Exhibition Place

CAPITAL WORKS DIVISION

EXHIBITION PLACE

Request for Tenders for

HALL 'A', WEST CORRIDOR AND LOADING DOCK RAMP RETROFITS AT ENERCARE CENTRE

RFT No.: EP101-2021

Contract No.: 21-076-17696

Issued: March 09, 2021

stephenson ENGINEERING
A SALAS O'BRIEN COMPANY

SPECIFICATIONS

FOR

THE BOARD OF GOVERNORS OF EXHIBITION PLACE
ENERCARE CENTRE
100 PRINCE'S BOULEVARD, UNIT 1 TORONTO, ONTARIO
HALL 'A', WEST CORRIDOR AND LOADING DOCK RAMP RETROFITS

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PART 1 GENERAL

1.1 DESCRIPTION

.1 The project includes Hall ‘A’, West Corridor and Loading Dock Ramp Retrofits at the Enercare Centre, Toronto, Ontario.

PART 2 SUMMARY OF WORK

2.1 BASE BID

.1 Work of this Contract includes, but is not limited to, the following items, not necessarily listed in sequential order, for which the detailed descriptions, intent and requirements for the work items are contained in these Contract Documents including specifications, drawings and reference building codes and standards.

.2 All materials referenced are to be new, supplied and installed by the Contractor, unless otherwise noted.

Item 1.1: Mobilization, demobilization, general requirements and permits
Provide all the labour, equipment and material necessary to mobilize, demobilize, to provide site safety, dust control and administration for the work on site and to conform to all requirements identified in specification section 01 30 00 “General Instructions”. Contractor shall perform utility locates and slab scanning prior to any removals or repairs at all work areas. Contractor is responsible for acoustic sounding review of the entire work areas and marking out locations of concrete repairs for the consultant’s review and verification. All repair locations shall be marked on as-built drawings for the consultant’s review and approval. Contractor shall account for all costs related to follow the Owner’s Construction Waste Management Plan (see Schedule F). Contractor shall account for all costs/premiums pertaining to nightwork and working within the allowable hours provided. Contractor shall account for any costs pertaining to additional re-mobilizations and de-mobilizations that may be required to complete the work within the allowable work hours and period.

Item 1.2: Bonds
Provide bonds in accordance with Client requirements.

Item 2.1: Supply and install engineer-designed temporary ventilation system
Provide all labour, equipment and material to supply and install new temporary engineer-designed ventilation system for any interior repairs at Hall A, the west corridor or the parking garage underneath the work area. Contractor shall ensure that dust does not escape the work area into the building and shall account for installation of any tarps, filter fabric, fencing, filters, etc. to seal the work area.

Item 2.2: **Localized topside concrete repairs**

Provide all labour, material and equipment required to repair topside concrete delamination and deterioration, as indicated in the Project Specification Sections and shown in Detail Drawings. The repair unit rate includes installation and removal of temporary shoring, temporary removal and reinstatement all mechanical and electrical fixtures that interfere with the repair and the supply and installation of supplemental reinforcement including embedment adhesives, welding and lapping, as directed by Consultant. Contractor shall ensure that exposed repair concrete has a polished finish at the top surface to match adjacent/ existing. All repair concrete shall be high-early strength mix.

Item 2.3: **Localized soffit concrete repairs**

Provide all labour, material and equipment required to repair soffit concrete delamination and deterioration, as indicated in the Project Specification Sections and shown in Detail Drawings. The repair unit rate includes installation and removal of temporary shoring, temporary removal and reinstatement all mechanical and electrical fixtures that interfere with the repair and the supply and installation of supplemental reinforcement including embedment adhesives, welding and lapping, as directed by Consultant. All repair concrete shall be high-early strength mix.

Item 2.4: **Localized through-slab concrete repairs**

Provide all labour, material and equipment required to repair through-slab concrete delamination and deterioration, as indicated in the Project Specification Sections and shown in Detail Drawings. The repair unit rate includes installation and removal of temporary shoring, temporary removal and reinstatement all mechanical and electrical fixtures that interfere with the repair and the supply and installation of supplemental reinforcement including embedment adhesives, welding and lapping, as directed by Consultant. Contractor shall note that slab thickness is approximately 350mm thick. Contractor shall ensure that exposed repair concrete has a polished finish at the top surface to match adjacent/ existing. All repair concrete shall be high-early strength mix.

Item 2.5: **Localized vertical concrete repairs**

Provide all labour, material and equipment required to repair vertical concrete delamination and deterioration, as indicated in the Project Specification Sections and shown in Detail Drawings. The repair unit rate includes installation and removal of temporary shoring, temporary removal and reinstatement all mechanical and electrical fixtures that interfere with the repair and the supply and installation of supplemental reinforcement including embedment adhesives, welding and lapping, as directed by Consultant. All repair concrete shall be high-early strength mix.

Item 2.6: **Localized concrete beam repairs**

Provide all labour, material and equipment required to repair beam concrete delamination and deterioration, as indicated in the Project Specification Sections and shown in Detail Drawings. The repair unit rate includes installation and removal of temporary shoring, temporary removal and reinstatement all mechanical and electrical fixtures that interfere with the repair and the supply and installation of supplemental reinforcement including embedment adhesives, welding and lapping, as directed by Consultant. All repair concrete shall be high-early strength mix.

Item 2.7: **Route and seal cracks**

Provide all labour, equipment and material to route and seal cracks at the entire west corridor and Hall 'A' work area where directed by the Consultant. Include for reviews by the manufacturer for surface preparation and application. Cracks shall be routed to 12mm wide x 12mm deep or as recommended by the manufacturer. Concrete crack sealant shall be clear and compatible with concrete sealer material. Contractor shall perform mockup for consultant, manufacturer and owner review to confirm material and application. No additional costs will be entertained for material changes as directed by the Consultant. Termination sealant is not included in this item.

Item 2.8: **Supply and install new concrete sealer at entire Hall 'A' and West Corridor work area**

Provide all labour, equipment and material to supply and install new clear top-surface applied clear concrete sealer and hardener in accordance with project specification and drawing requirements. Refer to the project drawings for upturn and termination details. Include for all reviews by the manufacturer. Include for all reglets, installation of sealant at all upturns and termination and metal surfaces. Note: termination detailing of the hot applied waterproofing & sealer system at the ramp loading dock door shall be reviewed by the consultant and the hot applied waterproofing & sealer manufacturers. Contractor shall perform mockup for consultant, manufacturer and owner review to confirm material and application. No additional costs will be entertained for material changes as directed by the consultant. Terminate at metal surfaces/upturns via reglets and cant sealant.

Item 2.9: **Localized garage painting**

Provide all labour, material and equipment required to paint exposed concrete elements to match existing, where directed by the consultant, include for two coats plus primer. Colours shall match existing and shall be in accordance with City of Toronto by-law requirements.

Item 3.1: **Removal of asphalt topping, heating cables and waterproofing**

Provide all labour, equipment and material to remove existing topping, waterproofing and heating cables & controls from the ramp slab within the work area to expose the concrete ramp slab. Refer to Appendix A drawing for extent of electrical work removals.

Excavate and remove asphalt pavement and bedding/ native material min. 1m wide x entire width of the ramp at the bottom of the ramp slab to accommodate ramp downturn waterproofing. Contractor shall assume an existing topping thickness of 50mm. Dispose of excavated and removed materials off-site.

Item 3.2: Supply and install new heating cables

Provide all labour, equipment and material to supply and install new heating cables and equipment in accordance with Appendix A drawings and specifications, including all materials, connections to existing power system, equipment and sensors.

Item 3.3: Supply and install new hot applied waterproofing

Provide all labour, equipment and material to install new two-ply hot applied waterproofing to the ramp slab, in accordance with project specifications and drawings, including all downturns, upturns on curbs, terminations, reinforcement, reglets, flashing and protection boards. Include for reviews by the manufacturer regarding surface preparation and application and submission of approval letter. Note: termination detailing of the hot applied waterproofing & concrete sealer system at the ramp loading dock door shall be reviewed by the consultant and the hot applied waterproofing & concrete sealer system manufacturers.

Item 3.4: Supply and install new asphalt topping

Provide all labour, equipment and material to install new compacted 50mm thick HL3HS asphalt topping at the ramp slab, in accordance with project specifications and drawings. Include in this item installations of U-Fill at the excavated work area at the bottom of the ramp to the top of the asphalt pavement. Include for installation of compacted HL8 base course and HL3 top course asphalt at the bottom of the ramp, assume 100mm of HL8 asphalt and 50mm of HL3 asphalt or to match existing on-site. Hot seal all joints at the culmination of repairs. Install new traffic marking to match existing and re-coat ramp surfaces to match existing, where removed.

Item 3.5: Guard rail replacement

Provide all labour, equipment and material to replace the guard rail assembly at the south side of the ramp work area. Chip and pocket out the existing embedded guard posts at the south side curb, 200mm x the width of the curb x the depth of the embedded portion. Pour back new concrete at the pockets, including installation of 15M dowels and reinforcing steel in each pocket. Supply and install new top-mounted, galvanized metal picket fencing, including all anchorage and factory pre-painted, colour to be selected by the Owner. Submit engineer-stamped shop drawings for the new guard rail assembly and anchorage.

2.2 ADDITIONAL PRICE ITEMS

Item S1: **Additional route and seal cracks at top surface of the slab corresponding to separate price waterproofing areas**

Provide all labour, equipment and material to route and seal additional cracks at the west corridor and Hall A work area pertaining to Item 2.7 at the location of the P.U.M.A. waterproofing system installation in Item S2. Include for reviews by the manufacturer for surface preparation and application. Cracks shall be routed to 12mm wide x 12mm deep or as recommended by the manufacturer. Termination sealant at upturns and metal surfaces is not included in this item.

Item S2: **Supply and install P.U.M.A. waterproofing system at indicated west corridor and Hall A work areas**

Provide all labour, equipment and material to supply and install new polyurethane methacrylate waterproofing membrane and traffic topping system to the specified thickness and at the locations shown on the project drawings, in accordance with project specification and drawing requirements. Refer to the project drawings for upturn and termination details. Include for all reviews by the manufacturer. Include for all reglets, installation of sealant cant at all upturns and termination and metal surfaces. Wear course colour shall be as selected by the Owner. Note: termination detailing of the hot applied waterproofing & P.U.M.A. at the ramp loading dock door shall be reviewed by the consultant and the hot applied waterproofing & P.U.M.A. waterproofing manufacturers, depending on if P.U.M.A. waterproofing proceeds. Contractor shall account for credit for not installing concrete sealing system at this work area. Contractor shall review termination detail of new P.U.M.A. waterproofing to new concrete sealing system with manufacturers of both systems.

Item S3: **Remove and replace west corridor suspended slab drains**

Provide all labour, equipment and material to remove existing suspended slab drains at the west corridor and approximately 1m of piping per drain. Chip approximately 600mm x 600mm of concrete to remove existing drain body assemblies, supply and install new drain assemblies, piping, elbows, connections and hangers. Replace insulating wrap to match existing, where present. Contractor shall ensure repair concrete is high-early strength mix. Drains shall be WATTS FD-490-F-90 or approved equivalent.

Item S4: **Replace deteriorated drain piping**

Provide all labour, equipment and material to replace drain piping and insulation at the underside of the Hall A and west corridor work area to match existing, where directed by the consultant. Materials shall match existing size and dimensions, including all connections, hangars, supports, etc. Contractor shall ensure that exposed repair concrete has a polished finish at the top surface to match adjacent/ existing. Piping shall be Class 4000 Cast Iron or PVC (by IPEX or approved equivalent) to match existing sizes.

END OF SECTION 01 11 13

PART 1 GENERAL

1.1 GENERAL

.1 Charges for the stand-by time or non-productive visits caused by the Contractor or the Contractor's forces will be paid by the Contractor.

.2 Progress payments on accounts of work authorized under cash allowances or construction contingencies shall be included in monthly certificate for payment.

.3 Unexpended portions of the allowances or contingencies will be deducted from the Contract Price. Increase in allowance beyond the stipulated amount shall be authorized by a Change Order.

.4 Any additional items above and beyond specified in section 1.2 below will be reviewed by the Owner and the Consultant.

1.2 CASH ALLOWANCES

.1 Expend cash allowances only on written instructions from the Consultant or Owner.

.2 No overhead or profit for the Contractor will be included in the cash allowance amounts.

.3 The Contractor's overhead and profit for administering and executing cash allowance work is included in the Contractor's general requirements cost.

.4 Provide a detailed cost breakdown for cash allowance expenditures, including supporting documentation, as requested by the Consultant.

.5 Only the following expenses of the Contractor shall be eligible for reimbursement under the cash allowance, subject to prior approval by the Consultant:

.1 Mechanical, Electrical Allowance

.1 This allowance is for mechanical and electrical equipment repairs not specified in the Contract Documents that are made necessary by the Work, due to conditions that were not visible upon, or reasonably inferable from an examination of the site as determined by the Consultant.

.2 The electrical portion of the allowance is for the cost of repairing buried electrical conduits, boxes and other electrical equipment and services during the work. The allowance does not cover the cost of repairs due to the Contractor's negligence.

.2 Material Testing Allowance

.1 Arrange and pay for a third party testing company/consultant, acceptable to the Owner and Consultant, to perform testing specified herein and as directed by the Consultant.

.2 Examples of testing that may be requested include: concrete consistency, concrete strength, soil compaction, pavement compaction, etc.

.3 Administer this allowance and do not arrange for testing beyond the stipulated amount without approval. No payment shall be made for costs incurred as a result of re-testing necessitated by work that has failed a previous test.

.4 The Consultant reserves the right to change the testing agency, at the Consultant's discretion.

END OF SECTION 01 21 00

PART 1 GENERAL

1.1 STANDARD, CODES AND BY-LAWS

.1 Conform to the requirements of the 2012 Ontario Building Code, including all amendments to date, and any applicable acts of any authority having jurisdiction and the following:

.1 *Occupational Health and Safety Act* and Regulations for Construction Projects;

.2 *Ontario Fire Marshall and Ontario Fire Protection and Prevention Act*; and

.3 City of Toronto by-laws respecting Demolition and Construction and Building Management.

1.2 SUPPLEMENTARY DEFINITIONS

.1 In the Specifications, references such as, “shown on the drawings”, “specified”, “scheduled”, “called for”, and the like shall be deemed to include Work required by the Contract Documents.

.2 In the Specifications the expression “Trade(s)” is synonymous with Subcontractor(s) if the context permits. The expression “all Trades” shall be deemed to include the Contractor.

1.3 BONDS

.1 Submit to the all bonds as outlined in all procurement documents.

1.4 PAYMENT METHODS

.1 Payment for lump sum items will be based on the percentage of the Item lump sum price installed and verified by the Consultant; and

.2 Payment for unit rate items will be based on the Item unit rate completed and verified by the Consultant.

1.5 PERMITS, INSPECTIONS AND APPROVAL CERTIFICATES

.1 Obtain and pay for all federal, provincial, and municipal permits necessary for this Work, with the exception of the building permit fee, which will be paid for by Owner, if required.

.2 The Contractor shall be responsible to obtain and pay any costs for permits, tests and certificates required by the local municipality.

.3 File and post the “Notice of Project” as required by the *Occupational Health and Safety Act* and Regulations for Construction Projects.

.4 Submit copies of inspection/approval certificates with any progress billings or invoices.

1.6 PROJECT SCHEDULE AND PHASING

.1 The Work is to be completed in accordance with project start/ completion milestone dates as outlined in the procurements documents.

.2 The building shall remain open at all times, unless otherwise confirmed by the Owner. Provide temporary protection for vehicular and pedestrian access, as required.

.3 The garage, building entrances and exits are to remain open and operational at all times. The Contractor is responsible for all temporary means required to maintain access and protect vehicles and pedestrians, as required.

.4 The Contractor is permitted to displace all parking stalls underneath the work areas.

.5 Within five working days after contract award, provide to the Owner and Consultant in the form of a Gantt chart, a schedule showing progress stages and final completion of the Work within the time period(s) required by the Contract Documents. A digital copy of the schedule completed in Microsoft Project is the preferred format.

.6 Monthly or more frequently if requested by the Consultant, review progress in relation to the schedule and employ such methods or work as may be required in order to meet the specified time of completion.

.7 Changes to the Work and construction schedule approved under Change Order or Change Directive must be identified on the Order or Directive and reflected in a revised schedule, to be submitted to the Consultant within five business days upon becoming aware of the impact of the Changes to the schedule.

.8 The Contractor must provide the Owner with at least two weeks' notice of a proposed temporary shut-down of building services and/or utilities. Approval must be received from the Owner before proceeding.

1.7 PROJECT WORKING TIMES

.1 Refer to procurement documents for allowable working hours.

1.8 COORDINATION

.1 All site work must be coordinated with the Site Contact at the building.

.2 The Specifications are divided into Divisions and Sections for convenience only. The Contractor, not the Contract Documents, shall establish the lines of demarcation and assign tasks to qualified Trades.

.3 A responsible representative for the Contractor (acting as Constructor) must be present as supervisor on site at all times when Work is being done, regardless of whether or not the Contractor's own forces are involved in the Work at that time.

Delegating a Subcontractor as the representative is not acceptable. The cost of said supervision is to be included in the Contract Price.

.4 Ensure that the subcontractors and trades cooperate and coordinate with other subcontractors and trades whose Work attaches to or is affected by their Work.

.5 Ensure that the subcontractors and trades receive specifications, drawings and instructions necessary to proceed with the Work.

.6 The Contractor is to assist site staff in relocating garbage/recycling/compost bins while the Work is taking place if required.

1.9 OPERATIONS AND PROTECTION OF PREMISES

.1 Be solely responsible for the safety and security of the Work area and all other areas directly related to, or affected by, the Work.

.2 Provide access to building maintenance staff to enter into electrical, mechanical and storage rooms.

.3 Protect the premises and all persons from hazards that may occur as a result of the Work.

.4 Prior to beginning the Work, submit to the Owner the proposed pedestrian and vehicular control measures, signing, site security, dust control measures and temporary lighting plans. Do not proceed until approval is given in writing. Modify procedures when required by the Owner and at no added cost to Owner.

.5 Keep noise to a minimum.

.6 Do not permit public access to areas of Work or directly below areas of Work.

.7 At least two weeks prior to mobilizing on site, submit to the Consultant and Owner for review, drawings indicating Work areas and phases, proposed pedestrian control measures, signage, site security, plans for transporting materials and equipment on and off site, dust control measures, temporary lighting plans, and emergency exits and egress pathways if applicable. Do not proceed until written approval is provided by the Consultant and Owner. Modify procedures when required by the Owner or Consultant at no added cost to the Owner.

.8 Obtain fire department approval for any Work or plans which negatively impact fire routes, fire safety, exit travel paths, sprinkler systems, etc. prior to commencing the Work. Abide by the requirements of the Fire Department regarding same. Provide copies of any notices, reports or other related to same. The Contractor is responsible for all temporary means required to maintain access and protect vehicles and pedestrians, as required.

.9 During material delivery, concrete placement, or any Work affecting traffic flow, the Contractor will be required to supply a traffic control person to direct traffic and pedestrian. The cost of such person is included in the Contract Price.

.10 Contractor shall adhere to all personal and client COVID-19 health and safety regulations.

1.10 TEMPORARY PROTECTION AND HOARDING

.1 Provide protection barriers, dust-tight partitions, and any other required measure around the Work areas to prevent the release of construction dust and debris from the Work area.

