



MTO Bituminous Section Report

2017 Partners In Quality Road Tour

Kitchener, Ottawa Sudbury, and Vaughan

Anne Holt

April 2017

Outline



Changes in Specifications

DSM and Form Updates

WBCMS Update

Trials and Initiatives

Changes in Specifications

OPSS.PROV.1101

- 111F09(M) - Additional Test Results and Samples for Performance Graded Asphalt Cement (PGAC)

OPSS.PROV.1151

- 111F06 - Mix Design Criteria Fill-Ins

OPSS.PROV.313

- 103F02 - Hot Mix Construction Fill-In
- 103F03 - Hot Mix Asphalt Construction - End Result
- 103F31(M) - Asphaltic Concrete Surface Smoothness

Overview of Action Plan Responses

Raised requirements for

- Compaction lower limit
- Inspection and sampling for AC
- Qualify for smoothness incentives
- Ash Content

Suspension of

- Incentives for asphalt material properties and compaction
- Reclaimed asphalt pavement (RAP) and roof shingle tabs (RST) in the top layer of pavement

Now required

- ExBBR and DENT tests on all contracts and for all PG grades
- AC storage documentation from hot mix producers
- Documentation from Asphalt Cement (AC) suppliers certifying the PG grade

Performance Graded Asphalt Cement (PGAC) SP111F09(M)

- ❖ Extended Bending Beam Rheometer (ExBBR) and Double Edge Notched Tension (DENT) tests are required for acceptance on **all contracts** and for **all grades** of asphalt cement
- ❖ Acceptance for Ash Content was updated to **0.6%** to reflect practices by Ontario municipalities and MTQ

Performance Graded Asphalt Cement (PGAC) SP111F09M (Table 1)

Ash Content

PGAC Grade	Property and Attributes	Acceptance Criteria	Major Borderline	Rejectable
All PGAC Grades except PG52-40 and PG58-40	Ash Content (%)	≤ 0.8 0.6	> 0.8 and ≤ 1.0 > 0.6 and ≤ 0.8	> 1.0 0.8
PG52-40 and PG58-40		≤ 1.0 0.6	N/A > 0.6 and ≤ 0.8	> 1.0 0.8

PG58-28

PGAC Grade	Attributes	Acceptance Criteria	Major Borderline	Rejectable
PG58-28	CTOD, δ_t (mm)	≥ 6.0	N/A	< 4.0
	Low Temperature Limiting Grade (LTLG) ($^{\circ}\text{C}$)	≤ -25.0	> -25.0 and ≤ -22.0	> -22.0
	Grade Loss ($^{\circ}\text{C}$)	≤ 4.0	N/A	> 6.0

PGAC Submission Requirements (SP103F02 and SP111F09M)

- ❖ AC suppliers are required to provide documentation certifying the PG grade.
- ❖ Documentation is required identifying the storage tank supplying AC during mix production and for any changes.
- ❖ Documentation from hot mix producers regarding asphalt cement (AC) storage has been added:
 - *“If the Contractor intends to store hot mix production in a silo, the planned times of hot mix production shall be provided to the Contract Administrator with 1 Business Day advance notice.”*

Hot Mix Materials (OPSS 1151 & SP111F06)

- ❖ Fine graded mixes are now the default gradation
- ❖ DSM listing for Aggregates: Surface Friction Courses gives dosage and type of AST-AGG

SP111F06, TABLE 6

Maximum Reclaimed Asphalt Pavement and Roof Shingle Tab Content

Traffic Category (Note 1)	Binder Course ≥ 150 mm Below Pavement Surface	Binder Course Within 150 mm of Pavement Surface	Surface Course Excluding SMA Surface Mixes	SMA Surface Course
A, B	40%	40%	20% 0%	0%
C, D	40%	20%	20% 0%	0%
E	40%	20%	20% 0%	0%

Notes:

1. Traffic category as specified in the Contract Documents.
- 2. The use of RST is not permitted in any surface course.**
3. 0.10% RST may be substituted for each 1.0% RAP permitted in the mix.

Hot Mix Construction

	SP 103F01	OPSS 313 & SP 103F02	Non Standard SP (will become SP103F03)
Specification Date	December 2014 & September 2015	November 2016 & March 2, 2017	March 20, 2017
AC Content Payment Adjustment	Based on AC_{JMF}	Based on AC_{ERS}	
Mix and Compaction Incentives	Max $PF_{MC} = 1.070$		Max $PF_{MC} = 1.000$
Compaction Lower Limit	90.5 / 91.5%		2017 Tenders Lower of: 92% with TODRF or 90.5 / 91.5%
			2018 Tenders 92%

Hot Mix Construction (OPSS 313 & SP103F02)

- ❖ Definition for crack added, and cracking included under surface defects.
- ❖ Temperature restriction for allowing placement of next lift or public traffic changed to 60°C (from 50°C).
- ❖ Submission of Technical Data Sheet and Safety Data Sheet for release agent(s) added
- ❖ For bridge decks, HMA temperature immediately after spreading shall be at least the minimum temperature recommended by the AC supplier.
- ❖ Breakdown rolling on structures shall commence immediately after spreading.
- ❖ Replacement core no longer required when thickness is less than 35 mm.

