



Iowa Department of Transportation

MINUTES OF IOWA D.O.T. SPECIFICATION COMMITTEE MEETING

November 8, 2012

Members Present:	Jim Berger Darwin Bishop Eric Johnsen, Secretary Ed Kasper Doug McDonald Gary Novey Dan Redmond Brian Smith John Smythe Willy Sorensen	Office of Materials District 3 - Construction Specifications Section Office of Contracts District 1 - Marshalltown RCE Office of Bridges & Structures District 4 - Materials Office of Design Office of Construction Office of Traffic & Safety
Members Not Present:	Donna Buchwald Sandra Larson Tom Reis, Chair	Office of Local Systems Systems Operations Bureau Specifications Section
Advisory Members Present:	Lisa McDaniel	FHWA
Others Present:	Nicole Fox Daniel Harness Brett Kloss Kevin Merryman Sam Moussalli Jim Nelson Nikita Rainey Jeff Schmitt Scott Schram Melissa Serio Wayne Sunday	Office of Local Systems Office of Design Office of Bridges & Structures Office of Construction Office of Materials Office of Bridges & Structures Office of Employee Services Office of Construction Office of Materials Office of Construction Office of Construction

Eric Johnsen, Assistant Specifications Engineer, opened the meeting. The following items were discussed in accordance with the revised agenda dated November 6, 2012:

1. Article 1105.03, Working Drawings.

The Office of Bridges and Structures requested to add requirements for electronic submittal of working drawings.

2. Article 1106.07, Waste.

Article 2102.03, F, 3, Contractor Provided Clearances.

The Offices of Construction and Location and Environment requested to clarify requirements for clearances and permits, specifically in regards to Contractor furnished borrow.

3. Article 1107.06, B, Legal Relations and Responsibility to the Public.

The Office of Materials requested to add specifications requiring Buy American for all projects, not just Federal-aid.

4. Article 2001.22, Plant Equipment for Hot Mix Asphalt Mixtures.

The Office of Materials requested to add additional requirements for HMA plants.

5. Article 2122.04, B, Special Backfill (Paved Shoulders).

The Office of Construction requested to change the method of measurement for special backfill placed under paved shoulder to be consistent with standard practice for other work types.

6. Article 2123.03, B, Constructing Earth Shoulders.

The Office of Design requested to add instructions for placing subgrade trimmings into earth shoulder construction.

7. Article 2217.03, B, Rubblizing Existing PCC Pavement.

The Office of Construction requested to allow the Engineer to adjust rubblizing procedures to fit existing site conditions.

8. Article 2301.03, K, 3, Cold Weather Protection (PCC Pavement).

The Office of Construction requested to clarify current requirements for cold weather protection.

9. Section 2303, Hot Mix Asphalt Mixtures.

The Office of Materials requested revisions to the HMA Mixtures specification.

10. Section 2318, Cold In-Place Recycled Asphalt Pavement.

The Office of Materials requested revisions to the cold in-place recycled asphalt pavement specifications.

11. Article 2405.03, H, Anchor Bolts for Bridge Bearings and Foundations (Foundations and Substructures).

Article 2522.03, E, 4, Anchor Bolts, Washers, and Nuts (Tower Lighting).

Section 4153, Miscellaneous Iron and Steel.

Article 4185.02, Poles and Supports (Highway Lighting Materials).

Article 4186.10, Sign Posts (Signing Materials).

The Office of Materials requested revisions to the galvanizing requirements for threaded fasteners.

12. Article 2408.02, Materials Requirements, Identification, and Fabrication (Steel Structures).

The Office of Materials requested revisions to clarify the Buy America requirements.

13. Article 2412.02, Materials (Concrete Bridge Decks).

The Office of Materials requested revisions to allow for increased slump when a mid-range water reducer is used in conjunction with a retarder.

- 14. Article 2435.03, A, General Requirements for Installation of Manholes and Intakes.
Section 2552, Trench Excavation and Backfill.
Article 4118.01, Pipe Backfill Material.
Section 4119, Pipe Bedding Material Under Interstate and Primary Roadways.**

The Office of Design and the Specifications Section requested revisions to clarify the specifications for bedding and backfill under Interstate and Primary roadways.

- 15. Article 2522.03, E, 12, b, Shaft, Base Plate, and Integral Shaft (Tower Lighting).**

The Office of Materials requested revisions to clarify galvanizing of tower lighting components.

- 16. Article 2527.03, F, Markings Obliterated during Construction (Pavement Marking).**

The Office of Local Systems requested to eliminate the requirement for temporary pavement markings on local systems projects.

- 17. Article 2548.02, B, 1, Milled Rumble Strips.**

The Office of Materials requested to allow CSS-1 asphalt emulsion on milled rumble strips.

- 18. Article 1105.04, A, Conformity with and Coordination of the Contract Documents.
Article 2107.01, Description (Embankments).
Section 25XX, Global Positioning System Machine Control.**

The Office of Design requested to incorporate specifications for GPS Machine Control into the Standard Specifications.

- 19. Section 4110, Fine Aggregate for Portland Cement Concrete.**

The Office of Materials requested revisions to the specifications for fine aggregate for PCC.

- 20. Article 4153.06, B, High Strength Fasteners (Miscellaneous Iron and Steel).
Article 4187.01, General Requirements (Materials for Support Structures).**

The Offices of Bridges & Structures and Materials requested revisions to the galvanizing requirements for steel fasteners and anchor bolts.

- 21. DS-09066, Partial Depth PCC Finish Patches.**

The Office of Construction requested revisions to the Developmental Specifications for Partial Depth PCC Finish Patches.

- 22. DS-12026, Small Business Development Contracts.**

The Specifications Section requested revisions to the Developmental Specifications for Small Business Development Contracts to allow the DS to be used on Federal-aid projects.

- 23. Article 2416.03, A, Construction (Rigid Pipe Culverts).
Article 2417.03, A, 1, Construction (Corrugated Culverts).**

The Office of Traffic & Safety requested revisions to the minimum pipe size for entrance culverts.

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Gary Novey		Office: Bridges and Structures	Item 1								
Submittal Date: 2012.10.25		Proposed Effective Date: April 2013									
Article No.: 1105.03 Title: Working Drawings		Other:									
Specification Committee Action: Approved with a minor typographical change.											
Deferred:	Not Approved:	Approved Date: 11/8/2012	Effective Date: 4/16/2013								
Specification Committee Approved Text: See Specification Section Recommended Text.											
<p>Comments: The word “in” was added to the final sentence of Article 1105.03, E.</p> <p>The Office of Construction asked if the industry had been informed of these changes. The Office of Bridges and Structures stated that they have been informing contractors and suppliers of these procedures as items have been submitted. The AGC will get a copy of these minutes and existing procedures are still allowed. The Office of Bridges and Structures is working on eventually creating a web portal for submittal of working drawings, instead of using email.</p> <p>The Office of Bridges and Structures indicated that each email included in the specification is monitored by three Iowa DOT employees.</p> <p>The Office of Bridges and Structures is planning on incorporating a tabulation into the plan set that would indicate what items require working drawings to be submitted.</p>											
<p>Specification Section Recommended Text:</p> <p>1105.03, Working Drawings.</p> <p>Replace Articles B through E:</p> <p>B. For projects on the Secondary Road System (non-Primary projects), working drawings shall be submitted to the Engineer unless noted otherwise in the contract documents.</p> <p>C. Unless specified otherwise in the contract documents, Contractor submittal time will be subject to the specified review time and the Contractor's need based on their schedule for the work.</p> <p>D. Submittals shall not be subdivided or made in a piecemeal fashion unless approved by the Engineer. If subdivided submittals are approved by the Engineer, they shall be made in packages with logical break points (e.g. structural steel units) so the Engineer may make a complete review of subdivided submittal.</p> <p>E. Submittals that are required to be revised and resubmitted shall have the revisions clouded or annotated to designate revisions. Resubmittals made in accordance with this provision will have a review time in calendar days of half of the review time shown in Table 1105.03-1. Resubmittals that are not in accordance with this provision will be allowed the review time shown in Table 1105.03-1.</p> <p>F. ELECTRONIC SUBMITTALS.</p> <p>1. For Primary and Interstate projects, electronic submittals may be made via email and sent to the following email addresses corresponding to the review office identified in Table 1105.03-1, or to the consultant email address indicated on the contract documents:</p> <table border="0" style="width: 100%;"> <tr> <td style="text-align: center;">REVIEW OFFICE</td> <td style="text-align: center;">EMAIL ADDRESS</td> </tr> <tr> <td>Bridges and Structures</td> <td>Bridges.Structures@dot.iowa.gov</td> </tr> <tr> <td>Design (Soils Design Section)</td> <td>Soils.Design@dot.iowa.gov</td> </tr> <tr> <td>Traffic and Safety</td> <td>Traffic.Safety@dot.iowa.gov</td> </tr> </table> <p>2. Provide a courtesy copy of the submittal to the Engineer and District Materials Engineer.</p> <p>3. When the contract documents specify submittals to be sent to the design consultant's email address, the review office shall be courtesy copied, in addition to the Engineer and District Materials Engineer.</p>				REVIEW OFFICE	EMAIL ADDRESS	Bridges and Structures	Bridges.Structures@dot.iowa.gov	Design (Soils Design Section)	Soils.Design@dot.iowa.gov	Traffic and Safety	Traffic.Safety@dot.iowa.gov
REVIEW OFFICE	EMAIL ADDRESS										
Bridges and Structures	Bridges.Structures@dot.iowa.gov										
Design (Soils Design Section)	Soils.Design@dot.iowa.gov										
Traffic and Safety	Traffic.Safety@dot.iowa.gov										

4. Electronic submittals shall be sent from the Contractor's email address that is applicable to the project. Emails sent from subcontractor's, fabricator's, and supplier's email address will not be accepted. Emails from personal email addresses are discouraged and may require authentication by the Engineer prior to acceptance for review.
5. Submittals shall be limited to 15 MB attachment file size. Split larger files and send in multiple emails.
6. The submittal file shall be Portable Document Format (PDF) sized to print on 11 inch by 17 inch (279.4 mm by 431.8 mm) or 8.5 inch by 11 inch (215.9 mm by 279.4 mm) paper. Full size print documents cannot be accepted in electronic format. Minimum resolution of 300 dpi (118 dots/cm) is recommended. Ensure document submitted is legible. Submittal files in other formats (e.g. CAD files) will not be accepted.
7. Provide project number and submittal description in the email subject line. The email will serve as the transmittal and shall include the Contractor's name, address, and telephone number, and the fabricator's name, address, and telephone number (if applicable) in the body of the email, or on the electronic attachment.
8. Shop drawings submitted electronically via email will be returned to the Contractor via email. Paper copies will not be distributed.

C G. PAPER SUBMITTALS.

For Primary and Interstate projects, all paper submittals shall be processed by the Contractor and sent to the review office identified in Table 1105.03-1 below with a copy of the cover letter sent to the Engineer and District Materials Engineer. The cover letter shall include the following information:

- Date of submittal or resubmittal
- Project number
- Description of submittal
- Contractor's name, address, and telephone number
- Number of submittal copies
- Fabricator's name, address, and telephone number (if applicable).

When the contract documents specify submittals to be sent to the design consultant, copies of the cover letter shall be sent to the review office, as well as the Engineer and District Materials Engineer.

Table 1105.03-1: Review Offices for Working Drawings

DESCRIPTION	REVIEW OFFICE	NUMBER OF COPIES ^(a)	REVIEW TIME (calendar days)
Falsework for slab bridges	Bridges and Structures	2 (6)	30
Cofferdam design (when required)	Bridges and Structures	2 (6)	30
Reconstruction of substructure (detailed plans for supporting the superstructure)	Bridges and Structures	2 (6)	30
Steel Structures	Bridges and Structures	2 (7)	30
Detail plans for falsework or centering support of steel structures (i.e. erection plans)	Bridges and Structures	2 (6)	30
Steel and aluminum pedestrian hand rails and aesthetic fences	Bridges and Structures	2 (7)	30
Highway sign support structures (i.e. bridge-type trusses, cantilevers, & bridge mounts)	Bridges and Structures	2 (7)	30
Precast concrete (i.e. deck panels, RCB culverts, noise wall panels, arch sections, etc.)	Bridges and Structures	2 (8)	30
Tower lighting	Bridges and Structures	2 (7)	30
Highway lighting	Traffic & Safety	2	30
Highway signing steel breakaway posts	Traffic and Safety	2	30

Traffic signalization* (b)	Traffic and Safety	2	30
Highway signing - Type A & and B signs	Traffic and Safety	2	30
Bridge components	Bridges and Structures	2 (7)	30
Pre-engineered steel truss recreational trail bridge	Bridges and Structures	2 (8)	30
MSE, segmental, & and modular block retaining walls	Design (Soils Design Section)	Preliminary submittal: 3 design calculations, 3 shop drawings, & and 3 field construction drawings	30
		Final submittal: 3 design calculations, 3 shop drawings, & and 3 field construction drawings	14
Soil nail & and tie-back retaining walls	Design (Soils Design Section)	6 final design plans	60
Intermediate foundation improvement (IFI) (i.e. stone columns, geopiers, etc.)	Design (Soils Design Section)	4 design calculations & and 8 field construction drawings	30
Removal of box girder bridges	Bridges and Structures	2 (5)	30
Structural erection manual	Bridges and Structures	2 (6)	30
Temporary shoring	Bridges and Structures	2 (6)	30
Temporary sheet pile retaining wall	Bridges and Structures	2 (6)	30
Safety grates for RCB culverts	Bridges and Structures	2 (7)	30
Architectural mock-ups	Bridges and Structures	1	30
Architectural paving	Bridges and Structures	1	30
Architectural paint color samples and manufacturer data	Bridges and Structures	3	30
Architectural concrete texture form liner samples and drawings	Bridges and Structures	3	30
Architectural concrete sealer samples and manufacturer data	Bridges and Structures	3	30
Architectural ornamental brick	Bridges and Structures	3	30
<p>(a) Number of copies only applies to paper submittals. Number of copies in parenthesis is the number required for full size prints. Full size prints are any print exceeding 11 inches by 17 inches (279.4 mm by 431.8 mm).</p> <p>* (b) Submittal time shall be within 45 calendar days from the date of award of contract.</p>			

~~D. Unless specified otherwise in the contract documents, Contractor submittal time shall be subject to the specified review time and the Contractor's need based on their schedule for the work.~~

~~E. When the contract documents specify submittals to be sent to the Design Consultant, copies of the cover letter shall be sent to the specified Review Office, Resident Construction Engineer, and District Materials Engineer.~~

Comments:

Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use Strikeout and Highlight.

1105.03 WORKING DRAWINGS.

- A. The plans will be supplemented by such working drawings as are necessary to adequately control the work. Working drawings shall be furnished by the Contractor, as required by the contract documents. When certification by a Professional Engineer licensed in the State of Iowa is required, the certification shall be in the appropriate branch of engineering, for the work specified in the contract documents. Working drawings may

include shop drawings of fabricated materials, erection plans, falsework plans, cofferdam plans, or other supplemental plans or data. Shop drawings for structures shall show fully detailed dimensions and sizes of all component parts of the structure. Prior to review of working drawings, any work done or material ordered shall be at the Contractor's risk. The Contractor shall understand that the Contracting Authority's review of working drawings submitted by the Contractor covers only requirements for strength and arrangement of component parts. The Contracting Authority assumes no responsibility for errors in dimensions and assumes the Contractor will use material complying with requirements of the contract documents or, where not specified, those of sound and reasonable quality, and will erect the subjects of such working drawings in accordance with recognized standards of first quality work or, when specified, in accordance with standards of the contract documents. If unanticipated and either unusual or complex construction procedures or site conditions occur, the Engineer may require the Contractor to submit such working drawings as, in the judgment of the Engineer, are necessary to satisfactorily complete the proposed construction.

B. For non-Primary projects (e.g. Secondary Road System), working drawings shall be submitted to the Engineer unless noted otherwise in the contract documents.

C. Unless specified otherwise in the contract documents, Contractor submittal time shall be subject to the specified review time and the Contractor's need based on their schedule for the work.

D. Submittals shall not be subdivided or made in a piecemeal fashion unless approved by the Engineer. If subdivided submittals are approved by the Engineer, they shall be made in packages with logical break points (e.g. structural steel units) so that the Engineer may make a complete review of the subdivided submittal.

E. Submittals that are required to be revised and resubmitted shall have the revisions clouded or annotated to designate the revisions. Resubmittals made in accordance with this provision will have a review time in calendar days of half of the review time shown in Table 1105.03-1. Resubmittals that are not in accordance with this provision will be allowed the review time shown Table 1105.03-1.

F. ELECTRONIC SUBMITTALS

For Primary and Interstate projects electronic submittals may be made via email and sent to the following email addresses corresponding to the Review Office identified in Table 1105.03-1, or to the consultant email address indicated on the contract documents:

<u>REVIEW OFFICE</u>	<u>EMAIL ADDRESS</u>
<u>Bridges and Structures</u>	<u>Bridges.Structures@dot.iowa.gov</u>
<u>Design (Soils Design Section)</u>	<u>Soils.Design@dot.iowa.gov</u>
<u>Traffic and Safety</u>	<u>Traffic.Safety@dot.iowa.gov</u>

The appropriate Resident Construction Engineer and District Materials Engineer shall be courtesy copied on the email submittal.

When the contract documents specify submittals to be sent to the Design Consultant email address the Review Office shall be courtesy copied in addition to the appropriate Resident Construction Engineer and District Materials Engineer.

Electronic submittals shall be sent from the Prime Contractor's email address that is applicable to the specific project. Emails sent from Subcontractor's, Fabricator's and Supplier's email address will not be accepted. Emails from personal email addresses are discouraged and may require authentication by the Engineer prior to acceptance for review.

Submittals shall be limited to a 15 MB attachment file size. Larger files shall be split and sent in multiple emails.

The submittal file shall be Portable Document Format (PDF) sized to print on paper 11 inch x 17 inch or 8.5 inch by 11 inch. Full size print documents cannot be accepted in electronic format. A minimum resolution of 300 dpi is recommended. The Contractor shall ensure that the document submitted is legible. Submittal files in other formats (e.g. CAD files) will not be accepted.

The email subject line shall include the project number and submittal description. The email shall serve as the transmittal and shall include the Contractor's name, address, and telephone number and the Fabricator's name, address, and telephone number (if applicable) in the body of the email or on the electronic attachment.

Shop drawings submitted electronically via email will be returned to the Contractor via email. No paper copies will be distributed.

GC. PAPER SUBMITTALS

For Primary and Interstate projects, all paper submittals shall be processed by the Prime Contractor and sent to the Review Office identified in Table 1105.03-1 below with a copy of the cover letter sent to the Resident Construction Engineer and District Materials Engineer. The cover letter shall include the following information:

- Date of submittal or resubmittal
- Project number
- Description of submittal
- Contractor's name, address, and telephone number
- Number of submittal copies
- Fabricator's name, address, and telephone number (if applicable).

When the contract documents specify submittals to be sent to the Design Consultant, copies of the cover letter shall be sent to the specified Review Office, as well as the appropriate Resident Construction Engineer and District Materials Engineer.

Table 1105.03-1: Review Offices for Working Drawings

DESCRIPTION	REVIEW OFFICE	NUMBER OF COPIES [±] (#) [±]	REVIEW TIME (calendar days)
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Steel Structures	Bridges and Structures	2 <u>7</u> <u>(7)</u>	30
Detail plans for falsework or centering support of steel structures (i.e. erection plans)	Bridges and Structures	2 <u>(6)</u>	30
Steel and aluminum pedestrian hand rails <u>and aesthetic fences</u>	Bridges and Structures	2 <u>(7)</u>	30
Highway sign support structures (i.e. trusses, cantilevers, & bridge mounts)	Bridges and Structures	2 <u>(7)</u>	30
Precast concrete (i.e. deck panels, RCB culverts, noise wall panels, arch sections, etc.)	Bridges and Structures	2 <u>(8)</u>	30
Tower lighting	Bridges and Structures	2 <u>(7)</u>	30
Highway lighting	Traffic <u>&and</u> Safety	2	30
Highway signing steel breakaway posts	Traffic and Safety	2	30
Traffic signalization*	Traffic and Safety	2	30
Highway signing - Type A & B signs	Traffic and Safety	2	30
Bridge components	Bridges and Structures	2 <u>(7)</u>	30
Pre-engineered steel truss recreational trail bridge	Bridges and Structures	2 <u>(8)</u>	30
MSE, segmental, & modular block retaining walls	Design (Soils Design Section)	Preliminary submittal: 3 design calculations, 3 shop drawings, & 3 field construction drawings	30

		Final submittal: 3 design calculations, 3 shop drawings, & 3 field construction drawings	14
Soil nail & tie-back retaining walls	Design (Soils Design Section)	6 final design plans	60
Intermediate foundation improvement (IFI) (i.e. stone columns, geopiers, etc.)	Design (Soils Design Section)	4 design calculations & 8 field construction drawings	30
Removal of box girder bridges	Bridges and Structures	2 <u>(5)</u>	30
Structural erection manual	Bridges and Structures	2 <u>(6)</u>	30
Temporary shoring	Bridges and Structures	2 <u>(6)</u>	30
Temporary sheet pile retaining wall	Bridges and Structures	2 <u>(6)</u>	30
Safety grates for RCB culverts	Bridges and Structures	2 <u>(7)</u>	30
<u>Architectural mock-ups</u>	<u>Bridges and Structures</u>	<u>1</u>	<u>30</u>
<u>Architectural paving</u>	<u>Bridges and Structures</u>	<u>1</u>	<u>30</u>
<u>Architectural paint color samples and manufacturer data</u>	<u>Bridges and Structures</u>	<u>3</u>	<u>30</u>
<u>Architectural concrete texture form liner samples and drawings</u>	<u>Bridges and Structures</u>	<u>3</u>	<u>30</u>
<u>Architectural concrete sealer samples and manufacturer data</u>	<u>Bridges and Structures</u>	<u>3</u>	<u>30</u>
<u>Architectural ornamental brick</u>	<u>Bridges and Structures</u>	<u>3</u>	<u>30</u>
<p>* Submittal time shall be within 45 calendar days from the date of award of contract. <u>†Number of copies only applies to paper submittals.</u> <u>‡Number of copies in parenthesis is the number required for full size prints. Full size prints are for any paper copy exceeding 11" x 17".</u></p> <p>D. — Unless specified otherwise in the contract documents, Contractor submittal time shall be subject to the specified review time and the Contractor's need based on their schedule for the work.</p> <p>E. — When the contract documents specify submittals to be sent to the Design Consultant, copies of the cover letter shall be sent to the specified Review Office, Resident Construction Engineer, and District Materials Engineer.</p>			
<p>Reason for Revision: Submittal of working drawings by Contractors to the DOT via email is becoming common but there are no procedures in place to define how and where the working drawings should be submitted. This has led to working drawings being sent to various DOT email addresses and in some cases this can delay the review of working drawings. Article 1105.03 has been reorganized into three parts and a section on electronic submittal requirements is now included. The first part covers items related to all working drawings. The second part is the new section on electronic (via email) submittal requirements. The third part is the requirements for paper submittals.</p>			
County or City Input Needed (X one)		Yes	No X
Comments: Electronic section applies to primary system projects.			
Industry Input Needed (X one)		Yes	No X
Industry Notified:	Yes	No	Industry Concurrence: Yes No
Comments: The original paper submittal option is still in place. This change adds an option for electronic submittals via email.			

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: John Smythe /Jim Rost		Office: Construction / Location & Environment	Item 2
Submittal Date: 2012.10.15		Proposed Effective Date: April 16, 2013	
Article No.: 1106.07 Title: Waste Article No.: 2102.03, F, 3 Title: Contractor Provided Clearances		Other:	
Specification Committee Action: Approved as recommended.			
Deferred:	Not Approved:	Approved Date: 11/8/2012	Effective Date: 4/16/2013
Specification Committee Approved Text: See Specification Section Recommended Text.			
<p>Comments: The Office of Contracts asked why archaeological and historic preservation clearances were removed from Article 2102.03, F, 3. The Office of Construction explained that the Office of Location and Environment felt that "environmental clearances and permits" covers these other types of clearances and permits. Also, Contractors do not have the same permits and clearances to follow as the Department does.</p> <p>The Office of Traffic & Safety asked how the Contractor knows what clearances and permits are required. The Contractor is required to know and follow all state regulations. There is also an FAQ provided on the Office of Construction's website that gives some guidance on wetlands and 404 permits.</p>			
Specification Section Recommended Text:			
<p>1106.07, Waste. Rename and Replace the Article: 1106.07 CONTRACTOR FURNISHED BORROW AND WASTE AREAS.</p> <p>A. The Contractor shall obtain necessary environmental clearances and permits.</p> <p>B. The Contractor shall provide waste areas or disposal sites for excess material (excavated material or broken concrete) not desirable to be incorporated into the work. The Contractor shall ensure areas (including haul roads and staging areas) selected for waste or disposal do not impact of excess material (excavated material or broken concrete), or furnishing borrow have been reviewed for impacts to, but not limited to the following:</p> <ul style="list-style-type: none"> • Culturally sensitive sites or graves. • Wetlands or "Waters of the U.S.", including streams or stream banks below the "ordinary high water mark", without an approved U.S. Army Corps of Engineers Section 404 Permit. • Threatened or endangered species. • Floodplains. • Sovereign lands. • Storm water discharge. <p>C. No payment for overhaul will be allowed for material hauled to or from these sites. Excess material shall not be placed within the right-of-way unless specifically stated on the plans.</p>			
<p>2102.03, F, 3, Contractor Provided Clearances. Rename and Replace the Article: 3. Contractor Provided Obtained Clearances and Permits. Obtain and provide engineer necessary environmental, archaeological, and historic preservation clearances and permits and comply with all restrictions attached to these clearances and permits for alternate borrow areas and sites where Contractor furnished borrow is obtained. Obtain other licenses and permits involved in the proposed use of these areas. </p>			
Comments:			

Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use **Strikeout and **Highlight**.)**

1106.07 WASTE CONTRACTOR FURNISHED BORROW AND WASTE AREAS.

The Contractor shall obtain necessary environmental clearances and permits.

The Contractor shall provide waste areas or disposal sites for excess material (excavated material or broken concrete) ~~not desirable to be incorporated into the work.~~ The Contractor shall ensure areas (including haul roads and staging areas) selected for waste or disposal for excess material (excavated material or broken concrete) or borrow have been reviewed for impacts to, but not limited to, the following ~~do not impact:~~

- Culturally sensitive sites or graves.
- Wetlands or "Waters of the U.S.", including streams or stream banks below the "ordinary high water mark", without an approved U.S. Army Corps of Engineers Section 404 Permit.
- Threatened or endangered species.
- Floodplains.
- Sovereign lands.
- Storm water discharge.

No payment for overhaul will be allowed for material hauled to **or from** these sites. Excess material shall not be placed within the right-of-way unless specifically stated on the plans.

3. Contractor Obtained Provided Clearances and Permits

Obtain and provide engineer necessary environmental, archaeological, and historic preservation clearances and permits and comply with all restrictions attached to these clearances and permits for alternate borrow areas and sites where Contractor furnished borrow is obtained. ~~Obtain other licenses and permits involved in the proposed use of these areas.~~

Reason for Revision: Further clarification was necessary to better define requirements for clearances and permits, especially related to contractor furnished borrow.

