

1.0 DESCRIPTION

This Quality Management Plan (QMP) for cold weather paving operations covers requirements for the placement of Hot Mixed Asphalt (HMA) and/or Warm Mix Asphalt (WMA) pavements in conditions outside those detailed in NSTIR Department Standard Specifications.

The QMP shall be required and in effect for all paving after October 1st. The Department will notify the Contractor of a point in time when all paving operations will cease for the remainder of the year, and the QMP will not be permitted.

2.0 REFERENCES

All reference standards shall be current issue or latest revision at the first date of tender advertisement. This specification refers to the following standards, specifications or publications:

Department Standard Specifications Division 4.1 – Emulsified Asphalt
Department Standard Specifications Division 4.2 – Performance Graded Asphalt Binder (PGAB)
Department Standard Specifications Division 4.4 – Asphalt Concrete Hot Mixed – Hot Placed
Department Standard Specifications Division 4.5 – Liquid Asphalt Primer
Department Standard Specifications Division 4.19 – Asphalt Concrete End Product Specification (EPS)

3.0 SUBMISSIONS

3.1 Quality Management Plan. The Contractor shall be responsible for providing a detailed QMP for cold weather paving. The QMP shall contain information detailing the equipment, processes, personnel and procedures to be put in place for cold weather paving. The QMP will be written to meet or exceed any criteria as detailed within this document. The QMP will be considered on a project level basis and must be approved by the Engineer. If approved, all conditions stated in the QMP shall be adhered to at all times. The Department reserves the right to limit the length of time beyond traditional paving cut off dates, request changes to the QMP, or terminate the QMP at any point in time. The Engineer will provide written approval within five (5) days of QMP receipt.

3.1.1 Paving Plan. The Contractor shall implement a Paving Plan (PP) to ensure the quantity and quality of equipment and personnel are adequate to achieve a quality end product as outlined in the Department's Specifications and the conditions as detailed in the QMP for cold weather paving. The plan must be submitted to the Engineer for review and approval as part of the QMP.

4.0 MATERIALS

4.1 Granular Base. A geotechnical consultant shall test and confirm that the minimum compaction requirements have been achieved in the granular base materials prior to the placement of any Asphalt Concrete. Where the minimum specified compaction requirement is not achieved prior to the granular base freezing the Contractor shall remove the frozen granular material, and underlying soils, replacing them with suitable non-frozen material. The Department may independently perform compaction tests to verify the results. The placement of asphalt prime shall be reviewed for all installations after October 1st. The Department's Engineer, when requested by the Contractor, will review and consult with Highway Construction Services staff regarding the request to cease prime placement. The contractor is expected to maintain the fine grade ahead of the paving operations which may require a roller and grader be present ahead of paving operations.

A Professional Engineer in good standing with Engineers Nova Scotia must certify to the Department's Engineer that the granular base layers meet the requirements under the QMP, and the Department's standard specifications, and will not adversely affect the Asphalt Concrete's performance.

4.2 Asphalt Concrete. Asphalt Concrete shall not be placed during rain, snow, or on any asphalt surfaces which are wet or not free of foreign materials. Asphalt Concrete shall not be placed on any surface which has ponded water or is frozen.

4.2.1 Hot Mix Asphalt. HMA shall not be placed when ambient air temperature is below 5°C. A combination of ambient air temperature and wind speed (and resulting wind chill) must be taken into consideration. All HMA placed during cold weather shall, where possible, use a joint heater and/or echelon paving. Trucking and rolling patterns shall be reviewed and adjustment shall be made as the temperature, and resulting compaction time, dictate. The HMA temperature testing frequency shall increase and temperatures will be checked at the plant, arrival at the job site, and behind the

paver to ensure the HMA meets the Department's specifications. This data will be recorded and reported to the Department's Engineer.

A Professional Engineer in good standing with Engineers Nova Scotia must certify to the Department's Engineer that the HMA meet the requirements under the QMP and the Department's standard specifications.

