SECTION 914

BRIDGE DECK WATERPROOFING

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914.01 SCOPE

The scope of this specification is the preparation and treatment of the concrete bridge deck, as shown on the plans and where designated by the Owner's Representative, with

a surface conditioner, hot applied rubberized asphalt membrane, membrane reinforcement, and fiber protection board. Joint filling compound shall fill grooves adjacent to curbs, sidewalk, and barrier walls. Undiluted tack coat shall be applied to the asphalt adjacent to curbs, sidewalks and barrier walls.

914.02 GENERAL

The Contractor shall submit for approval to the Owner's Representative the following documentation:

1. Product Data Sheets and the Manufacturer's Installation Instructions for all products to be used in the water proofing system, including, but not limited to the following:
    a. Surface Conditioner /Primer
    b. Hot Applied Rubberized Waterproofing Membrane
    c. Reinforcing Material (If required)
    d. Protection Board

2. In addition to the above information, the submission shall contain:
    a. the project name and number;
    b. proposed dates of application for priming, waterproofing, and paving;
    c. the specific gravity and the weight or mass per drum of the asphalt membrane;
    d. Overview of the Contractor's and foreman's previous experience installing the proposed system or similar systems;
    e. Letter from the manufacturer of the waterproofing membrane that all components to be used in the waterproofing system are accepted for use and are compatible with their product;
    f. Letter from the manufacturer of the waterproofing membrane that the contractor applying the waterproofing membrane is accepted to install their waterproofing system.

3. A copy of the Contractor's pre-waterproofing briefing which shall include, at a minimum, the following information:
    a. Overview of the waterproofing system's components and how the components will be applied;
    b. Any relevant safety information;
    c. Required surface preparation prior to application of primer/conditioner
    d. Required air temperatures and kettle temperatures for application;
    e. Required application thickness of membrane and how the thickness will be measured during application;

f. How defects such as bubbles, pinholes, and missed areas will be corrected
g. Where and how reinforcing materials will be placed
h. How protection board will be placed and rolled including the required overlap and joint staggering distances.

The pre-waterproofing briefing will be carried out with all workers that will be involved in the waterproofing operation. Multiple briefings shall be conducted as required to ensure that all workers are fully versed in the installation procedure or how to correct any installation errors. The Owner's Representative shall be provided with 48 hours notice to be present for briefings.

The Contractor shall give the Owner's Representative a minimum of 48 hours notice prior to commencing the waterproofing application; in addition, the prepared bridge deck shall be specifically accepted by the Owner's Representative.

All concrete surfaces shall be cured in accordance with Section 904.05 and be in a dry condition before waterproofing operations may begin. Waterproofing work shall not be performed during rainy or inclement weather or on frost covered surfaces.

The Contractor shall adhere to Section 820.02 and the required procedures.

914.03 MATERIALS

The waterproofing system will include a surface conditioner/primer, asphalt membrane, membrane reinforcement (as construction details require), protection board, and tack coat emulsion. All components to be used in the overall waterproofing system shall be accepted for use by the manufacturer of the hot applied (poured) rubberized asphalt membrane for compatibility with their product.

914.03.01 Surface Primer for Asphalt Membrane

The surface conditioner shall conform to the requirements of CGSB 37-GP-9Ma "Primer, Asphalt, Unfilled for Asphalt Roofing, Damproofing and Waterproofing" and accepted by the Owner's Representative and accepted for use by the manufacturer of the asphalt membrane.

914.03.02 Asphalt Membrane

The asphalt membrane shall be as follows or an accepted equivalent accepted by the Owner's Representative:

1) Ultraseal 3750 by Craftco Inc.
2) MACSEAL BDM by McAsphalt Industries

3) Henry 790-11 MTO Grade

914.03.03 Reinforcing Materials

The rubber materials shall be as follows or an accepted equal accepted by the Owner's Representative. Any product, including those listed below shall be accepted for use by the manufacturer of the asphalt membrane:

1) SBM 63 Butyl Rubber Membrane by Stedfast
2) Ultraseal Reinforcing Fabric by Craftco Inc.
3) Henry Polyfab Reinforcing Fabric
4) Henry 990-25 Elastomeric Flashing Sheet

914.03.04 Protection Board

Protection board shall be asphalt impregnated fiberboard accepted by the Owner's Representative and accepted for use by the manufacturer of the asphalt membrane.

914.03.05 Tack Coat for Protection Board

The tack coat used in conjunction with the protection board shall be as specified in Section 320.

914.03.06 Joint Sealing Compound

Joint sealing compound shall be as per Section 914.03.02 or an accepted equal accepted by the Owner's Representative.

914.03.07 Asphaltic Concrete Sealant

The asphaltic concrete sealant shall be an undiluted tack coat as per Section 914.03.05.

