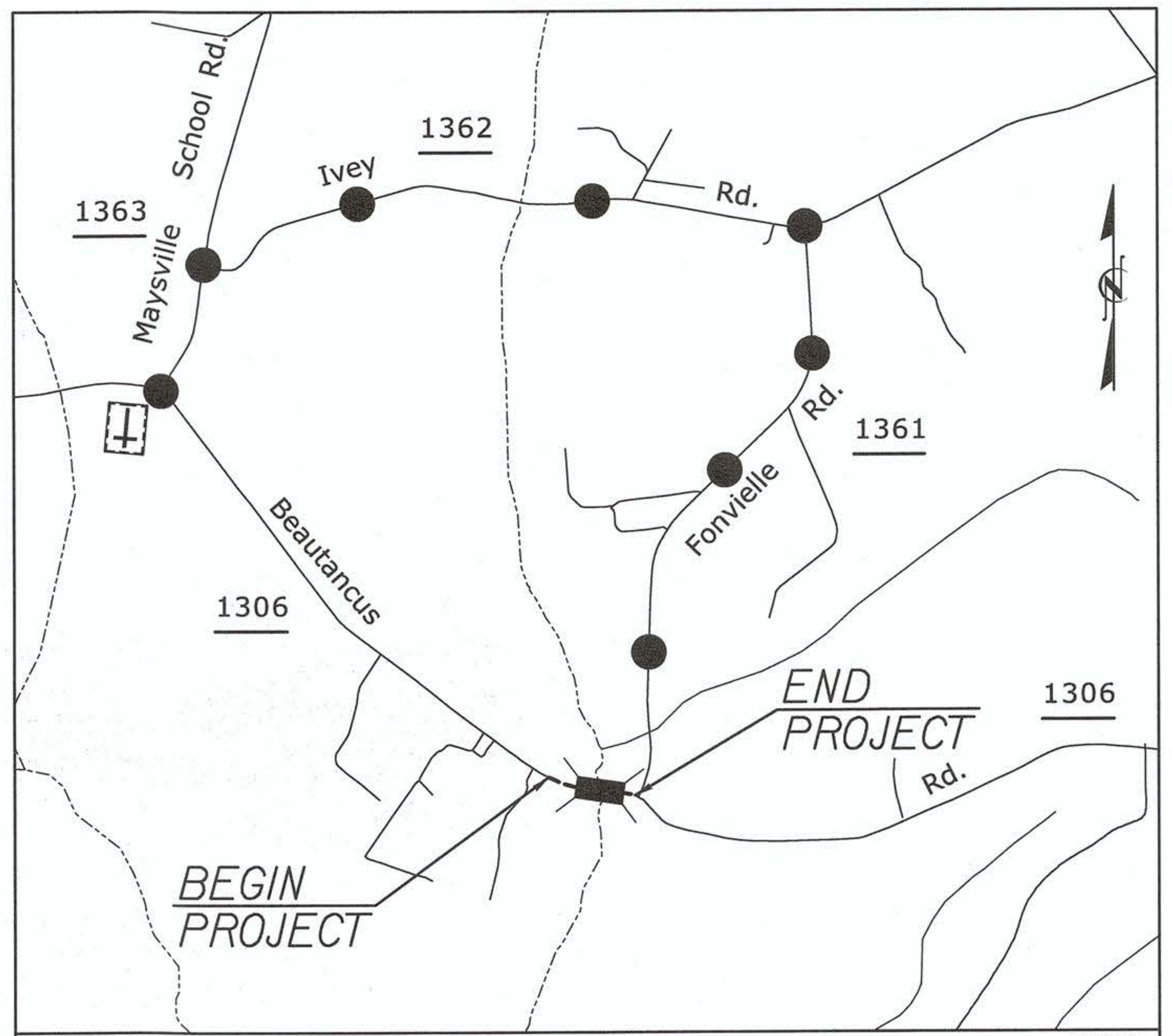
CONTRACT: DC00093

TIP PROJECT: BD-5103V

STATE	PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
NC	BD-5103V	1	44

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
45349.3.22	BRZ-1306(24)	LIB REPLACEMENT
45349.2.FD22		ROW

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



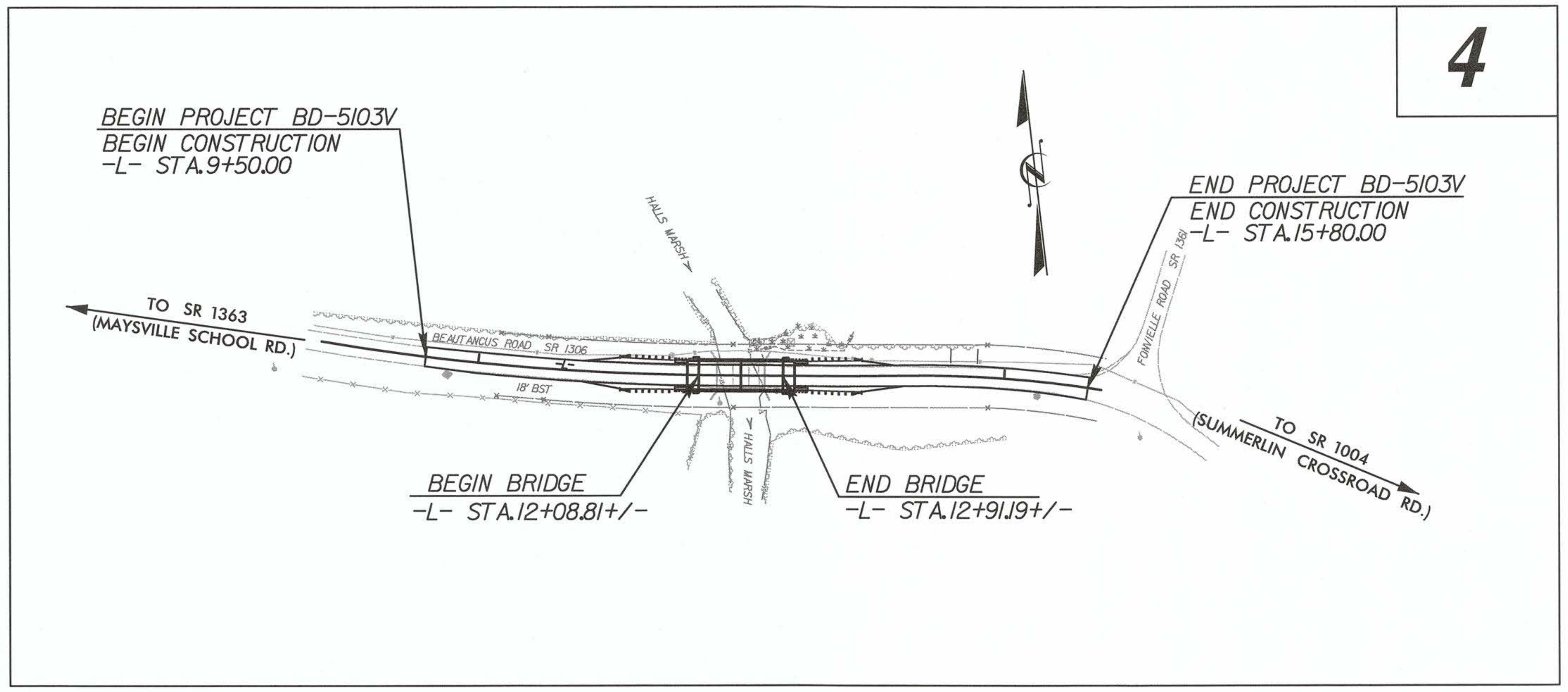
VICINITY MAP ●●● DETOUR ROUTE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

DUPLIN COUNTY

LOCATION: BRIDGE NO. 111 OVER HALLS MARSH ON SR 1306 (BEAUTANCUS RD.)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, GUARDRAIL, & STRUCTURE



GRAPHIC SCALES

50 25 0 50 100 — PLANS

50 25 0 50 100 — PROFILE (HORIZONTAL)

10 5 0 10 20 — PROFILE (VERTICAL)

DESIGN DATA

ADT 2008 = 640
ADT 2035 = 1280
DHV = 10%
D = 60%
T = 6% *
STATUTORY = 55 MPH
ADVISORY = 35 MPH
* TTST 2% DUAL 4%

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT BD-5103V =	0.103 MI.
LENGTH OF STRUCTURE TIP PROJECT BD-5103V =	0.016 MI.
TOTAL LENGTH OF TIP PROJECT BD-5103V =	0.119 MI.

Prepared In the Office of:

HNTB
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
NOVEMBER 11, 2013

LETTING DATE:
FEBRUARY 19, 2015

ENRICO A. ROQUE, P.E.
PROJECT ENGINEER

MONICA DUVAL
PROJECT DESIGNER

AMANDA GLYNN, P.E.
NCDOT CONTACT

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 15764 ENGINEER JAMES A. BYRD
SIGNATURE: P.E. 1/20/15

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 19824 ENGINEER ENRICO A. ROQUE
SIGNATURE: P.E. 1/20/15

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

P.E.
STATE HIGHWAY DESIGN ENGINEER

1/20/2015
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HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
BD-5103V	1-A
RW SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19824 ENGINEER
4/16/14

INDEX OF SHEETS

GENERAL NOTES: 2012 SPECIFICATIONS

EFFECTIVE: 01-17-12
REVISED: 11/01/11

GRADE LINE:
GRADING AND SURFACING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. GRADE LINES MAY BE ADJUSTED AT THEIR BEGINNING AND ENDING AND AT STRUCTURES AS DIRECTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

CLEARING:

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.

SUPERELEVATION:

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

SHOULDER CONSTRUCTION:

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

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.

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 Water and Sewer - Duplin County

Power - Duke Energy Progress

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS, EXCEPT AS SHOWN ON THE PLANS.

RIGHT-OF-WAY MARKERS:

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

2012 ROADWAY ENGLISH STANDARD DRAWINGS

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	
422.10	Reinforced Bridge Approach Fills
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 8 - INCIDENTALS	
806.01	Concrete Right-of-Way Marker
840.20	Frames and Wide Slot Flat Grates
840.36	Traffic Bearing Grated Drop Inlet - for Steel (840.37) Double Frame and Grates
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets

CENTERLINE COORDINATE LIST

POINT	STATION	NORTHING	EASTING
15001	-L- STA 9+50.00	487379.997145	2300681.215087
15003	-L- STA 11+96.99	487334.740665	2300923.906514
15004	-L- STA 14+07.25	487310.732495	2301132.773458
15002	-L- STA 15+80.00	487279.888142	2301302.558230

NOTE: SEE SHEET NO. 4 FOR DATUM DESCRIPTION

REVISIONS

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12/05/11

PROJECT REFERENCE NO.	SHEET NO.
BD-5103V	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 — R/W
- Proposed Right of Way Line with Iron Pin and Cap Marker — R/W
- Proposed Right of Way Line with Concrete or Granite R/W Marker — R/W
- 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 — HH
- 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:

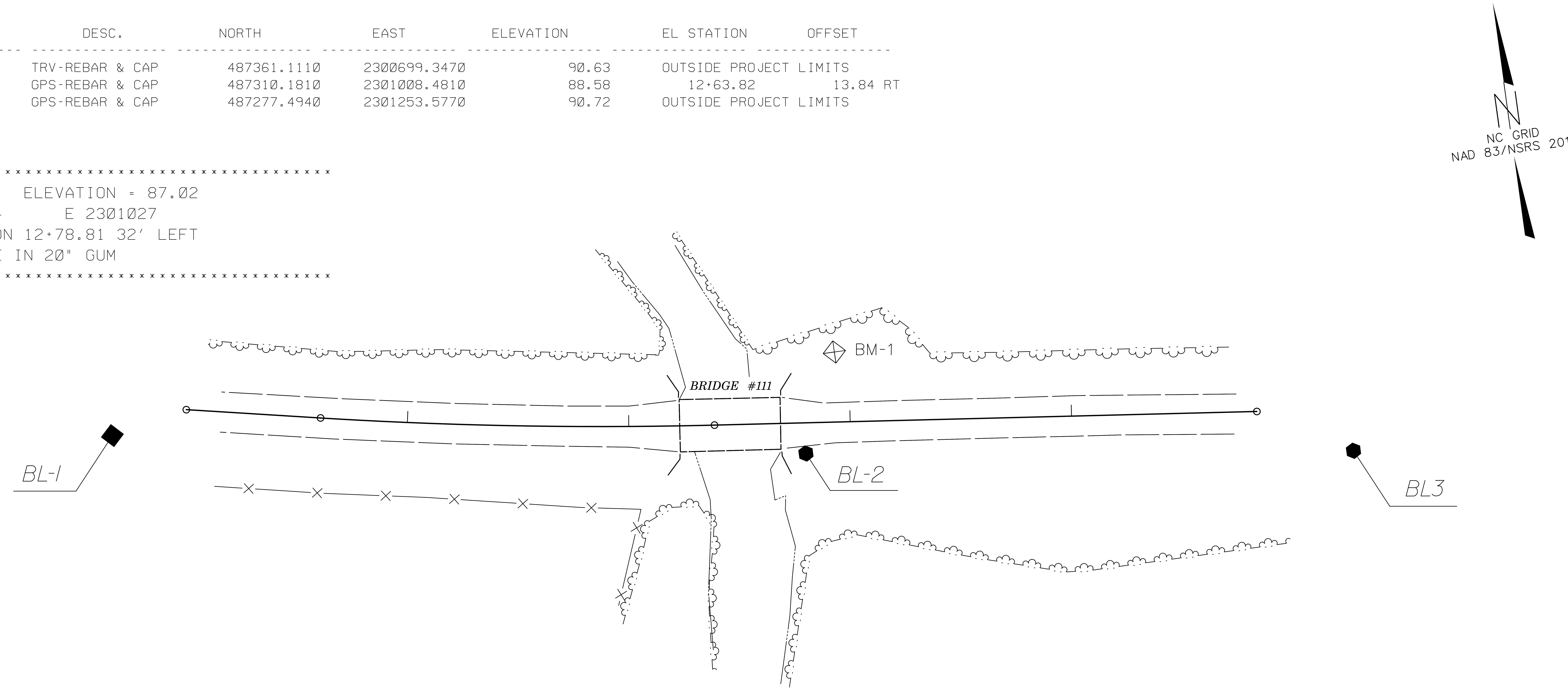
- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line — ?UTL
- U/G Tank; Water, Gas, Oil
- Underground Storage Tank, Approx. Loc. — UST
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- U/G Test Hole (S.U.E.*)
- Abandoned According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

SURVEY CONTROL SHEET BD–5103–V

BL

POINT	DESC.	NORTH	EAST	ELEVATION	EL STATION	OFFSET
BL1	TRV-REBAR & CAP	487361.1110	2300699.3470	90.63	OUTSIDE PROJECT LIMITS	
BL2	GPS-REBAR & CAP	487310.1810	2301008.4810	88.58	12+63.82	13.84 RT
BL3	GPS-REBAR & CAP	487277.4940	2301253.5770	90.72	OUTSIDE PROJECT LIMITS	

BM1 ELEVATION = 87.02
N 487354 E 2301027
L STATION 12+78.81 32' LEFT
RR SPIKE IN 20" GUM



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "BL-2"
WITH NAD 83/NSRS 2011 STATE PLANE GRID COORDINATES OF
NORTHING: 487310.181(//■) EASTING: 2301008.481(//■)
ELEVATION: 88.58(//■)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999878105
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "BL-2" TO -L- STATION 10+00 IS
N 78^ 02' 36.50" W 264.66'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTES:

1. *THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:*
   HTTP://WWW.NCDOT.GOV/DOH/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/

   THE FILES TO BE FOUND ARE AS FOLLOWS:
   BD–5103V_LS_CONTROL_121112.TXT

   SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

⬢ *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.*
PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION

NOTE: DRAWING NOT TO SCALE

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

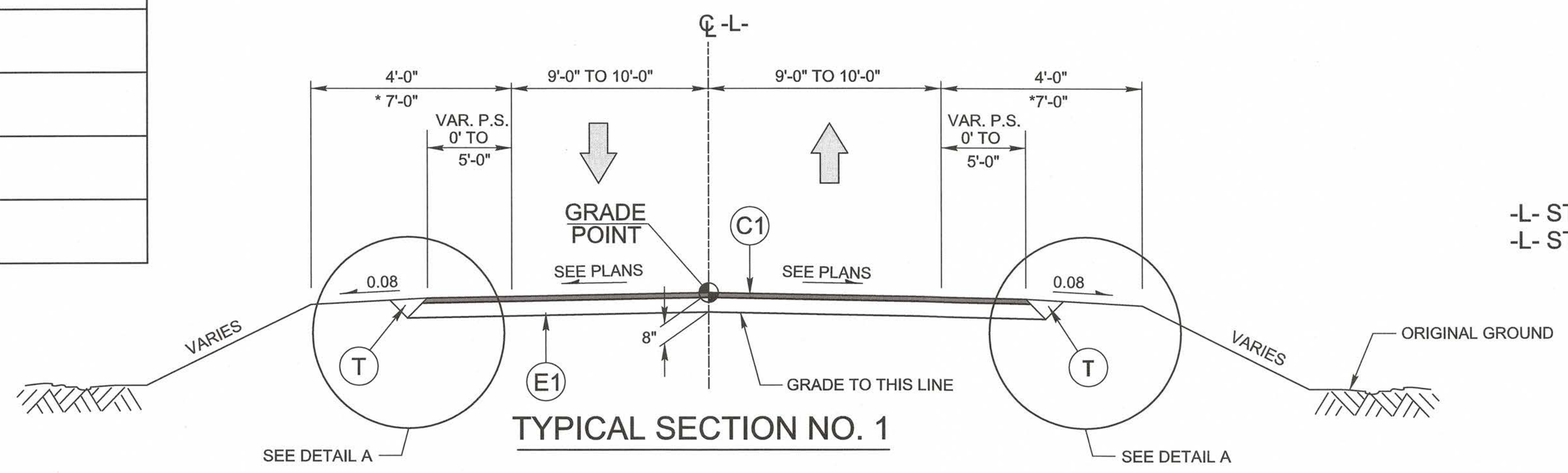
PROJECT REFERENCE NO.	SHEET NO.
BD-5103V	2
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 19824 ENGINEER RICO A. ROQUE 4/16/14

REVISIONS

PAVEMENT SCHEDULE	
C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YARD IN EACH OF TWO LAYERS.
C2	PROP. VARIABLE DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A AT AN AVERAGE RATE OF 110 LBS. PER SQ. YARD PER INCH. DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 1" IN DEPTH OR GREATER THAN 1.5" IN DEPTH.
E1	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YARD.
E2	PROP. VARIABLE DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B AT AN AVERAGE RATE OF 114 LBS. PER SQ. YARD PER INCH. DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5.5" IN DEPTH.
R	SHOULDER BERM GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING (SEE DETAIL)

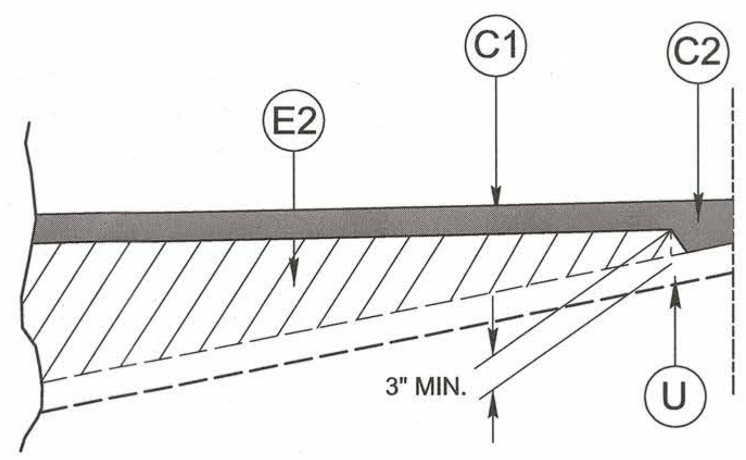
ALL PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE



TYPICAL SECTION NO. 1

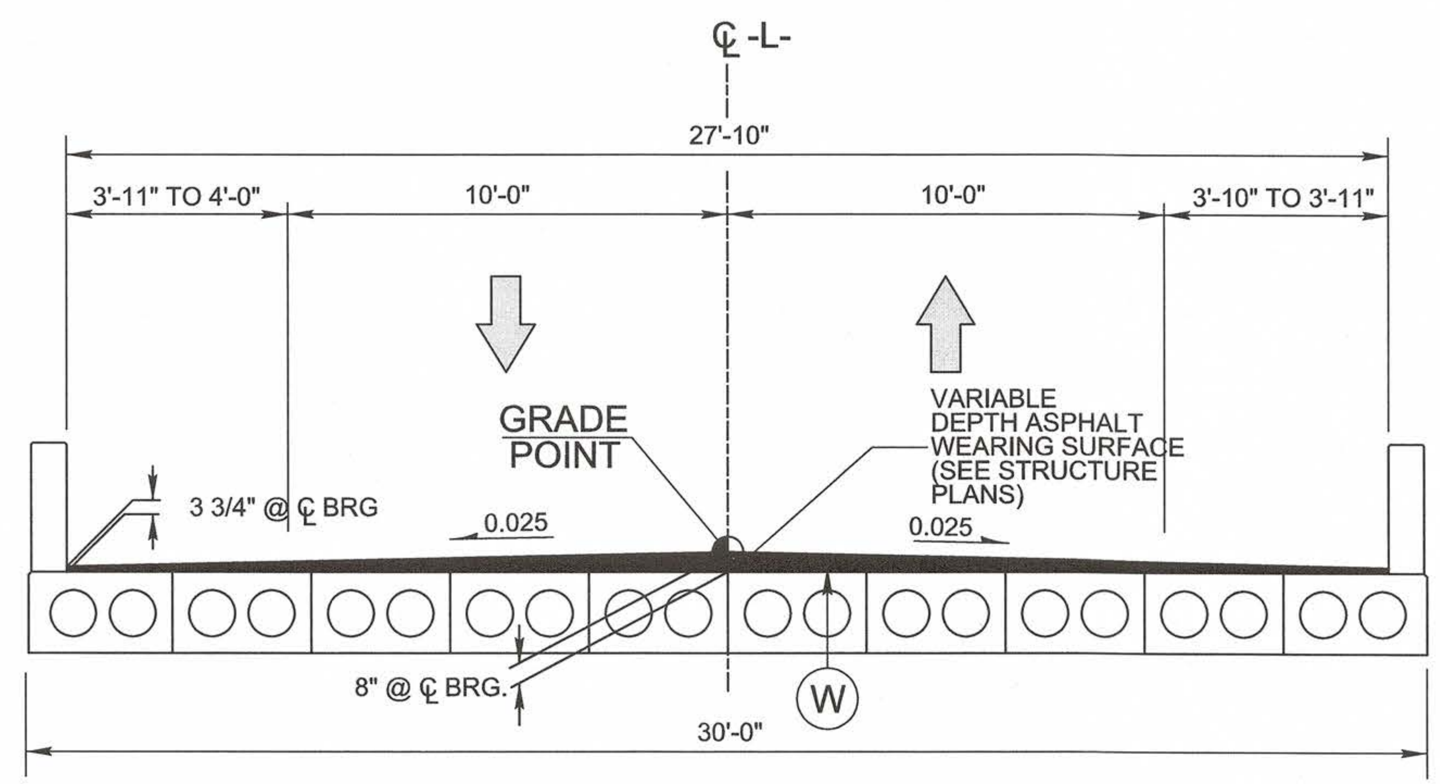
USE TYPICAL SECTION NO. 1 FROM:

-L- STA. 9+50.00 TO -L- STA. 12+08.81+/-(BEGIN BRIDGE)
-L- STA. 12+91.19+/-(END BRIDGE) TO -L- STA. 15+80.00



DETAIL SHOWING METHOD OF WEDGING

SEE TYPICAL SECTIONS

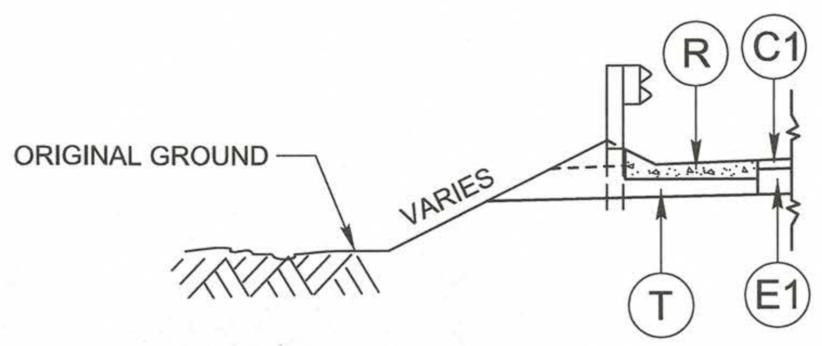


TYPICAL SECTION NO. 2

CORED SLAB BRIDGE OVERLAY

USE TYPICAL SECTION NO. 2 FROM:

-L- STA. 12+08.81+/- TO -L- STA. 12+91.19+/-



DETAIL A

SHOULDER BERM GUTTER LOCATIONS

-L- STA. 11+87.5 TO -L- STA. 11+97.9 RT
-L- STA. 11+87.5 TO -L- STA. 11+97.7 LT
-L- STA. 13+02.1 TO -L- STA. 13+13.5 RT
-L- STA. 13+02.3 TO -L- STA. 13+13.5 LT

NOTES: * SHOULDER WIDTH INCREASED 3' WITH THE USE OF GUARDRAIL

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343 E. Six Forks Road, Suite 200
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PROJECT REFERENCE NO.	SHEET NO.
BD-5103V	3
RW SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER

4/16/14

REVISIONS

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

ROW AREA DATA SUMMARY

PARCEL NO.	PROPERTY OWNERS NAMES	TOTAL ACREAGE	AREA TAKEN (ACRES)	AREA REMAINING RT.	AREA REMAINING LT.	CONST. EASE.	PERM. DRAIN. EASE.	TEMP. DRAIN. EASE.
1	MARK K. OSTHEIM, ET UX	–				1233.1	137.0	

DRAINAGE SUMMARY

STATION	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS IV R.C. PIPE (UNLESS NOTED OTHERWISE) 15"	18"	24"	30"	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0 THRU 5.0')	TOTAL L.F. FOR PAY QUANTITY SHALL BE COL.'A' + (1.3 X COL. 'B') A 5.0' THRU 10.0'	B 10.0' AND ABOVE	SIDE DRAIN PIPE 15"	18"	T.B. GRATED D.I., TYPE 'B' STD. 840.35	T.B.D.I. FRAME AND GRATE STD. 840.29	PIPE REMOVAL	REMARKS
SIZE																				
THICKNESS OR GAUGE																				
-L- 13+11.00	RT	0401	0402	89.90	86.00	85.59		24				1					1	1		CLASS IV R.C. PIPE
-L- 13+11.00	LT	0402	OUT	89.90	85.59	85.55		12				1					1	1		CLASS IV R.C. PIPE
TOTAL								36				2					2	2		

ABBREVIATIONS

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

PAVEMENT REMOVAL SUMMARY

IN SQUARE YARDS

LOCATION	REMOVAL OF ASPHALT PAVEMENT	BREAKING OF ASPHALT PAVEMENT
-L- STA. 9+50 TO 12+27	570	
-L- STA. 12+73 TO 15+80	640	
GRAND TOTAL	1210	
SAY	1210	

SUMMARY OF EARTHWORK

IN CUBIC YARDS

STATION	STATION	UNCLASSIFIED EXCAVATION	EMBANK. +%	BORROW	WASTE
-L- STA. 9+50.00	-L- STA. 12+34.00	148	250	102	
-L- STA. 12+70.00	-L- STA. 15+80.00	125	205	80	
PROJECT SUBTOTAL		273	455	182	
WASTE TO REPLACE BORROW					
PROJECT TOTAL		273	455	182	0
GRAND TOTALS:		273		182	
SAY:		280		190	

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 III	XIII	CAT-1	III	BIC	AT-1	IMPACT ATTENUATOR TYPE 350 EA	G	NG	SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS
-L-	11+33.90	12+08.90	RT	75.0			12+08.90		4	7	50		1				1	1												
-L-	11+33.72	12+08.72	LT	75.0				12+08.72	4	7		50		1			1	1												
-L-	12+91.10	13+66.10	RT	75.0				12+91.10	4	7		50		1			1	1												
-L-	12+91.28	13+66.28	LT	75.0			12+91.28		4	7	50		1				1	1												
	LESS ANCHOR DEDUCTIONS																													
	TYPE III	4 @ 18.75'	=	75.0																										
	TYPE 350	4 @ 50.00'	=	200.0																										
			TOTAL	25.0													4	4												
			SAY	25.0																										
	(5 ADDITIONAL GUARDRAIL POST)																													

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NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
BD-5103V	4
RW SHEET NO.	

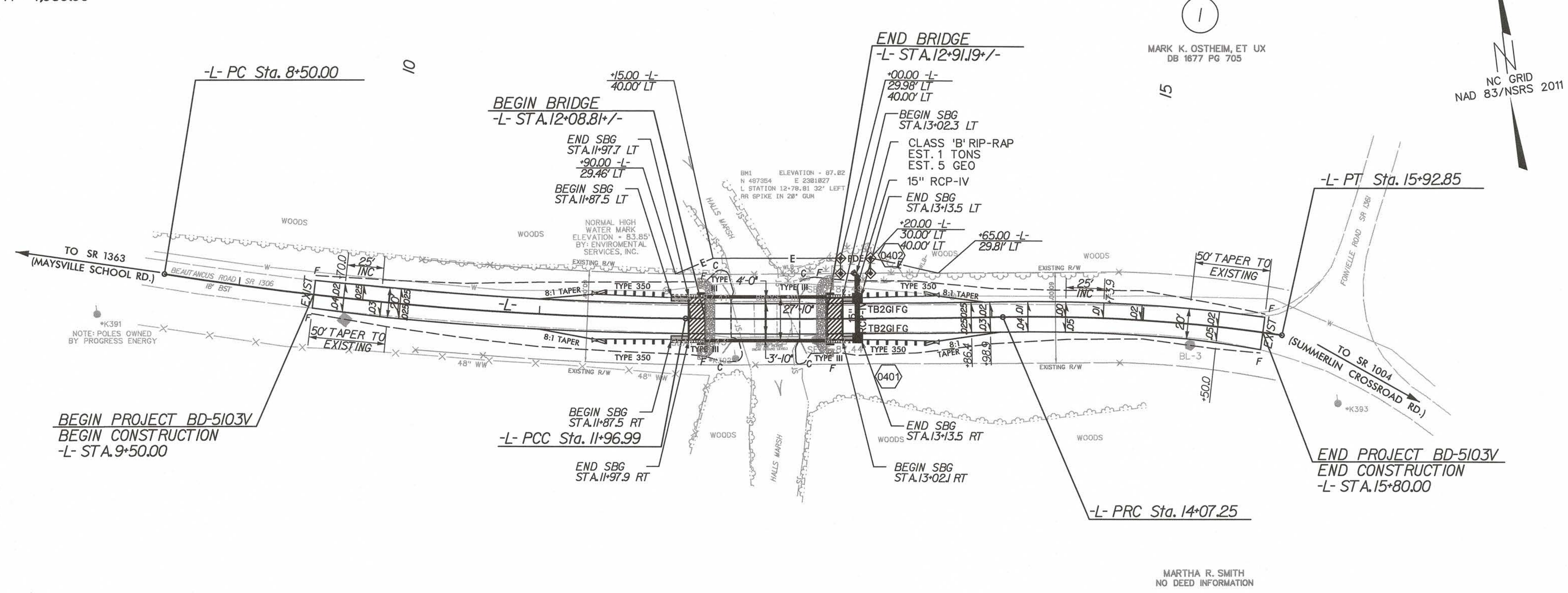
ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

4/16/14 — 4-16-14

PLAN

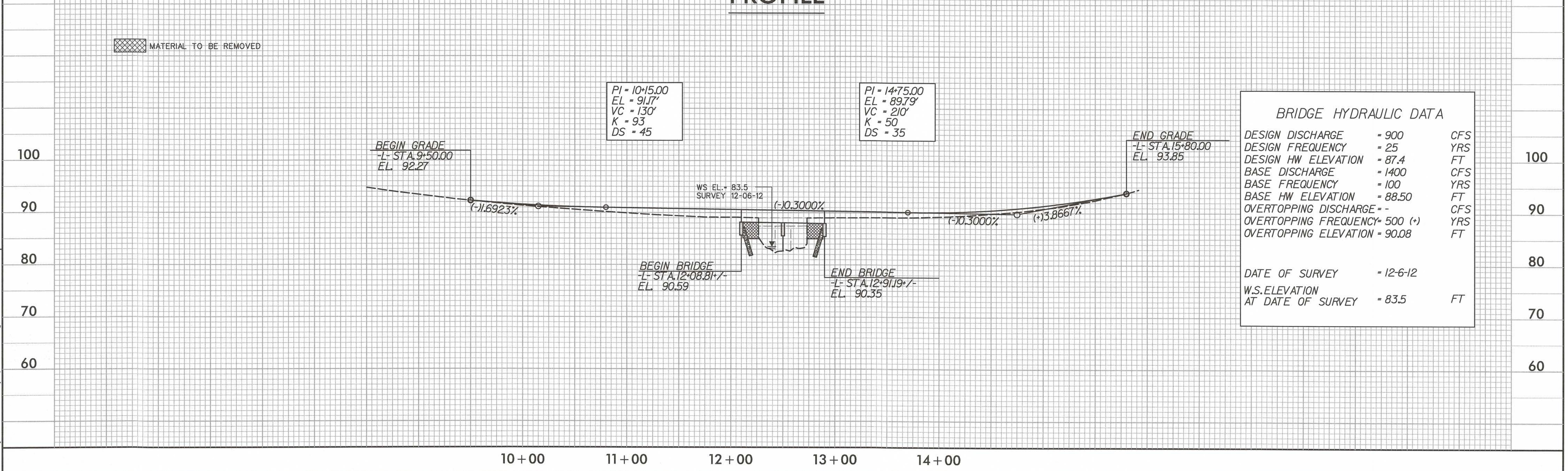
-L-

PI Sta 10+23.83	PI Sta 13+02.13	PI Sta 15+00.29
△ = 8° 38' 38.5" (LT)	△ = 1° 51' 32.5" (LT)	△ = 10° 01' 56.7" (RT)
D = 2° 29' 28.0"	D = 0° 53' 03.1"	D = 5° 24' 18.9"
L = 346.99'	L = 210.25'	L = 185.60'
T = 173.83'	T = 105.13'	T = 93.04'
R = 2,300.00'	R = 6,480.00'	R = 1,060.00'



REVISIONS

PROFILE



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 900	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 87.4	FT
BASE DISCHARGE	= 1400	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 88.50	FT
OVERTOPPING DISCHARGE	= -	CFS
OVERTOPPING FREQUENCY	= 500 (+)	YRS
OVERTOPPING ELEVATION	= 90.08	FT
DATE OF SURVEY	= 12-6-12	
W.S.ELEVATION AT DATE OF SURVEY	= 83.5	FT

4/15/2014
9:07:28 AM
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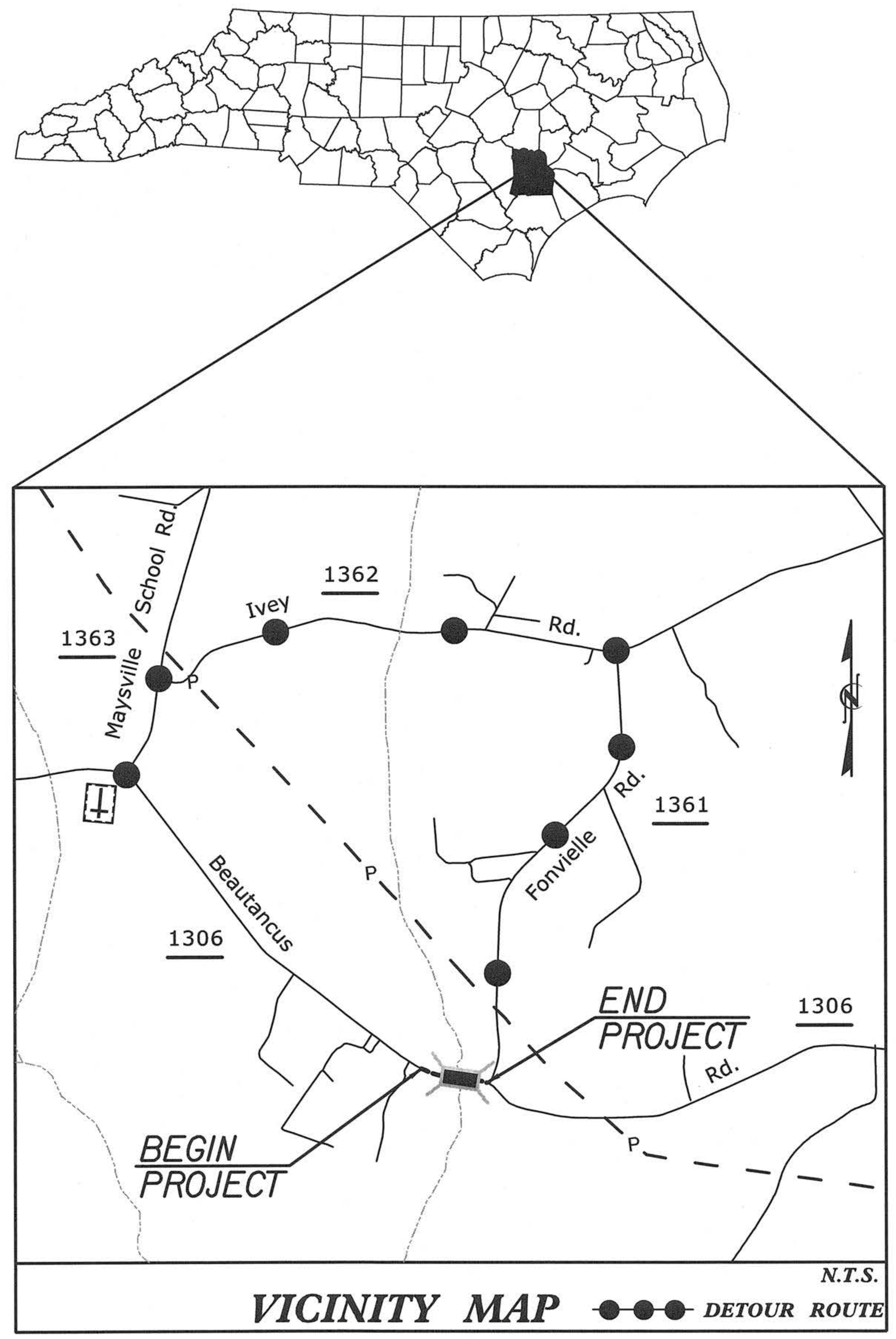
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

TRANSPORTATION MANAGEMENT PLAN

DUPLIN COUNTY



VICINITY MAP

INDEX OF SHEETS

ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS SHOWN IN "ROADWAY STANDARD DRAWINGS" PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C. DATED JAN 2012 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1101.01	WORK ZONE WARNING SIGNS
1101.03	TEMPORARY ROAD CLOSURES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1145.01	BARRICADES
1205.01	PAVEMENT MARKINGS - LINE TYPES & OFFSETS
1205.02	PAVEMENT MARKINGS - 2 LANE & MULTILANE ROADWAYS
1205.12	PAVEMENT MARKINGS - BRIDGES
1250.01	PAVEMENT MARKER SPACING
1251.01	RAISED PAVEMENT MARKERS - PERMANENT AND TEMPORARY
1261.01	GUARDRAIL AND BARRIER DELINEATOR SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATOR TYPE
1262.01	GUARDRAIL END DELINEATION

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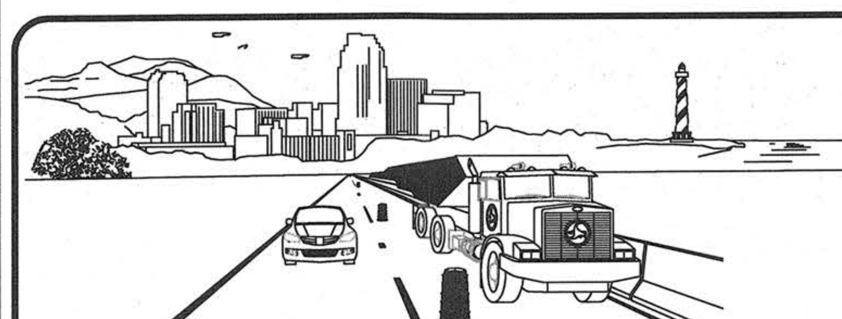
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

R. B. EARLY, PE — *TRAFFIC CONTROL PROJECT ENGINEER*
J. A. PHILLIPS — *TRAFFIC CONTROL DESIGN ENGINEER*



WORK ZONE SAFETY & MOBILITY
"from the MOUNTAINS to the COAST"

N.C.D.O.T. WORK ZONE TRAFFIC CONTROL
1561 MAIL SERVICE CENTER (MSC) RALEIGH, NC 27699-1561
750 N. GREENFIELD PARKWAY, GARNER, NC 27529 (DELIVERY)
PHONE: (919) 773-2800 FAX: (919) 771-2745

KATHERINE HITE, PE — *DIVISION TRAFFIC ENGINEER*

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

APPROVED: Rhonda B. Early
DATE: 4/15/14

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 023521 ENGINEER RHONDA B. EARLY

SHEET NO. TMP-1

TIP PROJECT: BD-5103V

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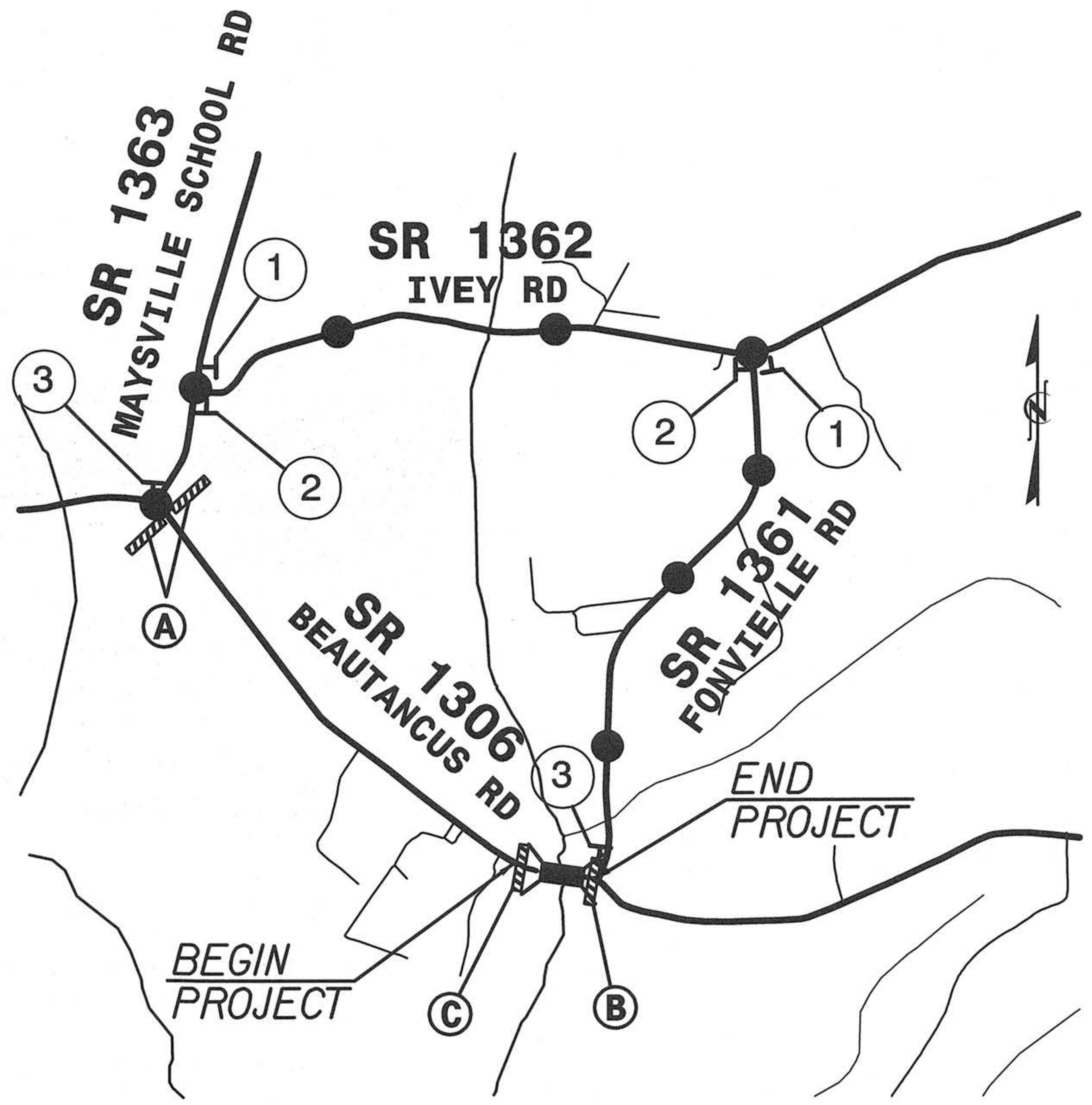
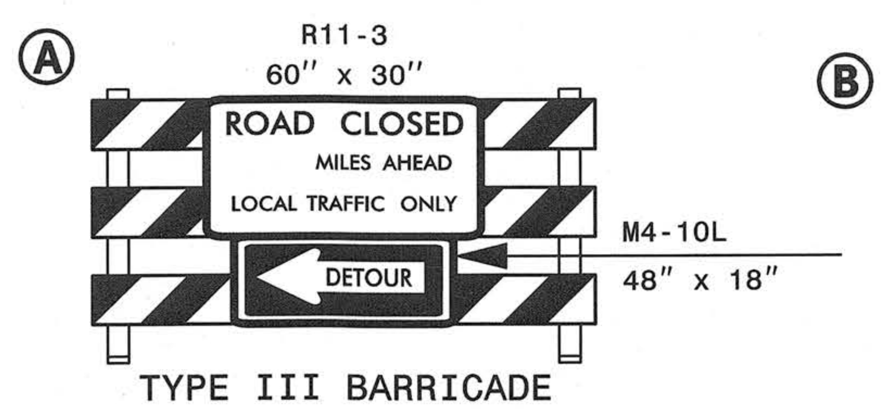
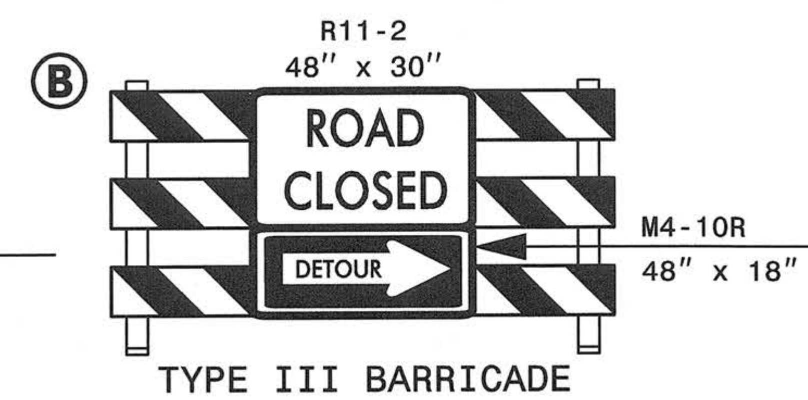
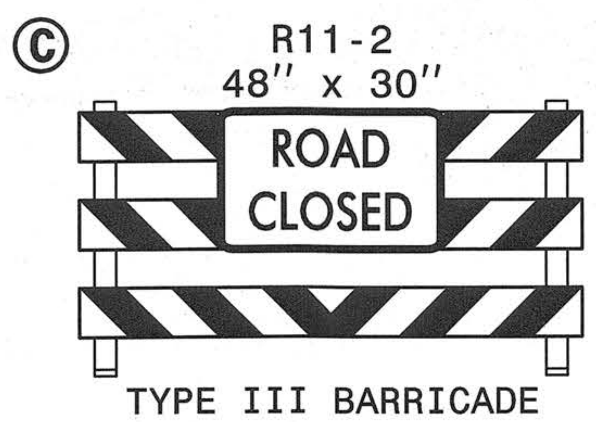
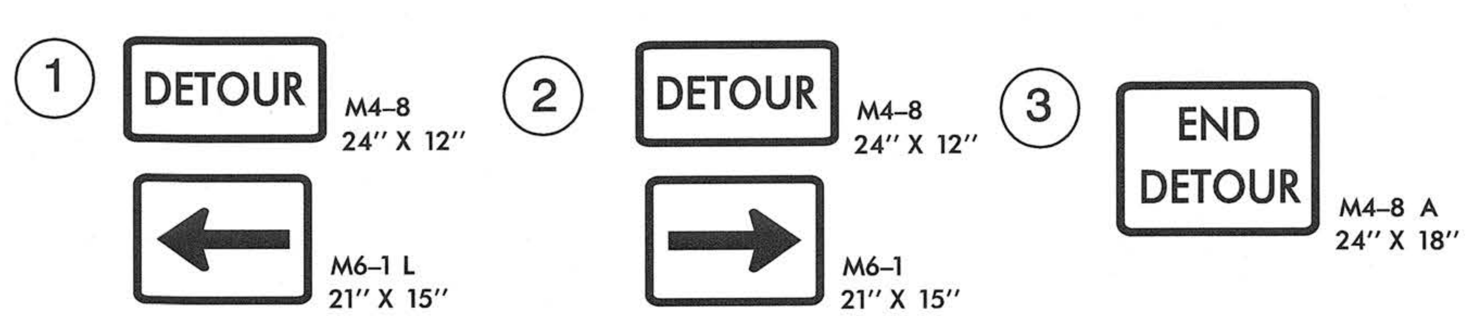
PROJ. REFERENCE NO.	SHEET NO.
BD-5103V	TMP-2











GENERAL NOTES

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

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

LANE AND SHOULDER CLOSURE REQUIREMENTS

A) REMOVE LANE CLOSURE DEVICES FROM THE LANE WHEN WORK IS NOT BEING PERFORMED BEHIND THE LANE CLOSURE OR WHEN A LANE CLOSURE IS NO LONGER NEEDED OR AS DIRECTED BY THE ENGINEER.

TRAFFIC PATTERN ALTERATIONS

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

SIGNING

C) INSTALL ADVANCE WORK ZONE WARNING SIGNS WHEN WORK IS WITHIN 40 FT FROM THE EDGE OF TRAVEL LANE AND NO MORE THAN THREE (3) DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.

D) PROVIDE SIGNING AND DEVICES REQUIRED TO CLOSE THE ROAD ACCORDING TO THE ROADWAY STANDARD DRAWINGS AND TRAFFIC CONTROL PLANS.