4.2.2 Warm Mix Asphalt. WMA shall not be placed when the ambient air temperature is below, 0°C. The Contractor must use WMA if paving operations are to take place when ambient air temperature is below 5°C. A combination of ambient air temperature and wind speed (and resulting wind chill) must be taken into consideration. The Contractor must use a WMA process or additive in place of HMA that has already received approval for general use by the Department. The WMA must satisfy all Department Standard Specifications including, but not limited to, mix design, and AASHTO T-283, before receiving project level approval for use. Project level approval must be granted prior to any WMA construction. All asphalt tickets shall identify the WMA process and/or additive and the application and/or dosage rate in addition to all other required information.

All WMA placed during cold weather shall, where possible, use a joint heater and/or echelon paving. Trucking and rolling patterns shall be reviewed and adjustment shall be made as the temperature, and resulting compaction time, dictate. The WMA temperature testing frequency shall increase and temperatures will be checked at the plant, arrival at the job site, and behind the paver to ensure the WMA meets the Department's specifications. This data will be recorded and reported to the Department's Engineer.

A Professional Engineer in good standing with Engineers Nova Scotia must certify to the Department's Engineer that the HMA meet the requirements under the QMP and the Department's standard specifications.

5.0 CONSTRUCTION METHODS.

5.1 Equipment and Additives.

5.1.1 WMA Foaming Equipment. The following list is approved for general use by the Department:

- Gencor Ultrafoam GX-2
- Astec Double Barrel Green System

The WMA foaming equipment must be equipped with a 'Cold Weather Package' including, but not limited to, wind screens for manifolds, electric or hot oil heating for manifolds, insulated and heat traced water lines, insulated and heated pump, insulated and heated water tank. All heating systems must activate automatically when temperatures drop to below 0°C. Water shall not contain any additives. Alternatively the water foaming system shall be installed such that all water can be removed from the foaming equipment, tanks, pump, lines etc. such that no freezing can occur during conditions where the temperature will drop below 0°C overnight or during work stoppages. The plant must be equipped with an alarm that shall sound immediately when the flow of water is impeded. Production of WMA shall cease immediately until the flow of water is resumed.

5.1.2 WMA Additives. The following list is approved for general use by the Department:

- Cecabase RT Bio 10
- Evotherm M1
- Advera WMA
- Zycotherm
- Zycotherm EZ

The WMA additives shall be used as per manufacturer recommendations. The maximum mixing/production temperature shall be as recommended by the manufacturer and shall not exceed 165°C unless otherwise approved by the Department's Engineer in consultation with Highway Construction Services staff.

5.1.3 Production Equipment. Asphalt Concrete production shall be balanced with the placement operation to ensure that specified compaction procedures are satisfied. The plant production rate must be adjusted such that the paver(s) move continuously.

5.1.4 Delivery Equipment. All loads of Asphalt Concrete shall be tarped. Tarps shall not be removed until just prior to unloading.

5.1.5 Placement Equipment. The contractor shall use a material transfer vehicle (MTV) under the QMP, where conditions permit, as per the Department's specifications. All other placement equipment shall satisfy the Department's specifications.

5.1.6 Compaction Equipment. The contractor shall use a suitable number and types of rollers to meet the minimum requirements as per the Department's standard specifications. The size, type and number of equipment used shall be identified in the QMP/PP. All pneumatic tired rollers shall be skirted as outlined in the Department's specifications.

5.2 Placement and Compaction. The contractor must demonstrate that they can achieve the minimum compaction requirements detailed in the Department's Standard Specification. The contractor shall ensure that all employees are trained and made aware of the importance of quality workmanship and how to achieve quality in changing, non-ideal cold weather paving conditions. The contractor shall detail a method (charts and/or software etc.) of determining compaction time(s) based on production temperatures, delivery time and temperature, lift thicknesses, base temperature and weather conditions (ambient temperatures and wind chill) to the satisfaction of the Department's Engineer.

6.0 QUALITY CONTROL / QUALITY ASSURANCE (QC/QA).

The QC/QA under the QMP shall satisfy the Department's Standard Specification. The Inspection Testing Plan (ITP) as detailed in the Department's specification shall be considered and, if necessary, the QMP should contain a revised ITP for cold weather paving.

The Department will perform Quality Assurance testing as stipulated in the Standard Specifications. The Department will also conduct random temperature audits during mixing, production and placement of Asphalt Concrete.