

20160106 - January's Specification Committee Meeting

Specification Committee Meeting Agenda

Wednesday, January 6th @ 9:00am

Building 5, Room 122

Approved Specification Revisions from last Committee meeting (12/2/15)

- **602 - Reinforcing Steel.** Adds Corrosion Resistant Reinforcing Steel Bar
- **102 - Bidding Requirements and Conditions.** Update Section 102.7 & 102.16 to 'Amendment'
- **663 - Pavement Markings.** Adds temporary pavement markings to Section 663.5.8
- **401 - Bituminous Asphalt Base, Wearing, and P&L.** Removes temporary pavement markings from Section 401.11

Approved Project Specific Provisions from last Committee meeting (12/2/15)

- **SP 685 - Bridge Cleaning**
- **SP 401 - PWL Paving**
- **SP 407 - SAMI Seal Paving**

Items removed from Committee Agenda

- **SP 601 - Epoxy Injection Crack Repair**

Provisions to be discussed:

Anticipated Start Time	Provision	Title	Description	Approval
9:05	403	SP 403 - Crack Sealing in Bituminous Pavement	Discussed in October, November, & December; 4th time to Committee. Project Specific provision for Crack/Joint Sealing in HMA. No updated to this provision. Approval expected in January.	
9:10	607	607.4.1 & 607.7 - Slotted hole for guardrail	Discussed in December, 2nd time to Committee. Changes are regarding placing slotted holes in W-beam. Adds information for Cut Slope Terminal. No update to this provision.	
9:15	401	SP 401 RAP	Discussed in December, 2nd time to Committee. Project Specific provision to address increased RAP mixes produced in small quantities. No updated to this provision. Approval expected in January.	
9:20	481	SP 481 Interlayer	Discussed in December, 2nd time to	

			<p>Committee. Project Specific provision for Membrane Interlayer.</p> <p>No updated to this provision.</p>
9:25	TBD	SP Rubblization	<p>Discussed in December, 2nd time to Committee. Project Specific provision for rubblization.</p> <p>No updated to this provision.</p>
9:30	406	SP 406 High Friction Surface Treatment	<p>1st time to Committee. Update to previously approved SP. Project Specific provision for high friction surface treatment.</p> <p>Redline copy included, showing the changes/updates to the provision.</p>
9:35	102	102 Drug-Free Workplace	<p>1st time to Committee. Permanent Specification change, adding Drug-Free workplace.</p>
9:40	103	SP 103 Cargo Preference Act	<p>1st time to Committee. Cargo Preference Act - implementation and requirements. This is required (per FHWA), on projects utilizing federal funding after 2/15/16.</p> <p><i>Please expedite your review of this item;</i> as the provision will be included in all proposals with federal-aid, starting with 2/9 letting (& forward).</p> <p>Approval expected in January.</p>
9:45	108	108.3.2 Detailed Construction Schedule	<p>1st time to Committee. Permanent Specification change, moving Construction Schedule requirements from 640.11 to 108.3.2.</p> <p>Redline copy included, showing the changes/updates.</p>
9:50	403	SP 403 - Crack Sealing in Bituminous Pavement	<p>1st time to Committee.</p> <p>This provision is a simplified version of the statewide sealing contracts SP403 ... It's to be used on maintenance and/or rehabilitation type projects.</p>
9:55	601	SP 601 - Concrete Sealer	<p>1st time to Committee.</p> <p>Project Specific provision for concrete crack sealer.</p>
10:00	601	SP 601 - FRP Concrete Patching	<p>1st time to Committee.</p> <p>Project Specific provision for concrete patching of bridge substructure units (prior to their wrapping of FRP).</p> <p>Part of WVDOT research project - would require some calibration with WVU.</p>

10:10	601	SP 601 - Fiber Reinforced Polymer (FRP)	<p>1st time to Committee. Project Specific provision for Fiber Reinforced Polymer (FRP) wrap system.</p> <p>Part of WVDOT research project - would require some calibration with WVU.</p>
10:20	607	SP 607 - Guardrail	<p>1st time to Committee. Project Specific provision requiring guardrail post and block be hardwood from the Appalachian region.</p>
10:25	607	SP 607 - Aesthetic Guardrail	<p>1st time to Committee. Project Specific provision for aesthetic treatment options to galvanized guardrail.</p>
10:35	608	SP 608 - Right-of-way Fence	<p>1st time to Committee. Project Specific provision requiring farm-field fence be pressure treated wood.</p>
10:40	627	SP 627 - ASAP Bridge	<p>1st time to Committee. Project Specific provision for design & construction of prefab structure.</p>
10:55	627	SP 627 - High Load Bearings	<p>1st time to Committee. Project Specific provision for high load multi-rotational bearings - Disc bearing assemblies.</p>
11:05	627	SP 627 - Cable Stay Repairs	<p>1st time to Committee. Project Specific provision for cable stay repair</p>
11:15	627	SP 627 - Cable Stay Tape	<p>1st time to Committee. Project Specific provision for cable stay taping</p>
11:25	650	SP 650 - Sodding	<p>1st time to Committee. Project Specific provision for sod installation.</p>
11:30	642	SP 642	<p>1st time to Committee. Project Specific provision for temporary erosion control requirements on New River Parkway.</p>
11:40	652	SP 652	<p>1st time to Committee. Project Specific provision for seeding & mulching requirements on New River Parkway.</p>
11:50	688	688 - Painting Metal Structures.	<p>1st time to Committee. Section updated, with complete Re-write.</p>

Note – This meeting will not be broadcast online.

Next Meeting

Wednesday, February 3, 2016 at 9AM

Building 5, Room 122: *(If Available. If not available a change in venue will be attached on the door)*

2016 Supplemental

The 2016 Supplemental is currently located online at this location:

<http://www.transportation.wv.gov/highways/contractadmin/specifications/Pages/default.aspx>

2016 Specifications Committee

The Specification Committee meets the first Wednesday of each month.

The remaining 2016 Committee dates are as follows:

February 3rd, March 2nd, April 6th, May 4th, June 1st, July 6th, August 3rd, September 7th, October 5th,
November 2nd, December 7th

Calendar subject to change, updates will be given, as needed.

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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

STATEWIDE SEALING CONTRACT

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

SECTION 403

CRACK SEALING IN ASPHALT PAVEMENT

403.1-DESCRIPTION:

The work shall consist of the cleaning, sealing, and filling of cracks and joints in asphalt pavement in the manner and subject to the conditions and regulations prescribed.

403.2-MATERIALS:

The material shall be hot poured crack sealant and conform to the requirements of Section 708.3 of the Standard Specifications. As well as being compatible with asphalt pavement recycling.

403.3-CONSTRUCTION:

403.3.1-Preparation of material for use: Before charging the compound into the melting unit, the unit shall be free from all foreign material. If the type of heater to be used requires that the sealing material, as shipped, be cut into smaller pieces before melting, the cutting method used is subject to the approval by the Engineer.

The heating kettle used for melting sealing materials shall be of the indirect heating or double boiler type, using oil as the heat transfer medium. It shall have a thermostatically controlled heat source, a built-in automatic agitator, and thermometers installed to indicate both the temperature of the melted sealing material and that of the oil bath. Other methods of indirect heating approved by the Engineer may be used. A positive means of controlling the temperature of the heat transfer at all points in the system shall be incorporated in the heater. Sealing material shall be uniformly heated until the pouring temperature recommended by the manufacturer is reached. Should the maximum pouring temperature recommended be exceeded, the material will be rejected. The material shall be poured as soon as possible after the pouring temperature is reached. Only sufficient material for the day's operation shall be heated each day.

403.3.2-Preparation of joints and cracks for sealing: The cracks shall be thoroughly cleaned of all loose scale, dirt, dust, other foreign matter prior to placing hot poured crack sealant.

403.3.3-Equipment for applying sealer: The equipment used shall consist of heating units from which material may be discharged into the crack through the use of flexible lines and suitable shoes.

403.3.4-Placement requirements: Any spillage of sealing material on pavements shall be immediately removed. A neat job with good workmanship will be required at all times. At no time shall sealing material be placed in a crack which is either dirty or wet. The crack shall be clean and surface dry at the time of placement. Work will be suspended when cracks are wet or damp and when the atmospheric temperature is below the minimum specified by the manufacturer. The standard overband shall be 3" centered over the crack.

403.3.5-Equipment, personnel, and documentation requirements: The Contractor (two (2) days prior to commencement of the project) shall submit to the Engineer a detailed list of all equipment to be used within the confines of the project. The Contractor shall also provide certification from the Sealing material manufacturer that the Contractor is qualified to apply the manufacturer's material in conformance with these specifications and the manufacturer's recommendations.

The Contractor is responsible for quality control, and shall employ a Project Control Coordinator at the Contractor's expense. The coordinator shall be designated and in attendance at the Pre-Construction Conference. This coordinator shall be a member of the Sealing Crew. The coordinator shall be responsible for all communication between the Sealing Crew and the Engineer.

The coordinator shall be required to fill out all Daily Sealing Report(s) and provide these completed forms to the Engineer for payment on a daily basis. The daily sealing reports shall be submitted no later than 24 hours after the work they represent has been completed. This Sealing report shall include but not be limited to the following:

1. Date
2. Location (Route # and MP)
3. Hours worked (including start and stop times)
4. Detailed listing of the Men and Equipment used
5. Amount of material used
6. Linear feet of Sealing performed
7. Detailed listing of traffic control devices used (including units and / or hours)
8. Weather information
9. Any other applicable information

Failure to deliver Sealing reports to the Engineer shall invoke daily liquidated damages as described in Section 108.7 and Table 108.7.1 of the West Virginia Division of Highway's Standard Specifications for each calendar day that the Contractor fails in delivering these sealing reports. Each week's liquidated damages are evaluated separately regarding delivery of sealing reports.

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The Department will randomly check the accuracy of these reports. If a discrepancy of more than 2% is found, the Contractor will be required to have an independent consultant, approved by the Division, verify all pay items on this contract. The cost of this consultant will be the responsibility of the Contractor and no reimbursement will be made by the Department.

The Contractor shall provide a calibrated measuring device for measuring the linear feet of Sealing Joints and Cracks for his use and an additional unit for use by the Department. (This will be at the Contractor's expense and shall be integral to the contract cost).

403.4-METHOD OF MEASUREMENT:

The quantity of work done will be measured in linear feet of “Crack Sealing in Asphalt Pavement”.

1. For longitudinal cracking along centerline, edgeline or joints measurement is to be conducted prior to cleaning and sealing.
2. For other cracking measurement is to be conducted after cleaning and prior to the placement of the sealant.

403.5-BASIS OF PAYMENT:

The quantity of work, as determined above, will be paid for at the contract unit price bid for the item below, which price and payment shall be full compensation for furnishing all materials, and doing all the work prescribed in a workmanlike and acceptable manner, including all the labor, tools, equipment, supplies and incidental necessary to complete the work.

403.6-PAY ITEM:

ITEM	DESCRIPTION	UNIT
403001-001	Crack Sealing in Asphalt Pavement	Linear Foot

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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

SECTION 607

GUARDRAIL

607.4.1-General:

ADD THE FOLLOWING AFTER THE THIRD PARAGRAPH:

Additional holes required in W-beam to secure rail to post shall be slotted per Standard Details. Slotted holes shall be placed so that they are free from tears, jagged edges and damage to the surrounding metal. Drilling to create slotted holes is forbidden.

607.7-BASIS OF PAYMENT:

REMOVE THE THIRD PARAGRAPH AND REPLACE IT WITH THE FOLLOWING:

Payment for Cut Slope Terminal Type A shall include extra-length guardrail posts as required, rubrail, excavating and backfilling the trench, reshaping, seeding and mulching of the cut slope, and either concrete block or soil plate anchor complete and in place. Cut Slope Terminal Type B shall include extra-length guardrail posts as required, drilling holes into the cut slope, and furnishing and installing rock bolts (2), end shoes (2), rubrail, and all other necessary hardware to complete the installation.

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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

SECTION 401

ASPHALT BASE, WEARING, AND PATCHING AND LEVELING COURSES

ADD THE FOLLOWING SUBSECTION TO THE SECTION:

401.4.3-Increase of Reclaimed Asphalt Pavement (RAP) in Asphalt Concrete Mixes: This Special Provision has been written to address the use of increased amounts of reclaimed asphalt pavement (RAP) used within mixes produced for projects in the WVDOH construction program.

The increased use of RAP can become an effective measure to help reduce overall construction costs and ultimately allow the WVDOH to treat more mileage within the established annual budgets. This will also allow the WVDOH to accomplish savings while at the same time, doing so in an environmentally responsible manner. However, it is important that any steps taken to use increased amounts of RAP be performed in a manner that will also not be detrimental to the quality of the asphalt concrete mixes produced.

The WVDOH will allow the increased use of RAP in Marshall Base 1 and Base 2, and Superpave 19 mm, 25 mm, and 37.5 mm mixes up to 25%. Initially, all mix designs shall be submitted in accordance to MP 401.02.24, with the exception that Section 5.0, Line 5.4 pertaining to RAP contents between 16% and 25% will be waived. The addition of up to 25% RAP will be allowed in Marshall Base 1, and Superpave 25 mm and 37.5 mm mixes for all applications provided that the processing of RAP is consistent with that discussed for State Funded projects below. For Marshall Base 2 and SP 19 mm, the following criteria shall be used for acceptance during production:

401.4.3.1-Interstates, APD Corridors, and Multilane Roadways:

- a) **Superpave 401 projects with PWL factors:** 25% RAP Base 2 or SP 19mm will be allowed.
- b) **All other projects will require one random loose roadway sample per 1000 ton placed.** Samples will be taken generally as per MP 401.07.21, by the Contractor along with WVDOH personnel. Each sample then will be tested by the Contractor in order to determine AC and gradation, and all such testing shall be witnessed by the WVDOH. The contractor must have an established ignition oven correction factor for both AC Content and gradation for each mixture. In addition this correction factor must be established prior to the project and will only be valid during the paving season it was established. All

sample results for AC and Gradation shall then be evaluated for additional pay factors as per Table 401.13.3.1 of the SP 401 Square Yard PWL, then applied in the formula shown below. The results for AC and gradation (minus #200) from QC samples at the plant will not be used for determination of pay adjustment. A lot will be 5,000 tons or portion thereof with a minimum of three samples. Portions less than 2,000 tons shall be incorporated into the previous lot. There will be no incentive for PWL from 96 to 100.

$$\text{Pay Deduction per Ton or SY (\%)} = \frac{100 - [(PF_{AC} + PF_G) / 2]}{2}$$

401.4.3.2-Other Federal Aid and NHS routes:

- a) WVDOH will monitor plant QC Samples for AC and gradation for the mix being produced. The contractor must have an established ignition oven correction factor for both AC Content and gradation for each mixture. In addition this correction factor must be established prior to the project and will only be valid during the paving season it was established. These results shall then be evaluated for additional pay factors as per Table 401.13.3.1 of SP 401 Square Yard PWL, and then applied in the formula shown below. A lot will be five samples or portion thereof with a minimum of three samples. Testing frequency shall be a minimum of 1 sample per 1,000 tons of daily production (maximum of 750 tons for adjusted sublots) and shall include gradation and AC content for each sample. There shall be at least one sample per day of production. Lots may cover more than one project, but no more than three. Any penalties calculated shall be applied to all the material represented by the testing of the evaluated lot. Portions less than two samples shall be incorporated into the previous lot. There will be no incentive for PWL from 96 to 100.

$$\text{Pay Deduction per Ton or SY (\%)} = \frac{100 - [(PF_{AC} + PF_G) / 2]}{2}$$

401.4.3.3-State Funded Projects (including Marshall Wearing IV or Superpave 19mm may be used as surface mix on routes with ADT below 3000):

- a) Process for addition of RAP shall include initial scalping to remove + 3/4" (19 mm) material and proper stockpile management in accordance with Best Practices for RAP Management as documented by NCHRP report 752, Appendix D, and as discussed in Publication No. FHWA-HRT-11-0-21. These documents can be accessed at the respective links below:

http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_752.pdf

<http://www.fhwa.dot.gov/publications/research/infrastructure/pavements/11021/11021.pdf>

The submission of mix designs shall be done in the same manner as described for Marshall Base 2/Superpave 19 mm above and production shall be monitored as described above for other Federal Aid or NHS Routes.

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**WEST VIRGINIA
DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION**

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

SECTION 481

ASPHALT INTERLAYER MEMBRANE

481.1 – DESCRIPTION:

This section covers the materials, equipment, construction and application procedures for placing pavement interlayer used to mitigate reflective cracking in asphalt pavements. The pavement interlayer is a process of applying a stress absorbing membrane over existing cracks. All materials are to be properly proportioned, mixed, and installed to the paved surface in accordance with this Specification, conformity to the dimensions and typical cross sections shown on the pavement interlayer layout, and as directed by the Engineer.

481.2 – MATERIALS:

Furnish the components of the pavement interlayer to include bond primer, interlayer membrane, and all other materials in accordance with the manufacturer’s recommendation. Use materials meeting the following:

481.2.1 Interlayer Membrane – The interlayer membrane shall consist of an approved membrane sandwiched between two layers of geotextile fabric. The bottom geotextile shall be designed to fully bond with the existing pavement and be capable of accommodating construction traffic without breaking its bond to existing pavement. The membrane compound shall be designed to prevent water from infiltrating the pavement base course through existing cracks or joints in the pavement, and act as a stress absorbing membrane between the new overlay and the underlying pavement. The geotextile on the top of the composite shall also be designed to fully bond with the asphalt overlay and provide high tensile stiffness reinforcement to the overlay. The interlayer membrane shall be supplied in rolls of minimum 24 inch width.

The interlayer membrane shall meet the minimum the quality standards discussed above. The Contractor shall make the materials submittals at least 30 days prior to planned initial installation. No installation will be permitted until the materials have been approved in writing by the Engineer.

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The stress absorbing membrane shall have the following physical characteristics:

Property	Value	Test Method
Cold Flex	No cracking at 0° F	ASTM D 146 mod.
Tensile Strength	2,000 psi minimum	ASTM D 412 mod.
Puncture Resistance	998 lbs	E 154-93
Elongation @ peak	10% minimum	ASTM D 412 mod.
Weight	0.8 lbs/sf typical	ASTM D 1910
Mastic Density	70 lbs/cubic foot min.	E 12
Thickness	0.135 inches typical	ASTM D 1777
Water Absorption	1% maximum	ASTM D 517
Brittleness @77 ⁰ F	Passes	ASTM D 517
Softening Point mastic	210°F-230°F	ASTM D 36
Adhesion of Fabric to compound	15 lb./in width	ASTM D 1000

481.2.2 Bond Primer - A bond primer shall be used in accordance with the manufacturer recommendations. Material that will be used as a bond primer must be submitted to the Engineer with the other material submittals.

481.3 - CONSTRUCTION:

481.3.1 Equipment - Provide safe, environmentally acceptable equipment that can produce a specification product. All equipment, tools, and machines used in the application of pavement interlayers shall be maintained in satisfactory working conditions at all times.

481.3.1.1 Pneumatic Rollers - A minimum of two self-propelled rollers shall be used on the project unless otherwise requested by the Project Manager. The rubber tired rollers shall have a gross load adjustable to apply 200-250 psi (1379-1724 kPa) of rolling width. Tire pressure shall be specified for the pneumatic tire rollers and shall not vary more than plus or minus 5.0 psi (34.5 kPa). It is recommended that the rollers travel no more than 10 miles per hour

481.3.1.2 Sweepers - Self-propelled four wheeled rotary mechanical brooms and or vacuum brooms capable of operating in both forward and reverse is recommended. Brooms should be checked to ensure they are in good condition and meet applicable environmental standards.

481.3.1.3 Miscellaneous Equipment - Provide hand squeegees, shovels, wire brushes, and other equipment as necessary to perform the work within the manufactures recommendaitons. Provide cleaning equipment such as power brooms, air compressors, water flushing equipment, and hand brooms for surface preparation.