.2 Protect the building and adjacent areas from flying debris, dust, water impingement and any and all such hazards as may cause injury, damage or destruction to persons, vehicle, furnishings, or elements of structure.

.3 Protect or cover parked vehicles to prevent damage from dust however caused.

.4 Provide construction hoarding as follows:

.1 For indoor work areas: Hoarding shall be constructed around the perimeter of all work areas during all phases of pneumatic concrete removal, saw cutting, and any dust-generating operation. Hoarding shall consist of 50mm by 100mm stud frames extending from floor to ceiling covered with two layers of polyethylene tarpaulins. Tarpaulins shall be overlapped and taped tight at joints to provide a dust-tight partition. Provide 1200mm tall plywood sheets on the exterior side of the Work area. Hoarding shall be inspected and maintained daily by the Contractor. Employ negative air measures within the work area. Do not impede the function of any garage exhaust systems. Provide locked access gates as required for access the site. Contractor shall design and install temporary engineer-designed ventilation system.

.2 For exterior repair areas: Hoarding shall be constructed of 1800mm tall chain link fence that is adequately secured using ground supports. The fencing shall be concealed with polyethylene tarpaulins or filter cloth. Hoarding shall be inspected and maintained daily by the Contractor. Provide locked access gates as required for access the site.

.3 Steel bases on temporary fencing shall be installed to minimize tripping hazards.

.5 Provide signage of professional quality to inform and protect the pedestrians and vehicles from construction activity.

.1 Signs shall be standard construction signage with black lettering on orange background with plywood backing.

.2 All signs shall have a minimum of 100 mm lettering.

.3 Secure all signs to hoarding or provide signage stands. Stands shall have ballast to prevent overturning.

.4 Upon removal of signs, patch repair all holes.

.6 Rectify any damage resulting from inadequate protection during the execution of the Work.

1.11 TRAFFIC CONTROL

.1 Provide a traffic control operator and traffic lights if vehicular access at the traffic lanes is restricted while Work is taking place.

.2 Property Management will provide and pay for security for the purposes of traffic control during Work hours.

.3 The following construction signs must be provided as directed by the Owner or Consultant:

.1 No parking

.2 Directional arrows to vehicle exit

.3 Caution Garage Repairs (or Area Repairs) in Progress. Sorry for the Inconvenience

.4 This Section is Closed for Repairs

.5 Two-Way Traffic Proceed With Caution

.6 Keep Left / Keep Right

.7 Directional arrows to pedestrian exits

.4 Confirm the signage requirements with the Consultant and Owner prior to ordering.

1.12 SHORING

.1 Provide temporary shoring to safely support the existing structure, building loads and construction loads, where required, to ensure the structure is maintained in a safe condition, damage is not caused to structural building elements and to conform to the following:

.1 Do not exceed the safe allowable live load capacity due to loads from equipment, materials, and the like without adequately shoring the structure.

.2 Design, erect, and arrange for inspection of shoring in accordance with CSA S269.1-16.

.3 Submit shop drawings, signed and sealed by an engineer registered with the Professional Engineers Ontario fully describing the shoring and including:

.1 Nature, intensity and location of applied loads;

.2 The type and location of shores together with their ultimate and safe Working loads; and

.3 At the request of the Consultant, provide proof of shoring design engineer’s professional liability insurance, with minimum coverage of $2,000,000.

.2 The Contractor shall repair all building finishes affected by the shoring and/or hoarding installation and removal, to match existing, unless otherwise directed by the Consultant.

1.13 HEAT AND VENTILATION

.1 Furnish and install all temporary heat and ventilation as required to meet the project's completion duration per the Bid Form and to:

.1 Facilitate the progress of the Work;

.2 Protect the Work and products against dampness and cold;

.3 Prevent moisture condensation on surfaces;

.4 Provide required ambient temperatures and humidity levels for storage, installation and curing of materials; and

.5 Provide adequate ventilation for a safe working environment.

.2 Take any and all necessary precautions to prevent fumes, odours, dust and deleterious matter entering areas adjacent to the Work.

1.14 FIRE PROTECTION

.1 Provide all temporary fire protection equipment as required and maintain in good order the same throughout the construction period.

.2 Do not impede building fire detection, suppression, or power systems without prior written approval from the Owner and coordination with the Owner's forces.

.3 Make arrangements for temporary provision of affected items as required.

1.15 CONTRACTOR'S USE OF SITE

.1 Limit areas of Work and storage to areas agreed to by the Owner.

.2 Maintain vehicle access routes free and safe.

.3 Electric power and water can be obtained from the building's electric power and domestic water distribution systems. The Contractor shall make all arrangements and pay for all permits, connections, equipment and the like to extend these services to the point required by the Contractor. Provide copies of electrical permits and review notices for temporary electrical power systems.

.4 The Contractor shall provide, maintain, and pay for temporary sanitary facilities for the workers in accordance with the governing regulations. Maintain temporary toilets in a sanitary condition for the whole duration of the Work. Arrange to have toilets emptied and cleaned no less than once a week, regardless of usage, or more frequently as directed or required by jurisdictional authorities. Clean and disinfect site of temporary toilets upon removal.

.5 Provide and maintain an emergency lighting system to provide lighting to the boiler room and stairwells in the event of a power disruption caused during the construction.

.6 Paid parking is available on site for the Contractor's Workforce vehicles or for Contractor's vehicles.

.7 No office, storage space or telephone will be provided by the Owner.

.8 Do not use wick pen or indelible marker on face of products or finished Work.

.9 Do not cut, bore or sleeve the structure without first obtaining the Consultant's written authorization for each condition, unless shown on the Drawings.

1.16 MATERIAL HANDLING AND STORAGE

.1 Do not exceed the safe live capacity of the structure.

.2 Store all construction material off the structural slabs, at an on-grade area agreed to by the Owner.

.3 Storage of construction materials on structural slabs requires temporary shoring. The Contractor is to provide engineered shop drawings verifying podium deck load capabilities and shoring design to accommodate construction bins and storage containers.

.4 Coordinate all deliveries in advance with the Owner or the Owner's on-site representative. Do not obstruct the Owner's maintenance and service operations.

.5 Store package materials in the original undamaged containers with the manufacturer's labels and seals intact, in the manner specified by the product manufacturer.

.6 Prevent damage to materials during handling and storage and protect surfaces.

.7 Trademarks and labels, except those essential to identify mechanical and electrical equipment, shall not be visible in the finished Work.

.8 No flammable or toxic materials shall be stored within the parking garage.

1.17 EXISTING CONDITIONS

.1 Base building drawings were prepared by Others. Existing conditions are based upon information available at the time that the Contract Drawings were prepared and are to be verified by the Contractor on site. The Contractor is to report any variations or discrepancies to the Consultant and await instructions before proceeding.

.2 Regardless of whether or not such detection has been expressly identified for pricing, be responsible for ascertaining the location of any buried or hidden services (including private services) in the structure or below grade locations prior to cutting/digging/coring/etc. and take protective measures.

.3 Verification of the buried services is to be performed on the public right-of-way and on private property, at or adjacent to, the proposed repair area(s).

.4 The Contractor is responsible for protecting all underground utilities, including sprinkler irrigation systems, within the work area. If damaged by the Contractor, reinstate sprinkler irrigation lines to match existing, at no additional cost the Owner.

.5 The Owner or Consultant will not be liable for any difficulties encountered or expenses incurred resulting from any condition known, or visible, at the time of Bid.

.6 Check and verify on site all dimensions, details and measurements required for any Work that is to fit to or conform to work already installed.

.7 Examine surfaces prepared by others that affect the Work and ensure that defects are corrected. Commencement of Work constitutes acceptance of the prepared work.

.8 The Contractor is responsible for providing a pre-construction deficiency list and detailed photos prior to commencement of any Work, to the satisfaction of the Consultant.

.9 Under no circumstance shall the affected areas of the repair be returned for occupancy without being entirely cleaned of all waste generated from the repair Work.

.10 Areas outside the Work areas are to be kept clean to the satisfaction of the Owner.

.11 Flush all floor drains within the Work area prior to commencing concrete repairs and at the completion of the repairs.

.12 Cover and protect the floor drains and/or catch basins for the duration of the Work.

.13 Heating Cable Scan: Perform a scan of the existing ramp heating cable system at the ground floor to P1 level ramp. Provide a report for the Consultant to review. Slab Scanning: Prior to commencing any concrete or drain removals, perform GPR scans of the suspended slab at the repair areas to identify locations of reinforcing steel and embedded electrical conduits. Do not damage, disturb or relocate any existing services, unless specifically requested by the Consultant.

1.18 MOCK-UPS

.1 A mock-up of each aspect of the Work is to be carried out a minimum of 10 Working days prior to the start of the related work.

.2 If the mock-up meets the intent of the Contract Documents, it may remain as part of the completed work. If the mock-up does not meet the intent of the Contract Documents, it must be removed immediately. Additional mock-ups must then be installed until one is accepted.

.3 Accepted mock-ups shall serve as the standard to which all work is compared.

.4 Refer to each Section for specific mock-up requirements.

1.19 RESTORATION

.1 Repair all areas having been damaged in the process of execution of the Work and replace all items being damaged beyond repair, to the complete satisfaction of the Owner.

.2 Repair all areas damaged on adjacent properties in the process of execution of the Work and replace all items damaged beyond repair, to the complete satisfaction of the Owner and the adjacent property Owner. In all cases, blend with existing conditions.

.3 Repair all landscaped areas damaged during the execution of the Work.

1.20 CLEANING

.1 Sweep the work area prior to commencing the Work.

.2 Vacuum clean catch basins near the work area prior to commencing concrete repairs.

.3 During the Work, promptly remove dust, sweepings, rubbish, debris and unwanted materials and dispose of off the site daily, or more frequently if directed by the Owner.

.4 Maintain the work area in a clean and safe condition during the course of the Work.

.5 The Contractor is responsible for maintaining areas adjacent to the Work area in a clean and tidy condition. Dust, sweepings, rubbish and debris that enter areas adjacent to the Work area must be cleaned by the Contractor in a timely manner and as directed by the Owner or Consultant.

.6 Upon completion of the Work and immediately prior to final review by the Consultant and Owner, thoroughly clean the Work area and make ready for immediate occupancy. Clean all windows, walls, pipes, panels, exit light boxes, fans, louvers and the like from dust, spills or drippings caused by the Contractor’s Work.

.7 Cleaning as a minimum shall consist of power washing and sweeping all slabs, walls, columns, ceilings and cleaning all fixtures, piping, etc. affected by the construction activity in and adjacent to the Work area.

1.21 DEMOBILIZATION

.1 Demobilization includes the removal of all tools and equipment necessary to conform to all requirements as specified in the Contract Documents.

.2 The demobilization also includes the thorough cleaning of the Work area prior to the Consultant and the Owner’s final review for final acceptance of the Work.

.3 Remove all temporary protection, equipment, waste and surplus materials from the site and leave it in neat, tidy condition to the satisfaction of the Owner and Consultant.

.4 After the completion of all concrete repairs, dispose of dust, sweepings, rubbish, unwanted materials and debris in accordance with local or municipal regulations.

.5 Upon completion of the Work and immediately before the Consultant's final review for total performance of the Work, all areas of the building affected by this Contract shall be thoroughly cleaned.

1.22 QUALITY CONTROL

.1 Implement a system of quality control to ensure that the minimum standards herein are attained.

.2 List the names, qualifications, duties and responsibilities of field supervisory and quality control personnel.

.3 Bring to the attention of the Consultant any defects in the Work or departures from the Contract Documents that occur during construction. The Consultant will decide upon corrective action and make recommendations in writing.

1.23 CONSTRUCTION REVIEW

.1 Make allowances during construction for down time made necessary for access to and review of the Work by the Consultant or the Owner.

.2 The Consultant's general review during construction and inspection and testing by independent inspection and testing agencies reporting to the Consultant are both undertaken to inform the Owner of the Contractor's performance and shall in no way augment the Contractor's quality control or relieve the Contractor of contractual responsibilities.

.3 The Contractor is responsible for compensating the Owner for all costs associated with defective Work, including consulting fees associated with the design and review of corrective action and prolonged schedule. The Contractor will reimburse the Owner for consulting fees at a rate of 115 percent of direct personnel fees and disbursement such as travel, equipment and material costs, plus HST, where applicable.

1.24 NOTIFICATIONS

.1 Prior to commencing significant portions of the Work, give the Consultant and independent inspection and testing agencies appropriate notification so as to afford them reasonable opportunity to review the Work. Failure to meet this requirement may be cause for the Consultant to classify the affected portion of the Work as defective.

1.25 INSPECTION AND TESTING

.1 The Consultant will appoint the independent inspection and testing agencies to make inspections or perform tests as the Consultant directs. The inspection and testing agencies shall be responsible only to the Consultant, shall address reports to the Consultant and shall make only such inspections or tests as the Consultant may direct.

.2 Authorized inspection and testing shall be charged against the Testing Allowance carried in the Contract, except that the Contractor will pay for subsequent inspections and tests when inspection and tests results show that the Work or portions of the Work do not meet the requirements of the Contract Documents.

.3 The Contractor shall be responsible for coordinating with the designated testing agency and for arranging for testing of materials, as directed by the Consultant.

.4 When defects are revealed, the Consultant may request, at the Contractor's expense, additional inspection or testing to ascertain the full extent of the defect.

.5 Engineered assemblies, systems or connections that are design by a Professional Engineer who is retained by the Contractor, are to be site reviewed by the Design Engineer at no additional cost to the Owner. The Design Engineer is to provide a letter verifying the shoring and re-shoring Work has been completed in conformance with the design.

1.26 SUBMITTALS

.1 No less than two weeks prior to commencing the Work, the Contractor shall submit the following documentation:

.1 Insurance Certificates (naming the Owner and Consultant as additional named insured) with minimum commercial general liability coverage of $5,000,000;

.2 Contractor's WSIB Clearance Certificate;

.3 Construction schedule;

.4 Phasing plan(s);

.5 Material safety data sheets;

.6 Shop drawings, including temporary shoring;

.7 COVID-19 and other health and safety documents;

.8 Mix designs or certificate from ready mix supplier that confirms delivered mix meets the specified requirements; and

.9 Other documentation, as indicated in the technical specification sections.

1.27 WARRANTY

.1 Except for extended warranties required by the Specifications, the Contractor shall submit a full labour and material warranty against defective work covering a period of two years from the date of Substantial Performance of the Contract.

Access to the areas of work and protection of the site are to be included in the warranty.

.2 Warranty letters shall be on official company letterhead, signed and sealed by a company representative with authority to bind the corporation and shall be original.

.3 Refer to the technical sections for warranty requirements over and above the above noted requirements.

1.28 PROJECT CLOSE-OUT PROCEDURES

.1 Arrange and attend a deficiency walk-through meeting with the Consultant to review the completed Work and identify all deficiencies.

.2 The Contractor shall request substantial completion in writing to the Consultant. As part of the written request, the Contractor shall submit the following:

.1 Itemized list of work remaining to be completed;

.2 Itemized list of deficient work to be rectified;

.3 Updated schedule confirming final completion of the Work.

.4 Complete list of all work items indicating percent complete and quantities repaired to date and projected quantities.

.5 All warranties.

.3 At final completion, provide three copies in binder format of the following:

.1 All warranties;

.2 Contact information during the warranty period;

.3 Project contact information including, Owner, Consultant, Contractor, and Sub-Contractors.

.4 Following written confirmation by the Consultant that the Work is complete and all deficiencies have been corrected, arrange and attend a final walk-through at the Site to review the final condition of the site and completion of the Work.

.5 At final completion, close all active permits (building permit, tree removal permit) with the local municipality.

1.29 AS-BUILT DRAWINGS

.1 Maintain at the site one set of Drawings and record on them any deviation from the Contract and all locations, sizes and types of concrete repairs. Neatly record all notes and dimensions on these drawings.

.2 Regularly update this record and make it available for review at any time.

.3 As-built drawings are to be prepared by the Contractor. Be responsible for creating as-built drawings from site data collected during the course of the Work.

.4 Provide separate as-built drawings for the work of each discipline, including but not limited to, architectural, structural, mechanical and electrical, which formed part of the Work. As-built drawings for each discipline or sub-trade are to be prepared by that discipline or sub-trade.

.5 Provide a legend or key for all symbols, shading, etc. even when such symbols are industry standard.

.6 The as-built drawings are to indicate, with reasonable accuracy, the final completed work including the extent and location of any and all repairs (including wholesale repairs), as well as any new components that were installed or relocated on site as part of the Work.

.7 The as-built drawings are to indicate layouts, penetrations and any structural elements secured to the structure.

.8 Clearly date and prominently mark each drawing "AS-BUILT DRAWING" and prepared by the name of the Contractor.

.9 Submit the as-built drawings to the Consultant prior to submitting the draft application for Final Payment.

.10 If the as-built drawings are not submitted within a timely manner to the Consultant, an amount equivalent to the cost of preparing the as-built drawings, as determined by the Consultant, will be withheld from the Final Payment.

END OF SECTION 01 30 00

PART 1 GENERAL

1.1 WORK INCLUDED

.1 Provide labour, equipment and material to demolish, remove and dispose the existing waterproofing system and/or deteriorated concrete at the work areas shown in the contract documents.

1.2 REFERENCE STANDARDS, CODES AND ACTS

.1 Conform to the requirements of the 2012 Ontario Building Code, including all amendments to date and any applicable acts of any authority having jurisdiction.

.2 CSA S350-M1980 (R2003) - Code of Practice for Safety in Demolition of Structures

1.3 PERMITS AND REGULATIONS

.1 Arrange and pay for all permits, notices, and inspections necessary for the proper execution and completion of the Work, except for the building permit, which shall be obtained and paid for by the Owner or by their authorized representative.

1.4 SUBMITTALS

.1 Prior to commencement of Work of this Section, prepare and submit to the Consultant a demolition report on the proposed demolition methods and procedures, including shop drawings clarifying locations of equipment, protection, methods, barriers, scaffolding, shoring and other related items for the safe removal the Work and retention of structures and services to remain.

.2 The demolition plan shall be prepared by a qualified Professional Engineer licenced in Ontario.

.3 Utility locate reports.

1.5 ACCESS

.1 Maintain the Owner's access requirements to and from the existing building, adjacent areas and around areas where demolition and removal Work is carried out and throughout the existing structures.

.2 Conduct operations with minimum interference to roads, streets, driveways and passageways.

.3 Do not place or store material in corridors, public areas, streets, lanes, passageways or similar locations.

.4 Provide and erect barriers and scaffolding, maintain lights, and traffic control, as required by the Owner, municipal traffic regulations or building by-laws.

.5 Maintain access to fire exits at all times.

1.6 EXISTING SITE CONDITIONS

.1 Drawings indicate the physical dimensions, existing levels and similar items being indicated, where known. All information relative to the existing conditions is intended to assist the Contractor in the evaluation of the Work, but with no specific representation, either expressed or implied, as to completeness or accuracy.

.2 Prior to beginning the Work, survey and record all existing conditions, and items identified to remain in place, that might be affected by the demolition operations.

.3 Provide complete photographic documentation of all buildings adjacent to the demolition area and portions of the existing building to remain. Photographs shall clearly indicate all existing cracks or damaged areas in walls, foundations, floors, roof and the like.

.4 If suspected hazardous or contaminated materials are encountered, advise the Consultant and await instructions for requirements regarding the removal and disposal of such contaminants which may be considered health hazards prior to demolition.

