



State of West Virginia
 Department of Administration
 Purchasing Division
 2019 Washington Street East
 Post Office Box 50130
 Charleston, WV 25305-0130

Solicitation

NUMBER
07130823

PAGE
1

ADDRESS CORRESPONDENCE TO ATTENTION OF:
ALAN CUMMINGS 304-558-2402

VENDOR

RFQ COPY
 TYPE NAME/ADDRESS HERE

SHIP TO

DIVISION OF HIGHWAYS
 JOBSITE
 SEE SPECIFICATIONS

DATE PRINTED
02/05/2013

BID OPENING DATE: 02/20/2013 BID OPENING TIME: 1:30PM

LINE	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
0001	1	LS		210-16		
ADDENDUM NO. 01 ISSUED TO DISTRIBUTE BRIDGE SPECIFICATIONS WHICH HAD BEEN INADVERTENTLY OMITTED FROM THE SOLICITATION. BID OPENING DATE AND TIME REMAIN UNCHANGED AS: 02/20/2013 AT 1:30 P.M. CONCRETE BOX BEAMS, BRIDGE RAIL AND COMPONENTS ***** THIS IS THE END OF RFQ 07130823 ***** TOTAL: _____						

SIGNATURE		TELEPHONE		DATE
TITLE	FEIN	ADDRESS CHANGES TO BE NOTED ABOVE		

WHEN RESPONDING TO SOLICITATION, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

SOLICITATION NUMBER: 07130823

Addendum Number: 1

The purpose of this addendum is to modify the solicitation identified as ("Solicitation") to reflect the change(s) identified and described below.

Applicable Addendum Category:

- Modify bid opening date and time
- Modify specifications of product or service being sought
- Attachment of vendor questions and responses
- Attachment of pre-bid sign-in sheet
- Correction of error
- Other

Description of Modification to Solicitation:

ISSUED TO DISTRIBUTE BRIDGE SPECIFICATIONS WHICH HAD BEEN INADVERTENTLY OMITTED FROM THE SOLICITATION. BID OPENING DATE AND TIME REMAIN UNCHANGED AS: 02/20/2013 AT 1:30 P.M.

Additional Documentation: Documentation related to this Addendum (if any) has been included herewith as Attachment A and is specifically incorporated herein by reference.

Terms and Conditions:

1. All provisions of the Solicitation and other addenda not modified herein shall remain in full force and effect.
2. Vendor should acknowledge receipt of all addenda issued for this Solicitation by completing an Addendum Acknowledgment, a copy of which is included herewith. Failure to acknowledge addenda may result in bid disqualification. The addendum acknowledgement should be submitted with the bid to expedite document processing.

ATTACHMENT A

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: 07130823

Instructions: Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

Addendum Numbers Received:

(Check the box next to each addendum received)

- | | |
|---|--|
| <input type="checkbox"/> Addendum No. 1 | <input type="checkbox"/> Addendum No. 6 |
| <input type="checkbox"/> Addendum No. 2 | <input type="checkbox"/> Addendum No. 7 |
| <input type="checkbox"/> Addendum No. 3 | <input type="checkbox"/> Addendum No. 8 |
| <input type="checkbox"/> Addendum No. 4 | <input type="checkbox"/> Addendum No. 9 |
| <input type="checkbox"/> Addendum No. 5 | <input type="checkbox"/> Addendum No. 10 |

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

Company

Authorized Signature

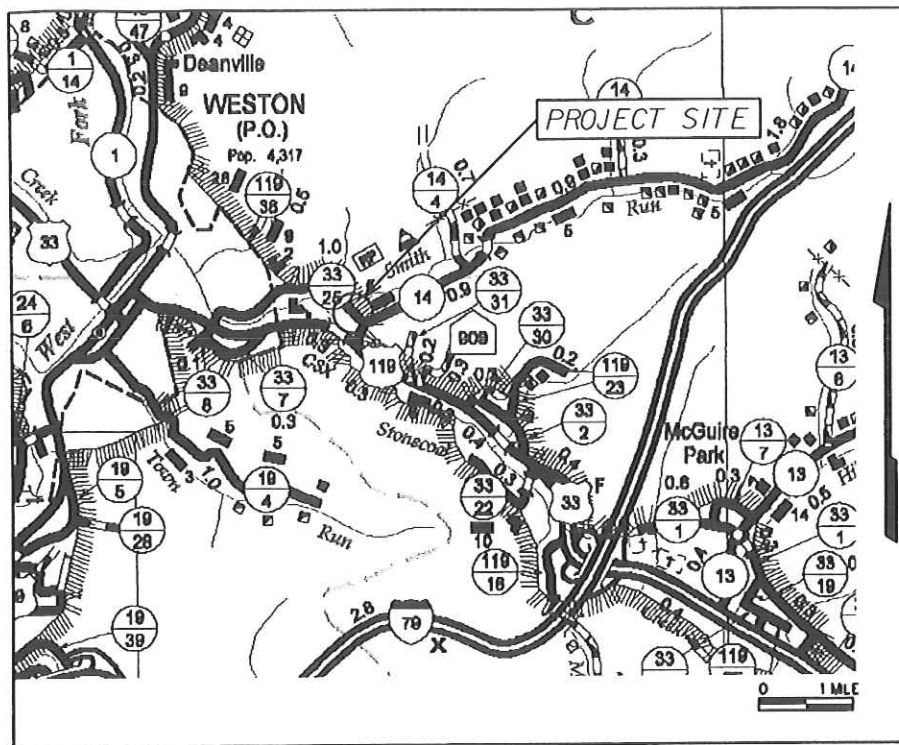
Date

NOTE: This addendum acknowledgement should be submitted with the bid to expedite document processing.
 Revised 6/8/2012

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS PLANS FOR CONSTRUCTION OF JOHN STREET CULVERT REPLACEMENT

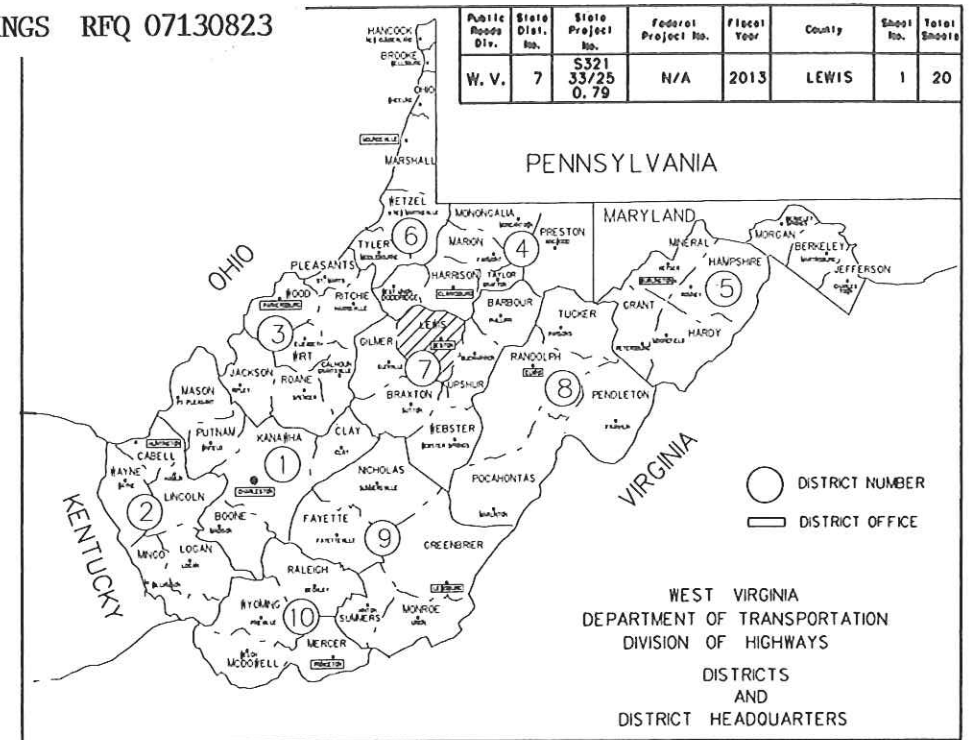
STATE PROJECT NO. S321-33/25-0.79
COUNTY ROUTE NO. 33/25
FREEMANS CREEK DISTRICT
LEWIS COUNTY

	Station	Station	(ft.)	miles)
Roadway	0+50.00	to 1+30.96	80.96	0.015
Bridge	1+30.96	to 1+74.63	43.67	0.008
Roadway	1+74.63	to 3+00.00	125.37	0.024
Total Project Length			250.00	0.047



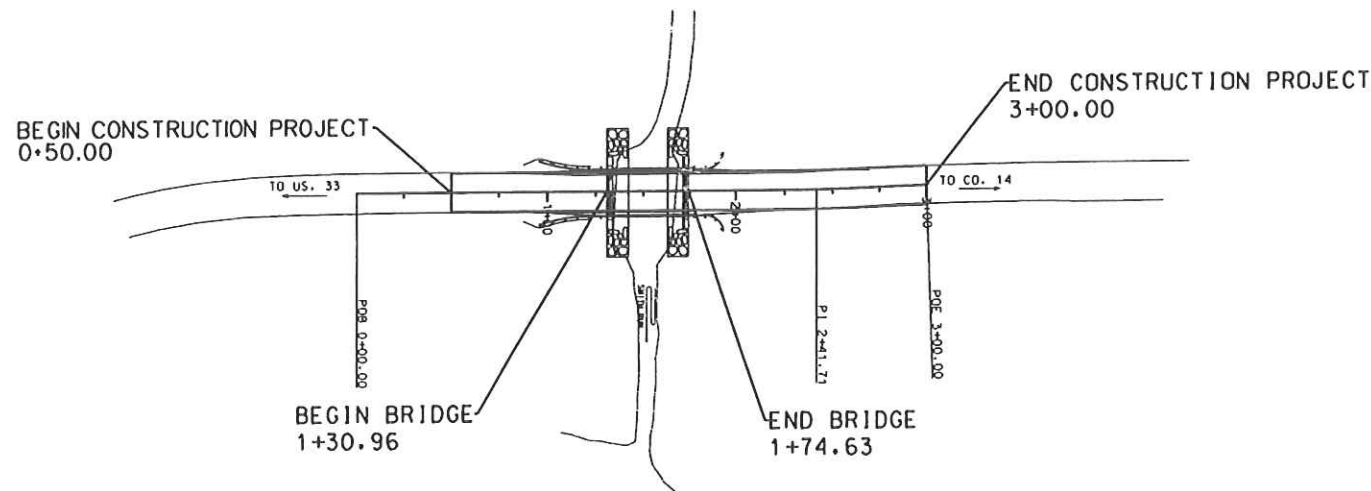
UTILITIES

MON POWER
FRONTIER OF WV
WV AMERICAN WATER
DOMINION HOPE
WESTON SANITARY



Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	Fiscal Year	County	Sheet No.	Total Sheets
W. V.	7	S321-33/25-0.79	N/A	2013	LEWIS	1	20

TYPE OF CONSTRUCTION
BRIDGE REPLACEMENT
BR. NO. 21-33/25-0.80
#11095



LAYOUT SCALE
0 50 ft.