481.3.2 Application – Pavement interlayers shall be applied in a manner to address cracks and joints in pavement that typically lead to reflective cracking in asphalt pavements. A manufacturer's representative shall be present on site for the initial start of the installation.

481.3.2.1 Weather Limitations – Membrane shall be applied when existing surface temperature is a minimum of 40 °F and rising. Surface shall be swept prior to membrane application. During installation weather must be dry, with no rain, drizzle or fog. Additionally, installation should not occur at temperatures less than the dew point due to the possibility of presence of surface moisture.

481.3.2.2 Surface Preparation - The surface shall be thoroughly clean and dry when the membrane is applied. The surface must be free of dirt, water, vegetation, and loose materials. The surface should be swept or blown with clean moisture and oil free compressed air. Material cleaned from the surface shall be removed and disposed of as directed by the engineer. Areas that are not adequately cleaned with sweeping or air may require scraping with shovels or other hand tools, followed by compressed air blowing. Surfaces with bonded accumulations may require more intensive cleaning procedures such as high pressure water blasting, wire brushing or abrasive cleaning.

Areas to have membrane placed shall be assessed and pre treated in accordance with Table 481.3.2.2.

Table 481.3.2.2 – Crack Pretreatment

Crack/Joints	Fill	Note:
½" wide or less	NA	
greater than ½" but less than 2" wide	Pre approved crack filler or hot mix asphalt	
Greater than 2" wide	Hot mix asphalt	
Greater than ½" vertical displacement	Wedged with compacted hot mix asphalt	
<ol style="list-style-type: none"> 1. Hot mix asphalt used to fill cracks or to wedge vertical displacement shall be limited to a maximum aggregate size of 3/8". 2. Hot mix asphalt used to fill cracks shall conform to Section 401. 3. Hot mix asphalt used to fill cracks shall be paid at the unit price of asphalt in the contract. 4. All filler or hot mix shall be compacted and level with the existing surface. 		

481.3.2.3 Solvents - The use of solvents (i.e., kerosene, gasoline, diesel fuel, and such) or other materials such as those used to clean paving equipment and tools is strictly prohibited. In the event that such solvents or materials come in contact with the membrane material the contaminated material shall be immediately removed from the jobsite and discarded.

481.3.2.4 Bond Primer Application - A properly applied layer of primer is required to adhere the interlayer membrane to the existing pavement surfaces. Surface shall be primed according to manufacturer's recommendations prior to placement of the membrane. The primer shall be placed on the surface, at a minimum rate of 0.0225

gallons per square yard (0.036 gallons per square yard on milled or distressed surfaces) at least 1 inch wider than the membrane and shall dry to be tack free before applying the membrane.

481.3.2.5 Membrane Placement - The membrane shall be placed in such a manner as to leave no voids between the membrane and the pavement at faulted joints. Membrane shall be installed straight and wrinkle free with no curled or uplifted edges. Any wrinkles over 3/8" in width shall be slit and folded down.

The membrane shall be installed in widths of 24" minimum and shall be centered over the joint or crack with $\pm 2"$. Transverse membranes shall be extended 4" to 6" beyond each pavement edge. Laps will be permitted in both the transverse and longitudinal membranes with a minimum overlap of 3". All laps shall be made in such a manner that the paver does not encounter the exposed edge of the lap first

Membrane shall not be left exposed to ultra-violet rays for over 20 days without protective cover or coating.

481.3.2.6 Rolling the Membrane - Immediately following the application of the membrane material, it shall be pressure rolled with a pneumatic roller to establish a tight and full continuous bond with the underlying surface.

481.3.3 Asphalt Overlay – After the membrane has been applied to the surface an asphalt concrete overlay having a minimum thickness of 2" is required prior to opening to traffic. The overlay process shall begin no sooner than 30 minutes after the membrane has been rolled. A tack coat meeting the requirements of Section 408 shall be applied over the membrane and the adjacent surface.

The asphalt overlay shall meet the requirements of Section 401 and conform to the contract documents.

481.3.4 Pre-paving Meeting - Hold an on-site pre-paving meeting with the Engineer before beginning work to review and discuss the following.

1. Detailed work schedule
2. Traffic control plan
3. Equipment inspection, including transport units

481.3.6 - Traffic Control – The interlayer membrane shall not be opened to the traveling public prior to being overlain with asphalt. Do not allow construction traffic on the membrane until it has cured sufficiently to prevent pickup by equipment tires or tracks. Protect the membrane from damage at intersections and driveways. Repair all damage to the membrane caused by construction traffic. All costs associated with this repair work will be borne by the Contractor. Otherwise Traffic Control will be in accordance with Section 636, and the *Manual on Temporary Traffic Control For Streets and Highways, Current Edition*, or as directed by the Engineer.

481.3.7 Quality Control - A interlayer membrane is be installed in accordance with quality control tolerances set by the manufacture. Identify the cause of the deviation and determine the corrective action necessary to repair the membrane and prevent further damage.

For Quality Assurance purposes, all joints and edges should be inspected for adhesion and sealing. If deficiencies are noted, they are to be corrected before proceeding with additional construction. Secure the Engineer's approval before resuming work.

481.4 - MEASUREMENT AND PAYMENT:

Payment for interlayer membranes includes all materials, equipment, labor for preparing the surface, placing temporary pavement markings, placing the membrane and complying with all requirements as specified in the contract documents.

The completed work as measured will be paid for at the contract unit price for the Items detailed in Section 481.5.

481.5 – PAY ITEMS:

ITEM NUMBER	DESCRIPTION	UNIT
481001-001	ASPHALT INTERLAYER MEMBRANE	SQUARE YARD (SY)

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**WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
SUPPLEMENTAL SPECIFICATION**

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

SECTION ###

**RUBBLIZATION OF
PORTLAND CEMENT CONCRETE PAVEMENT**

###.1-DESCRIPTION:

This section covers the equipment, construction and testing procedures for in place Rubblization of Portland Cement Concrete (PCC) Pavement for creating a base material for either asphalt pavement or new PCC pavement. Rubblization is the process of breaking and compacting the existing pavement. All equipment and materials shall be provided in accordance with this Specification and as directed by the Engineer.

###.2-MATERIALS:

As rubblization is a process materials are limited to aggregate or processed RAP that is used to fill voids, holes, or low spots in the rubblized pavement.

###.2.1-Fill Aggregate: The fill aggregate shall be clean, durable stone such as granite, slag, limestone or other high-quality aggregate. The quality of the fill material is important to the success of the base of the pavement. A hard, crushed, single size aggregate is recommended. Fill Aggregate shall meet the requirements listed in Section 703 of the Standard Specification. .

###.2.3-Reclaimed Asphalt Pavement: Reclaimed Asphalt Pavement (RAP) may be substituted for the fill aggregate material on roadways. Materials testing will be waived, however the RAP shall be processed allowing for the Top Size gradation not to exceed 3/4 inches (19 mm) or the maximum fill thickness. Approval shall be by visual inspection by the Engineer. Payment for RAP fill material substitution shall be at the same unit bid price for Fill Aggregate.

###.3-EQUIPMENT:

###.3.1-Equipment: Provide safe, environmentally acceptable equipment that can produce a specification product. All equipment, tools, and machines used in the process of rubblization shall be maintained in satisfactory working conditions at all times.

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###3.1-Breaker: Do we want to spec the types and sizes of the breakers or just let the broken sizes dictate? Like performance spec...

###3.1.1-Multi-Head Breaker (MHB): The equipment shall consist of a self-contained, self-propelled MHB. Hammer heads shall be mounted laterally in a single row or in pairs with half the hammers in a forward row, and the remainder diagonally offset in a rear row so there is continuous pavement breaking from side to side. This equipment shall have the capability of rubblizing pavement up to 13 ft. (4 m) in width, in a single pass. Hammer drop height shall have the ability to be independently controlled.

###3.1.2-Resonant Breaker: The equipment shall consist of a self-contained, self-propelled resonant frequency pavement breaking unit capable of producing low amplitude, 2,000 lbs. (8,880 N) blows, at a rate of not less than 44 per second.

###3.2-Vibrator Roller: Use a vibratory steel wheel roller having a total weight of not less than 10 tons. Operate the roller in the vibratory mode and at a speed not to exceed 6 feet (1.8 m) per second.

###3.3-Pneumatic Roller: A self-propelled rubber tire roller shall be used on the project unless otherwise requested by the Project Manager. The rubber tired rollers shall have a gross load adjustable to apply 300-500 psi of pressure for the tire rolling width. Tire pressure shall be specified for the pneumatic tire rollers and shall not vary more than plus or minus 5.0 psi (34.5 kPa). It is recommended that the rollers travel no more than 10 miles per hour

###3.4-Z-Plate Roller: The equipment shall consist of a self-contained, self-propelled vibratory steel wheel roller with a Z-pattern grid cladding mounted transversely to the surface of the drum. The vibratory roller shall have a minimum gross weight of 9 metric tons (10 tons).

###3.5-Miscellaneous Equipment: Provide hand rakes, shovels and other equipment as necessary to perform the work. Provide cutting equipment to cut reinforcing steel should it become exposed.

###4-CONSTRUCTION:

###4.1-Quality Control Plan: Breaking shall be accomplished a Rubblization Quality Control Plan shall be submitted to the Engineer detailing the process, equipment, and personnel to be used. Prior to the acceptance of the proposed breaking plan, the Contractor shall complete a strip for evaluation by the Engineer. To ensure the pavement is being broken to the specified dimensions. The Contractor shall excavate a broken area of 10 sq. ft. (1 sq. m), in two separate locations during the first day of breaking, as directed by the Engineer. Modifications to the breaking procedure must be made if the size requirements are not met. These excavations may be repaired with replacement material. If breaking procedures or conditions change, additional excavations to inspect the broken pavement dimensions shall be made, as directed by the Engineer.

###4.2-Pavement Preparation: Prior to rubblization asphalt concrete overlays and patched larger than three square feet shall be removed from the PCC pavement. The

Engineer shall verify the removal of asphalt pavements and approve the pavement for beginning the rubblization process

Saw full depth joints and completely sever load transfer devices to isolate the rubblizing area. Saw jointed pavements at an existing joint. PCC pavement or other PCC appurtenances to remain in place shall be saw cut and severed from the pavement to be rubblized with a full-depth saw cut.

Care shall be taken to not damage adjacent pavement during rubblization. Repair damage to the adjacent pavement caused by contractor as the engineer directs, at no cost to the Division.

The Contractor shall prevent damage to underground utilities and drainage structures during rubblizing. Approved alternate breaking methods shall be used over underground utilities and drainage structures as specified on the plans or directed by the Engineer.

###.4.3-Rubblization Process: Break the concrete pavement uniformly across the pavement width into particles that have a maximum dimension no greater than 12 inches.

Above the reinforcing steel or upper one-half of the pavement, the equipment shall break the pavement such that at least 75% of the pieces (by weight) are a maximum of 2 in. (50 mm).

Below the reinforcing steel or in the lower one-half of the pavement, at least 75% of the pieces shall be a maximum of 6 in (150 mm).

Concrete to steel bond shall be broken. Uniform breaking shall be maintained through successive passes of the breaking equipment.

###.4.3.1-Determining Particle Size: Determine particle size by excavating 2 test holes, of about 10 square feet each, during the first half day. Excavate at least one test hole per lane mile thereafter. Backfill and restore the stability of each test hole.

###.4.3.1-Existing Reinforcing Steel: Remove reinforcing steel exposed at the surface by cutting below the surface, disposing of the steel off site, and using fill aggregate to level the surface. Do not remove unexposed reinforcing steel.

###.4.4-Compaction: Prior to placing the asphalt overlay the complete width of the broken pavement shall be compacted by vibratory steel wheel and pneumatic tire rollers in the following sequence:

###.4.4.1-After Breaking: A minimum of four (4) passes with z-pattern steel gird roller, four (4) additional passes with a vibratory roller, and two (2) passes with a pneumatic tire roller.

###.4.4.2-Immediately Prior to Overlay: A minimum of two (2) passes with a vibratory roller.

###.4.5-Regrading: The contractor shall not trim the broken or rubblized pavement, or otherwise attempt to grade the broken or rubblized pavement to improve grade lines.

###.4.6-Additional Fill Aggregate: Fill holes and localized depressions, deeper than 2 inches, with fill aggregate and compact as the engineer directs.

###.4.7-Opening to Traffic: Public traffic will not be allowed on the rubblized pavement before the required asphalt overlay(s) are in place, except at crossovers and/or

access points. Public traffic will not be allowed on a rubblized crossover or access point for more than 24 hours. Maintenance of crossovers and/or access points shall be as specified by the Engineer. Crossovers and/or access points shall be maintained in the same compacted state as the other areas, until the asphalt overlay is in place. Construction traffic on the rubblized base shall be limited to delivery of materials directly ahead of the paver.

Otherwise Traffic Control will be in accordance with Section 636, and the *Manual on Temporary Traffic Control For Streets and Highways, Current Edition*, or as directed by the Engineer

###.4.8-Paving Limitations: A tracked paver shall be used to place the first lift of hot-mix asphalt binder over the prepared rubblized pavement. During stage construction, the overlay width shall be such that it will not interfere with subsequent rubblizing operations. At a given location, the overlay shall be placed within 48 hours of the pavement breaking operation.

If rain occurs between rubblizing and paving, the rubblized pavement shall be dry and stable to the satisfaction of the Engineer before the paving operation begins.

If a material transfer device is proposed, the Contractor shall submit equipment specifications with axle loading configurations and proposed paving sequence to the Engineer three weeks prior to paving. The Engineer will provide any equipment restrictions based on device loadings and proposed paving sequence.

###.5-MEASUREMENT AND PAYMENT:

Payment for rubblization includes all materials, dust control, equipment, labor for preparing the surface, breaking the existing pavement, and complying with all requirements. Rubblizing shall be measured for payment in Square Yards of existing pavement in place.

The completed work as measured will be paid for at the contract unit price for the Items detailed in Section ###.6.

###.6-PAY ITEMS:

ITEM NUMBER	DESCRIPTION	UNIT
###001-001	RUBBLIZATION	SQUARE YARD (SY)
###002-0011	FILL AGGREGATE	TONS (TN)

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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

SECTION 406
HIGH FRICTION SURFACE TREATMENT

406.1-DESCRIPTION:

This work shall consist of the construction of a high friction surface treatment (HFST) material, composed of binder material and aggregate, upon an existing surface, in accordance with these Specifications and in reasonably close conformity with the lines, grades, thicknesses, and cross sections shown on the Plans or established by the Engineer.

The contractor shall notify the Engineer a minimum of two weeks prior to starting any surface treatment operation.

406.2 - MATERIALS:

The materials shall conform to the requirements of the following:

The binder shall be a ~~two-part~~ **multi-component** cold-applied modified exothermic **epoxy polymer** resin binder treatment. ~~containing epoxy/amine binder.~~ The binder shall cure exothermically and hold the aggregate firmly in position and meet the following requirements:

Table 406.2a - Two-Part Multi-Component Modified Binder

<u>Property</u>	<u>Test Method</u>	<u>Specification Limits</u>
Ultimate Tensile Strength	ASTM D638	2800 psi
Elongation at break point	ASTM D638	30.0% minimum (54%)
Hardness	Durometer (shore)	60.0 minimum (70.0-90.0)
Compressive Strength	5mm min.	1600 psi
Gel Time	100 (g) mix	10 minutes min. (16 min)
Cure Rate	Thin film @ 75 °F	
	2 hours	

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Multi-Component Modified Binder Resin System

Property	Test Method*	Specification Limits
Viscosity	ASTM D2556	7 – 30 P
Durometer Hardness	ASTM D2240	60 - 80
Cure Rate (Dry through time)	D1640	3 hours max.
Adhesive Strength	ASTM C1583	250 PSI min. (100% substrate failure)
Ultimate Strength	C-579	2000 – 5000 PSI
Compressive Strength		1000 psi (@ 3 hours 5000 psi @ 7 days
Elongation at break point	ASTM D-638	30% min.
Gel Time	ASTM C-881	10 minutes min.
Water Absorption	ASTM D-570	1 % max.
Mixing Ratio	Per Manufacturer’s Recommendations	

Additional testing notes for laboratory: Prepare all samples per manufacturer’s recommendation*

- Viscosity – prepare one pint sample and mix for 2 to 3 minutes before testing. Use X1.1 for spindle selection and test at a temperature of 73 ± 2°F.
- Gel Time – Prepare a 60 g sample per manufacturer’s recommendation. Perform testing at a temperature of 73 ± 2°F.
- Cure Rate – Prepare specimens of 50-55 wet mil thickness.

Cure the following test specimens for 7 days at 73 ± 2°F, and test immediately without delay.

- Durometer Hardness – Use the type 1 precision type D method.
- Compressive Strength – Prepare specimen according to Method “B”, 2” x 2” cube, using 2.75 parts of sand to one part mix polymer resin by volume. Sand must conform to ASTM C778, 20-30 sand.
- Ultimate Tensile Strength Prepare Type 1 specimens in accordance to ASTM D638.
- Elongation at break point – Prepare Type 1 specimens in accordance to ASTM D638.

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The aggregate shall be bauxite material that is clean, dry and free from foreign matter and meets the following requirements:

Table 406.2b - Aggregate

<u>Property</u>	<u>Test Method*</u>	<u>Specification Limits</u>
SFC – Side Force Coefficient	ASTM E670-94 0	.70 minimum
SRV/SRT – Skid Resistance Value Test	ASTM E-274	65.0 mm min (70 mm)
PSV – Polished Stone Value	ASTM E660-96	75.0 mm max (70 mm)
Texture Depth – Sand Patch Method	ASTM E965	1.0 mm min (1.2 mm)
AAV-Aggregate Abrasion Value	AASHTO T96	20.0 max.
Aggregate Gradation	AASHTO T27	95.0–100.0% Passing No. 6 0.0-5.0 % Passing No. 16
Aluminum Oxide Content	ASTM C-25	87% min

* As an option, and with approval of the Engineer, the current edition of a corresponding AASHTO test may also be used in lieu of any ASTM test.

406.2.1 - Quality Control Testing: Quality control is the responsibility of the Contractor as specified in 106.1.

The contractor shall design a quality control plan in accordance with applicable section of MP307.00.50, excluding attachment 1, detailing the methods by which the quality control program will be conducted. Samples shall be obtained at a minimum frequency of one sample per day of aggregate placement.

406.3 ACCEPTANCE TESTING

Acceptance sampling and testing of aggregates is the responsibility of the Division, except for furnishing the necessary materials. Quality control sampling and testing performed by the Contractor may be used by the Division for Acceptance.

406.3.1- Skid Testing : The skid testing will be conducted within 90 days of the completed project installation by the Division or an independent testing firm at the discretion of the Division. Any surface application with a skid value less than 69 will be deemed unacceptable. The installed system will be tested for skid resistance 12 months after initial test, but not greater than 14 months, to determine friction compliancy to a minimum requirement of 64. Any surface application with less than 64 will be deemed unacceptable and will require reinstallation of the complete surface system at no cost to the Department.

406.3.2 - Acceptance for the Grading of Aggregate: Acceptance for gradation shall be on the basis of test results on consecutive random samples from a lot. A lot shall be considered the quantity of material represented by an average test value, not to exceed five sublots. Generally at the beginning of the project, the average shall be started on the second sample in accordance with MP 300.00.51. A subplot is the quantity of material

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represented by a single gradation test. In the case where only one sample is taken, this subplot shall be considered the lot. The material shall be sampled and tested in accordance with the applicable specification. The gradation test results shall be plotted on a control chart in accordance with MP 300.00.51. When the average, or when the most recent three consecutive individual test values fall outside the guidelines for this aggregate the lot of material represented will be considered nonconforming to the extent that the last of its sublots is nonconforming. When this occurs, the last subplot shall have its price adjusted in accordance with Table 406.3.2.2. In the case where the average is nonconforming and the last subplot contained is conforming, then there would be no price adjustment. In no event, however, shall a subplot of material have its price adjusted more than once, and the first adjustment, which is determined, shall apply.

