

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS PLANS FOR CONSTRUCTION

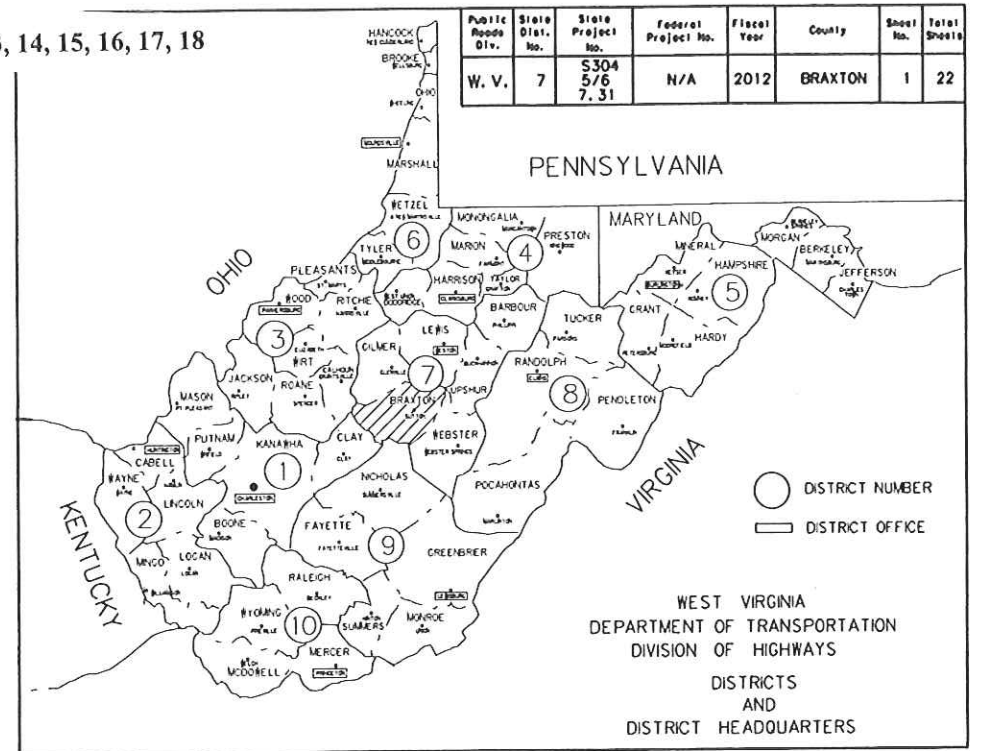
SHEET NO. 1, 2, 3, 8, 9, 12, 13, 14, 15, 16, 17, 18

OF STATE HIGHWAY

STATE PROJECT NO. S304-5/6-7.31
COUNTY ROUTE NO. 5/6
OTTER DISTRICT
BRAXTON COUNTY

RIFFLE I-BEAM BRIDGE REPLACEMENT

	Station	Station	ft.	miles
Roadway	0+50.00	to 1+65.13	115.13	0.022
Bridge	1+65.13	to 2+29.37	64.24	0.012
Roadway	2+29.37	to 3+50.00	120.63	0.023
Total Project Length *			300.00	0.057



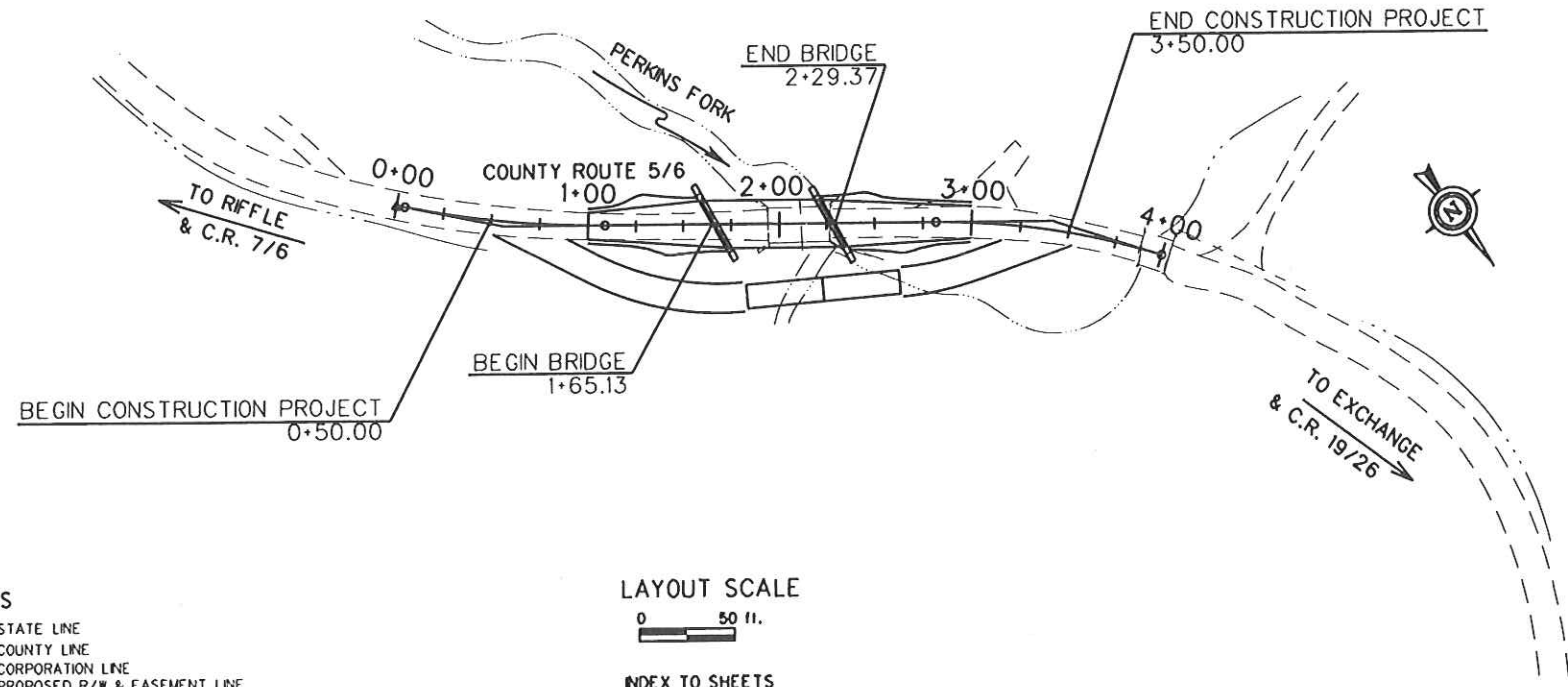
Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	Fiscal Year	County	Sheet No.	Total Sheets
W. V.	7	S304-5/6-7.31	N/A	2012	BRAXTON	1	22

WEST VIRGINIA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
DISTRICTS AND
DISTRICT HEADQUARTERS

TYPE OF CONSTRUCTION

BRIDGE CONSTRUCTION
BRIDGE REPLACEMENT #10832

UTILITIES
MON POWER A FIRST ENERGY COMPANY
FRONTIER OF WV



W. RICHARD WHITE
REGISTERED
6349
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER

SIGNED: _____
RESPONSIBLE CHARGE ENGINEER

DATE: _____

NOTES: STANDARD DETAIL BOOK VOL. I DATED JANUARY 1, 2000 & VOLUME II DATED JANUARY 1, 1994, SHALL APPLY TO THIS PROJECT.

DESIGNED BY:	GFL	8-11
DRAWN BY:	GFL	8-11
CHECKED BY:	RMW	9-11
REVIEWED BY:	WRW	9-11

DESIGN DESIGNATION	
A. D. T (2009)	300
A. D. T (2029)	366
D. H. V	N/A
D	N/A
T	N/A
V	25 MPH

CONVENTIONAL SIGNS	
	STATE LINE
	COUNTY LINE
	CORPORATION LINE
	PROPOSED R/W & EASEMENT LINE
	EXISTING R/W LINE
	PROPERTY LINE
	EXISTING FENCE
	PROPOSED FENCE
	EDGE OF STREAM
	PROPOSED GUARD RAIL
	EXISTING GUARD RAIL
	RAILROAD
	GAS LINE
	WATER LINE
	TELEPHONE LINE
	ELECTRIC LINE
	TELEPHONE POLE
	POWER POLE
	COMBINED POWER AND TELEPHONE POLE
	TREE
	SHRUB
	RIGHT OF WAY MARKER

LAYOUT SCALE
0 50 ft.

INDEX TO SHEETS

NO.	DESCRIPTION
1	TITLE SHEET
2	GENERAL NOTES
3	EXISTING ELEVATION & DECK SECTION, SCOPE OF WORK, & ESTIMATE OF QUANTITIES
4	R/W AND UTILITY INDEX
5	PROJECT PLAN VIEW
6	GEOMETRIC LAYOUT & REFERENCES
7	PROFILES AND TYP. SECTIONS
8	PROPOSED BRIDGE PLAN VIEW, POST TEN. ROD DETAILS, & GUARDRAIL DETAILS
9	ELEVATION VIEW, HYDRAULIC DATA, STRUCTURE EXCAVATION DETAILS, & PROP. DECK SECTION
10-11	SUBSTRUCTURE DETAILS
12-18	SUPERSTRUCTURE DETAILS
19-22	C.R. 5/6 & DETOUR CROSS SECTIONS

REVISION NUMBER	SHEET NUMBER	REVISIONS	DATE	BY

I HEREBY CERTIFY THAT THIS IS A CORRECT COPY OF THE PLANS OF PROJECT S304-5/6-7.31

EXECUTIVE SECRETARY
20

RECOMMENDED _____ DESIGNER

RECOMMENDED FOR APPROVAL _____ STATE HIGHWAY ENGINEER

APPROVED _____ COMMISSIONER OF HIGHWAYS

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W. VA.	7	S304-5/6-7.31	BRAXTON	2	22

GOVERNING SPECIFICATIONS

The governing provisions applicable to this project are the West Virginia Department of Highways Standard Specifications, Roads and Bridges, adopted 2000, as amended by the current Supplemental Specifications of the West Virginia Department of Highways, the contract plans and the contract documents.

*Current Supplemental Specifications shall be the Specifications in effect on the first day of project advertisement for letting to contract.

DESIGN-NEW STRUCTURES ①

This bridge is designed for an HL-93 live load capacity, as well as for a ⁵⁰ p.s.f. wearing surface.

Design Unit Stresses:

Reinforcing Steel- $f_s = 20,000$ p.s.i.	Class B Concrete- $f'_c = 3,000$ p.s.i.
Structural Steel (A36)- $f_s = 20,000$ p.s.i.	Class B Concrete- $f'_c = 1,200$ p.s.i.
Structural Steel (A588)- $f_s = 27,000$ p.s.i.	Class B Concrete- $n = 10$

DESIGN-REHABILITATION AND STRENGTHENING ②

This bridge is strengthened for a live load capacity of W . Strengthening steel design stress- $f_s = 20,000$ p.s.i. All structural steel shall be ASTM A36 unless otherwise designated on the construction plans.

CONCRETE (CAST-IN-PLACE) ③

Concrete shall be cured in accordance with Subsection 601.12 of the Standard Specifications. If used, polyethylene coated burlap shall conform to the requirements of Subsection 707.5 of the Standard Specifications.

The minimum covering, measured from the surface of the concrete to the face of any reinforcing steel bar, shall be 3 inches if the concrete is in contact with the ground surface and 2 inches otherwise, except as specified differently on the plans.

SUBSTRUCTURE CONCRETE (CAST-IN-PLACE) ④

All concrete in the substructure shall be Class B, air entrained. Chamfer all exposed edges of the substructure concrete 1 inch, except for the abutment curbs, which shall be chamfered 3/4 inch.

The exposed surface of the substructure shall be Class 1, Ordinary Surface Finish, in accordance with Subsection 601.11.1 of the Standard Specifications, except for the abutment curbs and wingwalls, which shall be Class 2, Rubbed Finish, in accordance with Subsection 601.11.2 of the Standard Specifications.

The abutment curtain wall shall not be poured until after the superstructure is in place. For footings embedded in rock, the top of the abutment footing shall be maintained at the elevations shown on the plans. The footings shall be carried a minimum of 1 foot into solid rock and poured against the face of the rock without forms, except where the rock excavation is not the entire depth of the footing.

The abutment bearing seat, upon which the shoes or other bearing devices will be set, shall be finished to true elevations as shown on the plans.

Fill anchor bolt holes with non-shrink grout after anchor bolts are set. The non-shrink grout shall consist of 1 part regular portland cement, 1 part silica sand and 1 part non-shrink admixture. The cost of the non-shrink grout shall be included in Pay Item 601-2, "Class B Concrete".

SUPERSTRUCTURE CONCRETE (CAST-IN-PLACE) ⑤

All concrete in the superstructure shall be Class K, air entrained. All concrete for decks, curbs, parapets or medians shall be Class K, air entrained, containing 7 bags of cement per cubic yard.

Chamfer all exposed edges of the curbs, parapets or medians 3/4". The exposed surfaces of the curbs shall be Class 2, Rubbed Finish, in accordance with Subsection 601.11.2 of the Standard Specifications. Bridge decks shall be finished in accordance with Subsection 601.11.4 of the Standard Specifications.

REINFORCING STEEL BARS ⑥

All reinforcing steel bars shall be intermediate grade billet steel, Grade 40 or 60 in accordance with Subsection 709.1 of the Standard Specifications. The requirements of Section 602 of the Standard Specifications shall be followed.

The minimum splice length or dowel bar embedment shall be 30 bar diameters. Reinforcement under the shoes or other bearing device shall be so placed so as to avoid interference with drilling of anchor bolt holes.

The inspector shall select random bars from the reinforcing bar list for test bars. He shall cut 5'-0" from the bars chosen, rebars have been detailed to allow a 30 bar diameter splice at each end. One rebar for each 10 tons or fraction thereof, of each size has been included in the bill of steel and will be paid for under Item 602-1. In the event all bars of any one size are not sent in one shipment, the supplier shall, at his expense, furnish one bar for each 10 tons or fraction thereof, for each extra shipment.

In the event that any shipment of material has been pre-tested and has been identified in accordance with Material's Control, Soil and Testing Division's Informational Memorandum Number 17(IM-17), the shipment may be accepted without further testing subject to record sampling procedures.

STRUCTURE EXCAVATION (FOOTINGS FOUNDED IN ROCK) ⑦

Structure excavation quantities through earth fill shall be measured from the top of rock to the original ground line, 18 inches outside the neat line of the footings. No excavation will be classified as wet or rock excavation. Rock shall be excavated and paid for as structure excavation to the neat lines of the footings only. Rock shall be excavated until a level surface is provided with the entire footing resting on hard rock.

STEEL TOUGHNESS REQUIREMENT ⑧

The provisions of the AASHTO Specifications in accordance with Article 615.4.9 of the Standard Specifications shall apply to those items of structural steel as shown and/or designated by these plans.

PAINTING (NEW STRUCTURES) ⑨

Shop and field painting shall be in accordance with Section 615 of the current Standard Specifications and/or Special Provisions.

OPTION: 9A

Paint system shall consist of one shop prime coat, one field prime coat and two field finish coats. Shop Prime Coat: One complete coat of vinyl shop primer conforming to the requirements of Subsection 711.7 of the Standard Specifications. This will replace the shop paint specified in Subsection 615.6.3. Dry film thickness shall be a minimum of two (2) mils.

Field Prime Coat: One complete coat of linseed/alkyd primer conforming to the requirements of Subsection 711.8 of the Standard Specifications. Dry film thickness shall be a minimum of two (2) mils. First Finish Coat: One complete pigmented finish coat conforming to the requirements of Subsection 711.10 of the Standard Specifications. The color shall be $\text{\textcircled{C}}$ in accordance with Federal Standard 595, number $\text{\textcircled{C}}$. Dry film thickness shall be a minimum of two (2) mils.

Top Finish Coat: One complete pigmented finish coat conforming to the requirements of Subsection 711.11 of the Standard Specifications. The color shall be $\text{\textcircled{C}}$ in accordance with Federal Standard 595, number $\text{\textcircled{C}}$. Dry film thickness shall be a minimum of two (2) mils.

OPTION: 9B

Paint system shall consist of shop prime coat, intermediate field fogcoat and finish topcoat. Field painting shall also include touch-up and repair of shop paint. Paint system shall be the inorganic zinc rich system meeting the requirements of Section 711.20 of the Standard Specifications.

Shop Prime Coat: Shall conform to the requirements of Subsection 711.20.2 of the Standard Specifications. Dry film thickness shall be minimum three (3) mils.

Intermediate Field Coat: Shall conform to the requirements of Subsection 711.20.3 of the Standard Specifications.

Topcoat: Shall conform to the requirements of Subsection 711.20.4 of the Standard Specifications. The color shall be $\text{\textcircled{C}}$ in accordance with Federal Standard 595, number $\text{\textcircled{C}}$. Dry film thickness of the total paint system shall be a minimum of seven (7) mils.

OPTION: 9C

Paint system shall consist of application of shop prime coat and field touch-up and repair of shop coat. Paint system shall be the inorganic zinc rich primer meeting the requirements of Subsection 711.20.2 of the Standard Specifications. Dry film thickness shall be a minimum three (3) mils.

CLEANING AND PAINTING (EXISTING STRUCTURES) ⑩

Field cleaning and painting shall be in accordance with either OPTION 10A or 10B and shall also conform to all applicable requirements of Section 620 of the current Standard Specifications and/or Special Provisions. When it is determined that the structure contains an environmentally hazardous existing paint system then option 10C shall also apply.

OPTION: 10A

Cleaning: The portions of the structure listed in the special notes and quantity sheet, which is approximately $\text{\textcircled{C}}$ per cent, shall be cleaned in accordance with Subsection 620.6.1 of the Standard Specifications.

The remaining portions of the structure not specified, shall be cleaned in accordance with Subsection 620.6.2.

It is not intended that sound, adherent old paint be removed unless it is excessively thick or inflexible.

Attention is called to the requirements of paragraph 2 of Section 620.6 which requires that edges of paint be properly feathered to produce a smooth appearance.

In the event that there is a difference of opinion as to which areas must be sandblasted or hand cleaned or to the extent of surface cleaning or surface preparation, the decision of the Engineer shall be final.

Spot Painting: All steel surfaces cleaned to bare metal shall receive one coat of linseed/alkyd primer conforming to the requirements of Section 711.8 of the Standard Specifications. This coat shall be tinted with a tinting agent, type as recommended by the paint manufacturer and approved by the Engineer.

Prime Coat: One complete coat of linseed/alkyd primer shall be applied to the entire structure upon completion of the spot painting. The primer shall conform to the requirements of Section 711.8 of the Standard Specifications. Dry film thickness shall be a minimum of two (2) mils.

Intermediate Field Coat: Upon completion of application of the prime coat, the entire structure shall receive a minimum of one complete color undercoat conforming to the requirements of Section 711.10 of the Standard Specifications. Dry film thickness shall be a minimum two (2) mils. The color shall be $\text{\textcircled{C}}$ in accordance with Federal Standard 595, number $\text{\textcircled{C}}$.

Top Coat-Pigmented Finish Coat: Upon completion of application of the intermediate coat, the entire structure shall receive a minimum of one complete pigmented finish coat conforming to the requirements of Section 711.11 of the Standard Specifications. Dry film thickness shall be a minimum two (2) mils. The color shall be $\text{\textcircled{C}}$ in accordance with Federal Standard 595, number $\text{\textcircled{C}}$.

OPTION: 10B

Cleaning: All surfaces to be painted shall be cleaned and prepared in accordance with Section 620.5 of the Standard Specifications to a "white metal" or "near white metal" condition. The paint system shall be as follows:

Field Prime Coat: All bare surfaces shall be primed with an organic zinc rich primer conforming to the requirements of SSPC Specification Number 20, Type 2. Dry film thickness of the primer shall be a minimum of four (4) mils.

Field Intermediate Coat: The field intermediate coat shall conform to the requirements of Article 711.20.3 of the Standard Specifications.

Field Top Coat: The field top coat shall conform to the requirements of Article 711.20.4 of the Standard Specifications. The color shall be $\text{\textcircled{C}}$ in accordance with Federal Standard 595, number $\text{\textcircled{C}}$. Dry film thickness of the total paint system shall be a minimum seven (7) mils.

OPTION: 10C

Environmental Protection: All portions of the structure shall be cleaned in accordance with the Special Provision for 620-Cleaning and Painting Existing Steel Bridges, Sub-articles 620.1, 620.9, 620.10, 620.11, and 620.12 as contained in these plans.

STRUCTURE EXCAVATION (FOOTINGS FOUNDED ON PILES) ⑪

Structure excavation quantities through earth fill shall be measured from the bottom of the footing to the original ground line, 18 inches outside the neat line of the footings. No excavation will be classified as wet or rock excavation.

PREFORMED ELASTOMERIC JOINT SEALER ⑫

The preformed elastomeric joint sealer shall conform to the requirements of Section 624 of the Standard Specifications.

BRIDGE GUARDRAIL ⑬

The guardrail, buffer end terminal sections, posts and end anchors shall conform to the requirements as set forth by the West Virginia Department of Highways Standard Details Book (Standard Sheets G.R.1 through G.R.7, as applicable) and Standard Bridge Plan Sheet BR-G1. Blocks are required. End anchorage shall be in accordance with Design Directive DD 16.4. All guardrail mounting hardware will be hot-dip galvanized after fabrication. Threads shall be retapped to ensure proper fit. Guardrail posts may be square or beveled.

STRUCTURAL STEEL ⑭

All structural steel shall conform to the requirements of ASTM A36 ($f_s = 20,000$ p.s.i.) unless otherwise noted.

For superstructures utilizing steel grid flooring, structural steel conforming to the requirements of ASTM A588 ($f_s = 27,000$ p.s.i.) may be substituted for ASTM A36 steel. No painting shall be required for ASTM A588 steel.

OPTION: 14A

All ASTM A36 steel shall be blast cleaned and shop primed in accordance with Section 615 of the Standard Specifications.

STEEL GRID FLOORING (CONCRETE FILLED TYPE) ⑮

The steel grid flooring shall conform to all applicable requirements of Section 621 of the current Standard Specifications and/or all Special Provisions of the West Virginia Department of Highways. The grid shall conform to all applicable requirements as set forth by the Bridge Grid Flooring Manufacturers Association. Size and type shall be as specified on the plans.

The steel grid flooring shall conform to all requirements of ASTM A36, A572 or A588, type as specified on the plans.

Cleaning: All surfaces to be painted shall be cleaned and prepared in accordance with Section 615.6 of the Standard Specifications to a "white metal" or "near white metal" condition. The paint system shall be as follows:

The steel grid flooring and all components shall either be shop painted with an inorganic zinc rich primer meeting Subsection 711.20.2 of the Standard Specifications or hot dipped galvanized meeting requirements of ASTM A123. Type of coating shall be as specified on the plans.

All reinforcing steel shall be number 3 billet steel bars either Grade 40 or 60 in accordance with Subsection 709.1 of the Standard Specifications.

The concrete used to fill the steel grid shall be Class A air entrained. The design stresses for this concrete are $f_c = 3,500$ psi, $f_t = 1,400$ psi and $n = 10$.

STEEL GRID FLOORING (OPEN TYPE) ⑯

The steel grid flooring shall conform to all applicable requirements of Section 621 of the current Standard Specifications and/or all Special Provisions of the West Virginia Department of Highways. The grid shall conform to all applicable requirements as set forth by the Bridge Grid Flooring Manufacturers Association. Size and type shall be as specified on the plans.

The steel grid flooring shall conform to all requirements of ASTM A36, A572 or A588, type as specified on the plans.