HMA Mix Properties (NSSP/SP103F03)

Table 7: Payment Factors Based on Per Cent Within Limits

PWL	Designated Large Sieve	4.75 mm Sieve	75 μ m Sieve	AC Content	Air Voids	Compaction
100	1.0033 1.000	1.0033 1.000	1.0034 1.000	1.010 1.000	1.020 1.000	1.030 1.000
99	1.0026 1.000	1.0027 1.000	1.0027 1.000	1.008 1.000	1.013 1.000	1.024 1.000
98	1.0020 1.000	1.0020 1.000	1.0020 1.000	1.006 1.000	1.007 1.000	1.018 1.000
97	1.0013 1.000	1.0013 1.000	1.0014 1.000	1.004 1.000	1.000	1.012 1.000
96	1.0006 1.000	1.0007 1.000	1.0007 1.000	1.002 1.000	1.000	1.006 1.000
95	1.000	1.000	1.000	1.000	1.000	1.000

Compaction Lower Limit Raised

- ❖ “...for the states currently requiring a compaction target below 92%, an increase of 10 to 30% in the pavement service life can be achieved by raising the compaction target by 1%.” (2016 NCAT Report 16-02R)
- ❖ 74% of USA DOT's using ERS use compaction lower limit of 92% or higher

States	Lower Limit
1(5%)	90.0%
0(0%)	90.5%
0(0%)	91.0%
4(21%)	91.5%
11(58%)	92.0%
1(5%)	92.5%
0(0%)	93.0%
1(5%)	93.5%
0(0%)	94.0%
1(5%)	94.5%

Hot Mix Compaction (NSSP/SP103F03)

Table 5: Specification Limits for HMA Acceptance Attributes, Pavement Compaction

HMA Type		Lower Limit (LL) %	Upper Limit (UL) %
Superpave 9.5, 12.5 and 12.5FC 1		91.5% 92%	97%
Superpave 12.5FC 2	Design Lift Thickness <50 mm	90.5% 92%	98%
	Design Lift Thickness ≥50 mm	91.5% 92%	98%
Superpave 37.5, 25.0 and 19.0	Design Lift Thickness <60 mm	90.5% 92%	97%
	Design Lift Thickness ≥60 mm	91.5% 92%	97%

Compaction Tender Opening Date Reduction Factor

Year of Tender Opening	Tender Opening Date Reduction Factor (TODRF)
2017	0.5
2018 and beyond	1.0

