

MTO SPECIAL PROVISIONS (MTOSP) MANUAL

REVISION NO. 8

August 22, 2019

Details of recent changes to individual SSPs are noted in the table below and the associated documents are available for viewing and download, free of charge, from the MTO Technical Publications website at www.raqs.mto.gov.on.ca/techpubs/cded.nsf

Reference Code	Existing Version	New Version	Implementation Date In CPS	New (New), Revised (Rev), Cancelled (Can), Reissued (Rei)
100F08	June 2017	August 2019	August 22, 2019	Can: Protection of Public Traffic. SSP is cancelled. Replaced by SSP 100F68 and 199F01.
100F68	N/A	August 2019	August 22, 2019	New: Amendment to MTO General Conditions of Contract, November 2016 - Condition of the Working Area, and Maintaining Roadways and Detours. SSP is implemented. Replaces SSP 100F08.
100S69	N/A	August 2019	August 22, 2019	New: Amendment to MTO General Conditions of Contract, November 2016 - Use of WBCMS for Administering the Contract. SSP is implemented. Replaces HO Nssp CMO0001.
103F03	October 2018	August 2019	August 22, 2019	Rev: Amendment to OPSS 313, November 2016 - Construction Requirements for Hot Mix Asphalt - End Result. SSP is revised.
103S05	October 2018	August 2019	August 22, 2019	Rev: Amendment to OPSS 314, November 2015. SSP is revised.
111F06	October 2018	August 2019	August 22, 2019	Rev: Amendment to OPSS 1151, November 2016. SSP is revised.
199F01	N/A	August 2019	August 22, 2019	New: Temporary Roadway Closures. SSP is implemented. Replaces SSP 100F08.
199F45	N/A	August 2019	August 22, 2019	New: Seasonal Shutdown. SSP is implemented.
199S66	March 2018	August 2019	August 22, 2019	Rev: Quality Conformance Requirements. SSP is revised with the addition of the first sentence to Clause 3.3.2.
399F02	January 2017	August 2019	August 22, 2019	Rev: Requirements for Temporary Hot Mix Pavement. SSP is revised.
741S03	May 2019	August 2019	August 22, 2019	Rev: Amendment to OPSS 741, November 2014 - Requirements for Temporary Construction Barrier. SSP is revised with minor corrections and the addition of HV2 type barrier.

**AMENDMENT TO MTO GENERAL CONDITIONS OF CONTRACT, NOVEMBER 2016 -
Conditions of the Working Area, and Maintaining Roadways and Detours**

Special Provision No. 100F68

August 2019

GC 7.07 Condition of the Working Area

Clause GC 7.07 of the MTO General Conditions of Contract is amended by the addition of the following:

- .04 Materials or Equipment shall not be stored adjacent to the edge of lanes carrying traffic within:
- a) [* Designer Fill-In, See Notes to Designer] m, on roadways with a posted speed equal to or greater than 70 km/h, or within
 - b) [* Designer Fill-In, See Notes to Designer] m, on roadways with a posted speed of less than 70 km/h.

Upon permission from the Contract Administrator, the distances specified above may be reduced to a minimum of 2.5 m in medians only, and 4 m in all other areas.

- .05 The Contractor shall at no additional cost to the Owner, remove any vehicle, equipment or material which, in the opinion of the Contract Administrator, constitutes a traffic hazard or obstruction to maintenance operations.

GC 7.08 Maintaining Roadways and Detours

Clause GC 7.08 of the MTO General Conditions of Contract is amended by the addition of the following:

- .08 The Contractor shall schedule the Work so that there will be no open excavation adjacent to a lane carrying traffic overnight and/or on non-Working Days, except where a traffic barrier designed to restrain errant vehicles is located between the traffic and the excavation.

Open excavations adjacent to the edge of lanes carrying traffic within:

- a) [* Designer Fill-in, See Notes to Designer] m, on roadways with a posted speed equal to or greater than 70 km/h, or within
- b) [* Designer Fill-in, See Notes to Designer] m, on roadways with a posted speed of less than 70 km/h,

shall be backfilled and compacted as specified to provide a continuous surface from the travelled way, prior to closing down operations each day.

AMENDMENT TO MTO GENERAL CONDITIONS OF CONTRACT, NOVEMBER 2016 - Use of WBCMS for Administering the Contract

Special Provision No. 100S69

August 2019

GC 1.07 Definitions

Subsection GC 1.07 of the MTO General Conditions of Contract is amended by the addition of the following definition:

Web-Based Contract Management Services (WBCMS) means a browser based solution that provides an electronic means to record, collect, transmit and store Contract data.

GC 1.09 Interpretation of Certain Words

Subsection GC 1.09 of the MTO General Conditions of Contract is amended by the addition of the following:

03. Any reference in the Contract Documents to “Owner Standard Form” or “PH-CC” shall be deemed to mean the electronic equivalent of that form within WBCMS where such exists.
- .04 The words “write”, “notify”, “submit”, “issue”, “provide”, “execute”, “report”, “give”, “furnish”, “return”, “apply” and their variations, and other words referring to a communication from the Contractor to the Contract Administrator, or from the Contract Administrator to the Contractor, shall mean the word “electronically using WBCMS” (e.g., “writing electronically using WBCMS”, “notify electronically using WBCMS”).
- .05 When administering Contract data, references to the term “Service Provider” in WBCMS shall mean the “Contractor”.

GC 3.0 ADMINISTRATION OF THE CONTRACT

Section GC 3.0 of the MTO General Conditions of Contract, is amended by the addition of the following subsection:

GC 3.15 Use of WBCMS

- .01 WBCMS shall be used to administer Contract data. After Contract award, submissions shall only be accepted by the Ministry through WBCMS.
- .02 WBCMS replaces paper copies therefore it is mandatory to fill the electronic records with all necessary data. It is not acceptable to attach a scanned copy of the paper version, where an electronic record in WBCMS is available.
- .03 The Owner shall provide subscription information to the Contractor, including purchasing instructions, at the time of Contract award. The following requirements shall apply:
 - a) The Work shall not commence until WBCMS subscriptions have been purchased.
 - b) The Contractor shall ensure that a subscription is in place for each role within 5 Business Days of notification and maintained until issuance of the Contract Completion Certificate.

- c) The Contractor shall agree to the WBCMS terms of service at the time of purchasing subscriptions and abide by the terms and conditions for the duration of the Contract.
 - d) The Contractor shall purchase an annual subscription for each user in a role for each awarded Contract. The Contractor shall purchase and maintain a minimum of 3 subscriptions for the duration of the contract.
 - e) The Contractor shall maintain 1 Approval Role subscription until receipt of the Release from Warranty Certificate.
 - f) Subscriptions cost \$1350 plus HST per user, per role, per year, and are valid for one year from the date of purchase.
 - g) It is the sole responsibility of the Contractor to ensure that internet access is continuously available to all their users at the work location during construction operations.
 - h) The Contractor shall use a browser which is supported by WBCMS. Internet Explorer 11 is supported by WBCMS.
 - i) The Contractor shall record all activities using WBCMS and the information must be entered on a daily basis.
 - j) There shall be no additional costs to the Owner for using or accessing WBCMS.
- .04 The roles and responsibilities within WBCMS are defined as;
- a) Company User Administrator - Administers subscriptions, user profiles and assigns staff roles. This role does not require an annual subscription and cannot enter or review Contract data.
 - b) Field Role - Enters Contract data at the work location.
 - c) Office Role - Enters and reviews Contract data.
 - d) Approval Role - Reviews and approves field and office data. Any user in this role has the ability to bind the Contractor.
- .05 When the Contract Documents require the submission of multiple copies of a document, and the document is to be submitted using WBCMS, then only the electronic submission is required.
- .06 A document signed and sealed by one or more Engineer, Ontario Land Surveyor, Professional Geoscientist, or other professional licenced according to federal or provincial legislation shall be submitted electronically using WBCMS. In addition to the electronic submission, within 5 Business Days of the electronic submission using WBCMS, an original signed and sealed copy of the document shall be submitted by hand or by mail to the Contract Administrator.
- .07 Submission of records using WBCMS shall be the legal equivalent of a delivery of original signed documents or information by hand by an authorized representative of the Contractor or the Contract Administrator.

AMENDMENT TO OPSS 313, NOVEMBER 2016

Special Provision No. 103F03

August 2019

OPSS 313, November 2016, Construction Specification for Hot Mix Asphalt - End Result, is deleted in its entirety and replaced with the following:

313.01 SCOPE

This specification covers the requirements for the placement, compaction, and acceptance of hot mix asphalt (HMA).

This specification also covers the requirements for the placement, compaction, and acceptance of HMA produced using warm mix asphalt (WMA) technology when the tender item title includes “Warm Mix”.

313.02 REFERENCES

This specification refers to the following standards, specifications, or publications:

Ontario Provincial Standard Specifications, Construction

OPSS 308 Tack Coat

Ontario Provincial Standard Specifications, Material

OPSS 1101 Performance Graded Asphalt Cement
OPSS 1151 Superpave and Stone Mastic Asphalt Mixtures

Ontario Ministry of Transportation Publications

MTO Laboratory Testing Manual

LS-100 Rounding-Off of Test Data and Other Numbers
LS-101 Calculation of Per Cent within Limits
LS-262 Bulk Relative Density of Compacted Bituminous Mixtures
LS-264 Theoretical Maximum Relative Density of Bituminous Paving Mixtures
LS-265 Determination of Percent Air Voids in Compacted Dense Bituminous Pavement Mixtures
LS-266 Determination of VMA in Compacted Bituminous Mixtures
LS-282 Quantitative Extraction of Asphalt Cement and Analysis of Extracted Aggregate from Bituminous Paving Mixtures
LS-292 Quantitative Determination of Asphalt Cement Content by Ignition and Analysis of Remaining Aggregate from Bituminous Paving Mixtures
LS-294 Measuring Pavement Lift Thickness
LS-306 Bulk Relative Density of Compacted Bituminous Mixtures Using Paraffin Coated Specimens
LS-317 Determination of the Severity of a Segregated Asphalt Pavement Surface
LS-604 Relative Density and Absorption of Coarse Aggregate
LS-605 Relative Density and Absorption of Fine Aggregate

ASTM International

- D 6752-11 Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Automatic Vacuum Sealing Method
- E 178-16 Standard Practice for Dealing with Outlying Observations

American Association of State Highway and Transportation Officials (AASHTO)

- M 320-17 Standard Specification for Performance Graded Asphalt Binder
- R 35-17 Superpave Volumetric Design for Hot - Mix Asphalt
- T 166-16 Bulk Specific Gravity of Compacted Bituminous Mixtures Using Saturated Surface-Dry Specimens
- T 283-14 Standard Method of Test for Resistance of Compacted Asphalt Mixtures to Moisture-Induced Damage
- T 305-14 Determination of Draindown Characteristics in Uncompacted Asphalt Mixtures
- T 312-15 Standard Method of Test for Preparing and Determining the Density of Hot Mix Asphalt (HMA) Specimens by Means of the Superpave Gyrotory Compactor

313.03 DEFINITIONS

For the purpose of this specification, the following definitions apply:

Ambient Air Temperature means the air temperature measured in the shade and away from the paving operations.

Anti-Stripping Treatment (AST) means a treatment used to minimize stripping of asphalt cement from HMA aggregates as defined in OPSS 1151.

Asphalt Cement (AC) means asphalt binder as defined in OPSS 1101.

Attribute means one of the following properties: designated large sieve (DLS), 4.75 mm sieve, 75 µm sieve, AC content, air voids, lift thickness, VMA, draindown, or compaction.

Binder Course means a HMA course between a surface course and either a granular base course or stabilized base course, an existing pavement, or another HMA binder course.

Crack means a break in the pavement surface, a separation of the pavement or aggregates at the surface of the pavement, and separation of pavement joints, and includes breaks and separations previously repaired by sealing.

Design Lift Thickness (T_D) means the thickness in millimetres as specified in the Contract Documents of:

- a) A specified lift of asphalt mix measured by square metres, or
- b) For multiple binder course lifts of the same tender item, it means the combined specified thicknesses in millimetres of the successive binder course lifts of the same tender item, at the same location measured by square metres.

Designated Large Sieve (DLS) means a sieve size specifically designated for each mix type for gradation testing. The designated sieve for the following mix types is:

- a) 25.0 mm for Superpave 37.5;
- b) 19.0 mm for Superpave 25.0;
- c) 12.5 mm for SMA 19.0 and Superpave 19.0;

- d) 9.5 mm for SMA 12.5 and Superpave 12.5, 12.5FC 1 and 12.5FC 2; and
- e) 4.75 mm for SMA 9.5 and Superpave 9.5.

Draindown means that portion of SMA mixture, fines and AC, that separates and flows downwards through the mixture.

Fat Spot means an area of pavement where asphalt mastic has migrated to the surface creating a substantially blacker area than the surrounding pavement.

Field Adjustment to the JMF means a change in the target gradation, AC content, or both of a mix, within limits as specified in the Contract Documents without a redesign of the HMA, resulting in an adjusted JMF.

Hot Mix Asphalt (HMA) means hot mixed, hot laid asphaltic concrete and includes mix produced using WMA technologies. HMA may include recycled or specialty mixes.

Hot Mix Asphalt Miscellaneous means HMA that is placed in areas other than the roadway as specified in the Contract Documents.

Job Mix Formula (JMF) means the percentage passing on each designated sieve of the total mass of aggregate and the amount of AC as a percentage by mass of the mixture that are based on mix design procedures as specified in the Contract Documents.

Joint means a vertical contact between a HMA pavement course and any HMA pavement or any rigid object that exists at the time the HMA is laid.

Levelling Course means a HMA course of variable thickness used for correcting crossfall and profile deficiencies in the existing pavement prior to placing an HMA binder or surface course. Levelling course may also be referred to as a padding course.

Lift Thickness means the thickness in millimetres, measured according to LS-294, of:

- a) A single lift of asphalt mix measured by square metres, or
- b) For multiple binder course lifts of the same tender item, it means the combined thickness of all placed and compacted successive binder course lifts of the same tender item, at the same location measured by square metres.

Loose Mix means a representative sample of uncompacted HMA for testing mix properties.

Lot means a specific quantity of Material or a specific amount of construction.

Mean means the arithmetic average of the test results within a lot.

Mid-Lane Segregation means a continuous or discontinuous longitudinal “streak” of segregation, typically no greater than 300 mm in width located anywhere across the width of the lane.

Mix Properties means the AC content, gradation, air voids, and VMA.

Other Segregation means discrete areas or patches of regular, irregular, or chevron shape segregation.

Outlier means a test result that for a specific significance level is determined by statistical analysis not to be part of the test result population.

Padding means a HMA layer used to eliminate transverse and longitudinal irregularities on an existing surface before placing the binder or surface course.

Paving in Echelon means two or more pavers are used to pave multiple adjacent lanes simultaneously.

Payment Adjustment Sieves means the DLS, 4.75 mm, and 75 μ m gradation sieves.

Per Cent within Limits (PWL) means an estimate of the percentage of the lot that is within specification limits, determined by using the mean and standard deviation of the lot.

Performance Graded Asphalt Cement (PGAC) means an asphalt binder that is produced from petroleum residue, either with or without the addition of non-particulate modifiers, according to AASHTO M 320.

Quality Assurance (QA) means a system or series of activities carried out by the Owner to ensure that Materials received from the Contractor meet the requirements as specified in the Contract Documents.

Quality Control (QC) means a system or series of activities carried out by the Contractor to ensure that Materials supplied to the Owner meet the requirements as specified in the Contract Documents.

Random Sample means a sample from a location chosen by the Contract Administrator based on random numbers such that any portion of a lot or subplot has an equal probability of being selected.

Reclaimed Asphalt Pavement (RAP) means the processed HMA material that is recovered by partial or full depth removal.

Roof Shingle Tabs (RST) means ground roof shingle scrap generated when new shingles are trimmed during production.

Segregation means a condition of the pavement characterized by areas with comparatively coarser or finer texture than that of the surrounding pavement, with severity levels:

- a) Slight Segregation - a pavement matrix is in place between the coarse aggregate particles; however, there are slightly more, coarse aggregate particles in comparison with the surrounding acceptable mix.
- b) Medium Segregation - the pavement has significantly more, coarse aggregate particles than the surrounding acceptable mat and usually exhibits some lack of surface matrix.
- c) Severe Segregation - the pavement appears very coarse, with coarse aggregate particle against coarse aggregate particle and the pavement has little or no matrix.

Standard Deviation means the square root of the value determined by summing the squares of the difference between each test result and the mean of the test results divided by the number of test results minus one.

Stone Mastic Asphalt (SMA) means HMA consisting of a gap graded, stone-on-stone coarse aggregate skeleton with an asphalt cement-rich mortar.

SMA Mixes means SMA 9.5, SMA 12.5, and SMA 19.0.

Straight Edge means a straight edge made of metal with a level recessed in its upper surface parallel to the lower edge.

Superpave means a system for specifying material components and asphalt mix design using the Superpave gyratory compactor. It is an acronym for Superior Performing Asphalt Pavements.

Surface Course means the HMA wearing course of any flexible or composite pavement.

Through Lane means a traffic lane not intended for entering or exiting the roadway and does not include shoulders. Where there is more than one roadway, through lane refers to the traffic lane for the higher-class roadway.

Vertical Surface means all edges of concrete curbs, catch basins, appurtenances, longitudinal joints, and transverse joints for application of joint painting material.

Voids means air voids and voids in mineral aggregate (VMA).

Warm Mix Asphalt (WMA) means warm mixed, warm laid asphaltic concrete produced using technologies that allow for the mixing, handling and compaction of the asphaltic concrete mixture at a temperature typically 20 to 50 °C lower than conventional HMA.

313.04 DESIGN AND SUBMISSION REQUIREMENTS

313.04.01 Submission Requirements

Prior to the start of paving, the purchase price of the AC, in the form of a purchase order or other document signed by the Contractor's senior financial officer, shall be submitted to the Contract Administrator.

If the Contractor intends to store hot mix production in a silo, the planned times of hot mix production shall be submitted to the Contract Administrator with 1 Business Day advance notice.

Prior to the start of paving on bridge decks, the mass of the rollers, except for Class V rollers, to be used on bridge decks, shall be submitted to the Contract Administrator in writing. The minimum compaction temperature for HMA or WMA recommended by the AC supplier shall also be submitted to the Contract Administrator in writing.

A copy of the Technical Data Sheet and Safety Data Sheet of the release agent(s) shall be submitted to the Contract Administrator.

313.05 MATERIALS

313.05.01 Hot Mix Asphalt

HMA shall be according to OPSS 1151. Asphalt cement, tack coat, anti-stripping treatments, release agents, and other additives shall be compatible with the other components of the hot mix asphalt.

313.05.02 Tack Coat

Tack coat shall be according to OPSS 308.

313.05.03 Release Agents

No release agents shall be used that may adversely affect the quality or performance of the HMA. Release agents shall be used according to the proprietary requirements.

Petroleum based release agents, excess water, or excess release agents shall not be used.

313.05.04 Warm Mix Asphalt

WMA shall be according to OPSS 1151 and the following:

The mix shall be produced at a facility capable of producing the mix according to the WMA technology supplier's instructions for the use of their WMA technology. All information required for the proper preparation, handling, storage, and use of the WMA materials shall be obtained from the WMA technology supplier.

313.05.05 Grit for Stone Mastic Asphalt

Grit for SMA shall be as specified in the Contract Documents.

313.06 EQUIPMENT

313.06.01 Rollers

A Class R Roller is a self-propelled pneumatic-tired roller.

A Class S Roller is self-propelled steel-drum, tandem, or three-wheel roller.

A Class V Roller is a self-propelled vibratory roller specifically designed for HMA compaction having either dual vibratory rolls or a combination of vibratory roll and pneumatic tires with a contact area equal to or greater than 70% of the roll width.

313.06.01.01 Rollers for Granular Grade Preparation

Finish rolling for granular grade shall be accomplished using, as a minimum:

- a) A Class S roller with a minimum mass of 7 tonnes and minimum mass of 3.5 kg per mm total roll width,
or
- b) A Class V roller with a drum width of at least 1.2 m.

313.06.01.02 Rollers on Bridge Decks

Compaction shall be accomplished using, as a minimum:

- a) A Class S roller with a minimum mass of 9 tonnes and minimum mass of 4.5 kg per mm total roll width,
and
- b) A Class R roller with a minimum mass of 18 tonnes and minimum mass of 2,500 kg per tire.

If Class V rollers are used, they shall be used in static mode.

