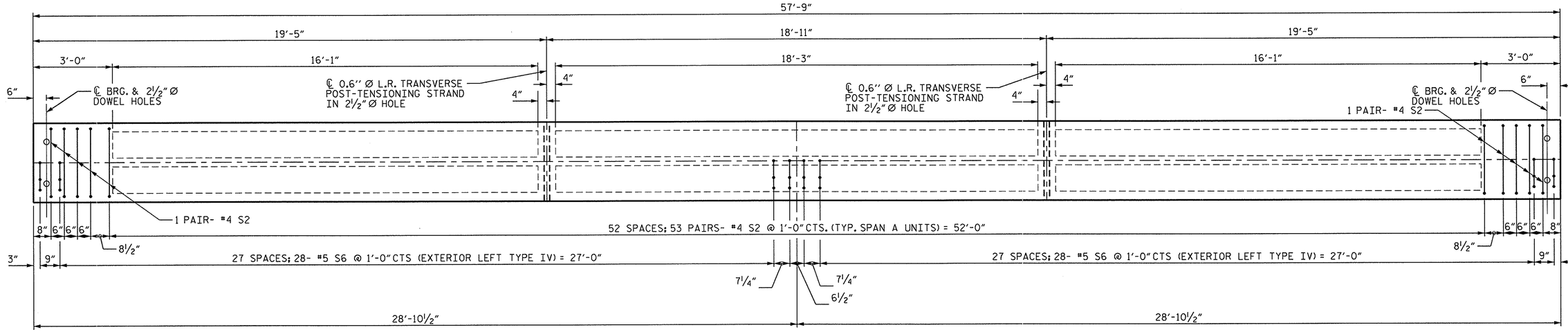


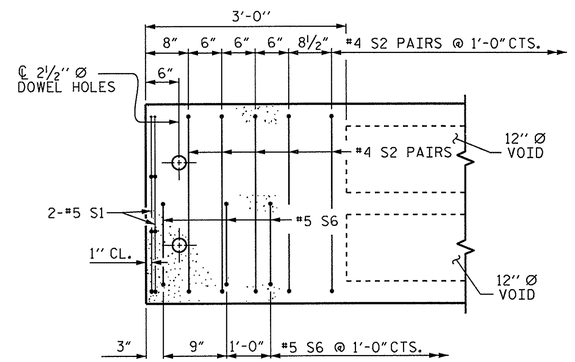
PLAN OF TYPE III CORED SLAB UNIT

FOR LOCATION OF S1 BARS AT ENDS OF SLAB, SEE "PART PLAN - EXTERIOR SECTIONS"



PLAN OF TYPE IV CORED SLAB UNIT

FOR LOCATION OF S1 BARS AT ENDS OF SLAB, SEE "PART PLAN - EXTERIOR SECTIONS"



TYPE IV EXTERIOR SECTION

TYPE III SIMILAR EXCEPT OMIT S6 BARS

PART PLAN - EXTERIOR SECTIONS

PROJECT NO. BD-5101N

PASQUOTANK COUNTY

STATION: 14+96.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PLAN OF SPAN
SPAN A
DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 14045 ENGINEER TIMOTHY L. COGGINS
04/30/2014

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

DRAWN BY : N. Ruffin DATE : 4/11/14
CHECKED BY : T. L. COGGINS DATE : 4/22/14
DESIGN ENGINEER OF RECORD: N. RUFFIN DATE : 4/30/14

30-APR-2014 14:42
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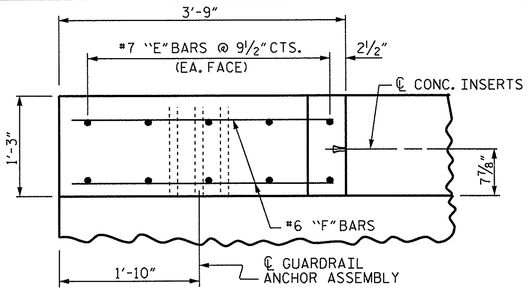
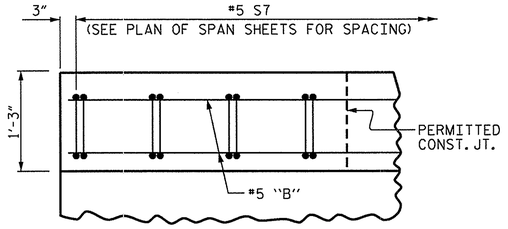
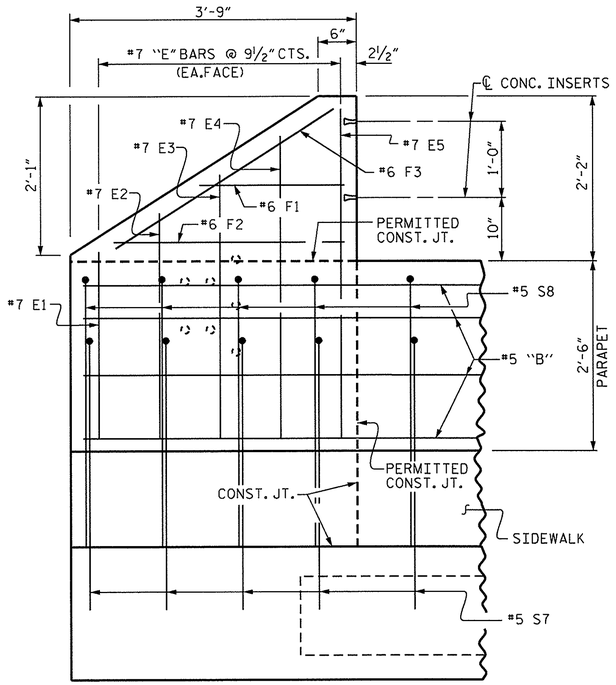
nruffin



PLAN OF END POST

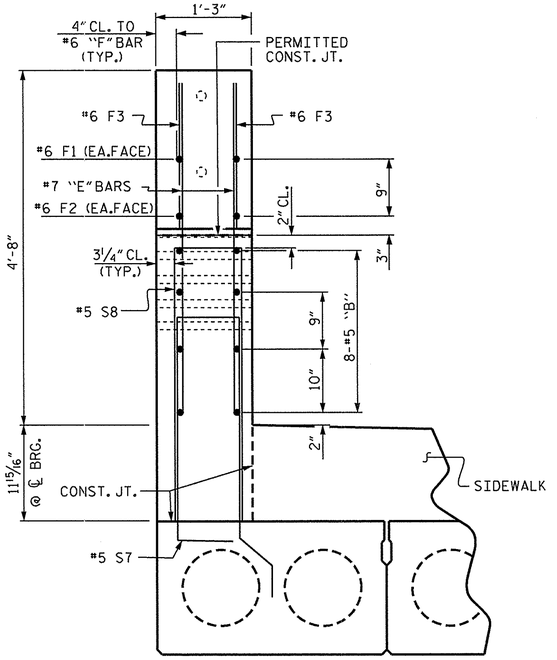


PLAN OF PARAPET



ELEVATION

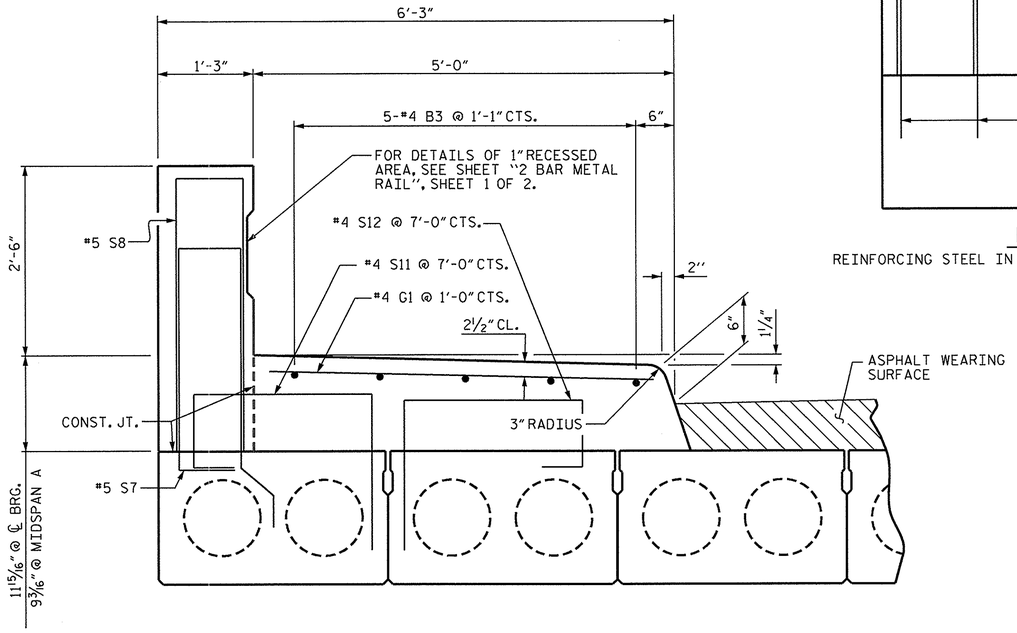
REINFORCING STEEL IN SIDEWALK NOT SHOWN FOR CLARITY



END VIEW

REINFORCING STEEL IN SIDEWALK NOT SHOWN FOR CLARITY

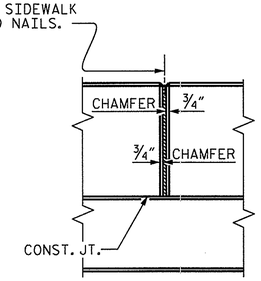
THE #5S8 MAY BE SHIFTED AS NECESSARY TO PROVIDE CLEARANCE TO THE 1¼" Ø HOLES.



SECTION THROUGH SIDEWALK

#5 "B" BARS IN PARAPET NOT SHOWN FOR CLARITY
SEE PLAN OF SPAN SHEETS FOR LOCATION OF STEEL IN SIDEWALK

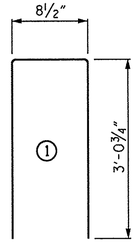
℄ ½" EXP. JT. MAT'L. IN PARAPET & SIDEWALK HELD IN PLACE WITH GALVANIZED NAILS.



ELEVATION AT EXPANSION JOINTS

PARAPET DETAILS

BAR TYPE



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

PARAPET AND END POSTS

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱B2	16	#5	STR.	28'-6"	476
✱E1	4	#7	STR.	2'-5"	20
✱E2	4	#7	STR.	2'-11"	24
✱E3	4	#7	STR.	3'-5"	28
✱E4	4	#7	STR.	3'-11"	32
✱E5	4	#7	STR.	4'-4"	35
✱F1	4	#6	STR.	1'-10"	11
✱F2	4	#6	STR.	3'-0"	18
✱F3	4	#6	STR.	3'-4"	20
✱S8	60	#5	1	6'-10"	428

✱EPOXY COATED REINFORCING STEEL	1,092 LBS.
CLASS AA CONCRETE (PARAPET & END POSTS)	9.5 CU. YDS.
1'-3" X 2'-6" CONCRETE PARAPET	57.75 LIN. FT

SIDEWALK

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱B2	10	#4	STR.	29'-8"	198
✱G1	58	#4	STR.	4'-7"	178

✱EPOXY COATED REINFORCING STEEL (SIDEWALK)	376 LBS.
CLASS AA CONCRETE (SIDEWALK)	8.8 CU. YDS.

PARAPET AND END POST FOR TWO BAR RAIL

PROJECT NO. BD-5101N

PASQUOTANK COUNTY

STATION: 14+96.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CONCRETE PARAPET, END POST, & SIDEWALK DETAILS LEFT SIDE

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

NORTH CAROLINA PROFESSIONAL SEAL 14045 ENGINEER TIMOTHY L. COGGINS
04/30/2014

DRAWN BY : N Ruffin DATE : 4/11/14
CHECKED BY : T.L. COGGINS DATE : 4/23/14
DESIGN ENGINEER OF RECORD: N.M. RUFFIN DATE : 4/30/14

30-APR-2014 14:42
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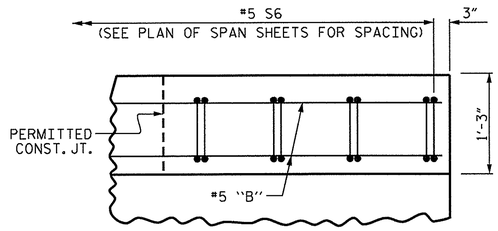
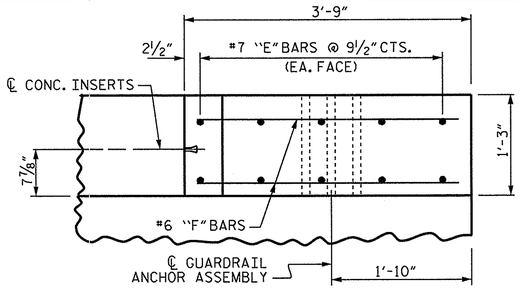
nruffin

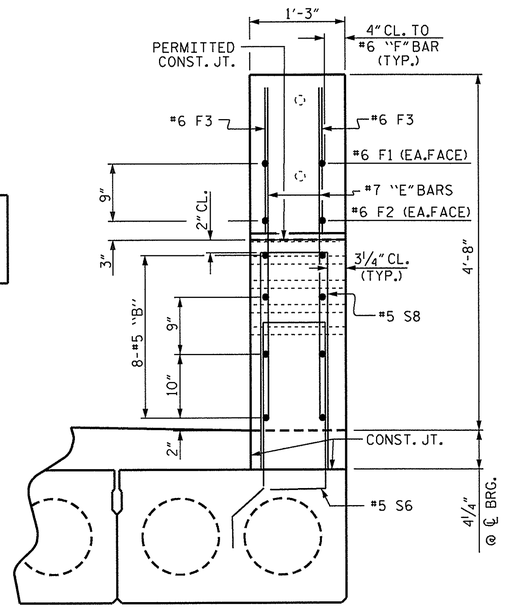


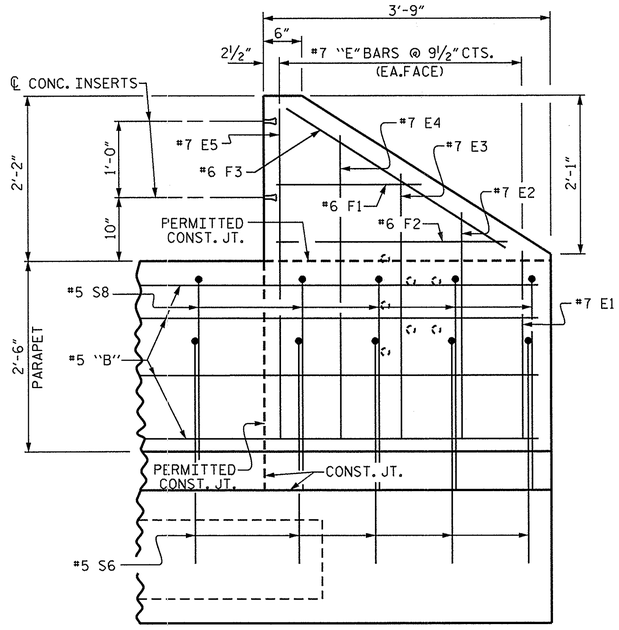


PLAN OF PARAPET

PLAN OF END POST

THE #5S8 MAY BE SHIFTED AS NECESSARY TO PROVIDE CLEARANCE TO THE 1¼" Ø HOLES.

