



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

# Solicitation

NUMBER
08140235

PAGE
1

ADDRESS CORRESPONDENCE TO ATTENTION OF:
CRYSTAL RINK
304-558-2402

\*709042451      304-425-8955

VENDOR

EASTERN VAULT COMPANY INC  
 PO BOX 1134

PRINCETON WV 24740

SHIP TO

DIVISION OF HIGHWAYS  
 JOBSITE  
 SEE SPECIFICATIONS

DATE PRINTED
06/17/2014

BID OPENING DATE: 07/09/2014

BID OPENING TIME 1:30PM

LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
0001	2,325	SF		210-16		\$ 158,878.45
CONCRETE BEAMS, CHANNELS, PRESTRESSED						
REQUEST FOR QUOTATION (ONE-TIME PURCHASE)						
THE WEST VIRGINIA STATE PURCHASING DIVISION FOR THE AGENCY, THE WEST VIRGINIA DIVISION OF HIGHWAYS, IS SOLICITING BIDS TO ESTABLISH A CONTRACT FOR THE ONE-TIME PURCHASE OF PRESTRESSED CONCRETE BOX BEAMS WITH ACCESSORIES FOR THE SHIPMAN'S BRIDGE PROJECT PER THE ATTACHED SPECIFICATIONS.						
***** THIS IS THE END OF RFQ 08140235 ***** TOTAL:						\$ 158,878.45
06/30/14 09:46:40AM West Virginia Purchasing Division						

SIGNATURE <i>Brian P. Struble</i>	BRIAN P. STRUBLE	TELEPHONE 304-425-8955	DATE 6-27-14
TITLE V.P. & G.M.	FEIN 55-0520255	ADDRESS CHANGES TO BE NOTED ABOVE	

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

**INSTRUCTIONS TO VENDORS SUBMITTING BIDS**

1. **REVIEW DOCUMENTS THOROUGHLY:** The attached documents contain a solicitation for bids. Please read these instructions and all documents attached in their entirety. These instructions provide critical information about requirements that if overlooked could lead to disqualification of a Vendor's bid. All bids must be submitted in accordance with the provisions contained in these instructions and the Solicitation. Failure to do so may result in disqualification of Vendor's bid.
2. **MANDATORY TERMS:** The Solicitation may contain mandatory provisions identified by the use of the words "must," "will," and "shall." Failure to comply with a mandatory term in the Solicitation will result in bid disqualification.
3. **PREBID MEETING:** The item identified below shall apply to this Solicitation.
  - A pre-bid meeting will not be held prior to bid opening.
  - A **NON-MANDATORY PRE-BID** meeting will be held at the following place and time:
  
  - A **MANDATORY PRE-BID** meeting will be held at the following place and time:

All Vendors submitting a bid must attend the mandatory pre-bid meeting. Failure to attend the mandatory pre-bid meeting shall result in disqualification of the Vendor's bid. No one person attending the pre-bid meeting may represent more than one Vendor.

An attendance sheet provided at the pre-bid meeting shall serve as the official document verifying attendance. The State will not accept any other form of proof or documentation to verify attendance. Any person attending the pre-bid meeting on behalf of a Vendor must list on the attendance sheet his or her name and the name of the Vendor he or she is representing. Additionally, the person attending the pre-bid meeting should include the Vendor's E-Mail address, phone number, and Fax number on the attendance sheet. It is the Vendor's responsibility to locate the attendance sheet and provide the required information. Failure to complete the attendance sheet as required may result in disqualification of Vendor's bid.

All Vendors should arrive prior to the starting time for the pre-bid. Vendors who arrive after the starting time but prior to the end of the pre-bid will be permitted to sign in, but are charged with knowing all matters discussed at the pre-bid.

Questions submitted at least five business days prior to a scheduled pre-bid will be discussed at the pre-bid meeting if possible. Any discussions or answers to questions at the pre-bid meeting are preliminary in nature and are non-binding. Official and binding answers to questions will be published in a written addendum to the Solicitation prior to bid opening.

4. **VENDOR QUESTION DEADLINE:** Vendors may submit questions relating to this Solicitation to the Purchasing Division. Questions must be submitted in writing. All questions must be submitted on or before the date listed below and to the address listed below in order to be considered. A written response will be published in a Solicitation addendum if a response is possible and appropriate. Non-written discussions, conversations, or questions and answers regarding this Solicitation are preliminary in nature and are non-binding.

Question Submission Deadline: July 2, 2014 at 5:00 PM EST

Submit Questions to: Crystal Rink  
 2019 Washington Street, East  
 Charleston, WV 25305  
 Fax: (304) 558-4115  
*(Vendors should not use this fax number for bid submission)*  
 Email: crystal.g.rink@wv.gov

5. **VERBAL COMMUNICATION:** Any verbal communication between the Vendor and any State personnel is not binding, including that made at the mandatory pre-bid conference. Only information issued in writing and added to the Solicitation by an official written addendum by the Purchasing Division is binding.
6. **BID SUBMISSION:** All bids must be signed and delivered by the Vendor to the Purchasing Division at the address listed below on or before the date and time of the bid opening. Any bid received by the Purchasing Division staff is considered to be in the possession of the Purchasing Division and will not be returned for any reason. The Purchasing Division will not accept bids, modification of bids, or addendum acknowledgment forms via e-mail. Acceptable delivery methods include hand delivery, delivery by courier, or facsimile. The bid delivery address is:

Department of Administration, Purchasing Division  
 2019 Washington Street East  
 Charleston, WV 25305-0130

The bid should contain the information listed below on the face of the envelope or the bid may not be considered:

SEALED BID: \_\_\_\_\_  
 BUYER: \_\_\_\_\_  
 SOLICITATION NO.: \_\_\_\_\_  
 BID OPENING DATE: \_\_\_\_\_  
 BID OPENING TIME: \_\_\_\_\_  
 FAX NUMBER: \_\_\_\_\_

In the event that Vendor is responding to a request for proposal, the Vendor shall submit one original technical and one original cost proposal plus n/a convenience copies of each to the Purchasing Division at the address shown above. Additionally, the Vendor should identify the bid type as either a technical or cost proposal on the face of each bid envelope submitted in response to a request for proposal as follows:

BID TYPE:  Technical  
 Cost

7. **BID OPENING:** Bids submitted in response to this Solicitation will be opened at the location identified below on the date and time listed below. Delivery of a bid after the bid opening date and time will result in bid disqualification. For purposes of this Solicitation, a bid is considered delivered when time stamped by the official Purchasing Division time clock.

Bid Opening Date and Time: July 9, 2014 at 1:30 PM EST

Bid Opening Location: Department of Administration, Purchasing Division  
 2019 Washington Street East  
 Charleston, WV 25305-0130

8. **ADDENDUM ACKNOWLEDGEMENT:** Changes or revisions to this Solicitation will be made by an official written addendum issued by the Purchasing Division. Vendor should acknowledge receipt of all addenda issued with this Solicitation by completing an Addendum Acknowledgment Form, 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.

9. **BID FORMATTING:** Vendor should type or electronically enter the information onto its bid to prevent errors in the evaluation. Failure to type or electronically enter the information may result in bid disqualification.

**GENERAL TERMS AND CONDITIONS:**

1. **CONTRACTUAL AGREEMENT:** Issuance of a Purchase Order signed by the Purchasing Division Director, or his designee, and approved as to form by the Attorney General's office constitutes acceptance of this Contract made by and between the State of West Virginia and the Vendor. Vendor's signature on its bid signifies Vendor's agreement to be bound by and accept the terms and conditions contained in this Contract.
  
2. **DEFINITIONS:** As used in this Solicitation/Contract, the following terms shall have the meanings attributed to them below. Additional definitions may be found in the specifications included with this Solicitation/Contract.
  - 2.1 **"Agency" or "Agencies"** means the agency, board, commission, or other entity of the State of West Virginia that is identified on the first page of the Solicitation or any other public entity seeking to procure goods or services under this Contract.
  
  - 2.2 **"Contract"** means the binding agreement that is entered into between the State and the Vendor to provide the goods and services requested in the Solicitation.
  
  - 2.3 **"Director"** means the Director of the West Virginia Department of Administration, Purchasing Division.
  
  - 2.4 **"Purchasing Division"** means the West Virginia Department of Administration, Purchasing Division.
  
  - 2.5 **"Purchase Order"** means the document signed by the Agency and the Purchasing Division, and approved as to form by the Attorney General, that identifies the Vendor as the successful bidder and Contract holder.
  
  - 2.6 **"Solicitation"** means the official solicitation published by the Purchasing Division and identified by number on the first page thereof.
  
  - 2.7 **"State"** means the State of West Virginia and/or any of its agencies, commissions, boards, etc. as context requires.
  
  - 2.8 **"Vendor" or "Vendors"** means any entity submitting a bid in response to the Solicitation, the entity that has been selected as the lowest responsible bidder, or the entity that has been awarded the Contract as context requires.

3. **CONTRACT TERM; RENEWAL; EXTENSION:** The term of this Contract shall be determined in accordance with the category that has been identified as applicable to this Contract below:

**Term Contract**

**Initial Contract Term:** This Contract becomes effective on \_\_\_\_\_ and extends for a period of \_\_\_\_\_ year(s).

**Renewal Term:** This Contract may be renewed upon the mutual written consent of the Agency, and the Vendor, with approval of the Purchasing Division and the Attorney General's office (Attorney General approval is as to form only). Any request for renewal should be submitted to the Purchasing Division thirty (30) days prior to the expiration date of the initial contract term or appropriate renewal term. A Contract renewal shall be in accordance with the terms and conditions of the original contract. Renewal of this Contract is limited to \_\_\_\_\_ successive one (1) year periods or multiple renewal periods of less than one year, provided that the multiple renewal periods do not exceed \_\_\_\_\_ months in total. Automatic renewal of this Contract is prohibited. Notwithstanding the foregoing, Purchasing Division approval is not required on agency delegated or exempt purchases. Attorney General approval may be required for vendor terms and conditions.

**Release Order Limitations:** In the event that this contract permits release orders, a release order may only be issued during the time this Contract is in effect. Any release order issued within one year of the expiration of this Contract shall be effective for one year from the date the release order is issued. No release order may be extended beyond one year after this Contract has expired.

**Fixed Period Contract:** This Contract becomes effective upon Vendor's receipt of the notice to proceed and must be completed within \_\_\_\_\_ days.

**One Time Purchase:** The term of this Contract shall run from the issuance of the Purchase Order until all of the goods contracted for have been delivered, but in no event shall this Contract extend for more than one fiscal year.

**Other:** See attached.

4. **NOTICE TO PROCEED:** Vendor shall begin performance of this Contract immediately upon receiving notice to proceed unless otherwise instructed by the Agency. Unless otherwise specified, the fully executed Purchase Order will be considered notice to proceed

5. **QUANTITIES:** The quantities required under this Contract shall be determined in accordance with the category that has been identified as applicable to this Contract below.

**Open End Contract:** Quantities listed in this Solicitation are approximations only, based on estimates supplied by the Agency. It is understood and agreed that the Contract shall cover the quantities actually ordered for delivery during the term of the Contract, whether more or less than the quantities shown.

- Service:** The scope of the service to be provided will be more clearly defined in the specifications included herewith.
- Combined Service and Goods:** The scope of the service and deliverable goods to be provided will be more clearly defined in the specifications included herewith.
- One Time Purchase:** This Contract is for the purchase of a set quantity of goods that are identified in the specifications included herewith. Once those items have been delivered, no additional goods may be procured under this Contract without an appropriate change order approved by the Vendor, Agency, Purchasing Division, and Attorney General's office.

6. **PRICING:** The pricing set forth herein is firm for the life of the Contract, unless specified elsewhere within this Solicitation/Contract by the State. A Vendor's inclusion of price adjustment provisions in its bid, without an express authorization from the State in the Solicitation to do so, may result in bid disqualification.
7. **EMERGENCY PURCHASES:** The Purchasing Division Director may authorize the Agency to purchase goods or services in the open market that Vendor would otherwise provide under this Contract if those goods or services are for immediate or expedited delivery in an emergency. Emergencies shall include, but are not limited to, delays in transportation or an unanticipated increase in the volume of work. An emergency purchase in the open market, approved by the Purchasing Division Director, shall not constitute a breach of this Contract and shall not entitle the Vendor to any form of compensation or damages. This provision does not excuse the State from fulfilling its obligations under a One Time Purchase contract.
8. **REQUIRED DOCUMENTS:** All of the items checked below must be provided to the Purchasing Division by the Vendor as specified below.
- BID BOND:** All Vendors shall furnish a bid bond in the amount of five percent (5%) of the total amount of the bid protecting the State of West Virginia. The bid bond must be submitted with the bid.
- PERFORMANCE BOND:** The apparent successful Vendor shall provide a performance bond in the amount of . The performance bond must be issued and received by the Purchasing Division prior to Contract award. On construction contracts, the performance bond must be 100% of the Contract value.
- LABOR/MATERIAL PAYMENT BOND:** The apparent successful Vendor shall provide a labor/material payment bond in the amount of 100% of the Contract value. The labor/material payment bond must be issued and delivered to the Purchasing Division prior to Contract award.

In lieu of the Bid Bond, Performance Bond, and Labor/Material Payment Bond, the Vendor may provide certified checks, cashier's checks, or irrevocable letters of credit. Any certified check, cashier's check, or irrevocable letter of credit provided in lieu of a bond must be of the same amount and delivered on the same schedule as the bond it replaces. A letter of credit submitted in lieu of a

performance and labor/material payment bond will only be allowed for projects under \$100,000. Personal or business checks are not acceptable.

**MAINTENANCE BOND:** The apparent successful Vendor shall provide a two (2) year maintenance bond covering the roofing system. The maintenance bond must be issued and delivered to the Purchasing Division prior to Contract award.

**WORKERS' COMPENSATION INSURANCE:** The apparent successful Vendor shall have appropriate workers' compensation insurance and shall provide proof thereof upon request.

**INSURANCE:** The apparent successful Vendor shall furnish proof of the following insurance prior to Contract award and shall list the state as a certificate holder:

**Commercial General Liability Insurance:**  
or more.

**Builders Risk Insurance:** builders risk – all risk insurance in an amount equal to 100% of the amount of the Contract.

The apparent successful Vendor shall also furnish proof of any additional insurance requirements contained in the specifications prior to Contract award regardless of whether or not that insurance requirement is listed above.

**LICENSE(S) / CERTIFICATIONS / PERMITS:** In addition to anything required under the Section entitled Licensing, of the General Terms and Conditions, the apparent successful Vendor shall furnish proof of the following licenses, certifications, and/or permits prior to Contract award, in a form acceptable to the Purchasing Division.

The apparent successful Vendor shall also furnish proof of any additional licenses or certifications contained in the specifications prior to Contract award regardless of whether or not that requirement is listed above.

- 9. LITIGATION BOND:** The Director reserves the right to require any Vendor that files a protest of an award to submit a litigation bond in the amount equal to one percent of the lowest bid submitted or \$5,000, whichever is greater. The entire amount of the bond shall be forfeited if the hearing officer determines that the protest was filed for frivolous or improper purpose, including but not limited to, the purpose of harassing, causing unnecessary delay, or needless expense for the Agency. All litigation bonds shall be made payable to the Purchasing Division. In lieu of a bond, the protester may submit a cashier's check or certified check payable to the Purchasing Division. Cashier's or certified checks will be deposited with and held by the State Treasurer's office. If it is determined that the protest has not been filed for frivolous or improper purpose, the bond or deposit shall be returned in its entirety.
- 10. ALTERNATES:** Any model, brand, or specification listed herein establishes the acceptable level of quality only and is not intended to reflect a preference for, or in any way favor, a particular brand or vendor. Vendors may bid alternates to a listed model or brand provided that the alternate is at least equal to the model or brand and complies with the required specifications. The equality of any alternate being bid shall be determined by the State at its sole discretion. Any Vendor bidding an alternate model or brand should clearly identify the alternate items in its bid and should include manufacturer's specifications, industry literature, and/or any other relevant documentation demonstrating the equality of the alternate items. Failure to provide information for alternate items may be grounds for rejection of a Vendor's bid.
- 11. EXCEPTIONS AND CLARIFICATIONS:** The Solicitation contains the specifications that shall form the basis of a contractual agreement. Vendor shall clearly mark any exceptions, clarifications, or other proposed modifications in its bid. Exceptions to, clarifications of, or modifications of a requirement or term and condition of the Solicitation may result in bid disqualification.
- 12. LIQUIDATED DAMAGES:** Vendor shall pay liquidated damages in the amount  
Refer to Standard Specifications Section for failure to complete on time  
108.7
- This clause shall in no way be considered exclusive and shall not limit the State or Agency's right to pursue any other available remedy.
- 13. ACCEPTANCE/REJECTION:** The State may accept or reject any bid in whole, or in part. Vendor's signature on its bid signifies acceptance of the terms and conditions contained in the Solicitation and Vendor agrees to be bound by the terms of the Contract, as reflected in the Purchase Order, upon receipt.
- 14. REGISTRATION:** Prior to Contract award, the apparent successful Vendor must be properly registered with the West Virginia Purchasing Division and must have paid the \$125 fee if applicable.
- 15. COMMUNICATION LIMITATIONS:** In accordance with West Virginia Code of State Rules §148-1-6.6, communication with the State of West Virginia or any of its employees regarding this Solicitation

during the solicitation, bid, evaluation or award periods, except through the Purchasing Division, is strictly prohibited without prior Purchasing Division approval. Purchasing Division approval for such communication is implied for all agency delegated and exempt purchases.