406.3.2.1 - Degree of Nonconformance: When a subplot of material is to have its price adjusted, the percentage point difference between the nonconforming test value and the specification limit shall be determined for each sieve size determined to be nonconforming and this value shall be multiplied by its appropriate multiplication factor as set forth in Table 406.3.2.1 to determine the degree of nonconformance on that sieve.

TABLE 406.3.2.1

NONCONFORMING MULTIPLICATION SIEVE SIZE	FACTOR
4 IN (100mm) to No 16(1.18mm)	1.0
No 40 (4.25µm) to No 50 (300µm)	1.5
No 100 (150µm)	2.0
No 200 (75µm)	3.0

The total measure of nonconformance of an individual subplot is the sum of all nonconformances on the various sieve sizes of that subplot. When the total degree of nonconformance has been established and it is 12.0 or less, the material will be paid for at an adjusted contract price as specified in Table 406.3.2.2. When the degree of nonconformance is greater than 12.0, the nonconforming subplot shall be resolved on an individual basis, requiring a special investigation by the Engineer to determine the appropriate course of action to be followed.

406.3.2.2 - Price Adjustment: Aggregates not conforming with the gradation requirements will be paid for at the adjusted contract price based on the degree of nonconformance as specified in Table 406.3.2.2.

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TABLE 406.3.2.2

ADJUSTMENT OF CONTRACT PRICE FOR GRADATION NOT WITHIN SPECIFICATIONS	
DEGREE OF NONCONFORMANCE	PERCENT OF CONTRACT PRICE TO BE REDUCED
1.1 to 3.0	2
3.1 to 5.0	4
5.1 to 8.0	7
8.1 to 12.0	11
Greater than 12	*

* The Division will make a special evaluation of the material and determine the appropriate action. Pending resolution of the matter, additional lifts of base or pavement shall not be placed over the nonconforming material.

CONSTRUCTION METHODS

406.4 - WEATHER RESTRICTIONS:

The epoxy polymer binder material shall not be placed on a wet surface, when the ambient air or surface temperature is either *below 50 degrees Fahrenheit or ambient temperature above 110 degrees Fahrenheit, or when the anticipated weather conditions or pavement surface temperature would prevent proper application of the surface treatment as determined by the Engineer in consultation with the manufacture’s representative.

*Applications below 50 degrees Fahrenheit will be considered acceptable if the manufacturer can demonstrate a cure rate (dry through time) of <3 hours at representative field conditions.

Do not place the HFST with visible moisture on the prepared surface at the time of placing. Test for moisture in the pavement by taping an 18”x18” plastic sheet to the pavement per ASTM D4263. Perform the plastic sheet test only when surface temperatures and ambient conditions are within the established parameters for application of the overlay system. In the event of rain, the pavement must be allowed to air dry prior to performing the plastic sheet test. A 2 hour minimum test duration is allowed in lieu of the 16 hours specified in ASTM D4263.

406.5 - METHODS:

The Contractor shall ensure that a manufacturer’s representative is on site to provide technical assistance during the start up operations and as necessary during the surface preparation, material placement and during any necessary remedial work.

The contractor shall cover and protect all existing pavement markings and utilities that are left in place prior to placement. All inadequately sealed joints and cracks greater than ¼” shall be cleaned and filled with a mixed epoxy specified herein or crack sealant approved by the epoxy polymer resin manufacturer.

For applications on new asphalt pavements, install the epoxy polymer

binder and high friction aggregate topping a minimum of 30 days after placement of the new pavement. ~~underlying and adjacent pavement. On new concrete surfaces, all curing compounds must be completely removed prior to installation.~~

Surfaces shall be clean, dry, and free of all dust, oil, debris and any other material that might interfere with the bond between the polymer resin binder material and existing surfaces. Adequate cleaning of all surfaces will be determined by the manufacturer's representative. Utilities, drainage structures, curbs and any other structure within or adjacent to the treatment location shall be protected from the application of the surface treatment materials. Cover and protect all existing pavement markings that are adjacent to the application as directed by the Engineer. Pavement markings that conflict with the surface application shall be removed by grinding and the surface shall be swept clean prior to the polymer binder application.

Clean concrete pavement surfaces by shot blasting and vacuum sweeping. Shot blast all surfaces to remove all curing compounds, loosely bonded mortar, surface carbonation, and deleterious material. Ensure that the prepared surface complies with the International Concrete Repair Institute (ICRI) standard for surface roughness CSP 5. After shot blasting, vacuum sweep or air wash, with a minimum of 180 cfm of clean and dry compressed air, all surfaces to remove all dust, debris, and deleterious material. Maintain air lance perpendicular to the surface and the tip of the air lance within 12 inches of the surface.

~~The Contractor shall place the surface treatment in accordance with the manufacturer's recommended methods at the thickness and details as shown in the contract documents and proportion the two part modified epoxy binder components to the correct ratio and mix as recommended by the manufacturer and hand mix the epoxy binder components or other approved methods as directed by the Engineer.~~

~~The Contractor shall have any automated/mechanical application equipment approved for use by the manufacturer of the high friction surfacing system.~~

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~~The Contractor shall uniformly distribute the epoxy binder over the pavement section to be treated and within the temperature range as specified at a uniform application thickness. The operations shall proceed in such a manner that does not allow the epoxy material to chill, set up, dry, or otherwise impair the retention of the covered aggregate.~~

~~The mixing components can be hand or mechanically applied onto the cleaned surface according to the epoxy binder manufacture's recommendations.~~

~~The Contractor shall apply the aggregate at a minimum rate of approximately 13-15 lbs per square yard immediately after placing the modified epoxy binder. Coverage shall be such that binder is not tracked by construction equipment. The placement of this material does not require compaction.~~

~~The treatment shall cure in accordance with manufacturer recommendations, at least 3 hours at ambient air temperature of at least 50 degrees Fahrenheit. The Contractor shall then remove the excess aggregate by hand or suction sweeping before opening roadway to traffic. Additional sweeping may be necessary after the system fully cures as determined by the inspector. The retained aggregate coverage rate should be approximately 12-14 lbs per square yard.~~

~~The HFST must conform to the following:~~

- ~~1. Surface preparation work, surface temperature, placement of the HFST must be in conformance with the binder supplier's specifications, these special provisions and as approved by the Engineer.~~
- ~~2. The minimum spread rate for polymer resin binder is 25-32 sf./gal.~~
- ~~3. The minimum spread rate of retained aggregate is 13-20 lb/sq yd.~~
- ~~4. HSFT must be allowed to cure for the minimum duration as recommended by the supplier's specifications and during that time the application area must be closed to all traffic including Contractor's equipment.~~

~~Mixing and Application Methods~~

~~Utilize one of the following methods to apply the resin binder and aggregate wearing course, in accordance with manufacturer's recommendations. Application method 1 shall be utilized on areas greater than 250 feet in length.~~

~~1. Automated Continuous Application~~

~~Automated continuous application shall be performed by an applicator vehicle with a minimum aggregate capacity of 40,000lbs and a minimum of 1200 gallons of the resin binder. The applicator shall continuously mix, meter, monitor and apply the resin binder and high friction aggregate in one continuous application pass.~~

~~The applicator vehicle shall be equipped with an inbuilt data management unit which is capable of producing real time data flow showing the volume of resin, the resin mil thickness on average throughout the application width, the volume of aggregate applied throughout the application width. The automated continuous application vehicle will have continuous pumping and portioning devices that blend the polymer binder within a controlled system. The polymer binder shall be blended and mixed in the ratio per the manufacturer's specification (+/- 2% by volume); the polymer binder shall be continuously applied once blended. The application vehicle should be capable of applying the minimum polymer binder spread rate.~~

~~The high friction aggregate shall be applied by the same automated continuous application vehicle that applies the resin binder to the pavement section. The automatic aggregate spreader shall be capable of applying up to a continuous 12 foot width~~

application. The high friction aggregate shall be applied within 3 seconds (+/- 1 sec) of the base polymer binder application onto the pavement section, from a minimum height of 12 inches from above the pavement section surface, at the minimum spread rate.

No exposed wet spots of the polymer binder shall be visible once the aggregate is installed. The operations should proceed in such a manner that will not allow the mixed material to separate, cure, dry, be exposed or otherwise harden in such a way as to impair retention and bonding of the high friction surfacing aggregate, walking, standing or any form of contact or contamination with the wet uncured resin will result in that section of resin being removed and replaced at the contractor's expense.

2. Hand Mixing and Application

For areas deemed to be low volume and areas less than 250 feet in length, hand-mix the resin binder in accordance to the manufacturer's recommendations. Uniformly spread the resin binder onto the surface using a serrated edge squeegee. Immediately broadcast the high friction surfacing aggregates until refusal.

The excess aggregate can be reused; the aggregate shall be reclaimed by a mechanical sweeper, the recovered aggregate must be clean, uncontaminated and dry.

Excess and loose aggregate must be removed from the traveled way and shoulders by street sweeping. Application of HFST on highway ramps require a second street sweeping 24-48 hours after application on the ramp.

Utilities, drainage structures, curbs, and any other structures within or adjacent to the treatment location must be protected against the application of the HFST materials.

When magnesium phosphate concrete is placed prior to the HFST bridge deck overlay, the magnesium phosphate concrete must be placed at least 72 hours prior to placing the polymer resin binder.

When modified high alumina based concrete is placed prior to the HFST bridge deck overlay, the polymer resin binder must not be placed on the concrete until at least 30 minutes after final set of the modified high alumina based concrete.

Expansion joints and deck drains must be adequately isolated prior to applying HSFT.

All debris, excess aggregate, material containers, and other waste shall be disposed of off the Right-of-Way according to Section 207 by the Contractor at no direct cost to the Department.

Any roadway features disturbed by the work of the Contractor's operations shall be restored in kind by the Contractor and approved by the Engineer at no cost to the Department.

406.7 - CLEANING AND SWEEPING:

~~The Contractor shall clean existing surface by use of mechanical sweepers, high pressure air or other methods approved by the manufacturer prior to installation. Receiving surfaces must be clean, dry and free of all dust, oil, debris and any other material that might interfere with the bond between the epoxy polymer binder material and existing surfaces. Asphalt surfaces may need to be washed with a mild detergent, rinsed, and dried unless waived by the Engineer. Concrete surfaces may need to be shot, sand or water blasted. The contractor shall remove existing pavement markings as stipulated in the contract documents. Adequate cleaning of all surfaces will be determined by consultation with the manufacturer's representative.~~

Excess and loose aggregate must be removed from the traveled way and

March 11, 2015

shoulders by street sweeping. Application of HFST requires a second street sweeping 24-48 hours after application.

406.8-JOINTS:

The longitudinal construction joints between adjacent lanes shall be kept clean of material foreign to the type of surface being treated. The joints shall be constructed without overlaps or gaps between the materials.

The transverse joint at the end of successive sections or lanes shall be covered with paper to prevent overlapping of the binder material. Following its use, the paper shall be removed and disposed of satisfactorily.

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406.9 - PROTECTION OF PAVEMENT AND TRAFFIC CONTROL:

The Contractor shall be responsible for the protection of the surface against damage by their equipment and personnel. Traffic shall not be permitted on any part of the work under construction until the treatment has cured sufficiently to prevent raveling or pickup under traffic. The applicable provisions of 636 shall apply for regulating traffic.

~~406.10-SEQUENCE OF OPERATIONS AND QUANTITIES OF MATERIALS:~~

~~The quantities and kinds of materials to be used and the sequence of applications and operations for the various treatments shall be as follows. The quantities shown are the rates per square yard (meter).~~

~~The rates of aggregate and binder material may be adjusted by the engineer. When in the opinion of the engineer adequate coverage is not being obtained.~~

- ~~i. Clean and sweep.~~
- ~~ii. Epoxy Binder material shall be applied according to the manufacture's recommendations.~~
- ~~iii. Spread immediately 13 to 15 lb. of aggregate material.~~
- ~~iv. Remove access aggregate after manufactures specified cure time.~~

406.11-METHOD OF MEASUREMENT:

No materials shall be removed from the Project for any purpose until the operation has been completed and the quantities of materials incorporated into the operations have been determined, except when authorized by the Engineer.

The quantities of work done will be measured as follows:

Where a surface treatment is placed upon a base constructed as an item in the same contract, the conditioning and cleaning and sweeping of the base shall be considered as a part of the construction of the base and no additional compensation will be allowed for "Cleaning and Sweeping".

The Quantity of "High Friction Surface Treatment" when specified to be paid by the square yard shall be measured by the total area the surface treatment is applied measured in place and accepted.

When items for maintaining traffic are included in the Contract, they will be measured and paid as provided in Section 636.

406.15-BASIS OF PAYMENT:

The quantities, determined as provided above, will be paid for at the contract unit prices bid for the items listed below, which prices and payments shall be full compensation for furnishing all the materials and doing all the work prescribed in a workmanlike and acceptable manner, including all labor, tools, equipment, supplies, and incidentals necessary to complete the work.

The Quantity of "High Friction Surface Treatment" when specified to be paid by the square yard shall include the cleaning and sweeping, binder material, aggregate and all labor and equipment required to perform the operation

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406.16-PAY ITEMS:

ITEM	DESCRIPTION	UNIT
406001-*	HIGH FRICTION SURFACE TREATMENT	Square Yard (Square meter)

* Sequence number

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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

SECTION 102

BIDDING REQUIREMENTS AND CONDITIONS

ADD THE FOLLOWING AS A NEW SECTION.

102.17-CONTRACTOR'S DRUG-FREE WORKPLACE POLICY:

Each Contractor submitting a bid must include with the bid, on a form provided by the Division, an affidavit that the Contractor implements and maintains a written drug-free workplace policy which meets the requirements of Article 1D, Chapter 21 of the Official Code of West Virginia, as amended. The successful bidder must submit a copy of its drug-free workplace policy within ten (10) days following the letting and prior to the awarding of the contract. Any successful bidder who fails to submit the policy within the specified time limit will risk forfeiture of his/her proposal guaranty bond.

The successful bidder must also insure that its subcontractors implement and maintain a written drug-free workplace policy complying with Article 1D, a copy of which must be submitted to the Division by the Contractor prior to the start of the subcontract work. The contract may be terminated if the Contractor:

1. Fails to implement its policy;
2. Fails to provide information regarding implementation of the policy at the request of the Division; or;
3. Provides to the Division false information regarding the policy.

A clearly legible copy of the written drug-free workplace policy must be kept posted in a prominent and easily accessible place at the project site by each contractor subject to the provisions of Article 1D.

Every contractor shall keep an accurate record showing the names, occupation and safety-sensitive status of all employees, in connection with the construction on the project, and showing any drug tests or alcohol tests performed and employee education and supervisor training received, which record shall be open at all reasonable hours for inspection by the Division. The Contractor must preserve these records for three years after completion and acceptance of the project.

All drug testing information specifically related to individual employee is confidential and should be treated as such by anyone authorized to review or compile program records.

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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

FOR

SECTION 103

AWARD AND EXECUTION OF CONTRACT

103.11-CARGO PREFERENCE ACT:

ADD THE FOLLOWING:

103.11-CARGO PREFERENCE ACT:

All Federal-aid projects awarded after February 15, 2016 shall meet the Cargo Preference Act Requirements and it's implementing regulations in 46 CFR 381; information on this policy can be found at: <https://www.fhwa.dot.gov/construction/cqit/cargo.cfm>

Clause 46 CFR §§ 381.7(a)-(b) should be included in all Federal-aid highway projects' contract specifications; are shown below:

Title 46-Shipping

Volume: 8

Date: 2014-10-01

Original Date: 2014-10-01

Title: Section 381.7-Federal Grant, Guaranty, Loan and Advance of Funds Agreements.

Context: Title 46- Shipping. CHAPTER II- MARITIME ADMINISTRATION, DEPARTMENT OF TRANSPORTATION. SUBCHAPTER J-MISCELLANEOUS. PART 381-CARGO PREFERENCE-U.S.FLAG VESSELS.

§ 381.7 Federal Grant, Guaranty, Loan and Advance of Funds Agreements.

In order to insure a fair and reasonable participation by privately owned United States-flag commercial vessels in transporting cargoes which are subject to the Cargo Preference Act of 1954 and which are generated by U.S. Government Grant, Guaranty, Loan and/or Advance of Funds Programs, the head of each affected department or agency shall require appropriate clauses to be inserted in those Grant, Guaranty, Loan and/or Advance of Funds Agreements and all third party contracts executed between the borrower/grantee and other parties, where the

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possibility exists for ocean transportation of items procured, contracted for or otherwise obtained by or on behalf of the grantee, borrower, or any of their contractors or subcontractors. The clauses required by this part shall provide that at least 50 percent of the freight revenue and tonnage of cargo generated by the U.S. Government Grant, Guaranty, Loan or Advance of Funds be transported on privately owned United States-flag commercial vessels. These clauses shall also require that all parties provide to the Maritime Administration the necessary shipment information as set forth in § 381 .3. A copy of the appropriate clauses required by this part shall be submitted by each affected agency or department to the Secretary, Maritime Administration, for approval no later than 30 days after the effective date of this part. The following are suggested acceptable clauses with respect to the use of United States-flag vessels to be incorporated in the Grant, Guaranty, Loan and/or Advance of Funds Agreements as well as contracts and subcontracts resulting therefrom:

(a) Agreement Clauses. "Use of United States-flag vessels:

"(1) Pursuant to Pub. L. 664 (43 U.S.C. 1241(b)) at least 50 percent of any equipment, materials or commodities procured, contracted for or otherwise obtained with funds granted, guaranteed, loaned, or advanced by the U.S. Government under this agreement, and which may be transported by ocean vessel, shall be transported on privately owned United States-flag commercial vessels, if available.

"(2) Within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (a)(1) of this section shall be furnished to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590."

(b) Contractor and Subcontractor Clauses. "Use of United States-flag vessels: The contractor agrees-

"(1) To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment. Material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels.

"(2) To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States. a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b) (1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590.

"(3) To insert the substance of the provisions of this clause in all subcontracts issued pursuant to this contract."

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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

SECTION 108

PROSECUTION AND PROGRESS

108.3-PROSECUTION OF THE WORK:

108.3.2- Detailed Construction Schedule (Schedule):

DELETE THE CONTENTS AND SUBSTITUTE THE FOLLOWING:

108.3.2-Detailed Construction Schedule (Schedule): The Schedules shall be prepared using scheduling software Primavera Project Manager P6 version 6.0 or higher. The following criteria shall apply to the development and maintenance of the schedule:

1. All Resources shall be grouped in a Project Resource Tree. This tree structure shall have one main heading name that begins with the project's specific 7 digit contract number followed by an underscore, followed by the project name.
 - a. The individual resource names shall be shown as a sublevel to the main heading name. The individual resource names shall begin with the project's specific 7 digit contract number followed by an underscore. Any additional description may follow the underscore.
2. The use of Project Codes is prohibited.
3. Global Activity Codes are prohibited. However, Project Activity Codes may be used. The Project Activity Code names shall begin with the project's specific seven (7) digit contract number followed by an underscore. Any additional description may follow the underscore.
4. Global Calendars are prohibited (except as noted below in section 6). However, Project Calendars may be used. The Project Calendar names shall begin with the project's specific seven (7) digit contract number, followed by an underscore. Any additional description may follow the underscore. In addition, the Project Default Calendar shall be assigned as a Project Calendar.

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5. The use of Cost Accounts is not required. However if the Contractor elects to use them, then all Cost Account names shall be grouped in a Project Cost Accounts Tree. This tree structure shall have one main heading name that begins with the project's specific 7 digit contract number followed by an underscore, followed by the project name.
 - a. The individual cost account names shall be shown as a sublevel to the main heading name. The individual cost account names shall begin with the project's specific seven (7) digit contract number, followed by an underscore. Any additional description may follow the underscore.
6. The Contractor Resource Calendar shall be linked to the WVDOT Standard Calendar. This shall be accomplished by creating a Global Calendar named and formatted exactly as follows:
 - a. WVDOT Standard 5 Day Workweek w/holidays - This WVDOT Standard Calendar shall be assigned to each resource and shall be allowable as the only calendar for all Schedule resources.

