February Specifications Committee Meeting Agenda

Meeting Date

Wednesday, February 3, 2021 @ 9:00am

Skype Meeting. E-mail distribution message includes instruction.

Approved Permanent Specification changes from last Committee meeting (12/2/20)

- **720.5.4-Schedule 3 NHS Pavement Projects and 720.6-Non-NHS Pavement Project.** Updates the adjustment table and revises non-NHS route requirements.
- **Section 609-Sidewalks**. Updates curb ramp requirements.
- **636.23.8-Eradication of Pavement Marking, 636.23.9-Temporary Pavement Markings-Paint, and 636.23.10-Temporary Pavement Markings-Tape.** Updates eradication of pavement markings and removes reference to 4 inch lines from the method of measurement
- Four proposed specification changes related to finalization of projects
    - **101.2-Definitions.**
    - **105.16.2-Final Acceptance.**
    - **108.6.1-General.**
    - **109.8-Acceptance and Final Payment.**
- **109.1-Measurement of Quantities and 109.20-Load Limit Violations and Weight Tickets.** The change is to facilitate use of e-ticketing.
- Three proposed specification changes related to WVDOH adoption of the WVDEP Erosion and Sediment Control Manual. The revision removes references to the WVDOH publication and replaces it with the WVDEP one.
    - **107.21.1-Erosion and Sedimentation Control.**
    - **207.6.3.1-Waste Within WVDOH Right-of-Way**
    - **211.3.1-Borrow within WVDOH R/W Limits and 211.3.3-Impervious Core**
- **Section 504-Bituminous Underseal for Concrete Pavement.** Removes section from specifications.
- **601-3.2.3-Yield.** Requires yield tests by the WVDOH filed inspector.
- **603.2.1-Inspection and Testing and 603.6.2.1-Class S-P Concrete Mix Design Testing.** Adds certification requirements for QC personnel at concrete fabricators.
- **606.2-Materials and 606.2.3-Free Draining Base Trench.** Updates outlet pipe material references.
- **626.7-Method of Measurement.** Clarify the retaining wall measurement.
- **636.6.2-Shadow Vehicle, 636.12-Temporary Impact Attenuating Device, and 636.25-Pay Items.** The revision updates the shadow vehicle and temporary impact attenuating devices requirements, to meet MASH requirements.
- **642.1-Description, 642.4-General Requirements, and 642.7-Method of Measurement.** The revision removes 'check dam' item and references from the specification.
- **Section 663-Pavement Markings and Rumble Strips.** The revision adds rumble strip item to the section (this information is currently in Section 664 & being removed from there).
- **Section 664-Impact Attenuators.** The revision consolidates the various proprietary items into one generic specification.

    715.41-Impact Attenuators. Material subsection revised to correlate with Section 664 revision.
- **715.9.3.1-Drums.** Permit tire ring collars alternate for drums.
- **604.2-Materials and 604.15-Pay Items** Adds Concrete Safety Slope End Section and updates pay item for it.
    - **714.8-Concrete Safety Slope End Sections.** Material subsection revised to correlate with Section 604 revision

Approved Project Specific Special Provisions (SP) from last Committee meeting (12/2/20)

- **SP504-Asphalt Underseal for Concrete Pavement**

Items removed from Committee Agenda

- **SP105-Dates of Governing Specifications and Standard Details**

Old Business - Provisions discussed at last Committee meeting

SECTION	TITLE	DESCRIPTION
212	**SP212 - Shoring, Causeway**	**3rd time to Committee; discussed in October and December.** Special provision for Shoring, Causeway. No update to the SP. Approval is expected in February.
403	**SP403 - Crack Sealing in Asphalt Pavement**	**2nd time to Committee; discussed in October.** Special provision for crack sealing in asphalt pavement. No update to the SP. Approval is expected in February.
615	**SP615 - Alternative Technical Concept**	**3rd time to Committee; discussed in October and December.** Special provision for Alternative Technical Concept of Steel Superstructure elements: causeway shoring, temporary falsework, and jacking of steel superstructure. No update to the SP. Approval is expected in February.
636	**SP636-Temporary CCTV**	**This is an update to previously approved SP. 2nd time to committee; discussed in December.** Project specific special provision for CCTV in work zones. The update includes the SIM card cost with the item. No update to the SP; it redline copy showing the changes/ updates to the special provision. Approval is expected in February.
307	**307.2-Materials**	**2nd time to committee; discussed in December.** Proposed specification change to Section 307. The revision removes reference to 704.6.3, which contradicts supplemental specification 307.2.4.1.2 and outlines the testing requirements. No update to the specification; it is redline copy showing the proposed changes/updates. Approval is expected in February.

601	**601.2-Materials**	**2nd time to committee; discussed in December.** Proposed specification change to Section 601. The revision adds concrete sealer material reference. No update to the specification; it is redline copy showing the proposed changes/updates. Approval is expected in February.
603	**603.15-Pay Items**	**2nd time to committee; discussed in December.** Proposed specification change to Section 603. The revision corrects the unit of deck panel items to square foot, as that's how it is listed in method of measurement subsection. No update to the specification; it is redline copy showing the proposed changes/updates. Approval is expected in February.
636	**636.19.4-Placement**	**2nd time to committee; discussed in December.** Proposed specification change to Section 636. The revision updates the placement requirements of Portable Message Signs. corrects the unit of deck panel items to square foot, as that's how it is listed in method of measurement subsection. No update to the specification.
704	**704.6.2-Gradation, Quality, and Crushed Particle Requirements & 704.6.3-Sampling, Testing and Acceptance Procedure**	**2nd time to committee; discussed in December.** Proposed specification change to Section 704. The revision moves Table 704.6.2 from within 704.6.3 to the end of subsection 704.6.2. No update to the specification; it is redline copy showing the proposed changes/updates. Approval is expected in February.

New Business - New Provisions for Spec Committee

SECTION	TITLE	DESCRIPTION
306	**SP306 - Rubbilization**	**Update to previously approved SP, 1st time to Committee.** Project Specific provision for Rubblization. It is redline copy showing the proposed changes to it.
663	**SP663 - Pavement Markings** (Districtwide Striping Contract)	**Update to previously approved SP, 1st time to Committee.** Project Specific provision for Districtwide Striping Contract, SP663-Pavement Markings. It is redline copy showing the proposed changes to it.

407 **405**	**SP407 - Stress Absorbing Membrane Interlayer** **405.2.1-Aggregates**	Two items related to aggregation gradation requirements; these are both suggestions from Industry (Russel Standard Corp.). **Update to previously approved SP, 1st time to Committee.** Project Specific provision for Stress Absorbing Membrane Interlayer (SAMI) seal. It is revision of the gradation requirements and is redline copy showing the proposed changes to it. **1st time to Committee.** Proposed specification change to Table 405.2. 1, revision of the aggregate gradation requirements. It is redline copy showing the proposed changes to it.
107	**107.21.1-Erosion and Sedimentation Control**	**1st time to Committee.** Proposed specification change to Section 107. The revision to 107.21.1 are updates to the NPDES permit registration process.
207	**SP207 - Impervious Membrane**	**1st time to Committee.** Project Specific provision for Impervious Membrane to protect MSE wall straps from degradation and deterioration from future deicing salts of roadway.
207	**SP207 - Soil Monitor Settlement Pins**	**1st time to Committee.** Project Specific provision for Soil Monitor Settlement Pins to monitor poor soil conditions in steep slope area.
211	**211.3.3-Core**	**1st time to Committee.** Proposed specification change to Section 211. The revision updates the impervious core subsection. It is redline copy showing the proposed changes.
403	**SP403 - Void Reducing Asphalt Membrane**	**1st time to Committee.** Project Specific provision for Void Reducing Asphalt Membrane (VRAM), a base asphalt material placed ahead of construction at longitudinal construction joints in asphalt surface courses to decrease deterioration of joint over time.
410	**Section 410**	**1st time to Committee.** Proposed specification change to Section 410. This specification suggestions is from Industry (Asphalt Association of WV). It is redline copy showing the proposed changes.
601	**601.3.1.1.1.4.2-Preventions Level W, X and Y**	**1st time to Committee.** Proposed specification change to Section 601. The revision to in Section 601.3.1.1 (Mix Design Using Potentially Reactive Aggregate) allows Lithium Nitrate Admixture.
615	**SP615 - Jacking Superstructure**	**1st time to Committee.** Project Specific provision for design, implementation, and maintenance of the jacking of steel superstructure to complete repairs as described in the plans.
626	**626.5.1.1-Facing Elements**	**1st time to Committee.** Proposed specification change to Section 626. The revision updates AASHTO references to M336.
627	**SP627 - Finger Expansion Joint**	**1st time to Committee.** Project Specific provision for a finger expansion dam.

642	**SP642 - Turbidity Curtain**	**1st time to Committee.** Project Specific provision for turbidity curtain.
690	**SP690 - Cross Slope and Superelevation Tolerances**	**1st time to Committee.** Project Specific provision for final pavement surface tolerances.
691	**SP691 - Finished Surface Lidar Survey**	**1st time to Committee.** Project Specific provision for pavement survey.
707	**SP707 - CFB Fly Ash**	**1st time to Committee.** Project Specific provision for new type of fly ash (CFB).

Comments

Comments are requested on these Specifications Changes and Project Specific Special Provisions. Please share your comments by February 1, 2021, they help in the decision making process.

Please Send Comments to: DOHSpecifications@wv.gov

Deadline for new items & updates to these provision is January 8, 2021.

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, April 7, 2021 at 9:00 a.m.
Skype Meeting and/or Group meeting location is in Building 5, Room 855 (meeting invite will include details.)

2017 Standard Specification Roads and Bridges & 2021 Supplemental Specifications

Electronic Copy (pdf): The 2017 Standard Specifications Roads & Bridges & 2021 Supplemental Specifications can be viewed, printed, or downloaded from the Specifications Website. A link to the Specifications pages is here: http://transportation.wv.gov/highways/contractadmin/specifications

Print Version: Hard copies of the 2017 Standard Specifications Roads and Bridges & 2021 Supplemental Specifications are available thru Contract Administration. An order form for the book is on Specifications Website. A link to the page is here: http://transportation.wv.gov/highways/contractadmin/specifications

2021 Specifications Committee

The Specification Committee typically meet every other month; on the first Wednesday. 2021 meetings will be held in February (2/3), April (4/7), June (6/2), August (8/4), October (10/6), and December (12/1). *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
http://transportation.wv.gov/highways/contractadmin/specifications

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 DOHSpecifications@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:

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

NEW BUSINSESS ITEMS:

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

1. Specification Changes – Show as red-line copy (see note)
2. Project Specific Special Provisions (SP) – Will be shown in all black.
3. 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.

September 17, 2020

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

SECTION 212
STRUCTURE, ROCK, AND WET EXCAVATION

ADD THE FOLLOWING SUBSECTIONS TO THE SECTION:

212.1-DESCRIPTION:

212.1.1-Shoring: This work consists of providing shoring to contain causeway material at specific areas designated in the Contract and any temporary bridge structures needed to maintain flow of water around causeway structures.

212.3-GENERAL:

212.3.1-Shoring: Materials and Construction Requirements: The Contractor shall locate, size, design and construct shoring which provides all necessary rigidity, and supports the loads imposed to facilitate construction as shown on the plans. The areas shown on plan are representative of what may be constructed under the U.S. Army Corps of Engineers 404 Permit. The contractor may reduce the causeway areas or use other means of Construction Access provided these means do not violate the 404 Permit requirements.

When the height of shoring exceeds 5' above the base of the excavation, shoring drawings shall be provided by the Contractor to the Engineer for information only. The drawings shall be prepared, signed and sealed by the Contractor's Engineer. These drawings shall be approved and signed by the Contractor and provided to the Engineer at least 10 days prior to start of work.

Temporary bridge drawings shall be provided by the Contractor to the Engineer for information only. The drawings shall be prepared, signed and sealed by the Contractor’s Engineer. These drawings shall be approved and signed by the Contractor and provided to the Engineer at least 10 days prior to start of work. October 19, 2012

Shoring and temporary bridges shall be constructed in conformity with the shoring and bridge drawings provided to the Engineer. Prior to placing construction or traffic loads on the supported earth and bridges, the Contractor's Engineer shall certify in writing that shoring and

bridge materials and construction have been inspected and that all shoring, bridge, materials and construction are in conformity with the drawings. A copy of this certification shall be submitted in an appropriate form for the Engineer's records.

If the embankment, construction, traffic or any other surcharge is in excess of what the original shoring or bridges were designed for, the Contractor shall provide a signed letter from the Contractor's Engineer prior to the load placement stating that the shoring and/or bridges will support the additional load.

Shoring and bridge drawings shall include the following information as applicable:

1. The size and grade of all structural materials.
2. Design notes, including design assumptions and construction details.
3. Where applicable, restrictions on heavy equipment placement at specific locations adjacent to the shoring.
4. Areas determined by the Contractor's Engineer where de-watering of the shored excavation will be required, and a description of the requirements (i.e., head added by the pump, flow rate, minimum pump size, etc.) and methods to be used for de-watering.
5. All other information determined by the Contractor's Engineer to be pertinent to the design and successful construction of the shoring and/or bridges.

212.11-METHOD OF MEASUREMENT:

212.11.1-Shoring: Shoring and temporary bridge structures will not be measured, but will be paid for as a single lump sum for each area described on the plans.

212.12-BASIS OF PAYMENT:

212.12.1-Shoring: Payment for shoring, causeway will be full compensation for all labor, materials equipment required to design, construct and remove the shoring and temporary bridges.

212.13-PAY ITEMS:

ADD THE FOLLOWING TO THE TABLE:

ITEM	DESCRIPTION	UNIT
212010-001	Shoring, Causeway	Lump Sum

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

SECTION 403
CRACK SEALING IN ASPHALT PAVEMENT

403.1-DESCRIPTION:

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

403.2-MATERIALS:

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

403.3-WEATHER RESTRICTIONS:

The sealant material shall not be applied when the weather is foggy, rainy or when the ambient and pavement temperatures are below 40° F.

403.4-CONSTRUCTION:

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

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

403.4.2-Preparation of Joints and Cracks for Sealing: The cracks shall be thoroughly cleaned of all loose scale, dirt, dust, vegetation, or other foreign matter prior to placing hot poured crack sealant. This ~~may~~ shall be accomplished by use of ~~compressed air, hand tools, power tools such as rotary brushes, or by any method or combination of methods~~ a hot air lance, and any other tools necessary to complete the work. The use of any tool which results in damage to the pavement is prohibited. ~~Oil/water separator shall be used on all air compressor equipment when cleaning the crack.~~

403.4.3-Equipment for Applying Sealer: The equipment used shall conform to the manufacturers recommendations and consist of heating units from which material may be discharged into the crack through the use of flexible lines and suitable shoes.

403.4.4-Placement Requirements: Any spillage of sealing material on pavements shall be immediately removed. A neat and workmanlike job will be required at all times. At no time shall sealing material be placed in a crack which either dirty or wet. The crack shall be clean and surface dry at the time of placement. Work will be suspended when cracks are wet or damp and when the atmospheric temperature is below ~~the minimum specified by the manufacturer~~ 40 degrees. The standard overband shall be 3" centered over the crack. After the sealant has cooled, settling shall not exceed 3/8" below the surface. Any damage to uncured sealant shall be repaired at the contractor's expense. Cracks wider than 1" and deeper than 3" shouldn't be sealed to avoid improper sealing. If no overlay work is being performed then no more than 25% of the surface area is to be crack sealed, due to danger of diminished skid resistance.

403.4.5-Equipment, Personnel, and Documentation Requirements: The Contractor (two (2) days prior to commencement of the project) shall submit to the Engineer a detailed list of all equipment to be used for crack sealing on the project. The Contractor shall also provide certification from the Sealing material manufacturer that the Contractor is qualified to apply the manufacturer's material in conformance with these specifications and the manufacture's recommendations.

The Contractor is responsible for quality control, and shall submit a quality control plan in accordance with these specifications to the Engineer at the Pre-Construction Conference.

403.5-METHOD OF MEASUREMENT:

The quantity of work done will be measured in linear feet of "Crack Sealing in Asphalt Pavement" applied and accepted. ~~Measurement is to be conducted after cleaning and prior to the placement of the sealant.~~

403.6-BASIS OF PAYMENT:

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

403.7-PAY ITEM:

ITEM	DESCRIPTION	UNIT

403001-001	Crack Sealing in Asphalt Pavement	Linear Foot

September 18, 2020

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

SECTION 615
STEEL STRUCTURES

615.1-GENERAL:

615.1.1-Description:

ADD THE FOLLOWING:

J**acking Steel Superstructure.** This work shall consist of the design and implementation of the jacking of steel superstructure to complete repairs as described in the plans. Jacking of steel superstructure shall include access, jacks, structural members, connections, rollers and other supports as needed to jack the superstructure and adequately support the anticipated loads during construction, including, but not limited to, dead loads, wind loads, and construction loads.

Temporary Falsework. This work shall consist of the design, installation, and removal of temporary falsework to support the bridge while completing repairs as described in the plans. Temporary falsework shall include foundations, structural members, connections, bracing, and other supports as needed to adequately support the anticipated loads during construction, including, but not limited to, dead loads, wind loads, and construction loads.

Shoring, Causeway. This work shall consist of construction of the causeway that is required for the shoring towers if they are placed outside the causeway limits as described in the plans. This work shall also include all necessary work required to maintain and remove the causeway and to restore the area to its original condition and obtaining all permits necessary for constructing the causeway.

615.1.2-Notice of Beginning Work:

ADD THE FOLLOWING:

615.1.2.1-Submittals: Submittals shall be accepted by the Engineer prior to commencement of the subject work.

ADD THE FOLLOWING SUBSECTION:

615.1.5-Alternate Technical Concepts (ATCs): ATCs eligible for consideration shall be limited to those deviations from the requirements of the plans that result in performance and quality of the end product that is equal to or better than the performance and quality of the end product absent the deviation, as determined by WVDOH in its sole discretion. A concept is not an ATC if, in WVDOH's sole judgment, it merely results in reduced quantities, performance or reliability. A concept is not eligible for consideration as an ATC if it is premised upon or would require an increase in the amount of time required for the work to be completed. ATCs that, if implemented, would require further environmental evaluation may be allowed, provided that the Contractor will bear the schedule and cost risk associated with such additional environmental evaluation. If the Contractor is not able to obtain the approvals necessary to implement the ATC, the Contractor will be obligated to complete the work in accordance with existing approvals without additional cost or extension of time.

If a Contractor is unsure whether a concept is consistent with the requirements of the contract or if that concept would be considered an ATC by WVDOH, WVDOH recommends that the Contractor submit such concept for review as an ATC.

615.1.5.1-Design Requirements: The ATC shall conform to the following design conditions and/or requirements:

(a) temporary towers and works shall have the ability to roll-in and roll-out of the bridge or support the bridge in-place;
(b) hydraulic analysis of the flood area shall be evaluated with all temporary towers and works in place; a hydrologic and hydraulic report shall be signed and sealed by a West Virginia Registered Professional Engineer;
(c) geometry of the bridge shall be verified by survey and submitted to the Engineer;
(d) calculations shall be signed and sealed by a West Virginia Registered Professional Engineer;

615.1.5.2-Bidding: The Contractor is only allowed to bid an ATC if approved to do so in advance of the letting date by the WVDOH. Bids will be rejected if an ATC is bid without approval.

615.1.5.3-Submission: The Contractor may submit ATCs for review to WVDOH Project Manager: (Name) until the date and time identified. All ATCs shall be submitted in writing, with a cover sheet identifying the Contractor and stating "Capon Bridge – Confidential ATCs." The Contractor shall clearly identify the submittal as a request for review of an ATC. If the Contractor does not clearly designate its submittal as an ATC, the

submission will not be treated as an ATC by WVDOH. ATC submittals shall include an electronic copy of a narrative description of the ATC and technical information, including drawings, as described below:

(a) a sequential ATC number identifying the Contractor and the ATC number (multi-part or multi-option ATCs shall be submitted as separate individual ATCs with unique sequential numbers);
(b) a description and conceptual drawings of the configuration of the ATC or other appropriate descriptive information;
(c) the locations where, and an explanation of how, the ATC will be used;
(d) any changes in operations requirements associated with the ATC, including ease of operations;
(e) any changes in maintenance requirements associated with the ATC, including ease of maintenance;
(f) any reduction in the time period necessary to design and perform the construction operations resulting from implementing the ATC, including, as appropriate, a description of method and commitments;
(g) references to requirements of the contract documents which are inconsistent with the proposed ATC, an explanation of the nature of the deviations from said requirements, and a request for approval of such deviations;
(h) the analysis justifying use of the ATC and why the deviation, if any, from the requirements of the contract documents should be allowed;
(i) a preliminary analysis of potential impacts on vehicular traffic (both during and after construction), environmental permitting, community impact, safety, and lifecycle costs, including impacts on the cost of repair, maintenance and operation;
(j) if and what additional right-of-way will be required to implement the ATC; Contractors are advised that they shall:
    i. be solely responsible for the acquisition of any such right-of-way, including the cost thereof and obtaining any necessary Environmental Approvals;
    ii. not be entitled to any additional time or money as a result of Site conditions (i.e., Hazardous Materials, differing site conditions, geotechnical issues, Utilities, etc.) on such additional right-of-way; and
    iii. not be entitled to any additional time or money as a result of any delay, inability or cost associated with the acquisition of such right of way);
(k) a description of other projects where the ATC has been used, the degree of success or failure of such usage and names and contact information including phone numbers and e-mail addresses for project owner representatives that can confirm such statements;
(l) a description of added risks to WVDOH or third parties associated with implementing the ATC;
(m) an estimate of any additional WVDOH, Contractor and third party costs associated with implementation of the ATC;
(n) an estimate of any savings that would accrue to WVDOH should the ATC be approved and implemented; and
(o) a description of how the ATC is equal or better in quality and performance than the requirements of the contract documents;

If implementation of an ATC will require approval by a third party (e.g., a governmental authority), the Contractor will have full responsibility for, and bear the full risk of, obtaining any such approvals. If any required third-party approval is not subsequently granted with the result that the Contractor must comply with the requirements of the contract documents, the Contractor will not be entitled to any additional time or money.

615.1.5.4-Review: WVDOH may request additional information regarding proposed ATCs at any time and will, in each case, return responses to each Contractor regarding its ATC on or before the date and time identified, provided that WVDOH has received all requested information regarding such ATC.