16. **FUNDING:** This Contract shall continue for the term stated herein, contingent upon funds being appropriated by the Legislature or otherwise being made available. In the event funds are not appropriated or otherwise made available, this Contract becomes void and of no effect beginning on July 1 of the fiscal year for which funding has not been appropriated or otherwise made available.
17. **PAYMENT:** Payment in advance is prohibited under this Contract. Payment may only be made after the delivery and acceptance of goods or services. The Vendor shall submit invoices, in arrears, to the Agency at the address on the face of the purchase order labeled "Invoice To."
18. **UNIT PRICE:** Unit prices shall prevail in cases of a discrepancy in the Vendor's bid.
19. **DELIVERY:** All quotations are considered freight on board destination ("F.O.B. destination") unless alternate shipping terms are clearly identified in the bid. Vendor's listing of shipping terms that contradict the shipping terms expressly required by this Solicitation may result in bid disqualification.
20. **INTEREST:** Interest attributable to late payment will only be permitted if authorized by the West Virginia Code. Presently, there is no provision in the law for interest on late payments.
21. **PREFERENCE:** Vendor Preference may only be granted upon written request and only in accordance with the West Virginia Code § 5A-3-37 and the West Virginia Code of State Rules. A Resident Vendor Certification form has been attached hereto to allow Vendor to apply for the preference. Vendor's failure to submit the Resident Vendor Certification form with its bid will result in denial of Vendor Preference. Vendor Preference does not apply to construction projects.
22. **SMALL, WOMEN-OWNED, OR MINORITY-OWNED BUSINESSES:** For any solicitations publicly advertised for bid on or after July 1, 2012, in accordance with West Virginia Code §5A-3-37(a)(7) and W. Va. CSR § 148-22-9, any non-resident vendor certified as a small, women-owned, or minority-owned business under W. Va. CSR § 148-22-9 shall be provided the same preference made available to any resident vendor. Any non-resident small, women-owned, or minority-owned business must identify itself as such in writing, must submit that writing to the Purchasing Division with its bid, and must be properly certified under W. Va. CSR § 148-22-9 prior to submission of its bid to receive the preferences made available to resident vendors. Preference for a non-resident small, women-owned, or minority owned business shall be applied in accordance with W. Va. CSR § 148-22-9.
23. **TAXES:** The Vendor shall pay any applicable sales, use, personal property or any other taxes arising out of this Contract and the transactions contemplated thereby. The State of West Virginia is exempt from federal and state taxes and will not pay or reimburse such taxes.
24. **CANCELLATION:** The Purchasing Division Director reserves the right to cancel this Contract immediately upon written notice to the vendor if the materials or workmanship supplied do not conform to the specifications contained in the Contract.

The Purchasing Division Director may cancel any purchase or Contract upon 30 days written notice to the Vendor in accordance with West Virginia Code of State Rules § 148-1-7.16.2.

- 25. WAIVER OF MINOR IRREGULARITIES:** The Director reserves the right to waive minor irregularities in bids or specifications in accordance with West Virginia Code of State Rules § 148-1-4.6.
- 26. TIME:** Time is of the essence with regard to all matters of time and performance in this Contract.
- 27. APPLICABLE LAW:** This Contract is governed by and interpreted under West Virginia law without giving effect to its choice of law principles. Any information provided in specification manuals, or any other source, verbal or written, which contradicts or violates the West Virginia Constitution, West Virginia Code or West Virginia Code of State Rules is void and of no effect.
- 28. COMPLIANCE:** Vendor shall comply with all applicable federal, state, and local laws, regulations and ordinances. By submitting a bid, Vendors acknowledge that they have reviewed, understand, and will comply with all applicable law.
- 29. PREVAILING WAGE:** On any contract for the construction of a public improvement, Vendor and any subcontractors utilized by Vendor shall pay a rate or rates of wages which shall not be less than the fair minimum rate or rates of wages (prevailing wage), as established by the West Virginia Division of Labor under West Virginia Code §§ 21-5A-1 et seq. and available at <http://www.sos.wv.gov/administrative-law/wagerates/Pages/default.aspx>. Vendor shall be responsible for ensuring compliance with prevailing wage requirements and determining when prevailing wage requirements are applicable. The required contract provisions contained in West Virginia Code of State Rules § 42-7-3 are specifically incorporated herein by reference.
- 30. ARBITRATION:** Any references made to arbitration contained in this Contract, Vendor's bid, or in any American Institute of Architects documents pertaining to this Contract are hereby deleted, void, and of no effect.
- 31. MODIFICATIONS:** This writing is the parties' final expression of intent. Notwithstanding anything contained in this Contract to the contrary, no modification of this Contract shall be binding without mutual written consent of the Agency, and the Vendor, with approval of the Purchasing Division and the Attorney General's office (Attorney General approval is as to form only). **No Change shall be implemented by the Vendor until such time as the Vendor receives an approved written change order from the Purchasing Division.**
- 32. WAIVER:** The failure of either party to insist upon a strict performance of any of the terms or provision of this Contract, or to exercise any option, right, or remedy herein contained, shall not be construed as a waiver or a relinquishment for the future of such term, provision, option, right, or remedy, but the same shall continue in full force and effect. Any waiver must be expressly stated in writing and signed by the waiving party.
- 33. SUBSEQUENT FORMS:** The terms and conditions contained in this Contract shall supersede any and all subsequent terms and conditions which may appear on any form documents submitted by Vendor to the Agency or Purchasing Division such as price lists, order forms, invoices, sales agreements, or

maintenance agreements, and includes internet websites or other electronic documents. Acceptance or use of Vendor's forms does not constitute acceptance of the terms and conditions contained thereon.

- 34. ASSIGNMENT:** Neither this Contract nor any monies due, or to become due hereunder, may be assigned by the Vendor without the express written consent of the Agency, the Purchasing Division, the Attorney General's office (as to form only), and any other government agency or office that may be required to approve such assignments. Notwithstanding the foregoing, Purchasing Division approval may or may not be required on certain agency delegated or exempt purchases.
- 35. WARRANTY:** The Vendor expressly warrants that the goods and/or services covered by this Contract will: (a) conform to the specifications, drawings, samples, or other description furnished or specified by the Agency; (b) be merchantable and fit for the purpose intended; and (c) be free from defect in material and workmanship.
- 36. STATE EMPLOYEES:** State employees are not permitted to utilize this Contract for personal use and the Vendor is prohibited from permitting or facilitating the same.
- 37. BANKRUPTCY:** In the event the Vendor files for bankruptcy protection, the State of West Virginia may deem this Contract null and void, and terminate this Contract without notice.
- 38. [RESERVED]**
- 39. CONFIDENTIALITY:** The Vendor agrees that it will not disclose to anyone, directly or indirectly, any such personally identifiable information or other confidential information gained from the Agency, unless the individual who is the subject of the information consents to the disclosure in writing or the disclosure is made pursuant to the Agency's policies, procedures, and rules. Vendor further agrees to comply with the Confidentiality Policies and Information Security Accountability Requirements, set forth in <http://www.state.wv.us/admin/purchase/privacy/default.html>.
- 40. DISCLOSURE:** Vendor's response to the Solicitation and the resulting Contract are considered public documents and will be disclosed to the public in accordance with the laws, rules, and policies governing the West Virginia Purchasing Division. Those laws include, but are not limited to, the Freedom of Information Act found in West Virginia Code § 29B-1-1 et seq.

If a Vendor considers any part of its bid to be exempt from public disclosure, Vendor must so indicate by specifically identifying the exempt information, identifying the exemption that applies, providing a detailed justification for the exemption, segregating the exempt information from the general bid information, and submitting the exempt information as part of its bid but in a segregated and clearly identifiable format. Failure to comply with the foregoing requirements will result in public disclosure of the Vendor's bid without further notice. A Vendor's act of marking all or nearly all of its bid as exempt is not sufficient to avoid disclosure and WILL NOT BE HONORED. Vendor's act of marking a bid or any part thereof as "confidential" or "proprietary" is not sufficient to avoid disclosure and WILL NOT BE HONORED. In addition, a legend or other statement indicating that all or substantially all of the bid is exempt from disclosure is not sufficient to avoid disclosure and WILL NOT BE HONORED.

Vendor will be required to defend any claimed exemption for nondisclosure in the event of an administrative or judicial challenge to the State's nondisclosure. Vendor must indemnify the State for any costs incurred related to any exemptions claimed by Vendor. Any questions regarding the applicability of the various public records laws should be addressed to your own legal counsel prior to bid submission.

- 41. LICENSING:** In accordance with West Virginia Code of State Rules §148-1-6.1.7, Vendor must be licensed and in good standing in accordance with any and all state and local laws and requirements by any state or local agency of West Virginia, including, but not limited to, the West Virginia Secretary of State's Office, the West Virginia Tax Department, West Virginia Insurance Commission, or any other state agency or political subdivision. Upon request, the Vendor must provide all necessary releases to obtain information to enable the Purchasing Division Director or the Agency to verify that the Vendor is licensed and in good standing with the above entities.
- 42. ANTITRUST:** In submitting a bid to, signing a contract with, or accepting a Purchase Order from any agency of the State of West Virginia, the Vendor agrees to convey, sell, assign, or transfer to the State of West Virginia all rights, title, and interest in and to all causes of action it may now or hereafter acquire under the antitrust laws of the United States and the State of West Virginia for price fixing and/or unreasonable restraints of trade relating to the particular commodities or services purchased or acquired by the State of West Virginia. Such assignment shall be made and become effective at the time the purchasing agency tenders the initial payment to Vendor.
- 43. VENDOR CERTIFICATIONS:** By signing its bid or entering into this Contract, Vendor certifies (1) that its bid was made without prior understanding, agreement, or connection with any corporation, firm, limited liability company, partnership, person or entity submitting a bid for the same material, supplies, equipment or services; (2) that its bid is in all respects fair and without collusion or fraud; (3) that this Contract is accepted or entered into without any prior understanding, agreement, or connection to any other entity that could be considered a violation of law; and (4) that it has reviewed this RFQ in its entirety, understands the requirements, terms and conditions, and other information contained herein. Vendor's signature on its bid also affirms that neither it nor its representatives have any interest, nor shall acquire any interest, direct or indirect, which would compromise the performance of its services hereunder. Any such interests shall be promptly presented in detail to the Agency.

The individual signing this bid on behalf of Vendor certifies that he or she is authorized by the Vendor to execute this bid or any documents related thereto on Vendor's behalf; that he or she is authorized to bind the Vendor in a contractual relationship; and that, to the best of his or her knowledge, the Vendor has properly registered with any State agency that may require registration.

- 44. PURCHASING CARD ACCEPTANCE:** The State of West Virginia currently utilizes a Purchasing Card program, administered under contract by a banking institution, to process payment for goods and services. The Vendor must accept the State of West Virginia's Purchasing Card for payment of all orders under this Contract unless the box below is checked.



Vendor is not required to accept the State of West Virginia's Purchasing Card as payment for all goods and services.

**45. VENDOR RELATIONSHIP:** The relationship of the Vendor to the State shall be that of an independent contractor and no principal-agent relationship or employer-employee relationship is contemplated or created by this Contract. The Vendor as an independent contractor is solely liable for the acts and omissions of its employees and agents. Vendor shall be responsible for selecting, supervising, and compensating any and all individuals employed pursuant to the terms of this Solicitation and resulting contract. Neither the Vendor, nor any employees or subcontractors of the Vendor, shall be deemed to be employees of the State for any purpose whatsoever. Vendor shall be exclusively responsible for payment of employees and contractors for all wages and salaries, taxes, withholding payments, penalties, fees, fringe benefits, professional liability insurance premiums, contributions to insurance and pension, or other deferred compensation plans, including but not limited to, Workers' Compensation and Social Security obligations, licensing fees, *etc.* and the filing of all necessary documents, forms, and returns pertinent to all of the foregoing. Vendor shall hold harmless the State, and shall provide the State and Agency with a defense against any and all claims including, but not limited to, the foregoing payments, withholdings, contributions, taxes, Social Security taxes, and employer income tax returns.

**46. INDEMNIFICATION:** The Vendor agrees to indemnify, defend, and hold harmless the State and the Agency, their officers, and employees from and against: (1) Any claims or losses for services rendered by any subcontractor, person, or firm performing or supplying services, materials, or supplies in connection with the performance of the Contract; (2) Any claims or losses resulting to any person or entity injured or damaged by the Vendor, its officers, employees, or subcontractors by the publication, translation, reproduction, delivery, performance, use, or disposition of any data used under the Contract in a manner not authorized by the Contract, or by Federal or State statutes or regulations; and (3) Any failure of the Vendor, its officers, employees, or subcontractors to observe State and Federal laws including, but not limited to, labor and wage and hour laws.

**47. PURCHASING AFFIDAVIT:** In accordance with West Virginia Code § 5A-3-10a, all Vendors are required to sign, notarize, and submit the Purchasing Affidavit stating that neither the Vendor nor a related party owe a debt to the State in excess of \$1,000. The affidavit must be submitted prior to award, but should be submitted with the Vendor's bid. A copy of the Purchasing Affidavit is included herewith.

**48. ADDITIONAL AGENCY AND LOCAL GOVERNMENT USE:** This Contract may be utilized by and extends to other agencies, spending units, and political subdivisions of the State of West Virginia; county, municipal, and other local government bodies; and school districts ("Other Government Entities"). This Contract shall be extended to the aforementioned Other Government Entities on the same prices, terms, and conditions as those offered and agreed to in this Contract. If the Vendor does not wish to extend the prices, terms, and conditions of its bid and subsequent contract to the Other Government Entities, the Vendor must clearly indicate such refusal in its bid. A refusal to extend this Contract to the Other Government Entities shall not impact or influence the award of this Contract in any manner.

**49. CONFLICT OF INTEREST:** Vendor, its officers or members or employees, shall not presently have or acquire any interest, direct or indirect, which would conflict with or compromise the performance of its obligations hereunder.

Vendor shall periodically inquire of its officers, members and employees to ensure that a conflict of interest does not arise. Any conflict of interest discovered shall be promptly presented in detail to the Agency.

**50. REPORTS:** Vendor shall provide the Agency and/or the Purchasing Division with the following reports identified by a checked box below:

- Such reports as the Agency and/or the Purchasing Division may request. Requested reports may include, but are not limited to, quantities purchased, agencies utilizing the contract, total contract expenditures by agency, etc.
- Quarterly reports detailing the total quantity of purchases in units and dollars, along with a listing of purchases by agency. Quarterly reports should be delivered to the Purchasing Division via email at [purchasing.requisitions@wv.gov](mailto:purchasing.requisitions@wv.gov).

**51. BACKGROUND CHECK:** In accordance with W. Va. Code § 15-2D-3, the Director of the Division of Protective Services shall require any service provider whose employees are regularly employed on the grounds or in the buildings of the Capitol complex or who have access to sensitive or critical information to submit to a fingerprint-based state and federal background inquiry through the state repository. The service provider is responsible for any costs associated with the fingerprint-based state and federal background inquiry.

After the contract for such services has been approved, but before any such employees are permitted to be on the grounds or in the buildings of the Capitol complex or have access to sensitive or critical information, the service provider shall submit a list of all persons who will be physically present and working at the Capitol complex to the Director of the Division of Protective Services for purposes of verifying compliance with this provision.

The State reserves the right to prohibit a service provider's employees from accessing sensitive or critical information or to be present at the Capitol complex based upon results addressed from a criminal background check.

Service providers should contact the West Virginia Division of Protective Services by phone at (304) 558-9911 for more information.

**52. PREFERENCE FOR USE OF DOMESTIC STEEL PRODUCTS:** Except when authorized by the Director of the Purchasing Division pursuant to W. Va. Code § 5A-3-56, no contractor may use or supply steel products for a State Contract Project other than those steel products made in the United States. A contractor who uses steel products in violation of this section may be subject to civil penalties pursuant to W. Va. Code § 5A-3-56. As used in this section:

- a. "State Contract Project" means any erection or construction of, or any addition to, alteration of or other improvement to any building or structure, including, but not limited to, roads or highways, or the installation of any heating or cooling or ventilating plants or other equipment, or the supply of and materials for such projects, pursuant to a contract with the State of West Virginia for which bids were solicited on or after June 6, 2001.

- b. "Steel Products" means products rolled, formed, shaped, drawn, extruded, forged, cast, fabricated or otherwise similarly processed, or processed by a combination of two or more or such operations, from steel made by the open hearth, basic oxygen, electric furnace, Bessemer or other steel making process.

The Purchasing Division Director may, in writing, authorize the use of foreign steel products if:

- a. The cost for each contract item used does not exceed one tenth of one percent (.1%) of the total contract cost or two thousand five hundred dollars (\$2,500.00), whichever is greater. For the purposes of this section, the cost is the value of the steel product as delivered to the project; or
- b. The Director of the Purchasing Division determines that specified steel materials are not produced in the United States in sufficient quantity or otherwise are not reasonably available to meet contract requirements.