1.7 PROTECTION

.1 Protect Work to remain against damage. Repair or replace damaged Work.

.2 Maintain in service and protect from damage, the existing utilities that are to remain.

.3 Conduct demolition operations to ensure safety of all persons and to prevent damage to existing structures and utilities, construction in progress, and other property.

.4 Conduct demolition operations and remove debris to disposal areas in a manner to ensure maximum safety and minimum interference with other operations.

.5 Provide temporary sheeting, shoring, bracing, underpinning and other protective measures, as required to prevent movement, collapse of, or damage to unsupported walls and other facilities as a result of the demolition operations.

.6 Support affected structures and, if safety of structure being demolished or adjacent structures or services appears to be endangered, take preventative measures and then cease operations and notify the Consultant.

.7 Remove and dispose of all temporary Work when no longer required

.8 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition Work.

1.8 NOTIFICATION

.1 Prior to commencing the work, give the Consultant and Independent Inspection and Testing Companies appropriate notification so as to afford them reasonable opportunity to review the Work. Failure to meet this requirement may be cause for the Consultant to classify the work as defective.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Temporary wood studs: Construction grade spruce.

.2 Polyethylene sheet: 0.152mm, thick, clear, stapled in place.

.3 Plywood: Douglas fir plywood.

PART 3 EXECUTION

3.1 BURIED SERVICES

.1 Before commencing work, verify the location of buried services within the work area and adjacent to the work area.

.2 Perform a utility locate prior to commencing any excavation and provide a copy of the locate report to the Consultant for review.

.3 Do not damage, disturb or relocate any existing services and utilities within the work area, unless specifically requested by the utility provider.

.4 Excavation adjacent to utilities is to be hand dug, in accordance with the requirements of the Ontario Ministry of Labour, TSSA and the ESA.

3.2 MAKING SAFE EXISTING SERVICES

.1 Arrange and pay for the disconnection, capping, and plugging of gas, water, sewer, electric, telephone, and other services to the structures to be demolished.

.2 In advance of the Work, notify each utility company involved and obtain approval before commencing that portion of the work. Disconnect and cap services at the property line.

.3 Interruptions to Owner's operations will not be permitted.

.4 Make good to the requirements of the local authorities' public roads, walkways and curbs soiled or damaged due to work of this Section.

3.3 GENERAL

.1 Supply, install, and maintain, during removal work, temporary hoardings and sidewalk covers, including lighting if required, in compliance with requirements

of authorities having jurisdiction, and to the approval of the Owner, to provide a smooth, continuous exterior surface in one plane, unbroken by supports, perforations or other structural members.

.2 Provide barricades, scaffolding and guard rails as required to give full protection to the general public, to workers and to adjoining properties.

.3 Protect adjacent properties against damages which might occur from falling debris or other causes. Do not interfere with use of adjacent buildings.

.4 Take precautions to guard against movement or settlement of existing structure to remain, adjacent land, buildings, and paving. If, at any time the safety of such land, buildings, or pavements appears to be in danger, cease removal operations and take necessary action to support endanger item. Suspend operations and notify the Consultant promptly. Take measures to support such land, buildings, and pavements. Do not resume removals until the Consultant permits.

.5 Do not place or store material in streets, lanes, or passageways, except as permitted by authorities having jurisdiction.

.6 Do not restrict traffic on public streets, lanes, and sidewalks except as permitted by authorities having jurisdiction.

3.4 ACCESS TO BUILDING INTERIOR

.1 Refer to the contract documents for access to the site.

.2 The exact access point(s) must be reviewed by the Consultant.

.3 Remove, store and maintain any existing cladding or façade temporarily removed for the purposes of interior building access.

.4 Upon completion of the Work, reinstate any removed materials or furniture, to match existing.

.5 The Contractor is responsible for storing, protecting and maintaining any temporarily removed material. Damage, as a result of the Contractor, will result is material replacement at no additional cost to the Owner.

3.5 PROTECTION OF EXISTING BUILDING

.1 All exterior walls:

.1 Install safety barriers around all perimeter walls composed of 12mm thick plywood hoarding.

.2 Extend plywood barriers from finished floor to underside of ceiling. Maintain minimum 25mm spacing between the hoarding and the exterior wall.

.3 Secure the hoarding to adjacent walls using wood studs.

.2 For ventilation at repair areas while repairs are taking place, provide an exhaust fan system with hose sufficiently long to remove dust and debris to street level. Ventilation routed is to be reviewed by the Consultant prior to commencing.

3.6 DEMOLITION

.1 Refer to the project Drawings for the extent of the demolition work.

.2 Do not allow existing drains which are to remain in place, to become blocked.

.3 Carry out removals in strict accordance with requirements of federal provincial and municipal authorities.

.4 At the end of each work shift, leave work area in a safe condition so that no part of the remaining structure is in danger of toppling, collapsing, or falling.

.5 During removal operations, keep work wetted down thoroughly to prevent dust and dirt rising. Furnish connections that may be required and pay for cost of water used. Upon completion, remove installed temporary waterline.

.6 Remove combustible materials, plastics, metal, glass, wood, and other organic material from site.

.7 Remove all combustible materials, metal, glass, and wood or other organic material from backfill material.

3.7 SALVAGE AND DISPOSAL OF MATERIALS

.1 All materials from the demolition, except where otherwise directed, shall be disposed without any extra change. Remove all material and debris from the site as quickly as possible and dispose of legally.

.2 Burning of debris or selling of materials on the site will not be permitted.

3.8 CLEANING

.1 Vacuum clean and wet mop floors and wipe clean wall surfaces free of dust on completion of the Work.

.2 After the demolition work is complete, survey the conditions again and restore existing facilities to their pre-demolition condition, unless otherwise directed by the Consultant.

END OF SECTION 02 41 19.01

PART 1 GENERAL

1.1 DESCRIPTION

.1 Provide all labour, equipment and material to erect and strip all formwork and falsework for the specified concrete repairs.

.2 Install all anchors, embedded metal inserts and for casting into concrete and assume responsibility for correct positioning within the agreed tolerance and in accordance to Drawings.

1.2 REFERENCE STANDARDS, CODES AND ACTS

.1 Conform to the requirements of the 2012 Ontario Building Code, including all amendments to date and any applicable acts of any authority having jurisdiction and the following:

.1 CAN/CSA O325-07 (R2012) - Construction Sheathing

.2 CAN/CSA O86-14 - Engineering design in wood

.3 CAN/CSA S413-14 - Parking Structures

.4 CSA A23.1-14/A23.2-14 - Concrete materials and methods of concrete construction/Test methods and standard practices for concrete

.5 CSA S269.1-16 – Falsework and formwork

.6 CSA S269.3-M92 (R2013) - Concrete Formwork

.2 Standards referenced by the Standards noted above are to apply even if they are not included in the list.

.3 Where there are differences between the Specifications and Drawings and the codes, standards or acts, the most stringent shall govern.

1.3 TOLERANCES

.1 Perform forming operations and place hardware so that finished concrete will be within the tolerances specified in CSA A23.1.

1.4 DESIGN

.1 Formwork and falsework shall be in accordance to the following:

.1 Design formwork and shoring to safely support vertical and lateral loads until they can be supported by the structure. Design formwork for loads and lateral pressures recommended in CSA S269.1.

.2 The falsework and shoring design shall be by a qualified professional engineer licensed in the Province of Ontario with demonstrated competence in the design of such temporary construction facilities.

.3 Design shores for columns to safely support the total vertical and lateral loads until the columns are complete and have reached 75 percent of their specified strength. Design the shores so that they can be unloaded gradually.

1.5 SUBMITTALS

.1 If requested by the Consultant, provide data sheets for formwork release agent.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Forms

.1 Formwork lumber: plywood and wood formwork materials shall conform to CAN/CSA O86 and CAN/CSA-O325.

.2 Falsework materials: Conform to CSA S269.1.

.3 Sheathings for exposed surfaces: New, Douglas Fir Plywood not less than 18mm thick, concrete form grade, conforming to CAN/CSA-O325.

.2 Release Agents

.1 Release agent shall be capable of releasing forms from hardened concrete without staining concrete or forming bug-holes and other surface defects.

.2 Agents shall be compatible with concrete and form materials, non-toxic, and in compliance with applicable VOC and other environmental standards.

.3 Release agent shall react chemically with concrete surface to facilitate release. Products containing diesel oil are not acceptable.

PART 3 EXECUTION

3.1 FORMWORK

.1 General

.1 Erect, support, brace, and maintain formwork to safely support vertical and lateral loads until they can be supported by the structure.

.2 All falsework erection shall be supervised by the Professional Engineer responsible for its design.

.3 Exposed concrete forms:

.1 Make joints of forms sufficiently tight to prevent leakage of concrete fines at corners of walls and columns or at the corners of exposed edges.

.2 Form panels for exposed concrete may be reused three times, providing the tie holes are reused and panels are not damaged in a way that will cause visual defects.

.4 Form preparation:

.1 Form surfaces shall be clean and dry. Remove traces of concrete build-up from form surfaces before applying release agent.

.2 Spray-apply release agent to ensure continuous and uniform film, free of runs.

.3 Use 25mm chamfer strips on external corners of concrete members and joints, unless specified otherwise.

.4 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.

.5 Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.

3.2 STRIPPING OF FORMS AND SHORING

.1 Re-shoring

.1 Where forms are stripped from horizontal or sloping members before concrete has reached its specified 28 day strength, re-shore the members so that they can safely support their own load plus construction loads.

.2 Ensure that the stripped member is of sufficient strength to safely carry its own weight over the area stripped out at any instant, together with any superimposed construction loads.

.2 Shoring

.1 As a minimum, conform to requirements of CSA S269.1.

.2 The design and provision of shores may be based on the assumption that each shored or re-shored flexural member shares load in relation to its achieved strength, provided the flexural member has attained at least 75 percent of its specified 28 day strength.

.3 Install shores so that they are supported on members which can safely support the shore load.

.4 As a guide, under specified curing conditions, 75 percent of the 28 day strength should be attained seven days after concreting in normal weather and 14 days after concreting in "Cold Weather".

.5 Base the decision to strip forms upon satisfactory results of the seven day concrete cylinder tests and on-site curing conditions.

.6 Stripping shall proceed simultaneously so as not to leave an area greater than 9 m^2 unsupported by formwork at any instant.

.7 Maintain formwork in place for a minimum of 28 days or for such longer time as may be required to ensure that the concrete has reached its specified 28 day strength.

.8 Side forms for vertical members may be stripped as soon as the concrete is sufficiently strong to stand unsupported and safely resist imposed loads.

3.3 NOTIFICATION

.1 Prior to commencing significant segments of the Work, give the Consultant appropriate notification so as to afford them reasonable opportunity to review the Work. Failure to meet this requirement may be cause for the Consultant to classify the Work as defective.

END OF SECTION 03 01 10

PART 1 GENERAL

1.1 DESCRIPTION

.1 Provide all labour, equipment and material to complete the concrete reinforcement work, as indicated on the Drawings and specified herein.

1.2 REFERENCE STANDARDS, CODES AND ACTS

.1 Conform to the requirements of the 2012 Ontario Building Code, including all amendments to date and any applicable acts of any authority having jurisdiction and the following:

.1 CAN/CSA G30.5-M1983 (R1998) - Welded Steel Wire Fabric for Concrete Reinforcement

.2 CAN/CSA G30.18-09 R2014 - Carbon steel bars for concrete reinforcement

.3 CSA A23.1-14/A23.2-14 - Concrete materials and methods of concrete construction / Test methods and standard practices for concrete

.4 CSA A23.3-14 - Design of Concrete Structures

.5 CSA W186-M1990 (R2012) - Welding of Reinforcing Bars in Reinforced Concrete Construction

.6 RSIC-04 - Reinforcing Steel Institute of Canada (RSIC) Manual of Standard Practice

.2 Where there are differences between the Specifications and Drawings and the codes, standards or acts, the most stringent requirement shall govern.

.3 Standards referenced by the Standards noted above are to apply even if they are not included in the list.

1.3 TOLERANCES

.1 Perform fabrication and setting so that completed Work will be within the tolerances set out in CSA A23.1.

.2 These tolerances are acceptable with regard to structural requirements. Interfacing tolerances may not be compatible with the above. Review and coordinate interfacing tolerances so that the various elements come together properly.

1.4 SUBMITTALS

.1 Submit data sheets indicating dowel epoxy material.

.2 If requested by the Consultant, submit copies of the bills of lading from the reinforcing steel supplier. Copies shall be submitted monthly, included with the progress draws.

.3 Submit certificate of training for the use of the adhesive material. Certificates must indicate that the Contractor's personnel have been trained in installing the system per the manufacturer's installation instructions.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Reinforcing Steel:

.1 Shall be new deformed "uncoated" bars conforming to CSA Standard G30.18 with a minimum yield stress of 400 MPa, unless otherwise noted. All bars to have Typical Identification Patterns and standard identification requirements.

.2 Reinforcement to be welded shall conform to the material recommendations contained in W186.

.2 Chairs, bolsters, bar supports, spacers: Conforming to CSA A23.1/A23.2.

.3 Welded Wire Mesh (Conforming to CSA Standard G30.5): 152 x 152 MW18.7/MW18.7 (6x6 6/6) hot-dip galvanized.

.4 Tie wire: Annealed wire 1.29 mm diameter (No.16 U.S. Standard Gauge), or heavier. For epoxy coated bars, ties shall be non-metallic, plastic-coated.

2.2 ADHESIVE

.1 For dowels and anchors: injectable, two-component adhesive for structural applications into existing concrete.

.2 Acceptable products:

.1 Hilti HIT HY-200; or

.2 Approved alternate.

PART 3 EXECUTION

3.1 FABRICATION

.1 Fabricate reinforcement in accordance with CSA A23.1 and the RSIC Manual of Standard Practice.

.2 Identify with a tag each bundle of bars with a code mark corresponding to that appearing on the bar list.

.3 Bend reinforcement once only and at room temperature. Do not straighten or re-bend reinforcement.

.4 Replace bars which develop cracks or splits.

3.2 DETERIORATED REINFORCING STEEL

.1 Where concrete deterioration extends beyond the column reinforcing steel, as determined by the Consultant, all unsound concrete shall be removed and replaced.

.2 All exposed reinforcing steel and bond surfaces are to cleaned in accordance with Section 03 01 30.51 “Cleaning of Cast-in-Place Concrete”.

.3 Additional reinforcing steel will be required when the existing reinforcing steel has a sectional loss of 20 percent or greater, and where directed by the Consultant. The additional reinforcing steel shall be of the same bar size as that of the original, or greater.

3.3 PLACING

.1 New reinforcing steel:

.1 Prior to concreting, accurately place reinforcement in accordance with CSA A23.1.

.2 Do not drive or force reinforcement into fresh concrete.

.3 Where toppings are placed on waterproof membrane systems, prevent reinforcement or tie wire from contacting these items.

.4 Maintain all metal including reinforcement, tie wires, conduit, etc. at least the specified cover dimension from form faces.

.2 Splicing:

.1 Location of splices not shown on the drawings shall be acceptable to the Consultant and in accordance with the Item 1.2 of this specification.

.2 Mechanical splices shall be subject to the review by the Consultant.

.3 Supplemental reinforcing steel shall be placed parallel to and no further than 20mm from the existing reinforcing steel, maintaining minimum concrete cover.

3.4 DOWELS

.1 Install dowels at locations identified by the Consultant.

.2 Pre-drill holes for dowels.

.3 The size of dowels shall not exceed the size of the vertical bars by more than one bar size.

.4 Clean all holes, per the epoxy manufacturer’s instructions, to remove loose material and drilling dust prior to the adhesive installation.

.5 Inject adhesive into holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive. Follow manufacturer recommendations to ensure proper mixing of

adhesive components. Sufficient adhesive shall be injected in the hole to ensure that the annular gap is filled to the surface.

.6 Remove excess adhesive from the surface. Shim dowels with suitable device to center the anchor in the hole. Do not disturb or load anchors before manufacturer specified cure time has elapsed.

3.5 QUALITY CONTROL

.1 Provide a system of quality control to ensure that the minimum standards specified herein are attained.

.2 Bring to the attention of the Consultant any defects in the Work or departures from the Contract Documents which may occur during Construction. The Consultant will decide upon corrective action and give recommendations in writing.

.3 The Consultant's general review during construction and inspection and testing by an independent inspection and testing agency and the reporting to the Consultant are both undertaken to inform the Contractor of the Contractor's performance and shall in no way augment the Contractor's quality control or relieve the Contractor of its contractual responsibility.

3.6 NOTIFICATION

.1 Prior to commencing significant segments of the Work, give the Consultant and the independent inspection and testing agency appropriate notification so as to afford them reasonable opportunity to review the Work. Failure to meet this requirement may be cause for the Consultant to classify the Work as defective.

3.7 INSPECTION AND TESTING

.1 Appointment of the independent inspection and testing agency:

.1 The Consultant will appoint the independent inspection and testing agency to make inspections or perform tests as the Consultant directs. The Independent Inspection and Testing Company shall be responsible only to the Consultant, and shall make only such inspections or tests as the Consultant may direct.

.2 When defects are revealed, the Consultant may request, at the Contractor's expense, additional inspection or testing to ascertain the full extent of the defect.

3.8 DEFECTIVE MATERIALS AND WORK

.1 Where evidence exists that defective work has occurred or that Work has been carried out incorporating defective materials, the Consultant may have tests, inspections or surveys performed, analytical calculations of structural strength made, and the like, in order to help determine whether the Work must be replaced. Tests, inspections or surveys or calculations carried out under these

circumstances will be made at the Contractor's expense, regardless of their results, which may be such that, in the Consultant's opinion, the Work may be acceptable.

.2 All testing shall be conducted in accordance with the requirements of the Ontario Building Code, except where this would, in the Consultant's opinion, cause undue delay or give results not representative of the rejected material in place. In this case, the tests shall be conducted in accordance with the standards given by the Consultant.

.3 Materials or work which fails to meet specified requirements may be rejected by the Consultant whenever found at any time prior to final acceptance of the Work regardless of previous inspection. If rejected, defective materials or work shall be promptly removed and replaced or repaired to the satisfaction of the Consultant, at no expense to the Owner.

END OF SECTION 03 01 20.01

PART 1 GENERAL

1.1 DESCRIPTION

.1 Provide all labour, equipment and material to abrasively blast and clean all suspended slab surfaces, exposed concrete with repair areas, and reinforcing steel surfaces within the repair areas.

1.2 REFERENCE STANDARDS

.1 International Concrete Repair Institute (ICRI) Technical Guidelines 310-330.

.2 Steel Structures Painting Council (SSPC), SSPC-SP6, “Commercial Blast Cleaning”.

.3 Steel Structures Painting Council (SSPC), SSPC-SP7, “Brush-Off Blast Cleaning”.

1.3 QUALIFICATIONS OF CONTRACTOR

.1 Work of this section shall be performed by a Contractor with adequate plant, equipment and skilled trades-people to perform the Work expeditiously, and known to have been responsible for satisfactory work, similar to that specified, during a period of at least the immediate past five years.

1.4 STORAGE, HANDLING AND PROTECTION

.1 Protect surrounding and adjoining work by adequately covering with tarpaulins or other suitable protective covering. Enclose each work area with suitable tarpaulins to confine the dust, debris and grit within the work area and prevent spread to adjoining areas. Make good all damage caused by failure to provide suitable and adequate protection.

.2 All equipment required for workers shall be in accordance with the requirements of local authorities having jurisdiction including but not limited the WHMIS requirements.