Cleaning: All surfaces to be painted shall be cleaned and prepared in accordance with Section 615.6 of the Standard Specifications to a "white metal" or "near white metal" condition. The paint system shall be as follows:

The steel grid flooring and all components shall either be shop painted with an inorganic zinc rich primer meeting Subsection 711.20.2 of the Standard Specifications or hot dipped galvanized meeting requirements of ASTM A123. Type of coating shall be as specified on the plans.

MAINTAINING TRAFFIC ⑰

Traffic shall be maintained in accordance with Section 636 and Subsection 104.5 of the Standard Specifications.

NOTE SELECTION TABLE

CODE	YES	NO	CODE	YES	NO
1	✓		10B		✓
2		✓	10C		✓
3	✓		11	✓	
4	✓		12		✓
5		✓	13	✓	
6	✓		14		✓
7		✓	14A		✓
8		✓	15		✓
9		✓	16		✓
9A		✓	17	✓	
9B		✓	18		✓
9C		✓	19	✓	
10		✓			
10A		✓			

These items are for Purchase Order Contract only.

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS-STRUCTURES

CONSTRUCTION PLANS OF
RIFLE I-BEAM BRIDGE
ON C.R. 5/6 (SLS)
OVER PERKINS FORK
BRAXTON COUNTY

DESIGNED BY:	GFL
DRAWN BY:	BWU
CHECKED BY:	BKR
REVIEWED BY:	WRW
DATE:	08-11
SCALE:	NONE
SHEET NO.:	2 OF 22
BRIDGE NUMBER:	21-5/6-7.33 (10832)

GENERAL NOTES

APPROVED: _____ DATE: _____

DIRECTOR, STRUCTURES DIVISION

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-STRUCTURES
STANDARD BRIDGE PLANS

GENERAL NOTES
STANDARD SHEET BR-2A

PREPARED: 11-26-90

REVISED 5-91

8-93

CONTROL VALUE

CODE	VALUE
A	NA
B	NA
C	NA
D	NA
E	NA
F	NA
G	NA

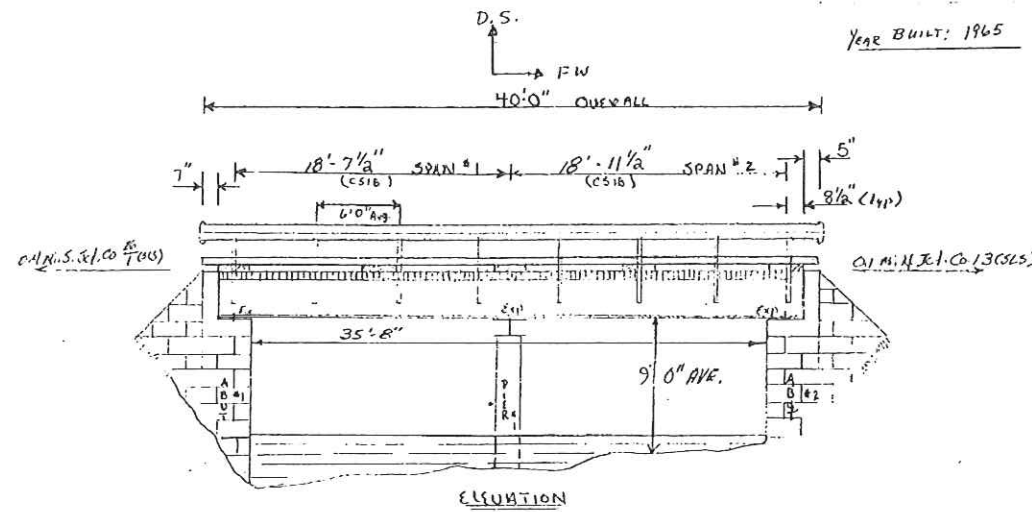
PROJECT NUMBERS		WV DISTRICT SEVEN	COUNTY BRAXTON	SHEET 3	OF 22
FEDERAL N/A	STATE S304-5/6-7.31				

ESTIMATE OF QUANTITIES

PROJECT NO. S304-5/6-7.31
FOR INFORMATION ONLY

DESCRIPTION	UNITS	NO. AND SIZE	TOTAL
CLASS B CONCRETE	CY		41
* 21 IN. CONC. BOX BEAMS (EXT.)	SF	2 @ 61' 6"	369
* 21 IN. CONC. BOX BEAMS (INT.)	SF	6 @ 61' 6"	1107
BENT REBAR	LB		1782
#5 REBAR STRAIGHT	LB	50 @ 20' 0"	1043
#8 REBAR STRAIGHT	LB	48 @ 20' 0"	2563
* 1" POST TENSIONING BAR X 15' W/NUTS	LF	2 EA.	30
* 1" POST TENSIONING BAR X 27' W/NUTS	LF	4 EA.	108
* 9" X 9" X 1" PLATES	EA		10
* 5" X 5" X 1/4" PLATES	EA		2
* 1" SPONGE RUBBER PREFORMED JOINT FILLER	SF	5 1/16" X 116'	53
* 1" SPONGE RUBBER PREFORMED JOINT FILLER	EA	4 3/4" X 11 1/8"	8
* 1" SPONGE RUBBER PREFORMED JOINT FILLER	EA	4 3/4" X 1' 2 1/16"	28
* 1" SPONGE RUBBER WASHER	EA	8" X 8" WITH 3 1/2" DIA. HOLE	34
* BEARING PADS 1 1/8" X 4 3/4" X 15 1/2"	EA		4
* BEARING PADS 1 1/8" X 4 3/4" X 28"	EA		14
* SWEDGED ANCHOR BOLTS 1" DIA. X 2' 0"	EA		16
* 1" SPONGE RUBBER PREFORMED JOINT FILLER	SF	1' 9" X 65' 0"	114
NON-SHRINK GROUT FOR JOINTS AND ANCHORS	BAG		174
* GUARDRAIL INSERT AND HARDWARE	EA		20
* BRIDGE GUARDRAIL (THREE BEAM)	LF		112.5
* CLASS 1 APPROACH GUARDRAIL	LF		93.75
* ASSYMETRICAL THREE BEAM TRANSITIONS	EA		4
H.M.A. BASE COURSE	TON		56
H.M.A. WEARING	TON		42
BASE STONE	TON		425
W12X65 PILING	LB	14 PCS. @ 20' 0"	18200
FOUNDATION PROTECTION MATERIAL	TONS		220
FABRIC FOR SEPARATION	SY		680
CUT	CY		292
FILL	CY		642

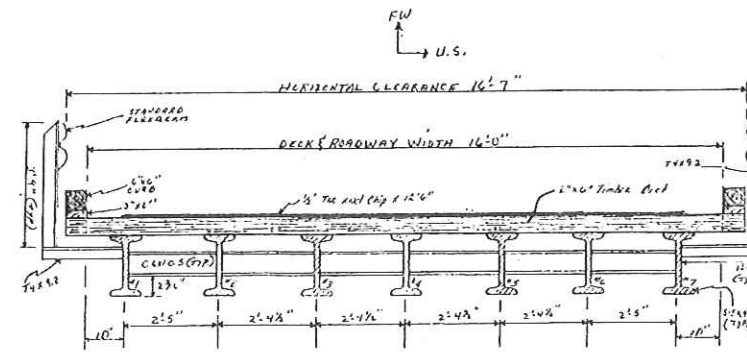
* SUPPLIED BY BOX BEAM FABRICATOR



Skew: 0°

(Looking Downstream)

EXISTING ELEVATION VIEW
NO SCALE



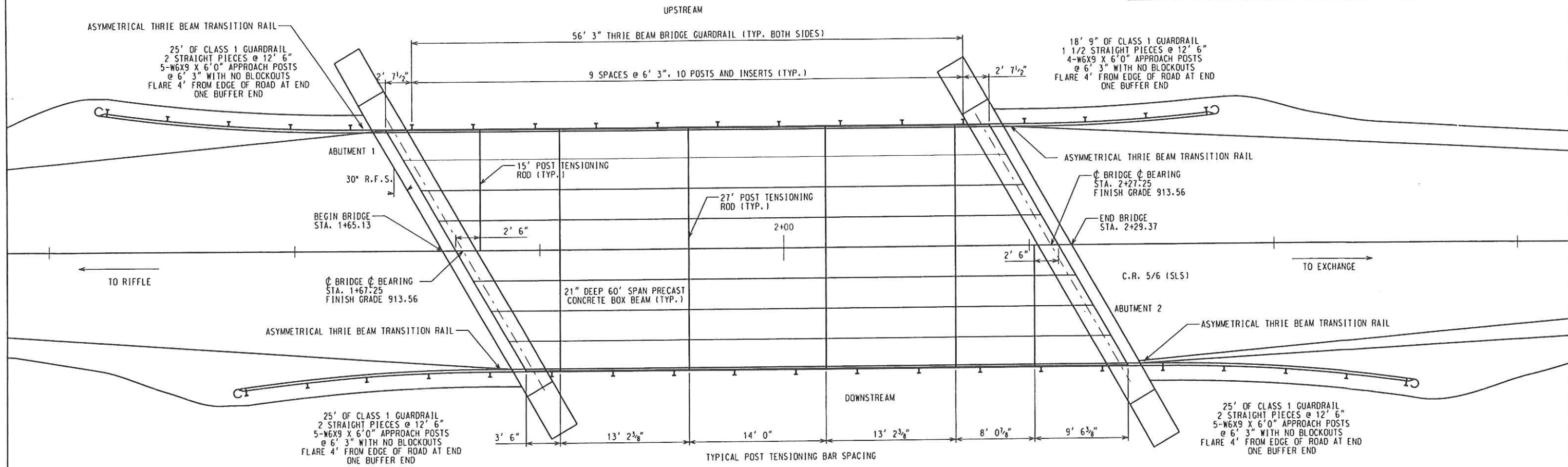
EXISTING DECK SECTION
NO SCALE

SCOPE OF WORK

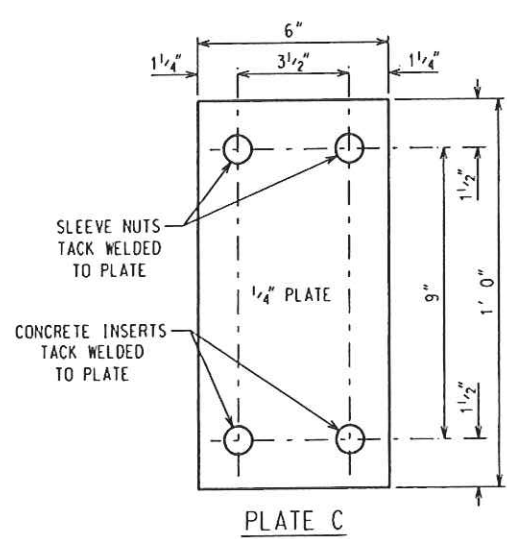
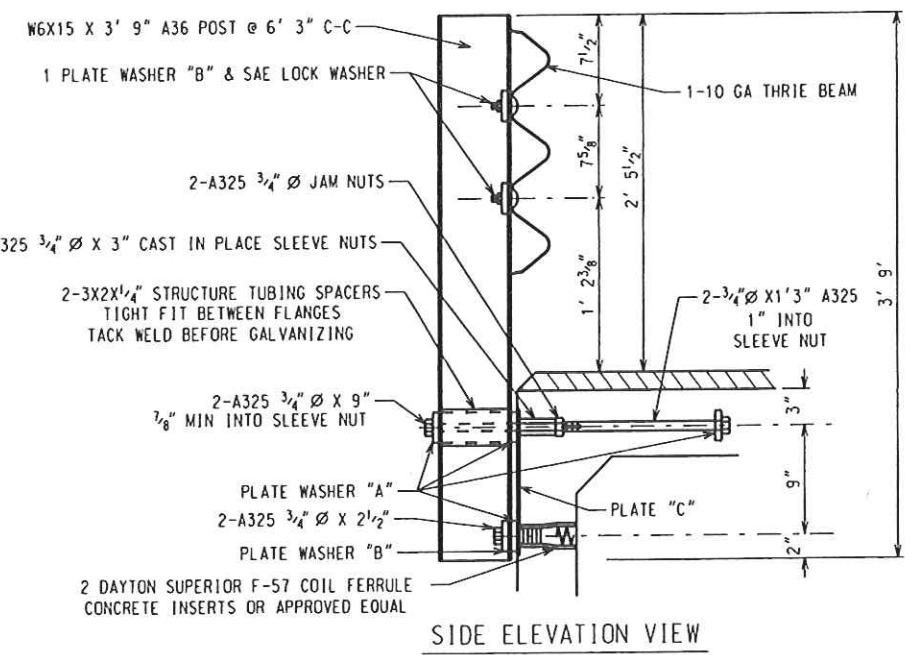
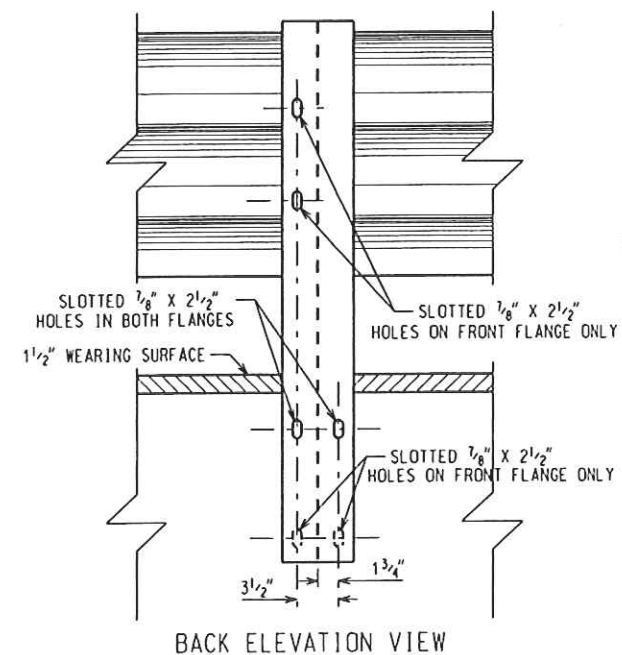
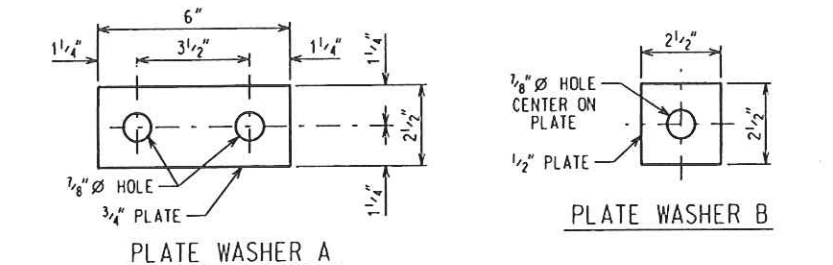
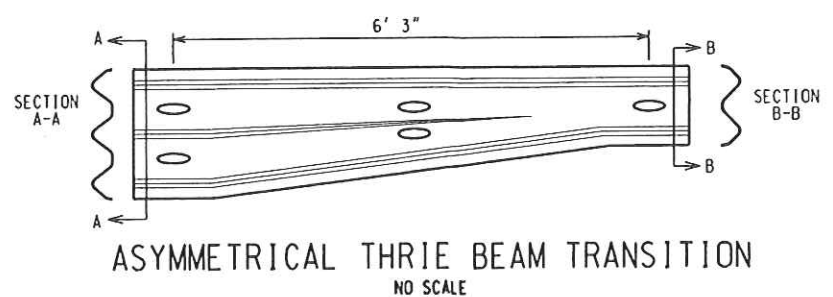
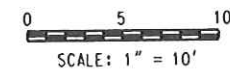
1. CONSTRUCT DETOUR.
2. CLOSE AND DEMOLISH EXISTING STRUCTURE.
3. EXCAVATE FOR ABUTMENTS AND DRIVE PILING.
4. FORM AND POUR ABUTMENTS.
5. PLACE FOUNDATION PROTECTION MATERIAL.
6. PLACE BEAMS, GROUT, AND POST TENSION.
7. FORM AND POUR BACKWALLS AND WINGWALLS.
8. BACKFILL AND CONSTRUCT APPROACHES
9. OPEN NEW BRIDGE AND REMOVE DETOUR
9. FORM & POUR A2 US WINGWALL.
10. FINISH FOUNDATION PROTECTION MATERIAL
11. SITE DRESS, SEED AND MULCH.
12. PLACE GUARDRAIL BY PURCHASE ORDER CONTRACT.
13. PAVE BY CONTRACT.

		WEST VIRGINIA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS DISTRICT SEVEN	
		CONSTRUCTION PLANS OF RIFFLE I-BEAM BRIDGE REPLACEMENT ON C.R. 5/6 (SLS) OVER PERKINS FORK BRAXTON COUNTY	
DESIGNED BY:	DATE:	EXISTING ELEVATION AND DECK SECTION, SCOPE OF WORK, AND ESTIMATE OF QUANTITIES	SHEET 3 OF 22 04-5/6-7.33 (10832)
GFL	08-11		
DRAWN BY:	DATE:		
GFL	08-11		
CHECKED BY:	DATE:		
RMW	09-11		
CHECKED BY:	DATE:		
REVIEWED BY:	DATE:		
WRW	09-11		

PROJECT NUMBERS		WV DISTRICT SEVEN	COUNTY BRAXTON	SHEET 8	OF 22
FEDERAL N/A	STATE S304-5/6-7.31				

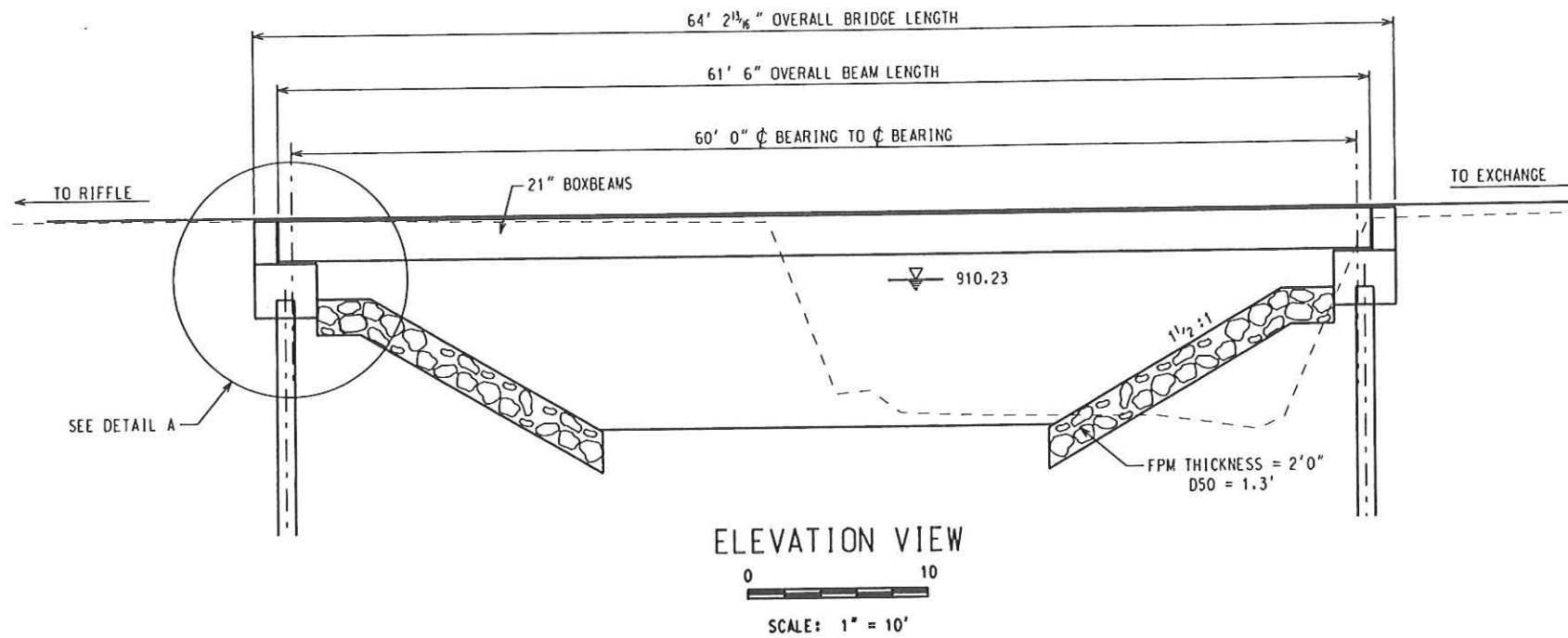


PROPOSED BRIDGE PLAN VIEW
GUARDRAIL & POST TENSIONING ROD LAYOUT



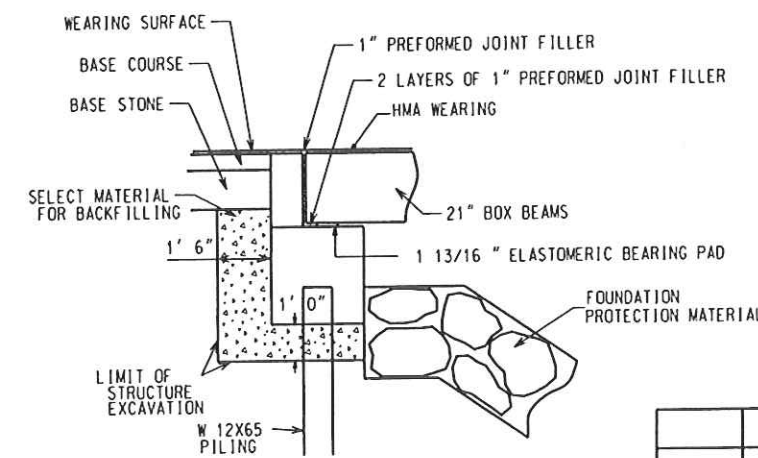
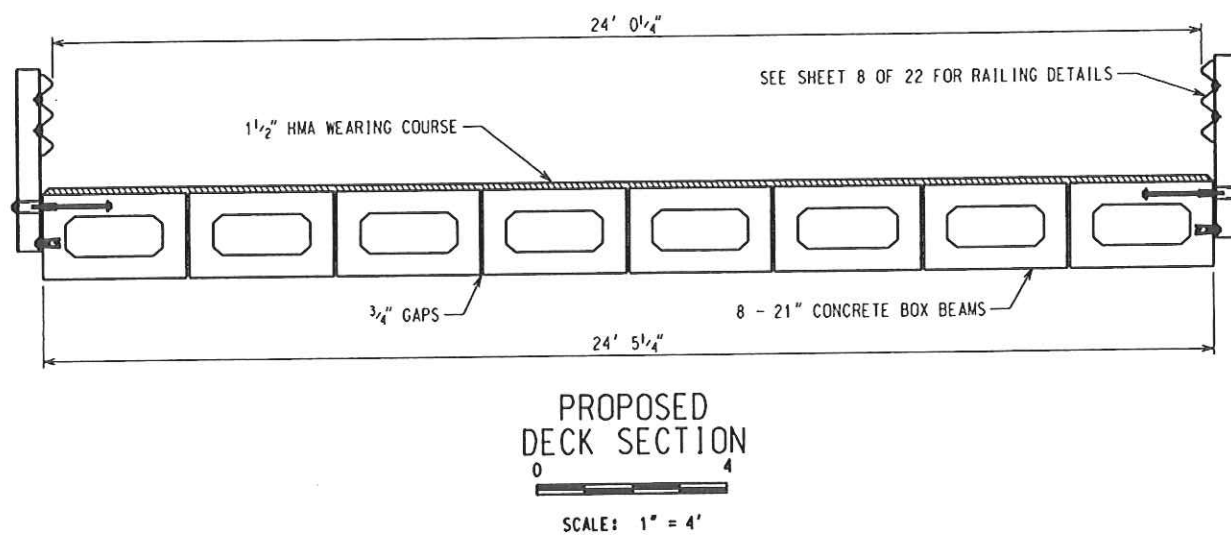
SIDE MOUNTED POST DETAILS
OREGON THRIE-BEAM SIDE MOUNT (TL-2)
NO SCALE

