MINUTES
OF
IOWA DOT SPECIFICATION COMMITTEE MEETING

February 11, 2016

Members Present:	Darwin Bishop	District 3 - Construction
	Mark Brandl	District 6 - Davenport RCE
	Eric Johnsen, Secretary	Specifications Section
	Gary Novey	Office of Bridges & Structures
	Dan Redmond	District 4 - Materials
	Tom Reis, Chair	Specifications Section
Members Not Present:	Donna Buchwald	Office of Local Systems
	Mitch Dillavou	Project Delivery Bureau
	Greg Mulder	Office of Construction & Materials
	Wes Musgrove	Office of Contracts
	Brian Smith	Office of Design
	Willy Sorensen	Office of Traffic & Safety
Advisory Members Present:	Kevin Jones	Office of Construction and Materials
	Lisa McDaniel	FHWA
Others Present:	John Dostart	Office of Local Systems
	Daniel Harness	Office of Design
	Tom Jacobson	Office of Construction & Materials
	Mahbub Khoda	Office of Construction & Materials
	Kevin Merryman	Office of Construction & Materials
	Scott Schram	Office of Construction & Materials

Tom Reis, Specifications Engineer, opened the meeting. The following items were discussed in accordance with the agenda dated February 1, 2016:

The agenda is as follows:

1. Section 2303, Flexible Pavement.
The Office of Construction and Materials requested to update the section on flexible pavement.

2. Section 4154, Fence Materials.
The Office of Construction and Materials requested to update to current ASTM and AASHTO standards.

3. DS-15031, Quality Management Concrete (QM-C).
The Office of Construction and Materials requested to revise the Developmental Specifications for Quality Management Concrete (QM-C).

4. **DS-15XXX, Work on Railroad Right-of-Way (Dakota, Minnesota, & Eastern Railroad).**
The Specifications Section requested approval of Developmental Specifications for Work on Railroad Right-of-Way (Dakota, Minnesota, & Eastern Railroad). Some approved revisions will also be made to the other existing Developmental Specifications for UPRR and Canadian National RR.

5. Discussion on use of non-metallic manhole covers.

Form 510130 (08-15)

IOWA DOT

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Greg Mulder / Scott Schram	**Office:** Construction & Materials	**Item 1**
Submittal Date:	**Proposed Effective Date:** April 19, 2016	
Article No.: Section 2303 **Title:** Flexible Pavement	**Other:** SS-15XXX	

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 2/11/2016	**Effective Date:** 4/19/2016

Specification Committee Approved Text: See attached Supplemental Specifications for Flexible Pavement.

Comments: The SS will be attached to all proposals starting with the April letting. The SS will be incorporated into the October 2016 General Supplemental Specifications.

Specification Section Recommended Text: See attached Supplemental Specifications for Flexible Pavement.

Comments: The SS will be incorporated into the October 2016 GS.

Member's Requested Change:

New Supplemental Specification (SS-15XXX), involving a general rewrite of Section 2303.

(See attached file).

Reason for Revision: Changes are recommendations of the SimSpec (HMA Specification Simplification) Committee, comprised of HMA Industry and Iowa DOT members. The goal of SimSpec was to simplify the HMA specifications, by eliminating duplication and conflicts, and through better organization of specification language.

New Bid Item Required (X one)	**Yes**	**No X**
Bid Item Modification Required (X one)	**Yes**	**No X**
Bid Item Obsoletion Required (X one)	**Yes**	**No X**

Comments: HMA industry representatives, as members of the SimSpec Committee, have been directly involved in discussions involving these specification changes. Industry expressed agreement with proposed specification changes, when discussed at the APAI Specification Committee meeting held January 21, 2016 and Strategic Asphalt Committee meeting held January 22, 2016.

County or City Comments: None

Industry Comments: None

SS-15005
(New)

SUPPLEMENTAL SPECIFICATIONS
FOR
FLEXIBLE PAVEMENT

Effective Date
April 19, 2016

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SUPPLEMENTAL SPECIFICATIONS AND THEY PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

Replace all of Section 2303 with the following:

2303.01 DESCRIPTION.

A. Design, produce, place, and compact flexible paving mixtures using proper quality control. Construct to the dimensions specified in the contract documents.

B. A surface course is the top lift. An intermediate course is the next lower lift or lifts. 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.

2303.02 MATERIALS.

A. Asphalt Binder.
Use the specified Performance Graded (PG) asphalt binder meeting the requirements of Section 4137. For shoulder mixtures refer to Section 2122. For base widening mixtures refer to Section 2213. Adjustments to the contract binder grade may be required according to Article 2303.02, C, 6.

B. Aggregates.

1. Individual Aggregates.
a. Use virgin mineral aggregate as specified in Section 4127.
b. When specified, furnish friction aggregate from sources identified in Materials I.M. T203.
1) Friction Classification L-2.
Use a combined aggregate such that:
a) At least 80% of the combined aggregate retained on the No. 4 sieve is Type 4 or better friction aggregate, and
b) At least 25% of the combined aggregate retained on the No. 4 sieve is Type 2 or better friction aggregate, and
c) 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.
d) On Interstates and all mixtures designed for 30,000,000 ESALS and higher, if

40% or more of the total aggregate is a limestone as defined in Materials I.M. T203, at least 30% of the combined aggregate retained on the No. 4 sieve is Type 2 or better friction aggregate

2) Friction Classification L-3.
Use a combined aggregate such that:
- **a)** At least 80% of the combined aggregate retained on the No. 4 sieve is Type 4 or better friction aggregate, and
- **b)** At least 45% of the combined aggregate retained on the No. 4 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 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 sieve is Type 4 or better friction aggregate.

2. Combined Aggregates.
- **a.** Use a combined aggregate meeting the requirements in Materials I.M. 510.
- **b.** When mixtures include RAM, use a combined aggregate gradation consisting of a mixture of RAM aggregate and virgin aggregate.

C. Recycled Asphalt Materials.

1. RAM includes RAP and RAS. The designations Classified and Unclassified are exclusively for the use of RAP in HMA.

2. Identify each RAP stockpile and document Classified and Unclassified RAP stockpiles as directed in Materials I.M. 505. Do not add material to a Classified 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 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.

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. 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. RAP may be used in accordance with Materials I.M. 510 Appendix C. For surface mixtures, 70% of the total asphalt binder shall be virgin.

a. Classified RAP.

1) Classified RAP is one of the following
- RAP from a documented source.
- RAP from an undocumented source meeting quality control sampling, testing, and reporting requirements in Materials I.M. 505. Material shall be tested at a lab designated by the Engineer according to Iowa Test Method 222 at no additional cost to the Contracting Authority.

2) Classified RAP may be used in mixtures for which the RAP aggregate meets the quality requirements for the mixture design per Materials I.M. 510 Appendix A.
3) When from a documented source, credit will be given for frictional aggregate and crushed particles used in the original pavement to be reclaimed as determined in the paving history (or mix design when paving history is unavailable).
4) For all other Classified RAP, credit for crushed particles shall be the percent of aggregate retained on the No. 8 sieve from Engineer's extraction test. No friction credit will be given.

b. Unclassified RAP.

1) Any stockpiled RAP not meeting the requirements of Classified RAP shall be designated as Unclassified RAP. 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.

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 Iowa DOT source approval will not be certified.

D. Flexible Paving Mixture.

1. The JMF is the percentage of each material, including the asphalt binder, to be used in the asphalt mixture. Ensure the JMF gradation is within the control points specified for the particular mixture designated.

2. The basic asphalt binder content is the historical, nominal mixture asphalt binder content, expressed as percent by weight (mass) of the asphalt binder in the total mixture. Apply the values in Table 2303.03-1, based on mixture size and type.

3. If the asphalt binder demand for the combination of aggregates submitted for an acceptable mix design exceeds the basic asphalt binder content (see Table 2303.02-1) by more than 0.75%, include an economic evaluation with the mix design. 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 2303.02-1: Basic Asphalt Binder Content (%)

Size	Aggregate Type	1 inch	3/4 inch	1/2 inch	3/8 inch
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 mixtures

substitutions meeting guidelines in Materials I.M. 511. When a commercial mix is specified, use a 1/2 inch 300K surface mixture or higher for JMF approval.

5. For shoulders placed as a separate operation refer to Section 2122. When paving the shoulder with the mainline the Contractor has the option to substitute the mainline intermediate or surface mixture for a specified shoulder mixture at the Contractor's expense.

6. For base widening refer to Section 2213. When an adjoining surface is designed for 300,000 ESALs or less and is paved during the same project, use a base mixture at same ESAL level used in surface mixture.

7. WMA refers to asphalt concrete mixtures produced at temperatures approximately 50°F or more below those typically used in production of HMA but no higher than that shown in Article 2303.03, C, 3, d, 2, a. Temperature reductions may be achieved through additives or water injection systems.

8. Submit a mixture design complying with Materials I.M. 510. Propose both a production and a compaction temperature between 215ºF and 280ºF for WMA mixture designs.

9. 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.

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. An equivalent trackless product approved on AASHTO's Product Evaluation Listing (APEL) may be used when ambient temperatures are at least 55ºF.

2. Anti-strip Agent.

a. Perform a moisture sensitivity evaluation of the proposed asphalt mixture design in accordance with Materials I.M. 319 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.

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 Appendix F and Materials I.M. 319 for bid item plan quantities of more than 1000 tons as follows:

1) For mixtures satisfying Article 2303.02, E, 2, a.

2) For conditions satisfied in Article 2303.02, E, 2, f.

c. Moisture susceptibility testing will not be required for base repair, patching, temporary pavement, or paved shoulders. Moisture susceptibility testing for mixture bid items of 1000 tons 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, 2]	
	< 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 Materials I.M 319 is less than 2.00, the SIP is invalid.
Note 2: Minimum SIP for mixtures placed as base widening is 5000 passes.

When notified of non-compliant results, the Engineer may suspend paving operations until an approved "significant mix change" is implemented.

e. When the Contractor's mix design SIP results are below 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 SIP is achieved.

f. The Engineer may require an evaluation of the test method in Materials I.M. 319 for plant produced mixture at any time.

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. Hydrated lime will not be considered part of the aggregate when determining the job mix formula.

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 additive rate that produces the maximum SIP value.

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 that produces the maximum SIP value. See Materials I.M. 319 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. WMA Technologies.
Chemical additives, organic additives, zeolites, or water injection systems 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. The Contractor is responsible for all aspects of the project.

2. Provide quality control management and testing, and maintain the quality characteristics specified.

a. Apply Article 2303.03, D to asphalt mixture bid items when the plan quantity is greater than 1000 tons.
b. Apply Article 2303.03, E, for asphalt mixture bid items that have a plan quantity of 1000 tons or less as well as patching, detours, and temporary pavement bid items. For items bid in square yards, apply Article 2303.03, E when the plan quantity by weight (estimated with a unit weight of 145 pounds per cubic foot unless otherwise stated on the plans) does not exceed 1000 tons.

B. Equipment.
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. 514.
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. 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.

2) Place a tack coat to form a continuous, uniform film on the area to be covered. Tack coat may be diluted with water at a 1:1 ratio 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
- Milled HMA Surface: 0.05 to 0.07 gallon per square yard
- PCC/Existing HMA Surface: 0.04 to 0.06 gallon per square yard

3) 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. 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.

4) 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 days' work.

5) Allow tack coat to adequately cure prior to placement of HMA. 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 for excessive application rates, breakdowns, and short sections remaining at the end of a day's run.

3. Handling, Production, and Delivery.

Ensure plant operation complies with the following requirements:

a. Handling Mineral Aggregate and RAM.

Apply Materials I.M. 505 and Materials I.M. 508.

b. Handling Asphalt Binder.

Maintain asphalt binder temperature between 260°F and 330°F. Heat modified asphalt binder according to the supplier's recommendations.

c. Handling Anti-strip Agents.

1) Hydrated Lime.

a) Added to a Drum Mixer.

(1) Add hydrated lime at the rate of 0.75% by weight of the total aggregate (virgin and RAM) 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) 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 of the total aggregate (virgin and RAM) 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 optimization of the SIP as determined by Materials I.M. 319. 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 Contactor 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 asphalt coating and mixture.

2) Do not allow the temperature of the mixtures to fall outside the following parameters:

a) Keep the production temperature of WMA mixtures between 215ºF and 280ºF until placed on the grade. Maximum production temperature for WMA is 330ºF after October 1st.

b) Do not produce WMA mixtures more than 10ºF below the target temperature designated in the JMF without the approval of the Engineer.

c) Keep the production temperature of HMA mixtures between 225ºF and 330ºF until placed on the grade. Do not discharge HMA into the hopper when its temperature is less than:

(1) 245ºF for a nominal layer thickness of 1 1/2 inches or less, or

(2) 225ºF for a nominal layer thickness of more than 1 1/2 inches.

d) Flexible paving mixtures not meeting these requirements will be rejected.

e) Production temperature limits apply starting at point of discharge from mixer.

3) Minimize segregation to the extent that it cannot be visibly observed in the compacted surface.

4) Apply only approved release agents to trucks and equipment, as specified in Article 2001.01.

5) Except for an unavoidable delay or breakdown, provide continuous and uniform delivery of hot HMA to any individual spreading unit.

4. Placement.

a. Clean each lift according to Article 2212.03, B, 1. If necessary, re-tack.

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	Road Surface Temperature, ºF
1 1/2	40
2 – 3	35
Over 3	35

Table 2303.03-2: Surface Course Lifts of Asphalt Mixtures

Nominal Thickness - inches	Road Surface Temperature, ºF
1	HMA: 50 / WMA: 40

1 1/2	HMA: 45 / WMA: 40
2 and greater	40

d. The Engineer may further limit placement if, in the Engineer's judgment, other conditions are detrimental to quality work.
e. Maintain a straight paving edge alignment. Correct edge alignment irregularities immediately.
f. 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	Minimum Lift Thickness - inches
3/8	1
1/2	1 1/2
3/4	2
1	3

g. Complete each layer to full width before placing succeeding layers.
h. 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.
i. After spreading, carefully smooth to remove all segregated aggregate and marks.
j. 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.
k. At the close of each working day, clear all construction equipment from the roadbed.
l. Prior to opening a lane to traffic, place fillets, safety edge, 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.
3) The quality characteristic is in-place air void content and will be based on the theoretical maximum specific gravity (G_{mm}) for that day's mixture.

b. Class I Compaction.

1) Applications.
Use Class I compaction for all courses for the traffic lanes, ramps, and loops on all roadways.

2) Test Strip Construction for Class I Compaction.

a) For the purpose of evaluating properties of the asphalt 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 other mixtures may be constructed, but are not required.
b) Test strips are not required when the entire production of the mixture bid item is placed in a single day.

c) The quantity of mixture subject to the test strip production, will be pre-established with the Engineer and limited to a half day's production

d) 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.

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 test strip production control that meets the requirements of Article 2303.03, D, 3, b. The test strip will be an independent lot. Determine sublots in accordance with Table 2303.03-5.

c. Class II Compaction.

Intended for paved shoulders, temporary crossovers, onsite detours, base widening in a non-travel lane and other situations where Class I is not specified.

1) Establish a rolling pattern to verify adequate density.

2) At the Engineer's option, cores or gauge readings at the frequency designated in Materials I.M. 204 Appendix F for the first day of placement will be used. The Engineer may modify the sample size and frequency provided compaction is thorough and effective.