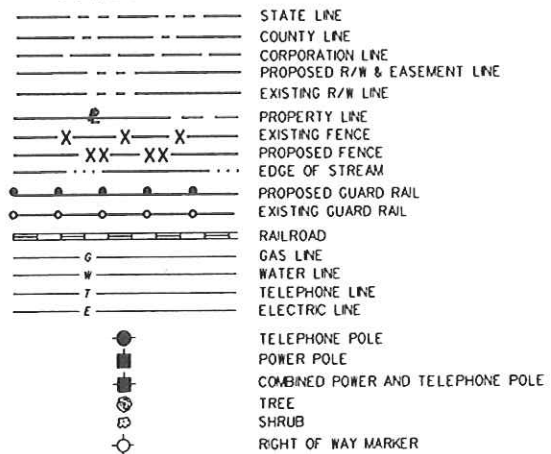
INDEX TO SHEETS

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
19-20	C.R. 33/25 CROSS SECTIONS

DESIGNED BY:	MRM	8-12
DRAWN BY:	MRM	8-12
CHECKED BY:	RMW	9-12
REVIEWED BY:	WRW	10-12

DESIGN DESIGNATION	
A. D. T (2009)	100
A. D. T (2029)	128
D. H. V.	N/A
D.	N/A
T.	N/A
V.	25 MPH

CONVENTIONAL SIGNS



SIGNED: *W. Richard White*
RESPONSIBLE CHARGE ENGINEER
DATE: 11/13/12

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

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

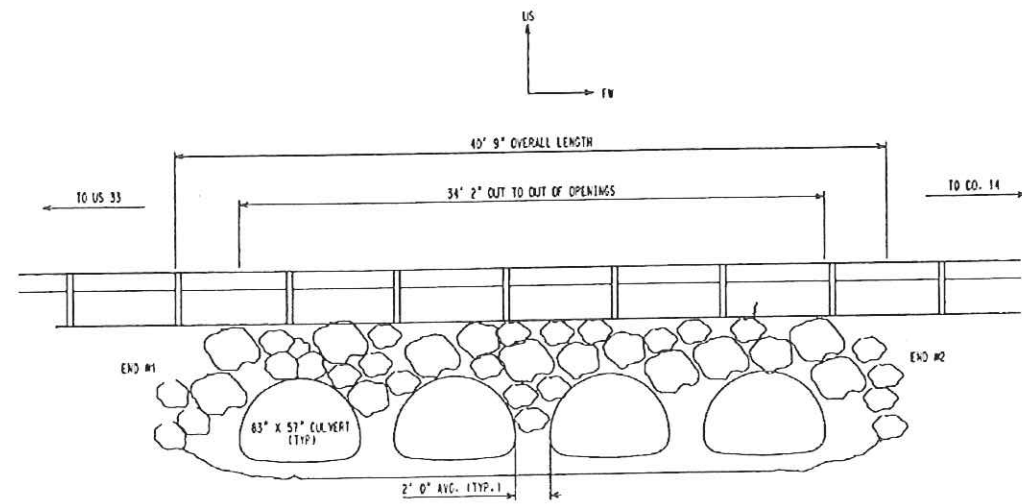
REVISION NUMBER	SHEET NUMBER	REVISIONS	DATE	BY

I HEREBY CERTIFY THAT THIS IS A CORRECT COPY OF THE PLANS OF PROJECT S321-33/25-0.79

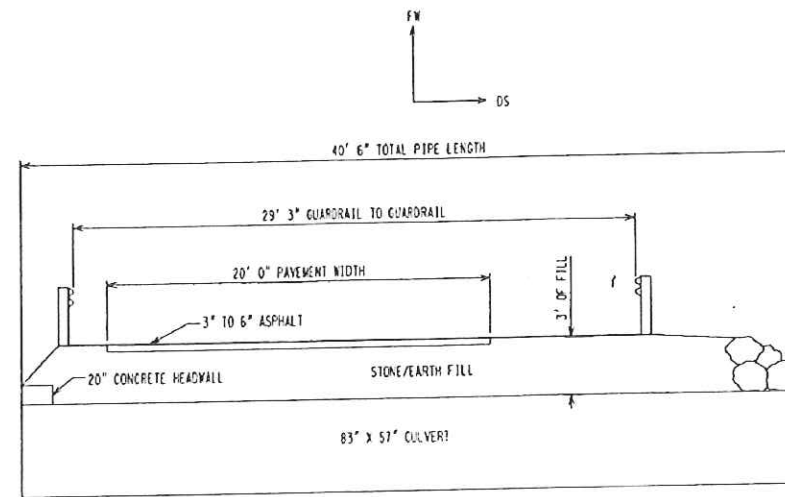
Charles Craig
EXECUTIVE SECRETARY
NOV 20 2012

RECOMMENDED FOR APPROVAL: *Paul D. Walter*
STATE HIGHWAY ENGINEER

APPROVED: *Paul D. Walter*
COMMISSIONER OF HIGHWAYS



EXISTING ELEVATION VIEW
NO SCALE



EXISTING DECK SECTION
NO SCALE

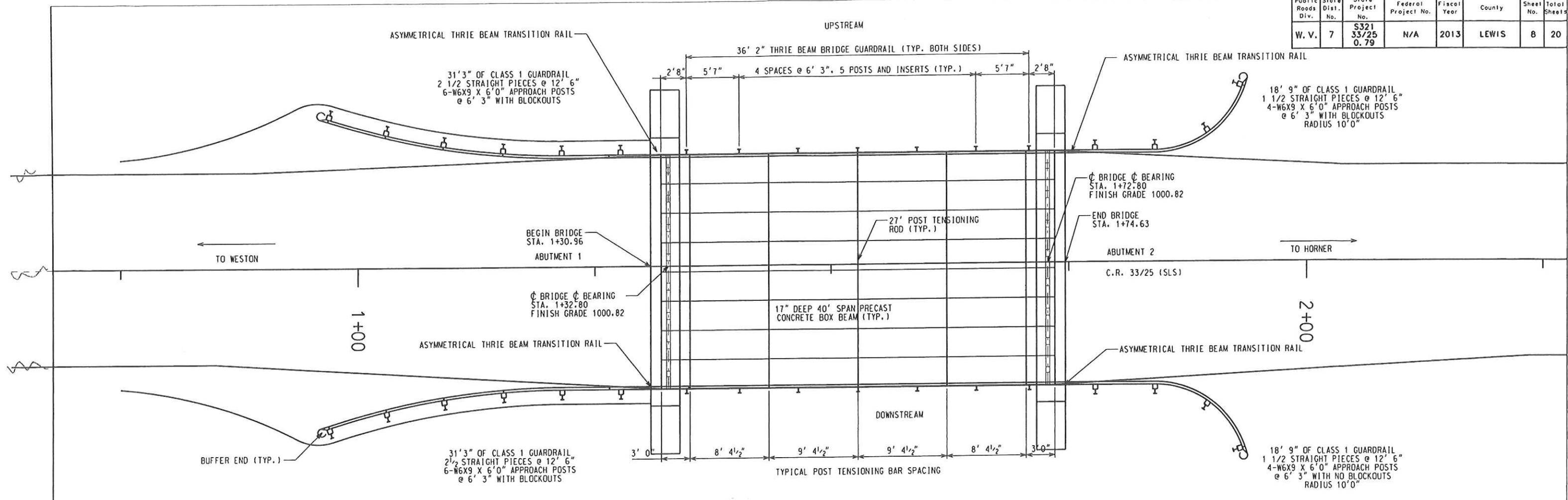
ESTIMATE OF QUANTITIES			
PROJECT NO. S321-33/25-0.79 FOR INFORMATION ONLY			
DESCRIPTION	UNITS	NO. AND SIZE	TOTAL
CLASS B CONCRETE	CY		30
17IN. CONC. BOX BEAMS (EXT.)	SF	2 @ 41' 6" LONG	249
17IN. CONC. BOX BEAMS (INT.)	SF	6 @ 41' 6" LONG	747
BENT REBAR	LB		1497
#5 REBAR STRAIGHT	LB	36 @ 20' 0"	751
#8 REBAR STRAIGHT	LB	35 @ 20' 0"	1869
1" POST TENSIONING BAR X 27' W/ONE NUT	LF	5 EA.	135
9" X 9" X 1" PLATES	EA		10
2" SPONGE RUBBER PREFORMED JOINT FILLER	EA	4 3/4" X 8 3/4"	14
2" SPONGE RUBBER PREFORMED JOINT FILLER	EA	4 3/4" X 6 7/8"	4
2" SPONGE RUBBER PREFORMED JOINT FILLER	EA	6 5/8" X 25' 0"	2
1" SPONGE RUBBER WASHER	EA	8" X 8" WITH 3 1/2" DIA. HOLE	35
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
NON-SHRINK GROUT FOR JOINTS AND ANCHORS	BAG		111
GUARDRAIL INSERT AND HARDWARE	EA		14
BRIDGE GUARDRAIL (THREE BEAM)	LF		72.3
CLASS 1 APPROACH GUARDRAIL	LF		100
ASYMMETRICAL THREE BEAM TRANSITIONS	EA		4
H.M.A. BASE COURSE	TON		100
H.M.A. WEARING	TON		40
BASE STONE	TON		410
W12X65 PILING	LB	12 PCS. @ 20' 0"	15600
FOUNDATION PROTECTION MATERIAL	SY		145
FABRIC FOR SEPARATION	SY		540
CUT	CY		30
FILL	CY		10

* SUPPLIED BY BOX BEAM FABRICATOR

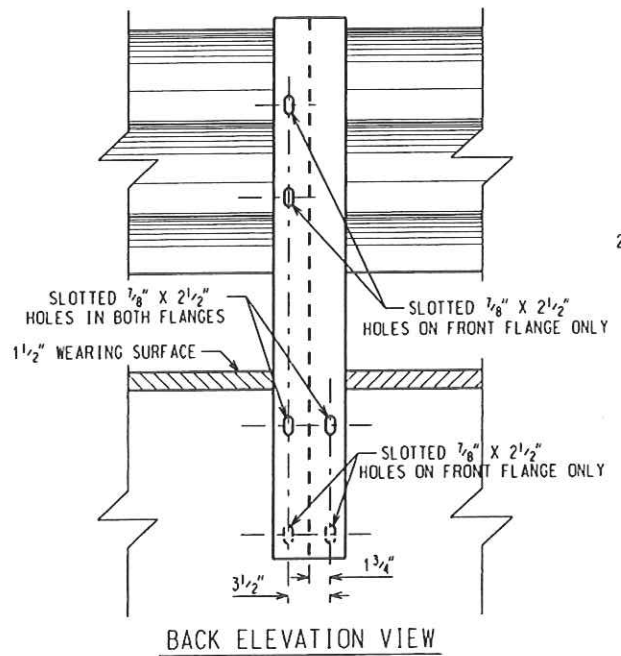
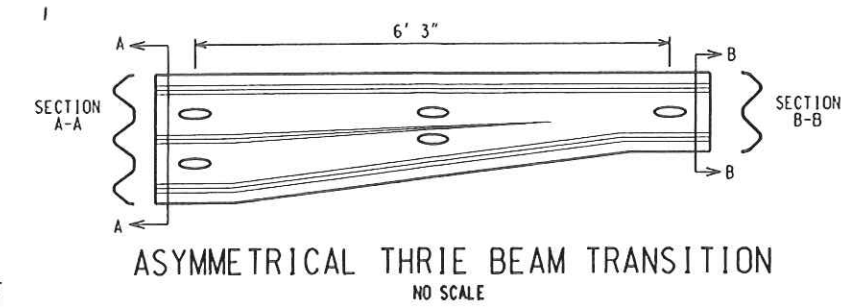
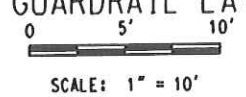
SCOPE OF WORK

1. INSTALL TRAFFIC CONTROL.
2. CLEAR AND GRUB.
3. PLACE STONE AND CONSTRUCT DETOUR.
4. CLOSE AND REMOVE EXISTING STRUCTURE.
5. EXCAVATE FOR ABUTMENTS, DRIVE PILING
6. FORM AND POUR ABUTMENTS.
7. PLACE FOUNDATION PROTECTION MATERIAL.
8. PLACE BEAMS, GROUT, AND POST TENSION.
9. FORM AND POUR BACKWALLS AND WINGWALLS.
10. BACKFILL AND CONSTRUCT APPROACHES.
11. OPEN NEW STRUCTURE TO TRAFFIC.
12. SITE DRESS, SEED AND MULCH.
13. PLACE GUARDRAIL BY PURCHASE ORDER CONTRACT.
14. PAVE BY PURCHASE ORDER CONTRACT.

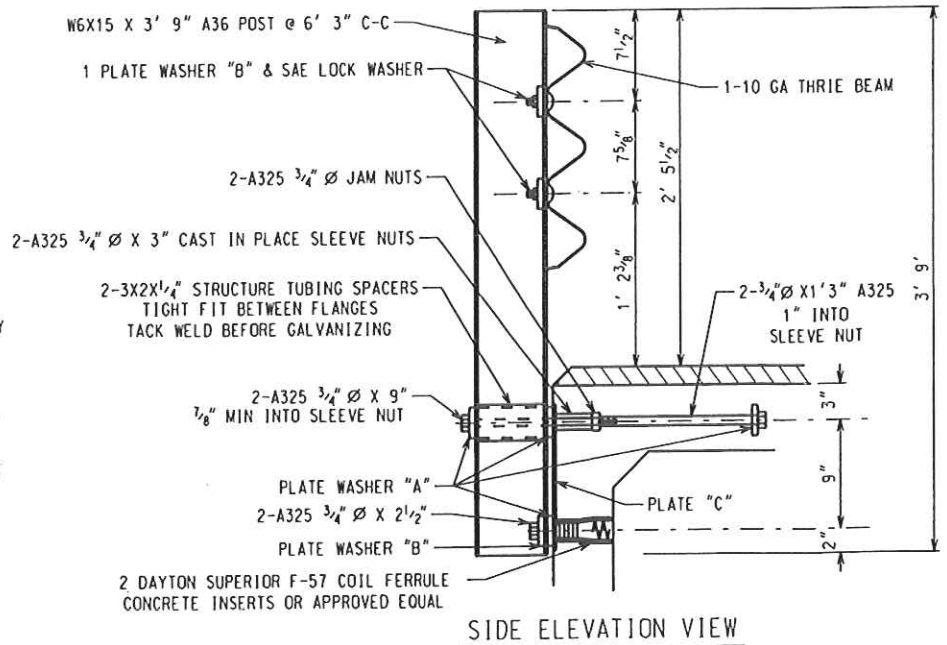
Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	Fiscal Year	County	Sheet No.	Total Sheets
W. V.	7	S321 33/25 0.79	N/A	2013	LEWIS	8	20



