

20230614 - June Specifications Committee Meeting

June Specifications Committee Meeting Agenda

Meeting Date

Wednesday, June 14, 2023 @ 9:00am

Meeting Location: 1334 Smith Street, Charleston, WV in Lower Level Conference

Also meeting virtually via Google Meet video conference. E-mail distribution message includes instruction.

Approved Permanent Specification changes from last Committee meeting (04/5/23)

- Four Specification changes involving adding fibers in Portland Cement Concrete
 - a. **Section 501-Portland Cement Concrete Pavements**, subsections 501.2, 501.3, 501.8, 501.9, 501.12.5, & 501.12.7
 - b. **Section 601-Structural Concrete**, subsections 601.2, 601.3, 601.7, 601.10.2, 601.10.6, & 601.11.5
 - c. **Section 679-Overlaying Portland Cement Concrete Bridge Decks**, subsections 679.2.1.6, 679.2.2, 679.2.3.3, 679.2.3.4, 679.2.3.6, & 679.3.7.4.1
 - d. **Subsection 715.3-Fibers for Portland Cement Concrete**
- **Section 109-Subsection 109.20-Weight Tickets:** Updates the weight ticket requirements.
- Two Specification Changes updating terminology from 'roadway prism' to 'construction limits.'
 - a. **Subsection 201.7-Disposal**
 - b. **Subsection 202.4-Buildings**
- **Section 410-Subsection 410.13.6-Bond Strength:** Update clarifies values used in calculation.
- **Section 615-Subsection, 615.3.3-Welded Stud Shear Connectors:** Update adds MP reference.
- Two specification changes involving updates to NTPEP testing requirements.:
 - a. **712.4-Galvanized Steel Deep Beam Guardrail, Fasteners and Anchor Bolts**
 - b. **712.5-Zinc-Aluminum-Magnesium Alloy Coating Guardrail, Fasteners and Anchor Bolts**

Approved Project Specific Special Provisions (SP) from last Committee meeting (04/5/23)

- None

Items removed from Committee Agenda

- None

Old Business-Provisions discussed at last Committee meeting

SECTION	TITLE	DESCRIPTION
<u>601</u>	SP 601-Structural Concrete M. Perrow	Updated to previously approved SP. 2nd time to Committee; discussed at April. Project Specific Special Provision (SP) for Structural Concrete. The update eliminates the allowance of accelerators in low temperatures and adds curing requirements based on

		<p>manufacturer recommendation and specified strength gain.</p> <p>No update to the SP; it is redline copy showing the revisions.</p> <p>Approval is expected in June.</p>
<u>601</u>	<p>SP 601-Surface Resistivity and Super Air Meter Testing</p> <p>S. Thapa</p>	<p>Updated to previously approved SP. 2nd time to Committee; discussed at April.</p> <p>Project Specific Special Provision (SP) for Surface Resistivity and Super Air Meter Testing. The update combines the two SPs into one, revises AASHTO reference and testing requirements, and removes the pay item.</p> <p>The SP has been updated per comments at the last meeting.</p> <p>Approval is expected in June.</p>
<u>900</u>	<p>SP 900 - Railroad Protective Services - Norfolk Southern Railway Company</p> <p>S. Runyan</p>	<p>2nd time to Committee; discussed at April.</p> <p>Project Specific Special Provision for Norfolk Southern Flagging Services.</p> <p>The SP has been updated per comments; moved to Section 900 & pay item added. It is redline copy showing the revisions.</p>
<u>107</u>	<p>107.21.3-Basis of Payment</p> <p>D. Kirk</p>	<p>2nd time to Committee; discussed at April.</p> <p>Specification Change to Section 107 Legal Relations and Responsibility to the Public. The change clarifies the intent of the Department to specify pay items in the contract.</p> <p>No update to the specification; it is redline copy showing the revisions.</p> <p>Approval is expected in June.</p>
<u>401</u>	<p>401.9.9-Material Transfer Vehicle</p> <p>SP401-Material Transfer Vehicle</p> <p>J. Adkins</p>	<p>2nd time to Committee; discussed at April.</p> <p>Changes to Section 401-Asphalt Base, Wearing, and Patching and Leveling Courses adding Material Transfer Vehicle (MTV) requirements to equipment subsection of specifications. A special provision (SP) for when we want to specify use of MTV</p> <p>Two items:</p> <ul style="list-style-type: none"> • Specification, Subsection 401.9.9-Material Transfer Vehicle • SP401-Material Transfer Vehicle <p>Both provisions have been updated per comments at the last meeting.</p>
<u>420</u>	<p>420.3.1-Mix Design</p> <p>J. Adkins</p>	<p>2nd time to Committee; discussed at April.</p> <p>Specification Change to Section 420-Micro Surfacing. The revision updates the Mixture Requirements. The change updates the AASHTO standard used in the paragraph from AASHTO PP 83 to AASHTO R 103.</p> <p>No update to the specification; it is redline copy showing the revisions.</p>

		Approval is expected in June.
<u>603</u>	<p>SP603-Post Tensioning</p> <p>T. Rogers, M&M</p>	<p>2nd time to Committee; discussed at April. Project Specific Special Provision for Post Tensioning.</p> <p>SP has been updated per comments at the last meeting; revising the subsection numbers. It is redline copy showing the revisions.</p> <p>Approval is expected in June.</p>
<u>623</u>	<p>623.3.2-Quality Personnel</p> <p>M. Perrow</p>	<p>2nd time to Committee; discussed at April. Specification Change to Section 623 Pneumatically Applied Mortar or Concrete (Shotcrete). The revision clarifies the role and duties of the Shotcrete Inspector during construction.</p> <p>No update to the specification; it is redline copy showing the revisions.</p> <p>Approval is expected in June.</p>
<u>636</u>	<p>636.11-Flagger</p> <p>M. Khan</p>	<p>2nd time to Committee; discussed at April. Specification Change to Section 636-Maintaining Traffic. The revision clarifies flagger requirements on Interstate and/or Expressways.</p> <p>The specification has been updated per comments at the last meeting; it is redline copy showing the revisions.</p>
<u>642</u>	<p>SP642-High Strength Silt Fence</p> <p>L. Rinehart</p>	<p>2nd time to Committee; discussed at April. Project Specific Special Provision for high strength silt fence.</p> <p>SP has been updated per comments at the last meeting; revising the subsection numbers. It is redline copy showing the revisions.</p>
<u>697</u>	<p>SP697-Bridge Safety Inspections</p> <p>Section 697 - Bridge Safety Inspections</p> <p>T. Brown</p>	<p>2nd time to Committee; discussed at April. Provision for bridge inspection on any temporary bridge or stage construction of a new bridge, to correlate with new federal bridge inspection requirements.</p> <p>Two items:</p> <ul style="list-style-type: none"> • SP697-Bridge Safety Inspections. Updated per comments at the last meeting; it is redline copy showing the changes • Section 697 - Bridge Safety Inspections. New Item.
<u>707</u>	<p>707.12-Concrete Sealer</p> <p>C. Preston</p>	<p>2nd time to Committee; discussed at April. Specification change to Section 707-Concrete Admixtures, Curing, and Coating Materials. The update adds NTPEP and AASHTO M224 requirements.</p> <p>No update to the specification; it is redline copy showing the revisions.</p> <p>Approval is expected in June.</p>

New Business - New Provisions for Spec Committee

SECTION	TITLE	DESCRIPTION
<u>601</u>	SP601-Galvanic Anode Protection Eric Williams, Vector Corrosion Technologies Inc.	1st time to Committee; update of previously approved SP. Project Specific Special Provision for galvanic anode protection. Updates the material requirements, installation requirements, and notes. The SP is redline copy; showing the proposed revisions.
<u>106</u>	106.3.1-Acceptance Plans J. Adkins	1st time to Committee. Specification change to Section 106-Control of Materials. The update removes subsection from Acceptance Plans, as the aggregate gradation/price information is included in various sections of spec book. The specification is redline copy showing the revision.
<u>401</u>	401.2-Materials J. Ross	1st time to Committee. Specification change to Section 401-Asphalt Base, Wearing, and Patching and Leveling Courses. The update removes a note (Note 1) in subsection 401.2 that conflicts with gradation requirements in Section 703 for friable particles. The specification is redline copy showing the revision.
<u>501</u>	501.3-Proportioning A. Gillispie	1st time to Committee. Specification change to Section 501-Portland Cement Concrete Pavement. The update gives Contractor option to use a reduce cement factor provided the aggregate used in those mix designs meet the requirements for optimized gradation of Section 601.2.4.1. Similar to Section 601.
<u>502</u>	502.5-Joints J. Adkins	1st time to Committee. Specification change to Section 502-Approach Slabs. The update revises referenced subsection to appropriate location in Section 501 (to 501.16-Sealing Joints & not 501.17-Protection of Pavement). The specification is redline copy showing the revision.
<u>601</u>	601.3.1-Mix Design Requirements A. Gillispie	1st time to Committee. Specification change to Section 601-Structural Concrete. The purpose of the change is to add the Nominal Aggregate Size of different aggregate size depending on Class of concrete. The specification is redline copy showing the revision.
<u>601</u>	SP601-Distributed Anode System Eric Williams, Vector Corrosion Technologies Inc.	1st time to Committee. Project Specific Special Provision for distributed anode system.
<u>636</u>	SP636-Automated Flagger Assistance Device G. Mullins	1st time to Committee. Project Specific Special Provision for automated flagger assistance device.

<p>702</p>	<p>702.1.5Mortar Strength (Determined by MP 702.01.25)</p> <p>M. Perrow</p>	<p>1st time to Committee.</p> <p>Specifiication change to Section 702-Fine Aggregate. The purpose of the change refence to MP 702.01.25 and Type IL cement.</p> <p>The specification is redline copy showing the revision.</p>
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Comments

Comments are requested on these Specifications Changes and Project Specific Special Provisions. Please share your comments by **June 9, 2023**, they help in the decision making process.

Please Send Comments to: Steve.D.Boggs@wv.gov

Deadline for new items & updates to these provision is **July 8, 2023**.

If you are the ‘champion’ of any specification changes and/or project specific special provisions currently in the Specification Committee, it is your responsibility to edit/update/modify them in a timely manner per comments and discussion in Spec Committee. *Failure to submit updates may result in removal of item and/or delays.*

Next Meeting

Wednesday, **August 2, 2023 at 9:00 a.m.**

Meeting will be held virtually via Google Meet video conference. E-mail distribution message includes instruction.

Specification Webpage Updated

Technical Support Division now has a webpage and the specification webpage has moved. The Specification page is here:

<https://transportation.wv.gov/highways/TechnicalSupport/specifications/>

2023 Standard Specification Roads and Bridges

Electronic copy (pdf): The 2023 Standard Specifications Roads & Bridges is posted on the Publications page under Specifications.

Print Version: We are working on getting the book printed and will provide an update during the meeting.

2023 Specifications Committee

The Specification Committee typically meet every other month; on the first Wednesday. 2023 meetings will be held in February (2/1), April (4/5), June (6/14), August (8/2), October (10/4), and December (12/6).

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

Specifications Committee Website

A copy of the meeting agenda can be found on the Specifications Committee Website

<https://transportation.wv.gov/highways/TechnicalSupport/specifications/SPECCOMIT/Pages/default.aspx>

Materials Procedures

Material Procedures (MPs) referenced in provisions are available upon request.

For questions regarding the Standard Specifications Road and Bridges, Supplemental Specifications, Project Specific Provisions, or the Specifications Committee please email Steve.D.Boggs@wv.gov.