At the Contract Administrator's request, rollers shall be weighed in the presence of the Contract Administrator or a representative.

313.06.02 Diamond Grinding

A diamond grinder shall be power-driven, self-propelled, and designed for grinding HMA. It shall be equipped with a grinding head with at least 50 diamond blades per 300 mm of shaft. The grinding head shall

be at least 1.2 m wide. The grinder shall be equipped with the capability to adjust the depth, slope, and crossfall to remove HMA to the required profile and shall also include a slurry pick-up system.

313.07 CONSTRUCTION

313.07.01 Quality Control

QC procedures shall be conducted to ensure HMA meets the requirements of the Contract Documents. Interpretation of QC inspections, test results, and measurements and the determination of any action to be taken shall be carried out to ensure that the work is according to the requirements of the Contract Documents.

A single sample for QC purposes may be obtained at the same time and location as QA acceptance samples. No additional loose mix samples shall be taken from the placed mix.

If the Contractor wishes to obtain additional samples for QC purposes, up to three cores may be taken in each surface lot. For binder courses, the Contractor shall be permitted to obtain one thickness core for their use from each subplot for each binder lift, prior to placement of the surface course. Cores shall not be spaced closer than 1 m from any other core. If further additional samples are required, a written request shall be made to the Contract Administrator, and samples shall only be taken upon written approval of the Contract Administrator. All sample locations shall be restored as specified in the Contract Documents.

313.07.02 Laboratory Correlations

On request, the Contract Administrator shall provide the opportunity to conduct a correlation of mix properties or compaction or both between the QA and QC laboratories prior to placement of HMA. The correlation may occur once for each mix type and shall be a maximum of 3 samples per mix type.

The Contract Administrator shall be provided with the samples and all information required to conduct the correlation testing. The Contract Administrator shall submit the QA test results on completion of the correlation testing.

313.07.03 Preparation of Foundation and Existing Pavement

Prior to placing any course of HMA on:

- a) A granular grade, a Class S roller or an equivalent Class V roller shall be used to finish roll the grade ahead of the paver. The granular grade after rolling shall be a compacted, smooth, float-free surface, free from contamination of foreign materials. Any distortion that will impact the specified thickness of the pavement to be placed shall be repaired.
- b) HMA or concrete surfaces, the HMA and concrete surfaces shall be clean and free of all loose, broken, and foreign materials.
- c) Milled surfaces, the milled surface shall be clean of all loose, broken, and foreign materials and shall be swept with a power broom.

The Contractor shall be responsible for preparing the existing surface to be paved by milling or padding or a combination, as the Contractor deems necessary, to place and compact each lift to the thickness as specified in the Contract Documents, provided such corrections do not reduce the thickness of existing pavement materials or underlying materials by more than 5 mm below the general profile of the surrounding existing unground or unmilled pavement surface.

313.07.04 Correction of Pavement Beneath Surface Courses

Unless otherwise specified in the Contract Documents, the Contractor may correct any pavement course underlying the surface course by padding, milling, grinding or a combination, in order to meet the surface smoothness requirements. Padding shall be completed using a mix type acceptable to the Owner. The thickness of those pavements after milling or grinding shall not be reduced by more than 5 mm below the general profile of the surrounding unground or unmilled pavement surface. The milled surface shall not exceed 25 mm from ridge to ridge, and the ridge to valley depth of the milled surface shall not exceed 10 mm.

313.07.05 Tack Coat

Tack coat shall be applied to surfaces according to OPSS 308 prior to placing HMA.

313.07.06 Transportation of Hot Mix Asphalt

Truck boxes used to transport HMA shall be clean and, if required, lightly coated with a uniform application of a release agent. Truck boxes shall be drained after each application and before loading.

313.07.07 Placing Hot Mix Asphalt

313.07.07.01 Operational Constraints

Paving shall not be carried out if the roadbed is frozen. When placing the mixture on a granular grade, the granular grade shall not be saturated and shall be free of standing water. The surface of a pavement upon which HMA is to be placed shall be clean and dry at the time of HMA placement.

For paving on bridge decks, an HMA course shall not be placed over the waterproofing membrane and protection board until a minimum 4 hours has elapsed following completion of the waterproofing system or, until the waterproofing system has set sufficiently that the integrity of the waterproofing system is not jeopardized.

An HMA course shall not be placed upon a previously laid course until the temperature of the previous course is 50 °C or less. For a HMA lift thickness of 60 mm or less, this temperature shall be measured at the surface. For a HMA lift thickness greater than 60 mm, this temperature shall be measured internally.

HMA binder courses shall be not placed unless the ambient air temperature is at least 2 °C. HMA surface courses shall not be placed unless the ambient air temperature is at least 7 °C.

Public traffic shall not be permitted on freshly laid HMA until the temperature of the mat is 50 °C or less.

When WMA is used, the WMA technology supplier's recommendations for placing the WMA mix shall be followed. Placement and compaction temperatures of WMA shall be according to the WMA technology supplier's recommendations but shall also meet the operational constraints listed in this clause.

A lot shall be closed before paving begins on a different lot using the same tender item, the same mix design or both; unless otherwise allowed by the Contract Administrator.

313.07.07.02 Paving

313.07.07.02.01 General

Levelling, binder, and surface courses shall be laid by means of mechanical self-propelled pavers. Prior to roller compaction, obvious defects in the HMA placed shall be corrected. Irregularities in the alignment and grade along the outside edges shall be corrected. Excess HMA shall not be cast onto the surface of the freshly laid mat. After final compaction of each course the surface shall be smooth and true to the established crown and grade, uniform in texture and shall be free of any defects, including but not limited to, cracks, segregation, fat spots, oil spills, chatter, and roller marks.

If the Contractor's actions fail to prevent continued medium or severe segregation regardless of cause, the Contract Administrator may instruct the Contractor to cease paving until the problem has been corrected.

All through lane paving courses shall be completed prior to the placement of adjacent sideroads, speed change lanes, and other paved areas.

HMA shall be placed and compacted to the thickness as specified in the Contract Documents for each lift.

At the end of each completed portion of the lanes and prior to opening them to traffic, the ends of completed sections of HMA course shall be temporarily ramped down to the existing pavement according to the Temporary Ramp Downs clause.

If paving is being carried out under lane closures, paving shall be completed to the same station for the full pavement width, including paved shoulders, prior to the roadway being reopened to traffic except as noted in the Partial Paving of Full Pavement Width clause.

313.07.07.02.02 Paving in Echelon

For the purpose of laying levelling, binder and surface courses as required under this Contract, paving in echelon [* Designer Fill-in, See Notes to Designer] for [** Designer Fill-in, See Notes to Designer].

When paving in echelon, the pavers shall be operated at the same time within 60 m of the next paver so that a hot joint is obtained between the lanes of HMA being placed. Should one paver break down while placing levelling, binder, or surface course, the Contract Administrator may permit the day's work to be completed with the remaining paver only.

313.07.07.02.03 Paving on Bridge Decks

The temperature of the HMA immediately after spreading shall be equal to or greater than the minimum temperature recommended by the AC supplier. When the HMA is produced using WMA technology, the temperature of the WMA immediately after spreading shall be equal to or greater than the minimum temperature recommended by the WMA technology supplier. Breakdown rolling shall commence immediately after spreading.

313.07.07.02.04 Paving Widening and Irregular Sections

The HMA shall be placed in widenings such that the top of the compacted HMA is placed to the top of the existing pavement. When stepped joints are specified in the Contract Documents, the layers placed in the widening shall be placed to the top of each step in separate operations. HMA shall be placed in the widening using equipment specially designed for this purpose.

In turnouts, driveways, and other irregular sections, other methods may be used to spread and finish the HMA.

313.07.07.02.05 Partial Paving of Full Pavement Width

[*** Designer Option, See Notes to Designer]

313.07.07.02.06 Temporary Ramp Downs

HMA courses shall be temporarily ramped down to the existing pavement at a slope of 120H:1V transversely. Transverse ramp downs shall not form part of the permanent pavement and shall be removed prior to paving of the adjacent section.

Where longitudinal ramp downs are permitted or if, due to unforeseen circumstances such as equipment breakdown occurring during paving, paving cannot be completed to the same station across the full pavement width, the HMA course shall be temporarily ramped down to the existing pavement at a slope of 10H:1V. Only one temporary longitudinal ramp down shall be in place across the width of the pavement at any time. The temporary longitudinal ramp down shall not form part of the permanent pavement and shall be removed prior to paving the adjacent section. The adjacent paving shall be completed such that the ramping is not in place more than 5 Days.

Loose particles generated during construction of the longitudinal or transverse ramp downs or both shall be removed from the roadway surface prior to re-opening the roadway to traffic. Temporary ramp downs shall remain intact and in place until they are removed prior to paving the adjacent section.

Temporary ramp downs shall be removed to produce a straight clean vertical surface for the full depth of the course prior to paving the adjacent lane or shoulder. After removal of the temporary longitudinal ramp down, traffic shall not be permitted to cross over the vertical surface at the longitudinal edge before the adjacent paving is completed.

313.07.07.03 Longitudinal and Transverse Joints

313.07.07.03.01 General

All joints shall be made to obtain a complete bond between the two pavement edges and a smooth riding surface. The existing or previously placed pavement edge shall be a straight clean vertical surface for the full depth of the course. Where ramping or damage has occurred, trimming shall be required. All dirt or other foreign material and all loose material shall be removed from all vertical surfaces.

313.07.07.03.02 Longitudinal Joints

The longitudinal joints shall be parallel to the lane and visually uniform longitudinally. The width of subsequent courses shall be staggered to an offset of 150 to 300 mm so that longitudinal joints do not coincide. The longitudinal joints in the surface course shall be offset 50 mm from the edge of the demarcation between the lanes as specified in the Contract Documents.

313.07.07.03.03 Transverse Joints at Limits of Paving

Joints between HMA pavement laid under this Contract and existing HMA courses not laid under the Contract shall be constructed as follows:

- a) Where a binder course is placed flush against an existing HMA pavement and a butt joint is to be made, the existing pavement shall be trimmed back to form a straight vertical surface.
- b) Where a surface course is placed flush against an existing HMA pavement, a butt joint shall be prepared by removing the existing pavement to the full depth of the existing surface course, to form a straight vertical surface, and for a longitudinal distance not less than 5 m so that the surface course placed has a thickness equal to the full depth of the existing surface course over the 5 m section.
- c) Where a binder course and surface course are not placed flush against an existing HMA pavement, the binder course shall be feathered out removing the existing surface course to a minimum depth of not less than 40 mm, to form a straight vertical surface, and for a longitudinal distance not less than 5 m so that the surface course placed has a minimum thickness of 40 mm over the 5 m section.
- d) Where multiple courses are placed flush against an existing HMA pavement, the joint for each course shall be offset at least 150 mm from the joint on the course below.

313.07.07.04 Compaction

Compaction of the HMA shall be conducted using appropriate methods and equipment to provide a uniformly compacted mat according to the requirements of this Contract. Class R rollers shall not be used to compact SMA.

At all places not accessible to rollers, the HMA shall be compacted by mechanical self-powered gas-, electric-, or air-powered equipment.

313.07.07.05 Gritting of Stone Mastic Asphalt

Hot grit shall be embedded in the SMA surface as specified in the Contract Documents.

313.07.08 Field Adjustments to the Job Mix Formula

The Contractor shall be permitted to adjust the JMF to more closely reflect the mix being produced. The number of field adjustments to the JMF shall be limited to three for each mix design submitted, one prior to the start of production and a maximum of two during production. Field adjustments to the JMF shall be limited in scope such that the net impact of all field adjustments to the JMF does not exceed any of the maximum field adjustments to the JMF in Table 1 in comparison to the original JMF submitted under the current mix design.

JMF adjustments shall not be accepted once placement of the specific mix type has been completed. The adjusted JMF shall be submitted in writing on a form supplied by the Contract Administrator. Upon receipt of the JMF adjustment submission, the Contract Administrator shall give a written confirmation of receipt of the adjusted JMF. Within 1 Business Day of receipt of the JMF adjustment, the Contract Administrator shall give written notice confirming conformance to the Contract requirements or advising of any non-conformance. The revised JMF may be applied to the lot being placed at the time the confirmation of receipt of the revised JMF is issued and the previous lot, if requested by the Contractor as part of the written submission for a JMF change. If this request is not made, the revised JMF shall only apply to mix placed subsequent to the receipt of the revised JMF.

313.07.09 Sampling

313.07.09.01 Asphalt Cement

Samples of the AC shall be taken according to OPSS 1101.

When the selected WMA technology requires that additives be added to the AC, the samples for acceptance of the AC shall be taken after the additive has been added to the AC.

313.07.09.02 Hot Mix Asphalt Aggregates for Density Testing

The Contractor shall procure samples for RAP and the aggregates identified in the mix design for each mix type using methods as specified in the Contract Documents. The first set of samples shall be taken no later than 10 Days prior to the start of production of the first lot of HMA. Subsequent samples shall be taken immediately following the completion of 15,000 tonnes \pm 1,000 tonnes of mix production, and thereafter at further intervals of 20,000 tonnes as required. The aggregate and RAP sampling program shall be established in consultation with the Contract Administrator prior to paving. If the Contractor determines that a sampling interval needs to be reduced to reflect changes in the aggregate properties, the Contract Administrator shall be notified, and samples shall be taken as warranted only when directed by the Contract Administrator.

A set of two samples shall be taken. One of these samples shall be for QA testing and the other shall be for referee testing. Samples for QA and referee testing shall be obtained concurrently.

Each sample shall be clearly identified as to the date of sampling, the lot number, and the tender item hot mix tonnage being produced when the sample was taken.

313.07.09.03 Hot Mix Asphalt Mix Properties

Samples shall be appropriately labelled with the Contract number, highway number, Region, lot number, subplot number, mix type, lift number, station, and date and time of sampling.

The Contract Administrator shall advise the Contractor of each random sample location or the tonnage from which the sample is to be taken. A set of two samples shall be taken as per Table 2. One of these samples shall be for QA testing and the other shall be for referee testing. Samples for QA and referee testing shall be obtained concurrently.

When the mass of the sample does not meet the requirements of Table 2, the sample shall be discarded and a new one taken immediately.

The SMA sample for draindown testing shall coincide with one of the other subplot samples as designated by the Contract Administrator. The samples shall be transferred to a clean stainless steel bowl or pan of suitable size, immediately after splitting, for delivery to the QA laboratory.

If the Owner's QA laboratory chooses LS-292, the Contractor shall provide, for each mix design, two sets of samples consisting of:

- a) 2 one-litre cans of AC,
- b) 25 kilograms of each aggregate type, and
- c) 1 kilogram of baghouse fines, if used in the mix design.

One sample is for Owner's QA testing and the other for referee testing for the purpose of ignition oven calibration, including aggregate correction factors. The samples shall be submitted to the Owner's QA laboratory at least 5 Business Days prior to the start of paving with the applicable HMA type. If materials have changed from the mix design, an additional two sets of samples, as detailed above shall be provided.

313.07.09.04 Compaction

Upon completion of each subplot, the Contract Administrator shall submit in writing, notification of each random sample location. Pavement core samples shall be obtained in duplicate, from each subplot no later than the next Business Day after the completion of the subplot. Each core shall meet the following requirements:

- a) Have a minimum nominal diameter of 150 mm and a maximum nominal diameter of 200 mm, and
- b) Consist of the full layer being sampled and at least one underlying layer, if one is present.

Cores shall not be taken within 250 mm of a longitudinal or transverse joint or the edge of pavement. Cores for compaction shall not be taken on bridge decks.

Each set of samples shall be taken from the same lane, same transverse offset, and at a spacing of 1.0 m ± 0.1 m between each individual core edge.

Care shall be taken to ensure that cores are not damaged during coring operations or in transit. If a core is damaged, a replacement core shall be extracted at a location adjacent to the original core.

Core samples shall also include design lift thickness on the label. The lot and subplot numbers shall be clearly marked with a permanent marker on all compaction cores.

HMA and compaction requirements for filling the sample holes shall be the same as the adjacent undisturbed pavement. Sample holes shall be cleaned, dried, and filled and then compacted using a mechanical self-powered gas-, electric-, or air-powered compactor immediately after sampling.

A 1 litre sample of the release agent(s) shall be delivered to the Contract Administrator upon request.

313.07.09.05 Warm Mix Asphalt

Samples of WMA shall be obtained at the paver from sublots according to Table 2 for moisture sensitivity testing. The sublots are to be selected randomly from the sublots identified for mix properties by the Contract Administrator. These samples shall be designated for QA testing for moisture sensitivity as per AASHTO T 283. A complete sample data sheet shall accompany the samples. The data sheet shall also identify corresponding mix properties lot/sublot number and that the samples are for moisture sensitivity testing. Moisture sensitivity testing is required for information only.

313.07.09.06 Lift Thickness

For HMA tender items measured by square metres, single cores consisting of all lifts placed shall be used to evaluate the lift thickness of all lifts. Sample locations shall be determined based on the surface area of the upper most lift placed on the Contract.

All areas of hot mix paving within the Contract limits, including paved shoulders, shall be sampled for lift thickness with the following exceptions:

- a) Detours and other temporary pavement.
- b) Miscellaneous hot mix.
- c) Bridge decks.

[**** Designer Option, See Notes to Designer]

Upon completion of each subplot of the upper most lift specified, the Contract Administrator shall submit in writing, notification of the location to be used for sampling. One pavement core sample shall be obtained from each subplot not later than the next Day after the completion of the subplot of the upper most lift specified. This one core shall be used for both QA and referee testing.

Each core shall have a nominal diameter of 50 mm and shall consist of all the specified hot mix lifts placed in the subplot and at least one underlying hot mix layer if one exists. Each core shall have its vertical side cored perpendicular to the upper surface of the core. Each sample shall be placed in a suitable container to protect the sample integrity during transport and until testing. The subplot number shall be clearly marked with a permanent marker on each core. In addition, the sample documentation as specified elsewhere in the Contract Documents shall also note the number of lifts for which the thickness measurements are required and mix type for each.

No replacement thickness cores shall be obtained for QA or referee testing. When a core thickness is reported as “indeterminate”, a new 150 mm core shall be taken centred over the subplot’s previously taken 50 mm core.

Holes resulting from the removal of thickness core samples shall be cleaned, dried and filled with a material acceptable to the Contract Administrator immediately after sampling.

313.07.10 Identification of Warm Mix Asphalt Paving Limits

When WMA is used, GPS coordinates for the WMA paving limits shall be submitted to the Contract Administrator no later than 7 Days after completion of WMA paving.

313.07.11 Management of Excess Material

Management of excess material shall be according to the Contract Documents.

313.08 QUALITY ASSURANCE

313.08.01 Acceptance Criteria

Acceptance of HMA shall be based on the following criteria:

- a) AC Physical Requirements
- b) Mix Properties and Compaction
- c) Surface Tolerance
- d) Surface Appearance
- e) Surface Smoothness
- f) Lift Thickness
- g) Geometrics and Longitudinal Joint Location

313.08.01.01 Asphalt Cement Physical Requirements

The Contract Administrator shall determine the acceptability of the AC according to OPSS 1101 and requirements specified elsewhere in the Contract Documents.

When the selected WMA technology requires that additives be added to the AC, acceptance of the AC shall be based on the samples that contain the WMA additive subject to the conditions as specified in the Contract Documents. The Contractor may request that an allowance be made for the impact of the WMA and AST on

a PGAC grade for QA or referee purposes provided that when production begins the Contractor submits to the Contract Administrator complete AASHTO M 320 test results for the following:

- a) AC with WMA and AST at the percentage identified in the mix design.
- b) AC without the additives.

The combined allowance shall be limited to maximum 2 °C colder than the high temperature grade or maximum 2 °C warmer than the low temperature grade.

313.08.01.02 Mix Properties and Compaction

313.08.01.02.01 Lot Size

313.08.01.02.01.01 General

The Contract Administrator shall determine the size and location of the lots and sublots, after discussion with the Contractor and before HMA production for the tender item starts. Guidelines for the breakdown of the tender item quantity into lots are as listed in Table 3.

When only one or two sublots are completed at the end of paving for the tender item due to a change in the JMF or when a delay of more than 20 Business Days occurs in placing the complete lot, the test results obtained shall be considered as part of the previous lot and the previous lot shall then have 11 or 12 sublots. When only 3 to 9 sublots are completed due to the above circumstances, then the 3 to 9 sublots shall be considered as a lot.

