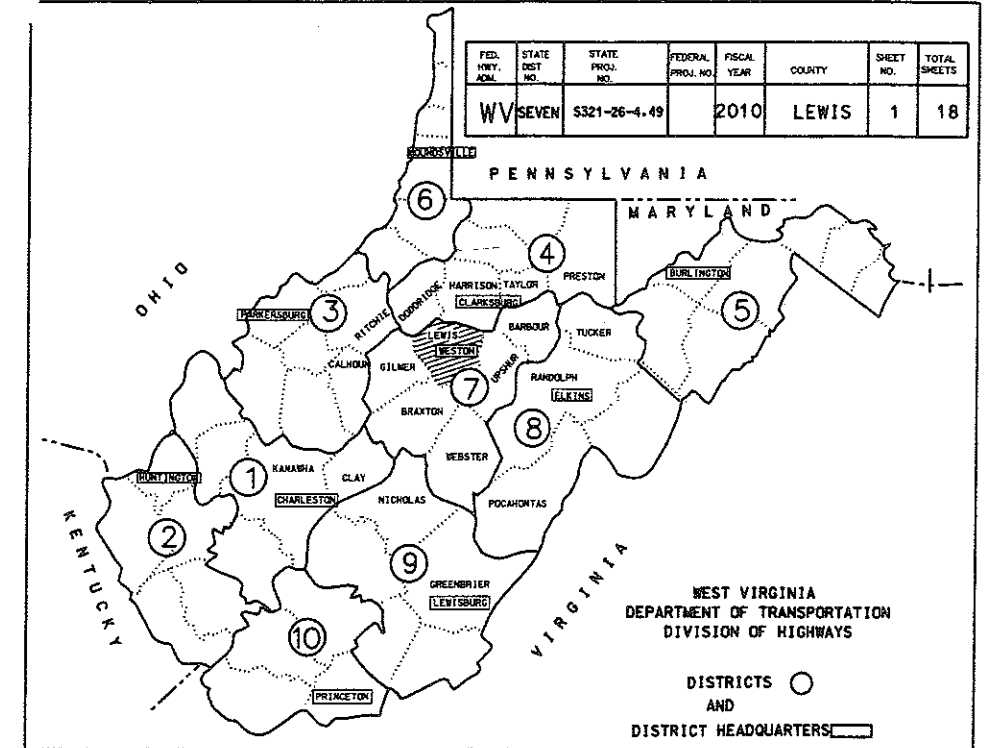


WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS CONSTRUCTION PLANS OF BERLIN BOX BEAM BRIDGE STATE PROJECT NO. S321-26-4.49 C.R. 26 (SLS) HACKERS CREEK DISTRICT LEWIS COUNTY

PROJECT LENGTH

C.R. 26	STA. 0+50.00 TO STA. 1+89.38 = 139.38 L.F. = 0.03 MI.
BRIDGE	STA. 1+89.38 TO STA. 2+53.62 = 64.24 L.F. = 0.01 MI.
C.R. 26	STA. 2+53.62 TO STA. 3+75.00 = 121.38 L.F. = 0.02 MI.
TOTAL LENGTH = 325.00 L.F. = 0.06 MI.	

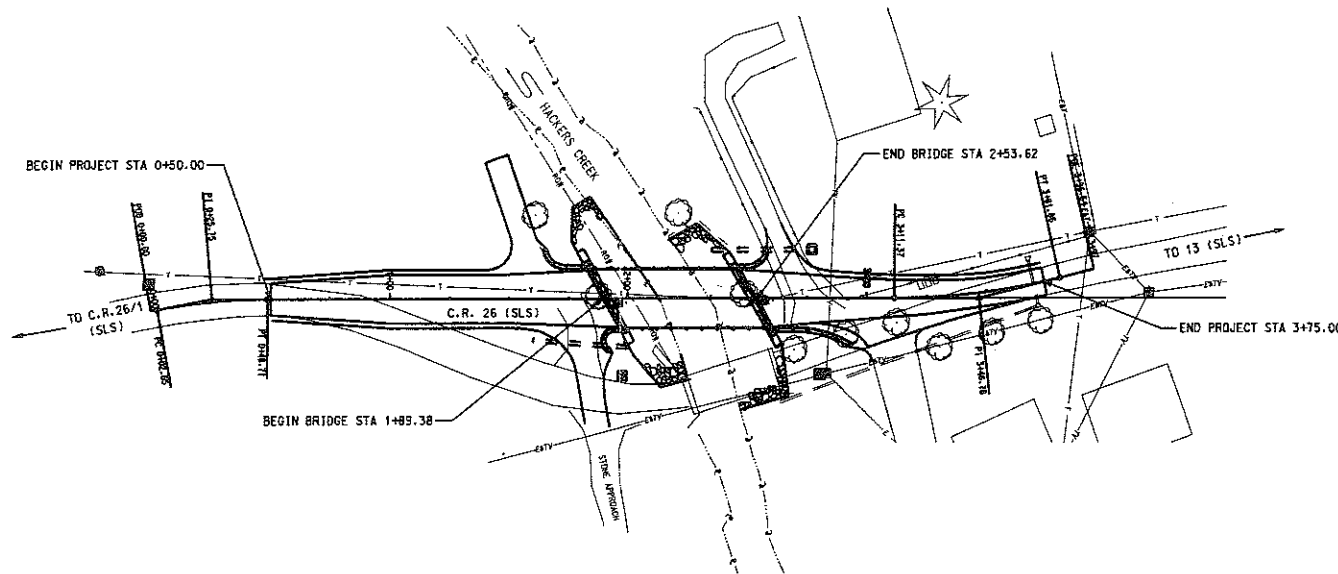


UTILITIES ENCOUNTERED:

VERIZON
ALLEGHENY POWER

CONVENTIONAL SIGNS

---	STATE LINE
---	COUNTY LINE
---	CORPORATION LINE
---	PROPOSED R/W LINE
---	PROPERTY LINE
X-X	EXISTING FENCE
D-D	DITCH
---	EDGE OF STREAM
---	PROPOSED GUARDRAIL
---	EXISTING GUARDRAIL
---	RAILROAD
G-G	GAS LINE
W-W	WATER LINE
T-T	TELEPHONE LINE
E-E	ELECTRIC LINE
●	TELEPHONE POLE
○	POWER POLE
⊙	COMBINED POWER AND TELEPHONE POLE
○	TREE
○	SHRUB
□	RIGHT OF WAY MARKER



TYPE OF CONSTRUCTION

BRIDGE REPLACEMENT
BR. NO. 21-26-4.52
(10955)

INDEX TO SHEETS

NO.	DESCRIPTION
1	TITLE SHEET
2	GENERAL NOTES
3	SUMMARY OF ESTIMATED QUANTITIES, SCOPE OF WORK, EXISTING ELEVATION VIEW, AND EXISTING DECK SECTION
4	PLAN VIEW, R/W INDEX, TYP C.R. 26 SECTION & TYP APPROACH ROAD SECTION
5	PROJECT REFERENCE POINTS AND C.R. 26 PROFILE
6	BRIDGE PLAN VIEW, POST TENSIONING LAYOUT DETAILS, & GUARDRAIL DETAILS
7	PROPOSED DECK SECTION, ELEVATION VIEW, STRUCTURE EXCAVATION DETAILS, & HYDRAULIC DATA.
8-9	TYPICAL ABUTMENT DIMENSIONING AND DETAILS, REBAR DETAILS
10-16	BOX BEAM STANDARD SHEETS
17-18	C.R. 26 CROSS SECTIONS

NOTE:

STANDARD DETAIL BOOK VOLUME 1 DATED JANUARY 1, 2000 & VOLUME II DATED JAN. 1, 1994, SHALL APPLY TO THIS PROJECT.

DESIGN DESIGNATION

A.D.T. (2006)	340
A.D.T. (2026)	436
D.H.V.	
D.	
T.	
V.	

STANDARD SHEETS

NO.	DATE
BR-2A	8-93
BR-B21A	10-07
BR-B21B	10-07
BR-B100	10-07
BR-B101	10-07
BR-B102A	10-07
BR-B102B	10-07
BR-B103	10-07

PREPARED BY:	GFL	DATE:	03-10
CHECKED BY:	BKR	DATE:	06-10
REVIEWED BY:	WRW	DATE:	06-10

REVISION NUMBER	SHEET NUMBER	REVISIONS	DATE	BY

I HEREBY CERTIFY THAT THIS IS A CORRECT COPY OF THE PLANS OF PROJECT S321-26-4.49

EXECUTIVE SECRETARY

RECOMMENDED *[Signature]* DESIGNER

RECOMMENDED FOR APPROVAL _____ DISTRICT MANAGER

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	S321-26-4.49	LEWIS	2	18

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 25 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_{16} . Strengthening steel design stress- $f_s = 60$ 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, rebar 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 Materials 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 next lines 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 next 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/dyld 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 (C) in accordance with Federal Standard 595, number (E). 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 (C) in accordance with Federal Standard 595, number (E). 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 (C) in accordance with Federal Standard 595, number (E). 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 (C) percent, 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/dyld 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/dyld 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 (C) in accordance with Federal Standard 595, number (E).
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 (C) in accordance with Federal Standard 595, number (E).

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 (C) in accordance with Federal Standard 595, number (E). 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 next 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 ($f_y = 20,000$ p.s.i.) unless otherwise noted.
For superstructures utilizing steel grid flooring, structural steel conforming to the requirements of ASTM A588 ($f_y = 27,000$ 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 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, $f_s = 1,400$ 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 635 and Subsection 104.5 of the Standard Specifications.

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
BERLIN BOX BEAM BRIDGE
ON C.R. 26 (SLS)
OVER HACKERS CREEK
LEWIS COUNTY

DESIGNED BY	GFL
DRAWN BY	BKR
CHECKED BY	BKR
REVIEWED BY	WRW
DATE	8-4-10
SCALE	NONE
SHEET NO.	2 OF 18
BRIDGE NUMBER	21-26-4.52
	(10955)

GENERAL NOTES

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

APPROVED _____ DATE _____
DIRECTOR STRUCTURES DIVISION

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

GENERAL NOTES
STANDARD SHEET BR-2A

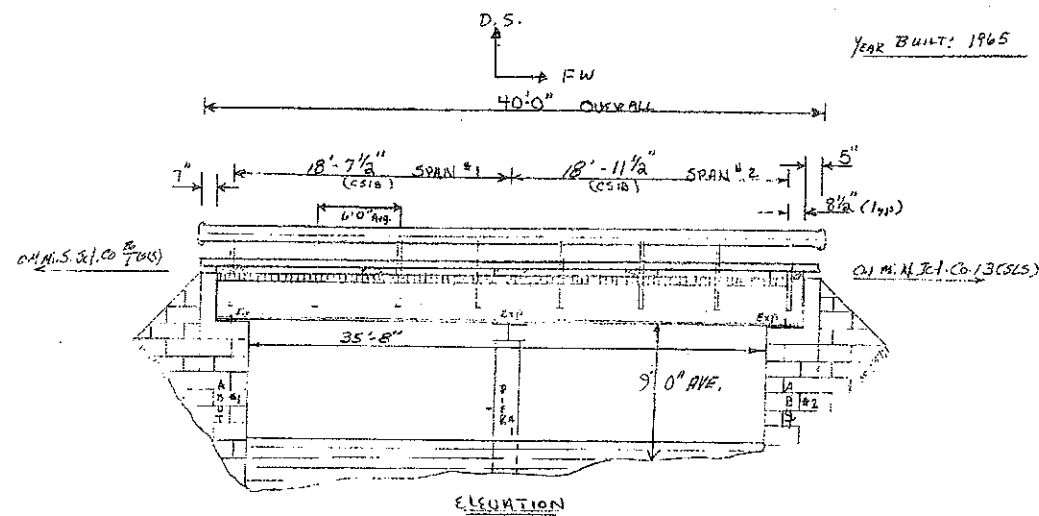
PREPARED: 11-26-90
REVISED: 5-91
8-93

ESTIMATE OF QUANTITIES

PROJECT NO. S321-26-4.49
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		1786
#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 1/4" PLATES	EA		2
* 1" SPONGE RUBBER PREFORMED JOINT FILLER	SF	5 1/8" 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 3/8" X 4 3/4" X 1 1/2"	EA		4
* BEARING PADS 1 3/8" X 4 3/4" X 2 1/2"	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	LF		125'
CLASS 1 APPROACH GUARDRAIL	LF		62.5
* ASSYMETRICAL THRIE BEAM TRANSITIONS	LF	4 EACH	25
H.M.A. BASE COURSE	TON		110
H.M.A. WEARING	TON		60
BASE STONE	TON		490
W12X65 PILING	LB	14 PCS. @ 20' 0"	18200
FOUNDATION PROTECTION MATERIAL	TONS		500
SUBGRADE	CY		120
FABRIC FOR SEPARATION	SY		700
CUT	CY		66
FILL	CY		481
15" CMP	LF		40
18" CMP	LF		40
TYPE G INLET	EA		1