PROVIDE SIGNING REQUIRED FOR THE OFF-SITE DETOUR ROUTE AS SHOWN ON SHEET TMP-2.

E) COVER OR REMOVE ALL SIGNS AND DEVICES REQUIRED TO CLOSE THE ROAD WHEN ROAD CLOSURE IS NOT IN OPERATION.

COVER OR REMOVE ALL SIGNS REQUIRED FOR THE OFF-SITE DETOUR WHEN THE DETOUR IS NOT IN OPERATION.

F) ENSURE ALL NECESSARY SIGNING IS IN PLACE PRIOR TO ALTERING ANY TRAFFIC PATTERN.

TRAFFIC CONTROL DEVICES

G) PLACE TYPE III BARRICADES, WITH "ROAD CLOSED" SIGN R11-2 ATTACHED, OF SUFFICIENT LENGTH TO CLOSE ENTIRE ROADWAY.

PAVEMENT MARKINGS AND MARKERS

H) INSTALL PAVEMENT MARKINGS ON THE FINAL SURFACE AS FOLLOWS:

ROAD NAME	MARKING	MARKERS
SR 1306 (BEAUTANCUS RD)	PAINT	RAISED

I) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.

J) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS.

K) PASSING ZONE WILL BE DETERMINED IN THE FIELD AND MUST BE APPROVED BY THE ENGINEER.

PHASING

PHASE I

PRIOR TO ANY CONSTRUCTION OPERATIONS, PLACE AND COVER OFF-SITE DETOUR SIGNS AS SHOWN ON TMP-2 AND IN ACCORDANCE WITH RSD 1101.03 (SHEETS 1 AND 3 OF 9).

PHASE II

USING OFF-SITE DETOUR, UNCOVER DETOUR SIGNS AS SHOWN ON TMP-2 AND CLOSE -L- (SR 1306 / BEAUTANCUS RD.) TO TRAFFIC AND CONSTRUCT BRIDGE, APPROACHES AND ROADWAY UP TO AND INCLUDING THE FINAL LAYER OF SURFACE COURSE.

PHASE III

UPON COMPLETION OF BRIDGE, APPROACHES AND ROADWAY, PLACE FINAL PAVEMENT MARKINGS AND MARKERS IN ACCORDANCE WITH ROADWAY STANDARD DRAWINGS. REMOVE BARRICADES AND DETOUR SIGNS AND OPEN -L- (SR 1306 / BEAUTANCUS RD.) TO TRAFFIC.

PROPOSED DETOUR

DETOUR ROUTE

DETOUR LENGTH 2.7 MILES

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343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

APPROVED: DATE: 9/15/14

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 023521 ENGINEER RHONDA B. EARLY

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

TRANSPORTATION MANAGEMENT PLAN

GENERAL NOTES, PHASING AND DETOUR

REVISIONS

QA/QC STAGE:
REVIEW:
CONCUR:
REVISE:
VERIFY:

8/17/99

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TIP PROJECT: BD-5103V

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BD-5103V	EC-1	6

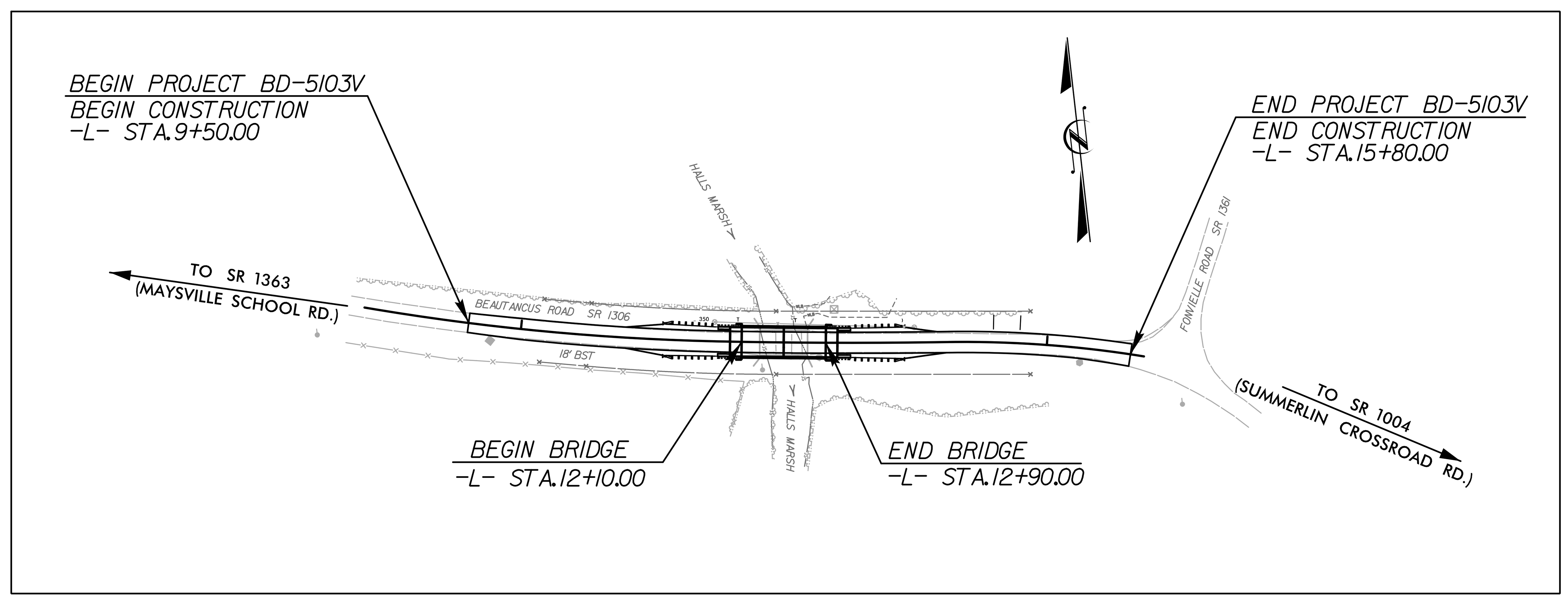
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

LOCATION: DUPLIN COUNTY BRIDGE NO. 111 OVER BRANCH GOSHEN ON SR 1306 (BEAUTANCUS RD.)

TYPE OF WORK: GRADING, PAVING, GUARDRAIL, DRAINAGE & STRUCTURE.



EROSION AND SEDIMENT CONTROL MEASURES

Std. #	Description	Symbol
1630.03	Temporary Silt Ditch	
1630.05	Temporary Diversion	
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	
1622.01	Temporary Berms and Slope Drains	
	Silt Basin Type B	
1633.01	Temporary Rock Silt Check Type-A	
	Temporary Rock Silt Check Type-A with Matting and Polyacrylamide (PAM)	
	Temporary Rock Silt Check Type-B	
	Wattle / Coir Fiber Wattle	
	Wattle / Coir Fiber Wattle with Polyacrylamide (PAM)	
1634.01	Temporary Rock Sediment Dam Type-A	
1634.02	Temporary Rock Sediment Dam Type-B	
1635.01	Rock Pipe Inlet Sediment Trap Type-A	
1635.02	Rock Pipe Inlet Sediment Trap Type-B	
1630.04	Stilling Basin	
1630.06	Special Stilling Basin	
	Rock Inlet Sediment Trap:	
1632.01	Type A	A
1632.02	Type B	B
1632.03	Type C	C
	Skimmer Basin	
	Tiered Skimmer Basin	
	Infiltration Basin	

GRAPHIC SCALE

0
PLANS

0
PROFILE (HORIZONTAL)

0
PROFILE (VERTICAL)

ROADSIDE ENVIRONMENTAL UNIT
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

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

Prepared In the Office of:

HNTB
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

2012 STANDARD SPECIFICATIONS

BENTON R. CARROLL, E.I
EROSION CONTROL
LEVEL III
CERTIFICATION #3180

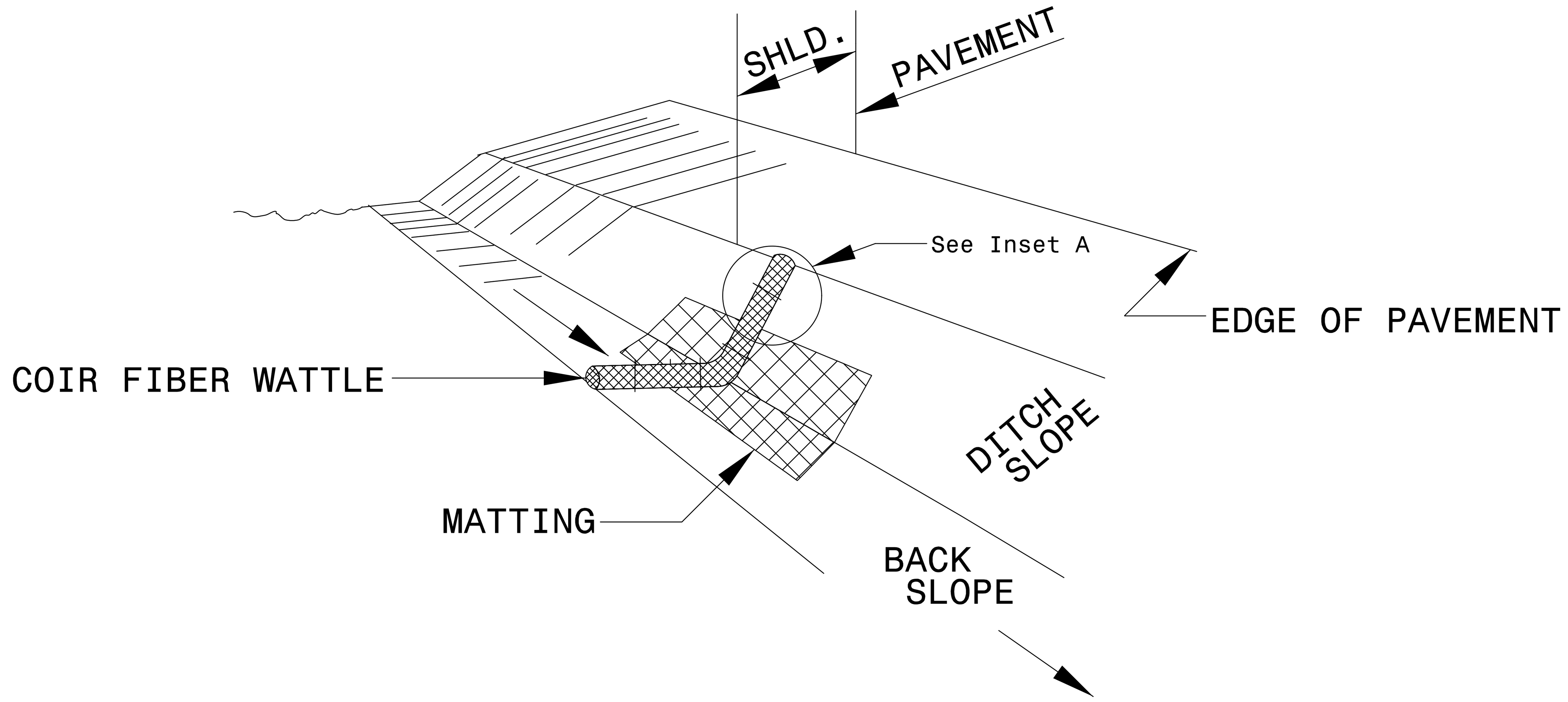
Roadway Standard Drawings

The following roadway english standards as appear in "Roadway Standard Drawings"– Roadway Design Unit – N. C. Department of Transportation – Raleigh, N. C., dated January 2012 and the latest revision thereto are applicable to this project and by reference hereby are considered a part of these plans.

1604.01	Railroad Erosion Control Detail	1632.01	Rock Inlet Sediment Trap Type A
1605.01	Temporary Silt Fence	1632.02	Rock Inlet Sediment Trap Type B
1606.01	Special Sediment Control Fence	1632.03	Rock Inlet Sediment Trap Type C
1607.01	Gravel Construction Entrance	1633.01	Temporary Rock Silt Check Type A
1622.01	Temporary Berms and Slope Drains	1633.02	Temporary Rock Silt Check Type B
1630.01	Riser Basin	1634.01	Temporary Rock Sediment Dam Type A
1630.02	Silt Basin Type B	1634.02	Temporary Rock Sediment Dam Type B
1630.03	Temporary Silt Ditch	1635.01	Rock Pipe Inlet Sediment Trap Type A
1630.04	Stilling Basin	1635.02	Rock Pipe Inlet Sediment Trap Type B
1630.05	Temporary Diversion	1640.01	Coir Fiber Baffle
1630.06	Special Stilling Basin	1645.01	Temporary Stream Crossing
1631.01	Matting Installation		

PROJECT REFERENCE NO.	SHEET NO.
BD-5103V	EC-2

COIR FIBER WATTLE DETAIL



ISOMETRIC VIEW

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.

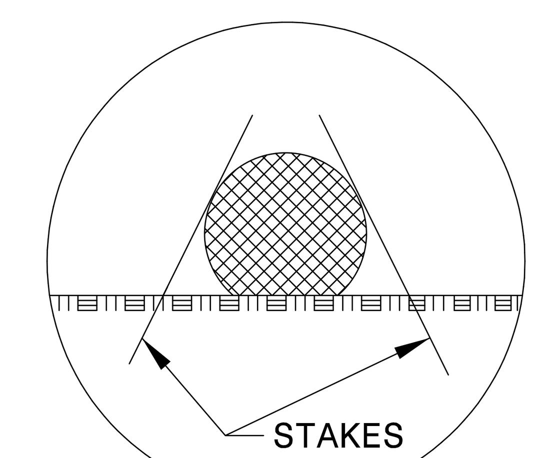
ONLY INSTALL WATTLE(S) TO A HEIGHT IN DITCH SO FLOW WILL NOT WASH AROUND WATTLE AND SCOUR DITCH SLOPES AND AS DIRECTED.

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.



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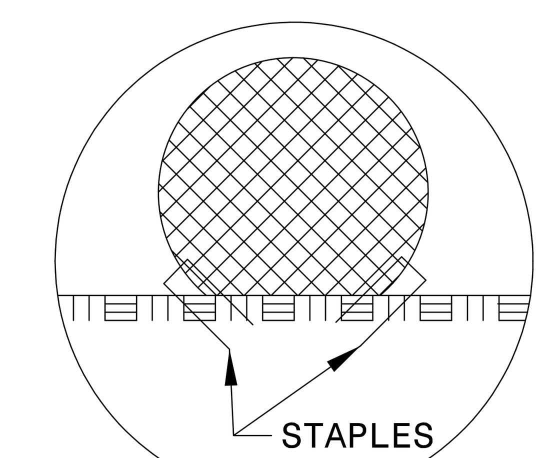
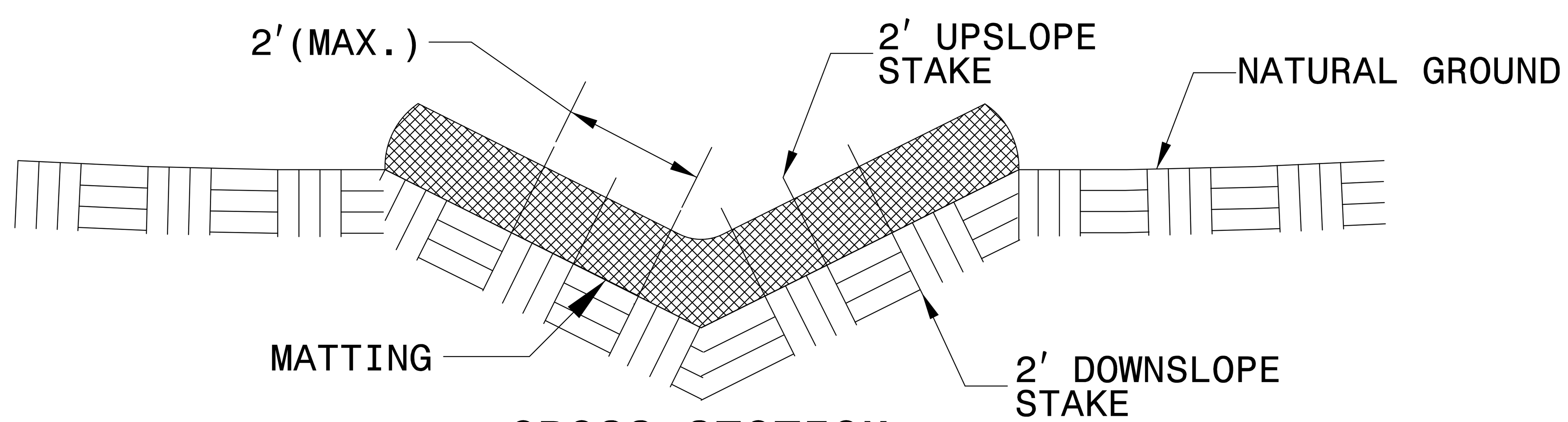
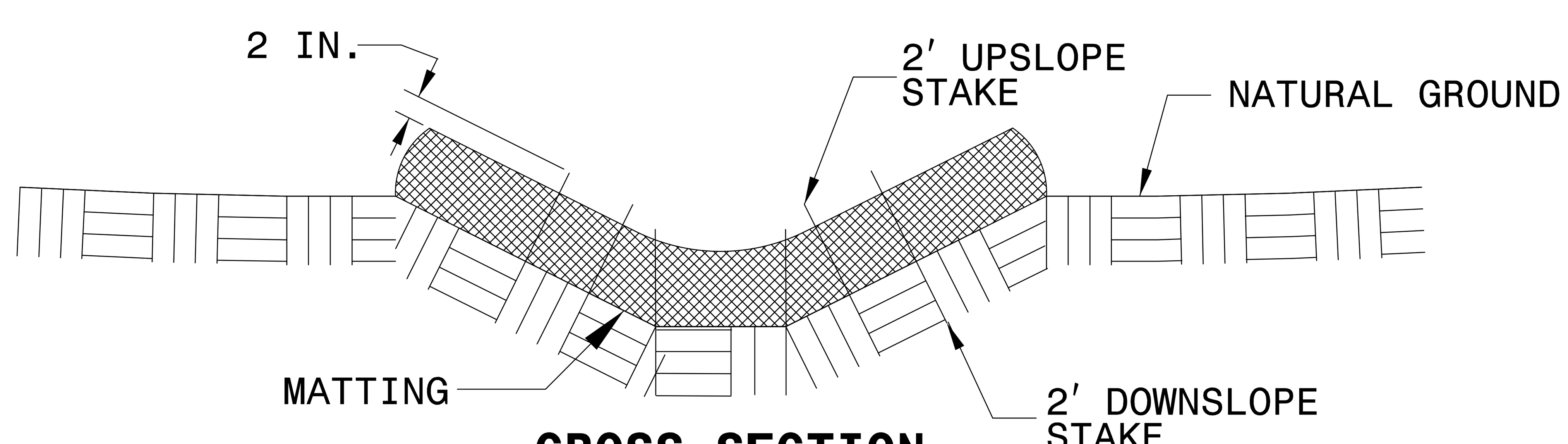


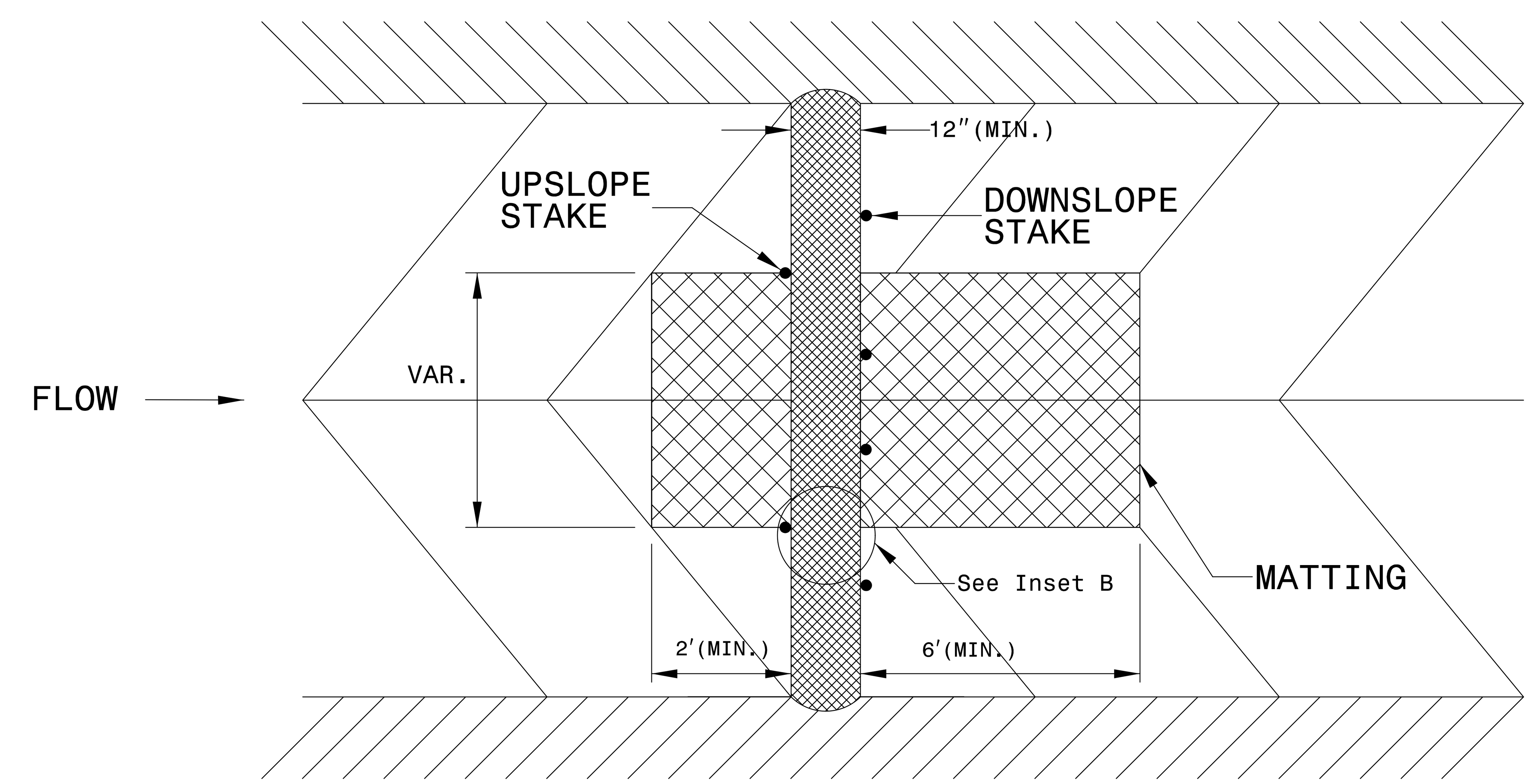
INSET B



CROSS SECTION VEE DITCH



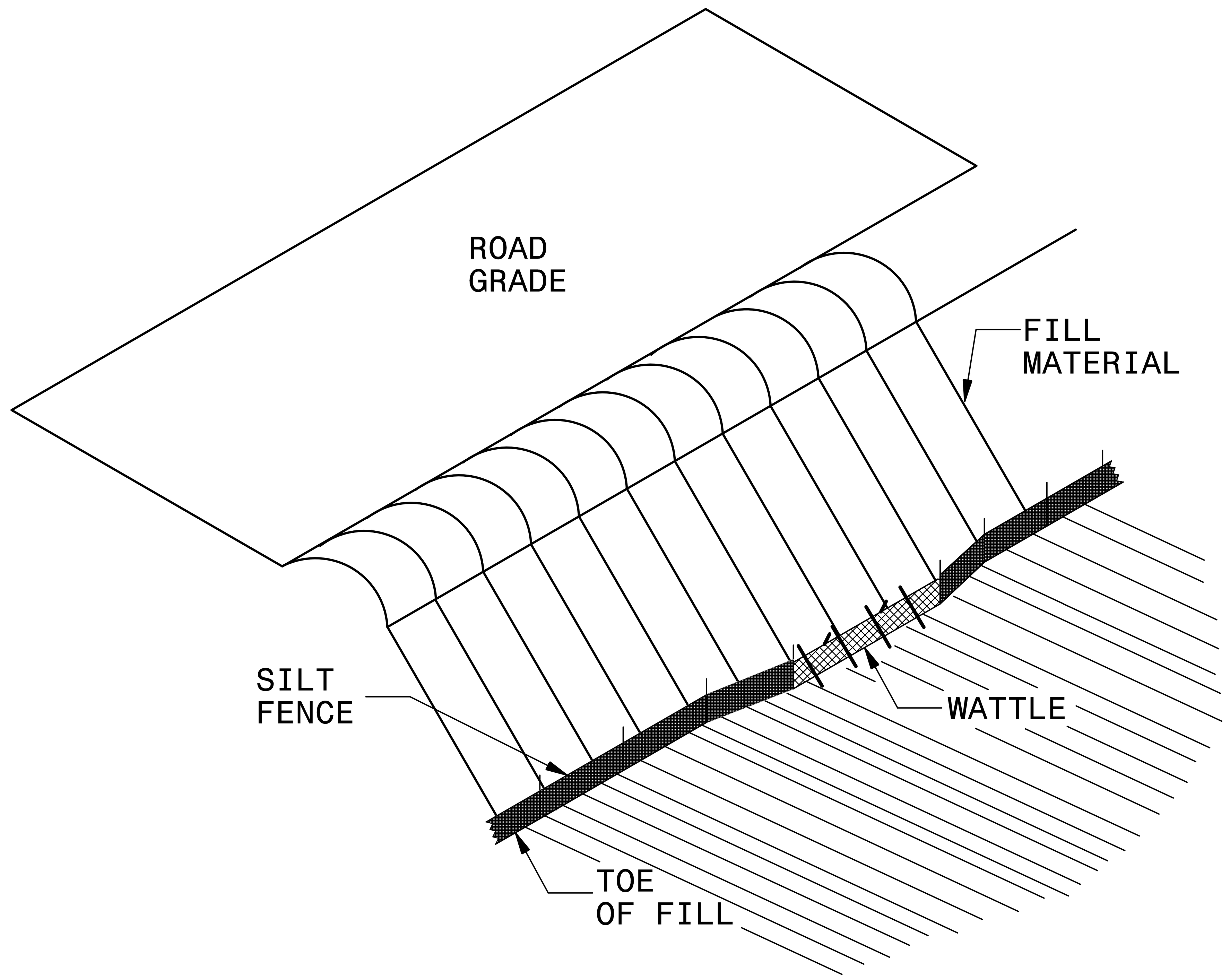
CROSS SECTION TRAPEZOIDAL DITCH



TOP VIEW

PROJECT REFERENCE NO.	SHEET NO.
BD-5103V	EC-3
R/W SHEET NO.	

SILT FENCE COIR FIBER WATTLE BREAK DETAIL



ISOMETRIC VIEW

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.

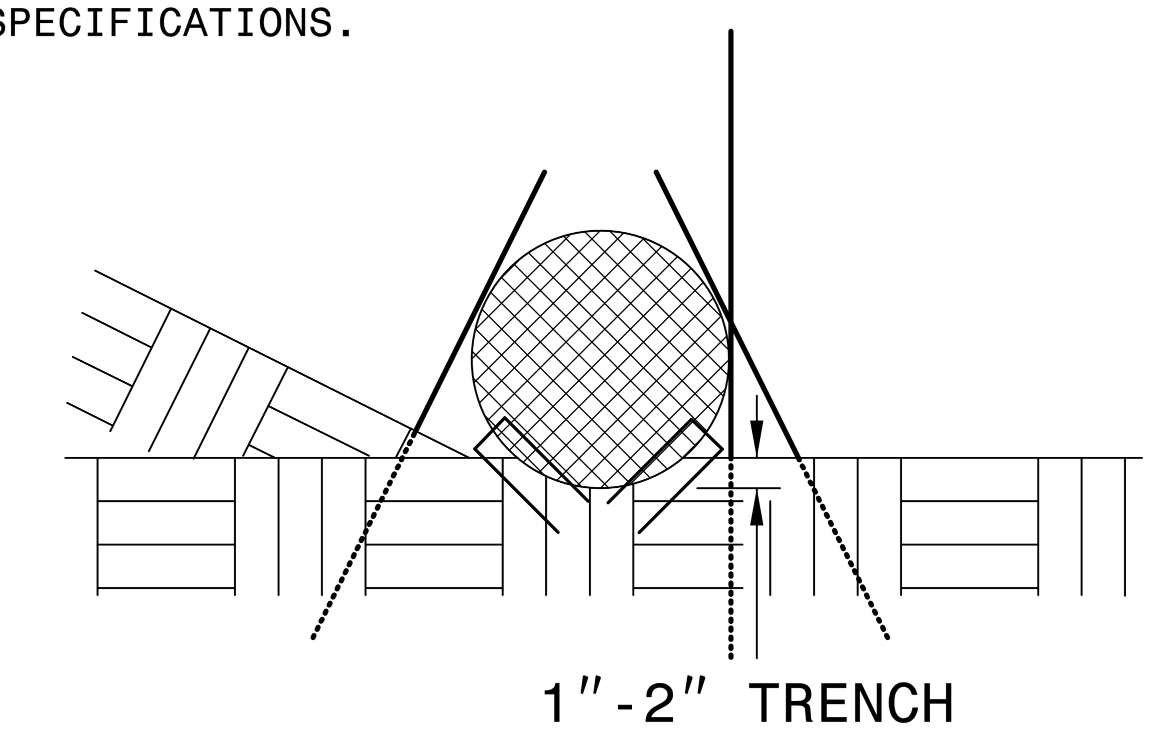
PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12" IN LENGTH.

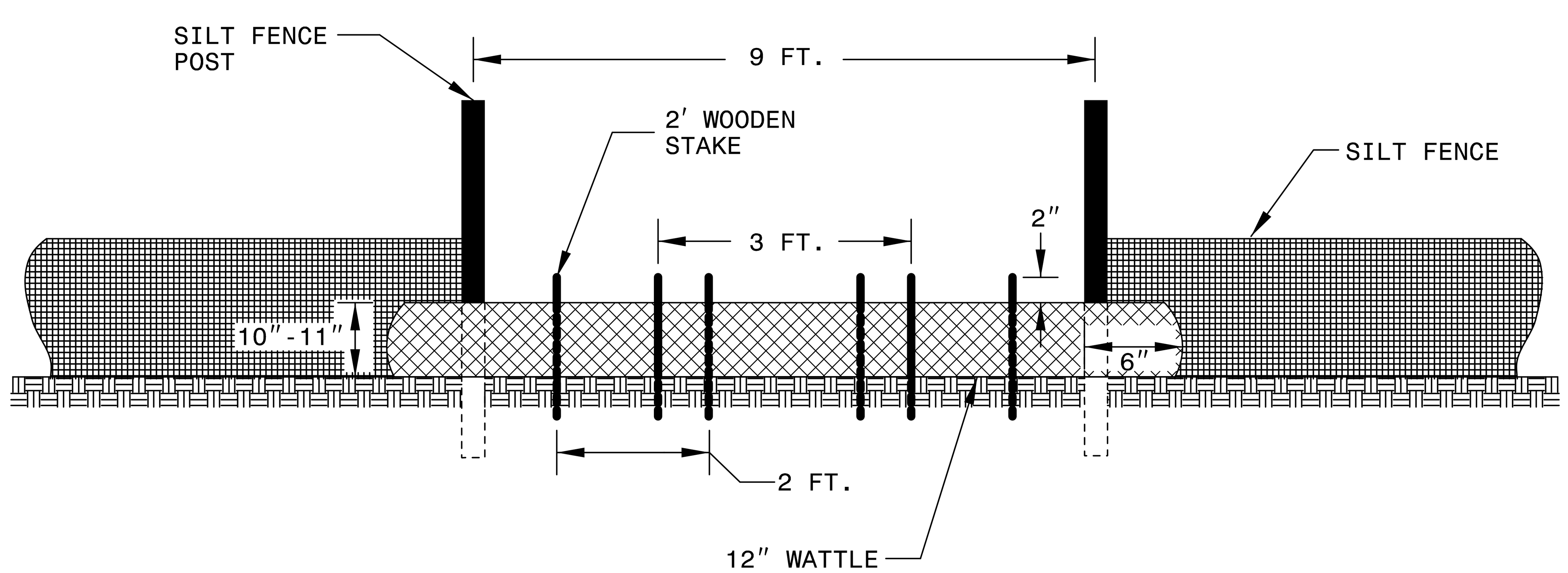
INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

WATTLE INSTALLATION CAN BE ON OUTSIDE OF THE SILT FENCE AS DIRECTED.

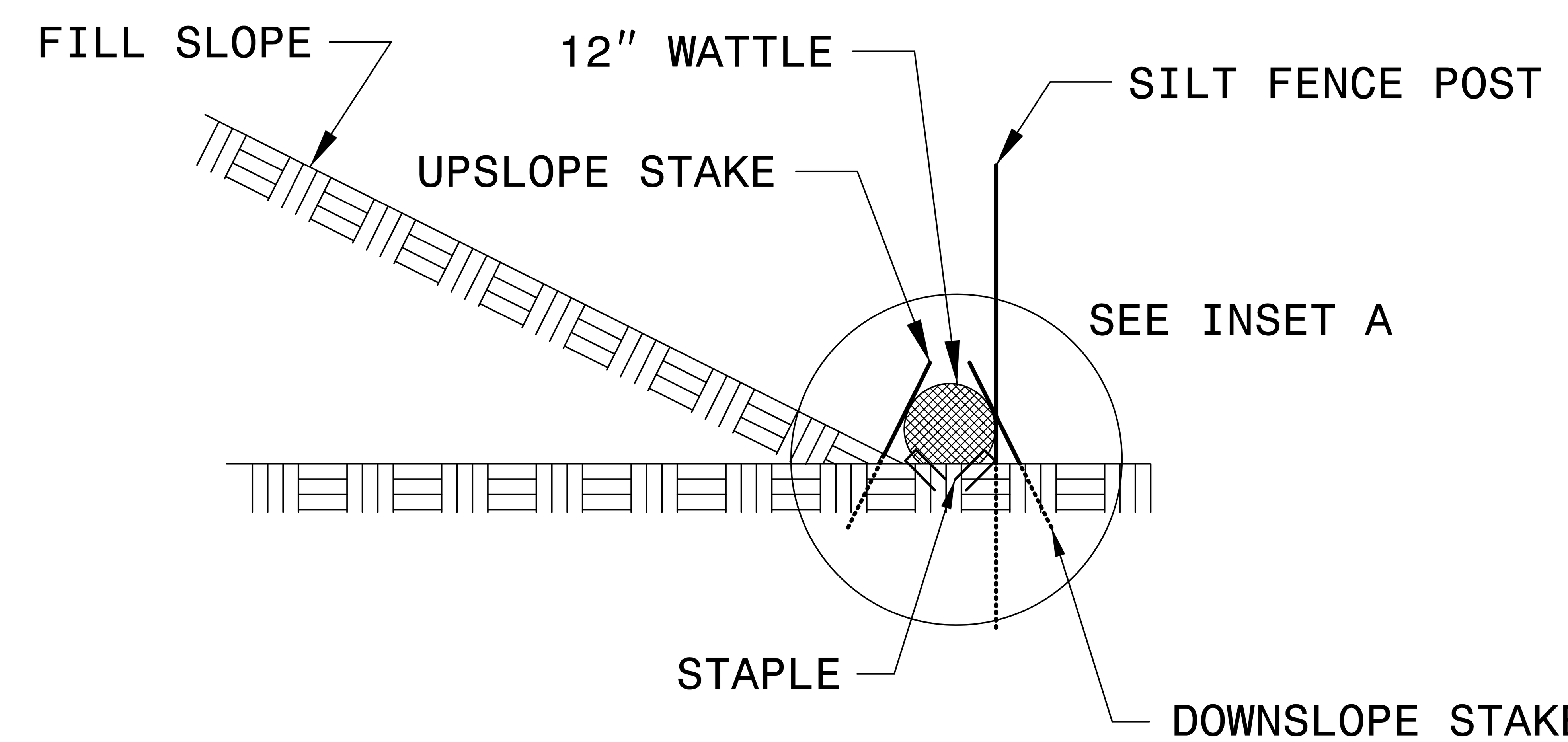
INSTALL TEMPORARY SILT FENCE IN ACCORDANCE WITH SECTION 1605 OF THE STANDARD SPECIFICATIONS.

INSET A





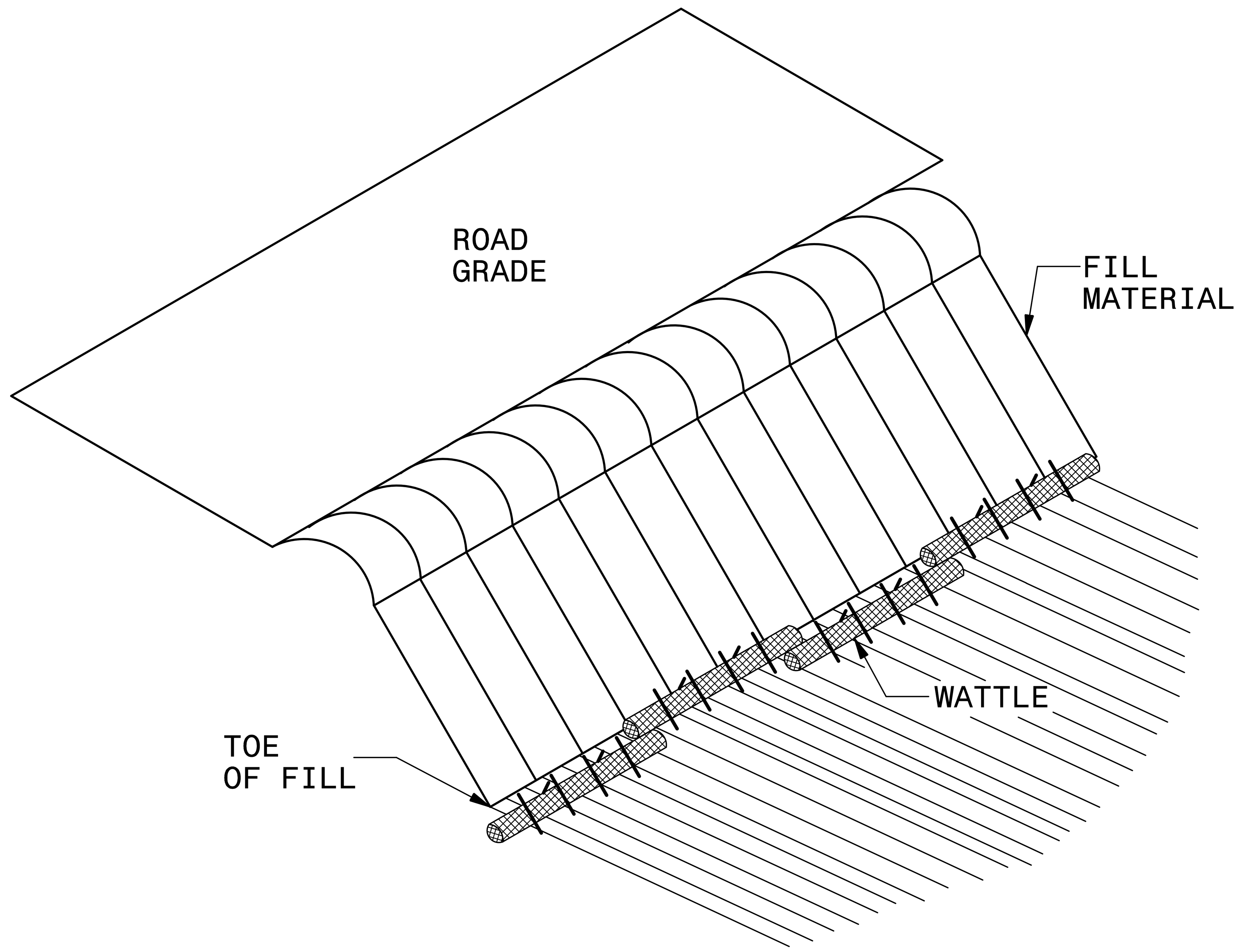
VIEW FROM SLOPE



SIDE VIEW

PROJECT REFERENCE NO.	SHEET NO.
BD-5103V	EC-4
R/W SHEET NO.	

COIR FIBER WATTLE BARRIER DETAIL



ISOMETRIC VIEW

NOTES:

USE MINIMUM 12 IN. DIAMETER COIR FIBER (COCONUT) WATTLE AND LENGTH OF 10 FT.

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

DO NOT PLACE WATTLES ON TOE OF SLOPE.

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

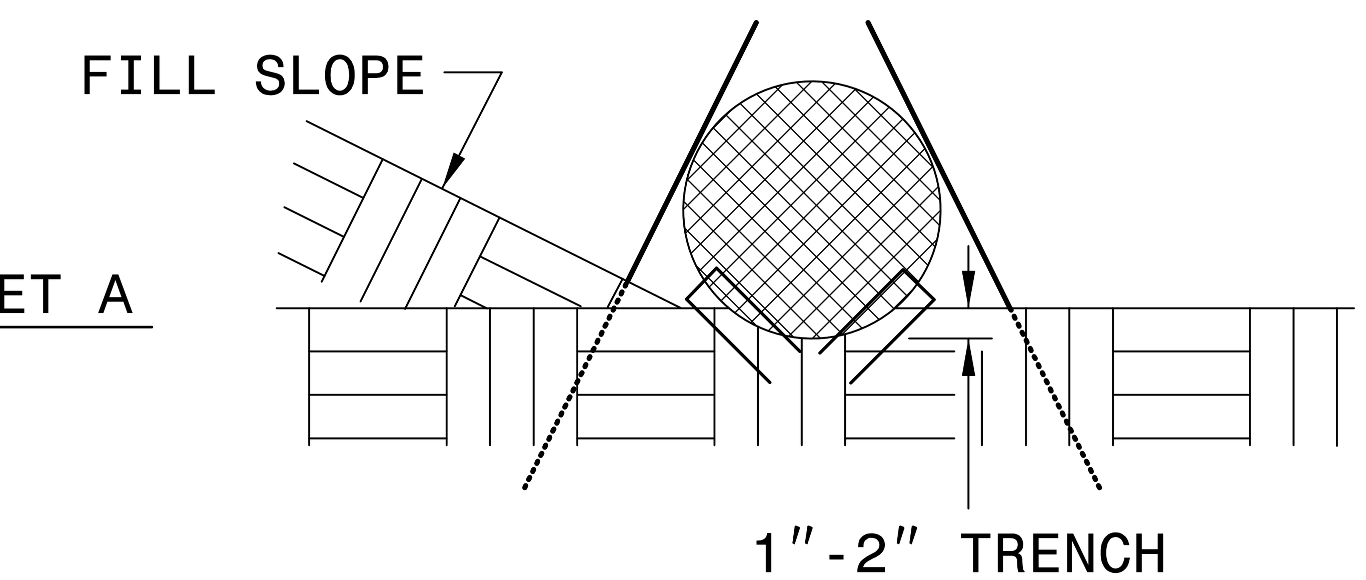
INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO GROUND.

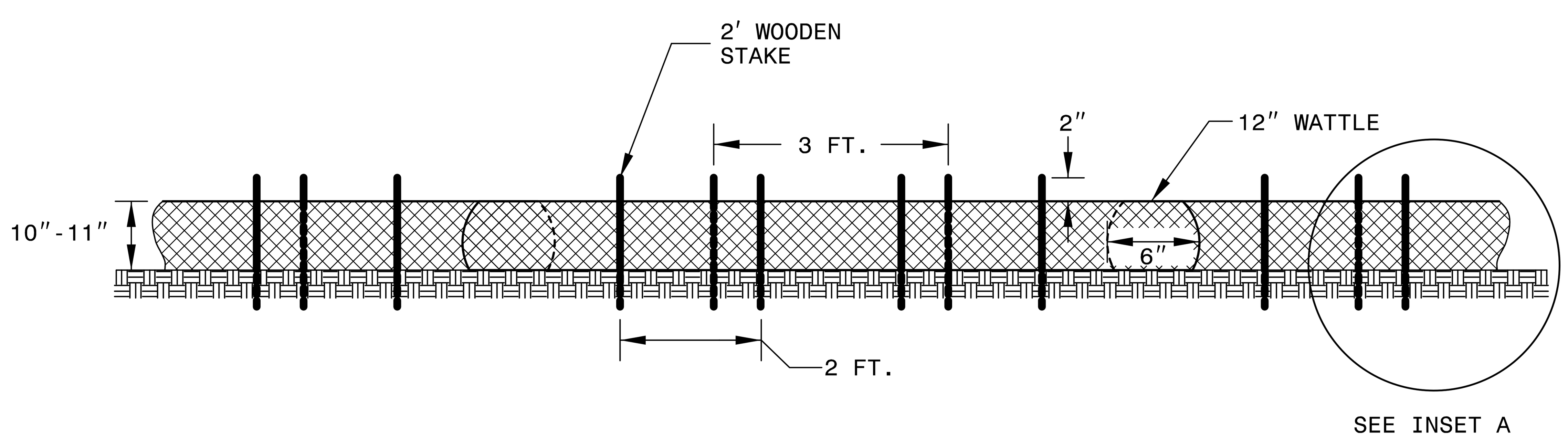
PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12″ IN LENGTH.

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

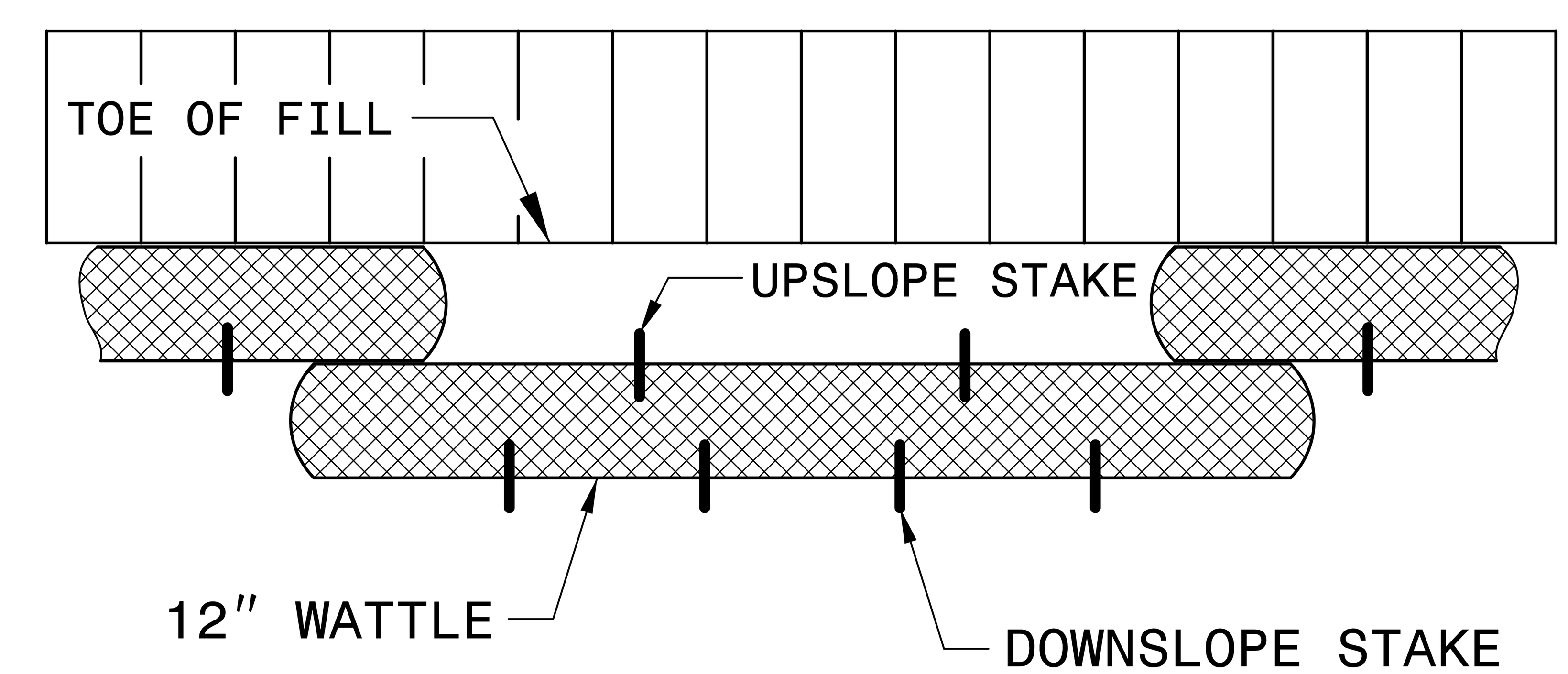
FOR BREAKS ALONG LARGE SLOPES, USE MAXIMUM SPACING OF 20 FT.

INSET A





FRONT VIEW



TOP VIEW

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION TIMEFRAMES

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.

MATTING FOR EROSION CONTROL

SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)	REMARKS
EC-6	-L-	13+00	14+00	LT	67	INSTALL ON SIDE SLOPES
				TOTAL	67	
				SAY	70	

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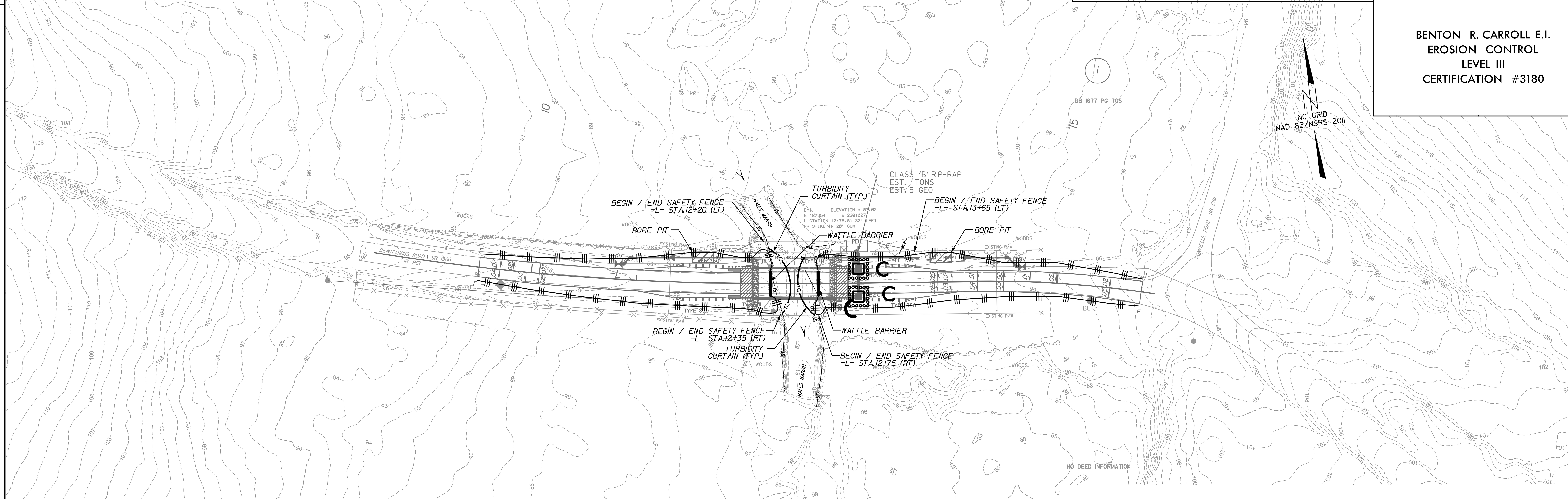
Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
BD-5103V	EC-6
R/W SHEET NO.	

