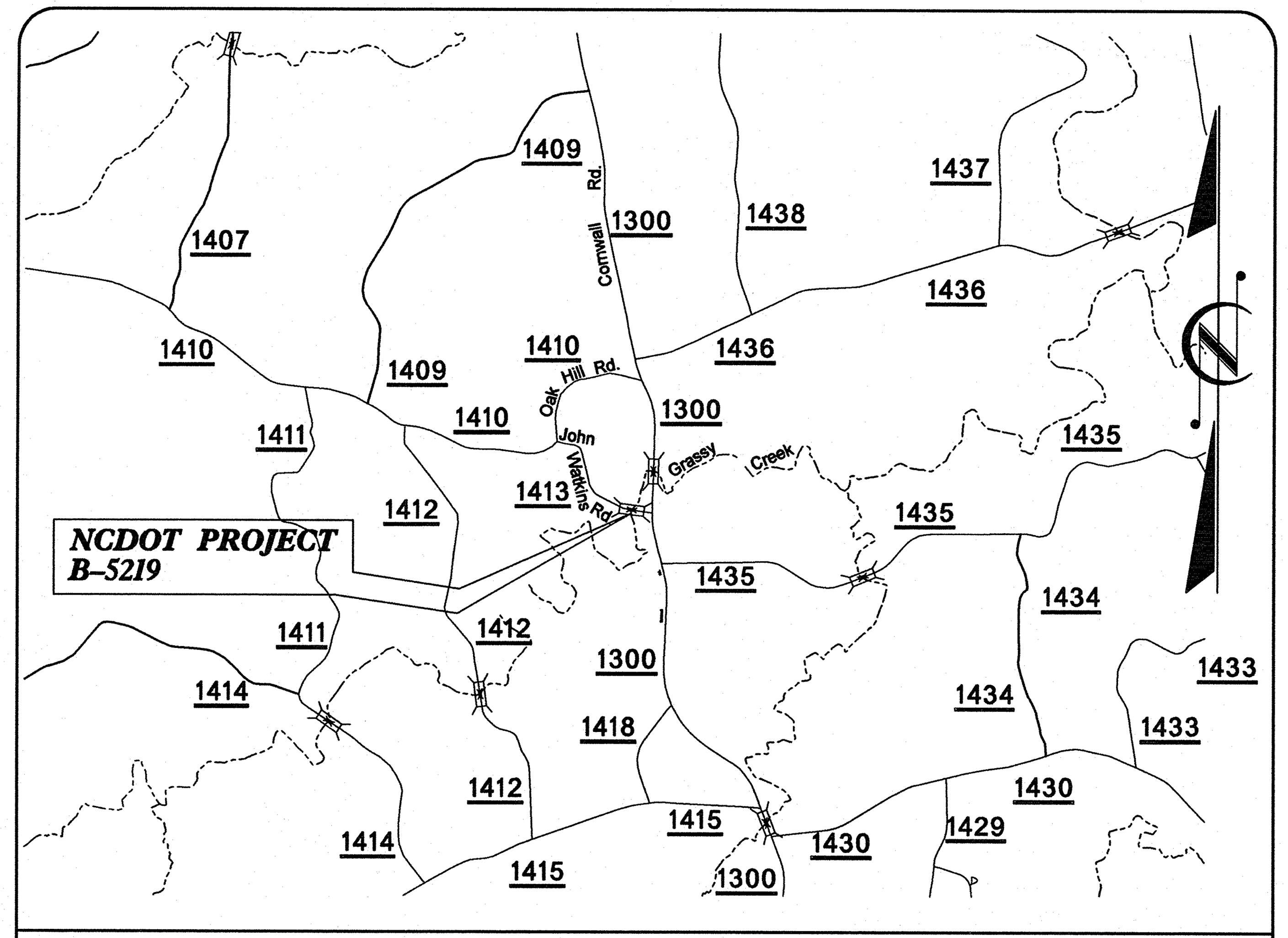
09/08/99

TIP PROJECT: B-5219

See Sheet 1-A For Index of Sheets



VICINITY MAP

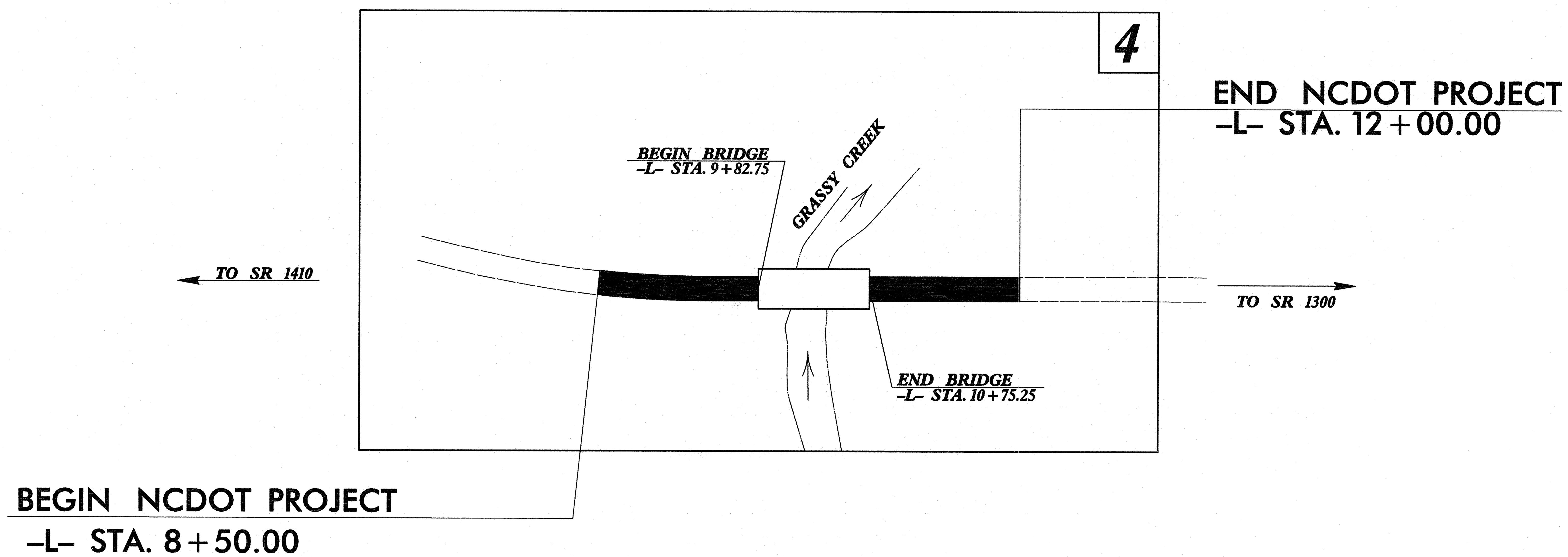
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

GRANVILLE COUNTY

LOCATION: BRIDGE #139 OVER GRASSY CREEK ON SR 1413 (JOHN WATKINS RD.)

TYPE OF WORK: GRADING, DRAINAGE, PAVING & STRUCTURE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5219	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
42816.1.1		P.E.	



NAD 83

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

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 2009 = 170
ADT 2029 = 300
DHV = 50 %
D = 10 %
V = 55 MPH

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-5219 =	0.048 MILES
LENGTH STRUCTURE TIP PROJECT B-5219 =	0.018 MILES
TOTAL LENGTH TIP PROJECT B-5219 =	0.066 MILES

Prepared for the North Carolina Department of Transportation in the Office of:

WETHERILL ENGINEERING
559 JONES FRANKLIN ROAD
SUITE 164
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:

LETTING DATE:

EDWARD G. WETHERILL, PE
PROJECT ENGINEER

GREG S. PURVIS, PE
PROJECT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 34356 ENGINEER JOSEPH J. DUDECK

HYDRAULICS ENGINEER

SIGNATURE: P.E. 9/16/10

NORTH CAROLINA PROFESSIONAL SEAL 022999 ENGINEER GREG S. PURVIS

ROADWAY DESIGN ENGINEER

9/16/10 P.E.
SIGNATURE:

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

P.E.
STATE HIGHWAY DESIGN ENGINEER

CONTRACT:

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9/16/2010

WETHERILL ENGINEERING
559 Jones Franklin Rd. Suite 164
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

GENERAL NOTES

GENERAL NOTES: 2006 SPECIFICATIONS

EFFECTIVE: 07-18-06
REVISED: 07-30-08

GRADING AND SURFACING OR RESURFACING AND WIDENING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. WHERE NO GRADE LINES ARE SHOWN, THE PROFILES SHOWN DENOTE THE TOP ELEVATION OF THE EXISTING PAVEMENT ALONG THE CENTER LINE OF SURVEY ON WHICH THE PROPOSED RESURFACING WILL BE PLACED. GRADE LINES MAY BE ADJUSTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

CLEARING:

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

SUPERELEVATION:

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

SHOULDER CONSTRUCTION:

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

UNDERDRAINS:

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

GUARDRAIL:

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

SUBSURFACE PLANS:

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

END BENTS:

THE ENGINEER SHALL CHECK THE STRUCTURE END BENT PLANS, DETAILS, AND CROSS-SECTION PRIOR TO SETTING OF THE SLOPE STAKES FOR THE EMBANKMENT OR EXCAVATION APPROACHING A BRIDGE.

LIST ROADWAY STANDARD DRAWINGS

EFF. 07-18-06
REV. 01-02-07

2006 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 July 18, 2006 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 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 6 - ASPHALT BASES AND PAVEMENTS	
654.01	Pavement Repairs
DIVISION 8 - INCIDENTALS	
840.00	Concrete Base Pad for Drainage Structures
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.46	Traffic Bearing Precast Drainage Structure
840.66	Drainage Structure Steps
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
862.04	Anchoring End of Guardrail - B-77 and B-83 Anchor Units
876.02	Guide for Rip Rap at Pipe Outlets
1101.03	Temporary Road Closures
1110.01	Stationary Work Zone Signs - Mounting Height & Lateral Clearance
1145.01	Barricades - Type III
1205.12	Pavement Markings - Bridge
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 Types
1262.01	Guardrail End Delineation

INDEX OF SHEETS

8/17/99
6:17:47 AM
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9/16/2010

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

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 Marker — R/W
- 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 Utility Easement — PUE
- Proposed Temporary Utility Easement — TUE
- 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 Wheel Chair Ramp — WCR
- 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 — HH
- 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

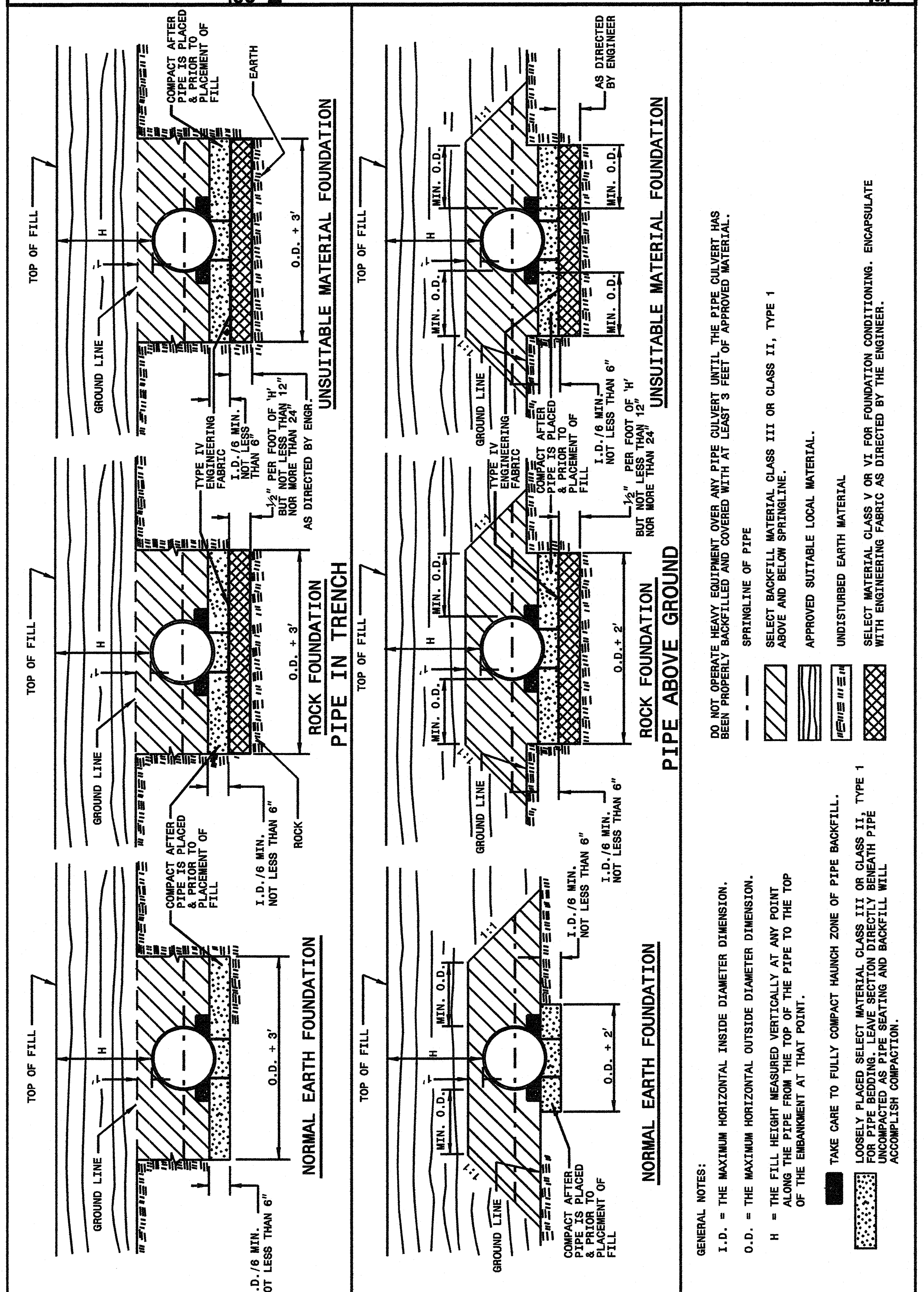
SANITARY SEWER:

- 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
- A/G Tank; Water, Gas, Oil
- U/G Test Hole (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

PROJECT REFERENCE NO.	SHEET NO.
B-5219	2

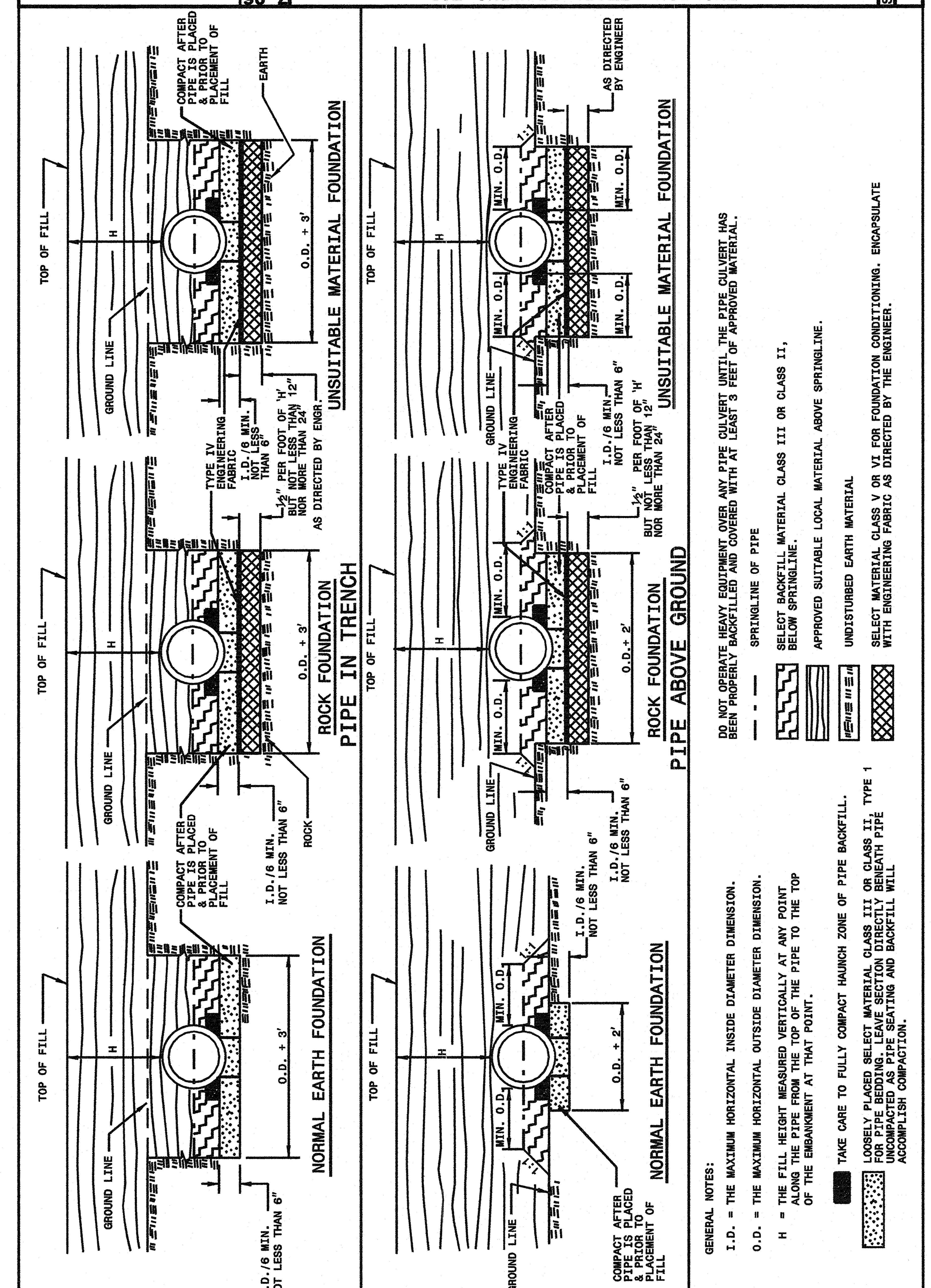


STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
FLEXIBLE PIPE

SHEET 1 OF 3
300D01



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

7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
RIGID PIPE

SHEET 2 OF 3
300D01

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

SEE PLATE FOR TITLE

ORIGINAL BY: KKempf DATE: 5-15-09
MODIFIED BY: DATE:
CHECKED BY: DATE:
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jhowerton AT PS237501

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jhowerton AT PS237501

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
B-5219	2A

FLEXIBLE PIPE

Round Corrugated Steel Pipe
2 2/3 x 1/2 corrugation **

Diameter (inches)	Minimum cover (inches)	Maximum Height of Cover (feet) (Ga) 16	14	12	10	8
12	12	204	256			
15	12	162	204			
18	12	135	169	239		
21	12	115	145	204		
24	12	100	126	178		
30	12	79	100	142		
36	12	65	83	117	152	
42	12	55	70	100	130	160
48	12	48	61	87	113	139
54	12		54	77	100	123
60	12			69	90	111
66	12				81	100
72	12				74	91
78	12					81
84	12					69

Round Corrugated Aluminum Pipe
2 2/3 x 1/2 corrugation **

Diameter (inches)	Minimum cover (inches)	Maximum Height of Cover (feet) (Ga) 16	14	12	10	8
12	12	123	155	218	281	344
15	12	98	123	174	224	275
18	12	81	102	144	187	228
21	12	69	87	123	160	195
24	12	60	76	108	139	171
27	12		67	95	123	151
30	12		60	85	111	136
36	12		50	71	92	113
42	12			60	78	96
48	12			52	68	84
54	12			46	50	74
60	12				50	62
66	12					51
72	12					41

** FOR DIFFERENT CORRUGATIONS AND ARCH PIPES REFER TO ROADWAY DESIGN MANUAL OR MANUFACTURERS SPECIFICATION.

HDPE - * (Minimum fill) 2' for pipe diameters ≥ 12" and ≤ 60"
* (Maximum fill) 20' for pipe diameters ≤ 24"
17' for pipe diameters ≥ 30" and ≤ 60"

PVC - * (Minimum fill) 2' for pipe diameters ≥ 12" and ≤ 36"
* (Maximum fill) 30' for pipe diameters ≥ 12" and ≤ 36"

* FILL HEIGHT IS MEASURED FROM THE TOP OF THE PIPE TO THE BOTTOM OF THE PAVEMENT STRUCTURE

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

CSP - AASHTO M36
CAAP - AASHTO M196
HDPE - AASHTO M294
PVC - ASTM F949 or AASHTO M304

NOTES: FILL HEIGHTS SHOWN WERE CALCULATED USING AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

1' MINIMUM COVER FOR ALL SIDE DRAIN PIPE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS

RIGID PIPE

RCP - * (Minimum fill) 1' for Class IV & CLASS V
2' for Class III & Class II

* (Maximum fill) 10' - Class II pipe
20' - Class III pipe
30' - Class IV pipe
40' - Class V pipe

(For fills > 40' & < 80' use LRFD Direct Design Method)

* FILL HEIGHT IS MEASURED FROM THE TOP OF THE PIPE TO THE BOTTOM OF THE PAVEMENT STRUCTURE

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

RCP - AASHTO M170

NOTES: FILL HEIGHTS SHOWN WERE CALCULATED USING AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

1' MINIMUM COVER FOR ALL SIDE DRAIN PIPE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.
7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
FILL HEIGHT TABLES

SHEET 3 OF 3
300D01

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.
7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
FILL HEIGHT TABLES

SHEET 3 OF 3
300D01

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

SEE PLATE FOR TITLE

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MODIFIED BY: DATE:
CHECKED BY: DATE:
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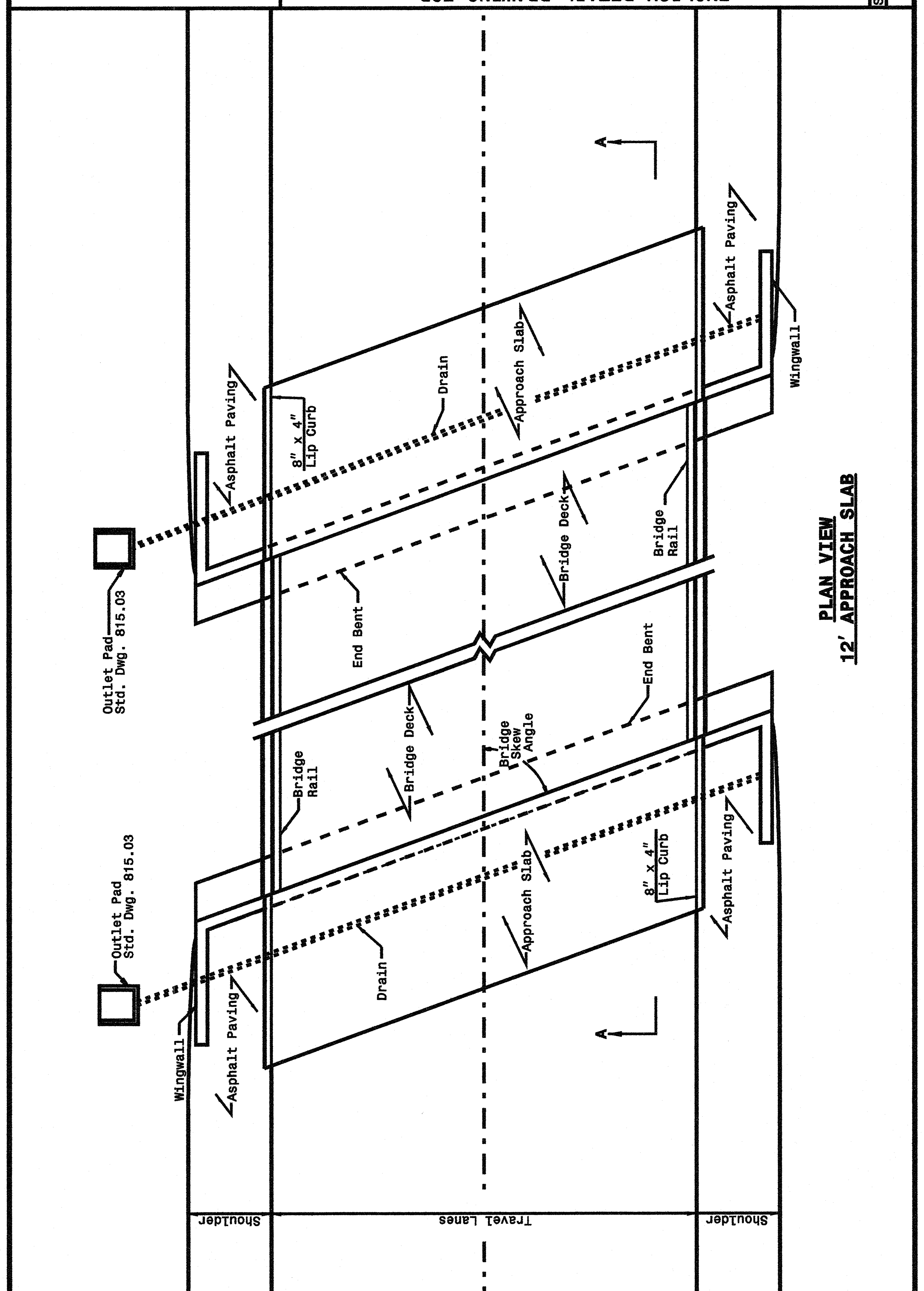
B-5219	2-B

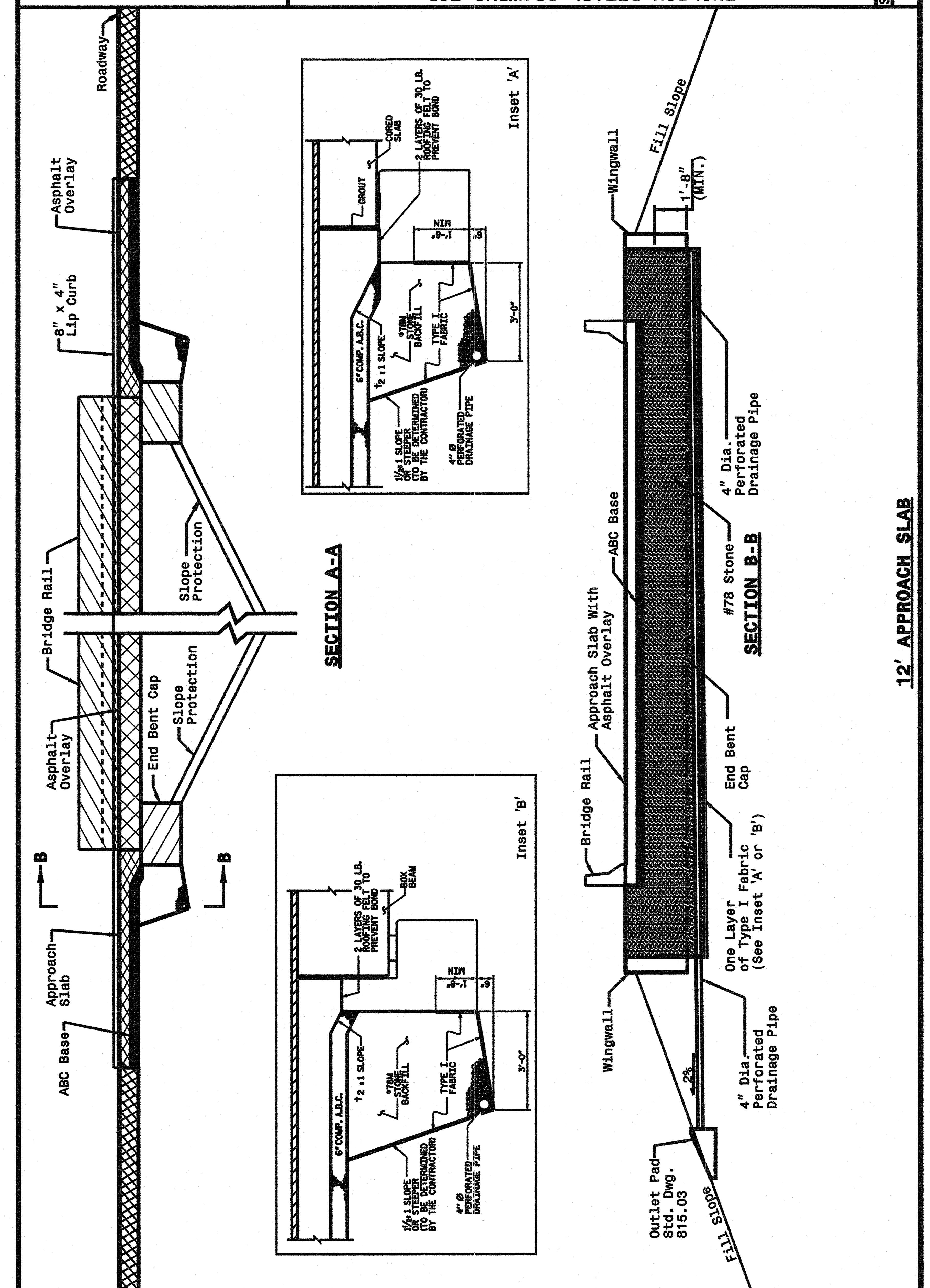


ENGLISH DETAIL DRAWING FOR BRIDGE APPROACH FILLS CORED SLAB & BOX BEAM BRIDGES SUB REGIONAL TIER

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

ENGLISH DETAIL DRAWING FOR
BRIDGE APPROACH FILLS
CORED SLAB & BOX BEAM BRIDGES
SUB REGIONAL TIER

SHEET 1 OF 2
422D11



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

ENGLISH DETAIL DRAWING FOR
BRIDGE APPROACH FILLS
CORED SLAB & BOX BEAM BRIDGES
SUB REGIONAL TIER

SHEET 2 OF 2
422D11

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

BRIDGE APPROACH FILLS
CORED SLAB & BOX BEAM BRIDGES
SUB REGIONAL TIER

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MODIFIED BY: DATE:
CHECKED BY: DATE:
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jhowerton AT PS23750I

12/06/07

COMPUTED BY: GSP	DATE: 1-28-2010
CHECKED BY:	DATE:

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.	SHEET NO.
B-5219	3

SUMMARY OF EARTHWORK

STATION	STATION	UNCL. EXCAV.	EMBANK. +%	BORROW	WASTE
-L- 8+50.00	-L- 9+82.75	3	16	13	
SUBTOTALS:		3	16	13	
-L- 10+75.25	-L- 12+00.00	2	16	14	
SUBTOTALS:		2	16	14	
PROJECT TOTALS:		5	32	27	
5% TO REPLACE TOPSOIL ON BORROW PIT				1	
GRAND TOTALS:		5		28	
SAY		50		50	

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

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

PAVEMENT REMOVAL SUMMARY

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD^2
-L-	8+82.75	EX. BRIDGE	CL	257
-L-	EX. BRIDGE	11+75.25	CL	266
			TOTAL:	523
			SAY:	530

SHOULDER BERM GUTTER SUMMARY

SURVEY LINE	STATION	STATION	LENGTH
-L- RT	9+57.75	9+71.75	14
-L- LT	9+57.75	9+71.75	14
-L- RT	10+86.25	11+00.25	14
-L- LT	10+86.25	11+00.25	14
		TOTAL:	56
		SAY:	60

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

STATION / SIZE / THICKNESS OR GAUGE	LOCATION (LT,RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	DRAINAGE PIPE (RCP, CSP, CAAP, HDPE or PVC) 12"	15"	18"	24"	30"	36"	42"	48"	DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE
10+90.00	LT	1		376.9															
10+90.00	RT	2		376.9															
10+90.00	RT	2	1		375.0	374.1			28										
10+90.00	LT	1	5		374.1	373.9			20										
9+67.80	LT	3		378.0															
9+67.80	LT	3	6		376.1	376.0			8										
9+67.80	RT	4		378.0															
9+67.80	RT	4	7		376.1	376.0			8										
PROJECT SUBTOTAL									64										

STATION	C. S. PIPE 12" .064	15" .064	18" .064	24" .064	30" .079	36" .079	42" .109	48" .109	R. C. PIPE CLASS III 12"	15"	18"	24"	30"	36"	42"	48"	R. C. PIPE CLASS IV 12"	15"	18"	24"	30"	36"	42"	48"
10+90.00																								
10+90.00																								
10+90.00																								
10+90.00																								
9+67.80																								
9+67.80																								
9+67.80																								
9+67.80																								
PROJECT SUBTOTAL																								

STATION	**" RC PIPE, (CLASS V)	***" RC PIPE CULVERTS, CONTRACTOR DESIGN	***" RC PIPE CULVERTS, CONTRACTOR DESIGN	15" SIDE DRAIN PIPE	18" SIDE DRAIN PIPE	ENDWALLS STD. 838.01, STD. 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YDS. R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0' THRU 5.0')	LIN. *FT. A 5.0' THRU 10.0'	B 10.0' AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G				T.B.D.I. STD. 840.35			G.D.I. (N.S.) FRAME WITH GRATE STD. 840.29		CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" C.Y. STD 840.72	CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71	PIPE REMOVAL LIN.FT.	REMARKS
10+90.00								1										1			1						
10+90.00								1										1			1						
10+90.00																											
10+90.00																											
9+67.80								1										1			1						
9+67.80																											
9+67.80								1										1			1						
9+67.80																											
PROJECT SUBTOTAL								4										4			4						

* TOTAL L.F. FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B')

ABBREVIATIONS

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

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

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH STRAIGHT	SHOP CURVED	DOUBLE FACED	WARRANT POINT APPROACH END	TRAILING END	"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH APPROACH END	TRAILING END	W APPROACH END	TRAILING END
-L-	9+07.75	9+82.75	RT	75			9+82.75		4.92	6.92	50		1	
-L-	9+07.75	9+82.75	LT	75				9+82.75	4.92	6.92		50		1
-L-	10+75.25	11+50.25	RT	75				10+75.25	4.92	6.92		50		1
-L-	10+75.25	11+50.25	LT	75			10+75.25		4.92	6.92	50		1	
			PROJECT SUBTOTAL	300										
			LESS ANCHORS	(-) 275										
			PROJECT TOTAL	25										
			SAY	25			ADDITIONAL GUARDRAIL POSTS = 5 EA.		(NOTE: EXTRA LONG GUARDRAIL POSTS ARE TO BE UTILIZED.)					

SURVEY LINE	ANCHORS XI MOD	XI	GRAU 350	M-350	B-77	CAT-1	VI MOD	BIC	AT-1	IMPACT ATTENUATOR TYPE 350 EA	G	NG	SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS
-L-			1		1											
-L-			1		1											
-L-			1		1											
-L-			1		1											
PROJECT SUBTOTAL			4		4	ANCHOR DEDUCTIONS										
LESS ANCHORS						B-77	= 4 @	18.75 =	75.00							
						GRAU 350	= 4 @	50.00 =	200.00							
PROJECT TOTAL								=	275.00							
SAY																

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9/16/2010

PROJECT REFERENCE NO.	SHEET NO.
B-5219	4
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

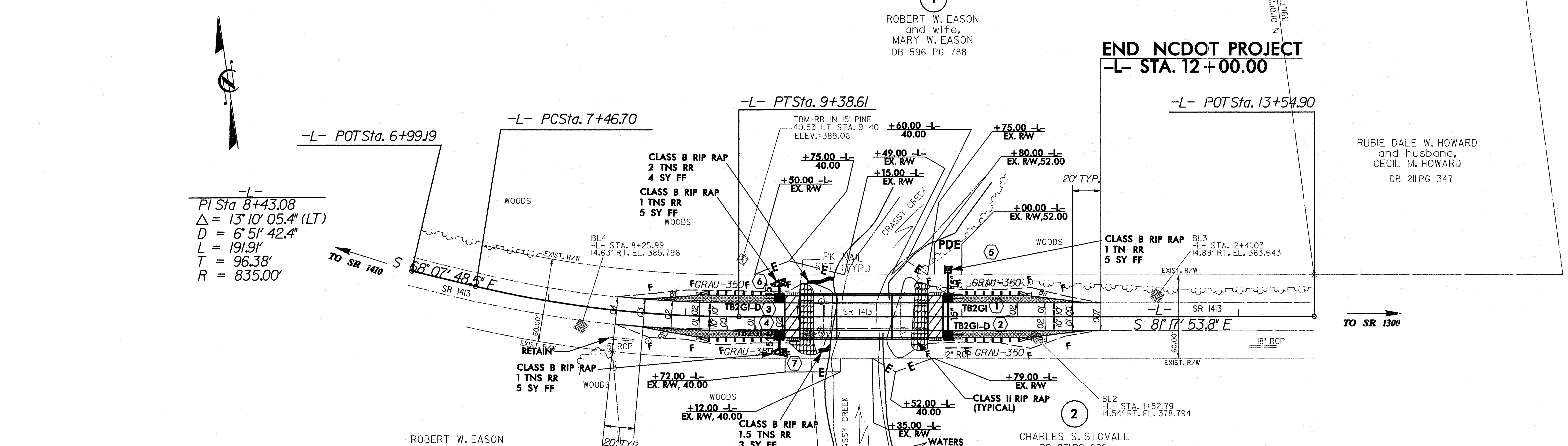
SEAL 022999 — NORTH CAROLINA PROFESSIONAL ENGINEER — GREG S. PURVIS — 9/10/10

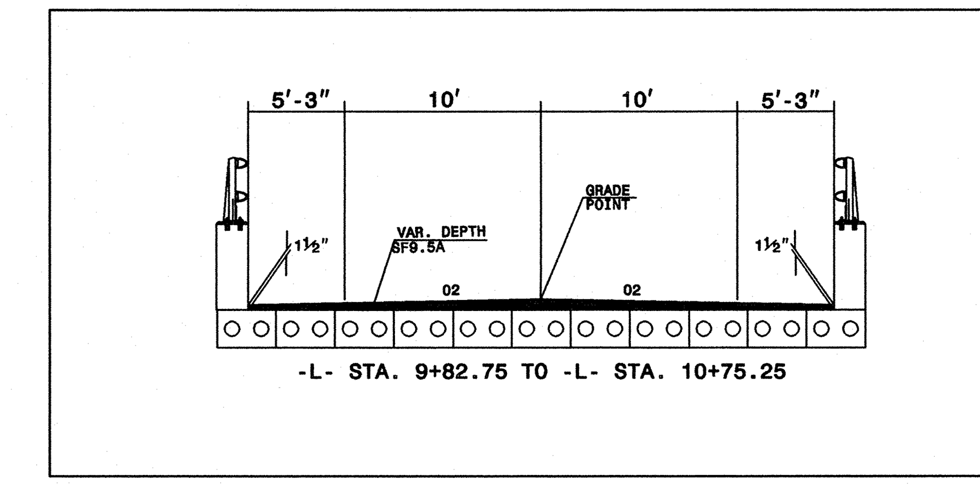
SEAL 13356 — NORTH CAROLINA PROFESSIONAL ENGINEER — JOSEPH J. DUDEK — 8/16/10

WETHERILL ENGINEERING
559 Jones Franklin Rd. Suite 164
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107

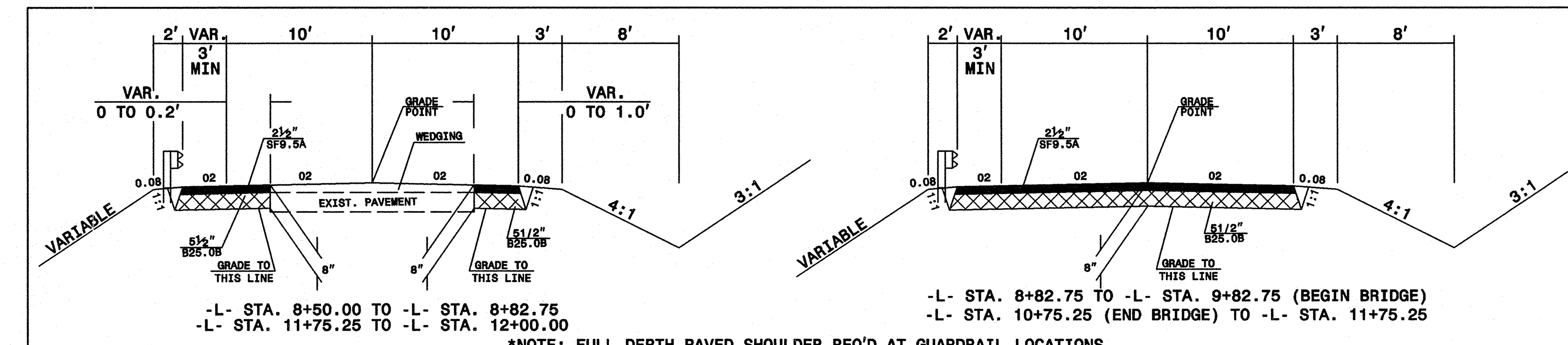
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

PLACE 4" DECK DRAINS @ 4' SPACING:
STA. 9+84 TO STA. 10+00 LT. & RT.
STA. 10+58 TO STA. 10+70 LT. & RT.

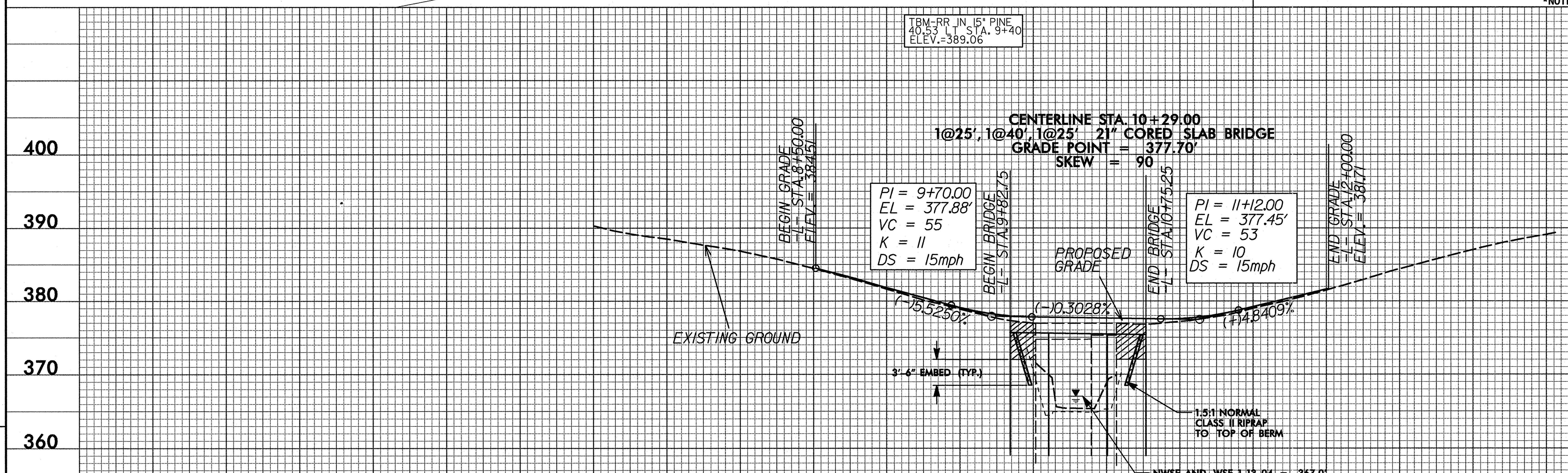


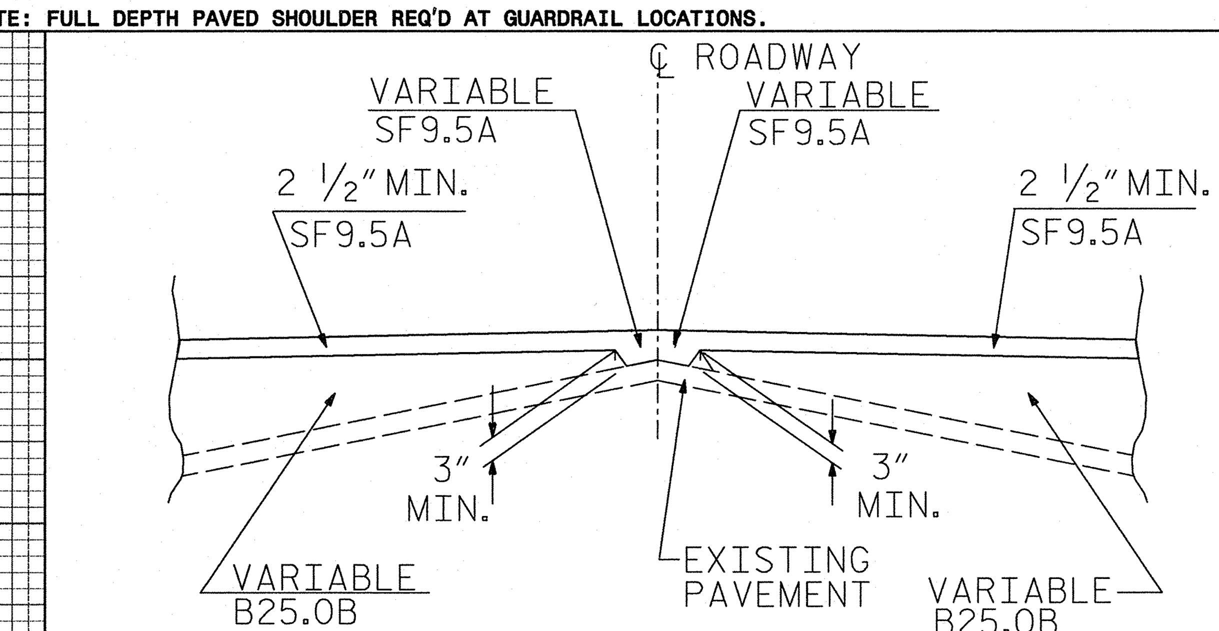


SEE SHEET S-1 THRU S- FOR STRUCTURE PLANS



*NOTE: FULL DEPTH PAVED SHOULDER REQ'D AT GUARDRAIL LOCATIONS.