Example

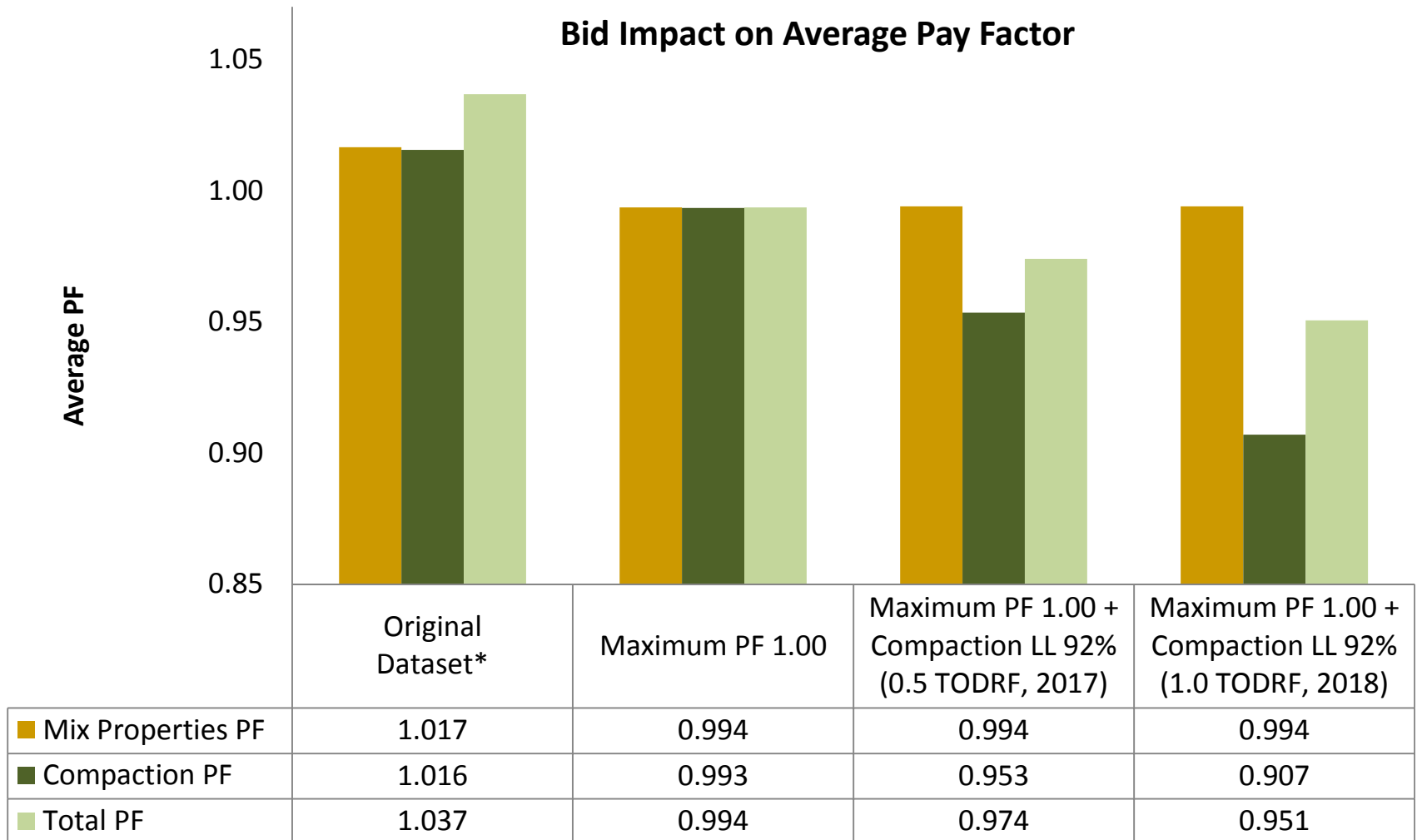
When TODRF =0.5

$$\begin{aligned} PF_{MC} &= [0.994 + 1 - 0.5 \times (1 - 0.907)] / 2 \\ &= 0.974 \end{aligned}$$

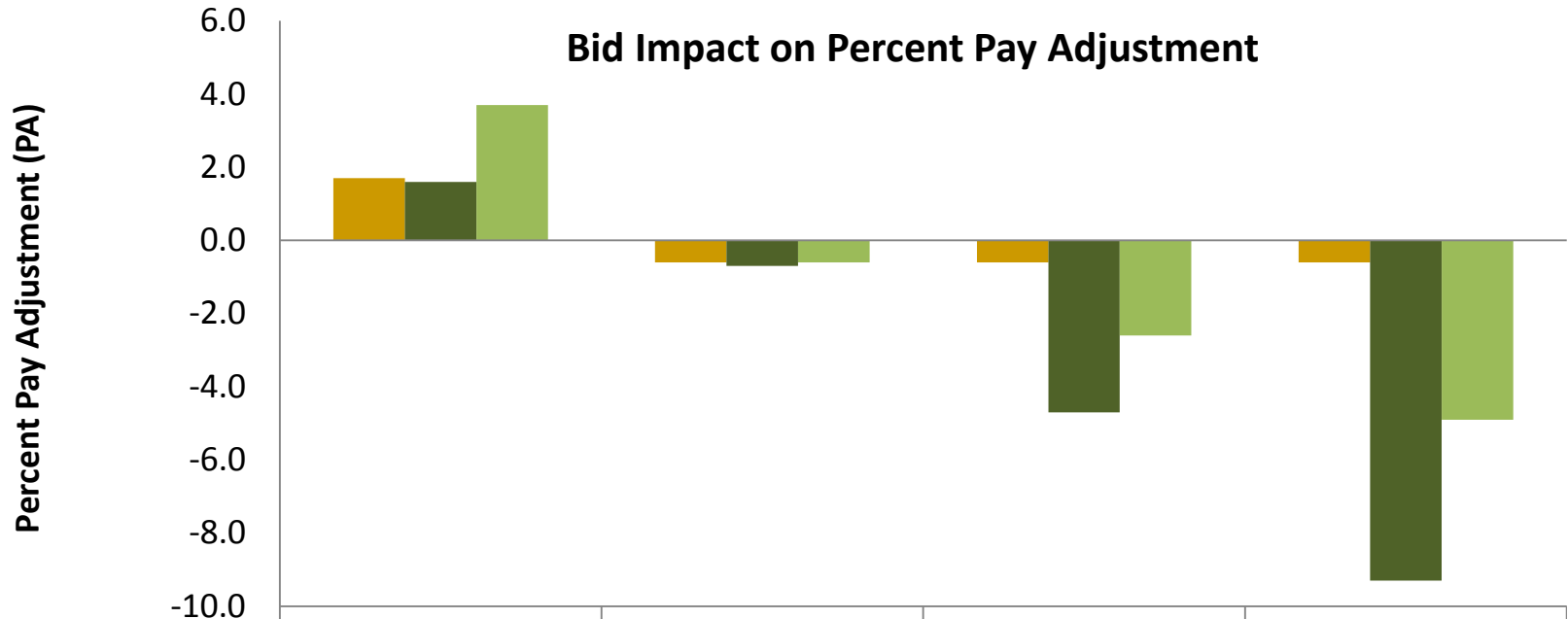
When TODRF =1

$$\begin{aligned} PF_{MC} &= [0.994 + 1 - 1.0 \times (1 - 0.907)] / 2 \\ &= 0.951 \end{aligned}$$