WVDOH's responses will be limited to one of the following statements:

(a) the ATC is acceptable for inclusion in the bid;
(b) the ATC is not acceptable for inclusion in the bid;
(c) the ATC is not acceptable in its present form, but may be acceptable upon the satisfaction, in WVDOH's sole discretion, of certain identified conditions which must be met or clarifications or modifications that must be made; or
(d) the submittal does not qualify as an ATC but may be included in the Contractor's bid without an ATC (i.e., the concept complies with the contract requirements).

WVDOH will make a preliminary determination on whether to accept and approve an ATC for submission. However, the Contractor will be responsible for ensuring that the final submittal complies with the contract requirements.

Approval of an ATC will constitute a change in the specific requirements of the contract documents associated with the approved ATC for that specific Contractor. Each Contractor, by submittal of its bid, acknowledges that the opportunity to submit ATCs was offered to all Contractors, and waives any right to object to WVDOH's determinations regarding acceptability of ATCs.

WVDOH's rejection of a pre-bid submission of an ATC will not entitle the Contractor to an extension of the bid Due Date or the date that the ATCs are due; provided, however, that the foregoing shall not limit WVDOH's absolute and sole right to modify the bid Due Date or any other date in connection with this procurement.

WVDOH anticipates that its comments provided to a Contractor will be sufficient to enable the Contractor to make any necessary changes to its ATCs. However, if a Contractor wishes additional clarifications regarding necessary changes, the Contractor may provide a written request for clarifications.

615.2-WORKING DRAWINGS:

615.2.2-Caber Diagram:

ADD THE FOLLOWING TO SECTION 615.2.2:

The Contractor shall conduct a pre- and post- surveys at each panel point to verify that the geometry has been maintained.

ADD THE FOLLOWING:

615.2.3-Temporary Falsework: The Contractor shall submit drawings illustrating fully their proposed method of temporary support. The drawings shall show details of all falsework bents, bracings, guys, dead-men, and attachments to the bridge; sequence of installation; installation procedures; capacities and weights. The drawings shall be complete in detail for all anticipated phases and conditions during erection. Design calculations, sealed by a West Virginia Registered Professional Engineer, shall be submitted by the Contractor to the Engineer twenty-one days prior to commencing work, unless otherwise noted in the plans. Receipt of plans, drawings and calculations does not constitute review or approval or relieve the Contractor of their responsibility to satisfactorily design the temporary falsework. The design calculations shall demonstrate that member capacities for falsework and supported members are not being exceeded.

615.2.4-Jacking Steel Superstructure: The Contractor shall submit drawings illustrating fully their proposed method of jacking the superstructure. The drawings shall show details of all jacks and product data; structural members, rollers, connections and other supports; sequence of jacking; and jacking procedures. The drawings shall be complete in detail for all anticipated phases and conditions during erection. Design calculations, sealed by a West Virginia Registered Professional Engineer, shall be submitted by the Contractor to the Engineer twenty-one days prior to commencing work, unless otherwise noted in the plans. Receipt of plans, drawings and calculations does not constitute review or approval or relieve the Contractor of their responsibility to satisfactorily design the jacking of the superstructure. The design calculations shall demonstrate that member capacities for jacking and supported members are not being exceeded.

615.2.5-Shoring, Causeway: The Contractor shall submit drawings illustrating fully their proposed method and limits of the causeway for the shoring towers if it beyond the limits as described in the plans. The drawings shall show details of the materials used; sequence of installation; installation procedures. The drawings shall be complete in detail for all anticipated phases and conditions during construction. Design calculations, sealed by a West Virginia Registered Professional Engineer, shall be submitted by the Contractor to the Engineer twenty-one days prior to commencing work, unless otherwise noted in the plans. Receipt of plans, drawings and calculations does not constitute review or approval or relieve the Contractor of their responsibility to satisfactorily design and construct the causeway.

615.6-ERECTION:

ADD THE FOLLOWING:

615.6.10-Temporary Falsework: The Contractor's attention is directed to sections 615.6.1 and 615.6.8. If the Contractor chooses not to place temporary falsework or the temporary falsework does not successfully support the loads and/or the supported structure is damaged, the Contractor is responsible for all remedies to return the supported structure to the original condition, as directed by the Engineer.

615.8-BASIS OF PAYMENT:

ADD THE FOLLOWING:

615.8.1-Temporary Falsework: The Contractor will be paid 75% of the bid price for this item once all the falsework is in place. The remaining 25% will be paid once it is all removed.

615.8.2-Jacking Steel Superstructure: The Contractor will be paid 50% of the bid price for this item once the truss is moved out. The remaining 50% will be paid once all jacking operations are completed and equipment removed.

The quantities, determined as provided above, will be paid for at the contract unit prices bid for the items listed below, which prices and payments shall be full compensation for furnishing all the material and doing all the work herein prescribed in workmanlike and acceptable manner including all labor, tools, equipment, supplies, access, installation of web-stiffeners (if required), beveled plates, rollers, structural modifications (if required), and incidentals necessary to complete the work.

615.8.3-Shoring, Causeway: The Contractor will be paid 50% of the bid price for this item once the causeway is constructed. The remaining 50% will be paid once the causeway is removed and the area is restored to its original conditions.

615.9-PAY ITEMS:

ADD THE FOLLOWING:

ITEM	DESCRIPTION	UNIT
202010-001	Shoring, Causeway, per ATC	Lump Sum
615010-003	Temporary Falsework, per ATC	Lump Sum
615039-001	Jacking Steel Superstructure, per ATC	Lump Sum

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

SECTION 636
MAINTAINING TRAFFIC

636.20-TEMPORARY TRAFFIC SIGNAL(S) OR TEMPORARY LIGHTING:

ADD THE FOLLOWING:

636.20.1-Temporary Closed Circuit Television (CCTV): This work shall consist of furnishing, installation, maintaining, and removing a fully-installed and operational temporary video camera (CCTV) system. The Contractor shall furnish and assemble all necessary materials and equipment for each CCTV as described below to provide a complete operational system that can be viewed and operated by those with appropriate permissions.

1. The CCTV shall include a Pan-Tilt-Zoom (PTZ) CCTV Camera, autonomous (24/7/365) and meet the requirements of this special provision. This item shall also include furnishing software and interfaces required to provide streaming video with PTZ controls to the WV DOH TMC as well as include a public web page for the CCTV units on this project for the general public to view streaming video in a format approved.

2. CCTV assembly shall be mounted to a round wood pole with a minimum height of 45 feet. All wood poles shall meet the requirements of Section 710.8 of the Standard Specifications.

3. ~~All equipment and materials shall be new.~~ All equipment shall be the latest model and shall contain the latest firmware unless it can be shown that an earlier version is required for compatibility with existing WVDOH communication protocols.

4. The cabinet/enclosure shall be a NEMA 4X stainless steel enclosure. The cabinet/enclosure shall have a continuously hinged door on one side, and shall be provided with a standard, #2 keyed brass lock. The enclosure shall be sized by the contractor that will provide ample space for all electrical connections, bus bar, surge protection, cellular

modem/antennae, H.264 encoder, and all other functional equipment pertinent to the operation of the CCTV.

5. The Contractor shall provide a separate power conductor from the nearest power control station or other pertinent power service as approved by the Engineer. Any conductor deriving power from a light source shall utilize a separate conductor to bypass any photocell control.
    a. The Contractor shall size this conductor so that there is less than a 5% power loss from the control station to the CCTV.
    b. The CCTV power conductor shall be distinctive from all other conductors within the existing raceway(s).

6. Unless otherwise specified, ground wiring shall be solid bare copper #4 AWG and securely connected inside enclosures with #4 AWG copper clamp connectors. Nuts and washer securing the wire are not acceptable. All grounding shall meet the National Electric Code. Ground wires shall be exothermically welded to the ground rods. Ground rod clamps are not acceptable. The following devices shall be grounded:
    a. Cabinet
    b. Camera system
    c. Communications

    The resistance to ground shall be less than 10 Ohms as measured with a ground resistance meter or equivalent.

7. All cellular communications (SIM cards) will be the responsibility of the Contractor, ~~provided by the Department~~ along with ~~the~~ all associated cellular costs. The CCTV, video interfaces, all appurtenances, software and documentation, training of Department and Project personnel and the acceptance testing of all equipment and interfaces shall be included. All SIM cards must be compatible with our ATMS.

8. The CCTV shall be equipped with a 4G/LTE digital cellular modem operational on a commercial cellular communication network ~~that accepts Department provided SIM cards~~ and provides reliable statewide broadband connectivity.

9. The Contractor shall provide a CCTV that includes all software required to provide communications with the TMC, provide remote configuration of the CCTV from the TMC, and permits full IP PTZ camera control and viewing at the TMC.

10. The Contractor shall set up the IP addressable CCTV camera to stream at a minimum of 1 frames per second and shall work with WV DOH TMC and IT Departments to integrate the camera into their current systems and to provide the highest image resolution achievable utilizing the wireless link.

11. The camera shall provide the ability to control and monitor CCTV video over wireless IP networks.

12. The zoom ratio shall be 12x Optical Minimum.

13. The camera shall have an auto focus with manual override capability.

14. The CCTV camera shall display up to four preset zones, each with a unique and descriptive title.

15. The Contractor shall program each CCTV camera with a minimum of two preset zones: Upstream and Downstream Traffic.

16. The CCTV camera shall display a minimum of 20 programmable characters for on-screen camera ID, location & titles.

17. The camera PT unit shall provide a proportional speed Pan/Tilt capability, where the speed decreases automatically as the zoom level increases.

18. The camera PT unit shall provide a 360° continuous pan rotation without cable interference or tangling.

19. The camera shall provide a minimum of 720H x 480V High Definition pixels.

20. The camera shall provide compressed video output compliant with H.264 (MPEG-4 Part 10/AVC) and Motion JPEG standards.

21. The camera shall have Color and Black & White video image display modes with both automatic and manual selection. The camera shall transition automatically to a Black & White mode (when in automatic mode) when the luminance reaches a predefined threshold (used during evening hours or periods of low luminance).

22. The CCTV camera image display shall vary between day and night by reverting to quasi-monochrome operation at night for increased sensitivity. At all times the camera shall provide a full motion video output with controllable frame rate of up to 30 frames per second for both H.264 and Motion JPEG. Long-term image integration is not acceptable.

23. The CCTV camera shall incorporate electronic image stabilization to reduce the effects of vibration and wind gusts on the displayed video image.

24. The camera shall include both automatic iris control and an override for manual iris adjustments.

25. The camera shall have password protection, IP address filtering, HTTPS encryption, IEEE 802.1X network access control, digest authentication, user access log.

26. The camera shall provide video access using a standard web browser to view live camera video.

27. The camera shall provide a RJ-45 Ethernet 10BASE-T/100BASE-TX connector that is IP66-rated.

28. The camera manufacturer shall have a minimum of 12 installed units of CCTV cameras at outdoor installations for ITS applications, operational for at least six (6) months. Qualification list of installations for the camera vendor shall be submitted at the preconstruction meeting.

29. Unless otherwise specified, the equipment inside the CCTV shall remain functional with outside temperatures ranging from -34° C to 74° C (-29° F to 165° F).

30. Unless otherwise specified, the equipment inside the CCTV shall remain functional with an outside relative humidity from 0-100%.

31. The maximum total weight for the combined CCTV camera assembly shall be 5 lbs. or less.

32. The power input requirements for the CCTV camera shall be sufficient to power the IP CCTV camera and heater to permit camera operation throughout the temperature range defined above.

33. The Contractor shall furnish all necessary software to permit WV DOH to configure the IP CCTV camera. All software installed shall be licensed for use throughout WV DOH.

34. The Contractor shall setup the CCTV cameras to allow real-time viewing of the camera video, pan/tilt/zoom control, camera control, and camera configuration and setup using the latest version of Internet Explorer. The Department will provide and setup the IP address (or host name) of the camera as well as provide usernames and passwords for the Contractor to configure each CCTV. The Contractor shall provide video for the WV DOH TMC web page per the requirements below unless directed otherwise by the WV DOH ITS Engineer.

35. The video from the cameras shall be provided in a format able to be displayed at the WV DOH TMC and on the project web page at a rate of at least 1 frame per second.

36. The system shall allow WV DOH authorized personnel to control the camera through a web-based interface to the camera's pan-tilt-zoom controls.

37. The video shall be viewable through the web page and shall have a minimum viewing size of 720x480 pixels.

38. The video format shall provide a stream to permit the video to be posted to the WV DOH TMC.

39. The Cellular 4G/LTE Gateway Modem shall provide full duplex data communications between the CCTV installation sites and the WV DOH TMC~~ over WV DOH's cellular~~

~~carrier. The Department shall make all provisions for setting up cellular service and configuring all equipment for end-to-end communications and provide that to the Contractor and assist with any questions related to this effort~~. Approved modems can be located on the WVDOH APL.

40. The 4G/LTE Gateway Cellular Modem shall be compatible with the data communications equipment installed at the CCTV installation sites and at the WV DOH TMC.

41. The 4G/LTE Gateway Cellular Modem shall include the following data communications security features:
    a. IP Sec VPN encryption technology; 3DES and AES encryption, typical
    b. An integrated application inspection firewall
    c. GRE tunneling
    d. HTTPS
    ~~d.~~e. DMZ capability

42. The 4G/LTE Gateway Cellular Modem shall include an antenna input for reception of GPS positioning and timing information.

43. The 4G/LTE Gateway Cellular Modem may include an integrated 4-Port Hardened Ethernet Switch for future use.

44. The 4G/LTE Gateway Cellular Modem shall meet or exceed the following power and environmental requirements:

45. The modem shall have an operating temperature range of -13°F to 140° F and a humidity range of 5% to 95% non-condensing.

46. Antenna and Antenna Cabling Requirements for the 4G/LTE Gateway Cellular Modem:

47. The Contractor shall provide and install an external omni-directional 4G/LTE antenna and an external GPS antenna for the 4G/LTE Gateway Cellular Modem.

48. The antennas shall be mounted ~~on the wood pole~~ in a manner to provide continuous cellular communications and good reception of cellular signals.

49. Prior to delivery of the equipment ~~and after receipt of the Department furnished and activated SIM cards,~~ it is expected that the Contractor will conduct in-house factory testing of all the individual components as well as an end-to-end testing of the entire system including hardware, communication and software. The Contractor shall provide appropriate proof of testing prior to the delivery of the equipment.

50. The operational testing phase is intended to provide WV DOH personnel the opportunity to independently operate the CCTV based upon procedures provided at the training session by the Contractor. The operational testing phase shall be completed within five (5) calendar days upon completion of the training sessions. During this period, the Contractor shall

provide technical support to address any questions or concerns encountered by WV DOH while operating the equipment. Any equipment issues and/or malfunction identified by WV DOH, either with the hardware, communication or software, shall be resolved by the Contractor to the satisfaction of WV DOH within 10 business days. Any equipment malfunction identified by WV DOH not resolved by the Contractor may result in that equipment being identified as being "not accepted" by WV DOH.

636.25-PAY ITEMS:

ADD THE FOLLOWING ITEM TO THE TABLE:

ITEM	DESCRIPTION	UNIT
636035-001	Temporary CCTV	Month

October 6, 2020

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

SECTION 307
CRUSHED AGGREGATE BASE COURSE

307.2-MATERIALS:

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

The crushed aggregate base course shall be composed of materials meeting the requirements of 704.6 for the class shown on the Plans ~~except that 704.6.3 shall not apply~~.

October 27, 2020

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

SECTION 601
STRUCTURAL CONCRETE

601.2–MATERIALS:

ADD THE FOLLOWING TO THE TABLE:

MATERIAL	SECTION OR SUBSECTION
Concrete Sealer	707.12

October 27, 2020

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

SECTION 603
PRESTRESSED CONCRETE MEMBERS

603.15-PAY ITEMS:

DELETE ITEMS 603020 AND 603021 FROM THE TABLE AND REPLACE WITH THE FOLLOWING:

ITEM	DESCRIPTION	UNIT
603020-*	"size" Prestressed Concrete Deck Panel	~~Linear~~Square Feet (Meter)
603021-*	"size" Precast Concrete Deck Panel	~~Linear~~Square Feet (Meter)

* Sequence number

September 15, 2020

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

SECTION 636
MAINTAINING TRAFFIC

636.19-PORTABLE MESSAGE SIGNS:

636.19.4-Placement:

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

Portable message signs that are not adequately shielded from impacts by utilizing barriers or terrain as described herein to the satisfaction of the Engineer shall be operational at all times to provide clear visibility. This shall include time periods allowed herein when such devices are temporarily no longer needed to serve their intended function of contributing to the efficient or safe operation of the work zone. In such cases the Contractor shall modify the speed displayed on the static speed limit sign accordingly if the speed limit in effect through the work area is changed, and changeable message signs shall be set to flashing warning mode or shall display an alternative generic message approved by the Engineer if a specific informational message is not currently required. In such cases, if the device is not expected to be needed for an entire daylight period or for more than four (4) hours at night, the device shall be temporarily relocated to a shielded location or other location off of the shoulder, either of which shall be approved by the Engineer.

Placement of and messages displayed on portable message signs shall be approved by the Engineer. A changeable message sign and a speed monitoring trailer are not to be placed where they conflict with one another.

Plan placement locations may be adjusted as needed in the field, with the Engineer's approval, in order to achieve greater advance sight distance and/or to utilize other existing devices or terrain features such as temporary barrier, guardrail, or benches to shield the device from impacts. A minimum sight distance of 800 feet should be achieved if possible, provided the device will maintain the operational function as intended by the placement location shown in the plans. Devices placed behind concrete barriers or guardrail should be placed at and behind the downstream end of such features if possible.

The approach to all portable message signs not adequately shielded from impacts to the satisfaction of the Engineer shall be delineated with traffic cones, channelizer cones, or drums. The delineation devices shall be tapered from the outside edge of the paved shoulder, or outside edge of the device if no paved shoulder exists, at a spacing of 25-feet. The length of the taper

shall be 150-feet and shall end 50-feet in advance of the device. The remaining 50-feet leading up to the device shall be delineated with a minimum of three (3) additional delineation devices placed inside of the inside edge of the device and tangent to the roadway.

Speed monitoring trailer systems shall be located within the area of the reduced work zone speed limit, but shall not be located within or before a transition or taper.

October 6, 2020

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

SECTION 704
STONE AND CRUSHED AGGREGATE

704.6-AGGREGATE FOR BASE OR SUBBASE:

REMOVE TABLE 704.6.2A AND 704.6.2B FROM WITHIN 704.6.3 AND MOVE TO END OF SUBSECTION 704.6.2

704.6.2-Gradation, Quality, and Crushed Particle Requirements: Material shall be sampled in accordance with MP 700.00.06, Aggregate Sampling Procedures.

When gravel is used in an unstabilized condition and in combination with other types of aggregate, it shall produce a combined material having a minimum of 80 percent one-face fracture as determined by weight of particles retained on the No. 4 (4.75 mm) sieve. When gravel is used in an unstabilized condition and alone, it shall have a minimum of 80 percent one-face fracture as determined by weight of particles retained on the No. 4 (4.75 mm) sieve.

TABLE 704.6.2A–GRADATION REQUIREMENTS

Gradation Amounts Finer Than Each Laboratory Sieve (Square Openings), % By Weight										
Aggr. class	8" (200)	2½" (63)	2" (50)	1½" (37.5)	1" (25)	3/4" (19)	#4 (4.75)	#40 (425 µm)	#100 (150 µm)	#200 (75 µm)
1				100		50-90	20-50	5-20		0-7.0
2				100		80-100	35-75	10-30		0-10.0
3				100		50-90	20-50	5-20		4.0-12.0
4				100		50-95	20-60	5-35		
5			100				30-90			0-25.0
6				100		50-100	25-70	10-45	3-28	
7	90-100		0-5	with intermediate sizes between 6" (150 mm) and 4" (100 mm) represented						
8				100		80-100	35-75	10-40		4.0-14.0
9		100		80-95		50-70	20-40			0-8.0
10 *					100	70-100	30-75	8-40		4.0-20.0

* Crusher Run Material Only

TABLE 704.6.2B-QUALITY REQUIREMENTS

Aggr. class	Los Angeles Abrasion, Percent Max.	Sodium Sulfate Soundness, Percent Max.	Liquid Limit Max.	Plasticity Index Max.	Deleterious Material, Percent Max.
1	50	12	25	6	5
2	50	12	25	6	5
3	50	12	25	6	5
4	Note 1		25	6	5
5			25	6	5
6			25	6	5
7		30			10 (by visual observation)
8	50	12	25	6	5
9	50	12	25	6	5
10	50	12	25	6	5

Note 1: The Los Angeles Abrasion value of aggregate comprising the base course shall be treated in the manner hereinafter set forth to determine the specification requirement for the item:

Los Angeles Abrasion Value Assigned to the Base Course Aggregate	LA<50	None
	50<LA<65	Top 4 inches (100 mm)
	65<LA<80	Top 6 inches (150 mm)
	80<LA	Top 8 inches (200 mm)

704.6.3-Sampling, Testing and Acceptance Procedure: Material shall be sampled in accordance with MP 700.00.06 Aggregate Sampling procedures. Frequency of sampling and testing and plotting of gradation test data will be in accordance with established Division procedures.

Material failing to comply with the Specification requirements when sampled, tested, and evaluated in accordance with the above Division procedures shall be removed and replaced at the Contractor's expense, or, at the option of the Engineer, may be left in place with reduced payment.

~~**TABLE 704.6.2A-GRADATION REQUIREMENTS**~~

~~Gradation Amounts Finer Than Each Laboratory Sieve (Square Openings), % By Weight~~										
~~Aggr. class~~	~~8" (200)~~	~~2½" (63)~~	~~2" (50)~~	~~1½" (37.5)~~	~~1" (25)~~	~~¾" (19)~~	~~#4 (4.75)~~	~~#40 (425 µm)~~	~~#100 (150 µm)~~	~~#200 (75 µm)~~
~~1~~				~~100~~		~~50-90~~	~~20-50~~	~~5-20~~		~~0-7.0~~
~~2~~				~~100~~		~~80-100~~	~~35-75~~	~~10-30~~		~~0-10.0~~
~~3~~				~~100~~		~~50-90~~	~~20-50~~	~~5-20~~		~~4.0-12.0~~
~~4~~				~~100~~		~~50-95~~	~~20-60~~	~~5-35~~		
~~5~~			~~100~~				~~30-90~~			~~0-25.0~~

6				100		50-100	25-70	10-45	3-28	
7	90-100		0-5	with intermediate sizes between 6" (150 mm) and 4" (100 mm) represented						
8				100		80-100	35-75	10-40		4.0-14.0
9		100		80-95		50-70	20-40			0-8.0
10 *					100	70-100	30-75	8-40		4.0-20.0

* Crusher Run Material Only

TABLE 704.6.2B-QUALITY REQUIREMENTS

Aggr. class	Los Angeles Abrasion, Percent Max.	Sodium Sulfate Soundness, Percent Max.	Liquid Limit Max.	Plasticity Index Max.	Deleterious Material, Percent Max.
1	50	12	25	6	5
2	50	12	25	6	5
3	50	12	25	6	5
4	Note 1		25	6	5
5			25	6	5
6			25	6	5
7		30			10 (by visual observation)
8	50	12	25	6	5
9	50	12	25	6	5
10	50	12	25	6	5

Note 1: The Los Angeles Abrasion value of aggregate comprising the base course shall be treated in the manner hereinafter set forth to determine the specification requirement for the item:

Los Angeles Abrasion Value Assigned to the Base Course Aggregate	LA≤50	None
	50<LA≤65	Top 4 inches (100 mm)
	65<LA≤80	Top 6 inches (150 mm)
	80<LA	Top 8 inches (200 mm)

Stabilization shall be accomplished with bituminous material or Portland cement in accordance with the applicable sections of these Specifications. When the depth indicated above exceeds the Plan depth for the item, the depth to be stabilized shall be the Plan depth. In the event the Contractor elects to stabilize the material, no separate payment will be made for the cost of such stabilization.

If aggregates are blended to produce the base course material, the Los Angeles Abrasion Value used to determine the stabilization requirements shall be the highest value obtained from testing the individual components of the blend.

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

SECTION 306
RUBBLIZATION OF PORTLAND CEMENT CONCRETE PAVEMENT

306.1-DESCRIPTION:

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

306.2-MATERIALS:

Aggregate or processed Reclaimed Asphalt Pavement (RAP) may be used to fill voids, holes, or low spots in the rubblized pavement.

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

306.2.~~3~~2-Reclaimed Asphalt Pavement: Reclaimed Asphalt Pavement may be substituted for the fill aggregate material on roadways. Materials testing will be waived, however the RAP shall be processed allowing for the Top Size gradation not to exceed 3/4 inches (19 mm) or the maximum fill thickness. Approval shall be by visual inspection by the Engineer. Payment for RAP fill material substitution shall be at the same unit bid price for Fill Aggregate.

306.3-EQUIPMENT:

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

306.3.1-Breaker:

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

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

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

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

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

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

306.4-CONSTRUCTION:

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

material. If breaking procedures or conditions change, additional excavations to inspect the broken pavement dimensions shall be made, as directed by the Engineer.

306.4.2-Pavement Preparation: Prior to rubblization, asphalt concrete overlays and patches larger than three square feet shall be removed from the PCC pavement. The Engineer shall verify the removal of asphalt pavements and approve the pavement for beginning the rubblization process

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

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

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

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

At the surface, the equipment shall break the pavement such that at least 75% of the pieces (by weight) are a maximum of 2 in. (50 mm).

Below the reinforcing steel or in the lower one-half of the pavement, at least 75% of the pieces shall be a maximum of 9 in (230 mm).

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

306.4.3.1-Determining Particle Size: Determine particle size by excavating 2 test holes, of about 10 square feet each, during the first half day. Excavate at least one test hole per lane mile thereafter. Backfill, compact, and restore the stability of each test hole. The subsequent testing may be waived by the Engineer provided that the surface conditions indicate that the process is meeting the particle size requirements.

306.4.3.~~1~~2-Existing Reinforcing Steel: Remove reinforcing steel exposed at the surface by cutting below the surface, disposing of the steel off site, and using fill aggregate to level the surface. Do not remove unexposed reinforcing steel.

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

306.4.4.1-After Breaking:

306.4.4.1.1-Breaking using Multi-Head Breaker (MBH): A minimum of four (4) passes with z-pattern steel gird roller, four (4) additional passes with a vibratory roller, and two (2) passes with a pneumatic tire roller.

306.4.4.1.2-Breaking using Resonance Breaker: A minimum of four (4) passes with a vibratory roller, and two (2) passes with a pneumatic tire roller.

306.4.4.1.3-Proof Roll the Broken Concrete Sections: Proof roll to ensure adequate strength of the roadway. Unless otherwise specified in the plans, any weak or unstable spots discovered through proof rolling shall be corrected by the Contractor and approved according to the Engineer, in accordance with Section 104.3 and 109.4 of specifications.

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

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

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

306.4.7-Opening to Traffic: Public traffic will not be allowed on the rubblized pavement before the required asphalt overlay(s) are in place, except at crossovers and/or access points. Public traffic will not be allowed on a rubblized crossover or access point for more than 24 hours. Maintenance of crossovers and/or access points shall be as specified by the Engineer. Crossovers and/or access points shall be maintained in the same compacted state as the other areas, until the asphalt overlay is in place. Construction traffic on the rubblized base shall be limited to delivery of materials directly ahead of the paver.

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

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

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

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

306.5-MEASUREMENT AND PAYMENT:

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

The completed work as measured will be paid for at the contract unit price for the Items detailed in Section 306.6.

306.6-PAY ITEMS:

ITEM	DESCRIPTION	UNIT
306001-001	Rubblization	Square Yard (Sy)
306002-001	Fill Aggregate	Tons (Tn)

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR THE
DISTRICT WIDE STRIPING CONTRACT

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

SECTION 663
PAVEMENT MARKINGS AND RUMBLE STRIPS

663.4–PAVEMENT PREPARATION – PREMARKING, CODING:

ADD THE FOLLOWING TO THE END OF THE SECTION:

The Department will be responsible for coding and spotting where old markings cannot be determined. The Contractor must give notification to the Division at least twelve (12) calendar days prior to commencement of work in that District to give the District sufficient time to perform any such coding and spotting.

663.5–APPLICATION:

663.5.1–General:

ADD THE FOLLOWING TO THE END OF THE SUBSECTION:

Prior to commencement of work, and only if required by the binder manufacturer, all existing edge, lane or center lines will be fully eradicated in accordance with Section 636.7 - Eradication of Pavement Markings. When eradicating lane or center lines, the Contractor shall replace the lines within twenty-four hours from the start of eradication. The eradication work shall not entitle the Contractor to additional payments above the contract price or to additional time to perform the contract.

663.5.2.1–Approved Equipment and Personnel:

ADD THE FOLLOWING SUBSECTION:

663.5.2.1.1–Project Control Coordinator: The Contractor is responsible for quality control, and shall employ a Project Control Coordinator (PCC) for this project, at the Contractor's expense. The PCC shall be designated and in attendance at the Pre-Construction Conference; failure to have the PCC assigned and in attendance shall delay the Engineer's issuance of the Notice to Proceed until completed, at no cost to the Division and with no extension of the contract time.

The PCC shall meet the following requirements:

- Shall be a member of the District Pavement Marking Crew and on this crew throughout the project.
- Shall be responsible for all communication between the District Pavement Marking Crew and the Engineer.
- Shall take and record a minimum of five (5) retroflectivity readings throughout the day, per color, per pavement marking crew. The equipment used to take these readings shall be the LTL-X meter manufactured by Delta Light and Optics which is approved for use by the Engineer or another meter approved in writing by the Traffic Engineering Division. The LTL-X readings and the printout tape shall be included in the Daily Centerline report. The tapes shall have the date, color and route on the LTL-X Log ID.
- Shall fill out all Daily Centerline Report(s) and provide these completed forms to the Engineer for payment on a weekly basis; failure to timely submit the reports will delay payment for this work. A separate Daily Centerline Report is required for each pay item of work performed by the Contractor on the day of the report. The Daily Centerline report shall include but not limited to the following:
    1. Date
    2. Location (Route #, Milepost, and GPS Coordinates / landmark description)
    3. Hours worked (including start and stop times)
    4. Detailed listing of personnel and equipment used
    5. Amount of material used
    6. Miles or feet of striping performed
    7. Detailed listing of traffic control devices used
    8. Weather information
    9. LTL readings with LTL tapes
    10. Any other applicable information.

The Engineer will randomly check the accuracy of these Daily Centerline Report(s). If a discrepancy of more than 2% is found, the Contractor may be required in the sole discretion of the Engineer to have an independent consultant, approved by the Division, to verify all pay items on this contract. The cost of the consultant will be the responsibility of the Contractor.

ADD SUBSECTIONS 663.5.10 AND 663.5.11 TO THE SECTION:

663.5.10-District Wide Striping Contract: The lineal footage and mileage quantities listed within the Proposal are estimates only. If the work under the Contract requires that additional lineal footage or mileage be striped, the Contractor shall be paid for additional work at the Contract unit bid price, but shall not be entitled to additional time to perform the Contract.

Once the Contractor begins a particular route or segment area, he shall continue this pavement marking until the scheduled route is completed.

Once the Contractor begins work on this Contract, he shall continue work until all of the scheduled routes are completed.

The Contractor ~~shall not place any pavement markings prior to April 15th~~ may commence with striping operations at any time after issuance of the Notice to Proceed. In the event of failures, damages, or other issues attributable to the application of the striping materials selected by the Contractor under application conditions that are outside the recommendations of the material manufacturer, the Contractor shall be responsible for and obligated to correct such issues. There shall be no extension of time given for weather.

Retroreflectivity values shall at all times be maintained throughout the warranty period. Loss due to pavement failure, unless caused by the marking material, will not be considered as a material failure and will not be included in the loss calculations and/or retroreflectivity readings.

663.5.11-Interim Completion Date / Priority Painting: At the Pre-Construction Conference the Contractor will be provided with county maps showing the Priority Painting routes to be painted. The contractor shall paint the centerline and lane line on all routes by July 1, _____. The Contractor shall be assessed liquidated damages per Section 108.7.1 for each calendar day that any of the routes are not marked with both the center line and lane line.

The Engineer may add or eliminate any route to or from the schedule.

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

SECTION 407
ASPHALT STRESS ABSORBING MEMBRANE INTERLAYER FIBER SAMI SEAL

407.1-DESCRIPTION:

This section covers the materials, equipment, construction and application procedures for placing Stress Absorbing Membrane Interlayer (SAMI) seal used as an interlayer between existing distressed pavements and a surface course of asphalt. The SAMI Seal is a process of applying asphalt emulsion, fiber glass strands, and aggregate in a single process. All ingredients are to be properly proportioned, mixed, and spread on the paved surface in accordance with this Specification and as directed by the Engineer.

407.2-MATERIALS:

Furnish the components of the SAMI Seal to include polymer-modified asphalt emulsion, clean cover aggregate, and fiber glass. Use materials meeting the following:

407.2.1-Asphalt Emulsion: The emulsified asphalt shall be polymer modified and shall contain asphalt, water, emulsifier, and polymer. It is typically recommended that the emulsified asphalt contain three percent (3%) polymer solids based on asphalt weight. It shall be pumpable and suitable for application through a distributor truck. Examples of polymer modified emulsified asphalt classifications may include CRS-2P (SBS), CRS-2L (LM) and shall meet the requirements listed in Section 705 of the Standard Specifications.

407.2.2-Fiber Glass: The glass fiber shall be Classification E Glass for general application as defined in ASTM D578, Standard Specification for Glass Fiber Strands. The glass fiber spools shall be supplied internally wound, in coils or cheese. Spools shall be cut in-place into 60mm, (2.38”) lengths which are distributed uniformly across and between the two applications of the asphalt emulsion. The range of application rates for the glass fiber shall be 2 to 4 ounces per square yard.

407.2.3-Cover Coat Aggregate: The cover coat aggregate used shall be the type specified for the particular application requirements of the SAMI seal. The cover coat aggregate shall be clean, durable stone such as granite, slag, limestone or other high-quality aggregate.

The shape and quality of the cover coat material is important to the successful application and performance of a chip seal. A hard, crushed, single size aggregate is recommended. Cover Coat Aggregate shall meet the requirements listed in Section 703 of the Standard Specification. The portion of the aggregate that has two fractured faces shall be greater than or equal to 80%. Aggregate meeting requirement locks together and provides better long term retention and stability.

407.2.3.1-Gradation: When tested in accordance with AASHTO T 27 (ASTM C 136) and AASHTO T 11 (ASTM C 117), the aggregate gradation shall be within one of the following bands.

Sieve Size	TYPE I		TYPE II		TYPE III	
	Nominal Maximum Size					
	1/4 in.	No. 9	3/8 in.	No. 8	1/2 in.	No. 67
1" (25.0 mm)						100
3/4" (19 mm)					100	90-100
1/2" (12.5 mm)			100	100	95-100	
3/8" (9.5 mm)	100	100	95-100	85-100	0-15	20-55
1/4" (6.4 mm)	95-100		0-35		0-10	
#4 (4.75 mm)		85-100		10-30		0-10
#8 (2.36 mm)	0-20	10-40	0-3	0-10	0-3	0-5
#16 (1.18 mm)		0-10				
#50 (300 µm)		0-5				
#200 (75 µm)	0-1	0-2	0-1	0-2	0-1	0-2

407.3-MIXTURE DESIGN REQUIREMENTS:

407.3.1-Mix Design: Submit to the Engineer, at least five working days before the start of production, a complete mix design prepared and certified by an experienced laboratory. The mix design shall consist of:

1. Signed certificate(s) of analysis covering the specific materials to be used on the project.
2. Specify target application rates for the aggregate, fiber glass and binder as well as permissible operating tolerances so that adjustments may be made due to varying field conditions.
3. List of material sources. Material sources must be on approved source lists published by the division. Materials Procedure 700.00.05, Guidelines for Establishing and Maintaining Approved Lists of Materials and Sources, outlines the requirements of these approved lists.

Once the design has been approved, no material substitution will be permitted unless approved by the Engineer. A new mix design is required for any change in aggregate or asphalt emulsion source.

407.4-CONSTRUCTION:

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

407.4.1.1-Emulsion and Fiber Distributor: The distributor shall be capable of providing a uniform application rate of asphalt binder varying from .02-0.60 gal/yd^2 over a variable width. The uniformity of the distributor shall not vary by more than 0.02 gal/yd^2. It shall be equipped with a variable power unit for the pump and full circulation spray bars, which are adjustable laterally and vertically. The nozzle angle and bar height shall be set to provide 100 percent of double coverage in a single pass.

The distributor shall include computerized application controls, a tachometer, pressure gauges, accurate volume devices, calibrated tank, and a thermometer for measuring temperatures of the emulsified asphalt in the tank.

The pressure distributor shall have computerized rate controller that automatically adjusts the distributor's pump to the ground speed. The distributor shall be capable of heating and re-circulating the emulsion to the specified temperature.

The emulsion and fiber applicator used shall be designed for applying the bituminous binder reinforced with glass fibers. The fiber cutter and distributor shall be an integrated unit. The applicator shall comprise an open bottom spray bar housing, a fan or blower producing a down draft in the housing, and two separate spray bars, one in front of the fiber applicator housing and one following. The fiber applicator shall be calibrated and capable of applying at the desired controlled rates.

407.4.1.2-Spreader Box: The machine shall be specifically designed and manufactured to apply various types of aggregate. It shall be self-propelled and supported by at least four tires on two axles capable of providing a uniform application rate of aggregate from 5-50 lbs/yd^2 (2.7-27 kg/m^2) over a variable width. It shall be designed to convey aggregate materials from a rear receiving hopper to a front spread hopper. The machine shall apply this aggregate in a uniform pattern across the entire width of the spread hopper regardless of spreading widths. The application rates will remain consistent regardless of the speed of the machine or changing spread widths. This shall be done with computer controls that monitor the ground speed and adjust the spread hopper rate in relationship to ground speed. Application rates will be preset in lbs/yd^2 (kg/m^2).

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

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

407.4.1.5-Miscellaneous Equipment: Provide hand squeegees, shovels and other equipment as necessary to perform the work. Provide cleaning equipment such as power brooms, air compressors, water flushing equipment, and hand brooms for surface preparation.

407.4.1.6-Lights on Equipment: Equip power brooms, distributors and truck mount spreaders with at least one approved, flashing, rotating or oscillating amber light that is visible in all directions. Equip continuous spreader units with one such light on each side.

407.4.2-Application: SAMI seals shall be applied in a manner to fill minor cracks and leave a uniform surface with straight longitudinal joints, transverse joints and edges.

407.4.2.1-Weather Limitations: SAMI seals shall not be applied unless the atmospheric temperature is 55 degrees F and rising, nor when the temperature has been below 45 degrees F in the preceding 12 hours. No bituminous material shall be applied while the surface is wet nor when impending weather conditions are such that proper curing may not be obtained.

407.4.2.2-Surface Preparation: The surface shall be thoroughly clean and dry when the bituminous material is applied. Material cleaned from the surface shall be removed and disposed of as directed by the engineer. Protect drainage structures, monument boxes, water shut-offs, etc., during application of bond coat and mixture.

407.4.2.3-Emulsion and Fiber Application: Properly sized nozzles shall be used for the material and application rate specified. Emulsion application rates shall vary between 0.35-0.45 gallons per square yard. Fiber application rates shall vary between 2-4 ounces per square yard. Multiple series of nozzles, for spraying the bituminous material, shall be spaced longitudinally, as to incorporate a number of sources for dispensing the cut glass fibers through the open bottom housing to the surface between the sprayed bituminous materials.

Basically, spray a layer of emulsion, then blow in the chopped fiberglass, and coat it with another layer of emulsion.

407.4.2.4-Aggregate Placement: Aggregate spreader shall be self-propelled and shall be equipped with hoppers, revolving cylinders and adjustments necessary to produce a uniform distribution of particles at the specified rate. Immediately following the application of the emulsion and fiber material, cover aggregate shall be applied uniformly without ridges or laps at the specified rate and adjusted as directed by the engineers to produce a minimum of excess loose particles. Deficiencies in the application of cover aggregate shall be corrected prior to rolling.

407.4.2.5-Compaction: Immediately following the application of the cover material, the treated surface shall be completely rolled. Rollers shall work in tandem and complete a minimum of three passes with a sufficient overlap. A minimum of one roller pass shall be completed using pneumatic tire type, meeting the minimum requirements. Depending

on the speed of the chip seal operation and the width of coverage, additional rollers may be required

At no time shall the rollers lag more than 500' behind the aggregate spreader. All ballasting shall conform to manufacturer's specifications.

407.4.2.6-Sweeping and Clean-up: Sweeping shall be performed using a pickup type sweeper or kickoff broom as appropriate for the work and as approved by the engineer. Sweeping shall be completed within 6 hours of material application. Initial sweeping shall remove all loose or unbound material. All debris shall be removed from the job site.

407.4.3-Temporary Pavement Marking: Shall be in accordance with Section 636

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

1. Detailed work schedule
2. Traffic control plan
3. Calibration of equipment
4. Mix design previously submitted to the Engineer
5. Equipment inspection, including transport units

407.4.5-Test strip: Test Strip(s) are intended to demonstrate the mixing of materials and placement procedures of each mixing machine to be used on the project. Test strip shall be performed at the beginning of the first day production and on the roadway to be treated. The completed test strip (minimum 500 feet length) shall be reviewed to detect and correct any variances in surface texture, material ratio(s) and finished surface appearance. Additionally, the test strip will be used to establish the target job application rate.

407.4.6-Traffic Control: Do not allow traffic on the mixture until it has cured sufficiently to prevent pickup by vehicle tires. Protect the new surface from damage at intersections and driveways. Repair all damage to the mixture caused by traffic. All costs associated with this repair work will be borne by the Contractor. Otherwise Traffic Control will be in accordance with Section 636, and the *Manual on Temporary Traffic Control for Streets and Highways, Latest Edition,* or as directed by the Engineer.

407.4.7-Quality Control: A mixture is to be produced that will meet the JMF and quality control tolerances. Notify the Engineer immediately if the quality control test results exceed any of the tolerances and stop mixture production. Identify the cause of the excess deviation and determine the corrective action necessary to bring the mixture into compliance. Secure the Engineer's approval before resuming work.

For Quality Assurance purposes, samples for gradation will be taken from aggregate stockpiles designated by the Contractor for use. The frequency of sampling and testing will be established by the Engineer based upon the Department's current acceptance program and local conditions encountered.

407.5-MEASUREMENT AND PAYMENT:

Payment for SAMI Seal includes all materials, equipment, labor for preparing the surface, placing temporary pavement markings, placing the SAMI Seal mixture and complying with all requirements. The placement includes application a surface course for full width coverage as specified in the contract documents.

The completed work as measured will be paid for at the contract unit price for the Items detailed in Section 407.6.

Materials placed in stockpiles or on the road not meeting the required tolerances may be accepted at a reduced price if it is not considered detrimental to the life of the treatment by the Engineer. The following price adjustment schedule will be used when appropriate and applied accordingly to representative material:

i. Five percent reduction in the bid price per square yard for each one-tenth percent the asphalt content is out of tolerance.

ii. One percent price adjustment in the bid price per square yard for each one percent that the aggregate gradation is out of the job mix range.

iii. Five percent reduction in the bid price per square yard for application rate dropping below the established rate by more than 2 lb/sq yd. If the application rate drops below the established rate by more than 3 lb/sq yd, the material will not be accepted and measures will need to be taken by the contractor to correct for such deficiency.

Price adjustments under i., ii., and iii. above shall apply concurrently; however, price adjustment will not apply in the event the material is rejected. The disposition of rejected material will be subject to the approval of the Engineer.

407.6-PAY ITEMS:

ITEM	DESCRIPTION	UNIT
407001-001	Stress Absorbing Membrane Interface (Sami) Seal	Square Yard (SY)

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

SECTION 405
CHIP SEAL

405.2-MATERIALS:

405.2.1-Aggregate:

TABLE 405.2.1
Design Aggregate Gradation Requirements for Chip Seal

Sieve Size	Type A		Type B		Type C	
	Nominal Maximum Size					
	1/2 in	No. 67	3/8 in	No. 8	No. 4	No. 9
1 in (25 mm)	–	100	–	–	–	–
3/4 in (19 mm)	100	90-100	–	100	–	–
1/2 in (12.5 mm)	90-100		100	100	–	–
3/8 in (9.5 mm)	5-30	20-55	90-100	85-100	100	100
No. 4 (4.75 mm)	0-10	0-10	5-30	10-30	90-100	85-100
No. 8 (2.36 mm)	–	0-5	0-10	0-10	5-30	10-40
No. 16 (1.18mm)	0-2		–	–	0-10	0-10
No. 30 (600 µm)	–	–	0-2		–	–
No 50 (300 µm)	–	–	–	–	0-2	0-5
No. 200 (75 µm)	0-2	0-2	0-2	0-2	0-2	0-2

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 IMPOUNDMENT:

107.21.1-Erosion and Sedimentation Control:

DELETE THE CONTENTS OF SUBSECTION 107.21.1, AND REPLACE WITH THE FOLLOWING:

The Contractor shall be responsible for water quality throughout the duration of construction in accordance with the National Pollutant Discharge Elimination System (NPDES) permit registration with the West Virginia Department of Environmental Protection Agency (WVDEP).

The WVDOH will provide for information purposes only and for possible use in the contractor's Storm Water Pollution Prevention Plan (SWPPP):

a. Estimated start and completion dates for the project.
b. List and name all receiving stream(s).
c. Topo map with the Limit of Disturbance (LOD) and receiving streams identified.
d. Sequence of Construction Activities.
e. Drainage Report, including the following:
    i. Drainage area maps for construction site discharges points. Note: Discharge points are all locations where the project stormwater leaves the site or enters a stream.
    ii. Pre-Construction Drainage Maps include 1 year 24-hour discharge calculations for each discharge point.
    iii. Post Construction Drainage Maps include 1 year 24-hour discharge calculations for each discharge point.
    iv. Ditchline and pipe sizing calculations.
    v. Discharge points and drainage analysis for completed project.
    vi. Permanent Stormwater Management design details.
    vii. For Large Construction Projects (3 Acres or more of earth disturbing activities) with post-construction peak discharge 10% (or more) greater than the pre-construction peak discharges of 5 cubic feet per second or more for the 1-year, 24-hour storm: Post-construction stormwater management BMPs must be

implemented to reduce potential location erosion at the discharge point. (Include calculations with permit application) Calculations and justification must be submitted if post-construction stormwater management features are deemed unnecessary.

f. Tier 2 or Tier 3 Stream Protection Designation (as designated by the WVDEP), Stream with an approved sediment-related Total Maximum Daily Load (TMDL)
g. Preliminary Site Plan (Maps) showing Limits of Disturbance and Receiving Waters; in ArcGIS Shapefile (.shp) and/or AutoCAD Drawing (.dwg) format.
h. Municipal Separate Storm Sewer Systems requirements (Design Directive 506) if applicable.
i. Soil maps https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

Prior to commencing construction activities, the Contractor shall be responsible for Developing and implementing a site-specific Storm Water Pollution Prevention Plan (SWPPP) and Groundwater Protection Plan (GPP). Additionally, a Karst Mitigation Plan (KMP) is required on projects located in: Berkeley, Fayette (south of CR 25), Grant, Greenbrier, Hampshire, Hardy, Jefferson, Mercer, Mineral, Monroe, Morgan, Monongalia (east of I-79) Pendleton, Pocahontas, Randolph, Summers, and Tucker Counties. The KMP must be included in the West Virginia Department of Environmental Protection (WVDEP) NPDES registration. The Contractor shall provide the WVDOH with:

1. Construction details and all information necessary to demonstrate that the Contractor's SWPPP and GPP satisfy all conditions of the NPDES Permit. In addition to the information the WVDOH provides for the Contractor's use if applicable.
2. The Contractor's SWPPP must include a During-Construction Drainage Maps include 1 year 24-hour discharge calculations for each discharge point
3. Each road or access road shall be classified as either permanent or temporary and categorized by construction activity: New, improved, incidental construction activity, or maintenance only. Temporary roads shall be reclaimed as soon as practical after they are no longer needed for operations. New or improved roads shall be designed with the complete specifications along the entire road.
4. Incidental construction activity necessary to address rills and gullies and other drainage issues, shall be designed with the complete specifications on that specific segment.
5. Detailed Site Plan (Maps) showing Limits of Disturbance and Receiving Waters; in ArcGIS Shapefile (.shp) and/or AutoCAD Drawing (.dwg) format.
6. Stormwater Pollution Prevention Plan; Project Site specific detail, phasing and projected schedule, Best Management Practices, Enhanced Best Management Practices (if applicable), Tier 2 or Tier 3 Stream Protection Designation (as designated by the WVDEP), Stream with an approved sediment-related Total Maximum Daily Load (TMDL), Cross-sections, Plan and Profile, Slope Stability Analysis, Soils, Location of topsoil stockpiles. Note: As per WVDEP requirements the site maps and plans shall contain a North arrow with sites oriented to the North, with a minimum of five-foot topographical contours.
7. Soil maps https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm
8. Designating a "Qualified Person" for Stormwater Pollution Prevention Plan development, compliance inspection, and corrections.
9. Initial inspection by Qualified Person for compliance with proposed plan & proper installation

10. Frequency of inspections:
    a. For Projects discharging into Tier 1 Streams (as designated by the WVDEP) inspection of all erosion and sediment control BMPs within disturbed areas at least once every seven calendar days and within 24 hours after any precipitation event greater than 0.25" per 24 hrs. period
    b. For Projects discharging towards Tier 2, Tier 3, or 303(d) Streams (as designated by the WVDEP) Inspection of all erosion and sediment control BMPs within disturbed areas at least once every four calendar days and within 24 hours after any precipitation event greater than 0.25" per 24 hrs. period.
    c. Temporary seeding & mulching within 4 days when areas will not be re-disturbed for more than 14 days. Any defective controls identified during the inspection must be repaired and/or installed correctly within 24 hours and corrections verified upon re-inspection by the Qualified Person within 48 hours. Permanent seeding and mulching within 4 days of reaching final grade. Final stabilization within 4 days after construction has been completed.
11. Installation of discharge point/outlet signs/markers
12. Waste and Borrow Site Plans
    a. Offsite waste and/or borrow plans and controls
        - Note: Separate NPDES CSW General Permit Registration (if applicable)
    b. Cross-sections, Plan and Profile
    c. Slope Stability Analysis
13. Groundwater Protection Plan; Project Site specific detail (including the design of the concrete washout if applicable)
14. The GPP shall include the following elements:
    a. A description of the operations, processes and materials present at the facility that may affect or contaminate groundwater.
    b. Procedures and containment facilities to protect groundwater resources from the potential contaminants.
    c. MSDS sheets
    d. These processes and facilities shall be identified on a facility map.
    e. The GPP must be signed by someone with signature authority for the applicant. Note: Signature Authority: a responsible corporate officer (president, vice pres. Secretary, treasure), principal executive officer or ranking elected official, senior executive director OR a letter of delegation of authority for the signatory is provided that is signed by one of the above.

The Department will review the documents for completeness and provide the Contractor with comments, if required, within:

i. 15 calendar days of receipt of all required documents for Minor Construction Projects (1 to 3 acres of disturbance).
ii. 30 calendar days for projects for Large Construction Projects (3 acres or greater of disturbance), however projects over 100 acres, will allow a 60 calendar day review period.

If revisions are required, the Contractor shall revise documents and resubmit to the Engineer, and Departments review time is restarted.

Once submitted to WVDEP, the approval time allotted shall be:

i. 90 calendar days for minor construction projects (1 to 3 acres of disturbance).

ii. 180 calendar days for large construction projects (3 acres or greater of disturbance).

Projects with public notice requirement shall warrant an additional 45 calendar days of review/approval time. Delay in WVDEP approval in excess of the above shall be considered an Excusable Noncompensable Delay in accordance with Section 108.6.2.

The Contractor shall prepare a Spill Prevention, Control and Countermeasures (SPCC) plan that itemizes specific measures that will be implemented to prevent and clean up chemical and petroleum product spills that may occur during all phases of construction. Fuel storage and refueling activities, equipment maintenance activities and equipment washing will be kept at least 500 feet away from any watercourse or wetland.

The Contractor shall implement an Employee training program for all on-site personnel directly involved with construction activities at all levels of responsibility that reiterates the components and goal of the SWPPP (Quarterly).

i. Address: spill & leak response and internal reporting, good housekeeping, and routine inspection & maintenance.
ii. Document training: Date, Time, Location, Attendees, Subjects Discussed

SWPPP template, GPP template, and guidance documents are located at: https://dep.wv.gov/WWE/Programs/stormwater/csw/Pages/home.aspx

Flocculants, or other treatment chemicals may be used only in accordance with good engineering practices and the manufacturer/supplier specifications. Dosing rates shall be specified, and material safety data sheets (MSDS) shall be included in the contractor's SWPPP and GPP, maintained on site, and available for inspection.

Any details not shown in the plans shall be in accordance with the latest version of the West Virginia Department of Environmental Protection, Erosion and Sediment Control Best Management Practices Manual. In the event that temporary erosion and sediment control measures are necessary due to the Contractors negligence, carelessness or failure to install permanent controls as part of the work as scheduled, such work shall be performed by the Contractor at his own expense.

Earth disturbing activities shall not be initiated until the WVDEP has approved the NPDES permit modification, SWPPP, GPP, and KMP (if required). The Department will not be responsible for any delays in obtaining WVDEP approval of the NPDES permit modifications due to the timeliness of WVDEP's review or the contractor's failure to provide a complete SWPPP, GPP, KMP (if required) or submit corrections and/or additional information required by WVDEP in a timely manner. Any additional/future NPDES permit registration modification applications shall be submitted by the contractor through the WVDEP Electronic Submission System (ESS).

During construction the contractor shall be responsible for:

1. Implementing remedial action to correct and/or repair failing erosion and sediment control features.
2. Implementing storm and winter shutdown procedures.
3. Shaping the earthwork prior to the suspension of grading operations each day in a manner that will permit storm runoff with minimum erosion.
4. Installing, operating and maintaining erosion and sediment control features in an acceptable condition.

5. Cleaning out and restoring to original conditions any erosion or sediment control feature that has reached half of its capacity. For sediment basins, one half of its capacity is considered as wet volume storage.
6. Providing the WVDEP with an Annual Progress Map if permitted for longer than one year
7. Directing the construction, operation, maintenance and dismantling of temporary erosion and sediment control features.

In addition to the above, the Contractor shall make themselves familiar with all requirements contained within the WVDEP's General Water Pollution Control Permit, Stormwater Associated with Construction Activities Permit Number WV0115924. A copy of this permit can be found at the following internet address:

http://www.dep.wv.gov/WWE/Programs/stormwater

Noncompliance with permit conditions constitutes a violation of the Clean Water Act and State Code and is subject to enforcement action by the WVDEP. The Contractor shall be responsible for any Notices of Violation, enforcement actions and/or fines associated with those violations. If the Contractor incurs a fine for any Notice of Violation and Consent Order, the Contractor must provide the DOH Project Supervisor documentation that the fine has been paid or the amount of the fine will be withheld from the Contractor's next invoice.

At the Project's Pre-Construction Conference, the Contractor shall submit to the Department the SWPPP, GPP, KMP (if applicable), the Co-Applicant #1 signature page (Exhibit 1) and the Contractor's E&S Manager Contact.

The Contractor's E&S Contact shall contain the following information: the name, title, mailing address and telephone number of the person who will be responsible for the Erosion and Sediment Control plans, implementation, maintenance, etc., for the life of the NPDES registration.

Upon completion of the Pre-Construction Conference, the Department will review the SWPPP, GPP, and KMP (if applicable). The Department will provide comments to the contractor concerning any deficiencies in the SWPPP, GPP, and KMP (if applicable). This review shall be considered as an effort by the Department to assist the contractor in meeting the NPDES Permit requirements. Only the WVDEP has the authority to approve NPDES registration documents. Once any necessary corrections and/or additional information are submitted by the contractor, the Department will modify the existing NPDES registration for this project to make the Contractor the number one Co-Applicant to the permit. Once this has been completed, the Contractor shall be responsible for any and all fees, violations and fines assessed against the project that is a result of the Contractor's negligence, carelessness, or failure to install permanent controls as part of the work as scheduled.

If any of the components of the approved SWPPP prove ineffective at minimizing or preventing sediment laden stormwater from leaving the project site, the contractor shall implement additional BMPS, modify the SWPPP, and modify the NPDES permit registration to provide a more effective means of controlling/eliminating erosion and siltation from the stormwater runoff. If approved BMPS are ineffective at protecting receiving waters and the contractor is unable to identify and employ BMPS capable of preventing sediment laden runoff from leaving the project site the contractor shall immediately cease further land disturbance until such time that the unauthorized discharge ceases.

Once the project is complete, the Contractor will still bear responsibility for the NPDES

registration until either a Notice of Termination (NOT) is received from the WVDEP or the Contractor has received final payment for the project. If an NOT has not been received by the time the final payment is made, the Department will modify the NPDES registration to remove the Contractor's name from the registration.

Exhibit 1 can be located online at:
http://www.transportation.wv.gov/highways/contractadmin/specifications/107.21.1EnSExhibit1/Pages/default.aspx

The Contractor will be advised if the project is located within an urbanized area with respect to the NPDES Municipal Separate Storm Sewer System (MS4) Permit. The MS4 permit requires on-site management of the runoff from the first one (1) inch of rainfall from the additional impervious area (if >5,000 sf) for an average 24-hour storm preceded by 48 hours of no measurable precipitation or provide equal benefits for water quality. The contractor is advised that any proposed changes or substitutions to the project may require additional stormwater management mitigation and any costs associated with such mitigation shall be borne by the contractor at no additional cost to the Department. The contractor shall allow seven (7) calendar days for the Department and the local MS4 authority to review and comment on the proposed changes. Additionally, changes or substitutions proposed by the contractor shall be approved by the Department in advance. Post-construction stormwater management shall comply with the WVDOH MS4 stormwater management plan requirements of NPDES general permit registration no. WVR30004 and Design Directive 506.

Periodic inspections of the site and BMP will be conducted by representatives of the WVDEP to ensure compliance with the conditions and requirements of the NPDES permit. Representatives of other resource agencies may also conduct site inspections throughout the life of the construction contract.

January 13, 2021

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

SECTION 207
EXCAVATION AND EMBANKMENT

207.2-MATERIALS:

ADD THE FOLLOWING:

207.2.3-Impervious Membrane: High Density Polyethylene (HDPE) geo-membrane liner systems shall have a nominal thickness of 30 mils. The geo-membrane shall be manufactured of new, first quality resin and shall be compounded and manufactured specifically for the intended purpose. The resin manufacturer shall certify each batch for the following properties:

Property	Test Method	Requirements
Specific Gravity	ASTM D 792	> 0.940
Melt Index	ASTM D 1238	< 0.4g/10 min.
Carbon Black Content	ASTM D 1603	2% - 3%

If requested by the Engineer, the HDPE supplier shall make available this certification for the Engineer's verification of the material.

207.9-SUBGRADE:

ADD THE FOLLOWING:

207.9.2-Impervious Membrane: Impervious Membranes shall be constructed as shown in the plans or as directed by the Engineer.

The surface of the HDPE geo-membrane liner system shall not have striations, roughness, pinholes, or bubbles and shall be free of holes, blisters, and any foreign matter; such as, soil or oil accumulation.

All seams of the HDPE geo-membrane liner system shall be, as per the manufacturer's specifications, sealed or overlapped to prevent leakage.

HDPE geo-membrane liner systems shall be delivered and, before installation, stored so that no damage is caused to the material.

Before liner installation, it shall be assured that the area that is to be lined shall be smooth and free of sharp objects or debris of any kind. No equipment or tools shall damage the membrane by handling, equipment, or personnel movement.

HDPE installation shall not be done during any precipitation or in the presence of excessive moisture such as fog or dew. The Engineer shall be the sole judge in determining satisfactory conditions.

Seams shall be oriented parallel to the line of maximum slope. Seams shall have a finished overlap of between 3 to 4 inches.

Field-testing of seams, according to the manufacturer's specifications, shall be conducted to verify satisfactory seaming conditions.

When backfilling, care shall be taken to prevent any damage to the HDPE system. The Contractor shall slope the last placed level of backfill away from the wall facing to rapidly direct runoff of rainwater away from the wall face. The Contractor shall not allow surface runoff from adjacent areas to enter the wall construction site.

207.15-METHOD OF MEASUREMENT:

ADD THE FOLLOWING TO THE END OF THE SUBSECTION:

The quantity of work done under this item will be the number of square yards of Impervious Membrane established in the Proposal.

207.16-BASIS OF PAYMENT:

ADD THE FOLLOWING TO THE END OF THE SUBSECTION:

The cost of furnishing all materials, including furnishing all labor, materials, and equipment necessary to complete Impervious Membrane will be included in this item.

207.17-PAY ITEM:

ADD THE FOLLOWING ITEM TO THE TABLE:

ITEM	DESCRIPTION	UNIT
207036-*	Impervious Membrane	Square Yard

* Sequence number

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

SECTION 207
EXCAVATION AND EMBANKMENT
(SOIL MONITORING SETTLEMENT PINS)

207.7-FORMING AND COMPACTING EMBANKEMENT:

ADD THE FOLLOWING:

207.7.6-Settlement Pins:

207.7.6.1-Scope: The work herein specified shall consist of furnishing materials, equipment, and labor necessary to complete and install the soil monitoring settlement pins shown in the contract plans. The Contractor shall install the soil monitoring settlement pins in the locations shown in the plans. Settlement pins shall be installed once the subgrade is achieved per the contract drawings and the embankment fill has been placed to a specific elevation defined in the general notes. Before purchase of any materials or the initiation of any work on the soil monitoring settlement pins, the Contractor shall submit a plan for the approval of the Engineer. The plan shall show the anticipated locations of the soil monitoring settlement pins. The Contractor shall be responsible for taking the readings from the soil monitoring settlement pins. The Contractor shall be responsible for the soil monitoring settlement pins maintenance for the duration of the project. The Engineer shall contact Geotechnical personnel from the Materials Control, Soils, and Testing Division, for assistance in inspection, installation, and data evaluation.

207.7.6.2-Purpose: Settlement is anticipated at the embankment as shown in the plans. Settlement shall be monitored in accordance with this special provision before the steel piling at the specific monitoring location can be installed. Information from the soil monitoring settlement pins will be used by the Engineer to evaluate the settlement at critical sections. This information will assist the Engineer in evaluating the project construction. The construction in the area of monitoring shall not begin until the settlement characteristics are acceptable to the Engineer.

207.7.6.3-Installation: Soil Monitoring Settlement Pins shall consist of 4-foot long #5 reinforcement bars driven a minimum of 3 feet into the ground. A point shall be marked on each pin that can be measured and identified for future readings. The soil monitoring settlement pins must be labeled for easy identification and reference. The initial location and elevation of each soil monitoring settlement pin shall be established by the Contractor. Elevation surveys shall be accurate to within 0.01 foot. A minimum of one reference point shall be established for each monitoring location. This reference point shall be outside the influence of any movement resulting from construction.

207.7.6.4-Readings and Reporting: Prior to taking readings, the Contractor shall present a reporting form for the approval of the Engineer. Time/Settlement graphs will be required. Readings shall be provided to the Engineer on a weekly basis. Readings shall be determined once per week after the embankment placement has been completed. The Engineer shall determine when the readings are to be terminated. As a guide, termination could be considered if the time rate of settlement is equal to or less than one-eighth (1/8) inch per week for at least four (4) consecutive weeks. The Engineer will provide a copy of the readings to Geotechnical personnel of Materials Control, Soils, and Testing Division.

207.7.5-Control: See plan general notes, Table 1 for settlement pin locations. The soil monitoring settlement pins should be placed immediately, after the completion of the fill. Reading of the soil monitoring settlement pins shall be made once per week.

207.7.6-Acceptance: Acceptance by the Engineer of the soil monitoring settlement pins and approval to proceed with monitoring shall be based on the satisfactory completion of the installations. The Contractor shall provide a plan showing the locations and elevations of the soil monitoring settlement pins and reference points. Acceptance by the Engineer to proceed with the installation of the piles at the monitoring location shall not be given until the settlement is one-eighth (1/8) inch or less per week for four (4) consecutive weeks. The Contractor shall provide the Engineer with a report showing the time/settlement graphs.

207.7.7-Protection: The Contractor shall be responsible for the protection of the soil monitoring settlement pins from damage. All damaged instrumentation shall be replaced or repaired at the Contractor's expense. Damage shall be corrected at the Contractor's expense, as directed by the Engineer, before continuing construction. Work in the area of the damaged instrumentation shall be stopped until the instrumentation is repaired by the Contractor and approved by the Engineer.

207.15-METHOD OF MEASUREMENT:

ADD THE FOLLOWING:

The quantity of work done will be the actual number of soil monitoring settlement pins per each completed in place and accepted by the Engineer.

207.16-BASIS OF PAYMENT:

ADD THE FOLLOWING:

The quantities, as determined as provided above, will be paid for at the contract unit price bid for the item listed below, which price and payment shall be full compensation for excavating, backfilling, disposing of surplus material, furnishing all the materials and doing all the work herein prescribed in a workman like and acceptable manner, including all tools, equipment, supplies and incidentals necessary to complete the work.

207.17-PAY ITEM:

ADD THE FOLLOWING ITEM TO THE TABLE:

ITEM	DESCRIPTION	UNIT
207050-000	Soil Monitor Settlement Pins	Each

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

SECTION 211
BORROW EXCAVATION

211.3-GENERAL:

211.3.3-Impervious Core:

DELETE THE SUBSECTION TILE AND CONTENTS, AND REPLACE WITH THE FOLLOWING:

211.3.3-~~Impervious~~ Core: An ~~I~~imperious cores shall be constructed for all sediment ~~dams~~ basins built of rock, gravel, and pervious soils.

~~The impervious core shall have a minimum dimensions as set forth in WVDEP Erosion and Sediment Control Best Management Practices Manual, latest edition.~~

When a key is necessary for the sediment ~~dam~~ basin, the impervious core shall be made an integral part of the key. When the impervious core is not constructed of soil, the core shall be anchored into the key by trenching for a minimum depth of 2 feet (610 mm).