The Schedule shall be submitted on standard D size sheets (24" x 36"). The critical path shall be distinguished from other paths on the Schedule. All back-up data used to generate the Schedule shall be submitted in digital form on acceptable media that is compatible with the computer system.

The submitted Print Out of the Schedule shall include the following data for each activity in the initial submittal and in all updates and revisions:

1. Activity number, as well as preceding and following activity numbers;
2. Activity description;
3. Duration of activity, in working days;
4. All quantities in accordance with pay items;
5. Dollar value of activity;
6. Remaining duration of activity, in working days;
7. Earliest start date, by calendar date;
8. Earliest finish date, by calendar date;
9. Actual start date, by calendar date;
10. Actual finish date, by calendar date;
11. Latest start date, by calendar date;
12. Latest finish date, by calendar date;
13. Total float for activity;
14. Free float for activity;

In addition to the above, the following information and data shall be included with the submission of the digital form to the Division:

15. Number of shifts per work day, hours per shift for activity;

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16. Number of work days per week for activity;
17. Major equipment and corresponding hours for activity;
18. Manpower by Trade or entity and corresponding hours for activity;
19. Activity Usage Profile Cost of Contractor's Income.
20. The following criteria shall apply to the development and maintenance of the Schedule:
 - a. All Resources shall be grouped in a Project Resource Tree. This tree structure shall have one main heading name that begins with the Project's specific 7 digit Contract ID Number followed by an underscore, followed by the Project Name.
 - b. Individual Resource names shall be shown as a sublevel to the main heading name. The Individual Resource names shall begin with the Project's specific 7 digit Contract ID Number followed by an underscore, followed by the Project Name. Any additional description may follow the underscore.
 - c. The use of Project Codes is prohibited.
 - d. The use of Global Activity Codes are prohibited, however Project Activity Codes may be used. The Project Activity Code name's shall begin with the Project's specific 7 digit Contract ID Number followed by an underscore. Any additional description may follow the underscore.
 - e. Global Calendars are prohibited (except as noted below in bullet g). However, Project Calendars may be used. The Project Calendar names shall begin with the Project's specific seven (7) digit Contract ID Number followed by an underscore. Any additional description may follow the underscore. Additionally, the Project Default Calendar shall be assigned as a Project Calendar.
 - f. The use of Cost Accounts is not required. However if the Contractor elects to use them, then all Cost Account names shall be grouped in a Project Cost Accounts Tree. This tree structure shall have one main heading name that begins with the Project's specific seven (7) digit Contract ID Number followed by an underscore, followed by the Project Name.
 - (i) Individual cost account names shall be shown as a sublevel to the main heading name. The individual cost account names shall begin with the Project's specific seven (7) digit Contract ID Number followed by an underscore. Any additional description may follow the underscore.
 - g. The Contractor Resource Calendar shall be linked to the WVDOT Standard Calendar. The WVDOT Standard Calendar shall be assigned to each resource and shall be allowable as the only calendar for all Schedule Resources. This shall be accomplished by creating a Global Calendar named and formatted exactly as follows:

WVDOT Standard 5 Day Workweek w/holidays
 - h. The first activity on the Schedule shall be Contract letting which shall be designated as a milestone starting on the actual contract letting date.

- i. The second activity on the Schedule shall be Project Award which shall be designated as a milestone with a 30 day lag from the Contract Letting milestone.
- j. The third activity on the Schedule shall be Notice to Proceed which shall be designated as a milestone with a 30 day lag from the Project Award milestone (or with a 7 day lag from Project Award on projects with an Incentive/Disincentive clause).
- k. Subsequent to the Notice to Proceed milestone, the logic and duration of remaining activities shall be developed and tied to the Substantial Completion milestone described in Section 108.3.1.
- l. Schedule calculation will be computed by *Retained Logic* method.
- m. Only contractual *Constraints* can be used on activities when preparing the Schedule, otherwise the use of *Constraints* is prohibited.
- n. All Actual Start Dates and Actual Finish Dates shall be reasonably captured in updated schedules.
- o. The activity costs described in Section 108.3.4 shall be incorporated into the Schedule via Resource Section. The use of Expenses for costs is prohibited.

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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

FOR

SECTION 403

CRACK SEALING IN ASPHALT PAVEMENT

403.1-DESCRIPTION:

The work shall consist of the cleaning, sealing, and filling of cracks and joints in asphalt pavement in the manner and subject to the conditions and regulations prescribed.

403.2-MATERIALS:

The material shall be hot poured crack sealant and conform to the requirements of Section 708.3 of the Standard Specifications. As well as being compatible with asphalt pavement recycling.

403.3-CONSTRUCTION:

403.3.1-Preparation of material for use: Before charging the compound into the melting unit, the unit shall be free from all foreign material. If the type of heater to be used requires that the sealing material, as shipped, be cut into smaller pieces before melting, the cutting method used is subject to the approval by the Engineer.

The heating kettle used for melting sealing materials shall be of the indirect heating or double boiler type, using oil as the heat transfer medium. It shall have a thermostatically controlled heat source, a built-in automatic agitator, and thermometers installed to indicate both the temperature of the melted sealing material and that of the oil bath. Other methods of indirect heating approved by the Engineer may be used. A positive means of controlling the temperature of the heat transfer at all points in the system shall be incorporated in the heater. Sealing material shall be uniformly heated until the pouring temperature recommended by the manufacturer is reached. Should the maximum pouring temperature recommended be exceeded, the material will be rejected. The material shall be poured as soon as possible after the pouring temperature is reached. Only sufficient material for the day's operation shall be heated each day.

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403.3.2-Preparation of joints and cracks for sealing: The cracks shall be thoroughly cleaned of all loose scale, dirt, dust, other foreign matter prior to placing hot poured crack sealant.

403.3.3-Equipment for applying sealer: The equipment used shall consist of heating units from which material may be discharged into the crack through the use of flexible lines and suitable shoes.

403.3.4-Placement requirements: The crack shall be clean and surface dry at the time of placement. At no time shall sealing material be placed in a crack which either dirty or wet. Work will be suspended when cracks are wet or damp and when the atmospheric temperature is below the minimum specified by the manufacturer.

Sealant shall be projected into the cracks/joints, filling from the bottom up. Ensure that the seal completely fills the crack/joint such that after cooling, the level of the seal is not greater than 1/8 inch below the pavement surface. Fill any depression in the seal greater than 3/16 inch to the specified limit by adding additional hot poured sealant. Do not overfill the joints. A neat job with good workmanship will be required at all times. Any spillage of sealing material on pavements shall be immediately removed.

A 3 inch overband shall be applied over the center of sealed crack.

403.3.5-Equipment, personnel, and documentation requirements: The Contractor (two (2) days prior to commencement of the project) shall submit to the Engineer a detailed list of all equipment to be used within the confines of the project. The Contractor shall also provide certification from the Sealing material manufacturer that the Contractor is qualified to apply the manufacturer's material in conformance with these specifications and the manufacture's recommendations.

The Contractor shall provide a calibrated measuring device for measuring the linear feet of Sealing Joints and Cracks for his use and an additional unit for use by the Department. (This will be at the Contractor's expense and shall be integral to the contract cost).

403.4-METHOD OF MEASUREMENT:

The quantity of work done will be measured in linear feet of "Crack Sealing in Asphalt Pavement".

1. For longitudinal cracking along centerline, edgeline or joints measurement is to be conducted prior to cleaning and sealing.
2. For other cracking measurement is to be conducted after cleaning and prior to the placement of the sealant.

403.5-BASIS OF PAYMENT:

The quantity of work, as determined above, will be paid for at the contract unit price bid for the item below, which price and payment shall be full compensation for furnishing all materials, and doing all the work prescribed in a workmanlike and acceptable manner, including all the labor, tools, equipment, supplies and incidental necessary to complete the work.

403.6-PAY ITEM:

ITEM	DESCRIPTION	UNIT
403001-001	Crack Sealing in Asphalt Pavement	Linear Foot

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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

FOR

SECTION 601
STRUCTURAL CONCRETE

601.1 – DESCRIPTION:

ADD THE FOLLOWING SECTION

601.1.1 Concrete Crack Sealer: The work shall consist of cleaning all cracks and furnishing and placing a Concrete Crack Sealing Material at the locations indicated on the plans and any other location designated by the Engineer. The construction shall be in accordance with this Specification and in reasonably close conformity with the Plans or as established by the Engineer.

601.2 – MATERIALS:

ADD THE FOLLOWING SECTIONS

601.2.1 – CONCRETE CRACK SEALING MATERIAL:

601.2.1.1: Concrete Crack Sealing Material shall be a high penetration two part hybrid urethane material that combines with sand to form a tough instant polymer concrete. This crack sealing material is also known as Roadware 10 Minute Concrete Mender and manufactured by Roadware Incorporated. This material shall be capable of sealing vertical or horizontal cracks. Material shall have an extremely low viscosity and properties that allow deep penetration into concrete, not shrink on cure and be resistant to chemical attack.

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601.2.1.2: All sealing materials shall be shipped in containers sealed in a manner acceptable to the Engineer. Each container shall be plainly marked with the following:

- 1) Product name
- 2) Component part
- 3) Batch number
- 4) Date of manufacture
- 5) Date of expiration of acceptance
- 6) Name & address of the manufacturer
- 7) Material safety data sheet

601.2.1.3: The Manufacturer of the Sealing Material shall submit documentation showing that the material submitted for construction meets the specification data listed as follows:

Mixing Ratio		1:1
Hardness @ 72° F		72D
Compressive Strength (with sand)		4500 psi
Elongation		6%
Tensile Strength		4475 psi
Bond Strength	ASTM A882	1984 psi
Viscosity (at application)		<9 cps
V.O.C. (mixed)		5.5 g/l
% Solids		98%
Cured Color		Gray
Cure Time @ 72° F		80% strength in 10 minutes

601.2.1.4: On vertical surfaces, a quickset reactive Gel Polymer Compound shall be placed along the surfaces of the crack to contain the sealing material during injection. The Gel Polymer Compound is also known as Multi-Bond and Seal 830 as manufactured by ASTC Polymers. The Manufacturer of the Gel Polymer Compound shall submit documentation showing that the material submitted for construction meets the specification data listed as follows:

General Physical Characteristics

Hardness	Shore D 60 to 63
Solids	100%
Mix Ratio	1:1
Tensile (lb/mil)	2300
Color	Natural or Black
Viscosity @ 72°F	Part A: 1000+/-300
CPS	Part B: 1700+/-500
Weight/gal	Part A: 10 lbs Part B: 8.8 lbs
Specific Gravity	1.08

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601.3 – PROPORTIONING

ADD THE FOLLOWING SUBSECTION

601.3.1 - PREPARATION OF SURFACE: The contractor shall remove all loose or foreign matter, dirt, grime, oil, grease, or any other materials that would diminish the bonding surface. All surfaces must be clean and dry. A wire brush or dry diamond blade attached to an electric hand grinder may be needed to achieve the necessary bonding surface.

The Contractor shall water blast the surfaces to remove any dirt, efflorescence or mineral deposits. Particular attention shall be given to removing any deposits from cracks. The Engineer will identify the cracks to be sealed. In general, any crack greater than 0.0625 inches in width will be sealed. At locations where the crack extends below the existing grade, the surface of the repair shall extend to a depth of 18” below grade. All excavation shall be included in the bid cost of the crack repair.

The bonding surface shall be dry and free of moisture. At the beginning of construction a representative of the Manufacturer of the Sealing Material shall be on site to approve of all bonding surfaces immediately prior to and during application of the Sealing Material for each application.

The Contractor shall protect from damage all concrete surfaces and previous made repairs, which are to remain in place. Materials damaged due to the Contractor's operations, as determined by the Engineer, shall be repaired or replaced at no additional cost to the Division and to the satisfaction of the Engineer.

601.13 PROTECTIVE SURFACE TREATMENT

ADD THE FOLLOWING SUBSECTION

601.13.4 Concrete Crack Sealing Installation: The Contractor shall notify the Engineer a minimum of seven days prior to installation of the Sealing Material. Notification will include the contract number, crack sealing product name, and approximate date of installation.

An experienced technical representative of the Manufacturer of the Sealing Material shall be present during all phases of substrate preparation and material installation. All placements shall be under the direction of the manufacturer's representative.

The Manufacturer's representative shall advise both the Engineer and the Contractor regarding proper installation procedures to assure the Sealing Material is installed correctly. The material shall be installed in accordance with the recommendations of the manufacturer's representative. In the event of a conflict, the Engineer's final decision will be binding.

After installation is completed, the Manufacturer's representative shall certify to the Engineer, in writing, that the Sealing Material was installed in accordance with the Manufacturer's requirements. If the representative determines the Contractor's crew is thoroughly familiar with

type of operation, he shall deliver a signed statement of competence for the crew to the Engineer for review. Upon approval by the Engineer of the statement of competence, the presence of the representative shall not be required. The statement shall list the names of the Contractor's crew and crew leader who would be responsible for sealing operation.

Injection and Sealing Procedures:

On vertical or inclined surfaces, the crack should be sealed with ASTC 830 gel polymer compound. The gel polymer compound shall not be applied within 24 hours of water blasting. Once a bead is on the crack, spread the gel polymer compound across the crack and let cure. Once cured, drill holes into the crack every 12-18 inches at a 30-45 degree angle, based upon the manufacturer's recommendations. The hole needs to be large enough to allow the sealer static mixer to be inserted into the hole about one or two inches deep and essentially seal the end. Holes will be drilled into the concrete along each vertical crack. Holes will be drilled with a hollow bit using a vacuum attached swivel chuck. It is mandatory that the drill material such as particles of sand and concrete and dust be removed from the hole as the hole is being drilled to assure that the crack remains open for injection of the sealing material.

The sealer should not be injected at temperatures less than 20 degrees F. During warmer weather, the sealer cartridges shall be kept cool (approximately 50 degrees F) to allow for superior penetration into the crack. Injection of the sealing material should start at an injection point at the end of the crack and for cracks on vertical or inclined surfaces, the injection should start at the lowest injection point and proceed upward.

Injection of the sealing material should start at the lowest point or at the injection point at the end of a crack and should continue until the sealing material flows to and out of the next injection point along the crack. When this flow is established, the injection point into which sealer is being injected will be plugged and the injection started at the second injection point along the crack. This process will be continued until the sealer flows along the entire limit of the crack and the crack is entirely sealed.

In the event that the sealer can be continued to be injected into an injection point but does not appear at an adjacent point or points, the injection of sealer will continue until no more material may be injected or a volume of 1 gallon of sealer has been injected per point, whichever comes first. In the event that the injection point will no longer accept the injection of sealer, additional holes will be drilled closer to the injection point in order to obtain flow of the sealer between points. At locations where the crack extends through the pier wall, both faces of the crack shall be injected and capped simultaneously to prevent loss of sealer on the opposite side and maintain proper flow.

Precautions to assure a continuous supply of properly blended sealer at the point of injection is important. The Contractor will take samples of the sealer at the mixing head at intervals not exceeding one (1) hour and conduct tests to determine that the material is being mixed satisfactorily, is curing properly and is attaining proper bonding strength. Careful documentation of the location of the test in relation to the cracks being filled and sealed will be maintained so

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that test data may be identified with sealed cracks. After filling cracks and cure of the sealer, the plugs at the injection points shall be removed and the holes patched flush with the concrete surface with the gel polymer compound. The repair areas shall be ground flush with surround concrete and abraded to achieve reasonably uniform surface texture and appearance. Any runs or spills shall be removed from concrete surfaces.

At the top horizontal surfaces, drill ½ inch to 1 inch holes into the crack at 12 inch intervals horizontally. These holes will become reservoirs for the sealer to allow it to flow down into the crack and horizontally in the crack. Fill to refusal and top with medium grit or fine grit dry manufactured sand or crushed flint. Dust the top with white cement to hide the color change that occurs with sealer in UV light.

601.13.4.1 – Concrete Crack Sealing Acceptance Criteria:

The Engineer shall accept the Contractor's work if, in his judgment, the following criteria are met:

- The Contractor stores, handles, mixes, and installs the materials according to the Manufacturer's recommendations and as specified herein.
- Representative of the Manufacturer is on site during mixing and placing of Concrete Crack Sealing Material.
- No degradation of material properties under field conditions is detected. The Contractor shall replace any material showing degradation.
- The surface of the existing concrete is free of loose or foreign matter, dirt, grime, oil, grease, or any other materials that would diminish the bonding surface.
- All work done as a result of the acceptance criteria shall be done at no additional cost to the Division.

601.14 - METHOD OF MEASUREMENT:

ADD THE FOLLOWING SUBSECTION:

601.14.1 – Concrete Crack Sealing: Sealing Material will be measured in place per lineal foot (LF).

601.15 – BASIS OF PAYMENT

ADD THE FOLLOWING SUBSECTION:

601.15.1.1 – Concrete Crack Sealing: The cost of the concrete crack sealing, to the limits shown in the plans or as directed by the Engineer, the cleaning of the cracks, and the placement of

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specified materials to make the necessary repairs shall be included in the payment for the item below. The quantities, determined above, will be paid for at the contract unit price bid for the item below, which price and payment shall be full compensation for furnishing all materials and doing all the work herein prescribed, including all the Manufacturer's cost, labor, tools, equipment, supplies and incidentals necessary to complete the work.

601.16 - PAY ITEM:

ADD THE FOLLOWING TO THE TABLE:

ITEM	DESCRIPTION	UNIT
601015-007	Concrete Crack Sealing	LF

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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: S310-15-10.14

FEDERAL PROJECT NUMBER: N/A

SECTION 601

**CONCRETE REPAIR IN PREPARATION FOR NON-STRUCTURAL
FRP WRAP APPLICATION**

601.1-DESCRIPTION:

ADD THE FOLLOWING SECTION:

601.1.1-Description of Work: This work will consist of removing deteriorated concrete, cleaning and sealing the reinforcing steel with a corrosion inhibitor, and applying a concrete repair material. These provisions are applicable only for concrete repair in preparation for FRP wrap installation in which the FRP is designed only to protect the concrete from corrosion and prevent degradation of the cover concrete. These provisions are not applicable for concrete repair in preparation for FRP wrap installation wherein the FRP wrap is designed for structural loads

601.2-MATERIALS:

ADD THE FOLLOWING SECTIONS

601.2.1-Rapid Set Cementitious Patching Material:

601.2.1.1: Rapid Set Cementitious Patching Material shall be selected from the WVDOH Materials Division list of approved repair materials for Portland cement concrete meeting requirements of section 715.4.1 of the standard specifications capable of patching deep holes, shallow feathering, and being trowelled vertically or overhead. The material shall not shrink on cure, be self-priming, and be capable of providing a strong bond to concrete and steel reinforcing bars. It shall be a nontoxic product and clean up with water.

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601.2.1.2: All concrete components and primer materials shall be shipped in strong containers sealed in a manner acceptable to the Engineer. Each container shall be plainly marked with the following:

- 1) Product name
- 2) Component part
- 3) Batch number
- 4) Date of manufacture
- 5) Date of expiration of acceptance
- 6) Name & address of the manufacturer
- 7) Material safety data sheet
- 8) Temp and time of storage

601.2.1.3: Clean, dry aggregates may be allowed in order to increase yield on deep placements per the Manufacturer's recommendations.

601.2.1.4: A retarder may be allowed in high temperature environments to improve workability per the Manufacturer's recommendations.

601.3-PROPORTIONING:

ADD THE FOLLOWING SUBSECTION:

601.3.3-Preparation of Concrete Repair Bonding Surface: The contractor shall remove all loose, soft, honeycombed, and disintegrated concrete. The extent of deterioration has been shown in the plans, and removal of material beyond this extent is at the discretion of the Engineer. Sound concrete must NOT be removed 3" beyond damage. The surface of the existing concrete (to remain) is free of all loose or foreign matter, dirt, grime, oil, grease, or any other materials that would diminish the bonding surface via washing with 1000 to 2000 psi pressure washing.

The existing exposed reinforcing steel bars shall be cleaned by sandblasting to a SSPC-SP6 finish. After sandblasting, a rust inhibitor compatible with the concrete patching material shall be applied to all exposed steel bars.