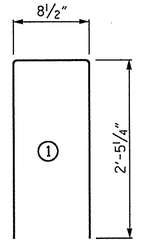




END VIEW

ELEVATION

BAR TYPE



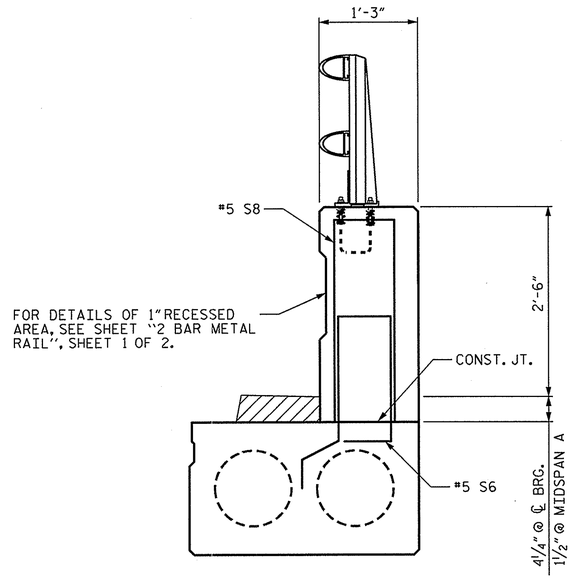
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

PARAPET AND END POSTS

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱B2	16	#5	STR.	28'-6"	476
✱E1	4	#7	STR.	2'-5"	20
✱E2	4	#7	STR.	2'-11"	24
✱E3	4	#7	STR.	3'-5"	28
✱E4	4	#7	STR.	3'-11"	32
✱E5	4	#7	STR.	4'-4"	35
✱F1	4	#6	STR.	1'-10"	11
✱F2	4	#6	STR.	3'-0"	18
✱F3	4	#6	STR.	3'-4"	20
✱S8	60	#5	1	5'-7"	349

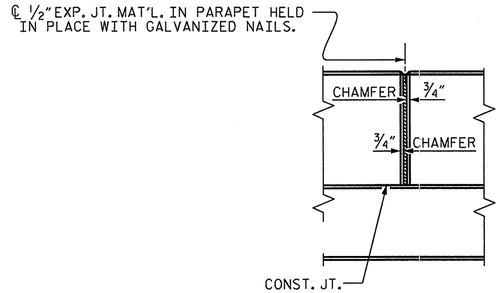
✱EPOXY COATED REINFORCING STEEL	1,013 LBS.
CLASS AA CONCRETE (PARAPET & END POSTS)	7.8 CU. YDS.
1'-3" X 2'-6" CONCRETE PARAPET	57.75 LIN. FT



SECTION THROUGH PARAPET

#5 "B" BARS IN PARAPET NOT SHOWN FOR CLARITY SEE "PARAPET AND END POST FOR TWO BAR RAIL".

PARAPET AND END POST FOR TWO BAR RAIL



ELEVATION AT EXPANSION JOINTS

PARAPET DETAILS

PROJECT NO. BD-5101N

PASQUOTANK COUNTY

STATION: 14+96.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CONCRETE PARAPET & END POST DETAILS RIGHT SIDE

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

NORTH CAROLINA PROFESSIONAL SEAL 14045 ENGINEER TIMOTHY L. COGGINS
04/30/2014

DRAWN BY : N. Ruffin DATE : 4/11/14
CHECKED BY : T.L. COGGINS DATE : 4/24/14
DESIGN ENGINEER OF RECORD: N.M. RUFFIN DATE : 4/30/14

30-APR-2014 14:42
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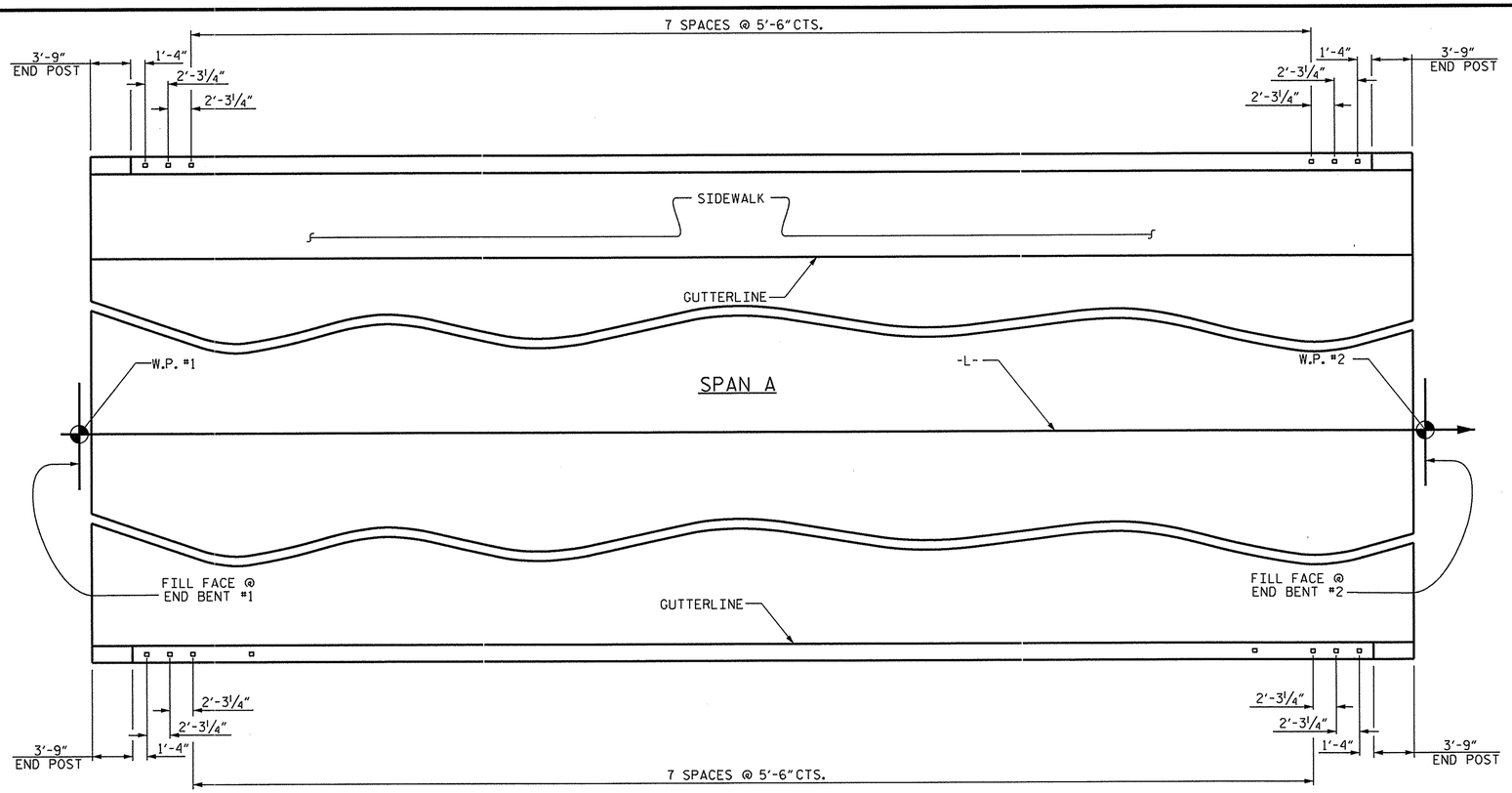
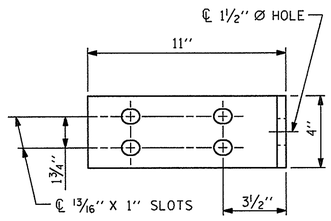
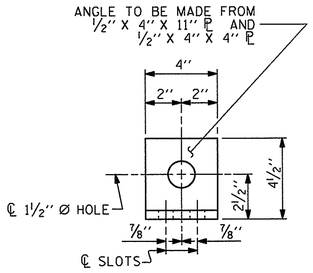


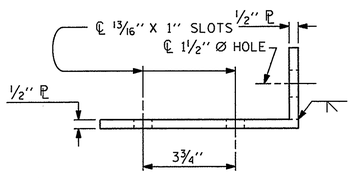
PLAN OF RAIL POST SPACINGS



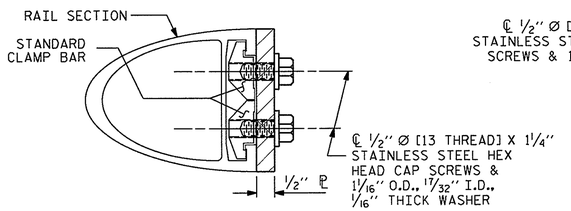
ELEVATION



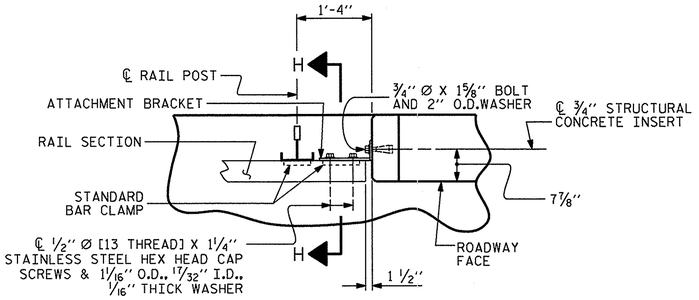
END VIEW



TOP VIEW



SECTION H-H



PLAN - RAIL AND END POST

NOTES

STRUCTURAL CONCRETE INSERT

THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1½".

B. 1 - ¾" Ø X 1⅝" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE ¾" Ø X 1⅝" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

C. WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

NOTES

METAL RAIL TO END POST CONNECTION

THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:

A. ½" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.

B. ¾" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A ¾"Ø X 1⅝" BOLT WITH 2" O.D. WASHER IN PLACE. THE ¾"Ø X 1⅝" BOLT SHALL HAVE N. C. THREADS.

C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F.

D. STANDARD CLAMP BARS (SEE METAL RAIL SHEET).

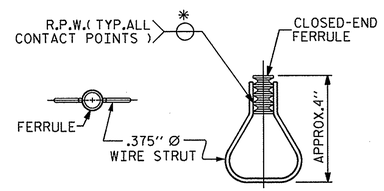
E. ½" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 2 BAR METAL RAILS.

THE ¾" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE ¾" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE ½" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE ¾" Ø X 1⅝" BOLT WITH WASHER SHALL BE REPLACED WITH A ¾"Ø X 6½" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE ¾" Ø X 1⅝" BOLT SHALL APPLY TO THE ¾"Ø X 6 ½" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.



PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

*EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.

PROJECT NO. BD-5101N

PASQUOTANK COUNTY

STATION: 14+96.00 -L-

DETAILS FOR ATTACHING METAL RAIL TO END POST

ASSEMBLED BY : N. Ruffin		DATE : 4/11/14	
CHECKED BY : T.L. COGGINS		DATE : 4/24/14	
DRAWN BY : FCJ 1/88	REV. 5/7/03	RWW/JTE	
CHECKED BY : CRK 3/89	REV. 5/1/06	TLA/GM	
	REV. 10/1/11	MAA/GM	

NORTH CAROLINA PROFESSIONAL SEAL 14045 ENGINEER TIMOTHY L. COGGINS
04/30/2014

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

RAIL POST SPACINGS AND END OF RAIL DETAILS
FOR TWO BAR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			

STD. NO. BMR2

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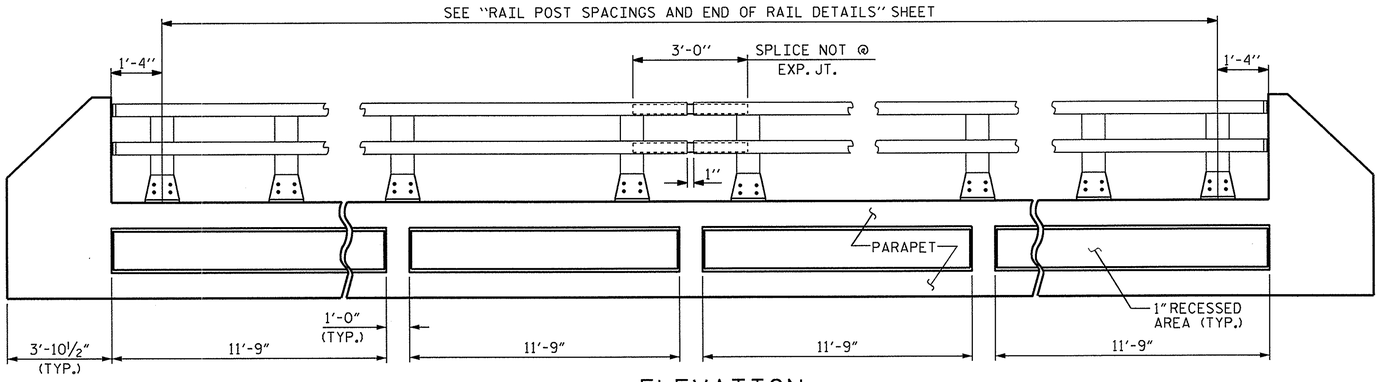
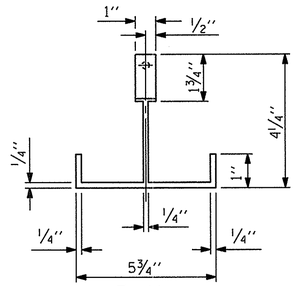
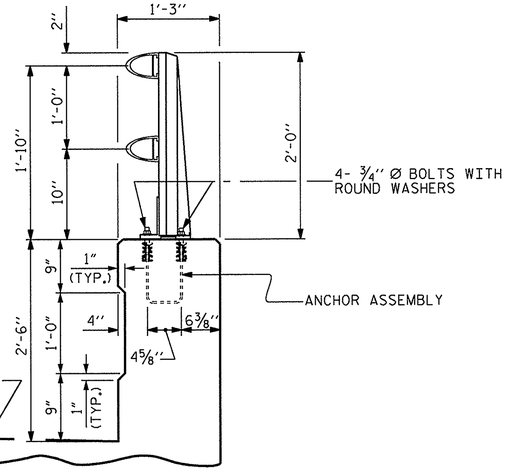


ELEVATION

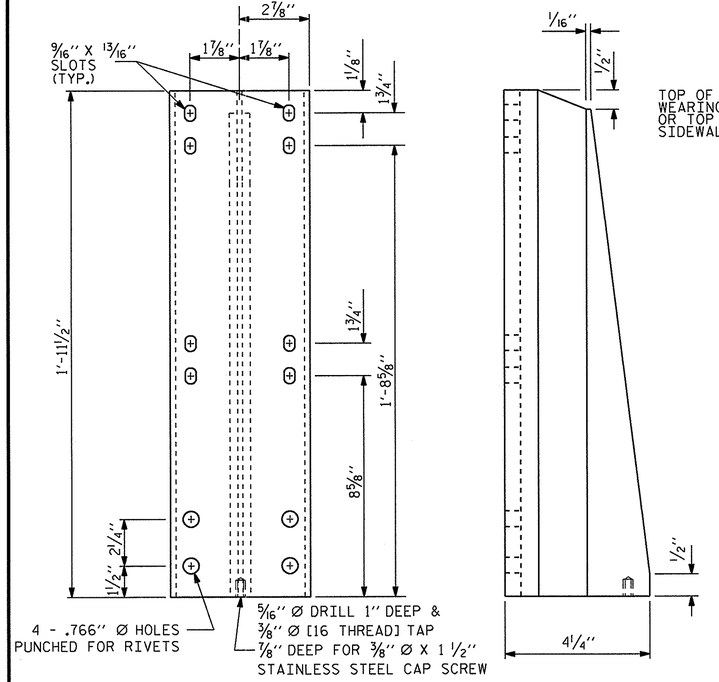
NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR2.



PLAN

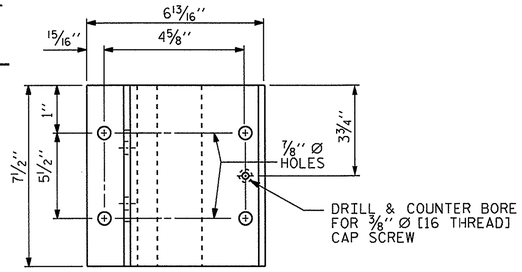


SECTION THRU PARAPET AND RAIL

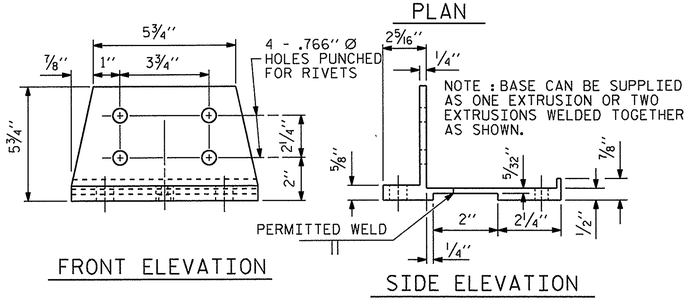


FRONT ELEVATION SIDE ELEVATION

DETAILS OF POST

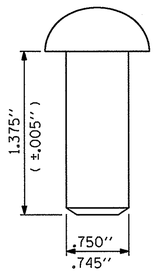


PLAN



FRONT ELEVATION SIDE ELEVATION

POST BASE DETAILS



RIVET DETAIL

NOTES

METAL RAIL SHALL BE ALUMINUM IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL NOTES AND THE FOLLOWING SPECIFICATIONS FOR THE MATERIALS.

