**Design Standards Letter**

**Letter Number: S-2017-04**

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**Section/Plan No.: 102, 403, 610, 620, 720, 901, 902, 903, 1048, 1081**

**Subject: Revised Supplement to the 2016 Standard Specifications and New Publication of the 2017 Standard Specification**

**Body**

**TO:** All Central and District Offices

**FROM:** Llans Taylor

**DATE:** June 8, 2017

**SUBJECT:** Engineering Policy

Standard Specifications Letter No. 4, 2017

Revisions Supplement to the 2016 Standard Specifications and the New Publication of the 2017 Standard Specification

The Supplemental Revisions to the *2016 Missouri Standard Specifications for Highway Construction* are now included in the new publication of the *2017 Missouri Standard Specification for Highway Construction* along with the following additional revision listed below. The 2017 *Missouri Standard Specification for Highway Construction* effective July 1, 2017 is now available on MoDOT’s website.

Questions regarding the Supplemental Revisions to the Missouri Standard Specification should be directed to Tim Oligschlaeger, Central Office, Engineering Policy Group, at 573-751-3813 or myself at 573-751-7412.

**MINOR REVISIONS:**

**SECTION 102 BIDDING REQUIREMENT AND CONDITIONS**

*Sec 102.3.5* Changed bidding software from “Trns🞄Port Expedite” to “AASHTOWare Project Bids”.

*Sec 102.7.1* Changed bidding software from “Trns🞄Port Expedite Bid” to “AASHTOWare Project Bids”.

*Sec 102.10.* Changed bidding software from “Trns Port Expedite Bid” to “AASHTOWare Project Bids”.

**SECTION 610 PAVEMENT SMOOTHNESS**

*Sec 610.4.5.4* Updated Table 1 to combine Full Depth Pavement into Multi-Lift Overlay > 3 – inches and revised Maximum Segment IRI from 80 to 125.

**SECTION 901 HIGHWAY LIGHTING**

*Sec 901.3* Changed specification for High-Strength Anchor Bolts from “ASTM A 449” to “ASTM F 1554” in table.

**SECTION 902 TRAFFIC SIGNALS**

*Sec 902.4* Added item “High-Strength Anchor Bolts” with specification “ASTM F 1554” to table.

*Sec 902.24.7* Added Sec to provide method of measurement for signal signs.

*Sec 902.25.24* Added Sec to provide a basis of payment for signal signs and mounting hardware.

**SECTION 903 HIGHWAY SIGNING**

*Sec 903.2* Added “Specification” to Section column in table heading and added item “High-Strength Anchor Bolts” with specification “ASTM F 1554” to table.

**SECTION 1081 COATING OF STRUCTURAL STEEL**

*Sec 1081.4.3.3.1* Deleted language stating cost of obtaining the EPA identification number will be subtracted from the contact.

**MAJOR REVISIONS:**

**SECTION 403 ASPHALTIC CONCRETE PAVEMENT**

*Sec 403.2.1* Added note to table for Design F that SP048 mixture shall have a minimum FAA of 40.

**SECTION 620 PAVEMENT MARKING**

*Sec 620.2* Deleted subsection and renumbered sections accordingly.

*Sec 620.2.1* Added Sec in its entirety and renumbered sections accordingly.

*Sec 620.2.1.7* Deleted Sec and renumbered sections accordingly.

*Sec 620.2.8* Updated Sec number in first sentence from 620.2.4.2 to 620.20.1.4.

*Sec 620.10* Moved to Sec 620.20.3.2 and changed from “Preformed Pavement Marking Tape” to “Durable Intersection Pavement Markings”. Sec 620.10 was renamed to “Temporary Pavement Marking”.

*Sec 620.10.1* Moved to Sec 620.20.3.2.1. Sec 620.10.1 was changed to “General”.

*Sec 620.10.1.1* Added Sec “Quality Control and Quality Assurance”.

*Sec 620.10.1.2* Previously listed as Sec 620.2.5. Renamed and revised Sec to clarify temporary pavement marking shall be provided and maintain at the contractor’s expense if existing markings are obliterated.

*Sec 620.10.1.3* Previously listed as Sec 620.2.5.1. Clarified temporary pavement marking for No-Passing Zones on two lane, two way roadways. When TRPMs or tape is used to mark the centerline, no-passing zone signs shall be posted as shown on plans in lieu of marking the no-passing zones.

*Sec 620.10.1.4* Previously Sec 620.2.5.2

*Sec 620.10.1.5* Previously listed as Sec 620.2.5.3. Revised time limit from fifteen days to time limit specified in Sec 620.2.1. Added for paint specifications see Sec 620.10.2.

*Sec 620.10.1.6* Added specification providing an option of using temporary non-removable pavement marking tape as specified in Sec 620.10.4, if duration is less than two weeks and removal of temporary marking is not required.

*Sec 620.10.1.7* Previously listed as Sec 620.2.6. Replaced pavement marking paint, preformed removable pavement marking tape and preformed short term pavement marking with “temporary pavement markings”. Clarified temporary paint shall not be used in lieu of tape without approval from the engineer.

*Sec 620.2.6.1* Deleted Sec 620.2.6.1 in its entirety.

*Sec 620.10.1.8* Previous listed as Sec 620.2.6.2. Clarified temporary pavement marking on final driving surface that will require removal shall be temporary removable pavement marking tape.

