

**CAVE AND BASIN NATIONAL HISTORIC SITE**

**BANFF NATIONAL PARK**

**REMEDIATION OF SOUTH BELVEDERE  
& BELVEDERE VIEWING DECK**

**PROJECT SPECIFICATIONS**

**Prepared for:**

PARKS CANADA AGENCY

**Prepared by:**



STANTEC ARCHITECTURE  
200-325 25 Street SE  
Calgary, AB T2A 7H8

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**STRUCTURAL**

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**Part 1            General**

**1.1                WORK COVERED BY CONTRACT DOCUMENTS**

- .1        Work of this Contract comprises remediation of Cave and Basin National Historic Site, South Belvedere and Belvedere Viewing Deck, located at 311 Cave Avenue, Banff, AB.

**1.2                SUMMARY OF WORK**

- .1        Remediation of the south belvedere:
  - .1        Work includes selective demolition and re-construction of concrete stair elements and concrete structural columns; and associated waterproofing and insulation scope.
- .2        Belvedere viewing deck:
  - .1        Work includes removal of existing pavers, insulation and waterproofing membrane; and installation of new replacement porcelain paver system, insulation, waterproofing membrane and concrete sloped topping.
- .3        Remediation of west wall louvre leak at bathing pavilion building
  - .1        Work includes removal of existing louvre, and selective portion of stone veneer; and installation of new steel back pan, waterproofing membrane, semi rigid insulation, repair/repoint and reinstall stone veneer, and reinstall existing louvre.
- .4        NOTE: The work referred to is intended to be a general overview of the work required. It is not a complete and exclusive representation of all work needed for execution of the project.

**1.3                CONTRACT METHOD**

- .1        Construct Work under stipulated price contract.

**1.4                WORK SCHEDULE**

- .1        Work to start after October 8, 2018 and is to be completed before March 22, 2019
- .2        Work will stop for the days of November 19-25 for an owner event.

**1.5                WORK BY OTHERS**

- .1        Co-operate with other Contractors in carrying out their respective works.
- .2        Co-ordinate work with that of other Contractors. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to Departmental Representative, in writing, any defects which may interfere with proper execution of Work.

**1.6 CONTRACTOR USE OF PREMISES**

- .1 Limit use of premises for access, to allow:
  - .1 Owner occupancy.
- .2 Co-ordinate use of premises under direction of Departmental Representative.
- .3 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .4 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .5 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.
- .6 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

**1.7 OWNER OCCUPANCY**

- .1 Owner will occupy premises during entire construction period for execution of normal operations.
- .2 Co-operate with Departmental Representative in scheduling operations to minimize conflict and to facilitate Owner usage.

**1.8 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING**

- .1 Execute work with least possible interference or disturbance to occupants, public and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

**1.9 DOCUMENTS REQUIRED**

- .1 Maintain at job site, one copy each document as follows:
  - .1 Contract Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Reviewed Shop Drawings.
  - .5 List of Outstanding Shop Drawings.
  - .6 Change Orders.
  - .7 Other Modifications to Contract.
  - .8 Field Test Reports.
  - .9 Copy of Approved Work Schedule.
  - .10 Health and Safety Plan and Other Safety Related Documents.
  - .11 Other documents as specified.

**Part 2            Products**

**2.1                NOT USED**

.1            Not used.

**Part 3            Execution**

**3.1                NOT USED**

.1            Not used.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1            Section 01 35 43 – Environmental Procedures

**1.2                USE OF SITE AND FACILITIES**

- .1            Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
- .2            Maintain existing services to building and provide for personnel and vehicle access.
- .3            Where security is reduced by work provide temporary means to maintain security.
- .4            Closures: protect work temporarily until permanent enclosures are completed.

**1.3                ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING**

- .1            Execute work with least possible interference or disturbance to occupants, public building operations and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

**1.4                EXISTING SERVICES**

- .1            Notify, Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .2            Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum.
- .3            Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.
- .4            Disruption of any service must occur outside of hours of operation.
- .5            Provide alternative routes for personnel, pedestrian, and vehicular traffic as required.
- .6            Establish location and extent of service lines in area of work before starting Work. Notify Departmental Representative of findings.
- .7            Provide temporary services when directed by Departmental Representative to maintain critical building and tenant systems.
- .8            Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
- .9            Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.
- .10          Record locations of maintained, re-routed and abandoned service lines.
- .11          Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

## **1.5 SPECIAL REQUIREMENTS**

- .1 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .2 Keep within limits of work and avenues of ingress and egress.
- .3 Coordinate times for delivery of materials with Departmental Representative.

## **1.6 SECURITY**

- .1 Where security has been reduced by Work of Contract, provide temporary means to maintain security.

## **1.7 BUILDING SMOKING ENVIRONMENT**

- .1 Comply with smoking restrictions. Smoking is not permitted.

## **1.8 SUPERVISORY PERSONNEL**

- .1 In accordance with Government of Canada GC 2.6 R28Z0D, within five Days after award notification, the Contractor shall submit to the Departmental Representative confirmation of the names of the supervisory personnel and other key staff designated for assignment on the Contract.
- .2 The following personnel shall be included in the list:
  - .1 Project Superintendent.
  - .2 Safety Representative.
  - .3 Provide the name(s) of the supervising stone mason, complete with a full résumé of experience and references for work completed on designated historic masonry structures.
- .3 The above personnel shall perform the following duties:
  - .1 The Project Superintendent shall be employed full time and shall be present on the Work Site each and every workday that Work is being performed, from the commencement of Work to Total Performance of the Work.
  - .2 The Project Superintendent shall nominate a Deputy Project Superintendent who shall have the authority of the Project Superintendent during the latter's absence.
  - .3 The Safety Representative shall possess safety experience in general construction. Duties shall encompass all matters of safety activities from commencement of Work until the Total Performance of the Work.

## **Part 2 Products**

### **2.1 NOT USED**

- .1 Not Used.



**Part 3            Execution**

**3.1                NOT USED**

.1            Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                APPOINTMENT AND PAYMENT**

- .1      Departmental Representative will appoint and pay for services of testing laboratory except as follows:
  - .1      Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
  - .2      Inspection and testing performed exclusively for Contractor's convenience.
  - .3      Testing, adjustment and balancing of conveying systems, mechanical and electrical equipment and systems.
  - .4      Mill tests and certificates of compliance.
  - .5      Tests specified to be carried out by Contractor under supervision of Departmental Representative.
- .2      Where tests or inspections by designated testing laboratory reveal Work not in accordance with contract requirements, pay costs for additional tests or inspections as required by Departmental Representative to verify acceptability of corrected work.

**1.2                CONTRACTOR'S RESPONSIBILITIES**

- .1      Provide labour, equipment and facilities to:
  - .1      Provide access to Work for inspection and testing.
  - .2      Facilitate inspections and tests.
  - .3      Make good Work disturbed by inspection and test.
  - .4      Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.
- .2      Notify Departmental Representative sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.
- .3      Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.
- .4      Pay costs for uncovering and making good Work that is covered before required inspection or testing is completed and approved by Departmental Representative.

**Part 2            Products**

**2.1                NOT USED**

- .1      Not Used.

CAVE AND BASIN NHS  
Remediation of South Belvedere  
& Belvedere Viewing Deck  
Project No. 116500476

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PAYMENT PROCEDURES FOR  
TESTING LABORATORY SERVICES  
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**Part 3            Execution**

**3.1                NOT USED**

.1            Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                ADMINISTRATIVE**

- .1      Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative.
- .2      Departmental Representative will
  - .1      Prepare agenda for meetings.
  - .2      Distribute written notice of each meeting four days in advance of meeting date to Consultant.
  - .3      Provide physical space and make arrangements for meetings.
  - .4      Preside at meetings.
  - .5      Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
  - .6      Reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants affected parties not in attendance.
- .3      Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

**1.2                PRECONSTRUCTION MEETING**

- .1      Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2      Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
- .3      Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.
- .4      Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .5      Agenda to include:
  - .1      Appointment of official representative of participants in the Work.
  - .2      Schedule of Work: in accordance with Section 01 32 16 - Construction Progress Schedule - Critical Path Method (CPM) .
  - .3      Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
  - .4      Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
  - .5      Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
  - .6      Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.

- .7 Owner provided products.
- .8 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .9 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.
- .10 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
- .11 Monthly progress claims, administrative procedures, photographs, hold backs.
- .12 Appointment of inspection and testing agencies or firms.
- .13 Insurances, transcript of policies.

### **1.3 PROGRESS MEETINGS**

- .1 Schedule progress meetings every two weeks during course of Work.
- .2 Contractor, major Subcontractors involved in Work Departmental Representative are to be in attendance.
- .3 Notify parties minimum five (5) days prior to meetings.
- .4 Departmental Representative will record minutes of meetings and circulate to attending parties and affected parties not in attendance within five (5) days after meeting.
- .5 Agenda to include the following:
  - .1 Review, approval of minutes of previous meeting.
  - .2 Review of Work progress since previous meeting.
  - .3 Field observations, problems, conflicts.
  - .4 Problems which impede construction schedule.
  - .5 Review of off-site fabrication delivery schedules.
  - .6 Corrective measures and procedures to regain projected schedule.
  - .7 Revision to construction schedule.
  - .8 Progress schedule, during succeeding work period.
  - .9 Review submittal schedules: expedite as required.
  - .10 Maintenance of quality standards.
  - .11 Review proposed changes for affect on construction schedule and on completion date.
  - .12 Review health and safety issues and incident reports.
  - .13 Review environmental issues.
  - .14 Other business.

## **Part 2 Products**

### **2.1 NOT USED**

- .1 Not Used.

**Part 3            Execution**

**3.1                NOT USED**

.1            Not Used.

**END OF SECTION**

## **Part 1            General**

### **1.1                DEFINITIONS**

- .1      Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2      Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.
- .3      Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.
- .4      Construction Work Week: Monday to Friday, inclusive, will provide five day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.
- .5      Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.
- .6      Master Plan: summary-level schedule that identifies major activities and key milestones.
- .7      Milestone: significant event in project, usually completion of major deliverable.
- .8      Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
- .9      Project Planning, Monitoring and Control System: overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.

### **1.2                REQUIREMENTS**

- .1      Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2      Plan to complete Work in accordance with prescribed milestones and time frame.
- .3      Limit activity durations to maximum of approximately [10] working days, to allow for progress reporting.
- .4      Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

### **1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00- Submittal Procedures.
- .2 Submit Project Schedule to Departmental Representative within 15 working days of receipt of award of Contract.