914.04 INSTALLATION

914.04.01 Concrete Surface Preparation

The existing surface of the concrete shall be treated by sandblasting, bush hammering or other such methods as the Owner's Representative may accept, so as to expose solid, laitance-free concrete. All dirt and debris shall be swept off and disposed of to leave a prepared surface satisfactory to the Owner's Representative before application of the surface primer/ conditioner. Immediately prior to the application of the surface primer/ conditioner, the concrete surface shall be cleaned with a jet of oil-free compressed air to remove all dust and any other foreign material. Waterproofing shall not commence until the Owner's Representative has accepted all preparation work.

Without limiting the generality thereof, in the preparation of new concrete decks the following can be anticipated: removal of concrete and grout spills, small depressions must be filled with Portland cement mixture, areas of heavy laitance require removal, sharp projections must be ground off and honeycombed concrete requires patching.

Old decks will generally require the removal of larger expanses of old hot mix pavement and waterproofing which is not well bonded. Scaled or spalled concrete must be removed and replaced with Portland cement concrete. This will generally be considered as rehabilitation work and will be paid for separately under Section 919.

Hot mix asphaltic patching shall not be used to level a deck prior to waterproofing.

914.04.02 Surface Primer for Asphalt Membrane

Surface primers shall be applied as directed by the manufacturer.

Surface primer shall be applied with accepted equipment which will provide a uniform application at the required rate.

The surface primer shall be applied only when the concrete is dry, clean and when the air and concrete surface temperature are above 5 degrees Celsius. No traffic shall be permitted upon the surface conditioner until it has fully cured.

The surface primer shall be applied to the entire deck surface including those vertical surfaces which are to be treated with waterproofing such as the vertical faces at curbs and expansion joint dams.

Surface primer shall be applied in accordance with CGSB 37-GP-15M “Application of Asphalt Primer for Asphalt Roofing, Dampproofing and Waterproofing.”

914.04.03 Application of Asphalt Membrane

Application of hot applied, rubberized asphalt membrane for bridge deck waterproofing shall generally comply with CGSB 37-GP-51M “Application of Rubberized Asphalt, Hot Applied, for Roofing and Waterproofing.”

Cakes of hot applied rubberized asphalt membrane shall be melted in an accepted, indirect heating or double boiler type mechanically agitated heating and mixing until which shall keep the contents continuously agitated until the material can be drawn free flowing and lump free from the mixing unit at a temperature not exceeding that recommended by the manufacturer. The kettle shall be equipped with a thermometer to measure membrane temperature.

No membrane shall be applied until the surface primer has cured completely. The hot applied rubberized asphalt membrane shall be applied at the temperature recommended by the manufacturer, to the clean primer coated concrete deck, so as to form a uniform single coat having a minimum thickness of 4mm and a maximum thickness of 5mm. The average thickness shall not be less than 4.5mm.

The operation shall be such that discontinuities in the membrane are avoided and any joints lapped 150mm. The membrane shall extend up the face of curbs, dams at expansion joints and deck drains to the height of the top of the hot mix asphaltic surface course and into the chase where this has been provided.

Membrane application temperature shall be not less than 175 degrees Celsius and not greater than 212 degrees Celsius. Overheated material may gel or become stringy and shall be rejected. The membrane shall be applied in such a manner to eliminate entrapped air, be of uniform thickness and essentially free of pinholes and blisters.

914.04.04 Application of Reinforcing Materials

In the areas indicated on the drawings, at all cracks and construction joints reinforcing material shall be placed directly over the hot applied rubberized asphalt membrane while it is still tacky. The reinforcing material shall extend up the face of the curbs or barrier walls to the top of the asphaltic pavement, or into the chase where this has been provided. The reinforcing material shall then be covered with a layer of hot applied rubberized asphalt membrane as shown on the plans or as directed by the manufacturer. At the horizontal and vertical surfaces, the reinforcing material shall be shaped to fit the interface, ensuring that air is not entrapped, fish mouths shall be eliminated.

914.04.05 Application of Protection Board

Protection boards shall be laid on the asphalt membrane while the surface is still warm and tacky. Materials or substances shall not be applied to either the membrane surface or the protection board to remove the tackiness prior to installation of the protection board. Protection boards may be butt jointed. Otherwise, protection boards shall be placed with edges overlapping a maximum of 25mm both longitudinally and transversely. The overlap pattern shall be consistently applied in one direction such that the quality of paving will not be reduced. The overlap pattern shall be such as to facilitate paving operations in the downgrade direction. The protection board edge shall be within 6mm of all curbs, drain verticals and expansion joint verticals.

Protection board shall be rolled as directed by the manufacturer.

No construction traffic or equipment shall be permitted upon the hot applied rubberized asphalt membrane until the protection board has been placed and the membrane has cooled to ambient temperature. Once cooled, only construction traffic directly associated with paving of the asphalt on the waterproofing will be allowed. Any other vehicular traffic, operated either by the public or by the Contractor will not be allowed, and each occurrence will result in the application of the daily liquidated rate to payment of this item.