UNLESS OTHERWISE REQUIRED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR HAS THE OPTION TO USE AN ALTERNATE TO THE 2 BAR METAL RAIL. THE ALTERNATE RAIL SHALL MEET THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS AND MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST (APL) UNDER "2 BAR METAL RAIL ALTERNATE". ADJUSTMENTS TO THE CONCRETE PARAPET WILL NOT BE ALLOWED.

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B-221 ALLOY 6061-T6.

MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

THE BASE OF RAIL POSTS, OR ANY OTHER ALUMINUM SURFACE IN CONTACT WITH CONCRETE SHALL BE THOROUGHLY COATED WITH AN ALUMINUM IMPREGNATED CAULKING COMPOUND OF APPROVED QUALITY.

MATERIAL FOR SHIMS TO BE ASTM B209 ALLOY 6061-T6.

GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR2.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

CERTIFIED MILL REPORTS ARE REQUIRED FOR RAILS AND POSTS. SHOP INSPECTION IS NOT REQUIRED.

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

METHOD OF MEASUREMENT FOR METAL RAILS: FOR LENGTH OF METAL RAILS TO BE PAID FOR, SEE THE STANDARD SPECIFICATIONS.

CURVED RAIL USAGE: WHERE RAILS ARE TO BE USED ON BRIDGES ON HORIZONTAL AND/OR VERTICAL CURVATURE THE CONTRACTOR MAY, AT HIS OPTION, HAVE THE REQUIRED CURVATURE IN THE RAIL FORMED IN THE SHOP OR IN THE FIELD. IN EITHER EVENT, THE RAIL SHALL CONFORM WITHOUT BUCKLING OR KINKING TO THE REQUIRED CURVATURE IN A UNIFORM MANNER ACCEPTABLE TO THE ENGINEER.

TO INSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST, BUT REMAINS VISIBLE AFTER RAIL PLACEMENT.

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

ALLOY 6351-T5 MAY BE SUBSTITUTED FOR ALLOY 6061-T6 WHERE APPLICABLE.

MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF PARAPET SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

PAY LENGTH = 100.50 LIN. FT.

PROJECT NO. BD-5101N

PASQUOTANK COUNTY

STATION: 14+96.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

ASSEMBLED BY : N. Raffin	DATE : 4/11/14					
CHECKED BY : T.L. COGGINS	DATE : 4/24/14					
DRAWN BY : EEM 6/94	REV. 5/1/06	TLA/GM				
CHECKED BY : RGW 6/94	REV. 10/1/11	MAA/GM				
	REV. 6/13	MAA/GM				

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

STD. NO. BMR3

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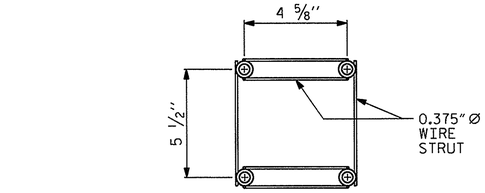
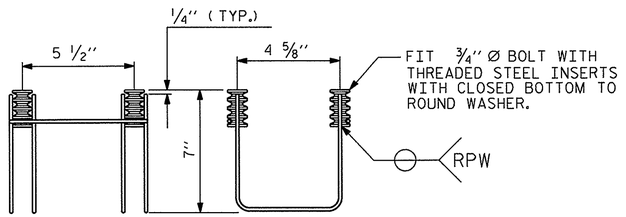


PLAN



SIDE VIEW ELEVATION

4-BOLT METAL RAIL ANCHOR ASSEMBLY

(24 ASSEMBLIES REQUIRED)

NOTES

STRUCTURAL CONCRETE ANCHOR ASSEMBLY

THE STRUCTURAL CONCRETE ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS :

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2'' FOR 3/4'' FERRULES.

B. 4 - 3/4'' Ø X 2 1/2'' 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 3/4'' Ø X 2 1/2'' 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.

C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16'' Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

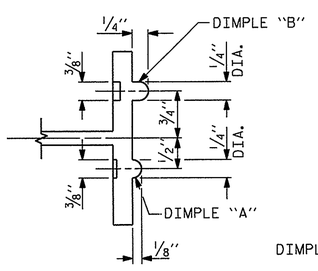
D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.

E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.

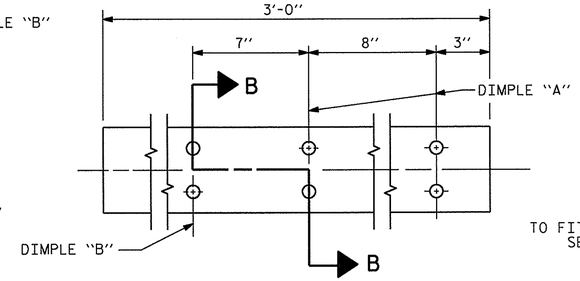
F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4"Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

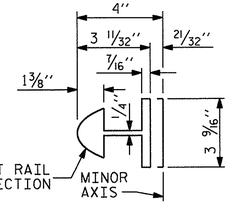
WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.



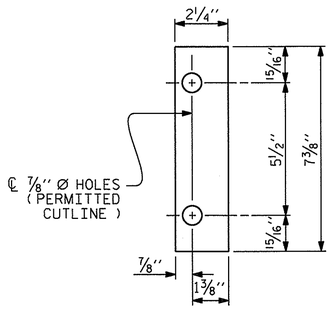
SECTION B - B



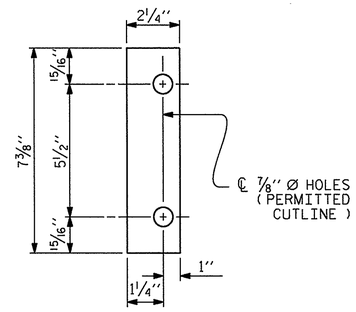
EXPANSION BAR DETAILS



BAR SECTION



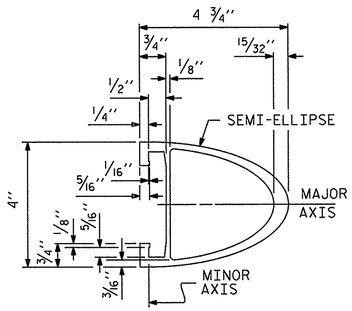
FRONT PLATE



REAR PLATE

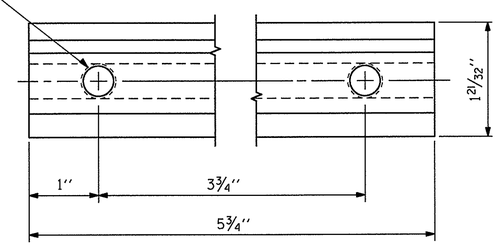
SHIM DETAILS

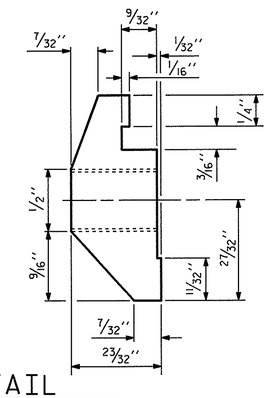
NOTE :
SHIMS MAY BE CUT ALONG PERMIITED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.



RAIL SECTION

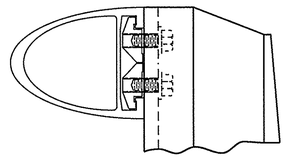
1/2'' Ø [13 THREAD] HOLE FOR 1/2'' Ø X 1'' STAINLESS STEEL HEX HEAD CAP SCREW & 1 1/16'' O.D., 17/32'' I.D., 1/16'' THICK WASHER (TYP.)



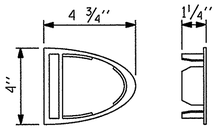


CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP

PROJECT NO. BD-5101N

PASQUOTANK COUNTY

STATION: 14+96.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			

ASSEMBLED BY : N. Ruffin	DATE : 4/11/14	
CHECKED BY : T.L. COGGINS	DATE : 4/24/14	
DRAWN BY : EEM 6/94	REV. 8/16/99	MAB/LES
CHECKED BY : RGW 6/94	REV. 5/1/06R	KMM/GM
	REV. 10/1/11	MAA/GM

NORTH CAROLINA PROFESSIONAL SEAL 14045 ENGINEER TIMOTHY W. COGGINS
10/30/2014

30-APR-2014 14:42
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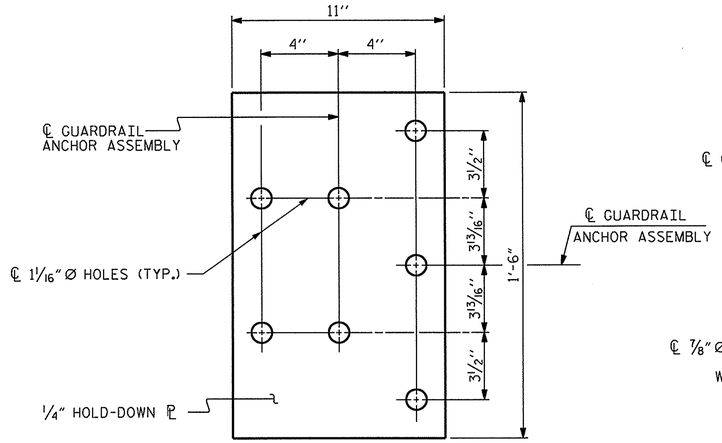
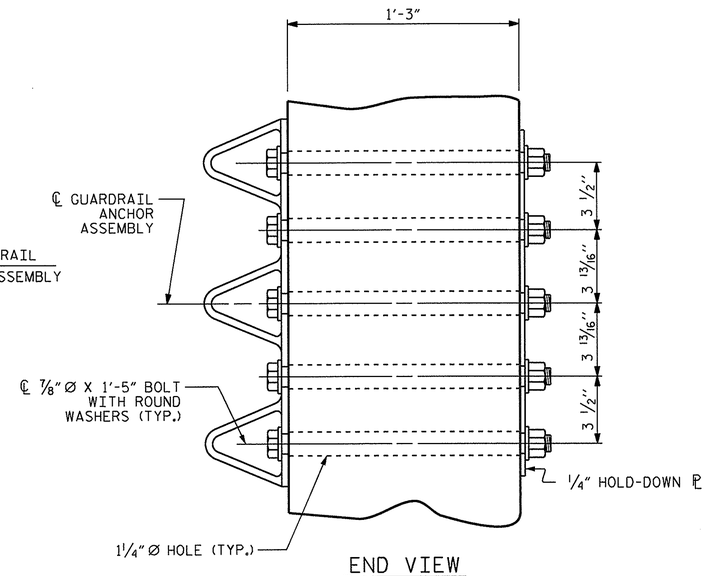
STD. NO. BMR4



PLAN



END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

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.

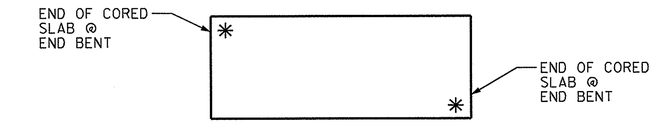
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

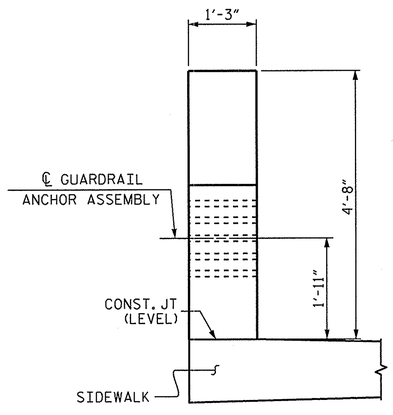
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

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.

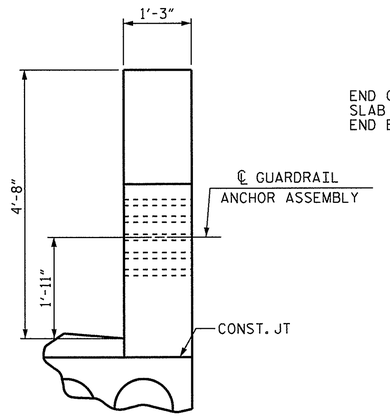


SKETCH SHOWING POINTS OF ATTACHMENT

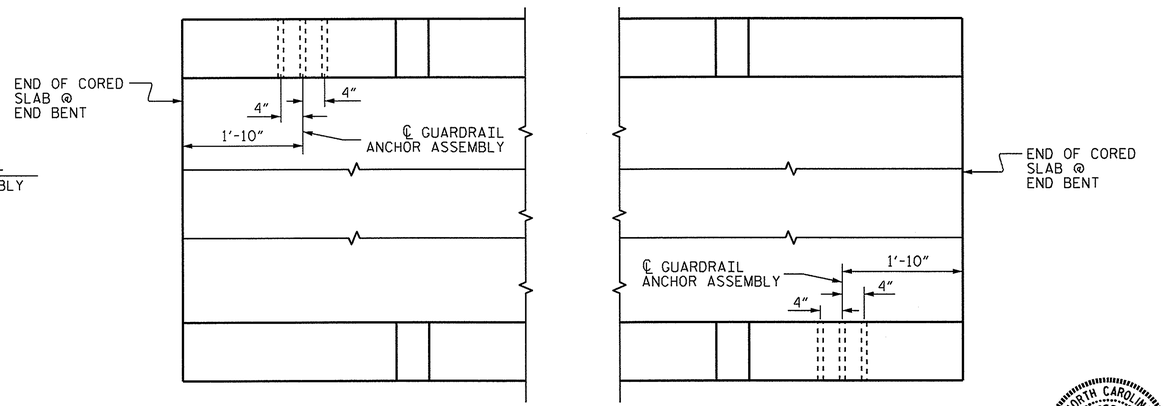
*LOCATION OF GUARDRAIL ATTACHMENT



END VIEW
(TWO BAR METAL RAIL)
LEFTSIDE



END VIEW
(TWO BAR METAL RAIL)
RIGHTSIDE



PLAN

LOCATION OF GUARDRAIL ANCHOR AT END POST

ASSEMBLED BY : N. Ruffin	DATE : 4/14/14	REV. 10/1/11	MAA/GM
CHECKED BY : T.L. COGGINS	DATE : 4/23/14	REV. 12/5/11	MAA/GM
DRAWN BY : MAA 5/10		REV. 6/13	MAA/GM
CHECKED BY : GM 5/10			

NORTH CAROLINA PROFESSIONAL SEAL 14045 ENGINEER TIMOTHY L. COGGINS
04/30/2014

PROJECT NO. BD-5101N
PASQUOTANK COUNTY
STATION: 14+96.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS

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

(SHT 4) STD. NO. GRA3

30-APR-2014 14:42
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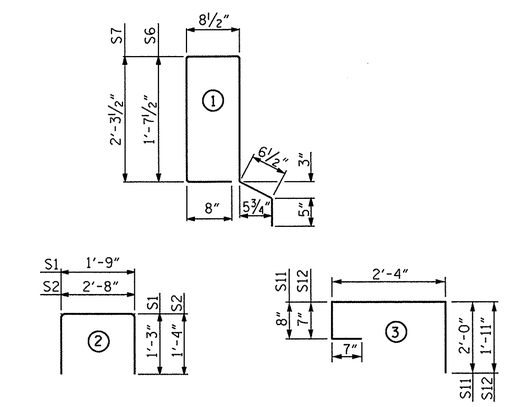
BILL OF MATERIAL FOR ONE CORED SLAB SECTION

SPAN A

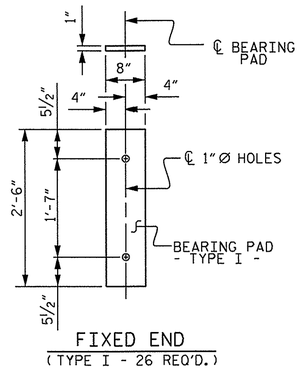
BAR	NUMBER	SIZE	TYPE	TYPE I LENGTH	TYPE I WEIGHT	TYPE II LENGTH	TYPE II WEIGHT	TYPE III LENGTH	TYPE III WEIGHT	TYPE IV LENGTH	TYPE IV WEIGHT
B1	4	#4	STR	29'-7"	79	29'-7"	79	29'-7"	79	29'-7"	79
S1	8	#5	2	4'-3"	35	4'-3"	35	4'-3"	35	4'-3"	35
S2	122	#4	2	5'-4"	435	5'-4"	435	5'-4"	435	5'-4"	435
✱S6	60	#5	1	———	———	———	———	———	———	5'-7"	349
✱S7	60	#5	1	6'-11"	433	———	———	———	———	———	———
✱S11	10	#4	3	5'-7"	37	———	———	———	———	———	———
✱S12	10	#4	3	———	———	5'-5"	36	———	———	———	———
REINFORCING STEEL					LBS. 549		LBS. 549		LBS. 549		LBS. 549
✱EPOXY COATED REINFORCING STEEL					LBS. 470		LBS. 36		———		349
7500 P.S.I. CONCRETE					8.2 CU. YDS.		8.2 CU. YDS.		8.2 CU. YDS.		8.2 CU. YDS.
0.6"Ø L.R. STRANDS No.				24		24		24		24	

GRADE 270 STRANDS	0.6"Ø L.R.
AREA (SQUARE INCHES)	0.217
ULTIMATE STRENGTH (LBS. PER STRAND)	58,600
APPLIED PRESTRESS (LBS. PER STRAND)	43,950

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.