File Format Structure and Progression of items thru Specifications Committee

The purpose of the below protocol is to provide guidance on the file structure of Proposed Specifications & Project Specific Provisions as they progress thru Specifications Committee. This procedure would facilitate a means of tracking changes from meeting to meeting; as the agenda & provisions are posted publicly online on the Spec Committee website.

TYPES OF PROVISIONS:

There are three standard types of provisions typically discussed in committee:

- a) Specification Changes – These are permanent changes to the WVDOT Standard Specifications.
 - o Unless inserted into a project proposal, these changes typically go into effect in January (of subsequent year) with the Supplemental Specifications
- b) Project Specific Special Provisions (SP) – Are applied to specifically designated projects.
- c) Updates to previously approved SP – Changes/edits/updated to SP that have been approved by spec committee.

NEW BUSINESS ITEMS:

New items should be setup & submitted in the following format:

- a) Specification Changes – Show as red-line copy (see note)
- b) Project Specific Special Provisions (SP) – Will be shown in all black.
- c) Updates to approved SP – Shown as red-line copy.

Each item should also include a description with:

- Brief overview of item
- Background info and/or reason for change

NOTE: Red-line copy is a form of editing which indicates removal or addition of text. You can redline a Microsoft Word document by using the built-in “Track Changes” feature or you can manually reline document with font color changes & strike-through.

OLD BUSINESS ITEMS:

Updated provisions that were discussed at the last committee meeting should be setup in the following format:

- Redline copy from prior meeting would not be shown
- Redline copy of new changes/updates (from previous meeting)

PROGRESSION OF ITEMS THRU COMMITTEE AND APPROVAL:

Depending on how important the project and/or comments/discussion of item at previous meeting, then several things can happen in no particular order.

- Few comments/discussion/minor changes...will recommend approval of item at next meeting

- A lot of comments/discussion...will not recommend approval at next meeting; item will be updated and reviewed again at the next meeting.
- SP's in committee may be used in advertised project. Hope to work to address comments & finish approving at subsequent meeting.

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

SECTION 601
STRUCTURAL CONCRETE

601.1-DESCRIPTION:

ADD THE FOLLOWING SECTION:

601.1.1 Rapid Set Cementitious or Polymer Concrete Patching: The work shall consist of removing the existing concrete, sandblasting the exposed steel reinforcing bars, cleaning the bonding surfaces of the existing concrete to remain, replacing any damaged or severed reinforcing, and furnishing and placing Rapid Set Cementitious or Polymer Concrete Patching 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-Rapid Set Cementitious or Polymer Concrete Patching Material:

601.2.1.1: Rapid Set Cementitious or Polymer Concrete Patching Material shall be a high early strength structural repair material capable of patching deep holes, shallow feathering, able to be poured in forms, or being troweled vertically or overhead. Material shall not shrink on cure, and be capable of providing a strong bond to concrete and steel reinforcing bars. It shall be a non-toxic product and clean up with water.

601.2.1.2: All Rapid Set Cementitious or Polymer Concrete Patching Materials shall be shipped in strong substantial containers sealed in a manner acceptable to the Engineer. Each container shall be plainly marked with the following:

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- 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 product selected shall be from the WVDOH approved list of concrete repair materials and shall conform to all criteria of section 715.4.1 or 715.4.2.

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

~~**601.2.1.5:** An Accelerator may be allowed in Low Temperature environments to improve workability per the Manufacturer's recommendations~~

601.2.1.65: 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 Bonding Surface: The contractor shall remove all loose, soft, honeycombed, and disintegrated concrete, plus an additional three (3) inches of sound concrete around the perimeter of the repair areas by means of sawcutting or other approved method that will not damage the sound concrete adjacent to the repair area. 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. Sandblasting, grinding, jack hammering, or the use of wire brushes may be needed to acquire the necessary bonding surface.

The existing exposed reinforcing steel bars shall be cleaned by sandblasting to a SSPC-SP-6 finish. After sandblasting, a rust inhibitor approved by the Manufacturer of the Rapid Set Cementitious or Polymer Concrete Material for compatibility shall be applied to all exposed reinforcing steel bars.

Any exposed reinforcing bar that is, per the Engineer's judgment, severed, missing, or damaged shall be replaced with a bar of the same diameter and coupled to the sound reinforcing that will remain with a Division approved mechanical splice. Reinforcing bar material shall be intermediate grade billet steel in accordance with AASHTO M31, Grade 60. This work shall be included under the pay item(s) included herein.

The bonding surface shall be dry and free of moisture and a representative of the Manufacturer shall be on site to approve of all bonding surfaces immediately prior to and during application of the Rapid Set Cementitious or Polymer Concrete Material.

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:

601.10.6-Rapid Set Cementitious or Polymer Concrete Patching Installation: An experienced technical representative of the Manufacturer of the Rapid Set Cementitious or Polymer Concrete 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 Rapid Set Cementitious or Polymer Concrete 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.

Prior to placing the Rapid Set Cementitious or Polymer Concrete Material, all areas shall be coated with the Manufacturer's recommended bonding compound if applicable.

After installation is completed, the Manufacturer's representative shall certify to the Engineer, in writing, that the Rapid Set Cementitious or Polymer Concrete Material was installed in accordance with the Manufacturer's requirements.

601.10.6.1-Rapid Set Cementitious or Polymer Concrete Patching Acceptance Criteria: The Engineer shall not accept the Contractor's work if, in his judgment, the following criteria are not met:

- a. The Contractor stores, handles, mixes, and installs the materials according to the Manufacturer's recommendations and as specified herein.
- b. Representative of the Manufacturer is on site during mixing and placing of Rapid Set Cementitious or Polymer Concrete Patching Material.
- c. No degradation of material properties under field conditions is detected. The Contractor shall replace any material showing degradation.
- d. All loose, soft, honeycombed, and disintegrated concrete, plus an additional three (3) inches of sound surface concrete around the perimeter of the repair areas is removed with no damage to adjacent sound concrete.
- e. 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.
- f. 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.
- g. No reinforcing bars to remain in place are damaged or severed.
- h. All work done as a result of the acceptance criteria shall be done at no additional cost to the Division.

601.12-CURING AND PROTECTING

DRAFT

ADD THE FOLLOWING SUBSECTION:

601.12.6- Rapid Set Cementitious or Polymer Concrete Patching: The material selected must be cured as recommended by the manufacturer. The manufacturer shall advise both the Engineer and the Contractor, in writing, of the curing recommendations in accordance with the manufacturer’s requirements. The curing method selected must be implemented until the concrete patch has reached the specified strength.

601.14-METHOD OF MEASUREMENT:

ADD THE FOLLOWING SUBSECTION:

601.14.1-Rapid Set Cementitious or Polymer Concrete Patching: Cementitious Patching or Polymer Concrete Material will be measured in place complete and accepted as determined by the dimensions on the Plans or contract documents, and will be per the method established by the pay items in the Proposal, per cubic foot or square foot, subject to adjustment as provided for in 104.2 and 109.2.

601.15-BASIS OF PAYMENT

ADD THE FOLLOWING SUBSECTION:

601.15.1.1-Rapid Set Cementitious or Polymer Concrete 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	Square Foot
601030-004	Patching Concrete Structures	Cubic Foot

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER:

FEDERAL PROJECT NUMBER: _____

**SECTION 601
STRUCTURAL CONCRETE**

601.3-PROPORTIONING

DELETE THE FOURTH PARAGRAPH OF THE SUBSECTION AND REPLACE WITH THE FOLLOWING:

Design mixture testing for Class H concrete shall be in accordance with MP 711.03.23 and shall include air content, slump, compressive strength, surface resistivity, super air meter (SAM) and rapid chloride permeability tests. For establishment of mixture proportions, rapid chloride permeability tests shall be made on representative samples prepared and tested in accordance with AASHTO T 277. The rapid chloride permeability test specimens shall be tested at an age of 90 days (or at any time prior to 90 days), and the results of this test shall not exceed 750 coulombs. Specimens shall be moist cured for 56 days prior to the start of specimen preparation unless specimens are to be tested prior to 56 days, in which case the specimens shall be moist cured until the time of test. The 28-day compressive strength of the test mix that satisfies the 750 coulomb threshold shall be used as the basis for acceptance of Class H concrete per Section 601.4.5. For establishment of the mixture proportions, surface resistivity testing shall be performed in accordance with AASHTO T358 and SAM testing shall be performed in accordance with AASHTO T 395. A set of three 4-inch x 8-inch cylinders shall be fabricated and moist cured, as specified in AASHTO R39, for 28 days prior to testing. Surface resistivity test results shall be for information purposes only, but ideally, the average result of the three cylinders should not be less than 40 k Ω -cm for 4-inch x 8-inch cylinders. The SAM test results (SAM number), shall be for information purposes only, but ideally the SAM number should be less than or equal to 0.20 for mix design qualification. The cost of all test mix requirements shall be considered incidental to the cost of Class H concrete.

For existing Class H mix designs, which have already approved by the Division, surface resistivity and SAM testing shall be performed on a laboratory trial batch at a Division Approved Concrete Mix Design Laboratory within 4-months of contract award date, and those results, along with the mix design number, shall be submitted to the following email address:

DOHConcreteMixDesign@wv.gov. A Division Approved Concrete Mix Design Laboratory shall be required to demonstrate competency in the performance of AASHTO 395 (SAM test) to MCS&T Division personnel prior to any work. The request to demonstrate competency shall be sent to the following e-mail address at least two-weeks prior to desired date of demonstration: DOHConcreteMixDesign@wv.gov.

ADD THE FOLLOWING SUBSECTION:

601.3.2.2.1-Sequential Pressure Method-Super Air Meter (SAM): The SAM testing shall be performed daily on the first batch, and then every fifth batch thereafter. The results of this SAM testing will be for informational purposes only. The target value of the SAM number at the point of placement should ideally be as shown in Table 601.3.2.2.1. However, SAM numbers obtained from this field testing are not required to meet the requirements of Table 601.3.2.2.1. Ideally, if the SAM number does not conform to the target values of Table 601.3.2.2.1, the Contractor would take immediate steps to adjust the concrete mix, so that the SAM number of succeeding loads is within the acceptable limits shown in Table 601.3.2.2.1. The entrained air content shall still be maintained within the tolerances specified in Section 601.3.2.2.

For each SAM test performed, the SAM number shall be recorded by the Contractor on the same T600 form on which the corresponding normal air content test result is recorded. An electronic copy of that T600 form and an electronic copy of the Concrete Batch Ticket for that concrete shall be sent to the following e-mail address within 72 hours of the completion of the test: DOHConcreteMixDesign@wv.gov.

TABLE 601.3.2.2.1

SAM Number	Required Action
Less than 0.25	Accept Concrete
0.25 to 0.30	Accept with Corrective Action Needed
Greater than 0.30	Reduced payment for concrete

601.4-TESTING:

601.4.1–Sampling and Testing Methods:

ADD THE FOLLOWING TO THE TABLE IN SUBSECTION 601.4.1:

Sequential Pressure Method - Super Air Meter (SAM)	AASHTO T 395
Surface Resistivity	AASHTO T 358

601.4.2-Contractor’s Quality Control:

ADD THE FOLLOWING AFTER THE FIRST PARAGRAPH IN THE SUBSECTION:

Prior to any testing with the SAM by Contractor QC personnel, those Contractor QC personnel must ~~be certified by~~ demonstrate competency in the performance of AASHTO

395 (SAM testing) to MCS&T Division personnel for testing with the SAM. This certification-The successful competency upon demonstration will validate their ability to test with the SAM following the guidelines of AASHTO T 395. MCS&T Division will maintain a database of all personnel who have been certified-shown successful competency to perform the SAM test. Only the SAM results from these certified individuals-personnel will be accepted, and the name(s) of these individuals-personnel shall be included in the contractor's field quality control plan. The request to demonstrate competency shall be send to the following e-mail address at least two weeks prior to the desired date of demonstration: DOHConcreteMixDesign@wv.gov.