Any cracks over 0.125 inches wide shall be filled with epoxy-resin-base crack filler that meets ASTM C881 Type IV, Grade 3 criteria. The class should be chosen based on the temperatures expected during application.

The Contractor shall protect from damage all materials which are to remain in place. Materials damaged due to the Contractor's operations, as determined by the Engineer, shall be repaired or replaced at no additional cost to the Department and to the satisfaction of the Engineer.

601.10-PLACING CONCRETE:

ADD THE FOLLOWING SUBSECTION:

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601.10.5-Rapid Set Cementitious Patching Installation:

The Contractor shall notify the Engineer a minimum of seven days prior to installation of the Rapid Set Cementitious Material. Notification will include the contract number, concrete product name, manufacturer's instructions and approximate date of installation. At no time should installation occur if temperatures during installation are below 40°F or are expected to fall below 32°F during the next 24 hours.

Fill all voids over 0.5 inches wide and 0.125 inches deep. Grind away all irregularities and protrusions to provide less than 1/8 inch surface profile deviation over a 12" length. The finished surface of the repair should be troweled to a smooth finish. The repaired area shall be allowed to cure for a minimum 24 hours before FRP wrap installation or per manufacturer's material specifications.

Area to be wrapped with FRP (as shown on the plans) shall be cleaned with water at pressures of 1000 to 2000 psi starting at the top and working down no more than 72 hours prior to wrapping.

601.10.5.1-Rapid Set Cementitious Patching Acceptance Criteria:

Representatives from the West Virginia University – Constructed Facilities Center (WVU-CFC) shall be present during material installation. The Engineer shall be responsible for contact Dr. Hota GangaRao from WVU-CFC at (304) 293-9986. The material shall be installed in accordance with the manufacturer's instructions. In the event of a conflict, the Engineer's final decision will be binding.

The Engineer shall accept the Contractor's work if, in his judgment, the following criteria are met:

- 1) The Contractor stores, handles, mixes, and installs the materials according to the Manufacturer's recommendations and as specified herein.
- 2) No degradation of material properties under field conditions is detected. The Contractor shall replace any material showing degradation.
- 3) Loose, soft, honeycombed, and disintegrated concrete is removed with no damage to adjacent sound concrete to limits set by the discretion of the Engineer.
- 4) The surface of the existing concrete to remain is free of loose or foreign matter, dirt, grime, oil, grease, or any other materials that would diminish the bonding surface.
- 5) Existing exposed reinforcing steel bars are free of dirt, grime, oil, grease, corrosion, or any other foreign matter that would prevent a good bonding surface or allow future corrosion of the reinforcing steel bars.
- 6) The finished surface is troweled smooth, with no deviations over 1/8 inch over 12 inches and no concave areas remain.
- 7) The entire area to be repaired with FRP is cleaned with water at pressures of 1000 to 2000 psi.

All work done as a result of the acceptance criteria shall be done at no additional cost to the Department.

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601.14-METHOD OF MEASUREMENT:

ADD THE FOLLOWING SUBSECTION:

601.14.1-Rapid Set Cementitious Patching:

Rapid Set Cementitious Patching Materials will be measured in place per square foot (SF).

601.15-BASIS OF PAYMENT:

ADD THE FOLLOWING SUBSECTION:

601.15.1.1 – Rapid Set Cementitious Patching:

The removal of existing concrete, to the limits shown in the plans or as directed by the Engineer, the cleaning of existing concrete to remain, the cleaning of exposed reinforcing bars, and the placement of specified materials to make the necessary repairs shall be included in the payment for the items below. The quantities, determined above, will be paid for at the contract unit price bid for the items below, which price and payment shall be full compensation for furnishing all materials and doing all the work herein prescribed, including all the Manufacturer's cost, labor, tools, equipment, supplies and incidentals necessary to complete the work.

601.16-PAY ITEM:

ADD THE FOLLOWING TO THE TABLE:

ITEM	DESCRIPTION	UNIT
601030-000	Patching Concrete Structures	SF

The Engineer shall notify Dr. Hota GangaRao of West Virginia University-Constructed Facilities Center (WVU-CFC) at (304) 293-9986 at least seven days prior to the start of wrapping.

601.4-TESTINGS:

ADD THE FOLLOWING TO THE END OF THE SECTION:

601.4.6-FRP Approvals: Material specifications, installation-construction procedures, and quality control plan must be submitted to the Engineer and approved by WVDOH prior to securing materials and beginning of installation.

601.4.7-FRP Quality Control: Quality assurance during installation of the FRP system components shall be described in a Quality Control plan. The quality control plan will include, but not limited to, the following:

- 1) Certification that the contractor has been trained to apply the specific FRP wrap material
- 2) Storage requirements
- 3) Procedures to inspect wrap during installation to ensure that it meets the manufacturer's instructions and those in these provisions

This plan shall also include field inspection of the FRP wrap by WVU-CFC personnel with InfraRed Thermography (IRT) and/or Digital Tap Hammer (DTH) to detect voids between the FRP wrap and the underlying concrete.

Test sections shall be made during FRP repair to permit tensile testing of the cured laminate to verify the material properties. The test section should be a section of the FRP wrap applied to a sheet of plastic to produce a laminate that is 18"x18" and the same thickness as the laminate installed on the structure. The test section should be made during the installation of the wrap on the structure and under the same application and environmental conditions. ASTM 3039 tensile tests will be conducted on this test section to verify the as-built laminate matches the minimum material specifications. Samples will be tested by WVDOT or WVU-CFC within 5 business days. If tested samples do not meet the minimum specifications listed above, additional layers of FRP wrap must be applied to bring the total laminate up to the minimum specifications at no additional cost to the Department.

601.10-PLACING CONCRETE:

DELETE THE SECTION AND REPALCE WITH THE FOLLOWING:

601.10-FRP CONSTRUCITON REQUIREMENTS:

Unless otherwise dictated by the FRP manufacturer's instructions, the following installation guidelines shall be followed for the entire FRP wrap system (primer, resin, fabric, etc.):

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- 1) Area to be wrapped with FRP (as shown on the plans) shall be cleaned with water at pressures of 1000 to 2000 psi starting at the top and working down no more than 72 hours prior to wrapping.
- 2) The ambient temperature and the temperature of the resin shall be between 55oF and 95oF at the time of mixing. The composite shall be applied when the relative humidity is less than 85% and the surface temperature is more than 5oF above the dew point. Contractor should provide verification of the temperature and humidity at the application location prior to use. The concrete surface should be dry prior to wrapping.
- 3) A compatible primer as recommended shall be applied to the concrete surface.
- 4) The FRP wrap system (fabric/resin) shall be applied to the concrete surface using methods that ensure that the entire width of the fabric is in intimate contact with the underlying.
- 5) Minimum of two mutually orthogonal layers of glass FRP fabric are required.
 - a. For round column wrapping, a minimum of two layers of FRP fabric wrapped in a spiral form around the column circumference and along the column height with a minimum overlap specified by the manufacturer.
 - b. Wrapping details for other cross sections are detailed in the plans.
 - c. New rolls should overlap the previous roll by 6 inches along the length of the roll.
 - d. The wrap should be installed so that vertical seams do not allow for water intrusion (i.e. lower wraps shall not overlap upper wraps).
 - e. Successive layers of wet composite materials shall be placed before curing begins (polymerization) on the previous layer.
- 6) Adequate ventilation of the project area shall be maintained at all times.
 - (a) Containment shall be provided by the Contractor to prevent the spread of fibers and/or resin residue during construction. All contained or waste material shall be properly disposed of by the Contractor.
 - (b) Contractor shall read and apply all safety precautions for all FRP wrap system components.

After the wrap is installed but before protective coatings are applied, the wrap will be inspected by WVU-CFC personnel using IRT or DTH within 24 hours following wrapping. Any voids over 2 square inches between the wrap and concrete must be filled with an injectable epoxy as per ACI 440.2R-08. Filling of voids is required for completion of the work and will be at no additional cost to the WVDOH.

601.10.1-Coating System Application Notes: After the final wrap layer is completely polymerized, an acrylic paint or equivalent should be applied to the entire FRP wrap area (color to be chosen by WVDOH).

601.14-METHOD OF MEASUREMENT:

ADD THE FOLLOWING TO THE END OF THE SECTION:

The lump sum bid for Item 601015-005 shall include all labor, tools, materials, equipment, supplies and incidentals necessary to complete the FRP installation as identified in this special provision and the contract documents. Cost shall include all means required to place material (lifts, etc.) and provide inspection access to WVDOH and WVU-CFC.

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601.16-PAY ITEMS:

ADD THE FOLLOWING ITEM TO THE TABLE:

ITEM	DESCRIPTION	UNIT
601015-005	FRP Wrap System	LS

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DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

FOR

SECTION 607

GUARDRAIL

ADD THE FOLLOWING:

607.2.1-Appalachian Hardwood Lumber: The Contractor shall utilize pressure treated hardwood from the Appalachian Region for all guardrail post and blocks on the project.



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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

FOR

SECTION 607

GUARDRAIL

AESTHETIC TREATMENT TO GALVANIZED SURFACES

607.1-DESCRIPTION:

ADD THE FOLLOWING SUBSECTION TO THE SECTION:

607.1.1-Galvanized Surface Staining: This work consists of preparing, staining, and finishing all visible galvanized surfaces and appurtenances to achieve a rustic brown color with a matte finish.

607.1.2-Painted Galvanized Surface: This work shall consist of preparing and painting, as required by the paint manufacturer’s requirements, galvanized surfaces with a rustic brown color surface as required by the manufacturer’s requirements

607.1.3-Powder Coated Galvanized Surface: This work shall consist of preparing and powder coating galvanized surfaces a rustic brown color.

607.2-MATERIALS:

ADD THE FOLLOWING SUBSECTIONS TO THE SECTION:

607.2.1-Galvanized Surface Staining: The stain must consist of a clear soluble solution of natural oxidizers and soft buffered organic acids that accelerates the oxidization process

without compromising the protective qualities of the galvanized surfacing. No pigment based colorants should be added to achieve the desired color. The stain must react with the target surface over a period of 7 - 21 days to produce a rustic brown color with a matte finish. The stain must be resistant to fading in the sun.

607.2.1.1-Submittals:

A. Submit the following items:

1. A copy of the manufacturer's product Material Safety Data Sheet together with instructions for application of stain 5 days before application.
2. Proposed methods to control overspray, spillage and protection of adjacent surfaces for approval by the State Representative. No staining will be allowed prior to approval.
3. Independent lab tests showing that the stain material is environmentally safe.

607.2.1.2-Quality Control and Assurance:

A. Sample Section

1. Apply stain to a minimum 12 inch sample section of metal. Notify the Engineer not less than 7 days before staining the sample section. Prepare and stain the sample section with the same materials, tools, equipment and methods to be used in staining final surfaces. The applied stain must be allowed to cure for a minimum of 14 days before the Engineer inspection. In the event more than one sample section is required by the Engineer, each additional sample section will be paid for as change order work.
2. Use the Engineer approved sample as the standard of comparison in determining acceptability of staining.

607.2.2-Painted Galvanized Surface: The paint and application shall be in accordance with Subsection 688.3.4.3.

607.2.3-Powder Coated Galvanized Surface: The products provided shall be commercially powder coated materials and shall meet the requirements of NFPA 33 and NFPA 34.

ADD THE FOLLOWING SUBSECTION TO THE SECTION:

607.3.4-Galvanized Surface Staining Construction:

607.3.4.1-Preparation: Target surfaces to be stained must be free of excessive oils, dirt and other contaminants. All surfaces must be dry before application of stain.

607.3.4.2-Application:

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- a. After areas to be stained have been prepared and the sample approved, apply stain to all existing galvanized surfaces and appurtenances required to be stained. Apply stain according to the manufacturer’s instructions to achieve a color consistent with the approved sample. Minimize overspray. Spray application should not be performed under windy or rainy conditions
- b. Stain must be applied uniformly. Irregularities must be corrected according to the stain manufacturer’s recommendations.
- c. Stained surfaces must be kept dry for a period of 5 days following the application of stain.
- d. Final approval of product samples shall be made by the Owner and/or Construction Manager.
- e. No work shall proceed until written approval is received.

607.3.4.3-Approved Products:

**METALS
STAINS FOR GALVANIZED STEEL PRODUCTS**

Products	Manufacturer’s Address
Natina Steel	Natina Products, LLC PO Box 4563 Palm Desert, CA 92261 (877) 762-8462 www.Natinaproducts.com
Or Approved Equal As approved by the Engineer	

607.7-BASIS OF PAYMENT:

ADD THE FOLLOWING SUBSECTION TO THE SECTION:

607.7.1-Galvanized Surface Staining: Basis of payment for Galvanized Surface Staining shall be Linear Foot for length of rail stained, which price and payment shall be full compensation for furnishing all the materials and doing all the work prescribed in this Special Provision in a workmanlike and acceptable manner including all labor, tools, equipment, supplies and incidentals necessary to complete the work.

607.8-PAY ITEMS:

ADD THE FOLLOWING TO THE TABLE:

ITEM NUMBER	DESCRIPTION	UNIT
607XXX-000	Type 1 Guardrail, Class I Aesthetic Guardrail	LF

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DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

FOR

SECTION 608

RIGHT-OF-WAY FENCE

608.2-MATERIALS:

DELETE PARAGRAPH TWO AND REPLACE WITH THE FOLLOWING:

All posts and braces for farm-field fence must be pressure treated wood. Wood type shall be used throughout the Project.



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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

FOR

SECTION 627

ASAP BRIDGE

627-GENERAL:

627.1-DESCRIPTION:

This special provision shall define the requirements to be performed by the Contractor and/or agents of the Contractor, in the submittal of the contract plans and the related activities in the construction of a proposed alternate bridge at Mill Branch. The contract for the above referenced project provides 100% design and construction plans for a proprietary system utilizing a Contech (Name CON/SPAN Precast Concrete Bridge System: 16' span by 8' rise) culvert with associated headwalls and wingwalls. The alternate proposed bridge design identified in this special provision shall comply with the following.

1. The superstructure and wingwalls shall be designed by the contractor in accordance with the AASHTO LRFD Bridge Design Specifications, 5th edition, including the 2010 interim revisions. Design calculations and drawings signed and sealed by a West Virginia Licensed Professional Engineer shall be submitted for approval. A minimum LRFR rating factor of 1.00 for HL-93 design live load shall be provided. Rating calculations signed and sealed by a West Virginia Licensed professional engineer shall be submitted for approval.
2. Additional information to be used is the WVDOH BRIDGE DESIGN MANUAL available at the link identified above. Any conflicts with the current WVDOH project development policy and the standard plans including but not limited to DD's, current AASHTO LRFD Code, and ASHTO provisions, shall be addressed by the Contractor.
3. The design will provide a minimum span length equal to or greater than the three sided box culvert.

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4. The superstructure type, typical section, structural and architectural details including barrier railing shall be identical to the bridge located at Big Branch. No other superstructure type shall be allowed.
5. Substructure architectural details shall be identical to the bridge located at Big Branch.
6. The contractor will be responsible to prepare and submit a Preliminary Hydraulic Study using HEC-RAS. The contractor will submit a request to WVDOH Engineering Division for the existing conditions model. The proposed alternate bridge shall create 0.00 ' increase in backwater as compared to the existing conditions model. The Preliminary Hydraulic Report for the alternative bridge will be submitted to WVDOH Engineering Division for review and comment. A Final Hydraulics Report addressing all WVDOH comments will be submitted to WVDOH Engineering Division for approval before any work can begin on the alternative bridge construction. As part of the Final Hydraulics Report the contractor shall perform a scour analysis per HEC-18 procedures and provide scour protection for Mill Branch as specified in the construction plans.
7. Substructure locations and type to be determined by bidder. Changes to roadway and bridge grades that require additional right of way will not be acceptable.
8. Horizontal alignment for CR 26 shall be considered final.
9. All bidders must base their bid on the quantities shown on the plans for Mill Branch Culvert or alternate Item number 627010-001 ASAP Bridge.
10. In regard to additional project criteria refer to General Notes for County Road 26 over Mills Branch in the contract plans.
 - a) Structure Geometry
 - b) Concrete Construction
 - c) Excavation
 - d) Joint Filler
 - e) Piling
 - f) Scour Protection
 - g) Dismantling Structures

627.2-UTILITIES:

The Contractor shall be responsible for verifying the location of all existing utilities whether public or private and preparing relocation plans. Relocation plans shall be provided to the District Utility Coordinator at which time relocations shall be accomplished as per the policy outlined in the *"Accommodation of Utilities on Highway Right of Way and Adjustment and Relocation of Utility Facilities on Highway Projects June 2007"*.

627.3-PERMITS FOR CONSTRUCTION:

All permits as required by the US Army Corps of Engineers (USACE), WV Department of Environment Protection (DEP), are final and provided in the contract documents.

627.4-COMPLETION TIME:

The contract completion date was developed to allow time to complete construction of this project and relocate utilities.

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627.5-TRAFFIC CONTROL:

The traffic control shall be in accordance with the *"Manual on Traffic Control for Streets and Highways, 2006 Edition"*. The traffic control plan and cases are provided in the plan notes and paid for by various items. Any deviation in the traffic control plan must be approved by the Engineer.

627.6- MATERIALS, INSPECTION AND TRAFFIC CONTROL:

All materials and inspection shall be as per the current *"WVDOH Standard Specifications Roads and Bridges"* and supplemental.

627.7-METHOD OF MEASUREMENT:

The quantity of work for "ASAP Bridge" will be measured and paid for as lump sum.

627.8-BASIS OF PAYMENT:

The Contractor will submit a payment schedule for approval by WVDOH at preconstruction, to be used as a basis for bi-monthly progress payment schedule.

627.9-PAY ITEMS:

ITEM	DESCRIPTION	UNIT
627010-001	ASAP Bridge	Lump Sum

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
SPECIAL PROVISIONS
FOR
STATE PROJECT: S 315-30-0.00
FEDERAL PROJECT: NHPP-0030(039)D
FOR
SECTION 627
HIGH LOAD MULTI-ROTATIONAL BEARINGS - DISC BEARING
ASSEMBLIES

A. GENERAL

This work shall consist of fabricating, testing, furnishing, and installing High Load Multi-Rotational Bearings that are shear inhibited disc type structural bearing devices of the type shown on the plans at the location shown on the plans and in accordance with these Special Provisions. The structural bearings shall adequately provide for movements such as thermal expansion and contraction, rotation, camber changes, and creep-shrinkage of structural members where applicable. The Contractor shall state at the pre-construction conference the specific manufacturer and model number of the device he intends to furnish and install.

B. DEFINITION

1. Shear Inhibited Disc Structural Bearing

The load bearing and rotational disc shall be composed of a polyether urethane material. This disc shall be contained between upper and lower steel bearing plates and equipped with an internal shear restriction mechanism.

For expansion bearings, the upper steel bearing plate shall have a PTFE sheet recessed and bonded into the top half of the plate to accommodate the horizontal movement of the structure. The PTFE surface of the upper steel bearing plate shall support an upper steel plate fitted with a continuously welded, highly polished stainless steel face. For unidirectional expansion bearings, the upper steel plate shall be fitted with guide bars or a keyway system to restrict the lateral movement of the structure. The guide bars and their opposing guided surfaces shall be faced with opposing strips of PTFE/stainless steel. The guide bars and shear restriction mechanism shall be designed to withstand a minimum force of 10% of the total vertical load. Higher horizontal forces shall be noted in the contract plans. Guiding off of the fixed base or any extension of it will not be permitted.

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All materials shall be as specified in the contract documents or as recommended by the manufacturer of the bearing device. Shear inhibited disc structural bearing shall be referred to throughout this specification as the bearing device.

C. QUALIFICATIONS

The supplier shall show previous history in the design and fabrication of disc bearings. Documentation showing a minimum of five years experience and ten bridge installations shall be provided to the engineer.