FIXED END
(TYPE I - 26 REQ'D.)

ELASTOMERIC BEARING DETAIL

ELASTOMER IN BEARINGS SHALL BE 50 DUROMETER HARDNESS.

DEAD LOAD DEFLECTION AND CAMBER		
3'-0" x 1'-9" 0.6"Ø L.R. STRAND		
	SPAN A	
CAMBER (SLAB ALONE IN PLACE) ↑	3⅜"	
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD✱✱ ↓	⅝"	
FINAL CAMBER ↑	2¾"	

✱✱ INCLUDES FUTURE WEARING SURFACE

CORED SLABS REQUIRED		NUMBER	LENGTH	TOTAL LENGTH
SPAN A	TYPE I	1	57'-9"	57'-9"
	TYPE II	1	57'-9"	57'-9"
	TYPE III	10	57'-9"	577'-6"
	TYPE IV	1	57'-9"	57'-9"
TOTAL	———	13	———	750'-9"

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 2½"Ø DOWEL HOLES AT FIXED ENDS OF SLAB SECTIONS SHALL BE FILLED WITH 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.

PLACEMENT OF THE ASPHALT WEARING SURFACE SHALL OCCUR AFTER CASTING THE CONCRETE PARAPET AND SIDEWALK.

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 5300 PSI.

ALL REINFORCING STEEL IN THE CONCRETE PARAPET AND SIDEWALK 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, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE CONCRETE PARAPET AND SIDEWALK IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE CENTERED BETWEEN EACH RECESSED AREA. EXPANSION JOINTS ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF 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.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

QUANTITIES FOR SIDEWALK ITEMS SHALL BE INCLUDED IN CLASS AA CONCRETE AND EPOXY COATED REINFORCING STEEL TOTALS.

THE #4 S2 STIRRUPS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO THE GROUTED RECESS.

PRESTRESSED CONCRETE CORED SLAB UNITS ARE DESIGNED FOR 0 PSI TENSION IN THE PRECOMPRESSED TENSILE ZONE UNDER ALL LOADING CONDITIONS.

PRESTRESSED CONCRETE CORED SLAB UNITS SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PROJECT NO. BD-5101N

PASQUOTANK COUNTY

STATION: 14+96.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

3'-0 X 1'-9" PRESTRESSED CONCRETE CORED SLAB UNT

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

NORTH CAROLINA PROFESSIONAL SEAL 14045 ENGINEER TIMOTHY L. COGGINS
04/30/2014

DRAWN BY : N Ruffin DATE : 4/8/14
CHECKED BY : T.L. COGGINS DATE : 4/25/14
DESIGN ENGINEER OF RECORD: N. RUFFIN DATE : 4/30/14

30-APR-2014 14:42
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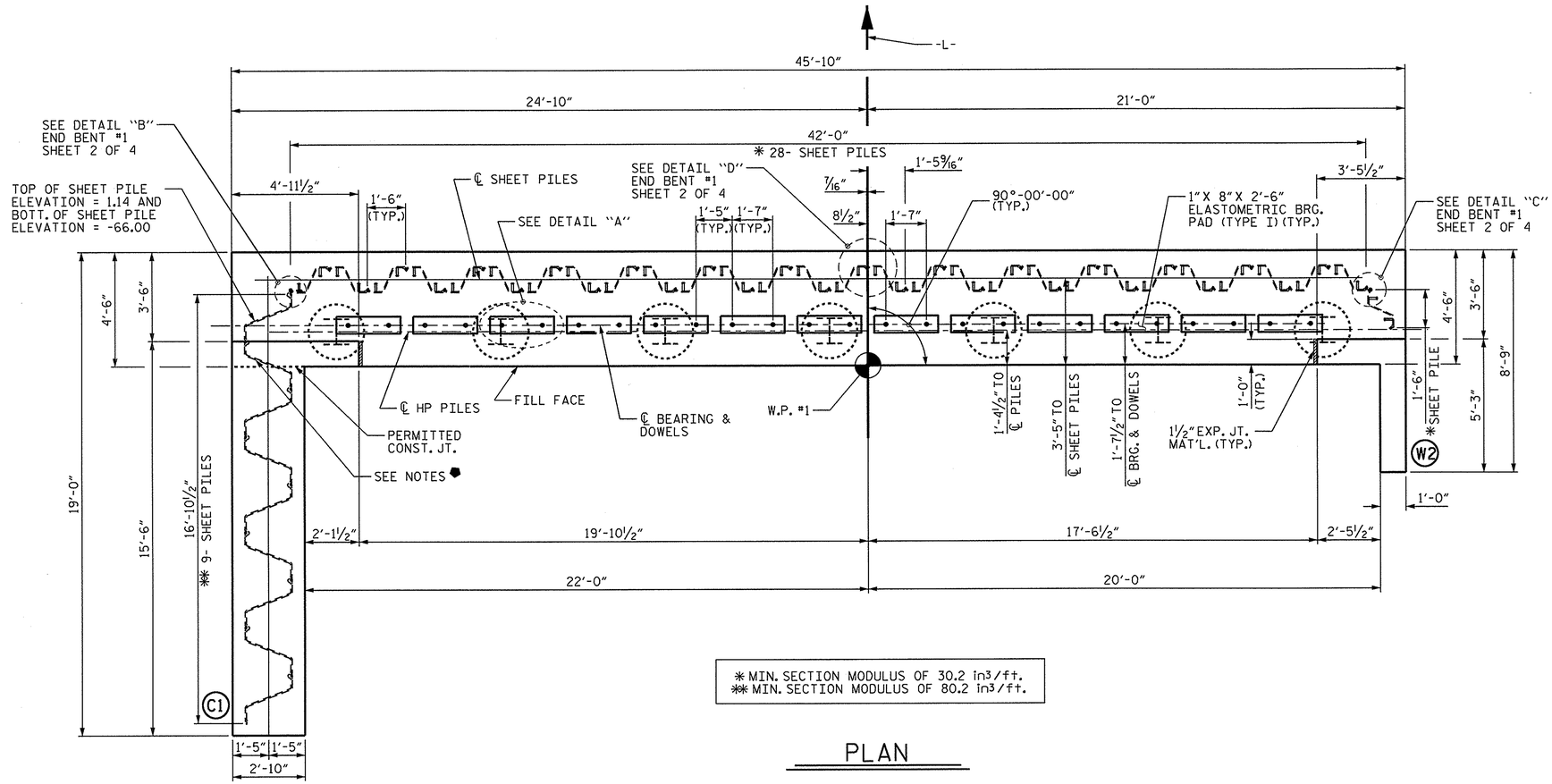
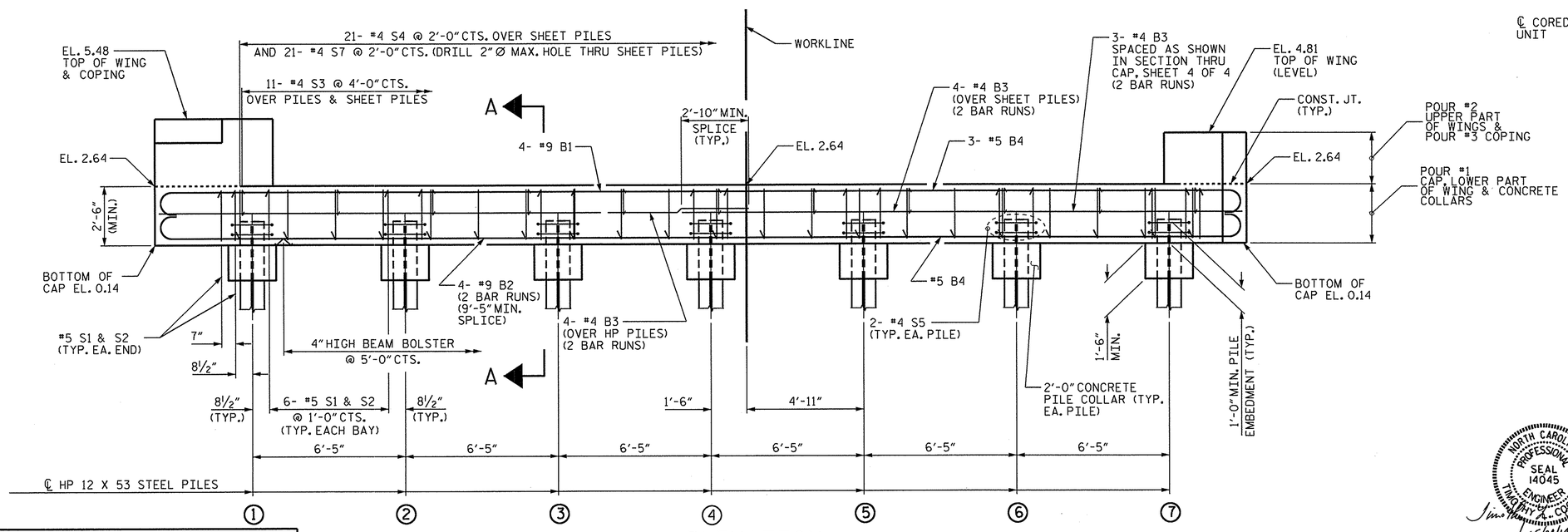


* MIN. SECTION MODULUS OF 30.2 in³/ft.
** MIN. SECTION MODULUS OF 80.2 in³/ft.

PLAN



ELEVATION

SHEET PILING NOT SHOWN FOR CLARITY.

--- NOTES ---

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

FOR PILE SPLICE DETAILS, SEE END BENT #1 SHEET 4 OF 4.

INSTALL THE 4"DIA. DRAIN PIPE THROUGH THE WING WALL AND SHEET PILING AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

FOR ANCHOR STUD DETAILS AND LOCATION, SEE END BENT #1 SHEET 2 OF 4.

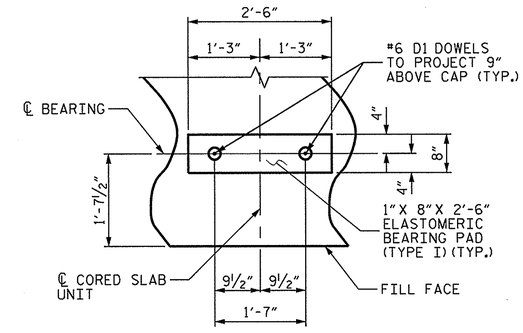
FOR STEEL SHEET PILES, SEE SPECIAL PROVISIONS.

FOR ELEVATION VIEW OF SHEET PILING, SEE END BENT #1 SHEET 2 OF 4.

THE CONCRETE IN THE END BENT CAP OF END BENT NO. 1 SHALL CONTAIN SILICA FUME. SILICA FUME SHALL BE SUBSTITUTED FOR 5% OF THE PORTLAND CEMENT BY WEIGHT. IF THE OPTION OF ARTICLE 1024-1 OF THE STANDARD SPECIFICATIONS TO PARTIALLY SUBSTITUTE CLASS F FLY ASH FOR PORTLAND CEMENT IS EXERCISED, THEN THE RATE OF FLY ASH SUBSTITUTION SHALL BE REDUCED TO 1.0 LB OF FLY ASH PER 1.0 LB. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

STEEL SHEET PILES SHALL BE METALLIZED. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

● FOR THE SECOND SHEET PILE
TOP OF SHEET PILE ELEVATION = 4.98
BOTTOM OF SHEET PILE ELEVATION = -66.00
TRIM BACK TO 6"FROM THE FILL FACE AND DOWN TO THE PREVIOUS SHEET PILE ELEVATION OF 1.14



DETAIL "A"

PROJECT NO. BD-5101N
PASQUOTANK COUNTY
STATION: 14+96.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT #1

NORTH CAROLINA PROFESSIONAL SEAL 14045 ENGINEER TIMOTHY L. COGGINS
05/20/14

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

DRAWN BY : N. Ruffin DATE : 2/12/14
CHECKED BY : T. L. COGGINS DATE : 4/02/14
DESIGN ENGINEER OF RECORD: N. RUFFIN DATE : 4/30/14

28-MAY-2014 08:31
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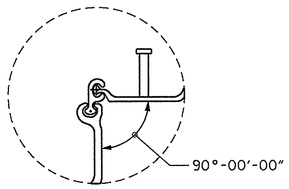
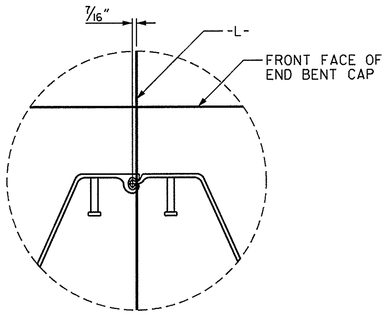
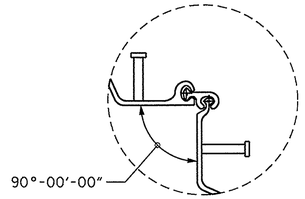


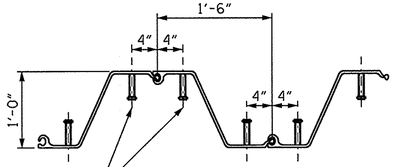
DETAIL "B"



DETAIL "D"