### **1.4 PROJECT SCHEDULE**

- .1 Develop detailed Project Schedule.
- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types including, but not limited to:
  - .1 Award.
  - .2 Shop Drawings, Samples.
  - .3 Permits.
  - .4 Mobilization.
  - .5 Demolition.
  - .6 Concrete repairs.
  - .7 Waterproofing.
  - .8 Louvre infill.
  - .9 Masonry repairs.
  - .10 Site restoration

### **1.5 PROJECT SCHEDULE REPORTING**

- .1 Update Project Schedule every two weeks reflecting activity changes and completions, as well as activities in progress.
- .2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

### **1.6 PROJECT MEETINGS**

- .1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.
- .2 Weather related delays with their remedial measures will be discussed and negotiated.

## **Part 2 Products**

### **2.1 NOT USED**

- .1 Not used.



**Part 3            Execution**

**3.1                NOT USED**

.1            Not used.

**END OF SECTION**

**Part 1            General**

**1.1                ADMINISTRATIVE**

- .1        Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2        Do not proceed with Work affected by submittal until review is complete.
- .3        Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4        Where items or information is not produced in SI Metric units converted values are acceptable.
- .5        Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .6        Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7        Verify field measurements and affected adjacent Work are co-ordinated.
- .8        Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .9        Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
- .10       Keep one reviewed copy of each submission on site.

**1.2                SHOP DRAWINGS AND PRODUCT DATA**

- .1        The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2        As required by 1.3 – Delegated Design Submittals, submit drawings stamped and signed by professional engineer registered or licensed in the Place of the Work.
- .3        Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .4        Allow 5 days for Departmental Representative's review of each submission.

- .5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
- .7 Accompany submissions with transmittal letter, in duplicate, containing:
  - .1 Date.
  - .2 Project title and number.
  - .3 Contractor's name and address.
  - .4 Identification and quantity of each shop drawing, product data and sample.
  - .5 Other pertinent data.
- .8 Submissions include:
  - .1 Date and revision dates.
  - .2 Project title and number.
  - .3 Name and address of:
    - .1 Subcontractor.
    - .2 Supplier.
    - .3 Manufacturer.
  - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
  - .5 Details of appropriate portions of Work as applicable:
    - .1 Fabrication.
    - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
    - .3 Setting or erection details.
    - .4 Capacities.
    - .5 Performance characteristics.
    - .6 Standards.
    - .7 Operating weight.
    - .8 Wiring diagrams.
    - .9 Single line and schematic diagrams.
    - .10 Relationship to adjacent work.
- .9 After Departmental Representative's review, distribute copies.
- .10 Submit one electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
- .11 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.

- .12 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
  - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
  - .2 Testing must have been within 3 years of date of contract award for project.
- .13 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
  - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
  - .2 Certificates must be dated after award of project contract complete with project name.
- .14 Submit electronic copies of manufacturers instructions for requirements requested in specification Sections and as requested by Departmental Representative.
  - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .15 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
- .16 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .17 Submit electronic copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
- .18 Delete information not applicable to project.
- .19 Supplement standard information to provide details applicable to project.
- .20 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .21 The review of shop drawings by Departmental Representative is for sole purpose of ascertaining conformance with general concept.
  - .1 This review shall not mean that Departmental Representative approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
  - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

### **1.3 DELEGATED DESIGN SUBMITTALS**

- .1 For all Sections of Work which require the Contractor and/or Subcontractors to provide professional engineering services by a professional engineer registered in the Place of the Work, have the Contractor's and/or Subcontractor's registered professional engineer design and engineer components for the project which the Contractor's and/or Subcontractor's registered professional engineer is responsible for, and sign and seal all Shop Drawings and supporting documentation, to the satisfaction of the Departmental Representative and the authority having jurisdiction.
- .2 The Contractor's and/or Subcontractor's engineer, must be a professional engineer registered in the Place of the Work and must be fully qualified and experienced in the design of items he/she is designing and to be responsible for the design of such components and systems, and to prepare, seal, and sign all Shop Drawings and to perform field reviews.
- .3 The Contractor's and/or Subcontractor's professional engineer responsible for this work is to inspect the fabrication and erection of all items in accordance with Responsibilities for Engineering Services on Building Projects v1.2 - dated March 2009.
- .4 Submit a signed and sealed Letter of Commitment on company letterhead addressed to Departmental Representative prior to starting Work requiring design and seal of a professional engineer registered in the Place of the Work. Note: where signed and sealed Shop Drawings are requested in the specifications, this letter is required in addition to the Shop Drawings.
- .5 At completion of the Work, have each of the Contractor's and/or Subcontractor's registered professional engineers provide to the Departmental Representative, a letter confirming that:
  - .1 All civil, structural, architectural, mechanical, electrical and other components are fabricated and erected in conformance with their design.
  - .2 All components are capable of supporting all the loads or capable of performance specified or indicated on the reviewed Shop Drawings.
  - .3 All changes to the Contract Documents have been reviewed and are acceptable.
  - .4 All components have been designed, fabricated and installed to substantially comply with the applicable requirements of the National Building Code.
  - .5 All components have been designed and installed to conform with the seismic restraint requirements of the National Building Code.
  - .6 The fabrication and installation of such components has been reviewed and accepted by the Contractor's and/or Subcontractor's registered professional engineers.
  - .7 All components are fabricated and erected in accordance with the reviewed Shop Drawings.
  - .8 Contractor's and/or Subcontractor's registered professional engineers for architectural work, required to have Shop Drawings signed and sealed by a professional engineer registered in the Place of the Work, must provide signed and sealed forms of professional involvement as required by the National Building Code.

- .9 Submit a signed and sealed Letter of Compliance on company letterhead addressed to Departmental Representative on completion of Work requiring design and seal of a professional engineer registered in the Place of the Work.

#### **1.4 SAMPLES**

- .1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples to Departmental Representative at site meetings or prepaid by courier to Departmental Representative's business address.
- .3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

#### **1.5 MOCK-UPS**

- .1 Erect mock-ups in accordance with 01 45 00 - Quality Control.

#### **1.6 PHOTOGRAPHIC DOCUMENTATION**

- .1 Submit electronic digital photography in fine resolution as directed by the Departmental Representative but no less than monthly with progress statement.
- .2 Project identification: name and number of project and date of exposure indicated.
- .3 Number of viewpoints: as directed by Departmental Representative.
  - .1 Viewpoints and their location as determined by Departmental Representative.
- .4 Frequency of photographic documentation: every two weeks and,
  - .1 Upon completion of: of Work.

#### **1.7 CERTIFICATES AND TRANSCRIPTS**

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.
- .2 Submit transcription of insurance immediately after award of Contract.

### **Part 2 Products**

#### **2.1 NOT USED**

- .1 Not Used.

**Part 3            Execution**

**3.1                NOT USED**

.1            Not Used.

**END OF SECTION**

**Part 1            General**

**1.1               REFERENCE STANDARDS**

- .1       Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2       Province of Alberta
  - .1       Occupational Health and Safety Act, R.S.A. - Updated 2018.

**1.2               ACTION AND INFORMATIONAL SUBMITTALS**

- .1       Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2       Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
  - .1       Results of site specific safety hazard assessment.
  - .2       Results of safety and health risk or hazard analysis for site tasks and operation.
- .3       Submit weekly to authority having jurisdiction and Departmental Representative.
- .4       Submit copies of reports or directions issued by Federal and Provincial health and safety inspectors.
- .5       Submit copies of incident and accident reports.
- .6       Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 7 days.
- .7       Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.

**1.3               SAFETY ASSESSMENT**

- .1       Perform site specific safety hazard assessment related to project.

**1.4               MEETINGS**

- .1       Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.

**1.5               REGULATORY REQUIREMENTS**

- .1       Do Work in accordance with Section 01 41 00- Regulatory Requirements.

**1.6               GENERAL REQUIREMENTS**

- .1       Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2       Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.



## **1.7 RESPONSIBILITY**

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Contractor will be responsible and assume the role Constructor as described in the Ontario Occupational Health and Safety Act and Regulations for Construction Projects.
- .3 Contractor shall be the Principal Contractor as described in the Quebec Act Respecting Health and Safety code for the Construction for only their scope and areas of work as defined and described this project specification.
- .4 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

## **1.8 COMPLIANCE REQUIREMENTS**

- .1 Comply with Occupational Health and Safety Act, General Safety Regulation, Alberta Reg. 2018.
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

## **1.9 UNFORSEEN HAZARDS**

- .1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise Departmental Representative verbally and in writing.
- .2 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, advise Safety Officer and follow procedures in accordance with Acts and Regulations of Province having jurisdiction and advise Departmental Representative verbally and in writing.

## **1.10 HEALTH AND SAFETY CO-ORDINATOR**

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
  - .1 Have site-related working experience specific to activities associated with Work of this project.
  - .2 Have working knowledge of occupational safety and health regulations.
  - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
  - .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
  - .5 Be on site during execution of Work.

**1.11 POSTING OF DOCUMENTS**

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with Departmental Representative.

**1.12 CORRECTION OF NON-COMPLIANCE**

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

**1.13 POWDER ACTUATED DEVICES**

- .1 Use powder actuated devices only after receipt of written permission from Departmental Representative.

**1.14 WORK STOPPAGE**

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not used.

**END OF SECTION**

**Part 1            General**

**1.1                GENERAL**

- .1 All Contractor operations shall be performed in such a manner that no detritus from his operations shall enter any river, waterway, ditch, or wetland within Banff National Park.
- .2 If, in the opinion of the Departmental Representative or Parks Canada, full containment of Contractor's detritus is not being achieved, operations may be ordered halted until the situation is rectified.
  - .1 Contactor to adhere to requirements identified in the Parks Canada Basic Impact Analysis document provided as a reference document.

**1.2                NATIONAL PARK REGULATIONS**

- .1 The Contractor shall ensure that all work is performed in accordance with the ordinances, laws, rules and regulations set out in the Canada National Parks Act and Regulations.
- .2 The Contractor and any sub-Contractors shall obtain a business license from the Parks Canada Administration Office in Banff prior to commencement of the contract.
- .3 All Contractor's business and private vehicles are required to obtain a vehicle work pass from Parks Canada. These permits may be obtained free of charge from the Departmental Representative, PCA Environmental Officer.