3) The Engineer will accept the rolling pattern based on the average test results. When the average field voids is less than or equal to 8.0%, the pattern is considered thorough and effective.

4) When the average field voids exceeds 8.0%, modify the rolling pattern. The Engineer may require additional testing until thorough and effective compaction is achieved.

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 within 3 inches of the existing longitudinal joint. Construct longitudinal joints to secure complete joint closure and avoid bridging of the roller. When the joint is completed, the hot side shall be no more than 1/4 inch higher than the cold side.

b. Saw transverse construction joint to a straight line at right angles to the center line to provide a full thickness vertical edge before continuing paving.

c. Place temporary runouts according to road standards. Remove temporary runouts before commencing paving. Runout removal is incidental to the HMA mixture.

7. Miscellaneous Operations.

a. Leveling and Strengthening Courses.

1) Use the same mixture specified for the base or intermediate course.

2) Compact leveling courses and intermediate mixtures placed as leveling/scratch courses (less than or equal to 1 inch plan thickness) using pneumatic and vibratory rollers.

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.

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) Use Class II compaction.

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) Unless otherwise approved, 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.

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, remove loose material, and tack the surface adjacent to the pavement. 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 or wider may be placed as a separate operation. Pave fillets which are 8 feet 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) Same rolling pattern established for adjoining mainline or ramp driving lane, as determined by density coring.

2) Shoulder area will not be included in 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.

1. General.

Except for small quantities as defined in Article 2303.03, A, 2, 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 HMA Level II.
d. An approved JMF will be required prior to beginning plant production.

3. Plant Production.

a. General.

1) 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. Production Control.

1) After the JMF is established, the combined aggregate gradation furnished for the project, asphalt binder content, asphalt film thickness, and laboratory air voids should consistently comply with the JMF target values and design criteria in Materials I.M. 510 Appendix A. Control them within the production tolerances given in Table 2303.03-4.

Table 2303.03-4: Production Tolerances

Measured Characteristic	Target Value (%)	Specification Tolerance (%) [a]
Cold feed gradation No. 4 and larger sieves	by JMF	± 7.0
Cold feed gradation No. 8	by JMF	± 5.0
Cold feed gradation No. 30	by JMF	± 4.0
Cold feed gradation No. 200	by JMF	± 2.0
Field laboratory air voids absolute deviation from target [b]	0.0	≤ 1.0
Daily asphalt binder content	by JMF	± 0.3

(a) Based on single test unless noted otherwise.
(b) When lab voids acceptance is not based on PWL.

2) The gyratory mix design gradation control points for the size mixture designated in the project plans will not apply to plant production control.

3) 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) The Contractor's adjustment recommendations prevail provided all specifications and established mix criteria are being met for plant production.

4) Calculate estimated film thickness every day of production according to Materials I.M. 501. Compliance is based on limits in Materials I.M. 510 Appendix A.

5) Calculate absolute deviation from target lab voids according to Materials I.M. 501. 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.

6) 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. The moving AAD may restart only in the event of a mandatory plant shutdown for failure to maintain the average within the production tolerance.

7) After the second occurrence of the moving AAD falling outside the specification tolerance limit, the Engineer may declare the lot or portions of the lot defective.

4. Sampling and Testing.

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 involved in sampling and testing on both verification and quality control shall be Iowa DOT certified for the duties performed per Materials I.M. 213.

3) Provide easy and safe access for Iowa DOT staff to the location in the plant where samples are taken.

4) 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.

5) Identify, store, and retain all quality control samples and field lab gyratory specimens used for acceptance until the lot is accepted.

6) Obtain verification samples at random times as directed and witnessed by the Engineer according to Materials I.M. 204 Appendix F. Secure all verification samples according to Materials I.M. 205 Appendix A. Store verification samples for the Contracting Authority until delivery to the Contracting Authority's lab.

7) Deliver the Plant Report to the Engineer and the designated district materials laboratory daily. At project completion, provide the Engineer a copy of the reports, charts, and other electronic file(s) containing project information generated during the progress of the work.

b. Asphalt Binder.

Sample and test asphalt binder to verify the quality of the binder grade. Do not sample when daily production is less than 100 tons of mixture.

c. Tack Material.

Sample and test asphalt emulsions to verify residual asphalt content.

d. Aggregate Gradation.

1) Use cold feed or ignition oven gradation for aggregate gradation control to assure materials are being proportioned according to the specifications.

2) Take a minimum of one aggregate gradation for each day's production that exceeds 100 tons of mixture. When more than one sample in a day's production is tested, use the average gradation to determine compliance of the daily lot.

3) Engineer will verify Contractor gradation with an ignition oven or a split cold feed sample. For ignition oven validation, split a cold feed sample with the Engineer to determine the need for a correction factor according to Materials I.M. 511. The Engineer may require additional cold feed split samples.

e. Uncompacted Asphalt Mixture.

1) Sample the loose mixture according to Materials I.M. 322.

2) Modify sampling location to include placement with mix stored from a previous day's production.

3) The number of daily samples is defined in Table 2303.03-5 based on the day's estimated production. See Materials I.M. 511 for determining sample locations.

Table 2303.03-5: Uncompacted Mixture Sampling

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

4) Do not take samples from the first 100 tons of mix produced each day or the first 100 tons of mix following a significant mix change. When paving operations are staged so each day of placement is less than 100 tons 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.

5) Split samples for specimen preparation according to Materials I.M. 357.

6) 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.

7) Test the quality control sample of each production paired sample as follows:

a) Prepare and compact two gyratory specimens according to Materials I.M. 325G.

b) Determine the bulk specific gravity of compacted mixture (G_{mb}) at N_{design} for each specimen according to Materials I.M. 321. Average the results.

c) Determine the Theoretical Maximum Specific Gravity (G_{mm}) of the uncompacted mixture according to Materials I.M. 350.

d) Determine laboratory air voids for each sample according to Materials I.M. 501.Use the target laboratory voids listed in Materials I.M. 510 Appendix A unless otherwise specified in the contract documents.

f. Compacted Pavement Cores.

1) 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 in each sublot. Determine a new random location for the sublot 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.

2) Take samples from the compacted mixture and test no later than the next working day following placement and compaction.

3) Restore the surfaces the same day. Dry, fill with the same material, and properly compact core holes.

4) Pavement core samples will be identified, taken possession of by the Engineer, and delivered to the Contractor's quality control field laboratory.

5) 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.

6) Prepare and test the cores according to Materials I.M. 320, 321, and 337.

7) 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.

8) The compacted HMA pavement will be tested in a timely manner by the Engineer's personnel. 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. Verification and Independent Assurance Testing.

a. 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.

b. 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.

c. 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.

d. Personnel and laboratory equipment performing tests used in the acceptance of material are required to have participated in the statewide Independent Assurance Program according to Materials I.M. 207.

6. Acceptance of Asphalt Mixtures.

a. Lab Voids.

1) Use the following methods of acceptance for laboratory voids:

a) For base widening, ramps and loops, 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 2303.03-4. During a day's production, if more than 100 tons of the bid item is placed in an area not listed above, apply Article 2303.03, D, 6, b, for entire production of bid item.

b) Determine PWL for each lot as defined in Materials I.M. 501. The PWL limits shall be +/- 1.0% from the target air voids. Each mixture bid item will constitute a lot. Lot size is defined as follows:

(1) No less than eight and no more than 15 sequential tests will constitute a lot (exceptions stated below).

(2) After the eighth test, all subsequent samples collected will also be included in the lot up to a maximum of 15.

(3) Once a lot has been established with at least eight tests, a new lot will begin the day following the fifteenth sample. Lots shall not contain partial days. When the fifteenth sample is reached, include all samples taken that day in the lot.

(4) If the bid item's production has ended and fewer than eight 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 fifteenth sample, include all samples for that day. Do not combine partial day's results.

(5) If samples cannot be combined with the previous lot due to maximum lot size restrictions or if fewer than eight 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.

(6) Test strips will be considered a separate lot.

(7) When the same mix type is produced for multiple bid items in one day from a single plant and the production going to each item exceeds 500 tons, assign all box samples to each bid item's existing lot for lab voids. In addition, assign the quantity of each bid item produced to its respective lot.

(8) When the same mix type is placed in both PWL and AAD areas in a single day on a single project, 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.

2) Determine the pay factor using the AAD procedure described in Materials I.M. 501 for mix in a PWL lot which is produced at 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
- Asphalt mixture produced and placed on shoulders.

To be considered irregular, the production rate for mixture bid items described above is not to exceed 1000 tons in a single day.

b. Field Voids.

1) Class I.

a) 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.

b) 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 excluding areas deducted from the field voids lot,
- When the day's operation is not more than 500 tons excluding quantities deducted from the field voids lot,
- When the mixture is being placed in irregular areas, or
- When placing strengthening courses.

c) 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 from the unconfined edge of a given pass of the placing equipment, from run-outs, or from day's work joints or structures.

d) Use the following methods of acceptance for field voids:

(1) For mixture bid items placed in the following areas:

- Base widening placed in a travel lane,
- 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, and
- Irregular areas identified by the Engineer that may include areas not suitable for continuous paving,

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 8.0% 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 Article 2303.05, A, 3, b, 3, to areas where thorough and effective compaction is not achieved.

(2) For all other areas of Class I compaction, determine PWL as defined in Materials I.M. 501. The PWL limits shall be between 91.5% of G_{mm} (8.5% voids) and 98.5% of G_{mm} (3.5% voids). 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.

e) 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.

2) For Class II apply Article 2303.03, C, 5, c.

c. Asphalt Film Thickness.

A lot is considered one day's production of one mixture. When film thickness falls outside the limits in Materials I.M. 510 Appendix A, see Article 2303.05, A, 3, c, for payment adjustment.

d. Thickness.

1) The Engineer will measure cores, exclusive of thin surface treatments, according to Materials I.M. 337. Sampling frequency and lot definitions are as follows:

a) Class I Compaction.

The Engineer will obtain and test samples for each lot according to Materials I.M. 204 Appendix F. Density cores sampled as part of a field voids lot will be combined into daily lots based on cores' intended 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. When measuring density of top lift from a full depth core, measure thickness before trimming core for density testing.

b) Class II Compaction.

The Engineer will obtain and test samples full depth once the final lift is placed. The lot shall be defined as the length of a day's production of the final lift. Take a minimum eight cores from each lot. The Engineer may approve classifying multiple days of construction as a lot.

2) 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 an alternate method is deployed by the Engineer
b) When the day's operation is 2500 square yards or less.
c) When the mixture is being placed in irregular areas.
d) When the mixture is being placed next to structures.

3) When the quality index falls below 0.00, the Engineer may declare the lot or parts of the lot defective. If the final lift has not been placed, the Engineer may approve additional thickness to be placed on succeeding lifts to ensure a final grade as intended. The unit price of the defective lot will be used for payment of the additional material.

e. 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 or greater or 5000 square yards 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, the Engineer may check the riding surface for defects using one of the following criteria:

- The surface shall not deviate from a straight line by more than 1/8 inch in 10 feet when measured longitudinally with a 10 foot straightedge.
- The surface shall not contain any bump or dip exceeding 1/2 inch over a 25 foot length when measured with a method in Materials I.M. 341.

The Engineer may either require the defects be corrected according to Article 2316.03, B, 2, or apply a price adjustment.

E. Quality Control for Small HMA Paving Quantities.

1. General.

For small quantities, a lot will be the entire quantity of each HMA mixture bid item.

2. Mix Design.

Prepare the JMF. Prior to 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 the optimum dosage is greater than 0%.
b. Use Materials I.M. 319 to optimize the design dosage rate.
c. When prior-approved designs have demonstrated acceptable field SIP values, the anti-stripping agent and dosage from the JMF may be used in lieu of optimization testing.

3. Plant Production.

a. Ensure 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 delivery tickets identify the JMF.
c. Monitor the quality control test results and make adjustments to keep the mixture near the target JMF values.

4. Sampling and Testing.

a. Field Voids.

1) Take compacted mixture G_{mb} measurements, except when Class II compaction is specified, no later than the next working day following placement and compaction.
2) 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.
3) PWL for field voids will not apply to small quantities.

b. Lab Voids.

Material sampling and testing is for production quality control. Acceptance of mixture is based on Contractor certification. Sampling and testing of uncompacted mixture is only required for mechanically placed mixture. Sample and test a minimum of one uncompacted mixture sample 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 of production. No split samples for agency verification testing are required.

c. Binder.

No binder sampling or testing is required.

d. Moisture Sensitivity.

Moisture susceptibility testing on plant produced mixture is not required.

e. Gradation.

Perform a minimum of one aggregate gradation.

5. Certification.

a. When the production tolerances in Table 2303.03-4 are not met, payment may be adjusted according to Article 1105.04.
b. When the production tolerances are met, 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 Plant Report.

> "The 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."

c. The Daily Plant Report may be submitted at the end of the project for all certified 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.

2. Measurement by Weight.
- **a.** The quantity of the type specified, expressed in tons, will be determined from the weight of individual loads, including fillets, measured to the nearest 0.01 tons.
- **b.** Loads may be weighed in trucks, weigh hoppers, or from the weight from batch plants computed by count of batches in each truck and batch weight. Article 2001.07 applies. Segregate the weights 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, will be shown in the contract documents to the nearest 0.1 square yard. 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, 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 by 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 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, b.

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. 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 of HMA mixture with anti-strip agent added.

E. Tack Coat.
Will not be measured separately.

F. Hot Mix Asphalt Pavement Samples.
Will not be individually counted for payment if furnished according to Article 2303.03, D, 4, or required elsewhere in the contract documents,

G. 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. Flexible Paving Mixture.

1. Payment will be the contract unit price for Asphalt Mixture of the type specified per ton or square yard.

2. Payment for test strips will be the contract unit price for the test strip mixture bid item per ton regardless of lift placement.

3. Payment will be adjusted by the following Pay Factor for field voids, laboratory voids, and film thickness determined for the lot.

Multiply the unit price for the HMA bid item by the Pay Factor rounded to three 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 maximum

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

2) Payment when PWL lots are incomplete:

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 maximum

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.

c. Film Thickness.

When film thickness is outside the limits in Materials I.M. 510 Appendix A, apply the following pay factor

Placement	Pay Factor

	(Low Film)	(High Film)
Base/Shoulders	0.85*(LL - FT)	0.85*(FT-UL)
Intermediate	0.80*(LL - FT)	0.80*(FT-UL)
Surface	0.75*(LL - FT)	0.75*(FT-UL)

Where
LL = Lower Limit (Materials I.M. 510 Appendix A)
UL = Upper Limit (Materials I.M. 510 Appendix A)

1. When basis of payment is by area, multiply the pay factor by 0.5.
2. For FT < 7.0 or FT > 16.0, the Engineer may consider the lot defective. This applies to all lots (days) of production.
3. No film thickness price adjustment for the test strip (first day of production, if no test strip performed) for each job mix formula.
4. No film thickness price adjustment on temporary pavement.

d. Pavement Thickness

Payment will be further adjusted by the appropriate percentage in Table 2303.05-1 below according to the quality index for thickness determined for that lot:

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

Table 2303.05-1: Payment Adjustment for Thickness

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

4. 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.

B. Asphalt Binder.

1. Payment will be the contract unit price per ton for the number of tons of asphalt binder used in the work.

2. 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 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.

3. When the basis of payment for HMA is in square yards, compensation for asphalt binder will be included in the contract unit price per square yard.

