INDEX TO CLAUSES

PART 1 - GENERAL

1.1 Work Included

.1 This section specifies requirements for constructing walks, curbs, and gutters. Work includes fine grading; supply, placing, and finishing of Portland Cement concrete and asphalt concrete; and backfilling.

1.2 Reference Standards

The latest editions of all the following references shall apply to this specification.

.1 Joint Committee on Contract Documents Standard Specification for Municipal Services.

.2 ASTM C309-19, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

.3 ASTM D1751-18, Standard specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).

.4 ASTM D5249-10 (R2021), Standard Specification for Backer Material for Use with Cold- and Hot-Applied Joint Sealants in Portland Cement Concrete and Asphalt Joints.

.5 CSA A23.1:24/A23.2:24, Concrete materials and methods of concrete construction/methods of test and standard practices for concrete.

.6 HRM Section S-1, Specification for Hot Mix Asphalt Concrete.

.7 Nova Scotia Department of Public Works - Highway Construction and Maintenance.

.8 CSA B651:23, Accessible design for the built environment.

1.3 Related Sections

.1 From Joint Committee on Contract Documents Standard Specification for Municipal Services:

.1	Earthwork	Section 31 20 00

.2 Concrete Section S-11, Part A

1.4 Protection

.1 Protection, including security, if necessary, to prevent damage to newly installed walks, curbs, and gutters shall be provided at Contractor's expense.

.2 Keep sufficient covering on site to protect fresh concrete from damage by weather.

PART 2 – PRODUCTS

2.1 Materials

.1 Isolation Joint Filler according to ASTM D 1751.

.2 Granular Base shall be Type 1 Gravel to Section 31 20 00.

.3 Asphalt Materials according to HRM Standard S-1 Specification for Hot Mix Asphalt Concrete (HMA).

.4 Curing Compound according to ASTM C309: 19 Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete, white in colour.

.5 Tactile Walking Indicator Surfaces Plates:

.1 Cast iron plates in accordance with ASTM A48, minimum class 30B, free from damage or blemishes, sound, free from casting faults, cracks, blowholes, and other defects.

.2 Attention type (truncated domes), 12-25mm top surface diameter, 22-35mm base surface diameter, 42-70mm centre-to-centre between domes to CSA B651:23 Clause 4.4.5.3.1.

.3 Directional type (flat-top elongated bars), 17-30mm top surface width, 27-40mm base surface width, 57-85mm centre-to-centre between bars, in accordance with CSA B651:23 Clause 4.4.5.4.1.

.4 Both types of indicators must be slip resistant and colour contrasted with surrounding walking material in accordance with CSA B651:23.

2.2 Concrete Mix

.1 Concrete in accordance with Section S-11, Part A and as specified herein.

.1 Exposure class of C-2 as outlined in CSA A23.1:24 Tables 1

and 2.

.2 Slump shall be in accordance with CSA A23.1:24 Clause 4.3.2.3.1.

.3 Macro-synthetic fibres shall be in accordance with Project Documentation.

.4 Concrete placed during cold weather concreting shall have a minimum temperature of 16 ºC and maximum temperature of 28 ºC at the time of placement.

2.3 Asphalt Concrete Mix

.1 Asphalt Concrete Mix according to HRM Standard S-1 HMA

PART 3 - EXECUTION

3.1 Fine Grading

.1 Fine grade gravel surface prior to placing Portland cement concrete or asphalt concrete.

3.2 Reinforcement

.1 Reinforcing steel mesh to be positioned at appropriate height using non-reactive chairs.

3.3 Adjusting Tops of Castings

.1 Adjust castings to match finished surface prior to placing surface course of asphalt concrete or Portland cement concrete.

3.4 Concrete Structures

.1 Complete concrete work in accordance with Section S-11, Part A and as specified herein:

.1 Placing:

.1 Place concrete in continuous operation beginning at lowest point. Tamp or vibrate to prevent honeycombing.

.2 Jointing:

.1 Isolation joints shall follow CSA A23.1:24 Clause 7.3.4, to be of full depth and installed where concrete abuts an

existing structure (ex. curbs, buildings, lamp post, fire hydrants, water valves, etc.), or as indicated by the Engineer. Isolation material may be a polyethylene foam, cross link polyethylene foam, or polyurethane and confirm to the requirements of ASTM D 5249.

.2 Contraction (control) joints shall follow CSA A23.1:24 Clause 7.3.3, to be between one quarter to one third of section thickness. Space joints every 3 metres for curbs and every 1.5 metres for concrete walks unless otherwise indicated. Saw cutting with a wet cut saw typically occurs between 8 to 24 hours after placement. Prior to saw cutting, ensure concrete is sufficiently set to resist ravelling and before shrinkage cracks appear. If section contains non isolated walks and curbs, contraction joints shall be aligned where practical. Provide a contraction joint within 150 mm of change in cross section of curbs, gutters, and walks. Panels shall not contain wedges with angles less than 60 degrees. Reinforcement as required by the Engineer should be considered if lower angles are required.