**53. PREFERENCE FOR USE OF DOMESTIC ALUMINUM, GLASS, AND STEEL:** In Accordance with W. Va. Code § 5-19-1 et seq., and W. Va. CSR § 148-10-1 et seq., for every contract or subcontract, subject to the limitations contained herein, for the construction, reconstruction, alteration, repair, improvement or maintenance of public works or for the purchase of any item of machinery or equipment to be used at sites of public works, only domestic aluminum, glass or steel products shall be supplied unless the spending officer determines, in writing, after the receipt of offers or bids, (1) that the cost of domestic aluminum, glass or steel products is unreasonable or inconsistent with the public interest of the State of West Virginia, (2) that domestic aluminum, glass or steel products are not produced in sufficient quantities to meet the contract requirements, or (3) the available domestic aluminum, glass, or steel do not meet the contract specifications. This provision only applies to public works contracts awarded in an amount more than fifty thousand dollars (\$50,000) or public works contracts that require more than ten thousand pounds of steel products.

The cost of domestic aluminum, glass, or steel products may be unreasonable if the cost is more than twenty percent (20%) of the bid or offered price for foreign made aluminum, glass, or steel products. If the domestic aluminum, glass or steel products to be supplied or produced in a "substantial labor surplus area", as defined by the United States Department of Labor, the cost of domestic aluminum, glass, or steel products may be unreasonable if the cost is more than thirty percent (30%) of the bid or offered price for foreign made aluminum, glass, or steel products.

This preference shall be applied to an item of machinery or equipment, as indicated above, when the item is a single unit of equipment or machinery manufactured primarily of aluminum, glass or steel, is part of a public works contract and has the sole purpose or of being a permanent part of a single public works project. This provision does not apply to equipment or machinery purchased by a spending unit for use by that spending unit and not as part of a single public works project.

All bids and offers including domestic aluminum, glass or steel products that exceed bid or offer prices including foreign aluminum, glass or steel products after application of the preferences provided in this provision may be reduced to a price equal to or lower than the lowest bid or offer price for foreign aluminum, glass or steel products plus the applicable preference.

If the reduced bid or offer prices are made in writing and supersede the prior bid or offer prices, all bids or offers, including the reduced bid or offer prices, will be reevaluated in accordance with this rule.

**CERTIFICATION AND SIGNATURE PAGE**

By signing below, I certify that I have reviewed this Solicitation in its entirety, understand the requirements, terms and conditions, and other information contained herein; that I am submitting this bid or proposal for review and consideration; that I am authorized by the bidder to execute this bid or any documents related thereto on bidder's behalf; that I am authorized to bind the bidder in a contractual relationship; and that to the best of my knowledge, the bidder has properly registered with any State agency that may require registration.

EASTERN VAULT Co., INC.

(Company)

B. P. Struble

(Authorized Signature)

BRIAN P. STRUBLE, VP & GM

(Representative Name, Title)

304-425-8158

304-425-9171

(Phone Number)

(Fax Number)

6-27-14

(Date)

**ADDENDUM ACKNOWLEDGEMENT FORM**  
**SOLICITATION NO.: 08140235**

**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.

EASTERN VAULT CO., INC.

\_\_\_\_\_  
Company



\_\_\_\_\_  
BRIAN P. STAUBLE  
Authorized Signature

JUNE 27, 2014

\_\_\_\_\_  
Date

NOTE: This addendum acknowledgment should be submitted with the bid to expedite document processing.

REQUEST FOR QUOTATION  
RFQ 08140235  
Prestressed Concrete Box Beams and Accessories

---

20

SPECIFICATIONS

1. **PURPOSE AND SCOPE:** The West Virginia Purchasing Division is soliciting bids on behalf of West Virginia Division of Highways to establish a contract for the one time purchase of ten (10) - prestressed concrete box beams with accessories for Project S342-37/8-15.66, Shipman's Bridge.
2. **DEFINITIONS:** The terms listed below shall have the meanings assigned to them below. Additional definitions can be found in section 2 of the General Terms and Conditions.
  - 2.1 **"Contract Item"** means prestressed concrete box beams with accessories as described in the pricing page and as detailed in the attached sheets.
  - 2.2 **"Pricing Page"** means the pages upon which Vendor should list its proposed price for the Contract Items in the manner requested. The Pricing Page is either included on the last page of this RFQ or attached hereto as Exhibit A.
  - 2.3 **"RFQ"** means the official request for quotation published by the Purchasing Division and identified as RFQ 08140235.
3. **GENERAL REQUIREMENTS:**
  - 3.1 **Mandatory Contract Item Requirements:** Contract Item must meet or exceed the mandatory requirements listed below.
    - 3.1.1 **Prestressed Concrete Box Beams with accessories.**
      - 3.1.1.1 Prestressed Concrete Box Beams must be in accordance with the West Virginia Division of Highways Standard Specifications Roads and Bridges, adopted 2010 and the current Supplemental Specifications and the attached control prints.  
[www.transportation.wv.gov/highways/engineering/Pages/publications/asp](http://www.transportation.wv.gov/highways/engineering/Pages/publications/asp)

REQUEST FOR QUOTATION  
RFQ 08140235  
Prestressed Concrete Box Beams and Accessories

---

**4. CONTRACT AWARD:**

**4.1 Contract Award:** The Contract is intended to provide Agencies with a purchase price for the Contract Items. The Contract shall be awarded to the Vendor that provides the Contract Items meeting the required specifications for the lowest overall total cost as shown on the Pricing Pages.

**4.2 Pricing Page:** Vendor should complete the pricing page by providing the unit price for each item in the pricing page. The total is the product of the quantity and the unit price for an item. The grand total is the sum of the total column in the pricing page. Vendor should complete the Pricing Page in full as failure to complete the Pricing Page in its entirety may result in Vendor's bid being disqualified.

Vendor should type or electronically enter the information into the Pricing Page to prevent errors in the evaluation.

**5. PAYMENT:**

**5.1 Payment:** Vendor shall accept payment in accordance with the payment procedures of the State of West Virginia.

**6. DELIVERY AND RETURN:**

**6.1 Shipment and Delivery:** Vendor shall coordinate with the District 8 Bridge Engineer (phone number 304-637-0220) the date and sequence of delivery for the contract items. The project will require a one-day, mid-morning delivery of all beams to the project site. Contract Items must be available for delivery within 60 days of receiving approved shop drawings. Shop drawings must be submitted 14 days of being awarded. Contract items must be delivered to Agency at job site on CR 37/8, near Mabie, WV. Delivery is an integral part of this purchase order and failure to comply will be cause to initiate a WV-82, Vendor Performance Form. This form will officially notify the West Virginia Division of Purchasing and Vendor of unsatisfactory performance in the execution of this purchase order and the requirements herein.

**6.2 Late Delivery:** The Agency placing the order under this Contract must be notified in writing if the shipment of the Contract Items will be delayed for any reason. Any delay in delivery that could cause harm to an Agency will be grounds for cancellation of the Contract, and/or obtaining the Contract Items from a third party.

REQUEST FOR QUOTATION  
RFQ 08140235  
Prestressed Concrete Box Beams and Accessories

---

22

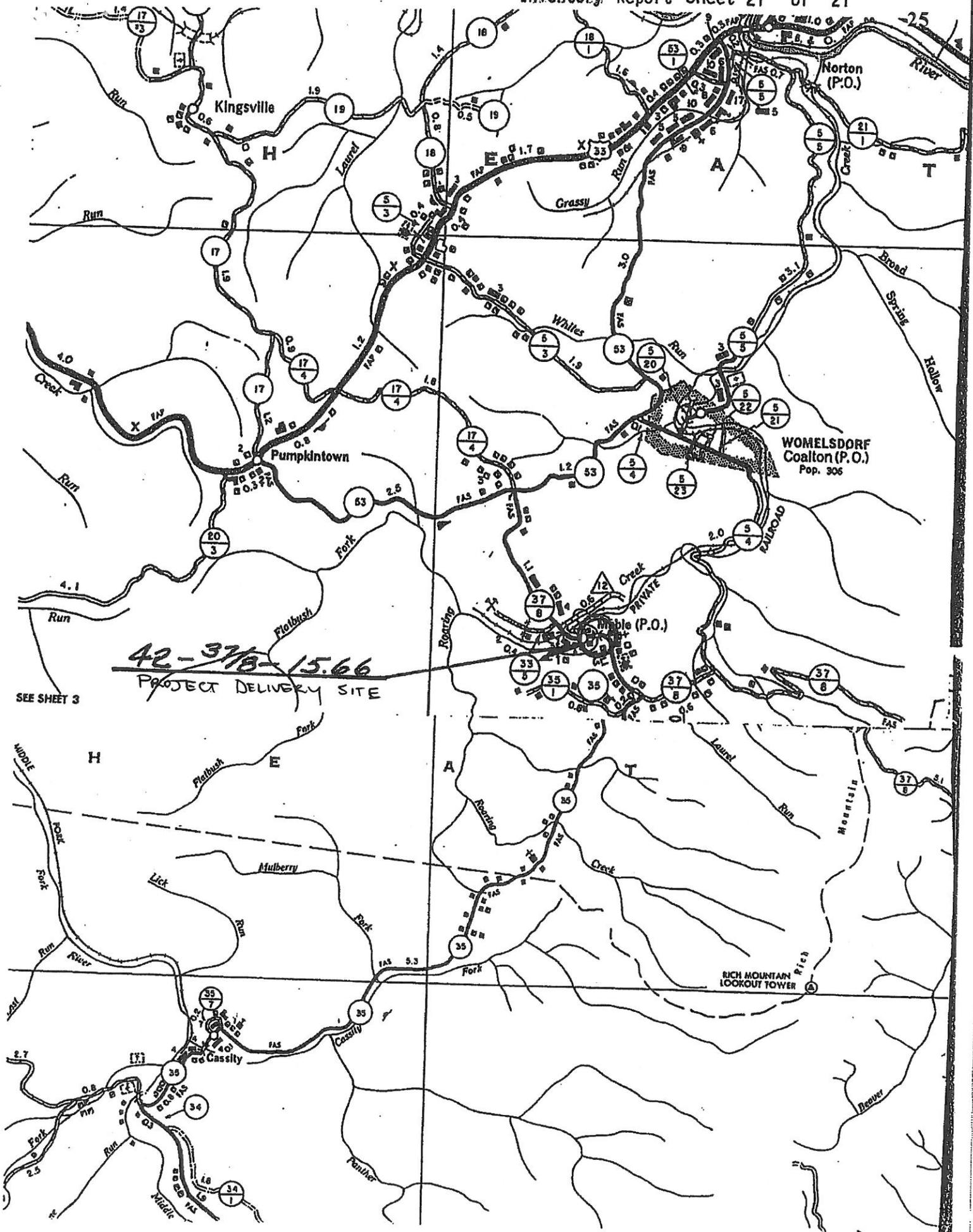
Any Agency seeking to obtain the Contract Items from a third party under this provision must first obtain approval of the Purchasing Division.

- 6.3 Delivery Payment/Risk of Loss:** Vendor shall deliver the Contract Items F.O.B. destination to the Agency's location.
- 6.4 Return of Unacceptable Items:** If the Agency deems the Contract Items to be unacceptable, the Contract Items shall be returned to Vendor at Vendor's expense and with no restocking charge. Vendor shall either make arrangements for the return within five (5) days of being notified that items are unacceptable, or permit the Agency to arrange for the return and reimburse Agency for delivery expenses. If the original packaging cannot be utilized for the return, Vendor will supply the Agency with appropriate return packaging upon request. All returns of unacceptable items shall be F.O.B. the Agency's location. The returned product shall either be replaced, or the Agency shall receive a full credit or refund for the purchase price, at the Agency's discretion.
- 6.5 Return Due to Agency Error:** Items ordered in error by the Agency will be returned for credit within 30 days of receipt, F.O.B. Vendor's location. Vendor shall not charge a restocking fee if returned products are in a resalable condition. Items shall be deemed to be in a resalable condition if they are unused and in the original packaging. Any restocking fee for items not in a resalable condition shall be the lower of the Vendor's customary restocking fee or 5% of the total invoiced value of the returned items.

Pricing Page					
RFQ #08140235					
Item Number	Quantity	Unit of Measure	Description	Unit Cost	Total
1	1860	SF	Interior Beam Section; 39" Prestressed Concrete Box Beams (3 Ft. Wide) 8 Beams x 77'-6" Overall Length	\$35.00	\$ 65,100.00 -
2	465	SF	Exterior Beam Section; 39" Prestressed Concrete Box Beams (3 Ft. Wide) 2 Beams x 77'-6" Overall Length	\$58.85	\$ 27,365.25 -
3	18	EA	1 13/16" Elastomeric Laminated Bearing Pads (60 Duro Hardness) 18-B1 Pad (4 3/4" x 28")	\$300.00	\$ 5,400.00 -
4	4	EA	1 13/16" Elastomeric Laminated Bearing Pads (60 Duro Hardness) 4-B2 Pad (4 3/4" x 15 1/2")	\$250.00	\$ 1,000.00 -
5	20	EA	1" Diameter x 2'-0" Swedged Anchor Bolt or No. 8 Deformed Reinforcing Bar (Grade 60) Galvanized	\$20.00	\$ 400.00 -
6	38.53	SF	2" Thick Sponge Rubber Preformed Joint Filler 61.46 LF @ 6.5" Wide = 33.29 SF, 13.96 LF @ 4.5" Wide = 5.24 SF	\$20.00	\$ 770.60 -
7	199.88	SF	1" Thick Sponge Rubber Preformed Joint Filler 61.5 LF @ 39" Wide	\$20.00	\$ 3,997.60 -
8	26	EA	Guardrail Attachment Assembly for box beam w/ studs, nuts, and washers.	\$500.00	\$ 13,000.00 -
9	173	LF	Type TL-2 Bridge Guardrail System	\$200.00	\$ 34,600.00 -

10	201.5	LF	1" Diameter Post-Tensioning Thread Bars w/ Nuts 6 Bars @ 33'-7"	\$ 30.00	\$ 6,045.00 -
11	12	EA	Bearing Plate 9" x 9" x 1"	\$ 100.00	\$ 1,200.00 -
<b>Grand Total</b>					\$ 158,878.45 -

Items for Project S342-37/8-15.66, Shipman's Bridge



42-3718-15.66  
PROJECT DELIVERY SITE

SEE SHEET 3

RICH MOUNTAIN  
LOOKOUT TOWER



DESIGN DATA FOR 39" DEPTH ADJACENT BOX BEAM

SPAN LENGTH $\ell$ TO $\ell$ BEARING	60'-0"	62'-0"	64'-0"	66'-0"	68'-0"	70'-0"	72'-0"	74'-0"	76'-0"	78'-0"	80'-0"
OVERALL LENGTH OF BEAM	61'-6"	63'-6"	65'-6"	67'-6"	69'-6"	71'-6"	73'-6"	75'-6"	77'-6"	79'-6"	81'-6"
NO. OF 270 KSI, 1/2" $\phi$ LOW-RELAXATION STRANDS, AREA/STRAND - 0.167 SQ. IN.	14	14	16	16	16	16	18	18	20	20	20
STRAND POSITION NUMBER	ROW 1	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	1,2,5,6,9,10,13,14	1,2,5,6,9,10,13,14	1,2,3,4,7,8,11,12,13,14	1,2,3,4,7,8,11,12,13,14	1,2,3,4,7,8,11,12,13,14
	ROW 2	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	15,16,21,22,27,28	15,16,21,22,27,28	15,16,19,20,23,24,27,28	15,16,19,20,23,24,27,28	15,16,19,20,23,24,27,28
	ROW 3										
	ROW 4	33,34	33,34	33,34	33,34	33,34	33,34	33,34	33,34	33,34	33,34
PRESTRESSING FORCE IMMEDIATELY AFTER STRAND RELEASE, Ppl, (KIPS/BEAM)	489	489	522	522	525	525	585	585	646	646	649
EFFECTIVE PRESTRESSING FORCE AFTER ALL LOSSES, Ppe, (KIPS/BEAM)	447	446	471	472	475	475	527	526	578	580	582
REQUIRED FACTORED MOMENT $\phi$ STRENGTH I, Mu (FT-KIPS/BEAM)	1215	1287	1389	1432	1506	1582	1880	1729	1828	1911	1985
FACTORED FLEXURAL RESISTANCE, $\phi$ M (FT-KIPS/BEAM)	1549	1549	1782	1782	1782	1782	2015	2015	2249	2249	2249
TOTAL NO. DEBONDED STRANDS									2	2	2
DEBONDED STRAND POSITION NUMBER & SHIELDING LENGTH FROM EACH END	ROW 1								7,8 @ 5'-0" EA. END	7,8 @ 5'-0" EA. END	7,8 @ 5'-0" EA. END
	ROW 2										
NUMBER & LENGTH #4 ET TOP TENSION BARS @ EACH END	3 - 34 x 7'-8"	3 - 34 x 7'-8"	3 - 34 x 8'-0"	3 - 34 x 8'-0"	3 - 34 x 8'-0"	3 - 34 x 8'-0"	3 - 34 x 8'-0"	3 - 34 x 8'-0"	3 - 34 x 9'-0"	3 - 34 x 9'-0"	3 - 34 x 9'-0"
NUMBER & LENGTH #5 BT BOTTOM TENSION BARS @ EACH END	4 - 38 x 8'-0"	4 - 38 x 8'-0"	4 - 38 x 8'-0"	4 - 38 x 8'-0"	4 - 38 x 8'-0"	4 - 38 x 8'-0"	4 - 38 x 8'-0"	4 - 38 x 8'-0"	4 - 38 x 10'-0"	4 - 38 x 10'-0"	4 - 38 x 10'-0"
DESIGN CAMBER $\pm$ POSITIVE (UP) (INCHES)	@ RELEASE	0.24	0.25	0.25	0.24	0.25	0.21	0.44	0.42	0.58	0.86
	@ ERECTION	0.30	0.26	0.47	0.45	0.25	0.36	0.85	0.47	0.71	0.85
	@ FINAL	0.47	0.69	0.32	0.23	0.42	0.80	0.25	0.69	0.35	0.81
NO OF INSERTS REQD.									13		
END OF BEAM TO $\ell$ OF FIRST INSERT EA. END									1'-9"		
SEE NOTE 6									5'-9"		
WEIGHT OF TYPICAL BEAM INCLUDING DIAPHRAGM (TONS)	24.6	25.7	28.4	27.1	27.6	28.6	29.5	30.0	31.0	31.6	32.6

- NOTES:
- BEAM WEIGHTS LISTED IN THE DESIGN TABLE ARE BASED ON ZERO SKEW, 2 FT. LONG ENDBLOCK AND DIAPHRAGMS SPACED @ 15 FT C/C. WEIGHTS FOR SKEWED BEAMS, LONGER ENDBLOCKS AND ADDITIONAL DIAPHRAGMS SHOULD BE ADJUSTED ACCORDINGLY. FOR ADDITIONAL DIAPHRAGMS, ADD 632 LBS/DIAPHRAGM. FOR SKEW ADD 38 LBS/DEGREE OF SKEW/END. FOR LONGER ENDBLOCK, ADD 798 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, MN-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 EFFECT 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  $\ell$  OF FIRST INSERT, AND  $\ell$  OF SECOND INSERT. ABOVE VALUES SHALL BE BASED ON THE REQUIRED 6'-3" GUARDRAIL POST SPACING ACROSS THE BRIDGE.
- THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-B39A, BR-B100, BR-B101, BR-B102A & B, BR-B103, BR-B104, BR-B105A & B AND BR-B106 AS APPLICABLE.

STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS
S342-37/B-15.66		8	RANDOLPH	0	00

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.

DESIGNED BY: [Signature]  
 DATE: 10-25-07  
 WEST VIRGINIA DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 ENGINEERING DIVISION  
 DESIGN TABLE FOR 39"  
 PRESTRESSED BOX BEAM  
 STANDARD SHEET BR-B39B

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 ENGINEERING DIVISION

SHIPMAN'S BRIDGE  
 OVER ROARING CREEK  
 IN RANDOLPH COUNTY

DESIGNED BY: [Signature]  
 DRAWN BY: [Signature]  
 CHECKED BY: [Signature]  
 DATE: 4/14  
 SCALE:  
 SHEET NO. 0 OF 00  
 BRIDGE NUMBER: 11201

DESIGN TABLE FOR 39"  
 PRESTRESSED BOX BEAM

**GOVERNING SPECIFICATIONS**

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION, DIVISION OF HIGHWAYS STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES, ADOPTED 2010 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 21'-4 1/2" (INCL. 3/4" GAP BETWEEN ADJ. BEAMS), A CURB-TO-CURB WIDTH OF 21'-2 1/8", TRANSVERSE POST-TENSIONING, AND 30° HF SKEW.
- DESIGN STRENGTH AND UNIT STRESSES:
 

MINIMUM CONCRETE STRENGTH @ STRAND RELEASE	5500 PSI
MINIMUM CONCRETE STRENGTH @ 28 DAYS	6000 PSI
TEMPORARY STRESS LIMITS IN CONCRETE BEFORE LOSSES:	
COMPRESSION STRESS LIMIT @ STRAND RELEASE	3600 PSI
TENSION STRESS LIMIT @ STRAND RELEASE	2800 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 (SOXIPS-DL)-LL)	3200 PSI
TENSILE STRESS LIMIT IN CONCRETE @ SERVICE III AFTER LOSSES:	
@ FINAL 1 (PS-DL-LL)	-270 PSI
TENSION STRESS LIMIT PRIOR TO TRANSFER	202.5 KSI
TENSION 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 3.19 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, BR-B105A & B AND BR-B106 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 SPICES SHALL BE A CLASS B, CONTACT TYPE. MINIMUM LAP SPICE LENGTHS SHALL BE AS GIVEN IN THE "LAP SPICE TABLE", THIS SHEET. ADDITIONALLY, IF LAP SPICING OF ET, LR, AND BT BARS IS USED, TERMINATION OF THE SPICE SHALL BE NO CLOSER TO THE END OF THE BEAM THAN 1/10 OF THE SPAN LENGTH.
- MINIMUM BAR BENDING DIAMETER SHALL BE 8 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 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 BITUMINOUS ELASTOMERIC WATERPROOFING MEMBRANE. MATERIAL SHALL MEET ASTM C836-84.

**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 60 DUROMETERS 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	W8x25	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 1/4" # x 2 1/4" MIN LEN.	ASTM A108 (11L17 STEEL)	AASHTO M111
WIRE	ANCHOR 3/8" #	ASTM A510 (1018 STEEL)	AASHTO M232
STUDS	1 1/4" # x 8" LONG	ASTM A108 (1045 C.D. STEEL)	AASHTO M232
NUTS	1 1/4" #	AASHTO M291, CLASS C	AASHTO M232
COUPLERS	TYPE 1A 1 1/4" # x 5" LONG	ASTM A108 (12L14 STEEL)	AASHTO M232
BOLTS	ANCHOR 1 1/4" # x 12" LONG	AASHTO M184 (TYPE 1, HH)	AASHTO M232
BOLTS	3/4" # x ALL LEN.	AASHTO M184 (TYPE 1, HH)	AASHTO M232
NUTS	3/4" #	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.

STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS
S342-37/B-15.66		8	RANDOLPH	0	00

**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 M11. THE GALVANIZING PLANT SHALL ADMINISTER ADEQUATE QUALITY CONTROL MEASURES TO SAFEGUARD AGAINST HYDROGEN EMBRITTLMENT. QUALITY CONTROL MEASURES SHALL COMPLY WITH ASTM A-143. CERTIFICATION FOR HOT-DIP GALVANIZING SHALL BE PROVIDED BY THE GALVANIZING PLANT.
- ALL POST-TENSIONING BEARING PLATES SHALL CONFORM TO AASHTO M270, GRADE 36.

**SHRINK KEY GROUT:**

- SHRINK 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 (ISLANER). 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 LANTAGE 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

PRESTRESSED CONCRETE BEAM  
DESIGN & ASSEMBLY NOTES  
STANDARD SHEET BR-B100

DATE: 07-02-07

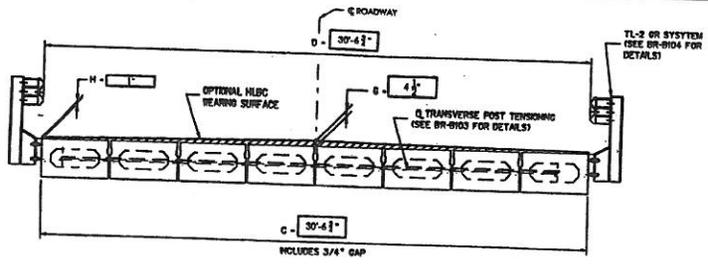
WEST VIRGINIA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
ENGINEERING DIVISION

**SHIPMAN'S BRIDGE  
OVER ROARING CREEK  
IN RANDOLPH COUNTY**

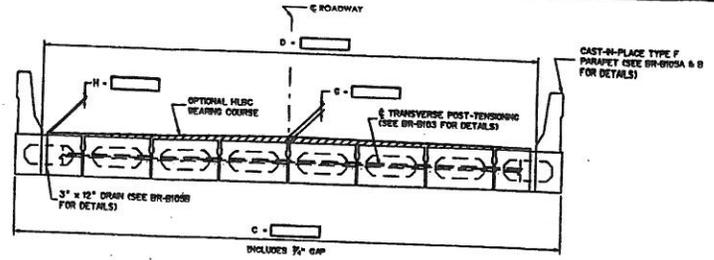
DESIGNED BY/WH: [ ]  
DRAWN BY/WH: [ ]  
CHECKED BY/WH: [ ]  
REVIEWED BY/WH: [ ]  
DATE: 4/14  
SCALE: [ ]  
SHEET NO. 0 OF 00  
BRIDGE NUMBER: 00000

PRESTRESSED CONCRETE BEAM  
DESIGN & ASSEMBLY NOTES

STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS
S342-37/8-15.66		8	RANDOLPH	0	00

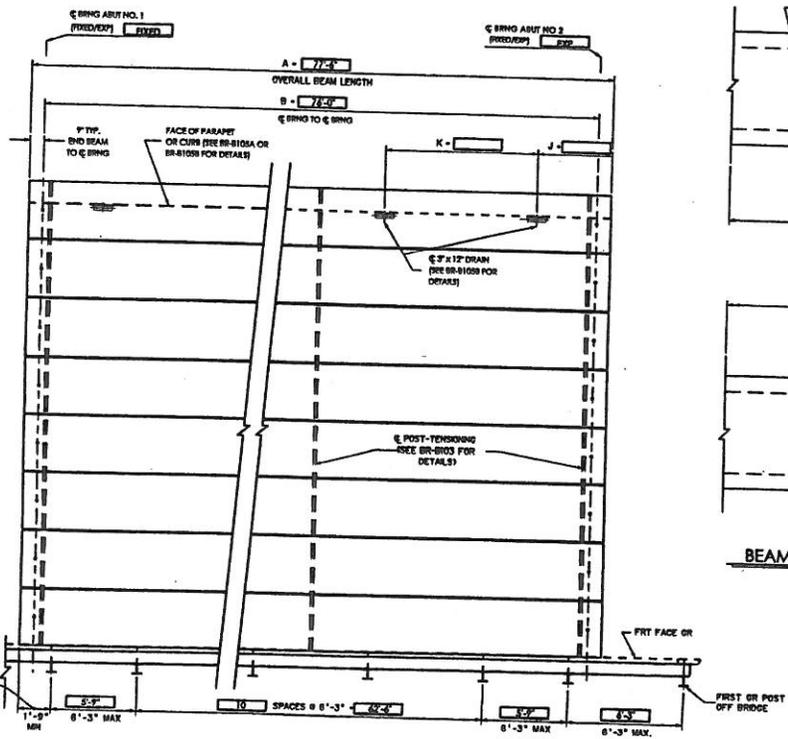


TYPICAL CROSS-SECTION WITH GUARDRAIL

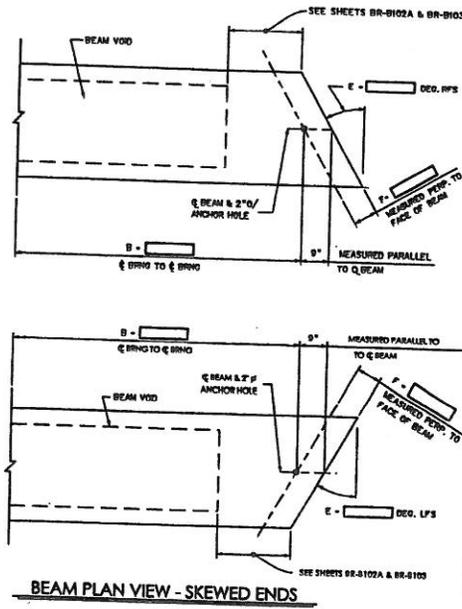


TYPICAL CROSS-SECTION WITH PARAPET OR CURB

CONTROL DIMENSIONS		
DESCRIPTION	CODE	VALUE
OVERALL BEAM LENGTH	A	77'-6"
SPAN LENGTH, C BEARING TO C BEARING	B	76'-0"
SUPERSTRUCTURE WIDTH - OUT TO OUT	C	30'-4 1/2"
ROADWAY WIDTH - FACE GR/PARAPET TO FACE GR/PARAPET	D	30'-4 1/2"
NUMBER OF BEAMS REQUIRED		10
BEAM SIZE (WIDTH x DEPTH)		36" x 39"
SHEW ANGLE (NORMAL, DEG. R/S OR DEG. L/S)	E	NONE
PERPENDICULAR DISTANCE FROM FACE OF BEAM TO C BEARING	F	9"
HLRC WEARING COURSE REQUIRED (YES/NO)		YES
THICKNESS OF WEARING COURSE @ EDGE OF DECK OR ROADWAY	G	4 1/2"
THICKNESS OF WEARING COURSE @ EDGE OF DECK OR PARAPET	H	1"
TL-2 BRIDGE GUARDRAIL SYSTEM REQUIRED (INSERTS ONLY)		NO
FABRICATOR TO SUPPLY TL-2 BRIDGE GUARDRAIL (YES/NO)		YES
FABRICATOR TO INSTALL BRIDGE GUARDRAIL PRIOR TO SHIPMENT (YES/NO)		NO
NUMBER OF GUARDRAIL POST INSERTS REQUIRED PER SIDE		13
TYPE F PARAPET REQUIRED (YES/NO)		NO
DRAINS REQUIRED (YES/NO)		NO
NUMBER OF DRAINS REQUIRED PER SIDE		N/A
10" CURB REQUIRED (YES/NO)		NO



DECK PLAN VIEW



BEAM PLAN VIEW - SKEWED ENDS

ITEM NO.	DESCRIPTION	UNITS	QUANTITY
603016	PRESTRESSED CONCRETE BOX BEAM	LF	775

- 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-817A & B THRU BR-812A & B, BR-8100, BR-8102A & B, BR-8103, BR-8104, BR-8105A & B AND BR-8106.

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
ENGINEERING DIVISION

PRESTRESSED CONCRETE BEAM  
DESIGN AND ASSEMBLY NOTES  
STANDARD SHEET BR-8101

DATE: 07-02-07

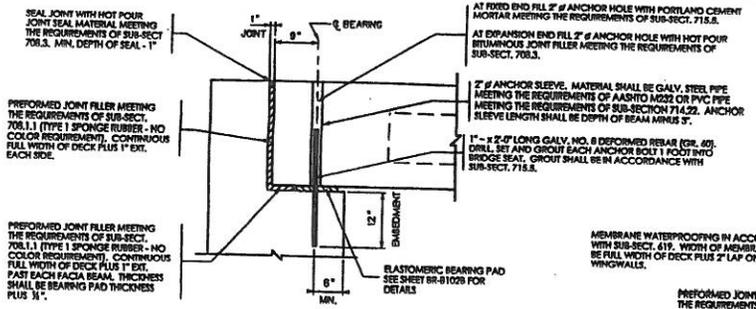
WEST VIRGINIA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
ENGINEERING DIVISION

SHIPMAN'S BRIDGE  
OVER ROARING CREEK  
IN RANDOLPH COUNTY

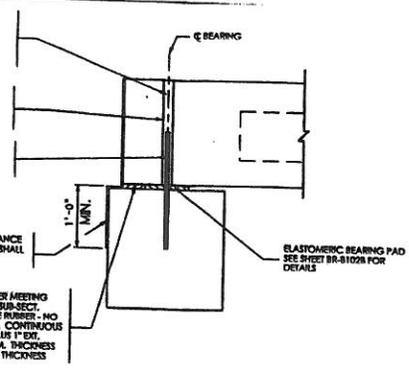
PRESTRESSED CONCRETE BEAM  
DESIGN & ASSEMBLY NOTES

DATE: 4/14  
SCALE:  
SHEET NO. 0 OF 00  
BRIDGE NUMBER: 11201

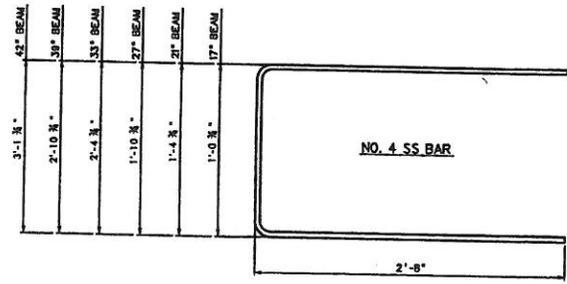
STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS
S342-37/8-15.66		8	RANDOLPH	0	00



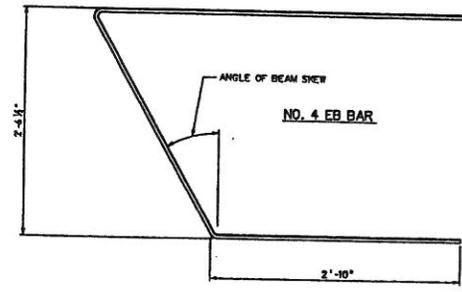
**END BEARING DETAIL WITH BACKWALL**



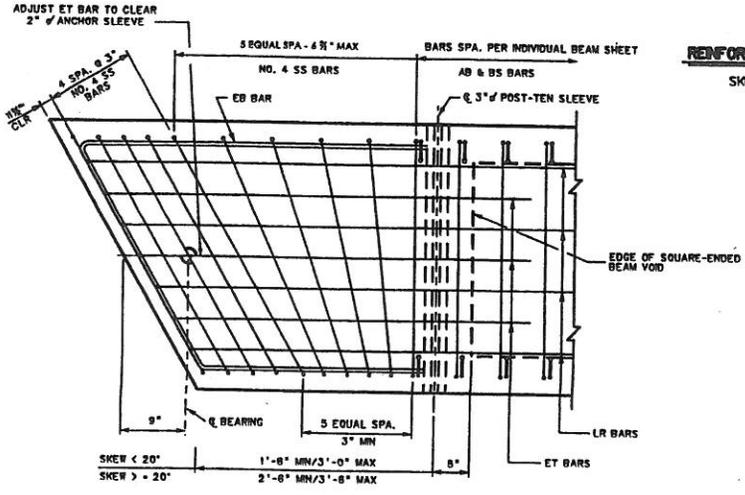
**END BEARING DETAIL WITHOUT BACKWALL**



**REINFORCING BAR DETAIL**

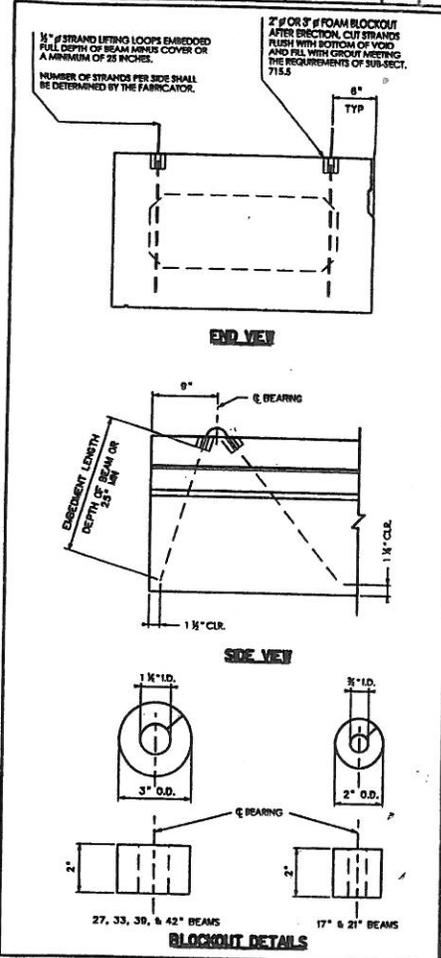


**SHEAR KEY DETAIL**



**END BLOCK DETAIL - SKEWED BEAMS**  
WO/POST-TEN. ACCESS POCKET

THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-817A & B THRU BR-812A, & B, BR-8100, BR-8101, BR-8102, BR-8103, BR-8104, BR-8105A & B AND BR-8106 AS APPROPRIATE.