*Sec 620.10.2* Moved to Sec 620.20.3.2.2. Sec 620.10.2 was changed to “Temporary Pavement Marking Paint”.

*Sec 620.10.2.1* Added specification providing a description of furnishing and placing temporary pavement marking paint.

*Sec 620.10.2.2* Added specification of material for temporary pavement marking paint and glass beads.

*Sec 620.10.2.3* Added specification “Construction Requirements”

*Sec 620.10.2.3.1* Added specification that temporary paint may be used as temporary pavement marking.

*Sec 620.10.2.3.2* Added specification for minimum thickness, width and beads for temporary paint.

*Sec 620.10.2.3.3* Added specification to allow placement of temporary paint line prior to cutting the rumble strip.

*Sec 620.10.2.3.4* Added specification that all of temporary pavement marking paint shall be removed before placement of permanent durable pavement marking.

*Sec 620.10.2.3.5* Added specification that all temporary pavement marking paint used on final surface shall be installed in the same location and in the same sequence as the final pavement marking.

*Sec 620.10.2.3.6* Added specification that all no-passing zones lines shall be marked prior to leaving the work zone unattended.

*Sec 620.10.2.4* Added specification for pavement marking paint equipment.

*Sec 620.10.3* Moved to Sec 620.20.3.2.3. Sec 620.20 moved to 620.10.3 changed from “Preformed Removable Pavement Marking Tape” to “Temporary Removable Pavement Marking Tape”.

*Sec 620.10.3.1* Moved to 620.20.3.2.3.1. Sec 620.20.1 to 620.10.3.1 and added maintaining temporary removable pavement marking tape to specification.

*Sec 620.10.3.2* Previously listed as Sec 620.20.2. Updated table from “Preformed Removable Pavement Marking” to “Temporary Removable Pavement Marking Tape”.

*Sec 620.10.3.3* Previously listed as Sec 620.20.3. Removed preformed and replaced with temporary for removable pavement marking tape.

*Sec 620.10.4* Moved to 620.20.4. Sec 620.30 was moved to 620.40.4 and changed from “Preformed Short Term Pavement Marking Tape” to “Temporary Non-Removable Pavement Marking Tape”.

*Sec 620.10.4.1* Existing Sec renumbered to 620.20.4.1 New Sec previously listed as Sec 620.30.1. Added maintaining temporary non-removable pavement marking tape to specification.

*Sec 620.10.4.2* Existing Sec renumbered to 620.20.4.2. New Sec previously listed as Sec 620.30.2. Updated table from “Preformed Short Term” to “Temporary Non-Removable” and Section number from 1048.30 to 1048.10.3.

*Sec 620.10.4.3* Existing Sec renumbered to 620.20.4.3. New Sec previously listed as Sec 620.30.3. Changed “preformed short term” to “temporary non-removable pavement”.

*Sec 620.30.4* Deleted Sec 620.30.4 in its entirety.

*Sec 620.30.5* Deleted Sec 620.30.5 in its entirety.

*Sec 620.10.5* Existing Sec renumbered to 620.20.5. New Sec previously listed as 620.60, renumber sections accordingly

*Sec 620.10.5.3.1* Previously listed as 620.60.3.1. Changed Temporary RPM’s to TRPM’s.

*Sec 620.10.5.3.2* Previously listed as 620.60.3.1.1. Changed Type 1 Temporary RPM’s to TRPM’s.

*Sec 620.60.3.1.2* Deleted Sec 620.60.3.1.2 in its entirety.

*Sec 620.10.5.3.3* Previously listed as 620.60.3.2. Clarified when TRPM’s shall be removed.

*Sec 620.60.4* Deleted Sec 620.60.4 in its entirety.

*Sec 620.60.5* Deleted Sec 620.60.5 in its entirety.

*Sec 620.10.6* Added Sec “Cold Weather Pavement Markings”.

*Sec 620.10.6.1* Added specification describing cold weather pavement marking.

*Sec 620.10.6.2* Added specification describing applications for cold weather pavement marking.

*Sec 620.10.6.3* Added specification describing limitations of use for cold weather pavement marking.

*Sec 620.10.6.4* Added specification and table for cold weather pavement marking paint and glass beads.

*Sec 620.10.6.5* Added specification for construction requirements of cold weather pavement marking paint and glass beads.

*Sec 620.10.6.5.1* Added specification for heating paint prior to application.

*Sec 620.10.7* Added specification stating no measurement will be made for temporary pavement marking paint, temporary removable tape, temporary non-removable tape and temporary raised pavement markers unless changes during construction or errors are found in the contract quantity.

*Sec 620.10.7.1* Added specification of method of measurement for temporary pavement marking paint, temporary removable marking tape and temporary non-removable marking tape.

*Sec 620.10.7.2* Added specification of method of measurement for temporary raised pavement markers (TRPMs).

*Sec 620.10.8* Added Sec 620.10.8 “Basis of Payment”

*Sec 620.10.8.1* Added specification of basis of payment for temporary pavement marking paint, temporary removable tape, temporary non-removable tape and temporary raised pavement markers.

*Sec 620.10.8.2* Added specification stating no payment for any temporary pavement markings when used as temporary pavement marking due to obliteration of existing markings as defined in Sec 620.10.12.

*Sec 620.20* Moved to 620.10.3. Sec 620.2.2 moved to 620.20.

*Sec 620.20.1* Moved to 620.10.3.1. Added “General” as Sec 620.20.1.

*Sec 620.2.2.1* Deleted Sec 620.2.2.1 in its entirety.

*Sec 620.2.2.2* Deleted Sec 620.2.2.2 in its entirety.

*Sec 620.2.2.3* Deleted Sec 620.2.2.3 in its entirety.

*Sec 620.20.1.1* Added specification “Quality Control and Quality Assurance”.

*Sec 620.20.1.2* Added specification contractor shall match pavement marking sequence in advance of the project limits.

*Sec 620.20.1.3* Added specification requiring contractor to place and maintain temporary pavement marking if road is open to traffic without permanent pavement marking.

*Sec 620.20.1.4* Previously list as 620.40.3.2. Clarified surface should be dry and free of all contaminants before installing permanent pavement marking.

*Sec 620.20.1.4.1* Added specification requiring all pre-existing pavement marking be removed before installation of durable pavement markings.

*Sec 620.40.3.3* Deleted Sec 620.40.3.3 in its entirety.

*Sec 620.40.3.3.1* Deleted Sec 620.40.3.3.1 in its entirety.

*Sec 620.40.3.3.2* Deleted Sec 620.40.3.3.2 in its entirety.

*Sec 620.70.3.3* Deleted Sec 620.40.3.3.3 in its entirety.

*Sec 620.70.3.3.1* Deleted Sec 620.70.3.3.1 in its entirety.

*Sec 620.70.3.3.2* Deleted Sec 620.70.3.3.2 in its entirety.

*Sec 620.70.3.3.3* Deleted Sec 620.70.3.3.3 in its entirety.

*Sec 620.70.3.3.4* Deleted Sec 620.70.3.3.4 in its entirety.

*Sec 620.70.3.3.5* Deleted Sec 620.70.3.3.5 in its entirety.

*Sec 620.70.3.3.6* Deleted Sec 620.70.3.3.6 in its entirety.

*Sec 620.70.3.3.7* Deleted Sec 620.70.3.3.7 in its entirety.

*Sec 620.70.3.3.8* Deleted Sec 620.70.3.3.8 in its entirety.

*Sec 620.70.3.3.9* Deleted Sec 620.70.3.3.9 in its entirety.

*Sec 620.20.1.5* Added specification for Tolerances of Pavement Marking Lines.

*Sec 620.20.2* Existing Sec renumbered to 620.10.3.2 New Sec created “Pavement Marking Paint.”

*Sec 620.20.2.1* Previously listed as 620.40.1. Clarified description of pavement marking paint.

*Sec 620.20.2.2* Previously listed as 620.40.2. Clarified material for pavement marking paint and updated table.

*Sec 620.20.2.3* Previously listed as 620.40.3 “Construction Requirements.”

*Sec 620.20.2.3.1* Previously listed as 620.40.3.1. Clarified specification for pavement marking equipment.

*Sec 620.40.3.4* Deleted Sec 620.40.3.4 in its entirety.

*Sec 620.20.2.3.2* Previously listed as 620.40.3.4.1. Clarified how paint shall be applied and how the finish should appear.

*Sec 620.20.2.3.3* Added specification for maximum temperature waterborne paint can be heated before application.

*Sec 620.20.2.3.4* Previously listed as 620.40.3.4.2. Clarified waterborne paint should only be used as specified in the contract and plans and shall not be used for stop bars, arrows, words, and symbols.

*Sec 620.20.2.4* Added specification “Weather Limitations.”

*Sec 620.20.2.4.1* Added specification requiring contractors to determine pavement surface temperature and air temperature.”

*Sec 620.20.2.4.2* Add specification for pavement surface temperature and air temperature for waterborne paint applications.

*Sec 620.40.4* Deleted Sec 620.40.4 in its entirety.

*Sec 620.40.5* Deleted Sec 620.40.5 in its entirety.

*Sec 620.20.2.5* Add specification for standard waterborne paint.

*Sec 620.40.3.4.4* Deleted Sec 620.40.3.4.4 in its entirety.

*Sec 620.20.2.5.1* Add specification for Type P drop-on glass beads.

*Sec 620.40.3.4.5* Deleted Sec 620.40.3.4.5 in its entirety.

*Sec 620.40.3.4.6* Deleted Sec 620.40.3.4.6 in its entirety.

*Sec 620.20.2.6* Previously listed as 620.40.3.4.3. Clarified specification for High Build Waterborne Paint.

*Sec 620.20.2.6.1* Add specification for Type L drop-on glass beads.

*Sec 620.20.3* Moved to 620.10.3.3. Changed Sec 620.20.3 to “Durable Pavement Markings”.

*Sec 620.20.3.1* Added Sec 620.20.3.1 “Durable Pavement Markings Lines.”

*Sec 620.20.3.1.1* Previously listed as 620.70.1. Clarified description from epoxy to durable pavement marking.

*Sec 620.20.3.1.2* Previously listed as 620.70.2. Updated table from epoxy to durable pavement marking.

*Sec 620.70.3* Deleted Sec 620.70.3 in its entirety.

*Sec 620.20.3.1.3* Previously listed as 620.70.3.1. Clarified equipment for applying durable pavement markings.

*Sec 620.70.3.1.1* Deleted Sec 620.70.3.1.1 in its entirety.

*Sec 620.70.3.1.2* Deleted Sec 620.70.3.1.2 in its entirety.