County or City Input Needed (X one)	Yes	No X
Comments:		
Industry Input Needed (X one)	Yes	No X
Industry Notified:	Yes	No
Industry Concurrence:	Yes	No
Comments:		

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Jim Berger		Office: Materials	Item 3
Submittal Date: 2012.10.22		Proposed Effective Date: April 2013	
Article No.: 1107.06, B. Title: Legal Relations and Responsibility to the Public		Other:	
Specification Committee Action: Approved with changes.			
Deferred:	Not Approved:	Approved Date: 11/8/2012	Effective Date: 4/16/2013
Specification Committee Approved Text: 1107.06, Federal Participation. Retitle the Article Federal Participation Requirement. Replace Article B: B. On all contracts involving Federal-aid , all products of iron, steel, or a coating of steel which are incorporated into the work must have been shall be of domestic origin and shall be melted and manufactured in the United States. The Engineer may allow minimal amounts of these materials from foreign sources, provided the cost does not exceed 0.1% of the contract sum or \$2,500, whichever is greater. The Contractor shall certify that these materials are of domestic origin. This amount shall include transportation, assembly, and testing as delivered cost of foreign products to the project.			
Comments: The Office of Materials requested that "melted and" be added to the first sentence. This is to prevent foreign billets from being melted down in the U.S. The FHWA requested that the title of Article 1107.06 be revised since Article B applies to all projects, not only those with Federal-aid.			
Specification Section Recommended Text: 1107.06, B. Replace the Article: On all contracts involving Federal-aid , all products of iron, steel, or a coating of steel which are incorporated into the work shall must have been be of domestic origin and shall be manufactured in the United States. The Engineer may allow minimal amounts of these materials from foreign sources, provided the cost does not exceed 0.1% of the contract sum or \$2,500, whichever is greater. The Contractor shall certify that these materials are of domestic origin. This amount shall include transportation, assembly, and testing as delivered cost of foreign products to the project.			
Comments:			
Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use Strikeout and Highlight.)			
1107.06B FEDERAL PARTICIPATION. B. On all contracts involving Federal-aid , all products of iron, steel, or a coating of steel which are incorporated into the work must have been be of a domestic origin and must be manufactured in the United States. The Engineer may allow minimal amounts of these materials from foreign sources, provided the cost does not exceed 0.1% of the contract sum or \$2,500, whichever is greater. The Contractor shall certify that these materials are of domestic origin. This amount shall include transportation, assembly and testing as delivered cost of the foreign products to the project.			
Reason for Revision: This to require Buy American for all projects, not just Federal Aid projects. This proposed change also intends to avoid any unintentional violation of the MAP-21 provisions.			
County or City Input Needed (X one)		Yes	No

Comments:					
Industry Input Needed (X one)			Yes	No	
Industry Notified:	Yes	No	Industry Concurrence:	Yes	No
Comments:					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Jim Berger		Office: Materials	Item 4
Submittal Date: October 26, 2012		Proposed Effective Date: April 2013	
Article No.: 2001.22 Title: Plant Equipment for Hot Mix Asphalt Mixtures		Other:	
Specification Committee Action: Approved as recommended.			
Deferred:	Not Approved:	Approved Date: 11/8/2012	Effective Date: 4/16/2013
Specification Committee Approved Text: See Specification Section Recommended Text.			
Comments: None.			
Specification Section Recommended Text:			
<p>2001.22, A, 3, a. Replace the Article: A dual system of weigh belts system is used to control delivery of virgin aggregates and recycled material to the dryer.</p> <p>2001.22, A, 3. Add the Article: f. Calibrated bins are dedicated to deliver each recycled asphalt material to the drum unless materials are pre-blended under the direction of the Engineer.</p> <p>2001.22, D, Aggregate Bins. Add the Article: 4. The plant has a dedicated bin for each virgin aggregate product used in the job mix formula.</p>			
Comments:			
Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use Strikeout and Highlight.)			
<p>2001.22, A, 3, a. Replace the Article: a. A system of dual weigh belts system is used to control delivery of virgin aggregates and recycled material to the dryer.</p> <p>2001.22, A, 3, f. Add the Article: f. Calibrated bins are dedicated to deliver each recycled asphalt material to the drum unless materials are pre-blended under the direction of the Engineer.</p> <p>2001.22, D, 4. Add the Article: 4. The plant has a dedicated bin for each virgin aggregate product used in the job mix formula.</p>			
Reason for Revisions: Each RAP pile contains a different AC content. When more than one pile is being utilized in the mix, they either need to be pre-blended or fed with individual weigh belts and totalizers to provide accurate measurement of oil for payment. The practice of feeding virgin aggregates through the RAP collar when there are an insufficient number of bins needs to be addressed in the specification. The material is never included in the cold feed sample for gradation testing and reasonable assurance of adequate drying cannot be attained.			
County or City Input Needed (X one)		Yes	No X

Comments:					
Industry Input Needed (X one)			Yes X	No	
Industry Notified:	Yes X	No	Industry Concurrence:	Yes	No
Comments: Pending					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: John Smythe / Kevin Merryman		Office: Construction		Item 5	
Submittal Date: October 23, 2012			Proposed Effective Date: April 2013		
Article No.: 2122.04, B Title: Special Backfill (Method of Measurement, Paved Shoulders)			Other:		
Specification Committee Action: Approved as recommended.					
Deferred:	Not Approved:	Approved Date: 11/8/2012		Effective Date: 4/16/2013	
Specification Committee Approved Text: See Specification Section Recommended Text.					
Comments: None.					
Specification Section Recommended Text: 2122.04, B, Special Backfill. Replace the Article: Contract quantity: Article 2102.04, A, 4, applies.					
Comments:					
Member's Requested Change (Redline/Strikeout): 2122.04 METHOD OF MEASUREMENT. B. Special Backfill. Contract quantity: Article 2102.04, A, 4, applies.					
Reason for Revision: To be consistent with standard practice for other work types, measurement of Special Backfill when placed with paved shoulders should be a measured quantity and not contract quantity.					
County or City Input Needed (X one)			Yes	No X	
Comments:					
Industry Input Needed (X one)			Yes	No X	
Industry Notified:	Yes	No X	Industry Concurrence:	Yes	No
Comments:					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Brian Smith		Office: Design		Item 6	
Submittal Date: 10/26/2012		Proposed Effective Date: 4/16/2013			
Article No.: 2123.03, B		Other:			
Title: Constructing Earth Shoulders					
Specification Committee Action: Approved as recommended.					
Deferred:	Not Approved:	Approved Date: 11/8/2012		Effective Date: 4/16/2013	
Specification Committee Approved Text: See Specification Section Recommended Text.					
Comments: None.					
Specification Section Recommended Text:					
2123.03, B, 1.					
Add the Article:					
c. Placing material resulting from subgrade trimming operations and completing construction with a minimum of 4 inches (100 mm) of topsoil.					
Comments:					
Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use Strikeout and Highlight .)					
2123.03, B, 1.					
Add new Article:					
c. Placing material resulting from subgrade trimming operations and completing construction with a minimum of 4 inches (100 mm) of topsoil.					
Reason for Revision: On divided four-lane projects that involve grading one year and paving the next, the subgrade is graded to a 2%-2% top the first year then trimmed to a 1%-2% top before paving. The Office of Design would like to add instructions for incorporating trimmings into earth shoulder construction.					
County or City Input Needed (X one)		Yes		No	
Comments:					
Industry Input Needed (X one)		Yes		No	
Industry Notified:	Yes	No	Industry Concurrence:	Yes	No
Comments:					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: John Smythe / Jeff Schmitt		Office: Construction	Item 7
Submittal Date:		Proposed Effective Date: April 2013 GS	
Article No.: 2217.03, B Title: Rubblizing Existing PCC Pavement		Other:	
Specification Committee Action: Approved with changes.			
Deferred:	Not Approved:	Approved Date: 11/8/2012	Effective Date: 4/16/2013
<p>Specification Committee Approved Text: 2217.03, B, Rubblizing Existing PCC Pavement. Replace Articles 2, 3, and 4:</p> <ol style="list-style-type: none"> Operate breaker unit at a speed so existing pavement is reduced into particles with a nominal maximum size of 4 inches (100 mm), based on visual inspection of rubblized pavement surface. When conditions warrant in specific locations, the Engineer may direct or allow larger maximum particle dimensions, not to exceed 12 inches (300 mm). Additional passes may be required if larger sizes remain after initial rubblizing pass. Do not operate breaker unit within 50 feet (15 m) of bridge abutments and other locations designated by the Contracting Authority. Begin rubblizing procedure at a free shoulder edge and work towards centerline joint. Operate vibratory steel drum roller close behind rubblizing operation at a speed not to exceed 6 feet (2 m) per second. Compact and seat rubblized pavement with a minimum of 4 coverages. In addition, roll surface immediately ahead of paving equipment to remove distortion that may occur from batch haul trucks or other equipment. 			
<p>Comments: The Office of Construction asked if the specification should be more explicit on when the larger maximum particle dimensions would be allowed. Additional language was included.</p>			
<p>Specification Section Recommended Text: 2217.03, B, Rubblizing Existing PCC Pavement. Replace Articles 2, 3, and 4:</p> <ol style="list-style-type: none"> Operate the breaker unit at a speed such that the existing pavement is reduced into particles with a nominal maximum size of 4 inches (100 mm), based on a visual inspection of the rubblized pavement surface. The Engineer may direct or allow larger maximum particle dimensions, not to exceed 12 inches (300 mm). Additional passes may be required if larger sizes remain after the initial rubblizing pass. Do not operate the breaker unit within 50 feet (15 m) of bridge abutments and other locations designated by the Contracting Authority. Begin the rubblizing procedure at a free shoulder edge and work towards the centerline joint. Operate the vibratory steel drum roller close behind the rubblizing operation at a speed not to exceed 6 feet (2 m) per second. Compact and seat rubblized pavement with a minimum of 4 coverages. In addition, roll the surface immediately ahead of the paving equipment to remove distortion that may occur from batch haul trucks or other equipment. 			
<p>Comments:</p>			
<p>Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use Strikeout and Highlight.) 2217.03, B.</p> <ol style="list-style-type: none"> Operate the breaker unit at a speed such that the existing pavement is reduced into particles with a nominal maximum size of 4 inches (100 mm), based on a visual inspection of the rubblized 			

<p>pavement surface. The Engineer may direct or allow larger maximum particle dimensions, not to exceed 12 inches (300 mm). Additional passes may be required if larger sizes remain after the initial rubblizing pass. Do not operate the breaker unit within 50 feet (15 m) of bridge abutments and other locations designated by the Contracting Authority.</p>					
<p>3. Begin the rubblizing procedure at a free shoulder edge and work towards the centerline joint.</p>					
<p>4. Operate the vibratory steel drum roller close behind the rubblizing operation at a speed not to exceed 6 feet (2 m) per second. Compact and seat the rubblized pavement with a minimum of 4 coverages. In addition, roll the surface immediately ahead of the paving equipment to remove distortion that may occur from batch haul trucks or other equipment.</p>					
<p>Reason for Revision: Depending on underlying conditions, it may be impossible to comply with the 4" maximum particle size requirement without compromising the structural integrity of the existing base. Proposed change will provide Engineer with the ability to properly adjust the rubblization operation to fit existing site conditions.</p>					
County or City Input Needed (X one)			Yes		No X
<p>Comments: Proposed specification revision provided to local agencies by Office of Local Systems.</p>					
Industry Input Needed (X one)			Yes		No X
Industry Notified:	Yes X	No	Industry Concurrence:		Yes X
				No	
<p>Comments: Industry representatives expressed agreement with proposed specification change, when discussed at Strategic Asphalt Committee meeting on September 20, 2012.</p>					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: John Smythe / Kevin Merryman		Office: Construction		Item 8	
Submittal Date: October 23, 2012			Proposed Effective Date: April 2013		
Article No.: 2301.03, K, 3 Title: Cold Weather Protection			Other:		
Specification Committee Action: Approved as recommended.					
Deferred:		Not Approved:		Approved Date: 11/8/2012	
				Effective Date: 4/16/2013	
Specification Committee Approved Text: See Specification Section Recommended Text.					
Comments: None.					
Specification Section Recommended Text:					
2301.03, K, 3, b.					
Replace Note (a) of Table 2301.03-1:					
(a) Protection shall remain until overnight the first night covering is required. After the first night of covering, protection may be removed when one of the following conditions is met:					
1. Pavement is 5 calendar days old.					
2. Opening strength is attained.					
3. Forecasted low temperatures exceed 35°F (2°C) for the next 48 hours.					
4. Forecasted high temperatures exceed 55°F (13°C) in the next 24 hours and subgrade temperatures are above 40°F (4°C).					
Comments:					
Member's Requested Change (Redline/Strikeout):					
2301.03 CONSTRUCTION.					
K. Curing and Protection of Pavement.					
3. Cold Weather Protection.					
a. Apply cure to all concrete pavement, including exposed edges of the slab, according to Article 2301.03, K, 2, prior to applying protection.					
b. Protect concrete pavement less than 36 hours old as shown in Table 2301.03-1. Payment will be made as provided in Article 2301.05.					
Table 2301.03-1: Concrete Pavement Protection Requirements					
Night Temperature Forecast		Type of Protection^(a)			
35°F to 32°F (2°C to 0°C)		One layer of burlap for concrete.			
31°F to 25°F (-1°C to -4°C)		Two layers of burlap or one layer of plastic on one layer of burlap.			
Below 25°F (-4°C)		Four layers of burlap between layers of 4 mil (100 µm) plastic, insulation blankets meeting the requirements below, or equivalent commercial insulating material approved by the Engineer.			

	<p>(a) The protection is to remain overnight the first night covering is required. After the first night of covering, the protection may be removed when until one of the following conditions is met:</p> <ol style="list-style-type: none"> 1. The pavement is 5 calendar days old. 2. Opening strength is attained. 3. Forecasted low temperatures exceed 35°F (2°C) for the next 48 hours. 4. Forecasted high temperatures exceed 55°F (13°C) in the next 24 hours and subgrade temperatures are above 40°F (4°C). 				
<p>c. When insulation blankets are used, use blankets consisting of a layer of closed cell polystyrene foam protected by at least one layer of plastic film, rated by the manufacturer with a minimum R-value of 1.0 (0.1761 for metric units).</p> <p>d. Shut down paving operations in time to comply with protection requirements outlined above. The cover may be temporarily removed to perform sawing or sealing. The Engineer may modify temperature restrictions and protection requirements.</p>					
<p>Reason for Revision: Clarification of current requirements.</p>					
<p>County or City Input Needed (X one)</p>		<p>Yes</p>	<p>No <input checked="" type="checkbox"/></p>		
<p>Comments:</p>					
<p>Industry Input Needed (X one)</p>		<p>Yes</p>	<p>No <input checked="" type="checkbox"/></p>		
<p>Industry Notified:</p>	<p>Yes <input checked="" type="checkbox"/></p>	<p>No</p>	<p>Industry Concurrence:</p>	<p>Yes</p>	<p>No</p>
<p>Comments:</p>					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Jim Berger		Office: Materials	Item 9
Submittal Date: October 26, 2012		Proposed Effective Date: January 15, 2013	
Section No.: 2303 Title: Hot Mix Asphalt Mixtures		Other:	
Specification Committee Action: Approved with changes.			
Deferred:	Not Approved:	Approved Date: 11/8/2012	Effective Date: 4/16/2013
Specification Committee Approved Text: See attached Draft SS for Flexible Paving Mixtures.			
<p>Comments: The District 3 Construction Office asked if Article 2303.01, C, and the reference to 280°F contradicts with the changes to Article 2303.03, C, 3, d, 3, a, which now allows up to 330°F after October 1st. Article 2303.01, C was revised to reference Article 2303.03, C, 3, d, 3, a.</p> <p>The Office of Materials noted that Article 2303.03, C, 2, b, 2, did not provide a rate for tack coat on an existing HMA surface. "Existing HMA" was added to the PCC Surface line. Also, the metric rates were corrected.</p> <p>The Office of Construction asked about eliminating the payment adjustment for moisture susceptibility. The new moisture susceptibility test will not have a pay adjustment at this time. The contractor may be shut down due to a failure to meet the moisture susceptibility requirements until the mix design is changed, but they will not have a price adjustment or be required to remove what was previously placed. The new moisture susceptibility test results will be obtained much sooner than the old test, so there will be less material placed in the interim. The Office of Materials also indicated that it is unlikely that a mix design that passes would fail in the field.</p> <p>The Office of Contracts asked how the SS will be applied. The SS will be applied to all projects, so that any asphalt bid items that do not fall into Section 2303 will also be covered by the SS.</p> <p>The Office of Materials would like to apply the SS to previously let projects that are still under construction or not yet begun so that the new testing procedures can be implemented for all projects this next season. The RCE's will pursue mutual benefit change orders for these projects.</p>			
Specification Section Recommended Text: See attached Draft SS for Flexible Paving Mixtures.			
Comments: Revisions will be issued as a Supplemental Specification until they can be incorporated into GS-12002 in April 2013.			
Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use Strikeout and Highlight .)			
<ul style="list-style-type: none"> • See attached 			
Reason for Revisions:			
Table 2303.02-1:			
We can now evaluate RAP quality with XRF testing			
2303.02, D, 3			
Economic evaluation needs clarification			
2303.02, D, 8			
AASHTO T312 has been in place for over a decade			
2303.02, E, 2, a			
Replace AASHTO T283 with Hamburg Testing. No special attention needed for WMA			
2303.02, E, 2, b			
Update reference			
2303.02, E, 2, d			
Replace TSR requirements with Hamburg			
2303.02, E, 2, e			
Not applicable to Hamburg testing			
2303.02, E, 2, f			

Update test reference

2303.02, E, 2, g

Update reference

2303.02, E, 2, h, 2, b.

Update test reference

2303.02, E, 2, h, 2, c.

Not applicable to Hamburg testing

2303.03, C, 2, b, 2

Tack rates are outdated. New NCAT study recommends different rates for appropriate surface

2303.03, C, 3, c, 1, c

Update test reference

2303.03, C, 3, d, 3, a

WMA technologies should be allowed at HMA temperatures in late fall paving. The technologies simply act as a compaction aid.

2303.03, C, 3, d, 4, h

Rule of thumb for 3 times the nominal maximum aggregate size do not apply to leveling/scratch courses

2303.03, D

Interstate bid items can qualify for small quantities when 1000 tons or less.

2303.03, D, 3, b, 2, a

Gradation control may be either by cold feed or ignition oven.

2303.03, D, 3, b, 2, b

Higher sampling frequency is already implied since a minimum of one sample is required. Eliminate redundancy.

2303.03, D, 3, b, 2, c

Gradation verification may be either by ignition oven or cold feed to accommodate districts willing and able to witness split cold feed sampling to directly compare cold-feed to cold-feed.

2303.03, D, 3, b, 2, d

Testing will not necessarily be ignition oven if Engineer chooses cold feed

2303.03, D, 3, b, 3, e

There are cases where bid items > 1000 tons are only placed ~60 tons at a time for items such as bridge ends. It is conceivable the entire bid item would be accepted without taking a single sample.

2303.03, D, 3, b, 3, i, 1

All shoulders are treated the same. Update reference.

2303.03, D, 3, b, 3, i, 2

Update reference.

2303.03, D, 3, b, 3, j

All shoulders treated the same. Irregular areas must be produced below 1000 tons in a day. SY limits are not appropriate since daily production is based on weight of mix.

2303.03, D, 3, b, 4, a

Update test reference for Hamburg

2303.03, D, 3, b, 4, b, 3

Update test reference for Hamburg

2303.03, D, 4, b

Collect joint cores for information in 2013

2303.03, D, 4, c, 1

Cores taken for density are still measured for thickness to ensure the course is placed at the required thickness for the pavement's design. In these cases, the lots should be daily just as the density cores are grouped. Alternatively, cores taken to verify thickness at the completion of placement for square yard items, are grouped into lots based on areas of similar uniform plan thickness and width.

2303.03, D, 4, c, 2

Needs clarified and edited to avoid redundancy with previous article.

2303.03, D, 4, c, 3

The QI equation may be based on plan thickness for SY items when cores are taken full depth. However, it should be based on the contractor's chosen lift thickness when cores are not taken full

depth. 2303.03, D, 4, c, 5 If the QI < 0, declaration of defective work is only necessary if the final lift(s) haven't been placed. Thickness on an individual lift may be insufficient, but can be supplemented with upper lifts to ensure total design thickness is achieved. 2303.03, D, 5, b, 7 IM 511 requires email. 2303.03, D, 5, b, 8 Update test reference for Hamburg 2303.03, E, 1, a Update test reference for Hamburg 2303.03, E, 1, b Update test reference for Hamburg 2303.03, E, 1, c Update test reference for Hamburg 2303.03, E, 4, a At least one box sample and one cold feed sample is required for small quantities. Often times the contractor will use a mix they've used on another job. The mix may be certified using information on previous compliance to specifications. 2303.03, E, 4, c Only applies to small quantities 2303.05, A, 6 Begin 2013 without pay schedule. Work on developing an appropriate schedule as more information becomes available. 2303.05, D, 1 Update for Hamburg					
County or City Input Needed (X one)			Yes	No X	
Comments:					
Industry Input Needed (X one)			Yes X	No	
Industry Notified:	Yes X	No	Industry Concurrence:	Yes	No
Comments: Pending					

DRAFT SS-12XXX
(New)



**SUPPLEMENTAL SPECIFICATIONS
FOR
FLEXIBLE PAVEMENT**

**Effective Date
January 16, 2012**

THE STANDARD SPECIFICATIONS, SERIES 2012, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SUPPLEMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

Replace Section 2303 of the Standard Specifications and GS-12001 with the following:

Section 2303. ~~Hot Mix Asphalt Mixtures~~ Flexible Pavement

2303.01 DESCRIPTION.

- A.** Design, produce, place, and compact flexible paving (HMA and warm mix asphalt (WMA)) mixtures. Use proper quality control practices for the construction of surface, intermediate, or base course on a prepared subbase, base, or pavement to the dimensions specified in the contract documents.
- B.** A surface course is the upper lift for a wearing surface of a designated thickness. An intermediate course is the next lower lift or lifts of a designated thickness. Use intermediate course mixtures for leveling, strengthening, and wedge courses. A base course is the lift or lifts placed on a prepared subgrade or subbase.
- C.** WMA refers to asphalt concrete mixtures produced at temperatures approximately 50°F (28 °C) or more below those typically used in production of HMA, but no higher than 280°F (135 °C) that shown in Article 2303.03, C, 3, d, 3, a. Temperature reductions may be achieved through additives or water injection systems approved by the Bituminous Engineer. The goal with WMA is to produce mixtures with similar or better strength, durability, and performance characteristics as HMA using substantially reduced production temperatures.
- D.** Unless explicitly stated, produce and place WMA mixtures meeting the same requirements established for HMA mixtures. Equivalent WMA mixtures may be substituted for HMA mixtures unless it is prohibited by the specifications.

2303.02 MATERIALS.

Use materials meeting the following requirements:

- A. Asphalt Binder.**

The Performance Graded asphalt binder, PG XX-XX, will be specified in the contract documents to meet climate, traffic, and pavement conditions. Use asphalt binder meeting requirements of Section 4137. Unless otherwise specified in the contract documents, use PG 58-28 for shoulder mixtures.
- B. Aggregates.**
 - 1. Individual Aggregates.**
 - a.** Use virgin mineral aggregate as specified in Materials I.M. 510 and meeting requirements of Section 4127.

- b. When frictional classification of the coarse aggregate is required, the contract documents will specify the friction level and location. Furnish friction aggregate from sources identified in Materials I.M. T203. Limestone aggregate sources defined as containing less than 15% magnesium oxide (MgO) are identified in Materials I.M. T203.

1) Friction Classification L-2.

- a) On Interstates and all mixtures designed for 30,000,000 ESALS and higher (cross-overs and detours with posted speeds below 60 mph excluded), if 40% or more of the total aggregate is a limestone, use a combined aggregate such that:
- 1) At least 80% of the combined aggregate retained on the No. 4 (4.75 mm) sieve is Type 4 or better friction aggregate,
 - 2) At least 30% of the combined aggregate retained on the No. 4 (4.75 mm) sieve is Type 2 or better friction aggregate,
 - 3) At least 25% of the combined aggregate passing the No. 4 (4.75 mm) sieve is Type 2 or better friction aggregate, and
 - 4) The fineness modulus of the combined Type 2 aggregate is at least 1.0. Calculations for fineness modulus are shown in Materials I.M. 501.
- b) For all other mixtures that do not satisfy Article 2303.02, B, 1, a, use a combined aggregate such that:
- 1) At least 80% of the combined aggregate retained on the No. 4 (4.75 mm) sieve is Type 4 or better friction aggregate, and
 - 2) At least 25% of the combined aggregate retained on the No. 4 (4.75 mm) sieve is Type 2 or better friction aggregate, and
 - 3) For Interstates and all mixtures designed for 30,000,000 ESALS and higher, the fineness modulus of the combined Type 2 aggregate is at least 1.0. Calculations for fineness modulus are shown in Materials I.M. 501.

2) Friction Classification L-3.

Use a combined aggregate such that:

- At least 80% of the combined aggregate retained on the No. 4 (4.75 mm) sieve is Type 4 or better friction aggregate, and
- At least 45% of the combined aggregate retained on the No. 4 (4.75 mm) sieve is Type 3 or better friction aggregate, or if Type 2 is used in place of Type 3, at least 25% of the combined aggregate retained on the No. 4 (4.75 mm) sieve is Type 2.

3) Friction Classification L-4.

Use a combined aggregate such that at least 50% of the combined aggregate retained on the No. 4 (4.75 mm) sieve is Type 4 or better friction aggregate.

2. Blended Aggregates.

- a. Use a blended aggregate meeting the combined aggregate requirements in Materials I.M. 510.
- b. When mixtures include RAP, use a blended mineral aggregate gradation consisting of a mixture of RAP aggregate combined with virgin aggregate.

C. Recycled Asphalt Materials.

1. Recycled Asphalt Materials (RAM) includes Recycled Asphalt Pavement (RAP) and Recycled Asphalt Shingles (RAS). RAP is salvaged asphalt pavement. Use RAP from a source designated in the contract documents, or furnish Classified RAP, Certified RAP, or Unclassified RAP from the Contractor's stockpile. The designations Classified, Certified, and Unclassified are exclusively for the use of RAP in HMA.
2. Identify each RAP stockpile and document Classified and Certified RAP stockpiles as directed in Materials I.M. 505. Include the following information when documenting Classified RAP material in a stockpile for future use in HMA:
 - Identification of the project from which the material was removed,
 - Mix data from the original project including mixture type,
 - Aggregate classification,
 - Location and depth in the pavement structure,
 - Extracted gradation information, if available, and
 - Description of stockpile location and quantity.

Do not add material to a Classified or Certified RAP stockpile without the approval of the District Materials Engineer.

3. The Engineer may reject a RAP stockpile for non-uniformity based on visual inspection. Work the stockpiles in such a manner that the materials removed are representative of a cross section of the pile.
4. Place stockpiles of RAP on a base sufficient to prevent contamination, as directed in Materials I.M. 505. Do not use RAP stockpiles containing concrete chunks, grass, dirt, wood, metal, coal tar, or other foreign or environmentally restricted materials. RAP stockpiles may include PCC (not to exceed 10% of the stockpile) from patches or composite pavement that was milled as part of the asphalt pavement. Track equipment may operate on the stockpile during its construction.
5. When RAP is taken from a project, or is furnished by the Contracting Authority, the contract documents will indicate quantity of RAP expected to be available and test information, if known. Salvage this material. Unless otherwise specified in the contract documents, RAP not used in HMA becomes the property of the Contractor.
6. For mix design purposes, the Contracting Authority will test samples of the RAM. The aggregate gradation and amount of asphalt binder in the RAM will be based on the Contracting Authority's extraction tests. For mixtures containing RAM, adjust the contract binder grade as directed in Materials I.M. 510. No adjustments will be made to the contract unit price for required changes to the asphalt binder grade.
 - a. **Classified RAP.**
 - 1) Classified RAP is from a documented source with the aggregate meeting the appropriate quality requirements in Materials I.M. 510, and properly stockpiled.
 - 2) Classified RAP may be used in the base, intermediate, and surface mixtures for which the RAP aggregate qualifies. Classified RAP may be used in accordance with Table 2303.02-1.
 - 3) Credit for frictional aggregate may be given for virgin aggregates used in the original pavement to be reclaimed. Types 4 and 5 frictional aggregate content in the RAP may be given full credit, while Types 2 and 3 content may be given credit for half the proportion in the original pavement. Credit may be used toward the total frictional aggregate requirement. No frictional credit shall be given beyond one generation of the RAP's service life.
 - 4) Credit may be given for crushed particles in the original pavement to be reclaimed as determined in the paving history (or mix design when paving history is unavailable).
 - b. **Certified RAP.**
Any stockpiled RAP not meeting the requirements of Classified RAP or from an unknown source may be given a Certified status when meeting quality control sampling, testing, and reporting requirements in Materials I.M. 505. Certified RAP may be used in accordance with Table 2303.02-1.
 - c. **Unclassified RAP.**
 - 1) Any stockpiled RAP not meeting the requirements of Classified RAP or Certified RAP shall be designated as Unclassified RAP. Unclassified RAP may be used in accordance with Table 2303.02-1. No frictional aggregate credit or aggregate crushed particles credit will be given for Unclassified RAP.
 - 2) When an Unclassified RAP stockpile is characterized by sampling and testing for mix design, no material can be added to the stockpile until the project is completed.

Table 2303.02-1: Allowable RAP Usage

Mix Designation	Aggregate Quality Type	Maximum Allowance Allowable Usage		
		Unclassified RAP	Certified ² RAP	Classified RAP
HMA 100K S	B	0%	10%	No limit ¹
HMA 100K I	B	10%	20%	No Limit
HMA 100 K B	B	10%	20%	No Limit
HMA 300K S	B	0%	10%	No limit ¹
HMA 300 K I	B	10%	20%	No Limit
HMA 300K B	B	10%	20%	No Limit
HMA 1M S L-4	A	0%	0%	No limit ¹
HMA 1M S	A	0%	0%	No limit ¹

HMA 1M I	B	10%	20%	No Limit
HMA 1M B	B	10%	20%	No Limit
HMA 1M B (shoulder)	B	10%	20%	No Limit
HMA 3M S L-4	A	0%	0%	No limit ¹
HMA 3M S L-3	A	0%	0%	No limit ¹
HMA 3M S	A	0%	0%	No limit ¹
HMA 3M I	A	0%	0%	No Limit
HMA 3M B	B	10%	20%	No Limit
HMA 10M S L-3	A	0%	0%	No limit ¹
HMA 10M I	A	0%	0%	No Limit
HMA 10M B	B	10%	20%	No Limit
HMA 30M S L-3	A	0%	0%	No limit ¹
HMA 30M S L-2	A	0%	0%	No limit ¹
HMA 30M I	A	0%	0%	No Limit
HMA 30M B	B	10%	20%	No Limit
HMA 100M S L-2	A	0%	0%	No limit ¹
HMA 100M I	A	0%	0%	No Limit
HMA 100M B	B	10%	20%	No Limit
Note: 1. At least 70% of the total asphalt binder in the surface mix shall be virgin. 2. Certified RAP meeting Type A quality for alumina per Section 4127 shall have the same maximum allowable usage as Classified RAP for all mixes.				

7. Pre-consumer or post-consumer shingles that have been processed, sized, and ready for incorporation into an asphalt mixture constitute RAS material.
8. Up to 5% RAS by weight of total aggregate may be used in the design and production of an asphalt mixture. The percentage of RAS used is considered part of the maximum allowable RAP percentage. Unless explicitly stated otherwise in this specification or Materials I.M. 505, use RAS according to the same requirements as prescribed for RAP material.
9. RAS shall be certified from an approved supplier designated in Materials I.M. 506. Material processed prior to DOT source approval will not be certified.