601.4.5-Tests for Permeability Acceptance of Class H Concrete:

DELETE THE TITLE OF THE SUBSECTION AND REPLACE WITH THE FOLLOWING:

601.4.5-Tests for Permeability Acceptance and Surface Resistivity of Class H Concrete:

ADD THE FOLLOWING PARAGRAPH TO THE END OF THE SUBSECTION:

The Contractor shall also be required to fabricate and test three Surface Resistivity test specimens, in accordance with AASHTO R100 and AASHTO T 358, every time that a set of compressive strength specimens for Class H concrete is fabricated. These test specimens shall be 4-inch x 8-inch, and they shall be tested at an age of 28-days. These test specimens shall be moist cured, in the same manner as the Class H compressive strength specimens, until as close to the time of testing as possible. The average Surface Resistivity test result of these three test specimens shall be used for information purposes only. The 28-day Surface Resistivity result of each of these three specimens, the Project Number for which they were fabricated, and the approved mix design number which was used to batch the concrete shall be forwarded to the following e-mail address: DOHConcreteMixDesign@wv.gov as soon as testing is completed. Average Surface Resistivity results equal to or greater than 30 k Ω -cm for 4-inch x 8-inch cylinders are considered acceptable. Any Agency or Laboratory which tests Surface Resistivity test specimens have to be certified by MCS&T.

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____
FEDERAL PROJECT NUMBER: _____

ADD THE FOLLOWING:

SECTION 900
RAILROAD PROTECTIVE SERVICES – NORFOLK SOUTHERN
RAILWAY COMPANY

900.1–RAILROAD PROTECTIVE SERVICES – NORFOLK SOUTHERN RAILWAY
COMPANY:

The Contractor shall adhere to the latest edition of *Norfolk Southern’s Special Provisions for Protection of Railway Interest*, Section 8 – Contractor Protective Services, which is located within the bid documents. ADD link

~~As of the date of this advertisement, t~~The following companies have been pre-approved by Norfolk Southern Railway Company to provide railroad protective services (Railroad Flagger):

Railpros Direct Hire
Gary Killion
682-219-9196
Gary.Killion@railpros.com

Railroad Consultants Direct Hire
~~Steve Lloyd-Jon Parker~~
~~615-542-8901-615-663-6594~~
~~sllloyd@railroad-consultants.com-JParker@railroad-consultants.com~~

900.2-Blank

900.3-METHOD OF MEASUREMENT

Payment for this item shall be based on the estimated number of flagging days listed in the plans. The amount of days (hours) as depicted in the invoice(s) provided by the contractor by the

company providing railroad protective services. Additional hours requested solely for the benefit of the Contractor will not be paid.

900.4–BASIS OF PAYMENT:

The quantities, determined as provided above, will be paid at the contract unit price bid for the item listed below, which price and payment shall be full compensation, including all labor, tools, equipment, supplies, and incidentals necessary to complete the work.

900.5–PAY ITEM:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
<u>900005-005</u>	<u>Railroad Protective Services – Direct Hire</u>	<u>Day</u>

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

SECTION 107

LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC

107.21-PROTECTION OF RIVERS, STREAMS, AND IMPOUNDMENTS:

107.21.3-Basis of Payment:

DELETE THE ENTIRE CONTENTS OF SUBSECTION 107.21.3 AND REPLACE WITH THE FOLLOWING:

~~Except when pay items are specifically described and furnished as pay items in 642, Temporary Pollution Control, the water pollution and erosion and siltation control requirements set forth shall be at the expense of the Contractor.~~

The Department will specify pay items in the contract to protect rivers, streams and impoundments. These include but are not limited to sections 641, 642, 651, 652, 653, 654, 655, and 656. Cost and quantities for items deemed necessary or beneficial by the Engineer or Environmental Monitor that are not specifically described and furnished as pay items in the contract shall be negotiated by the Engineer and Contractor to be included in the Contract.

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

SECTION 401

ASPHALT BASE, WEARING, AND
PATCHING AND LEVELING COURSES

401.9-EQUIPMENT:

DELETE SUBSECTION 401.9.10-COMPACTION EQUIPMENT AND RENUMBER AS 401.9.11. AND ADD THE FOLLOWING TO SUBSECTION 401.9.10:

401.9.10-Materials Transfer Vehicle: A Materials Transfer Vehicle (MTV) shall be designed to independently transfer and continuously mix asphalt concrete to mitigate thermal and particle size segregation when transferring from the haul equipment to the paving equipment.

An MTV shall have a high-capacity truck unloading system, ~~capable of receiving 600 tons per hour from the hauling equipment, be capable of receiving and transferring material at a rate that exceeds the capacity of the delivery and paving equipment,~~ and have a minimum combined capacity of 15 tons of asphalt concrete, including the MTV storage bin and hopper. An MTV shall include a system contained within an integrated storage bin which continuously mixes the asphalt concrete prior to discharge to the paving equipment. Additionally, the MTV should have a discharge conveyor with the ability to swivel to allow for the delivery of the mixture material to the paver while the MTV operates from an adjacent lane.

The MTV shall be maintained ~~at all times and in satisfactory working conditions and in proper working conditions.~~

401.9.10.11-Compaction Equipment: Compaction shall be performed by self-propelled steel-wheeled or pneumatic-tired rollers. The use of either vibratory or oscillatory type rollers is acceptable. Pneumatic rollers shall be equipped with skirting around the wheel area to prevent heat loss to the tires and tire pads. Hand-held rollers or vibrating plates may be used in small inaccessible areas as approved by the Engineer. Prior to use on any project, the roller shall be inspected to see that it is in good mechanical condition. The total weight, weight per inch of width (steel-wheeled), and average ground contact pressure (pneumatic-tired) shall be documented in the contractors QCP in accordance with MP 401.

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**

401.1-DESCRIPTION:

ADD THE FOLLOWING:

401.1.1-Materials Transfer Vehicle: This work shall consist of the use of a Materials Transfer Vehicle (MTV) for transferring asphalt concrete from hauling equipment to the paver during construction. An MTV, as defined in Section 401.9.10, contributes to an efficient non-stop paving operation by reducing thermal and particle size segregation in the material, both of which adversely affect the smoothness and durability of the final pavements. The work shall be constructed in accordance with these specifications and the applicable requirements of Section 401, 402, or 410 of the Specifications.

NOTE: ~~Asphalt paving applications suitable for MTV shall include a minimum of one (1) mile of continuous pavement. MTV usage is only to be specified for projects with approval of the Asphalt and Pavement Groups at MCS&T. Asphalt paving applications suitable for MTV shall be used on the mainline of the traveled way. MTVs may also be included on all ramps, full width acceleration lanes, full width deceleration lanes and full width turn lanes that are greater than 1,000 feet in length. At the Engineer's discretion, isolated portions of a project may be exempt from use of the MTV if the weight or operation of the MTV is detrimental to the roadway.~~

401.13-BASIS OF PAYMENT:

ADD THE FOLLOWING:

No additional measurement is necessary nor will additional compensation be allowed for use of an MTV on the project.

Appendix 401A. This sheet is not required with PS&E submission.:

Designer Note: This specification requires use of MTV on paving projects. It is intended for only specified projects which meet criteria listed below. However, the designer needs to be aware of site conditions, such as weight/height of the MTV, should be considered during project selection. If an MTV is used for a project, it shall meet the following requirements:

When to use:

- The two-way ADT is equal to or greater than 35 mph
- The project length is a minimum of one (1) mile of continuous pavement.
- The total tonnage of all asphaltic concrete is greater than 2,000 tons

Where to use:

- Mainline of the traveled way
- Ramps, full width acceleration lanes, full width deceleration lanes and full width turn lanes that are greater than 1,000 feet in length.

Do not use the MTV for the following conditions:

- A project with lane width that is equal to or less than 11 feet.
- A passing lane only project.
- PWL Projects

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

SECTION 420

SINGLE / MULTIPLE COURSE MICRO SURFACING

420.3-MIXTURE REQUIRMENTS:

420.3.1-Mix Design:

DELETE THE CONTENTS AND REPLACE WITH THE FOLLOWING.

Submit to the Engineer, at least fourteen calendar days before the start of production, a complete mix design prepared and certified by an experienced laboratory. The source for all materials must be shown. Provide a job mix formula (JMF) to the Engineer at the pre-paving meeting showing individual proportions of each material, that when combined, shall meet the requirements of AASHTO ~~PP-83~~ R 103, with the exception that the Saturated Abrasion Loss by ISSA TB-144 shall be 2.0 grams max. A new mix design is required for any change in aggregate or asphalt emulsion source.

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____
FEDERAL PROJECT NUMBER: _____

SECTION 603
PRESTRESSED CONCRETE MEMBERS

603.12-HANDLING, STORING, TRANSPORTING, AND ERECTION:

DELETE THE TITLE AND CONTENTS FROM 603.12, AND REPLACE WITH THE FOLLOWING:

603.12-POST TENSIONING:

The work under this section shall consist of furnishing, storing, handling, installing, stressing, and grouting of post-tensioning systems in cast-in-place and precast concrete structural members in accordance with the details shown on the Plans, Section 603 of the Specifications, and this Special Provision.

603.12.1-Materials: Furnish materials that meet requirements of the most current versions of the following documents unless indicated otherwise: Post-Tensioning Institute’s *Specification for Multistrand and Grouted Post-Tensioning (PTI/ASBI M50.3)* and Post-Tensioning Institute’s *Specification for Grouting of Post-Tensioned Structures (PTI M55.1)*.

603.12.1.1-Post-Tensioning System: Furnish a post-tensioning system following the minimum requirements for Protection Level 2 (PL-2) in accordance with PTI/ASBI M50.3. PT supplier shall submit certified test reports to the Engineer for all post-tensioning systems to be used on the project tendons demonstrating compliance with the requirements of PTI/ASBI M50.30 Section 4.4 “System Approval Testing.” All components of the post-tensioning system, with the exception of prestressing strand, shall be furnished by a single supplier.

Where required in the contract drawings, provide unbonded single strand tendons in accordance with the most current version of the following document: Post-Tensioning Institute’s *Specification for Unbonded Single Strand Tendons (PTI M10.2)*.

603.12.1.2-Prestressing Steel: Furnish prestressing steel conforming to one of the following types:

- Uncoated, low-relaxation, Grade 270, seven-wire steel strand meeting the requirements of AASHTO M203 (ASTM A416).
- Grade 150, high strength, coarse thread steel bars meeting the requirements of the most current version of AASHTO M275 (ASTM A722).

603.12.1.3-Grout: Provide pre-packaged grout in accordance with PTI M55.1 meeting the requirements of Class C grout. Do not use grout that exceeds the manufacturer's recommended shelf life or 6 months, whichever is less.

Potable water shall be used for mixing grout. If potable water is not available, the proposed water shall meet the requirements of PTI M55.1 and Section 715.7 of the Standard Specification.

603.12.2-Equipment: Furnish equipment that meet requirements of the most current versions of the following documents unless indicated otherwise: PTI/ASBI M50.3 and PTI M55.1.

603.12.2.1-Stressing Equipment: Provide hydraulic jacks, pressure gauges, and other stressing equipment that meets PTI/ASBI M50.3.

603.12.2.2-Grouting Equipment: Provide grout mixing, testing, and pumping equipment that meets PTI M55.1.

603.12.3-Required Submittals: Submittals required in this section for post-tensioned elements are in addition to the requirements of Section 601 "Structural Concrete" and Section 603 "Prestressed Concrete Members" of the Standard Specification. Prepare shop drawings to address the requirements stated in Section 105.2 of the Standard Specification.