Mix Properties/Compaction Bid Impact Analysis

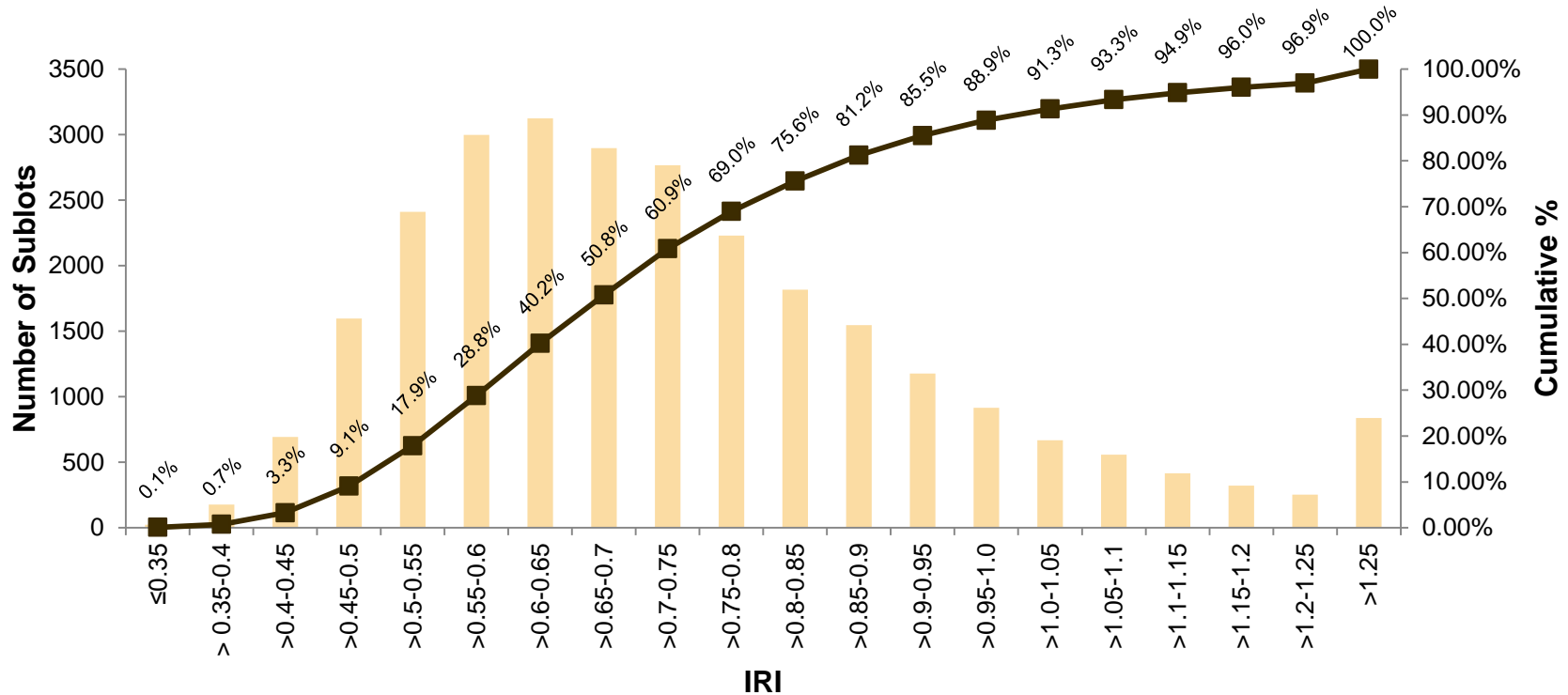


Mix Properties/Compaction Bid Impact Cont'd



	Original Dataset*	Maximum PF 1.0	Maximum PF 1.00 + Compaction LL 92% (0.5 TODRF, 2017)	Maximum PF 1.00 + Compaction LL 92% (1.0 TODRF, 2018)
MIX PROPERTIES PA	1.7	-0.6	-0.6	-0.6
COMPACTION PA	1.6	-0.7	-4.7	-9.3
TOTAL PA	3.7	-0.6	-2.6	-4.9

Smoothness Incentives: IRI Frequency Distribution Histogram



Original	Max Incentive	Incentive	Full Pay	Pay Reduction (Table 1A) Full Pay (Table 1B)	Rejectable
Change Made	Max Incentive	Incentive	Full Pay	Pay Reduction (Table 1A) Full Pay (Table 1B)	Rejectable

Hot Mix Pavement Smoothness SP103F31(M)

Table 1B

IRI Sublot Payment Factor - Category B Pavement Treatments

Average Sublot IRI (m/km)	Sublot Payment Factor
≤ 0.500	1.200
> 0.500 to 0.650 0.600	1.867 2.2 - (1.333 2.0 x IRI)
$> \del{0.650} 0.600 to 1.250$	1.000
> 1.250	Rejected (Requires repairs)