*Sec 620.70.3.1.3* Deleted Sec 620.70.3.1.3 in its entirety.

*Sec 620.70.3.1.4* Deleted Sec 620.70.3.1.4 in its entirety.

*Sec 620.70.3.1.5* Deleted Sec 620.70.3.1.5 in its entirety.

*Sec 620.70.3.2* Deleted Sec 620.70.3.2 in its entirety.

*Sec 620.70.3.4* Deleted Sec 620.70.3.4 in its entirety.

*Sec 620.20.3.1.4* Previously listed as 620.70.3.4.1. Clarified weather limitations for applying durable pavement markings.

*Sec 620.70.3.4.2* Deleted Sec 620.70.3.4.2 in its entirety.

*Sec 620.70.3.5* Deleted Sec 620.70.3.5 in its entirety.

*Sec 620.70.3.6* Deleted Sec 620.70.3.6 in its entirety.

*Sec 620.20.3.2* Previously listed as 620.10. Changed “Preformed Pavement Marking Tape” to Durable Intersection Pavement Markings”.

*Sec 620.20.3.2.1* Previously listed as 620.10.1. Clarified description for Durable Intersection Pavement Markings.

*Sec 620.20.3.2.2* Previously listed as 620.10.2. Clarified materials detail and removed table.

*Sec 620.20.3.2.3* Previously listed as 620.10.3.

*Sec 620.20.3.2.3.1* Previously listed as 620.10.3.1. Updated “Preformed pavement marking tape” to “ Durable Intersection Pavement Markings and added material shall be from the MoDOT Qualified Products list.

*Sec 620.20.3.2.3.2* Previously listed as 620.10.3.1.1. Clarified grooving for intersection marking.

*Sec 620.20.3.2.3.3* Previously listed as 620.10.3.1.2. Clarified material for arrows, words and symbols.

*Sec 620.20.3.2.4* Previously listed as 620.10.3. Clarified acceptance for durable intersection pavement marking.

*Sec 620.20.4* Existing Sec deleted. Sec 620.10.4 moved to 620.20.4.

*Sec 620.20.4.1* Previously listed as 620.10.4.1. Clarified final measurement for permanent pavement marking.

*Sec 620.20.4.2* Previously listed as 620.10.4.2.

*Sec 620.20.4.3* Previously listed as 620.10.4.3. Clarified measurement for durable intersection pavement marking.

*Sec 620.20.5* Previously Sec 620.10.5.

*Sec 620.20.5.1* Clarified basis of payment for permanent pavement marking.

*Sec 620.20.5.2* Add specification for payment adjustment for permanent pavement marking lines based on retroreflectivity measurements.

*Sec 620.30* Renamed Sec from “Preformed Short Term Pavement Marking Tape” to “Drop-On Glass Beads”.

*Sec 620.30.1* Moved to and replaces Sec 620.10.4.1. Sec 620.40.3.5 moved to and replaces Sec 620.30.1 Added additional information on the application of Drop-On Glass Beads.

*Sec 620.30.2*  Moved to 620.10.4.2. Changed Sec 620.30.2 to “Material”.

*Sec 620.30.3* Clarified application rate for Type P Glass Beads.

*Sec 620.30.4* Clarified application rate for Type L Glass Beads.

*Sec 620.30.5* Add specification, “Basis of Payment”.

*Sec 620.40* Renamed Sec from “Paint For Pavement Marking” to “Quality Control and Quality Assurance”.

*Sec 620.40.1* Added Sec requiring contractor to control and monitor quality of the work for all temporary and permanent pavement markings and removal.

*Sec 620.40.1.1* Added requirements for Quality Control of Temporary and Permanent Pavement Marking Paint.

*Sec 620.40.1.1.1* Added requirements for initial Quality Control evaluations.

*Sec 620.40.1.1.2* Added requirements for air and surface temperature checks.

*Sec 620.40.1.2* Added requirements for Quality Control for Durable Pavement Marking.

*Sec 620.40.1.3* Added requirements for Quality Control for Temporary Raised Pavement Markers.

*Sec 620.40.2* Added Sec for Quality Assurance.

*Sec 620.40.2.1* Added Sec for measuring retroreflectivity of pavement markings.

*Sec 620.40.2.1.1* Added requirement for measuring retroreflectivity pavement markings.

*Sec 620.40.2* Added Sec for Quality Assurance.

*Sec 620.40.2.2* Added Sec “Acceptance”.

*Sec 620.40.2.2.1* Added Sec for evaluation of pavement marking after installation.

*Sec 620.40.2.2.2* Added Sec for failed permanent pavement marking requirements.

*Sec 620.40.2.2.3* Added Sec for acceptance of permanent pavement markings.

*Sec 620.40.2.2.4* Added Sec with table for retroreflectivity acceptance requirements and payment adjustments.

*Sec 620.40.2.2.4.1* Added Sec for failed paint markings that didn’t meet acceptance requirements.

*Sec 620.40.2.2.4.2* Added Sec for payment adjustment.

*Sec 620.40.2.2.4.2.1* Added Sec for subsequent measurement when necessary due to corrective work.

*Sec 620.2.3* Deleted existing specification and changed 620.2.1.2 to 620.2.3.

*Sec 620.2.3.1* Deleted Sec 620.2.3.1 in its entirety.

*Sec 620.2.3.2* Deleted Sec 620.2.3.2 in its entirety.