WEST VIRGINIA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS DISTRICT SEVEN		CONSTRUCTION PLANS OF RIFFLE 1-BEAM BRIDGE REPLACEMENT ON C.R. 5/6 (SLS) OVER PERKINS FORK BRAXTON COUNTY	SHEET 8 OF 22
PROPOSED BRIDGE PLAN VIEW, POST TENSIONING ROD DETAILS, AND GUARDRAIL DETAILS			
REVISIONS	DATE BY		
DESIGNED BY: GFL	DATE: 08-11		
DRAWN BY: GFL	DATE: 08-11		
CHECKED BY: RMW	DATE: 09-11		
CHECKED BY:			
REVIEWED BY: WRW	DATE: 09-11		



	MINIMUM	MAXIMUM
D100	2.0	2.3
D85	1.6	1.9
D50	1.3	1.5
D15	0.5	0.8

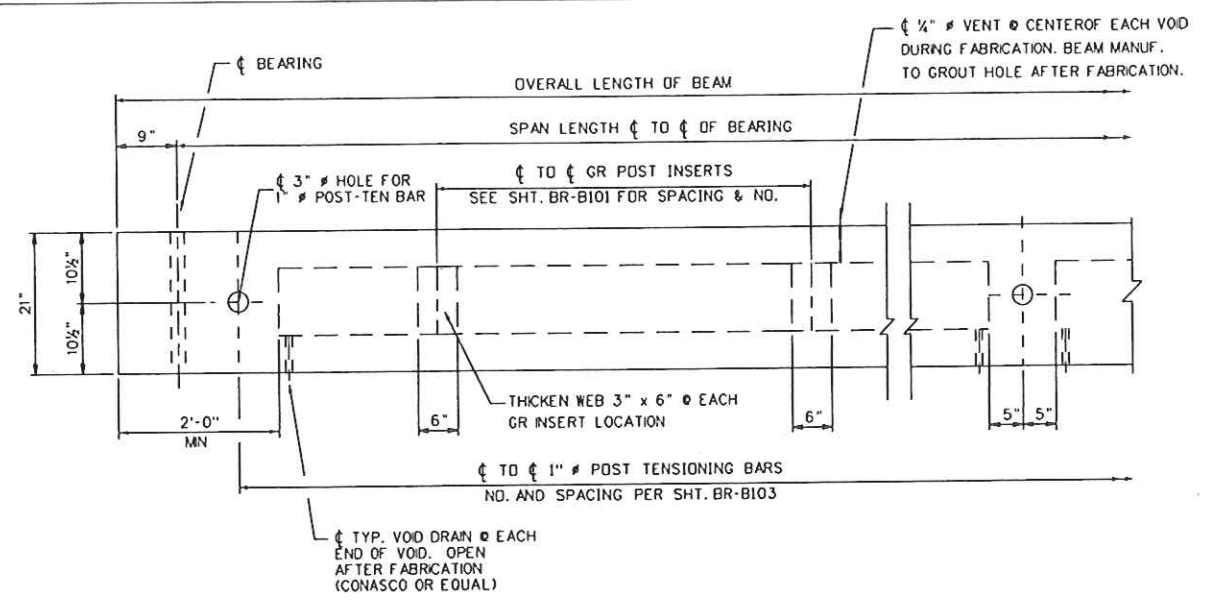
DESIGN FLOOD FREQUENCY:	010
DESIGN DISCHARGE:	1026 CFS
EFFECTIVE WATERWAY AREA OF EXISTING STRUCTURE:	283 SF
EFFECTIVE WATERWAY AREA OF NEW STRUCTURE:	409 SF
ELEVATION AT BOTTOM OF EXISTING SUPERSTRUCTURE:	910.70
ELEVATION AT BOTTOM OF NEW SUPERSTRUCTURE:	911.18
LOW WATER ELEVATION:	902.60
STREAM BED ELEVATION:	901.60



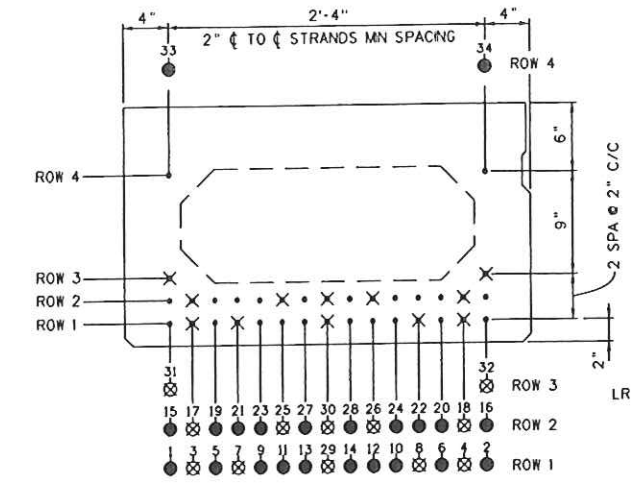
STRUCTURE EXCAVATION DETAIL
 DETAIL A
 (TYP. BOTH ABUTMENTS)
 NO SCALE

WEST VIRGINIA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS DISTRICT SEVEN	
CONSTRUCTION PLANS OF RIFFLE 1-BEAM BRIDGE REPLACEMENT ON C.R. 5/6 (SLS) OVER PERKINS FORK BRAXTON COUNTY	
REVISIONS	DATE BY
DESIGNED BY: GFL	DATE: 08-11
DRAWN BY: GFL	DATE: 08-11
CHECKED BY: RMW	DATE: 09-11
CHECKED BY:	
REVIEWED BY: WRW	DATE: 09-11
ELEVATION VIEW, HYDRAULIC DATA, STRUCTURE EXCAVATION DETAILS, AND PROPOSED DECK SECTION.	
SHEET	9 OF 22
04-5/6-7.33 (10831)	

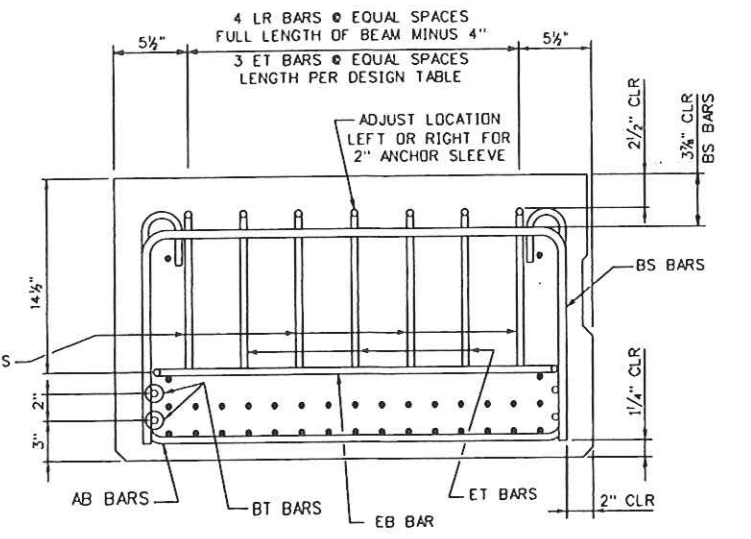
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL	7	BRAXTON	12	22
S304-5/6-7.31	N/A				



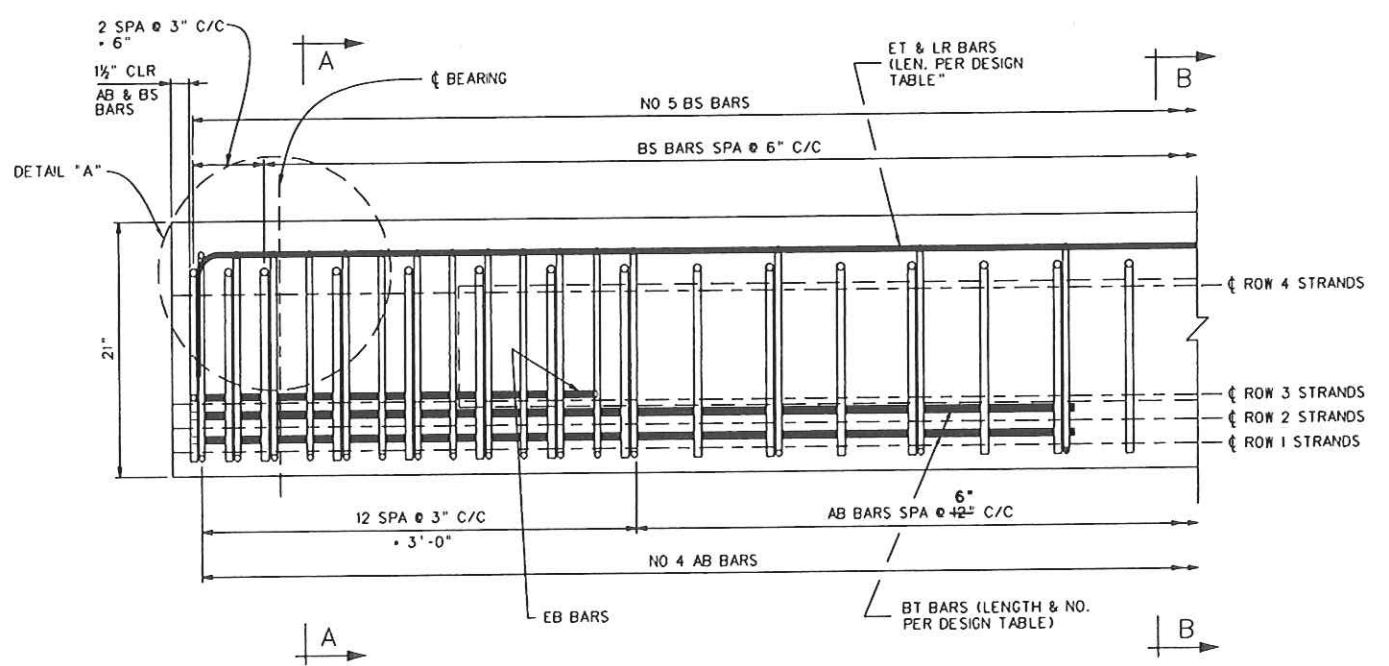
GENERAL ELEVATION VIEW



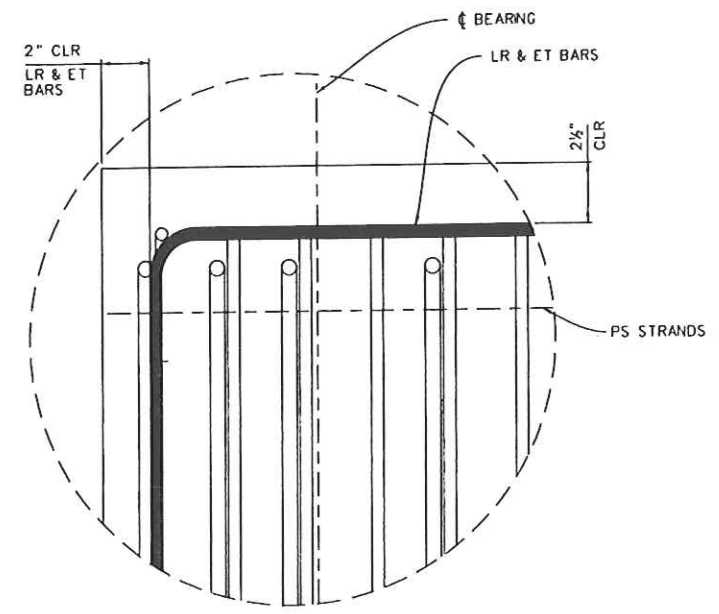
BEAM PRESTRESSING
TYPICAL BEAM END & MIDSPAN



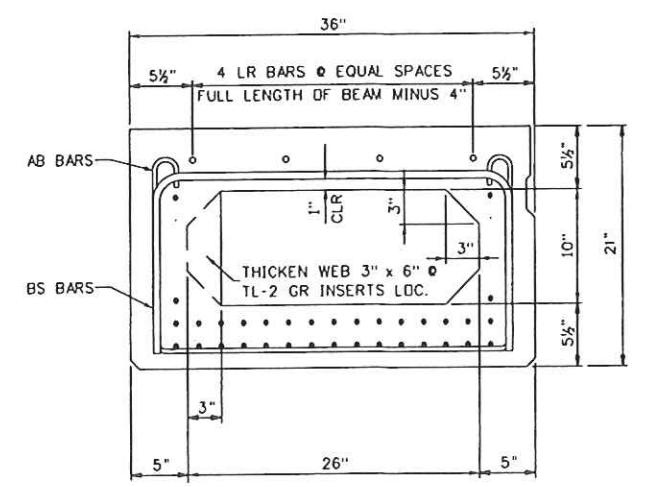
SECTION A-A



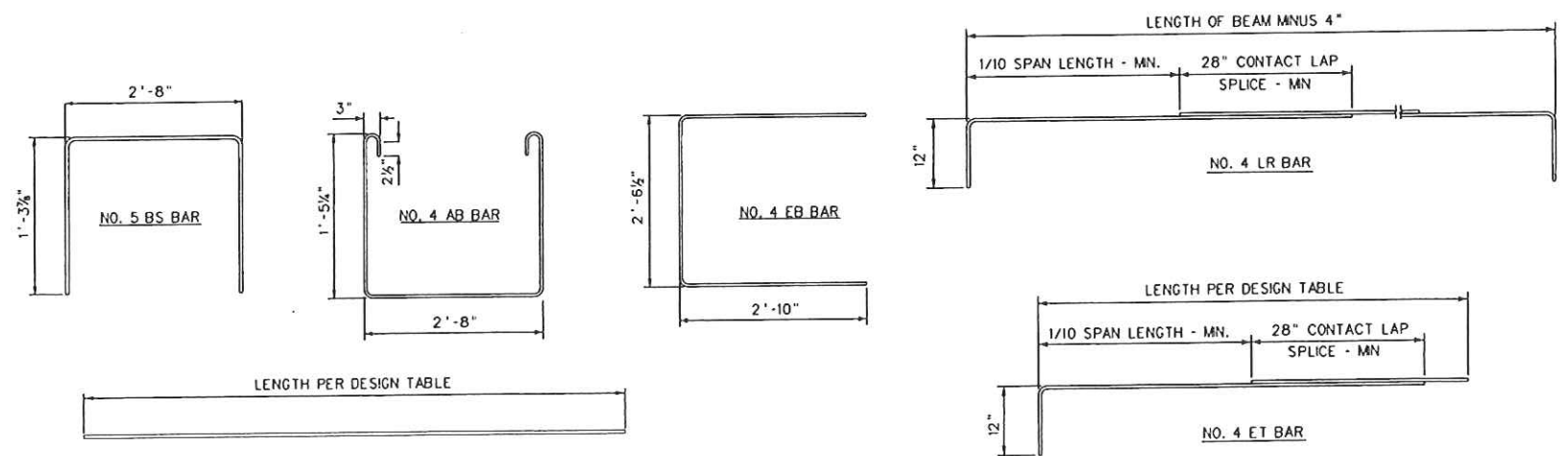
REINFORCING STEEL ELEVATION



DETAIL "A"



SECTION B-B



REINFORCING BAR DETAIL

NOTES:

- REFER TO SHEET BR-B102A FOR SHEAR KEY DETAILS.
- DESIGNER SHALL USE THE FOLLOWING KEY TO INDICATE STRAND AND DEBONDING PATTERN ON "BEAM PRESTRESSING VIEW", THIS SHEET.

●	ACTIVE STRAND	NA
▽	DEBOND STRAND: LENGTH FROM END OF BEAM	NA
△	DEBOND STRAND: LENGTH FROM END OF BEAM	NA
□	DEBOND STRAND: LENGTH FROM END OF BEAM	NA
- THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-B21B, BR-B10D, BR-B10I, BR-B102A & B, BR-B103, BR-B104, AND BR-B105A & B AS APPLICABLE.

APPROVED: _____ DATE: _____
DIRECTOR, ENGINEERING DIVISION

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

21" PRESTRESSED CONCRETE
BOX BEAMS
DESIGN AND ASSEMBLY DETAILS

STANDARD SHEET BR-B21A

PREPARED: 1-14-05
REVISOR: _____

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

DESIGNED BY: THB/GFL
DRAWN BY: TBH/GFL
CHECKED BY: TM/RWW
REVIEWED BY: BRW
DATE: 08/3/11
SCALE:
SHEET 13 OF 22
BRIDGE NO. 04-5/6-7.33 (10832)

CONSTRUCTION PLANS OF
RIFFLE I-BEAM BRIDGE REPLACEMENT
ON C.R. 56 (SLS)
OVER PERKINS FORK
BRAXTON COUNTY

21" PRESTRESSED BOX BEAM
DESIGN AND ASSEMBLY DETAILS

STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS
S304-5/6-7.31	N/A	7	BRAXTON	13	22

MIN. CONCRETE STRENGTH @ RELEASE = 5500 PSI
 MIN. CONCRETE STRENGTH @ 28 DAYS = 8000 PSI
 INITIAL PULL/STRAND = 33,820 LBS
 CROSS-SECTION AREA/STRAND = 0.167 SQ. IN.

DESIGN DATA FOR 21" DEPTH ADJACENT BOX BEAM												
SPAN LENGTH ϕ TO ϕ BEARING	30'-0"	32'-0"	34'-0"	36'-0"	38'-0"	40'-0"	42'-0"	44'-0"	46'-0"	48'-0"	50'-0"	60'-0"
OVERALL LENGTH OF BEAM	31'-6"	33'-6"	35'-6"	37'-6"	39'-6"	41'-6"	43'-6"	45'-6"	47'-6"	49'-6"	51'-6"	61'-6"
NO. OF 270 KSI, 1/2" ϕ LOW-RELAXATION STRANDS, AREA/STRAND = 0.167 SQ. IN.	10	10	10	12	12	14	14	14	16	16	16	22
STRAND POSITION NUMBER	ROW 1	1,2,11,12	1,2,11,12	1,2,11,12	1,2,7,8,13,14	1,2,7,8,13,14	1,2,7,8,13,14	1,2,7,8,13,14	1,2,5,6,9,10,13,14	1,2,5,6,9,10,13,14	1,2,5,6,9,10,13,14	1,2,5,6,9,10,11,12,13,14
	ROW 2	15,16,25,28	15,16,25,28	15,16,25,26	15,16,27,28	15,16,27,28	15,16,21,22,27,28	15,16,21,22,27,28	15,16,21,22,27,28	15,16,21,22,27,28	15,16,21,22,27,28	15,16,19,20,21,22,23,24,27,28
	ROW 3											
	ROW 4	33,34	33,34	33,34	33,34	33,34	33,34	33,34	33,34	33,34	33,34	33,34
PRESTRESSING FORCE IMMEDIATELY AFTER STRAND RELEASE, P _{pl} , (KIPS/BEAM)	327	328	328	391	391	453	454	454	515	516	517	706
EFFECTIVE PRESTRESSING FORCE AFTER ALL LOSSES, P _{pe} , (KIPS/BEAM)	297	298	298	350	352	403	404	406	454	456	458	647
REQUIRED FACTORED MOMENT @ STRENGTH I, M _u (FT-KIPS/BEAM)	359	393	427	465	504	545	588	639	693	746	800	1067
FACTORED FLEXURAL RESISTANCE, M _r (FT-KIPS/BEAM)	527	527	527	644	644	743	743	743	853	853	853	1130
TOTAL NO. DEBONDED STRANDS												
DEBONDED STRAND POSITION NUMBER & SHIELDING LENGTH FROM EACH END	ROW 1											
	ROW 2											
NUMBER & LENGTH #4 ET TOP TENSION BARS @ EACH END	3 - #4 x 4'-6"	3 - #4 x 4'-6"	3 - #4 x 5'-0"	3 - #4 x 5'-0"	3 - #4 x 5'-0"	3 - #4 x 5'-6"	3 - #4 x 5'-6"	3 - #4 x 5'-6"	3 - #4 x 6'-0"	3 - #4 x 6'-0"	3 - #4 x 6'-6"	3 - #4 x 6'-6"
NUMBER & LENGTH #5 BT BOTTOM TENSION BARS @ EACH END	2 - #5 x 8'-6"	2 - #5 x 8'-6"	2 - #5 x 8'-6"	2 - #5 x 8'-6"	4 - #5 x 8'-6"	4 - #5 x 8'-6"	4 - #5 x 8'-6"	4 - #5 x 8'-6"	4 - #5 x 8'-6"	4 - #5 x 8'-6"	4 - #5 x 8'-6"	4 - #5 x 13'-0"
DESIGN CAMBER +/- POSITIVE (UP) (INCHES)	@ RELEASE	0.15	0.15	0.15	0.26	0.27	0.37	0.38	0.38	0.55	0.55	0.54
	@ ERECTION	0.23	0.23	0.22	0.40	0.39	0.56	0.55	0.52	0.79	0.76	0.71
	@ FINAL	0.24	0.22	0.18	0.40	0.38	0.55	0.49	0.46	0.70	0.59	0.45
NUMBER & SPACING OF TL-2 GUARDRAIL INSERTS SEE NOTE 6	NO OF INSERTS REQD.										SEE PAGE 6 OF 18	SEE PAGE 8 OF 22
	END OF BEAM TO ϕ OF FIRST INSERT EA. END										SEE PAGE 6 OF 18	SEE PAGE 8 OF 22
	ϕ OF 1st INSERT TO ϕ 2nd INSERT EA. END										SEE PAGE 6 OF 18	SEE PAGE 8 OF 22
WEIGHT OF TYPICAL BEAM INCLUDING DIAPHRAGM (TONS)	9.2	9.8	10.4	10.9	11.8	12.0	12.6	13.1	13.8	14.3	14.9	17.6

NOTES

- BEAM WEIGHTS LISTED IN THE DESIGN TABLE ARE BASED ON ZERO SKEW, 2 FT. LONG ENDBLOCK AND DIAPHRAGMS SPACED @ 15 FT C/C. WEIGHTS FOR SKEWED BEAMS, LONGER ENDBLOCKS AND ADDITIONAL DIAPHRAGMS SHOULD BE ADJUSTED ACCORDINGLY.
 FOR ADDITIONAL DIAPHRAGMS, ADD 226 LBS/DIAPHRAGM.
 FOR SKEW ADD 21 LBS/DEGREE OF SKEW/END.
 FOR LONGER ENDBLOCK, ADD 271 LBS/LF/END.
- DESIGNERS SHOULD NOTE THAT DATA IN STANDARD TABLE IS BASED ON EVEN SPAN LENGTHS, A TWO LANE STRUCTURE 8 BEAMS WIDE AND ZERO SKEW. SUPERIMPOSED DEAD LOADS INCLUDE TYPE F PARAPET (321 PLF) AND A FWS OF 50 PSF. FOR NON-STANDARD BRIDGES DATA SHOULD BE VERIFIED AND IF REQUIRED NEW DESIGN DATA ENTERED INTO BLANK COLUMNS. IN NO CASE SHALL THE STANDARD DESIGN TABLE BE ALTERED.
- PREDICTED DESIGN CAMBER VALUES LISTED IN THE TABLE ARE BASED ON EMPIRICAL FORMULAS AND AS SUCH ARE APPROXIMATE. FOR MEMBERS WITH SPAN-TO-DEPTH RATIOS AT OR EXCEEDING 25, THE TOLERANCE VALUES LISTED IN APPENDIX B OF PCI MANUAL FOR QUALITY CONTROL, MNL-116, MAY NOT APPLY. MEASUREMENT OF CAMBER FOR COMPARISON TO PREDICTED DESIGN VALUES SHOULD BE COMPLETED WITHIN 72 HOURS OF RELEASE. ADDITIONALLY, CAMBER SHOULD BE EVALUATED UNDER CONDITIONS THAT MINIMIZE THE AFFECT OF TEMPERATURE VARIATION.