BENTON R. CARROLL E.I.
EROSION CONTROL
LEVEL III
CERTIFICATION #3180

REVISIONS

PLAN



NOTE: THE CONTRACTOR SHALL INSTALL SPECIAL SEDIMENT CONTROL FENCE OR WATTLES IN LOW AREAS OF SILT FENCE AND UNDER THE BRIDGE, AS NEEDED OR DIRECTED BY THE ENGINEER.

PROFILE

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 900	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 87.4	FT
BASE DISCHARGE	= 1400	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 88.50	FT
OVERTOPPING DISCHARGE	= 2500	CFS
OVERTOPPING FREQUENCY	= 500 (+)	YRS
OVERTOPPING ELEVATION	= 90.08	FT
DATE OF SURVEY	= 12-6-12	
W.S.ELEVATION AT DATE OF SURVEY	= 83.5	FT

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TIP PROJECT: BD-5103V

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BD-5103V	UC-01	6

UTILITY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027661 ENGINEER KEVIN C. ZDEB

2014-FEB-21

HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554

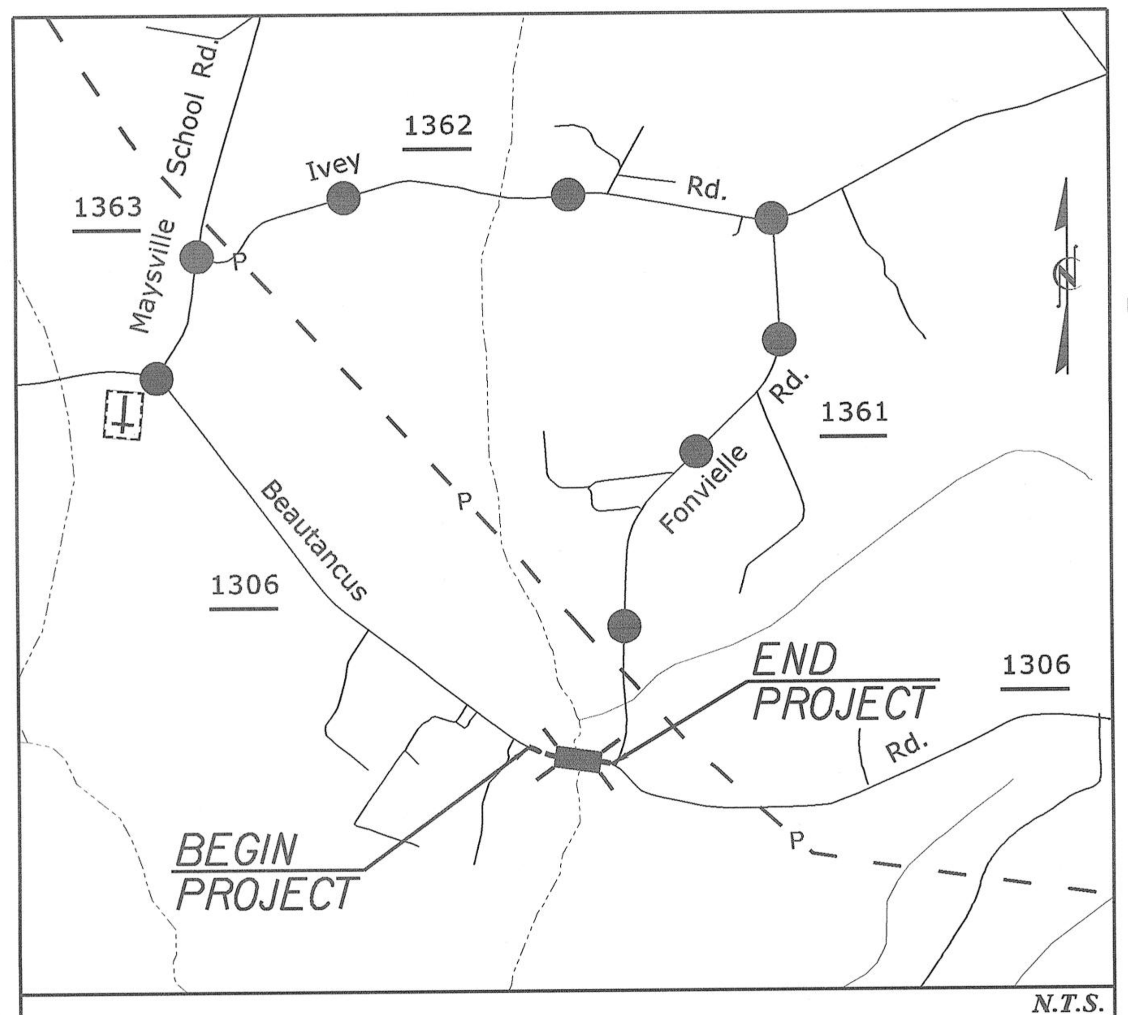
DATE: FEBRUARY 19, 2014

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

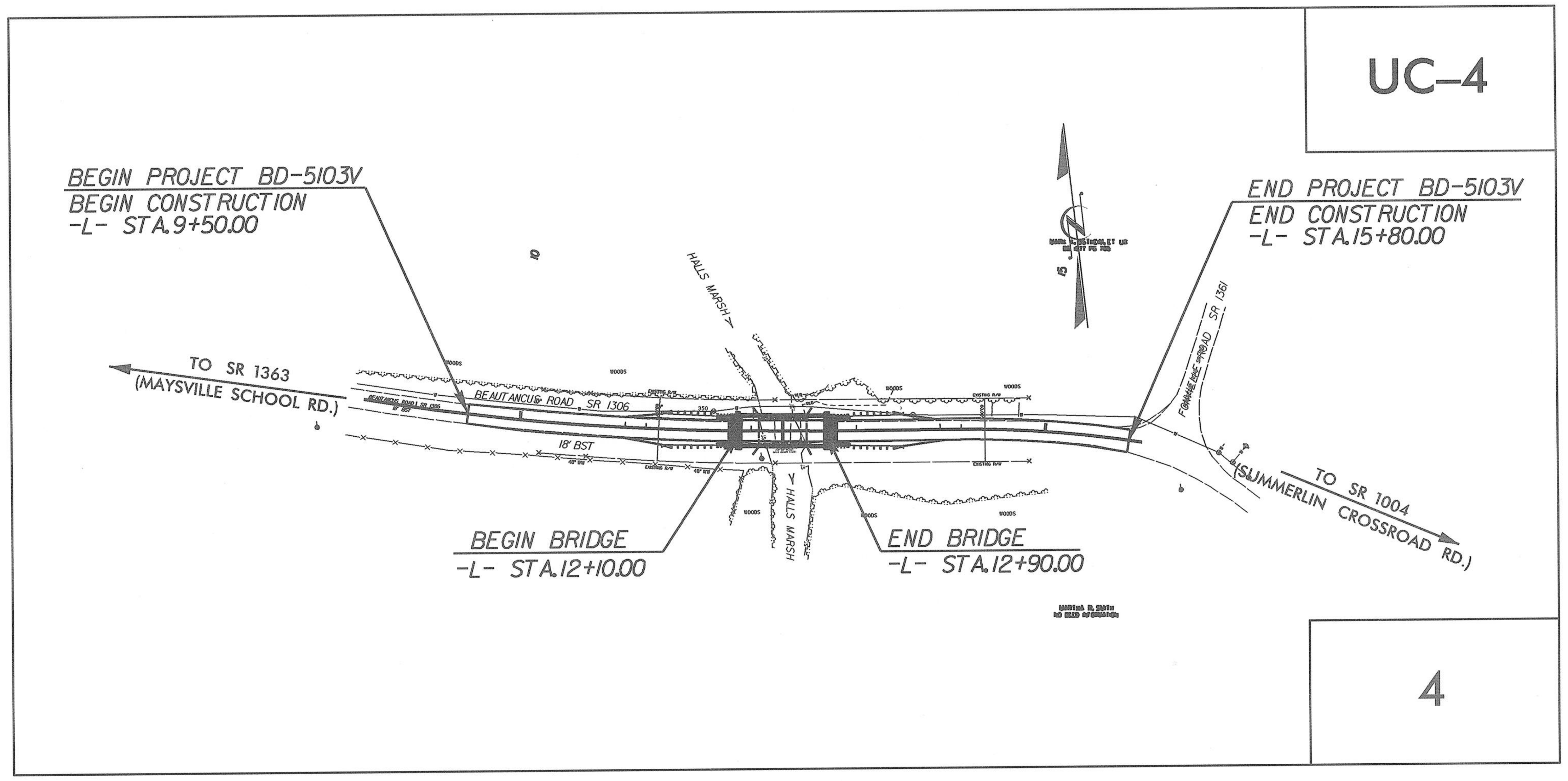
UTILITY CONSTRUCTION PLANS
DUPLIN COUNTY

LOCATION: BRIDGE NO. 111 OVER BRANCH OF GOSHEN ON SR 1306 (BEAUTANCUS RD.)

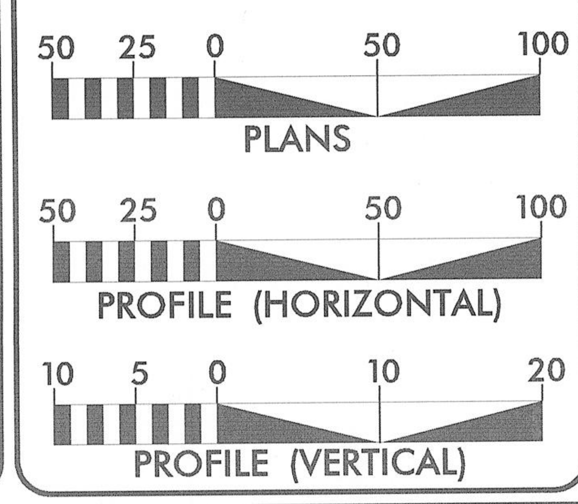
TYPE OF WORK: UTILITIES CONSTRUCTION



VICINITY MAP ●●● DETOUR ROUTE



CONTRACT:



PROJECT LENGTH

LENGTH ROADWAY OF TIP PROJECT BD-5103V =	0.053 MI.
LENGTH OF STRUCTURE TIP PROJECT BD-5103V =	0.013 MI.
TOTAL LENGTH OF TIP PROJECT BD-5103V =	0.066 MI.

INDEX OF SHEETS

UTILITY OWNERS ON PROJECT

WATER - DUPLIN COUNTY

UTILITY DESIGN BY:

MA Engineering CONSULTANTS, INC.
598 East Chatham Street, Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax. 919.297.0221

NCDOT PROJECT ENGINEER:
AMANDA GLYNN, P.E.

PREPARED FOR:
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION BRIDGE PROGRAM

2/20/2014
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PROJECT REFERENCE NO.	SHEET NO.
BD-5103V	UC-02

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

UTILITIES PLAN SHEET SYMBOLS

PROPOSED WATER SYMBOLS

Water Line (Sized as Shown)	12" WL
11¼ Degree Bend	
22½ Degree Bend	
45 Degree Bend	
90 Degree Bend	
Plug	
Tee	
Cross	
Reducer	
Gate Valve	GV
Butterfly Valve	BV
Tapping Valve	TGV
Line Stop	LS
Line Stop with Bypass	LS/BP
Blow Off	BO
Fire Hydrant	PFH
Relocate Fire Hydrant	RFH
Remove Fire Hydrant	REM FH
Water Meter	PWM
Relocate Water Meter	RWM
Remove Water Meter	REM WM
Water Pump Station	PS(W)
RPZ Backflow Preventer	PRPZ
DCV Backflow Preventer	PBFP
Relocate RPZ Backflow Preventer	RRPZ
Relocate DCV Backflow Preventer	RBFP

PROPOSED SEWER SYMBOLS

Gravity Sewer Line (Sized as Shown)	12" SS
Force Main Sewer Line (Sized as Shown)	12" FSS
Manhole (Sized per Note)	
Sewer Pump Station	PS(SS)

PROPOSED MISCELLANOUS UTILITIES SYMBOLS

Power Pole	
Telephone Pole	
Joint Use Pole	
Telephone Pedestal	TEL PED
Utility Line by Others (Type as Shown)	PROP O/H POW LINES
Trenchless Installation	12" TL INSTALL
Encasement by Open Cut	24" ENCAS BY OC
Encasement	24" ENCASEMENT
Thrust Block	
Air Release Valve	AR
Utility Vault	UV
Concrete Pier	CP
Steel Pier	SP
Plan Note	NOTE
Pay Item Note	PAY ITEM

EXISTING UTILITIES SYMBOLS

Power Pole	
Telephone Pole	
Joint Use Pole	
Utility Pole	
Utility Pole with Base	
H-Frame Pole	
Power Transmission Line Tower	
Water Manhole	
Power Manhole	
Telephone Manhole	
Sanitary Sewer Manhole	
Hand Hole for Cable	
Power Transformer	
Telephone Pedestal	
CATV Pedestal	
Gas Valve	
Gas Meter	
Located Miscellaneous Utility Object	
Abandoned According to Utility Records	AATUR
End of Information	E.O.I.
*Underground Power Line	P
*Underground Telephone Cable	T
*Underground Telephone Conduit	TC
*Underground Fiber Optics Telephone Cable	T FO
*Underground TV Cable	TV
*Underground Fiber Optics TV Cable	TV FO
*Underground Gas Pipeline	G
Aboveground Gas Pipeline	A/G Gas
*Underground Water Line	W
Aboveground Water Line	A/G Water
*Underground Gravity Sanitary Sewer Line	SS
Aboveground Gravity Sanitary Sewer Line	A/G Sanitary Sewer
*Underground SS Forced Main Line	FSS
Underground Unknown Utility Line	?UTL
SUE Test Hole	
Water Meter	
Water Valve	
Fire Hydrant	
Sanitary Sewer Cleanout	

*For Existing Utilities

Utility Line Drawn from Record (Type as Shown)	
Designated Utility Line (Type as Shown)	

REV: 2/1/2012

5/14/99

2/20/2014 8:45:43 AM
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UTILITY DESIGN ENGINEER

SEAL 027661 KEVIN C. ZOEB

2014-FEB-21

MA Engineering CONSULTANTS, INC. 598 E. Chatham Street, Suite 137 Cary, N. C. 27511

HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554

DATE: FEBRUARY 19, 2014

REVISIONS

8/17/99

UTILITY CONSTRUCTION

GENERAL NOTES:

1. THE PROPOSED UTILITY CONSTRUCTION SHALL MEET THE APPLICABLE REQUIREMENTS OF NC DEPARTMENT OF TRANSPORTATION'S "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" DATED JANUARY 2012.

2. THE EXISTING UTILITIES BELONG TO

DUPLIN COUNTY
CONTACT: DONNA BROWN
PHONE: 910-296-2123

3. ALL WATER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL AND NATURAL RESOURCES, DIVISION OF WATER RESOURCES - PUBLIC WATER SUPPLY SECTION. ALL SEWER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES, DIVISION OF WATER RESOURCES - WATER QUALITY SECTION. PERFORM ALL WORK IN ACCORDANCE WITH THE APPLICABLE PLUMBING CODES.

4. THE UTILITY OWNER OWNS THE EXISTING UTILITY FACILITIES AND WILL OWN THE NEW UTILITY FACILITIES AFTER ACCEPTANCE BY THE DEPARTMENT AND UTILITY OWNER. THE DEPARTMENT OWNS THE CONSTRUCTION CONTRACT AND HAS ADMINISTRATIVE AUTHORITY. COMMUNICATIONS AND DECISIONS BETWEEN THE CONTRACTOR AND UTILITY OWNER ARE NOT BINDING UPON THE DEPARTMENT OR THIS CONTRACT UNLESS AUTHORIZED BY THE ENGINEER. AGREEMENTS BETWEEN THE UTILITY OWNER AND CONTRACTOR FOR THE WORK THAT IS NOT PART OF THIS CONTRACT OR IS SECONDARY TO THIS CONTRACT ARE ALLOWED, BUT ARE NOT BINDING UPON THE DEPARTMENT.

5. PROVIDE ACCESS FOR THE DEPARTMENT PERSONNEL AND THE OWNER'S REPRESENTATIVES TO ALL PHASES OF CONSTRUCTION. NOTIFY DEPARTMENT PERSONNEL AND THE UTILITY OWNER TWO WEEKS PRIOR TO COMMENCEMENT OF ANY WORK AND ONE WEEK PRIOR TO SERVICE INTERRUPTION. KEEP UTILITY OWNERS' REPRESENTATIVES INFORMED OF WORK PROGRESS AND PROVIDE OPPROTUNITY FOR INSPECTION OF CONSTRUCTION AND TESTING.

6. THE PLANS DEPICT THE BEST AVAILABLE INFORMATION FOR THE LOCATION, SIZE, AND TYPE OF MATERIAL FOR ALL EXISTING UTILITIES. MAKE INVESTIGATIONS FOR DETERMINING THE EXACT LOCATION, SIZE, AND TYPE MATERIAL OF THE EXISTING FACILITIES AS NECESSARY FOR THE CONSTRUCTION OF THE PROPOSED UTILITIES AND FOR AVOIDING DAMAGE TO EXISTING FACILITIES. REPAIR ANY DAMAGE INCURRED TO EXISTING FACILITIES TO THE ORIGINAL OR BETTER CONDITION AT NO ADDITONAL COST TO THE DEPARTMENT.

7. MAKE FINAL CONNECTIONS OF THE NEW WORK TO THE EXISTING SYSTEM WHERE INDICATED ON THE PLANS, AS REQUIRED TO FIT THE ACTUAL CONDITIONS, OR AS DIRECTED.

8. MAKE CONNECTIONS BETWEEN EXISTING AND PROPOSED UTILITIES AT TIMES MOST CONVENIENT TO THE PUBLIC, WITHOUT ENDANGERING THE UTILITY SERVICE, AND IN ACCORDANCE WITH THE UTILITY OWNER'S REQUIREMENTS. MAKE CONNECTIONS ON WEEKENDS, AT NIGHT, AND ON HOLIDAYS IF NECESSARY.

9. ALL UTILITY MATERIALS SHALL BE APPROVED PRIOR TO DELIVERY TO THE PROJECT. SEE 1500-7, " SUBMITTALS AND RECORDS" IN SECTION 1500 OF THE STANDARD SPECIFICATIONS. THE UTILITY OWNER SHALL BE INCLUDED IN THE SUBMITTAL REVIEW AND ALLOWED 10 CALENDAR DAYS TO REVIEW THE SUBMITTALS FOR APPROVAL. MATERIALS SUPPLIED ON THE PROJECT THAT ARE NOT SPECIFICALLY IDENTIFIED ON THE PLANS OR IN NCDOT STANDARDS SHALL MEET THE STANDARD SPECIFICATIONS OF THE UTILITY OWNER.

10. CONTRACTOR SHALL NOTIFY NC ONE-CALL AT 1-800-632-4949 PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION ACTIVITY SUCH THAT ALL EXISTING UTILITIES CAN BE MARKED. FURTHERMORE, THE CONTRACTOR SHALL MAKE EVERY EFFORT TO CONTACT ANY UTILITY OWNERS THAT ARE NOT MEMBERS OF NC ONE-CALL AND HAVE FACILITIES RESIDING WITHIN THE PROJECT LIMITS.

PROJECT SPECIFIC NOTES:

1. ALL WATER LINE PIPE FOR OPEN TRENCH CONSTRUCTION SHALL BE RESTRAINED JOINT DUCTILE IRON PRESSURE CLASS 350. WATER LINE PIPE FOR TRENCHLESS INSTALLATION SHALL BE HDPE DR-9.

2. ALL FITTINGS SHALL BE DUCTILE IRON PRESSURE CLASS 350.

3. THE EXISTING 10" WATER LINE SHALL BE RESTRAINED ON THE PORTION TO REMAIN AFTER VALVE INSTALLATION. THE CONTRACTOR SHALL EXCAVATE THE EXISTING WATER LINE AND INSTALL THE BELL RESTRAINT CLAMPS AT EVERY BELL JOINT FOR THE DISTANCE NOTED IN THE TABLE ON SHEET UC-3B.

4. ALL FITTINGS (BENDS, TEES, CROSSES, REDUCERS, PLUGS, ETC.) SHALL BE ADEQUATELY RESTRAINED BY THE USE OF RESTRAINING GLANDS AND/OR CAST IN PLACE CONCRETE THRUST RESTRAINTS AS DETAILED ON THESE PLANS OR AS DIRECTED BY THE RESIDENT ENGINEER.

5. EXISTING BURIED WATER LINE TO BE ABANDONED SHALL BE CAPPED AND FILLED WITH FLOWABLE FILL.

PROJECT QUANTITIES:

Job Name: BD-5103V   Date: 2/19/2014

Item Number	Description	Quantity	
5326000000-E	10" Water Line	104	LF
5326200000-E	12" Water Line	287	LF
5552000000-E	10" Valve	2	EA
5871700000-E	Trenchless Installation of 12" Pipe in Soil	144	LF
5871710000-E	Trenchless Installation of 12" Pipe not in Soil	143	LF
5802000000-E	Abandon 10" Utility Pipe	384	LF

PROJECT REFERENCE NO.	SHEET NO.
BD-5103V	UC-3A

UTILITY DESIGN ENGINEER

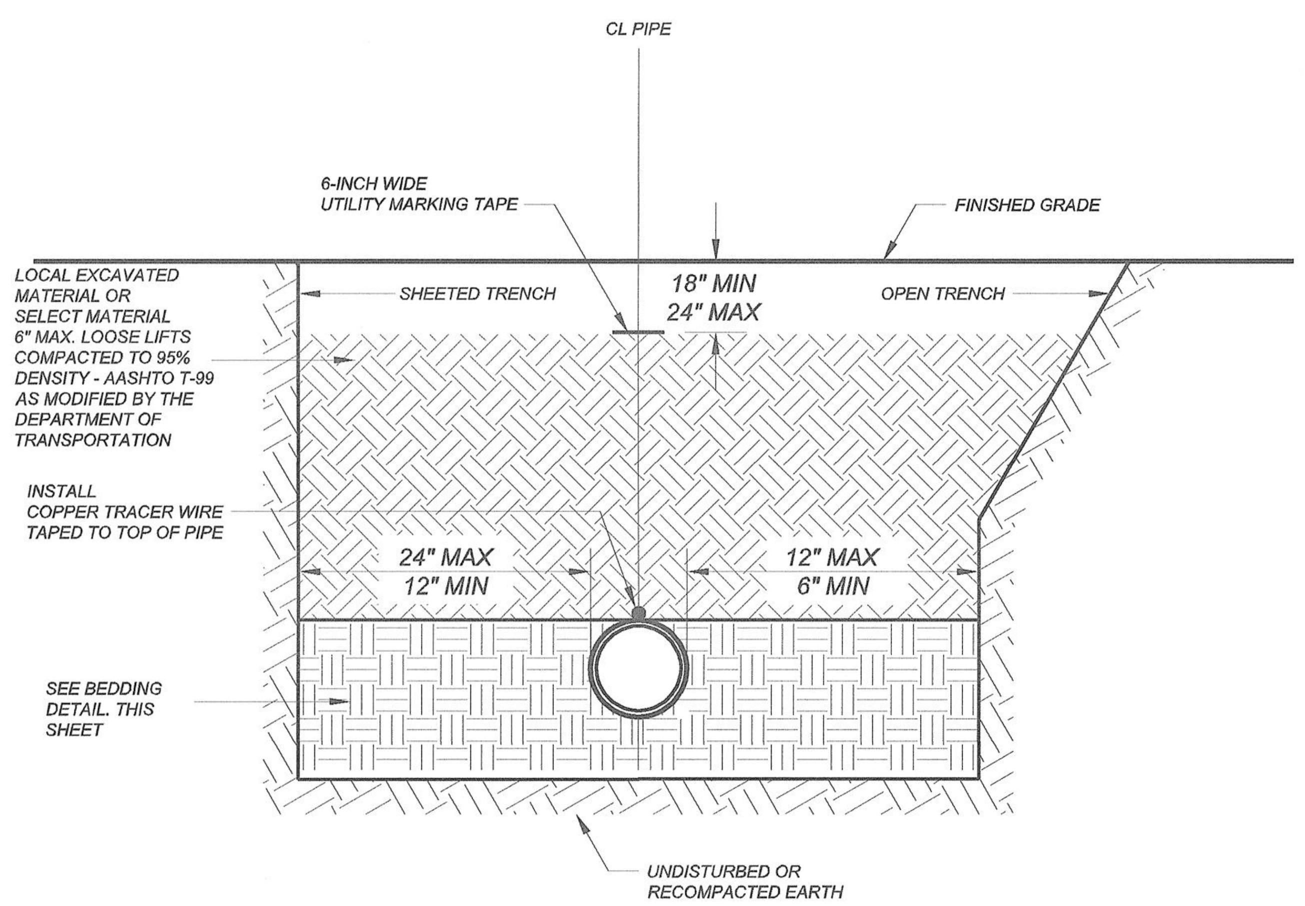
NORTH CAROLINA PROFESSIONAL SEAL 027661 ENGINEER KEVIN C. ZDEB

2014-FEB-21

MA Engineering CONSULTANTS, INC.
598 E. Chatham Street, Suite 137
Cary, N. C. 27511

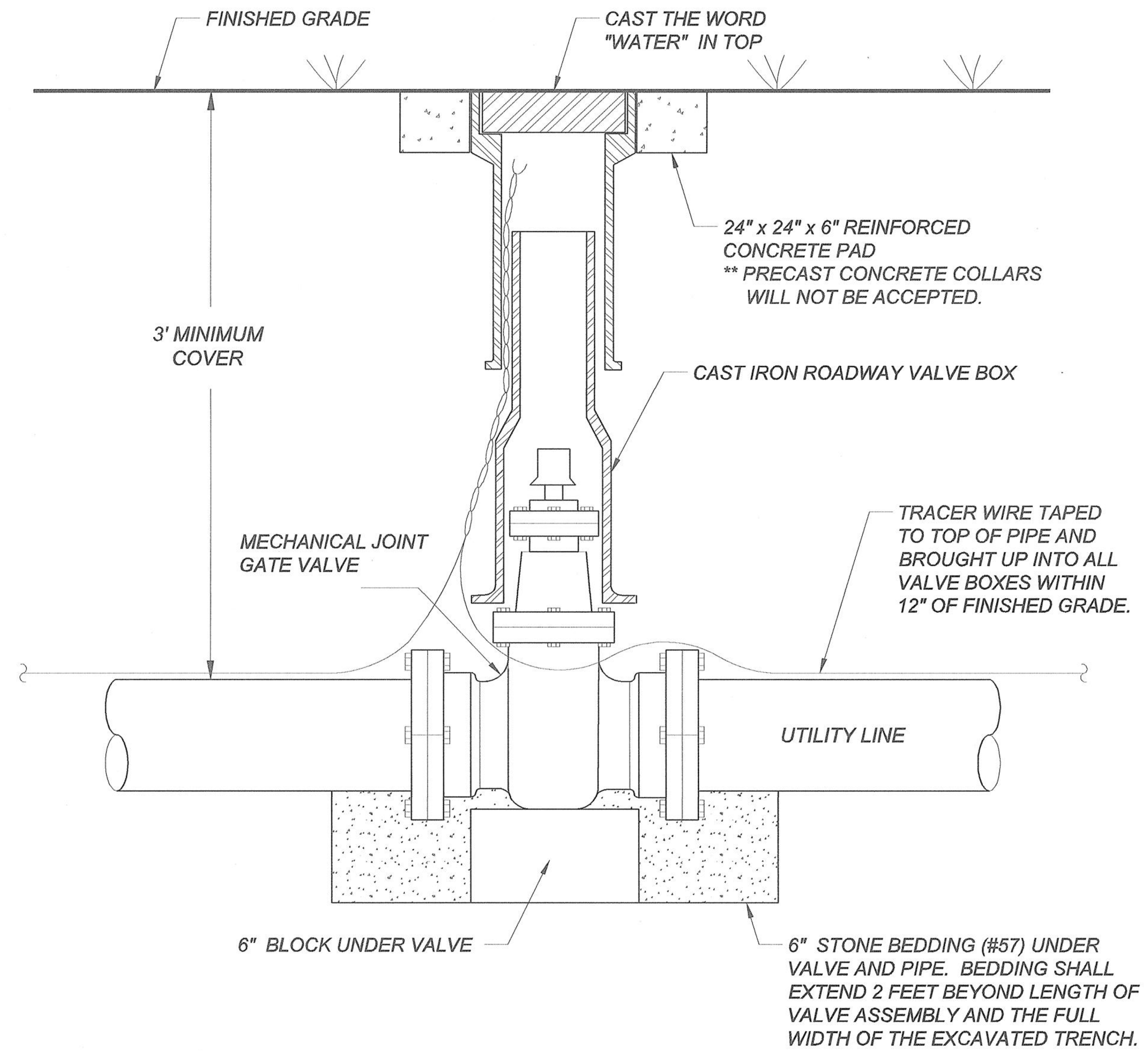
HNTB
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

DATE: FEBRUARY 19, 2014



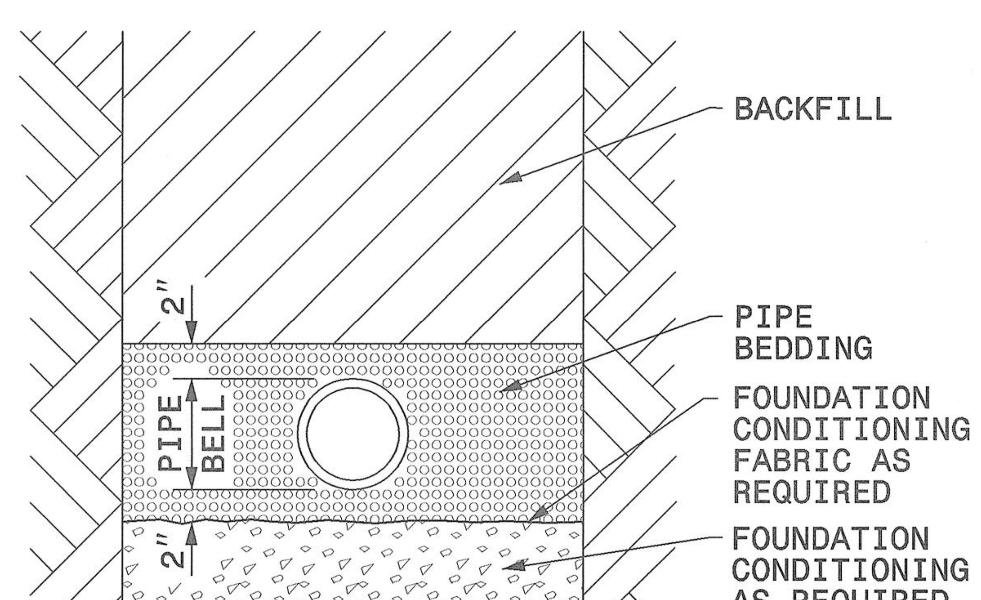
NOTES:
1. ALL SHORING & TRENCHING SHALL COMPLY WITH OSHA SAFETY STANDARDS FOR THE CONSTRUCTION INDUSTRY.
2. BELL HOLES NOT SHOWN.
3. ALL BACKFILL MATERIAL SHALL BE FREE OF ROCKS, FOREIGN MATERIAL, AND FROZEN EARTH.

GENERAL TRENCH DETAIL
NTS



GATE VALVE DETAIL
NTS

PIPE BEDDING DETAIL



PLACE FOUNDATION CONDITIONING MATERIAL BELOW BEDDING IF REQUIRED, AS DIRECTED BY ENGINEER. PIPE BEDDED IN SELECT MATERIAL, CLASS II (TYPE 1) OR CLASS III. TRENCH BACKFILLED IN LOOSE 6" LAYERS COMPACTED TO TOP OF TRENCH USING LOCAL EXCAVATED MATERIAL IF APPROVED BY THE ENGINEER, OR SELECT MATERIAL. ALL MATERIAL SHALL BE FREE OF ROCKS, FOREIGN MATERIAL, AND FROZEN EARTH. COMPACTION SHALL BE TO APPROXIMATELY 95% DENSITY IN ACCORDANCE WITH AASHTO T-99 AS MODIFIED BY THE DEPARTMENT OF TRANSPORTATION.

MAXIMUM TRENCH WIDTH
AT TOP OF PIPE

NOMINAL PIPE SIZE (INCHES)	TRENCH WIDTH (INCHES)	NOMINAL PIPE SIZE (INCHES)	TRENCH WIDTH (INCHES)
4	28	20	44
6	30	24	48
8	32	30	54
10	34	36	60
12	36	42	66
14	38	48	72
16	40	54	78
18	42		

PROJECT REFERENCE NO.	SHEET NO.
BD-5103V	UC-3B

UTILITY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 027661 ENGINEER KEVIN C. ZDEB

2014-FEB-21

MA Engineering CONSULTANTS, INC.
598 E. Chatham Street, Suite 137
Cary, N. C. 27511

HNTB NORTH CAROLINA, P.C.
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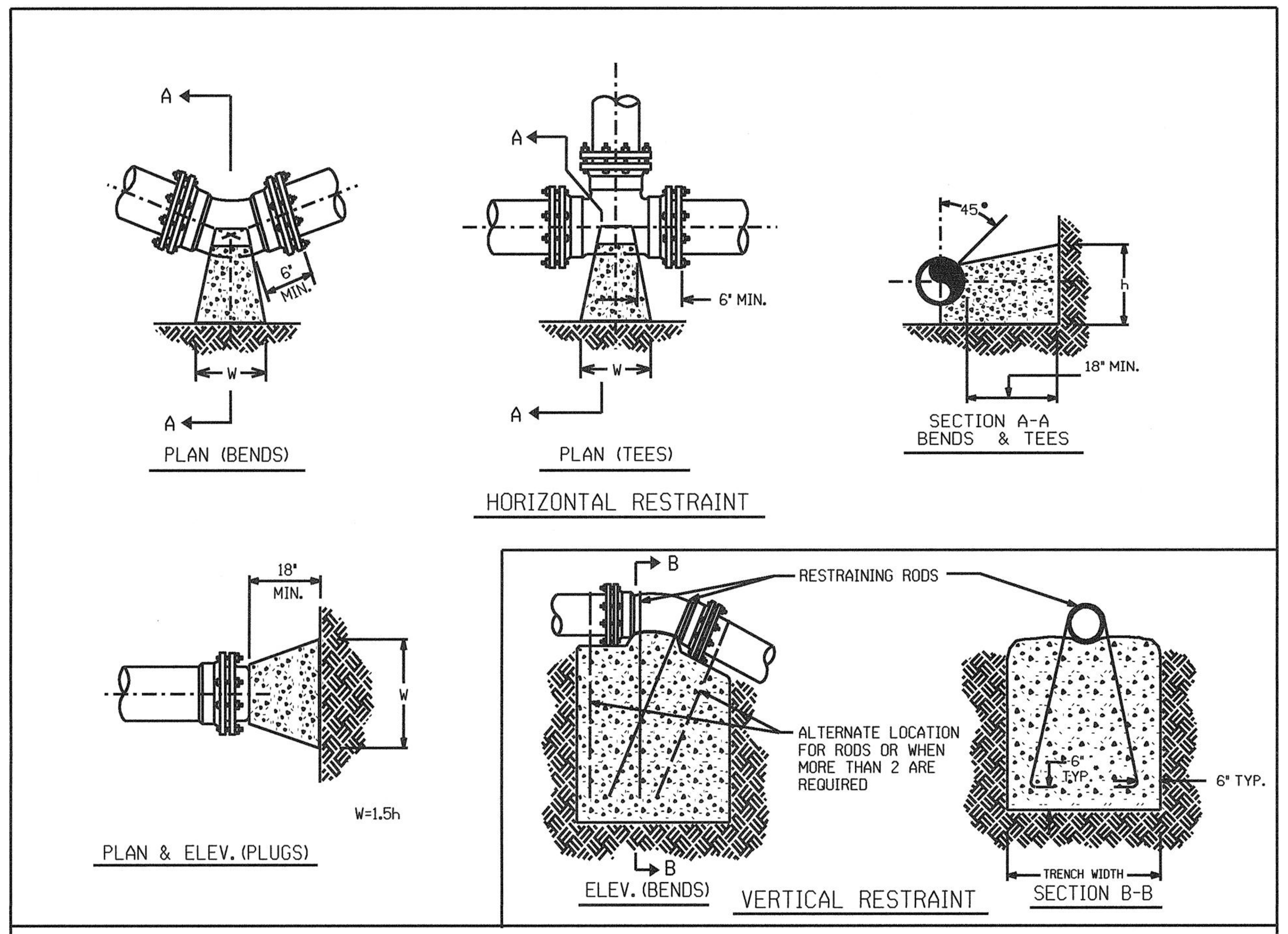


THRUST RESTRAINT FOR PIPE LINES

PVC PIPE RESTRAINED JOINT DESIGN TABLE

FITTING	REQUIRED RESTRAINED LENGTH (FT) OF PVC PIPE BY DEPTH OF COVER							
HORIZONTAL BENDS	**3 FT**	**4 FT**	**5 FT**	**6 FT**	**7 FT**	**8 FT**	**9 FT**	**10 FT**
10 INCH DIA - 11.25 DEG	4	3	3	3	2	2	2	2
10 INCH DIA - 22.5 DEG	7	6	6	5	5	4	4	4
10 INCH DIA - 45 DEG	15	13	11	10	9	8	7	7
10 INCH DIA - 90 DEG	35	30	26	23	21	19	17	16
VERTICAL DOWN BENDS	**3 FT**	**4 FT**	**5 FT**	**6 FT**	**7 FT**	**8 FT**	**9 FT**	**10 FT**
10 INCH DIA - 11.25 DEG	13	11	9	8	7	7	6	5
10 INCH DIA - 22.5 DEG	26	21	18	16	14	13	11	11
10 INCH DIA - 45 DEG	53	44	37	32	29	26	23	21
VERTICAL UP BENDS	**3 FT**	**4 FT**	**5 FT**	**6 FT**	**7 FT**	**8 FT**	**9 FT**	**10 FT**
10 INCH DIA - 11.25 DEG	4	3	3	3	2	2	2	2
10 INCH DIA - 22.5 DEG	7	6	6	5	5	4	4	4
10 INCH DIA - 45 DEG	15	13	11	10	9	8	7	7
DEAD ENDS / VALVES	**3 FT**	**4 FT**	**5 FT**	**6 FT**	**7 FT**	**8 FT**	**9 FT**	**10 FT**
10 INCH DIA	100	85	74	66	59	54	50	46
REDUCERS	**3 FT**	**4 FT**	**5 FT**	**6 FT**	**7 FT**	**8 FT**	**9 FT**	**10 FT**
10 INCH X 8 INCH	34	29	25	22	20	18	17	16

ASSUMPTIONS

LAYING CONDITION = TYPE 4
SOIL DESIGNATION = GC = COHESIVE-GRANULAR
DESIGN PRESSURE = 200 PSI (TEST PRESSURE)
SAFETY FACTOR = 1.5

NOTES

1. RL = RUN LENGTH BETWEEN FIRST JOINTS OF PIPE ALONG THE RUN LINE OF TEE.
2. RESTRAINED LENGTH IS MEASURED AS FOLLOWS:
   A. HORIZONTAL/VERTICAL BENDS: ALONG EACH SIDE OF BEND.
   B. HORIZONTAL/VERTICAL BENDS - OFFSET: ALONG THE OUTER SIDE OF EACH BEND. ALL PIPE BETWEEN THE TWO BENDS SHALL BE RESTRAINED JOINT.
   C. DEAD ENDS: ALONG PIPE FROM THE PLUG.
   D. VALVES: ALONG THE PIPE IN EACH DIRECTION FROM THE VALVE .
   E. REDUCERS: ALONG THE LARGER PIPE.
   F. TEES: ALONG THE BRANCH PIPE FROM THE TEE .
3. WHEN IT IS NOT POSSIBLE TO INSTALL THE RESTRAINED LENGTHS AS NOTED BY THIS TABLE, CONTRACTOR SHALL INSTALL THE APPROPRIATE CONCRETE THRUST RESTRAINTS AS PER THE DETAILS HEREIN.

BASED ON TEST PRESSURE OF 200 P.S.I.

HORIZONTAL RESTRAINT
(ALL AREAS GIVEN ARE IN SQUARE FEET)

PIPE SIZE	DEGREE OF BEND	LBS. STATIC THRUST *	ALLOWABLE SOIL BEARING (PSF) 1000	2000	3000	4000	5000	6000	7000	8000
4"	11 1/4°	616	1	1	1	1	1	1	1	1
	22 1/2°	1,226	1	1	1	1	1	1	1	1
	45°	2,405	2	1	1	1	1	1	1	1
	90°	4,444	4	2	1	1	1	1	1	1
	TEE/PLUG	3,143	3	2	1	1	1	1	1	1
6"	11 1/4°	1,385	2	1	1	1	1	1	1	1
	22 1/2°	2,758	3	2	1	1	1	1	1	1
	45°	5,409	5	3	2	2	1	1	1	1
	90°	9,999	10	5	3	3	2	2	2	1
	TEE/PLUG	7,068	7	4	3	2	2	1	1	1
8"	11 1/4°	2,424	3	1	1	1	1	1	1	1
	22 1/2°	4,904	5	3	2	1	1	1	1	1
	45°	9,619	10	5	3	2	2	2	2	1
	90°	17,773	18	9	6	4	4	3	3	2
	TEE/PLUG	12,568	13	6	4	3	3	2	2	2
10"	11 1/4°	3,846	4	2	2	1	1	1	1	1
	22 1/2°	7,661	8	4	3	2	2	2	1	1
	45°	15,028	15	8	5	4	3	3	2	2
	90°	27,768	28	14	9	7	6	5	4	3
	TEE/PLUG	19,635	20	10	7	5	4	3	3	2
12"	11 1/4°	5,543	6	3	2	2	1	1	1	1
	22 1/2°	11,032	11	6	4	3	2	2	2	2
	45°	21,641	22	11	7	5	4	4	3	3
	90°	39,987	40	20	13	10	8	7	6	5
	TEE/PLUG	28,274	28	14	9	7	6	5	4	4
14"	11 1/4°	7,544	8	4	3	2	2	2	1	1
	22 1/2°	15,016	15	8	5	4	3	3	2	2
	45°	29,455	29	15	10	7	6	5	4	4
	90°	54,426	54	27	18	14	11	9	8	7
	TEE/PLUG	38,485	38	19	13	10	8	6	5	5
16"	11 1/4°	9,854	10	5	3	3	2	2	2	2
	22 1/2°	19,612	20	10	7	5	4	3	3	3
	45°	38,471	38	17	13	10	8	6	5	5
	90°	71,085	71	36	24	18	14	12	10	9
	TEE/PLUG	50,265	50	25	17	13	10	8	7	6

* INCLUDES 1.25 SAFETY FACTOR

VERTICAL RESTRAINT
(ALL VOLUMES GIVEN ARE IN CUBIC YARDS)**

PIPE SIZE	RESTRAINING RODS NO.REQ'D	RESTRAINING RODS DIA.	DEGREE OF BEND 11 1/4°	22 1/2°	45°
4"	2	1/2"	0.25	0.50	0.75
6"	2	1/2"	0.50	1.0	1.75
8"	2	5/8"	0.75	1.50	3.0
10"	2	3/4"	1.25	2.25	4.50
12"	2	7/8"	1.75	3.25	6.50
14"	4	5/8"	2.25	4.50	8.75
16"	4	3/4"	3.0	6.0	11.50

**INCLUDES 1.50 SAFETY FACTOR

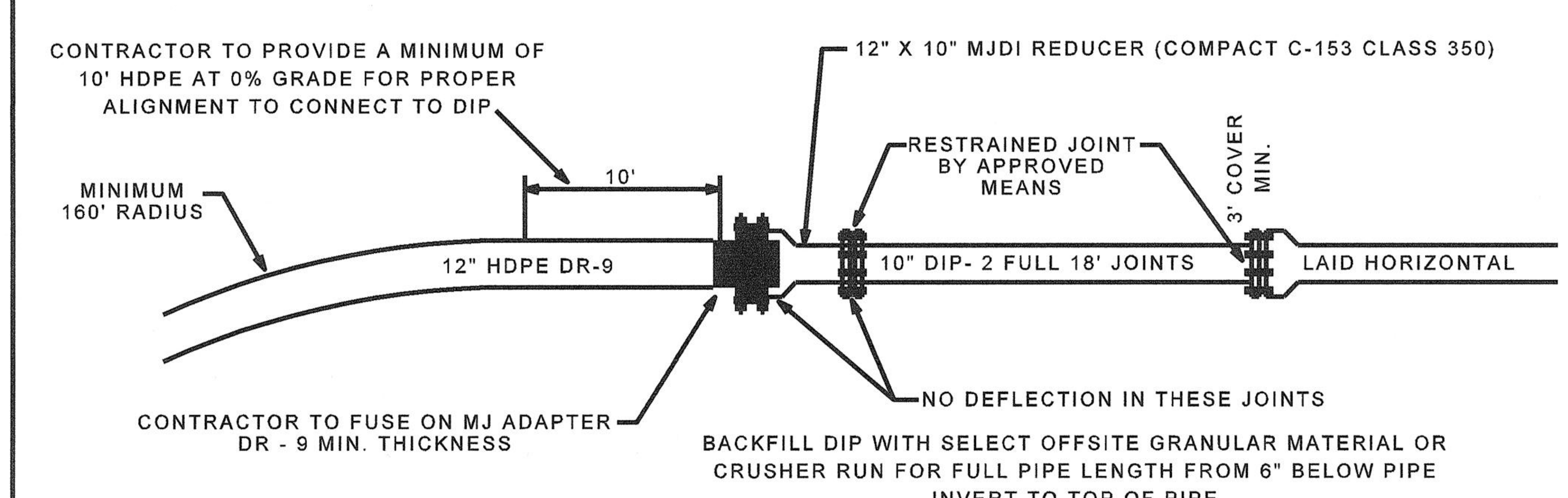
GENERAL NOTES:
1. CONCRETE SHALL BE CLASS "B".
2. CONCRETE SHALL NOT CONTACT BOLTS ENDS OF MECHANICAL JOINT FITTINGS.
3. CONSULT WITH ENGINEER FOR CONCRETE REQUIREMENTS ON MAINS LARGER THAN 16 INCHES. (FOR VERTICAL & HORIZONTAL BENDS)
4. ALLOWABLE SOIL BEARING SHALL BE DETERMINED BY THE ENGINEER.

REVISIONS		
NO.	DATE	DESCRIPTION

SHEET 2 OF 2

THRUST RESTRAINT FOR WATER MAINS

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



12" HDPE X 10" DIP TRANSITION

NOT TO SCALE

PROJECT REFERENCE NO.	SHEET NO.
BD-5103V	UC-4

UTILITY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 02766 ENGINEER KEVIN C. ZDEB

2014-FEB-21

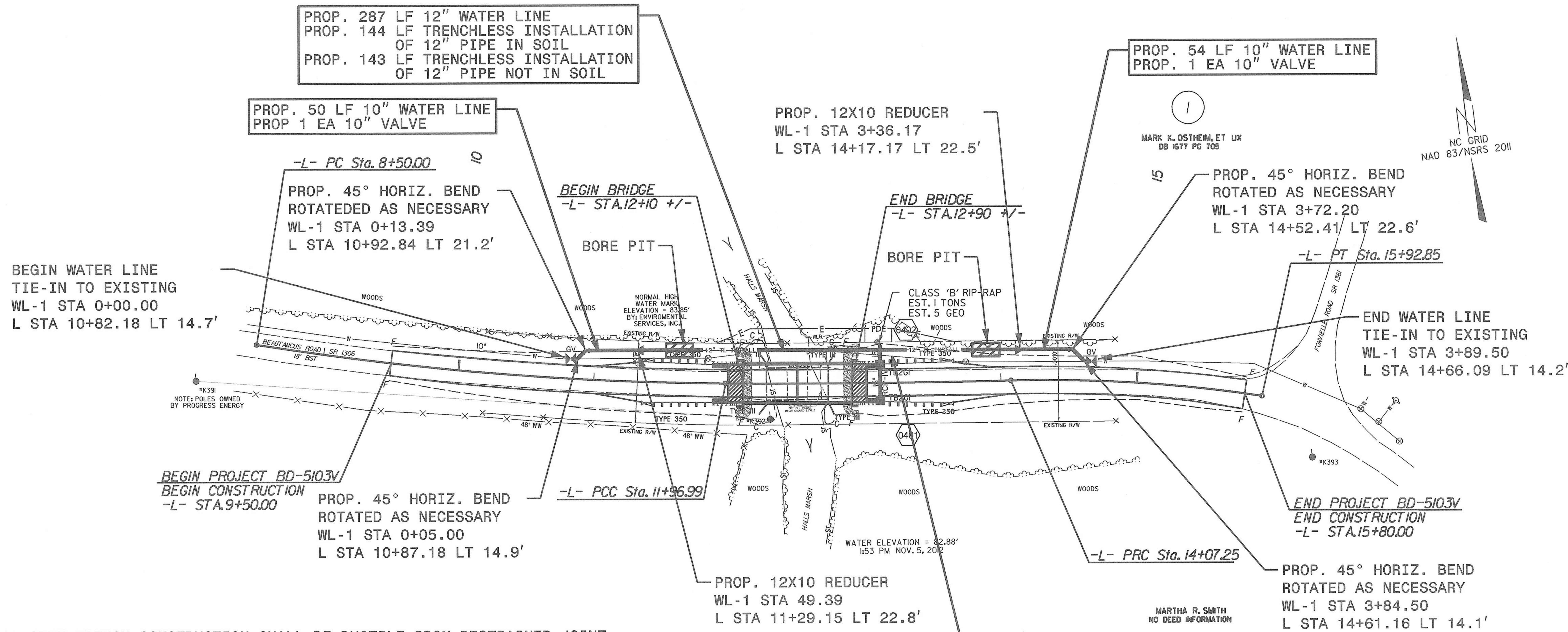
MA Engineering CONSULTANTS, INC. 598 E. Chatham Street, Suite 137 Cary, N. C. 27511

HNTB NORTH CAROLINA, P.C. 343 E. Six Forks Road, Suite 200 Raleigh, North Carolina 27609 NC License No: C-1554

DATE: FEBRUARY 19, 2014

UTILITY OWNERS ON THIS PROJECT:

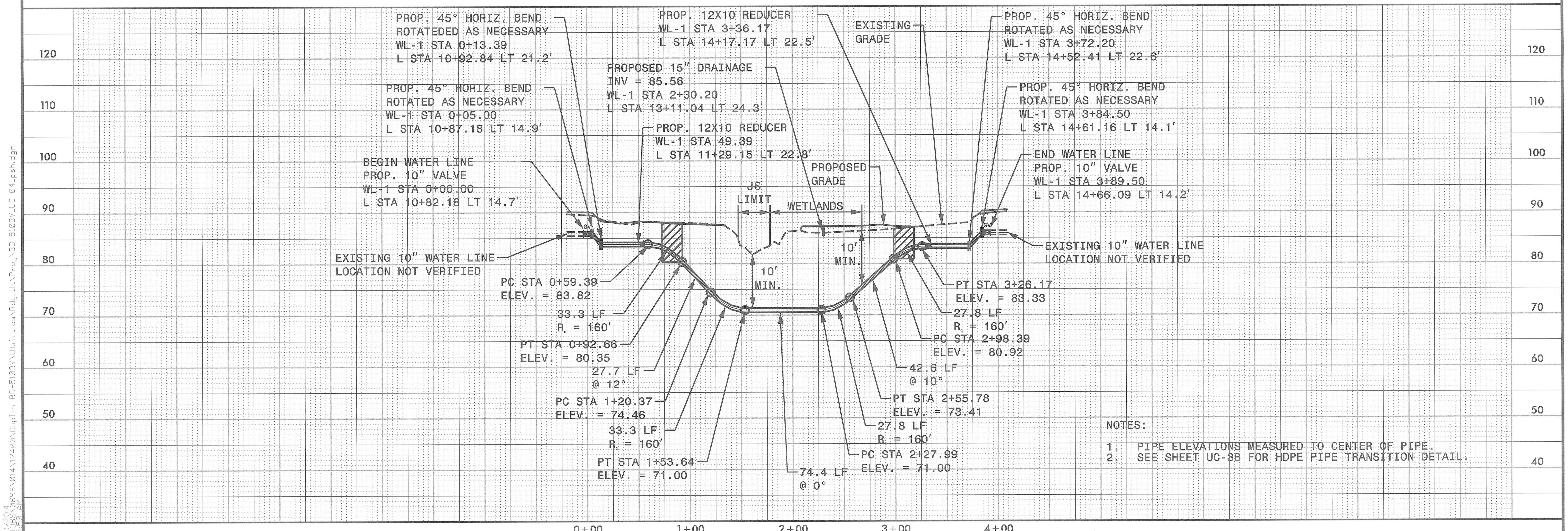
1. DUPLIN COUNTY
UTILITY:10" WATER LINE
CONTACT: DONNA BROWN
PHONE: 910-296-2123



NOTES:

1. PIPE FOR OPEN TRENCH CONSTRUCTION SHALL BE DUCTILE IRON RESTRAINED JOINT.
2. PIPE FOR TRENCHLESS INSTALLATION SHALL BE HDPE DR-9.
3. SEE SHEET UC-3B FOR PIPE RESTRAINT DETAILS.
4. PIPE TO BE ABANDONED SHALL BE FILLED WITH FLOWABLE FILL AND CAPPED AT EACH END.