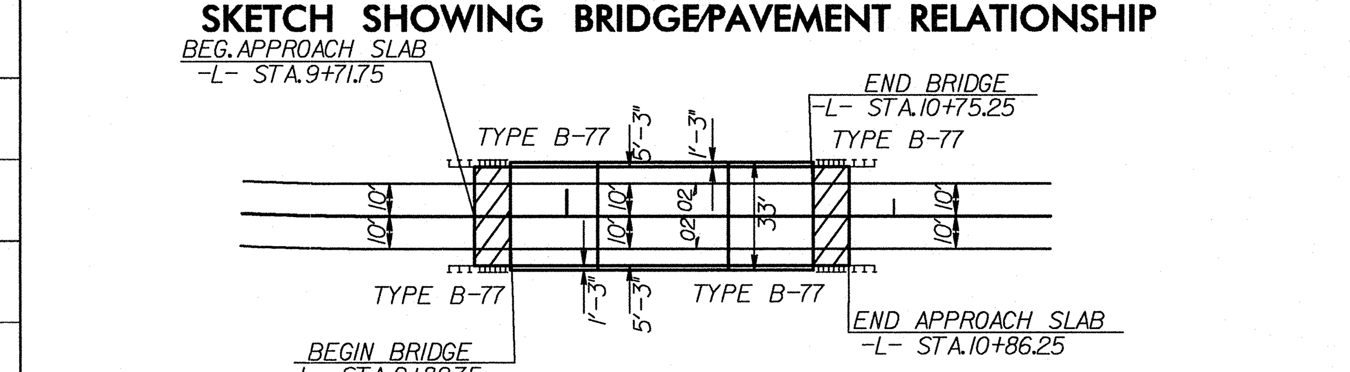




DETAIL SHOWING METHOD OF WEDGING

NOT TO SCALE

SKETCH SHOWING BRIDGE/PAVEMENT RELATIONSHIP



STRUCTURE HYDRAULIC DATA

DESIGN DISCHARGE	=	2500	CFS
DESIGN FREQUENCY	=	10	YRS
DESIGN HW ELEVATION	=	377.0	FT
BASE DISCHARGE	=	4900	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	381.7	FT
OVERTOPPING DISCHARGE	=	2600	CFS
OVERTOPPING FREQUENCY	=	10+	YRS
OVERTOPPING ELEVATION	=	377.5	FT

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TIP. NO. B-5219

GRANVILLE COUNTY

STATION: 10 + 29.00 -L-

REPLACES BRIDGE: NO. 139

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

REVISIONS

8/17/99

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EROSION CONTROL PLANS

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

2006 STANDARD SPECIFICATIONS

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 July 18, 2006 and the latest revison thereto are applicable to this project and by reference hereby are considered a part of these plans.

1605.01	Temporary Silt Fence	1632.03	Rock Inlet Sediment Trap Type C
1606.01	Special Sediment Control Fence	1633.02	Temporary Rock Silt Check Type B
1630.02	Silt Basin Type B		

PROJECT REFERENCE NO.	SHEET NO.
B-5219	EC-1 (CONST. 4)
R/W SHEET NO.	

Level III-A EC Certified by:
Joseph Dudeck
Certification Number: 403

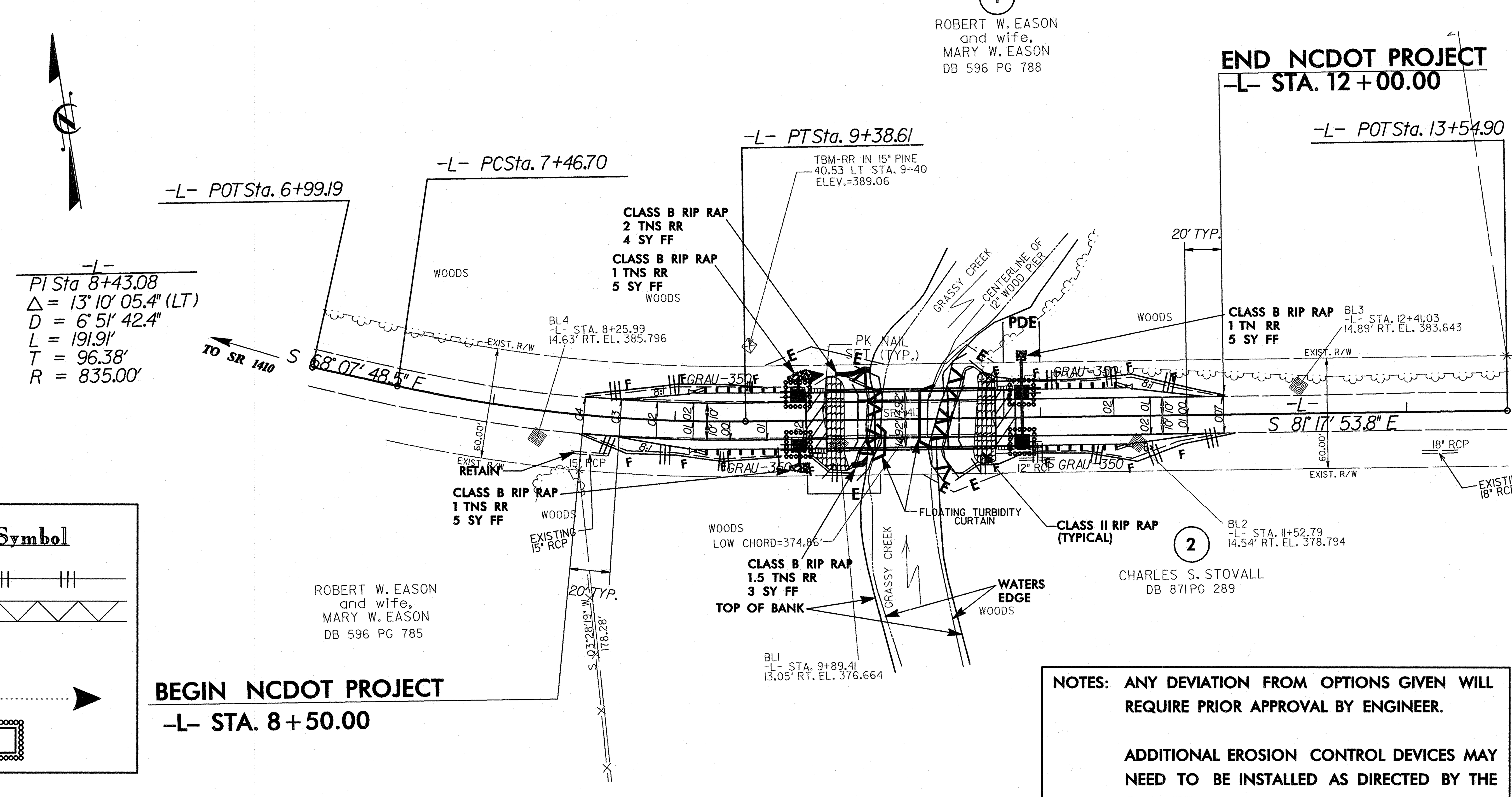
WETHERILL ENGINEERING
559 Jones Franklin Rd. Suite 164
Raleigh, N.C. 27606
License No. F-0377
Bus: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

Place Matting for Erosion Control on Slope as Work Allows.

QUANTITIES:

Temporary Silt Fence	615 LF
Matting for Erosion Control	1800 SY
Sediment Control Stone	55 TNS
Erosion Control Stone, CL B	5 TN
Silt Excavation	15 CY
1/4" Hardware Cloth	275 LF

Std. #	Description	Symbol
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	
1630.02	Silt Basin Type B	
1633.02	Temporary Rock Silt Check Type-B	
1632.03	Rock Inlet Sediment Trap Type C	

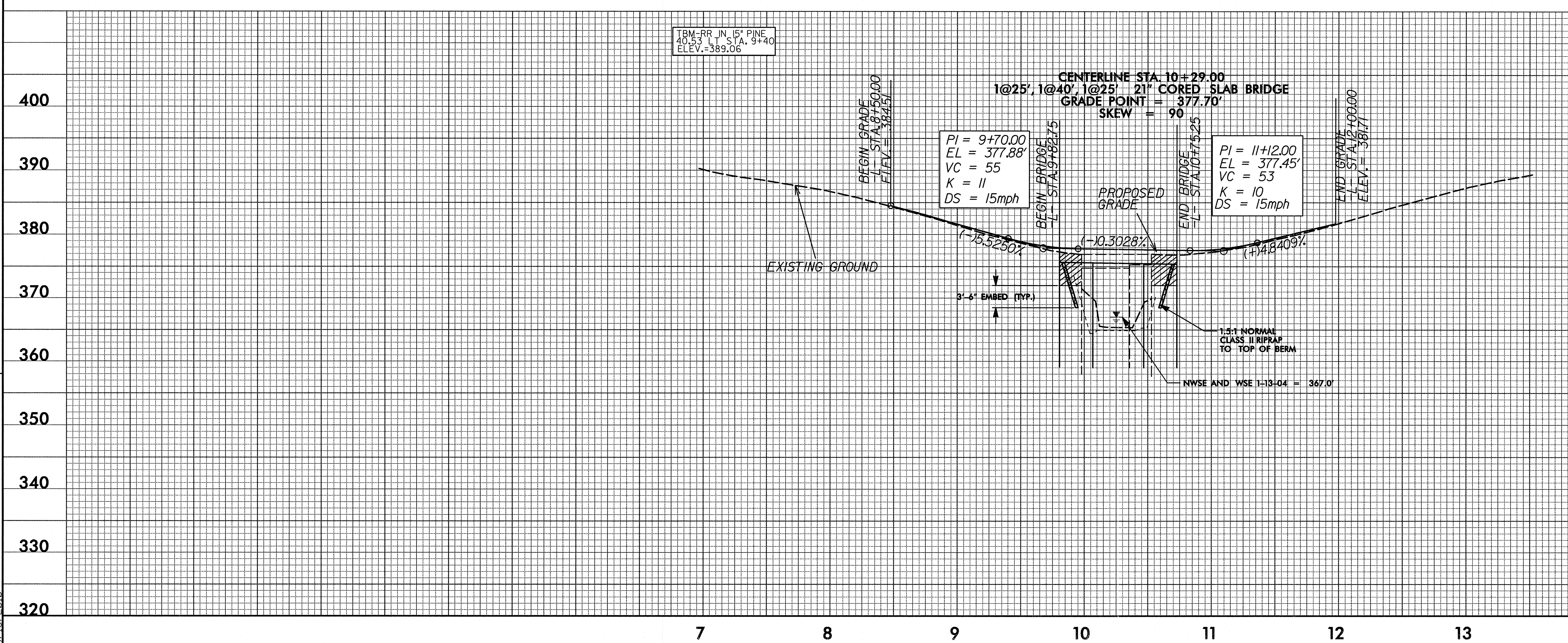


CONSTRUCTION SEQUENCE

1. ACCESS AND MOBILIZATION: STABILIZE BARE AREAS IMMEDIATELY WITH TEMPORARY VEGETATION AND/OR GRAVEL AS CONSTRUCTION TAKES PLACE.
2. INSTALL SILT FENCE, TURBIDITY CURTAIN AND SPECIAL SEDIMENT CONTROL FENCE. SILT FENCE SHALL BE INSTALLED UP TO THE EXISTING BRIDGE ABUTMENTS TO PREVENT SEDIMENT-LADEN RUNOFF FROM LEAVING THE CONSTRUCTION SITE. SILT FENCE SHALL BE INSTALLED AT THE PERIMETER OF DISTURBED AREAS.
3. PROCEED WITH CONSTRUCTION OF THE NEW BRIDGE. ADDITIONAL GRAVEL STABILIZATION OR SILT FENCE MAY BE REQUIRED BEHIND THE OLD ABUTMENTS WHEN THE OLD BRIDGE IS REMOVED AND BEFORE THE NEW BRIDGE IS INSTALLED.
4. MAINTENANCE INSPECTIONS SHALL BE PERFORMED WEEKLY AND AFTER PERIODS OF RAINFALL. REPAIRS SHALL BE MADE IMMEDIATELY.
5. ONCE THE SITE IS STABILIZED, REMOVE ALL EROSION CONTROL DEVICES.

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

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



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TIP. NO. B-5219
GRANVILLE COUNTY
STATION: 10 + 29.00 -L-
REPLACES BRIDGE: NO. 139

REVISIONS						SHEET NO.
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REVISIONS

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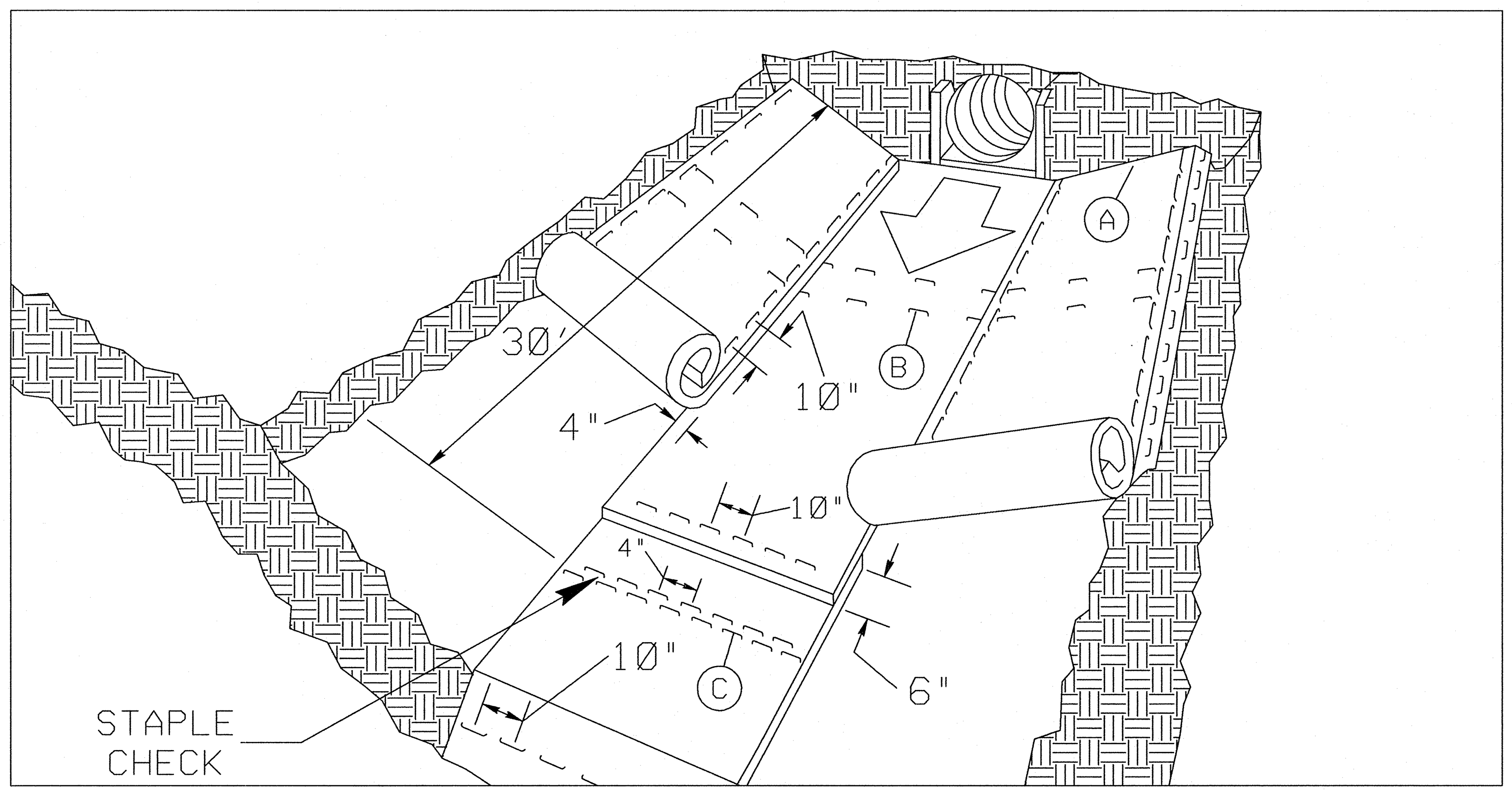
PROJECT REFERENCE NO.	SHEET NO.
B-5219	EC-2
R/W SHEET NO.	

MATTING INSTALLATION DETAIL



MATTING IN DITCHES

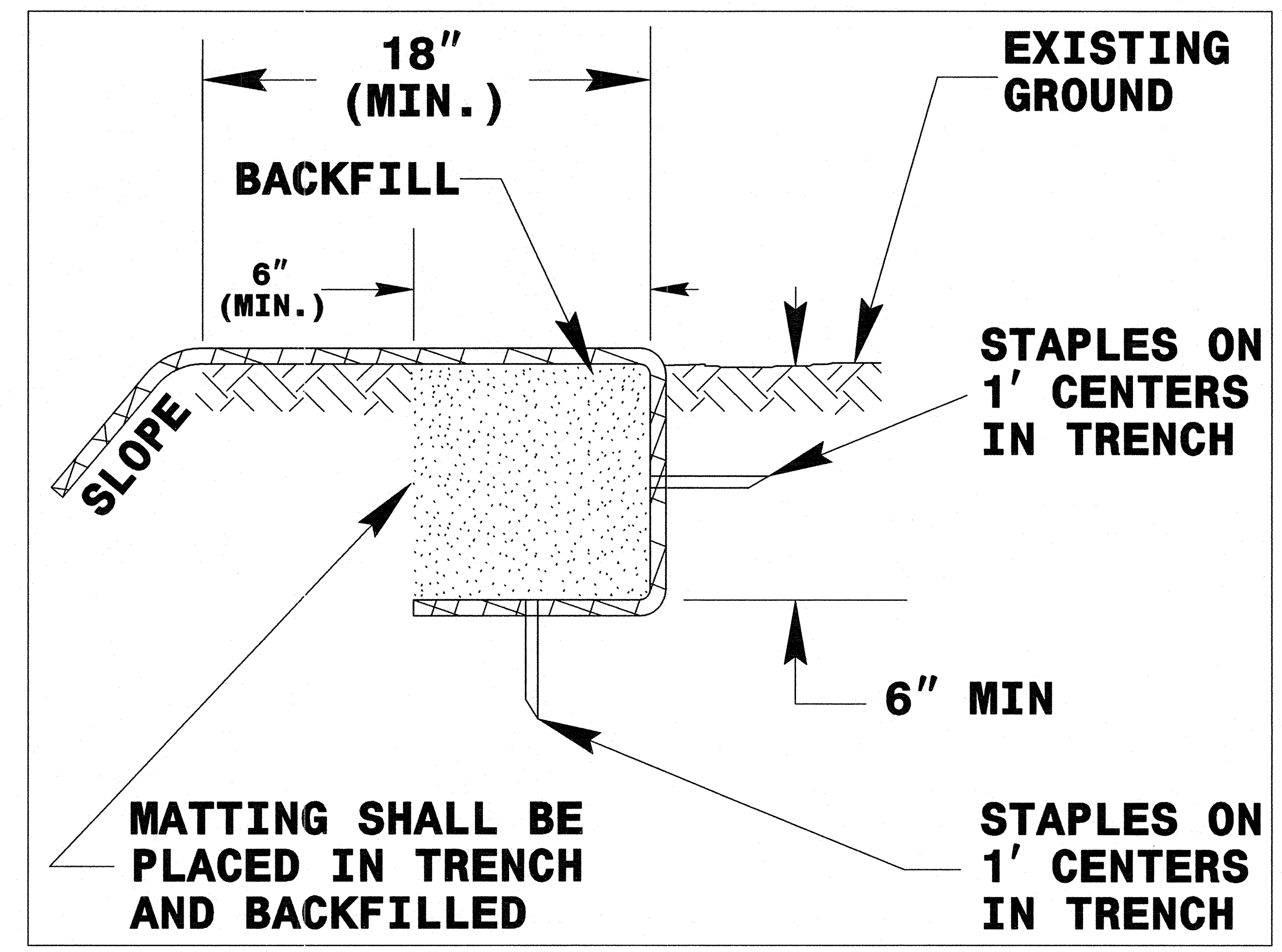
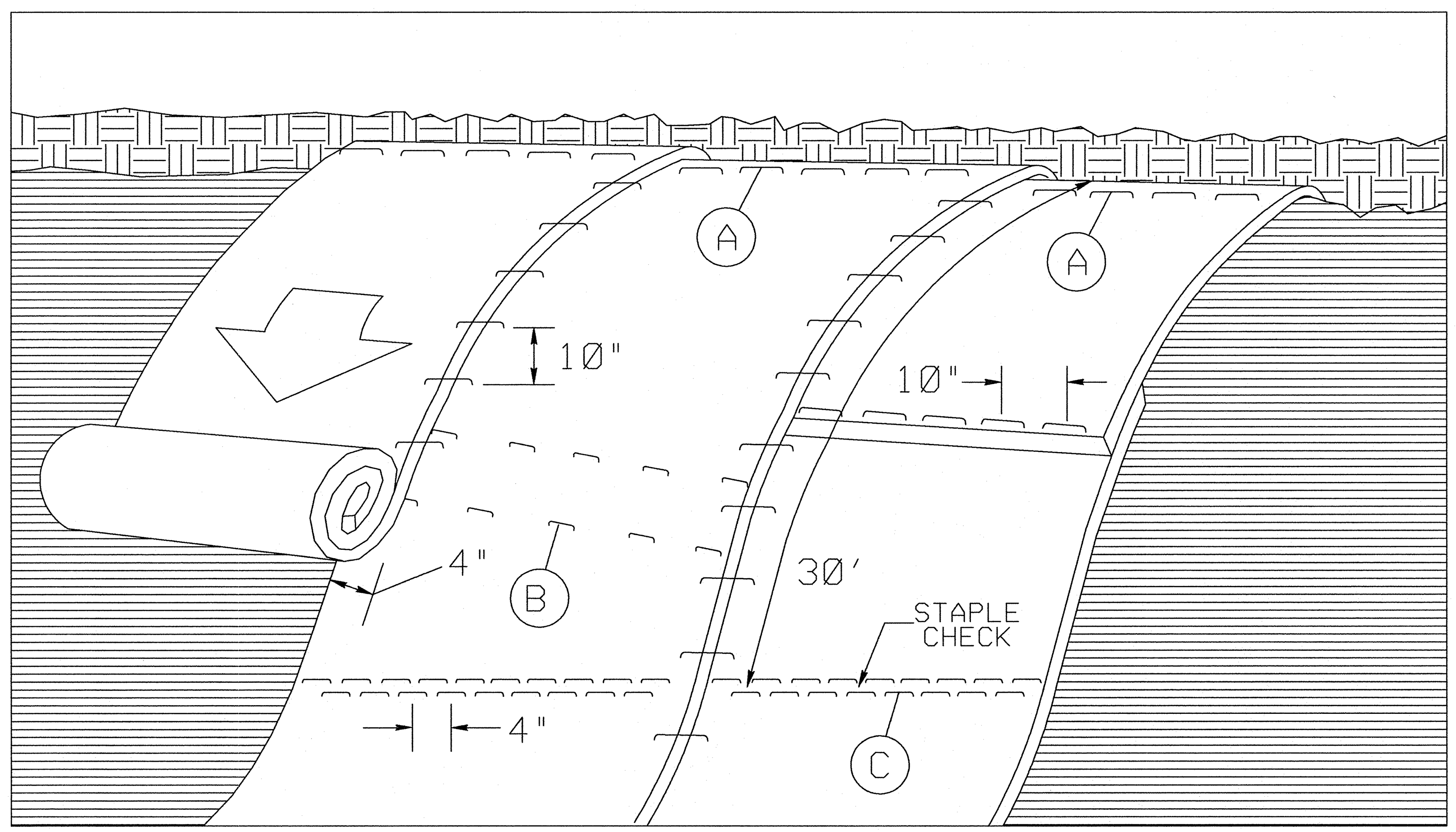


DIAGRAM A



MATTING ON SLOPES

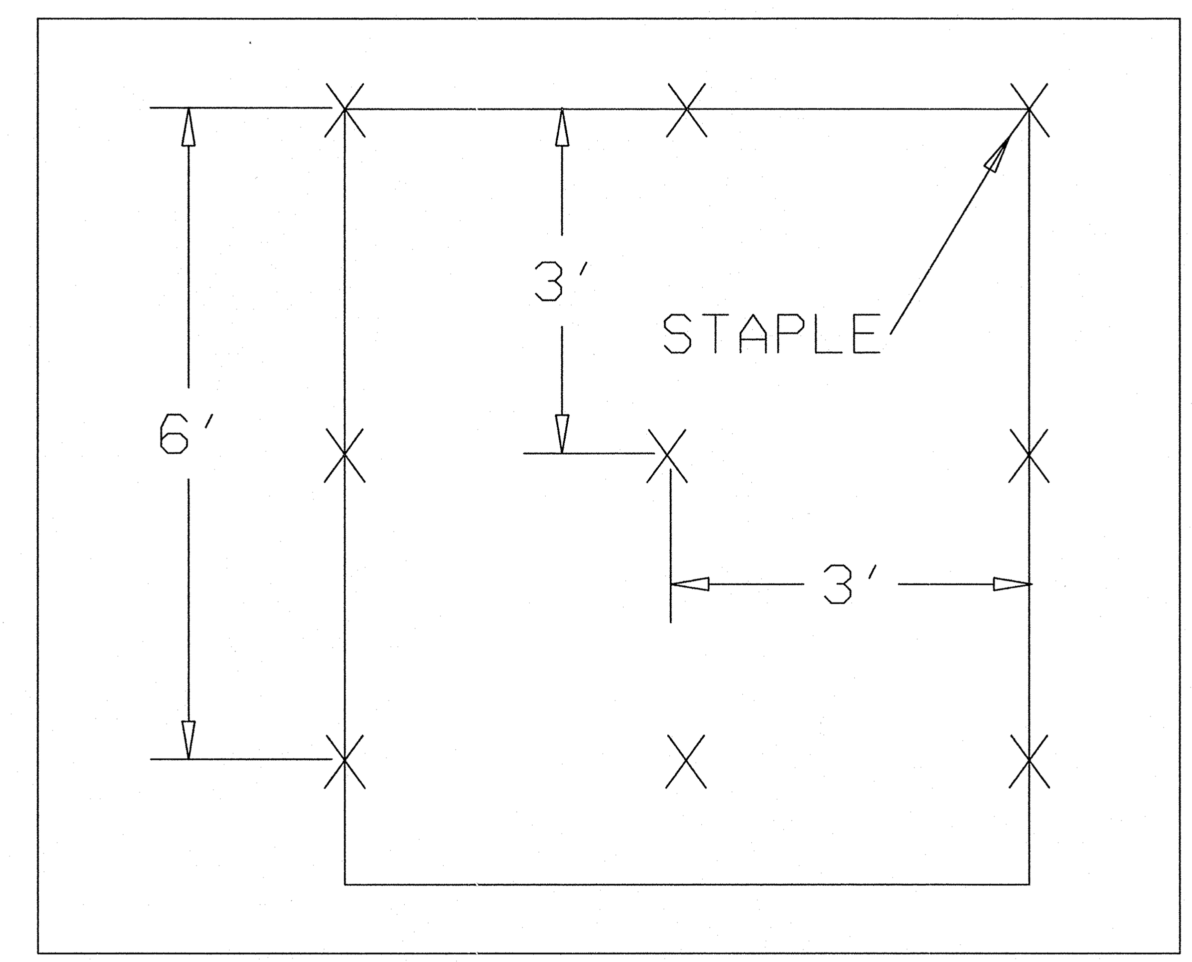


DIAGRAM B

STAPLE CHECK PATTERN

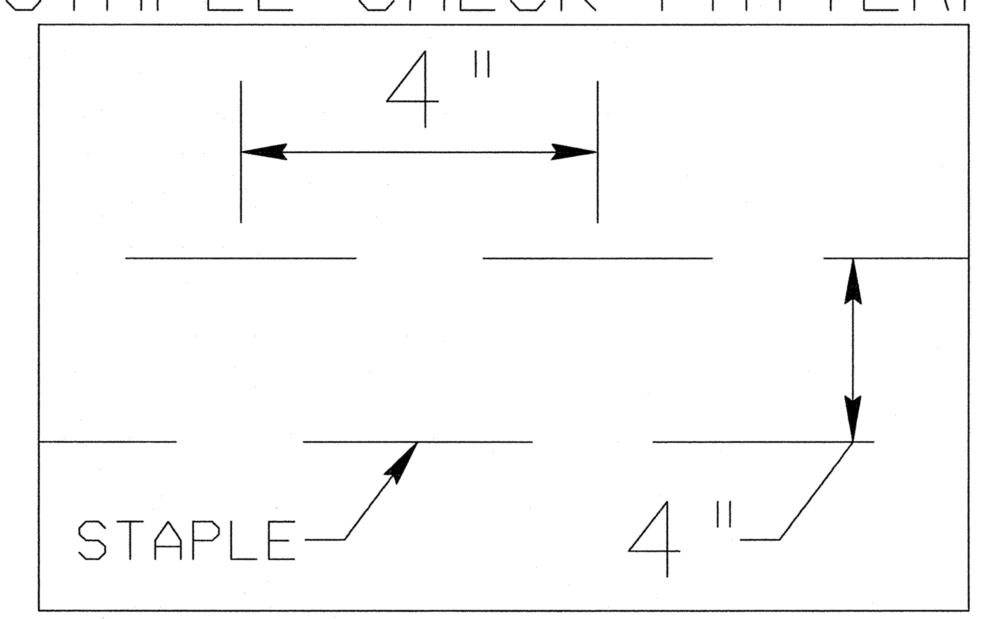


DIAGRAM C

NOTES:

THIS DETAIL APPLIES TO STRAW, EXCELSIOR, AND PERMANENT SOIL REINFORCEMENT MAT (PSRM) INSTALLATION.

STAPLES SHALL BE NO. 11 GAUGE STEEL WIRE FORMED INTO A "U" SHAPE WITH A MINIMUM THROAT WIDTH OF 1 INCH AND NOT LESS THAN 6 INCHES IN LENGTH.

NOT TO SCALE

PROJ. REFERENCE NO.	SHEET NO.
B-5219	X-1

STATE OF NORTH CAROLINA

DIVISION OF HIGHWAYS

CROSS-SECTION SUMMARY

NOTE: EMBANKMENT COLUMN DOES NOT INCLUDE BACKFILL FOR UNDERCUT

Station L	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
8+50.00	0	0
8+75.00	0	2
9+00.00	0	3
9+25.00	0	5
9+50.00	1	3
9+75.00	1	0

Station L	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)
10+75.00	0	0
11+00.00	0	2
11+25.00	1	2
11+50.00	1	4
11+75.00	0	4
12+00.00	0	1

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

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-5219	X-2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TIP. NO. B-5219

GRANVILLE COUNTY

STATION: 10 + 29.00 -L-

REPLACES BRIDGE: NO. 139

REVISIONS						SHEET NO.
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PROJ. REFERENCE NO.	SHEET NO.
B-5219	X-3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TIP. NO. B-5219

GRANVILLE COUNTY

STATION: 10 + 29.00 -L-

REPLACES BRIDGE: NO. 139

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

TIP. NO. B-5219

GRANVILLE COUNTY

STATION: 10 + 29.00 -L-

REPLACES BRIDGE: NO. 139

REVISIONS						SHEET NO.
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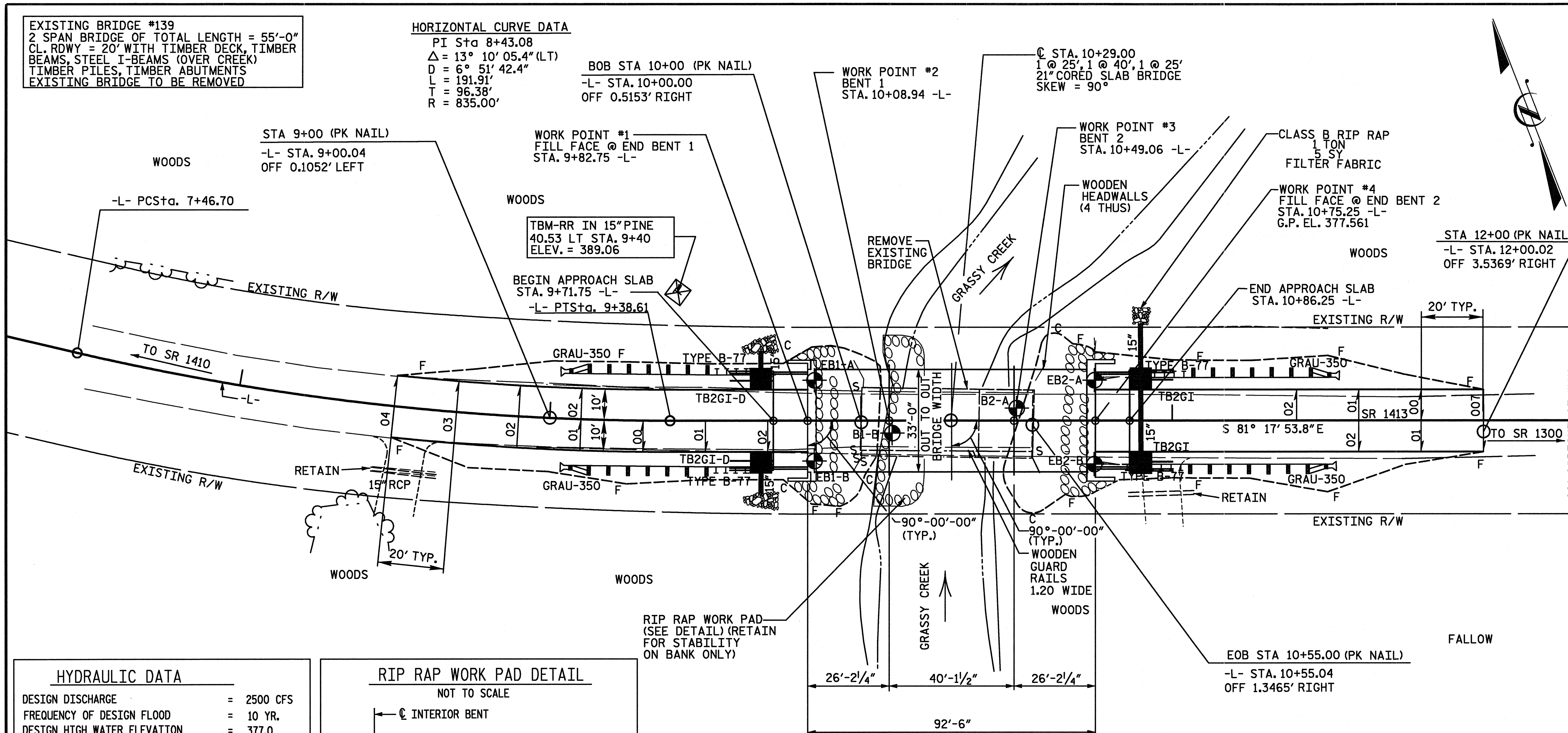
#139 GRANVILLE TIP PROJECT: B-5219



HYDRAULIC DATA

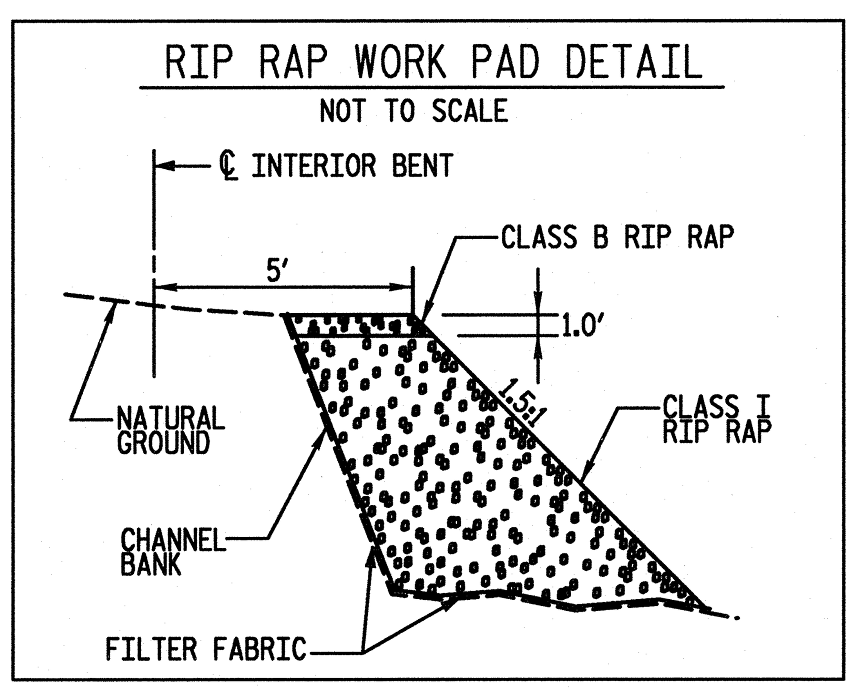
DESIGN DISCHARGE	=	2500 CFS
FREQUENCY OF DESIGN FLOOD	=	10 YR.
DESIGN HIGH WATER ELEVATION	=	377.0
DRAINAGE AREA	=	20.6 SQ. MI.
BASIC DISCHARGE (Q100)	=	4900 CFS
BASIC HIGH WATER ELEVATION	=	381.7

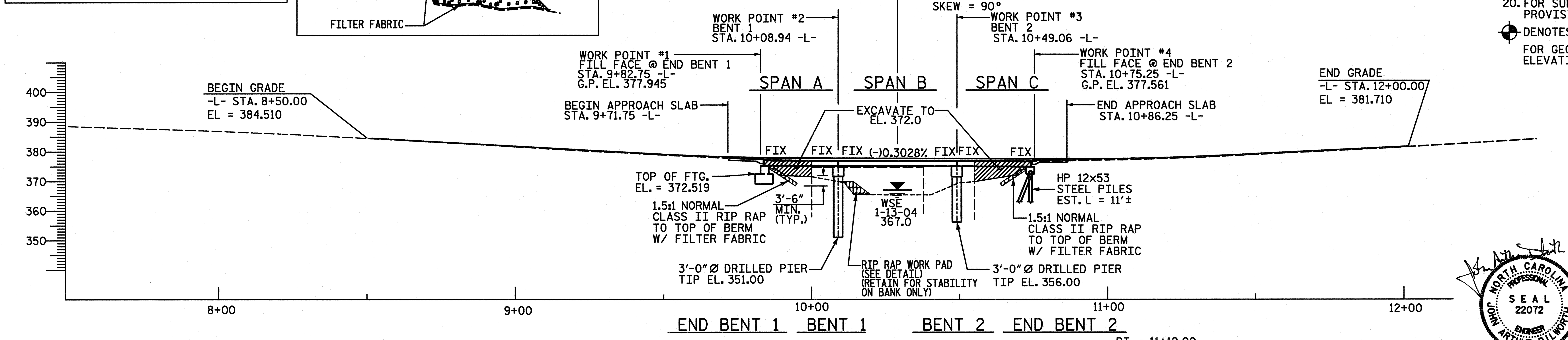
OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	=	2600 CFS
FREQUENCY OF OVERTOPPING FLOOD	=	10 YR. +
OVERTOPPING FLOOD ELEVATION	=	377.5

RIP RAP WORK PAD DETAIL

NOT TO SCALE





END BENT 1 BENT 1 BENT 2 END BENT 2

GRADE DATA

PI = 9+70.00
EL = 377.88
VC = 55.0'
(-)5.5250% (-)0.3028%

GRADE DATA

PI = 11+12.00
EL = 377.45'
VC = 53.0'
(-)0.3028% (+)4.8409%

PROFILE ALONG ℄ SURVEY -L-

SCALE: 1" = 20'-0"

NOTES

1. THE REQUIRED BEARING CAPACITY OF THE SPREAD FOOTING AT END BENT 1 IS 4 TSF. THE REQUIRED BEARING CAPACITY SHALL BE VERIFIED.
2. PILES AT END BENT 2 SHALL BE DRIVEN TO A MINIMUM BEARING CAPACITY OF 45 TONS EACH.
3. WHEN DRIVING PILES, THE MAXIMUM BLOW COUNT SHALL NOT BE EXCEEDED.
4. FOR DRILLED PIERS, SEE SPECIAL PROVISIONS.
5. DRILLED PIERS HAVE BEEN DESIGNED FOR AN APPLIED LOAD OF 310 KIPS EACH AT THE TIP OF THE PIER.
6. DRILLED PIERS HAVE BEEN DESIGNED FOR BOTH SKIN FRICTION AND TIP BEARING. THE REQUIRED TIP BEARING CAPACITY IS 22 TSF AT BENT 1 AND BENT 2. THE TIP BEARING CAPACITY SHALL BE VERIFIED.
7. DRILLED PIERS AT BENT 1 SHALL EXTEND TO AN ELEVATION NO HIGHER THAN 351.00 FEET AND SATISFY THE REQUIRED TIP BEARING CAPACITY WITH A MINIMUM PENETRATION OF 7.5 FEET INTO ROCK AS DEFINED BY THE DRILLED PIERS SPECIAL PROVISIONS.
8. DRILLED PIERS AT BENT 2 SHALL EXTEND TO AN ELEVATION NO HIGHER THAN 356.00 FEET AND SATISFY THE REQUIRED TIP BEARING CAPACITY WITH A MINIMUM PENETRATION OF 6.5 FEET INTO ROCK AS DEFINED BY THE DRILLED PIERS SPECIAL PROVISIONS.
9. THE SCOUR CRITICAL ELEVATION (SCE) FOR BENT 1 IS 355.50 FEET. THE SCOUR CRITICAL ELEVATION (SCE) FOR BENT 2 IS 361.00 FEET. THE SCOUR CRITICAL ELEVATIONS ARE FOR USE BY MAINTENANCE FORCES TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF STRUCTURE.
10. CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR DRILLED PIERS. SEE SPECIAL PROVISION FOR CROSSHOLE SONIC LOGGING.
11. SLURRY CONSTRUCTION SHALL NOT BE USED FOR THIS PROJECT.
12. SID INSPECTIONS ARE NOT REQUIRED TO DETERMINE THE BOTTOM CLEANLINESS OF THE DRILLED PIERS.
13. THE QUANTITY OF RIP RAP TO BE PAID FOR WILL BE THE ACTUAL NUMBER OF TONS OF EACH CLASS OF RIP RAP WHICH HAS BEEN INCORPORATED INTO THE COMPLETED AND ACCEPTED WORK. THE RIP RAP WILL BE MEASURED BY BEING WEIGHED IN TRUCKS CERTIFIED WEIGHING DEVICES. THE QUANTITY OF RIP RAP WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER TON.

PLAIN RIP RAP CLASS II (2'-0" THICK)	FILTER FABRIC
END BENT NO. 1 = 100 TONS	115 SY
END BENT NO. 2 = 95 TONS	105 SY
TOTAL: = 195 TONS	220 SY
PLAIN RIP RAP CLASS I	**FILTER FABRIC**
WORK PAD @ BENT 1 QTY. = 50 TONS	100 SY
CLASS B RIP RAP	
WORK PAD @ BENT 1 QTY. = 20 TONS	

14. ONCE WORK PAD IS NO LONGER NEEDED FOR BENT 1, REMOVE ROCK FROM STREAM AND DISTRIBUTE ALONG BANK FOR STABILITY.
15. THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH FHWA'S TECHNICAL ADVISORY T5140.20 (SCOUR AT BRIDGES).
16. THE EXISTING BRIDGE SHALL BE REMOVED BY SAWING AND/OR NON SHATTERING METHODS SUCH THAT DEBRIS WILL NOT FALL INTO THE WATER.
17. FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
18. FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
19. FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
20. FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

⯐ DENOTES GEO-TECH BORING HOLE LOCATIONS.

FOR GEO-TECH ELEVATIONS, TBM @ 40.53 LT STA. 9+40 ELEVATION 389.06 = ASSUMED ELEVATION 100'.

WBS NO. 42816.1.1

GRANVILLE COUNTY

STATION: 10+29.000 -L-

REPLACES BRIDGE NO. 139

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 22072 JOHN ARTHUR DILWORTH 12-2-10

WETHERILL ENGINEERING

559 Jones Franklin Rd. Suite 164 Raleigh, N.C. 27606 Bus: 919 851 8077 Fax: 919 851 8107 License No. F-0377

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
BRIDGE #139 ON SR 1413
OVER GRASSY CREEK

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

REVISIONS

SHEET NO. S-1

TOTAL SHEETS 19

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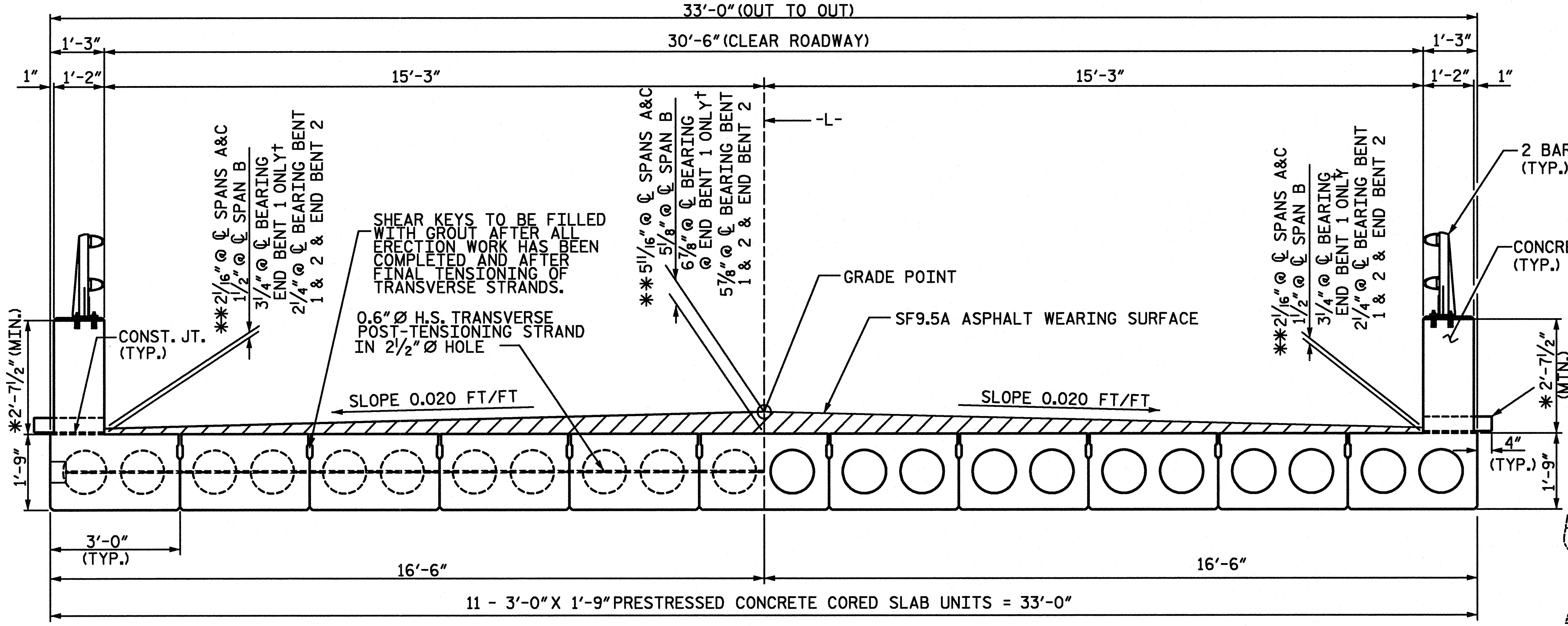
DRAWN BY : J.C. PENDERGRAFT DATE : 2/10
CHECKED BY : J. DILWORTH DATE : 2/10



TYPICAL SECTION

✱ THE MINIMUM HEIGHT OF THE PARAPET IS SHOWN. THE HEIGHT OF THE PARAPET VARIES WHILE THE TOP OF PARAPET FOLLOWS THE PROFILE OF THE GUTTERLINE.