.3 Be responsible for the safety of workers, equipment, protective clothing and helmet supplied with clean, dust free filtered air.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Abrasive: Hard angular sand and blasting grit abrasive that will not adversely affect the underlying concrete surface. Grit gradation shall be selected by the Contractor to achieve the desired finish.

.2 Abrasive materials suitable for the purposes at hand shall be used for the abrasive blast cleaning operation.

.3 No re-use of the abrasive will be permitted.

PART 3 EXECUTION

3.1 SURFACE PREPARATION FOR REINFORCING STEEL AND CONCRETE REPAIRS

.1 Concrete shall be treated so as to remove all loose material, laitance and surface contaminants.

.2 Exposed reinforcement shall be sandblasted to SSPC-SP7, "Brush-Off Blast Cleaning":

.1 All loose mill scale, loose rust, oil, grease, dirt, loose paint or other foreign matter must be removed by the use of abrasives propelled through nozzles or by centrifugal wheels.

.2 A brush-off blast cleaned surface finish is defined as one from which the previously mentioned contaminants/coatings are removed completely.

.3 Tight mill scale and tightly adhered rust, paint and coatings are permitted to remain provided that all mill scale and rust have been exposed to the abrasive blast pattern sufficiently to expose numerous flecks of the underlying metal fairly uniformly distributed over the entire surface.

.3 A maximum of 24 hours shall be allowed to elapse between the abrasive blast cleaning operation and concrete repair material placing.

3.2 PRESSURE WASHING

.1 Remove surface contaminants using high-pressure water suitable for the exposed concrete surface.

.2 Remove water runoff and prevent said runoff from entering the storm drainage system.

.3 The use of chemical must be reviewed by the Consultant.

3.3 SURFACE PREPARATION FOR CONCRETE SLABS

.1 Vacuum shot blast in order to achieve a good profile for waterproofing membrane bonding.

.2 As a minimum, mechanically grind or sand-blast the slab and vertical surfaces, in accordance with these specifications and to the requirements of the waterproofing manufacturer.

.3 Surfaces shall be prepared in accordance with (ICRI) Technical Guidelines, to profiles specified by the waterproofing manufacturer.

3.4 SURFACE PREPARATION FOR INTERIOR CONCRETE FLOORS

.1 Preparation of slab to be in accordance with these specifications and the requirements of the manufacturer's published literature.

.2 Remove and dispose the existing waterproofing and caulking from the slab surfaces, including all upturns and coves.

.3 Clean the exposed concrete floor:

.1 Use oil absorbent material. Minimum three applications required.

.2 Apply neutralizer tri-sodium phosphate (TSP) or other degreasing cleaning detergents, as recommended by the epoxy flooring manufacturer.

.3 Use a floor scrubbing machine to spread the cleaning detergent and remove surface contaminants. Apply to remove surface oils.

.4 Allow cleaned concrete floor to dry. Include ventilation equipment for air circulation.

.5 Re-apply oil absorbent and clean, as required by the epoxy flooring manufacturer.

.6 Vacuum clean the concrete surface to remove powder or debris.

.4 Abrasive preparation:

.1 Mechanically grind the concrete surface, removing approximately 3mm from the concrete cover. Vacuum and collect dust, fines, etc. continuously from the grinding process.

3.5 PROTECTION

.1 Provide protective screens where necessary, and at the boundaries of work areas.

.2 Provide suitable protection for all entrance and exit ways into the building, all fresh air intakes, all garage exhaust fans, telephone, hydro and mechanical rooms, all plumbing, landscaping, exposed ducts and electrical or other cables.

3.6 CLEANING

.1 Remove and dispose of all debris resulting from the work as the work proceeds, leaving the work areas broom clean at the end of each day.

END OF SECTION 03 01 30.51

PART 1 GENERAL

1.1 DESCRIPTION

.1 Provide all labour, equipment and material to repair deteriorated or delaminated concrete and pitted concrete surfaces.

1.2 REFERENCE STANDARDS, CODES AND ACTS

.1 Conform to the requirements of the 2012 Ontario Building Code including all amendments to date and any applicable acts of any authority having jurisdiction and the following:

.1 ACI 117-10 - Standard Specifications for Tolerances for Concrete Construction and Materials

.2 ASTM C260/C260M-10a - Specification for Air Entraining Admixtures for Concrete

.3 ASTM C494/C494M-15a - Specification for Chemical Admixtures for Concrete

.4 CAN/CSA A23.3-14 - Design of Concrete Structures for Buildings

.5 CAN/CSA A283-06 (R2011) - Qualification Code for Concrete Testing Laboratories

.6 CAN/CSA A3000-13 – Cementitious Materials Compendium

.7 CAN/CSA S413-14 - Parking Structures

.8 CAN/CSA-O325-07 (R2012) - Construction Sheathing

.9 CSA A23.1-14/A23.2-14 - Concrete materials and methods of concrete construction / Test methods and standard practices for concrete

.10 CSA S269.1-16 – Formwork and falsework

.11 CSA S269.3-M92 (R2013) - Concrete Formwork

.12 Ontario Provincial Standard Specification (OPSS) 1359

1.3 SUBMITTALS

.1 Submit the following for the Consultant’s review:

.1 Product specifications; and

.2 Manufacturer’s written certification of material compatibility.

1.4 INSPECTION AND TESTING

.1 Notify the Consultant for review of placement of mortar, including application of slurry coat.

.2 Mortar Testing:

.1 Testing will be performed by an independent testing agency designated by the Consultant.

.2 Testing procedures shall be in accordance with CSA A23.1 and A23.2, as well as relevant ASTM standards.

.3 Provide six standard cubes per day for testing compressive strength of polymer modified mortar. Samples will be taken randomly from batches of mortar being placed. Two specimens will be tested at seven days. Four specimens will be tested at 28 days to determine compliance with the requirements of these specifications.

.3 Mortar Testing with Aggregate Extension:

.1 Testing will be performed by an independent testing agency designated by the Consultant.

.2 Polymer Modified Mortar (PMM) testing will include:

.1 One standard strength test per day. Each strength test sample will consist of three cylinders with proper identification and field data. One specimen will be tested at seven days and two at 28 days. Store cylinders in a protected area free from vibrations and tampering; maintaining a temperature of 20 ± 5°C for a minimum of 20 hours prior to transporting to the testing laboratory for curing in accordance with CSA Standard A23.2.

.2 If PMM is being placed when there is a probability of the air temperature falling below 5°C during the curing period, each test sample shall include one additional "field-cured" cylinder (reference CSA A23.2) to be stored as near to the placed concrete as possible, and shall receive the same protection from the elements as the concrete that it represents. This cylinder shall be stored in the field for the full five day cure period prior to being transported to the testing laboratory for a seven day compressive strength test. Specimens shall not be removed from the moulds until after the five day cure period, if the Contractor wishes to test "field-cured" cylinders earlier for removal of formwork, additional samples should be prepared at the Contractor's expense.

.4 Mortar Test Compressive Strength Results:

.1 Mortar will be considered under strength if:

.1 The average of any day's tests is below the specified strength;

.2 Any single test result is more than 3.5MPa below the specified strength for cylinder samples or less than 80 percent of the specified strength for cube samples.

.2 In case of dispute, and at the discretion of the Consultant, the Contractor may have two 100mm diameter by 100mm long cores from the concrete drilled and tested, at his own expense for each result below the required

strength, in accordance with CSA Standard A23.2. The results shall be evaluated in accordance with the CSA Standard A23.1.

1.5 ENVIRONMENTAL CONDITIONS

.1 Ensure a minimum ambient and surface temperature at installation 7ºC, unless performing work in cold environments.

.2 Store materials in a dry location, where ambient temperatures vary between 18ºC and 27ºC.

.3 Do not apply materials to wet, iced or frosted surfaces or in areas exposed to snow, sleet or rain during application period.

.4 Ensure salts of any kind, from any source, and other contaminants, are not allowed on substrates which are to receive repair material.

PART 2 PRODUCTS

2.1 GENERAL

.1 All materials to be placed in accordance with the contract specifications and the manufacturer's requirements, whichever are more stringent.

.2 Formwork lumber:

.1 Refer to Section 03 01 10 "Formwork and Falsework".

2.2 MATERIALS FOR SURFACE PATCHING AND LEVELLING

.1 Topside repairs:

.1 BASF: Master Emaco T 302 (formerly SD2 Repair Mortar);

.2 Sika Canada Inc.: SikaTop 121/122 PLUS; or

.3 Approved alternate.

.2 Vertical/soffit repairs:

.1 BASF: Master Emaco N 300CI (formerly known as EMACO R300);

.2 Sika Canada Inc.: SikaTop 123 PLUS; or

.3 Approved alternate.

2.3 MATERIALS FOR CONCRETE REPAIRS

.1 Horizontal repairs:

.1 BASF: MasterEmaco T 1060 (formerly 10-60 Rapid Mortar);

.2 WR Meadows: Meadow-Crete GPS; or

.3 Approved alternate.

.2 Vertical/soffit repairs:

.1 BASF: MasterEmaco N 425 (formerly Gel Patch);

.2 Euclid Canada Inc.: Verticoat Supreme; or

.3 WR Meadows: Meadow-Crete GPS.

PART 3 EXECUTION

3.1 PREPARATION

.1 Notify the Consultant to review and comment on the areas identified for repair mortar. Adjust areas based on Consultant's comments until agreement is reached.

.2 Ensure concrete substrate is structurally sound. Loose or unsound concrete should be removed.

.3 Saw cut the edges of the repair locations to a depth of at least 10mm to avoid feather edging and to provide a square edge. Break out the complete repair area to a minimum depth of 10mm up to the sawn edge.

.4 Clean the surface by removing any dust, unsound or contaminated material, oil, paint, greases, and corrosion deposits, or as directed by the Consultant. Free water should be blown dry.

.5 Where breaking is not required, roughen the surface and remove any laitance by mechanical means or high pressure water wash. Remove oil and grease deposits by steam cleaning, detergent, scrubbing or degreasing.

.6 Frozen substrates should be heated to remove frost. Holes should be prepared by blowing out with oil-free air to remove drilling debris and surplus water.

.7 If required by the product manufacturer, apply a pH indicator to the prepared surface to test for carbonation. If carbonation is present, abrade surface to a depth that is not carbonated, as directed by the product manufacturer.

.8 For vertical surfaces and soffits where concrete patch depth is greater than 25mm, install to manufacturer's instructions stainless steel anchors. Maximum centre to centre spacing in each direction is 250mm. Tie anchor heads together with 1.5mm diameter stainless steel wire.

.9 Where half or more of the diameter of reinforcement steel is exposed either by existing conditions or concrete removal, bond between the concrete and reinforcing steel is broken, or corrosion is present, the concrete shall be removed to provide a minimum 25mm clearance around entire perimeter of steel and along entire exposed length.

.10 If reinforcing steel is exposed, clean the exposed reinforcement in accordance with Section 03 01 30.51 "Cleaning of Cast-in-Place Concrete" or until all surface corrosion has been removed, as directed by the Consultant.

3.2 POLYMER MODIFIED MORTAR PLACEMENT

.1 Mix and apply polymer modified mortar in strict accordance with the manufacturer's written specifications. Provide saturated surface dry substrate prior to applying slurry coats.

.2 Prepare and scrub slurry coat into concrete substrate prior to placing mortar as required by the manufacturer.

.3 Ensure that sufficient time is allowed for curing prior to material being disturbed. All defective repairs shall be replaced at the Contractor's expense.

.4 Place polymer modified mortar on top horizontal surfaces in a single pour, and in layers on vertical or overhead surfaces.

.5 Verify the minimum and maximum application depths specified in the manufacturer's current published application guidelines prior to placing the repair material. Do not exceed the maximum application depths.

.6 If the maximum application depth is to be exceeded, extend the repair material with aggregate, in accordance with the manufacturer's published requirements.

3.3 FINISHING, CURING AND PROTECTION

.1 Finish to lines and levels of adjacent concrete. Edges shall be flush and trowel finished.

.2 Curing for horizontal surfaces:

.1 Wet curing (as recommended by the product manufacturer): Must begin as soon as finishing is completed on any area. Cover fresh polymer modified mortar with wet burlap and keep continuously moist or keep moist by mist spray of water. Wet curing shall continue for at least five full days. Use an approved curing sealing compound which will not inhibit the bond of the new paint in lieu of wet curing in difficult areas. The use of curing sealing compounds will not be permitted in areas where repairs are to be waterproofed.

.2 Liquid-membrane curing compounds or plastic sheeting may be used to protect the early surface from precipitation, as directed by the product manufacturer.

.3 Curing for vertical surfaces:

.1 Use appropriate curing compound if surface cannot be damp cured. Refer to product manufacturer requirements.

.4 Protect repair material from sunlight, wind, rain and frost immediately after placing.

.5 Protect from freezing for minimum of 24 hours after application.

END OF SECTION 03 01 30.61

PART 1 GENERAL

1.1 DESCRIPTION

.1 Provide all labour, equipment and material to repair deteriorated and delaminated concrete in accordance with the Contract Documents.

.2 Provide all labour, equipment and material to install new concrete at the repair areas, in accordance with the Contract Documents.

1.2 REFERENCE STANDARDS, CODES AND ACTS

.1 Conform to the requirements of the 2012 Ontario Building Code, including all amendments to date and any applicable acts of any authority having jurisdiction and the following:

.1 ACI 117-10 - Standard Specifications for Tolerances for Concrete Construction and Materials

.2 ASTM C260/C260M-10a - Specification for Air Entraining Admixtures for Concrete

.3 ASTM C494/C494M-15a - Specification for Chemical Admixtures for Concrete

.4 CAN/CSA A23.3-14 - Design of Concrete Structures for Buildings

.5 CAN/CSA A283-06 (R2011) - Qualification Code for Concrete Testing Laboratories

.6 CAN/CSA A3000-13 – Cementitious Materials Compendium

.7 CAN/CSA S413-14 - Parking Structures

.8 CAN/CSA-O325-07 (R2012) - Construction Sheathing

.9 CSA A23.1-14/A23.2-14 - Concrete materials and methods of concrete construction / Test methods and standard practices for concrete

.10 CSA S269.1-16 – Falsework and formwork

.2 Standards referenced by the Standards noted above are to apply even if they are not included in the list.

.3 Where there are differences between the Specifications and Drawings and the codes, standards or acts, the most stringent shall govern.

1.3 WARRANTY

.1 The warranty shall cover the repair of deteriorated concrete as a result of faulty materials and/or workmanship for a period of two years from the date of Substantial Performance of the work.

1.5 PERFORMANCE REQUIREMENTS

.1 For the duration of the warrant periods, the concrete delamination repairs performed under this Contract shall not:

.1 Spall, scale or crack excessively;

.2 De-bond from existing substrate;

.3 Delaminate due to reinforcing steel corrosion.

1.6 TOLERANCES

.1 Perform placing operations so that completed work will be within the tolerances set out in CSA A23.1 and as listed below.

.2 Finish tolerances shall meet the requirements of CSA A23.1.

1.7 SUBMITTALS

.1 Certificates

.1 Prior to beginning work and when any change in materials or source of supply is proposed, provide the following certificates prepared by an approved inspection company. The cost of this work shall be borne by the Contractor.

.1 The concrete supplier must submit a valid “Certificate of Concrete Production Facilities” as issued by the Ready Mixed Concrete Association of Ontario (RMCAO), including certification that all raw materials used in the production of concrete proposed for the work comply with the requirements of the specifications and CSA A23.1.

.2 Mix Design

.1 Submit the proposed mix design for all concrete mix types to the Consultant for review two weeks prior to their initial use.

.3 Slab scanning: Prior to commencing any concrete or drain removals, perform GPR scans of the suspended slab at the repair areas to identify locations of reinforcing steel and embedded electrical conduits. Do not damage, disturb or relocate any existing services, unless specifically requested by the Consultant.

.4 Provide shop drawings for the Consultant’s review indicating a temporary shoring system designed to safely support the specified repair areas and the applied loads until the restoration Work is complete. Shop drawings to be signed and sealed by a professional Engineer licensed in the Province of Ontario.

1.8 INSPECTION AND TESTING

.1 All concrete that is tested must be done by a testing firm certified in accordance with CSA A283, retained by the Contractor, paid through the Contract cash allowances and approved by the Consultant.

.2 Provide casual labour to the testing firm's field personnel for the purpose of obtaining and handling sample materials. Provide free access to all portions of the work, and cooperate with the testing firm.

.3 Advise testing firm 24 hours in advance of concrete placement.

.4 The testing firm is to conduct all tests in accordance with CSA A23.2.

.5 Samples of the concrete are to be taken the end of the chute of the concrete supply truck.

.6 The testing firm is to take a minimum of three test cylinders for a strength test and not less than one strength test for each 20m^3 of concrete, or portion thereof, for each type of concrete placed and not less than one test for each type of concrete placed in any one day.

.7 The testing firm is to report results of tests immediately to the Contractor. The Contractor is responsible for ensuring that the concrete meets the requirements of the specifications. Report adverse test results to the Consultant immediately.

.8 The testing firm is to submit to the Consultant and Contractor certified copies of the test results within five calendar days of the test.

.9 For all Portland cement concrete compressive strength tests, use 100mm by 200mm or 150mm by 300mm cylinders.

.10 In accordance with requirements of A23.1, the Contractor is to provide storage facilities on Site for all test cylinders.

1.9 QUALITY CONTROL

.1 Reject and do not place concrete with:

.1 Slump outside of the specified or mix design range, whichever is more stringent;

.2 Air content lower than the minimum specified range; or

.3 Concrete is over two hours from batch time.

.2 The maximum time between adding mix water and complete discharge of concrete into forms shall be 120 minutes. Exemptions to this time frame shall only be permitted by the Consultant, when previously reviewed chemical additives are used.

PART 2 PRODUCTS

2.1 GENERAL

.1 All materials to be placed in accordance with the Contract specifications and the manufacturer's requirements, whichever are more stringent.

.2 Use of calcium chloride is not permitted.

2.2 BONDING AGENTS

.1 Cement slurry:

.1 Maximum W/C ratio 0.4; and

.2 1:1 cement sand mixture.

.2 For packaged concrete, prepare cementitious slurry in accordance with manufacturer's instructions.

2.3 GRAVITY FEEDING - READY-MIX CONCRETE

.1 Design the mix in accordance with CSA A23.1 so that concrete will be homogeneous, uniformly workable, ready to place into corners and angles of forms and around reinforcement by methods of placing and consolidation employed on the work, but without permitting materials to segregate or excessive free water to collect on the surface. The concrete, when hardened, shall have the qualities specified.

.2 Concrete repair properties:

.1	Exposure class	C-1
.2	Min. 28-day compressive strength	35 MPa
.3	Air Content	5% to 8%
.4	Slump (Before Super-P)	50 ± 20mm
.5	Cement	Type GU
.6	Coarse aggregate	20mm
.7	Chloride ion permeability test	<1500 Coulombs within 91 days

2.4 GRAVITY FEEDING - PACKAGED CONCRETE

.1 Acceptable Products:

.1 King Packaged Materials Company: King FA S6/S10; or

.2 Approved alternate.

2.5 PRESSURE GROUTING - READY-MIX CONCRETE

.1 For pressure grouting material, see Section 03 64 00 "Pressure Grouting".

2.6 PRESSURE GROUTING - PACKAGED CONCRETE

.1 For pressure grouting material, see Section 03 64 00 "Pressure Grouting".