D. CONTRACT DRAWINGS

The contract drawings shall indicate the following design parameters for proper sizing and detailing of structural bearings:

1. Maximum and minimum vertical load.
2. Horizontal load if it is over the minimum 10% of the total vertical load and the direction.
3. Total movement for expansion bearings and the direction.
4. Amount of rotation anticipated.
5. Allowable pressure on concrete substructure.
6. Anchorage details.
7. Uplift data, if required.
8. Temporary holding clips, if required.
9. Removable bearing details, if required.
10. Self-aligning rotation in plan details, if required.
11. Jacking port details.
12. Flexible guide details, if required.
13. Type of bearing, i.e. fixed, guided, non-guided.
14. Seismic details.

E. MATERIALS

All materials shall be new and unused with no reclaimed material incorporated in the finished bearing.

The Contractor shall furnish a manufacturer's certification that the materials proposed for use on the project have been pre-tested and will meet the requirements as set forth in the manufacturer's current literature.

The material shall not be installed in the field prior to the Engineer's approval.

1. Polyether Urethane Rotational Element

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The rotational element used in the construction of the shear inhibited disc type bearings shall be molded from a polyether urethane compound. The physical properties of the polyether urethane shall conform to the following requirements:

<u>PHYSICAL PROPERTY</u>	<u>ASTM TEST METHOD</u>	<u>REQUIREMENTS</u>
Hardness, Type D Durometer	D-2240	60 min 64 max
Tensile stress, psi	D-412	
@ 100% Elongation		2100 min
@ 200% Elongation		3700 min
Tensile strength, psi	D-412	5500 min
Ultimate Elongation, %	D-412	253 min
Compression Set, 22h @ 158 °F, %	D-395	40 max

2. Steel

All steel used in the construction of the bearings (except stainless), shall conform to AASHTO M 270 unless otherwise specified in the contract plans. All steel surfaces exposed to the atmosphere (except stainless and area in contact with the polyether urethane rotational element) shall be hot dipped galvanized in accordance with AASHTO Mill.

3. Stainless Steel

Stainless steel for expansion bearings shall conform to ASTM A167 Type 304 or ASTM A240 Type 304, and shall be continuously welded to upper steel plate. The face of the stainless steel in contact with the PTFE shall have a No.8 bright mirror finish (less than 5 micro inches root mean square). The minimum thickness of the stainless steel shall be 16 gauge. Bonding or mechanically fastening of stainless to upper steel plate will not be allowed.

4. Polytetrafluoroethylene (PTFE)

PTFE shall be manufactured from pure virgin (not reprocessed) unfilled PTFE resin. The PTFE sheet shall be bonded and recessed into the upper steel bearing plate. The PTFE sheet shall have a minimum thickness of 1/8 of an inch and be recessed one-half of its thickness into its steel substrate. The PTFE sheet shall be acid-etched on the bonded side and polished on the side facing the stainless steel to insure a low coefficient of friction.

The PTFE strips for guide bars shall be 15% glass filled and a minimum of 1/32 inch thick and shall be bonded and mechanically fastened into the steel edges. The fasteners shall be recessed so as not to interfere with sliding during movement. The PTFE shall be resistant to all acids, alkalis and petroleum products, stable at temperatures from -350 OF to +500 OF, non-flammable, and non-absorbing of water. The PTFE shall be bonded to

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grit blasted steel using an adhesive approved by the manufacturer. The unfilled PTFE shall conform to the following requirements:

<u>PHYSICAL PROPERTY</u>	<u>ASTM TEST METHOD</u>	<u>REQUIREMENTS</u>
Ultimate Tensile Strength, psi	D-638	2800 min
Ultimate Elongation, %	D-638	200 min
Specific Gravity	D-292	2.13 min

F. FABRICATION REQUIREMENTS

The finish of the mold used to produce the rotational element shall conform to good machine shop practice. Each bearing shall have a project identification number and lot number marked on a side that will be visible after erection.

Gross bearing dimensions shall have a tolerance of -0, +1/8 inch. Overall thickness tolerance shall be -0, +1/8 inch. All bearing surfaces of steel plates shall be finished flat within 0.01 inch.

G. TESTING

The bearing devices to be tested shall be selected by the design authority at random. The bearing device will be visually examined both during and after the test. Any visual effects shall be cause for rejection.

1. Coefficient of Friction

Sliding coefficient of friction tests will be performed by the manufacturer of one expansion bearing device from each lot. A lot will be the quantity as defined by the design authority with a maximum of 25 bearings per lot. The coefficient of friction will be measured at the bearing design capacity on the 5th, 15th and 100th cycle at a speed on one inch/minute. A total of 100 cycles shall be run. The sliding coefficient of friction shall be calculated as the horizontal load required to maintain continuous sliding at a given speed divided by the bearing's design capacity vertical load. The vertical load shall have been applied continuously for a minimum of one-hour prior to testing.

The measured sliding coefficient of friction shall not exceed 0.03.

2. Rotation

Rotation tests will be performed by the manufacturer on one bearing device from each lot. The polyether urethane element shall be capable of maintaining its initial uniform contact with the steel bearing plates through a rotation of 0.02 radians under a compressive load equal to 150% of the design capacity of the bearing device.

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Any observed separation between the edge of the rotational elements and the bearing plates shall be cause for rejection.

H. CONSTRUCTION REQUIREMENTS

The Contractor shall submit shop drawings in a timely fashion after the award of contract. At the discretion of the Engineer, the manufacturer may be required to furnish facilities for inspection of the completed device or a representative sample in his plant. The inspectors shall be allowed free access to the necessary parts of the manufacturer's plant. The manufacturer shall provide a technical representative to be present at times while the bearing device is being installed. The Contractor shall notify the bearing device manufacturer of the scheduled installation a minimum of two weeks prior to the installation date.

The bearing device manufacturer's instructions for the proper installation of the bearing shall be entered in the shop drawings. Shop drawings, which lack manufacturer's installation instructions, may be returned without approval.

The bearing device shall be installed in strict accordance with the manufacturer's instructions, this specification and the advice of their official representative.

The manufacturer shall ship each bearing fully assembled. The bearing devices are not to be disassembled prior to installation without the knowledge of the design authority and manufacturer.

I. BASIS OF PAYMENT

The accepted quantity of bridge bearing device will be paid for at the contract unit per bearing.

<u>PAY ITEM</u>	<u>PAY UNIT</u>
627006-001 GUIDED BEARING, DISC	EACH
627006-002 NON-GUIDED BEARING, DISC	EACH
627006-003 FIXED BEARING, DISC	EACH

Payment will be full compensation for all work necessary to complete the items including furnishings and installing structural bearing device.

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**WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

**SPECIAL PROVISION
FOR**

STATE PROJECT NUMBER: S305-22-0.04.00

FEDERAL PROJECT NUMBER: NHPP-0022(064)D

**FOR
SECTION 627**

ADD THE FOLLOWING SECTION:

SECTION 627 – CABLE STAYED BRIDGE, CABLE STAY REPAIRS

627.1- DESCRIPTION:

The work shall consist of removing existing PE pipe and grout, and furnishing and placing rust inhibitor(s), grout and re-installing existing and/or installing new PE pipe at the locations indicated on the plans, and, providing access for the Engineer to the repairs during all activities. This work shall be in accordance with this Specification and in conformity with the plans.

627.2- MATERIALS:

627.2.1- POLYETHYLENE PIPE:

New PE pipe shall be PE3408 and have a minimum cell classification of 345464C per ASTM D3350 with a minimum 20 minutes of OIT. HDPE welding rod shall contain a minimum 2.5% carbon black, with MI less than 0.4 g/10 min and OIT of 20 minutes.

All polyethylene pipe (PE pipe), and all material for welding PE pipe shall be stored in a clean, dry location and kept out of direct sunlight. All material shall be clearly labeled or marked with the following information:

- 1) Product name
- 2) Date of manufacture
- 3) Name & address of the manufacturer

Unless new pipe is proposed as indicated on the plans, the existing PE pipe shall be reinstalled. The Contractor may propose to use new PE pipe in additional locations if PE pipe of suitable dimensions and meeting the requirements of this specification can be obtained by the

Contractor. The Contractor shall provide material information for all proposed PE pipe and PE pipe welding material to WVDOH for approval prior to mobilizing equipment and/or personnel to the project site. The Contractor shall provide a 1-ft. sample of the new pipe and 80 grams of PE pipe welding material to the Engineer prior to mobilizing equipment and/or personnel to the project site and at least 2 weeks prior to scheduled start of the repair work. All unused new and removed PE pipe shall become the property of WVDOH and the Contractor shall make arrangements with Mr. Dave Sada, District 6, District Bridge Engineer for the delivery of the material.

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627.2.2- GROUT:

Grout mix shall conform to the requirements of the 1998 AASHTO LRFD Bridge Construction Specifications, 3rd Edition (as amended through the 2014 Interims) Section 10.9.3 “Grout Physical Properties” and as specified within these Specifications. Grout shall be Class B (Aggressive Exposure Type) per Table 10.9.3-1 and have the properties indicated in Table 10.9.3-2 of the AASHTO LRFD Bridge Construction Specifications (3rd Edition, as amended through the 2014 Interims). SIKA Grout 300PT or Engineer approved equal shall be the grout used for this project.

Grout Physical Properties

Grout shall contain components to achieve a thixotropic behavior.

Grouts shall contain no aluminum powder.

Water shall be potable, clean and free of injurious quantities or substances (chlorides, sulfates and nitrates) known to be harmful to Portland cement or post-tensioning steel.

All grout shall be stored in a clean, dry location, and shall be pre-bagged in plastic lined or coated bags. All material shall be clearly marked with the following information:

- | | |
|------------------------------------|---|
| 1) Product name | 5) Lot number |
| 2) Date of manufacture | 6) Mixing instructions |
| 3) Name and address of manufacture | 7) Conformance to latest pre-qualification testing and performance requirements |
| 4) Shelf life | |

Any grout package that does not exhibit the above information, or loses that information, or has the integrity of the packaging compromised in the opinion of the Engineer, shall be rejected and shall be removed from the site and wasted to prevent reuse.

Storage of grout in the open must be on a raised platform and with adequate waterproof covering. On-site storage of grout is limited to a maximum period of one month.

627.2.3- CABLE COATINGS:

The cable coatings to be used for this work shall be PreLube 19, spray penetrating oil, and SYNCAN, synthetic complex grease, both as manufactured by the Grignard Company or Engineer

approved equal. The Contractor shall determine what amount of cable coating material will be necessary to complete the work and purchase that material prior to beginning work.

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627.2.4- CABLE TAPING:

The cable taping material shall conform to WVDOH Special Provision 627, Cable Stay Tape.

627.3- EXISTING POLYETHYLENE PIPE REMOVAL:

The existing polyethylene pipe (PE pipe) shall be removed at the locations identified in the plans and to the extents as shown in the plans. The Engineer may modify the extent of the PE pipe removal and may add locations based on changed conditions and/or judgment.

The Contractor shall take those precautions necessary to ensure the removed PE pipe or the equipment or other material used in the removal of the PE pipe will not be allowed to fall to the bridge below or into the Ohio River.

The Contractor shall use equipment that can be adjusted to limit its cutting depth, and shall not cut to a depth greater than the PE pipe wall thickness at that repair location. The longitudinal cut line shall not be extended past the circumferential line and/or cut line with power equipment, but shall be completed with manual cutting tools (such as a hammer and chisel). The Contractor shall monitor all PE pipe cutting activities and adjust the cutting depths as necessary to avoid cutting past the PE pipe wall into the grout as the exact location of the cable wire strands is not known, and these wire strands must not be cut or reduced in area in any way.

The sections of PE pipe to be removed shall be marked prior to their removal to ensure they will be re-installed in their original positions. The existing PE pipe that is removed shall be re-installed at all repair locations.

The Contractor shall prevent cupping or other distortion of the removed pipe due to residual stresses while it is awaiting re-installation. One method could be to clamp PE pipe sections onto a suitable diameter form which will maintain its shape, similar to a shoe last.

The Engineer shall inspect the removed PE pipe immediately after removal, and immediately prior to re-installation for any defects or other damage that may require additional investigation.

627.4- EXISTING GROUT REMOVAL:

The existing grout shall be removed at the locations identified in the plans and not less than the extent as shown in the plans. The Engineer may modify the extent of grout removal and may add locations based on changed conditions and/or judgment. The Contractor shall take those precautions necessary to ensure that at no time shall the removed grout, or the equipment or other material used in the removal of the grout or inspection of the wires, be allowed to fall onto the bridge below or into the Ohio River. The removed grout shall be collected and disposed of off-site.

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A small section of grout shall be removed around the circumference of the cable in the middle of the exposed section of grout to determine the depth of grout cover on the cables' strand. Maximum 1/8-in. deep score lines shall then be cut, but at no time shall the depth of the score line be allowed to nick, cut or touch the wire strands. Steel band clamps shall be installed adjacent to the score lines and the grout then removed between the score lines. Grout removal shall be performed by hand with the lightest hammer necessary to fracture the grout. The tool or equipment used to cut the grout score lines shall be capable of being adjusted to limit the cutting depth to 1/8-in.

All grout shall be removed between the score lines. The Contractor shall take care that the hammer does not contact the strand with sufficient force to damage the wires.

The Contractor shall provide brass or bronze wire brushes to the Engineer for use in removing the final remains of the grout on the strand. The Contractor shall allot a minimum of two hours for the Engineer to inspect the strand at each repair location after the grout has been removed to the approval of the Engineer. The Contractor shall also provide brass or bronze screw drivers or other prying tools for the Engineer's use to facilitate this inspection. The Engineer may direct the Contractor to expand the repair extent should corrosion extend beyond the area initially opened and exposed for inspection. The Contractor shall then perform the same applicable operations for the expanded repair extent. The Contractor shall be paid for the total length of repair (per LF) of cable, this LF includes the original repair length and any additional length required as directed by the Engineer.

627.5- APPLICATION OF CABLE COATINGS:

The strand shall be coated with two corrosion inhibitors. The first shall be a spray penetrating oil and the second shall be a synthetic grease as specified in Section 627.2.3 of this Special Provision. The Contractor shall take those precautions necessary to ensure that at no time shall the cable coating materials be allowed to drip or fall off the wire strands to the cables, bridge or Ohio River below. The Contractor shall clean any cable coating material from cable and bridge surfaces should any material fall, drip or be spilled from the repair location.

The top layer of wires shall be worked with brass or bronze tools during oiling to allow the penetrating oil to be applied to the second layer of wire strands. All visible and exposed wires shall be coated with penetrating oil.

The synthetic grease shall be applied after the penetrating oil and after the penetrating oil has ceased dripping from, or collecting on the strand. The Contractor shall apply the grease to all exposed wires in a uniform coating.

The Contractor shall clean all cable coating material from the exposed grout, polyethylene pipe and Tedlar PVF tape with the appropriate cleaning material and equipment.

627.6- INSTALLATION OF POLYETHYLENE PIPE:

The Contractor shall prepare the removed and new polyethylene pipe (PE pipe) for

installation as shown in the plans. The use of a “backer bar” or other means, may be necessary to facilitate the welding of the longitudinal cuts in the grout void region.

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The Contractor shall provide a demonstration of the PE pipe welding equipment, material, and personnel capabilities for the Engineer using the new PE pipe prior to beginning the repairs. Three 1 foot sections of PE pipe shall be split and then welded back together. The welded pipe sections shall be submitted to the engineer a minimum of 2 weeks prior to the scheduled start of work. Gas temperatures at the tip of the welding gun shall be recorded. The welded samples will be tested for strength. The welds must develop a minimum of 80% of the tensile strength of the PE pipe. The Contractor shall utilize the same welding equipment, material and personnel for all PE pipe repairs. Should any factor change, the Contractor shall provide additional demonstrations to satisfy the Engineer prior to re-starting repair work.

627.7- GROUT PLACEMENT:

The Contractor shall follow the grout manufacturer’s recommendations and provide a complete list of equipment, material, and placement procedures to Engineer prior to mobilizing equipment and/or personnel to the project site.

The Contractor shall inject new grout at all repair locations where existing grout is removed. The grout injection shall be accomplished as shown in the plans and as specified herein. The Contractor shall utilize a mechanical mixer and grout pump in the performance of this work, manually mixing the grout and hand placement of the grout shall not be allowed.

Grout placement shall not be done when the temperature of the grout exceeds 81° F, when the temperature of the cable sheathing exceeds 100° F, or when the ambient air temperature is forecast to be lower than 45° F within a 24 hour period.

Grout shall be injected into the PE pipe at the low point of the cable as shown in the plans. The pumping pressure shall be constant as the PE pipe is being filled, and as grout is forced out the grout vent hole for a minimum of 15 seconds. The 15 seconds shall be considered fulfilled when the grout has flowed from the grout vent with no visible slugs of grout, air or water for 15 seconds. Should a slug of grout, air or water be observed, the grout will continue to be injected at the constant pressure and a new 15 second period began. When the 15 second period has been fulfilled, the grout vent hole shall be plugged and the pressure held for 5 seconds. The grout injection port shall then be plugged and bleed water removed. The Contractor shall repeat the process if the grout injection port is not plugged in a timely fashion and injected grout is lost, at no extra cost to WVDOH.

The Contractor shall obtain the agreement of the Engineer for the fulfillment of this work. The Contractor shall clean all grout from the PE pipe and Tedlar PVF tape surfaces during and after the grout placement has been completed to the approval of the Engineer.

After the grout has cured according to the manufacturer’s recommendations, the Contractor shall remove the plug in the grout injection port and grout vent hole and allow the Engineer to verify full grouting at those locations. The Contractor may be required to drill ¼ in.

diameter “observation holes” in the cable to verify full grouting the length of the repair at the discretion of the Engineer. After the grouting procedure is finished, “observation holes” shall be filled with PE pipe weld material.

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Grouting equipment shall be the same as used for the grout acceptance tests. Grouting equipment shall include a moving blade mixer capable of continuous mechanical mixing which will produce a grout free of lumps and undispersed cement. Follow the grout manufacturer’s recommendation for the use of a grout mixer. The pump shall be a positive displacement type able to produce an outlet pressure of 75 psi and shall have seals which are adequate to prevent introduction of oil or other foreign substance into the grout.

A pressure gauge having a full-scale reading of no greater than 1.5 times the anticipated grouting pressure shall be installed in the grout line between the pumping outlet and the grout injection port.

A screen, which is easily accessible for inspection and cleaning with clear openings of 3/16-in. maximum size, shall be installed between the mixer and the pump.

The grouting equipment shall utilize gravity feed to the pump inlet from a hopper attached directly over it. The hopper must be kept at least 1/3 full of grout at all times during the pumping operation to prevent air from being drawn into the stay pipe. Prior to beginning grouting operations, the contractor shall demonstrate that the combination of grout materials, mixer and pump are capable of satisfactorily grouting the stays by performing a grouting acceptance test on a mock-up of a stay cable repair.

Introduction of admixtures and mixing of the grout shall be in accordance as recommended in writing by the manufacturer of the admixtures used and in accordance with the procedures used in the grout test.

627.8- SHOP DRAWINGS:

The Contractor shall prepare shop drawings for the repairs as shown in the plans. Shop drawings for the repairs shall include plans and details for the fittings, valves and other that will be necessary to provide positive mechanical shut off valves. The shop drawings shall be submitted to the Engineer for review and approval prior to fabrication.

627.10- ACCEPTANCE CRITERIA:

The Engineer shall not accept the Contractor’s work if in his judgment, the following criteria are not met:

The Contractor fails to store, handle, mix, or install the materials according to the Manufacturer’s recommendations and as specified herein.

Degradation of material properties under field conditions is detected. Any material showing degradation shall be replaced by the Contractor.

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If any PE pipe needs to be rewelded for whatever reason, it will be done by the Contractor.

If a repair is found not fully grouted, it will be filled by the Contractor with material and methods acceptable and approved by the Engineer.

All work done as a result of the acceptance criteria shall be done at no additional cost to the Department.

627.11- METHOD OF MEASUREMENT:

Cable stay repairs will be measured in place, in linear feet, based on the length of PE pipe removed, and shall include all material and work necessary for the PE pipe removal and installation, grout removal and injection and cable coatings within the limits of the repairs.