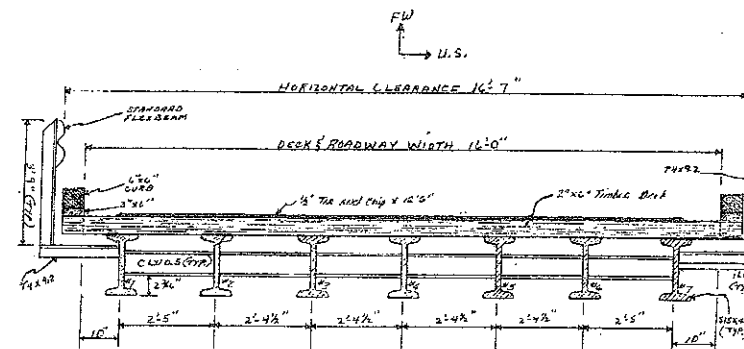
* SUPPLIED BY BOX BEAM FABRICATOR



Skew: 0°

(Looking Downstream)

EXISTING ELEVATION VIEW
NO SCALE



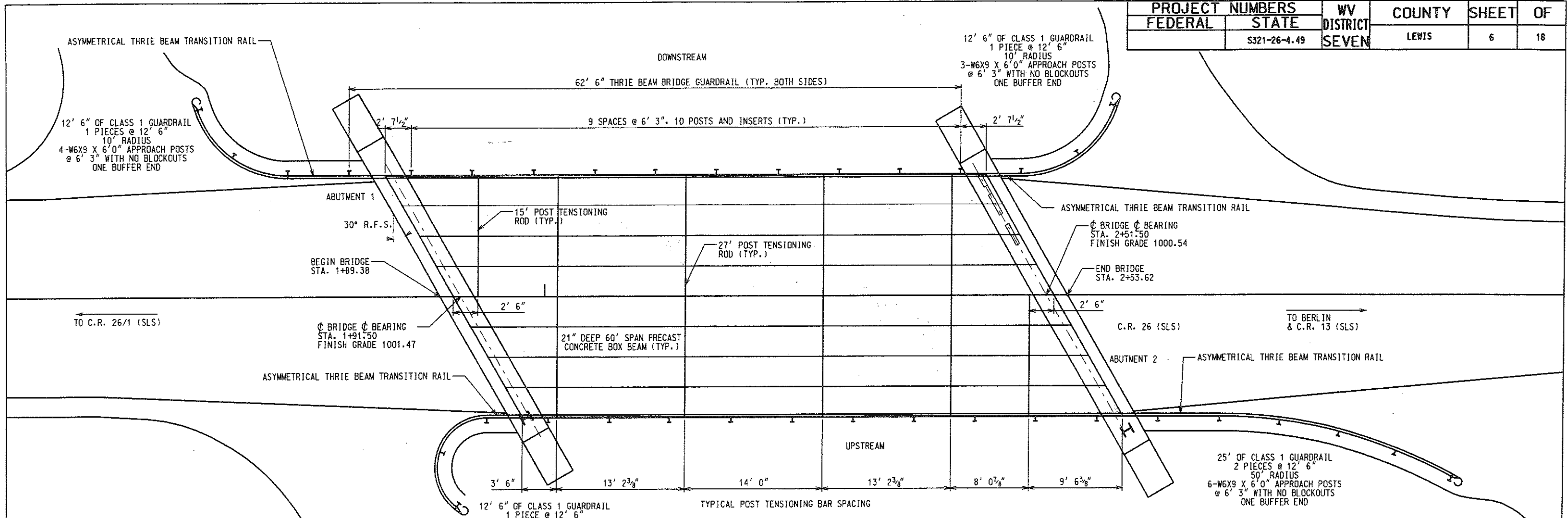
EXISTING DECK SECTION
NO SCALE

SCOPE OF WORK

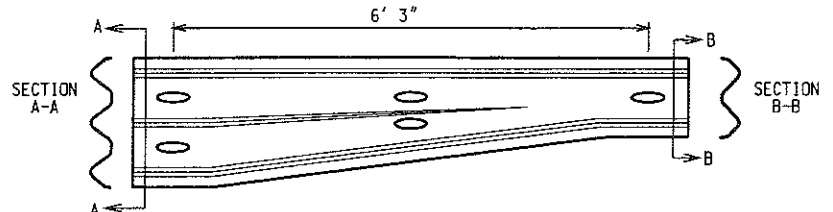
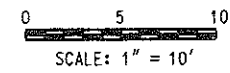
1. CONSTRUCT APPROACH FILL.
2. EXCAVATE FOR ABUTMENTS AND DRIVE PILING.
3. FORM AND POUR ABUTMENTS. (EXCEPT FOR A2 US WINGWALL)
4. PLACE FOUNDATION PROTECTION MATERIAL.
5. PLACE BEAMS, GROUT, AND POST TENSION.
6. FORM AND POUR BACKWALLS AND WINGWALLS. (EXCEPT FOR A2 US WINGWALL)
7. BUILD APPROACHES.
8. REMOVE EXISTING STRUCTURE TO GRADE.
9. FORM & POUR A2 US WINGWALL.
10. FINISH F.P.M.
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 BERLIN BOX BEAM BRIDGE ON COUNTY ROUTE 26 (SLS) OVER HACKERS CREEK LEWIS COUNTY	
REVISIONS DATE BY DESIGNED BY: GFL 03-10 DRAWN BY: RMW 03-10 CHECKED BY: BKR 06-10 REVIEWED BY: WRW 06-10	EXISTING ELEVATION AND DECK SECTION, SCOPE OF WORK, AND ESTIMATE OF QUANTITIES
	SHEET 3 OF 18 21-26-4.52 (10955)

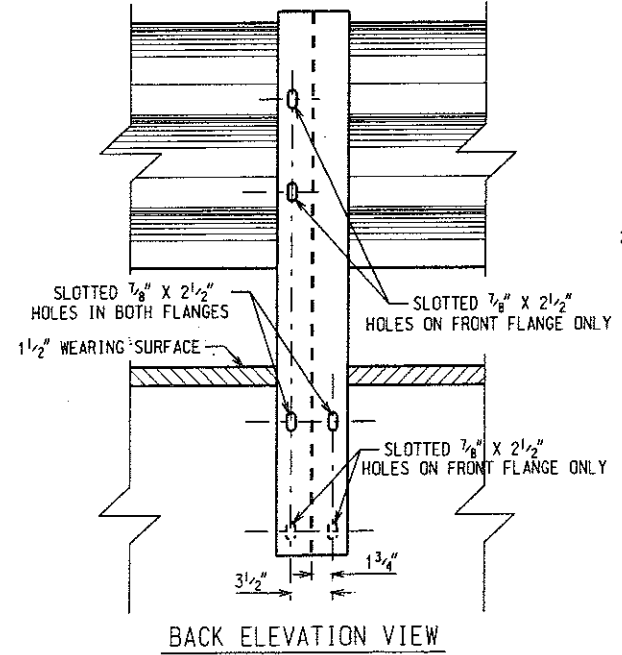
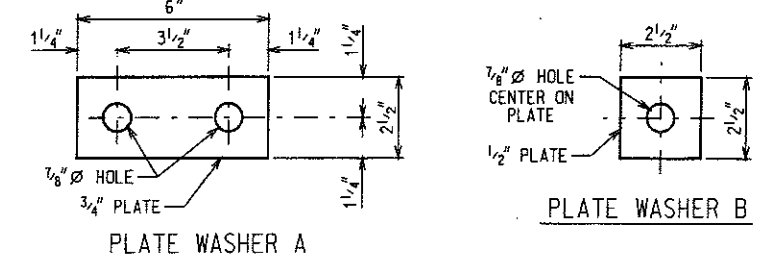
PROJECT NUMBERS		WV	COUNTY	SHEET	OF
FEDERAL	STATE	DISTRICT	LEWIS	6	18
	S321-26-4.49	SEVEN			



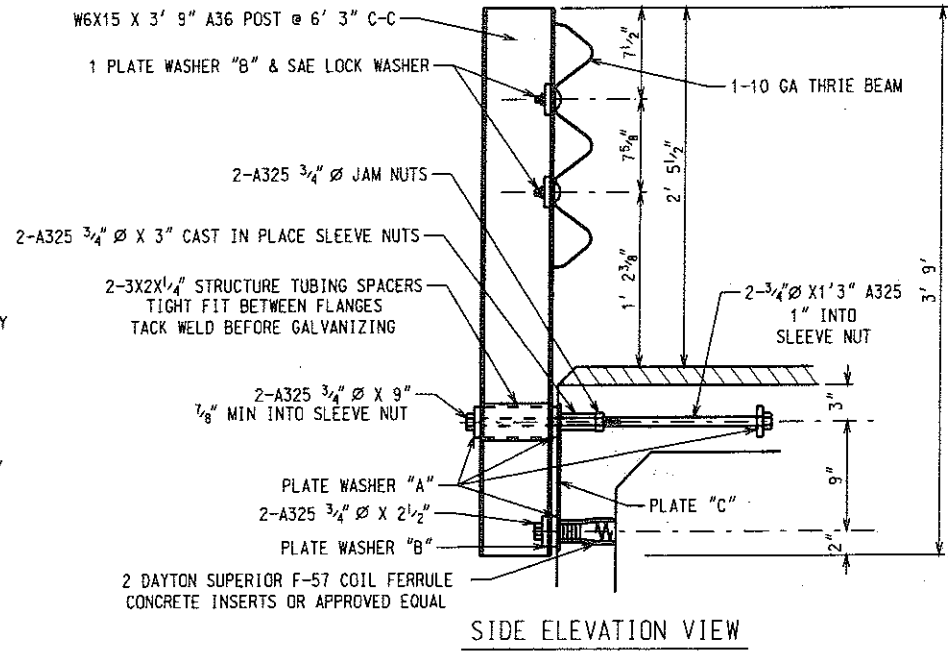
PROPOSED BRIDGE PLAN VIEW



ASYMMETRICAL THRIE BEAM TRANSITION
NO SCALE



BACK ELEVATION VIEW



SIDE ELEVATION VIEW

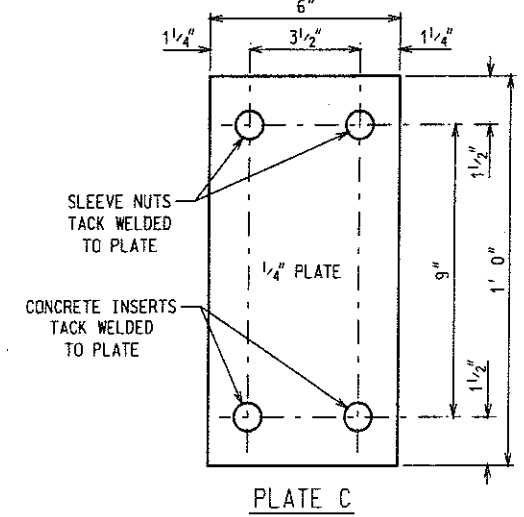
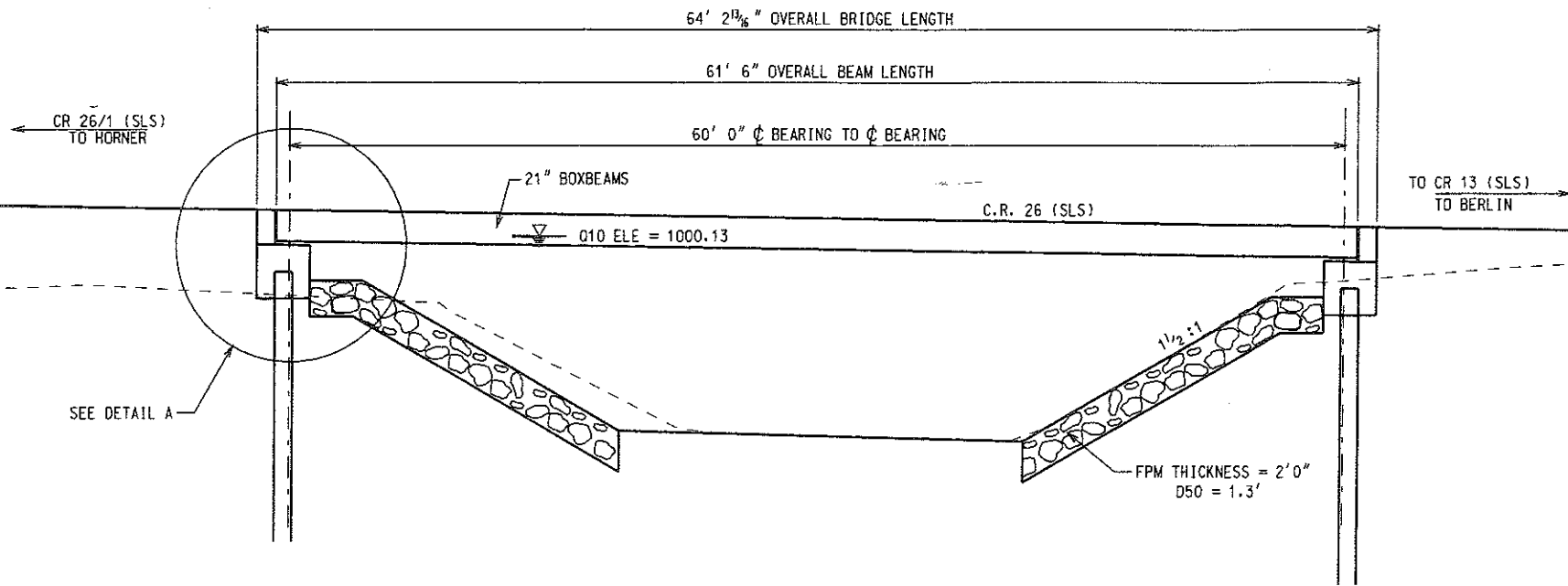