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.

1. 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 test results from the field produced mixture meet or exceed the minimum requirement established in Article 2303.02, E, 2, d . Payment will be made at the rate of $2.00 per ton of asphalt mixture in which the anti-strip agent is incorporated.

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

E. Tack Coat.
Incidental to HMA.

G. Hot Mix Asphalt Pavement Samples.

1. Payment will be the lump sum contract price.

2. Payment is full compensation for furnishing all samples for all courses or items of work, and for delivery of samples as specified in Article 2303.03, D, 4.

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Greg Mulder / Mahbub Khoda	**Office:** Construction & Materials	**Item 2**
Submittal Date: December 18, 2015	**Proposed Effective Date:**	
Article No.: 4154 **Title:** Fence Materials	**Other:**	

Specification Committee Action: Approved with changes.

Deferred:	**Not Approved:**	**Approved Date:** 2/11/2016	**Effective Date:** 10/18/2016

Specification Committee Approved Text:

4154, Fence Materials.

Replace Section 4154:

4154.01 DESCRIPTION.

A. Materials covered by this section include woven wire farm field and deer fence fabric, chain link fabric, barbed wire, steel fence posts, wood fence posts, tie and brace wire, gates, and special fittings.

B. Use material of the size and type designated in the contract documents. ~~Use new material meeting the requirements of the following provisions.~~

C. Inspection and acceptance of fence materials will be according to Materials I.M. 454.10.

~~**D.** Ensure similar parts with different shapes or protective coatings are not intermingled within the project limits.~~

4154.02 FIELD FENCE AND DEER FENCE FABRIC.

A. Field fence shall conform to AASHTO M 279 ~~and~~ or ASTM A 116 and shall be, unless otherwise specified:

1. Type Z, Class 3.

2. Design numbers 1047-6-11 or 939-6-11 for grade 60 wire or design numbers 1047-6-12 1/2 or 939-6-12 1/2 for grade 125 wire.

3. Use galvanized (as determined by visual inspection) steel rod for splicing fence material.

B. Deer fence shall be woven wire that meets the following requirements:

1. 12.5 gauge wire according to ASTM A 116 (excluding wire spacing and fence height).

2. Wires are spaced horizontally and vertically as shown in the contract documents ~~or closer~~.

4154.03 CHAIN LINK FABRIC.

A. When chain link fence is specified in the contract documents, chain link fabric shall conform to one of the following:

1. Zinc coated fabric meeting requirements of ASTM A 392, Class 2 (2.0 ounces per square foot) or AASHTO M 181 Type I, Class D.

2. Aluminum coated fabric meeting the requirements of ASTM A 491 or AASHTO M 181, Type II.

3. PVC coated fabric meeting requirements of ASTM F 668, Class 2b or AASHTO M 181, Type IV, Class B Fused.

B. Unless otherwise specified in contract documents, use:

1. 9 gauge coated wire with a breaking strength of 1290 pounds.

2. Height of fabric of 72 inches.

3. Selvage knuckled at both the top and bottom.

4. Mesh size 2 ± 1/8 inches.

4154.04 BARBED WIRE.
Unless otherwise specified in contract documents, use barbed wire conforming to ASTM A 121 or AASHTO M 280, Design Number 12-4-5-14R, Type Z Class 3.

4154.05 BRACE WIRE, TENSION WIRE, AND TIE WIRE.

A. Tension wire shall meet requirements of AASHTO M 181 or one of the following:

1. ASTM A 824 or A 817, Type II, Class 3.

~~**2.** ASTM A 121, Type Z, Class 3 zinc coated or aluminum coated.~~

~~**3**~~ **2.** ASTM A 824 or A 817, Type I.

~~**4**~~ **3.** ASTM F 1664, PVC (Vinyl) Coated, Class 2b.

B. Brace and tie wire shall meet the requirements of ASTM F 626 zinc coated or aluminum coated.

1. Where specified, round metallic-coated tie wires, clips, and hog rings shall be polymer coated to match the color of the chain-link fabric as selected from ASTM F 934

2. The coating process and metallic-coated core wire materials shall be in accordance with ASTM F 668.

C. Unless designated otherwise, use wire sizes no smaller than the following diameters:

Table 4154.05-1: Wire Sizes

Use	Wire Size
Tension wire Brace wire Tie wires or clips for fastening field fence to steel posts	No. 7 No. 9 No. 12
Use tie wires for chain link fence no smaller than No. 9 diameter for post ties or No. 12 diameter for rail and brace ties. Equivalent steel clips or aluminum wires or clips may be used if the Engineer approves.	

4154.06 STAPLES.

A. Unless otherwise specified in the contract documents, use fence staples conforming to ASTM F 1667 - 13, Table 57: F 1667 ST FN - 06 Z.

B. Obtain Engineer's approval for the staples to be used.

4154.07 WOOD POSTS.

A. Use pine posts of the size and length designated in the contract documents that meet the requirements of Section 4164 with pressure preservative treatment meeting the requirements of Section 4161.

B. Unless specified otherwise, use round stock posts of the following sizes and lengths:

Table 4154.07-1: Post Sizes and Lengths

Use	Length, feet
Line posts, 4 inch top End, corner, gate, pull, angle, and brace posts, 6 inch top	7 8

C. If contemplating driving the line posts, the tip of the post may have a blunt point made before treatment and located near the center line of the post.

4154.08 BRACES FOR FIELD FENCE.

A. Unless otherwise specified in the contract documents, use either of the following between wood pull posts:

1. 2 3/8 inch ~~SS-40~~ ASTM F 1043 steel pipe.

2. 5 inch diameter wood posts.

B. Use diagonal trussing with a double-wrapped 9 gauge, Class 3 steel brace wire.

C. Ensure ends are flattened to fit squarely against the posts with brace approximately horizontal.

4154.09 STEEL LINE POSTS FOR FIELD FENCE AND DEER FENCE.

A. Use T-section steel posts, of the length specified, as line posts with wood posts, as shown in the contract documents. Do not use them for corner, brace, pull, end, or gate posts.

B. Only one type of steel post may be used in any installation 1000 feet or less in length.

C. Equip posts with lugs or other approved means to prevent the fence fabric from moving vertically.

D. Use nominal 1.33 pounds per foot T-section post meeting requirements of ASTM A 702 and hot dip galvanizing requirements of ASTM A 123.

E. Completely paint the finished post with a prime coat with no limitation on color or tip identification except as provided for 1000 foot installations. Ensure the paint is thoroughly dry before posts are bundled for shipment.

4154.10 STEEL POSTS, BRACES, AND RAILS FOR CHAIN LINK FENCE.

A. Steel pipe length shall be designated in the contract documents and shall conform to ~~AASHTO M 181 (ASTM)~~ one of the following requirements:

1. AASHTO M 181 Grade 1 or ~~(~~ASTM F 1083~~); minimum average zinc coating weight of 1.8 ounces per square foot~~ Schedule 40.

2. AASHTO M 181 Grade 2 or ~~(~~ASTM F 1043, Group ~~I C~~ IC~~); external zinc coating minimum of 0.9 ounces per square foot and internal zinc coating minimum 0.9 ounces per square foot~~. Group IC galvanized before forming product shall be minimum G-210 (ASTM A 653).

B. When specified, PVC thermoplastic coating shall be fused and adhered to zinc-coated posts with a minimum coating thickness of 0.010 inch conforming to ASTM F 934 & ASTM F 1043 ~~Sections 7 and 8~~.

4154.11 FITTINGS FOR CHAIN LINK FENCE.

A. Comply with the following:

1. Attach braces to posts using fittings which will hold both the post and brace rigidly.

2. Use diagonal truss rods of 3/8 inch diameter, round steel rods with an appropriate commercial means for tightening.

3. Furnish a locknut or other device to hold the tightening device in place.

4. Furnish a suitable sleeve or coupling device, recommended by the manufacturer, to connect sections of top rail and to provide for expansion and contraction.

5. Use stretcher bars no less than 3/8 inch diameter, or equivalent cross section area, with suitable clamps for attaching fabric to corner, end, or gate posts.

B. Ensure fittings also conform to AASHTO M 181 or ASTM F 626.

4154.12 GATES.

A. Field Fence and Chain Link Fence.

1. Ensure gates provide the width of opening shown in the contract documents. Install a vertical stay in gates more than 6 feet wide. Where the width of opening specified is:
16 feet or less, provide a single gate frame.
More than 16 feet, provide two gate frames using a drop bar locking device allowing operation as a double gate.

2. Ensure each gate is furnished complete with necessary hinges, latch, and other special fittings recommended for the type of gate and gate post being installed.

3. For chain link fence gates, use the pipe size shown in the contract documents or approved by the Engineer. When size is not shown in the contract documents, use:
1 1/2 inch nominal diameter pipe for gates 6 feet wide or more, and
1 1/4 inch nominal diameter pipe for gates less than 6 feet wide.

4. Use gate fabric similar to that used for the fence. Attach using stretcher bars.

5. Use adjustable rods to cross truss gates 6 feet wide or more.

6. Ensure materials are galvanized with no less than 0.8 ounce per square foot of surface. Gates for field fence may be painted with a prime coat and an enamel finish coat.

B. Deer Fence.
Furnish the following, galvanized according to Article 4154.10:

1. Tines molded in one piece of steel with no welds.

2. Structural steel tubes with wall thickness of 0.1875 inches and unit weight of 4.32 pounds per foot.

3. Support plates, hinges, and top braces.

Comments: The Office of Construction and Materials requested that "woven wire farm" in Article 4154.01, A remain in the specification after consulting with the Office of Design.

Specification Section Recommended Text:

4154, Fence Materials.

Replace Section 4154:

4154.01 DESCRIPTION.

A. Materials covered by this section include ~~woven wire farm~~ field and deer fence fabric, chain link fabric, barbed wire, steel fence posts, wood fence posts, tie and brace wire, gates, and special fittings.

B. Use material of the size and type designated in the contract documents. ~~Use new material meeting the requirements of the following provisions.~~

C. Inspection and acceptance of fence materials will be according to Materials I.M. 454.10.

~~**D.** Ensure similar parts with different shapes or protective coatings are not intermingled within the project limits.~~

4154.02 FIELD FENCE AND DEER FENCE FABRIC.

A. Field fence shall conform to AASHTO M 279 ~~and~~ or ASTM A 116 and shall be, unless otherwise specified:

1. Type Z, Class 3.

2. Design numbers 1047-6-11 or 939-6-11 for grade 60 wire or design numbers 1047-6-12 1/2 or 939-6-12 1/2 for grade 125 wire.

3. Use galvanized (as determined by visual inspection) steel rod for splicing fence material.

B. Deer fence shall be woven wire that meets the following requirements:

3. 12.5 gauge wire according to ASTM A 116 (excluding wire spacing and fence height).

4. Wires are spaced horizontally and vertically as shown in the contract documents ~~or closer~~.

4154.03 CHAIN LINK FABRIC.

B. When chain link fence is specified in the contract documents, chain link fabric shall conform to one of the following:

4. Zinc coated fabric meeting requirements of ASTM A 392, Class 2 (2.0 ounces per square foot) or AASHTO M 181 Type I, Class D.

5. Aluminum coated fabric meeting the requirements of ASTM A 491 or AASHTO M 181, Type II.

6. PVC coated fabric meeting requirements of ASTM F 668, Class 2b or AASHTO M 181, Type IV, Class B Fused.

B. Unless otherwise specified in contract documents, use:

5. 9 gauge coated wire with a breaking strength of 1290 pounds.

6. Height of fabric of 72 inches.

7. Selvage knuckled at both the top and bottom.

8. Mesh size 2 ± 1/8 inches.

4154.04 BARBED WIRE.
Unless otherwise specified in contract documents, use barbed wire conforming to ASTM A 121 or AASHTO M 280, Design Number 12-4-5-14R, Type Z Class 3.

4154.05 BRACE WIRE, TENSION WIRE, AND TIE WIRE.

A. Tension wire shall meet requirements of AASHTO M 181 or one of the following:

3. ASTM A 824 or A 817, Type II, Class 3.

~~**4.** ASTM A 121, Type Z, Class 3 zinc coated or aluminum coated.~~

~~**3**~~ **2.** ASTM A 824 or A 817, Type I.

~~**4**~~ **3.** ASTM F 1664, PVC (Vinyl) Coated, Class 2b.

B. Brace and tie wire shall meet the requirements of ASTM F 626 zinc coated or aluminum coated.

3. Where specified, round metallic-coated tie wires, clips, and hog rings shall be polymer coated to

match the color of the chain-link fabric as selected from ASTM F 934

4. The coating process and metallic-coated core wire materials shall be in accordance with ASTM F 668.

C. Unless designated otherwise, use wire sizes no smaller than the following diameters:

Table 4154.05-1: Wire Sizes

Use	Wire Size
Tension wire Brace wire Tie wires or clips for fastening field fence to steel posts	No. 7 No. 9 No. 12
Use tie wires for chain link fence no smaller than No. 9 diameter for post ties or No. 12 diameter for rail and brace ties. Equivalent steel clips or aluminum wires or clips may be used if the Engineer approves.	

4154.06 STAPLES.

C. Unless otherwise specified in the contract documents, use fence staples conforming to ASTM F 1667 - 13, Table 57: F 1667 ST FN - 06 Z.

D. Obtain Engineer's approval for the staples to be used.

4154.07 WOOD POSTS.

A. Use pine posts of the size and length designated in the contract documents that meet the requirements of Section 4164 with pressure preservative treatment meeting the requirements of Section 4161.

B. Unless specified otherwise, use round stock posts of the following sizes and lengths:

Table 4154.07-1: Post Sizes and Lengths

Use	Length, feet
Line posts, 4 inch top End, corner, gate, pull, angle, and brace posts, 6 inch top	7 8

C. If contemplating driving the line posts, the tip of the post may have a blunt point made before treatment and located near the center line of the post.

4154.08 BRACES FOR FIELD FENCE.

A. Unless otherwise specified in the contract documents, use either of the following between wood pull posts:

3. 2 3/8 inch ~~SS-40~~ ASTM F 1043 steel pipe.

4. 5 inch diameter wood posts.

B. Use diagonal trussing with a double-wrapped 9 gauge, Class 3 steel brace wire.

C. Ensure ends are flattened to fit squarely against the posts with brace approximately horizontal.

4154.09 STEEL LINE POSTS FOR FIELD FENCE AND DEER FENCE.

A. Use T-section steel posts, of the length specified, as line posts with wood posts, as shown in the contract documents. Do not use them for corner, brace, pull, end, or gate posts.

B. Only one type of steel post may be used in any installation 1000 feet or less in length.

C. Equip posts with lugs or other approved means to prevent the fence fabric from moving vertically.

D. Use nominal 1.33 pounds per foot T-section post meeting requirements of ASTM A 702 and hot dip galvanizing requirements of ASTM A 123.

E. Completely paint the finished post with a prime coat with no limitation on color or tip identification except as provided for 1000 foot installations. Ensure the paint is thoroughly dry before posts are bundled for shipment.

4154.10 STEEL POSTS, BRACES, AND RAILS FOR CHAIN LINK FENCE.

A. Steel pipe length shall be designated in the contract documents and shall conform to ~~AASHTO M 181 (ASTM)~~ one of the following requirements:

3. AASHTO M 181 Grade 1 or ~~(~~ASTM F 1083~~); minimum average zinc coating weight of 1.8 ounces per square foot~~ Schedule 40.

