Administration and Inspection Activities for Waterproofing Bridge Decks and Culverts with Hot-Applied Rubberized Asphalt Waterproofing Membrane

(As specified in OPSS 914, SSP 914F02, SSP 914S07)

914.01 SCOPE

This CAIS covers the construction administration and inspection requirements for waterproofing of new and existing concrete bridge decks with hot applied asphalt membrane as specified in OPSS 914, November 2024; SSP 914F02, SSP 914S07.

914.02 REFERENCES

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

Ontario Provincial Standard Specifications, Construction:

OPSS 914 Waterproofing Bridge Decks and Culverts with Hot-Applied Rubberized Asphalt Waterproofing Membrane

MTO Standard Special Provisions:

SSP 914F02 Amendment to OPSS 914, November 2024 - Existing Concrete Surface Type
SSP 914S07 Amendment to OPSS 914, October 2026

Construction Administration and Inspection Specifications (CAIS):

CAIS 1212 Hot-Poured Rubberized Asphalt Joint Sealing Compound
CAIS 1213 Hot Applied Rubberized Asphalt Waterproofing Membrane
CAIS 1215 Protection Board
CAIS 1216 Primer used with Hot-Applied Rubberized Asphalt Waterproofing Membrane
CAIS 1217 Membrane Reinforcement for Hot-Applied Rubberized Asphalt Waterproofing Membrane

Ontario Ministry of Transportation Publications

MTO Field Guide, for the Acceptance of Hot Mix Asphalt and Hot-Applied Rubberized Asphalt Waterproofing Membrane

MTO Forms:

PH-CC-129A Protection Board and Waterproofing Membrane Thickness Report
PH-CC-340 Field Sample Data Sheet - Concrete
PH-CC-701 Request to Proceed
PH-CC-702 Notice to Proceed

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914.03 DEFINITIONS

For the purposes of this CAIS, the definitions shall be as specified in OPSS 914.

914.04 DESIGN AND SUBMISSION REQUIREMENTS

914.04.01 Submission Requirements

914.04.01.01 HRA Waterproofing Membrane Supporting Documentation

Administrative Activities:

1	-	Check that the HRA waterproofing membrane supporting documentation is submitted prior to waterproofing.	-
2	-	Review the HRA waterproofing membrane supporting documentation prior to waterproofing.	-

914.04.01.02 Cold Weather Protection Plan

Administrative Activities:

1	-	When the Contractor proposes to waterproof at temperatures between 0 °C and 5 °C, check that a cold weather protection plan is submitted for acceptance a minimum of 14 Days prior to commencing waterproofing.	-
2	-	Review the cold weather protection plan and Check that the specified items are included in the plan.	
3	-	Consult with the regional Quality Assurance Section to determine the acceptability of the cold weather protection plan and whether waterproofing at temperatures between 0 °C and 5 °C is acceptable to the region.	
4	-	Advise the Contractor, in writing, whether the proposal to waterproof at temperatures between 0 °C and 5 °C is accepted.	

914.04.01.03 Protection Board

Administrative Activities:

1	-	Check that the protection board manufacturer's recommendations for handling and storage of the protection board is submitted a minimum of 7 Days prior to placement of HRA waterproofing membrane.	-

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914.05 MATERIALS

Inspection Activities:

1	M	Check that the following delivered materials are from the Designated Sources of Materials (DSM) list: a) Hot Poured Rubberized Asphalt Joint Sealing Compound, if used. b) HRA Waterproofing Membrane c) Protection Board	100%
2	M	Check that the following delivered materials are as recommended by the HRA waterproofing manufacturer for the HRA waterproofing membrane that is used: a) Membrane Reinforcement b) Primer	100%
3	-	Check that the membrane reinforcement is labelled as specified and is of the specified grade.	100%
4	-	Check that HRA waterproofing membrane is supplied to the job site in cakes in the manufacturer's sealed containers and that each container is labelled with the manufacturer's lot number.	100%
5	-	Check that protection board meets the thickness requirements as specified in OPSS 1215 and OPSS 914 as early as possible prior to the commencement of the waterproofing operation.	100%
6	-	Check that bond breaker film for staged construction and discontinuities is as specified in SSP 914S07. Discontinuities include when there is a stoppage of placement of the waterproofing within a stage.	100%