✱✱ BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS.

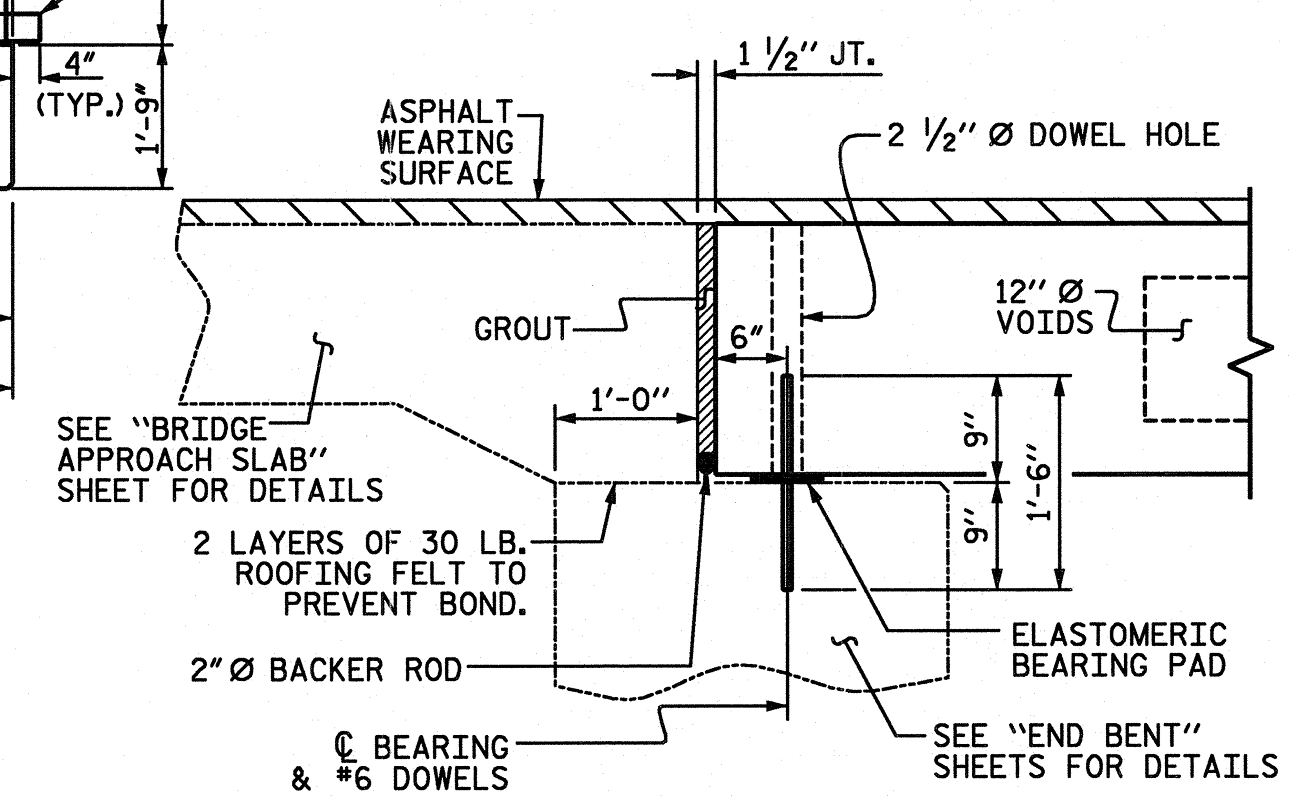
† ADDITONAL ASPHALT REQUIRED IN SPAN A UP TO STA. 9+97.50 -L- WHERE VERTICAL CURVE ENDS.

GENERAL NOTES:

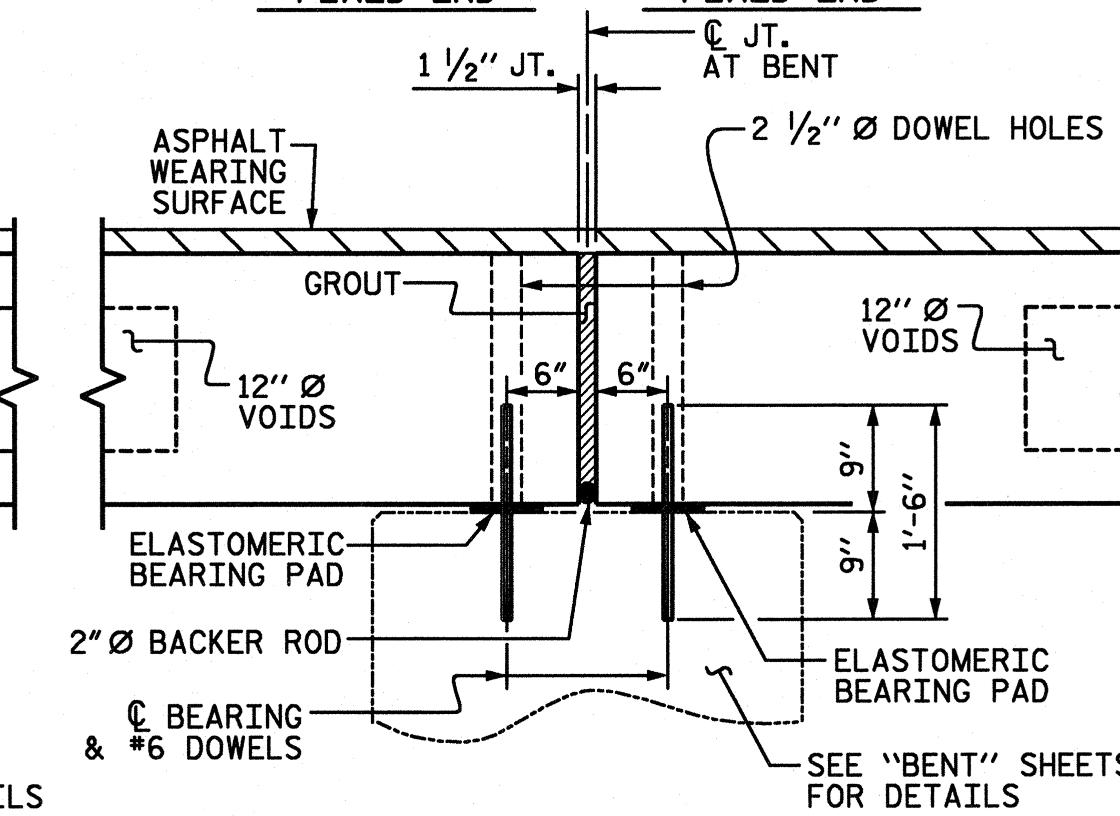
ASSUMED LIVE LOAD = HS 20 OR ALTERNATE LOADING. EXCEPT THAT THE BEAMS HAVE BEEN DESIGNED FOR HS 25.

ALL MATERIAL AND WORKMANSHIP SHALL COMPLY WITH THE APPLICABLE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES OF THE NC DEPARTMENT OF TRANSPORTATION DATED JULY 2006 AND WITH THE SPECIAL PROVISIONS.

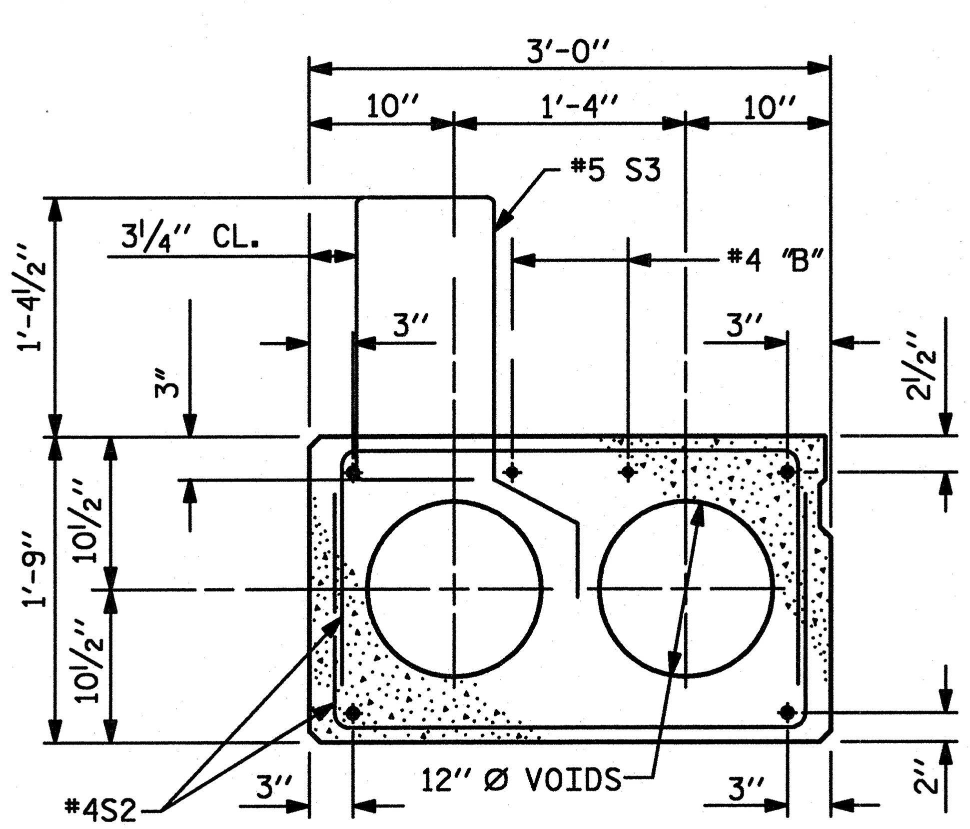
UNLESS OTHERWISE NOTED ON PLANS, ALL EXPOSED CORNERS ON STRUCTURE SHALL BE CHAMFERED 3/4".



SECTION AT END BENT

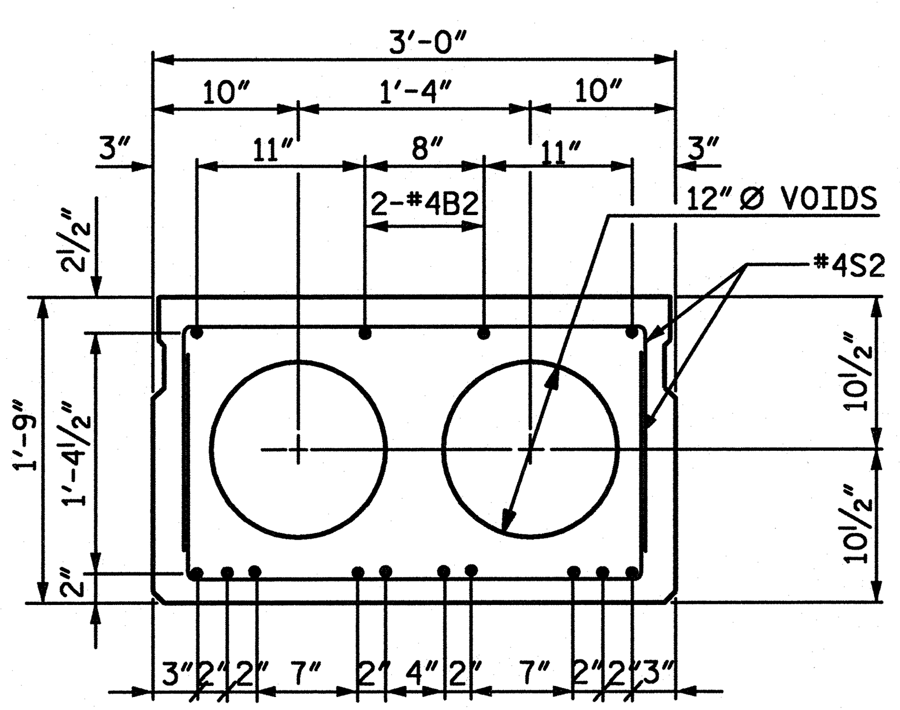


SECTION AT BENT



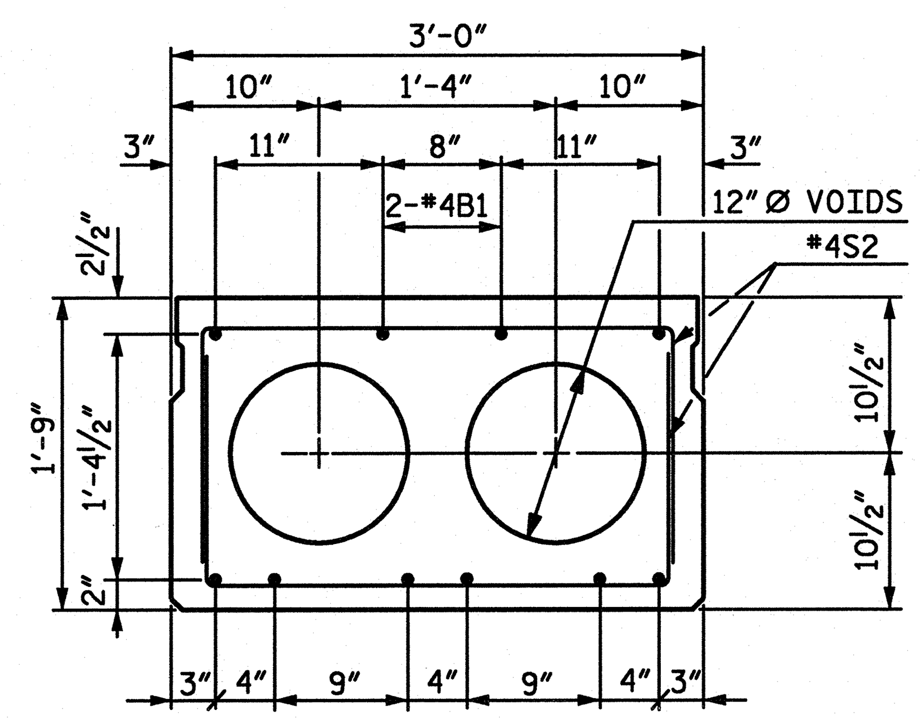
EXTERIOR SLAB SECTION

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



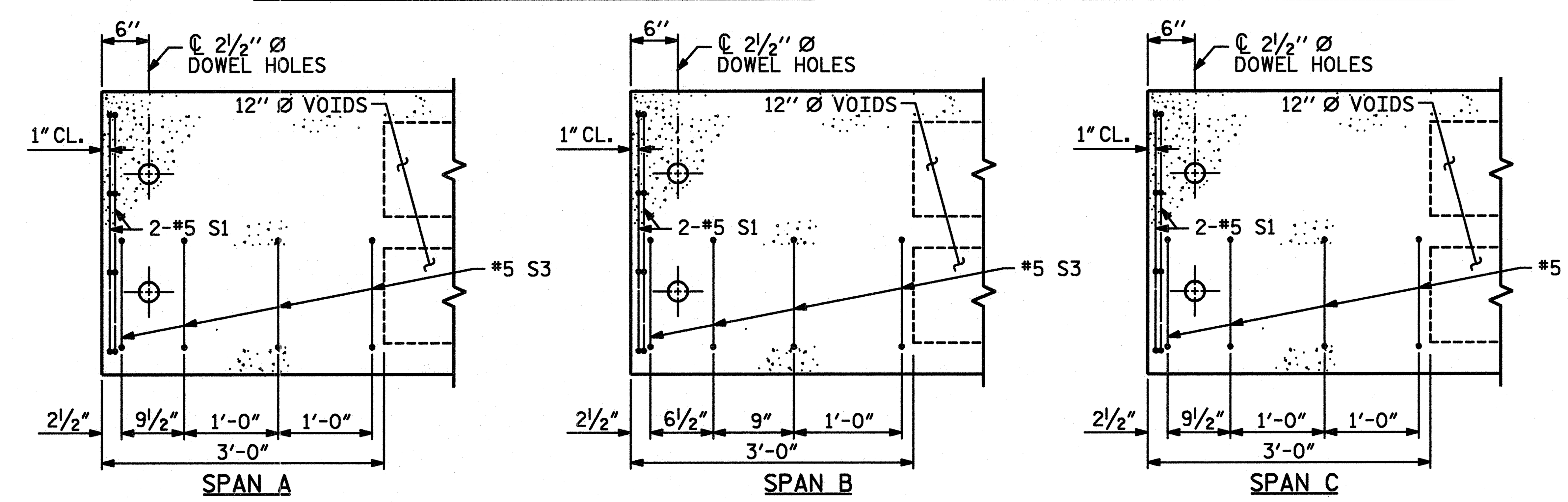
40'-SPAN B

12 - 0.6" Ø LOW RELAXATION STRANDS INTERIOR SLAB SECTIONS



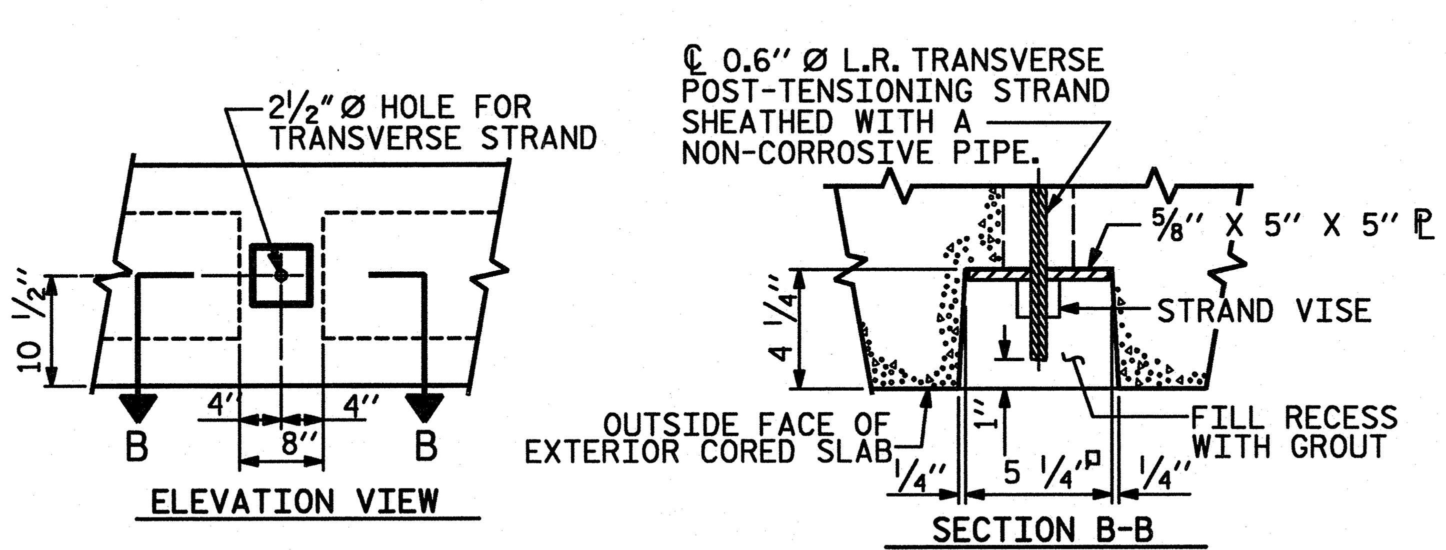
25'-SPANS A & C

8 - 0.6" Ø LOW RELAXATION STRANDS INTERIOR SLAB SECTIONS

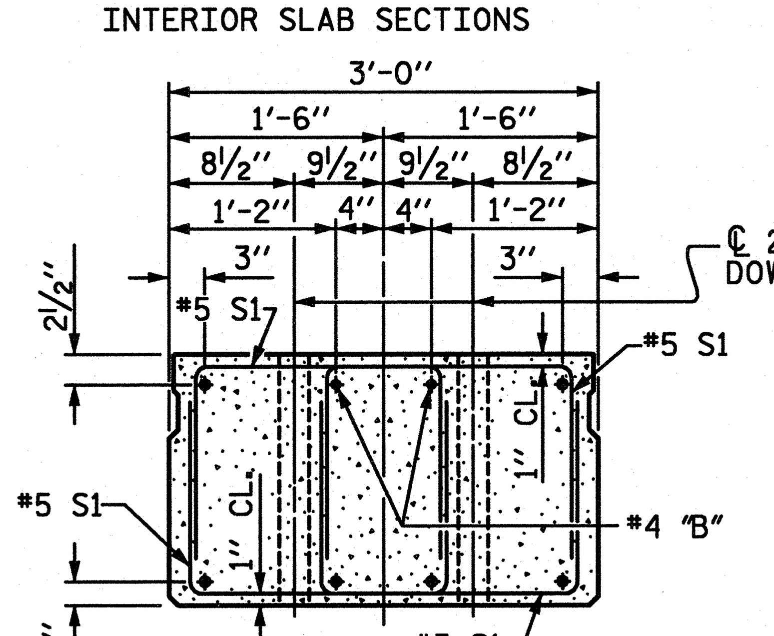


PART PLAN-EXTERIOR SECTION

NOTE: EXTERIOR SECTION SHOWN-INTERIOR SECTION SIMILAR EXCEPT OMIT S3 BARS.

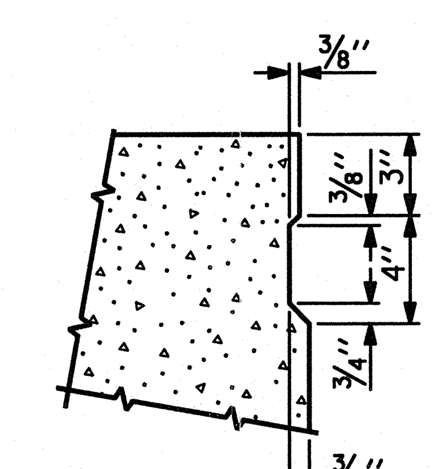


GROUTED RECESS AT END OF POST-TENSIONED STRAND CORED SLABS



END ELEVATION

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



SHEAR KEY DETAIL

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

WBS NO. 42816.1.1

GRANVILLE COUNTY

STATION: 10+29.000 -L-

REPLACES BRIDGE NO. 139

WETHERILL ENGINEERING

559 Jones Franklin Rd. Suite 164 Raleigh, N.C. 27606 Bus: 919 851 8077 Fax: 919 851 8107 License No. F-0377

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

STD. NO. PCS2

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

DRAWN BY : J. PENDERGRAFT DATE : 2/10
CHECKED BY : J. DILWORTH DATE : 2/10

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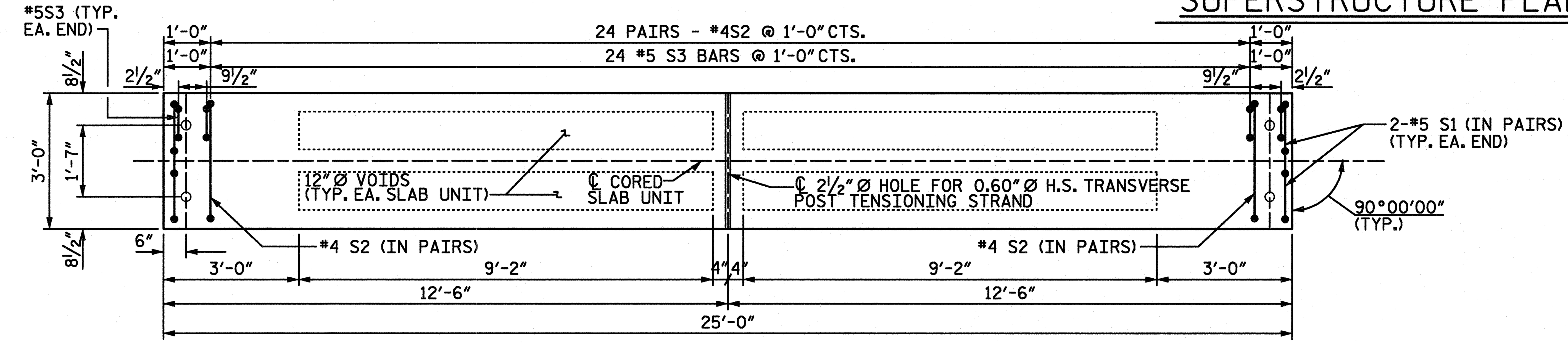
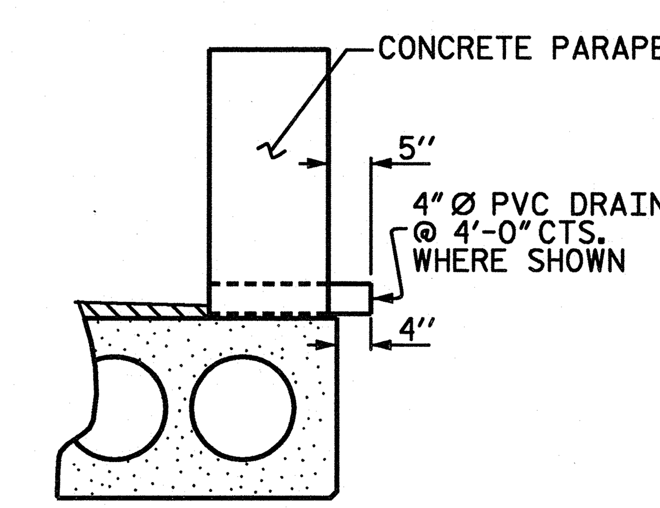
SUPERSTRUCTURE PLAN OF SPANS



PLAN OF EXTERIOR CORED SLAB UNIT SPANS "A" & "C"

EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5S3 BARS.



DECK DRAIN DETAIL

FOR DECK DRAINS SEE SECTION 1054-3 OF STANDARD SPECS.

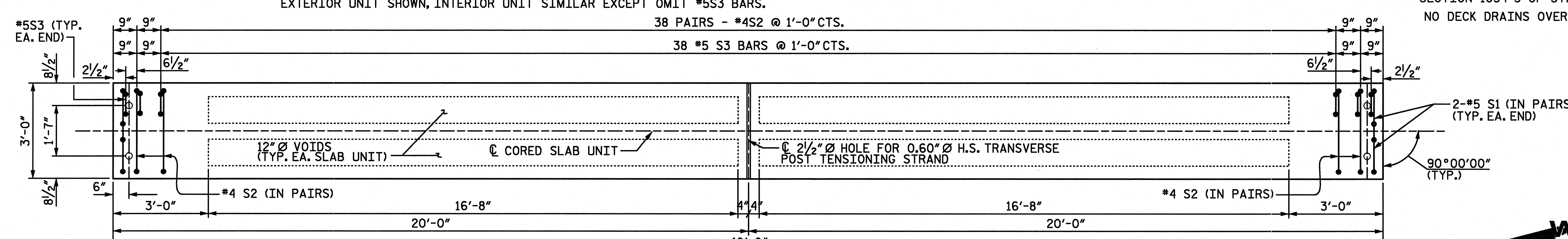
NO DECK DRAINS OVER OPEN WATER.

WBS NO. 42816.1.1

GRANVILLE COUNTY

STATION: 10+29.000 -L-

REPLACES BRIDGE NO. 139



PLAN OF EXTERIOR CORED SLAB UNIT SPAN "B"

EXTERIOR UNIT SHOWN, INTERIOR UNIT SIMILAR EXCEPT OMIT #5S3 BARS.

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE PLAN OF SPANS

SEAL 22072 — NORTH CAROLINA PROFESSIONAL ENGINEER — JOHN ARTHUR DILWORTH — 12-2-10

WETHERILL ENGINEERING — 559 Jones Franklin Rd. Suite 164, Raleigh, N.C. 27606, Bus: 919 851 8077, Fax: 919 851 8107, License No. F-0377

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

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

DRAWN BY : J. PENDERGRAFT DATE : 2/10
CHECKED BY : J. DILWORTH DATE : 2/10

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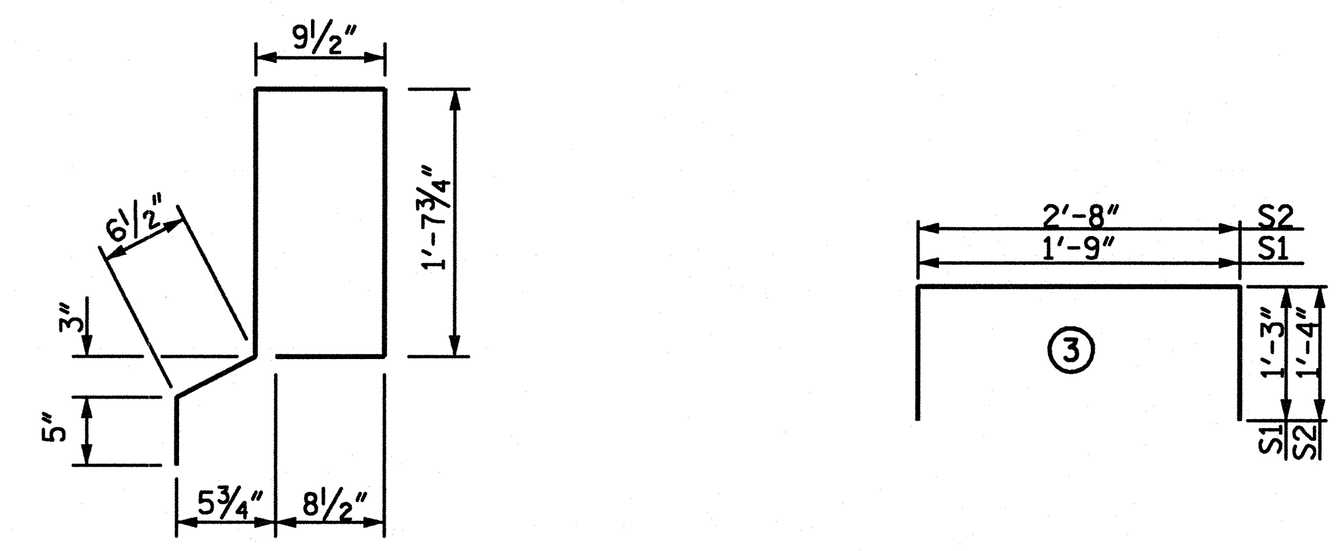
BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT
* DENOTES EPOXY COATED

BILL OF MATERIAL FOR ONE CORED SLAB SECTION

			SPANS A & C						SPAN B					
			EXTERIOR UNIT			INTERIOR UNIT			EXTERIOR UNIT			INTERIOR UNIT		
BAR	SIZE	TYPE	NUMBER	LENGTH	WEIGHT	NUMBER	LENGTH	WEIGHT	NUMBER	LENGTH	WEIGHT	NUMBER	LENGTH	WEIGHT
B1	#4	STR	2	24'-8"	33	2	24'-8"	33						
B2	#4	STR							4	20'-9"	55	4	20'-9"	55
S1	#5	3	8	4'-3"	35	8	4'-3"	35	8	4'-3"	35	8	4'-3"	35
S2	#4	3	48	5'-4"	171	48	5'-4"	171	80	5'-4"	285	80	5'-4"	285
* S3	#5	1	26	5'-9"	156				42	5'-9"	252			
REINFORCING STEEL		LBS.			239			239			375			375
* EPOXY COATED REINFORCING STEEL		LBS.			156						252			
5000 P.S.I. CONCRETE		CU. YDS.			3.8			3.8			5.8			5.8
0.6" Ø L.R. STRANDS		No.			8			8			12			12

DEAD LOAD DEFLECTION AND CAMBER

	SPANS A&C	SPAN B
	0.6" Ø L.R. STRAND	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	1/4" ↑	7/8" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD **	1/16" ↓	1/8" ↓
FINAL CAMBER	3/16" ↑	3/4" ↑

** INCLUDES FUTURE WEARING SURFACE

SPANS A & C

CORED SLABS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR C.S.	4	25'-0"	100'-0"
INTERIOR C.S.	18	25'-0"	450'-0"
TOTAL	22		550'-0"

SPAN B

CORED SLABS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
EXTERIOR C.S.	2	40'-0"	80'-0"
INTERIOR C.S.	9	40'-0"	360'-0"
TOTAL	11		440'-0"

GRADE 270 STRANDS

	0.6" Ø L.R.
AREA (SQUARE INCHES)	0.217
ULTIMATE STRENGTH (LBS. PER STRAND)	58,590
APPLIED PRESTRESS (LBS. PER STRAND)	43,940

NOTES

ASSUMED LIVE LOAD = HS 20 OR ALTERNATE LOADING. EXCEPT THAT THE BEAMS HAVE BEEN DESIGNED FOR HS 25.

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 2" Ø BACKER ROD SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.

WHEN CORED SLABS ARE CAST, A POSITIVE HOLD-DOWN SYSTEM SHALL BE EMPLOYED TO PREVENT VOIDS FROM RISING OR MOVING SIDEWAYS. THIS SYSTEM SHALL BE DESIGNED TO BE LEFT IN PLACE UNTIL THE CONCRETE HAS REACHED RELEASE STRENGTH. AT LEAST THREE WEEKS PRIOR TO CASTING CORED SLABS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND COMMENT, DETAILED DRAWINGS OF THE PROPOSED HOLD-DOWN SYSTEM. IN ADDITION TO STRUCTURAL DETAILS, LOCATION AND SPACING OF THE HOLD-DOWNS SHALL BE INDICATED.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE CORED SLAB UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 4000 PSI FOR SPANS A, B & C.

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

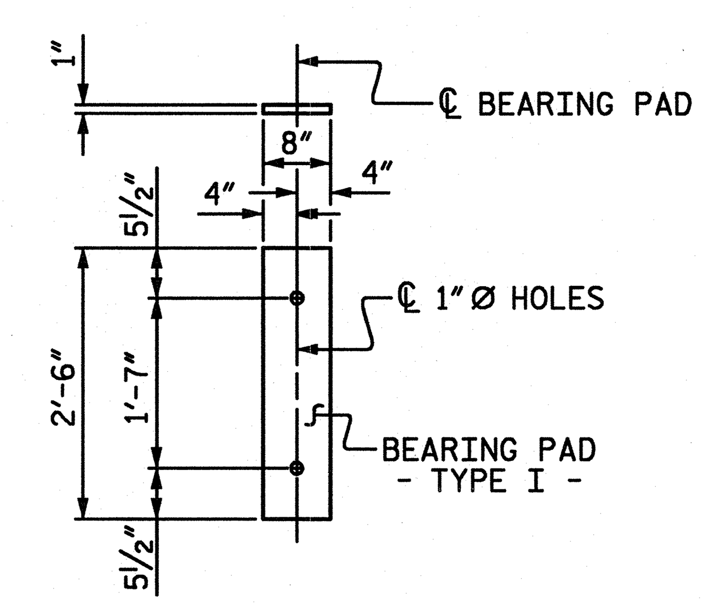
APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.

ALL REINFORCING STEEL IN PARAPETS SHALL BE EPOXY COATED.

FOR PRESTRESSED CONCRETE MEMBERS, SEE SPECIAL PROVISIONS.
FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

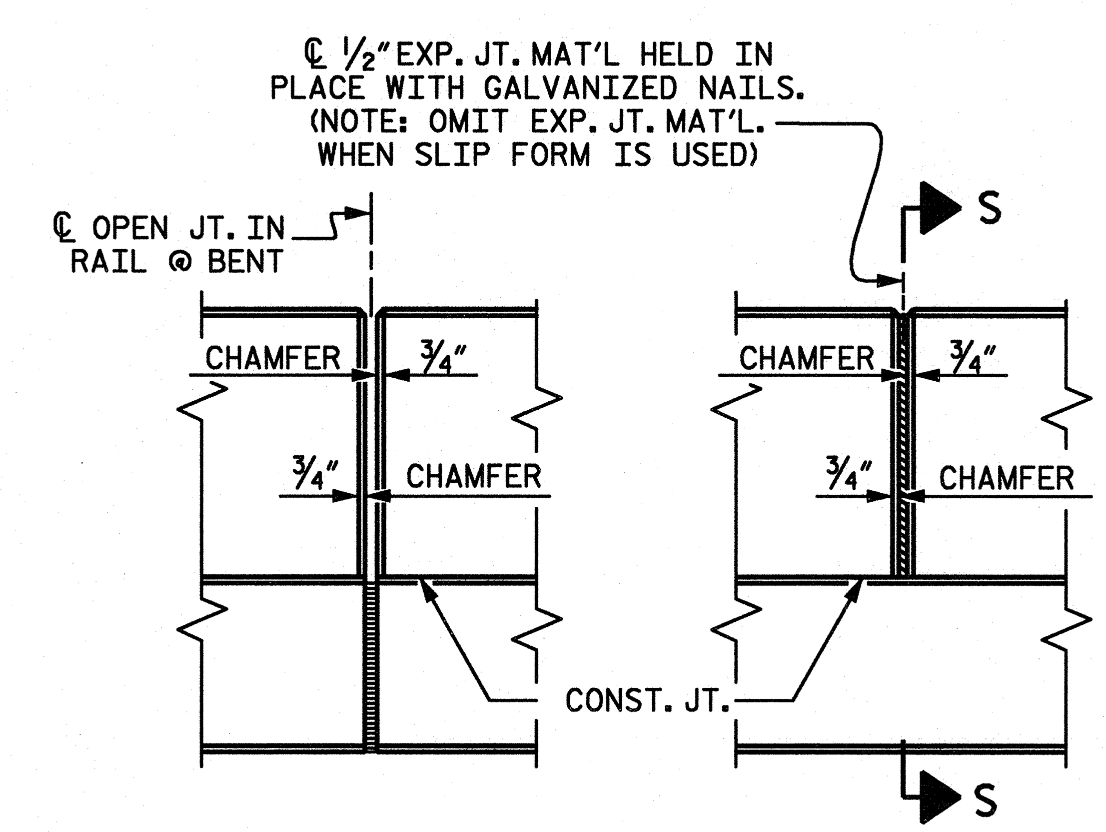
TRANSVERSE POST TENSIONING OF THE CORED SLAB SECTIONS SHALL BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, EXCEPT THAT THE 0.6" Ø STRANDS SHALL BE TENSIONED TO 43,950 POUNDS.



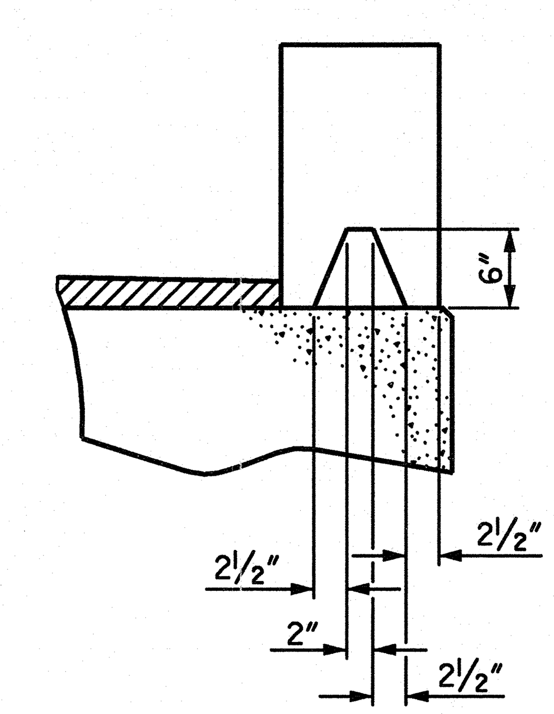
FIXED END
(TYPE I - 66 REQ'D)

ELASTOMERIC BEARING DETAILS

(50 DUROMETER HARDNESS)



ELEVATION AT EXPANSION JOINTS



SECTION S-S

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

PARAPET DETAILS

WBS NO. 42816.1.1

GRANVILLE COUNTY

STATION: 10+29.000 -L-

REPLACES BRIDGE NO. 139

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH
12-2-10

WETHERILL ENGINEERING
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License No. F-0377
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
BILL OF MATERIAL

STD. NO. PCS3

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

DRAWN BY : J. PENDERGRAFT DATE : 2/10
CHECKED BY : J. DILWORTH DATE : 2/10

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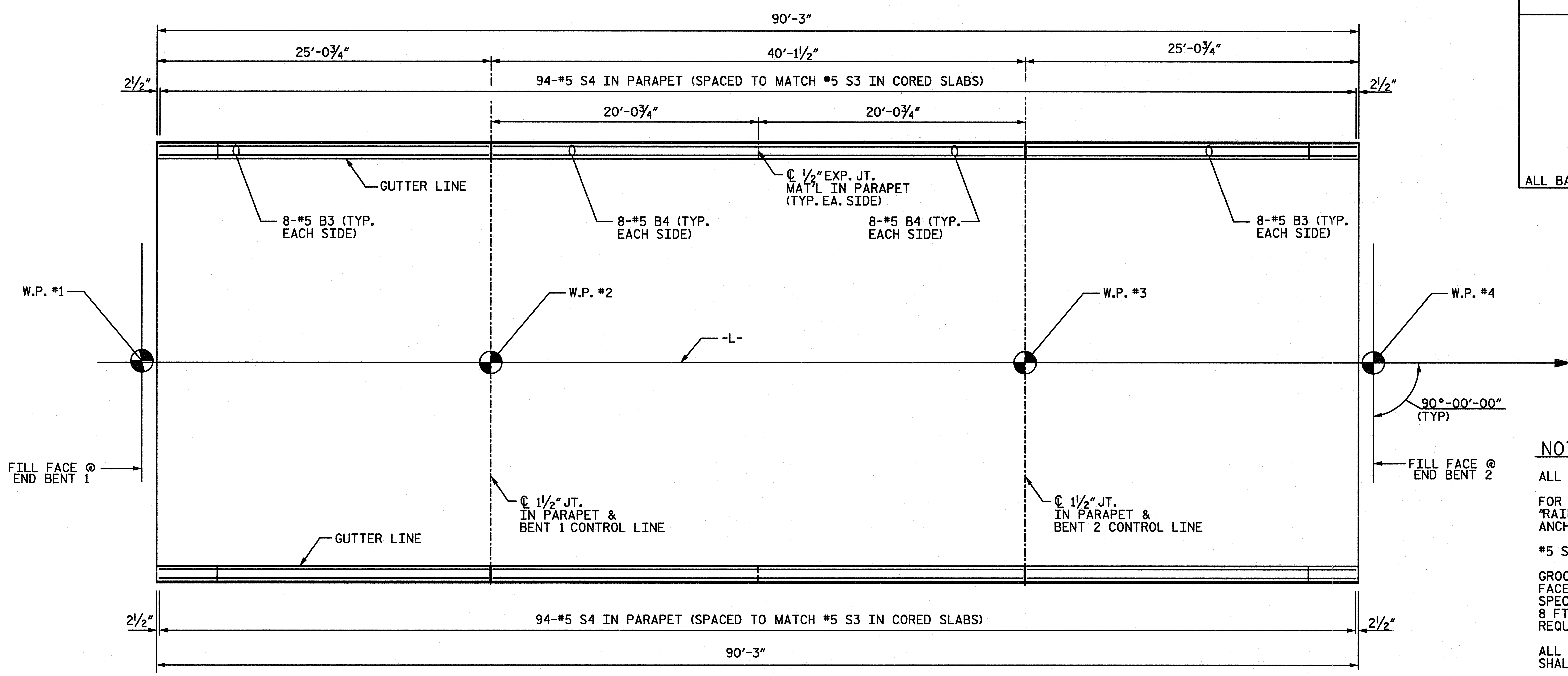
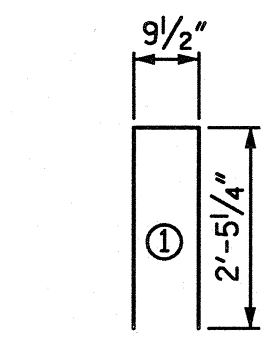


PLAN OF CONCRETE PARAPET

NOTE: DIMENSIONS ARE MEASURED ALONG BACK OF PARAPET

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

TWO BAR METAL RAIL

BILL OF MATERIAL FOR CONCRETE PARAPETS AND FOUR END POSTS

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
✱B3	32	#5	STR	24'-8"	823
✱B4	32	#5	STR	19'-7"	654
✱E1	8	#7	STR	2'-7"	42
✱E2	8	#7	STR	3'-1"	50
✱E3	8	#7	STR	3'-7"	59
✱E4	8	#7	STR	4'-1"	67
✱E5	8	#7	STR	4'-5"	72
✱F1	8	#6	STR	1'-9"	21
✱F2	8	#6	STR	2'-11"	35
✱F3	8	#6	STR	3'-8"	44
✱S4	188	#5	1	5'-8"	1111

✱ EPOXY COATED

REINFORCING STEEL = 2978 LBS.