4. AASHTO M 181 Grade 2 or ~~(~~ASTM F 1043, Group ~~I C~~ IC~~); external zinc coating minimum of 0.9 ounces per square foot and internal zinc coating minimum 0.9 ounces per square foot~~. Group IC galvanized before forming product shall be minimum G-210 (ASTM A 653).

B. When specified, PVC thermoplastic coating shall be fused and adhered to zinc-coated posts with a minimum coating thickness of 0.010 inch conforming to ASTM F 934 & ASTM F 1043 ~~Sections 7 and 8~~.

4154.11 FITTINGS FOR CHAIN LINK FENCE.

A. Comply with the following:

1. Attach braces to posts using fittings which will hold both the post and brace rigidly.

2. Use diagonal truss rods of 3/8 inch diameter, round steel rods with an appropriate commercial means for tightening.

3. Furnish a locknut or other device to hold the tightening device in place.

4. Furnish a suitable sleeve or coupling device, recommended by the manufacturer, to connect sections of top rail and to provide for expansion and contraction.

5. Use stretcher bars no less than 3/8 inch diameter, or equivalent cross section area, with suitable clamps for attaching fabric to corner, end, or gate posts.

B. Ensure fittings also conform to AASHTO M 181 or ASTM F 626.

4154.12 GATES.

A. Field Fence and Chain Link Fence.

1. Ensure gates provide the width of opening shown in the contract documents. Install a vertical stay in gates more than 6 feet wide. Where the width of opening specified is:
16 feet or less, provide a single gate frame.
More than 16 feet, provide two gate frames using a drop bar locking device allowing operation as a double gate.

2. Ensure each gate is furnished complete with necessary hinges, latch, and other special fittings recommended for the type of gate and gate post being installed.

3. For chain link fence gates, use the pipe size shown in the contract documents or approved by the Engineer. When size is not shown in the contract documents, use:
1 1/2 inch nominal diameter pipe for gates 6 feet wide or more, and
1 1/4 inch nominal diameter pipe for gates less than 6 feet wide.

4. Use gate fabric similar to that used for the fence. Attach using stretcher bars.

5. Use adjustable rods to cross truss gates 6 feet wide or more.

6. Ensure materials are galvanized with no less than 0.8 ounce per square foot of surface. Gates for field fence may be painted with a prime coat and an enamel finish coat.

B. Deer Fence.
Furnish the following, galvanized according to Article 4154.10:

1. Tines molded in one piece of steel with no welds.

2. Structural steel tubes with wall thickness of 0.1875 inches and unit weight of 4.32 pounds per foot.

3. Support plates, hinges, and top braces.

Comments:

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

4154.01 DESCRIPTION.

A. Materials covered by this section include ~~woven wire farm~~ field and deer fence fabric, chain link fabric, barbed wire, steel fence posts, wood fence posts, tie and brace wire, gates, and special fittings.

B. Use material of the size and type designated in the contract documents. ~~Use new material meeting the requirements of the following provisions.~~

C. Inspection and acceptance of fence materials will be according to Materials I.M. 454.10.

~~**D. Ensure similar parts with different shapes or protective coatings are not intermingled within the project limits.**~~

4154.02 FIELD FENCE AND DEER FENCE FABRIC

A. Field fence shall conform to AASHTO M 279 ~~and~~ or ASTM A 116 and shall be, unless otherwise specified:

1. Type Z, Class 3.

2. Design numbers 1047-6-11 or 939-6-11 for grade 60 wire or design numbers 1047-6-12 1/2 or 939-6-12 1/2 for grade 125 wire.

3. Use galvanized (as determined by visual inspection) steel rod for splicing fence material.

B. Deer fence shall be woven wire that meets the following requirements:

1. 12.5 gauge wire according to ASTM A 116 (excluding wire spacing and fence height).

2. Wires are spaced horizontally and vertically as shown in the contract documents ~~or closer~~.

4154.04 BARBED WIRE.
Unless otherwise specified in contract documents, use barbed wire conforming to ASTM A 121 or AASHTO M 280, Design Number 12-4-5-14R, Type Z Class 3.

4154.05 BRACE WIRE, TENSION WIRE, AND TIE WIRE.

A. Tension wire shall meet requirements of AASHTO M 181 or one of the following:

1. ASTM A 824 or A 817, Type II, Class 3.

~~**2.** ASTM A 121, Type Z, Class 3 zinc coated or aluminum coated.~~

2 ~~**3.**~~ ASTM A 824 or A 817, Type I.

3 4. ASTM F 1664, PVC (Vinyl) Coated, Class 2b.

B. Brace and tie wire shall meet the requirements of ASTM F 626 zinc coated or aluminum coated.

1. Where specified, round metallic-coated tie wires, clips, and hog rings shall be polymer coated to match the color of the chain-link fabric as selected from ASTM F 934

2. The coating process and metallic-coated core wire materials shall be in accordance with ASTM F 668.

C. Unless designated otherwise, use wire sizes no smaller than the following diameters:

Table 4154.05-1: Wire Sizes

Use	Wire Size
Tension wire Brace wire Tie wires or clips for fastening field fence to steel posts	No. 7 (4.49 mm) No. 9 (3.76 mm) No. 12 (2.68 mm)
Use tie wires for chain link fence no smaller than No. 9 (3.76 mm) diameter for post ties or No. 12 (2.68 mm) diameter for rail and brace ties. Equivalent steel clips or aluminum wires or clips may be used if the Engineer approves.	

4154.08 BRACES FOR FIELD FENCE.

A. Unless otherwise specified in the contract documents, use either of the following between wood pull posts:

1. 2 3/8 inch (60.3 mm) ~~SS 40~~ ASTM F 1043 steel pipe.

2. 5 inch (127 mm) diameter wood posts.

B. Use diagonal trussing with a double-wrapped 9 gauge, Class 3 steel brace wire.

C. Ensure ends are flattened to fit squarely against the posts with brace approximately horizontal.

4154.10 STEEL POSTS, BRACES, AND RAILS FOR CHAIN LINK FENCE.

A. Steel pipe length shall be designated in the contract documents and shall conform to ~~AASHTO M 181 (ASTM)~~ one of the following requirements:

1. AASHTO M 181 Grade 1 or ~~(~~ASTM F 1083~~); minimum average zinc coating weight of 1.8 ounces per square foot (549 g/m2)~~ Schedule 40.

2. AASHTO M 181 Grade 2 or ~~(~~ASTM F 1043, Group IC ~~I C); external zinc coating minimum of 0.9 ounces per square foot (275 g/m2) and internal zinc coating minimum 0.9 ounces per square foot (275 g/m2)~~. Group IC galvanized before forming product shall be minimum G-210 (ASTM A 653).

B. When specified, PVC thermoplastic coating shall be fused and adhered to zinc-coated posts with a minimum coating thickness of 0.010 inch (0.254 mm) conforming to ASTM F 934 & ASTM F 1043 ~~Sections 7 and 8~~.

4154.11 FITTINGS FOR CHAIN LINK FENCE.

A. Comply with the following:

1. Attach braces to posts using fittings which will hold both the post and brace rigidly.

2. Use diagonal truss rods of 3/8 inch (9.5 mm) diameter, round steel rods with an appropriate

commercial means for tightening.

3. Furnish a locknut or other device to hold the tightening device in place.

4. Furnish a suitable sleeve or coupling device, recommended by the manufacturer, to connect sections of top rail and to provide for expansion and contraction.

5. Use stretcher bars no less than 3/8 inch (9.5 mm) diameter, or equivalent cross section area, with suitable clamps for attaching fabric to corner, end, or gate posts.

B. Ensure fittings also conform to AASHTO M 181 or ASTM F 626.

Reason for Revision: Update current requirements, primarily to provide appropriate ASTM and AASHTO references.

New Bid Item Required (X one)	**Yes**	**No** x
Bid Item Modification Required (X one)	**Yes**	**No** x
Bid Item Obsoletion Required (X one)	**Yes**	**No** x

Comments:

County or City Comments:

Industry Comments: Industry assisted with revisions.

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Greg Mulder / Kevin Merryman	**Office:** Construction & Materials	**Item 3**
Submittal Date: December 21, 2015	**Proposed Effective Date:** April 2016	
Article No.: DS-15031 **Title:** Quality Management Concrete (QM-C)	**Other:**	

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 2/11/2016	**Effective Date:** 4/19/2016

Specification Committee Approved Text: See attached Developmental Specifications for Quality Management Concrete (QM-C).

Comments:

Specification Section Recommended Text: See attached Draft Developmental Specifications for Quality Management Concrete (QM-C).

Comments:

Member's Requested Change: **(Do not use '<u>Track Changes</u>', or '<u>Mark-Up</u>'. Use ~~Strikeout~~ and Highlight.)**
See Attached

Reason for Revision:

1. Removed coarseness workability incentive payment. This really is not an incentive as contractors have achieved the full 3% nearly all of the time. It was originally included with QM-C to help demonstrate to contractors the benefits of optimized gradations.
2. Lowered max water/cement ratio to 0.42. This is based upon recommendations from national research showing durability can be dramatically improved by keeping max w/c at or below 0.42.
3. Added QC requirement that contractor will be responsible for checking air behind paver to monitor air loss. We are finding that there is confusion over whether or not air loss through the paver should be checked and who is responsible for checking it. This is an owner responsibility on most projects, but we are making it a contractor QC responsibility for QM-C projects.
4. Added price adjustment schedule for gradations that fall in Zone I or Zone IV. This will be removed from the DS and placed in the Construction Manual in January 2017. Since we are removing the incentive/disincentive provisions from the DS, a price adjustment schedule is necessary for gradations outside of the allowable limits.

New Bid Item Required (X one)	**Yes**	**No** X
Bid Item Modification Required (X one)	**Yes**	**No** X
Bid Item Obsoletion Required (X one)	**Yes** X	**No**

Comments: The bid item for QM-C coarseness workability incentive will be deleted.

County or City Comments:

Industry Comments: This change was sent to ICPA the week of December 14. We have not received any feedback yet, but may prior to the January Spec. Committee meeting. Comments or concerns from industry may need to be addressed at the Spec. Committee meeting.

DS-15038
(Replace DS-15031)

DEVELOPMENTAL SPECIFICATIONS
FOR
QUALITY MANAGEMENT CONCRETE (QM-C)

Effective Date
April 19, 2016

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

15038.01 DESCRIPTION.

A. This specification identifies a concrete mixture design with an optimum combined aggregate gradation, and the Contractor's testing and quality control responsibilities. Optimization of the aggregates should produce concrete with low water requirement as well as improved workability and finishing characteristics. While concrete strength is important and is measured, it is not the basis for optimization of the concrete mixture design.

B. Testing and quality control apply to all Contractor produced concrete using the Concrete Design Mixture (CDM). The CDM applies to mainline slip form pavement. At the Contractor's option, the CDM may apply to any other slip form paving.

15038.02 MATERIALS.

For all materials, meet the quality requirements for the respective items in Division 41 of the Standard Specifications. Compatibility of all material combinations is the Contractor's responsibility based on acquired field experience with proposed materials.

15038.03 ~~LABORATORY~~ CONCRETE DESIGN MIXTURE.

A. An Iowa DOT PCC Level III Certified Technician is responsible for the development of the CDM. Develop a CDM based on a unit volume of 1.000 according to industry standard practice, and containing proportions of materials, including admixtures. Base the proportions upon saturated surface dry aggregates to produce a workable concrete mixture meeting the constraints of Table DS-15038.03-1:

Table DS-15038.03-1: Concrete Mixture Constraints

Nominal Maximum Coarse Aggregate Size	Greater than or equal to 1 inch
Gradation	Materials I.M. 532
Cementitious Content	Minimum, 560 pounds per cubic yard*
Fly Ash Substitution Rate	See Article 2301.02, B, 6
Water/Cementitious Ratio	Maximum, ~~0.45~~ 0.42
Air Content	6% ± 1%, Design Absolute Volume = 0.060
28 Day Flexural Strength, Third Point	Minimum, 640 pounds per square inch

*	The minimum cement content assumes the use of Type I/II cement with a specific gravity of 3.14 for an absolute volume of 0.106. If cement other than Type I/II is used, use an absolute volume of 0.106 and determine the weight of cement from the specific gravity of the cement. Cement content may need to be increased to maintain the water to cementitious ratio during hot weather conditions.

~~**B.** Use normal production gradations to determine the relative percentage of each individual aggregate used in the CDM. Select the relative percentage of each individual aggregate to produce the desired combined aggregate gradation using the following sieves: 1.5 inch, 1 inch, 0.75 inch, 0.5 inch, 0.375 inch, No. 4, No. 8, No. 16, No. 30, No. 50, No. 100, and No. 200.~~

~~**C**~~ **B.** Develop a target combined gradation in Zone II for each CDM based on normal production gradations and the relative percentages of each individual aggregate. Submit Form 955QMC to aggregate producer(s) to ensure individual gradations used are acceptable. Limit the percent passing the No. 200 sieve to no more than 1.5% for the combined aggregate gradation. When the coarse aggregate used meets the increase in percent passing the No. 200 sieve, according to Section 4109, Aggregate Gradation Table, Note 10 of the Standard Specifications, limit the percent passing the No. 200 sieve to no more than 2.0% for the combined aggregate gradation.

~~**D**~~ **C.** ~~Comply with AASHTO T 126 for laboratory development of the CDM. Mix designs may be conducted in a ready mix or central mix batch plant provided the following conditions are met:~~ Contractor may use water reducing admixture, Type A, or water reducing and retarding admixture, Type D, in the CDM.

- ~~All non-mix design materials are emptied,~~
- ~~Mix design materials are used, and~~
- ~~Batch size is at least 3 cubic yards.~~

~~**E.** An Iowa DOT PCC Level III Certified Technician is required to oversee the development of the CDM. Allow the Engineer to witness the development of the CDM. Provide notice 7 calendar days prior to this event. Perform the tests in Table DS-15038.03-2 in the development of the CDM:~~

~~**Table DS-15038.03-2: Tests for CDM**~~

~~Specific Gravity of Each Individual Aggregate~~	~~Materials I.M. 307~~
~~Gradation of Each Individual Aggregate~~	~~Materials I.M. 302~~
~~Unit Weight of Plastic Concrete~~	~~AASHTO T 121~~
~~Air Content of Plastic Concrete~~	~~Materials I.M. 318~~
~~28 Day Flexural Strength~~	~~AASHTO T 97~~
~~Temperature of Plastic Concrete~~	~~ASTM C 1064~~

15038.04 MIX DESIGN DOCUMENTATION.

~~**A.**~~ At least 7 calendar days prior to the start of paving, submit a CDM report to the District Materials Engineer for approval on Iowa DOT form. Contract extensions will not be allowed due to inadequate or additional CDMs. ~~In the CDM report include the information shown in Table DS-15038.04-1:~~

~~**Table DS-15038.04-1: Items to Include in CDM Report**~~

~~Cover Page~~	~~Contractor name~~ ~~Project number~~ ~~Date and location of CDM laboratory development~~ ~~Date Submitted~~ ~~Signature of Contractor representative~~
~~Material Source Information~~	~~Brand~~ ~~Type~~ ~~Source~~

~~Material Proportion Information~~	~~Specific gravity~~ ~~Relative percentage of each individual aggregate~~ ~~Target combined gradation % passing (Materials I.M. 531)~~ ~~Target combined gradation charts (Materials I.M. 532)~~ ~~Design batch weight (mass) (SSD)~~ ~~As mixed batch weight (mass) (SSD)~~
~~Mix Properties~~	~~Unit weight (mass) of plastic concrete~~ ~~Air content of plastic concrete~~ ~~28 day flexural strength~~ ~~Slump~~ ~~Temperature of plastic concrete~~

~~**B.** The District Materials Engineer may approve the mix design without laboratory mixture testing if the proposed mix design proportions fall within Zone II-A of Materials I.M. 532. If the mix design is approved without laboratory testing, cast a set of three beams on the first day of paving from concrete meeting the mix design criteria. Test the beams for 28 day flexural strength, third point loading. When the coarse aggregate for the mix design is quartzite, cast an additional set of three beams, and test at 90 days. Submit the strength results to the Engineer.~~

15038.05 QUALITY CONTROL.

A. General.

1. The Contractor is responsible for quality control of the concrete. An Iowa DOT PCC Level II Certified Technician is required to oversee quality control operations. The individual conducting the testing on grade is required to be an Iowa DOT PCC Level I Certified Technician. Calibrate and correlate testing equipment prior to and during paving operations.