When a delay of more than 20 Business Days occurs in placing the complete lot and this lot shall be completed during the same calendar year, the Contractor may, prior to the end of the 20 Business Days, request in writing to the Contract Administrator that the lot be continued upon the resumption of paving for that tender item. If the request is not made or is not accepted by the Contract Administrator, the lot shall be terminated and evaluated for acceptance.

313.08.01.02.01.02 Optional Surface Trial

When the surface hot mix tender item is 5,000 tonnes or more, an optional trial of one lot, not exceeding 500 tonnes, with one subplot shall be permitted. The trial shall be placed in a binder course, and the lift thickness shall not be greater than 60 mm. If the Contractor elects to place this optional trial, the Contract Administrator shall be advised in writing prior to placing the trial lot. The optional trial shall not be placed in a critical location such as bridge decks. The optional trial lot will be treated as a small quantity lot for basis of acceptance and payment.

313.08.01.02.01.03 Lot Size for Bridge Decks

Hot mix placed on a bridge deck should be treated as a separate lot. Where hot mix is placed in multiple stages, each stage shall be treated as a separate lot.

The lot shall be either a single subplot or divided into 3 approximately equal sublots as determined by the Contract Administrator, in consultation with the Contractor.

313.08.01.02.01.04 Lot Size for Tonnage Tender Items

Lot size is generally 5,000 tonnes. Sublots are generally 500 tonnes, however, subplot sizes may be adjusted to ensure a minimum of 3 sublots per lot.

When the tender item quantity is less than 1,000 tonnes, the sublots shall be determined by the Contract Administrator based upon such testing as is deemed necessary by the Contract Administrator to determine substantial conformance with the Contract.

313.08.01.02.01.05 Lot Size for Square Metre Tender Items

For lift thicknesses in the order of 40 to 50 mm, lot size is generally 40,000 m² with sublots of 4,000 m², however, subplot sizes may be adjusted to ensure a minimum of 3 sublots per lot. For lift thicknesses in the order of 60 to 80 mm, the lot size would generally be adjusted to 25,000 m² with sublots of 2,500 m².

When the tender item quantity is less than 4,000 m², the sublots shall be determined by the Contract Administrator based upon such testing as is deemed necessary by the Contract Administrator to determine substantial conformance with the Contract.

313.08.01.02.02 Acceptance Testing

The Owner shall conduct tests, carry out calculations and provide values according to Table 4. The Contractor shall be provided with results from the completed tests.

The QA laboratory shall conduct density tests for RAP and aggregates identified in the mix design for each mix type using methods as specified in the Contract Documents.

When new aggregate samples are received, QA density testing on the new aggregate samples shall be conducted and the calculation of VMA for the subsequent lot(s) shall be based on the densities of the most recent QA samples submitted. When a change in aggregate density is noted, a request shall be made to the Contract Administrator that new samples be obtained between routine random samples. The Contractor shall also state in the sample request if the current lot will be closed or, if the lot will be completed and the new density tests results will not be used for calculation of VMA until the next lot.. The submitted request shall meet Contract Administrator's satisfaction prior to changes being made to sampling.

313.08.01.02.03 Basis of Acceptance

Acceptance for all mixes for mix properties and compaction is based on the lot PWL for each attribute, excluding VMA. PWL shall be determined using lot test results, LS-101, and lower and upper limits as specified in Table 5. The PWL of the lot for each criterion shall be used to determine the payment adjustment factor from Table 6. If the PWL is less than 50% for AC content, air voids or compaction, or less than 25% for any payment adjustment sieve, the lot is rejectable and shall be subject to repair or payment adjustment. VMA shall meet the minimum mix design requirements according to OPSS 1151 for each lot and payment shall be based on the lot mean as specified in the Payment Factor for Voids clause. If the VMA payment factor is less than 0.500, the lot shall be considered rejectable. SMA lots shall be considered rejectable if the draindown is more than 0.3%.

When the tender item quantity is less than 1,000 tonnes, the HMA may be accepted by the Contract Administrator based upon such testing as is deemed necessary by the Contract Administrator to determine substantial conformance with the Contract. When 3 or more tests have been completed for a lot the Material

shall be accepted at the full Contract price, subjected to a payment adjustment or rejected as specified in Contract Documents.

Any lot comprised of one or two sublots, shall not be subject to payment adjustment unless the mix is rejectable. Acceptance for these lots shall be on a subplot by subplot basis. The subplot shall be considered acceptable if the AC content, gradation, air voids, and compaction of each subplot comply with the limits specified in Table 5, and the VMA shall be no more than 0.50% below the design minimum. Mix that does not comply with the requirements shall be considered rejectable.

The Contract Administrator shall determine if a rejectable lot may remain in the work without repairs. When the Contract Administrator has determined that a rejectable lot may remain in the work without repair, the lot shall be subjected to an additional payment adjustment reflecting the extent of the non-conformance as determined by the Contract Administrator. If the Contractor elects to repair the lot in lieu of a payment adjustment, or if the Contract Administrator determines that a rejectable lot requires repair, the lot shall be repaired and re-evaluated as specified in the Repairs for Mix Properties and Compaction clause.

313.08.01.02.04 Referee Testing

A single request for referee testing for a given lot can only be invoked by the Contractor within 5 Business Days of the Contractor receiving the Contract Administrator's calculated QA payment factors for that lot. Referee testing for aggregate density can only be invoked by the Contractor within 5 Business Days of the Contractor receiving the test results for aggregate density.

For mix properties and compaction, the Contractor may request testing by a referee laboratory for the entire lot, or a maximum of two sublots from that lot. Referee testing shall fall into one of three categories:

- a) Mix properties only,
- b) Compaction only, or
- c) Mix properties and compaction.

The Contractor may request referee testing for determining the draindown of a SMA sample.

The referee laboratory shall use the same test method as the QA laboratory except that when the QA laboratory chooses LS-292, the referee laboratory shall use that method provided the calibration requirements are met. If they are not met, the referee laboratory shall use LS-282.

When referee testing of mix properties is invoked, the referee laboratory shall conduct all necessary testing, with the exception of the combined aggregate density which shall be supplied by the Contact Administrator.

When referee testing for compaction is invoked, the referee laboratory shall determine the MRD of the loose mix sample for the subplot, and this value shall be used in the calculation of compaction for the referee core.

The results generated by the referee laboratory shall be used to re-evaluate the lot to determine the payment factors for the acceptance of the disputed properties for the disputed lots of HMA. The referee test results are binding on both the Owner and the Contractor.

313.08.01.02.05 Outliers in Referee Results

Where an entire lot of 3 or more sublots has been referee tested, the Contractor may question an individual value for any attribute of a subplot's test result, excluding VMA. The request shall be made within 3 Business Days of the Contractor receiving all of the test results for the lot, and only when the payment factor for the

attribute with an outlier is less than 1.0. The validity of the questioned attribute shall be ascertained in accordance with ASTM E 178 using a T test at a 10% significance level.

If the T test procedure shows that the questioned value of the attribute is not an outlier, then the test result shall be used in the calculations. If the T test procedure shows that the questioned value of the attribute is an outlier, then the test result for the subplot shall be checked for mathematical errors. If there are no mathematical errors, the subplot with the outlier is treated as a lot with one subplot and the remaining sublots shall form a separate lot with no further consideration for outliers.

If only two sublots remain, the two sublots shall be treated as two separate lots each with one subplot.

313.08.01.03 Surface Tolerance

The surface tolerances of any pavement surface shall be such that when tested with a 3 m straight edge placed anywhere, including the edge of the pavement, in any direction on the surface, except across the crown or drainage gutters, there shall not be a gap between the bottom of the straight edge and the surface of the pavement:

- a) Greater than 6 mm for all binder courses, levelling courses and padding, or
- b) Greater than 3 mm for all surface courses.

The Contractor shall provide all traffic control, as required, for the Owner to conduct surface tolerance measurements. All tolerance-related repairs shall be carried out according to the Repairs subsection.

Longitudinal joints shall be constructed such that the elevation difference across the longitudinal joints shall not exceed 5 mm, when measured with a straight edge placed on the asphalt surface with the higher elevation and overhanging the joint by not more than 50 mm. All joints which exceed the 5 mm tolerance shall be repaired such that the tolerance is met.

313.08.01.04 Surface Appearance

HMA deemed by visual appearance to have flushing, bleeding, segregation, fat spot, surface damage, cracking, chatter, or surface contamination but not limited to these, shall be considered deficient material or work. The Contractor shall provide traffic control, for all surface appearance assessments. Deficient material, mixture, and work shall be removed and replaced or repaired or assessed a payment reduction.

313.08.01.04.01 Segregation

HMA exhibiting medium or severe mid-lane segregation shall be assessed a payment reduction or shall be repaired at the discretion of the Contract Administrator.

From the time the Contract Administrator provides notification of mid-lane segregation, a maximum of 500 tonnes of HMA may be placed, to demonstrate the effectiveness of any repairs or adjustments or both made to a defective paver. The repairs or adjustments or both shall be demonstrated to the Contract Administrator. If the repairs or adjustments or both to the paver do not eliminate midlane segregation to the satisfaction of the Contract Administrator within the allowable 500 tonnes of HMA, then the use of that paver shall be discontinued.

Other segregation shall be addressed in accordance with the following:

- a) Slightly segregated mix shall be accepted into the work with no payment reduction.

- b) Medium segregation in levelling courses or padding with a thickness greater than 40 mm, and binder courses shall normally be left in place with no payment reduction. However, any areas of medium segregation that deteriorates prior to being overlaid by another pavement course shall be repaired at no cost to the Owner.
- c) Medium segregation in surface courses shall be assessed a payment reduction or repaired at the discretion of the Contract Administrator.
- d) Severely segregated mix shall be repaired by removal and replacement.

Levelling courses and padding with a total thickness less than 40 mm, bullnoses, and tapers that were not machine-laid and any areas of handwork shall not be assessed on the basis of segregation but on the basis of other workmanship-related problems. However, if they deteriorate prior to being overlaid by another pavement course, the Contract Administrator shall assess the causes of the deterioration before determining responsibility for the cost of repairs.

313.08.01.04.02 Challenging Severity of Segregation

The Contractor may challenge, in writing, the severity of any segregated area assessed as either medium or severe, within 5 Business Days of receiving the Owner’s first visual assessment. The written challenge shall list the dimensions and the Contractor’s assessment of the severity of each disputed area.

For Contracts with up to 30,000 tonnes of HMA, the Contractor shall be allowed a maximum of two separate written challenges for each tender item. However, for Contracts with more than 30,000 tonnes of HMA, the Contractor shall be allowed a maximum of four separate written challenges for each tender item. Each written challenge may involve more than one disputed segregated area.

A representative of the Owner, who did not carry out the original assessment and who is not the Contract Administrator shall make a second visual assessment of the disputed areas. This second visual assessment shall be carried out within 5 Business Days after the Contract Administrator has received the Contractor’s written challenge and the results of that second visual assessment shall be binding on both the Owner and Contractor.

The Contractor may further challenge the Owner’s second visual assessment of the segregation severity, if the segregation has occurred in any one of the mixes listed in Table 7. Such a challenge shall be resolved by a representative of the Owner determining the Macrotexture Ratio, according to LS-317. Table 7 shall be used with the Macrotexture Ratio to determine the degree of severity and the disposition of the disputed area of segregation. The results of that testing shall be binding on both the Owner and the Contractor.

313.08.01.05 Acceptance Criteria for Surface Smoothness

The acceptability of surface smoothness shall be as specified in the Contract Documents.

313.08.01.06 Lift Thickness for Square Metre Tender Items

313.08.01.06.01 Lot Size

The Contract Administrator shall determine the size and location of the lots and sublots for thickness before hot mix production for the tender item starts.

There shall be one lot consisting of all square metre tender items when the entire Contract has the same number of lifts and tender items throughout. There shall be a separate lot for areas with:

- a) Different number of lifts,
- b) Different tender items, or
- c) Both.

Each lot shall be divided into sublots, corresponding to the area of the upper most lift, which generally is the surface course. Sublots shall normally be 2,000 m² in size. A minimum of 3 sublots are required for each lot.

313.08.01.06.02 Acceptance Testing

The Owner shall conduct tests, carry out calculations, and provide values according to Table 4. The Contract Administrator shall provide the Contractor with a copy of each lift thickness measurement for each lift placed at each sample location upon completion of the subplot measurement.

313.08.01.06.03 Basis of Acceptance

The acceptance of lift thickness is based on subplot lift thickness measurements and lot mean lift thickness of the tender item. The Contract Administrator shall calculate the thickness payment adjustment for the lot once all measurements for the lot have been completed.

Sublot lift thickness shall be acceptable if they are equal to or greater than the minimum subplot lift thickness as specified in Table 8 for the tender item's T_D .

The subplot shall be deemed rejectable and shall be repaired if:

- a) The lift thickness measurement is less than the minimum subplot lift thickness as specified in Table 8, or
- b) For successive binder lifts of the same tender item, the combined lift thickness for these successive lifts is less than the minimum subplot lift thickness as specified in Table 8.

When a lift thickness lot contains any subplot that is deemed rejectable, the lot is rejectable until the subplot has been repaired and re-evaluated as acceptable. When the Contract Administrator allows a rejectable subplot to remain in place without repair, the Contractor shall receive a payment reduction for the subplot according to the Payment Adjustment for Lift Thickness clause. A subplot lift thickness measurement for a rejectable subplot that receives a payment reduction shall not be used to assess the lot mean for the tender item.

The Contract Administrator shall calculate the lot mean lift thickness for each tender item to one decimal point and the lot thickness payment adjustment based on all the subplot lift thickness measurements in the lot, according to LS-101 and Table 9. If the lot mean lift thickness for the surface course tender item is less than 85% of the T_D the lot is rejectable.

The Owner shall determine if a rejectable lot may remain in the work without repairs. When the Owner has determined that a rejectable lot may remain in the work without repair, the lot shall be subjected to a payment reduction as determined by the Owner.

313.08.01.06.04 Referee Testing

The Contractor may only challenge an individual lift thickness measurement by requesting referee testing within 5 Business Days of the Contractor receiving the subplot lift thickness measurement and shall submit the request in writing to the Contract Administrator. The Contractor shall then have the opportunity to view the re-measurement of the QA designated pavement core for that subplot at an alternative Owner designated QA laboratory together with the Owner's representative. The re-measurement shall include the individual lift

thickness that was challenged and shall also include any other lifts or combination of lifts in the core. The re-measured lift thickness measurements shall be considered binding and shall replace the original lift thickness measurements for assessment of all lifts measured for the core.

313.08.01.07 Geometrics and Longitudinal Joint Location

313.08.01.07.01 General

After final compaction, the HMA shall be smooth and true to the design profile and cross-section and constructed to the design width.

313.08.01.07.02 Pavement Width

The Contract Administrator shall conduct random spot checks of the width of each binder and surface course HMA lift for acceptance. The Contractor shall provide and maintain offset stakes on both sides of the roadway, or other identifiers acceptable to the Contract Administrator, for use in checking the pavement width at 25 m maximum intervals until the Contract Administrator advises the Contractor that the stakes or identifiers are no longer required.

The width of each lift shall be accepted provided:

- a) The outside edges of the lanes and the paved shoulders are parallel to the centreline and visually uniform.
- b) The width across all the adjacent lanes from the outside edge to outside edge is not less than the sum of the specified lane widths, and
- c) The width of the paved shoulders is not less than the paved shoulder width as specified in the Contract Documents.

If the width is not acceptable at any location, the Contract Administrator shall notify the Contractor in writing that the pavement is rejectable, and the Contractor shall submit a written proposal for corrective action to the Contract Administrator within 3 Business Days of receiving the notification.

313.08.01.07.03 Longitudinal Joint Location

Longitudinal joints not meeting the Contract requirements shall be removed and replaced or assessed a payment reduction.

313.08.02 Repairs

313.08.02.01 General

The Contractor shall perform all repairs at no cost to the Owner.

All transverse joints in surface course repairs shall butt up to a full depth vertical surface. Repairs shall consist of the removal and replacement of the full thickness of the hot mix lift or the placement of an overlay when permitted by the Contract Administrator. A paver shall be used in carrying out the repair.

Repairs shall be full lane or full shoulder width except where localized repairs are allowed as specified in the Contract Documents.

The materials and the construction of repairs shall meet the requirements as specified in the Contract Documents.

The limits and type of repairs shall be subject to the approval of the Contract Administrator and shall be approved prior to the repair being carried out.

Repairs of an urgent nature, including moderate to very severe aggregate loss, moderate to very severe flushing, and wheel track rutting 16 mm in depth or greater shall be repaired within 7 Days, unless extended by mutual agreement.

With the exception of urgent repairs, repairs shall be completed within 60 Days or prior to seasonal shutdown each year, whichever is the lesser, unless extended by mutual agreement.

313.08.02.02 Repairs for Mix Properties and Compaction

The Contractor may elect to carry out repairs in lieu of accepting a payment adjustment, if the lot is not rejectable and the total payment factor for the lot is less than 0.940. When the Contract Administrator requires a rejectable lot to be repaired or the Contractor elects to carry out repairs in lieu of accepting a payment adjustment, the Contractor shall determine what areas of HMA in a lot are to be repaired subject to the minimum lengths and widths as specified in the Contract Documents. Each repair area shall include at least one of the loose mix or compaction core sample locations or both representing that subplot.

The minimum length of a single-repair to one lane shall be 250 m. The minimum length of a single-repair that extends over more than one lane shall be 250 lane-metres and no portion of the single-repair in a lane shall be less than 125 m in length.

The minimum limits of each repair shall be at least 125 lane-metres from the location of the loose mix or compaction core or both that represents the subplot; otherwise, a repair limit shall coincide with one end of the subplot when the sample location is less than 125 lane-metres from it. If the proposed limit of a single-repair falls within the proposed limit of another single-repair, the overlap shall count towards the 250 lane-metre minimum for both repairs. Repair areas within a single lane shall be separated by at least 100 m. If the delineation of repair areas results in patches less than 100 m apart, these repair areas shall be re-established to form a continuous repair.

The Contractor shall submit a list and sketch identifying the proposed locations of the repairs to the Contract Administrator for review at least 5 Business Days prior to the intended start of the repair work. Each subplot and single-repair shall be uniquely labelled. Overlapping repair areas and discontinuous portions of a single-repair shall be labelled so that they are readily identified with their single-repair.

Prior to the repair, the Contractor shall take slab samples or cores for testing of mix properties or compaction or both in the unrepaired area within 1 m of the limits of each end of the repair area. The Contractor shall not be permitted to take additional samples or cores beyond these locations until after QA or referee testing demonstrates that the remaining Material in the subplot proposed for repair is deemed to be rejectable. If the proposed repair limit coincides with the beginning of a subplot that is being left unrepaired, samples are not required at this location. Sufficient material shall be obtained for testing by the Owner's QA laboratory and for possible referee testing.

Testing shall demonstrate that the remaining Material in the subplot proposed for repair is not rejectable. To determine if the mix is rejectable, the mix properties and compaction shall comply with the basis of acceptance of lots with one or two sublots. If the Material is deemed to be rejectable, the proposed limit of the repair shall be extended by a minimum of 25 m, and the sampling and testing repeated. The repair area selected by the Contractor shall incorporate the location used for obtaining samples that shall be used to confirm that the remaining mix is not rejectable. If the contractor's repair proposal results in the removal of

at least half the subplot tonnage, the Contract Administrator may waive testing demonstrating the suitability of the remainder of that subplot.

The unrepaired sublots combined with the unrepaired areas of any repaired sublots shall comprise one lot and shall be assessed based on the loose mix and core samples representing the unrepaired sublots. When a repaired subplot consists of two or more separate unrepaired areas, the Contract Administrator shall decide whether to combine these unrepaired areas as one subplot or to consider each unrepaired area as a separate subplot. If there are only one or two sublots in a lot that are not repaired, the Contract Administrator shall include those sublots as part of the previous or next lot.

The mix used for the repair shall comprise a separate lot or the Contract Administrator in conjunction with the Contractor may decide to include it as part of the current lot being produced. The repaired area shall be tested for all criteria.

The two reconfigured lots shall be accepted at the full Contract price, subjected to a payment adjustment according to the Payment Adjustment for Mix Properties and Compaction clause, or rejected.

313.08.02.03 Repairs for Surface Tolerance

All areas not meeting the surface tolerance requirements shall be repaired by diamond grinding to a maximum of 5 mm or removed and replaced. Slurry produced from diamond grinding shall be removed from the site by the Contractor and managed as specified in the Contract Documents. The repaired areas shall be re-evaluated for surface tolerance acceptance by means of a 3 m straight edge as specified in Surface Tolerance clause.