SCALE:
1" = 50' PLAN
1" = 50' HORIZ. PFL
1" = 10' VERT. PFL



NOTES:

1. PIPE ELEVATIONS MEASURED TO CENTER OF PIPE.
2. SEE SHEET UC-3B FOR HDPE PIPE TRANSITION DETAIL.

TIP PROJECT: BD-5103V

T.I.P. NO.	SHEET NO.
BD-5103V	UO-1

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

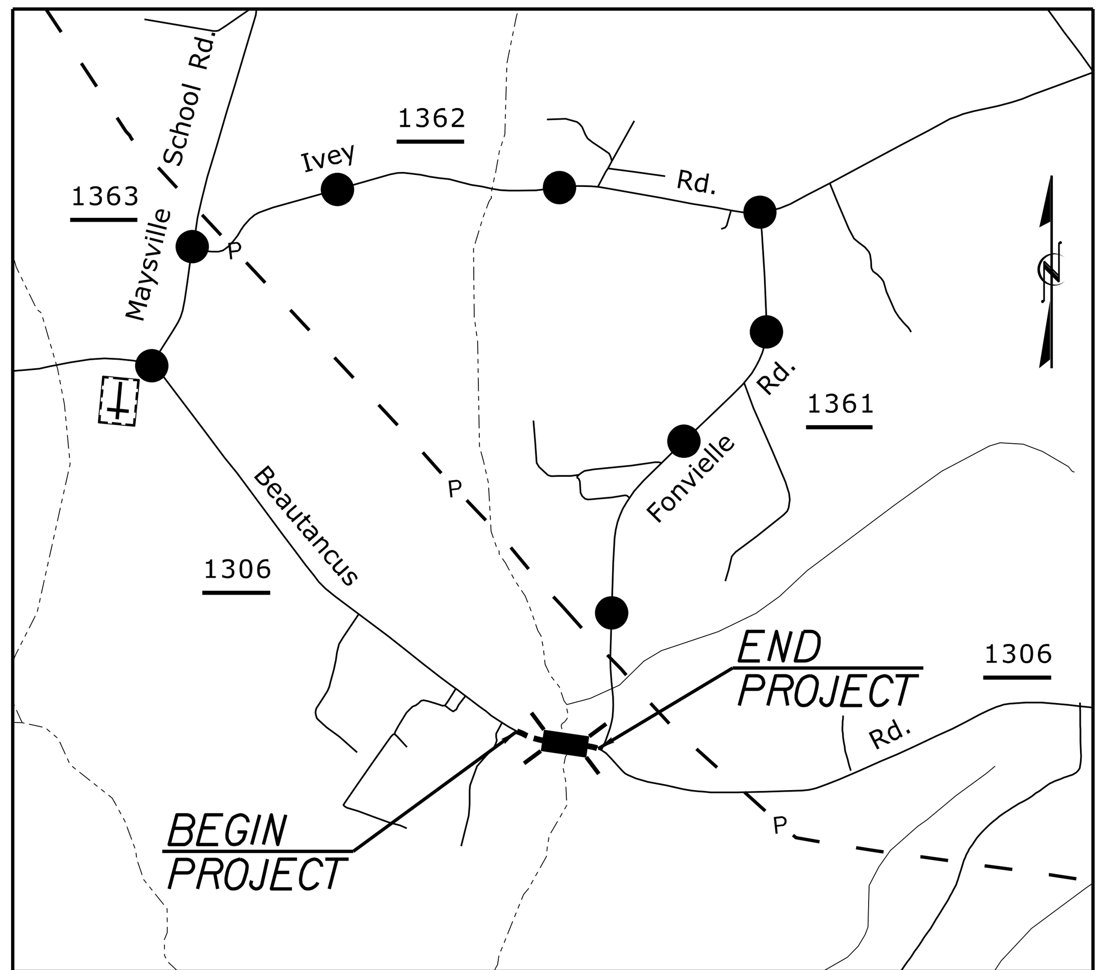
DATE: FEBRUARY 21, 2014

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

UTILITIES BY OTHERS PLANS
DUPLIN COUNTY

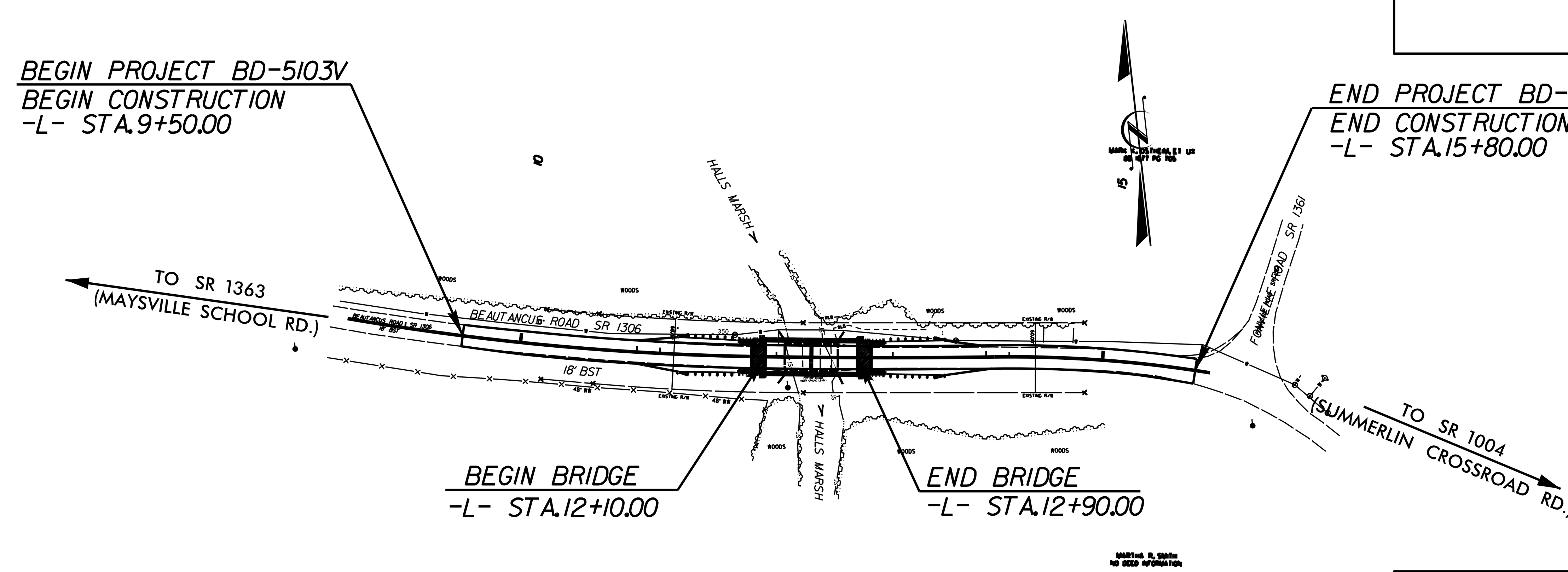
LOCATION: BRIDGE NO. 111 ON SR 1306 (BEAUTANCUS RD.) OVER HALLS MARSH

TYPE OF WORK: UTILITY BY OTHERS RELOCATION



VICINITY MAP ●●● DETOUR ROUTE

UC-4



4

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
UO-1	TITLE SHEET
UO-2	PLAN SHEET

UTILITY OWNERS ON PROJECT

(1) POWER – DUKE ENERGY PROGRESS
Mr. Eddie Watkins
8024 Glenwood Ave., Suite 230
Raleigh, NC 27612
(919) 882-5051
eddie.watkins@duke-energy.com

UTILITY DESIGN BY:
MA Engineering CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919 297 0220 Fax: 919 297 0221

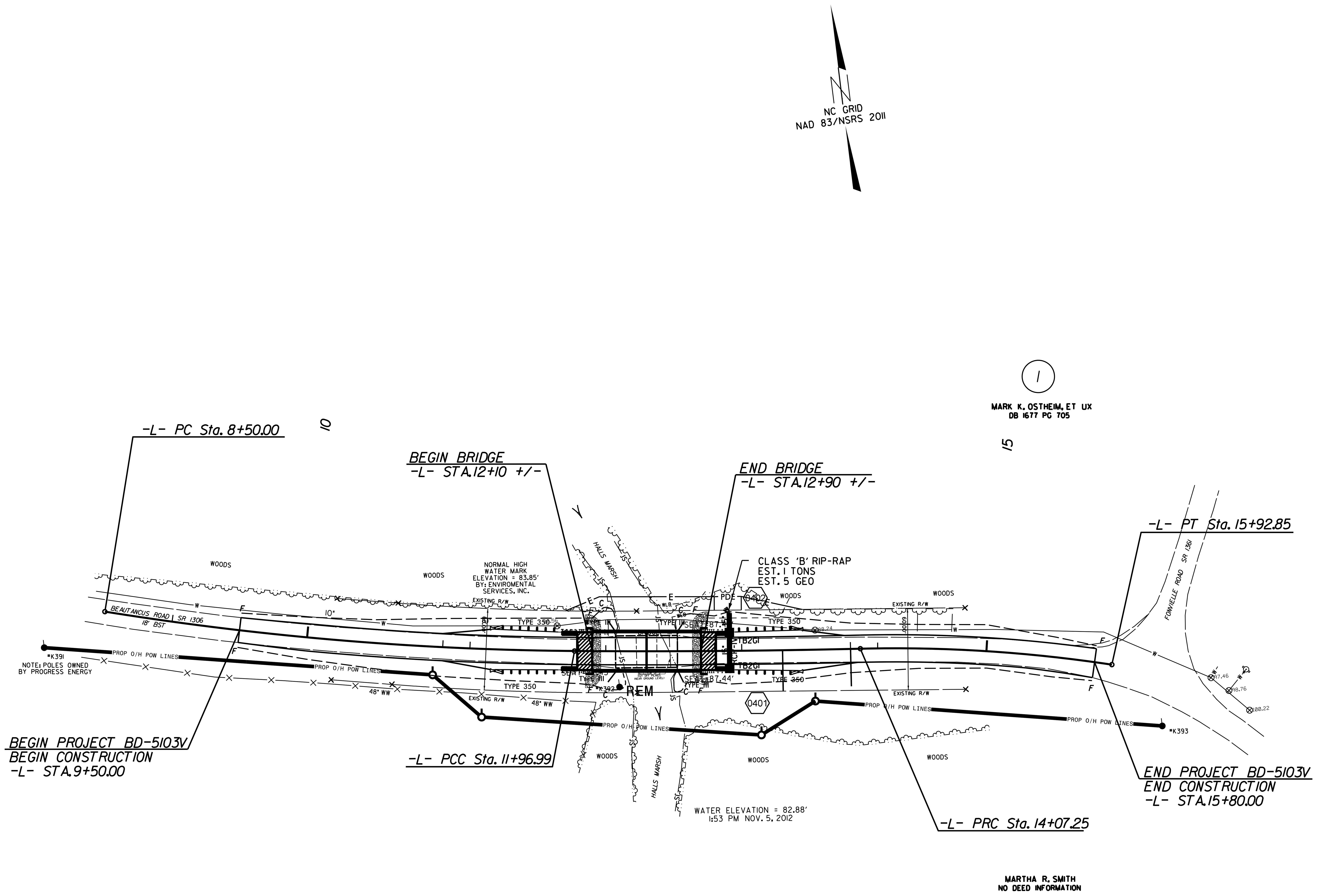
NCDOT PROJECT ENGINEER:
AMANDA GLYNN, P.E.

PREPARED FOR:
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION BRIDGE PROGRAM

PROJECT REFERENCE NO.	SHEET NO.
BD-5103V	UO-2

UTILITIES BY OTHERS

NOTE:
ALL PROPOSED UTILITY WORK SHOWN ON THIS SHEET WILL BE DONE BY OTHERS



MA Engineering CONSULTANTS, INC.
598 E. Chatham Street, Suite 137
Cary, N. C. 27511

5/14/99
$$$$SYSTIME$$$$
$$$$DGN$$$$
$$$$USERNAME$$$$

PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
BD-51Ø3V	X-1	5

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

02/03/98

8:33:11 AM

$$$$USERNAME$$$$

PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
BD-5103V	X-2	5

PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
BD-5103V	X-3	5

02/03/98

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$$$$USERNAME$$$$

PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
BD-5103V	X-4	5

02/03/98

8:33:13 AM
$$$$USERNAME$$$$

PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
BD-5103V	X-5	5

02/03/98

8:33:13 AM
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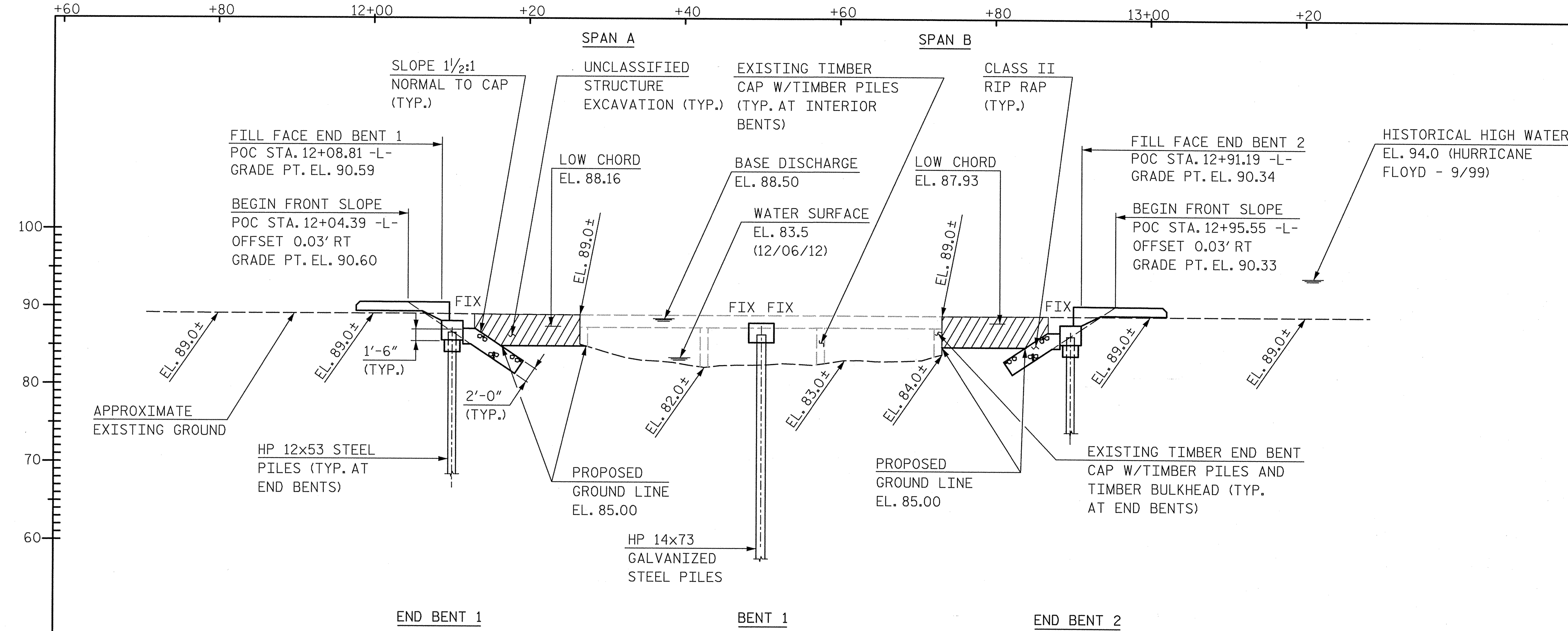
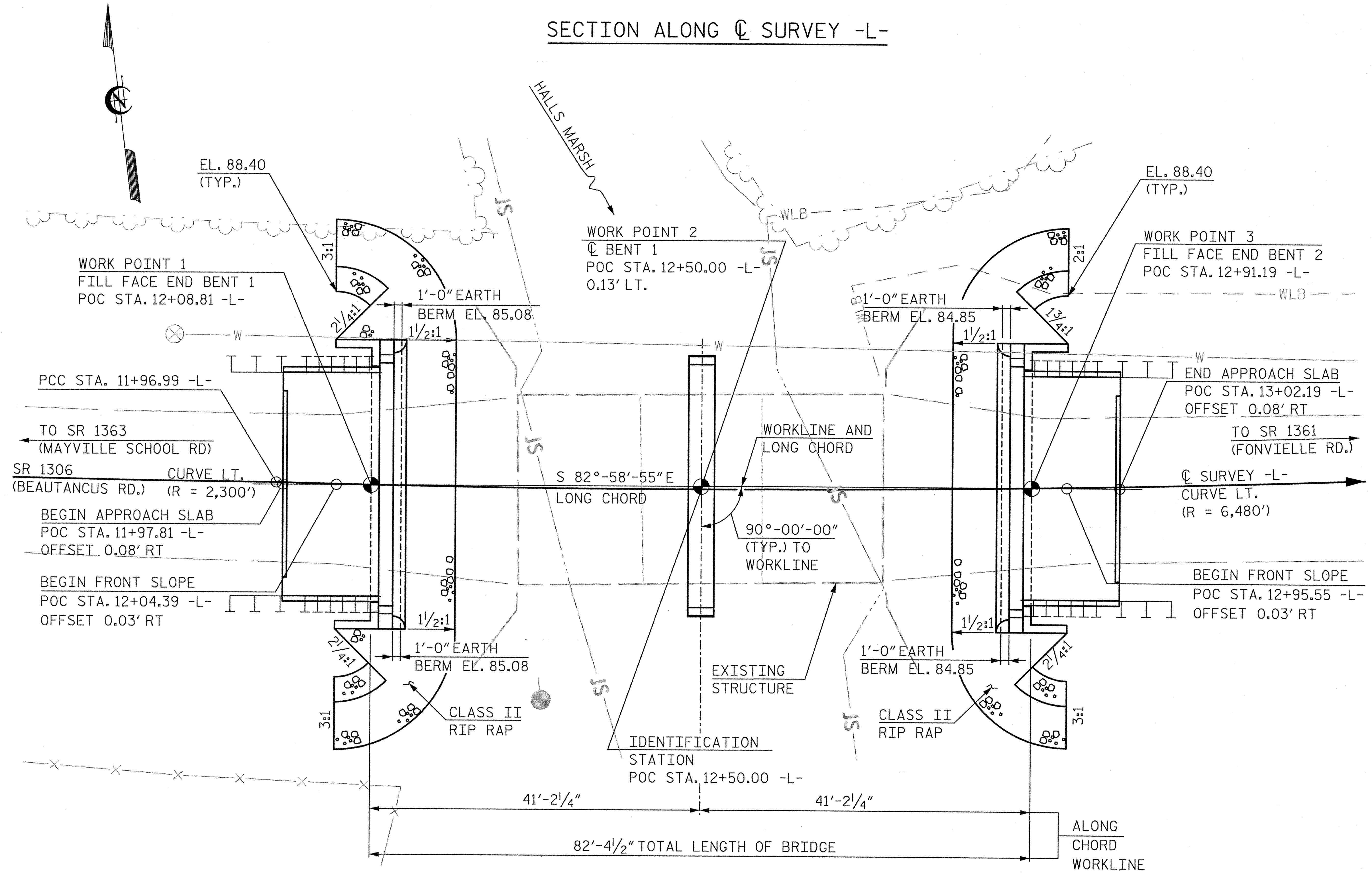
F.A. PROJECT NO. BRZ-1036(24)



SECTION ALONG ℄ SURVEY -L-



PLAN

NOTES: PILES NOT SHOWN FOR CLARITY.

WORKLINE FOR BRIDGE SHALL BE THE ROADWAY LONG CHORD BETWEEN FILL FACE WORK POINTS AND ITS EXTENSION.

FOR GENERAL NOTES, SEE SHEET 2.

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	900 CFS
FREQUENCY OF DESIGN FLOOD	=	25 YR
DESIGN HIGH WATER ELEVATION	=	87.4 FT.
DRAINAGE AREA	=	8.8 SQ. MI.
BASIC DISCHARGE (Q100)	=	1,400 CFS
BASIC HIGH WATER ELEVATION	=	88.50 FT.

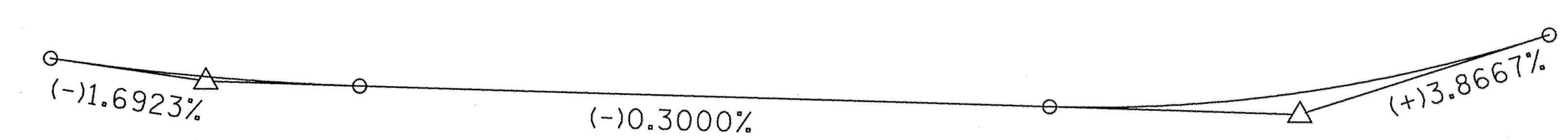
OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	=	NA
FREQUENCY OF OVERTOPPING FLOOD	=	>500(+) YR
OVERTOPPING FLOOD ELEVATION	=	90.08 FT.

NOTE: OVERTOPPING OCCURS AT ROADWAY STA. 13+85.12

PI STA. = 10+15.00
EL. = 91.17
V.C. = 130'

PI STA. = 14+75.00
EL. = 89.79
V.C. = 210'



GRADE DATA -L-

CURVE DATA -L-

PI STA. = 10+23.83	PI STA. = 13+02.13
△ = 8°38'38.5" (LT)	△ = 1°51'32.5" (LT)
D = 2°29'28.0"	D = 0°53'03.1"
L = 346.99'	L = 210.25'
T = 173.83'	T = 105.13'
R = 2,300.00'	R = 6,480.00'

PROJECT NO. BD-5103V

DUPLIN COUNTY

STATION: 12+50.00 -L-

SHEET 1 OF 2

REPLACES BRIDGE NO. 0111

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING FOR BRIDGE ON SR 1306 OVER HALLS MARSH BETWEEN SR 1363 AND SR 1361

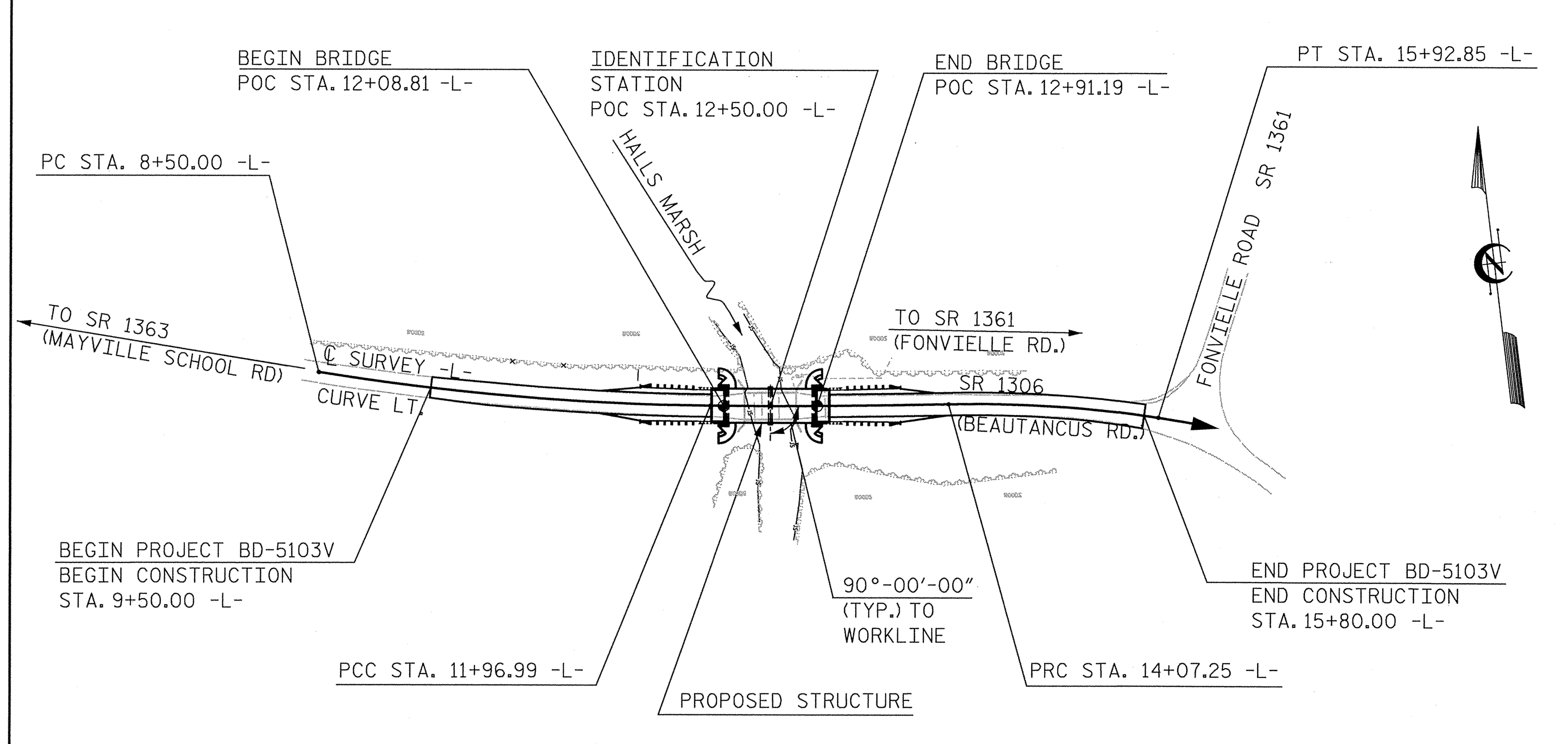
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 PAUL J. BARBER 12/10/13

HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	J. BAYNE	DATE	9/13	DWG. NO. 1
CHECKED BY	P. BARBER	DATE	10/13	

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

BM - "BM1", RR SPIKE IN BASE OF 20" SWEET GUM, 31.65' LT. OF STA. 12+97.69 -L-, EL. 87.02



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

FOUNDATION NOTES:

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 70 TONS PER PILE.

DRIVE PILES AT END BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 120 TONS PER PILE.

PILES AT BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 90 TONS PER PILE.

DRIVE PILES AT BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 170 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAG OR SCOUR.

PILES AT END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 70 TONS PER PILE.

DRIVE PILES AT END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 120 TONS PER PILE.

INSTALL PILES AT BENT NO. 1 TO A TIP ELEVATION NO HIGHER THAN 53.0 FT.

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

THE SCOUR CRITICAL ELEVATION FOR BENT NO. 1 IS ELEVATION 71.0 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 30 TO 45 FT-KIPS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT NO. 1 AND END BENT NO. 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.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 30 TO 60 FT-KIPS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT BENT NO. 1. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.

TESTING PILES WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS AND FOR PILE DRIVING CRITERIA, SEE PILE DRIVING CRITERIA PROVISION.

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE AT STATION 12+50.00 -L-	PDA TESTING	UNCLASSIFIED STRUCTURE EXCAVATION AT STATION 12+50.00 -L-	CLASS A CONCRETE	BRIDGE APPROACH SLABS AT STATION 12+50.00 -L-	REINFORCING STEEL	HP 12x53 STEEL PILES		HP 14x73 GALVANIZED STEEL PILES		STEEL PILE POINTS	PILE REDRIVES	VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0"x1'-9" PRESTRESSED CONCRETE CORED SLABS	
	LUMP SUM	EACH	LUMP SUM	CU. YDS.	LUMP SUM	LBS.	NO.	LIN. FT.	NO.	LIN. FT.	EACH	EACH	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	NO.	LIN. FT.
SUPERSTRUCTURE	LUMP SUM	—	—	—	LUMP SUM	—	—	—	—	—	—	—	160.5	—	—	LUMP SUM	20	800
END BENT NO. 1	—	—	LUMP SUM	13.1	—	1,977	5	250	—	—	—	3	—	59	65	—	—	—
BENT NO. 1	—	—	—	9.9	—	1,959	—	—	7	420	7	4	—	—	—	—	—	—
END BENT NO. 2	—	—	LUMP SUM	13.1	—	1,977	5	250	—	—	—	3	—	50	56	—	—	—
TOTAL	LUMP SUM	1	LUMP SUM	36.1	LUMP SUM	5,913	10	500	7	420	7	10	160.5	109	121	LUMP SUM	20	800

GENERAL NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

THIS BRIDGE SHALL BE CONSTRUCTED USING TOP-DOWN CONSTRUCTION METHODS. THE USE OF A TEMPORARY CAUSEWAY OR WORK BRIDGE IS NOT PERMITTED.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE 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.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 18'-0" FT. EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

THE EXISTING 3 SPAN STRUCTURE WITH SPAN LENGTHS OF 16'-0", 15'-0", AND 15'-7" WITH REINFORCED CONCRETE DECK AND TIMBER JOISTS, WITH A 25.3' OUT TO OUT DECK WIDTH ON TIMBER CAPS AND TIMBER PILES SHALL BE REMOVED. IN ADDITION, ANY PILES REMAINING FROM PREVIOUS BRIDGE CONSTRUCTION OR MAINTENANCE OPERATIONS SHALL BE REMOVED AND INCLUDED IN THE LUMP SUM PAY ITEM FOR "REMOVAL OF EXISTING STRUCTURE AT STATION 12+50.00 -L-".

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.

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.

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

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

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

PROJECT NO. BD-5103V

DUPLIN COUNTY

STATION: 12+50.00 -L-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 PAUL J. BARBER 12/10/13

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON SR 1306
OVER HALLS MARSH
BETWEEN SR 1363
AND SR 1361

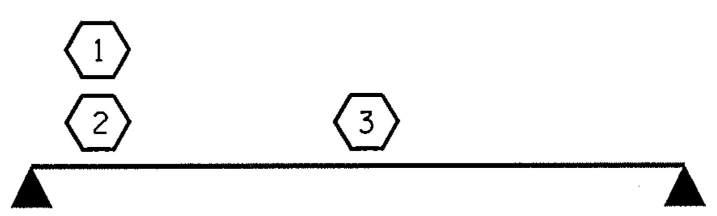
HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY J. BAYNE DATE 9/13
CHECKED BY P. BARBER DATE 10/13
DWG. NO. 2

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

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE											SERVICE III LIMIT STATE						COMMENT NUMBER
								MOMENT					SHEAR						MOMENT					
							LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93(Inv)	N/A	**1**	1.319	--	1.75	0.278	1.76	40′	EL	19.5	0.549	**1.32**	40′	EL	**1.95**	0.80	0.278	1.55	40′	EL	19.5	
		HL-93(Opr)	N/A	--	1.709	--	1.35	0.278	2.28	40′	EL	19.5	0.549	1.71	40′	EL	1.95	N/A	--	--	--	--	--	
		HS-20(Inv)	36.000	**2**	1.540	55.449	1.75	0.278	2.21	40′	EL	19.5	0.549	**1.54**	40′	EL	**1.95**	0.80	0.278	1.94	40′	EL	19.5	
		HS-20(Opr)	36.000	--	1.997	71.878	1.35	0.278	2.86	40′	EL	19.5	0.549	2	40′	EL	1.95	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SV	SNSH	13.500	--	3.606	48.687	1.4	0.278	5.1	40′	EL	19.5	0.549	4.13	40′	EL	1.95	0.80	0.278	3.61	40′	EL	19.5	
	SV	SNGARBS2	20.000	--	2.964	59.289	1.4	0.278	4.19	40′	EL	15.6	0.549	3.07	40′	EL	1.95	0.80	0.278	2.96	40′	EL	19.5	
	SV	SNAGRIS2	22.000	--	2.906	63.929	1.4	0.278	4.09	40′	EL	15.6	0.549	2.91	40′	EL	1.95	0.80	0.278	2.92	40′	EL	15.6	
	SV	SNCOTTS3	27.250	--	1.803	49.125	1.4	0.278	2.55	40′	EL	19.5	0.549	2.07	40′	EL	1.95	0.80	0.278	1.80	40′	EL	19.5	
	SV	SNAGGRS4	34.925	--	1.623	56.667	1.4	0.278	2.29	40′	EL	19.5	0.549	1.82	40′	EL	1.95	0.80	0.278	1.62	40′	EL	19.5	
	SV	SNS5A	35.550	--	1.578	56.107	1.4	0.278	2.23	40′	EL	19.5	0.549	1.9	40′	EL	1.95	0.80	0.278	1.58	40′	EL	19.5	
	SV	SNS6A	39.950	--	1.502	59.992	1.4	0.278	2.12	40′	EL	19.5	0.549	1.77	40′	EL	1.95	0.80	0.278	1.50	40′	EL	19.5	
	SV	SNS7B	42.000	**3**	1.432	60.149	1.4	0.278	2.02	40′	EL	19.5	0.549	1.81	40′	EL	1.95	0.80	0.278	**1.43**	40′	EL	**19.5**	
	TTST	TNAGRIT3	33.000	--	1.848	60.976	1.4	0.278	2.61	40′	EL	19.5	0.549	2.08	40′	EL	1.95	0.80	0.278	1.85	40′	EL	19.5	
	TTST	TNT4A	33.075	--	1.872	61.901	1.4	0.278	2.65	40′	EL	19.5	0.549	1.98	40′	EL	1.95	0.80	0.278	1.87	40′	EL	19.5	
	TTST	TNT6A	41.600	--	1.587	66.032	1.4	0.278	2.24	40′	EL	19.5	0.549	1.94	40′	EL	1.95	0.80	0.278	1.59	40′	EL	19.5	
	TTST	TNT7A	42.000	--	1.627	68.354	1.4	0.278	2.3	40′	EL	19.5	0.549	1.79	40′	EL	1.95	0.80	0.278	1.63	40′	EL	19.5	
	TTST	TNT7B	42.000	--	1.664	69.888	1.4	0.278	2.35	40′	EL	19.5	0.549	1.72	40′	EL	1.95	0.80	0.278	1.66	40′	EL	19.5	
	TTST	TNAGRIT4	43.000	--	1.619	69.61	1.4	0.278	2.28	40′	EL	15.6	0.549	1.65	40′	EL	1.95	0.80	0.278	1.62	40′	EL	19.5	
	TTST	TNAGT5A	45.000	--	1.498	67.412	1.4	0.278	2.12	40′	EL	19.5	0.549	1.71	40′	EL	1.95	0.80	0.278	1.50	40′	EL	19.5	
	TTST	TNAGT5B	45.000	--	1.455	65.486	1.4	0.278	2.06	40′	EL	19.5	0.549	1.56	40′	EL	1.95	0.80	0.278	1.46	40′	EL	19.5	



LRFR SUMMARY

FOR SPAN 'A' AND 'B'

LOAD FACTORS:

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

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

1.
2.
3.
4.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER

PROJECT NO. BD-5103V
DUPLIN COUNTY
STATION: 12+50.00 -L-

NORTH CAROLINA PROFESSIONAL SEAL 025516 ENGINEER EMILY E. MURRAY
11/8/13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
LRFR SUMMARY FOR 40′ 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			15

ASSEMBLED BY : C.B. PRUETT DATE : 9/25/13
CHECKED BY : EMILY MURRAY DATE : 11/4/13

DRAWN BY : CVC 6/10
CHECKED BY : DNS 6/10

05-NOV-2013 14:45
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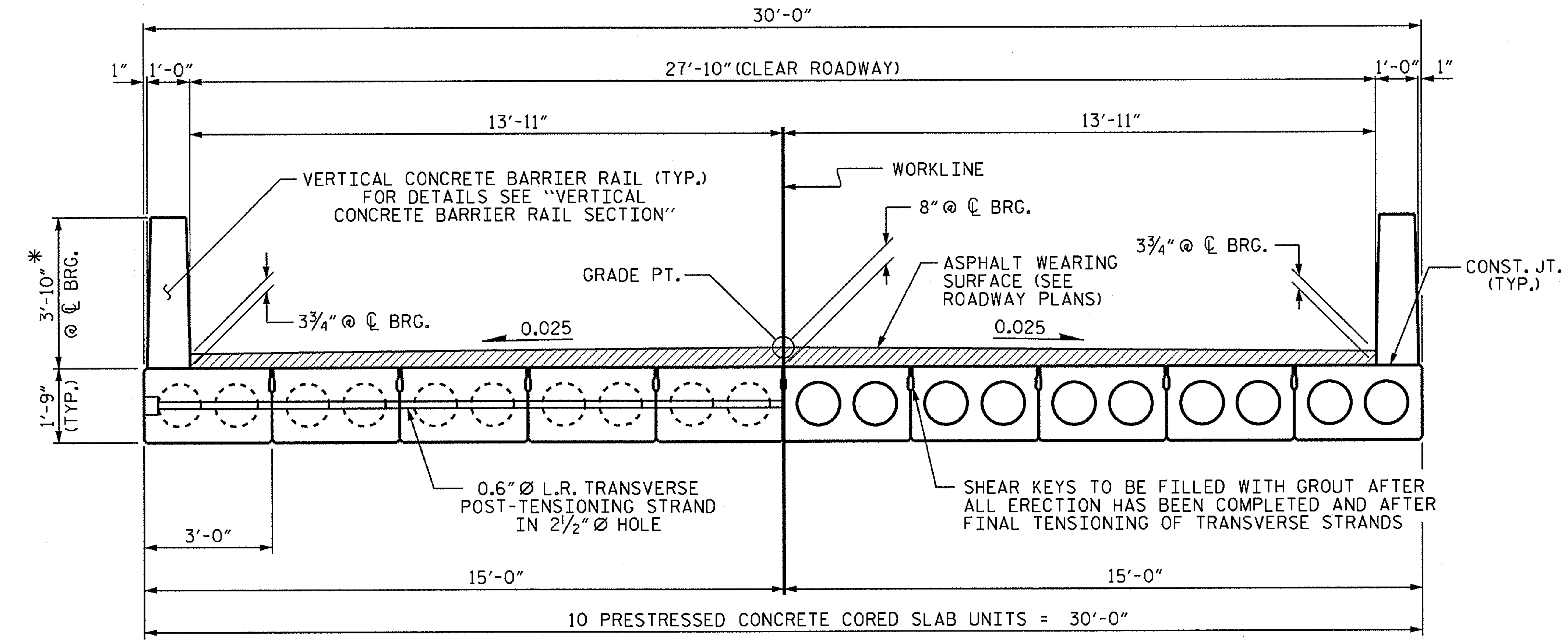
cbpruett

STD. NO. 21LRFR1_90S_40L



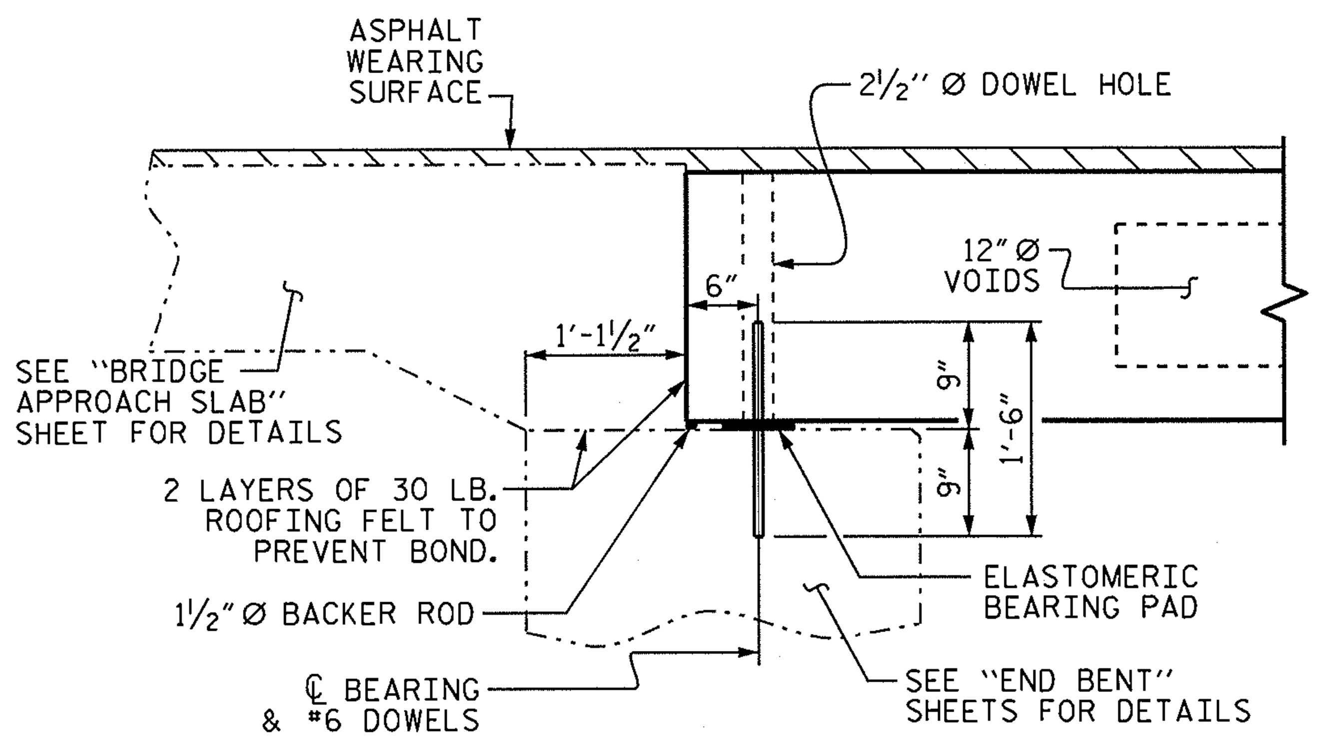
HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

HALF SECTION
THROUGH VOIDS

TYPICAL SECTION

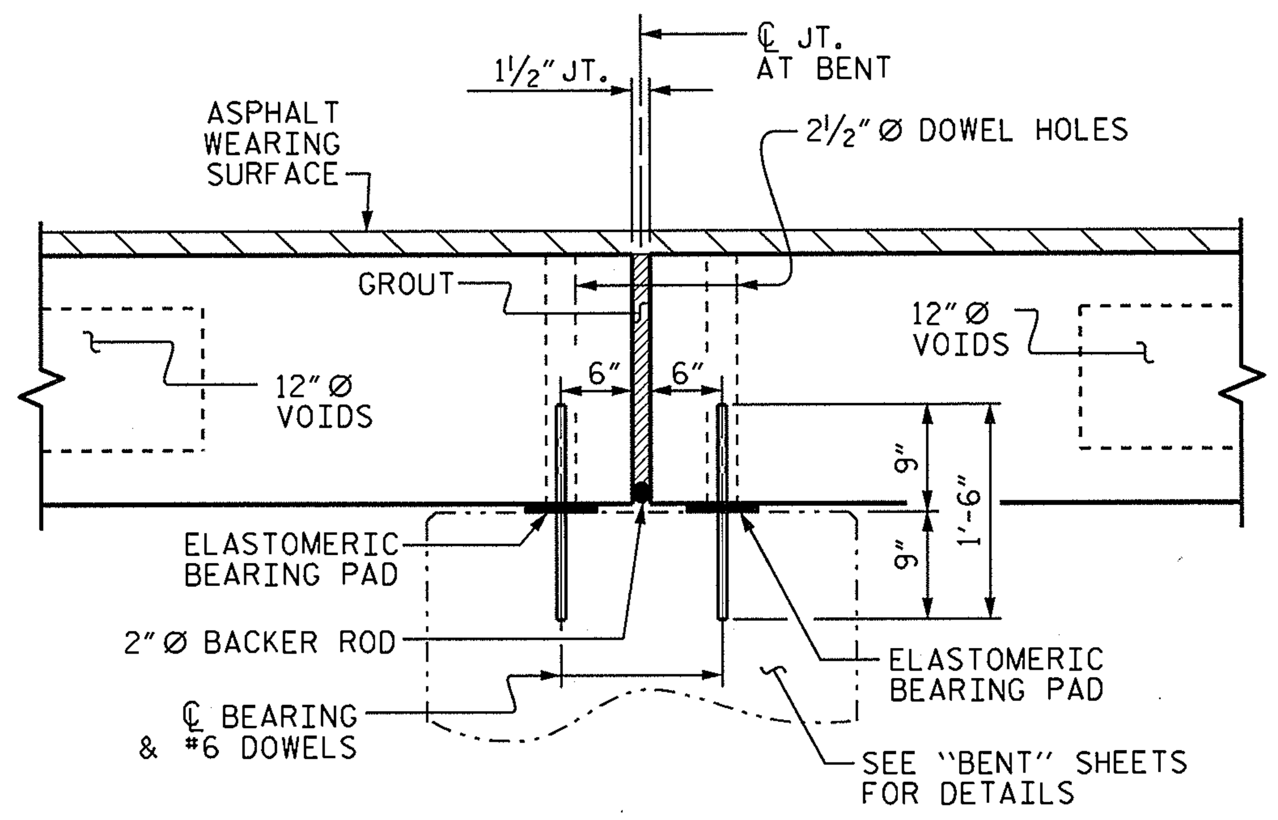
* - THE MAXIMUM BARRIER RAIL HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE BARRIER RAIL AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE BARRIER RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR RAIL HEIGHT DETAILS AND ASPHALT THICKNESS SEE THE "VERTICAL CONCRETE BARRIER RAIL SECTION" DETAIL.