**LIFTING DETAILS**

APPROVED: <i>[Signature]</i>	DATE: 10-25-07
WEST VIRGINIA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS ENGINEERING DIVISION	PREPARED: 07-02-07
PRESTRESSED CONCRETE BEAM SKEWED END REINFORCING MISC. DESIGN AND ASSEMBLY DETAILS	REVISIONS:
STANDARD SHEET BR-8102A	

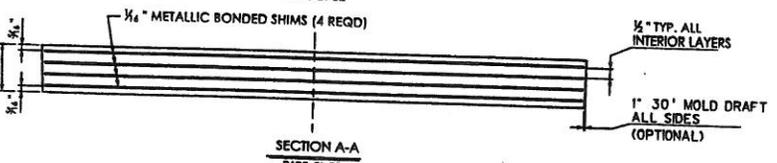
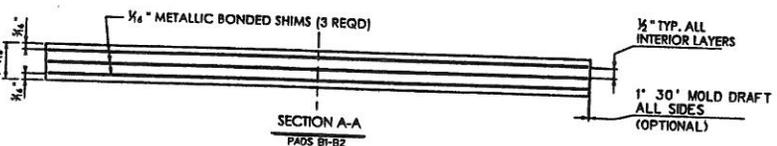
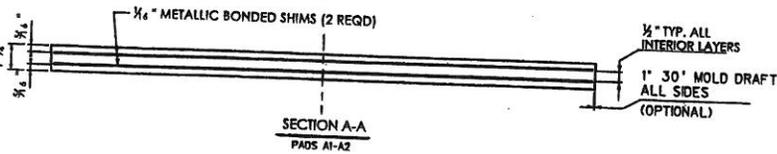
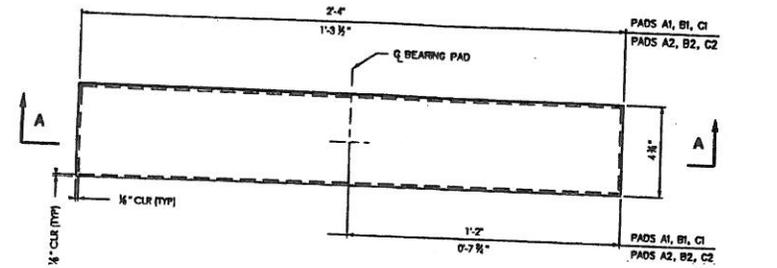
WEST VIRGINIA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
ENGINEERING DIVISION

**SHIPMAN'S BRIDGE  
OVER ROARING CREEK  
IN RANDOLPH COUNTY**

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

DESIGNED BY: THB/
DRAWN BY: THB/
CHECKED BY: TM/
REVIEWED BY: TW/
DATE: 4/14
SCALE:
SHEET 0 OF 00
BRIDGE NO. 00000

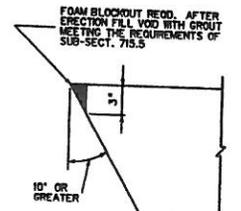
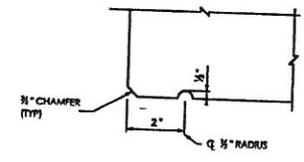
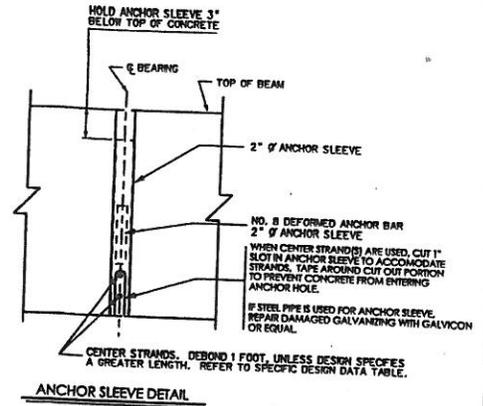
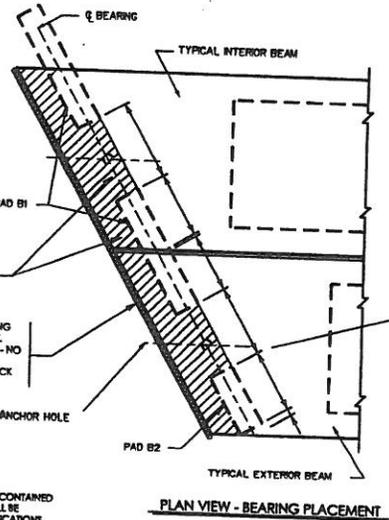
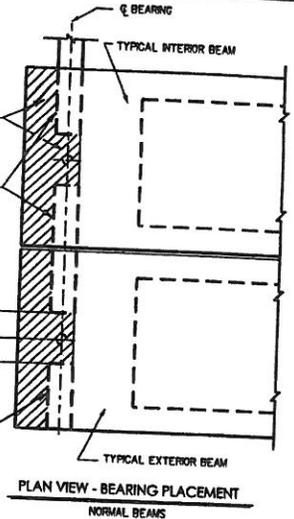
STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS
S342-37/8-15.66		8	RANDOLPH	0	00



PERFORMED JOINT FILLER MEETING THE REQUIREMENTS OF SUB-SECT. 708.1.1 (TYPE I SPONGE RUBBER - NO COLOR REQUIREMENTS). THICKNESS SHALL BE BEARING PAD THICKNESS PLUS 1/4". (TYPICAL)

PERFORMED JOINT FILLER MEETING THE REQUIREMENTS OF SUB-SECT. 708.1.1 (TYPE I SPONGE RUBBER - NO COLOR REQUIREMENTS). THICKNESS SHALL BE BEARING PAD THICKNESS PLUS 1/4". (TYPICAL)

PERFORMED JOINT FILLER MEETING THE REQUIREMENTS OF SUB-SECT. 708.1.1 (TYPE I SPONGE RUBBER - NO COLOR REQUIREMENTS). CONTINUOUS FULL WIDTH OF DECK PLUS 1" EXT. EACH SIDE.



**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 16 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 34 KSI.
- BEARING PADS ARE DESIGNED FOR ZERO BRIDGE GRADE. FOR BRIDGE GRADES GREATER THAN 5%, PADS SHALL BE SPECIALLY 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 .0001. 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-817A & B THRU BR-842A & B, BR-8100, BR-8101, BR-8102A, BR-8103, BR-8104, BR-8105A & B AND BR-106 AS APPROPRIATE.

PAD	LENGTH	WIDTH	HEIGHT	NO. SHIMS	SHIM SIZE	SPAN RANGES	MAXIMUM REACTION	MAXIMUM MOVEMENT ONE DIRECTION
A1	2'-8"	28"	1 3/4"	2	7/8" x 4 1/2" x 2" - 3 3/4"	20' - 50'	25 KIPS	0.50"
B1	4'-8"	28"	1 3/4"	3	7/8" x 4 1/2" x 2" - 3 3/4"	40' - 70'	75 KIPS	0.60"
C1	2'-8"	28"	2 3/4"	4	7/8" x 4 1/2" x 2" - 3 3/4"	60' - 100'	89 KIPS	1.00"
A2	2'-8"	19 1/2"	1 3/4"	2	7/8" x 4 1/2" x 1" - 3 3/4"	20' - 50'	25 KIPS	0.50"
B2	4'-8"	15 1/2"	1 3/4"	3	7/8" x 4 1/2" x 1" - 3 3/4"	40' - 70'	38 KIPS	0.60"
C2	2'-8"	19 1/2"	2 3/4"	4	7/8" x 4 1/2" x 1" - 3 3/4"	60' - 100'	43 KIPS	1.00"

APPROVED: *James B. ...* DATE: 07-02-07

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
ENGINEERING DIVISION

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

MODIFIED  
STANDARD SHEET BR-8102B

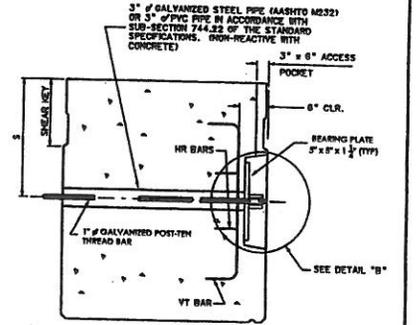
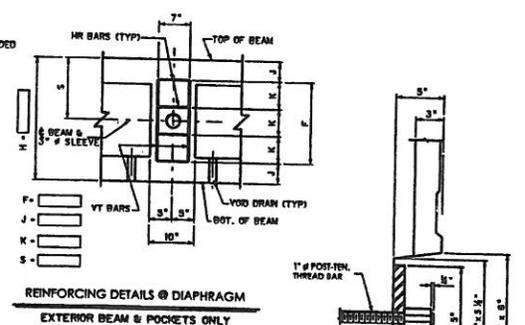
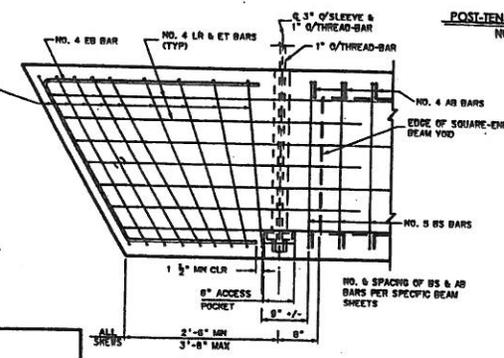
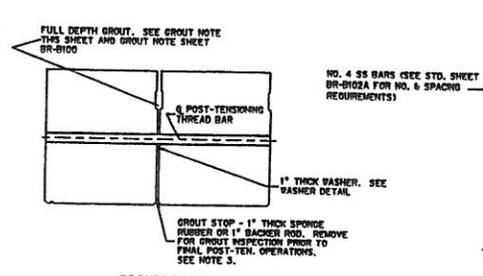
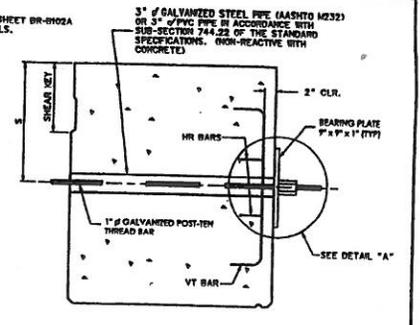
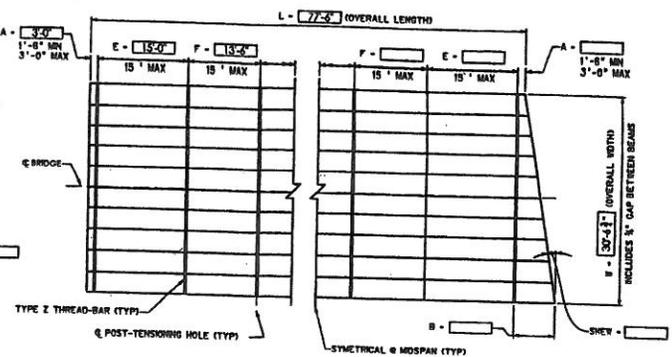
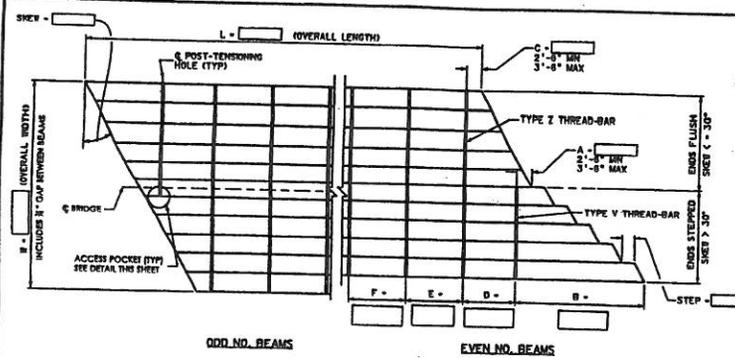
WEST VIRGINIA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
ENGINEERING DIVISION

DESIGNED BY: THB/  
DRAWN BY: THB/  
CHECKED BY: THB/  
REVIEWED BY: THB/  
DATE: 4/14  
SCALE:  
SHEET 0 OF 00  
BRIDGE NO. 11201

SHIPMAN'S BRIDGE  
OVER ROARING CREEK  
IN RANDOLPH 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
342-37/8-15.66		8	RANDOLPH	0	00



- PROCEDURE NOTES**
- INSTALL ONE RICH THICK WASHER AND GROUT STOP BY GLUING TO ONE SIDE FOR THE ENTIRE LENGTH OF EACH BEAM PRIOR TO SETTING BEAMS. GROUT SHALL BE AN APPROVED CONSTRUCTION TYPE GLUE OR EPOXY ADHESIVE. GROUT STOP MAY BE INSTALLED AFTER BEAMS ARE SET.
  - GLUE A 2" x 2" x 2" PIECE OF PRESSURE TREATED PLYWOOD AT EACH THREAD-BAR LOCATION TO INSURE THAT A 1/2" GAP IS OBTAINED. PLYWOOD SPACERS TO BE OFFSET APPROXIMATELY 3 FEET FROM THE THREAD-BAR HOLE AND CENTERED ON THE HOLE DEPTH. PLYWOOD SPACERS ARE REQUIRED ON ONLY ONE BEAM EDGE FACE OF ADJUTING BEAMS. AFTER THE BEAMS ARE SET AND THE THREAD-BARS INSTALLED, FULL 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 1/2" WITH ALL EXCESS 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 LOCATION, PREPARE JOB CONTROL GROUT CURBS 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 4000 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 WYOMING 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-8100 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 REPRODUCED IN A MANNER ACCEPTABLE TO THE ENGINEER.
  - AFTER GROUT AS BEEN PLACED AND REACHED ITS MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AND HAS CURED A MINIMUM OF 3 DAYS, APPLY 30% OF THE FINAL POST-TENSIONING FORCE TO ALL THREAD-BARS WORKING BEAM ENDS TO MIDSPAN. AFTER ALL THREAD-BARS HAVE BEEN TENSIONED TO 30%, 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 1%, 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 1%, 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 TONG CUTTING. TOUCH-UP TRIMMED ENDS WITH GALVANIZED OR EQUAL.
  - INSTALL ANCHOR DOWELS AS DETAIL ON STANDARD SHEETS BR-8101 AND BR-8102A.

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

SPAN	76'-0"
SKREW	NONE
L	77'-6"
W	30'-4 1/2"
A	3'-0"
B	
C	
D	
E	15'-0"
F	15'-0"
STEP	

BEAM SIZE	REINFORCEMENT BAR DIM. SPACING	DIST
IN.	IN.	IN.
17	12	2 1/2
21	12	4
27	18	4 1/2
33	24	4 1/2
39	30	4 1/2
42	33	4 1/2

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

BAR	FORMULA	LENGTH
VIEW 1	3'-0"	
Z	8'-0"	33'-7"
VIEW 1	3'-0"	

BAR	CODE	CALC.	MEASURED												
			NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	NO. 6	NO. 7	NO. 8	NO.	NO.			
V	①	1.23"													
Z	①														
CALCULATED ① = WPT.3 / 34.8			STD. DEV. (CALCULATED) ① = (WPT.3) / 31.2												
CALCULATED ② = WPT.3 / 59.2															

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

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
ENGINEERING DIVISION  
PRESTRESSED CONCRETE BEAM  
TRANSVERSE POST-TENSIONING DETAILS  
STANDARD SHEET BR-B103

PREPARED: 07-02-07  
DATE: 4/16

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
ENGINEERING DIVISION

**SHIPMAN'S BRIDGE  
OVER ROARING CREEK  
IN RANDOLPH COUNTY**

PRESTRESSED CONCRETE BEAM  
TRANSVERSE POST-TENSIONING DETAILS

DESIGNED BY: TW  
CHECKED BY: TW  
REVIEWED BY: TW  
DATE: 4/16  
SCALE:  
SHEET NO. 0 OF 00  
BRIDGE NUMBER  
11201



## SECTION 603 PRESTRESSED CONCRETE MEMBERS

### 603.1-DESCRIPTION:

This work consists of the construction of precast/prestressed concrete members, pretensioned in accordance with these specifications and in conformity with the plan details and notes. This work shall include manufacturing, inspection, handling, storing, transporting and erecting of structural members of precast/prestressed concrete, and, when specified, shall also include precast concrete members which do not contain pretensioning steel components.

