STANDARD SPECIFICATIONS

The 2007 U.S. Customary English Units Standard Specifications for Road and Bridge Construction, of the New Jersey Department of Transportation, hereinafter referred to as the "NJDOT Standard Specifications", is hereby made a part of these Contract Documents. Division 100 – General Provisions, and Division 150 – Contract Requirements, except as otherwise provided in the Special Provisions or noted within, is replaced by The General Conditions and Request For Proposals.

The NJDOT Standard Specifications are made a part of these specifications by this reference and will not be repeated herein. It is the responsibility of any Bidder and / or Contractor to become familiar with these NJDOT Standard Specifications, copies of which may be examined at the office of the Engineer, and may be obtained, upon payment of the cost thereof, from:

State of New Jersey
Department of Transportation
1035 Parkway Avenue
Trenton, New Jersey 08625

The General Conditions and Request For Proposals shall, in the order of precedence established in the Table of Contents, govern and prevail in the case of conflict between them and the NJDOT Standard Specifications.

In the NJDOT Standard Specifications, the words "Commissioner" or "Department" shall refer to and mean the person, persons, body, board or agent legally empowered to enter into contracts and otherwise legally act for the Owner. The word "State" shall refer to and mean the Owner as hereinbefore defined unless the context clearly means only the State of New Jersey. The word "Engineer" shall refer to and mean the professional engineering representative of the Owner as hereinbefore defined and the word "Inspector" shall mean the authorized project representative of the Engineer with the authority as hereinbefore defined. The word "Laboratory" shall mean and refer to the Engineer who may, at his discretion, and with the consent of the Owner, employ qualified technical personnel or testing laboratories to assist him in fulfilling the duties normally assigned to the "Laboratory" in these NJDOT Standard Specifications.

Payment for a pay item in the Proposal includes all the compensation that will be made for the work of that item as described in the Contract Documents unless the "basis of payment" clause provides that certain work essential to that item will be paid for under another pay item. Whenever any section, subsection, subpart or subheading is amended by such terms as changed to, deleted or added it is construed to mean that it amends that section, subsection, subpart or subheading of the 2007 Standard Specifications unless otherwise noted. Whenever reference to page number is made, it is construed to refer to the 2007 Standard Specifications unless otherwise noted. Whenever reference to Title 27 is made, it is construed to mean Title 40.

Whenever reference is made in the NJDOT Standard Specifications to a portion of Division 100 – General Provisions and Division 150 – Contract Requirements, not saved from deletion nor replaced by a reference to The General Conditions or Request For Proposals, it will be construed to refer to appropriate provisions of The General Conditions or Request For Proposals covering the same subject matter.

When reference is made herein to the bulletins, standards, specifications, publications, or requirements of the American Association of State Highway and Transportation Officials (AASHTO), the American Concrete Institute (ACI), the American Society of Civil Engineers (ASCE) or similar national or regional associations, institutes, or organizations, the requirements of the bulletins, standards, specifications, publications, or requirements referred to shall be considered a part of these specifications by such reference and shall not be repeated herein but shall have the same import and be as binding as if herein set forth in full.

SPECIAL PROVISIONS

SPECIFICATIONS TO BE USED

The 2007 Standard Specifications for Road and Bridge Construction, of the New Jersey Department of Transportation (Department) as amended herein will govern the construction of this Project and the execution of the Contract.

DIVISION 100 – GENERAL PROVISIONS

SECTION 101 – GENERAL INFORMATION

THE SECTION IS INCLUDED

101.02 ABBREVIATIONS

THE FOLLOWING ABBREVIATIONS ARE ADDED:

ADA	Americans with Disabilities Act
CFR	Code of Federal Regulations
CUF	Commercially Useful Function
DCR/AA	New Jersey Department of Transportation, Division of Civil Rights and Affirmative Action
EEO	Equal Employment Opportunity
GFE	Good Faith Effort
OJT	On-The-Job-Training
USC	United States Code
USDOL	United States Department of Labor

101.03 TERMS

THE FOLLOWING TERMS ARE ADDED.

Special Provisions. Project specific specifications, non-standard specifications, and requirements for the performance of prescribed work which, in addition to the Standard Specifications, is part of the Contract documents.

101.04 INQUIRIES REGARDING THE PROJECT

THIS SUBSECTION IS DELETED

SECTION 102 – BIDDING REQUIREMENTS AND CONDITIONS

THIS SECTION IS DELETED

SECTION 103 – AWARD AND EXECUTION OF CONTRACT

THIS SECTION IS DELETED

SECTION 104 – SCOPE OF WORK

THIS SECTION IS DELETED

SECTION 105 – CONTROL OF WORK

THIS SECTION IS INCLUDED

105.06 COOPERATION WITH OTHERS

THE FOLLOWING IS ADDED:

Railroads. In addition to the foregoing provisions, the following specific provisions relate to railroads only:

> Where the Project includes work across, over, under, or adjacent to railroad tracks or railroad ROW, the Contractor shall safeguard the traffic, tracks, and appurtenances, and other property of the railroad that may be affected by its Work. The Contractor shall comply with the regulations of the railroad relating to its Work, shall keep tracks clear of obstructions, and shall provide temporary chain-link-fence, barricades, warning signs, lights, or other safety devices as required by the railroad. Separate payments for such safety devices will not be made. Prior to the commencement of any work within the railroad ROW or on railroad facilities, the Contractor

shall obtain the railroad's written approval of access, the method of construction, and the schedule of the Work. The Contractor shall provide a copy of the submittal and approval to the Resident Engineer.

The safety and continuity of railroad operations shall be the first priority when working in proximity to the railroad. Railroad approval does not release the Contractor from responsibility or liability for any damage that the railroad may suffer, or for which the Contractor may be held liable, by the acts of the Contractor.

Fouling of railroad facilities' track, power lines, and signal systems occurs when the railroad parameters for normal operations are jeopardized because obstructions are in close proximity to the facilities. The Contractor shall obtain from the railroad its fouling parameters for the work site and observe the railroad's regulations concerning fouling. Construction equipment or material shall not be stored or operated within the fouling distance of the railroad facilities without written permission of the railroad, with a copy to the Resident Engineer.

The Contractor must monitor and record top of rail elevations and track alignment for the duration of the project. These measurements are to be taken in accordance with "GUIDELINES FOR WORKING WITHIN OR IN VICINITY OF NJ TRANSIT'S RIGHT-OF-WAY". This publication is attached to the end of this document and shall be referred to for other rules, regulations, general requirements and provisions including, but not limited to, NJ Transit Safety Training for contractor staff, insurance requirements, protection of tracks and wires, safety, training, track outages, etc.

The railroad may assign inspectors, engineers, or flagmen during the time the Contractor is engaged in work on or adjacent to railroad property for the general supervision of construction operations, to ensure adherence to the Contract Documents and applicable railroad requirements, and to ensure the use of approved construction methods.

The Contractor will need to establish an escrow account with the railroad.

1. **Railroad Training.** All Contractor personnel on the job site need to certified to work within the railroad ROW. Training and its cost is the responsibility of the Contractor.
2. **Railroad Temporary Access Permit (TAP)**. It is the responsibility of the Contractor to apply for and obtain the TAP. As the permit holder, the Contractor is responsible to pay any and all expenses to the Railroad. No entry upon NJ TRANSIT property for the purpose of conducting surveys, field inspections, obtaining soil information, or for any other purpose required for the design and engineering of the proposed railroad occupancy, will be allowed without a Temporary Access Permit executed by NJ TRANSIT.

SECTION 106 – CONTROL OF MATERIAL

THIS SECTION IS DELETED

SECTION 107 – LEGAL RELATIONS

THIS SECTION IS DELETED

SECTION 108 – PROSECUTION AND COMPLETION

THIS SECTION IS DELETED

SECTION 109 – MEASUREMENT AND PAYMENT

THIS SECTION IS DELETED

DIVISION 150 – CONTRACT REQUIREMENTS

SECTION 151 – PERFORMANCE BOND AND PAYMENT BOND

THIS SECTION IS DELETED

SECTION 152 – INSURANCE

THIS SECTION IS DELETED

SECTION 152 – INSURANCE

THIS SECTION IS DELETED

SECTION 154 – MOBILIZATION

THIS SECTION IS DELETED

SECTION 155 – CONSTRUCTION FIELD OFFICE

THIS SECTION IS DELETED

SECTION 156 – MATERIALS FIELD LABORATORY AND CURING FACILITY

THIS SECTION IS DELETED

SECTION 157 – CONSTRUCTION LAYOUT AND MONUMENTS

THIS SECTION IS DELETED

SECTION 158 – SOIL EROSION AND SEDIMENT CONTROL AND WATER QUALITY CONTROL

THIS SECTION IS INCLUDED

158.01 DESCRIPTION

THE FOLLOWING IS ADDED:

Soil Erosion and Sediment Control shall include implementation and maintenance of soil erosion and sediment control devices and construction procedures, as shown on the Drawings or as required by a certified Soil Erosion and Sediment Control Plan or as directed by the Engineer, which will reduce and prevent soil losses and associated damages from sedimentation during construction of this project.

All work shall be inconformance with the contract documents and Standards for Soil Erosion and Sediment Control in New Jersey revised and adopted January 2014, and the latest revisions thereof.

158.04 MEASUREMENT AND PAYMENT

THE FOLLOWING IS ADDED:

Soil Erosion and Sediment Control and Water Quality items will be measured and paid only to the extent that such items are scheduled in the Proposal. If a Lump Sum Soil Erosion and Sediment Control and Water Quality item is scheduled in the Proposal, it will include all costs of soil erosion and sediment control and water quality items that are not scheduled items in the Proposal. If there are no Soil Erosion and Sediment Control and Water Quality items scheduled in the

Proposal the cost of the Soil Erosion and Sediment Control and Water Quality work will be included in the overall lump sum for the project.

SECTION 159 – TRAFFIC CONTROL

159.02.01 Materials
THE FOLLOWING IS ADDED TO THE LIST OF MATERIALS REFERENCES:

Box Beam for Construction Barrier Curb 913.04

THE FOLLOWING IS ADDED:

Provide temporary crash cushions, inertial barrier systems as specified in 611.02. Provide temporary compressive crash cushions as specified for compressive crash cushions in 611.02.

159.03.02 Traffic Control Devices
THE FIRST SENTENCE IN THE SECOND PARAGRAPH IS CHANGED TO:

Before beginning construction, traffic control devices shall be placed where shown on the plans or where required by the contract documents or where required by the Contractor's operations or as directed by the owner or owner's designee responsible for traffic control.

2. Construction Barrier Curb.
THE ENTIRE TEXT IS CHANGED TO:

Alternate A or B construction barrier curb may be used interchangeably in any location. The Contractor may use construction barrier curb that is constructed using gray or white concrete. Do not place different colors of construction barrier curb in a continuous run. Do not use construction barrier curb having any of the following deficiencies:

1. Exposed steel at the connector flangeway.
2. Exposed reinforcement steel.
3. Cracking through the cross section.
4. An area of concrete missing larger than a 3-inch by 3-inch right triangle.
5. Debris in the keyway.
6. Non-functioning anchor bolt holes.
7. Non-functioning anchor rod hole.
8. Paint applied to the surface.
9. Objects protruding from the surface.
10. Previous repairs.
11. Do not use damaged, kinked or bent connection key or box beam stiffener.

At least 30 days before delivering construction barrier curb to the Project Limits, provide the RE notice that the barrier curb is available for inspection. The RE will inspect the barrier curb, along with a Contractor representative, to determine what pieces are not approved for delivery to the Project Limits. Final determination of construction barrier approval will be made at the time of placement at the Project.

Ensure that anchor pins do not project above the plane of the barrier curb. Install the Construction Barrier Curb stiffened with box beams as indicated in the contract documents.

Replace construction barrier curb that does not meet the specified requirements. Do not patch or repair construction barrier curb.

Provide top and side mounted flexible delineators on the construction barrier curb. For delineators located on the right side when facing in the direction of traffic, ensure that the retroreflective sheeting is white. For delineators located on the left side when facing in the direction of traffic, ensure that the retroreflective sheeting is yellow. Attach flexible delineators according to the manufacturer's recommendations.

Starting at the beginning of the construction barrier curb section mount top delineators at 100-foot intervals on tangent sections, or curves of radii greater than 1,910 feet, and at 50-foot intervals on curves of radii of 1,910 feet or less.

Mount side delineators at the lead end of each barrier segment with the top of the delineator 3 inches from the top of the barrier.

159.03.08 Traffic Direction

A. Flagger.
THE LAST SENTENCE IS CHANGED TO:

Ensure that the flagger is equipped with a STOP/SLOW paddle and follows MUTCD flagging procedures.

B. Police.
THE FOURTH PARAGRAPH IS DELETED.

159.04 MEASUREMENTS AND PAYMENT

THE SECOND PARAGRAPH IS CHANGED TO:

For traffic control devices measured by the linear foot or unit basis that are specified in 159.03.02, the Department will make payment for the maximum quantity in service at one time as required by the Contract. For CONSTRUCTION SIGNS, the Department will make payment for the maximum quantity of specific sign types in service at one time as required by the Contract. If a particular sign type has more than one unique text, each sign with a unique text will be considered to be a specific sign type. The Department will make payment for 50 percent of the Contract bid price for traffic control devices specified in 159.03.02 that are measured on a linear foot, square foot or unit basis upon approved placement. The Department will prorate the balance of payment over the duration of the Contract.

THE FOLLOWING IS ADDED

Traffic Control items will be measured and paid only to the extent that such items are scheduled in the Proposal. If a Lump Sum Traffic Control item is scheduled in the Proposal, it will include all costs of traffic control items that are not scheduled items in the Proposal. If there are no Traffic Control items scheduled in the Proposal the cost of the Traffic Control work will be included in the overall lump sum for the project.

SECTION 160 – PRICE ADJUSTMENTS

THIS SECTION IS DELETED

SECTION 161 – FINAL CLEANUP

THIS SECTION IS DELETED

DIVISION 200 – EARTHWORK

SECTION 201 – CLEARING SITE

201.03.01 Clearing Site
THE FOLLOWING IS ADDED:

Clearing Site shall also include connection, disconnection, or plugging of existing pipes, the removal and/or resetting and/or replacement of all lawn decorations, minor yard structures, mailboxes, decorative shrubs or hedges, signs, concrete sign posts, fences, trees, tree stumps, underbrush, clearing of any wooded areas, boulders, rocks, cobblestone, bricks, tanks, concrete, timber, head walls, retaining walls, curb, asphalt, pavement reflectors and castings, construction materials and all obstructions seen or unseen, either standing or fallen within the limits of construction of the project, or similar obstructions along the line of work as shown on the plans or as directed by the engineer, for which no specific pay item is provided for in the contract. The Contractor shall be responsible to contact the owner of said hedge, shrub, fence or sign to determine if the owner desires to reclaim it. If the owner should desire to reclaim the item, the Contractor shall then use reasonable care and relocate and reset the item beyond the work limits.

Clearing site shall also include relocating or resetting of any underground sprinkler systems, sprinkler heads, piping or valves. The contractor shall determine the manufacturer and model of the existing system prior to disturbing the area. Sprinklers shall be reset or relocated to the surrounding proposed elevations in accordance with the procedures recommended by the manufacturer. Materials which require replacement shall be replaced with materials equal or greater in kind. No separate payment will be made for additional materials required to reactivate lawn sprinkler system.

Clearing Site shall also include removal of abandoned underground utility facilities in coordination with the utility company.

Clearing Site shall also include removal of existing guide rail and appurtenances as shown on the plans.

Clearing Site shall also include, but not limited to, the removal of the existing electrical material and equipment designated for removal, as indicated on the plans, such as controller cabinet and equipment, meter cabinet and equipment, traffic signal assemblies, traffic signal standards, pedestal standards, traffic signal cables, loop detectors leads, junction boxes, push button assemblies, associated lighting units, service risers and foundations. The item shall also include backfilling the existing holes remaining after removal of existing service risers, foundations and junction boxes and installation of a water tight cap on all abandoned conduit ends.

In the performance of the work under this item, the Contractor will be held responsible for any damage to existing construction that is to remain in place. The Contractor shall use extreme care and exercise every precaution necessary to prevent damage or injury thereto. Any damage as a result of the Contractor's operations shall be repaired or replaced by him to the satisfaction of the Engineer at no additional expense to the owner.

B. Clearing and Grubbing.
THE FOLLOWING IS ADDED:

Dispose of material and debris as specified in 201.03.09.

Remove trees and branches within 15 feet of the end of JCP&L pole cross arms. If the resulting tree is rendered hazardous, then remove the entire tree according to SECTION 802.

201.04 MEASUREMENT AND PAYMENT
THE FOLLOWING IS ADDED:

Quantities of the various items of Clearing Site will only be measured to the extent that an item is scheduled in the Proposal.

Separate payment for the various items, types and kinds of Clearing Site, Sampling, Demolition, and other items in this section will be made only to the extent that appropriate items are scheduled in the Proposal. Clearing Site and other items

in this section for which no item is scheduled in the proposal will not be measured and paid for. All costs for the work required for such items will be included in the various items scheduled in the Proposal.

The Department will not make separate payment for the following:

- all items specified for removal and disposal in parts 201.03.01.
- backfill with suitable excavated materials from the project.
- removal of abandoned underground utility facilities.
- removal of existing guide-rail and end treatments.
- removal of existing fences.
- removal and relocation of mailboxes, minor yard structures, decorative shrubs, and hedges.
- removal, resetting, and reactivating existing sprinkler system.
- resetting and maintenance of the existing traffic control systems.
- protection of the existing utilities, drainage or sanitary sewer pipe. In the event that the facility is damaged and must be replaced as described in this section, separate payment will not be made for the replacement of the damaged pipe.
- removal of the existing curb, pavement, sidewalk, driveways and retaining walls is included in the Excavation, Unclassified pay item.
- the removal and/or resetting and/or replacement of items mentioned in section 201.03.01. Remove trees and branches within 15 feet of the end of JCP&L pole cross arms. If the resulting tree is rendered hazardous, then remove the entire tree according to SECTION 802.

THE FOLLOWING IS ADDED

Clearing Site items will be measured and paid only to the extent that such items are scheduled in the Proposal. If a Lump Sum Clearing Site item is scheduled in the Proposal, it will include all costs of clearing site that are not scheduled items in the Proposal. If there are no Clearing Site items scheduled in the Proposal the cost of the Clearing Site work will be included in the overall lump sum for the project.

SECTION 202 – EXCAVATION

202.01 DESCRIPTION
THE FOLLOWING IS ADDED:

This work shall consist of excavation and removal of all earth, rock, boulders, brick, stone and concrete masonry, small structures and other materials encountered of whatever nature, required for the construction of roadways and their appurtenances, exclusive of these materials provided for payment under other items scheduled in the proposal; the transportation of the excavated materials; the construction of embankment with suitable materials excavated; the disposal of unsuitable and surplus materials; and other work as herein described.

202.02 MATERIALS
THE FIRST IN THE LIST IS CHANGED TO:

Coarse Aggregate (No. 57, or 67).....901.03

202.03.03 Excavating Unclassified Material

A. Excavating.
THE FIRST PARAGRAPH IS CHANGED TO:

The Department, as the generator, is solely responsible for the designation of excavated material. Unclassified excavation consists of excavation and management of material of whatever nature encountered, except for regulated material, pavement removal and acid producing soil.

B. Temporarily Storing.
THE FOLLOWING SENTENCE IS ADDED AFTER THE SECOND SENTENCE OF THE FIRST PARAGRAPH:

Do not commingle different types or classifications of material.

202.03.07 Reuse or Disposal of Excess Material

A. Reuse.

THE THIRD PARAGRAPH IS CHANGED TO:

Upon RE's approval, reuse excavated soil to widen or flatten slopes of embankment, to fade embankments into cuts, or as approved at other locations. Ensure that the excess material is not reused within a wetland, a transition area, a riparian zone, a flood hazard area or other regulated area without obtaining an appropriate NJDEP permit.

B. Disposal.

PARTS 1 AND 2 UNDER THE FIRST PARAGRAPH ARE CHANGED AND PART 3 IS ADDED:

1. At least 10 days before disposing, submit the disposal procedure and location to the RE for approval. Do not dispose of excavation on property proposed to be or used for parks, playgrounds, and other recreational purposes; residential facilities; educational facilities; environmentally sensitive areas such as wetlands; historic sites; or within sight of a State highway during all seasons.
2. Obtain the potential owner's notarized authorization of the acceptance of the excess material. If the potential owner requires environmental material sampling, obtain RE's approval at least 7 days before sampling for oversight only. Approval of the sampling does not imply agreement with the sampling results and the Department reserves the right to sample the material for classification. Provide the RE all testing results and documentation associated with the sampling.
3. Load and transport excess material that the RE determines to be excess, unusable or unsuitable for the project according to Federal, State, and local law, rules and regulations.

202.04 MEASUREMENT AND PAYMENT

THE FOLLOWING IS ADDED:

Excavation of the various kinds will be measured and paid under the items listed in this Section only to the extent that such items are scheduled in the Proposal. Excavation of the various kinds for which no item is scheduled in the Proposal will not be measured and paid, all costs for the work required for such items will be included in the various items scheduled in the Proposal.

On projects where the item Stripping is not listed in the proposal, the volume of material stripped will be paid under EXCAVATION, UNCLASSIFIED.

The Department will not measure or make payment for sawcutting existing pavements, stripping, or disposal of excess or unsuitable material from excavation. Payment should be factored into the various items in the proposal.

The Department will not make payment for presplitting but all costs shall be included into the various items in the proposal.

The Department will not make payment for soil sampling and analyses required to complete the project but all costs shall be included in the various items in the proposal.

The Department will not make payment for removal of pavement but all costs shall be included in the various items in the proposal.

All unit prices include furnishing materials, installation, labor, equipment, disposal and all other costs incidental thereof necessary to complete same.

THE FOLLOWING IS ADDED

Excavation items will be measured and paid only to the extent that such items are scheduled in the Proposal. If a Lump Sum Excavation item is scheduled in the Proposal, it will include all costs of excavating that are not scheduled items in the Proposal. If there are no Excavation items scheduled in the Proposal the cost of the Excavation work will be included in the overall lump sum for the project.

DIVISION 300 – SUBBASE AND BASE COURSES

SECTION 302 – AGGREGATE BASE COURSE

302.04 MEASUREMENT AND PAYMENT
THE FOLLOWING IS ADDED:

Aggregate Base Course items will be measured and paid only to the extent that such items are scheduled in the Proposal. If a Lump Sum Aggregate Base Course item is scheduled in the Proposal, it will include all costs of aggregate base course that are not scheduled items in the Proposal. If there are no Aggregate Base Course items scheduled in the Proposal the cost of the Aggregate Base Course work will be included in the overall lump sum for the project.

DIVISION 400 – PAVEMENTS

SECTION 401 – HOT MIX ASPHALT (HMA) COURSES

401.02.01 Materials
THE FIRST PARAGRAPH IS CHANGED TO:

Provide materials as specified:

Tack Coat 64-22, PG 64-22.....902.01.01
Prime Coat, Grade CSS-1 .....902.01.03
Tack Coat:
Emulsified Asphalt, Grade RS-1, RS-1h, CRS-1, or CRS-1h.....902.01.03
Polymer Modified Tack Coat:
Polymer Modified Emulsified Asphalt 902.01.04
HMA 902.02
HMA HIGH RAP 902.13
Joint Sealer, Hot-Poured 914.02
Polymerized Joint Adhesive.....914.03

401.02.02 Equipment
THE LAST PARAGRAPH IS CHANGED TO:

When an MTV is used, install a paver hopper with a minimum capacity of 14 tons in the hopper of the HMA paver.

THE FOLLOWING IS ADDED AT THE END:

NOTE: A Spray Paver as specified in 1003.04 may be used in lieu of a HMA Paver.

401.03.01 Preparing Existing Pavement

A. Milling of HMA.

Stage	Max. time interval allowed

THE FOLLOWING IS ADDED TO THE THIRD PARAGRAPH:

If unbound aggregate material is encountered within the specified milling depth, mill unbound aggregate material without damaging the underlying material.

THE FOLLOWING IS ADDED AFTER THE FOURTH PARAGRAPH:

Sawcut at the limit of paving in driveways and at other limits requiring a neat edge between new and existing HMA.

B. Milling of Concrete

THE FOLLOWING IS ADDED TO THE FIRST PARAGRAPH:

If reinforcement steel becomes exposed or dislodged, cut off the exposed reinforcement at the concrete surface as directed by the RE.

THE FOLLOWING IS ADDED TO THE FIFTH PARAGRAPH:

Ensure that no reinforcement steel is protruding from the surface.

D. Repairing HMA Pavement.
THE ENTIRE TEXT IS CHANGED TO:

Arrange a meeting with the RE at the project site to establish the limits of HMA pavement repair. Additional repairs, not delineated on the plans or by the RE during the project site meeting, may be required if the need is established by the RE.

If potholes are discovered, notify the RE immediately. The RE may immediately direct repairs of small areas. The RE may require further evaluation of a large area to determine the need for additional milling and paving.

Perform HMA repairs as a separate operation before milling, paving and other surface treatments. The Contractor may request approval of the RE to perform the repair work as one operation with the paving or surface treatment.

HMA repairs may be performed on full depth HMA pavement or on composite pavement (HMA over concrete pavement). For full depth HMA pavement, sawcut existing HMA pavement to a depth of 8 inches. For composite pavement sawcut existing HMA to a depth of 8 inches or up to the top of concrete, whichever is less. Sawcut lines parallel and perpendicular to the roadway baseline and 3 inches away, at the closest point, from the damaged area to be repaired.

Remove damaged and loose material within the boundary of the sawcuts to form rectangular openings with vertical sides to a depth of 8 inches for HMA pavement, or to the top of concrete for composite pavement. A milling machine may be used to remove damaged pavement and form the repair areas if approved by the RE.

After the existing damaged HMA and loose material has been removed, the RE will examine underlying material to determine its condition.

If the base of the repair area is unbound material then shape and compact the unbound material to produce a firm and level base.

If water exists in the area, remove the underlying material to the depth specified by the RE. Place geotextile, then place and compact coarse aggregate to required grade to provide for a minimum 8 inch thick HMA pavement repair. Compact coarse aggregate as specified in 203.03.02.C. If the base of the repair is HMA or concrete pavement then ensure that the remaining pavement is cleaned and dry prior to applying tack coat.

Apply tack coat at an application rate of 0.15 gallons per square yard to the vertical surfaces and base of the opening. Spread and grade HMA surface course mix in the opening as specified for the roadway surface or a HMA surface course mix approved by the RE. Ensure that the temperature of the HMA when placed is at least 250 °F, and compact as specified in 401.03.03.F. Compact areas not accessible to rollers with a flat face compactor. Compact until the top of the patch is flush with, or 1/8 inch higher than, the adjacent pavement surface.

Reuse removed material as specified in 202.03.07.A.

THE FOLLOWING PART IS ADDED:

E. Micro-Milling.

Stage	Max. time interval allowed

Ensure that pavement repairs are performed prior to micro-milling. Ensure that joint and crack sealing is performed after micro-milling.

Micro-mill pavement surfaces to the required depth, profile, and cross slope. The micro milling depth is not to exceed 1 1/2 inch depth. Operate the micro-milling machine at a speed recommended by the manufacturer, not greater than 50 feet per minute. Use automatic grade controls to control the line and grade of the milling machine. Use either a stringline or ski reference system. Replace teeth in the milling drum that become dislodged, broken, or unevenly worn. Perform the work in a manner that prevents dust and other particulate matter from escaping into the air.

Ensure positive drainage is maintained. When micro-milling to improve the profile, ensure that at least 95 percent of the surface is micro-milled and textured. Ensure that the micro-milled area is free from gouges, continuous grooves, ridges, and delaminated areas and has a uniform texture consisting of discontinuous longitudinal striations. If during micro-milling the pavement surface becomes damaged, then correct the damaged areas as approved by the RE. Ensure that the micro-milling produces a final surface texture with a mean texture depth of not greater than 4mm when tested according to ASTM E 965.

Ensure that the vertical differential in the surfaces across transverse joints and cracks is less than 1/4 inch after micro-milling. The RE will use a 10 feet long straight edge to evaluate the vertical differential at transverse joints and cracks by centering the straightedge perpendicular to and across the transverse joints or cracks. If the vertical

differential exceeds 1/4 inch as measured from the bottom of the straight edge to the top of the pavement surface at any point, perform corrective action until the differential is 1/4 inch or less.

When micro-milling to correct profile and cross slope, ensure the cutting depth is sufficient to remove ruts and corrugations and to scarify the remaining surface. If the depth required to remove ruts and corrugations exceeds a depth of 1 1/2 inches, then notify the RE. The RE may direct additional milling to correct these areas.

Using a mechanical sweeper, clean the area before opening to traffic and before subsequent construction or resurfacing. Reuse millings and sweepings as specified in 202.03.07.A.

The RE will visually inspect the micro-milled surface. The RE may reject micro-milled areas that are unsatisfactory based on visual inspection. Improper micro-milling that produces excess surface damage or a surface which does not meet the requirements of this specification may be rendered unsatisfactory as determined by the RE. Correct areas of the micro-milling that the RE rejects. Visual inspection by the RE is considered sufficient grounds for such rejection.

401.03.02 Tack Coat and Prime Coat
THE ENTIRE TEXT IS CHANGED TO:

Clean the surface where the HMA is to be placed of foreign and loose material. Immediately before beginning paving operations, ensure that the surface is dry. Do not place tack coat or prime coat unless the weather restrictions, as specified in 401.03.03.B, are met.

Do not apply tack coat or prime coat to asphalt-stabilized drainage course.

For curbs, gutters, manholes, and other similar structures, do not apply tack coat or prime coat. Clean the exposed surfaces of these structures and apply a uniform coating of polymerized joint adhesive to contact surfaces before paving.

A spray paver may be used to apply tack coat, or polymer modified tack coat, and HMA in a single operation. When paving HMA with a spray paver, use tack coat. When paving polymer modified HMA with a spray paver, use polymer modified tack coat. When using a spray paver then apply tack coat at a rate of 0.10 to 0.15 gallons per square yard and at a temperature as specified in Table 401.03.02-1.

In areas inaccessible to distributor spray bars, use hand spraying equipment for tack and prime coat. Do not allow traffic on tack coated or prime coated surfaces. Treat surfaces as follows:

1. **Tack Coat.** Uniformly spray tack coat when placing HMA on paved surfaces. Apply tack coat only to areas to be paved in the same day. Apply tack coat as specified in Table 401.03.02-1:

Table 401.03.02-1 Tack Coat Application

Material	Spraying Temp, °F	Gallons per Square Yard	Season
Emulsified Asphalt:			
RS-1, RS-1h	125 to 185	0.05 to 0.15	All year
CRS-1, CRS-1h	125 to 185	0.05 to 0.15	All year

Correct uncoated or lightly coated areas. Blot areas showing an excess of tack coat with sand or other similar material. Remove blotting material before paving. Ensure that the material is not streaked or ribboned.