TOTAL CLASS AA CONCRETE = 21.6 CU YDS.

CONCRETE PARAPET AND ENDPOSTS = 180.50 L.F.

NOTES

ALL REINFORCING STEEL IN THE PARAPETS AND END POSTS SHALL BE EPOXY COATED.

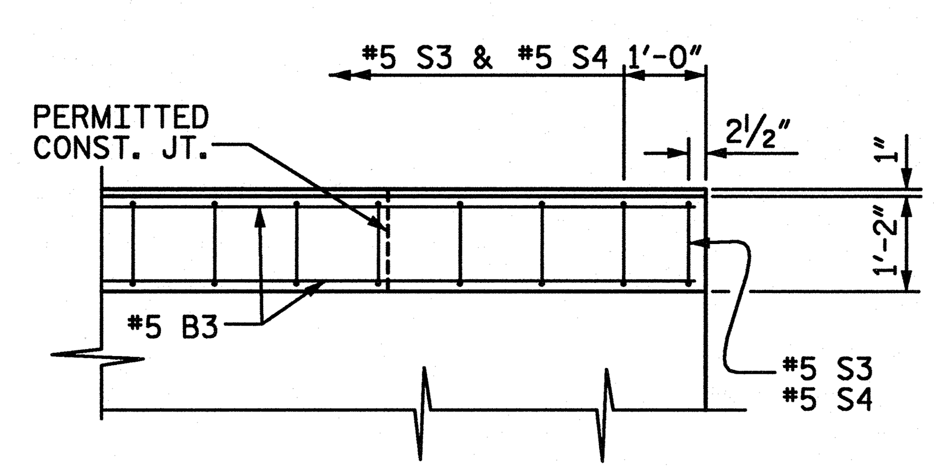
FOR DETAILS OF CONCRETE INSERT AND GUARDRAIL ANCHOR ASSEMBLY, SEE "RAIL POST SPACING AND END OF RAIL DETAILS" SHEET 4 OF 5 AND "GUARDRAIL ANCHORAGE DETAILS" SHEET 5 OF 5.

#5 S3 BARS ARE INCLUDED IN THE BILL OF MATERIAL FOR CORED SLAB UNITS.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT A SPACING OF 8 FT. TO 10 FT. BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.

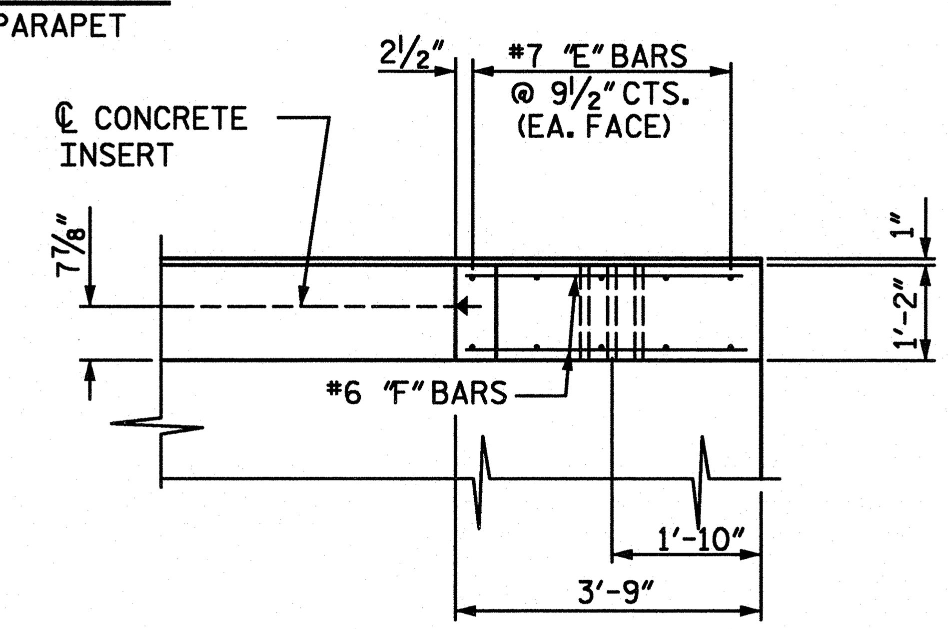
ALL BAR SUPPORTS USED IN THE PARAPET AND ALL INCIDENTAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

THE MINIMUM HEIGHT OF THE PARAPET IS SHOWN. THE HEIGHT OF THE PARAPET VARIES WHILE THE TOP OF THE PARAPET FOLLOWS THE PROFILE OF THE GUTTER LINE.

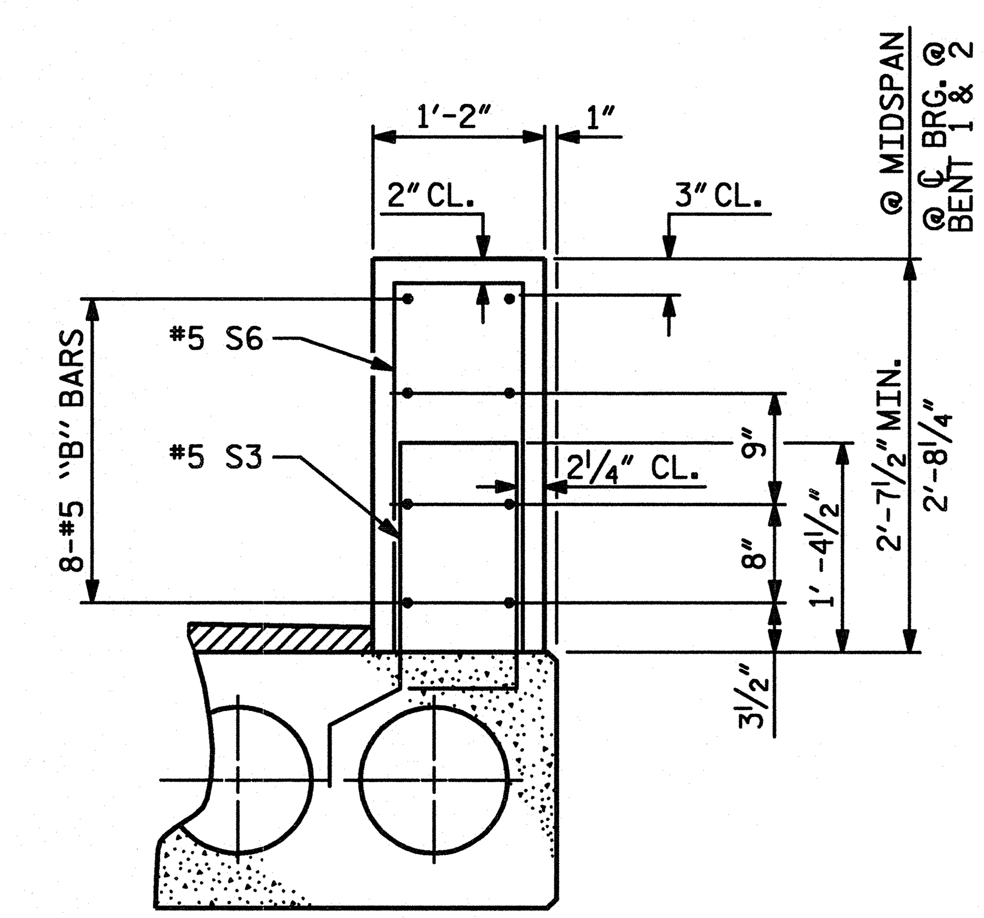


PLAN OF PARAPET

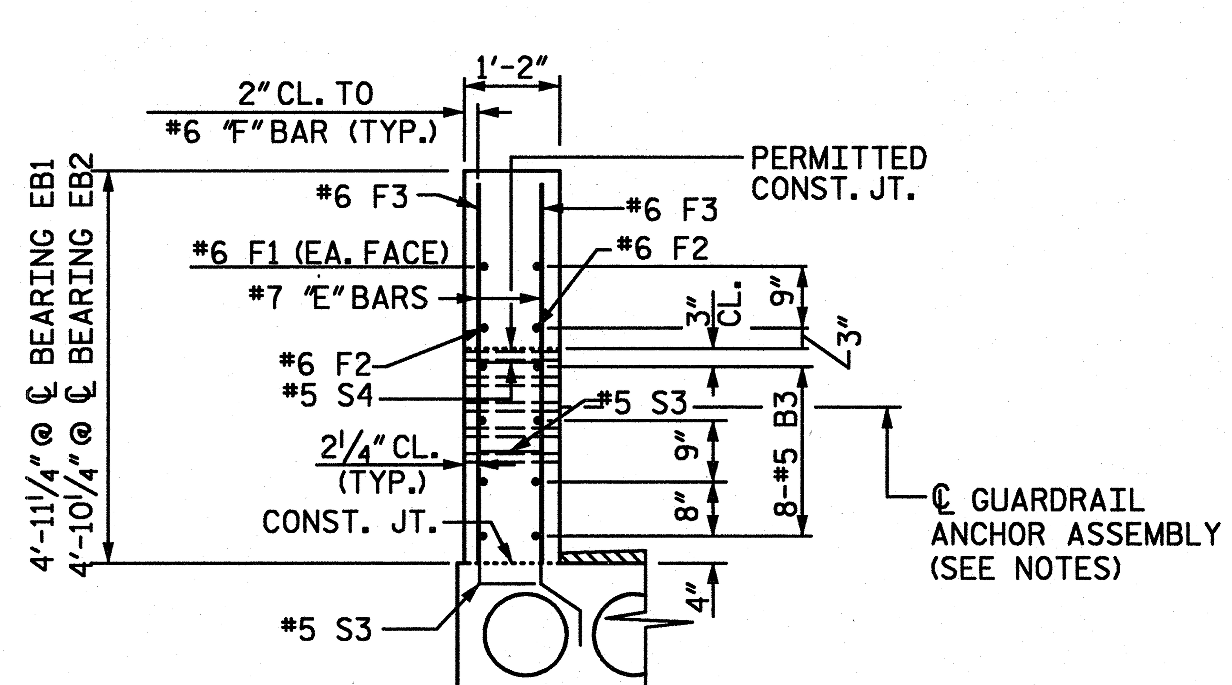
#5 S4 TO MATCH #5 S3
SEE "PLAN OF SPANS" SHEET S-3



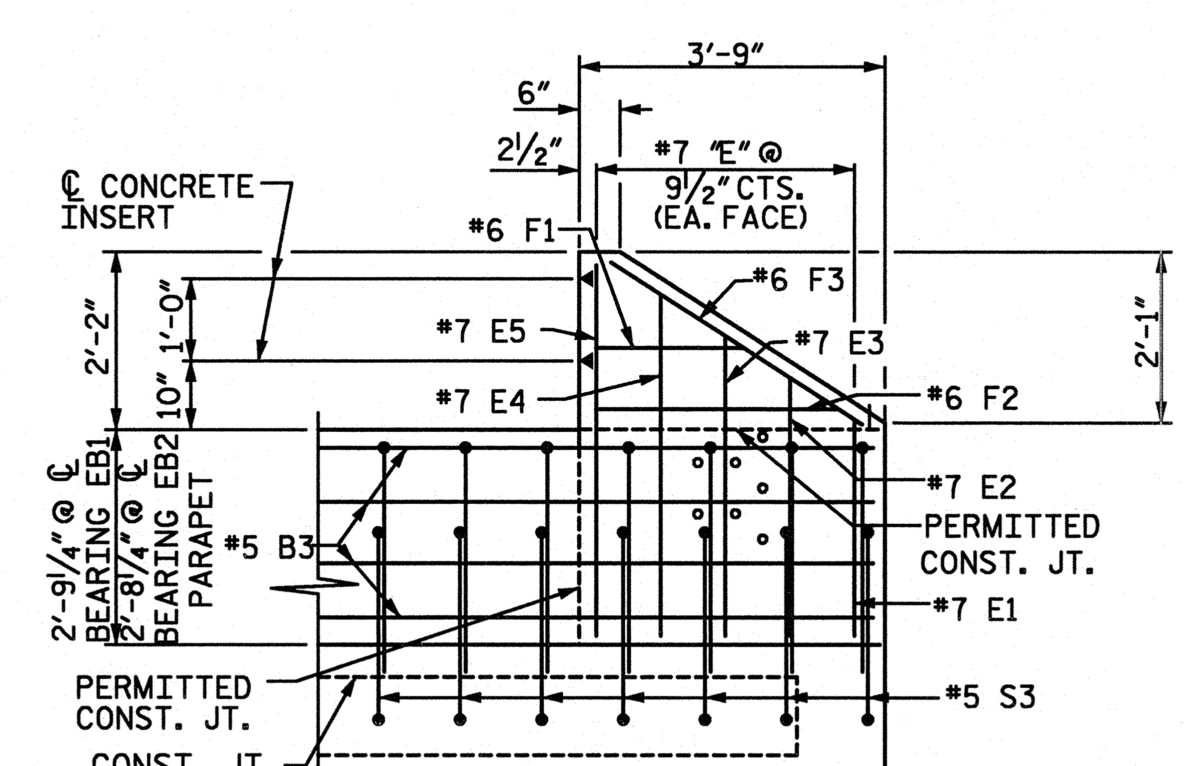
PLAN OF END POST



TWO BAR METAL RAIL PARAPET SECTION



END VIEW



ELEVATION

WBS NO. 42816.1.1

GRANVILLE COUNTY

STATION: 10+29.000 -L-

REPLACES BRIDGE NO. 139

SHEET 1 OF 5

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH

12-2-10

WETHERILL ENGINEERING

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TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
CONCRETE PARAPET AND PARAPET END POST DETAILS

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S-5
1			3				TOTAL SHEETS
2			4				19

DRAWN BY : J. PENDERGRAFT DATE : 6/10
CHECKED BY : J. DILWORTH DATE : 6/10

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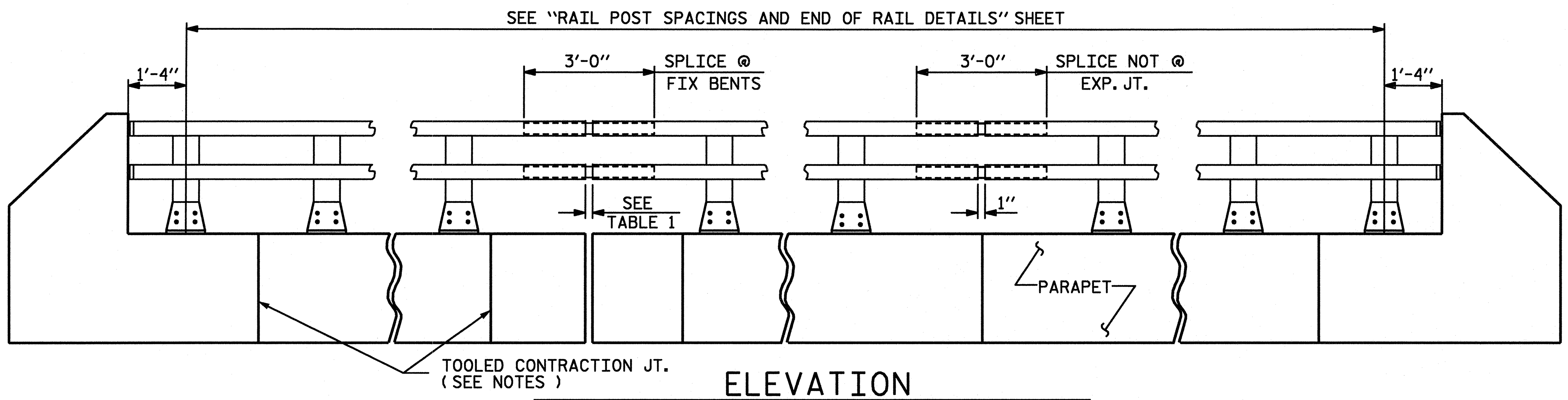
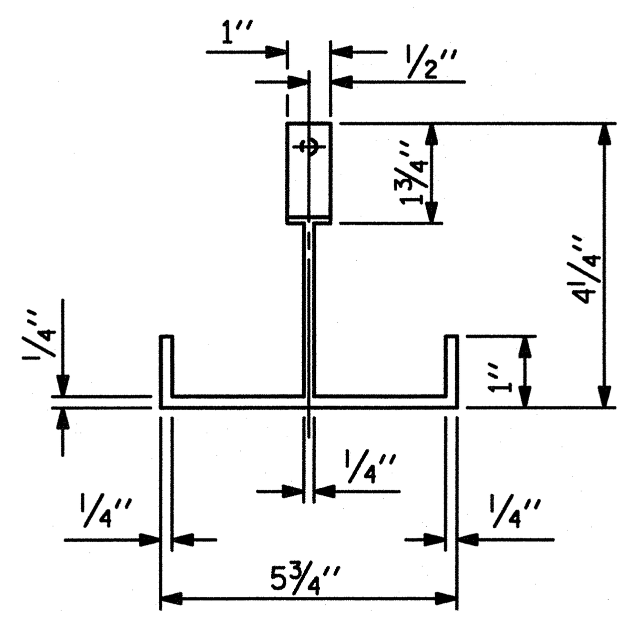


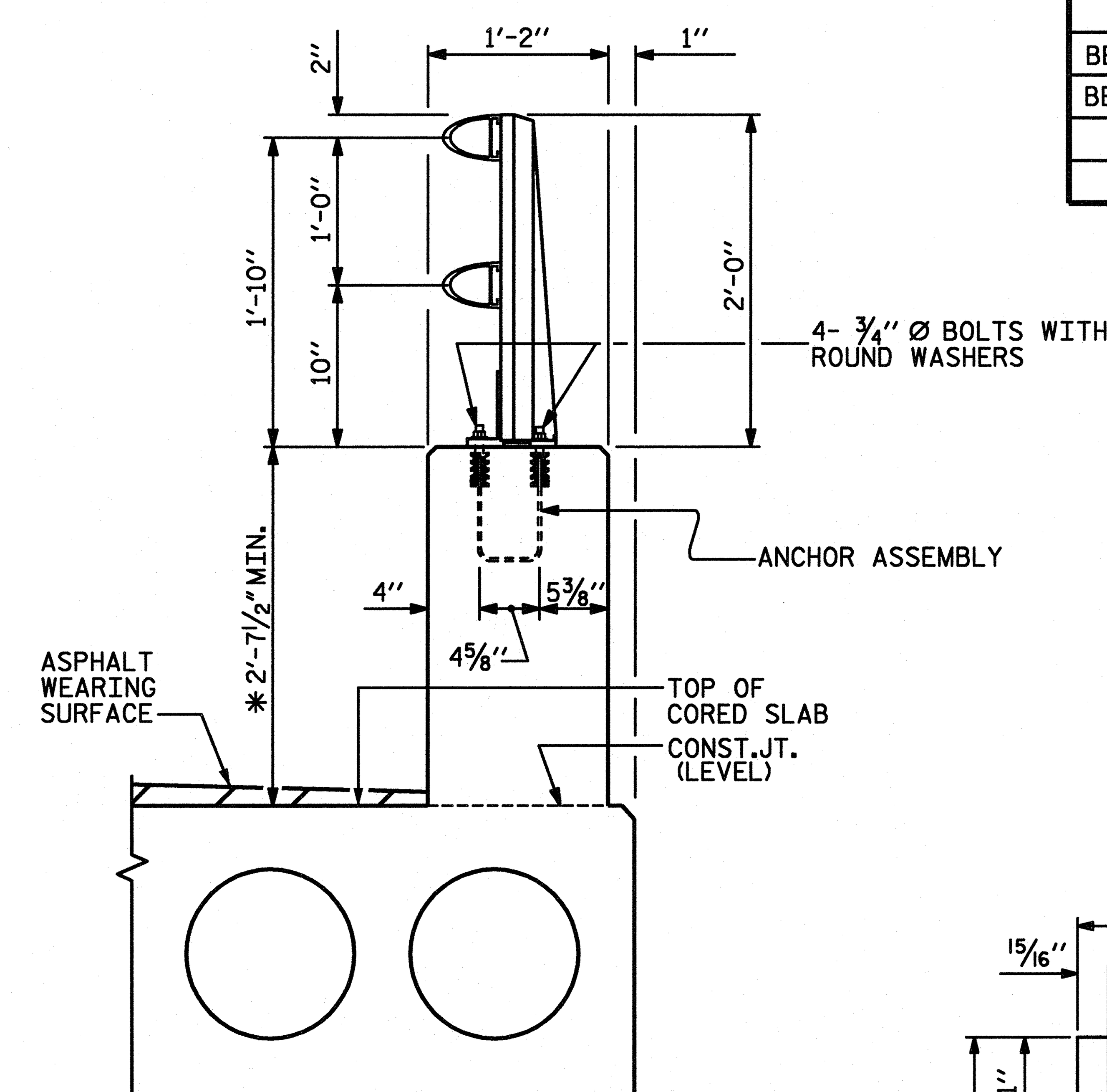
ELEVATION

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



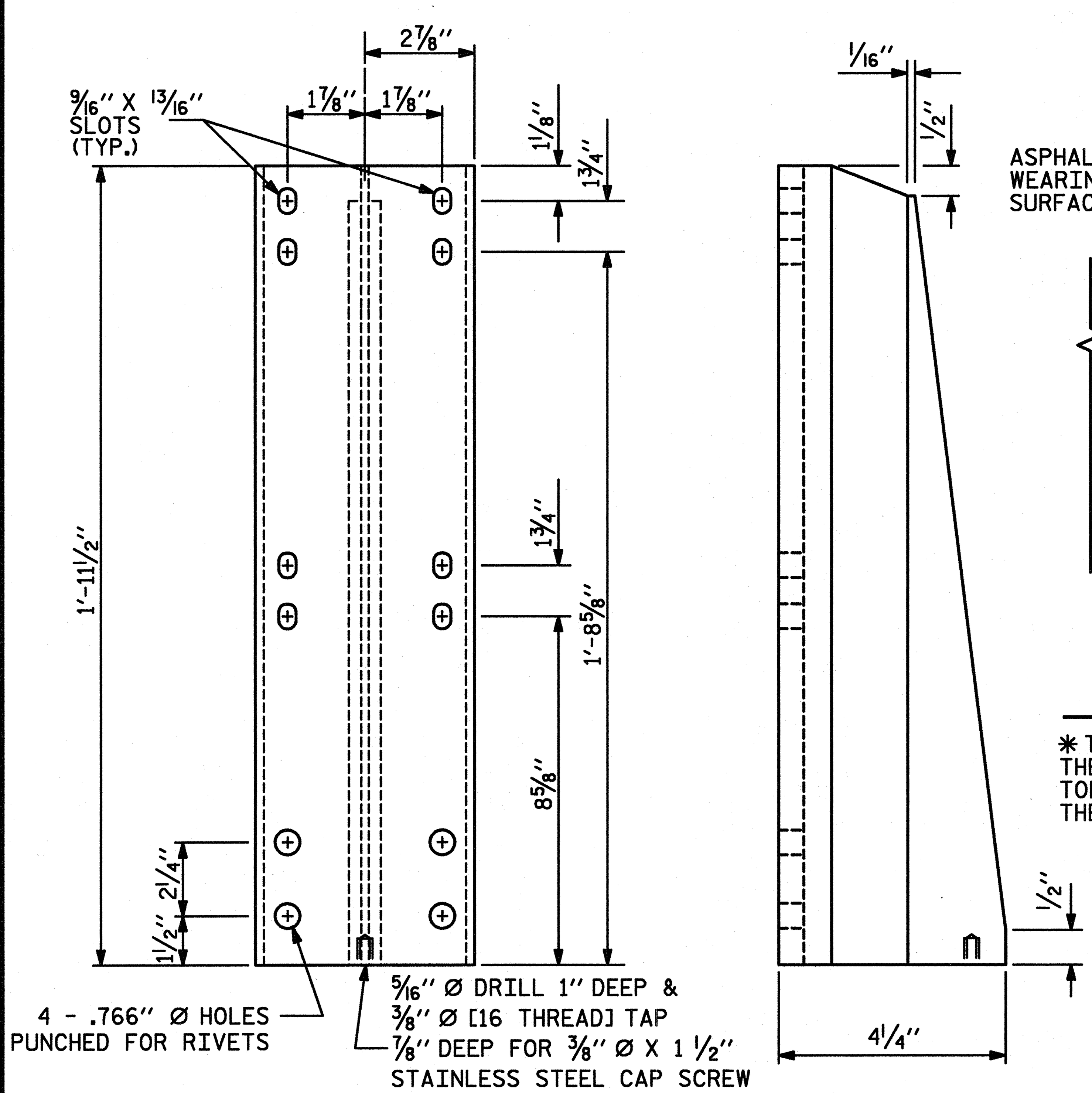
PLAN

TABLE 1	
℄ EXP. JT. @	RAIL OPENING
BENT No. 1	1 1/2"
BENT No. 2	1 1/2"



SECTION THRU PARAPET AND RAIL

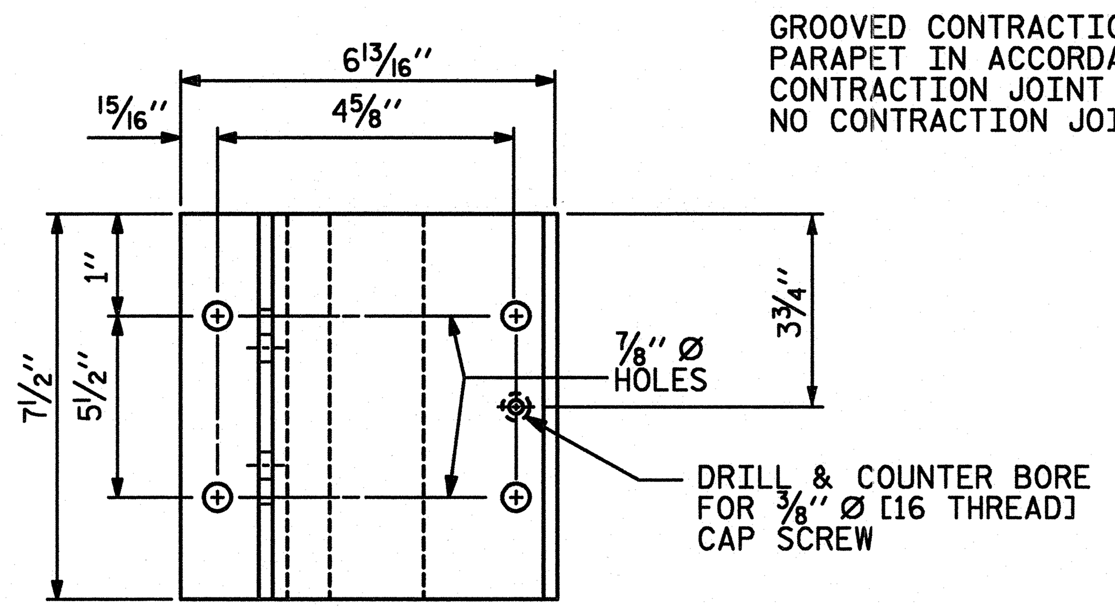
✱ THE MINIMUM HEIGHT OF THE PARAPET IS SHOWN, THE HEIGHT OF THE PARAPET VARIES WHILE THE TOP OF THE PARAPET FOLLOWS THE PROFILE OF THE GUTTERLINE.



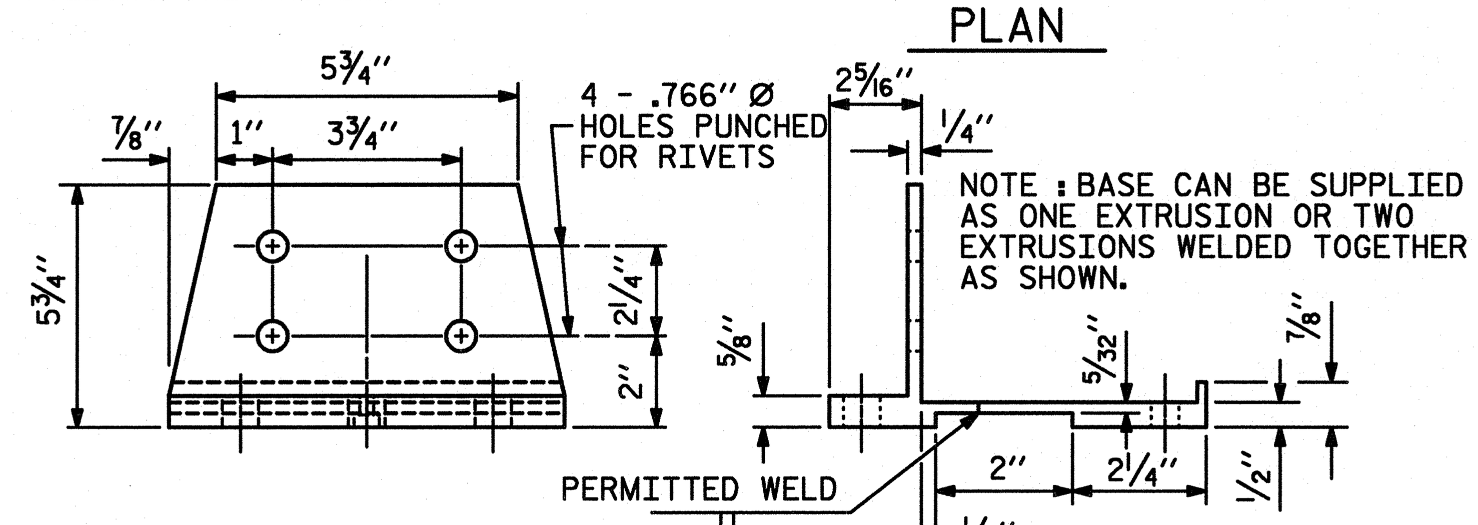
FRONT ELEVATION

SIDE ELEVATION

DETAILS OF POST



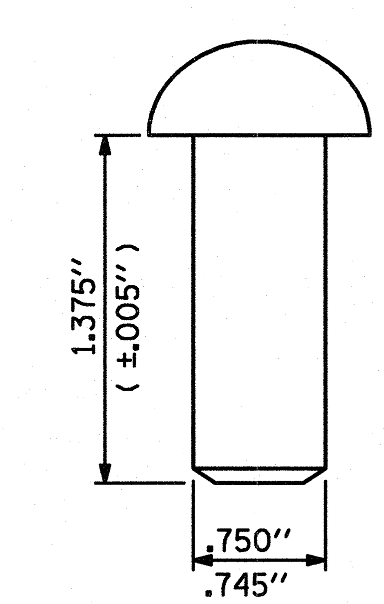
PLAN



FRONT ELEVATION

SIDE ELEVATION

POST BASE DETAILS



RIVET DETAIL

NOTES

AT THE CONTRACTOR'S OPTION, METAL RAIL MAY BE EITHER ALUMINUM OR GALVANIZED STEEL IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL NOTES AND THE FOLLOWING SPECIFICATIONS FOR THE ALTERNATE MATERIALS; HOWEVER, THE CONTRACTOR WILL BE REQUIRED TO USE THE SAME RAIL MATERIAL ON ALL STRUCTURES ON THE PROJECT FOR WHICH METAL RAIL IS DESIGNATED.

ALUMINUM RAILS

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

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

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

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

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

POST, POST BASES, RAILS, EXPANSION BARS AND CLAMP BARS: AASHTO M270 GRADE 36 STRUCTURAL STEEL - GALVANIZED TO AASHTO M111.

RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A502 FOR GRADE 1 RIVETS.

THE CUT ENDS OF GALVANIZED STEEL RAILING, AFTER GRINDING SMOOTH SHALL BE GIVEN TWO COATS OF ZINC RICH PAINT MEETING THE REQUIREMENTS OF FEDERAL SPECIFICATION MIL-P-26915 USAF TYPE 1, OR OF FEDERAL SPECIFICATIONS TT-P-641.

SHIMS: SHIMS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

RAIL CAPS: RAIL CAPS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

GENERAL NOTES

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

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

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

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

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

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT A SPACING OF 8FT. TO 10FT. BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.

PAY LENGTH = 165.50 LIN. FT.

WBS NO. 42816.1.1

GRANVILLE COUNTY

STATION: 10+29.000 -L-

REPLACES BRIDGE NO. 139

SHEET 2 OF 5

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH 12-2-10

WETHERILL ENGINEERING
559 Jones Franklin Rd. Suite 164 Raleigh, N.C. 27606 Bus: 919 851 8077 Fax: 919 851 8107 License No. F-0377
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

2 BAR METAL RAIL

STD. NO. BMR3

REVISIONS								SHEET NO.
NO.	BY:	DATE:		NO.	BY:	DATE:		S-6
1				3				TOTAL SHEETS
2				4				19

DRAWN BY : J. PENDERGRAFT DATE : 2/10
CHECKED BY : J. DILWORTH DATE : 2/10

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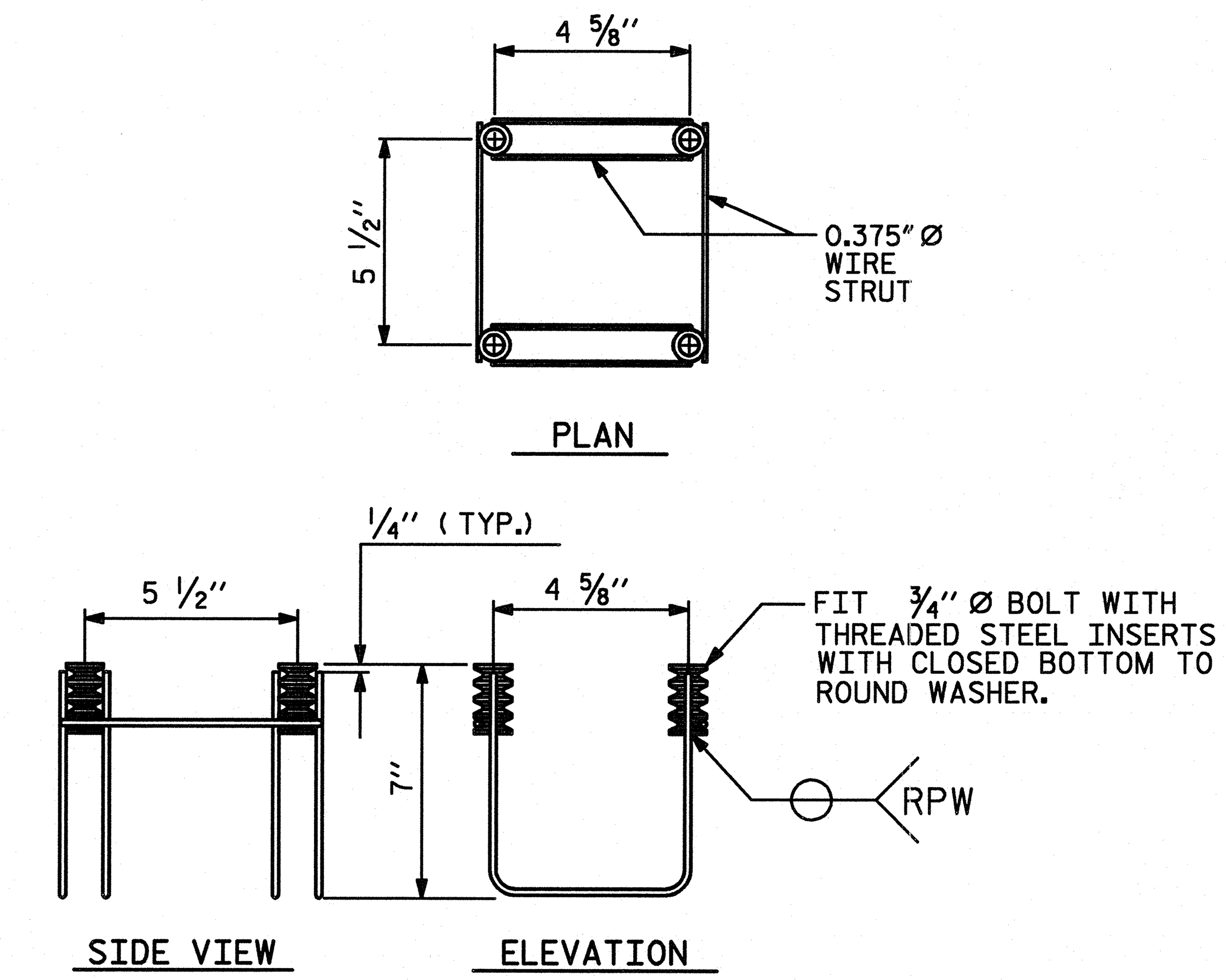


MINIMUM LENGTH OF THREADS IN INSERT (FERRULE): 1¾"

4-BOLT METAL RAIL ANCHOR ASSEMBLY

(32 ASSEMBLIES REQUIRED)

NOTES

STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR ¾" FERRULES.

B. 4 - ¾" Ø X 2½" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE ¾" Ø X 2½" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

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

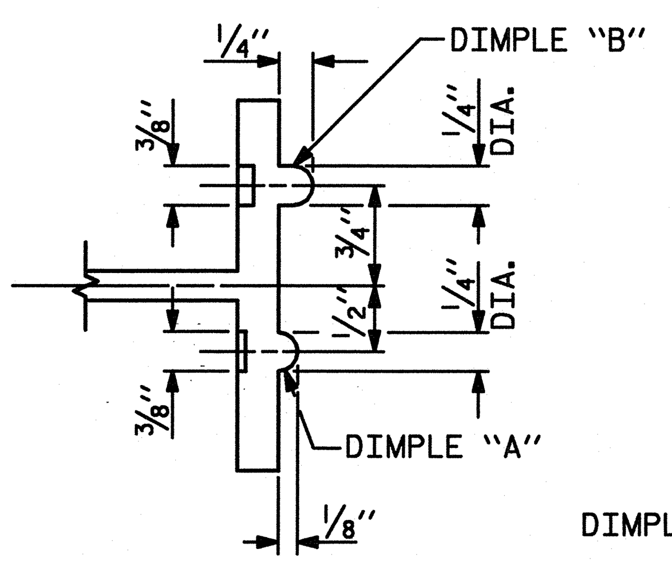
D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.

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

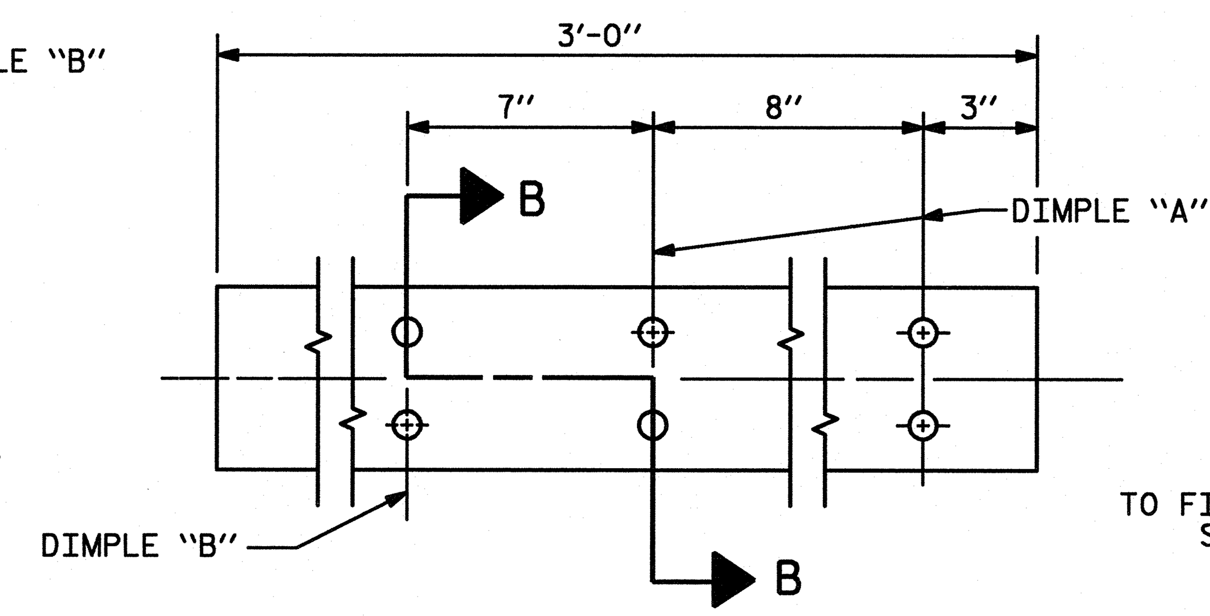
F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE ¾" Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE SPECIAL PROVISIONS.

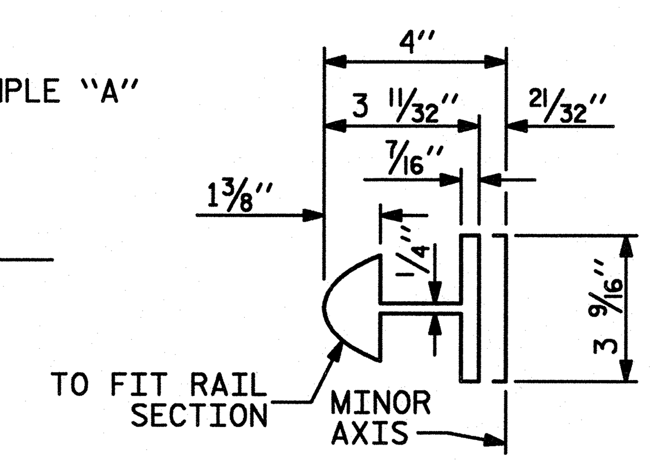
WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY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



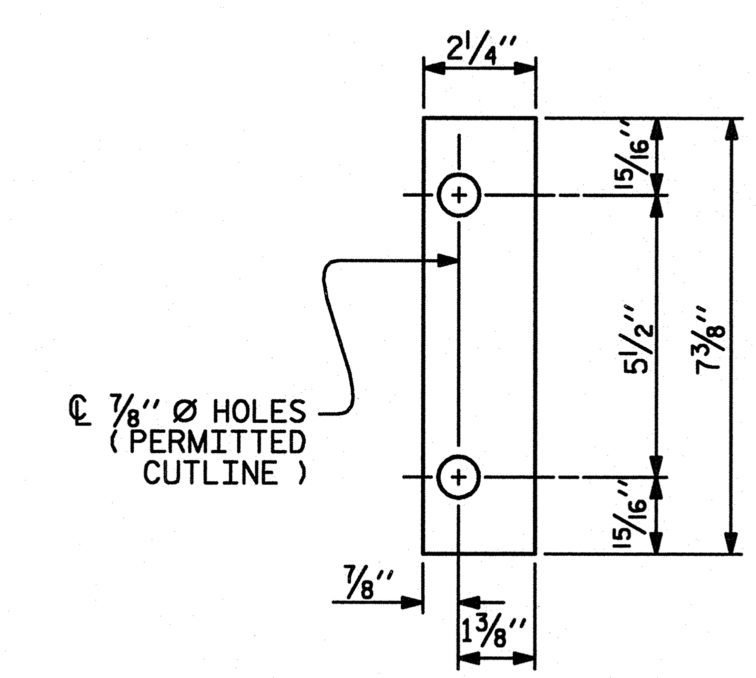
SECTION B - B



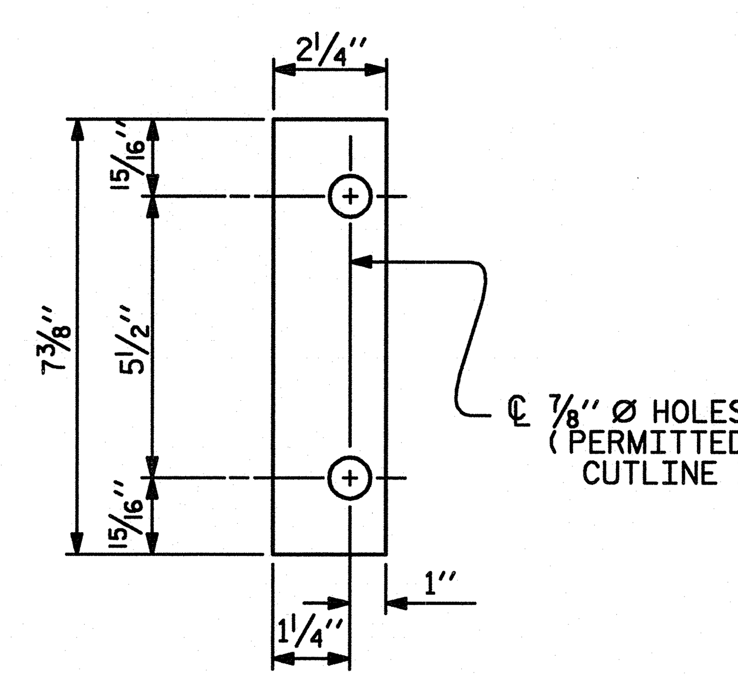
EXPANSION BAR DETAILS



BAR SECTION



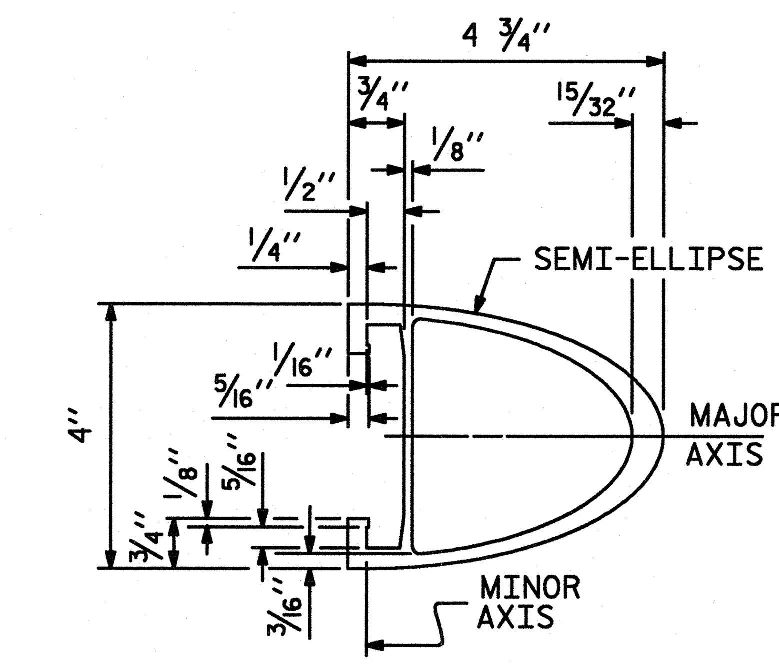
FRONT PLATE



REAR PLATE

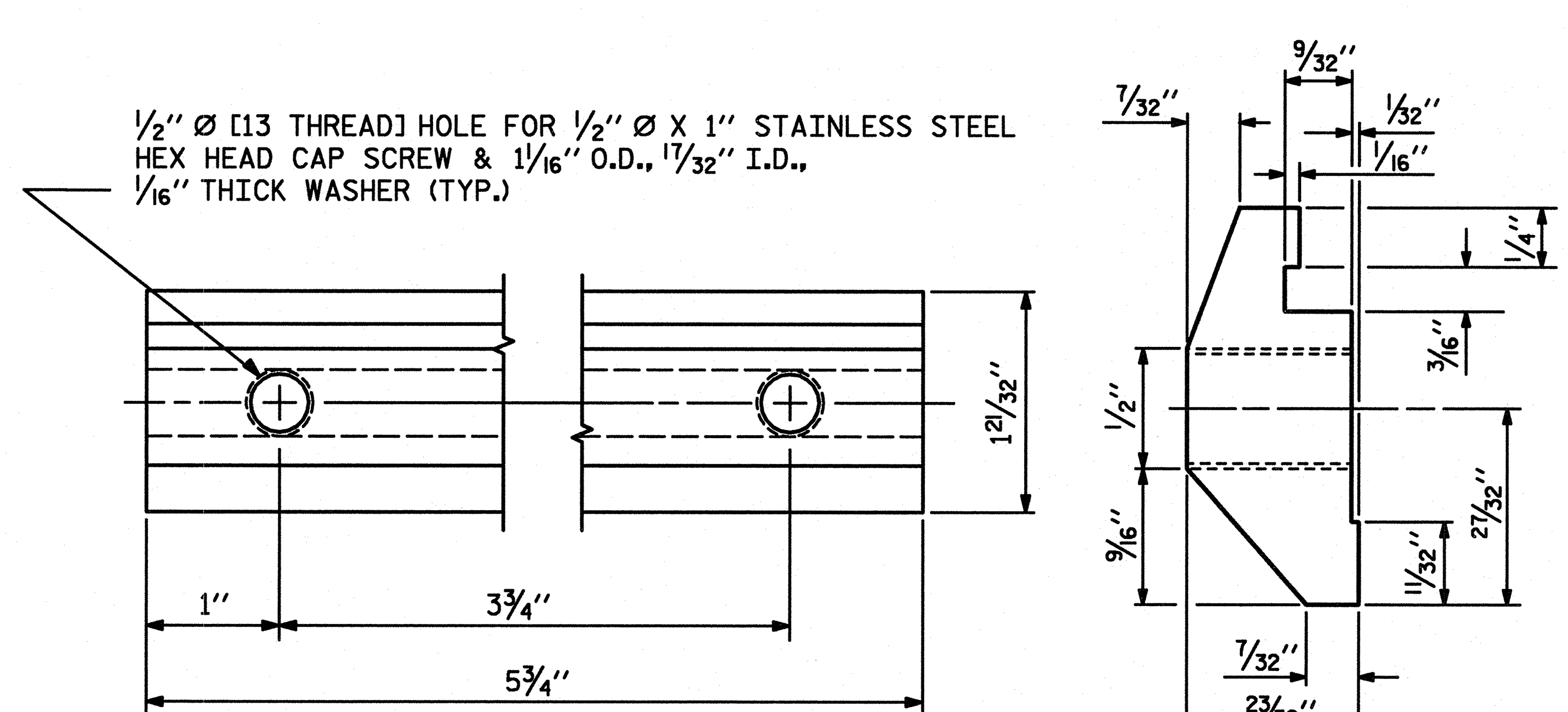
SHIM DETAILS

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



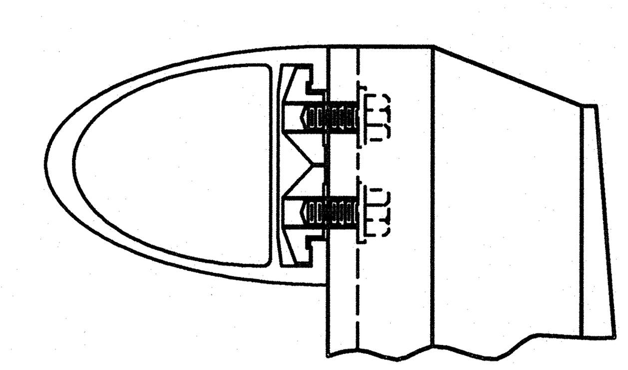
RAIL SECTION

½" Ø [13 THREAD] HOLE FOR ½" Ø X 1" STAINLESS STEEL HEX HEAD CAP SCREW & 1 1/16" O.D., 17/32" I.D., 1/16" THICK WASHER (TYP.)