**1.3                CANADIAN ENVIRONMENTAL ASSESSMENT ACT (CEAA)**

- .1 Execution of the Work is subject to the provisions within the Canadian Environmental Assessment Act (CEAA) 2012 and subsequent amendments.
- .2 The Contractor is required to prepare an Environmental Protection Plan (EPP), which will include the topics in the following sub sections.
- .3 Failure to comply with or observe environmental protection measures as identified in these specifications may result in the Work being suspended pending rectification of the problems.
- .4 The Contractor shall notify the ESO (Environmental Surveillance Officer) and the Departmental Representative in a reasonably timely manner of any actual or potential environmental incidents or failure of protection measures.
- .5 The Contractor shall notify the ESO and the Departmental Representative immediately of any violations of environmental approvals, permits, authorizations or EPP measures.

**1.4                RELICS AND ANTIQUITIES**

- .1 Give immediate notice to Departmental Representative if evidence of archaeological finds are encountered during construction, and wait for written instructions before proceeding with Work in this area.

- .2 Relics and antiquities and items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tablets, and similar objects found on the site shall remain the property of Parks Canada. Protect such articles and request directives from Departmental Representative.
- .3 Provide forty-eight (48) hours notice Departmental Representative prior to commencing any work that may interfere with or affect any identified historical or archaeological site. Commence work only upon written instruction from Departmental Representative.

## **1.5 WILDLIFE**

- .1 Avoid or terminate activities on site that attract or disturb wildlife.
- .2 Pets are not allowed on the work site, or in any administrative or laydown areas.
- .3 All personnel will be instructed by Parks Canada's ESO the procedures to follow in the event of wildlife appearance near or intrusion into the construction site. Personnel are not to attract or approach any wildlife seen near the site, and are to vacate their location in the event of aggressive behaviour or persistent intrusion by bears, cougars, wolves, elk or moose. The ESO and the Departmental Representative are to be notified about the circumstance immediately. The Banff warden services will be called to determine the course of action. The general presence of wildlife observed near the construction site, any carcasses or unusual wildlife observations shall be reported to the ESO and the Departmental Representative.

## **1.6 FIRE PROTECTION AND CONTROL**

- .1 A fire extinguisher will be carried and available for use on each machine in the event of fire (e.g. ignited by a spark) to prevent the fire from burning the unit or spreading to other fuels in the work area. Basic firefighting equipment – e.g., three (3) shovels, two (2) pulaskis, and two (2) 20 litre backpack pumps shall be maintained at the construction site at a location known and easily accessible to all the Contractor's staff. Contractor's staff shall receive basic training in early response to wildfire events during the "environmental briefing".
- .2 Machinery and equipment shall be operated in a manner and with all original manufacturers' safety devices to prevent ignition of flammable materials in the area.
- .3 No smoking is allowed on the construction site to ensure that accidental ignition of any flammable material is prevented. Fires or burning of waste materials are not permitted.
- .4 The Contractor shall maintain an awareness of the fire danger rating (Index) in the work area by contacting the Banff fire duty officer. Fire prevention care is to be commensurate with the Fire Index.
- .5 In case of fire, the Contractor or worker shall take immediate action to extinguish the fire provided it is safe to do so. The ESO and the Departmental Representative shall be notified of any fire immediately.
- .6 Deliberately lighting of fires or burning of waste materials is strictly not permitted.

## **1.7 SITE ACCESS AND PARKING**

- .1 A plan detailing access to the construction site shall be prepared by the Contractor and included in the EPP. This includes access and facilities at the work sites and within the

work limits, including day-to-day entry/egress and plans for delivery and approach for large dimension materials will be anticipated and described. The access plan shall describe worker transportation to and from the construction site, and parking of workers' private vehicles. Specific details of any vehicles to transport workers to site or site equipment to be used on the trails are to be provided.

- .2 Restrict vehicle movements to work limits.
- .3 Do not park vehicles in areas beyond work limits, unless specifically authorized by the ESO and the Departmental Representative.
- .4 A Contractor's office and work headquarters may be established at a location at the discretion of the Departmental Representative. The Contractor shall prepare a plan regarding structures, equipment, waste materials management, water, power and sewage services, materials lay-down area, fuel storage, operations, etc. required at this location. The plan will be subject to review and approval by the Departmental Representative. This site may be shared with other Contractors.
- .5 A workers' accommodation camp will not be permitted.

## **1.8 EROSION AND SEDIMENT CONTROL (ESC) PLAN**

- .1 The Contractor must prepare an ESC plan for the project to be included in the Environmental Protection Plan. The plan must detail temporary and permanent environmental control measures that the Contractor will undertake to comply with all applicable legislation, regulations and approvals during the course of their construction. The plan should address the following items:
  - .1 Pre-Construction Actions:
    - .1 Prepare and submit for review by Departmental Representative the "Environmental Protection Plan"
  - .2 Construction Considerations:
    - .1 Clearing and excavation must start only after installing the sediment and runoff measures as per the plan which has been reviewed and accepted by the Departmental Representative. Only areas required for immediate construction activity and as approved by the Departmental Representative may be cleared. Additional control measures must be installed as excavation advances.
    - .2 Stockpiles can be located anywhere in the construction work areas approved by Parks Canada Agency. They must be stabilized against erosion immediately following stockpiling operations. Runoff from the stockpile areas must be contained to prevent contamination of drainage systems.
    - .3 Sediment and debris must be prevented from reaching waterways.
    - .4 Dust control measures must be implemented to prevent wind transport of
    - .5 dust from disturbed soil surfaces.
    - .6 On-going inspection and maintenance of Erosion and Sediment Controls must be performed by the Contractor until restoration is achieved.

- .3 Post-Construction Activities:
  - .1 All accumulated sediment and debris must be removed as required after construction activities are complete.
  - .2 Stockpile, storage and laydown areas must be cleaned and restored to pre-construction condition.
- .4 The ESC Plan must include natural area protection measures for natural areas impacted by the project.

## **1.9 DRAINAGE**

- .1 Prior to directing stored water off site, obtain approval from Departmental Representative and ESO.
- .2 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

## **1.10 PLANT PROTECTION**

- .1 Vegetation:
  - .1 Protect trees and plants on site and adjacent properties as shown in the Drawings.
  - .2 Protect trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m minimum.
  - .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.
  - .4 Avoid unnecessary traffic, dumping and storage of materials over root zones.
  - .5 Prevent stripping of topsoil and vegetation.
  - .6 If any nest or dens are discovered during work, the area must be flagged and work temporarily ceased until Departmental Representative has taken appropriate action.
  - .7 All works shall be undertaken in a manner that prevents the introduction or minimizes the spread of invasive alien species and noxious weeds.

## **1.11 POLLUTION CONTROL**

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment in accordance with local authorities' emission requirements.
- .3 Spills or releases of hazardous materials or deleterious substances that may cause damage to the environment or human health shall be immediately reported to Departmental Representative and, if required, to the Provincial authority.
- .4 The Contractor shall take all reasonable measures to contain all spills. The Contractor shall contain, collect and dispose of spilled products at their expense.
- .5 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

- .6 All equipment must be properly maintained, in sound mechanical condition and free of any fuel, oil, and hydraulic fluid or coolant leaks.
- .7 Equipment must be free of external grease, loose dirt or oil and the machinery must be pressure washed prior to the start of the project.
- .8 All machinery must be equipped with emergency spill kits large enough to contain 110% of any possible spills or leaks of oil, fuel, hydraulic fluid or coolant during the project.
- .9 The operators of the equipment must be familiar with how to properly use the spill kits in the event of an emergency.
- .10 Fuel, oils, lubricants, chemicals, and any potentially hazardous material must not be dispelled into the environment.
- .11 Machinery and vehicles must keep to roads, trails, or designated temporary workspaces and turnaround points. The Departmental Representative will identify approved off-road workspaces.
- .12 Rutting and/or compaction of ground surfaces should be avoided as much as possible by keeping to designated work areas and away from wet locations.
- .13 All areas with rutting damage or noticeable compaction from heavy equipment must be re-graded and back-filled if necessary.
- .14 Any holes or depressions caused by site preparation or construction will be back-filled and compacted to an appropriate degree.

#### **1.12 CONTRACTOR'S OPERATIONS**

- .1 Confine all operations to the work areas designated by the Departmental Representative. No activities of any kind may be carried out beyond those work areas without the written permission of the Departmental Representative.
- .2 Do not store or stockpile construction materials in the trees bordering or being preserved on site. Do not unreasonably encumber the site with products.
- .3 Provide sufficient sanitary facilities and maintain in a clean condition.
- .4 Conduct operations at all times in such a manner as to preserve the natural features and vegetation in the area. Cut and fill slopes shall be blended with adjoining topography. Material from fill slopes shall not be permitted to slough or roll into surrounding tree cover or to bury any plant material designated to be retained.
- .5 When in the opinion of the Departmental Representative, negligence on the part of the Contractor results in damage or destruction of vegetation, or other environmental or aesthetic features beyond the staked or designated work area, the Contractor shall be responsible, at his expense, for complete restoration including the replacement of trees, shrubs, topsoil, grass, etc. to the satisfaction of the Departmental Representative. Failure to comply with or observe environmental protection requirements as identified in these specifications may result in work being suspended pending rectification of the problems and operators of equipment being charged under the National Park Act.

### **1.13 START- UP AND ENVIRONMENTAL BRIEFING**

- .1 All staff employed at the construction site shall attend an orientation conducted by the Contractor regarding their individual and collective responsibilities, to ensure avoidable adverse environmental impact does not arise from their activities and personal choices. Employees must attend this briefing before beginning their work at the site. Each employee, having received the environmental briefing, will be issued a certification sticker to be displayed on their helmet. Employees of other service and materials providers who attend at the site – e.g., concrete truck operators, crane operators, and truck drivers must be apprised of their duty not to cause adverse environmental impact.
- .2 Parks Canada will have an ESO attending the site to monitor the construction activity for conformance with the EPP. The ESO or alternate designated Parks Canada staff member will present the "environmental briefing". The ESO's main duties are to monitor the progress of the construction on an on-going basis to ensure compliance with environmental protection measures, and to provide guidance through the Departmental Representative, in the event of unanticipated environmental problems. Although the ESO has authority to enforce National Parks Act violations, direction to the Contractor will be the duty of the Departmental Representative.

### **1.14 HAZARDOUS PRODUCTS AND MATERIALS**

- .1 A list of products and materials to be used or brought to the construction site that are considered or defined as hazardous to the environment shall be presented in the EPP. Such products include, but are not limited to; grout, fuel, concrete finishing agents, paint, etc. A plan detailing the containment and storage, security, handling, use, unique spill response requirements and disposal of empty containers, surplus product or waste generated in the application of these products shall be presented in the EPP.
- .2 Hazardous products shall be stored no closer than 100 m from any waterway.
- .3 MSDS sheets for hazardous material are to be provided in a location accessible to all workers.

