PART 1 – GENERAL

1.1 RELATED SECTIONS

..1 Section 061500 – Wood structure

.2 Section 310099 – Earthworks for Minor Works

.3 Section 312313 – Rough Grading

.4 Section 321540 – Crushed stone paving

1.2 BASIS OF PAYMENT

.1 Measurement Procedures:

.1 Item L-001: Precast Concrete Pavers type 1. Measure for supply and installation of prefabricated concrete pavers type 1 including pavers, bedding material and joint material, edge restraints and all work required for proper implementation, including excavation, infrastructure and crushed rock or gravel base, in square meters. The unit price bid (sq. meters) will be for full compensation for all labour, materials and equipment to do the work.

.2 Precast Concrete Pavers type 2. - Supply and installation of prefabricated concrete pavers type 2 including pavers, bedding material and joint material, edge restraints and all work required for proper implementation, including excavation, infrastructure and crushed rock or gravel base in lump sum. The contract lump sum price will be full compensation for all labour, materials and equipment to do the work.

.3 Limestone edges type 3. - Supply and installation of limestone edges type 3 including edges, bedding material and joint material, edge restraints and all work required for proper implementation, including excavation, infrastructure and crushed rock or gravel base, in lump sum. The contract lump sum price will be full compensation for all labour, materials and equipment to do the work.

.4 Cobblestone pavers type 4. - Installation of supplied cobble stones including bedding material and joint material, edge restraints and all work required for proper implementation, including excavation, infrastructure and crushed rock or gravel base, in lump sum. The contract lump sum price will be full compensation for all labour, materials and equipment to do the work.

.5 Supply and installation of prefabricated concrete slabs for benches include excavation, infrastructure and crushed rock or gravel base, bedding material and slabs. The contract lump sum price will be full compensation for all labour, materials and equipment to do the work.

.6 Supply and installation of prefabricated concrete slabs for the wood walkway include excavation, infrastructure and crushed rock or gravel base, bedding material, and slabs. The contract lump sum price will be full compensation for all labour, materials and equipment to do the work.

.7 Supply and installation of prefabricated concrete base for the doors in the wood cladding are included in the contract lump sum price will be full compensation for all labour, materials and equipment to do the work.

.8 Retaining Wall. - Supply and installation of prefabricated concrete retaining wall between temporary washrooms include excavation, infrastructure and crushed rock or gravel base, bedding material, and slabs in linear meters. The contract lump sum price will be full compensation for all labour, materials and equipment to do the work.

1.3 REFERENCES

.1 American Society for Testing and Materials International, (ASTM).
- .1 ASTM C136M-14, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
- .2 ASTM C979M-10, Standard Specification for Pigments for Integrally Colored Concrete.

.2 Canadian Standards Association (CSA International).
- .1 CSA A23.1/A23.2-F09 (C2014), Concrete Materials and Methods of Concrete Construction/Method of Test for Concrete
- .2 CSA A179-F04 (C2014), Mortar and Grout for Unit Masonry.
- .3 CSA-A231.2-14, Precast Concrete Pavers.
- .4 CSA A283-06 (R2011), Qualification Code for Concrete Testing Laboratories.

1.4 SHOP DRAWINGS

.1 Submit shop drawings for each paving motif, for the entire new paved area around the relocated plaque and concrete slabs for benches in accordance with General Requirements present in the current book of specifications.

.2 The drawings must indicate the dimensions, the thicknesses and the method of assembly, anchoring and installation of each material and prescribed accessory.

1.5 SUBMITTALS

.1 Technical data sheets
Submit product data in accordance with General Conditions and Requirements section for unit pavers, bedding and joint materials, edge restraints, ad spacers.

.2 Submit following sampling and testing data::
- .1 Sieve analysis for gradation of bedding and joint materials.

.3 Submit two 2 copies of relevant safety data sheets WHMIS (workplace hazardous materials information system) in accordance with the General and administrative clauses. The sheets must indicate the rate of emission of VOC of products mentioned below cleaning products.

.4 Submit full size sample of each type of unit pavers, retaining wall block, and concrete slabs used in accordance with General Requirements present in the current book of specifications. Selection of colour will be done upon presentation of the samples. Departmental Representative may modify the choice of colour to insure adequate integration of the pavers in the existing context.

.5 Submit samples for each joint sand used.

.6 Submit shop drawings indicating assembly adjacent the catch basins, paving patterns, the measurements of the new paved area around the relocated plaque, and the retaining wall.

.7 Construct Mock-up 1 m x 1 m for each type of pattern. Approved mock-up may remain as part of finished work.
- .1 Allow (24) hours for inspection of mock-up before proceeding with work.
- .2 When accepted, mock-up will demonstrate minimum standard of quality required for this work.