- DESIGNER, FABRICATOR, AND ERECTOR SHALL BE AWARE THAT SKEWED END BEAMS MAY TWIST OR WARP, CAUSING UNEVEN BEAM SEATING AT THE BEARINGS. THE CONTRACTOR IS REQUIRED TO CORRECT AT THE TIME OF ERECTION, BEFORE THE BEAMS ARE SECURED IN PLACE. METHOD OF CORRECTION SHALL PROVIDE AN EVEN, TOTAL BEARING AND A LEVEL TOP BEAM SURFACE. TOLERANCE, AFTER CORRECTION, SHALL BE (+/-) 1/8 INCH. THE FABRICATOR SHALL NOTIFY THE CONTRACTOR AND DESIGNER IF CORRECTIONS ARE REQUIRED PRIOR TO SHIPMENT.
- MAXIMUM BEAM SKEW SHALL BE 30 DEGREES.
- DESIGNER INPUT VALUES OF NUMBER OF INSERTS, DISTANCE FROM END OF BEAM TO ϕ FIRST INSERT, AND ϕ FIRST INSERT TO ϕ SECOND INSERT. ABOVE VALUES SHALL BE BASED ON THE REQUIRED 6'-3" GUARDRAIL POST SPACING ACROSS THE BRIDGE.
- THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-B21A, BR-B100, BR-B101, BR-B102A & B, BR-B103, BR-B104, AND BR-B105A & B AS APPLICABLE.

APPROVED: _____ DATE: _____
 DIRECTOR, ENGINEERING DIVISION

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 ENGINEERING DIVISION

DESIGN TABLE FOR 21"
 PRESTRESSED BOX BEAM
 STANDARD SHEET BR-B21B

PREPARED: 1-14-05
 REVIEWED: _____

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 ENGINEERING DIVISION

CONSTRUCTION PLANS OF
 RIFFLE I-BEAM BRIDGE REPLACEMENT
 ON C.R. 56 (SLS)
 OVER PERKINS FORK
 BRAXTON COUNTY

DESIGNED BY: THB/CF L
 DRAWN BY: THB/CF L
 CHECKED BY: TM/FRM
 REVIEWED BY: WRW
 DATE: 08/3/11
 SCALE:
 SHEET NO 13 OF 22
 BRIDGE NUMBER
 04-5/6-7.33
 (10832)

DESIGN TABLE FOR 21"
 PRESTRESSED BOX BEAM

STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS
S304-5/6-7.31	N/A	7	BRAXTON	14	22

GOVERNING SPECIFICATIONS

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION, DIVISION OF HIGHWAYS STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES, ADDED [2000] AS AMENDED BY THE CURRENT SUPPLEMENTAL SPECIFICATIONS. THE CONTRACT PLANS AND CONTRACT SPECIAL PROVISIONS ARE THE GOVERNING PROVISIONS APPLICABLE TO THIS PROJECT.

ALL BEAMS ARE DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, DATED 1998 AS AMENDED BY THE 2003 INTERIM SPECIFICATIONS.

DESIGN NOTES

ALL STANDARD ADJACENT PRESTRESSED CONCRETE BRIDGE BEAMS ARE DESIGNED TO MEET THE FOLLOWING CRITERIA:

1. DESIGN LOADS:

HL-93 LIVE LOAD IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

FUTURE WEARING SURFACE OF 50 PSF OF ROADWAY.

TYPE F PARAPET WEIGHING 321 PLF.

DIAPHRAGM DEAD LOAD, NUMBER REQUIRED BASED ON 15'-0" MAX. SPACING.

2. TWO LANE BRIDGE WITH AN OVERALL WIDTH OF 24'-5" (INCL. 3/4" GAP BETWEEN ADJ. BEAMS), A CURB-TO-CURB WIDTH OF 22'-1", TRANSVERSE POST-TENSIONING, AND ZERO SKEW.

3. DESIGN STRENGTH AND UNIT STRESSES:

MINIMUM CONCRETE STRENGTH @ STRAND RELEASE	5500 PSI
MINIMUM CONCRETE STRENGTH @ 28 DAYS	8000 PSI
TEMPORARY STRESS LIMITS IN CONCRETE BEFORE LOSSES:	
COMPRESSION STRESS LIMIT @ STRAND RELEASE	3600 PSI
TENSION STRESS LIMIT @ STRAND RELEASE	-200 PSI
COMPRESSIVE STRESS LIMITS IN CONCRETE @ SERVICE I AFTER LOSSES:	
@ FINAL I (PS+DL+LL)	4800 PSI
@ FINAL 2 (PS+DL)	3600 PSI
@ FINAL 3 [50%(PS+DL)+LL]	3200 PSI
TENSILE STRESS LIMIT IN CONCRETE @ SERVICE III AFTER LOSSES:	
@ FINAL I (PS+DL+LL)	-270 PSI
TENDON STRESS LIMIT PRIOR TO TRANSFER:	202.5 KSI
TENDON STRESS LIMIT AFTER ALL LOSSES:	194.4 KSI

4. DEBONDING OR SHIELDING OF STRANDS TO REDUCE TEMPORARY TENSILE STRESSES IS PERMITTED, HOWEVER DEBONDING IS LIMITED TO 40% PER ROW AND 25% TOTAL. IN NO INSTANCES SHALL OUTER STRANDS BE DEBONDED. DEBONDED STRANDS SHALL BE SEPARATED BY AT LEAST ONE FULLY BONDED STRAND AND SHALL BE SYMMETRICAL ABOUT THE C OF THE BEAM. SHIELDING OF STRANDS SHALL BE ACCOMPLISHED BY TAPING OR TIGHT FITTING PLASTIC TUBES TAPED AT EACH END.

5. THE ELASTOMERIC BEARING PADS PROVIDED IN THE STANDARD DESIGNS ARE BASED ON ZERO GRADE AND ARE LIMITED TO A MAXIMUM OF 5% GRADE. IN INSTANCES OF GRADES EXCEEDING THIS LIMIT, PADS SHALL BE SPECIFICALLY DESIGNED. INDIVIDUAL PAD DESIGNS SHALL BE IN ACCORDANCE WITH SECTION 14, AASHTO LRFD. BEVELED SOLE PLATES ARE PERMITTED.

6. MAXIMUM BEAM SKEW SHALL BE 30 DEGREES.

7. WHEN ALTERNATE DESIGNS OR SITE SPECIFIC DESIGNS ARE PROVIDED, CRITERIA SET FORTH IN THESE STANDARDS SHALL APPLY.

8. NEGATIVE DESIGN CAMBER AFTER ALL LOSSES IS NOT PERMITTED.

9. EACH BEAM PROVIDED IN THESE STANDARD DESIGNS HAS BEEN LOAD RATED IN ACCORDANCE WITH SECTION 3.15 OF THE WEST VIRGINIA DIVISION OF HIGHWAYS BRIDGE DESIGN MANUAL, 2004. ADDITIONALLY, LOAD RATING PROCEDURES ARE IN ACCORDANCE WITH THE AASHTO MANUAL FOR CONDITION EVALUATION AND LOAD AND RESISTANCE FACTOR RATING OF HIGHWAY BRIDGES, 2003.

BAR SIZE	NO. 3	NO. 4	NO. 5	NO. 6
SPLICE LEN.	21"	28"	34"	41"

THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-B17A & B THRU BR-B42A & B, BR-B101, BR-B102A & B, BR-B103, BR-B104, AND BR-B105A & B AS APPLICABLE.

MATERIALS & FABRICATION NOTES

• THE PRESTRESSED CONCRETE BEAMS SHALL CONFORM TO ALL APPLICABLE PROVISIONS OF SECTION 603 OF THE STANDARD SPECIFICATIONS.

MILD REINFORCEMENT:

• ALL MILD REINFORCING STEEL SHALL BE GRADE 60, DEFORMED BILLET STEEL AND SHALL BE EPOXY COATED EXCEPT WHERE NOTED. ALL UNCOATED REINFORCING SHALL MEET THE REQUIREMENTS OF AASHTO M31. ALL EPOXY COATED REINFORCING SHALL MEET THE REQUIREMENTS OF AASHTO M284, EXCEPT WHERE AMENDED BY SECTION 709.1 OF THE STANDARD SPECIFICATIONS.

• ALL TENSION LAP SPLICES SHALL BE A CLASS B, CONTACT TYPE. MINIMUM LAP SPLICE LENGTHS SHALL BE AS GIVEN IN THE "LAP SPLICE TABLE", THIS SHEET. ADDITIONALLY, IF LAP SPLICING OF ET, LR, AND BT BARS IS USED, TERMINATION OF THE SPLICE SHALL BE NO CLOSER TO THE END OF THE BEAM THAN 1/10 OF THE SPAN LENGTH.

• MINIMUM BAR BENDING DIAMETER SHALL BE 6 BAR DIAMETERS, EXCEPT THAT NO. 4 AB BARS MAY HAVE A MINIMUM BEND DIAMETER OF 4 BAR DIAMETERS.

• MINIMUM CONCRETE COVER SHALL BE AS SPECIFIED IN SECTION 603.5 OF THE STANDARD SPECIFICATIONS, EXCEPT WHERE NOTED ON THE PLANS.

PRESTRESSING STRAND:

• ALL PRESTRESSING STEEL SHALL BE 1/2" Ø, GRADE 270, 7 WIRE UNCOATED, LOW-RELAXATION STRAND MEETING THE REQUIREMENTS OF AASHTO M203, SUPPLEMENT S1.

• ALL BEAMS DESIGNED IN THESE STANDARDS UTILIZE STRANDS WITH A NOMINAL AREA OF 0.167 SQ. IN. STRANDS WITH A NOMINAL AREA OF 0.153 SQ. IN. IS PERMITTED FOR INDIVIDUAL OR ALTERNATE DESIGNS, HOWEVER THE DESIGNER IS ENCOURAGED TO USE THE LARGER STRAND FOR UNIFORMITY REASONS. IN NO CASES WILL STRESS-RELIEVED STRAND BE PERMITTED.

• ALL STRANDS SHALL BE ENCLOSED INSIDE THE STIRRUP CAGE FOR THE FULL LENGTH OF THE BEAM.

• ALL EXPOSED PRESTRESSING STRAND AT EACH BEAM END SHALL BE SHOP COATED WITH A LIQUID COLD-APPLIED ELASTOMERIC WATERPROOFING MEMBRANE. MATERIAL SHALL BE SONOSHIELD HLM 5000, MANUFACTURED BY DEGUSSA CHEMICALS OR APPROVED EQUAL.

CONCRETE:

• ALL CONCRETE USED IN MANUFACTURING PRESTRESSED CONCRETE BEAMS SHALL MEET THE REQUIREMENTS OF SECTION 603.6 OF THE STANDARD SPECIFICATIONS. DESIGN STRENGTHS SHALL MEET OR EXCEED THE MINIMUM VALUES SET FORTH IN THESE PLANS.

• ALL CONCRETE USED IN PARAPETS AND CURBS SHALL BE CLASS K CONCRETE.

ELASTOMERIC BEARING PADS:

• ALL BEARING PADS SHALL MEET THE APPLICABLE REQUIREMENTS AS SET FORTH IN SECTION 18.2 OF THE AASHTO LRFD BRIDGE CONSTRUCTION SPECIFICATIONS, 1998 EDITION WITH CURRENT INTERIMS. ALL BEARINGS SHALL BE STEEL REINFORCED LAMINATED BEARINGS.

• THE ELASTOMER MATERIAL SHALL BE DURO 60 WITH A MINIMUM LOW TEMPERATURE GRADE OF 3 (ZONE C).

• ALL STEEL REINFORCING SHALL MEET THE REQUIREMENTS OF AASHTO M270, GRADE 36.

GUARDRAIL, GUARDRAIL POSTS, TUBING & INSERTS:

• ALL W-BEAM GUARDRAIL AND ATTACHMENT HARDWARE SHALL BE IN ACCORDANCE WITH SECTION 712.4 OF THE STANDARD SPECIFICATIONS. GUARDRAIL POSTS, STRUCTURAL TUBING, POST ATTACHMENT INSERTS, AND HARDWARE SHALL MEET THE LISTED MATERIAL AND COATING SPECIFICATIONS:

ITEM	DESCRIPTION	MATERIAL SPEC.	COATING SPEC.
POST	W6x25	AASHTO M270, GR 36	AASHTO M111
PLATE	1/2" x 7"	AASHTO M270, GR 36	AASHTO M111
TUBING	TS 8x4x3/16	ASTM A500, GR B	AASHTO M111
CHANNEL	C7x9.8	AASHTO M270, GR 36	AASHTO M111
FERRULE	TYPE 2A } 1/4" Ø x 2 1/2" MIN LEN.	ASTM A108 (11L17 STEEL)	AASHTO M232
		ASTM A510 (1018 STEEL)	AASHTO M232
STUDS	1/4" Ø x 8" LONG	ASTM A108 (1045 C.D. STEEL)	AASHTO M232
NUTS	1/4" Ø	AASHTO M291, CLASS C	AASHTO M232
COUPLERS	TYPE 1A } 1/4" Ø x 5" LONG	ASTM A108 (12L14 STEEL)	AASHTO M232
		AASHTO M164 (TYPE 1, HH)	AASHTO M232
BOLTS	1/4" Ø x 12" LONG	AASHTO M164 (TYPE 1, HH)	AASHTO M232
BOLTS	3/8" Ø x ALL LEN.	AASHTO M164 (TYPE 1, HH)	AASHTO M232
NUTS	3/8" Ø	AASHTO M291, CLASS C	AASHTO M232
WASHERS	ALL	AASHTO M293	AASHTO M232

WELDING:

• TACK WELDING OF REINFORCEMENT IS NOT PERMITTED. REINFORCING CAGES AND LONGITUDINAL STEEL SHALL BE ADEQUATELY TIED WITH APPROVED MEANS TO PREVENT RACKING AND MISALIGNMENT.

• ALL WELDING OF FABRICATED ITEMS, AS SHOWN IN THESE PLANS SHALL BE IN ACCORDANCE WITH ALL APPLICABLE PROVISIONS OF AASHTO/AWS D1.5, 2002.

POST-TENSIONING BARS:

• POST - TENSIONING THREAD BARS SHALL BE ONE INCH DIAMETER, 150 KSI STEEL, AND SHALL CONFORM TO AASHTO M275, TYPE II. STEEL THREAD BARS SHALL BE DESIGNED TO ALLOW THE USE OF HEAVY HEX NUTS AND COUPLERS THAT THREAD ONTO THE END OF THE DEFORMATIONS. HEAVY HEX NUTS AND COUPLERS SHALL BE OF A DESIGN AND MATERIAL RECOMMENDED BY THE BAR MANUFACTURER TO DEVELOP THE FULL TENSILE STRENGTH OF THE BAR. PROPERLY DOCUMENTED CERTIFIED MILL TEST REPORTS SHALL BE PROVIDED FOR EACH HEAT OF STEEL THREAD BARS.

• ALL POST-TENSIONING THREAD BARS, NUTS, BEARING PLATES, COUPLERS, AND ANCILLARY HARDWARE SHALL BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH AASHTO M111. THE GALVANIZING PLANT SHALL ADMINISTER ADEQUATE QUALITY CONTROL MEASURES TO SAFEGUARD AGAINST HYDROGEN EMBRITTLMENT. QUALITY CONTROL MEASURES SHALL COMPLY WITH ASTM A-143. CERTIFICATION FOR HOT-DIP GALVANIZING SHALL BE PROVIDED BY THE GALVANIZING PLANT.

• ALL POST-TENSIONING BEARING PLATES SHALL CONFORM TO AASHTO M270, GRADE 36.

SHEAR KEY GROUT:

• SHEAR KEY GROUT SHALL BE A GROUT THAT IS RECOMMENDED BY THE MANUFACTURER FOR A POURABLE GROUT APPLICATION AND THAT BASED ON THE MANUFACTURER'S TEST DATA WILL ATTAIN A MINIMUM OF 4500 PSI COMPRESSIVE STRENGTH IN 3 DAYS UNDER CONDITIONS REPRESENTATIVE OF THE CONDITIONS TO BE EXPERIENCED AT THE SITE. THE GROUT MUST BE LISTED ON THE APPROVED LIST OF GROUTS PUBLISHED BY THE WEST VIRGINIA DIVISION OF HIGHWAYS, MATERIALS CONTROL, SOIL AND TESTING DIVISION. THE CONTRACTOR SHALL PRE-TEST THE PROPOSED GROUT FOR COMPRESSIVE STRENGTH AT 3 AND 7 DAYS AND SUBMIT THE RESULTS TO THE BRIDGE PROJECT MANAGER FOR APPROVAL PRIOR TO INSTALLATION OF THE GROUT IN THE STRUCTURE. THE TESTS WILL BE BASED ON A POURABLE CONSISTENCY WITH THE SAME WATER/GROUT MIXTURE RATIO TO BE USED IN THE STRUCTURE.

• THE CONTRACTOR SHALL BE REQUIRED TO SUBMIT FOR EACH PROJECT, THE GROUT PRE-TEST RESULTS OBTAINED IN THE NOTE ABOVE. THE CONTRACTOR SHALL BE REQUIRED TO PERFORM A NEW PRE-TEST AND SUBMISSION FOR APPROVAL UNDER ANY OF THE FOLLOWING CONDITIONS:

- A PERIOD OF 18 MONTHS HAS ELAPSED SINCE LAST PRE-APPROVAL TESTING.
- GROUT MANUFACTURER HAS REVISED OR CHANGED THE GROUT SPECIFICATIONS.
- THE CONTRACTOR ALTERS THE WATER/GROUT MIXTURE RATIO.
- THE CONTRACTOR CHANGES GROUT MANUFACTURER.

• THE CONTRACTOR IS REQUIRED TO COMPLETE THE GROUT STRENGTH TABLE ON BR-B103.

• TEST PROCEDURE FOR DETERMINING THE COMPRESSIVE STRENGTH OF GROUT SHALL USE CUBE SPECIMENS IN ACCORDANCE WITH ASTM C109, AS MODIFIED BY ASTM C1107. GROUT TESTING IN ACCORDANCE WITH AASHTO T23 (STANDARD CYLINDER TEST) IS NOT ACCEPTABLE.

PROTECTIVE SURFACE TREATMENT:

• EACH PRESTRESSED CONCRETE BEAM SHALL BE TREATED BY THE MANUFACTURER AT THE FABRICATION PLANT WITH AN APPROVED CONCRETE SEALER (SILANE). AN APPROVED LIST OF CONCRETE SEALERS ARE ON FILE AT THE WEST VIRGINIA DIVISION OF HIGHWAYS, MATERIALS CONTROL, SOIL AND TESTING DIVISION. COVERAGE SHALL INCLUDE TOP AND BOTTOM OF INTERIOR BEAMS, AND TOP, BOTTOM AND EXTERIOR SIDE OF EXTERIOR BEAM. APPLICATION RATE SHALL BE PER TREATMENT MANUFACTURER'S RECOMMENDATION.

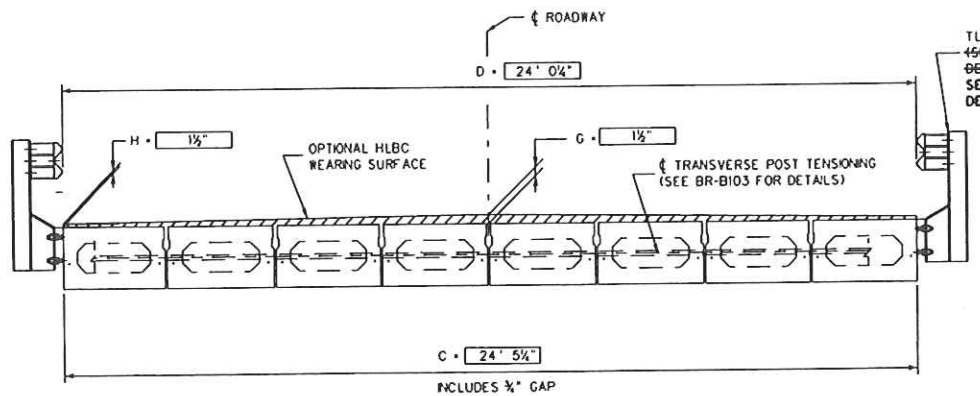
• AFTER COMPLETION OF THE SILANE TREATMENT BY FABRICATOR AND A MAXIMUM OF FIVE WORKING DAYS PRIOR TO SHIPMENT OF THE BEAMS, THE FABRICATOR SHALL BE RESPONSIBLE FOR ABRASIVE BLAST CLEANING TO CLEAN WHITE CONCRETE THE INTERIOR SIDES OF BEAMS FOR THE FULL LENGTH. CLEAN WHITE CONCRETE SHALL MEAN REMOVAL OF ALL DIRT, GREASE, OIL, AND LOOSE CONCRETE LAITANCE AND PROVIDE A ROUGHENED CONCRETE SURFACE. BLASTING MEDIUM SHALL BE APPROVED BY THE DIVISION OF HIGHWAYS.

SHOP DRAWINGS:

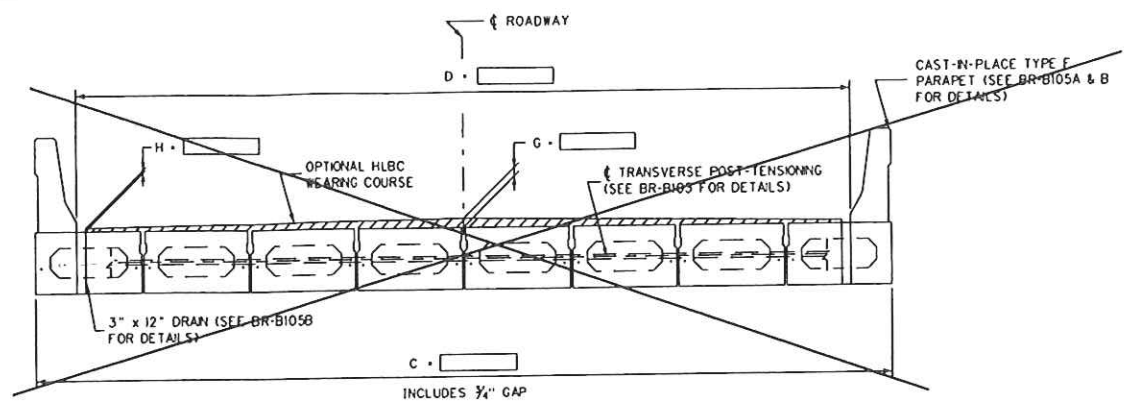
THE FABRICATOR SHALL BE RESPONSIBLE FOR THE PREPARATION OF SHOP DRAWINGS IN ACCORDANCE WITH THE WEST VIRGINIA DIVISION OF HIGHWAYS DOCUMENTS, DD-102 AND THE STANDARD SPECIFICATIONS. ADDITIONAL INFORMATION IS PROVIDED IN SECTION 7 OF THE BRIDGE DESIGN MANUAL. SHOP DRAWINGS SHALL INCLUDE THE FABRICATOR'S DETENSIONING PLAN.