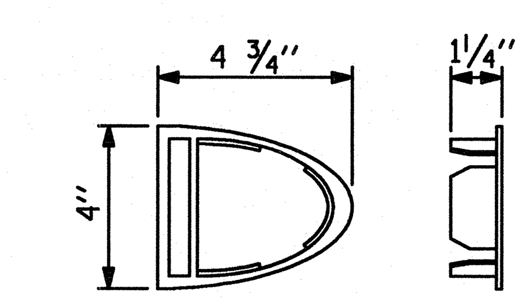


CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP

WBS NO. 42816.1.1

GRANVILLE COUNTY

STATION: 10+29.000 -L-

REPLACES BRIDGE NO. 139

SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

STD. NO. BMR4

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH 12-2-10

WETHERILL ENGINEERING
559 Jones Franklin Rd. Suite 164 Raleigh, N.C. 27606 Bus: 919 851 8077 Fax: 919 851 8107 License No. F-0377
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S-7
1			3					TOTAL SHEETS
2			4					19

DRAWN BY : J. PENDERGRAFT DATE : 2/10
CHECKED BY : J. DILWORTH DATE : 2/10

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NOTES:
STRUCTURAL CONCRETE INSERT

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

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

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

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

NOTES:
METAL RAIL TO END POST CONNECTION

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

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

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

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

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

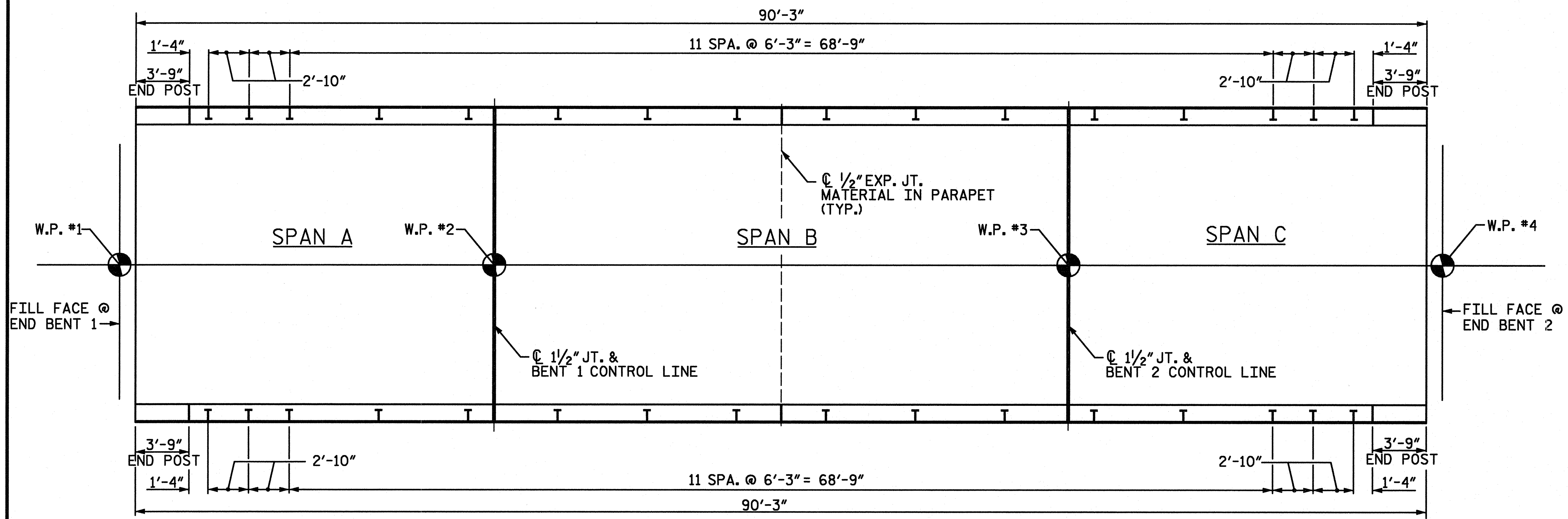
E. ½″ Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 1 OR 2 BAR METAL RAILS.

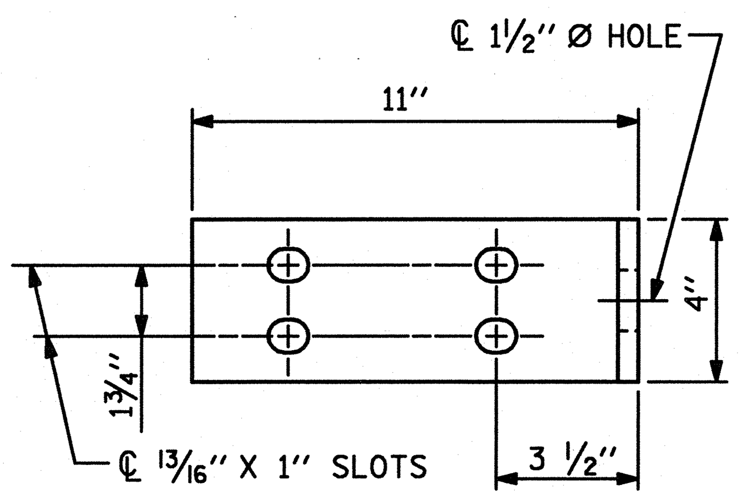
THE ¾″ STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

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

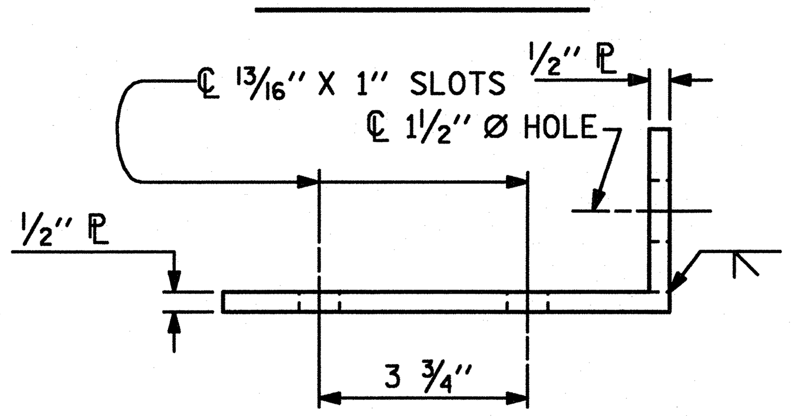
THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE ¾″ Ø X 1⅝″ BOLT WITH WASHER SHALL BE REPLACED WITH A ¾″Ø X 6½″ BOLT AND 2″ O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE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



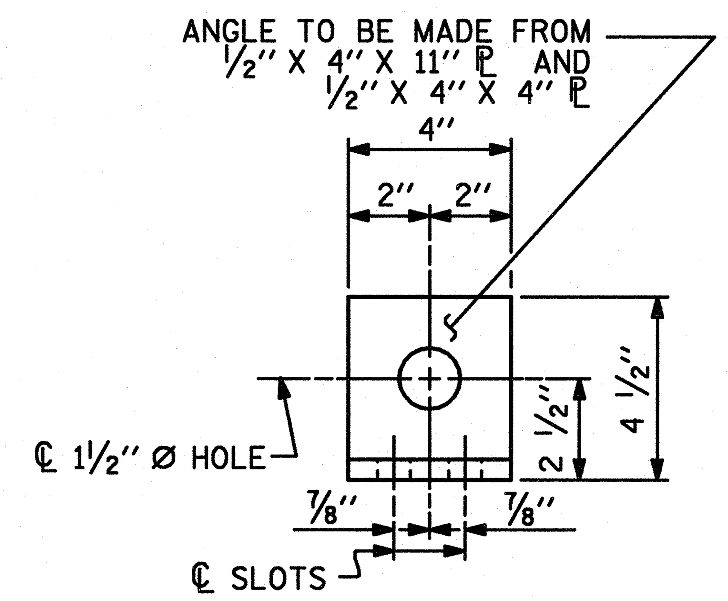
PLAN OF RAIL POST SPACINGS
NOTE: DIMENSIONS ARE MEASURED ALONG BACK OF PARAPET



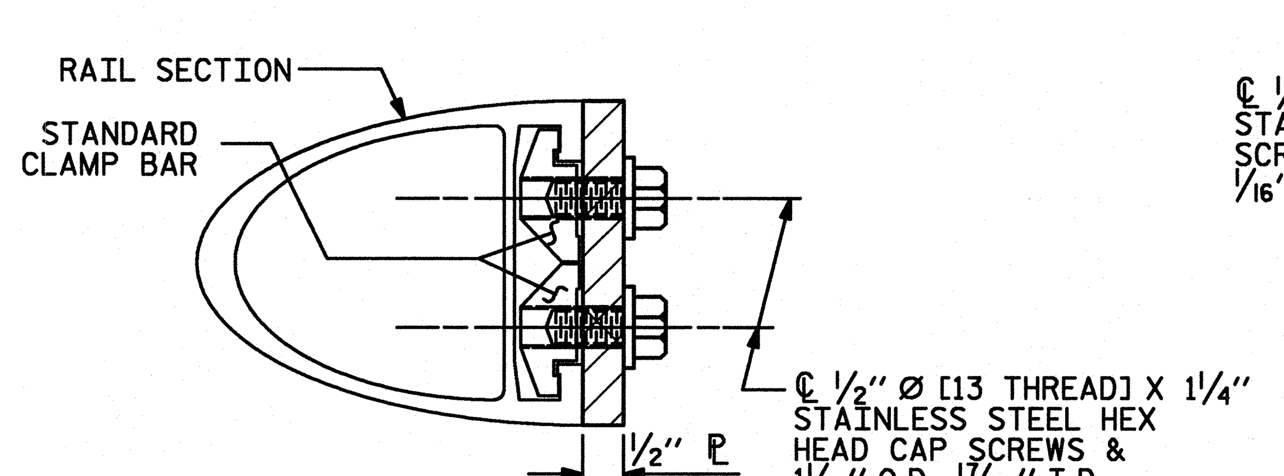
ELEVATION



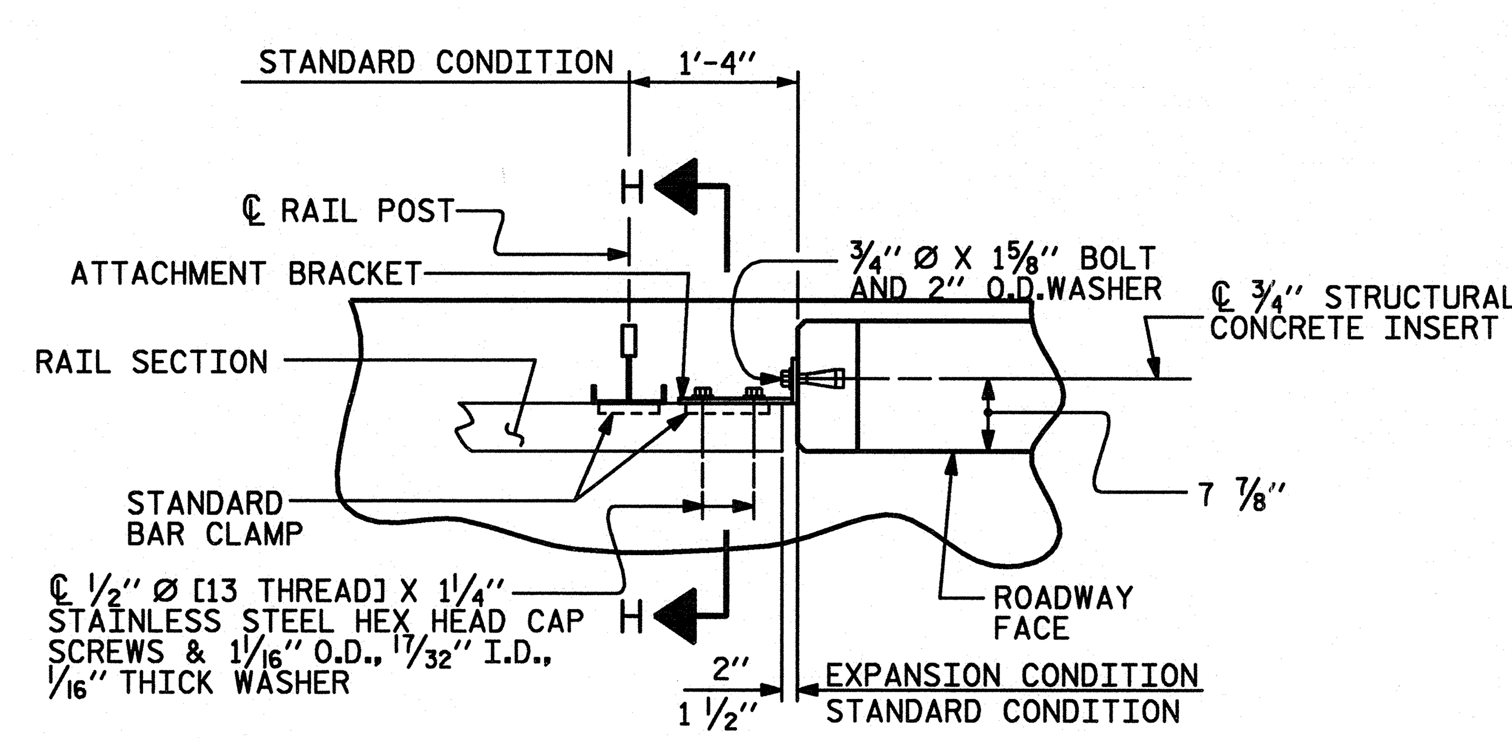
TOP VIEW



END VIEW (FIX AND EXP.)



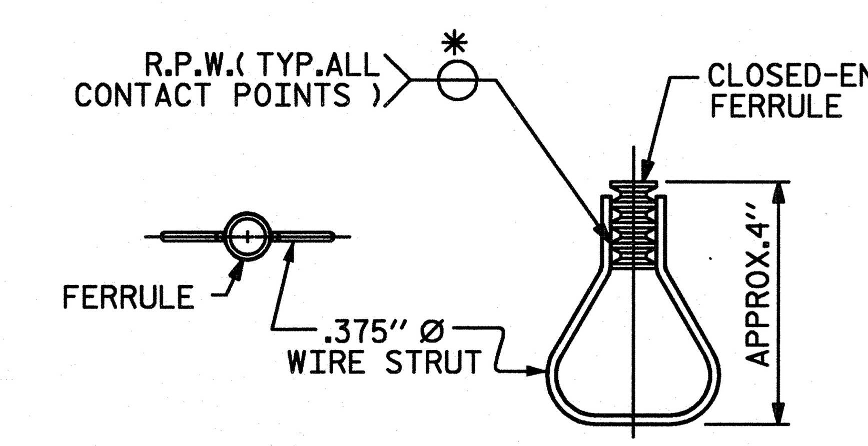
SECTION H-H (FIX)



PLAN - RAIL AND END POST

FIXED

DETAILS FOR ATTACHING METAL RAIL TO END POST



PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

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

WBS NO. 42816.1.1

GRANVILLE COUNTY

STATION: 10+29.000 -L-

REPLACES BRIDGE NO. 139

SHEET 4 OF 5

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH

12-2-10

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WETHERILL ENGINEERING

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
RAIL POSTS SPACINGS
AND
END OF RAIL DETAILS
FOR ONE OR TWO BAR METAL RAILS

STD. NO. BMR2

REVISIONS								SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:			S-8
1			3					TOTAL SHEETS
2			4					19

DRAWN BY : J. PENDERGRAFT DATE : 2/10
CHECKED BY : J. DILWORTH DATE : 2/10

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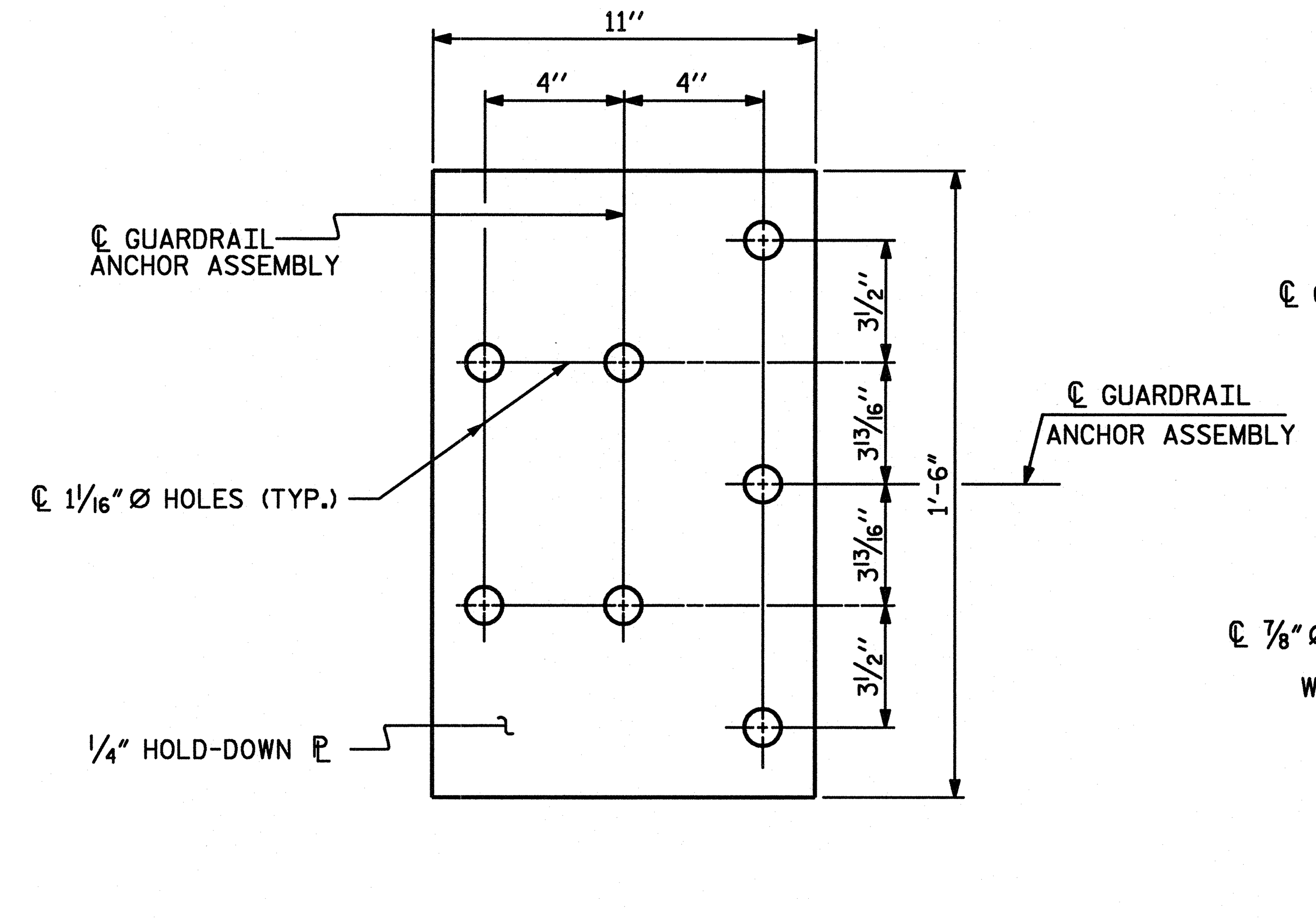
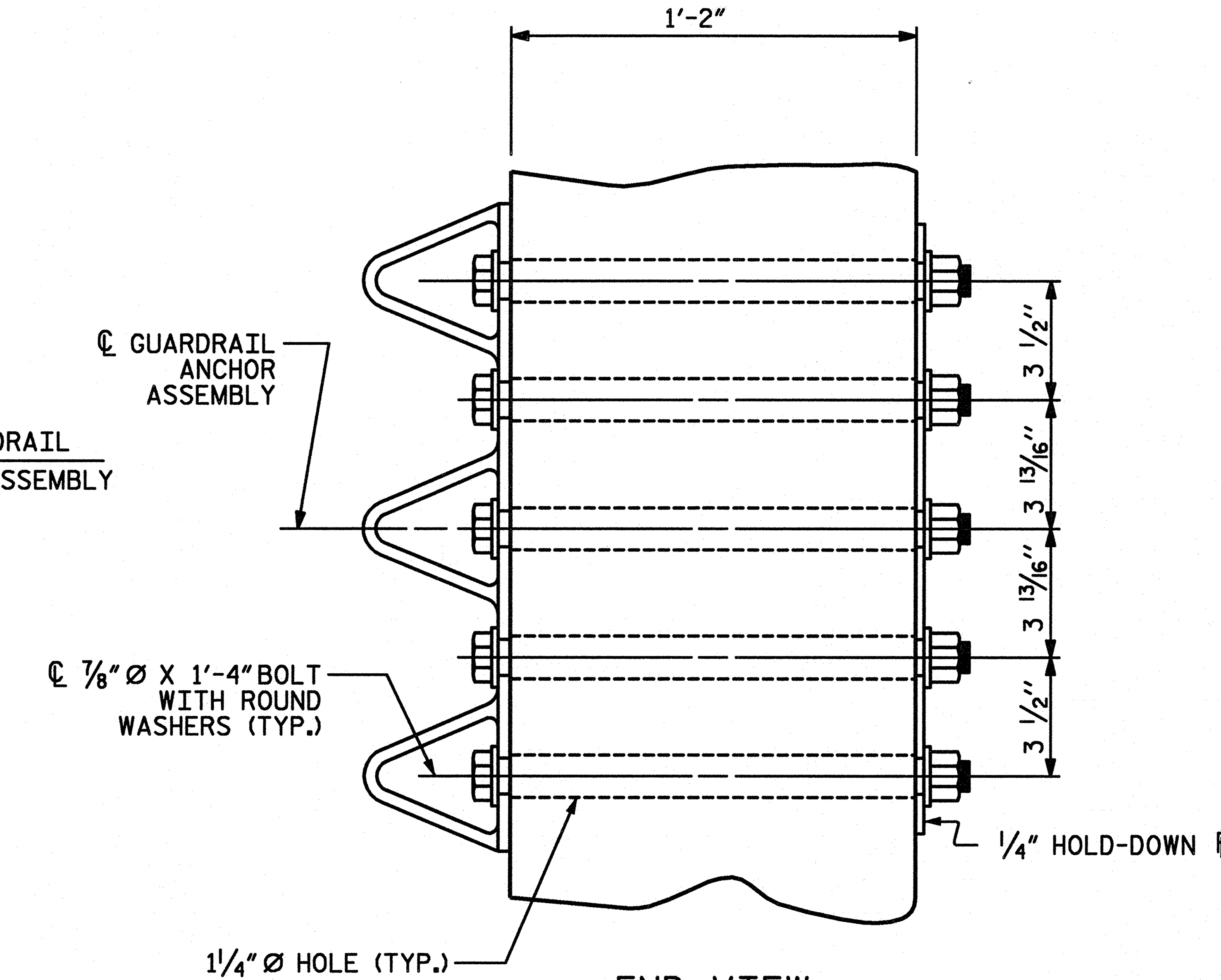


PLAN



END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A ¼″ HOLD DOWN PLATE AND 7 - ⅞″ 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 ⅞″ Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

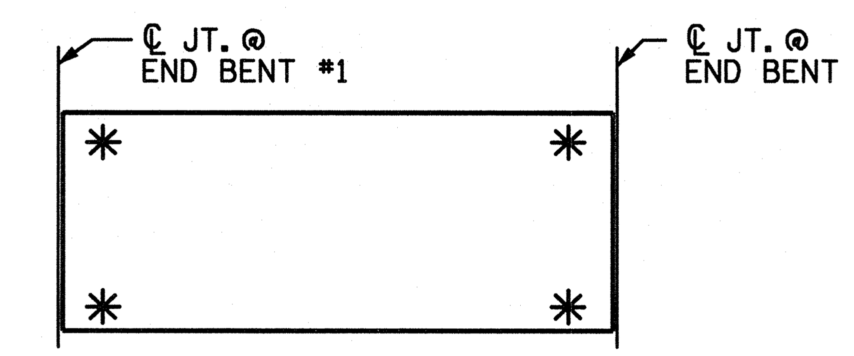
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

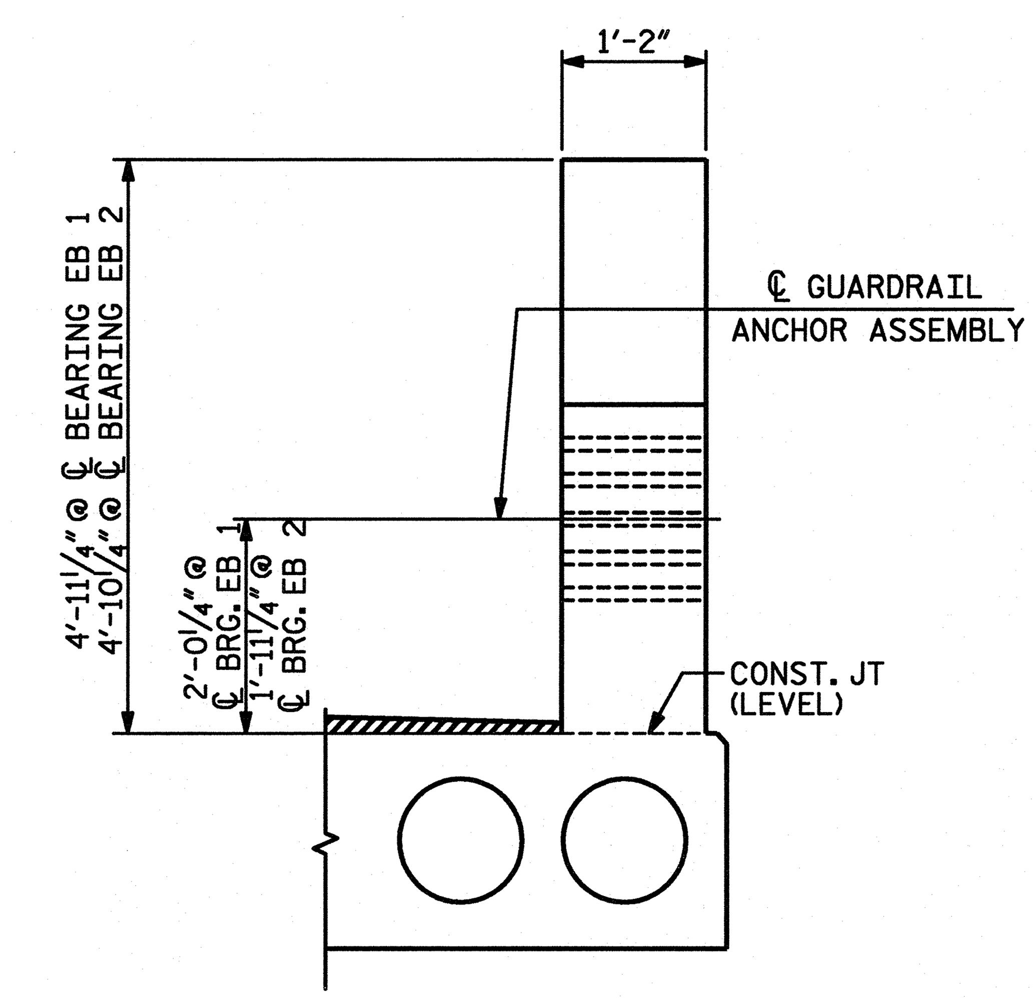
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

THE 1 ¼″ Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

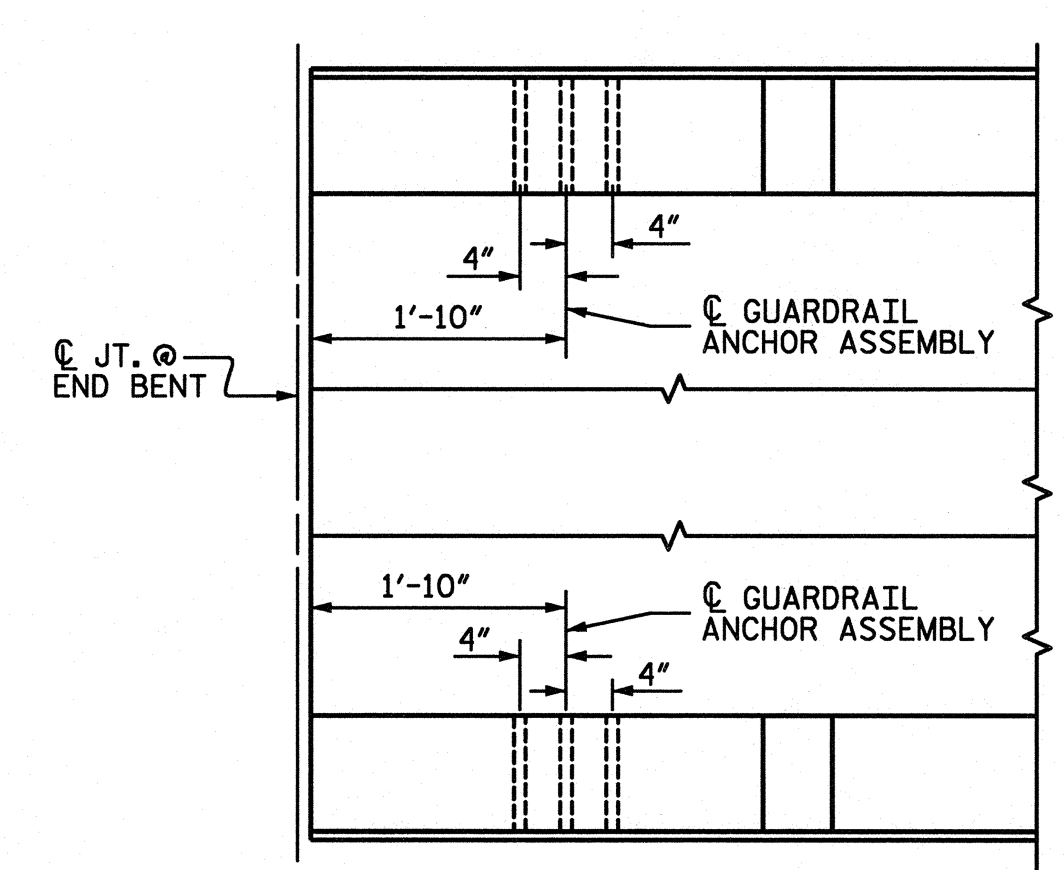


SKETCH SHOWING POINTS OF ATTACHMENT

* LOCATION OF GUARDRAIL ATTACHMENT



END VIEW
(TWO BAR METAL RAIL)



PLAN

LOCATION OF GUARDRAIL ANCHOR AT END POST

WBS NO. 42816.1.1
GRANVILLE COUNTY
STATION: 10+29.000 -L-
REPLACES BRIDGE NO. 139
SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS
STD. NO. GRA3

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH
12-2-10

WETHERILL ENGINEERING
559 Jones Franklin Rd. Suite 164
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License No. F-0377
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			19

DRAWN BY : J. PENDERGRAFT DATE : 6/10
CHECKED BY : J. DILWORTH DATE : 6/10

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NOTES:

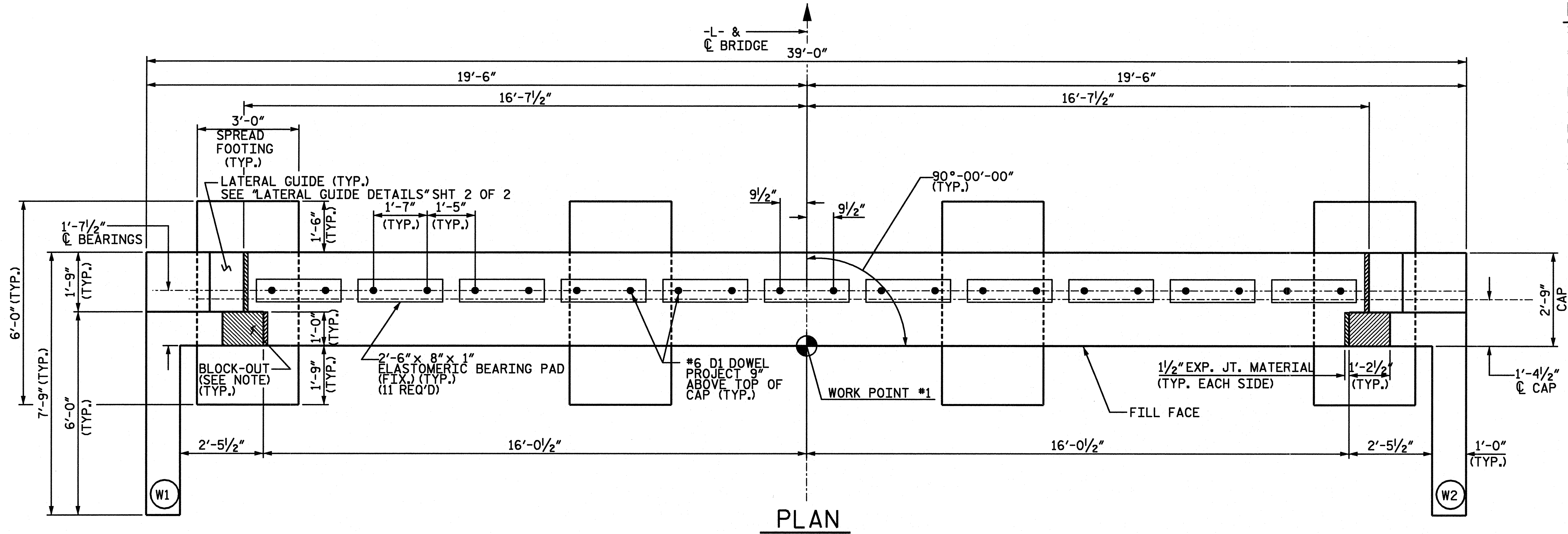
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

#5 T1 BARS MAY BE SHIFTED AS NECESSARY TO FACILIATE TYING #5 S3 BARS.

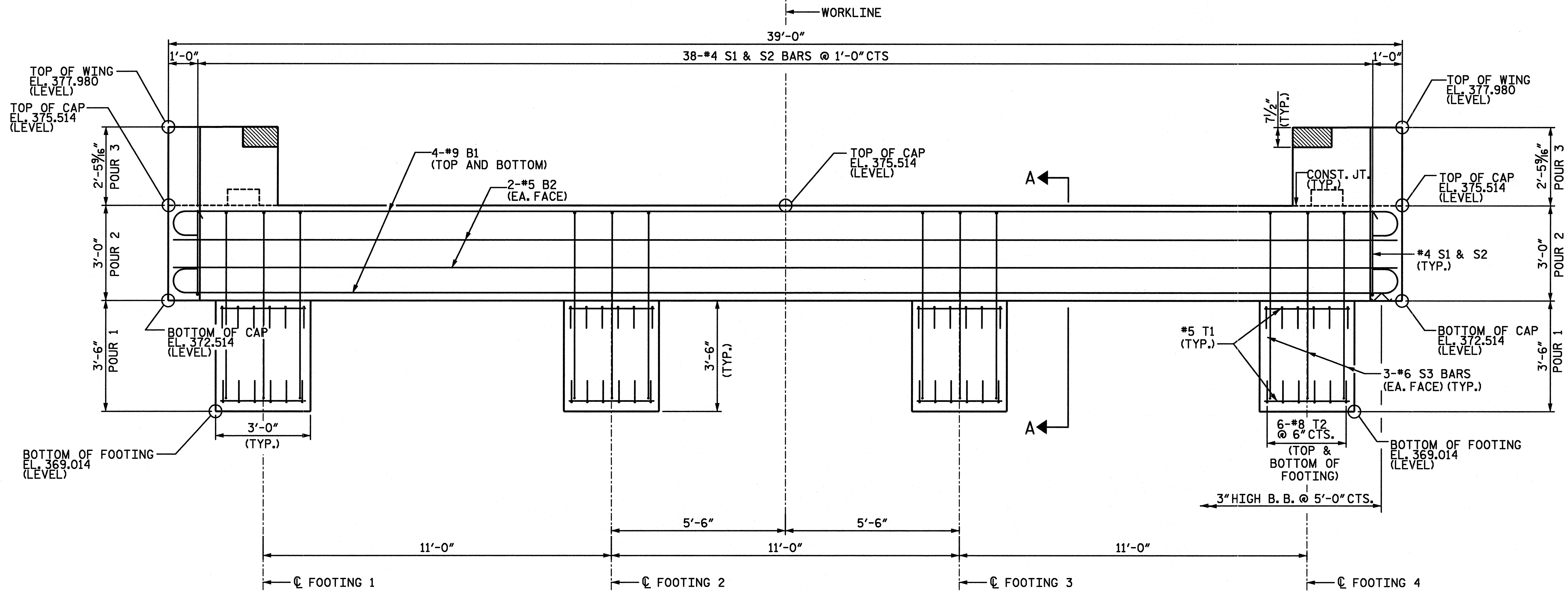
THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE BARRIER RAIL IS CAST IF SLIP FORMING IS USED.

THE LATERAL GUIDE AT EACH END OF THE CAP IS NOT TO BE POURED UNTIL AFTER THE CORED SLAB UNITES ARE IN PLACE. FOR LATERAL GUIDE DETAILS, SEE SHEET 2 OF 2.

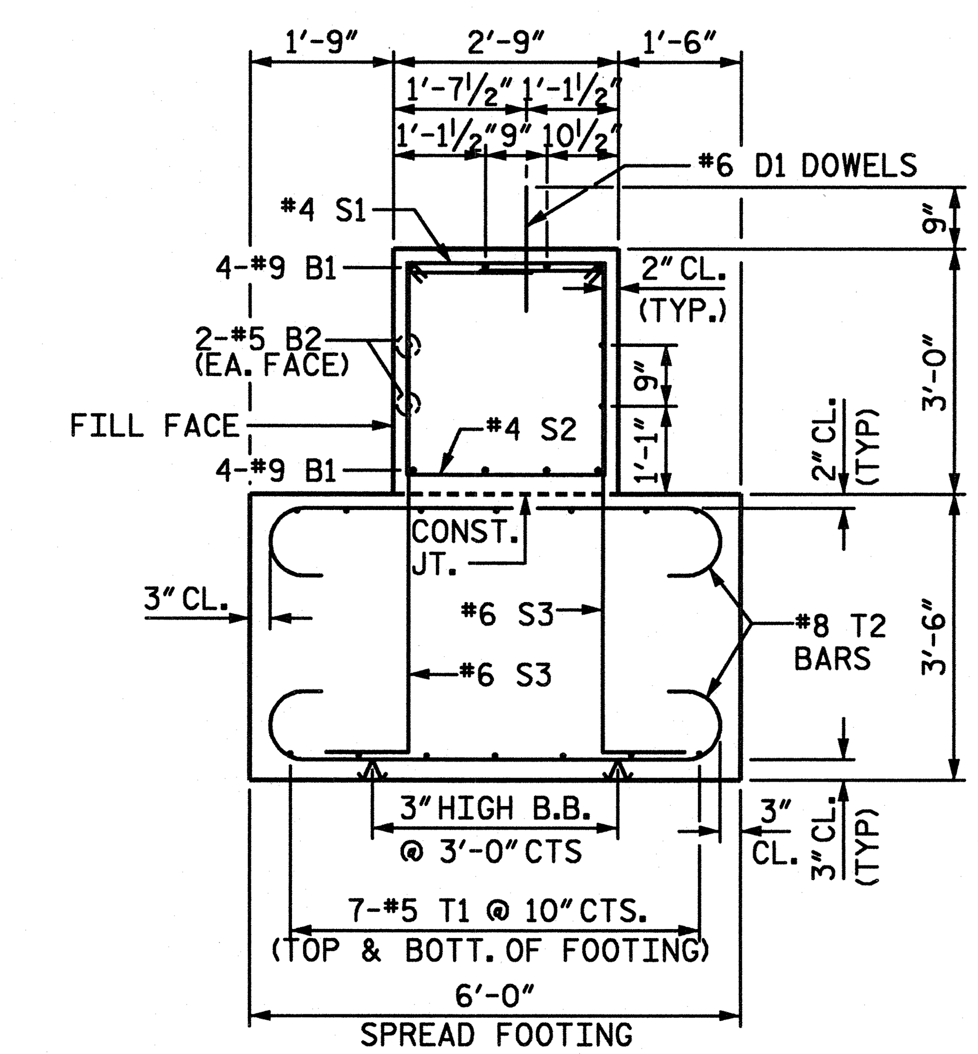
SEE SHEET S-13 FOR TEMPORARY DRAINAGE AT END BENT 1.