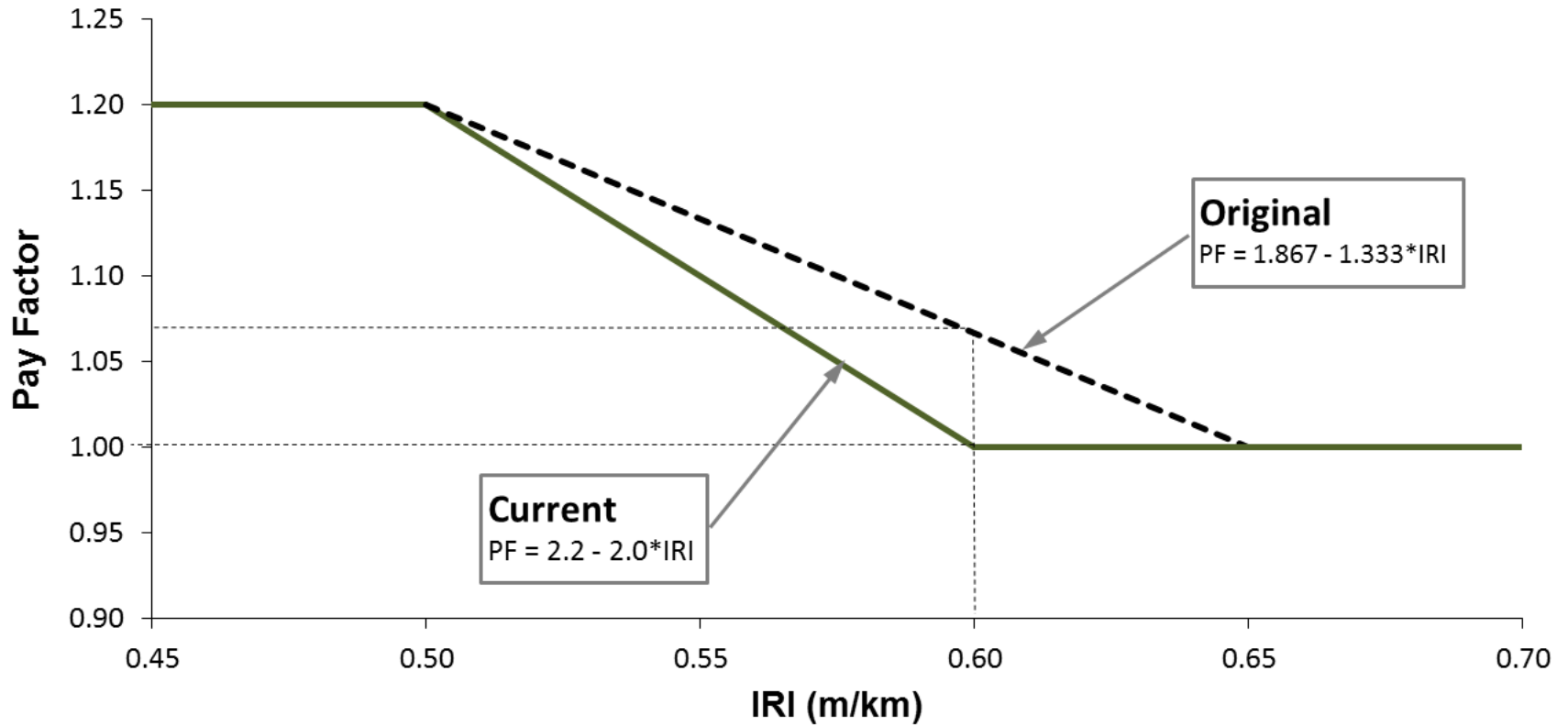
- ❖ Added a new table for pavements with one lift over CIR, FDR, CIREAM, and milled surfaces
- ❖ Raised the bar to obtain incentives for smoothness

Smoothness Changes and Bid Impact

SP 103F31M, Table 1A IRI Sublot Payment Factor -All Pavement Treatments Except Category B	
Average Sublot IRI (m/km)	Sublot Payment Factor
≤ 0.500	1.200
> 0.500 to 0.650 0.600	1.867 2.2 - (1.333 2.0 x IRI)
$> \del{0.650} 0.600 to 1.000$	1.000
> 1.000 to 1.250	1.40 - (0.4 x IRI)
> 1.250	Rejected (Requires repairs)

Original Average IRI Lot Pay Factor	Revised Average IRI Lot Pay Factor
1.029	1.024

Smoothness Sublot Pay Factor Changes



RAQS - MTO Info (Alerts/Tools)

<https://www.raqs.merx.com/>



MINISTRY OF TRANSPORTATION R.A.Q.S.

Select - Contract Bulletin



Scroll down to MTO Info



The screenshot displays the RAQS website interface. At the top, there is a navigation bar with links for 'MINISTRY HOME', 'RAQS LEGACY', 'MERX', and 'FRANÇAIS', along with 'LOGIN' and 'REGISTER' options. Below this is a sidebar menu with a 'Contracts' dropdown menu. The main content area is titled 'Contract Bulletin' and features a list of various contract-related items, each with a count and a plus sign to expand it. The items include: 'Information Posted in last 7 Calendar Days (36)', 'Tenders Under Call (56)', 'Open Bids (109)', 'Awarded In last 30 Days (14)', 'Articles Posted in last 7 Calendar Days (19)', 'Item List - MTO Contracts (106)', 'French Contract Abstract List (75)', and 'MTO Info (37)'. The 'MTO Info (37)' section is expanded, showing a table with one entry: 'ALERT: HMA Acceptance Changes & Beta ERS Bid Tool'.

RAQS - MTO Info (Alerts/Tools)



MINISTRY OF TRANSPORTATION R.A.Q.S.