2.7 HAND PATCHING - PACKAGED CONCRETE

.1 For hand patching material, see Section 03 01 30.61 "Polymer Modified Mortar".

2.8 CONCRETE REINFORCEMENT

.1 New deformed reinforcing steel bars shall conform to CSA Standard G30.18-09 R2014, Grade 400.

2.9 ADMIXTURES

.1 Superplasticizers, if acceptable to the Consultant, shall conform to requirements of ASTM C494, Type F or G.

.2 Add superplasticizer, not water, to bring slump to level acceptable to floor finisher for placement. **Do not add water.**

.3 Ensure mix designs are correctly adjusted for placement, strength, durability and air content requirements.

PART 3 EXECUTION

3.1 CONCRETE REPAIR IDENTIFICATION

.1 Prior to proceeding with the repair work, the Contractor must mark all concrete repairs for the Consultant's review. The Contractor will:

.1 Remove any existing wearing surface, moisture protection membranes or coatings from the areas specified to be repaired;

.2 Clean surfaces of dirt, debris, loose concrete, salt encrustations, stains and the like to permit close examination of their condition;

.3 Acoustically sound and visually review 100 percent of all concrete surfaces and mark, with paint, deteriorated and delaminated areas to be repaired. Such areas include spalls, delamination and unsound concrete, which may adversely affect the structure or the proper functioning of the moisture protection system;

.4 Determine, by visual inspection and hammer tapping, the areas of deteriorated and delaminated soffits and soffit cracks to be repaired. Mark these areas with paint;

.5 Notify the Consultant to review and comment on the areas identified for repair. Adjust areas based on Consultant's comments until agreement is reached; and

.6 Mark on the Contract Drawings the location of delaminated concrete areas that have been agreed to with the Consultant and calculated total areas for each.

3.2 REPAIRS TO DETERIORATED AND DELAMINATED CONCRETE

.1 Repair spalls, delamination and unsound concrete which may adversely affect the structure or the installation and/or proper functioning of the waterproofing system.

.2 Before proceeding with the repair work, ensure that agreement on the areas to be repaired has been obtained from the Consultant.

.3 Install and maintain, if necessary, sufficient temporary shoring to safely support the suspended slab and their applied loads until the restoration repair work is complete.

.4 The perimeter of all areas of repair shall be squared-off and saw-cut a minimum of 12mm deep with the following stipulations:

.1 Saw-cut overrun at corners and at intersections is not permitted;

.2 Prior to saw-cutting and to prevent damage to the existing reinforcing steel, the Contractor shall determine, by means of a cover meter, the actual amount of concrete cover over the embedded reinforcing steel; and

.3 Where insufficient concrete cover exists over the reinforcing steel to permit the 12mm deep saw-cut, perimeter removal to a vertical edge, using Consultant-reviewed methods, is permitted; and

.4 FEATHER EDGES ARE NOT PERMITTED.

.5 Remove concrete using manually operated equipment pneumatic hammer maximum to saw-cut, taking precautions to avoid damaging the saw cut edge. Edges with spalls or chips shall be re-saw-cut at the Contractor's expense.

.6 Use of rivet-busters to remove concrete is not permitted.

.7 Remove delaminated concrete down to a level of sound concrete. Minimum depth of removal of 50mm is required.

.8 Where reinforcing steel is corroded, continue concrete removal along the length of the steel until un-corroded steel is uncovered.

.9 Remove concrete to provide a 25mm clearance around all reinforcing steel.

.10 Excess or unnecessary concrete removal shall be paid by the Contractor at no extra cost to the Owner.

.11 Upon completion of concrete removal, a final check of areas adjacent to the repair patch is to be made by the Contractor to determine if there is any additional delamination which may have occurred. The Contractor is to mark any additional delaminated areas and notify the Consultant for their review.

.12 Upon completion of all concrete removals, mechanically abrade repair patches by particle blasting until both the concrete substrate and exposed reinforcing steel are free of all cement paste, rust, loose and fractured concrete and bond inhibiting materials.

.13 Remove all loosened concrete debris and bond inhibiting materials and wash down exposed surfaces with pressured water jet and air hose.

.14 Where directed by the Consultant, add or splice reinforcing bars.

.15 Pre-wet repair patches and maintain concrete saturated surface dry for a minimum of 24 hours prior to placing concrete.

.16 Any standing water shall be blown off concrete surface prior to application of bonding agent.

.17 As a minimum, comply with the following:

.1 Brush a bond coat of bonding agent onto the clean concrete surface to be repaired and cover all surfaces of exposed reinforcing.

.2 While the cement slurry bonding agent is still tacky, fill the area to be repaired with repair material and trowel smooth flush to the existing surrounding concrete. Consolidate the concrete by mechanical vibrators as required.

.3 Fill the cavities with a bonded concrete and finish to match adjacent surfaces. Comply with the procedures described herein and employ such other procedures as may be required such that the concrete infill is bonded to the existing concrete to withstand a stress not less than 1034kPa.

.4 Do not use concrete mixed more than two hours after introduction of mixing water or one hour during hot weather conditions.

.5 Wet cure new ready mixed concrete at 10°C for a minimum of seven days. Cure pre-packaged repair materials as per manufacturers published instructions.

.6 Do not allow traffic onto repair patches until 75 percent of the specified 28 day strength has been achieved.

3.3 COLUMN REPAIRS

.1 Proceed as specified in Item 3.2, clause 1 through 17, inclusive.

.2 Form areas where new concrete is to be poured using gravity feed method.

.3 Mixing pre-package concrete repair materials.

.4 Prepare repair material in accordance with the manufacturer’s printed instructions. Have a copy of these printed instructions on site during the work.

.5 Materials must be mixed in a concrete drum mixer.

.6 The manufacturer’s representative is to be present on site at the time of concrete placement.

3.4 SOFFIT, VERTICAL SURFACE, LEDGE BEAM AND BOTTOM EDGE REPAIRS

.1 Concrete repairs of this section are defined as repairs that extend beyond the reinforcing steel and, for estimating purposes, may be assumed to have an average depth of 75mm, unless noted otherwise.

.2 Where locations of soffit concrete delamination are greater than $1m^2$, these areas shall be repaired as a full-depth of slab repair.

.3 Proceed as specified in Item 3.2, clause 1 through 17, inclusive.

.4 Along the line of each major crack or spall, remove loose concrete and delaminated areas, expose the bottom reinforcement in each direction. Notify the Consultant for inspection.

.5 For vertical surfaces and soffits where concrete patch depth is greater than 25 mm, install stainless steel concrete anchors, as directed by the Consultant. Maximum centre to centre spacing in each direction is 250mm.

.6 Tie anchor heads together with 1.5mm diameter stainless steel wire.

.7 Remove and reinstall the existing mechanical or electrical services and electrical fixtures, as required to repair cracks and delaminated concrete at the underside of concrete slabs.

.8 Fill cavities in soffit and cracks with patching compound. Apply cement slurry bonding agent to cavity surfaces prior to filling cavities. Trowel to a uniform finish to match adjacent existing surfaces. Cure in accordance with the manufacturer's printed instructions.

3.5 THROUGH-SLAB REPAIRS

.1 Where locations of soffit concrete delamination coincide with locations of topside concrete delamination, the concrete shall be repaired as a full-depth slab (through-slab) repair.

.2 Where locations of soffit concrete delamination are greater than $1m^2$, these areas shall be repaired as a full-depth of slab repair.

.3 Proceed as specified in Item 3.2, clause 1 through 17, inclusive.

.4 Form areas where new concrete is to be poured.

.5 As a minimum comply with the following:

.1 Brush a bond coat of cement slurry bonding agent onto the clean concrete surface to be repaired and cover all surfaces of exposed reinforcing.

.2 While bond coat is still tacky, fill the area to be repaired with concrete. Vibrate as necessary to ensure that entire area is filled with consolidated concrete. Trowel smooth flush to the existing surrounding concrete.

.3 Wet cure new ready mixed concrete at minimum 10ºC for a minimum of seven days. Cure pre-packaged repair materials as per manufacturer’s published instructions.

.4 Do not allow traffic onto repair patches until 75 percent of the specified 28 day strength has been achieved.

3.6 CONCRETING IN EXTREME TEMPERATURES

.1 When the air temperature is at or above 27ºC, pour and cure concrete in accordance with the requirements of CSA A23.1.

.2 When temperatures may go below 5ºC, pour and cure concrete in accordance with the requirements of CSA A23.1.

3.7 REPAIR OF SURFACE DEFECTS

.1 Repair of surface defects shall begin immediately after form removal. For repairs with epoxy mortar, concrete shall be dry.

.2 Surface defects are defined as form-tie holes, air voids or pockets, bug holes with a diameter or depth greater than a 6mm, or honeycombed areas, rock pockets, fins and burrs.

.3 Repair of surface defects shall be tightly bonded and shall result in concrete surfaces of uniform colour, texture and matching adjacent surfaces, free of shrinkage racks.

3.8 CLEANING

.1 Upon satisfactory completion of the work, clean excess or waste materials and debris and leave the premises in a condition acceptable to the Consultant.

.2 Do not unload excess concrete from concrete trucks during clean-up operations and do not deposit in undesignated or unauthorized locations within the property boundaries whether concealed or not.

.3 Upon completion of localized concrete repairs, paint the repair area and adjacent surfaces to match existing. Refer to Section 09 91 23 “Painting”.

END OF SECTION 03 01 30.71

PART 1 GENERAL

1.1 DESCRIPTION

.1 Provide all labour, equipment and material to install new cast in place concrete at the slab repair areas.

1.2 REFERENCE STANDARDS, CODES AND ACTS

.1 Conform to the requirements of the 2012 Ontario Building Code including all amendments to date and any applicable acts of any authority having jurisdiction and the following:

.1 ACI 117-10 - Standard Specifications for Tolerances for Concrete Construction and Materials

.2 ASTM C260/C260M-10a - Specification for Air Entraining Admixtures for Concrete

.3 ASTM C494/C494M-15a - Specification for Chemical Admixtures for Concrete

.4 CAN/CSA A23.3-14 - Design of Concrete Structures for Buildings

.5 CAN/CSA A283-06 (R2011) - Qualification Code for Concrete Testing Laboratories

.6 CAN/CSA A3000-13 – Cementitious Materials Compendium

.7 CAN/CSA S413-14 - Parking Structures

.8 CAN/CSA-O325-07 (R2012) - Construction Sheathing

.9 CSA A23.1-14/A23.2-14 - Concrete materials and methods of concrete construction / Test methods and standard practices for concrete

.10 CSA S269.1-16 – Falsework and formwork

.1 Ontario Provincial Standard Specification (OPSS) 1359

1.3 WARRANTY

.1 The warranty shall cover the repair of deteriorated concrete as a result of faulty materials and/or workmanship for a period of two years from the date of Substantial Performance of the work.

.2 Warranty includes repairs required as a consequence of failure of work of this section.

.3 Correct all deficiencies immediately.

1.4 PERFORMANCE REQUIREMENTS

.1 For the duration of the warranty periods, the concrete delamination repairs performed under this contract shall not:

.1 Spall, scale or crack excessively;

.2 De-bond from existing substrate;

.3 Delaminate due to reinforcing steel corrosion.

1.5 SUBMITTALS

.1 Submit the following for the Consultant's review:

.1 Concrete mix designs;

.2 Product specifications; and

.3 Manufacturer's written certification of material compatibility.

1.6 INSPECTION AND TESTING

.1 Test all concrete by a testing firm certified in accordance with CSA A283, retained and paid for by the Owner and approved by the Consultant.

.2 Provide casual labour to the testing firm's field personnel for the purpose of obtaining and handling sample materials. Provide free access to all portions of the work, and cooperate with the testing firm.

.3 Advise testing firm 24 hours in advance of concrete placement.

.4 Testing firm is to conduct all tests in accordance with CSA A23.2-14.

.5 Samples of the concrete are to be taken the end of the chute of the concrete supply truck.

.6 Testing firm to take a minimum of three test cylinders for a strength test and not less than one strength test for each 20 m^3 of concrete, or portion thereof, for each type of concrete placed and not less than one test for each type of concrete placed in any one day.

.7 Testing firm is to report results of tests immediately to the Contractor. The Contractor is responsible for ensuring that the concrete meets the requirements of the specifications. Report adverse test results to the Consultant immediately.

.8 Testing firm is to submit to the Consultant Contractor and concrete supplier certified copies of test results within 5 days of test.

.9 For all Portland cement concrete compressive strength tests, 100mm by 200mm or 150mm by 300mm cylinders shall be used.

.10 In accordance with requirements of A23.1, provide storage facilities for site storage of all cylinders.

PART 2 PRODUCTS

2.1 MATERIALS AND ACCESSORIES

.1 Portland cement to conform to CAN/CSA A3000.

.2 Water to conform to CAN/CSA-A23.1.

.3 Aggregates:

.1 Conform to CAN/CSA-23.1.

.2 Coarse aggregates to be normal density, free of organic matter and deleterious substances.

.4 Air-Entraining admixture: conform to ASTM C260.

.5 Chemical admixtures:

.1 Conform to ASTM C494.

.2 Consultant to review accelerating or set-retarding admixtures during cold and hot weather placing.

.3 Chemical admixtures shall be compatible with each other and the air entraining admixture.

.6 Calcium chloride or any admixture containing chloride shall not be used in the concrete mix.

.7 Reinforcing Steel:

.1 Refer to Section 03 01 20 “concrete reinforcement”

.8 Dowel adhesive:

.1 Refer to Section 03 01 20 “concrete reinforcement”

2.2 CONCRETE MIX

.1 Interior concrete slabs, interior concrete walls and any other interior reinforced concrete structures:

.1	Normal weight Portland Cement Concrete conforming to CAN/CSA A23.1-14.	
.2	Minimum compressive strength at 28 days	35 MPa
.3	Aggregate	20 mm
.4	Slump at the point of discharge: to be specified by concrete supplier as required to suit application.	
.5	All concrete to be proportioned in accordance with CAN/CSA – A23.1-14.	

.2 Exterior/interior retaining/foundation walls and interior slabs exposed to chlorides:

.1	Normal weight Portland Cement Concrete confirming to CAN/CSA A23.1.	
.2	Exposure class	C-1
.3	Minimum compressive strength at 28 days	35 MPa
.4	Total percent air content	5% to 8%
.5	Slump	50mm ± 20 mm

.6 Cement Type GU

.7 Aggregate 20 mm

.8 Chloride ion permeability test < 1500 Coulombs within 91 days.

.9 Slump at the point of discharge: to be specified by concrete supplier as required to suit application.

.10 All concrete to be proportioned in accordance with CAN/CSA – A23.1-14.

.11 All concrete shall be high-early strength mixture.

.3 Other mixes:

.1 Unshrinkable backfill concrete: in accordance with OPSS 1359.

.2 Low-strength concrete capping: maximum 10MPa concrete strength.

PART 3 EXECUTION

3.1 PREPARATORY WORK

.1 Provided 48 hours' notice prior to replacing concrete to allow for the consultant's visual review of the forms, reinforcing steel and preparation.

3.2 APPLICATION - GENERAL

.1 Form all new cast-in-place concrete.

.2 New reinforcing steel bars and wire mesh shall be supported (with new chair reinforcement supports, etc.) to maintain concrete cover. Reinforcing shall be tied and fixed into position, so as to prevent movement during concrete placement and consolidation. Place new reinforcing steel in accordance with CAN/CSA-A23.1.

.3 Obtain Consultant's review of the reinforcing steel and its position. Notify Consultant when reinforcement installation is complete and before placing concrete. At least 48 hours' notice shall be given to provide opportunity to review the Work.

.4 Place concrete in manner consistent with good construction practices for this type of work. Supply, mix, place, consolidate, finish, cure and protect concrete in strict accordance with CAN/CSA-A23.1. It is the responsibility of the Contractor to provide adequate methods of heating to control the placement and curing conditions. Do not have heating devices unattended.

.5 Construction joints:

.1 Incorporate both horizontal and vertical construction joints in accordance with CSA A23.1, and typical details shown on the drawings.

.2 Spacing between joints to be maximum 24 times the slab thickness.

.3 Unless otherwise indicated on drawings, provide a non-compressible bond breaker to separate slabs-on-grade from vertical surfaces, such as building paper or polyethylene film.

.4 Saw-cut joint depth to be minimum 25mm or maximum 50mm, as directed by the Consultant.

.5 Avoid damaging the reinforcing steel when saw-cutting joints.

.6 Alternate saw-cutting near corners, walls and columns shall be submitted for Consultant review before commencing concrete placement.

.6 Equipment transporting concrete and runways used by equipment transporting concrete shall not be supported by the garage structural slab or other structural slabs.

.7 Maintain accurate records of poured concrete items, to indicate date, location of pour, air temperature, field test results and test samples taken.

.8 Place and consolidate concrete in accordance with CAN/CSA-A23.1. Vibrate concrete into place to ensure complete consolidation.

3.3 FINISHING

.1 Finish concrete in accordance with the requirements of CAN/CSA-A23.1 to match existing finishes.

.2 Commence troweling only after bleed water has disappeared and concrete has achieved initial set.

.3 At all times during the work, protect exposed concrete, exposed masonry and other exposed members from staining or becoming coated with concrete leakage due to continuing concreting operations. Members which become coated may be classed as defective by the Consultant.

3.4 CURING

.1 Cure and protect concrete in accordance with CAN/CSA-A23.1.

.2 Damp-cure the cast-in-place concrete, using wet burlap covered by polyethylene film, for a minimum of seven days after installation. Apply wet burlap as soon as possible after finishing, and without damage to the surface. The concrete surface shall be kept continuously moist for the entire cure period. Protect the cast-in-place concrete from high temperature during initial cure.

.3 Protect the cast-in-place concrete from damage during the curing period. Do not permit chipping operations adjacent to the repaired areas for a minimum of seven days after the installation of the cast-in-place concrete.

.4 Curing temperatures shall be maintained between +10°C and +30°C for the entire curing period. The Contractor shall supply and install curing blankets, temporary heat and enclosures, including cost of installation, fuel, ventilation, operation, maintenance and removal of equipment at no cost to the contract when the curing

temperature has or is expected to drop below 10 degrees Celsius during the curing period. The use of direct fired heaters discharging waste products into work areas will not be permitted.

.5 Do not use curing compounds.

.6 The cast-in-place concrete shall be shaded from direct sunlight or excessive wind for seven days following installation.

.7 The Contractor shall supply and install curing blankets, temporary heat and enclosures, including cost of installation, fuel, ventilation, operation, maintenance and removal of equipment at no cost to the contract when the curing temperature has or is expected to drop below 10 degrees Celsius during the curing period. The use of direct fired heaters discharging waste products into work areas will not be permitted.

3.5 CONCRETING IN EXTREME TEMPERATURES

.1 When the air temperature is at or above 27ºC, pour and cure concrete in accordance with the requirements of CSA A23.1.

.2 When temperatures may go below 5ºC, pour and cure concrete in accordance with the requirements of CSA A23.1.

END OF SECTION 03 31 00

PART 1 GENERAL

1.1 DESCRIPTION

.1 Provide all labour, equipment and material to design and install a new hot-dip galvanized metal handrail at the ramp on the west loading entrance of the Enercare Centre.