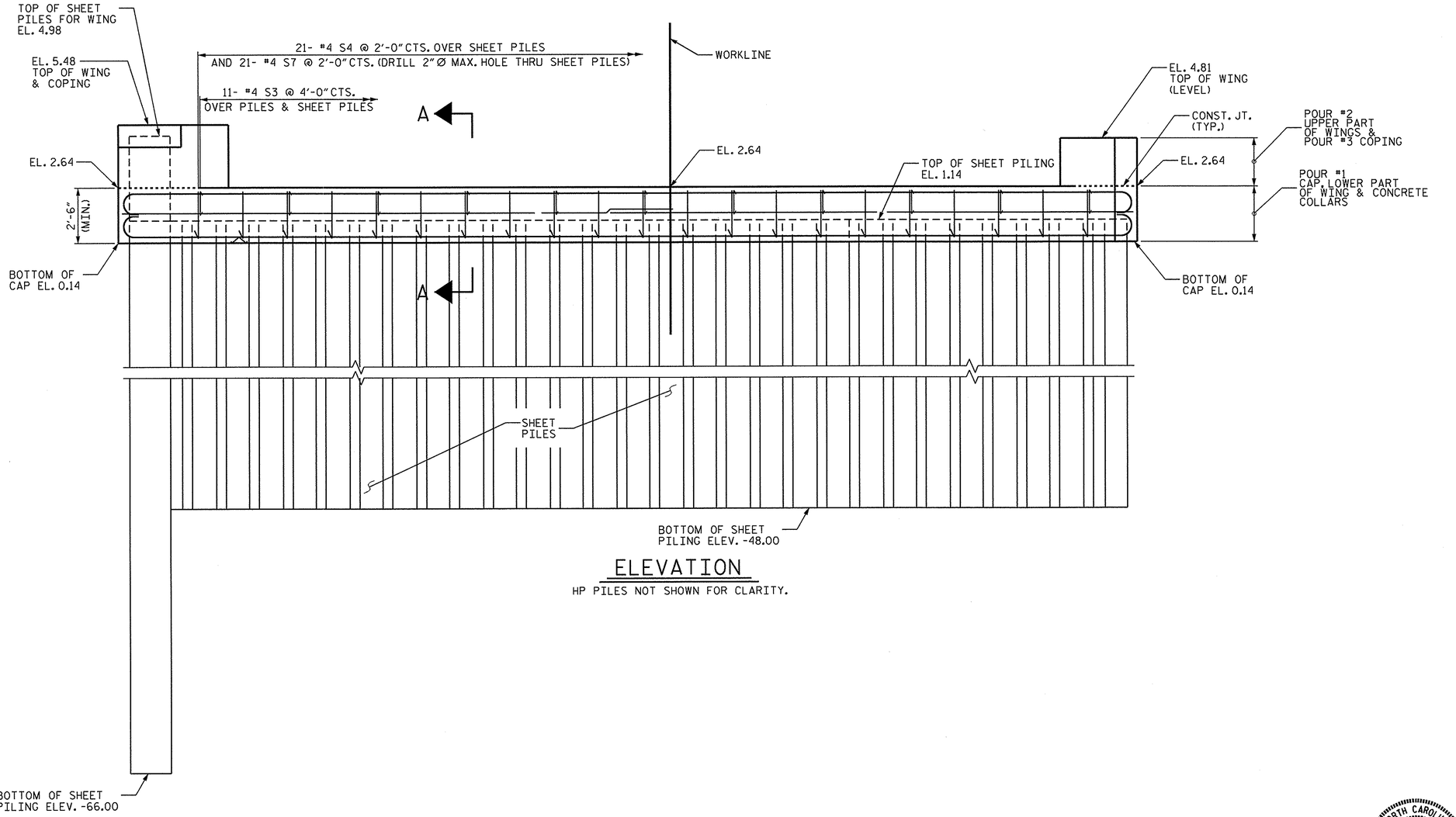


DETAIL "C"



¾"Ø x 5" ANCHOR STUDS
WELDED TO SHEET PILES
(2 STUDS PER SHEET PILE
ONLY IN THE CAP)

ANCHOR STUD DETAILS



ELEVATION

HP PILES NOT SHOWN FOR CLARITY.

PROJECT NO. BD-5101N

PASQUOTANK COUNTY

STATION: 14+96.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT #1

NORTH CAROLINA PROFESSIONAL SEAL 14045 ENGINEER TIMOTHY L COGGINS
05/28/14

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

DRAWN BY : N. Ruffin DATE : 2/12/14
CHECKED BY : T. L. COGGINS DATE : 4/2/14
DESIGN ENGINEER OF RECORD: N. RUFFIN DATE : 4/30/14

28-MAY-2014 08:31
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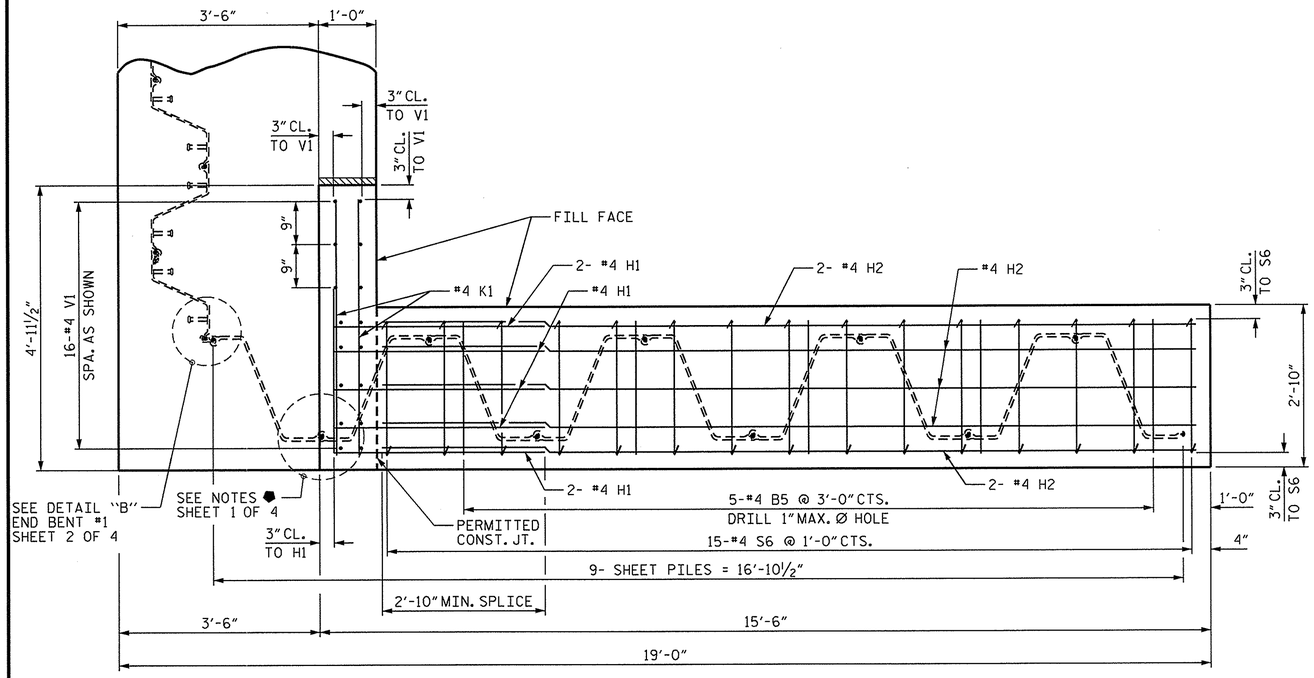
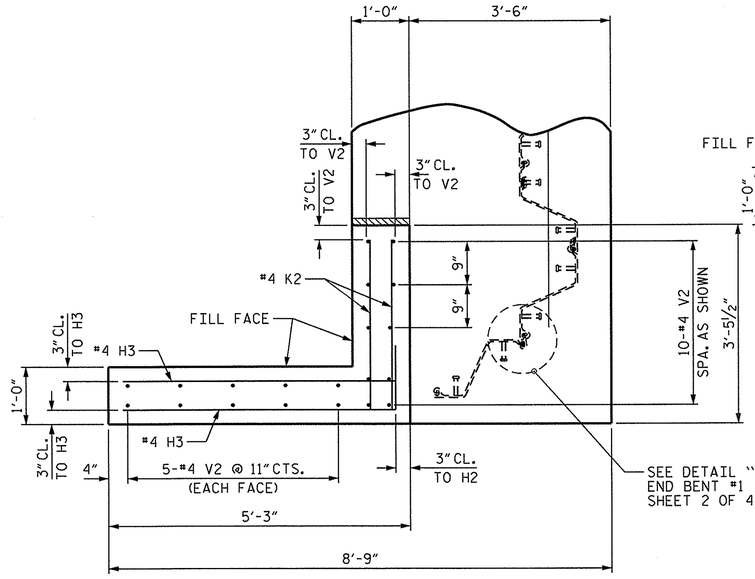
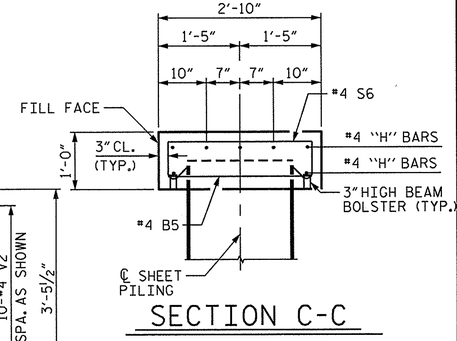
nruffin



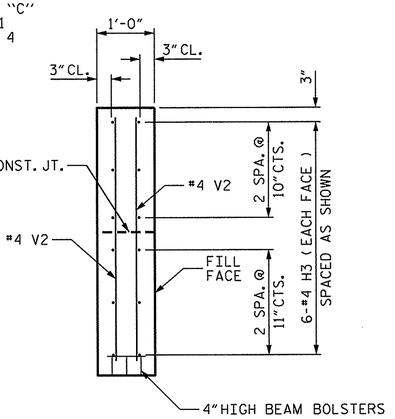
PLAN OF COPING C1



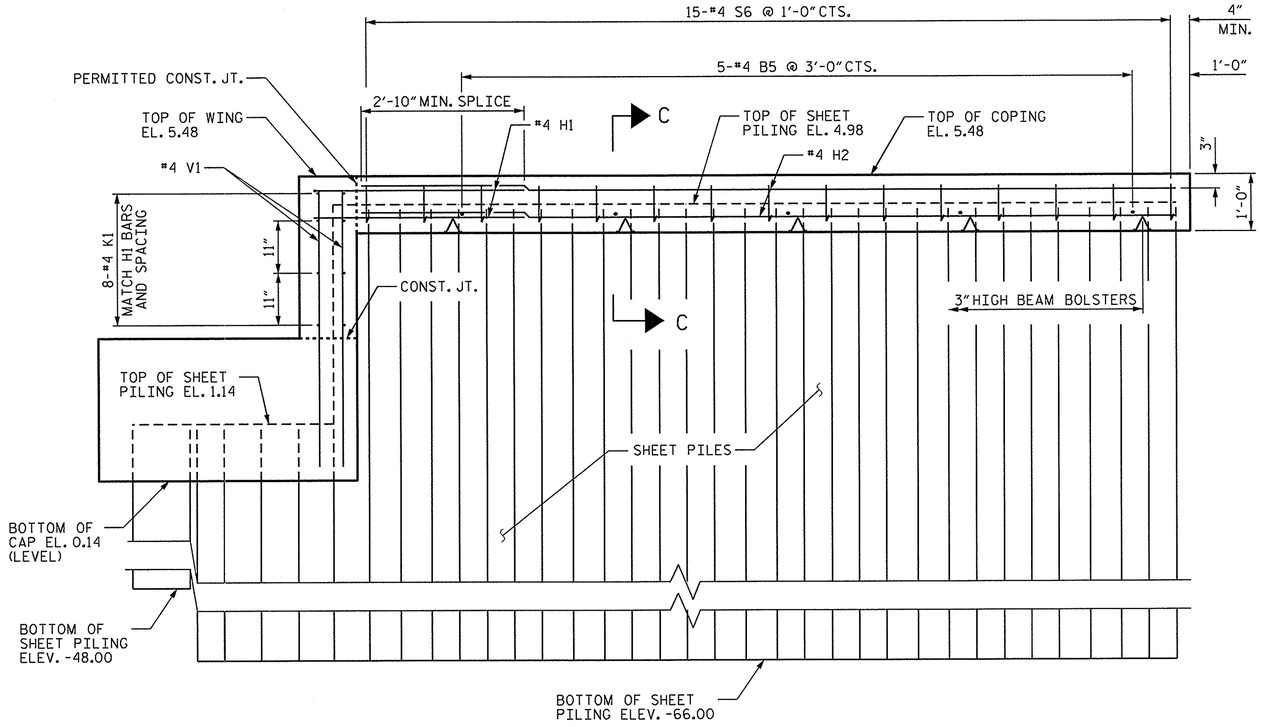
PLAN OF WING W2



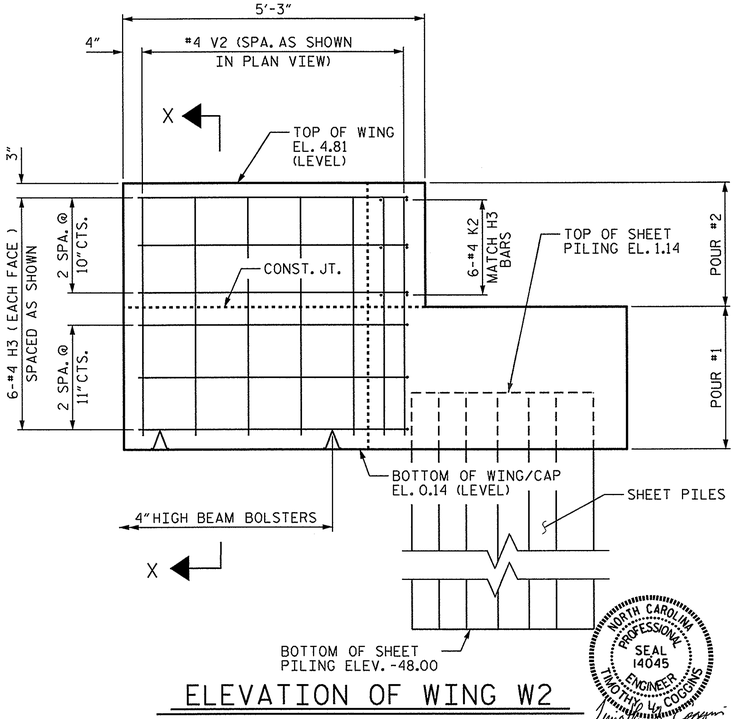
SECTION C-C



SECTION X-X



ELEVATION OF COPING C1



ELEVATION OF WING W2

NORTH CAROLINA PROFESSIONAL SEAL 14045 ENGINEER TIMOTHY LEE COGGINS 04/30/2014

PROJECT NO. BD-5101N

PASQUOTANK COUNTY

STATION: 14+96.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT #1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			

DRAWN BY : N. Ruffin DATE : 2/18/14
CHECKED BY : T.L. COGGINS DATE : 4/2/14
DESIGN ENGINEER OF RECORD: N. RUFFIN DATE : 4/30/14

30-APR-2014 14:42
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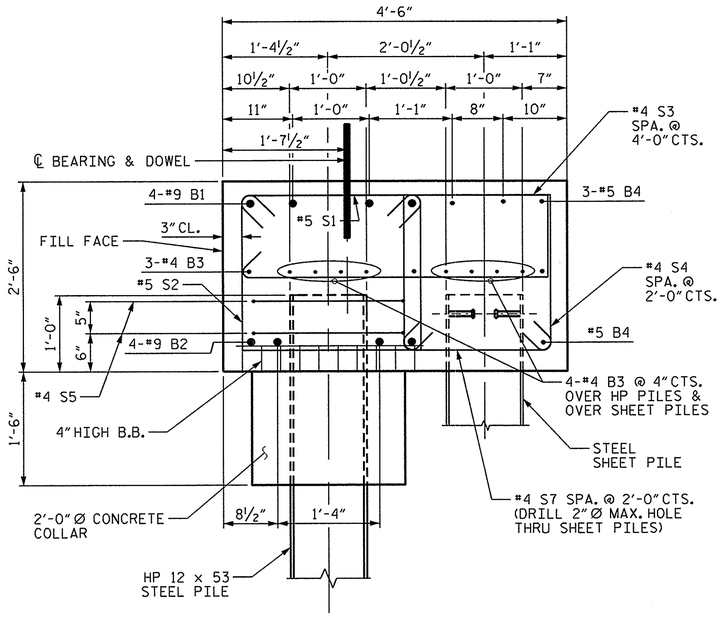
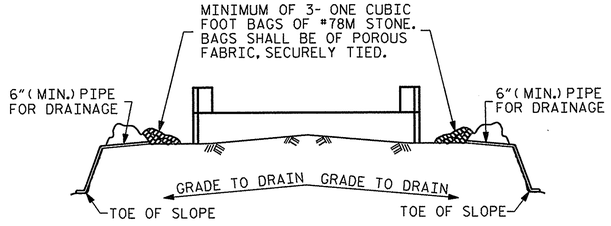
nruffin



SECTION A-A THRU CAP



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.