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS ENGINEERING DIVISION	
CONSTRUCTION PLANS OF RIFLE I-BEAM BRIDGE RELACEMENT ON C.R. 5/6 (SLS) OVER PERKINS FORK BRAXTON COUNTY	DESIGNED BY: THB/ GFL DRAWN BY: THB/ GFL CHECKED BY: TM/ RWL REVIEWED BY: WRW DATE: 08/3/11 SCALE: NO SCALE SHEET NO 14 OF 22
PRESTRESSED CONCRETE BEAM	BRIDGE NUMBER 04-5/6-7.33 (10832)
DESIGN & ASSEMBLY NOTES	

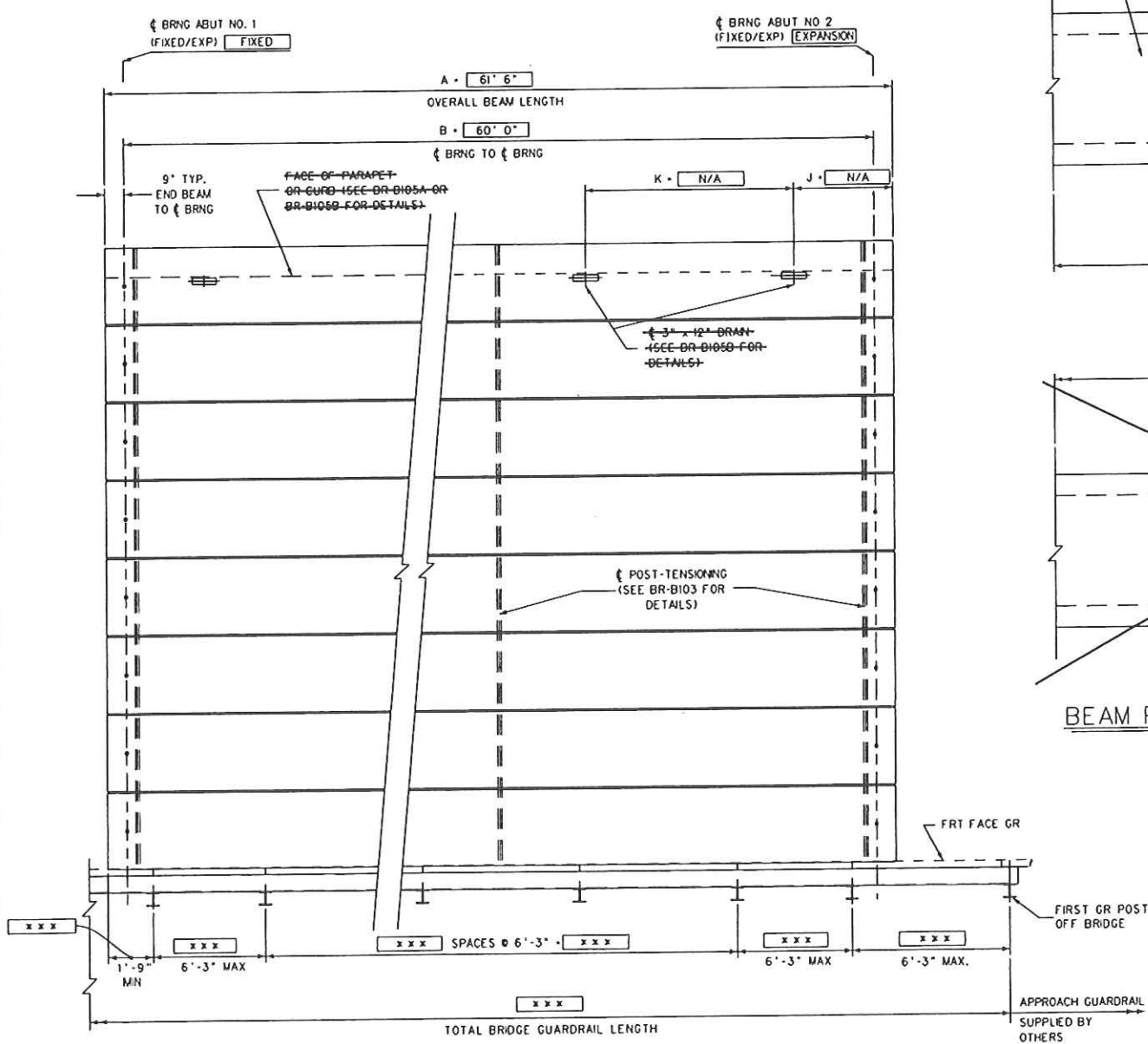
CONTROL DIMENSIONS		
DESCRIPTION	CODE	VALUE
OVERALL BEAM LENGTH	A	61' 6"
SPAN LENGTH, ϕ BEARING TO ϕ BEARING	B	60' 0"
SUPERSTRUCTURE WIDTH - OUT TO OUT	C	24' 0 1/4"
ROADWAY WIDTH - FACE GR/PARAPET TO FACE GR/PARAPET	D	24' 1/4"
NUMBER OF BEAMS REQUIRED	—	8
BEAM SIZE (WIDTH x DEPTH)	—	3' x 21"
SKEW ANGLE (NORMAL, DEG. RFS OR DEG. LFS)	E	30° RFS
PERPENDICULAR DISTANCE FROM FACE OF BEAM TO ϕ BEARING	F	7 3/8"
HLBC WEARING COURSE REQUIRED (YES/NO)	—	YES
THICKNESS OF WEARING COURSE ϕ ϕ OF DECK OR ROADWAY	G	1 1/2"
THICKNESS OF WEARING COURSE ϕ EDGE OF DECK OR PARAPET	H	1 1/2"
TL-2 BRIDGE GUARDRAIL SYSTEM REQUIRED (YES/NO)	—	YES
FABRICATOR TO SUPPLY TL-2 BRIDGE GUARDRAIL (YES/NO)	—	YES
FABRICATOR TO INSTALL BRIDGE GUARDRAIL PRIOR TO SHIPMENT (YES/NO) (IF NO, FABRICATOR TO SHIP LOOSE)	—	YES
NUMBER OF GUARDRAIL POST INSERTS REQUIRED PER SIDE	—	10
TYPE F PARAPET REQUIRED (YES/NO)	—	NO
DRAINS REQUIRED (YES/NO)	—	NO
NUMBER OF DRAINS REQUIRED PER SIDE	—	—
10" CURB REQUIRED (YES/NO)	—	NO



TYPICAL CROSS-SECTION WITH GUARDRAIL

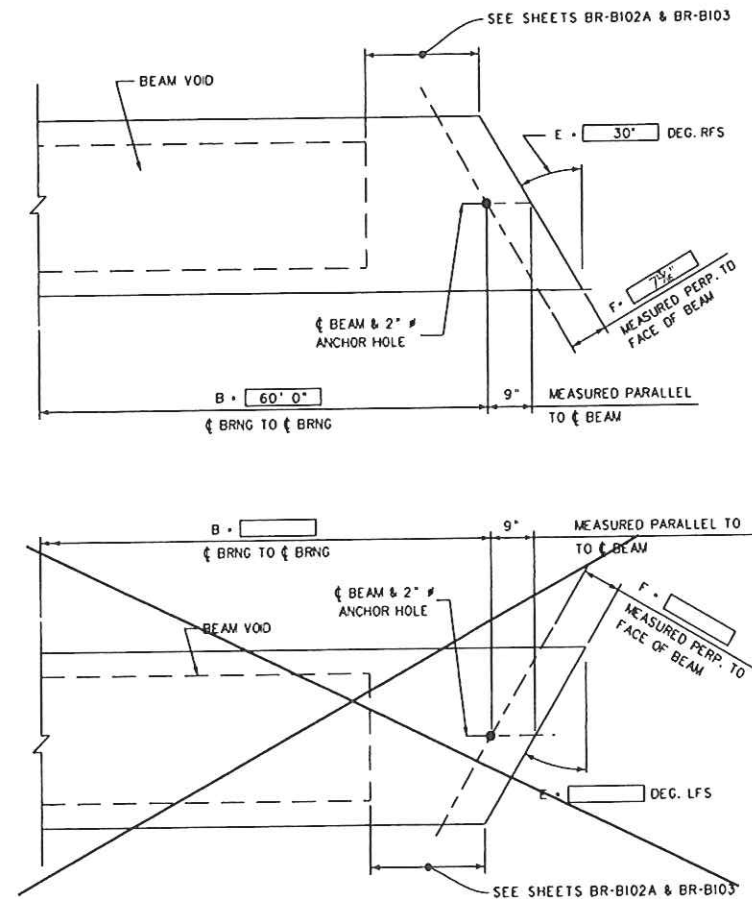


TYPICAL CROSS-SECTION WITH PARAPET OR CURB



*** SEE SHEET 8 OF 22 FOR DETAILS

DECK PLAN VIEW



BEAM PLAN VIEW - SKEWED ENDS

ESTIMATE OF QUANTITIES

ITEM NO.	DESCRIPTION	UNITS	QUANTITY
603016	PRESTRESSED CONCRETE BOX BEAM	LF	492

- NOTES:
- WHEN BRIDGE GUARDRAIL IS TO BE SUPPLIED BY THE BEAM FABRICATOR, COST OF ALL BRIDGE GUARDRAIL ITEMS TO INCLUDE POSTS, RAIL ELEMENTS, ATTACHMENT HARDWARE, AND MISCELLANEOUS ITEMS NEEDED TO COMPLETELY INSTALL BRIDGE GUARDRAIL SHALL BE INCLUDED IN ITEM 603016 "PRESTRESSED CONCRETE BOX BEAM."
 - THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-B17A & B THRU BR-B42A & B, BR-B100, BR-B102A & B, BR-B103, BR-B104, AND BR-B105A & B.

APPROVED: _____ DATE: _____

DIRECTOR, ENGINEERING DIVISION

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

PREPARED: 1-14-05

REVIEWED: _____

PRESTRESSED BOX BEAM
SUPERSTRUCTURE LAYOUT

STANDARD SHEET BR-B101

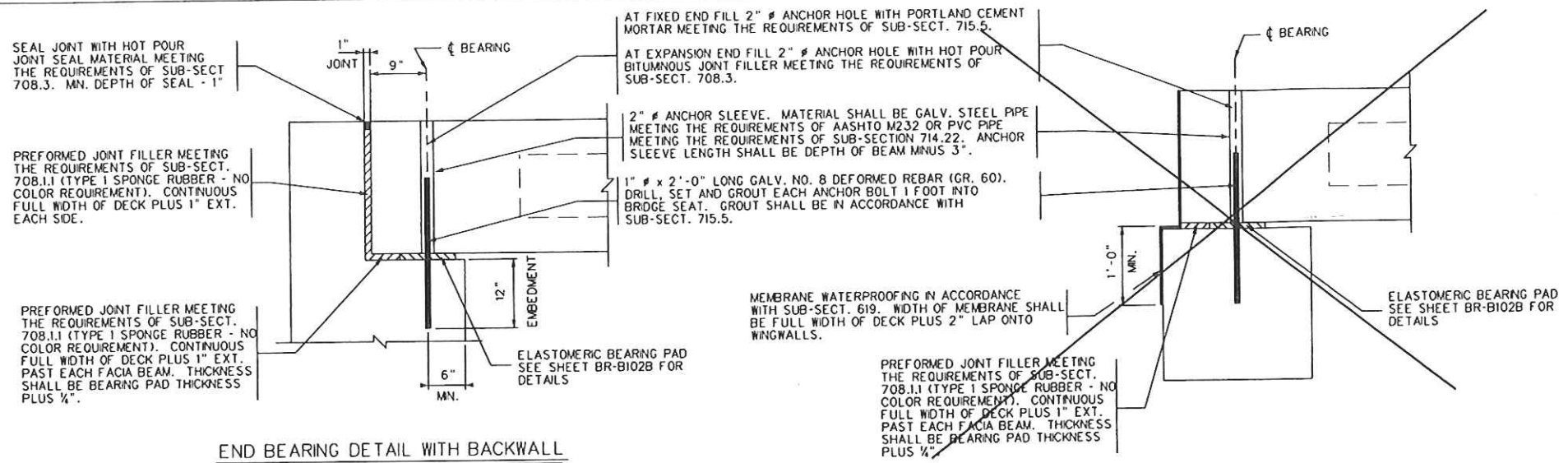
WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

DESIGNED BY: THB/GFL
DRAWN BY: THB/GFL
CHECKED BY: TM/RWJ
REVIEWED BY: WRW
DATE: 08/3/11
SCALE: NO SCALE
SHEET NO 15 OF 22
BRIDGE NUMBER 04-5/6-7.33 (10832)

CONSTRUCTION PLANS OF
RIFLE I-BEAM BRIDGE
REPLACEMENT ON C.R. 5/6 (SLS)
OVER PERKINS FORK
BRAXTON COUNTY

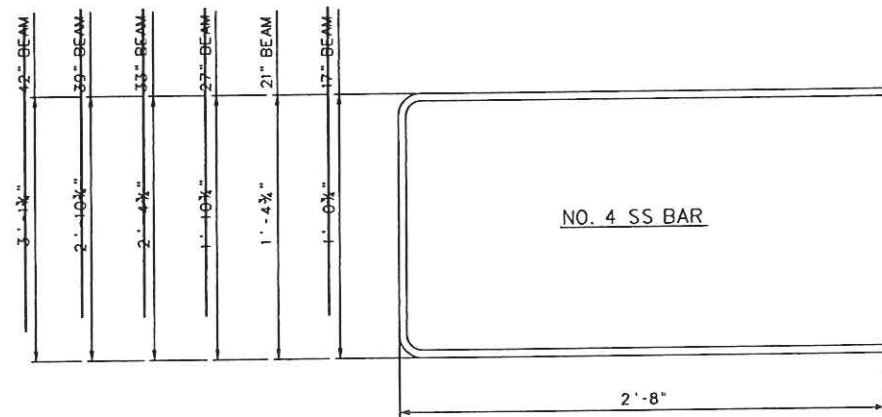
PRESTRESSED BOX BEAM
SUPERSTRUCTURE LAYOUT

STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS
S304-5/6-7.31	N/A	7	BRAXTON	16	22