1.2 CODES AND STANDARDS

.1 Conform to the requirements of the 2012 Ontario Building Code, including all amendments to date, and any applicable acts of any authority having jurisdiction and the following:

.1 ASTM E935-13e1 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings

.2 CAN/CGSB 12.1-M90 - Tempered or Laminated Safety Glass

.3 CAN/CGSB 1.183-99 - Zinc-Rich Epoxy Coating

.4 CAN/CSA G164-M92 (R2003) - Hot Dip Galvanizing of Irregularly Shaped Articles

.5 CSA G40.20-13/G40.21-13 - General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel

.6 CSA S16-14 - Design of steel structures

.7 CSA S136-16 - North American Specification for the Design of Cold Formed Steel Structural Members

.8 CSA W47.1-09 (R2014) - Certification of Companies for Fusion Welding of Steel

.9 CSA W59-13 - Welded Steel Construction (Metal Arc Welding)

.10 CCSA W178.1-14 - Certification of welding inspection organizations

1.3 QUALIFICATIONS

.1 All work shall be done by a Contractor who has at least five years of proven satisfactory experience.

.2 Work of this section is to be performed only by qualifies personnel specially trained for this type of work.

.3 Use only installation Contractors approved by the railing manufacturer.

.4 Welding shall be carried out only by an experienced welder qualified to the requirements of CSA W47.1.

.5 Welding inspector and inspection company must be certified in accordance with CSA W178.1.

1.4 SUBMITTALS

.1 Prior to design and fabrication, examine the site conditions and take site measurements to ensure adequate and proper fitting.

.2 Submit shop drawings, schedules and erection diagrams prior to commencement of fabricating clearly showing:

.1 The signed stamp of a professional structural engineer registered in Ontario.

.2 Shop details, cuts, connections, holes, threaded fasteners, rivets and welds. Indicate welds using symbols to CSA W59.

.3 Type, size, spacing of anchors and other fittings.

.3 The Consultant will not review the structural strength, design, and detail of members, connections and anchorage. The responsibility for these items shall remain with the design engineer whose signed stamped impression will appear on each of the shop drawings.

.4 Submit product data sheets and maintenance instructions.

.5 Contractor's Welding Certificate: Provide the Railing Fabricator/Contractor's W47.2 welding certificate from the Canadian Welding Bureau (per Claude 3.4.1 below).

.6 The Design Engineer shall visit the site during and following the railing installation. Submit written confirmation that the railings, guards and handrails have been fabricated and installed in accordance with the design drawings (per Clause 3.4.2 below).

1.5 PROTECTION

.1 Before shipment, protect finished surfaces against damage. Wrap, crate, or package for shipment accordingly.

.2 Take all necessary precautions to ensure paint surfaces are not marred or scratched during hoisting and erection.

.3 Prevent staining of new grate by concrete, mortar, plaster, oil, grease or other contaminations.

1.6 WARRANTY

.1 Provide a two year warranty for work of this section against defects in the materials and workmanship from the date of substantial performance, as determined by the Consultant.

.2 Warranty shall include, but shall not be limited to, breakage, corrosion, deterioration of finishes, damage to substrate at anchor locations, material failure, etc.

.3 Contractor shall correct all deficiencies immediately.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Structural Steel

.1 Structural steel and hollow structural steel shall meet the requirements of CSA G40.20/G40.21.

.2 All HSS members to be structural quality steel, grade 350W, Class H.

.3 All other steel members shall be grade 300W structural steel.

.4 Steel members shall be hot-dip galvanized in accordance with CAN/CSA G164-M92 (R2003).

.2 Paint and Coatings

.1 All steel railings to be factory painted. Paint steel railings to match existing or to be chosen from the standard range of colours. Touch ups are permitted on site, as recommended by the railing manufacturer.

.2 Zinc-rich paint to be in accordance with CAN/CGSB 1.183-99.

.3 Other Materials

.1 Anchors, hardware and internal fasteners: Anchors to concrete, including nuts and washers, shall be Hilti HAS-E stainless steel.

.2 All fasteners and hardware including nuts and washers and any internal fasteners shall be stainless steel.

PART 3 EXECUTION

3.1 GENERAL

.1 Make all field measurements necessary for fabrication.

.2 Fabricate the work true to dimensions, square, plumb, level, and in accordance with the contract documents. All joints and intersecting members shall be accurately fitted and continuously welded.

.3 Welds shall be filed or ground smooth and flush. Do not leave grinding marks.

.4 All welding shall conform to CSA W59-13.

.5 Finished work shall be free from distortion and defects detrimental to appearance and performance.

3.2 FABRICATION

.1 Contractor to ensure a total guard height of 1092mm (minimum) above the finished walking surface.

.2 Pre-treat all railing metal components as recommended by coating manufacturer and apply finish coating in strict accordance with the manufacturer's instructions. Finished surfaces shall be free of flow lines, streaks, sags and blisters.

.3 Fabrication shall conform to CSA S16-14 for steel railings.

.4 Fabricate items in largest possible sections.

.5 Insulate between dissimilar metals, or between metal and concrete, with a bituminous paint to prevent electrolysis.

3.3 INSTALLATION

.1 Connect guard posts to concrete for structural strength.

.2 No field touch-ups are permitted.

.3 The Contractor is to ensure that there are no scratches to the railing coating.

.4 No alteration is permitted without a written letter by the design engineer.

.5 Ensure that all gaps, terminations and transitions are in compliance with the most current version of the building code.

.6 Avoid subjecting members to sudden shock, impact, or excessive loads during installation.

.7 Report to Consultant any improper fit to prior to taking corrective measures.

.8 Install new railing by accurately fitting joints and intersections.

.9 Install all anchors in accordance with manufacturer instructions.

.10 Clean new railing to the satisfaction of the Owner. Use cleaning products as recommended by the railing manufacturer.

.11 Do not remove erection equipment from site until installation has been inspected and accepted.

.12 Maintain square-ness of guards during transportation and installation.

.13 Tamper-proof all exposed anchors and fasteners, unless otherwise noted.

3.4 QUALITY CONTROL

.1 If requested by the Consultant, provide copies of the CSA W47.2-11 Certification.

.2 The guard Design Engineer shall visit the site during and following the railing installation. Submit written confirmation that the railings have been fabricated and installed in accordance with the design drawings.

3.5 CLEANING

.1 Touch-up primed surfaces that are burned or scratched.

.2 Clean dirt from surfaces resulting from the installation of this work.

.3 Maintain protection of finished surfaces until final clean-up.

END OF SECTION 05 52 01

PART 1 GENERAL

1.1 DESCRIPTION

.1 Provide all labour, equipment and material to remove and dispose the existing hot-applied rubberized waterproofing system at the west loading dock ramp slab, including upturns and downturns.

.2 Provide all labour, equipment and material to install new two-ply hot-applied reinforced rubberized asphalt waterproofing membrane system at the at the west loading dock ramp slab, including upturns and downturns.

1.2 REFERENCE STANDARDS, CODES AND ACTS

.1 Conform to the requirements of the 2012 Ontario Building Code, including all amendments to date and any applicable acts of any authority having jurisdiction and the following:

.1 CGSB 37-GP-9MA - Primer, Asphalt, Unfilled, for Asphalt Roofing, Damproofing and Waterproofing

.2 CAN/CGSB-37.50-M89 - Asphalt, Rubberized, Hot Applied, for Roofing and Waterproofing

.3 CAN/CGSB-37.51-M90 - Application of Rubberized Asphalt, Hot Applied, for Roofing and Waterproofing

.1 CAN/CSA S413-14 - Parking Structures

.4 ASTM D4263 - Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method

.5 ASTM D5957 - 98(2013) - Standard Guide for Flood Testing Horizontal Waterproofing Installations

1.3 QUALIFICATIONS

.1 The applicator shall be familiar with and fully equipped to apply hot-rubberized asphalt materials and shall be familiar with good waterproofing practices.

.2 The applicator shall be an approved applicator by the waterproofing membrane manufacturer and have a minimum of five years' experience in installation of the hot-rubberized waterproofing systems

1.4 WARRANTY

.1 Provide a five year warranty against defects in materials and workmanship.

.2 Provide a five year manufacturer's warranty against defects in materials.

1.5 SUBMITTALS

.1 Prior to the installation of the waterproofing system provide a written report from the manufacturer stating that the slab was prepared and is in a condition suitable for the waterproofing membrane system application.

.2 Provide waterproofing system data sheets, for Consultant review.

1.6 QUALITY ASSURANCE

.1 A site inspection shall be made by technical representative of waterproofing manufacturer prior to commencing installation of the system for purposes of reviewing and approving related conditions affecting performance requirements of this Specification.

1.7 STORAGE AND HANDLING

.1 Hot-rubberized asphalt should be stored in closed containers outdoors.

.2 Store primer at temperatures of +5°C and above to facilitate handling. Keep solvent away from open flame or excessive heat.

.3 Primer contains solvent and is flammable. Do not use near open flame.

1.8 SITE CONDITIONS

.1 Environmental Requirements:

.1 No installation work shall be performed during rainy or inclement weather and on frost or wet covered surfaces.

.2 Adhesion test of membrane shall be carried out when ambient temperature falls below minus 5°C.

.2 Temporary protection of the membrane shall be provided to prevent mechanical damage or damage from spillage of oil or solvents until such time as permanent protection is provided.

.3 Do not permit traffic of any kind over unprotected membrane.

PART 2 PRODUCTS

2.1 WATERPROOFING MEMBRANE SYSTEM

.1 For concrete deck applications: Two-ply, hot fluid-applied, flexible, continuous, water-tight, reinforced, rubberized asphalt waterproofing membrane system.

.2 Acceptable manufacturers:

.1 Henry: Bakor 790-11 Hot Rubberized Asphalt;

.2 Hydrotech Membranes Corp.: Monolithic Membrane 6125;

.3 McAsphalt Industries Ltd.: MACSEAL BDM;

.4 Multiseal: Multiseal 1080; or

.5 Approved equivalent.

2.2 PRIMER

.1 Penetrating primer for priming concrete substrates.

.2 Acceptable products:

.1 Bakor 910-01; or

.2 Approved alternate.

2.3 REINFORCING FABRIC

.1 Unsaturated spun bonded polyester mat reinforcement sheet “reemay”, as recommended by the waterproofing system manufacturer.

2.4 FLASHING SHEET

.1 At upturns/downturns and crack treatment:

.1 Modified bitumen membrane (butyl) having a minimum thickness of 1.5mm (60 mils) and a non-woven polyester reinforcement.

.2 Acceptable products:

.1 Bakor/Henry Company Canada: 990-25 Elastomeric Flashing Sheet;

.2 Carlisle Syntec Systems: CCW-711 Self-Adhering Sheet Waterproofing (fastening bar not required); or

.3 Approved alternate.

.2 At floor drains: Heavy duty uncured neoprene for non-exposed areas (60 mil thickness), as recommended by the waterproofing system manufacturer.

.3 At expansion joints: Heavy duty uncured neoprene for non-exposed areas (60 mil thickness), as recommended by the waterproofing system manufacturer.

2.5 FASTENING BAR

.1 25mm by 3m aluminum bar with predrilled holes at 300mm.

2.6 PROTECTION BOARD

.1 For bonded asphalt/mastic systems: glass ply sheet, composed of asphalt-impregnated fiberglass ply felt, as recommended by the waterproofing manufacturer.

.2 At drive lanes and pavement: Asphalt core board between two outside layers of fibreglass mat.

.1 Minimum thickness: 3.0mm (118 mils).

.2 Acceptable products:

.1 IKO Industries Ltd: Protectobard;

.2 W.R. Meadows: Vibraflex 120; or

.3 Approved alternate.

PART 3 EXECUTION

3.1 PREPARATION

.1 Saw cut or grind all exposed corners at the edge of the slab or other locations of waterproofing membrane downturn to round edges.

.2 Melting equipment shall consist of an indirect fired kettle with a double shell containing a high flash point heat transfer oil and mechanical agitator.

.3 Avoid overheating of hot-rubberized asphalt. The rubberized asphalt kettle utilized must be in accordance to manufacturer's published specifications. Recommended application temperature is 180°C to 200°C. Do not heat above 218°C, unless otherwise directed by the membrane manufacturer.

.4 As a minimum, horizontal concrete surfaces are to be shot-blasted and vertical concrete surfaces are to be sandblasted. Refer to Section 03 01 30.51 "Cleaning of Cast-in-Place Concrete".

.5 All concrete surfaces shall be cured a minimum of 28 days and shall be dry, unless otherwise specified in the manufacturer's published instructions.

.6 New concrete surfaces shall be a minimum wood float or troweled finish and be uniform.

.7 Voids, honeycombs, exposed aggregate areas, holes and other damaged horizontal or vertical surfaces which preclude a smooth and level surface shall be repaired prior to the application of waterproofing membrane.

.8 If requested by the Consultant, perform a slab surface moisture test using a plastic sheet, in accordance with ASTM D4263.

.9 Install 12mm by 12mm reglets in the concrete surface around the perimeter of the existing waterproofing system, including upturns, downturns and around floor drains and penetrations. Reglets are to be installed before the primer application. Contractor must verify that reglets are clean and dry prior to proceeding with the application of primer.

.10 Ensure that a minimum overlap of 300mm can be provided between the new and existing waterproofing system.

.11 Before application of hot-rubberized asphalt, the substrate shall be clean and dry, free from surface water, ice, snow or frost, dust, dirt oil, grease, cleaning residue, curing compounds or any other foreign matter detrimental to the adhesion of the hot-rubberized asphalt.

.12 The Contractor must verify that the moisture content on concrete surfaces is in accordance with the manufacturer's published instructions prior to proceeding with the surface preparation.

.13 The moisture content of the concrete substrate shall not exceed 5.2% when measured using a handheld electronic moisture meter, or 85% RH as measured in accordance with ASTM F2170. The costs for testing, as directed by the Consultant, will be paid through the testing allowance.

3.2 PRIMER

.1 Apply primer uniformly at a rate of approximately $7m^2/l$, avoiding an excessive or over-spraying application. Ponding of the primer is not permitted.

.2 The primer shall be dry before applying the hot-rubberized asphalt, in accordance with the manufacturer's requirements.

.3 Apply primer and first coat of waterproofing membrane within the same day. Primed areas that become dirty overtime will require a re-application of primer.

3.3 HOT-RUBBERIZED ASPHALT MEMBRANE

.1 Apply waterproofing material within the manufacturer's recommended application temperature ranges for ambient temperature and concrete substrate temperature.

.2 Apply membrane by squeegee to a uniform thickness and to manufacturer's instructions. Ensure full bond of membrane to substrate.

.3 Apply first coat of hot-rubberized asphalt membrane evenly to a thickness of not less than 2mm or not less than the manufacturer's recommended minimum thickness, whichever is greater.

.4 Install reinforcing fabric sheet and press firmly into the hot membrane. Avoid wrinkling of the fabric and ensure air is not trapped.

.5 Overlap the fabric with adjacent sheets of fabric by a minimum of 50mm. Apply a second layer of hot-rubberized asphalt membrane evenly over the fabric at a thickness of not less than 3mm.

3.4 PROTECTION BOARD

.1 Protection board shall be installed over the membrane to prevent damage from overburden and pavement material.

.2 Apply protection board when hot-rubberized membrane is still warm and tacky.

.3 Provide minimum 50mm overlap with adjacent protection board and minimum 75mm overlap at ends.

.4 Do not allow membrane to cool before applying protection board especially where asphalt paving is to be applied over protection board as adhesion is necessary.

.5 Install drainage boards per the manufacturer's instructions.

3.5 UPTURNS AND DOWNTURNS

.1 Apply hot-rubberized asphalt membrane 150mm up all vertical surfaces to provide a thickness of approximately 3mm to the vertical faces and a minimum of 200mm out onto the horizontal surface, unless otherwise directed by the Consultant.

.2 Embed flashing sheet in the hot-rubberized asphalt membrane, avoiding any wrinkles and extending a minimum of 150mm out onto the horizontal surface. Lap sheets a minimum 75mm.

.3 Use fastening/termination bar to mechanically fasten the membrane system:

.1 At upturns, install one row on the vertical surface;

.2 At downturns, install fastening bar at both ends of flashing sheet (one row on vertical surface; one row on horizontal surface);

.3 Fastening bar is not required with the use of self-adhering flashing sheet.

.4 Apply hot-rubberized asphalt membrane in accordance with item 3.3.

3.6 CRACKS AND CONSTRUCTION JOINTS

.1 Seal cracks and joints less than 3mm in width with a 3mm thick coat of hot-rubberized asphalt membrane and a strip of 300mm wide polyester fabric, centred on joint. Extend the membrane minimum 75mm beyond the sheet edges.

.2 Seal cracks and joints over 3mm width with a 3mm thick coat of hot-rubberized asphalt membrane and a strip of flashing sheet, centered on joint. Extend the membrane minimum 75mm beyond the sheet edges.

3.7 LOOPED HORIZONTAL EXPANSION JOINTS

.1 Apply a two-ply hot-rubberized asphaltic membrane system minimum 200mm on both side of the expansion joint.

.2 Over the membrane, loop an elastomeric sheet into the expansion joint. The depth of the flashing sheet should be approximately three times the expansion joint width and extend 200mm on both side of the joint.

.3 Adjacent reinforcing sheets should be lapped a minimum of 75mm. Avoid wrinkles.

.4 Install a heat-resistant backer rod at the looped elastomeric sheet.

.5 Apply (unreinforced) hot-rubberized asphaltic waterproofing over the elastomeric sheet and backer rod.

.6 Install a second elastomeric sheet, having a loop depth of 1.5 times the joint width.

.7 Apply a final coat of (unreinforced) hot-rubberized asphaltic membrane system minimum 200mm on both side of the expansion joint.

3.8 DRAINS AND PENETRATIONS

.1 Temporarily block all drains during the application of the membrane system, or other materials, which might block or clog the drain or plumbing. Remove blocking when work is not in progress and upon completion.

.2 Install a 12mm by 12mm reglet in the concrete surface surrounding the floor drain.

.3 Apply primer 200mm beyond edge of drain.

.4 Apply hot-rubberized asphalt membrane extending 300mm beyond drain and overlapping onto the existing membrane, where required.

.5 Embed 600mm by 600m square flashing sheet centred on the drain and onto the slab.

.6 Terminate the flashing under the clamping ring of the drain and cut away the inner portion of the flashing.

.7 Use firm pressure to press the flashing against the hot-applied waterproofing membrane and ensure good adhesion. Do not interfere with the drain's weep holes.

.8 Apply hot-rubberized asphalt membrane in accordance with item 3.3.

3.9 FIELD QUALITY CONTROL

.1 Final review of completed work shall be performed by the Consultant, the Contractor and the manufacturer.

.2 A pull test may be conducted by the Consultant to verify that the waterproofing membrane is well bonded to the slab. The Contractor is to repair all pull test locations immediately following the completion of the Consultant's testing.

.3 The Consultant may measure the membrane thickness with a pin test gauge at least once for every 10 square meters of applied membrane.

3.10 CLEANING

.1 Promptly as the work proceeds and on completion, clean up and remove from the premises all rubbish and surplus materials resulting from the foregoing work.

.2 Clean soiled surfaces, spatters, and damage caused by the Work of this section.

END OF SECTION 07 14 13

PART 1 GENERAL

1.1 DESCRIPTION

.1 Provide all labour, material and equipment to install a new polyurethane-methacrylate traffic coating system at the Hall A and west corridor area as shown on the project drawings (separate price item).