PROPOSED BRIDGE PLAN VIEW AND GUARDRAIL LAYOUT



BACK ELEVATION VIEW



SIDE ELEVATION VIEW

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

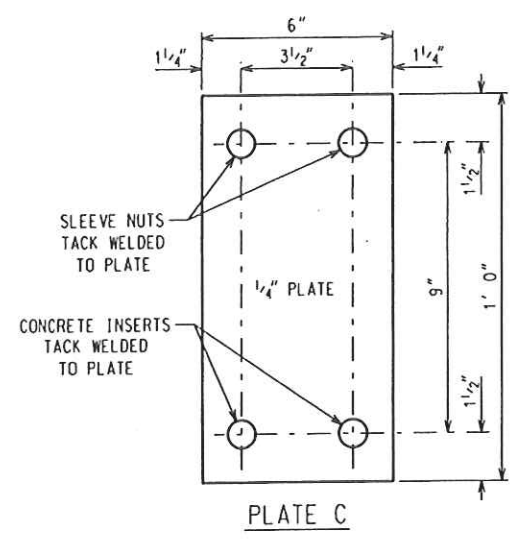


PLATE C

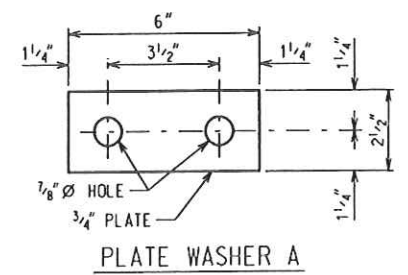


PLATE WASHER A

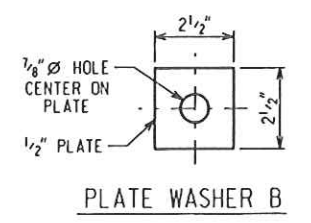
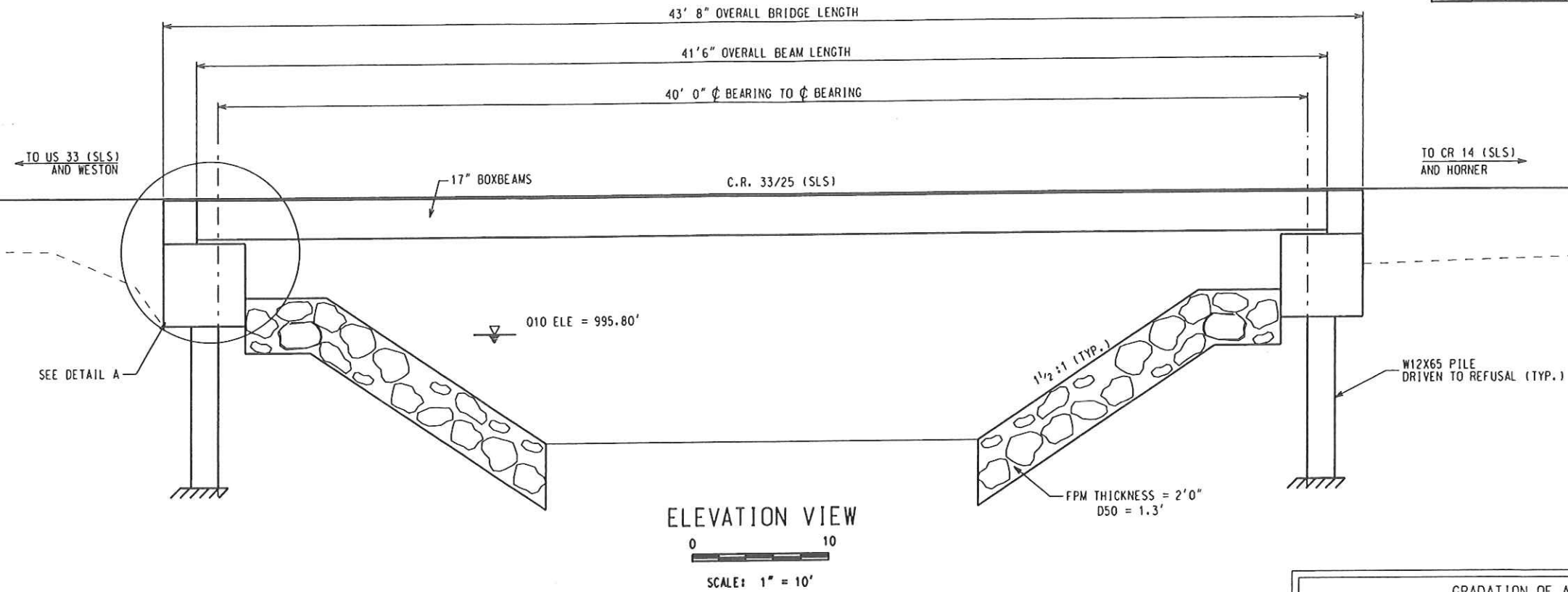


PLATE WASHER B

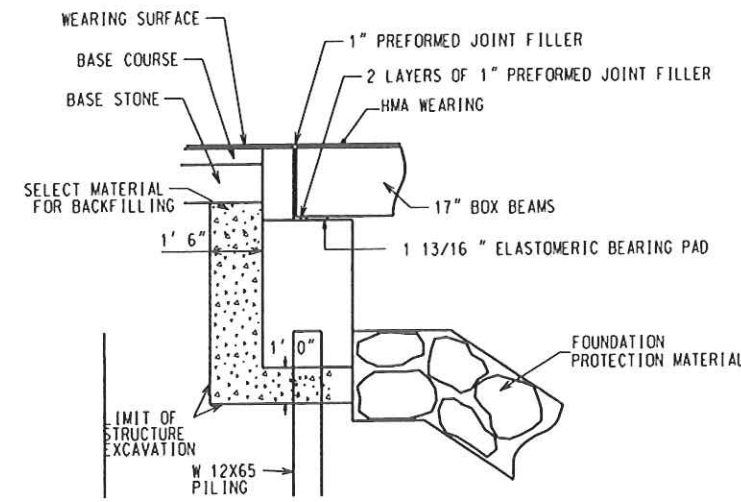
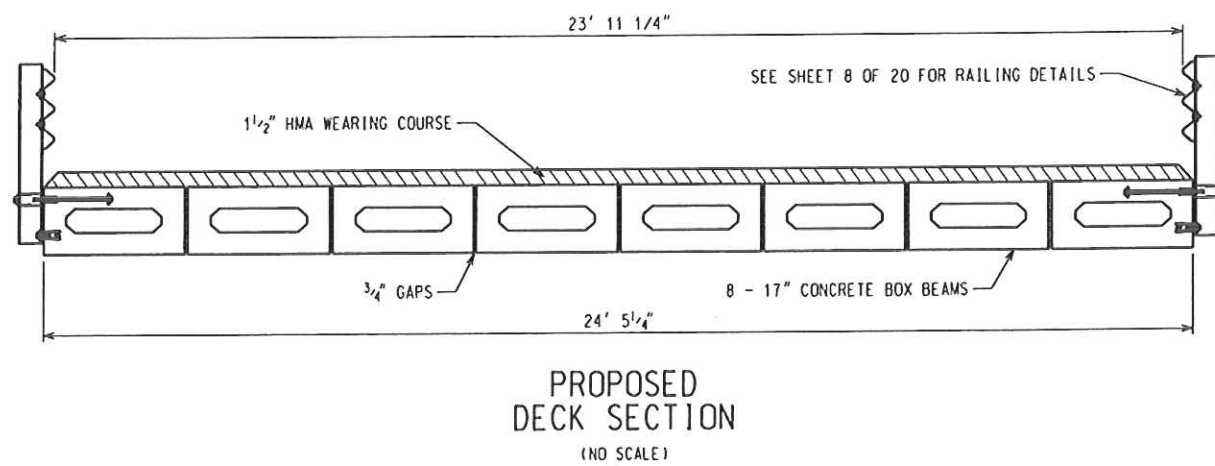
DESIGNED BY:	M/RM	8-12					
DRAWN BY:	M/RM	8-12					
CHECKED BY:	R/MW	9-12					
REVIEWED BY:	NRW	10-12	REVISION NUMBER	SHEET NUMBER	REVISION	DATE	BY

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROPOSED BRIDGE PLAN VIEW, POST TENSIONING
ROD DETAILS, AND GUARDRAIL DETAIL

Public Roads Div.	State Dist. No.	State Project No.	Federal Project No.	Fiscal Year	County	Sheet No.	Total Sheets
W. V.	7	5321 33/25 0.79	N/A	2013	LEWIS	9	20



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



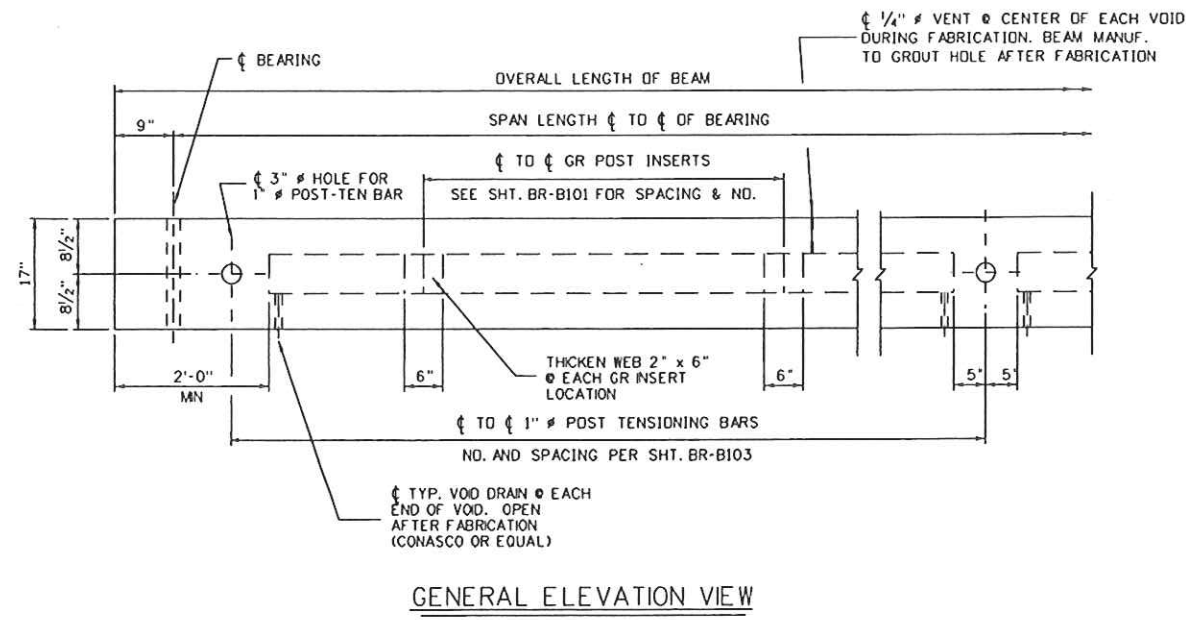
DESIGN FLOOD FREQUENCY:	010
DESIGN DISCHARGE:	580 CFS
EFFECTIVE WATERWAY AREA OF EXISTING STRUCTURE:	99 SF
EFFECTIVE WATERWAY AREA OF NEW STRUCTURE:	202.5 SF
ELEVATION AT BOTTOM OF EXISTING SUPERSTRUCTURE:	991.63
ELEVATION AT BOTTOM OF NEW SUPERSTRUCTURE:	999.03
LOW WATER ELEVATION:	992.00
STREAM BED ELEVATION:	991.63

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

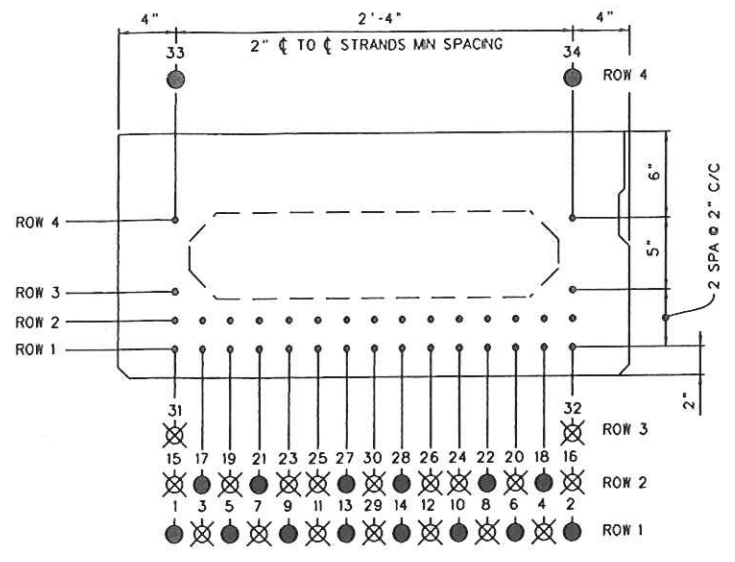
DESIGNED BY:	MRM	8-12				
DRAWN BY:	MRM	8-12				
CHECKED BY:	RMW	9-12				
REVIEWED BY:	WRW	10-12	REVISION NUMBER	SHEET NUMBER	REVISION	DATE BY

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 ELEVATION VIEW, HYDRAULIC DATA,
 STRUCTURE EXCAVATION,
 PROPOSED DECK SECTION