603.12.3.1-Grouting Plan: Prior to the start of post-tensioning material installation, submit written grouting procedures for review and approval by the Engineer. The grouting plan shall include all items required by PT M55.1. Include air-pressure test procedures for identifying potential grout leaks prior to grouting. Include names of crew members responsible for post-tensioning material installation, post-tension stressing operations, and grouting operations along with proof of personnel certification outlined in Section 603.12.4.1 of this Special Provision. Grouting Plan shall be submitted sufficiently in advance of the start of the work to allow time for review and distribution by the Engineer and corrections by the contractor/supplier without delaying the work.

603.12.3.2-Post-Tensioning Drawings Details: Prior to the start of post-tensioning material installation, submit Post-Tensioning System Drawings and Tendon Installation Drawings for review and approval by the Engineer. Post-Tensioning System Drawings and Tendon Installation Drawings shall meet the requirements of PTI/ASBI M50.3. All drawings shall be submitted sufficiently in advance of the start of the work to allow time for review and distribution by the Engineer and corrections by the contractor/supplier without delaying the work.

603.12.3.3-Field Mockup Test Plan: Prior to the start of post-tensioning material installation, submit a Field Mockup Test Plan for review and approval by the Engineer. The Field Mockup Test Plan shall meet the requirements of PTI M55.1. The plan shall be submitted sufficiently in advance of the start of the work to allow time for review and distribution by the Engineer and corrections by the contractor/supplier without delaying the work.

603.12.3.4-Post-Tensioning Calculations: Prior to the start of post-tension stressing operations, submit stressing calculations for all tendons for review and approval by the Engineer. Stressing calculations shall meet the requirements of PTI/ASBI M50.3. Calculations shall be sealed by a Professional Engineer licensed in the State of West Virginia. Prestressing Calculations shall be submitted sufficiently in advance of the start of the work to allow time for review and distribution by the Engineer and corrections by the contractor/supplier without delaying the work.

603.12.4-Construction: Cast-in-place concrete construction shall meet the requirements of this section and Section 601 “Structural Concrete” of the Standard Specifications. Precast concrete construction shall meet the requirements of this section and Section 603 “Prestressed Concrete Members” of the Standard Specification.

603.12.4.1-Qualifications of Personnel: For Post-Tensioning System installation and post-tensioning operations the work crews shall meet the personnel qualification requirements of PTI/ASBI M50.3. For Grouting operations, the work crews shall meet the personnel qualification requirements of PTI M55.1.

603.12.4.2-Packaging, Handling, and Storage of Post-Tensioning Components: Package, store, and handle grout, ducts, anchors, and other post-tensioning accessories per the requirements of PTI/ASBI M50.3 and PTI M55.1 unless noted otherwise. Protect, handle, and store prestressing strand per the requirements of PTI/ASBI M50.3 and Section 603.7 of the Standard Specification.

Install grout caps and ensure vents are closed at all times so that water and other contaminants cannot enter the duct before strand installation. Flushing of ducts is not permitted.

603.12.4.3-Post-tensioning Material Installation and Stressing: Follow PTI/ASBI M50.3 for duct and prestressing steel installation procedures and requirements unless otherwise specified. Verify that concrete strength requirements on the plans are met for stressing and staged loading of post-tensioned structural elements.

Stress the tendons as quickly as is practicable after installation, but no longer than seven days after installation. Protect tendon tails and anchor plates from water intrusion between installation and grouting/capping of tendons. Follow the tensioning procedure noted in the approved Post-Tensioning Drawing Details.

603.12.4.4-Concrete Placement: Cast-in-place concrete placement shall meet the requirements of Section 601 “Structural Concrete” of the Standard Specifications. Precast

concrete placement shall meet the requirements of this section and Section 603 “Prestressed Concrete Members” of the Standard Specification. Both cast-in-place and precast elements shall meet the requirements PTI/ASBI M50.3 for concrete placement in post-tensioned elements.

If a duct blockage is discovered during proving of post-tensioning ducts, the Contractor/PT Supplier shall submit a procedure to clear and repair the duct to the Engineer for approval.

603.12.4.5-Grouting: Grout tendons in accordance with PTI M55.1. Follow grouting procedures noted in the approved Grouting Plan. Prior to grouting, perform a duct air-pressure test meeting the requirements of PTI M55.1 and repair any detected leaks. The time between tendon installation and grouting shall not exceed the permissible interval requirements of PTI M55.1.

Prior to the start of production grouting, perform field trial tests and field mockup tests meeting the requirements of the approved Field Mockup Test Plan. The Field Mockup Test shall be witnessed by the Engineer. Results of the Field Mockup Test shall be submitted to the Engineer for approval prior to initiation of production grouting.

Perform field testing of the production grout and post-grout inspections in accordance with PTI M55.1.

603.14-MEASUREMENT AND PAYMENT:

603.14.1-Method of Measurement:

ADD THE FOLLOWING TO THE END OF SUBSECTION 603.14.1:

The quantity of post-tensioning tendons to be paid for under this Section shall be the computed weight, in pounds (kilograms), of permanent post-tensioning steel tendons entered into the completed structure and accepted. Measurement shall be the theoretical plan length measured from anchor plate bearing face to anchor plate bearing face with no allowance made for waste or extension past the anchor plate faces. No measurement will be made for temporary post-tensioning, which shall be considered incidental to the item "Post Tensioning Strands" and the item "Post Tensioning Bars".

For quantity determination the following unit weights shall be used:

Prestressing System	Weight per Unit Length
0.50 inch diameter seven wire strand	0.521 plf
0.60 inch diameter seven wire strand	0.740 plf
1 inch high strength deformed bar	3.010 plf
1-1/4 inch high strength deformed bar	4.395 plf
1-3/8 inch high strength deformed bar	5.564 plf

603.14.2-Basis of Payment:

ADD THE FOLLOWING TO THE END OF SUBSECTION 603.14.2:

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Post-tensioning tendons will be paid for at the contract unit price per pound of steel strand and per pound of steel bar, complete and in place. Payment shall be full compensation for furnishing, installing, stressing, grouting all post-tensioning tendons, and probing and inspecting grouted anchorages. Payment shall also include anchorage assemblies and post-tensioning system hardware which is not embedded in concrete, grout and grouting, all testing, anchorage protection systems, and all labor, materials, tools, equipment, and incidentals necessary for completing the work in accordance with these Special Provisions and the plans. This payment shall also include lubricant in the tendon ducts for friction control. No separate measurement and payment will be made for anchorage components, including anchorages and diablos for future tendons and spare ducts, local anchorage zone reinforcement supplied as an integral part of a proprietary anchorage system, nor ducts for similar post-tensioning system hardware. Anchorage components, ducts, and similar items of post-tensioning system hardware, which are embedded within the cast-in-place concrete, shall be deemed to be included in the cost of the cast-in-place concrete.

In the event that the Contractor constructs the structure with an accepted alternative not detailed on the Plans, the payment shall be based on the unit price bid extended by either the quantities shown on the Plans or the actual quantities used and accepted, whichever is less.

603.15-PAY ITEMS:

ADD THE FOLLOWING TO THE TABLE:

ITEM	DESCRIPTION	UNIT
603003-001	Post Tensioning Strands	Pound
603004-001	Post Tensioning Bars	Pound

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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
SUPPLEMENTAL SPECIFICATION
FOR
SECTION 623
PNEUMATICALLY APPLIED MORTAR OR CONCRETE (SHOTCRETE)

623.3-QUALIFICATIONS:

623.3.2-Quality Control Personnel:

DELETE THE SUBSECTION AND REPLACE WITH THE FOLLOWING:

Shotcrete Inspector: For ~~Every~~ project in which shotcrete is included, ~~the Contractor~~ is required to have an ~~independent~~ Shotcrete Inspector with a current ACI Shotcrete Inspector Certification. The Shotcrete Inspector must have verifiable work experience in one of the following areas: 1. Testing, inspection, and quality control of shotcrete. 2. Supervision of shotcrete construction work. 3. Design of shotcrete structures. The Shotcrete Inspector is required to be at the place of shotcrete placement while shotcrete placement is occurring. ~~The Shotcrete Inspector shall also submit a daily written report to the Engineer detailing where the shotcrete placement occurred and that the shotcrete placement was performed correctly according to the Specification and in reasonably close conformity with the Plans or as established by the Engineer. The Shotcrete Inspector shall stop shotcrete placement immediately if the shotcrete placement does not satisfy the requirements of the Specification or if it is not in reasonably close conformity with the Plans or as established by the Engineer. The reason for stopping shall be documented and included in the daily written report. The work shall resume after all issues are resolved satisfactorily.~~

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

**SECTION 636
MAINTAINING TRAFFIC**

636.11-FLAGGER OR TRAFFIC DIRECTOR:

636.11.1-Flagger:

DELETE THE CONTENTS OF SUBSECTION 636.11.1 AND REPLACE WITH THE FOLLOWING:

All flaggers shall be furnished by the Contractor, and it shall be the Contractor's responsibility to provide flaggers at ~~any~~ locations necessary to assure the safety of the travelling public. No flaggers are allowed on Interstate mainline; however, they may be allowed on ramps and/or Expressways mainline, when approved by the Traffic Engineering Division. Hand signaling devices and high visibility apparel meeting the requirements of the WVDOH Traffic Control Manual shall be used by the Contractor's personnel assigned to traffic control responsibilities. Approved headgear, if worn, and vests worn by the Contractor's personnel shall not bear the Division symbol. Wireless two-way communication shall be provided to the flaggers when they are out of sight of each other.

Flaggers must be certified by passing an American Traffic Safety Service Association (ATSSA) training. The Contractor may use noncertified flaggers for their benefit, ease of operations, or other activities not receiving payment.

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

SECTION 642
TEMPORARY POLLUTION CONTROL

642.6-TEMPORARY PIPE, CONTOUR DITCHES, BERMS, SLOPE DRAINS, ROCK CHECK DAM, SILT FENCE, AND SUPER SILT FENCE:

ADD THE FOLLOWING SUBSECTION:

642.6.7-High Strength Silt Fence: 42” high Reinforced High Strength Silt Fence is a heavy-duty, high-tensile/ high-modulus, woven geotextile sediment fence. Designed using a value engineering approach, it is equivalent in strength and stiffness to that of wire or chain-link backed silt fence.

642.7-METHOD OF MEASUREMENT:

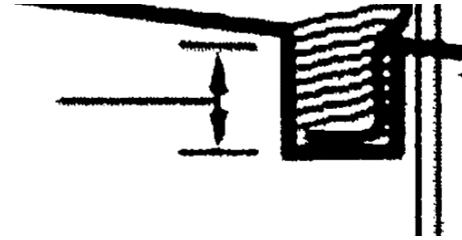
ADD THE FOLLOWING SUBSECTION:

642.7.2-High Strength Silt Fence: Excavate trench a maximum of 4” wide and 6” deep [or as recommended by the manufacturer](#). The trench shall be hand-cleaned following excavation to remove bulky debris such as rocks, sticks, and soil clods. [Roll](#) out [the fence](#) on the ground along the proposed fence line and next to the anchor trench. For the initial post, place the end of Reinforced High Strength Silt Fence along the post height and rotate the post [two full](#) 360 degrees, maintaining tension on the fabric. Secure the fence to the post at all ~~four (4) orange-colored reinforcing~~ bands locations with steel wire (metal T-posts using 16-gage 304 SS wire with mitered ends, securing with safety pliers) or nylon ties (puncture two 0.25” openings, spaced at a width apart that is roughly equivalent to the post width, and secure the fence to the post using 8” nylon heavy-duty cable ties/zip-ties that are UV resistant and have a minimum 120-lb tensile strength). [Metal T-posts shall conform to the requirements of either AASHTO](#)

M 281 / ASTM A702 or ASTM A499 and coated to meet the requirements of AASHTO M 111 unless otherwise directed on project plans.