D. Flexible Paving Mixture.

1. The job mix formula (JMF) is the percentage of each material, including the asphalt binder, to be used in the HMA mixture. Ensure JMF gradation is within control points specified for particular mixture designated. Use JMF to establish a single percentage of aggregate passing each required sieve size.
2. The basic asphalt binder content is the historical, nominal mixture asphalt binder content, expressed as percent by weight (mass) of asphalt binder in total mixture. Apply values in Table 2303.03-1, based on mixture size and type.
3. If asphalt binder demand for the combination of aggregates submitted for an acceptable mix design exceeds the basic asphalt binder content (see Table 2302.02-1, 2303.02-2) by more than 0.75%, include an economic evaluation with the mix design. ~~Base this evaluation on past job mix history, possible aggregate proportion changes, and aggregate availability and haul costs for any changes or substitutions considered.~~ For economic evaluation, provide an alternate mix design utilizing aggregates which results in an optimum binder content not exceeding basic asphalt binder content by more than 0.75% and documentation of costs associated with hauling both proposed aggregates and alternate aggregates to plant site. Alternate JMF shall meet requirements of Section 2303.

Table 2303.02-2: Basic Asphalt Binder Content (%)

Size	Aggregate Type	1 inch (25 mm)	3/4 inch (19 mm)	1/2 inch (12.5 mm)	3/8 inch (9.5 mm)
Intermediate and Surface	Type A	4.75	5.50	6.00	6.00
Intermediate and Surface	Type B	5.25	5.75	6.00	6.25
Base	Type B	5.25	6.00	6.00	6.25

4. Use a mixture design meeting gyratory design and mixture criteria corresponding to the design level specified in the contract documents. The Engineer may approve the substitution of any mixture which meets requirements for a higher mixture than specified in the contract documents, at no additional cost to the Contracting Authority. When a commercial mix is specified, use a 1/2 inch (12.5 mm) 300K surface mixture or higher for JMF approval.
5. Use 1,000,000 ESAL HMA base mixture for shoulders placed as a separate operation. For outside shoulders on Interstate projects, the Contractor has the option to substitute the mainline intermediate or surface mixture for a specified base mixture, at the Contractor's expense.
6. Unless otherwise indicated on the contract documents, use a 1/2 inch (12.5 mm) or 3/4 inch (19 mm) 1,000,000 ESAL HMA Base mixture (or higher ESAL) for base widening. When an adjoining surface is designed for 300,000 ESALS or less and is paved during same project, use a base mixture at same ESAL level used in surface mixture.
7. Prepare gyratory mixture designs for base, intermediate, and surface mixtures. Follow the procedure outlined in Materials I.M. 510. Submit a mixture design complying with Materials I.M. 510. Propose both a production and a compaction temperature between 215°F (102°C) and 280°F (138°C) for WMA mixture designs.
8. Use a gyratory compactor for design and field control meeting the protocol for Superpave gyratory compactors AASHTO T 312. Compactors for which compliance with this protocol is pending may be used at the discretion of the District Materials Engineer.

E. Other Materials.

1. Tack Coat.

Tack coat may be SS-1, SS-1H, CSS-1, or CSS-1H. Do not mix CSS and SS grades. RC-70 and MC-70 may also be used after October 1, at the Contractor's option.

2. Anti-strip Agent.

a. Perform a moisture sensitivity evaluation of the proposed asphalt mixture design in accordance with Materials I.M. 507 Appendix A of this specification for the following mixtures when placed in travelled lanes:

- 1) Mixtures for Interstate and Primary highways designed for 30,000,000 ESALS and higher
- 2) Mixtures for Interstate and Primary highways containing quartzite, granite, or other siliceous (not a limestone or dolomite) aggregate obtained by crushing from ledge rock in at least 40% of the total aggregate (virgin and recycled) or at least 25% of the plus No. 4 (4.75 mm).
- 3) All WMA mixtures placed in travel lanes designed for 10,000,000 ESALS and higher. For the purpose of evaluating moisture sensitivity of a proposed mix design, the Contractor may test the proposed JMF from plant produced material placed off-site at no additional cost to the contracting authority.

For the purpose of evaluating moisture sensitivity of a proposed mix design, Contractor may test proposed JMF from plant produced material placed off-site at no additional cost to the Contracting Authority.

b. Sample and test plant produced mixture for moisture susceptibility in accordance with Materials I.M. 204 and Materials I.M. 507 Appendix A of this specification for bid item plan quantities of more than 1000 tons (1000 Mg) as follows:

- 1) For mixtures satisfying Article 2303.02, E, 2, a,
- 2) For conditions satisfied in Article 2303.02, E, 2, g f.

- c. Moisture susceptibility testing of plant produced mixture will not be required for base repair, patching, temporary pavement, or paved shoulders. Moisture susceptibility testing for mixture bid items of 1000 tons (1000 Mg) or less is only required on the mix design for mixtures satisfying Article 2303.02, E, 2, a.
- d. Use the following minimum stripping inflection point (SIP) requirements for plant produced material:

PG High Temperature, °C	SIP, Number of Passes ¹	
	< 3,000,000 ESALS	≥ 3,000,000 ESALS
58	10,000	14,000
64	10,000	14,000
70	10,000	14,000

Note 1: If ratio between creep slope and stripping slope as defined in Appendix A of this specification is less than 2.00, the SIP is invalid.

A minimum tensile strength ratio (TSR) of 80.0% is required on plant produced mixture. When notified of non-compliant results, the Engineer may suspend paving operations until an approved "significant mix change" is implemented.

- e. For mixture bid items of more than 1000 tons (1000 Mg), when the Contractor's mix design TSR results are greater than or equal to 80% and less than 90%, an anti-strip agent will be required until the Contracting Authority's TSR results on the plant produced mixture are equal to or exceeding 80%. Plant produced material without anti-strip shall be tested without penalty to confirm the need for an anti-strip agent. See Materials I.M. 510 Appendix C for additional information.
 - f. When the Contractor's mix design TSR SIP results are below 80.0% the minimum specified in Article 2303.02, E, 2, d, an anti-strip agent will be required. Plant produced material with anti-strip shall be tested to verify the minimum TSR SIP is achieved. See Materials I.M. 510 Appendix C for additional information.
 - g. The Engineer may require an evaluation of the test method in Materials I.M. 507 Appendix A of this specification for plant produced mixture as follows:
 - 1) When there is a "significant mix change" to a mix satisfying Article 2303.02, E, 2, a.
 - 2) When there is contamination and/or coating of the aggregate for any mixture placed in a travel lane.
 - 3) When aggregates are inadequately dried during production of any mixtures placed in a travel lane.
 - g. The following anti-strip agents may be used:
 - 1) **Hydrated Lime.**
Meet the requirements of AASHTO M 303, Type I or ASTM C 1097, Type S. Do not apply Section 4193. Hydrated lime will not be considered part of the aggregate when determining the job mix formula and the filler/bitumen ratio.
 - 2) **Liquid Anti-strip Additives.**
For each JMF, obtain approval for liquid anti-strip additives blended into the binder. Approval will be based on the following conditions:
 - a) The asphalt binder supplier provides test results that the additive does not negatively impact the asphalt binder properties, including short term and long term aged properties.
 - b) The design is to establish the optimum additive rate when comparing the dry strength of specimens prepared with asphalt binder not containing the anti-strip additive to conditioned specimens prepared with asphalt binder containing the anti-strip additive that produces the optimum (maximum) SIP value. See Materials I.M. 510 Appendix C for additional information.
 - c) A dosage rate can be selected such that the conditioned indirect tensile strength can be improved by at least 10% while meeting all other requirements.
 - 3) **Polymer-based Liquid Aggregate Treatments.**
For each JMF, obtain approval for polymer-based liquid aggregate treatments. Approval will be based on the design establishing the optimum additive rate when comparing the dry strength of specimens prepared without the anti-strip additive to conditioned specimens prepared with asphalt binder containing the anti-strip additive. See Materials I.M. 510 Appendix C for additional information.
3. **Sand for Tack Coats.**
Use sand meeting the requirements of Gradation No. 1 of the Aggregate Gradation Table in Article 4109.02.

4. Fabric Reinforcement.

Use fabric reinforcement meeting the requirements of Article 4196.01, B, 4.

5. WMA Technologies.

Chemical additives, organic additives, or water injection systems approved by the Bituminous Engineer may be used at the rate established by the mixture design in the production of WMA. Once production of a bid item has begun with a WMA technology, continue its use throughout the remainder of the bid item's production unless otherwise approved by the District Materials Engineer.

2303.03 CONSTRUCTION.

A. General.

1. Contractor is responsible for all aspects of the project.
2. Provide quality control management and testing, and maintain the quality characteristics specified.
3. Apply Quality Management - Asphalt (QM-A) to asphalt mixture bid items when the plan quantity is greater than 1000 tons (1000 Mg) and all Interstate contracts. Follow the procedures and meet the criteria established in Articles 2303.02 and 2303.03, B; Section 2521; and Materials I.M. 510 and 511.
4. Apply Article 2303.03, E, for asphalt mixture bid items that have a plan quantity of 1000 tons (1000 Mg) or less as well as any patching bid items. For items bid in square yards (m²), apply Article 2303.03, E when the plan quantity by weight (estimated with a unit weight of 145 pounds per cubic foot (2323 kg/m³) unless otherwise stated on the plans) does not exceed 1000 tons (1000 Mg). Article 2303.03, E applies to Interstate patching as well as Interstate bid items of less than 1000 tons (1000 Mg), all of which are placed in a non-travel lane.

B. Equipment.

Provide sufficient equipment of the various types required to produce, place, and compact each layer of mixture as specified, such that the mixture is workable at the minimum placement and compaction temperature desired, regardless of storage or haul distance considerations.

Modify the asphalt mixing plant as required by the manufacturer when introducing a WMA technology. Plant modifications may include additional plant instrumentation, the installation of water injection systems and/or WMA additive delivery systems, tuning the plant burner and adjusting the flights in order to operate at lower production temperatures and/or reduced tonnage.

Use equipment meeting the requirements of Section 2001 with the following modifications:

1. Plant Calibration.

- a. Calibrate each plant scale and metering system before work on a contract begins. Use calibration equipment meeting the manufacturer's guidelines and Materials I.M. 508.
- b. The Engineer may waive calibration of permanent plant scales when a satisfactory operational history is available. The Engineer may require any scale or metering system to be recalibrated if operations indicate it is necessary.
- c. Make calibration data available at the plant.
- d. Calibrate each aggregate feed throughout an operating range wide enough to cover the proportion of that material required in the JMF. Make a new calibration each time there is a change in size or source of any aggregate being used.
- e. For continuous and drum mixing plants, calibrate the asphalt metering pump at the operating temperature and with the outlet under pressure equal to that occurring in normal operations.

2. Paver.

Apply Article 2001.19. Spreaders described in Article 2001.13, D, may be used to place paved shoulders. Spreaders used to place the final lift of paved shoulders shall meet additional requirements of Article 2001.19.

3. Rollers.

- a. For initial and intermediate rolling, use self-propelled, steel tired, pneumatic tired, or vibratory rollers meeting the requirements of Article 2001.05, B, C, or F. Their weight (mass) or tire pressure may be adjusted when justified by conditions.

- b. For finish rolling, use self-propelled, steel tired rollers or vibratory rollers in the static mode that meet the requirements of Article 2001.05, B, or F.

4. Scales.

Apply Article 2001.07, B, to paving operations regardless of the method of measurement.

C. HMA Construction.

1. Maintenance of the Subgrade and Subbase.

- a. Maintain completed subgrade and subbase to the required density, true cross section, and smooth condition, prior to and during subsequent construction activities.
- b. If rutting or any other damage occurs to the subgrade or subbase as a result of hauling operations, immediately repair the subgrade and subbase. Such repair will include, if necessary, removal and replacement, at no additional cost to the Contracting Authority.
- c. Should traffic by others authorized to do work on the project be specifically permitted by the Engineer to use loads which exceed the Contractor's established limit, the Contracting Authority will pay repair costs for repairs directed by the Engineer.

2. Preparation of Existing Surfaces.

a. Cleaning.

Clean and prepare existing surface according to Article 2212.03, B, 1.

b. Tack Coats.

- 1) Apply tack coats when the entire surface area on which the coat is to be applied is free of moisture. Do not apply them when the temperature on the surface being covered is less than 25°F (-4°C).
- 2) Place a tack coat to form a continuous, uniform film on the area to be covered. ~~Unless directed otherwise, spread the tack coat at an undiluted rate of 0.02 to 0.05 gallon per square yard (0.1 to 0.2 L/m²). The tack coat may be diluted with water to improve application. Unless directed otherwise, spread tack coat at the following undiluted rates:~~

• New HMA Surface	0.03 to 0.05 gallon per square yard (0.14 to 0.23 L/m ²)
• Milled HMA Surface	0.05 to 0.07 gallon per square yard (0.23 to 0.32 L/m ²)
• PCC/Existing HMA Surface	0.04 to 0.06 gallon per square yard (0.18 to 0.27 L/m ²)

Tack coat may be diluted with water to improve application.
- 3) Allow tack coat to adequately cure prior to placement of HMA to assure bond to the underlying surface and avoid damage of the HMA being placed. If tack coat surface becomes dirty from weather or traffic, thoroughly clean and, if necessary, retack. A light application of sand cover may also be required, but this is anticipated only for excessive application rates, breakdowns, and short sections remaining at the end of a day's run.
- 4) On highways being constructed under traffic, use procedures that provide safety and convenience to the public (without soiling their vehicles) as controlling factors. Limit tack coat application lengths to minimize inconvenience to the public. Keep applications within the hot mixture placing work area that is controlled by flaggers at each end. Plan applications so they will be covered with hot mixture when the work area is opened to traffic at the end of the day's work.
- 5) Tack the vertical face of exposed, longitudinal joints as a separate operation at a rate from 0.10 to 0.15 gallon per square yard (0.5 to 0.7 L/m²). Tack before the adjoining lift is placed. Lightly paint or spray vertical surfaces of all fixtures, curbs, bridges, or cold mixture with which the hot mixture will come in contact to facilitate a tight joint with the fresh mixture.

c. Fabric Reinforcement.

- 1) When fabric reinforcement is required, the locations will be designated in the contract documents.
- 2) Do not place fabric on wet or damp surfaces, or when the road surface is less than 50°F (10°C).
- 3) Apply fiberglass fabric only with an adhesive recommended by the manufacturer.
- 4) Place fabrics with an adhesive backing according to the manufacturer's recommendations.
- 5) Place other fabrics with a heavy coat of asphalt binder at a rate of 0.20 to 0.25 gallons per square yard (0.9 to 1.1 L/m²). Use the same binder grade used in the asphalt concrete mixture. For binders containing a WMA technology, place at a temperature between 260°F and 315°F (127°C and 160°C), otherwise place at a temperature between 295°F and 315°F (145°C and 160°C).
- 6) Place fabric reinforcement according to the contract documents (full width or individual crack or joint treatment). Place fabric immediately following the adhesive or asphalt binder placement

under the fabric. Placement may be by hand or by a mechanical method designed for this purpose.

- 7) Take precautions to avoid wrinkles in the fabric and to ensure that air bubbles are removed without breaking the fabric. Cut and lap wrinkles or folds which cannot be removed by brushing in order to provide a smooth surface.
- 8) Additional adhesive or asphalt binder may be required to produce a tight, bonded surface. When applied full lane width, use a minimum 12 inch (300 mm) transverse and longitudinal lap.
- 9) Avoid applying tack coat over longitudinally placed fabric.
- 10) To avoid damage to fabric, do not allow traffic over fabric during placement and during curing of the adhesive material. A light application of HMA mix may be hand sprinkled on the fabric to prevent damage from necessary equipment traffic.
- 11) When directed by the Engineer, repair damaged or soiled fabric prior to HMA overlay, at no additional cost to the Contracting Authority. The Engineer may also require sanding during this period, at no additional cost to the Contracting Authority.

3. Handling, Production, and Delivery.

Ensure plant operation complies with the following requirements:

a. Handling Mineral Aggregate and RAP.

- 1) Keep various aggregate products used separate from one another. Make adequate provisions to prevent intermingling.
- 2) Handle stockpiling and processing in a manner to ensure uniform incorporation of the aggregate into the mix.
- 3) Feed various aggregates separately in their proper proportions using feeders to the cold elevator. Feed them at a rate to permit correct and uniform temperature control of heating and drying operations.

b. Handling Asphalt Binder.

Bring asphalt binder to a temperature of 260°F to 330°F (125°C to 165°C) before being measured for mixing with the aggregates. The temperature between these limits may be further regulated according to the characteristics of the mixture, method of proportioning, and viscosity of the asphalt binder. Heat modified asphalt binder according to the supplier's recommendations.

c. Handling Anti-strip Agents.

1) Hydrated Lime.

Accurately proportion lime using a method acceptable to the Engineer.

a) Added to a Drum Mixer.

- (1) Add hydrated lime at the rate of 0.75% by weight (mass) of the total aggregate (virgin and RAP) for Interstate and Primary projects. Add hydrated lime to a drum mixer using one of the following methods:
 - (a) Add to virgin aggregate on the primary feed belt, as a lime water slurry.
 - (b) Thoroughly mix with the total combined aggregate if the aggregate contains at least 3% total moisture.
 - (c) Add to the outer drum of a double drum system away from heated gas flow and prior to the addition of the virgin asphalt binder.
- (2) Alternative methods for mixing will be allowed only with the Engineer's approval. Do not introduce hydrated lime directly into a single drum mixer by blowing or by auger.

b) Added to a Batch Plant.

Add hydrated lime at the rate of 0.5% by weight (mass) of the total aggregate (virgin and RAP) for Interstate and Primary projects. Introduce it to a batch plant using one of the methods below. In any case, introduce the lime prior to the start of the dry mix cycle.

- (1) Place on the recycle belt which leads directly into the weigh hopper.
- (2) Add directly into the pugmill.
- (3) Add directly into the hot aggregate elevator into the hot aggregate stream.

c) Added to the Aggregate Stockpile.

Add hydrated lime at a rate established by the AASHTO T 283 test optimization of the SIP as determined by Appendix A of this specification. The instructions for establishing the rate are discussed in Materials I.M. 510. Add it to the source aggregates defined in Article 2303.02, E, 2, thoroughly mixed with sufficient moisture to achieve aggregate coating, and then place in the stockpile.

2) Liquid.

- a) When liquid anti-strip additives are used, employ equipment complying with the anti-strip manufacturer's recommended practice to store, measure, and blend the additive with the binder.

- b) The additive may be injected into the asphalt binder by the asphalt supplier or the Contractor. If the Contractor elects to add the liquid anti-strip agent, they assume the material certification responsibilities of the asphalt binder supplier. Ensure the shipping ticket reports the type and amount of additive and time of injection.
 - c) Ensure the asphalt supplier provides the Contractor and Engineer with the shelf life criteria defining when the anti-strip additive maintains its effectiveness. Do not use binder that has exceeded the shelf life criteria.
 - d) When using polymer-based aggregate treatment, comply with the manufacturer's recommended specifications and guidelines.
- d. Production of Hot Mix Asphalt Mixtures.**
- 1) Regulate the exact proportions of the various materials to be within the limits specified to produce a satisfactory bituminous coating and mixture. First dry mix the aggregates, then add the asphalt binder.
 - a) In batch plants, add the asphalt binder in an evenly spread sheet over the full length of the mixer box.
 - b) In continuous plants, spray the asphalt binder evenly into the aggregate within the first 30% of the length of the mixer box using a positive pressure spray.
 - c) In drum mixing plants, spray the asphalt binder evenly into the aggregate using a positive pressure spray.
 - 2) Operate the mixer so that the mixture is of consistently uniform temperature, and when discharged from the mixer does not vary more than 20°F (11°C).
 - 3) Do not allow the temperature of the mixtures to fall outside the following parameters:
 - a) Keep the production temperature of WMA mixtures between 215°F (102°C) and 280°F (138°C) until placed on the grade. Maximum production temperature for WMA is 330°F (165°C) after October 1st.
 - b) Do not produce WMA mixtures more than 10°F (6°C) below the target temperature designated in the JMF without the approval of the Engineer.
 - c) Keep the production temperature of HMA mixtures between 225°F (102°C) and 330°F (165°C) until placed on the grade. Do not discharge HMA into the hopper when its temperature is less than:
 - (1) 245 °F (118°C) for a nominal layer thickness of 1 1/2 inches (40 mm) or less, or
 - (2) 225 °F (102°C) for a nominal layer thickness of more than 1 1/2 inches (40 mm).
 - d) Flexible paving mixtures not meeting these requirements will be rejected.
 - e) Production temperature limits apply starting at point of discharge from mixer.
 - 5 4) Use a rate of production that will not exceed the manufacturer's rated capacity for the mixer and will provide uniform coating. For batch mixers, use a dry mixing time of no less than 5 seconds and a wet mixing time of no less than 25 seconds. For continuous mixers, use a mixing time of no less than 30 seconds.
 - 6 5) Control handling and manipulation of the hot mixture from the mixer to the final spread on the road in order to maintain uniform composition and minimize segregation of coarser particles. Minimize segregation to the extent that it cannot be visibly observed in the compacted surface. Apply only approved release agents to trucks and equipment, as specified in Article 2001.01.
 - 7 6) Except for an unavoidable delay or breakdown, provide continuous and uniform delivery of hot HMA to any individual spreading unit. Deliver at a rate sufficient to provide as continuous an operation of the spreading unit as practical. Keep the paver hopper sufficiently full at all times to prevent non-uniform mixture flow to the screed.
- 4. Placement.**
- a. Clean the surface of each layer according to Article 2212.03, B, 1. If necessary, retack to provide bond with the succeeding course.
 - b. Prior to placing the final lift, correct bumps or other significant irregularities that appear or are evident in the intermediate course or other lower course.
 - c. Do not place HMA mixtures under the following circumstances:
 - 1) On a wet or damp surface.
 - 2) When road surface temperature is less than that shown in Tables 2303.03-1 and 2303.03-2.

Table 2303.03-1: Base and Intermediate Course Lifts of Asphalt Mixtures

Nominal Thickness - inches (mm)	Road Surface Temperature, °F (°C)
1 1/2 (40)	40 (4)
2 - 3 (50 - 80)	35 (2)
Over 3 (Over 80)	35 (2)

Table 2303.03-2: Surface Course Lifts of Asphalt Mixtures

Nominal Thickness - inches (mm)	Road Surface Temperature, °F (°C)
1 (30)	HMA: 50 (10) / WMA: 40 (4)
1 1/2 (40)	HMA: 45 (7) / WMA: 40 (4)
2 and greater (50 and greater)	40 (4)

- 3) After November 15, except with the Engineer's approval.
- d. The Engineer may further limit placement if, in the Engineer's judgment, other conditions are detrimental to quality work.
- e. When placing the mixture, maintain a finishing machine forward speed that will provide a continuous uniform operation. Minimize stopping.
- f. Use a wire or string line to guide finishing machine and maintain alignment. Correct edge alignment irregularities immediately.
- g. The contract documents will show the total thickness to be placed. Spread the mixture at a rate such that, when compacted, the layer(s) will be the required thickness.
- h. Base the minimum layer thickness on Table 2303.03-3. Minimum layer thickness does not apply to leveling/scratch courses.

Table 2303.03-3: Minimum Lift Thickness

Design Mix Size - inches (mm)	Minimum Lift Thickness - inches (mm)
3/8 (9.5)	1 (25)
1/2 (12.5)	1 1/2 (40)
3/4 (19)	2 (50)
1 (25)	3 (75)

- i. Ensure the compacted thickness of the top layer does not exceed 3 inches (75 mm). This restriction does not apply to HMA shoulders.
- j. The maximum compacted thickness of lower layers may exceed 4 inches (100 mm) if it is demonstrated that the thicker layers have satisfactory density. The riding characteristics of the thicker layers must be within conformance to that expected from a 3 inch (75 mm) layer.
- k. Complete each layer to full width before placing succeeding layers.
- l. While operating on the road surface, do not use kerosene, distillate, other petroleum fractions, or other solvents, for cleaning hand tools or for spraying the paver hopper. Do not carry containers of cleaning solution on or near the paver. When a solvent is used, do not use the paver for at least 5 hours after cleaning. Collect and remove all cleaning materials and cleaning residue from the project and plant site. The cleaning material and residue becomes the property of the Contractor.
- m. Whenever practical, spread mixtures using a finishing machine. Irregular areas may be spread by hand. Spread the hot mixture uniformly to the desired depth with hot shovels and rakes. Do not dump loads faster than they can be spread properly. Do not allow workers to stand on the loose mixture while spreading.
- n. After spreading, carefully smooth to remove all segregated coarse aggregate and rake marks. Use rakes and lutes designed for use on HMA mixtures.
- o. Unless stated elsewhere in the contract documents, when placing two adjacent lanes, pave no more than 1 day of rated plant production before paving the adjacent lane(s). Place the adjacent lane to match the first lane during the next day of plant production.
- p. Do not spread more mixture than can be compacted in the specified working hours of the same working day.
- q. At the close of each working day, clear all construction equipment from the roadbed.
- r. Prior to opening a lane to traffic, place fillets or full width granular shoulders according to Article 2121.03, C, 4. Place the material adjacent to and equal in thickness to the resurfacing. Fillet removal is incidental to the HMA mixture.

5. Compaction.

a. General.

- 1) Promptly and thoroughly compact each layer. Use mechanical tampers for areas inaccessible to the rollers.

- 2) Use a rolling procedure and compactive effort that will produce a surface free of ridges, marks, or bumps. Obtain the Engineer's approval for the rolling procedure and compactive effort.
 - b. **Class I Compaction.**
 - 1) **Applications.**
 - a) Use Class I compaction for base, intermediate, and surface courses for the traffic lanes, ramps, and loops on all roadways.
 - b) For Class I compaction, the quality characteristic is in-place air void content and will be based on the theoretical maximum specific gravity (G_{mm}) obtained from the Quality Control Program for that day's mixture.
 - 2) **Test Strip Construction for Class I Compaction.**
 - a) For the purpose of evaluating properties of the HMA mixtures and for evaluating an effective rolling pattern:
 - (1) Construct a test strip of the surface mixture prior to its placement on the surface course for Interstate highways, Primary highways, and ramps connecting Interstate and Primary highways.
 - (2) Construct a test strip of the intermediate mixture at the start of its placement on the intermediate course for Interstate highways, interstate-to-interstate ramps.
 - (3) Test strips for base mixtures may be constructed, but are not required.
 - b) When the contract documents specify both intermediate and surface courses and a test strip is required, place a surface course test strip in lieu of intermediate mixture in a section of the intermediate course prior to actual surface course placement. If surface course and intermediate course are not placed the same calendar year, then place test strip at beginning of surface mix production.
 - c) Test strips are not required when the entire production of the mixture bid item is placed in a single day.
 - d) The quantity of HMA mixture subject to the test strip production, will be pre-established with the Engineer and limited to a half day's production:
 - e) Only one test strip will be allowed for each mixture and shall be declared to the Engineer prior to placement. The Engineer may require additional test strips if a complying HMA mixture or rolling pattern was not established.
 - f) Use procedures and documentation during test strip construction that allow the Engineer and Contractor to confirm mixture design properties and effectiveness of compaction procedures.
 - g) Use test strip production control that meets the requirements of Article 2303.03, D, 3, c. The test strip will be an independent lot. Determine sublots in accordance with Table 2303.03-4.
 - c. **Class II Compaction.**

Intended for paved shoulders, temporary crossovers, onsite detours, and other situations where Class I is not specified.

 - 1) For all rollers, make initial contact with the hot mixture using the power driven wheels or drum.
 - 2) Perform initial rolling at a temperature so the mixture will compact without excessive distortion. Except on longitudinal joints and super-elevated curves, begin rolling with the initial roller at the outer edges of the pavement. With each successive pass, progress inward toward the center. For each reverse trip, lap all but 4 to 6 inches (100 to 150 mm) of the previous track. When reversing direction, stop the initial roller at an angle with the longitudinal direction.
 - 3) Following the initial rolling, give the layer an intermediate rolling with a pneumatic tired roller before the temperature falls below 225°F (110°C). Cover the area no less than six times with the intermediate roller.
 - 4) Use a finish, steel tired roller to smooth out all marks and roughness in the surface.
 - 5) For areas inaccessible to rollers, use mechanical tampers or other approved compaction methods.
6. **Joints and Runouts.**
 - a. Construct longitudinal joints for courses on resurfacing projects directly above the longitudinal joint in the existing pavement. Limit the offset distance between longitudinal joints in succeeding full depth HMA paving courses to 3 inches (75 mm) or less. Adjust hot mixture spreading along longitudinal joints to secure complete joint closure and full compression of the mixture with a smooth surface and joint after compaction.
 - b. Separate transverse construction joints in succeeding courses by at least 6 feet (1.6 m). Do not use wood or metal headers to form joint edge during rolling of the fresh mixture. Saw header to a straight line at right angles to the center line to provide a full thickness vertical edge before continuing paving. Provide a 10 foot (3 m) straightedge for checking transverse construction joints

for smoothness. Before compaction, use hand methods to correct surface variations at transverse construction joints indicated by the straightedge.

- c. When a transverse construction joint is open to traffic, install a temporary runout 10 feet (3 m) long per 1 inch (25 mm) of lift thickness. Use suitable paper or burlap (not sand, dirt, or wood) under the taper to prevent adhesion.
- d. When required to end paving for winter shutdown, locate runouts adjacent to each other. Install a winter shutdown runout 25 feet (8 m) long per 1 inch (25 mm) of lift thickness.
- e. For temporary runouts open to traffic for periods greater than 4 weeks or winter shutdown runouts, the Contractor may reduce the amount of top size aggregate in the transition taper. Remove temporary runouts and winter shutdown runouts before commencing paving. Runout removal is incidental to the HMA mixture.

7. Miscellaneous Operations.

a. Leveling and Strengthening Courses.

- 1) The contract documents will show course thickness. Place strengthening and leveling courses as indicated in the contract documents. Use the same mixture specified for the base or intermediate course.
- 2) When the width of strengthening or leveling course is 8 feet (2.4 m) or more, spread using a finishing machine.
- 3) Compact leveling courses and intermediate mixtures placed as leveling/scratch courses (less than or equal to 1 inch (25mm) plan thickness) using Class II compaction, except make all passes with a pneumatic roller.

b. Wedge Courses.