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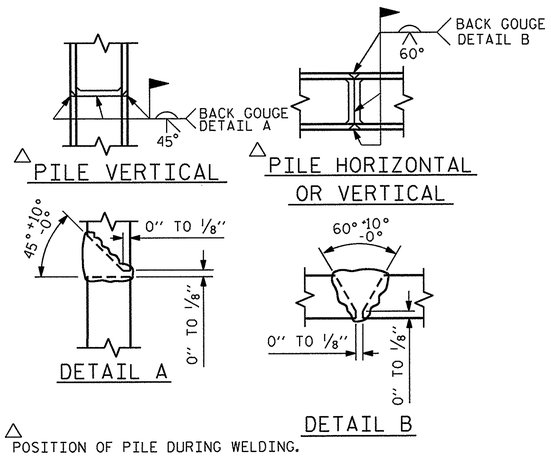
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

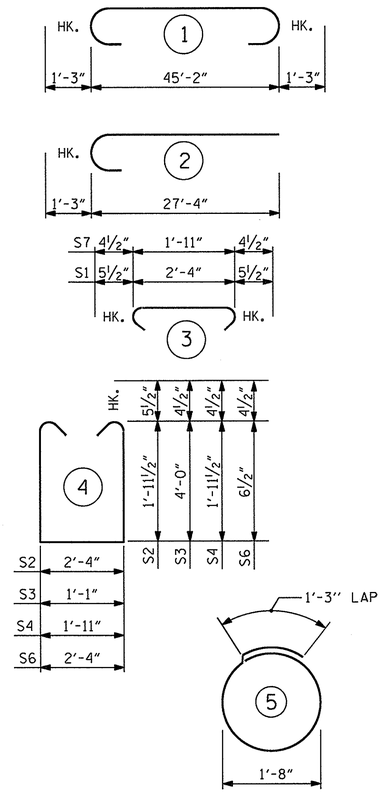
TEMPORARY DRAINAGE AT END BENT



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL
END BENT #1

BAR	NO	SIZE	TYPE	LENGTH	WEIGHT
*B1	4	9	1	47'-8"	648
*B2	8	9	2	28'-7"	777
*B3	22	4	STR	24'-1"	354
*B4	4	5	STR	45'-4"	189
*B5	5	4	STR	2'-4"	8
*D1	26	6	STR	1'-6"	59
*H1	7	4	6	4'-4"	20
*H2	7	4	STR	14'-2"	66
*H3	12	4	6	5'-5"	43
*K1	8	4	STR	4'-6"	24
*K2	6	4	STR	2'-11"	12
*S1	40	5	3	3'-3"	136
*S2	40	5	4	7'-2"	299
*S3	11	4	4	9'-10"	72
*S4	21	4	4	6'-7"	92
*S5	14	4	5	6'-6"	61
*S6	15	4	4	4'-2"	42
*S7	21	4	3	2'-8"	37
*V1	16	4	STR	4'-10"	52
*V2	20	4	STR	4'-2"	56

*EXPOY COATED REINFORCING STEEL LBS. 3,047

CLASS "AA" CONCRETE BREAKDOWN

POUR #1 CAP & LOWER PART OF WINGS & COLLARS	20.7 C.Y.
POUR #2 UPPER PART OF WINGS	1 C.Y.
POUR #3 COPING	1.5 C.Y.
TOTAL	23.2 C.Y.

HP 12 x 53 STEEL PILES
No. = 7 LIN. FEET. 665

PILE REDRIVES EA. 1

STEEL SHEET PILES

NO. 90 = 2
NO. PILES = 38

TOTAL NO. = 40 SQ. FT. 3335

PROJECT NO. BD-5101N
PASQUOTANK COUNTY
STATION: 14+96.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE
END BENT #1

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

NORTH CAROLINA PROFESSIONAL SEAL 14045 ENGINEER TIMOTHY L. COGGINS
05/23/14

DRAWN BY : N. Ruffin DATE : 2/18/14
CHECKED BY : T. L. COGGINS DATE : 4/2/14
DESIGN ENGINEER OF RECORD: N. RUFFIN DATE : 4/30/14

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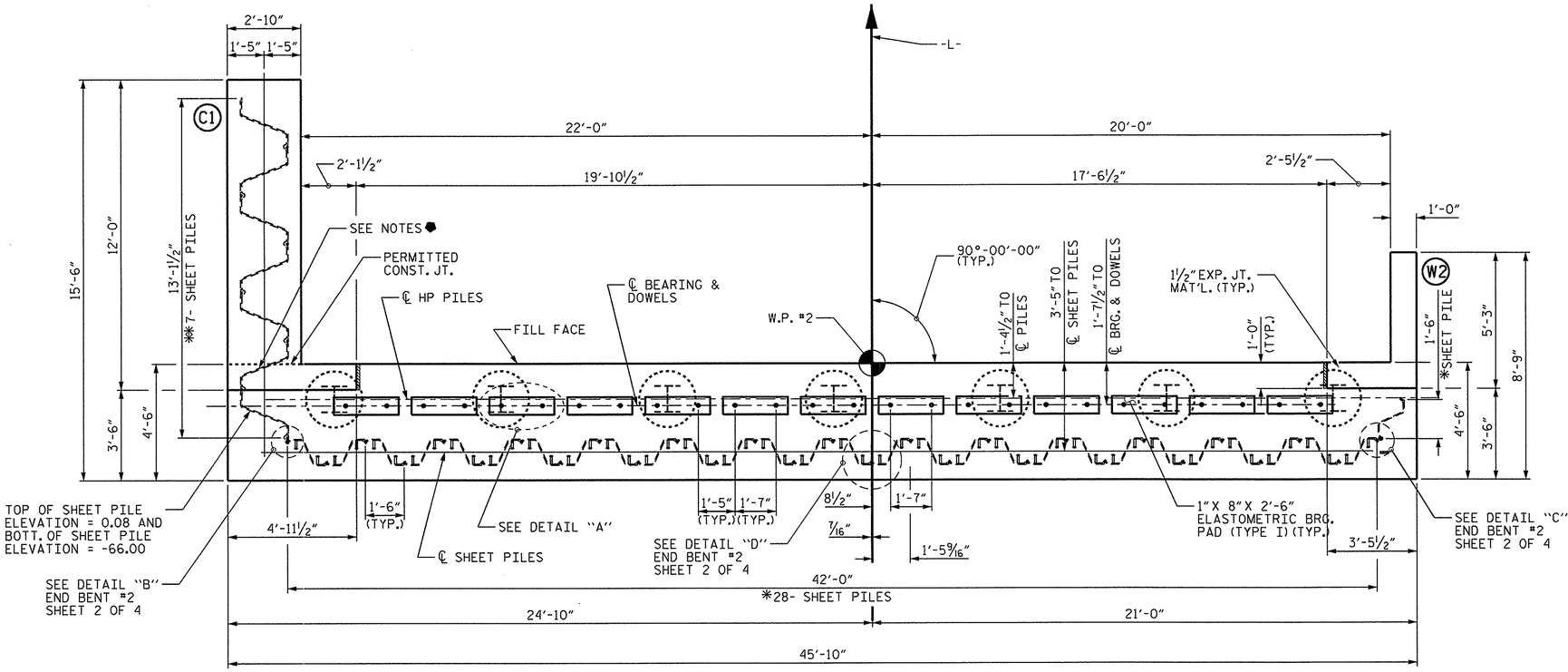
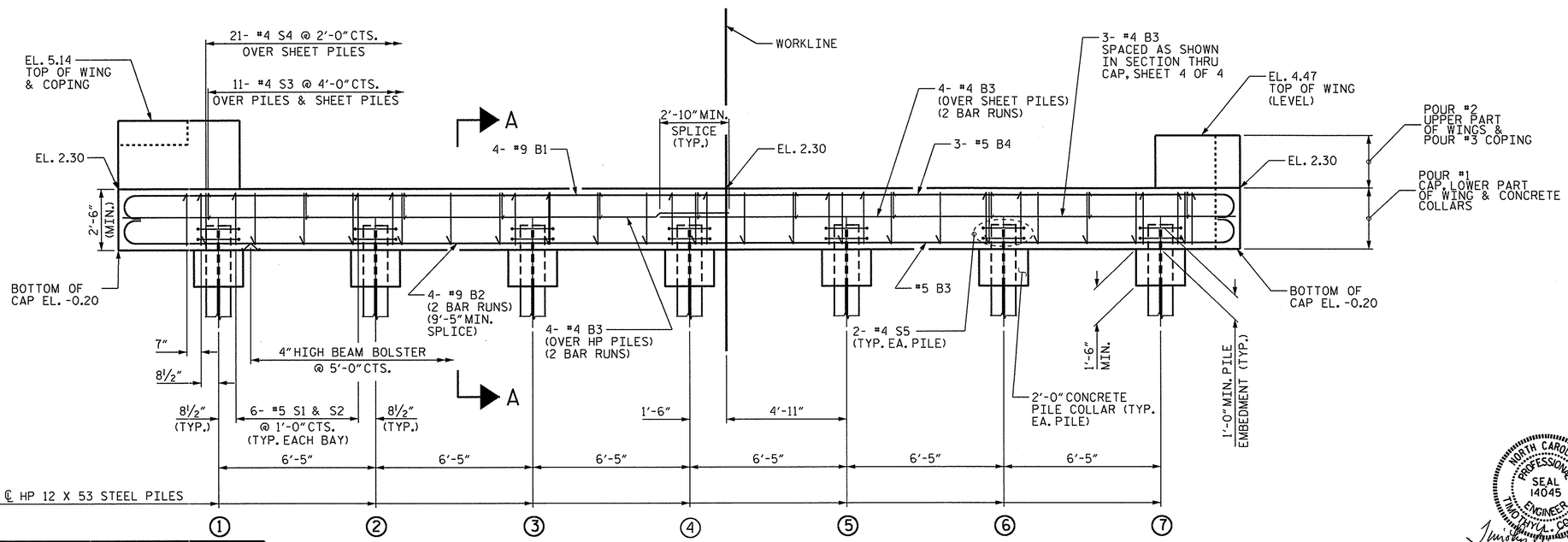
NCDOT



*MIN. SECTION MODULUS OF 30.2 in3/ft.
**MIN. SECTION MODULUS OF 80.2 in3/ft.

PLAN



ELEVATION

SHEET PILING NOT SHOWN FOR CLARITY.

--- NOTES ---

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

FOR PILE SPLICE DETAILS, SEE END BENT #2 SHEET 4 OF 4.

INSTALL THE 4" DIA. DRAIN PIPE THROUGH THE WING WALL AND SHEET PILING AS REQUIRED FOR REINFORCED BRIDGE APPROACH FILLS, SEE THE ROADWAY PLANS. REINFORCING STEEL IN THE WING WALL MAY BE SHIFTED AS NECESSARY TO CLEAR THE DRAIN PIPE.

FOR ANCHOR STUD DETAILS AND LOCATION, SEE END BENT #2 SHEET 2 OF 4.

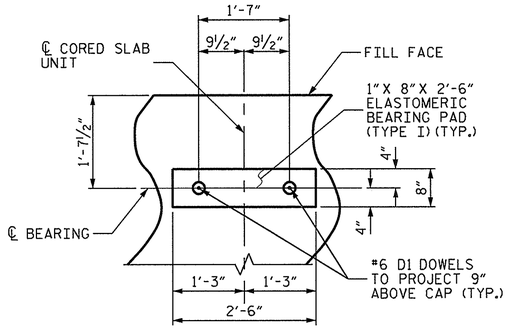
FOR STEEL SHEET PILES, SEE SPECIAL PROVISIONS.

FOR ELEVATION VIEW OF SHEET PILING, SEE END BENT #2 SHEET 2 OF 4.

THE CONCRETE IN THE END BENT CAP OF END BENT NO. 2 SHALL CONTAIN SILICA FUME. SILICA FUME SHALL BE SUBSTITUTED FOR 5% OF THE PORTLAND CEMENT BY WEIGHT. IF THE OPTION OF ARTICLE 1024-1 OF THE STANDARD SPECIFICATIONS TO PARTIALLY SUBSTITUTE CLASS F FLY ASH FOR PORTLAND CEMENT IS EXERCISED, THEN THE RATE OF FLY ASH SUBSTITUTION SHALL BE REDUCED TO 1.0 LB OF FLY ASH PER 1.0 LB. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

STEEL SHEET PILES SHALL BE METALLIZED. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

● FOR THE SECOND SHEET PILE
TOP OF SHEET PILE ELEVATION = 4.64
BOTTOM OF SHEET PILE ELEVATION = -66.00
TRIM BACK TO 6" FROM THE FILL FACE AND DOWN TO THE PREVIOUS SHEET PILE ELEVATION OF 0.08



DETAIL "A"

PROJECT NO. BD-5101N
PASQUOTANK COUNTY
STATION: 14+96.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT #2

NORTH CAROLINA PROFESSIONAL SEAL 14045 ENGINEER TIMOTHY L. COGGINS
04/30/2014

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

DRAWN BY : N. Ruffin DATE : 2/12/14
CHECKED BY : T.L. COGGINS DATE : 4/2/14
DESIGN ENGINEER OF RECORD: N. RUFFIN DATE : 4/30/14

30-APR-2014 14:41
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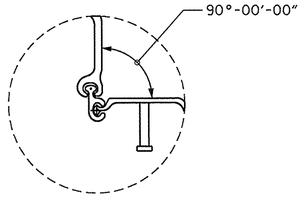
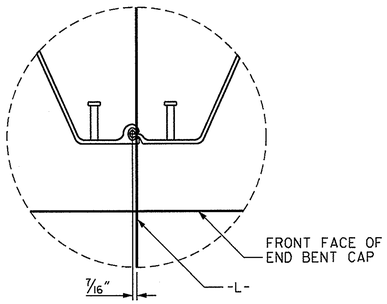
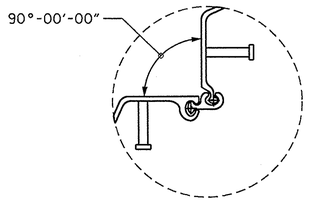


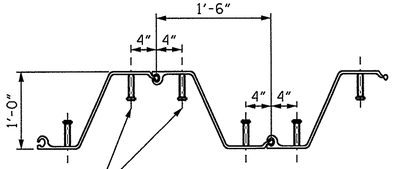
DETAIL "B"



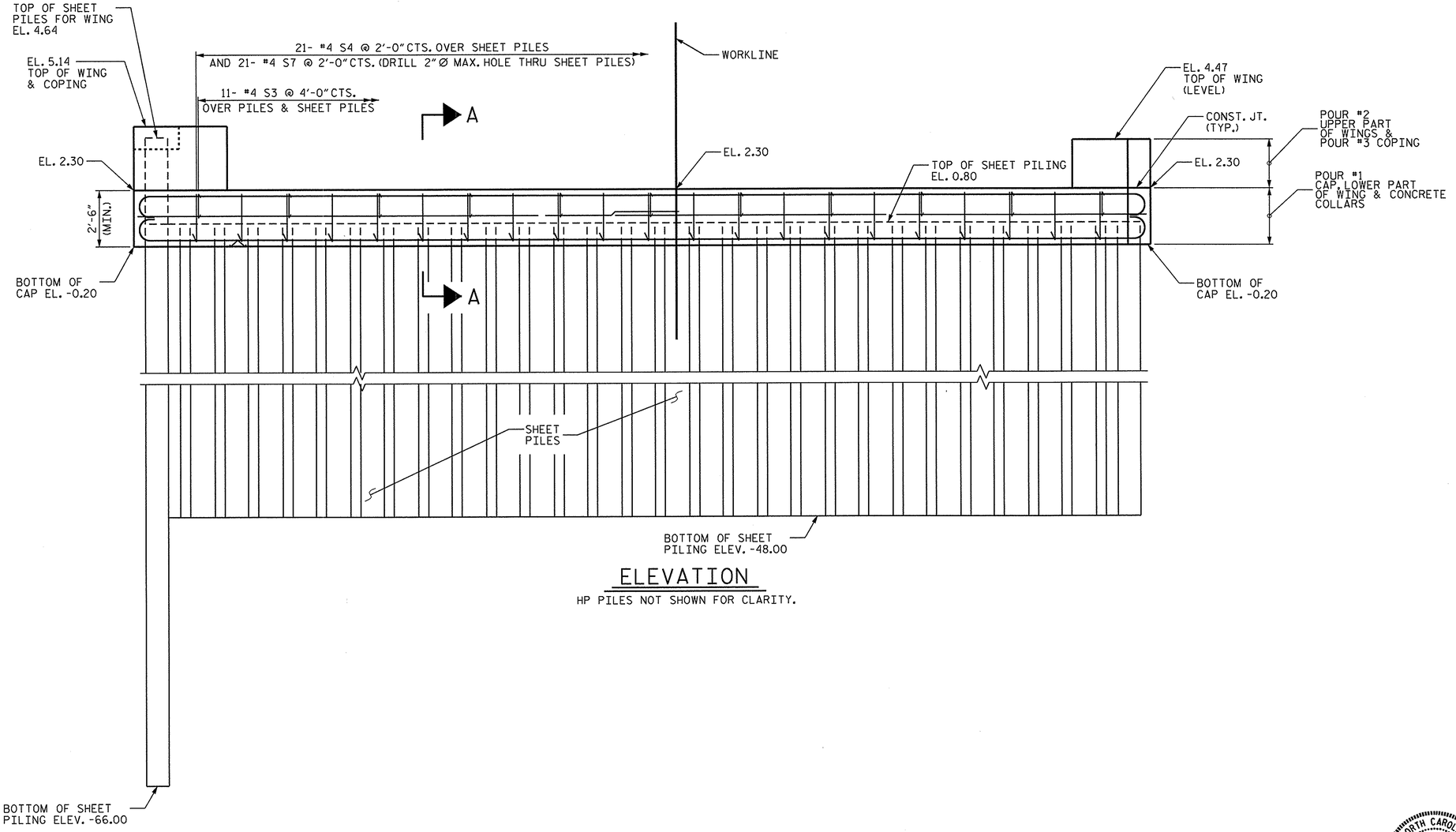
DETAIL "D"



DETAIL "C"



ANCHOR STUD DETAILS



ELEVATION

HP PILES NOT SHOWN FOR CLARITY.