FIXED END

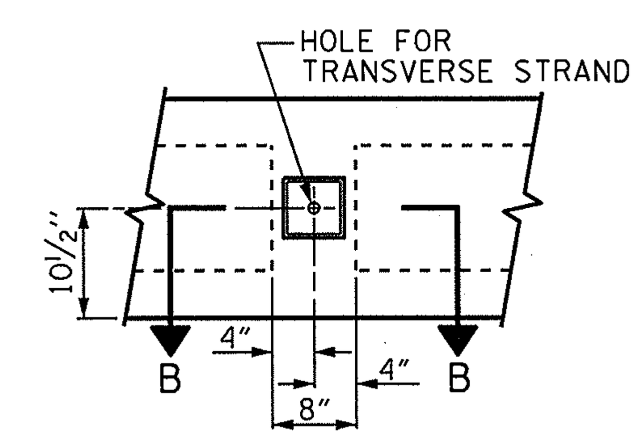


SECTION AT END BENT

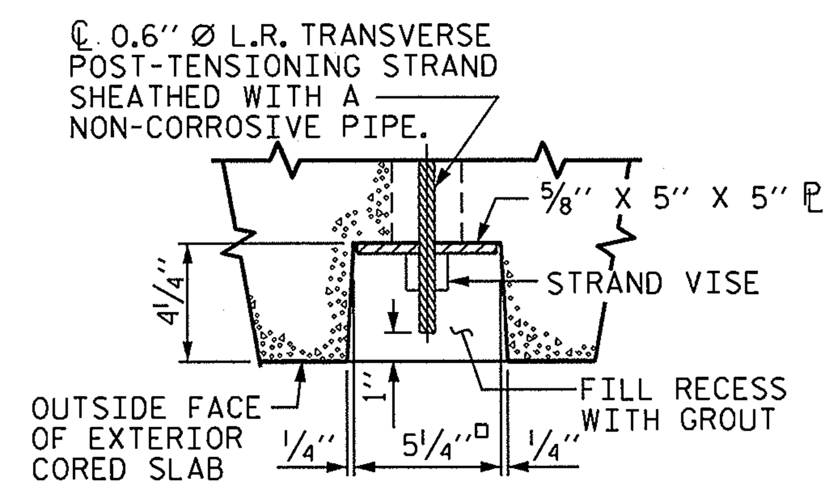
FIXED END FIXED END



SECTION AT BENT

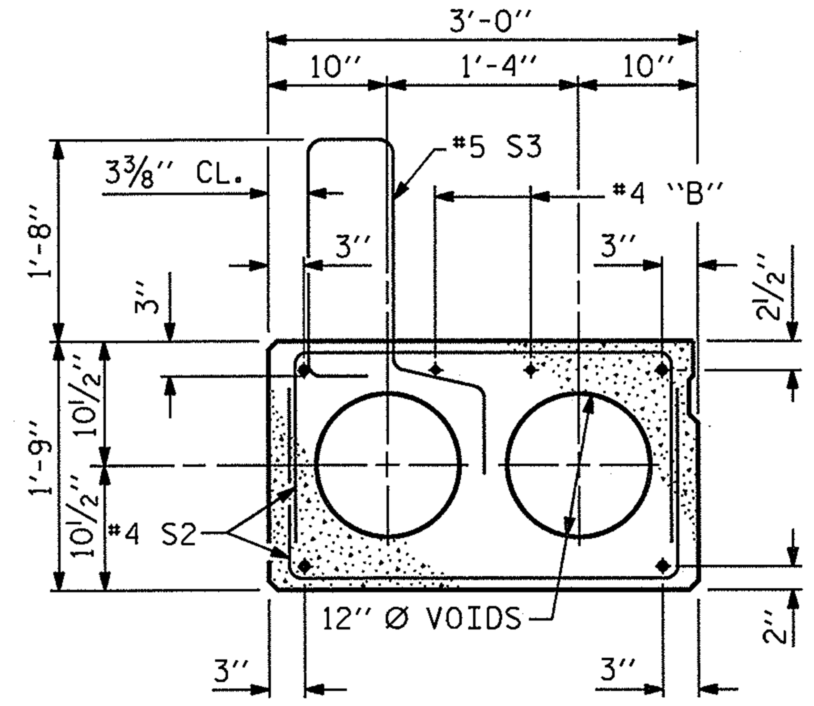


ELEVATION VIEW



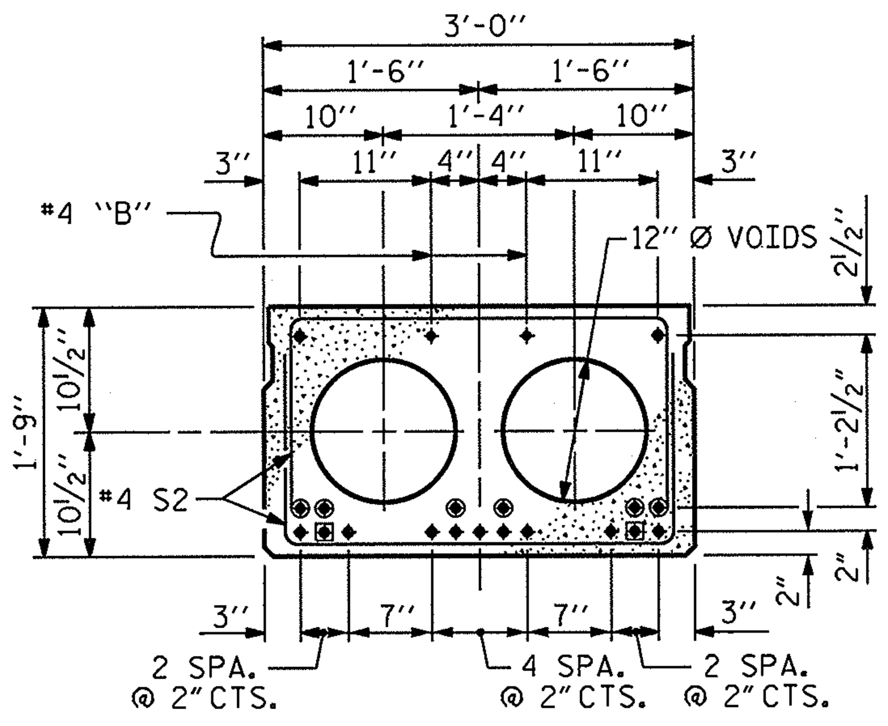
SECTION B-B

GROUTED RECESS AT END OF POST-TENSIONED STRAND OF CORED SLABS



EXT. SLAB SECTION

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



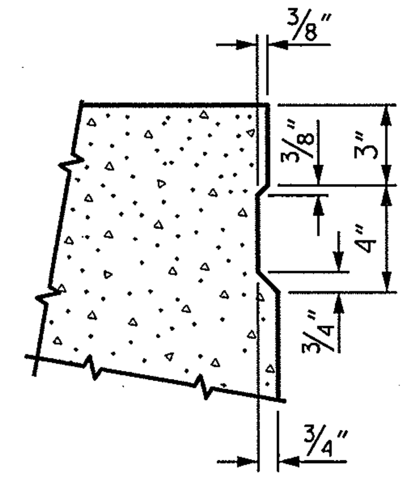
INTERIOR SLAB SECTION
(40' UNIT)
(13 STRANDS REQUIRED)

0.6" Ø LOW RELAXATION STRAND LAYOUT

▣ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 2'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

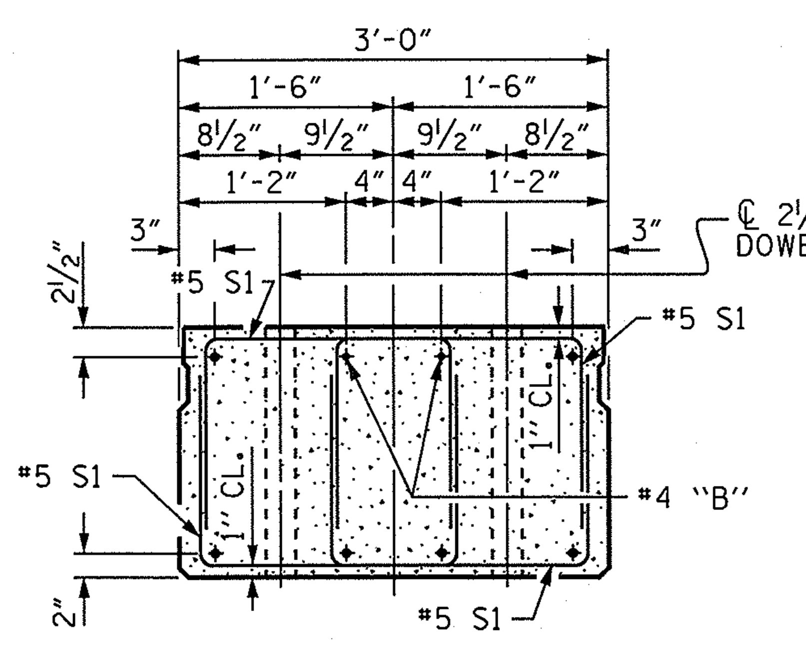
◉ OPTIONAL FULL LENGTH DEBONDED STRANDS. THESE STRANDS ARE NOT REQUIRED. IF THE FABRICATOR CHOOSES TO INCLUDE THESE STRANDS IN THE CORED SLAB UNIT, THE STRANDS SHALL BE DEBONDED FOR THE FULL LENGTH OF THE UNIT AT NO ADDITIONAL COST. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

DEBONDING LEGEND



SHEAR KEY DETAIL

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



END ELEVATION

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

NORTH CAROLINA PROFESSIONAL SEAL 025516 ENGINEER EMILY E. MURRAY
Emily E. Murray 11/5/13

PROJECT NO. BD-5103V
DUPLIN COUNTY
STATION: 12+50.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
3'-0" X 1'-9"
PRESTRESSED CONCRETE
CORED SLAB UNIT
90° SKEW

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

ASSEMBLED BY : C.B. PRUETT	DATE : 9/25/13
CHECKED BY : EMILY MURRAY	DATE : 11/4/13
DRAWN BY : DGE 5/09	REV. 12/11 MAA/AAC
CHECKED BY : BCH 6/09	

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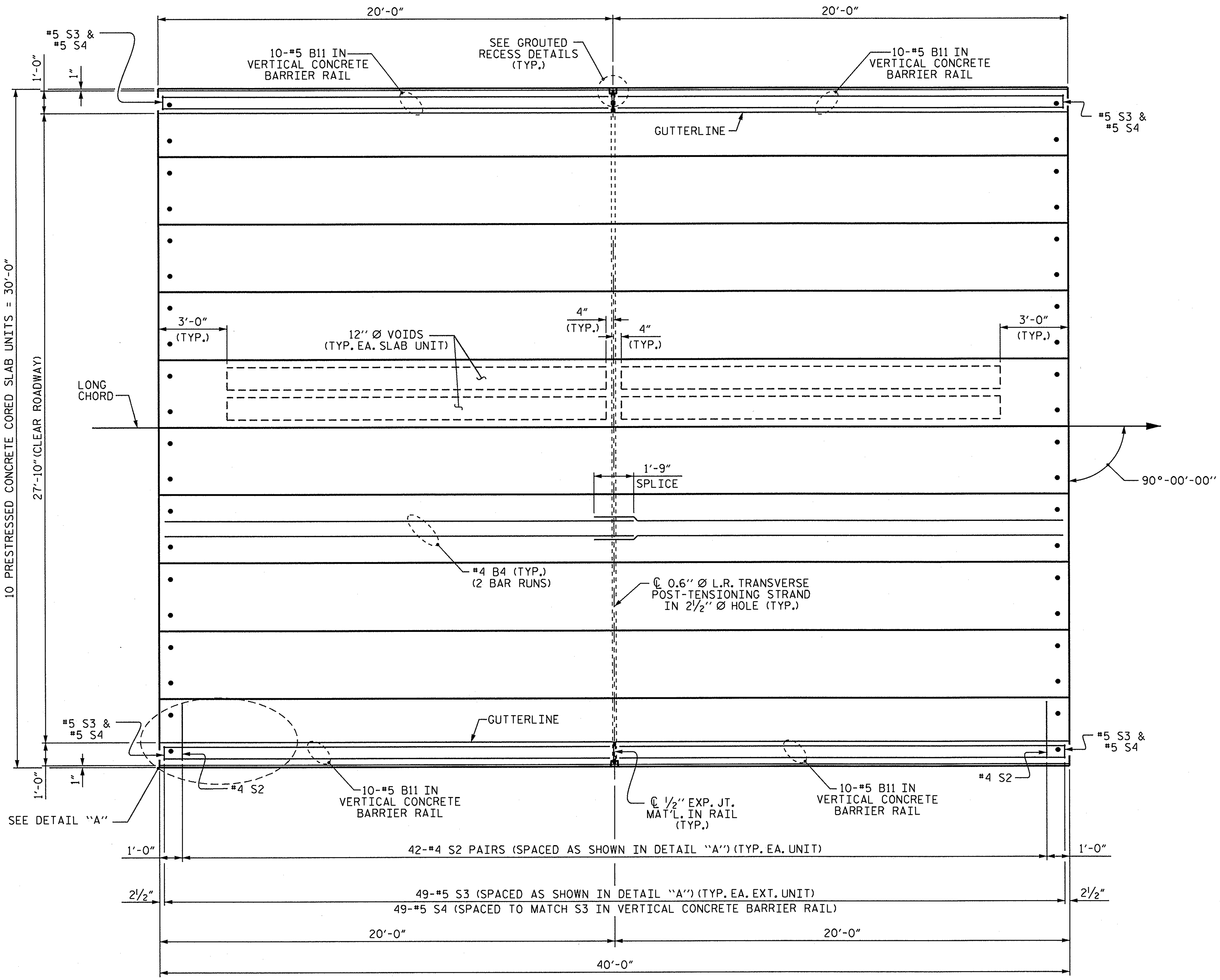
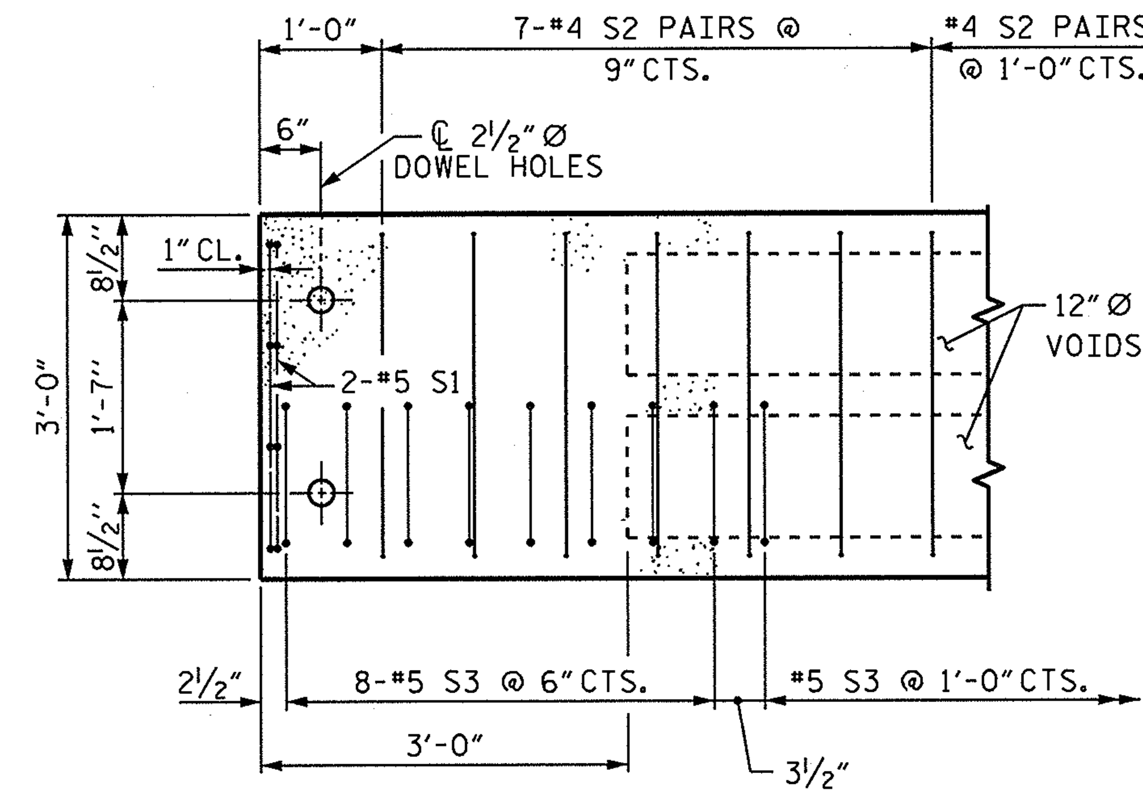
cbpruett

STD. NO. 21" PCS2_30_90S



PLAN OF UNIT

NO DECK DRAINS REQUIRED



DETAIL "A"

NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S3 BARS.

PROJECT NO. BD-5103V

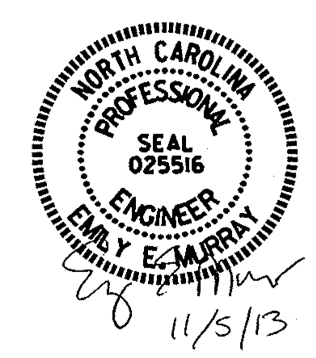
DUPLIN COUNTY

STATION: 12+50.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PLAN OF 40' UNIT
27'-10" CLEAR ROADWAY
90° SKEW



REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S-5
1			3				TOTAL SHEETS
2			4				15

ASSEMBLED BY : C.B. PRUETT	DATE : 9/25/13	
CHECKED BY : EMILY MURRAY	DATE : 11/4/13	
DRAWN BY : DGE 3/09	REV. 12/5/11	MAA/AAC
CHECKED BY : BCH 3/09		

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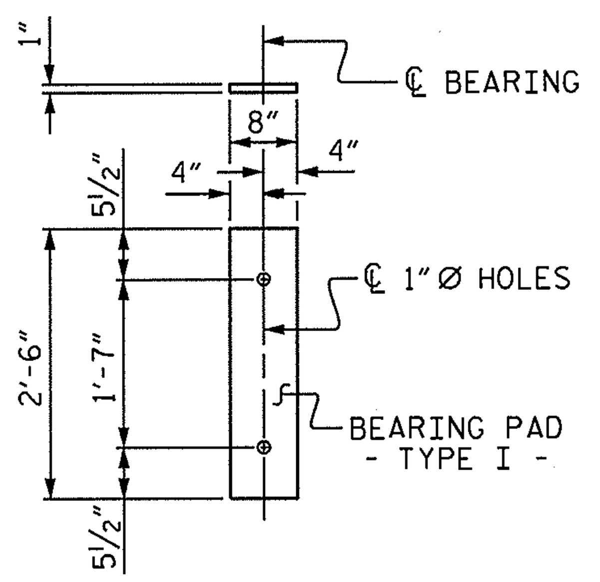
STD. NO. 21" PCS_30_90S_40L



FIXED END
(TYPE I - 40 REQ'D)

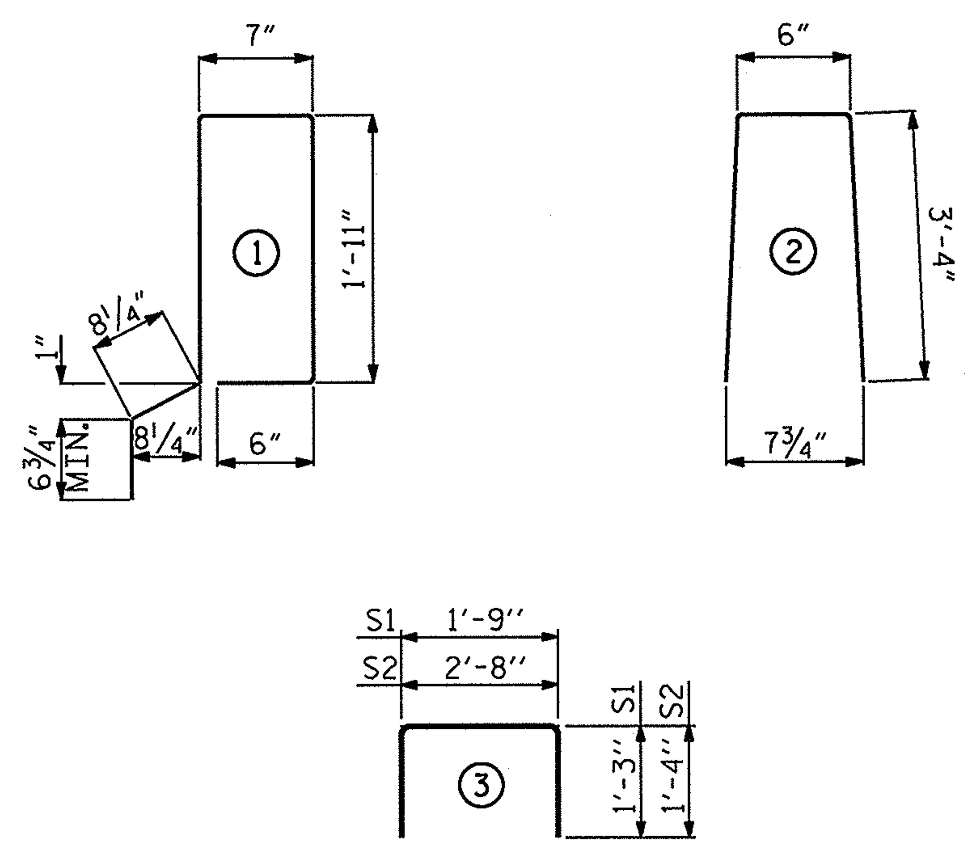
ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 50 DUROMETER HARDNESS.

BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	40' UNIT					
* B11	40	80	#5	STR	19'-7"	1634
* S4	98	196	#5	2	7'-2"	1466
* EPOXY COATED REINFORCING STEEL		LBS.				3100
CLASS AA CONCRETE		CU.YDS.				21.0
TOTAL VERTICAL CONCRETE BARRIER RAIL		LN. FT.				160.5

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

DEAD LOAD DEFLECTION AND CAMBER

	3'-0" x 1'-9"
40' CORED SLAB UNIT	0.6"Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	1¼" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	⅛" ↓
FINAL CAMBER	1⅛" ↑

** INCLUDES FUTURE WEARING SURFACE

CORED SLABS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
40' UNIT			
EXTERIOR C.S.	4	40'-0"	160'-0"
INTERIOR C.S.	16	40'-0"	640'-0"
TOTAL	20		800'-0"

BILL OF MATERIAL FOR ONE 40' CORED SLAB UNIT

BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT LENGTH	EXTERIOR UNIT WEIGHT	INTERIOR UNIT LENGTH	INTERIOR UNIT WEIGHT
B4	4	#4	STR	20'-9"	55	20'-9"	55
S1	8	#5	3	4'-3"	35	4'-3"	35
S2	84	#4	3	5'-4"	299	5'-4"	299
* S3	49	#5	1	6'-2"	315		
REINFORCING STEEL	LBS.				389		389
* EPOXY COATED REINFORCING STEEL	LBS.				315		
6500 P.S.I. CONCRETE	CU. YDS.				5.8		5.8
0.6"Ø L.R. STRANDS	No.				13		13

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 NON-SHRINK GROUT.

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

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

ALL REINFORCING STEEL IN THE VERTICAL CONCRETE BARRIER RAIL 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 BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

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

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

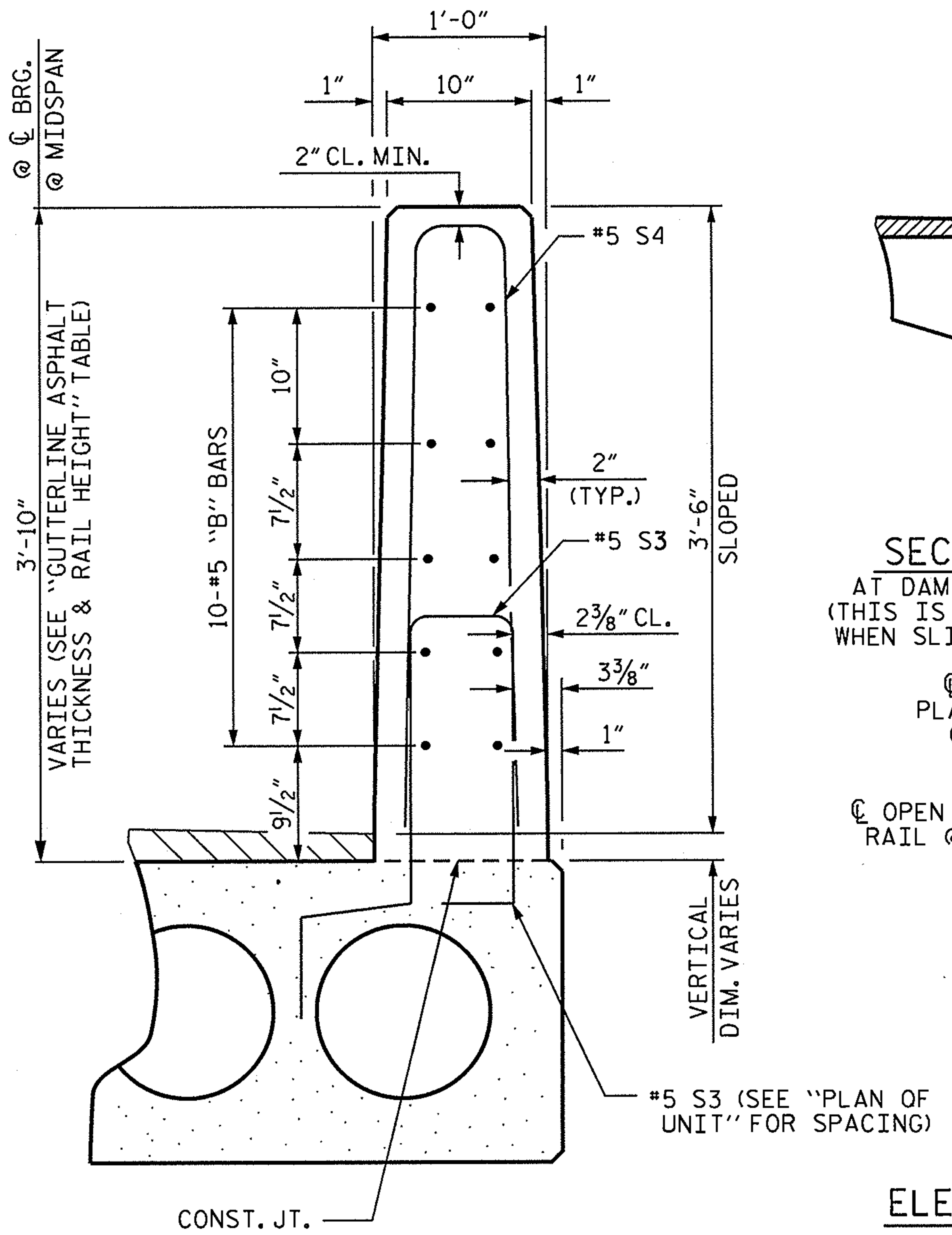
FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT

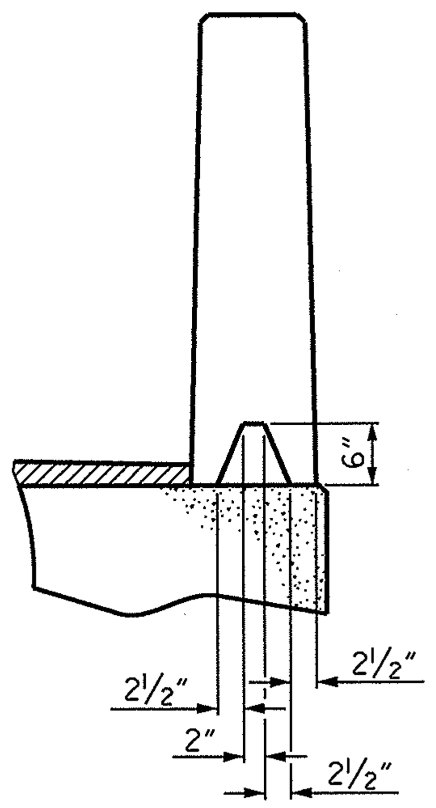
27'-10" CLEAR ROADWAY	ASPHALT OVERLAY THICKNESS	RAIL HEIGHT
	@ MID-SPAN	@ MID-SPAN
	NORMAL CROWN SECTION	
40' UNITS	2⅝"	3'-8⅞"

CONCRETE RELEASE STRENGTH

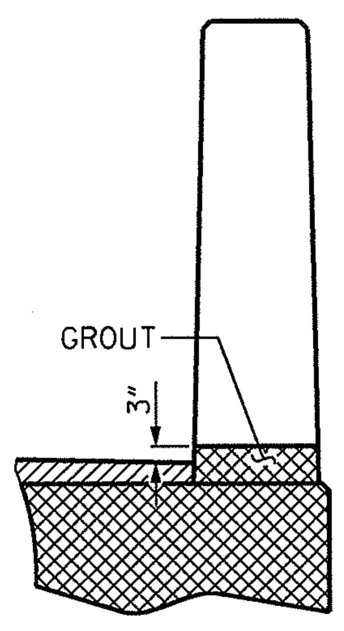
UNIT	PSI
40' UNITS	4000



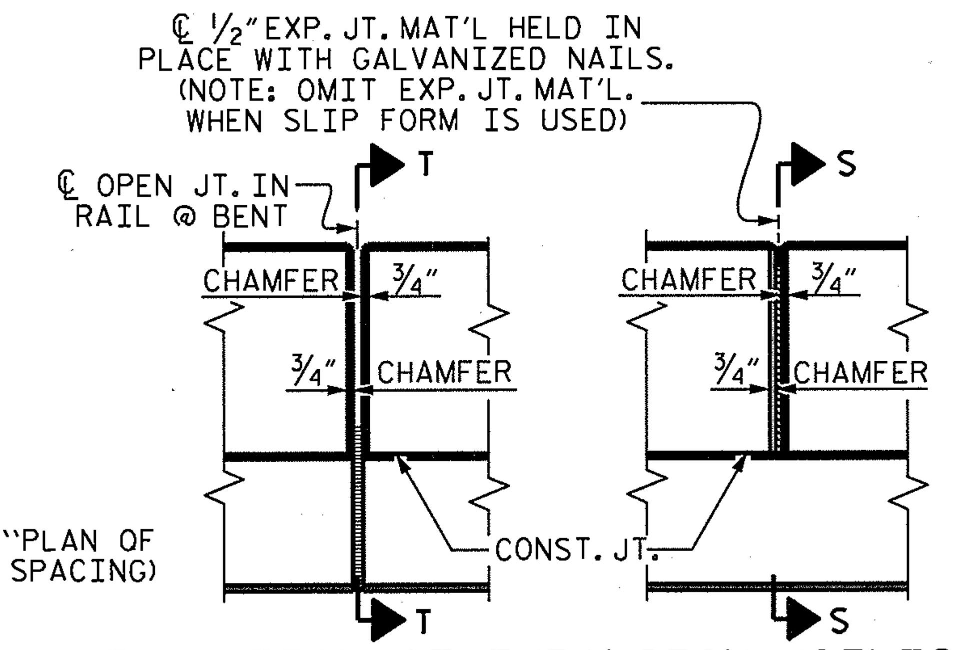
VERTICAL CONCRETE BARRIER RAIL SECTION



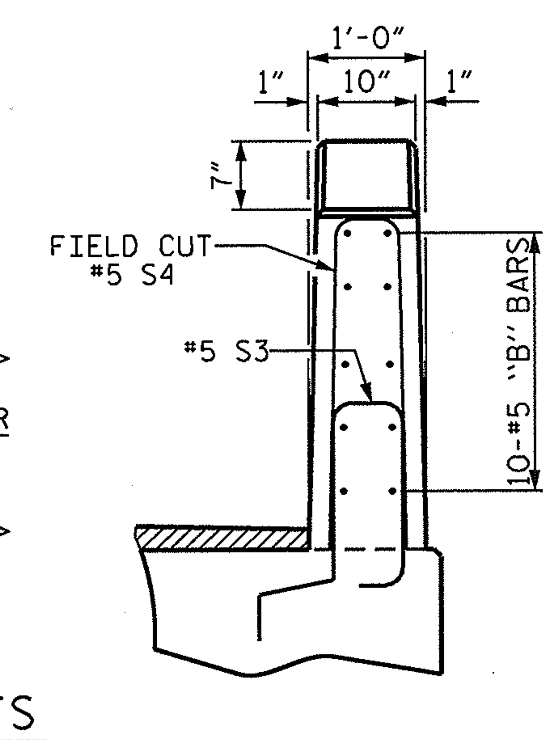
SECTION S-S
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



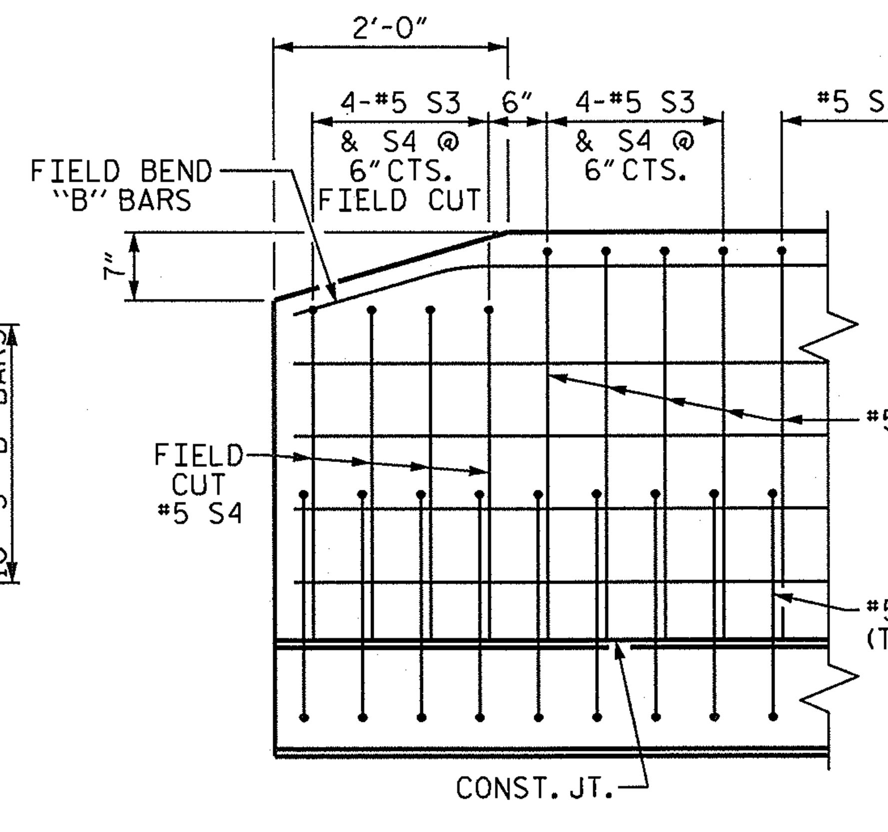
SECTION T-T
AT OPEN JOINT AT BENT
(THIS IS TO BE USED WHERE FOAM JOINT IS NOT USED)



ELEVATION AT EXPANSION JOINTS



END VIEW



SIDE VIEW

END OF RAIL DETAILS

GRADE 270 STRANDS

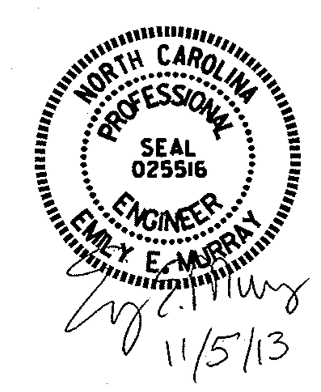
	0.6"Ø L.R.
AREA (SQUARE INCHES)	0.217
ULTIMATE STRENGTH (LBS. PER STRAND)	58,600
APPLIED PRESTRESS (LBS. PER STRAND)	43,950

PROJECT NO. BD-5103V
DUPLIN COUNTY
STATION: 12+50.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
3'-0" X 1'-9"
PRESTRESSED CONCRETE
CORED SLAB UNIT
90° SKEW



11/5/13

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

SHEET NO. S-6
TOTAL SHEETS 15

ASSEMBLED BY : C.B. PRUETT DATE : 9/25/13
CHECKED BY : EMILY MURRAY DATE : 11/4/13
DRAWN BY : DGE 5/09
CHECKED BY : BCH 6/09
REV. 12/11 MAA/AAC

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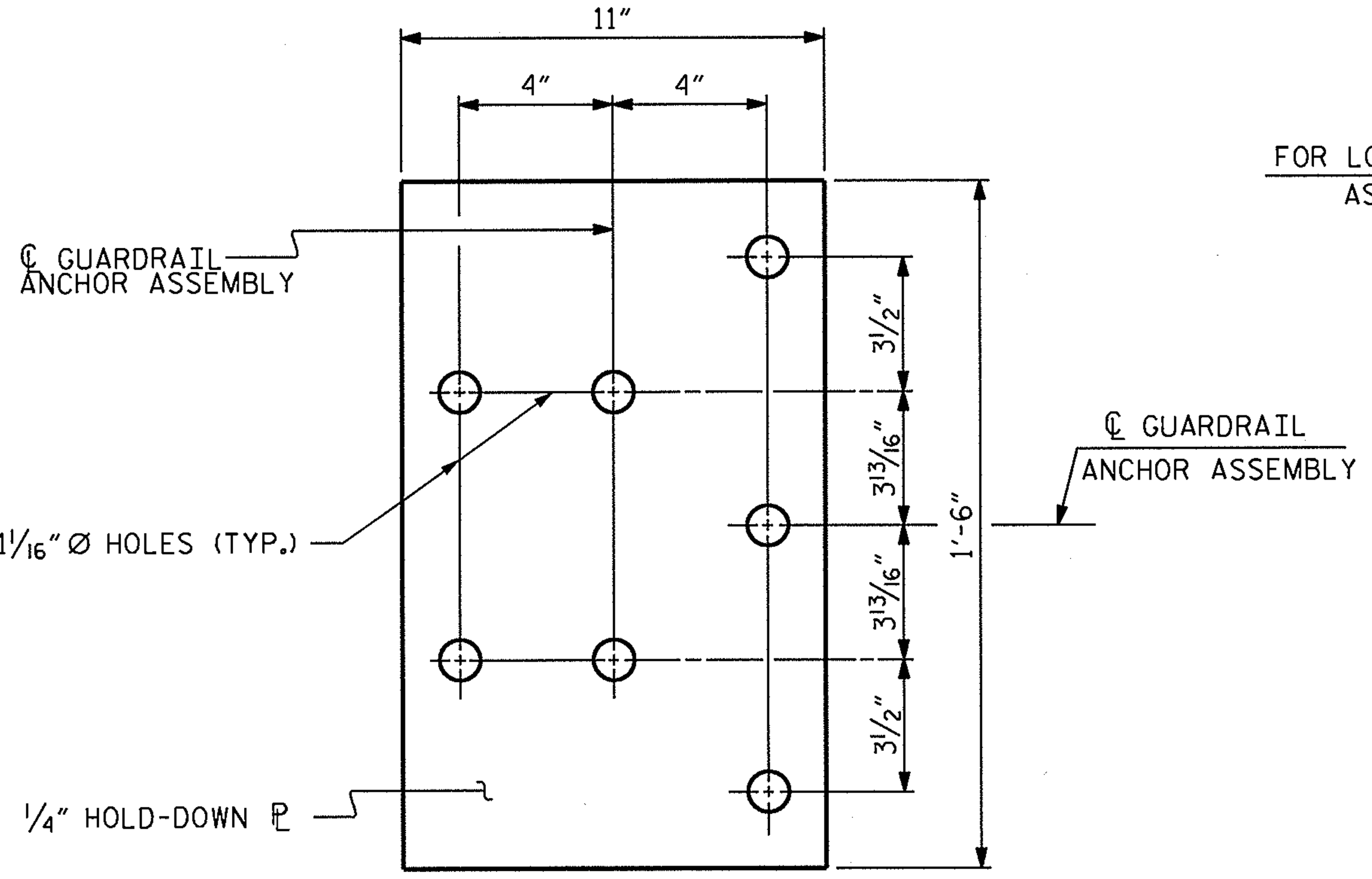
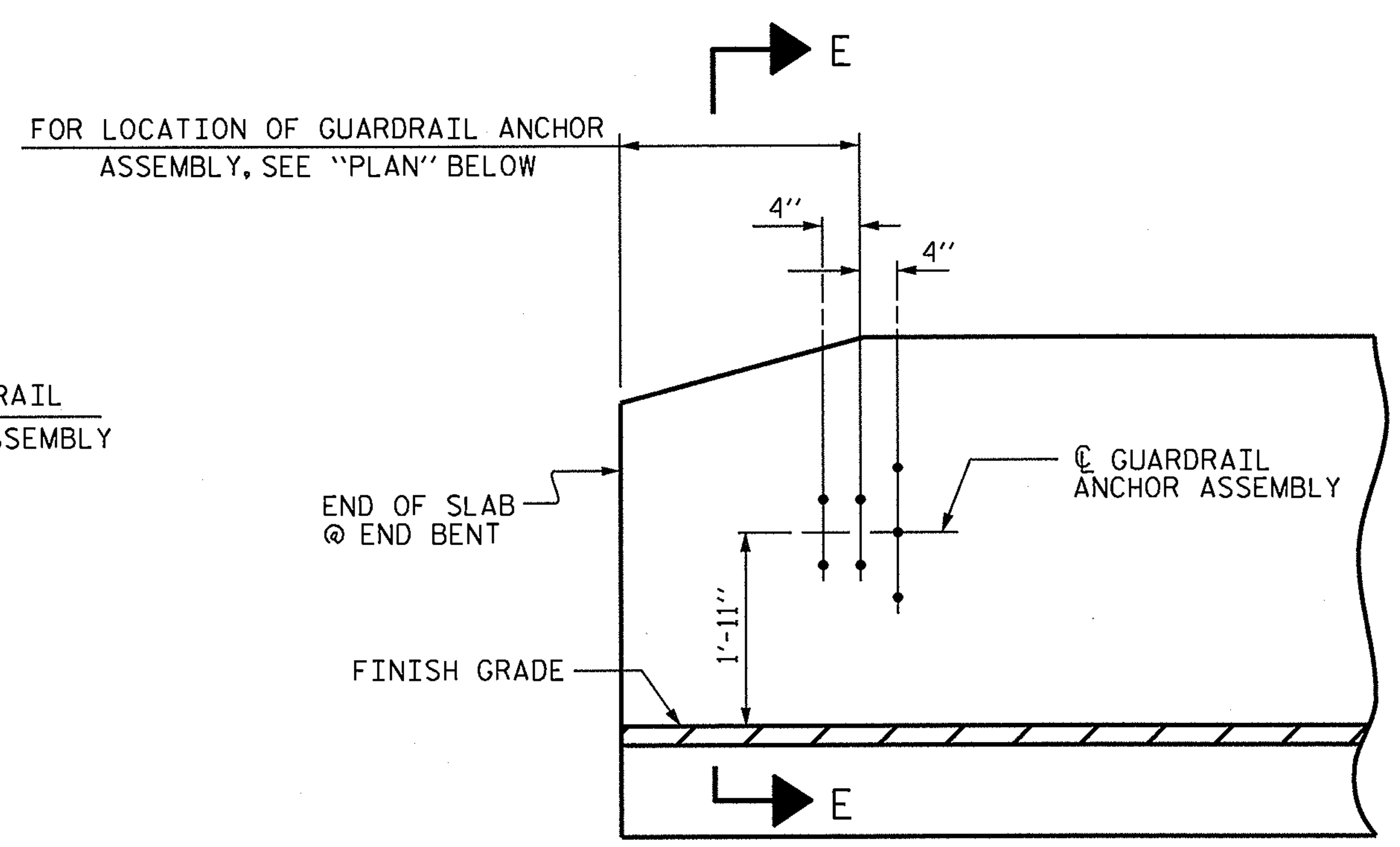
STD. NO. 21"PCS3_30_90S



PLAN



ELEVATION

NOTES

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

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

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

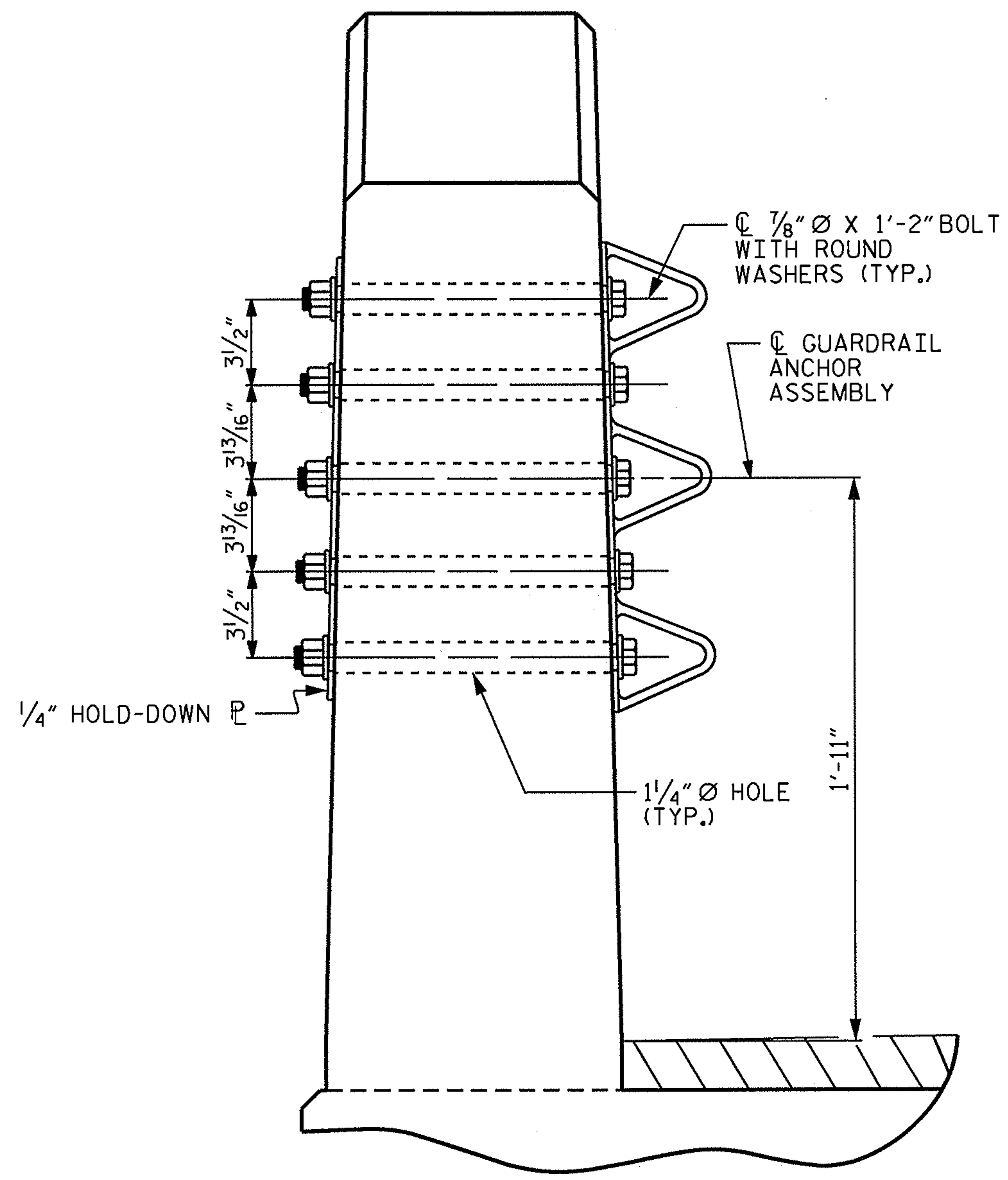
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

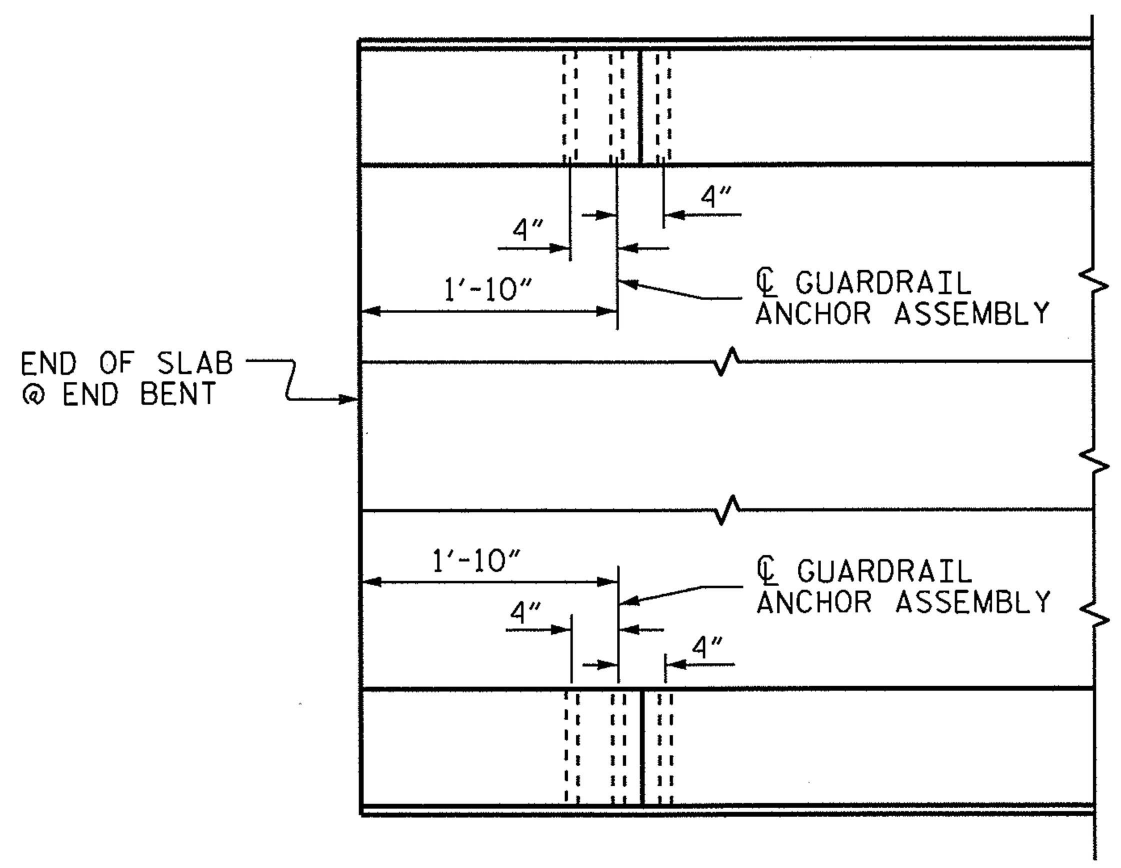
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

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



SECTION E-E

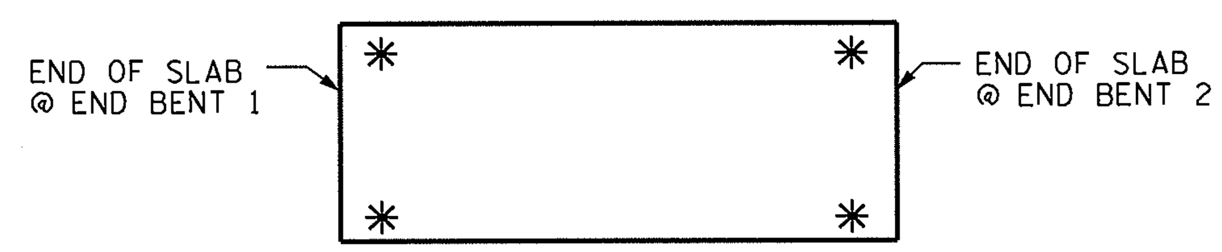
GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

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



SKETCH SHOWING POINTS OF ATTACHMENT

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. BD-5103V

DUPLIN COUNTY

STATION: 12+50.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
GUARDRAIL ANCHORAGE FOR VERTICAL CONCRETE BARRIER RAIL

NORTH CAROLINA PROFESSIONAL SEAL 025516 ENGINEER EMILY E. MURRAY
11/5/13

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS 15
2			4			

(SHT 1) STD. NO. GRA3

ASSEMBLED BY : C.B. PRUETT	DATE : 9/25/13	
CHECKED BY : EMILY MURRAY	DATE : 11/4/13	
DRAWN BY : MAA 5/10	REV. 10/1/11	MAA/GM
CHECKED BY : GM 5/10	REV. 12/5/11	MAA/GM
	REV. 6/13	MAA/GM

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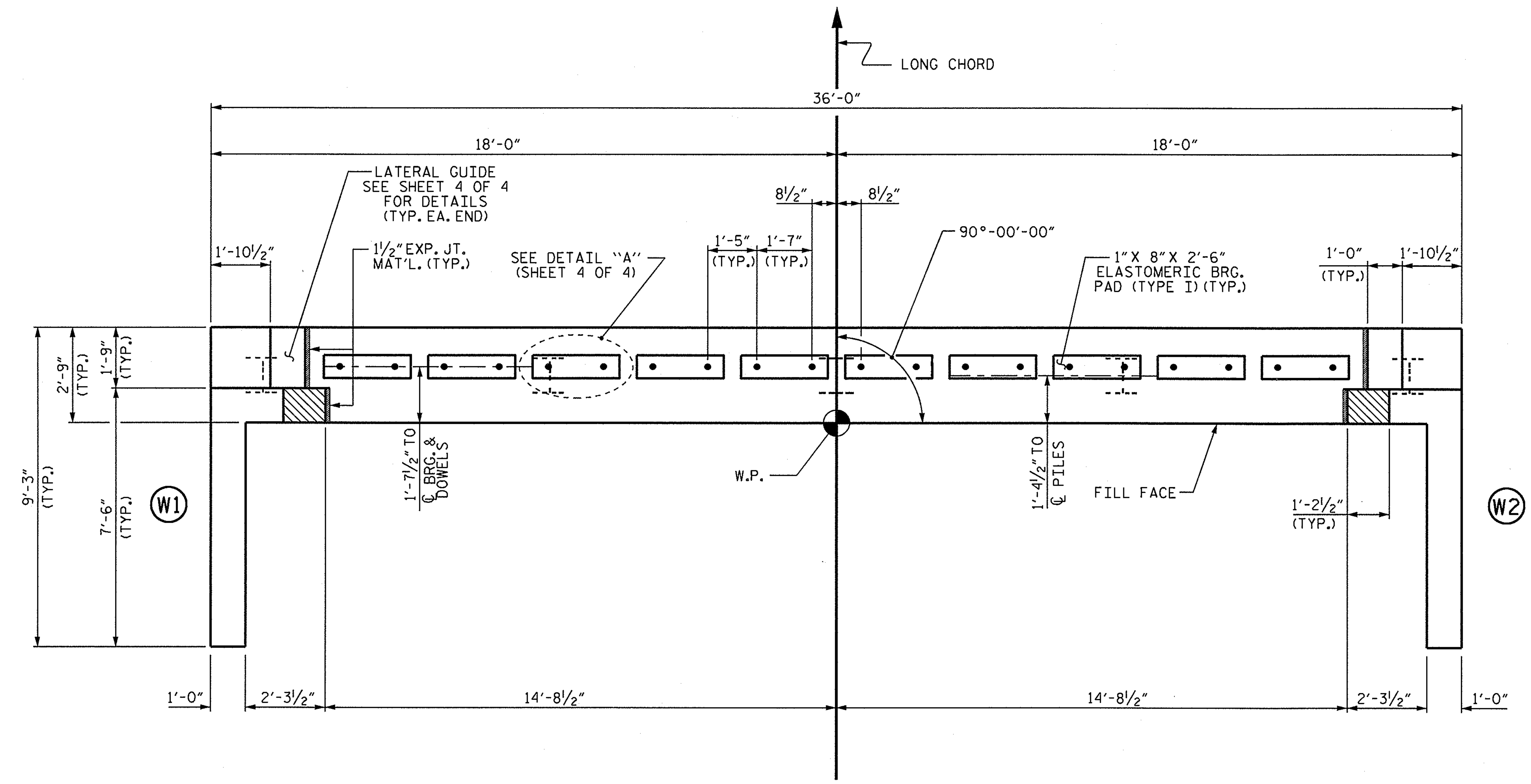
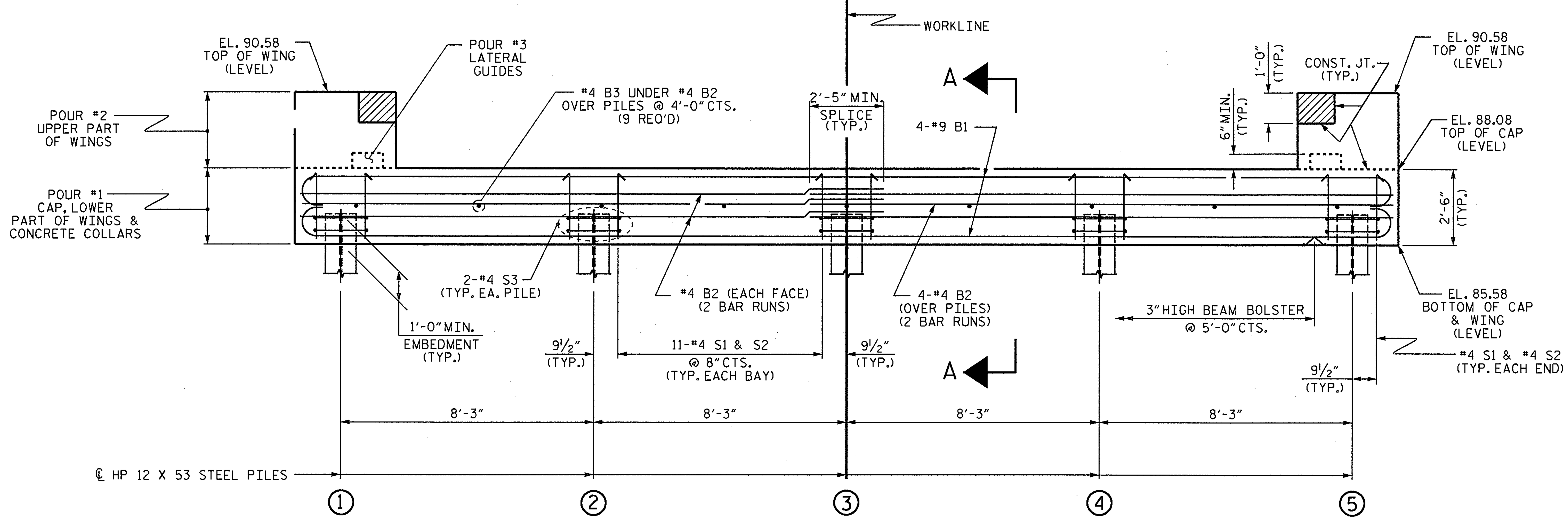


PLAN



ELEVATION

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

NOTES

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

THE LATERAL GUIDES ARE NOT TO BE POURED UNTIL AFTER THE CORED SLAB UNITS ARE IN PLACE.