313.08.02.04 Repairs for Segregation

Repairs for segregation shall meet the requirements of the General Repairs clause. In binder courses, localized repairs for mid-lane segregation less than 300 mm in width are permitted.

313.08.02.05 Repairs for Thickness

The Contractor shall not be permitted to make any repairs solely to correct for excess lift thickness.

The minimum length of a repair is the entire length of the subplot being repaired.

Acceptance for lift thickness of the repaired subplot shall be based on the individual subplot lift thickness measurement and the lot thickness payment adjustment shall be calculated based on the re-evaluated subplot measurement.

313.09 MEASUREMENT FOR PAYMENT

313.09.01 Actual Measurement

- 313.09.01.01 SMA 9.5**
- SMA 9.5 - ... mm Lift Thickness**
- SMA 12.5**
- SMA 12.5 - ... mm Lift Thickness**
- SMA 19.0**
- SMA 19.0 - ... mm Lift Thickness**
- Superpave 4.75**
- Superpave 9.5**

Superpave 9.5 - ... mm Lift Thickness
Superpave 12.5
Superpave 12.5 - ... mm Lift Thickness
Superpave 12.5 - Warm Mix
Superpave 12.5 - Warm Mix - ... mm Lift Thickness
Superpave 12.5FC 1
Superpave 12.5FC 1 - ... mm Lift Thickness
Superpave 12.5FC 1 - Warm Mix
Superpave 12.5FC 1 - Warm Mix - ... mm Lift Thickness
Superpave 12.5FC 2
Superpave 12.5FC 2 - ... mm Lift Thickness
Superpave 12.5FC 2 - Warm Mix
Superpave 12.5FC 2 - Warm Mix - ... mm Lift Thickness
Superpave 19.0
Superpave 19.0 - ... mm Lift Thickness
Superpave 19.0 - Warm Mix
Superpave 19.0 - Warm Mix - ... mm Lift Thickness
Superpave 25.0
Superpave 25.0 - ... mm Lift Thickness
Superpave 25.0 - Warm Mix
Superpave 25.0 - Warm Mix - ... mm Lift Thickness
Superpave 37.5
Hot Mix Asphalt Miscellaneous

313.09.01.01.01 By Area

Measurement of HMA by area shall be the horizontal area in square metres in place.

The quantities of HMA used for temporary ramping shall not be measured for payment. The removal of HMA used for temporary ramping shall not be measured for payment.

313.09.01.01.02 Tonne to Square Metre Conversion

When the unit of measure for a HMA tender item is square metres, and the Contract Documents refer to a quantity of mix for that tender item in tonnes and the Contract Documents do not already modify the quantity to relate to square metres, the Contract Administrator shall determine the theoretical HMA quantity in square metres (Q_A) that shall replace the non-payment tonnage quantity (Q_t) references as follows:

$$Q_A = Q_t / [0.975 \times BRD_{MD} \times (T_D/1000)] \quad \text{(Formula 1)}$$

Where:

BRD_{MD} = the bulk relative density in t/m^3 , provided in the HMA design submitted for mix, the Q_A is calculated for

T_D = the design thickness, in millimetres, of the mix

Q_t = non-payment tonnage quantity referred to elsewhere in the Contract Documents for the mix under the measurement by square metre tender item

313.09.01.01.03 By Mass

Measurement of HMA by mass shall be in tonnes according to the requirements of the Contract Documents.

The quantities of HMA used for temporary ramping shall not be measured for payment. The removal of HMA used for temporary ramping shall not be measured for payment.

313.09.01.02 Hot Mix Asphalt Miscellaneous

Measurement of HMA Miscellaneous shall be by area in square metres, regardless of the number of lifts placed.

313.09.02 Plan Quantity Measurement

When measurement is by Plan Quantity, such measurement is based on the units shown in the clauses under Actual Measurement. The Plan Quantity shall not be adjusted due to any of the exceptions specified in the Lift Thickness clause under the Sampling clause.

313.10 BASIS OF PAYMENT

313.10.01 Hot Mix

- 313.10.01.01 SMA 9.5 - Item**
- SMA 9.5 - ... mm Lift Thickness - Item**
- SMA 12.5 - Item**
- SMA 12.5 - ... mm Lift Thickness - Item**
- SMA 19.0 - Item**
- SMA 19.0 - ... mm Lift Thickness - Item**
- Superpave 4.75 - Item**
- Superpave 9.5 - Item**
- Superpave 9.5 - ... mm Lift Thickness - Item**
- Superpave 12.5 - Item**
- Superpave 12.5 - ... mm Lift Thickness - Item**
- Superpave 12.5 - Warm Mix - Item**
- Superpave 12.5 - Warm Mix - ... mm Lift Thickness - Item**
- Superpave 12.5FC 1 - Item**
- Superpave 12.5FC 1 - ... mm Lift Thickness - Item**
- Superpave 12.5FC 1 - Warm Mix - Item**
- Superpave 12.5FC 1 - Warm Mix - ... mm Lift Thickness - Item**
- Superpave 12.5FC 2 - Item**
- Superpave 12.5FC 2 - ... mm Lift Thickness - Item**
- Superpave 12.5FC 2 - Warm Mix - Item**
- Superpave 12.5FC 2 - Warm Mix - ... mm Lift Thickness - Item**
- Superpave 19.0 - Item**
- Superpave 19.0 - ... mm Lift Thickness - Item**
- Superpave 19.0 - Warm Mix - Item**
- Superpave 19.0 - Warm Mix - ... mm Lift Thickness - Item**
- Superpave 25.0 - Item**
- Superpave 25.0 - ... mm Lift Thickness - Item**
- Superpave 25.0 - Warm Mix - Item**
- Superpave 25.0 - Warm Mix - ... mm Lift Thickness - Item**
- Superpave 37.5 - Item**
- Hot Mix Asphalt Miscellaneous - Item**

Payment at the Contract price for the above tender items shall include full compensation for all labour, Equipment, and Materials required to do the work (including the HMA quantities used for temporary ramping), the removal of HMA used for temporary ramping, and the applicable payment adjustments.

When repairing HMA, the Contractor shall be responsible for and shall carry out all associated work and replace or restore all associated damage and removals at no cost to the Owner.

When the Contract Administrator instructs the Contractor to cease paving due to continued medium or severe segregation regardless of cause, the Owner shall not be held responsible for any additional costs that the Contractor may incur.

The preparation and correction of existing surfaces and pavement beneath surface courses carried out in order to meet the requirements of the Contract Documents, including milling, padding, and diamond grinding, shall be at no cost to the Owner.

313.10.01.02 Payment Adjustment for Mix Properties and Compaction

For all mixes, when the Contractor is not required to or does not elect to repair a lot, the payment adjustment for that lot due to mix properties and compaction requirements shall be:

$$PA_{MC} = \text{lot quantity} \times \text{price} \times [PF_{MC} - 1.000] \quad (\text{Formula 2})$$

Where:

- PA_{MC} = payment adjustment for mix properties and compaction
lot quantity = the quantity of the mix in the lot. For SMA 19.0, SMA 12.5, SMA 9.5, Superpave 12.5FC 1, and Superpave 12.5FC 2 tender items measured by tonnage, the lot quantity is the quantity of the mix in the lot multiplied by the applicable mass multiplier factor (MF) in the Payment Adjustment for Aggregate Density clause.
price = the Contract price of the hot mix tender item
 PF_{MC} = payment factor for mix properties and compaction

For all mixes, when the PF_{MC} is:

- a) Less than 1.000, there shall be a reduction in payment, and
- b) Equal to 1.000 there shall be no adjustment.

313.10.01.02.01 Calculations

313.10.01.02.01.01 General

The PF_{MC} shall be based on the individual payment factors obtained from Table 6, based on PWL, determined for gradation, AC content, voids, and compaction using LS-101, Table 5, and the formulae in the Payment Factor for Gradation clause, the Payment Factor for Combined Gradation and Asphalt Cement Content clause, the Payment Factor for Voids clause, the Payment Factor for Combined Mix Properties clause, and the Payment Factor for Combined Mix Properties and Compaction clause. Rounding-off procedures for all calculations shall follow LS-100.

When there is no sampling or testing specified in the Contract Documents for an attribute or when the requirement for sampling or testing for an attribute is waived by the Owner, the payment factor for that attribute shall be equal to the payment factor it is added to in Formulae 5, 10, 11 or 12.

313.10.01.02.01.02 Payment Factor for Gradation

The payment factor for gradation shall be calculated using the following formulae:

For Superpave 37.5, Superpave 25.0, Superpave 19.0, Superpave 12.5, Superpave 12.5FC 1, Superpave 12.5FC 2, SMA 19.0, and SMA12.5:

$$PF_G = (PF_{DLS} + PF_{4.75} + PF_{75}) / 3 \quad (\text{Formula 3})$$

For Superpave 9.5, Superpave 4.75, and SMA 9.5:

$$PF_G = (PF_{4.75} + PF_{75}) / 2 \quad (\text{Formula 4})$$

Where:

- PF_G = payment factor for gradation
- PF_{DLS} = payment factor for designated large sieve
- PF_{4.75} = payment factor for the 4.75 mm sieve
- PF₇₅ = payment factor for the 75 µm sieve

313.10.01.02.01.03 Payment Factor for Combined Gradation and Asphalt Cement Content

The payment factor for combined gradation and AC content shall be calculated using the following formula:

$$PF_{GAC} = (PF_G + PF_{AC}) / 2 \quad (\text{Formula 5})$$

Where:

- PF_{AC} = payment factor for AC content
- PF_{GAC} = payment factor for combined gradation and AC content

313.10.01.02.01.04 Payment Factor for Voids

For Superpave mixes, if the lot mean VMA is not more than 0.5 per cent below the minimum VMA as specified in the Contract Documents for mix design purposes, the payment factor for VMA is 1.000. For lot mean VMA results more than 0.5 per cent lower than the minimum specified for mix design purposes, a payment factor for the subject lot shall be calculated in accordance with the following:

$$\text{If } (VMA_{\min} - VMA_{\text{mean}}) \geq 2.5, \text{ then } PF_{VMA} = 0.0 \quad (\text{Formula 6})$$

$$\text{If } (VMA_{\min} - VMA_{\text{mean}}) < 2.5 \text{ then, } PF_{VMA} = 0.8000 - 0.4 \times (VMA_{\min} - 0.5 - VMA_{\text{mean}}) \quad (\text{Formula 7})$$

Where:

- PF_{VMA} = payment factor for VMA
- VMA_{mean} = lot mean VMA
- VMA_{min} = minimum VMA specified for mix design

For Superpave mixes, the payment factor for VMA shall be compared to the payment factor for air voids and the lesser of the two is the payment factor for voids (PF_{VOIDS}).

For SMA mixes, if the lot mean VMA is not more than 1.0 per cent below the minimum VMA as specified in the Contract Documents for mix design purposes, the payment factor for VMA is 1.000. For lot mean VMA results more than 1.0 per cent lower than the minimum specified for mix design purposes, a payment factor for the subject lot shall be calculated in accordance with the following:

If $(VMA_{min} - VMA_{mean}) \geq 3.0$, then $PF_{VMA} = 0.0$ (Formula 8)

If $(VMA_{min} - VMA_{mean}) < 3.0$ then, $PF_{VMA} = 0.8000 - 0.4 \times (VMA_{min} - 1.0 - VMA_{mean})$ (Formula 9)

Where:

PF_{VMA} = payment factor for VMA

VMA_{mean} = lot mean VMA

VMA_{min} = minimum VMA specified for mix design

For SMA mixes, the payment factor for VMA shall be compared to the payment factor for air voids and the lesser of the two is the payment factor for voids (PF_{VOIDS}).

313.10.01.02.01.05 Payment Factor for Combined Mix Properties

The payment factor for combined mix properties shall be calculated using the following formula:

$$PF_M = (PF_{GAC} + PF_{VOIDS}) / 2 \quad \text{(Formula 10)}$$

Where:

PF_M = payment factor for combined mix properties

313.10.01.02.01.06 Payment Factor for Combined Mix Properties and Compaction

The payment factor for combined mix properties and compaction shall be calculated using Formula 11.

$$PF_{MC} = (PF_C + PF_M) / 2 \quad \text{(Formula 11)}$$

Where:

PF_C = payment factor for compaction

The PF_{MC} shall be rounded and reported to four decimal places.

When the Contract Administrator decides that the unrepaired area of an original lot that has been partially repaired shall not be resampled, the PF_{MC} for the unrepaired area shall be 1.000.

313.10.01.02.01.07 Small Quantity Lots

For any lot comprised of one or two sublots, each subplot shall be assigned a PF_{MC} of 1.000 if the subplot is not rejectable. If the subplot is determined to be rejectable, it shall be administered as described in the Repairs for Mix Properties and Compaction clause. When the Owner has determined that a rejectable subplot may remain in the work without repair, the lot shall be subjected to a payment adjustment reflecting the extent of the non-conformance as determined by the Owner.

313.10.01.03 Payment Adjustment for Surface Smoothness

Payment adjustment for surface smoothness shall be as specified in the Contract Documents.

313.10.01.04 Payment Adjustment for Segregated HMA

For all surface courses, where payment reduction for segregation is allowed in lieu of repairs, the payment reduction shall be calculated as follows:

- a) \$2,000 once for each applicable surface course tender item,
- b) An additional payment reduction of \$2.50/m for mid-lane segregation, and
- c) An additional payment reduction of \$5.00/m² for other segregation. The area of repair shall be computed by multiplying the full lane width by the length of the repair and rounded to the next whole square metre.

313.10.01.05 Payment Adjustment for Aggregate Density

For Superpave 12.5FC 1, Superpave 12.5FC 2, SMA 19.0, SMA 12.5, and SMA 9.5 tender items measured in tonnes, the tender quantity is based on reference densities according to Table 10. A payment adjustment for aggregate density for each lot for these tender items shall be calculated by the following formulae:

$$MF = D_R / (BRD_{mix}) \quad \text{(Formula 12)}$$

$$PA_{AD} = M_{mix} \times \text{Contract Price} \times [MF - 1.000] \quad \text{(Formula 13)}$$

Where:

- D_R = the reference density in t/m³, as specified in Table 10
- BRD_{mix} = the lot average bulk relative density in t/m³, calculated from values obtained in the testing of bulk samples obtained during production. The values shall be the same as those used in calculating the final air voids payment factor for the lot.
- PA_{AD} = payment adjustment for aggregate density
- M_{mix} = the weighed mass of the mix in the lot incorporated into the work
- MF = the mass multiplier factor calculated to 3 decimal places
- Contract Price = the Contract price of the tender item for the mix

For all mixes, when the mass multiplier factor is:

- a) Less than 1.000 there shall be a reduction in payment,
- b) Equal to 1.000 there shall be no adjustment, and
- c) Greater than 1.000 there shall be an increase in payment for the lot.

There shall be no payment adjustment for aggregate density for HMA tender items measured by square metres.

313.10.01.06 Payment Adjustment for Asphalt Cement Content and Changes in the Price Index

313.10.01.06.01 Hot Mix Asphalt Quantity Calculation

The quantity of HMA for use in the calculations (T_{mix}) shall be the tonnage of HMA accepted into the work.

When the unit of measure is square metres, T_{mix} shall be determined using the theoretical tonnage. The theoretical tonnage shall be calculated by the Contract Administrator as follows and rounded to one decimal according to LS-100:

$$T_{mix} = [0.975 \times BRD_{mix} \times (T_D / 1000) \times A_{mix}] \quad \text{(Formula 14)}$$

Where:

- BRD_{mix} = the lot average bulk relative density in t/m³, calculated from values obtained in the testing of bulk samples obtained during production of the first complete lot of at least 3 sublots of HMA

placed in the work. The values shall be the same as those used in calculating the final payment factor for air voids for the lot.

T_D = the design thickness, in millimetres, of the HMA
 A_{mix} = area of hot mix placed in square metres

313.10.01.06.02 Payment Adjustment for Asphalt Cement Content

The payment adjustment for AC content shall be calculated using the following formula:

$$PA_{AC} = T_{mix} \times [Price_{AC} \times (AC_{ERS} - AC_{BID})/100] \quad \text{(Formula 15)}$$

Where:

PA_{AC} = payment adjustment for asphalt cement content
 T_{mix} = the quantity of the HMA accepted into the lot according to the Hot Mix Asphalt Quantity Calculation clause
 $Price_{AC}$ = the purchase price per tonne of the AC used in the mix according to the invoice submitted as per the Submission Requirements subsection
 AC_{ERS} = the average percentage by mass of AC in the lot
 AC_{BID} = the percentage by mass of AC specified for bidding purposes elsewhere in the Contract Documents. For SMA mixes select a minimum AC Content from Table 5 of OPSS 11151 based on combined aggregate bulk relative density from first set of QA samples

For progress payment purposes, payment adjustments are made on the monthly progress payment certificate for the months in which hot mix paving occurs.

313.10.01.06.03 Payment Adjustment for Changes in the Asphalt Cement Price Index

A payment adjustment is applied based on changes to the Ministry's PGAC price index unless the Contractor opts out by notifying the Ministry in writing within 5 Business Days of receiving permission to start work. Once the Contractor has opted out of payment adjustments based on the price index, the Contractor shall not be permitted to opt back in. The price index is published monthly in the Contract Bulletin. The price index is used to calculate the amount of the payment adjustment per tonne of new AC accepted into the Work.

The price index is based on the price, excluding taxes, FOB the depots in the Toronto area, of AC grade PG 58-28 or equivalent. One index is used to establish and calculate the payment adjustment for all grades.

A payment adjustment per tonne of new AC is established for each month in which paving occurs when the price index for the month differs by more than 5% from the price index for the month prior to Tender Opening. When the price index differential is less than 5%, there is no payment adjustment established for that month. Payment adjustments due to changes in the price index are independent of any other payment adjustments made to the hot mix tender items.

The payment adjustment for the month is calculated from the formulae in Table 11.

The payment adjustment per tonne applies to the quantity of new AC in the HMA accepted into the Work during the month for which it is established. The quantity of new AC includes all grades of AC supplied by the Contractor with and without polymer modifiers.

For each month in which a payment adjustment has been established, the quantity is calculated using the HMA quantity accepted into the Work and its corresponding AC content as required by the JMF except for mixes which contain reclaimed asphalt pavement.

For mixes which contain reclaimed asphalt pavement the percentage of new AC is determined from the difference between the AC content required by the JMF and the AC content of the reclaimed asphalt pavement incorporated into the HMA, as calculated by the Contract Administrator.

For mixes containing an AST-AC, the percentage of AST-AC is deducted from the percentage of new AC. No other deductions are made for any other additives.

For progress payment purposes, payment adjustments are made on the monthly progress payment certificate for the months in which HMA paving occurs.

313.10.01.07 Payment Adjustment for Lift Thickness

The payment adjustment for lift thickness shall apply to all placed and compacted HMA measured by square metre tender items using the horizontal area of the surface course in the lot. When the thickness payment adjustment is determined using a T_L calculated using a combination of tender items, the thickness payment adjustment shall apply to each binder course tender item included in T_L . The thickness payment adjustment shall be a reduction in payment. The formulae provided in Table 9 shall be used to calculate the thickness payment adjustment for each tender item. The lot payment adjustment shall be the sum of the payment adjustments calculated for each tender item.

When a rejectable subplot remains in the work without repair, the rejectable lifts in the subplot shall be subject to a payment reduction. The thickness payment adjustment for each rejectable lift shall be:

$$PA_T = 0.5 \times (\text{subplot quantity} \times \text{Contract price}) \quad (\text{Formula 16})$$

Where:

- PA_T = subplot payment adjustment for each rejectable lift
- subplot quantity = the area of the subplot
- Contract price = the Contract price of the tender item for the lift

313.10.02 Anti-Stripping Treatments

When aggregates have been processed from commercial sources for use in hot mix surface course paving, payment at the Contract price for the applicable HMA tender item shall be full compensation for all labour, Equipment, and Materials required to test, supply, and incorporate, the AST.

When aggregates have been processed from MTO/Crown, Wayside, and/or Letter of Approval quarries for use in hot mix surface course paving and the use of an AST was required, payment at the Contract price for the applicable HMA tender item shall be full compensation for all Labour, Equipment, and Materials required to test, supply, and incorporate the AST. When hydrated lime is used as the AST, payment includes full compensation for the amount up to 1.0% by mass of total dry aggregate. When an alternate AST-AGG is used as the AST, payment includes full compensation for the amount up to the listed minimum dosage from the DSM listing for Anti-Stripping Treatments by mass of aggregate. When an AST-AC is used as the AST, payment includes full compensation for the amount up to the listed minimum dosage from the DSM listing for Anti-Stripping Treatments by mass of AC. Payment for additional AST above the listed minimum dosages shall be administered as a Change in the Work.