2. At least 7 calendar days prior to the preconstruction conference, submit to the Engineer a Quality Control Plan complying with Materials I.M. 530. Include the proposed mix design(s) with the Quality Control Plan. Do not begin paving until the plan is reviewed for compliance with the contract documents. Maintain equipment and qualified personnel to direct and perform all field quality control sampling and testing necessary to:

- Determine the various properties of the concrete governed by the contract documents, and
- Maintain the properties described in this specification.

B. Quality Control Testing.

1. Perform all quality control tests necessary to control the production and construction processes applicable to this specification and as set forth in the Quality Control Plan. Take samples for quality control testing in a random manner according to the prescribed sampling rate. Perform the tests listed in Table DS-15038.05-1:

Table DS-15038.05-1: Quality Control Table

	Limits	Testing Frequency	Test Methods
Unit Weight (Mass) of Plastic Concrete	Monitor for changes, ± 3%	Twice/day	AASHTO T 121
Gradation Combined % Passing	See Paragraph 2 below	1/1500 cubic yard	Materials I.M. 216, 301, 302, 531
Aggregate Moisture Contents	See Materials I.M. 527	1/1500 cubic yard	Materials I.M. 308
Air Content Plastic Concrete In Front of Paver	See Article 2301.02, B, 4	1/350 cubic yard See below	Materials I.M. 318
Air Content Plastic Concrete In Back of Paver	May be used by Project Engineer to adjust target air in front	2/day for first 3 days and 1/week thereafter (for each paver used)	Materials I.M. 318

	of paver		
Water/Cementitious Ratio	~~0.45~~ 0.42 maximum	Twice/day	Materials I.M. 527
Vibrator Frequency	See Article 2301.03, A, 3, a, 6, a	With Electronic Vibration Monitoring: Twice/day Without Electronic Vibration Monitoring: Twice/Vibrator/Day	Materials I.M. 384

2. Maintain ~~T~~the running average of three combined aggregate gradation tests ~~is required fall~~ within the limits established by the CDM target gradation and the working ranges of Table DS-15038.05-2:

Table DS-15038.05-2: CDM Target Gradations

Sieve Size	Working Range
No. 4 or greater	± 5%
No. 8 to No. 30	± 4%
No. 50	± 3%
No. 100	± 2%
minus No. 200	See Article DS-15038.03

C. Corrective Action.

For QM-C mixes only, plot all process control test results on control charts as described in Materials I.M. 530.

1. Aggregate Tests.

Take corrective action when the running average approaches the working range limits. When a combined gradation test result for a sieve exceeds the working range limits, adjust the target and notify the Engineer. If the verification test result for the minus No. 200 exceeds the limits in Article DS-15038.03 for the combined gradation, the material represented by that test for this sieve will be considered non-complying. ~~Pay factors~~ Price adjustments will be assessed based on Coarseness/Workability Factors as described in Article DS-15038.07, E.

2. Concrete Tests.

Take corrective action when an individual test result approaches the control limits. Notify the Engineer whenever an individual test result exceeds the control limits.

D. Acceptable Field Adjustments.

1. All mix changes must be mutually agreed upon between the Contractor and Engineer. Document all mix changes on the QM-C Mix Adjustment form. Determine batch weights using a basic water cement ratio of 0.40. When the water cement ratio varies more than ±0.03 from the basic water cement ratio, adjust the mix design to unit volume of 1.000. A change in the source of materials or an addition of admixtures or additives requires a new CDM. The following are small adjustments that may be made without a new CDM being required:

- Increase cementitious content.
- Decrease fly ash substitution rate.
- Aggregate proportions may be adjusted from CDM proportions by a maximum of ± 4% for each aggregate.
- Change water reducer to water reducer retarder.
- Adjustment in water reducer or water reducer retarder admixture dosage.
- Change in source of fly ash.
- Change in source of sand, provided target gradation limits are met.

2. When circumstances arise, such as a cement plant breakdown, that create cement supply problems, a change in cement source may be allowed with the Engineer's approval. Consult the District Materials Engineer for approval of other changes to the mix design. A set of three beams for 28 day flexural strength testing may be required to document the changes.

3. Should conditions beyond the Contractor's control prevent completion of the work with the CDM, a Class C mix, or a mix based on Class C mix proportions using project materials, will be allowed, at no additional cost to the Contracting Authority. Mutual agreement between the Contractor and Engineer is required. ~~Pay Factor incentives/disincentives in Table DS-15038.07-1, will not be applied to Class C mixtures.~~

~~4. Prior to 28 days strength test results, paving with QM-C mix may begin if the Engineer approves when the mix design strength, based on the average of three beams, meets or exceeds 640 psi.~~

E. Hand Finished Pavement.
Use project materials based on Class C or Class M concrete mix proportions. With approval of the Engineer, the Contractor's CDM may be used for hand finished pavement. Quality control, as required in this specification, will not apply to hand finished pavement.

15038.06 METHOD OF MEASUREMENT.
Measurement will be as follows:

A. Standard or Slip-Form Portland Cement Concrete Pavement, QM-C.
Square yards shown in the contract documents.

B. Portland Cement Concrete Overlay, QM-C, Furnish Only.
Article 2310.04, A, of the Standard Specifications applies.

C. Portland Cement Concrete Overlay, QM-C, Placement Only.
Article 2310.04, B, of the Standard Specifications applies.

D. Hand Finished Pavement.
Square yards of Standard or Slip-Form Portland Cement Concrete Pavement, QM-C, constructed using Class C or Class M mixtures. For overlays, the Engineer will compute the number of:
- Square yards of Portland Cement Concrete Overlay, QM-C, Placement Only, constructed using Class C or Class M mixtures, and
- Cubic yards of Class C and Class M mixtures used.

15038.07 BASIS OF PAYMENT.
The cost for furnishing labor, equipment, and materials for the work required by the Contractor to design, test, and provide process control for production of QM-C shall be included in the contract unit price for QM-C bid items. Payment will be the contract unit prices as follows:

A. Standard or Slip Form Portland Cement Concrete Pavement, QM-C.

~~1.~~ Contract unit price for Standard or Slip-Form Portland Cement Concrete Pavement, QM-C, per square yard.

~~2. The contract unit price per square yard for Standard or Slip-Form Portland Cement Concrete Pavement, QM-C, constructed will be adjusted according to Table DS-15038.07-1 based upon the average coarseness and workability factors for each lot according to Materials I.M. 530.~~

~~**Table DS-15038.07-1: Pay Factor Chart**~~

~~Gradation Zone (Materials I.M. 532)~~	~~Pay Factor~~
~~II-A~~	~~1.03~~
~~II-B~~	~~1.02~~
~~II-C~~	~~1.01~~
~~II-D~~	~~1.00~~
~~IV~~	~~0.98~~
~~I~~	~~0.95~~

B. Portland Cement Concrete Overlay, QM-C, Furnish Only.
Article 2310.05, A, of the Standard Specifications applies. Average coarseness and workability factor for each lot will be determined according to Materials I.M. 530. ~~The contract unit price will be adjusted according to Table DS-15038.07-1.~~

C. Portland Cement Concrete Overlay, QM-C, Placement Only.
Article 2310.05, B, of the Standard Specifications applies. Average coarseness and workability factor for each lot will be determined according to Materials I.M. 530. ~~The contract unit price will be adjusted according to Table DS-15038.07-1.~~

D. Hand Finished Pavement.

1. Standard or Slip-Form Portland Cement Concrete Pavement, QM-C: per square yard.

2. Portland Cement Concrete Overlay, QM-C, Placement Only: per square yard.

3. Portland Cement Concrete Overlay, QM-C, Furnish Only: per cubic yard.

~~**4.** Pay Factor incentives/disincentives in Table DS-15038.07-1 will not be applied to hand finished pavement.~~

E. Price Adjustment
Failure to provide an optimized gradation within Zone II, when required, will result in the following price adjustments.

Table DS-15038.07-1: Price Adjustments

Gradation Zone (Materials I.M. 532)	Price Adjustment Per Lot
IV	2%
I	5%

Form 510130 (08-15)

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Tom Reis	**Office:** Specifications	**Item 4**
Submittal Date: January 25, 2016	**Proposed Effective Date:** April 19, 2016	
Article No.: **Title:**	**Other:** DS-15XXX, Work on Railroad Right-of-Way (Dakota, Minnesota, & Eastern Railroad)	

Specification Committee Action: Approved with changes.

Deferred:	**Not Approved:**	**Approved Date:** 2/11/2016	**Effective Date:** 4/19/2016

Specification Committee Approved Text: See attached Developmental Specifications for Work on Railroad Right-of-Way (Dakota, Minnesota, & Eastern Railroad).

Comments: The Office of Bridges and Structures asked where in the contract documents the contact information for the railroad would be located. That information will be in the DS.

The District 6 Office asked who is responsible for checking the RR insurance and enforcing it. The Office of Contracts will review the insurance submittals before signing the contract. The insurance is then submitted to the Engineer and railroad company by the Contractor. The railroad company then has the chance to review the specific endorsements that they require for compliance. The Engineer will be required to verify that the insurance remains in effect and/or has been renewed on longer projects when work is going on that is governed by the DS.

Additional information was added regarding how to find train movement information on the US DOT Crossing Inventory website. This information will be included on the other RR DS's.

Specification Section Recommended Text: See attached Draft Developmental Specifications for Work on Railroad Right-of-Way (Dakota, Minnesota, & Eastern Railroad).

The following language will also be added to DS-15027, 15028, and 15034:

> Contractor shall use the website listed below to acquire Railroad train movement information for the purpose of obtaining Railroad Protective Liability Insurance:
> http://safetydata.fra.dot.gov/officeofsafety/publicsite/crossing/xingqryxing.aspx
>
> The DOT Crossing Inventory Number will be located in the project plans.

All DS's will also be reviewed for current contact information for the railroads, which used to be included on the railroad data sheet.

Comments:

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

Reason for Revision: To provide a consistent specification when working in Dakota, Minnesota, & Eastern Railroad right-of-way for the Department and Local Systems projects.

New Bid Item Required (X one)	**Yes**	**No** X
Bid Item Modification Required (X one)	**Yes**	**No** X

Bid Item Obsoletion Required (X one)	**Yes**	**No** X
Comments:		
County or City Comments:		
Industry Comments:		

DS-15039
(New)

DEVELOPMENTAL SPECIFICATIONS
FOR
CONSTRUCTION OR MAINTENANCE WORK ON RAILROAD RIGHT-OF-WAY
(DAKOTA, MINNESOTA, & EASTERN RAILROAD CORPORATION dba CANADIAN PACIFIC)

Effective Date
April 19, 2016

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

15039.01 DESCRIPTION.
This specification applies to projects on the Interstate, Primary, Secondary, and Local Road systems involving construction or maintenance of roadways and structures on Dakota, Minnesota & Eastern Railroad Company dba Canadian Pacific ("CP") Right-of-way (ROW).

This specification describes the following:
- Requirements when work is within the ROW or properties of CP and adjacent to tracks, wire lines, and other facilities.
- Coordination with CP when work by the Contractor will be performed upon, over, or under the CP ROW, or may impact current or future CP operations.

The CP representatives will be the persons identified by the CP Public Works Manager to handle specific tasks related to the project. The attachments specify the contact information for these individuals.

Prior to advertising the project for letting, the Contracting Authority will negotiate and obtain an agreement with CP for the work on CP ROW. The Contractor will also be required to enter into a Right of Entry agreement with CP for the purpose of coordinating Contractor work and CP train activities. A copy of this agreement is attached as DS-15039, Attachment A.

Contractor shall provide physical barriers approved by CP to protect track and ballast from damage and contamination when Contractor's equipment is operating within 25 feet from nearest rail.

15039.02 REQUESTS FOR INFORMATION.
Requests for information involving work within CP ROW shall be in accordance with the procedures listed in the contract documents. Requests shall be submitted to the Engineer. Engineer will forward the request to CP as necessary.

15039.03 CONSTRUCTION AND AS-BUILT SUBMITTALS.

A. Submittals are required for construction materials and procedures as outlined below. Submittals shall include all review comments from the Engineer. Design submittals shall be stamped and signed by a Professional Engineer registered in the State of Iowa.

B. The tables below provide CP's minimum submittal requirements for the construction items noted. Submittal requirements are in addition to those specified elsewhere in the contract documents. The minimum review times indicated below represent CP's requirements only. Contractor shall allow additional time for CP's review time as stated elsewhere in the contract documents.

For this specification the following definitions shall apply:
- Overpass: when the roadway bridges over the railroad.
- Underpass: when the roadway crosses under the railroad.

C. Submittals will be made by the Engineer to CP. Items in Table DS-15039.04-1 shall be submitted for both railroad overpass and underpass projects, as applicable. Items in Table DS-15039.04-2 shall be submitted for underpass projects only.

Prior to or during construction of underpass structures, CP requires the review and approval of drawings, reports, test data, and material data sheets to determine compliance with the specifications. Product information for items noted in Table DS-15039.04-2 shall be submitted to CP through the Engineer for their review and approval. The signed submittal and the Engineer's review comments will be reviewed and approved by CP. Review of the submittals by CP will not be conducted until after review by the Engineer.

Table DS-15039.04-1: Review Sets and Miniumum Time for Review

Description	Sets Required	CP's Minimum Review Time
Shoring design and details	2	4 weeks
Falsework design and details	2	4 weeks
Drainage design provisions	2	4 weeks
Erection diagrams and sequence	2	4 weeks
Demolition diagram and sequence	2	4 weeks

Table DS-15039.04-2: Sets Required

Description	Sets Required	Notes
Shop drawings	4	Steel and Concrete members
Bearings	4	For entire structures
Concrete Mix Designs	4	For entire structures
Rebar & Strand certifications	4	For superstructure only
28 day concrete strength	4	For superstructure only
Waterproofing material certifications and installation procedure	4	Waterproofing & protective boards
Structural steel certifications	4	All fracture critical members & other members requiring improved notch toughness
Fabrication and Test reports	4	All fracture critical members & other members requiring improved notch toughness.
Welding Procedures and Welder Certification	4	AWS requirements
Foundation Construction Reports	4	Pile driving, drilled shaft construction, bearing pressure test reports for spread footings.