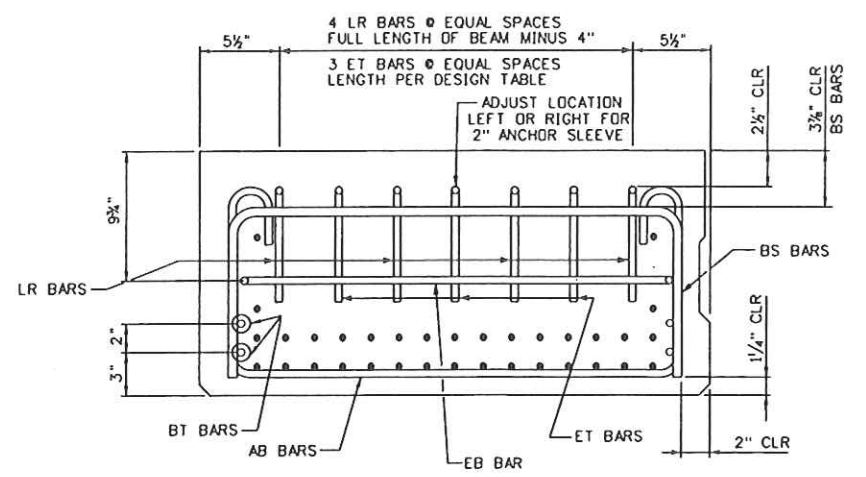
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				
S321-33/25-0.79	N/A	7	LEWIS	12	20



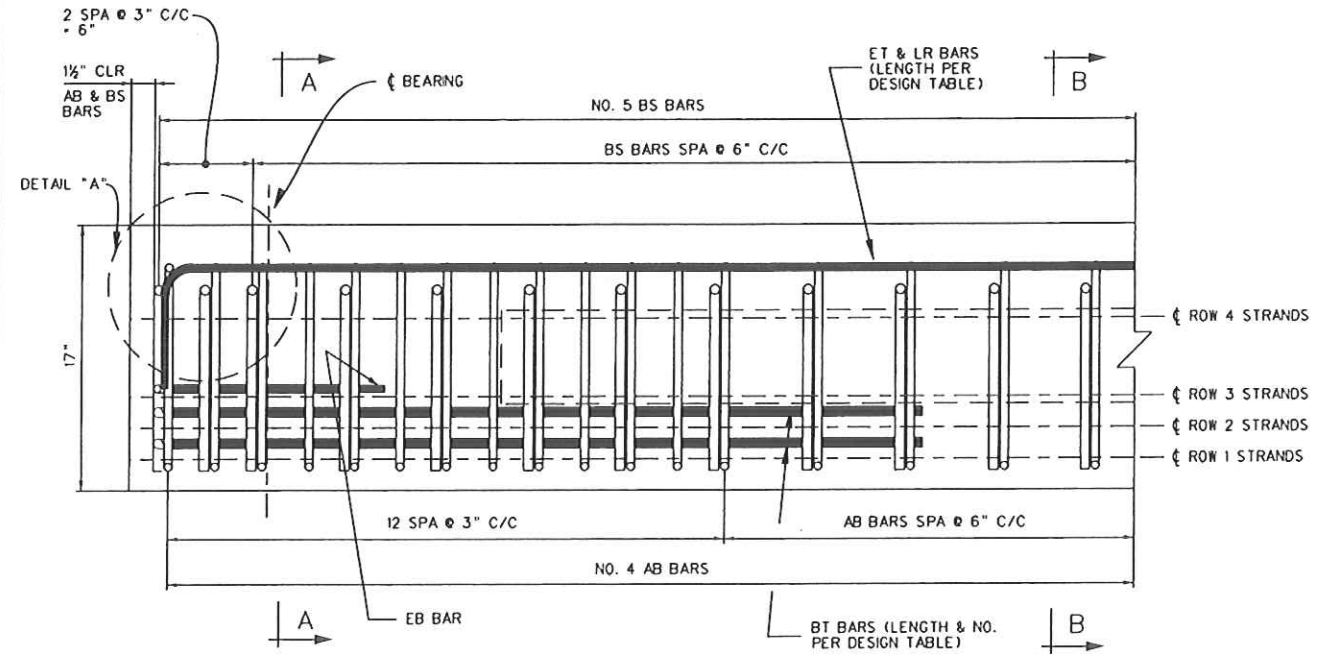
GENERAL ELEVATION VIEW



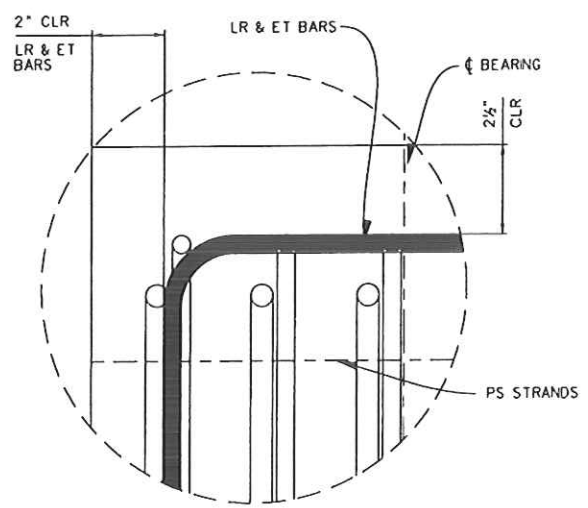
BEAM PRESTRESSING
TYPICAL BEAM END & MIDSPAN



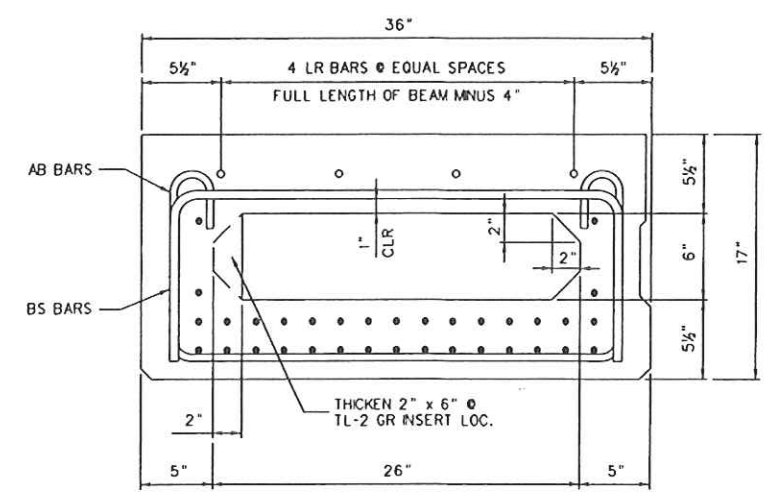
SECTION A-A



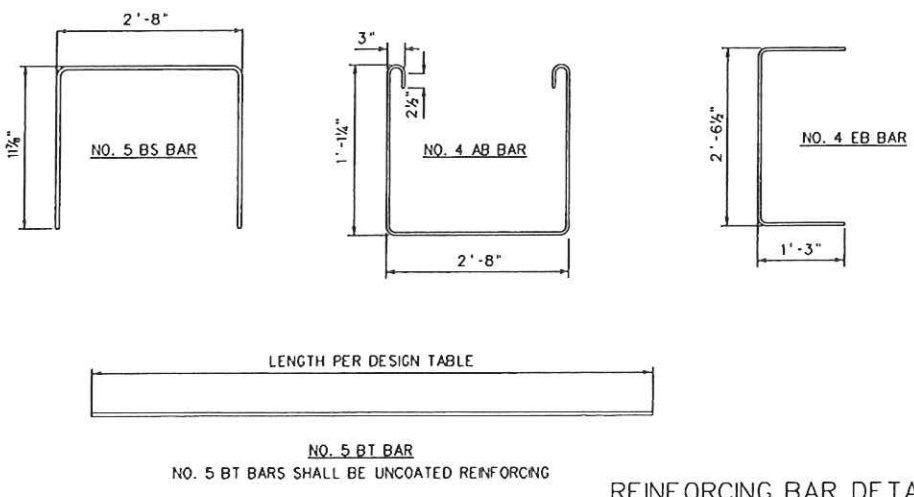
REINFORCING STEEL ELEVATION



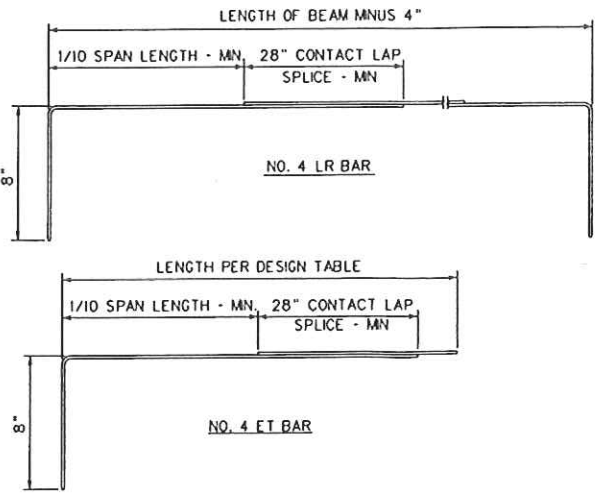
DETAIL "A"



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 _____
 - △ DEBOND STRAND: LENGTH FROM END OF BEAM _____
 - DEBOND STRAND: LENGTH FROM END OF BEAM _____
- THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-B17B, BR-B100, BR-B101, BR-B102A & B, BR-B103, BR-B104, AND BR-B105A & B AS APPLICABLE.

WHEN A POST-TEN. ACCESS POCKET IS USED AS DETAILED ON SHEET BR-B103 STRANDS IN ROWS 3 AND 4 SHALL BE ELIMINATED. THE BEAM SHALL BE REDESIGNED AS NECESSARY.

APPROVED: _____ DATE: _____
DIRECTOR, ENGINEERING DIVISION

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

17" PRESTRESSED CONCRETE
BOX BEAMS
DESIGN AND ASSEMBLY DETAILS
STANDARD SHEET BR-B17A

PREPARED: 1-14-05
REVISOR:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

17" PRESTRESSED CONCRETE
BOX BEAMS
DESIGN AND ASSEMBLY DETAILS

17" PRESTRESSED BOX BEAM
DESIGN AND ASSEMBLY DETAILS

DESIGNED BY: MRM
DRAWN BY: MRM
CHECKED BY: RMW
REVIEWED BY: WRW
DATE: 8-12
SCALE:
SHEET 12 OF 20
BRIDGE NO. 21-33/25-0.80 (11095)

STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS
5321-33/25-0.79	N/A	7	LEWIS	13	20

DESIGN DATA FOR 17" DEPTH ADJACENT BOX BEAM

SPAN LENGTH ϕ TO ϕ BEARING		20'-0"	22'-0"	24'-0"	26'-0"	28'-0"	30'-0"	32'-0"	34'-0"	36'-0"	38'-0"	40'-0"
OVERALL LENGTH OF BEAM		21'-6"	23'-6"	25'-6"	27'-6"	29'-6"	31'-6"	33'-6"	35'-6"	37'-6"	39'-6"	41'-6"
NO. OF 270 KSI, 1/2" ϕ LOW-RELAXATION STRANDS, AREA/STRAND = 0.167 SQ. IN.		10	10	10	10	12	12	14	14	16	16	16
STRAND POSITION NUMBER	ROW 1	1,2,11,12	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
	ROW 2	17,18,25,26	17,18,25,26	17,18,25,26	17,18,25,26	17,18,27,28	17,18,27,28	17,18,21,22,27,28	17,18,21,22,27,28	17,18,21,22,27,28	17,18,21,22,27,28	17,18,21,22,27,28
	ROW 3	---	---	---	---	---	---	---	---	---	---	---
	ROW 4	33,34	33,34	33,34	33,34	35,34	35,34	35,34	35,34	35,34	35,34	35,34
PRESTRESSING FORCE IMMEDIATELY AFTER STRAND RELEASE, Ppt, (KIPS/BEAM)		320	320	326	326	380	380	451	461	512	512	513
EFFECTIVE PRESTRESSING FORCE AFTER ALL LOSSES, Ppe, (KIPS/BEAM)		293	293	294	294	345	345	396	397	448	448	447
REQUIRED FACTORED MOMENT ϕ STRENGTH I, Mu (FT-KIPS/BEAM)		204	221	260	280	319	340	382	416	453	491	531
FACTORED FLEXURAL RESISTANCE, Mr (FT-KIPS/BEAM)		400	400	400	400	496	496	580	586	680	646	646
TOTAL NO. DEBONDED STRANDS		---	---	---	---	---	---	---	---	---	---	---
DEBONDED STRAND POSITION NUMBER & SHIELDING LENGTH FROM EACH END	ROW 1	---	---	---	---	---	---	---	---	---	---	---
	ROW 2	---	---	---	---	---	---	---	---	---	---	---
NUMBER & LENGTH *4 ET TOP TENSION BARS ϕ EACH END		3 - *4 x 3'-0"	3 - *4 x 3'-6"	3 - *4 x 4'-0"	3 - *4 x 4'-0"	3 - *4 x 4'-0"	3 - *4 x 4'-0"	3 - *4 x 4'-0"	3 - *4 x 4'-0"	3 - *4 x 4'-0"	3 - *4 x 4'-0"	3 - *4 x 9'-6"
NUMBER & LENGTH *5 BT BOTTOM TENSION BARS ϕ EACH END		2 - *5 x 7'-0"	2 - *5 x 7'-0"	2 - *5 x 7'-0"	2 - *5 x 7'-0"	4 - *5 x 7'-0"	4 - *5 x 7'-0"	4 - *5 x 7'-0"	4 - *5 x 7'-0"	4 - *5 x 7'-0"	4 - *5 x 7'-0"	4 - *5 x 7'-0"
DESIGN CAMBER * = POSITIVE (UP) (INCHES)	ϕ RELEASE	0.14	0.14	0.16	0.16	0.27	0.29	0.36	0.40	0.57	0.59	0.61
	ϕ ERECTION	0.20	0.23	0.25	0.26	0.47	0.48	0.61	0.62	0.89	0.91	0.90
	ϕ FINAL	0.25	0.27	0.29	0.29	0.50	0.50	0.60	0.60	0.87	0.94	0.87
NUMBER & SPACING OF TL-2 GUARDRAIL INSERTS	NO OF INSERTS RECD.	---	---	---	---	---	---	---	---	---	---	---
	END OF BEAM TO ϕ OF FIRST INSERT EA END	---	---	---	---	---	---	---	---	---	---	---
SEE NOTE 6	ϕ OF 1st INSERT TO ϕ 2nd INSERT EA END	---	---	---	---	---	---	---	---	---	---	---
WEIGHT OF TYPICAL BEAM INCLUDING DIAPHRAGM (TONS)		5.6	6.1	6.6	7.1	7.6	8.1	8.6	9.1	9.6	10.1	10.6