Concrete floors, curbs, parapets, curtain walls, and diaphragms shall be cast in place on the project unless otherwise provided for on the plans. When the above elements are specified as precast members, they shall be manufactured in accordance with this specification.

### 603.2-MATERIALS:

603.2.1 Materials Details: Materials shall meet the requirements specified in the following Sections/Subsections:

Precast/Prestressed Concrete Materials	Sections/Subsections
Cement	ASTM C150, 701.3
#Fine Aggregates	702.1
*Coarse Aggregates	703.1, 703.2, & 703.3
+Admixtures:	
Air Entraining Admixtures	707.1
Retarding Admixtures	707.2
Water Reducing Admixtures	707.3
**Pozzolonic Additives	707.4
Mixing Water	715.7
Reinforcing Steel	709.1
Prestressing Steel	709.2
Hot-Poured Elastic Type Concrete Joint Sealer	708.3
Preformed Expansion Joint Filler	708.1
Elastomeric Bearing Pads	715.14
Welded Wire Fabric	709.4
Steel Bolts and Nuts	709.23
Concrete Sealant	707.12
Shear-Key Grout	715.5

- # When the top surface of a prestressed member is designed as the bridge wearing surface
- \* The maximum size of coarse aggregate shall not exceed the minimum horizontal or vertical clear spacing between pretensioned or reinforcing steel elements divided by 1.33. Lightweight aggregates shall not be used unless their use is permitted by the Engineer in writing.
- \*\* The use of a Pozzolonic additive is not permitted when a blended hydraulic cement is used. Unless otherwise permitted by the Engineer, only one source of a Pozzolonic additive shall be used.
- + Calcium chloride or any admixture containing chloride ion in excess of 0.1 percent by weight shall not be used in prestressed concrete members.

**603.2.2-Inspection and Testing:** A representative of the Engineer shall have free entry at all times, while the work on the Contract is being performed, to all parts of the manufacturer's works which concern the manufacture of the materials ordered. The manufacturer shall afford the representative of the Engineer, without charge, all reasonable facilities to satisfy themselves that the material is being furnished in accordance with these specifications.

**603.3-PLANT REQUIREMENTS AND APPROVAL:**

**603.3.1-Plant Approval:** All fabricators of prestressed concrete members shall be certified in the appropriate Group and Category in accordance with the Precast/Prestressed Concrete Institute (PCI) Plant Certification Program. Fabricators shall be certified in Group B3 or B4 for manufacture of prestressed straight strand bridge members. For prestressed draped strand bridge members, the fabricator shall be certified in Group B4. The Engineer or his authorized representative shall approve all plants manufacturing prestressed and precast reinforced concrete bridge members before manufacture of the members may be started. Requests for such approvals shall be submitted to the Engineer at least three weeks prior to the date of manufacture of the members. Requests shall include details of the plant facilities, materials, and the production methods the manufacturer intends to use.

The manufacturer shall have an established quality control program in effective operation at the plant. This program shall be submitted to the Engineer for approval at least 30 days prior to the start of the production.

If a contractor/fabricator is found to consistently deviate from PCI guidelines, the contractor/fabricator will be required to use independent laboratory quality control testing and inspection until it can be shown that conformity with PCI guidelines has been reestablished. The laboratory used is subject to the approval by the Engineer. The cost of the independent laboratory is to be borne by the contractor/fabricator.

**603.3.2-Supervision:** The contractor/fabricator shall provide a PCI Level II certified technician, skilled in the use of the system of prestressing to be used, who shall supervise the work and give the Engineer or his representative such assistance as may be considered necessary.

**603.3.3-Equipment and Tools:**

**603.3.3.1-General:** All equipment, tools and machinery used in the work shall be adequate for the purpose for which it is to be used and shall be maintained in a satisfactory working condition. The use of portable pretensioning beds for the manufacture of prestressed concrete members is not acceptable.

The contractor/fabricator shall provide all other equipment and tools necessary for the construction and the prestressing.

**603.3.3.2-Equipment:** The jacks shall be equipped with instruments for monitoring the hydraulic pressure. Electronic pressure transducers with digital indicators may be used. All pressure gauges or electronic pressure indicators shall indicate the load directly to one (1) percent of the maximum gauge or sensor/indicator capacity or (2) two percent of the maximum load applied, whichever is smaller.

Each jack and its gauge shall be calibrated as a unit with the cylinder extension in the approximate position that it will be at final jacking force. The calibration of the jack and gauge shall be done while the jack is in the identical configuration as will be used on the site, e.g., same length hydraulic lines. An independent laboratory shall furnish certified calibration charts with each jack and gauge used in the work. Certified calibration of each ram shall be made prior to the start of stressing operations and every six (6) months thereafter, or as requested by the Engineer. Any repair of the rams, such as replacing seals, changing length of hydraulic lines, changing type of pump or using gauges which have not been calibrated with the ram, shall be cause for recalibration of the jack and gauge with a load cell. No extra compensation will be allowed for the initial or subsequent ram calibrations.

**603.3.3.3-Forms and Casting Beds:** Forms and casting beds shall be subject to the approval of the Engineer. Unless otherwise approved, only metal forms on concrete founded casting beds shall be used. The forms and casting beds shall be well constructed, carefully aligned, substantial and firm, securely braced and fastened together, sufficiently tight to prevent leakage of mortar and strong enough to withstand the action of mechanical vibrators. The forms shall be constructed to permit movement of the members without damage during release of the prestressing force or movement caused by thermal expansion during curing. The casting beds and all form work will be approved before any concrete is placed, but such approval shall not relieve the contractor/fabricator of responsibility for the results obtained.

#### **603.4-WORKING DRAWINGS:**

**603.4.1-General:** The contractor/fabricator shall expressly understand that the Engineer's approval of the working drawings submitted by the contractor/fabricator covers the requirements for "strength and detail," and that the Engineer assumes no responsibility for errors in dimensions.

Working drawings must be approved prior to performance of the work involved and such approval shall not relieve the contractor/fabricator of any responsibility under the contract for the successful completion of the work.

All working drawings shall be in English units. Use of dual (metric and English) units is not allowed.

**603.4.2-Shop Drawings:** The contractor/fabricator shall submit copies of the detailed shop drawings to the Engineer for approval. Shop drawings shall be submitted sufficiently in advance of the start of the work to allow time for review by the Engineer and corrections by the contractor/fabricator without

delaying the work. The size of the original drawings shall be 22 inches x 34 inches (559 mm x 864 mm) including margins, unless otherwise permitted. The shop drawings submitted for approval may be reduced.

Shop drawings for concrete structures shall give full detailed dimensions and sizes of component parts of the structure and details of all miscellaneous parts. Design camber for all members shall be shown on the shop drawings.

**603.4.3-Erection Drawings:** The contractor shall submit drawings illustrating fully their proposed method of erection. The drawings shall show details of all falsework bents, bracing, guys, dead-men, lifting devices, and attachments to the bridge members: sequence of erection, location of cranes and barges, crane capacities, location of lifting points on the bridge members, and weights of the members. The plan and drawings shall be complete in detail for all anticipated phases and conditions during erection. Design calculations, sealed by a Registered Professional Engineer, shall be submitted by the contractor/fabricator to the Engineer for approval which will demonstrate that allowable stresses for falsework and concrete members being erected are not exceeded and that member capacities and final geometry shall be correct.

When the designated concrete deck overhang exceeds 30 inches (760 mm) , the erection drawings submitted by the contractor/fabricator shall include complete details of the forming and bracing for the overhang and shall transmit the concrete deck dead load to an area of the beam or stringer which will prevent distortion. All forming and bracing procedures are subject to approval of the Engineer.

#### **603.5-REINFORCEMENT:**

All reinforcing bars and welded wire fabric shall meet all requirements of Section 602 and shall be free of frost, loose rust, grease, dirt, oil, paint, mill scale, corrosion or other deleterious substances. Any steel which cannot be satisfactorily cleaned shall not be used.

When splicing is required, all reinforcing bars shall be lapped for a length of at least 30 bar diameters.

Reinforcing bars, welded wire fabric and other embedded fixtures shall be accurately placed as indicated on the Plans and shall be maintained in their correct position during the manufacture of the unit. Reinforcement shall not be held in position by tack welding.

The minimum concrete cover for reinforcing steel shall be as follows, unless otherwise shown on the Plans:

Main Reinforcement .....	1½ inches (40 mm)
Slab Reinforcement, top of slab .....	1½ inches (40 mm)
Slab Reinforcement, bottom of slab .....	1 inch (25 mm)
Stirrups and Ties .....	1 inch (25 mm)

The longitudinal or main wires of welded wire fabric shall be placed transverse to the longitudinal axis of the unit. Laps of welded wire fabric shall be a minimum of 6 inches (150 mm) unless otherwise approved by the Engineer.

## 603.6 CONCRETE:

**603.6.1-General:** The composition, proportioning, and mixing of concrete shall be such so as to produce a homogeneous concrete mixture of a quality that will conform to the test and design requirements specified and as noted on the Plans. Concrete for all prestressed members shall have a minimum compressive strength as may be specified on the plans or in the special provisions. Materials used to form voids in the members shall be fabricated from form material acceptable to the Engineer or from cardboard, which has been treated with a waterproofing agent. Any void made from more than one piece of material shall be glued and banded to prevent separation during concreting operations. Any evidence of separation will be cause for rejection. All concrete materials including admixtures shall meet requirements specified in subsection 603.2 and/or as indicated in the plans.

**603.6.2-Mix Design:** Concrete mixtures must be established initially by methods in accordance with ACI 318, Chapter 5. Mixes may be designed either by a commercial laboratory or by PCI certified concrete plant personnel. Prior to adoption of a mix design as a plant standard, it shall be field tested by use of the production plant batching and mixing equipment, construction methods, and curing to be used in production of the members. The use of a previous mix design can be approved for a project if sufficient test data (30 or more tests) are available from the past year for evaluation (ACI 301, Chapter 3, method).

All design mixes shall be developed using the type of cement, the type and gradation of aggregates, and admixtures proposed for use in plant mixes. The mix design shall also include either compressive strength tests or a penetration resistance test (in accordance with ASTM C 403) that verify the amount of time it takes to achieve a compressive strength of 500 psi (3.5 Mpa). The Engineer shall approve the mix design. When any of these variables are changed, or after a three-year time period, the mix shall be re-evaluated and submitted to the Engineer for approval.

**603.6.3-Proportioning of Concrete:** Materials shall be proportioned by weight, unless otherwise authorized by the Engineer. The concrete shall contain the minimum amount of water per sack of cement required to obtain satisfactory workability and the specified minimum strength, but in no case shall this amount exceed five gallons per sack (0.44 liter per kg) of cement, including the free water in the aggregate, and /or admixtures. The minimum cement factor shall be seven bags per cubic yard (390 kg per m<sup>3</sup>) of concrete. Concrete for all members shall be air-entrained with a target air content of seven percent. A working tolerance of plus or minus two percentage points will be allowed. When the ambient temperature is 90 °F (32° C) or higher, a retarding admixture shall be added to the concrete mixture. The Engineer may permit the use of retarding or water-reducing admixture when necessary. Slump shall not exceed 8 inches (200 mm) with the use of high range water reducers

**603.6.4-Sampling and Test Methods:**

Sampling Freshly Mixed Concrete	AASHTO T 141
Slump of Hydraulic-Cement Concrete	AASHTO T 119
Unit Weight and Yield of Concrete	AASHTO T 121
	AASHTO T 152
Air Content of Freshly Mixed Concrete	or
	AASHTO T 196
Making and Curing Concrete Test Specimens in the Field	AASHTO T 23
Compressive Strength of Cylindrical Concrete Specimens	AASHTO T 22
Temperature of Concrete	ASTM C 1064

Cylinders shall be manipulated and cured by methods identical to those used in curing the concrete members.

Slump, Temperature, and Air Content tests shall be conducted on the first batch of concrete each day and every time that cylinders are fabricated. Slump, Temperature, and Air Content tests shall also be conducted whenever Quality Control Personnel or the Inspector see a variation in the mix.

Unit Weight and Yield tests shall be conducted on the first batch of concrete each day and thereafter, as deemed necessary by Quality Control or Quality Assurance Personnel.

The Fabricator's Quality Control Personnel shall maintain records of the beam number(s) into which each batch of concrete is placed.

**603.6.5-Strength of Concrete:** Each strength test (i.e. strand release and 28-day) shall consist of the average strength of a minimum of two compressive strength test cylinders fabricated from a single randomly selected batch of concrete, as it is being placed in the forms.

A minimum of one set of cylinders shall be fabricated (at random) for each member cast in a form, with a maximum of one set of cylinders per batch of concrete. These cylinders, molded during fabrication, shall be the same size specimens as were used in the approved mix design.

Any member, for which the average concrete compressive strength at 28-days is less than the 28-day design compressive strength value, may be rejected at the option of the Contractor. If the Contractor elects to use such a member, it will be evaluated as to its adequacy for the use intended. Any member evaluated as unsatisfactory will be rejected by the Division, and the Contractor shall fabricate another member to replace the one which was evaluated as unsatisfactory. When the evaluation indicates that the member will be satisfactory for its intended use, the Engineer will provide for an appropriate price adjustment under the provisions of 603.14.2.1.

**603.6.6-Batching and Mixing:** Concrete batching plants and their operation shall be in conformance with ASTM C 94, "Specifications for Ready-Mix Concrete". Concrete batch plants shall be capable of producing concrete of the quality required and they shall be adequately equipped and properly operated. Concrete supplied to the plant by an outside batch plant shall meet the same requirements of batch plant facilities. Evidence of

conformance will be certification of the outside plant by the National Ready-Mix Concrete Association (NRMCA).

Fine and coarse aggregates and cement shall be measured by weight. Water and liquid admixture may be measured by either weight or volume. Measurement of the various components of concrete, and measuring equipment shall be in accordance with ASTM C 94.

Concrete shall be mixed by one of the following methods:

1. Central mixed concrete-concrete mixed in a central stationary mixer and delivered to the casting area by appropriate methods.
2. Shrink mixed concrete-concrete that is partially mixed in a stationary mixer, then mixed completely and delivered to the casting site in a truck mixer.
3. Truck mixed concrete-concrete that is completely mixed in a truck mixer as it is delivered to the casting site.

Mixing times shall be established by uniformity tests in accordance with procedures in ASTM C 94.

**603.6.7-Placing Concrete:** Suitable means shall be used for placing concrete without segregation. The concrete mixture shall not be dropped from a distance of more than 4 feet (1.2 meters), relative to the top of the form or the reinforcement. Special care shall be taken to deposit the concrete in its final position in each part of the form. Working of flowing concrete along the forms from the point of deposit will not be permitted. Care must be taken to work the concrete under and around the prestressing strands and reinforcement. The plastic concrete shall be consolidated in place by either external or internal vibration, or both when necessary. The vibrators shall be of a type and design approved by the Engineer, and the size of the vibrating head will be governed by the spacing of the prestressing cables and reinforcement. Vibrators may be used only to consolidate the concrete after it has been properly placed.

Internal vibrators shall be operated vertically and shall be slowly pushed into and pulled out of the concrete and shall not be held in one spot long enough to cause segregation. Concrete segregated by the vibrator shall be removed and discarded. Partially hardened layers of concrete shall not be penetrated or disturbed by the vibrator. Transmission of vibration into prestressing cable or reinforcement embedded in partially hardened concrete by the vibrating equipment will not be permitted.

**603.6.8-Cold Weather Production:** In addition to the requirements of Subsection 601.9.1, the following requirements shall apply to outdoor casting operations. When ambient temperatures below 40° F (4° C) are anticipated, the following shall be used as necessary to keep the temperature of concrete within the prescribed limits:

1. Minimum concrete temperature shall be 50° F (10° C) after placement.

2. Concrete shall not be placed on cold forms, steel, or appurtenances. When the temperature of these facilities are below 40° F (4° C), steam heat or other means shall be provided to maintain the temperature to at least 50° F (10° C) unless concrete is delivered above 60° F (15° C) and no frost, snow or ice is present in the form.
3. Placing concrete under covers or in suitable enclosures.
4. Use of heated mixing water.
5. Avoidance of the use of frozen aggregate or aggregate containing frost, snow or ice.
6. Use of insulated forms.