Compaction testing reports for backfill at abutments	4	Must meet 95% maximum dry density, Modified Proctor ASTM D 1557.

D. As-Built Records will be submitted to CP within 1 year of completion of the structures. These records shall consist of the following items:

1. Overpass Projects:
- Electronic files of all structure design drawings with as-constructed modifications shown in Auto-Cad Civil 3D or Acrobat .PDF format.
- Hard copies of all structure design drawings with as-constructed modifications shown.

2. Underpass Projects:
- Electronic files of all structure design drawings with as-constructed modifications shown, in Auto-Cad Civil 3D or Acrobat .PDF format.
- Hard copies of all structure design drawings with as-constructed modifications shown.
- Final approved copies of shop drawings for concrete and steel members.
- Foundation Construction Reports
- Compaction testing reports for backfill at abutments

15039.04 SITE INSPECTIONS BY CP.

Site inspections may be performed by CP at any point during construction, including but not limited to the following:
- Preconstruction meetings
- Pile driving, drilling of caissons or drilled shafts
- Reinforcement & concrete placement for railroad bridge substructure or superstructure
- Erection of precast concrete or steel bridge superstructure
- Placement of waterproofing (prior to placing ballast on bridge deck)
- Completion of the bridge structure

A detailed construction schedule, including the proposed temporary horizontal and vertical clearances and construction sequence for all work to be performed, shall be provided to the Engineer for submittal to CP for review and approval prior to commencement of work. This schedule shall also include the anticipated dates when the above listed events will occur. This schedule shall be updated for the above listed events as necessary, but at least monthly so that site visits may be scheduled.

15039.05 CP REPRESENTATIVES.

CP representatives will be provided at the expense of the Contracting Authority to protect CP facilities, property, and movements of its trains or engines. CP may, at the Contractor's sole cost, risk and expense, furnish whatever protective services it considers necessary, including, but not limited to, flagger(s), inspector(s), and stand-by personnel.

In general, CP will furnish such personnel or other protective services as follows:
- Flagging protection will be required during any operation involving direct and potential interference with CP's tracks or traffic. This may include but is not limited to fouling of railroad operating clearances, reasonable proximity of accidental hazard to railroad traffic, work within 25 feet horizontally of the nearest centerline, any work over any railroad track, or in any other condition that CP deems protective services necessary, which may include work on or off CP's property more than 25 feet from the nearest centerline of a railroad track, such as any equipment extension (including but not limited to a crane boom) that will reach or has the potential to reach within 25 feet of any track.
- For any excavation below elevation of track subgrade if, in the opinion of CP, track or other CP facilities may be subject to settlement or movement.
- During any clearing, grubbing, excavation, or grading, or other construction activity in proximity to CP facilities, which, in the opinion of CP, may endanger CP facilities or operations.

- During the Contractor's operations when, in the opinion of CP, CP facilities, including, but not limited to, tracks, buildings, signals, wire lines, or pipe lines, may be endangered.
- Contractor shall arrange with CP to provide the adequate number of flag persons to accomplish the work.

Contractor shall be required to pay CP in advance for the cost of personnel or other protective services. Prepayment will be based on the Contractor's estimated time for needing protective services, and if that prepayment will be exhausted prior to the expiration of the contractor's need for protective services, additional prepayment funds will be needed to cover the new projected completion of the project.

In the event CP is unable to furnish flagging protection, inspection services, or standby personnel at the desired time or on the desired date(s), Contractor shall not perform the said operation or work until such time and date(s) that appropriate CP services can be made available. CP shall not be liable for any delay or increased costs incurred by Contractor owing to CP's inability or failure to have appropriate CP services available at the time or on the date requested.

15039.06 INSURANCE.

Before the contract is awarded, Contractor shall submit to the Department a certificate of insurance evidencing the coverage. The certificate shall identify the insurance company firm name and address, Contractor firm name, policy period, type of policy, limits of coverage, and scope of work covered (including project number). Policies shall provide no less than 30 calendar days prior written notice to Contracting Authority and Railroad of cancellation or material change in policies. Following award of the Contract, Contractor shall submit a certificate of insurance evidencing the foregoing coverage to the Railroad and Contracting Authority (if other than the Department), and a certified, true, and complete copy of policy or policies to the Contracting Authority and Railroad. Upon request from either the Contracting Authority or Railroad, a certified duplicate original of any required certificate or policy shall be furnished at no cost to the Contracting Authority or Railroad.

Insurance shall be kept in full force and effect during the performance of work and thereafter until the Contractor removes all tools, equipment, and material from CP's property and cleans the premises in a manner reasonably satisfactory to CP.

If the Contractor uses a subcontractor(s), the Contractor shall provide the required insurances and shall provide either: equivalent to that described herein or (ii) obtain endorsements to the required policies naming the subcontractor(s) as additional insured parties.

A. Commercial General Liability Insurance.

Commercial general liability (CGL) (occurrence based) with a combined single limit of not less than $1,000,000.00 each occurrence. CGL insurance shall be written on ISO occurrence form CG 00 01 12 04 (or a substitute form providing equivalent coverage).

The policy shall also contain the following endorsement, which shall be stated on the certificate of insurance:

- Contractual Liability Railroads ISO form CG 24 17 10 01 (or a substitute form providing equivalent coverage) showing "Dakota, Minnesota & Eastern Railroad Corporation Property" as the Designated Job Site.
- Designated Construction Project(s) General Aggregate Limit ISO Form CG 25 03 03 97 (or a substitute form providing equivalent coverage) showing the project on the form schedule.

B. Business Automobile Coverage Insurance.

Business auto coverage written on ISO form CA 00 01 (or a substitute form providing equivalent liability coverage) with a combined single limit of not less $1,000,000.00 for each accident; covering owned, non-owned, and hired vehicles engaged in or about the work.

The policy shall contain the following endorsements, which shall be stated on the certificate of insurance:

- Coverage For Certain Operations In Connection With Railroads ISO form CA 20 70 10 01 (or a substitute form providing equivalent coverage) showing “Dakota, Minnesota & Eastern Railroad Corporation” as the Designated Job Site.
- Motor Carrier Act Endorsement - Hazardous materials clean up (MCS-90), if required by law.

C. Railroad Protective Liability Insurance.
Railroad protective liability insurance (occurrence form), in the name of the Dakota, Minnesota, & Eastern Railroad Company d/b/a Canadian Pacific, with limits of $5,000,000.00 per occurrence and $10,000,000.00 aggregate for bodily injury (including death) and property damage.

Contractor shall use the website listed below to acquire Railroad train movement information for the purpose of obtaining Railroad Protective Liability Insurance:

http://safetydata.fra.dot.gov/OfficeofSafety/PublicSite/Crossing/Crossing.aspx

The US DOT Crossing Inventory Number will be located in the project plans. Zero trains per day will be displayed on the crossing inventory report for locations with grade separated crossings or at-grade crossings when there is less than one train per day. In these situations generating a map to find alternative crossing locations may be used to provide the number of trains per day and speed nearest the project location.

D. Workers Compensation and Employers Liability Insurance.
Coverage shall include, but not limited to: Contractor's statutory liability under the workers' compensation laws of the State of Iowa including requirements of any occupational disease law.

If Contractor is self-insured, evidence of the State of Iowa’s approval and excess workers compensation coverage shall be provided. Coverage shall include liability arising out of the U. S. Longshoremen's and Harbor Workers' Act, the Jones Act, and the Outer Continental Shelf Land Act, if applicable.

The policy shall contain the following endorsement, which shall be stated on the certificate of insurance:

Alternate Employer endorsement ISO form WC 00 03 01 A (or a substitute form providing equivalent coverage) showing CP in the schedule as the alternate employer (or a substitute form providing equivalent coverage).

E. Umbrella Insurance.
If Contractor utilizes umbrella policies, these policies shall “follow form” and afford no less coverage than the primary policy. Excess coverage is not allowed.

F. Pollution Liability Insurance.
Pollution liability coverage shall be written on ISO form Pollution Liability Coverage Form Designated Sites CG 00 39 12 04 (or a substitute form providing equivalent liability coverage), with limits of at least $1,000,000.00 per occurrence and an aggregate limit of $2,000,000.00.

If the scope of work as defined in this contract includes disposal of hazardous or non-hazardous materials from the job site, Contractor shall furnish to CP evidence of pollution legal liability insurance maintained by the disposal site operator for losses arising from the insured facility accepting the materials, with coverage in minimum amounts of $1,000,000.00 per loss, and an annual aggregate of $2,000,000.00.

G. Policy(ies) required above (except worker’s compensation and employers liability) shall include CP and its Parents as “Additional Insured” using ISO Additional Insured Endorsements CG 20 26, and CA 20 48 (or substitute forms providing equivalent coverage). The coverage provided to CP and its Parents as additional insured shall, to the extent provided under ISO Additional Insured

Endorsement CG 20 26, and CA 20 48 provide coverage for CP's negligence whether sole or partial, active or passive, and shall not be limited by Contractor's liability under the indemnity provisions contained in the specifications.

H. Punitive damages exclusion, if any, shall be deleted (and the deletion indicated on the certificate of insurance), unless the law governing prohibits all punitive damages that might arise in connection with this contract.

I. Contractor waives all rights of recovery, and its insurers also waive all rights of subrogation of damages against Railroad and its agents, officers, directors, and employees. This waiver shall be stated on the certificate of insurance.

J. Prior to commencing the work, Contractor shall furnish Railroad with a certificate(s) of insurance, executed by a duly authorized representative of each insurer, showing compliance with the insurance requirements in this contract.

K. Insurance policies shall be written by a reputable insurance company acceptable to CP or with a current Best's Insurance Guide Rating of A- and Class VII or better, and authorized to do business in the State of Iowa.

L. The fact that insurance is obtained by the Contractor or by CP on behalf of the Contractor shall not be deemed to release or diminish the liability of the Contractor, including, without limitation, liability under the indemnity provisions of this contract. Damages recoverable by CP from the Contractor or any third party shall not be limited by the amount of the required insurance coverage.

15039.07 ASSIGNMENT, SUBCONTRACTING, AND INSURANCE ENDORSEMENTS.

Contractor shall not assign or subcontract the provisions of this specification, or any interest therein, without the written consent of the Engineer. Contractor shall be responsible for the acts and omissions of all subcontractors. Before Contractor commences any work, they shall, except to the extent prohibited by law; (1) require each subcontractor to include the Contractor and CP as "Additional Insureds" in the subcontractor's Commercial General Liability policy and Business Automobile policies with respect to all liabilities arising out of the subcontractor's performance of work on behalf of the Contractor by endorsing these policies with ISO Additional Insured Endorsements CG 20 26, and CA 20 48 (or substitute forms providing equivalent coverage; (2) require each subcontractor to endorse their Commercial General Liability Policy with "Contractual Liability Railroads" ISO Form CG 24 17 10 01 (or a substitute form providing equivalent coverage) for the job site; and (3) require each subcontractor to endorse their Business Automobile Policy with "Coverage For Certain Operations In Connection With Railroads" ISO Form CA 20 70 10 01 (or a substitute form providing equivalent coverage) for the job site.

15039.08 ADDITIONAL SAFETY REQUIREMENTS.

Personnel employed by the Contractor or subcontractors shall complete the course "CP Contractor Security/Safety Course", and be registered prior to working on CP property, except that such personnel are not required to execute the Right of Entry form for contractors, it being understood that all contractors or subcontractors shall instead execute the Right of Entry Agreement attached to this specification. The CP orientation course is available at: www.contractororientation.com. This course shall be completed annually.

CP has exempted from this requirement those it classifies as "Delivery Persons" from this training, such as UPS, FedEx, trucking companies, etc. who merely access the property to supply materials or equipment.

Contractor shall require its employees to be suitably dressed to perform their duties safely. Contractor shall require workers to wear personal protective equipment as specified by CP rules and regulations. All personal protective equipment will be of safe design and construction for the work to be performed and shall be maintained in a sanitary and reliable condition. Protective equipment shall include, but not be

limited to the following PPE listed below that meet the U.S. ANSI standards (American National Standards Institute):

- Eye and face protection ANSI Z 87.1
- Head protection ANSI Z 89.1
- Foot protection ANSI Z 41.1
- High Visibility apparel ANSI / ISEA Z 107

Additional eye protection shall be provided to meet specific job situations such as welding, grinding, burning, etc.; and hearing protection which affords enough attenuation to give protection from noise levels that will be occurring on the job site. Only waist length shirts with sleeves and trousers covering the entire leg shall be worn. Flare-legged trouser bottoms shall be tied to prevent catching.

CP requires that the Contractor provide their personnel with the proper training, and that the Contractor's personnel are provided with 1) a sticker to be affixed visibly on their hard hat and 2) a qualification card so that CP employees know that the Contractor's personnel are familiar with CP safety practices and proof of having successfully completed the "CP Contractor Security/Safety Course" course. If a Contractor's employee does not have the sticker and qualification card, that Contractor employee will not be allowed on CP property.

Heavy equipment operating within CP ROW shall be equipped with audible back-up warning devices. If in the opinion of CP the Contractor's equipment is unsafe for use on CP's ROW, the Contractor shall remove such equipment from the CP ROW.

Contractor shall promptly notify CP of any U.S. OSHA reportable injuries occurring to any employee that arises during the work performed on the work site within CP ROW.

If at any time the Engineer or CP is of the opinion that any work of the Contractor is being or is about to be done or prosecuted without due regard and precaution for safety and security, or in violation of any applicable safety rule, the Engineer may suspend the work until proper protective measures are adopted and provided. In addition, if CP has a reasonable, good faith belief that the Contractor is engaging, or is about to engage, in any activity that poses a substantial risk of causing great bodily injury or death to any person, or significant property damage, CP may suspend the work of the Contractor and shall as soon as possible thereafter contact the Engineer to review the circumstances of the work stoppage. CP shall thereafter abide by the decision of the Engineer as to the necessity of the work stoppage.

15039.09 SAFETY MEASURES-PROTECTION OF OPERATIONS.

Contractor shall perform work in a safe manner and in conformity with the following standards:

A. Explosives.

Contractor shall not discharge any explosives on or in the vicinity of CP's property without the prior consent of CP, which shall not be given if, in the sole discretion of CP, such discharge would be dangerous or would interfere with CP's property or facilities. For the purposes hereof, the "vicinity of CP's property" shall be deemed to be any place on CP's property or in such close proximity to CP's property that the discharge of explosives could cause injury to CP's employees or other persons, or cause damage to or interference with the facilities or operations on CP's property. CP reserves the right to impose limitations on the transportation, handling, storage, security, and use of explosives as CP, in CP's sole discretion, may deem to be necessary, desirable, or appropriate. In addition to any limitations as may be specifically imposed:

1. Contractor shall provide no less than 48 hours written notice, excluding weekends and holidays, before discharging any explosives.

2. Explosives loaded in holes, placed or otherwise readied for discharge, shall be discharged the same day during daylight hours, and at mutually acceptable times.

3. Contractor, at its own expense, shall take all precautionary measures and construct all temporary shelters necessary to guard against danger of damage, destruction, or interference arising out of or connected with any blasting or any transportation, handling, storage, security, or use of explosives.

B. Obstructions to View.
Except as otherwise provided herein, Contractor shall not cause or permit the view along the tracks of CP to be obstructed, nor place any combustible material on the crossing area, nor erect any structures thereon except as allowed by the contract documents.