Drive the initial post (72” metal t-post) with the attached fence to a depth of 36” below surface. Using spacing no greater than 6’ on center, drive interior posts to 36” depth below surface, and attach the fencing as you go. To attach fencing, position 42” high Reinforced High Strength Silt Fence in front of the adjacent t-post, pulling the fencing tight and fasten it to the post at all four (4) ~~orange-colored reinforcing~~ band locations. After the interior posts have been fastened, secure the fence to the final post by pulling the final section of fencing taut, and then **rotating the post 360 degrees** while maintaining tension on the fence system. Secure the fence to the post at all four (4) ~~orange-colored reinforcing~~ band locations with the steel wire or nylon ties. Drive the final post into the ground to a 36” depth below the surface. The woven geotextile fence shall be specifically designed and fabricated to withstand high tensile stresses and to prevent excessive material elongation and strain. It shall resist fence deflection and ultimate failure due to ripping, sagging or overturning from forces associated with excessive backwater depths, debris flows and overtopping. Ensure bottom 6” to 8” of fabric has been placed in trench or as recommended by the manufacturer. Backfill trench (overfill) with soil placed on and around fabric as shown in the diagram below. Compact soil backfill manually or via mechanical equipment such as the front wheel of a tractor, skid steer, roller, compactor or other device (ASTM D 6462 Standard Practice for Silt Fence Installation).

**BURY FILTER CLOTH 6"
MINIMUM TO GROUND**



The High Strength Silt Fence shall have Fencing and Filter Fabric that is 34” to 36” above ground with filter fabric extending 6” to 8” below ground surface.

Wide width tensile strength ASTM D 4595 (>5000 lbs/ft MD, >3500lbs/ft TD).

Wide Width Test Elongation ASTM D 4595 (< 10% MD, <9% TD).

Grab Tensile Strength ASTM D 4632 (>500 lbs. MD, >280 TD).

CBP Puncture ASTM D 6241 (> 1800 lbs.).

Trapezoidal Tear ASTM D 5433 (>195 lbs. MD, >170lbs. TD).

Mullen Burst ASTM E 3786 (>750 psi).

Apparent Opening Size ASTM D 4751 (Sieve #70).

Water Flux ASTM D 4491 (>18 gpm/sf). UV Stability ASTM D 4355 (>90% strength retained Machine Direction).

(MD=Machine Direction, TD=Traverse Direction)

Once sedimentation has reached a third of the Reinforced High Strength Silt Fence height, all accumulated sediment shall be removed and disposed of as directed by the Engineer. The Contractor shall inspect all silt fences after each rainfall event of at least 0.50.25 inches or greater. Any deficiencies or damage shall be repaired by the Contractor. If the Reinforced High Strength Silt Fence height is damaged or inadvertently moved during the sedimentation removal process,

the contractor shall ~~immediately~~ replace and/or repair any Reinforced High Strength Silt Fence immediately after the damage occurs. The Contractor shall be responsible for all details, devices, accessories, and special construction necessary to properly furnish, install, adjust and place in continuous satisfactory service, and complete the work in an acceptable manner.

642.8-BASIS OF PAYMENT

ADD THE FOLLOWING SUBSECTION:

642.8.1-High Strength Silt Fence: Reinforced High Strength Silt Fence shall be measured by the linear foot complete and in place Reinforced High Strength Silt Fence shall be paid per Linear Foot or Units as shown in the plans and/or other Erosion and Sediment Control Specifications as referenced in the plans.

642.9-PAY ITEMS:

ADD THE FOLLOWING TO THE TABLE:

ITEM	DESCRIPTION	UNIT
642015-005	High Strength Silt Fence	Linear Foot

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

SECTION 697

**SAFETY INSPECTION OF IN-SERVICE BRIDGES
DURING CONSTRUCTION**

697.1–DESCRIPTION:

The work shall consist of performing all bridge safety inspection requirements of the Federal Highway Administration’s current National Bridge Inspection Standards (NBIS) for normally-scheduled inspections, temporary structures, and for any structure or portion thereof that utilizes staged construction until the construction project is fully complete. The inspection team leader shall meet the minimum requirements of a team leader as specified by the NBIS, shall be approved by WVDOH Operations Division, and shall be on site during the duration of all inspection activities. Operations Division shall be notified of the times and dates that any field inspection activities will be occurring.

697.1.1–Inspection Requirements for Normally-Scheduled Inspections: A list of upcoming scheduled bridge safety inspections and the respective inspection types required for the existing structure, or any portion(s) of the existing structure that remain(s) open to traffic, shall be noted in the construction plans. Each inspection shall be performed and completed during the month and year as noted in the plans in accordance with the department’s requirements for the noted inspection type as described in the current edition of the WVDOH Bridge Inspection Manual. In cases where an inspection and inspection type are scheduled but no portion(s) of the existing structure remain(s) open to traffic, the Pay Item for that particular inspection will be non-performed. An inspection report, in accordance with the WVDOH Bridge Inspection Manual for the given inspection being performed, shall be compiled and submitted to the District Bridge Engineer within sixty (60) calendar days of completing the inspection utilizing the Department’s inspection data software. The inspection and the finalized inspection report must meet the approval of WVDOH Operations Division. The District Construction Engineer shall be notified in writing once the inspection report has been finalized and approved by Operations Division.

697.1.2–Inspection Requirements for Temporary Structures: An initial inspection shall be performed immediately prior to opening any temporary structure or portion thereof to public traffic. The initial inspection shall be in accordance with current NBIS requirements and in accordance with the department’s requirements for an Inventory Inspection as described in the current edition of the WVDOT Bridge Inspection Manual. An In-Depth Routine Inspection, in accordance with the WVDOT Bridge Inspection Manual, shall be performed concurrently with the Inventory Inspection. An Inventory Inspection Report and an In-Depth Routine Inspection Report shall be compiled and submitted to the District Bridge Engineer within sixty (60) calendar days of completing the inspection utilizing the Department’s inspection data software. The inspection and the finalized inspection reports must meet the approval of WVDOT Operations Division. The District Construction Engineer shall be notified in writing once the inspection reports have been finalized and approved by Operations Division.

A Bridge Rating Submission in accordance with Design Directive 202, meeting the requirements for Rating by District Bridge Engineer, shall be attached to the Inventory Inspection Report for the temporary structure. It will not be necessary to include a title sheet with a proposed sheet index. However, all other required items listed for the submission shall be supplied. Load rating of the temporary structure will be performed by WVDOT evaluation personnel once the Inventory Inspection Report has been submitted.

If a temporary structure or portion thereof is open to traffic twenty-four (24) months after the inspection date of the initial inspection, a routine inspection shall be performed in accordance with current NBIS requirements and in accordance with the department’s requirements for an ~~In-Depth~~ Routine Inspection as described in the current edition of the WVDOT Bridge Inspection Manual. An ~~In-Depth~~ Routine Inspection Report shall be compiled and submitted to the District Bridge Engineer within sixty (60) calendar days of completing the inspection utilizing the Department’s inspection data software. The inspection and the finalized inspection report must meet the approval of WVDOT Operations Division. The District Construction Engineer shall be notified in writing once the inspection report has been finalized and approved by Operations Division.

In cases where a panel-type bridge is being utilized, such as those bridges manufactured by Mabey, Acrow, or Bailey, a Special Inspection shall be performed at a maximum interval of every six (6) months, beginning at the inspection date of the initial Inventory Inspection, for the entire period that the structure is open to traffic. This inspection shall be in accordance with the WVDOT Bridge Inspection Manual and shall consist of a hands-on inspection of all truss members, connections, pins, and retainer clips. A Special Inspection Report shall be compiled and submitted to the District Bridge Engineer within sixty (60) calendar days of completing the inspection utilizing the Department’s inspection data software. The inspection and the finalized inspection report must meet the approval of WVDOT Operations Division. The District Construction Engineer shall be notified in writing once the inspection report has been finalized and approved by Operations Division. If a panel-type bridge is anticipated and a pay item has been included on the project to accommodate the inspection(s), the pay item will be non-performed if a panel-type bridge is not ultimately used.

697.1.3–Inspection Requirements for Structures Utilizing Staged Construction: An initial inspection shall be performed on each individual construction stage immediately prior

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to opening each stage or portion thereof to public traffic. A revised initial inspection will be required for each additional phase prior to opening each phase to public traffic. The initial inspection shall be in accordance with current NBIS requirements and in accordance with the department’s requirements for an Inventory Inspection as described in the current edition of the WVDOH Bridge Inspection Manual. An In-Depth Routine Inspection, in accordance with the WVDOH Bridge Inspection Manual, shall be performed concurrently with each Inventory Inspection. An Inventory Inspection Report and an In-Depth Routine Inspection Report shall be compiled and submitted to the District Bridge Engineer within sixty (60) calendar days of completing the inspection utilizing the Department’s inspection data software. The inspection and the finalized inspection reports must meet the approval of WVDOH Operations Division. The District Construction Engineer shall be notified in writing once the inspection reports has~~ve~~ been finalized and approved by Operations Division.

If a construction stage, subsequent construction stages, or portions thereof are open to traffic twenty-four (24) months after the inspection date of the ~~first-most recently~~ initial In-Depth Routine Inspection, a routine inspection shall be performed in accordance with current NBIS requirements and in accordance with the department’s requirements for ~~an In-Depth~~ Routine Inspection as described in the current edition of the WVDOH Bridge Inspection Manual. ~~An In-Depth~~ Routine Inspection Report shall be compiled and submitted to the District Bridge Engineer within sixty (60) calendar days of completing the inspection utilizing the Department’s inspection data software. The inspection and the finalized inspection report must meet the approval of WVDOH Operations Division. The District Construction Engineer shall be notified in writing once the inspection report has been finalized and approved by Operations Division.

697.2-Blank

697.3 – METHOD OF MEASUREMENT:

Bridge safety inspection work will be paid for per each inspection and inspection type performed for each individual bridge or construction stage.

697.4–BASIS OF PAYMENT:

Payment for the above described work, including all materials, equipment, labor, and any other incidental work necessary to complete this item, will be considered completely covered by the contract unit price for the item below.

697.5 – PAY ITEM:

ITEM	DESCRIPTION	UNIT
697001-*	NBIS Bridge Safety Inspection, “designation”, “type”	Lump Sum <u>Each</u>

- * Sequence number
- “designation” Bridge, temporary bridge, or stage name designation
- “type” Inspection type, typically Inventory Inspection or In-Depth Routine Inspection

Note 1: Each individual bridge inspection should be added as separate line item in project proposal.

Example:

March 22, 2023–June 1, 2023

697001-001, NBIS Bridge Safety Inspection, Temporary Bridge, Inventory-Depth Routine Inspection, Each
697001-001, NBIS Bridge Safety Inspection, Staged One-Bridge, In-Depth Routine Inspection, Each

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

ADD THE FOLLOWING:

SECTION 697
SAFETY INSPECTION OF IN-SERVICE BRIDGES
DURING CONSTRUCTION

697.1–DESCRIPTION:

The work shall consist of performing all bridge safety inspection requirements of the Federal Highway Administration’s current National Bridge Inspection Standards (NBIS) for normally scheduled inspections, temporary structures, and for any structure or portion thereof that utilizes staged construction until the construction project is fully complete. The inspection team leader shall meet the minimum requirements of a team leader as specified by the NBIS, shall be approved by WVDOH Operations Division, and shall be on site during the duration of all inspection activities. Operations Division shall be notified of the times and dates that any field inspection activities will be occurring.