313.10.03 Hot Mix Asphalt Miscellaneous

Payment at the Contract price for the above tender item shall be full compensation for all labour, Equipment, and Materials to do the work except that the HMA Material shall be paid for under the appropriate HMA tender item.

313.10.04 Tack Coat

Where there is no separate tender item for tack coat, payment at the Contract price for the applicable HMA tender item to be placed on the tack coat shall be full compensation for all labour, Equipment, and Materials for the tack coating.

313.10.05 Repair

No payment shall be made for the:

- a) Quantity of HMA that is removed and replaced, overlaid, or otherwise repaired; or
- b) For additional shouldering, traffic control, and other work such as zone painting or bridge deck waterproofing.

When:

- a) In lieu of a reduction in payment, the Contractor repairs the lot, subplot, or visually defective HMA; or
- b) The Contract Administrator has determined that a rejectable lot or subplot requires repair;

the Contractor shall be charged for all additional testing resulting from a repair to a lot at the rates established by the Owner for the year in which the testing was carried out.

No additional payment shall be made to the Contractor for the cost of tolerance measurements of the repaired areas that are required by the Contract Administrator.

313.10.06 Referee Testing and Segregation Challenge

313.10.06.01 Mix Properties and Compaction

If the referee test results show that the referee payment factor for compaction or mix properties is higher than the payment factor for compaction or mix properties based on the original QA test results by more than 0.025 and the referee results show that the lot is not rejectable, the Owner shall bear the cost of the referee testing for that attribute.

If the referee test results show that the lot is rejectable or the referee test results show that the referee payment factor for compaction or mix properties is not higher than the payment factor for compaction or mix properties based on the original QA test results by more than 0.025, the Contractor shall be charged the cost of the referee testing.

For density testing of aggregates, if referee testing is invoked, the cost of referee testing is assigned as follows:

- a) If the combined aggregate density as determined by the referee laboratory is within 0.010 of the result determined by the QA laboratory, the cost of referee testing shall be borne by the Contractor.
- b) If the referee result is between 0.011 and 0.020 of the QA result, the cost of referee testing shall be shared equally between the Contractor and Owner.

- c) If the difference in results is equal to or in excess of 0.020, the cost of referee testing shall be borne by the Owner.

When there is an outlier in the referee test results, the Contractor shall be charged 50% of the total cost for referee testing of all sublots in the original lot.

The cost of the referee testing shall be based on the referee testing rates as specified elsewhere in the Contract Documents.

313.10.06.02 Lift Thickness

If the referee test result is at least 3 mm greater than the original QA test result, the Owner shall bear the cost of the thickness measurement referee testing. If the referee test result is not 3.0 mm or greater than the original QA test result for the subplot retested, the Contractor shall be charged the cost of the referee testing.

313.10.06.03 Segregation Challenge

If, under a challenge, as described in the Challenging Severity of Segregation clause, the Contractor is successful, the Owner shall pay for the cost of the traffic control, if the traffic control was not necessary for any other reason. The Owner shall not be responsible for any other costs associated with the second visual assessment, including the cost of delays.

If the Contractor is not successful, the Contractor shall be responsible for all costs associated with the second visual assessment, including the cost of traffic control and delays.

**TABLE 1
Maximum Field Adjustments for JMF**

JMF Properties	Maximum Field Adjustment % (Notes 1 and 2)
AC content (all mixes except SMA mixes)	± 0.2
AC content (SMA mixes only)	± 0.4
Per cent RAP	- 5.0
Per cent passing 26.5 mm, 25.0 mm, 19.0 mm, and 16.0 mm sieves	± 5.0
Per cent passing 13.2 mm, 12.5 mm, and 9.5 mm sieves	± 4.0
Per cent passing 4.75 mm, 2.36 mm, and 1.18 mm sieves	± 3.0
Per cent passing 300, and 150 µm sieves	No limits
Per cent passing 75 µm sieve (all mixes except SMA mixes)	± 1.0
Per cent passing 75 µm sieve (SMA mixes only)	± 2.0
Notes:	
1. The maximum field adjustment is applied against the original JMF submitted with the mix design.	
2. The adjusted JMF shall meet the requirements of the Contract, including AC content and gradation on all sieves.	

TABLE 2
Sample Size and Frequency

Material	Sample Size	Frequency of Sampling
SMA mixes, Superpave 9.5, 12.5, 12.5FC 1, 12.5FC 2, and 19.0 (Note 1)	20 to 30 kg or 30 to 40 kg (Note 2)	Every subplot
Superpave 25.0 and 37.5 (Note 1)	25 to 35 kg or 35 to 45 kg (Note 2)	Every subplot
HMA Compaction Cores	150 to 200 mm diameter	Every mix properties subplot
HMA Thickness Cores	50 mm diameter	Every thickness subplot
HMA Aggregates for Density Testing	Coarse aggregate 10 kg Fine aggregate, RAP 5 kg	First sample to be taken at least 10 Days prior to producing first HMA lot; second sample at 15,000 tonnes; thereafter every 20,000 tonnes or when new samples requested
SMA mixes for draindown testing	3 to 5 kg	Once per lot
WMA for moisture sensitivity testing (Note 1)	50 kg	3 sublots per mix type
<p>Notes:</p> <ol style="list-style-type: none"> Each material sample receptacle shall have a maximum mass of 30 kg. For ease of handling, especially when the larger sample size is required, splitting of material at the paving site is permitted such that a sample is contained in a maximum of two receptacles whose total mass does not exceed the maximum specified above. Once delivered to testing laboratories, combining of the material from the two receptacles is only mandatory if a single receptacle contains insufficient material to carry out the full suite of tests required. The larger sample size shall be applicable when samples are designated for testing to the maximum number of gyrations. The frequency of the larger samples shall be one per lot, as designated by the Contract Administrator. 		

TABLE 3
Breakdown of the Tender Item Quantity into Lots for Mix Properties and Compaction

Number of Tonnes	Quantity of Square Metres		Number of Lots
	40 to 50 mm Lift Thickness	60 to 80 mm Lift Thickness	
< 5,000	40,000	25,000	1
5,000 to 10,000	40,000 to 80,000	25,000 to 50,000	2
10,000 to 12,000	80,000 to 100,000	50,000 to 60,000	2 or 3 (Note 1)
> 12,000	> 100,000	> 60,000	3 +
<p>Notes:</p> <ol style="list-style-type: none"> As determined by the Contract Administrator in consultation with the Contractor. 			

**TABLE 4
Testing Requirements**

Properties and Attributes	Testing Method	Calculations, Values, and Results Required
Mix Properties		
AC Content and Aggregate Gradation for mix samples	LS-282 or LS-292	% AC, % passing DLS sieve, 4.75 mm sieve, 75 µm sieve
Volumetric Properties		
Laboratory Compaction to: i. Design number of gyrations (N_{des}) ii. Maximum number of gyrations (N_{max}) Maximum Theoretical Specific Gravity (G_{mm})	AASHTO T 166 using the same laboratory compaction protocol as was used in mix design. (Note 1) AASHTO T 312, LS-264 Superpave Mixes only: in addition to compacting all samples to the design number of gyrations, one sample from each lot of HMA shall be compacted to the maximum number of gyrations. Bulk Relative Density for mix samples, BRD_m	BRD_m BRD at N_{des} BRD at N_{ini} BRD at N_{max} G_{mm} $\% G_{mm}$ @ N_{ini} $\% G_{mm}$ @ N_{des} $\% G_{mm}$ @ N_{max}
Voids in Mineral Aggregate (VMA)	LS-604, LS-605, LS-266 (Note 2) G_{sb} = combined bulk relative density of blended coarse and blended fine aggregates	G_{sb} VMA
Voids Filled with Asphalt (VFA)	AASHTO R 35	VFA
Air voids for mix (V_a)	LS-265	V_a
Dust to Binder Ratio (D_p) for Superpave mixes	AASHTO R 35	D_p
Compaction		
Compaction and Thickness of Cores	BRD_c = Bulk Relative Density for core samples, LS-262 (Note 1) $MRD_m = G_{mm}$ (Maximum Relative Density for loose mix samples, LS-264) $\% \text{ Compaction} = (100 \times BRD_c / MRD_m)$	Thickness of Core $\% \text{ Compaction}$
Lift Thickness		
Thickness of Cores	LS-294	Lift Thickness
SMA Mix Properties		
Draindown for mix	AASHTO T 305	$\% \text{ Draindown}$
WMA Mix Properties		
WMA Moisture Sensitivity	AASHTO T 283 including Table 1	TSR Visual Stripping Rating
<p>Notes:</p> <ol style="list-style-type: none"> For all gyratory-compacted specimens and cores of SMA mixes and Superpave mixes, if the per cent water absorbed by the specimen is found to exceed 2% by volume, as described in AASHTO T 166, then the bulk relative density shall be determined using either LS-306 or ASTM D 6752 Calculate to two decimal places for each subplot using the BRD_m for the subplot, and the G_{sb} of the most recent QA samples, as specified in the Contract Documents, to provide a lot mean VMA to one decimal place. The rounding-off procedure, for all values, shall be according to LS-100. 		

TABLE 5
Specification Limits for HMA Acceptance Attributes

Attributes	HMA Type	Lower Limit (LL) %	Upper Limit (UL) %
AC Content	All HMA types	JMF - 0.40 (Note 1)	JMF + 0.50
Designated Large Sieve	All HMA types	JMF - 5.0	JMF + 5.0
4.75 mm Sieve	All HMA types	JMF - 5.0	JMF + 5.0
75 µm Sieve	All HMA types	JMF - 2.0	JMF + 2.0
Air Voids	All HMA types	2.5	5.5
Pavement Compaction	Superpave 37.5, 25.0, 19.0,12.5, 9.5 and 12.5FC 1	92.0	97.0
	Superpave 12.5FC 2	92.0	98.0
	SMA	93.0	98.0

Notes:

1. When a JMF change results in a decrease in the design AC content, the lower limit (LL) shall be set at the revised JMF minus 0.3% for all lots to which the JMF change applies.

TABLE 6
Payment Factors Based on Per Cent Within Limits

PWL	Designated Large Sieve	4.75 mm Sieve	75 µm Sieve	AC Content	Air Voids	Compaction
100	1.000	1.000	1.000	1.000	1.000	1.000
99	1.000	1.000	1.000	1.000	1.000	1.000
98	1.000	1.000	1.000	1.000	1.000	1.000
97	1.000	1.000	1.000	1.000	1.000	1.000
96	1.000	1.000	1.000	1.000	1.000	1.000
95	1.000	1.000	1.000	1.000	1.000	1.000
94	1.000	1.000	1.000	1.000	1.000	1.000
93	1.000	1.000	1.000	1.000	1.000	1.000
92	1.000	1.000	1.000	1.000	1.000	1.000
91	1.000	1.000	1.000	1.000	1.000	1.000
90	1.000	1.000	1.000	1.000	1.000	1.000
89	1.000	1.000	1.000	1.000	1.000	0.991
88	1.000	1.000	1.000	1.000	1.000	0.983
87	1.000	1.000	1.000	1.000	1.000	0.974
86	1.000	1.000	1.000	1.000	1.000	0.965
85	1.000	1.000	1.000	1.000	1.000	0.956
84	0.997	0.997	0.997	0.992	1.000	0.948
83	0.994	0.994	0.994	0.984	1.000	0.939
82	0.992	0.992	0.992	0.976	1.000	0.930
81	0.989	0.989	0.989	0.968	1.000	0.921
80	0.986	0.986	0.986	0.960	1.000	0.913
79	0.983	0.983	0.983	0.952	0.999	0.904

PWL	Designated Large Sieve	4.75 mm Sieve	75 µm Sieve	AC Content	Air Voids	Compaction
78	0.980	0.980	0.980	0.944	0.998	0.895
77	0.977	0.977	0.977	0.936	0.995	0.886
76	0.974	0.974	0.974	0.928	0.991	0.878
75	0.972	0.972	0.972	0.920	0.986	0.869
74	0.969	0.969	0.969	0.912	0.980	0.860
73	0.966	0.966	0.966	0.904	0.973	0.851
72	0.963	0.963	0.963	0.896	0.964	0.843
71	0.960	0.960	0.960	0.888	0.955	0.834
70	0.957	0.957	0.957	0.880	0.944	0.825
69	0.954	0.954	0.954	0.872	0.933	0.816
68	0.951	0.951	0.951	0.864	0.920	0.808
67	0.949	0.949	0.949	0.856	0.906	0.799
66	0.946	0.946	0.946	0.848	0.891	0.790
65	0.943	0.943	0.943	0.840	0.875	0.781
64	0.940	0.940	0.940	0.832	0.858	0.773
63	0.937	0.937	0.937	0.824	0.839	0.764
62	0.934	0.934	0.934	0.816	0.820	0.755
61	0.931	0.931	0.931	0.808	0.799	0.746
60	0.929	0.929	0.929	0.800	0.778	0.738
59	0.926	0.926	0.926	0.790	0.755	0.729
58	0.923	0.923	0.923	0.780	0.731	0.720
57	0.920	0.920	0.920	0.770	0.706	0.711
56	0.917	0.917	0.917	0.760	0.680	0.703
55	0.914	0.914	0.914	0.750	0.653	0.694
54	0.911	0.911	0.911	0.740	0.624	0.685
53	0.909	0.909	0.909	0.730	0.595	0.676
52	0.906	0.906	0.906	0.720	0.564	0.668
51	0.903	0.903	0.903	0.710	0.533	0.659
50	0.900	0.900	0.900	0.700	0.500	0.650
49	0.882	0.882	0.882	0.686	0.490	0.637
48	0.864	0.864	0.864	0.672	0.480	0.624
47	0.846	0.846	0.846	0.658	0.470	0.611
46	0.828	0.828	0.828	0.644	0.460	0.598
45	0.810	0.810	0.810	0.630	0.450	0.585
44	0.792	0.792	0.792	0.616	0.440	0.572
43	0.774	0.774	0.774	0.602	0.430	0.559
42	0.756	0.756	0.756	0.588	0.420	0.546
41	0.738	0.738	0.738	0.574	0.410	0.533
40	0.720	0.720	0.720	0.560	0.400	0.520
39	0.702	0.702	0.702	0.546	0.390	0.507
38	0.684	0.684	0.684	0.532	0.380	0.494

PWL	Designated Large Sieve	4.75 mm Sieve	75 µm Sieve	AC Content	Air Voids	Compaction
37	0.666	0.666	0.666	0.518	0.370	0.481
36	0.648	0.648	0.648	0.504	0.360	0.468
35	0.630	0.630	0.630	0.490	0.350	0.455
34	0.612	0.612	0.612	0.476	0.340	0.442
33	0.594	0.594	0.594	0.462	0.330	0.429
32	0.576	0.576	0.576	0.448	0.320	0.416
31	0.558	0.558	0.558	0.434	0.310	0.403
30	0.540	0.540	0.540	0.420	0.300	0.390
29	0.522	0.522	0.522	0.406	0.290	0.377
28	0.504	0.504	0.504	0.392	0.280	0.364
27	0.486	0.486	0.486	0.378	0.270	0.351
26	0.468	0.468	0.468	0.364	0.260	0.338
25	0.450	0.450	0.450	0.350	0.250	0.325
24	0.432	0.432	0.432	0.336	0.240	0.312
23	0.414	0.414	0.414	0.322	0.230	0.299
22	0.396	0.396	0.396	0.308	0.220	0.286
21	0.378	0.378	0.378	0.294	0.210	0.273
20	0.360	0.360	0.360	0.280	0.200	0.260
19	0.342	0.342	0.342	0.266	0.190	0.247
18	0.324	0.324	0.324	0.252	0.180	0.234
17	0.306	0.306	0.306	0.238	0.170	0.221
16	0.288	0.288	0.288	0.224	0.160	0.208
15	0.270	0.270	0.270	0.210	0.150	0.195
14	0.252	0.252	0.252	0.196	0.140	0.182
13	0.234	0.234	0.234	0.182	0.130	0.169
12	0.216	0.216	0.216	0.168	0.120	0.156
11	0.198	0.198	0.198	0.154	0.110	0.143
10	0.180	0.180	0.180	0.140	0.100	0.130
9	0.162	0.162	0.162	0.126	0.090	0.117
8	0.144	0.144	0.144	0.112	0.080	0.104
7	0.126	0.126	0.126	0.098	0.070	0.091
6	0.108	0.108	0.108	0.084	0.060	0.078
5	0.090	0.090	0.090	0.070	0.050	0.065
4	0.072	0.072	0.072	0.056	0.040	0.052
3	0.054	0.054	0.054	0.042	0.030	0.039
2	0.036	0.036	0.036	0.028	0.020	0.026
1	0.018	0.018	0.018	0.014	0.010	0.013
0	0.000	0.000	0.000	0.000	0.000	0.000

TABLE 7
Allowable Macrotexture Ratios for Various Mixes

Mix Type	Macrotexture Ratio (M _R)		
	Degree of Segregation		
	Slight	Medium	Severe
Superpave 9.5	< 1.5	1.5 to 2.0	> 2.0
Superpave 12.5, 12.5FC 1, 12.5FC 2	< 1.6	1.6 to 2.2	> 2.2
Superpave 19.0	< 1.8	1.8 to 2.6	> 2.6
Superpave 25.0	< 2.0	2.0 to 3.5	> 3.5

TABLE 8
Minimum Sublot Lift Thickness

Mix Course	Design Lift Thickness (T _D) mm	Minimum Sublot Lift Thickness mm
All Courses	25 to 39	T _D - 7
	40 to 59	T _D - 10
Surface Course	60 and greater	T _D - 15
Binder Courses	60 and greater	0.70 x T _D

TABLE 9
Lot Thickness Payment Adjustment

Course	T _L	Thickness Payment Adjustment, PA _T
Surface Course (Note 1)	T _L ≥ [0.85 x T _D]	PA _T = lot quantity x price x {[1.000 - (T _L / T _D)] x 2.0}
Binder Course	T _L ≥ [0.95 x T _D]	PA _T = lot quantity x price x {[1.000 - (T _L / T _D)]}
	[0.95 x T _D] > T _L ≥ [0.85 x T _D]	PA _T = lot quantity x price x {[1.000 - (T _L / T _D)] x 2.0}
	T _L < [0.85 x T _D]	PA _T = lot quantity x price x {[1.000 - (T _L / T _D)] x 3.0}
<p>Where: T_L = lot mean lift thickness for the tender item, if lot mean lift thickness is less than or equal to T_D (see definition), or T_L = T_D, if lot mean lift thickness is greater than T_D lot quantity = the horizontal area of the upper most lift of hot mix in the lot (normally surface course) price = the Contract price of the hot mix tender item</p>		
<p>Notes: 1. A lot is rejectable when the surface course T_L < [0.85 x T_D].</p>		

TABLE 10
Reference Densities, D_R

Region	Reference Densities, D _R tonnes/m ³
West Region	2.530
Central Region Northeastern Region Northwestern Region	2.520
Eastern Region	2.390

TABLE 11
AC Price Adjustment

I _P	AC Price Adjustment, PA
I _P > 1.05 I _{T0}	PA = (I _P - 1.05 I _{T0}) x T _{AC}
I _P < 0.95 I _{T0}	PA = (0.95 I _{T0} - I _P) x T _{AC}
<p>Note: If I_P > 1.05 I_{T0} the Contractor receives compensation; however, if I_P < 0.95 I_{T0} the Owner receives a rebate. Where: PA = payment adjustment for new AC, in dollars I_{T0} = PGAC price index for the month prior to Tender Opening I_P = PGAC price index for the month in which paving occurs T_{AC} = quantity of new AC in tonnes T_{AC}, shall be calculated as follows: T_{AC} = [AC_{new} /100] x T_{mix_mnth} Where: AC_{new} = the percentage of new AC in the mix as required by the JMF. T_{mix_mnth} = the tonnage of HMA, as calculated in the Hot Mix Quantity Calculation clause, accepted into the work during the month for which the payment adjustment was calculated.</p>	

AMENDMENT TO OPSS 314, NOVEMBER 2015

Special Provision No. 103S05

August 2019

314.02 REFERENCES

Section 314.02 of OPSS 314 is amended by the addition of the following:

Ontario Ministry of Transportation Publications

MTO Laboratory Testing Manual:

LS-706 Moisture - Density Relationship of Soils Using 2.5 kg Rammer and 305 mm Drop

314.07 CONSTRUCTION

314.07.02 Winter Grading

Clause 314.07.02 of OPSS 314 is deleted in its entirety and replaced with the following:

Any areas where materials used for Subbase, Base, selected subgrade or other fill applications are being placed shall be free of ice and snow. Frozen material shall not be incorporated into the Work. Materials used for Subbase, Base, selected subgrade or other fill applications shall not be placed over frozen ground.