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

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

THE CONTRACTOR HAS THE OPTION TO OMIT THE LATERAL GUIDE IF APPROVED BY THE ENGINEER.

INSTALL THE 4" DIA. DRAIN PIPE THROUGH THE WING WALL 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.

PROJECT NO. BD-5103V
DUPLIN COUNTY
STATION: 12+50.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1

NORTH CAROLINA PROFESSIONAL SEAL 025516 ENGINEER EMILY E. MURRAY
11/5/13

REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S-8
1			3					TOTAL SHEETS
2			4					15

ASSEMBLED BY : C.B. PRUETT	DATE : 9/25/13
CHECKED BY : EMILY MURRAY	DATE : 11/4/13
DRAWN BY : DGE 02/10	
CHECKED BY : MKT 02/10	

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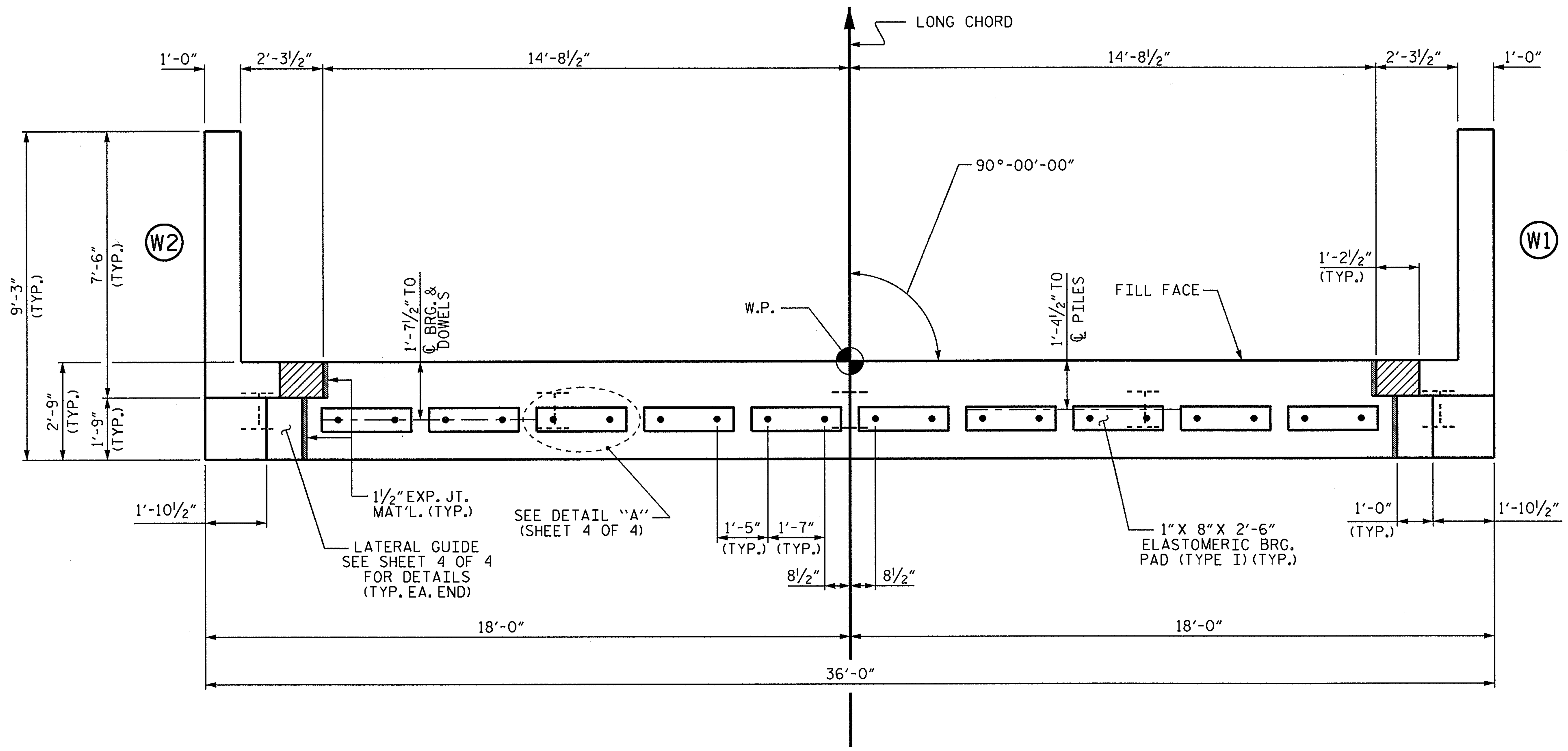
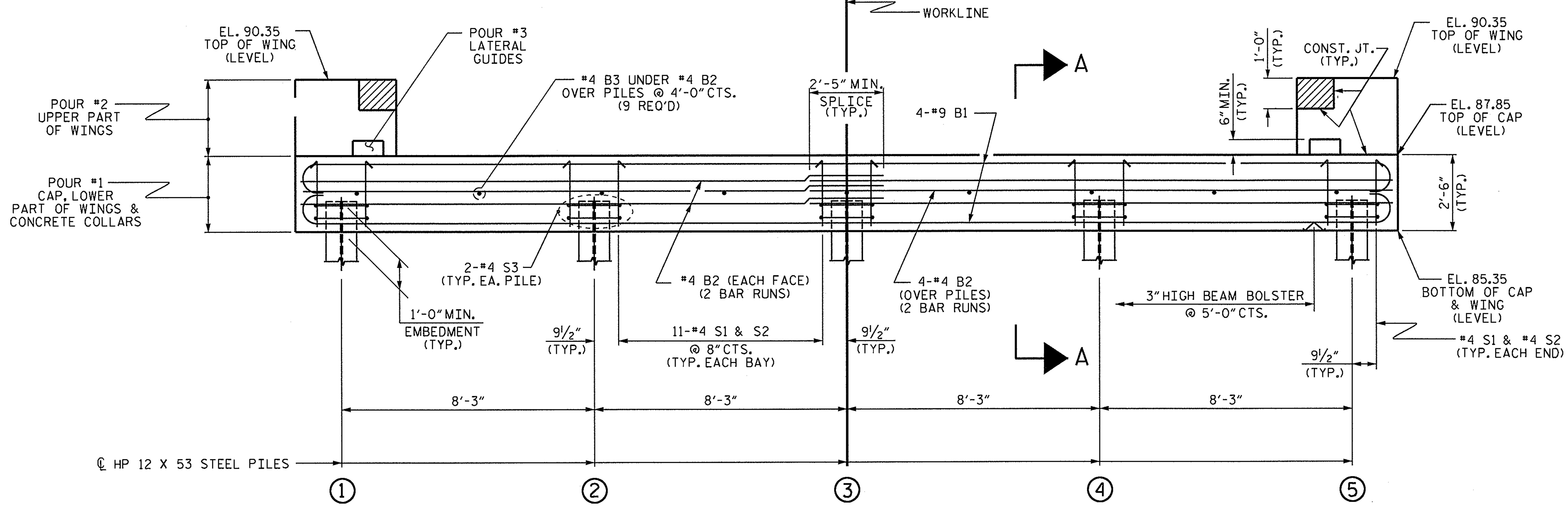
STD. NO. EB_30_90S



PLAN



ELEVATION

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

NOTES

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

THE LATERAL GUIDES ARE NOT TO BE POURED UNTIL AFTER THE CORED SLAB UNITS ARE IN PLACE.

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

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

THE CONTRACTOR HAS THE OPTION TO OMIT THE LATERAL GUIDE IF APPROVED BY THE ENGINEER.

INSTALL THE 4" DIA. DRAIN PIPE THROUGH THE WING WALL 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.

PROJECT NO. BD-5103V
DUPLIN COUNTY
STATION: 12+50.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 2

NORTH CAROLINA PROFESSIONAL SEAL 025516 ENGINEER EMILY E. MURRAY
11/5/13

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			15

ASSEMBLED BY : C.B. PRUETT	DATE : 9/25/13
CHECKED BY : EMILY MURRAY	DATE : 11/4/13
DRAWN BY : DGE 02/10	
CHECKED BY : MKT 02/10	

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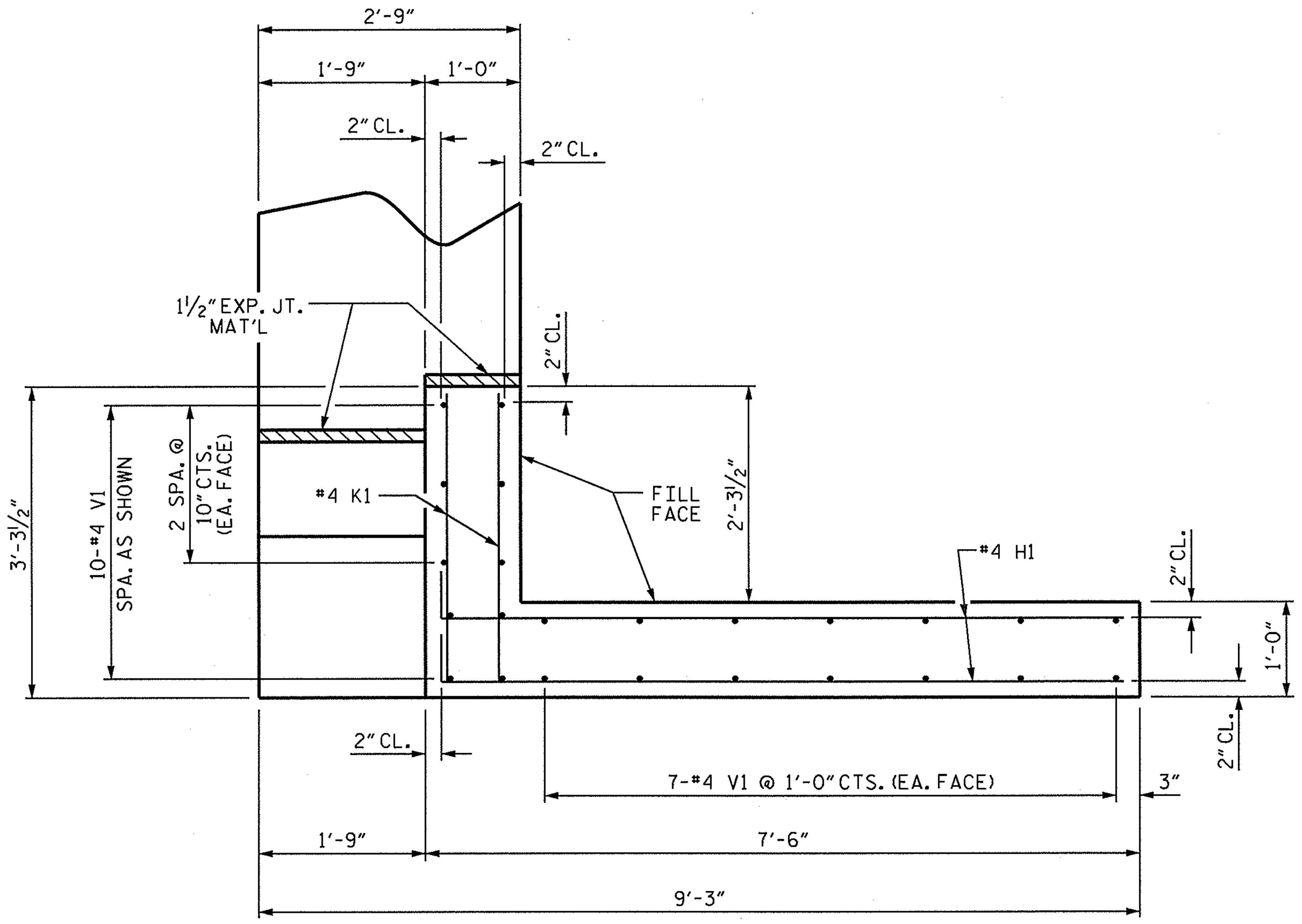
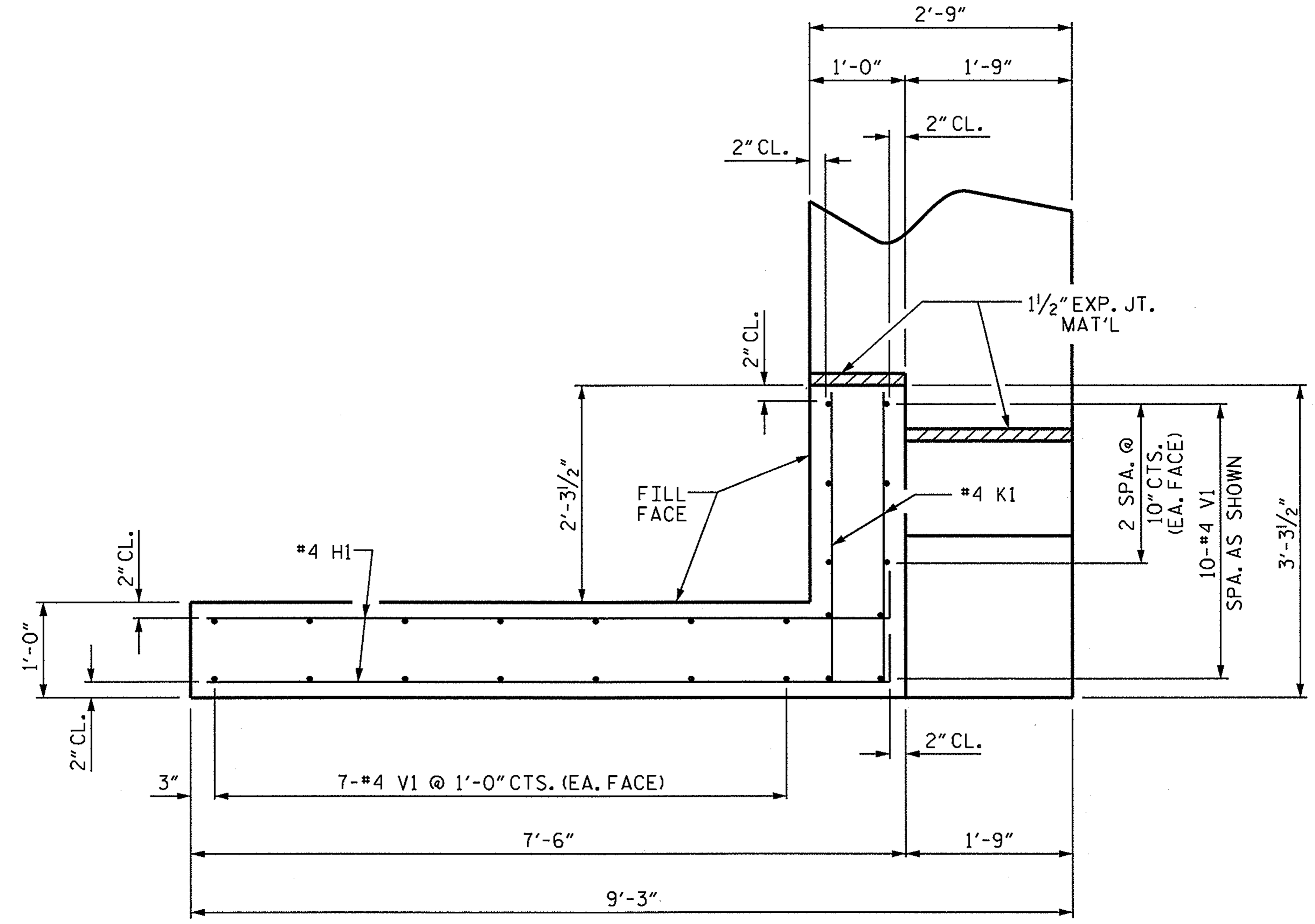
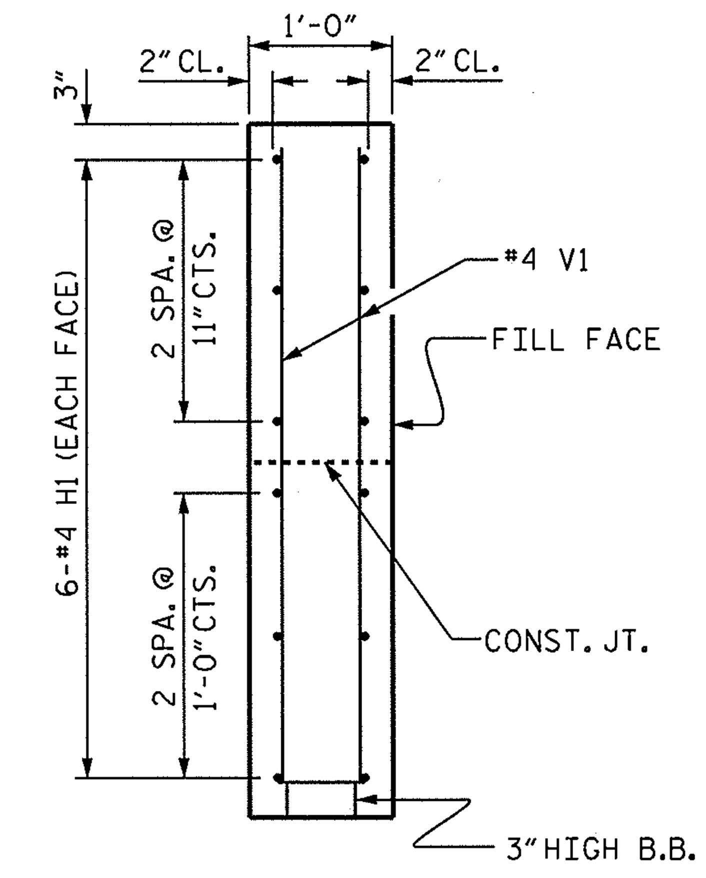


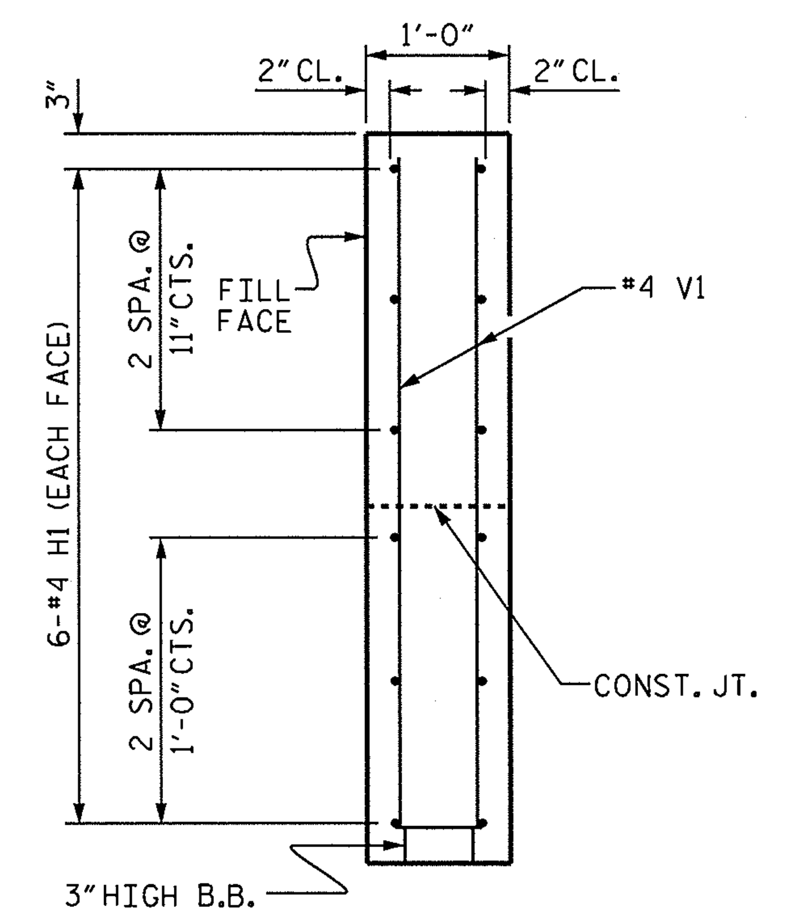
PLAN OF WING (W1)



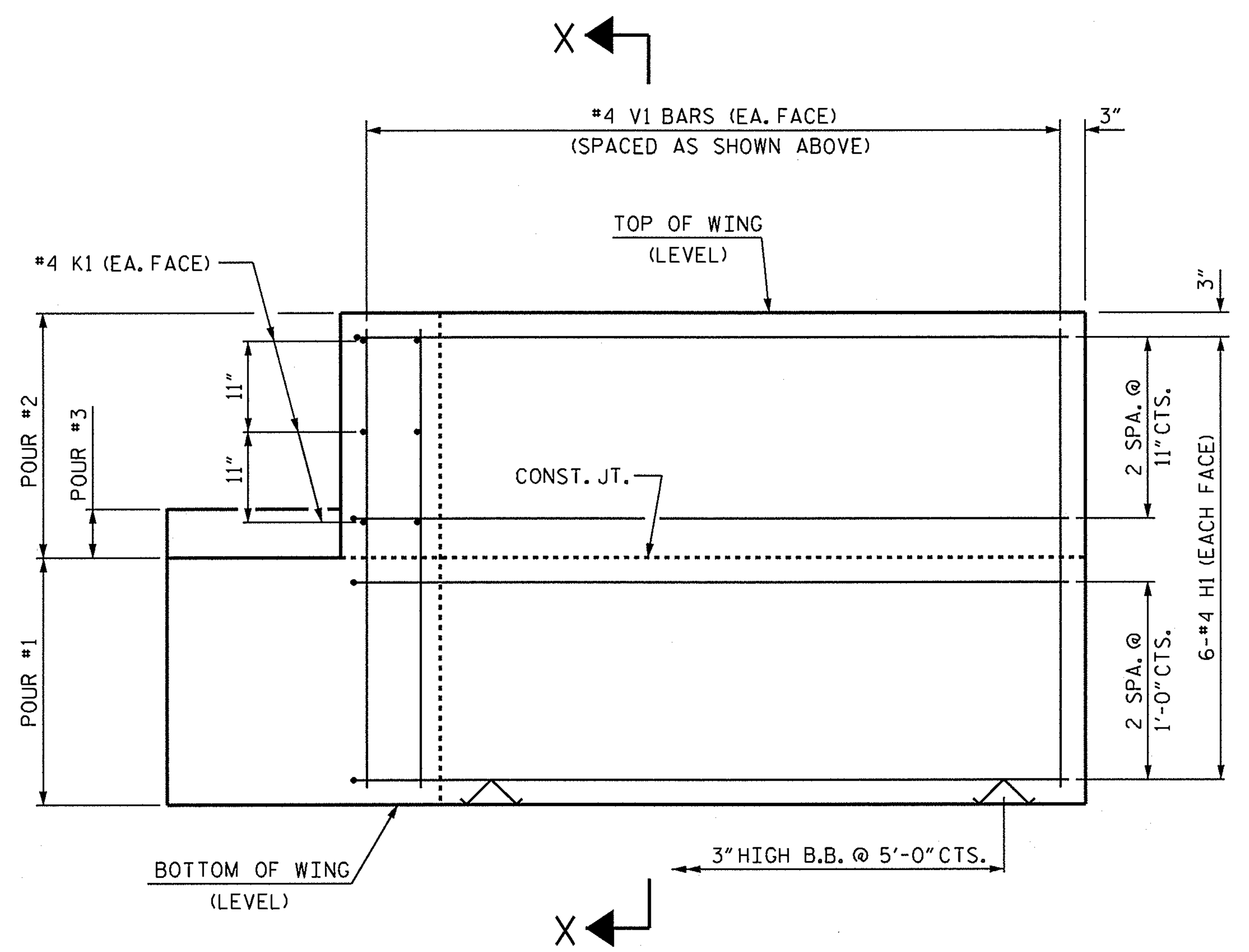
PLAN OF WING (W2)



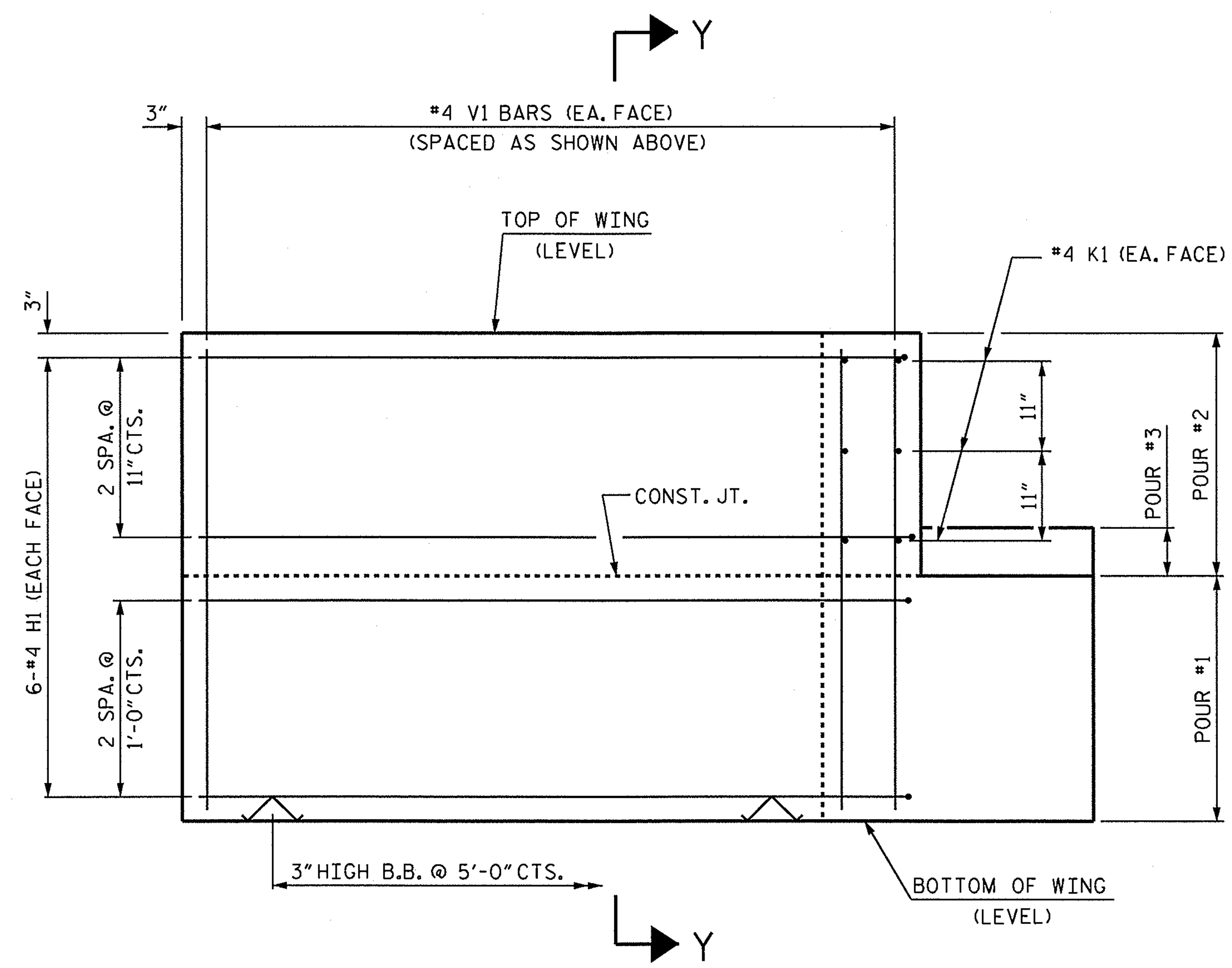
SECTION X-X



SECTION Y-Y



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

WING DETAILS

PROJECT NO. BD-5103V
DUPLIN COUNTY
STATION: 12+50.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT
WING DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 025516 ENGINEER EMILY E. MURRAY
11/5/13

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			15

ASSEMBLED BY : C.B. PRUETT DATE : 9/25/13
CHECKED BY : EMILY MURRAY DATE : 11/4/13

DRAWN BY : DGE 02/10
CHECKED BY : MKT 02/10

05-NOV-2013 14:48
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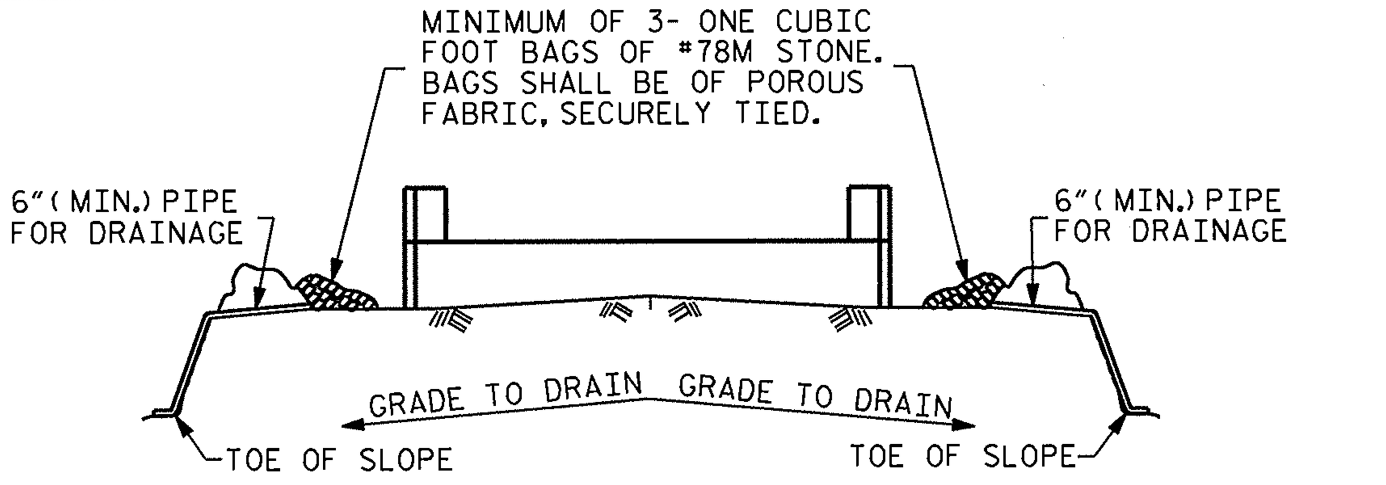
cbpruett

STD. NO. EB_30_90S

TEMPORARY DRAINAGE AT END BENT

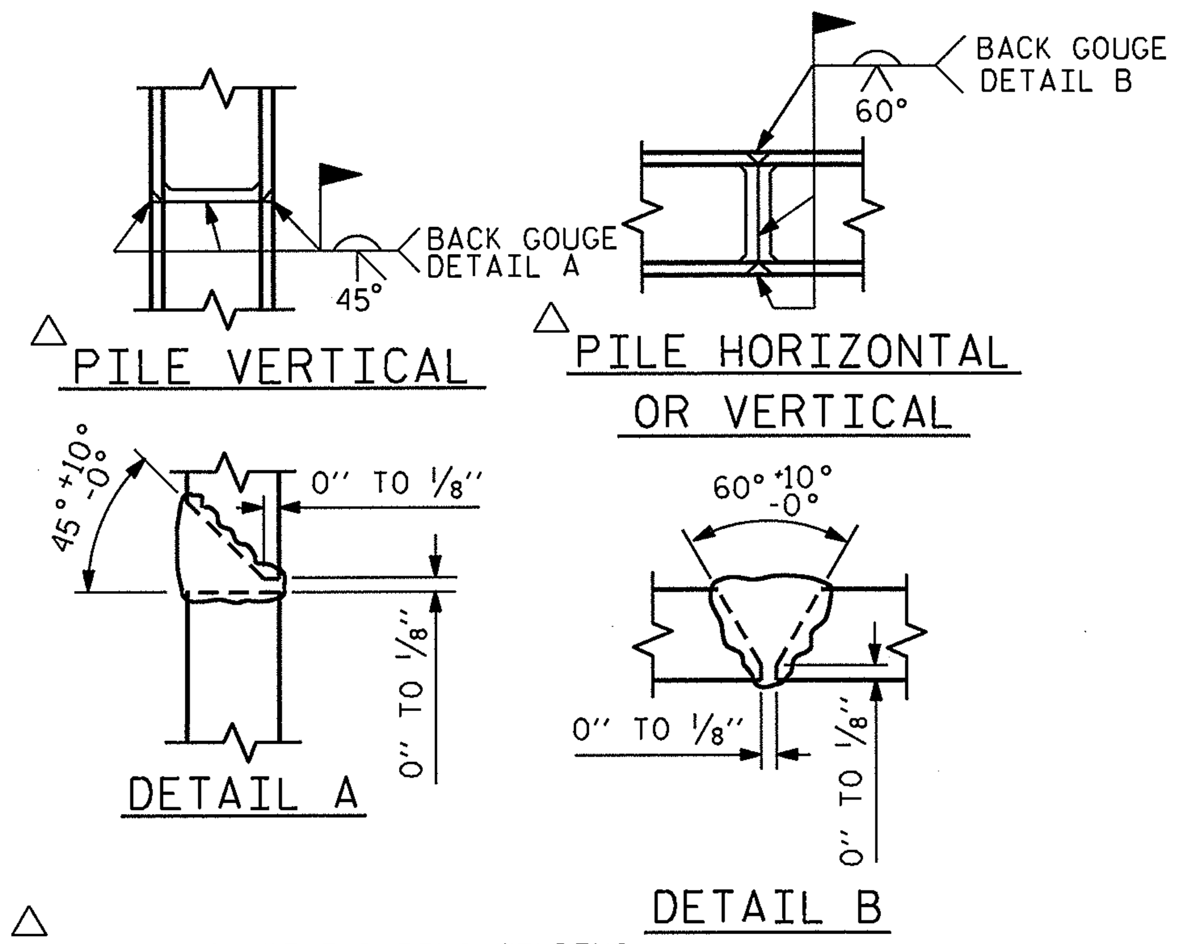


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

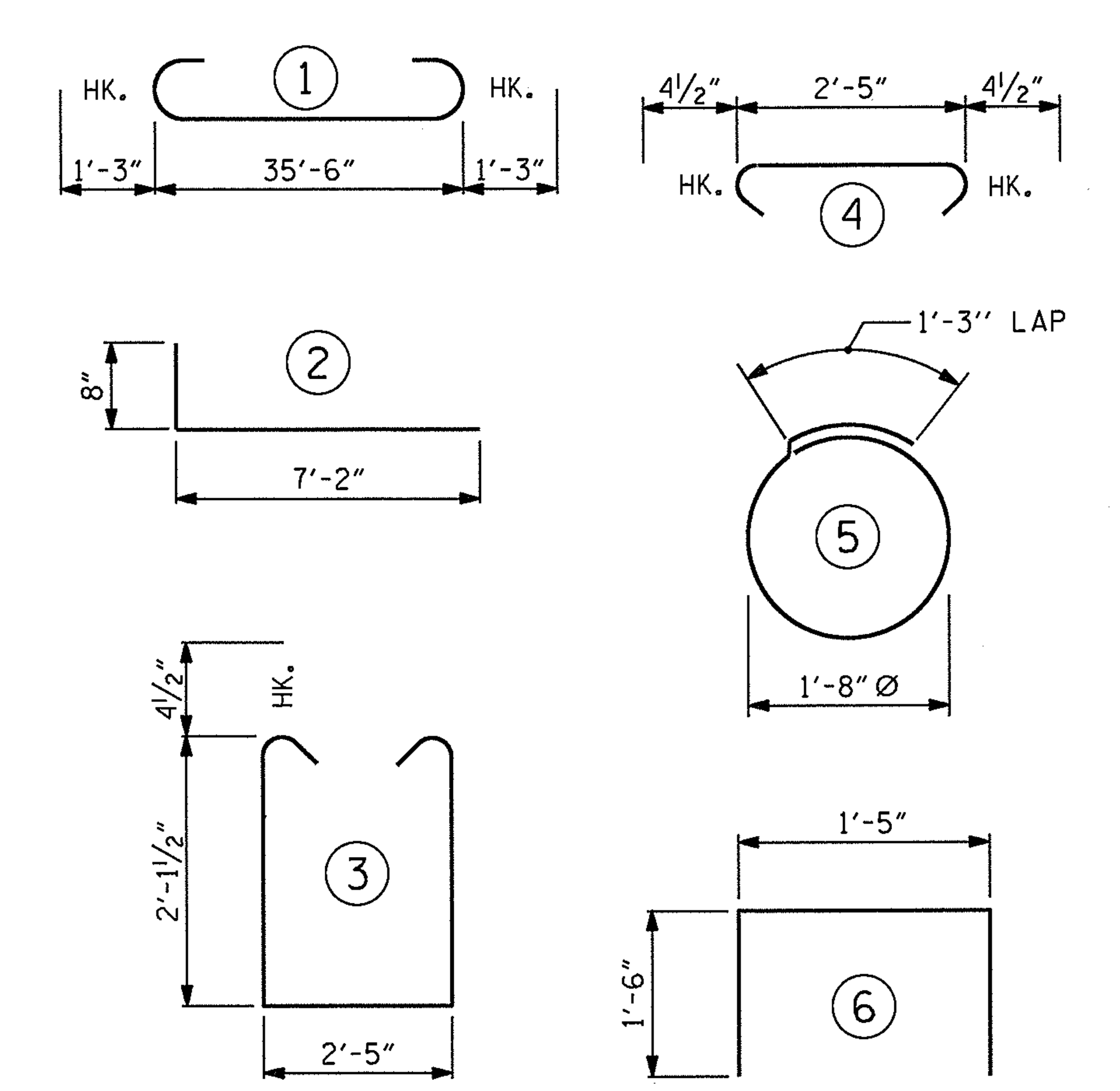
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

PILE SPLICE DETAILS



△ POSITION OF PILE DURING WELDING.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

END BENT No. 1	END BENT No. 2
HP 12 X 53 STEEL PILES	HP 12 X 53 STEEL PILES
NO: 5 LIN. FT.= 250	NO: 5 LIN. FT.= 250
PILE REDRIVES EA. 3	PILE REDRIVES EA. 3

BILL OF MATERIAL
FOR ONE END BENT

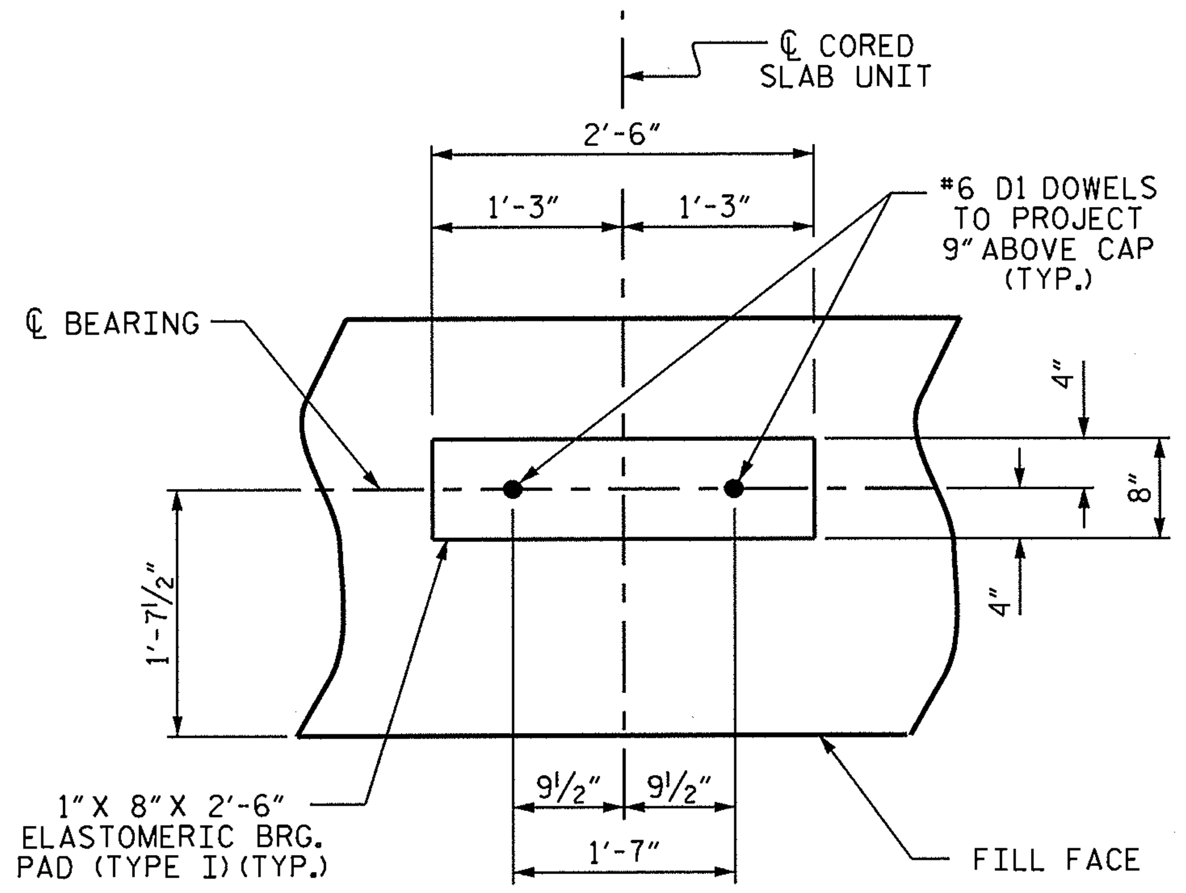
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	38'-0"	1034
B2	16	#4	STR	19'-1"	204
B3	9	#4	STR	2'-5"	15
D1	20	#6	STR	1'-6"	45
H1	24	#4	2	7'-10"	126
K1	12	#4	STR	2'-11"	23
S1	46	#4	3	7'-5"	228
S2	46	#4	4	3'-2"	97
S3	10	#4	5	6'-6"	43
S4	4	#4	6	4'-5"	12
V1	48	#4	STR	4'-8"	150

REINFORCING STEEL (FOR ONE END BENT) 1977 LBS.

CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)

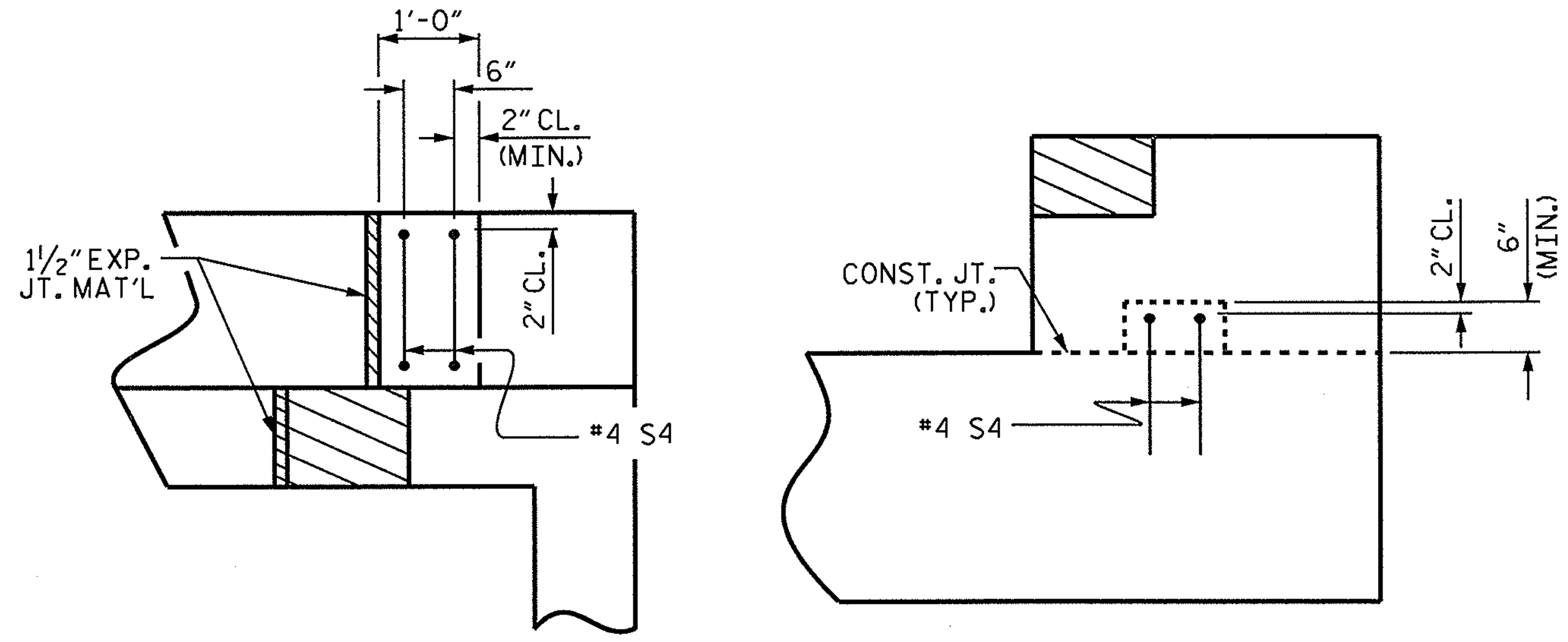
POUR #1	CAP, LOWER PART OF WINGS & COLLARS	11.2 C.Y.
POUR #2	UPPER PART OF WINGS	1.8 C.Y.
POUR #3	LATERAL GUIDES	0.1 C.Y.
TOTAL CLASS A CONCRETE		13.1 C.Y.