MIN. CONCRETE STRENGTH @ RELEASE = 6000 PSI
 MIN. CONCRETE STRENGTH @ 28 DAYS = 8000 PSI
 INITIAL PULL/STRAND = 33,820 LBS
 CROSS-SECTION AREA/STRAND = 0.167 SQ. IN.

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 135 LBS/DIAPHRAGM.
 FOR SKEW ADD 17 LBS/DEGREE OF SKEW/END.
 FOR LONGER ENDBLOCK, ADD 163 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.
- SPECIAL STRAND NOTE FOR 17" BOX SECTION ONLY: WHEN TL-2 GUARDRAIL INSERTS ARE REQUIRED THE BOTTOM INSERT (TYPE 2A ANCHOR) CONFLICTS WITH STRAND NO. 15. STRANDS 15 AND 16 HAVE BEEN MOVED TO POSITIONS 17 AND 18. FOR UNIFORMITY PURPOSES, ALL BEAMS OF THE SAME DESIGN SHALL USE SAME STRAND PATTERN.
- THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-B17A, BR-B100, BR-B101, BR-B102A & B, BR-B103, BR-B104, AND BR-B105A & B AS APPLICABLE.

APPROVED: _____ DATE: _____

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 ENGINEERING DIVISION

DESIGN TABLE FOR 17"
 PRESTRESSED BOX BEAM
 STANDARD SHEET BR-B17B

PREPARED: 1-14-05

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 ENGINEERING DIVISION

DESIGNED BY: MRW
 DRAWN BY: MRW
 CHECKED BY: RMW
 REVIEWED BY: WRW
 DATE: 8-12
 SCALE:
 SHEET NO. 13 OF 20

BRIDGE NUMBER
 21-33/25-0.80
 (11095)

DESIGN TABLE FOR 17"
 PRESTRESSED BOX BEAM

STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS
S321-33/25-0.79	N/A	7	LEWIS	14	20

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 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
- 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.

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" #, GRADE 270, 7 WIRE UNCOATED, LOW-RELAXATION STRAND MEETING THE REQUIREMENTS OF AASHTO M203, SUPPLEMENT SI.
- 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" # x 2 1/2" MIN LEN.	ASTM A108 (11L17 STEEL)	AASHTO M232
		ASTM A510 (1018 STEEL)	AASHTO M232
WIRE	ANCHOR 3/8" #	ASTM A108 (1045 C.D. STEEL)	AASHTO M232
STUDS	1/4" # x 8" LONG	AASHTO M291, CLASS C	AASHTO M232
NUTS	1/4" #	ASTM A108 (12L14 STEEL)	AASHTO M232
COUPLERS	TYPE 1A 1/4" # x 5" LONG	AASHTO M164 (TYPE 1, HH)	AASHTO M232
		AASHTO M164 (TYPE 1, HH)	AASHTO M232
BOLTS	1/4" # x 12" LONG	AASHTO M291, CLASS C	AASHTO M232
BOLTS	3/8" # x ALL LEN.	AASHTO M291, CLASS C	AASHTO M232
NUTS	3/8" #	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 EMBRITTELEMENT. 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.

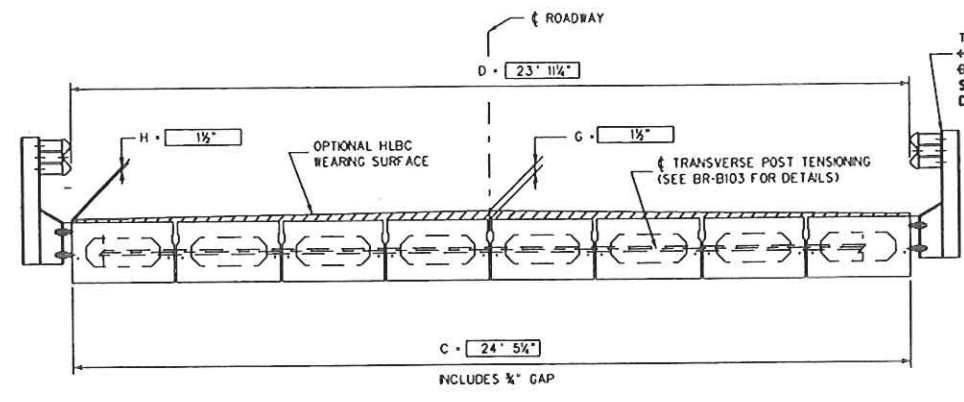
PROTECTIVE SURFACE TREATMENT:

- 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.

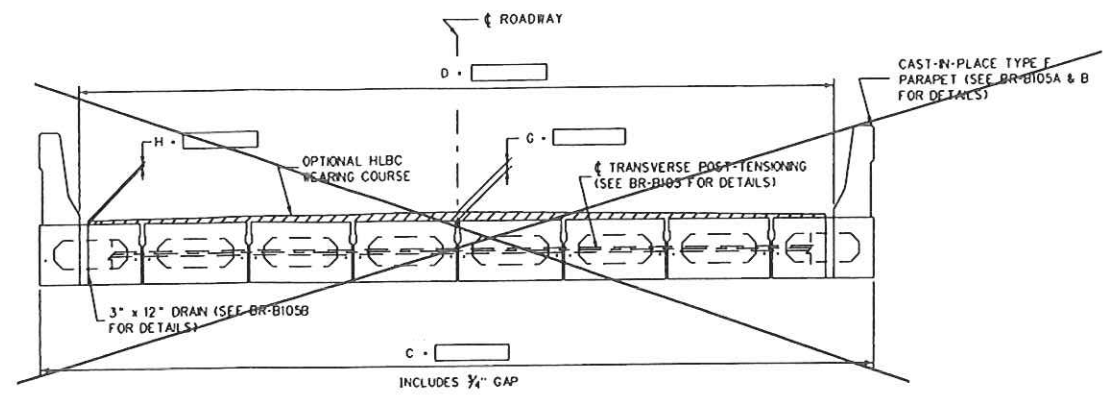
SHOP DRAWINGS:

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		DESIGNED BY: THB/ARW
CONSTRUCTION PLANS OF JOHN STREET CULVERT REPLACEMENT ON C.R. 3325 (SLS) OVER SMITH RUN LEWIS COUNTY		DRAWN BY: THB/ RWB
PRESTRESSED CONCRETE BEAM DESIGN & ASSEMBLY NOTES		CHECKED BY: TM/ GFL
STANDARD SHEET BR-B100		REVIEWED BY: WRW
DATE: 6/12		SCALE:
SHEET NO 14 OF 20		BRIDGE NUMBER 21-33/25-0.80 (11095)

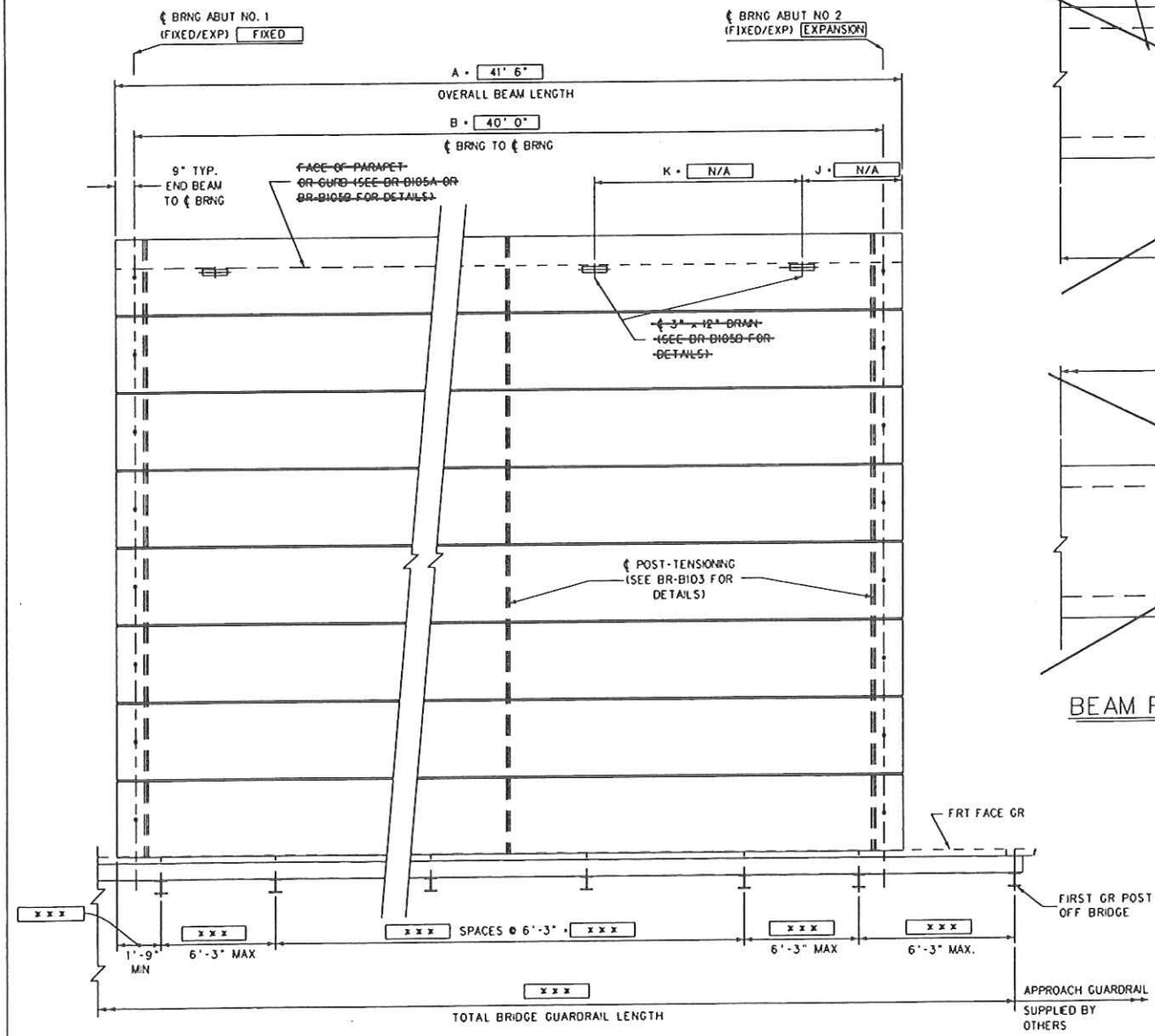


TYPICAL CROSS-SECTION WITH GUARDRAIL



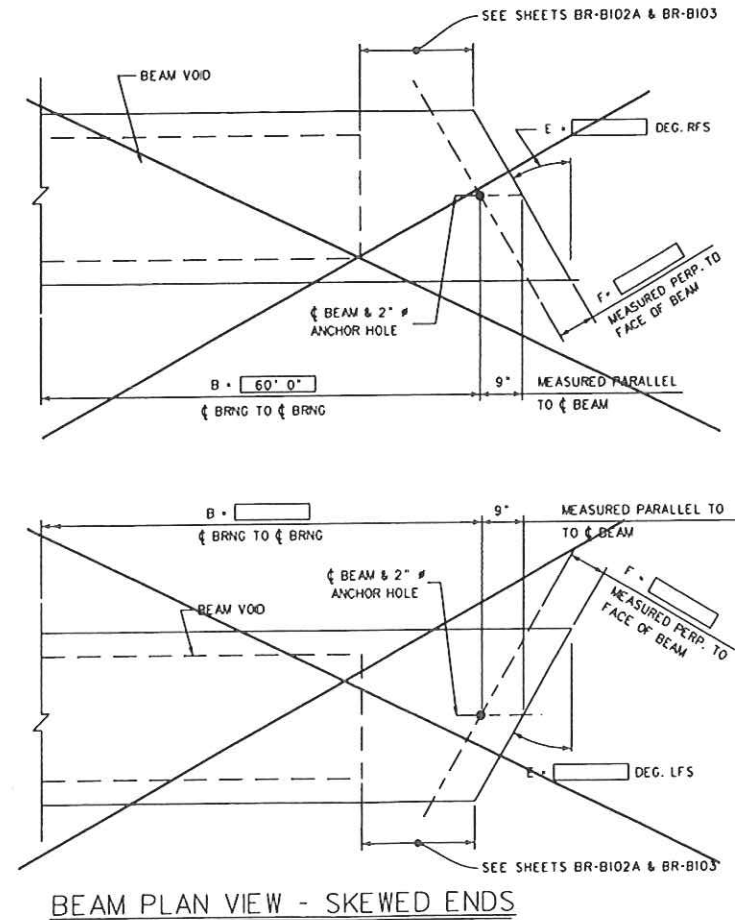
TYPICAL CROSS-SECTION WITH PARAPET OR CURB

CONTROL DIMENSIONS		
DESCRIPTION	CODE	VALUE
OVERALL BEAM LENGTH	A	41' 6"
SPAN LENGTH, ϕ BEARING TO ϕ BEARING	B	40' 0"
SUPERSTRUCTURE WIDTH - OUT TO OUT	C	24' 5/4"
ROADWAY WIDTH - FACE GR/PARAPET TO FACE GR/PARAPET	D	23' 11/4"
NUMBER OF BEAMS REQUIRED	—	8
BEAM SIZE (WIDTH x DEPTH)	—	3' x 17"
SKEW ANGLE (NORMAL, DEG. RFS OR DEG. LFS)	E	0° RFS
PERPENDICULAR DISTANCE FROM FACE OF BEAM TO ϕ BEARING	F	9"
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 8 OF 20 FOR DETAILS

DECK PLAN VIEW



BEAM PLAN VIEW - SKEWED ENDS

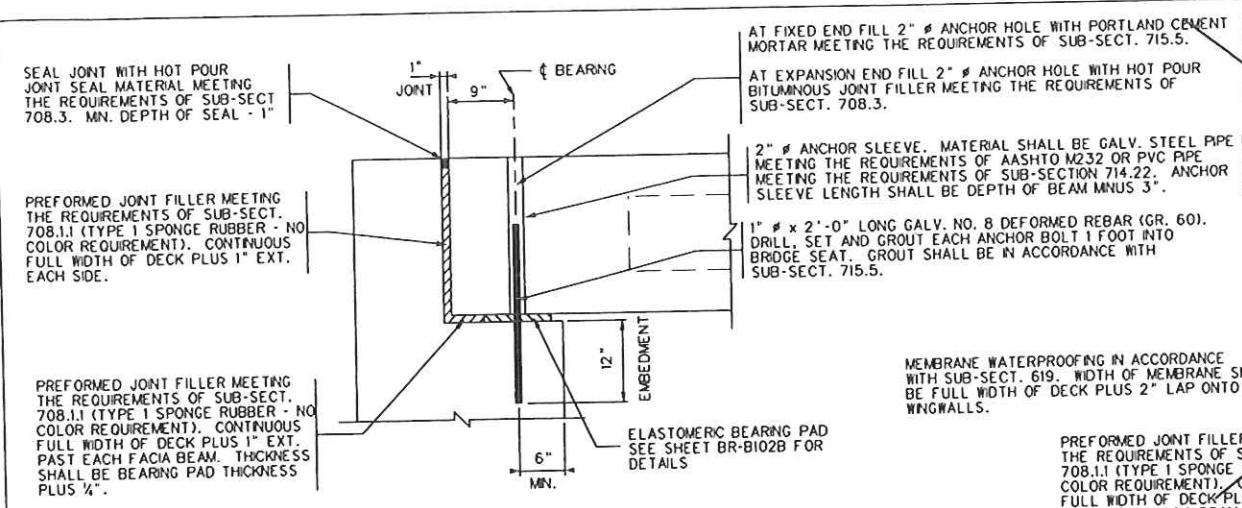
ESTIMATE OF QUANTITIES			
ITEM NO.	DESCRIPTION	UNITS	QUANTITY
603016	PRESTRESSED CONCRETE BOX BEAM	LF	332

NOTES:
1. 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."
2. 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.

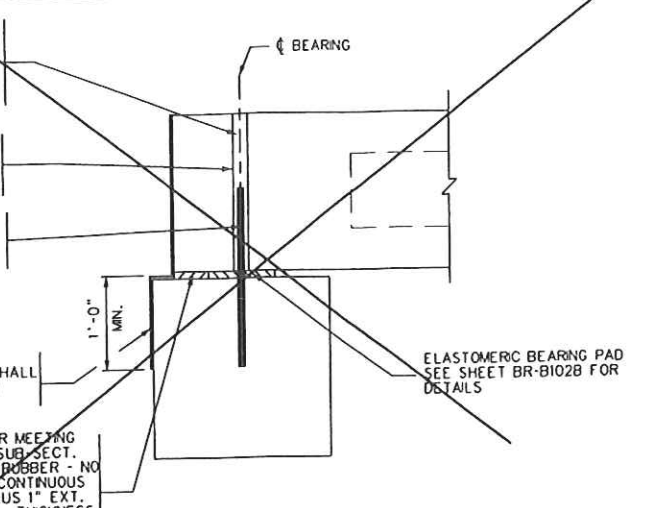
APPROVED: _____ DATE: _____
DIRECTOR, ENGINEERING DIVISION
WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION
PREPARED: 1-14-05
REVIEWED: _____
PRESTRESSED BOX BEAM
SUPERSTRUCTURE LAYOUT
STANDARD SHEET BR-B101

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION
DESIGNED BY: THB/RMW
DRAWN BY: THB/RMW
CHECKED BY: TM/GFL
REVIEWED BY: WRW
DATE: 6/12
SCALE: NO SCALE
SHEET NO 15 OF 20
BRIDGE NUMBER 21-33/25-0.80 (11095)
CONSTRUCTION PLANS OF JOHN STREET CULVERT REPLACEMENT ON C.R. 33/25 (SLS) OVER SMITH RUN LEWIS COUNTY
PRESTRESSED BOX BEAM SUPERSTRUCTURE LAYOUT

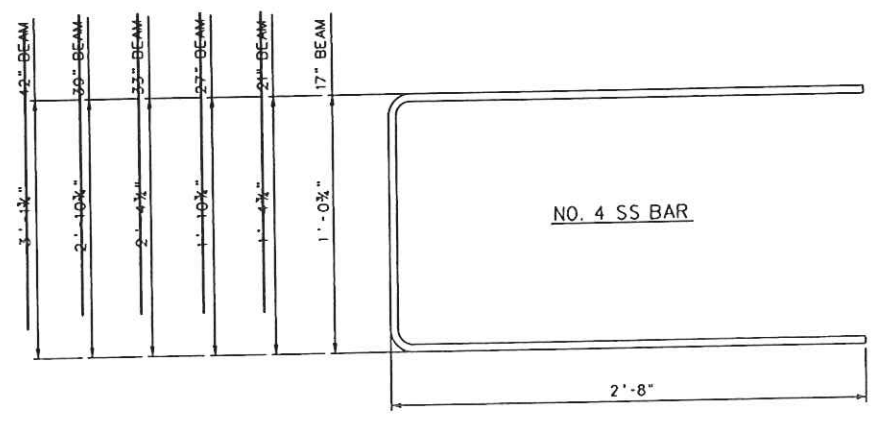
STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS
S321-33/25-0.79	N/A	7	LEWIS	16	20



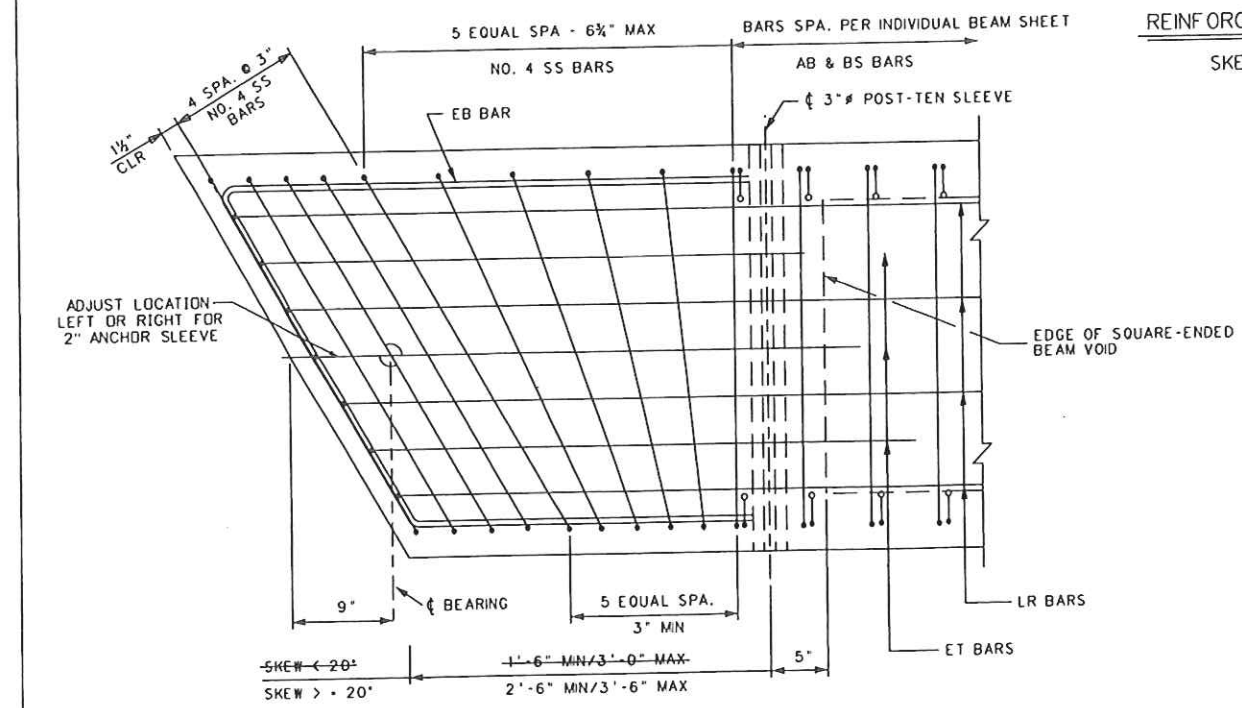
END BEARING DETAIL WITH BACKWALL



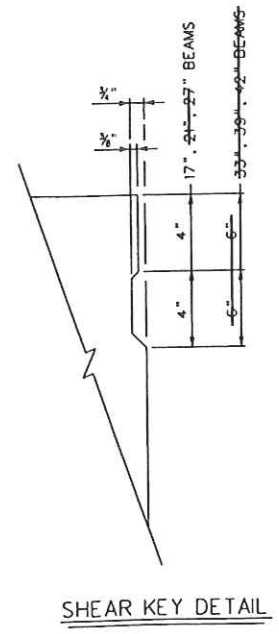
END BEARING DETAIL WITHOUT BACKWALL



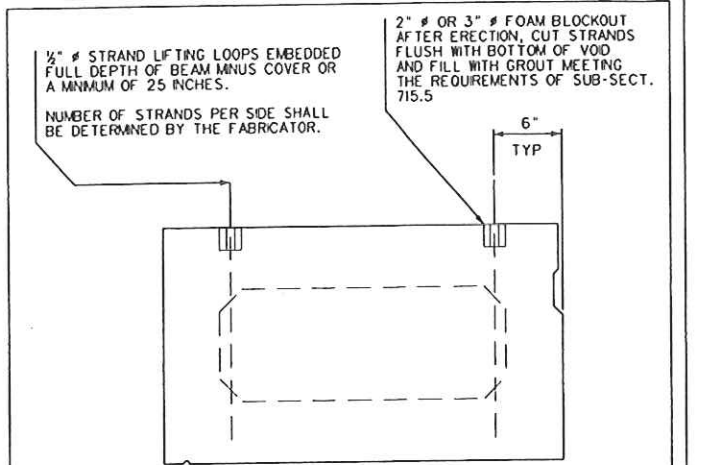
REINFORCING BAR DETAIL SKEWED BEAMS



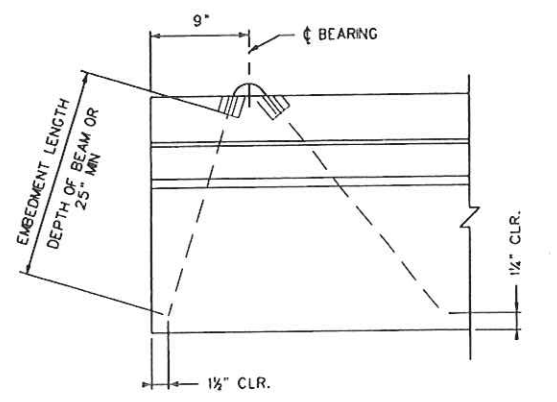
END BLOCK DETAIL - SKEWED BEAMS W/O POST-TEN. ACCESS POCKET



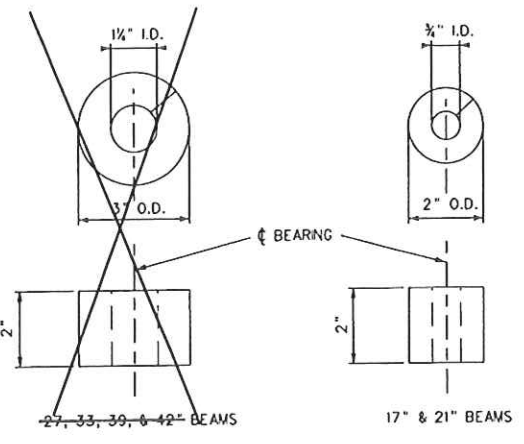
SHEAR KEY DETAIL



END VIEW



SIDE VIEW



BLOCKOUT DETAILS

LIFTING DETAILS

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

DESIGNED BY: THB/ MRW
DRAWN BY: THB/ RWV
CHECKED BY: TM/ GFL
REVIEWED BY: WRW
DATE: 6/12
SCALE: NO SCALE
SHEET NO 16 OF 20