314.07.04 Shoulders

Subsection 314.07.04 of OPSS 314 is amended by the addition of the following to the fourth paragraph:

The material shall be placed in lifts not greater than 300 mm in thickness prior to compaction.

314.07.05 Compaction

314.07.05.02 Compaction Requirements

314.07.05.02.01 Granular B, Type II

Clause 314.07.05.02.01 of OPSS 314 is deleted in its entirety and replaced with the following:

Granular B Type II shall be placed and compacted at a moisture content which is no more than 0.5 % above and no more than 1.5% below its optimum moisture content according to LS-706.

The material shall not be dumped into position but shall be deposited on and pushed over the end of the lift being constructed by means of bulldozers or other equipment approved by the Contract Administrator.

The placement of the first lift of material over wet or weak subgrade shall be monitored and the placement and compaction procedure modified as required, with the approval of the Contract Administrator, to minimize subgrade disturbance. Localized, unusually wet or weak subgrade areas shall be identified to the Contract Administrator for possible treatment.

In restricted zones as specified in OPSS 501, Granular B, Type II shall be compacted using hand-operated vibratory equipment with a minimum operating mass of 400 kg and a maximum power output between 5.0

and 9.9 kW. Where confined areas are less than the minimum width and where such equipment cannot be used safely, then smaller vibratory hand-operated tampers shall be used. One hundred percent compaction coverage with a minimum of four passes shall be provided in all cases.

In non-restricted zones, Granular B, Type II shall be compacted using single drum, vibratory, smooth steel drum rollers, with a minimum operating mass of 5,000 kilograms and minimum operating dynamic force of 75 kN. One hundred percent roller pass coverage with a minimum number of four passes shall be provided. Each roller pass shall overlap the coverage of the preceding pass by a minimum of 0.5 m.

Regardless of the minimum number of passes being specified, additional passes may be required, at the discretion of the Contract Administrator.

Clause 314.07.05.02 of OPSS 314 is amended by the addition of the following clauses:

314.07.05.02.03 Shoulders

Where granular material is being placed around guiderail and sign posts at the shoulders, it shall be compacted using hand-operated vibratory equipment according to OPSS 501.

314.07.05.02.03.01 Lift Thicknesses Less than 100 mm

If the lift thickness for grade correction at the shoulders is less than 100 mm, compaction testing using a nuclear gauge may be waived at the discretion of the Contract Administrator.

Where compaction testing using a nuclear gauge is waived, the granular material being used shall be placed and compacted at a moisture content which is no more than 0.5 % above and no more than 1.5% below its optimum moisture content according to LS-706.

Where the shoulder is wide enough, the granular material shall be compacted using a single drum, vibratory, smooth steel drum roller, with a minimum operating mass of 5,000 kilograms and a minimum operating dynamic force of 75 kN. Where narrower shoulders prevent such equipment from being effectively used, the granular material shall be compacted using hand-operated vibratory compaction equipment with a minimum operating mass of 400 kg and a maximum power output between 5.0 and 9.9 kW.

In either case, wherever compaction testing using a nuclear gauge is waived, a minimum of four passes shall be completed and where possible, each pass shall overlap the coverage of the preceding pass by a minimum of 0.5 m.

Regardless of the minimum number of passes being specified, additional passes may be required, at the discretion of the Contract Administrator.

AMENDMENT TO OPSS 1151, NOVEMBER 2016

Special Provision No. 111F06

August 2019

1151.02 REFERENCES

Section 1151.02 of OPSS 1151 is amended by the addition of the following under **Ontario Ministry of Transportation Publication**, MTO Laboratory Testing Manual:

LS-321 Method for Calculation of Asphalt Film Thickness

1151.03 DEFINITIONS

Section 1151.03 of OPSS 1151 is amended by deleting the definition of **RAP Content**.

Section 1151.03 of OPSS 1151 is further amended by the addition of the following definitions:

Binder Replacement means the asphalt cement from the RAP contributing to the total asphalt cement content in the mix, expressed as a percentage.

Roof Shingle Tabs (RST) means as defined in OPSS 313.

1151.04 DESIGN AND SUBMISSION REQUIREMENTS

1151.04.01 Design Requirements

1151.04.01.01 General

Clause 1151.04.01.01 of OPSS 1151 is deleted in its entirety and replaced with the following:

A laboratory that has current CCIL Type A certification, AMRL, or AMRL equivalent certification shall be used to conduct all mix designs and mix checks.

Superpave mixes shall be designed using the procedures specified in LS-309, with the exception of WMA mixes. WMA mixes shall be designed using the procedures specified in LS-318 at the anticipated WMA production temperature. In the mix design procedure, all references to RAP Content shall be deleted and replaced with % binder replacement.

Superpave materials, mix designs, and the JMF shall be according to the requirements specified in Tables 1, 2, 3 and 4 for the HMA mix type specified in the Contract Documents.

The use of RST is not permitted in the HMA.

SMA mixes shall be designed using the procedures specified in LS-311. SMA materials, mix designs, and the JMF shall be according to the requirements specified in Tables 1, 4, and 5 for the SMA mix type specified in the Contract Documents. Cellulose or mineral fibres shall be used as a stabilizing additive in dosage rates of 0.3% or 0.4%, respectively, by mass of the total mixture. Regardless of the type of fibre used, the manufacturer's recommendations for any product used shall be followed.

The composition of the HMA may be modified as permitted in Table 6.

The amount of RAP allowable by mass in a mix will be calculated by the Asphalt Binder Replacement method according to the following formula:

$$\% \text{ Binder Replacement} = [(\% \text{ asphalt cement content of RAP} \times \% \text{ RAP by mass of mix}) / (\% \text{ total asphalt cement content of mix})]$$

RAP as processed and ready for use in a HMA shall be tested using LS-282 or LS-292 to determine the average percentage asphalt cement and the average gradation for the extracted RAP aggregates.

Density testing of aggregates and RAP shall be conducted for the purpose of developing the mix design for each mix type in the Contract. Such testing shall be performed during production of each aggregate, RAP, or during stockpiling of the materials at the HMA plant.

In addition, if the composition of the mix is modified by including RAP, the high and low grade of PGAC required shall be lowered by 6 °C when:

$$\% \text{ Binder Replacement} > 20 \%$$

The JMF selected for use shall produce HMA that meets all the requirements specified in the Contract Documents.

For HMA in this Contract, the mix properties, the compaction effort, and the aggregate properties specified in the Contract Documents, shall conform to the requirements for the traffic category specified in Table A. The use of a mix designed with a traffic category different than specified in Table A is not permitted.

The asphalt cement (AC) added to the hot mix types shall be performance graded asphalt cement, PGAC as specified in Table A. For bidding purposes only, the percentage by mass of asphalt cement, AC_{BID} contained in the various HMA mix types shall be as specified in Table A.

**TABLE A
HMA Mix Design Criteria**

HMA Type	Location in Contract	Traffic Category	PGAC Grade	AC _{BID} % (Note 1)
*	*	*	*	*
Note 1: For SMA Mix Types a minimum AC Content is specified in Table 5 based on combined aggregate bulk relative density.				

[* Designer Fill-Ins for Table A, See Notes to Designer]

[** Designer Options, See Notes to Designer]

[*** Designer Options, See Notes to Designer]

1151.04.02 Submission Requirements

1151.04.02.01 Mix Design

Clause 1151.04.02.01 of OPSS 1151 is amended by the addition of the following:

The % Binder Replacement shall be calculated and submitted with the mix design.

For SMA mix, the technical data sheet for the supplied fibres shall be submitted with the mix design.

The asphalt film thickness (T_F) shall be calculated according to LS-321 and submitted on Form PH-CC-251 along with the mix design. The calculated asphalt film thickness shall be shown on the mix design summary sheet.

1151.05 MATERIALS

1151.05.02 Aggregates

1151.05.02.01 Reclaimed Asphalt Pavement and Roof Shingle Tabs

Clause 1151.05.02.01 of OPSS 1151 is deleted in its entirety and replaced with the following:

1151.05.02.01 Reclaimed Asphalt Pavement

The aggregate contained in the RAP, where permitted in a HMA, shall be according to the aggregate requirements of OPSS 1003 for the mix type specified in the Contract Documents.

RAP that is contaminated with deleterious material shall not be used and shall be removed from the work. RAP shall be stockpiled conforming to the stockpiling requirements for coarse aggregates according to OPSS 1001, except that when the material is stockpiled on a compacted granular pad, the top 75 mm of the pad shall be the coarse aggregate that is required for a new (virgin) mixture of the tendered hot mix item.

The use of RAP that is obtained from existing stockpiles that do not have a foundation conforming to the above paragraph shall be permitted provided that the bottom 0.3 m of the stockpile is not incorporated into the work.

Process control sampling and testing of the RAP shall be as specified in the Contract Documents.

1151.05.05 Fibres

Subsection 1151.05.05 of OPSS 1151 is deleted in its entirety and replaced with the following:

Fibres shall be either cellulose or mineral fibres, and appropriate for use in the SMA mix design, such as those detailed in QIS 122. The use of rock wool, asbestos, fiberglass, and fibres contained in RST, is prohibited.

Table 1 of OPSS 1151 is amended by deleting Note 1 in its entirety and replacing it with the following:

1. For mixes that have been specified in the Contract Documents as coarse graded, the allowable range of percentage by mass passing the 4.75 mm sieve shall be 45-55, and for the 2.36 mm sieve the allowable range will be 28-58.

Table 6 of OPSS 1151 is deleted in its entirety and replaced with the following:

TABLE 6
Maximum % Binder Replacement

Traffic Category (Note 1)	Binder Course 150 mm or More Below Pavement Surface	Binder Course Within 150 mm of Pavement Surface	Surface Course
A, B	40%	40%	****
C, D	40%	20%	****
E	40%	20%	****

Note 1: Traffic category as specified in the Contract Documents.

[**** Designer Fill-Ins for Table 6, See Notes to Designer]

Table 8 of OPSS 1151 is deleted in its entirety and replaced with the following:

TABLE 8
Sample Quantities for Mix Design Monitoring

Material	Quantity (Note 1)
Asphalt Cement	4 litres evenly split between 2 containers
Aggregate	75 to 100 kg of each type
RAP	75 to 100 kg required when RAP contained in the mix
Fines material passing 75 µm sieve	5 to 10 kg when the mix is to be produced with a plant that returns fines to the mix
Mineral Filler	5 to 10 kg sample for SMA mixes
Any other material samples including anti-stripping agents and fibres to be used in HMA	Quantity large enough to allow for a complete mix design

Note 1: Each material sample receptacle shall have a maximum mass of 30 kg.

Table 9 of OPSS 1151 is deleted in its entirety.

TEMPORARY ROADWAY CLOSURES

Special Provision No. 199F01

August 2019

1.0 HOLIDAY / SPECIAL EVENT RESTRICTIONS

Closures for mobilization of equipment and materials and construction operations shall not be permitted on the holidays / special events specified below; and when applicable, after noon on the date preceding and/or before noon on the date following, as specified below.

[*1 Designer Fill-In, See Notes to Designer]

2.0 CLOSURES FOR MOBILIZATION OF EQUIPMENT AND MATERIALS

The use of construction accesses, shoulder closures, lane closures, and ramp closures for mobilization of equipment and materials (i.e., loading and unloading of materials and construction equipment onto and from the travelled portion of the highway) shall only be permitted during the times specified below, subject to restrictions as noted, when applicable.

[*2 Designer Fill-In, See Notes to Designer]

2.1 Delivery and Trucking

The Contractor shall plan and schedule the routes of vehicles transporting all materials to, from or within the job, so that vehicular movements are accomplished with minimum interference and interruptions to traffic. This will necessitate vehicles to "slip-off" or "slip-on" in the direction of traffic, in order to merge with and thereby avoid crossing traffic lanes.

Access to and from the highway right-of-way will be restricted to ramps at the interchanges unless otherwise provided for in the Contract. Median cross-overs shall not be used except where single axle vehicles are entering a passing lane that is closed to traffic.

The Contractor shall obtain the Contract Administrator's prior approval for the location of any "slip-off" or "slip-ons". The Contract Administrator reserves the right to alter, reject or close same as considered necessary. The Contractor shall notify suppliers of materials and equipment of the above requirements.

3.0 CLOSURES FOR CONSTRUCTION OPERATIONS

3.1 Shoulder Closures

Shoulder closures for construction operations shall only be permitted during the times specified below, subject to restrictions as noted.

[*3 Designer Fill-In, See Notes to Designer]

3.2 Lane Closures

Lane closures for construction operations shall only be permitted during the times specified below, subject to restrictions as noted.

[*4 Designer Fill-In, See Notes to Designer]

3.3 Ramp Closures

Ramp closures for construction operations shall only be permitted during the times specified below, subject to restrictions as noted.

[*5 Designer Fill-In, See Notes to Designer]

3.3.1 Simultaneous Ramp Closures

The following ramps shall not be closed at the same time:

[*6 Designer Fill-In, See Notes to Designer]

3.3.2 Consecutive Ramp Closures

[*7 Designer Fill-In, See Notes to Designer]

3.4 Full Mainline Closures

A full mainline closure shall be used:

- a) When work affecting the travelled portion of an undivided highway requires the stoppage of traffic across the full width of the traffic lanes in both directions of travel.
- b) When work affecting the travelled portion of a freeway or divided highway requires the stoppage of traffic across the full width of the traffic lanes in one direction of travel. When necessary the closure of the adjacent lane on the other side of a median barrier may also be required.

Full mainline closures shall only be permitted during the times and for the work specified below, subject to restrictions as noted, when applicable.

[*8 Designer Fill-In, See Notes to Designer]

4.0 CLOSURE REQUIREMENTS

4.1 Closure Notifications

Prior to all closures of lanes and/or ramps and/or shoulders for any reason, the Contractor shall:

1. Inform the Contract Administrator:
 - a) at least 1 week prior to the start date, for all closures lasting less than one week.
 - b) at least 2 weeks prior to the start date, for all closures lasting more than one week.
 - c) of all emergency closures as soon as any details are known.

2. Inform the Contract Administrator of any closure that is being canceled subsequent to 1. above.

[*9 Designer Fill-In, See Notes to Designer]

4.2 Ontario Provincial Police (OPP) Assisted Closures and Speed Control

In addition to the requirements listed in Ontario Traffic Manual (OTM) Book 7, Temporary Conditions, the Contractor has the option to use OPP assisted lane closures and speed control activities to execute the work.

Mandatory use of OPP (or their designate) shall be employed for all full mainline closures.

Mandatory use of OPP (or their designate) shall also be employed for:

[*10 Designer Fill-In, See Notes to Designer]

All costs associated with optional and/or mandatory use of OPP for closures and/or speed control activities are deemed to be included in the Temporary Traffic Control Signs tender item. No additional payment will be made to the Contractor for these operations.

If an authorized third party stipulates that additional OPP assisted lane closures or speed control activities are required, the Owner will compensate the Contractor for the cost of the OPP services as a Change in the Work.

5.0 PAYMENT ADJUSTMENTS

5.1 Payment Adjustments for Early Closing

On each occasion when the Contractor closes lanes and/or ramps to traffic earlier than the specified times, the Contract Administrator will assess the Contractor an initial payment reduction of \$ [*11 Designer Fill-In, See Notes to Designer].

Thereafter, a further payment reduction of \$ [*12 Designer Fill-In, See Notes to Designer] per minute will be assessed against the Contractor for every minute outside the permitted closure window that the lanes and/or ramps are not open to traffic. The Contract Administrator will be the sole judge of the length of time of the delay.

For progress payment purposes, payment adjustments are made on the monthly progress payment certificate for the month in which the early closing(s) occurs.

5.2 Payment Adjustments for Late Opening

On each occasion when the Contractor fails to reopen the lanes and/or ramps by the specified time, the Contract Administrator will assess the Contractor an initial payment reduction of \$ [*11 Designer Fill-In, See Notes to Designer].

If lanes and/or ramps are not open within 15 minutes after the specified time, a further payment reduction of \$ [*11 Designer Fill-In, See Notes to Designer] shall be assessed against the Contractor.

Thereafter, a further payment reduction of \$ [*12 Designer Fill-In, See Notes to Designer] per minute shall be assessed against the Contractor for every minute that the lanes and/or ramps are not open to traffic. The Contract Administrator will be the sole judge of the length of time of the delay.

For progress payment purposes, payment adjustments are made on the monthly progress payment certificate for the month in which the late opening(s) occurs.

SEASONAL SHUTDOWN

Special Provision No. 199F45

August 2019

1.0 Scope

This Special Provision covers the requirements for the seasonal shutdown of construction operations prior to the transfer of the Roadway to the Owner.

2.0 General

For the purposes of this Contract, seasonal shutdown shall be the period from:

[* Designer Fill-In, See Notes to Designer]

At the commencement of the seasonal shutdown period, all permanent highway lanes, shoulders, structures and interchange ramps which were in place prior to the start of construction, their reconstructed counterparts, or the lane configuration specified in the Contract Documents for the seasonal shutdown period, shall be open to traffic and shall remain unrestricted at all times to public traffic during the seasonal shutdown period.

The Contractor's Critical Path Schedule shall at all times reflect the seasonal shutdown Contract requirements as defined in this Special Provision.

The Contractor shall schedule and carry out operations in accordance with Seasonal Shutdown Requirements, including the construction and/or removal of any temporary transitions between the existing pavement structure and the new pavement structure.

All Work associated with the seasonal shutdown requirements specified below shall be deemed to be included in the Contract price for the appropriate tender items in the Contract Documents and no additional payment shall be made.

All hot mix paving work performed by the Contractor to meet seasonal shutdown requirements, that does not meet the full requirements of OPSS 313, shall be considered temporary paving and all costs associated with the placement and subsequent removal of the temporary pavement shall be at the Contractor's expense.

3.0 Seasonal Shutdown Requirements

The requirements in this Special Provision are additional to seasonal shutdown requirements specified elsewhere in the Contract Documents and shall not relieve the Contractor of any other requirements contained in the Contract, without the written approval of the Contract Administrator.

All operations shall be completed to the satisfaction of the Contract Administrator and as follows:

- a) The minimum acceptable pavement structure for seasonal shutdown will be either the existing full depth pavement structure or the new proposed pavement structure up to and including the upper binder course.
- b) No vertical pavement drop-offs will be permitted except on closed portions of the Roadway(s) separated from public traffic by temporary construction barrier or other approved barrier system.

- c) All pavement marking obliteration that is required to remove temporary pavement markings on a surface other than the final pavement surface shall be completed by grinding using equipment as specified in the DSM listing for Line Removal Systems, Pavement Markings, or by abrasive blasting, using equipment and material as specified in the DSM listing for Line Removal Systems, Pavement Markings. If the temporary pavement markings are on the final pavement surface, all required pavement marking obliteration shall be completed by abrasive blasting, using equipment and material as specified in the DSM listing for Line Removal Systems, Pavement Markings.
- d) Pavement markings to be left in place during seasonal shutdown shall be painted markings only and shall have had a second application of paint according to the requirements specified elsewhere in the Contract Documents.
- e) All guide rail systems that are to remain in place during seasonal shutdown shall be installed to the elevation requirements for the pavement surface that will be in place during seasonal shutdown. The shoulders shall be graded to reflect the required guide rail height. Sufficient room on the posts shall be left to allow for adjustment to final guide rail height.
- f) [** Designer Fill-In, See Notes to Designer]

QUALITY CONFORMANCE REQUIREMENTS

Special Provision No. 199S66

August 2019

1.0 SCOPE

This Special Provision describes the process for the assessment of conformance to the quality requirements and the administrative actions for non-conformance. This Special Provision does not cover conformance to occupational health and safety legislation and regulations, traffic control requirements, excess loading of vehicles, CVOR requirements, or traffic management plans.

2.0 DEFINITIONS

For the purpose of this Special Provision, the following definitions apply:

Acceptance Test Results means the test results that are used for the final assessment of conformance with the specification for the Material. Depending on the specification for the Material, the final assessment of conformance is based on one of the following: quality control, quality assurance or referee test results.