C. Excavation.
Contractor shall not excavate from existing slopes nor construct new slopes which are excessive and may create hazards of slides or falling rock, impair, or endanger the clearance between existing or new slopes and the tracks of CP. Contractor shall not perform any work that may disturb the stability of any area or adversely affect CP's tracks or facilities. Contractor, at its own expense, shall install and maintain adequate shoring and cribbing for all excavation or trenching performed by them in connection with construction, maintenance, or other work. Shoring and cribbing shall be constructed and maintained with materials and in a manner approved by CP to withstand all stresses likely to be encountered, including any stresses resulting from vibrations caused by CP's operations in the vicinity.

D. Drainage.
Contractor, at its expense, shall provide and maintain suitable facilities for draining the highway and its appurtenances, and shall not suffer or permit drainage water to flow or collect upon property of CP that may adversely affect any of CP’s operations, equipment or any third parties with permitted facilities on CP’s ROW. Contractor, at its own expense, shall provide adequate passageway for the waters of any streams, bodies of water, and drainage facilities (either natural or artificial, and including water from CP's culverts and drainage facilities), so that said waters may not, because of any facilities or work of the Contractor, be impeded, obstructed, diverted or caused to back up, overflow or damage the property of CP or any part thereof, or property of others. Contractor shall not obstruct or interfere with existing ditches or drainage facilities.

E. Clearances.
Contractor shall provide a minimum vertical clearance of 22.0 feet above top of rails and a minimum lateral clearance of 12.5 feet from centerline of track nearest temporary construction falsework. No materials, supplies, or equipment will be stored within 25 feet from the centerline of any railroad track, measured at right angles thereto.

Proposed changes to the specified minimum clearances shall be submitted in writing to CP, through the Engineer, at least 30 calendar days in advance of the work. No work shall commence until the Engineer receives concurrence, in writing, from CP that approval is given and that arrangements have been made for flagging service, as may be necessary. CP will have 15 calendar days to respond to the request.

F. Demolition of Existing Structures.
Contractor shall submit demolition plans to the Engineer for review and approval. The Engineer will forward such plans to CP as identified in the project agreement for CP to review and approve. Demolition performed over or near CP track will require proper protective shielding or other measures (as identified on the plans) as maybe required by CP, and the Contractor shall be required provide signed plans, signed by a Professional Engineer licensed in the State of Iowa, and schedule for review and approval by CP. Such protective shielding or measures shall be designed for immediate removal by Contractor whenever instructed to do so by CP. Demolition shall not be undertaken until CP has advised Engineer of its approval of the plans and schedule, and the Contractor has received the Engineer’s and CP’s written approval of such demolition plans and schedule. All such reviews and approvals or rejections will be completed by the Engineer and CP within 45 calendar days of receipt from the Contractor.

15039.10 WALKWAYS.
Along the outer side of each exterior track of multiple operated track, and on each side of single operated track, an unobstructed continuous space suitable for CP's use in walking along trains, extending to a line not less than 12 feet from centerline of track, shall be maintained. Any temporary impediments to walkways and track drainage encroachments or obstructions allowed during work hours while CP's flagging service is provided shall be removed before the close of each work day. Walkways with railings shall be constructed by Contractor over open excavations when in close proximity of track, and railings shall not be closer than 8.5 feet horizontally from center line of tangent track or 9.5 feet horizontally from centerline of curved track.

15039.11 EXCAVATIONS IN CLOSE PROXIMITY TO CP FACILITIES.
Contractor shall take special precaution in connection with excavating and shoring. Excavations for construction of footings, piers, columns, walls, or other facilities that require shoring shall comply with the following requirements: OSHA, AREMA, and CP "Guidelines for Temporary Shoring".

Contractor shall contact CP for facility locates at least 5 working days prior to commencing work at 1.248.740.6227 during normal business hours (7:00 a.m. to 3:00 p.m. C.S.T., Monday through Friday, except holidays. Contractor shall pay CP in advance for the cost of CP locates. The cost for a cable locate is $250.00. If a telecommunications system is buried anywhere on or near CP property, the Contractor shall coordinate with CP and the telecommunication company to arrange for relocation or other protection of the system prior to beginning any work on or near CP property.

15039.12 NO INTERFERENCE WITH CP'S OPERATION.
Contractor shall not interfere with the constant, continuous, and uninterrupted use of the tracks, property, and facilities of CP its lessees, licensees, or others, unless specifically permitted and authorized in advance by CP. When not in use, Contractor's machinery and materials shall be kept at least 50 feet from the centerline of CP's nearest active track, and there shall be no crossings of CP's tracks except at existing open public crossings or as provided by private construction crossing agreement between CP and the Contractor. CP may require the Contractor to furnish detailed plans prior to entry upon the premises and to view and inspect any activity or work on or above CP's property.

15039.13 TRAFFIC CONTROL.
Contractor's operations that control traffic across or around CP facilities shall be coordinated with and approved by CP.

15039.14 INDEMNITY.
As used in this Article, "CP" includes other railroad companies using CP's property at or near the location of the Contractor's work and CP's and their officers, agents, and employees; "Loss" includes loss, damage, claims, demands, actions, causes of action, penalties, costs, and expenses of whatsoever nature, including court costs and attorneys' fees, which may result from the following:

- Injury to or death of persons whomsoever (including CP's officers, agents, and employees, the Contractor's officers, agents, and employees, as well as any other person); and
- Damage to or loss or destruction of property whatsoever (including Contractor property, damage to the roadbed, tracks, equipment, or other property of CP, or property in its care or custody).

Contractor shall indemnify, hold harmless, and defend to the extent allowed by law CP from any loss which is due to or arises from any cause and is associated in whole or in part with the work covered herein, a breach of the contract or the failure to observe the health and safety provisions herein, or any activity or omission arising out of performance or nonperformance; except to the extent caused by the gross negligence or willful misconduct of CP.

15039.15 MAINTENANCE OF CP FACILITIES.
Contractor shall maintain ditches and drainage structures free of silt or other obstructions which may result from its operations, promptly repair eroded areas within CP's ROW, and repair any other damage to CP property, or its tenants; at no cost to CP. Contractor will be required upon the completion of the work

to remove from within the limits of CP's property all machinery, equipment, surplus materials, false work, rubbish or temporary buildings, and to leave said property in a condition satisfactory to the Engineering Manager of CP or their authorized representative.

15039.16 COMMUNICATIONS AND SIGNAL LINES.
No digging, trenching or boring activities shall be conducted in the proximity of any known buried Railroad Company signal cables without Railroad Company's Signal Department representative being present. If required, CP will rearrange its communications and signal lines, grade crossing warning devices, train signals and tracks, and facilities that are in use and maintained by CP's forces in connection with its operation at the expense of the Contracting Authority. This work will be performed by CP and it is not a part of the contract.

15039.17 FIBER OPTIC CABLE SYSTEMS.
Fiber optic cable systems may be buried on CP's property. Protection of the fiber optic cable systems is of extreme importance since any break could disrupt service to users resulting in business interruption and loss of revenue and profits. Contractor shall contact Iowa One Call (1.800.292.8989 (a 24-hour number)) to determine if fiber optic cable is buried anywhere on CP's ROW to be used by the Contractor. If it is, Contractor shall telephone the telecommunications company involved, arrange for a cable locator, and make arrangements for relocation or other protection of the fiber optic cable prior to beginning any work on CP's ROW.

In addition to the liability terms elsewhere in this specification, Contractor shall indemnify and hold harmless CP against and from all cost, liability, and expense whatsoever (including, without limitation, attorney's fees, court costs, and expenses) arising out of or in any way contributed to by any act or omission of the Contractor, agents, or employees, that causes or contributes to (1) any damage to or destruction of any telecommunications system on CP's property, and (2) any injury to or death of any person employed by or on behalf of any telecommunications company, its contractor, agents, or employees, on CP's property. Contractor shall not have or seek recourse against CP for any claim or cause of action for alleged loss of profits, revenue, loss of service, or other consequential damage to a telecommunication company using CP's property or a customer or user of services of the fiber optic cable on CP's property.

15039.18 COOPERATION.
CP will cooperate with the Contractor so that work may be conducted in an efficient manner, and will cooperate with the Contractor in enabling use of CP's ROW in performing the work.

15039.19 WAIVER OF BREACH.
The waiver by CP of the breach of any condition, covenant, or specification herein contained to be kept, observed and performed by the Contractor shall in no way impair the right of CP to avail itself of any subsequent breach thereof.

15039.20 CP OPERATIONS.
Contractor shall be advised that trains or equipment are expected on any track, at any time, in either direction. Contractor shall become familiar with the train schedules in this location and structure its bid assuming intermittent track windows in this period, as defined below.

Railroad tracks within and adjacent to the work are active and rail traffic over these tracks shall be maintained throughout the contract. Activities may include both through moves and switching moves to local customers. Railroad traffic and operations may occur continuously throughout the day and night on these tracks and shall be maintained at all times. Contractor shall coordinate and schedule the work so that construction activities do not interfere with CP operations.

Work windows for this contract shall be coordinated with the Engineer, who shall receive CP's approval before advising the Contractor of the availability of any work window. Types of work windows include Conditional Work Windows and Absolute Work Windows, as defined below:

A. Conditional Work Window: A period of time that CP operations have priority over construction activities. At the direction of the CP flag person, upon approach of a train, and when trains are present, the tracks shall be cleared (i.e., no construction equipment, materials, or personnel within 25 feet, or as directed by CP, from the tracks). Conditional Work Windows are available for the contract.

B. Absolute Work Window: A period of time that construction activities are given priority over CP operations. During this time frame the designated tracks will be inactive for train movements and may be fouled by the Contractor. At the end of an Absolute Work Window the tracks or signals shall be completely operational for train operations and all CP, Public Utilities Commission, and Federal Railroad Administration requirements, codes, and regulations for operational tracks shall be met. In the situation where the operating tracks or signals have been affected, CP will perform inspections of the work prior to placing back into service. CP flag persons will be required for construction activities requiring an Absolute Work Window.

Absolute Work Windows will not generally be granted, and any provided shall require the express written approval by CP's Transportation Department. Any request will require a detailed explanation for CP review and approval.

C. Work on CP's ROW shall be done at such times and in such manner so as not to interfere with or endanger the operations of CP. Whenever work may affect the operations or safety of trains, the method of doing such work shall first be submitted to CP for approval, but such approval shall not relieve the Contractor from liability. Any work to be performed by the Contractor that requires flagging or inspection service shall be deferred until the flagging protection required by CP is available at the job site.

D. Contractor shall make requests in writing for both Absolute and Conditional Work Windows, at least 2 weeks in advance of any work. The written request shall include:

- Exactly what the work entails.
- The days and hours that work will be performed.
- The exact location of work, and proximity to the tracks.
- The type of window requested and the amount of time requested.
- The designated contact person.

Contractor shall provide written notice to CP at least 48 hours before commencing work in connection with approved work windows when work will be performed within 50 feet of any track center line.

E. Should a condition arising from, or in connection with the work, require that immediate and unusual provisions be made to protect operations and property of CP, Contractor shall make such provisions. If in the judgment of CP such provisions are insufficient, CP may require or provide such provisions as deemed necessary. In any event, such provisions shall be at the Contractor's expense. CP or Engineer will have the right to order Contractor to temporarily cease operations in the event of an emergency or, if in the opinion of CP, Contractor's operations could endanger CP's operations. In the event such an order is given, Contractor shall immediately notify the Engineer of the order.

15039.21 RAILROAD FLAGGING.

A. Notification.

Contractor shall notify CP and Engineer at least 15 working days in advance of commencement of any work on CP property and at least 10 working days in advance of proposed performance of any work by the Contractor in which any person or equipment will be within 50 feet of any track, or near enough to any track that any equipment extension (such as, but not limited to, a crane boom) will reach to within 50 feet of any track. Notice shall made using CP's "Request for Flagging Services" form attached as DS-15039, Attachment B.

The services of a flagman will be required during any operation involving direct interference with CP's tracks or traffic, fouling of railroad operating clearances, or reasonable proximity of accidental hazard to railroad traffic, when work takes place within 50 feet horizontally of the nearest centerline, any work over any railroad track, or in any other condition that CP deems the services of a flagman necessary, which may include work on or near CP's property more than 50 feet from the nearest centerline of a railroad track. Additional flagmen will also be furnished whenever in the opinion of CP such protection is needed.

Upon receipt of 10 working day notice, CP will determine and inform Contractor whether a railroad flagger need be present and whether the Contractor need implement any special protective or safety measures. If flagging or other special protective or safety measures are performed by CP, such services will be provided at Contractor's expense with the understanding that if CP provides any flagging or other services, the Contractor shall not be relieved of any of its responsibilities or liabilities set forth herein. Contractor shall be required to pay CP in advance for the cost of personnel or other protective services. CP shall not be liable for any increased costs incurred by the Contractor or Contracting Authority owing to CP's inability or failure to have appropriate CP personnel available at the time or on the date requested.

To enable orderly flagger reassignment to other projects the Contractor shall notify CP 5 working days prior to the termination of flagging need or 5 working days prior to completion of the Contractor's work, whichever is sooner. Contractor shall inform CP when work requiring flaggers is complete.

CP will notify the Engineer and Contractor when non-compliance is reported by CP train crews or other CP employees. Contractor work performed without proper flagging services, when such flagging is required, will be subject to a $5,000.00 per day price adjustment to Contractor, and may result in the removal of Contractor by CP or Engineer from the project.

B. Flagger Hours and Rate of Pay.

The rate of pay for each flagger will be at the base rate of $1,300.00 per weekday (1-10 hour continuous period). Weekend flagman protection will be at the rate of $150.00 per hour, with a 10 hour minimum of $1,500.00. Hours in excess of 10 continuous hours per flagman on either weekday or weekend days will be billed at the rate of $150.00 per hour. Rates are subject to change, at any time, by law or by agreement between CP, its employees or contractors, and may be retroactive as a result of negotiations or a ruling of an authorized Governmental Agency. Additional charges on labor are also subject to change. If the wage rate or additional charges are changed, Contractor shall pay on the basis of the new rates and charges.

A flagman has to perform many functions in conjunction with a flagging project. The hours start once the flagman reaches the local yard. Any needed safety materials must be collected and other railroad employees that may come into the area must be well informed of the project that will be taking place. The commute time from the local yard to the actual project is included in an invoice. Once on site the individual must set up warning devices several miles away from the site (in both directions) in order to assure locomotive engineers are properly warned of additional safety precautions necessary. Once the day is over, the flagman must collect these warning devices and return them to the local yard. In CP terminal areas, this employee is compensated for a full eight hour day regardless if the employee was physically flagging at the location or not, therefore, the full day is charged back to the contractor. If CP must pay the employee for hours in excess of their daily scheduled time or on a holiday in order to accomplish the flagging project, those costs are passed onto the contractor as well.

Occasionally it is necessary for the flagman to leave the project for various reasons. Some of these are to throw a manual switch in order to divert an oncoming train, or to meet a train that is approaching.

C. Reimbursement to CP.

Contractor shall reimburse the CP for railroad flagger services provided within 15 days of billing from the CP. In the event the Contractor fails to reimburse or pay CP for hours of flagman protection provided, the Contracting Authority will reimburse CP within 30 calendar days of the Contractor defaulting on the payment (default is defined as non-payment within 30 calendar days of billing by CP to the Contractor). Failure of the Contractor to reimburse CP may result in a reduction or suspension of the Contractors bidding qualifications according to Article 1102.03 of the Standard Specifications.