Before paving, allow tack coat to cure to a condition that is tacky to the touch.

2. **Tack Coat 64-22.** When precipitation has occurred within 24 hours before application, the RE will determine whether to allow the work to proceed, or to wait until the surface is completely dry. Only apply tack coat that can be paved over in the same day. Apply tack coat 64-22 at a rate of 0.06 to 0.14 gallons per square yard and at a spraying temperature of 325 °F. Adjust the spraying temperature and application rate to produce a uniform coating, with no excess material.

Correct uncoated or lightly coated areas and remove excess tack coat from affected areas. Ensure that the material is not streaked or ribboned.

3. **Polymer Modified Tack Coat**. When paving polymer modified HMA, apply polymer modified tack coat with a spray paver at a temperature of 140 to 185 °F. Continuously monitor rate of spray, ensuring a uniform

application rate over entire width to be overlaid. Apply at the rate of 0.10 to 0.15 gallons per square yard. For ultra-thin friction course, modified open-graded friction course and asphalt-rubber open-graded friction course, apply at a rate of 0.20 to 0.25 gallons per square yard. For Bridge Deck Waterproof Surface Course, apply at a rate of 0.15 to 0.20 gallons per square yard. Do not allow traffic, equipment, tools, or any other disturbance to the polymer modified tack coat before placing the HMA material.

4. **Prime Coat.** Clean the surface of foreign and loose material where the HMA is to be placed. Immediately before beginning paving operations, ensure that the surface is dry. Do not place prime coat unless the weather restrictions, as specified in 401.03.03.B, are met.

   Do not apply prime coat to asphalt-stabilized drainage course.

   For curbs, gutters, manholes, and other similar structures, do not apply prime coat. Clean the exposed surfaces of these structures and apply a uniform coating of polymerized joint adhesive to contact surfaces before paving.

   In areas inaccessible to distributor spray bars, use hand spraying equipment for. Do not allow traffic on prime coated surfaces. Treat surfaces as follows:

   Apply prime coat of emulsified asphalt on unpaved surfaces as follows:

Table 401.03.02-2 Prime Coat Application

Material	Spraying Temp, °F	Gallons per Square Yard	Season
Emulsified Asphalt:			
CSS-1	70 to 140	0.1 to 0.50	All year

   Apply prime coat at least 12 hours before placement of the HMA and when the base courses are not saturated or frozen. Unless the prime coat is under asphalt-stabilized drainage course, the RE may waive the application of prime coat if more than 5 inches of HMA is placed on the unbound aggregate course before the roadway is opened to traffic. Take measures to prevent prime coat from entering into the drainage system or extending beyond the area to be paved.

401.03.03 HMA Courses

A. Paving Plan.

THE FIRST PARAGRAPH IS CHANGED TO:

At least 20 days before beginning placing HMA, submit a detailed plan of operation to the RE for approval that includes the following:

THE PARTS 3, 5 & 9 ARE CHANGED TO:

3. Number, type, and model of equipment. Innovative equipment features to be utilized such as but not limited to intelligent compaction rollers, paver mounted infrared thermal profile system, and other Global Position System (GPS) located construction equipment.
5. Longitudinal joint layout plan, quality control and construction practices.
9. Paving sequence and paver automation use plan. Ensure that the HMA surface course is constructed for the full width of the traveled way, shoulder, and auxiliary lanes as a single paving operation.

THE FOLLOWING ARE ADDED AT THE END OF THE FIRST PARAGRAPH:

15. If applicable, the warm mix asphalt additive or process being used.

16. Proposed location for test strip.

THE FOLLOWING PARAGRAPH IS ADDED:

When using HMA HIGH RAP submit for Department approval a plan of the location for the HMA HIGH RAP on the project.

C. Test Strip.

Construct a test strip for each HMA mix for contracts with more than a total of 5500 tons of HMA. For HMA HIGH RAP, construct the test strip at least 14 days prior to production. Test strips are not necessary for temporary pavement. Ensure that the tack coat or prime coat has been placed as specified in 401.03.02, before placing HMA. Transport and deliver, spread and grade, and compact as specified in 401.03.03.D, 401.03.03.E, and 401.03.03.F, respectively, and according to the approved paving plan. Construct a test strip for the first 700 to 1200 square yards placed for each job mix formula. While constructing the test strip, record the following information and submit to the RE:

1. **Ambient Temperature.** Measure ambient temperature at the beginning and end of each day's paving operation.
2. **Base Temperature.** Measure the surface temperature of the existing base before paving.
3. **HMA Temperature.** Measure the temperature of the HMA immediately after placement.
4. **Roller Pattern.** Provide details on the number of rollers, type, and number of passes used on the test strip.
5. **Nuclear Density Gauge Readings.** Obtain the maximum density from the plant, and input it into the nuclear density gauge. Use the nuclear density gauge to read the bulk density and percent air voids.
6. **Quality Control Core Density Test Results.** Take 5 randomly selected quality control cores to test for the bulk specific gravity and the maximum specific gravity.

   Use drilling equipment with a water-cooled, diamond-tipped, masonry drill bit that shall produce 6-inch nominal diameter cores for the full depth of the pavement. Remove the core from the pavement without damaging it. After removing the core, remove all water from the hole. Fill the hole with HMA or cold patching material, and compact the material so that it is 1/4 inch above the surrounding pavement surface.

   Compare the nuclear density gauge readings and the core test results to establish a correlation. Use this correlation as a guide for the continued use of the nuclear density gauge for density control.
7. **Warm Mix Asphalt.** Note the warm mix asphalt additive or process, if used.

When a spray paver is used, during the test strip or prior to starting the paving operation, operate spray paver without mix to verify tack coat application rate and demonstrate full tack coat coverage to the RE for the project. Only after the RE approves the tack coat application and coverage, then proceed with the test strip.

Upon completion of the test strip, the Contractor may continue paving except when paving HMA HIGH RAP. If the Contractor does not continue paving, the Department will accept the test strip as the first lot regardless of size.

If the test strip does not meet requirements, make adjustments and construct a second test strip. If the second test strip does not meet requirements, suspend paving operations until written approval to proceed is received.

Before making adjustments to the paving operations, notify the RE in writing. If any changes are made to the paving plan after the beginning of the paving operation, construct an additional test strip.

D. Transportation and Delivery of HMA.

THE ENTIRE TEXT IS CHANGED TO:

Deliver HMA using HMA trucks in sufficient quantities and at such intervals to allow continuous placement of the material. Do not allow trucks to leave the plant within 1 hour of sunset unless nighttime lighting is provided as specified in 108.06. The RE will reject HMA if the HMA trucks do not meet the requirements specified in 1009.02. The RE will suspend construction operations if the Contractor fails to maintain a continuous paving operation. Before the truck leaves the plant, obtain a weigh ticket from a fully automatic scale. Before unloading, submit for each truckload a legible weigh ticket that includes the following:

1. Name and location of the HMA plant.
2. Contractor
3. Project title.
4. Load time and date.
5. Truck number.
6. Mix designation.
7. Item name and number

8. Plant lot number.
9. Tare, gross, and net weight.

Ensure that weigh tickets are signed and sealed by a certified weighmaster.

In the event of breakdown of an automatic printer system, the RE will accept weigh tickets showing the tare, gross, and net weight of each truck, as entered and certified by a weighmaster for a period not exceeding the necessary repair time as certified by a licensed repairman.

When using an automated batching plant, obtain weigh tickets from the printer used in conjunction with an automated batching and mixing system. Ensure the printed ticket shows the individual weights of the various components of the HMA in a batch, the total weight of each batch, and the sum of all batch weights in the truckload. At the completion of each day's work provide certification from the weighmaster that the total net weight supplied was correct.

E. Spreading and Grading.

THE ENTIRE TEXT IS CHANGED TO:

Use a stringline or other linear reference system to ensure proper line and grade when spreading material. Ensure that the system is in place and approved by the RE before placing HMA. Ensure that the underlying surface meets line and grade as specified in 202.03.03.C. Before placing HMA, ensure that the tack coat or prime coat has been placed as specified in 401.03.02 to the full width of the HMA. Obtain RE approval of the underlying surface far enough in advance of spreading HMA to allow 1 day's paving operations.

Ensure that the certified APCT is present during paving operations.

Ensure that an MTV independently delivers HMA from the HMA trucks to the HMA paver.

Before beginning, ensure that the temperature of the screed on the HMA paver is heated to at least the laydown temperature of the HMA. Using the MTVs and HMA pavers, construct paving courses in lifts of at least 4 times the nominal maximum aggregate size of the HMA being constructed. Ensure the paver vibratory screed is on when paving and that the paver automation is used as per the paving plan. Ensure the paver and auger speed are coordinated and operated at the proper speed to allow for a uniform head of material across the entire width of the paver. Ensure that the proper paver and auger speed are maintained. Ensure that the grade and profile are maintained.

Use HMA having a nominal maximum aggregate size of 3/8 inch or less in transition (run out) areas. On areas where irregularities or unavoidable obstacles make use of a paver impractical, spread, rake, and lute HMA with hand tools. For these areas, dump, spread, and screed the HMA to obtain the required compacted thickness.

When paving HMA HIGH RAP record the laydown temperature (temperature immediately behind the paver) at least once per hour during paving. Submit the temperatures to the RE and the HMA Plant producing the HMA HIGH RAP.

Construct joints as follows:

1. **Longitudinal Joints.** Perform paving with the spring-loaded end plates of the paver in the "down" position and ensure that they are firmly seated on the pavement surface. Ensure augers and tunnels are extended to within 12 to 18 inches of the end plates and that a continual supply of hot material flows out to the end plates and the material is not segregating. Ensure the longitudinal joint in 1 lift offsets that in the lift immediately below by approximately 6 inches. Offset the joint in the surface course from the lane lines by 6 inches. When constructing a joint between lanes of opposing traffic, offset the joint by 6 inches into either lane.

   a. **Echelon Paving.** If a single paver does not spread the HMA the entire width of the roadway, use 2 or more pavers in echelon. Ensure that the trailing paver follows within 300 feet of the lead paver. Extend the screed and end gate of the trailing paver 1 inch over the uncompacted HMA placed by the lead paver. Ensure that the uncompacted HMA elevation from the trailing paver is equal to that from the lead paver at the joint. The Contractor may construct either a butt joint or a wedge joint. Do not rake the joint.

   b. **Cold Joint Paving.** If echelon paving is not possible, construct the pavement using cold longitudinal joints. When constructing the first lane, compact so the line and grade of the edges of the HMA are not displaced. Construct longitudinal joints parallel to the centerlines within a tolerance of ±1 inches per

100 linear feet. If this tolerance is not met, trim or mill the edge of the HMA mat as necessary. Before paving the abutting lane, ensure longitudinal joints are straight, and free from dust and debris.

For surface course only, uniformly apply polymerized joint adhesive to longitudinal cold joint. Apply a 1/8 inch thick coating of polymerized joint adhesive over the entire joint face. Apply slowly to ensure an even coating thickness. Apply polymerized joint adhesive to the vertical faces, curb and utility structures.

When maintaining traffic with a lift thickness greater than 2 inches, construct a wedge joint. The RE will permit a butt joint for lift thickness 2 inches or less when maintaining traffic, or for lift thickness greater than 2 inches when maintaining traffic is not required. Maintain a uniform width and depth of overlapped material at all times. Position the paver so that the HMA overlaps the edge of the lane previously placed by 1/2 to 1 inch. Leave the material sufficiently high to allow for compaction. Do not lute the HMA material. Do not broadcast HMA material at the joint across the new HMA mat.

When compacted, ensure that the new mat at the joint is even or slightly higher (maximum 1/8 inch) than the previously placed adjoining mat. If the newly compacted mat results in a depression at the joint of more than1/8 inch, suspend paving operations until corrective action is taken to prevent reoccurrence.

2. **Transverse Joints.** Construct transverse joints to provide a smooth riding surface. When using a bulkhead to form the joint, ensure that the bulkhead forms a straight line and vertical face. If a bulkhead is not used to form the joint, make the joint by sawing the compacted HMA for a sufficient distance behind the end of the placement to ensure full thickness and a smooth surface at the joint. Remove the full lift thickness of HMA ahead of the sawed joint. In either case, paint the joint face with polymerized joint adhesive before the fresh material is placed against it. Unless prohibited by field conditions, cross roll to obtain thorough compaction of these joints.

F. Compacting.

THE FOURTH SENTENCE OF THE LAST PARAGRAPH IS CHANGED TO:

On a daily basis, provide results of both the nuclear density and core testing to the RE.

G. Opening to Traffic.

THE ENTIRE TEXT IS CHANGED TO:

Remove loose material from the traveled way, shoulder, and auxiliary lanes before opening to traffic. Open HMA courses to traffic or construction equipment, including paving equipment, only after the surface temperature has cooled to less than 140 °F.

When using Warm Mix Asphalt, do not allow traffic or construction equipment on the HMA course until the surface temperature is less than 120 °F.

H. Air Void Requirements.

THE FIRST PARAGRAPH IS CHANGED TO:

Mainline lots are defined as the area covered by a day's paving production of the same job mix formula for the traveled way and auxiliary lanes. The RE may combine daily production areas less than 1000 tons with previous or subsequent production areas. If a day's production is greater than 4000 tons, the RE may divide the area of HMA placed into 2 lots with approximately equal areas.

THE FOLLOWING IS ADDED TO THE THIRD PARAGRAPH:

Inside shoulders less than 6 feet in width will not be included in other lots unless requested by the RE.

THE FOLLOWING IS ADDED AFTER THE THIRD PARAGAPH:

If areas of existing shoulders are found to be insufficient to support the proposed HMA pavement and the required compaction cannot be achieved, notify the RE immediately. The RE may either direct additional milling and paving to provide a suitable base to pave the proposed HMA or waive coring and air void requirements in such shoulder areas.

PART 5 IS CHANGED TO:

5 Outlier Detection. If PD < 10, the ME will not screen for outliers. If PD ≥ 10, the ME will screen acceptance cores for outliers using a statistically valid procedure. The following procedure applies only for a sample size of 5 or 10.

1. The ME will arrange the core results in ascending order, in which X_1 represents the smallest value and X_N represents the largest value.
2. If X_N is suspected of being an outlier, the ME will calculate:

$$R = \frac{X_N - X_{(N-1)}}{X_N - X_1}$$

3. If X_1 is suspected of being an outlier, the ME will calculate:

$$R = \frac{X_2 - X_1}{X_N - X_1}$$

4. For N=5 if R > 0.642, the value is judged to be statistically significant and the core is excluded. For N = 10 if R > 0.412, the value is judged to be statistically significant and the core is excluded.

If an outlier is detected for N = 5 and no retest is warranted, the contractor may replace that core by taking an additional core at the same offset and within 5 feet of the original station. If an outlier is detected and a retest is justified, take a replacement core for the outlier at the same time as the 5 additional retest cores are taken. If the outlier replacement core is not taken within 15 days, the ME will use the initial core results to determine PPA.

If an outlier is detected for N = 10, the Contractor may replace that core by taking an additional core at the same offset and within 5 feet of the original station. If the outlier replacement core is not taken within 15 days, the ME will use the initial core results to determine PPA.

PART 6 IS CHANGED TO:

6. Retest. If the initial series of 5 cores produces a percent defective value of PD ≥ 30 for mainline or ramp lots, or PD ≥ 50 for other pavement lots, the Contractor may elect to take an additional set of 5 cores at random locations chosen by the ME. Notify the RE within 15 days of receipt of the initial core results to take the additional cores. If the RE is not notified within the 15 days, the ME will use the initial core results to determine the PPA. If the additional cores are taken, the ME will recalculate the PPA using the combined results from the 10 cores.

PART 7 IS CHANGED TO:

7 Removal and Replacement. If the final lot PD ≥ 75 (based on the combined set of 10 cores or 5 cores if the Contractor does not take additional cores), remove and replace the lot and all overlying work. The replacement work is subject to the same requirements as the initial work.

For shoulder lots, instead of removal and replacement, the Department will assess the calculated PPA, and the Contractor shall perform a fog seal of the lot as specified in 422.03.01.

I. Thickness Requirements.

1. Total Thickness.

THE ENTIRE TEXT IN PART E IS CHANGED TO:

e. Retest. If the initial series of 5 cores produces a percent defective value of PD ≥ 30, the Contractor may elect to take an additional set of 5 cores at random locations chosen by the RE. Notify the RE within 15 days of receipt of the initial core results to take the additional cores. If the RE is not notified within the 15 days, the ME will use the initial core results to determine the PPA. If the additional cores are taken, the ME will recalculate the PPA using the combined results from the 10 cores.

2. Surface Course Thickness.

THE ENTIRE TEXT IN PART D IS CHANGED TO:

d. Retest. If the initial series of 5 cores produces a percent defective value of PD > 10, the Contractor may take an additional 5 cores at random locations determined by the ME. Notify the RE within 15 days of receipt of the initial core results to take the additional cores. If the RE is not notified within the 15 days, the ME will use the initial core results to determine the PPA. When the additional cores are taken, the ME will recalculate the PPA using the combined results from the 10 cores to obtain the total PD.

J. Ride Quality Requirements.

THE ENTIRE TEXT IS CHANGED TO

The Department will evaluate the ride quality of the final riding surface of all constructed pavement on the project using the International Roughness Index (IRI) according to ASTM E 1926. The final riding surface is defined as the last lift of the pavement structure where traffic will be allowed. The pavement will be evaluated using the target IRI (T) determined from Table 401.03.03-8.

For projects paving on mainline travel lanes equal to or greater than 2,500 feet length and any lane within the project of at least 1,000 feet length, the Department will evaluate the ride quality of the final riding surface of the mainline travel lanes using IRI. The Department will use the measured IRI to calculate the pay adjustment (PA) using pay adjustment equation (PAE) type PA1 as specified in Table 401.03.03-7. PA will be based on lots of 0.01 mile length. The PA will be positive for superior quality work or negative for inferior quality work.

For projects paving on mainline travel lanes of less than 2,500 feet length, the RE will visually inspect the final riding surface. Based on visual inspection, if the RE determines that the work may not conform to the ride quality requirements, then the Department will evaluate the ride quality of the final riding surface using IRI. Visual inspection by the RE is considered sufficient grounds for such evaluation. The Department will use the measured IRI to calculate the PA using pay equation type PA1 as specified in Table 401.03.03-7.

For paving on ramps and shoulders, the RE will visually inspect the final riding surface. Based on visual inspection, if the RE determines that the work may not conform to the ride quality requirements, then the Department will evaluate the ride quality of the final riding surface using IRI. Visual inspection by the RE is considered sufficient grounds for such evaluation. The Department will use the measured IRI to calculate the pay adjustment using pay equation type PA2 as specified in Table 401.03.03-7.

When paving over bridge structures, the Department will use the measured IRI to calculate the pay adjustment using pay equation type PA3 as specified in Table 401.03.03-7.

1. Smoothness Measurement. The Department will test the longitudinal profile of the final riding surface for ride quality with a Class 1 Inertial Profiling System according to NJDOT R-1. If project conditions preclude the use of the Class 1 Inertial Profiling System, the Department will use a Class 1 Walking Profiler or lightweight profiler.

2. Quality Control Testing. Perform quality control testing during lift placement to ensure compliance with the ride quality requirements specified in Table 401.03.03-8.

3. Preparation for IRI Testing. Notify the RE when all paving is complete and the RE will request IRI testing by Pavement & Drainage Management & Technology (PDMT) unit. Provide traffic control when the Department performs IRI testing. Perform mechanical sweeping of the surface before IRI testing. To facilitate auto triggering on laser profilers, place a single line of temporary pavement marking tape perpendicular to the roadway baseline at the beginning and end of each lane, shoulder, and ramp to be tested or at the direction of the Department. Submit the actual stationing for each temporary pavement marking tape location to the RE.

4. Quality Acceptance. The Department will determine acceptance and provide PA based on the following:

a. Pay Adjustment. The acceptable IRI for the roadway pavement will be the target IRI (T) from Table 401.03.03-8 for which full payment will be made and will be determined using the latest available existing current average IRI (C) data of the right most travel lane specified in 102.04 or from PDMT. The number of lots for final pay adjustment will be reduced by the number of lots excluded for each segment shown in Table 401.03.03-7. Lots excluded from final PA will be those with the highest

recorded IRI numbers for respective roadway and bridge deck segments. A single average IRI value and the corresponding PA for each 0.01 mile lot will be reported. IRI units are in inches per mile.

Table 401.03.03-7 Pay Adjustment Equations (PAE) for Ride Quality

Pay Equation Type	Exclusions		Pay Equations
PA1	As shown in the Special Provisions Table 401.03.03-9	IRI≤170	PA1=PAE
		IRI>170	PA1= -A or Corrective action
PA2	Will include, if tested	IRI ≤ 120	PA2 =$0
		120 < IRI ≤ 170	PA2 = (IRI − 120) x (−$10.00)
		IRI>170	Maximum Negative Pay or Corrective action
PA3	Will include, if tested	IRI<T	PA3=PAE
		T≤IRI≤120	PA3=0
		120<IRI≤170	PA3=PAE
		IRI>170	PA3= -A or Corrective action

$$PAE = \frac{A}{-37.75347 \times \log_e(T) + 194.87} - \frac{A}{-37.75347 \times \log_e(IRI) + 194.87}$$

$$A = 1267.2\left[\frac{M}{9} + \frac{PD}{150}\right]$$

P = Bid price of last lift of the pavement structure to be evaluated or price listed in Table 401.03.03-7A as shown in the Special Provisions, whichever is higher, per Ton
D[1] = Design thickness of last lift to be evaluated, Inch
M = Bid price of Milling, per Square Yard
T = Target IRI

1. For various design thicknesses of last lift to be evaluated within a segment, calculate the thickness using the following equation:

$$\text{Design thickness of last lift to be evaluated (D)} = \frac{D_1N_1 + D_2N_2 + \cdots D_NN_N}{N_1 + N_2 + N_3 + \cdots N_N}$$

Where:
D_N = Design thickness of the last lift to be evaluated of N sections having same mix, Inch
N_N = Number of lots of N section with design thickness D_N of last lift to be evaluated

FOLLOWING TABLE IS ADDED

Table 401.03.03-7A Minimum Value of P

Surface Course Mix	P

Table 401.03.03-8 Target IRI for Resurfacing or Reconstruction (T)[3]

Roadway Type	Current average IRI (C)	New Construction or Reconstruction	Number of Operation for other than New Construction or Reconstruction[5]			
			One[4]	Two[4]	Three[4]	Four or More[4]
			Target IRI (T)			
Freeways or Limited Access Highways	≤ 60	50	50	50	50	50
	61 to ≤95		53	50	50	50
	96 to ≤170		55	53	50	50
	171 to≤200		0.64C[7]	55	53	50
	201 to ≤285			58	55	50

	>286[8]			60	58	53
Other than Freeways or Limited Access Highways with speed limit > 35 MPH	≤ 60	60	60	60	60	60
	61 to ≤95		63	60	60	60
	96 to ≤170		66	63	60	60
	171 to≤200			66	63	60
	201 to ≤285		0.64C[7]	69	66	60
	>286[8]			72	69	63
Other than Freeways or Limited Access Highways with speed limit ≤ 35 MPH	≤ 60	70	70	70	70	70
	61 to ≤95		74	70	70	70
	96 to ≤170		77	74	70	70
	171 to≤200			77	74	70
	201 to ≤285		0.64C[7]	81	77	70
	>286[8]			84	81	74

1. The Department will determine target IRI (T) of roadways containing multiple speed limits of greater than 35 MPH and less than or equal to 35 MPH based on the following equation:

$$\text{Target IRI of a roadway consists of N Roadway type (T)} = \frac{T_1L_1 + T_2L_2 + \cdots \ldots T_N L_N}{L_{1+}L_{2+}L_{3+} \ldots . L_N}$$

   Where TN is the Target IRI of N section and LN is the length of N section in miles to the nearest 0.01 mile
2. Current average IRI (C) is the average of the latest available preconstruction network level IRI data of right most travel lane from PDMT.
3. Target IRI (T) is the lowest of Current average IRI (C) and T determined from the table.
4. Multiply T with 1.05 for HMA over Concrete, if total HMA after proposed treatment is less than 8 inch thick.
5. Milling is one operation. Paving each layer of asphalt mix is an individual operation unless plans specify paving a mix in two lifts. In such case, each lift is considered as an operation.
6. Construction or reconstruction of full pavement box on subgrade is new construction or reconstruction.
7. Use Pay Equation as below:

   IRI≤T PA=0

   IRI>T PA=PAE
8. For paving over rubblized concrete, use C >286 to determine target IRI, then multiply T with 1.05 if total HMA after proposed treatment is less than 8-inch thick.

FOLLOWING TABLE IS ADDED

Table 401.03.03-9 Exclusions for Resurfacing or Reconstruction

Roadway	Lane Number	Exclusions

Lane designation is by increasing numbers from left to right in the direction of traffic with left lane being Lane 1.

b. Corrective Action. If the average IRI is greater than 170 inches per mile after testing is performed, the Department may require corrective action or assess the maximum negative pay adjustment as computed in Table 401.03.03-7. If the Department requires corrective action submit a plan for corrective action. If the plan for corrective action is approved and the lot is corrected, the Department will retest and evaluate the corrected area as a new lot that must meet the same requirements as the initial work. If the plan for corrective action is not approved, the Department may require removal and replacement. The replacement work is subject to the same requirements as the initial work.

401.03.04 Sawcutting and Sealing of Joints in HMA Overlays
THE TEXT OF THIS SUBPART IS DELETED.

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401.03.05 Core Samples
THE LAST SENTENCE OF THE 2ND PARAGRAPH IS CHANGED TO THE FOLLOWING:

Apply an even coating of tack coat to sides of the hole. Place HMA in maximum lifts of 4 inches in the hole and compact each lift. Ensure that the final surface is 1/4 inch above the surrounding pavement surface.

THE FIFTH PARAGRAPH IS CHANGED TO:

At least 24 hours prior to coring, provide a tamper proof core sample box for the RE's inspection and approval. Ensure that the core sample box can be locked and sealed and is tamper proof in such a manner that it cannot be opened without removing the seals. Ensure that the core sample box provides protection for the cores from being disturbed or damaged during transit. Mark the Department assigned core number on the side of the sample. Place core samples and corresponding forms, including a completed and signed Form DC-286 Contractor's certificate of compliance Core sample delivery, in the core sample box. Ensure Form DC-286 is also signed by a Department witness. Before sealing the core sample box, ensure that the RE has recorded the seal number on the laboratory form. Transport the sealed core sample boxes to the Department Laboratory. The RE at his discretion may decide to deliver the core samples as indicated above.

THE SIXTH PARAGRAPH IS CHANGED TO:

The Department will not accept damaged core samples for testing. If the core sample box exhibits indications of tampering, the core samples will be rejected. If the Department rejects any core samples, drill a replacement core at the same offset and within 5 feet of the original station and deliver to the laboratory as specified above within 48 hours.

401.04 MEASUREMENT AND PAYMENT
THE FOLLOWING ITEM IS DELETED:

Item	*Pay Unit*
SAWING AND SEALING JOINTS IN HOT MIX ASPHALT OVERLAY	LINEAR FOOT

THE FOURTH PARAGRAPH IS CHANGED TO:

The Department will measure TACK COAT, TACK COAT 64-22, PRIME COAT and POLYMER MODIFIED TACK COAT by the volume delivered, converted to the number of gallons at 60 °F as calculated by the temperature-volume correction factors specified in 902.01.

THE FOLLOWING IS ADDED:

HMA Course items will be measured and paid only to the extent that such items are scheduled in the Proposal. If a Lump Sum HMA Course item is scheduled in the Proposal, it will include all costs of the HMA course that are not scheduled items in the Proposal. If there are no HMA Course items scheduled in the Proposal the cost of the HMA Course work will be included in the overall lump sum for the project.

DIVISION 450 – CONCRETE PAVEMENT REHABILITATION

SECTION 452 – PARTIAL DEPTH CONCRETE PAVEMENT REPAIR

452.02.01 Materials
THE FOLLOWING MATERIAL IS ADDED:

Preformed Joint Filler 914.01

452.03.01 Partial Depth Concrete Pavement Repair

A. Preparation.
THE FOLLOWING PARAGRAPH IS ADDED:

Maintain existing joints by placing a 3/8 inch to 1 inch thick preformed joint filler along the joint when constructing partial depth repairs along an existing joint. Multiple layers of preformed joint filler may be required for joints wider than 1 inch.

B. Concrete Placement.
THE FOLLOWING PARAGRAPH IS ADDED:

Do not pave over partial depth repairs until the concrete cures for 7 days.

452.04 MEASUREMENT AND PAYMENT
THE FOLLOWING IS ADDED:

Partial Depth Concrete Repair items will be measured and paid only to the extent that such items are scheduled in the Proposal. If a Lump Sum Partial Depth Concrete Repair item is scheduled in the Proposal, it will include all costs of the Partial Depth Concrete Repair that are not scheduled items in the Proposal. If there are no Partial Depth Concrete Repair items scheduled in the Proposal the cost of the Partial Depth Concrete Repair work will be included in the overall lump sum for the project.

DIVISION 500 – BRIDGES AND STRUCTURES

SECTION 506 – STRUCTURAL STEEL

506.04 MEASUREMENT AND PAYMENT
THE FOLLOWING IS ADDED:

Structural Steel items will be measured and paid only to the extent that such items are scheduled in the Proposal. If a Lump Sum Structural Steel item is scheduled in the Proposal, it will include all costs of the Structural Steel that are not scheduled items in the Proposal. If there are no Structural Steel items scheduled in the Proposal the cost of the Structural Steel work will be included in the overall lump sum for the project.

DIVISION 600 – MISCELLANEOUS CONSTRUCTION

SECTION 606 – SIDEWALKS, DRIVEWAYS, AND ISLANDS

606.03.01 HMA Sidewalks, Driveways, and Islands
THE THIRD AND FOURTH PARAGRAPHS ARE CHANGED TO:

For sidewalks and islands, construct the base course using DGA as specified in 302.03.01. Construct the HMA course, as specified in 401.03.03. Compact using at least 1/2 ton rollers.

For driveways, if directed by the RE, construct a base course using DGA as specified in 302.03.01 to the thickness directed by the RE. Construct the HMA course, as specified in 401.03.03. Compact using at least 1/2 ton rollers.