### **1.15 EQUIPMENT FUELLING AND MAINTENANCE**

- .1 A fuel delivery, storage and distribution plan shall be submitted. Topics to be addressed in the EPP will include, but not necessarily be limited to:
  - .1 Diesel and gasoline supply vehicles, including bulk tankers shall be parked more than 100 m from rivers.
  - .2 Fuel tanks with manual or electric pump delivery systems shall be used, gravity feed is not allowed.
  - .3 Fuelling personnel shall maintain immediate attention to and presence at the fuelling operation.
  - .4 Fuelling sites will be identified by the Contractor in the EPP.
  - .5 Lubricant changes and minor repairs shall be conducted at a location identified by the Contractor in consultation with the ESO. Waste lubricants, used filters and other waste maintenance products shall be removed from Banff National Park to recycling or certified disposal sites. Equipment shall be inspected daily for fluid/fuel leaks and maintained in good working order.



- .6 Equipment to be used on the project site shall be thoroughly cleaned of soil, seeds and any debris or external contaminants outside the national park before delivery to the work site.

#### **1.16 WASTE MATERIAL STORAGE AND REMOVAL**

- .1 The Contractor shall prepare a Construction and Waste management plan as a part of the EPP. The Plan shall include the following basic principle:
  - .1 Waste reduction which follows the 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.
- .2 Wastes generated at the construction site are to be contained and removed in a timely and approved manner. The EPP shall detail the waste management procedures, including the following:
  - .1 Describe the management of waste.
  - .2 Construction wastes shall be stored in containers at an approved location and removed promptly when the containers are 90% full.
  - .3 A concerted effort to reduce, reuse and recycle materials is expected.
  - .4 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.
  - .5 Provide containers to deposit recyclable materials.
  - .6 Transport all recyclable materials to an approved recycling facility off site.
  - .7 Waste materials are to be disposed at a certified construction waste landfill outside Banff National Park. No burying, burning or discarding of waste materials will be permitted at the construction site, or elsewhere in Banff National Parks.
  - .8 No materials attractive to wildlife are to be stored at the site overnight – daily removal is mandatory. Human food products are to be contained in a manner so as not to attract animals and waste food stuffs are to be removed from the construction site every day.
  - .9 Portable container toilets are to be provided in sufficient numbers and locations to ensure convenient usage including frequency of pump out.
- .3 All garbage must be stored and handled in conformance with the National Parks' Garbage Regulations.
- .4 No food, domestic garbage or hazardous wastes may be deposited in the trade waste site.
- .5 Dispose of all hazardous wastes in conformance with the Environmental Contaminates Act and applicable provincial regulations while observing the Code of Good Practice for Management of Hazardous and Toxic Wastes at Federal Establishments.
- .6 Provide bear proof garbage containers on-site for domestic garbage generated on-site by Contractor's personnel and make arrangement for collection and disposal on a daily basis or when directed by the Departmental Representative.
- .7 Maintain the site in a tidy condition, free from the accumulation of waste products, debris and litter. Do not dispose of or allow dispersing waste or volatile materials such as

mineral spirits, oil or paint thinners or other hazardous wastes into waterways. Provide clean- up equipment and adequate supply of absorbent material on-site.

**1.17 NOTIFICATION**

- .1 Departmental Representative or ESO will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.
- .2 Contractor: after receipt of such notice, inform ESO and Departmental Representative of proposed corrective action and take such action for approval by ESO.
  - .1 Take action only after receipt of written approval by ESO.
- .3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11- Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Burying of rubbish and waste materials on site will not be permitted.
- .3 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.
- .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11- Cleaning.

**END OF SECTION**

**Part 1 General**

**1.1 REFERENCES AND CODES**

- .1 Perform Work in accordance with National Building Code of Canada (NBC) including amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
- .2 Meet or exceed requirements of:
  - .1 Contract documents.
  - .2 Specified standards, codes and referenced documents.

**1.2 HAZARDOUS MATERIAL DISCOVERY**

- .1 Asbestos: demolition of spray or trowel-applied asbestos is hazardous to health. Stop work immediately when material resembling spray or trowel-applied asbestos is encountered during demolition work. Notify Departmental Representative.
- .2 PCB: Polychlorinated Biphenyl: stop work immediately when material resembling Polychlorinated Biphenyl is encountered during demolition work. Notify Departmental Representative.
- .3 Mould: stop work immediately when material resembling mould is encountered during demolition work. Notify Departmental Representative.

**1.3 BUILDING SMOKING ENVIRONMENT**

- .1 Smoking is prohibited on the Project Site.

**1.4 NATIONAL PARKS ACT**

- .1 Perform Work in accordance with National Parks Act.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                INSPECTION**

- .1      Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2      Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.
- .3      If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4      Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction.

**1.2                INDEPENDENT INSPECTION AGENCIES**

- .1      Independent Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by PWGSC.
- .2      Provide equipment required for executing inspection and testing by appointed agencies.
- .3      Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .4      If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to PWGSC. Pay costs for retesting and reinspection.

**1.3                ACCESS TO WORK**

- .1      Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2      Co-operate to provide reasonable facilities for such access.

**1.4                PROCEDURES**

- .1      Notify appropriate agency and Departmental Representative sufficiently in advance of required tests on order that arrangements can be made for attendance by testing agencies.
- .2      Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3      Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

## **1.5 REJECTED WORK**

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Consultant as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by.

## **1.6 REPORTS**

- .1 Submit electronic copies of inspection and test reports to Departmental Representative.
- .2 Provide copies to subcontractor of work being inspected or tested.

## **1.7 TESTS AND MIX DESIGNS**

- .1 Furnish test results and mix designs as requested.
- .2 Cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by Departmental Representative and may be authorized as recoverable.

## **1.8 MOCK-UPS**

- .1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of Sections required to provide mock-ups.
- .2 Construct in locations as specified in specific Section.
- .3 Prepare mock-ups for Departmental Representative review with reasonable promptness and in orderly sequence, to not cause delays in Work.
- .4 Failure to prepare mock-ups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .5 Remove mock-up at conclusion of Work or when acceptable to Departmental Representative.
- .6 Mock-ups may remain as part of Work.
- .7 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

## **1.9 MILL TESTS**

- .1 Submit mill test certificates as required of specification Sections.

**Part 2            Products**

**2.1                NOT USED**

.1            Not Used.

**Part 3            Execution**

**3.1                NOT USED**

.1            Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1        Section 01 52 00 – Construction Facilities.
- .2        Section 01 56 00 – Temporary Barriers and Enclosures.

**1.2                INSTALLATION AND REMOVAL**

- .1        Provide temporary utilities controls in order to execute work expeditiously.
- .2        Remove from site all such work after use.

**1.3                WATER SUPPLY**

- .1        Provide continuous supply of potable water for construction use.
- .2        Arrange for connection with appropriate utility company and pay costs for installation, maintenance and removal.
- .3        Pay for utility charges at prevailing rates.

**1.4                TEMPORARY HEATING AND VENTILATION**

- .1        Provide temporary heating required during construction period, including attendance, maintenance and fuel.
- .2        Construction heaters used inside building must be vented to outside or be non-flameless type. Solid fuel salamanders are not permitted.
- .3        Provide temporary heat and ventilation in enclosed areas as required to:
  - .1        Facilitate progress of Work.
  - .2        Protect Work and products against dampness and cold.
  - .3        Prevent moisture condensation on surfaces.
  - .4        Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
  - .5        Provide adequate ventilation to meet health regulations for safe working environment.
- .4        Maintain temperatures of minimum 10 degrees C, or as otherwise specified in other Sections of Work, in areas where construction is in progress.
- .5        Ventilating:
  - .1        Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
  - .2        Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
  - .3        Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
  - .4        Ventilate storage spaces containing hazardous or volatile materials.

- .5 Ventilate temporary sanitary facilities.
- .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.
- .6 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
  - .1 Conform with applicable codes and standards.
  - .2 Enforce safe practices.
  - .3 Prevent abuse of services.
  - .4 Prevent damage to finishes.
  - .5 Vent direct-fired combustion units to outside.
- .7 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

## **1.5 TEMPORARY POWER AND LIGHT**

- .1 Maximum power supply of 230 volts 30 amps is available and will be provided for construction use at no cost. Connect to existing power supply in accordance with Canadian Electrical Code and provide meters and switching.
- .2 Provide and pay for temporary power during construction for temporary lighting and operating of power tools.
- .3 Arrange for connection with appropriate utility company. Pay costs for installation, maintenance and removal.

## **1.6 TEMPORARY COMMUNICATION FACILITIES**

- .1 Provide and pay for temporary data hook up, line equipment necessary for own use.

## **1.7 FIRE PROTECTION**

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction governing codes, regulations and bylaws.
- .2 Burning rubbish and construction waste materials is not permitted on site.

## **Part 2 Products**

### **2.1 NOT USED**

- .1 Not Used.



**Part 3            Execution**

**3.1                NOT USED**

.1            Not Used.

**END OF SECTION**

**Part 1            General**

**1.1               RELATED REQUIREMENTS**

- .1       Section 01 51 00 – Temporary Facilities.
- .2       Section 01 56 00 – Temporary Barriers and Enclosures.

**1.2               REFERENCES**

- .1       Canadian Standards Association (CSA International)
  - .1       CAN/CSA-S269.2-M1987(R2003), Access Scaffolding for Construction Purposes.
  - .2       CAN/CSA-Z321-96(R2001), Signs and Symbols for the Occupational Environment.
- .2       Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions 'C', In Effect as of: May 14, 2004.

**1.3               INSTALLATION AND REMOVAL**

- .1       Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.
- .2       Identify areas which have to be gravelled to prevent tracking of mud.
- .3       Indicate use of supplemental or other staging area.
- .4       Provide construction facilities in order to execute work expeditiously.
- .5       Remove from site all such work after use.

**1.4               SCAFFOLDING**

- .1       Scaffolding in accordance with CAN/CSA-S269.2.
- .2       Provide and maintain scaffolding.

**1.5               HOISTING**

- .1       Provide, operate and maintain hoists cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for their use of hoists.
- .2       Hoists cranes to be operated by qualified operator.

**1.6               SITE STORAGE/LOADING**

- .1       Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
- .2       Do not load or permit to load any part of Work with weight or force that will endanger Work.