The impervious core may be constructed using one of the following methods:

a) Soil Impervious Core: Soil impervious cores may be shaped to facilitate placement and compaction. The coefficient of permeability of the soil used for the impervious core must be 10^{-4} cm per sec or less. A key, a minimum of 4 feet (1.2 m) in depth, must be constructed into the original ground. The compaction of the impervious core shall be as in accordance with Section 716.3.

b) Concrete Impervious Core: When concrete is used for the impervious core, Class B Concrete shall be used. The requirements of Section 601, Structural Concrete shall control the mixture and placement of the concrete. The Engineer may waive the testing of the Class B Concrete if the concrete is from an approved plant.

c) HDPE or LLDPE Impervious Core: When the impervious core is constructed of High Density Polyethylene (HDPE) or Low Linear Density Polyethylene (LLDPE), the liner shall be manufactured to be suitable for buried conditions and may be either smooth or textured. The Contractor shall obtain recommendations from a liner manufacturer for the material best suited for impervious cores, handling, storage, and construction procedures. The manufacturer of the liner shall furnish the Engineer a Letter of Certification stating the liner is suitable for the intended use.

d) Other Methods for an Impervious Core: The Contractor may design and use other methods of preventing the seepage of water from the wet area. The Engineer must approve the design of the alternative method.

The bottom width of the impervious core should, at a minimum, equal the total embankment height. The maximum size of the impervious core is a function of the embankment's upstream and downstream external slopes.

When the impervious core is not constructed used the Soil Impervious Core method the Contractor shall submit a plan containing construction details and materials to be used for the impervious core(s) for the approval of the Engineer prior to the start of work and the purchase of any materials. This submittal will be part of the temporary and permanent pollution control schedules and methods required by Section 642.3 ~~Preconstruction Conference, Construction Methods, Section 642, Temporary Pollution Control, of the *West Virginia Division of Highways Standard Specifications Roads and Bridges*, latest edition~~.

January 14, 2021

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

SECTION 403
VOID REDUCING ASPHALT MEMBRANE

403.1-DESCRIPTION:

This work consists of furnishing and installing Void Reducing Asphalt Membrane (VRAM) material ahead of construction of longitudinal construction joints in asphalt concrete surface courses.

403.2-MATERIALS:

The material shall be a base asphalt modified with styrene-butadiene diblock or triblock copolymer without oil extension, or styrene-butadiene rubber elastomers. It shall not use air blown asphalt, acid modification, or other modifiers. VRAM material shall meet the requirements of table 403.2 below.

TABLE 403.2 VRAM MATERIAL REQUIREMENTS

Test	Test Requirement	Test Method
Dynamic shear @ 88°C (unaged), G*/sin δ, kPa	1.00 min.	AASHTO T 315
Creep stiffness @ -18°C (unaged), Est Stiffness (S), MPa m-value	300 max. 0.300 min.	AASHTO T 313
Ash, %	1.0 to 4.0	AASHTO T 111
Elastic Recovery, (unaged) 10 cm elongation, hold 5 minutes before cutting, 25°C, Report to nearest 0.1%	70 min.	ASTM D6084 Method A
Separation of Polymer, Difference in °C of the softening point (ring and ball apparatus)	3 max.	ASTM D7173, AASHTO T53

403.3-EQUIPMENT:

403.3.1-Distributor: When a pressure distributor is used to apply VRAM, the distributor shall be equipped with a heating and recirculating system along with a functioning auger agitating system or vertical shaft mixer in the hauling tank to prevent localized overheating.

403.3.2-Melter: When a melter kettle is used to transport and apply VRAM, only oil-jacketed, double-boiler melter kettles with agitating and recirculating systems shall be used. Material from the kettle may be dispensed through a pressure feed wand with an applicator shoe or through a pressure feed wand into a hand-operated "thermal push cart."

403.4-CONSTRUCTION:

403.4.1-Surface Preparation: Prior to placing VRAM, the pavement surface area to be treated shall be cleaned of all foreign material. VRAM shall be applied only to surfaces that are dry and cleaned of all dust, debris, and any substances that will prevent adhesion. VRAM may be placed before or after the tack coat placement, however, tack coat shall not be placed on top of VRAM material. When placing after the tack coat, the tack coat must be fully cured prior to placement of the VRAM.

403.4.2-Weather Requirements: VRAM shall be applied only when the pavement surface temperature and the ambient temperature are a minimum of 40 °F and rising.

403.4.3-Application: VRAM shall be applied at the application rate and width listed in Table 403.4.3.

When the VRAM material will not be exposed to traffic, the Contractor shall coordinate the application of VRAM and placement of the asphalt mixture to ensure the center of the VRAM application is within ± 2.0 inches of the center of the cold longitudinal joint being constructed.

When traffic is to be maintained across the VRAM material, the Contractor shall apply VRAM material on the cold longitudinal construction joint such that 60 percent of the specified band width is placed on the side of the joint that will be paved first. The contractor shall not open to traffic if width of exposed VRAM material is greater than 6 inches.

If the paving operation allows VRAM to be placed on only one side of the cold longitudinal joint at a time and it is not exposed to traffic, the Contractor shall place 50 percent of the required width and application rate prior to paving the first pass. Prior to closing the cold longitudinal joint with the final pass, the Contractor shall place the remainder of the VRAM material and coat the cold joint's vertical face with VRAM material. The total amount of VRAM material applied shall meet the application rate listed in Table 403.4.3.

If the work includes constructing only one side of a cold longitudinal joint; such as adjacent to pavement to remain in place, or against curb, or curb and gutter; the Contractor shall construct the VRAM using one-half the width and one-half the application rate listed in Table 404.4.3.

The VRAM, meeting the requirements specified herein, shall be applied to the existing surface at the width and target application rate as specified in the following table:

TABLE 403.4.3 VRAM APPLICATION RATES

Coarse-Graded HMA Mixtures [Note 1]		
Overlay Thickness, in	**VRAM Width, in.**	**Application Rate, lb/ft**
1	18	1.15
1 ¼	18	1.31
1 ½	18	1.47
1 ¾	18	1.63
≥ 2	18	1.80
Fine-Graded HMA Mixtures [Note 1]		
Overlay Thickness, in	**VRAM Width, in.**	**Application Rate, lb/ft**
1	18	0.80
1 ¼	18	0.88
≥ 1 ½	18	0.95

Note 1 - Refer to Table 4 of MP 401.02.28 for definitions of coarse and fine graded mixes

Ensure the applied width of VRAM is within ± 1.5 inches of the width specified. If the VRAM flows more than 2 inches from the initial placement width, the Contractor shall immediately stop placement and perform corrective actions.

When beginning placement of a run of VRAM, the Contractor shall use a suitable release paper to cover previous VRAM application to prevent doubling up of thickness of VRAM.

The contractor shall ensure the VRAM is suitable for construction traffic to drive on without pickup or tracking within 30 minutes of placement. If pickup or tracking occurs, immediately stop placement of VRAM and repair damaged areas.

403.4.4-Paving: Prior to start of paving, the Contractor shall ensure the paver end plate and any grade control devices are adequately raised above the finished height of the VRAM. The contractor shall immediately cease placement of asphalt mixture and VRAM if flushing is noted in the asphalt surface and shall not continue placement of the asphalt mixture until the issue is corrected.

403.5-ACCEPTANCE:

The Contractor shall furnish a bill of lading for each tanker supplying material to the project. The Contractor shall verify the application rate of VRAM within the first 1,000 feet of the day's scheduled application length and every 6,000 feet the remainder of the day. For projects less than 3000 feet, the rate will be verified once.

Verification shall be done by placing suitable paper or a pan of known weight at a random location in the path of the VRAM placement. After VRAM application, pick up the paper or pan and obtain the weight of material. Calculate the weight per foot of VRAM. Ensure the actual weight per foot of VRAM is within ± 15 percent of the target application rate from Table 403.4.3. Application rate verification shall be provided to the Engineer. Replace VRAM in the areas where the samples are taken.

403.6-METHOD OF MEASUREMENT:

The quantity of work done will be measured in linear feet of VRAM completed and accepted in place.

403.7-BASIS OF PAYMENT:

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

403.8-PAY ITEM:

ITEM	DESCRIPTION	UNIT
403001-001	Void Reducing Asphalt Membrane	Linear Foot

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

SECTION 410
ASPHALT BASE AND WEARING COURSES, PERCENT WITH LIMITS

DELETE THE CONTENTS AND REPLACE WITH THE FOLLOWING:

410.1-DESCRIPTION:

410.1.1-General: The Contractor shall note that this Section is to be used for Square Yard Paving operations; however, the proposal and / or plans may contain 401 and 402 items to be paid and measured by the Ton (TN). Instances where those items occur, they shall be constructed and measured in accordance with the applicable sections of the West Virginia Division of Highways Standard Specifications Roads and Bridges, current edition, and the Supplemental Specifications current when the contract is let.

Additionally, the following Materials Procedures (MP) for Square Yard Paving may be obtained by contacting the Materials Control, Soil and Testing (MCS&T) Division:

a. MP 401.02.31 QC & Acceptance
b. MP 401.07.20 Sampling Loose Asphalt Pavement Mixtures
c. MP 401.07.21 Sampling Compacted Asphalt
d. MP 401.07.22 Thickness of Asphalt Concrete Using Cores
e. MP 401.07.23 Bond Strength
f. MP 401.07.24 Pavement Macrotexture
g. MP 401.07.25 Evaluation of Asphalt Pavements
h. MP 401.13.50 Determination of PWL

410.1.2-PWL Paving Description: This work shall consist of constructing one or more courses of asphalt, mixed mechanically in a plant, composed of aggregate and asphalt material designed in accordance with either the Marshall or Superpave Design System as specified in the contract documents, on a prepared foundation in accordance with these specifications and in reasonable close conformity with the lines, grades, weights or thicknesses, and cross sections shown on the Plans or established by the Engineer.

The unit of measurement for asphalt will be by the ton (megagram), square yard (square meter), or cubic yard (cubic meter).

The work will be accepted in accordance with these Specifications and the applicable requirements of Sections 105, 106, and 109.

410.2-MATERIALS:

The materials shall conform to the following requirements:

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 2 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.

410.2.1-Performance Graded Binder Grade: The standard grade for Performance Graded (PG) binders shall be PG 64S-22, any deviation will be noted in the contract documents. PG 64H-22 shall be used on projects specified with over 20 million ESALs over the design life. PG 64S-22 binder may be used in asphalt placed below the top two lifts in any pavement section, scratch course and patching-and-leveling are not identified as lifts.

CONSTRUCTION METHODS

410.3-GENERAL:

Construction methods to be used in performing the work shall be submitted to the Engineer for review prior to the start of work. This review may require modification of the proposed methods to provide the desired end product. All equipment, tools, machinery, and plant shall be maintained in a satisfactory working condition.

410.4-COMPOSITION OF MIXTURES:

410.4.1-General: The aggregate for use in the designated mixture shall consist of a mixture of aggregate (coarse, fine, reclaimed asphalt pavement (RAP) if desired, or mixture thereof) and mineral filler if required. It shall be the responsibility of the Contractor to determine the percentage of RAP to be used in the mix. The amount and grade of virgin PG Binder to be used in the RAP designs shall be determined in accordance with Materials Procedure (MP) 401.02.24 and MP 401.02.28.

410.4.2-Job Mix Formula: Job Mix Formula (JMF) is the specification for a single mix produced at a single plant. This mix may be specific to a single project or be used on multiple projects if the basic design criteria (design compaction level and PG Binder grade) are the same.

The Contractor shall submit a proposed JMF for each combination of aggregate and asphalt material for each asphalt mixture to be produced. Depending on the design type, the JMF

gradations shall be within the tolerances set forth in either Table 410.4.2A or Table 410.4.2B. Marshall mix designs shall be developed in accordance with MP 401.02.22. Superpave mix designs shall be developed in accordance with MP 401.02.28.

Each proposed JMF must be documented on the Division Form T400 or T400SP and the entire JMF package shall be forwarded for review to the District Materials Engineer/Supervisor. After the District reviews the T400/T400SP and JMF package shall then be transmitted to the Materials Control, Soils and Testing Division for final review. If the JMF requires revision, it will be returned to the designer through the District. The T400/T400SP Form shall contain the following information:

i. Identification of the source and type of materials used in the design.
ii. The aggregate blend percentages and the percentage for each sieve fraction of aggregate considered the desirable target for that fraction.
iii. The percentage of virgin asphalt binder to be blended with RAP and the total asphalt binder representing the optimum asphalt content for the JMF submitted, which is to be considered the desirable target percentage.
iv. The temperature of the completed mixture at the plant which shall be within ± 25° F (± 14° C) of the median mix temperature established by the temperature-viscosity chart or as recommended by the asphalt supplier.
v. The ratio (calculated to the nearest one-tenth percent) of the Fines to Asphalt (FA). For Marshall mixes the ratio is defined as the percentage of aggregate passing the No. 200 (75 µm) sieve, divided by the percentage of asphalt content calculated at the percentage optimum asphalt content of the design. For Superpave mixes the ratio is defined as the percentage of aggregate passing the 75 µm (No. 200) sieve, divided by the percentage of effective asphalt content calculated at the percentage optimum asphalt content of the design.

TABLE 410.4.2A
Design Aggregate Gradation Requirements for Marshall Mix Designs

Type of Mix	Base-I	Base-II (Patch & Level)	Wearing IV	Wearing-I (Scratch-I)	Wearing-III (Scratch-III)
Sieve Size	Nominal Maximum Size				
	1 ½ in (37.5 mm)	¾ in (19 mm)	¾ in (19 mm)	3/8 in (9.5 mm)	No. 4 (4.75 mm)
2 in (50 mm)	100	–	–	–	–
1 ½ in (37.5 mm)	90-100	–	–	–	–
1 in (25 mm)	90 max	100	100	–	–
¾ in (19 mm)	–	90-100	90-100	–	–
½ in (12.5 mm)	–	90 max	90 max	100	–
3/8 in (9.5 mm)	–	–	–	85-100	100
No. 4 (4.75 mm)	–	–	47 min	80 max	90-100
No. 8 (2.36 mm)	15-36	20-50	20-50	30-55	90 max
No. 16 (1.18 mm)	–	–	–	–	40-65
No. 30 (600 µm)	–	–	–	–	–
No. 50 (300 µm)	–	–	–	–	–
No. 200 (75 µm)	1-6	2-8	2-8	2-9	3-11

TABLE 410.4.2B
Design Aggregate Gradation Requirements for Superpave Mix Designs

Type of Mix	37.5	25	19 Note 1 (Patch & Level)	12.5	9.5 (Scratch)	4.75 (Scratch)
Sieve Size	Nominal Maximum Size					
	37.5 mm (1 ½ inch)	25 mm (1 inch)	19 mm (3/4 inch)	12.5 mm (1/2 inch)	9.5 mm (3/8 inch)	4.75 (No. 4)
50 mm (2”)	100	–	–	–	–	–
37.5 mm (1½”)	90-100	100	–	–	–	–
25 mm (1”)	90 max	90-100	100	–	–	–
19 mm (3/4”)	–	90 max	90-100	100	–	–
12.5 mm (1/2”)	–	–	90 max	90-100	100	100
9.5 mm (3/8”)	–	–	–	90 max	90-100	95-100
4.75 mm (No.4)	–	–	–	–	90 max	90-100
2.36 mm (No.8)	15-41	19-45	23- 49	28-58	32-67	
1.18 mm (No.16)	–	–	–	–	–	30-60
600 µm (No.30)	–	–	–	–	–	–
300 µm (No. 50)	–	–	–	–	–	–
75 µm (No.200)	0-6	1-7	2-8	2-10	2-10	6-12

Note 1 When a 19 mm mix is specified for use as a heavy-duty surface mix, it shall be designed as a fine graded mix with the additional requirement of a minimum of 47% passing the 4.75 mm (No.4) screen.

If it becomes necessary to change aggregate sources, a new mix design shall be developed and submitted for approval. When using neat (unmodified) PG Binders, the binder grade must always remain the same for each design, however the binder source may be changed without requiring a new mix design given that the replacement binder is provided from an approved source. If a source change results in the use of an additive enhanced modified binder of the same grade, a new mix design will be required.

If a modified binder source is changed or if the modification process is changed, a new mix design shall be developed and submitted for approval. A source change to a new location with the original manufacturer/supplier and the original modification process will not require a new mix design.

At no time shall different grades of PG Binders be mixed together in the same storage tank. When it is necessary to switch to a new binder grade the tank shall be drawn down as far as possible, normally to the top of heating coils, before refilling with the new binder. The new binder shall be circulated thoroughly before restarting production.

410.4.2.1-Warm Mix Asphalt: When the Contractor chooses to use an approved asphalt design to be produced as warm-mix asphalt (WMA) using the water injection system, the temperature of the completed mixture at the plant may be lowered to an established range that has previously been determined through trial production. The allowable temperature range specified on the approved T400 mix design form shall be adjusted accordingly when producing WMA. In addition, all references to the minimum compaction temperatures in Sections 410.10.3 and 410.10.4 of this specification, may be

waived if it can be established that additional density can be obtained at lower temperatures without damaging the pavement. All testing requirements established for Hot Mix Asphalt mix designs and quality assurance/quality control testing shall also apply to WMA.

410.5-TESTING:

410.5.1-Test Methods:

MP 700.00.06	Aggregate Sampling Procedures
AASHTO T168	Sampling Hot-Mix Asphalt
AASHTO T11	Materials Finer than No. 200 (75 µm) Sieve in Mineral Aggregates by Washing
AASHTO T27	Sieve Analysis of Fine and Coarse Aggregates
AASHTO T30	Mechanical Analysis of Extracted Aggregate
AASHTO T164	Quantitative Extraction of Bitumen from Bituminous Paving Mixtures
AASHTO T308	Asphalt Content of HMA by the Ignition Method (Test Method A)
AASHTO T245	Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus
ASTM D5581	Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus (For Base-I Marshall designs only)
AASHTO T166	Bulk Specific Gravity of Compacted Bituminous Mixtures
AASHTO T209	Maximum Specific Gravity of Bituminous Paving Mixtures
AASHTO T312	Determining the Density of HMA Specimens by Means of the Superpave Gyratory Compactor
AASHTO T331	Bulk Specific Gravity and Density of Compacted HMA Using Automatic Vacuum Sealing Method
ASTM D7227	Rapid Drying of Compacted Asphalt Specimens Using Vacuum Drying Apparatus
MP 401.02.31	Quality Control and Acceptance of Asphaltic Mixtures
MP 401.07.20	Sampling Loose Asphaltic Mixtures in the Field
MP 401.07.21	Sampling Compacted Asphaltic Mixtures in the Field
MP 401.07.22	Measuring Thickness of Asphalt Pavement using Drilled Cores
MP 401.07.23	Measuring Bond Strength of Cored Specimens
MP 401.07.24	Measuring Asphaltic Pavement Macrotexture
MP 401.07.25	Evaluation of Pavement with Substandard Properties
MP 401.13.50	Determination of Percent Within Limits

410.6-CONTRACTORS QUALITY CONTROL:

410.6.1-Quality Control Testing: Quality control of the asphalt pavement is the responsibility of the Contractor. The Contractor shall maintain equipment and qualified personnel including at least one certified Asphalt Plant Technician at each plant. The technician shall be in charge of all plant quality control activities such as mix proportioning and adjustment and all sampling and testing activities necessary to maintain the various properties of asphalt within the limits of the specification.

The Contractor shall maintain necessary equipment and qualified personnel including at least one certified Asphalt Field and Compaction Technician at each project during paving operations. Additionally, a certified Asphalt Field and Compaction Technician with certification to perform nuclear density testing of asphalt pavements shall perform all testing

necessary to assure compaction of the asphalt meets specification requirements. ~~Compaction Technicians may serve as Asphalt Field and Compaction Technicians for asphalt compaction testing until December 31, 2017.~~

410.6.2-Job Mix Formula Field Verification: For each JMF, a mix design field verification shall be conducted during the first days of plant production. For Marshall and Superpave designs, the verification shall be in accordance with the guidelines established in MP 401.02.31. The field verification is for the purpose of demonstrating that the JMF can be produced within the specified tolerances set forth in the MP 401.02.31. If the mix cannot be produce within these requirements, a new mix design will be required.

410.6.3-Quality Control Testing Requirements: After the JMF design field verification has been successfully completed, sampling frequency and test requirements for quality control shall be as set forth in MP 401.02.31 for Marshall and Superpave designs. If the Division determines that a mix cannot be consistently produced within the tolerance limits of the specified design properties, approval of the mix may be revoked and the contractor will be required to provide a new mix design.

410.7-ACCEPTANCE TESTING:

410.7.1-Acceptance Testing of Asphalt: For Interstates and divided NHS Highways, material from the paving of the traveled lanes and shoulders will be accepted in the field on a lot-by-lot basis. Lots will be established cumulatively and will be specific for each JMF. Each lot consists of five equal sublots (n=5). A completed sublot will have cores obtained for Pavement Density, and Bond Strength and a Loose Mixture sample for gradation and asphalt content. Samples for mat density and bond strength shall also be used to measure lift thickness prior to any preparation for density or bond strength. All field samples shall be obtained from locations determined as per MP 401.07.20 and MP 401.07.21.

A normal lot size is 2,500 tons with five, 500-ton sublots (n=5), unless operational conditions or project size dictate otherwise. If operational conditions or project size dictate, readjustment of the lot will be made as specified in Table 410.7.1. Breakdowns or stoppages of short periods due to such causes as weather or equipment failure will not be considered as reason to adjust the lot size. The original lot will be continued when work resumes after stoppages of less than 5 days. If a lot is terminated due to a stoppage of 5 days or more, adjust the lot size and number of sublots as specified in Table 410.7.1.

For two lane and non-divided NHS Routes, refer to Section 410.13.7.1.

TABLE 410.7.1

Re-adjustment of Lot Size and Associated Number of Sublots Remaining Quantity Following Last Full Lot	**Action**
Less than 500 tons without a combination of one mixture acceptance sample and one density core	Quantity combined with the previous lot, (n=5)
Less than 500 tons with a combination of one mixture acceptance sample and one density core	One new sublot defined and quantity combined with the previous lot, (n=6)
500 tons to less than 1,000 tons without a combination of two mixture acceptance samples and two density cores	One new sublot defined and quantity combined with the previous lot, (n=6)
500 tons to less than 1,000 tons with a combination of two mixture acceptance samples and two density cores	Two new sublots defined and quantity combined with the previous lot, (n=7)
1,000 tons to less than 1,500 tons without a combination of three mixture acceptance samples and three density cores	Two new sublots defined and quantity combined with the previous lot, (n=7)
1,000 tons to less than 1,500 tons with a combination of three mixture acceptance samples and three density cores	New lot defined, (n=3)
1,500 tons to less than 2,000 tons without a combination of four mixture acceptance samples and four density cores	New lot defined, (n=3)
1,500 tons to less than 2,000 tons with a combination of four mixture acceptance samples and four density cores	New lot defined, (n=4)
2,000 tons to less than 2,500 tons without a combination of five mixture acceptance samples and five density cores	New lot defined, (n=4)
2,000 tons to less than 2,500 tons with a combination of five mixture acceptance samples and five density cores	New lot defined, (n=5)

Immediately after each sample is taken, it shall be identified by labeling or otherwise with the following information:

1. Contract ID
2. State Project Number
3. Sample Type (density, bond, loose, etc.)
4. Pavement Course (surface, base)
5. Lot Number
6. Sublot Number
7. Date
8. Sampled By

A sample labeling standard is shown in MP 401.07.20 Sampling of Loose Asphaltic Pavement Mixtures and MP 401.07.21. Upon fully identifying, marking, or labeling, and securing, samples shall be transported to the District Materials Laboratory for testing unless otherwise indicated in the proposal.