- 1) Use the base or intermediate mixture to construct wedge courses used to secure desired curve super-elevation. When possible, spread using a finishing machine.
- 2) Place wedge courses in compacted layers no thicker than 3 inches (75 mm). Avoid crushing the coarse aggregate. Place wedge courses to the full width of the pavement.
- 3) On super-elevated curves which require wedge course placement, stage the shoulder construction. After completing each day's wedge placement operations and prior to suspending that day's construction activities, construct a full width shoulder on the high side up to the completed wedge course elevation. Shoulder construction staging will be considered incidental to shoulder construction.
- 4) The Engineer may waive field void sampling for wedge courses provided compaction has been thorough and effective.

c. Fixtures in the Pavement Surface.

- 1) Adjust manholes, intakes, valve boxes, or other fixtures encountered within the area to be covered by HMA to conform to the final adjacent finished surface. Payment for adjustment of manholes or intakes will be per Section 2435. Payment for adjustment of valve boxes and other fixtures will be per Section 2554. Unless specified otherwise in the plans, adjust fixtures:
 - Between placing the surface course and the layer preceding the surface course, or
 - After placing the surface course using a composite patch or PCC patch.
- 2) Use PCC and HMA patch material complying with the requirements of Section 2529. Make patches large enough to accommodate the structure being adjusted.
- 3) Construct patches to be square. Orient them diagonally to the direction of traffic flow. Ensure the elevation of the adjusted fixture and patch does not differ from the elevation of the surrounding pavement surface by more than 1/4 inch (6 mm).
- 4) When shaping and compacting resurfacing near inlets to storm sewer intakes, shape to ensure maximum drainage into intakes.

d. Fillets for Intersecting Roads and Driveways.

- 1) Shape, clean of loose material, and tack coat the surface adjacent to the pavement being surfaced when fillets are designated in the contract documents for driveways to homesteads and commercial establishments and at intersecting roads. On the tack coated surface, place and compact the hot mixture in layers equal to the adjacent layer. Extend from the edge of the pavement as shown on the plans.
- 2) Place and compact fillets at intersecting roads at the same time as the adjacent layer.
- 3) Entrance fillets that are 8 feet (2.4 m) or wider may be placed as a separate operation. Pave fillets which are 8 feet (2.4 m) or wider with a self propelled finishing machine described in Article 2001.19.
- 4) The Engineer may approve other equipment for placement of fillets, based on a demonstration of satisfactory results.

e. Stop Sign Rumble Strips.

If the plans include the bid item Rumble Strip Panel (In Full Depth Patch), apply Section 2529. To meet the requirements of placing Stop Sign Rumble Strips before opening roadway sections to traffic, the Contractor may construct temporary rumble strip panels meeting the final pattern and location of the Stop Sign Rumble Strip indicated in the plans

f. Paved HMA Shoulders.

- 1) Compact paved HMA shoulders using one of the following methods:
 - a) Class II compaction (Article 2303.03, C, 5, c),
 - b) Rolling pattern established during the first day of shoulder placement to achieve Class I compaction (Article 2303.03, C, 5, b), or
 - c) Same rolling pattern established for adjoining mainline or ramp driving lane, as determined by density coring.
- 2) Shoulder area will not be included in Percent Within Limits (PWL) calculations for field voids on adjoining mainline or ramp driving lane. A price adjustment may be applied to shoulder areas that do not adhere to the established roller pattern.

D. Quality Assurance Program.

For ~~interstate mixtures placed in a travel lane and~~ each mixture bid item that has a plan quantity of more than 1000 tons (1000 Mg) (patching excluded) apply requirements of this article.

For items bid in square yards (m^2), apply the requirements of this article when the plan quantity by weight (estimated with a unit weight of 145 pounds per cubic foot (2323 kg/m^3) unless otherwise specified in the plans) exceeds 1000 tons (1000 Mg).

HMA mixture bid items with plan quantities of 1000 tons (1000 Mg) or less and patching bid items are both defined as small quantities. For those bid items, meet the requirements of Article 2303.03, E. For items bid in square yards (m^2), when the plan quantity by weight (estimated with a unit weight of 145 pounds per cubic foot (2323 kg/m^3) unless otherwise specified in the plans) does not exceed 1000 tons (1000 Mg), meet the requirements of Article 2303.03, E.

1. General.

Follow the procedures and meet the criteria established in Articles 2303.02 and 2303.03, B, Section 2521, and Materials I.M. 510 and 511.

2. Mix Design - Job Mix Formula.

- a. The Contractor is responsible for the JMF for each mixture.
- b. Submit a completed JMF, using the computer format of Form 956, for approval to the materials lab designated by the Contracting Authority. Submit supporting documentation demonstrating the design process was followed and how the recommended JMF was determined. Include an economic evaluation when required. Include trial and final proposed aggregate proportions (Form 955) and corresponding gyratory data. In addition, submit sufficient loose mixture and individual material samples for approval of the design.
- c. Personnel preparing the JMF shall be Iowa DOT certified in bituminous mix design.
- d. If the JMF is not satisfactory, submit another JMF for review. An approved JMF will be required prior to beginning plant production. The Contractor will be charged \$1000 for each JMF approval requested and performed which exceeds two per mix size, type, and proposal item on any individual project or group of tied projects.

3. Plant Production.

a. General.

- 1) Perform sampling and testing to provide the quality control of the mixture during plant production. Certified Plant Inspection according to Section 2521 is required.
- 2) Personnel performing production quality control testing shall be Iowa DOT certified for the duties performed.
- 3) Provide easy and safe access for Iowa DOT staff to the location in the plant where samples are taken.
- 4) All of the following qualify as a "significant mix change":
 - A single occurrence of an aggregate interchange of greater than 5%.
 - An aggregate interchange of greater than 5% from last approved JMF.
 - A single occurrence of an asphalt content change greater than 0.2%.
 - An asphalt content change greater than 0.2% from last approved JMF.
 - A deletion or introduction of a new material into the mix.

- A change of additive dosage rate.
- A change of binder, aggregate, or additive source.

b. Sampling and Testing.

Submit a testing plan meeting the requirements of Materials I.M. 511, Appendix D prior to the preconstruction meeting.

1) Asphalt Binder

Sample and test asphalt binder to verify the quality of the binder grade. Take asphalt binder samples at random times as directed and witnessed by the Engineer according to Materials I.M. 204.

2) Aggregate Gradation

- a) Use cold feed or ignition oven gradation for aggregate gradation control to assure materials are being proportioned according to the specifications. Take aggregate quality control samples at random times in accordance with Materials I.M. 204.
- b) Take a minimum of one aggregate gradation for each day's production that exceeds 100 tons (Mg). Higher testing frequencies may be used when defined by a pre-determined quality control plan approved by the Engineer. When more than one sample in a day's production is tested, use the average gradation to determine compliance of the daily lot.
- c) Engineer will verify Contractor gradation with an ignition oven or a split cold feed sample. When cold feed quality control is verified with the ignition oven, split a cold feed sample with the Engineer on the first day's production of each mixture. The Engineer will determine the need for a correction factor for the cold feed gradation based on the Engineer's cold feed gradation and ignition oven results. The Engineer may require additional cold feed split samples to evaluate the need or value of a correction factor for the cold feed and ignition oven gradation.
- d) Secure aggregate gradation samples transported to the agency lab for determination of the ignition oven correction factor testing in accordance with Materials I.M. 511.

3) Uncompacted Asphalt Mixture

- a) Sample the hot HMA mixture at random locations as directed and witnessed by the Engineer according to Materials I.M. 322. Secure and test the samples according to Materials I.M. 511. Modify sampling location to include placement with mix stored from a prior day's production.
- b) Sampling frequency will be determined by the estimated daily production of each mixture placed. The number of sublots is defined in Table 2303.03-4:

Table 2303.03-4: Uncompacted Mixture Sublot Size

Estimated Daily Production, Tons (Mg)	Number of Sublots
101-500	1
501-1250	2
1251-2000	3
2001-4500	4
Over 4500	5

- c) The Contractor may request to have a quality control plan that indicates a higher testing frequency if pre-approved by the Engineer at the preconstruction meeting.
- d) Assist the Engineer with material sampling for verification testing. When the Engineer provides notification that a sample is to be taken, initiate sampling within 15 minutes. Sampling should normally be completed within 30 minutes of notification.
- e) Do not take paired samples from the first 100 tons (100 Mg) of mix produced each day or the first 100 tons (100 Mg) of mix following a significant mix change. When paving operations are staged so each day of placement is less than 100 tons (100 Mg) for the entire production of the bid item, establish a sampling plan with the Engineer that includes a minimum of one sample per 2500 tons (2500 Mg).
- f) For PWL analysis of laboratory voids, each mixture bid item will constitute a lot. Lot size is defined as follows:
 - (1) No less than 8 and no more than 20 sequential tests will constitute a lot (exceptions stated below).
 - (2) After the 8th test, all subsequent samples collected over the remainder of that week will also be included in the lot up to a maximum of 20.
 - (3) Once a lot has been established with at least 8 tests, a new lot will begin at the start of the following week or the day following the 20th sample, whichever occurs first. Lots shall not contain partial days. When the 20th sample is reached, include all samples taken that day in the lot.

- (4) When determining PWL lot size for lab voids, Sunday through Saturday defines a week.
 - (5) If the bid item's production has ended and fewer than 8 tests are available, those tests may be combined with the previous lot provided the maximum lot size has not already been reached. When combining results, if the day to be combined contains the 20th sample, include all samples for that day. Do not combine partial day's results.
 - (6) If samples cannot be combined with the previous lot due to maximum lot size restrictions or if fewer than 8 tests are available for the entire production of a bid item, combine those tests into a single lot and use the AAD analysis in Materials I.M. 501.
 - (7) Test strips will be considered a separate lot.
 - (8) When the same mix type is produced for multiple bid items in one day, assign all box samples to each bid item's existing PWL lot for lab voids. Assign the quantity of each bid item produced to its respective lot.
- g) Test the quality control sample of each production paired sample as follows:
- (1) Prepare and compact two gyratory specimens according to Materials I.M. 325G. Compact loose WMA field samples, transported to the laboratory, at 240°F (115°C).
 - (2) Determine the the bulk specific gravity of compacted mixture (G_{mb}) at N_{design} for each specimen according to Materials I.M. 321. G_{mb} will be determined by compacting specimens to N_{design} . Average the results.
 - (3) Determine the Theoretical Maximum Specific Gravity of the uncompacted mixture according to Materials I.M. 350.
 - (4) Determine laboratory air voids for each sample according to Materials I.M. 501.
- h) Use the target laboratory voids listed in Materials I.M. 510 Appendix A unless otherwise specified in the contract documents.
- i) Use the following methods of acceptance for laboratory voids:
- (1) For base widening, non-high speed ramps, ~~non-interstate~~ shoulders, recreational trails, and other mixture bid items not placed in travel lanes of a permanent pavement, acceptance for laboratory voids will be based on a moving average absolute deviation (AAD) from target as defined in Materials I.M. 501. Use the production tolerance in Table 2303.03-5. At any time, if more than 100 tons (100 MG) of the bid item is placed in an area not listed above, apply Article ~~2303.03, D, 3, b, 3, ix, b~~ 2303.03, D, 3, b, 3, i, 2, for entire production of bid item.
 - (2) For all other mixture bid items, determine PWL for each lot as defined in Materials I.M. 501. Use 1.0% below the target air voids as the lower specification limit and 1.0% above the target air voids as the upper specification limit. Lot size is defined in Article ~~2303.03, D, 3, b, 3, vi~~ 2303.03, D, 3, b, 3, f. When the same mix type is placed in both PWL and AAD areas in a single day, include all samples for that day in the PWL lot as well as the quantity of the mixture bid item produced and placed in the PWL area.
 - (3) When same mix type is produced for multiple bid items in a single day from a single plant, apply all samples for that day to the lot for each bid item.
- j) For mixture bid items in a PWL lot, determine the pay factor using the average absolute deviation (AAD) procedure described in Materials I.M. 501 for proportions of a mixture bid item which are produced in irregular intervals and placed in irregular areas. The following items qualify as such and shall be combined into a single lot:
- Asphalt mixture produced and placed on gores, detours, cross-overs, temporary pavements, turning lanes, and fillets,
 - Asphalt mixture produced and placed on ramps that are not high-speed ramps,
 - Asphalt mixture produced and placed on ~~non-interstate~~ shoulders.
- To be considered irregular, the production rate for mixture bid items described above is not to exceed 1000 tons (1000 Mg) ~~{10,000 square yards (8400 m²)}~~ for items bid in ~~square yards~~ in a single day.
- 4) **Moisture Susceptibility**
- a) The Engineer may obtain plant produced samples for moisture susceptibility testing in accordance with ~~Materials I.M. 507~~ Appendix A of this specification at any time for mixtures identified in Article 2303.02, E, 2, A a or Article 2303.02, E, 2, ~~C f~~, to verify the minimum ~~TSR~~ requirement in Article 2303.02, E, 2, d, has been achieved.
 - b) When liquid anti-strip additives are added by the Contractor at the plant, satisfy one of the following methods to regulate the quantity of additive:
 - (1) Present certification that the equipment used to measure and blend the liquid anti-strip additive:
 - Meets the anti-strip supplier's recommended practice,
 - Is directly tied to the asphalt binder supply system, and

- Has been calibrated to the equipment manufacturer’s guidelines.
 - (2) Test the binder to measure the quantity of liquid anti-strip additive in the binder for every 5000 tons (5000Mg) of HMA production. Obtain the Engineer’s approval for the supplier’s test method prior to use of the test.
 - (3) Run the test method in Materials I.M. 507 Appendix A of this specification during production. If unable to certify or test for the presence and quality, run the test method in Materials I.M. 507 Appendix A of this specification each 10,000 tons (10,000 Mg) of production to measure the effectiveness of the additive. Ensure test results satisfy 80% TSR when compared to the dry strength of specimens prepared with asphalt binder containing the additive the minimum requirement in Article 2303.02, E, 2, d.
- c. Production Control.**
- 1) After the JMF is established, the combined aggregate furnished for the project, the quantity of asphalt binder, and the laboratory air voids should consistently comply with the JMF, as target values. Control them within the production tolerance given in Table 2303.03-5.

Table 2303.03-5: Production Tolerances

Measured Characteristic	Target Value (%)	Specification Tolerance (%) ^(a)
Cold feed gradation No. 4 (4.75 mm) and larger sieves	by JMF	± 7.0
Cold feed gradation No. 8 (2.36 mm)	by JMF	± 5.0
Cold feed gradation No. 30 (600 µm)	by JMF	± 4.0
Cold feed gradation No. 200 (75 µm)	by JMF	± 2.0 ^(b)
Field laboratory air voids absolute deviation from target ^(c)	0.0	≤ 1.0
Daily asphalt binder content	by JMF	± 0.3
VMA ^(e)	by JMF	± 1.0 ^(f)
(a) Based on single test unless noted otherwise. (b) Maintain the filler/bitumen ratio of the plant produced mixture between 0.6 and 1.4. (c) When lab voids acceptance is not based on PWL. (e) Restricted to an asphalt film thickness as specified for the level of HMA mixture. May be waived per Materials I.M. 510, Appendix A. (f) Based on the daily lot average.		

- 2) Control plant production so that the plant produced HMA mixture will meet mixture design criteria (within the test tolerances given in Table 2303.03-5) for Air Voids and VMA at N_{design} gyrations of the gyratory compactor. Monitor the slope of the gyratory compaction curve of plant produced material. Slope variations in excess of ±0.40 of the mixture design gyratory compaction curve slope may indicate potential problems with uniformity of the mixture.
- 3) The gyratory mix design gradation control points for the size mixture designated in the project plans will not apply to plant production control.
- 4) Strive for the target value of the percent air void and asphalt binder by adjusting gradation and asphalt binder content.
- 5) Produce a uniform composition mixture complying with the JMF.
- 6) Adjustments to the JMF target gradation and asphalt binder content values may be made.
 - a) The Contractor determines from quality control testing that adjustments are necessary to achieve the specified properties.
 - b) Consult with the Engineer regarding adjustments to the JMF.
 - c) Notify the Engineer if the average daily gradation for a mixture bid item is outside the production tolerances. If other production tolerances and mixture requirements of Materials I.M. 510 Appendix A are acceptable, a change in gradation target can be requested.
 - d) If filler/bitumen ratio exceeds the limits listed in Table 2303.03-5, change the JMF at the start of the next day’s production for that mixture.

- e) The Contractor's adjustment recommendations prevail, provided all specifications and established mix criteria are being met for plant production.
- 7) Measure estimated film thickness and voids in the mineral aggregate (VMA) for specification compliance every day of HMA production.
- 8) Prepare quality control charts according to Materials I.M. 511. Keep the charts current and available showing both individual sample results and moving average values for both lab voids and absolute deviation from target. Base moving average values on four consecutive sample results. The moving average absolute deviation from target may restart only in the event of a mandatory plant shutdown for failure to maintain the average within the production tolerance. Include the target value and specification tolerances on control charts.
- 9) Calculate laboratory voids for individual samples according to Materials I.M. 501. Use the individual density and individual maximum specific gravity determined for each sample. To determine the moving average of laboratory voids, use the average of the last four individual sample laboratory voids. Calculate absolute deviation from target lab voids according to Materials I.M. 501 of this specification. To determine the moving average absolute deviation from target laboratory voids, use the average of the last four individual sample absolute deviations from target laboratory voids.
- 10) Monitor the test results and make mix adjustments, when appropriate, to keep the mixture near the target values. Notify the Engineer whenever the process approaches a specification tolerance limit. When acceptance for lab voids is not based on PWL, cease operations when the moving average point for absolute deviation from target lab voids is outside the specification tolerance limit. Assume responsibility to cease operations, including not incorporating material which has not been placed. Do not start the production process again until notifying the Engineer of the corrective action proposed.

4. Construction.

a. Field Voids for Class I Compaction.

- 1) Take samples to determine field voids from the compacted mixture and test no later than the next working day following placement and compaction.
- 2) A lot is considered to be one layer of one mixture bid item placed during a day's operation. The Engineer may approve classifying multiple layers of construction placed during a single day as a lot provided only one mixture was used.
- 3) For the following situations sampling for field voids may be waived by the Engineer provided compaction has been thorough and effective, or sampling may be modified by mutual agreement to include more than one day's production provided samples are taken prior to trafficking:
 - When the day's operation is not more than 2500 square yards (2500 m²) excluding areas deducted from the field voids lot,
 - When the day's operation is not more than 500 tons (500 Mg) excluding quantities deducted from the field voids lot,
 - When the mixture is being placed in irregular areas, or
 - When placing wedge or strengthening courses.
- 4) The Engineer will obtain and test samples for each lot according to Materials I.M. 204 Appendix F. The Contractor may request to have a quality control plan that indicates a higher testing frequency at no additional cost to the Contracting Authority if pre-approved by the Engineer at the preconstruction meeting. The Engineer will determine the core locations. The length laid in each lot will be divided into approximately equal sublots. Obtain one sample at a random location, as directed and witnessed by the Engineer, in each subplot. Determine a new random location for the subplot when the designated core location falls on a runout taper at an existing pavement, bridge, or bridge approach section where the thickness is less than the design thickness.
- 5) If a sample is damaged or measures less than 70% or more than 150% of the intended thickness, an alternate sampling location will be determined and used. Take samples from no less than 1 foot (300 mm) from the edge of a given pass of the placing equipment, from run-outs, or from day's work joints or structures.
- 6) Use the following methods of acceptance for field voids:
 - a) For mixture bid items placed in the following areas:
 - Base widening placed in a travel lane,
 - Non high-speed ramps,
 - Bridge approaches placed as a separate operation,
 - Non-interstate travel lanes intended to be in service for fewer than 12 months,
 - State Park and Institutional roadways,

- Recreational trails,
- Irregular areas identified by the Engineer that may include areas not suitable for continuous paving, and
- Wedges,

the Engineer will accept the field voids lot based on the average test results or an established effective rolling pattern when approved by the Engineer. Do not exceed 8% average field voids. The Engineer may modify the sample size and frequency provided compaction is thorough and effective. The Engineer may apply the pay schedule in 2303.05, A, 3, b, 3 to areas where thorough and effective compaction is not achieved.

- b) For all other areas of Class I compaction, determine PWL, as defined in Materials I.M. 501, for each lot using a lower specification limit (LSL) of 3.5% voids (96.5% of G_{mm}) and an upper specification limit (USL) of 8.5% voids (91.5% G_{mm}).
- 7) When the PWL falls below 80.0, use the procedure outlined in Materials I.M. 501 to identify outliers with 1.80 as the quality index criterion. Only one core may be considered an outlier in a single lot. If an outlier is identified, recalculate the PWL with the results of the remaining cores and determine whether the PWL is improved. Use the larger of the original and recalculated PWL to determine the pay factor.
- 8) When the PWL falls below 50.0, the Engineer may declare the lot or parts of the lot deficient or unacceptable.
- 9) Use maximum specific gravity (G_{mm}) results in field voids calculations as follows:
 - a) When cores represent one day's production and more than one G_{mm} test result is available, use the average G_{mm} in the field voids calculation for all cores.
 - b) When cores represent one day's production and only one G_{mm} test result is available, use the single G_{mm} test result in the field voids calculation for all cores.
 - c) When the cores represent more than one day's production, use the average of all G_{mm} test results from all days corresponding with the cores.

b. Longitudinal Joint Compaction.

- 1) When PWL is used for Class I field voids acceptance and placement of lot results in the formation of a longitudinal joint(s) matching one or more lanes, obtain and test samples taken directly on each joint created.
- 2) Using random core locations determined for field voids lot, Engineer will randomly select four of these locations to be sampled for joint density. At each of the four locations (longitudinal station/milepost), obtain one sample for each longitudinal joint being formed as directed and witnessed by the Engineer. Take samples using a 6 inch (150 mm) diameter bit centered on top of the visible line between the two lanes.
- 3) Do not sample when matching new paving to pre-existing lanes.
- 4) Use average of all validated G_{mm} test results from all days corresponding with the cores, when calculating field voids of the joint(s).
- 5) Include results on daily plant report.

b c. Thickness.

- 1) The Engineer will measure cores, exclusive of sealcoat, according to Materials I.M. 337. ~~All areas of uniform thickness and width for the project will be divided into lots. Sampling frequency and lot definitions are as follows:~~
 - a) Thickness cores sampled from completed course shall be taken full depth and divided into lots based on areas of uniform thickness and width. Use frequency specified for taking density samples from surface lift.
 - b) Density cores sampled as part of a field voids lot will be combined into daily lots based on cores' intended thickness.
- 2) ~~Use the frequency specified for taking G_{mb} samples from the surface lift when measuring for completed thickness. Samples for thickness not tested for G_{mb} , because they are less than 70% of the intended thickness, are included for thickness. In these particular instances, do not measure the thickness of additional sufficiently thick samples used to determine field voids. Take thickness samples full depth of the completed course. After measurement, remove the G_{mb} samples for the top layer from the core. When measuring density of top lift from a full depth core, measure thickness before trimming core for density testing.~~
- 3) For full depth cores taken from completed course, intended thickness is designated in the contract documents. For all other cores, intended thickness is established by the Contractor meeting requirements in Articles 2303.03, C, 4, h through j. If any of the measurements for a lot is less than the designated thickness, the quality index for thickness of that lot will be determined by the following formula:

(English)

$$QI_{\text{Thickness}} = \frac{\text{Average Thickness}_{\text{Measured}} - (\text{Thickness}_{\text{Plan Intended}} - 0.5)}{\text{Maximum Thickness}_{\text{Measured}} - \text{Minimum Thickness}_{\text{Measured}}}$$

(Metric)

$$QI_{\text{Thickness}} = \frac{\text{Average Thickness}_{\text{Measured}} - (\text{Thickness}_{\text{Plan Intended}} - 12.7)}{\text{Maximum Thickness}_{\text{Measured}} - \text{Minimum Thickness}_{\text{Measured}}}$$

- 4) Provided there is reasonable assurance that the pavement complies with the required thickness, the Engineer may waive sampling for thickness for the following situations:
 - a) When the day's operation is 2500 square yards (2500 m²) or less.
 - b) When the mixture is being placed in irregular areas.
 - c) When the mixture is being placed next to structures.
- 5) When the quality index falls below 0.00 and final lift of the course has been placed, the Engineer may declare the lot or parts of the lot defective.

c. Smoothness.

Construct pavement to have a smooth riding surface according to the following:

- 1) Apply Section 2317 to HMA surface mixture bid items of a Primary project if any individual HMA mixture bid item is 1000 tons (1000 Mg) or greater or 5000 square yards (4200 m²) or greater. Apply Section 2316 to all other Primary projects with a surface course and when specifically required for other projects.
- 2) When neither Section 2316 nor Section 2317 is applied to a project, periodically check the riding surface longitudinally with a 10 foot (3 m) straightedge. The surface shall not deviate from a straight line by more than 1/8 inch in 10 feet (3 mm in 3 m). If a deviation is present, correct the area according to Article 2316.03, B, 2.

5. Sampling and Testing.

a. General.

- 1) Maintain and calibrate the quality control testing equipment using prescribed procedures. Sample and test according to the specified procedures as listed in the applicable Materials I.M. and Specifications. When the results from a Contractor's quality control lab are used as part of product acceptance, the Contractor's quality control lab is required to be qualified.
- 2) Identify, store, and retain all quality control samples and field lab gyratory specimens used for acceptance until the lot is accepted. The Contracting Authority will prescribe the method of securing the identity and integrity of the verification samples according to Materials I.M. 511. Store verification samples for the Contracting Authority until delivery to the Contracting Authority's lab.
- 3) Identify all samples using a system the Engineer approves.

b. Individual Materials and Uncompacted Mixture.

- 1) Complete the following as designated by the Engineer:
 - Identify samples of asphalt binder, aggregate, and tack coat material.
 - Secure and promptly deliver the samples to the appropriate laboratory.
- 2) Take paired samples of uncompacted HMA mixture (each box of the pair weighing at least 30 pounds (14 kg)) according to Materials I.M. 322.
- 3) Conduct quality control tests for mixture properties using representative portions of the mix from the quality control sample of each subplot.
- 4) Split samples for specimen preparation according to Materials I.M. 357.
- 5) Paired sampling may also be accomplished by taking a bulk sample and immediately splitting the sample according to Materials I.M. 322 on the grade.
- 6) Record and document all test results and calculations on data sheets approved by the Contracting Authority. Record specific test results on the Daily Plant Report the Contracting Authority provides. Also include a description of the quality control actions taken (adjustment of cold feet percentages, changes in JMF, and so forth) on the Daily Plant Report.
- 7) ~~Facsimile, or deliver by other methods the Engineer approves,~~ Deliver Daily Plant Report to the Engineer and designated laboratory daily as directed in Materials I.M. 511. At project completion, provide Engineer a copy of electronic file(s) containing project information generated during the progress of the work.
- 8) When sampling for moisture susceptibility testing, obtain a 70 pound (35 kg) sample according to Materials I.M. 322. ~~If the Contractor's TSR results from the mixture design are less than 90%, sample at a minimum frequency of 1/10,000 tons of plant production until a complying test result is achieved, after which the minimum frequency may be reduced to 1/50,000 tons.~~

Each sample shall constitute a separate lot and include all quantities placed from beginning of bid item's production (or previous sampling point) to next sampling point (or 10,000 tons, whichever is less). The Engineer will select, at random, the sample location. Split the sample and deliver half to the Central Materials Laboratory.

c. Compacted Pavement Cores.

- 1) Cut and trim samples under the direction of and witnessed by the Engineer for tests of G_{mb} , thickness, or composition by using a power driven masonry saw or by drilling a minimum 4 inch (100 mm) nominal diameter core.
- 2) Restore the surfaces the same day. Dry, fill with the same material, and properly compact core holes.
- 3) Pavement core samples will be identified, taken possession of by the Engineer, and delivered to the Contractor's quality control field laboratory.
- 4) The Engineer may either:
 - Transport the cores directly to the lab, or
 - Secure the cores and allow the Contractor to transport the cores to the lab.
- 5) The compacted HMA pavement will be tested in a timely manner by the Engineer's personnel who are Iowa DOT Certified to perform the test.
- 6) Prepare and test the cores according to Materials I.M. 320, 321, and 337.

d. Verification and Independent Assurance Testing.

- 1) The Contractor's quality control test results will be validated by the Engineer's verification test results on a regular basis using guidelines and tolerances set forth in Materials I.M. 216 and 511.
- 2) If the Engineer's verification test results validate the Contractor's test results, the Contractor's results will be used for material acceptance. Disputes between the Contractor's and Engineer's test results will be resolved according to Materials I.M. 511.
- 3) The Engineer will randomly select one or more of the daily production verification samples. Some or all of the samples selected will be tested in the materials laboratory designated by the Engineer. The Engineer will use the verification test results to determine if the Contractor's test results can be used for acceptance.
- 4) The Engineer will test each lot of cores at the Contractor's field quality control laboratory. Cores may also be tested by the Contractor; however, the Contractor's test results will not be used for material acceptance.
- 5) Personnel and laboratories performing tests used in the acceptance of material are required to have participated in the statewide Independent Assurance Program according to Materials I.M. 208.

E. Quality Control for Small HMA Paving Quantities.

1. Mix Design.

Prepare the JMF. Prior to HMA production, obtain the Engineer's approval for the JMF. Comply with Article 2303.02 and Materials I.M. 510.

For mixtures meeting the criteria in Article 2303.02, E, 2, a:

- a. An anti-stripping agent is required when ~~TSR on mix design is less than 90%~~ the optimum dosage is greater than 0%.
- b. Use ~~Materials I.M. 507~~ Appendix A of this specification to optimize the design dosage rate.
- c. When prior-approved designs have demonstrated acceptable field ~~TSR~~ SIP values, the anti-stripping agent and dosage from the JMF may be used in lieu of optimization testing.