**1.7 CONSTRUCTION PARKING**

- .1 Limited parking will be permitted on site provided it does not disrupt performance of Work.
- .2 Provide and maintain adequate access to project site.
- .3 Parking is not permitted on natural or undisturbed areas. Parking will be confined to parking lots, roadways or as approved by the Departmental Representative.

**1.8 SECURITY**

- .1 Provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays.
- .2 Provide fencing and additional security as deemed necessary.

**1.9 OFFICES**

- .1 Provide marked and fully stocked first-aid case in a readily available location.

**1.10 EQUIPMENT, TOOL AND MATERIALS STORAGE**

- .1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

**1.11 SANITARY FACILITIES**

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

**1.12 CONSTRUCTION SIGNAGE**

- .1 No other signs or advertisements, other than warning signs, are permitted on site.
- .2 Signs and notices for safety and instruction in both official languages Graphic symbols to CAN/CSA-Z321.
- .3 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Departmental Representative.
- .4 Permanent company signage on contractor vehicles and trailers is permitted.

**1.13 PROTECTION AND MAINTENANCE OF TRAFFIC**

- .1 Provide access and temporary relocated roads as necessary to maintain traffic.
- .2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.

- .3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs
- .4 Protect travelling public from damage to person and property.
- .5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
- .6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.
- .7 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .8 Dust control: adequate to ensure safe operation at all times.
- .9 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.
- .10 Maintain access for emergency vehicles at all times.
- .11 Provide snow removal during period of Work.

#### **1.14 CLEAN-UP**

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable.
- .4 Stack stored new or salvaged material not in construction facilities.
- .5 Vacuum out all roof drains and locations where debris may have gathered during construction, daily.

#### **1.15 FIRE PROTECTION FACILITIES**

- .1 Provide fire extinguishers and other equipment on site and maintain emergency vehicle access at all times.

### **Part 2 Products**

#### **2.1 NOT USED**

- .1 Not Used.

**Part 3            Execution**

**3.1                NOT USED**

.1            Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1        Section 01 51 00 – Temporary Facilities.
- .2        Section 01 52 00 – Construction Facilities.

**1.2                REFERENCES**

- .1        Canadian Standards Association (CSA International)
  - .1        CSA-O121-M1978(R2003), Douglas Fir Plywood.

**1.3                INSTALLATION AND REMOVAL**

- .1        Provide temporary controls in order to execute Work expeditiously.
- .2        Remove from site all such work after use.

**1.4                HOARDING**

- .1        Erect temporary site enclosures using 38 x 89 mm construction grade lumber framing at 600 mm centres and 1200 x 2400 x 13 mm exterior grade fir plywood to CSA O121.
- .2        Apply plywood panels vertically as indicated.
- .3        Paint public side of hoarding.
- .4        Provide lockable pedestrian doors.

**1.5                GUARD RAILS AND BARRICADES**

- .1        Provide secure, rigid guard rails and barricades around open shafts, open stair wells, open edges of floors and roofs.

**1.6                WEATHER ENCLOSURES**

- .1        Provide weather tight closures to unfinished door and window openings, tops of shafts and other openings in floors and roofs.
- .2        Close off floor areas where walls are not finished; seal off other openings; enclose building interior work for temporary heat.
- .3        Design enclosures to withstand wind pressure and snow loading.

**1.7                DUST TIGHT SCREENS**

- .1        Provide dust tight screens or insulated partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.
- .2        Maintain and relocate protection until such work is complete.

**1.8 ACCESS TO SITE**

- .1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

**1.9 PUBLIC TRAFFIC FLOW**

- .1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect public.

**1.10 FIRE ROUTES**

- .1 Maintain access to property including overhead clearances for use by emergency response vehicles.

**1.11 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY**

- .1 Protect surrounding private and public property from damage during performance of Work.
- .2 Be responsible for damage incurred.

**1.12 PROTECTION OF BUILDING FINISHES**

- .1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.
- .2 Provide necessary screens, covers, and hoardings.
- .3 Confirm with Departmental Representative, locations and installation schedule 3 days prior to installation.
- .4 Be responsible for damage incurred due to lack of or improper protection.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                REFERENCES**

- .1        Within text of each specifications section, reference may be made to reference standards.
- .2        Conform to these reference standards, in whole or in part as specifically requested in specifications.
- .3        If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .4        Cost for such testing will be born by PCA in event of conformance with Contract Documents or by Contractor in event of non-conformance.

**1.2                QUALITY**

- .1        Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2        Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.
- .3        Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .4        Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
- .5        Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .6        Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

**1.3                AVAILABILITY**

- .1        Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.



- .2 In event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

#### **1.4 STORAGE, HANDLING AND PROTECTION**

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.
- .9 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

#### **1.5 TRANSPORTATION**

- .1 Pay costs of transportation of products required in performance of Work.
- .2 Transportation cost of products supplied by Owner will be paid for by Departmental Representative. Unload, handle and store such products.

#### **1.6 MANUFACTURER'S INSTRUCTIONS**

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative will establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

**1.7 QUALITY OF WORK**

- .1 Ensure Quality of Work is of highest standard, executed by licensed or qualified workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.

**1.8 CO-ORDINATION**

- .1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.

**1.9 CONCEALMENT**

- .1 In finished areas conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
- .2 Before installation inform Departmental Representative if there is interference. Install as directed by Departmental Representative.

**1.10 REMEDIAL WORK**

- .1 Refer to Section 01 73 00 - Execution Requirements.
- .2 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.
- .3 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

**1.11 LOCATION OF FIXTURES**

- .1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.
- .2 Inform Departmental Representative of conflicting installation. Install as directed.

**1.12 FASTENINGS**

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.

- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

### **1.13 FASTENINGS - EQUIPMENT**

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.
- .3 Bolts may not project more than one diameter beyond nuts.
- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

### **1.14 PROTECTION OF WORK IN PROGRESS**

- .1 Prevent overloading of parts of building. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated without written approval of Departmental Representative.

### **1.15 EXISTING UTILITIES**

- .1 When breaking into or connecting to existing services or utilities, including PCA owned utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, building occupants, and pedestrian and vehicular traffic.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

## **Part 2 Products**

### **2.1 NOT USED**

- .1 Not Used.

## **Part 3 Execution**

### **3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                SURVEY REFERENCE POINTS**

- .1      Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.
- .2      Make no changes or relocations without prior written notice to Departmental Representative.
- .3      Report to Departmental Representative when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.

**1.2                SURVEY REQUIREMENTS**

- .1      Establish lines and levels, locate and lay out, by instrumentation.

**1.3                EXISTING SERVICES**

- .1      Before commencing work, establish location and extent of service lines in area of Work and notify Consultant of findings.
- .2      Remove abandoned service lines within 2m of structures. Cap or otherwise seal lines at cut-off points as directed by Departmental Representative.

**1.4                LOCATION OF EQUIPMENT AND FIXTURES**

- .1      Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.
- .2      Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .3      Inform Departmental Representative of impending installation and obtain approval for actual location.
- .4      Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative.

**1.5                SUBSURFACE CONDITIONS**

- .1      Promptly notify Consultant in writing if subsurface conditions at Place of Work differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.
- .2      After prompt investigation, should Consultant determine that conditions do differ materially, instructions will be issued for changes in Work as provided in Changes and Change Orders.

**Part 2            Products**

**2.1                NOT USED**

.1            Not Used.

**Part 3            Execution**

**3.1                NOT USED**

.1            Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1        Section 07 84 00 - Firestopping

**1.2                ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Submit written request in advance of cutting or alteration which affects:
  - .1        Structural integrity of elements of project.
  - .2        Integrity of weather-exposed or moisture-resistant elements.
  - .3        Efficiency, maintenance, or safety of operational elements.
  - .4        Visual qualities of sight-exposed elements.
  - .5        Work of Departmental Representative or separate contractor.
- .3        Include in request:
  - .1        Identification of project.
  - .2        Location and description of affected Work.
  - .3        Statement on necessity for cutting or alteration.
  - .4        Description of proposed Work, and products to be used.
  - .5        Alternatives to cutting and patching.
  - .6        Effect on Work of Departmental Representative or separate contractor.
  - .7        Written permission of affected separate contractor.
  - .8        Date and time work will be executed.

**1.3                MATERIALS**

- .1        Required for original installation.
- .2        Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.

**1.4                PREPARATION**

- .1        Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2        After uncovering, inspect conditions affecting performance of Work.
- .3        Beginning of cutting or patching means acceptance of existing conditions.
- .4        Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .5        Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

**1.5 EXECUTION**

- .1 Execute cutting, fitting, and patching including excavation and fill, to complete Work.
- .2 Fit several parts together, to integrate with other Work.
- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.
- .5 Remove samples of installed Work for testing.
- .6 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .7 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .8 Employ qualified installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .9 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .10 Restore work with new products in accordance with requirements of Contract Documents.
- .11 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .12 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping material in accordance with Section 07 84 00 - Firestopping, full thickness of the construction element.
- .13 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.
- .14 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1        Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**1.2                REFERENCES**

- .1        Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses And Conditions (SACC)- ID:r0202d, Title: General Conditions 'C', In Effect As Of: May 14, 2004.

**1.3                PROJECT CLEANLINESS**

- .1        Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.
- .2        Remove waste materials from site at daily regularly scheduled times or dispose of outside of the National Park, as directed by Departmental Representative.
- .3        Clear snow and ice from access to building, bank/pile snow in designated areas only.
- .4        Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5        Provide on-site containers for collection of waste materials and debris.
- .6        Provide and use marked separate bins for recycling. Refer to Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .7        Dispose of waste materials and debris off site.
- .8        Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.
- .9        Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .10      Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .11      Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .12      Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

**1.4                FINAL CLEANING**

- .1        Clean Work prior to final review by Departmental Representative.
- .2        When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .3        Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.



- .4 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .5 Remove waste products and debris other than that caused by Departmental Representative or other Contractors.
- .6 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative.
- .7 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .8 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .9 Remove dirt and other disfiguration from exterior surfaces.
- .10 Clean and sweep roofs, gutters, areaways, and sunken wells.
- .11 Sweep and wash clean paved areas.
- .12 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.
- .13 Clean roofs, downspouts, and drainage systems.
- .14 Remove snow and ice from access to building.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                WASTE MANAGEMENT GOALS**

- .1      Prior to start of Work conduct meeting with Departmental Representative to review and discuss PCA's waste management goal and Contractor's proposed Waste Reduction Workplan for Construction, Renovation and /or Demolition (CRD) waste to be project generated.
- .2      PAC's waste management goal: to divert Project Waste from landfill sites to the greatest extent possible. Prior to project completion provide Departmental Representative documentation certifying that waste management, recycling, reuse of recyclable and reusable materials have been extensively practiced.
- .3      Minimize amount of non-hazardous solid waste generated by project and accomplish maximum source reduction, reuse and recycling of solid waste produced by CRD activities.
- .4      Protect environment and prevent environmental pollution damage.