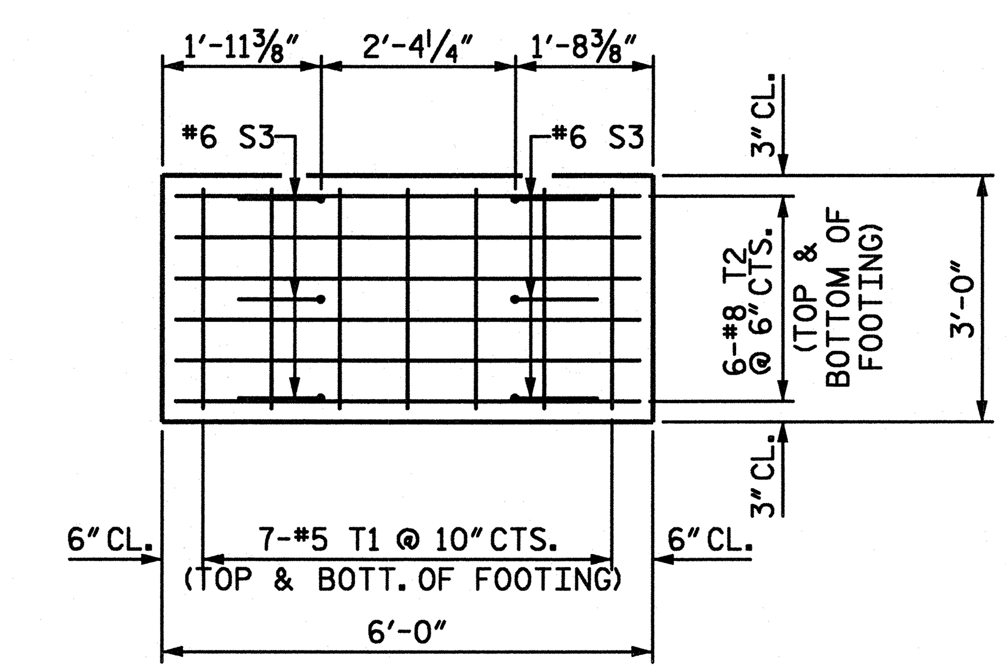
PLAN



ELEVATION



SECTION A-A



PLAN VIEW OF FOOTING

WBS NO. 42816.1.1

GRANVILLE COUNTY

STATION: 10+29.000 -L-

REPLACES BRIDGE NO. 139

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 1

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH
12-2-10

WETHERILL ENGINEERING
559 Jones Franklin Rd. Suite 164
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TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

REVISIONS							
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.	S-10
1			3			TOTAL SHEETS	19
2			4				

DRAWN BY : J. PENDERGRAFT DATE : 2/10
CHECKED BY : J. DILWORTH DATE : 2/10

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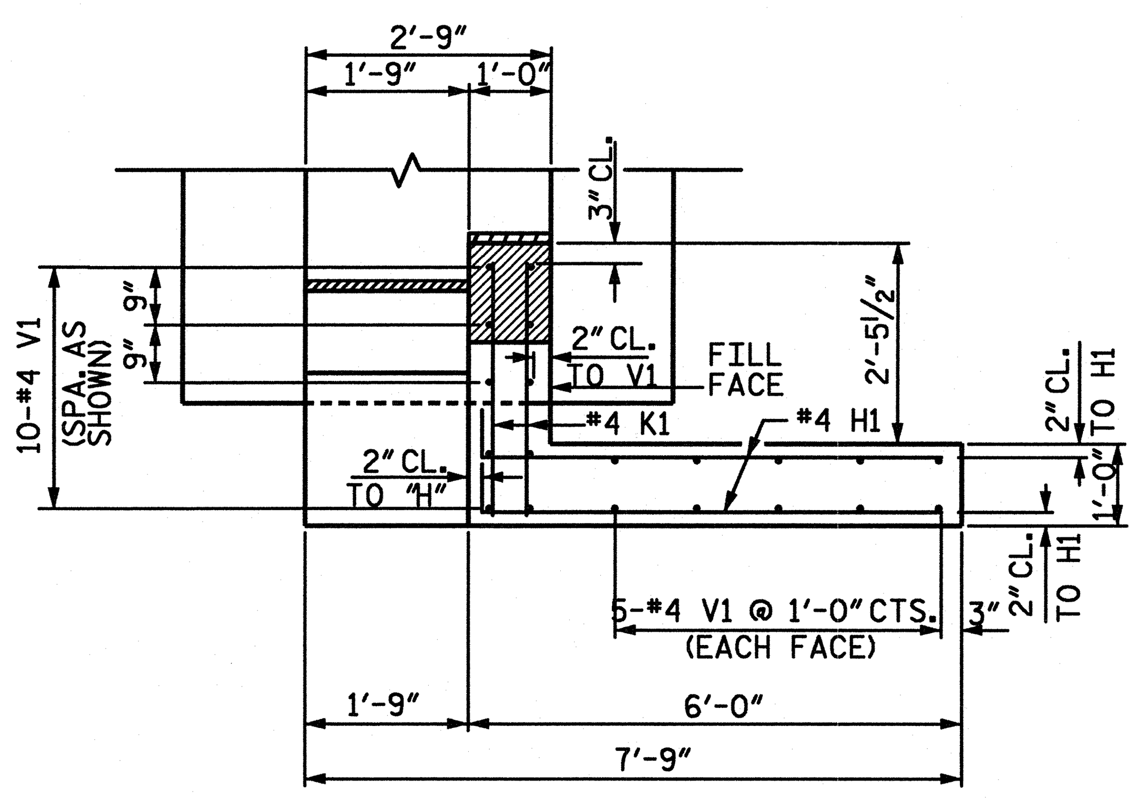
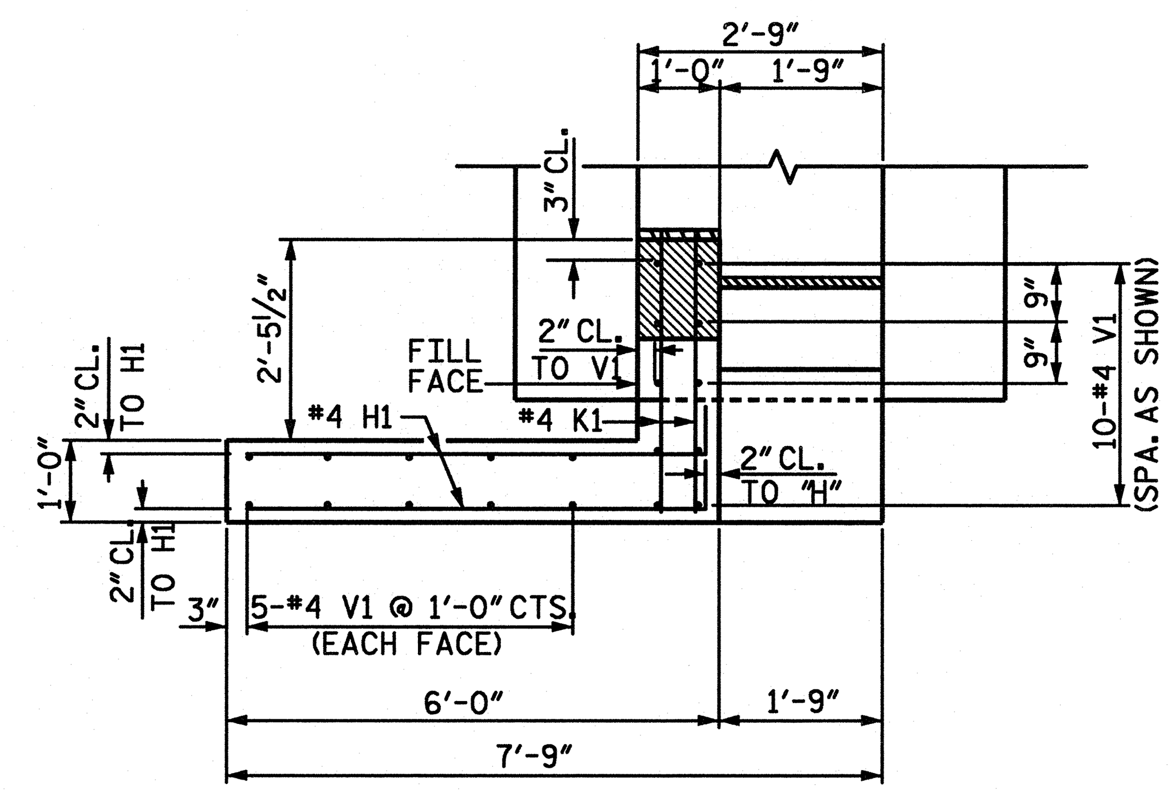
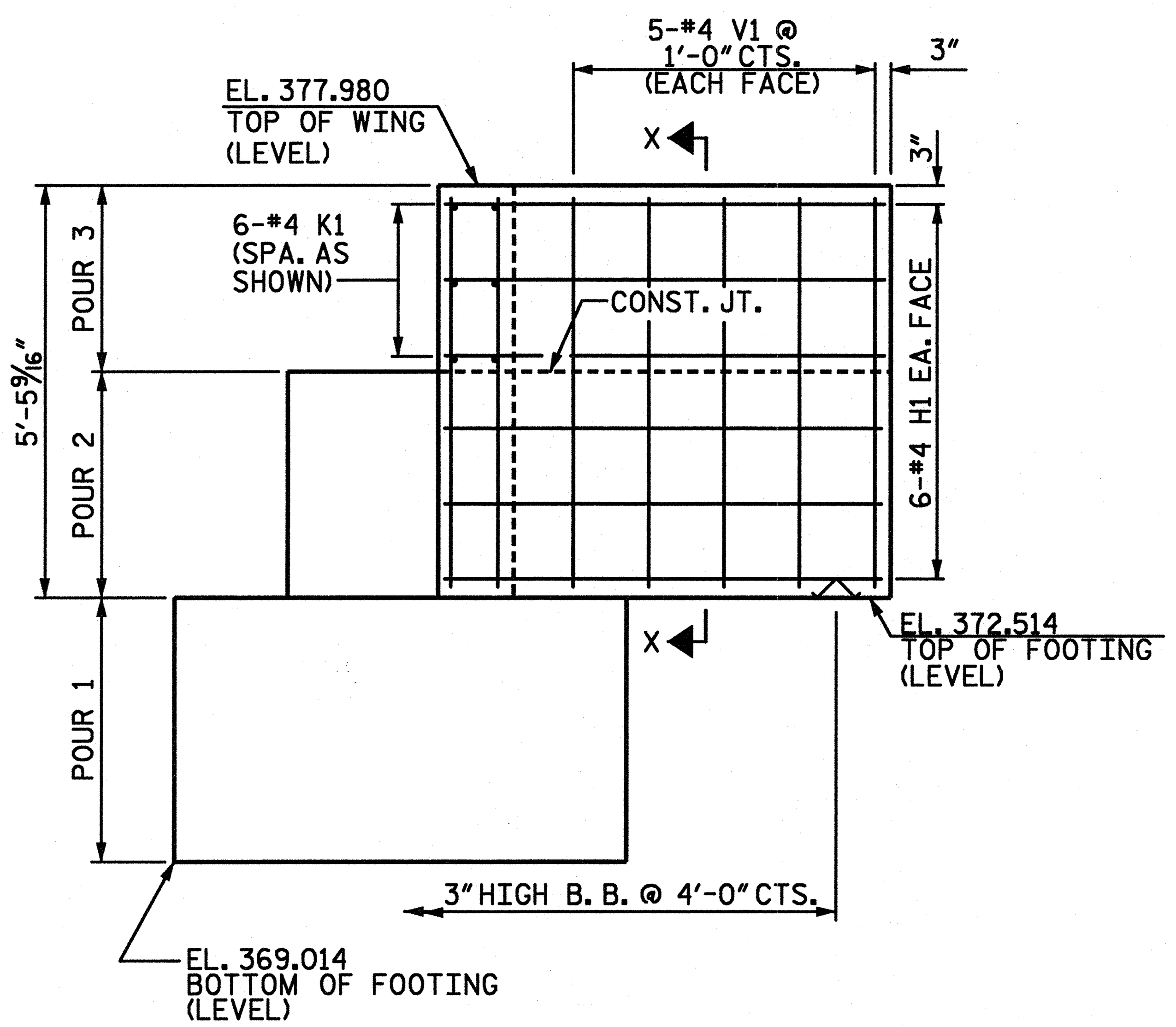


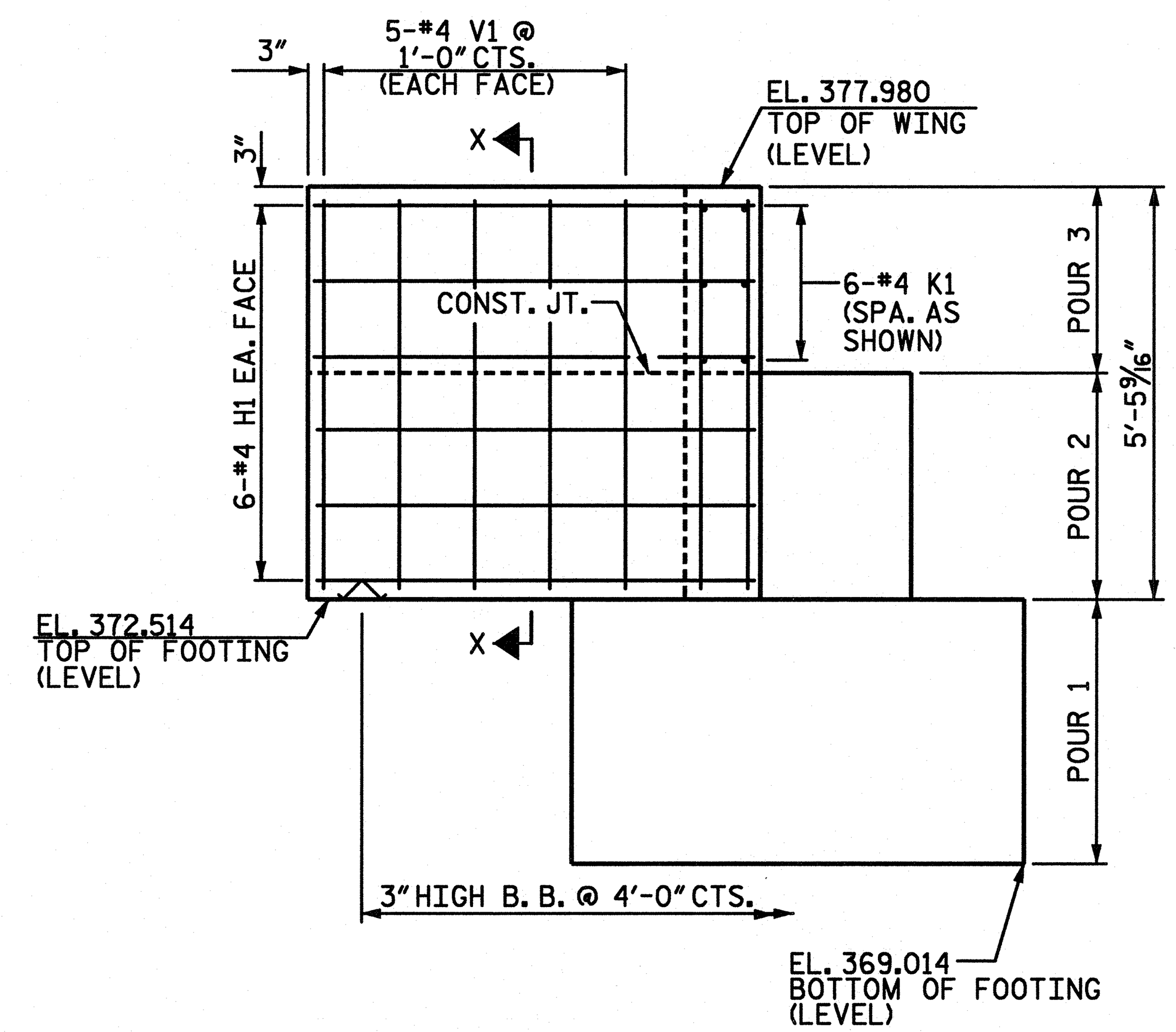
PLAN OF WING (W1)



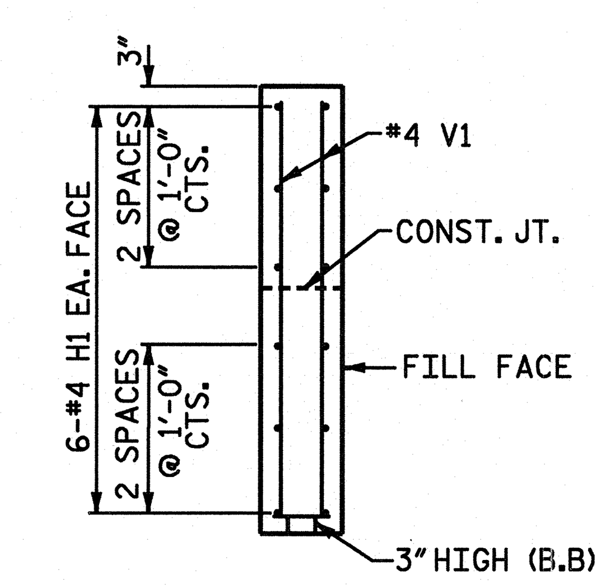
PLAN OF WING (W2)



ELEVATION OF WING (W1)

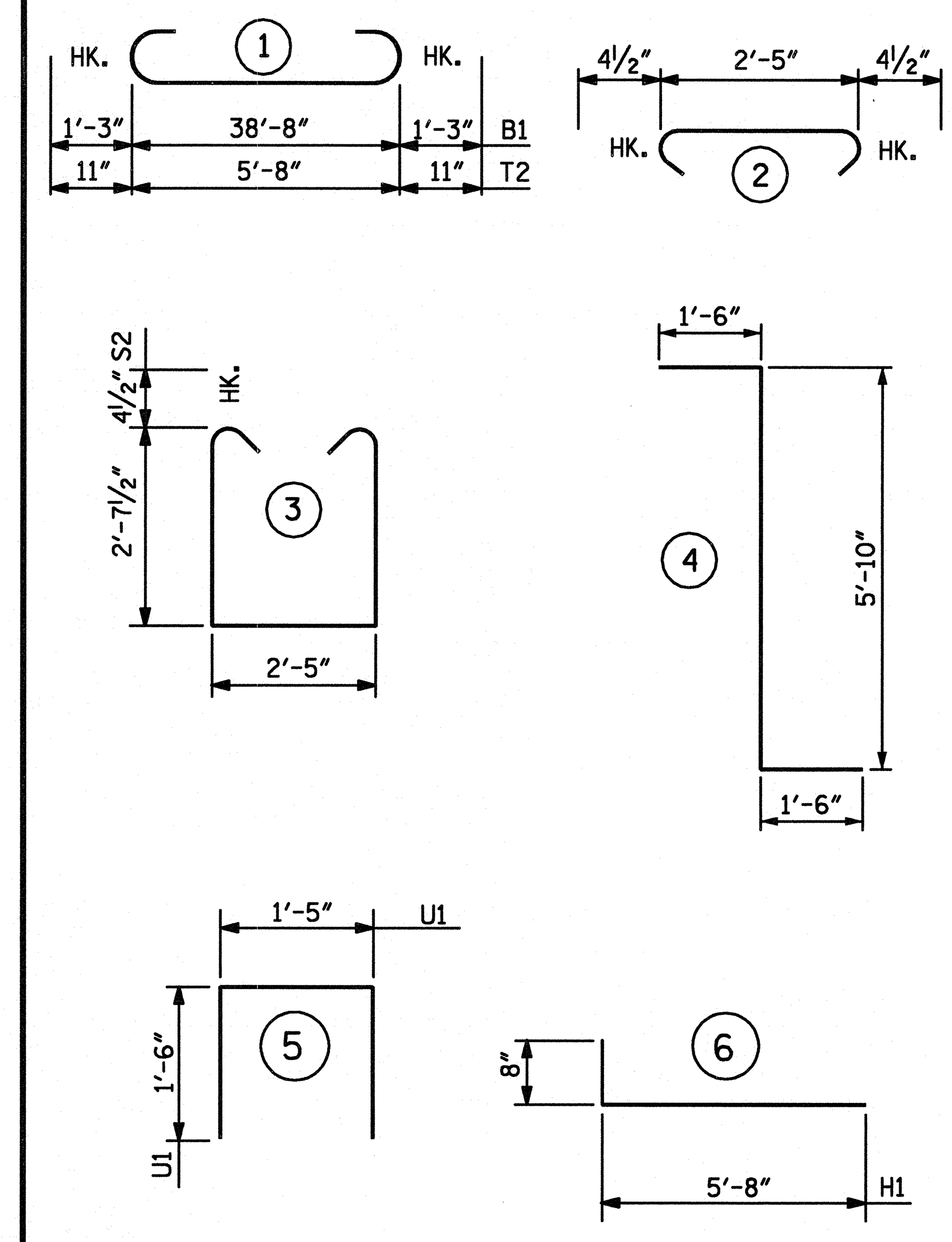


ELEVATION OF WING (W2)



SECTION X-X

BAR TYPES



(ALL BAR DIMENSIONS ARE OUT TO OUT.)

BILL OF MATERIAL

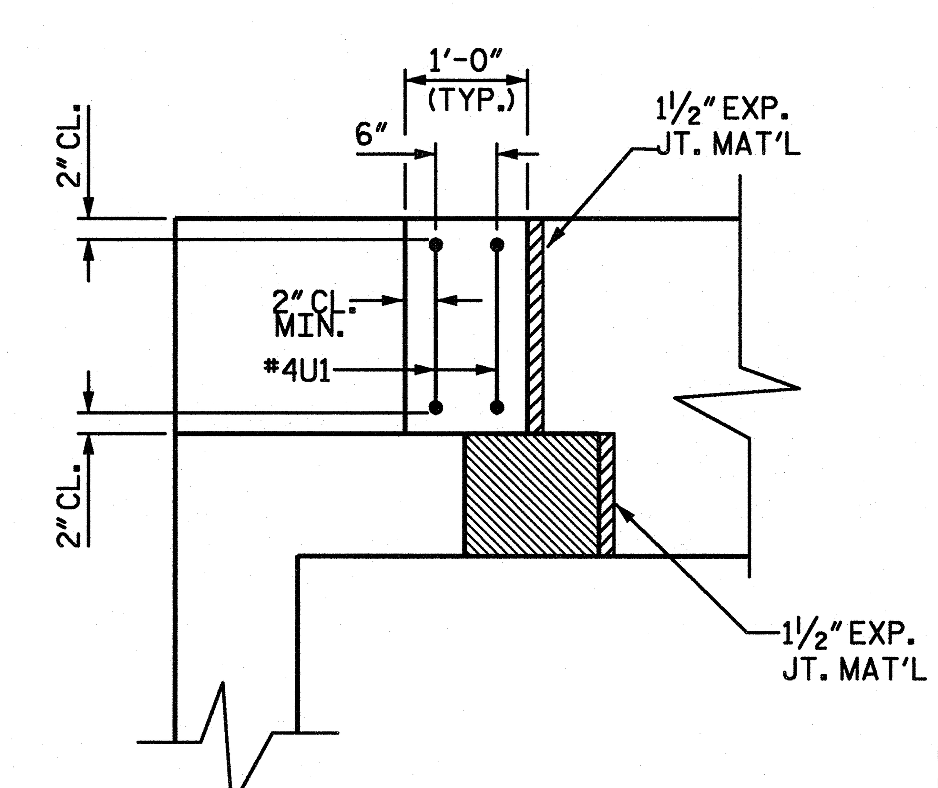
END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	41'-2"	1120
B2	4	#5	STR	38'-8"	161
D1	22	#6	STR	1'-6"	50
H1	24	#4	6	6'-4"	102
K1	12	#4	STR	3'-1"	25
S1	38	#4	2	3'-2"	80
S2	38	#4	3	8'-5"	214
S3	24	#6	4	8'-10"	318
T1	56	#5	STR.	2'-6"	146
T2	48	#8	1	7'-6"	961
U1	4	#4	5	4'-5"	12
V1	40	#4	STR	5'-0"	134

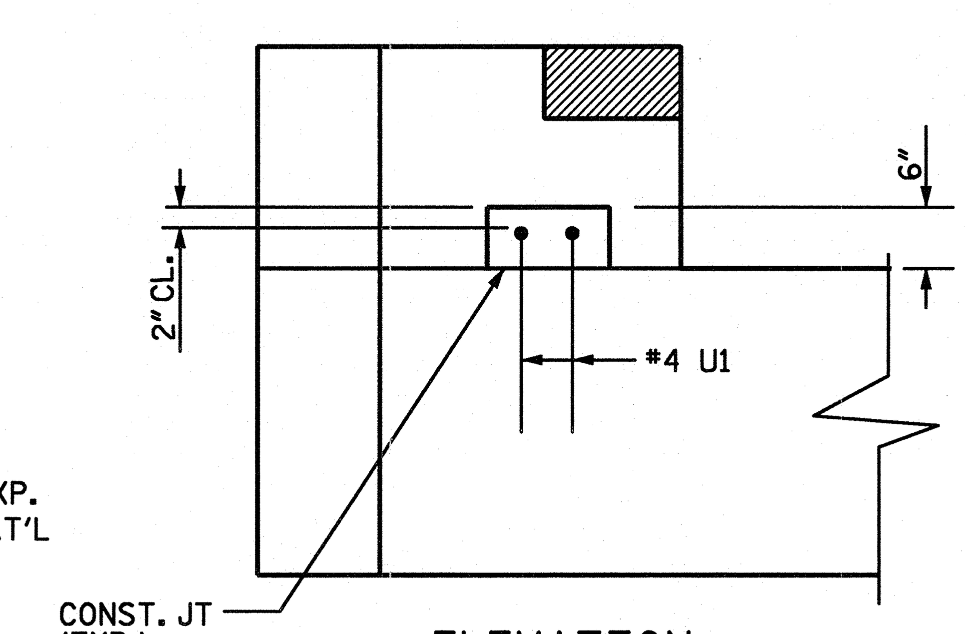
REINFORCING STEEL = 3323 LBS

CLASS A CONCRETE

POUR 1	FOOTING	C.Y.	9.3
POUR 2	CAP & LOWER PART OF WINGS	C.Y.	13.0
POUR 3	UPPER PART OF WINGS	C.Y.	1.6
POUR 4	LATERAL GUIDES	C.Y.	0.1
	TOTAL	C.Y.	24.0



PLAN



ELEVATION

LATERAL GUIDE DETAILS

WBS NO. 42816.1.1

GRANVILLE COUNTY

STATION: 10+29.000 -L-

REPLACES BRIDGE NO. 139

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 1

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH
12-2-10

WETHERILL ENGINEERING
559 Jones Franklin Rd. Suite 164
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
License No. F-0377

TRANSPORTATION PLANNING/DESIGN – BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN – GIS/GPS – CONSTRUCTION OBSERVATION

REVISIONS

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

SHEET NO. S-11

TOTAL SHEETS 19

DRAWN BY : J. PENDERGRAFT DATE : 2/10
CHECKED BY : J. DILWORTH DATE : 2/10

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NOTES:

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

HOOKS ON "M" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

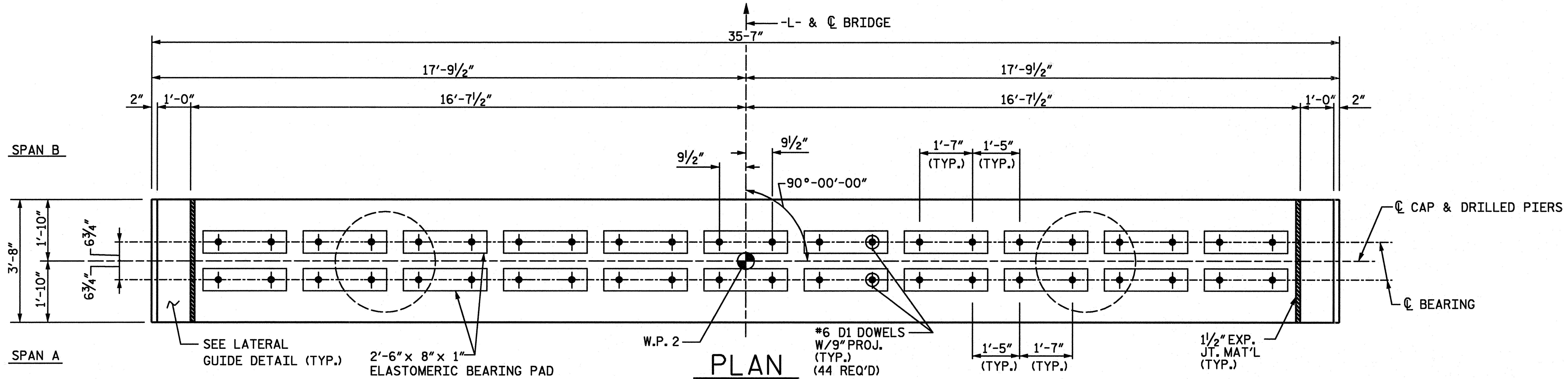
ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEM FOR "PLACEMENT OF SUBSTRUCTURE".

FOR DRILLED PIERS, SEE SPECIAL PROVISIONS.

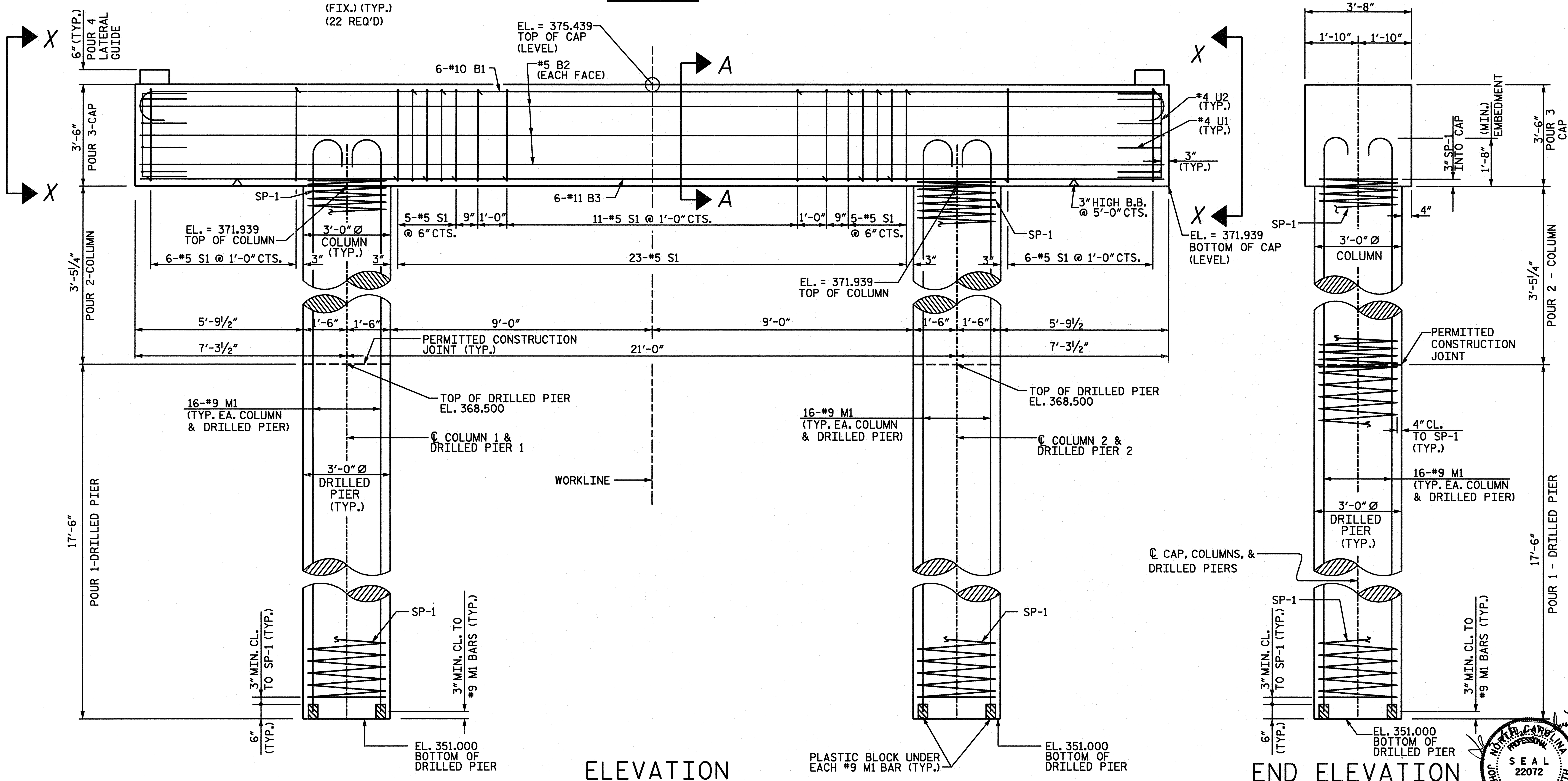
INVERT ALTERNATE STIRRUPS.

THE LATERAL GUIDE AT EACH END OF THE CAP SHALL NOT BE POURED UNTIL AFTER THE CORED SLAB UNITS ARE IN PLACE.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.



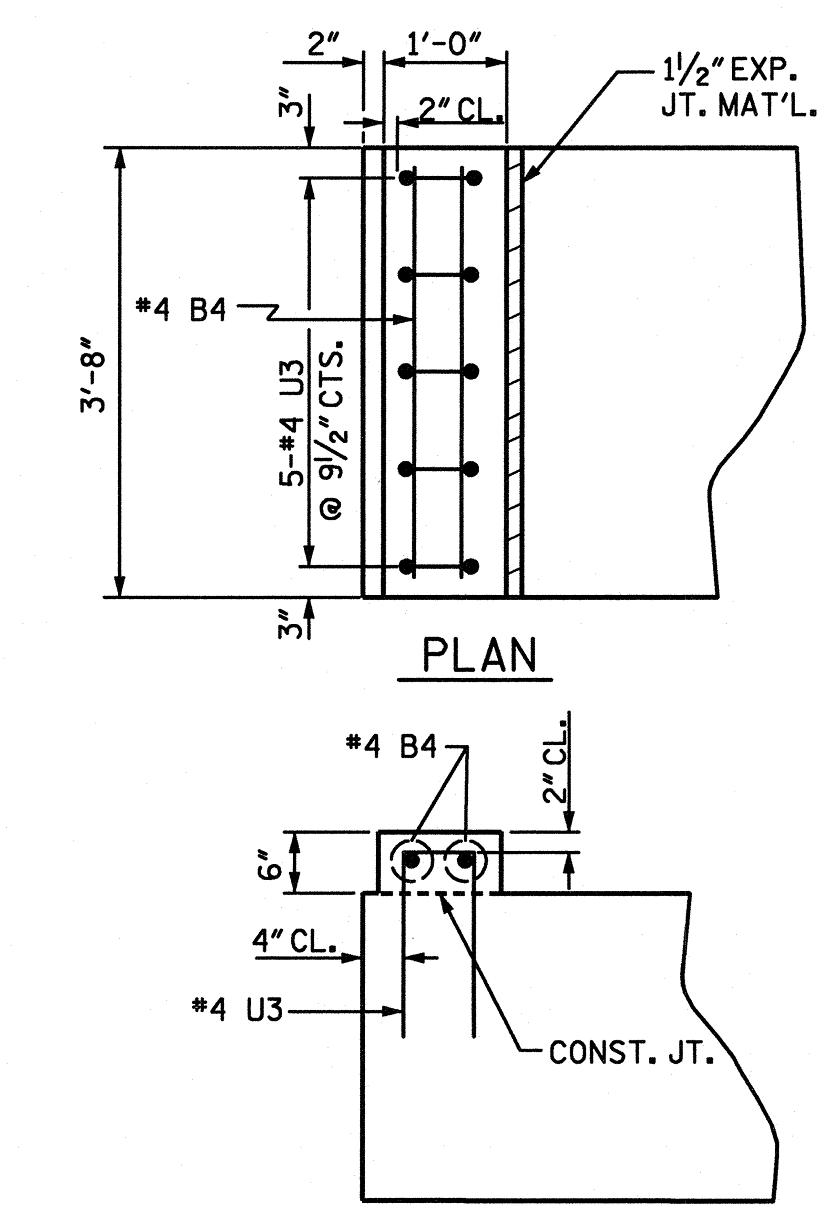
PLAN



ELEVATION

REINFORCING STEEL AND DIMENSIONS TYPICAL FOR ALL DRILLED PIERS

END ELEVATION



LATERAL GUIDE DETAIL

(EACH END SIMILAR)

WBS NO. 42816.1.1

GRANVILLE COUNTY

STATION: 10+29.000 -L-

REPLACES BRIDGE NO. 139

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT 1

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 22072 JOHN ARTHUR DILWORTH
12-2-10

WETHERILL ENGINEERING
559 Jones Franklin Rd. Suite 164 Raleigh, N.C. 27606 Bus: 919 851 8077 Fax: 919 851 8107 License No. F-0377
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

REVISIONS								SHEET NO.
NO.	BY:	DATE:		NO.	BY:	DATE:		S-12
1				3				TOTAL SHEETS
2				4				19

DRAWN BY : J. PENDERGRAFT DATE : 2/10
CHECKED BY : J. DILWORTH DATE : 2/10

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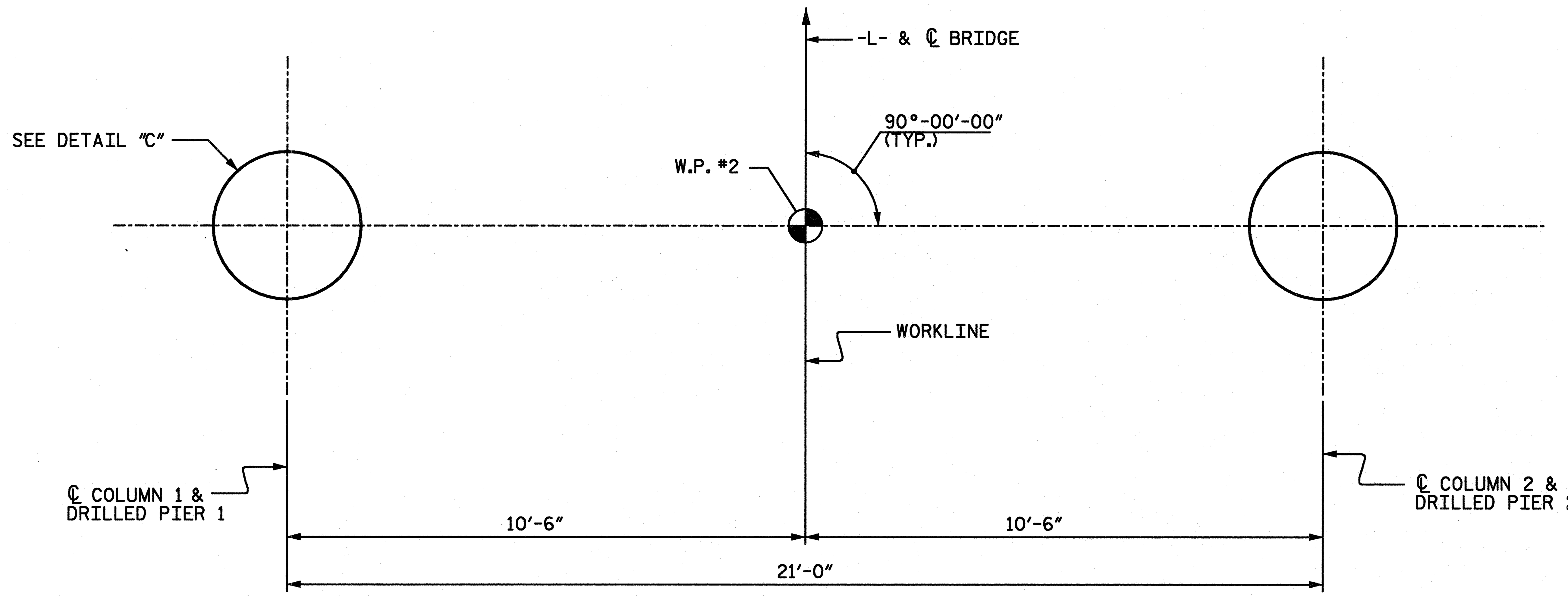
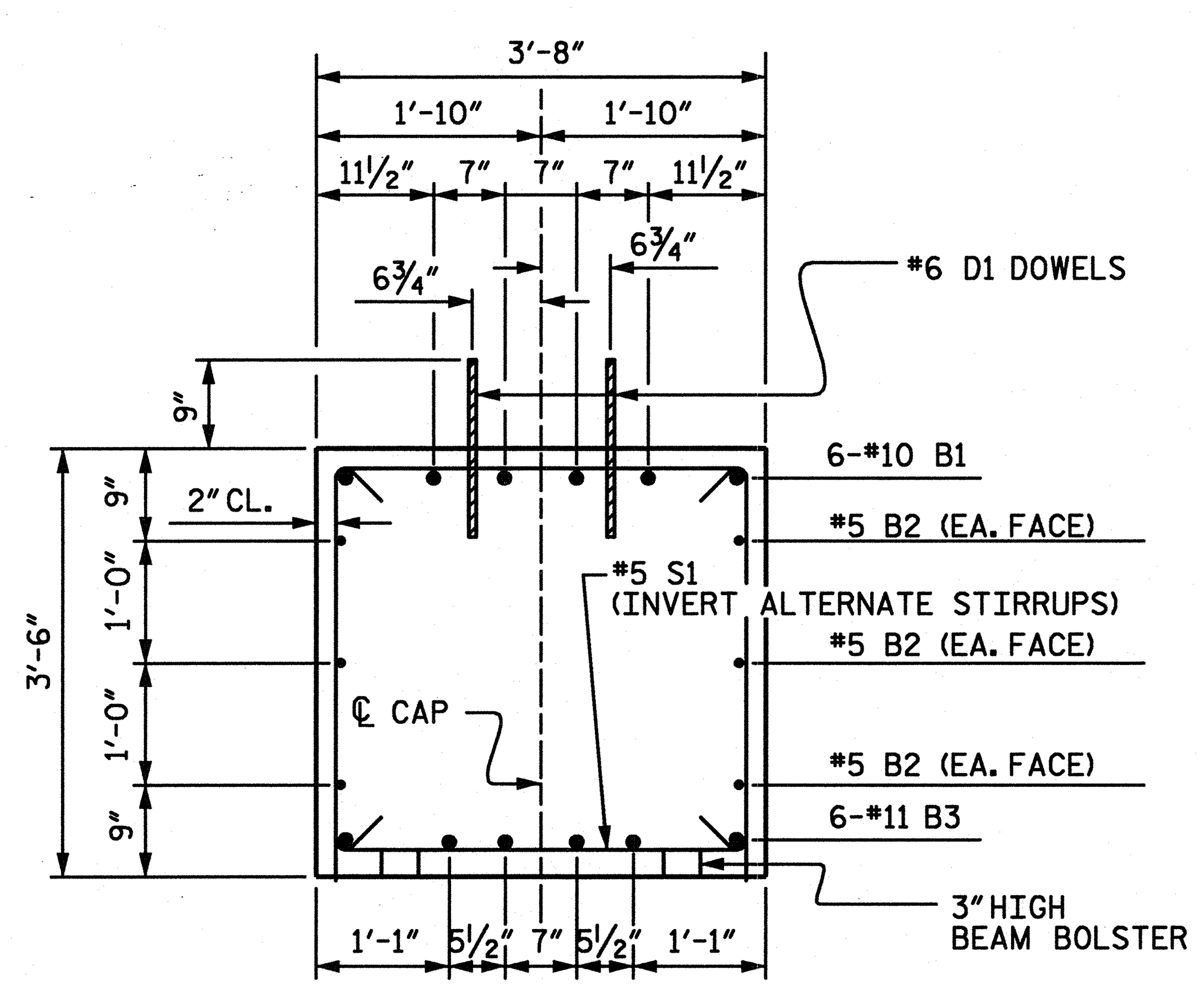
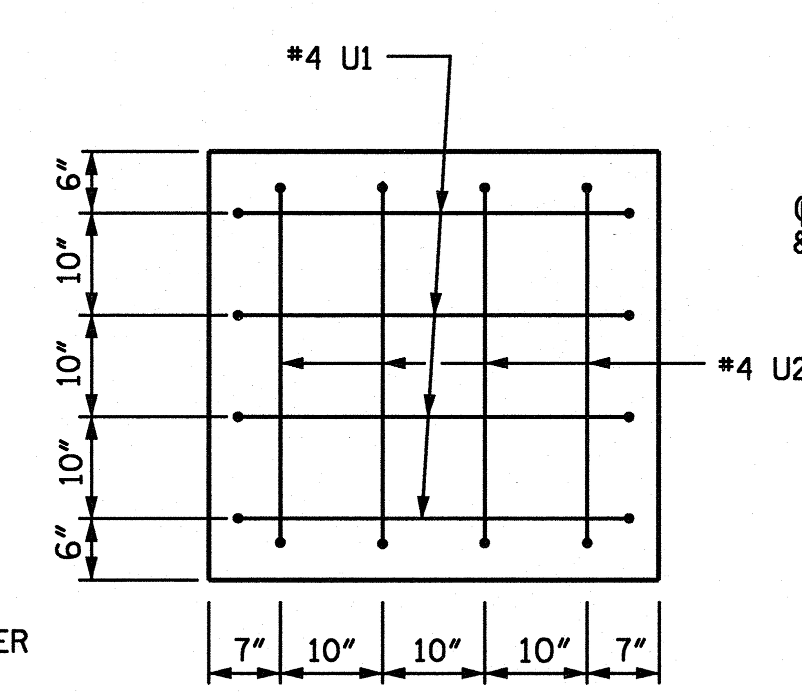


PLAN OF COLUMNS & DRILLED PIERS

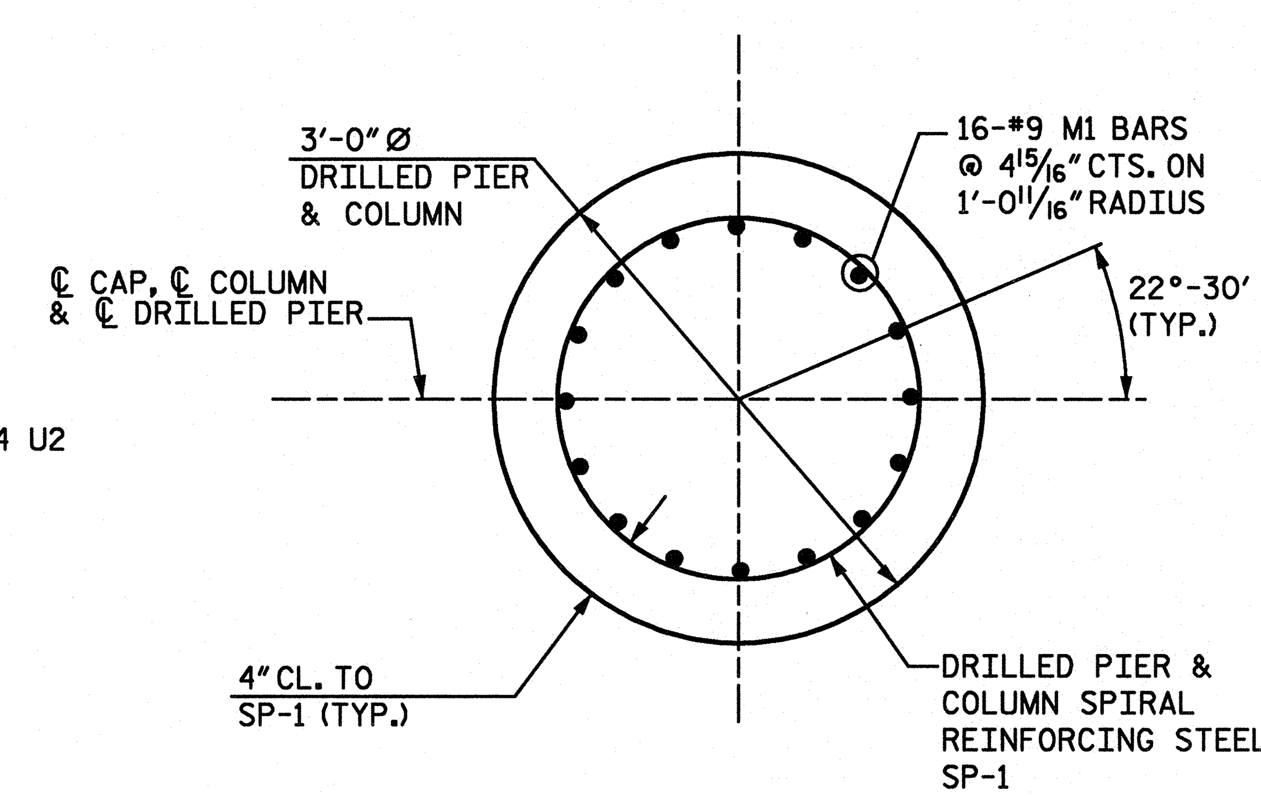
REINFORCING STEEL AND DIMENSIONS ARE
TYPICAL FOR ALL COLUMNS & DRILLED PIERS



SECTION A-A

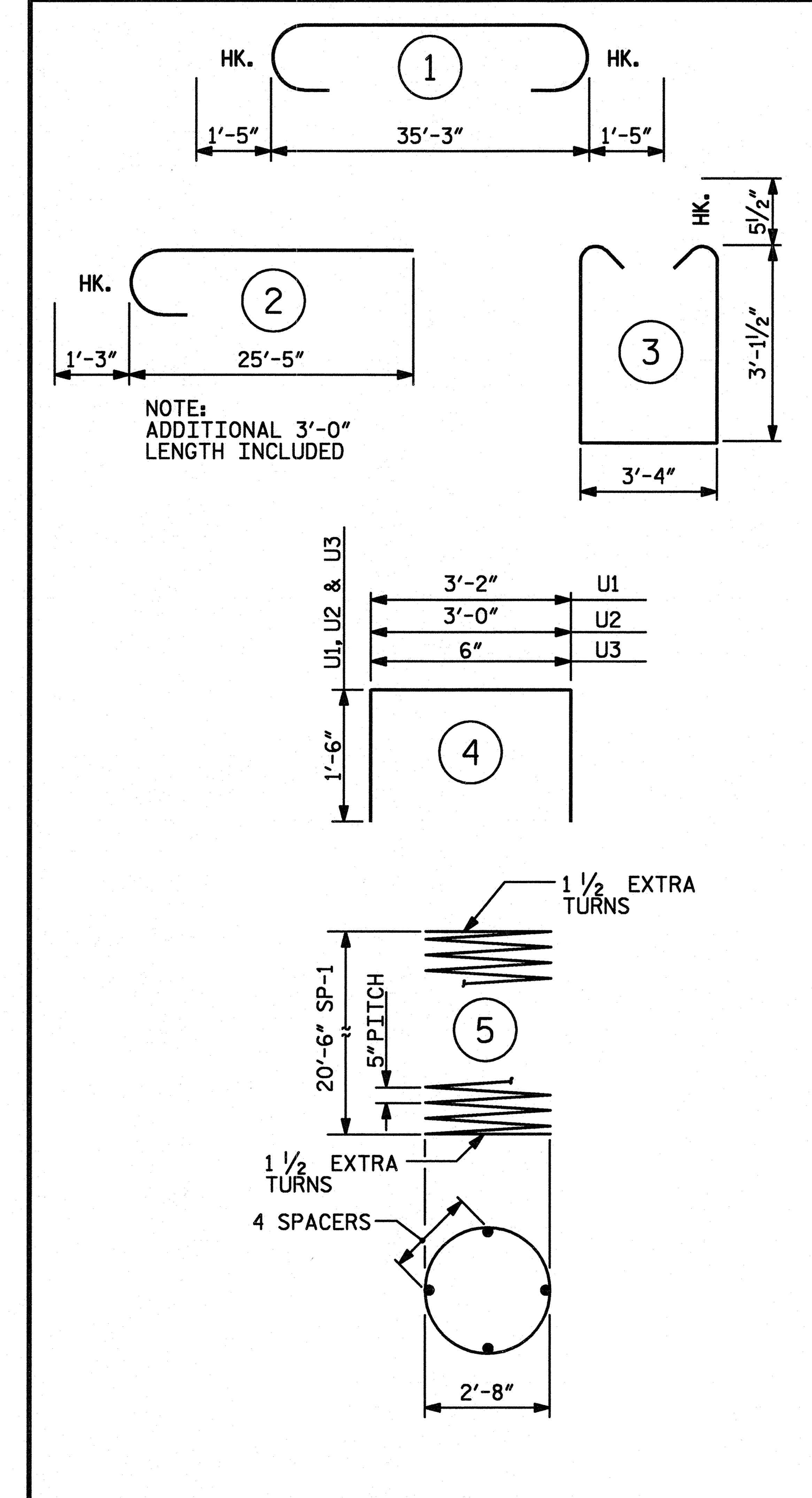


VIEW X-X



DETAIL "C"

BAR TYPES



(ALL BAR DIMENSIONS ARE OUT TO OUT.)