*Sec 620.2.3.3* Deleted Sec 620.2.3.3 in its entirety.

*Sec 620.2.4* Deleted existing specification and changed 620.2.1.3 to 620.2.4.

*Sec 620.2.4.1* Deleted Sec 620.2.4.1 in its entirety.

*Sec 620.2.4.2* Deleted Sec 620.2.4.2 in its entirety.

*Sec 620.2.4.3* Deleted Sec 620.2.4.3 in its entirety.

*Sec 620.50.1* Clarified description for pavement marking removal.

*Sec 620.50.2* Clarified construction requirements for pavement marking removal.

*Sec 620.50.3.2* Clarified measurement for pavement marking removal.

*Sec 620.50.4* Deleted Sec 620.2.4.3 in its entirety.

*Sec 620.2.5* Deleted existing specification and changed 620.2.1.4 to 620.2.5.

**SECTION 720 MECHANICALLY STABILIZED EARTH WALL SYSTEMS**

*Sec 720.2* Added Pipe Pile Spacers to Material Item table.

*Sec 720.2.2* Change “welded steel wire fabric” to steel welded wire reinforcement” in the first sentence.

*Sec 720.4.7* Added Sec “Pipe Pile Spacers”.

*Sec 720.4.7.1* Added specification for locations to use pipe pile spacers.

*Sec 720.4.7.2* Added specification for what types of pipe pile spacers to use.

*Sec 720.4.7.3* Added specification for size and placement of pipe pile spacers.

*Sec 720.4.7.4* Added specification for driving the piles before construction of the mechanically stabilized earth wall and placing the soil reinforcing and backfill material around the piling in lieu of using pipe pile spacers. Renumbered sections accordingly.

*Sec 720.5.2* Added specification for method of measurements for pipe pile spacers. Renumbered sections accordingly.

*Sec 720.6* Added specification for basis of payment for pipe pile spacers.

**SECTION 1048 PAVEMENT MARKING MATERIAL**

*Sec 1048.1* Clarified scope for specification to include all temporary pavement markings, permanent pavement markings and drop-on glass beads.

*Sec 1048.10* Renamed Sec from “Performed Pavement Marking Tape” to Temporary Pavement Marking Materials.

*Sec 1048.10.1* Changed specification to Temporary Paint Materials.

*Sec 1048.10.1.1* Deleted existing Sec and changed to “Cold Weather Pavement Marking Paint”.

*Sec 1048.10.1.1.1* Moved Sec 1048.80 “Acrylic Copolymer Fast Dry Pavement Marking Paint” to new Sec 1048.10.1.1.1.

*Sec 1048.10.1.1.1.1* Previously Sec 1048.80.1.

*Sec 1048.10.1.1.1.2* Previously Sec 1048.80.2.

*Sec 1048.10.1.1.1.2.1* Previously Sec 1048.80.2.1.

*Sec 1048.10.1.1.1.2.2* Previously Sec 1048.80.2.2.

*Sec 1048.10.1.1.1.2.3* Previously Sec 1048.80.2.2.1.

*Sec 1048.10.1.1.1.2.4* Previously Sec 1048.80.2.2.2.

*Sec 1048.10.1.1.1.3* Previously Sec 1048.80.2.3.

*Sec 1048.10.1.1.1.3.1* Previously Sec 1048.80.2.3.1.

*Sec 1048.10.1.1.1.3.2* Previously Sec 1048.80.2.3.2.

*Sec 1048.10.1.1.1.3.3* Previously Sec 1048.80.2.3.3.

*Sec 1048.10.1.1.1.4* Previously Sec 1048.80.2.3.3.1.

*Sec 1048.10.1.1.1.4.1* Previously Sec 1048.80.2.3.3.2.

*Sec 1048.10.1.1.1.4.2* Previously Sec 1048.80.2.3.3.4.

*Sec 1048.10.1.1.1.5* Previously Sec 1048.80.3.

*Sec 1048.10.1.1.1.5.1* Previously Sec 1048.80.3.1.

*Sec 1048.10.1.1.1.5.2* Previously Sec 1048.80.3.2.

*Sec 1048.10.1.1.1.5.3* Previously Sec 1048.80.3.3.

*Sec 1048.10.1.1.2* Added Sec “Cold Weather Waterborne Pavement Marking Paint”.

*Sec 1048.10.1.1.2.1* Added specification for description of Cold Weather Waterborne Pavement Marking Paint.

*Sec 1048.10.1.1.2.2* Added specification for Materials of Cold Weather Waterborne Pavement Marking Paint.

*Sec 1048.10.1.1.2.2.1* Added specification for Acrylic Emulsion Polymer.

*Sec 1048.10.1.1.2.2.2* Added General specification for Cold Weather Waterborne Pavement Marking Paint.

*Sec 1048.10.1.1.2.2.3* Added specification for Maintained retroreflectivity.

*Sec 1048.10.1.1.2.2.4* Added specification for Mixed Paint.

*Sec 1048.10.1.1.2.2.4.1* Added specification for straining paint before filling.

*Sec 1048.10.1.1.2.2.4.2* Added specification for volatile content.

*Sec 1048.10.1.1.2.2.4.3* Added specification for paint properties.

*Sec 1048.10.1.1.2.2.4.3.1* Added specification with table for Physical Properties.

*Sec 1048.10.1.1.2.2.4.3.2* Added specification with table for Color.