**1.2                RELATED REQUIREMENTS**

- .1      Section 01 74 11 - Cleaning

**1.3                USE OF SITE AND FACILITIES**

- .1      Execute Work with minimal interference and disturbance to normal use of premises.
- .2      Maintain security measures established by facility provide temporary security measures approved by Departmental Representative.

**1.4                WASTE PROCESSING SITES**

- .1      Contractor is responsible to research and locate waste diversion resources and service providers. Salvaged materials are to be transported off site to approved and/or authorized recycling facilities or to users of material for recycling.

**1.5                STORAGE, HANDLING AND PROTECTION**

- .1      Store, materials to be reused, recycled and salvaged in locations as directed by Departmental Representative.
- .2      Unless specified otherwise, materials for removal become Contractor's property.
- .3      Protect, stockpile, store and catalogue salvaged items.
- .4      Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.
- .5      Protect structural components not removed and salvaged materials from movement or damage.
- .6      Support affected structures. If safety of building is endangered, cease operations and immediately notify Departmental Representative.

- .7 Protect surface drainage, mechanical and electrical from damage and blockage.
- .8 Provide on-site facilities and containers for collection and storage of reusable and recyclable materials.
- .9 Separate and store materials produced during project in designated areas.
- .10 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated processing facilities.
  - .1 On-site source separation is recommended.
  - .2 Remove co-mingled materials to off site processing facility for separation.
  - .3 Obtain waybills, receipts and/or scale tickets for separated materials removed from site.
  - .4 Materials reused on-site are considered to be diverted from landfill and as such are to be included in all reporting.

## **1.6 DISPOSAL OF WASTES**

- .1 Do not bury rubbish or waste materials.
- .2 Do not dispose of mineral spirits into waterways, storm, or sanitary sewers.
- .3 Remove materials on-site as Work progresses.
- .4 Prepare project summary to verify destination and quantities on a material-by-material basis.

## **Part 2 Products**

### **2.1 NOT USED**

- .1 Not Used.

## **Part 3 Execution**

### **3.1 APPLICATION**

- .1 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

### **3.2 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

- .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- .2 Source separate materials to be reused/recycled into specified sort areas.

### **3.3 DIVERSION OF MATERIALS**

- .1 From following list, separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by Departmental Representative, and consistent with applicable fire regulations.
  - .1 Mark containers or stockpile areas.
  - .2 Provide instruction on disposal practices.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1        Section 01 78 00 – Closeout Submittals.

**1.2                ADMINISTRATIVE REQUIREMENTS**

- .1        Acceptance of Work Procedures:
  - .1        Contractor's Inspection: Conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
    - .1        Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
    - .2        Request Departmental Representative's inspection.
  - .2        Departmental Representative's Inspection:
    - .1        Departmental Representative and Contractor to inspect Work and identify obvious defects and deficiencies.
    - .2        Contractor to correct Work as directed.
  - .3        Completion Tasks: submit written certificates in English that tasks have been performed as follows:
    - .1        Work: completed and inspected for compliance with Contract Documents.
    - .2        Defects: corrected and deficiencies completed.
    - .3        Equipment and systems: tested, adjusted and fully operational.
    - .4        Certificates required by Boiler Inspection Branch: submitted.
    - .5        Operation of systems: demonstrated to Departmental Representative's personnel.
    - .6        Work: complete and ready for final inspection.
  - .4        Final Inspection:
    - .1        When completion tasks are done, request final inspection of Work by Departmental Representative, and Contractor.
    - .2        When Work incomplete according to Departmental Representative, complete outstanding items and request re-inspection.
  - .5        Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.
  - .6        Commencement of Lien and Warranty Periods: date of Departmental Representative's acceptance of submitted declaration of Substantial Performance to be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.

- .7 Final Payment:
  - .1 When Departmental Representative considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.
- .8 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

**1.3 FINAL CLEANING**

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1            General**

**1.1               RELATED REQUIREMENTS**

- .1        Section 01 77 00 – Closeout Procedures.

**1.2               ADMINISTRATIVE REQUIREMENTS**

- .1        Pre-warranty Meeting:
  - .1        Convene meeting one week prior to contract completion with contractor's representative, in accordance with Section 01 31 19 - Project Meetings to:
    - .1        Verify Project requirements.
    - .2        Review warranty requirements.
  - .2        Departmental Representative to establish communication procedures for:
    - .1        Notifying construction warranty defects.
    - .2        Determine priorities for type of defects.
    - .3        Determine reasonable response time.
  - .3        Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.
  - .4        Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

**1.3               ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, four final copies of operating and maintenance manuals in English and French.
- .3        Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.
- .4        Provide evidence, if requested, for type, source and quality of products supplied.

**1.4               FORMAT**

- .1        Organize data as instructional manual.
- .2        Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
- .3        When multiple binders are used correlate data into related consistent groupings.
  - .1        Identify contents of each binder on spine.
- .4        Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

- .5 Arrange content by process flow, under Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Text: manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab.
  - .1 Bind in with text; fold larger drawings to size of text pages.
- .9 Provide 1:1 scaled CAD files in dxf format on CD.

## **1.5 CONTENTS - PROJECT RECORD DOCUMENTS**

- .1 Table of Contents for Each Volume: provide title of project;
  - .1 Date of submission; names.
  - .2 Addresses, and telephone numbers of Departmental Representative and Design-Builder with name of responsible parties.
  - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
  - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data.
  - .1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.
- .6 Training: refer to Section 01 79 00 - Demonstration and Training.

## **1.6 AS -BUILT DOCUMENTS AND SAMPLES**

- .1 Maintain, in addition to requirements in General Conditions, one record copy of:
  - .1 Contract Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Change Orders and other modifications to Contract.
  - .5 Reviewed shop drawings, product data, and samples.
  - .6 Field test records.
  - .7 Inspection certificates.
  - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction.



- .1 Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
  - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition.
  - .1 Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative.

## **1.7 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS**

- .1 Record information on set of blue line opaque drawings, and in copy of Project Manual, provided by Departmental Representative.
- .2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress.
  - .1 Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: mark each item to record actual construction, including:
  - .1 Measured depths of elements of foundation in relation to finish first floor datum.
  - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
  - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
  - .4 Field changes of dimension and detail.
  - .5 Changes made by change orders.
  - .6 Details not on original Contract Drawings.
  - .7 References to related shop drawings and modifications.
- .5 Specifications: mark each item to record actual construction, including:
  - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
  - .2 Changes made by Addenda and change orders.
- .6 Other Documents: maintain field test records, required by individual specifications sections.
- .7 Provide digital photos, if requested, for site records.

## **1.8 MATERIALS AND FINISHES**

- .1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.
  - .1 Provide information for re-ordering custom manufactured products.

- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Moisture-protection and weather-exposed products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Additional requirements: as specified in individual specifications sections.

## **1.9 MAINTENANCE MATERIALS**

- .1 Spare Parts:
  - .1 Provide spare parts, in quantities specified in individual specification sections.
  - .2 Provide items of same manufacture and quality as items in Work.
  - .3 Deliver to location as directed; place and store.
  - .4 Receive and catalogue items.
    - .1 Submit inventory listing to Departmental Representative.
    - .2 Include approved listings in Maintenance Manual.
  - .5 Obtain receipt for delivered products and submit prior to final payment.
- .2 Extra Stock Materials:
  - .1 Provide maintenance and extra materials, in quantities specified in individual specification sections.
  - .2 Provide items of same manufacture and quality as items in Work.
  - .3 Deliver to location as directed; place and store.
  - .4 Receive and catalogue items.
    - .1 Submit inventory listing to Departmental Representative.
    - .2 Include approved listings in Maintenance Manual.
  - .5 Obtain receipt for delivered products and submit prior to final payment.
- .3 Special Tools:
  - .1 Provide special tools, in quantities specified in individual specification section.
  - .2 Provide items with tags identifying their associated function and equipment.
  - .3 Deliver to location as directed; place and store.
  - .4 Receive and catalogue items.
    - .1 Submit inventory listing to Departmental Representative.
    - .2 Include approved listings in Maintenance Manual.

## **1.10 DELIVERY, STORAGE AND HANDLING**

- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
- .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
- .3 Store components subject to damage from weather in weatherproof enclosures.
- .4 Store paints and freezable materials in a heated and ventilated room.

- .5 Remove and replace damaged products at own expense and for review by Departmental Representative.

#### **1.11 WARRANTIES AND BONDS**

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Submit warranty management plan, 30 days before planned pre-warranty conference, to Departmental Representative approval.
- .3 Warranty management plan to include required actions and documents to assure that Departmental Representative receives warranties to which it is entitled.
- .4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.
- .5 Submit, warranty information made available during construction phase, to Departmental Representative for approval prior to each monthly pay estimate.
- .6 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:
  - .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
  - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
  - .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
  - .4 Verify that documents are in proper form, contain full information, and are notarized.
  - .5 Co-execute submittals when required.
  - .6 Retain warranties and bonds until time specified for submittal.
- .7 Except for items put into use with Departmental Representative's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.
- .8 Conduct joint 4 month and 9 month warranty inspection, measured from time of acceptance, by Departmental Representative.
- .9 Include information contained in warranty management plan as follows:
  - .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.
  - .2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include roofs,.
  - .3 Provide list for each warranted equipment, item, feature of construction or system indicating:
    - .1 Name of item.
    - .2 Model and serial numbers.
    - .3 Location where installed.
    - .4 Name and phone numbers of manufacturers or suppliers.

- .5 Names, addresses and telephone numbers of sources of spare parts.
- .6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
- .7 Cross-reference to warranty certificates as applicable.
- .8 Starting point and duration of warranty period.
- .9 Summary of maintenance procedures required to continue warranty in force.
- .10 Cross-Reference to specific pertinent Operation and Maintenance manuals.
- .11 Organization, names and phone numbers of persons to call for warranty service.
- .12 Typical response time and repair time expected for various warranted equipment.
- .4 Contractor's plans for attendance at 4 and 9 month post-construction warranty inspections.
- .5 Procedure and status of tagging of equipment covered by extended warranties.
- .6 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.
- .10 Respond in timely manner to oral or written notification of required construction warranty repair work.
- .11 Written verification to follow oral instructions.
- .1 Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1        Section 01 74 11 - Cleaning
- .2        Section 01 74 21 21 - Construction/Demolition Waste Management and Disposal.