MINISTRY HOME | RAQS LEGACY | MERX | FRANÇAIS

LOGIN | REGISTER

Contracts

Contract Bulletin

Contracts By Region

5 Year Contract History

Qualification Forms, Guides &

Procedures

Construction Documents

What's New in RAQS


Road Talk

▶ Service Provider

▶ Municipality

▶ Help

MTO Info

Article Name
 ALERT: HMA Acceptance Changes & Beta ERS Bid Tool

Back to List

ALERT: HMA Acceptance Changes & Beta ERS Bid Tool

Updated: 13-Apr-2017

ALERT - Hot Mix Acceptance Changes and Beta Version ERS Bid Impact Tool



Beta Version ERS Bid Impact Tool - April 12, 2017



UPDATED Asphalt Mix Acceptance Changes (2017) - March 20, 2017

Powered by MERX

DSM Updates

DSM 3.05.10-
Antistripping
Additives

- Materials added regularly, may not be in published list

DSM 3.05.30-
Emulsified
Asphalt

- Non-tracking tack coat products now included

Form Updates

PH-CC-250 (PGAC Test Reporting Sheet)

PH-CC-349 (Bituminous Material Product Sample Form)

PH-CC-868-103F01 (ERS Hot Mix Asphalt Payment Calculation)

PH-CC-868-313&103F02 (ERS Hot Mix Asphalt Payment Calculation)

PH-CC-868-103F03 (ERS Hot Mix Asphalt Payment Calculation)

PH-CC-869 (Thickness Pay Factor Calculation)

PH-CC-874 (IRI Smoothness Payment Calculation)

PH-CC-883 (Bituminous Referee Testing Request)

WBCMS Scope & Implementation

- ❖ WBCMS scope – all PH-CC-Forms and current business processes which are documented through procedural guides are now translated to records.
 - Construction Contracts
 - CA & Inspection Contracts
 - Lab Contracts
- ❖ The entire product is role and permission based. Records are workflow enabled.
- ❖ Award schedule is being tracked & coordinated – NSSP & appropriate clause added to Tenders and associated CA & Lab
- ❖ Contracts have been awarded in all regions via WBCMS

Training

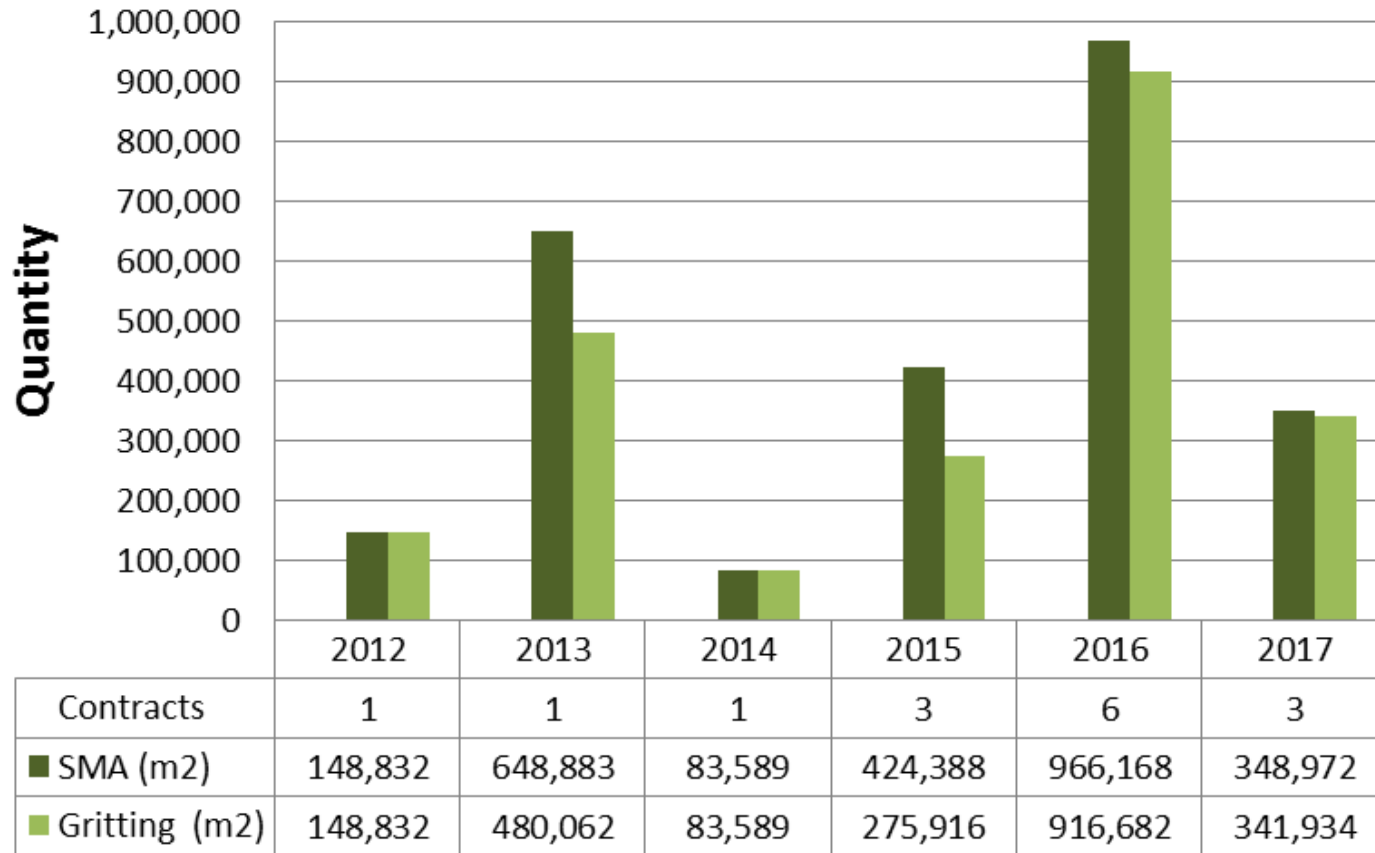
- ❖ Training underway since January 2017
 - High level overview sessions for Executive Staff of external firms
 - Company User administrator for all contract types
 - CA and Construction pre-administration stage
 - CA and Construction administration stage
 - Lab pre-administration & administration stage
- ❖ Training sessions for external service providers are posted on the WBCMS communication portal
 - <http://www.aurigo.com/wbcms-mto/>
- ❖ Call centre provided for technical assistance to external service providers:
 - 1-844-677-4834 (Monday to Friday, 07:00 to 19:00, Eastern Standard Time) or
 - E-mail: wbcms.support@aurigo.com

How will they know?