*Sec 1048.10.1.1.2.2.4.3.3* Added specification for paint Flexibility.

*Sec 1048.10.1.1.2.2.4.3.4* Added specification for paint Water Resistance.

*Sec 1048.10.1.1.2.2.4.3.5* Added specification for Freeze-Thaw Stability.

*Sec 1048.10.1.1.2.2.4.3.6* Added specification for Heat Stability.

*Sec 1048.10.1.1.2.2.4.3.7* Added specification for Dilution Test.

*Sec 1048.10.1.1.2.2.4.3.8* Added specification for Storage Stability.

*Sec 1048.10.1.1.2.2.4.3.9* Added specification for Contract Ratio.

*Sec 1048.10.1.1.2.2.4.3.10* Added specification for Reflectance.

*Sec 1048.10.1.1.2.2.4.3.11* Added specification for Bleeding.

*Sec 1048.10.1.1.2.2.4.3.12* Added specification for Dry Through Time.

*Sec 1048.10.1.1.2.5* Added specification for Acceptance.

*Sec 1048.10.1.1.2.5.1* Added specification for Stability in Storage.

*Sec 1048.10.2* Moved to new Sec 1048.20.2.2.1 and 1048.20 was moved to 1048.10.2. Added the word Temporary and removed Preformed from Sec.

*Sec 1048.10.2.1* Moved to new Sec 1048.20.2.2.1.1 and 1048.20.1 was moved to 1048.10.2.1 Added the word Temporary and removed Preformed from Sec.

*Sec 1048.10.2.2* Moved to new Sec 1048.20.2.2.1.2 and 1048.20.2 was moved to 1048.10.2.2 Removed the word Reflectance at the beginning of the Sec.

*Sec 1048.10.2.3* Moved to new Sec 1048.20.2.2.1.3 and 1048.20.3 was moved to 1048.10.2.1.

*Sec 1048.10.2.4* Moved to new Sec 1048.20.2.2.1.4 and 1048.20.4 was moved to 1048.10.2.4.

*Sec 1048.10.3* Previously Sec 1048.30 and changed “Preformed Short Term Pavement Marking Tape” to “Temporary Non-Removable Pavement Marking Tape”.

*Sec 1048.10.3.1* Previously Sec 1048.30.1.

*Sec 1048.10.3.2* Previously Sec 1048.30.2.

*Sec 1048.10.3.3* Previously Sec 1048.30.3.

*Sec 1048.10.4* Previously Sec 1048.50.

*Sec 1048.10.4.1* Previously Sec 1048.50.1.

*Sec 1048.10.4.2* Previously Sec 1048.50.2. Removed Type 1 from the beginning of the Sec and updated minimum prismatic reflective face of 0.38 square inches for each face to minimum of 6.0 square inches of ASTM Type V reflective sheeting on both faces of the vertical section.

*Sec 1048.50.3* Deleted Sec 1048.50.3 in its entirety.

*Sec 1048.20* Moved to 1048.10.2. Created new Sec “Permanent Pavement Marking Materials”.

*Sec 1048.20.1* Moved to 1048.10.2.1. Created new Sec “Pavement Marking Paint Materials”.

*Sec 1048.20.1.1* Previously Sec 1048.100.

*Sec 1048.20.1.1.1* Previously Sec 1048.100.1.

*Sec 1048.20.1.1.2* Previously Sec 1048.100.2.

*Sec 1048.20.1.1.2.1* Previously Sec 1048.100.2.1.

*Sec 1048.20.1.1.2.2* Previously Sec 1048.100.2.2.

*Sec 1048.20.1.1.2.3* Previously Sec 1048.100.2.3.

*Sec 1048.20.1.1.2.3.1* Previously Sec 1048.100.2.3.1.

*Sec 1048.20.1.1.2.3.2.* Previously Sec 1048.100.2.3.2.

*Sec 1048.20.1.1.3* Previously Sec 1048.100.3.

*Sec 1048.20.1.1.4* Previously Sec 1048.100.4.

*Sec 1048.20.1.1.4.1* Previously Sec 1048.100.4.1.

*Sec 1048.20.1.1.4.2* Previously Sec 1048.100.4.2.

*Sec 1048.20.1.1.4.3* Previously Sec 1048.100.4.3.

*Sec 1048.20.1.2* Previously Sec 1048.90.

*Sec 1048.20.1.2.1* Previously Sec 1048.90.1.

*Sec 1048.20.1.2.2* Previously Sec 1048.90.2.

*Sec 1048.20.1.2.2.1* Previously Sec 1048.90.2.1.

*Sec 1048.20.1.2.2.2* Previously Sec 1048.90.2.2.

*Sec 1048.20.1.2.2.3* Previously Sec 1048.90.2.3.

*Sec 1048.20.1.2.2.3.1* Previously Sec 1048.90.2.3.1.

*Sec 1048.20.1.2.2.3.2* Previously Sec 1048.90.2.3.2.

*Sec 1048.20.1.2.3* Previously Sec 1048.90.3.

*Sec 1048.20.1.2.3.1* Previously Sec 1048.90.3.1.

*Sec 1048.20.1.2.3.2* Previously Sec 1048.90.3.2.

*Sec 1048.20.1.2.3.3* Previously Sec 1048.90.3.3.

*Sec 1048.20.1.2.3.3.1* Previously Sec 1048.90.3.3.1.