PROJECT NO. BD-5101N

PASQUOTANK COUNTY

STATION: 14+96.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT #2

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

NORTH CAROLINA PROFESSIONAL SEAL 14045 ENGINEER TIMOTHY L. COGGINS
05/28/14

DRAWN BY : N. Ruffin DATE : 2/12/14
CHECKED BY : T. L. COGGINS DATE : 4/2/14
DESIGN ENGINEER OF RECORD: N. RUFFIN DATE : 4/30/14

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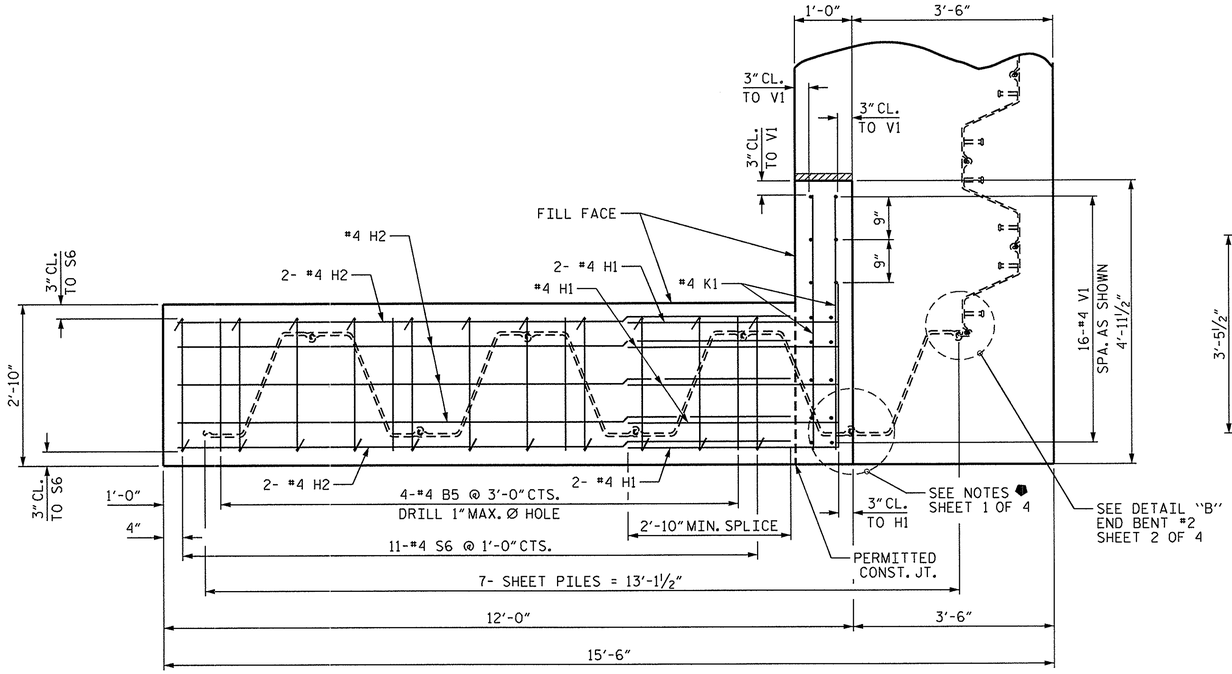
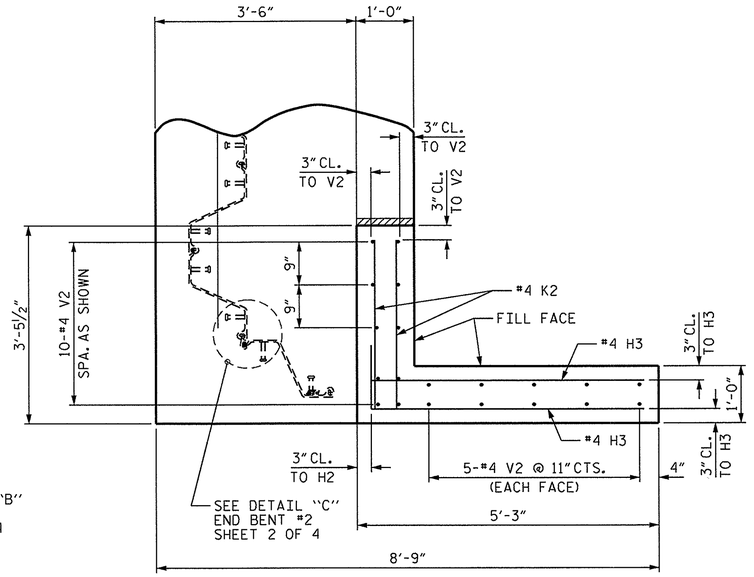
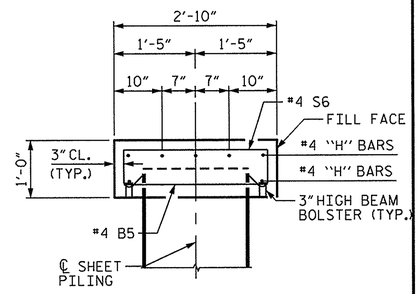


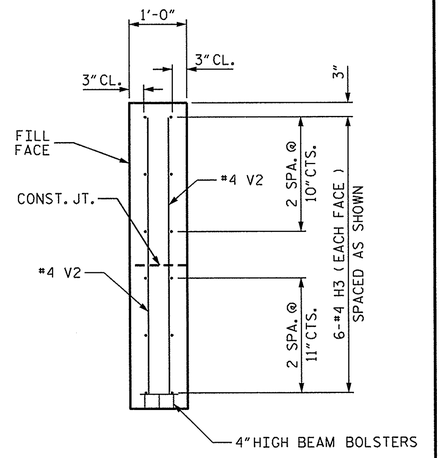
PLAN OF COPING C1



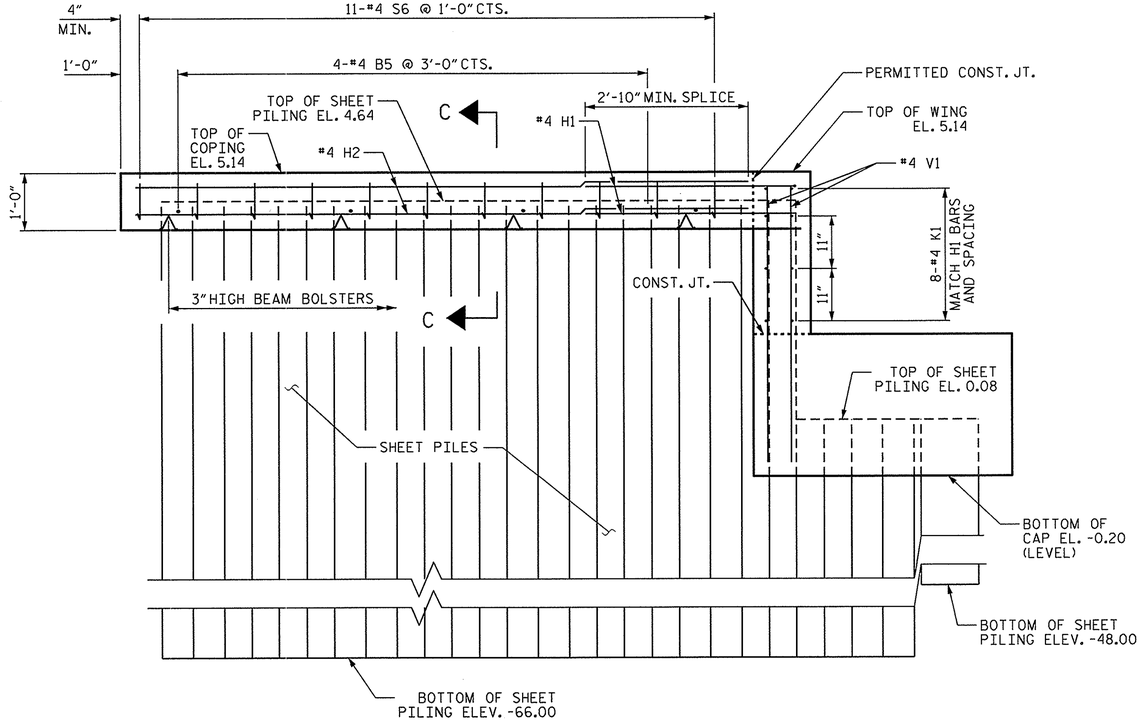
PLAN OF WING W2



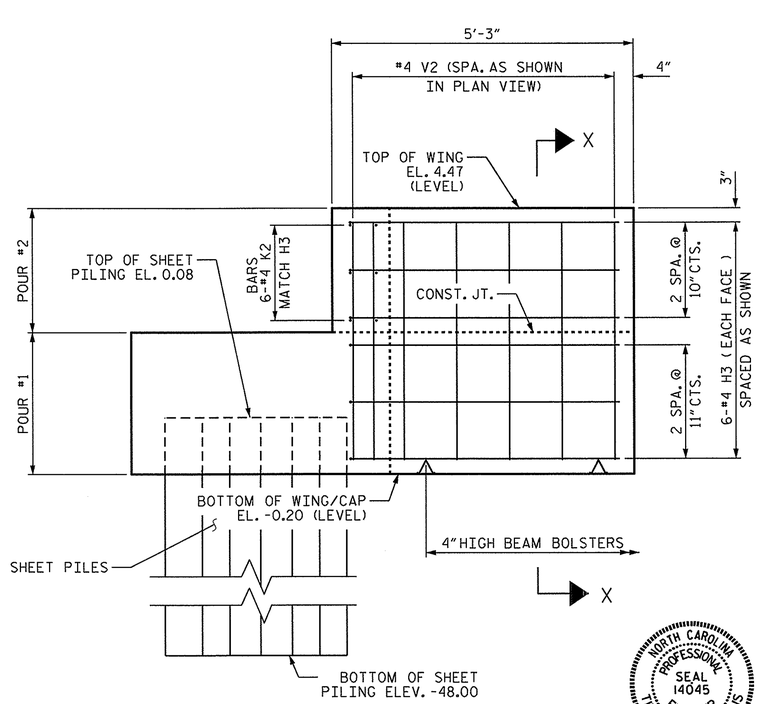
SECTION C-C



SECTION X-X



ELEVATION OF COPING C1



ELEVATION OF WING W2

NORTH CAROLINA PROFESSIONAL SEAL 14045 ENGINEER TIMOTHY L. COGGINS
04/30/2014

PROJECT NO. BD-5101N
PASQUOTANK COUNTY
STATION: 14+96.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT #2

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

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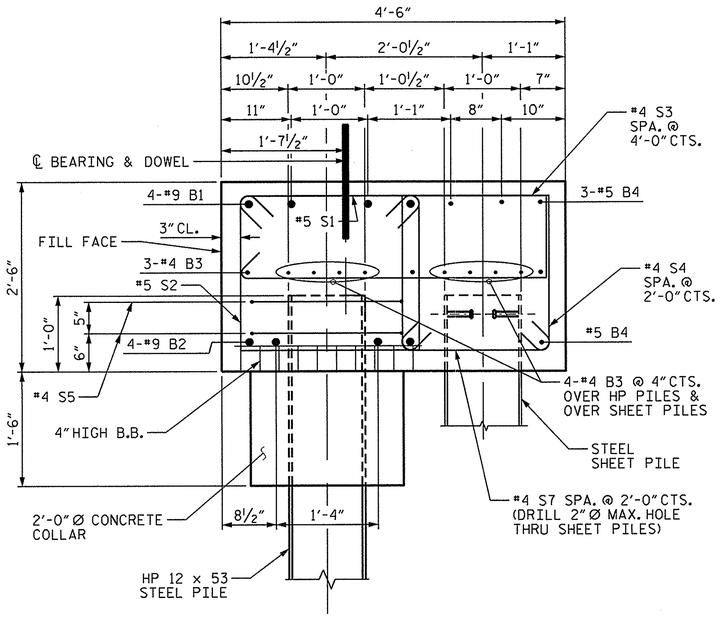
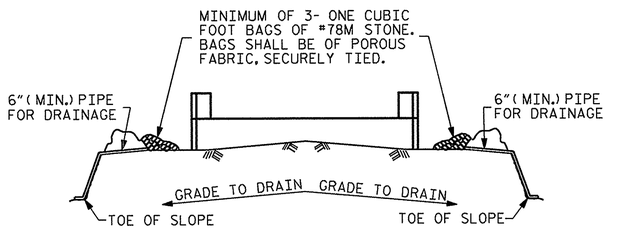


SECTION A-A THRU CAP



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.

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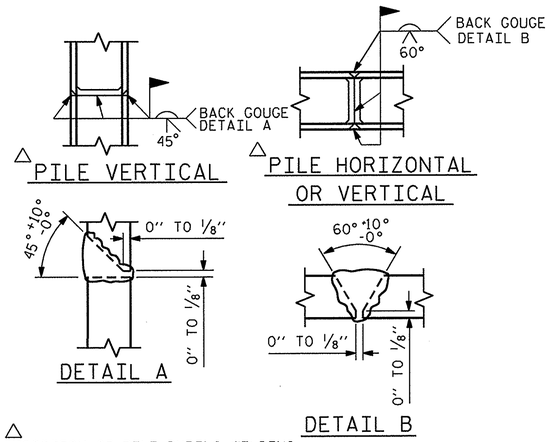
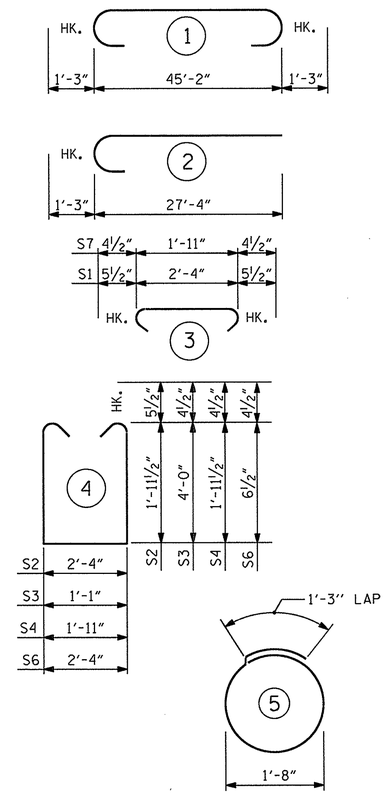


△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL
END BENT #2

BAR	NO	SIZE	TYPE	LENGTH	WEIGHT
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*EXPOXY COATED REINFORCING STEEL LBS. 3,018

CLASS "AA" CONCRETE BREAKDOWN

POUR #1 CAP & LOWER PART OF WINGS & COLLARS	20.7 C.Y.
POUR #2 UPPER PART OF WINGS	1 C.Y.
POUR #3 COPING	1.2 C.Y.
TOTAL	22.9 C.Y.