2. Plant Production.

- a. Ensure HMA production plant calibration for the JMF is current and no more than 12 months old.
- b. Use certified asphalt binder and approved aggregate sources meeting the JMF. Ensure the plant maintains an asphalt binder log to track the date and time of binder delivery. Ensure HMA delivery tickets identify the JMF.
- c. Monitor the quality control test results and make adjustments to keep the mixture near the target JMF values.

3. Construction.

- a. Take compacted mixture G_{mb} measurements, except when Class II compaction is specified, no later than the next working day following placement and compaction. Use the field quality control laboratory compaction for field G_{mb} control, as specified in Article 2303.03, D. The Engineer may accept the void content of the compacted layer based on cores or calculations from density gauge

measurements. The Engineer may waive field void sampling provided the compaction has been thorough and effective.

- b. For small quantities, a lot will be the entire quantity of each HMA mixture bid item.
- c. The PWL for field voids will not apply to small quantities.

4. Sampling and Testing.

- a. Material sampling and testing is for production quality control only. Acceptance of mixture is based on Contractor certification. Perform a minimum of one aggregate cold-feed and one uncompacted HMA test per lot. Sampling and testing of uncompacted HMA mixture is only required for mechanically placed mixture. Sample and test according to the Standard Specifications and Materials I.M.s using certified technicians and qualified testing equipment. The Engineer may approve alternative sampling procedures or may waive sampling of uncompacted mix and gradation if Contractor can provide plant reports from other recent project(s) demonstrating the JMF has been produced within specification. Take the sample between the first 100 to 200 tons (100 to 200 Mg) of production. No split samples for agency verification testing are required.
- b. Asphalt binder will be accepted based on the asphalt supplier's shipment certification. No binder sampling or testing is required.
- c. Material sampling or testing is not required for daily HMA production of less than 100 tons (100 Mg) of any small quantity mixture on any project bid item.
- d. Moisture susceptibility testing on plant produced mixture is not required.

5. Certification.

- a. Provide a certification for the production of any mixture in which the requirements in this article are applied. Place the test results and the following certification statement on the Daily HMA Plant Report (Form 800241).

"The HMA mixture contains certified asphalt binder and approved aggregate as specified in the approved mix design and was produced in compliance with the provisions of Article 2303.03, E."
- b. The Daily HMA Plant Report for certified HMA may be submitted at the end of the project for all certified HMA quantities, or submitted at intervals for portions of the certified quantity.

2303.04 METHOD OF MEASUREMENT.

A. Hot Mix Asphalt Mixture.

1. General.

- a. Removal of fillets is incidental to the contract unit price for the mixture.
- b. If the Contractor chooses to place intermediate or surface mixture in lieu of base for the outside shoulders, the quantity will be calculated from the pavement and shoulder template. If placed as a separate operation, the quantity will be calculated from scale tickets. If the substitute mixture placed on the shoulder is for an intermediate course fillet only, include the quantity in the fillet for payment in the quantity placed in the adjacent intermediate course.
- c. Payment for the quality control requirements for small quantities will not be measured separately.
- d. Unless stated otherwise, equivalent WMA mixtures may be substituted for specified HMA mixtures.

2. Measurement by Weight (Mass).

- a. The quantity of the type specified, expressed in tons (megagrams), will be determined from the weight (mass) of individual loads, including fillets, measured to the nearest 0.01 tons (0.01 Mg).
- b. Loads may be weighed in trucks, weigh hoppers, or from the weight (mass) from batch plants computed by count of batches in each truck and batch weight (mass). Article 2001.07 applies. Segregate the weights (mass) of various loads into the quantities for each pay item.

3. Measurement by Area.

- a. The quantity of the type specified, expressed in square yards (square meters), will be shown in the contract documents to the nearest 0.1 square yard (0.1 m²). The area of manholes, intakes, or other fixtures will not be deducted from the measured pavement area.
- b. When constructing shoulders on a basis of payment of square yards (square meters), inspection of the profile and elevation will be based on the completed work relative to the pavement edge. The Contractor is responsible for the profile and elevation of the subgrade and for thickness.

B. Asphalt Binder.

1. Measure the amount of asphalt binder used from batch plants, continuous plants, or drum mixing plants by stick measurement in the Contractor's storage tank or in-line flow meter reading, according to Article 2001.07, B.
2. Compute the asphalt binder quantity added to the storage tank using a supplier certified transport ticket accompanying each load.
3. The quantity of asphalt binder not used in the work will be deducted.
4. When the quantity of asphalt binder in a batch is measured by weight (mass) and is separately identified by automatic or semi-automatic printout, the Engineer may compute the quantity of asphalt binder used from this printout. By mutual agreement, this method may be modified when small quantities or intermittent operations are involved.
5. The Engineer will calculate and exclude the quantity of asphalt binder used in mixtures in excess of the tolerance specified in Article 2303.03, D, 3, c.
6. When payment for-HMA is based on area, the quantity of asphalt binder used will not be measured separately for payment.

C. Recycled Asphalt Pavement.

1. A completed Daily HMA Plant Report with the certification statement is required for measurement and payment for Contractor Certified HMA. The quantity of asphalt binder will be based on the approved JMF and any plant production quality control adjustments.
2. The quantity of asphalt binder in RAP incorporated into the mixture, will be calculated in tons (megagrams). This quantity shall be based on the actual asphalt binder content determined for the mix design from the results of the Engineer's extraction tests.
3. The quantity of asphalt binder in RAP, which is incorporated into the mix, will be included in the quantity of asphalt binder used.

D. Anti-strip Agent.

Will not be measured separately. The quantity will be based on tons (megagrams) of HMA mixture with anti-strip agent added.

E. Tack Coat.

Will not be measured separately.

F. Fabric Reinforcement.

The quantity, in square yards (square meters) to the nearest 0.1 square yard (0.1 m²), will be shown in the contract documents.

G. Hot Mix Asphalt Pavement Samples.

Will not be individually counted for payment if furnished according to Article 2303.03, D, 5, or required elsewhere in the contract documents,

H. Recycled Asphalt Shingles.

67% of the asphalt binder from RAS which is incorporated into the mixture will be included in the quantity of asphalt binder used.

2303.05 BASIS OF PAYMENT.

The costs of designing, producing, placing, and testing bituminous mixtures and the cost of furnishing and equipping the QM-A field laboratory will not be paid for separately, but are included in the contract unit price for the HMA mixes used. The application of tack coat and sand cover aggregate are incidental and will not be paid for separately. Pollution testing is at the Contractor's expense. The installation of temporary Stop Sign Rumble Strips will not be paid for separately, but is incidental to the price bid for the HMA course for which it is applied.

The quality control requirements for small quantities are incidental to the items of HMA mixtures in the contract.

A. Asphalt Concrete Mixture.

1. Payment will be the contract unit price for Hot Mix Asphalt Mixture of the type specified per ton (megagram) or square yard (square meter). Unless stated otherwise, equivalent WMA mixtures may be substituted for specified HMA mixtures with no change in the contract unit price.
2. Payment for test strips will be the contract unit price for the test strip mixture bid item per ton (megagram) regardless of lift placement.
3. Payment will be adjusted by the following Pay Factor for field voids and laboratory voids determined for the lot.

Multiply the unit price for the HMA bid item by the Pay Factor rounded to 3 decimal places.

a. Laboratory Voids

- 1) Payment when PWL is used for acceptance:

PWL	Pay Factor
95.1 – 100.0	$PF = 0.006000 * PWL + 0.430$
80.0 – 95.0	1.000
50.0 – 79.9	$PF = 0.008333 * PWL + 0.3333$
Less than 50.0	0.750

When PWL is less than 50.0, the Engineer may declare the lot or parts of the lot deficient or unacceptable.

- 2) Payment when AAD is used for acceptance:

AAD from Target Air Void	Pay Factor
0.0 to 1.0	1.000
1.1 to 1.5	0.900
1.6 to 2.0	0.750
Over 2.0	0.500 maximum

When the AAD is more than 2.0, the Engineer may declare the lot or parts of the lot deficient or unacceptable.

- 3) Use the following payment schedule when a test strip is constructed:

AAD from Target Air Void	Pay Factor
0.0 to 1.5	1.000
1.6 to 2.0	$PF = 2.5 - AAD$
Over 2.0	0.500 maximum

When the AAD is more than 2.0, the Engineer may declare the lot or parts of the lot deficient or unacceptable.

b. Field Voids

- 1) Payment when PWL is used for acceptance:

PWL	Pay Factor
95.1 – 100.0	$PF = 0.008000 * PWL + 0.240$
80.0 – 95.0	1.000
50.0 – 79.9	$PF = 0.008333 * PWL + 0.3333$
Less than 50.0	0.750

When PWL is less than 50.0, the Engineer may declare the lot or parts of the lot deficient or unacceptable.

- 2) Payment when a test strip is constructed:

Average Field Voids (Pa), %	Pay Factor
0.0 to 9.0	1.000
9.1 to 9.5	$PF = 10 - Pa$
Over 9.5	0.500 maximum

When the average air void content from a test strip exceeds 9.5%, the Engineer may declare the lot or parts of the lot deficient or unacceptable.

- 3) Payment when PWL is not used for acceptance:

Average Field Voids (Pa), %	Pay Factor
0.0 to 8.0	1.000
8.1 to 9.5	$PF = (11 - Pa) / 3$
Over 9.5	0.500 maximum

When the average air void content exceeds 9.5%, the Engineer may declare the lot or parts of the lot deficient or unacceptable.

- When the basis of payment is by area, payment will be further adjusted by the appropriate percentage in Table 2303.05-2 below according to the quality index for thickness determined for that lot:

Table 2303.05-2: Payment Adjustment (by Area) for Thickness

Quality Index (Thickness) 8 Samples	Percent of Payment (Previously Adjusted for Field Voids)
Greater than 0.34	100
0.14 to 0.34	95
0.00 to 0.13	85
Less than 0.00	75 maximum

- Payment for courses for which quality index (thickness) is not determined because of size or shape, and courses which are found to be deficient in average width, will be according to Article 1105.04.
- ~~When moisture susceptibility testing in accordance with Materials I.M. 507 is performed on plant produced mixture, the payment for asphalt mixture will be adjusted according to Table 2303.05-3:~~

Table 2303.05-3: Asphalt Mixture Payment Adjustment for Moisture Susceptibility

Contracting Authority's Results (Percent TSR)	Pay Factor
TSR ≥ 80	1.00
70 < TSR < 80	PF = 0.025*TSR - 1
TSR ≤ 70	0.75 maximum

B. Asphalt Binder.

- Payment will be the contract unit price per ton (megagram) for the number of tons (megagrams) of asphalt binder used in the work.
- Payment for asphalt binder will be for new asphalt binder the asphalt binder in the RAP which is incorporated in the mixture, and 67% of the asphalt binder from RAS which is incorporated into the mixture. The quantity of asphalt binder in RAM, which is incorporated into the mix, will be calculated in tons (megagrams) of asphalt binder in the RAM. This will be based on the actual asphalt binder content determined for the mix design from the results of the Engineer's extraction test.
- When the basis of payment for HMA is in square yards (square meters), compensation for asphalt binder will be included in the contract unit price per square yard (square meter).

C. Recycled Asphalt Pavement.

RAP owned by the Contracting Authority will be made available to the Contractor for the recycled mixture at no cost to the Contractor other than loading, hauling, and processing as required for incorporation into the mix.

D. Anti-strip Agent.

- When anti-strip agent is required, the incorporation of the anti-strip agent into the asphalt mixture will be considered as extra work ordered by the Engineer if the Contracting Authority's TSR test results from the field produced mixture meet or exceed the minimum requirement and the conditioned indirect tensile strength is improved by at least 10% over that from the plant mixture without anti-strip (or original JMF conditioned strength when plant mix without anti-strip is not available) established in Article 2303.02, E, 2, d. Payment will be made at the rate of \$2.00 per ton (megagram) of asphalt mixture in which the anti-strip agent is incorporated. WMA mixtures designed for 10,000,000 ESALS and higher must satisfy Articles 2303.02, E, 2, a, 1 or 2 to be eligible for anti-strip payment. For mix designs (small quantities excluded) with a TSR greater than or equal to 80%, payment will stop when the Contracting Authority's TSR results of the field produced mixture without the agent are greater than or equal to 80% and any remaining asphalt binder containing the agent in the current tank is consumed.

2. Payment will be full compensation for designing, adding, and testing for anti-strip agent.

E. Tack Coat.

Incidental to HMA.

F. Fabric Reinforcement.

1. Payment will be the contract unit price for Fabric Reinforcement per square yard (square meter).
2. Payment is full compensation for furnishing all materials, labor, and equipment necessary for installing the fabric as required, including the adhesive or heavy tack coat of asphalt binder used as the adhesive.

G. Hot Mix Asphalt Pavement Samples.

1. Payment will be the lump sum contract price for cutting HMA Pavement Samples to determine field voids or thickness according to the specifications, when either of these is the responsibility of the Contractor, and elsewhere when required by the contract documents.
2. Payment is full compensation for furnishing all such samples for all courses or items of work, and for delivery of samples as specified in Article 2303.03, D, 5.

APPENDIX A - MOISTURE SENSITIVITY TESTING OF ASPHALT MIXTURES

SCOPE

This test method identifies the Iowa DOT modifications to AASHTO T 324, Hamburg Wheel-Track Testing of Compacted Hot-Mix Asphalt (HMA). Moisture susceptibility of asphalt paving mixtures is based on the stripping inflection point (SIP) calculated from test measurements.

REFERENCES

AASHTO R 30, Standard Practice for Mixture Conditioning of Hot-Mix Asphalt (HMA)
Materials I.M. 322, Sampling Uncompacted Hot Mix Asphalt
Materials I.M. 350, Determining Maximum Specific Gravity of Hot Mix Asphalt (HMA) Mixtures
Materials I.M. 325G, Method of Test for Determining the Density of Hot Mix Asphalt (HMA) Using the Superpave Gyratory Compactor (SGC).
AASHTO T 324, Hamburg Wheel-Track Testing of Compacted Hot-Mix Asphalt (HMA)

APPARATUS

See AASHTO T 324, Hamburg Wheel-Track Testing of Compacted Hot-Mix Asphalt (HMA)

SPECIMEN PREPARATION

For plant produced material, collect a 70 pound (32 kg) sample according to Materials I.M. 322. Prepare two gyratory test specimens according to Materials I.M. 325G for each test wheel conforming to the mold geometrics. Compact specimens to 7% (\pm 1%) air voids (93% of G_{mm} per Materials I.M. 350). For Mix Design, age the specimens according to AASHTO R 30 prior to compaction.

PROCEDURE

1. Place molds containing the specimens into the mounting trays, compacted side up.
2. The test temperature shall be 50°C. Condition specimens for 30 minutes after achieving test temperature. At no time should specimens be submerged longer than 35 minutes prior to test initiation.
3. Lower wheel onto specimens
4. Set the wheel-tracker to shut off after 20,000 passes or when the maximum LVDT displacement is 20 mm.
5. Perform the HWT test as per equipment manufacturer's instructions.

STRIPPING INFLECTION POINT

Use the most current version of the Iowa DOT Hamburg Software to determine the SIP. For each sensor, the deformation curve is characterized by a 6th degree polynomial determined through least-squares multiple regression. If the curve has an R^2 greater than or equal to 98.0%, the creep and stripping slopes are calculated. If not, the sensor is considered invalid and is not used in the analysis.

The SIP, creep slope, and stripping slope are calculated for each valid sensor for each wheel. The final SIP and slopes are the average of both wheels provided both sides of the device contain the same mix. If the ratio between the average stripping slope and the average creep slope is less than 2.0, the SIP is invalid and the mix is considered passing.

Details: The creep slope represents the rate of rutting in the linear region of the deformation curve prior to the onset of tertiary flow. The stripping slope is the rate of rutting in the linear region of the post tertiary deformation curve to the end of the test. The stripping inflection point (SIP) is the point of intersection of these two slopes.

Stripping Slope: The stripping slope is calculated prior to the creep slope. First, the maximum rutting slope (absolute value) near the end of the test is found. This is accomplished by using Solver to find the pass number nearest the end of the test (strip pass) at which the first derivative of the deformation curve is smallest (rutting is a negative value). The slope of the curve is then evaluated at this pass number to give the stripping slope. The stripping slope intercept is then found using point slope form. Note: the first derivative is synonymous with slope.

Creep Slope: To calculate the creep slope, the pass at which the absolute value of the rutting slope is the smallest prior to the strip pass is first found. This is accomplished first using Solver to find the pass (creep pass) at which the second derivative is zero (prior to the strip pass). The first derivative of the deformation curve is then evaluated at the creep pass, resulting in the creep slope.

SIP: The intersection of the creep slope and the stripping slope is found mathematically setting the equations for both lines equal and solving for the pass number.

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Jim Berger		Office: Materials	Item 10
Submittal Date: October 26, 2012		Proposed Effective Date: Apr 2013	
Section No.: 2318 Title: Cold In-Place Recycled Asphalt Pavement		Other:	
Specification Committee Action: Approved with changes.			
Deferred:	Not Approved:	Approved Date: 11/8/2012	Effective Date: 4/16/2013
Specification Committee Approved Text:			
2318.02, A, Asphalt Stabilizing Agent.			
Replace Articles 1 and 2:			
<ol style="list-style-type: none"> Standard Asphalt Emulsion (HFMS-2s) meeting the requirements of Section 4140 shall be used on Primary and Interstate projects. Other projects may use CSS-1 or HFMS-2s emulsions meeting the requirements of Section 4140 may be used in place of HFMS-2s on other projects or an engineered emulsion when specified on the contract documents. Do not use emulsions as a stabilizing agent for cold in place recycling during nighttime operations. Foamed Asphalt using PG 52-34 or PG 46-34 asphalt binder meeting the requirements of Section 4137 may be used on Interstate, Primary, Secondary, and local projects. For projects using PG 52-34 as the cold in-place stabilizing agent, meet the following requirements: <ul style="list-style-type: none"> Minimum $G^*/\sin\delta$ of 0.70 kPa for the original asphalt binder, Minimum $G^*/\sin\delta$ of 1.5 kPa for RTFO aged binder, or Maximum $G^*\sin\delta$ of 5000 kPa for PAV aged binder. 			
2318.03, Construction.			
Replace the first paragraph:			
Except in specific cases when permitted by the Engineer, CIR will only be allowed between May 1 and October 1. Do not perform recycling operations when:			
<ul style="list-style-type: none"> The ambient daytime temperature is below 60°F (15°C), For night work, the following day's forecasted high is below 60°F (15°C), The weather is foggy or rainy, or Weather conditions are such that proper mixing, placing, and compacting of the recycled material cannot be accomplished. 			
Comments: The Office of Materials asked to include "as the cold in-place stabilizing agent" to Article 2318.02, A, 2.			
Specification Section Recommended Text:			
2318.02, A, Asphalt Stabilizing Agent.			
Replace Articles 1 and 2:			
<ol style="list-style-type: none"> Standard Asphalt Emulsion (HFMS-2s) meeting the requirements of Section 4140 shall be used on Primary and Interstate projects. Other projects may use CSS-1 or HFMS-2s emulsions meeting the requirements of Section 4140 may be used in place of HFMS-2s on other projects or an engineered emulsion when specified on the contract documents. Do not use emulsions as a stabilizing agent for cold in place recycling during nighttime operations. Foamed Asphalt using PG 52-34 or PG 46-34 asphalt binder meeting the requirements of Section 4137 may be used on Interstate, Primary, Secondary, and local projects. For projects using PG 52-34, meet a minimum of 0.70 kPa for $G^*/\sin\delta$ on the original asphalt binder as measured by AASHTO T 315. 			
2318.03, Construction.			
Replace the first paragraph of the Article:			
Except in specific cases when permitted by the Engineer, CIR will only be allowed between May 1 and October 1. Do not perform recycling operations when:			
<ul style="list-style-type: none"> The ambient daytime temperature is below 60°F (15°C), For night work, the following day's forecasted high is below 60°F (15°C), 			

<ul style="list-style-type: none"> • The weather is foggy or rainy, or • Weather conditions are such that proper mixing, placing, and compacting of the recycled material cannot be accomplished. 					
Comments:					
Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use Strikeout and Highlight.)					
2318.02, A, 1.					
Replace the Article:					
1. Standard Asphalt Emulsion (HFMS-2s) meeting the requirements of Section 4140 shall be used on Primary and Interstate projects. Other projects may use CSS-1 or HFMS-2s emulsions meeting the requirements of Section 4140 may be used in place of HFMS-2s on other projects or Engineered Emulsion when specified on the contract documents. Do not use emulsions as a stabilizing agent for cold in place recycling during nighttime operations.					
2318.02, A, 2.					
Replace the Article:					
2. Foamed Asphalt using PG 52-34 or PG 46-34 asphalt binder meeting the requirements of Section 4137 may be used on Interstate, Primary, Secondary, and local projects. For projects using PG 52-34, meet a minimum of 0.70 kPa for G*/sinδ on the original asphalt binder as measured by AASHTO T315.					
2318.03					
Replace the first paragraph:					
Except in specific cases when permitted by the Engineer, CIR will only be allowed between May 1 and October 1. Do not perform recycling operations when:					
<ul style="list-style-type: none"> • The ambient daytime temperature is below 60°F (15°C), • For night work, the following day's forecasted high is below 60°F (15°C), • The weather is foggy or rainy, or • Weather conditions are such that proper mixing, placing, and compacting of the recycled material cannot be accomplished. 					
Reason for Revisions: Suppliers in the northern part of the state can ship a PG 50-34 at a lower cost rather than blending a harder binder that is not readily available at these terminals. In a CIR operation, the difference in a 0.3 kPa DSR is insignificant.					
We are now beginning to utilize CIR for higher volume routes, which require night work. The temperature restriction should be adjusted to accommodate operations. Foamed asphalt shows a more rapid strength gain than emulsion and therefore should always be used when CIR is performed at night.					
County or City Input Needed (X one)			Yes	No X	
Comments:					
Industry Input Needed (X one)			Yes X	No	
Industry Notified:	Yes X	No	Industry Concurrence:	Yes	No
Comments: Pending					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Jim Berger		Office: Materials	Item 11
Submittal Date: 2012.10.22		Proposed Effective Date: April 2013	
<p>Article No.: 2405.03, H Title: Anchor Bolts for Bridge Bearings and Foundations (Foundations and Substructures) Article No.: 2522.03, E, 4 Title: Anchor Bolts, Washers, and Nuts (Tower Lighting) Section No.: 4153 Title: Miscellaneous Iron and Steel Article No.: 4185.02 Title: Poles and Supports (Highway Lighting Materials) Article No.: 4186.10 Title: Sign Posts (Signing Materials)</p>		Other:	
Specification Committee Action: Approved with changes.			
Deferred:	Not Approved:	Approved Date: 11/8/2012	Effective Date: 4/16/2013
Specification Committee Approved Text:			
<p>2405.03, H, 1, a. Replace the Article: Use bolts, nuts and washers, galvanized according to ASTM A 153 F 2329, Class C; or ASTM B 695, Class 50 55, Type I.</p>			
<p>2522.03, E, 4, Anchor Bolts, Washers, and Nuts. Replace the first paragraph: Ensure galvanizing for anchor bolts, washers, and nuts meets the requirements of ASTM F 2329; or ASTM B 695, Class 50 55, Type I Coating.</p>			
<p>4153.06, A, 3. Replace the second sentence of the Article: Fasteners may be mechanically galvanized to meet the requirements of ASTM B 695, Class 50 55 Type 1 I.</p>			
<p>4153.07, D, 4. Replace the Article: Ensure the galvanized coating meets the requirements of ASTM F 2329.</p>			
<p>4153.07, E, Lag Bolts. Replace the Article: Use lag bolts meeting the requirements of ANSI B18.2.1, galvanized according to ASTM F 2329.</p>			
<p>4185.02, B, 4. Replace the second bullet: Are fully mechanically galvanized to ASTM B 695, Class 50 55, Type 1 I.</p>			
4185.02, B, 6.			

Replace the third bullet:

Are galvanized according to the requirements of ASTM ~~A 153~~ F 2329, ~~Class C~~, or ASTM B 695, Class ~~50~~ 55, Type I.

4186.10, B, 5.

Replace the Article:

Furnish bolts (including the entire length of the anchor bolts), nuts, and washers that are galvanized according to ASTM F 2329 or B 695 Class ~~50~~ 55, Type ~~1-coating~~ I.

Comments: The Office of Materials noted that the references were not consistent. Changes were made accordingly. Article 4153.06, B, 1, b was removed from this revision as it is covered by Item 20 in this month's meeting.

Specification Section Recommended Text:

2405.03, H, 1, a.

Replace the Article:

Use bolts, nuts and washers, galvanized according to ASTM ~~A 153~~ F 2329, ~~Class C~~; or ASTM B 695, Class ~~50~~ 55.

2522.03, E, 4, Anchor Bolts, Washers, and Nuts.

Replace the first paragraph of the Article:

Ensure galvanizing for anchor bolts, washers, and nuts meets the requirements of ASTM F 2329; or ASTM B 695, Class ~~50~~ 55, Type I Coating.

4153.06, A, 3.

Replace the second sentence of the Article:

Fasteners may be mechanically galvanized to meet the requirements of ASTM B 695, Class ~~50~~ 55 Type 1.

4153.06, B, 1, b.

Replace the Article:

For galvanized high strength fasteners, the fasteners meet the requirements of ASTM B 695, Class ~~50~~ 55 Type I.

4153.07, D, 4.

Replace the Article:

Ensure the galvanized coating meets the requirements of ~~ASTM~~ F 2329.

4153.07, E, Lag Bolts.

Replace the Article:

Use lag bolts meeting the requirements of ANSI B18.2.1, galvanized according to ~~ASTM~~ F 2329.

4185.02, B, 4.

Replace the second bulleted item:

- Are fully mechanically galvanized to ASTM B 695, Class ~~50~~ 55, Type 1.

4185.02, B, 6.

Replace the third bulleted item:

- Are galvanized according to the requirements of ASTM ~~A 153~~ F 2329, ~~Class C~~, or ASTM B 695, Class ~~50~~ 55 Type 1 coating.