606.03.02 Concrete Sidewalks, Driveways, and Islands

F. Placing Concrete.
THE ENTIRE PART F. IS CHANGED TO:

Obtain RE approval of forms and joint placement before placing concrete. Place concrete according to the limitations specified in 504.03.02.C. To place concrete between November 1 and March 15, submit to RE for approval a plan detailing the method of protecting the concrete from salt for at least 30 days after placing. Do not begin placing concrete until this plan is approved. Place concrete across the formed area to minimize rehandling. Ensure that concrete is not discharged into windrows or piles. Continuously place concrete between transverse joints without the use of intermediate bulkheads. To prevent bowing or misalignment of the transverse joints, place concrete simultaneously on both sides of transverse joints without disturbing the joints. Consolidate the concrete by hand spading or using internal mechanical vibrators. If a slab is not completed from transverse joint to transverse joint, remove the incomplete slab and replace. Terminate each day's placement at a transverse joint. If concrete becomes segregated during placement, cease operations and correct handling operations. Protect concrete as specified in 504.03.02.I.

H. Protection and Curing.
THE LAST SENTENCE IS CHANGED TO:

> Ensure vehicles and other loads are not placed on sidewalks, islands, and driveways until the concrete has attained compressive strength of 3000 pounds per square inch, as determined from 2 concrete cylinders field cured according to AASHTO T 23.

606.04 MEASUREMENT AND PAYMENT
THE FOLLOWING IS ADDED:

Concrete Sidewalk items will be measured and paid only to the extent that such items are scheduled in the Proposal. If a Lump Sum Concrete Sidewalk item is scheduled in the Proposal, it will include all costs of the Concrete Sidewalk that are not scheduled items in the Proposal. If there are no Concrete Sidewalk items scheduled in the Proposal the cost of the Concrete Sidewalk work will be included in the overall lump sum for the project.

SECTION 607 – CURB

607.03.01 Concrete Barrier Curb

D. Placing Concrete.
THE THIRD SENTENCE OF THE FIRST PARAGRAPH IS CHANGED TO:

> To place concrete between November 1 to March 15, submit to RE for approval a plan detailing the method of protecting the concrete from salt for at least 30 days after placing.

607.03.02 Concrete Vertical Curb and Concrete Sloping Curb

D. Placing Concrete.
THE ENTIRE TEXT IS CHANGED TO:

Place concrete for vertical curb and sloping curb as specified in 607.03.01.D, except that consolidation may be achieved by hand spading or internal mechanical vibrators.

607.03.04 Concrete Vertical Curb and Concrete Sloping Curb, Dowelled

D. Placing Concrete.
THE ENTIRE TEXT IS CHANGED TO:

Place concrete for vertical and sloping curb as specified in 607.03.02.D.

607.04 MEASUREMENT AND PAYMENT
THE FOLLOWING IS ADDED:

Concrete Vertical Curb items will be measured and paid only to the extent that such items are scheduled in the Proposal. If a Lump Sum Concrete Vertical Curb item is scheduled in the Proposal, it will include all costs of the Concrete Vertical Curb that are not scheduled items in the Proposal. If there are no Concrete Vertical Curb items scheduled in the Proposal the cost of the Concrete Vertical Curb work will be included in the overall lump sum for the project.

SECTION 610 – TRAFFIC STRIPES, TRAFFIC MARKINGS, AND RUMBLE STRIPS

610.02.01 Materials
THE FOLLOWING MATERIALS ARE RENAMED TO:

Traffic Stripes.....912.03.01
Traffic Markings.....912.03.02

610.03.01 Long-Life Traffic Stripes
THE SUBPART HEADING AND THE ENTIRE TEXT IS CHANGED TO:

610.03.01 Traffic Stripes

A. Striping Plan. At least 20 days before beginning the work, submit to the RE for approval a striping plan that includes:

1. Schedule of operations for applying traffic stripes.
2. Number and type of equipment.
3. Manufacturer's recommendations for use of the materials, including, but not limited to, mixing ratios and application temperatures.
4. Details on the means and methods for surface preparation
5. Details on the means and methods for premarking
6. Details on the proposed test strip such as location, length etc

B. Surface Preparation. Immediately before striping the pavement surface, clean the surface of dirt, oil, grease, and foreign material, including curing compound on new concrete. Clean the surface 2 inches beyond the perimeter of the stripes to be placed.

C. Striping Test Strip. Before beginning striping operations, construct 1 or more striping test strips to demonstrate the Contractor's ability to meet the requirements specified in 610.03.01.D. For each striping test strip, apply striping to approximately 500 linear feet of pavement with the same striping procedure that will be used for the Project. Construct a test strip for each applicator unit and epoxy resin material used. Provide the RE with 50 test cards made of heavy stock paper measuring 8 inches by 2 inches, and two wet film thickness gauges. Construct additional test strips when major equipment repairs or adjustments are made or when the traffic stripes are determined to be defective. Construct additional test strips when traffic striping operations are performed on multiple, non-continuous occasions. Perform additional test strips as requested by the RE. When the test strip is in

compliance, as determined by the RE, proceed with striping operations. Each test strip may remain in place and become part of the finished stripes subject to the requirements of 610.03.01.E.

D. Applying Striping. Mix epoxy resin with an automatic proportioning and mixing machine, and hot-spray the compound at a temperature of between 100 and 130 °F onto dry surfaces. Apply the compound with a wet film thickness of 20 ± 1 mil. Apply the material during dry weather conditions when the ambient temperature is a minimum of 45 °F and the surface temperature is a minimum of 50 °F. Adjust operations as required for the prevailing ambient and surface conditions to achieve a no-track drying time of 30 minutes or less**.**

Immediately after, or in conjunction with, the compound application, uniformly apply 12 pounds of large glass beads per gallon of epoxy resin to the compound. After applying the large glass beads, uniformly apply 12 pounds of small glass beads per gallon of epoxy resin to the compound.

Remove all compound that has been tracked or spilled outside of the intended placement areas.

E. Performance. Ensure that the traffic Stripes, show no fading, lifting, cracking, chipping for any reason including but not limited to traffic wear, maintenance activities including snow plowing, until Acceptance. Ensure that 60 days after application, traffic stripes have a minimum retroreflectance value of:

375 millicandelas per square meter per lux for white traffic stripe

250 millicandelas per square meter per lux for yellow traffic stripe

F. Defective work. Replace traffic stripes that are determined by the RE before Acceptance to be defective or that are damaged during construction. Remove defective stripes as specified in 610.03.08.

Replace an entire 10-foot skip line if the RE determines the stripe to have a deficiency.

If the RE determines, based upon calculated and measured yields, that the striping has a wet film thickness of less than 19 mils, restripe the entire length with 20 mils of new compound.

Provide the RE with a Reflectometer that meets a 30 meter geometry as specified in ASTM E 1710, capable of measuring wet and dry conditions as specified in ASTM E 2176 and ASTM E 2177, and that has been certified by the manufacturer as being calibrated within the last two years. The RE will test the retroreflectance of traffic stripes. Replace traffic stripes that do not meet the retroreflectance values indicated in 610.03.01.E. Replace the entire length of striping where improper curing or discoloration has occurred. Discoloration is localized areas or patches of brown or grayish colored compound. Where improper curing or discoloration occurs intermittently in intervals of 100 feet or less throughout the striping length, replace the entire length of striping from the beginning of the first occurrence until the end of the last occurrence, plus 5 feet on each end.

Replace the entire length of striping that has failed to bond to the pavement, or has chipped or cracked. Where more than 25 spots of chipping, cracking, or poor bonding have occurred within 1000 linear feet of striping, replace the entire 1000 foot length of striping as indicated in 610.03.01.E.

G. Opening to Traffic. Complete each application of all types of traffic stripes and allow to thoroughly dry before opening to traffic. At a minimum, delineate center lines on undivided roadways and broken lines between lanes before the traveled way is opened. The RE will determine when the traveled way can be opened to traffic.

610.03.02 Thermoplastic Traffic Markings
THE SUBPART HEADING AND THE ENTIRE TEXT IS CHANGED TO:

610.03.02 Traffic Markings Lines, Traffic Markings Symbols and Traffic Markings Route Symbols

A. Marking Plan. At least 20 days before beginning the work, submit to the RE for approval a marking plan that includes:

1. Schedule of operations for applying traffic markings,
2. Number and type of equipment,
3. Manufacturer's recommendations for use of the materials, including mixing ratios and application temperatures.
4. Details on the means and methods for surface preparation
5. Details on the means and methods for premarking

B. Surface Preparation. Immediately before marking the pavement surface, clean the surface of dirt, oil, grease, and foreign material, including curing compound on new concrete. Clean the surface 2 inches beyond the perimeter of the marking to be placed.

C. Applying Traffic Markings. Place preformed thermoplastic or hot extruded thermoplastic traffic markings on thoroughly dry surfaces and during dry weather conditions. Apply using equipment and procedures that produce markings of the specified color, width, and thickness with well-defined edges, uniform retroreflectivity, and proper bonding to the pavement. Apply the thermoplastic material as follows:

1. **Preformed Thermoplastic.** Melt the preformed thermoplastic tape to bond the traffic markings permanently in position according to the manufacturer's recommendations.

   Meet the minimum initial retroreflectance value, as specified in 610.03.01.D for thermoplastic tape, by applying additional glass beads to the hot-wet material in a uniform pattern as necessary.

2. **Extruded Thermoplastic.** Uniformly heat the thermoplastic material. When the ambient and surface temperatures are at least 50 °F, apply the melted material at a temperature of between 400 and 425 °F. Extrude the thermoplastic traffic markings on the HMA or concrete pavement ensuring a thickness of 90 ± 1 mils.

   Immediately after, or in conjunction with the thermoplastic extrusion, uniformly apply glass beads to the wet material at a minimum rate of 10 pounds per 100 square feet of markings. Apply glass beads by mechanical means only.

D. Performance. Ensure that the traffic markings show no fading, lifting, cracking, chipping for any reason including but not limited to traffic wear, maintenance activities including snow plowing, until Acceptance. Ensure that 60 days after application, traffic markings have a minimum retroreflectance value of:

375 millicandelas per square meter per lux for white traffic markings

250 millicandelas per square meter per lux for yellow traffic markings

E. Defective work. Replace thermoplastic traffic markings that are determined by the RE before Acceptance to be defective or that are damaged during construction. Remove defective markings as specified in 610.03.08.

Replace the entire area of thermoplastic traffic markings determined to be less than the required thickness, to have incorrect color or width, to have failed to bond to the pavement, or to have chipped or cracked. The minimum replacement area is an individual word or symbol, or for longitudinal lines the entire length from where the deficiency first occurs to where it no longer exists.

The RE will determine initial retroreflectance as follows:

Provide the RE with a Reflectometer that meets a 30 meter geometry as specified in ASTM E 1710, capable of measuring wet and dry conditions as specified in ASTM E 2176 and ASTM E 2177, and that has been certified by the manufacturer as being calibrated within the last two years. The RE will test the retroreflectance of traffic markings. Replace traffic markings that do not meet the retroreflectance values indicated in 610.03.02.D.

F. Opening to Traffic. Complete each application of thermoplastic traffic markings and allow to thoroughly dry before opening to traffic. The RE will determine when the traveled way can be opened to traffic.

610.03.04 Removal of RPMs
THE ENTIRE TEXT IS CHANGED TO:

Remove RPMs as directed by the RE. Dispose of RPMs as specified in 201.03.09. If directed by the RE, fill the hole with HMA patch as specified in 159.03.07 except sawcutting is not required.

610.03.06 Ground Mounted Flexible Delineators
THE FIRST PARAGRAPH IS CHANGED TO:

Use white retroreflective sheeting for delineators located on the right side when facing in the direction of traffic. Use yellow retroreflective sheeting for delineators located on the left side when facing in the direction of traffic.

610.03.07 Rumble Strip
THE ENTIRE SUBPART IS CHANGED TO:

At least 20 days before constructing rumble strips, submit a plan for cutting rumble strips and debris collection/removal to the RE for approval.

Construct rumble strips on newly constructed pavement after it has cooled sufficiently to allow the cutting to be done cleanly without causing damage to the adjacent pavement.

Clean the area where rumble strips are to be constructed. Construct rumble strips by cutting indentations into the pavement perpendicular to the traveled way without disturbing the surrounding pavement. Collect cuttings and reuse or dispose of as specified in 202.03.07.

Ensure that the centerline rumble strips are constructed before placing TRAFFIC STRIPES. After cutting centerline rumble strips and collecting the debris, apply Fog Seal over the centerline rumble strip as specified in 422.03.02.

Do not construct rumble strips 200 feet linear feet before and after the approximate midpoint of Weigh-in-Motion (WIM) systems in the roadway as listed in the Special Provisions.

Route	Weigh-in-Motion (WIM) Systems Midpoint Station

610.04 MEASUREMENT AND PAYMENT
THE FOLLOWING IS ADDED:

Traffic Marking Lines items will be measured and paid only to the extent that such items are scheduled in the Proposal. If a Lump Sum Traffic Marking Lines item is scheduled in the Proposal, it will include all costs of the Traffic Marking Lines that are not scheduled items in the Proposal. If there are no Traffic Marking Lines items scheduled in the Proposal the cost of the Traffic Marking Lines work will be included in the overall lump sum for the project.

THE SECOND PARAGRAPH IS CHANGED TO:

The Department will measure TRAFFIC STRIPES and TRAFFIC MARKINGS LINES by the linear foot for each specified width of stripe. The Department will not measure gaps in striping.

DIVISION 700 – ELECTRICAL

SECTION 701 – GENERAL ITEMS

701.03.01 Existing Systems
THE FIFTH PARAGRAPH IS CHANGED TO:

If removal of existing above ground electrical material is required, deliver salvaged materials to the nearest Department electrical maintenance yard and unload the salvaged materials as directed. Dispose of salvaged materials rejected by the Department from the Project Limits as specified in 201.03.09.

Deliver and unload salvaged ITS materials to:

Mobility Management North (MMN)- ITS Maintenance
670 River Drive
Elmwood Park, NJ 07407-1347
Telephone: 732-697-7360

Mobility Management South (MMS) – ITS Maintenance
One Executive Suite Route 70 West
Cherry Hill, NJ 08002-4106
Telephone: 856-486-6615

THE FOLLOWING IS ADDED:

If new cable or wire is designated to be installed into existing conduit systems, clean and swab the conduit system prior to installing the cable or wire. After cleaning, test each conduit by pulling through a metal ball with a diameter at least 85 percent of the nominal inside diameter of the conduit to ensure the conduit is free of any obstruction or foreign material. If the ball fails to pass through the conduit, repair or replace the defective conduit as directed by the RE. Restore disturbed areas to original condition.

701.03.02 Rigid Metallic Conduit (Earth)

B. Installation.
THE FOLLOWING IS ADDED:

In rigid metallic conduit used exclusively for fiber optic cable, install a tracer wire continuously for the entire run of conduit, including through the junction boxes, mounting it on the wall. Splice the tracer wire only in the junction box. Seal the ends of rigid metallic conduit carrying the tracer wire. If wire or cable is not scheduled to be installed within 6 months of conduit installation, cap and seal the other conduits leaving the true tape inside. Install warning tape in the trench above the conduit.

701.03.03 Rigid Metallic Conduit (Roadway)
THE FOLLOWING IS ADDED:

In rigid metallic conduit used exclusively for fiber optic cable, install a tracer wire continuously for the entire run of conduit, including through the junction boxes, mounting it on the wall. Splice the tracer wire only in the junction box. Seal the ends of rigid metallic conduit carrying the tracer wire. If wire or cable is not scheduled to be installed within 6 months of conduit installation, cap and seal the other conduits leaving the true tape inside. Install warning tape in the trench above the conduit.

701.03.05 Rigid Nonmetallic Conduit

B. Installation.
THE LAST PARAGRAPH IS CHANGED TO:

Install true tape marked in 1-foot increments for the length of the rigid non-metallic conduit. Install a tracer wire continuously for the entire run of conduit, including through the junction boxes, mounting it on the wall. Splice the tracer wire only in the junction box. Seal the ends of rigid nonmetallic conduit carrying the tracer wire. If wire or

cable is not scheduled to be installed within 6 months of conduit installation, cap and seal the other conduits leaving the true tape inside. Install warning tape in the trench above the conduit.

701.03.06 Flexible Metallic Conduit
THE ENTIRE SUBSECTION TEXT IS CHANGED TO:

Install liquidtight flexible metallic conduit according to NEC requirements. Cut liquidtight flexible metallic conduit according to manufacturer's recommendations. Ensure that conduit used for fiber optic cables meets the minimum bend and radius requirements as specified in the Contract and according to the fiber optic cable manufacturer. Utilize NEMA-4X weather-tight hubs for conduit connections to ITS and electrical enclosures.

701.03.07 Flexible Nonmetallic Conduit

B. Installation.
THE SECOND PARAGRAPH IS DELETED.

THE THIRD PARAGRAPH IS CHANGED TO:

Construct flexible nonmetallic conduit runs so that there are no joints or splices in the conduit between adjacent junction boxes. Ensure flexible nonmetallic conduit runs are terminated in the junction boxes according to manufacturer's recommendations.

THE LAST PARAGRAPH IS CHANGED TO:

Install true tape marked in 1-foot increments for the length of the flexible non-metallic conduit. Install a tracer wire continuously for the entire run of conduit, including through the junction boxes, mounting it on the wall. Splice the tracer wire only in the junction box. Seal the ends of flexible nonmetallic conduit carrying the tracer wire. If wire or cable is not scheduled to be installed within 6 months of conduit installation, cap and seal the other conduits leaving the true tape inside. Install warning tape in the trench above the conduit.

701.03.15 Cable and Wire

A. Installing.
THE FOLLOWING IS ADDED

Test the existing tracer wire in the conduit for continuity. If there is no existing tracer wire in any of the conduits in the same trench, then install a continuous tracer wire between the adjacent junction boxes without any splice when installing the cable and wire as directed by the RE.

C. Connection and Coordination with Utility Services.
THE FOLLOWING IS ADDED:

Obtain and provide for utility services required for testing and operation of ITS systems until interim acceptance of each system or device. Utility Services may be governed by differing Authorities Having Jurisdiction (AHJ). Along with Utility Requirements, comply with all AHJ requirements. Upon successful completion of level C testing and acceptance of any device, provide the RE with a letter requesting transfer of utility services providing the latest copy of the utility bill from each utility company. Such transfers are to be effective beginning the next monthly billing cycle after completion of successful ITS system testing as specified in Section 704 and interim acceptance of the device or as directed by the RE.

Once new utility services have been energized or activated and the utility company has de-energized and unhooked the old service connection; remove existing pole risers and service heads, cut back one foot below grade, and plug the conduits.

Service Requests

Device Site No.	Primary Route	Final MP	Direction	Location	Township	County	Utility Territory	Job No.	Utility Contact Person	Utility Pole No.

701.04 MEASUREMENT AND PAYMENT
THE FOLLOWING IS ADDED:

The Department will not include payment for restoring disturbed areas in the various Items of this Section. The Department will pay for restoring disturbed areas (pavement, curb, sidewalk, driveway or island) as specified in 104.03.03.

The Department will not include payment when the RE directs the installation of a new conduit or a repair to the defective conduit in the various Items of this Section. The Department will pay for the installation, when directed by the RE, of a new conduit or a repair to the defective conduit as specified in 104.03.03

The Department will not include payment when the RE directs the installation of a tracer wire in existing conduit in the various Items of this Section. The Department will pay for the installation, when directed by the RE, of a tracer wire in existing conduit as specified in 104.03.03.

THE FOLLOWING IS ADDED:

Conduit items will be measured and paid only to the extent that such items are scheduled in the Proposal. If a Lump Sum Conduit item is scheduled in the Proposal, it will include all costs of the Conduit that are not scheduled items in the Proposal. If there are no Conduit items scheduled in the Proposal the cost of the Conduit work will be included in the overall lump sum for the project.

DIVISION 900 – MATERIALS

SECTION 901 – AGGREGATES

THE ENTIRE SUBSECTION IS CHANGED TO:

901.07 GRIT

901.07.01 Grit for Epoxy Waterproofing.

Use grit for spreading over the epoxy waterproofing that is a subangular, natural, 98 percent silica sand. Ensure that 90 percent of the total sample by weight falls between the No. 4 and No. 30 sieves, with 0 percent passing the No. 30 sieve.

901.07.02 Fine Aggregate for Fog Seal.

Use fine aggregate for spreading over fog seal that conforms to 901.05.02 and the gradation requirements in Table 901.07.02-1:

Table 901.07.02-1 Gradation Requirements for Fine Aggregate used on Fog Seal

Sieve Size	Percent Passing
No. 8	100
No. 16	90 - 100
No. 50	70- 100
No. 200	0 - 2

901.11 SOIL AGGREGATE

1. Composition of Soil Aggregate.

THE FOLLOWING IS ADDED TO THE LAST PARAGRAPH:

For Designation I-14, the Contractor may use up to 30 percent steel slag by weight of the coarse aggregate portion of the soil aggregate. Obtain steel slag from a source listed on the QPL as specified in 901.01. Use steel slag that was produced as a co-product of the steel making process. Ensure that the steel slag consists of tough, durable pieces that are uniform in density and quality. Stockpile steel slag as specified in 901.02. Ensure steel slag for blending with I-14 Soil Aggregate does not exceed 0.50 percent expansion from hydration when tested according to ASTM D 4792.

SECTION 902 – ASPHALT

902.01 BITUMINOUS MATERIALS

THE ENTIRE TEXT IS CHANGED TO:

Use the following temperature-volume correction (TVC) factors to convert the volume of bituminous materials, measured at the temperature at the point of use, to the volume at 60 °F:

1. For PG Binder, use the following equation:

$$TVC = 1.0211326242 - 3.548988118 \times 10^{-4}\,[T\,(°F)] + 4.49881 \times 10^{-8}\,[T\,(°F)]^2$$

2. For emulsified asphalts, use Table 902.01-1.

Table 902.01-1 TVC Factors for Emulsified Asphalt Material (40 – 103 °F)

Temp (°F)	Factor	Temp (°F)	Factor	Temp (°F)	Factor	Temp (°F)	Factor
40	1.0050	56	1.0010	72	0.9970	88	0.9930
41	1.0048	57	1.0008	73	0.9968	89	0.9928
42	1.0045	58	1.0005	74	0.9965	90	0.9925
43	1.0043	59	1.0003	75	0.9953	91	0.9923

Table 902.01-1 TVC Factors for Emulsified Asphalt Material (40 – 103 °F)							
Temp (°F)	**Factor**	**Temp (°F)**	**Factor**	**Temp (°F)**	**Factor**	**Temp (°F)**	**Factor**
44	1.0040	60	1.0000	76	0.9960	92	0.9920
45	1.0038	61	0.9998	77	0.9958	93	0.9918
46	1.0035	62	0.9995	78	0.9955	94	0.9915
47	1.0033	63	0.9993	79	0.9953	95	0.9913
48	1.0030	64	0.9990	80	0.9950	96	0.9910
49	1.0028	65	0.9988	81	0.9948	97	0.9908
50	1.0025	66	0.9985	82	0.9945	98	0.9905
51	1.0023	67	0.9983	83	0.9943	99	0.9903
52	1.0020	68	0.9980	84	0.9940	100	0.9901
53	1.0018	69	0.9978	85	0.9938	101	0.9899
54	1.0015	70	0.9975	86	0.9935	102	0.9896
55	1.0013	71	0.9973	87	0.9933	103	0.9884
104	0.9891	123	0.9845	142	0.9799	161	0.9754
105	0.9889	124	0.9843	143	0.9797	162	0.9751
106	0.9886	125	0.9840	144	0.9794	163	0.9749
107	0.9884	126	0.9838	145	0.9792	164	0.9747
108	0.9881	127	0.9835	146	0.9790	165	0.9744
109	0.9879	128	0.9833	147	0.9787	166	0.9742
110	0.9876	129	0.9830	148	0.9785	167	0.9739
111	0.9874	130	0.9828	149	0.9782	168	0.9737
112	0.9872	131	0.9826	150	0.9780	169	0.9735
113	0.9869	132	0.9823	151	0.9778	170	0.9732
114	0.9867	133	0.9821	152	0.9775	171	0.9730
115	0.9864	134	0.9818	153	0.9773	172	0.9728
116	0.9862	135	0.9816	154	0.9770	173	0.9725
117	0.9860	136	0.9814	155	0.9768	174	0.9723
118	0.9857	137	0.9811	156	0.9766	175	0.9721
119	0.9855	138	0.9809	157	0.9763	176	0.9718
120	0.9852	139	0.9806	158	0.9761	177	0.9716
121	0.9850	140	0.9804	159	0.9758	178	0.9713
122	0.9847	141	0.9802	160	0.9756	179	0.9711

902.01.01 Asphalt Binder
THE SECOND PARAGRAPH IS CHANGED TO:

When specified, use PG 64E-22 asphalt binder that is a storage-stable and conforms to AASHTO M 332 including compliance with the elastic response requirement in Appendix X1.1.

902.01.02 Cutback Asphalts
THE ENTIRE SUBPART IS DELETED.

902.01.03 Emulsified Asphalts
THE ENTIRE TEXT IS CHANGED TO:

Use undiluted anionic emulsified asphalts of the rapid-setting (RS) and medium-setting (MS) types conforming to AASHTO M 140. Use undiluted cationic emulsified asphalts of the rapid-setting (CRS), quick-setting (CQS), and medium-setting (CMS) types conforming to AASHTO M 208.

For prime coats, use an anionic emulsified asphalt of the slow-setting (SS) type conforming to AASHTO M140 or cationic emulsified asphalt of the slow-setting (CSS) type confirming to AASHTO M 208.

The emulsified asphalt producer shall provide the emulsified asphalt quality control plan annually to the ME for approval. Ensure that the quality control plan conforms to AASHTO R77.

Submit to the ME a certification of compliance, as specified in 106.07, for the emulsified asphalt. The ME will perform quality assurance sampling and testing of each emulsified asphalt lot as defined in the approved quality control plan.

902.01.04 Polymer Modified Tack Coat
THE TITLE AND ENTIRE TEXT IS CHANGED TO:

902.01.04 Polymer Modified Emulsified Asphalt

Use undiluted polymer modified emulsified asphalt of the rapid-setting (RS), cationic rapid-setting (CRS), medium-setting (MS), and cationic quick-setting (CQS) types conforming to AASHTO M 316. The polymer modified emulsified asphalt producer shall provide the polymer modified emulsified asphalt quality control plan annually to the ME for approval. Ensure that the quality control plan conforms to AASHTO R77.

Submit to the ME a certification of compliance, as specified in 106.07, for the polymer modified emulsified asphalt. The ME will perform quality assurance sampling and testing of each polymer modified emulsified asphalt lot as defined in the approved quality control plan.
THE FOLLOWING SUBPART IS ADDED:

902.01.05 Warm Mix Asphalt (WMA) Additives and Processes

Use a WMA additive or process that is listed on the Northeast Asphalt User/Producer Group (NEAUPG) Qualified WMA Technologies List which can be found at the following website: http://www.neaupg.uconn.edu/

If an approved HMA mix design is used, a separate mix design with WMA additives or processes is not required.

Submit information on the WMA additive or process with the Paving Plan required in 401.03.03.A. For controlled foaming systems, also submit the operating parameters of the system including accuracy of the meter, operating range, and temperature of the binder. Provide the target and operating tolerances for the percent water injection and temperatures for the binder. Provide a method for validating this with changing production rates.

Ensure that a technical representative of the manufacturer is on-site or available for consultation for the first day or night of production.

902.02.01 Mix Designations
THE ENTIRE SUBPART IS CHANGED TO:

The requirements for specific HMA mixtures are identified by the abbreviated fields in the Item description as defined as follows:

HOT MIX ASPHALT 12.5ME SURFACE COURSE

1. **"HOT MIX ASPHALT"** "Hot Mix Asphalt" is located in the first field in the Item description for the purpose of identifying the mixture requirements.
2. **"12.5"** The second field in the Item description designates the nominal maximum size aggregate (in millimeters) for the job mix formula (sizes are 4.75, 9.5, 12.5, 19, 25, and 37.5 mm).
3. **"M"** The third field in the Item description designates the design compaction level for the job mix formula based on traffic forecasts as listed in Table 902.02.03-2 (levels are L=low and M=medium).
4. **"E"** The fourth field in the Item description designates the high temperature designation of the performance-graded binder. Options are "64" for PG 64-22 and "E" for PG 64E-22.
5. **"SURFACE COURSE"** The last field in the Item description designates the intended use and location within the pavement structure (options are surface, intermediate, or base course).

902.02.02 Composition of Mixtures
THE ENTIRE SUBPART IS CHANGED TO:

Provide materials as specified:

Aggregates for Hot Mix Asphalt 901.05
Asphalt Binder.....902.01.01
Warm Mix Additives and Processes (optional).....902.01.05

If a WMA additive is pre-blended in the asphalt binder, ensure that the asphalt binder meets the requirements of the specified grade after the addition of the WMA additive. If a WMA additive is added at the HMA plant, ensure that the addition of the additive will not negatively impact the grade of asphalt binder. Follow the manufacturer's recommendations for percentage of WMA additive needed.

Mix HMA in a plant that is listed on the QPL and conforms to the requirements for HMA Plants as specified in 1009.01.

Composition of the mixture for HMA surface course is coarse aggregate, fine aggregate, and asphalt binder, and may also include mineral filler, WMA additive, and up to 15 percent Reclaimed Asphalt Pavement (RAP). For controlled asphalt foaming system WMA, the Department may require an anti-stripping additive. Ensure that the finished mix does not contain more than a total of 1 percent by weight contamination from Crushed Recycled Container Glass (CRCG).

The composition of the mixture for HMA base or intermediate course is coarse aggregate, fine aggregate, and asphalt binder, and may also include mineral filler, WMA additive and up to 35 percent of recycled materials. For controlled asphalt foaming system WMA, the Department may require an anti-stripping additive. The 35 percent of recycled materials may consist of a combination of RAP, CRCG, Ground Bituminous Shingle Material (GBSM), and RPCSA, with the following individual limits:

Table 902.02.02-1 Use of Recycled Materials in HMA Base or Intermediate Course

Recycled Material	Maximum Percentage
RAP	25
CRCG	10
GBSM	5
RPCSA	20

Combine the aggregates to ensure that the resulting mixture meets the grading requirements specified in Table 902.02.03-1. In determining the percentage of aggregates of the various sizes necessary to meet gradation requirements, exclude the asphalt binder.

Ensure that the combined coarse aggregate, when tested according to ASTM D 4791, has less than 10 percent flat and elongated pieces retained on the No. 4 sieve and larger. Measure aggregate using the ratio of 5:1, comparing the length (longest dimension) to the thickness (smallest dimension) of the aggregate particles.

