



GS-23003

General Supplemental Specifications for Highway and Bridge Construction

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THE STANDARD SPECIFICATIONS, SERIES 2023, ARE AMENDED BY THE FOLLOWING MODIFICATIONS, ADDITIONS, AND DELETIONS. THESE ARE GENERAL SUPPLEMENTAL SPECIFICATIONS AND SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS. REVISIONS INCLUDED IN PREVIOUS SERIES 2023 GENERAL SUPPLEMENTAL SPECIFICATIONS ARE NOT INCLUDED IN THIS EDITION.

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Division 11. General Requirements and Covenants.

Section 1102

1102.03, A, 1, b.

Replace the Article:

The Contractor does any act or omits doing or performing any act which, in the judgment of the Contracts Engineer, evidences a material change in the Contractor's financial responsibility or work capability where, in the judgment of the Contracts Engineer, the same will materially prejudice the Contractor's ability to successfully prosecute such public improvement contracts, or the Contractor knowingly submits false information on the "Contractor's Financial - Experience - Equipment Statement" (Form 650004) or "~~Certification of Uncompleted Work Under Contract~~" (Form 650022) or other information concerning prequalification, or

1102.20, Assurances Required.

Replace the first paragraph:

To comply with US DOT Order 1050.2A (~~dated August 24, 1971~~) the following Appendix A ~~is a~~ and Appendix E are contract requirements of each contract and shall be included in each subcontract.

Section 1107

1107.08, Public Convenience and Safety.

Add the Article and **renumber** subsequent Articles:

J. No storage of flammable products or combustible materials will be permitted below overhead portions of bridges or other highway structures. When not in use, products and materials which present risk of fire hazard must be stored at least 15 feet from the footprint of overhead structural elements.

- ~~J~~ **K.**
- ~~K~~ **L.**
- ~~L~~ **M.**
- ~~M~~ **N.**

Division 23. Surface Courses.

Section 2301

2301.02, B, 3, a.

Add as the third sentence:

When a water reducing admixture is used the maximum allowable slump will be 5 inches.

2301.03, H, 4, b.

Replace the Article:

Apply [Section 2317](#) to all PCC Pavement bid items of a Primary project if any individual PCC Pavement bid item for that project is 5000 square yards or greater. Apply Section 2316 to all other Primary projects or when specifically required for other projects.

2301.03, U, 1.

Replace Table 2301.03-3:

Table 2301.03- 3: Minimum Flexural Strength

Strength Class of Concrete	Thickness	Minimum Age	psi
A	<8"	14 10 calendar days ^(a)	500
	≥8"	8 calendar days	500
C	<9"	7 calendar days ^(b)	500

	≥9"	5 calendar days	500 ^(a)
M		48 hours ^(e b)	500
(a)	10 calendar days for concrete 8 inches thick or more. 350 psi when maturity is used.		
(b)	5 calendar days for concrete 9 inches thick or more.		
(e)	Pavement may be opened for use prior to 48 hours when minimum flexural strength requirements are met.		

Section 2303

2303.03, D, 6, e, Smoothness.

Replace the Article:

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 or when specifically required for other projects.
- 2) When neither [Section 2316](#) nor [Section 2317](#) is not 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.

2303.05, A, 3, a, Laboratory Voids.

Add the Article and renumber subsequent Articles:

- 2) When PWL applies, the minimum pay factor for lab voids shall be 1.0 when the following changes are made via plan note or special provision:
 - a) Decreasing the target lab voids from the limits published in Materials I.M. 510.
 - b) Increasing the minimum asphalt film thickness from the limits published in Materials I.M. 510.

2 3)
3 4)

Section 2316

2316, Pavement Smoothness.

Delete the Section:

~~Section 2316. Pavement Smoothness~~

~~2316.01 DESCRIPTION:~~

- ~~A. Apply this specification when Section 2317 does not apply.~~
- ~~B. Test and evaluate pavement smoothness. Perform surface correction if required.~~

~~2316.02 TESTING AND EVALUATION:~~

~~A. General:~~

- ~~1. Evaluate pavement smoothness for all main line pavement surfaces, except when specifically excluded or modified by the contract documents. Main line pavement is defined as all permanent pavement for traffic lanes, including:

 - Tapers to parallel lanes or through lanes at intersections,
 - Tapers to climbing lanes, and
 - Tapers to ramps and loops.~~
- ~~2. Evaluate pavement smoothness for all interchange ramps and loops.~~

3. For non-Primary projects, do not evaluate pavement smoothness unless specified in the contract documents.
4. If this specification is required by contract documents on non-Primary projects let by the Department, it will be added in its entirety. Selected portions of the specification will not be deleted.
5. Bridge approach sections which are a part of the paving contract will be tested according to Section 2428.
6. Smoothness Requirements:
 - a. Apply Table 2316.02-1 to all projects when specified. Smoothness requirements in inches per mile are listed in Schedules A and B.
 - b. For through traffic lanes wider than 8.5 feet which require matching the surface of the new pavement to the surface of an existing old pavement, the price reduction tables for Schedule A and B will be replaced by Schedule C. When the Profile Index is greater than 7.0 inches for schedule A segments or 22.0 inches per mile for Schedule B segments, calculate an Average Base Index (ABI) for each segment as shown in Table 2316.02-1.

Table 2316.02-1: Schedule for Identification of Pavements

Pavement	Schedule by Posted Speed (mph) (Existing or Proposed)	
	45 or less	over 45
Mainline, curbed (one or both sides of roadway)	B	A
Mainline, not curbed	A	A
Ramps and Collector Distributor Roads	A ^(e)	A ^(e)
Loops	B	B
Side Roads	B	A
Grade Separations ^(a)	B	A
Pavement adjacent to existing pavement (added lane)	C ^(b)	C ^(b)
(a) Including municipal or Secondary Roads therein. (b) $ABI = \frac{PI + X}{2}$ where: PI = the profile index of the edge line of the abutting lane. If the computed ABI is less than X, use an ABI equal to X X = 7 inches/mile if Schedule A, or 22 inches/mile if Schedule B. (c) When a ramp or collector distributor road terminates at an intersection with a traffic signal or stop sign, the 700 feet nearest the intersection will be evaluated under Schedule B.		

7. Exclusions. Roundabouts will be excluded from smoothness testing. The surface of a roundabout shall not deviate from a straight line by more than 1/8 inch in 10 feet when measured longitudinally with a 10 foot straightedge. Paved shoulders will be excluded from smoothness testing unless used as a temporary driving surface. When used as a temporary driving surface, evaluate paved shoulders for bumps and dips only. Evaluate and correct as provided in Article 2316.03, C.

B. Measurement.

1. General.
 - a. Provide and operate an Ames or California type profilograph or an inertial profiler to produce a

profilogram (profile trace) of the surface tested, according to Materials I.M. 341.

- b. When a pavement for which smoothness is to be tested is adjacent to an existing old pavement, smoothness must also be tested on the old pavement 3 feet from the adjacent edge for ABI calculation. Should the surface of the old pavement be specified for correction, perform smoothness testing for ABI calculation after correction.
- c. Remove all objects and foreign material on the pavement surface, including protective covers if used, prior to testing. If appropriate, properly replace protective covers after testing.
- d. Produce a profilogram for each segment of 50 feet or more. Include the 16 feet beyond the ends of the section in the profilogram.

2. Pavements.

- a. The pavement surface will be divided into sections that represent continuous placement.
- b. A section will terminate at a day's work joint (header), a bridge, similar interruption, or when continuous placement crosses to a section with a different smoothness designation.
- c. Sections longer than 778 feet or 0.147 miles placed without interruption will be separated into segments of 0.1 mile. The terminating segment may be shorter than 0.1 mile and greater than 250 feet and still be considered a segment. A segment is to be in only one traffic lane. Each traffic lane will be tested and evaluated separately. Gaps for temporary crossings or similar construction sequencing which are placed in otherwise continuous sections will be tested, when placed, and included in the adjacent section evaluation. Determine pavement profiles for each lane according to procedures for one lane, as shown in Materials I.M. 341 except for main line traffic lanes which will be tested in the wheel paths. Round trace scallops to nearest 0.01 inch. Wheel paths are defined as 3 feet and 9 feet from center line or lane line. Average the two wheel path profile indexes for each segment. For projects with less than 0.5 miles of mainline paving, Contractor may elect to determine pavement profile in the quarter point unless another location is specified in the contract documents.

C. Profilograph Testing.

Perform testing and provide the Engineer with the profilogram results. Ensure testing and evaluation are done by a trained and certified person. Ensure the evaluation is certified according to Materials I.M. 341.

1. Test each segment within 48 hours following placement. Provide the Engineer the index for each segment of paving by the end of the next day worked following the placement until there has been 3 consecutive days of paving where the index for all segments would result in 100% payment or better.
2. Should any following day be evaluated to receive less than 100% payment, immediately notify the Engineer, and take corrective action to modify paving methods and equipment to achieve 100% payment or better.
3. Submit all final profilograph test reports and profile traces to the Engineer within 14 calendar days following completion of paving on the project. Selected reports and traces may be requested by the Engineer in advance of paving completion for purposes of validating the Contractor's test results. Incentive payments for qualifying segments will be made following receipt of appropriate documentation of certified smoothness results.
4. The Engineer will perform verification testing to validate the contractor's certified quality control testing. If the Engineer's verification test results validate the Contractor's test results, the Contractor's results will be used for acceptance. Disputes between the Contractor's and Engineer's test results will be resolved according to Materials I.M. 341. The Engineer may test the entire project length if it is determined that the Contractor certified test results are inaccurate, and the Contractor will be charged for this work at a rate of \$400.00 per mile, per profile track, with a minimum charge of \$800.00. Furnishing inaccurate tests may result in decertification of the Contractor's certified operator.

D. Profile Index.

1. Calculate a profile index for each segment from the profilogram, according to Materials I.M. 341, except for:
 - a. Side road connections less than 600 feet in length.
 - b. Single lift pavement overlays 2 inches or less in thickness unless the existing surface has been corrected by milling or scarification.
 - c. Storage lanes and turn lanes.

- d. ~~Pavement less than 8.5 feet in width.~~
- e. ~~The 16 feet at the ends of the section when the Contractor is not responsible for the adjoining surface.~~
- f. ~~Runout tapers on HMA overlays at existing pavement, bridges, or bridge approach sections when the thickness is less than the design thickness.~~
- g. ~~Detour Pavement.~~
- h. ~~Crossovers.~~
- i. ~~Sections less than 50 feet long.~~
- j. ~~Roundabouts.~~

~~Evaluate pavement segments excluded from profile index calculation for bumps and dips. Evaluate and correct per Article 2316.03, C.~~

- 2. ~~If there is a segment 250 feet or 0.047 mile long or less at the end of a section, include the profilograph measurements for that segment in the evaluation of the adjacent segment in that section.~~
- 3. ~~Identify bumps and dips separately on all profilograms. These appear as high or low points on the profilogram and correspond to high points (bumps) or low points (dips) on the pavement surface. They are identified by locating vertical deviations exceeding 0.5 inches for a 25 foot span for both bumps and dips as indicated on the profilogram.~~

2316.03 SURFACE CORRECTION.

A. General.

- 1. ~~Surface correction for pavement smoothness may be required, which includes bumps or dips. Complete the correction before the determination of pavement thickness.~~
- 2. ~~Perform bump, dip, and smoothness correction work for the full lane width of the paved surface.~~
- 3. ~~Obtain the Engineer's approval for all correction work. After all required correction work is completed, determine the final profile index.~~

B. Pavements.

1. Portland Cement Concrete Pavement.

- a. ~~Accomplish PCC pavement surface correction by grinding the pavement with a diamond grinder, by PCC resurfacing, or by replacement.~~
- b. ~~Use grinding and texturing equipment that meets the requirements of Section 2532. Use a cutting head that is a minimum of 36 inches wide, unless a 24 inch cutting head is necessary due to space limitations.~~
- c. ~~Perform surface correction parallel to lane lines or edge lines as directed by the Engineer. Make each pass parallel to the previous passes. Ensure the ground surface is of a uniform texture.~~
- d. ~~Do not allow adjacent passes to overlap more than 1 inch or have a vertical difference of more than 1/8 inch as measured from bottom of groove to bottom of groove.~~
- e. ~~Begin and end smoothness correction at lines normal to the pavement lane lines or edge lines within any one corrected area. Proceed from the center line or lane line toward the pavement edge to maintain pavement cross slope.~~

2. Hot Mix Asphalt Pavements.

- a. ~~Accomplish asphalt pavement surface correction by:~~
 - ~~Diamond grinding,~~
 - ~~Overlaying the area,~~
 - ~~Replacing the area, or~~
 - ~~Inlaying the area.~~
- b. ~~For diamond grinding, perform the same work and use the same equipment specified for PCC pavement. Cover the surface that has been ground with a seal coat according to Section 2307 with the following modifications:~~
 - ~~The binder bitumen may be the same material used for tack coat, applied at a rate of 0.10 gallon per square yard. Hand methods may be used for spraying.~~

- Apply a cover aggregate consisting of sand at a rate of 10 pounds per square yard. Hand methods may be used for spreading. Apply the sand slightly damp, but with no free moisture, as determined by visual inspection. Embed with at least one complete pneumatic roller coverage.
 - This seal coat is intended to be placed immediately after the diamond grinding is completed in the travel lane. Complete this work when the road surface temperature is above 60°F.
 - Labor, equipment, and materials used for this seal coat will not be paid for separately, but are incidental to the items for which correction is required.
- c. If the surface is corrected by overlay, replacement, or inlay, begin and end the surface correction with a transverse saw cut normal to the pavement lane lines or edge lines within any one area. Ensure the profile of the surface is smooth with no bumps or dips at the beginning or end of correction. Overlay correction must be for the entire pavement width. Maintain pavement cross slope through the corrected areas.

C. Bumps and Dips.

Evaluate bumps and dips, including those at headers, on all pavements for which pavement smoothness is designated.

1. Bumps.

- a. For all pavements evaluated, if the Engineer does not assess a price adjustment, correct all bumps exceeding 0.5 inch within a 25 foot span, as indicated on the profilogram, except as stated in Article 2316.03, C, 3.
- b. Corrected bumps will be considered satisfactory when measurement by the profilograph shows that the bumps are 0.3 inch or less in a 25 foot span.
- c. When a through traffic lane over 8.5 feet wide is constructed adjacent to an existing old pavement, bump correction or price adjustment to the Contractor for a bump will not apply if a bump exists at that location in the adjacent existing old pavement.

2. Dips.

- a. On all pavements, if the Engineer does not assess a price adjustment, correct dips of 0.5 inch to 1.0 inch in a 25 foot span, as indicated on the profilogram, except as stated in Article 2316.03, C, 3. Replace the pavement in areas with dips over 1.0 inch. Corrected dips will be considered satisfactory when the profilogram shows the dips are less than 0.3 inch in a 25 foot span.
- b. When a lane over 8.5 feet wide is constructed adjacent to an existing old pavement, correction of a dip or price adjustment to the Contractor for a dip will not be required if a dip exists at that location in the adjacent existing old pavement.

3. Exceptions.

When the Contractor is not responsible for the adjoining surface, bumps and dips in the 16 feet at the end of a section will be reviewed by the Engineer. Correct all bumps and dips determined to be under the control of the Contractor and resulting from the Contractor's operations. Correction of bumps and dips determined to be beyond the control of the Contractor will be paid according to Article 1109.03, B.

2316.04 SMOOTHNESS.

Pavement smoothness will be compensated by adding to (incentive) or subtracting from (price reduction) the price bid for pavement a determined amount for each segment. These amounts are identified in the appropriate schedule of Article 2316.05.

A. Pavement Where Schedule A Smoothness is Required.

- 1. For the appropriate categories of highway, as shown in Schedule A, incentives for pavement smoothness will be paid for each segment of pavement with an initial index per mile per segment of 3.0 inches or less.
- 2. For segments with an initial index of 7.1 to 10.0 inches per mile, the Contractor will be assessed a price reduction.
- 3. For segments with an index of 10.1 inches per mile and greater, grind the surface to a final index of 7.0 inches per mile or less.

B. Pavement Where Schedule B Smoothness is Required.

1. For all highways, incentives for pavement smoothness will be paid for each segment of pavement with an initial index of 12 inches per mile per segment or less.
2. For all segments with an initial index of 22.1 to 30.0 inches per mile, the Contractor will be assessed a price reduction.
3. For segments with an index of 30.1 inches per mile and greater, grind the surface to a final index of 22.0 inches per mile or less.

C. Pavement Adjacent to Existing Pavement.

1. Smoothness will be evaluated by the ABI as defined in Article 2316.02, A, 6 or 7, for each segment of new pavement 8.5 feet wide or more, and over 600 feet in length, which is to be matched to the surface of an existing pavement.
2. Surface correction is required for smoothness exceeding ABI + 12 when Schedule A is required and exceeding ABI + 30 when Schedule B is required. Payment will be based on results after correction according to Schedule C.
3. Longitudinally check areas not included in the profilograph test with a 10 foot straight edge. Ensure the surface does not deviate from a straight line by more than 1/8 inch in 10 feet. Meet requirements of Article 2316.03 for all corrections needed.

D. Bridge Approach Sections.

Smoothness of bridge approach sections will not be used in the calculations for incentive or price reduction of pavement segments, sections, or the project.

2316.05 SCHEDULE OF PAYMENT.

- A. For each traffic lane of main line pavement and each traffic lane of interchange ramps and loops evaluated for smoothness, as defined in Article 2316.02, A, the Engineer will determine the length of each segment in miles.
- B. For roadways, the Contractor may receive an incentive payment or be assessed a price reduction based on the number of qualifying segments and the initial profile index.
- C. Pavement segments excluding repair work that are subject to profilograph testing, as defined in Article 2316.02, D, will be considered for additional payment as a smoothness incentive or price reduction. For a segment to be qualified for incentive, there must be no grinding within that segment.
- D. Surface correction (grinding) of bridge approach sections, and as stated in Article 2316.03, C, 3, will not count as surface correction on adjacent pavement segments and will not detract from possible incentive payments on those segments.
- E. Single lift pavement resurfacing 2 inches thick or more that has milling or scarification of the original pavement will be rated using the multi-lift schedules.
- F. A \$1600 price adjustment will be assessed for each dip not corrected in each pavement lane under Schedule A and B, except as stated in Article 2316.03, C, 3. In addition, a \$1600 price adjustment will be assessed for each bump not corrected under Schedule A and B, except as stated in Article 2316.03, C, 3. Bumps and dips not corrected will also be included in the evaluation for the segment smoothness.
- G. The cost of certified smoothness and associated traffic control is incidental to the cost of the pavement.
- H. These payments or assessments will be based on the following schedules:

1. Schedule A Smoothness Requirements.

Pavement segments which are designated for Schedule A smoothness will be evaluated for incentive or price reduction assessments as follows:

Table 2316.05-1: Incentives for Pavement Smoothness

Initial Profile Index	Single-Lift Pavements		Multi-Lift Pavements	
	Primary	Non-Primary	Primary	Non-Primary
Inches Per Mile Per Segment ^(a)	Dollars Per Segment	Dollars Per Segment	Dollars Per Segment	Dollars Per Segment
0-1.0	700	300	250	125
1.1-2.0	600	250	200	100
2.1-3.0	450	200	150	50
3.1-7.0	Unit Price	Unit Price	Unit Price	Unit Price

^(a) For each segment of pavement that has an initial index, within the limits listed, with no grinding, the Contractor will receive an incentive payment as shown in the tabulation for the appropriate category.

Table 2316.05-2: Price Reduction for Pavement Smoothness

Initial Profile Index	Single-Lift Pavements		Multi-Lift Pavements	
	Primary	Non-Primary	Primary	Non-Primary
Inches Per Mile Per Segment ^(a)	Dollars Per Segment	Dollars Per Segment	Dollars Per Segment	Dollars Per Segment
3.1-7.0	Unit Price	Unit Price	Unit Price	Unit Price
7.1-10.0	200	100	100	50
10.1 & Over ^(a)	Grind Only	Grind Only	Grind Only	Grind Only

^(a) For segments with an initial index of 10.1 and over, grind the surface to a final index of 7.0 or better. In lieu of grinding the surface to a final index of 7.0 or better, the Contractor may elect to replace part or all of the segment.

2. Schedule B Smoothness Requirements.

- a. Pavement segments designated for Schedule B smoothness and indexed in segments greater than 50 feet will be evaluated for incentive or price reduction as shown in Tables 2316.05-3 and 2316.05-4.
- b. No price reduction assessment will be made for individual segments shorter than 50 feet properly corrected if required.

Table 2316.05-3: Incentives for Pavement Smoothness

Initial Profile Index	New Pavements	Resurfaced Pavements
Inches Per Mile Per Segment ^(a)	Dollars Per Segment	Dollars Per Segment
0-4.0	600	300
4.1-8.0	500	250
8.1-12.0	400	200
12.1-22	Unit Price	Unit Price

^(a) For each segment of pavement that has an initial index, within the limits listed, with no grinding, the Contractor will receive an incentive payment as shown in the tabulation for the appropriate category.

Table 2316.05-4: Price Reduction for Pavement Smoothness

Initial Profile Index	New Pavements	Resurfaced Pavements
Inches Per Mile Per Segment^(a)	Dollars Per Segment	Dollars Per Segment
12.1-22.0 22.1-30.0 30.1 & Over ^(a)	Unit Price 500 Grind Only	Unit Price 250 Grind Only
^(a) For segments with an initial index of 30.1 and over, grind the surface to a finish index of 22.0 or better. In lieu of grinding the surface to a final index of 22.0 or better the Contractor may elect to replace part or all of the segment.		

3. Schedule C Smoothness Requirements (Pavement Adjacent to Existing Pavement).

For new pavement which has been matched to an existing old pavement for which an Average Base Index (ABI) was calculated, the pavement will be evaluated for a price reduction for each segment based on Schedule A or Schedule B payment.

Table 2316.05-5: Initial Profile Index or Profile Index after Correction

Schedule A Inches Per Mile Per Segment	Schedule B Inches Per Mile Per Segment	Dollars Per Segment
0 to ABI	0 to ABI	0
ABI + 0.1 to ABI +4 incl.	ABI + 0.1 to ABI + 10 incl.	300
ABI + 4.1 to ABI +8.0 incl.	ABI + 10.1 to ABI + 20 incl.	500
ABI + 8.1 to ABI +12 incl.	ABI + 20.1 to ABI + 30 incl.	800
Greater than ABI + 12	Greater than ABI + 30	Grind Only

4. Bridge Approach Sections.

Correct bridge approach sections for smoothness as specified in Section 2428.

Section 2317

2317, Primary and Interstate Pavement Smoothness.

Retitle the Section:

Primary and Interstate Pavement Smoothness

Division 24. Structures.

Section 2403

2403.03, F, 5.

Replace Articles c through e:

- c. When insulation is used, apply an adequate amount of approved insulating material to formwork and exposed concrete surfaces to maintain concrete temperature in compliance with the requirements of Article 2403.03, F, 5, d. Install and secure insulation in a manner which provides uniform and consistent protection across the entirety of each insulated face of the concrete element. Individually insulate metal which protrudes or projects from the formwork or finished concrete surface (e.g., metal formwork bracing, reinforcing steel projections), as needed to manage heat loss. Do not allow water or wind to compromise the effectiveness of the insulation. When blanket insulation is used, ensure edges and seams are overlapped, sealed and secured from disturbance. After placement, leave insulation undisturbed until the concrete attains a minimum age of 96 hours.

- d. The duration of required cold weather protection shall be the first 96 hours after placing, subject to the following temperature controls. Maintain the concrete temperature at no less than 50°F for the first 48 hours after placing. After the first 48 hours, the concrete temperature may be allowed to gradually reduce for the next 48 hours at a rate not exceeding 25°F in 24 hours.
- e. Monitor concrete temperatures for the ~~first 96 hours after placement~~ full duration of required cold weather protection. Furnish and install approved commercial temperature monitoring equipment configured to automatically record a minimum of one reading per hour for the ~~96-hour~~ full duration of temperature monitoring. The temperature monitoring equipment must be accurate within +/-2°F in the temperature range of 0°F to 180°F. The quantity and location of temperature sensors will be approved by the Engineer prior to concrete placement. Up to eight sensors per placement shall be situated to provide representative monitoring of concrete surface temperatures throughout the placement, with one sensor located in the area of minimum expected concrete temperature. Position the sensors with 2 inches clear cover to the surface of the concrete. Furnish temperature readings to the Engineer prior to discontinuation of cold weather protection.

2403.05, A, 4.

Replace the second sentence:

The additional payment for cold weather protection will ~~be \$17.00~~ include base payment of \$9.00 per cubic yard, plus payment of \$2.00 per cubic yard per day of required cold weather protection.

Section 2408**2408.02, Q, 2, a, 1.**

Replace the first sentence:

Perform shop painting only in a facility approved by AISC, ~~SSPC AAMP~~, or the Engineer.

2408.02, Q, 2, b, Non-Weathering Structural Steel Applications.

Replace Articles 3 through 6:

3) Prime Coat.

- a) Apply a coat of zinc silicate paint to all surfaces as soon as possible after blasting and before formation of any surface rust, and no later than 16 hours after blasting the surface. Approved paints are shown in [Materials I.M. 482.02, Appendix A](#). Use a target average dry film thickness of 4 mils with no spot measurement below 3 mils or above 6 mils.
- b) Apply a stripe coat by brush to edges, welds, crevices, bolt heads, and other surface irregularities when applying the primer coat. The stripe coat may be applied to the surface by spray as long as it is immediately and thoroughly worked into these areas by brush.
- ~~b~~ c) Perform repairs or build-up of the paint film as soon as possible, and no later than 24 hours from the initial application.
- ~~c~~ d) Completely reblast and repaint steel members with coating areas measuring less than 3 mils that have not been corrected within 24 hours.
- ~~d~~ e) Correct, to the Engineer's satisfaction, all defects in application such as runs, sags, mud cracking, over-spray, and dry spray.
- ~~e~~ f) Excessive coating thickness is as equally undesirable as unacceptably thin coating thickness, and both will be sufficient cause for rejection. Excessive thickness will be evaluated on a case-by-case basis in consultation with the coating manufacturer.
- ~~f~~ g) Inorganic zinc silicate paint film will be considered cured and ready for shipment after achieving a ~~minimum~~ resistance rating of 4 as verified by 50 Methyl Ethyl Ketone (MEK) rubs as per ASTM D 4752. Moisture misting and plastic tenting may be required during cold application temperatures and low relative humidity conditions to aid in prime coat curing.

4) Top Coat.

- a) When designated by the contract documents, shop apply a topcoat of waterborne acrylic paint to all primed surfaces. Paint galvanized fasteners according to [Article 2408.02, Q, 2, b, 5](#), after bolting. It is recommended that application be initiated with a mist coat applied prior to full coat application. To avoid moisture condensation, keep the top coat under a roof, protected from dirt, dust, and moisture, in an area where the temperature is maintained above 40°F for a minimum 24 hours after painting is completed.

- b) When a topcoat of waterborne acrylic paint is designated, apply a stripe coat prior to full topcoat application by brush to edges, welds, crevices, bolt heads, and other surface irregularities. The stripe coat may be applied to the surface by spray as long as it is immediately and thoroughly worked into these areas by brush.
 - b c) Shield concrete at all junction points of concrete and steel so that application of paint on steel is complete without overspray on the concrete.
 - e d) Approved paints are listed in [Materials I.M. 482.05, Appendix A](#). Ensure the dry film thickness of the top coat is a minimum of 2 mils. Unless otherwise specified in the contract documents, use a topcoat color that is Iowa standard foliage green Federal Color Standard Number 14223.
- 5) **Field Repair and Painting.**
- a) After erection, repair and repaint paint damage due to transportation, handling, or construction activities. Use an approved zinc rich epoxy paint listed in [Materials I.M. 482.02, Appendix C](#), for repairing primer, priming un-galvanized fasteners, and any coating damage to galvanized fasteners.
 - b) Ensure areas to be repaired and repainted are clean, dry, and free from grease, oil, corrosion products, and other detrimental materials. Do not apply paint to surfaces unless they are free from moisture or frost and conform to the paint manufacturer's requirements for environmental conditions. Follow the paint manufacturer's recommendations for repair.
 - c) When designated by the contract documents, include a field applied waterborne acrylic topcoat.
- 6) **Cleaning of Paint Surfaces.**
Upon completion of concrete placement, clean exposed structural steel surfaces specified for painting to remove all concrete and laitance before the concrete sets up.

2408.02, Q, 2, c, Weathering Structural Steel Applications.

Replace Articles 1 and 2:

- 1) **Prime Coat.**
- a) Apply a coat of zinc silicate paint to all surfaces as soon as possible after blasting and before formation of any surface rust, and no later than 16 hours after blasting the surface. Approved paints are shown in [Materials I.M. 482.02, Appendix A and Appendix C](#). Ensure the minimum average dry film thickness is 4 mils with no spot measurement below 3 mils or above 6 mils.
 - b) Apply a stripe coat by brush to edges, welds, crevices, bolt heads, and other surface irregularities when applying the primer coat. The stripe coat may be applied to the surface by spray as long as it is immediately and thoroughly worked into these areas by brush.
 - c) Perform any repairs or build up to the applied prime coat as soon as possible and no later than 24 hours from the initial application.
- 2) **Top Coat.**
- a) Apply a top coat of waterborne acrylic paint from the approved lists shown in [Materials I.M.s 482.05, Appendix A](#); or [482.07, Appendix A](#), to the primed surfaces after the primer has cured to a minimum resistance rating of 4 as verified by 50 MEK rubs as per ASTM D 4752 for inorganic zinc rich primers. Use a top coat color matching Federal Color Standard Number 20045. Ensure the top coat covers all the primed surfaces, except faying surfaces of bolted joints, with a uniform film of paint.
 - b) Apply a stripe coat by brush to edges, welds, crevices, bolt heads, and other surface irregularities when applying the primer coat. The stripe coat may be applied to the surface by spray as long as it is immediately and thoroughly worked into these areas by brush.
 - c) Apply the top coat in the shop unless otherwise permitted in writing by the Engineer.

Section 2412

2412.03, D, 4, a, 8.

Replace the Article:

Continuously remove slurry or residue resulting from grooving operations. Do not deposit on deck or approach pavement. Leave deck and approach pavements in a clean condition. Ensure residue from grooving operations does not flow across lanes occupied by public traffic or into gutters or other drainage facilities. This residue may be spread on foreslope or removed according to [Article 1104.08](#). When residue is deposited on the foreslope in areas where cable guardrail is present, spread the residue in a manner that prevents it from collecting in the sockets for the cable guardrail system. Take measures to prevent damage to vegetation during spreading of residue. If damage occurs, repair at no cost to the Contracting Authority. Do not allow discharge of slurry or residue into gutters, drainage facilities, or waterbodies.

Section 2433**2433.03, D, 1, g.****Replace** the Article:

The dry method of construction will not be allowed for drilled shafts with shale and/or mudstone identified in the bearing strata of the soil profile.

Section 2435**2435.03, F, 1, General.****Add** the Article and **renumber** following Article:

- c. Install replacement fillet as necessary.
- d. Place backfill material according to [Section 2552](#).

2435.05, H, 2.**Replace** the Article:

Payment is full compensation for coring into the existing manhole or intake, removal of existing fillet, pipe connections, replacement of fillet, grout, and waterstop (when required).

Division 25. Miscellaneous Construction.**Section 2503****2503.04, D, Connection to Existing Manhole or Intake.****Replace** the Article:

Connections to existing manhole or intake will be measured according to [Article 2435.04, GH](#).

2503.05, D, Connection to Existing Manhole or Intake.**Replace** the Article:

Connections to existing manhole or intake will be paid according to [Article 2435.05, GH](#).

Section 2508**2508.01, A, 3, b, 2, a, 1.****Replace** the Article:

Areas of deteriorated paint where the existing top coat is peeled or deteriorated and the underlying existing primer is in sound condition. In these cases, remove only the loose existing top coat by manual methods complying with SSPC-SP2 so the underlying existing primer is left in place. Remove the deteriorated top coat back to the boundary of soundly adhering top coat. A soundly adhering top coat is defined as that which cannot be lifted from the primer with a putty knife according to SSPC-SP3.

2508.01, A, 3, b, 9, a.**Replace** the second sentence:

Chloride ions after blasting and blow down shall be less than 157 µg of chloride per 100 mm² square centimeter.

2508.01, A, 4, a, General.**Add** the Article and **renumber** following Article:

- 3) Provide a written description, shop drawings, and calculations for the design and construction of work platforms, and containment and ventilation systems, including, but not limited to the following:
 - Provide detailed drawings signed and stamped by a Professional Engineer licensed in the State of Iowa.

- Data, calculations, and assumptions used for the design of the containment and ventilation system, structural impact analysis, and the imposed loads (including wind loads) on the existing structure, signed by a Professional Engineer licensed in the State of Iowa. Include the design airflow within containment, and the locations and sizes of air inlets and exhaust.
 - The plan for staging, installing, moving, and removing the containment, and the methods of attachment that will be used. Make attachment points to specific, substantial framing members only.
 - Provide a written plan describing the rigging and staging for this project. Have the plan signed by a Professional Engineer licensed in the State of Iowa verifying the bridge's ability to support all loads imposed by the Contractors operations, including but not limited to, the containment, rigging, temporary access and materials storage.
 - Include the methods of access that will be provided to work areas inside containment, locations of safety lines, and locations of containment entryways.
 - The methods and procedures that will be used for cleaning and securing the containment at the end of each work day, and the cleaning undertaken prior to dropping or relocating the containment.
 - Technical data sheets, specification sheets, any other information needed to thoroughly describe the containment plan and materials proposed for use. Provide the manufacturer's specifications for the proposed enclosure material(s), including information on light transmittance, flame spread, and fuel contributed, burst strength, abrasion durability, and unit weight of material. Only use materials that are flame retardant.
 - A description of debris collection and air filtration equipment, including the equipment data sheets, airflow capacity, equipment weights and temporary utility service requirements.
 - The methods of access that will be provided to work areas inside containment, and locations of safety lines.
- 3 4)** Suspend blasting if the Engineer determines that air expelled from containment or from the vacuum nozzle has noticeable dust or particulate matter. If the Engineer determines the containment measures are inadequate, alter the removal operation or the containment to meet the Engineer's requirement.

2508.01, B, 3, b, 4.

Replace the second sentence:

SSPC Technology Update No. 7 provides guidance on sampling methodology, however, Locations where it is recommended to take samples include:

2508.01, B, 4, b, 2.

Add as the second sentence:

Ensure that all containment materials are flame retardant.

2508.01, B, 4, b, 3.

Add the Article:

- e) When vacuum-shrouded power tool cleaning is performed, construct and use an SSPC Class 3P containment system. When power tool cleaning is performed without vacuum attachments, erect an SSPC Class 2P containment system.

2508.01, B, 5, c, 3.

Add to the end of the Article:

Prior to shipment of waste from the project site, provide the names, addresses, qualification/certifications, and permits for the proposed hauler of hazardous waste and waste disposal facility.

2508.02, E, 2, b, Prime Coat.

Replace Articles 3 and 4:

- 3) ~~Pay special attention to all rivets, bolts, edges of connections, areas of pack rust, and areas which may be difficult to access. These areas may require ringing/stripping.~~ Apply a stripe coat by brush to edges, welds, crevices, bolt heads, and other surface irregularities when applying the primer coat. The stripe coat may be applied to the surface by spray as long as it is immediately and thoroughly worked into these areas by brush.

- 4) Allow the prime and stripe coats to cure according to the coating manufacturer's recommendations before the intermediate coat is applied.

2508.02, E, 2, c, Intermediate Coat.

Add the Article and renumber following Article:

- 2) Apply a stripe coat by brush to edges, welds, crevices, bolt heads, and other surface irregularities when applying the primer coat. The stripe coat may be applied to the surface by spray as long as it is immediately and thoroughly worked into these areas by brush.
- 2 3) The Zinc Silicate system does not require an intermediate coat.

2508.02, E, 6, b.

Replace the Article:

Seal cracks and seams less than 3/16 inch wide with the prime coat. Seal cracks and seams that cannot be sealed with the prime coat using caulk before after the intermediate coat and before the top coat is applied. In the case of Zinc Silicate, this will be after the primer and before the top coat is applied.

Section 2511

2511.03, B, 2, b, 1.

Replace the second sentence:

Prepare subgrade according to [Article 2109.03, CB](#).

Section 2528

2528.01, C, 1.

Replace the Article:

Maintain a trained Traffic Control Technician on staff, even though the traffic control portion of the contract may be subcontracted. The trained Traffic Control Technician is required to have attended and passed the exam in an ATSSA Traffic Control Technician, IMSA Work Zone Traffic Control, Iowa AGC Traffic Control Technician class, Minnesota DOT Traffic Control Supervisor training class, or Texas Engineering Extension Service Work Zone Traffic Control training class. This trained Traffic Control Technician is responsible for overall management of the Contractor's quality control program for traffic control. Starting April 2018, the Traffic Control Technician shall retake and pass the exam in one of the approved classes every 5 years. To maintain trained status, the Traffic Control Technician shall attend and pass the exam in an approved training class at a minimum of every 5 years.

2528.03, J, Flaggers.

Rename Article and Add the Article:

J. Flaggers and Automated Flagger Assistance Devices.

7. Automated Flagger Assistance Devices.

- a. Contractor may choose to use Automated Flagger Assistance Devices (AFADs) for flagging operations. Ensure all AFADs meet the current requirements of the MUTCD Section 6E.04 and 6E.06.
- b. AFADs shall be operated by trained flaggers who have been instructed in the operation of AFADs used on the project. Trained flaggers shall be available to step in as manual flaggers in case of an AFAD malfunction.
- c. Place AFADs where flagger stations are shown on the project plans. AFADs shall be clearly visible to approaching traffic, and if used at night, illuminated as flagger stations.
- d. A flagger operating an AFAD shall have direct line of sight to the AFAD location and an unobstructed view of approaching traffic. The use of a camera to monitor the AFAD and/or the approaching traffic is not permitted in lieu of a manual flagger.
- e. Flaggers shall not perform other duties while operating AFADs. Flaggers shall not leave AFADs unattended at any time while they are in use. AFADs shall not be operated by a pilot car driver.

- f. A single flagger is permitted to operate two AFADs if the following requirements are met:
 - 1) The flagger has unobstructed view of both AFADs,
 - 2) The flagger has unobstructed view of both directions of approaching traffic,
 - 3) The distance between AFAD locations is not greater than 1000 feet.
- g. Immediately replace AFADs with manual flaggers in the event of malfunction. The Contractor shall have an equal number of trained flaggers present on-site available to operate the number of AFADs in use.
- h. Remove AFADs from the roadway when not in use.

2528.03, Construction.

Add the Article and renumber existing Article O:

O. Truck-Mounted or Trailer-Mounted Attenuator.

1. When specified in the contract documents, furnish, operate, and maintain a Truck-mounted or Trailer-mounted Attenuator (TMA) that meets Test Level 3 (TL-3) requirements of NCHRP 350 or MASH-16.
2. Operate and maintain the TMA according to the manufacturer's recommendations, the contract documents, and/or as directed by the Engineer. Place the TMA as detailed in the appropriate Standard Road Plans or other contract documents.

P. Limitations.

2528.04, J, Flaggers.

Rename Article and Add the Article:

J. Flaggers and Automated Flagger Assistance Devices.

3. AFADs will not be measured for payment separately, but they may be used as a supplement or an alternate to flaggers. Flaggers will include AFADs, if AFADs are used as described in this specification. Flaggers will be measured as a single unit for the combination of manual flagger and AFAD at each flagger station location. If more than one AFAD is controlled by a single manual flagger, Flagger will be measured for payment by the flagger station locations (AFAD locations).

2528.04, Method of Measurement.

Add the Article:

M. Truck-Mounted or Trailer-Mounted Attenuator.

The Engineer will count the number days that a TMA is required by the contract documents.

2528.05, J, Flaggers.

Rename Article and Add the Articles:

J. Flaggers and Automated Flagger Assistance Devices.

3. No direct payment for AFADs will be made for installation, operation, relocation, maintenance, or removal of the devices.
4. Additional flagging related signs and devices necessary to comply with requirements related to the use of AFADs will not be paid for directly but shall be incidental to Traffic Control.

2528.05, Basis of Payment.

Add the Article:

M. Truck-Mounted or Trailer-Mounted Attenuator.

Payment will be at the contract unit price per calendar day for each TMA provided. Payment is full compensation for furnishing, placing, operating, and maintaining the TMA.

Section 2529

2529.02, B, 9, Concrete Mixtures.

Add to the end of the Article:

When earlier opening time is required, use rapid set patch materials in accordance with Materials I.M. 491.20 and manufacturer's recommendations.

2529.02, B, 10, Dowel Bars and Tie Bars.

Add as the second sentence:

Glass fiber reinforced polymer (GFRP) dowels meeting limitations and requirements of Section 4156 may be substituted for dowel bars only.

2529.03, G, 4.

Add as the fourth sentence:

Cure patches using rapid set patch materials a minimum of 3 hours.

2529.03, H, Smoothness.

Replace the Article:

Apply Section ~~2316~~ 2317 to smoothness of full depth finish patches (except when the contract includes an overlay or pavement surface repair by diamond grinding or milling within the patch area) with the following modifications for Full Depth Finish Patches (50 feet or greater in length):

1. Smoothness testing and evaluation is required for each patch with a length of 50 feet or more. For full lane width patches, perform the testing near the center of the traffic lane after the patch is placed. For partial lane width patches, perform testing in the patched wheel path.
2. Patches 50 feet to 100 feet in length:
 - a. Test the patch length, and the existing pavement in that lane, for a distance of three times the patch length on both ends of the patch. If a patch occurs near a bridge, an intersection, and so forth, where the proper distance cannot be tested, make up the required total on the other end of the patch. If interference occurs on both ends, test only to the points of interference.
 - b. Establish ~~one Average Base Index (ABI) of the pavement for both ends of patch~~ a Mean Roughness Index for the patch, MRI_{patch} .
 - c. ~~Calculate a new index for the entire length.~~ Establish a Mean Roughness Index for the existing pavement on both ends of the patch, $MRI_{preexisting\ pavement}$.
 - d. Compare the ~~new index with the ABI~~ MRI_{patch} to $MRI_{preexisting\ pavement}$. Perform surface correction according to Article ~~2316.03~~ 2317.04 ~~to a profile index so that the MRI is less than the ABI~~ $MRI_{preexisting\ pavement}$ when either of the below listed conditions exists:
 - 1) ~~New profile index~~ MRI_{patch} exceeds ~~12.0~~ 75.0 inches per mile and exceeds ~~ABI~~ $MRI_{preexisting\ pavement}$ by more than ~~2.0~~ 7.5 inches per mile.
 - 2) ~~New profile index~~ MRI_{patch} exceeds ~~30.0~~ 90.0 inches per mile and exceeds ~~ABI~~ $MRI_{preexisting\ pavement}$.
 - e. Corrective action involves correction of ~~bumps and dips exceeding a vertical height of 0.5 inch in a 25 foot span in the patch~~ areas of localized roughness, if identified from the trace, plus appropriate surface correction within the patch and existing pavement, or both, on either end of the patch within the limits tested.
3. Patches 100 feet to 250 feet in length: Article 2529.03, H, 2, applies, except the length tested is the patch length, and the existing pavement in that lane for a distance of 300 feet on both ends of the patch.
4. Patches over 250 feet in length: Apply the requirements ~~for Chart B pavement,~~ of Section ~~2316~~ 2317.

Section 2532

2532.03, D, 1, b.

Replace the Article:

Continuously remove all slurry or residue resulting from the grinding operations. Do not deposit on the slab or shoulder. Leave pavement and paved shoulders in a clean condition. Ensure residue from grinding operations does not flow across lanes occupied by public traffic ~~or into gutters or other drainage facilities~~. This residue may be spread on the foreslope or removed according to [Article 1104.08](#). When residue is deposited on the foreslope in areas where cable guardrail is present, spread the residue in a manner that prevents it from collecting in the sockets for the cable guardrail system. Take measures to prevent damage to vegetation during spreading of residue. If damage occurs, repair at no cost to the Contracting Authority. Do not allow discharge of slurry or residue into gutters, drainage facilities, or waterbodies.

Section 2549

2549, Pipe, Culvert, and Manhole Rehabilitation.

Replace the Section title:

Pipe, Culvert, and Manhole Cleaning and Rehabilitation

2549.01, Description.

Replace the Article:

This section was developed in conjunction with [Sections 4050](#) and [6020 of the SUDAS Standard Specifications](#), with modifications to suit the needs of the Department.

A. Pipe Cleaning.

1. Mainline pipe cleaning (not associated with a rehabilitation or pre-inspection) is light pipe cleaning with a hydraulic flusher and includes cleaning the pipe and associated manholes, including drop connections and benches, to remove all deposits settled (DS).
2. Pre-rehabilitation cleaning and inspection is light pipe cleaning with a hydraulic flusher. Does not include root cutting or removal of deposits or protruding service connections.
3. Additional pipe cleaning is heavy sewer or culvert cleaning including an unlimited number of passes with high velocity hydro cleaning equipment / hydraulic spinner nozzle, cutting roots, removing deposits of attached encrustation (DAE), and removing deposits of attached grease (DAGS). Does not include lateral cuts.

B. Cured-in-place Pipe (CIPP) Lining:

1. Sewer Main or Culvert.
2. Service (Lateral) Repair.
3. Point Repair.

C. Pressure Testing and Grouting of Sewer Joints.

D. Sewer pipe spot repairs.

~~D. Pre-rehabilitation cleaning and inspection is light cleaning including an unlimited number of passes with a hydraulic flusher. Does not include root cutting or removal of deposits or protruding service connections.~~

~~E. Additional cleaning is heavy cleaning including an unlimited number of passes with high velocity hydro cleaning equipment / hydraulic spinner nozzle, cutting roots, removing deposits of attached encrustation (DAE), and removing deposits of attached grease (DAGS). Does not include lateral cuts.~~

- F E.** Rehabilitate existing manholes to waterproof and to prevent inflow and infiltration, to prevent corrosion, or to reestablish the structural integrity of the manhole. Includes construction of structural liners, protective liners, and infiltration barriers.

2549.03, A, 3, Sewer Cleaning and Inspection for Rehabilitation.

Replace the title:

Sewer Cleaning and Inspection ~~for Rehabilitation~~.

Replace Articles c and d:

c. ~~Pre-Rehabilitation~~ Pipe Cleaning.

- 1) Perform light cleaning with hydraulic flusher or high velocity cleaning equipment to remove loose debris.
- 2) Complete up to three passes in an attempt to remove all debris from pipe.
- 3) If the ~~pre-rehabilitation~~ light cleaning fails to leave the pipe in a condition ready for lining, contact Engineer for authorization to proceed with additional sewer cleaning.

d. Additional Sewer Cleaning.

- 1) Notifying Engineer prior to performing heavy cleaning as required to remove obstructions, grease, rock, sticks, ~~deposits settled (DS), deposits attached grease (DAGS), deposits attached encrustation (DAE),~~ and roots, so the sewer is ready for lining. This item does not include cutting/grinding protruding service lines.
- 2) Utilize bucket machines with Teflon or equivalent covers, rotating nozzles, saws or cutters, or high velocity hydro-cleaning equipment.
- 3) Keep all debris removed during additional cleaning separate from debris removed during light cleaning. Prior to removal, decant and press debris onsite. Discharge decanted water into a sanitary sewer or other Engineer approved location prior to obtaining the tonnage of the material removed from the pipe.
- ~~3~~ 4) Notify Engineer prior to use of mechanical/hydraulic spinner nozzle, chain flail, or other devices that may damage pipe or service connections.
- ~~4~~ 5) If deposits and obstructions cannot be removed by tools normally used in the pipe cleaning industry, notify Engineer immediately.
- ~~5~~ 6) Maintain a log of time spent performing additional pipe cleaning on each pipe segment.

2549.03, A, 3, e, 1.

Replace the Article:

Grind or cut services that protrude more than 1/2 inch into the sewer main ~~as approved by the Engineer~~.

2549.04, A, Pipe and Culvert Cleaning and Inspection for Rehabilitation.

Replace the title and Article:

Pipe and Culvert Cleaning and Inspection ~~for Rehabilitation~~.

1. Mainline Cleaning.

Measurement will be made for each diameter range of sewer main or diameter of culvert cleaned.

~~1~~ 2. Pre-Rehabilitation Cleaning and Inspection.

Measurement will be made for each diameter range of sewer main or diameter of culvert cleaned and inspected prior to rehabilitation.

~~2~~ 3. Additional Sewer or Culvert Cleaning.

Measurement will be made on an hourly basis for additional pipe cleaning for each diameter range of sewer main or diameter of culvert.

4. Debris Removal, Transportation, and Disposal.

Measurement will be made on a per ton basis for decanted and pressed debris removed as a part of additional pipe or culvert cleaning.

2549.05, A, Pipe and Culvert Cleaning and Inspection for Rehabilitation.

Replace the title and Article:

Pipe and Culvert Cleaning and Inspection ~~for Rehabilitation.~~**1. Mainline Cleaning.**

- a. Payment will be made at the unit price per linear foot for each diameter of cleaning.
- b. Payment is full compensation for light sewer cleaning, debris removal and transport, post CCTV inspection for Engineer review (sewer pipe only), and logging of active service taps (if specified). Unit price also includes disposal and associated costs for all debris removed from sewer.

2. Pre-Rehabilitation Cleaning and Inspection.

- a. Payment will be made at the unit price per linear foot for each diameter of pre-rehabilitation cleaning and inspection.
- b. Payment is full compensation for pre-cleaning CCTV inspection (sewer pipe only), light sewer cleaning, debris removal and transport, post cleaning CCTV inspection for Engineer review (sewer pipe only), and identification and logging of active service taps (if applicable). Unit price also includes disposal and associated costs for all debris removed from pipe.

3. Additional Sewer or Culvert Cleaning.

- a. Payment will be made at the unit price per hour for additional pipe cleaning.
- b. Payment is full compensation for heavy pipe cleaning; root cutting; deposit cutting; ~~and removing, transporting, disposing, paying associated costs for all debris removed from sewer,~~ and post cleaning CCTV inspection for Engineer review.

4. Debris Removal, Transportation, and Disposal.

- a. Payment will be made at the unit price per ton for additional pipe cleaning based on tickets from an approved landfill site.
- b. Payment is full compensation for removing, decanting, transporting, disposing, and paying associated costs for all debris removed from pipe.

Section 2552**2552.04, C, Replacement of Unsuitable Backfill Material.**

Replace the title:

Removal, Disposal, and Replacement of Unsuitable Backfill Material.**2552.05, A, 2.**

Replace the Article:

Removal and disposal of ~~unsuitable excess backfill material encountered during standard trench excavation~~ resulting from pipe installation.

2552.05, D, Replacement of Unsuitable Backfill Material.

Replace the title and Article:

Removal, Disposal, and Replacement of Unsuitable Backfill Material.

1. Payment will be at the contract unit price per cubic yard for the quantity of ~~the suitable replacement~~ backfill material furnished.
2. Payment is full compensation for ~~removal, hauling, and disposal costs of the unsuitable material and the~~ furnishing, hauling, and placing of the suitable replacement backfill material. Unit price does not include landfill costs for contaminated materials.

Section 2554

2554.03, A, 7, e, Surface Water Crossings.

Replace the first paragraph:

Comply with Recommended Standards for Water Works, 2007 2012 Edition (~~Great Lakes Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers~~).

Section 2556

2556.02, A, 1.

Replace the Article:

Ensure epoxy coated dowel bars, 1.25 inches by 15 inches for pavement less than 10 inches and 1.5 inches by 15 inches for pavement 10 inches or greater, conform to requirements of [Section 4151](#). Uniformly coat dowel bars with approved bond breaker according to [Article 4151.02, B](#). Glass fiber reinforced polymer (GFRP) dowels meeting limitations and requirements of Section 4156 may be substituted.

2556.03, B, 1.

Add as the third sentence:

Cut slots to required width to prevent chairs from moving during placement of grout or the chair width plus 1/8 inch.

Section 2558

2558, Cross Stitching of Concrete Pavement.

Add the Section:

Section 2558. Cross Stitching of Concrete Pavement

2558.01 DESCRIPTION.

Drill holes and anchor deformed tie bar reinforcement diagonally across cracks or longitudinal joints in concrete pavement in accordance with the details shown on the plans. Do not use on transverse cracks or joints.

2558.02 MATERIALS.

A. Reinforcing Steel.

Use an epoxy coated No. 6 deformed steel bar meeting [Section 4151](#) of the Standard Specifications.

B. Epoxy Grout.

Use epoxy grout in accordance with [Materials I.M. 491.11, Appendix A](#).

2558.03 CONSTRUCTION.

A. Equipment

Use a low impact hydraulic drill with a tungsten carbide bit. An air operated drill may be used with approval of the Engineer. Do not damage the surface or crack the concrete when drilling. Demonstrate the process prior to use on the repair pavement.

B. Drilling Holes.

1. Drill a 7/8 inch diameter hole transversely across the joint at an angle and distance as described in Standard Road Plan PV-109.
2. Use a drilling guide to ensure the angle and distance are correct and consistent. Cross sectional view of drilling into slab is shown in the plans.
3. Drill holes on alternating sides of the joint line at 24 inch spacing, avoiding any in-place bars.

4. Do not drill completely through the slab. Leave approximately 1 inch undrilled at the bottom of the slab. If hole punches through bottom of slab, fill with epoxy and move 6 inches.
5. Maintain at least 18 inches from load transfer devices.

C. Cleaning Holes.

Blow air into holes to remove dust and debris. The air must be free of oil and other contaminants.

D. Insert Tie Bar.

1. Pour the epoxy into the hole, leaving some volume for the bar to occupy the hole.
2. Insert the tie bar into the hole, remove excess epoxy and finish flush with the pavement surface.
3. Leave approximately 1 inch of cover at the surface of the slab when using the dimensions in Standard Road Plan PV-109.

E. Opening to Traffic.

Do not open pavement to traffic until the epoxy is tack free.

2558.04 METHOD OF MEASUREMENT.

The number of each installed cross-stitched tie bar location will be counted.

2558.05 BASIS OF PAYMENT.

The Contractor will be paid the contract unit price for each installed cross-stitched bar. This price is full compensation for furnishing all materials, tools, labor, equipment and incidentals necessary to complete the work.

Division 41. Construction Materials.

Section 4116

4116.05, Cement Requirements.

Replace Table 4116.05-1:

Table 4116.05-1: Cement Types and Substitutions

Cement Type	Min. Required Substitution	Max. Allowable Substitution
Type I, Type II, IL	20% Class F Fly Ash	25% Class F Fly Ash
Type I, Type II, IL	25% GGBFS	35% GGBFS
Type IS, IP, IT	---	20% Class C Fly Ash

Section 4138

4138.01, A.

Replace the third bullet:

Slow Curing (SC) ~~AASHTO M 140~~ ASTM D 2026

Section 4145

4145.04, E.

Add as the second bullet:

- Computed wall thickness is defined as 1 inch per foot of pipe diameter or equivalent diameter, plus 1 inch.

4145.04, F.

Delete the Article:

~~F. Compute wall thickness based on the following: No more than 1 inch per foot of pipe diameter or equivalent diameter, plus 1 inch.~~

Section 4149

4149.02, A, 9, a.

Replace the Article:

Comply with ASTM F ~~2736~~ 2764.

Section 4184

4184, Reflectorizing Spheres for Traffic Paint.

Replace the Section:

4184.01 DESCRIPTION.

- A. This specification covers two types of glass spheres or beads, dual coated and uncoated, for the production of reflectorized pavement markings.
 - Waterborne and VOC compliant solvent borne traffic paint: use dual coated beads (silicone and silane).
 - Epoxy pavement markings: use silicone only coated beads (no silane).
 - Refer to Table 4184.02-1 for gradations of waterborne and VOC compliant solvent borne traffic paint.
 - Refer to Table 4184.02-2 for gradations of multi-component liquid pavement markings.

- B. The glass beads shall not exhibit a characteristic of toxicity, relative to heavy metals. Glass beads shall not contain more than 200 ppm total of lead, antimony, or arsenic. Manufacturer shall provide a certificate of analysis stating total lead, antimony, and arsenic content for each batch of glass beads supplied. Use transparent, clear, colorless glass spheres that are:
 - Free from milkiness, dark particles, and excessive air inclusions.
 - Essentially clear from surface scarring or scratching.
 - Free of hard lumps and clusters
 - Readily dispensed under any conditions suitable for paint striping.
 - Virgin glass for 0.850 mm (20 Sieve) and larger glass spheres.

- C. Glass Beads shall meet AASHTO M247 requirements and the following specific requirements.

4184.02 SPECIFIC REQUIREMENTS.

A. Gradation.

Meet the gradation requirements of Table 4184.02-1 or Table 4184.02-2 depending on marking type.

**Table 4184.02-1: Gradation Requirements
(Standard Blend Glass Spheres/Beads)**

Sieve Size	Percent Passing*	Percent Retained*
16	100	0
20	90-100 85-92	8-15
30	50-75 50-67	25-35
40	45-45 0-37	30-50
50	0-15	15-35
80		0-10
pan		0-2

* Shall meet either Percent Passing or Percent Retained gradation but not required to meet both.

**Table 4184.02-2 Gradation Requirements
(Utah Blend Glass Spheres/Beads)**

Sieve Size	Percent Passing
16	90-100
18	65-80
20	
30	30-50
40	
50	0-5
80	
pan	

B. Roundness.

Minimum of 80% true spheres.

C. Refractive Index.

Minimum refractive index of 1.50.

D. Properties of Dual Coated Spheres.

1. Coated with a dual coating that has both a moisture resistant silicone coating and an adhesion promoting silane coating.
2. Passes the moisture resistance test and the adherence coating test.

E. Properties of Silicone Coated Spheres.

1. Coated only with a silicone coating (no silane).
2. Passes the moisture resistance test and test negative for the adherence coating test.

4184.03 METHODS OF TEST.

Test the specific requirements according to Office of Materials Test Method No. Iowa 814.

Section 4188

4188, Traffic Control Devices.

Add the Articles:

4188.12 AUTOMATED FLAGGER ASSISTANCE DEVICES.

- A. Ensure all AFADs meet the current requirements of the MUTCD Section 6E.04 and 6E.06.
- B. Use RED/YELLOW Lens type AFADs as per MUTCD Section 6E.06.
- C. AFADs shall meet crashworthiness requirements of Article 4188.01, B.
- D. When using AFADs for work zones on Primary roadways, remote communication capabilities meeting requirements of Article 4188.11 are required.

4188.13 TRUCK-MOUNTED OR TRAILER-MOUNTED ATTENUATOR.

- A. Use a TMA that meets or exceeds the requirements of Article 4188.01 for Category 3 devices.
- B. The face of the TMA visible to approaching traffic shall have retro reflectorized alternating red and yellow stripes, sloping downwards in both directions from the center of the TMA. Retroreflective sheeting shall meet ASTM D 4956, Type VIII or Type XI requirements.