CONSTRUCTION PLANS OF
JOHN STREET CULVERT REPLACEMENT
ON C.R. 33/25 (SLS)
OVER SMITH RUN
LEWIS COUNTY

BRIDGE NUMBER
21-33/25-0.80
(11095)

APPROVED: _____ DATE: _____
DIRECTOR, ENGINEERING DIVISION

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

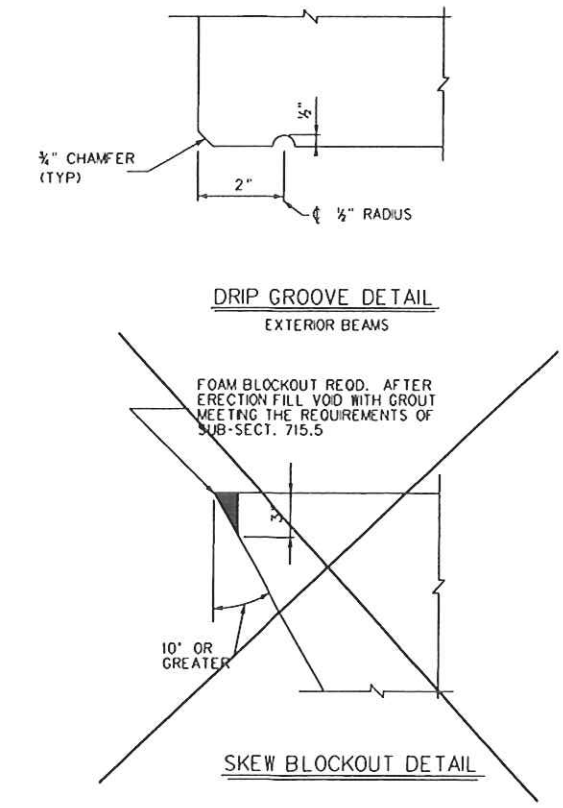
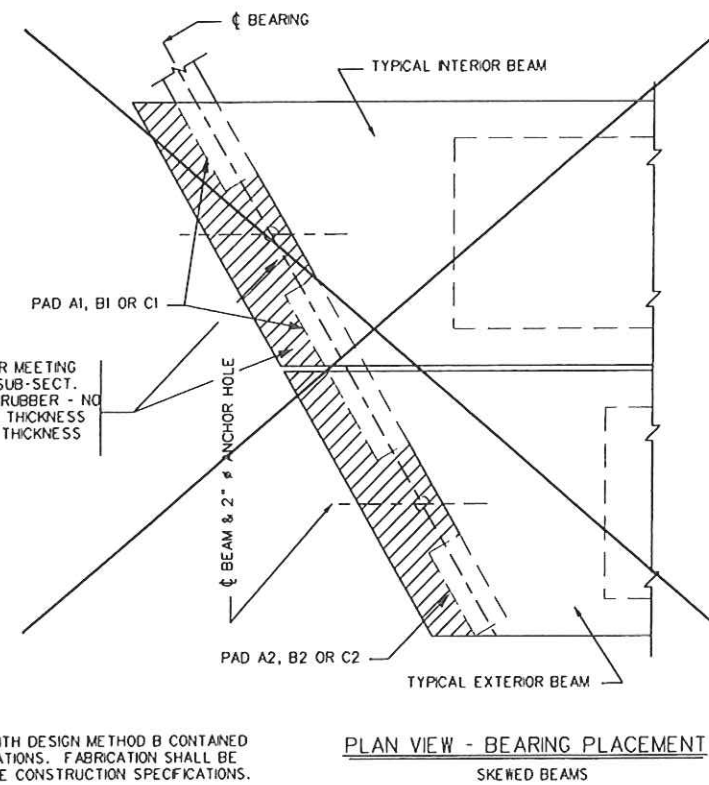
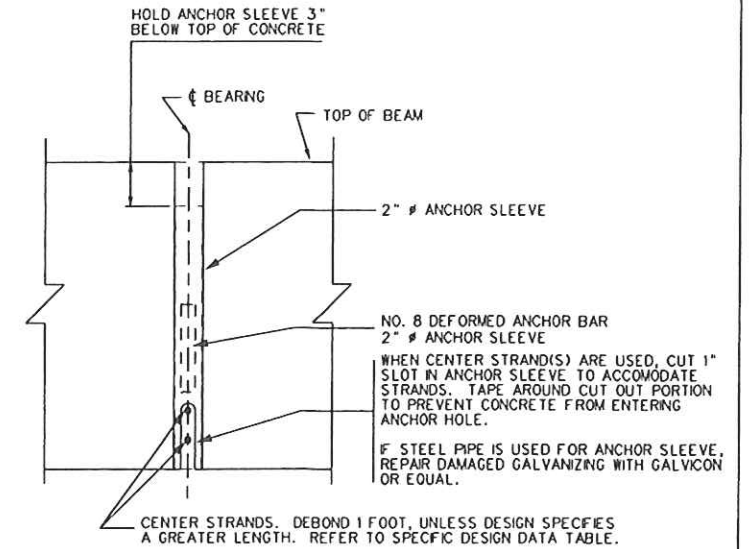
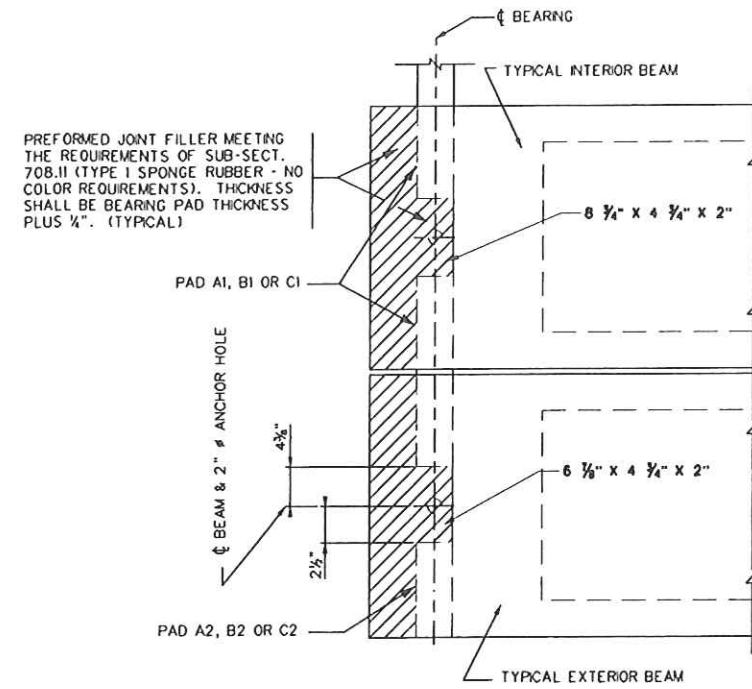
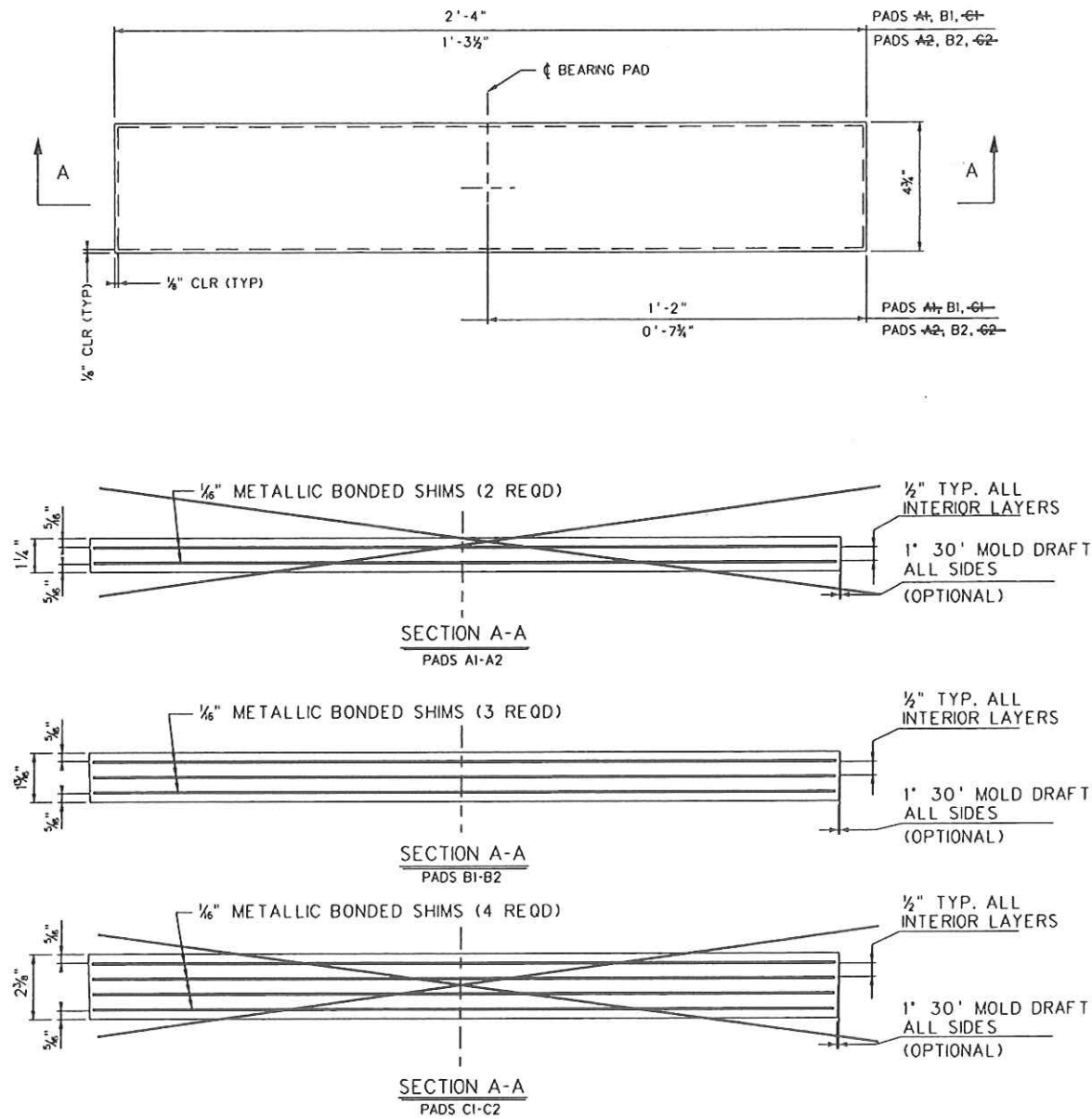
PREPARED: 1-14-05
REVIEW: _____

PRESTRESSED CONCRETE BEAM
SKEW END REINFORCING
MISC. DESIGN AND ASSEMBLY DETAILS

STANDARD SHEET BR-B102A

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.

STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS
S321-33/25-0.79	N/A	7	LEWIS	17	20



PAD	LENGTH	WIDTH	HEIGHT	NO. SHMS	SHIM 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 1/4"	3	1/8" x 4 1/2" x 2'-3 3/4"	40' - 78'	75 KIPS	0.80"
C1	4 1/4"	20"	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 1/4"	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 ± 1/8 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.