410.7.1.1-Mixture Acceptance Samples. The Inspector will select sample locations in each sublot according to MP 401.07.20 Sampling of Loose Asphaltic Pavement Mixtures. The Inspector or in the presence of the Inspector, one loose mixture sample shall be obtained for each sublot. This sample is to be taken directly from the uncompacted mixture and immediately processed in accordance with the MP.

410.7.1.2-Compaction: Compaction testing for mat density shall be performed for all traveled lanes, ramps and shoulders. Work will be evaluated based on an Upper Specification Limit (USL) of ~~97.0~~ 98.0 and a Lower Specification Limit (LSL) of 91.5 for all mats within travel lanes. Acceptance of mat density shall be in accordance with 410.13.3.

Maximum density values that are supplied by the asphalt producer shall be verified by the District Materials staff by determining the theoretical maximum specific gravity in accordance with AASHTO T209 Theoretical Maximum Specific Gravity (Gmm). This verification of Gmm shall be conducted once per lot for all mixes, or one in each five reported values from the asphalt producer. This Gmm value must be within 0.024 of the asphalt producer's daily average. Any deviation of greater shall warrant special evaluation. Joint density testing is required. The joint density shall be evaluated based on a Lower Specification Limit (LSL) of 89% of a maximum density established by averaging the maximum densities for the paved mats adjacent to the constructed longitudinal joint. The joint density requirement shall only apply to the surface lift of the pavement structure. Lots for joint density shall also be established cumulatively and laid out as per the applicable provisions within MP 401.07.21.

A normal lot size for evaluation of joint density is 10,000 linear feet of constructed joint with five, 2000 foot long sublots, unless operational conditions or project size dictate otherwise. Lots for joint density determined to be 4000 feet in length or less shall be incorporated into the previous full lot. If the length is 2000 feet or less, then one sample shall be taken, and the lot be evaluated with six samples (n=6). If the length is greater than 2000 feet, then ~~and~~ two samples shall be taken, and the lot be evaluated with seven samples (n=7). Lots for joint density that are greater than 4000 feet in length shall have samples taken representative of each 2000-foot long sublot or portion thereof.

Acceptance for joint density shall be as per 410.13.4.

Patching-and-leveling and scratch courses shall not be included in determining the total new pavement thickness to be tested for compaction. When asphalt is placed in areas that require a non-uniform thickness or is tapered to a thin edge, the method of acceptance testing shall be determined by the Engineer. Acceptance testing is not required on areas in which a full-size roller is restricted from compacting the mat properly. These areas shall be compacted to the satisfaction of the Engineer.

410.7.1.3-Shoulders and Ramps: As per MP 401.07.21, shoulders and ramp areas that are constructed simultaneously with the mainline are not included in the sampling plan. However, these simultaneously constructed shoulder and ramp areas shall be included in the lot of the adjacent mainline for the purposes of penalty and bonus calculations for compaction and mixture properties.

Shoulders that are constructed independently of the mainline shall be tested as per MP 401.07.21. However, compaction penalty calculations for these independently constructed shoulders shall not apply.

410.7.1.4-Thickness: Thickness testing shall be performed on all traveled lanes, ramps and independently constructed shoulders.

Cores obtained for mat density and bond strength will both be measured for thickness as per MP 410.07.22 Measurement for Thickness of Asphalt Pavement Using Drilled Cores, prior to those subsequent analyses. The core measurements which represent the thickness of the sampling units shall be analyzed to determine the average value of the pavement thickness. Pavement Thickness (T) shall include all of the pavement layers as specified excluding any patch and level course and scratch courses. This value will be used to determine the degree of compliance with the provisions and to develop certain factors to be used in the derivation of equitable deductions as set forth in Section 410.13.5, in the event the provisions of this Specification are not met.

410.7.1.5-Bond Strength: Bond Strength Testing shall be conducted to ensure the creation of a monolithic layered pavement; this is typically achieved by the application of a tack coat between pavement layers. Any tack coats applied by the Contractor shall be applied in accordance with Section 408.

Bond Testing shall be performed on all surface layers beginning with the existing pavement layer and then all intermediate pavement layers called for in the proposal and plans, this testing shall be performed on all traveled lanes and shoulders. Bond Testing is not required for pavement layers placed on top of a granular type layer (aggregate base, rubblized concrete, macadam, etc.).

If an asphalt pavement layer is to be placed atop a concrete surface, Bond Strength testing is not required however, a tack coat shall be applied in accordance with Section 408 to ensure complete coverage of the surface and to the satisfaction of the Engineer.

Core bond strength shall exceed a minimum of 100 psi when tested in accordance to MP 410.07.23 Guide to Determining Interface Bond Shear Strength.

410.7.2-Surface Tolerance: Shall be in accordance with Section 720 on the finished mat.

410.7.3-Pattern Segregation: Pattern segregation is continuous or repeated areas of non-uniform distribution of coarse and fine aggregate particles in the finished mat. The Division will address pattern segregation as follows:

410.7.3.1-Evaluating Pattern Segregation: If the Engineer observes pattern segregation that may result in defective pavement, then:

i. The Inspector will notify the Contractor of the observed pattern segregation.
ii. The Contractor may continue to work at their own risk while they immediately

and continually adjust the operation to eliminate the pattern segregation from future work.

iii. As a minimum and in the presence of the Engineer and the Contractor's Representative, Division personnel shall determine the average depth of pavement surface macrotexture according to MP 401.07.24 in areas with the pattern segregation and in areas with non-segregated pavement. The pattern segregation is unacceptable if the difference in average pavement texture depth between the non- segregated and segregated areas exceeds the following:
   a. For 9.5 mm or Wearing I mixes – 0.012 inch (0.305 mm)
   b. For 12.5 mm mixes – 0.016 inch (0.406 mm)

iv. The Engineer will determine if the pavement is defective as specified in Section 410.7.3.3.

410.7.3.2-Test Section: If the macrotexture tests identify unacceptable pattern segregation, then:

i. Immediately suspend placing the asphalt course. Evaluate the cause of pattern segregation according to the Paving Operation QC Plan. Provide proposed corrective actions to the Engineer and do not resume placing the asphalt course until after the Engineer reviews the proposed corrective actions and authorizes paving to continue.

ii. Determine if the pattern segregation resulted in defective pavement as specified in Section 410.7.3.3.

iii. After the Engineer allows paving to resume, place a test section not to exceed 200 tons. If the corrective actions do not eliminate observed pattern segregation, the Department will suspend paving, even if it is before the Contractor places the entire test section. Propose additional corrective actions and construct another test section. Resume normal paving operations after constructing an entire test section without pattern segregation as determined by the Engineer.

410.7.3.3-Defective Pavement: At locations selected by the Engineer and with the Engineer present, drill three 6-inch diameter cores from the area of pattern segregation and three cores from the pavement representing a non-segregated area. Do not compress, bend, or distort samples during cutting and handling and immediately provide the cores to the Inspector. The Inspector will transport cores to the producer's laboratory. With the Engineer present, test the cores at the plant for density, asphalt content, and gradation. Additional cores and/or additional testing as per MP 401.07.24 Measuring Pavement Macrotexture Depth can be used to further evaluate the pavement.

An area of pattern segregation contains defective pavement if:

a. the summation of absolute deviations from any two sieves is 20% or more from the JMF;
b. the core density is defective, the mixture is defective in asphalt content;
c. or the mixture is defective for percent passing the 75 μm (No. 200) sieve.

The core density is defective, or the cores are defective for asphalt content or gradation of the 75 μm (No. 200) sieve if the PWL is less than 55 as determined in accordance with MP 401.13.50 and based on three samples (n=3). Remove and replace the full width of the

affected lane and a minimum of 5 feet beyond each end of the area with unacceptable pattern segregation. Construct replacement pavement conforming to the appropriate surface tolerances.

410.7.4-Flushing: Provide a mix that will not flush. Flushing is continuous or repeated areas of excessive asphalt on the pavement surface. The Division may recognize flushing until the Division approves the project through final inspection. The Division will address flushing as follows:

410.7.4.1-Evaluating Flushing: When the Engineer observes flushing, then:

i. The Engineer will immediately notify the Contractor of the observed flushing.
ii. The Contractor may continue work at its own risk while it immediately and continually adjusts the operation to eliminate flushing from future work.
iii. In the presence of the Engineer, determine the average depth of pavement surface macrotexture according to MP 401.07.24 in areas of suspected flushing. If the average texture depth is less than or equal to 0.006 inches (0.152 mm), then the pavement will be considered to be flushed and is defective.

410.7.4.2-Test Section: If the macrotexture tests identify flushing, then:

i. Immediately suspend placing the paving course. Evaluate the cause of flushing according to the Paving Operation QC Plan and as directed. Provide proposed corrective actions to the Engineer and do not resume placing the paving course until after the Engineer reviews the proposed corrective actions and authorizes paving to continue.
ii. Remove and replace the defective wearing course at no cost to the Division for the full width of the affected lane and a minimum of 5 feet beyond each end of the area of defective wearing course. Construct replacement wearing course conforming to the appropriate surface tolerances.
iii. After the Engineer allows paving to resume, place a test section not to exceed 200~~TN~~ tons. If the corrective actions do not eliminate observed flushing, the Division will suspend paving even if it is before the Contractor places the entire test section. Propose additional corrective actions and construct another test section. Resume normal paving operations after constructing an entire test section without flushing as determined by the Engineer.

410.8-BLANK

410.9-EQUIPMENT:

410.9.1-Plants: All plants shall meet the general requirements set forth in AASHTO M156 unless it can be demonstrated to the satisfaction of the Engineer that a consistent quality mix can be produced with modifications to any of these requirements.

All plants in West Virginia producing asphalt for the Division shall provide documented evidence of compliance with current requirements of the West Virginia Air Pollution Control Commission.

All plants which are not in West Virginia but producing asphalt for the West Virginia Division of Highways shall provide documented evidence of compliance with current

requirements of the laws and regulations of the State in which they are producing, applicable to air pollution.

410.9.2-Dust Collector: An efficient dust collecting system shall be provided to prevent the loss of fine material. The material collected may be returned to the mixture at a uniform rate or discarded.

410.9.3-Truck Scales: Truck scales shall be provided at each Plant, except that truck scales are not required at properly calibrated automatic batching plant facilities which are equipped with digital printout equipment, and which load the trucks directly from the mixer or the weigh hopper in a surge or storage silo.

A person designated as a weigher shall be provided by the producer. The weigher shall certify that the weight of the asphalt, as determined either by the truck scales or from the digital printout of the batch weights, is correct.

Each truck shall be weighed empty prior to each load, except at automatic batch plants approved to operate without truck scales.

All truck scales shall be mounted on solid foundations which will insure them remaining plumb and level.

Approval and sealing of scales shall be conducted at the frequency determined by the West Virginia Division of Labor, Bureau of Weights and Measures, and when the plant is moved, or upon the request of the Engineer. The Engineer shall be notified of any scale malfunctions when material is being furnished to Division of Highways projects. The Division may, at its option, accept inspection and sealing by out-of-state agencies when the mixing plant is located outside West Virginia.

A digital recorder shall be required on all truck scales. The digital recorder shall produce a printed record of the gross, tare and net weights, and the time, date, truck identification, and project number. Provision shall be made for constant zero compensation and further provision shall be made so that the scales may not be manually manipulated during the printing process. The system shall be interlocked so as to allow printing only when the scale has come to rest. In case of breakdown of the automatic equipment, the Engineer may permit manual operation for a reasonable time, normally not to exceed 48 hours, while the equipment is being repaired.

The scales shall be of sufficient size and capacity to weigh the loaded trucks that are used for delivery of asphalt from the plant.

410.9.4-Test Weights: As part of its standard equipment, each plant which proportions aggregate by weight shall provide a minimum of ten 50-pound (22.68 kg) test weights for the purpose of verifying the continued accuracy of its weighing equipment.

Plants which proportion asphalt material by weight shall furnish, in addition to the above, one five pound (2.268 kg) test weight.

410.9.5-Surge and Storage Silos: During the normal daily operation of the plant, asphalt may be stored in a surge or storage silo for a maximum of ~~12~~ 6 hours, provided the silo has received prior evaluation and acceptance through the District plant inspection. The resulting temperature of the material at time of placement and compaction shall be sufficient to comply with 410.10.~~13 and 410.10.4~~

~~Longer silo storage times, up to 24 hours, may be permitted for dense graded asphalt if the storage silo is insulated and/or heated to assure that the proper mix temperature is maintained. The gates at the bottom of the storage silo shall be adequately heated and sealed when the asphalt is held for the extended period of time. When asphalt is stored for the extended time period, it shall not be used until the temperature has been checked and the asphalt has been visually inspected for hardening of the mix and stripping of the asphalt from the aggregate. Approval of the extended storage time may be revoked if it is determined through inspection and/or testing that the extended storage is having a detrimental effect on the asphalt.~~

410.9.6-Inspection of Equipment and Plant Operations: The Engineer shall have access to the plant to assure the adequacy of the equipment in use, to inspect the conditions and operation of the plant, to verify weights, to verify the proportion and character of materials, and to determine if specified temperatures are being maintained in the preparation of the mixture.

410.9.7-Trucks for Transporting Mixture: The use of diesel fuel, kerosene, or similar solvent-based products which can dissolve the asphalt film from the aggregate particles will not be permitted for use as a release agent. Any commercial release agent which is certified as harmless to the mix may be used; however, the Division reserves the right to restrict any release agent that is shown to cause problems during placement of the mix. All excess release agent shall be removed from the truck bed prior to loading the asphalt.

All truck beds shall be insulated with approved material. No trucks shall be used which cause segregation of the materials, which show large oil leaks, or which cause undue delays in delivery of material. All trucks shall be provided with a waterproof cover and a hole in the body for the purpose of conveniently checking the temperature of the load. Covers shall be suspended slightly above the mixture, shall extend over the sides of the truck, and shall be securely fastened to eliminate air infiltration and to prevent water from coming in contact with the mixture.

410.9.8-Laboratory: A testing facility or laboratory, as described below, shall be provided within reasonable proximity of the asphalt plant. Plant operations must be visible from within the laboratory.

The laboratory shall be of sufficient size to hold all laboratory test equipment and supplies with adequate floor space to allow the technicians to test samples in an efficient manner. The laboratory shall be furnished and maintained with adequate ventilation, heat, light, water, sink and drainage, electrical or gas outlets, or both, work table, shelves, and supply cabinets.

The laboratory shall be supplied with the equipment and materials listed below and these shall be maintained to meet the applicable requirements of AASHTO or ASTM:

i. Hot plate, gas or electric.
ii. Large ovens (as needed for heating and drying samples), gas or electric.
iii. Unit weight container, ½ cubic foot (0.014 cubic meter). Required for slag only.
iv. Balances of sufficient capacity and accuracy for conducting specified tests and plant calibration.

v. Thermometers: dial type, liquid-in-glass, and digital as required for conducting standard test procedures and monitoring mix temperatures. Digital thermometers shall be equipped with an appropriate sturdy probe that can be pushed into a sample of hot asphalt to check the temperature of the mix.
vi. Ro-Tap Sieve shaker or equivalent, with 8 and/or 12 inch (200 and/or 300 mm) diameter screens.
vii. Sample splitters for fine and coarse aggregates.
viii. Miscellaneous items (including sample splitting trowels, scoops, square point shovel, aggregate sample pans, heat resistant gloves, measuring rules, brushes,flashlight, timing devices, and glassware as needed).
ix. Expendable supplies necessary for performance of tests.
x. Equipment for determining the maximum specific gravity of asphalt mixtures as specified in AASHTO T209.
xi. Non-contact infrared thermometer accurate to ± 2° F (± 1° C).
xii. Equipment for determining the bulk specific gravity of asphalt mixtures using saturated surface dry specimens complying with AASHTO T166.
xiii. Marshall equipment necessary to comply with AASHTO T245 and ASTM D5581, including a calibrated automatic testing apparatus having recording capabilities and compaction hammers. (Marshall designs only)
xiv. Asphalt content ignition oven with built-in scale and printer meeting the requirements of AASHTO T308, Test Method A.
xv. Calibrated Gyratory compactor meeting requirement of AASHTO T312 with computer (including software for data acquisition and test calculations) and printer. Compactor must be calibrated to the internal angle in accordance with AASHTO TP71 with annual verification (Superpave designs only).

410.9.9-Asphalt Paving Equipment: Asphalt paving equipment shall be self-contained and of sufficient size, power, and stability to receive, distribute and strike-off the asphalt mixture at rates and widths commensurate with the typical sections and other details shown on the plans. The paver shall be provided with an activated screed or strike-off assembly equipped to be heated. Approval of the paver by the Engineer will be based on the demonstrated capability of the equipment to place the mixture to the required cross-section, profile, and alignment in an acceptable, finished condition ready for compaction.

The paver shall be equipped with means of preventing the segregation of the coarse aggregate particles when moving the mixture from the paver hopper to the paver augers. It shall also be capable of pushing a sufficient amount of the mixture under the auger gearbox to prevent streaking or tearing of the mat. Some paver models may require the installation of a manufacturer retrofit kit or equipment modification to accomplish this.

Specialized equipment or hand methods approved by the Engineer may be employed to spread the asphalt mixture where the use of standard full-scale paver is impractical due to the size or irregularity of the area to be paved.

Pavers shall be equipped with mechanical or automatic grade and slope controls. The use of automatic grade and slope controls with a traveling straight edge shall be required only when specified on the Plans or in the Proposal. Both the grade and slope controls shall be in working order at all times. In the event of failure of the automatic controls, the Contractor will be

permitted to finish the day's work using manual controls but will not be allowed to resume work the following day until the grade and slope controls are in proper working order.

410.9.10-Compaction Equipment: Compaction may be performed by self-propelled steel-wheeled, pneumatic-tired and/or vibratory rollers. Hand-held rollers or vibrating plates may be used in small inaccessible areas if 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.

410.10-PAVING OPERATIONS:

410.10.1-Spreading and Finishing: Before spreading any material, the contact surfaces of curbs, gutters, manholes, and of adjacent Portland cement concrete pavement edges shall be painted or sealed with asphalt material. Exact edge of pavement, except on concrete, shall be established by a string or chalk line for a distance of not less than 500 feet ahead of the spreading operation. For projects where the existing pavement was milled prior to the placement of new asphalt, the edge of pavement shall be the edge of milled section.

For mixes produced with neat (non-modified) asphalts (which may include PG 64H- 22, PG 64S-22, PG 58H-28, and PG 58S-28) the temperature of the mixture at the time of placement shall be within the temperature requirements of the JMF. The JMF temperature range shall be the liquid asphalt supplier's specified mixing temperature ±45°F (±25°C) with a maximum mixing temperature of 338°F (170°C). Additional allowances will be made for water injection processes with a minimum mixing temperature of 220°F (105°C).

The mix temperature shall be monitored by inserting a thermometer into the mix through the hole in the truck bed.

The temperature of the completed mix, when measured at the plant, shall be within the tolerance as established by the JMF. The first load which demonstrates temperatures outside of that range shall be accepted, provided that the temperature is still within the master temperature range. No additional loads of material shall be run out until necessary steps are taken to reestablish the temperature of the mix within the plant tolerance. When measured at the project site, the temperature of the mix shall be within the tolerance established by the JMF. The first truck load of material which demonstrates temperatures outside of that range or any trucks in transit at that time shall be accepted provided temperatures are within the master temperature range. Any truckload of material which exceeds the master temperature range may be rejected by the Engineer. However, the plant shall immediately be notified that no additional loads of material are to be dispatched until necessary action is taken to reestablish temperature within JMF specification limits.

When the surface temperature falls to within 10°F (6°C) of the weather restrictions of Table 410.8, the mix temperature may be increased up to a maximum of 338°F (170°C) unless otherwise specified by the asphalt supplier. The temperature of each truckload of material shall be monitored for compliance. Any truckload of material which exceeds this maximum temperature may be rejected by the Engineer.

Mixes produced with asphalts that contain modifiers for high or low temperature performance enhancement shall meet the temperature requirements recommended by the asphalt supplier, as determined using the mid-point of the mixing temperature range shown on the asphalt temperature-viscosity charts and allowing for ± 25°F (14°C).

410.10.2-Safety Edge: When the total specified lift thickness of pavement is 1.5 inches or greater, asphalt safety edge shall be constructed on the outside pavement edge. The device utilized shall be a model listed on Division Approved Product Listing.

The resulting finished surface of the safety edge shall be sufficiently consolidated so as to show no segregation or raveling of the aggregate and shall have the same surface profile and texture of the compacted mat surface.

Safety edge is not to be used through intersections, against curb or barrier, or when directed by the Engineer. The paving operation shall allow for automatic and/or manual transitions at cross roads, driveways, and intersections. The Engineer may allow short sections of handwork for transitions at driveways, intersections, interchanges, and bridges.

410.11-PROTECTION OF PAVEMENT AND TRAFFIC CONTROL:

The Contractor shall be responsible for the protection of asphalt surfaces from damage by their equipment and personnel. When the construction of asphalt surfaces is undertaken on projects under public traffic and the road surface is 16 feet wide or greater and the ADT is 400 or greater, the Contractor shall place no passing signs, Interim pavement markings, and Temporary pavement markings to delineate the edge line, centerline, and/or lane line of the roadway as required herein and in the project plans. The provision of Section 336: Maintaining Traffic shall apply.

Interim markings are described as markings applied to freshly resurfaced roadways between lifts and after placement of the final lift prior to opening the portion of the roadway being resurfaced to traffic. These markings are intended to provide the minimum amount of delineation required for safe navigation of the roadway and are to be succeeded by Temporary markings within a three (3) to fourteen (14) day period, based on the type of roadway and AADT, as specified herein. Interim and Temporary markings shall conform to the requirements of Section 663: Pavement Markings.