PLATE C

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

WEST VIRGINIA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS DISTRICT SEVEN		CONSTRUCTION OF BERLIN BOX BEAM BRIDGE ON C.R. 26 (SLS) OVER HACKERS CREEK LEWIS COUNTY	SHEET 6 OF 18
REVISIONS DATE BY DESIGNED BY: GFL DATE: 12-09 DRAWN BY: RMW DATE: 03-10 CHECKED BY: BKR DATE: 06-10 REVIEWED BY: WRW DATE: 06-10			
PROPOSED BRIDGE PLAN VIEW, POST TENSIONING ROD DETAILS, AND GUARDRAIL DETAILS		21-26-4.52 (10955)	

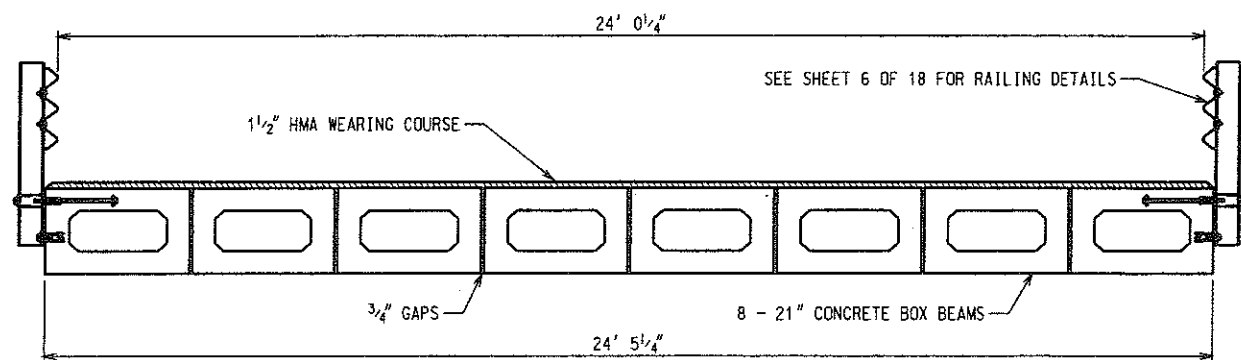
PROJECT NUMBERS		WV DISTRICT SEVEN	COUNTY LEWIS	SHEET 7	OF 18
FEDERAL	STATE				
	S321-26-4.49				



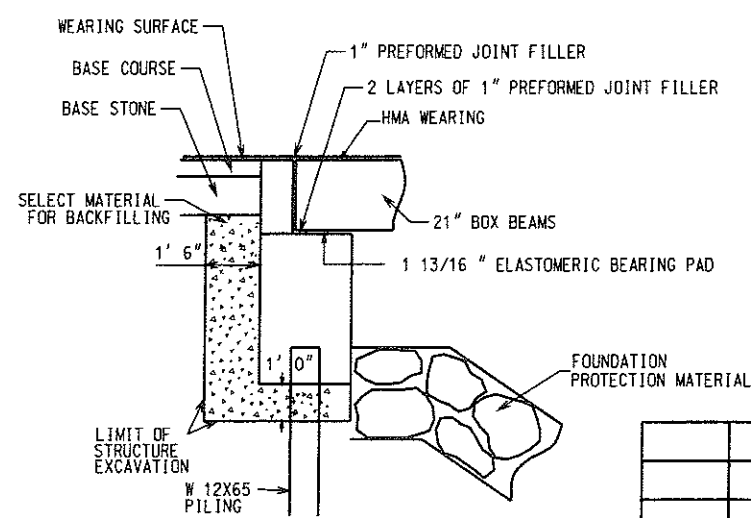
	MINIMUM	MINIMUM
D100	2.0	2.3
D85	1.6	1.9
D50	1.3	1.5
D15	0.5	0.8

ELEVATION VIEW
 0 10
 SCALE: 1" = 10'

DESIGN FLOOD FREQUENCY:	010
DESIGN DISCHARGE:	3036 CFS
EFFECTIVE WATERWAY AREA OF EXISTING STRUCTURE:	291 SF
EFFECTIVE WATERWAY AREA OF NEW STRUCTURE:	433 SF
ELEVATION AT BOTTOM OF EXISTING SUPERSTRUCTURE:	997.00
ELEVATION AT BOTTOM OF NEW SUPERSTRUCTURE:	998.68
LOW WATER ELEVATION:	989.00
STREAM BED ELEVATION:	988.69



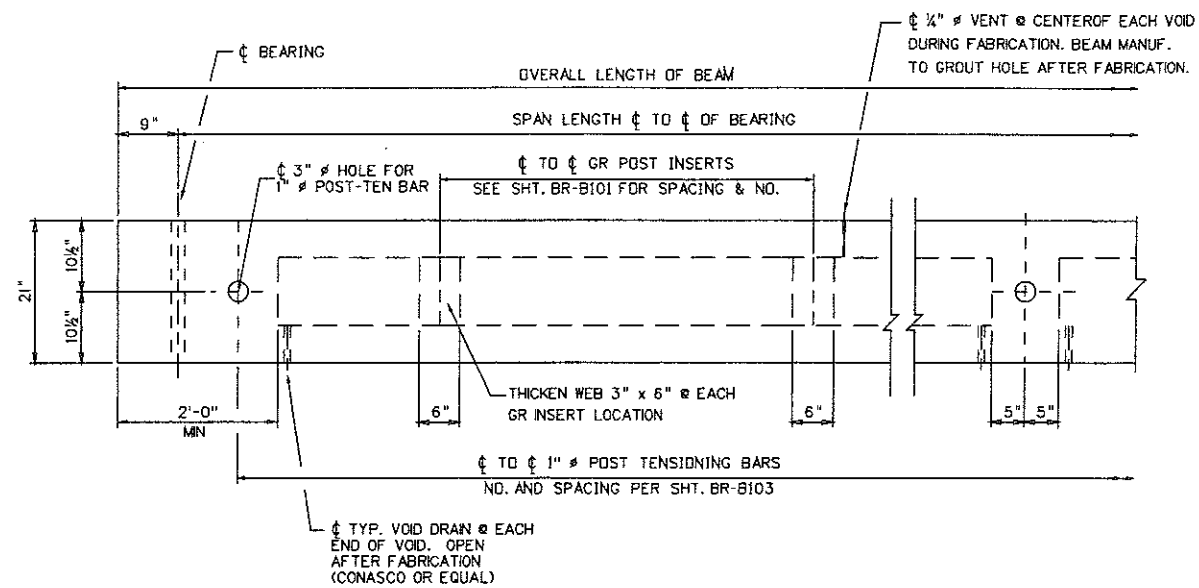
PROPOSED DECK SECTION
 0 4
 SCALE: 1" = 4'



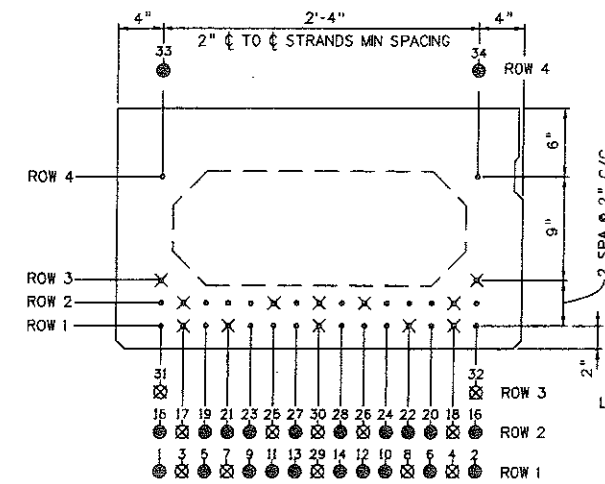
STRUCTURE EXCAVATION DETAIL
 DETAIL A
 (TYP. BOTH ABUTMENTS)
 NO SCALE

WEST VIRGINIA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS DISTRICT SEVEN	
CONSTRUCTION PLANS OF BERLIN BOX BEAM BRIDGE ON COUNTY ROUTE 26 (SLS) OVER HACKERS CREEK LEWIS COUNTY	
REVISIONS DATE BY DESIGNED BY: GFL DATE: 12-09 DRAWN BY: RMW DATE: 03-10 CHECKED BY: BKR DATE: 06-10 CHECKED BY: REVIEWED BY: WRW DATE: 06-10	ELEVATION VIEW, HYDRAULIC DATA, STRUCTURE EXCAVATION DETAILS, AND PROPOSED DECK SECTION.
SHEET 7 OF 18 21-26-4.52 (10955)	

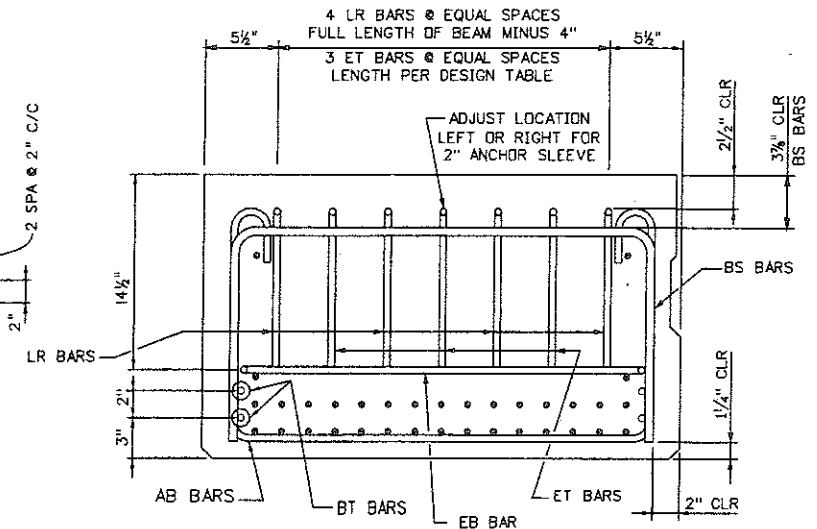
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				
S321-26-4.49		7	LEWIS	10	18