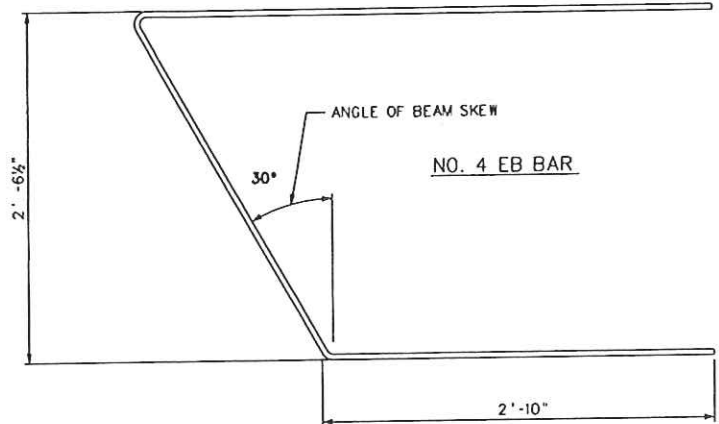


END BEARING DETAIL WITH BACKWALL

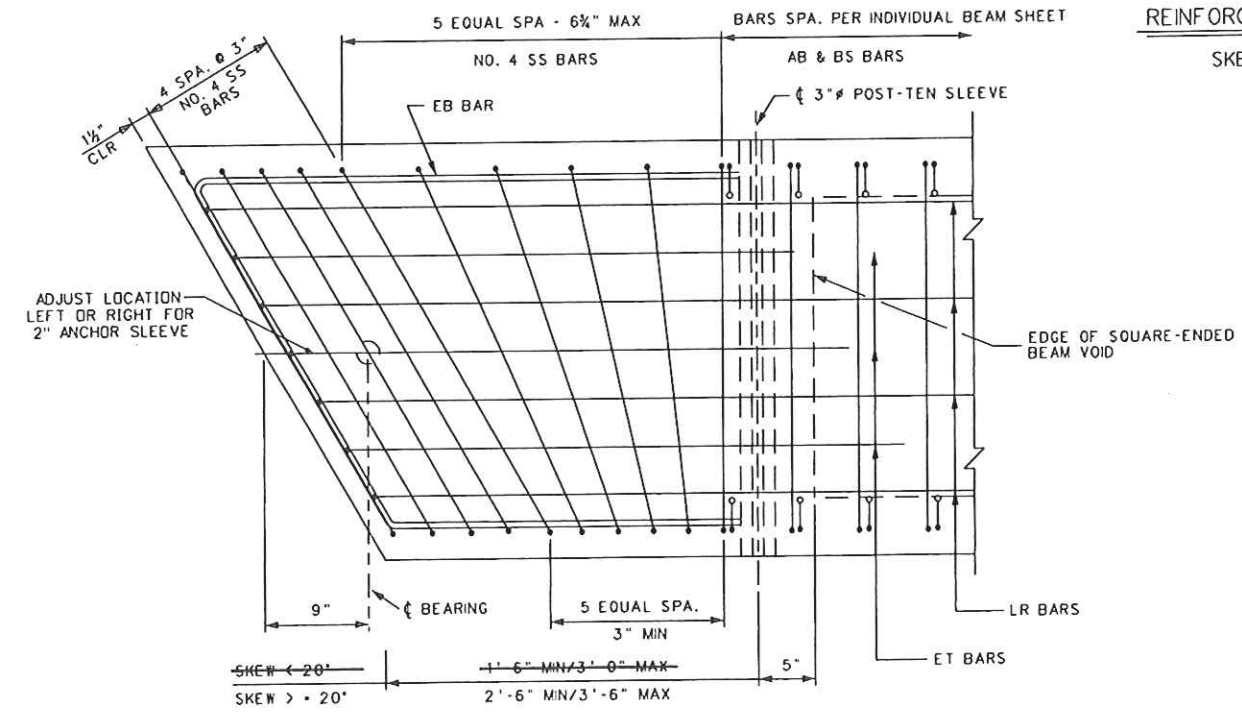
END BEARING DETAIL WITHOUT BACKWALL



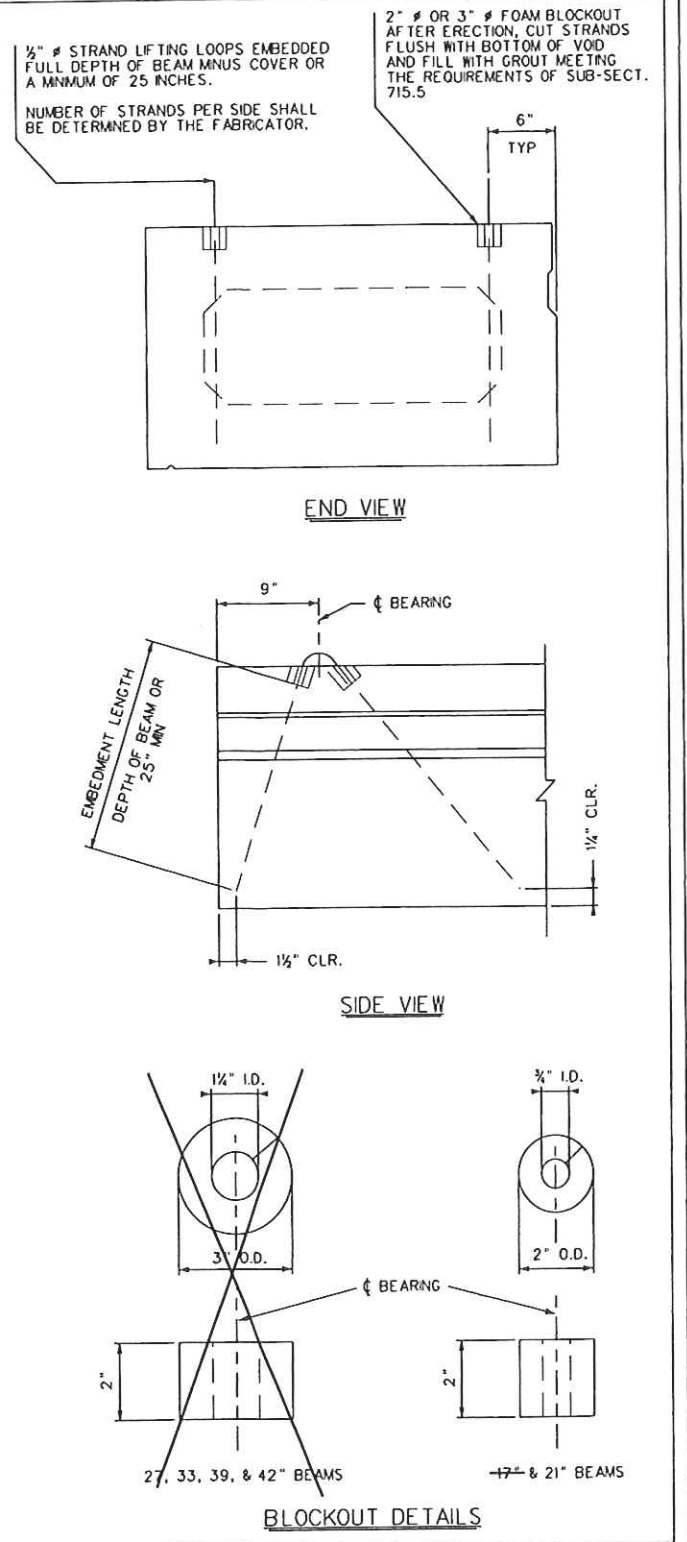
REINFORCING BAR DETAIL SKEWED BEAMS



SHEAR KEY DETAIL



END BLOCK DETAIL - SKEWED BEAMS W/O POST-TEN. ACCESS POCKET



LIFTING DETAILS

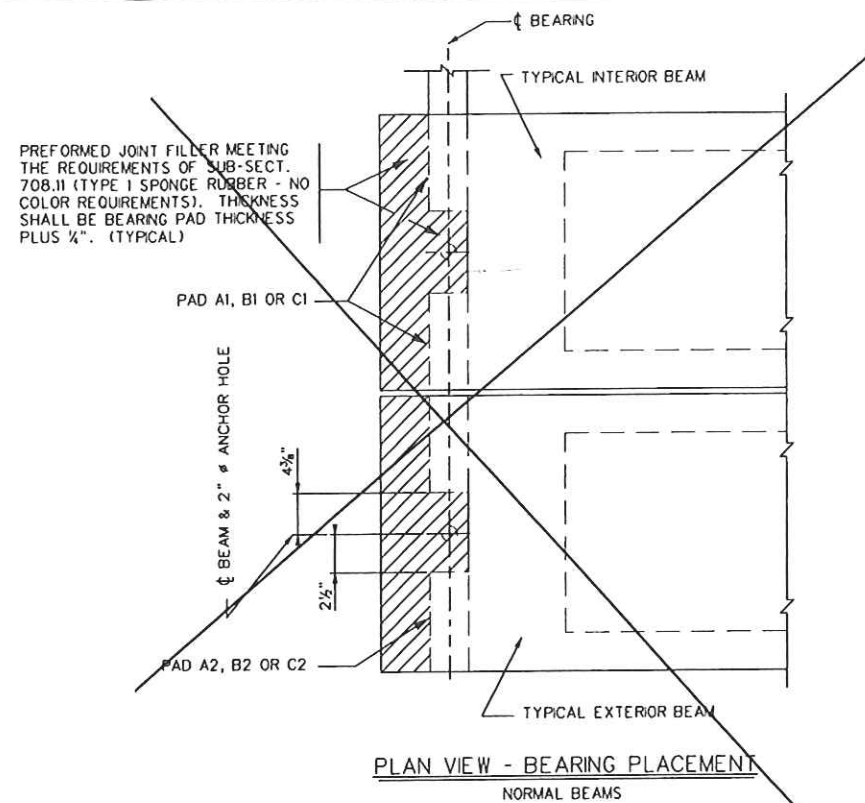
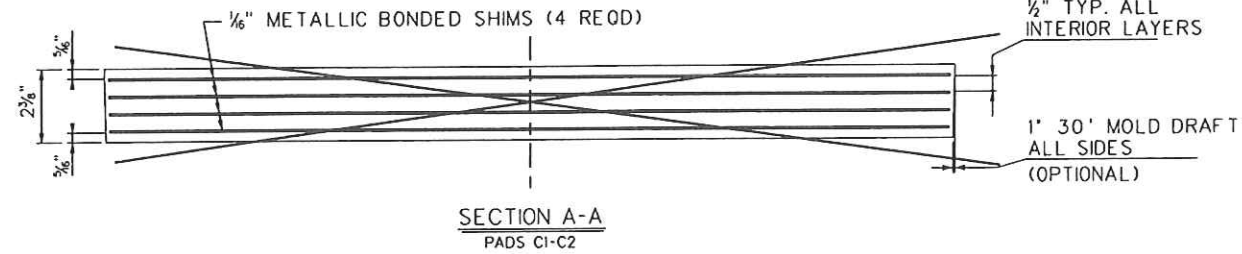
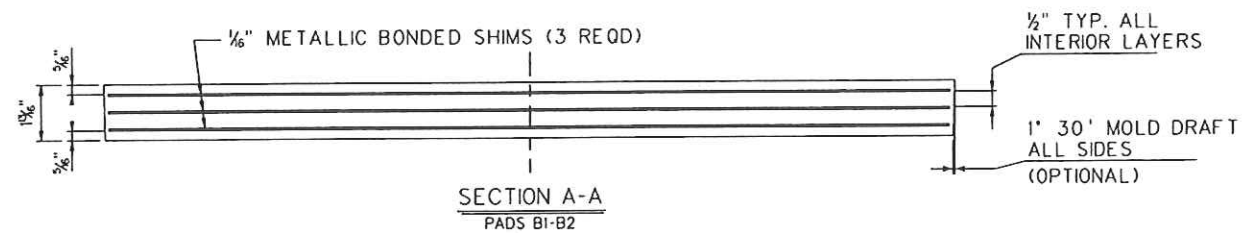
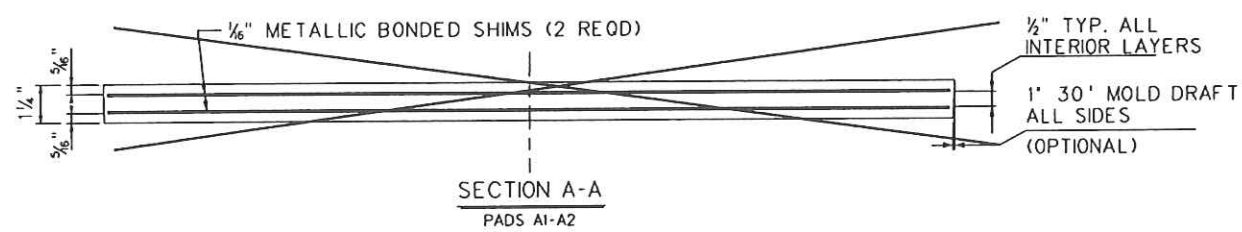
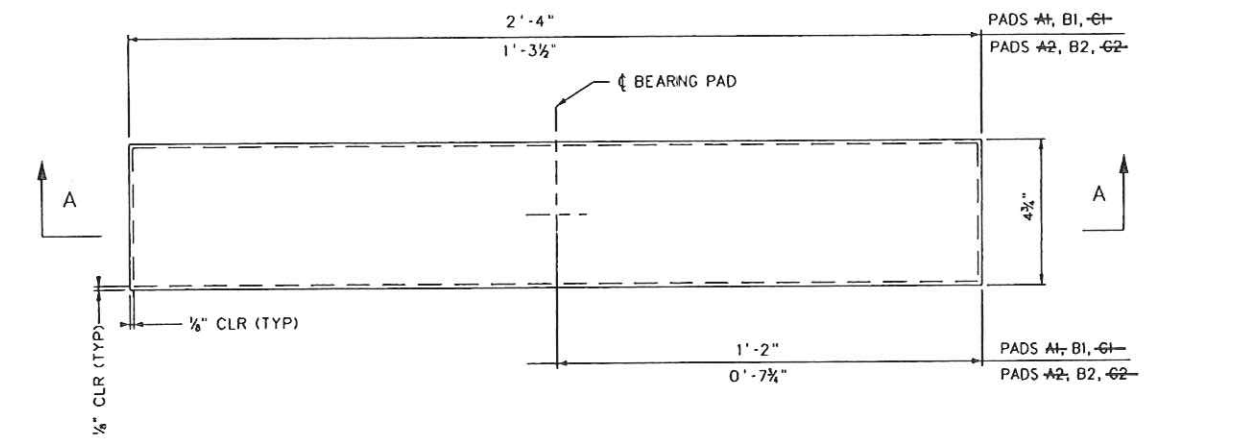
THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-B17A & B THRU BR-B42A & B, BR-B100, BR-B101, BR-B102B, BR-B103, BR-B104, AND BR-B105A & B AS APPROPRIATE.

APPROVED	DATE
WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS ENGINEERING DIVISION	1-14-05
PRESTRESSED CONCRETE BEAM SKEW END REINFORCING MISC. DESIGN AND ASSEMBLY DETAILS	
STANDARD SHEET BR-B102A	

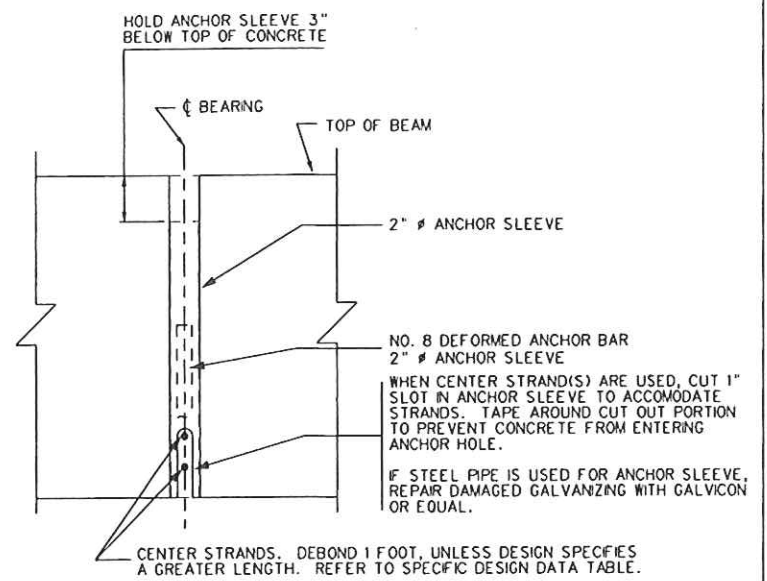
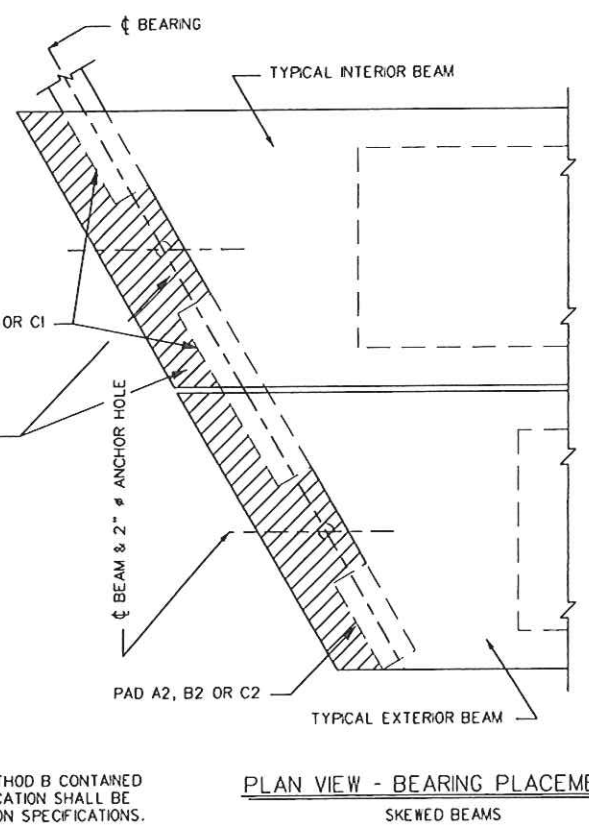
WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

CONSTRUCTION PLANS OF RIFFLE I-BEAM BRIDGE REPLACEMENT ON C.R. 5/6 (SLS) OVER PERKINS FORK BRAXTON COUNTY	
DESIGNED BY: THB/ GFL	DRAWN BY: THB/ GFL
CHECKED BY: TM/ RW	REVIEWED BY: WRW
DATE: 08/3/11	SCALE: NO SCALE
SHEET NO 16 OF 22	BRIDGE NUMBER
PRESTRESSED CONCRETE BEAM SKEWED END REINFORCING MISC. DESIGN AND ASSEMBLY DETAILS	04-5/6-7.33 (10832)

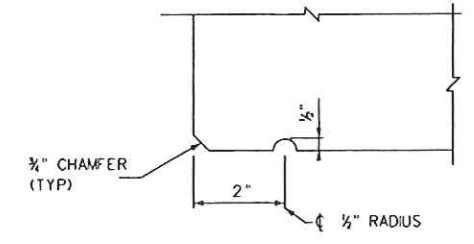
STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS
S304-5/6-7.31	N/A	7	BRAXTON	17	22



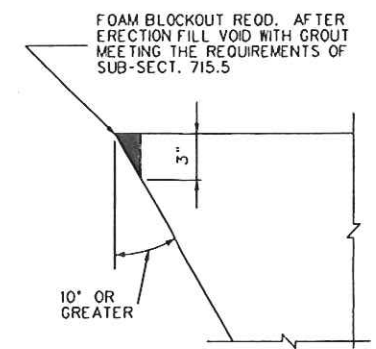
PREFORMED JOINT FILLER MEETING THE REQUIREMENTS OF SUB-SECT. 708.11 (TYPE 1 SPONGE RUBBER - NO COLOR REQUIREMENTS). THICKNESS SHALL BE BEARING PAD THICKNESS PLUS 1/4". (TYPICAL)



ANCHOR SLEEVE DETAIL



DRIP GROOVE DETAIL EXTERIOR BEAMS



SKEW BLOCKOUT DETAIL

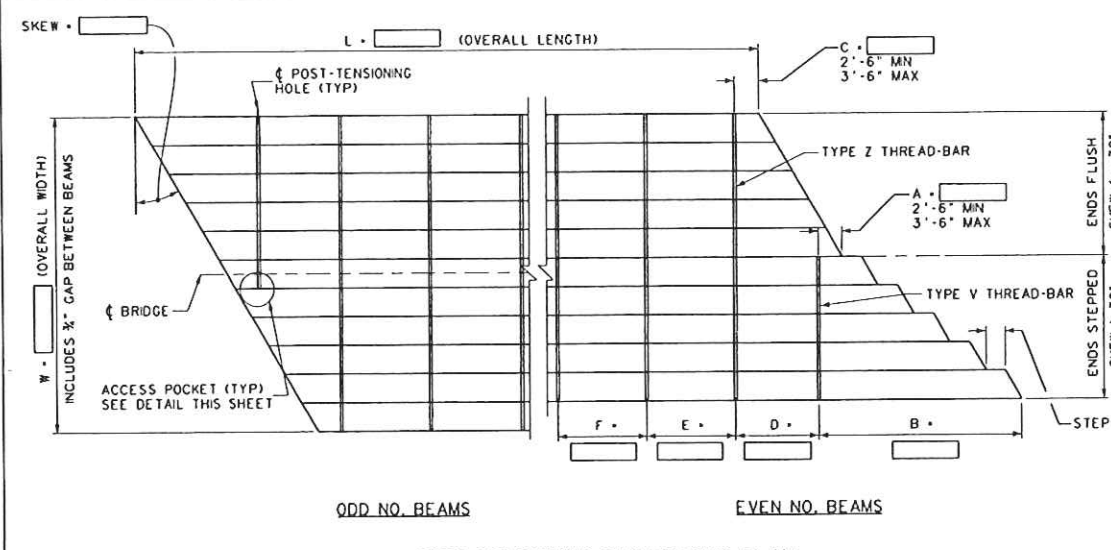
PAD	LENGTH	WIDTH	HEIGHT	NO. SHMS	SHM SIZE	SPAN RANGES	MAXIMUM REACTION	MAXIMUM MOVEMENT ONE DIRECTION
A1	4 1/4"	20"	1 1/4"	2	1/8" x 4 1/2" x 2'-3 3/4"	20' - 30'	55 KIPS	0.39"
B1	4 1/4"	28"	1 3/8"	3	1/8" x 4 1/2" x 2'-3 3/4"	40' - 78'	75 KIPS	0.80"
C1	4 1/4"	28"	2 1/4"	4	1/8" x 4 1/2" x 2'-3 3/4"	80' - 100'	89 KIPS	1.02"
A2	4 1/4"	15 1/2"	1 1/4"	2	1/8" x 4 1/2" x 1'-3 3/4"	20' - 30'	20 KIPS	0.39"
B2	4 1/4"	15 1/2"	1 3/8"	3	1/8" x 4 1/2" x 1'-3 3/4"	40' - 78'	38 KIPS	0.80"
C2	4 1/4"	15 1/2"	2 1/4"	4	1/8" x 4 1/2" x 1'-3 3/4"	80' - 100'	45 KIPS	1.02"

NOTES:

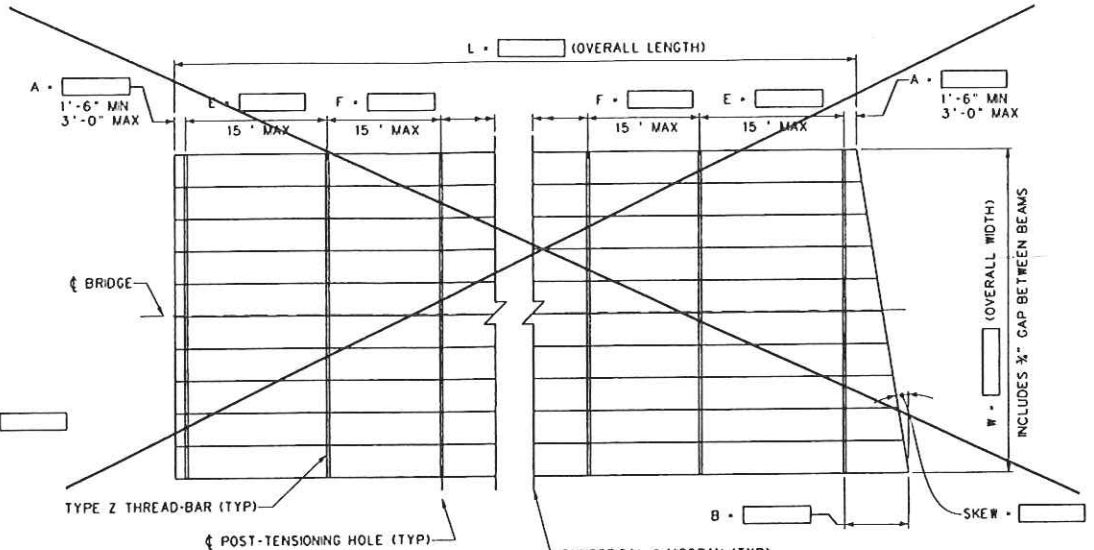
- ELASTOMERIC BEARING PADS ARE DESIGNED IN ACCORDANCE WITH DESIGN METHOD B CONTAINED IN SECTION 14 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. FABRICATION SHALL BE IN ACCORDANCE WITH SECTION 18 OF THE AASHTO LRFD BRIDGE CONSTRUCTION SPECIFICATIONS.
- ALL BEARINGS ARE DESIGNED FOR A LOW TEMPERATURE ZONE C AND SHALL HAVE A DUROMETER HARDNESS OF 60. METALLIC REINFORCEMENT SHALL HAVE A MINIMUM YIELD STRENGTH OF 36 KSI.
- BEARING PADS ARE DESIGNED FOR ZERO BRIDGE GRADE. FOR BRIDGE GRADES GREATER THAN 5 %, PADS SHALL BE SPECIFICALLY DESIGNED FOR THE GRADE. AS AN ALTERNATE, CAST-IN-PLACE BEVELED SOLE PLATES MAY BE USED.
- DESIGNER, FABRICATOR AND ERECTOR SHALL BE AWARE THAT SKEWED END BEAMS MAY TWIST OR WARP, CAUSING UNEVEN BEAM SEATING AT THE BEARINGS. THE CONTRACTOR IS REQUIRED TO CORRECT AT THE TIME OF ERECTION, BEFORE THE BEAMS ARE SECURED IN PLACE. METHOD OF CORRECTION SHALL PROVIDE AN EVEN, TOTAL BEARING AND A LEVEL TOP BEAM SURFACE. TOLERANCE AFTER CORRECTION SHALL BE + 1/4 INCH. THE FABRICATOR SHALL NOTIFY THE CONTRACTOR AND DESIGNER IF CORRECTIONS ARE REQUIRED PRIOR TO SHIPMENT.
- FOR BEAMS WITH STEPPED ENDS USE PADS A2, B2, OR C2 ON BOTH SIDES OF EACH BEAM.
- ELASTOMERIC BEARING PADS SHALL BE INCLUDED IN THE PRICE OF THE BEAMS.
- THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-B17A & B THRU BR-B42A & B, BR-B100, BR-B101, BR-B102A, BR-B103, BR-B104, AND BR-B105A & B AS APPROPRIATE.

APPROVED: _____ DATE: _____
 DIRECTOR, ENGINEERING DIVISION
 WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 ENGINEERING DIVISION
 PREPARED: 1-14-05
 GFL 6-05
 PRESTRESSED CONCRETE BEAM
 ELASTOMERIC BEARING PAD DETAILS
 MISC. DESIGN AND ASSEMBLY DETAILS
 STANDARD SHEET BR-B102B

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 ENGINEERING DIVISION
 CONSTRUCTION PLANS OF
 RIFFLE I-BEAM BRIDGE
 REPLACEMENT ON C.R. 5/6 (SLS)
 OVER PERKINS FORK
 BRAXTON COUNTY
 DESIGNED BY: THB/ GFL
 DRAWN BY: THB/ GFL
 CHECKED BY: TM/ RWB
 REVIEWED BY: WRW
 DATE: 08/3/11
 SCALE: NO SCALE
 SHEET NO 17 OF 22
 BRIDGE NUMBER
 04-5/6-7.33
 (10832)

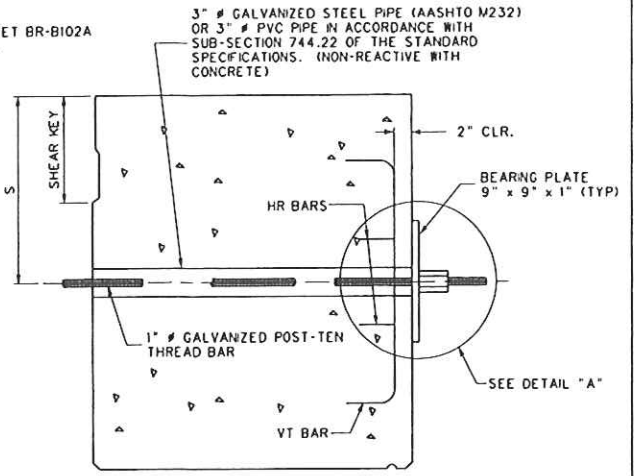


POST-TENSIONING BAR SPACING PLAN
SEE 8 OF 22 FOR DETAILS

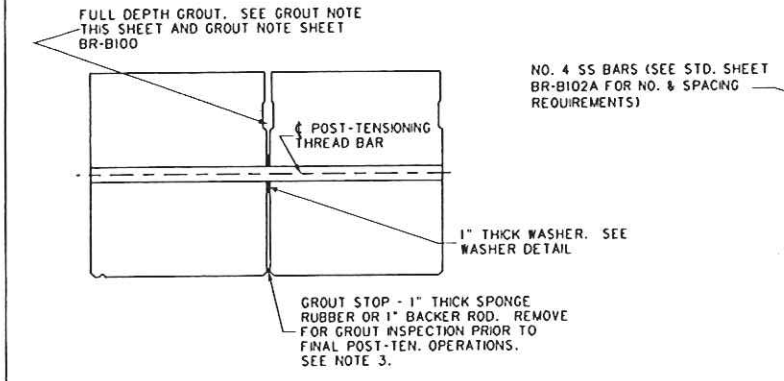


POST-TENSIONING BAR SPACING PLAN
NORMAL OR SKEW < 20°

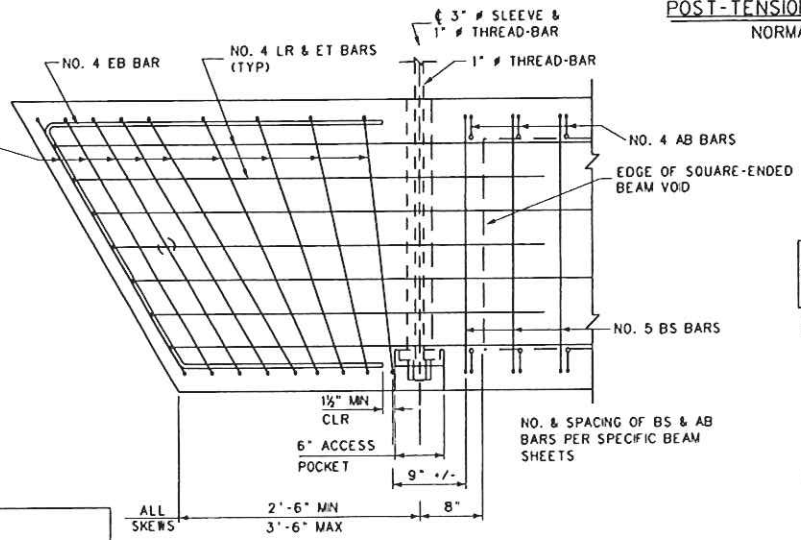
REFER TO STANDARD SHEET BR-B102A FOR SHEAR KEY DETAILS.