697.1.1–Inspection Requirements for Normally-Scheduled Inspections: A list of upcoming scheduled bridge safety inspections and the respective inspection types required for the existing structure, or any portion(s) of the existing structure that remain(s) open to traffic, shall be noted in the construction plans. Each inspection shall be performed and completed during the month and year as noted in the plans in accordance with the department’s requirements for the noted inspection type as described in the current edition of the WVDOH Bridge Inspection Manual. In cases where an inspection and inspection type are scheduled but no portion(s) of the existing structure remain(s) open to traffic, the Pay Item for that particular inspection will be non-performed. An inspection report, in accordance with the WVDOH Bridge Inspection Manual for the given inspection being performed, shall be compiled and submitted to the District Bridge Engineer within sixty (60) calendar days of completing the inspection utilizing the Department’s inspection data software. The inspection and the finalized inspection report must meet the approval of WVDOH Operations Division. The District Construction Engineer shall be notified in writing once the inspection report has been finalized and approved by Operations Division.

697.1.2–Inspection Requirements for Temporary Structures: An initial inspection shall be performed immediately prior to opening any temporary structure or portion thereof to public traffic. The initial inspection shall be in accordance with current NBIS requirements and in accordance with the department’s requirements for an Inventory

Inspection as described in the current edition of the WVDOH Bridge Inspection Manual. An In-Depth Routine Inspection, in accordance with the WVDOH Bridge Inspection Manual, shall be performed concurrently with the Inventory Inspection. An Inventory Inspection Report and an In-Depth Routine Inspection Report shall be compiled and submitted to the District Bridge Engineer within sixty (60) calendar days of completing the inspection utilizing the Department's inspection data software. The inspection and the finalized inspection reports must meet the approval of WVDOH Operations Division. The District Construction Engineer shall be notified in writing once the inspection reports have been finalized and approved by Operations Division.

A Bridge Rating Submission in accordance with Design Directive 202, meeting the requirements for Rating by District Bridge Engineer, shall be attached to the Inventory Inspection Report for the temporary structure. It will not be necessary to include a title sheet with a proposed sheet index. However, all other required items listed for the submission shall be supplied. The load rating of the temporary structure will be performed by WVDOH evaluation personnel once the Inventory Inspection Report has been submitted.

If a temporary structure or portion thereof is open to traffic twenty-four (24) months after the inspection date of the initial inspection, a routine inspection shall be performed in accordance with current NBIS requirements and in accordance with the department's requirements for a Routine Inspection as described in the current edition of the WVDOH Bridge Inspection Manual. A Routine Inspection Report shall be compiled and submitted to the District Bridge Engineer within sixty (60) calendar days of completing the inspection utilizing the Department's inspection data software. The inspection and the finalized inspection report must meet the approval of WVDOH Operations Division. The District Construction Engineer shall be notified in writing once the inspection report has been finalized and approved by Operations Division.

In cases where a panel-type bridge is being utilized, such as those bridges manufactured by Mabey, Acrow, or Bailey, a Special Inspection shall be performed at a maximum interval of every six (6) months, beginning at the inspection date of the initial Inventory Inspection, for the entire period that the structure is open to traffic. This inspection shall be in accordance with the WVDOH Bridge Inspection Manual and shall consist of a hands-on inspection of all truss members, connections, pins, and retainer clips. A Special Inspection Report shall be compiled and submitted to the District Bridge Engineer within sixty (60) calendar days of completing the inspection utilizing the Department's inspection data software. The inspection and the finalized inspection report must meet the approval of WVDOH Operations Division. The District Construction Engineer shall be notified in writing once the inspection report has been finalized and approved by Operations Division. If a panel-type bridge is anticipated and a pay item has been included on the project to accommodate the inspection(s), the pay item will be non-performed if a panel-type bridge is not ultimately used.

697.1.3–Inspection Requirements for Structures Utilizing Staged Construction: An initial inspection shall be performed on each individual construction stage immediately prior to opening each stage or portion thereof to public traffic. A revised initial inspection will be required for each additional phase prior to opening each phase to public traffic. The initial inspection shall be in accordance with current NBIS requirements and in accordance with the department's requirements for an Inventory Inspection as described in the current edition of

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the WVDOH Bridge Inspection Manual. An In-Depth Routine Inspection, in accordance with the WVDOH Bridge Inspection Manual, shall be performed concurrently with each Inventory Inspection. An Inventory Inspection Report and an In-Depth Routine Inspection Report shall be compiled and submitted to the District Bridge Engineer within sixty (60) calendar days of completing the inspection utilizing the Department’s inspection data software. The inspection and the finalized inspection reports must meet the approval of WVDOH Operations Division. The District Construction Engineer shall be notified in writing once the inspection reports have been finalized and approved by Operations Division.

If a construction stage, subsequent construction stages, or portions thereof are open to traffic twenty-four (24) months after the inspection date of the most recently performed In-Depth Routine Inspection, a routine inspection shall be performed in accordance with current NBIS requirements and in accordance with the department’s requirements for a Routine Inspection as described in the current edition of the WVDOH Bridge Inspection Manual. A Routine Inspection Report shall be compiled and submitted to the District Bridge Engineer within sixty (60) calendar days of completing the inspection utilizing the Department’s inspection data software. The inspection and the finalized inspection report must meet the approval of WVDOH Operations Division. The District Construction Engineer shall be notified in writing once the inspection report has been finalized and approved by Operations Division.

697.2-Blank

697.3 – METHOD OF MEASUREMENT:

Bridge safety inspection work will be paid for per each inspection and inspection type performed for each individual bridge or construction stage.

697.4–BASIS OF PAYMENT:

Payment for the above described work, including all materials, equipment, labor, and any other incidental work necessary to complete this item, will be considered completely covered by the contract unit price for the item below.

697.5 – PAY ITEM:

ITEM	DESCRIPTION	UNIT
697001-*	NBIS Bridge Safety Inspection, “designation”, “type”	Each

- * Sequence number
- “designation” Bridge, temporary bridge, or stage name designation
- “type” Inspection type, typically Inventory Inspection or In-Depth Routine Inspection

Note 1: Each individual bridge inspection should be added as separate line item in project proposal.

Example:
 697001-001, NBIS Bridge Safety Inspection, Temporary Bridge, Inventory Inspection, Each
 697001-001, NBIS Bridge Safety Inspection, Stage One, In-Depth Routine Inspection, Each

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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
SUPPLEMENTAL SPECIFICATION
FOR
SECTION 707
CONCRETE ADMIXTURES, CURING AND COATING MATERIALS

707.12-CONCRETE SEALER:

DELETE THE CONTENTS OF SUBSECTION 707.12 AND REPLACE WITH THE FOLLOWING:

707.12.1-General: The material shall be a one component, water repellent penetrating sealer, meeting the criteria listed in section 707.12.2. The material shall be capable of meeting the criteria with a single coat and shall not alter the color of the treated surfaces.

707.12.2-Acceptance: Concrete sealers shall be evaluated by AASHTO National Transportation Product Evaluation Program (NTPEP) and shall meet the requirements of AASHTO M 224.

~~The Contractor shall furnish certified laboratory test data showing the material meets the following performance requirements:~~

- ~~1. Absorption ASTM C642 (non air entrained concrete). Concrete should be proportioned and mixed in accordance with ASTM C672. Sealed concrete, under total immersion, will not exceed 1.0% absorption after 48 hours or 2.0% absorption after 50 days.~~
- ~~2. Sealing Resistance ASTM C72. A rating of "No Sealing" after 100 cycles on the sealed concrete (non air entrained concrete) as compared to "Server Sealing" on untreated concrete.~~
- ~~3. NCHRP 244, Series II Cube Test~~
 - ~~3.1 Weight Gain not to exceed 25% of untreated cube.~~
 - ~~3.2 Absorbed Chloride not to exceed 25% of untreated cube.~~
- ~~4. NCHRP 244, Series IV Southern Exposure~~
 - ~~4.1 Absorbed Chloride not to exceed 10% of untreated concrete.~~

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

SECTION 601
STRUCTURAL CONCRETE

601.1-DESCRIPTION:

ADD THE FOLLOWING TO THE END OF THE SECTION:

601.1.1-Embedded Galvanic Anodes: This work consists of installing embedded galvanic anodes in conjunction with Patching Concrete Structures (removing all loose, disintegrated, and delaminated concrete; preparing the surface; furnishing and placing reinforcing steel as required; placing forms; and placing concrete patches, including curing of same).

601.2-MATERIALS:

DELETE THE CONTENTS AND ADD THE FOLLOWING TO THE END OF THE SECTION:

Furnish pre-manufactured galvanic anodes designed for ~~cathodic protection controlling corrosion~~ when embedded in concrete and tied to steel reinforcing. The core of the anode shall consist of a minimum of ~~100~~ 160 grams of electrolytic high grade zinc in compliance with ASTM B 418 Type II cast around ~~a pair of~~ steel tie wires and encased in a highly alkaline cementitious shell with a pH of 14, ~~or encased in a material that uses activation methods to~~ with sufficient alkalinity to assure performance over the 20 year design life of the anode. The galvanic anode shall contain no intentionally added constituents which are corrosive to reinforcing steel, e.g. chloride, bromide, etc. The anodes shall have one side that is less than 1½-inches in height.

Furnish galvanic anodes in accordance with these specifications. Supply a certification of compliance that the anode and spacing meets the basis of design to the engineer before starting work. Deliver, store, and handle all materials according to the manufacturer's instructions.

Repair concrete shall be hydraulic cement-based material with a 28-day moist cured electrical resistivity less than ~~15,000~~ 50,000 ohm-cm according to ASTM C 1760. Concrete mixes containing high levels of supplementary cementitious materials such as silica fume, ground-granulated blast furnace slag, fly ash or metakaolin may not meet the resistivity requirement. Insulating materials such as epoxy bonding agents shall not be used unless otherwise called for in the design.

601.10-PLACING CONCRETE:

DELETE THE TITLE AND CONTENTS OF SUBSECTION 601.10, AND REPLACE WITH THE FOLLOWING:

601.10-GALVANIC ANODE INSTALLATION:

Install embedded galvanic anodes in accordance with manufacturer's recommendations, as shown on the plans, and as listed in this specification.

1. Install galvanic anodes to existing reinforcement along the perimeter of the repair at spacing as specified on the plans. In no case shall the distance between anodes exceed ~~30-28~~ inches nor shall the distance between the anode, Keep the anodes as close to the edge of the repair as practical while allowing for new mortar to completely encapsulate the anodes, less than and the edge of the repair exceed 46 inches.
2. Provide a 1-inch clearance between anodes and substrate to allow repair material to encase anode. Ensure that there is at least 1-inch cover over the anode. If necessary, increase the size of the repair cavity to accommodate the anodes.
3. Secure the galvanic anodes as close as possible to the patch edge using the anode tie wires (bare wire). Wrap tie wires around the cleaned and uncoated reinforcing steel at least one full turn in opposite directions and then tighten the tie wires to allow little or no free movement. If the anode is to be tied onto a single bar, or if less than 1½-inch of concrete cover is expected, place anode beneath the uncoated bar and secure to reinforcing steel. If 1½-inch concrete cover will exist over the anode, the anode may be placed at the intersection between two bars and secured to each bar.