D. Documentation and Reimbursement to the Contractor.

Contractor shall initially pay CP for all flagging costs in conjunction with railroad flaggers when any of the conditions identified in Article DS-15039.05, warrant a flagger. The Contracting Authority will reimburse the Contractor for any daily cost that exceeds $1,000.00 per day for the cost of flagger services provided by CP. The Contracting Authority will reimburse the Contractor 100% of the total cost of flagger services, as deemed necessary by CP, that does not meet any of the conditions identified in Article DS-15039.05, unless the flagger's presence on the project was a result of the Contractor's communication, or lack of communication, with CP. The Contracting Authority will reimburse the Contractor following completion of all work necessitating flagging operations by CP and receipt of documentation verifying CP invoices have been paid.

For each day that railroad flaggers have been provided, the Contractor shall document daily the conditions on the project site that warrant the flagger. The Contractor shall submit the daily records to the Engineer each week. The Engineer will review the daily logs and promptly notify the Contractor if any information in the daily log is believed to be incorrect.

Contractor shall forward copies of the invoices received from CP for flaggers and a summary of the flagging costs incurred that exceed the Contactors' requirements described in Article DS-15039.05, to the Engineer with a request for payment for the additional railroad flagger costs. The Engineer will review the Contractor's daily logs against CP's invoice and make payment for the eligible costs in accordance with Article 1109.03, of the Standard Specifications.

Contractor shall be responsible to CP for all flagging costs. Flagging costs for subcontracted work shall be the responsibility of the Contractor. Reimbursement from subcontractors to the Contractor shall be the sole responsibility of the Contractor.

Contractor shall forward, to the Engineer, copies of payments made to CP for flagging costs.

The Contracting Authority may award multiple contracts for work in the same general area. Contractor shall try to stage work to minimize the need for railroad flaggers. In the event of multiple projects in a particular location, the Contractor initially requiring flagging on a daily basis shall be responsible for all flagging costs for that day.

15039.22 TEMPORARY CROSSINGS.

At other than established public road crossings, the Contractor shall not move any equipment or materials across CP's tracks until written permission has been obtained from CP.

If the Contractor requires a temporary railroad crossing the Contractor shall arrange for the crossing installation at a location acceptable to the Contractor and CP at the Contractor's expense to include all CP costs of installation, maintenance, removal, and track restoration. The temporary crossing shall be gated and locked at all times when not required for use by the Contractor. Flagging will always be required during use of a temporary crossing. The billing, Contractor payment provisions, and final Contractor payment requirements for crossing costs except flagging are to be covered as agreed to in a separate private construction crossing agreement between the Contractor and CP. Prior notice of need for a temporary crossing is required to allow for CP site review, cost estimating, securing material, and work crew scheduling and will vary. The Contractor should contact CP prior to making a bid when a temporary crossing is required.

15039.23 LIMITATION OF RIGHTS GRANTED.

The Contract, any Temporary Easement, and Permanent Easement are all subject to the prior and continuing right and obligation of CP to use and maintain its property, not inconsistent with highway purposes, including the right and power of CP to construct, maintain, repair, renew, use, operate, change, modify, or relocate CP tracks, roadways, signal, communication, fiber optics, or other wirelines, pipelines, and other facilities upon, along, or across any or all parts of its property, all or any of which may be freely done at any time or times by CP, not inconsistent with highway purposes and at CP's sole cost and expense.

The Contract, Temporary Construction Easement, and Permanent Easement, whether recorded or unrecorded, are subject to all outstanding rights (including those in favor of licensees and lessees of CP's property, and others) and the right of CP to renew and extend the same, and is made without covenant of title or for quiet enjoyment.

15039.24 MECHANIC'S LIENS.

Contractor shall not permit or suffer any mechanic's or material supplier's liens of any kind or nature to be enforced against any property of CP for any work performed. Contractor shall indemnify and hold harmless CP from and against any liens, claims, demands, costs or expenses of whatsoever nature in any way connected with or growing out of such work done, labor performed, or materials furnished. It is understood that this specification may be recorded in the county in which the work is to be performed and such recording shall serve as public notice that no Contractor, subcontractor, or material supplier shall file any notice of a mechanic's or material supplier's lien or permit or suffer any mechanic's lien or material supplier's lien on the property of CP to the extent permitted by law.

15039.25 METHOD OF MEASUREMENT AND BASIS OF PAYMENT.

Railroad Protective Liability Insurance for Dakota, Minnesota & Eastern Railroad Corporation doing business as Canadian Pacific; will be paid for as a Lump Sum bid item. The Contractor will be paid 100% of the Lump Sum bid item once the Engineer has received all necessary certificates of insurance.

Attachments to this specification:

- DS-15039, Attachment A: Right of Entry Agreement
- DS-15039, Attachment B: Requirements Regarding Flagging and Cable Location for Construction on CP

DS-15039, Attachment A

RIGHT OF ENTRY AGREEMENT

This Right of Entry Agreement ("Agreement") is made between _____ (hereafter Contractor) and Dakota, Minnesota & Eastern Railroad Corporation dba Canadian Pacific (hereafter Railroad) in order to permit Contractor to enter onto Railroad's property, for the purposes of performing work in connection with the following project for the Contracting Authority:

Project _____, as further identified in the attached project documents.

Contractor shall pay to Railroad upon execution of this Agreement the sum of $500.00 as consideration for the right of entry awarded under this Agreement and to cover preparation and administration of this Agreement.

Contractor and Railroad hereby agree as follows:

1. Contractor shall enter Railroad's property (identified in the attached project documents) only in connection with the above-referenced project;

2. Contractor shall give Railroad at least 15 working days' advance notice of the date Contractor plans to start any work on the project;

3. Upon request, Contractor shall provide Railroad with detailed plans of the project at no cost to Railroad;

4. Contractor shall comply with all terms and requirements set forth in Iowa Department of Transportation Special Provisions (DS-15039) for Construction or Maintenance Work on Railroad Right-of-Way, including but not limited to the insurance requirements set forth in such specification Contractor shall provide Railroad with certificates and declarations sheets that prove or show compliance with such insurance requirements;

5. As used in this paragraph, "CP" includes other railroad companies using CP's property at or near the location of the Contractor's work and CP's and their officers, agents, and employees; "Loss" includes loss, damage, claims, demands, actions, causes of action, penalties, costs, and expenses of whatsoever nature, including court costs and attorneys' fees, which may result from the following:
   - Injury to or death of persons whomsoever (including CP's officers, agents, and employees, the Contractor's officers, agents, and employees, as well as any other person); and
   - Damage to or loss or destruction of property whatsoever (including Contractor property, damage to the roadbed, tracks, equipment, or other property of CP, or property in its care or custody).

   Contractor shall indemnify, hold harmless, and defend to the extent allowed by law CP from any loss which is due to or arises from any cause and is associated in whole or in part with the work covered herein, a breach of the contract or the failure to observe the health and safety provisions herein, or any activity or omission arising out of performance or nonperformance; except when caused by the sole negligence of CP, or except to the extent caused by the gross negligence or willful misconduct of CP;

6. The insurance requirements set forth in this Agreement shall not relieve or limit Contractor's liability to Railroad under the indemnity provisions of this Agreement;

7. Contractor shall comply with any federal, state or local laws, statutes, codes, ordinances, rules and regulations applicable to its construction and maintenance of the project. Contractor shall defend, indemnify and hold railroad and its affiliates harmless with respect to any fines, penalties,

liabilities or other consequences arising from contractor's failure to comply with any such federal, state or local laws, statutes, codes, ordinances, rules and regulations;

8. Contractor shall promptly notify Railroad of any loss, damage, injury or death arising out of or in connection with the project work;

9. The provisions of this Agreement shall survive the termination or expiration of the Agreement;

10. Railroad certifies that it has carefully reviewed the project plans and that it agrees to permit the Contractor and its employees, officers and subcontractors to enter onto and work upon its property for the purpose of completing said project under the terms of this Agreement;

11. Any notices or communications concerning this agreement shall be delivered to the following designated individuals:

    Edward A. Oom
    Manager Public Works
    CP Plaza – 120 South 6th Street
    Minneapolis, MN 55402
    Telephone Number: 612.330.4553
    Email: Edward_Oom@cpr.ca

    For Contractor _____

    Address: _____
    _____

IN WITNESS WHEREOF, Contractor and Railroad have executed and delivered this agreement as of the date set forth below.

_____ _____
Date Contractor

_____ _____
Date Railroad

DS-15039, Attachment B

REQUIREMENTS REGARDING FLAGGING AND CABLE LOCATION FOR CONSTRUCTION ON CP
(Hereinafter called "Railroad")
(Revised: Effective August 1st 2015)

NOTE: Flagging and/or Cable Locate fees may apply

A utility or contractor shall not commence, or carry on, any work for installation, maintenance, repair, changing or renewal of any FACILITY, under, over or on RAILROAD property at any location without giving notice to the RAILROAD authorized representative at the RAILROAD's office located at Minneapolis, Minnesota, telephone 612.330.4553, or for cable locates telephone 866.291.0741, or for emergency Phone 800-716-9132; and if, in the opinion of the RAILROAD the presence of an authorized representative of the RAILROAD is required to supervise the same, the RAILROAD shall render bills to the utility or contractor for all expenses incurred by it for such supervision. This includes all labor costs for flagmen or cable locate supplied by the RAILROAD to protect RAILROAD operation, and for the full cost of furnishing, installation and later removal of any temporary supports for said tracks, as the RAILROAD's Chief Engineer's Office may deem necessary.

A flagman is required anytime a utility or contractor does any work on or near RAILROAD property within twenty-five (25) feet horizontally of the centerline or any work over any railroad track. The RAILROAD, however, also reserves the right to require a flagman for work on RAILROAD property, which is more than twenty-five (25) feet from the centerline of a railroad track when there are other conditions, or considerations that would dictate the need for a flagman to safeguard the RAILROAD's operations, property and safety of working personnel.

A cable locate of RAILROAD owned facilities may be required to identify and protect Signal & Communication cables that have been installed to provide power, signal control, and wayside communications. These cables are vital to a safe and reliable railway operation. The cable locate will be performed by a qualified RAILROAD employee.

Cost for a cable locate is $250.00, which is to be prepaid before installation is to begin.

Outside contractors are prohibited from driving on, along, or across any track that does not have a CP installed crossing. They may utilize an existing public crossing. The practice of allowing rubber tired equipment to operate over track with no crossing has been banned.

Exceptions to this rule will require the express approval from CP Engineering.

Prior to any project being started, the RAILROAD requires a "Request for Flagging Services" form to be completed and submitted; including check for prepayment based on the number of days flagman protection will be required.

Request for Flagging Services and Cable Location

Southern Region

Inquiries may be directed to: **Otis Goodman**
Public Works Supervisor
CP Plaza – 120 South 6th Street
Minneapolis, MN 55402
Telephone: (612) 330-4554
Email: Otis_Goodman@cpr.ca

Date submitted: _____

I : _____ with : _____, am requesting that flagging
(Name) (Company Name)

protection be provided for _____. **Is this a continuation of an existing project? Yes ☐ No ☐**
(Project Name)

All blanks below must be completely filled in before any flagman request will be honored.

Project Location: _____

RR milepost: _____ Street/Intersection: _____

Right of Entry/License/Permit No.: _____ Dated: _____ Railroad: _____

*** You must have an agreement with CN railroad subsidiary, such as a Right of Entry, Permit or Formal Agreement and proof of insurance. You must have flagman protection before you can enter the property.***

Contractor's Contact Person: _____ Phone: _____

Anticipated # of Days Protection is needed: _____ **Specific Dates Flagging needed: _____,_____,**

_____,_____,_____,_____,_____,_____,_____,

Project Starting time: _____ Anticipated Ending Time: _____ Anticipated # Hours per Day: _____ hrs.*
* Flagmen start and end time may vary based on type of protection required.

Location for flagman to report: _____

Description of work to be performed: _____

_____ Railroad Cable Locate Required? **Yes ☐ No ☐**

A prepayment check MUST be sent and received at the address shown at the top of this page before flagman protection will be scheduled. The amount of prepayment is based on the number of days and hours flagman protection is required. The base rate per day for flagman protection is $1,300.00 for 10 hours, this includes 2 overtime hours to set flags. Additional overtime hours will be billed at the rate of $150.00 per hour. Weekend and Holidays should be prepaid at the overtime rate of $150.00 per hour or $1,500.00 for 10 hours. Any Prepayment for overtime hours not used will be refunded. Cost for cable locate is $250.00, and must be prepaid as well before installation begins. Checks should be made payable to the railroad subsidiary listed on your Right of Entry, Permit or Formal Agreement.

A Prepayment check and Proof of Insurance MUST accompany this form and be received prior to the beginning of this project. Flagman will be provided at your cost, depending on availability, within five (5) business days.

If the project runs longer than originally anticipated, Otis Goodman must be contacted by email and an additional check must be submitted before work can resume. Rates are Effective August 1st 2015.

****ALL blanks must be completely filled****

Billing Information:

Company Name: _____

Billing Address: _____

City: _____State:_____Zip:_____

Company Phone: _____Company Fax: _____E-Mail: _____
(REQUIRED)

I agree to pay for flagging services as requested: _____
(SIGN AND PRINT NAME)

Attach a map and location information and mail this form with cover letter on your company's letterhead, prepayment and proof of insurance to Otis Goodman at the above address.

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Greg Mulder	**Office:** Construction and Materials	**Item 5**
Submittal Date: 1/27/2016	**Proposed Effective Date:** NA	
Article No.: **Title:**	**Other:** Input on a new product.	

Specification Committee Action: None.

Deferred:	**Not Approved:**	**Approved Date:**	**Effective Date:**

Specification Committee Approved Text:

Comments: The Office of Design had some reservations about the locking system that may need to be addressed before the new manhole covers can be used.

The Office of Construction and Materials will respond to the manufacturer that the Department is accepting of manhole covers made of alternative materials as long as the manufacturer can show that strength, durability, and other requirements are met. If they can meet these requirements, the Specification Committee will approve any changes necessary to allow the use of these products. Additional testing may be required on a version of the product that meets the minimum dimensions allowed by the Department.

Additionally, the committee discussed how best to review new products, since the new products committee has not be active, mostly due to a lack of submitted products. The committee may review these products in the future since they are received sporadically.

Specification Section Recommended Text:

Comments:

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

AlphaGen, a company in Vinton, Iowa, is manufacturing a non-ferrous manhole cover and ring. They are seeking approval to be considered for use in state, county, and city work. They currently make a 23.5" cover that meets the strength requirements of 4149.04, I, 2. They indicate they can make a 26" diameter version to meet SW-601 and SW-602. They currently don't meet 4149.04, I, 1 which calls for cast iron or steel.

If the Specification Committee is receptive to considering a change to 4149.04,I,1 to allow other materials, we could suggest to the company to cast the larger ring and cover and have additional AASHTO M306 load testing done by ISU to verify that the design meets AASHTO M306 strength requirements.

Reason for Revision:

New Bid Item Required (X one)	**Yes**	**No** X
Bid Item Modification Required (X one)	**Yes**	**No** X
Bid Item Obsoletion Required (X one)	**Yes**	**No** X

Comments: Having the input and insight from the Specification Committee will help the company move forward with or readjust their plans for the manhole covers.

County or City Comments:

Industry Comments: