MINUTES
OF
IOWA DOT SPECIFICATION COMMITTEE MEETING

October 12, 2023

Members Present:	Mark Dunn	Contracts & Specifications Bureau
	Daniel Harness	Design Bureau
	Eric Johnsen, Chair	Contracts & Specifications Bureau
	Mike Nop	Bridges & Structures Bureau
	Willy Sorenson	Traffic & Safety Bureau
	Wes Musgrove	Construction & Materials Bureau
	Scott Nixon	District 1 - DCE
	Dillon Feldmann	Local Systems Bureau
	Bob Welper	District 2 - DME
Members Not Present:	Darwin Bishop	District 3 – DCE
	Charlie Purcell	Project Delivery Division
Advisory Members Present:	David Carney	SUDAS
	Andy Case	Dallas County
	Ben Daleske	Fayette County
	Jeff Devries	Construction & Materials Bureau
	Scott Sommers	Construction & Materials Bureau
	Todd Hanson	Construction & Materials Bureau
	Melissa Serio	Construction & Materials Bureau
	Desiree McClain	Construction & Materials Bureau
	Asley Buss	Construction & Materials Bureau
	Matt Miller	Construction & Materials Bureau

The Specification Committee met on Thursday, October 12, 2023, at 9:00 a.m. Eric Johnsen, Specifications Engineer, opened the meeting. The items were discussed in accordance with the agenda dated October 2, 2023.

The minutes are as follows:

1. Section 2120, Fuel Adjustment.

The Construction and Materials Bureau requested to update fuel adjustment specifications to reflect implementation of AASHTOWare Project.

2. Article 2303.05, H, 2, Cold Weather Paving (Flexible Pavement).

The Construction and Materials Bureau requested to allow payment for cold weather paving when liquidated damages are being assessed.

3. Article 2433.03, D, Shaft Excavation.

The Construction and Materials Bureau requested to require the permanent casing (when required) to be placed before the Contractor leaves the work site for the day.

4. Article 2601.03, C, 3, a, Rural Seeding, Preparation and Application (Erosion Control).

The Construction and Materials Bureau requested to address concerns of tearing up existing stabilizing seeding.

5. Article 2602.03, L, 3, Mobilizations, Erosion Control (Water Pollution Control (Soil Erosion)).

The Construction and Materials Bureau requested to provide additional explanation to when erosion control mobilizations will be paid.

6. Article 4169.10, B, C and D, Special Ditch Control and Slope Protection and Netting.
Article 4169.10, F, 2, Anchoring Devices (Transition Mat).

The Construction and Materials Bureau requested to update the specifications for slope protection, special ditch control, and transition mat anchors.

7. Article 4183.03, Fast Dry Waterborne Traffic paints.

The Construction and Materials Bureau requested to update specifications for traffic paint materials and testing.

8. DS-15XXX, Portable Pop-Up Network for Inspection Use.

The Construction and Materials Bureau requested approval of Developmental Specifications for Portable Pop-Up Network for Inspection Use.

9. DS-23XXX, PCC Pavement Non-Destructive Thickness Determination Contractor Quality Control And Acceptance For Local Systems (Non-Federal Aid).

The Construction and Materials Bureau requested approval of Developmental Specifications for PCC Pavement Non-Destructive Thickness Determination Contractor Quality Control And Acceptance For Local Systems (Non-Federal Aid).

10. New Specification Books.

The warehouse will not be stocking the 2023 Standard Specification books for internal ordering. The Contracts and Specifications Bureau will be ordering a limited number of books for the RCE and District Materials offices. Any books required beyond these should be ordered directly from lulu.com using a Department P card.

Form 510130 (08-15)

IOWA DOT

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Wes Musgrove/ Melissa Serio	**Office:** Construction & Materials	**Item 1**
Submittal Date: 9/15/23	**Proposed Effective Date:** April 2024 GS	
Section No.: 2120 **Title:** Fuel Adjustment	**Other:**	

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 10/12/2023	**Effective Date:** 4/16/2024

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: The Specifications Section asked if we should review the specific items listed in Article 2120.03, B as some of the variations do not have bid items, such as Selected Backfill (Stockpile), Excavation, Class 10 (Stockpile), and Excavation, Class 12 (Waste). It was decided not to remove these references at this time, but will look into removing them or simplifying the list.

Specification Section Recommended Text:

2120.03, A.

Replace the Article:

For contracts where the Department is the Contracting Authority, applied to eligible items as the work is done. For contracts where the Department is not the Contracting Authority, ~~A~~applied to eligible items as the work is done, when the contract quantity of that eligible item is 50,000 cubic yards or more.

2120.03, C.

Replace the Article:

Fuel adjustment using a FUF of 0.27 gallon per cubic yard will be applied to Embankment-in-Place, Contractor Furnished, and Embankment-in-Place ~~(non-dredge material)~~.

2120.03, D.

Delete the Article:

~~Fuel adjustment will also be applied to Embankment-In-Place (dredge material). The fuel usage will be based on billed gallons (liters) of fuel used.~~

2120.04, A.

Replace the Article:

For contracts where the Department is not the Contracting Authority, ~~P~~provide the Engineer with a monthly spreadsheet (the Engineer will provide the format) with quantities, and the fuel adjustment for the month (even if there will be no adjustment).

2120.04, B.

Replace the Article:

For contracts where the Department is not the Contracting Authority, ~~I~~if the contract quantity for an item is in tons, convert the quantity to cubic yards using an appropriate conversion factor

the Engineer approves. The total quantity of cubic yards for each month (Y) is the sum of these quantities.

2120.04, E.

Replace the Article:

A fuel adjustment will be made for items of work covered in this specification when the CPI for the month the work is performed is more than ~~$0.15 per gallon~~ 5% different than the BPI established at the beginning of the project.

1. ~~For items of work covered in Article 2120.03, B or 2120.03, C:~~

~~a.~~ If the CPI is greater than the BPI plus ~~$0.15~~ 5%, then the fuel adjustment will be positive which warrants additional payment to the Contractor. The following formula will be used to calculate the additional payment:

~~FA = FUF(CPI - (BPI + 0.15))Y~~

FA = FUF(CPI – (BPI x 1.05))Y

~~b~~ 2. If the CPI is less than the BPI minus ~~$0.15~~ 5%, then the fuel adjustment will be negative and a credit will be due to the contracting authority. The following formula will be used to calculate the credit:

~~FA = FUF(CPI - (BPI - 0.15))Y~~

FA = FUF(CPI – (BPI x 0.95))Y

~~**2.** For the item of work covered in Article 2120.03, D:~~

~~**a.** If the CPI is greater than the BPI plus $0.15, then the fuel adjustment will be positive which warrants additional payment to the Contractor. The following formula will be used to calculate the additional payment:~~

~~FA = (CPI - (BPI + 0.15)) x (billed gallons of fuel used per month)~~

~~**b.** If the CPI is less than the BPI minus $0.15, then the fuel adjustment will be negative and a credit will be due to the contracting authority. The following formula will be used to calculate the credit:~~

~~FA = (CPI - (BPI - 0.15)) x (billed gallons of fuel used per month)~~

2120.05 Basis of Payment.

Replace the Article:

A. Payment will be the Fuel Adjustment (FA) for each month, subject to the deduction for partial payments described in Article 1109.05. Should the Fuel Adjustment (FA) be negative, an equal amount will be deducted on payments made to the Contractor from sums otherwise due. This payment or deduction will be made by change order for contracts where the Department is not the Contracting Authority or automatically in each pay estimate for contracts where the Department is the Contracting Authority.

B. On completion of the work of the contract~~:~~

~~1.~~ ~~For all items covered in Article 2120.03, B or 2120.03, C~~, the sum of the total quantities (Y) for each monthly period will be adjusted by pro-rating, if necessary, to agree with the final quantities to be paid.

~~2. For the item covered in Article 2120.03, D, the sum of the total quantities for billed gallons of fuel used for each monthly period will be adjusted, if necessary, to agree with the final quantities to be paid. This adjustment will be made by either:~~

- ~~Subtracting the proper quantity from the last adjustment made, or~~
- ~~Adding the proper quantity and computing the adjustment on the basis of the CPI in effect on the last working day any of this work was done.~~

~~C. On completion of the work of the contract, the monthly fuel adjustment will be revised by pro-rating any variance from the plan quantity.~~

~~D~~ **C.** Payment or deduction is full compensation for all fluctuations in fuel prices during the time the contract work is being done.

Comments:

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

2120.03, A.

Replace the Article:

For contracts where the Department is the Contracting Authority, applied to eligible items as the work is done. For contracts where the Department is not the Contracting Authority, ~~A~~applied to eligible items as the work is done, when the contract quantity of that eligible item is 50,000 cubic yards or more.

2120.03, C.

Replace the Article:

Fuel adjustment using a FUF of 0.27 gallon per cubic yard will be applied to Embankment-in-Place, Contractor Furnished, and Embankment-in-Place ~~(non-dredge material)~~.

2120.03, D.

Delete the Article:

~~Fuel adjustment will also be applied to Embankment-In-Place (dredge material). The fuel usage will be based on billed gallons (liters) of fuel used.~~

2120.04, A.

Replace the Article:

For contracts where the Department is not the Contracting Authority, ~~P~~provide the Engineer with a monthly spreadsheet (the Engineer will provide the format) with quantities, and the fuel adjustment for the month (even if there will be no adjustment).

2120.04, B.

Replace the Article:

For contracts where the Department is not the Contracting Authority, ~~I~~if the contract quantity for an item is in tons, convert the quantity to cubic yards using an appropriate conversion factor the Engineer approves. The total quantity of cubic yards for each month (Y) is the sum of these quantities.

2120.04, E.

Replace the Article:

A fuel adjustment will be made for items of work covered in this specification when the CPI for the month the work is performed is more than ~~$0.15 per gallon~~ 5% different than the BPI established at the beginning of the project.

1. ~~For items of work covered in Article 2120.03, B or 2120.03, C:~~

~~a.~~ If the CPI is greater than the BPI plus ~~$0.15~~ 5%, then the fuel adjustment will be positive which warrants additional payment to the Contractor. The following formula will be used to calculate the additional payment:

~~FA = FUF(CPI - (BPI + 0.15))Y~~

FA = FUF(CPI – (BPI x 1.05))Y

~~b~~ 2. If the CPI is less than the BPI minus ~~$0.15~~ 5%, then the fuel adjustment will be negative and a credit will be due to the contracting authority. The following formula will be used to calculate the credit:

~~FA = FUF(CPI - (BPI - 0.15))Y~~

FA = FUF(CPI – (BPI x 0.95))Y

~~**2.** For the item of work covered in Article 2120.03, D:~~

~~**a.** If the CPI is greater than the BPI plus $0.15, then the fuel adjustment will be positive which warrants additional payment to the Contractor. The following formula will be used to calculate the additional payment:~~

~~FA = (CPI - (BPI + 0.15)) x (billed gallons of fuel used per month)~~

~~**b.** If the CPI is less than the BPI minus $0.15, then the fuel adjustment will be negative and a credit will be due to the contracting authority. The following formula will be used to calculate the credit:~~

~~FA = (CPI - (BPI - 0.15)) x (billed gallons of fuel used per month)~~

2120.05 Basis of Payment.

Replace the Articles:

A. Payment will be the Fuel Adjustment (FA) for each month, subject to the deduction for partial payments described in Article 1109.05. Should the Fuel Adjustment (FA) be negative, an equal amount will be deducted on payments made to the Contractor from sums otherwise due. This payment or deduction will be made by change order for contracts where the Department is not the Contracting Authority or automatically in each pay estimate for contracts where the Department is the Contracting Authority.

B. On completion of the work of the contract~~:~~

~~**1.** For all items covered in Article 2120.03, B or 2120.03, C~~, the sum of the total quantities (Y) for each monthly period will be adjusted by pro-rating, if necessary, to agree with the final quantities to be paid.

~~**2.** For the item covered in Article 2120.03, D, the sum of the total quantities for billed gallons of fuel used for each monthly period will be adjusted, if necessary, to agree with the final quantities to be paid. This adjustment will be made by either:~~

- ~~Subtracting the proper quantity from the last adjustment made, or~~
- ~~Adding the proper quantity and computing the adjustment on the basis of the CPI in effect on the last working day any of this work was done.~~

~~**C.** On completion of the work of the contract, the monthly fuel adjustment will be revised by pro-rating any variance from the plan quantity.~~

~~**D**~~ **C.** Payment or deduction is full compensation for all fluctuations in fuel prices during the time the contract work is being done.

Reason for Revision: This revision is being submitted as part of the DOT's AASHTOWare Project implementation.

Full implementation of AASHTOWare Project implementation (on projects where the DOT is the Contracting Authority) will occur with the November 2023 letting. Prior to this, the DOT had select contracts that used AASHTOWare Project and DS-15102 was applied. This DS was approved at the Nov. 2022 specification committee meeting.

This spec revision will incorporate changes into Standard Specification 2120 with the April 2024 GS.

To keep the calculation consistent, the fuel adjustment formula changes will apply to all projects. On contracts where the DOT is the Contracting Authority, fuel adjustment will apply to all eligible items and no minimum quantity is required. This is due to how AASHTOWare Project applies and calculates fuel adjustment. However for contracts where the DOT is not the Contracting Authority, it will continue to apply only when the contract quantity of that eligible item is 50,000 cubic yards or more.

With this spec revision, DS-15102 (now DS-23037) can be discontinued starting with the April 16, 2024 letting.

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: None		
County or City Comments:		
Industry Comments:		

Form 510130 (08-15)

IOWA DOT

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Wes Musgrove / Jeff Schmitt	**Office:** Construction & Materials	**Item 2**
Submittal Date: 09/14/2023	**Proposed Effective Date:** April 2024 GS	
Article No.: 2303.05, H, 2 **Title:** Cold Weather Paving (Flexible Pavement / Basis of Payment)	**Other:**	

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 10/12/2023	**Effective Date:** 4/16/2024

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: The District 3 office had some reservations about paying for compaction additive when a Contractor has control over when they pave. The Construction and Materials Bureau explained that there is no such restriction for cold weather protection for PCC pavement and that getting a quality product is the most important thing. The cost is only intended to cover the expenses incurred for the additive. The District 1 office also indicated that the Engineer has the discretion to not allow cold weather paving if there is no advantage to getting the project done.

Specification Section Recommended Text:

2303.05, H, 2, c.

Delete the Article:

~~**c.** On days when liquidated damages have been assessed.~~

Comments:

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

H. Cold Weather Paving.

2. Contracting Authority will not pay for compaction additive when:

a. Pay Factor for Field Voids is less than 1.0 for Class I compaction.

b. Compaction is not thorough and effective for Class II compaction.

~~**c.** On days when liquidated damages have been assessed.~~

Reason for Revision: The item to be removed was from Wisconsin DOT's version of cold weather paving specification, on which this specification was based. We agree with industry that in most situations involving cold weather paving, liquidated damages (LD's) are already being assessed. We feel it is unfair to penalize the contractor twice, in effect, for being in LD's. The compaction additive is required to successfully perform the cold weather paving operation that is of mutual benefit.

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: Discussed with asphalt industry at Strategic Asphalt Committee meeting on 09/06/2023.

County or City Comments: N/A
Industry Comments: Industry in complete agreement with proposed change.

Form 510130 (08-15)

IOWA DOT

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Wes Musgrove/ Desiree McClain	**Office:** Construction & Materials	**Item 3**
Submittal Date: 9/19/2023	**Proposed Effective Date:** April 2024 GS	
Article No.: 2433.03, D **Title:** Shaft Excavation	**Other:**	

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 10/12/2023	**Effective Date:** 4/16/2024

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: None.

Specification Section Recommended Text:

2433.03, D, 1, General.

Add the Article:

h. The Contractor shall bear full responsibility for the stability of the shaft during construction.

2433.03, D, 4, c.

Add to the end of the Article:

Excavate the shaft using a continuous operation until the permanent casing is placed.

Comments:

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

1. General.

a. Construct drilled shafts by either the wet, dry, or casing method as necessary to produce sound, durable concrete foundation shafts free of defects. These methods are described below.

b. Remove surface and subsurface obstructions. Special tools and/or procedures may be required.

c. If the Engineer determines that the material encountered during excavation and/or present at tip elevation is unsuitable and/or differs from that anticipated in the design of the drilled shaft, extend the drilled shaft tip elevations.

d. Maintain a drilling log during shaft and socket excavation. In the log, place information such as elevation, depth of penetration, drilling time in each of the strata, material description, and remarks. Furnish two copies of the log (signed by the Contractor) to the Engineer within 1 week after completion of the excavation.

e. After the shaft excavation has been completed, immediately proceed with shaft construction.

f. Do not excavate a shaft within a distance of three shaft diameters of a previously constructed shaft within 24 hours of completing concrete placement, unless approved by the Engineer.

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

h. The contractor shall bear full responsibility for the stability of the shaft during construction.

4. Casing Method.

a. The casing method is used to advance the hole through unstable material. Over-reaming to the outside diameter of the casing may be required. Before the casing is to be removed, the level of fresh concrete must be a minimum of 5 feet above the bottom of the casing so that fluid trapped behind the casing is displaced upward. As the casing is withdrawn, maintain the concrete level so that fluid trapped behind the casing is displaced upward without contamination or displacing shaft concrete.

b. Determine the appropriate depth to terminate the temporary casing to ensure the stability of the shaft. The purpose of the temporary casing is to stabilize the shaft walls during drilling to prevent cave-ins as the result of potential vibrations. The purpose of the casing is also to prevent shaft installation procedures from having an impact on adjacent structures, railroads, and so forth.

c. Permanent casing, if required, will be specified in the contract documents. Excavate the shaft using a continuous operation until the permanent casing is placed.

Reason for Revision: In the recent projects, contractors have drilled the temporary shaft and then placed the permanent casing after the hole has been drilled. There has been instances where the hole has been left open over night and it has caved in. Therefore, if we require permanent casing, we want the casing to be placed in the hole if there is going to be no supervision on the project.

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

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IOWA DOT

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Wes Musgrove/Melissa Serio	**Office:** Construction & Materials	**Item 4**
Submittal Date: 9/15/23	**Proposed Effective Date:** April 2024 GS	
Article No.: 2601.03, C, 3, a **Title:** Rural Seeding, Preparation and Application (Erosion Control)	**Other:**	

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 10/12/2023	**Effective Date:** 4/16/2024

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: None.

Specification Section Recommended Text:

2601.03, C, 3, a, Preparation and Application.

Replace Article 2 and **add** the Article:

2) In areas without existing stabilizing crop residue, ~~P~~prepare seedbed according to Article 2601.03, B, 4, a, and apply seed according to Article 2601.03, B, 4, d, using only a drop seeder complying with Article 2601.03, A, 19.

3) In areas with existing stabilizing crop residue, apply seed with a slit seeder or a native grass seed drill with a no till attachment. Seedbed preparation will not be required, except for areas with rills and gullies.

Comments:

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

2601.03, C, 3, a.

Replace the Article:

3. Rural Seeding.

a. Preparation and Application.

1) Prepare seed according to Article 2601.03, B, 4, c.

2) In areas without existing stabilizing crop residue, p~~P~~repare seedbed according to Article 2601.03, B, 4, a, and apply seed according to Article 2601.03, B, 4, d, using only a drop seeder complying with Article 2601.03, A, 19.

3) In areas with existing stabilizing crop residue, apply seed with a slit seeder or a native grass seed drill with a no till attachment. Seedbed preparation will not be required, except for areas with rills and gullies.

Reason for Revision: To address concerns of tearing up existing stabilizing seeding, which increases erosion potential and risk of storm water permit non-compliance issues.

Proposed revision was presented to industry at May 5, 2023 annual erosion control contractor meeting.

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: None		
County or City Comments:		
Industry Comments:		

Form 510130 (08-15)

IOWA DOT

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Wes Musgrove/Melissa Serio	**Office:** Construction & Materials	**Item 5**
Submittal Date: 9/15/23	**Proposed Effective Date:** April 2024 GS	
Article No.: 2602.03, L, 3 **Title:** Mobilizations, Erosion Control (Water Pollution Control (Soil Erosion))	**Other:**	

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 10/12/2023	**Effective Date:** 4/16/2024

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: None.

Specification Section Recommended Text:

2602.03, L, 3.

Add to end of Article:

Multiple mobilizations will also not be paid for the same equipment used to perform different items of erosion control work.

Comments:

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

2602.03, L, 3.

Add to end of Article:

Multiple mobilizations will also not be paid for the same equipment used to perform different items of erosion control work.

Reason for Revision: Provide additional explanation to when Erosion Control Mobilizations will be paid. This change will mirror existing requirement that multiple mobilizations will not be paid for the same crew used to perform different items of EC work.

Proposed revision was presented to industry at May 5, 2023 annual erosion control contractor meeting.

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: None

County or City Comments:

Industry Comments:

Form 510130 (08-15)

IOWA DOT

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Wes Musgrove/Melissa Serio	**Office:** Construction & Materials	**Item 6**
Submittal Date: 9/15/23	**Proposed Effective Date:** April 2024 GS	
Article No.: 4169.10, B, C and D **Title:** Special Ditch Control and Slope Protection and Netting **Article No.:** 4169.10, F, 2 **Title:** Anchoring Devices (Transition Mat)	**Other:**	

Specification Committee Action: Approved with a minor revision.

Deferred:	**Not Approved:**	**Approved Date:** 10/12/2023	**Effective Date:** 4/16/2024

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: The Construction and Materials Bureau requested that the word “protection” in the first paragraph of Article 4169.10, B, 3 be changed to “control”.

Specification Section Recommended Text:

4169.10, B, Special Ditch Control.

Replace the Article:

1. **Wood Excelsior Mat.**
   A mat of interlocking wood fibers. Meet the following requirements:
   - Plastic netting applied to both sides for holding the excelsior in place.
   - Nontoxic to growth of plants and germination of seeds.
   - Minimum dry weight of 0.68 pounds per square yard according to ASTM D 6475.
   - Furnished in rolls with a minimum uniform width of 48 inches, with a tolerance of minus 1 inch and a minimum length of 80 feet.
   - Furnished in ~~plastic~~ bags or otherwise protected to prevent damage from weather and handling.

2. **Coconut Fiber Mat.**
   At the Contractor's option, coconut fiber mat may be substituted for wood excelsior mat specified in Article 4169.10, B, 1 for special ditch control. Meet the following requirements:
   - Uniform thickness with the coconut fiber evenly distributed over the entire area of the mat.
   - Both sides of the mat covered with polypropylene netting attached with cotton thread.
   - Minimum dry weight of 0.40 pounds per square yard according to ASTM D 6475.
   - Furnished in rolls with a minimum uniform width of 48 inches with a tolerance of minus 1 inch and a minimum length of 80 feet.
   - Furnished in ~~plastic~~ bags or otherwise protected to prevent damage from weather and handling.

3. **Biodegradable Mat.**
   At the Contractor's option, a biodegradable mat may be substituted for wood excelsior mat specified in Article 4169.10, B, 1 for special ditch control. Meet the following requirements:
   - Consists of all-natural, biodegradable fibers mechanically bound together with a non-welded, movable jointed, all-natural, biodegradable netting applied to one or both sides

or a netless mat made of natural fibers mechanically interlocked. Straw is not approved for use as all-natural, biodegradable fibers.
- Minimum dry weight (mass) of 0.40 pounds per square yard for coconut fiber or 0.68 for pounds per square yard for wood excelsior according to ASTM D 6475.
- Minimum shear stress (according to D 6460 or equivalent) of 2.0 psf.
- Furnished in rolls with a minimum uniform width of 48 inches with a tolerance of minus 1 inch and a minimum length of 80 feet.
- Furnished in bags or otherwise protected to prevent damage from weather and handling.

4169.10, C, Slope Protection.

Replace the Article:

~~Wood excelsior mat, coconut fiber mat, straw mat, or straw coconut mat may be used for slope protection.~~

1. **Wood Excelsior Mats.**
   A mat of interlocking wood fibers meeting the requirements of Article 4169.10, B, 1. with the following exceptions:
   - Plastic netting applied to one or both sides for holding the excelsior in place. ~~Mats without netting where the excelsior is mechanically stitched together to hold it in place may be allowed.~~
   - Minimum dry weight of 0.50 pounds per square yard according to ASTM D 6475.

2. **Straw Mat, Straw-Coconut Fiber Mat, or Coconut Fiber Mat.**
   At the Contractor's option straw mat, straw-coconut fiber mat, or coconut fiber mat may be substituted for wood excelsior mat specified in Article 4169.10, C, 1 for slope protection. Meet the following requirements:
   - Consistent thickness with the straw, straw-coconut fiber, or coconut fiber evenly distributed over the entire area of the mat.
   - The top side of the mat covered with polypropylene netting attached with cotton thread.
   - Minimum dry weight (mass) of 0.40 pounds per square yard according to ASTM D 6475.
   - Furnished in rolls with a uniform width of 48 inches, with a tolerance of minus 1 inch and a minimum length of 80 feet.
   - Furnished in ~~plastic~~ bags or otherwise protected to prevent damage from weather or handling.

3. **Biodegradable Mat.**
   At the Contractor's option, a biodegradable mat may be substituted for wood excelsior mat specified in Article 4169.10, C, 1 for slope protection. Meet the following requirements:
   - Consists of all-natural, biodegradable fibers mechanically bound together with a non-welded, movable jointed, all-natural, biodegradable netting applied to one or both sides or a netless mat made of natural fibers mechanically interlocked.
   - Minimum dry weight (mass) of 0.40 pounds per square yard for straw, straw-coconut, or coconut fiber or 0.50 for pounds per square yard for wood excelsior according to ASTM D 6475.
   - C Factor (according to ASTM D 6459) less than or equal to 0.10 or minimum shear stress (according to D 6460 or equivalent) of 1.0 psf.
   - Furnished in rolls with a minimum uniform width of 48 inches with a tolerance of minus 1 inch and a minimum length of 80 feet.
   - Furnished in bags or otherwise protected to prevent damage from weather and handling.

4169.10, D, Netting.

Replace the Article:

~~1.~~ Comply with the following mesh netting sizes. A tolerance of ~~plus or minus~~ 0.10 inch applies to netting size.

- Netting applied on wood excelsior mats: no more than 1 inch by 2 inches.
- Netting applied on coconut fiber only mats for channel and slope: no more than 3/4 inch by 3/4 inch or 1/2 inch by 1 inch.
- Netting applied on the top side of straw and straw-coconut fiber mats for slopes only: no more than 1/2 inch by 1~~/2~~ inch.

~~2. A minimum weight of 9 pounds per 1000 square yards is required for netting for special ditch control or slope protection.~~

4169.10, F, 2, d.

Replace the Article:

The top washer a minimum of 3 inches in diameter and constructed of a UV resistant plastic or metal alloy.

Comments:

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

4169.10, B.

Replace the Article:

B. Special Ditch Control.

1. Wood Excelsior Mat.

A mat of interlocking wood fibers. Meet the following requirements:

- Plastic netting applied to both sides for holding the excelsior in place.
- Nontoxic to growth of plants and germination of seeds.
- Minimum dry weight of 0.68 pounds per square yard according to ASTM D 6475.
- Furnished in rolls with a minimum uniform width of 48 inches, with a tolerance of minus 1 inch and a minimum length of 80 feet.
- Furnished in ~~plastic~~ bags or otherwise protected to prevent damage from weather and handling.

2. Coconut Fiber Mat.

At the Contractor's option, coconut fiber mat may be substituted for wood excelsior mat specified in Article 4169.10, B, 1 for special ditch control. Meet the following requirements:

- Uniform thickness with the coconut fiber evenly distributed over the entire area of the mat.
- Both sides of the mat covered with polypropylene netting attached with cotton thread.
- Minimum dry weight of 0.40 pounds per square yard according to ASTM D 6475.
- Furnished in rolls with a minimum uniform width of 48 inches with a tolerance of minus 1 inch and a minimum length of 80 feet.
- Furnished in ~~plastic~~ bags or otherwise protected to prevent damage from weather and handling.

3. Biodegradable Mat.

At the Contractor's option, a biodegradable mat may be substituted for wood excelsior mat specified in Article 4169.10, B, 1 for special ditch protection. Meet the following requirements:

- Consists of all-natural, biodegradable fibers mechanically bound together with a non-welded, movable jointed, all-natural, biodegradable netting applied to one or both sides or a netless mat made of natural fibers mechanically interlocked. Straw is not approved for use as all-natural, biodegradable fibers.

- Minimum dry weight (mass) of 0.40 pounds per square yard for coconut fiber or 0.68 for pounds per square yard for wood excelsior according to ASTM D 6475.
- Minimum shear stress (according to D 6460 or equivalent) of 2.0 psf.
- Furnished in rolls with a minimum uniform width of 48 inches with a tolerance of minus 1 inch and a minimum length of 80 feet.
- Furnished in bags or otherwise protected to prevent damage from weather and handling.

4169.10, C.

Replace the Article:

C. Slope Protection.
~~Wood excelsior mat, coconut fiber mat, straw mat, or straw coconut mat may be used for slope protection.~~

1. Wood Excelsior Mats.
A mat of interlocking wood fibers meeting the requirements of Article 4169.10, B, 1. with the following exceptions:

- Plastic netting applied to one or both sides for holding the excelsior in place. ~~Mats without netting where the excelsior is mechanically stitched together to hold it in place may be allowed.~~
- Minimum dry weight of 0.50 pounds per square yard according to ASTM D 6475.

2. Straw Mat, Straw-Coconut Fiber Mat, or Coconut Fiber Mat.
At the Contractor's option straw mat, straw-coconut fiber mat, or coconut fiber mat may be substituted for wood excelsior mat specified in Article 4169.10, C, 1 for slope protection. Meet the following requirements:

- Consistent thickness with the straw, straw-coconut fiber, or coconut fiber evenly distributed over the entire area of the mat.
- The top side of the mat covered with polypropylene netting attached with cotton thread.
- Minimum dry weight (mass) of 0.40 pounds per square yard according to ASTM D 6475.
- Furnished in rolls with a uniform width of 48 inches, with a tolerance of minus 1 inch and a minimum length of 80 feet.
- Furnished in ~~plastic~~ bags or otherwise protected to prevent damage from weather or handling.

3. Biodegradable Mat.
At the Contractor's option, a biodegradable mat may be substituted for wood excelsior mat specified in Article 4169.10, C, 1 for slope protection. Meet the following requirements:

- Consists of all-natural, biodegradable fibers mechanically bound together with a non-welded, movable jointed, all-natural, biodegradable netting applied to one or both sides or a netless mat made of natural fibers mechanically interlocked.
- Minimum dry weight (mass) of 0.40 pounds per square yard for straw, straw-coconut, or coconut fiber or 0.50 for pounds per square yard for wood excelsior according to ASTM D 6475.
- C Factor (according to ASTM D 6459) less than or equal to 0.10 or minimum shear stress (according to D 6460 or equivalent) of 1.0 psf.
- Furnished in rolls with a minimum uniform width of 48 inches with a tolerance of minus 1 inch and a minimum length of 80 feet.
- Furnished in bags or otherwise protected to prevent damage from weather and handling.

4169.10, D.

Replace the Article:

D. Netting.

~~1.~~ Comply with the following mesh netting sizes. A tolerance of ~~plus or minus~~ 0.10 inch applies to netting size.

- Netting applied on wood excelsior mats: no more than 1 inch by 2 inches.

- Netting applied on coconut fiber only mats for channel and slope: no more than 3/4 inch by 3/4 inch or 1/2 inch by 1 inch.
- Netting applied on the top side of straw and straw-coconut fiber mats for slopes only: no more than 1/2 inch by 1~~/2~~ inch.

~~**2.** A minimum weight of 9 pounds per 1000 square yards is required for netting for special ditch control or slope protection.~~

4169.10, F, 2, d.

Replace the Article:

d. The top washer a minimum of 3 inches in diameter and constructed of a UV resistant plastic or metal alloy.

Reason for Revision:

For slope protection and special ditch control:

- Create biodegradable subsection in both slope protection and special ditch control. New subsections include material and performance requirements.
- Revise netting maximum sizes.
- Add "minimum" to roll width because larger widths are not a concern

Draft revisions were presented to industry at May 5, 2023 annual erosion control contractor meeting, and revised revisions (based on comments) were sent with follow-up meeting minutes.

For transition mat anchors, allow metal alloy in addition to currently allowed plastic washers.

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: None		
County or City Comments:		
Industry Comments:		

Form 510130 (08-15)

IOWA DOT

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Wes Musgrove / Brian Worrel	**Office:** Construction & Materials	**Item 7**
Submittal Date: August 2024	**Proposed Effective Date:** April 2024	
Article No.: 4183.03 **Title:** Fast Dry Waterborne Traffic paints	**Other:**	

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 10/12/2023	**Effective Date:** 4/16/2024

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: None.

Specification Section Recommended Text:

4183.03, A, 1, a.

Replace the Article:

Is capable of being heated and spray applied up to a temperature of ~~140~~ 120°F without damaging the formulation or serviceability of the product and the traffic striping equipment.

4183.03, B, 1, Composition.

Replace Articles a through e:

a. Pigment Content.
Percent pigment by weight of the finished product to be from ~~45.0~~ 58.0% to ~~55.0~~ 63.0% ~~by weight for white and 55.0% to 58.0% by weight for yellow~~ as tested by ASTM D 3723. The white paint must contain a minimum of 1 pound per gallon of TiO2 ASTM D 476 Type II Rutile 92% Min. TiO2 tested in accordance with ASTM D 1394 or ASTM D 4764. The total solids of high build paint when tested in accordance with ASTM D 2369 must be a minimum of 76% by weight.

b. Resin Solids.
Composed of 100% acrylic emulsion polymer (per Materials I.M. 483.03) or approved equal that allow finished paint products to meet all other areas of the specifications.

c. Nonvolatile Vehicle.

1) No less than ~~43.0~~ 42.0% by weight for white paint and no less than ~~45.0~~ 44.0% by weight for yellow paint.

2) Use the the following formula for calculating nonvolatile vehicle (NVV):

NVV= (N-P)/(100-P)

Where:
N = the percent by weight of non-volatiles as determined by ASTM D 2369
P = the percent weight of pigment as determined by ASTM D 3723

d. Volatile Organic Compounds.
Not to exceed 1~~.25~~ pound~~s~~ per gallon excluding water and VOC exempt solvents. Use ASTM D 3960 to determine the level of VOCs.

e. Flash Point.

Closed cup flash point is to be no less than ~~100~~ 140°F as tested by ASTM D 56.

4183.03, B, 2, Laboratory Test Requirements.

Replace Articles b through e:

b. Viscosity.
1) For white: no less than 80 or no greater than ~~90~~ 95 Krebs Units at 77°F.
2) For yellow: no less than ~~75~~ 80 Kreb Units or no greater than ~~85~~ 95 Krebs Units at 77°F.
3) Use ASTM D 562 to measure viscosity.

c. No-Pick-Up Time.
1) Less than ~~5~~ 10 minutes.
2) Test according to the requirements of ASTM D 711~~, except with a test stripe having a wet film thickness of 6 mils as measured by an Interchemical et film thickness gage and no air movement~~.

d. Directional Reflectance (without Glass Spheres).
1) For white: 84.0% minimum.
2) For yellow: ~~50.7~~ 50.0% minimum.

e. Dry Opacity.
1) ~~For white: a~~ A minimum contrast ratio of ~~0.955~~ 0.980.
~~**2) For yellow: a minimum contrast ratio of 0.930.**~~
~~**3**~~ **2)** Test according to the requirements of Federal Test 141a Method 4121. Use a test stripe with a wet film thickness of ~~7~~ 15 mil as measured by an Interchemical Wet Film Thickness Gage.

4183.03. B, 4, b.

Replace the Article:

Provide ~~M~~SDS.

Comments:

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

4183.03 FAST DRY WATERBORNE TRAFFIC PAINTS.

A. General Requirements.

1. Use paint that:
a. Is capable of being heated and spray applied up to a temperature of ~~140~~120°F without damaging the formulation or serviceability of the product and the traffic striping equipment.
b. Is not damaged or deteriorates when reheated or if held under heated conditions for 6 hours.
c. Provides proper anchorage and refraction for glass beads when the beads are applied at the rate of 6 pounds per gallon.
d. Is free of heavy metals as defined by the US EPA.
e. Free of skins, pigment agglomerates, and foreign matter.
f. Shows no evidence of excessive settling, gelling, skinning, spoilage, or livering upon storage in sealed containers under normal above freezing temperatures within a 12 month period in the sealed delivery container.

2. When the air temperature is below the freezing point (32°F (0°C)), ship or store the paint in an insulated vehicle or storage building with heating capability to ensure the inside temperature is held above freezing.

B. Specific Requirements.

1. Composition.

The composition of the paint is left to the discretion of the manufacturer as long as the finished product meets the following requirements and applicable Federal, State, or local regulations for products of this type.

a. Pigment Content.

Percent pigment by weight of the finished product to be from ~~45~~ 58.0% to ~~55~~ 63.0% ~~by weight for white and 55.0% to 58.0% by weight for yellow~~ as tested by ASTM D 3723.The white paint must contain a minimum of 1 lb per gallon of TiO2 ASTM D476 Type II Rutile 92% Min. TiO2 tested in accordance with ASTM D1394 or ASTM D4764. The total solids of high build paint when tested in accordance with ASTM D2369 must be a minimum of 76% by weight.

b. Resin Solids.

Composed of 100% acrylic emulsion polymer (per Materials I.M. 483.03) or approved equal that allow finished paint products to meet all other areas of the specifications.

c. Nonvolatile Vehicle.

1) No less than 42 ~~43~~.0% by weight for white paint and no less than 44 ~~45~~.0% by weight for yellow paint.

2) Use the the following formula for calculating nonvolatile vehicle (NVV):

NVV= (N-P)/(100-P)

Where:

N = the percent by weight of non-volatiles as determined by ASTM D 2369

P = the percent weight of pigment as determined by ASTM D 3723

d. Volatile Organic Compounds.

Not to exceed 1~~.25~~ pound~~s~~ per gallon excluding water and VOC exempt solvents. Use ASTM D 3960 to determine the level of VOCs.

e. Flash Point.

Closed cup flash point is to be no less than ~~100~~ 140°F as tested by ASTM D 56.

f. Density.

A minimum of 12 pounds per gallon, with the density of the production batches not varying by more than ± 0.2 pounds per gallon from the density of the qualification samples. Use ASTM D 1475 to measure density.

2. Laboratory Test Requirements.

a. Color.

1) For white, the color after drying is to be a flat white, free from tint, furnishing good opacity and visibility under both daylight and artificial light.

2) For yellow, the color is to be within the following CIE chromaticity limits when measured with an instrument having a 2 degree observer, using a standard C illuminant, and 45/0 or 0/45 geometry.

Table 4183.03-1: CIE Chromaticity Limits

CIE Data Limits	Y	x	y
Minimum Maximum	0.5400 0.5910	0.462 0.501	0.428 0.455

3) The yellow color chip with chromaticity readings can be obtained from the Office of Materials for correlation.

b. Viscosity.

1) For white: no less than 80 or no greater than ~~90~~ 95Krebs Units at 77°F.

2) For yellow: no less than ~~75~~ 80 Kreb Units or no greater than ~~85~~ 95 Krebs Units at 77°F.

3) Use ASTM D 562 to measure viscosity.

c. No-Pick-Up Time.

1) Less than ~~5~~ 10 minutes.

2) Test according to the requirements of ASTM D 711~~., except with a test stripe having a wet film thickness of 6 mils as measured by an Interchemical et film thickness gage and no air movement.~~

d. Directional Reflectance (without Glass Spheres).

1) For white: 84.0% minimum.

2) For yellow: 50.0~~7~~% minimum.

e. Dry Opacity.

1) For white: a minimum contrast ratio of 0.980~~55~~.

2) For yellow: a minimum contrast ratio of 0.980~~30~~.

3) Test according to the requirements of Federal Test 141a Method 4121. Use a test stripe

with a wet film thickness of ~~7~~ 15 mil as measured by an Interchemical Wet Film Thickness Gage.

f. Flexibility.
No cracking or flaking shows when tested according to Federal Specification TT-P-1952b.

g. Pigment Particle Size.
Grind of no less than 3 on a Hegman Grind Gage when measured according to ASTM D 1210.

3. Field Service Requirements.

a. Paint Pigment.

1) Use well ground pigment properly dispersed in the vehicle.

2) Ensure the pigment does not cake or thicken in the container, and does not become granular or curdled.

3) If pigment settles in the paint, the result is to be a thoroughly wetted, soft mass permitting the complete and easy vertical penetration of a paddle. Settled pigment is to be easily redispersed with minimum resistance to the sideways manual motion of the paddle across the bottom of the container, to form a smooth uniform product of the proper consistency.

4) Do not use paint that cannot be easily redispersed as a result of excessive pigment settlement as described above, or any other cause.

b. Specified Properties.

1) Ensure the paint retains all specified properties under normal above freezing, outside storage conditions for 12 months after acceptance and delivery.

2) The vendor is responsible for all costs and transportation charges incurred in replacing paint that is unfit for use.

3) Ensure replacement paint properties remain satisfactory for 12 months from date of acceptance and delivery.

4. Packaging and Marking.

a. Ensure each container is plainly marked with the gross, tare, net weight, the lot number, producer's name, the date of manufacture, and the type of paint.

b. Provide ~~M~~SDS.

c. Ensure each container is filled with the volume in liters corrected to 77°F as specified in the contract documents.

C. Inspection and Acceptance.
Comply with Materials I.M. 483.03 for inspection and acceptance of paint.

Reason for Revision: In meetings with Manufacturers and industry it was found our specifications for traffic paint materials and testing are outdated. These revisions bring us into line with current testing requirements and material characteristics for waterborne traffic paint markings.

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:		

Form 510130 (08-15)

IOWA DOT

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Wes Musgrove / Matt Miller	**Office:** Construction & Materials	**Item 9**
Submittal Date: 7/27/2023	**Proposed Effective Date:** 1/17/2024	
Article No.: **Title:**	**Other:** DS-23048, Portable Pop-Up Network for Inspection Use	

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 10/12/2023	**Effective Date:** 1/17/2024

Specification Committee Approved Text: See attached Developmental Specifications for Portable Pop-Up Network for Inspection Use.

Comments: The District 2 office asked about the 10 days to replace a bad unit. The Construction and Materials Bureau explained that the units as purchased were a minimum of 10 days to receive, so they did not want to go shorter. The hope is that eventually contractors will have multiple of these and they could be replaced quickly.

Specification Section Recommended Text: See attached draft Developmental Specifications for Portable Pop-Up Network for Inspection Use.

Comments: District 2 asked if the DOT wanted the Contractor to provide insurance in case a unit was lost or damaged by the Engineer or their representatives. We also need to define what happens if the Engineer or their representatives lose or damage the unit.

Also, what are the data requirements? I do not see that in the specifications.

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

New DS

Reason for Revision: New Developmental Specification to add item to projects with limited cellular service. This item will ensure digital collection of project data like e-tickets by producing a 300' Wi-Fi with an amplified dual sim cellular connection for the duration of the specific project.

New Bid Item Required (X one)	**Yes X**	**No**
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-23048
(New)

DEVELOPMENTAL SPECIFICATIONS
FOR
PORTABLE POP-UP NETWORK FOR INSPECTION USE

Effective Date
January 17, 2024

THE STANDARD SPECIFICATIONS, SERIES 2023, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

23048.01 DESCRIPTION.
This Developmental Specification defines the minimum requirements for portable suitcase pop-up network cases to be used in highway construction sites, equipped with dual SIM 5G mobile connectivity. The network cases shall provide reliable, high-speed wireless connectivity to support construction site inspections through digital means and safety of field staff in support of digital construction technologies.

23048.02 MATERIALS.

A. Pop up network case shall include the following minimum requirements:
- Rugged case (w/CAT6 port, 12.6V input, power button).
- DC power cord, wall charger, ethernet, & antenna cables (all pre-wired).
- Secure connectivity for network access.
- Mobile dual SIM provider 5G LTE connection with two Wi-Fi radios (5 GHz and 2.4 GHz).
- 1 Gbps download speed; 150 Mbps upload speed where available.
- 300 feet of expected Wi-Fi broadcast range.
- Ability to configure, manage, troubleshoot remotely with cloud management software.
- Multiple simultaneous connections.
- Advanced threat protection and cloud-managed security controls.
- Integrated antennas and external CAT6 port with POE.

B. Device shall meet or exceed the following specifications:
- **Safety Certifications:** UL/CUL, CB Scheme, EN60950-1, EN 62368
- **Material Certifications:** WEEE, RoHS, RoHS-2, California Prop 65
- **Case Specifications:** Weatherproofing IP64
- **Antenna Type:** Multi-MIMO
- **Leads**: Two Cellular, two Wi-Fi, and one GPS
- **Cellular Type:** 4G | CBRS | LTE (617-960MHz / 1710-6000MHz)
- **Bands:** B2 B4 B5 B12 B14 B17 B25 B26 B29 B30 B41 B66 B71 n5 n25 n41 n66 n71 B2 B4 B5 B12 B14 B17 B29 B30 B48 B66 n5 B2 B4 B5 B12 B14 B17 B29 B30 B66
- **5G NR Bands:** n77 n78 n79 n77 n78 n79 n77 n78 n79
- **Wi-Fi Frequency Range:** 2.4GHz to 7GHz (Concurrent)

- **Isolation 4G 5G Elements**: >10dB
- **Isolation Wi-Fi Elements**: >12db
- **Correlation Co-Efficient 4G/5G Elements:** <0.2
- **Correlation Co-Efficient Wi-Fi Elements:** <0.2
- **Nominal Impedance:** 50Ω
- **Frequency Range:** 1562MHz to 1612MHz
- **LNA Gain**: 29dB ± 2dB
- **VSWR:** <2.0:1
- **Out of Band Rejection:** >45dB (@ > +/- 100MHz f)
- **Typical Noise Figure:** <-2dB
- **Notch Filter Rejection:** @787MHz 24dB
- **Operating Voltage:** 3 to 5V DC
- **Typical Current:** 15mA
- **Antenna Housing:** High Impact UV Stable ABS Polymer
- **Connector Type:** SMA
- **Operating Temp:** -40°F to +176°F
- **Battery Specifications:**
  - FAA compliant Battery Pack (up to 10 hours life)
  - Battery Type Lithium-Ion
  - Output 12V
  - Capacity 10,000 mAh
  - Short-Circuit Protection
  - Over-Current Protection
  - Overcharging Protection
  - Discharge Protection

23048.03 CONSTRUCTION.

A. Furnish unit to the Engineer at least 24 hours before mobilization to the project.

B. If unit fails, loses functionality due to damage, or is lost, repair or replace the unit within 5 working days. If lost or damaged by the Engineer or their representative, cost to replace the unit will be borne by the Contracting Authority.

C. Contractor may connect to the unit, provided it doesn't significantly slow the bandwidth while the Engineer is using it.

23048.04 METHOD OF MEASUREMENT.

The Engineer will count the number of Pop-Up Network Devices furnished according to this specification.

23048.05 BASIS OF PAYMENT.

A. Payment for each Pop-Up Network Device will be the contract unit price.

B. Payment is full compensation for furnishing, delivery, and maintaining service (including cellular costs) to the Pop-Up Network Device for the duration of the contract.

Form 510130 (08-15)

IOWA DOT

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Wes Musgrove	**Office:** Construction & Materials	**Item**
Submittal Date: 6/12/2023	**Proposed Effective Date:** 1/17/2024	
Article No.: **Title:**	**Other:** DS-23049, PCC Pavement Non-Destructive Thickness Determination Contractor Quality Control And Acceptance For Local Systems (Non-Federal Aid)	

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 10/12/2023	**Effective Date:** 1/17/2024

Specification Committee Approved Text: See attached Developmental Specifications for PCC Pavement Non-Destructive Thickness Determination Contractor Quality Control And Acceptance For Local Systems (Non-Federal Aid)

Comments: None.

Specification Section Recommended Text: See attached Draft Developmental Specifications for PCC Pavement Non-Destructive Thickness Determination Contractor Quality Control And Acceptance For Local Systems (Non-Federal Aid)

Comments:

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

Reason for Revision: Allow contractor MIT thickness testing on county PCC pavements with agency acceptance for non federal aid projects. This specification has been utilized successfully on a couple of projects in Johnson and Palo Alto counties.

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: Counties agree.

Industry Comments: Industry has requested use of MIT thickness as an option to coring.

DS-23049
(New)

DEVELOPMENTAL SPECIFICATIONS
FOR
PCC PAVEMENT NON-DESTRUCTIVE THICKNESS DETERMINATION CONTRACTOR QUALITY CONTROL AND ACCEPTANCE FOR LOCAL SYSTEMS (NON-FEDERAL AID)

Effective Date
January 17, 2024

THE STANDARD SPECIFICATIONS, SERIES 2023, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

Replace Article 2301.04, A, 2 with the following.

2. Requirements for thickness do not apply to detour pavements, paved drives, and temporary pavements. The thickness of pavement constructed will be determined as follows:

a. The division of sections, lots, and thickness measurement locations will be ~~determined by the Engineer according to Materials I.M. 346~~ according to Appendix A.

b. ~~For Interstate and Primary projects, evaluate pavement thickness for sections of the same design thickness more than 3500 square yards using non-destructive testing according to Materials I.M. 346 Method A.~~ At locations determined by the Engineer.

~~**c.** For non-Primary projects evaluate pavement thickness for sections of the same design thickness more than 3500 square yards by coring according to Materials I.M. 346 Method B. The specification will be adopted in its entirety.~~

~~**d**~~ **c.** Determine thickness for sections of the same design thickness 3500 square yards or less, by probing plastic concrete in accordance with Materials I.M. 396.

~~**e**~~ **d.** Only sections which are evaluated for thickness will be included in the thickness index determination. Areas not evaluated for thickness will be paid for at the contract unit price.

APPENDIX A
EVALUATING PORTLAND CEMENT
CONCRETE PAVEMENT THICKNESS

SCOPE

Thickness measurements will be taken on Portland Cement Concrete (PCC) pavement, to determine the pavement thickness and the thickness index for each section. Refer to Specification DS-15xxx.

APPARATUS

1. An MIT Scan T2 or T3 gauge will be used to perform thickness measures.
2. Steel Targets will be 11.81 inches in diameter, 24 gauge, meeting ASTM A 653, commercial steel with a G90 coating (about 275 g/m^2 total both sides).

DEFINITIONS

Section: All Portland Cement Concrete in a project of the same bid item. Irregular areas, as defined herein, of the same bid item shall form a separate section. On multiple year projects, a separate section will be formed for each year. If less than 20,000 square yards are placed in one year, that section will be grouped with a previous or subsequent year.

Lot: A portion of a section normally 200 feet in length and 2 traffic lanes wide.

Regular area pavement sections:

- All mainline pavement for normal travel lanes. Includes middle (both direction) turn lanes
- Paved shoulder – if same thickness as pavement and part of pavement bid item include with pavement. If separate bid item, treat as separate section.
- Paved median - if same thickness as pavement and part of pavement bid item, and longer than 300 feet, include with pavement.
- Auxiliary lanes of full width longer 300 feet.
- Widening greater than 6 feet.

Irregular areas:

- Widening less than 6 feet.
- Side street connections.
- Ramps, including gore areas, and collector distributor roads.
- Deceleration and acceleration lanes.
- Turn lanes, including taper sections.
- Tapers.
- Radiuses.
- Median crossovers

PROCEDURES

The Engineer will determine the location of each lot, the random location of each metal target, and the random thickness measuring scheme for each section using an Iowa DOT developed MSExcel spreadsheet. Immediately prior to paving, the Engineer will place the target or observe the contractor place the target.

A. Target Location for Regular Areas

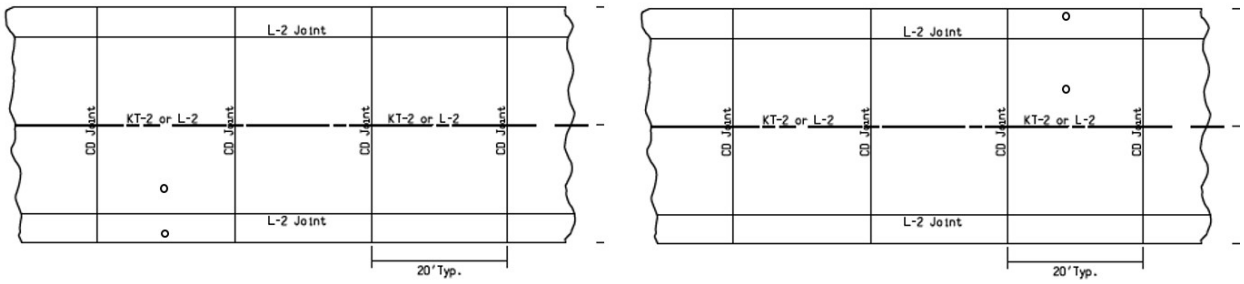
1. Divide the section longitudinally into 2000 square yard lots. One target will be located in each lot based on the spreadsheet selection. Beginning with the first station at +00, place a target from the edge of the pavement half way between dowel baskets~~)~~. See Figure 1. If the +00 station falls on a basket, move the target location ahead halfway between the dowel baskets. A minimum of ten targets will be tested. If a target location falls on a bridge or in an approach section, it will be eliminated.

2. The transverse location of the targets will be randomly determined by the spreadsheet program. The random locations will be 4 foot from edge of pavement, left or right. For ease of measuring, plates may be placed 18 inches from the edge if there is no tie steel or a work bridge is not available.
3. The program will randomly determine which targets to measure. If a measurement location falls on a bridge or bridge approach pavement, it will be eliminated and the next closest target not in the original random

selection will be used for measurement.

4. Shoulders. Divide the section into 800 foot long lots including both shoulders. Beginning with the first station at +00, locate a target every 400 feet, alternating between the inside and outside shoulder (or every 800 feet on one side). On 6 foot shoulders or wider, the targets should be 4 feet from the edge of the pavement. On 4 foot shoulders, the targets should be 3 feet from the edge of the pavement.

Figure1. Target Location



B. Target Location for Irregular Areas

1. All irregular areas of the same design thickness will be grouped together for determining the number of lots. The Engineer may waive sections of the same design thickness that total less than 5000 square yards.

2. Place targets randomly in all irregular areas larger than 100 square yards. One target will be randomly located in each selected irregular area For irregular areas greater than 1000 square yards, randomly place a minimum of two targets. Targets must be placed at least 2 feet away from tie steel and 4 feet from dowel bars. A minimum of ten targets will be tested to represent each section of irregular areas. For projects with less than ten irregular areas larger than 100 square yards, select a minimum of three areas to place targets. All targets will be measured. If more than 20 targets are located in irregular areas, randomly select 50% to be tested.

C. Testing

Follow the manufacturer's instructions for operating the thickness gauge. It is important to avoid testing close to any steel including vehicles, equipment, steel toed shoes as well as tie bars, dowel bars and baskets, and manhole covers. When wearing steel toed shoes, always keep both toes at least 2 feet from the gauge during the test. Three total repeat readings will be taken. The readings should all be within 4 mm (0.15 in.) of each other.

D. Section Evaluation

1. Use the following formula to determine the mean thickness for the section:

$$\overline{X} = \frac{\sum X}{n}$$

Where: $\overline{X}$ = mean length for the section

$\sum X$ = sum of core lengths for the section

n = number of cores taken within the section

Round the mean thickness to two decimal places.

2. Use the following formula to determine the sample standard deviation of the thickness of the section:

$$S = \sqrt{\frac{\sum \left(X - \overline{X}\right)^2}{n-1}}$$

Where:

S = thickness standard deviation for the section.
$\overline{X}$ = mean thickness for the section
X = individual thickness values for the section.
n = number of tests representing the section.

$\sum$ = sign indicating the sum of all values of $(X - \overline{X})^2$

Round the sample standard deviation to two decimal places.

NOTE: Calculations of the standard deviation are best made with an electronic calculator with standard deviation capability that uses the formula containing the quantity (n-1).

3. Use the following formula to determine the thickness index for the section of pavement thickness.

$$TI = (\overline{X} - S) - T$$

Where:

TI = thickness index for the section
$\overline{X}$ = mean thickness length for the section
T = design thickness, including subbase adjustment in IM 346
S = measurement thickness standard deviation (of the sample) for the section

Round the thickness index to two decimal places.

NOTE: If the mean thickness minus the standard deviation is less than T of the section, the thickness index will be a negative number.

4. Basis of Payment. Payment for the quantities of pavement in square yards in each section will be as shown in Article 2301.05 of the Standard Specifications and based on the thickness index as determined in accordance with these instructions.

E. Quality Assurance Testing

The Engineer will perform quality assurance testing by probing.

1. Probing – The Engineer may probe a minimum of one (1) test per seven (7) plates at random locations during paving operations in accordance with Materials IM 396. Plates may be moved to 18 inches from the edge of the pavement to allow easier testing.
2. The Engineer may utilize a MIT SCAN T2 or T3 gage, other than the one used by the contractor, to test a minimum of ten random locations.
3. The Engineer may also survey, to a minimum of 0.005 foot, on the plate prior to paving and on top of the pavement directly over the plate after placement to determine an accurate thickness verification.

F. Deficient Areas

1. If any measurement is deficient from T by 1 inch or more, the measurement should be rechecked to confirm the reading and the equipment. If the repeat measurement is also 1 inch or more below T, mark the location directly over the target. The Contractor shall drill a 4.0 inch diameter core at that location. If the core length confirms the pavement is deficient by 1 inch or more, continue to drill cores as described below.

2. Deficient areas, represented by cores deficient in length by 1 inch or more from design thickness, are to be replaced. These areas will be determined by drilling a core 60 feet in each direction longitudinally at the same transverse location from the deficient core. Drilling will be continued at 60 feet intervals until a core is obtained which is not deficient by 1 inch or more from design thickness. Interpolate between this core and the adjacent core to determine the limits of the deficient area. This is the area to be removed and replaced

at contractor's expense. These additional cores are to be used to define the deficient area and will not be used in the thickness index calculation. When an obstruction, such as a bridge, intersection, previous work, etc., prevents drilling a core at the required 60 feet interval in either direction longitudinally, continue the balance of the distance on the other side of the obstruction.

3. Any readings taken in the area for removal will be eliminated from the analysis for the entire section. A minimum of two plates will be placed on alternate sides prior to placement. After replacement, the contractor measure the thickness using the MIT SCAN to verify the thickness. The engineer will witness the measurement.

G. Final Pavement Thickness Measurement

1. Include all MIT SCAN measurements and probe measurements. The final pavement thickness will be determined by one of the following:
    a. If all the probe measurements are within ±0.25" of the MIT SCAN measurements, the MIT SCAN measurements will be considered validated. The Engineer will determine final thickness based on the average MIT SCAN measurements.
    b. If at any one location, the probe measurements are greater than ±0.25" difference from the MIT SCAN measurements, the contractor will core at the plate location and 2 feet away from the plate location. If the core at the plate location indicates that it has moved during placement, use the core thickness from the core taken two feet away as the pavement thickness. The Engineer will replace the MIT SCAN thickness at the location with the core thickness taken two feet away along with the average MIT SCAN measurements as final pavement thickness.
    c. If all of the probe measurements are greater than ±0.25" difference from the MIT SCAN measurements, the Engineer will randomly select a minimum of 10 random locations, at two feet from the plate location, for coring by the contractor. The Engineer will use the average core thickness, tested in accordance with IM 346, to determine final pavement thickness.