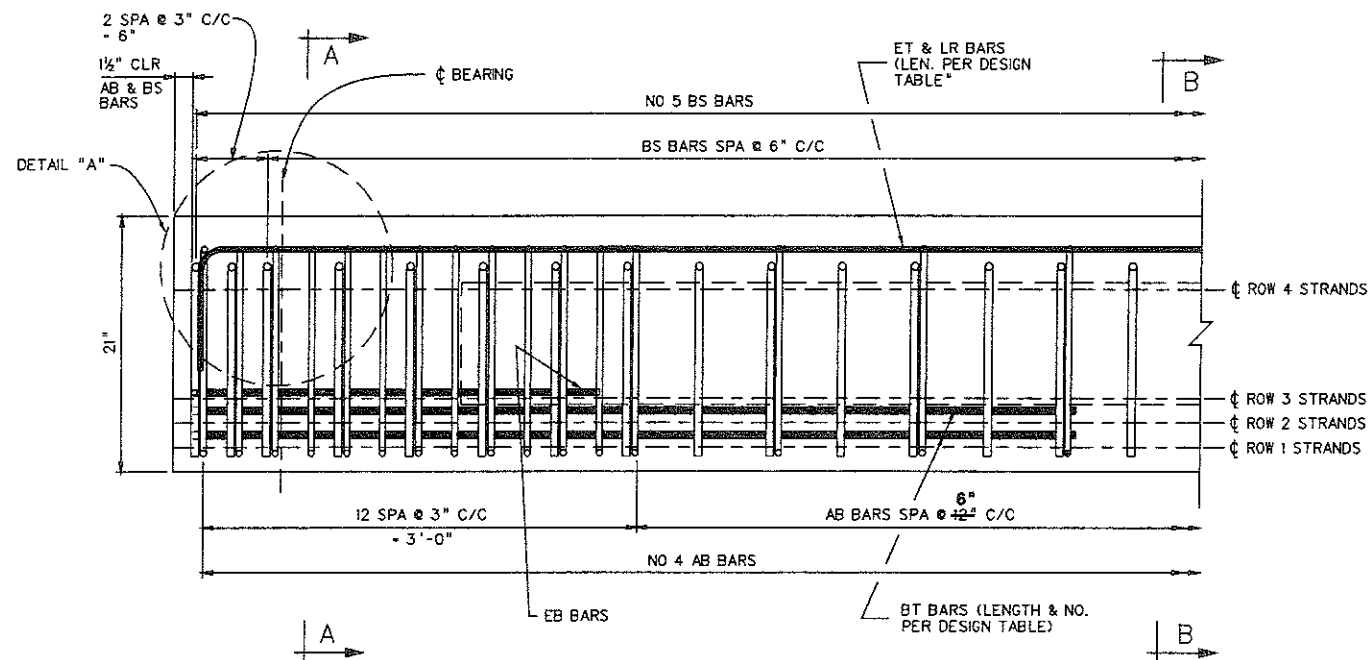
GENERAL ELEVATION VIEW



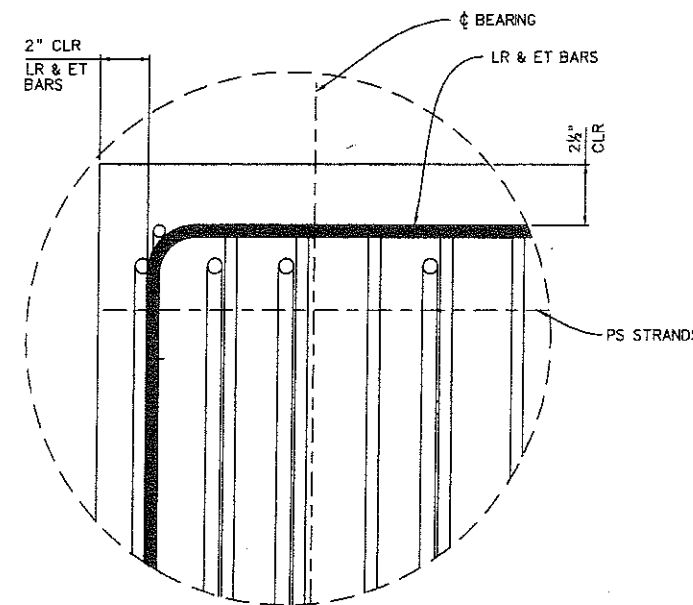
BEAM PRESTRESSING
TYPICAL @ BEAM END & MIDSPAN



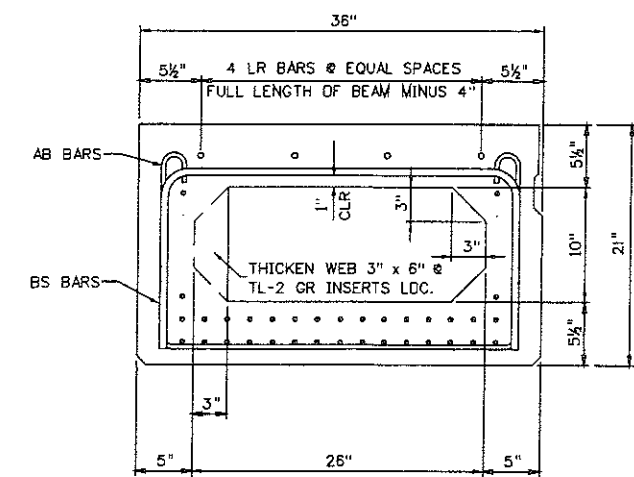
SECTION A-A



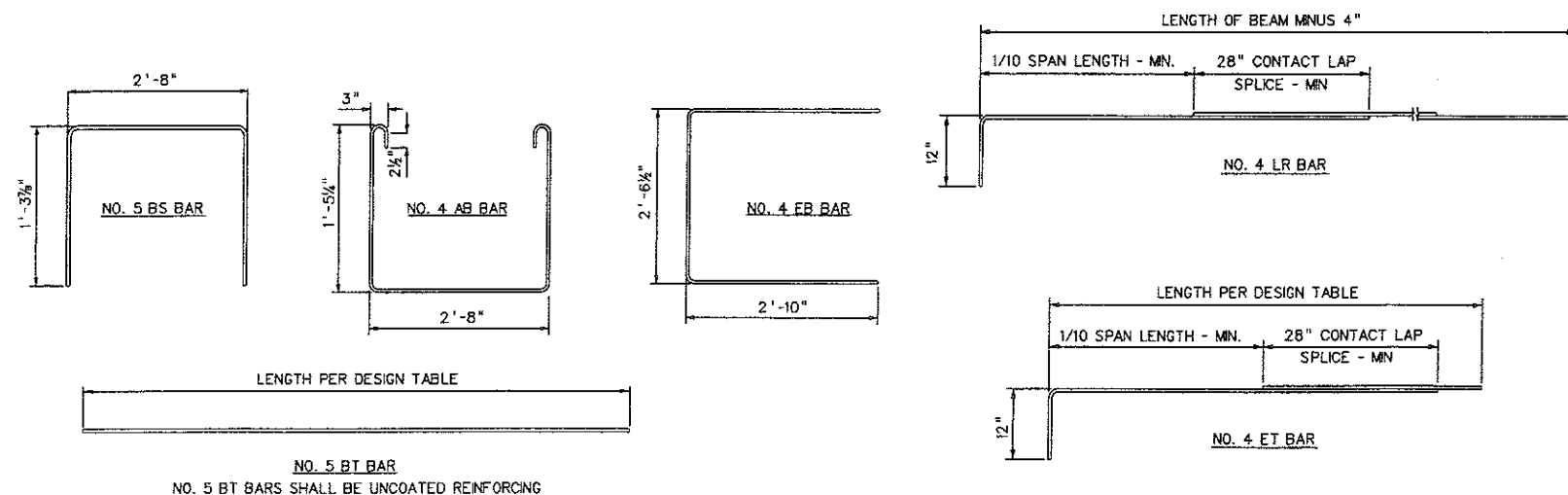
REINFORCING STEEL ELEVATION



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	
▽	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-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

21" PRESTRESSED CONCRETE
 BOX BEAMS
 DESIGN AND ASSEMBLY DETAILS
 STANDARD SHEET BR-B21A

PREPARED: 1-14-05
 REVISIONS:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 ENGINEERING DIVISION

CONSTRUCTION PLANS OF
 BERLIN BOX BEAM BRIDGE
 ON C.R. 26 (SLS)
 OVER HACKERS CREEK
 LEWIS COUNTY

DESIGNED BY: THB/DFL
 DRAWN BY: BH/RMM
 CHECKED BY: TM/RMM
 REVIEWED BY: WRW
 DATE: 01/12/10
 SCALE:
 SHEET 10 OF 18
 BRIDGE NO. 21-26-4.52

STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS
S321-26-4.49		7	LEWIS	11	18

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	15,16,25,26	15,16,25,26	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, Ppt, (KIPS/BEAM)	327	328	328	391	391	453	454	454	515	516	517	706
EFFECTIVE PRESTRESSING FORCE AFTER ALL LOSSES, Ppe, (KIPS/BEAM)	297	298	298	350	352	408	408	406	454	456	458	647
REQUIRED FACTORED MOMENT @ STRENGTH I, Mu (FT-KIPS/BEAM)	359	393	427	465	504	545	588	639	693	746	800	1067
FACTORED FLEXURAL RESISTANCE, Mr (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 6'-0"	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	0.40	0.70	0.59	0.45
NUMBER & SPACING OF TL-2 GUARDRAIL INSERTS	NO OF INSERTS REQD.											SEE PAGE 6 OF 18
	END OF BEAM TO ϕ OF FIRST INSERT EA END											SEE PAGE 6 OF 18
	ϕ OF 1st INSERT TO ϕ 2nd INSERT EA END											SEE PAGE 6 OF 18
WEIGHT OF TYPICAL BEAM INCLUDING DIAPHRAGM (TDNS)	9.2	9.8	10.4	10.9	11.5	12.0	12.6	13.1	13.8	14.3	14.9	17.6

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.

WEIGHTS LISTED IN THE DESIGN TABLE ARE BASED ON ZERO SKEW, 2 FT. LONG ENDBLOCK DIAPHRAGMS SPACED @ 15 FT C/C. WEIGHTS FOR SKEWED BEAMS, LONGER ENDBLOCKS AND DIAPHRAGMS SHOULD BE ADJUSTED ACCORDINGLY.

DIAPHRAGMS, ADD 226 LBS/DIAPHRAGM.

PERCENTAGE OF SKEW/END.

71 LBS/LF/END.

THIS STANDARD TABLE IS BASED ON EVEN SPAN LENGTHS, AND ZERO SKEW. SUPERIMPOSED DEAD LOADS INCLUDE 50 PSF. FOR NON-STANDARD BRIDGES DATA SHOULD BE ENTERED INTO BLANK COLUMNS. IN NO CASE SHALL

THE TABLE ARE BASED ON EMPIRICAL FORMULAS FOR SPAN-TO-DEPTH RATIOS AT OR EXCEEDING 25, AND FOR QUALITY CONTROL, MNL-116, MAY

VALUES SHOULD BE COMPLETED UNDER CONDITIONS

4. 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.

6. MAXIMUM BEAM SKEW SHALL BE 30 DEGREES.

6. 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.

7. 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: _____ DIRECTOR, ENGINEERING DIVISION _____ DATE: _____

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
 BERLIN BOX BEAM BRIDGE
 ON C.R. 26 (SLS)
 OVER HACKERS CREEK
 LEWIS COUNTY

DESIGNED BY: THB/GFL
 DRAWN BY: THB/GFL
 CHECKED BY: TM/BKR
 REVIEWED BY: WRW
 DATE: 01/12/10
 SCALE:
 SHEET NO 11 OF 18
 BRIDGE NUMBER
 21-26-4.52
 (10955)

DESIGN TABLE FOR 21"
 PRESTRESSED BOX BEAM

STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS
S321-26-4.49		7	LEWIS	12	18

GOVERNING SPECIFICATIONS

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION, DIVISION OF HIGHWAYS STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES, ADOPTED 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:

- 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.
- 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.
- 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 1 (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 1 (PS+DL+LL)	-270 PSI
TENDON STRESS LIMIT PRIOR TO TRANSFER	202.5 KSI
TENDON STRESS LIMIT AFTER ALL LOSSES	194.4 KSI
- 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.
- 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.
- MAXIMUM BEAM SKEW SHALL BE 30 DEGREES.
- WHEN ALTERNATE DESIGNS OR SITE SPECIFIC DESIGNS ARE PROVIDED, CRITERIA SET FORTH IN THESE STANDARDS SHALL APPLY.
- NEGATIVE DESIGN CAMBER AFTER ALL LOSSES IS NOT PERMITTED.
- 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.

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. ANCHOR } 3/8" Ø	ASTM A108 (11L17 STEEL)	AASHTO M232
WIRE		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 ANCHOR } 1/4" Ø x 12" LONG	ASTM A108 (12L14 STEEL)	AASHTO M232
BOLTS		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 EMBRITTEMENT. 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:

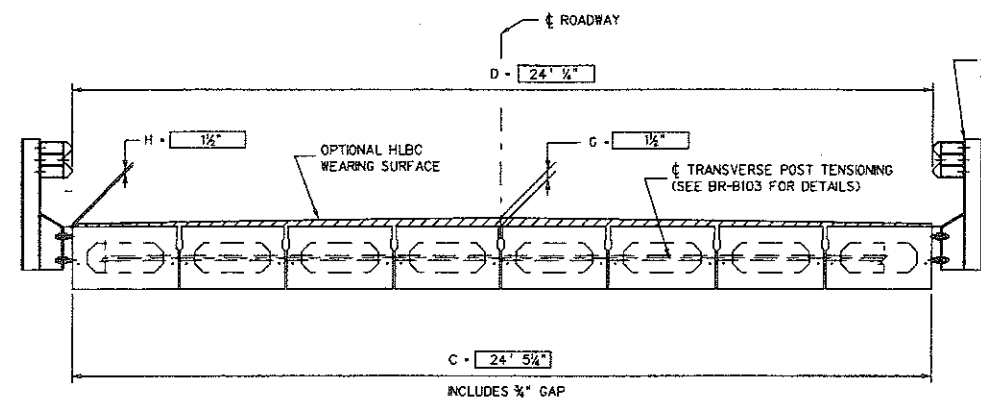
THE FABRICATOR SHALL BE RESPONSIBLE FOR THE PREPARATION OF SHOP DRAWINGS IN ACCORDANCE WITH THE WEST VIRGINIA DIVISION OF HIGHWAYS DOCUMENTS, DD-102 AND THE STANDARD SPECIFICATIONS. ADDITIONAL INFORMATION IS PROVIDED IN SECTION 7 OF THE BRIDGE DESIGN MANUAL. SHOP DRAWINGS SHALL INCLUDE THE FABRICATOR'S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

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

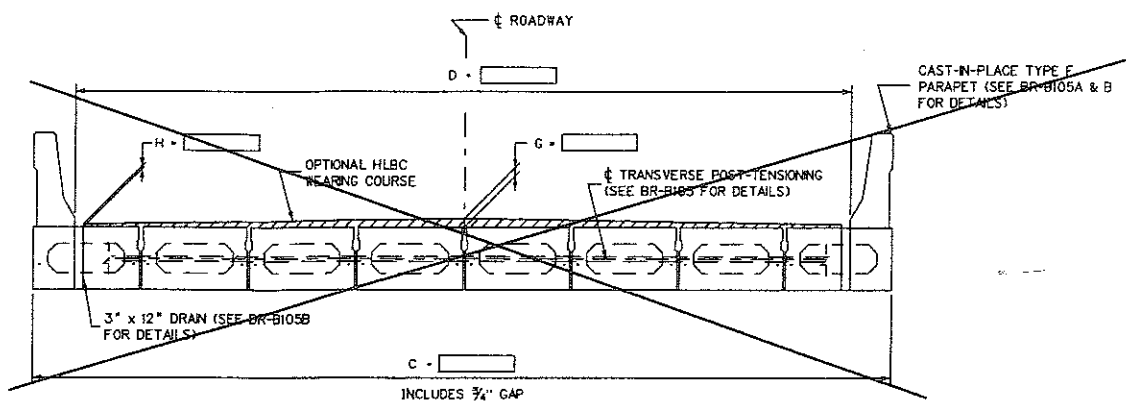
THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-B17A & B THRU BR-B42A & B, BR-B101, BR-B102A & B, BR-B104, AND BR-B105A & B AS APPLICABLE.