627.12- BASIS OF PAYMENT:

The preparation for the cable stay repair, testing, polyethylene pipe, polyethylene pipe welding material, grout, cable coatings, and removal and installation of all of the specified materials to affect the cable stay repair shall be included in the payment for the item. The quantities, determined above, will be paid for at the contract unit price bid for the items below, which price and payment shall be full compensation for furnishing all materials and doing all the work herein prescribed, including all the cost, labor, tools, equipment, supplies and incidentals necessary to complete the work.

627.13- PAY ITEM:

627001-002 Cable Stay Repair, LF

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**WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

**SPECIAL PROVISION
FOR
STATE PROJECT: S305-22-0.04.00**

FEDERAL PROJECT: NHPP-0022(064)D

**FOR
SECTION 627**

ADD THE FOLLOWING SECTION:

SECTION 627 – CABLE STAY TAPE

627.20- DESCRIPTION:

The work shall consist of furnishing and placing Tedlar PVF tape at the locations indicated in the plans, and providing access for the Engineer to the repairs during all activities. This work shall be in accordance with this Specification and in conformity with the plans.

627.21- MATERIALS:

627.21.1- TEDLAR PVF TAPE:

Requirements

Backing	Tedlar PVF	
Adhesive	Acrylic	
Color	White	
Width	4 in.	
Adhesion to steel	Minimum of 45 oz./in width	ASTM Test Method D-3330
Tensile Strength	Minimum of 22 lbs./in width	ASTM Test Method D-3759
Elongation at Break	Minimum of 160%	ASTM Test Method D-3759
Backing Thickness	2.1 mils +/- 0.1 mils	ASTM Test Method D-3652
Total Tape Thickness	3.4 mils +/- 0.15 mils	ASTM Test Method D-3652
Temperature Use Range	-90 deg. to 210 deg. F	

All Tedlar PVF tape shall be stored in a clean dry location and in accordance with manufacturer's recommendations. All material shall be clearly labeled or marked with the

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following information:

- 1) Product name
- 2) Date of manufacture
- 3) Name & address of the manufacturer
- 4) Expiration Date
- 5) Lot number

The manufacturer of the Tedlar PVF tape shall submit documentation showing that the material submitted for construction is of equal or higher quality than the material provided by WVDOH.

At the end of project, all rolls (full or partial) of tape shall become the property of the WVDOH and the Contractor shall make arrangements with Mr. Dave Sada, District 6, District Bridge Engineer for the delivery of the material.

627.21.2- CABLE STAY TAPE PREPARATION:

The loose, rough, or ragged edges of the Tedlar PVF tape at the repair locations shall be trimmed. The polyethylene pipe at the repair location shall be cleaned using a cloth soaked in a cleaning solvent which is acceptable to the tape and polyethylene pipe manufactures such as VM&P Naphtha and isopropyl alcohol. The use of oily or soapy solutions that might leave a film behind is prohibited.

The Contractor shall clean and dry the area to receive Tedlar PVF tape to the satisfaction of the Engineer immediately prior to Tedlar PVF tape application.

627.21.3- CABLE STAY TAPE APPLICATION:

The contractor shall apply Tedlar PVF tape at the locations indicated and to the extents shown in the plans. The application of Tedlar PVF tape shall be done in dry ambient conditions with a maximum allowable air temperature of 84°F and a minimum allowable air temperature of 36°F.

Prior to the Contractor mobilizing equipment and/or personnel to the project site, the Contractor shall provide a demonstration of the methods and personnel they intend to utilize during the repairs on a 10-ft. section of inclined polyethylene pipe. The Contractor shall demonstrate to the satisfaction of the Engineer that the tape can be applied in the helical manner without wrinkles and bumps using a taping machine or manual methods. The method approved at the demonstration stage shall be used for the actual repairs.

The Tedlar PVF tape shall be applied (wrapped) in a helical manner from bottom of repair to top, under tension with a 50% overlap. The taping process shall be started and ended with 2 wraps of 100% overlap.

Splicing of the Tedlar PVF tape is prohibited except for repairs which require a length of tape greater than a new roll of tape. If necessary, the Contractor shall splice rolls of Tedlar tape together carefully by overlapping the trailing end of one roll by 2-in. minimum onto the leading end of the new roll and continuing the wrapping process. At each splice location, 2 wraps of 100% overlap shall occur. For those circumstances which require a splice, only one splice is allowed.

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627.21.4- ACCEPTANCE CRITERIA:

The Engineer shall not accept the Contractor's work if in his judgment, the following criteria are not met:

The Contractor fails to store, handle, or install the materials according to the Manufacturer's recommendation and as specified herein.

The Tedlar tape shall have a clean smooth appearance free of any wrinkles, bumps or debris between the tape and the PE pipe which would affect the performance of the tape.

If any Tedlar tape needs to be rewrapped for whatever reason, it will be done by the Contractor.

If a repair is found not fully sealed, the affected area will be rewrapped by the Contractor.

Degradation of material properties under field conditions is detected. Any material showing degradation shall be replaced by the Contractor.

All work done as a result of the acceptance criteria shall be done at no additional cost to the Department.

627.21.5- METHOD OF MEASUREMENT:

Cable stay tape will be measured in place, in linear feet, based on the length of PE pipe taped, and shall include all material and work necessary for the Tedlar PVF tape preparation and installation within the limits of the repairs.

627.21.6- BASIS OF PAYMENT:

The purchase, preparation and installation of the Tedlar PVF tape shall be included in the payment for the item. The quantities, determined as given in Section 627.21.5, Method of Measurement, will be paid for at the contract unit price bid for the items below, which price and payment shall be full compensation for furnishing all materials and doing all the work herein prescribed, including all the cost, labor, tools, equipment, supplies and incidentals necessary to complete the work.

627.21.7- PAY ITEM:

No direct payment will be made for this work, but shall be included under 627001-002, Cable Stay Repair, LF.

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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

SECTION 650

SODDING

650.1-DESCRIPTION:

This work consists of furnishing, hauling, excavating for and preparing the bed, and placing sod.

650.2-MATERIALS:

Furnish sod consisting of well-rooted Kentucky Blue Grass (*Poa pratensis*) or Canadian Blue Grass (*Poa compressa*) and Tall Fescue (*Festuca arundinacea*) containing a growth of not more than 5 percent of other grasses, and free from all noxious weeds such as wild mustard, thistles, quack grass, Johnson grass, dandelions, and crab grass.

Ensure that all sod is certified by the sod supplier that it complies with this item. Ensure that the sod was recently mowed to a height of not more than 3 inches (75 mm). Furnish a certificate with each shipment, and furnish the following additional information from the sod supplier:

- A. The name of the producer.
- B. The amount of sod shipped in square yards (square meters).
- C. The location of sod field.
- D. The location of job site.
- E. The date sod was cut.
- F. The thickness the sod was cut.

Furnish wood stakes that are at least 1/2 × 3/4 × 12 inches (13 × 19 × 300 mm).

Furnish T-pins that are 18-inch (450 mm) in length and 1/4 inch (6 mm) in diameter and have a 3-inch (75 mm) tee.

Furnish round pins that are 18-inch (450 mm) in length and 1/4 inch (6 mm) in diameter and have a 1.5-inch (38 mm) washer.

Furnish galvanized poultry netting 50 inches (1200 mm) wide with 2-inch (50 mm) mesh and No. 20 gage minimum wire.

Furnish fertilizer and lime according to Item 652.

650.3-CONSTRUCTION REQUIREMENTS:

650.3.1-Lifting Sod: Furnish sod strips that are not less than 3 feet (0.9 m) and not over 6 feet (1.8 m) in length with a uniform width of not over 24 inches (0.6 m). Furnish sod strips that lay flat on skids. The Contractor may elect to deliver sod rolls of up to 25 feet (7.6 m) in length. Furnish sod rolls that are pre-rolled on skids. Furnish sod cut to a depth equal to the growth of the fibrous roots but in no case less than 1 inch (25 mm).

Deliver sod to the job within 24 hours after being cut, and install it within 48 hours after being cut.

During wet weather, allow the sod to dry sufficiently to prevent tearing during handling and placing. During dry weather, water the sod before lifting to ensure its vitality and to prevent the dropping off of the soil in handling.

650.3.2-Preparation of Areas to be Sodded: Before placing the sod, excavate the sod bed to a depth that when the sod is in place the top of the sod is flush with the surrounding grade and conforms to the typical cross-section. If specified, place the topsoil according to Item 651. If specified under Item 651, apply commercial fertilizer and agricultural liming material. Incorporate these materials in the areas to be sodded at the rate specified in 652.6 to a depth of not less than 1 inch (25 mm). Incorporate these materials within 48 hours prior to placing the sod. Immediately before placing the sod, rake the area or otherwise bring it to an even surface forming a proper sod bed. If the area is dry, thoroughly water the sod bed.

650.3.3-Placing Sod: Do not place any sod when the temperature is below 32 °F (0 °C). Do not place any frozen sod, and do not place any sod upon frozen soil. When placing sod between June 1 and October 15, cover it immediately with straw mulch 1 inch (25 mm) thick, loose measurement.

Lift sod from trucks or storage piles, and place it by hand with close joints and no overlapping. Plug all gaps between sections of sod and openings at angles with sod. After laying, thoroughly water the sod, and tamp the sod with approved sod tampers sufficiently to bring the sod into close contact with the sod-bed and to ensure tight joints between the sections or strips. Upon placing the sod, ensure that the surface of the sodded areas coincides with the finished grade.

650.3.3.1-On Slopes Steeper Than 3:1 But Flatter Than 2:1: Lay sod with the long edges of the strip parallel to the contour starting at the bottom of the slope. Neatly match successive strips, and stagger all joints by at least 12 inches (300mm).

For sod placed 6 feet (1.8 m) or greater in height (measured along the slope), stake each strip or roll securely along all sides with stakes not more than 2 feet (0.6 m) apart with the flat side against the slope or with pins not more than 2 feet (0.6 m) apart. Drive the wooden stakes so that the last 1 inch (25 mm) remains above the top of the sod. Drive pins 1 inch (25 mm) below the top of the grass.

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650.3.3.2-In Ditches: Place sod in ditches with joints staggered at least 12 inches (300 mm). Stake each strip or roll securely along all sides with wooden stakes not more than 2 feet (0.6 m) apart with the flat side against the slope. Drive the wooden stakes so that the last 1 inch (25 mm) remains above the top of the sod.

650.3.3.3-On Slopes 2:1 or Steeper: Before placing the sod, place the galvanized poultry netting or equivalent. Stake the galvanized poultry netting or equivalent securely to the subgrade by using pins or wood stakes. Place the pins or wooden stakes at 4 foot (1.2m) intervals. Fasten the netting to the wooden stakes with staples. Where the sod width is from 8 to 10 feet (2.4 to 3 m) wide, the Engineer will allow two strands of netting for a total width of 8 feet (2.4 m). For sod, stake each strip or roll securely along all sides with wooden stakes not more than 2 feet (0.6 m) apart with the flat side against the slope or with pins not more than 2 feet (0.6 m) apart. Drive the wooden stakes so that the last 1 inch (25 mm) remains above the top of the sod. Drive pins 1 inch (25mm) below the top of the grass.

650.3.4-Watering: Keep all sodded areas thoroughly moist for 30 days after sodding. Repair any areas damaged following installation. Ensure that sod is in place for at least 30 days before final acceptance.

650.4-METHOD OF MEASUREMENT:

The quantity of work done will be measured in square yards (meter) of “Sodding” as determined from the lines and dimensions shown on the Plans.

650.5-BASIS OF PAYMENT:

The quantities, determined as provided above, will be paid at the contract unit process bid for the items, which prices and payment shall be full compensation for furnishing all the materials and doing all the work prescribed in a workmanlike and acceptable manner, including all labor, tools, equipment, supplies, and incidentals necessary to complete the work.

650.6-PAY ITEMS:

ITEM	DESCRIPTION	UNIT
650010-001	SODDING, “staking requirements”	Square Yard (Meter)

**WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
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**SPECIAL PROVISION
FOR**

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

FOR

SECTION 642

TEMPORARY POLLUTION CONTROL

642.1-DESCRIPTION:

ADD THE FOLLOWING:

642.1.1-New River Parkway: Project located in New River Parkway which restricts the type of temporary pollution control elements used in the area.

642.5-MATERIALS:

DELETE ITEM i. AND REPLACE WITH THE FOLLOWING:

- i. Mulches may be wood cellulose fiber, wood chips, bark, matting or other material acceptable to the Engineer. Mulch materials shall be reasonably free of noxious weeds. Chemical mulch binders shall conform to the requirements in 715.27.1.

DELETE ITEM iii. AND REPLACE WITH THE FOLLOWING:

- iii. Temporary seed, such as annual ryegrass (Italian ryegrass), cereal rye or wheat, barley or oats, and millet, used in temporary seed mixture, shall be of a commercial grade meeting requirements of the State Seed Law, Temporary seed labeled with the notation "germination below standard" will not be acceptable for use on projects. Temporary seed shall not be used on the project after one year from the date of germination test shown on the label. Seed other than that specified above shall meet the requirements of 715.28.

DELETE ITEM vi. AND REPLACE WITH THE FOLLOWING:

- vi. BLANK

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642.5.2 Schedule of Seeding Operations:

DELETE THE SECTION AND REPLACE WITH THE FOLLOWING:

642.5.2-Schedule of Seeding Operations:

642.5.2-Schedule of Seeding Operations: Fill slopes, embankments, and waste sites shall be seeded and mulched in 10-ft lifts or within four calendar days, whichever occurs first.

Cut slopes and borrow pits shall be seeded and mulched each 15-ft depth of excavation or within four calendar days, whichever occurs first. However, benched areas shall be seeded after completion of each bench, regardless of height.

642.5.3 Seed and Mixture planting seasons:

DELETE THE SECTION AND REPLACE WITH THE FOLLOWING:

642.5.3-Seed Mixtures and Planting Seasons: Temporary seed mixtures shall be used on any embankment or area which will be subject to further construction work before the project is completed. The type of seed mixture to be used on any area will be determined by the Engineer in accordance with Tables 642.5.3.1.

642.5.4-Mulch, Fertilizer and Lime:

DELETE ITEM i. AND SUBSTITUTE THE FOLLOWING.

- i. Wood cellulose fiber mulch shall be used for all mulching at the rate of 1,500 lbs. per acre. Fertilizer shall be applied at the rate of 800 lbs. per acre of 10-20-10, or equivalent

DELETE ITEM ii.

DELETE ITEM iii.

642.6-TEMPORARY PIPE, CONTOUR DITCHES, BERMS, SLOPE DRAINS, DITCH CHECKS, AND SILT FENCE:

642.6.4-Ditch Checks:

DELETE THE CONTENTS AND SUBSTITUTE THE FOLLOWING:

642.6.4-Ditch Checks: Silt fence shall be used to control erosion and trap sediment as required. Ditch checks shall be constructed in cut or median ditches by installing silt fence or by using wood, plywood, logs, rocks, steel, or other devices to control velocity and to aid in sediment control.

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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

FOR

SECTION 652

SEEDING AND MULCHING

652.1-DESCRIPTION:

ADD THE FOLLOWING:

652.1.1-New River Parkway: Project located in New River Parkway which restricts the type of seeding and mulching elements used in the area.

652.3-SEASONS OF WORK:

DELETE THE FIRST SENTENCE OF PARAGRAPH ONE AND REPLACE WITH THE FOLLOWING:

Permanent seeding or second and third seeding following the original seeding, under 652, shall be performed between the dates of April 1 to May 15.

652.4-AREA PREPERATION FOR SEEDING AND MULCHING:

DELETE REFERENCES TO 'AGRICULTURAL LIMESTONE' WITHIN SECTION.

652.5-SOWING SEED:

ADD THE FOLLOWING TO TABLE 652.5:

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VARIETY OF SEED	TYPE A
Indiangrass	8
Little Bluestem	8
Switchgrass "Variety Shelter"	10
Annual Ryegrass August 1 to May 15 Or Weeping Love Grass May 15 to August 1	10
UPLAND MIX** Common milkweed Browneyed susan American sienna Winkleleaf goldenrod Woodland sunflower Butterfly milkweed New York ironweed Arrowleaf threeawn Hairy lespedeza Virginia creeper Trumpet creeper White snakeroot Or FLOODPLAIN MIX** Indian woodoats Eastern bottlebrush grass American sienna Winkleleaf goldenrod Woodland sunflower New York ironweed Trumpetweed Cardinal flower Fall phlox Blue mistflower	15

** Add 15 lbs. /acre to Seed Mix A of any combination of at least 5 species per mix category. Use upland mix in areas above the 100 year flood elevation and use floodplain mix below the 100 floodplain boundary. If these species are not commercially available an equivalent broad leaved species may be substituted, as directed by the Engineer.

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652.6-APPLYING MULCH AND FERTILIZER:

652.6.1-General:

DELETE ALL REFERENCES TO “STRAW AND HAY MULCH”

652.6.2-Staw Mulch:

DELETE ENTIRE SUBSECTION

652.6.5-Wood Chips:

DELETE ENTIRE SUBSECTION

652.8-SECOND AND THIRD STEP SEEDING, FERTILIZING, AND MULCHING:

DELETE THE ENTIRE SUBSECTION AND SUBSTITUTE THE FOLLOWING:

Second and third step seeding shall consist of application of temporary seeding mixtures contained in Table 642.5.3.1 “Temporary Seeding Mixtures” at the rates and dates specified. Second or third step seeding of Permanent Seed Mixture A shall be applied only between the dates of April 1-May 15.

652.9-METHOD OF MEASUREMENT:

DELETE REFERENCES TO “GROUND AGRICULTURAL LIMESTONE”, “WOOD CHIPS, OR BARK MULCH”, “STRAW”

652.11-PAY ITEMS:

ADD THE FOLLOWING:

ITEM	DESCRIPTION	UNIT
652003-006	SEED MIXTURE, A	Pound (Kilogram)

DRAFT

SECTION 688 PAINTING METAL STRUCTURES

688.1 -DESCRIPTION:

The painting (coating) of metal structures shall follow the provided requirements set forth in this specification unless otherwise noted in the Contract. This specification shall apply to surface preparation, coating application, contractor responsibilities, environmental and worker protection, and waste handling/disposal.

688.2 -GENERAL:

688.2.1–Surface Preparation:

688.2.1.1–Non-Blasting: When non-blast cleaning is specified in the contract documents, any one or any combination of the methods below shall be used. The surface and the surface profile after cleaning shall meet the requirements of the methods below. The amount of material, rust scale, and pack rust removed after non-blast cleaning, will meet the requirements of the SSPC methods listed:

Hand Tool Cleaning SSPC-SP2
Power Tool Cleaning SSPC-SP3
Commercial Grade Power Tool Cleaning SSPC-SP15

688.2.1.2–Blasting: The compressed air used for nozzle blasting shall be free of water or oil. The cleanliness of each compressed air system shall be verified at least once per shift using the blotter test in accordance with ASTM D4285, “Standard Test Method for Indicating Oil or Water in Compressed Air”.

688.2.1.2.1–Commercial: Shall meet the requirements of SSPC-SP 6 prior to painting. The appearance of the steel surface after blast cleaning shall correspond to the applicable and current SP 6 pictorial standards of SSPC Vis 1.

688.2.1.2.2–Brush-Off Blast: Shall meet the requirements of SSPC-SP 7 prior to painting. The appearance of the steel surface after brush off blast cleaning shall correspond to the applicable and current SP 7 pictorial standards of SSPC Vis 1.

688.2.1.2.3–Near White: Shall meet the requirements of SSPC-SP 10 prior to painting. The appearance of the steel surface after blast cleaning shall correspond to the applicable and current SP 10 pictorial standards of SSPC Vis 1.

688.2.1.2.4–Blast Media: The abrasives used for all blasting shall meet the guidelines set forth in SSPC AB1 for mineral and slag abrasives, and AB3 for ferrous metallic abrasives. Any additive mixed with the abrasive shall be approved by the Division prior to use. The abrasives used shall produce a height of profile between 1.0 and 3.0 mils (25 µm and 75 µm).