.8 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with in accordance with current book of specifications.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance provisions of current book of specifications.

PART 2 – PRODUCTS

2.1 MATERIAL

.1 Infrastructures, below grade, and crushed stone or gravel base must be assembled according to present specifications and civil engineering specifications.

.2 The bedding and joint materials between the pavers is of open gradation ranging between 2.5 mm to 5.0 mm in size. The thickness of the laying bed must be 25mm. The colors of the joint material will be approved upon presentation of samples. The color should be similar to the existing joints of the same pavers.

Gradation 2,5 - 5,0 mm CSA

Sieve Size	% Passing
10 mm	100
5 mm	70 à 100
2,5 mm	10 à 40
1,25 mm	0 à 10

.3 Do not deliver or install material when there is frost, when the ground is humid or muddy. Material must be supplied according to optimal humidity conditions for compaction determined with AASHTO T99 (ASTM D 698). Do not supply or install materials that have a humidity level that is too high (above those which are deemed optimal for compaction according to AASHTO T 99 (ASTM D 698)).

.4 Under all circumstances protect ground and materials from excess water and erosion. Protect stored materials from heavy rain and of water after compaction, allow enough time for drainage and drying of the surface in order to obtain the optimal humidity level required for compaction.

.5 Pavers;
- .1 Type 1 Unit Pavers: Concrete unit pavers, 300 x 600 mm consistent with pavers leading from Canal Drive towards Famous Five monument.
- .2 Type 2 Unit Pavers: New pavers matching the existing pavers around the MacDonald Monument Plaque.
- .3 Type 3 Unit Pavers: Limestone edges consistent with edges used around the interpretive plaques.
- .4 Type 4: cobble stone supplied by Departmental Representative.

.6 Precast concrete slabs
- .1 Type 1: Slab for bench in accordance with section 323700 – Site furnishings.
- .2 Type 2: Slab for wood walkway: precast concrete slabs 450 x 450mm x 100mm thick.

.7 Precast concrete base for the wood cladding doors.

.8 Precast concrete retaining wall
- .1 Single-sided blocks, dimensions 150mm (height) x 279mm (depth) x 406mm (length of visible face) x 267mm (length of hidden face). Cap dimensions 90mm (height) x 356mm (depth) x 711mm (length). Color: polished shale grey.

2.2 EDGE RESTRAINTS

.1 Aluminium edges allowing linear and curved installation 4.8mm thick x 57mm high x 57mm deep x 2m long installed away from pavers.. Mill finish with 9.5 mm x 254 mm spiral steel spikes through edging holes in section base of paver restraint every 300mm. Edges must be equipped with pre-pierced holes for anchors, compliant to the norm CAN/ CSA-A231.2 and installed according to manufacturer's instructions. Edges must be joined together.

2.3 CLEANING COMPOUNDS

.1 Clear, organic solvent, designed and recommended by manufacturer for cleaning concrete pavers of contamination encountered.

.2 Acid based chemical detergent, designed and recommended by manufacturer for removal of contamination encountered on pavers.

2.4 CONCRETE ADHESIVE

.1 Type: Synthetic elastomeric polymer Calculated VOC (less exempt solvent): 303 g/L State : Medium-viscosity mastic Weight/gallon : 9.0 lbs. Color : Light tan Flashpoint : < 0 °F. Solids : 65% Freeze/thaw stability : Stable Viscosity : 130,000 cps

2.5 GEOTEXTILE

.1 According to the section 321540 – Crushed stone paving.

PART 3 – EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 PROTECTION MEASURES

.1 Take the necessary measures to avoid damaging buildings, infrastructure and adjacent vegetation. If necessary, repair any damage resulting from construction the work.

3.3 EARTHWORK

.1 Check that rough grading and excavations level comply with the requirements of Departmental Representative and ensure that the levels correspond to the theoretical levels required.

.2 Concerning access to buildings and site during the work period, comply with the instructions of the present book of specifications. Coordinate paving work in a way that interferes least as possible with the customary uses of the premise. Ensure free access to buildings at all times.

3.4 STRUCTURAL SURFACE

.1 Verify that levels of structural surface conform to levels prescribed in current specifications in order to obtain indicated levels. If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Departmental Representative.

.2 Verify that top of structural surface (top of base) does not exceed plus or minus 10 mm of grade over 3 m straight edge.

.3 Ensure that structural surface is not frozen or standing water is present during installation.

.4 For the retaining wall, cover the base and back of the trench with a geotextile. Extend the geotextile towards the back of the excavation and eventually above the drainage fill once it is in place close to the top of the wall.then install the structural surface.

3.5 PLACING OF BEDDING MATERIAL

.1 For pavers and slabs Ensure bedding material is not saturated or frozen at all times until installation is complete.