**1.2                REFERENCES**

- .1        CSA International
  - .1        CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.
- .2        U.S. Environmental Protection Agency (EPA)/Office of Water
  - .1        EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

**1.3                ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Submit in accordance with Section 01 74 21 - Construction/Demolition Waste Management Disposal.
- .2        Submit demolition drawings:
  - .1        Submit for review and approval by Consultant shoring and underpinning drawings stamped and signed by professional engineer registered or licensed in the Province of <Insert Value> Canada, showing proposed method.

**1.4                SITE CONDITIONS**

- .1        If material resembling spray or trowel-applied asbestos or other designated substance listed as hazardous be encountered, stop work, take preventative measures, and notify Consultant immediately.
  - .1        Proceed only after receipt of written instructions have been received from Departmental Representative.
- .2        Notify Departmental Representative before disrupting building access or services.

**Part 2            Products**

**2.1                NOT USED**

- .1        Not used.

## **Part 3            Execution**

### **3.1                EXAMINATION**

- .1      Inspect site with Departmental Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.
- .2      Locate and protect utilities. Preserve active utilities traversing site in operating condition.
- .3      Notify and obtain approval of utility companies before starting demolition.
- .4      Disconnect, cap, plug or divert, as required, existing public utilities within the property where they interfere with the execution of the work, in conformity with the requirements of the authorities having jurisdiction. Mark the location of these and previously capped or plugged services on the site and indicate location (horizontal and vertical) on the record drawings. Support, shore up and maintain pipes and conduits encountered.
  - .1      Immediately notify Consultant and utility company concerned in case of damage to any utility or service, designated to remain in place.
  - .2      Immediately notify the Departmental Representative should uncharted utility or service be encountered, and await instruction in writing regarding remedial action.

### **3.2                PREPARATION**

- .1      Temporary Erosion and Sedimentation Control:
  - .1      Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to: sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever is more stringent.
  - .2      Inspect, repair, and maintain erosion and sedimentation control measures during demolition.
  - .3      Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal after completion of demolition work.
- .2      Protection of In-Place Conditions:
  - .1      Prevent movement, settlement, or damage to adjacent structures, to remain in place. Provide bracing and shoring required.
  - .2      Keep noise, dust, and inconvenience to occupants to minimum.
  - .3      Protect building systems, services and equipment.
  - .4      Provide temporary dust screens, covers, railings, supports and other protection as required.
  - .5      Do Work in accordance with occupation health and safety regulations and all other applicable regulations in effect at the Place of the Work.
- .3      Demolition/Removal:
  - .1      Remove items as indicated.
  - .2      Removal of Pavements, Curbs and Gutters:

- .1 Square up adjacent surfaces to remain in place by saw cutting or other method approved by Departmental Representative.
- .2 Protect adjacent joints and load transfer devices.
- .3 Protect underlying and adjacent granular materials.
- .3 Remove parts of existing building to permit new construction.
- .4 Trim edges of partially demolished building elements to tolerances as defined by Departmental Representative to suit future use.

### **3.3 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Refer to demolition drawings and specifications for items to be salvaged for reuse.
- .4 Waste Management: separate waste materials for reuse in accordance with Section 01 74 21.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION**

**Part 1        General**

**1.1            RELATED REQUIREMENTS**

- .1        Section 07 56 00 – Protected Membrane Roofing.
- .2        Division 26 – Electrical.

**1.2            MEASUREMENT AND PAYMENT**

- .1        Measure supply and installation of precast parking curbs in units of each type and size installed.

**1.3            REFERENCES**

- .1        ASTM International
  - .1        ASTM C109/C109M-08, Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 in. or 50 mm Cube Specimens).
  - .2        ASTM C260-06, Standard Specification for Air-Entraining Admixtures for Concrete.
  - .3        ASTM C330-09, Standard Specification for Lightweight Aggregates for Structural Concrete.
  - .4        ASTM C494/C494M-10a, Standard Specification for Chemical Admixtures for Concrete.
  - .5        ASTM C827-10, Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures.
  - .6        ASTM C939-10, Standard Test Method for Flow of Grout for Preplaced-Aggregate Concrete (Flow Cone Method).
- .2        CSA International
  - .1        CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
  - .2        CSA A23.4-09, Precast Concrete-Materials and Construction.
  - .3        CSA A3000-08, Cementitious Materials Compendium.
  - .4        CSA G30.18-09, Carbon and Steel Bars for Concrete Reinforcement.

**1.4            ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Product Data:



- .1 Submit manufacturer's instructions, printed product literature and data sheets for concrete curbs and include product characteristics, performance criteria, physical size, mix design, finish and limitations.
- .3 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in the Place of the Work.
- .4 Samples:
  - .1 Submit duplicate samples, minimum 300 x 300 x 50 mm, of precast concrete paver complete with Luxfer Prism insert.

## **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect concrete curbs from damage.
  - .3 Replace defective or damaged materials with new.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Portland cement: to CSA A23.1/A23.2 and CSA 3000.
- .2 Water: to CSA A23.1/A23.2.
- .3 Aggregates: to CSA A23.1/A23.2.
  - .1 Coarse aggregates to be high density.
  - .2 Low density aggregate for lightweight concrete: to ASTM C330.
- .4 Air entraining admixture: to ASTM C260.
- .5 Chemical admixtures: to ASTM C494/C494M. Use of accelerating or set retarding admixtures for cold and hot weather placing to approval of Departmental Representative.
- .6 Supplementary cementing materials: to CSA A3000.

- .7 Shrinkage compensating grout: premixed compound consisting of metallic aggregate, Portland cement, water reducing and plasticizing agents.
  - .1 Compressive strength: 35 MPa at 28 days.
  - .2 Consistency:
    - .1 Fluid: to ASTM C827. Time of efflux through flow cone ASTM C939, under 30 seconds.
    - .2 Flowable: to ASTM C827. Flow table, 5 drops in 3 seconds, ASTM C109/C109M, applicable portion 125 to 145%.
    - .3 Plastic: to ASTM C827. Flow table, 5 drops in 3 seconds, ASTM C109/C109M, applicable portions 100 to 125%.
    - .4 Dry pack: to manufacturer's requirements.
- .8 Reinforcing steel: to Section 03 20 00 - Concrete Reinforcing.
- .9 Stair abrasive inserts:
  - .1 35 mm wide x 6 mm thick mill finish aluminum extrusion.
  - .2 Provide insert with 2 strips of not less than 65% virgin grain Aluminum Oxide abrasive, black.
- .10 Luxfer Prisms: Supplied by Owner. Refer to Section 01 11 00.

## **2.2 CONCRETE MIXES**

- .1 Proportion concrete in accordance with CSA A23.1/A23.2, to following requirements:
  - .1 Type HSb cement.
  - .2 Minimum compressive strength at 28 days: 35 MPa.
  - .3 Class of exposure: F-1.
  - .4 Nominal size of coarse aggregate: 10 mm.
  - .5 Chemical admixtures: in accordance with ASTM C494/C494M.
  - .6 Supplementary cementing materials: in accordance with CSA A3000.

## **2.3 FABRICATION**

- .1 Fabricate: to CSA A23.4, as indicated.
- .2 Finish: commercial grade, retarder finish or light sandblast finish.
- .3 Cast in Luxfer Prisms into pavers as indicated.
- .4 Embed 6 mm inserts at 200 mm on centre around perimeter of underside of pavers for attachment of LED light strip, as indicated.
- .5 Coordinate fabrication of stair treads and landings with Structural.

- .6 Embed aluminum abrasive inserts into leading edge of stair treads and landings.

### **Part 3 Execution**

#### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for precast concrete installation in accordance with manufacturer's written instructions.
  - .1 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

#### **3.2 INSTALLATION**

- .1 Install precast concrete pavers as indicated, on paving pedestals as specified in Section 07 56 00.
- .2 Coordinate attachment of lighting strip with Division 26.
- .3 Install level, flush and square.
- .4 Replace damaged and defective units as directed by Departmental Representative.

#### **3.3 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

#### **3.4 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by precast concrete specialties installation.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 07 56 00 – Protected Membrane Roofing.

**1.2 REFERENCES**

- .1 American Society for Testing Materials (ASTM):
  - .1 ASTM C 309 - Liquid Membrane-Forming Compounds Having Special Properties of Curing and Sealing Concrete.
- .2 International Concrete Repair Institute (ICRI):
  - .1 ICRI Guideline Number 03732: and Specifying Concrete Surface Preparation for Sealers, Coatings and Polymer Overlays.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical properties, finish and limitations.
  - .2 Manufacturer's product data to describe:
    - .1 Surface preparation.
    - .2 Primers.
    - .3 Application instructions
    - .4 Compatibility with other waterproofing materials which cementitious crystalline waterproofing may come in contact with.
- .3 Certification stating applicator is experienced in the application of the specified product.

**1.4 QUALITY ASSURANCE**

- .1 Manufacturer Qualifications: Minimum 5 year experience manufacturing similar products.
- .2 Installer Qualifications: Minimum 2 year experience installing similar products.
- .3 Mock Up: In a location designated by the Departmental Representative, place a minimum 10 square meters mock up using materials, procedures and personnel proposed to be used on the project. During mock-up and initial period of installation, the manufacturer of the surface hardener will provide, at no cost, the service of a trained employee to aid in securing proper use of the product.

**1.5 PRE-INSTALLATION MEETINGS**

- .1 Pre-installation Meeting: Convene a pre-installation meeting three weeks before the start of application of the concrete topping material. Require attendance of parties directly affecting the work of this Section, including Contractor, Departmental Representative, applicator, and manufacturer representative.

## **1.6 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Deliver all materials and store in their original unopened packages, in undamaged condition with manufacturer's seals and labels intact.
  - .2 Store materials in waterproof and weatherproof shelters, built with floor off ground.
  - .3 All material that becomes lumpy will be rejected.

## **1.7 SITE CONDITIONS**

- .1 Ambient Conditions:
  - .1 Follow all manufacturer's specifications and recommendations for storage temperatures ambient air temperatures and surface application conditions.
- .2 Substrate Conditions:
  - .1 Proceed with installation only after contaminants capable of interfering with adhesion are removed from joint substrates

## **1.8 ENVIRONMENTAL REQUIREMENTS**

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Health Canada.
- .2 Ventilate area of work as directed by Departmental Representative by use of approved portable supply and exhaust fans.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Concrete Topping: One-component, shrinkage-compensated, polymer-modified, fast-setting cementitious mortar with a corrosion inhibitor and silica fume:
  - .1 Mapecem 102, as manufactured by Mapei.
  - .2 Other preapproved product.
- .2 Bonding agent: as recommended by the manufacturer.
- .3 Extending aggregate: non-reactive, washed, clean, saturated surface dry, 10 mm pea gravel.