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In addition, the container or bag of abrasive shall include the name of the abrasive, the name of the manufacturer, and the size of the abrasive. If any additive has been included with the abrasive, the name and the percentage of the additive shall be on the container or bag.

688.2.1.3-Post-Surface Preparation: Surface prep operations shall be performed in such a manner that no damage is done to partially or entirely completed portions of the work. After surface prep, any areas that are repaired by welding shall be prepped again. Areas repaired by grinding or other means shall have the anchor pattern restored by abrasive blasting. Visible deposits of oil, grease, or other contaminants shall be removed according to SSPC-SP1 "Solvent Cleaning" prior to painting. Dust, loose residues, and the removal of abrasives from pockets and corners shall be removed from prepared surfaces by brushing, blowing off with clean, dry air, vacuum cleaning. The prepped surface shall be checked for cleanliness by wiping a clean, dark cloth across the surface. If residue is present, the surface shall be cleaned again and rechecked. All blast cleaned surfaces shall be painted prior to any rust bloom or flash rust occurring or within 24 hours, whichever comes first.

688.2.2-Paint Application Requirements:

688.2.2.1-Weather Conditions: Painting shall not be done when the ambient temperature is below 40° F (5° C) or above 100° F (38° C), or the relative humidity above 90 percent. The temperature of the steel must be at least 5° F (3° C) above the dew point. Painting shall not be performed when the surface to be coated is sufficiently hot to cause blistering of the film or too rapid solvent release. Painting will only be permitted between the dates of April 15th through October 15th. There will be no painting permitted to occur in a heated containment.

688.2.2.2-Paint Storage: Paint and thinners shall be stored in a temperature-controlled environment between 40° F (5° C) and 100° F (38° C). At no time will paint be used beyond the manufacturer's shelf life.

688.2.2.3-Paint Application: The blast cleaned surface shall be painted within 24 hours. In the event rust bloom or flash rusting occurs, the effected members shall be re-cleaned by blasting. The paint shall be applied by spray methods, except those areas inaccessible to spray application may be brushed. Brushes, when used, shall have sufficient body and length of bristle to spread a uniform coat. Small touch-up areas may be brushed, if approved by the Engineer. Use of an agitated pot shall be mandatory in spray application of the paint. The agitator or stirring rod shall reach within 1 inch (25 mm), of the bottom of the pot and shall be in motion at all times during paint application. Coatings shall be mixed in strict accordance with the coating manufacturer's written instructions. Under certain conditions, it may be necessary to thin or adjust the solvent balance of the paint. The type and amount of solvent to be used shall be that listed on the coating manufacturer's product data sheet for that material. Upon thinning, the dry film thickness requirement shall still be met.

Application requirements and drying times between coats shall be in accordance with the manufacturer's written instructions. Dry film thickness requirements shall be specified in the contract documents. Exposed steel surfaces of expansion dams shall be painted as specified for structural steel.

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Spray guns must be equipped with the recommended size tip for the paint product being applied and shall be held perpendicular (90 degrees) to, and at, the proper distance from the receiving surface. Complete protection shall be provided by the contractor against paint spatter, spillage, overspray, wind-blown paint, or similar releases. Appropriate containment shall be placed around the work area to protect public and private property. This shall include pedestrian, marine, or vehicular traffic on any portion of the bridge, and any highway appurtenances that are found upon, beneath, or adjacent to the structure. Staging must be adequate to provide access to all areas being painted. Violation of these requirements causing excessive paint waste will be justification for the WVDOH Engineer to order the Contractor to cease all work on the project until corrective action has been taken. The Contractor shall be responsible for cleaning and/or replacing any property damaged by the Contractor's operations at no cost to the Department. The method of cleaning and/or replacement shall be submitted to the Engineer in advance for approval.

688.2.2.3.1-Painting Sequence: Shall be in accordance with the following:

FULL PRIME COAT:

The structure shall receive one coat of a primer meeting the requirements of Section 711 of the Standard Specifications. The full prime coat shall be applied before the stripe prime coat. The primer used for the full prime coat and the stripe prime coat shall be of the same type and shall be from the same manufacturer.

STRIPE PRIME COAT:

All edges, corners, crevices, bolt heads and nuts, all rivet heads, edges of flanges and plates, welds, sharp edges, in general all edges, shall receive one stripe coat, by brush application, of the same primer as the Full Prime Coat. Striping shall extend a minimum of one inch (2cm) from the edge. The prime coat shall at a minimum, be set-to-touch before the stripe coat is applied. No dry film thickness is specified for this coat. This coat shall be tinted as allowed by the manufacturer to be in contrast to the full prime coat and intermediate coat. The tinting agent shall be the paint manufacturer's approved tinting agent.

INTERMEDIATE COAT:

The structure shall receive one uniform coat of a paint meeting the requirements of Section 711 of the Standard Specifications. The color shall be in contrast to the prime and top coats. If tinting is required, the tinting agent shall be the paint manufacturer's approved tinting agent.

CAULKING:

Caulking shall be applied before the application of the topcoat. This includes all seams between diaphragm connections to stiffeners and splices; and seams between any connection that is riveted or bolted. Any welded connections that are not fully sealed by the weld shall be caulked with a paste type caulk. The caulk shall be pressed into the seams between the adjoining surfaces, by wetted finger or specialty tool, to insure bond and provide a smooth uniform surface. Caulking in a 3-coat system shall be applied after the intermediate coat has cured. Caulking on a 2-coat system shall be applied after prime coat has cured. The top coat shall not be applied until the caulking has fully cured in accordance with the manufacturer's recommendations.

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The caulking material shall be compatible with the paint system being applied and shall be by written recommendation of the paint manufacturer. The caulking material shall be tested for compatibility with the paint system at the same time that the paint is tested for intercoat compatibility. Caulking operations shall be performed only when weather conditions are within the parameters as specified in section 688.2.2.1.

TOP COAT:

The structure shall receive one uniform coat of paint as designated in the plans meeting the requirements of Section 711 of the Standard Specifications. The color shall be as designated in the plans and shall be in accordance with current Federal Standard 595.

688.2.2.3.2-Paint Systems:

3 COAT: Primer, Intermediate, Top Coat

2 COAT: Primer, Top Coat

1 COAT: Epoxy Mastic only

688.2.2.3.3 - Painting over Galvanized Surfaces: Painting Galvanized surfaces shall be in accordance to the paint manufacturer's recommendations. The Contractor is to exercise care while cleaning and painting around expansion joints and galvanized surfaces. Any damage to the expansion joints or galvanized surfaces found by the Engineer, as a result of the cleaning and painting operation shall be repaired and/or replaced, to the satisfaction of the Engineer, at the Contractor's expense.

688.2.3 -Inspection of Applied Paint: If in the opinion of the Engineer the coating has flaws other than deficiencies in the prescribed dry film thickness, the material shall be repaired or shall be removed and replaced. Defects in the film, including but not limited to runs, sags, mud-cracking, lifting, overspray, dry spray, pinholes, and holidays shall be corrected until a continuous uniform film has been applied. Excessive film thickness shall be reduced and insufficient film thickness shall be increased. If the thickness of the finish coat is reduced, a thin coat of the finish shall be reapplied to seal the surface and to blend the area into the surrounding coating. Depending on the defect, total removal and replacement of the effected coating may be required. No unsightly runs or sags shall be visible. All "mud-cracking" and/or "dry overspray" in the paint film shall be removed. Excessive bubbles or pinholes shall not be visible in the coat after examination under a minimum of 8X magnification. Calibration of the thickness gage and dry film thickness measurements shall be in accordance with MP 708.40.00.

688.2.3.1–Access for Inspection: The Contractor shall furnish suitable safe access and shall provide a time mutually agreed to for inspecting the structural steel prior to and after coating. The Division's inspector shall approve all repairs. When providing suitable safe access, rubber rollers or other protective devices shall be used. Metal rollers or clamps and other types of fastenings that will mar or damage freshly coated surfaces shall not be used. No temporary attachments, supports for access, or forms, shall damage the coating system (In particular, on the fascias where bracing is used, sufficient size support pads must be provided). Any damage that occurs from such devices shall be repaired.

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688.2.3.2- Repair Procedures for Field Paint Deficiencies: All field repairs to the coating shall be made in strict accordance with the coating manufacturer's recommendations except where the requirements listed in this specification are more stringent. Any repairs to the applied coatings shall be from the same manufacturer. All welds from which the coating of paint has been damaged or is otherwise defective shall be blast cleaned and repaired. Surfaces that will be inaccessible for coating after erection shall be repaired and/or recoated prior to erection. The Engineer is to review and accept a repair plan before damaged areas are repainted. The requirements specified herein for provisions for inspection, mixing, thinning, temperature and humidity, and application shall govern the coating of the repaired areas. In order to avoid abrupt changes in paint thickness, the area adjacent to repair areas shall transition from zero paint thickness to full system thickness within not less than 3 inches (75 mm) of the repair area by means of sanding the transition area. The requirements for the dry film thickness of the repair coats are the same as those specified for the paint system.

688.2.4-Submittals: Submittals shall be forwarded through the Prime Contractor and be accepted by the Engineer prior to commencement of the subject work. This is the responsibility of both the Fabricator and the Field Contractor.

688.2.4.1-Quality Control Plan for Painting: Minimum requirements and document form are set forth in MP 688.02.20.

688.2.4.2-Containment/Disposal Control Plan for Existing Steel Structures: Minimum requirements shall be set forth in MP 688.03.20.

688.2.4.3-Contractors Qualifications: Contractors performing sand blasting and field painting operations shall be SSPC QP1, and SSPC QP2 qualified.

688.3 -FIELD PAINTING OF SHOP PRIMED COATED STEEL:

688.3.1- General: Field painting of new shop prime coated structures: Shall include, unless otherwise specified in the contract, the preparation of the primed surface for painting, the procurement of all materials to meet the necessary specifications and the application of the coatings. In addition, the Contractor shall protect pedestrian, vehicular, and other traffic on or underneath the structure from splattering, splashing, or dripping paint. Railings, curbs and all other superstructure and substructure shall be protected against spatters, splashes, and the like.

688.3.2-Shear Studs: Shear studs shall be applied in the field. At this time, all adjoining concrete work shall be finished and the primer repaired to the satisfaction of the Engineer.

688.3.3 -Materials: The field coats (intermediate and/or top coats) of paint shall meet the requirements of 711.22.3 and 711.22.4. The intermediate coat shall be applied at a minimum of one mil (25 μ m) dry. The top coat shall be applied at a minimum of 3 mils (75 μ m) dry. The total thickness of the field coats shall be a minimum of 4 mils (100 μ m) dry for the 711.22 system. Each coat shall be a contrasting color to the previous coat. In addition, the field intercoat adhesion shall be at least 3A when tested in accordance with MP 711.00.20.

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688.3.4-Surface Preparation: Prior to topcoating, surface contamination such as rust, dirt, mud, oil, concrete, loose zinc, salts, or other foreign matter shall be removed. The entire structure shall be pressure washed at 2000 – 3000 psi (13800 – 20700 kpa). Touch up of the primer shall be in accordance with section 688.2.3.2.

688.3.5-Paint Application Requirements: Painting shall be in accordance with Section 688.2.2.3. Paint containment shall be Class 3P as specified in the current edition of SSPC Guide 6.

688.4–COMPLETE PAINTING AND ZONE PAINTING OF EXISTING STRUCTURES:

688.4.1-General: The field coats (total system) of paint shall meet the requirements of Section 711. The applicable sections of 711, the dry film thickness and the color shall be as specified in the contract documents. Each coat shall be a contrasting color to the one previously applied. Where Zone Painting applies, the contract documents shall specify the areas to be prepared and painted.

688.4.2-Surface Preparation: The surface shall be prepared as specified in the contract documents. Specific instructions will be given on the amount of surface required to be blast cleaned in accordance with the specific standards identified in 688.2.1.1. The remainder may be removed by non-blast cleaning, according to the standards identified in 688.2.1.1. All laminar and stratified rust that has formed on the existing steel surfaces shall be removed. Pack rust formed along the perimeter of mating surfaces of connected plates or shapes shall be removed to the extent feasible without mechanically detaching the mating surface. Any rust remaining after cleaning shall be tight and intact when examined using a dull putty knife. The tools used to remove these corrosion products shall be identified in the submittals and accepted by the Engineer. If the surface preparation or removal of rust results in nicks or gouges, the work shall be suspended, and the damaged areas repaired to the satisfaction of the Engineer, at the Contractor's expense. In general, all accessible steel surfaces not galvanized, aluminum or weathering steel shall be blast cleaned. The Contractor is to exercise care while cleaning and painting around expansion joints and galvanized surfaces. Any damage to the expansion joints or galvanized surfaces found by the Engineer, as a result of the cleaning and painting operation shall be repaired and/or replaced, to the satisfaction of the Engineer, at the Contractor's expense.

688.4.4-Vegetation Removal: - It is anticipated that some vegetation may need to be trimmed or removed in order to accomplish the cleaning and painting of the structure. Any such cutting and removal of vegetation shall be considered incidental to Cleaning and Painting the existing structure and shall be at the contractor's discretion and expense. Any such vegetation so cut, shall be removed from the site by the contractor at his sole expense.

688.4.5-Utilities and Navigational Lighting: Any damage to the existing utilities shall be repaired and/or replaced, to the satisfaction of the utility owner, at the Contractors expense.

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688.4.6-Paint Designation Label:

688.4.6.1-Description: The bridge paint designation label shall consist of painting on the fascia web of the exterior girder. The following information; the paint system, month-year, and contractor will be in accordance with this special provision and attached details. This paint designation label will only be utilized during the complete removal and painting of existing or new structures. The paint designation label will be assigned to the Contractor during the Pre-Construction meeting.

688.4.7-Location: The paint designation label will be located at abutment number one on the fascia web of the exterior girder with a southern or eastern orientation.

688.4.8-General: All work performed according to this Project Note shall be considered incidental to the painting of the existing structure.

688.5-ENVIRONMENTAL, WORKER PROTECTION, AND WASTE HANDLING:

688.5.1-General: Environmental protection shall be used when cleaning, painting, welding or cutting an existing bridge that has a coating containing lead-based paint. The containment class, emission assessment methods and levels as defined by the current revision of SSPC Guide 6 shall be as stated in the contract documents. A containment/disposal control plan shall be submitted by the prime contractor to the Division according to the requirements as set forth in MP 688.03.20 - Guide for Developing the Contractor's Containment/Disposal Control Plan for Spent Material Prior to Painting Existing Steel Structures. The specific pollution control system which is proposed for the complete capture, containment, collection, and disposal of the "spent material" generated by the work shall be included in the plan. This work shall be performed in compliance with West Virginia Division of Environmental Protection (WVDEP), United States Environmental Protection Agency (EPA) Occupational Safety & Health Administration (OSHA), United States Coast Guard (USCG), SSPC Guide 6 and Guide 7, and other agencies' rules, regulations, standards and guidelines in effect at the time the work is in progress.

688.5.2-Permits for Disposal of Spent Material: The Contractor shall obtain all documents and/or permits that are required for the handling and disposal of the "spent material" collected during the course of the work. All material shall be disposed of at an approved site(s) by a licensed and permitted waste transporter. The Contractor shall not begin cleaning or blasting until he has submitted final documentation that he has an approved disposal site and has all documents and/or permits for the handling, storing, and transporting of hazardous and non-hazardous waste. "Spent material" and other project waste, regardless of the presence of hazardous metals, shall be stored in roll-offs or sealed 55-gallon drums. In no case shall the material be stored directly on the ground or on tarps on the ground. The containers shall be marked and labeled in accordance with all applicable and current Federal and State regulations. The "spent material" shall not be disposed of until authorized by the Engineer and in no case shall "spent material" be allowed to accumulate longer than 90 days prior to transport.

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688.5.2.1-“Spent Material: This shall include material from other waste streams and shall be sampled and tested in accordance with the current revision of SSPC Guide 7 and all applicable methods of EPA SW-846. The Contractor shall, at the Contractor’s expense, select a laboratory that will sample and analyze the “spent materials”. The laboratory must be certified by the WVDEP, EPA or by another state’s DEP-equivalent. Certification will be provided to the Engineer prior to the beginning of work. The “spent material” will be transported and disposed of in accordance with all applicable and current Federal and State regulations. The waste transporter for both hazardous and non-hazardous waste will be listed on the Contractor’s Containment/Disposal Control Plan.

688.5.3-Additional requirements for all containment classes: Ground covers will be provided beneath the containment area and all equipment where spills are possible to capture inadvertent spills or leaks of debris. Extend the covers a minimum of 5 feet beyond the area to be covered. Debris shall be removed from the covers at least once per shift, or as directed by the Engineer. If the ground beneath the structure serves as the base of the containment, install and maintain air and dust impenetrable such as solid plywood panels or flexible materials such as tarpaulins. Provide explosion–proof lighting inside containment for all surface preparation, paint application, and inspection work. Maintain a minimum of 10 foot-candles for surface preparation and painting, and a minimum of 30 foot-candles for inspection. Water booms shall be used to contain inadvertent releases of debris unless prohibited by navigation lanes. In these cases, a boat with a skimmer shall be available to collect fugitive materials. Remove all project-related debris from the surface of the water or from the stream sediment at the end of each working day at a minimum unless directed otherwise by the Engineer.

688.5.4–Temporary Waste Storage: The Division (WVDOH) will obtain a provisional (temporary) EPA waste generator number for the project prior to the beginning of the work. The location of the temporary waste storage site at the project shall be noted in the Contractor’s Containment/Disposal Control Plan. This location must be approved of by the Division prior to beginning work.

688.5.5-Worker Protection: The Contractor shall provide protection for their Workers as per the requirements of 29 CFR 1926.62 and any other applicable requirements set forth by OSHA. The Contractor shall have a Certified Industrial Hygienist (CIH) develop, review and approve their written compliance plan. The CIH shall be certified by the American Board of Industrial Hygiene. The CIH, or a technician working under the direction of the CIH, shall be present during the first three days of work and at least twice a month thereafter. The CIH shall certify in writing during the first week of work and at the end of the work that the worker protection plan fully complied with all regulations and that the plans were fully implanted. Daily inspections of the work area shall be made by the project “competent person”. The Contractor shall have identified the “competent person” by name in both the CIH’s written compliance plan and the Contractor’s Containment/Disposal Control Plan. The compliance plan shall also include the “competent person’s” qualifications and the frequency of inspections to be taken.

688.5.6-Division Employee Worker Protection: The Contractor shall provide respiratory protection and protective clothing and other necessary equipment for up to 2 Division employees at each site.

688.6-METHOD OF MEASUREMENT:

688.6.1-The unit of measurement: Cleaning and Painting Existing Steel Bridges “or "Cleaning and Painting Existing Steel Bridges Coated with Lead Based Paint" shall be lump sum. The unit of measurement for "Containment and Disposal of Spent Material" shall be lump sum.

688.7-BASIS OF PAYMENT:

688.7.1-Basis of payment: Cleaning and Painting Existing Steel Bridges" or "Cleaning and Painting Existing Steel Bridges Coated with Lead Based Paint”, or "Containment and Disposal of Spent Material" shall be lump sum 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 herein prescribed in workmanlike and acceptable manner, including all labor, tools, equipment, supplies and incidentals necessary to complete the work.

688.7.2-Pay Items

ITEM	DESCRIPTION	UNIT
688001-*	CLEAN AND PAINT EXISTING STEEL BRIDGE	LUMP SUM
688002-*	CLEAN AND PAINT EXISTING STEEL BRIDGE COATED WITH LEAD BASED PAINT	LUMP SUM
688003-*	CONTAINMENT AND DISPOSAL OF SPENT MATERIAL	LUMP SUM
688004-*	ZONE CLEANING AND PAINTING STEEL BRIDGE	SQ.FT.
688005-*	ZONE CLEANING AND PAINTING STEEL BRIDGE WITH LEAD-BASED PAINT	SQ.FT.

* Sequence Number