Administrative Activities:

1	-	Check that the hot poured rubberized asphalt joint sealing compound, the HRA waterproofing membrane and the protection board are according to the Contract Documents and are on the DSM list.	-
2	-	Record the manufacturer's lot number for the primer.	-
3	-	Record the manufacturer's lot numbers for the hot-poured rubberized asphalt joint sealing compound (if used) and the HRA waterproofing membrane.	-
4	-	Record the date of manufacture for the protection board.	-
5	-	Check that the membrane reinforcement and the primer are according to the Contract Documents and are as recommended by the HRA waterproofing manufacturer for the HRA waterproofing membrane that is used.	-

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914.06 EQUIPMENT

Administrative Activities:

1	-	Check that the air compressor is as specified in OPSS 914.	-
2	-	Check that the mixing kettle is a double boiler oil heat transfer type with a built-in agitator and equipped with two functional permanently installed dial type thermometers as specified in OPSS 914 and the Contract Documents.	-
3	-	Check that the heating of the material in the kettle is controlled by an automatic thermostat to maintain the temperature of the product used within the range specified by the manufacturer.	-
4	-	Check that the thermometer calibration for the thermometers for both the melted compound and oil are as specified in OPSS 914.	-
5	-	Check that a separate calibrated thermometer with an accuracy of ± 2 °C is available on the job site for verification of material temperature.	-

914.07 CONSTRUCTION

914.07.01 Existing Asphalt Covered Decks

Administrative Activities:

1	-	Receive from the Contractor written notification with date and time of commencement of stripping of asphalt riding surface from the existing concrete structure deck, at least 7 Days prior.	-

914.07.02 Notice to Proceed with Waterproofing Operations

Inspection Activities:

1	M	Verify that the Bridge Deck or Culvert Surface Preparation is as specified, prior to issuing the Notice to Proceed.	100%

Administrative Activities:

1	-	Receive from the Contractor a Request to Proceed, with the date and time of commencement of any waterproofing operations, and supporting documentation, at least 48 hours prior to commencement of waterproofing.	-
2	-	Provide Contractor with a Notice to Proceed with waterproofing operation.	-

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914.07.03 General Waterproofing Operations and Operational Constraints

Inspection Activities:

1	-	Check that the order of waterproofing operations is as specified in OPSS 914 and that there is no delay between operations.	100%
2	-	Check that primer is applied on the same Day as the HRA waterproofing membrane is applied.	100%
3	-	Check that approach slabs are waterproofed.	100%
4	-	Check that waterproofing operations, filling of grooves and joint sealing are carried out within the specified temperature constraints and when precipitation is not expected to occur.	100%
5	-	Reject waterproofing and joint sealing that is placed when the ambient air temperature is below 0 ºC.	100%
6	-	Review any proposal to carry out waterproofing operations between 0 and 5 ºC.	100%
7	-	Check that all concrete surfaces against which the waterproofing system is to be applied are air cured with no exposure to precipitation of water, for a least 72 hours immediately prior to the application of the waterproofing system.	100%
8	-	Check that waterproofing materials are stored as specified in OPSS 914, prior to their use.	25%
9	-	Check that, when present, drainage holes are not plugged or covered by the waterproofing system.	100%

Administrative Activities:

1	-	If precipitation is expected or does occur during the 72-hour air curing period, and the Contractor submits a proposal detailing the measures to mitigate the impact of the precipitation on the air curing of the concrete surface, Review the proposal and consult with the MTO Quality Assurance section. Issue a written notification to the Contractor to inform if the proposal was accepted.	-

914.07.04 Applicators

Administrative Activities:

1	-	Check that the applicator performing the waterproofing is from current Approved Applicator's List for Waterproofing Membrane.	-

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914.07.05 Bridge Deck or Culvert Surface Preparation

914.07.05.01 Treatment of Grout Tubes on Bridge Deck Surfaces

Inspection Activities:

1	-	Check that grout tubes have been cut flush with the bridge deck surface prior to abrasive blast cleaning.	75%
2	-	Check that grout tubes are recut flush with the concrete surface if abrasive blast cleaning results in the tube projecting from above the concrete.	75%
3	-	Check that membrane reinforcement is installed as specified.	75%

914.07.05.02 New Concrete Bridge Decks, Culverts and Concrete Deck Overlays

Inspection Activities:

1	M	Check that the bridge deck or culvert meets the requirement for surface tolerance and surface finish specified in the Contract Documents.	100%
2	M	Check the surface of the concrete is completely treated by abrasive blast cleaning to expose sound, laitance-free concrete.	100%
3	-	Check that any curing compound, if used on the concrete surface, is completely removed.	100%
4	M	Check that all dirt and debris is removed from the bridge deck or culvert and adjacent surfaces.	100%
5	M	Immediately prior to the application of the primer, check that the concrete surface is cleaned with an air compressed to remove all dust, debris and other foreign material.	100%
6	-	Check that no equipment or vehicles, other than construction equipment directly associated with the waterproofing operation, is allowed on the abrasive blast cleaned area.	100%
7	-	Check that dust and debris from exposed Work, and from construction operations such as concrete cutting/grinding, abrasive blast cleaning of concrete and steel, does not cause a nuisance to pedestrian and vehicular traffic within the ROW, adjacent residential/commercial/institutional properties, and is not entering a watercourse or Environmentally Sensitive Area.	25%

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914.07.05.03 Existing Bridge Decks or Culvert Surface Preparation

Inspection Activities:

1	M	Prior to abrasive blast cleaning operations, Check the existing bridge deck or culvert surface and identify any areas that require repairs or remedial work that is not specified in the Contract Documents. If repairs or remedial work is required, administer the work as a Change in the Work.	100%
2	-	Prior to the abrasive blast cleaning operations, Check that all areas of the deck, not including sawcut grooves, meet the maximum depth of texture of 2 mm.	100%
3	-	Prior to waterproofing, Check that all existing waterproofing material has been removed and all concrete surfaces prepared as specified in OPSS 914.	100%
4	M	Check that no residual HRA waterproofing membrane is present on the concrete surface to be primed and waterproofed. Check that removal work has not caused any damage to the existing surface of the concrete. Identify any damage to the concrete surface due to waterproofing removal operations.	100%
5	M	Check that all repairs and remedial Work to the concrete deck, due to a Change in the Work or due to damage by the Contractor, are completed prior to waterproofing.	100%
6	-	Check that dust and debris from exposed Work, and from construction operations such as concrete cutting/grinding, abrasive blast cleaning of concrete and steel, does not cause a nuisance to pedestrian and vehicular traffic within the ROW, adjacent residential/commercial/institutional properties, and is not entering a watercourse or Environmentally Sensitive Area.	25%

914.07.05.04 Modification of Deck Joint Assemblies of Existing Bridge Decks

Inspection Activities:

1	-	Prior to waterproofing, Check that all modifications to deck joint assemblies are carried out as specified.	100%

914.07.05.05 Modification of Deck Drains

Inspection Activities:

1	-	Check that modifications to deck drains are made prior to waterproofing and are as specified in the Contract Documents.	100%

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914.07.05.06 Contamination of Bridge Deck or Culvert Surface

Inspection Activities:

1	-	Check that repairs are acceptable if an oil spill or any other contamination of the bridge deck or culvert surface occurs on the concrete prior to or during the waterproofing operation.	100%

914.07.06 Primer

Inspection Activities:

1	M	Prior to application of primer, Check that the concrete surface is dry and clean, while making sure a torch or open flame is not used to expedite the drying of the concrete surface.	100%
2	-	Check that primer is applied uniformly at the required rate and using equipment approved by the manufacturer.	75%
3	-	Check that the primer is applied to all areas specified.	100%
4	-	Check that primer is applied only to areas that will be waterproofed during the same Day. If waterproofing operations are delayed, Check that the concrete surface is re-primed on the same Day that HRA waterproofing membrane is applied.	100%
5	-	Check the primer is fully cured before waterproofing operations proceed.	75%
6	-	If the primed surface is exposed to any precipitation or water, Check that the primed surface is re-primed prior to application of HRA waterproofing membrane.	75%

914.07.07 HRA Waterproofing Membrane and Hot-Poured Joint Sealing Compound Preparation

Inspection Activities:

1	M	For each Day's placement of waterproofing or joint sealant, Check that the kettle is empty prior to the initial charge of material.	100%
2	-	Check that the preparation of HRA waterproofing membrane or hot-poured joint sealing compound is as specified.	75%

914.07.08 Application of HRA Waterproofing Membrane

Inspection Activities:

1	-	Check that waterproofing is applied according to the Contract Documents and the Field Guide for the Acceptance of Hot Mix Asphalt and Hot-Applied Rubberized Asphalt Waterproofing Membrane.	75%

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2	-	Check that the waterproofing membrane is within the temperature range recommended by the manufacturer. Reject any batch of waterproofing membrane that has exceeded the maximum allowable heating temperature. Rejected batches of waterproofing shall not be used in the work.	100%
3	-	Measure the waterproofing membrane thickness for acceptance according to the specified requirements in the Quality Assurance section of OPSS 914. Record all measurements on MTO form PH-CC-129A.	100%

Administrative Activities:

1	-	Complete the waterproofing membrane thickness acceptance form and Check that the Contractor signs PH-CC-129A prior to paving.	-

914.07.09 Membrane Reinforcement

Inspection Activities:

1	-	Check that the membrane reinforcement is placed as specified.	75%

914.07.10 Application of Protection Board

Inspection Activities:

1	-	Visually inspect protection boards for uniform appearance, fibre glass mesh is properly coated, and excess sand is not present on the protection board prior to placement.	75%
2	-	Check that the protection boards are placed as specified in OPSS 914.	75%
3	-	Check that sand used to separate individual protection boards, or any other material, is not present on the abrasive blast cleaned surface, primed surface or the HRA waterproofing membrane surface.	100%
4	-	Check that the protection board is bonded with the HRA waterproofing membrane.	50%
5	-	Throughout placement, continuously visually check protection board to ensure the boards are properly impregnated with asphalt, that they have a uniform appearance, that the fibre glass mesh is properly coated, and excess sand is not present on the protection board prior to placement. (For more details see MTO Field Guide, for the Acceptance of Hot Mix Asphalt and Hot-Applied Rubberized Asphalt Waterproofing Membrane)	75%
6	-	Check that construction equipment or any vehicles are not allowed on the protection boards once placed, except construction equipment directly associated with the paving operations, that follow after the HRA waterproofing membrane has fully set.	100%

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6	-	Check that the binder course pavement is placed within 7 Days of waterproofing.	75%
7	-	Check that prior to placement of the binder course, the protection board is clean, dry, free of sand and other debris and contamination and protected from ice, snow and rain. Check that the protection board remains stable, with no movement, and no perforations prior to and during placement of binder course pavement.	75%

914.07.11 Additional Requirements for Waterproofing of Culverts

Inspection Activities:

1	-	For waterproofing of culverts, Check that the additional requirements are met as specified.	75%

914.07.12 Form and Fill Grooves

Inspection Activities:

1	-	Check that heating and mixing kettle for joint sealing compound is as specified.	75%
2	-	Check that forming and filling of grooves is as specified in the Contract Documents and the Field Guide for the Acceptance of Hot Mix Asphalt and Hot-applied Rubberized Asphalt Waterproofing Membrane.	75%
3	-	Check that any damage to the joint sealing compound caused by the Contractor's operations is repaired.	75%
4	-	Check that no traffic is allowed over the joint sealing compound until the compound has cooled to ambient temperature.	75%

Administrative Activities:

1	-	Check that forming and filling of grooves is performed within 14 Days of surface course asphalt placement.	-

914.07.13 Materials Sampling and Testing

Administrative Activities:

1	-	Determine the time of sampling using the Field Guide for the Acceptance of Hot Mix Asphalt and Hot-applied Rubberized Asphalt Waterproofing Membrane. Direct the Contractor to take samples as specified.	-

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2	-	Determine, in consultation with the regional Quality Assurance Section, if additional samples from the lot are required. Additional samples should be taken if changes are noted in the HRA waterproofing membrane, after the quality assurance sample is taken. Record on form PH-CC-340, Field Sample Data Sheet - Concrete, that the sample is an additional sample for quality assurance testing of the lot as well as the reason for taking the additional sample.	-
3	M	Examine the sample containers prior to sampling to Check that they are new, clean and free of debris. Check that the type of container is as specified, for each material sampled. For HRA waterproofing membrane, the sample container should be a 4-litre metal container with a double tight lid (e.g. a paint can). Glass or plastic containers are unacceptable and shall not be used. The 4-litre container for sampling HRA waterproofing membrane shall be completely filled to allow sufficient sample for referee testing, if invoked.	-
4	-	Check that material samples are taken as specified in the Contract Documents and the Field Guide for the Acceptance of Hot Mix and Bridge Deck Waterproofing.	-
5		For HRA waterproofing membrane, Check that MTO form PH-CC-340 is completed in its entirety and the following information is recorded on the form: - Manufacturer's Name - Product Name - HRA temperature during application (important) - Lot number - Manufacturer's Batch Number - Structure Site No. - Approved Applicator	-
6	-	Check that MTO form PH-CC-340, Field Sample Data Sheet – Concrete is included in the sample bag and seal the sample bag with a security tag. Check that the sample bag is accompanied by a transmittal form.	-
7	-	Deliver the material samples to the designated laboratory and verify that the samples are received.	-

914.07.14 Repairs

Administrative Activities:

1	-	Check that a repair proposal is received for any repairs. Check that the repair proposal meets the requirements specified in OPSS 914. Consult with the regional Quality Assurance section to determine the acceptability of the repair proposal. Issue a written response to the Contractor.	-

Inspection Activities:

1	-	If the repair proposal is accepted, Check that lots that have been repaired or replaced meet the Quality Assurance acceptance requirements and the requirements of the accepted repair proposal.	100%

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914.07.15 Management of Excess Material

Inspection Activities:

1	-	Check that management of excess material is as specified in the Contract Documents.	50%

914.07.16 Joint Details for Staged Construction

Inspection Activities:

1	-	Check that joints for staged construction are as specified in SSP 914S07 and the Contract Documents.	100%

914.08 QUALITY ASSURANCE

914.08.01 General

Administrative Activities:

1	-	Determine the acceptance of the waterproofing system as specified in OPSS 914.	-

914.08.02 Field Inspection

Inspection Activities:

1	-	Inspect the work and reject all or a portion of the work based on the presence of one or more of the defects listed in OPSS 914.	100%

914.08.03 Verification of Application Rate of Primer

Inspection Activities:

1	-	If application rate of primer appears to be unacceptable, based on visual inspection, consult with the regional Quality Assurance section to determine if testing, as specified in OPSS 914, is required.	100%

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914.08.04 Acceptance of HRA Waterproofing Membrane Quality

914.08.04.01 Lot Size

Administrative Activities:

1	-	Determine the lot sizes and limits for each lot in accordance with the Contract Documents and the Field Guide for the Acceptance of Hot Mix and Bridge Deck Waterproofing.	-