.3 Construction joints shall follow CSA A23.1:24 Clause 7.3.2, to be of full depth and to be used at the end of days construction or when the placement of concrete is interrupted by more than 30 mins. 15 mm thick bitumen impregnated fibreboard to be used as joint material with three (3) 10 mm smooth steel bars evenly spaced where the free ends of the dowel bars are greased and have an expansion cap on one end. Concrete cover to be 50 mm. Joint shall be finished with an edging tool with a 12.7 mm radius.

.4 Expansion joints shall follow CSA A23.1:24 Clause 7.3.5, to be of full depth and spaced 30 m apart and at every cold joint. Joints also to be placed between curb and sidewalk which are perpendicular to each other. For expansion joints between walks and curbs and/or gutters, full depth will still apply however just the bitumen impregnated fibreboard shall be used. For expansion joints between walks, 15 mm thick bitumen impregnated fibreboard to be used as joint material with three (3) 10 mm smooth steel bars evenly spaced where the free ends of the dowel bars are greased and have an expansion cap on one end. Concrete cover to be 50 mm. Joint shall be finished with an edging tool with a 12.7 mm radius. Top surface of fiberboard to be fully exposed along its entire length.

.5 Concrete placed against utility poles shall have a suitable bond breaker installed and be treated as an isolation joint as described above.

.6 Finish perimeter of all slabs with an edging tool.

.3 Finishing:

.1 Do not apply water to newly placed concrete surfaces.

.2 Broom exposed concrete surfaces to provide evenly textured, non-skid surface.

.4 Curing:

.1 Apply curing compound in accordance with CSA A23.1:24 Clause 7.8. Curing compound to be applied to the entire surface and all faces. Concrete to have a uniform white colour after application of curing compound.

.5 Form Stripping:

.1 Strip forms only when concrete has developed sufficient strength to resist damage to corners and edges.

.2 Bump-out/Curb Extension reinforcement:

.1 Concrete mixture for curb and gutter on bump-out construction to contain macro-synthetic fibers with a minimum Fe,150 of 1.2 MPa or as specified in Project Documentation.

.3 Trip hazard mitigation:

.1 All finished surfaces shall be carefully inspected to identify potential trip hazards.

.2 The Contractor shall ensure that surfaces meet safety standards and adhere to local regulations and any applicable legal precedents.

.3 Regular assessments shall be carried out during and after construction to identify and rectify any surfaces deviating from the acceptable tolerance of 8 mm between adjacent surfaces, as measured with a 2 m straight edge. These surfaces shall be promptly corrected to ensure the safety of pedestrians. If such deviations can be reasonably rectified while the concrete is still in a workable state, the Contractor

can proceed with the necessary adjustments without Engineer approval. However, if the concrete has already set and significant alterations are required, the Contractor must inform the Engineer. Alternatively, if the Contractor feels that the hazard is due to subgrade conditions out of their control, such as a tree root, they will inform the engineer of these conditions. In such cases, the decision to proceed with grinding, removal, and replacement, or alternative repairs shall be at the Engineer's discretion.

3.5 Tactile Walking Indicator Surfaces Placement

.1 Tactile plate layout to be developed following HRM Standard Detail 131 and as specified in Project Documentation, or if not specified, to be conducted by the Contractor via field measurements.

.2 Tactile plates shall be placed with the top of the base plate (bottom of the truncated domes and/or flat-top elongated bars) flush with concrete surface.

.3 Attention type tactile plates to be positioned between 100mm to 200mm from the curb edge when utilized for hazard identification at intersections and shall be installed as per CSA B651:23 Clause 4.4.5.4.3, and HRM Standard Detail 131.

.4 Directional type tactile plates shall be installed as per CSA B651:23 Clause 4.4.5.4.3, and HRM Standard Details and/or as specified in the Project Documentation.

3.6 Asphalt Concrete Surfaces

.1 Place asphalt concrete mix in accordance with HRM Standard S-1, Specification for Hot Mix Asphalt Concrete.

3.7 Extruded Portland Cement Concrete and Asphalt Concrete

.1 Submit extruding equipment and mule configuration for review by the Engineer.

.2 The bottom of the granular base and sub-base for curb is to match that of street gravels or 150 mm thick minimum, whichever is greater.

.3 Curb bedding shall be 150 mm Type 1 gravel. The remainder shall match type and depth of street gravels.

.4 Outside edge of curb bedding to be 150 mm behind curb at surface and increase 100 mm for each 200 mm below curb.

3.8 Backfilling

.1 Backfill when Portland cement concrete or asphalt concrete have strength sufficient to resist damage from backfilling operations. Backfill to Section 31 20 00.

.1 The Contractor shall backfill the area behind the curb to a distance not less than 0.6 m from the back of the curb. The material used shall be free from large rock, organic and/or deleterious material.

PART 4 - MEASUREMENT & PAYMENT

4.1 General

.1 Payment for all works carried out in accordance with this specification will be paid for per the payment items detailed in Section 01 22 00 – Measurement and Payment, of the Contract.

****** END PART B ******