*Sec 1048.20.1.2.3.3.2* Previously Sec 1048.90.3.3.2.

*Sec 1048.20.1.2.3.3.3* Previously Sec 1048.90.3.3.3.

*Sec 1048.20.1.2.3.3.4* Previously Sec 1048.90.3.3.4.

*Sec 1048.20.1.2.3.3.5* Previously Sec 1048.90.3.3.5.

*Sec 1048.20.1.2.3.3.6* Previously Sec 1048.90.3.3.6.

*Sec 1048.20.1.2.3.3.7* Previously Sec 1048.90.3.3.7.

*Sec 1048.20.1.2.3.3.8* Previously Sec 1048.90.3.3.8.

*Sec 1048.20.1.2.3.3.9* Previously Sec 1048.90.3.3.9.

*Sec 1048.20.1.2.3.3.10* Previously Sec 1048.90.3.3.10.

*Sec 1048.20.1.2.3.3.11* Previously Sec 1048.90.3.3.11.

*Sec 1048.20.1.2.4* Previously Sec 1048.90.4.

*Sec 1048.20.1.2.4.1* Previously Sec 1048.90.4.1.

*Sec 1048.20.1.2.4.2* Previously Sec 1048.90.4.2.

*Sec 1048.20.1.2.4.3* Previously Sec 1048.90.4.3.

*Sec 1048.20.2* Added Sec “Durable Pavement Marking Materials”.

*Sec 1048.20.2.1* Added Sec “Plural Component Pavement Materials”.

*Sec 1048.20.2.1.1* Previously Sec 1048.60. Changed Material to Materials.

*Sec 1048.20.2.1.1.1* Added Sec “Fast Cure Epoxy Pavement Marking Materials.

*Sec 1048.20.2.1.1.1.1* Previously Sec 1048.60.1.

*Sec 1048.20.2.1.1.1.2* Previously Sec 1048.60.2.

*Sec 1048.20.2.1.1.1.3* Previously Sec 1048.60.3.

*Sec 1048.20.2.1.1.1.4* Previously Sec 1048.60.4.

*Sec 1048.20.2.1.1.1.5* Previously Sec 1048.60.5.

*Sec 1048.20.2.1.1.1.6* Previously Sec 1048.60.6.

*Sec 1048.20.2.1.1.1.7* Previously Sec 1048.60.7.

*Sec 1048.20.2.1.1.1.8* Previously Sec 1048.60.8.

*Sec 1048.20.2.1.1.1.9* Previously Sec 1048.60.9.

*Sec 1048.20.2.1.1.1.10* Previously Sec 1048.60.10.

*Sec 1048.20.2.1.1.1.11* Previously Sec 1048.60.11.

*Sec 1048.20.2.1.1.1.12* Previously Sec 1048.60.12.

*Sec 1048.20.2.1.1.1.12.1* Previously Sec 1048.60.12.1.

*Sec 1048.20.2.1.1.1.12.2* Previously Sec 1048.60.12.2.

*Sec 1048.20.2.1.1.1.13* Previously Sec 1048.60.13.

*Sec 1048.20.2.1.2* Previously Sec 1048.70.

*Sec 1048.20.2.1.2.1* Previously Sec 1048.70.1.

*Sec 1048.20.2.1.2.2* Previously Sec 1048.70.2.

*Sec 1048.20.2.1.2.3* Previously Sec 1048.70.3.

*Sec 1048.20.2.1.2.4* Previously Sec 1048.70.4.

*Sec 1048.20.2.1.2.5* Previously Sec 1048.70.5.

*Sec 1048.20.2.1.2.6* Previously Sec 1048.70.6.

*Sec 1048.20.2.1.2.7* Previously Sec 1048.70.7.

*Sec 1048.20.2.1.2.8* Previously Sec 1048.70.8.

*Sec 1048.20.2.1.2.9* Previously Sec 1048.70.9.

*Sec 1048.20.2.1.2.10* Previously Sec 1048.70.10.

*Sec 1048.20.2.1.2.11* Previously Sec 1048.70.11.

*Sec 1048.20.2.1.2.11.1* Previously Sec 1048.70.11.1.

*Sec 1048.20.2.1.2.11.2* Previously Sec 1048.70.11.2.

*Sec 1048.20.2.1.2.12* Previously Sec 1048.70.12.

*Sec 1048.20.2.2* Add Sec “Durable Preformed Pavement Marking Materials”.

*Sec 1048.20.2.2.1* Previously Sec 1048.10.2. Changed “Type 2 Preformed Pavement Marking Tape” to “Cold Applied Preformed Pavement Marking Tape Materials”.

*Sec 1048.20.2.2.1.1* Previously Sec 1048.10.2.1.

*Sec 1048.20.2.2.1.2* Previously listed as Sec 1048.10.2.2. In the first sentence, changed “Type 2” to “Cold applied”, and “ceramic beads embedded in the embossed, pattern surface” to “glass beads embedded in the surface”. Removed the second and third sentence.

*Sec 1048.20.2.2.1.3* Previously listed as Sec 1048.10.2.3. Sec was rewritten to remove the minimum thickness requirements and clarified marking tape shall be free of cracks, true edges, straight, unbroken, width shall be no less or 1/8” greater than stated, and length shall not be less than stated.

*Sec 1048.20.2.2.1.4* Previously listed as Sec 1048.10.2.4. Changed “tape” to “marking tape in the first sentenced. Added the second sentence requiring minimum adhesion values as shown in table 2 of ASTM D1000.