1.2 REFERENCE STANDARDS

.1 Conform to the requirements of the 2012 Ontario Building Code including all amendments to date and any applicable acts of any authority having jurisdiction and the following:

.1 CAN/CSA S413-14 - Parking Structures

.2 CAN/CGSB 19.24-M90 - Multicomponent, Chemical-Curing Sealing Compound

.3 ASTM C920 – Standard Specification for Elastomeric Joint Sealants

.4 ASTM C836/C836M-12 - Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course

.5 ASTM C1127 – Standard Guide for Use of High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane with an Integral Wearing Surface

.6 ASTM C1193 – Standard Guard for Use of Joint Sealants

.7 ASTM D4258 – Standard Practice for Surface Cleaning Concrete for Coating

.8 ASTM D4259 – Standard Practice for Abrading Concrete

1.3 MAINTENEANCE DATA

.1 Provide instruction manuals for proper procedures to be taken in the cleaning and maintenance of membrane traffic topping including recommended cleaning agents.

1.4 QUALITY ASSURANCE

.1 Work of this section shall be executed by qualified applicator approved by material manufacturer. Applicator shall have minimum five years proven satisfactory experience in this type of work, having adequate equipment and skilled personnel to expediently complete work of this Section in an efficient and very best workmanship manner. Submit proof of experience.

.2 Provide a full time qualified supervisor at the site to direct work of this Section.

.3 The system manufacturer shall review and approve joint layouts, methods of providing joints, concrete curing and finishing methods and related details prior to application. Manufacturer’s representative shall submit written report

indicating the slab was prepared and is in a condition suitable for membrane application.

.4 A site inspection shall be made by authorized personnel prior to commencing installation of the system for purposes of reviewing and approving related conditions affecting performance requirements of this Specification.

1.5 TECHNICAL SUPERVISION

.1 Ensure that a qualified technical representative of the traffic topping manufacturer is on site to review surface preparation and application procedure and to check quality of completed system. Submit all reports and letter of acceptance from the technical representative to the Consultant.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Accept materials on site in manufacturer's unopened original packaging.

.2 Store products in weather protected environment, clear of ground and moisture, within temperature ranges recommend by the traffic coating manufacturer.

1.7 ENVIRONMENTAL CONDITIONS

.1 Ensure that temporary heat is being provided in area of work to maintain slab surface and ambient air temperature at a minimum of 5^0C for a minimum period of 48 hours before, during and for 48 hours after application of traffic topping system, unless otherwise directed by the material manufacturer.

.2 Do not apply materials to wet, iced or frosted surfaces or in areas exposed to snow, sleet or rain during application period.

.3 Ensure that working areas are well ventilated.

.4 Do not use materials near fire or flame.

.5 Ensure contaminants of any kind are not allowed on substrates which are to receive traffic topping system.

.6 Take all safety precautions recommended by the traffic topping manufacturer and by authorities having jurisdiction when handling and applying membrane traffic topping materials.

.7 Protect substrates from environmental conditions that affect system performance.

1.8 WARRANTY

.1 The contractor shall provide a written single-source performance warranty, signed and issued in the name of Owner stating that the membrane traffic topping system work of this section is warranted against defects related to workmanship and material deficiency for a period of five years from date of Certificate of Substantial Performance and that all defects will be repaired, including making

good of materials and areas disturbed or damaged due to location and rectification of defects. The following conditions shall be specifically covered under warranty:

.1 Cohesive or adhesive failure of the system;

.2 Weathering deficiencies resulting in failure of the system;

.3 Abrasion or tear failure of the system resulting from normal traffic use; and

.4 Pinholes, failure to bridge narrow cracks, shifting, raveling etc.

.2 The contractor and manufacturer shall provide a written single-source performance warranty, signed and issued in the name of Owner stating that the membrane traffic topping system work of this section is warranted for a period of ten years from date of Certificate of Substantial Performance and that the manufacturer agrees to furnish traffic coating material to repair or replace those materials installed according to Tremco's written instructions that exhibit material defects or otherwise fail to perform as specified under normal use within warranty period specified. If the Owner submitted a written requested within thirty days prior to expiration of the initial term, Tremco will inspect the membrane traffic topping and will extend the warranty for an additional ten (10) years (subject to the terms, conditions and limitations set in Tremco's 10 Plus 10 Year Warranty).

.1 Access for repair: Owner shall provide unimpeded access to the project and the traffic coating system for purpose of testing, leak investigation and repair.

.2 Cost limitation: manufacturer's obligation for repair or replacement shall be limited to the original installed cost of the work.

.3 Hairline cracks arising from normal shrinkage and/or expansion and contraction of concrete shall not be considered as structural failure, but shall be considered normal and consequently the warranty shall not be voided as a result of such minor defects.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Traffic coating system for vehicular traffic: Cold fluid-applied, elastomeric, polyurethane methyl methacrylate waterproofing system with integral wearing surface for heavy duty vehicular traffic:

.1 Tremco Inc: Vulkem EWS (Extreme Wearing System) with PUMA Technology, or:

.1 System components:

.1 Primer: Tremco PUMA Primer

.2 Base course: Tremco PUMA BC

.3 Wear course: Tremco PUMA WC

.4 Top course: Tremco PUMA TC

.5 Cleaner, initiator, filler powder: as required by the manufacturer.

.6 Aggregate: as required by the manufacturer

.2 Approved equivalent.

2.2 ACCESSORIES

.1 Sealants:

.1 For cracks greater than 1.6mm wide: as recommended by membrane manufacturer.

.2 For cants: as recommended by the membrane manufacturer.

.3 For expansion joints: as recommended by the membrane manufacturer.

.2 Levelling mortar: compatible with the waterproofing system.

2.3 FINISHING

.1 Membrane wear course colour to be determined by the Owner at a future date.

PART 3 EXECUTION

3.1 INSPECTION

.1 Examine and test surfaces which are to receive membrane traffic topping and ensure that surfaces are acceptably dry and free from conditions which will adversely affect execution, permanence and quality of work.

.2 Do not proceed with application of membrane traffic topping until other work which infringes on traffic topping has been completed.

.3 Verify that new concrete has reached minimum 28 day cure strength and that moisture levels in the slab will not adversely affect the performance of the system. The minimum number of moisture tests is one test per 500m^2.

.4 Test for capillary moisture by method and traffic coating adhesion per manufacturer’s recommendation.

3.2 PREPARATION OF CONCRETE SUBSTRATE

.1 Remove existing waterproofing and sealants from the slab surfaces.

.2 Preparation of slab and vertical surfaces to be in accordance with these specifications and the requirements of the manufacturer’s published literature.

.3 Remove projections and excess materials and fill voids with manufacturer’s recommended substrate patching material.

.4 Refer to Section 03 01 30.51 “Cleaning of Cast-in-Place Concrete” for minimum surface preparation requirements.

.5 Acid etching is not an acceptable method of surface preparation.

.6 All rough surfaces with an amplitude exceeding 1.0mm should be ground and/or filled with a latex bonded mortar, or 100 percent solids epoxy mortar compatible with the waterproofing system.

.7 Clean horizontal and vertical surfaces by methods approved by traffic topping manufacturer.

.8 Remove all dust and dirt from substrate surfaces by blowing all debris from surfaces with clean, dry, oil-free air or by vacuuming with an industrial type vacuum cleaner.

.9 Mask and protect all surfaces which are to be left exposed and which do not require membrane traffic topping. Ensure neat, straight lines.

.10 Provide appropriate cant with deep joint sealant to eliminate 90 degree angles. Tool material to form a 45-degree angle transition. Penetrations must be grouted solid at all instances.

.11 Prepare non-moving shrinkage cracks, large cracks, construction joints, expansion joints, projections, and protrusions, penetrations, and changes in plane in accordance with manufacturer’s written instructions and details.

3.3 SURFACE PREPARTION FOR CRACKS IN CONCRETE

.1 Cracks less than 1.6mm wide shall be treated with a stretch coat of waterproofing membrane.

.2 Cracks greater than 1.6mm wide shall be routed and sealed with a compatible polyurethane compound, in accordance with the manufacturer’s instructions.

.3 Cracks that are routed, ground or saw-cut are to receive a straight sided 6mm by 6mm deep joint.

.4 Sandblast joint and prepare for installation of sealant.

.5 Rout and fill cracks with coating and tool flush with surface

.6 Feather edges of joint coating applications.

.7 Allow coating to cure.

3.4 INSTALLATION OF WATERPROOFING SYSTEM

.1 New concrete curbs are to be constructed around the perimeter of all pipes, conduits or penetrations through the slab, as directed by the Consultant.

.2 Start traffic-coating application in presence of manufacturer’s technical representative.

.3 For membrane system overlapping onto existing traffic coating systems, stagger membrane, wear course and top course systems, as required by the waterproofing system manufacturer.

.4 Terminate membrane in reglets recessed in or cut in concrete surfaces.

.5 Prime surfaces that are to receive a traffic topping, in accordance with the manufacturer's recommendations. Roller or machine-apply primer as required to achieve manufacturer's application rates.

.6 Apply aggregate loading to the primed surfaces in accordance with the manufacturer's written instructions.

.7 For cracks less than 1.6mm wide, apply a stretch coat in accordance with the manufacturer's written instructions.

.8 Apply base course and wear course using a notched metal rake, followed by back-rolling with a metal spike roller.

.9 Install each course to minimum thickness as follows or that stipulated in manufacturer's written instructions, whichever is more stringent:

Location	Primer and Base Course Application	Min. Membrane Thickness
		Wet mils
All Applications	Primer	17
All Applications	Base Course	80

.10 Carry membrane at least 100mm up vertical surfaces, columns, walls, curbs, sleeves and the like.

.11 Apply wear course and aggregate loading in accordance with the following specifications and thicknesses or that stipulated in manufacturer's written instructions, whichever is greater.

Location	Wear Course Application	Min. Membrane Thickness
		Wet mils
All Applications	Wear Course	100

.12 Remove unbonded aggregate and apply top course in accordance with the manufacturer's specifications.

Location	Top Course Application	Min. Membrane Thickness
		Wet mils
All Applications	Top Course	17-30

.13 Cure traffic coating. Prevent contamination and damage during application and curing stages.

3.5 PROTECTION

.1 No individuals are permitted in areas during application and until surface has cured and has been approved for traffic by the applicator and the manufacturer.

.2 Where work of other trades may be required over the completed work, apply temporary protection board to cover installed membrane traffic topping until directed by Consultant for their removal.

.3 Report in writing to Consultant, any and all damage to membrane traffic topping caused by work of other trades.

3.6 FIELD QUALITY CONTROL

.1 Site inspection by the independent inspection company and/or the Consultant will be made to ensure that the requirements for cleaning, preparation and proper application and thickness of the membrane traffic topping system is being made. Areas not meeting performance requirements shall be redone at the Contractor's own expense.

.2 To verify membrane and/or wear course thicknesses, the Consultant will perform wet mil thickness tests and/or dry film cut tests. The number of sample locations will be one per 100m^2 of coated surfaces, unless otherwise determined by the Consultant.

.3 To evaluate bonding of the waterproofing system to the substrate and between the membrane and the wear course, direct tensile pull tests will be conducted by a testing agency, designed by the Consultant. The test will be performed in accordance with ASTM D7234 and CSA 23.2-6B. The average minimum adhesion shall not be less than 1.05MPa.

.4 The Contractor is to repair dry-film cut tests and bond test locations at no additional cost to the Owner.

3.7 CLEANING AND PROTECTING

.1 Clean spills, stains, and overspray resulting application utilizing cleaning agents recommended by manufacturers of affected construction. Remove masking materials.

.2 Protect traffic coating from damage from subsequent work. Protect traffic coating materials from exposure to UV light for period in excess of that acceptable to traffic coating manufacturer, replace overexposed materials and retest.

END OF SECTION 07 18 00.03

PART 1 GENERAL

1.1 DESCRIPTION

.1 Provide all labour, equipment and material to install a water repellent sealer and hardener at the Hall ‘A’ and west corridor suspended slab areas.

1.2 WARRANTY

.1 The manufacturer shall provide a written single-source performance warranty, signed and issued in the name of Owner stating that the concrete sealer work of this section is warranted against defects related to workmanship and material deficiency for a period of five years from date of Certificate of Substantial Performance and that all defects will be repaired, including making good of materials and areas disturbed or damaged due to location and rectification of defects.

.2 The following conditions shall be specifically covered under the warranty: crazing, cracking, spalling, chipping and discolouration, loss of water repellent effect under ordinary wear and tear conditions.

1.3 SUBMITTALS

.1 Contractor shall have satisfactorily completed a program of instruction in proper methods of preparation of the substrate, patching of repair of the substrate, block replacement and repointing and concrete sealer installation. The applicator shall have in writing, a certificate of approval from the manufacturer. Submit the certificate, if requested by the Consultant.

.2 Submit the letter of surface preparation acceptance from the material manufacturer prior to installation of new material.

.3 After completion of concrete sealer installation, submit certificate, signed by both applicator and manufacturer, stating that installed work complies with specified requirements.

.4 Provide instruction manuals for proper procedures to be taken in the cleaning and maintenance of the concrete sealer including recommended cleaning agents.

1.4 QUALIFICATIONS

.1 Be a recognized established sealer Contractor, having at least five years of proven satisfactory experience, with skilled workers thoroughly trained and competent in carrying out the sealer work.

1.5 MOCK-UP

.1 If requested by the Consultant, provide a concrete sealer mock-up, with a minimum area of 25m^2 at a vertical and/or horizontal location designated by Consultant.

.2 Reviewed work in test area shall serve as a standard for similar work throughout building.

.3 Reviewed work may remain as part of the completed work.

.4 The Contractor shall modify, remove or replace and re-install the mock-up work, if it is acceptable to the Consultant.

.5 A representative from the material manufacture should be present during the mock-up installation.

.6 A written approval should be submitted to the Consultant by the material manufacturer for the mock-up procedure.

1.6 ENVIRONMENTAL CONDITIONS

.1 Do not apply materials to wet, iced or frosted surfaces or in areas exposed to water, snow or other chemicals during the application period.

.2 Do not apply in rain or when rain is expected within four hours. Do not apply above 35°C or below 4°C, or when temperatures are expected to fall below -7°C within 12 hours.

.3 Ensure that working areas are well ventilated.

.4 Do not use materials near fire or flame.

.5 Ensure contaminants of any kind are not allowed on substrates which are to receive the concrete sealer.

.6 Take all safety precautions recommended by the concrete sealer manufacturer and by authorities having jurisdiction when handling and applying concrete sealer materials.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Clear, deep-penetrating sealer for protecting new and existing concrete surfaces and capable of sealing water, chlorides and acids, with surface applied hardener;.

.2 Acceptable products:

.1 Euclid Chemical: Euco Diamond Hard and Ultra Guard sealer and densifier two-part system, or;

.2 Approved alternate.

.3 Acceptable crack sealant product;

.1 As approved by the manufacturer.

PART 3 EXECUTION

3.1 CONCRETE REPAIRS

.1 Verify that new or repaired concrete has reached minimum 28 day cure strength and that moisture levels in the slab will not adversely affect the performance of the system.

3.2 SURFACE PREPARATION

.1 Relocate all storage containers and any other equipment abutting the structure as required to access and facilitate the Work. Replace all moved items after acceptance of the Work.

.2 Clean all surfaces of all sand, dust, oil, grease, soot, chemical films and coatings prior to application. Power-wash, sandblast or grind as necessary to achieve the desired surface preparation and until dirt and bond inhibiting materials have been removed.

.3 Protect asphalt-based products such as roofing materials or plastic products from overspray.

.4 Report to the Consultant, in writing, of conditions which may be detrimental to the proper performance of the materials. Proceeding with the Work shall be taken as acceptance of the existing surfaces and conditions.

.5 Install heal bead sealant at the junction of all vertical to horizontal surfaces.

.6 Allow surfaces to dry minimum of three days after rainfall or cleaning before applying further coats.

3.3 SURFACE PREPARATION FOR CRACKS AND JOINTS IN CONCRETE

.1 Crack control, sealing, patching, and expansion joint sealants can be installed before or after application of the sealer, as recommended by the sealer manufacturer.Rout and seal any cracks in the top surface of the concrete slab in accordance with the sealer manufacturer specifications.

.2 Allow adequate curing time following sealant-manufacturer’s recommendations. Following the application, remove excess product that might pond on a concave sealant joint.

3.4 APPLICATION

.1 Ensure that a qualified technical representative of the sealer manufacturer is on site during the initial preparation and the beginning of the application period to review the surface preparation and the application procedure.

.2 Stir material thoroughly before and during application.

.3 For horizontal surfaces:

.1 Apply in accordance with manufacturer's requirements.

3.5 CLEANING

.1 Upon satisfactory completion of the Work, clean excess or waste materials and debris and leave the premises in a condition acceptable to the Consultant.

.2 Remove all spills, splashes, splatters or over spray as work progresses using means and materials that are not detrimental to affected surfaces.

.3 Keep work area free from an unnecessary accumulation of tools, equipment, surplus materials and debris.

.4 Remove combustible rubbish materials and empty pails each day and safely dispose of same in accordance with requirements of authorities having jurisdiction.

3.6 TESTING

.1 If requested by the Consultant, concrete core samples will be extracted from the sealed surface of the slab. Two tests will be conducted at each location to confirm sealer application rates. The core will be cut in half and the lower half of the core will be used as the reference core. The top surface of the reference core will be lightly sandblasted and will be compared to the treated surface.

.2 The concrete sealer will be tested to confirm an 80% reduction in water absorption in comparison to the untreated surface (the reference core).

.3 The Contractor is to include the cost of repairing and applying surface sealer at the test areas in the bid.

.4 If requested by the Consultant, after water repellent has dried, spray coated surfaces with water to verify coating coverage, to the satisfaction of the Consultant.

END OF SECTION 07 19 00

PART 1 GENERAL

1.1 DESCRIPTION

.1 Provide all labour, equipment and material to route and seal cracks prior to either P.U.M.A. waterproofing or installation of concrete sealer and shall be compatible with the waterproofing/ concrete sealer product.

1.2 REFERENCE STANDARDS, CODES AND ACTS

.1 Conform to the requirements of the 2012 Ontario Building Code, including all amendments to date and any applicable acts of any authority having jurisdiction and the following:

.1 ASTM C920-14a - Standard Specification for Elastomeric Joint Sealants

.2 ASTM C1193-16 - Standard Guide for Use of Joint Sealants

.3 ASTM C1472-16 - Standard Guide for Calculating Movement and Other Effects When Establishing Sealant Joint Width

.4 ASTM D2240-15 - Standard Test Method for Rubber Property—Durometer Hardness

.5 CAN/CGSB-19.13 – M87 - Sealing Compound, One-component, Elastomeric, Chemical Curing

.6 CAN/CGSB-19.17 – M90 - One-Component Acrylic Emulsion Base Sealing Compound

.7 CAN/CGSB-19.24 – M90 Multi-component, Chemical Curing Sealing Compound

.8 CSA A23.1-14 - Concrete Materials and Methods of Concrete Constructions

1.3 SUBMITTALS

.1 Four weeks prior to starting the work, the contractor shall submit the following:

.2 List of the materials to be provided under this section.

.3 Manufacturer’s product data and specifications for each material.

.4 Sealant manufacturer’s written project recommendations.

.5 At the Consultant’s request, submit samples, including available colours, of the materials to be used on the project.

1.5 QUALITY ASSURANCE

.1 Perform the work in accordance with the manufacturer's written project recommendations.

.2 Obtain each type of joint sealant through one source from a single manufacturer.

1.6 QUALIFICATIONS

.1 The installation of the sealant work shall be performed by a recognized specialized applicator, having at least five years of experience, with skilled mechanics, thoroughly trained and competent in all phases of the work.