**603.6.9-Hot Weather Production:** In addition to the requirements of Subsection 601.9.2, the following requirements shall apply to outdoor casting operations:

When the ambient temperature is above 100° F (38° C), or other adverse weather conditions are present, it is recognized that plastic shrinkage of concrete, or loss of strength below specification requirements, or both may occur. If such conditions do occur, the following procedures or combination of procedures shall be used as necessary to correct these deficiencies:

1. Water fog spraying of forms, prior to placement of concrete. Forms exposed to direct sunlight can be misted for cooling prior to placement of concrete.
2. Shaded storage for aggregates.
3. Burying, insulating or shading water supply facilities.
4. Sprinkling or fog spraying of aggregates.
5. Use of shaved or crushed ice for a portion of the mixing water. Only so much ice shall be used as will be entirely melted at the completion of the mixing period.
6. Use of cold water in batching. Water can be chilled and stored in an insulated tank or pulled from a source if temperatures are low enough to aid mix temperature reduction.
7. Application of wet burlap or mats or fog spraying as soon as the water sheen disappears from the concrete. This is especially important for hot, windy, exposed locations.
8. Use of white pigmented curing compound for its heat-reflective properties except on composite surfaces.
9. Use of self-retarding admixtures.
10. Avoidance of the use of cement with temperatures over 170° F (77° C).
11. Shading of product surface during and after casting to avoid heat buildup in direct sunlight.

Concreting operations shall be discontinued when concrete temperatures exceed 100° F (38° C) at the time of placing.

**603.7-PRESTRESSING:**

**603.7.1-Protection of Prestressing Steel:** All prestressing steel shall be protected against physical damage and rust at all times during storage and manufacturing. Prestressing steel shall also be free of deleterious material such as grease, oil, wax, or paint, except where called for on the plans. Prestressing steel that has sustained physical damage at any time shall be rejected. The use of prestressing reinforcement having kinks, bends, nicks, or other defects will not be permitted. The development of pitting, other than slight rusting shall be cause for rejection.

Prestressing steel shall be packaged in containers or shipping forms for the protection of the strand against physical damage and corrosion during shipping and storage. A corrosion inhibitor which prevents rust or other results of corrosion shall be incorporated in a corrosion inhibitor carrier type packaging material, or when permitted by the Engineer, may be applied directly to the steel. The corrosion inhibitor shall have no deleterious effect on the steel or concrete or bond strength of steel to concrete.

The shipping package or form shall be clearly marked with a statement that the package contains high strength prestressing steel, and the type of corrosion inhibitor used, including the date packaged.

All anchorages, end fittings, couplers, and exposed strands, which will not be encased in concrete or grout in the completed work, shall be permanently protected against corrosion.

If an anti-bonding agent is used on the forms to facilitate member removal, every precaution shall be taken to protect the prestressing strands against any degree of coating by the anti-bonding agent.

**603.7.2-Storing of Prestressing Steel:** Prestressing steel shall be stored in a protected area which includes a roof (and sides if necessary) to keep moisture off the strand. In addition the cover must have a floor or at least the strand must be placed on supports to keep it out of mud and water until it is to be used. It shall not be removed from its protective packaging until immediately prior to installation in the forms and placement of concrete. Openings in the packaging shall be resealed as necessary to protect the unused steel. While exposed, the steel shall be protected to prevent corrosion.

**603.7.3-Placement of Prestressing Steel:** Prestressing shall be accurately installed in the forms and held in place by the stressing jack or temporary anchors and, when tendons are to be draped, by hold-down devices. The hold down devices used at all points of change in slope of tendon trajectory shall be of a low-friction type.

**603.7.4-Safety Measures:** Effective safety measures shall be taken to prevent injuries to personnel due to the breakage of strands or failure of anchorage devices during the tensioning operations. The protection provided shall be adequate and shall permit the inspector to perform his normal duties. When the safety precautions, in the opinion of the Engineer, are inadequate the contractor will revise the procedures or equipment to the satisfaction of the

Engineer. The inspector will abide by the safety rules established by the producer.

#### **603.7.5-Stressing Requirements:**

**603.7.5.1-General:** The provisions set forth in this section refer to the application and measurement of stresses to prestressed concrete members manufactured by the process of pretensioning. Prestressing forces shall not be transferred to any member nor shall end anchors be released before the concrete has attained a minimum compressive strength as specified on the plans or in the special provisions as determined by tests of standard cylinders cured identically as the member.

An initial force shall be applied to each strand such as to develop a load of approximately 10% of the final prestressing load as shown on the plans. A record shall be maintained of the jacking force and elongations thereby. Several prestressed members may be cast in one continuous line and stressed at one time.

Forms shall be removed and members detensioned immediately after steam curing or heat curing is discontinued while the concrete is still warm and moist. The elements shall be cut or released in an order such that lateral eccentricity of prestress forces will be a minimum.

**603.7.5.2-Tensioning of Strands:** In all methods of tensioning, stress induced in the strands shall be determined by monitoring applied force and independently by measurement of elongation. Applied force may be monitored by direct measurement using a pressure gauge piped into the hydraulic pump and jack system. The elongation measurements shall agree with their computed theoretical values within a tolerance of  $\pm 5\%$ . If discrepancies are in excess of 5% between the calculated forces, determined by elongation measurement and gauge reading, the tensioning operation shall be suspended and the source of error determined, evaluated, and corrected by qualified personnel before proceeding.

Calculations for elongation and gauge readings must include appropriate allowances for friction in the jacking system, strand seating, movement of bulkheads, bed shortening if under load, thermal corrections, and any other compensation for the setup.

**603.7.5.3-Methods of Stress Measurement:** Methods of measurement of the stressing force consist of pressure gauges to measure force from the pressure applied to hydraulic jacks or any other method approved by the Engineer.

**603.7.5.4-Gauging Systems:** Hydraulic gauges shall conform to the provisions set forth in Section 603.3.3. All gauges measuring the stressing load shall be graduated so they can be read within a tolerance of  $\pm 2\%$ .

Tensioning methods employing hydraulic gauges shall have appropriate bypass valve snubbers and fittings so that the gauge pointer will not fluctuate but will remain steady until the jacking load is released.

**603.7.5.5-Control of Jacking Force:** Pressure bypass valves may be used for stopping the jack at the required load or for manually stopping the load with the valve. The accuracy of setting of automatic cutoff valves shall be verified by running to the desired cutoff load whenever there is reason to suspect improper results, and at a minimum, at the beginning of the operation each day.

**603.7.5.6-Wire Failure in Strands:** Failure of wires in a pretensioning strand is acceptable provided the total area of wire failure is not more than 2 % of the total area of strands in a member, and providing the breakage is not symptomatic of a more extensive distress condition. Failure of any individual wire prior to placing concrete will require replacement of the strand.

**603.7.5.7-Calibration Records For Jacking Equipment:** All jacking and load measuring equipment shall be calibrated as specified in Section 603.3.3. Calibration records should show the following data.

1. Date of calibration.
2. Agency, laboratory or registered Professional Engineer (PE) supervising the calibration.
3. Method of calibration; i.e. proving ring, load cell, testing machine, etc., and its calibration reference.
4. The full range of calibration with gauge readings indicated against actual load.

Calibration records for all tensioning systems being used shall be available for preparing theoretical tensioning values. Personnel involved in preparing tensioning calculations shall have a copy of these records for reference.

**603.7.6-Pretensioning and Strand Debonding:** Pretensioning shall conform to the provisions set forth in Article 2.2, "Pretensioning" of the latest edition of the PCI Quality Control Manual MNL-116.

Plastic sheathing shall be used for strand debonding and shall be approved by the Engineer prior to use. Items such as animal fat, reactive greases, or PVC pipes shall not be used. Any other material shall be approved by the Engineer prior to use.

**603.7.7-Detensioning:** Detensioning shall conform to the provisions set forth in Article 2.3, "Detensioning" of the latest edition of the PCI Quality Control Manual MNL-116.

**603.7.8-Concrete Cover:** Minimum concrete cover for prestressing steel shall be 1 ½ inches (40 mm) unless otherwise shown on the plans.

**603.8-CURING:**

**603.8.1 General:** Careful attention shall be given to the proper curing of concrete. Prior to placing of concrete, the contractor shall submit the proposed curing methods and procedures to the Engineer for approval. Elevated temperature curing facilities shall be tested prior to approval. Approved equipment and materials for curing shall be available for use prior to casting.

Inadequate curing facilities or lack of attention to the proper curing of concrete shall be sufficient cause for the Engineer to stop all concrete placement until approved curing is provided. Inadequate curing may be cause for rejection of the member. All test cylinders shall be cured in the same environment as the precast/prestressed concrete members.

Curing shall be commenced prior to the formation of surface shrinkage cracks. The curing mats, sheets, or blankets shall be carefully placed in contact with the concrete member to avoid damage to the freshly finished concrete.

The following curing requirements shall apply for precast/prestressed members. Any other special method of curing shall meet with the approval of the Engineer. Concrete shall not be exposed to temperatures below freezing until the specified minimum strength as shown in plan notes has been attained.

All concrete shall be cured by water curing, accelerated temperature curing, or any other method approved by the Engineer.

**603.8.2-Water Curing:** All exposed surfaces of the concrete shall be kept wet continuously for the required curing time. The water used for curing shall meet the requirements of 603.2. Water curing shall be permitted as follows:

**603.8.2.1-Wet Mat Method:** For water curing by the mat method, cotton mats, polyethylene sheeting, or polyethylene burlap blankets may be used. The mats, sheets or blankets shall be adequately anchored and weighted to provide continuous contact with all concrete surfaces. Any concrete surfaces which cannot be cured by contact shall be enclosed by mats, adequately anchored, so that outside air cannot enter the enclosure. Sufficient moisture shall be provided inside the enclosure to keep all of the surfaces of the concrete wet for the required curing time, but in no case less than 36 hours.

**603.8.2.2-Saturated Cover Curing:** The member, covered as specified for the initial phase of curing, shall be maintained on the casting bed in an approved enclosure designed and equipped to insure complete saturation of the covering. The temperature within the enclosure and that of the covering material shall be maintained to provide a uniform curing temperature at the surface of the member, within the limits of 80 °F to 130 °F (27° C) to (54° C), until the specified strength is attained, but in no case less than 36 hours. The covering shall be kept thoroughly saturated throughout the entire curing period and the temperature of the water used shall be controlled uniformly to maintain the selected curing temperature of the surface of the member.

**603.8.2.3-Water Spray Curing:** The member, covered as specified for the initial phase of curing, shall be maintained in the casting bed in an approved enclosure. When the concrete is sufficiently hardened to resist damage, the covering shall be removed and the exposed surfaces of the unit shall be subjected to a continuous fine spray of water. The temperature within the enclosure and that of the water used shall be controlled to provide a uniform curing temperature at the surface of the member, within the limits of 80 °F and 130 °F (27° C) to (54° C) until the specified member strength is attained, but in no case less than 36 hours.

**603.8.3-Accelerated Curing:** Accelerated curing of the concrete shall be done by low pressure steam curing, or radiant heat curing. Transfer of stress shall be accomplished immediately after the heat curing has been discontinued. Accelerated curing shall be applied at a controlled rate following initial set of the concrete as per ASTM C403. Accelerated curing shall be done under suitable enclosures which minimize all heat losses and maintain uniform cure conditions within the enclosed area. Members must be maintained wet during accelerated curing time.

If accelerated curing is used, the contractor/fabricator shall furnish recording thermometers showing the time-temperature relationship of the concrete throughout the entire curing period. Recording thermometers shall be kept in proper calibration and recalibrated at least annually.

**603.8.3.1-Low-Pressure Steam Curing:** Low-pressure steam curing shall be done under a suitable enclosure to contain the live steam and minimize moisture and heat losses. The concrete shall be allowed to attain its initial set before application of the live steam.

Application of live steam shall not be directed on the concrete or forms such as to cause localized high temperatures. During the initial application of live steam, the concrete temperature shall be raised at an average rate not exceeding 80 °F(27° C)/per hour, until the curing temperature is reached. The maximum sustained concrete temperature during the curing cycle shall not exceed 160° F (70° C). The maximum temperature shall be held until the concrete has reached the required release strength. The maximum peak concrete temperature during the curing cycle shall be 190 °F (88° C). The concrete temperature shall be maintained uniformly throughout the extremities of the prestressed member. At the end of curing, the concrete temperature shall be reduced at an average rate not exceeding 50° F (10° C)/per hour.

**603.8.3.2-Radiant Heat Curing:** Radiant heat may be applied by means of pipes circulating steam, hot oil or hot water, or by electric heating elements. Radiant heat curing shall be done under a suitable enclosure to contain the heat, and moisture loss shall be minimized by covering all exposed concrete surfaces with a plastic sheeting or by applying an approved liquid membrane curing compound to all exposed concrete surfaces. The heat application shall be maintained to create a uniform concrete temperature throughout the extremities of the member.

After the waiting period prior to application of the heat, the concrete temperature shall increase at an average rate not exceeding 80° F (27° C)/per hour until the curing temperature is reached. The maximum sustained concrete temperature within the curing cycle shall not exceed 160° F (70° C). The maximum temperature shall be held until the concrete has reached the required release strength as shown in plan notes. The maximum peak concrete temperature during the curing cycle shall be 190° F (88° C). The maximum cooling rate from sustained concrete curing temperature shall be 50° F (10° C)/per hour.

#### **603.9-FINISHING:**

To assure the production of well formed matching members, all surfaces of the concrete shall be finished, shall be true and even, and shall be free from rough, open, or honeycombed areas, depressions or projections. The edges shall be finished or chamfered, or both. Care shall be exercised in removing forms to avoid spalling or otherwise damaging the concrete.

Top surfaces of prestressed members shall be screeded or rough floated to bring mortar to the surface and cover all aggregate. The top surface of members that will receive cast-in-place concrete on the project site shall be finished as noted on the project plans, or if no finish is noted, they shall have either a raked or stiff broom finish. Aggregate shall not be loosened when roughening the surface. The fascia surfaces of bridge members shall be finished with a PCI Grade A Formed Finish. All other members shall be finished with a PCI Standard Grade Formed Finish. Concrete on exposed reinforcing steel and loose laitance on concrete surfaces to be in contact with cast-in-place concrete shall be removed from all members.

Fabrication holes, except box beam vent holes, in the bottom of all beams, shall be filled with nonshrink mortar and made flush with the surrounding surface. No patching is required for small holes and irregularities on the sides of adjacent box beams that are to be sandblasted prior to shipment. Care shall be taken in final cutting the ends of strands to avoid damaging the concrete surface.

#### **603.10-WORKMANSHIP:**

**603.10.1-General:** Holes and voids in the surface of concrete resulting from bolts, ties, or large air pockets shall be wetted and filled with mortar having the same proportion of fine aggregate and cement as in the concrete, after which exposed mortar surfaces shall be finished smooth and even with a wood float.

Surfaces to be repaired and finished shall be kept wet for at least one hour before hydraulic cement mortar is applied. Immediately following patching work, repaired areas shall be wet cured for at least 48 hours. The wet cure may be accomplished by the use of steam, wet burlap or continuous spray wetting. A liquid membrane-curing compound may be used on non-composite surfaces.

Beams or girders having honeycomb of such extent to affect their strength or resistance to deterioration will not be accepted.

**603.10.2-Defects and Breakage:**

Defective or damaged members which cannot be satisfactorily repaired, or which are not acceptable to the Engineer will not be incorporated into the work. All other members that sustain damage during fabrication, handling, storage or transportation shall be evaluated in accordance with Chapter three of PCI Journal Vol. 30, # 3 entitled "Fabrication and Shipment Cracks in Precast or Prestressed Beams and Columns", hereinafter referred to as "specification". This specification is to be used to determine the severity of cracks. All cracks with a width of 4 mils (0.1 mm) or less may be repaired by silane treatment if the repair section of the specification allows repairs. All cracks over 4 mils (0.1 mm) to and including 16 mils (0.4 mm) shall be repaired by epoxy injection if allowed by the specification. Members with cracks over 16 mils (0.4 mm) shall not be incorporated into the work unless approved by the Engineer.

**603.11 DIMENSIONAL TOLERANCES:**

All tolerances shall be applied with respect to the theoretical positions and dimensions shown in the plans. The tolerances listed in this article represent the total allowable tolerance that will be accepted in the finished product.

The limits of tolerance do not necessarily represent fully acceptable construction; they are the limits at which construction becomes unacceptable. In general, workmanship shall be at a level of quality that will be well within the tolerance limits. Out of tolerance dimensions shall be handled in accordance with MP 603.10.40.