<p>4186.10, B, 5. Replace the Article:</p> <ul style="list-style-type: none"> Furnish bolts (including the entire length of the anchor bolts), nuts, and washers that are galvanized according to ASTM F 2329 or B 695 Class 50 55, Type 1 coating. 		
<p>Comments:</p>		
<p>Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use Strikeout and Highlight.)</p>		
2405.03, H.	<p>ANCHOR BOLTS FOR BRIDGE BEARINGS AND FOUNDATIONS.</p> <p>1. General.</p> <p>a. Use bolts, nuts and washers, galvanized according to ASTM A-153 F 2329, Class-C; or ASTM B 695, Class 50 55.</p>	
2522.03 E.4.	<p>ANCHOR BOLTS, WASHERS, AND NUTS.</p> <p>Ensure galvanizing for anchor bolts, washers, and nuts meets the requirements of ASTM F 2329; or ASTM B 695, Class-50 55, Type I Coating.</p>	
4153.06 A.3	<p>BOLTS, NUTS, WASHERS AND FASTENERS.</p> <p>Where galvanized fasteners are specified, zinc is applied by hot dipped galvanizing to meet the requirements of ASTM F 2329. Fasteners may be mechanically galvanized to meet the requirements of ASTM B 695, Class 50 55 Type 1.</p>	
4153.06 B.1.b	<p>BOLTS, NUTS, WASHERS AND FASTENERS.</p> <p>For galvanized high strength fasteners, the fasteners meet the requirements of ASTM B 695, Class 50 55 Type I.</p>	
4153.07 D.4	<p>Nails.</p> <p>Ensure the galvanized coating meets the requirements of ASTM F 2329.</p>	
4153.07 E	<p>Lag Bolts.</p> <p>Use lag bolts meeting the requirements of ANSI B18.2.1, galvanized according to ASTM F 2329.</p>	
4185.02 B.4	<p>ANCHOR BOLT AND SLIP-BASE PLATE FASTENERS FOR LIGHTING POLES.</p> <p>If slip bases are furnished, furnish 1 inch by 4 1/2 inch (25 mm by 112 mm) bolts slip base plate that:</p> <ul style="list-style-type: none"> Are high-strength bolts meeting the requirements of ASTM A 325, and Are fully mechanically galvanized to ASTM B 695, Class 50 55, Type 1. 	
4185.02 B.6	<p>ANCHOR BOLT AND SLIP-BASE PLATE FASTENERS FOR LIGHTING POLES.</p> <p>Furnish nuts that:</p> <ul style="list-style-type: none"> Meet the requirements of ASTM A 563, DH, Are heavy hex, and Are galvanized according to the requirements of ASTM A-153 F 2329, Class-C, or ASTM B 695, Class 50 55 Type 1 coating. 	
4186.10 B.5	<p>SIGN POSTS.</p> <ul style="list-style-type: none"> Furnish bolts (including the entire length of the anchor bolts), nuts, and washers that are galvanized according to ASTM F 2329 or B 695 Class 50 55, Type 1 coating. 	
<p>Reason for Revision: ASTM galvanizing requirements for threaded fasteners have been changed. Most of the changes to the threaded fasteners have been made to specifications, design standards and I.M.s in 2009. Some have been missed. The ASTM galvanizing requirements for the Mechanical Galvanizing has been changed to require a thicker zinc coating the threaded fasteners; ASTM B 695, Class 55 in lieu of Class 50, Type 1.</p>		
<p>County or City Input Needed (X one)</p>		<p>Yes</p>
		<p>No</p>
<p>Comments:</p>		

Industry Input Needed (X one)			Yes	No	
Industry Notified:	Yes	No	Industry Concurrence:	Yes	No
Comments:					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Jim Berger		Office: Materials		Item 12	
Submittal Date: 2012.10.22		Proposed Effective Date: April 2013			
Article No.: 2408.02		Other:			
Title: Materials Requirements, Identification, and Fabrication (Steel Structures)					
Specification Committee Action: Approved as recommended.					
Deferred:	Not Approved:	Approved Date: 11/8/2012		Effective Date: 4/16/2013	
Specification Committee Approved Text: See Specification Section Recommended Text.					
Comments: None.					
Specification Section Recommended Text:					
2408.02, Materials Requirements, Identifications, and Fabrication.					
Replace the first sentence:					
Unless modified elsewhere modified in the contract documents, all fabrication to which this section applies shall be done in the states, territories, and possessions of the United States and in other locations within the geographic limits of North America and in steel fabrication shops and plants that are approved prior to the letting according to Materials I.M. 557.					
Comments:					
Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use Strikeout and Highlight .)					
2408.02 MATERIALS REQUIREMENTS, IDENTIFICATION, AND FABRICATION.					
Unless elsewhere modified in the contract documents, all fabrication to which this section applies shall be done in the states, territories, and possessions of the United States and in other locations within the geographic limits of North America and in steel fabrication shops and plants that are approved prior to the letting according to Materials I.M. 557. All main member fabrication, except bearing devices, must be fabricated by plants certified as Category III, Major Steel Bridges, under the provisions of AISC's Quality Certification Program.					
Reason for Revision: This is to avoid any misinterpretation of the Buy America requirements that is confined to the United States and does not include North America (such as Canada).					
County or City Input Needed (X one)			Yes	No	
Comments:					
Industry Input Needed (X one)			Yes	No	
Industry Notified:	Yes	No	Industry Concurrence:	Yes	No
Comments:					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Jim Berger		Office: Materials		Item 13	
Submittal Date: November 2012			Proposed Effective Date: April 2013		
Article No.: 2412.02 Title: Materials (Concrete Bridge Decks)			Other:		
Specification Committee Action: Approved as recommended.					
Deferred:	Not Approved:	Approved Date: 11/8/2012		Effective Date: 4/16/2013	
Specification Committee Approved Text: See Specification Section Recommended Text.					
Comments: None.					
Specification Section Recommended Text: 2412.02, Materials. Renumber Article E and add the Article: E. When Type A Mid Range water reducing admixture is used, the slump, measured according to Materials I.M. 317, may be increased to between 1 inch (25 mm) and 4 inches (100 mm) as a target range, allowing a maximum of 5 inches (125 mm). F. Use a single source of cement during an individual placement. Drain all aggregate for at least 24 hours after washing and before batching.					
Comments:					
Member's Requested Change (Redline/Strikeout): D. Use retarding admixtures compatible with the air entraining agent used. Previous experience, satisfactory to the Engineer, will be required to indicate the approximate adjustments in proportions made necessary by the addition of the admixture and compatibility with other materials used. Agitate the retarding admixture prior to and during its use. E. When a Type A Mid Range water reducing admixture is used, the slump, measured according to Materials I.M. 317, may be increased to between 1 inch (25 mm) and 4 inches (100 mm) as a target range, allowing a maximum of 5 inches (125 mm). F. Use a single source of cement during an individual placement. Drain all aggregate for at least 24 hours after washing and before batching.					
Reason for Revision: Industry requests an allowance for increased slump when a mid-range water reducer is used in conjunction with a retarder. This is also consistent with 2413 and 2529 specifications when using a mid-range water reducer.					
County or City Input Needed (X one)		Yes		No	
Comments:					
Industry Input Needed (X one)		Yes X		No	
Industry Notified:	Yes	No	Industry Concurrence:	Yes X	No
Comments:					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Brian Smith / Tom Reis / Eric Johnsen		Office: Design / Specifications	Item 14
Submittal Date: 8/30/2012		Proposed Effective Date: 04/2013	
Article No.: 2435.03, A Title: General Requirements for Installation of Manholes and Intakes. Section No.: 2552 Title: Trench Excavation and Backfill Article No.: 4118.01 Title: Pipe Backfill Material Section No.: 4119 Title: Pipe Bedding Material Under Interstate and Primary Roadways		Other:	
Specification Committee Action: Approved as recommended.			
Deferred:	Not Approved:	Approved Date: 11/8/2012	Effective Date: 4/16/2013
Specification Committee Approved Text: See Specification Section Recommended Text.			
Comments: None.			
Specification Section Recommended Text:			
2435.03, A, General Requirements for Installation of Manholes and Intakes. Add the Article: 13. Bedding and Backfill Under Interstate and Primary Roads. Place and compact the material according to Article 2552.03, E.			
2552.02, Materials. Renumber Articles C, D, E, and F and Retitle Articles C, D, and E. C D. Backfill Material (Other Areas). D E. Topsoil (Class V) Material). E F. Stabilization (Foundation) Materials. F G. Special Pipe Embedment and Encasement Material.			
Add the Article: C. Backfill Material (Under Interstate and Primary Roadways). Meet the requirements of Section 4119.			
2552.03, E, Primary and Secondary Backfill. Renumber and Retitle Articles 3, 4 and 5: 3 4. Haunch Support (Other Areas). 4 5. Primary and Secondary Backfill (Other Areas). 5 6. Final Trench Backfill (Other Areas).			
Add the Article: 3. Backfill Under Interstate and Primary Roads. a. Place in lifts no greater than 6 inches (150 mm) thick. b. Thoroughly tamp or vibrate each layer to insure compaction. c. Place backfill material after recording locations of connections and appurtenances or at the			

Engineer's direction.

- d. Terminate backfill material at subgrade elevation.

4118.01, Description.

Replace the Article:

Gravel or crushed stone. Crushed PCC may be used if approved by the Engineer.

Aggregate of the following types:

- Crushed Stone,
- Gravels for which 75% or more of the particles retained on the 3/8 inch (9.5 mm) sieve have at least one fractured face as defined in Materials I.M. 305 (the fractured face requirement shall only apply to bedding material placed under Primary or Interstate roadways), or
- Crushed PCC, if approved by the Engineer.

4119, Pipe Backfill Material Under Interstate and Primary Roadways.

Add the Section.

Section 4119. Pipe Backfill Material Under Interstate and Primary Roadways.

4119.01 DESCRIPTION.

Aggregate of the following types:

- Crushed Stone,
- Gravels for which 75% or more of the particles retained on the 3/8 inch (9.5 mm) sieve have at least one fractured face as defined in Materials I.M. 305, or
- Crushed PCC, if approved by the Engineer.

4119.02 CRUSHED STONE.

Meet the requirements of Article 4120.04.

4119.03 CRUSHED GRAVEL.

Meet the requirements of Article 4120.03.

4119.04 CRUSHED PCC.

Meet the requirements of Materials I.M. 210 and for Gradation No. 11 of the Aggregate Gradation Table, Article 4109.02 (Appendix).

Comments:

Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use **Strikeout** and **Highlight**.)

2435.03, A, 13, Bedding and Backfill under Interstate and Primary Roads.

Add as a new article:

6. Bedding and Backfill under Primary Roads.

Place and compact the material according to Article 2435.03, A and Article 2552.03, E (Class 1 materials).

2552.02, G, Bedding and Backfill under Interstate and Primary Roads.

Add as a new article:

Use crushed stone or crushed gravel complying with Article 4120.04 for all bedding and backfill. Use gravel that is 100% crushed produced by crushing material retained on a 1.5 inch (37.5 mm) or larger screen.

2552.03, E, 6, Bedding and Backfill under Primary Roads.

Add as a new article:

6. Bedding and Backfill under Primary Roads.

Place and compact the material according to Article 2435.03, A and Article 2552.03, E (Class 1 materials).

Reason for Revision: Currently, this language appears in Standard Note 263-1 (used with sanitary sewer, watermain, and appurtenances) Tab 104-5A (list of intakes and utility accesses), and in Tab

<p>104-5B (list of intakes, utility accesses, and storm sewer pipe). Since this is the standard procedure, the Office of Design would like to add this to the Standard Specifications and remove it from Tabs 104-5A and 104-5B, as well as void Standard Note 263-1. The Office of Construction has asked that material requirements in Section 2435 be left as they are.</p>					
County or City Input Needed (X one)			Yes	No	
Comments:					
Industry Input Needed (X one)			Yes	No	
Industry Notified:	Yes	No	Industry Concurrence:	Yes	No
Comments:					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Jim Berger		Office: Materials		Item 15	
Submittal Date: 2012.10.22			Proposed Effective Date: April 2013		
Article No.: 2522.03, E, 12, b Title: Shaft, Base Plate, and Integral Shaft (Tower Lighting)			Other:		
Specification Committee Action: Approved with changes.					
Deferred:		Not Approved:		Approved Date: 11/8/2012	
				Effective Date: 4/16/2013	
Specification Committee Approved Text: 2522.03, E, 12, b. Replace the Article: Ensure that after fabrication, pole shafts, anchor bolts, base plate, washers, nuts, and all steel items are: <ul style="list-style-type: none"> Fully galvanized inside and outside according to ASTM A 123 or ASTM A 153 F 2329 as appropriate, and Are of uniform color and appearance. 					
Comments: The Office of Materials corrected that ASTM F 2329 is required for the fasteners.					
Specification Section Recommended Text: 2522.03, E, 12, b. Replace the Article: Ensure that after fabrication, pole shafts, anchor bolts, base plate, washers, nuts, and all steel items are: <ul style="list-style-type: none"> Fully galvanized inside and outside according to ASTM A 123 or ASTM A 153 as appropriate, and Are of uniform color and appearance. 					
Comments:					
Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use Strikeout and Highlight .)					
2522.03 E.12.b SHAFT, BASE PLATE, AND INTEGRAL SHAFT. <ul style="list-style-type: none"> b. Ensure that after fabrication pole shafts, anchor bolts, base plate, washers, nuts, and all steel items are: <ul style="list-style-type: none"> Fully galvanized inside and outside according to ASTM A 123 or ASTM A 153 as appropriate, and Are of uniform color and appearance. 					
Reason for Revision: ASTM A 153 is limited to galvanized fasteners.					
County or City Input Needed (X one)			Yes		No
Comments:					
Industry Input Needed (X one)			Yes		No
Industry Notified:		Yes	No	Industry Concurrence:	
				Yes	No
Comments:					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Donna Buchwald		Office: Local Systems	Item 16
Submittal Date: 2012.10.29		Proposed Effective Date: April 2012	
Article No.: 2527.03, F Title: Markings Obliterated during Construction (Pavement Marking)		Other:	
Specification Committee Action: Approved with changes.			
Deferred:	Not Approved:	Approved Date: 11/8/2012	Effective Date: 4/16/2013
Specification Committee Approved Text:			
2527.03, F, 2. <p>Replace the first sentence:</p> <p>On Primary and Interstate highways, Rreplace pavement markings before the lane or road is opened to traffic in the following situations:</p>			
2527.03, F, Markings Obliterated during Construction. <p>Renumber Articles 3 and 4, and Add the Article.</p> <p>3. On other roadways, centerline markings obliterated during construction shall be replaced within 3 calendar days after the operation that obliterated the markings has been completed within the entire project limits. Place traffic control as shown in the contract documents.</p> <p>3 4. 4 5.</p>			
Comments: The Office of Traffic and Safety asked if there was a road standard to cover the traffic control. The Office of Design indicated that there was not. The Office of Design will create a modified plan detail showing the correct traffic control set-up. This detail may become a standard road plan in October 2013. Traffic control information will be removed from the specification.			
Specification Section Recommended Text:			
2527.03, F, 2. <p>Replace the first sentence of the Article:</p> <p>On Primary and Interstate highways, Rreplace pavement markings before the lane or road is opened to traffic in the following situations:</p>			
2527.03, F, Markings Obliterated during Construction. <p>Renumber Articles 3 and 4, and Add new Article.</p> <p>3. On other roadways, centerline markings obliterated during construction shall be replaced within 3 calendar days after the operation that obliterated the markings has been completed within the entire project limits. Place "No Center Line" (W8-12) signs on the right shoulder of mainline at the beginning and ending of the temporary traffic control zone, and after each public side road for each direction of travel for traffic that may enter from all intersecting side roads where the speed limit is greater than 35 mph, or at 2 mile (3.2 km) intervals, whichever is less. Place "Pass with Care" (R4-2) signs where each existing "No Passing Zone" ends.</p> <p>3 4. 4 5.</p>			
Comments: The term 'roadways' was used to replace the recommended term 'projects' since there are projects that include work on both systems. The Specifications Engineer believes this should be designated for a certain traffic volume cutoff since there are many non-Primary roadways that carry			

significantly more traffic than many Primary roadways.					
Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use Strikeout and Highlight.)					
2527.03, F, 2					
Replace the first sentence of the article:					
2. On Interstate and Primary projects replace pavement markings before the lane or road is opened to traffic in the following situations:					
2527.03, F, 3					
Add the following as a new Article 2527.03, F, 3, and renumber original Articles 2527.03, F, 3 and 4, as Article 2527.03, F, 4 and 5, respectively.					
On Secondary-non-primary projects, centerline markings obliterated during construction shall be replaced within 3 calendar days after the intermediate or surface lift operation that obliterated the markings has been completed within the entire project limits. Place "No Center Line" (W8-12) signs on the right shoulder of mainline at the beginning and ending of the temporary traffic control zone, and after each public side road for each direction of travel for traffic that may enter from all intersecting side roads where the speed limit is greater than 35, or at 2 mile intervals, whichever is less. Place "Pass with Care" (R4-2) signs where each existing "No Passing Zone" ends.					
Reason for Revision: The counties contacted the Office of Local Systems and asked why the specifications were requiring temporary pavement markings. Our review of the MUTCD determined that temporary pavement markings are not required (no traffic volume is cited in MUTCD for requiring temporary markings). The counties did not want to be held to something that wasn't required of them, and FHWA has approved this change. The counties believe it takes more time and money to paint when they don't "have" to. They are trying to cut project costs anywhere they can.					
County or City Input Needed (X one)			Yes X		No
Comments: The Office of Local Systems worked with the County Engineers Specification Committee to develop the proposed changes.					
Industry Input Needed (X one)			Yes		No
Industry Notified:	Yes	No	Industry Concurrence:	Yes	No
Comments:					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Jim Berger		Office: Materials		Item 17	
Submittal Date: October 26, 2012			Proposed Effective Date: April 2013		
Article No.: 2548.02, B, 1			Other:		
Title: Milled Rumble Strips					
Specification Committee Action: Approved as recommended.					
Deferred:		Not Approved:		Approved Date: 11/8/2012	
Effective Date: 4/16/2013					
Specification Committee Approved Text: See Specification Section Recommended Text.					
Comments: None.					
Specification Section Recommended Text:					
2548.02, B, 1.					
Replace the Article:					
Use asphalt emulsion Grade CSS-1 or CSS-1h, meeting requirements of Section 4140.					
Comments:					
Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use Strikeout and Highlight.)					
2548.02,B,1.					
Replace the Article:					
1. Use asphalt emulsion Grade CSS1 or CSS-1h, meeting requirements of Section 4140.					
Reason for Revisions: Harder asphalts used to make CSS1-h are less available and more expensive in the northern part of the state. Either one will perform.					
County or City Input Needed (X one)			Yes		No X
Comments:					
Industry Input Needed (X one)			Yes X		No
Industry Notified:		Yes X	No	Industry Concurrence:	
				Yes	No
Comments: Industry requests change					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Brian Smith		Office: Design	Item 18
Submittal Date: 10/26/2012		Proposed Effective Date: 4/16/2013	
Article No.: 1105.04, A Title: Conformity with and Coordination of the Contract Documents Article No.: 2107.01 Title: Description (Embankments) Section No.: 25XX Title: Global Positioning System Machine Control		Other:	
Specification Committee Action: Approved with changes.			
Deferred:	Not Approved:	Approved Date: 11/8/2012	Effective Date: 4/16/2013
Specification Committee Approved Text:			
1101.03, Definition of Terms.			
Add the definition:			
Electronic Support File.			
A file provided to the Contractor for their convenience that is not part of the contract documents. Electronic support files may include, but are not limited to:			
<ul style="list-style-type: none"> • Machine control data files. • Tabulations of plan quantities. • Earthwork files. • Alignment files. • Soil testing data files. • CADD files. 			
1105.04, Conformity with and Coordination of the Contract Documents.			
Renumber Articles B, C, D, E, and F and Add the Article:			
B. Electronic support files, if available, will be provided prior to letting and are for information only. Should there be a discrepancy between an electronic support file and a contract document, the contract document shall govern.			
B C.			
C D.			
D E.			
E F.			
F G.			
Comments: The Office of Design withdrew the second and third revisions for further discussion. The Committee decided that electronic support files should not be considered contract documents and by adding them to Article 1105.04, A, the Department was at least implying that they were part of the contract documents. The Committee decided to add a new Article to Article 1105.04, detailing the hierarchy of electronic support files. The Committee also felt that a definition of electronic support files would be beneficial. The definition was added to Article 1101.03.			
Specification Section Recommended Text:			
1105.04, A, Conformity with and Coordination of the Contract Documents.			
Add the Article:			
11. Electronic support files.			
2107.01 Description.			

Add the Article:

- C.** See Section 25XX for optional machine guidance specifications.

Section 25XX, Global Positioning System Machine Control.

Add the Section:

25XX.01 DESCRIPTION.

- A.** This section contains requirements for construction using Global Positioning System (GPS) machine control techniques. Use this section in conjunction with Section 2526 unless construction survey is being provided by the Contracting Authority.
- B.** The Contractor may use equipment equipped with GPS machine control.
- C.** The Contracting Authority may provide electronic surface models. If models are provided, some areas of construction may not be covered by the model. Contractor has the option to either:
 - Construct remaining areas using conventional construction survey techniques, or
 - At no additional cost to the Contracting Authority, build required surface models to facilitate GPS machine control.
- D.** Contractor may choose which type of GPS machine control equipment and systems to use. Ensure equipment and systems achieve the existing requirements. Convert electronic data provided by the Contracting Authority into the format required by the machine control system. The intent of the Contracting Authority is to provide machine guidance files in a generic format that can be converted as needed.

25XX.02 EQUIPMENT.

Provide equipment required to accomplish GPS machine control. Use equipment that generates end results meeting the Standard Specifications.

25XX.03 CONSTRUCTION.

A. Contracting Authority Responsibilities.

- 1.** Engineer will set initial horizontal and vertical control points in the field for the project as indicated in the contract documents.
- 2.** Engineer will provide project specific localized coordinate system if required. The control information utilized in establishing the localized coordinate system, specifically the rotation, scaling, and translation can be obtained from the Engineer upon request.
- 3.** Contracting Authority may make available the following electronic data files with the proposal form. This information is available at the Office of Contracts' website. Files that are made available are in a generic format. Perform necessary conversion of files for selected equipment. For naming conventions and file formats refer to Office of Design's online design manual. Note that additional files, such as storm sewer design files, may be included in the original design software format.
 - a.** CAD Files:
 - Primary CADD (Computer Aided Design and Drafting) design file.
 - CADD cross section files.
 - CADD Right of Way file.
 - CADD Topography files.
 - 3D Design break line files in an industry standard format.
 - b.** Machine Control Surface Model Files (including topsoil placement where required on the plans):

- Documentation file describing all of the surface models.
- LandXML format.
- c. Alignment Data Files:
 - Documentation file describing the alignment information both horizontal and vertical.
 - LandXML format.

4. No guarantee is made that data systems used by the Engineer will be directly compatible with systems the Contractor uses.
5. Electronic information shall be considered a representation of actual conditions to be encountered during construction. Providing the Contractor this information does not relieve the Contractor from the responsibility of making an investigation of conditions to be encountered, including, but not limited to site visits, and basing their bid on information obtained from these investigations and their professional interpretation and judgment. Contractor assumes the risk of error if the information is used for purposes for which it was not intended.
6. Assumptions the Contractor makes from this electronic information is at their risk.
7. Ensure electronic data will function in the machine control system.
8. Engineer may perform spot checks of machine control results, surveying calculations, records, field procedures, and actual staking. If Engineer determines work is not being performed in a manner that ensures accurate results, the Engineer may order work to be redone, to meet the requirements of the contract documents, at no additional cost to the Contracting Authority.

B. Contractor's Responsibilities.

If Contractor chooses GPS machine control, general staking will be superseded with the requirements listed below.

1. General.

- a. Provide Engineer with a GPS rover (with same capabilities as units used by Contractor) for use during duration of the contract. At the end of the contract, GPS rover unit will be returned. Provide Engineer 8 hours formal training on Contractor's GPS machine control systems.
- b. If applicable, review and apply data the Contracting Authority has provided to perform GPS machine control grading.
- c. Contractor bears all costs, including, but not limited to the cost of actual reconstruction of work, that may be incurred due to errors in application of GPS machine control grading techniques. Grade elevation errors and associated quantity adjustments resulting from the Contractor's activities are at no cost to the Contracting Authority.
- d. Convert Contracting Authority's electronic data into a format compatible with the machine control system.
- e. Manipulation of Contracting Authority's electronic data is taken at Contractor's own risk.
- f. Check and recalibrate, if necessary, GPS machine control system at beginning of each work day.
- g. Meet same accuracy requirements as conventional construction detailed in the Standard Specifications.
- h. If Construction Survey is not provided by the Contracting Authority, preserve all reference points and monuments that are established by the Engineer. Reestablish reference points that have not been preserved at no additional cost to the Contracting Authority.

- i. At least one week prior to preconstruction conference, submit to the Engineer for review a written machine control work plan including equipment type, control software manufacture and version, and proposed location of local GPS base station used for broadcasting differential correction data to rover units.

2. Grading.

- a. If construction survey is not provided by Contracting Authority, establish secondary control points at appropriate intervals and at locations along the length of the project and outside the project limits and/or where work is performed beyond the project limits as required at intervals not to exceed 1000 feet (300 m). Determine horizontal position of these points using static GPS sessions or by traverse connection from original baseline control points. Establish elevation of these control points using differential leveling from project benchmarks, forming closed loops. Provide a copy of new control point information to Engineer prior to construction activities. Contractor shall be responsible for errors resulting from their efforts. Correct deficiencies to the satisfaction of the Engineer at no additional cost to the Contracting Authority.
- b. If construction survey is not provided by the Contracting Authority, set hubs at the top of the finished subgrade at all hinge points on the cross section at 1000 foot (300 m) intervals on mainline and at least two cross sections on side roads and ramps. Establish these hubs, using conventional survey methods, for use by the Engineer to check accuracy of construction.
- c. If construction survey is not provided by the Contracting Authority, provide control points and conventional grade stakes at critical points such as, but not limited to, PCs, PTs, superelevation points, and other critical points required for construction of drainage and roadway structures.

25XX.04 METHOD OF MEASUREMENT.

None.

25XX.05 BASIS OF PAYMENT.

- A. Payment for GPS Machine Control shall be included in contract unit price for construction of embankments, subgrade, or other associated work.
- B. Delays due to satellite reception of signals to operate the GPS machine control system will not result in adjustment to the contract unit price or be justification for granting contract time extensions.

Comments: Do we need to define electronic support files?

Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use **Strikeout** and **Highlight**.)

1105.04, A, Conformity with and Coordination of the Contract Documents.

Add as a new item:

- 11. Electronic support files.

2107.01 Description

Add as a new item:

- C. See section 25XX for optional machine guidance specifications.

25XX, Global Positioning System Machine Control.

Add new Section:

25XX.01 GENERAL.

- A.** This section contains requirements for construction using Global Positioning System (GPS) machine control techniques. Use this section in conjunction with Section 2526 of the Standard Specifications unless construction survey is being provided by the Contracting Authority.
- B.** The Contractor has the option of using equipment equipped with GPS machine control.
- C.** The Contracting Authority may provide electronic surface models. Even if the models are provided, some areas of construction may not be covered by the model. The Contractor has the option to either:
 - Construct remaining areas using conventional construction survey techniques, or
 - At no additional cost to the Contracting Authority, build the required surface models to facilitate GPS machine control.
- D.** The Contractor has the option of which type of GPS machine control equipment and systems to use. Ensure the equipment and systems achieve the existing requirements. Convert the electronic data provided by the Contracting Authority into the format required by the machine control system. The intent of the Contracting Authority is to provide machine guidance files in a generic format that can be converted as needed.

25XX.02 EQUIPMENT.

Provide all equipment required to accomplish GPS machine control. Use equipment that generates end results meeting the Standard Specifications.

25XX.03 CONSTRUCTION.

A. Contracting Authority Responsibilities.

- 1.** The Engineer will set the initial horizontal and vertical control points in the field for the project as indicated in the contract documents.
- 2.** The Engineer will provide the project specific localized coordinate system if required. The control information utilized in establishing the localized coordinate system, specifically the rotation, scaling, and translation can be obtained from the Engineer upon request.
- 3.** The Contracting Authority may make available the following electronic data files with the proposal form. This information is available at the Office of Contracts' website. The files that are made available are in a generic format. Perform necessary conversion of the files for the selected equipment. For naming conventions and file formats please see the Office of Design's online design manual. Note that additional files, such as storm sewer design files, may be included in the original design software format.
 - a.** CAD Files:
 - Primary CADD(Computer Aided Design and Drafting) design file.
 - CADD cross section files.
 - CADD Right of Way file.
 - CADD Topography files.
 - 3D Design break line files in an industry standard format.
 - b.** Machine Control Surface Model Files (including topsoil placement where required in the plans):
 - Documentation file describing all of surface models.
 - LandXML format.
 - c.** Alignment Data Files:
 - Documentation file describing all of the alignment information both horizontal and vertical.
 - LandXML format.

No guarantee is made that the data systems used by the Engineer will be directly compatible with the systems the Contractor uses.

The electronic information is not to be considered a representation of actual conditions to be encountered during construction. Providing the Contractor this information does not relieve the Contractor from the responsibility of making an investigation of conditions to be encountered, including but not limited to site visits, and basing the bid on information obtained from these investigations and their professional interpretations and judgment. The Contractor assumes the risk of error if the information is used for any purposes for which the information was not intended.

Any assumptions the Contractor makes from this electronic information is at their risk.

Ensure the electronic data will function in the machine control system.

4. The Engineer may perform spot checks of the machine control results, surveying calculations, records, field procedures, and actual staking. If the Engineer determines the work is not being performed in a manner that will assure accurate results, the Engineer may order such work to be redone, to the requirements of the contract documents, at no additional cost to the Contracting Authority.

B. Contractor's Responsibilities.

If the Contractor chooses GPS machine control, general staking will be superseded with the requirements listed below.

1. General.

- a. Provide the Engineer with a GPS rover (with the same capabilities as units used by the Contractor) for use during the duration of the contract. At the end of the contract, the GPS rover unit will be returned. Provide the Engineer 8 hours of formal training on the Contractor's GPS machine control systems.
- b. If applicable, review and apply the data the Contracting Authority has provided to perform GPS machine control grading.
- c. The Contractor bears all costs, including but not limited to the cost of actual reconstruction of work, that may be incurred due to errors in application of GPS machine control grading techniques. Grade elevation errors and associated quantity adjustments resulting from the Contractor's activities are at no cost to the Contracting Authority.
- d. Convert the Contracting Authority's electronic data into a format compatible with the machine control system.
- e. Manipulation of the Contracting Authority's electronic data is taken at the Contractor's own risk.
- f. Check and recalibrate, if necessary, the GPS machine control system at the beginning of each work day.
- g. Meet the same accuracy requirements as conventional construction as detailed in the Standard Specifications.
- h. If Construction Survey is not provided by the Contracting Authority, preserve all reference points and monuments that are established by the Engineer within the project limits. Reestablish reference points that have not been preserved at no additional cost to the Contracting Authority.
- i. At least one week prior to the preconstruction conference, submit to the Engineer for review a written machine control work plan which includes the equipment type, control software manufacture and version, and the proposed location of the local GPS base station used for broadcasting differential correction data to rover units.