Ensure that the combined fine aggregate in the mixture conforms to the requirements specified in Table 902.02.02-2. Ensure that the material passing the No. 40 sieve is non-plastic when tested according to AASHTO T 90.

Table 902.02.02-2 Additional Fine Aggregate Requirements for HMA

Tests	Test Method	Minimum Percent
Uncompacted Void Content of Fine Aggregate	AASHTO T 304, Method A	45
Sand Equivalent	AASHTO T 176	45

902.02.03 Mix Design

TABLES 902.02.03-2, AND 902.02.03-3 ARE CHANGED TO:

Table 902.02.03-2 Gyratory Compaction Effort for HMA Mixtures

Compaction Level	ESALs[1] (millions)	N_{des}	N_{max}
L	< 0.3	50	75
M	≥ 0.3	75	115

1. Design ESALs (Equivalent (80kN) Single-Axle Loads) refer to the anticipated traffic level expected on the design lane over a 20-year period.

Table 902.02.03-3 HMA Requirements for Design										
Compaction Levels	**Required Density (% of Theoretical Max. Specific Gravity)**		**Voids in Mineral Aggregate (VMA), % (minimum)**						**Voids Filled With Asphalt (VFA)1 %**	**Dust-to-Binder Ratio**
			Nominal Max. Aggregate Size, mm							
	@N_{des}[2]	**@N_{max}**	**37.5**	**25.0**	**19.0**	**12.5**	**9.5**	**4.75**		
L	96.0	≤ 98.0	11.0	12.0	13.0	14.0	15.0	16.0	70 - 80	0.6 - 1.2
M	96.0	≤ 98.0	11.0	12.0	13.0	14.0	15.0	16.0	65 - 78	0.6 - 1.2

1. For 37.5-mm nominal maximum size mixtures, the specified lower limit of the VFA is 64 percent for all design traffic levels.
2. As determined from the values for the maximum specific gravity of the mix and the bulk specific gravity of the compacted mixture. Maximum specific gravity of the mix is determined according to AASHTO T 209. Bulk specific gravity of the compacted mixture is determined according to AASHTO T 166. For verification, specimens must be between 95.0 and 97.0 percent of maximum specific gravity at N_{des}.

THE FOURTH PARAGRAPH IS CHANGED TO:

At the ME's request, test the mix design to ensure that it meets a minimum tensile strength ratio of 80 percent, when tested according to AASHTO T 283. The ME will require tensile strength ratio testing for new aggregate sources and for aggregates or mixes suspected of stripping susceptibility.

902.02.04 Sampling and Testing
THE ENTIRE TEXT IS CHANGED TO:

A. General Acceptance Requirements. The RE or ME may reject and require disposal of any batch or shipment that is rendered unfit for its intended use due to contamination, segregation, improper temperature, lumps of cold material, or incomplete coating of the aggregate. For other than improper temperature, visual inspection of the material by the RE or ME is considered sufficient grounds for such rejection.

For PG 64-22, ensure that the temperature of the mixture at discharge from the plant or surge and storage bins is at least 290 °F when the ambient temperature is less than 50 °F or is at least 275 °F when the ambient temperature is greater than or equal to 50 °F. For PG 64E-22, ensure that the temperature of the mixture at discharge from the plant or surge and storage bins is at least 10 °F above the manufacturer's recommended laydown temperature. For mixes produced using a WMA additive or process, ensure that the temperature of the mixture at discharge from the plant or surge and storage bins is at least 10 °F above the WMA manufacturer's recommended laydown temperature.

Do not allow the mixture temperature to exceed 330 °F at discharge from the plant.

Combine and mix the aggregates and asphalt binder to ensure that at least 95 percent of the coarse aggregate particles are entirely coated with asphalt binder as determined according to AASHTO T 195. If the ME determines that there is an on-going problem with coating, the ME may obtain random samples from 5 trucks and will determine the adequacy of the mixing on the average of particle counts made on these 5 test portions. If the requirement for 95 percent coating is not met on each sample, modify plant operations, as necessary, to obtain the required degree of coating.

If used, ensure that the equipment for controlled asphalt foaming system is running according to the manufacturer's recommendations. Ensure that the metering of water to foam the asphalt is controlled to produce a uniform mixture.

B. Sampling. The ME will take a random sample from each 700 tons of production for volumetric acceptance testing and to verify composition. The ME will perform sampling according to AASHTO T 168, NJDOT B-2, or ASTM D 3665. During production at the plant, a sample of asphalt binder will be taken once every 3500 tons or as directed by the ME.

C. Quality Control Testing. The HMA producer shall provide a quality control (QC) technician who is certified by the Society of Asphalt Technologists of New Jersey as an Asphalt Technologist, Level 2. The QC technician may substitute equivalent technician certification by the Mid-Atlantic Region Technician Certification Program (MARTCP). Ensure that the QC technician is present during periods of mix production for the sole purpose of

quality control testing and to assist the ME. The ME will not perform the quality control testing or other routine test functions in the absence of, or instead of, the QC technician.

The QC technician shall perform sampling and testing according to the approved quality control plan, to keep the mix within the limits specified for the mix being produced. The QC technician may use acceptance test results or perform additional testing as necessary to control the mix.

To determine the composition, perform ignition oven testing according to AASHTO T 308 and aggregate gradation according to AASHTO T 30.

For each acceptance test, perform maximum specific gravity testing according to AASHTO T 209 on a test portion of the sample taken by the ME. Sample and test coarse aggregate, fine aggregate, mineral filler, and RAP according to the approved quality control plan for the plant.

When using RAP, ensure that the supplier has in operation an ongoing daily quality control program to evaluate the RAP. As a minimum, this program shall consist of the following:

1. An evaluation performed to ensure that the material conforms to 901.05.04 and compares favorably with the design submittal.
2. An evaluation of the RAP material performed using a solvent or an ignition oven to qualitatively evaluate the aggregate components to determine conformance to 901.05.
3. Quality control reports as directed by the ME.

D. Acceptance Testing and Requirements. The ME will determine volumetric properties at Ndes for acceptance from samples taken, compacted, and tested at the HMA plant. The ME will compact HMA to the number of design gyrations (Ndes) specified in Table 902.02.03-2, using equipment according to AASHTO T 312. The ME will determine bulk specific gravity of the compacted sample according to AASHTO T 166. The ME will use the most current QC maximum specific gravity test result in calculating the volumetric properties of the HMA.

The ME will determine the dust-to-binder ratio from the composition results as tested by the QC technician.

Ensure that the HMA mixture conforms to the requirements specified in Table 902.02.04-1, and to the gradation requirements in Table 902.02.03-1. If 2 samples in 5 consecutive samples fail to conform to the gradation or volumetric requirements, immediately initiate corrective action.

The ME will test a minimum of 1 sample per 3500 tons for moisture, basing moisture determinations on the weight loss of an approximately 1600-gram sample of mixture heated for 1 hour in an oven at 280 ± 5°F. Ensure that the moisture content of the mixture at discharge from the plant does not exceed 1.0 percent.

Table 902.02.04-1 Hot Mix Asphalt Requirements for Control

Compaction Levels	Required Density (% of Theoretical Max. Specific Gravity)	Voids in Mineral Aggregate (VMA), % (minimum)						Dust-to-Binder Ratio
		Nominal Max. Aggregate Size, mm						
	@Ndes[1]	37.5	25.0	19.0	12.5	9.5	4.75	
L, M	95.0 – 97.0	11.0	12.0	13.0	14.0	15.0	16.0	0.6 - 1.3

1. As determined from the values for the maximum specific gravity of the mix and the bulk specific gravity of the compacted mixture. Maximum specific gravity of the mix is determined according to AASHTO T 209. Bulk specific gravity of the compacted mixture is determined according to AASHTO T 166.

902.03.01 Composition of Mixtures

THE ENTIRE TEXT IS CHANGED TO:

Mix OGFC and MOGFC in a plant that is listed on the QPL and conforms to the requirements for HMA plants as specified in 1009.01.

Composition of mixture for OGFC and MOGFC is coarse aggregate, fine aggregate and asphalt binder and may include a WMA additive. Ensure that the mixture conforms to the following requirements:

1. Use aggregate for OGFC and MOGFC that conforms to 901.05, except, for coarse aggregate, use broken stone of gneiss, granite, quartzite, or trap rock. Do not use RAP, CRCG, GBSM, or RPCSA.
2. Use asphalt binder for OGFC and MOGFC that is PG 64E-22 as specified in 902.01.01.

3. If used, ensure that WMA additives or processes conform to 902.01.05. If a WMA additive is pre-blended in the asphalt binder, ensure that the asphalt binder meets the requirements of the specified grade after the addition of the WMA additive. If a WMA additive is added at the HMA plant, ensure that the addition of the additive will not negatively impact the grade of asphalt binder. Follow the manufacturer's recommendations for percentage of WMA additive needed. For controlled asphalt foaming system WMA, the Department may require an anti-stripping additive.
4. For MOGFC, add a stabilizing additive consisting of mineral fiber or cellulose fiber to the mix. Use a stabilizing additive that conforms to the requirements for stabilizing additives in AASHTO M 325. Use only 1 type per mix design. If using mineral fibers, use a dosage rate of 0.4 percent by weight of total mix. If using cellulose fibers, use a dosage rate of 0.3 percent by weight of total mix. The dosage rate may be increased, as necessary, to prevent draindown as measured by the visual draindown determination of asphalt content in NJDOT B-8. Accurately control proportioning the fibers into the mixture within ±10 percent of the required weight, and use equipment that ensures uniform dispersion of the fibers. Store fibers in a dry location with a storage temperature not to exceed 120 °F. The supplier of the cellulose or mineral fibers shall provide a certification of compliance, as specified in 106.07, that the material supplied conforms to AASHTO M 325. Ensure that a technical representative from the additive supplier is at the work site for the first full day of construction for technical assistance.

902.03.02 Mix Design
THE FOURTH PARAGRAGH IS CHANGED TO:

The ME will test 2 specimens to verify that the final JMF produces a mixture that has a minimum void content as specified in Table 902.03.03-1. The ME will determine percent air voids according to AASHTO T 209, and either NJDOT B-6 or AASHTO T 331.

902.03.03 Sampling and Testing
THE FOLLOWING IS ADDED TO THE FIRST PARAGRAPH:

Ensure that the mix meets the requirements as specified in 902.02.04.A, otherwise the RE or ME will reject the material.

THE SECOND PARAGRAPH IS CHANGED TO:

During production, the ME will take one random acceptance sample from each 700 tons of production to verify composition. Conduct air voids and draindown tests as directed by the ME.
THE THIRD AND FOURTH PARAGRAPH ARE CHANGED TO:

If the composition testing results are outside of the production control tolerances specified in Table 902.03.03-2 for an acceptance sample, immediately run a quality control sample. If the quality control sample is also outside of the control tolerances in Table 902.03.03-2, determine if a plant adjustment is needed and take corrective action to bring the mix into compliance. Take additional quality control samples after the corrective action to ensure that the mix is within the production control tolerances. If 2 consecutive acceptance samples are outside the tolerances specified in Table 902.03.03-2, immediately stop production. Obtain ME approval of a plant correction plan before resuming production. Upon restarting production, do not transport mixture to the Project Limits before the results of a QC sample from the mixture indicate that the mixture meets JMF tolerances. The ME will reject mixture produced at initial restarting that does not meet tolerances.

The ME will perform sampling according to NJDOT B-2 or ASTM D 3665, and will perform testing for composition according to AASHTO T 308 or NJDOT B-5. Perform testing for air voids according to AASHTO T 209 and either NJDOT B-6 or AASHTO T 331. Perform testing for draindown according to NJDOT B-7 or NJDOT B-8. During production at the plant, a sample of asphalt binder will be taken once every 3500 tons or as directed by the ME.

TABLE 902.03.03-2 IS CHANGED TO:

Table 902.03.03-2 Production Control Tolerances for OGFC and MOGFC Mixtures	
Sieve Sizes	**Production Control Tolerances from JMF[1]**
1/2"	±3.0
3/8"	±4.0
No. 4	±3.0
No. 8	±1.0
No. 200	±1.0
Asphalt Binder Content, % (AASHTO T 308)[2]	±0.40
Asphalt Binder Content, % (NJDOT B-5)[2]	±0.15
Minimum % Air Voids	1.0% less than design requirement

1. Production tolerances may not fall outside of the wide band gradation limits in Table 902.03.03-1.
2. The asphalt binder content may not be lower than the minimum after the production tolerance is applied.

902.04 ULTRA-THIN HMA

THE ENTIRE SUBSECTION IS CHANGED TO:

902.04.01 Composition of Mixture

Mix ultra-thin HMA in a plant listed on the QPL conforming to the requirements for HMA plants specified in 1009.01.

Use ultra-thin HMA that consists of coarse aggregate, fine aggregate, and polymer modified asphalt binder and that may contain mineral filler or a WMA additive. Do not add RAP, CRCG, GBSM, or RPCSA. Combine the material in such proportions that the total aggregate and asphalt binder conform to the composition percentages specified in Table 902.04.02-1.

To produce the ultra-thin HMA, use aggregates and asphalt binder that conforms to the following:

1. For asphalt binder, use PG 64E-22 conforming to the requirements of 902.01.01.
2. If used, ensure that WMA additives or processes conform to 902.01.05. If a WMA additive is pre-blended in the asphalt binder, ensure that the asphalt binder meets the requirements of the specified grade after the addition of the WMA additive. If a WMA additive is added at the HMA plant, ensure that the addition of the additive will not negatively impact the grade of asphalt binder. Follow the manufacturer's recommendations for percentage of WMA additive needed. For controlled asphalt foaming system WMA, the Department may require an anti-stripping additive.
3. For fine aggregate, use 100 percent stone sand conforming to 901.05.02. Ensure that the gradation conforms to Table 902.04.01-1 and that the sand equivalent is more than 45 percent when tested according to AASHTO T 176.

Table 902.04.01-1 Fine Aggregate Gradation	
Sieve Size	**Total % Passing By Mass**
3/8″	100
No. 4	95-100
No. 8	70-90
No. 16	50-70
No. 30	45-55
No. 50	25-40
No. 100	15-28
No. 200	10.0-17.0

4. Use coarse aggregate that conforms to 901.05.01 and Table 902.04.01-2. Permissible geologic classifications for coarse aggregate are, gneiss, granite, quartzite, or trap rock. Ensure that the gradation conforms to Table 902.04.01-3.

Table 902.04.01-2 Coarse Aggregate Properties			
Tests	**Test Method**	**Minimum Percent**	**Maximum Percent**
Percentage of wear, Los Angeles Abrasion Test	AASHTO T 96		25
Flakiness Index	NJDOT A-8		20
Clay Lumps and Friable Particles	ASTM C 142		2
Asphalt Affinity[1]	ASTM D 3625	95	

1. Anti-stripping agents may be required to provide resistance to stripping.

Table 902.04.01-3 Coarse Aggregate Gradation	
Sieve Size	**Total % Passing By Mass**
1/2″	100
3/8″	85-100
1/4″	0-15
No. 4	0-5
No. 200	0.0-3.0

5. Use mineral filler, if necessary, that conforms to 901.05.03.

902.04.02 Mix Design

Design the ultra-thin HMA as specified in NJDOT Test Method B-13 and ensure the JMF meets the requirements in Table 902.04.02-1.

Size, uniformly grade, and combine aggregate fractions in proportions so that the grading of total aggregate and asphalt binder in the JMF conform to the composition by mass percentages specified in Table 902.04.02-1.

Table 902.04.02-1 JMF Requirements for Ultra-Thin Friction Course		
Sieve Size	**Percent Passing[1]**	**Production Control Tolerances[2]**
1/2″	100	0.0
3/8″	85-100	±3.0
1/4″	30-50	±4.0
No. 4	24-40	±3.0
No. 8	21-32	±3.0
No. 16	16-26	±3.0
No. 30	12-20	±2.0
No. 50	8-16	±2.0
No. 100	5-10	±1.0
No. 200	4.0-7.0	±1.0
Asphalt Binder Content (Ignition Oven)[3]	4.9 - 6.0	±0.30

1. Aggregate percent passing to be determined based on dry aggregate weight.
2. Production tolerances are for the approved JMF and may not fall outside of the wide band gradation limits.
3. The asphalt binder content may not be lower than the minimum after the production tolerance is applied.

Design the ultra-thin HMA to meet the requirements in Table 902.04.02-2.

Table 902.04.02-2 UTFC Mix Properties			
Tests	**Test Method**	**Minimum**	**Maximum**
Draindown	AASHTO T 305		0.3 %
Film Thickness	NJDOT B-13	10 micron	
Cantabro Loss	NJDOT B-8		30 %

Air Voids (@ 75 gyrations)	NJDOT B-13	8.0 %

When tested for moisture sensitivity according to AASHTO T 283, ensure that the ultra-thin HMA has a tensile strength ratio of at least 80 percent. Prepare specimens according to AASHTO T 312, and test according to AASHTO T 283 except for the following:

1. Before compaction, condition the mixture for 2 hours according to AASHTO R 30, Section 7.1.
2. Compact specimens with 75 gyrations.
3. Extrude specimens as soon as possible without damaging.
4. Use NJDOT Test Method B-13 to determine void content.
5. Record the void content of the specimens.
6. If less than 55 percent saturation is achieved, repeat the procedure, unless the difference in tensile strength between duplicate specimens is greater than 25 pounds per square inch.
7. If visual stripping is detected, modify or readjust the mix.

At least 30 days before the initial production date, submit the mix design to the ME for approval on forms supplied by the Department, including JMF for the ultra-thin HMA. Include a statement naming the source of each component and a report with the results for the criteria specified in Tables 902.04.01-1, 902.04.01-2 and 902.04.02-1.

If the source of any component material changes, submit a new JMF and obtain ME approval before using the new material. When unsatisfactory results or other conditions make it necessary, the ME may require a new JMF.

During the construction of the test strip, take samples to confirm that the plant mixed material meets the requirements of the mix design. The ME will not grant final approval of the mix design until a successful verification of the plant produced mix and construction test strip.

902.04.03 Sampling and Testing

Ensure that the mix meets the requirements as specified in 902.02.04.A, otherwise the RE or ME will reject the material. Maintain the temperature of the mix between 300 °F and 330 °F. Perform and meet requirements for quality control testing as specified in 902.02.04.C.

Ensure that a technical representative from the lab which designed the mix is present during the first night of production to make adjustments as needed for mix compliance. During production, the ME will take one random acceptance sample from each 700 tons of production to verify composition. Conduct draindown tests as directed by the ME.

If the composition testing results are outside of the production control tolerances specified in Table 902.04.02-1 for an acceptance sample, immediately run a quality control sample. If the quality control sample is also outside of the control tolerances in Table 902.04.02-1, determine if a plant adjustment is needed and take corrective action to bring the mix into compliance. Take additional quality control samples after the corrective action to ensure that the mix is within the production control tolerances. If 2 consecutive acceptance samples are outside the tolerances specified in Table 902.04.02-1, immediately stop production. Obtain ME approval of a plant correction plan before resuming production. Upon restarting production, do not transport mixture to the Project Limits before the results of a QC sample from the mixture indicate that the mixture meets JMF tolerances. The ME will reject mixture produced at initial restarting that does not meet tolerances.

The ME will perform sampling according to NJDOT B-2 or ASTM D 3665, and will perform testing for composition according to AASHTO T 308. Perform testing for draindown according to AASHTO T 305 for every 3500 tons or as directed by the RE. The ME may require testing and calculations of film thickness according to NJDOT B-13. The ME may require adjustment or re-design of the UTFC for failure of draindown or film thickness based on the requirements in Table 902.04.02-2. During production at the plant, the ME will take a sample of the asphalt binder once every 3500 tons or as directed by the ME.

902.05.01 Composition of Mixture
THE ENTIRE TEXT IS CHANGED TO:

Mix SMA in a plant that is listed on the QPL and conforms to the requirements for HMA plants as specified in 1009.01.

The composition of the SMA mixture is coarse aggregate, fine aggregate, mineral filler, mineral fibers or cellulose fibers, and polymer modified asphalt binder and may include a WMA additive.

Use asphalt binder for SMA that is PG 64E-22 as specified in 902.01.01.

For coarse aggregate in SMA, use crushed stone conforming to 901.05.01 and Table 902.05.01-1. Use at least 2 stockpiles of crushed stone with differing gradations to allow adjustments to meet the JMF.

Table 902.05.01-1 Coarse Aggregate Properties for SMA

Tests	Test Method	Maximum Percent
Percentage of wear, Los Angeles Abrasion Test	AASHTO T 96	30
Flat and Elongated, 5 to 1 (Material Retained on the No. 4 Sieve)	ASTM D 4791	5
Flat and Elongated, 3 to 1 (Material Retained on the No. 4 Sieve)	ASTM D 4791	20

For fine aggregate, use 100 percent stone sand conforming to 901.05.02. Ensure that the combined fine aggregate in the mixture conforms to the requirements in Table 902.02.02-2.

For mineral filler, use rock dust or crushed limestone conforming to AASHTO M 17. Ensure that the mineral filler has a plasticity index of less than 4 percent when tested according to AASHTO T 90.

Do not add RAP, CRCG, GBSM, or RPCSA to the mixture.

Add stabilizing fibers consisting of mineral fiber or cellulose fiber conforming to AASHTO M 325. Use only one type per mix design. If using mineral fibers, use between 0.4 and 0.6 percent by weight of total mix. If using cellulose fibers, use between 0.3 and 0.4 percent by weight of total mix. Provide control to accurately proportion the fibers into the mixture within ±10 percent of the required weight, and use equipment that ensures uniform dispersion of the fibers. If using pre-packaged bags of fibers added to the pugmill during the dry mix cycle, follow the manufacturer's recommendations for the dry and wet mixing time. Store fibers in a dry location with a storage temperature not to exceed 120 °F. The supplier of the cellulose or mineral fibers shall provide a certification of compliance, as specified in 106.07, for the fibers. Ensure that a technical representative from the fiber supplier is at the HMA plant for the first full day of production for technical assistance.

If used, ensure that WMA additives or processes conform to 902.01.05. If a WMA additive is pre-blended in the asphalt binder, ensure that the asphalt binder meets the requirements of the specified grade after the addition of the WMA additive. If a WMA additive is added at the HMA plant, ensure that the addition of the additive will not negatively impact the grade of asphalt binder. Follow the manufacturer's recommendations for percentage of WMA additive needed. For controlled asphalt foaming system WMA, the Department may require an anti-stripping additive.

902.05.02 Mix Design

THE ENTIRE TEXT IS CHANGED TO:

Design the SMA to meet the requirements in Table 902.05.02-1 and Table 902.05.02-2. Prepare the JMF according to AASHTO R 46. Determine the JMF at 4 percent air voids and 75 gyrations of the Superpave gyratory compactor.

Table 902.05.02-1 SMA Specification Band (% passing) nominal-maximum aggregate size

Production Control Tolerances from JMF[1]	Sieve Size	19 mm % Passing	12.5 mm % Passing	9.5 mm % Passing
0%	1"	100	100	100
±2%	3/4"	90-100	100	100
±5%	1/2"	50-88	90-100	100
±5%	3/8"	25-60	50-80	70-95
±3%	No. 4	20-28	20-35	30-50
±2%	No. 8	16-24	16-24	20-30
±4%	No. 16	–	–	0-21
±3%	No. 30	–	–	0-18
±3%	No. 50	–	–	0-15

±2%	No. 200	8.0-11.0	8.0-11.0	8.0-12.0
	Coarse Aggregate Fraction	Portion Retained on No. 4 Sieve	Portion retained on No. 4 Sieve	Portion retained on No. 8 Sieve
	Minimum Lift Thickness	2 inches	1 1/2 inch	1 inch

1. Production tolerances may fall outside of the wide band gradation limits.

Table 902.05.02-2 SMA Mixtures Volumetrics For Design and Plant Production

Property	Production Control Tolerances	Requirement
Air Voids	±1%	3.5%
Voids in Mineral Aggregate (VMA)	–	17.0% minimum
VCA_{mix}	–	Less than VCA_{dry}
Draindown @ production temperature	–	0.30% maximum
Asphalt Binder Content (AASHTO T 308)[1]	±0.40%	6% minimum
Tensile Strength Ratio (AASHTO T 283)	–	80% minimum

1. Asphalt binder content may not be lower than the minimum after the production tolerance is applied.

902.05.03 Sampling and Testing
THE ENTIRE TEXT IS CHANGED TO:

Perform quality control testing as specified in 902.02.04.C. Ensure that the mix meets the requirements as specified in 902.02.04.A, otherwise the RE or ME will reject the material.

During production at the plant, the ME will take a sample from each 700 tons of production to verify composition and air voids. Conduct draindown, VCAmix, VCAdry, and VMA testing as directed by the ME. Perform tests according to AASHTO R 46.

If the testing results are outside of the production control tolerances specified in Table 902.05.02-1 and Table 902.05.02-2 for an acceptance sample, immediately run a quality control sample. If the quality control sample is also outside of the control tolerances in Table 902.05.02-1, determine if a plant adjustment is needed and take corrective action to bring the mix into compliance. Take additional quality control samples after completing the corrective action to ensure that the mix is within tolerances. If 2 consecutive acceptance samples are outside the tolerances specified in Table 902.05.02-1 and Table 902.05.02-2, immediately stop production. Obtain ME approval of a plant correction plan before resuming production. Upon restarting production, do not transport mixture to the Project Limits before the results of a QC sample from the mixture indicate that the mixture meets JMF tolerances. The ME will reject mixture produced at initial restarting that does not meet tolerances.

The ME will perform sampling according to NJDOT B-2 or ASTM D 3665, and will perform testing for composition according to AASHTO T 308. The ME will determine bulk specific gravity of the compacted sample according to AASHTO T 166 or AASHTO T 331. The ME will use the most current QC maximum specific gravity test result, obtained according to AASHTO T 209, in calculating the volumetric properties of the SMA. Perform testing for draindown according to AASHTO T 305. During production at the plant, a sample of asphalt binder will be taken once every 3500 tons or as directed by the ME.

902.06.01 Composition
THE ENTIRE TEXT IS CHANGED TO:

Mix ASDC in a plant that is listed on the QPL and conforms to the requirements specified in 1009.01.

The mixture shall consist of asphalt binder and aggregate and may contain a WMA additive. Use asphalt binder that is PG 64-22 as specified in 902.01.01. Use aggregate that conforms to 901.05.01 or 901.05.02 and the gradation requirements specified in Table 902.06.01-1.

If used, ensure that WMA additives or processes conform to 902.01.05. If a WMA additive is pre-blended in the asphalt binder, ensure that the asphalt binder meets the requirements of the specified grade after the addition of the WMA additive. If a WMA additive is added at the HMA plant, ensure that the addition of the additive will not negatively

impact the grade of asphalt binder. Follow the manufacturer's recommendations for percentage of WMA additive needed. For controlled asphalt foaming system WMA, the Department may require an anti-stripping additive.

Table 902.06.01-1 Gradation Requirements and Tolerances for ASDC

Production Tolerance (Variation From JMF)	Sieve Size	JMF (Percent Passing)
	1"	100
±1.0	3/4"	95 - 100
±3.0	1/2"	85 - 100
±6.0	3/8"	60 - 90
±2.0	No. 4	15 - 25
±2.0	No. 8	2 - 10
±1.0	No. 200	2 - 5

Design the mixture to have an asphalt binder content of 3 ± 1/2 percent by weight of dry aggregate.

902.06.03 Sampling and Testing

THE ENTIRE TEXT IS CHANGED TO:

Perform quality control testing as specified in 902.02.04.C. Ensure that the mix meets the requirements as specified in 902.02.04.A, except that the temperature of the mix at discharge is required to be between 230 °F and 275 °F, otherwise the RE or ME will reject the material. For mixes produced using a WMA additive or process, ensure that the temperature of the mixture at discharge from the plant or surge and storage bins is at least 10 °F above the WMA manufacturer's recommended laydown temperature.

During production, the ME will take one random acceptance sample from each 700 tons of production to verify composition. Conduct draindown tests as directed by the ME.

If the composition testing results are outside of the production control tolerances specified in Table 902.06.01-1 for an acceptance sample, immediately run a quality control sample. If the quality control sample is also outside of the control tolerances specified in Table 902.06.01-1, determine if a plant adjustment is needed and take corrective action to bring the mix into compliance. Take additional quality control samples after the corrective action to ensure that the mix is within tolerances. If 2 consecutive acceptance samples are outside the tolerances specified in Table 902.06.01-1, immediately stop production. Obtain ME approval of a plant correction plan before resuming production. Upon restarting production, do not transport mixture to the Project before the results of a QC sample from the mixture indicate that the mixture meets JMF tolerances. The ME will reject mixture produced at initial restarting that does not meet tolerances.

The ME will perform sampling according to NJDOT B-2 or ASTM D-3665 and will perform testing for composition according to AASHTO T 308. If directed by the ME, perform testing for draindown according to AASHTO T 305. During production at the plant, a sample of asphalt binder will be taken once every 3500 tons or as directed by the ME.

THE FOLLOWING SUBSECTIONS ARE ADDED

902.07 ASPHALT-RUBBER OPEN-GRADED FRICTION COURSE (AR-OGFC)

902.07.01 Composition of Mixture

Mix AR-OGFC in a plant listed on the QPL and conforming to the requirements for HMA plants specified in 1009.01. Ensure the HMA plant is equipped with asphalt-rubber binder blending equipment as specified in 1009.03.

Composition of mixture for AR-OGFC is coarse aggregate, fine aggregate and asphalt-rubber binder. Ensure that the mixture conforms to the following requirements:

1. Use aggregates that conform to 901.05. Use fine aggregate that is 100 percent stone sand and conforms to Table 902.02.02-2.
2. Do not use RAP, CRCG, GBSM, or RPCSA.
3. Use asphalt-rubber binder that conforms to 902.07.02.

902.07.02 Asphalt-Rubber Binder

A. Materials. Use the following materials:

1. Ground Crumb Rubber. Ensure that the ground crumb rubber has a specific gravity of 1.15 ± 0.05, is free of wire or other contaminating materials, and contains not more than 0.5 percent fabric. Use crumb rubber that is ambient ground and conforms to the gradation requirements specified in Table 902.07.02-1. Ensure that the moisture content is less than 0.75 percent. The Contractor may add up to four percent calcium carbonate by weight of the granulated rubber, to prevent the particles from sticking together.

Table 902.07.02-1 Ground Crumb Rubber Gradation

Sieve Size	Percent Passing[1, 2]
No. 8	100
No. 16	65 – 100
No. 30	20 – 100
No. 50	0 – 45
No. 200	0 – 5

1. Perform gradation according to AASHTO T 27 using a minimum 50 gram sample.
2. Ensure that the gradation is performed as specified in NJDOT B-11.