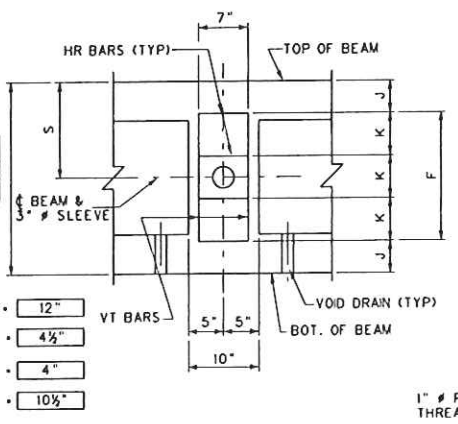
POST-TENSIONING BAR DETAILS



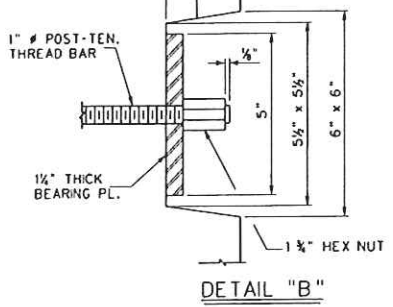
GROUT DETAILS



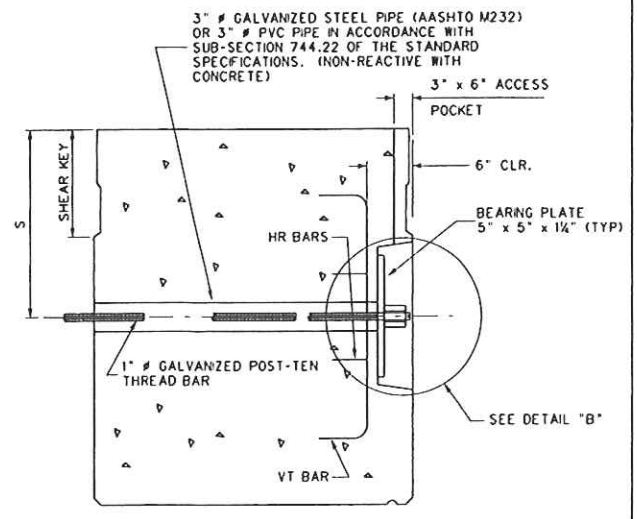
SHEAR REINFORCEMENT DETAIL
BEAMS WITH ACCESS POCKETS



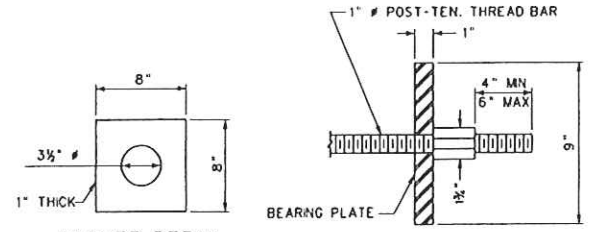
REINFORCING DETAILS @ DIAPHRAGM
EXTERIOR BEAM & POCKETS ONLY



DETAIL "B"



ACCESS POCKET, END POST-TENSIONING BAR



WASHER DETAIL

DETAIL "A"

SPACE POST-TENSIONING THREAD BARS TO AVOID CONFLICT WITH GUARDRAIL INSERTS.

THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-B17A & B THRU BR-B42A & B, BR-B100, BR-B101, BR-B102A & B, BR-B104, AND BR-B105A-B.

- PROCEDURE NOTES**
- INSTALL ONE INCH THICK WASHER AND GROUT STOP BY GLUING TO ONE SIDE, FOR THE ENTIRE LENGTH OF EACH BEAM PRIOR TO SETTING BEAMS. GLUE SHALL BE AN APPROVED CONSTRUCTION TYPE GLUE OR EPOXY ADHESIVE. GROUT STOP MAY BE INSTALLED AFTER BEAMS ARE SET.
 - GLUE A 3/4" x 2" x 2" PIECE OF PRESSURE TREATED PLYWOOD AT EACH THREAD-BAR LOCATION TO INSURE THAT A 3/4" GAP IS OBTAINED. PLYWOOD SPACERS TO BE OFFSET APPROXIMATELY 2 FEET FROM THE THREAD-BAR HOLE AND CENTERED ON THE HOLE DEPTH. PLYWOOD SPACERS ARE REQUIRED ON ONLY ONE BEAM EDGE FACE OF ABUTTING BEAMS. AFTER THE BEAMS ARE SET AND THE THREAD-BARS INSTALLED, PULL THE ENTIRE SUPERSTRUCTURE TOGETHER BY APPLYING A POST-TENSIONING FORCE OF APPROXIMATELY 3000 POUNDS. AT THIS STAGE THE GAP BETWEEN BEAMS SHALL BE A UNIFORM 3/4" WITH ALL SWEEP REMOVED. RECORD THE ACTUAL FORCE APPLIED.
 - FILL THE GAP BETWEEN BEAMS AND SHEAR KEY FULL DEPTH WITH THE PRE-APPROVED, PRE-TESTED GROUT MIXTURE. FROM EACH BATCH, PREPARE JOB CONTROL GROUT CUBES FOR THREE AND SEVEN DAY TESTS. THESE JOB CONTROL SAMPLES WILL BE USED TO DETERMINE WHEN THE GROUT HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 4500 PSI. A MINIMUM OF THREE SPECIMENS PER TEST SHALL BE OBTAINED, AND THE AVERAGE OF THE TEST RESULTS USED. ACCEPTANCE SAMPLING AND TESTING OF THE GROUT IS THE RESPONSIBILITY OF THE CONTRACTOR; HOWEVER, A REPRESENTATIVE OF THE WOODH SHALL WITNESS ALL OF THE ACCEPTANCE SAMPLING AND TESTING.
TEST PROCEDURE SHALL BE ASTM C109 AS MODIFIED BY ASTM C1107. IN NO INSTANCE SHALL THE CONTRACTOR PROCEED WITH POST-TENSIONING OR OTHER BEAM ERECTION PROCEDURES UNTIL THE REQUIRED MINIMUM GROUT STRENGTH IS ATTAINED AND VERIFIED BY THE ENGINEER. IN THE EVENT THAT THE MINIMUM GROUT STRENGTH IS NOT ATTAINED, THE ENGINEER SHALL BE NOTIFIED AND CORRECTIVE ACTION TAKEN AT THE DIRECTION OF THE ENGINEER. SEE SHEAR KEY GROUT NOTE, SHEET BR-B100 FOR ADDITIONAL REQUIREMENTS.
AFTER THE GROUT HAS REACHED AN INITIAL SET CONDITION AND PRIOR TO ANY FINAL POST-TENSIONING PROCEDURES, THE CONTRACTOR SHALL REMOVE THE GROUT STOP AND INSPECT THE GROUT FOR VOIDS OR OTHER IRREGULARITIES. ANY VOIDS DEEPER THAN 2" FROM THE BOTTOM SHALL BE REGROUTED IN A MANNER ACCEPTABLE TO THE ENGINEER.
 - AFTER GROUT AS BEEN PLACED AND REACHED IT'S MINIMUM COMPRESSIVE STRENGTH OF 4500 PSI AND HAS CURED A MINIMUM OF 3 DAYS, APPLY 50% OF THE FINAL POST-TENSIONING FORCE TO ALL THREAD-BARS, WORKING BEAM ENDS TO MOSPAN. AFTER ALL THREAD-BARS HAVE BEEN TENSIONED TO 50%, APPLY THE REMAINING PERCENTAGE OF FINAL POST-TENSIONING FORCE, WORKING IN THE SAME SEQUENCE AS THE FIRST STAGE OF FINAL TENSIONING.
 - MEASURE AND RECORD. IN THE ELONGATION TABLE, THIS SHEET, THE ACTUAL TOTAL ELONGATION OF EACH THREAD-BAR. COMPARE THE MEASURED ELONGATION TO THE CALCULATED ELONGATION. A SIGNIFICANT DIFFERENCE BETWEEN MEASURED AND CALCULATED ELONGATIONS COULD INDICATE IMPROPER JACKING TECHNIQUES, FAULTY MATERIALS, FAULTY JACKS, OR IMPROPERLY CALIBRATED JACKS. IF THE DIFFERENCE IS GREATER THAN 15%, THEN THE JACK SHALL BE RE-CALIBRATED AND THE JACKING TECHNIQUES EVALUATED. IF, AFTER THE ABOVE STEPS ARE TAKEN, THE PERCENTAGE DIFFERENCE IS GREATER THAN 10%, THEN THE ENGINEER SHALL BE NOTIFIED AND CORRECTIVE ACTION TAKEN AT THE DIRECTION OF THE ENGINEER. ALL COSTS INVOLVED IN CORRECTION SHALL BE AT THE CONTRACTORS EXPENSE.
 - USING SAW, TRIM EXCESS THREAD-BAR LEAVING 4" TO 6" PAST THE NUT. DO NOT TRIM THREAD-BARS BY TORCH CUTTING. TOUCH-UP TRIMMED ENDS WITH GALVICON OR EQUAL.
 - INSTALL ANCHOR DOWELS AS DETAILED ON STANDARD SHEETS BR-B101 AND BR-B102A.

FINAL POST-TENSIONING FORCE
TYPE Z BARS = 80 KIPS
TYPE V BARS = 40 KIPS

POST-TENSIONING BAR LAYOUT SCHEDULE

SPAN	SKEW	L	W	A	B	C	D	E	STEP

SEE SHEET 8 OF 22 FOR DETAILS

DIMENSIONS

BEAM SIZE	REINFORCEMENT DIM	BAR SPACING	BAR DIST		
	F	J	K	S	
	IN.	IN.	IN.	IN.	
	17	12	2 1/2	4	8 1/2
	21	12	4 1/2	4	10 1/2
	27	10	4 1/2	6	13 1/2
	33	24	4 1/2	8	16 1/2
	39	30	4 1/2	10	19 1/2
	42	33	4 1/2	11	21

GROUT STRENGTH TABLE

	3 DAY (PSI)	7 DAY (PSI)
PRE-TEST STRENGTH		
JOB CONTROL STRENGTH		
GROUT TYPE & MANUFACTURER		

POST-TENSIONING BAR LENGTH

BAR	FORMULA	LENGTH
V(EVEN)	W-3'	15' 0"
Z	W-3'	27' 0"
V(ODD)	W-4'-6"	

ELONGATION (INCHES)

BAR	CODE	CALC.	MEASURED											
			NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	NO. 6	NO. 7	NO. 8	NO.	NO.		
Z	⊙	1"												
V	⊙	1/4"												

CALCULATED ⊙ - WFT.J / 24.B
CALCULATED ⊙ - WFT.J / 99.2
ODD NO. BEAMS
CALCULATED ⊙ - WFT.J - 31 / 99.2

- SPECIAL WARNING NOTES**
- DO NOT STAND IN LINE WITH THE POST-TENSIONING BAR DURING TENSIONING PROCEDURES.
 - NUTS, COUPLERS AND EXTENSION RODS USED IN THE POST-TENSIONING WORK SHALL BE THE MATERIAL APPROVED BY THE MANUFACTURER OF THE HIGH STRENGTH POST-TENSIONING RODS. IN NO CASE SHALL THE CONTRACTOR USE NON-APPROVED MATERIAL OR MATERIAL FROM TWO DIFFERENT SOURCES.

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

PRESTRESSED CONCRETE BEAM
TRANSVERSE POST-TENSIONING DETAILS
STANDARD SHEET BR-B103

DATE: 1-14-05
REVIEWED: [Signature]

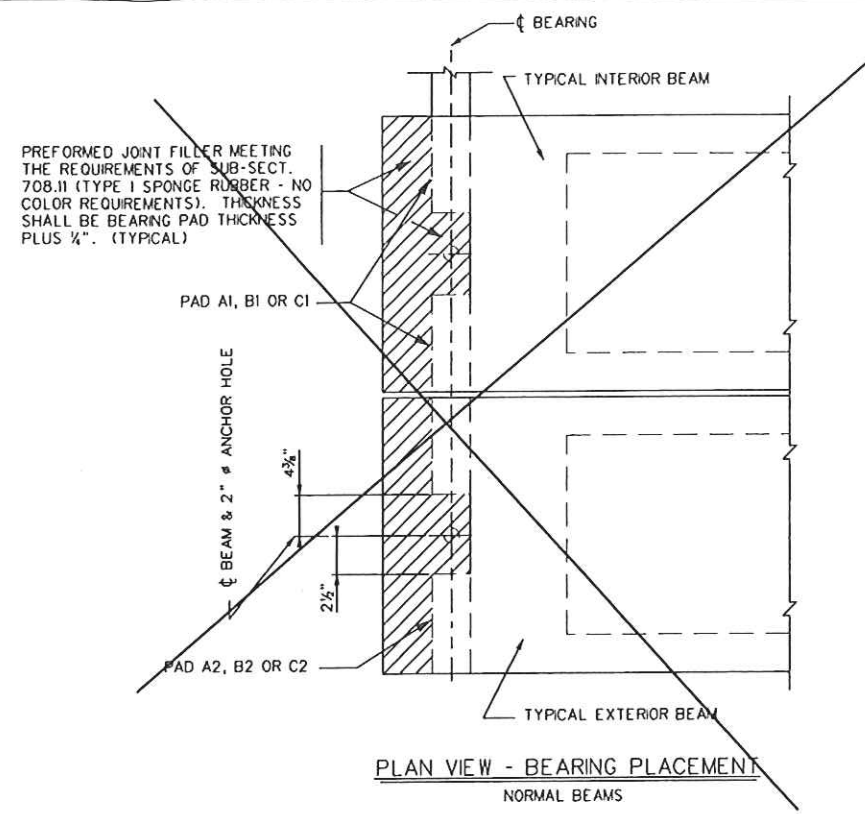
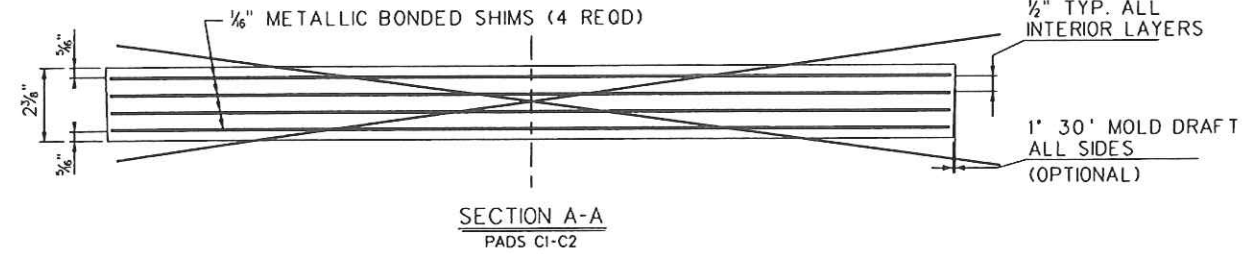
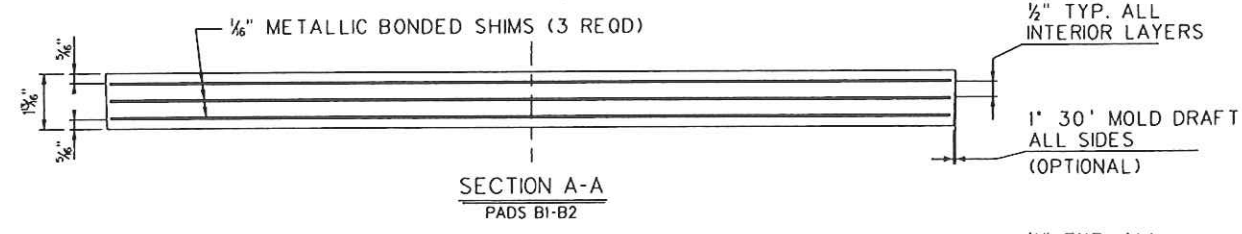
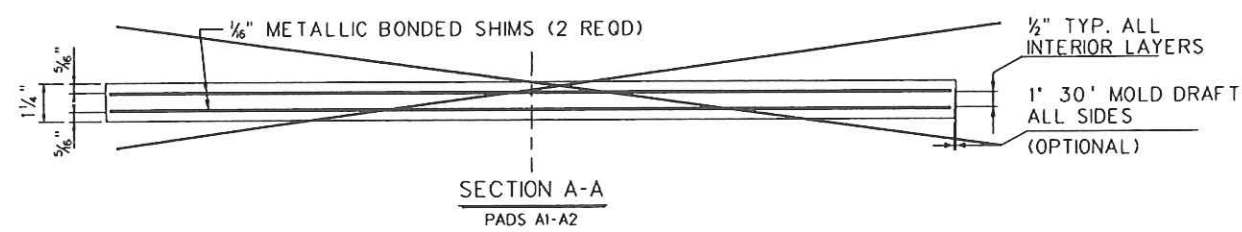
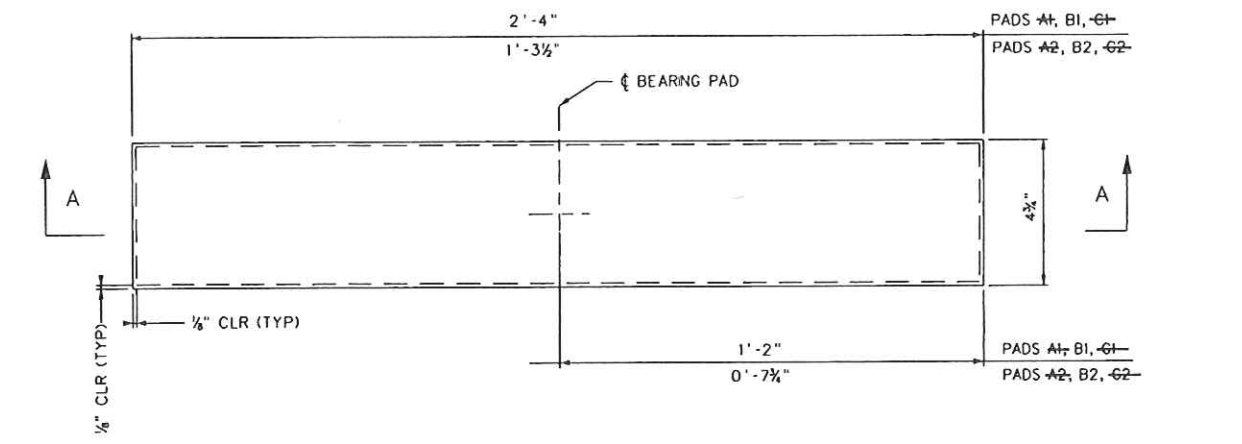
WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

CONSTRUCTION PLANS OF
RIFFLE I-BEAM BRIDGE REPLACEMENT
ON C.R. 5/6 (SLS)
OVER PERKINS FORK
BRAXTON COUNTY

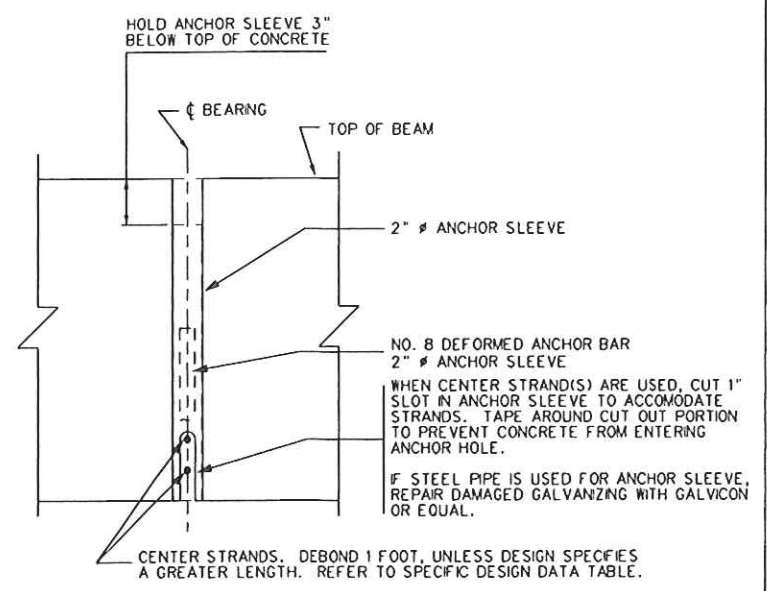
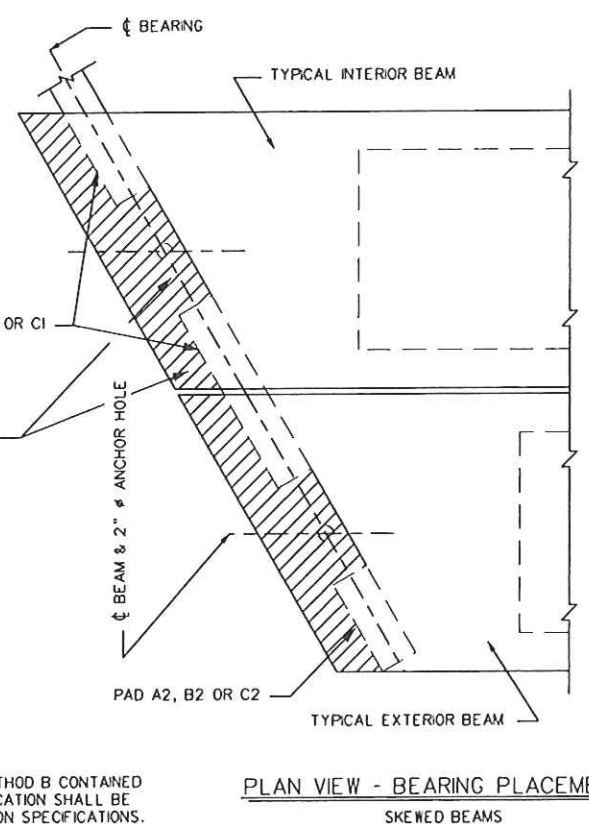
DESIGNED BY: THB/GFL
DRAWN BY: THB/RMW
CHECKED BY: TM/RMW
REVIEWED BY: WRW
DATE: 01/12/10
SCALE: NO SCALE
SHEET 18 OF 22
BRIDGE NUMBER
04-5/6-7.33
(10831)

PRESTRESSED CONCRETE BEAM
TRANSVERSE POST-TENSIONING DETAILS

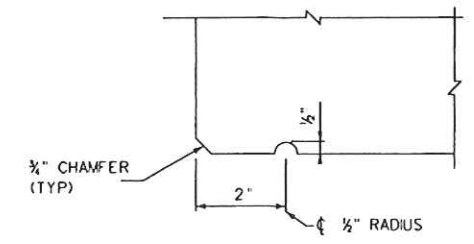
STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS
S304-5/6-7.31	N/A	7	BRAXTON	17	22



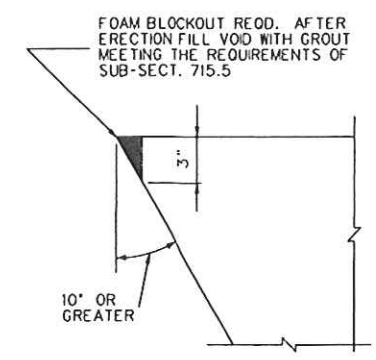
PREFORMED JOINT FILLER MEETING THE REQUIREMENTS OF SUB-SECT. 708.11 (TYPE 1 SPONGE RUBBER - NO COLOR REQUIREMENTS). THICKNESS SHALL BE BEARING PAD THICKNESS PLUS 1/4". (TYPICAL)



ANCHOR SLEEVE DETAIL



DRIP GROOVE DETAIL EXTERIOR BEAMS



SKEW BLOCKOUT DETAIL

BOX BEAM BEARING PAD CONTROL DIMENSIONS								
PAD	LENGTH	WIDTH	HEIGHT	NO. SHIMS	SHM SIZE	SPAN RANGES	MAXIMUM REACTION	MAXIMUM MOVEMENT ONE DIRECTION
A1	4 1/4"	20"	1 1/4"	2	1/8" x 4 1/2" x 2'-3 1/4"	20' - 30'	55 KIPS	0.39"
B1	4 1/4"	28"	1 3/8"	3	1/8" x 4 1/2" x 2'-3 1/4"	40' - 78'	75 KIPS	0.80"
C1	4 1/4"	20"	2 1/4"	4	1/8" x 4 1/2" x 1'-3 1/4"	80' - 100'	89 KIPS	1.02"
A2	4 1/4"	15 1/2"	1 1/4"	2	1/8" x 4 1/2" x 1'-3 1/4"	20' - 36'	20-16PS	0.39"
B2	4 1/4"	15 1/2"	1 3/8"	3	1/8" x 4 1/2" x 1'-3 1/4"	40' - 78'	38 KIPS	0.80"
C2	4 1/4"	15 1/2"	2 1/4"	4	1/8" x 4 1/2" x 1'-3 1/4"	80' - 100'	45-10PS	1.02"

NOTES:

- ELASTOMERIC BEARING PADS ARE DESIGNED IN ACCORDANCE WITH DESIGN METHOD B CONTAINED IN SECTION 14 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS. FABRICATION SHALL BE IN ACCORDANCE WITH SECTION 18 OF THE AASHTO LRFD BRIDGE CONSTRUCTION SPECIFICATIONS.
- ALL BEARINGS ARE DESIGNED FOR A LOW TEMPERATURE ZONE C AND SHALL HAVE A DUROMETER HARDNESS OF 60. METALLIC REINFORCEMENT SHALL HAVE A MINIMUM YIELD STRENGTH OF 36 KSI.
- BEARING PADS ARE DESIGNED FOR ZERO BRIDGE GRADE. FOR BRIDGE GRADES GREATER THAN 5%, PADS SHALL BE SPECIFICALLY DESIGNED FOR THE GRADE. AS AN ALTERNATE, CAST-IN-PLACE BEVELED SOLE PLATES MAY BE USED.
- DESIGNER, FABRICATOR AND ERECTOR SHALL BE AWARE THAT SKEWED END BEAMS MAY TWIST OR WARP, CAUSING UNEVEN BEAM SEATING AT THE BEARINGS. THE CONTRACTOR IS REQUIRED TO CORRECT AT THE TIME OF ERECTION, BEFORE THE BEAMS ARE SECURED IN PLACE. METHOD OF CORRECTION SHALL PROVIDE AN EVEN, TOTAL BEARING AND A LEVEL TOP BEAM SURFACE. TOLERANCE AFTER CORRECTION SHALL BE 1/4 INCH. THE FABRICATOR SHALL NOTIFY THE CONTRACTOR AND DESIGNER IF CORRECTIONS ARE REQUIRED PRIOR TO SHIPMENT.
- FOR BEAMS WITH STEPPED ENDS USE PADS A2, B2, OR C2 ON BOTH SIDES OF EACH BEAM.
- ELASTOMERIC BEARING PADS SHALL BE INCLUDED IN THE PRICE OF THE BEAMS.
- THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-B17A & B THRU BR-B42A & B, BR-B100, BR-B101, BR-B102A, BR-B103, BR-B104, AND BR-B105A-B AS APPROPRIATE.