.2 Spread and screed material on structural surface to achieve 25 mm compacted thickness after vibrating pavers in place. Do not use joint sand for bedding sand.

.3 Bedding material must be kept loose until pavers placed. Sectors consolidated in any way whatsoever, even just by the rain, must be scarified, loosened, and returned to their original state.

.4 Do not disturb screened material. Do not use bedding material to fill depressions in structural surface.

3.6 CONCRETE SLAB FOR BENCH

.1 Install slab below finished level of pavers. Slabs must be located so that anchors of bench are centred over slab. Backfill with crushed stone around slabs ensuring not to displace them.

3.7 INSTALLATION OF EDGE RESTRAINTS

.1 Install restraints true to grade, in accordance with manufacturer's recommendations.

.2 Contractor must patch all finished surfaces that have been damaged to the satisfaction of the Departmental Representative.

3.8 INSTALLATION OFRETAINING WALL

.1 Using blocks of the same height, place the first course on the compacted leveling pad according to the predetermined layout. Check the alignment and leveling in all directions and make sure that all the blocks are in full contact with the leveling pad and properly supported. If required, build a stepped foundation to accommodate levels.

.2 Place the exposed surfaces of the blocks side by side. There must be no space between the exposed faces of adjacent blocks.

.3 Backfill at the rear of the wall and the space between the back of the blocks with 20 mm clean stone. Level and settle the clean stone. Any cavities in the blocks must also be filled with clean stone.

.4 Clean the top of each block before laying the next course. Depending on the type of block, install the connectors on the extremity of each block.

.5 Lay the subsequent courses, backfilling at the rear of the wall every 200 mm maximum.

.6 Make sure the subsequent courses are laid such that the vertical seams are aligned with the blocks below

.7 Position the course of coping stones to complete the wall. The coping stones or final course of blocks must be fixed to the subjacent blocks using concrete adhesive and there must be no space between the blocks.

3.9 INSTALLATION OF CONCRETE AND LIMESTONE PAVERS

.1 Pavers must be installed according to drawings and by an experienced Installer. Space between pavers should be 5mm wide and in accordance with the manufacturer's recommendations.

.1 Pavers must be installed according to the assemblies specified in drawings.

.2 Pavers must be sawed to insure adequate assembly.

.2 Use appropriate end, edge and corner stones. Saw cut pavers to fit around obstructions and at abutting structures. Cut pavers must never have a dimension less than 50% of the original size. Pavers should never be cut longitudinally.

.3 Pavers must be deposited on bedding material.

.4 Only un-sawed paving can be used to start motif, as indicated on plans. When a saw-cut is required, use a saw to obtain a clean cut. Protect paved surfaces from dust coming from sawing.

.5 Pavers must be levels to meet required levels.

.6 Contractor must make sure the level of pavers is in conformity with the requirements and level indicated on the plans.

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.7 Use appropriate end, edge and corner stones. Saw cut pavers to fit around obstructions and at abutting structures.

.8 Installation by mechanical equipment:

- .1 Prepare installation sequence and obtain approval of sequence by Departmental Representative.
- .2 Place pavers pallets and other materials without exceeding load bearing capacity, or otherwise detrimentally affecting installations.
- .3 Run equipment approved for installation only on paving surfaces vibrated in place.
- .4 Complete installation after placing each 5 m width of installation.
- .5 Inspect pavers and remove chipped, broken or otherwise damaged pavers as directed by Departmental Representative.
- .6 Replace pavers removed without altering layout and structural quality.

.9 Use a low amplitude, high frequency plate compactor capable of at least 22 kN centrifugal compaction force to vibrate pavers into bedding sand.

.10 Inspect, remove, and replace chipped, broken and damaged pavers.

.11 Sweep dry joint sand material into joints.

.12 Settle sand by vibrating pavers with plate compactor.

.13 Continue application of joint material and compaction with vibrating plate compactor until joints are filled with joint material. Do not use plaques at less than 1 meter from pavers not held in place..

3.10 CLEANING

.1 Carry out cleaning at times and conditions recommended by manufacturer of cleaning compound

.2 Remove and dispose of loose, extraneous materials from surfaces to be cleaned.

.3 Apply cleaning compounds appropriate for removal of various contaminants encountered in accordance with manufacturer's recommendations.

.4 Final surfaces to be free of contamination.

.5 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

3.11 QUALITY CONTROL

.1 Final surface elevations not to exceed plus or minus 10mm under 3 m long straightedge.

.2 Final level of pavers must exceed catch basin's covers, curbs and concrete components by 3 to 4mm.

.3 Final pavers level must meet requirements.

***** END OF SECTION *****