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS ENGINEERING DIVISION		DESIGNED BY: THE/ GFL
CONSTRUCTION PLANS OF BERLIN BOX BEAM BRIDGE ON C.R. 26 (SLS) OVER HACKERS CREEK LEWIS COUNTY		DRAWN BY: THE/ RMW
PRESTRESSED CONCRETE BEAM		CHECKED BY: TM/ RMW
DESIGN & ASSEMBLY NOTES		REVIEWED BY: WRW
STANDARD SHEET BR-B100		DATE: 01-12-10
DESIGN & ASSEMBLY NOTES		SCALE: NO SCALE
PRESTRESSED CONCRETE BEAM		SHEET NO 12 OF 18
DESIGN & ASSEMBLY NOTES		BRIDGE NUMBER 21-26-4.52 (10955)

STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS
S321-26-4.49		7	LEWIS	13	18

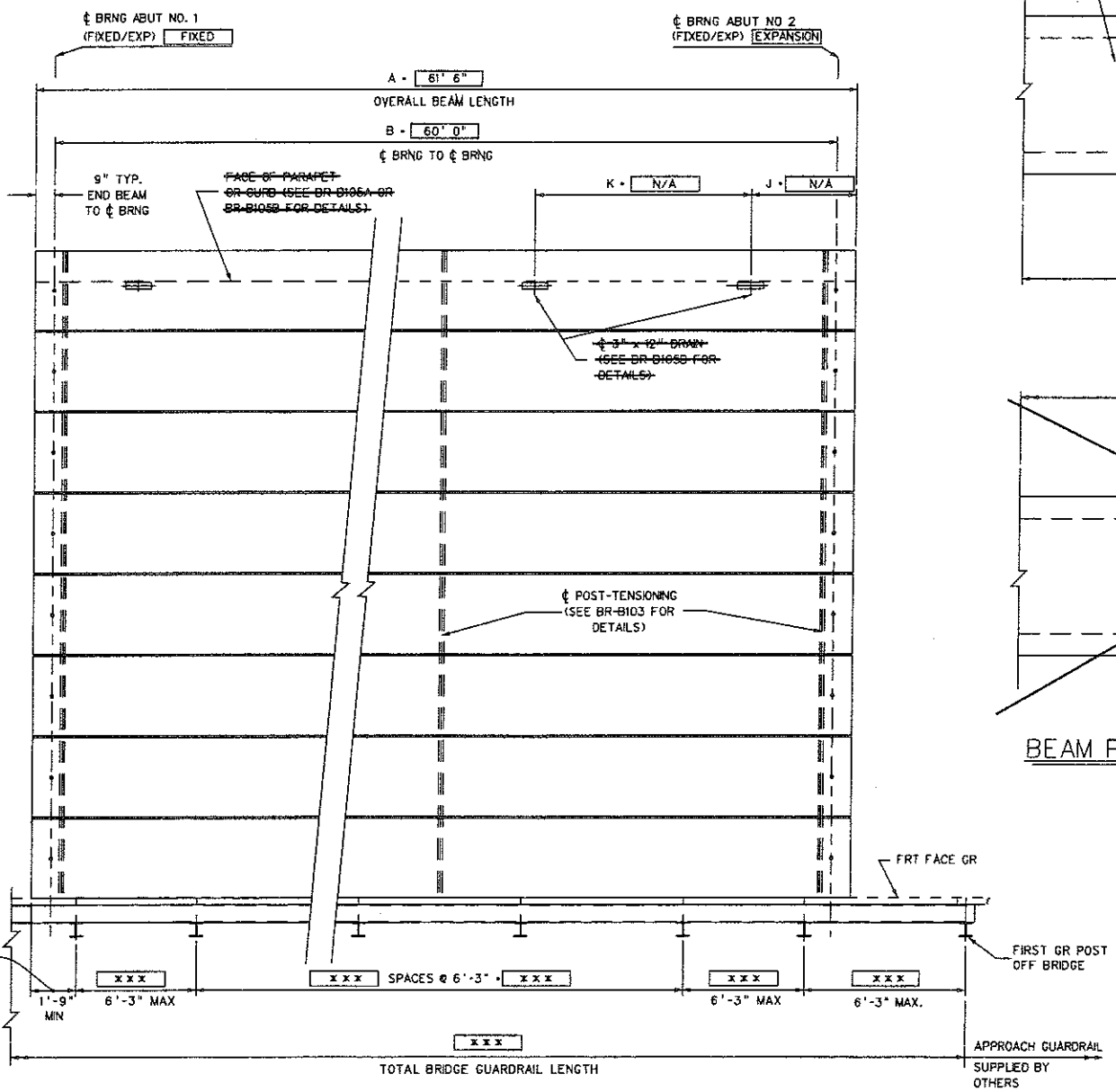


TYPICAL CROSS-SECTION WITH GUARDRAIL



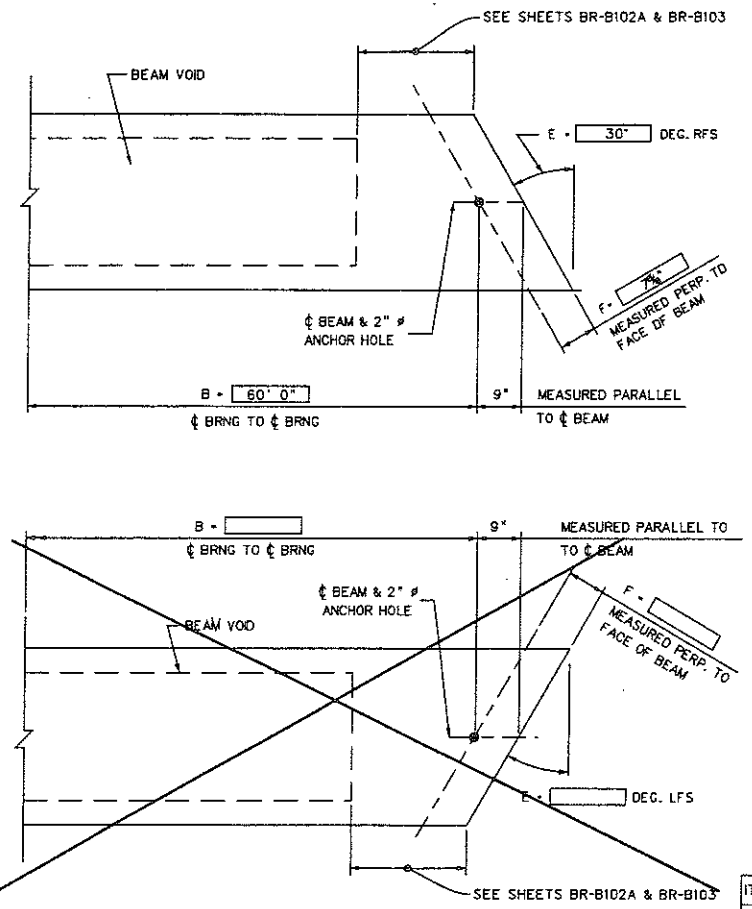
TYPICAL CROSS-SECTION WITH PARAPET OR CURB

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' 5/4"
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 27"
SKEW ANGLE (NORMAL, DEG. RFS OR DEG. LFS)	E	30° RFS
PERPENDICULAR DISTANCE FROM FACE OF BEAM TO ϕ BEARING	F	7 3/4"
HLBC WEARING COURSE REQUIRED (YES/NO)	---	YES
THICKNESS OF WEARING COURSE 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



*** SEE SHEET 6 OF 18 FOR DETAILS

DECK PLAN VIEW



BEAM PLAN VIEW - SKEWED ENDS

ESTIMATE OF QUANTITIES

ITEM NO.	DESCRIPTION	UNITS	QUANTITY
603016-018	PRESTRESSED CONCRETE BOX BEAM	LF	482

- 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: _____ DIRECTOR, ENGINEERING DIVISION DATE: _____

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS ENGINEERING DIVISION

PREPARED: 1-14-05

REVIEWED: _____

STANDARD SHEET BR-B101

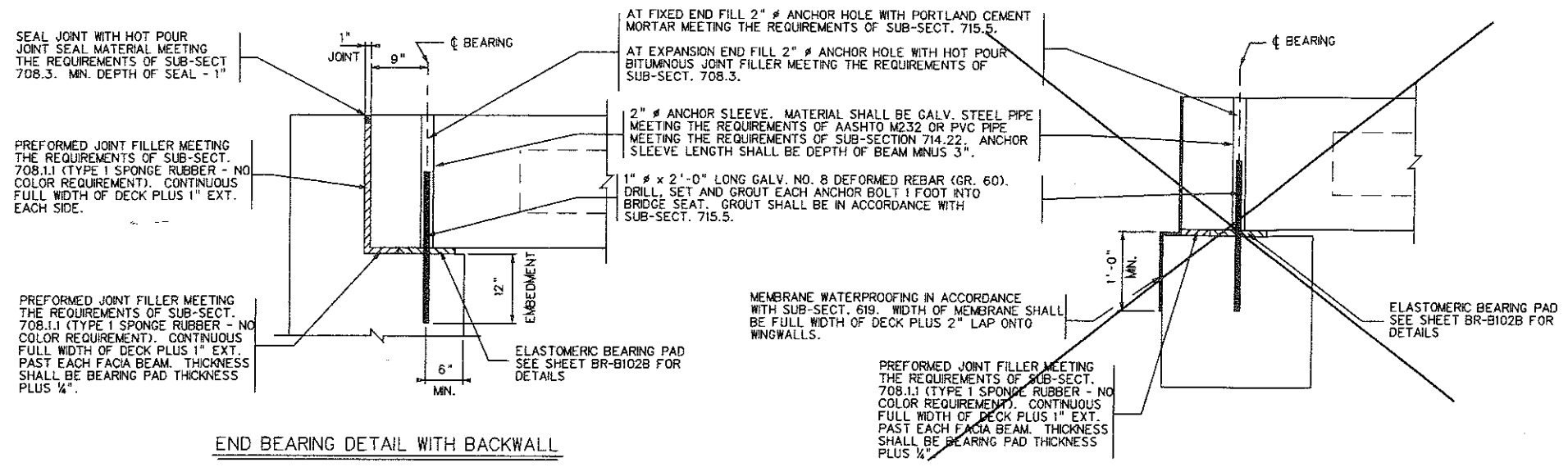
WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