✱ THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

BILL OF MATERIAL

BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#10	1	38'-1"	983
B2	6	#5	STR	35'-3"	221
B3	6	#11	STR	35'-3"	1124
B4	4	#4	STR	3'-4"	9
D1	44	#6	STR	1'-6"	99
M1	32	#9	2	26'-8"	2901
S1	35	#5	3	10'-6"	383
U1	8	#4	4	6'-2"	33
U2	8	#4	4	6'-0"	32
U3	10	#4	4	3'-6"	23
REINFORCING STEEL					5808 lbs
SP-1	2	✱	5	374'-9"	782
SPIRAL DRILLED PIER REINFORCING STEEL					782 lbs

CLASS A CONCRETE BREAKDOWN	
POUR 2 (COLUMN)	1.8 C.Y.
POUR 3 (CAP)	16.9 C.Y.
POUR 4 (LATERAL GUIDES)	0.1 C.Y.
TOTAL CLASS A CONCRETE	18.8 C.Y.

3'-0" Ø DRILLED PIERS

DRILLED PIER CONCRETE	
POUR 1 (DRILLED PIERS)	9.2 C.Y.
3'-0" Ø DRILLED PIERS IN SOIL :	20.0 LIN. FT.
3'-0" Ø DRILLED PIERS NOT IN SOIL :	15.0 LIN. FT.

WBS NO. 42816.1.1

GRANVILLE COUNTY

STATION: 10+29.000 -L-

REPLACES BRIDGE NO. 139

SHEET 2 OF 2

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 22072 JOHN ARTHUR DILWORTH
12-2-10

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Fax: 919 851 8107
License No. F-0377
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT 1

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S-13
1			3				TOTAL SHEETS
2			4				19

DRAWN BY : J. PENDERGRAFT DATE : 2/10
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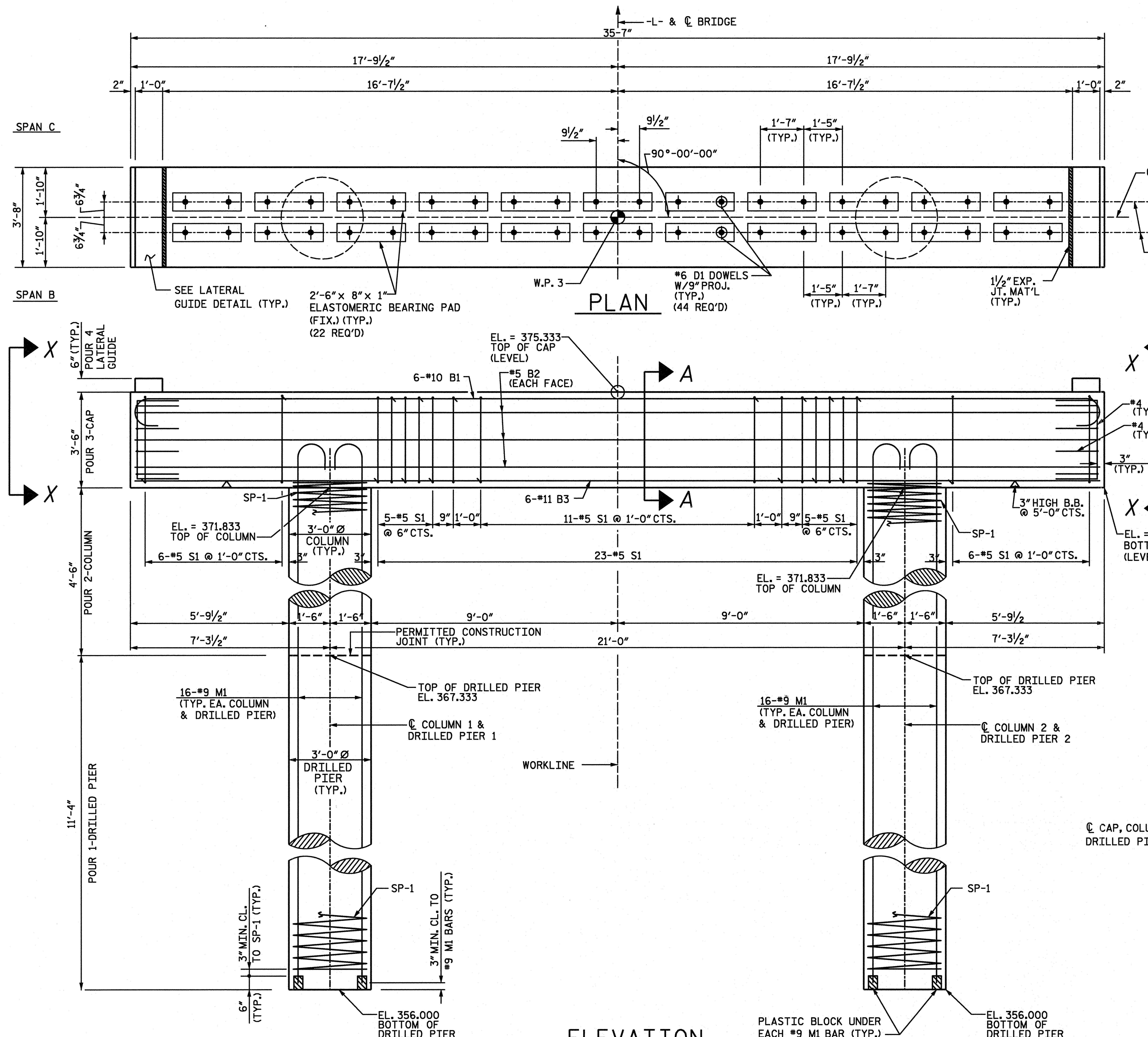
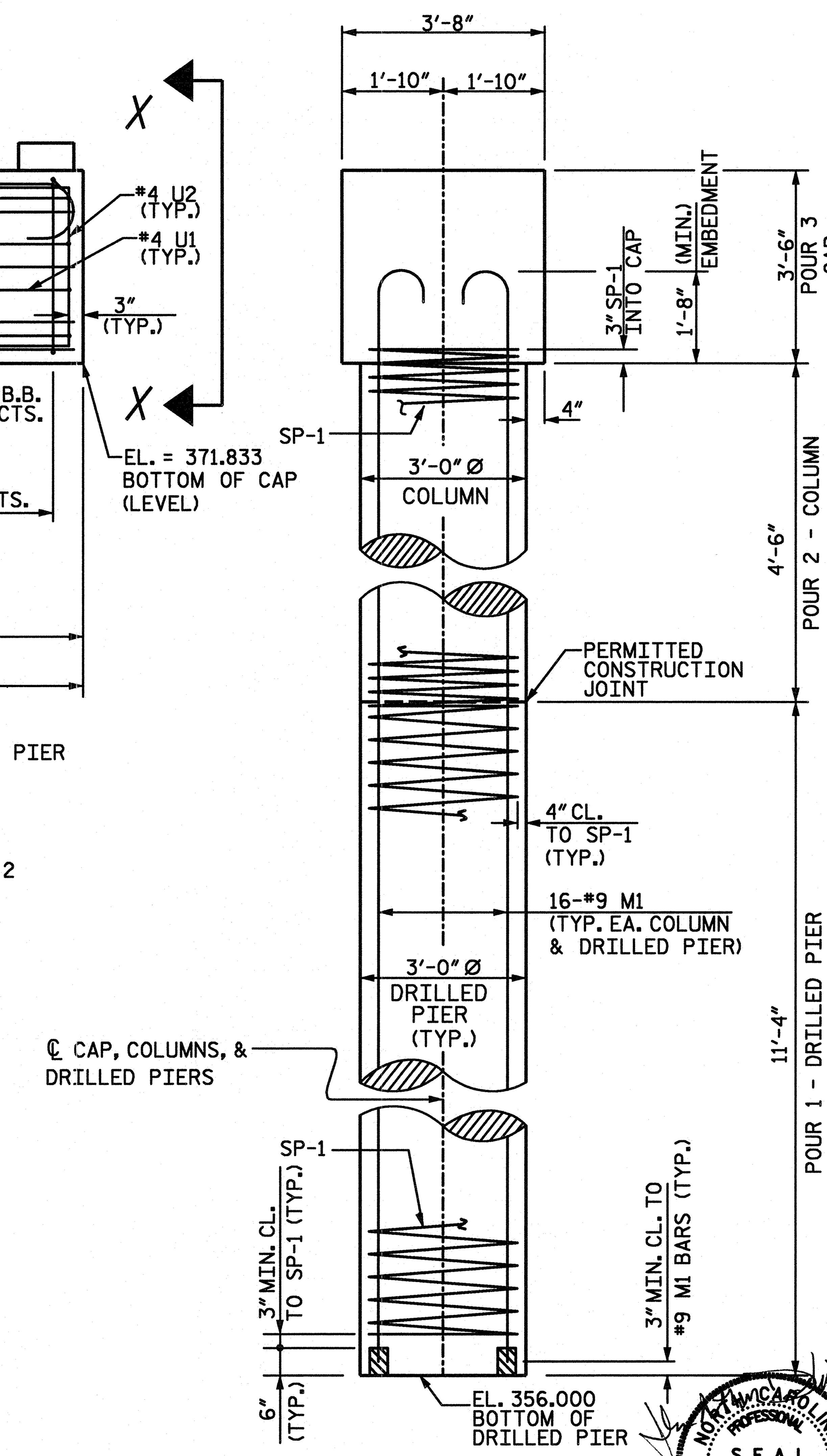


ELEVATION

REINFORCING STEEL AND DIMENSIONS TYPICAL FOR ALL DRILLED PIERS



END ELEVATION

NOTES:

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

HOOKS ON "M" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

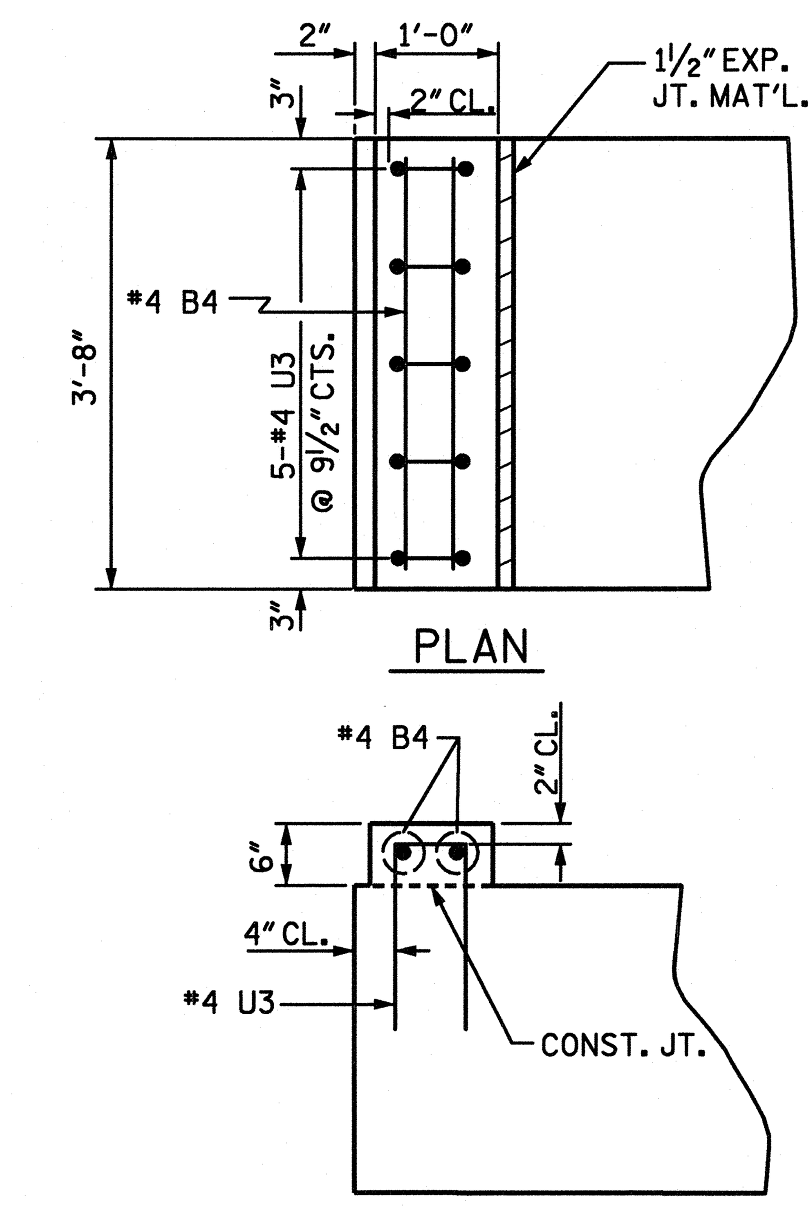
ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEM FOR "PLACEMENT OF SUBSTRUCTURE".

FOR DRILLED PIERS, SEE SPECIAL PROVISIONS.

INVERT ALTERNATE STIRRUPS.

THE LATERAL GUIDE AT EACH END OF THE CAP SHALL NOT BE POURED UNTIL AFTER THE CORED SLAB UNITS ARE IN PLACE.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.



LATERAL GUIDE DETAIL

(EACH END SIMILAR)

WBS NO. 42816.1.1

GRANVILLE COUNTY

STATION: 10+29.000 -L-

REPLACES BRIDGE NO. 139

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT 2

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 22072 JOHN ARTHUR DILWORTH
12-2-10

WETHERILL ENGINEERING
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License No. F-0377

TRANSPORTATION PLANNING/DESIGN – BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN – GIS/GPS – CONSTRUCTION OBSERVATION

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

SHEET NO. S-14
TOTAL SHEETS 19

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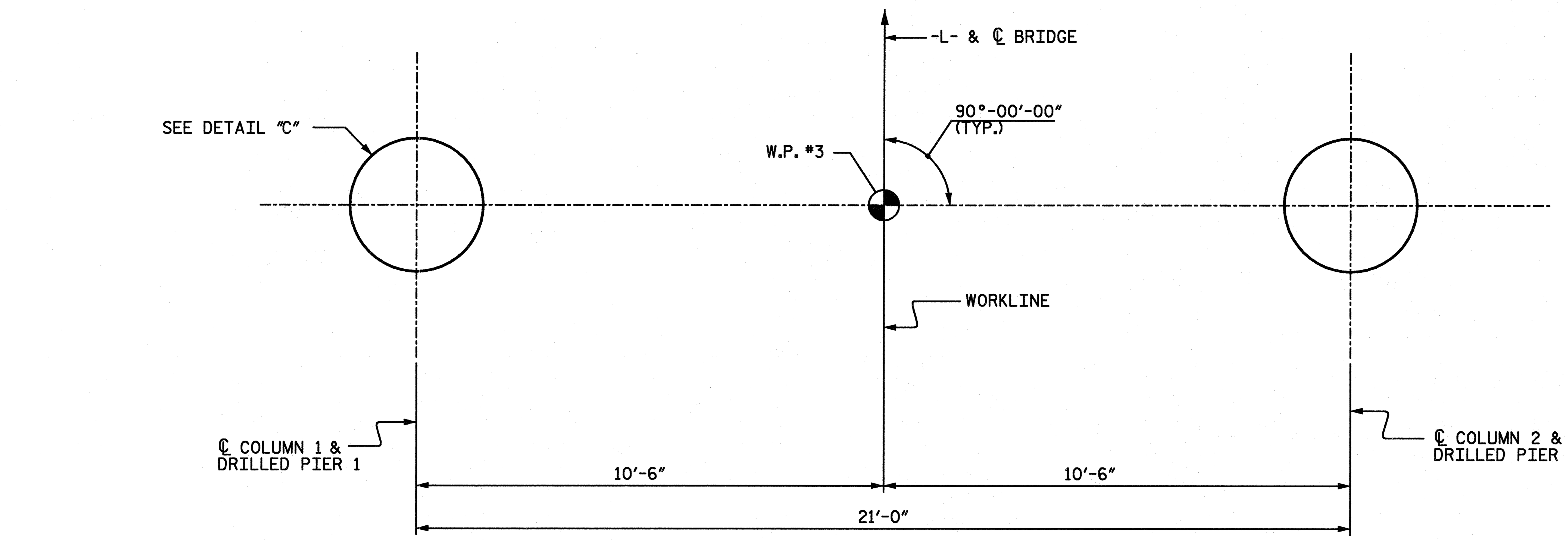
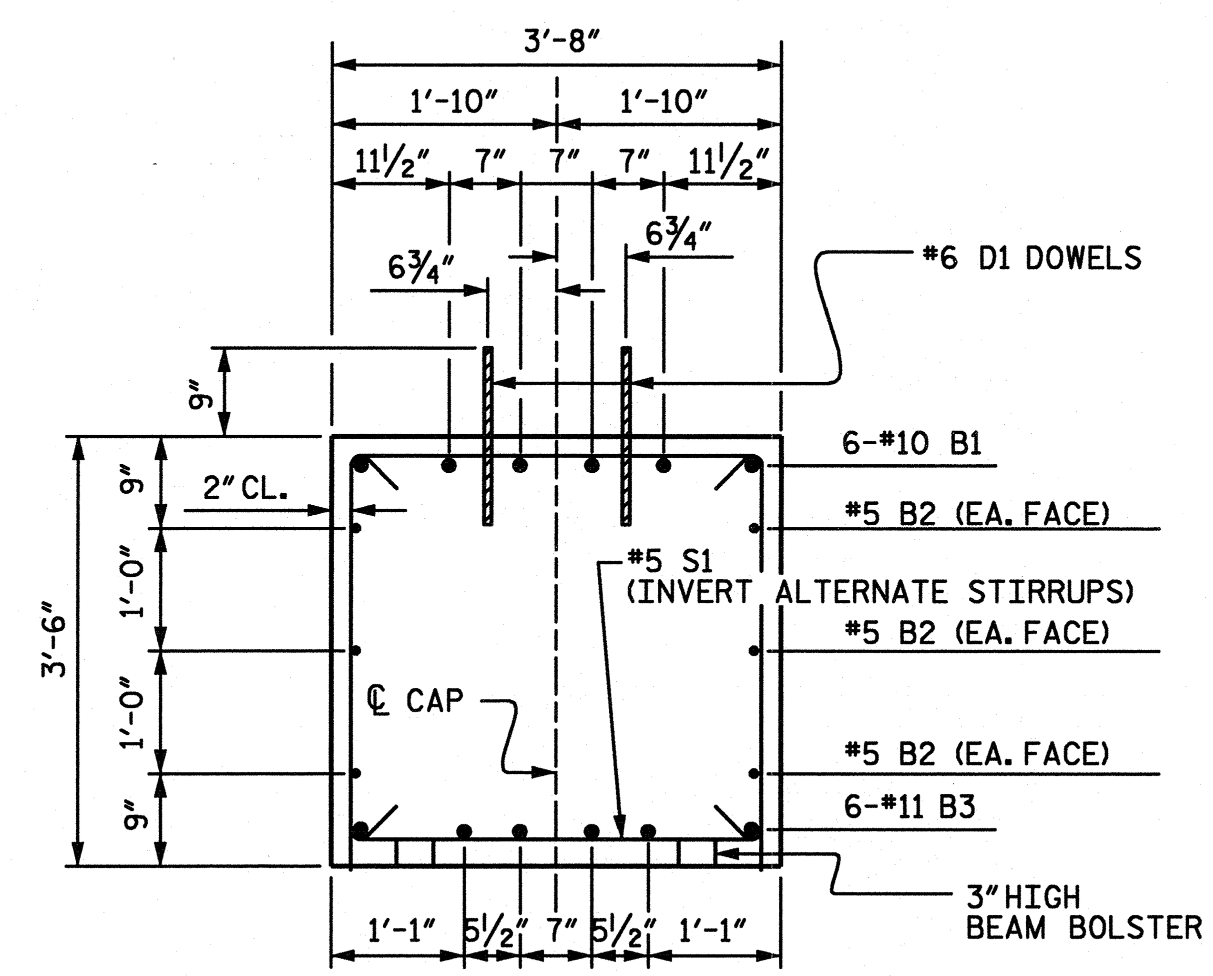
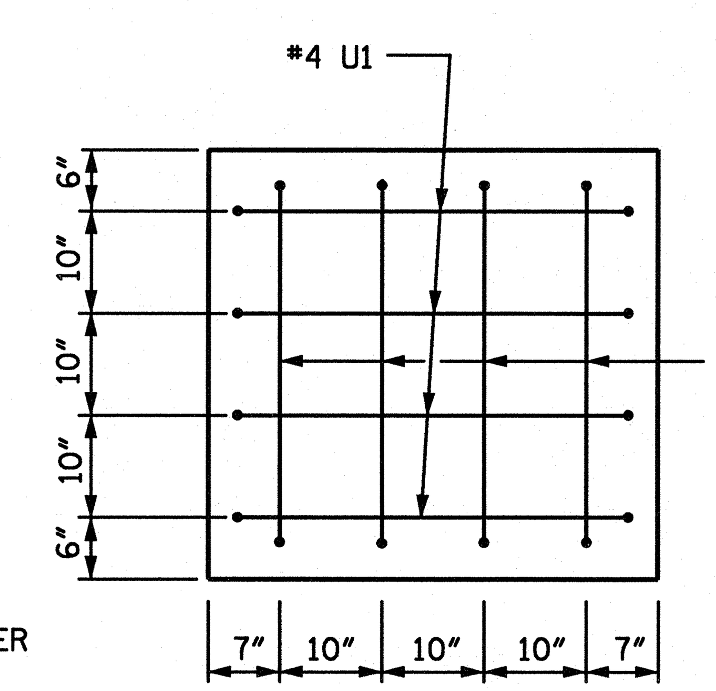


PLAN OF COLUMNS & DRILLED PIERS

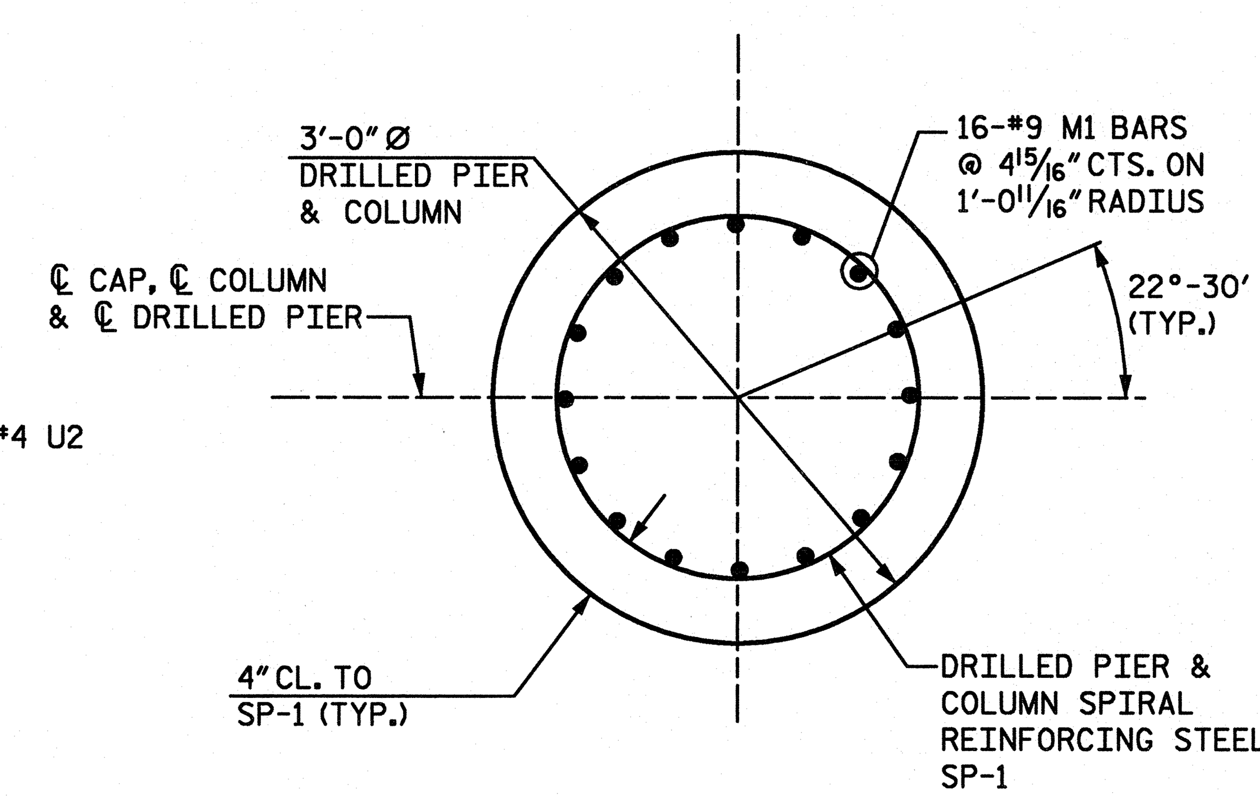
REINFORCING STEEL AND DIMENSIONS ARE TYPICAL FOR ALL COLUMNS & DRILLED PIERS



SECTION A-A

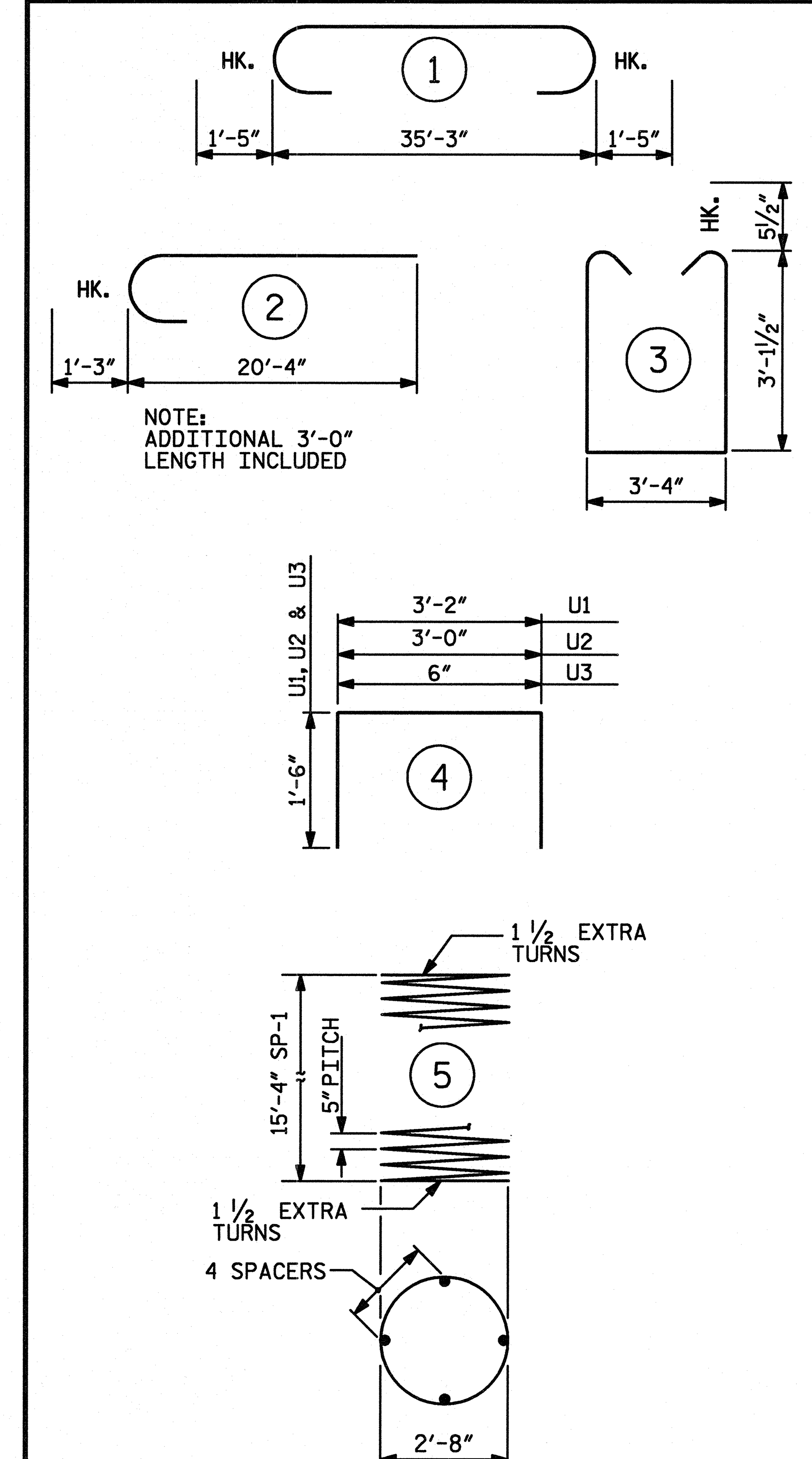


VIEW X-X



DETAIL "C"

BAR TYPES



(ALL BAR DIMENSIONS ARE OUT TO OUT.)

✱ THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

BILL OF MATERIAL

BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#10	1	38'-1"	983
B2	6	#5	STR	35'-3"	221
B3	6	#11	STR	35'-3"	1124
B4	4	#4	STR	3'-4"	9
D1	44	#6	STR	1'-6"	99
M1	32	#9	2	21'-7"	2348
S1	35	#5	3	10'-6"	383
U1	8	#4	4	6'-2"	33
U2	8	#4	4	6'-0"	32
U3	10	#4	4	3'-6"	23
REINFORCING STEEL					5255 lbs
SP-1	2	✱	5	285'-8"	596
SPIRAL DRILLED PIER REINFORCING STEEL					596 lbs

CLASS A CONCRETE BREAKDOWN	
POUR 2 (COLUMN)	2.4 C.Y.
POUR 3 (CAP)	16.9 C.Y.
POUR 4 (LATERAL GUIDES)	0.1 C.Y.
TOTAL CLASS A CONCRETE	19.4 C.Y.

3'-0" Ø DRILLED PIERS

DRILLED PIER CONCRETE	
POUR 1 (DRILLED PIERS)	5.9 C.Y.
3'-0"Ø DRILLED PIERS IN SOIL :	9.7 LIN. FT.
3'-0"Ø DRILLED PIERS NOT IN SOIL :	13.0 LIN. FT.

WBS NO. 42816.1.1

GRANVILLE COUNTY

STATION: 10+29.000 -L-

REPLACES BRIDGE NO. 139

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE BENT 2

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH
12-2-10

WETHERILL ENGINEERING
559 Jones Franklin Rd. Suite 164
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Fax: 919 851 8107
License No. F-0377
TRANSPORTATION PLANNING/DESIGN – BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN – GIS/GPS – CONSTRUCTION OBSERVATION

REVISIONS							
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.	S-15
1			3			TOTAL SHEETS	19
2			4				

DRAWN BY : J. PENDERGRAFT DATE : 2/10
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NOTES:

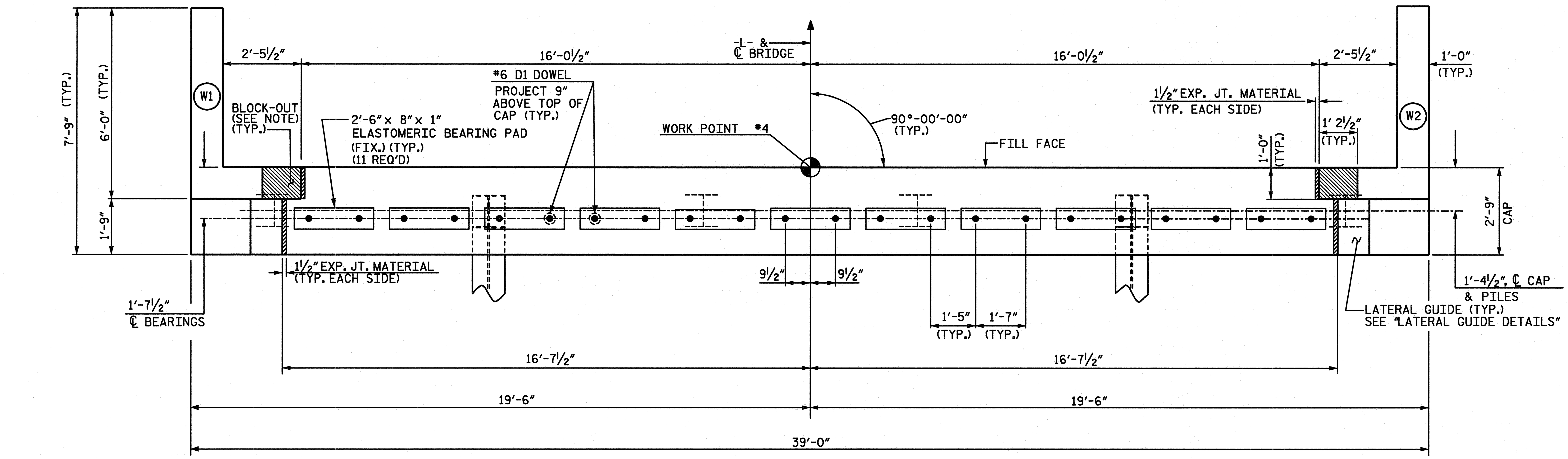
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

FOR SECTION A-A, SEE SHT. 2 OF 3.

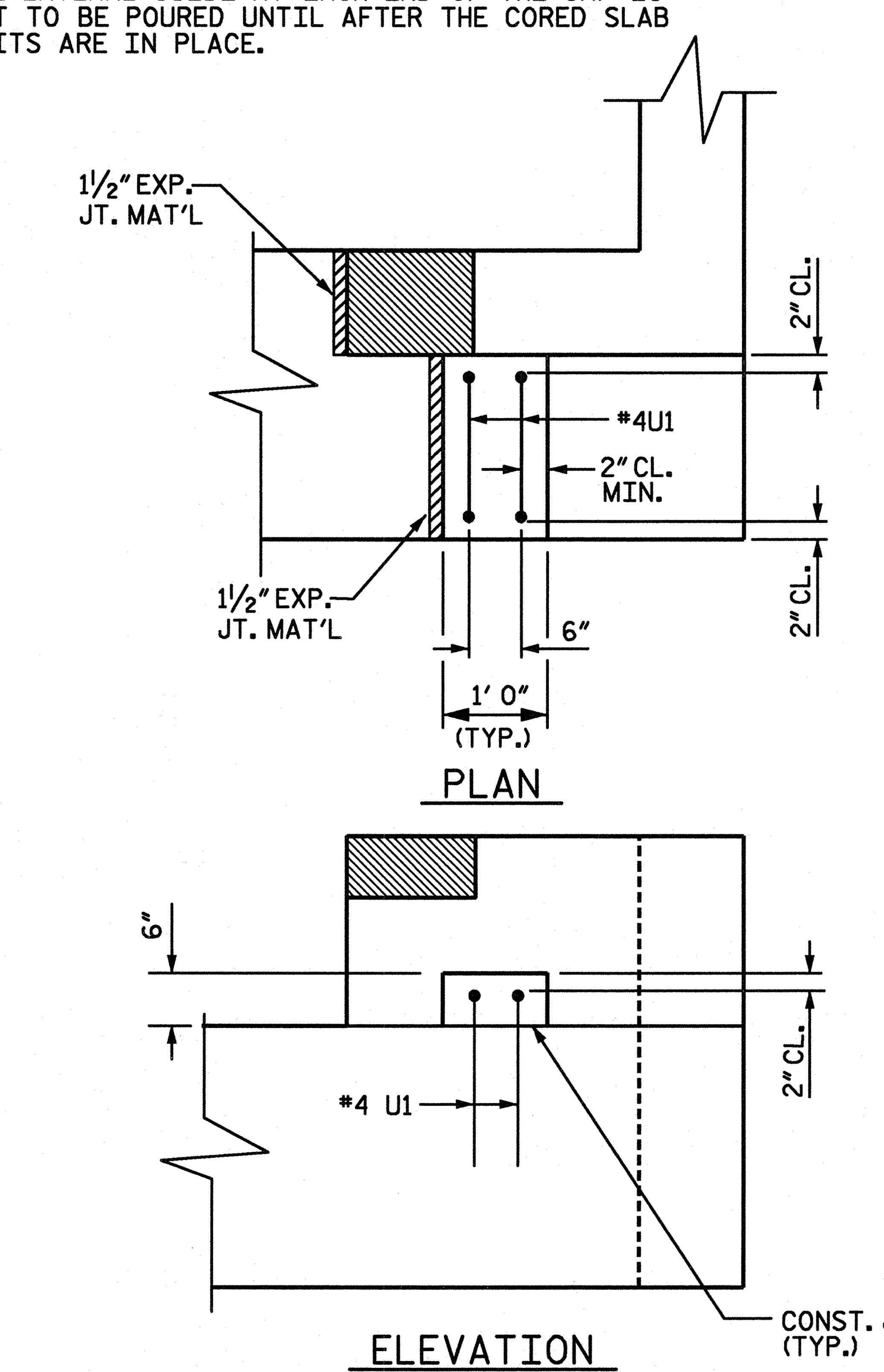
FOR MISC. DETAILS, SEE SHT. 2 OF 3.

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

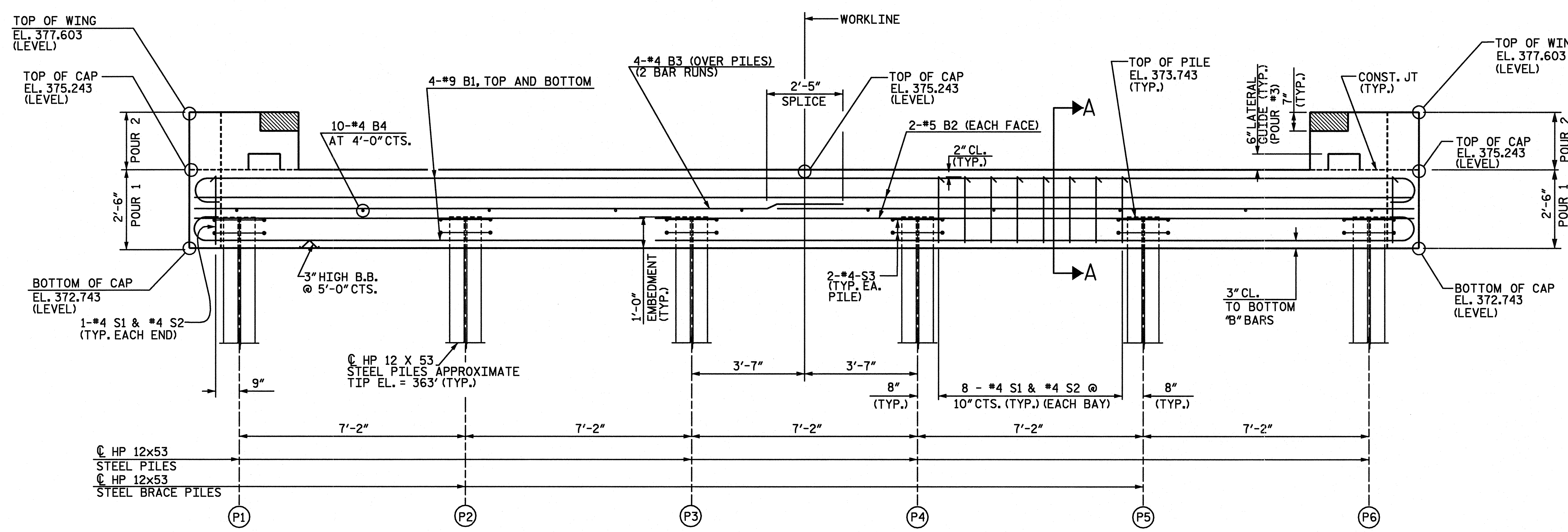
THE LATERAL GUIDE AT EACH END OF THE CAP IS NOT TO BE POURED UNTIL AFTER THE CORED SLAB UNITS ARE IN PLACE.