914.08.04.02 Basis of Acceptance

Administrative Activities:

1	-	Evaluate the acceptance of the HRA waterproofing membrane quality as specified in the Contract Documents.	-

914.08.04.03 Referee Testing

Administrative Activities:

1	-	Receive request from the Contractor for referee testing of waterproofing membrane quality, and Check that the Contractor's request for referee testing is made within 3 Business Days of receiving notification of payment adjustment or rejection of the lot.	-
2	-	Check that referee testing is as specified in OPSS 914.	-

914.08.05 Acceptance of HRA Waterproofing Membrane Thickness

914.08.05.01 General

Administrative Activities:

1	-	Determine the lot sizes and limits for each lot as specified in OPSS 914.	-
2	-	Divide each lot into 10 equal sublots, and determine the sampling location within each sublot.	-

914.08.05.02 Testing

Inspection Activities:

1	-	Measure the waterproofing membrane thickness as specified in OPSS 914.	100%

914.08.05.03 Basis of Acceptance

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Administrative Activities:

1	-	Calculate the mean and standard deviation of each lot to determine acceptance of the HRA waterproofing membrane thickness.	-
2	-	Determine if the lot is in the acceptable, marginal, or rejectable range as specified in OPSS 914.	-
3	-	Receive from the Contractor a proposal in writing for an alternative to removal and replacement for rejectable HRA waterproofing membrane thickness.	-
4	-	Prepare a recommendation to the Owner when the Contractor has submitted a proposal in writing for alternative to removal and replacement for rejectable HRA waterproofing membrane thickness. Consult with the MTO Structural Section if the waterproofing membrane thickness exceeds 6 mm.	-

914.08.05.04 Referee Testing

Administrative Activities:

1	-	Receive request from the Contractor for referee testing of HRA waterproofing membrane thickness immediately after being advised of the acceptance test results.	-

Inspection Activities:

1	-	For referee testing, take 10 new thickness measurements within the lot and in the presence of the Contractor.	100%

914.08.06 Acceptance of Protection Board Thickness

914.08.06.01 Lot Size

Administrative Activities:

1	-	Determine the lot sizes and limits for each lot as specified in OPSS 914.	-

914.08.06.02 Testing

Administrative Activities:

1	-	Randomly select two boards from each lot for testing, one board for field testing by the Contract Administrator and one board for laboratory testing by the designated laboratory.	-

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Inspection Activities:

1	-	Test the field-tested protection board according to LS-359. Record all measurements on MTO form PH-CC-129A.	-

914.08.06.03 Basis of Acceptance

Administrative Activities:

1	-	Determine the acceptability of protection board thickness on a lot-by-lot basis as specified in OPSS 914.	-

914.08.06.04 Referee Testing

Administrative Activities:

1	-	Check that referee testing of protection board thickness is as specified in OPSS 914.	-

914.09 MEASUREMENT FOR PAYMENT

Administrative Activities:

1	-	Measurement for payment shall be as specified.	-

914.10 BASIS OF PAYMENT

914.10.01 Bridge Deck Waterproofing - Item
Culvert Waterproofing - Item

914.10.01.01 General

Administrative Activities:

1	-	Basis of payment shall be as specified.	-

914.10.01.02 Payment Adjustment Due to HRA Waterproofing Membrane Thickness Deficiency

Administrative Activities:

1	-	Adjustment for payment shall be as specified in OPSS 914.	-

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914.10.01.03 Payment Adjustment Due to HRA Waterproofing Membrane Quality Deficiency

Administrative Activities:

1	-	Adjustment for payment shall be as specified in OPSS 914.	-

914.10.01.04 Calculation for Total Payment Adjustment

Administrative Activities:

1	-	Calculation for payment adjustment shall be as specified in OPSS 914.	-

914.10.02 Form and Fill Grooves - Item
Membrane Reinforcement - Item
Modification of Deck Drains – Item

Administrative Activities:

1	-	Basis of payment shall be as specified in OPSS 914.	-

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