1.7 MOCK-UP

.1 Construct mock-ups two weeks prior to commencement of the work to demonstrate all of the joints encountered in this project.

.2 The mock-ups shall be 1 m in length for each type of sealant and substrate.

.3 The mock-ups shall demonstrate the surface preparation prior to the sealant installation and the location, size, shape, colour, depth of joints, and adhesion and cohesion, complete with back-up material, primer, and new sealant.

.4 Upon receipt of written confirmation from the Consultant, the mock-up may remain as part of the finished work.

.5 The approved mock-up shall be the standard to which all work shall be performed.

.6 The mock-up shall be performed prior to the pre-installation conference.

1.8 DELIVERY, STORAGE AND PROTECTION

.1 Deliver all materials to the job-site in their original unopened containers with labels indicating manufacturer, product name and designation, colour, expiration date, pot life, curing time, and mixing instructions for multi-component materials.

.2 Store all materials in strict accordance with the manufacturer's recommendations.

.3 Keep the materials dry and protected from the weather, freezing and contamination.

.4 Ensure that the labels and seals on all materials are intact upon delivery.

.5 Remove rejected or contaminated materials from the site.

1.10 ENVIRONMENTAL REQUIREMENTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials. Labelling and provision of MSDS sheets shall be acceptable to Labour Canada.

.2 Ensure that all materials, containers, rags, etc. are disposed of in accordance with the local Waste Management Plan and hazardous material disposal regulations and requirements.

1.11 WARRANTY

.1 Contractor shall provide a warranty by the sealant manufacturer covering a period of five years for all labour and materials from the date of Substantial Performance of the contract agreeing to furnish sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within the specified warranty period.

.2 Defective work shall include, but is not limited to, joint leakage, cracking, crumbling, melting, running, loss of adhesion or loss of cohesion, and substrate staining.

1.12 Field Testing Program

.1 Material and adhesion tests shall be conducted at the discretion of the Consultant on a random basis to show that properties are appropriate to the particular sealant and proper bond is achieved.

.2 The Contractor shall repair all test areas as part of the work in accordance with this section.

.3 All sealant installation failing material and adhesion tests shall be rectified in accordance with manufacturer and Consultant approved methods. Rectified areas will be retested until results confirm compliance with the manufacturer’s written requirements.

PART 2 PRODUCTS

2.1 MATERIALS

.1 One-component, polyurethane joint sealant:

.1 As approved by the manufacturer.

.2 The colour of the sealant shall be clear. Custom colour may be required if the manufacturer’s range of standard colours is not suitable.

.3 The Contractor shall obtain written confirmation of the sealant suitability for this project. A copy of this confirmation shall be forwarded to the Consultant prior to commencing with the work of this section.

2.2 PRIMERS

.1 Primer shall be as specified by the sealant manufacturer.

.2 Fillet Joint Applications

.1 Bond breaker tape, polyethylene tape or other plastic tape recommended by the sealant manufacturer shall be used to prevent adhesion to the specified sealant or to the back of joint.

2.3 CLEANING

.1 The cleaning material for the surfaces to receive the sealant shall be as recommended by the manufacturer of the sealant.

.2 Clean the joint by removing all residues using a vacuum cleaner or pressure washing. Substrate must be dry prior to application.

2.4 MASKING TAPE (FOR SILICONE AND POLYURETHANE SEALANTS)

.1 Non-staining, non-absorbent material compatible with joint sealant and surface adjacent to joints.

PART 3 EXECUTION

3.1 EXAMINATION

.1 For slabs-on-grade: Ensure concrete substrate, ensure concrete has sufficient cured, in accordance with CSA A23.1-14, Section 7.2.5 “Joint Filling”.

.2 Verify that surfaces and conditions are ready to accept the work of this section.

.3 Commencing with the installation means acceptance of the existing substrates by the Contractor.

.4 Examine the areas and conditions under which the work will be performed. Review the planned operating procedures with the Consultant. Do not proceed with work until any unsatisfactory conditions are corrected in a manner acceptable to both the Owner and the Consultant.

.5 Verify that the specified environmental conditions exist before commencing with the work.

.6 The Contractor shall arrange for the sealant Manufacturer’s representative to visit the site and review the surface preparation and installation procedures at the start of the work.

3.2 PROTECTION

.1 The Contractor is responsible for maintaining the work weather tight during the course of the project. At the end of each work day or when stoppage occurs,

provide necessary protection to prevent water penetration through the exterior walls.

.2 Seal and protect all openings, doors, windows and adjacent areas to minimize the potential for damage and the spread of dust, water or other materials into the building or adjacent sidewalks and properties.

.3 Protect adjacent finished materials from marking or damage during the work.

.4 Protect completed sealant installation during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes such that sealant is without deterioration or damage at time of substantial completion. If, despite such protection, damage or deterioration occurs, such sealant shall be rectified immediately.

3.3 SURFACE PREPARATION

.1 Consult and follow the sealant manufacturer's project recommendations.

.2 Remove the existing sealant without causing damage to the substrates.

.3 Remove dust, paint, loose mortar and other foreign matter, and dry joint surfaces.

.4 Where necessary to protect the adjacent surfaces, mask by suitable means prior to priming and sealant installation.

.5 Report in writing to the Consultant, any conditions which may be detrimental to the proper performance of the work. Proceeding with the work shall be taken as acceptance of the existing surfaces and conditions.

.6 The joints shall be clean, dry and free of frost and foreign matter prior to surface application.

.7 Clean concrete where necessary by grinding, sandblasting or wire brushing. Expose a sound surface free of contamination and laitance.

.8 Butt and bridge joint applications:

.9 Fillet joint applications:

.1 Remove oil, grease and other coatings from non-ferrous metals with an approved cleaning solvent or abrasive technique. Obtain approval from the Consultant prior to commencing.

3.4 PRIMING

.1 Prime all substrates as directed by the sealant manufacturer's recommendations.

.2 Prime sides of the joint using the two-cloth method in accordance with the manufacturer's directions, immediately prior to sealant installation.

.3 Primers that require application by the wipe of a clean soft cloth, shall be poured onto the cloth. Do not dip the cloth into the primer container.

.4 Prime only as much area as can be sealed in the same working day.

3.5 INSTALLATION OF THE BACK-UP MATERIAL (FOR SILICONE AND POLYURETHANE SEALANTS)

.1 Bond Breaker Tape:

.1 Install bond breaker tape without stretching, twisting or puncturing the tape.

.2 Use an approved installation tool that is blunt surfaced and is designed accurately to place tape within the joint.

.3 Width of bond breaker tape shall fit exactly the width of the joint.

.4 Install tape at the back of the joint.

.5 Do not leave gaps between ends of bond breaker tape.

.6 Three-sided adhesion is not permitted.

.7 Foam backer rod shall only be installed in areas that can be sealed in the same working day.

3.6 APPLICATION

.1 The Contractor shall have a trained representative on site at all times who is responsible for all sealant applications.

.2 Perform all work in strict accordance with the manufacturer's printed instructions. The Contractor shall provide the Consultant a copy of these instructions prior to commencing with the injection and sealing operations.

.3 Mix multi-component sealant such that air pocket formation is minimized in accordance with the manufacturer's recommendation.

.4 The sealant must be applied continuously to ensure that all voids and joints are completely filled.

.5 For silicone or polyurethane applications:

.1 Tool the sealant with light pressure immediately after application to ensure positive and complete contact of the sealant to the interface. Only tooling agents that are approved in writing by the sealant manufacturer and that do not discolour sealants or adjacent surfaces shall be used.

.2 Neatly tool the surface to form a slight concave profile. The surface of the sealant shall be smooth, free from ridges, wrinkles, air pockets and embedded impurities.

3.7 CLEAN UP

.1 Clean the adjacent surfaces immediately and leave the work area neat and clean. All excess (sealant and primer) and droppings shall be removed using the recommended cleaners as the work progresses.

.2 All masking shall be removed immediately after tooling the joints. Sealant affected by the masking removal shall be retooled to achieve proper joint configuration.

END OF SECTION 07 92 00

PART 1 GENERAL

1.1 DESCRIPTION

.1 Provide all labour, equipment and material to remove existing, supply and install hot-mixed, hot-laid high stability HL3 asphalt pavement topping at the west loading dock ramp to match existing thickness.

1.2 REFERENCE STANDARDS

.1 Except where modified by this Section or the contract drawings, the Ministry of Transportation (MTO) specifications listed below shall govern:

.1 OPSS 310 – Construction Specification for Hot-Mix, Hot Laid Asphaltic Concrete, Hot-Mix Patching

.2 OPSS 1003 – Aggregates – Hot-Mix Asphaltic Concrete

.3 OPSS 1103 – Emulsified Asphalt

.4 OPSS 1150 – Hot-Mixed, Hot-Laid Asphaltic Concrete

1.3 SUBMITTALS

.1 One copy of the mix design for the asphalt concrete proposed to be used with this specification shall be submitted to the Consultant for review a minimum of two weeks prior to commencing paving.

.2 Submit a test certificate from a CCIL (Canadian Council of Independent Laboratories) approved laboratory for the asphalt cement used in this project a minimum of two weeks prior to commencing paving.

1.4 WARRANTY

.1 Provide a written and signed warranty in the name of the Owner.

.2 The warranty shall cover the repair of replacement of asphalt paving materials as a result of faulty materials and/or workmanship for a period of two years from the date of Substantial Performance of the work.

.3 Upon written notice from the Consultant that the work is defective, promptly repair or replace defective work to the Consultant’s satisfaction.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Materials shall be as specified, unless otherwise noted.

.2 Tack coat: Shall be slow setting (SS-1) emulsified asphalt diluted with an equal volume of water conforming to CAN 2-16.2-M77.

.3 High Density (HL3) Asphalt material: Shall be 85/100 grade, HL-3HS having properties given table 1 of OPSS 1101.

.4 Hot-pour sealant: to ASTM D 6690, Type III.

PART 3 EXECUTION

3.1 ASPHALT PAVING

.1 Place asphalt mix only when substrate or surface of previous course is dry.

.2 Do not exceed the safe live load capacity of the ramp.

.3 Maximum permissible lift thickness is 25mm.

.4 If a period of 24 hours has elapsed between asphalt lifts, apply a tack coat of SS-1 asphalt emulsion to the surface of the asphalt binder course in conformance with OPSS 310.

.5 Field compacted density of the HL3 asphalt concrete to be a minimum 93 percent of the maximum relative density (MRD) of the mix.

.6 Minimum asphalt mix compaction temperature of 135°C required at any time. The temperature of the mix at delivery to site and immediately prior to compaction shall be in accordance with the appropriate OPSS requirements.

.7 Roll to compact until all roller marks are eliminated. The speed of the roller shall at all times be slow enough to avoid tearing of the asphalt concrete. Keep roller wheels slightly moistened with water and detergent (the latter only if required) to prevent adhesion of the asphalt to the roller wheels. No heavy rolling equipment will be permitted. Only hand rolling equipment is to be used.

.8 Slope the surface of the asphalt concrete wearing course away from all walls, columns, entrances and exit ways and provide a minimum slope to all drains of one percent. No areas of ponding water will be accepted. Allow for thickening of asphalt as required to achieve slopes. No additional cost shall be incurred by the Owner for asphalt thickening.

.9 Adjacent to upturns, provide an asphalt cant with minimum 45 degree slope, unless otherwise noted. Seal top of asphalt cant with hot-pour sealant.

.10 Upon completion the surface of the pavement shall be smooth and true to the specified grade.

.11 Use mechanical plate tamper to tamp areas not accessible to rolling equipment. Hand tamping will not be acceptable.

3.3 JOINTS IN ASPHALT

.1 At the perimeter joints at the junction between the new asphalt pavement and existing asphalt pavement, saw-cut 25mm square joints in the asphalt concrete surface.

.2 Immediately prior to pouring sealant compound, saw-cut joints shall be dry and cleaned of all debris. The pavement surfaces adjacent to the cleaned joints shall be cleaned to ensure that no debris contaminates the cleaned joints prior to sealing.

.3 Place joint sealer in two pours. Fill joint flush on the first application. Cap the joint on the second application, as soon as complete shrinkage of the first application has taken place.

.4 Apply a light sprinkling of cement dust over the joint sealer to eliminate surface tackiness.

.5 Protect all newly installed joints from construction traffic until the joint material has cured.

3.4 CRACK SEALING

.1 Clean crack of all debris with high pressure air blower.

.2 Crack shall be dry and cleaned of all debris. The pavement surfaces adjacent to the cleaned cracks shall be cleaned to ensure that no debris contaminates the crack prior to sealing.

.3 Place crack sealant in one pour. Fill crack flush with asphalt surface flush cap immediately after installation with a rubber squeegee.

.4 Apply a light sprinkling of cement dust over the crack sealer to eliminate surface tackiness.

3.5 PROTECTION

.1 Keep vehicular traffic off all newly paved surfaces until the surface temperature of the asphalt has cooled below 38°C. Do not permit stationary loads on pavement until 48 hours after placement.

.2 The completed surface shall be protected from damage or overstressing by vehicles during all remaining construction work.

3.6 TESTING

.1 Inspection and testing of asphalt pavement will be carried out on behalf of the Owner by a Testing Laboratory that is to be reviewed by the Consultant.

.2 The Contractor is required to cooperate with Testing Laboratory, and to provide access and samples to the Testing Laboratory. The Contractor shall give 24 hours advance notice for inspection and/or testing services.

.3 Asphalt concrete shall be tested in accordance with laboratory procedures of the MTO. The following shall be tested for the HL3:

.1 In-situ compaction – with a nuclear density gauge

.2 Asphalt cement content – one sample from each day of production.

.3 Gradation – one sample from each day of production

.4 Costs of testing will be paid out of the Testing Allowance.

.5 Any work not accepted by the Consultant shall be immediately corrected by the Contractor to the Consultant's satisfaction.

1.1 TRAFFIC MARKINGS

.1 Reinstate paint parking lines and markings on pavement to match existing. Refer to Section 32 17 23 "Pavement Markings".

3.7 CLEANING

.1 Upon completion of work, wash and sweep the work area.

.2 Remove any debris or asphalt that may have gotten into drains.

END OF SECTION 32 12 16.01

PART 1 GENERAL

1.1 DESCRIPTION

.1 Provide all labour, equipment and material to install new painted traffic lines and markings at the work areas.

1.2 REFERENCE STANDARDS, CODES AND ACTS

.1 Conform to the requirements of the 2012 Ontario Building Code, including all amendments to date and any applicable acts of any authority having jurisdiction and the following:

.1 CAN/CGSB-1.5-M91 - Low Flash Petroleum Spirits Thinner.

.2 CGSB 1-GP-12c-68 - Standard Paint Colours.

.3 CGSB 1-GP-71-83 - Method, of Testing Paints and Pigments.

.4 CGSB 1-GP-74M-79 - Paint, Traffic, Alkyd.

1.3 SUBMITTALS AND SAMPLES

.1 Provide a site plan to the Owner with the painting and marking scheme prior to commencing existing pavement removals.

.2 If requested by the Consultant, submit material samples to the Consultant at least four weeks prior to commencing work.

.3 Mark samples with name of project and its location, paint manufacturer's name and address, name of paint, CGSB specification number and formulation number and batch number.

1.4 DELIVERY, STORAGE, HANDLING AND PROTECTION

.1 Deliver materials to site in sealed original containers with labels intact and store in space directed by Consultant.

.2 Keep stored materials covered at all times. The presence of any unauthorized material or containers for such on the site shall be sufficient cause for rejection of all paint materials on the site at that time.

.3 Exercise extreme caution in the storage of materials to prevent fire or which may create fire hazards. Thinners and solvents shall be stored in CSA approved metal safety containers in accordance with governing fire and safety regulations.

1.5 ENVIRONMENTAL CONDITIONS

.1 All areas shall be clean and dust free before painting is commenced.

.2 Clean surfaces soiled by spillage of paint and paint spatters. If cleaning operations damage the surface, repair or replace damaged work without cost to the Owner.

.3 Be responsible for damage to the work of this section until the work is complete and accepted by the Owner. In cases of damage, surfaces shall be cleaned and repainted, as directed by the Consultant.

.4 Leave storage and mixing areas clean and free from evidence of occupancy upon completion of painting.

1.6 QUALIFICATIONS

.1 Paint applicator to be an approved pressure type distributor, capable of:

.1 Applying paint in single, double and dashed lines;

.2 Marking components uniformly, at rates specified, and to dimensions as indicated, and to have positive shut-off;

.3 Marking components to produce an even and uniform film thickness at the required application rates; and

.4 Applying markings of uniform cross sections and clear-cut edges without running, spattering, over-spray, and to dimensions as indicated.

1.7 WARRANTY

.1 Provide a written and signed warranty in the name of the Owner.

.2 The warranty shall cover the repair of replacement of pavement markings as a result of faulty materials and/or workmanship for a period of two years from the date of Substantial Performance of the work.

.3 Upon written notice from the Consultant that the work is defective, promptly repair or replace defective work to the Consultant’s satisfaction.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Acceptable products:

.1 Insl-X latex traffic paint TP-22XX by Benjamin Moore & Co.;

.2 Hotline fast dry latex TM2152/3 by Sherwin-Williams Co.; or

.3 Approved alternate.

.2 Paint colours shall be:

.1 CGSB 1-GP-12C yellow 505-308;

.2 CGSB 1-GP-12C white 513-301; or

.3 To match existing.

.3 Ensure the proper use of proprietary materials in strict accordance with manufacturer's directions.

.4 Brushes, rollers, and all other equipment shall be the best of their respective kinds, clean and suitable for the work.

.5 Painting and marking scheme: to match existing.

PART 3 EXECUTION

3.1 CONDITION OF SURFACES

.1 Pavement surface to be dry, free from ponded water, frost, ice, dust, oil, grease and other foreign materials.

.2 The Contractor shall power broom clean all surfaces dry where edge lines are to be applied. When required by the Consultant, other surfaces shall also be power broom cleaned.

3.2 APPLICATION

.1 Unless otherwise directed by the Consultant, apply paint only when air temperature is above 10ºC, wind speed is less than 60km/h and no rain is forecast within next four hours.

.2 Apply traffic paint evenly at rate of 3m/L.

.3 Do not thin paint.

.4 Symbols and letters to conform to dimensions indicated.

.5 Paint lines to be of uniform colour and density, 100mm to 115mm in width with sharp edges.

.6 Thoroughly clean distributor tank before refilling with paint of different colour.

.7 Apply materials in a two-coat application, in strict accordance with manufacturer's directions and specifications, and be familiar with those directions and specifications.

3.3 LAYOUT AND TOLERANCE

.1 The Contractor shall lay out the locations of all lines, words and other symbols to assure their proper placement.

.1 The layout and pre-marking lines shall be reviewed by the Owner before marking operations are started.

.2 When applying longitudinal or transverse lines, the Contractor shall use existing lines, construction joints or pre-marking to guide this marking equipment, unless otherwise directed.

.2 Paint markings to be within +/-12mm of the dimensions indicated.

3.4 PROTECTION OF COMPLETED WORK

.1 Protect pavement markings until dry.

.2 Promptly, as the Work proceeds and on completion of the Work, remove all paint where spilled, splashed or spattered; during the progress of the work.

.3 Keep the premises free from any unnecessary accumulation of tools, equipment, surplus materials and debris.

.4 At the conclusion of the Work, leave the premises neat and clean to the satisfaction of the Owner.

END OF SECTION 32 17 23