CONSTRUCTION PLANS OF
BERLIN BOX BEAM BRIDGE
ON C.R. 26 (SLS)
OVER HACKERS CREEK
LEWIS COUNTY

PRESTRESSED BOX BEAM
SUPERSTRUCTURE LAYOUT

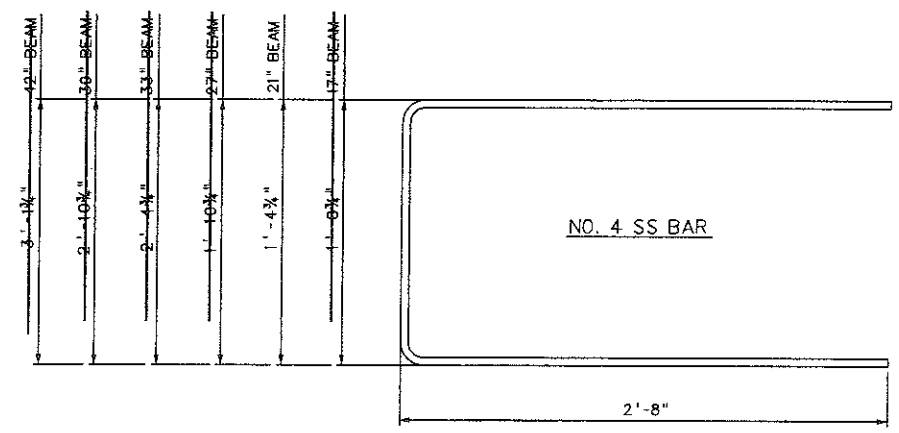
DESIGNED BY: THE/GFL
DRAWN BY: THE/RMW
CHECKED BY: TM/RMW
REVIEWED BY: WRW
DATE: 01/12/10
SCALE: NO SCALE
SHEET NO 13 OF 18
BRIDGE NUMBER
21-26-4.52
(10855)

STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS
S321-26-4.49		7	LEWIS	14	18