410.12-METHOD OF MEASUREMENT:

Asphalt will be measured by the Square Yard (SY). The quantity will be determined by the Plan Quantity as provided for in the proposal unless otherwise directed by the Engineer.

Any patching or leveling mixture placed on a subbase or base course constructed in the same Contract with the asphalt items shall be at the expense of the Contractor. No additional compensation will be allowed for the material or any work incidental to its placement unless otherwise approved by the Engineer. No additional measurement is necessary nor will addition compensation be allowed for the placement of Safety Edge.

410.13-BASIS OF PAYMENT:

The quantities determine as provided above, will be paid for at the contract unit price for the items listed below, which prices and payment shall be full compensation for furnishing all the materials and doing all the work herein prescribed in a workmanlike and acceptable manner, including all labor, tools, equipment, field laboratory, supplies, tack coat, and incidentals necessary to complete the work and provide the performance criteria specified.

There will be no additional compensation for Interim Pavement Markings**.**

410.13.1-When a Lot of asphalt material is found not in compliance with the tolerance requirements for asphalt content and gradation as shown in MP 401.02.31, it shall be subject

to a price adjustment in accordance with the criteria for Determination of Percent Within Limits established in MP 401.13.50 and pay factors in Table 410.13.3.1.

410.13.2-BLANK

410.13.3- For Interstates and divided NHS Highways, the unit price for each Lot of asphalt pavement Mat shall be adjusted as follows in Table 410.13.3.1 in accordance with MP 401.13.50. For two-lane and non-divided NHS Routes, the pay factor for asphalt content and percent passing the 75 µm (No. 200) sieve shall be determined by Table 410.13.3.1. However, the mat density pay factor shall be determined by Table 410.13.7.2.

TABLE 410.13.3.1

Percentage of Material Within Specification Limits (PWL)	Lot Pay Factor (Percent of Contract Unit Price)
96-100 Note 1	102 Note 1
90-95	100
75-89	[(0.5)PWL]+55
55-74 Note 2	[(1.4)PWL]-12

Note 1 Payment of 102% for mat density shall be subject to additional requirement of the average compaction for the lot being evaluated to be a minimum of 93% density.

Note 2 Material with a PWL less than 55 is considered defective and will be considered for removal and replacement of the lot. If only one lot characteristic has a percent within limits less than 55, the Engineer, may allow the Contractor to leave the defective lot in place. The decision to remove and replace the subject lot shall include evaluation of all lot characteristics for pay and surface characteristics as per guidelines set forth in MP 401.07.25. If the material is left in place, the Department will pay for the defective lot at a value not to exceed 50% of the contract unit price of asphalt per square yard. (ie Contract unit price = $10 sy → $5 sy max)

410.13.3.1-Price Adjustment: The Division will compute the percent of the contract unit price paid as follows:

$$\text{Lot Payment} = CP\ (2PD + PB + PA) / 400$$

Where:

CP = Contract unit price per lot (unit price times lot quantity)
PD = Payment Factor Percentage for mat density
PB = Payment Factor Percentage for asphalt content.
PA = Payment Factor Percentage for percent passing the 75 µm (No. 200) sieve

Shoulders and ramps shall be included in penalty calculations for mixture and compaction unless they are constructed independently, where the density requirements shall be waived. When compaction requirements are waived, PD will be minimum of 100.

410.13.4-Joint Density Adjustments: For Interstates and divided NHS Highways, joint Density PWL calculations shall be in accordance with MP 401.13.50. Joint Density bonus adjustments will be calculated for joint lots with a PWL greater than or equal to 80. Joint

Density negative adjustments will be calculated for joint list with a PWL less than or equal to 60. Price adjustments shall be calculated using the formulas below. There will be no adjustment for joint lots who's PWL falls between 60 and 80.

Bonus adjustment calculated as follows:

$$\$T = \frac{PWL-80}{20} \text{ X } 4{,}000$$

Negative adjustment calculated as follows:

$$\$T = \frac{60-PWL}{60} \text{ X } 12{,}500$$

Adjustments calculated for lots less than or greater than 10,000 feet in length shall be prorated directly proportional to the amount of length less than or greater than 10,000 feet.

For two-lane and non-divided NHS Routes, refer to Section 410.13.7.3.

410.13.5-Thickness Adjustments: No payment will be made for pavement areas deficient in thickness by more than 35% T.

Pavement which is deficient in thickness by more than 50% T is considered to be inadequate to perform satisfactorily and shall be removed and replaced at no added cost to the Division.

The balance of the item, the portion of the item not treated in the manner set forth above, will be treated in the manner set forth in 410.13.5.1 below.

410.13.5.1-Price Adjustments for Thickness - When all individual measurements meet or exceed the specified thickness, there will be no adjustment for payment. If any individual values or when the average value of the pavement thickness per lot is less than the specified total thickness, the quantity of pavement represented by this average thickness will be paid by a direct calculation as defined as follows:

$$\text{Price Adjustment } \% = \left(\frac{t}{T}\right) x100$$

Where:

T = Total Plan Thickness

t = avg. lot thickness + 0.04 in.

This value is then applied to the unit price for the asphalt place in the lot, this adjustment shall remain separate from the PWL adjustments for AC, Gradation, Density, etc.

410.13.6-Bond Strength Adjustment: For Interstates and divided NHS Routes, bond Strength PWL calculations shall be in accordance with 410.13.50, Guide to Statistical Analysis of Material Using Quality Level Analysis-Percent within Limits. However, for the purpose of relieving large standard deviations from abnormally strong samples, any sample with a strength exceeding 150 psi will be evaluated as 150 psi instead of the actual strength. The actual strength ~~should~~ shall still be recorded as such on the reporting form.

Bond Strength positive adjustments will be calculated for lots with PWL greater than or equal to 90. Bond Strength Negative adjustment will be calculated for lots with PWL less than

or equal to 70. There is no adjustment for bond Strength lots who's PWL falls between 70 and 90.

Positive adjustment calculated as follows:

$\$T = \frac{PWL-90}{20}$ X ~~2,000~~ 5,000

Negative adjustment calculated as follows:

$\$T = \frac{/0-PWL}{70}$ X ~~40,000~~ 25,000

Adjustments calculate for lots less than or greater than the standard 2,500 tons shall be prorated directly proportional to the amount of tonnage less than or greater than 2,500 tons. This shall be calculated on the theoretical tonnage for the lot, not the actual tonnage used.

For two-lane and non-divided NHS Routes, refer to Section 410.13.7.4

410.13.7 – Two-Lane and Non-divided NHS Route Exceptions: Due to the wide range of variability on the roadway, the following exceptions for lot/sublot layout and analysis of existing condition dependent test results shall apply:

410.13.7.1-Acceptance Testing of Asphalt: A lot shall consist of three (3) to seven (7) equal sublots. A normal sublot size is 500 tons unless operational conditions and sublot size dictate otherwise. Determine the number of sublots on the project by converting the square yardage of the travel lanes and simultaneously paved shoulders to tonnage. Divide the tonnage by 500 and round to the nearest whole number (n). Use that number (n) in Table 410.13.7.1 to determine the number of lots to be used for acceptance.

TABLE 410.13.7.1

Number of Sublots (n)	Number of Lots
3 to 7	1 Lot with (n) even sublots
8	2 Lots with 4 even sublots each
9	2 Lots - Lot 1, 5 Sublots / Lot 2, 4 Sublots
10	2 Lots with 5 even sublots each
11	2 Lots - Lot 1, 6 Sublots / Lot 2, 5 Sublots
12	2 Lots with 6 even sublots each
13	2 Lots - Lot 1, 7 Sublots / Lot 2, 6 Sublots
14	3 Lots - Lot 1, 5 Sublots / Lot 2, 5 Sublots / Lot 3, 4 Sublots
15	3 Lots with 5 even Sublots each

Turn lanes, intersections, and independently constructed shoulders shall not be subject to price adjustments, positive or negative, if the combined square yardage converts to less than 500 tons. If the square yardage converts to over 500 tons, then one additional sublot for asphalt content, percent passing the 75 µm (No. 200) sieve, and bond strength shall be added to the last lot constructed. Compaction shall be monitored, documented, and

submitted to the Engineer by a certified Asphalt Field and Compaction Technician to assure that it meets specification requirements.

410.13.7.2 -Basis of Payment: The payment factor for density shall be adjusted as follows in Table 410.13.7.2. This payment factor (PD) will then be used in the Lot Payment calculation formula in Section 410.13.3.1.

TABLE 410.13.7.2

Payment Factors for Pavement Mat Density	
Average Lot Percent Density	**Payment Factor (PD)**
Greater than 98 %	Note 1
94.00% to 98.00%	102
93.00% to 93.99%	101
91.50% to 92.99%	100
88.00% to 91.49%	= 100 – 4*(91.50% - Percent density)
Less than 88%	= 84 – 10*(88% - Percent density) Note 2

Note 1 Mat density slightly above 97% is normally only a problem if it leads to asphalt flushing on the surface of the mat or rutting due to an unstable mix. The Division will make a special evaluation of the material and determine the appropriate action.

Note 2 When the density is less than 92%, the mat will be more susceptible to accelerated deterioration and a decrease in the expected service life of the pavement. For mat densities less than 88%, the percent of Contract Bid Price will be decreased by an additional 10% per percentage of mat density less than 88%, unless a Special evaluation performed by the Division determines a more appropriate action.

410.13.7.3-Joint Density Adjustments: The adjustment for joint density shall be determined by Table 410.13.7.3. This adjustment is per linear foot and will be multiplied by the total number of liner feet in the lot to determine the total lot adjustment. This is calculated per lot and applied per Section 410.13.8.3.

TABLE 410.13.7.3

Pay Adjustment for Pavement Joint Density per Linear Foot	
Average Lot Percent Density	Price Adjustment ($ / LF)
Greater than 97 %	Note 3
94.00% to 97.00%	0.40
91.50% to 93.99%	= [0.40 – {0.12*(94.00 - Percent Density)}]
89.00% to 91.49%	0
88.00% to 88.99%	-0.20
Less than 88%	= [{0.50*(Percent Density – 88.00)} – 0.20]

Note 3 Joint density slightly above 97% is normally only a problem if it leads to asphalt flushing on the surface of the mat or rutting due to an unstable mix. The Division will make a special evaluation of the material and determine the appropriate action.

410.13.7.4-Bond Strength Adjustments: The adjustment for bond strength shall be determined by Table 410.13.7.4. This is calculated per lot and applied per Section 410.13.8.4. This shall be calculated on the theoretical tonnage for the lot, not the actual tonnage used.

TABLE 410.13.7.4	
Pay Adjustment for Bond Strength per 2500 Ton Lot	
Average Lot Bond Strength (PSI)	**Price Adjustment ($ / Lot)**
Greater than 150.00	5000
100.00 to 149.99	= [5000 – 100*(150.00 – PSI)]
75.00 to 99.99	= [{1000*(PSI - 75.00)} – 25,000]
Less than 75.00	- 25,000

410.13.~~7~~8-Lot Payment Calculations: The pay factors that are calculated with in the specification are to be applied in the following way:

410.13.~~7~~8.1-PWL Factors: The calculated total PWL for a given lot is applied to the bid unit price for the asphalt mixture in the lot. Once the unit price has been adjusted the quantities can be calculated to arrive at the payment for the lot.

410.13.~~7~~8.2-Thickness Adjustment: There is no adjustment for thickness greater than the thickness that is specified in the plans. If there is a Price Adjustment (Section 410.13.5) for thickness this factor (percentage) is applied to the contract bid unit price times the quantity in the lot to arrive at a dollar amount penalty. This penalty is applied to the overall payment for the lot.

410.13.~~7~~8.3-Joint Density Adjustment: If it is determined in Section 410.13.4 of this specification that a Joint Density Adjustment is warranted the dollar amount determined in the formulas of Section 410.13.4 or Table 410.13.7.3 shall be applied to the overall payment for the lot.

410.13.~~7~~8.4-Bond Strength Adjustment: If it is determined that a Bond Strength Adjustment is warranted ~~by~~ the formulas in Section 410.13.6 or Table 410.13.7.4 shall be used to calculate the adjustment. This adjustment shall be applied to the overall payment for the lot.

410.14-PAY ITEMS:

ITEM	DESCRIPTION	UNIT
410001-*	"design method" Asphalt Base Course, Type "mix type"	Square Yard (Meter)
410002-*	"design method" Asphalt Wear Course, Type "mix type"	Square Yard (Meter)
410007-*	"design method" Asphalt Skid Pavement, Type "mix type"	Square Yard (Meter)

* Sequence number
"design method" shall be either Marshall or Superpave
"mix type" from Table 401.4.2A or 401.4.2B

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

SECTION 601
STRUCTURAL CONCRETE

601.3-PROPORTIONING:

601.3.1-Mix Design Requirements:

601.3.1.1-Mix Design Using Potentially Reactive Aggregate:

601.3.1.1.1-Selecting Preventive Measures For ASR:

601.3.1.1.1.4-Requirements for Various Prevention Levels:

601.3.1.1.1.4.2-Preventions Level W, X and Y:

ADD THE FOLLOWING AT THE END OF SUBSECTION 601.3.1.1.1.4.2

Option 3: Using the Lithium Nitrate Admixture: The 30 percent aqueous solution of Lithium Nitrate Admixture meeting the requirements of Section 707.17 shall be used for all level of prevention including "Level Z" given in Table 601.3.1.1.1.3 except for Class H concrete. The dosage rate of Lithium Nitrate Admixture shall be based upon the alkali content of cement used in a concrete mix.

Calculation of lithium nitrate ($LiNO_3$) admixture dosage (100 percent) for mitigation without use of SCMs with a 30 percent aqueous solution of lithium nitrate.

$$\text{Gallons of } LiNO_3/yd^3 = (A * B * 0.55)/100$$

Where:

A = Pound of Portland cement per cubic yard in a concrete mix

B = Percentage of Alkali content of cement used in a concrete mix

Example: If the cement content of concrete is 550 lbs/yd^3 and the total alkali content of the cement is 0.82 percent, the dosage of lithium nitrate admixture is: (550 * 0.82 * 0.55)/100 = 2.48 Gal/yd^3.

$$\text{Liters of } LiNO3/m3 = (A * B * 4.6)/100$$

Where:

A = Kg of Portland cement per cubic meter in a concrete mix

B = Alkali content of cement used in a concrete mix

The water content of the mix shall be adjusted by removing 0.85 gallons of water per gallon of lithium nitrate solution.

Example: Amount of water to be reduced (using the value from above example)
Gal/yd^3 = 0.85 * 2.48 = 2.11

Any concrete mix using a 100 percent lithium nitrate admixture dosage will be accepted without evaluation. The contractor shall evaluate the effectiveness of less than 100 percent lithium nitrate admixture in a concrete mix, alone or in combination with fly ash or slag cement or silica fume, in the reduction of expansion in accordance with ASTM C1567*, when a reactive aggregate(s) is (are) used in a concrete mix, at a Division approved lab (an AASHTO accredited Lab, accredited for ASTM C1567) at the contractor's expense. The dosage rate shall not be less than 50 percent when only a lithium nitrate admixture is using for evaluation and no SCMs are included in the concrete mix. The sampling and shipping of all aggregate shall be witnessed by a representative of the Division. The ASTM C1567 test results will be considered valid for 5 years from the date of testing.

If both of the aggregates (coarse and fine) used in a concrete mix are reactive (R1, R2 or R3), the contractor shall evaluate the effectiveness of the lithium nitrate admixture, alone or in combination with fly ash or slag cement or silica fume for both of the aggregates separately. When the same source material** is proposed for the use both as coarse and as fine aggregate, test only a selection of the reactive fine aggregate or reactive coarse aggregate, unless there is reason to expect that the coarse aggregate has a different composition than the fine aggregate or vice-versa. The combination of cement, lithium nitrate admixture, alone or in combination with fly ash or slag cement or silica fume, and aggregate that expands less than 0.10% at 16 days after casting will be considered as meeting the "Requirements for Various Prevention Levels (Section 601.3.1.1.1.4)" except for Class H concrete.

The approved lithium nitrate admixture shall meet the requirements of Section 707.17 and will be listed as "Type S" admixture with footnote of approved admixture for ASR mitigation on the MCS&T web page under Division Approved Source/Product Listing (APL) for Type S: Special Performance. The alkali level of fly ash used in the subject mix shall not exceed 4.5%. The alkali level of slag cement used in the subject mix shall not exceed 1.00%. The alkali level of silica fume used in the subject mix shall not exceed 1.00%. Mix design shall be reviewed and approved by the Engineer.

* Modify the w/c ratio of the mortar used in the ASTM C1567 test to 0.50.
Replace Section 5.3 (Sodium Hydroxide Solution) of ASTM C1567 with the following:
Sodium Hydroxide Solution - Each liter of solution shall contain 40.0 g of NaOH dissolved in 800 ml of water. Add 71 ml of the lithium nitrate admixture multiplied by the decimal equivalent of the lithium nitrate admixture dosage. (For example, to test a 75% lithium nitrate admixture dosage, each liter of solution will contain 0.75 times 71 ml of lithium nitrate admixture.) This mixture shall be diluted with additional distilled or deionized water to obtain 1.0 liter of solution. The volume proportion of soaking solution to mortar bars in a storage container shall be 4 ± 0.5 volumes of solution to 1 volume of mortar bars. The volume of a mortar bar may be taken as 184 ml. Include sufficient test solution to ensure complete immersion of the mortar bars.

** Same source material applies to same Limestone, Diabase, Quartzite and Basalt source.

December 21, 2020

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

SECTION 615
STEEL STRUCTURES

615.1-GENERAL:

615.1.1-Description:

ADD THE FOLLOWING:

Jacking Steel Superstructure. This work shall consist of the design, implementation, and maintenance of the jacking of steel superstructure to complete repairs as described in the plans. Jacking of steel superstructure shall include access, jacks, structural members, connections, rollers and other supports as needed to jack the superstructure and adequately support the anticipated loads during construction, including, but not limited to, dead loads, wind loads, and construction loads.

615.1.2-Notice of Beginning Work:

ADD THE FOLLOWING:

615.1.2.1-Submittals: Submittals shall be accepted by the Engineer prior to commencement of the subject work.

615.2-WORKING DRAWINGS:

ADD THE FOLLOWING:

615.2.3-Jacking Steel Superstructure: The Contractor shall submit drawings illustrating fully their proposed method of jacking the superstructure. The drawings shall show details of all jacks and product data; structural members, rollers, connections and other supports;

sequence of jacking; and jacking procedures. The drawings shall be complete in detail for all anticipated phases and conditions during erection. Design calculations, sealed by a West Virginia Registered Professional Engineer, shall be submitted by the Contractor to the Engineer at least twenty-one (21) calendar days prior to commencing work, unless otherwise noted in the plans. Receipt of plans, drawings and calculations does not constitute review or approval or relieve the Contractor of their responsibility to satisfactorily design the jacking of the superstructure. The design calculations shall demonstrate that member capacities for jacking and supported members are not being exceeded.

615.8-BASIS OF PAYMENT:

ADD THE FOLLOWING:

615.8.2-Jacking Steel Superstructure: The quantities, determined as provided above, will be paid for at the contract unit prices bid for the items listed below, which prices and payments shall be full compensation for furnishing all the material and doing all the work herein prescribed in workmanlike and acceptable manner including all labor, tools, equipment, supplies, access, installation of web-stiffeners (if required), beveled plates, rollers, structural modifications (if required), necessary upkeep and maintenance, and incidentals necessary to complete the work.

The Contractor will be paid 75% of the bid price for this item once all the jacking of steel superstructure is in place to complete repairs. The remaining 25% will be paid once it is all removed.

615.9-PAY ITEMS:

ADD THE FOLLOWING:

ITEM	DESCRIPTION	UNIT
615039-001	Jacking Steel Superstructure	Lump Sum

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SUPPLEMENTAL SPECIFICATION

FOR

SECTION 626
RETAINING WALL SYSTEMS

626.5-MATERIALS:

626.5.1-Mechanically Stabilized Earth Components:

626.5.1.1-Facing Elements:

DELETE THE CONTENTS OF SUBSECTION 626.5.1.1.3 AND REPLACE THE FOLLOWING:

626.5.1.1.3-Wire Facings: Wire facing shall be shop fabricated of cold drawn steel wire conforming to the minimum requirements of AASHTO ~~M 32-M/M 32-~~ M336 and welded into the finished configuration in accordance with AASHTO ~~M 55-M/~~M 55. Galvanizing shall conform to the minimum requirements of AASHTO M-111.

Retention material shall be placed along the back face of the wire facing to retain the backfill behind the wall. Retention material shall be capable of retaining the backfill, UV resistant and shall have a high permittivity.

DELETE THE CONTENTS OF SUBSECTION 626.5.1.1.5 AND REPLACE THE FOLLOWING:

626.5.1.1.5-Metal Soil Reinforcing or Attachment Devices: Cutting of reinforcing strips or mesh at vertical obstacles shall not be permitted. Care must be taken to avoid damage to the galvanized coating during handling, storing, and shipping.

The following requirements shall apply to all soil reinforcing and attachment devices:

A. Reinforcing strips shall be hot rolled from bars to the required shape and dimensions. Their physical and mechanical properties shall conform to ASTM A-36. Galvanization shall be required and shall conform to the minimum requirements of AASHTO M-111.

B. Reinforcing mesh shall be shop fabricated of cold drawn steel wire conforming to the requirements of paragraph one of Section 709.4. Galvanization shall be applied after the mesh is fabricated and shall conform to the minimum requirements of AASHTO M-111.

C. The tie strips shall be shop fabricated of a hot rolled steel conforming to the

minimum requirements of ASTM A-570, Grade 50 or equivalent. Galvanization shall be required and shall conform to AASHTO M-111.

D. Loop embedments shall be fabricated of cold drawn steel wire conforming to ASTM A-510, UNS G-10350 or AASHTO ~~M 32~~ M336. Loop embeds shall be welded in accordance with ASTM A-185. Both shall be galvanized in accordance with ASTM B-633 or AASHTO M-111.

E. Bolts shall meet the requirements of AASHTO M-164. Nuts shall meet the requirements of AASHTO M-291 Grade DH or AASHTO M-292 2H. Fasteners shall be galvanized in accordance with AASHTO M-232.