Submit to the ME a certification of compliance, as specified in 106.07, for the ground crumb rubber. In addition, ensure that the certificates confirm that the rubber is a crumb rubber, derived from processing whole scrap tires or shredded tire materials; and the tires from which the crumb rubber is produced are taken from automobiles, trucks, or other equipment owned and operated in the United States. Include with the certifications verifications that the processing did not produce, as a waste product, casings, or other round tire material that can hold water when stored or disposed of above ground.

2. Asphalt Binder.

a. Use asphalt binder that conforms to AASHTO M 320, Table 1; PG 64-22, PG 58-28 or an approved blend of both grades. The asphalt binder producer is required to provide the asphalt binder quality control plan annually to the ME for approval. Ensure that the quality control plan conforms to AASHTO R 26. Submit to the ME a certification of compliance, as specified in 106.07, for the asphalt binder. The ME will perform quality assurance sampling and testing of each asphalt binder lot as defined in the approved quality control plan.

b. Use one or more of the following types of warm mix asphalt (WMA) additives or processes:

1. Organic additives such as a paraffin wax or a low molecular weight esterified wax.

2. Chemical additive that acts as a surfactant or dispersing agent.

Do not use controlled asphalt foaming systems or any other steam injection processes or steam introducing additives. WMA is a method of producing asphalt pavement at a mixing and compaction temperatures at least 30 ºF lower than Hot Mix Asphalt (HMA) by using one or more of the types of WMA additives listed above. Submit information on the WMA additive or process with the Paving Plan required in 402.03.02.A. Include in the submission, the name and description of the additive or process, the manufacturer's recommendations for usage of the additive or process, recommendations for mixing and compaction temperatures, and details on at least one project on which the additive was successfully used in the United States on a crumb rubber modified asphalt mixture. In the details of a project, include tonnage, type of mix, dosage, mixing and compaction temperatures, available test results, and contact information for project. If a WMA additive is pre-blended in the asphalt binder, ensure that the asphalt binder meets the requirements of the specified grade after the addition of the WMA additive. If a WMA additive is added at the HMA plant, ensure that the addition of the additive will not negatively impact the grade of asphalt binder. The ME will evaluate the impacts to performance grade of the asphalt binder based upon certification from manufacturer in conjunction with laboratory data indicating the

effects of the additive on the asphalt binder properties. Follow the manufacturer's recommendations for the dosage of WMA additive needed and approved blending method(s).

Ensure that a technical representative of the WMA additive manufacturer is on-site or available for consultation during the production and placement of the AR-OGFC with the warm mix additive.

B. Mixing. Using the asphalt-rubber binder blending equipment in 1009.03, produce the asphalt-rubber binder to contain at least 17 percent ground rubber by the weight of total asphalt binder (asphalt + crumb rubber). Ensure that the temperature of the asphalt cement is between 350 and 400 °F at the time of addition of the ground rubber. Ensure that there are no agglomerations of rubber particles in excess of two inches in the least dimension in the mixing chamber.

Document that the proportions are accurate and that the rubber has been uniformly incorporated into the mixture. Report as directed by the ME. Ensure that the crumb rubber and asphalt-cement are thoroughly mixed before beginning the one-hour reaction period. Rubber floating on the surface or agglomerations of rubber particles is evidence of insufficient mixing. Maintain the temperature of the asphalt-rubber binder immediately after mixing between 325 and 375 °F. Maintain the temperature of the asphalt-rubber binder for at least one hour before using.

C. Properties. Prepare asphalt-rubber binder using the "wet process." Physical properties are required to comply with the requirements of ASTM D 6114, Type II, except for the properties specified in Table 902.07.02-2.

Table 902.07.02-2 Asphalt-Rubber Binder Properties

Property	Test Procedure	Requirement
Resilience: 77 °F; %, minimum	ASTM D 5329	25
Rotational Viscosity[1] 350 °F; cP	NJDOT B-12	2000 – 4000

1. The viscotester used must be correlated to a Rion (formerly Haake) Model VT-04 viscotester using the No. 1 Rotor. The Rion viscotester rotor, while in the off position, is required to be completely immersed in the binder at a temperature from 350 ± 3 °F for a minimum heat equilibrium period of 60 seconds, and the average viscosity determined from three separate constant readings (± 500 cP) taken within a 30 second time frame with the viscotester level during testing and turned off between readings. Continuous rotation of the rotor may cause thinning of the material immediately in contact with the rotor, resulting in erroneous results.

D. Handling and Testing. Once the asphalt-rubber binder has been mixed, thoroughly agitate during periods of use to prevent settling of the rubber particles. During production, maintain asphalt-rubber binder between 325 and 375 °F. Ensure that asphalt-rubber binder is not held at 325 °F or higher for more than 16 hours. Allow asphalt-rubber binder held for more than 16 hours to cool. To reuse, gradually reheat to between 325 and 375 °F. Do not cool and reheat more than one time. Do not store asphalt-rubber binder above 250 °F for more than four days.

For each load or batch of asphalt-rubber binder, provide the RE with the following:

1. The source, grade, amount, and temperature of the asphalt cement before the addition of rubber.
2. The source and amount of rubber and the rubber content expressed as percent by the weight of the asphalt cement.
3. Times and dates of the rubber additions and resultant viscosity test.
4. A record of the temperature, with time and date reference for each load or batch. The record begins at the time of the addition of rubber and continue until the load or batch is completely used. Take readings and record every temperature change in excess of 20 °F, and as needed to document other events that are significant to batch use and quality.

902.07.03 Mix Design

Submit binder and mix designs including JMF for each mixture performed by an AASHTO accredited lab with at least five successfully completed asphalt-rubber open-graded friction course projects greater than 5,000 tons each. Include a statement naming the source of each component and a report with the results for the criteria specified in Table

902.07.03-1. Include a report detailing the rotational viscosity of the asphalt-rubber binder at 60, 90, 135, 240, and 1440 minutes. Submit lab qualifications and references to the ME for approval prior to beginning work.

Design the mix to meet the criteria in Table 902.07.03-1.

Table 902.07.03-1 JMF Master Ranges and Mixture Requirements AR-OGFC

	Mixture Designations (% Passing[1])
Sieve Sizes	**AR-OGFC**
1/2"	100
3/8"	90 – 100
No. 4	20 – 40
No. 8	5 – 10
No. 200	0 – 3.0
Minimum asphalt-rubber binder, %[2]	8.4
Minimum % Air Voids, design	15

1. Aggregate percent passing to be determined based on dry aggregate weight.
2. Asphalt-rubber binder content to be determined based on total weight of mix.

Determine and verify the JMF according to NJDOT B-8. Ensure that the JMF is within the master range specified in Table 902.07.03-1.

Prepare compacted test specimens for submittal to the ME at least 30 days before the initial production date. Prepare these specimens from material mixed according to the final JMF, using 50 gyrations of the Superpave gyratory compactor according to AASHTO T 312.

The ME will test 2 specimens to verify stone-on-stone contact according to NJDOT B-8 and that the final JMF produces a mixture that has a minimum void content as specified in Table 902.07.03-1. The ME will determine percent air voids according to AASHTO T 209 and AASHTO T 331.

The ME will test 2 test specimens for abrasion and impact resistance using a modified L.A. Abrasion Test according to NJDOT B-8. The maximum allowable loss as calculated by this method is 30 percent.

Do not modify, which includes changing the asphalt cement supplier, the JMF unless the ME approves the modification.

902.07.04 Sampling and Testing

A. General Acceptance Requirements. General Acceptance Requirements. The RE or ME may reject and require disposal of any batch or shipment that is rendered unfit for its intended use due to contamination, segregation, improper temperature, lumps of cold material, or incomplete coating of the aggregate. For other than improper temperature, visual inspection of the material by the RE or ME is considered sufficient grounds for such rejection.

For AR-OGFC with WMA additive, ensure that the temperature of the mixture at discharge from the plant or surge and storage bins meets the WMA additive manufacturer's recommendations. Do not allow the mixture temperature to exceed 300 °F at discharge from the plant. For mixes produced using a WMA additive or process, ensure that the temperature of the mixture at discharge from the plant or surge and storage bins is at least 10 °F above the WMA manufacturer's recommended laydown temperature.

Combine and mix the aggregates and asphalt-rubber binder to ensure that at least 95 percent of the coarse aggregate particles are entirely coated with asphalt-rubber binder as determined according to AASHTO T 195. If the ME determines that there is an on-going problem with coating, the ME may obtain random samples from 5 trucks and will determine the adequacy of the mixing on the average of particle counts made on these 5 test portions. If the requirement for 95 percent coating is not met on each sample, modify plant operations, as necessary, to obtain the required degree of coating.

B. Quality Control Testing. The HMA producer is required to provide a quality control (QC) technician who is certified by the Society of Asphalt Technologists of New Jersey as an Asphalt Technologist, Level 2. The QC technician may substitute equivalent technician certification by the Mid-Atlantic Region Technician Certification Program (MARTCP). Ensure that the QC technician is present during periods of mix production for the sole

purpose of quality control testing and to assist the ME. The ME will not perform the quality control testing or other routine test functions in the absence of, or instead of, the QC technician.

The QC technician is required to perform sampling and testing according to the approved quality control plan, to keep the mix within the limits specified for the mix being produced. The QC technician may use acceptance test results or perform additional testing as necessary to control the mix.

For each acceptance test, perform maximum specific gravity testing according to AASHTO T 209 on a test portion of the sample taken by the ME. Sample and test coarse aggregate, fine aggregate and mineral filler according to the approved quality control plan for the plant.

C. Acceptance Testing. During production, the ME will take one random acceptance sample from each 700 tons of production to verify composition. The ME will perform sampling according to NJDOT B-2 or ASTM D 3665, and will perform testing for composition according to AASHTO T 308. Perform testing for air voids according to T 209 and either B-6 or T 331. Perform testing for draindown according to NJDOT B-8. During production at the plant, a sample of asphalt binder will be taken once every 3500 tons or as directed by the ME.

Conduct air voids and draindown tests as directed by the ME.

If the composition testing results are outside of the production control tolerances specified in Table 902.07.04-1 for an acceptance sample, immediately run a quality control sample. If the quality control sample is also outside of the control tolerances in Table 902.07.04-1, determine if a plant adjustment is needed and take corrective action to bring the mix into compliance. Take additional quality control samples after the corrective action to ensure that the mix is within the production control tolerances. If two consecutive acceptance samples are outside the tolerances specified in Table 902.07.04-1, immediately stop production. Obtain ME approval of a plant correction plan before resuming production. Upon restarting production, do not transport mixture to the Project Limits before the results of a QC sample from the mixture indicate that the mixture meets JMF tolerances. The ME will reject mixture produced at initial restarting that does not meet tolerances.

Table 902.07.04-1 Production Control Tolerances for AR-OGFC Mixtures

Sieve Sizes	Production Control Tolerances from JMF[1]
1/2"	±6.0
3/8"	±2.0
No. 4	±4.0
No. 8	±1.0
No. 200	±1.0
Asphalt-rubber binder, % (AASHTO T 308)[2]	±0.40
Minimum % Air Voids	1.0% less than design requirement

1. Production tolerances may fall outside of the wide band gradation limits in Table 902.07.03-1.
2. Asphalt-rubber binder content may not be lower than the minimum in Table 902.07.03-1 after the production tolerance is applied.

902.08 HIGH PERFORMANCE THIN OVERLAY (HPTO)

902.08.01 Composition of Mixture

THE ENTIRE TEXT AS APPEARS IN THE SI IS CHANGED TO:

Mix HPTO in a plant that is listed on the QPL and conforms to the requirements for HMA Plants as specified in 1009.01. The composition of the mixture for HPTO is coarse aggregate, fine aggregate, and asphalt binder, and may also include mineral filler and a WMA additive. Do not use Reclaimed Asphalt Pavement (RAP), Ground Bituminous Shingle Material, Remediated Petroleum Contaminated Soil Aggregate, or Crushed Recycled Container Glass (CRCG). Use asphalt binder and aggregates that meet the following requirements:

1. Use polymer modified asphalt binder that is specially formulated for meeting the mix performance criteria in this specification. Consult with the asphalt binder supplier to obtain the appropriate material for the specific

mix design. Submit a certificate of analysis (COA) showing the PG continuous grading (AASHTO R 29) for the asphalt binder used in the mix design.

For quality assurance testing of the asphalt binder, the ME may sample the asphalt binder during production of the mix and compare the results with the COA submitted at the time of test strip. To analyze the binder the ME will test the binder at the nearest standard PG temperature then compare the results with the COA. If the high (G*/ sin δ) and low (stiffness and m value) temperature passing test results are within 5 percent of the results from the passing temperature on the COA, then the ME will consider the asphalt binder comparable to the binder used during test strip.

2. WMA additives may be used in the mix and must conform to 902.01.05. If a WMA additive is pre-blended in the asphalt binder or added at the HMA plant, ensure that the mix meets the mix performance criteria in this specification and will not be negatively impacted by the WMA additive. Follow the manufacturer's recommendations for percentage of WMA additive needed. Controlled asphalt foaming system WMA is prohibited for use in this mixture.
3. Use coarse aggregate that is gneiss, granite, quartzite, or trap rock and conforms to 901.05.01.
4. For fine aggregate, use 100 percent stone sand conforming to 901.05.02 and having an uncompacted void content of at least 45 percent when tested according to AASHTO T 304, Method A. In addition, the minimum sand equivalent is 45 percent when tested according to AASHTO T 176.
5. If necessary, use mineral filler as specified in 901.05.03.

902.08.02 Mix Design
THE ENTIRE TEXT IS CHANGED TO:

At least 45 days before initial production, submit a job mix formula for the HPTO on forms supplied by the Department. Include a statement naming the source of each component and a report showing the results meet the criteria specified in Tables 902.08.02-1 and 902.08.02-2.

For the job mix formula for the HPTO mixture, establish the percentage of dry weight of aggregate passing each required sieve size and an optimum percentage of asphalt binder based upon the weight of the total mix. Determine the optimum percentage of asphalt binder according to AASHTO R 35 and M 323 with an Ndes of 50 gyrations. Before maximum specific gravity testing or compaction of specimens, condition the mix for 2 hours according to the requirements for conditioning for volumetric mix design in AASHTO R 30, Section 7.1. If the absorption of the combined aggregate is more than 1.5 percent according to AASHTO T 84 and T 85, condition the mix for 4 hours according to AASHTO R 30, Section 7.2 prior to compaction of specimens (AASHTO T 312) and determination of maximum specific gravity (AASHTO T 209). Ensure that the job mix formula is within the master range specified in, Table 902.08.02-1.

Table 902.08.02-1 JMF Requirements for HPTO

Sieve Sizes	Percent Passing1	Production Control Tolerances2
3/8"	100	±0.0%
No. 4	65-85	±4.0%
No. 8	33-55	±4.0%
No. 16	20-35	±3.0%
No. 30	15-30	±3.0%
No. 50	10-20	±2.0%
No. 100	5-15	±2.0%
No. 200	5.0-8.0	±1.0%
Asphalt Binder Content (Ignition Oven)[3]	7.4 % minimum	±0.30%

1. Aggregate percent passing to be determined based on dry aggregate weight.
2. Production tolerances are for the approved JMF and may not fall outside of the wide band gradation limits.
3. The asphalt binder content may not be lower than the minimum after the production tolerance is applied.

Design the HPTO to meet the requirements in Table 902.08.02-2.

Table 902.08.02-2 Volumetric Requirements for Design and Control of HPTO

	Required Density (% of Max. Sp. Gr.)		Voids in Mineral Aggregate	Dust to Binder Ratio	Draindown AASHTO T 305
	N_{des} (50 gyrations)	N_{max} (100 gyrations)	(VMA)		
Design Requirements	96.5	≤ 99.0	≥ 18.0 %	0.6 - 1.2	≤ 0.1 %
Control Requirements	95.5 - 97.5	≤ 99.0	≥ 18.0 %	0.6 – 1.3	≤ 0.1 %

Ensure that the job mix formula provides a mixture that meets a minimum tensile strength ratio (TSR) of 85 percent when prepared according to AASHTO T 312 and tested according to AASHTO T 283 with the following exceptions:

1. Before compaction, condition the mixture for 2 hours according to AASHTO R 30 Section 7.1.
2. Compact specimens with 40 gyrations.
3. Extrude specimens as soon as possible without damaging.
4. Use AASHTO T 269 to determine void content.
5. Record the void content of the specimens.
6. If less than 55 percent saturation is achieved, the procedure does not need to be repeated, unless the difference in tensile strength between duplicate specimens is greater than 25 pounds per square inch.
7. If visual stripping is detected, modify or readjust the mix.

For each mix design, submit 3 gyratory specimens and one loose sample corresponding to the composition of the job mix formula, including the design asphalt content. The ME will use these samples for verification of the properties of the job mix formula. Compact the specimens to the design number of gyrations (Ndes). To be acceptable all three gyratory specimens must comply with the gradation and asphalt content requirements in Table 902.08.02-1 and with the control requirements in Table 902.08.02-2. The ME reserves the right to be present at the time of molding the gyratory specimens.

In addition, submit 11 gyratory specimens and two 5 gallon buckets of loose mix to the ME. The ME will use these additional gyratory samples for performance testing of the HPTO mix. The ME reserves the right to be present at the time of molding the gyratory specimens. Ensure that the additional gyratory specimens are compacted according to AASHTO T 312. Compact 6 of the specimens to 77 millimeters in height and an air void content of 5.0 ± 0.5 percent. The ME will test the six 77 millimeter specimens using an Asphalt Pavement Analyzer (APA) according to AASHTO T 340 at 64 °C, 100 pound per square inch hose pressure, and 100 pound wheel load. Compact the other 5 specimens to 115 millimeter in height. These 5 specimens will be cut, from the middle of each 115 millimeter in height specimen, to 38 millimeter in height test specimens. The air void content of the 5 cut specimen will be determined to ensure compliance with the target air void content of 5.0 ± 0.5 percent. The ME will use the five 38 millieter in height specimens to test using an Overlay Tester (NJDOT B-10) at 25 °C and a joint opening of 0.025 inch. The ME will eliminate the high and low Overlay test results then average and report the middle 3 test results. The ME will ensure that all submitted specimens are within the target air void content as tested at the Material's Central Lab. The ME will not accept specimens lower than the target air void content, but may accept and test specimens higher than the target air void content.

The ME will approve the JMF if the average rut depth for the 6 specimens in the Asphalt Pavement Analyzer testing is not more than 4 millimeter in 8,000 loading cycles and the average number of cycles to failure in the Overlay Tester is not less than 600. If the JMF does not meet the APA and Overlay Tester criteria, redesign the HPTO mix and submit for retesting. The JMF for the HPTO mixture is in effect until modification is approved by the ME. If required, the ME may use the 5 gallon buckets of the loose HPTO mix to compact additional gyratory specimens for performance testing and the performance test results may be used for approval of the JMF.

When unsatisfactory results for any specified characteristic of the work make it necessary, the Contractor may establish a new JMF for approval. In such instances, if corrective action is not taken, the ME may require an appropriate adjustment to the JMF.

Should a change in sources or changes in the properties of materials occur, the ME will require that a new JMF be established and approved before production can continue.

The ME may verify a mix on an annual basis rather than on a project-to-project basis if the properties and proportions of the materials do not change. If written verification is submitted by the HMA supplier that the same source and character of materials are to be used, the ME may waive the requirement for the design and verification of previously approved mixes.

902.08.03 Sampling and Testing
THE ENTIRE TEXT IS CHANGED TO:

A. General Acceptance Requirements. The RE or ME may reject and require disposal of any batch or shipment that is rendered unfit for its intended use due to contamination, segregation, improper temperature, lumps of cold material, or incomplete coating of the aggregate. For other than improper temperature, visual inspection of the material by the RE or ME is considered sufficient grounds for such rejection.

Ensure that the temperature of the HPTO at discharge from the plant or surge and storage bins is maintained between 300 and 330 °F. For mixes produced using a WMA additive or process, ensure that the temperature of the mixture at discharge from the plant or surge and storage bins is at least 10 °F above the WMA manufacturer's recommended laydown temperature.

Combine and mix the aggregates and asphalt binder to ensure that at least 95 percent of the coarse aggregate particles are entirely coated with asphalt binder as determined according to AASHTO T 195. If the ME determines that there is an on-going problem with coating, the ME may obtain random samples from 5 trucks and will determine the adequacy of the mixing on the average of particle counts made on these 5 test portions. If the requirement for 95 percent coating is not met on each sample, modify plant operations, as necessary, to obtain the required degree of coating.

B. Sampling. The ME will take a sample of HPTO for volumetric acceptance testing from each 700 tons of a mix. The ME will perform sampling according to AASHTO T 168, NJDOT B-2, or ASTM D 3665. During production at the plant, a sample of asphalt binder will be taken once every 3500 tons or as directed by the ME.

C. Quality Control Testing. The HMA producer is required to provide a quality control (QC) technician who is certified by the Society of Asphalt Technologists of New Jersey as an Asphalt Technologist, Level 2. The QC technician may substitute equivalent technician certification by the Mid-Atlantic Region Technician Certification Program (MARTCP). Ensure that the QC technician is present during periods of mix production for the sole purpose of quality control testing and to assist the ME. The ME will not perform the quality control testing or other routine test functions in the absence of, or instead of, the QC technician.

The QC technician is required to perform sampling and testing according to the approved quality control plan, to keep the mix within the limits specified for the HPTO mix being produced. The QC technician may use acceptance test results or perform additional testing as necessary to control the mix.

To determine the composition, perform ignition oven testing according to AASHTO T 308. For each acceptance test, perform maximum specific gravity testing according to AASHTO T 209 on a test portion of the sample taken by the ME. Sample and test coarse aggregate, fine aggregate, mineral filler, and asphalt binder according to the approved quality control plan for the plant.

D. Acceptance Testing and Requirements. The ME will determine volumetric properties at N_{des} for acceptance from samples taken, compacted, and tested at the HMA plant. The ME will compact HPTO to 50 gyrations, using equipment according to AASHTO T 312. The ME will determine bulk specific gravity of the compacted sample according to AASHTO T 166. The ME will use the most current QC maximum specific gravity test result in calculating the volumetric properties of the HPTO.

The ME will determine the dust-to-binder ratio from the composition results as tested by the QC technician.

Ensure that the HMA mixture conforms to the requirements specified in Table 902.08.02-2, and to the gradation requirements in Table 902.08.02-1. If 2 samples in 5 consecutive samples fail to conform to the gradation or volumetric requirements, immediately initiate corrective action.

The ME will test a minimum of 1 sample per 3500 tons for moisture, basing moisture determinations on the weight loss of an approximately 1600 gram sample of mixture heated for 1 hour in an oven at 280 ± 5 °F. Ensure that the moisture content of the mixture at discharge from the plant does not exceed 1.0 percent.

E. Performance Testing. Provide 11 gyratory specimens that are compacted according to AASHTO T 312 and 2 boxes of loose mix. Compact 6 of the specimens to 77 millimeter in height and an air void content of 5.0 ± 0.5 percent. Compact the other 5 specimens to 115 millimeter in height. These 5 specimens will be cut, from the middle of each 115 millimeter in height specimen, to 38 millimeter in height test specimens. The air void content of the 5 cut test specimens will be determined to ensure compliance with the target air void content of 5.0 ± 0.5 percent.

The ME will use the boxes of loose mix to determine the maximum specific gravity of the mix according to AASHTO T 209. The ME will use the gyratory samples for performance testing of the HPTO mix. The ME will test six 77 millimeter in height specimens using an Asphalt Pavement Analyzer (APA) according to AASHTO T 340 at 64 °C, 100 pound per square inch hose pressure, and 100 pound wheel load. The ME will use the five 38 millimeter in height specimens to test using an Overlay Tester (NJDOT B-10) at 25 °C and a joint opening of 0.025 inch. The ME will eliminate the high and low Overlay test result then average and report the middle 3 test results. The ME will ensure that all submitted specimens are within the target air void content as tested at the Material's Central Lab. The ME will not accept specimens lower than the target air void content, but may accept and test specimens higher than the target air void content.

Ensure that the first sample is taken during the construction of the test strip as specified in 406.03.01.C. Thereafter, sample every lot or as directed by the ME. If the test strip is done within the project limits and the performance testing results are acceptable to the ME, the results will be included into the first lot. A lot is defined as material placed on the traveled way within the project limits.

If a sample does not meet the criteria for performance testing as specified in Table 902.08.03-1, the Department will assess a pay adjustment as specified. The Department will calculate the pay adjustment by multiplying the percent pay adjustment (PPA) by the quantity in the lot and the bid price for the HPTO item. If APA rutting is greater than 12 millimenters or Overlay cycles is less than 400 or both, the Department will assess the maximum pay adjustment of PPA = -100 percent or may require removal and replacement. PPA for both APA and Overlay are cumulative and may not exceed -100 percent in total. If samples received are lower than the target air void range, 5.0 ± 0.5 percent, the Department will consider the samples un-testable and assess a PPA of -100 percent or may require removal and replacement of the lot. If the Department requires removal and replacement, then the replacement work is subject to the same requirements as the initial work.

Table 902.08.03-1 Performance Testing Pay Adjustments for HPTO

Test	Requirement	Test Result	PPA
APA @ 8,000 loading cycles, mm (AASHTO T 340)	5.0 maximum	$t \leq 5.0$ $5.0 < t \leq 12.0$ $t > 12.0$	0 -50(t-5)/7 -100 or Remove & Replace
Overlay Tester, cycles (NJDOT B-10)	600 minimum	$t \geq 600$ $600 > t \geq 400$ $t < 400$	0 -(600-t)/4 -100 or Remove & Replace

THE FOLLOWING SUBSECTIONS ARE ADDED

902.09 MICRO SURFACING

902.09.01 Composition of the Mixture

Ensure that the micro surfacing mixture components conform to the following:

1. **Micro Surfacing Emulsion.** Use polymer modified emulsified asphalt. Ensure that the emulsified asphalt and emulsified asphalt residue is a quick set polymer modified asphalt emulsion conforming to the requirements of AASHTO M 208 for a CQS-1h emulsion and the following:

    a. Use a minimum of 3 percent polymer material, by weight of asphalt.

    b. Ensure that the polymer material is milled or blended into the asphalt prior to the emulsification process by an emulsion manufacturer approved by the ME.

    c. Ensure that the polymer modifier and any additives enable the micro surfacing material to receive

normal traffic within one hour without causing damage to the surface. The cement mixing test is waived for this emulsion. .

d. Ensure that the emulsified asphalt and the emulsified asphalt residue meet all of the quality test criteria in section 4.1.2 of the International Slurry Surfacing Association (ISSA) "Recommended Performance Guideline for Micro Surfacing"; A 143

2. **Aggregate.** Use only manufactured stone sand and crushed stone that conform to 901.05. Ensure that the fine aggregate has a Sand Equivalent value of 65 percent minimum when tested according to AASHTO T 176.

3. **Mineral Filler.** Use mineral filler that conforms to ASTM D 242 and is free of lumps.

4. **Water.** Use water that conforms to 919.08.

5. **Other Additives.** The Contractor may use other additives to provide control of the break/set time in the field. Ensure that the type of additive is specified in the mix design.

902.09.02 Mix Design of Micro Surfacing Mixture

A. Mix Design Requirements. Ensure that an AASHTO accredited lab, with at least five successfully completed micro surfacing projects greater than 5,000 square yards each, performs the mix design. Submit the mix design and certified test results of the micro surfacing mixture for approval in accordance with the provisions of ASTM D 6372, Standard Practice for Design, Testing, and Construction of Micro Surfacing and the following:

1. Ensure that the aggregate used in the job mix formula is from the same source and representative of the material proposed for use on the project.
2. Ensure that the compatibility of the aggregate, micro surfacing emulsion, water, mineral filler, and other additives is evaluated in the mix design. Perform the mix design using materials consistent with those supplied by the contractor for the project. Ensure the micro surfacing mix conforms to the requirements as specified in Table 902.09.02-1.

902.09.02-1 Micro Surfacing Mixture Requirements

Tests	ISSA Test Method	Specification
Mix Time @ 77 °F Mix Time @ 100 °F	TB 113	Controllable to 120 seconds minimum Controllable to 35 seconds minimum
Wet Cohesion @ 30 minutes minimum (set) @ 60 minutes minimum (traffic)	TB 139	 12 kg-cm minimum 20 kg-cm or near spin minimum
Wet Stripping	TB 114	90 % minimum
Wet-Track Abrasion Loss One-hour soak Six-day soak	TB 100	 50 g/ft^2 (538 g/m^2) maximum 75 g/ft^2 (807 g/m^2) maximum
Lateral Displacement	TB 147	5% maximum
Specific Gravity after 1,000 cycles of 125 pounds (56.71 kg)	TB 147	2.10 maximum
Excess Asphalt by LWT Sand Adhesion	TB 109	50 g/ft^2 (538 g/m^2) maximum
Classification Compatibility	TB 144	11 grade points minimum (AAA, BAA)

3. Ensure proportioning of the mix design is within the limits in Table 902.09.02-2:

Table 902.09.02-2 Mix Design Proportion Requirements

Component Materials	Limits
Residual asphalt	5.5 to 11.5% by dry weight of aggregates
Mineral filler	0.0 to 3% by dry weight of aggregates
Polymer-based modifier	min. of 3% polymer solids based on bitumen weight content
Additives	as needed
Water	as required to ensure proper mix consistency

4. Ensure that the proportions of aggregate and mineral filler are provided and within the limits of Table 902.09.03-1.

B. Mix Design Report. Submit the final mix design in the following format:

1. Source of each individual material.
2. Aggregate:
   a. Gradation
   b. Sand Equivalent
   c. Abrasion Resistance
   d. Soundness
3. Field Simulation Tests:
   a. Wet Stripping Test
   b. Wet Track Abrasion Loss
   c. Classification Compatibility
   d. Trial Mix Time @ 77 °F and 100 °F
4. Interpretation of Results and the Determination of a Job Mix Formula (JMF):
   a. Percentage of Mineral Filler (minimum and maximum)
   b. Percentage of Water, including aggregate moisture (minimum and maximum)
   c. Percentage of Mix Set Additive (if required)
   d. Percentage of Modified Emulsion
   e. Residual Content of Modified Emulsion
   f. Percentage of Residual Asphalt
   g. Combined Aggregate Gradation (JMF)
5. Signature and date

902.09.03 Sampling and Testing

The ME will perform sampling and testing of the aggregate at least 10 days prior to the start of work. The ME will sample aggregate from stockpiles designated and constructed for each mixture type on the project. The ME will sample the aggregate according to AASHTO T 2 and test according to AASHTO T 11 and T 27 using the following sampling frequency:

1. When the project quantity for the specified mixture type is less than 500 tons, designate the entire quantity as one lot and divide into three equal sublots for sampling. Obtain one sample from each sublot and submit to the ME for testing. The ME will randomly select only one of the three samples and test for compliance with Table 902.09.03-1. If the sample tested meets the specification, the entire lot is acceptable for use on the project. If the sample fails, the ME will test the remaining two samples. If the two samples both meet specification, the entire lot is acceptable for use on the project. If either of the two additional samples fails to meet the specification, the entire lot is rejected.
2. When the project quantity for the specified mixture type is 500 tons or greater, divide the aggregate into equal lots at the discretion of the ME, but in no case is the lot size to exceed 1,000 tons. Divide each lot into three equal sublots and obtain one sample for each sublot. The ME will randomly select only one of the three samples and test for compliance with Table 902.09.03-1. If the sample tested meets the specification, the entire lot is acceptable for use on the project. If the sample fails, the ME will test the remaining two samples. If the two samples both meet specification, the entire lot is acceptable for use on the project. If either of the two additional samples fails to meet the specification, the entire lot is rejected.