HP 12 x 53 STEEL PILES
No. = 7 LIN. FEET. 665

STEEL SHEET PILES

NO. 90 = 2
NO. PILES = 36

TOTAL NO. = 38 SQ. FT. 3050

PROJECT NO. BD-5101N
PASQUOTANK COUNTY
STATION: 14+96.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT #2

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

NORTH CAROLINA PROFESSIONAL SEAL 14045 ENGINEER TIMOTHY L. COGGINS
05/28/14

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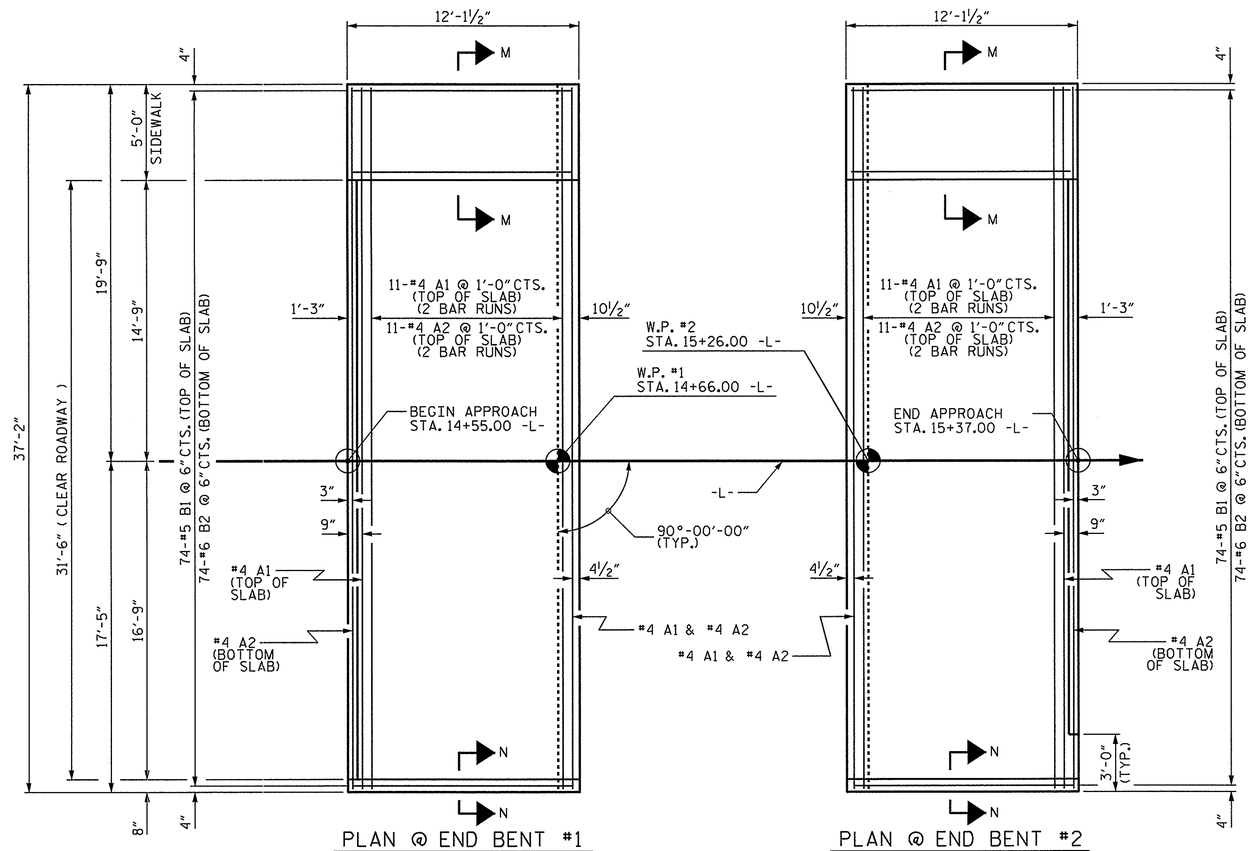
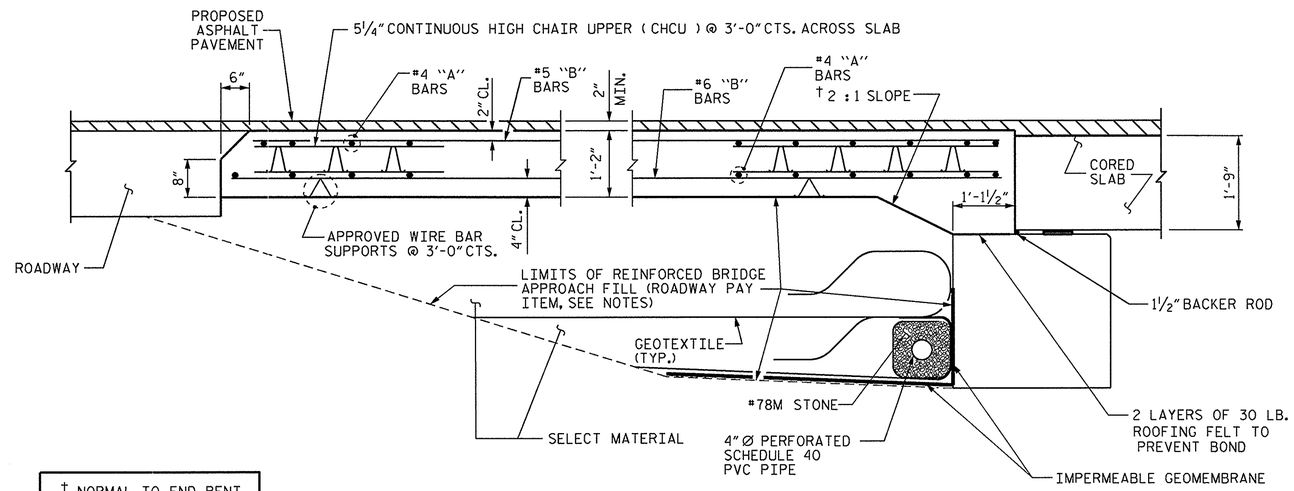


PLAN @ END BENT #1

PLAN @ END BENT #2

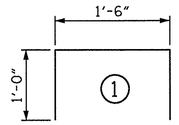
DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



† NORMAL TO END BENT

SECTION THRU SLAB

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

APPROACH SLAB AT EB #1

BAR	NO	SIZE	TYPE	LENGTH	WEIGHT
*A1	26	4	STR	19'-5"	337
*A2	26	4	STR	19'-5"	337
*B1	74	5	STR	11'-3"	868
*B2	74	6	STR	11'-8"	1297
*B3	5	4	STR	11'-8"	39
*G1	13	4	STR	4'-7"	40
*U1	10	4	1	3'-6"	23

*EPOXY COATED REINFORCING STEEL LBS. 2,941

CLASS AA CONCRETE BREAKDOWN

APPROACH SLAB	21.8 C.Y.
SIDEWALK	1.6 C.Y.
TOTAL CLASS AA CONCRETE	23.4 C.Y.

APPROACH SLAB AT EB #2 RT

BAR	NO	SIZE	TYPE	LENGTH	WEIGHT
*A1	26	4	STR	19'-5"	337
*A2	26	4	STR	19'-5"	337
*B1	74	5	STR	11'-3"	868
*B2	74	6	STR	11'-8"	1297
*B3	5	4	STR	11'-8"	39
*G1	13	4	STR	4'-7"	40
*U1	10	4	1	3'-6"	23

*EPOXY COATED REINFORCING STEEL LBS. 2,941

CLASS AA CONCRETE BREAKDOWN

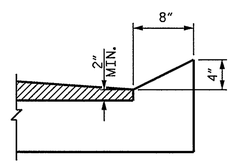
APPROACH SLAB	21.8 C.Y.
SIDEWALK	1.6 C.Y.
TOTAL CLASS AA CONCRETE	23.4 C.Y.

NOTES

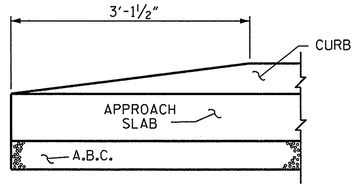
FOR REINFORCED BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, IMPERMEABLE GEOMEMBRANE, 4" Ø DRAINAGE PIPE, #78M STONE, AND SELECT MATERIAL, SEE ROADWAY PLANS.

AREA BETWEEN THE WINGWALL OR SHEET PILING WITH COPING 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.



SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

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

NORTH CAROLINA PROFESSIONAL SEAL 14045 ENGINEER TIMOTHY L. COGGINS
04/30/2014

PROJECT NO. BD-5101N

PASQUOTANK COUNTY

STATION: 14+96.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE CORED SLAB (SUB-REGIONAL TIER)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			

DRAWN BY : N. Ruffin DATE : 4/15/14
CHECKED BY : T. L. COGGINS DATE : 4/25/14
DESIGN ENGINEER OF RECORD: N. RUFFIN DATE : 4/30/14

30-APR-2014 14:41
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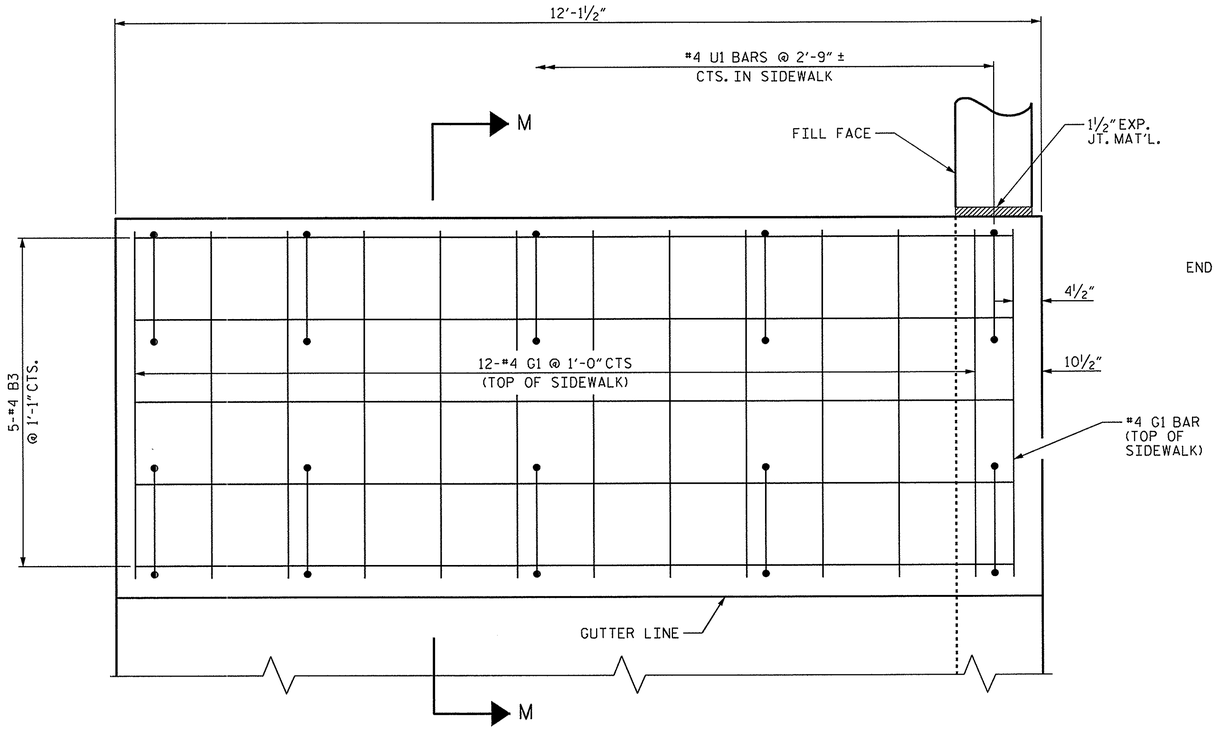
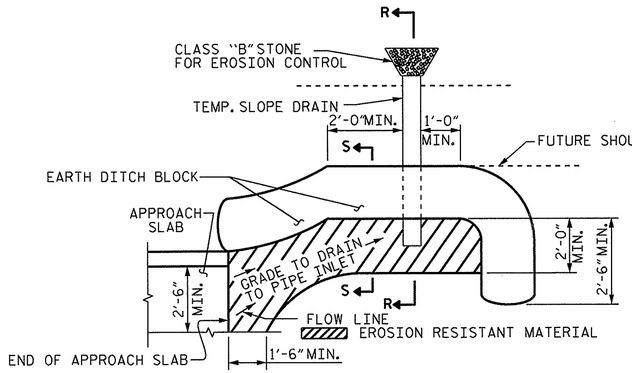
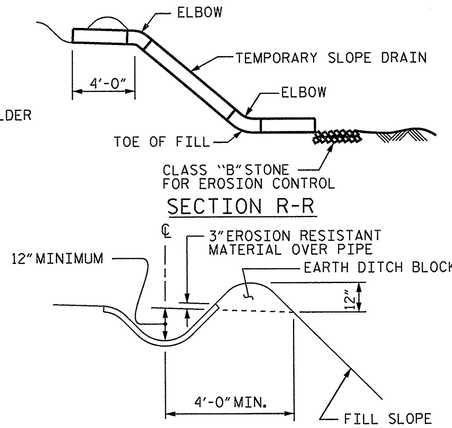


DETAILS OF SIDEWALK ON APPROACH SLAB



NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.

PLAN VIEW

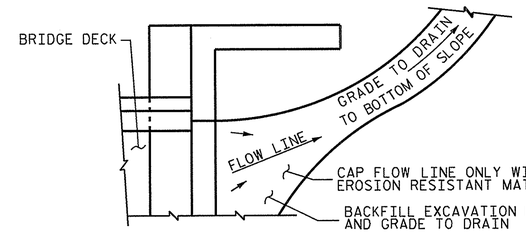


SECTION R-R

SECTION S-S

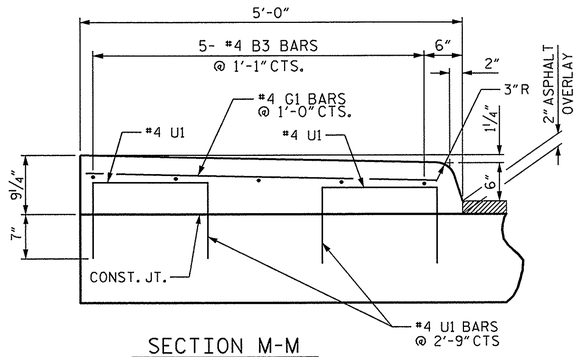
TEMPORARY BERM AND SLOPE DRAIN DETAILS

(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



SECTION M-M

SIDEWALK DETAILS

PROJECT NO. BD-5101N

PASQUOTANK COUNTY

STATION: 14+96.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE CORED SLAB (SUB-REGIONAL TIER)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			TOTAL SHEETS
2			4			

NORTH CAROLINA PROFESSIONAL SEAL 14045 ENGINEER TIMOTHY L. COGGINS
Timothy L. Coggins 04/30/2014

DRAWN BY : N. Ruffin DATE : 4/15/14
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