Deficient Material means Material that has an attribute, property or characteristic that does not meet the requirements of the Contract Documents. This includes, but is not limited to, any Material for which acceptance test results indicate less than full payment under a Contract Document containing provisions for payment adjustments.

Deficient Workmanship means work that does not meet the requirements of the Contract Documents due to the Contractor's construction activities including, but not limited to, incorrect elevations, dimensions, alignment, appearance and/or crossfall of individual components, products and finished construction.

Non-Conformance means an occurrence of work not meeting the requirements of the Contract Documents, or an occurrence of deficient Material or deficient workmanship.

Quality Control (QC) means a system or series of activities carried out by the Contractor to ensure that the final product and Material supplied to the Owner meet the requirements of the Contract Documents.

3.0 QUALITY REQUIREMENTS

3.1 General

The Contractor shall meet the quality requirements as detailed in Table 1.

The Contractor is responsible for all QC activities and shall provide the staff and resources necessary to implement QC processes that result in conformance to the quality requirements.

The Contractor is responsible for identifying and immediately communicating to the Contract Administrator all occurrences of work not meeting the quality requirements according to this Special Provision.

3.2 Assessment of Conformance

During the course of construction, and within 30 Days after the date of certification of Contract Completion, the Contract Administrator shall assess the conformance to the quality requirements related to the following activities:

- a) The production, supply and placement of all Material used in the Work;
- b) The removal, rehabilitation, modification or construction of temporary or permanent elements of the Work; and
- c) Sampling, testing and QC records associated with a) and b) above.

The Contract Administrator's assessment of conformance may consist of random or milestone inspections, continuous inspection, sampling and testing for audit or acceptance purposes, audits of the QC documentation specified in the Contract Documents or any combination of the preceding actions, at the discretion of the Owner. In addition, the Owner may perform audits to assess conformance.

3.3 Non-Conformance Process

3.3.1 General

The Contractor shall identify and address all non-conformances prior to issuing a Certificate of Conformance, Manufacturer's Certificate of Conformance, Request to Proceed, or any other certification when such submissions are required by the Contract Documents.

If components of the work do not conform with the Contract Documents, the Contractor shall propose a corrective action which may include an amendment to the Contract Documents. Amendments to the Contract Documents shall deliver the functionality of the original Contract Documents. Any aspect of a corrective action that involves or may involve doing work or an act that is within the practice of professional engineering shall be prepared by an Engineer.

Proposed amendments to the Contract Documents shall be approved by the Owner prior to issuing a Certificate of Conformance, Manufacturer's Certificate of Conformance, or Request to Proceed.

Any amendments to the Contract Documents accepted by the Owner, and within the scope of the Certificate of Conformance, Manufacturer Certificate of Conformance, and/or Request to Proceed shall be appended to the related certification.

3.3.2 Non-Conformances

The Contractor shall immediately identify and notify the Contract Administrator of the non-conformance prior to the Contract Administrator bringing it to the Contractor's attention.

The Contractor shall address identified non-conformances as follows:

- a) Implement preventative measures prior to continuing with the associated activity and not proceed with any subsequent activity that would prevent or impede corrective action.

- b) Within 3 Business Days, unless otherwise mutually agreed in writing, submit a Non-Conformance Report to the Contract Administrator. The report shall include the following information:
 - i. Date and time of the occurrence
 - ii. Description of the non-conformance
 - iii. Cause of the non-conformance
 - iv. Extent of the non-conformance
 - v. Proposal for corrective action, payment reduction, or mitigation action, including any amendments to the Contract Documents, for the Contract Administrator's written approval.
- c) Carry out corrective action, payment reduction, or mitigating action according to the approved proposal.

3.3.3 Non-Conformances not Identified by Contractor

When the Contractor does not submit a Non-Conformance Report, the Contract Administrator may initiate the Non-Conformance Report. The initial report shall include the following information:

- a) Date and time of the occurrence.
- b) Description of the Non-Conformance.

When a Non-Conformance Report is initiated by the Contract Administrator, the Contractor shall complete the Non-Conformance Report within 3 Business Days and address the non-conformance according to this Special Provision.

3.4 Deviations

3.4.1 Notification of the Status of the Non-Conformance

Within 3 Business Days of receiving a completed Non-Conformance Report, the Contract Administrator will notify the Contractor in writing that the non-conformance is one of the following:

- a) A deviation, including the reason for the deviation;
- b) Not a deviation; or
- c) Under review with the Owner.

When the status of the non-conformance is identified as "under review with the Owner", the status will be updated in writing to a) or b) when the review is complete.

3.4.2 Assessment of Deviations

A deviation shall be assessed for:

- a) Any non-conformance to the performance requirements of Category 1 through 4 of Table 1 that are not addressed according to the Non-Conformance Process subsection;
- b) Any non-conformance to the performance requirements of Category 5 or 6 of Table 1;
- c) The third and each subsequent occurrence of the same or similar non-conformance regardless of compliance with the Non-Conformance process subsection;

- d) Incorporating deficient Material into the Work without prior approval of the corrective action by the Contract Administrator, after the deficiency has been identified; or
- e) Omitting and/or disregarding Material placement and/or construction requirement(s), without the approval of the Owner, reducing the quality level and/or making the quality level unacceptable, indeterminate or unexpectedly acceptable.

Within 3 Business Days after a deviation has been assessed, the Contractor shall comply with the requirements of the Contract Documents that were the subject of the deviation. The deviation will not be waived regardless of the Contractor's subsequent conformance.

3.4.3 Classification of a Deviation

The Contract Administrator will notify the Contractor in writing of the classification of a deviation ("minor" or "major"), after a non-conformance is determined to be a deviation.

The classification of the deviation may be subject to the Owner's review at any time. The Contract Administrator will inform the Contractor of the classification of the deviation, or a change in the classification resulting from a review by the Owner, in a timely manner.

The classification of all deviations will be determined no later than 30 Days after the date of certification of Contract Completion.

A deviation will be assessed as a **major deviation** if it negatively impacts, or increases the Owner's risk of negatively impacting, one or more of the following:

- a) The short or long term performance of the product;
- b) The Owner's ability to assess the quality of the Material or workmanship as a result of, but not limited to, inadequate documentation, and/or completeness of the records or reports; or
- c) The Owner's ability to administer the acceptance of Material according to the Contract Documents as a result of, but not limited to, missing or deficient quality assurance or referee samples.

or a deviation will be assessed as a **major deviation** for:

- d) The third occurrence and each subsequent occurrence of the same or similar minor deviation;
- e) Submitting a Certificate of Conformance, Manufacturer's Certificate of Conformance, Request to Proceed, or any other certification when the work does not conform with the requirements of the Contract Documents.
- f) Proceeding with work prior to submission of a Certificate of Conformance, Manufacturer's Certificate of Conformance, Request to Proceed, other certification, or prior to receiving a Notice to Proceed when required by the Contract Documents.

All other deviations will be assessed as minor deviations.

3.4.4**Contractor's Right to Challenge a Deviation**

Within 3 Business Days of being notified of the classification of a deviation, the Contractor may challenge the assessment of the deviation. To challenge a deviation, the Contractor shall submit in writing to the Contract Administrator the reason they are challenging the assessment of the deviation and all relevant documentation supporting their position. The Contract Administrator will review the Contractor's submission and issue a final decision on the assessment of the deviation.

4.0**ADMINISTRATIVE ACTION**

If the Contractor does not comply with the requirements of the Contract Documents that were the subject of a Non-Conformance Report, the Owner may take other action it deems necessary.

**TABLE 1
QUALITY REQUIREMENTS**

Category	Requirements
1.0 Contractor Personnel / Firms	<ul style="list-style-type: none"> a) Personnel and firms shall meet the qualifications as specified in the Contract Documents; and b) Qualifications (for example: certificates, licences) shall be maintained for the duration of their participation in the Work.
2.0 Sampling, Testing and Submission of Results	<p>The following shall be performed according to the Contract Documents:</p> <ul style="list-style-type: none"> a) Material sampling, preparation, handling, delivery and storage; and b) Quality control sampling, testing and submission of results where quality control requirements are specified in the Contract Documents.
3.0 Material and Mix Designs	<p>Each of the following shall comply with, and be supplied, according to the Contract Documents:</p> <ul style="list-style-type: none"> a) Material from approved/designated sources; b) The complete mix design submission, including all supporting documentation; c) Material from sources identified in the accepted mix design submission; and d) Submission of certification for all materials that require certification. <p>Each of the following shall be performed according to the Contract Documents:</p> <ul style="list-style-type: none"> a) The mix design; b) Material testing and/or inspection prior to incorporation into the work, and checking that Material meet the accepted mix designs, c) Material handling and/or storage; and d) Addition and/or mixing of materials identified in the accepted mix design. <p>Deficient Material shall not be incorporated into the work.</p>
4.0 Material Placement and Construction	<p>Each of the following shall be according to the Contract Documents:</p> <ul style="list-style-type: none"> a) Submission of Material-related documentation; b) Submission of drawings plans and procedures; c) Condition of substrate, formwork or other locations against which Material is to be placed; d) Environmental conditions for Material placement, including but not limited to temperature and weather constraints and placement restrictions, e) Tools and equipment; f) Construction requirements for Material placement and/or removal and/or repairs; and g) Provision of protection of Material and components of the work and/or maintenance of environmental conditions after Material placement (for example; curing of concrete, cold weather protection).
5.0 Addressing Non-Conformances	<p>The Contractor shall address all non-conformances according to the Non-Conformance Process subsection.</p>
6.0 Certifications, Request to Proceed, Notice to Proceed and Submission of Drawings / Documents	<p>The Contractor shall ensure that:</p> <ul style="list-style-type: none"> a) All specified inspections have been carried out prior to certification and issuing of Request to Proceed when specified in the Contract Documents; b) A written Notice to Proceed is received prior to proceeding to the next operation of the work when specified in the Contract Documents; c) All certifications and Request to Proceed are correct, completed accurately, submitted on time according to the Contract Documents and submitted prior to proceeding with the next phase of the work where specified; and d) All drawings and other documents sealed and signed by an Engineer or signed by an Ontario Land Surveyor are submitted on time according to the Contract Documents.

TEMPORARY HOT MIX PAVEMENT - Item No.

Special Provision No. 399F02

August 2019

REQUIREMENTS FOR TEMPORARY HOT MIX PAVEMENT

1.0 SCOPE

This Special Provision covers the requirements for the construction of temporary hot mix pavement.

2.0 REFERENCES

This Special Provision refers to the following standards, specifications, or publications:

Ontario Provincial Standard Specifications, Construction

OPSS 313 Hot Mix Asphalt - End Result

3.0 DEFINITIONS

For this Special Provision, the definitions in OPSS 313 and the following definition apply:

Temporary Hot Mix Pavement means hot mix that is not intended to form part of the permanent work.

4.0 DESIGN AND SUBMISSION REQUIREMENTS - Not Used

5.0 MATERIALS

5.01 Hot Mix Asphalt

Temporary hot mix pavement mix shall be suitable for its intended use.

5.02 Release Agents

No release agents shall be used that may adversely affect the quality or performance of the HMA. Release agents shall be used according to the proprietary requirements.

Petroleum based release agents, excess water, or excess release agents shall not be used.

6.0 EQUIPMENT - Not Used

7.0 CONSTRUCTION

7.01 Preparation of Foundation and Existing Pavement

Prior to placing any course of HMA on:

- a) A granular grade, a Class S roller or an equivalent Class V roller shall be used to finish roll the grade ahead of the paver. The granular grade after rolling shall be a compacted, smooth, float-free surface, free

from contamination of foreign materials. Any distortion that will impact the specified thickness of the pavement to be placed shall be repaired.

- b) HMA or concrete surfaces, the HMA and concrete surfaces shall be clean and free of all loose, broken, and foreign materials.
- c) Milled surfaces, the milled surface shall be clean of all loose, broken, and foreign materials and shall be swept with a power broom.

The Contractor shall be responsible for preparing the existing surface to be paved by milling or padding or a combination as necessary, to place and compact each lift to the thickness as specified in the Contract Documents, provided the thickness of existing pavement materials or underlying materials is not reduced by more than 5 mm below the general profile of the surrounding existing unmilled pavement surface.

7.02 Placing Hot Mix Asphalt

7.02.01 Paving

Levelling, binder and surface courses shall be laid to the specified depths by means of mechanical self-propelled pavers and uniformly compacted with rollers. A shoulder spreader may be used if the lane widening is equal to or less than 1.5 m in width and adjacent to an existing lane.

Excess HMA shall not be cast onto the surface of the freshly laid mat. After final compaction of each course the surface shall be smooth and true to the established crown and grade, uniform in texture and shall be free of any defects including, but not limited to, segregation, fat spots, oil spills, chatter, and roller marks.

All through lane paving courses shall be completed prior to the placement of adjacent sideroads, speed change lanes, and other paved areas.

HMA shall be placed and compacted to the thickness as specified in the Contract Documents for each lift.

At the end of each completed portion of the lanes and prior to opening them to traffic, the ends of completed sections of HMA course shall be temporarily ramped down to the existing pavement according to the Temporary Ramp Downs clause.

If paving is being carried out under lane closures, paving shall be completed to the same station for the full pavement width, including paved shoulders, prior to the roadway being reopened to traffic except as noted in the Partial Paving of Full Pavement Width clause.

7.02.02 Partial Paving of Full Pavement Width

[* Designer Option, See Notes to Designer]

7.02.03 Temporary Ramp Downs

HMA courses shall be temporarily ramped down to the existing pavement at a slope of 120H:1V transversely. Transverse ramps downs shall not form part of the permanent pavement and shall be removed prior to paving of the adjacent section.

Where longitudinal ramp downs are permitted or if, due to unforeseen circumstances such as equipment breakdown occurring during paving, paving cannot be completed to the same station across the full pavement

width, the HMA course shall be temporarily ramped down to the existing pavement at a slope of 10H:1V. Only one temporary longitudinal ramp down shall be in place across the width of the pavement at any time. The temporary longitudinal ramp down shall not form part of the permanent pavement and shall be removed prior to paving the adjacent section. The adjacent paving shall be completed such that the ramping is not in place more than 5 Days.

Loose coarse aggregate particles generated during construction of the longitudinal or transverse ramp downs or both shall be removed from the roadway surface prior to re-opening the roadway to traffic. Temporary ramp downs shall remain intact and in place until they are removed prior to paving the adjacent section.

Temporary ramp downs shall be removed to produce a straight clean vertical surface for the full depth of the course prior to paving the adjacent lane or shoulder. After removal of the temporary longitudinal ramp down, traffic shall not be permitted to cross over the vertical surface at the longitudinal edge before the adjacent paving is completed.

7.03 Winter Carry-over of Temporary Hot Mix Pavement

If temporary hot mix pavement is specified to be removed prior to seasonal shutdown but due to delays cannot be removed:

- a) The Contract Administrator shall be notified at least 20 Business Days prior to the seasonal shutdown, and;
- b) The responsibility for preparing the temporary hot mix pavement for, and making repairs during, the shutdown period will depend upon the reasons for the carry-over to the next construction season.

Preparation requirements for the shutdown period will be subject to prior approval by the Owner and may include, but are not limited to, drainage improvements, erosion control measures, resurfacing with a lift of HMA, placing shoulder materials, temporary pavement markings, and traffic control.

7.04 Quality Control

7.04.01 General

QC procedures shall be conducted to ensure HMA meets the requirements of the selected HMA type for the intended purpose.

7.04.02 Repairs

All defects in the materials and workmanship of the temporary hot mix pavement shall be repaired to ensure a safe and smooth riding surface. Repairs shall be made with the same HMA type as the original work unless the Owner accepts a proposal to do otherwise. The Contractor shall not be responsible for repairing defects caused by granular base, sub-base or sub-grade problems provided these have been constructed according to the Contract Documents.

Timing of pothole repairs shall be according to the Owner's maintenance standard current at the time of repair.

In emergency situations, or if the Contractor has not started repairs within 24 hours of receiving written notification the Owner may, without obligation to do so, make such repairs. The Owner will keep records of

lane closure times and repair costs. The Contractor shall not conduct any operations in the same area during the Owner's repair operation.

7.05 Management of Excess Material

Management of excess material shall be according to the Contract Documents.

8.0 QUALITY ASSURANCE - Not Used

9.0 MEASUREMENT FOR PAYMENT

9.01 Actual Measurement

9.01.01 Temporary Hot Mix Pavement

9.01.01.01 By Mass

Measurement of temporary hot mix pavement shall be by mass in tonnes.

The quantities of HMA used for temporary ramping shall not be measured for payment. The removal of HMA used for temporary ramping shall not be measured for payment.

9.02 Plan Quantity Measurement

When measurement is by Plan Quantity, such measurement is based on the units shown in the clauses under Actual Measurement.

10.0 BASIS OF PAYMENT

10.01 Temporary Hot Mix Pavement - Item

Payment at the Contract price for the above tender item shall be full compensation for all labour, Equipment and Materials to do the work.

10.02 Repair Delay Charges

The Contractor will be assessed \$30 per hour for each hour, or part thereof, that expires between:

- a) 24 hours after the time that the Contractor is given written notification by the Contract Administrator that a deficiency has been observed in the temporary hot mix pavement and the time that the repair begins, and
- b) each time that uncompleted repair work stops and the time that it resumes.

10.03 Removal of Temporary Hot Mix Pavement

Payment for removal of the temporary hot mix pavement, excluding defective temporary hot mix pavement, shall be made under the applicable tender item for HMA pavement removal.

TEMPORARY CONSTRUCTION BARRIER, CATEGORY I - Item No.
TEMPORARY CONSTRUCTION BARRIER, CATEGORY II - Item No.
TEMPORARY CONSTRUCTION BARRIER, CATEGORY III - Item No.
TEMPORARY CONSTRUCTION BARRIER, CATEGORY IV - Item No.
TEMPORARY CONSTRUCTION BARRIER, RELOCATION - Item No.
MOVABLE TEMPORARY CONCRETE BARRIER - Item No.
MOVABLE TEMPORARY CONCRETE BARRIER, RELOCATION - Item No.
MOVABLE TEMPORARY CONCRETE BARRIER, SHIFT - Item No.

Special Provision No. 741S03

August 2019

Amendment to OPSS 741, November 2014

OPSS 741, November 2014, Construction Specification for Temporary Concrete Barrier is deleted in its entirety and replaced with the following:

REQUIREMENTS FOR TEMPORARY CONSTRUCTION BARRIER

741.01 SCOPE

This specification covers the requirements for the construction of temporary construction barrier.

741.02 REFERENCES

This specification refers to the following standards, specifications or publications:

Ontario Provincial Standard Specifications, Construction

OPSS 723 Energy Attenuators

Ontario Provincial Standard Specifications, Material

OPSS 1350 Concrete - Materials and Production
OPSS 1440 Steel Reinforcement for Concrete
OPSS 1504 Steel Beam Guide Rail
OPSS 1601 Wood, Preservative Treatment, and Shop Fabrication

Ontario Ministry of Transportation Publications

Ontario Traffic Manual (OTM):
Book 7 Temporary Conditions
Book 11 Pavement, Hazard and Delineation Markings

MTO Form:
PH-CC-876 Certification of Temporary Construction Barrier Installations

Designated Sources for Materials (DSM)

CSA Standards

G40.20-13/G40.21-13 Rolled or Welded Structural Quality Steel/Structural Quality Steel
W59-18 Welded Steel Construction (Metal Arc Welding)

ASTM International

A 123/A 123M-17 Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
D 4956-17 Retroreflective Sheeting for Traffic Control

741.03 DEFINITIONS

For the purpose of this specification, the following definitions apply:

Movable Temporary Concrete Barrier means a temporary concrete barrier that can be quickly shifted laterally using a barrier transfer machine.

Relocation means the movement of a temporary construction barrier or movable temporary concrete barrier system from one location to another, which typically occurs when construction operations move from one stage to the next.

Shift means the lateral displacement of a movable temporary concrete barrier system, which is typically completed to facilitate the opening or closing of traffic lane(s). The lateral displacement may vary throughout the length of a barrier installation.

Temporary Construction Barrier means a device which provides a physical limitation, through which a vehicle would not normally pass, and is intended to contain or redirect an errant vehicle of a particular size range, at a given speed and angle of impact. It may be a temporary concrete barrier or temporary steel barrier.