Take precautions to ensure that approved stockpiles of aggregate do not become contaminated at the jobsite. Screen oversize aggregate or foreign materials from the aggregate prior to delivery to the mixer.

During the micro surfacing application, in the presence of the inspector, sample the mixture twice daily or as directed from the pug mill discharge chute. Use a rectangular non-absorptive container, such as a loaf pan, of sufficient size to obtain a sample from the entire cross section of the mixture being discharged. Ensure that an AASHTO accredited lab, with at least five successfully completed micro surfacing projects greater than 5,000 square yards each, analyzes the mix for binder content and compliance with specifications. Submit certified results to the ME. The ME may perform

independent testing.

Ensure that the asphalt content is within ± 0.40 percent of the JMF. If the asphalt content is outside of the allowable tolerance, recalibrate or adjust the mixing machine. The RE may stop the micro surfacing operation if two or more samples fail to conform to the tolerance. Take corrective action or re-design the micro surfacing mixture. Resume operations only after RE has approved the corrective action.

Use aggregate, including mineral filler, which conforms to the gradation in Table 902.09.03-1.

Table 902.09.03-1 Gradation Requirements for Aggregate and Mineral Filler

Sieve Size	Type II Percent Passing	Type III Percent Passing	Stockpile Tolerances from JMF
3/8″	100	100	-
No. 4	90-100	70-90	±4%
No. 8	65-90	45-70	±5%
No. 16	45-70	28-50	±4%
No. 30	30-50	19-34	±3%
No. 50	18-30	12-25	±3%
No. 100	10-21	7-18	±2%
No. 200	5-15	5-15	±2%

902.10 SLURRY SEAL

902.10.01 Composition of the Mixture

Ensure that the slurry seal mixture components conform to the following:

1. **Slurry Seal Emulsion.** Use polymer modified emulsified asphalt. Ensure that the emulsified asphalt and emulsified asphalt residue is a quick set polymer modified asphalt emulsion conforming to the requirements of AASHTO M 208 for a CQS-1h emulsion and the following:
    a. Use a minimum of 3 percent polymer material, by weight of asphalt.
    b. Ensure that the polymer material is milled or blended into the asphalt prior to the emulsification process by an emulsion manufacturer approved by the ME.
    c. Ensure that the polymer modifier and any additives enable the slurry seal material to receive normal traffic within one hour without causing damage to the surface.
    d. Ensure that the emulsified asphalt and the emulsified asphalt residue material conform to the requirements in table 902.10.01-1.

902.10.01-1 Emulsified Asphalt and Residue Requirements

Tests	Test Method	Specification
Tests on Emulsified Asphalt		
Storage Stability, 24 hours, percent	AASHTO T 59	1 % maximum
Residue by Distillation[1], percent	AASHTO T 59	62 % minimum
Tests on Asphalt Residue		
Softening Point by Ring and Ball	AASHTO T 53	135 °F minimum

1. Test temperature held at 350 °F for 20 minutes.

2. **Aggregate.** Use only manufactured stone sand and crushed stone that conform to 901.05. Ensure that the fine aggregate has a Sand Equivalent value of 45 percent minimum when tested according to AASHTO T 176.

3. **Mineral Filler.** Use mineral filler that conforms to ASTM D 242 and is free of lumps.

4. **Water.** Use water that conforms to 919.08.

5. **Other Additives.** The Contractor may use other additives to provide control of the break/set time in the field. Ensure that the type of additive is specified in the mix design.

902.10.02 Mix Design of Slurry Seal Mixture

A **Mix Design Requirements.** Ensure that an AASHTO accredited lab, with at least five successfully completed slurry seal projects greater than 5,000 square yards each, performs the mix design. Submit the mix design and certified test results of the slurry seal mixture for approval in accordance with the provisions of ASTM D 3910, Standard Practice for Design, Testing, and Construction of Slurry Seal and the following:

1. Ensure that the aggregate used in the job mix formula is from the same source and representative of the material proposed for use on the project.
2. Ensure that the compatibility of the aggregate, slurry seal emulsion, water, mineral filler, and other additives is evaluated in the mix design. Perform the mix design using materials consistent with those supplied by the contractor for the project. Ensure the slurry seal mix conforms to the requirements as specified in Table 902.10.02-1.

902.10.02-1 Slurry Seal Mixture Requirements

Tests	ISSA Test Method	Specification
Mix Time @ 77 °F Mix Time @ 100 °F	TB 113	Controllable to 120 seconds minimum Controllable to 35 seconds minimum
Slurry Seal Consistency	TB 106	0.79 to 1.18 inches
Wet Cohesion @ 30 minutes minimum (set) @ 60 minutes minimum (traffic)	TB 139	 12 kg-cm minimum 20 kg-cm or near spin minimum
Wet Stripping	TB 114	90 % minimum
Wet-Track Abrasion Loss One-hour soak Six-day soak	TB 100	 50 g/ft^2 (538 g/m^2) maximum 75 g/ft^2 (807 g/m^2) maximum
Lateral Displacement	TB 147	5% maximum
Specific Gravity after 1,000 cycles of 125 pounds (56.71 kg)	TB 147	2.10 maximum
Excess Asphalt by LWT Sand Adhesion	TB 109	50 g/ft^2 (538 g/m^2) maximum
Classification Compatibility	TB 144	11 grade points minimum (AAA, BAA)

3. Ensure proportioning of the mix design is within the limits in Table 902.10.02-2:

Table 902.10.02-2 Mix Design Proportion Requirements

Component Materials	Limits
Residual asphalt	7.5 to 13.5% by dry weight of aggregates
Mineral filler	0.0 to 3% by dry weight of aggregates
Polymer-based modifier	min. of 3% polymer solids based on bitumen weight content
Additives	as needed
Water	as required to ensure proper mix consistency

4. Ensure that the proportions of aggregate and mineral filler are provided and within the limits of Table 902.10.03-1.

B **Mix Design Report.** Submit the final mix design in the following format:

1. Source of each individual material.
2. Aggregate:
   a. Gradation
   b. Sand Equivalent
   c. Abrasion Resistance
   d. Soundness
3. Field Simulation Tests:
   a. Wet Stripping Test
   b. Wet Track Abrasion Loss
   c. Classification Compatibility
   d. Trial Mix Time @ 77 °F and 100 °F

4. Interpretation of Results and the Determination of a Job Mix Formula (JMF):

   a. Percentage of Mineral Filler (minimum and maximum)
   b. Percentage of Water, including aggregate moisture (minimum and maximum)
   c. Percentage of Mix Set Additive (if required)
   d. Percentage of Modified Emulsion
   e. Residual Content of Modified Emulsion
   f. Percentage of Residual Asphalt
   g. Combined Aggregate Gradation (JMF)

5. Signature and date

902.10.03 Sampling and Testing

The ME will perform sampling and testing of the aggregate at least 10 days prior to the start of work. The ME will sample aggregate from stockpiles designated and constructed for each mixture type on the project. The ME will sample the aggregate according to AASHTO T 2 and test according to AASHTO T 11 and T 27 using the following sampling frequency:

1. When the project quantity for the specified mixture type is less than 500 tons, designate the entire quantity as one lot and divide into three equal sublots for sampling. Obtain one sample from each sublot and submit to the ME for testing. The ME will randomly select only one of the three samples and test for compliance with Table 902.10.03-1. If the sample tested meets the specification, the entire lot is acceptable for use on the project. If the sample fails, the ME will test the remaining two samples. If the two samples both meet specification, the entire lot is acceptable for use on the project. If either of the two additional samples fails to meet the specification, the entire lot is rejected.
2. When the project quantity for the specified mixture type is 500 tons or greater, divide the aggregate into equal lots at the discretion of the ME, but in no case is the lot size to exceed 1,000 tons. Divide each lot into three equal sublots and obtain one sample for each sublot. The ME will randomly select only one of the three samples and test for compliance with Table 902.10.03-1. If the sample tested meets the specification, the entire lot is acceptable for use on the project. If the sample fails, the ME will test the remaining two samples. If the two samples both meet specification, the entire lot is acceptable for use on the project. If either of the two additional samples fails to meet the specification, the entire lot is rejected.

Take precautions to ensure that approved stockpiles of aggregate do not become contaminated at the jobsite. Screen oversize aggregate or foreign materials from the aggregate prior to delivery to the mixer.

During the slurry seal application, in the presence of the inspector, sample the mixture twice daily or as directed from the pug mill discharge chute. Use a rectangular non-absorptive container, such as a loaf pan, of sufficient size to obtain a sample from the entire cross section of the mixture being discharged. Ensure that an AASHTO accredited lab, with at least five successfully completed slurry seal projects greater than 5,000 square yards each, analyzes the mix for binder content and compliance with specifications. Submit certified results to the ME. To ensure mix compliance, the ME may perform independent testing.

Ensure that the asphalt content is within ± 0.40 percent of the JMF. If the asphalt content is outside of the allowable tolerance, recalibrate or adjust the mixing machine. The RE may stop the slurry seal operation if two or more samples fail to conform to the tolerance. Take corrective action or re-design the slurry seal mixture. Resume operations only after RE has approved the corrective action.

Use aggregate, including mineral filler, which conforms to the gradation in Table 902.10.03-1.

Table 902.10.03-1 Gradation Requirements for Aggregate and Mineral Filler

Sieve Size	Type I Percent Passing	Type II Percent Passing	Type III Percent Passing	Stockpile Tolerances from JMF
3/8″	100	100	100	-
No. 4	100	90-100	70-90	±5%
No. 8	90-100	65-90	45-70	±5%
No. 16	65-90	45-70	28-50	±5%
No. 30	40-65	30-50	19-34	±5%

No. 50	25-42	18-30	12-25	±3%
No. 100	15-30	10-21	7-18	±3%
No. 200	10-20	5-15	5-15	±2%

THE FOLLOWING SUBSECTION IS ADDED:

902.11 BINDER RICH INTERMEDIATE COURSE (BRIC)

902.11.01 Composition of Mixture.

Mix BRIC in a plant that is listed on the QPL and conforms to the requirements for HMA plants as specified in 1009.01. The composition of the BRIC mixture is coarse aggregate, fine aggregate, polymer modified asphalt binder, and may also include mineral filler, and crumb rubber. Do not add Reclaimed Asphalt Pavement (RAP), Crushed Recycled Container Glass (CRCG), Ground Bituminous Shingle Material (GBSM), or Remediated Petroleum Contaminated Soil Aggregate (RPCSA). Use asphalt binder and aggregates that meet the following requirements:

1. Use polymer modified asphalt binder that is specially formulated for meeting the mix performance criteria in this specification. Consult with the asphalt binder supplier to obtain the appropriate material for the specific mix design. Submit a certificate of analysis (COA) showing the PG continuous grading (AASHTO R 29) for the asphalt binder used in the mix design.

   For quality assurance testing of the asphalt binder, the ME may sample the asphalt binder during production of the mix and compare the results with the COA submitted at the time of test strip. To analyze the binder the ME will test the binder at the nearest standard PG temperature then compare the results with the COA. If the high ($G^*/ \sin \delta$) and low (stiffness and m value) temperature passing test results are within 5 percent of the results from the passing temperature on the COA, then the ME will consider the asphalt binder comparable to the binder used during test strip.

2. For coarse aggregate in BRIC, use crushed stone conforming to 901.05.01.

3. For fine aggregate, use stone sand conforming to 901.05.02. Ensure that the combined fine aggregate in the mixture conforms to the requirements for compaction level M as specified in Table 902.02.02-2.

4. Use mineral filler, if necessary, that conforms to 901.05.03.

902.11.02 Mix Design

At least 45 days before initial production, submit a job mix formula for the BRIC on forms supplied by the Department, to include a statement naming the source of each component and a report showing that the results meet the criteria specified in Tables 902.11.03-1 and 902.11.03-2.

The job mix formula for the BRIC mixture establishes the percentage of dry weight of aggregate passing each required sieve size and an optimum percentage of asphalt binder based upon the weight of the total mix. Determine the optimum percentage of asphalt binder according to AASHTO R 35 and M 323 with an Ndes of 50 gyrations. Before maximum specific gravity testing or compaction of specimens, condition the mix for 2 hours according to the requirements for conditioning for volumetric mix design in AASHTO R 30, Section 7.1. If the absorption of the combined aggregate is more than 1.5 percent according to AASHTO T 84 and T 85, ensure that the mix is short term conditioned for 4 hours according to AASHTO R 30, Section 7.2 prior to compaction of specimens (AASHTO T 312) and determination of maximum specific gravity (AASHTO T 209). Ensure that the job mix formula is within the master range specified in Table 902.11.03-1.

Ensure that the job mix formula provides a mixture that meets a minimum tensile strength ratio (TSR) of 85 percent when prepared according to AASTHO T 312 and tested according to AASHTO T 283 with the following exceptions:

1. Before compaction, condition the mixture for 2 hours according to AASHTO R 30 Section 7.1.
2. Compact specimens with 40 gyrations.
3. Extrude specimens as soon as possible without damaging.
4. Use AASHTO T 269 to determine void content.
5. Record the void content of the specimens.

6. If less than 55 percent saturation is achieved, the procedure does not need to be repeated, unless the difference in tensile strength between duplicate specimens is greater than 25 pounds per square inch.
7. Report any visual stripping in accordance with AASHTO T 283 Section 11, modify or readjust the mix if stripping is evident.

For each mix design, submit with the mix design forms 3 gyratory specimens and 1 loose sample corresponding to the composition of the JMF. The ME will use these to verify the properties of the JMF. Compact the specimens to the design number of gyrations (Ndes). For the mix design to be acceptable, all gyratory specimens must comply with the requirements specified in Tables 902.11.03-1 and 902.11.03-2. The ME reserves the right to be present at the time the gyratory specimens are molded.

In addition, submit 11 gyratory specimens and two 5 gallon buckets of loose mix to the ME. The ME will use these additional gyratory samples for performance testing of the BRIC mix. The ME reserves the right to be present at the time of molding the gyratory specimens. Ensure that the 6 gyratory specimens are compacted according to AASHTO T 312, are 77 millimeters high, and have an air void content of 3.5 ± 0.5 percent. The ME will test 6 specimens using an Asphalt Pavement Analyzer (APA) according to AASHTO T 340 at 64 °C, 100 pound per square inch hose pressure, and 100 pound wheel load. Compact the other 5 specimens to 115 millimemters in height. These 5 specimens will be cut, from the middle of each 115 millimeters in height specimen, to 38 millimeters in height test specimens. The air void content of the 5 cut specimen will be determined to ensure compliance with the target air void content of 3.5 ± 0.5 percent. The ME will use the five 38 millimeters in height specimens to test using an Overlay Tester (NJDOT B-10) at 25 °C and a joint opening of 0.025 inch. The ME will eliminate the high and low Overlay test results then average and report the middle 3 test results. The ME will ensure that all submitted specimens are within the target air void content as tested at the Material's Central Lab.

The ME will approve the JMF if the average rut depth for the 6 specimens in the asphalt pavement analyzer testing is not more than 6 mm in 8,000 loading cycles and the number of cycles to failure in the Overlay Tester is not less than 700. If the JMF does not meet the APA and Overlay Tester criteria, redesign the BRIC mix and submit for retesting. The JMF for the BRIC mixture is in effect until modification is approved by the ME.

When unsatisfactory results for any specified characteristic of the work make it necessary, the Contractor may establish a new JMF for approval. In such instances, if corrective action is not taken, the ME may require an appropriate adjustment to the JMF.

Should a change in sources be made or any changes in the properties of materials occur, the ME will require that a new JMF be established and approved before production can continue.

The ME may verify a mix on an annual basis rather than on a project-to-project basis if the properties and proportions of the materials do not change. If written verification is submitted by the HMA supplier that the same source and character of materials are to be used, the ME may waive the requirement for the design and verification of previously approved mixes.

902.11.03 Sampling and Testing

A. General Acceptance Requirements. The RE or ME may reject and require disposal of any batch or shipment that is rendered unfit for its intended use due to contamination, segregation, improper temperature, lumps of cold material, or incomplete coating of the aggregate. For other than improper temperature, visual inspection of the material by the RE or ME is considered sufficient grounds for such rejection.

For BRIC, ensure that the temperature of the mixture at discharge from the plant or surge and storage bins is at least 10 °F above the manufacturer's recommended laydown temperature. Do not allow the mixture temperature to exceed 330 °F at discharge from the plant.

Combine and mix the aggregates and asphalt binder to ensure that at least 95 percent of the coarse aggregate particles are entirely coated with asphalt binder as determined according to AASHTO T 195. If the ME determines that there is an on-going problem with coating, the ME may obtain random samples from 5 trucks and will determine the adequacy of the mixing on the average of particle counts made on these 5 test portions. If the requirement for 95 percent coating is not met on each sample, modify plant operations, as necessary, to obtain the required degree of coating.

B. Sampling. The ME will take a sample of BRIC for volumetric acceptance testing from each 700 tons. The ME will perform sampling according to AASHTO T 168, NJDOT B-2, or ASTM D 3665. During production at the plant, a sample of asphalt binder will be taken once every 3500 tons or as directed by the ME.

C. Quality Control Testing. The HMA producer shall provide a quality control (QC) technician who is certified by the Society of Asphalt Technologists of New Jersey as an Asphalt Technologist, Level 2. The QC technician may substitute equivalent technician certification by the Mid-Atlantic Region Technician Certification Program (MARTCP). Ensure that the QC technician is present during periods of mix production for the sole purpose of quality control testing and to assist the ME. The ME will not perform the quality control testing or other routine test functions in the absence of, or instead of, the QC technician.

The QC technician shall perform sampling and testing according to the approved quality control plan, to keep the mix within the limits specified in Tables 902.11.03-1, 902.11.03-2, and 902.11.03-4. The QC technician may use acceptance test results or perform additional testing as necessary to control the mix.

To determine the composition, perform ignition oven testing according to AASHTO T 308. For fully automated plants, the QC technician may determine composition using hot bin analysis according to NJDOT B-5. Use only one method for determining composition within a lot.

D. Acceptance Testing and Requirements. The ME will determine volumetric properties at N_{des} for acceptance from samples taken, compacted, and tested at the HMA plant. The ME will compact HMA to the number of design gyrations (N_{des}) of 50 gyrations, using equipment according to AASHTO T 312. The ME will determine bulk specific gravity of the compacted sample according to AASHTO T 166. The ME will use the most current QC maximum specific gravity test result in calculating the volumetric properties of the HMA.

The ME will determine the dust-to-binder ratio from the composition results as tested by the QC technician.

Ensure that the HMA mixture conforms to the requirements specified in Table 902.11.03-2 and to the gradation requirements in Table 902.11.03-1. If 2 samples in a lot fail to conform to the gradation or volumetric requirements, immediately initiate corrective action.

The ME will test a minimum of 1 sample per lot for moisture, basing moisture determinations on the weight loss of an approximately 1600 gram sample of mixture heated for 1 hour in an oven at 280 ± 5 °F. Ensure that the moisture content of the mixture at discharge from the plant does not exceed 1.0 percent.

E. Performance Testing. Provide 11 gyratory specimens and 2 box samples of loose mix to the ME. The ME will use these additional gyratory samples for performance testing of the BRIC mix. The ME reserves the right to be present at the time of molding the gyratory specimens. Ensure that the 6 gyratory specimens are compacted according to AASHTO T 312, are 77 millimeters high, and have an air void content of 3.5 ± 0.5 percent. The ME will test 6 specimens using an Asphalt Pavement Analyzer (APA) according to AASHTO T 340 at 64 ºC, 100 pound per square inch hose pressure, and 100 pound wheel load. Compact the other 5 specimens to 115 millimeters in height. These 5 specimens will be cut, from the middle of each 115 millimeters height specimen, to 38 millimeters in height test specimens. The air void content of the 5 cut specimen will be determined to ensure compliance with the target air void content of 3.5 ± 0.5 percent. The ME will use the five 38 millimeters in height specimens to test using an Overlay Tester (NJDOT B-10) at 25 °C and a joint opening of 0.025 inch. The ME will eliminate the high and low Overlay test results then average and report the middle 3 test results. The ME will use the boxes of loose mix to determine the maximum specific gravity of the mix according to AASHTO T 209. The ME will ensure that all submitted specimens are within the target air void content as tested at the Material's Central Lab.

Ensure that the first sample is taken during the construction of the test strip as specified in 409.03.01.C. Thereafter, sample every second lot or as directed by the ME. If a sample does not meet the design criteria for performance testing as specified in Table 902.11.03-4, the ME may stop production of BRIC until corrective action is taken. If the BRIC mix exceeds the APA criteria of 12 millimeters in 8,000 loading cycles, the RE may require removal and replacement of the lot of BRIC.

Table 902.11.03-1 JMF Requirements for BRIC

Sieve Sizes	Percent Passing[1]	Production Control Tolerances[2]

3/8"	100	±0%
No. 4	90-100	±2%
No. 8	55-90	±4%
No. 30	20-55	±4%
No. 200	4-10	±2%
Asphalt Binder Content (Ignition Oven)[3]	7.4 % minimum	±0.40%
Maximum Lift Thickness	1.5 inch	

1. Aggregate percent passing to be determined based on dry aggregate weight.
2. Production tolerances are for the approved JMF and may fall outside of the wide band gradation limits.
3. The asphalt binder content may not be lower than the minimum after the production tolerance is applied.

Table 902.11.03-2 Volumetric Requirements for Design and Control of BRIC

	Required Density (% of Max Sp. Gr.) @ Ndes (50 gyrations)	@ Nmax (100 gyrations)	Voids in Mineral Aggregate (VMA)	Dust to Binder Ratio	Draindown AASHTO T 305
Design Requirements	97.5	≤ 99.0	≥ 18.0 %	0.6 – 1.2	≤ 0.1 %
Control Requirements	96.5 – 98.5	≤ 99.0	≥ 18.0 %	0.6 – 1.3	≤ 0.1 %

Table 902.11.03-3 Mix Design Performance Testing Requirements for BRIC

Test	Requirement
Asphalt Pavement Analyzer (AASHTO T 340)	≤ 6 mm@ 8,000 loading cycles
Overlay Tester (NJDOT B-10)	≥700 cycles

Table 902.11.03-4 Production Performance Testing Requirements for BRIC

Test	Requirement
Asphalt Pavement Analyzer (AASHTO T 340)	≤ 7 mm@ 8,000 loading cycles
Overlay Tester (NJDOT B-10)	≥ 650 cycles

THE FOLLOWING SUBSECTIONS ARE ADDED:

902.12 ASPHALT RUBBER GAP GRADED COURSE

902.12.01 Composition of Mixture

Mix ARGG course in a plant listed on the QPL and conforming to the requirements for HMA plants specified in 1009.01. Ensure the HMA plant is equipped with asphalt-rubber binder blending equipment as specified in 1009.03.

Composition of mixture for ARGG surface course is coarse aggregate, fine aggregate and asphalt-rubber binder. Do not use RAP, CRCG, GBSM, or RPCSA in ARGG surface course.

Composition of mixture for ARGG intermediate course is coarse aggregate, fine aggregate and asphalt-rubber binder. ARGG intermediate course may contain up to 10 percent RAP.

Use aggregates that conform to 901.05. Use coarse aggregate that is crushed stone conforming to 901.05.01 and Table 902.12.01-1.

Table 902.12.01-1 Coarse Aggregate Properties for ARGG

Tests	Test Method	Maximum Percent
Percentage of wear, Los Angeles Abrasion Test	AASHTO T 96	30

Flat and Elongated, 5 to 1 (Material Retained on the No. 4 Sieve)	ASTM D 4791	5
Flat and Elongated, 3 to 1 (Material Retained on the No. 4 Sieve)	ASTM D 4791	20

Use fine aggregate that is manufactured stone sand and conforms to Table 902.02.02-2.

Use asphalt-rubber binder that conforms to 902.07.02.

902.12.02 Mix Design

At least 45 days before initial production, submit job mix formula(s) for each ARGG mixture performed by an AASHTO accredited lab with at least five successfully completed ARGG course projects greater than 5,000 tons each. Include a statement naming the source of each component and a report with the results for the criteria specified in Table 902.12.02-1 and 902.12.02-2. Include a report detailing the rotational viscosity of the asphalt-rubber binder at 60, 90, 135, 240, and 1440 minutes. Submit lab qualifications and references to the ME for approval prior to beginning work.

Design the mix to meet the criteria in Table 902.12.02-1 and Table 902.12.02-2. Prepare the JMF according to AASHTO R 46. Determine the JMF at 4 percent air voids and 75 gyrations of the Superpave gyratory compactor.

Table 902.12.02-1 JMF Master Ranges and Mixture Requirements ARGG Course

Mixture Designations (% Passing[1])		
Sieve Sizes	**ARGG Course**	**Production Control Tolerances[2]**
3/4"	100	±0%
1/2"	90-100	±2%
3/8"	83-87	±1%
No. 4	28-42	±3%
No. 8	14-22	±2%
No. 200	0-6	±2%
Coarse Aggregate Fraction	Portion retained on No. 4 Sieve	
Minimum Lift Thickness	1.5 inch	

1. Aggregate percent passing to be determined based on dry aggregate weight.
2. Production tolerances are for the approved JMF and may fall outside of the wide band gradation limits.

Table 902.12.02-2 ARGG Course Mixtures Volumetrics For Design and Plant Production

Property	Production Control Tolerances	Design Requirement
Air Voids	±1%	4%
Voids in Mineral Aggregate (VMA)	–	18.0% minimum
Voids in Coarse Aggregate of Mix(VCA_{mix})	–	Less than VCA_{dry}
Draindown @ production temperature	–	0.30% maximum
Asphalt Binder Content (Ignition Oven)[1, 2]	±0.40%	7.6% minimum
Tensile Strength Ratio	–	80% minimum

1. Asphalt-rubber binder content to be determined based on total weight of mix.
2. The asphalt binder content may not be lower than the minimum after the production tolerance is applied.

902.12.03 Sampling and Testing

Perform quality control testing as specified in 902.02.04.C. Ensure that the mix meets the requirements as specified in 902.02.04.A, otherwise the RE or ME will reject the material. Ensure that the temperature of the mixture at discharge from the plant or surge and storage bins meets the WMA additive manufacturer's recommendations. Do not allow the mixture temperature to exceed 300 °F at discharge from the plant.

During production at the plant, the ME will take a sample from each 700 tons of production to verify composition and air voids. Conduct draindown, VCA_{mix}, VCA_{dry}, and VMA testing every 3500 Tons or as directed by the ME. Perform tests according to AASHTO R 46.

If the testing results are outside of the production control tolerances specified in Table 902.12.02-1 and Table 902.12.02-2 for an acceptance sample,immediately run a quality control sample. If the quality control sample is also outside of the control tolerances in Table 902.12.02-1, determine if a plant adjustment is needed and take corrective action to bring the mix into compliance. Take additional quality control samples after completing the corrective action to ensure that the mix is within tolerances. If 2 consecutive acceptance samples are outside the tolerances specified in Table 902.12.02-1 and Table 902.12.02-2, immediately stop production. Obtain ME approval of a plant correction plan before resuming production. Upon restarting production, do not transport mixture to the Project Limits before the results of a QC sample from the mixture indicate that the mixture meets JMF tolerances. The ME will reject mixture produced at initial restarting that does not meet tolerances.

The ME will perform sampling according to NJDOT B-2 or ASTM D 3665, and will perform testing for composition according to AASHTO T 308, or NJDOT B-5. The ME will determine bulk specific gravity of the compacted sample according to AASHTO T 166. The ME will use the most current QC maximum specific gravity test result, obtained according to AASHTO T 209, in calculating the volumetric properties of the ARGG. Perform testing for draindown according to AASHTO T 305. During production at the plant, the ME will take a sample of the asphalt binder once every 3500 tons or as directed by the ME.

902.13 HOT MIX ASPHALT HIGH RAP

902.13.01 Mix Designations

The requirements for specific HMA mixtures with required minimum amounts of RAP are identified by the abbreviated fields in the Item description as defined as follows:

HOT MIX ASPHALT 12.5ME SURFACE COURSE HIGH RAP

1. **"HOT MIX ASPHALT"** "Hot Mix Asphalt" is located in the first field in the Item description for the purpose of identifying the mixture requirements.
2. **"12.5"** The second field in the Item description designates the nominal maximum size aggregate (in millimeters) for the job mix formula (sizes are 4.75, 9.5, 12.5, 19, 25, and 37.5 mm).
3. **"M"** The third field in the Item description designates the design compaction level for the job mix formula based on traffic forecasts as listed in Table 902.02.03-2 (levels are L=low and M=medium).
4. **"E"** The fourth field in the Item description designates the high temperature designation of the performance-graded binder. Options are "64" for PG 64-22 and "E" for PG 64E-22.
5. **"SURFACE COURSE"** The last field in the Item description designates the intended use and location within the pavement structure (options are surface, intermediate, or base course).
6. **"HIGH RAP"** This additional field designates that there will be a minimum percentage of RAP required for the mixture in 902.13.02.

902.13.02 Composition of Mixture

Provide materials as specified:

Aggregates for Hot Mix Asphalt 901.05

Use a virgin asphalt binder that will result in a mix that meets the performance requirements specified in Table 902.13.03-2. Ensure that the virgin asphalt binder meets the requirements of 902.01.01 except the performance grade. Use a performance grade of asphalt binder as determined by the mix design and mix performance testing. Submit a certificate of analysis (COA) showing the PG continuous grading (AASHTO R 29) for the asphalt binder used in the mix design.

For quality assurance testing of the asphalt binder, the ME may sample the asphalt binder during production of the mix and compare the results with the COA submitted during test strip approval. To analyze the binder the ME will test the

binder at the nearest standard PG temperature then compare the results with the COA. If the high (G*/ sin δ) and low (stiffness and m value) temperature passing test results are within 5 percent of the results from the passing temperature on the COA, then the ME will consider the asphalt binder comparable to the binder used during the test strip.