2. Grading.

<p>a. If construction survey is not provided by the Contracting Authority, establish secondary control points at appropriate intervals and at locations along the length of the project and outside the project limits and/or where work is performed beyond the project limits as required at intervals not to exceed 1000 feet (300 m). Determine the horizontal position of these points using static GPS sessions or by traverse connection from the original baseline control points. Establish the elevation of these control points using differential leveling from the project benchmarks, forming closed loops. Provide a copy of all new control point information to the Engineer prior to construction activities. The Contractor is responsible for all errors resulting from their efforts. Correct all deficiencies to the satisfaction of the Engineer at no additional cost to the Contracting Authority.</p> <p>b. If construction survey is not provided by the Contracting Authority, set hubs at the top of the finished subgrade at all hinge points on the cross section at 1000 foot (300 m) intervals on mainline and at least two cross sections on the side roads and ramps. Establish these hubs, using conventional survey methods, for use by the Engineer to check the accuracy of the construction.</p> <p>c. If construction survey is not provided by the Contracting Authority, provide control points and conventional grade stakes at critical points such as, but not limited to, PCs, PTs, superelevation points, and other critical points required for the construction of drainage and roadway structures.</p>						
<p>25XX.04 METHOD OF MEASUREMENT. None.</p>						
<p>25XX.05 BASIS OF PAYMENT.</p> <p>A. Payment for GPS Machine Control will incidental to the contract unit price for construction of embankments, subgrade, or other associated work.</p> <p>B. Delays due to satellite reception of signals to operate the GPS machine control system will not result in adjustment to the contract unit price for any construction items or be justification for granting contract time extensions.</p>						
<p>Reason for Revision: The Office of Design would like to add specifications to the GS for GPS machine control.</p>						
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">County or City Input Needed (X one)</td> <td style="width: 25%;">Yes</td> <td style="width: 25%;">No X</td> </tr> </table>	County or City Input Needed (X one)	Yes	No X			
County or City Input Needed (X one)	Yes	No X				
<p>Comments:</p>						
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Industry Input Needed (X one)</td> <td style="width: 25%;">Yes X</td> <td style="width: 25%;">No</td> </tr> </table>	Industry Input Needed (X one)	Yes X	No			
Industry Input Needed (X one)	Yes X	No				
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">Industry Notified:</td> <td style="width: 12.5%;">Yes X</td> <td style="width: 12.5%;">No</td> <td style="width: 25%;">Industry Concurrence:</td> <td style="width: 12.5%;">Yes</td> <td style="width: 12.5%;">No</td> </tr> </table>	Industry Notified:	Yes X	No	Industry Concurrence:	Yes	No
Industry Notified:	Yes X	No	Industry Concurrence:	Yes	No	
<p>Comments: I would like to see under 25XX.03 A Contracting Authority Responsibilities, that the engineer also sets some check points at the start of the work to verify that surfaces they provided match the plans and coordinate system. In A part 4, I would like to compare instruments at the start of work so we can adjust to match what they are going to spot check us against. In B part 2 Grading, By Construction Survey do you mean a licensed surveyor? I thought I should mention that the software I use, Trimble SCS900, will not run a level loop on control points I set. Once I have calibrated the site off existing control I can record new points. I can check those points versus the original calibration.</p>						

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Jim Berger	Office: Materials	Item 19
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Submittal Date: 2012.10.22		Proposed Effective Date: April 2013	
Section No.: 4110 Title: Fine Aggregate for Portland Cement Concrete		Other:	
Specification Committee Action: Deferred at the request of the Office of Materials.			
Deferred: X	Not Approved:	Approved Date:	Effective Date:
Specification Committee Approved Text:			
Comments:			
Specification Section Recommended Text:			
4110.02, Gradation.			
Replace the Article:			
<ol style="list-style-type: none"> 1. Meet the requirements for Gradation No. 1 of the Aggregate Gradation Table, Article 4109.02. 2. Have a fineness modulus between 2.6 and 3.2 when determined according to AASHTO T 27. The fineness modulus shall not vary by more than 0.20 from the base fineness modulus for the source as determined in AASHTO M 6. 			
4110.03, Quality.			
Replace the Article:			
A. Meet the requirements of Table 4110.03-1:			
Table 4110.03-1: Test Limits and Methods			
Fine Aggregate Quality	Test Limits	Test Method	
Shale and Coal	2.0% (maximum)	Materials I.M. 344	
Mortar Strength	6000 psi (41.4 MPa) (minimum)	Office of Materials Test Method No. Iowa 212	
Organic Impurities ^(a)	Color no darker than the reference standard	AASHTO T 21	
Organic Impurities ^(b)	7-day relative strength equal or greater than 95%	AASHTO T 71	
<p>(a) The test for organic materials will only be determined for initial source approval and when the Engineer suspects a change in the amount of organic impurities for the source.</p> <p>(b) In the event the initial source approval testing fails AASHTO T 21, provide independent testing by a Laboratory meeting Materials I.M. 409.</p>			
B. The Engineer may require additional mortar strength testing for sources where quality changes.			
Comments:			
Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use Strikeout and Highlight.)			
4110.02 GRADATION.			
<ol style="list-style-type: none"> 1. Meet the requirements for Gradation No. 1 of the Aggregate Gradation Table, Article 4109.02. 			

- 2. Have a fineness modulus between 2.6 and 3.2 when determined according to AASHTO T 27. The fineness modulus shall not vary by more than 0.20 from the base fineness modulus for the source as determined in AASHTO M 6.

4110.03 QUALITY.

A. Meet the requirements of Table 4110.03-1:

Table 4110.03-1: Test Limits and Methods

Fine Aggregate Quality	Test Limits	Test Method
Shale and Coal	2.0% (maximum)	Materials I.M. 344
Mortar Strength	6000 psi (41.4 MPa) (minimum)	Office of Materials Test Method No. Iowa-212
Organic Impurities ^(a)	Color no darker than the reference standard	AASHTO T 21
Organic Impurities ^(b)	7-day relative strength equal or greater than 95%	AASHTO T 71
(c) The test for organic materials will only be determined for initial source approval and when the Engineer suspects a change in the amount of organic impurities for the source. (d) In the event the initial source approval testing fails AASHTO T 21, provide independent testing by a Laboratory meeting Materials I.M. 409.		

~~B. The Engineer may require additional mortar strength testing for sources where quality changes.~~

Reason for Revision: Continued approval of fine aggregate now rely more on consistency of the fineness modulus (FM) than an absolute mortar strength. The restriction on variation of the FM by not more than 0.20 is not new (IM 409) but needs to be emphasized in specifications. The range of FM between 2.6 and 3.2 more closely matches AASHTO M 6-08, but is modified slightly for Iowa sources.

The Mortar Strength requirement for new sources or sources with changing fine aggregate characteristics will first have a quick screening test of organic material (AASHTO T 21). If T 21 fails, a mortar strength test will be performed through a certified laboratory. This process will be described in IM 409.

County or City Input Needed (X one)		Yes	No X		
Comments:					
Industry Input Needed (X one)		Yes	No X		
Industry Notified:	Yes	No	Industry Concurrence:	Yes	No
Comments:.					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Gary Novey / Jim Berger	Office: Bridges & Structures / Materials	Item 20
Submittal Date: 10/25/2012	Proposed Effective Date: April 2013	
Article Number: 4153.06, B Title: High Strength Fasteners (Miscellaneous Iron and Steel) Article Number: 4187.01 Title: General Requirements (Materials for Support Structures)	Other:	

Specification Committee Action: Approved with minor changes.

Deferred:	Not Approved:	Approved Date: 11/8/2012	Effective Date: 4/16/2013
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Specification Committee Approved Text:

4153.06, B, 1.

Replace the Article:

Ensure the following:

- a. High strength bolts, nuts, and washers meet the requirements of the appropriate ASTM Specifications as follows:
 - bolts — A 325
 - nuts — A 563 Grade DH3
 - washers — F 436

For black steel, bolts are ASTM A 325 Type 1, nuts are ASTM A 563 Grade DH heavy hex, and washers are ASTM F 436 Type 1.
- b. For galvanized high strength fasteners steel, the fasteners meet the requirements of ASTM B 695, Class 50 55 Type I or ASTM F 2329 with zinc bath temperature limited to 850°F (455°C). Galvanize entire fastener assembly [bolt, nut(s) and washer(s)] by the same zinc-coating process, with no mixed processes in a lot of fastener assemblies. Bolts are ASTM A 325 Type 1, nuts are ASTM A 563 Grade DH heavy hex, and washers are ASTM F 436 Type 1.
- c. For weathering steel, bolts are ASTM A 325 Type III 3, nuts are ASTM A 563 Grade DH3 heavy hex, and washers are ASTM F 436 Type III 3.

4187, Materials for Support Structures.

Rename the Section:

Materials for Sign Support Structures

4187.01, General Requirements.

Replace the first sentence:

Furnish materials for aluminum alloy or galvanized overhead steel sign support structures meeting the following requirements:

4187.01, A, Material for Aluminum Alloy Superstructure.

Rename the Article:

Materials for Aluminum Alloy Superstructures.

4187.01, C, Fasteners for Aluminum Alloy and Galvanized Steel Superstructures and Anchor Bolts.

Replace the Article:

1. **Material Fasteners for Aluminum Superstructures.**
 - a. **Stainless Steel Bolts and Studs.**
 - 1) Use the size specified in the contract documents.
 - 2) ~~Meet the requirements of~~ Comply with ASTM A 320/A 320M Type 304 Class 1 Grade B8, Class 1A Grade B8A, or Class 2 Grade B8; or ASTM F 593 Alloy Group 1 Alloy 304 or 304L, Group 2 Alloy 316 or 316L, or Group 3 Alloy 321 or 347 meeting Condition A, CW1 or

CW2.

2 3) Use hexagonal bolt heads complying with ASTM A 320/A 320M Class 1. Threads are to comply with ANSI/ASME B1.1 for UNC thread series, Class 2A fit tolerance. Use the stress area to compute the tensile strength.

b. Stainless Steel Nuts and Jam Nuts.

1) Use the size specified in the contract documents.

2) ~~Meet the requirements of~~ Comply with ASTM A 194/A 194M Grade 8, 8A, 8C, 8CA, 8M, 8MA, 8T, or 8TA; or ASTM F 594 Alloy Group 1 Alloy 304 or 304L, Group 2 Alloy 316 or 316L, or Group 3 Alloy 321 or 347 meeting Condition A, CW1 or CW2. Use same alloy properties (i.e. group, alloy, class and condition) as those of the bolts specified. ~~Meet a minimum proof load of 75,000 psi (517MPa).~~

2 3) Use hexagonal nuts and jam nuts complying with the requirements of ASTM F 594. Threads are to comply with ANSI/ASME B 1.1 for UNC thread series, Class 2B fit tolerance. ~~In lieu of jam nuts, stainless steel lock washers may be used.~~

4) Unless otherwise specified, use dimensions in accordance with the requirements of ANSI/ASME B 18.22.2.

c. Stainless Steel Washers.

1) Comply with ANSI B18.22.1 for the bolts specified.

2) The Engineer may approve washers with dimensions other than those specified.

3) Meet requirements of ASTM A 240/A 240M. Use same alloy properties (i.e. group, alloy, class and condition) as those of the bolts specified.

d. Stainless Steel U-Bolts.

1) Use the size specified in the contract documents.

2) ~~Meet the requirements of~~ Comply with ASTM A 320/A 320M Type 304 Class 1 Grade B8, Class 1A Grade B8A, or Class 2 Grade B8; or ASTM F 593 Alloy Group 1 Alloy 304 or 304L, Group 2 Alloy 316 or 316L, or Group 3 Alloy 321 or 347 meeting Condition A, CW1 or CW2.

3) Threads shall comply with ANSI/ASME B 1.1 for UNC thread series, Class 2A tolerance.

4) Use nuts as specified in Article 4187.01, C.1.b.

5) Use washers as specified in Article 4187.01, C.1.c.

2. Fasteners for Galvanized Steel Superstructures.

a. Galvanized Steel High Strength Bolts.

1) Use size specified in the contract documents.

2) Galvanize according to requirements of ASTM B 695, Class 55 Type 1 or ASTM F 2329 with zinc bath temperature limited to 850°F (455°C).

3) Bolts shall be ASTM A 325 Type 1 or ASTM A 449 Type 1.

4) Threads are to comply with ANSI/ASME B 1.1 for UNC thread series, Class 2A tolerance.

b. Galvanized Steel Nuts and Jam Nuts.

1) Use size specified in the contract documents.

2) Galvanize according to the requirements of ASTM B 695, Class 55 Type 1 or ASTM F 2329 with zinc bath temperature limited to 850°F (455°C).

3) Regular nuts shall be ASTM A 563 Grade DH heavy hex.

4) Jam nuts shall be ASTM A 563 Grade DH heavy hex.

5) Threads are to comply with ANSI/ASME B 1.1 for UNC thread series, Class 2B tolerance.

c. Galvanized Steel Washers.

1) Comply with ANSI B18.22.1 for the bolts specified.

2) Galvanize according to the requirements of ASTM B 695, Class 55 Type 1 or ASTM F 2329 with zinc bath temperature limited to 850°F (455°C).

3) Washers shall be ASTM F 436 Type 1.

d. Galvanized Steel U-Bolts.

1) Use size specified in the contract documents.

2) Galvanize according to the requirements of ASTM B 695, Class 55 Type 1 or ASTM F 2329 with zinc bath temperature limited to 850°F (455°C).

3) U-bolts shall be ASTM A 449 Type 1, ASTM A 307 Grade B or ASTM F 1554, Grade 36 or 55.

4) Threads are to comply with ANSI/ASME B 1.1 for UNC thread series, Class 2A tolerance.

5) Bend and thread U-bolts prior to galvanizing.

e. Stainless Steel U-Bolts.

1) Use size specified in the contract documents.

2) Comply with ASTM A 320/A 320M Class 1 Grade B8, Class 1A Grade B8A, or

Class 2 Grade B8; or ASTM F 593 Group 1 Alloy 304 or 304L, Group 2 Alloy 316 or 316L, or Group 3 Alloy 321 or 347 meeting Condition A, CW1 or CW2.

- 3) Threads are to comply with ANSI/ASME B 1.1 for UNC thread series, Class 2A tolerance.
- 4) Use nuts as specified in Article 4187.01, C, 1, b.
- 5) Use washers as specified in Article 4187.01, C, 1, c.

2.3. Anchor Bolts, Nuts, and Washers.

Use bolts, nuts, and washers galvanized according to the requirements of ASTM F 2329 or ASTM B 695, Class 50, Type I coating. Meet the following requirements:

a. Anchor Bolts.

- 1) Use full-length galvanized bolts.
- 2) Comply with ASTM F 1554, Grade 55, S1 or Grade 105, S5 (724 MPa) as specified.
- 3) ~~Use Unified Coarse Thread Series~~ Threads are to comply with ANSI/ASME B1.1 for UNC thread series, Class 2A tolerance.
- 4) ~~Use Class 2A tolerance.~~
- 5) 4) The end of each anchor bolt intended to project from the concrete is to be color coded in red to identify the grade.
- 6) 5) Do not bend or weld anchor bolts.

b. Nuts.

- 1) Comply with ASTM A 563, Grade DH.
- 2) Use heavy hex.
- 3) Use ANSI/ASME B1.1 for UNC thread series, Class 2B tolerance.
- 3) 4) Nuts may be over-tapped according to the allowance requirements of ASTM A 563.

c. Washers.

Comply with ASTM F 436 Type 1.

d. Galvanizing.

Galvanize entire anchor bolt assembly (anchor bolt, nuts and washers) according to the requirements of ASTM B 695, Class 55 Type 1 or ASTM F 2329 with zinc bath temperature limited to 850°F (455°C). Galvanize entire assembly by the same zinc-coating process, with no mixed processes in a lot of fastener assemblies.

Comments: The Office of Materials had some additional revisions to Article 4187.01, C, 3, a, 2, which were incorporated.

Specification Section Recommended Text:

4153.06, B, 1.

Replace the Article:

Ensure the following:

- d.** ~~High strength bolts, nuts, and washers meet the requirements of the appropriate ASTM Specifications as follows:~~

bolts — A 325
nuts — A 563 Grade DH3
washers — F 436

For black steel, bolts are ASTM A 325 Type 1, nuts are ASTM A 563 Grade DH heavy hex, and washers are ASTM F 436 Type 1.

- e.** For galvanized ~~high strength fasteners~~ steel, the fasteners meet the requirements of ASTM B 695, Class 50 55 Type I or ASTM F 2329 with zinc bath temperature limited to 850°F (455°C). Galvanize entire fastener assembly [bolt, nut(s) and washer(s)] by the same zinc-coating process, with no mixed processes in a lot of fastener assemblies. Bolts are ASTM A 325 Type 1, nuts are ASTM A 563 Grade DH heavy hex, and washers are ASTM F 436 Type 1.
- f.** For weathering steel, bolts are ASTM A 325 Type III 3, nuts are ASTM A 563 Grade DH3 heavy hex, and washers are ASTM F 436 Type III 3.

4187, Materials for Support Structures.

Rename the Section:

Materials for Sign Support Structures

4187.01, General Requirements.

Replace the first sentence of the Article:

Furnish materials for aluminum alloy or galvanized ~~overhead~~ steel sign support structures meeting the following requirements:

4187.01, A, Material for Aluminum Alloy Superstructure.

Rename the Article:

Materials for Aluminum Alloy Superstructures.

4187.01, C, Fasteners for Aluminum Alloy and Galvanized Steel Superstructures and Anchor Bolts.

Replace the Article:

2. Material Fasteners for Aluminum Superstructures.

e. Stainless Steel Bolts and Studs.

- 2) Use the size specified in the contract documents.
- 2) ~~Meet the requirements of~~ Comply with ASTM A 320/A 320M Type 304 Class 1 Grade B8, Class 1A Grade B8A, or Class 2 Grade B8; or ASTM F 593 Alloy Group 1 Alloy 304 or 304L, Group 2 Alloy 316 or 316L, or Group 3 Alloy 321 or 347 meeting Condition A, CW1 or CW2.
- 2 3) Use hexagonal bolt heads ~~complying with ASTM A 320/A 320M Class 1.~~ Threads are to comply with ANSI/ASME B1.1 for UNC thread series, Class 2A fit tolerance. Use the stress area to compute the tensile strength.

f. Stainless Steel Nuts and Jam Nuts.

- 2) Use the size specified in the contract documents.
- 2) ~~Meet the requirements of~~ Comply with ASTM A 194/A 194M Grade 8, 8A, 8C, 8CA, 8M, 8MA, 8T, or 8TA; or ASTM F 594 Alloy Group 1 Alloy 304 or 304L, Group 2 Alloy 316 or 316L, or Group 3 Alloy 321 or 347 meeting Condition A, CW1 or CW2. Use same alloy properties (i.e. group, alloy, class and condition) as those of the bolts specified. ~~Meet a minimum proof load of 75,000 psi (517MPa).~~
- 2 3) Use hexagonal nuts and jam nuts ~~complying with the requirements of ASTM F 594.~~ Threads are to comply with ANSI/ASME B 1.1 for UNC thread series, Class 2B fit tolerance. ~~In lieu of jam nuts, stainless steel lockwashers may be used.~~
- 4) Unless otherwise specified, use dimensions in accordance with the requirements of ANSI/ASME B 18.22.2.

g. Stainless Steel Washers.

- 2) Comply with ANSI B18.22.1 for the bolts specified.
- 2) The Engineer may approve washers with dimensions other than those specified.
- 3) Meet requirements of ASTM A 240/A 240M. Use same alloy properties (i.e. group, alloy, class and condition) as those of the bolts specified.

h. Stainless Steel U-Bolts.

- 2) Use the size specified in the contract documents.
- 2) ~~Meet the requirements of~~ Comply with ASTM A 320/A 320M Type 304 Class 1 Grade B8, Class 1A Grade B8A, or Class 2 Grade B8; or ASTM F 593 Alloy Group 1 Alloy 304 or 304L, Group 2 Alloy 316 or 316L, or Group 3 Alloy 321 or 347 meeting Condition A, CW1 or CW2.
- 3) Threads shall comply with ANSI/ASME B 1.1 for UNC thread series, Class 2A tolerance.
- 4) Use nuts as specified in Article 4187.01, C.1.b.
- 5) Use washers as specified in Article 4187.01, C.1.c.

2. Fasteners for Galvanized Steel Superstructures.

e. Galvanized Steel High Strength Bolts.

- 5) Use size specified in the contract documents.
- 6) Galvanize according to requirements of ASTM B 695, Class 55 Type 1 or ASTM F 2329 with zinc bath temperature limited to 850°F (455°C).
- 7) Bolts shall be ASTM A 325 Type 1 or ASTM A 449 Type 1.
- 8) Threads are to comply with ANSI/ASME B 1.1 for UNC thread series, Class 2A tolerance.

f. Galvanized Steel Nuts and Jam Nuts.

- 6) Use size specified in the contract documents.
- 7) Galvanize according to the requirements of ASTM B 695, Class 55 Type 1 or ASTM F 2329 with zinc bath temperature limited to 850°F (455°C).
- 8) Regular nuts shall be ASTM A 563 Grade DH heavy hex.
- 9) Jam nuts shall be ASTM A 563 Grade DH heavy hex.
- 10) Threads are to comply with ANSI/ASME B 1.1 for UNC thread series, Class 2B tolerance.

g. Galvanized Steel Washers.

- 4) Comply with ANSI B18.22.1 for the bolts specified.
- 5) Galvanize according to the requirements of ASTM B 695, Class 55 Type 1 or ASTM F 2329 with zinc bath temperature limited to 850°F (455°C).
- 6) Washers shall be ASTM F 436 Type 1.

h. Galvanized Steel U-Bolts.

- 6) Use size specified in the contract documents.
- 7) Galvanize according to the requirements of ASTM B 695, Class 55 Type 1 or ASTM F 2329 with zinc bath temperature limited to 850°F (455°C).
- 8) U-bolts shall be ASTM A 449 Type 1, ASTM A 307 Grade B or ASTM F 1554, Grade 36 or 55.
- 9) Threads are to comply with ANSI/ASME B 1.1 for UNC thread series, Class 2A tolerance.
- 10) Bend and thread U-bolts prior to galvanizing.

e. Stainless Steel U-Bolts.

- 1) Use size specified in the contract documents.
- 2) Comply with ASTM A 320/A 320M Class 1 Grade B8, Class 1A Grade B8A, or Class 2 Grade B8; or ASTM F 593 Group 1 Alloy 304 or 304L, Group 2 Alloy 316 or 316L, or Group 3 Alloy 321 or 347 meeting Condition A, CW1 or CW2.
- 3) Threads are to comply with ANSI/ASME B 1.1 for UNC thread series, Class 2A tolerance.
- 4) Use nuts as specified in Article 4187.01, C, 1, b.
- 5) Use washers as specified in Article 4187.01, C, 1, c.

2.3. Anchor Bolts, Nuts, and Washers.

~~Use bolts, nuts, and washers galvanized according to the requirements of ASTM F 2329 or ASTM B 695, Class 50, Type I coating.~~ Meet the following requirements:

a. Anchor Bolts.

- 1) Use full-length galvanized bolts.
- 2) Comply with ASTM F 1554, Grade 55 or 105 (724 MPa) as specified.
- 3) ~~Use Unified Coarse Thread Series~~ Threads are to comply with ANSI/ASME B1.1 for UNC thread series, Class 2A tolerance.
- 4) ~~Use Class 2A tolerance.~~
- 5) The end of each anchor bolt intended to project from the concrete is to be color coded in red to identify the grade.
- 6) Do not bend or weld anchor bolts.

b. Nuts.

- 1) Comply with ASTM A 563, Grade DH.
- 2) Use heavy hex.
- 3) Use ANSI/ASME B1.1 for UNC thread series, Class 2B tolerance.
- 4) Nuts may be over-tapped according to the allowance requirements of ASTM A 563.

c. Washers.

Comply with ASTM F 436 Type 1.

d. Galvanizing.

Galvanize entire anchor bolt assembly (anchor bolt, nuts and washers) according to the requirements of ASTM B 695, Class 55 Type 1 or ASTM F 2329 with zinc bath temperature limited to 850°F (455°C). Galvanize entire assembly by the same zinc-coating process, with no mixed processes in a lot of fastener assemblies.

Comments:

Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use **Strikeout** and **Highlight**.)

DIVISION 41. CONSTRUCTION MATERIALS

...

4186. Signing Materials.

4187. Materials for **Sign Support Structures.**

4188. Traffic Control Devices.

...

Section 4153. Miscellaneous Iron and Steel

4153.06, B. High Strength Fasteners.

1. Ensure the following:

a. High strength bolts, nuts, and washers meet the requirements of the appropriate ASTM Specifications as follows:

bolts — A 325

nuts — A 563 Grade DH3

washers — F 436

For black steel, bolts are ASTM A 325 Type 1, nuts are ASTM A 563 Grade DH heavy hex, and washers are ASTM F 436 Type 1.

b. For galvanized high strength fasteners steel, the fasteners meet the requirements of ASTM B 695, Class 55 Type 1 or ASTM F 2329 with zinc bath temperature limited to 850 degrees Fahrenheit. Galvanize entire fastener assembly [bolt, nut(s) and washer(s)] by the same zinc-coating process, with no mixed processes in a lot of fastener assemblies. Bolts are ASTM A 325 Type 1, nuts are ASTM A 563 Grade DH heavy hex, and washers are ASTM F 436 Type 1.

c. For weathering steel, bolts are ASTM A 325 Type ~~III~~ 3, nuts are ASTM A 563 Grade DH3 heavy hex, and washers are ASTM F 436 Type ~~III~~ 3.

Section 4187. Materials for **Sign Support Structures**

4187.01 GENERAL REQUIREMENTS.

Furnish materials for aluminum alloy or galvanized ~~steel overhead~~ sign support structures meeting the following requirements:

4187.01, A—Materials for Aluminum Alloy Superstructures.

...

4187.01, B—Materials for Galvanized Steel Superstructures.

...

4187.01, C—Fasteners for Aluminum Alloy and Galvanized Steel Superstructures and Anchor Bolts.

3. Material Fasteners for Aluminum Superstructures.

i. Stainless Steel Bolts and Studs.

- 3) Use the size specified in the contract documents.
- 2) ~~Meet the requirements of~~ Comply with ASTM A 320/A 320M Type 304 Class 1 Grade B8, Class 1A Grade B8A, or Class 2 Grade B8; or ASTM F 593 Alloy Group 1 Alloy 304 or 304L, Group 2 Alloy 316 or 316L, or Group 3 Alloy 321 or 347 meeting Condition A, CW1 or CW2.
- ~~2)3)~~ Use hexagonal bolt heads. complying with ASTM A 320/A 320M Class 1. Threads are to comply with ANSI/ASME B1.1 for UNC thread series, Class 2A fit tolerance. Use the stress area to compute the tensile strength.

j. Stainless Steel Nuts and Jam Nuts.

- 3) Use the size specified in the contract documents.
- 2) ~~Meet the requirements of~~ Comply with ASTM A 194/A 194M Grade 8, 8A, 8C, 8CA, 8M, 8MA, 8T, or 8TA; or ASTM F 594 Alloy Group 1 Alloy 304 or 304L, Group 2 Alloy 316 or 316L, or Group 3 Alloy 321 or 347 meeting Condition A, CW1 or CW2. Use the same alloy properties (i.e. group, alloy, class and condition) as those of the bolts specified. ~~Meet a minimum proof load of 75,000 psi (517MPa).~~
- ~~2)3)~~ Use hexagonal nuts and jam nuts. complying with the requirements of ASTM F 594. Threads are to comply with ANSI/ASME B 1.1 for UNC thread series, Class 2B fit tolerance. In lieu of jam nuts, stainless steel lockwashers may be used.
- 4) Unless otherwise specified, use dimensions in accordance with the requirements of ANSI/ASME B 18.22.2.

k. Stainless Steel Washers.

- 3) Comply with ANSI B18.22.1 for the bolts specified.
- 2) The Engineer may approve washers with dimensions other than those specified.
- 3) Meet the requirements of ASTM A 240/A 240M. Use the same alloy properties (i.e. group, alloy, class and condition) as those of the bolts specified.

l. Stainless Steel U-Bolts.

- 3) Use the size specified in the contract documents.
- 2) ~~Meet the requirements of~~ Comply with ASTM A 320/A 320M Type 304 Class 1 Grade B8, Class 1A Grade B8A, or Class 2 Grade B8; or ASTM F 593 Alloy Group 1 Alloy 304 or 304L, Group 2 Alloy 316 or 316L, or Group 3 Alloy 321 or 347 meeting Condition A, CW1 or CW2.
- 3) Threads are to comply with ANSI/ASME B 1.1 for UNC thread series, Class 2A tolerance.
- ~~3)4)~~ Use nuts as specified in Article 4187.01, C.1.b.
- ~~4)5)~~ Use washers as specified in Article 4187.01, C.1.c.

2. Fasteners for Galvanized Steel Superstructures.

i. Galvanized Steel High Strength Bolts.

- 9) Use the size specified in the contract documents.
- 10) Galvanize according to the requirements of ASTM B 695, Class 55 Type 1 or ASTM F 2329 with zinc bath temperature limited to 850 degrees Fahrenheit.
- 11) Bolts shall be ASTM A 325 Type 1 or ASTM A 449 Type 1.
- 12) Threads are to comply with ANSI/ASME B 1.1 for UNC thread series, Class 2A tolerance.

j. Galvanized Steel Nuts and Jam Nuts.

- 11) Use the size specified in the contract documents.
- 12) Galvanize according to the requirements of ASTM B 695, Class 55 Type 1 or ASTM F 2329 with zinc bath temperature limited to 850 degrees Fahrenheit.
- 13) Regular nuts shall be ASTM A 563 Grade DH heavy hex.
- 14) Jam nuts shall be ASTM A 563 Grade DH heavy hex.
- 15) Threads are to comply with ANSI/ASME B 1.1 for UNC thread series, Class 2B tolerance.

k. Galvanized Steel Washers.

- 7) Comply with ANSI B18.22.1 for the bolts specified.
- 8) Galvanize according to the requirements of ASTM B 695, Class 55 Type 1 or ASTM F 2329 with zinc bath temperature limited to 850 degrees Fahrenheit.
- 9) Washers shall be ASTM F 436 Type 1.

l. Galvanized Steel U-Bolts.

- 11) Use the size specified in the contract documents.
- 12) Galvanize according to the requirements of ASTM B 695, Class 55 Type 1 or ASTM F 2329 with zinc bath temperature limited to 850 degrees Fahrenheit.
- 13) U-bolts shall be ASTM A 449 Type 1, ASTM A 307 Grade B or ASTM F 1554, Grade 36 or 55.
- 14) Threads are to comply with ANSI/ASME B 1.1 for UNC thread series, Class 2A tolerance.
- 15) Bend and thread U-bolts prior to galvanizing.

e. Stainless Steel U-Bolts.

- 1) Use the size specified in the contract documents.
- 2) Comply with ASTM A 320/A 320M Class 1 Grade B8, Class 1A Grade B8A, or Class 2 Grade B8; or ASTM F 593 Group 1 Alloy 304 or 304L, Group 2 Alloy 316 or 316L, or Group 3 Alloy 321 or 347 meeting Condition A, CW1 or CW2.
- 3) Threads are to comply with ANSI/ASME B 1.1 for UNC thread series, Class 2A tolerance.
- 3)4) Use nuts as specified in Article 4187.01, C.1.b.
- 4)5) Use washers as specified in Article 4187.01, C.1.c.

2.3. Anchor Bolts, Nuts, and Washers.

Use bolts, nuts, and washers galvanized according to the requirements of ASTM F 2329 or ASTM B 695, Class 50, Type I coating. Meet the following requirements:

a. Anchor Bolts.