914.04.06 Application of Protection Board Tack Coat

The diluted tack coat material shall be applied at the rate of 0.5 litre per square metre.

Tack coat material shall be applied to the protection board cover with accepted equipment which will provide a uniform application at the required rate. The tack coat shall be applied only when the protection board cover is dry, clean and when the air temperature is above 5 degrees Celsius. The tack coat on the protection board cover shall be placed just sufficiently ahead of paving to allow for adequate curing.

914.04.07 Paving Operations

The Contractor shall schedule their operations so that paving shall be carried out as soon as the membrane has cooled to ambient temperature but no earlier than 12 hours from conclusion of the waterproofing installation.

Asphalt shall be placed within 48 hours after waterproofing is complete unless otherwise accepted by the Department. Liquidated damages will apply for each 24 hour period that this time period is exceeded. Paving equipment shall not be permitted upon the tack coat until it has fully cured. Asphaltic paving of bridge decks shall be in accordance with Section 922.

914.04.08 Forming and Filling Grooves with Joint Sealing Compound

Along each curb and for the full length of each curb, sidewalk, barrier wall, or where indicated in the contract drawings, the Contractor shall form a rectangular groove 12mm-20mm wide extending from the surface to the top of the base course of asphalt. If only one lift of asphalt is present, the groove shall extend to the top of the waterproofing membrane. This groove shall be made using asphalt impregnated strips or timber placed against the curb prior to the placing of the hot mix asphaltic concrete.

If required, the material used to form the groove shall be coated with an accepted bond breaker and shall be fully removed after the mix has been fully compacted. The Contractor may use an alternative method of forming the grooves with the approval of the Owner’s Representative.

Immediately prior to pouring the sealing compound, the groove shall be completely empty, dry and then cleaned of any dust or debris by an oil-free compressed air jet.

The joint sealing compound shall be poured in place after the asphaltic pavement reaches ambient air temperature.

Cakes of joint sealing compound shall be melted on the job site and shall be continuously agitated in the mechanically agitated heating and mixing kettle. The contents shall be continuously agitated until the material can be drawn free flowing and lump free from the mixing kettle at a temperature within the range recommended by the manufacturer.

The compound shall not be heated in excess of the pouring temperature recommended by the manufacturer. The Contractor may be required to demonstrate with the equipment proposed for use that it will consistently produce a joint sealing compound of proper pouring consistency.

Pouring shall be done by the use of hand pouring pots, mechanical methods, or any other method which will give satisfactory results. The pouring equipment shall be designed such that a minimum of time will elapse during pouring operations so the compound will be placed in a workmanlike manner. Shields shall be provided to prevent the compound from being spilled on the concrete curb and on the newly placed bituminous surface.

Sufficient compound shall be poured into the groove so that upon completion of the work the surface of the compound will be flush with the surface of the pavement when the air temperature at time of pouring is 27 degrees Celsius or over, or 5mm below the surface of the pavement when the temperature is below 27 degrees Celsius. If the compound subsides to a level below the surface of the pavement, a second pouring will be required. When more than one pouring is required to fill the groove, succeeding pours will be made immediately.

Damage such as stones embedded in the joint sealing compound by construction traffic and Contractor's operation shall be repaired by the Contractor at their expense.

Traffic will not be permitted upon the surface course during the operation of forming and filling the grooves.

914.04.09 Sealing Surface of Asphaltic Concrete Adjacent To Curbs

After the grooves at curbs have been filled and before it has become contaminated with dirt or debris, the surface shall be spray or brush painted with a uniform continuous, liberal application of undiluted tack coat specified in Section 914.03.07 at the rate as per

manufacturer's instructions, or as directed by the Owner's Representative, for a width of 600mm adjacent to all curbs, barrier walls, or where otherwise specified, to completely seal the surface. The tack coat shall extend 25mm up adjacent concrete surfaces.

914.05 SAMPLING

The Department's representatives may at their discretion require that sufficient quantities of the surface conditioner, hot poured rubberized asphalt membrane, joint sealing compound, or tack coat be obtained from the materials being used on the project as might be required for immediate analysis or future testing purposes.

914.06 MEASUREMENT FOR PAYMENT

The area treated with hot applied rubberized asphalt membrane will be measured in square metres to the nearest one decimal place and will for payment purposes be considered the product of the width of the bridge deck measured perpendicular to faces of curb and side walk and the length of the bridge measured in plan between centre lines of abutment bearings. No allowance will be made in the measurement for the turn-up at the curb line or for any overlaps.

914.07 BASIS OF PAYMENT

Payment at the contract price for "Bridge Deck Waterproofing" in the Unit Price Table shall be full compensation for the preparation of the concrete deck surface, the supply and application of surface conditioner, hot applied rubberized asphalt membrane, rubber membrane, protection boards, tack coat, joint sealing compound, the forming and filling of the grooves, the supply and application of undiluted seal coat, the handling and controlling of traffic, and for all other items incidental to the satisfactory completion of work as determined by the Owner's Representative.