Mix HMA HIGH RAP in a plant that is listed on the QPL for HMA Plants and conforms to the requirements for HMA Plants as specified in 1009.01.

Composition of the mixture for HMA HIGH RAP surface course is coarse aggregate, fine aggregate, asphalt binder, and a minimum of 20 percent Reclaimed Asphalt Pavement (RAP), and may also include mineral filler, asphalt rejuvenator and Warm Mix Asphalt (WMA) additives or processes as specified in 902.01.05. When WMA is used it must meet the requirements as specified in 902.10. Ensure that the finished mix does not contain more than a total of 1 percent by weight contamination from Crushed Recycled Container Glass (CRCG).

The composition of the mixture for HMA HIGH RAP base or intermediate course is coarse aggregate, fine aggregate, asphalt binder, and a minimum of 30 percent Reclaimed Asphalt Pavement (RAP), and may also include mineral filler, up to 10 percent of additional recycled materials, asphalt rejuvenator, and Warm Mix Asphalt (WMA) additives or processes as specified in 902.01.05. When WMA is used it must meet the requirements as specified in 902.10. The recycled materials may consist of a combination of RAP, CRCG, Ground Bituminous Shingle Material (GBSM), and RPCSA, with the following individual limits:

Table 902.13.02-1 Use of Recycled Materials in Base or Intermediate Course

Recycled Material	Minimum Percentage	Maximum Percentage
RAP	30	
CRCG		10
GBSM		5
RPCSA		20

Combine the aggregates to ensure that the resulting mixture meets the grading requirements specified in Table 902.02.03-1. In determining the percentage of aggregates of the various sizes necessary to meet gradation requirements, exclude the asphalt binder.

Ensure that the combined coarse aggregate, when tested according to ASTM D 4791, has less than 10 percent flat and elongated pieces retained on the No. 4 sieve and larger. Measure aggregate using the ratio of 5:1, comparing the length (longest dimension) to the thickness (smallest dimension) of the aggregate particles.

Ensure that the combined fine aggregate in the mixture conforms to the requirements specified in Table 902.02.02-2. Ensure that the material passing the No. 40 sieve is non-plastic when tested according to AASHTO T 90.

902.13.03 Mix Design

At least 45 days before initial production, submit a job mix formula for the HMA HIGH RAP on forms supplied by the Department, to include a statement naming the source of each component and a report showing that the results meet the criteria specified in Tables 902.02.03-1 and 902.13.03-1.

Include in the mix design the following based on the weight of the total mixture:

1. Percentage of RAP or GBSM.
2. Percentage of asphalt binder in the RAP or GBSM.
3. Percentage of new asphalt binder.
4. Total percentage of asphalt binder.
5. Percentage of each type of virgin aggregate.

Table 902.13.03-1 HMA HIGH RAP Requirements for Design

Compaction Levels	Required Density (% of Theoretical Max. Specific Gravity)		Voids in Mineral Aggregate (VMA)[2], % (minimum)					Voids Filled With Asphalt (VFA) %	Dust-to-Binder Ratio
			Nominal Max. Aggregate Size, mm						
	@N_{des}[1]	@N_{max}	25.0	19.0	12.5	9.5	4.75		
L	96.0	≤ 98.0	13.0	14.0	15.0	16.0	17.0	70 - 85	0.6 - 1.2

M	96.0	≤ 98.0	13.0	14.0	15.0	16.0	17.0	65 - 85	0.6 - 1.2

1. As determined from the values for the maximum specific gravity of the mix and the bulk specific gravity of the compacted mixture. Maximum specific gravity of the mix is determined according to AASHTO T 209. Bulk specific gravity of the compacted mixture is determined according to AASHTO T 166. For verification, specimens must be between 95.0 and 97.0 percent of maximum specific gravity at N_{des}.
2. For calculation of VMA, use bulk specific gravity of the combined aggregate include aggregate extracted from the RAP.

The job mix formula for the HMA HIGH RAP mixture establishes the percentage of dry weight of aggregate, including the aggregate from the RAP, passing each required sieve size and an optimum percentage of asphalt binder based upon the weight of the total mix. Determine the optimum percentage of asphalt binder according to AASHTO R 35 and M 323 with an N_{des} as required in Table 902.02.03-2. Before maximum specific gravity testing or compaction of specimens, condition the mix for 2 hours according to the requirements for conditioning for volumetric mix design in AASHTO R 30, Section 7.1. If the absorption of the combined aggregate is more than 1.5 percent according to AASHTO T 84 and T 85, ensure that the mix is short term conditioned for 4 hours according to AASHTO R 30, Section 7.2 prior to compaction of specimens (AASHTO T 312) and determination of maximum specific gravity (AASHTO T 209). Ensure that the job mix formula is within the master range specified in Table 902.02.03-1.

Ensure that the job mix formula provides a mixture that meets a minimum tensile strength ratio (TSR) of 80 percent when prepared according to AASHTO T 312 and tested according to AASHTO T 283. Submit the TSR results with the mix design.

Determine the correction factor of the mix including the RAP by using extracted aggregate from the RAP in the proposed proportions when testing is done to determine the correction factor as specified in AASHTO T 308. Use extracted aggregate from the RAP in determining the bulk specific gravity of the aggregate blend for the mix design.

For each mix design, submit with the mix design forms 3 gyratory specimens and 1 loose sample corresponding to the composition of the JMF. Ensure that the samples include the percentage of RAP that is being proposed for the mix. The ME will use these to verify the properties of the JMF. Compact the specimens to the design number of gyrations (N_{des}). For the mix design to be acceptable, all gyratory specimens must comply with the requirements specified in Tables 902.02.03-1 and 902.13.03-1. The ME reserves the right to be present at the time the gyratory specimens are molded.

In addition, submit 11 gyratory specimens and two 5 gallon buckets of loose mix to the ME. The ME will use these additional gyratory samples for performance testing of the HMA HIGH RAP mix. The ME reserves the right to be present at the time of molding the gyratory specimens. Ensure that the additional gyratory specimens are compacted according to AASHTO T 312. Compact 6 of the specimens to 77 millimeter height, and have an air void content of 6.5 ± 0.5 percent. The ME will test 6 specimens using an Asphalt Pavement Analyzer (APA) according to AASHTO T 340 at 64 ºC, 100 pound per square inch hose pressure, and 100 pound wheel load. Compact the other 5 specimens to 115 mm height. These 5 specimens will be cut, from the middle of each 115 millimeter height specimen, to 38 millimeter height test specimens. The air void content of the 5 cut specimen will be determined to ensure compliance with the target air void content of 6.5 ± 0.5 percent. The ME will use the five 38 millimeter height specimens to test using an Overlay Tester (NJDOT B-10) at 25 °C and a joint opening of 0.025 inch. The ME will eliminate the high and low Overlay test results then average and report the middle 3 test results. The ME will ensure that all submitted specimens are within the target air void content as tested at the Material's Central Lab.

The ME will approve the JMF if the results meet the criteria in Table 902.13.03-2.

Table 902.13.03-2 Performance Testing Requirements for HMA HIGH RAP Design

Test	Requirement			
	Surface Course		Intermediate and Base Course	
	PG 64-22	PG 64E-22	PG 64-22	PG 64E-22
APA @ 8,000 loading cycles (AASHTO T 340)	≤ 7 mm	≤ 4 mm	≤ 7 mm	≤ 4 mm
Overlay Tester (NJDOT B-10)	≥ 200 cycles	≥ 275 cycles	≥ 100 cycles	≥ 150 cycles

If the JMF does not meet the APA and Overlay Tester criteria, redesign the HMA HIGH RAP mix and submit for retesting. The JMF for the HMA HIGH RAP mixture is in effect until modification is approved by the ME.

When unsatisfactory results for any specified characteristic of the work make it necessary, the Contractor may establish a new JMF for approval. In such instances, if corrective action is not taken, the ME may require an appropriate adjustment to the JMF.

Should a change in sources be made or any changes in the properties of materials occur, the ME will require that a new JMF be established and approved before production can continue.

902.13.04 Sampling and Testing

A. General Acceptance Requirements. The RE or ME may reject and require disposal of any batch or shipment that is rendered unfit for its intended use due to contamination, segregation, improper temperature, lumps of cold material, or incomplete coating of the aggregate. For other than improper temperature, visual inspection of the material by the RE or ME is considered sufficient grounds for such rejection.

Ensure that the temperature of the mix at discharge from the plant or storage silo meets the recommendation of the supplier of the asphalt binder, supplier of the asphalt modifier and WMA manufacturer. For HMA, do not allow the mixture temperature to exceed 330 °F at discharge from the plant. For WMA, do not allow the mixture temperature to exceed 300 °F at discharge from the plant.

Combine and mix the aggregates and asphalt binder to ensure that at least 95 percent of the coarse aggregate particles are entirely coated with asphalt binder as determined according to AASHTO T 195. If the ME determines that there is an on-going problem with coating, the ME may obtain random samples from 5 trucks and will determine the adequacy of the mixing on the average of particle counts made on these 5 test portions. If the requirement for 95 percent coating is not met on each sample, modify plant operations, as necessary, to obtain the required degree of coating.

B. Sampling. The ME will take 5 stratified random samples of HMA HIGH RAP for volumetric acceptance testing from each lot of approximately 3500 tons of a mix. When a lot of HMA HIGH RAP is less than 3500 tons, the ME will take samples at random for each mix at the rate of one sample for each 700 tons. The ME will perform sampling according to AASHTO T 168, NJDOT B-2, or ASTM D 3665. During production at the plant, a sample of asphalt binder will be taken once every 3500 tons or as directed by the ME.

Use a portion of the samples taken for volumetric acceptance testing for composition testing.

C. Quality Control Testing. The HMA HIGH RAP producer shall provide a quality control (QC) technician who is certified by the Society of Asphalt Technologists of New Jersey as an Asphalt Technologist, Level 2. The QC technician may substitute equivalent technician certification by the Mid-Atlantic Region Technician Certification Program (MARTCP). Ensure that the QC technician is present during periods of mix production for the sole purpose of quality control testing and to assist the ME. The ME will not perform the quality control testing or other routine test functions in the absence of, or instead of, the QC technician.

The QC technician shall perform sampling and testing according to the approved quality control plan, to keep the mix within the limits specified for the mix being produced. The QC technician may use acceptance test results or perform additional testing as necessary to control the mix.

To determine the composition, perform ignition oven testing according to AASHTO T 308.

For each acceptance test, perform maximum specific gravity testing according to AASHTO T 209 on a test portion of the sample taken by the ME. Sample and test coarse aggregate, fine aggregate, mineral filler, and RAP according to the approved quality control plan for the plant.

Ensure that the supplier has in operation an ongoing daily quality control program to evaluate the RAP. As a minimum, this program shall consist of the following:

1. An evaluation performed to ensure that the material conforms to 901.05.04 and compares favorably with the design submittal.
2. An evaluation of the RAP material performed using a solvent or an ignition oven to qualitatively evaluate the aggregate components to determine conformance to 901.05.
3. Quality control reports as directed by the ME.

D. Acceptance Testing and Requirements. The ME will determine volumetric properties at N_{des} for acceptance from samples taken, compacted, and tested at the HMA plant. The ME will compact HMA HIGH RAP to the number of design gyrations (N_{des}) specified in Table 902.02.03-2, using equipment according to AASHTO T 312. The ME will determine bulk specific gravity of the compacted sample according to AASHTO T 166. The ME will use the most current QC maximum specific gravity test result in calculating the volumetric properties of the HMA HIGH RAP.

The ME will determine the dust-to-binder ratio from the composition results as tested by the QC technician.

Ensure that the HMA HIGH RAP mixture conforms to the requirements specified in Table 902.13.04-1, and to the gradation requirements in Table 902.02.03-1. If 2 samples in a lot fail to conform to the gradation or volumetric requirements, immediately initiate corrective action.

The ME will test a minimum of 1 sample per lot for moisture, basing moisture determinations on the weight loss of an approximately 1600 gram sample of mixture heated for 1 hour in an oven at 280 ± 5 °F. Ensure that the moisture content of the mixture at discharge from the plant does not exceed 1.0 percent.

Table 902.13.04-1 HMA HIGH RAP Requirements for Control

Compaction Levels	Required Density (% of Theoretical Max. Specific Gravity)	Voids in Mineral Aggregate (VMA), % (minimum)					Dust-to-Binder Ratio
		Nominal Max. Aggregate Size, mm					
	@Ndes[1]	25.0	19.0	12.5	9.5	4.75	
L, M	95.0 – 98.5	13.0	14.0	15.0	16.0	17.0	0.6 - 1.3

1. As determined from the values for the maximum specific gravity of the mix and the bulk specific gravity of the compacted mixture. Maximum specific gravity of the mix is determined according to AASHTO T 209. Bulk specific gravity of the compacted mixture is determined according to AASHTO T 166.

E. Performance Testing for HMA HIGH RAP. Provide 11 gyratory specimens that are compacted according to AASHTO T 312 and 2 boxes of loose mix. Compact 6 of the specimens to 77 millimeter height and an air void content of 6.5 ± 0.5 percent. Compact the other 5 specimens to 115 millimeter height. These 5 specimens will be cut, from the middle of each 115 millimeter height specimen, to 38 millimeter height test specimens. The air void content of the 5 cut test specimens will be determined to ensure compliance with the target air void content of 6.5 ± 0.5 percent.

The ME will use the boxes of loose mix to determine the maximum specific gravity of the mix according to AASHTO T 209. The ME will use the gyratory samples for performance testing of the HMA HIGH RAP mix. The ME will test six 77 millimeter height specimens using an Asphalt Pavement Analyzer (APA) according to AASHTO T 340 at 64 °C, 100 pound per square inch hose pressure, and 100 pound wheel load. The ME will use the five 38 millimeter height specimens to test using an Overlay Tester (NJDOT B-10) at 25 °C and a joint opening of 0.025 inch. The ME will eliminate the high and low Overlay test result then average and report the middle 3 test results. The ME will ensure that all submitted specimens are within the target air void content as tested at the Material's Central Lab.

Ensure that the first sample is taken during the construction of the test strip as specified in 406.03.01.C. Thereafter, sample every lot or as directed by the ME. If the test strip is done within the project limits and the performance testing results are acceptable to the ME, the results will be included into the first lot. A lot is defined as material placed on the traveled way within the project limits.

If a sample does not meet the criteria for performance testing as specified in Table 902.13.03-2, the Department will assess a pay adjustment as specified in Table 902.13.04-2 and 902.13.04-3. If a lot fails to meet requirements for both APA and Overlay Tester, the Department will assess pay adjustments for both parameters or may require removal and replacement of the lot. The Department will calculate the pay adjustment by multiplying the percent pay adjustment (PPA) by the quantity in the lot and the bid price for the HMA HIGH RAP item. If samples received are not within the target air void range, 6.5 ± 0.5 percent, the Department will consider the samples un-testable and asses a PPA of -100 percent for APA specimens and/or Overlay specimens or may require removal and replacement of the lot. PPA for both APA and Overlay are cumulative and may not exceed -100 percent in total. If the Department requires removal and replacement, then the replacement work is subject to the same requirements as the initial work.

Table 902.13.04-2 Surface Course Performance Testing Pay Adjustments for HMA HIGH RAP			
	Surface Course		PPA
	PG 64-22	PG 64E-22	
APA @ 8,000 loading cycles, mm (AASHTO T 340)	$t \leq 7$	$t \leq 4$	0
	$7 < t \leq 10$	$4 < t \leq 7$	PG 64-22: -50(t-7)/3 PG 64E-22: -50(t-4)/3
	$t > 10$	$t > 7$	-100 or Remove & Replace
Overlay Tester, cycles (NJDOT B-10)	$t \geq 200$	$t \geq 275$	0
	$200 > t \geq 150$	$275 > t \geq 200$	Surface PG 64-22: -(200-t) Surface PG 64E-22: -(275-t)/1.5
	$t \leq 150$	$t \leq 200$	-100 or Remove & Replace

Table 902.13.04-3 Intermediate and Base Course Performance Testing Pay Adjustments for HMA HIGH RAP			
	Intermediate and Base Course		PPA
	PG 64-22	PG 64E-22	
APA @ 8,000 loading cycles, mm (AASHTO T 340)	$t \leq 7$	$t \leq 4$	0
	$7 < t \leq 10$	$4 < t \leq 7$	PG 64-22: -50(t-7)/3 PG 64E-22: -50(t-4)/3
	$t > 10$	$t > 7$	-100 or Remove & Replace
Overlay Tester, cycles (NJDOT B-10)	$t \geq 100$	$t \geq 150$	0
	$100 > t \geq 75$	$150 > t \geq 110$	Intermediate PG 64-22: -(2t-200) Intermediate PG 64E-22: -1.25(150-t)
	$t \leq 75$	$t \leq 110$	-100 or Remove & Replace

THE FOLLOWING SUBSECTIONS AND SUBPARTS ARE ADDED:

902.14 BRIDGE DECK WATERPROOF SURFACE COURSE (BDWSC)

902.14.01 Composition of the Mixture

Provide BDWSC mixture that is produced at an HMA plant that is listed on the QPL and meets the requirements specified in 1009.01. Composition of the mixture for BDWSC is coarse aggregate, fine aggregate, and asphalt binder, and may also include mineral filler and crumb rubber. Do not use Reclaimed Asphalt Pavement (RAP), Ground Bituminous Shingle Material, Remediated Petroleum Contaminated Soil Aggregate, or Crushed Recycled Container Glass (CRCG) in BDWSC.

1. Use polymer modified asphalt binder that is specially formulated for meeting the mix performance criteria in this specification. Consult with the asphalt binder supplier to obtain the appropriate material for the specific mix design. Submit a certificate of analysis (COA) showing the PG continuous grading (AASHTO R 29) for the asphalt binder used in the mix design.

   For quality assurance testing of the asphalt binder, the ME may sample the asphalt binder during production of the mix and compare the results with the COA submitted during test strip approval. To analyze the binder the ME will test the binder at the nearest standard PG temperature then compare the results with the COA. If the high ($G^*/\sin\delta$) and low (stiffness and m value) temperature passing test results are within 5 percent of the results from the passing temperature on the COA, then the ME will consider the asphalt binder comparable to the binder used during the test strip.

2. Use coarse aggregate that conforms to 901.05.01 and is classified as argillite, gneiss, granite, quartzite, or trap rock as defined in 901.03.01.

3. Use fine aggregate that is stone sand as specified in 901.05.02 and has an uncompacted void content of at least 45 percent when tested according to AASHTO T 304, Method A. Ensure that the minimum sand equivalent of the fine aggregate is 45 percent when tested according to AASHTO T 176.

4. Ensure that mineral filler, if used, conforms to 901.05.03.

902.14.02 Mix Design

At least 45 days before initial production, submit a JMF for the BDWSC on forms supplied by the Department. Include a statement naming the source of each component and a report confirming the results meet the criteria specified in Table 902.14.02-1 and Table 902.14.02-2.

Table 902.14.02-1 Job Mix Formula Requirements for BDWSC

Sieve Size	Percent Passing[1]	Production Control Tolerances[2]
1/2″	100	± 0.0%
3/8″	80-100	± 4.0%
#4	55-85	± 6.0%
#8	32-42	± 2.0%
#16	20-30	± 2.0%
#30	12-22	± 2.0%
#50	7-16	± 2.0%
#100	3-12	± 2.0%
#200	2.0-6.0	± 1.0%
Asphalt Binder Content (Ignition Oven)[3]	7.0 % minimum	± 0.30%
Lift Thickness	1.5 – 3.0 inch	

1. Aggregate percent passing to be determined based on dry aggregate weight.
2. Production tolerances are for the approved JMF and may not fall outside of the wide band gradation limits.
3. The asphalt binder content may not be lower than the minimum after the production tolerance is applied.

Table 902.14.02-2 Volumetric Requirements for Design and Control of BDWSC

	Required Density (% of Max Sp. Gr.)	Voids Filled with Asphalt	Voids in Mineral Aggregate	Dust to Binder Ratio	Draindown AASHTO T 305
	N_{des} (50 gyrations)	(VFA)	(VMA)		
Design Requirements	99	90 - 100	≥ 18.0 %	0.3 – 0.9	≤ 0.1 %
Control Requirements	98 - 100	90 - 100	≥ 18.0 %	0.3 – 0.9	≤ 0.1 %

Establish the percentage of dry weight of aggregate passing each required sieve size and an optimum percentage of asphalt binder based upon the weight of the total mix. Determine the optimum percentage of asphalt binder according to AASHTO R 35 and M 323 with an N_{des} of 50 gyrations. Before maximum specific gravity testing or compaction of specimens, condition the mix for 2 hours according to the requirements for conditioning for volumetric mix design in AASHTO R 30, Section 7.1. If the absorption of the combined aggregate is more than 1.5 percent according to AASHTO T 84 and T 85, short term condition the mix for 4 hours according to AASHTO R 30, Section 7.2 prior to compaction of specimens (AASHTO T 312) and determination of maximum specific gravity (AASHTO T 209). Ensure that the JMF is within the master range specified in Table 902.14.02-1.

Ensure that the mixture meets a minimum tensile strength ratio (TSR) of 90 percent when tested according to AASHTO T 283 with the following exceptions:

1. Before compaction, condition the mixture for 2 hours according to AASHTO R 30 Section 7.1.
2. Compact specimens with 40 gyrations according to AASHTO T 312.
3. Extrude specimens as soon as possible without damaging.
4. Use AASHTO T 269 to determine void content.
5. Record the void content of the specimens.

6. If less than 55 percent saturation is achieved, the procedure does not need to be repeated, unless the difference in tensile strength between duplicate specimens is greater than 25 pounds per square inch.
7. If visual stripping is detected, modify or readjust the mix.

For each mix design, submit 3 gyratory specimens and one loose sample corresponding to the composition of the JMF, including the design asphalt content, with the mix design forms. The ME will use these samples for verification of the properties of the job mix formula. Compact the specimens to the design number of gyrations (N_{des}). To be acceptable, all 3 gyratory specimens must comply with the gradation and asphalt content requirements in Table 902.14.02-1 and with the control requirements in Table 902.14.02-2. The ME reserves the right to be present at the time of molding the gyratory specimens.

In addition, submit 6 gyratory specimens and 12 boxes of loose mix to the ME. The ME will use these additional samples for performance testing of the BDWSC mix. Ensure that the additional gyratory specimens are compacted according to AASHTO T 312, are 77 millimeters high, and have a maximum air void content of 3.0 percent. The ME will test the specimens using an Asphalt Pavement Analyzer according to AASHTO T 340 at 64 °C, 100 pounds per square inch hose pressure, and 100 pound wheel load. The ME will use the supplied loose mix to compact 2 samples to a maximum air void content of 3.0 percent for Flexural Beam Fatigue testing. The ME will test the fatigue specimens according to AASHTO T 321 at 15 °C, 10 Hertz loading frequency, and 1,500 micro-strains. The ME will approve the JMF if the average rut depth for the 6 specimens in the Asphalt Pavement Analyzer testing is not more than 3 millimeters in 8,000 loading cycles and the fatigue life, as determined by AASHTO T 321, is not less than 100,000 cycles. If the JMF does not meet the APA and Flexural Beam Fatigue criteria, redesign the BDWSC mix and submit for retesting. The ME will ensure that all submitted specimens are within the target air void content as tested at the Material's Central Lab.

The JMF for the BDWSC mixture is in effect until modification is approved by the ME. If required, the ME may use the 12 boxes of loose BDWSC mix to compact additional gyratory specimens for performance testing and the performance test results may be used for approval of the JMF.

When unsatisfactory results for any specified characteristic of the work make it necessary, the Contractor may establish a new JMF for approval. In such instances, if corrective action is not taken, the ME may require an appropriate adjustment to the JMF.

Should a change in sources be made or a change in the properties of materials occurs, the ME will require that a new JMF be established and approved before production can continue.

902.14.03 Sampling and Testing

A. General Acceptance Requirements. The RE or ME may reject and require disposal of any batch or shipment that is rendered unfit for its intended use due to contamination, segregation, improper temperature, lumps of cold material, or incomplete coating of the aggregate. For other than improper temperature, visual inspection of the material by the RE or ME is considered sufficient grounds for such rejection.

Ensure that the temperature of the mix at discharge from the plant or storage silo meets the recommendation of the supplier of the asphalt binder or supplier of the asphalt modifier.

Combine and mix the aggregates and asphalt binder to ensure that at least 95 percent of the coarse aggregate particles are entirely coated with asphalt binder as determined according to AASHTO T 195. If the ME determines that there is an on-going problem with coating, the ME may obtain random samples from 5 trucks and will determine the adequacy of the mixing on the average of particle counts made on these 5 test portions. If the requirement for 95 percent coating is not met on each sample, modify plant operations, as necessary, to obtain the required degree of coating.

B. Sampling. Perform sampling as specified in 902.02.04.B.

C. Quality Control Testing. Perform quality control testing as specified in 902.02.04.C.

D. Acceptance Testing and Requirements. The ME will determine volumetric properties at N_{des} for acceptance from samples taken, compacted, and tested at the HMA plant. The ME will compact HMA to the 50 design gyrations (N_{des}), using equipment according to AASHTO T 312. The ME will determine bulk specific gravity of the compacted sample according to AASHTO T 166. The ME will use the most current QC maximum specific gravity test result in calculating the volumetric properties of the BDWSC.

The ME will determine the dust-to-binder ratio from the composition results as tested by the QC technician.

Ensure that the HMA mixture conforms to the requirements specified in Table 902.14.02-1 and Table 902.14.02-2. If 2 samples in a lot fail to conform to the gradation or volumetric requirements, immediately initiate corrective action.

The ME will test a minimum of 1 sample per lot for moisture, basing moisture determinations on the weight loss of an approximately 1600 gram sample of mixture heated for 1 hour in an oven at 280 ± 5 °F. Ensure that the moisture content of the mixture at discharge from the plant does not exceed 1.0 percent.

E. Performance Testing. Provide 6 gyratory specimens that are compacted according to AASHTO T 312 and 12 boxes of loose mix. Compact the 6 gyratory specimens to 77 millimeters high and maximum air void content of 3.0 percent. The ME will test the specimens using an Asphalt Pavement Analyzer according to AASHTO T 340 at 64°C, 100 pound per square inch hose pressure, and 100 pound wheel load. The ME will use the supplied loose mix to determine the maximum specific gravity of the mix according to AASHTO T 209 and to compact 2 samples to a maximum air void content of 3.0 percent for Flexural Beam Fatigue testing. The ME will test the fatigue specimens according to AASHTO T 321 at 15°C, 10 Hertz loading frequency, and 1,500 micro-strains. The ME will ensure that all submitted specimens are within the target air void content as tested at the Material's Central Lab.

Ensure that the first sample is taken in the first lot of production. Thereafter, sample every second lot. The ME may stop production of BDWSC if a sample does not meet the design criteria for performance testing as detailed in Table 902.14.03-1.

Table 902.14.03-1 Performance Testing Requirements for BDWSC

Test	Requirement
APA @ 8,000 loading cycles (AASHTO T 340)	≤ 3 mm
Flexural Fatigue Life (AASHTO T 321)	≥ 100,000 cycles

902.15 RETROFIT STRIP SEAL JOINT SYSTEM

Use a strip seal joint system that builds up the joint using elastomeric or polymer concrete and seals the joint using a strip seal expansion joint. Ensure that the joint system includes a method for securing the strip seal with the elastomeric or polymer concrete.

Ensure that the strip seal joint system is capable of being constructed within the allowable lane closure hours for the project and compatible with installation in an asphalt overlay.

Use strip seal gland that is a neoprene strip seal gland according to 914.04.02.B or a preformed silicon strip seal meeting the criteria in Table 902.15-1.

Table 902.15-1 Requirements for Preformed Silicon Strip Seal

Property	Test Method	Requirement
Durometer (Shore A)	ASTM D 2240	55 ± 5
Tensile (psi)	ASTM D 412	550 minimum
Elongation	ASTM D 412	350% minimum
Tear (die B ppi)	ASTM D 624	80 minimum
Compression Set @ 350 °F, 22 hrs.	ASTM D 395	30% maximum
Operating Temperature Range 1		– 60 °F to + 450 °F
Specific Gravity		1.51
Color		Black

1. The heat age data at temperatures above 300 °F does not apply in this application but in general, tested at 302 °F and 437 °F, no degradation occurs causing functional concern. The operating temperature range indicates the material remains elastomeric in nature at the above temperatures.

SECTION 903 – CONCRETE

903.02.01 Air-Entraining Admixtures
THE ENTIRE SUBPART IS CHANGED TO:

Use air-entraining admixtures for concrete that are listed on the QPL and conform to AASHTO M 154, except that the tests for bleeding and volume change are not required.

The ME will test for uniformity through the use of infrared spectrophotometry, pH values, solids content, and specific gravity for liquid admixtures.

For pH test of non-liquid admixture, dissolve 1.28 grams of powder in 128 milliliter of distilled water. Keep all bulk storage tanks inside a heated area with an ambient temperature of not less than 32 °F. Do not reuse air-entraining admixture that has been allowed to freeze until it has been agitated and retested.