DETAIL "A"



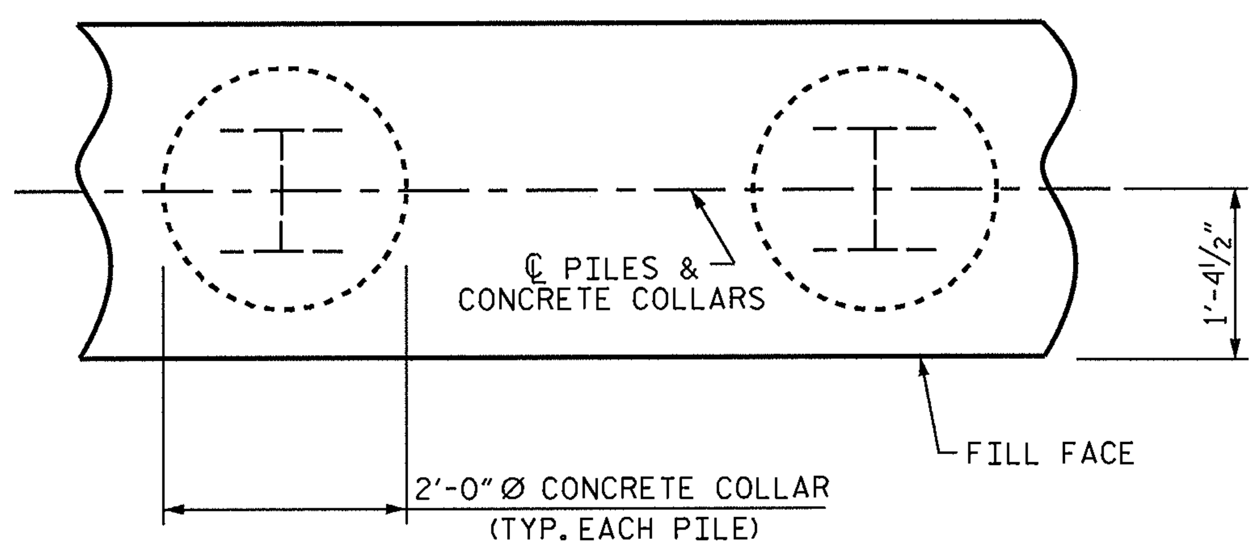
(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)

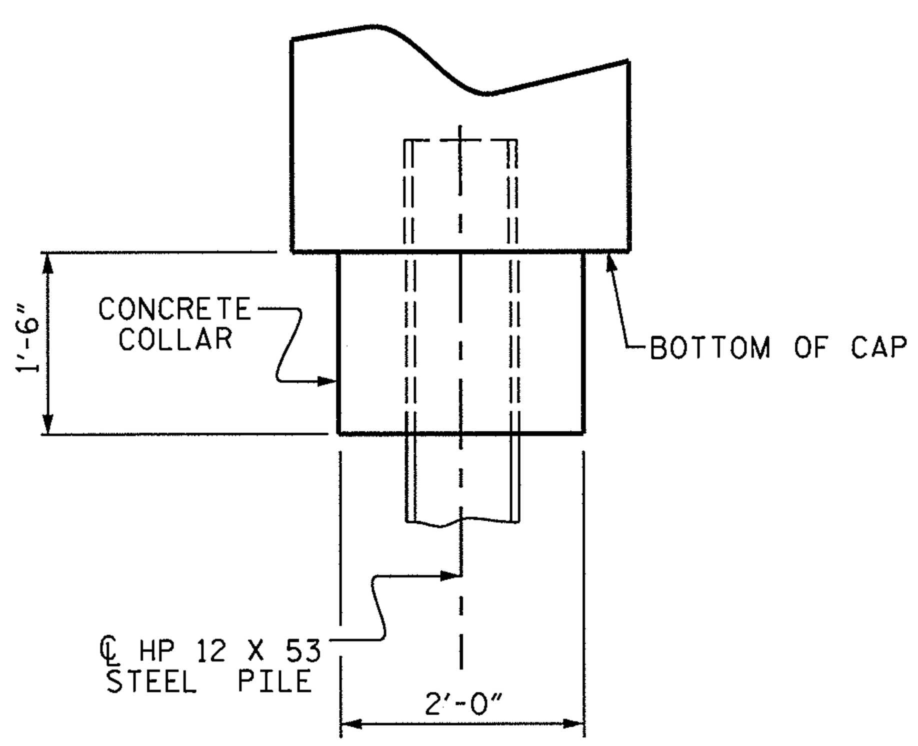
LATERAL GUIDE DETAILS



(RIGHT LATERAL GUIDE SHOWN, LEFT END SIMILAR)

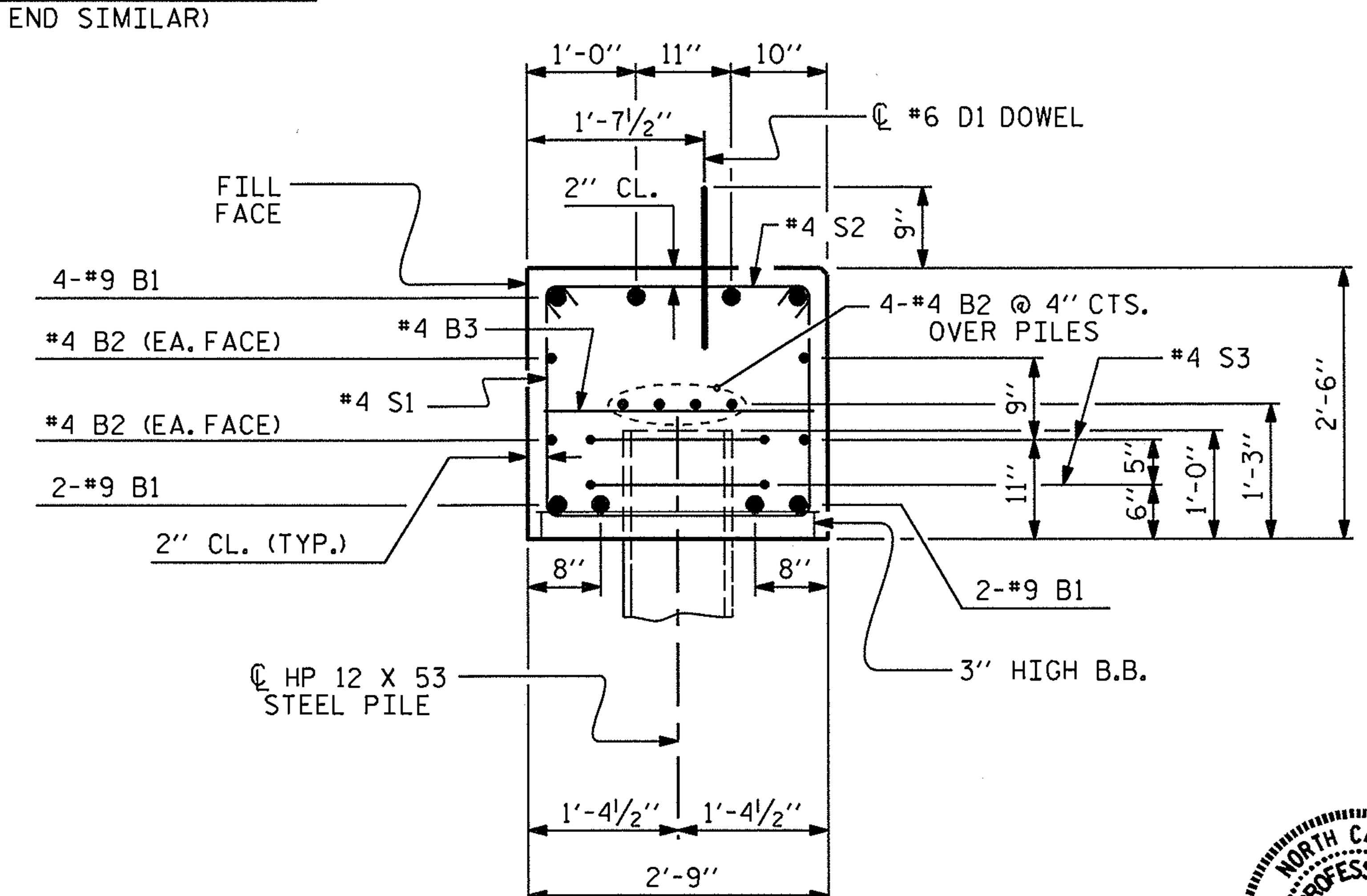
CORROSION PROTECTION FOR STEEL PILES DETAIL





(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)

SECTION A-A



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

PROJECT NO. BD-5103V
DUPLIN COUNTY
STATION: 12+50.00
SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1 & 2
DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 025516 EMILY E. MURRAY
11/5/13

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			15

ASSEMBLED BY : C.B. PRUETT	DATE : 9/25/13
CHECKED BY : EMILY MURRAY	DATE : 11/4/13
DRAWN BY : DGE	02/10
CHECKED BY : MKT	02/10

05-NOV-2013 14:48
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cbpruett

STD. NO. EB_30_90S

NOTES

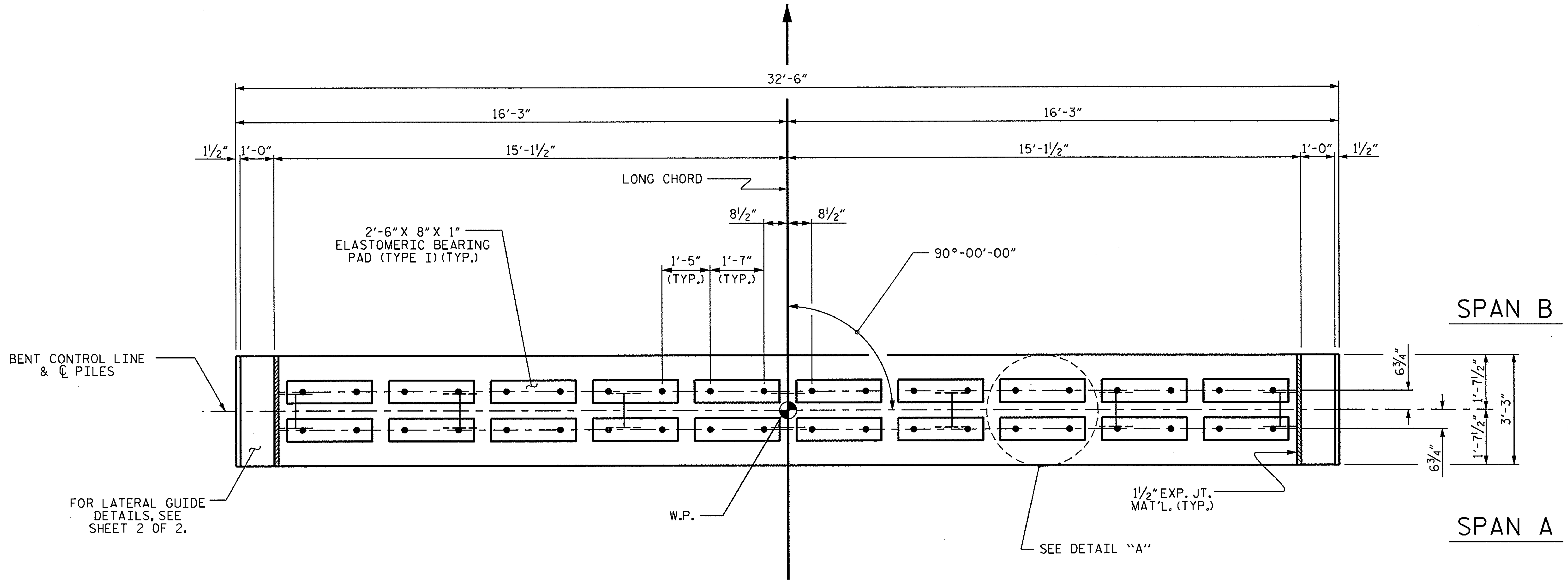
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

THE LATERAL GUIDES ARE NOT TO BE POURED UNTIL AFTER THE CORED SLAB UNITS ARE IN PLACE.

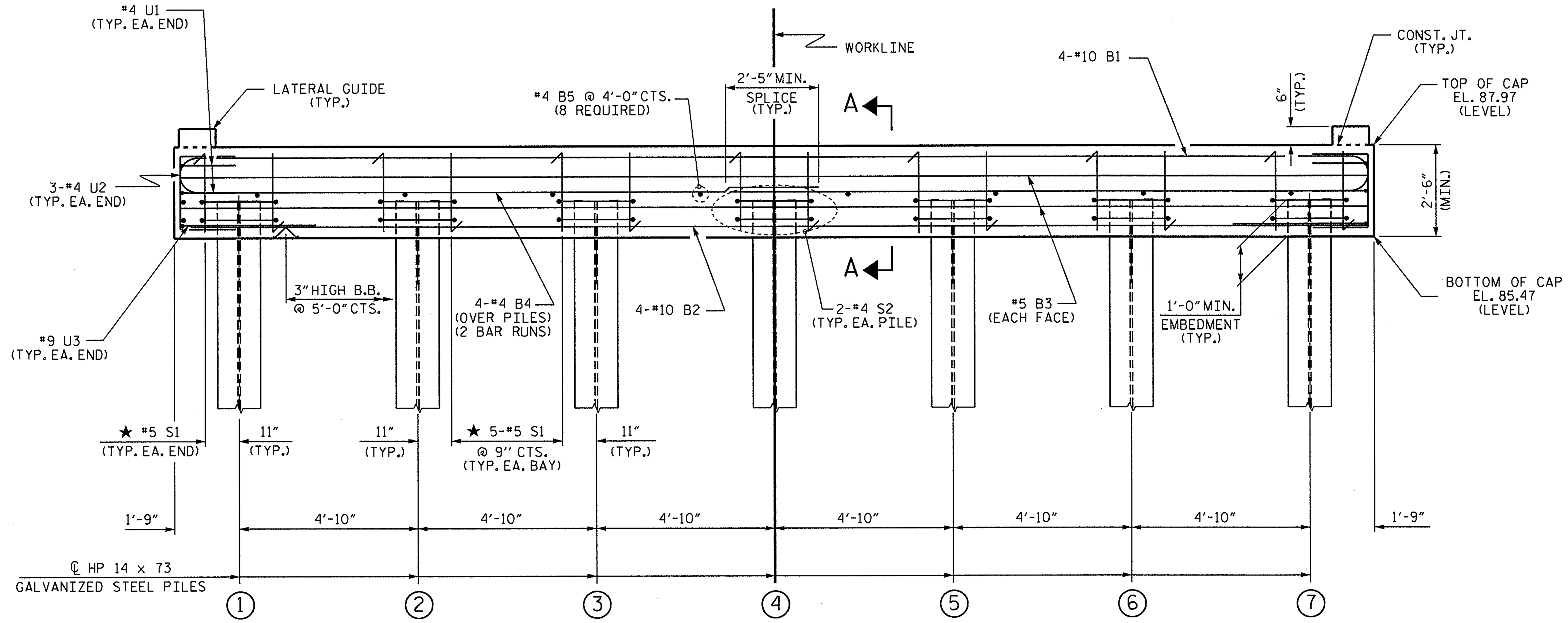
★ INVERT ALTERNATE STIRRUPS.

GALVANIZE THE FULL LENGTH OF EACH INTERIOR BENT PILE IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS.

THE CONTRACTOR HAS THE OPTION TO OMIT THE LATERAL GUIDE IF APPROVED BY THE ENGINEER.

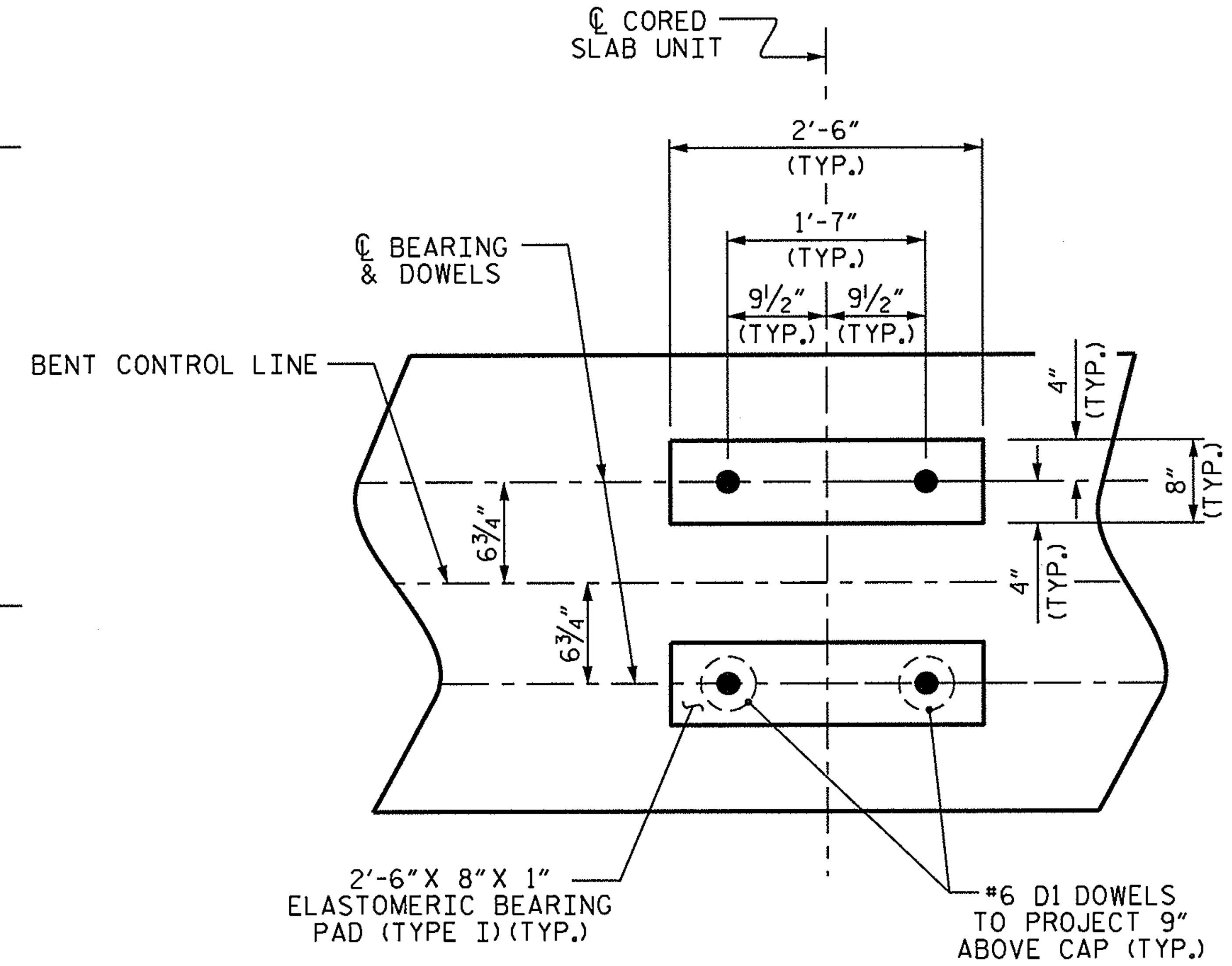


PLAN



ELEVATION

FOR SECTION A-A, SEE SHEET 2 OF 2



DETAIL "A"

(DIMENSIONS ARE TYPICAL EACH BEARING)

PROJECT NO. BD-5103V

DUPLIN COUNTY

STATION: 12+50.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 1

NORTH CAROLINA PROFESSIONAL SEAL 025516 ENGINEER EMILY E. MURRAY

11/5/13

REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S-12
1			3					TOTAL SHEETS
2			4					15

ASSEMBLED BY : C.B. PRUETT	DATE : 9/25/13
CHECKED BY : EMILY MURRAY	DATE : 11/4/13
DRAWN BY : DGE 05/10	
CHECKED BY : MKT 05/10	

9/25/13

06-NOV-2013 08:00
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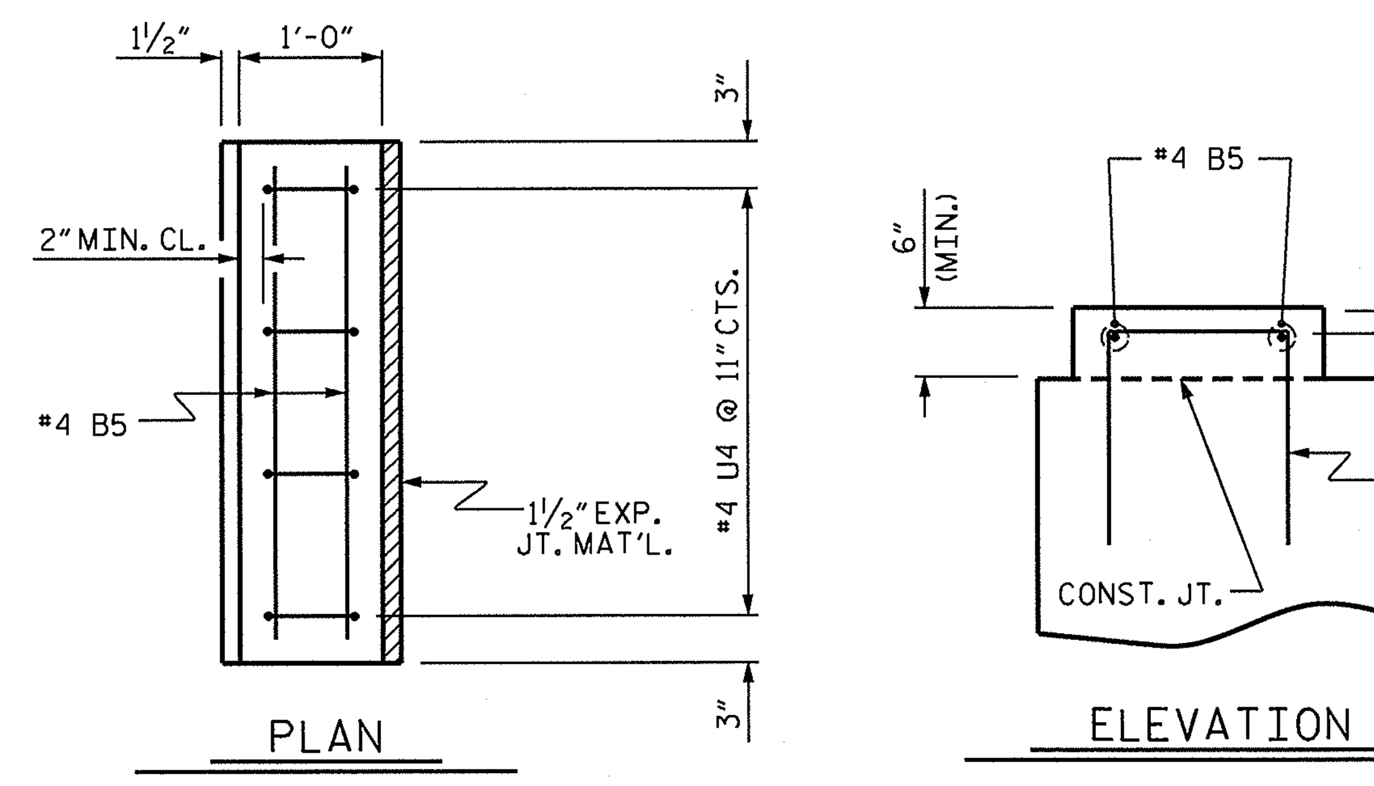
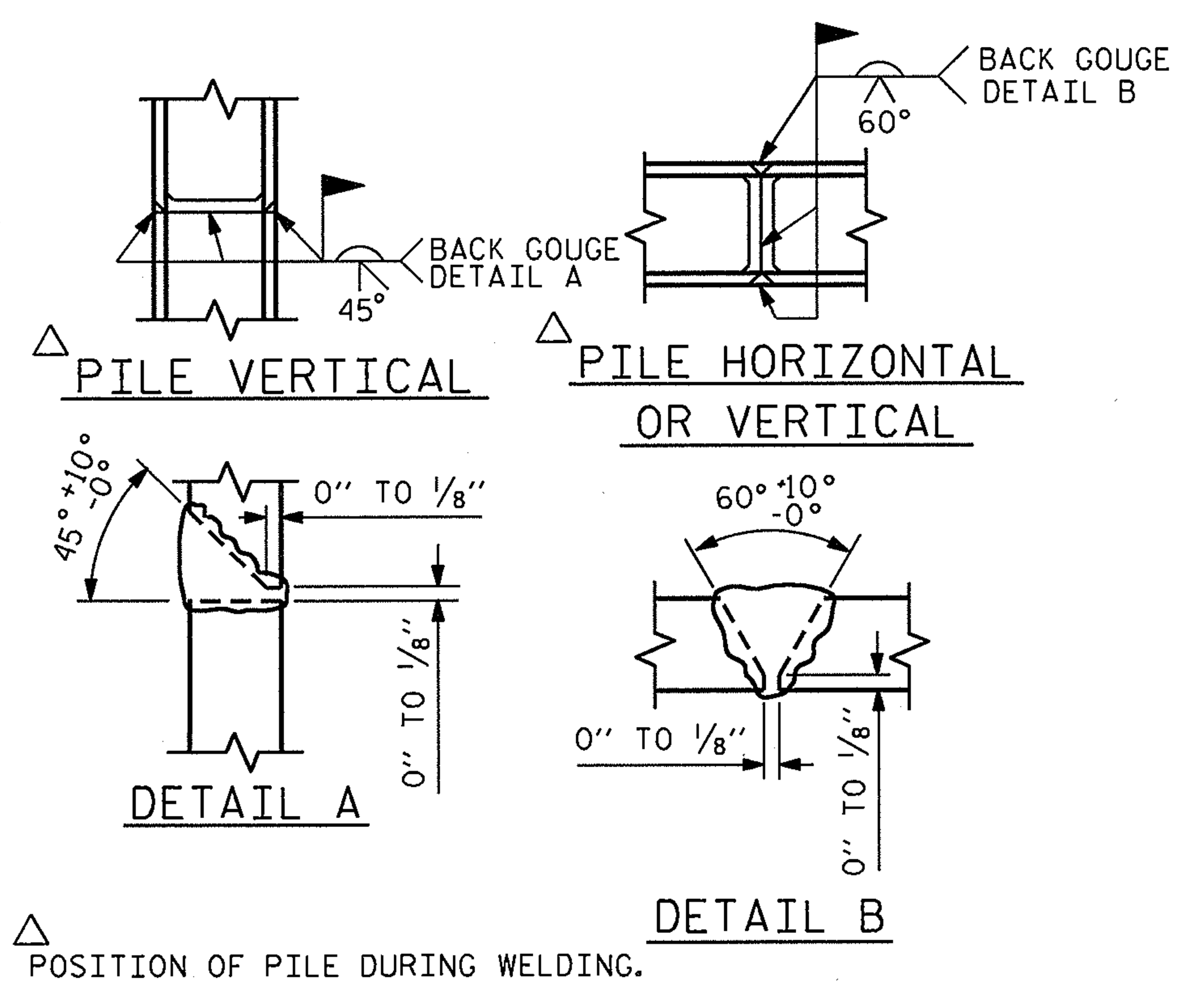
cbpruett

STD. NO. 14" HP_BT_30_90S_<60'



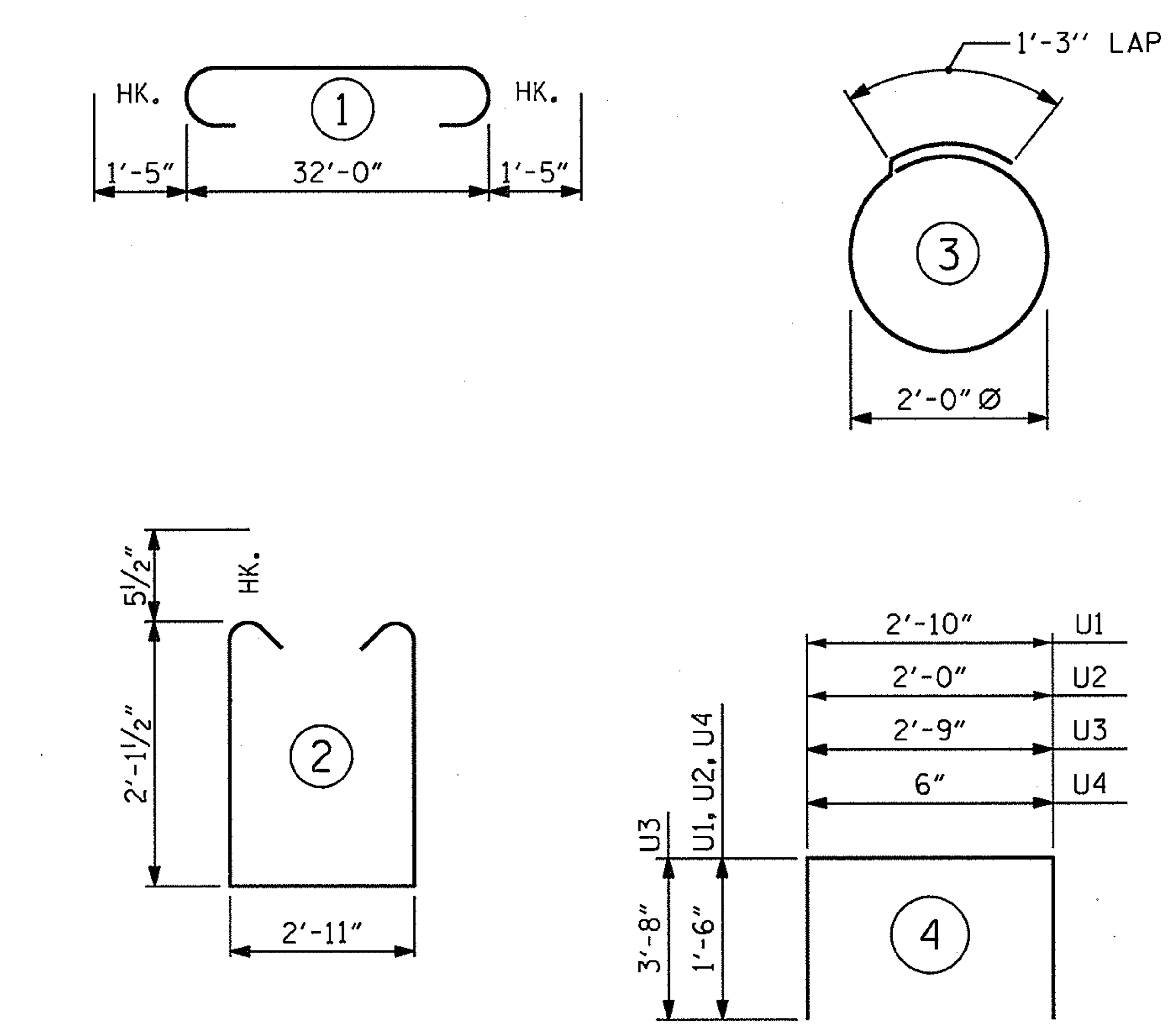
LATERAL GUIDE DETAILS

(LEFT LATERAL GUIDE SHOWN, RIGHT SIDE SIMILAR)



PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL
FOR ONE BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	4	#10	1	34'-10"	600
B2	4	#10	STR	32'-2"	554
B3	4	#5	STR	32'-2"	134
B4	8	#4	STR	17'-4"	93
B5	12	#4	STR	2'-11"	23
D1	40	#6	STR	1'-6"	90
S1	32	#5	2	8'-1"	270
S2	14	#4	3	7'-7"	71
U1	4	#4	4	5'-10"	16
U2	6	#4	4	5'-0"	20
U3	2	#9	4	10'-1"	69
U4	8	#4	4	3'-6"	19

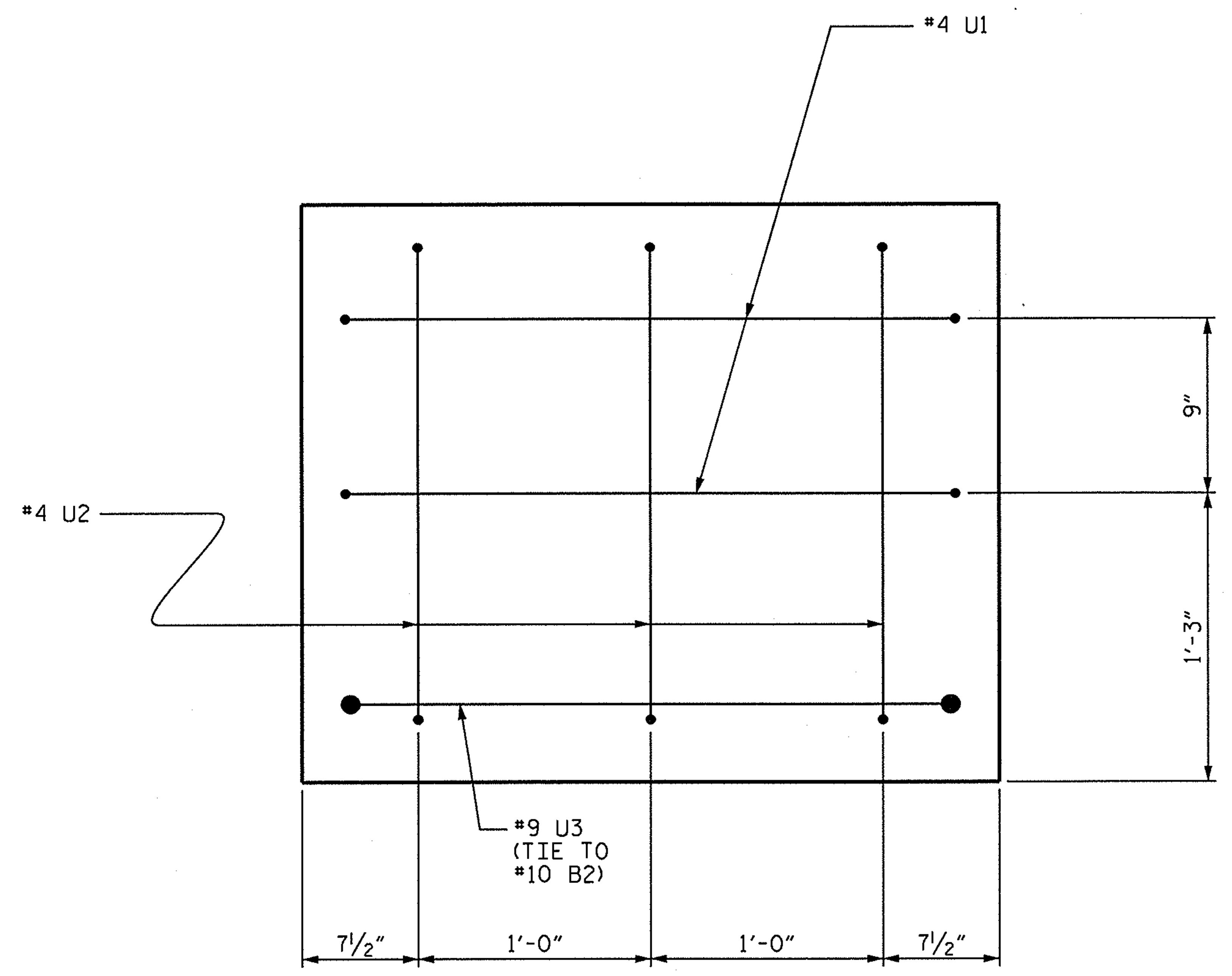
REINFORCING STEEL (FOR ONE BENT) 1959 LBS

CLASS A CONCRETE BREAKDOWN (FOR ONE BENT)

POUR #1 (CAP)	9.8 C.Y.
POUR #2 (LATERAL GUIDES)	0.1 C.Y.
TOTAL CLASS A CONCRETE	9.9 C.Y.

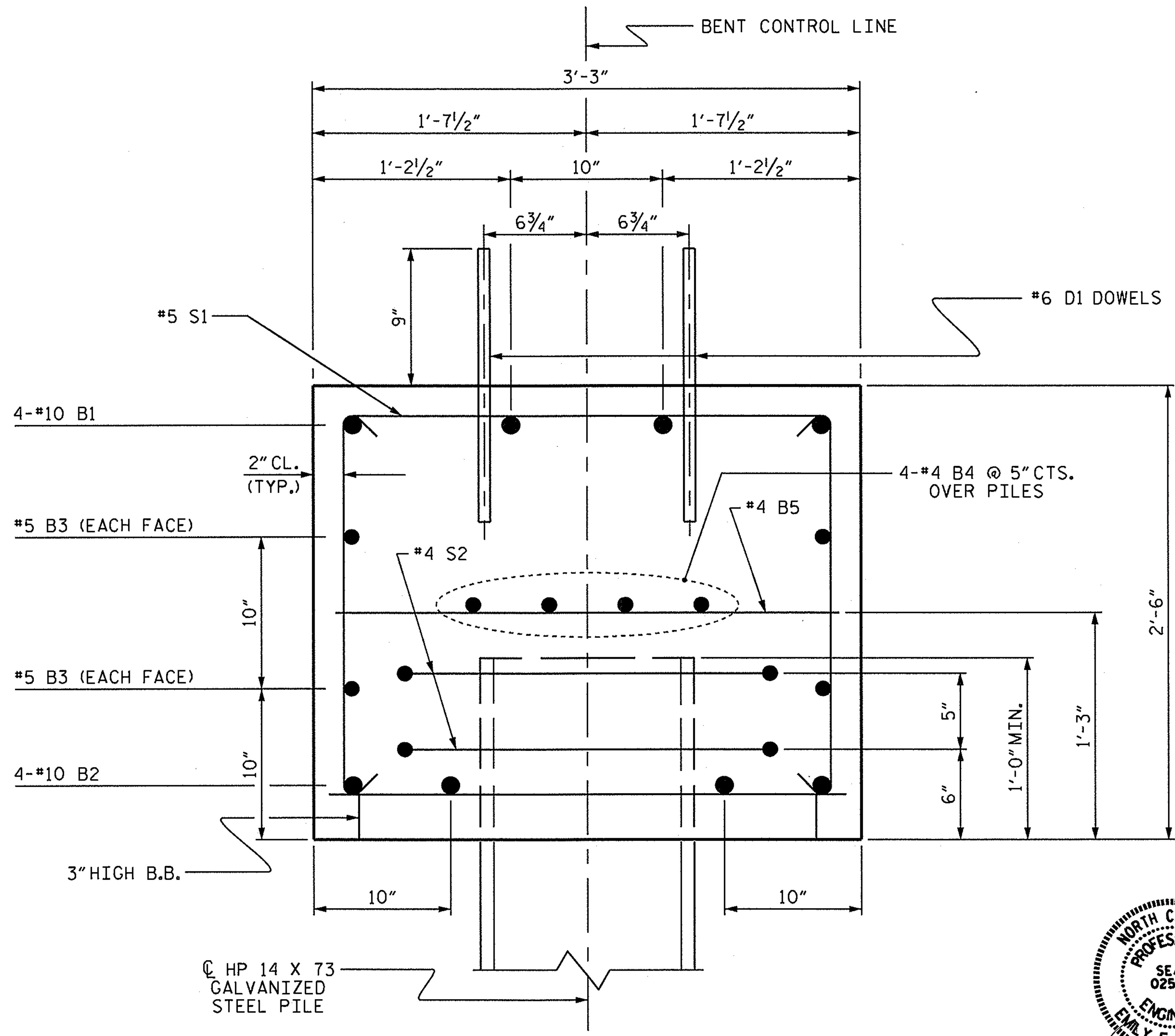
HP 14 X 73 GALVANIZED STEEL PILES (FOR ONE BENT)

No. 7	LIN. FT.	420
PILE REDRIVES	EA.	4
STEEL PILE POINTS	EA.	7



END OF CAP VIEW

(TYPICAL BOTH ENDS)



SECTION A-A

NORTH CAROLINA PROFESSIONAL SEAL 025516 ENGINEER EMILY E. MURRAY

11/5/13

PROJECT NO. BD-5103V

DUPLIN COUNTY

STATION: 12+50.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT No. 1

REVISIONS							
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.	S-13
1			3			TOTAL SHEETS	15
2			4				

DRAWN BY : C.B. PRUETT DATE : 9/25/13
CHECKED BY : EMILY MURRAY DATE : 11/4/13

DRAWN BY : DGE 05/10
CHECKED BY : MKT 05/10

05-NOV-2013 14:49
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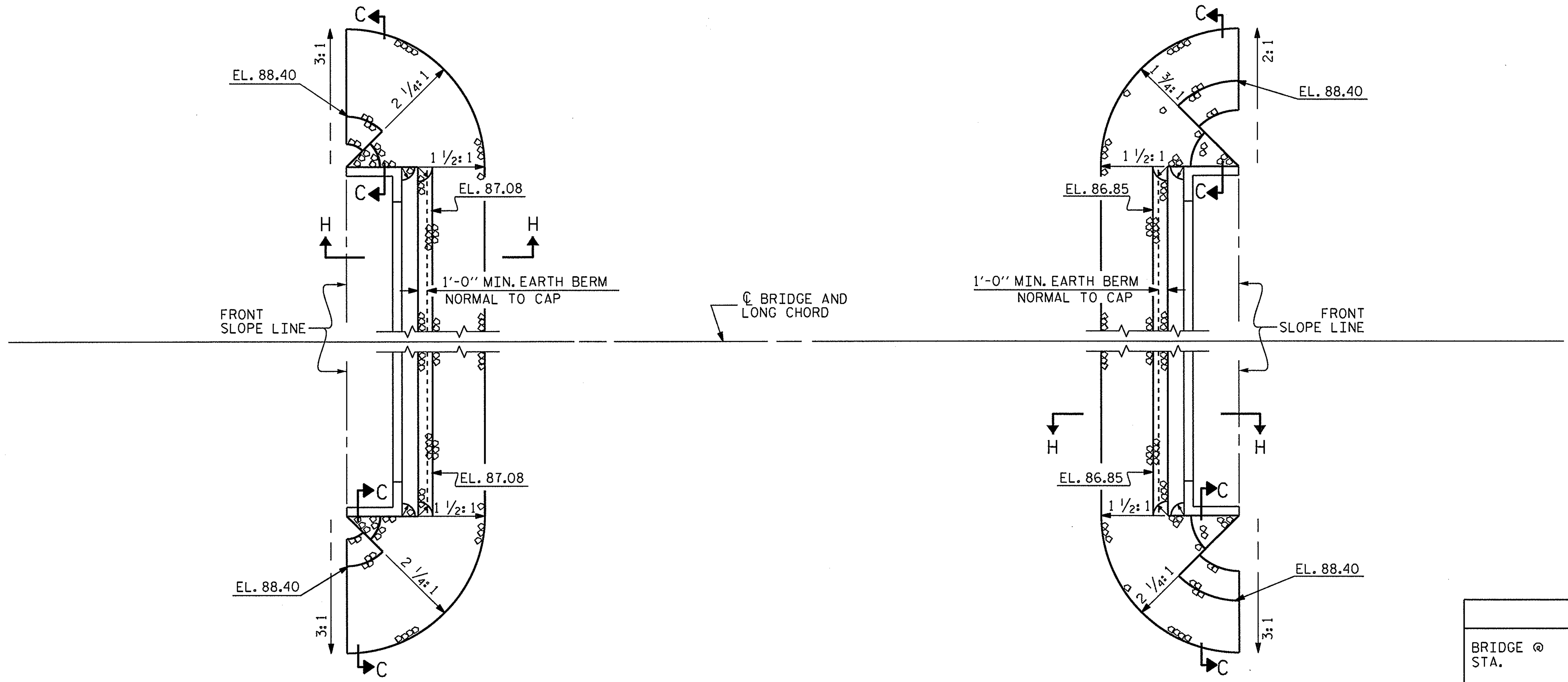
cbpruett

STD. NO. 14" HP_BT_30_90S_<60'

NOTES :

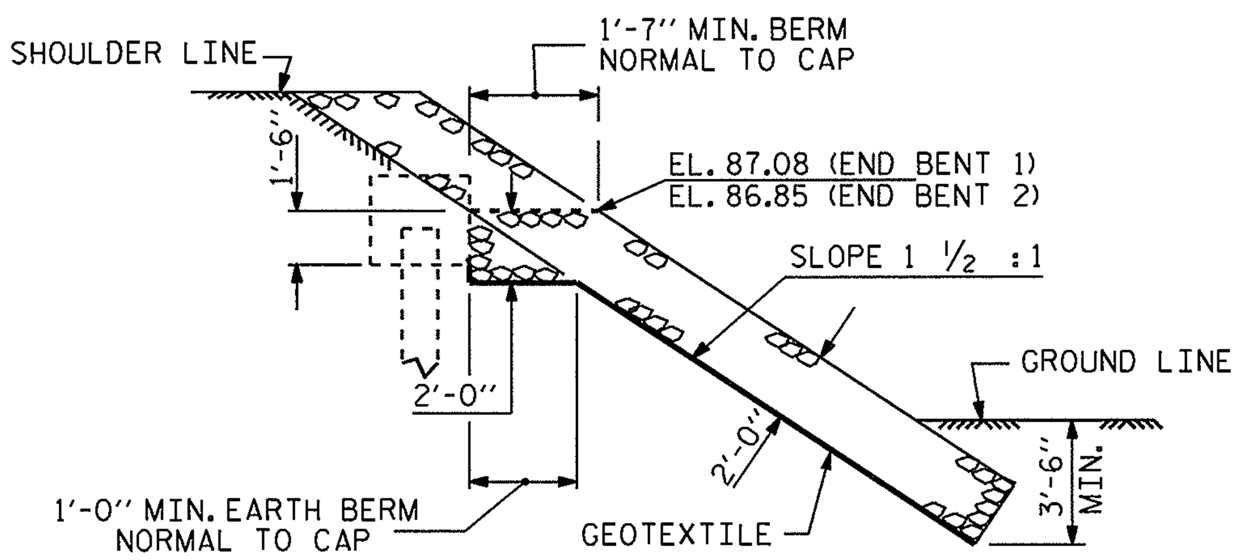
FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.