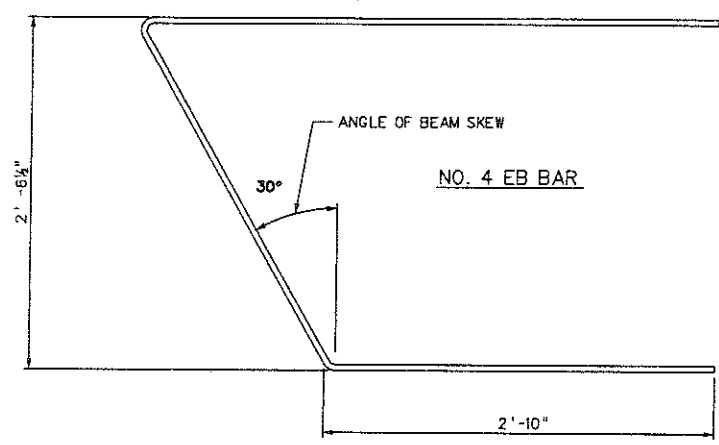
END BEARING DETAIL WITH BACKWALL

END BEARING DETAIL WITHOUT BACKWALL

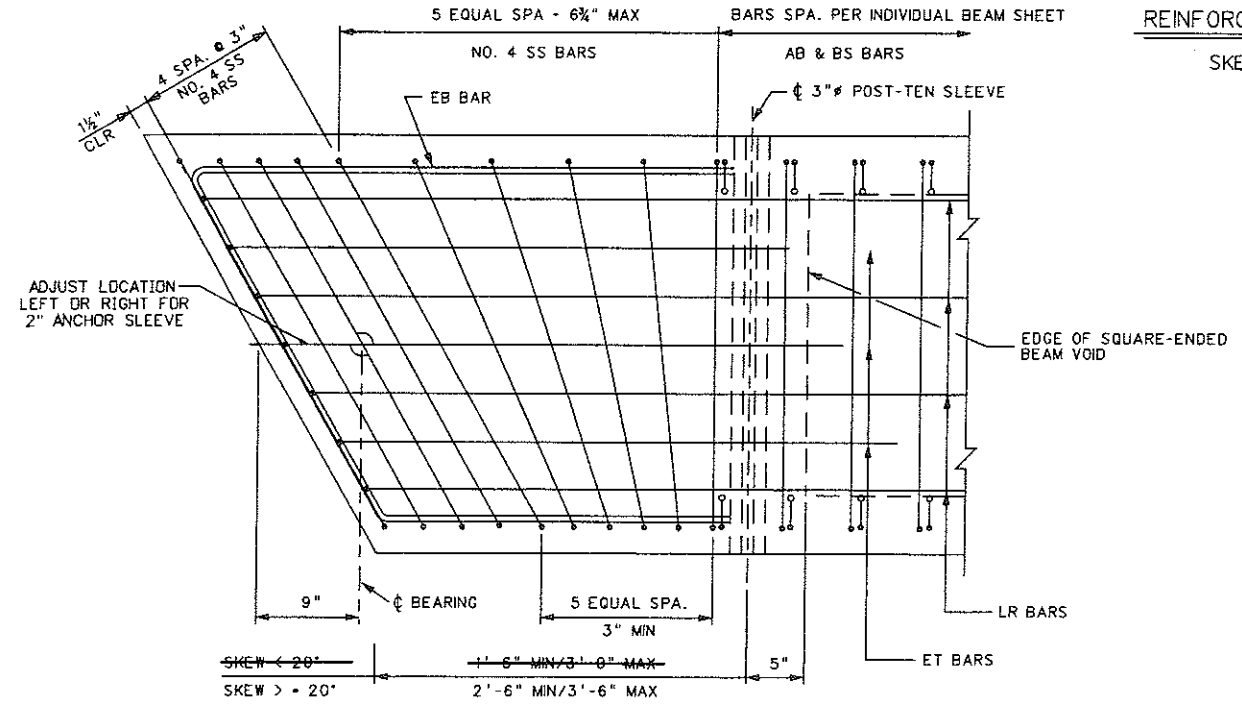


REINFORCING BAR DETAIL

SKEWED BEAMS

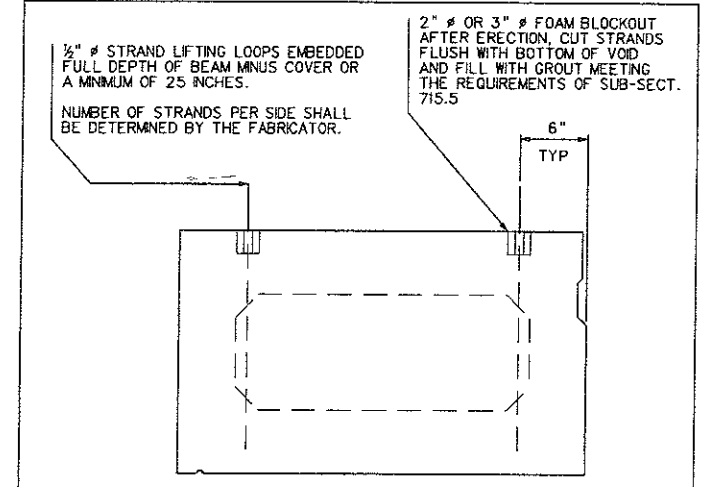


SHEAR KEY DETAIL

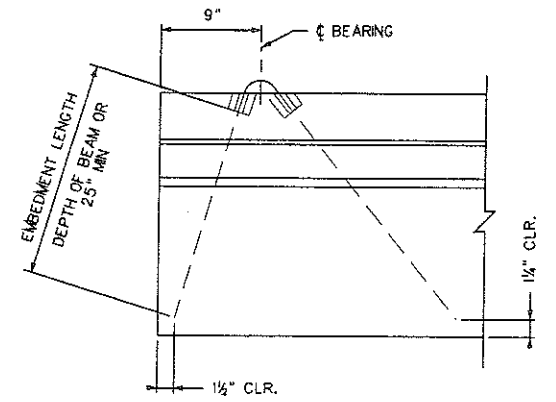


END BLOCK DETAIL - SKEWED BEAMS

WO/POST-TEN. ACCESS POCKET

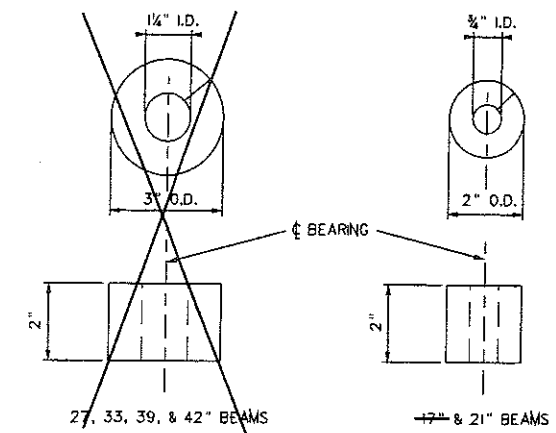


END VIEW



SIDE VIEW

LIFTING DETAILS



BLOCKOUT DETAILS

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

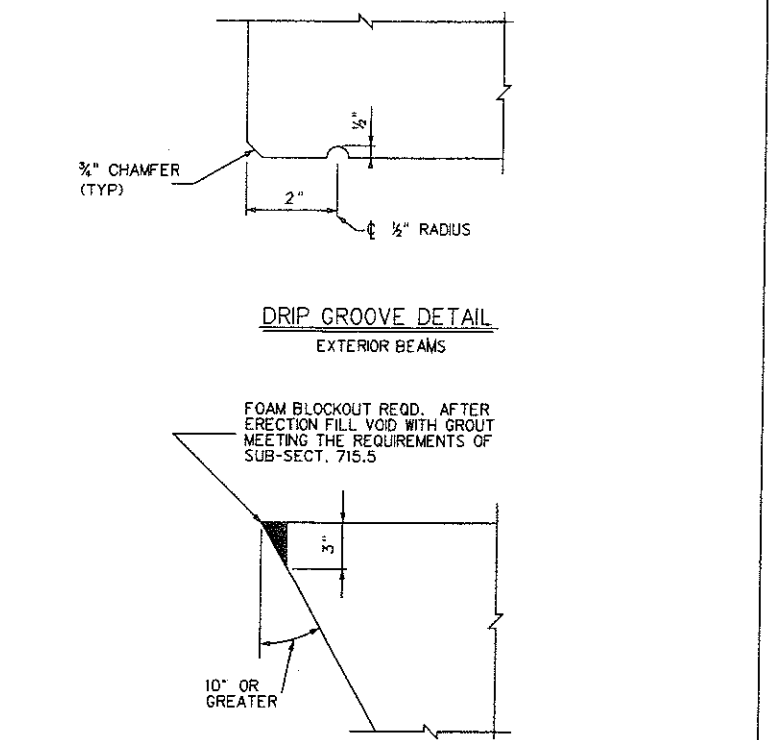
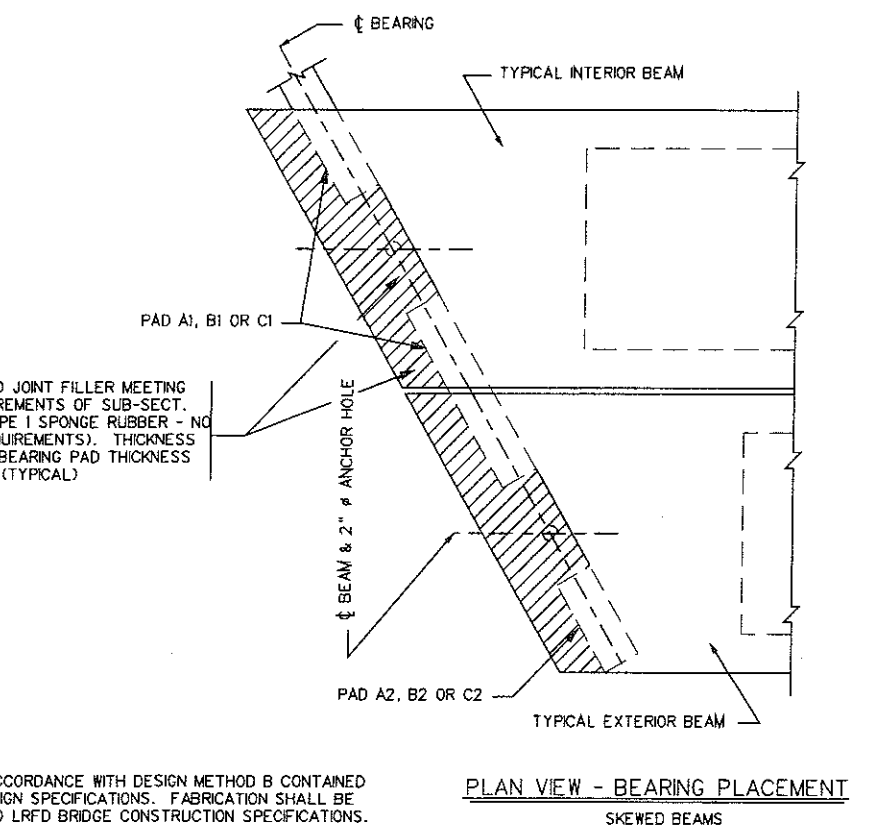
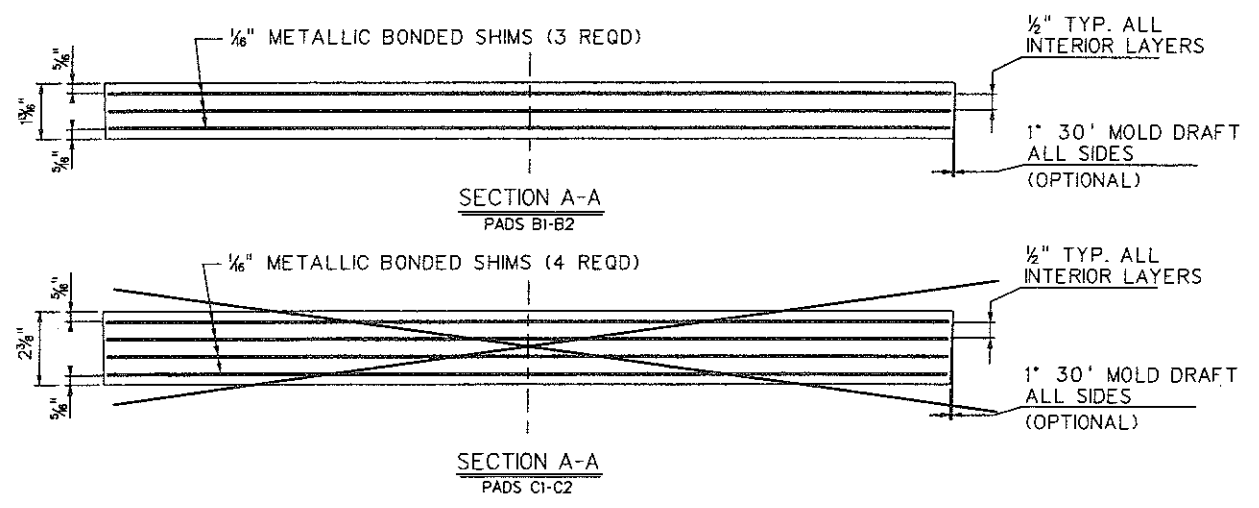
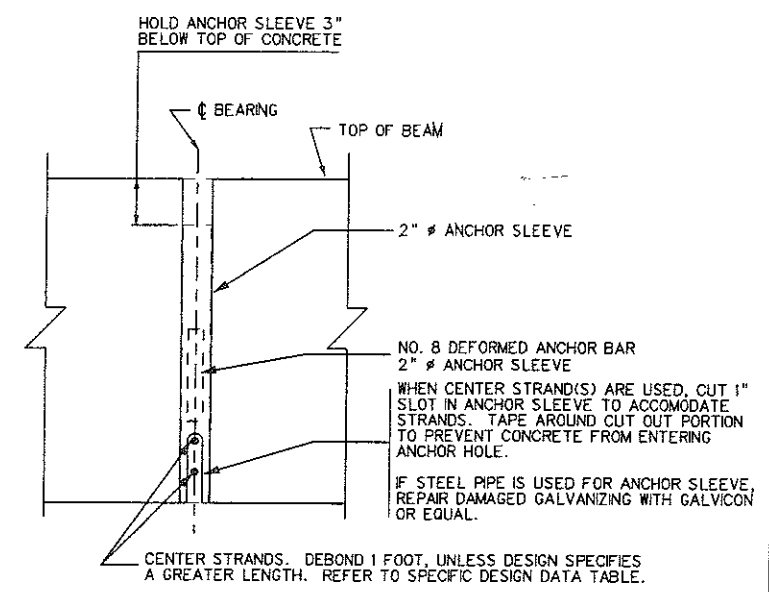
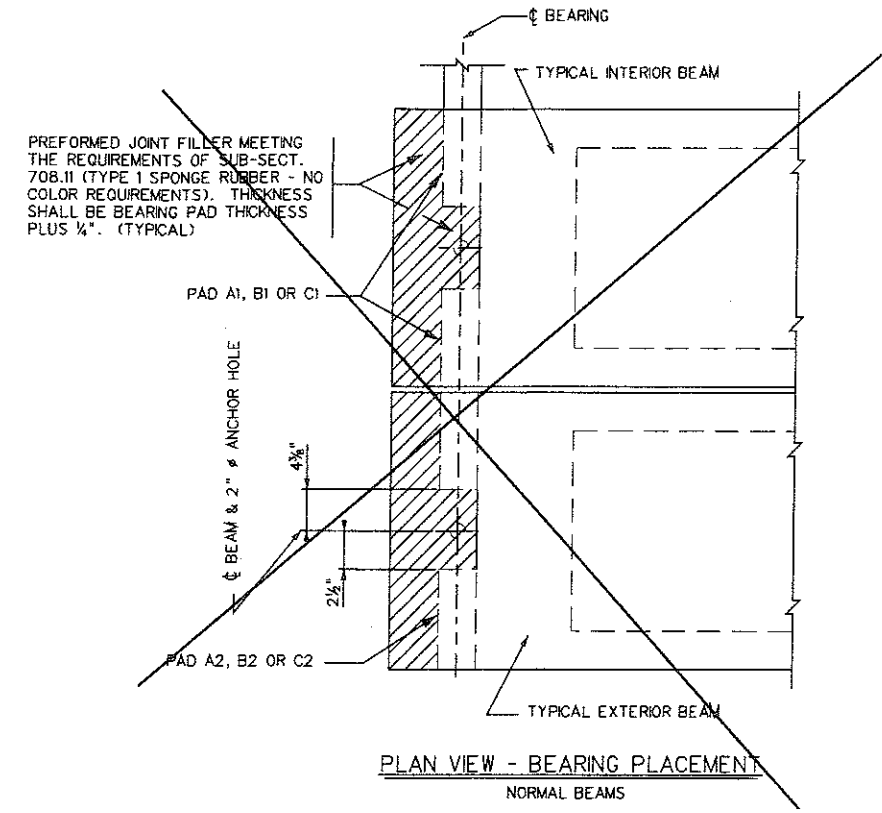
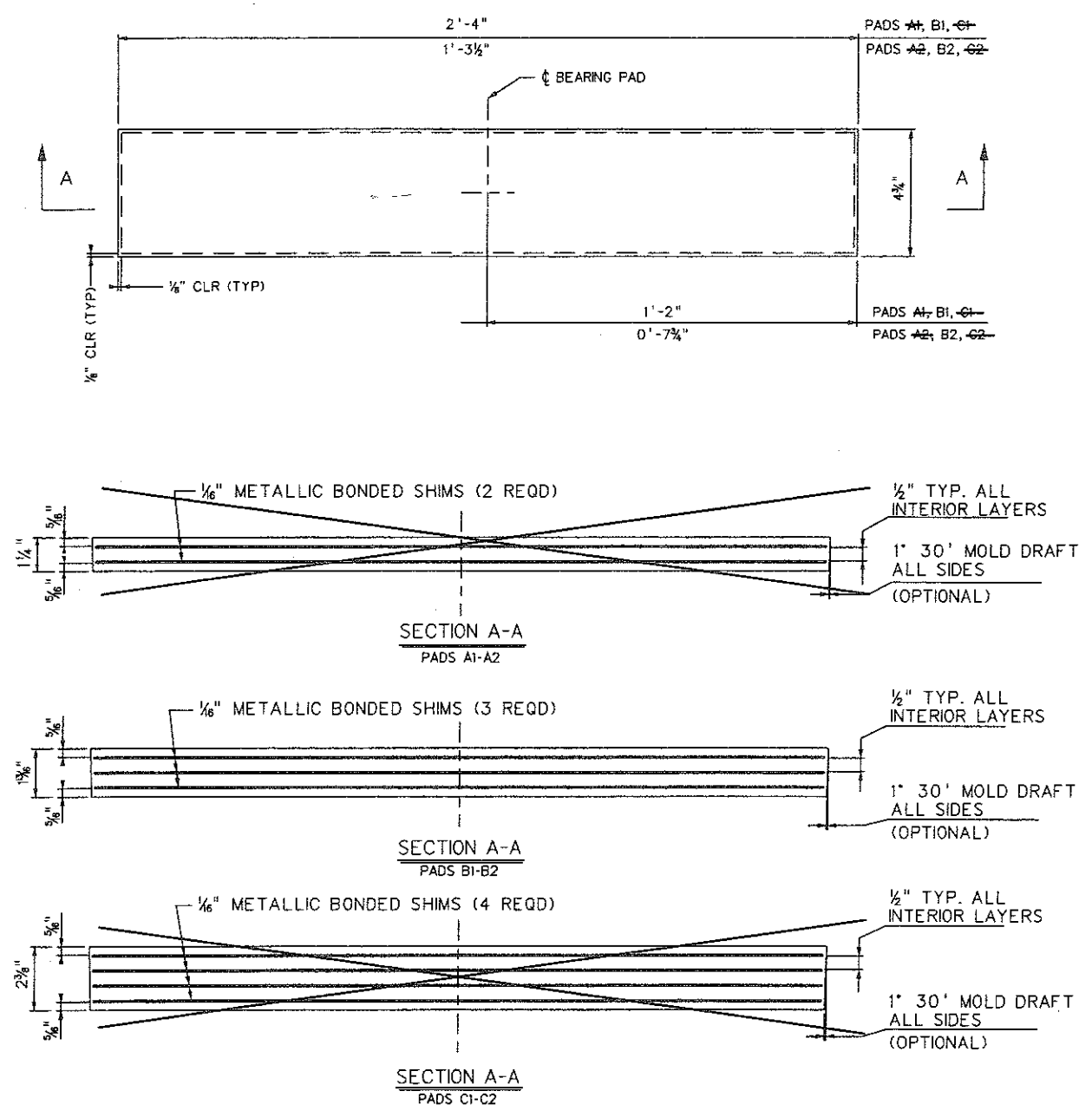
CONSTRUCTION PLANS OF
BERLIN BOX BEAM BRIDGE
ON C.R. 26 (SLS)
OVER HACKERS CREEK
LEWIS COUNTY

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

DESIGNED BY: THB/ GFL
DRAWN BY: THB/ RMW
CHECKED BY: TM/ RMW
REVIEWED BY: WRW
DATE: 01/12/10
SCALE: NO SCALE
SHEET NO 14 OF 18
BRIDGE NUMBER 21-26-4.52 (10955)

PRESTRESSED CONCRETE BEAM
SKEWED END REINFORCING
MISC. DESIGN AND ASSEMBLY 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.



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 DIAMETER 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 + 1/8 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.

BOX BEAM BEARING PAD CONTROL DIMENSIONS								
PAD	LENGTH	WIDTH	HEIGHT	NO. SHIMS	SHIM SIZE	SPAN RANGES	MAXIMUM REACTION	MAXIMUM MOVEMENT ONE DIRECTION
A1	4 1/2"	28"	1 1/4"	2	1/8" x 4 1/2" x 2'-3 3/4"	20' - 36'	55 KIPS	0.39"
B1	4 1/2"	28"	1 1/2"	3	1/8" x 4 1/2" x 2'-3 3/4"	40' - 78'	75 KIPS	0.80"
C1	4 1/2"	28"	2 1/8"	4	1/8" x 4 1/2" x 2'-3 3/4"	60' - 100'	89 KIPS	1.02"
A2	4 1/2"	15 1/2"	1 1/4"	2	1/8" x 4 1/2" x 1'-3 3/4"	20' - 36'	28 KIPS	0.39"
B2	4 1/2"	15 1/2"	1 1/2"	3	1/8" x 4 1/2" x 1'-3 3/4"	40' - 78'	38 KIPS	0.80"
C2	4 1/2"	15 1/2"	2 1/8"	4	1/8" x 4 1/2" x 1'-3 3/4"	60' - 100'	45 KIPS	1.02"

APPROVED: _____ DIRECTOR, ENGINEERING DIVISION DATE: _____

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

PREPARED: 1-14-05
REVISION: GFL 6-05

PRESTRESSED CONCRETE BEAM
ELASTOMERIC BEARING PAD DETAILS
MSC. 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/ RMW
CHECKED BY: TM/ RMW
REVIEWED BY: WRW

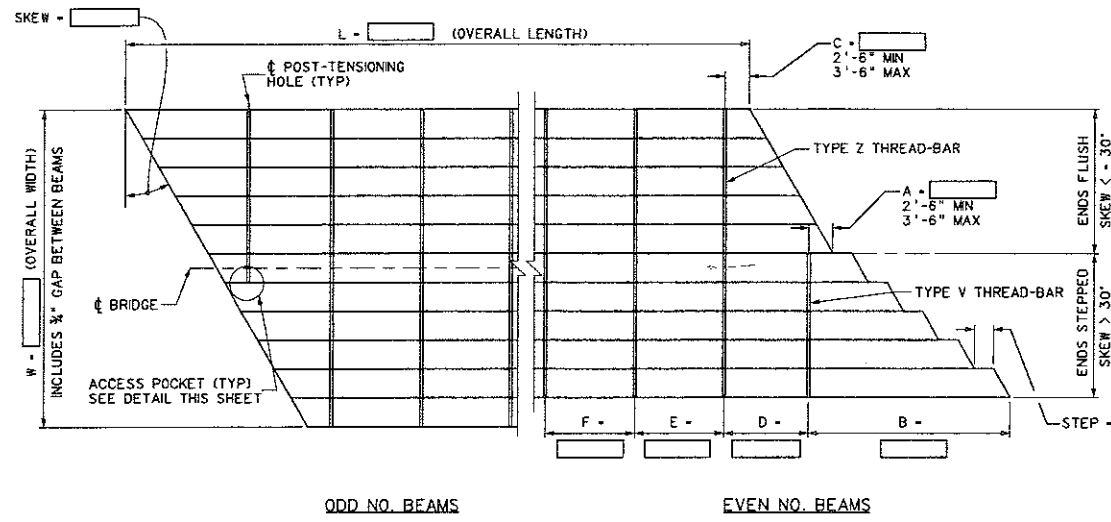
DATE: 01/12/10
SCALE: NO SCALE
SHEET NO 15 OF 18