903.02.04 Viscosity Modifying Admixture
THE FIRST SENTENCE IS CHANGED TO:

Use a viscosity modifying admixture that is listed on the QPL and that, when evaluated according to the test methods and mix design proportions in AASHTO M 194, conforms to the following physical requirements:

903.03.05 Control and Acceptance Testing Requirements

E. Acceptance Testing for Strength for Pay-Adjustment Items.
Concrete Items which are subject to pay adjustment and the base prices are as follows:

ITEMS	DESCRIPTION	UNIT	BASE PRICE
507021P	CONCRETE BRIDGE DECK	CY	$500.00
507036P	CONCRETE BRIDGE PARAPET	LF	$305.00
505039P	PRESTRESSED CONCRETE SLAB BEAM, (TYPE SII-36), 36" X 15"	LF	$125.00
505042P	PRESTRESSED CONCRETE SLAB BEAM, (TYPE SIII-36), 36" X 18"	LF	$130.00
505015P	PRESTRESSED CONCRETE BOX BEAM, (TYPE BI-36), 36" X 27"	LF	$170.00
505045P	PRESTRESSED CONCRETE SLAB BEAM, (TYPE SIV-36), 36" X 21"	LF	$160.00
505018P	PRESTRESSED CONCRETE BOX BEAM, (TYPE BII-36), 36" X 33"	LF	$170.00
505021P	PRESTRESSED CONCRETE BOX BEAM, (TYPE BIII-36), 36" X 39"	LF	$175.00
505024P	PRESTRESSED CONCRETE BOX BEAM, (TYPE BIV-36), 36" X 42"	LF	$185.00
505003P	PRETENSIONED PRESTRESSED CONCRETE BEAM, 45"	LF	$155.00
505006P	PRETENSIONED PRESTRESSED CONCRETE BEAM, 54"	LF	$155.00
505048P	PRESTRESSED CONCRETE SLAB BEAM, (TYPE SII-48), 48" X 15"	LF	$160.00
505051P	PRESTRESSED CONCRETE SLAB BEAM, (TYPE SIII-48), 48" X 18"	LF	$135.00
505009P	PRETENSIONED PRESTRESSED CONCRETE BEAM, 63"	LF	$185.00
505027P	PRESTRESSED CONCRETE BOX BEAM, (TYPE BI-48), 48" X 27"	LF	$215.00
505054P	PRESTRESSED CONCRETE SLAB BEAM, (TYPE SIV-48), 48" X 21"	LF	$215.00
505030P	PRESTRESSED CONCRETE BOX BEAM, (TYPE BII-48), 48" X 33"	LF	$185.00
505033P	PRESTRESSED CONCRETE BOX BEAM, (TYPE BIII-48), 48" X 39"	LF	$220.00
505036P	PRESTRESSED CONCRETE BOX BEAM, (TYPE BIV-48), 48" X 42"	LF	$230.00
505012P	PRETENSIONED PRESTRESSED CONCRETE BEAM, 72"	LF	$200.00
502045M	CAST-IN-PLACE CONCRETE PILE, DRIVEN, 12" DIAMETER	LF	$50.00
502090M	PRECAST CONCRETE PILE, DRIVEN, 12" X 12"	LF	$90.00
502132M	PRESTRESSED CONCRETE PILE, DRIVEN, 12" X 12"	LF	$50.00
502135M	PRESTRESSED CONCRETE PILE, DRIVEN, 14" X 14"	LF	$50.00
502138M	PRESTRESSED CONCRETE PILE, DRIVEN, 16" X 16"	LF	$50.00
502141M	PRESTRESSED CONCRETE PILE, DRIVEN, 18" X 18"	LF	$50.00

502144M	PRESTRESSED CONCRETE PILE, DRIVEN, 20" X 20"	LF	$75.00
502147M	PRESTRESSED CONCRETE PILE, DRIVEN, 22" X 22"	LF	$75.00
502150M	PRESTRESSED CONCRETE PILE, DRIVEN, 24" X 24"	LF	$75.00
502151M	PRESTRESSED CONCRETE PILE, DRIVEN, 30" X 30"	LF	$75.00
502156M	PRESTRESSED CONCRETE PILE, DRIVEN, 54" DIAMETER	LF	$200.00

4. Compute Percent Pay Adjustment (PPA).

THE FIFTH PARAGRAPH IS CHANGED TO:

If the Department elects not to core, the Contractor may accept the PPA calculated by Equation 1 or 2, as appropriate, or, when approved by the Department, the Contractor may take cores as specified in Table 903.03.06-4. Take the cores within 90 days from the date of concrete placement. The Department will not award a positive pay adjustment based on core samples taken more than 90 days from the date of concrete placement. If electing to core, perform the coring as directed by the ME, and provide the cores to the ME for testing.

F. Acceptance Testing for Strength for Non-Pay-Adjustment Items.

THE FIFTH PARAGRAPH IS CHANGED TO:

If cores are taken, the Department will use the core results to determine the final disposition of the lot. If, based on the core results, the lot is determined to be at a quality level of PD < 75, the Department will compute the pay-adjustment as specified in 903.03.05.E. The Department will not award positive pay adjustment for non-pay-adjustment Items. If the lot is confirmed to be at a quality level of PD ≥ 75, the ME will reject the lot and the RE may do one of the following:

1. Require the Contractor to remove and replace the defective lot
2. Allow the Contractor to leave the defective lot in place and receive a PPA computed by Equation 2.
3. Allow the Contractor to submit a plan, for approval, for corrective action.

903.03.06 Tables

Table 903.03.06-2 Requirements for Structural Concrete Items

THE SEVENTH LINE UNDER CAST-IN-PLACE ITEMS IS CHANGED TO:

Table 903.03.06-2 Requirements for Structural Concrete Items

	Concrete Class	Slump[1] (inches)	Percent Air Entrainment for Coarse Aggregate[1]	
			No. 57 & No. 67	No. 8
Decks, Sidewalks, Curbs, Parapets, Concrete Patch	A	3 ± 1	6.0 ± 1.5	7.0 ± 1.5

903.05.02 Mix Design and Verification

THE ENTIRE TABLE 903.05.02-1 IS CHANGED TO:

Table 903.05.02-1 Design and Verification Requirements for HPC

Performance Characteristic	Test Method	Requirements	
		HPC-1	HPC-2
Scaling Resistance[1]@ 50 cycles (visual rating of the surface, maximum)	ASTM C 672	3	–
Abrasion Resistance (average depth of wear in inches, maximum)	ASTM C 944	–	0.04
Freeze-Thaw Durability (relative dynamic modulus of elasticity after 300 cycles, minimum)	ASTM C 666 Proc. A	80%	80%
Surface Resistivity[2] @ 56 days (kΩ-cm, minimum)	AASHTO T 358	36	36

Compressive Strength[3] @ 56 days (pounds per square inch, minimum)	AASHTO T 22	5400	5400
Water-Cement Ratio (maximum)	–	0.40	0.40

1. For the scaling resistance testing, moist cure specimens for 14 days and then air cure for 14 days.
2. If the surface resistivity requirement has been achieved in 28 days, consider the surface resistivity acceptable. If the required surface resistivity is not achieved in 28 days, test the HPC sample at 56 days.
3. If the compressive strength requirement has been achieved in 28 days, consider the strength acceptable. If the required compressive strength is not achieved in 28 days, test the HPC samples at 56 days.

THE THIRD PARAGRAPH IS CHANGED TO:

In addition to verifying the compressive strength of the HPC mix, the ME will verify the surface resistivity according to AASHTO T358. Submit 4 additional cylindrical samples, having a 4 inch diameter and a length of at least 8 inches, to the ME for this verification testing. The ME will average the values of tests on 2 specimens for each mix design.

903.05.04 Control and Acceptance Testing Requirements
THE ENTIRE SUBPART IS CHANGED TO:

With the exception that the ME may perform compression testing at 56 days, the ME will enforce the requirements specified in 903.03.05 for control and acceptance testing of non-pay adjustment Class A concrete in the fabrication of the HPC elements.

Produce HPC that conforms to the acceptance testing criteria in Table 903.05.04-1.

Table 903.05.04-1 Acceptance Requirements for HPC

Performance Characteristic	Test Method	Requirement
Percent Air Entrainment[1]	AASHTO T 152	6.0 ± 1.5 (No. 57/67 Aggregate) 7.0 ± 1.5 (No. 8 Aggregate)
Slump (inches)[1, 2]	AASHTO T 119	3 ± 1
Surface Resistivity @ 56 days[3, 4] (kΩ-cm, minimum)	AASHTO T 358	19
Compressive Strength @ 56 days[5] (pounds per square inch, minimum)	AASHTO T 22	4400

1. If using a Type F or G admixture, change the Slump and Air Content values for the HPC as follows:
   1.1 Slump: 6 ± 2 inches
   1.2 Air Content: increase both the target value and tolerance percentages by 0.5
2. For slip-formed parapet, design and produce a mix with a slump of 1 ± 1/2 inch.
3. The ME will not test for the surface resistivity requirements for HPC used for Items other than bridge decks.
4. For surface resistivity, the ME will mold 4 additional cylinders, taking 2 cylinders each from 2 randomly selected delivery trucks for testing at 56 days.
5. For compressive strength testing, the initial rate for the HPC is 6 per lot. The retest limit is 4400 pounds per square inch.

The ME will test 2 specimens for surface resistivity and will average the results of the 2 specimens to determine the test result. The ME will perform 2 tests on each lot from samples taken from 2 randomly selected delivery trucks. The lot is eligible for 100 percent payment provided that the test results are equal to or above 19 kilo-ohm centimeter.

If, upon testing at 56 days, 1 or more individual test results is below 19 kilo-ohm centimeter, the RE may do one of the following:

1. Require that the Contractor remove and replace the defective lot.
2. Allow the Contractor to submit a corrective action plan for approval.

903.06.02 SCC For Precast Concrete
THE ENTIRE PART B. IS CHANGED TO:

B. Mix Design and Verification. Design the mix, as specified in 903.03.02 or 903.05.02, to conform to the strength, water-cement ratio, and air content requirements for the specified class of concrete for the item that is being cast. In addition, ensure that the SCC conforms to the requirements specified in Table 903.06.02-1.

Table 903.06.02-1 Requirements for SCC for Precast Concrete		
Property	**Test Method**	**Requirement**
Slump Flow	NJDOT C-4	16 to 24 inches
Visual Stability Index		
Plastic Concrete	NJDOT C-4	1 maximum
Hardened Concrete	NJDOT C-5	1 maximum

Perform mix design verification as specified in 903.03.02 or 903.05.02. For the verification batch, ensure that the air content is in the top half of the allowable range and the slump flow is between 22 and 24 inches. Perform air content, slump flow, and visual stability index (plastic concrete) testing on the verification batch. Make concrete cylinders for compression testing as specified in 903.03.02 or 903.05.02 and make 2 additional 4 × 8 inch cylinders for visual stability index on the hardened concrete. Saw the additional cylinders length-wise according to NJDOT C-5. The ME will perform the compressive strength testing and the visual evaluation to assign a visual stability index in order to approve the mix.

SECTION 905 – REINFORCEMENT METALS

905.01 REINFORCEMENT STEEL
THE ENTIRE SUBPART IS CHANGED TO:

Provide reinforcement steel manufactured at an AASHTO NTPEP (National Transportation Product Evaluation Program) certified mill. For a list of NTPEP certified mills, see the following webpage: https://data.ntpep.org/REBAR/Audits.

For reinforcement steel, submit a certification of compliance as specified in 106.07. Attach copies of the mill certifications for each heat of reinforcement steel. The ME will randomly sample and test heats of reinforcement steel for quality assurance. The ME will randomly inspect and sample galvanized and epoxy coated reinforcement steel for quality assurance.

905.01.03 Welded Wire Reinforcement
THE FIRST PARAGRAPH IS CHANGED TO:

Use plain or deformed steel welded wire reinforcement according to ASTM A1064. When used for concrete pavement, use welded wire reinforcement mats at least 5 feet in width.
THE SECOND PARAGRAPH IS CHANGED TO:

When approved as an alternate to galvanized reinforcement bars, use galvanized welded wire reinforcement that meets the requirements of ASTM A 641, Table 1, Class 1.

905.01.05 Dowels
THE ENTIRE SUBPART IS CHANGED TO:

Use plain reinforcement bars according to ASTM A 615, Grade 60. Galvanize according to ASTM A 123.

905.03.03 Dowel Bars
THE FIRST PARAGRAPH IS CHANGED TO:

For dowel bars in transverse joints, use epoxy-coated, Grade 60, plain reinforcement steel according to ASTM A 615. If shown on the Plans, use dowel bars fitted with end caps. Ensure that the end caps are non-metallic and designed to prevent the entrance of grout or mortar into the expansion void.

SECTION 906 – STRUCTURAL STEEL

906.01 STRUCTURAL STEEL MATERIALS

THE ENTIRE SUBSECTION IS CHANGED TO:

Provide structural steel materials conforming to the requirements in Table 906.01-1 and as shown on the Plans.

Table 906.01-1 Structural Steel Materials Requirements

Product	Test Method	Type/Grade/Class
Structural Steel Plate1	ASTM A 709	Grade 36, 50, 50W, or HPS70W2
Tie rods, plate washers, tie backs, turnbuckles, plates, shapes, and shims	ASTM A 709	Grade 36
Steel tube and pipe for Sign Structures 3, 4, 5	ASTM A 53 or ASTM A 500	Type S, Grade B or Type E, Grade B Grade B or C
Steel Piles		
Steel H-piles	ASTM A 572	Grade 50
Steel sheet piles	ASTM A 572	Grade 50
Steel pipe piles	ASTM A 252	Grade 2
Casings for Drilled Shafts6	ASTM A 252	Grade 2
Flooring		
Grid Flooring	ASTM A 709	Grade 36
Formed Steel Flooring	ASTM A 1011	Grade 30
Steel Forgings	ASTM A 668	Class C
Shear Connector Studs7	ASTM A 108	Grades G1015, 1018, or 1020
Stay-In-Place (SIP) Forms8	ASTM A 653	Grades 33, 37, 40, 49, or 80

1. For steel used in tension zones, ensure that the steel conforms to Zone 2 impact testing requirements.
2. For the manufacture of Grade HPS70W, the Department will allow the use of the Thermo-Mechanical Controlled Process.
3. For sizes less than or equal to 24 inches in diameter, only use electric resistance welded single seam pipe.
4. For pipe with wall thickness greater than 1/2 inch, the fabricator may substitute API Specification 5L, Grade B.
5. ASTM A 500 Grade B or C is approved for use only with equivalent tensile and yield strengths as that specified for ASTM A 53 Grade B, Type E or S, with additional CVN testing for materials with wall thickness ½ inch or greater. Provide mill certs for approval by the ME prior to fabrication.
6. For casings, use smooth, non-corrugated steel pipe.
7. For shear connector studs, use cold-drawn bars that are killed or semi-killed.
8. For SIP, use a galvanized coating designation G235 or Z700.

Before using, submit to the ME a representative sample of each size for material testing and approval. Provide a mill certification that indicates the chemical and physical properties for each heat of material. For SIP forms, steel forgings and shear connector studs, submit certifications of compliance, as specified in 106.07, with the mill certifications attached.

906.03 STEEL CASINGS FOR DRILLED SHAFTS

THE SECOND PARAGRAPH IS CHANGED TO:

For permanent casings, used as a structural component within the drilled shaft, clean and coat the exterior surfaces with prime coat of an inorganic zinc coating system as specified in 906.06.

906.04.01 AISC Certification

THE ENTIRE SUBPART IS CHANGED TO:

Ensure that the structural steel fabricating plant is certified under the AISC Quality Certification Program in the applicable categories by the type of work performed. See the following web page: https://www.aisc.org/certification/

906.04.05 Quality Control and Acceptance
THE FOURTH PARAGRAPH IS CHANGED TO:

Inspect and test structural steel bridge members according to ANSI/ AASHTO/ AWS D1.5 Bridge Welding Code, as modified by the following:

1. Assembly and fabrication may not continue until completed work has been inspected and accepted by the ME.
2. Grind flush complete-penetration butt welds scheduled for ultrasonic testing.
3. Test 100 percent of complete joint penetration groove and butt welds, including butt welds in longitudinal stiffeners.

906.07 4-BAR OPEN STEEL PARAPET
SUBSECTION IS RENAMED AND CHANGED TO:

906.07 STEEL BAR BRIDGE RAILING

For steel bar bridge railing, including NJDOT standard steel 4-bar bridge railing, provide anchor bolts, washers, and exposed bolts as specified in 908.01.03, and all other bolts and nuts as specified in 908.01.01 and 908.01.02. Provide rail bars according to ASTM A 500 Grade B, rail post according to ASTM A 709, Grade 50, and all other shapes and plates according to ASTM A 709, Grade 36.

Fabricate steel bar bridge railing according to 906.04 and paint according to 906.06 or galvanize according to 912.02.01. Prohibit welded splices for steel rail tubes.

SECTION 912 – PAINTS, COATINGS, TRAFFIC STRIPES, AND TRAFFIC MARKINGS

912.03.01 Epoxy Traffic Stripes
THE SUBPART HEADING IS CHANGED TO:

912.03.01 Traffic Stripes

A. Epoxy Resin.
THE FIRST SENTENCE IS CHANGED TO:

For pavement striping, use an epoxy resin that is a 2 component, 100 percent solids formulation conforming to the following requirements:

B. Glass Beads.
THE FIRST PARAGRAPH IS CHANGED TO:

Submit certifications of compliance as specified in 106.07 for each lot of glass beads used on the Contract. For each lot of glass beads, submit test results indicating the parts per million of lead, antimony and arsenic as determined by testing according to Environmental Protection Agency testing method 3052 and testing method 6010B or 6010C. Ensure that glass beads do not contain more than 200 ppm of lead, 200 ppm of antimony, or 100 ppm of arsenic.

912.03.02 Thermoplastic Traffic Markings
THE SUBPART HEADING IS CHANGED TO:

912.03.02 Traffic Markings
THE ENTIRE SUBPART TEXT IS CHANGED TO:

For traffic markings, use either preformed or hot extruded thermoplastic conforming to AASHTO M 249, except that for preformed thermoplastic, the minimum thickness requirement is 90 mils. Use beads conforming to AASHTO M 247, Type 1, with a moisture resistant coating. Ensure that glass beads do not contain more than 200 ppm of lead, 200 ppm of antimony, or 100 ppm of arsenic.

Submit certifications of compliance, as specified in 106.07, for each batch of materials used on the Contract. For each lot of glass beads, submit test results indicating the parts per million of lead, antimony and arsenic as determined by testing according to Environmental Protection Agency testing method 3052 and testing method 6010B or 6010C.

912.04.01 Latex Paint
THE ENTIRE SUBPART TEXT IS CHANGED TO:

Use latex traffic paint that is a fast-drying white, or non-lead yellow, ready-mixed pigmented binder emulsified in water and capable of anchoring reflective glass beads that are separately applied. Ensure that the color matches FED-STD-595B color chip No. 33538 for yellow and No. 37886 for white. Ensure that the paint has a maximum no-track time of 120 seconds when applied in a wet film. In addition, ensure that the finished product meets the following:

1. Volume of solids is a minimum 61 percent.
2. Total solids are a minimum of 77.5 percent total non-volatiles by weight, when tested according to ASTM D 2369.
3. Weight per gallon is a minimum 14 ± 0.2 pounds per gallon for each color.
4. Hegman Grind is a minimum of 2 Hegman when tested according to ASTM D 1210.
5. Viscosity is between 70 and 95 Krebs Units at 77 °F, when tested according to ASTM D 562.

Use glass beads conforming to AASHTO M247, Type 1, with a moisture resistance coating. Ensure that glass beads do not contain more than 200 ppm of lead, 200 ppm of antimony, or 100 ppm of arsenic.

Submit a certification of compliance, as specified in 106.07, for latex and glass beads. For each lot of glass beads, submit test results indicating the parts per million of lead, antimony and arsenic as determined by testing according to Environmental Protection Agency testing method 3052 and testing method 6010B or 6010C.

SECTION 914 – JOINT MATERIALS

914.03 POLYMERIZED JOINT ADHESIVE
TABLE 914.03-1 IS CHANGED TO:

Table 914.03-1 Requirements for Polymerized Joint Adhesive

Property	Test Method	Requirement
Cone Penetration, 25 °C	ASTM D 5329	60-100
Flow, 60 °C	ASTM D 5329	5 mm maximum
Resilience, 25 °C	ASTM D 5329	30% minimum
Ductility, 4 °C	ASTM D 113	30 cm minimum
Tensile Adhesion, 25 °C[1]	ASTM D 5329	500% minimum
Softening Point	ASTM D 36	77 °C minimum
Asphalt Compatibility	ASTM D 5329	Pass

1. A precision estimate for this standard has not been developed, so it should not be used for acceptance or rejection of a material during product approval.

914.04.01 Preformed Elastomeric (Compression Type)

B. Joint Sealer.
THE LAST SENTENCE OF THE SECOND PARAGRAPH IS CHANGED TO:

If splicing of a sealer is allowed, ensure that the sealer at the splice point has no significant misalignment at its sides or top and that misalignment at the bottom does not exceed half of the bottom wall thickness.

914.04.03 Modular Joints
THE ENTIRE SUBPART IS CHANGED TO:

A. Manufacturer. Manufacturer is to be AISC certified for "Bridge and Highway Components (CPT)", have a minimum of 3 years experience in Modular Bridge Joint System (MBJS) fabrication, and has completed fatigue testing of the designed structural elements and connections or splice details per AASHTO LRFD Construction Specifications.

B. Materials. Use materials that conform to the following requirements:

1. Use structural steel conforming to the requirements of AASHTO M 270M/M 270 (ASTM A709/A709M), Grade 50, or Grade 50W with Zone 2 CVN requirements. Do not use aluminum components.
2. Use stainless steel conforming to ASTM A240/A240M, Type 304.
3. Use PTFE that is 100 percent virgin material, woven PTFE fabric, or dimpled PTFE conforming to the material requirements in Section 18 of the AASHTO LRFD Bridge Design Specifications, and Section 19 of AASHTO LRFD Bridge Construction Specifications.
4. Use neoprene strip seals conforming to the requirements in Table 914.06-1 and that have a maximum movement range of 3.15 inches per seal. Provide water tightness of strip seals at connection to steel beams and field splice(s). Do not use box seals or seals utilizing double webs.

Table 914.06-1 Tests for Neoprene Strip Seals

Property	Test Method	Requirement
Tensile strength, minimum psi	ASTM D 412	2000
Elongation at break, minimum %	ASTM D 412	250
Hardness, Type A durometer	ASTM D 2240	55 to 70
Compression Set at 72 hr at 212 °F, maximum %	ASTM D 395	40

5. Use bolts and other hardware conforming to the requirements of AASHTO M 164 (ASTM F3125/F3125M Grade A325) and galvanized according to AASHTO M232 (ASTM A153/A153M) or ASTM B695.
6. Fabricate slide bearings and precompressed springs as steel reinforced elastomeric pads with a PTFE sliding surface. Do not manufacture components from polyurethane compounds.

Perform prequalification tests, Open Movement and Vibration (OMV) testing and Seal Pushout (SPO) testing, according to AASHTO LRFD Construction Specifications Section 19/A19 and provide testing report.

C. Fabrication. Fabricate the structural steel components of the modular joint assembly as specified in 906.04 and according to AWS D1.5 and as shown on the Plans and approved working drawings. Hot-dip galvanize the assembly according to AASHTO M111 (ASTM A123/A123M).

Perform field splices according to the details and procedures included in the approved working drawings.

D. Shipping, Handling, and Certification. The RE will reject joint systems damaged during shipping or handling. The Contractor may repair minor damage to the galvanizing according to ASTM A780/A780M. Store the expansion joint system according to the manufacturer's recommendations.

Submit a certification of compliance, as specified in 106.07, for the modular joint assembly. With the certification, submit test results for neoprene strip seal and mill certifications for the structural steel components.

SECTION 918 – ELECTRICAL MATERIALS

918.01 CONDUIT AND FITTINGS

4. Flexible Nonmetallic Conduit.

THIS PART IS CHANGED TO:

Use coil able HDPE conduit made from virgin HDPE resin as per the minimum standard of PE345440E according to ASTM D3350. Ensure conduit is circular and of uniform cross sectional area and dimensions in accordance with ASTM F2160. Ensure conduit is of continuous length containing no welds or joints coiled on a reel. Additionally, conduit's inner and outer walls are to be smooth and the inner wall is to be lubricated with manufacturer's recommended lubricant. Conduit colors are to be integrally extruded throughout the conduit in the manufacturing process. Ensure conduit is permanently marked with a laser ink imprinter or

heat embossed white lettering showing the diameter, size, sequential length marks, owners name, ASTM, SDR, and/or Schedule rating. Additional markings of date-of-manufacture, time, and batch-of-resin are to be identified and referenced to certifications and quality control test results. Ensure manufacturer provides certification of the properties specified and mark/label the reels with purchase order, project name and/or other information for tracking and receiving. Applicable material standards are required based on the following applications:

a. **Direct Burial**. Use conduit material with a rating of Schedule 80 conforming to ASTM F2160, NEMA TC-7 EPEC-80 and certified for its intended use.

b. **Innerduct**. Use conduit material with a rating of Schedule 40 conforming to ASTM F2160, NEMA TC-7 EPEC-40.

ITS conduits used for the installation of Fiber Optic Cable including tracer wire, are to be extruded integrally colored orange to indicate its use for Communications.

ITS conduits designated for electrical use are to be extruded integrally colored red to indicate its use for Electrical wiring.

Submit a certificate of compliance, as specified in 106.07, for all materials, components, and assemblies.

918.12 PEDESTALS, POLES, TRANSFORMER BASES, AND MAST BRACKET ARMS
THE FIRST SENTENCE OF THE FIRST PARAGRAPH IS CHANGED TO:

Fabricate pedestals, poles, transformer bases, and mast bracket arms for traffic signal, highway lighting, and camera standards with materials according to the appropriate ASTM standard and the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.

DIVISION 1000 – EQUIPMENT

SECTION 1003 – HMA SITE EQUIPMENT

1003.03 HMA PAVER

THE FOLLOWING IS ADDED AT THE END:

NOTE: A Spray Paver as specified in 1003.04 may be used in lieu of a HMA Paver.

1003.04 ULTRA-THIN LIFT PAVER

THE HEADING AND THE ENTIRE SUBSECTION TEXT IS CHANGED TO:

1003.04 SPRAY PAVER

Provide a self-propelled spray paver that meets the requirements in 1003.03 and is specifically designed and manufactured for applying tack coat and polymer modified tack coat immediately in front of, and just prior to applying, hot mix asphalt in a single operation without trafficking and tracking of the tack coat. Ensure the spray paver is insulated and equipped with a heater to evenly heat, maintain and apply the tack coat at the proper temperature recommended by the manufacturer. Ensure the spray paver can apply tack coat in a controlled manner which automatically adjusts the rate of tack coat application based on the speed of the paver to provide a uniform and complete tack coat coverage of the paving surface. Ensure that the spray paver is capable of spreading tack coat and HMA to the width, thickness, and application rates required without tearing, shoving, or gouging the mixture, to produce a smooth and homogeneous surface. Ensure the spray paver is capable of operation at forward speeds of at least 70 feet per minute. Ensure that the spray paver is equipped and operated using a heated vibratory screed or tamper bar to ensure material is capable of being placed and compacted to the required density and smoothness. Ensure that the paver is equipped with an automatic reverse signal alarm that is audible above the surrounding noise.

SECTION 1008 – MISCELLANEOUS EQUIPMENT

1008.01 MILLING MACHINE

THE ENTIRE SUBSECTION IS CHANGED TO:

A **Standard Milling Machine.** Provide a self-propelled planing, grinding, or cutting milling machine with variable operating speeds that is capable of removing HMA or concrete without the use of heat. Ensure that the milling machine is equipped with automatic grade controls. Use either a stringline or ski type reference system. If a ski type reference system is used, ensure that the ski has a minimum length of 20 feet. Ensure that the milling machine is equipped with an automatic audible warning signal when operating in reverse. The RE may not require use of the automatic grade controls at intersections and other locations.

Immediately replace teeth in the milling drum that become dislodged, broken, or unevenly worn with teeth of the same length as the remaining teeth in that row.

B **Micro Milling Machine.** Provide a standard milling machine as specified in 1008.01.A that is equipped with a cutting mandrel designed specifically for cold planing and texturing asphalt and concrete pavement surfaces to close tolerances as defined herein. Ensure that the cutting mandrel is equipped with four wraps of flighting with blocks that bolt in, each accepting 3 to 4 carbide or polycrystalline diamond (PCD) tipped cutting bits on the wear side of the flight. The cutting bits on the wraps at 0 degrees and 180 degrees repeat each other. Likewise the cutting bits at 90 degrees and 270 degrees also repeat each other, creating a double hit cutting mandrel. Ensure that tips of the cutting bits, on any given wrap, are spaced at a maximum of 1/4 inch axial distance between the tips of each bit, plus or minus of 1/32 inch. Repeat the cutting bits on the second wrap to the proceeding wrap at 1/4 inch maximum.

Ensure that the cutting bits and height of the holder blocks are uniform so that the cutting radius of the mandrel is within plus or minus of 0.02 inch. Ensure that the blocks are completely machined and capable of being easily removed from the cutting mandrel to check tolerance and height of the holders.

Ensure that the equipment used does not cause strain or damage to the underlying pavement surface course, causes excessive ravel, aggregate fractures, spalls or disturbance of the transverse or longitudinal joints.

Replace cutting bits that become dislodged, broken, or unevenly worn. When only changing intermittent cutting bits, remove an existing "sample" cutting bit from the machine and measure amount of wear and gage height. Ensure that replacement bit is matched to existing height of the "sample" cutting bit, plus or minus of 1/32 inch, to insure even micro-milling.

SECTION 1009 – HMA PLANT EQUIPMENT

1009.01 HMA PLANT

A. Requirements for HMA Mixing Plants.

THE FOLLOWING IS ADDED AFTER THE SECOND PARAGRAGH:

The HMA producer is required to have a quality control (QC) program plan approved annually by the ME as per Materials Approval Procedure MAP-102. The HMA producer is required to ensure that the QC plan conforms to the requirements outlined in the report entitled "Hot Mix Asphalt Quality Control Program Plan" prepared by the Department of Transportation and New Jersey Asphalt Paving Association. Failure to follow these requirements will result in rejection of HMA materials supplied by the HMA producer and removal of the HMA supplier from the QPL.

1. Plant Laboratory.

a. General Equipment.

THE PART NUMBER 1 IS CHANGED TO:

1. An office for the exclusive use of the ME with a floor area of at least 100 square feet, excluding the plant lab area.

THE FOLLOWING SUBSECTION IS ADDED AFTER 1009.02:

1009.03 ASPHALT-RUBBER BINDER BLENDING EQUIPMENT

Provide equipment for preparation of Asphalt-Rubber Binder. Ensure that the unit is equipped with a crumb rubber feed system capable of continuously supplying the asphalt cement feed system, and is capable of fully blending the individual crumb rubber particles with the asphalt cement. Use an asphalt-rubber binder storage tank that is equipped with a heating system capable of maintaining the temperature of the binder between 325 and 375 °F during the reaction. Ensure the asphalt-rubber binder storage tank is also equipped with an internal auger mixing device, oriented horizontally in the tank, capable of maintaining a uniform mixture of the asphalt-rubber binder.

Ensure that the tanks for storage of asphalt-rubber binder are equipped to uniformly heat the material to the required temperature under effective and positive control at all times. Ensure that heating is accomplished so that no flame comes in contact with the heating tank.

Provide a circulating system of sufficient capacity for the binder to ensure continuous circulation between the storage tank and proportioning units during the entire operating period. Ensure that the discharge end of the binder circulating pipe is maintained below the surface of the binder in the storage tank to prevent discharge of hot binder into the open air.

Ensure that pipe lines and fittings are steam or oil jacketed, electrically or otherwise heated, and insulated to prevent heat loss.

Provide valves according to AASHTO T 40, except ensure that a sampling valve is also located in the lowest third of each storage tank.

If the plant has been equipped with a water injection type asphalt foaming system, ensure that the system will allow the proper amount of asphalt rubber binder to be supplied continuously or provide a by-pass to ensure that the proper amount of asphalt rubber binder is supplied to the mix.