APPROVED: _____ DIRECTOR, ENGINEERING DIVISION DATE: _____

BEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS ENGINEERING DIVISION

PREPARED: 1-14-05

REVIEWED: GFL 6-05

STANDARD SHEET BR-B102B

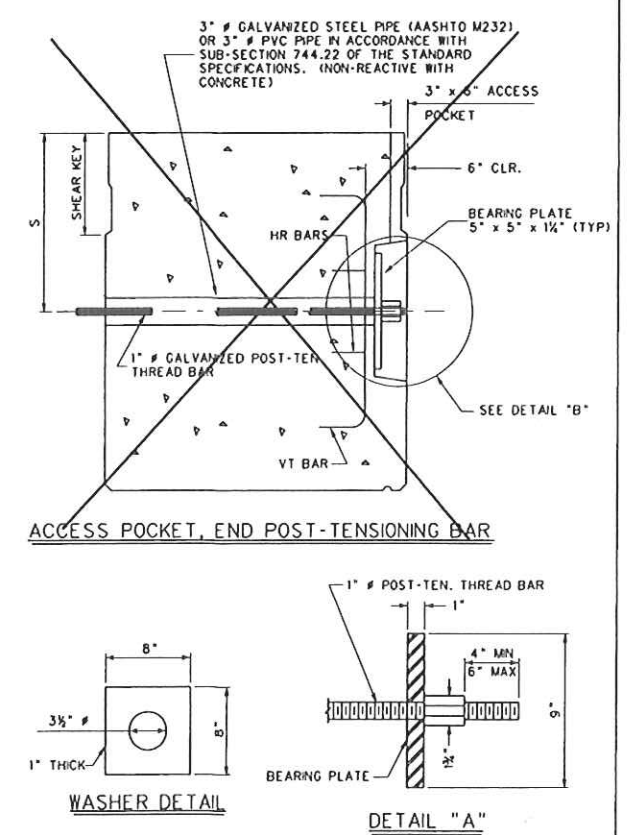
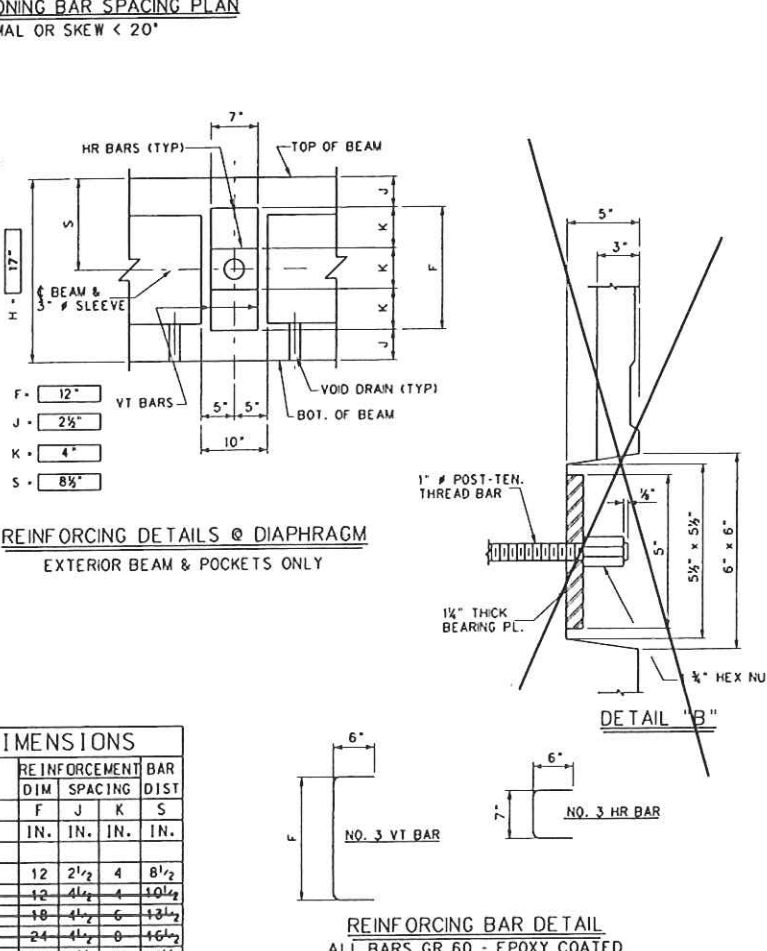
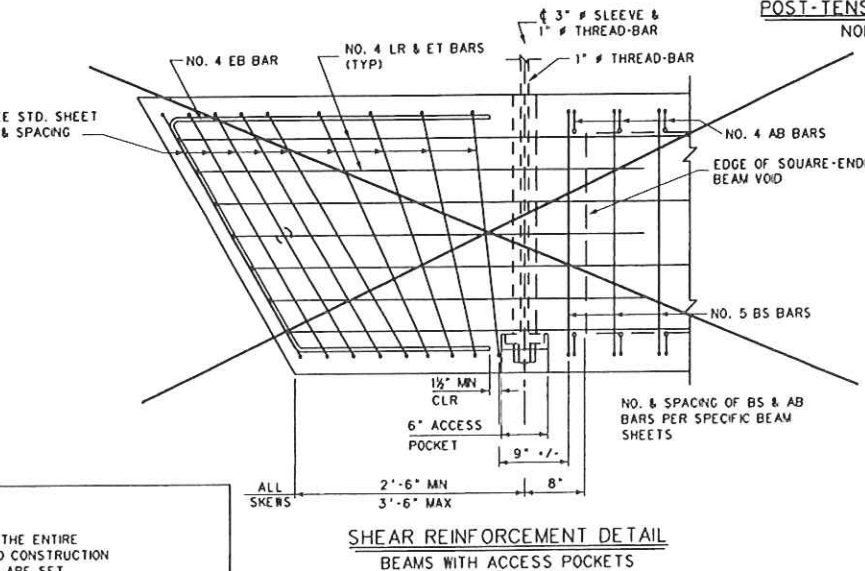
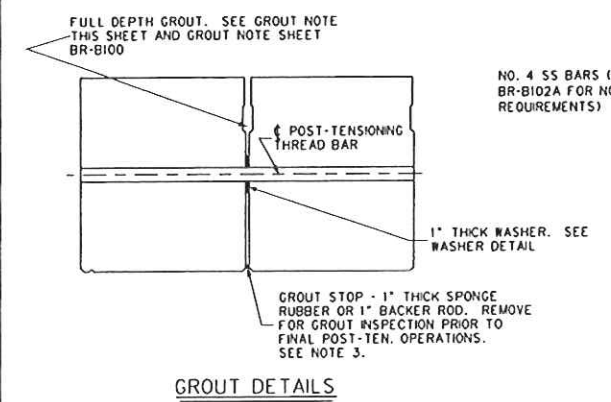
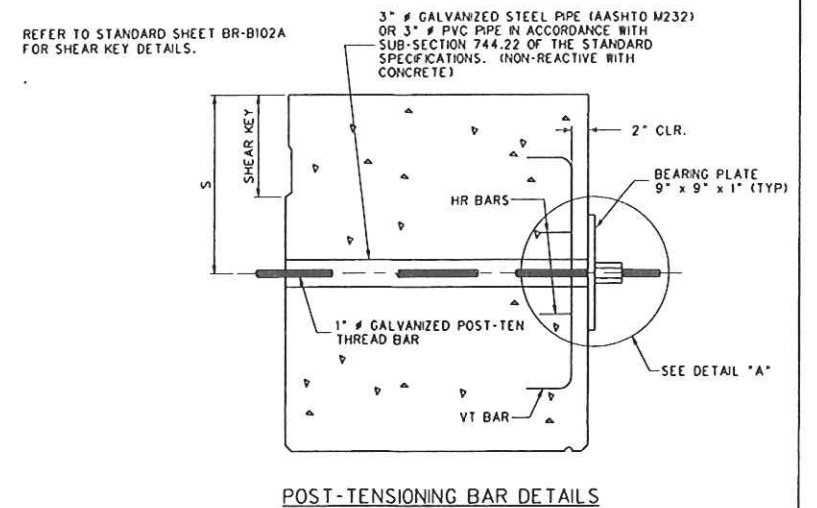
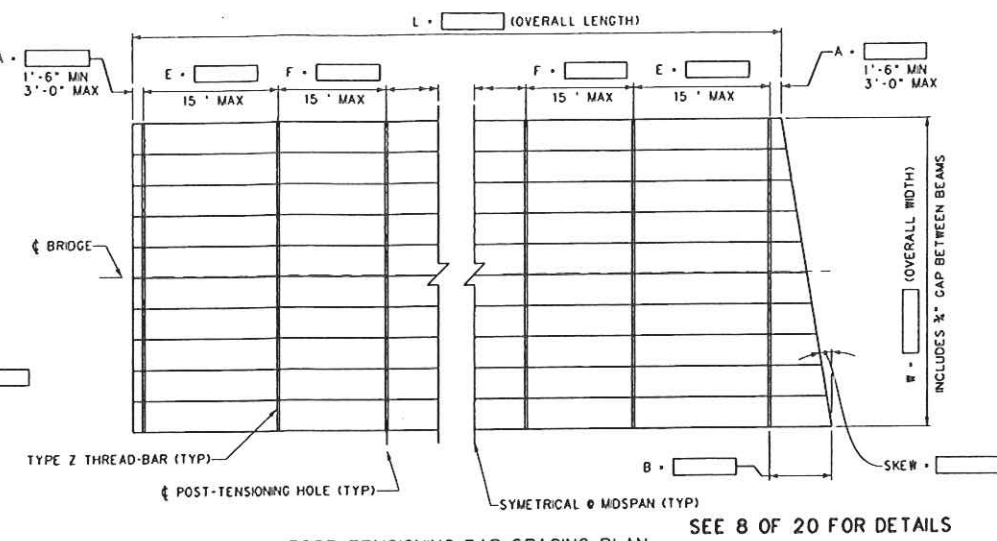
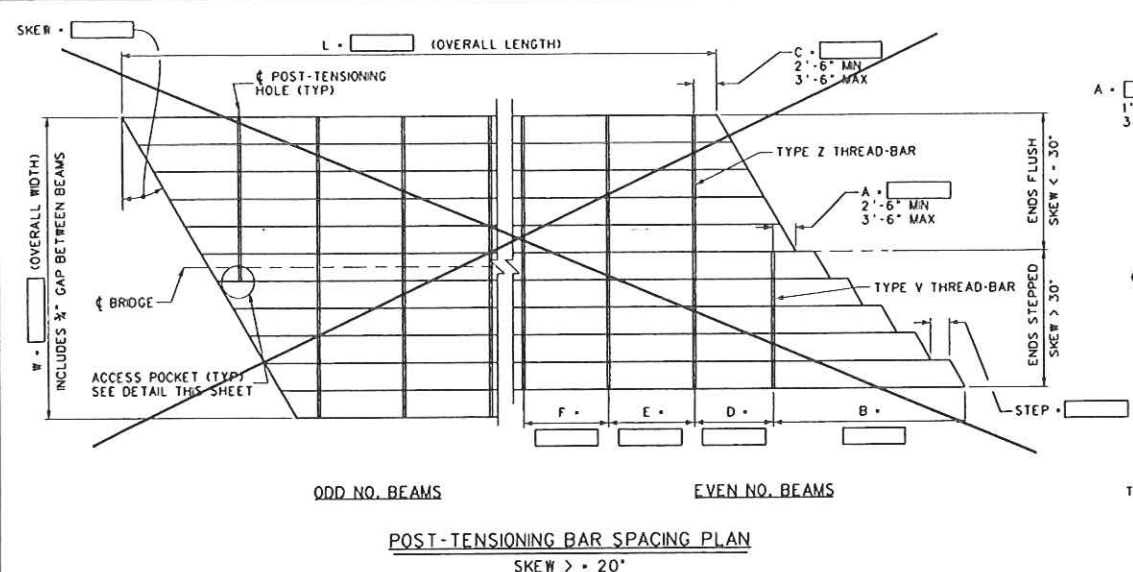
WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 ENGINEERING DIVISION

DESIGNED BY: THB/ MRM
 DRAWN BY: THB/ RMW
 CHECKED BY: TM/ GFL
 REVIEWED BY: WRW
 DATE: 6/12
 SCALE: NO SCALE
 SHEET NO 17 OF 20
 BRIDGE NUMBER 21-33/25-0.80 (11095)

CONSTRUCTION PLANS OF
 JOHN STREET CULVERT REPLACEMENT
 ON C.R. 33/25 (SLS)
 OVER SMITH RUN
 LEWIS COUNTY

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

STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS
S321-33/25-0.79	N/A	7	LEWIS	18	20



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 WVDOT 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			
F			
STEP			

SEE SHEET 8 OF 20 FOR DETAILS

DIMENSIONS

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

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	L/2	
Z	W/3	27' 0"
V-ODD	(L/2) + 6"	

ELONGATION (INCHES)

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

CALCULATED ⊗ - WFT. / 24.8
CALCULATED ⊕ - WFT. / 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

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

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

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

DESIGNED BY: THB/RMW
DRAWN BY: THB/RMW
CHECKED BY: TM/GFL
REVIEWED BY: WRW
DATE: 6/12
SCALE: NO SCALE
SHEET 18 OF 20
BRIDGE NUMBER 21-33/25-0.80 (11095)

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