- ❖ Once the MTO procurement process is completed,
 - Contract Services team set-up contracts in WBCMS
 - Request the name of the “Company User Administrator” for each firm
 - Contract Services team update the contract to “Awarded”
 - WBCMS send auto-generated e-mail to firm – company administrator
 - Regional office follows-up with administrator
 - Administrator purchases subscriptions
 - » Add user profiles & associate users to subscriptions
 - CSA is notified and reviews & approves team members
 - Users access WBCMS to complete on-line records

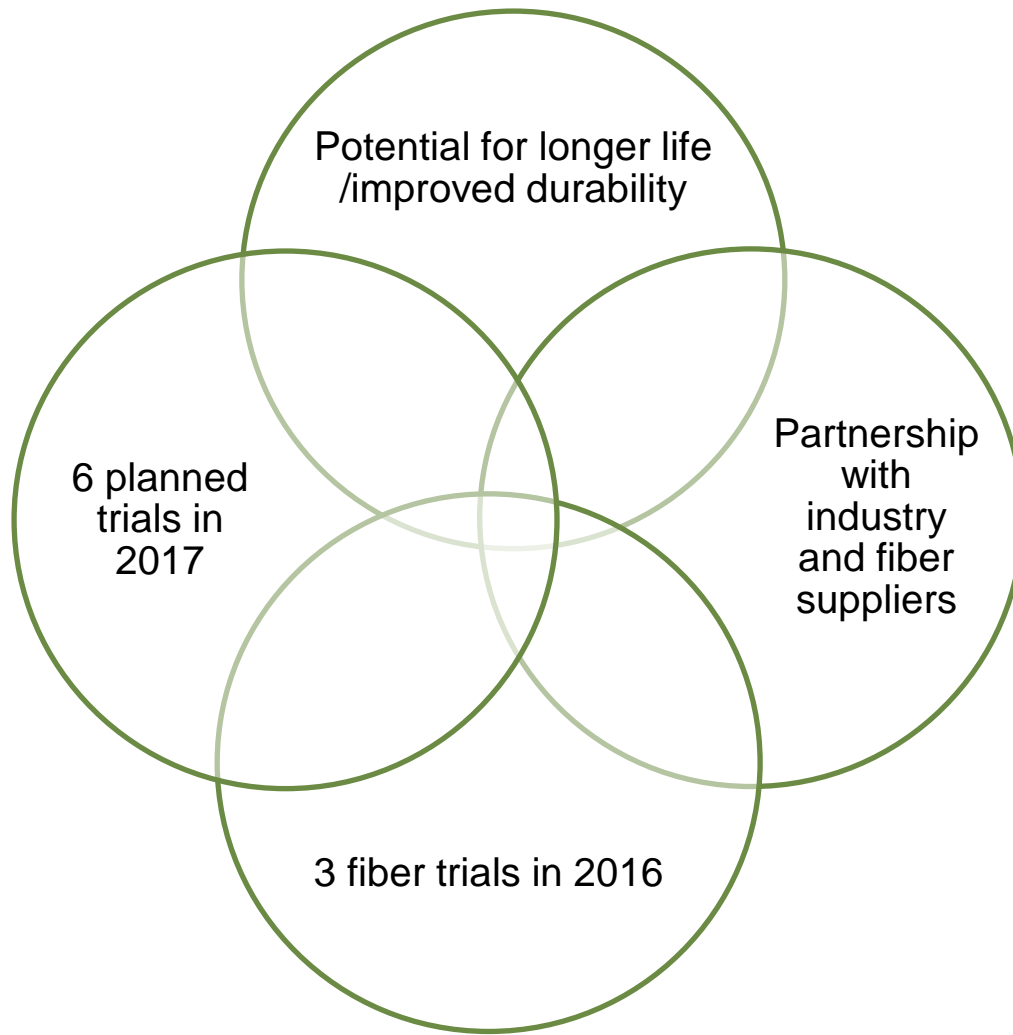
- ❖ User Guides available on WBCMS-MTO application