F. Connector pins and mat bars shall be fabricated from cold drawn steel conforming to AASHTO ~~M 32~~ M336and welded to the soil reinforcement mats as shown in the plans. Galvanization shall be required and shall conform to AASHTO M-111.

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

SECTION 627
FINGER EXPANSION DAM & DRAINAGE ASSEMBLY

627.1-DESCRIPTION:

The work shall consist of removing the existing finger expansion dam assembly, and of furnishing and placing the new finger expansion dam and drainage assembly at the locations indicated on the plans. The construction shall be in accordance with this Specification and in reasonably close conformity with the Plans or as established by the Engineer.

627.2-MATERIALS:

627.2.1-Steel Products: All steel components of the finger dam and drainage assembly shall meet AASHTO Designation M270, 36 ksi or 50 ksi, and the requirements of Section 615 of the Specifications unless otherwise noted herein or in the plans.

627.2.2-Reinforcing Steel: Reinforcing steel bars shall be epoxy coated and shall be in accordance with Section 602 of the Specifications.

627.2.2-Finger Dam Drain Trough: The finger dam drain trough shall be fabricated using a continuous synthetic fabric reinforced elastomer that is resistant to abrasion, sunlight, oils, and saltwater and shall comply with the requirements listed below:

Description	Requirement	ASTM Method
Thickness (inches)	0.25	
Durometer Hardness (Shore A)	50 or 60	D2240
Low Temperature Brittleness (wrapped around a 3” dia. mandrel)	No Cracking (22 hrs. @ -20°F)	
Tensile Strength (minimum, both directions)	800 lbs./in.	D412
Elongation (maximum)	30%	D412
Tear (Die C)	120 lbs./in.	D624

Description	Requirement	ASTM Method
Ozone Resistance	No cracks for 100 hours of exposure of 20% elongated samples @ 100°F and 100 PPHM ozone.	D1149

The finger dam drain trough shall not be spliced unless indicated on the approved shop drawings. When splices are indicated, they shall be vulcanized by the manufacturer. Longitudinal splices are not permitted.

The maximum depth of the finger dam drain trough shall be controlled so that it does not come into contact with the existing bridge substructure.

627.3-SHOP DRAWINGS:

The Contractor shall field verify all plan dimensions to ensure accuracy of expansion joint fabrication prior to submission of shop drawings.

The Contractor shall design and develop the sequencing of all work as required by the plans and prepare shop drawings of sufficient detail to fabricate all structural steel components necessary for completion of the contract. Sequencing details and shop drawings shall be certified by the Contractor and submitted to the Engineer.

627.4-PREPARATION OF JOINT:

The Contractor shall remove the existing expansion joint assembly to the limits shown in the plans. The opening left by the removal of the joint shall meet the dimensional requirements shown in the plans. If additional concrete is needed to extend the deck to obtain the required joint opening, this work and material shall be included in this item.

The Contractor, to the satisfaction of the Engineer, shall inspect the portion of the existing expansion joint assembly to remain in place as shown in the plans. If, in the opinion of the Engineer, the remaining steel assembly has been separated from the anchor studs or the anchor studs are no longer bonded to sound concrete, the Contractor shall cut the deck, remove those portions of the existing steel and studs, and fill the void with Class K Concrete to the limits shown for placing the new joint. The repair material shall be fully cured prior to pouring the concrete headers. These repairs, if required, shall be included in this item unless otherwise shown in the plans.

Care shall be taken to not damage the reinforcing bars or their bond to the existing concrete. Any bars missing or damaged beyond repair, in the opinion of the Engineer, shall be replaced with new epoxy coated bars of comparable size. Contractor shall be responsible for all costs associated with any repair deemed necessary by the Engineer. These bars shall be coupled to sound rebars once the damaged portions have been removed. These repairs, if required, shall be done in accordance with Sections 104.3 and 109.4 of the Specifications unless otherwise shown in the plans.

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.

627.5-INSTALLATION:

Field splices, when approved, are to be placed at crown breaks or transverse breaks in deck. Welding shall meet the requirements of Section 615.5.7 of the Specifications.

The steel retainers must be placed and aligned to the correct "grades" and elevations. The temporary support method used to achieve this alignment is subject to the Engineer's approval.

Remove all loose and unsound concrete from the surface within the joint area. Blast clean the joint area, steel retainer and anchorage in accordance with the Structural Steel Painting Council Specification SP10 immediately prior to placement of the concrete.

After installation is completed, the manufacturer's representative shall certify to the Engineer, in writing, that the expansion dam assembly was installed in accordance with the Manufacturer's requirements.

627.6-WATERTIGHT INTEGRITY TEST:

The Contractor shall test the entire (full-length) joint system for watertight integrity. Contractor shall employ a method satisfactory to the Engineer. The entire joint system shall be covered with water for a minimum duration of 15 minutes. The concrete surfaces under the joint shall be inspected, during this 15 minute period and also for a minimum of 45 minutes after the supply of water has stopped, for any evidence of dripping water or moisture outside of the expansion dam drainage system.

Should the joint system exhibit evidence of water leakage at any place whatsoever outside of the expansion dam drainage system, the Contractor shall locate the place(s) of leakage and he shall take any and all measures necessary to stop the leakage. The Engineer will approve measures deemed necessary by the Contractor.

In the event that measures to eliminate leakage have to be taken, a subsequent water integrity test shall be performed subject to the same conditions as the original test.

627.7-ACCEPTANCE CRITERIA:

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

1. The Contractor fails to store, handle, mix, or install the materials according to the Manufacturer's recommendations and as specified herein.
2. Degradation of material properties under field conditions is detected. The Contractor shall replace any material showing degradation.
3. The joint fails the "watertight integrity test". If failure occurs, repairs shall be conducted in accordance with the test requirements.
4. Contractor shall be responsible for resealing all neoprene troughs that need resealed.
5. If the finished joint system contains shrinkage cracks sufficient to cause debonding, or if the system became damaged during construction or by traffic prior to final acceptance, the joint system shall be removed and replaced by the Contractor.
6. All work done as a result to meet ~~of~~ the acceptance criteria shall be done at no additional cost to the Department.

627.8- METHOD OF MEASUREMENT:

Finger expansion dam assembly will be measured in place along the centerline of the joint in linear feet.

627.9-BASIS OF PAYMENT:

The removal of existing concrete and the old expansion device, to the limits shown in the plans, and the placement of specified materials to rebuild the expansion device and drainage system

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 listed below, which prices and payments shall be full compensation for furnishing all materials and performing the work herein prescribed in a workmanlike and acceptable manner. The contract unit price shall also include the Manufacturer's cost, labor, tools, equipment, supplies and incidentals necessary to complete the work.

627.10-PAY ITEM:

ITEM	DESCRIPTION	UNIT
627016-001	Remove and Rebuild Expansion Joint	Linear Foot

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

FOR

SECTION 642
TEMPORAY POLLUTION CONTROL

642.6-TEMPORARY PIPE, CONTOUR DITCHES, BERMS, SLOPE DRAINS, DITCH CHECKS, SILT FENCE, PREMANUFACTURED DITCH CHECKS AND SUPER SILT FENCE AND COMPOST FILTER SOCKS:

DELETE THE HEADING AND REPLACE WITH THE FOLLOWING:

642.6-TEMPORARY PIPE, CONTOUR DITCHES, BERMS, SLOPE DRAINS, DITCH CHECKS, SILT FENCE, PREMANUFACTURED DITCH CHECKS, SUPER SILT FENCE, COMPOST FILTER SOCKS, AND TURBIDITY CURTAINS:

ADD THE FOLLOWING SUBSECTION:

642.6.7-Turbidity Curtain: Turbidity Curtain shall be provided to protect water quality in streams during construction and demolition activities. Turbidity curtains are best used to contain silt and turbidity in moving water applications.

A turbidity curtain is a flexible, impermeable barrier used to trap sediment in water bodies. This curtain is generally weighted at the bottom to ensure that sediment does not travel under the curtain, which is supported at the top through a flotation system. Staked curtains are available for applications with very limited exposure to water flow or wave action.

Description and Purpose: Turbidity curtains prevent the migration of sediment from a work site in a water environment into the stream below the project site or into a larger body of water.

The practice is also sometimes referred to as 'turbidity barrier' or 'silt curtain'.

A turbidity curtain is generally used when construction activity occurs within a waterbody or along its shoreline and is of short duration, generally less than one month. Curtains are used in calm water surfaces. Turbidity curtains are not to be used across high volume or high flowing watercourses.

Turbidity curtains shall be oriented parallel to the direction of flow.

For sites not subject to heavy wave action the curtain height shall provide sufficient slack to allow the top of the curtain to rise to the maximum expected high-water level (including waves) while the bottom maintains continuous contact with the bottom of the water body. The bottom edge of the curtain shall have a weight system capable of holding the bottom of the curtain down and conforming to the bottom of the water body, so as to prohibit escape of turbid water under the curtain.

For sites subject to heavy wave action, the curtain height shall provide sufficient slack to allow the top of the curtain to rise to the maximum expected high-water level (including waves) while the bottom remains one foot above the bottom. The weight system shall hold the lower edge of the curtain in place so as to allow one foot of clearance above the bottom at mean low water, so that the curtain does not stir up sediment by repeatedly striking the bottom.

Type 1 Turbidity Curtain: Type 1 turbidity curtains are floating barriers that are designed to control various sediments or runoff in calm waters. Typical application are ponds, shallow lakes, small streams, and marshes. Type 1 depth of range is 2 feet to 20 feet.

The materials shall conform to the following requirements:

Description	Fabric	Float	Chain	Cable	Options
Standard	18oz Laminate	6” – 8”	1/4”	X	Float Size
Filter Fabric Skirt	6% Woven	4” – 8”	1/4” or 3/16"	X	Float Size, Skirt Fabric, Chain

Fabric	18 oz/sq yd PVC Laminated polyester fabric. Optional filter fabric for skirt
Flotation	6-in expanded polystyrene (EPS) foam contained in individually sealed float pockets
Tension/ballast	1/4-in Grade 30 galvanized steel chain: 5,200 lb breaking strength; 0.63 lb/ft weight
Section length	25 ft, 50 ft and 100 ft
Skirt depth	To 20 ft. Depth can be tapered to conform to bottom profile.

Type 2 Turbidity Curtain: Type 2 turbidity curtains are best used to contain silt and turbidity in moving water applications. Type 2 curtains are manufactured using high strength fabric with heavy duty tension members, along with aluminum stress plates that the bottom skirt corners. These type 2 turbidity curtains are best used in dredging and marine construction areas that experience mild current, wind, and wave activity. Typical application are lakes, streams, and slow-moving rivers. Type 2 depth of range is 2 feet to 65 feet.

The materials shall conform to the following requirements:

Description	Fabric	Float	Chain	Cable	Options
Standard	22 oz	6”, 8”, 10”, 12”	5/16” – 3/8”	5/16”	Float, Chain
Filter Fabric Skirt	Woven or Nonwoven	6” – 12”	5/16” – 3/8”	5/16”	Float, Chain, Skirt Fabric

Fabric	22 oz/sq yd PVC-coated polyester; optional filter fabric for skirt
Flotation	8-in to 12-in diameter (depending on skirt depth) expanded polystyrene (EPS) foam contained in individually sealed float pockets
Top tension	5/16-in galvanized steel cable (9,800 lb breaking strength) contained in a polyethylene tube.
Bottom tension and ballast	5/16-in galvanized steel chain: 7,600 lb breaking strength; 0.93 lb/ft weight
End connectors	High-tensile-strength aluminum universal connector at float and top tension cable. ASTM 3/8-in stainless steel locking pins. Lacing grommets on reinforced fabric on lower skirt. Chain ends shackled section-to-section. Tool-free connections.
Section length	50 ft and 100 ft, standard
Skirt depth	To 50 ft; Can be tapered to conform to bottom profile.

Furling lines may be needed for the turbidity curtain to be effective.

Anchor systems, ropes, marker buoys, solar-powered lights, repair kits may be needed to maintain the location and effectiveness of the turbidity curtain.

Type 3 Turbidity Curtain Type 3 Turbidity Curtains, also referred to as Type III Turbidity Curtains, combine our standard high-strength fabric with heavy duty tension members)above and below the flotation and at the bottom of the curtain), fabric reinforcement, and stress plates at the bottom skirt corners. Typical application are open water exposed to moderate wind, waves and moving water. Type 3 depth range is 3 feet to 130 feet.

Description	Fabric	Float	Chain	Cable	Options
Heavy Duty	22oz or greater	10" – 24"	3/8", 1/2" 5/8"	Dual 5/16"	Float, Chain, Skirt Fabric
Filter Fabric Skirt	Woven or Nonwoven	8" – 24"	5/16" – 5/8"	Dual 5/16"	Float, Chain, Skirt Fabric

Fabric for float and chain pockets:	22 oz/sq yd PVC-coated polyester Fabric for skirt area: As above, or woven/nonwoven filter fabric
Flotation:	8-in to 12-in diameter (depending on skirt depth) expanded polystyrene (EPS) foam contained in individually sealed float pockets
Top tension:	Two 5/16-in galvanized steel cable (9,800 lb breaking strength) contained in polyethylene tubes; one above and one below the float
Bottom tension and ballast	
End connectors:	High-tensile-strength aluminum universal connector at float and top tension cable. ASTM 3/8-in stainless steel locking pins. Lacing grommets on reinforced fabric on skirt. Chain ends shackled section-to-section on the type III turbidity curtains. Tool-free connections. All corners reinforced with 40-oz PVC fabric. Aluminum stress plates at bottom corners.
Section length:	50 ft and 100 ft, standard
Skirt depth:	To 100 ft; Can be tapered to conform to bottom profile.

Furling lines may be needed for the turbidity curtain to be effective.

Anchor systems, ropes, marker buoys, solar-powered lights, repair kits may be needed to maintain the location and effectiveness of the turbidity curtain.

Anchor systems, ropes, marker buoys, solar-powered lights, repair kits.

Installation:

1. The turbidity curtain shall be located downstream of the lateral limits of the construction site and firmly anchored in place;
2. The alignment shall be set as close to the work area as possible but not so close as to be disturbed by construction equipment;
3. The height of the curtain shall be designed to account for expected wave action and water level fluctuations as a result of storm events. At a minimum, the curtain height should be 20 percent greater than the depth of the water;

4. The area that the turbidity curtain protects shall not contain large culverts or drainage outlets which may cause the curtain to fail during flow events;
5. If water depth is less than two feet, and flow at the designed alignment is minimal, the toe can be anchored in place by staking.
6. Hard armor (i.e., concrete barriers) may be necessary to protect the curtain on the upstream side in certain flowing water applications.
7. Assure that all necessary permits for work within a jurisdictional water are obtained from the regulatory agencies prior to starting work;
8. The area of proposed installation of the curtain shall be inspected for obstacles and impediments that could damage the curtain or impair its effectiveness to retain sediment;
9. All construction materials shall be removed so they cannot enter the water body;
10. Shallow installations can be made by securing the curtain by staking rather than using a flotation system;
11. Supplemental anchors of the turbidity curtain toe shall be used, as needed, depending on water surface disturbances such as boats and wave action by winds.

Monitoring:

1. The turbidity curtain shall be inspected daily and repaired or replaced immediately.
2. If the curtain is oriented in a manner that faces the prevailing winds, frequent checks of the anchorage shall be made.
3. While inspecting, look for areas where turbid water is escaping into the larger water body.

Maintenance:

1. It is not normally necessary to remove sediment deposited behind the curtain; but, when necessary, removal is usually done by hand prior to removal of the barrier. All removed silt is stabilized away from the water body;
2. The barrier shall be removed by carefully pulling it toward the construction site to minimize the release of attached sediment;
3. Any floating construction or natural debris shall be immediately removed to prevent damage to the curtain

642.7-METHOD OF MEASUREMENT:

To be added later.

642.8-BASIS OF PAYMENT:

To be added later.

642.9-PAY ITEMS:

ITEM	DESCRIPTION	UNIT
642045-*	Turbidity Curtain, “type”	Square Yard

“type” – Type 1, Type 2, or Type 3

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

SECTION 690
CROSS SLOPE AND SUPERELEVATION TOLERANCE

690.1-DESCRIPTION:

This section covers the cross slope and superelevation tolerances and testing procedures of the finished surface for the project.

690.2-EVALUATION CRITERIA:

The project shall be evaluated by District Construction personnel with assistance of the Regional Construction Engineer and participation by the FHWA. Evaluation shall occur in the following manner for cross-slope acceptability.

The as-built cross slopes shall be compared to the plan cross-slopes (which were designed, submitted, and accepted prior to construction).

Tangent Sections: Tangent sections shall be evaluated with a .50% tolerance (1.50% minimum – 2.50% maximum).

Tangent areas which fail to provide a cross-slope in the 1.50% - 2.50% range shall be further evaluated via the following criteria:

In general, areas in consecutive length of 250’ or more outside tolerance will require additional evaluation and potential remediation.

These specific areas shall be further investigated by site visit for conformation of cross-slope deficiencies (via additional measurements with levels or scanning) and safety/drainage concerns (location in a sag of a vertical curve, accident data, discussions with maintenance forces and traffic engineering).

After site review, if warranted, contractor is informed that the area requires remediation to comply with cross-slope criteria.

Superelevated Sections: Superelevated sections shall also be evaluated with a .50% tolerance. In general, areas in consecutive length of 250’ or more with variance outside the tolerance as compared to the plan superelevated cross slopes will require additional evaluation and potential remediation.

These specific areas shall be further investigated by site visit for conformation of cross-slope deficiencies (via additional measurements with levels or scanning) and safety/drainage concerns (location in a sag of a vertical curve, accident data, discussions with maintenance forces and traffic engineering).

After site review, if warranted, contractor is informed that the area requires remediation to comply with superelevation criteria.

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SECTION 691
FINISHED SURFACE LIDAR SURVEY

691.1-DESCRIPTION:

A terrain model representing the as built roadway surface, shoulders, and median is a required deliverable for the project. The model shall include cross sections at 50 feet intervals; generated from the modeled surface. The following items are required:

1. Digital files include an electronic surface and cross section file.
2. Hard copy of cross sections at 1" = 10' horizontal and vertical scales.
3. Tabular spreadsheet of as-built and plan cross-slopes. Digital file and hard copy.

The tabular and visual representations of the cross-slopes shall provide information for each travel lane.

691.2-DATA COLLECTION:

The terrain models described above shall be developed from mapping meeting the requirements as follows:

Data Collection for Mobile LiDAR and Reduction:

Mapping services for this project require conducting mobile LiDAR collection of roadway data by remote sensing methods. Other means of data collection may be submitted for approval prior to performing.

The contractor shall deliver triangulated surfaces and planimetric in a computer aided drafting format compatible with Division standards. The criteria will adhere to the following protocols:

Project Datum:

1. NAD83 West Virginia State Plane (GRID)
2. NAVD88 Elevations
3. All data shall be referenced to the WV DOT Real Time Network

Data Collection:

1. Minimum of two passes, one on each of the inside lanes

2. No collection when snow is present on road, shoulder, or median

Deliverables:

1. Five Mile Maximum file sizes
2. Digital Terrain Model of road surface (inside edge of pavement to outside edge of pavement)
3. Scan data in .las file type
4. All digital calibrated photos (if applicable)
5. Delivered on external hard drive

691.2.1-Submittals: All submissions of any records in an electronic medium must be in such a format that it is directly compatible with current software products used by the Department as per Section 691.2.2. Any inspection or checking of the Contractor's model by the Engineer and the acceptance of all or any part of it shall not relieve the Contractor of their responsibility to secure the proper dimensions, grades, and elevations of any part of the work.

The terrain model is subject to review by the Division before acceptance. The Contractor shall be responsible to address corrections in the model. Upon acceptance this data and model shall become the property of the Division.

691.2.2-Software Requirements: Any spreadsheets must be submitted in electronic format such as Microsoft Excel or other applicable formats. The software utilized in preparation of the various Terrain Models must be compatible with the current Bentley Systems© software products used by the Department.

691.3 THROUGHT 691.7: BLANK

691.8-PAY ITEMS:

ITEM	DESCRIPTION	UNIT
691001-001	As-Built Survey, Pavement	Lump Sum

January 14, 2021

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

SPECIAL PROVISION

FOR

STATE PROJECT NUMBER: _____

FEDERAL PROJECT NUMBER: _____

FOR

SECTION 707
CONCRETE ADMIXTURES, CURING, AND COATIANG MATERIALS

707.4-SUPPLEMENTARY CEMENTITIOUS MATERIALS (SCMs) FOR USE IN PORTLAND CEMENT CONCRETE:

ADD THE FOLLOWING SUBSECTION:

707.4.1.1-Circulating Fluidized Bed Combustion (CFB) Fly Ash: CFB fly ash shall meet the requirements of ASTM C618, Class F or C when sampled and tested in accordance with the applicable Section of ASTM C311, except that the maximum allowable Specification limit for Sulfur Trioxide (SO_3) shall be increased to 11.0%.

Prior to use on any WVDOH project, the CFB fly ash used in any concrete mix for that project will be tested by the Division, along with the cement used in that concrete mix, for expansion in water in accordance with ASTM C1038. The CFB fly ash shall be tested with the cement source used in that mix design at the same ratio of fly ash to cement, which is used in the subject mix design. The CFB fly ash shall be considered as acceptable for use in that mix design if the expansion result of that ASTM C1038 test is $\leq 0.020\%$ at 14 days.

CFB fly ash may only be used in Class B or Class D concrete, and it shall not be used in any structural applications or bridge elements. The applications in which CFB fly ash may be used include, but are not limited to, non-structural applications such as miscellaneous concrete elements as listed in Section 4.2.6.1 of MP 601.03.50. CFB fly ash shall not be used in beams and girders, columns, bridge piers, arch rings including ties and spandrel walls, rigid frames, box culverts, bridge abutments, retaining walls, bridge footings, and pedestals.

Prior to use of CFB fly ash on any WVDOH project, the Division will obtain a sample of that CFB fly ash at the Concrete Plant which will supply concrete containing the CFB fly ash to the subject project. MCS&T will test this sample and record at which project it was used.

CFB fly ash will also be tested by an AASHTO Accredited Lab, accredited for ASTM C441, for ASR mitigation in accordance with ASTM C441. For the CFB fly ash to be

approved, there shall be a minimum of 50% reduction in mortar bar expansion. The alkali content of test mix shall be equal to or greater than the control mix. The weight of fly ash shall be 20-30 % of the weight of the cementitious materials.