741.04 DESIGN AND SUBMISSION REQUIREMENTS

741.04.01 Submission Requirements

741.04.01.01 General

The Contract Administrator shall be notified in writing of the Contractor's selection of the types and locations of all temporary construction barrier selected, including all applicable standard drawings one week prior to the first placement.

Installation of the movable temporary concrete barrier shall not commence until the Contract Administrator has received the copy of the installation instructions and manufacturer's specifications.

741.04.01.02 Movable Temporary Concrete Barrier

Working Drawings and a copy of the manufacturer's specifications and installation instructions shall be submitted to the Contract Administrator prior to the installation of the movable temporary concrete barrier.

741.04.01.03 Temporary Steel Barrier

One copy of the manufacturer's installation instructions and Working Drawings shall be submitted to the Contract Administrator.

Installation of the temporary steel barrier shall not commence until the Contract Administrator has received the copy of the instructions and Working Drawings.

741.05 MATERIALS

741.05.01 Temporary Concrete Barrier

741.05.01.01 Concrete

Concrete for the manufacture of temporary concrete barrier units shall be according to OPSS 1350, except that the restrictions on volume batching shall not apply. The Contractor shall assume the responsibility for the mix design. The following specific requirements shall apply:

- a) Class of concrete: Nominal minimum 28-Day compressive strength of 35 Mpa.
- b) Coarse aggregate: 19.0 mm nominal maximum size.

741.05.01.02 Steel Reinforcement

Steel reinforcement shall be according to OPSS 1440 and the Contract Documents.

741.05.01.03 Connection Assembly Components

Connection assembly components including steel shapes and hollow sections for the I-Lock connection shall be Grade 350W according to CSA G40.20/G40.21 and the Contract Documents. Connection assembly components for other non-proprietary temporary concrete barrier systems shall be according to the Contract Documents.

Connection assembly components for proprietary temporary concrete barrier systems shall be according to manufacturer's specifications and the Contract Documents.

741.05.01.04 Restraint Systems, Type M Connection Only

All materials required for the restraint systems shall be according to the Contract Documents.

741.05.01.05 Thrie Beam Guide Rails, Bolts, and Nuts

Thrie beam guide rails shall be fabricated according to OPSS 1504 and the Contract Documents. Bolts and nuts shall be according to OPSS 1504.

741.05.01.06 Steel Plates, Bolts, and Nuts

Steel plates shall be fabricated according to CSA G40.20/G40.21 and the Contract Documents. Steel plates shall have minimum yield strength of 345 Mpa. All steel plates shall be hot dip galvanized after fabrication according to ASTM A 123. Bolts and nuts shall be according to OPSS 1504.

741.05.01.07 Wooden Blocks

Wooden blocks shall be according to OPSS 1601.

741.05.01.08 Delineators

Delineators shall be two-sided, and each side shall have a minimum reflective surface of 100 x 100 mm; high intensity retroreflective sheeting according to ASTM D 4956, Type VIII; orange colour; and flexibility to bend 90° from vertical and self-restore.

741.05.01.09 Marking

All temporary concrete barrier units shall be permanently and legibly marked by the manufacturer on each temporary concrete barrier as follows:

- a) Name or trademark of manufacturer on file with Owner including identification of plant if manufacturer has more than one plant and year of manufacture embossed on top of each temporary concrete barrier at one end.
- b) Owner approved three-digit code of manufacturer and plant identification, and six-digit code for date of manufacture (Year Month Day, example January 15, 2008 is 080115) stencilled in minimum 50 mm high digits with indelible ink or paint on top of each temporary concrete barrier at opposite end of embossed markings.
- c) Duplicate three-digit code of manufacturer and plant identification, and six-digit code for date of manufacture, stencilled in minimum 50 mm high digits with indelible ink or paint on the vertical face of one end elevation of each temporary concrete barrier.
- d) Markings are not permitted on traffic faces of temporary concrete barrier.

741.05.02 Temporary Steel Barrier

741.05.02.01 General

All supplied components shall conform to the manufacturer's specifications.

741.05.02.02 Temporary Steel Barrier Systems

Table 1 lists the manufacturers and names of temporary steel barrier systems acceptable for the item Temporary Construction Barrier. The Contractor is given the option of supplying and installing any of these approved systems.

741.06 EQUIPMENT

741.06.01 Barrier Transfer Machine for Movable Temporary Concrete Barrier

Barrier transfer machines required to shift the movable temporary concrete barrier shall be supplied by a supplier of moveable temporary concrete barrier listed on the DSM listing for Traffic Barriers, Temporary Concrete Barrier.

741.07 CONSTRUCTION

741.07.01 General

The temporary construction barrier system shall meet the minimum category in Table 1 specified in the

Contract Documents. Temporary construction barrier of a higher category is also acceptable for lower categories. For example, category II, III and IV are also acceptable for Category I items.

741.07.01.01 Installation

Temporary construction barrier shall be installed at locations specified in the Contract Documents.

Construction of temporary construction barrier shall be by use of precast concrete or prefabricated steel barrier units.

Temporary construction barrier shall be installed with connections properly engaged. Proprietary systems shall be installed according to the manufacturer's installation instructions.

741.07.01.02 Foundation Preparation

Temporary construction barrier shall be installed on a paved surface having a maximum crossfall of 6% measured perpendicular to the installation and shall be in place prior to the opening of traffic operations. Two Days shall be allowed between the placement of final asphalt surface and placement of temporary construction barrier. Temporary construction barrier shall be in place prior to the opening of traffic operations.

Drainage shall be maintained under the temporary construction barrier.

741.07.01.03 Tolerances

The horizontal and vertical alignment at the junction of each barrier section shall be within 15 mm. The minimum radius on which the barrier may be placed shall be as specified for each type of connection.

741.07.01.04 Construction Markers

Construction markers shall be placed in advance of the temporary construction barrier installation to assist in directing the traffic away from the flared approach end treatment. Taper length for full lane closures and the maximum distance between markers shall be according to OTM Book 7.

741.07.01.05 Quality Control

The Contractor is responsible to supply and install the temporary construction barrier units and certify that they meet acceptance criteria. The Contractor shall do an initial inspection of the units prior to installation and a further inspection of the units after each installation. When the installed or relocated units do not meet the acceptance criteria the units shall be removed and replaced with units that meet the acceptance criteria. Each installation and relocation of units shall be certified by submitting to the Contract Administrator within 24 hours of installation or relocation of the units a completed MTO Form PH-CC-876 Certification of Temporary Construction Barrier Installations. Certification is not required after shifting of movable temporary concrete barriers. Certification shall be done by an authorized representative of the Contractor.

While in-service on the Contract and when units have been damaged or alignment discontinuity is beyond that allowable by the acceptance criteria, the affected units shall be reinstalled or replaced as necessary. The repair shall be performed within a 48 hour period, starting at the occurrence or first awareness.

741.07.01.06 Restoration of Asphalt and Concrete Surfaces

Restoration of asphalt and concrete surfaces disturbed during the installation and removal of restrained temporary construction barrier shall be as specified in the Contract Documents.

741.07.01.07 Delineators

Delineators according to OTM Book 11 shall be installed at 4 m intervals on temporary concrete barriers and at the barrier unit connections on temporary steel barriers.

Delineators shall be securely fastened to the top of the temporary construction barrier with reflective surfaces clearly visible.

Delineators shall be maintained at all times.

741.07.02 Temporary Concrete Barrier

741.07.02.01 Transitions

Transition from one type of temporary concrete barrier to another type of temporary concrete barrier is permitted by using the temporary concrete barrier transition detail specified in the Contract Documents.

The proportion of each type of approved temporary concrete barrier used for the Work shall be at the Contractor's discretion. However, a minimum continuous length of 100 m of any one type of temporary concrete barrier is required prior to transitioning to another type.

Transitions between unrestrained temporary concrete barrier and permanent concrete barrier shall be as specified in the Contract Documents.

Transitions between reduced deflection temporary concrete barriers and unrestrained temporary concrete barriers shall be as specified in the Contract Documents.

741.07.02.02 Maximum Deflection

Table 2 shall be used to determine acceptable barrier types. The back face of a barriers system shall not be placed less than the minimum distance from the top of an excavation or fixed object specified in the Contract Documents, regardless of the deflection category corresponding to the tender item.

741.07.02.03 Quality Control

Repaired precast concrete barrier units may be used provided that the structural integrity of the unit is maintained. An Engineer's seal and signature shall be affixed to documentation certifying that the repair method used shall not impact the structural integrity of the unit.

741.07.02.04 Acceptance Criteria

For all applications, any unit that fails one or more of the following acceptance criteria shall be rejected:

- a) Dimensions of each unit shall not deviate from those specified by more than the following tolerance:
 - i. Specified dimensions up to 300 mm \pm 5 mm
 - ii. Specified dimensions greater than 300 mm \pm 10 mm

- b) Steel elements of each connecting device shall be free of visible fracture, distortion, and perforation.
- c) Concrete within 200 mm of a connecting device shall be free of visible cracks that exceed 0.3 mm in width, measured at the widest point of the crack.
- d) All cracks wider than 0.3 mm, other than addressed in c), shall neither extend through the precast unit nor be longer than 300 mm.
- e) The unit shall be free of honeycombing.
- f) The end of any unit shall not be located further than 50 mm from the horizontal alignment of the installation.

In addition to the above criteria, when the precast units are used on facilities with a posted regulatory speed limit of 80 km/h or higher, any unit that fails one or more of the following acceptance criteria shall be rejected:

- a) Damage to edges shall not extend more than 100 mm onto any adjacent face. When edge damage extends more than 50 mm onto such a face, damage to the opposite side of that edge shall not extend more than 50 mm onto the opposite face.
- b) The total length of concrete breakout damage to edges flanking the connecting devices, whether repaired or not, shall not exceed 25% of the respective connecting device length on each side of each connecting device.
- c) The concrete damage in the area of the drainage recess shall not reach higher than one third of the lower sloped surface containing the recess.
- d) Concrete breakouts on the traffic faces or on the top of the precast unit other than addressed in a) to c) above shall not be greater than 150 mm in any direction measured on the surface, nor shall the breakout depth at any point exceed 25 mm measured perpendicularly to the face.
- e) Accumulated total concrete breakouts addressed in d) on the traffic sides of the unit shall not exceed 10% of the total surface area of the respective side.
- f) Drilled holes into the barrier shall not have diameter greater than 40 mm.
- g) The horizontal and vertical alignment discontinuity between adjacent units shall not exceed 20 mm, as measured with a 1 m straightedge.

741.07.02.05 Drainage Gaps for Temporary Concrete Barrier

Gaps for drainage shall be installed as identified by the contractor to accommodate surface runoff using the three beam transition specified in the Contract Documents.

741.07.02.06 Temporary Concrete Barrier Restraint Systems, Type M Connection Only

741.07.02.06.01 General

Type M temporary concrete barrier used for temporary concrete barrier restraint systems shall have been manufactured after October 2011, as verified by the markings.

Restraint systems shall be installed at locations specified in the Contract Documents.

Mechanical and adhesive anchoring systems shall be installed according to the manufacturer's specifications to the minimum embedment depth specified in the Contract Documents.

All welds shall be according to CSA W59.

741.07.02.06.02 Transitions

Transitions between restrained temporary concrete barrier and unrestrained temporary concrete barrier shall be as specified in the Contract Documents.

741.07.03 Movable Temporary Concrete Barrier System

741.07.03.01 General

The movable temporary concrete barrier system shall be installed and relocated at the locations specified and according to the Contract Documents, the Working Drawings, and the manufacturer's installation instructions and specifications.

Movable temporary concrete barrier shall be installed on a paved surface having a maximum crossfall of 6% measured perpendicular to the installation and shall be in place prior to the opening of traffic operations.

Gaps between barriers shall be kept clear of debris at all times.

The movable temporary concrete barrier system shall be removed from the Working Area when no longer required.

741.07.03.02 Shifting

The shift of movable temporary concrete barrier, including the shift of energy attenuators, shall be at the locations specified in the Contract Documents. The method and procedure for the shift shall be according to the manufacturer's installation instructions. The movable temporary concrete barrier and energy attenuators shall be shifted back to the original location when required. Shifting of the movable temporary concrete barrier and energy attenuators at the locations specified in the Contract Documents shall be completed as many times as is necessary to complete the work requiring the shift.

741.07.03.03 End Treatment

One end or both ends, as specified in the Contract Documents, of the movable temporary concrete barrier installation shall be protected with a crash cushion according to the manufacturer's specifications according to OPSS 723.

741.07.03.04 Quality Control

The Contractor is responsible to supply and install the movable temporary concrete barrier units and certify that they meet the acceptance criteria listed under the Acceptance Criteria for movable temporary concrete barrier. The Contractor shall do an initial inspection of the units prior to installation and a further inspection of the units after each subsequent relocation. Every installation and relocation of units shall be certified by submitting to the Contract Administrator within 24 hours of installation or relocation of the units a completed Owner Standard Form PH-CC-876, Certification of Temporary Construction Barrier Installations. Certification shall be by an authorized representative of the Contractor.

Installed or relocated units that do not meet the acceptance criteria for movable temporary concrete barrier shall be removed and replaced within 48 hours with units that meet the acceptance criteria.

Units damaged while in service shall be replaced within 48 hours of the damage occurrence or awareness of the damage.

741.07.03.05 Acceptance Criteria

Any movable temporary concrete barrier unit that fails one or more of the following acceptance criteria shall be rejected:

- a) Dimensions of each unit shall not deviate from those specified by more than the following tolerances:
 - i. For specified dimensions up to 300 mm, the tolerance shall be ± 5 mm.
 - ii. For specified dimensions greater than 300 mm, the tolerance shall be ± 10 mm.
- b) Steel elements of each connecting device shall be free of visible fracture, distortion, and perforation.
- c) Top or head of each unit shall not expose mesh or rebar nor have damage greater than 75 mm deep.
- d) Bottom or foot of each unit shall not have:
 - i. Damage greater than 250 mm long measured parallel to roadway.
 - ii. Damage greater than 75 mm wide measured perpendicular to roadway.
 - iii. Damage greater than 150 mm high.
- e) All cracks wider than 0.3 mm shall neither extend through the unit nor be longer than 300 mm.
- f) The unit shall be free of honeycombing.

741.07.04 Temporary Steel Barrier

741.07.04.01 Anchorages

Barrier systems shall be installed and anchored according to the manufacturer's installation instructions for the specified configuration.

741.07.04.02 Transitions

Transitions between temporary steel barrier systems; or between temporary steel barrier and temporary concrete barrier shall not be permitted.

Transitions between permanent concrete barrier; or steel beam guiderail and temporary steel barrier shall not be permitted.

741.07.04.03 End Treatment

One end or both ends, as specified in the Contract Documents, of the temporary steel barrier installation shall be protected with a crash cushion according to the manufacturer's specifications according to OPSS 723.

741.07.04.04 Acceptance Criteria

Any temporary steel barrier unit that fails one or more of the following acceptance criteria shall be rejected:

- a) Dimensions of each unit shall not deviate from those specified by more than the following tolerances:
 - i. For specified dimensions up to 300 mm, the tolerance shall be ± 5 mm.
 - ii. For specified dimensions up to 300 mm, the tolerance shall be ± 10 mm.
- b) Connecting devices shall be free of visible fracture, distortion or perforation.
- c) Surface impact deformations shall not exceed 25% of the barrier faces. Surface deformations shall be no deeper than 25mm measured perpendicularly to the face.
- d) All steel surfaces shall be free of visible gaps.
- e) All welds shall be in visibly cracks or rips.
- f) All steel surfaces shall be free of rust.

741.07.05 Management of Excess Material

Management of excess material shall be according to the Contract Documents

741.08 QUALITY ASSURANCE

741.08.01 General

The Owner may conduct random Quality Assurance checks on units that have been supplied and installed or relocated to verify the Contractor's ability to ensure compliance with the acceptance criteria. Units that are identified by the Owner's representative as not meeting the acceptance criteria or those units that have been repaired and do not have documentation certifying the method of repair must be removed and replaced with units that meet the acceptance criteria for temporary construction barrier or movable temporary concrete barrier as applicable. This shall be done within a 48-hour period of notice to the Contractor, unless agreed otherwise in writing.

741.09 MEASUREMENT FOR PAYMENT

741.09.01 Actual Measurement

- 741.09.01.01 Temporary Construction Barrier, Category I**
- Temporary Construction Barrier, Category II**
- Temporary Construction Barrier, Category III**
- Temporary Construction Barrier, Category IV**

Measurement of barriers shall be by length in metres along the centreline of the barrier, from end to end, including temporary end sections installed and removed, up to the maximum length of barriers required to be placed at any one time during the Contract.

741.09.01.02 Temporary Construction Barrier, Relocation

Measurement of barriers shall be by length in metres along the centreline of the barrier, from end to end, including temporary end sections relocated.

Barriers that are temporarily surplus to a contract or a stage within a contract, including for seasonal shutdown requirements, which are required for future stages shall be paid for as one relocation for the combined moves into and out of storage, including any off-site storage required due to on-site restrictions.

741.09.01.03 Movable Temporary Concrete Barrier

Measurement of barriers shall be by length in metres along the centreline of the movable temporary concrete barrier, from end to end, up to the maximum length of barrier required to be placed at any one time during the Contract.

**741.09.01.04 Movable Temporary Concrete Barrier, Relocation
Movable Temporary Concrete Barrier, Shift**

Measurement of barriers shall be by length in metres from end to end of each individual relocation, along the centreline of the movable temporary concrete barrier.

Movable temporary concrete barrier that is temporarily surplus for an intermediate stage, but will be required for a later stage, shall be paid as one relocation for the combined moves into and out of on-site storage, including any off-site storage due to on-site restrictions.

741.09.02 Plan Quantity Measurement

When measurement is by Plan Quantity, such measurement shall be based on the units shown in the clause under Actual Measurement.

741.10 BASIS OF PAYMENT

- 741.10.01 Temporary Construction Barrier, Category I - Item**
- Temporary Construction Barrier, Category II - Item**
- Temporary Construction Barrier, Category III - Item**
- Temporary Construction Barrier, Category IV - Item**
- Temporary Construction Barrier, Relocation - Item**
- Movable Temporary Concrete Barrier - Item**
- Movable Temporary Concrete Barrier, Relocation - Item**

Payment at the Contract price for the above tender items shall be full compensation for all labour, Equipment, and Material to do the Work.

Costs associated with any required removals and replacements of defective workmanship or materials shall be at no additional cost to the Owner.

741.10.02

Movable Temporary Concrete Barrier, Shift - Item

Payment at the Contract price for the above tender items shall be full compensation for all labour, Equipment, and Material to do the work.

Payment shall be prorated over the time requiring shifting of movable temporary concrete barrier.

**Table 1
Approved Temporary Construction Barrier Systems**

Manufacturer	Temporary Steel Barrier System
Laura Metaal	BarrierGuard 800
Hill and Smith Inc	Zoneguard
Laura Metaal	Safezone
Safe Barriers	Defender Barrier
Saferoads	HV2

**Table 2
Temporary Construction Barrier Deflection Categories (Note 1)**

Type	System	Hard Surface, Unrestrained	HMA, Restrained	Concrete, Restrained	Bolted to Bridge Deck	Gravel, Restrained
Temporary Concrete Barrier	Type M	II	III	III	IV	-
	Type J	I	-	-	-	-
	Type T	II	-	-	-	-
	Type QMB	II	-	-	-	-
	Type X, 9.0m	III (Note 2)	-	-	-	-
	Type X, 6.0m	III (Note 2)	-	-	-	-
	Type X, 3.0m	III (Note 2)	-	-	-	-
Temporary Steel Barrier	ZoneGuard	I (Note 3)	-	-	-	-
	ZoneGuard MDS	-	IV	IV	IV	-
	BarrierGuard 800	I (Note 3)	-	-	-	-
	BarrierGuard 800 LDS	-	III	III	III	-
	BarrierGuard 800 MDS	-	IV	IV	IV	-
	SafeZone	I (Note 3)	-	-	-	-
	SafeZone LDS	-	III	III	III	-
	Defender LDS	-	III	III	IV	I
HV2	I	-	-	-	-	

Table 2 Notes:

1. The Roman numerals I, II, III and IV in the table indicate that a barrier is acceptable for use when the Temporary Construction Barrier item of the corresponding deflection category is specified.
2. Type X Temporary Concrete Barrier is acceptable for deflection category IV when used adjacent to a single reversible lane, controlled by traffic signals resting in red phase and with a posted regulatory speed of less than 70 km/h.
3. Barrier system requires anchoring at end of run according to the Contract Documents.