- 1) Use full-length galvanized bolts.
- 2) Comply with ASTM F 1554, Grade 55 or 105 (724 MPa) as specified.
- 3) Use Unified Coarse Thread Series Threads are to comply with ANSI/ASME B1.1 for UNC thread series, Class 2A tolerance.
- 4) Use Class 2A tolerance.
- 5)4) The end of each anchor bolt intended to project from the concrete is to be color coded in red to identify the grade.
- 6)5) Do not bend or weld anchor bolts.

b. Nuts.

- 1) Comply with ASTM A 563, Grade DH.
- 2) Use heavy hex.
- 3) Use ANSI/ASME B1.1 for UNC thread series, Class 2B tolerance.
- 3)4) Nuts may be over-tapped according to the allowance requirements of ASTM A 563.

c. Washers.

Comply with ASTM F 436 Type 1.

d. Galvanizing.

Galvanize entire anchor bolt assembly (anchor bolt, nuts and washers) according to the requirements of ASTM B 695, Class 55 Type 1 or ASTM F 2329 with zinc bath temperature limited to 850 degrees Fahrenheit. Galvanize entire assembly by the same zinc-coating process, with no mixed processes in a lot of fastener assemblies.

Reason for Revision: Galvanizing requirements for steel fasteners and anchor bolts have changed. Material requirements for stainless steel fasteners were clarified. Galvanized steel fasteners are now permitted for use with galvanized steel sign support structures.

County or City Input Needed (X one)	Yes	No X
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Comments: Changes affect sign supports that are used almost exclusively for projects on the Interstate System and Primary Road System.

Industry Input Needed (X one)			Yes	No X	
Industry Notified:	Yes	No	Industry Concurrence:	Yes	No
Comments: A few fabricators were informally contacted to get input on some of the changes, such as the use of galvanized steel U-bolts with galvanized steel sign support structures.					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: John Smythe / Kevin Merryman		Office: Construction		Item 21	
Submittal Date: October 23, 2012			Proposed Effective Date: January 16, 2013		
Article No.: Title:			Other: DS-09066, Partial Depth PCC Finish Patches		
Specification Committee Action: Approved with changes.					
Deferred:	Not Approved:	Approved Date: 11/8/2012		Effective Date: 4/16/2013	
Specification Committee Approved Text: See attached Draft DS for Partial Depth PCC Finish Patches.					
Comments: The Office of Contracts asked about the revised wording in Article 2530.04, B, 2. This wording was revised to match Article 2530.04, A, 2. The Committee preferred the wording in Article 2530.04, A, 2, so this was also used for Article 2530.04, B, 2.					
Specification Section Recommended Text: See attached Draft DS for Partial Depth PCC Finish Patches.					
Comments:					
Member's Requested Change (Redline/Strikeout): See attached.					
Reason for Revision: This specification was used on a single project this past construction season. Revisions are based upon input/comments from the contractor and inspection staff on the project.					
County or City Input Needed (X one)			Yes	No X	
Comments:					
Industry Input Needed (X one)			Yes	No X	
Industry Notified:	Yes X	No	Industry Concurrence:	Yes	No
Comments: Some of the changes were based upon comments from industry. A copy of the proposed changes has been sent to ICPA.					

DRAFT DS-12XXX
(New)



Iowa Department of Transportation

DEVELOPMENTAL SPECIFICATION FOR PARTIAL DEPTH PCC FINISH PATCHES

Effective Date
January 16, 2013

THE STANDARD SPECIFICATIONS, SERIES 2012, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

This specification replaces Section 2530 of the Standard Specifications for Partial Depth Portland Cement Concrete Patches.

2530.01 DESCRIPTION.

- A. This specification contains requirements for Partial Depth PCC Patches, Partial Depth PCC Joint and Crack Repair Patches, and Overdepth Patches.
- B. Remove pavement in areas designated in the contract documents. This includes furnishing and placing patching material to provide a new traffic surface, and restoring adjacent shoulder as shown in the contract documents. This work is in areas where the size, shape, and depth of patch depends on extent of pavement deterioration and shall be determined during removal operation.
- C. Patches may be identified and constructed as one of the following types:
 1. **Finish Patches.**

Finish patches are square or rectangular in shape. They will be less than 6 feet (2 m) in length when placed on a longitudinal or transverse joint or random crack. Patches will be identified by tabulation in the contract documents. The patch size and location for each lane will be shown. Patch size and locations may be adjusted by the Engineer to fit field conditions.
 2. **Joint and Crack Repair Patches.**

Joint and crack repairs are square or rectangular in shape. They will be placed at a longitudinal or transverse joint or random crack. They will be a minimum of 6 feet (2 m) in length, and will be identified by tabulation in the contract documents. Size and location will be shown. Repair size and location may be adjusted to fit field conditions.
 3. **Overdepth Patches**

Overdepth Patches are irregular in shape. They are placed to the full depth of existing pavement in areas of unsound concrete as designated by the Engineer. Repair size and location will be determined at time of construction.

2530.02 MATERIALS.

Meet the requirements for the type of material specified.

A. PCC Patching Material.

Meet one of the requirements below. When patching encroaches on an adjacent lane open to traffic or when there is patching on two lane pavements or other locations where overnight closures are not permitted, use Class A or Class B patching material. Pavements with three or more lanes and when overnight closure is permitted, use Class C patching material.

1. Class A Patching Material.

- a. Use a modified Portland cement type manufactured to provide rapid set and high early strength. Meet requirements of Materials I.M. 491.20.
- b. When a mortar is furnished, add the manufacturer's recommended quantity of coarse aggregate. Use pea gravel, minimum Class 2 durability, meeting requirements of Section 4112.

2. Class B Patching Material.

Use high early strength rapid set (5 hour) concrete meeting requirements of Materials I.M. 529 and the following requirements:

- Use Class M mixture patching material with calcium chloride. Class M mixtures with calcium chloride shall not contain fly ash.
- Place concrete within 30 minutes after introduction of calcium chloride.
- For coarse aggregate, use crushed carbonate stone chips or pea gravel, minimum Class 2 durability, meeting requirements of Section 4112.

3. Class C Patching Material.

Use mixture with an early set that will allow time of opening to traffic in 24 to 36 hours as directed by the Engineer. For coarse aggregate, meet requirements for Class B patching material. Use Class M mixture meeting requirements of Materials I.M. 529 without addition of calcium chloride.

4. Modifications to Mixtures for Class B and Class C Patching Material.

Apply the following modifications to mixtures for Class B and Class C patching material:

a. Slump.

- 1) Slump, measured according to Materials I.M. 317 prior to addition of calcium chloride solution, shall be between 1 and 2.5 inches (25 and 65 mm) as a target range, allowing a maximum of 3 inches (75 mm). If calcium chloride solution is not to be added, slump shall be between 1 and 3 inches (25 and 75 mm) as a target range, allowing a maximum of 4 inches (100 mm).
- 2) When a Type A Mid Range water reducing admixture is used, the slump, tested prior to the addition of calcium chloride, shall be between 1 and 4 inches (25 and 100 mm) as a target range, allowing a maximum of 5 inches (125 mm).

b. Air Entrainment.

Entrained air content of unconsolidated concrete will be determined according to Materials I.M. 318, prior to addition of calcium chloride if it is to be added. When calcium chloride is to be added, air entrainment shall be 5.0%, with a tolerance of $\pm 2.0\%$. When calcium chloride is not to be added, air entrainment shall be 6.5%, with a tolerance of $\pm 1.5\%$.

c. Temperature.

Temperature of Class B patching material, as delivered to job site, shall be as required in Article 2530.02, B, 4, d. Ensure temperature of Class C patching material, as delivered to the job site, is greater than 65°F (18°C). Heating water, aggregate, or both, may be necessary. Cost of heating is incidental to patching.

d. Cement.

- 1) For Class M concrete mixtures, meet requirements of Section 4101.
- 2) Refer to Table 2530.02-1 for cement types and maximum allowable substitution rates. Maximum substitution for Type IS shall not exceed 25%.

Table 2530.02-1: Cement Types and Maximum Allowable Substitution Rates

Patch Class	Cement Type	Maximum Allowable Substitution	Minimum Mix Temperature
B	Type I, Type II Type IS	0% Fly Ash 0% Fly Ash	75°F (24°C) 80°F (27°C)*
C	Type I, Type II Type IS	10% Fly Ash 0% Fly Ash	65°F (18°C) 70°F (21°C)*
* When Type A Mid Range water reducing admixture is used, limit the minimum mix temperature to that required when Type I/II cement is used.			

e. Calcium Chloride.

- 1) Where calcium chloride is required, furnish it in water solution form and add it to the mix at job site. Use a commercial 32% calcium chloride solution, or equivalent, prepared according to Table 2530.02-2:

Table 2530.02-2: Proportions for 32% Calcium Chloride Solutions

Type of Solid Calcium Chloride	Pounds (Grams) of Solid per Gallon (liter) of Water	Solution Produced per Gallon (liter) of Water
Type 1 – Regular Flake (77% material)	6 (720)	1.3
Type 2 – Concrete Flake or Pellets (94% material)	4.5 (540)	1.2

- 2) Engineer will check solution concentration using a hydrometer according to Materials I.M. 373. Add solution at the rate of 3.0 gallons per cubic yard (14.8 L/m³) of concrete. Calcium chloride solutions of different concentrations may be approved by the Engineer, provided appropriate adjustments in the total concrete composition are made.
- 3) Agitate mixture until calcium chloride is completely in solution, and continue agitation as necessary to maintain uniformity.
- 4) Except when using continuous mixing equipment described in Article 2001.20, E, ensure calcium chloride solution is present in mix for at least 2 minutes of mixing.

f. Water Reducer.

Type A Mid Range water reducing admixture may be used. Use one listed in Materials I.M. 403, at manufacturer's recommended dosage.

g. Transit Mix Concrete.

Use mix from a plant which can be delivered and placed within 60 minutes from start of mixing. Time may be extended to 90 minutes when a retarding admixture, used according to Materials I.M. 403 including temperature dosage guidelines (and at no additional cost to Contracting Authority), is added at the plant. Continuous mixing equipment using volumetric proportioning may be used according to Article 2001.20, E.

h. Prepackaged Mixture.

A prepackaged mixture, proportioned as specified above for Class B or Class C matching material, may be furnished as a Class B or Class C patching material with the Engineer's approval. Coarse aggregate for prepackaged mixtures shall meet the requirements of Article 4115.05. Mix prepackaged mixtures in an on-site paddle type mixer; or proportion and mix with continuous mixing equipment using volumetric proportioning according to Article 2001.20, E.

B. Joint Boards.

Comply with the following:

1. Joint boards for recreating joints and cracks: use a resilient filler, cellulosic fiber, paraffin coated cardboard, or other **nonabsorbent**, compressible material of proper shape to recreate joint during placement of patch material.
2. Boards for recreating transverse joints: one piece. One piece boards will not be required in lengths exceeding 6 feet (1.8 m).
3. Boards for recreating longitudinal joints: one piece. One piece boards will not be required in lengths exceeding 6 feet (1.8 m).
4. Joints and open transverse cracks: use a board with a nominal width of 0.25 inch (5 mm). Metal strips may be used for narrow cracks.
5. Extend boards and metal strips into the pavement to bottom of patch; no horizontal joints permitted.
6. Use of a bond breaker on board surfaces is encouraged.

C. Joint Sealer.

Use hot poured joint sealer meeting requirements of Section 4136.

2530.03 CONSTRUCTION.

A. Equipment.

1. Remove using milling machine, jack hammer, or similar equipment. Equip milling machines to stop at preset depths to prevent damage to dowel bars and reinforcement. Hand equipment may be necessary to achieve designated shape.
2. The following additional equipment is required:
 - a. Sandblasting equipment for cleaning prepared patch area.
 - b. Air chisel, 15 pound (7 kg) (or less), to complete patch area preparation. Larger air chisel, not to exceed 30 pound (14 kg), may be used if it does not result in significant damage to patch area and edges.
 - c. Air compressor that emits oil and moisture free air for cleaning prepared area.
 - d. On-site paddle type concrete mixer for mixing Class A patching material or other prepackaged mixtures.

B. Patch Construction.

1. General.

- a. Tabulations for partial depth patches shown in the contract documents are for estimating purposes only. Engineer will designate location and limits of patches.
- b. Hand operated equipment may be necessary for all or some removal.
- c. Remove pavement within designated area to a minimum depth of 2 inches (50 mm) or to sound concrete as determined by the Engineer. Material removed and not designated for salvage becomes property of the Contractor and **shall** be removed according to Article 1104.08.

2. Preparation of Patch Area.

- a. Remove concrete in designated repair area using either of the following methods:
 - 1) Mill transversely or longitudinally matching general alignment of patch. Use a mill that produces patch edges with a 30 to 60 degree angle or chip back patch edges to a 30 to 60 degree angle. Chip out secondary spalling resulting from milling at no additional cost to the Contracting Authority.

- 2) Place 2 inch (50 mm) saw cuts along perimeter of patch area and chip back patch edges to a 30 to 60 degree angle.
 - b. If a joint or crack is within patch area, construct **bottom** edge of patch at least 3 inches (75 mm) beyond joint or crack. Minimum patch width will be 10 inches (260 mm).
 - c. Form or saw patch edges to prevent them from protruding beyond edge of existing pavement by more than 3/8 inch (10 mm).
 - d. Each patch will have a generally rectangular area. Remove concrete to a minimum depth of 2 inches (50 mm). Many areas will require removal of unsound concrete to a greater depth to reach sound concrete. Maximum depth is one half existing pavement thickness.
 - e. Do not damage steel reinforcement during removal process. Damaged steel will be the responsibility of the Contractor. If the end of a dowel bar is exposed, cut or remove dowel. Place duct tape, form oil, grease, or other method approved by the Engineer as a bond breaker on exposed dowels not removed.
 - f. When removal to a depth of one half existing pavement thickness leaves unsound concrete within patch area, the Engineer may designate part of the patch area as a Overdepth Patch. Remove concrete for the full depth of the pavement. Consolidate subgrade or subbase material using mechanical tamper or other compaction equipment as directed by Engineer. Furnish and install No. 4 (No. 15) tie bars at mid-depth of existing pavement using an approved non-shrink grout. Place bar to provide a minimum two inch concrete cover.
 - g. When it is necessary to go below reinforcing steel to reach sound concrete, cut reinforcing steel flush with perimeter patch edges and remove.
 - h. Clean patch area by sandblasting, followed by cleaning with compressed air. Completed surfaces shall appear surface dry to visual examination.
 - i. Recreate a joint or crack in patch area with a joint board of proper size and shape. Extend board to bottom of patch area to completely separate patching material on both sides. Use board of a width approximately equal to joint or crack. For wide openings, several thicknesses may be used. For patches 6 feet (2 m) or greater in length, longitudinal joints may be reestablished by sawing to a depth of 1/3 the pavement thickness.
- 3. Placing Patch Material.**
- a. Scrub cement-sand-water grout of creamy consistency onto patch surface, including edges. Grout shall consist of two parts of Type I or Type I/II Portland cement and one part sand mixed with water. Mix grout by mechanical means. Place patch material before grout dries. If grout dries before placement of patch material, clean patch area again by sandblasting and air blasting, then reapply grout.
 - b. Mix patching material and place in patch area. Consolidate and work into place in a manner ensuring good bonding. Level it with adjacent pavement to provide a smooth riding surface not varying from existing pavement surface by more than 1/8 inch (3 mm) when measured with a 10 foot (3 m) straightedge placed over patch. Replace or grind patch to correct deficiencies. Texture patches longer than 1 foot (0.3 m) in the manner of adjacent pavement surface.
 - c. For Class A patching materials, perform work according to patching manufacturer's recommendations and limitations, subject to approval of the Engineer. Furnish these recommendations to the Engineer.
- 4. Surface Finish.**
- Level partial depth patches with adjacent pavement. Trowel toward edge of the repair when finishing. Edge adjacent to joint boards or inserts in fresh concrete. Ensure they have a smooth riding surface.
- 5. Protecting and Curing.**
- a. **Class A Patching Material.**
Cure according to manufacturer's recommendations. Use minimum curing time according to Materials I.M. 491.20, Appendix A.

b. Class B Patching Material.

- 1) Cure as specified in Article 2529.03, H.
- 2) Cure for minimum time specified in Article 2529.02 for mixture used.

c. Class C Patching Material.

- 1) ~~Cure according to Article 2529.03, H. Patches may be covered immediately with white pigmented curing compound. Specified cure may be delayed as much as 2 hours. Cure patches with an approved white pigmented curing compound meeting the requirements of Section 4105. Apply curing compound within 30 minutes after placement of patching material.~~
- 2) Cure patches involving Class M concrete a minimum of 36 hours.
- 3) ~~After required curing period, insulation blanket and joint forming board may be removed in a manner not damaging the patch, or removal may be delayed until sealing is done provided no damage results from delay. Cure according to Article 2529.03, H, when overnight low temperatures are forecast to be below 35°F (2°C).~~

6. Joint and Crack Sealing.

Where joints and cracks cross patches; saw, seal, and clean patch according to Article 2301.03, P. Complete sealing within 5 working days after patch is placed. When joint and crack sealing is included in the contract, perform sealing as part of that operation.

C. Limitations of Operations.

1. Unless road is closed, maintain traffic during construction operations. Conduct operations with minimum inconvenience to traffic. On two-lane roads, limit operations to one traffic lane at a time, except for minor encroachment in adjacent lane for sawing and installing forms when traffic is maintained. For multiple lane roadways, work area may include one lane in each direction.
2. Adjacent lane shall be opened to traffic prior to the pavement being removed from a patch area.
3. When approved by the Engineer, patch areas may extend up to 2 feet (0.6 m) into adjacent lane as allowed by the contract documents.
- ~~4. Adjust work schedule so work for each patch, including removal of barricades and equipment (except cure period for PCC Class C concrete), will be completed the same day it is started between the hours of 30 minutes after sunrise to 30 minutes before sunset. If unforeseen conditions result in excavated areas being left overnight, assign a sufficient number of flaggers to warn and direct traffic until patches are placed. Additional payment will not be made for necessary flaggers.~~
- ~~5~~ 4. Place PCC patching material when ambient air and pavement temperatures are at least 45°F (7°C).
- ~~6~~ 5. The Engineer may limit advance sawing.
- ~~7~~ 6. If an emergency makes a DW joint necessary, temporarily fill excavated area following the joint with a suitable hot or cold paving mixture or stable granular material, as directed by the Engineer. The Engineer may direct the lane remain closed to traffic overnight. Provide traffic control.
- ~~8. When PCC patches without calcium chloride are constructed, place two drums meeting Article 2528.03, C, in front of each patch location where there is a possibility of turning into or returning to the closed lane. Additional drums need not be placed for patches spaced closer than 150 feet (45 m).~~

~~9. Apply Articles 1107.08, 1107.09, and 1108.03.~~

D. Area Restoration.

When patch is completed, remove forms if they have been used. Fill excavated space along outside pavement edge with material similar to existing shoulder, satisfactory to the Engineer. Thoroughly compact material before section is opened to traffic.

E. Failure Repair.

Repair failed patches that appear within 30 calendar days of original construction or subsequent repair at no cost to Contracting Authority. Failures may include, but are not limited to, loss of bond between patch and underlying pavement or random cracking.

2530.04 METHOD OF MEASUREMENT.

Engineer will determine quantities involved in satisfactory construction of partial depth patches for areas specified as follows:

A. Partial Depth PCC Finish Patches.

1. Engineer will calculate area of each patch in square feet (square meters) from surface measurements. Area of each patch less than 1 square foot (0.1 m^2) will be counted as 1 square foot (0.1 m^2) for payment purposes. If patch area is increased by Contractor to accommodate milling equipment, only area designated by the Engineer will be measured for payment.
2. Removal and repair of areas up to one half existing pavement thickness will ~~not be measured separately for payment~~ be included in this payment.

B. Partial Depth PCC Joint and Crack Repair Patches.

1. Measurement for Partial Depth PCC Joint and Crack Repair Patches will be to the nearest 0.1 linear foot (0.1 m) on the basis of 10 inch (260 mm) width of repair. Areas designated for repair outside the 10 inch (260 mm) repair width will be measured as Partial Depth PCC Finish Patches per Article 2530.04, A, 1.
2. Removal and repair of areas up to one half existing pavement thickness will be included in this payment.

C. Overdepth Patches.

Engineer will calculate area of each Overdepth Patch in square feet (square meters) at the mid-depth of the pavement. Area of each patch less than 1 square foot (0.1 m^2) will be counted as 1 square foot (0.1 m^2) for payment purposes.

2530.05 BASIS OF PAYMENT.

Payment for construction of various types of partial depth patches, satisfactorily constructed, at areas specified, will be the contract unit price as follows:

A. Partial Depth PCC Finish Patches.

1. Per square foot (square meter).
2. Payment is full compensation for repairs up to one half existing pavement thickness and includes removal of pavement, preparing patch area, furnishing and placing material, construction of joints, sawing, finishing, curing, and restoration of area.

B. Partial Depth PCC Joint and Crack Repair Patches.

1. Per linear foot (meter)
2. Payment is full compensation for repairs up to one half existing pavement thickness and includes removal of pavement, preparing the patch area, furnishing and placing material, construction of joints, sawing, finishing, curing, and restoration of area.

C. Overdepth Patches.

1. Per square foot (square meter). Payment for Overdepth Patches will be in addition to Partial Depth PCC Finish Patch or Partial Depth PCC Joint and Crack Repair Patch quantities for the same area.
2. Payment is full compensation for repairs designated in lower half of existing pavement and includes removal of pavement, preparing the patch area, and furnishing and placing material.

- D.** When joint and crack sealing is included in the contract, it will be paid for as a part of that work.

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Tom Reis		Office: Specifications		Item 22	
Submittal Date: 2012.11.01		Proposed Effective Date: January 16, 2013			
Article No.: Title:		Other: DS-120XX (replacing DS-12026), Small Business Development Contracts			
Specification Committee Action: Approved with changes.					
Deferred:	Not Approved:	Approved Date: 11/8/2012		Effective Date: 1/16/2013	
Specification Committee Approved Text: See attached draft DS for Small Business Development Contracts.					
Comments: This proposed revision was passed by the Specification Committee. Additionally, all references to the Office of Contracts were revised to the Office of Employee Services - Civil Rights Section.					
Specification Section Recommended Text: See attached DS.					
Comments: The changes to DS-12026 are being made to comply with the Department's DBE program as approved by the FHWA February 2012. The intent of the changes is to allow the Small Business Development Contract program to be eligible for use on projects using Federal-aid funds.					
Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use Strikeout and Highlight .)					
Reason for Revision:					
County or City Input Needed (X one)		Yes		No X	
Comments:					
Industry Input Needed (X one)		Yes		No X	
Industry Notified:	Yes	No X	Industry Concurrence:	Yes	No
Comments:					

DRAFT DS-120XX
(Replaces DS-12026)



**DEVELOPMENTAL SPECIFICATIONS
FOR
SMALL BUSINESS DEVELOPMENT CONTRACTS**

**Effective Date
January 16, 2013**

THE STANDARD SPECIFICATIONS, SERIES 2012, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

120XX.01 DESCRIPTION.

The intent of this specification is for the Department to comply with Iowa Code 314.14 by providing contracts where only small businesses compete against each other, and not against large established contractors.

120XX.02 DEFINITIONS.

Certified Small Business Contractors (CSBC) – A contractor who has been recognized as meeting the requirements of a Small Business contractor by the Iowa DOT's Office of ~~Contracts~~ Employee Services - Civil Rights Section.

Prequalification – Submittal of a Contractors Financial-Equipment-Experience (FEE) Statement as described in Article 1102.01 of the Standard Specifications

Small Business – A firm which meets the requirement of Iowa Code 314.14 which defines a "Small business" as any enterprise which is operated for profit, under a single management, and which has either fewer than twenty employees or an annual gross income of less than four million dollars computed as the average of the three preceding fiscal years.

Small Business Certification – A document completed by a small business and submitted to the Iowa DOT's Office of ~~Contracts~~ Employee Services - Civil Rights Section certifying the firm complies with the size requirements of the Iowa Code 314.14 Small Business requirements. The Department may require the small business to provide additional proof of eligibility to verify the requirements of Iowa Code 314.14 are not exceeded.

Targeted Small Business (TSB) – Iowa Code 15.102 paragraph 7a defines a "Targeted small business" as a small business which is 51% or more owned, operated, and actively managed by one or more women, minority persons, or persons with a disability.

TSB Bond Waiver – Iowa Code 12.44 requires agencies of state government to waive the requirement of satisfaction, performance, surety, or bid bonds for targeted small businesses which are able to demonstrate the inability of securing such a bond because of a lack of experience, lack of net worth, or lack of capital. This waiver will not apply to businesses with a record of repeated failure of substantial performance or material breach of contract in prior circumstances. The waiver will only be applied to a

project or individual transaction amounting to fifty thousand dollars or less, notwithstanding Iowa Code 573.2. In order to qualify, the TSB shall provide written evidence to the Department of inspections and appeals that the bond would otherwise be denied the business. The granting of the waiver will in no way relieve the business from its contractual obligations and will not preclude the Department from pursuing any remedies under law upon default or breach of contract. The Department of inspections and appeals will certify TSBs for eligibility and participation in this program and will make this information available to other state agencies.

120XX.03 BIDDING FOR CONTRACTS.

Only firms designated as approved Certified Small Business Contractors (CSBCs) by the Department will be allowed to bid on proposals designated for Small Business Contractors. A CSBC wishing to bid on a proposal designated for Small Business Contractors shall submit a written request to bid using the standard Iowa DOT procedures to be approved to bid on a proposal. The Department will give either written approval or denial of each request. Prequalification by the Department is not required, but the Department may require a CSBC to provide references or examples of similar types of work in order to be approved for bidding on individual proposals.

Prior to execution of a contract, the CSBC will be required to provide:

1. A Certificate of Insurance (as required by Article 1103.04 of the Standard Specifications) and
2. For contracts exceeding \$25,000, either a Performance Bond (as required by Article 1103.05 of the Standard Specifications) or a TSB Bond Waiver.

~~Article 1102.19 of the Standard Specifications does not apply to this contract.~~

A Traffic Control Technician according to Article 2528.01, C, 1, of the Standard Specifications is not required for this contract.

120XX.04 CONSTRUCTION OF THE WORK.

Article 1108.01 of the Standard Specifications allows a contractor to subcontract up to 70% of the contract amount. On contracts designated for CSBCs the Contractor may subcontract 70% of the contract amount, but this work shall only be subcontracted to another CSBC.

While the Department recognizes that a small business may not have all the equipment and resources of larger contractors, all requirements of the contract documents shall apply to the CSBC.

120XX.05 PAYMENT FOR WORK.

Payment for work will be according to Article 1109.05 of the Standard Specifications.

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Willy Sorenson	Office: Traffic & Safety	Item 23
Submittal Date: November 6, 2012	Proposed Effective Date: April 2013	
Article No.: 2416.03, A Title: Construction (Rigid Pipe Culverts) Article No.: 2417.03, A, 1 Title: Construction (Corrugated Culverts)	Other:	

Specification Committee Action: Approved as recommended.

Deferred:	Not Approved:	Approved Date: 11/8/2012	Effective Date: 4/16/2012
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Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: The Office of Local Systems asked if the Iowa Administrative Code section applied to city and county projects. The section only applies to the Primary Highway System. Cities and counties can use smaller pipes at their discretion.

Specification Section Recommended Text:

2416.03, A.

Replace Table 2416.03-1:

Table 2416.03-1: Minimum and Maximum Allowable Pipe Sizes

Culvert Use	Minimum Pipe Size in. (mm)	Maximum Pipe Size in. (mm)
Roadway Culvert	18 (450)	108 (2700)
Entrance Culvert	15 (375) 18 (450)	108 (2700)

2417.03, A, 1.

Replace Table 2417.03-1:

Table 2417.03-1: Minimum Allowable Pipe Sizes

Culvert Use	Minimum Pipe Size in. (mm)
Roadway Culvert	18 (450)
Entrance Culvert	15 (375) 18 (450)

Comments:

Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use **Strikeout** and **Highlight**.)

2416.03 Construction

A. 1500D (Class II) (75D) pipe may be used for entrance culverts only. Use 2000D (Class III), 3000D (Class IV), or 3750D (Class V) (100D, 150D, or 175D) pipes for roadway culverts, or if conditions require, for entrance culverts. Table 2416.03-1 provides minimum and maximum allowable pipe sizes.

Table 2416.03-1: Minimum and Maximum Allowable Pipe Sizes

Culvert Use	Minimum Pipe Size in. (mm)	Maximum Pipe Size in. (mm)
Roadway Culvert	18 (450)	108 (2700)
Entrance Culvert	15 (375) 18 (450)	108 (2700)

2417.03 CONSTRUCTION.

A. **Maximum and Minimum Sizes.**

1. Table 2417.03-1 provides minimum allowable pipe sizes.

Table 2417.03-1: Minimum Allowable Pipe Sizes

Culvert Use	Minimum Pipe Size in. (mm)
Roadway Culvert	18 (450)
Entrance Culvert	15 (375) 18 (450)

Reason for Revision:

The reason for the proposed change for the minimum pipe size for an entrance is to bring this specification into compliance with all of the following:

- 1) Iowa Administrative Code 761-Chapter 112.6(3)a.
- 2) Design Manual 4B-1 Determining Entrance and Safety Ramp Pipe Culverts Lengths
- 3) Guidelines for Preliminary Design of Culverts, April 2000, page 2, Size.

County or City Input Needed (X one)		Yes	No <input checked="" type="checkbox"/>
Comments:			
Industry Input Needed (X one)		Yes	No <input checked="" type="checkbox"/>
Industry Notified:	Yes	No	Industry Concurrence:
			Yes
			No
Comments:			