SMA Update

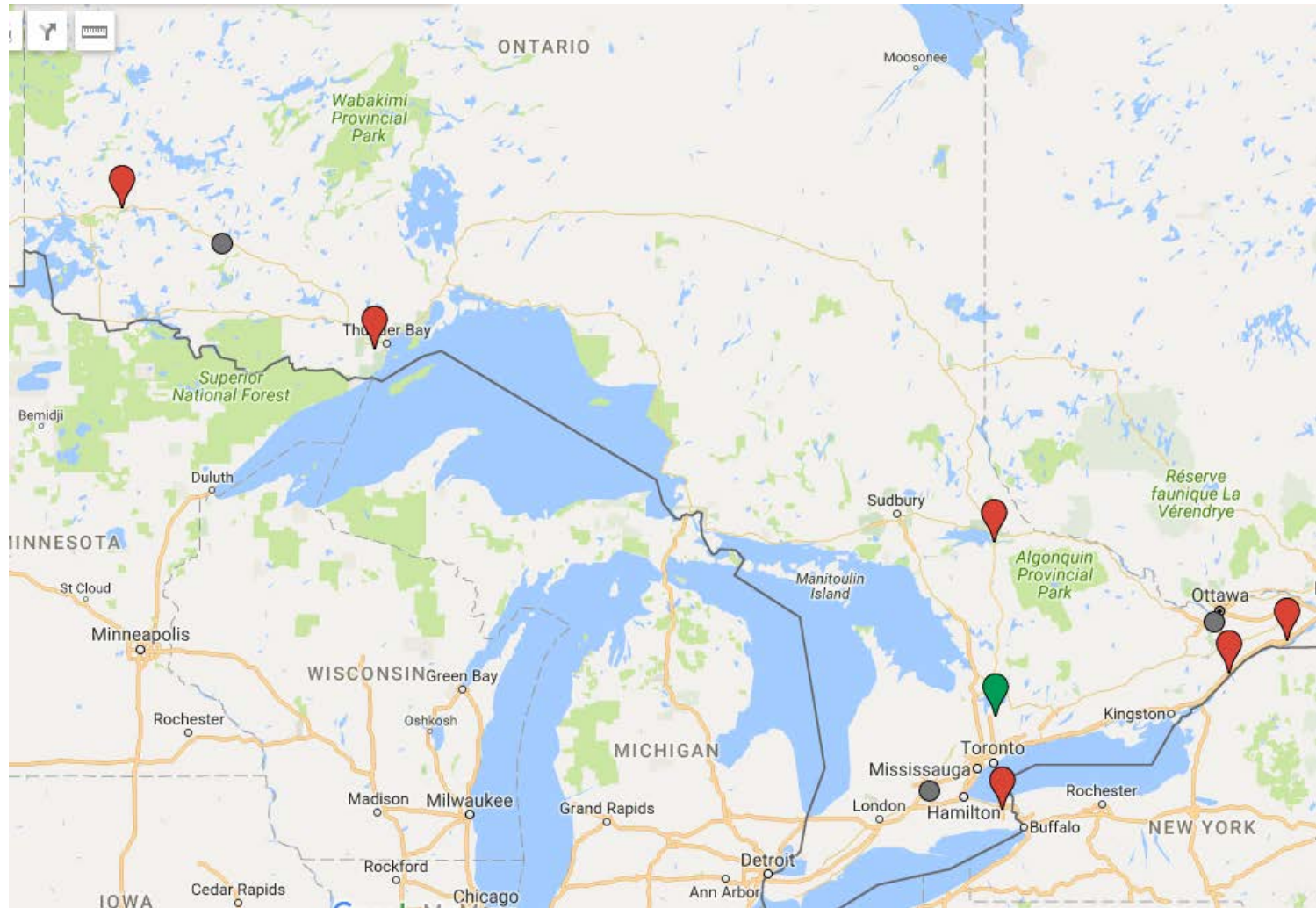


← Trials → ← Contracts →

Trials



Trial Locations



● 2016 Fibre 📍 2017 Fibre 🟢 FHWA SPS-10 WMA

Initiatives - MERO Current

- ❖ Estimation of REOB content using ash content, X-Ray Fluorescence (XRF), and Fourier Transform Infrared (FTIR) Spectroscopy
- ❖ Estimation of 72 Hour Stiffness and Creep using ExBBR 1 and 24 hour values
- ❖ Evaluation of $\Delta T_c (T_{\text{stiffness}} - T_{\text{creep}})$ to predict PGAC performance
- ❖ Evaluation of the Moisture Induced Stress Tester (MIST) as an alternative moisture conditioning process to the TSR test
- ❖ Evaluation of swelling parameter from the MIST to predict stripping resistance

Initiatives - MERO Upcoming

❖ MTO has just placed an order to purchase a Dynamic Testing System (DTS-30) that will allow us to run the following tests:

- Dynamic Modulus
- Flow Number
- S-VECD (Simplified Visco Elastic Continuum Damage)
- Texas Overlay
- Four Point Bending
- Semicircular Bend
- Disk-Shaped Compact Tension
- Indirect Tensile Creep Compliance and Strength
- Resilient Modulus
- TSRST (Thermal Stress Restrained Specimen Test)



Initiative - Research Studies

- ❖ Under HIIFP, MTO provides funding to Ontario colleges and universities to encourage applied research in transportation infrastructure in Ontario
 - Effect of Warm Mix Additives on Tensile Strength of Compacted Asphalt Mix – University of Waterloo (2014)
 - Development of a New Asphalt Mixture Aging/Conditioning to be Used for Performance Testing of Asphalt Mixtures (2016) – University of Waterloo
 - Development of High Modulus Asphalt mix design technology for use on Ontario's Highways (2016) – University of Waterloo

- ❖ Special Study: The Use of the AMIR Compaction Technology to Compact HMA on MTO Bridges (2016) – Carleton University

Questions



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