BRIDGE NUMBER
21-26-4.52
(10955)

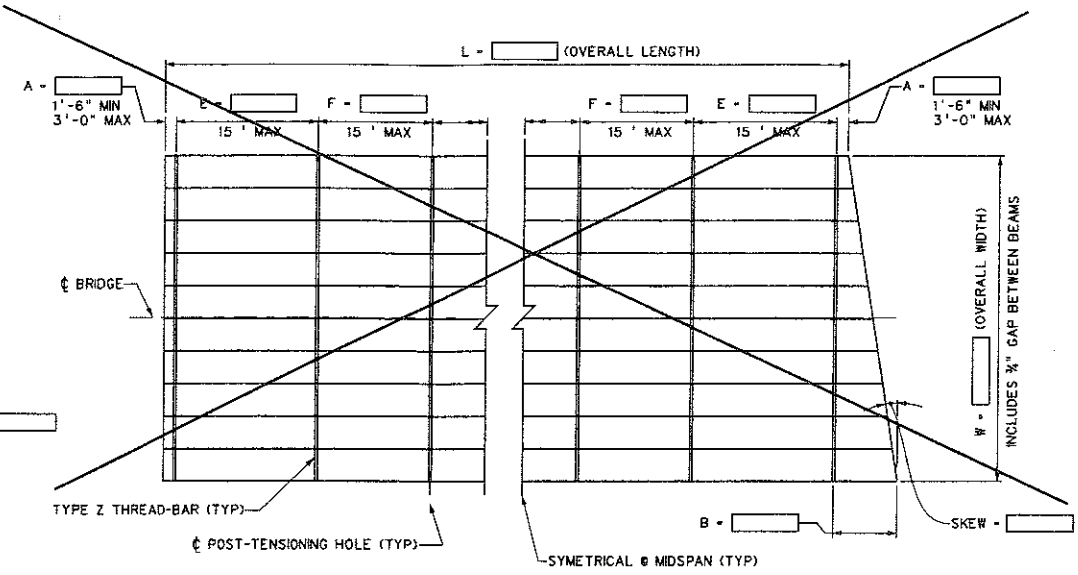
CONSTRUCTION PLANS OF
BERLIN BOX BEAM BRIDGE
ON C.R. 26 (SLS)
OVER HACKERS CREEK
LEWIS COUNTY

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

STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS
S321-26-4.49		7	LEWIS	16	18

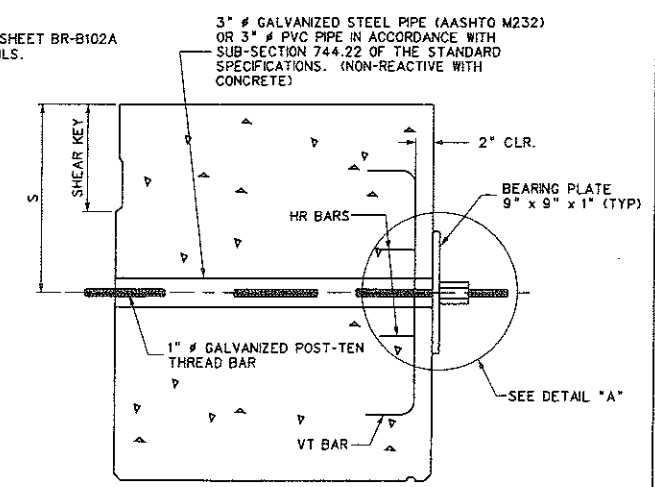


POST-TENSIONING BAR SPACING PLAN
SKEW > 20°
SEE 6 OF 18 FOR DETAILS

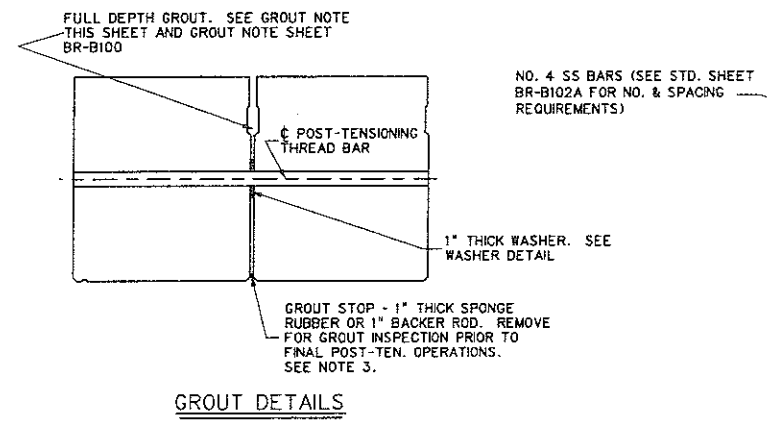


POST-TENSIONING BAR SPACING PLAN
NORMAL OR SKEW < 20°

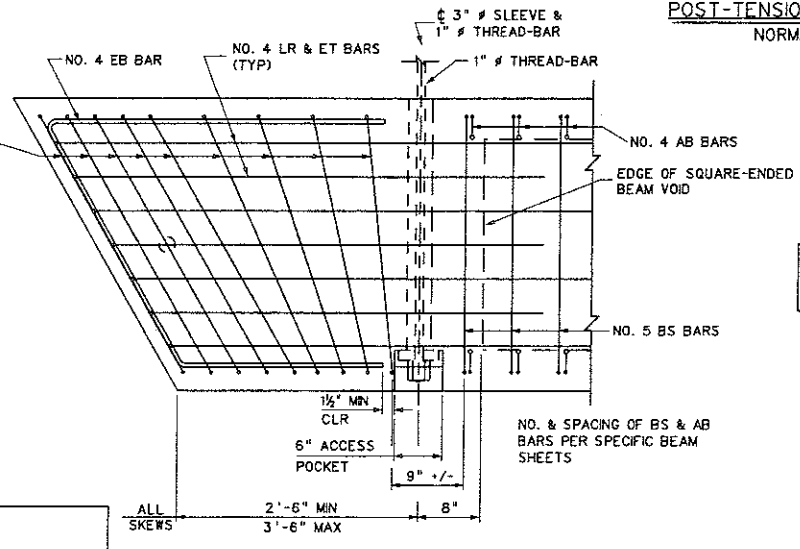
REFER TO STANDARD SHEET BR-B102A FOR SHEAR KEY DETAILS.



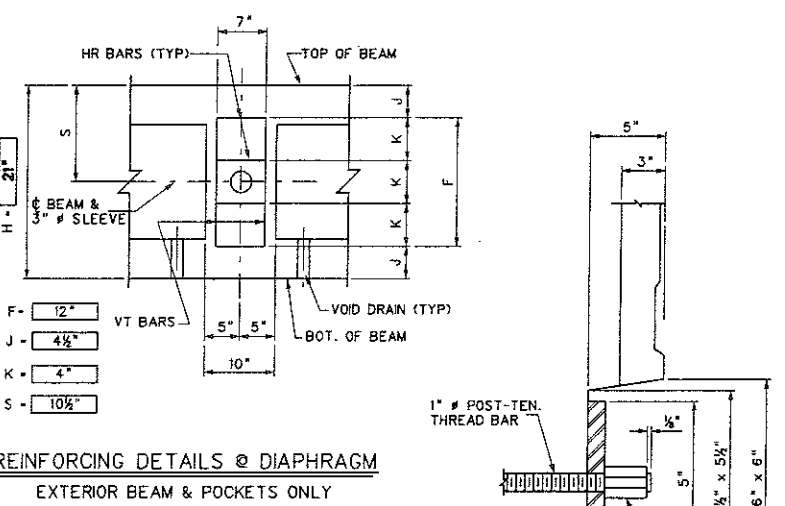
POST-TENSIONING BAR DETAILS



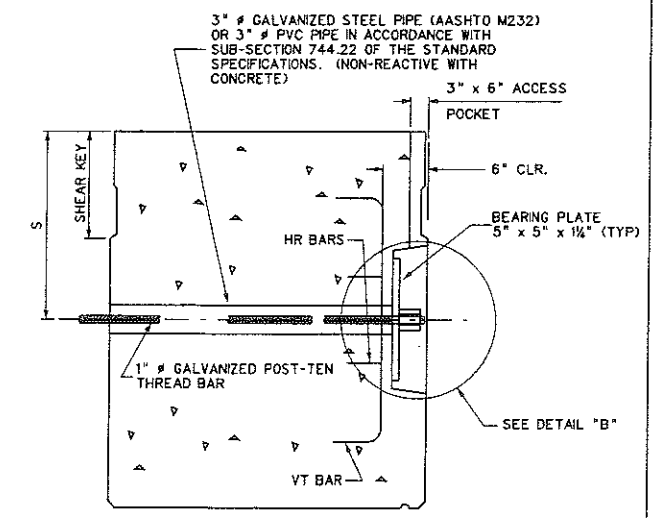
GROUT DETAILS



SHEAR REINFORCEMENT DETAIL
BEAMS WITH ACCESS POCKETS



REINFORCING DETAILS @ DIAPHRAGM
EXTERIOR BEAM & POCKETS ONLY



ACCESS POCKET, END POST-TENSIONING BAR

- 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 WDOH SHALL WITNESS ALL OF THE ACCEPTANCE SAMPLING AND TESTING.

TEST PROCEDURE SHALL BE ASTM C109 AS MODIFIED BY ASTM C1017. 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 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 8" PAST THE NUT. DO NOT TRIM THREAD-BARS BY TORCH CUTTING. TOUCH-UP TRIMMED ENDS WITH CALVICIN 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 6 OF 18 FOR DETAILS

DIMENSIONS

BEAM SIZE	REINFORCEMENT BAR				
	DIM	SPACING	BAR	SIZE	DIST
	F	J	K	S	
	IN.	IN.	IN.	IN.	IN.
17	12	4 1/2	4	8 1/2	
21	12	4 1/2	4	10 1/2	
27	18	4 1/2	6	13 1/2	
33	24	4 1/2	6	16 1/2	
39	30	4 1/2	10	19 1/2	
42	33	4 1/2	11	24	

GROUT STRENGTH TABLE

PRE-TEST STRENGTH	JOB CONTROL STRENGTH	
	3 DAY (PSI)	7 DAY (PSI)
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'	

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 1/4"														

CALCULATED ⊗ - W/FT. / 24.8
CALCULATED ⊗ - W/FT. / 99.2

ODD NO. BEAMS
CALCULATED ⊗ - W/FT. / 31.7 99.2

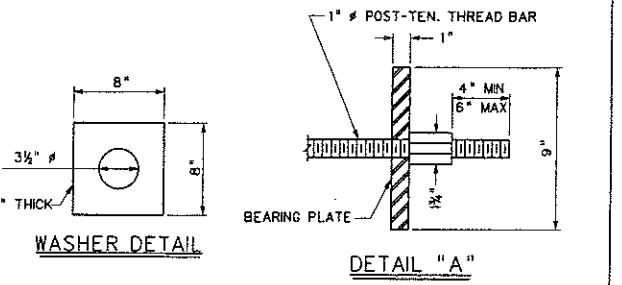
- SPECIAL WARNING NOTES**
- DO NOT STAND IN LINE WITH THE POST-TENSIONING BAR DURING TENSIONING PROCEDURES.
 - NUTS, COUPLERS AND EXTENSION RODS USED IN THE POST-TENSIONING WORK SHALL BE THE MATERIAL APPROVED BY THE MANUFACTURER OF THE HIGH STRENGTH POST-TENSIONING RODS. IN NO CASE SHALL THE CONTRACTOR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



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.

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

DESIGNED BY: THB/GFL
DRAWN BY: THB/RMW
CHECKED BY: THB/RMW
REVIEWED BY: WRW
DATE: 01/12/10
SCALE: NO SCALE
SHEET 16 OF 18
BRIDGE NUMBER 21-26-4.52 (10955)

CONSTRUCTION PLANS OF
BERLIN BOX BEAM BRIDGE
ON C.R. 26 (SLS)
OVER HACKERS CREEK
LEWIS COUNTY

PRESTRESSED CONCRETE BEAM
TRANSVERSE POST-TENSIONING DETAILS