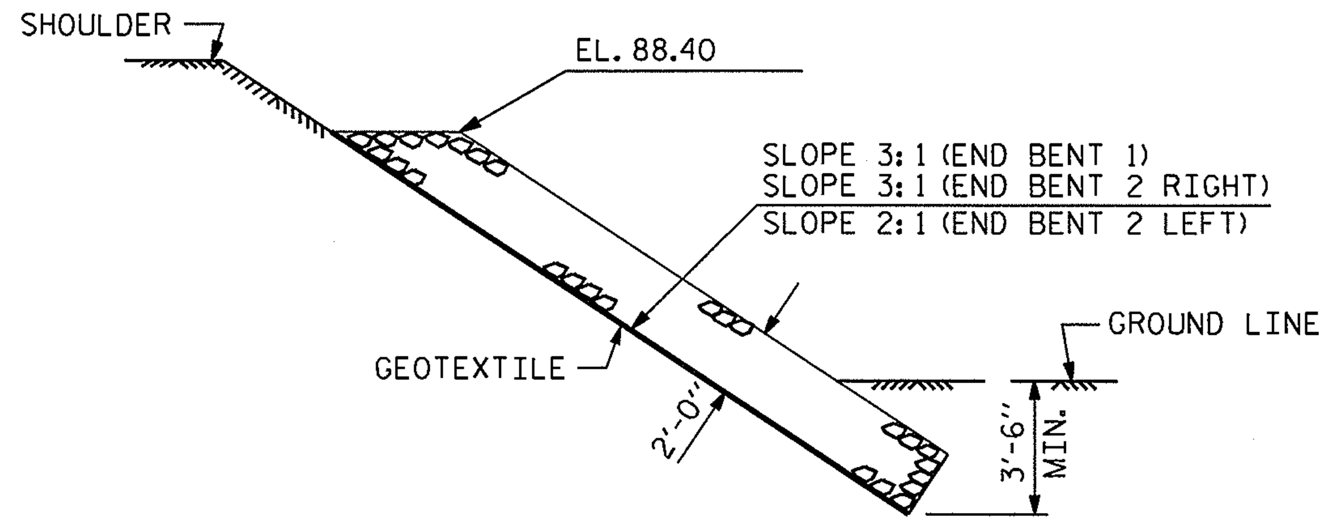
END BENT 1

END BENT 2

ESTIMATED QUANTITIES		
BRIDGE @ STA.	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	59	65
END BENT 2	50	56



SECTION H-H



SECTION C-C

PROJECT NO. BD-5103V

DUPLIN COUNTY

STATION: 12+50.00 -L-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 025516 EMILY E. MURRAY

11/5/13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RIP RAP DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			15

ASSEMBLED BY : C.B. PRUETT	DATE : 9/25/13	
CHECKED BY : EMILY MURRAY	DATE : 11/4/13	
DRAWN BY : REK 1/84	REV. 5/1/06R	TLA/GM
CHECKED BY : RDU 1/84	REV. 10/1/11	MAA/GM
	REV. 12/21/11	MAA/GM

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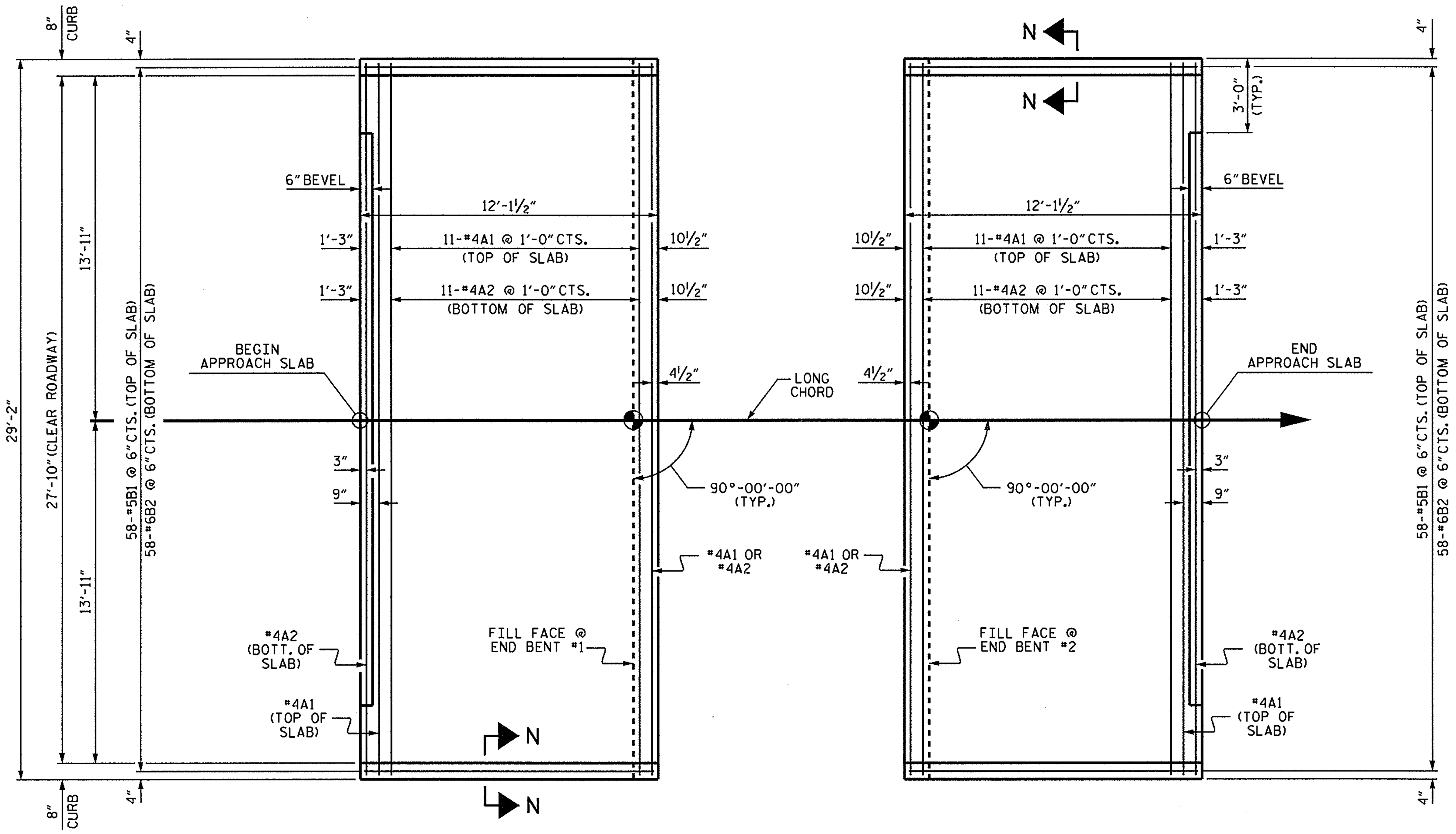
cbpruett

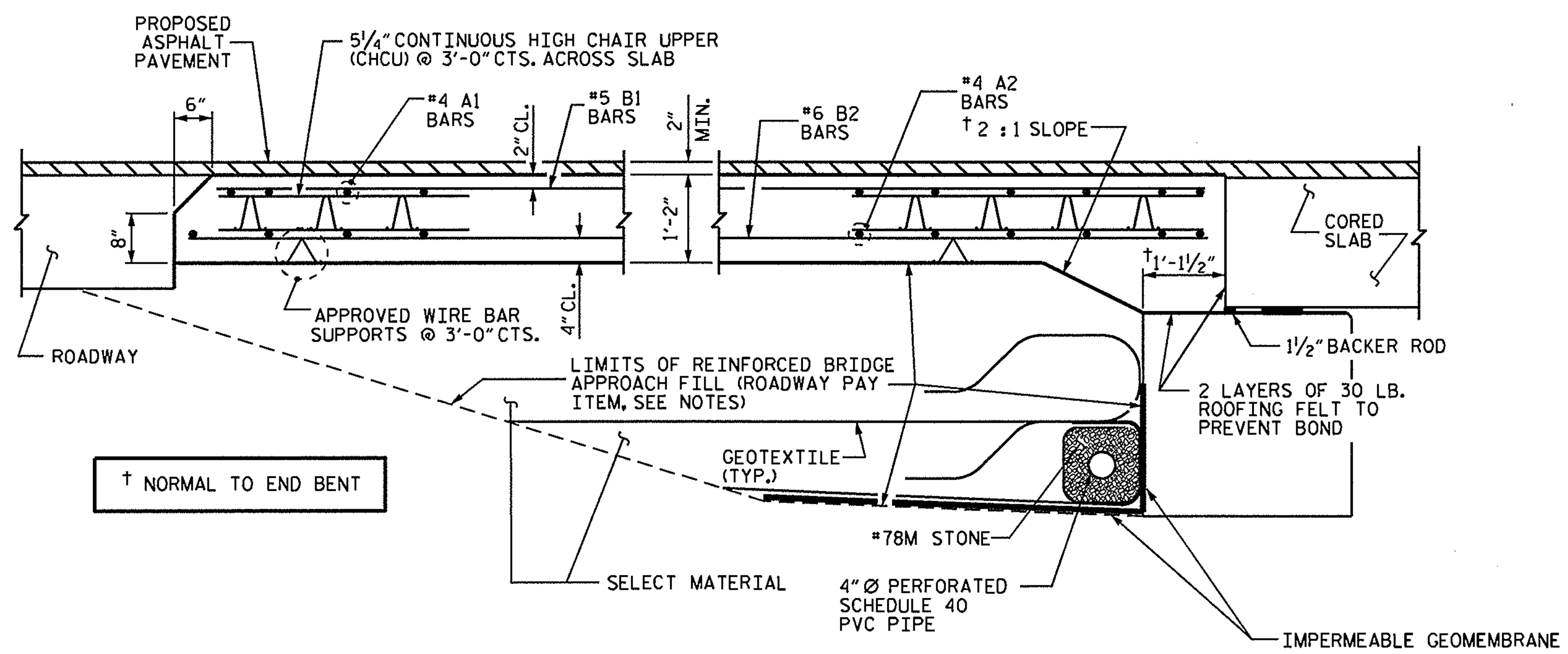
STD. NO. RR1 (Sht 2)



PLAN @ END BENT #1

PLAN @ END BENT #2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



† NORMAL TO END BENT

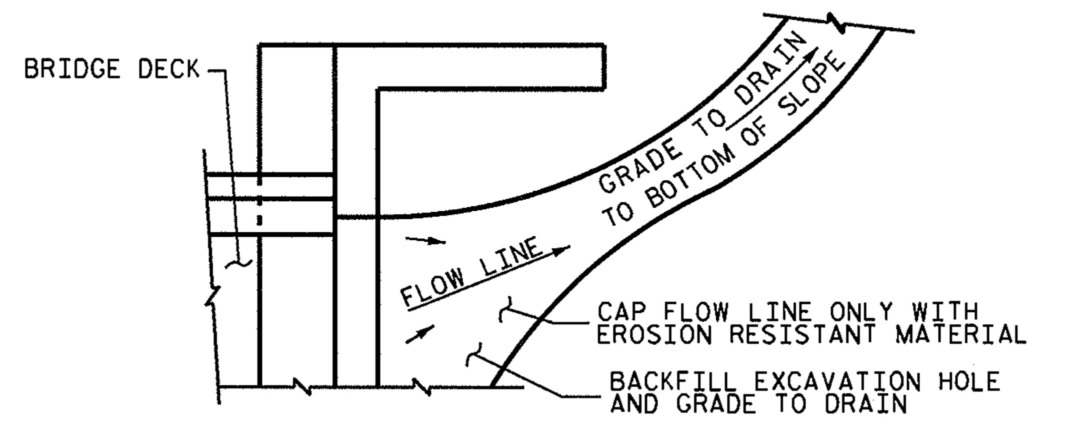
SECTION THRU SLAB

NOTES

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

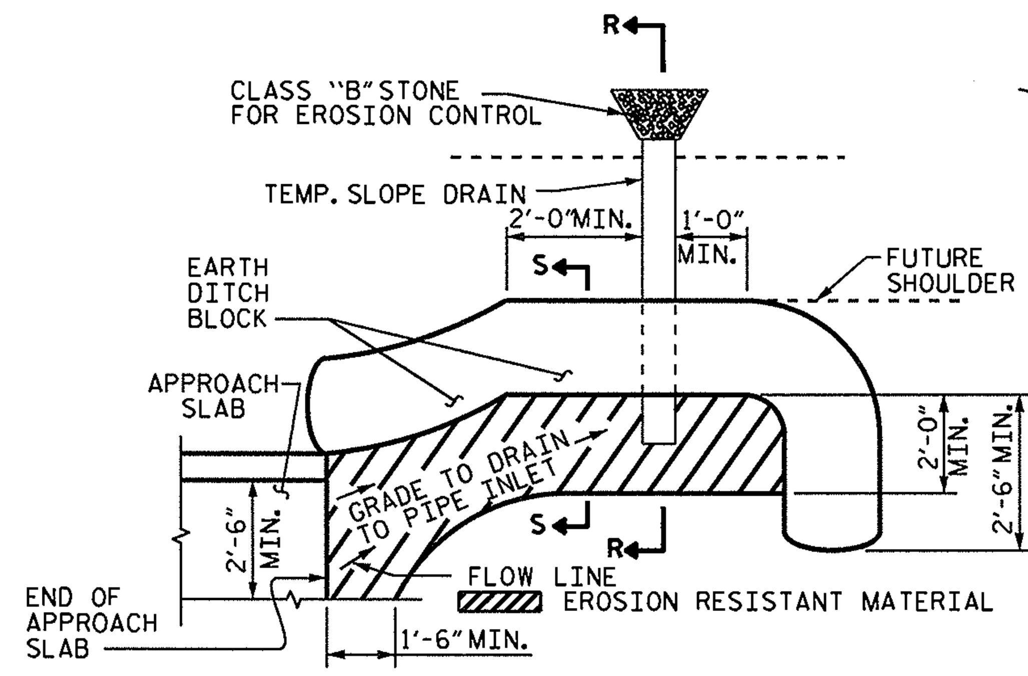
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

APPROACH SLAB GROOVING IS NOT REQUIRED.



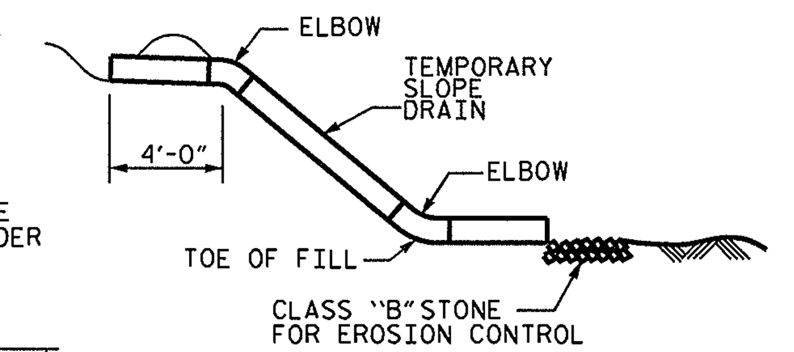
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL

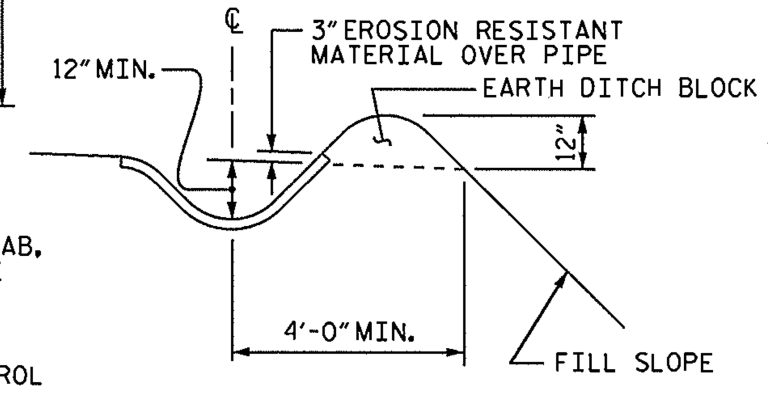


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 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

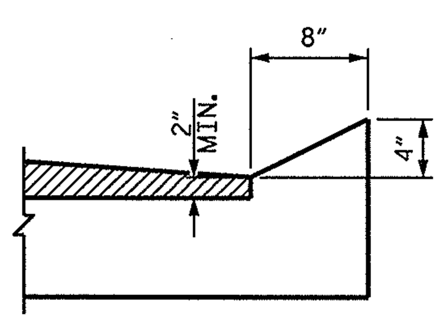


SECTION S-S

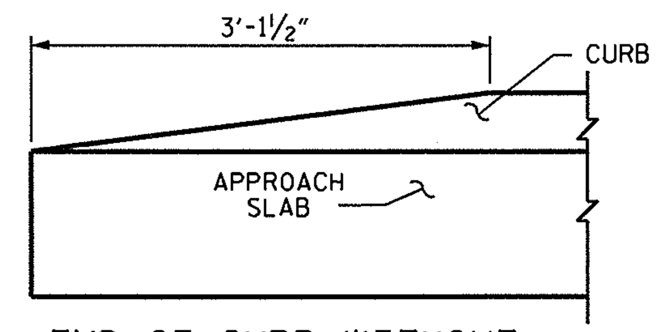
TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

BILL OF MATERIAL					
APPROACH SLAB AT EB #1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	13	#4	STR	28'-10"	250
A2	13	#4	STR	28'-10"	250
* B1	58	#5	STR	11'-2"	676
B2	58	#6	STR	11'-8"	1016
REINFORCING STEEL				LBS.	1266
* EPOXY COATED REINFORCING STEEL				LBS.	926
CLASS AA CONCRETE				C. Y.	16.9
APPROACH SLAB AT EB #2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	13	#4	STR	28'-10"	250
A2	13	#4	STR	28'-10"	250
* B1	58	#5	STR	11'-2"	676
B2	58	#6	STR	11'-8"	1016
REINFORCING STEEL				LBS.	1266
* EPOXY COATED REINFORCING STEEL				LBS.	926
CLASS AA CONCRETE				C. Y.	16.9



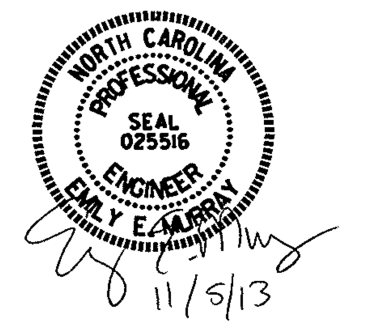
SECTION N-N



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"



PROJECT NO. BD-5103V

DUPLIN COUNTY

STATION: 12+50.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
BRIDGE APPROACH SLAB
FOR PRESTRESSED CONCRETE
CORED SLAB UNIT
90° SKEW

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

ASSEMBLED BY : C.B. PRUETT DATE : 9/25/13
CHECKED BY : EMILY MURRAY DATE : 11/4/13

DRAWN BY : SHS/MAA 5-09 REV. 12-11 MAA/AAC
CHECKED BY : BCH 5-09

05-NOV-2013 14:49
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cbpruett

STD. NO. BAS_30_90S

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2012 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8"Ø SHEAR STUDS FOR THE 3/4"Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8"Ø STUDS FOR 4 - 3/4"Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8"Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4"Ø STUDS BASED ON THE RATIO OF 3 - 7/8"Ø STUDS FOR 4 - 3/4"Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

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

ENGLISH

JANUARY, 1990

REV. 6-16-95 EEM (✓) RGW REV. 5-7-03 RWW (✓) JTE REV. 10-1-11 MAA (✓) GM
REV. 8-16-99 RWW (✓) LES REV. 5-1-06 TLA (✓) GM

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BD-5103V	1	5

PROJECT: 45349.1.22 ID: BD-5103V

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. *45349.1.22 (BD-5103V)* F.A. PROJ. *BRZ-1306 (24)*

COUNTY *DUPLIN*

PROJECT DESCRIPTION *BRIDGE NO. 111 ON SR 1306 (BEAUTANCUS ROAD) OVER HALLS MARSH AT -L- STA. 12+50*

CONTENTS

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

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

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

PERSONNEL

C.M. WRIKE

R.E. SMITH

D.G. PINTER

INVESTIGATED BY *J.L. STONE*

CHECKED BY *D.N. ARGENBRIGHT*

SUBMITTED BY *D.N. ARGENBRIGHT*

DATE *OCTOBER 2013*

NORTH CAROLINA LICENSED SEAL 2007 GEOLOGIST JOSEPH L. STONE

10/15/13

DRAWN BY: *C.P. TURNER*

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

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

PROJECT REFERENCE NO.	SHEET NO.
BD-5103V	2 OF 5

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:

VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2, A-3	A-4, A-5, A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING #10	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
#40	30 MX	50 MX	51 MN											
#200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
LIQUID LIMIT				40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PLASTIC INDEX	6 MX		NP	10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	No MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS., GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT²)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE	<4	N/A
	LOOSE	4 TO 10	
	MEDIUM DENSE	10 TO 30	
	DENSE	30 TO 50	
	VERY DENSE	>50	
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT	<2	<0.25
	SOFT	2 TO 4	0.25 TO 0.50
	MEDIUM STIFF	4 TO 8	0.5 TO 1.0
	STIFF	8 TO 15	1 TO 2
	VERY STIFF	15 TO 30	2 TO 4
	HARD	>30	>4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.00	0.42	0.25	0.075	0.053

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE MM 305 / 75 / 2.0 / 0.25 / 0.05 / 0.005
IN. 12 / 3

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
LL — LIQUID LIMIT	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE; SL — SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NONPLASTIC	0-5	VERY LOW
LOW PLASTICITY	6-15	SLIGHT
MED. PLASTICITY	16-25	MEDIUM
HIGH PLASTICITY	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 31
MODERATELY COMPRESSIBLE	LIQUID LIMIT EQUAL TO 31-50
HIGHLY COMPRESSIBLE	LIQUID LIMIT GREATER THAN 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	>10%	>20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT DMT VST PMT TEST BORING
- AUGER BORING
- CORE BORING
- MW MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING W/ CORE
- SPT N-VALUE
- REF SPT REFUSAL

ABBREVIATIONS

AR - AUGER REFUSAL	MED. - MEDIUM	VST - VANE SHEAR TEST
BT - BORING TERMINATED	MICA. - MICACEOUS	WEA. - WEATHERED
CL. - CLAY	MOD. - MODERATELY	γ - UNIT WEIGHT
CPT - CONE PENETRATION TEST	NP - NON PLASTIC	γ_d - DRY UNIT WEIGHT
CSE. - COARSE	ORG. - ORGANIC	
DMT - DILATOMETER TEST	PMT - PRESSUREMETER TEST	SAMPLE ABBREVIATIONS
DPT - DYNAMIC PENETRATION TEST	SAP. - SAPROLITIC	S - BULK
e - VOID RATIO	SD. - SAND, SANDY	SS - SPLIT SPOON
F - FINE	SL. - SILT, SILTY	ST - SHELBY TUBE
FOSS. - FOSSILIFEROUS	SLI. - SLIGHTLY	RS - ROCK
FRAC. - FRACTURED, FRACTURES	TCR - TRICONE REFUSAL	RT - RECOMPACTED TRIAXIAL
FRAGS. - FRAGMENTS	w - MOISTURE CONTENT	CBR - CALIFORNIA BEARING RATIO
HI. - HIGHLY	V - VERY	

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] MOBILE B-___
- [ ] BK-51
- [ ] CME-45C
- [x] CME-550
- [ ] PORTABLE HOIST
- [ ] ___
- [ ] ___

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [x] CASING [ ] W/ ADVANCER
- [x] TRICONE 2 15/16 " STEEL TEETH
- [ ] TRICONE ___" TUNG.-CARB.
- [ ] CORE BIT
- [ ] ___

HAMMER TYPE: [x] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B___
- [ ] -N___
- [ ] -H___

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] ___

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, YIELDS SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, YIELDS SPT N VALUES < 100 BPF*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FEET
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	> 4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
AQUIFER - A WATER BEARING FORMATION OR STRATA.
ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.
ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.
CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.
CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: BM-1: RAILROAD SPIKE IN BASE OF 20" SWEET GUM AT -L- STA. 12+97.69, 31.65' LT

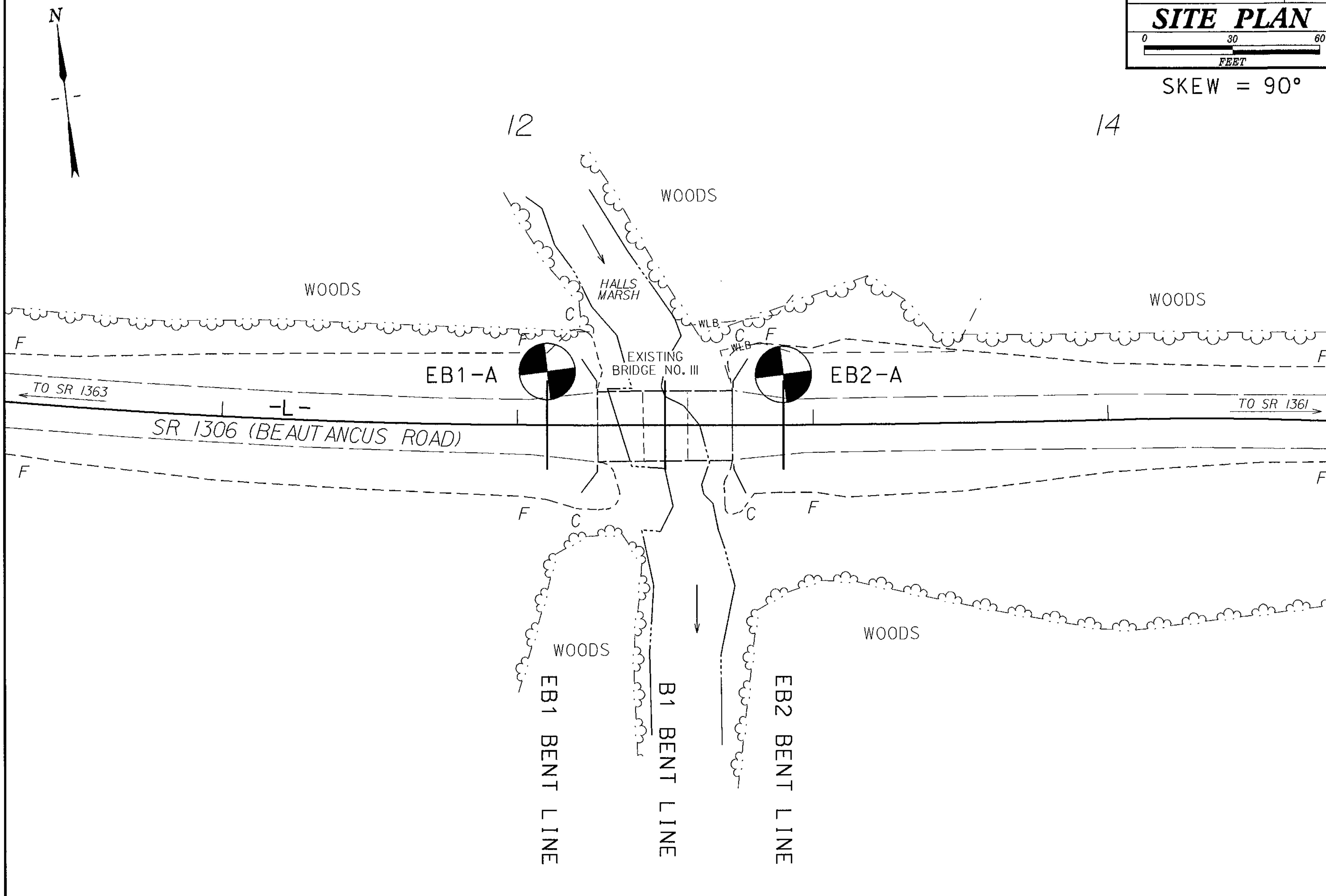
ELEVATION: 87.02 FT.

NOTES:

REVISED 09/23/09

PROJECT REFERENCE NO.	SHEET
BD-5103V	3 OF 5

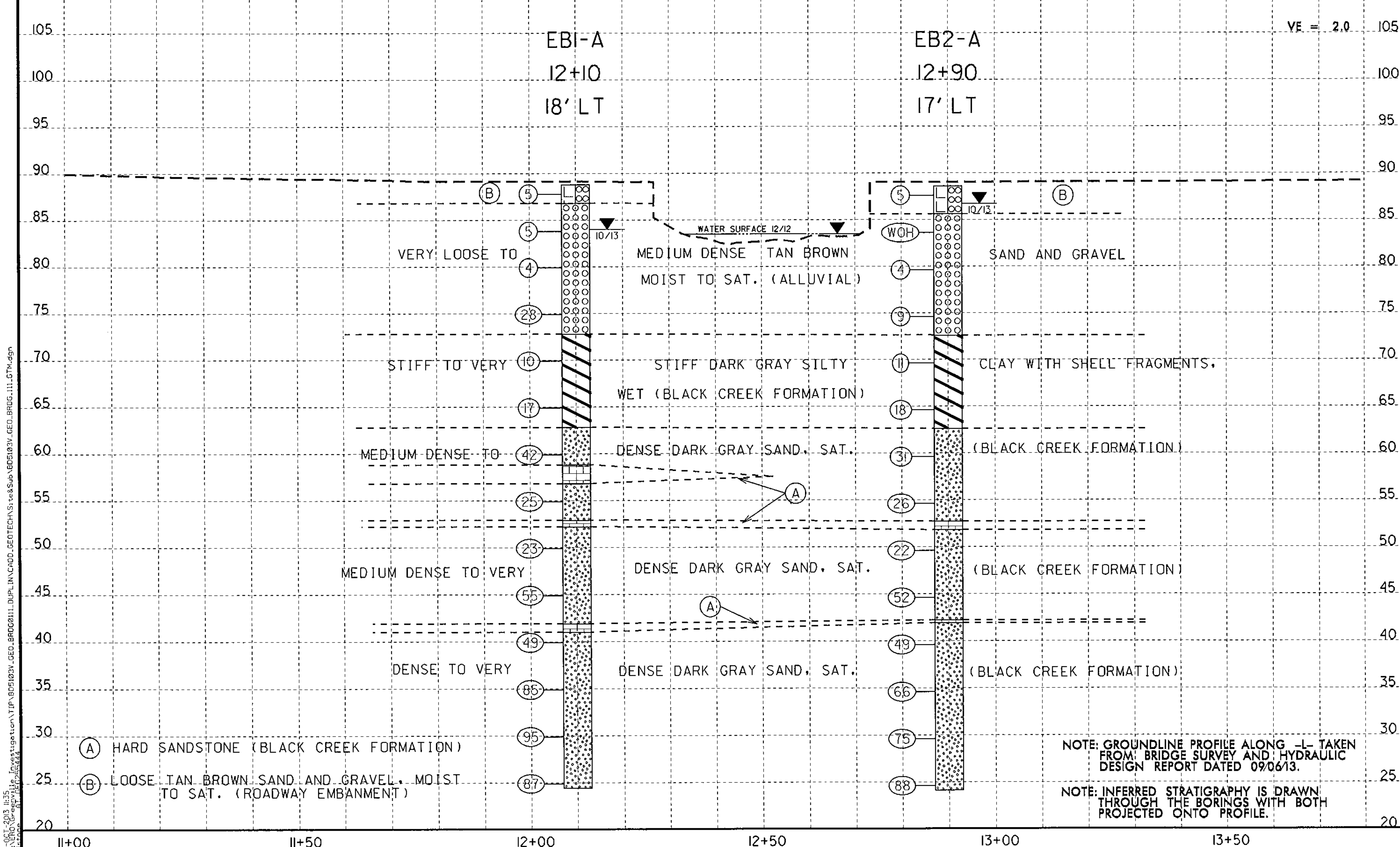
SITE PLAN



PROJECT REFERENCE NO.	SHEET NO.
BD-5103V	4 OF 5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROFILE THROUGH BORINGS PROJECTED ALONG -L-



Ⓐ HARD SANDSTONE (BLACK CREEK FORMATION)

Ⓑ LOOSE TAN BROWN SAND AND GRAVEL, MOIST TO SAT. (ROADWAY EMBANMENT)

NOTE: GROUNDLINE PROFILE ALONG -L- TAKEN FROM BRIDGE SURVEY AND HYDRAULIC DESIGN REPORT DATED 09/06/13.

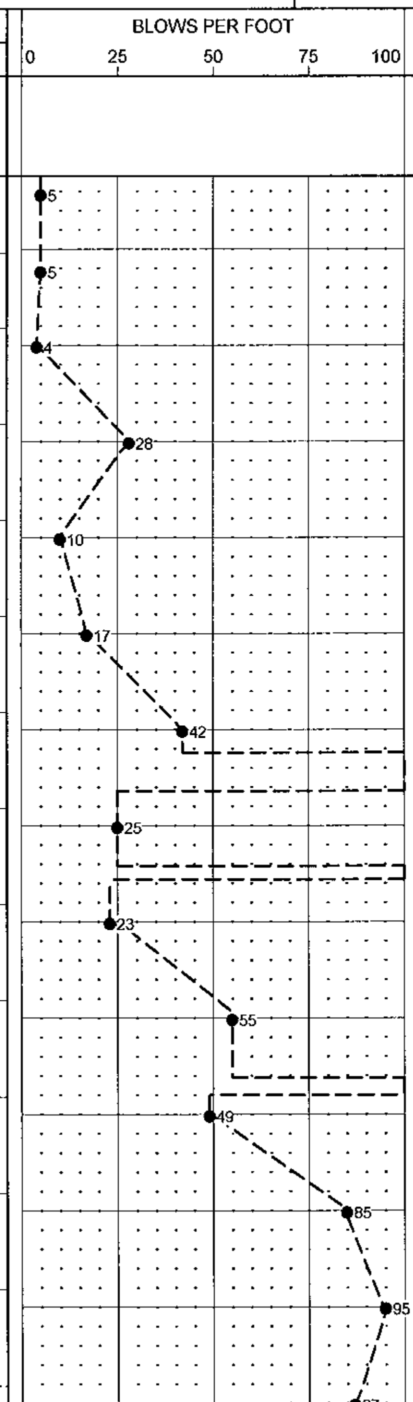
NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO PROFILE.

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

Boring EB1-A

WBS 45349.1.22	**TIP** BD-5103V	**COUNTY** DUPLIN	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE NO. 111 ON -L- (SR 1306) OVER HALLS MARSH			**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 12+10	**OFFSET** 18 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 88.8 ft	**TOTAL DEPTH** 64.4 ft	**NORTHING** 487,351	**EASTING** 2,300,939 / **24 HR.** 4.8
DRILL RIG/HAMMER EFF./DATE GFO0057 CME-550X 73% 01/22/2013		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Smith, R. E.	**START DATE** 10/03/13	**COMP. DATE** 10/03/13	**SURFACE WATER DEPTH** N/A

DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT
88.8	0.0	2	2	3	5
84.8	4.0	5	2	3	5
80.9	7.9	1	2	2	4
75.9	12.9	7	11	17	28
70.9	17.9	3	4	6	10
65.9	22.9	6	6	11	17
60.9	27.9	13	20	22	42
55.9	32.9	6	8	17	25
50.9	37.9	6	8	15	23
45.9	42.9	13	20	35	55
40.9	47.9	17	24	25	49
35.9	52.9	26	37	48	85
30.9	57.9	27	48	47	95
25.9	62.9	25	43	44	87

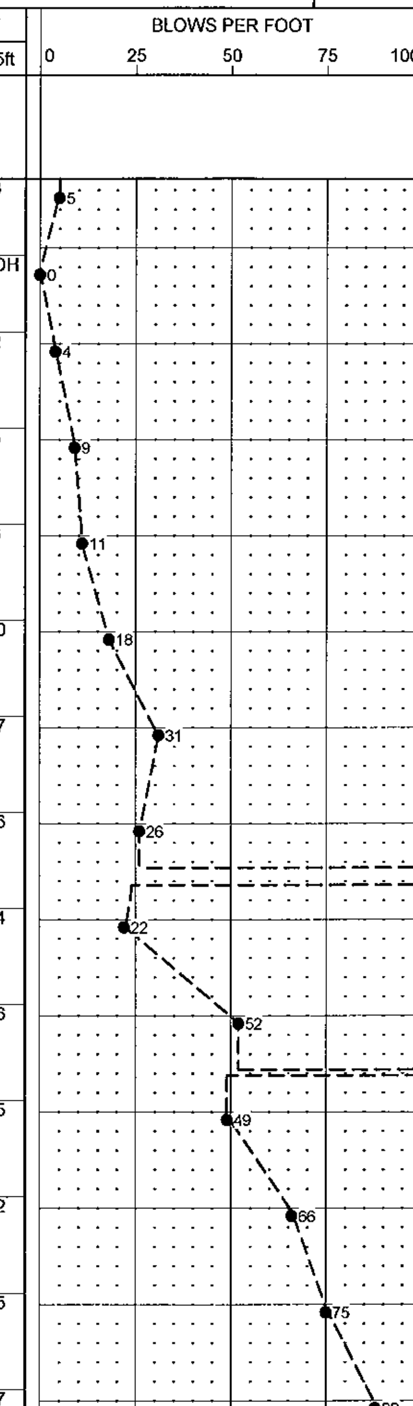


ELEV. (ft)	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
88.8	GROUND SURFACE	0.0
	ROADWAY EMBANKMENT TAN BROWN SAND AND GRAVEL, MOIST	
86.8	**ALLUVIAL** TAN BROWN SAND AND GRAVEL, MOIST TO SAT.	2.0
72.8	**COASTAL PLAIN** DARK GRAY SILTY CLAY WITH SHELL FRAGMENTS, WET (BLACK CREEK FORMATION)	16.0
62.8	**COASTAL PLAIN** DARK GRAY SAND, SAT. (BLACK CREEK FORMATION)	26.0
58.8	**COASTAL PLAIN** SANDSTONE	30.0
56.8	**COASTAL PLAIN** DARK GRAY SAND, SAT. (BLACK CREEK FORMATION)	32.0
52.9	**COASTAL PLAIN** SANDSTONE	35.9
52.2	**COASTAL PLAIN** DARK GRAY SAND, SAT. (BLACK CREEK FORMATION)	36.6
41.9	**COASTAL PLAIN** SANDSTONE	46.9
41.0	**COASTAL PLAIN** DARK GRAY SAND, SAT. (BLACK CREEK FORMATION)	47.8
24.4	Boring Terminated at Elevation 24.4 ft IN VERY DENSE SAND	64.4

Boring EB2-A

WBS 45349.1.22	**TIP** BD-5103V	**COUNTY** DUPLIN	**GEOLOGIST** Wrike, C. M.
SITE DESCRIPTION BRIDGE NO. 111 ON -L- (SR 1306) OVER HALLS MARSH			**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 12+90	**OFFSET** 17 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 88.6 ft	**TOTAL DEPTH** 64.5 ft	**NORTHING** 487,340	**EASTING** 2,301,018 / **24 HR.** 1.9
DRILL RIG/HAMMER EFF./DATE GFO0057 CME-550X 73% 01/22/2013		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Smith, R. E.	**START DATE** 10/07/13	**COMP. DATE** 10/07/13	**SURFACE WATER DEPTH** N/A

DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT
88.6	0.0	2	2	3	5
84.6	4.0	WOH	WOH	WOH	0
80.6	8.0	2	2	2	4
75.6	13.0	3	4	5	9
70.6	18.0	5	5	6	11
65.6	23.0	5	8	10	18
60.6	28.0	10	14	17	31
55.6	33.0	9	10	16	26
50.6	38.0	8	8	14	22
45.6	43.0	16	16	36	52
40.6	48.0	12	24	25	49
35.6	53.0	21	24	42	66
30.6	58.0	27	30	45	75
25.6	63.0	30	41	47	88



ELEV. (ft)	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
88.6	GROUND SURFACE	0.0
	ROADWAY EMBANKMENT TAN BROWN SAND AND GRAVEL, MOIST TO SAT.	
85.6	**ALLUVIAL** TAN BROWN SAND AND GRAVEL, MOIST TO SAT.	3.0
72.6	**COASTAL PLAIN** DARK GRAY SILTY CLAY WITH SHELL FRAGMENTS, WET (BLACK CREEK FORMATION)	16.0
62.6	**COASTAL PLAIN** DARK GRAY SAND, SAT. (BLACK CREEK FORMATION)	26.0
52.7	**COASTAL PLAIN** SANDSTONE	35.9
51.8	**COASTAL PLAIN** DARK GRAY SAND, SAT. (BLACK CREEK FORMATION)	36.8
42.2	**COASTAL PLAIN** SANDSTONE	46.4
41.9	**COASTAL PLAIN** DARK GRAY SAND, SAT. (BLACK CREEK FORMATION)	46.7
24.1	Boring Terminated at Elevation 24.1 ft IN VERY DENSE SAND	64.5

WETLAND & STREAM IMPACTS

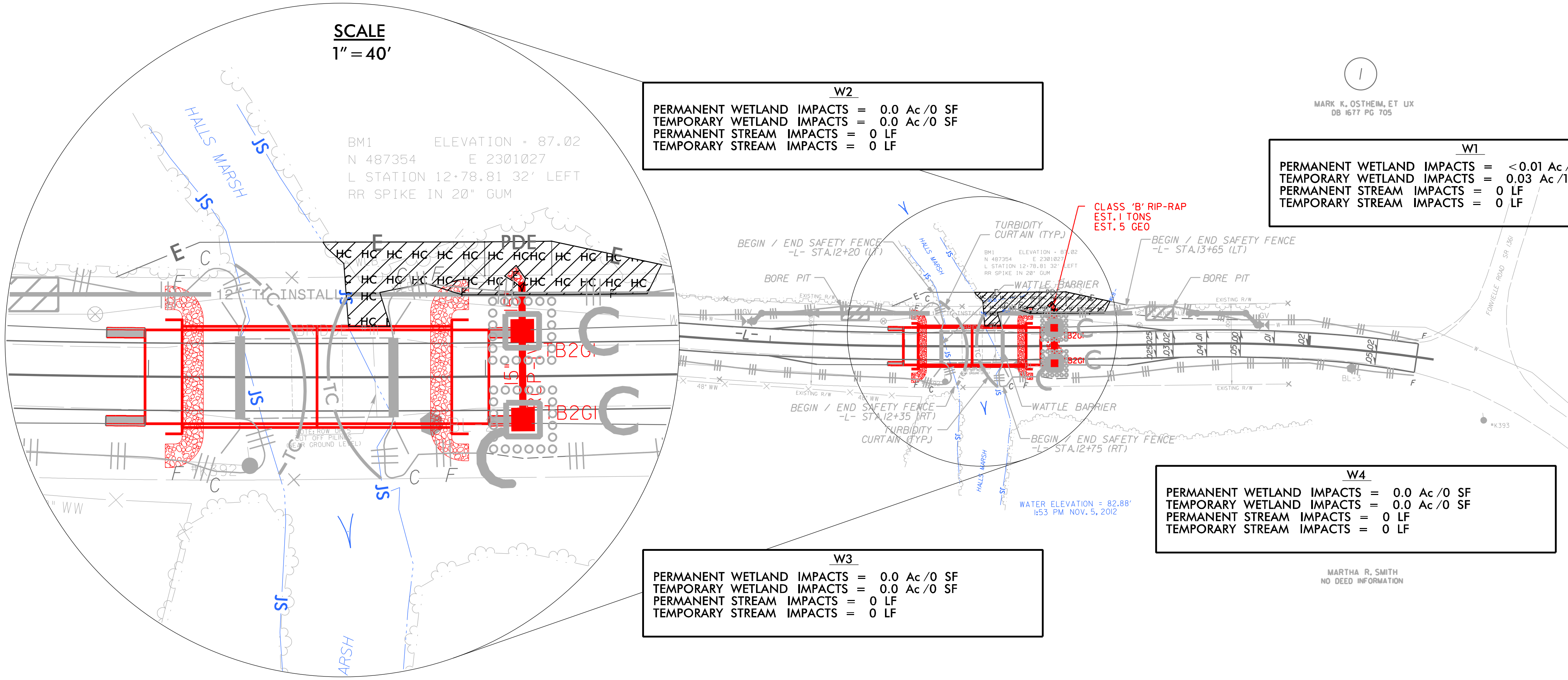
PROJECT REFERENCE NO.	SHEET NO.
BD-5103V	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

LEGEND
HC — DENOTES HAND CLEARING
F — DENOTES FILL IN WETLAND

SCALE
1" = 40'



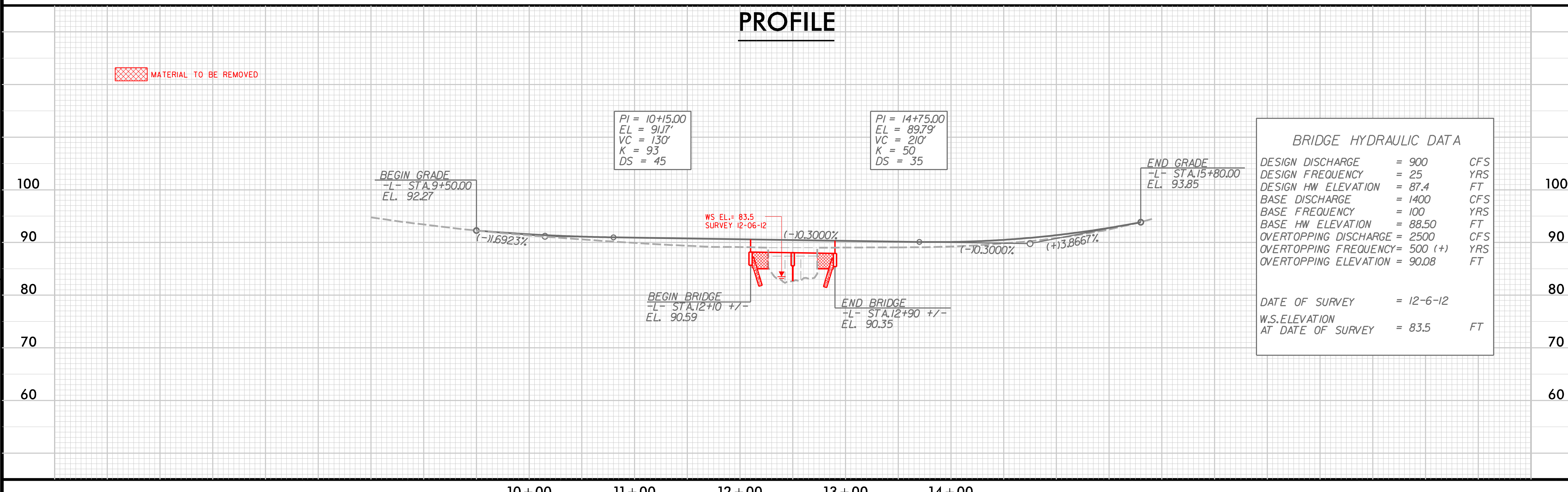
W1
PERMANENT WETLAND IMPACTS = < 0.01 Ac / 93 SF
TEMPORARY WETLAND IMPACTS = 0.03 Ac / 1334 SF
PERMANENT STREAM IMPACTS = 0 LF
TEMPORARY STREAM IMPACTS = 0 LF

W2
PERMANENT WETLAND IMPACTS = 0.0 Ac / 0 SF
TEMPORARY WETLAND IMPACTS = 0.0 Ac / 0 SF
PERMANENT STREAM IMPACTS = 0 LF
TEMPORARY STREAM IMPACTS = 0 LF

W3
PERMANENT WETLAND IMPACTS = 0.0 Ac / 0 SF
TEMPORARY WETLAND IMPACTS = 0.0 Ac / 0 SF
PERMANENT STREAM IMPACTS = 0 LF
TEMPORARY STREAM IMPACTS = 0 LF

W4
PERMANENT WETLAND IMPACTS = 0.0 Ac / 0 SF
TEMPORARY WETLAND IMPACTS = 0.0 Ac / 0 SF
PERMANENT STREAM IMPACTS = 0 LF
TEMPORARY STREAM IMPACTS = 0 LF

PROFILE



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 900	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 87.4	FT
BASE DISCHARGE	= 1400	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 88.50	FT
OVERTOPPING DISCHARGE	= 2500	CFS
OVERTOPPING FREQUENCY	= 500 (+)	YRS
OVERTOPPING ELEVATION	= 90.08	FT
DATE OF SURVEY	= 12-6-12	
W.S. ELEVATION AT DATE OF SURVEY	= 83.5	FT

REVISIONS

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WETLAND & STREAM IMPACTS

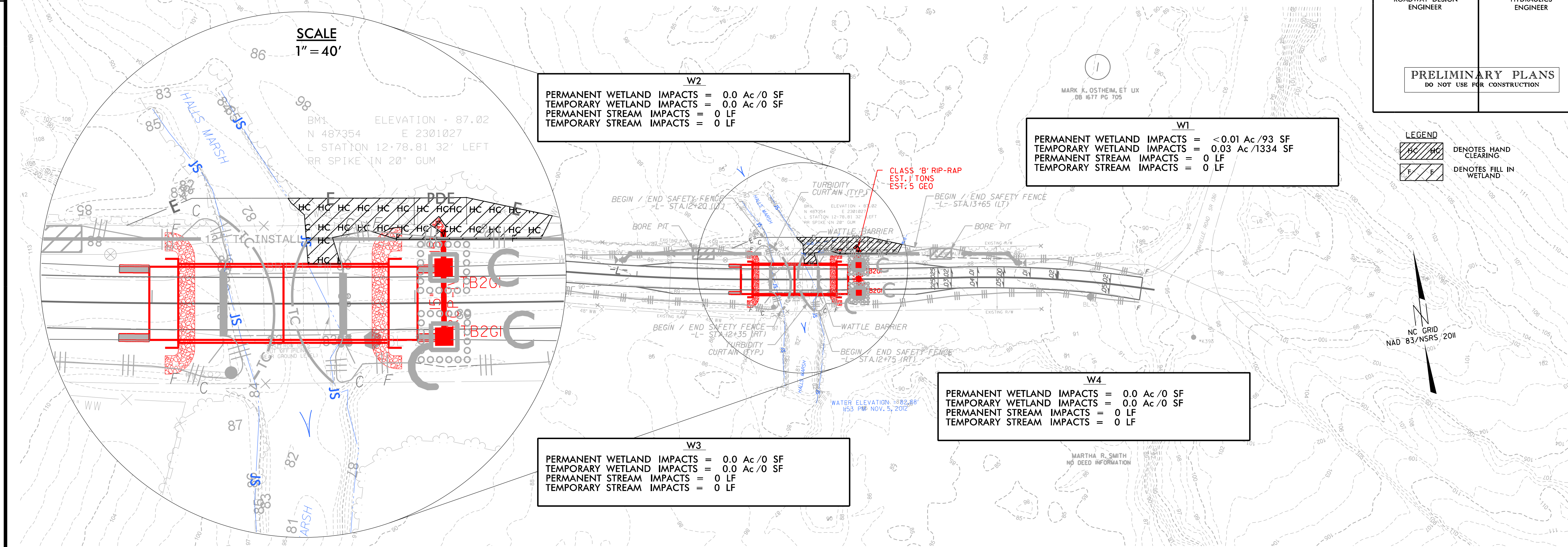
HNTB NORTH CAROLINA, P.C.
343 E. Six Forks Road, Suite 200
Raleigh, North Carolina 27609
NC License No: C-1554

PROJECT REFERENCE NO.	SHEET NO.
BD-5103V	4

R/W SHEET NO.

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



LEGEND
- HC — DENOTES HAND CLEARING
- F — DENOTES FILL IN WETLAND

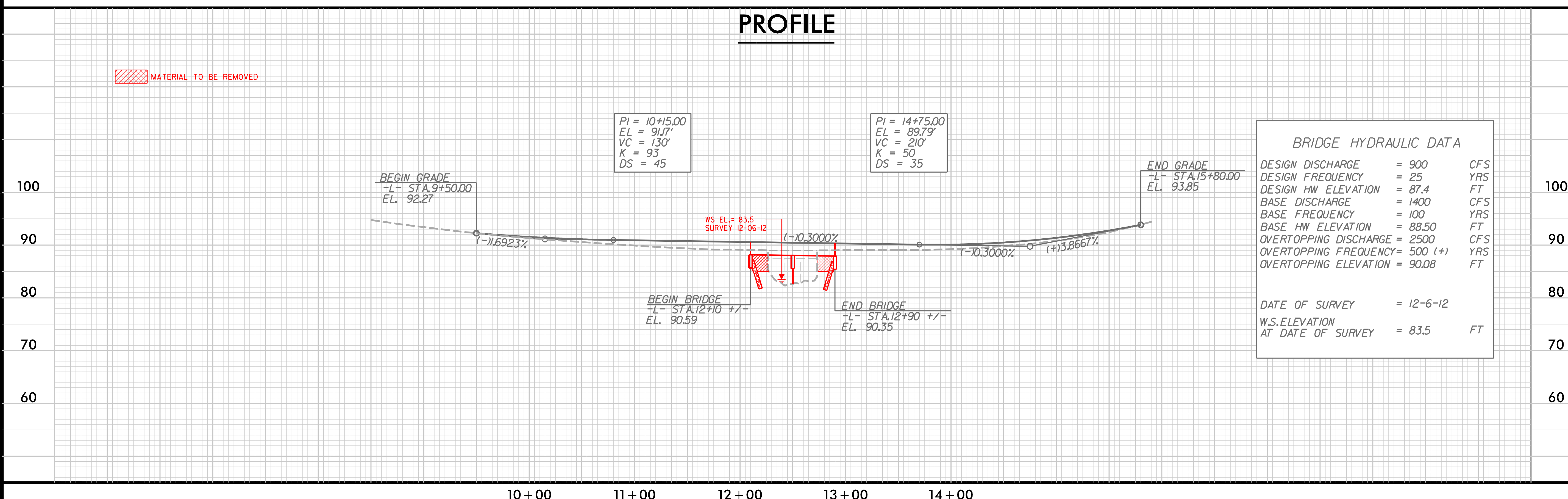
W1
PERMANENT WETLAND IMPACTS = <0.01 Ac / 93 SF
TEMPORARY WETLAND IMPACTS = 0.03 Ac / 1334 SF
PERMANENT STREAM IMPACTS = 0 LF
TEMPORARY STREAM IMPACTS = 0 LF

W2
PERMANENT WETLAND IMPACTS = 0.0 Ac / 0 SF
TEMPORARY WETLAND IMPACTS = 0.0 Ac / 0 SF
PERMANENT STREAM IMPACTS = 0 LF
TEMPORARY STREAM IMPACTS = 0 LF

W3
PERMANENT WETLAND IMPACTS = 0.0 Ac / 0 SF
TEMPORARY WETLAND IMPACTS = 0.0 Ac / 0 SF
PERMANENT STREAM IMPACTS = 0 LF
TEMPORARY STREAM IMPACTS = 0 LF

W4
PERMANENT WETLAND IMPACTS = 0.0 Ac / 0 SF
TEMPORARY WETLAND IMPACTS = 0.0 Ac / 0 SF
PERMANENT STREAM IMPACTS = 0 LF
TEMPORARY STREAM IMPACTS = 0 LF

PROFILE



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	900	CFS
DESIGN FREQUENCY	=	25	YRS
DESIGN HW ELEVATION	=	87.4	FT
BASE DISCHARGE	=	1400	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	88.50	FT
OVERTOPPING DISCHARGE	=	2500	CFS
OVERTOPPING FREQUENCY	=	500 (+)	YRS
OVERTOPPING ELEVATION	=	90.08	FT
DATE OF SURVEY	=	12-6-12	
W.S. ELEVATION AT DATE OF SURVEY	=	83.5	FT

REVISIONS

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