Confirm electrical connection between every anode tie wire and uncoated reinforcing steel with a multi-meter. Electrical connection is acceptable if the DC resistance measured with the multi-meter is 1 Ohm or less or the DC potential is 1 mV or less. The maximum DC resistance shall be 1 Ohm. Confirm electrical continuity of every exposed uncoated reinforcing steel within the repair area. Steel reinforcement continuity is acceptable if the DC resistance measured with the multi-meter is 1 Ohm or less or the DC potential is 1 mV or less shall be considered continuous when the DC resistance is 1 Ohm or less. If necessary, establish the electrical continuity with uncoated steel tie wire.

Provide the Engineer with a report documenting the resistance measurement for every reinforcing bar in each repair area. The report shall be signed by the contractor's employee responsible for supervision of the repair work.

The contractor will have a representative from the galvanic anode manufacturer to provide training and on-site technical assistance during the initial installation of the galvanic anodes, unless contractor has previous experience installing embedded galvanic anodes.

601.14-METHOD OF MEASUREMENT:

DELETE THE ENTIRE SECTION:

601.15-BASIS OF PAYMENT:

ADD THE FOLLOWING TO THE END OF THE SECTION:

This work shall be paid for as Item ~~615075-001 Miscellaneous Bridge Work, Distributed Anode System (DAS)~~ 601030-025, Galvanic Anode Protection, per Lump Sum. It will include all labor, tools, equipment, supplies, and incidentals necessary to complete the work.

NOTE:

~~Do not use this specification for patch areas less than 5 ft². Anode spacing shall be specified by the designer. Anode spacing is dependent upon the reinforcing steel density; chloride content; and amount of zinc per anode. The density of the reinforcing steel is the total surface area of the bar (ft²) within a square foot of concrete (regardless of depth). Corrosion levels in the concrete can be broken into three measurable categories based on ASTM C 1152 Acid Soluble Chloride of Mortar and Concrete: Light corrosion levels: < 4 lb/yd³, Moderate corrosion levels 4 to 8 lb/yd³ and High corrosion levels: > 8 lb/yd³. In lieu of coring to determine chloride thresholds, the following general guidelines may be considered: Light corrosion for concrete aged 0-15 years and exposed to deicing salt or concrete of any age not directly exposed to deicing salt; Moderate corrosion for concrete aged 16-30 years and exposed to deicing salt; High corrosion for concrete 31 years and older and exposed to deicing salt. The following anode spacing guidelines are based a minimum zinc content of 100 grams per anode and to mitigate the initiation of new corrosion activity:~~

Steel Density Ratio	Anode Spacing (Inches)		
	Light Corrosion Levels	Moderate Corrosion Levels	High Corrosion Levels
<0.3	30	30	30
0.31-0.6	28	26	24

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0.61—0.9	26	23	20
0.91—1.2	22	20	18
1.21—1.5	20	18	16
1.51—1.8	18	16	14
1.81—2.1	17	14	12

NOTE: Anode spacing shall be specified by the designer. Anode spacing is dependent upon the reinforcing steel density; the level of corrosion risk (i.e. amount of chloride and the corrosivity of the local environment); and amount of zinc per anode. The density of the reinforcing steel is the total surface area of the bar (ft²) within a square foot of concrete (regardless of depth).

Corrosion levels in the concrete can be broken into three measurable categories based on ASTM C 1152 Acid-Soluble Chloride of Mortar and Concrete:

- Low to Moderate corrosion levels: < 5 lb/yd³.
- High corrosion levels 5 to 9 lb/yd³.
- Extremely High corrosion levels: > 9 lb/yd³.

In lieu of coring to determine chloride thresholds, the following general guidelines may be considered:

- Light corrosion for concrete aged 0-15 years and exposed to deicing salt or concrete of any age not directly exposed to deicing salt.
- Moderate corrosion for concrete aged 16-30 years and exposed to deicing salt.
- High corrosion for concrete 31 years and older and exposed to deicing salt.

The basis of design is as follows:

- Anode: Type 1A Embedded Galvanic Anode with a minimum of 160 grams of zinc.
- Service Life: 20 years minimum
- Efficiency*Utilization Factor: 85%
- Minimum current density delivered 4 inches outside the edge of repair in the parent concrete between anodes:
 - Low to Moderate Risk – 0.4 mA/m² of steel surface area
 - High Corrosion Risk – 0.8 mA/m²
 - Extremely High Risk – 1.6 mA/m²
- Anode aging factor: 12.5 years (Approximate half-life, the time when anode current drops by 50%)

<u>Steel Density Ratio</u> <u>(Steel Surface Area divided by concrete surface area)</u>	<u>Basis of Design / Anode Spacing (Inches)</u>		
	<u>Low to Moderate Corrosion Risk</u>	<u>High Corrosion Risk</u>	<u>Extremely High Corrosion Risk</u>
	<u>(0.4 mA/m² @ 20 years)</u>	<u>(0.8 mA/m² @ 20 years)</u>	<u>(1.6 mA/m² @ 20 years)</u>
<u>< 0.3</u>	<u>28</u>	<u>28</u>	<u>25</u>
<u>0.31 – 0.6</u>	<u>28</u>	<u>25</u>	<u>17</u>
<u>0.61 – 0.9</u>	<u>28</u>	<u>20</u>	<u>14</u>
<u>0.91 – 1.2</u>	<u>25</u>	<u>17</u>	<u>11</u>
<u>1.21 – 1.5</u>	<u>22</u>	<u>15</u>	<u>10</u>
<u>1.51 – 1.8</u>	<u>20</u>	<u>14</u>	<u>9</u>
<u>1.81 – 2.1</u>	<u>19</u>	<u>13</u>	<u>8</u>

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- Alternate (or equal) anodes shall provide design details based on the following factors:
 - Initial and final current to steel from field monitoring.
 - Anode aging factor base on continual monitoring of field installations sufficient to determine the actual half-life of the anode in field installations. If insufficient data exists to determine anode aging factor, an anode aging factor of 4 years shall be used.
 - Efficiency*Utilization factor determined by removing anodes from field installation and measuring actual versus theoretical zinc consumption.
 - Anode spacing to achieve specified current density at 20 years.

601.16-PAY ITEMS:

DELETE THE CONTENTS AND ADD THE FOLLOWING TO THE TABLE:

ITEM	DESCRIPTION	UNIT
615075-001*	Miscellaneous Bridge Work, Distributed Anode System (DAS);	Lump Sum
<u>601030-025</u>	<u>Galvanic Anode Protection</u>	<u>Lump Sum</u>

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

SECTION 106

CONTROL OF MATERIALS

106.3-SAMPLES:

106.3.1-Acceptance Plans:

DELETE THE CONTENTS OF THE SUBSECTION AND REPLACE WITH THE FOLLOWING:

~~**106.3.1.1-Percent Within Tolerance:** The percentage of each lot or subplot of material, product, item of construction, or completed construction within the specified tolerances will be determined by the procedures as referenced by the specification requirements. 43 When West Virginia AP-A is referenced, it will consist of Tables 106-1 to 106-5 inclusive, published in MP 106.00.20.~~

106.3.1.2¹-Sampling of Reworked Lots or Sublots: It is the intent of these Specifications that lots or sublots of materials, products, items of construction or completed construction meet specification requirements at the time of submission. Lots or sublots generally will not be resampled unless reworked before submission. Sampling after reworking will be at the expense of the Contractor.

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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

SECTION 401

**ASPHALT BASE, WEARING, AND
PATCHING AND LEVELING COURSES**

401.2-MATERIALS:

DELETE THE TABLE AND REPLACE WITH THE FOLLOWING:

MATERIAL	SUBSECTION
Coarse Aggregate	703.1 thru 703.3 ^{Note 1 & Note 2} (See MP 401.02.28 for exceptions and additions required for Superpave Items.)
Fine Aggregate	702.3 (See MP 401.02.28 for additions required for Superpave Items)
Mineral Filler	702.4
Performance Graded Binders	705.5

~~Note 1 The total shale, coal and other lightweight deleterious material and friable particles shall not exceed 3%.~~

Note 1 When slag is specified in the contract, the coarse aggregate shall be slag which meets the requirements of 703.3, except as amended in this subsection.

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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
SUPPLEMENTAL SPECIFICATION
FOR
SECTION 501
PORTLAND CEMENT CONCRETE PAVEMENT

501.3-PROPORTIONING:

ADD THE FOLLOWING BEFORE PARAGRAPH FIVE:

The Contractor may develop mix designs with a reduced target cement factor as indicated in Table 501.3.1.1 in lieu of Table 501.3.1, provided the aggregates used in those mix designs meet the requirements for optimized aggregate gradation in Section 601.3.2.4.1. The \bar{A} requirements will not apply for mix designs that use optimized aggregate gradation.

TABLE 501.3.1.1

Minimum 28-Day Design Strength	Minimum Cement Factor	Maximum Water Content	Nominal Maximum Aggregate Size	Target Entrained Air
Pounds per square inch	lbs./c.y.	lb. of water / lb. of cement	Inches	Percent
3,000 Compressive or 500 Flexural ^{Note 1}	524 ^{Note 2}	0.44	1 or ¾	7.0

Note 1 Flexural strength when tested by the third point method.

Note 2 An equal mass of a SCM may be substituted for Portland cement up to the following maximum amount. Only one SCM is permitted in a mix design.

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

**SECTION 502
APPROACH SLABS**

502.5-JOINTS:

DELETE THE CONTENTS OF THE SUBSECTION AND REPLACE WITH FOLLOWING:

Approach slabs shall have longitudinal joints in line with the longitudinal joints of the adjacent pavement. Longitudinal joints shall be sawed to a minimum depth of one-fourth of the plan depth of the slab plus $\frac{1}{4}$ inch; the width shall be $\frac{1}{4}$ inch, with a tolerance of plus or minus $\frac{1}{16}$ inches. Sawing shall be performed within five days after the slab is placed and prior to opening to construction traffic. Joints shall be sealed in accordance with the requirements of Sections ~~501.17~~ 501.16 and 503.

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

SECTION 601
STRUCTURAL CONCRETE**601.3-PROPORTIONING:****601.3.1-Mix Design Requirements:**

DELETE TABLE 601.3.1D AND REPLACE WITH THE FOLLOWING:

TABLE 601.3.1D

Class of concrete	Design 28 Day Compressive Strength	Target Cement Factor	Maximum Water Content	Nominal Maximum Aggregate Size	Entrained Air
	Pounds per Square inch	lbs./c.y. ^{Note 1}	lb. of water/lb. of cement ^{Note 2}	Inches	Percent
A	3,500	642	0.51	½ <u>or</u> ¾	7.5
K	4,000	618	0.44	1 <u>or</u> ¾	7.0
B	3,000	524	0.49	1 <u>or</u> ¾	7.0
C	2,500	454	0.58	1 <u>or</u> ¾	6.0
D	2,000	360	0.62	1 <u>or</u> ¾	5.5
H	4,000	See Table 601.3.1E	0.40	1 <u>or</u> ¾	6.5
DC ^{Note 3}	4,500	665	0.44	½ <u>or</u> ¾	6.0

Note 1 An equal mass of a SCM may be substituted for Portland cement up to the maximum amount in Table 601.3.1B. Only one SCM is permitted in a mix design, except for Class H concrete. The target cement factor of Class H concrete shall consist of Option 1 or Option 2 from Table 601.3.1E. The Contractor may choose either option.

Note 2 When using a SCM, masses of these materials shall be considered as cement for purposes of establishing maximum water content.

Note 3 Nominal maximum aggregate size of ¾ inches may be used in Class DC concrete, provided the Engineer approves the use of that size aggregate for the specific project on which it is to be used. That approval will depend on the minimum spacing of the reinforcing steel in the drilled shaft foundation.