**603.11.1 Prestressed Concrete I-Beams and Bulb Tee Beams:**

<i>Characteristics</i>	<i>Value</i>
Depth (flanges)	±1/4 inch (± 6 mm)
Depth (Overall)	+1/2 inch, to -1/4 inch (+15 to -6 mm)
Width (flanges)	+3/8, to -1/4 inch (+10 to -6 mm)
Width (Web)	+3/8, to -1/4 inch (+10 to -6 mm)
Length of Beam	±1/8 inch per 10 feet, ±1 inch max. (± 1 mm/m, 25 mm max)
Sweep (variation from straight line parallel to centerline of member)	± 1/8 inch per 10 ft (± 1 mm/m)
Camber variation from design camber	± 1/8 inch per 10 feet ± 1/2 inch max up to 80 feet length ± 1 inch max. over 80 length (± 1 mm/m) (± 13 mm max. up to 24 m length) (± 25 mm max. over 24 m length)
Camber variation from design camber	±3/16 inch per 12 inches ± 1 inch (±15 mm/m, ± 5 mm max)
Position of plates	± 1 inch (± 25 mm)
Position of bearing plates	± 5/8 inch (± 16 mm)
Diaphragm Inserts (spacing between centers of inserts and from centers of inserts to the ends of the beams.)	± 1/2 in (± 15 mm)
Stirrup bars ( Projection above top of beam)	± 3/4 inch (± 20 mm)
Stirrup bars ( Longitudinal spacing)	± 2 inches (± 50 mm)

<i>Characteristics</i>	<i>Value</i>
Concrete Cover	$\pm 1/4$ in ( $\pm 6$ mm)
Position of inserts for structural connections	$\pm 1/2$ in ( $\pm 15$ mm)
Position of hold-down points for draped strands	$\pm 5$ inches ( $\pm 125$ mm)
Position of Inserts	$\pm 1/2$ inch ( $\pm 15$ mm)
Position of handling devices:	
Parallel to length	$\pm 6$ inches ( $\pm 150$ mm)
Transverse to length	$\pm 1$ inch ( $\pm 25$ mm)
Prestressing strand position (vertical or horizontal).	$\pm 1/4$ inch ( $\pm 6$ mm)

## 603.11.2 Precast/Prestressed Concrete Box Beams and Plank Beams:

<i>Characteristics</i>	<i>Value</i>
Depth (Overall)	±1/4 inch (± 6 mm)
Depth (top flange)	+1/2 inch (+15 mm)
Depth (bottom flange)	+1/2 inch to -1/8 inch (+15 to 3 mm)
Width (Overall)	±1/4 inch (±6 mm)
Width (Web)	±3/8 inch (±6 mm)
Length	± 3/4 inch (± 20 mm)
Sweep (variation from straight line parallel to centerline of member) Up to 40 feet (12 m) length member	±1/4 inch (± 6 mm)
40 to 60 feet (12 to 18 m) length member	±3/8 inch (±10 mm)
Greater than 60 feet (18 m) length member	± 1/2 in (± 15 mm)
Camber variation from design camber	±1/8 inch per 10 feet, ±1/2 inch Max. (±1 mm/m, ±15 mm Max)
Variation from specified end Squareness of skew:	± 5/8 inch (± 16 mm)
Horizontal	±1/8 inch per 12 inches ± 1/2 inch Max. (±1 mm/100 mm, ±15 mm Max)
Vertical	1/2 in (± 15 mm)
Position of tendons Individual	± 1/4 in (± 6 mm)
Position of Inserts for structural connections	± 1/2 in (± 15 mm)
Position of handling devices:	
Parallel to length	± 6 inches (± 150 mm)
Transverse to length	± 1 in (± 25 mm)
Position of stirrups:	
Longitudinal spacing	± 1 inch (± 25 mm)
Projection above top	+ 1/4 inch (± 6 mm), - 3/4 inch (- 20 mm)
Position of dowels tubes	± 5/8 inch (± 16 mm)
Position of hold-down points for draped strands	± 5 inch (± 125 mm)
Position of tie rods tubes:	
Parallel to length	± 1/2 inch (± 15 mm)
Vertical	±3/8 inch (±10 mm)
Position of slab void:	
End of void to center of tie hole	± 1/2 inch (± 15 mm)
Adjacent to end block	± 1 inch (± 25 mm)
Concrete Cover	± 1/4 inch (± 6 mm) 1/4 inch per 10 feet long. Bars (6 mm per 3 m)

### 603.11.3-Prestressed Concrete Deck Panels:

<i>Characteristics</i>	<i>Value</i>
Length	± 1/2 in (± 15 mm)
Width	± 1/2 in (± 15 mm)
Nominal Depth	+ 1/4 inch - 1/8 in (+6 mm, -3 mm)
Horizontal Alignment – Deviation from straightness of matting edge of panels	1/8 in (3 mm)
Deviation of ends from plan dimension Horizontal Alignment	± 1/2 in (± 15 mm)
Position of strands :	
Vertical	±1/8 (±3 mm)
Horizontal	± 1/2 in (± 15 mm)
Concrete Cover	± 1/4 inch (± 6 mm) 1/4 inch per 10 feet long. Bars (6 mm per 3 m)

### 603.12-HANDLING, STORING, TRANSPORTING, AND ERECTION:

The Contractor shall be responsible for proper handling, lifting, storing, hauling, and erection of all members so that they are placed in the structure without damage.

Prestressed members shall be maintained in an upright position at all times and shall be handled and supported in a manner which prevents torsion. No member shall be moved from the casting yard until the member has been accepted.

Storing of members shall be done with adequate blocking so that warpage or cracking will not occur. Blocking will be such that at least 6 inches (150 mm) clearance is maintained above the surface on which the blocking is placed. Placement of the blocking from beam ends shall be at locations not greater than (3) percent of the beam length. Concrete box beams shall be supported by the solid end block area during handling, storage, hauling, and erection. Members which are improperly stored and which become cracked, warped, or otherwise damaged in storage will be subject to rejection.

Members when stacked, shall be separated by blocking capable of supporting the members. The blocking shall be arranged in vertical planes. Stacking of members shall be arranged such that lifting devices will be accessible and undamaged. Stacking shall not exceed two members high.

All concrete beams or girders when erected, shall be securely tied and/or braced unless otherwise shown on the plans. When railroad or roadway traffic must be maintained beneath girders or beams already placed, traffic shall be protected against falling objects during the erection of diaphragms and other structural members, during the placing of cast-in-place concrete, and during the erection and dismantling of forms. Protection shall consist of nets or flooring with openings not larger than 1 inch (25 mm).

When precast / prestressed concrete adjacent box beams are erected, the fit of mating surfaces will be such that excessive grout leakage will not occur. If such fit is not provided the joint shall be filled with grout or sealed with an acceptable caulking suitable to the Engineer.

#### **603.13-CONSTRUCTION OF DECK:**

The variation in heights between beams shall not be more than 1/2 in (13 mm) between adjacent box beams where there is no wearing surface. For adjacent box beam bridges with wearing surfaces, the differential shall not exceed 3/4 inches (19 mm).

Dowel bar and lifting bolt holes shall be filled with non-shrink grout. Adjacent box beam units shall be transverse post tensioned by the use of high strength threaded bars, or by other methods as shown on the Plans.

#### **603.14-MEASUREMENT AND PAYMENT:**

**603.14.1-Method of Measurement:** Precast/Prestressed concrete structural members will be measured along the member centerline in linear feet (meter). Deck panels shall be measured by area in square feet (meter) complete in place.

Precast reinforced concrete three-sided structures shall be measured along the centerline of the erected structure in linear feet (meter).

Precast reinforced concrete headwalls and wingwalls for use with precast reinforced concrete three-sided structures shall be measured in square feet (meter) as measured on the exterior face of the member.

**603.14.2-Basis of Payment:** Precast/Prestressed concrete beams, deck panels, precast reinforced concrete three-sided structures, and precast reinforced concrete headwalls and wingwalls will be paid for at the contract unit price bid for the items listed below, which price and payment shall be full compensation for furnishing all the materials and doing all the work prescribed in a workmanlike and acceptable manner including the cost of furnishing and manufacturing the concrete members; for labor, concrete, forms, conventional reinforcing steel, prestressing strands, inserts, anchorage devices, bearing pads, shims, grout, wingwalls and headwall connection hardware, joint sealing/waterproofing, and other devices, and for moving, transporting and erecting the finished product in accordance with the Plans and Specifications. For precast reinforced concrete three-sided structures where the headwall is cast integral with the end structure unit, the headwall will be paid for in square feet (meter) as if it were not integral cast. Cast-in-place concrete diaphragms, curb, parapet, railing, and reinforcing steel for cast-in-place concrete are not included in this item.

##### **603.14.2.1-Price Adjustments**

Members found not in compliance with the requirements of 603.6.5 for compressive strength, but for which the evaluation indicates may still be used, will be paid for at a reduced contract price in accordance with the following formula:

$$\text{Price Reduction} = \left( \frac{f'_c - \bar{X}}{0.5f'_c} \right) \times \text{CIC}$$

Where:

$f'_c$  = 28-Day Design Compressive Strength, psi (Mpa)

$\bar{X}$  = Average 28-day Compressive Strength as determined in 603.6.5

CIC = Contractor's invoiced cost of the member itself (as billed by the Fabricator)

Note: This cost does not include the cost of items (such as bearing pads, guardrail items, delivery charges, etc.) which are incidental to the cost of member.

#### 603.15-PAY ITEMS:

ITEM	DESCRIPTION	UNIT
603016-*	"size" Prestressed Concrete Box Beam	Linear Feet (Meter)
603017-*	"size" Prestressed Concrete Plank Beam	Linear Feet (Meter)
603018-*	"size" Prestressed Concrete I Beam	Linear Feet (Meter)
603019-*	"size" Prestressed Concrete Bulb T Beam	Linear Feet (Meter)
603020-*	"size" Prestressed Concrete Deck Panel	Linear Feet (Meter)
603021-*	"size" Precast Concrete Deck Panel	Linear Feet (Meter)
603027-*	Precast Reinforced Concrete Three-Sided Structure	Linear Feet (Meter)
603028-*	Precast Reinforced Concrete Wingwall	Linear Feet (Meter)
603029-*	Precast Reinforced Concrete Headwall	Square Feet (Meter)

\* Sequence Number

**602.7-BAR SPLICES:****602.7.1-Lapping:**

DELETE THE SECTION AND REPLACE WITH THE FOLLOWING:

**602.7.1-Lapping:** All reinforcement shall be furnished in full lengths as indicated on the Plans. No splicing of bars, except where shown on the Plans, will be permitted without the written approval of the Engineer. Lapped splices shall be well distributed or located at points of low tensile stress. The bars shall be rigidly clamped or wired at all splices in a manner approved by the Engineer. Minimum lengths of lap splices unless otherwise noted shall be:

#4 Bar	1'-9"
#5 Bar	2'-2"
#6 Bar	2'-9"
#7 Bar	3'-9"
#8 Bar	4'-11"
#9 Bar	6'-2"
#10 Bar	7'-10"
#11 Bar	9'-7"

For epoxy coated bars, the minimum lap splice length shall be increased by 50 percent at locations where concrete cover is less than 3 bar diameters and 20 percent at all other locations.

**SECTION 603  
PRESTRESSED CONCRETE MEMBERS**

**603.15-PAY ITEMS**

DELETE THE FOLLOWING ITEMS FROM THE TABLE:

ITEM	DESCRIPTION	UNIT
603027-*	Precast Reinforced Concrete Three-Sided Structure	Linear Feet (Meter)
603028-*	Precast Reinforced Concrete Wingwall	Linear Feet (Meter)
603029-*	Precast Reinforced Concrete Headwall	Square Feet (Meter)

# State of West Virginia VENDOR PREFERENCE CERTIFICATE

Certification and application\* is hereby made for Preference in accordance with *West Virginia Code*, §5A-3-37. (Does not apply to construction contracts). *West Virginia Code*, §5A-3-37, provides an opportunity for qualifying vendors to request (at the time of bid) preference for their residency status. Such preference is an evaluation method only and will be applied only to the cost bid in accordance with the *West Virginia Code*. This certificate for application is to be used to request such preference. The Purchasing Division will make the determination of the Vendor Preference, if applicable.

**1. Application is made for 2.5% vendor preference for the reason checked:**

Bidder is an individual resident vendor and has resided continuously in West Virginia for four (4) years immediately preceding the date of this certification; **or,**

Bidder is a partnership, association or corporation resident vendor and has maintained its headquarters or principal place of business continuously in West Virginia for four (4) years immediately preceding the date of this certification; **or** 80% of the ownership interest of Bidder is held by another individual, partnership, association or corporation resident vendor who has maintained its headquarters or principal place of business continuously in West Virginia for four (4) years immediately preceding the date of this certification; **or,**

Bidder is a nonresident vendor which has an affiliate or subsidiary which employs a minimum of one hundred state residents and which has maintained its headquarters or principal place of business within West Virginia continuously for the four (4) years immediately preceding the date of this certification; **or,**

**2. Application is made for 2.5% vendor preference for the reason checked:**

Bidder is a resident vendor who certifies that, during the life of the contract, on average at least 75% of the employees working on the project being bid are residents of West Virginia who have resided in the state continuously for the two years immediately preceding submission of this bid; **or,**

**3. Application is made for 2.5% vendor preference for the reason checked:**

Bidder is a nonresident vendor employing a minimum of one hundred state residents or is a nonresident vendor with an affiliate or subsidiary which maintains its headquarters or principal place of business within West Virginia employing a minimum of one hundred state residents who certifies that, during the life of the contract, on average at least 75% of the employees or Bidder's affiliate's or subsidiary's employees are residents of West Virginia who have resided in the state continuously for the two years immediately preceding submission of this bid; **or,**

**4. Application is made for 5% vendor preference for the reason checked:**

Bidder meets either the requirement of both subdivisions (1) and (2) or subdivision (1) and (3) as stated above; **or,**

**5. Application is made for 3.5% vendor preference who is a veteran for the reason checked:**

Bidder is an individual resident vendor who is a veteran of the United States armed forces, the reserves or the National Guard and has resided in West Virginia continuously for the four years immediately preceding the date on which the bid is submitted; **or,**

**6. Application is made for 3.5% vendor preference who is a veteran for the reason checked:**

Bidder is a resident vendor who is a veteran of the United States armed forces, the reserves or the National Guard, if, for purposes of producing or distributing the commodities or completing the project which is the subject of the vendor's bid and continuously over the entire term of the project, on average at least seventy-five percent of the vendor's employees are residents of West Virginia who have resided in the state continuously for the two immediately preceding years.

**7. Application is made for preference as a non-resident small, women- and minority-owned business, in accordance with *West Virginia Code* §5A-3-59 and *West Virginia Code of State Rules*.**

Bidder has been or expects to be approved prior to contract award by the Purchasing Division as a certified small, women- and minority-owned business.

Bidder understands if the Secretary of Revenue determines that a Bidder receiving preference has failed to continue to meet the requirements for such preference, the Secretary may order the Director of Purchasing to: (a) reject the bid; or (b) assess a penalty against such Bidder in an amount not to exceed 5% of the bid amount and that such penalty will be paid to the contracting agency or deducted from any unpaid balance on the contract or purchase order.

By submission of this certificate, Bidder agrees to disclose any reasonably requested information to the Purchasing Division and authorizes the Department of Revenue to disclose to the Director of Purchasing appropriate information verifying that Bidder has paid the required business taxes, provided that such information does not contain the amounts of taxes paid nor any other information deemed by the Tax Commissioner to be confidential.

**Under penalty of law for false swearing (*West Virginia Code*, §61-5-3), Bidder hereby certifies that this certificate is true and accurate in all respects; and that if a contract is issued to Bidder and if anything contained within this certificate changes during the term of the contract, Bidder will notify the Purchasing Division in writing immediately.**

Bidder: EASTERN VAULT CO., INC.

Signed: 

Date: 6-25-2014

Title: V.P. GEN. MANAGER

RFQ No. 08140235

STATE OF WEST VIRGINIA  
Purchasing Division

# PURCHASING AFFIDAVIT

**MANDATE:** Under W. Va. Code §5A-3-10a, no contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and: (1) the debt owed is an amount greater than one thousand dollars in the aggregate; or (2) the debtor is in employer default.

**EXCEPTION:** The prohibition listed above does NOT apply where a vendor has contested any tax administered pursuant to chapter eleven of the W. Va. Code, workers' compensation premium, permit fee or environmental fee or assessment and the matter has not become final or where the vendor has entered into a payment plan or agreement and the vendor is not in default of any of the provisions of such plan or agreement.

**DEFINITIONS:**

**"Debt"** means any assessment, premium, penalty, fine, tax or other amount of money owed to the state or any of its political subdivisions because of a judgment, fine, permit violation, license assessment, defaulted workers' compensation premium, penalty or other assessment presently delinquent or due and required to be paid to the state or any of its political subdivisions, including any interest or additional penalties accrued thereon.

**"Employer default"** means having an outstanding balance or liability to the old fund or to the uninsured employers' fund or being in policy default, as defined in W. Va. Code § 23-2c-2, failure to maintain mandatory workers' compensation coverage, or failure to fully meet its obligations as a workers' compensation self-insured employer. An employer is not in employer default if it has entered into a repayment agreement with the Insurance Commissioner and remains in compliance with the obligations under the repayment agreement.

**"Related party"** means a party, whether an individual, corporation, partnership, association, limited liability company or any other form or business association or other entity whatsoever, related to any vendor by blood, marriage, ownership or contract through which the party has a relationship of ownership or other interest with the vendor so that the party will actually or by effect receive or control a portion of the benefit, profit or other consideration from performance of a vendor contract with the party receiving an amount that meets or exceed five percent of the total contract amount.

**AFFIRMATION:** By signing this form, the vendor's authorized signer affirms and acknowledges under penalty of law for false swearing (W. Va. Code §61-5-3) that neither vendor nor any related party owe a debt as defined above and that neither vendor nor any related party are in employer default as defined above, unless the debt or employer default is permitted under the exception above.

**WITNESS THE FOLLOWING SIGNATURE:**

Vendor's Name: EASTERN VAULT CO., INC.

Authorized Signature: Brian P. Struble **BRIAN P. STRUBLE** Date: 6-26-2014

State of West Virginia

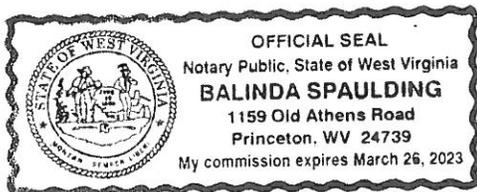
County of Mercer, to-wit:

Taken, subscribed, and sworn to before me this 26<sup>th</sup> day of June, 2014.

My Commission expires March 26, 2023.

**AFFIX SEAL HERE**

NOTARY PUBLIC Balinda Spaulding  
*Purchasing Affidavit (Revised 07/01/2012)*



**NOTE:**  
Vendor and Notary's date must be the same.  
Notary required to **AFFIX SEAL** on Purchasing Affidavit.