*Sec 1048.20.2.2.1.5* Added Sec “Color”. White and yellow markings shall conform to ASTM D6628 requirements.

*Sec 1048.20.2.2.1.6* Previously Sec 1048.10.2.5.

*Sec 1048.20.2.2.1.7* Previously Sec 1048.10.2.6. Clarified minimum index of refraction for glass beads and ceramic beads.

*Sec 1048.20.2.3* Added Sec “Durable Intersection Marking Materials”.

*Sec 1048.20.2.3.1* Added Sec “Preformed Thermoplastic Material”.

*Sec 1048.20.2.3.1.1* Added Sec “General” for Preformed Thermoplastic Material.

*Sec 1048.20.2.3.1.2* Added Sec “Toxicity” for Preformed Thermoplastic Material which requires no fumes shall be released that is toxic and all material shall be completely inert during curing.

*Sec 1048.20.2.3.1.3* Added Sec “Adhesion to Pavement” for Preformed Thermoplastic Material requiring material to have a high degree of adhesion to pavement surface and shall be applied per manufactures specification.

*Sec 1048.20.2.3.1.4* Added Sec “Abrasion Resistance” for Preformed Thermoplastic Material requiring maximum abrasion resistance of 150 mg with CS-17 wheel under a load of 1,000 grams for 1,000 cycles when test in accordance with ASTM D 1925.

*Sec 1048.20.2.3.1.5* Added Sec “Yellowness Index for Preformed Thermoplastic Material requiring maximum yellowness index of 6 before the QUV test and maximum yellow index of 23 after 72-hour QUV test, when tested in accordance with ASTM D 1925.

*Sec 1048.20.2.3.1.6* Added Sec “Color” for Preformed Thermoplastic Material requiring the finished white color to be free from tint, furnishing good opacity and visibility under both daylight and artificial light. The finished yellow color shall closely match Federal Test Standard 595 – Color Chip Number 33538.

*Sec 1048.20.2.3.1.7* Added Sec “Qualification” for Preformed Thermoplastic Material requiring material to be field tested at NTPEP test decks in a northern, wet climate region for minimum of six months. The maintained retroflectivity and durability shall be in accordance with the following requirements after being installed on at least one NTPEP test deck for a minimum of six months, including December, January, and February.

*Sec 1048.20.2.3.1.8* Added Sec “Maintained Retroreflectivity” for Preformed Thermoplastic Material listing retroreflectivity requirements.

*Sec 1048.20.2.3.1.9* Added Sec “Durability” for Preformed Thermoplastic Material requiring a durability rating of at least 5 for both concrete and asphalt surfaces when tested in the wheel path area of the NTPEP test deck.

*Sec 1048.20.2.3.1.10* Added Sec “Packaging” for Preformed Thermoplastic Material requiring the manufacturer’s name and address, product name, color, manufacturing date, date of expiration of the material. In addition the manufacturer shall include reference to the specific NTPEP test deck to which the product was applied, including NTPEP identification numbers and report numbers.

*Sec 1048.20.2.3.2* Added Sec “Plural Component Intersection Marking Materials”.

*Sec 1048.20.2.3.2.1* Added Sec “Epoxy Materials”.

*Sec 1048.20.2.3.2.1.1* Added Sec “General”. Epoxy Materials used for intersection markings shall be in accordance with Sec. 1048.20.2.1.1.

*Sec 1048.20.2.3.2.2* Added Sec “Polyurea Materials”.

*Sec 1048.20.2.3.2.2.1* Added Sec “General”. Polyurea Materials used for intersection markings shall be in accordance with Sec. 1048.20.2.1.2.

*Sec 1048.20.2.3.3* Added Sec “Cold Applied Tape Intersection Marking Material”.

*Sec 1048.20.2.3.3.1* Added Sec “General”. Cold Applied Tape Materials used for intersection markings shall be in accordance with Sec 1048.20.2.2.1.

*Sec 1048.30* Previously Sec 1048.40.

*Sec 1048.30.1* Previously Sec 1048.40.1.

*Sec 1048.30.2* Previously Sec 1048.40.5.

*Sec 1048.30.2.1* Previously Sec 1048.40.5.1.

*Sec 1048.30.2.2* Previously Sec 1048.40.5.2. Changed ASTM D 1155 to ASTM D 1155 or AASHTO PP-74 to sentence 1. Sentence 2, removed “(determined visually per aspect ratio using microfiche reader); testing to be in accordance with Federal Lands Highway (FLH) test Method T520.93” and replaced with “as determined by ASTM D 1155 or AASHTO PP-74”.

*Sec 1048.30.3* Previously Sec 1048.40.3.

*Sec 1048.30.3.1* Previously Sec 1048.40.3.1.

*Sec 1048.30.3.2* Previously Sec 1048.40.3.2. Changed “visual inspection” to “ASTM D 1155 or AASHTO PP-74” in the first sentence. Sentence 2, removed “visually per aspect ratio using microfiche reader” and replaced with “by ASTM D 1155 or AASHTO PP-74”. Removed the third sentence.

*Sec 1048.30.3.3* Previously Sec 1048.40.3.3.

*Sec 1048.30.4* Previously Sec 1048.40.2

*Sec 1048.40.4* Deleted in its entirety.

LET/TMO