APPROVED: _____ DATE: _____
 DIRECTOR, ENGINEERING DIVISION

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 ENGINEERING DIVISION

PREPARED: 1-14-05
 GFL 6-05

PRESTRESSED CONCRETE BEAM
 ELASTOMERIC BEARING PAD DETAILS
 MISC. DESIGN AND ASSEMBLY DETAILS

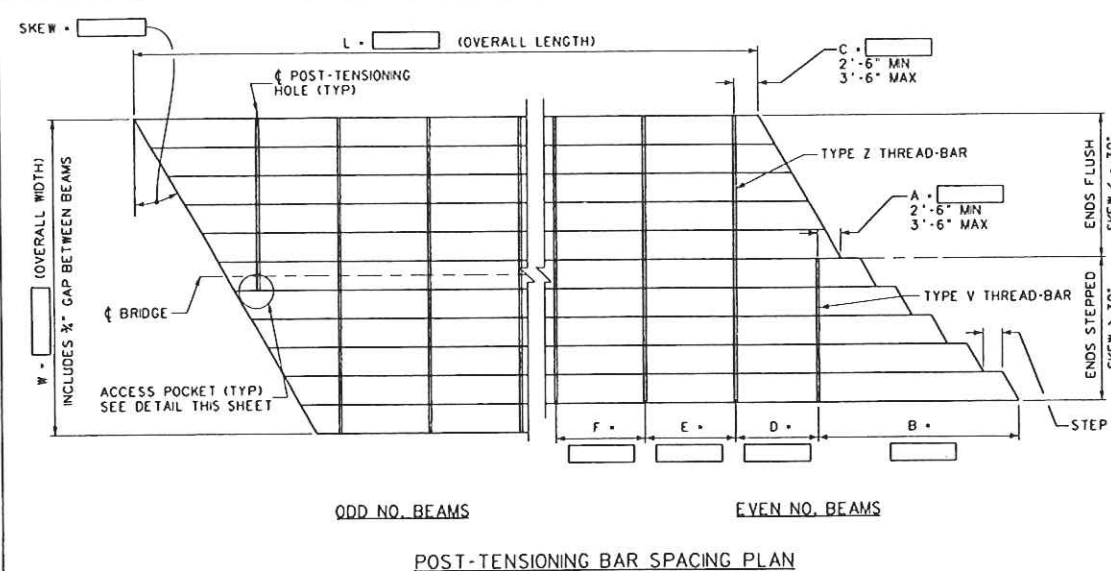
STANDARD SHEET BR-B102B

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 ENGINEERING DIVISION

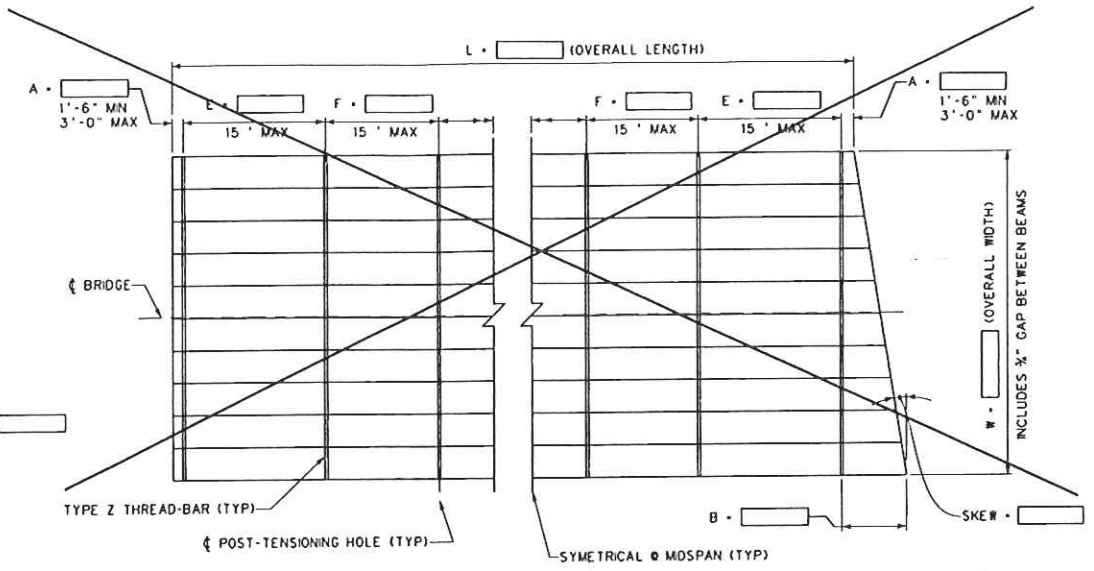
DESIGNED BY: THB/ GFL
 DRAWN BY: THB/ GFL
 CHECKED BY: TM/ RMW
 REVIEWED BY: WRW
 DATE: 08/3/11
 SCALE: NO SCALE
 SHEET NO 17 OF 22
 BRIDGE NUMBER
 04-5/6-7.33
 (10832)

CONSTRUCTION PLANS OF
 RIFFLE I-BEAM BRIDGE
 REPLACEMENT ON C.R. 5/6 (SLS)
 OVER PERKINS FORK
 BRAXTON COUNTY

PRESTRESSED CONCRETE BEAM
 ELASTOMERIC BEARING PAD DETAILS
 MISC. DESIGN AND ASSEMBLY DETAILS

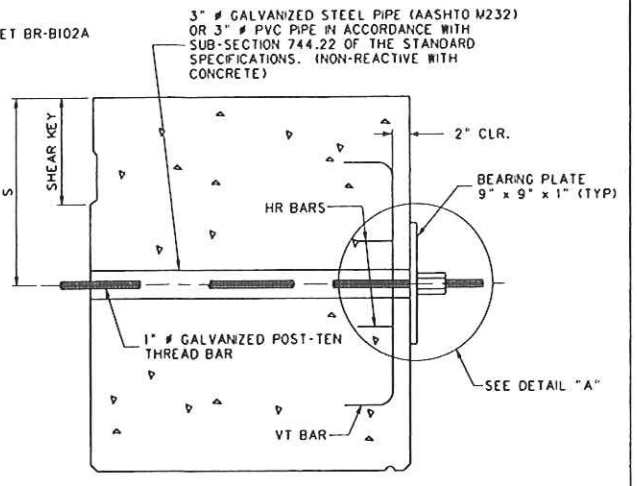


POST-TENSIONING BAR SPACING PLAN
SKEW > 20°
SEE 8 OF 22 FOR DETAILS

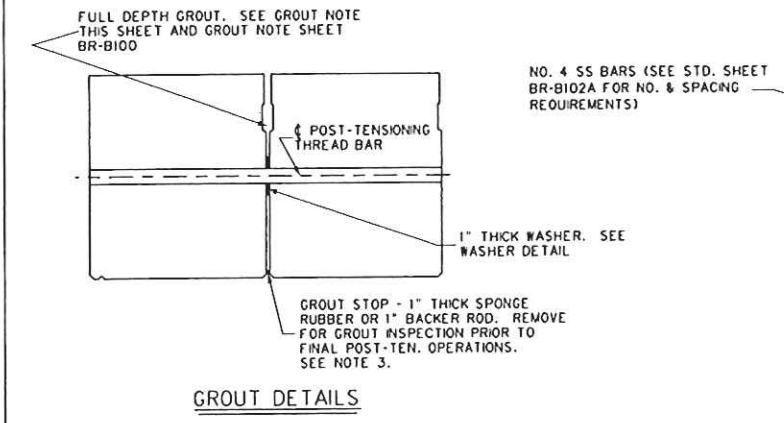


POST-TENSIONING BAR SPACING PLAN
NORMAL OR SKEW < 20°

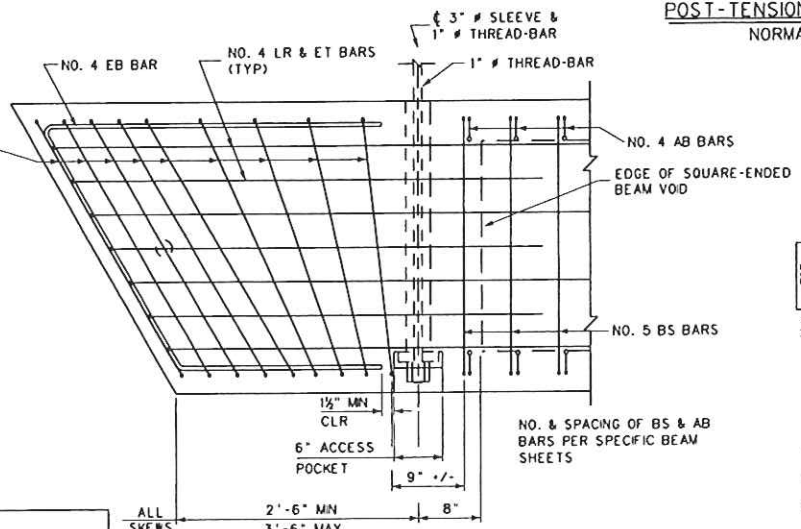
REFER TO STANDARD SHEET BR-B102A FOR SHEAR KEY DETAILS.



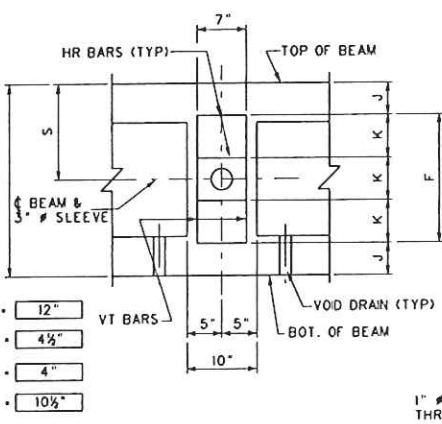
POST-TENSIONING BAR DETAILS



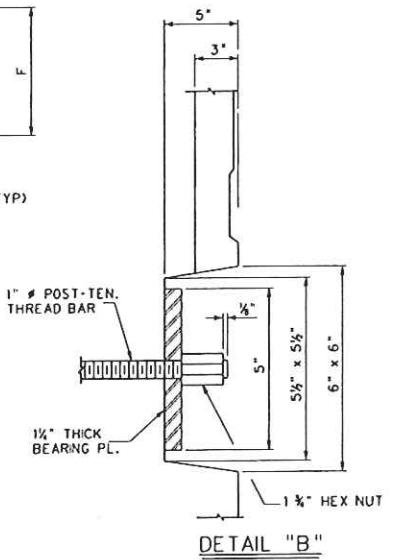
GROUT DETAILS



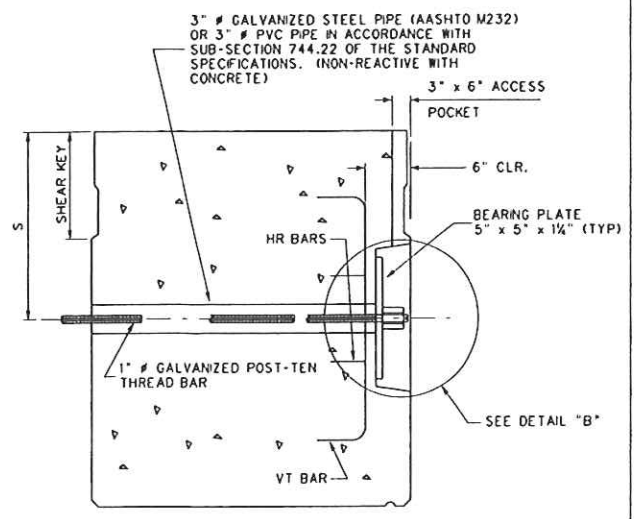
SHEAR REINFORCEMENT DETAIL
BEAMS WITH ACCESS POCKETS



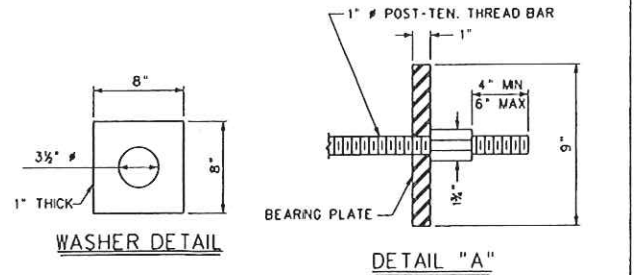
REINFORCING DETAILS @ DIAPHRAGM
EXTERIOR BEAM & POCKETS ONLY



DETAIL "B"



ACCESS POCKET, END POST-TENSIONING BAR



WASHER DETAIL

DETAIL "A"

SPACE POST-TENSIONING THREAD BARS TO AVOID CONFLICT WITH GUARDRAIL INSERTS.

THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-B17A & B THRU BR-B42A & B, BR-B100, BR-B101, BR-B102A & B, BR-B104, AND BR-B105A-B.

- PROCEDURE NOTES**
- INSTALL ONE INCH THICK WASHER AND GROUT STOP BY GLUING TO ONE SIDE, FOR THE ENTIRE LENGTH OF EACH BEAM PRIOR TO SETTING BEAMS. GLUE SHALL BE AN APPROVED CONSTRUCTION TYPE GLUE OR EPOXY ADHESIVE. GROUT STOP MAY BE INSTALLED AFTER BEAMS ARE SET.
 - GLUE A 3/4" x 2" x 2" PIECE OF PRESSURE TREATED PLYWOOD AT EACH THREAD-BAR LOCATION TO INSURE THAT A 3/8" GAP IS OBTAINED. PLYWOOD SPACERS TO BE OFFSET APPROXIMATELY 2 FEET FROM THE THREAD-BAR HOLE AND CENTERED ON THE HOLE DEPTH. PLYWOOD SPACERS ARE REQUIRED ON ONLY ONE BEAM EDGE FACE OF ABUTTING BEAMS. AFTER THE BEAMS ARE SET AND THE THREAD-BARS INSTALLED, PULL THE ENTIRE SUPERSTRUCTURE TOGETHER BY APPLYING A POST-TENSIONING FORCE OF APPROXIMATELY 3000 POUNDS. AT THIS STAGE THE GAP BETWEEN BEAMS SHALL BE A UNIFORM 3/8" WITH ALL SWEEP REMOVED. RECORD THE ACTUAL FORCE APPLIED.
 - FILL THE GAP BETWEEN BEAMS AND SHEAR KEY FULL DEPTH WITH THE PRE-APPROVED, PRE-TESTED GROUT MIXTURE. FROM EACH BATCH, PREPARE JOB CONTROL GROUT CUBES FOR THREE AND SEVEN DAY TESTS. THESE JOB CONTROL SAMPLES WILL BE USED TO DETERMINE WHEN THE GROUT HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 4500 PSI. A MINIMUM OF THREE SPECIMENS PER TEST SHALL BE OBTAINED, AND THE AVERAGE OF THE TEST RESULTS USED. ACCEPTANCE SAMPLING AND TESTING OF THE GROUT IS THE RESPONSIBILITY OF THE CONTRACTOR; HOWEVER, A REPRESENTATIVE OF THE WYDOH SHALL WITNESS ALL OF THE ACCEPTANCE SAMPLING AND TESTING.

TEST PROCEDURE SHALL BE ASTM C109 AS MODIFIED BY ASTM C1107. IN NO INSTANCE SHALL THE CONTRACTOR PROCEED WITH POST-TENSIONING OR OTHER BEAM ERECTION PROCEDURES UNTIL THE REQUIRED MINIMUM GROUT STRENGTH IS ATTAINED AND VERIFIED BY THE ENGINEER. IN THE EVENT THAT THE MINIMUM GROUT STRENGTH IS NOT ATTAINED, THE ENGINEER SHALL BE NOTIFIED AND CORRECTIVE ACTION TAKEN AT THE DIRECTION OF THE ENGINEER. SEE SHEAR KEY GROUT NOTE, SHEET BR-B100 FOR ADDITIONAL REQUIREMENTS.

AFTER THE GROUT HAS REACHED AN INITIAL SET CONDITION AND PRIOR TO ANY FINAL POST-TENSIONING PROCEDURES, THE CONTRACTOR SHALL REMOVE THE GROUT STOP AND INSPECT THE GROUT FOR VOIDS OR OTHER IRREGULARITIES. ANY VOIDS DEEPER THAN 2" FROM THE BOTTOM SHALL BE REGROUTED IN A MANNER ACCEPTABLE TO THE ENGINEER.
 - AFTER GROUT HAS BEEN PLACED AND REACHED IT'S MINIMUM COMPRESSIVE STRENGTH OF 4500 PSI AND HAS CURED A MINIMUM OF 3 DAYS, APPLY 50% OF THE FINAL POST-TENSIONING FORCE TO ALL THREAD-BARS, WORKING BEAM ENDS TO MIDSPAN. AFTER ALL THREAD-BARS HAVE BEEN TENSIONED TO 50%, APPLY THE REMAINING PERCENTAGE OF FINAL POST-TENSIONING FORCE, WORKING IN THE SAME SEQUENCE AS THE FIRST STAGE OF FINAL TENSIONING.
 - MEASURE AND RECORD, IN THE ELONGATION TABLE, THIS SHEET, THE ACTUAL TOTAL ELONGATION OF EACH THREAD-BAR. COMPARE THE MEASURED ELONGATION TO THE CALCULATED ELONGATION. A SIGNIFICANT DIFFERENCE BETWEEN MEASURED AND CALCULATED ELONGATIONS COULD INDICATE IMPROPER JACKING TECHNIQUES, FAULTY MATERIALS, FAULTY JACKS, OR IMPROPERLY CALIBRATED JACKS. IF THE DIFFERENCE IS GREATER THAN 15%, THEN THE JACK SHALL BE RE-CALIBRATED AND THE JACKING TECHNIQUES EVALUATED. IF, AFTER THE ABOVE STEPS ARE TAKEN, THE PERCENTAGE DIFFERENCE IS GREATER THAN 10%, THEN THE ENGINEER SHALL BE NOTIFIED AND CORRECTIVE ACTION TAKEN AT THE DIRECTION OF THE ENGINEER. ALL COSTS INVOLVED IN CORRECTION SHALL BE AT THE CONTRACTORS EXPENSE.
 - USING SAW, TRIM EXCESS THREAD-BAR LEAVING 4" TO 6" PAST THE NUT. DO NOT TRIM THREAD-BARS BY TORCH CUTTING. TOUCH-UP TRIMMED ENDS WITH GALVICON OR EQUAL.
 - INSTALL ANCHOR DOWELS AS DETAILED ON STANDARD SHEETS BR-B101 AND BR-B102A.

FINAL POST-TENSIONING FORCE
TYPE Z BARS - 80 KIPS
TYPE V BARS - 40 KIPS

POST-TENSIONING BAR LAYOUT SCHEDULE

SPAN	REINFORCEMENT DIM	BAR SPACING	BAR DIST
L	F	J	K
W	F	J	K
A	F	J	K
B	F	J	K
C	F	J	K
D	F	J	K
E	F	J	K
STEP	F	J	K

SEE SHEET 8 OF 22 FOR DETAILS

DIMENSIONS

BEAM SIZE	REINFORCEMENT DIM	BAR SPACING	BAR DIST
H	F	J	K
L	F	J	K
W	F	J	K
A	F	J	K
B	F	J	K
C	F	J	K
D	F	J	K
E	F	J	K
STEP	F	J	K

GROUT STRENGTH TABLE

	3 DAY (PSI)	7 DAY (PSI)
PRE-TEST STRENGTH		
JOB CONTROL STRENGTH		
GROUT TYPE & MANUFACTURER		

POST-TENSIONING BAR LENGTH

BAR	FORMULA	LENGTH
V (EVEN)	W-3'	15' 0"
Z	W-3'	27' 0"
V (ODD)	W-4'-6"	

ELONGATION (INCHES)

BAR	CODE	CALC.	MEASURED												
			NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	NO. 6	NO. 7	NO. 8	NO.	NO.			
Z	⊙	1"													
V	⊙	1/4"													

CALCULATED ⊙ - WFT.3 / 24.8
CALCULATED ⊙ - WFT.3 / 99.2
ODD NO. BEAMS - CALCULATED ⊙ - WFT.3 / 99.2

- SPECIAL WARNING NOTES**
- DO NOT STAND IN LINE WITH THE POST-TENSIONING BAR DURING TENSIONING PROCEDURES.
 - NUTS, COUPLERS AND EXTENSION RODS USED IN THE POST-TENSIONING WORK SHALL BE THE MATERIAL APPROVED BY THE MANUFACTURER OF THE HIGH STRENGTH POST-TENSIONING RODS. IN NO CASE SHALL THE CONTRACTOR USE NON-APPROVED MATERIAL OR MATERIAL FROM TWO DIFFERENT SOURCES.

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

PREPARED: 1-14-05
REVIEWED:

PRESTRESSED CONCRETE BEAM
TRANSVERSE POST-TENSIONING DETAILS
STANDARD SHEET BR-B103

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

CONSTRUCTION PLANS OF
RIFFLE I-BEAM BRIDGE REPLACEMENT
ON C.R. 5/6 (SLS)
OVER PERKINS FORK
BRAXTON COUNTY

DESIGNED BY: THB / GFL
DRAWN BY: THB / RMW
CHECKED BY: TM / RMW
REVIEWED BY: WRW
DATE: 01/12/10
SCALE: NO SCALE
SHEET 18 OF 22
BRIDGE NUMBER 04-5/6-7.33 (10831)
PRESTRESSED CONCRETE BEAM
TRANSVERSE POST-TENSIONING DETAILS