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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

**SECTION 601
STRUCTURAL CONCRETE**

601.1-DESCRIPTION:

ADD THE FOLLOWING TO THE END OF THE SECTION:

601.1.1-Distributed Anode System (DAS): The work under this section consists of supplying, installing, and energizing a zinc-based galvanic corrosion protection system, including required electrical connections, materials, testing, and ensuring continuity of the reinforcing steel to all elements as outlined in the construction drawings.

Distributed embedded galvanic anodes are designed to provide galvanic corrosion protection. The anodes are connected to reinforcing steel and embedded in concrete to mitigate corrosion.

601.2-MATERIALS:

ADD THE FOLLOWING TO THE END OF THE SECTION:

The distributed galvanic anode units shall be alkali-activated with a pH greater than 14 and shall not contain intentionally added constituents that are corrosive to reinforcing steel as per ACI 222R such as chlorides, bromides, or other halides. The anode core shall be manufactured with zinc in compliance with ASTM B418 Type II (Z13000) with iron content less than 15 ppm and that is evenly distributed around a steel core which is continuous along the length of the unit. Unless otherwise specified, the anode unit shall be supplied with a pair of uncoated steel tie wires with optional loop ties to make connections to the reinforcing steel.

Individual anode units shall be approximately *[enter nominal dimensions from table below]*. The length of individual anode units shall be *[enter length of each anode] [as shown on*

the drawings]. Anode units shall be supplied with uncoated, steel tie wires for *[direct connection to the steel or connection to an inter-anode connecting header wire as per the design]*.

Distributed galvanic anodes shall be Galvashield DAS available from Vector Corrosion Technologies or approved equal.

The spacing of the distributed galvanic anode units will be as per the outlined design.

Application for approved equals shall be requested in writing two weeks before submission of project bids. Application for galvanic anode approved equals shall include verification of the following information:

1. Type of activation mechanism must be stated and demonstrated.
2. The distributed anode contains no intentionally added constituents corrosive to reinforcing steel or detrimental to concrete, e.g. chloride, bromide, sulfate, etc.
3. Initial startup current per anode per area at specified average annual temperature of structure.
4. Aging term - This is the number of years over which the electric current produced by the installed anode drops to half of the initial measured current.
5. Submittal of monitored performance data for two examples of satisfactory field performance where said aging term has been achieved.
6. Initial mass of zinc.
7. Efficiency and utilization determined from site performance data of no less than seven years.
8. Anode units contain zinc around uncoated, (non-galvanized) steel tie wires.
9. Third party product evaluation, such as from Concrete Innovations Appraisal Service, BBA, etc.
10. Using the information above, model how the alternative design will meet the minimum current density at the end of life of *[enter service life here]*.

601.10-PLACING CONCRETE:

DELETE THE SECTION AND REPLACE WITH THE FOLLOWING:

601.10-DISTRIBUTED ANODE SYSTEM (DAS) INSTALLATION:

The galvanic corrosion protection system shall consist of alkali-activated distributed galvanic anodes placed *[evenly across the concrete surface] [in a single line]*. The anode units are connected to the reinforcing steel to be protected and encased in concrete with a minimum of 1 ½ inch of clear concrete cover over the anode units. After the anode units are installed and encased in concrete, the system provides galvanic protection to the embedded reinforcing steel.

Remove loose or delaminated concrete. Use the smallest practical size chipping hammer to minimize damage to sound concrete.

Clean exposed reinforcing steel of rust, mortar, etc. to provide sufficient electrical connection and mechanical bond. If a significant reduction in the cross section of the reinforcing steel has occurred, replace, or install supplemental reinforcement as directed by the engineer of record. Secure loose reinforcing steel by tying tightly to other bars with steel tie wire. Verify electrical continuity of all reinforcing steel, including supplemental steel.

Reinforcing steel shall be tested for electrical continuity by procedures as directed by the cathodic protection technician. Electrical connection is acceptable if the DC resistance measured with the multi-meter is 1 W or less or the DC potential is 1 mV or less. Reinforcing steel found to be discontinuous shall be bonded to continuous reinforcement by steel tie wire.

Any new steel added to the structure, such as supplemental reinforcing, wire mesh or rebar shall be electrically continuous. The new steel shall be connected to the anode grid or bonded to existing reinforcing steel. After the distributed galvanic anodes are installed, the continuity of the connection between anode tie wire and reinforcing steel is verified using the same procedures prior to concrete placement.

Distributed anodes shall be placed in locations as per the design and indicated on the drawings. Secure anodes to prevent movement during concrete placements.

The distributed anode system must be connected to the reinforcing steel to be protected. The anodes are directly tied to cleaned exposed steel or can be interconnected to header wires to create a distributed anode grid. The anode grid shall be connected to reinforcing steel with a minimum of two connections per 500 ft² of concrete area.

If no exposed steel exists after preparation of the substrate, a small area of concrete shall be removed to expose reinforcing steel for anode connection. Electrical connections to the reinforcing steel shall be established by tying the header wire to the exposed steel or by alternate methods. Proposed electrical connection details shall be approved by the anode manufacturer and shall be detailed on the shop drawing submittal for approval by the engineer.

After the distributed galvanic anodes have been installed. Place approved concrete taking care to avoid damage to the anodes, connections, and wiring. Consolidate concrete around anodes assuring no voids exist. *[For vertical and overhead repairs like columns and beams, use the following "Minimum concrete cover depth over the anodes shall be ¾ inches." For horizontal applications like bridge deck overlays and joint replacements, use the following "Minimum concrete cover depth over the anodes shall be 1.5 inches.]*

601.10.1-Manufacturer Technical Assistance: The contractor will enlist and pay for the services of a NACE-qualified cathodic protection technician (CP2 or greater) supplied by the galvanic anode manufacturer. The qualified corrosion technician shall have verifiable experience in the installation and testing of embedded galvanic protection systems for reinforced concrete structures.

The technician shall provide contractor training and support for development of application procedures, shop drawings for submittals, anode, and concrete installation, reinforcing steel connection procedures, and verification of electrical continuity of embedded steel. The contractor shall coordinate its work with the designated technician to allow for site support during project startup and initial anode installation.

601.15-BASIS OF PAYMENT:

ADD THE FOLLOWING TO THE END OF THE SECTION:

This work shall be paid for as Item 601030-030, Distributed Anode System (DAS), per Lump Sum. It will include all labor, tools, equipment, supplies, and incidentals necessary to complete the work.

NOTE: *Typical Distributed Anode System (DAS) Sizes and Weights:*

- *Lengths: Standard 39 inches but can be customized to project requirements.*
- *Nominal Dimensions ***:*

DAS:

0.6 lb./ft.

1.1" x 1.5"

DAS-X:

1.65 lb./ft.

1.25" x 2"

**** Typically, +/- 1/8"*

Design based on aging term of 12.5 years and an efficiency/utilization of 75%.

Corrosion Risk Category	Chloride Level *	Minimum Current Density at end of life **
Low to Moderate	<5lbs/yd ³	0.6mA/m ² (0.06mA/ft ²)
High	5-9lbs/yd ³	1.2mA/m ² (0.11mA/ft ²)
Extremely High	>9lbs/yd ³	2.4mA/m ² (0.22mA/ft ²)

** Chloride content is based on lb/yd³*

*** Designer to specify end of life minimum current*

601.16-PAY ITEMS:

ADD THE FOLLOWING TO THE TABLE:

ITEM	DESCRIPTION	UNIT
601030-030	Distributed Anode System	Lump Sum

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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

**SECTION 636
MAINTAINING TRAFFIC**

636.11-FLAGGER OR TRAFFIC DIRECTOR:

ADD THE FOLLOWING SECTION:

636.11.3–Automated Flagger Assistance Device: An automated flagger assistance device (AFAD) system consists of two AFAD units of the same make and model that can be paired and operated by one or two certified flaggers. AFADs shall only be used in situations where there is only one lane of approaching traffic in the direction to be controlled.

The Contractor shall furnish, install, and maintain a portable, self-contained, trailer mounted red/yellow lens AFAD for temporary traffic control as specified in the Contract Documents or as directed. Flaggers operating the AFADs shall meet the requirements specified in 636.11.1. The AFAD system shall be MASH compliant. The operator(s) must have an unobstructed view of the AFAD and approaching traffic in both directions. The operator(s) shall have no other tasks assigned to them. One operator may operate both AFADs if there is an unobstructed view of both devices and queued traffic. If the AFAD system is equipped with a network of cameras and the manufacturer’s recommended guidelines allow so, the Engineer, may allow the operator to work from a position that does not include an unobstructed view. The operator must be at the job site.

A red/yellow AFAD shall alternately display a steadily illuminated circular red LED lens and a flashing circular yellow LED lens to control traffic. The AFAD shall have at least one (1) set of circular red and circular yellow lenses that are twelve (12) inches in diameter. The red shall be on top and yellow on the bottom. The bottom of the housing shall be at least seven (7) feet above the pavement.

The gate arm shall be made of a lightweight rigid material that deflects if an errant vehicle strikes the gate arm. The gate arm shall deflect and return to a functional position after the errant vehicle clears the gate arm. The length of the gate arm shall be at least eight (8) feet and the end of the arm shall reach at least the center of the lane being controlled. The

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gate arm shall not extend in the opposite lane. If a vehicle strikes the gate arm, an intrusion alarm of a minimum 115 decibels shall immediately sound until turned off by the operator.

A “Stop Here on Red” sign shall be installed on the right-hand side of the approach at the point at which drivers are expected to stop when the steady circular red lens is illuminated. The sign shall be rectangular, and each shall be at least 24x30 inches in size with the letters at least six (6) inches high. To inform traffic to stop, the AFAD shall display a steadily illuminated circular red lens and the gate arm shall be in the down position. To inform traffic to proceed, the AFAD shall display a flashing circular yellow lens and the gate arm shall be in the upright position.

The maximum distance between AFAD units shall be 1,000 feet without any side road intersections, unless prior approval is obtained by the Engineer. AFAD’s shall be placed in the field such that traffic can clearly see the units without interference from the sun.

636.23–METHOD OF MEASUREMENT:

ADD THE FOLLOWING:

636.23.29-Automated Flagger Assistance Device (AFAD): The AFAD shall be measured in hours and shall be paid for the actual authorized time controlling traffic. Payment shall include operator, any incidentals, temporary storage, maintenance, and removal of the AFAD as authorized or approved by the Engineer.

636.24–BASIS OF PAYMENT:

DELETE THE FIRST PARAGRAPH AND REPLACE WITH THE FOLLOWING:

The quantities, determined as provided above, will be paid for at the contract unit price bid for the items listed below, 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. When aggregate for maintaining traffic, dust palliatives, flagger, traffic director, automated flagger assistance device, cleaning of traffic control devices or the electric arrow are contained in the contract as pay items, payment for such pay items will not be made subsequent to the date of required completion of the project.

636.25–PAY ITEM:

ADD THE FOLLOWING TO THE TABLE:

ITEM	DESCRIPTION	UNIT
636014-*	Automated Flagger Assistance Device	Hour

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

SECTION 702
FINE AGGREGATE

702.1-FINE AGGREGATE FOR PORTLAND CEMENT CONCRETE:

702.1.5-Mortar Strength (Determined by AASHTO T71)

DELETE THE TITLE AND CONTENTS OF SUBSECTION 702.1.5 AND REPLACE WITH THE FOLLOWING:

702.1.5-Mortar Strength (Determined by ~~AASHTO T71~~ MP 702.01.25): Fine aggregate failing the organic impurities test shall be subjected to the test for mortar making properties. The fine aggregate shall develop a compressive strength at the age of seven days; ~~when using Type I or II cement, or at three days when using Type III~~ Type II cement, of not less than 90 percent of the strength developed by a mortar prepared in the same manner with the same cement and graded Ottawa sand having a fineness modulus of 2.4 plus or minus 0.10.