PLAN



LATERAL GUIDE DETAILS



ELEVATION

NOTE: ALL PILES ARE HP 12x53 GALVANIZED STEEL PILES.

WBS NO. 42816.1.1

GRANVILLE COUNTY

STATION: 10+29.000 -L-

REPLACES BRIDGE NO. 139

SHEET 1 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH

12-2-10

WETHERILL ENGINEERING

559 Jones Franklin Rd. Suite 164
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CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 2

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S-16
1			3				TOTAL SHEETS
2			4				19

DRAWN BY : J. PENDERGRAFT DATE : 2/10
CHECKED BY : J. DILWORTH DATE : 2/10

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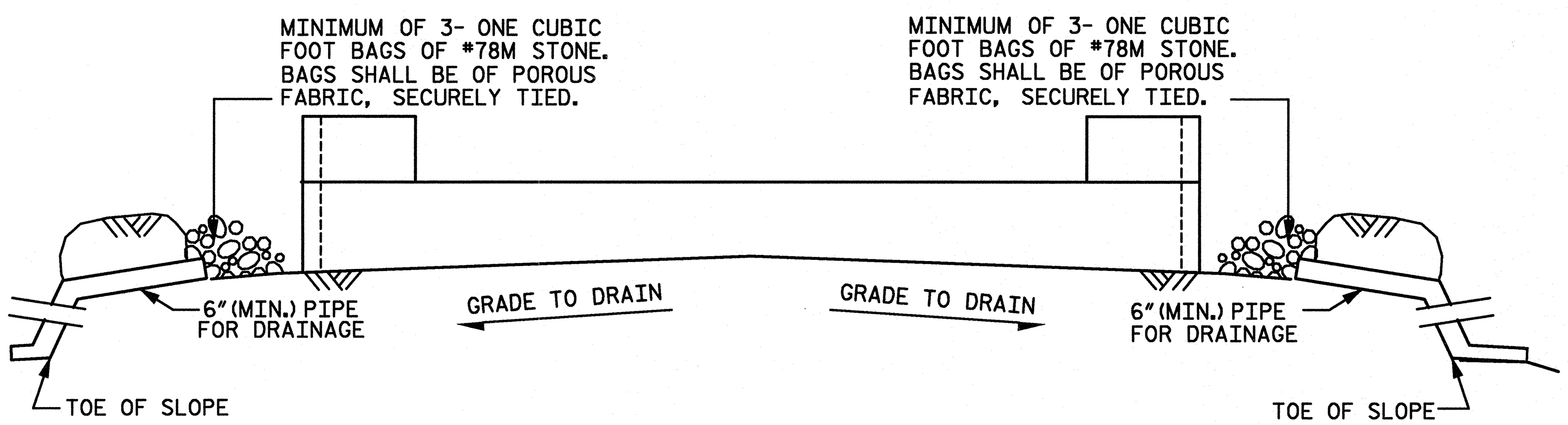
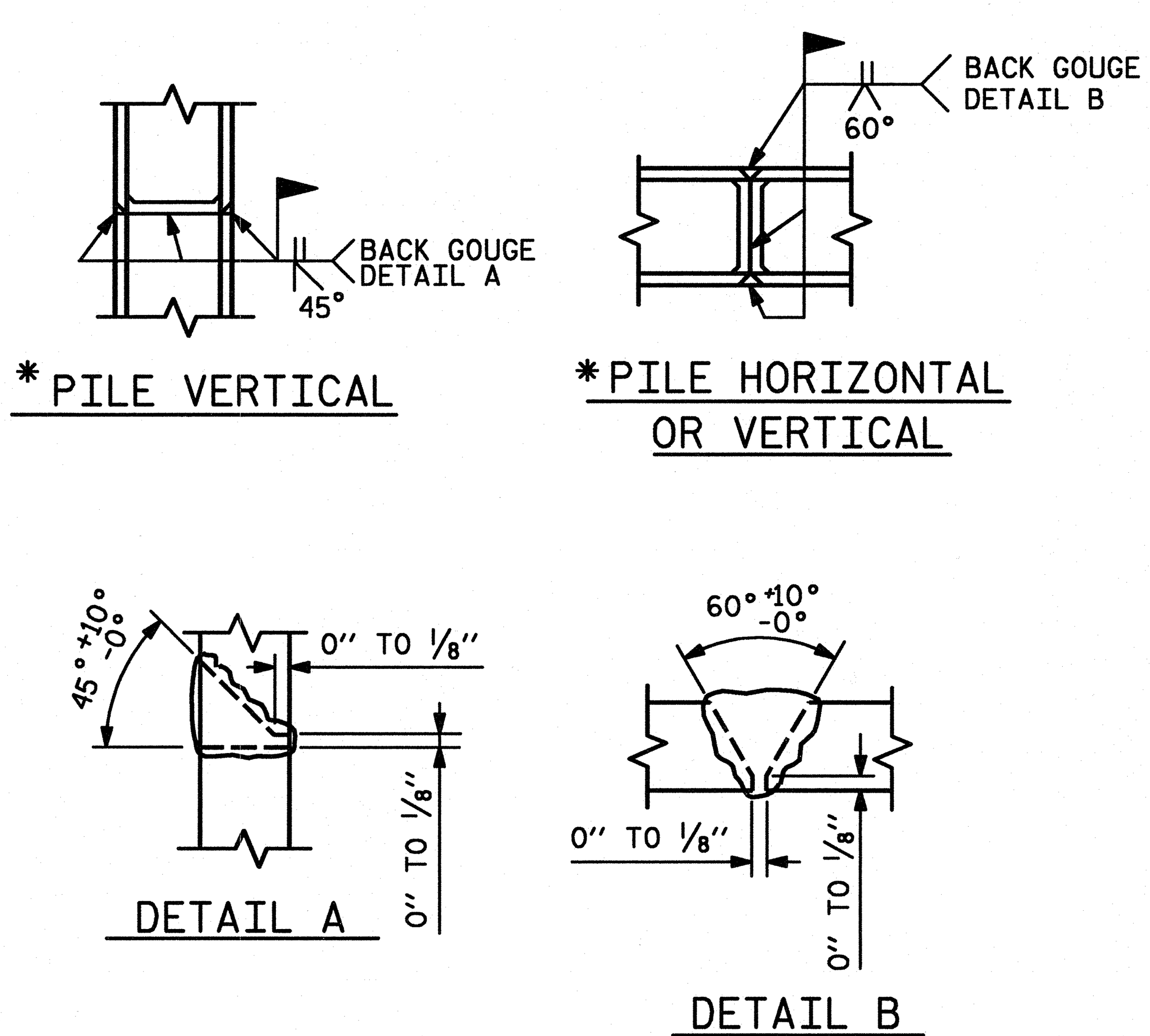


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

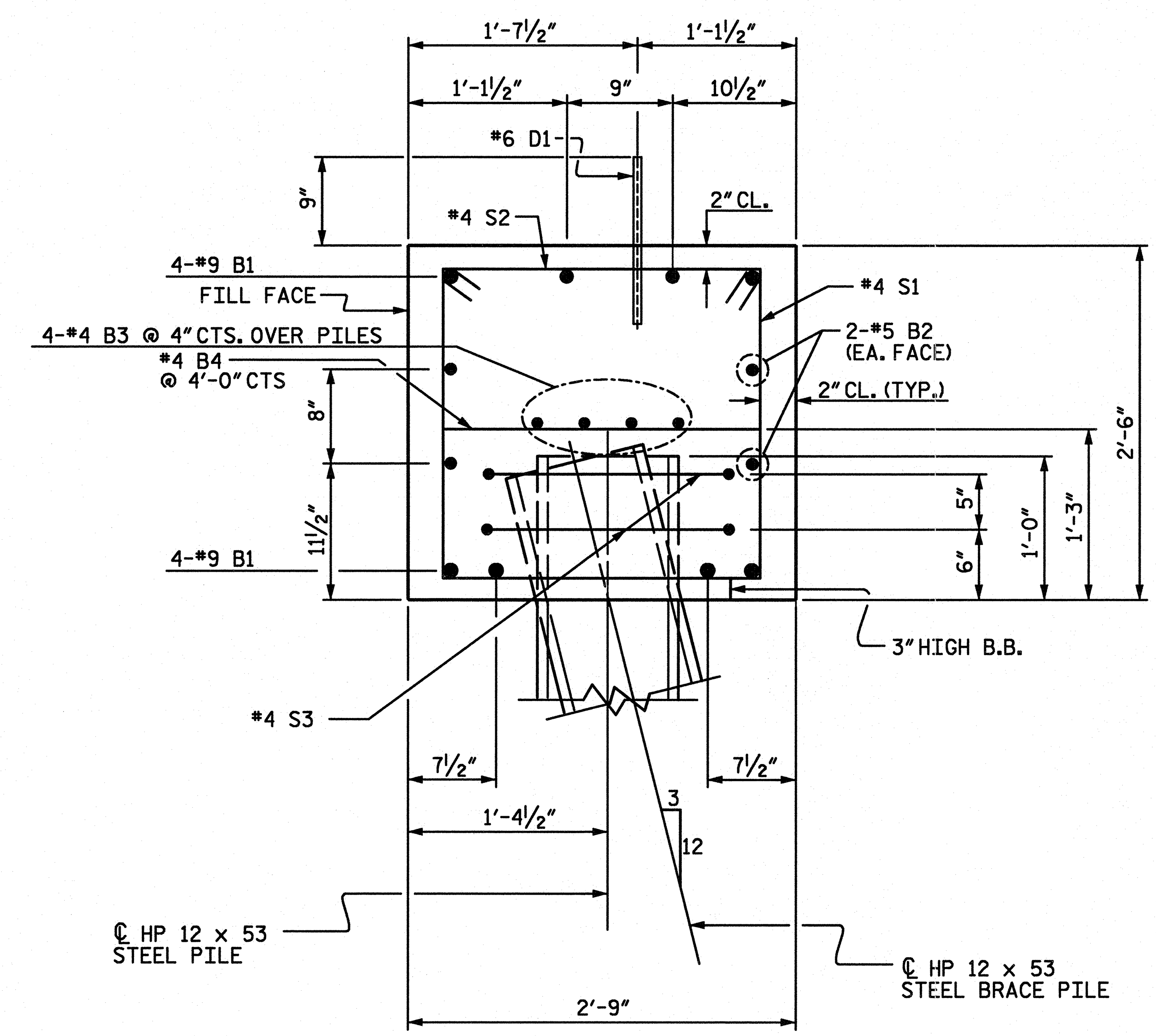
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



PILE SPLICE DETAILS

*POSITION OF PILE DURING WELDING.



SECTION A-A

WBS NO. 42816.1.1

GRANVILLE COUNTY

STATION: 10+29.000 -L-

REPLACES BRIDGE NO. 139

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 2

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH
12-2-10

WETHERILL ENGINEERING
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TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

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

SHEET NO. S-17
TOTAL SHEETS 19

DRAWN BY : J. PENDERGRAFT DATE : 2/10
CHECKED BY : J. DILWORTH DATE : 2/10

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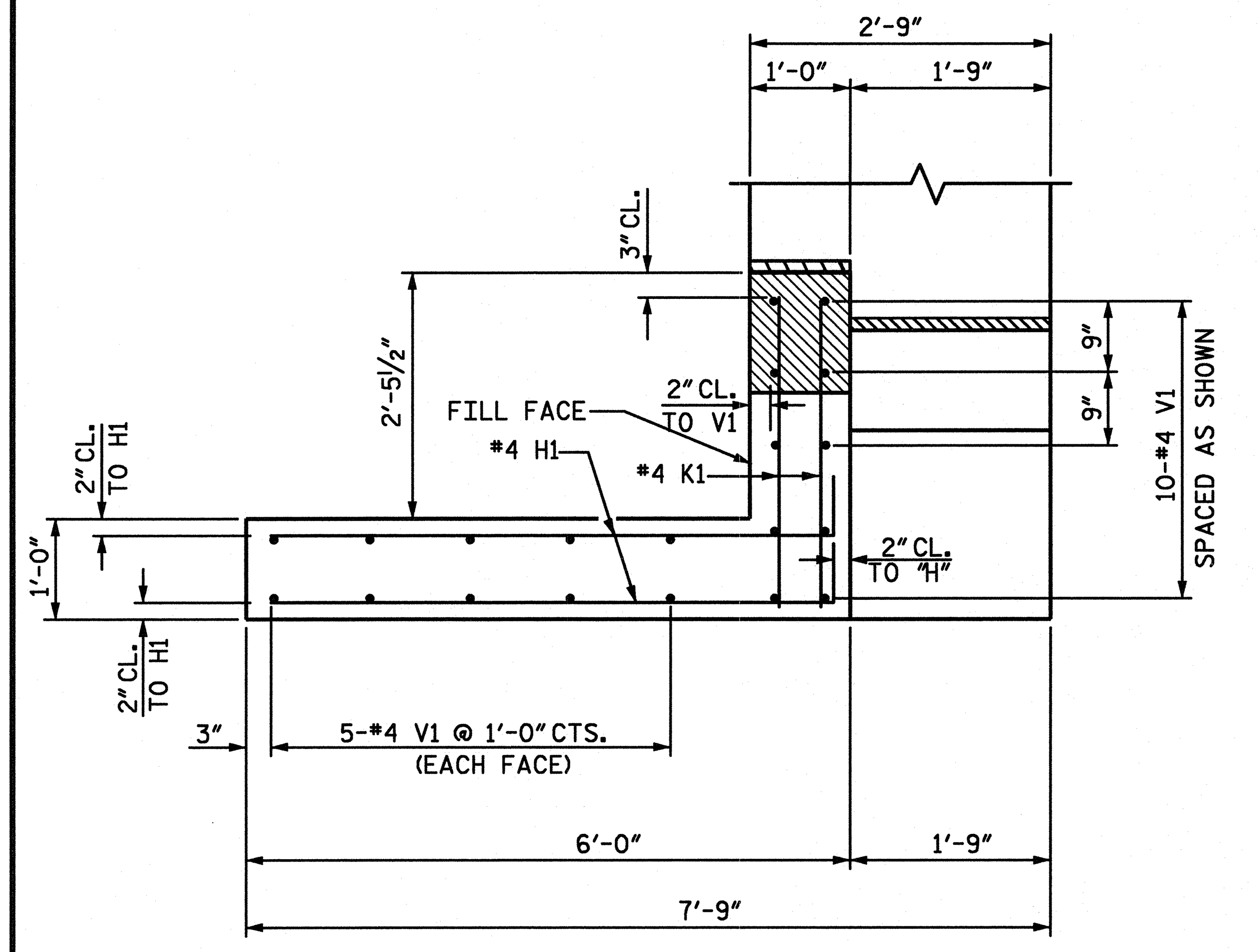
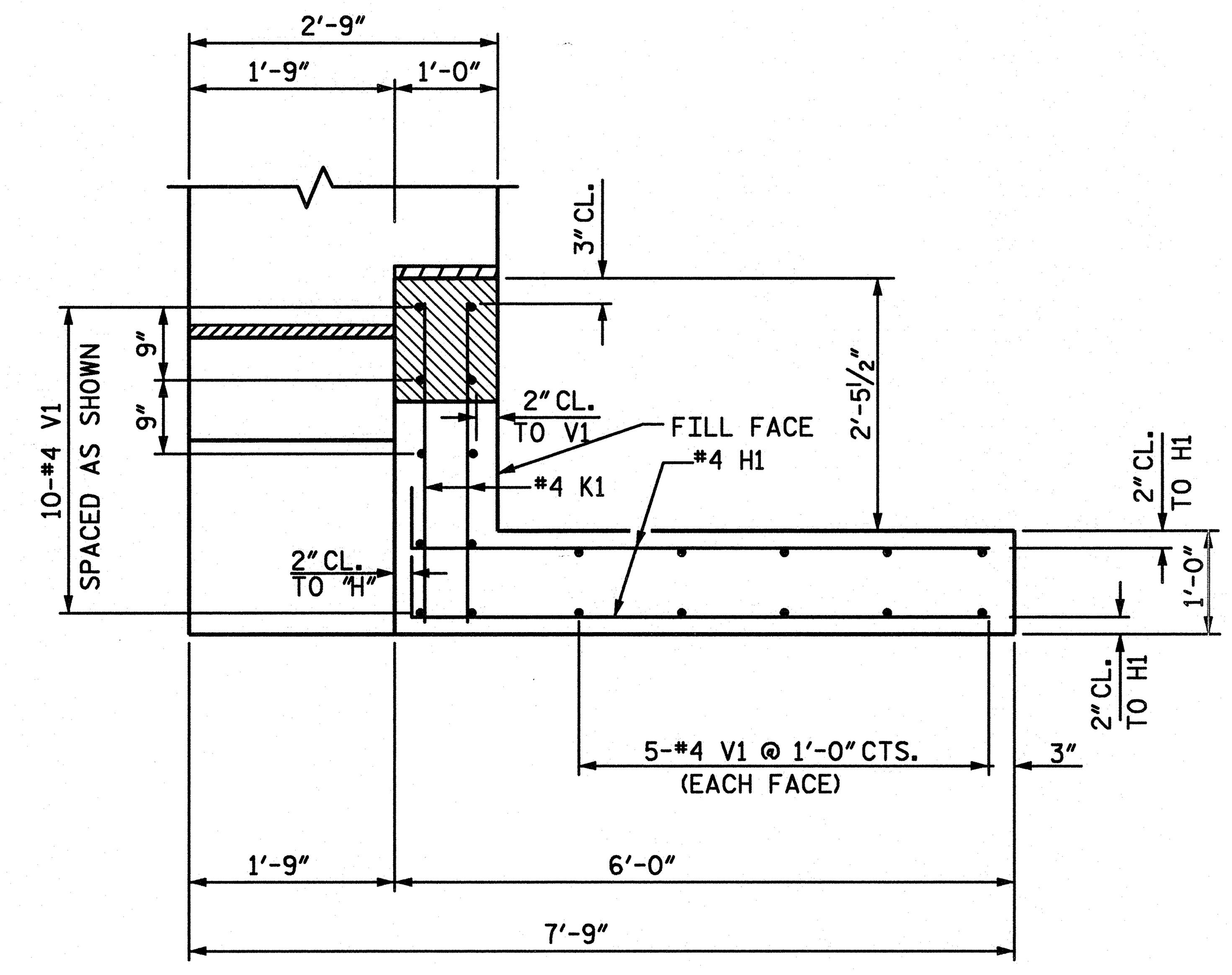
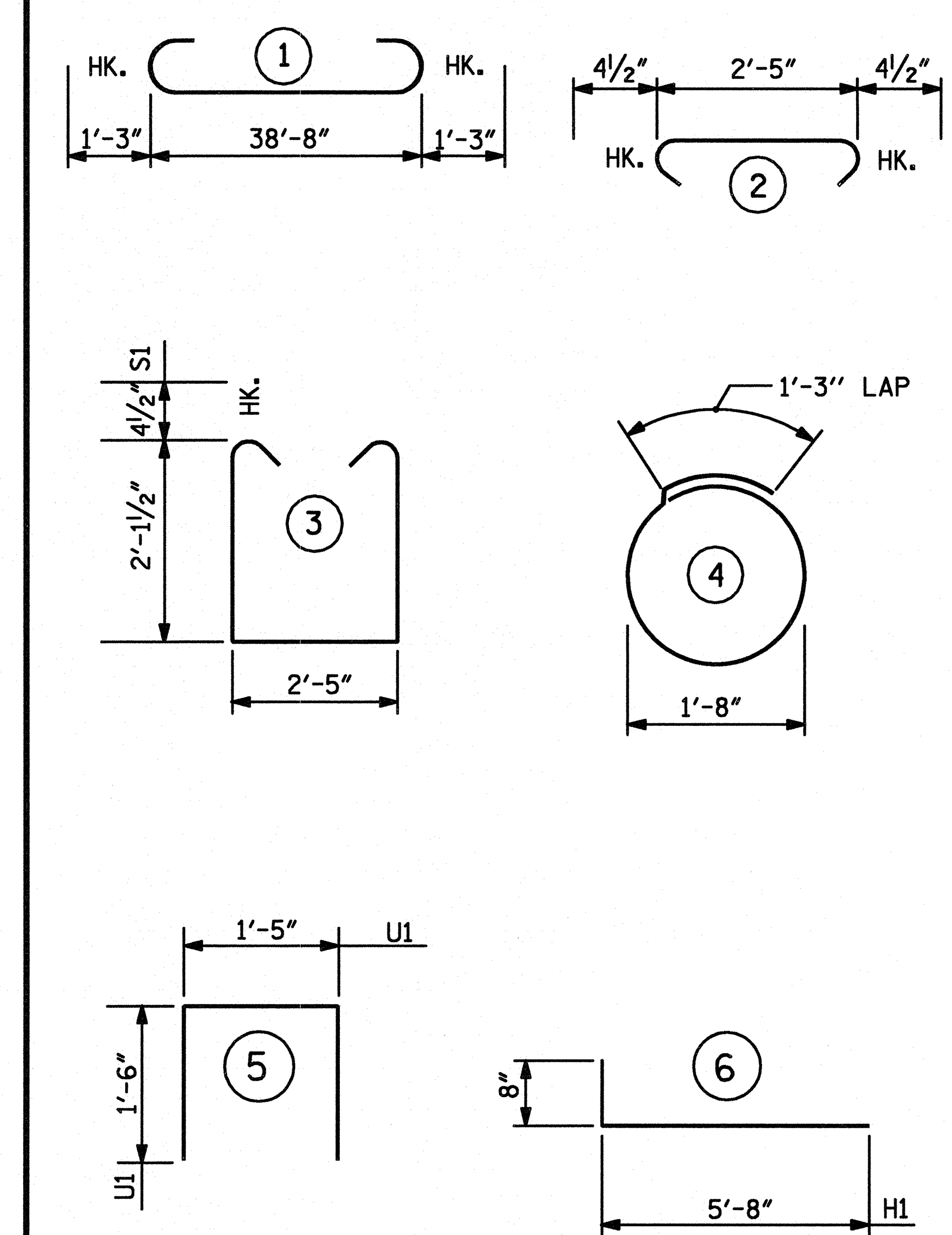


PLAN OF WING (W1)



PLAN OF WING (W2)

BAR TYPES



(ALL BAR DIMENSIONS ARE OUT TO OUT.)

BILL OF MATERIAL

END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	41'-2"	1120
B2	4	#5	STR	38'-8"	161
B3	8	#4	STR	20'-7"	110
B4	10	#4	STR	2'-5"	16
D1	22	#6	STR	1'-6"	50
H1	24	#4	6	6'-4"	102
K1	12	#4	STR	3'-1"	25
S1	42	#4	3	7'-5"	208
S2	42	#4	2	3'-2"	89
S3	12	#4	4	6'-6"	52
U1	4	#4	5	4'-5"	12
V1	40	#4	STR	4'-5"	118

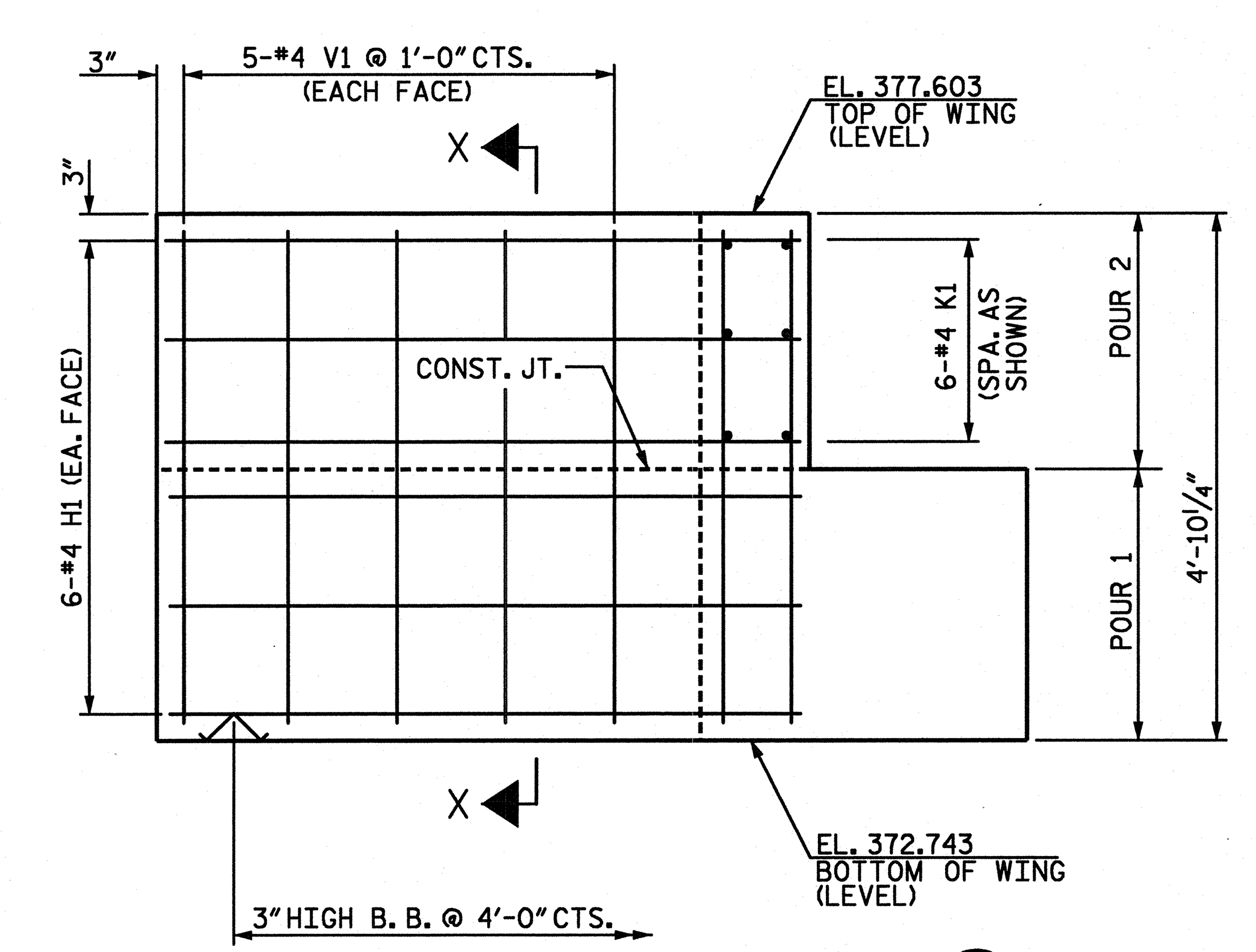
REINFORCING STEEL = 2063 LBS

CLASS A CONCRETE

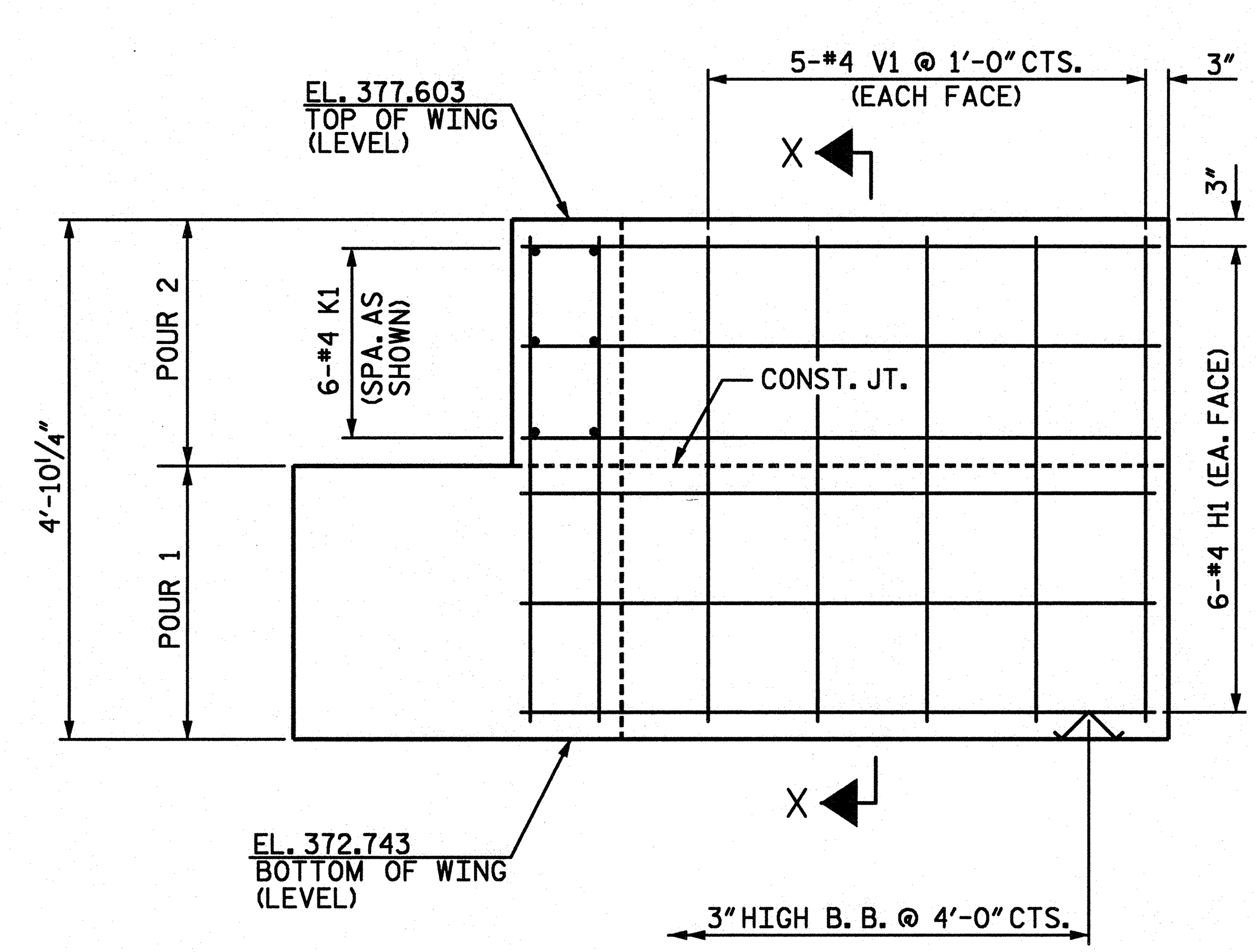
POUR 1	CAP & LOWER PART OF WINGS	C.Y.	10.9
POUR 2	UPPER PART OF WINGS	C.Y.	1.5
POUR 3	LATERAL GUIDES	C.Y.	0.1
	TOTAL	C.Y.	12.5

HP 12 X 53 GALVANIZED STEEL PILES

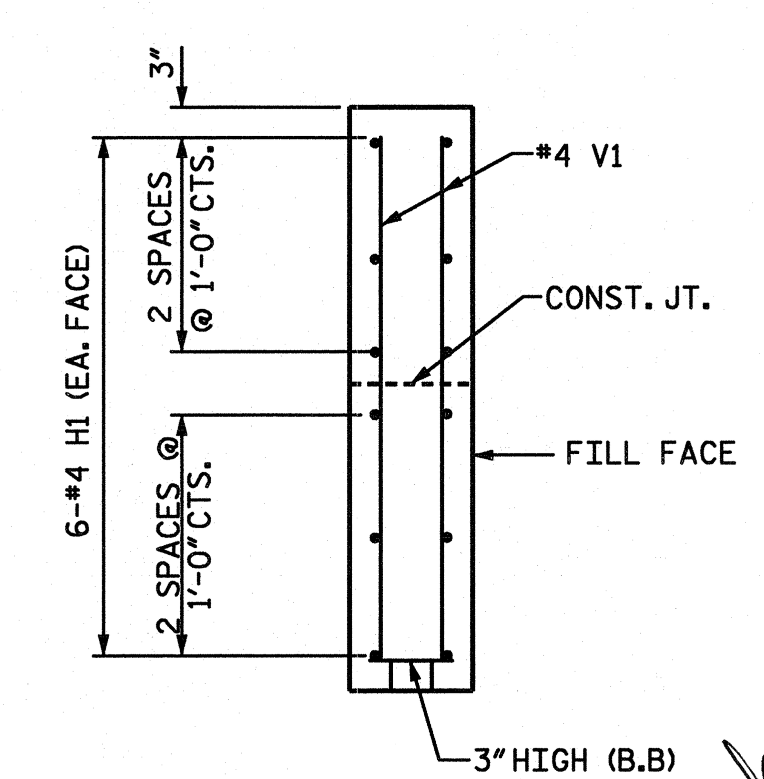
NO. 6 (LIN. FT.) 65



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)



SECTION X-X

WBS NO. 42816.1.1

GRANVILLE COUNTY

STATION: 10+29.000 -L-

REPLACES BRIDGE NO. 139

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 2

NORTH CAROLINA PROFESSIONAL SEAL 22072 ENGINEER JOHN ARTHUR DILWORTH

12-2-10

WETHERILL ENGINEERING
559 Jones Franklin Rd. Suite 164
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
License No. F-0377

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

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

SHEET NO. S-18

TOTAL SHEETS 19

DRAWN BY : J. PENDERGRAFT DATE : 2/10
CHECKED BY : J. DILWORTH DATE : 2/10

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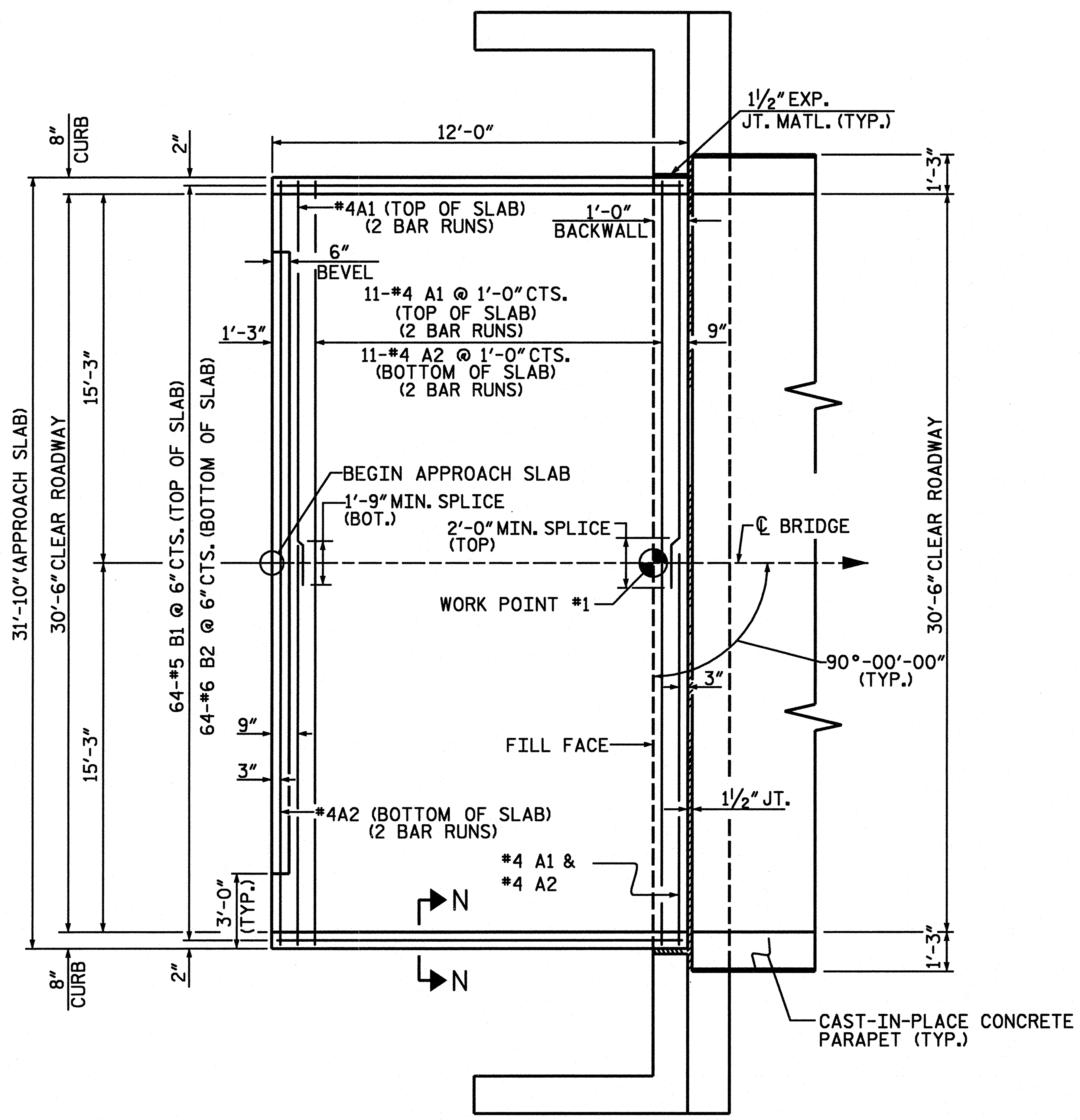


PLAN OF APPROACH SLAB @ END BENT 1

(END BENT 2 SIMILAR)

NOTES

FOR BRIDGE APPROACH FILL INCLUDING FABRIC, 4" Ø DRAINAGE PIPE, AND #78M STONE BACKFILL, SEE ROADWAY PLANS.

APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.

FABRIC SHALL BE TYPE 1 ENGINEERING FABRIC IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

#78M STONE BACKFILL (CLASS V SELECT MATERIAL) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

#78M STONE BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

FOR THE 4" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

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

THE 6" COMP. A.B.C. SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB AND SHALL EXTEND 1'-0" OUTSIDE OF EACH EDGE OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 4" TYPE B-25.0B ASPHALT CONCRETE BASE COURSE IN LIEU OF 6" COMP. A.B.C. IF THIS OPTION IS USED, THE BASE COURSE SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB, AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB.

THE CONTRACTOR MAY USE 5" CLASS "A" CONCRETE BASE IN LIEU OF 6" COMP. A.B.C. IF THIS OPTION IS USED, THE CONCRETE BASE SHALL BE FLUSH WITH THE ROADWAY END OF THE APPROACH SLAB, AND THE WIDTH SHALL BE THE SAME AS THAT OF THE APPROACH SLAB. THE CONCRETE SHALL BE FINISHED TO A SMOOTH SURFACE AND A LAYER OF 30 LB ROOFING FELT SHALL BE PLACED BETWEEN THE CONCRETE BASE AND THE APPROACH SLAB TO PREVENT BOND. THE APPROACH SLAB SHALL NOT BE CAST UNTIL THE CONCRETE BASE HAS REACHED AN AGE OF THREE CURING DAYS.

FOR JOINT DETAILS, SEE "PRESTRESSED CONCRETE CORED SLAB UNIT" SHEETS.

THE JOINT AT THE END BENT SHALL BE GROUTED AS SOON AS PRACTICAL AFTER THE CONSTRUCTION OF THE APPROACH SLABS.

APPROACH SLAB GROOVING IS NOT REQUIRED.

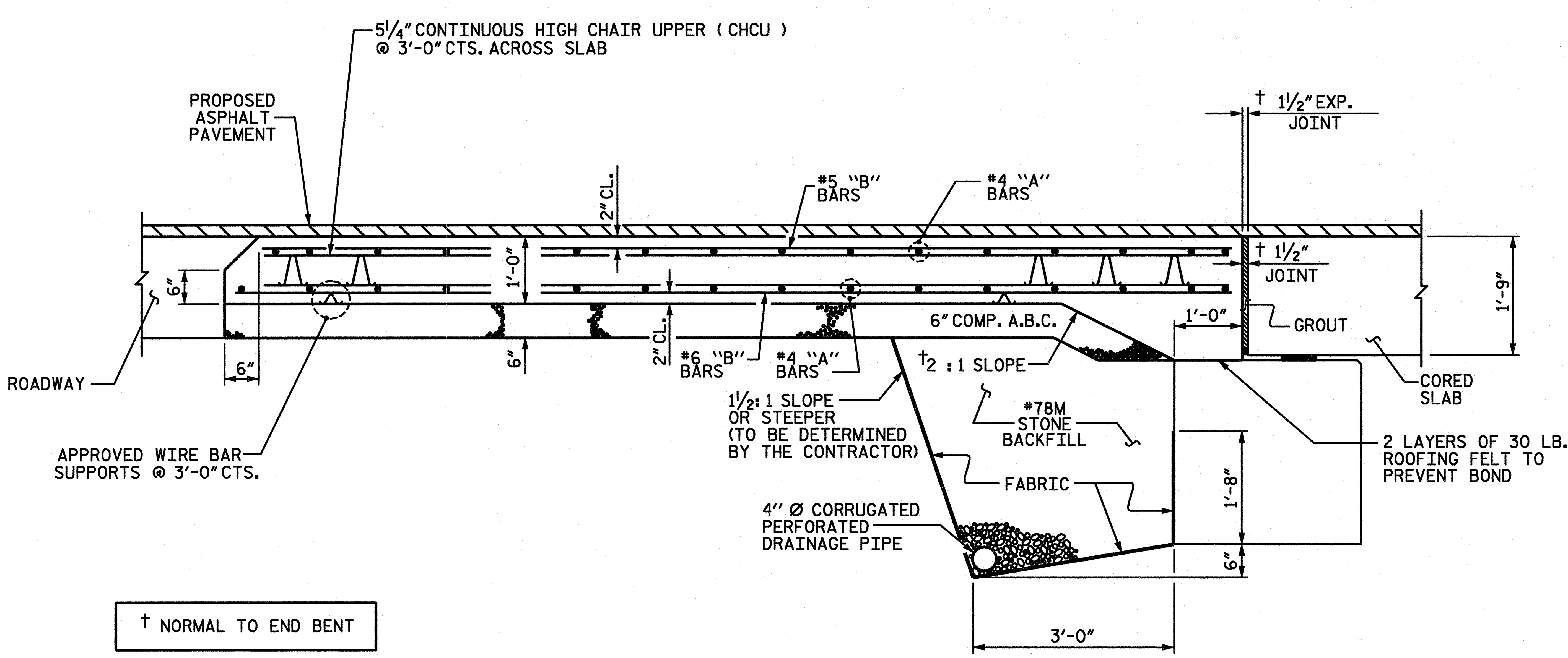
WORK SHOWN ON THIS DRAWING WILL BE PAID UNDER THE LUMP SUM PRICE FOR APPROACH SLABS.

TEMPORARY DRAINAGE AND TEMPORARY BERM AND SLOPE DRAINS WILL BE PAID FOR UNDER THE LUMP SUM PRICE FOR APPROACH SLABS, SEE ROADWAY STANDARD 1622.01.

BILL OF MATERIAL

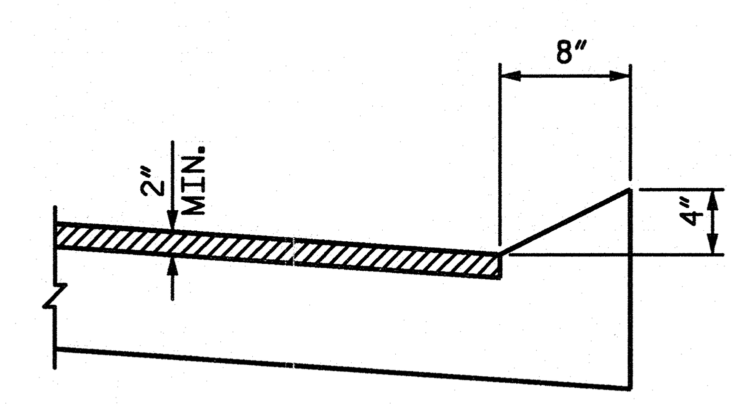
FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	26	#4	STR	16'-9"	291
A2	26	#4	STR	16'-8"	289
✱ B1	64	#5	STR	11'-2"	745
B2	64	#6	STR	11'-8"	1121
REINFORCING STEEL				LBS.	1410
✱ EPOXY COATED REINFORCING STEEL				LBS.	1036
CLASS AA CONCRETE				C. Y.	15.9

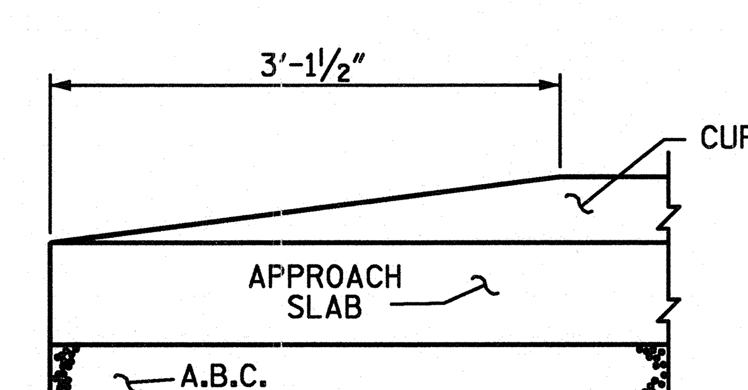


† NORMAL TO END BENT

SECTION THRU SLAB



SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

WBS NO. 42816.1.1

GRANVILLE COUNTY

STATION: 10+29.000 -L-

REPLACES BRIDGE NO. 139

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 22072 JOHN ARTHUR DILWORTH 12-2-10

WETHERILL ENGINEERING
559 Jones Franklin Rd. Suite 164 Raleigh, N.C. 27606 Bus: 919 851 8077 Fax: 919 851 8107 License No. F-0377
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

STD. NO. BAS13

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

DRAWN BY : J. PENDERGRAFT DATE : 5/10
CHECKED BY : J. DILWORTH DATE : 5/10

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STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

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

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

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

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

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

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

REINFORCING STEEL:

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

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

STRUCTURAL STEEL:

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

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

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

HANDRAILS AND POSTS:

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

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. 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