**Part 3            Execution**

**3.1                CONDITION OF SURFACE**

- .1      Examine work of other trades for defects or discrepancies which will prejudice a proper installation of the work of this Section, and if such conditions exist, notify the Departmental Representative in writing.
- .2      Obtain the Departmental Representative's acceptance before commencing any corrective measures required to work of other trades.
- .3      Commencement of installation of any part of this work constitutes acceptance of the work done under other Sections.

**3.2                PROTECTION**

- .1      Prior to installation, protect materials against freezing and high temperatures detrimental to stability of the product.
- .2      Following installation of the work, protect application against damage by abrading and the like.
- .3      When required by limitations of product, protect materials used for work of this Section against freezing prior to, during and following installation.

**3.3                PREPARATION**

- .1      Clean surfaces thoroughly prior to installation.
- .2      Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- .3      Mechanically abrade surfaces where required by shot blasting, to achieve surface texture of the concrete comparable to I.C.R.I., 6 mm profile height, or as otherwise required by the material manufacturer.
- .4      Coat exposed reinforcing steel with bonding agent as recommended by the manufacturer.

**3.4                MIXING**

- .1      Mix as directed by the manufacturer.
- .2      Into a clean mixing pail, pour 4/5 of the recommended amount of cool, clean potable water.
- .3      Slowly add topping mix to water while mixing, using a low-speed mixer. Add as much of the remaining 1/5 of water as needed to achieve the desired consistency.
- .4      Mix for up to 4 minutes and remix to a smooth, homogenous consistency.
- .5      For an extended mix, add 20% by weight (4.99 kg) of extending aggregate.
- .6      Do not overmix.
- .7      Do not over water.

**3.5                APPLICATION**

- .1      Apply as directed by the manufacturer.
- .2      Apply a scrub coat of concrete topping slurry or bonding agent as directed by the manufacturer.

- .3 Apply concrete topping by trowel or screed to slopes indicated on the drawings and to minimum of 6 mm thickness and maximum of 50 mm thickness.
- .4 If thicker course is required use concrete topping with extending aggregate. Obtain Departmental Representatives acceptance prior to applying topping thicker than 50 mm.

### **3.6 CURING**

- .1 Protect placed material from excessively hot or windy conditions as directed by the manufacturer, using damp burlap, for the first 4 hours of curing.
- .2 Alternatively, apply a water-based curing compound conforming to ASTM C309.

**END OF SECTION**

**Part 1            General**

**1.1            RELATED REQUIREMENTS**

- .1        Section 04 03 42 – Historic – Replacing Stone.

**1.2            REFERENCES**

- .1        ASTM International
  - .1        ASTM C5-10, Standard Specification for Quicklime for Structural Purposes.
  - .2        ASTM C144-11, Standard Specification for Aggregate for Masonry Mortar.
  - .3        ASTM C185-08, Standard Test Method for Air Content of Hydraulic Cement Mortar.
  - .4        ASTM C207-06(2011), Standard Specification for Hydrated Lime for Masonry Purposes.
  - .5        ASTM C260/C260M-10a, Standard Specification for Air-Entraining Admixtures for Concrete.
  - .6        ASTM C270-12a, Standard Specification for Mortar for Unit Masonry.
  - .7        ASTM C780-12, Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
  - .8        ASTM C1072-11, Standard Test Method for Measurement of Masonry Flexural Bond Strength.
  - .9        ASTM C1489-15, Standard Specification for Lime Putty for Structural Purposes.
- .2        CSA International
  - .1        CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
  - .2        CAN/CSA-A179-04(R2009), Mortar and Grout for Unit Masonry.
  - .3        CAN/CSA-A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

**1.3            ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Product Data:
  - .1        Submit manufacturer's instructions, printed product literature and data sheets for mortar and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2        Prior to mixing or preparation of mortars submit for review to Departmental Representative confirmation of source or product data sheet of:
    - .1        Aggregate.
    - .2        Cement.
    - .3        Lime.
    - .4        Premixed products.



- .5 Pigments.
- .3 Samples:
  - .1 Provide samples in quantity and size in accordance with CAN/CSA-A179.
- .4 Test reports:
  - .1 Submit test results during site work as directed by Departmental Representative as follows:
    - .1 Sieve analysis: sand.
    - .2 Bulking analysis: sand.
    - .3 Air content: mortar mix in plastic state.
    - .4 Vicat cone penetration: mortar mix.
    - .5 Mortar compressive strength: at 7 and 28 days or otherwise required.

#### **1.4 QUALITY ASSURANCE**

- .1 Qualifications:
  - .1 Mechanics to have minimum of 5 years experience in lime mortar preparation.
  - .2 Mortar to be mixed by same mechanics throughout project.
- .2 Test Reports: submit certified test reports including sand gradation tests in accordance with CSA A179 showing compliance with specified performance characteristics and physical properties.
- .3 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .4 Existing mortar analysis: Analyze existing mortar for stone work for chemistry, water absorption, colour, compressive strength, etc. to obtain similar properties for new mortar mix.

#### **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store cementitious materials and aggregates in accordance with CSA A23.1/A23.2.
  - .3 Store lime putty in plastic lined sealed drums.
  - .4 Protect from weather, freezing and contamination.
  - .5 Remove rejected or contaminated material from site.
  - .6 Store and protect mortar materials from nicks, scratches, and blemishes.
  - .7 Replace defective or damaged materials with new.

## 1.6 SITE CONDITIONS

- .1 Ambient Conditions:
  - .1 Provide weather-tight enclosure to store materials and mix mortars, maintain air temperature above 10 degrees C at all times.
  - .2 Maintain maximum/minimum thermometers and relative humidity gauges on site and in enclosures.
    - .1 Maintain a daily record of temperature and humidity.
- .2 Install relative humidity and temperature equipment, record temperature and relative humidity and submit report to Departmental Representative.

## Part 2 Products

### 2.1 MATERIALS

- .1 Water: potable, clean and free from contaminants.
- .2 Sand: to CAN/CSA-A179.

Sieve Size	% By Weight Passing Each Sieve	% By Weight Retained on Each Sieve
No. 4 (4.75 mm)	100	0
No. 8	90	10
No. 16 (1.18 mm)	70	20
No. 30 (600 mm)	50	20
No. 50 (300 mm)	30	20
No. 100 (150 mm)	15	15
No. 200 (75 mm)	0	15

- .1 Sharp, screened and washed pit sand, free of organic material, with final grading and colour to review of Departmental Representative.
- .2 Custom blend sands where necessary to provide appropriate colour match and gradation to review of Departmental Representative.
- .3 Portland cement: to CAN/CSA-A3000.
- .4 Masonry cement: to CAN/CSA-A3000.
- .5 Lime:
  - .1 Processed Lime (Quicklime): to ASTM C5, fresh, finely ground and crushed; high calcium, 4 mm fines, dry bagged.
  - .2 Hydrated Lime:
    - .1 Dolomitic finishing lime, Type "S", to ASTM C207.
    - .2 Hydrated, high calcium, Type "N" masons' lime to ASTM C207.
  - .3 Air-entrained dolomitic lime, Type SA lime: between 7% and 12% air entrainment.
  - .4 Lime putty: high-purity dolomitic lime putty product that is fully slaked and screened for immediate use, to ASTM C1489.

- .6 Colour:
  - .1 coloured sand to match existing. Use minimum amount necessary.
  - .2 Maximum colour: 2% of total volume of aggregate.
  - .3 Match core of freshly broken sample of original mortar.
  - .4 Coloured admixtures: maximum 15% of binder content by mass.
- .7 Additives:
  - .1 Obtain written approval of Departmental Representative before using additives.
- .8 Air entrainment:
  - .1 Vinsol resin type: to ASTM C260/C260M.
- .9 Mortar mill:
  - .1 Mortar mill comprising mortar pan with adjustable cast iron sprung rollers on cranked roller shaft, steel scrapers and blades for lime putty mixing.
- .10 Spiral paddle mill comprising a mechanically driven rotating barrel with integral internal paddles for other than lime putty mixing
  - .1 Each batch add up to 6 large stones to tumble and pound mortar during mixing process.
- .11 Plasterer's metal troughs.

## **2.2 MORTAR MIXES**

- 2.3** Mortar for stone masonry: match existing, to CSA A179.

## **Part 3 Execution**

### **3.1 GENERAL PREPARATIONS**

- .1 Traditional Mortar:
  - .1 Prepare measuring boxes to ensure accurate proportioning of materials.
  - .2 Maintain separate measuring boxes for each component.
  - .3 Ensure sand is tested and volume corrected for bulking.
  - .4 Ensure air entraining agent is available together with a graduated container for accurate volume measurements.
  - .5 Ensure testing equipment is ready and in working order.
  - .6 Apply Vicat cone test to ensure desirable performance of the mortar and record results.
- .2 Premixed Mortar:
  - .1 Follow manufacturer's written instructions.
  - .2 Whole bag has to be prepared.
  - .3 Apply Vicat cone test to ensure desirable performance of the mortar and record results.

### 3.2 BULKING OF SAND

- .1 Test sand for bulking:
  - .1 At start of work.
  - .2 After each new delivery of sand.
  - .3 After severe change in weather.
- .2 Test and adjust sand quantities for bulking:
  - .1 Obtain sample of sand which accurately reflects average condition of pile of damp sand, as follows:
    - .1 Take 4 shovels full of sand, each from a different level of the pile, and mix thoroughly.
    - .2 Place sand in a conical pile and divide into 4 quarters with a board. Remove 2 opposite quarters from pile, and combine remaining 2 quarters and mix thoroughly.
    - .3 Repeat quartering and mixing procedure until a sample of size required for testing remains.
  - .2 Fill a 1-litre capacity jar, about two-thirds full with damp sand to be tested. Drop sand in loosely. Do not pack it in. Level off surface, measure depth of damp sand (D).
    - .1 Carefully empty sand into another container, and half fill first container with water.
    - .2 Pour back about half of test sample of sand slowly into water so it is entirely saturated. Rod it thoroughly to remove air.
    - .3 Add rest of sand, rodding again to remove air and level off surface. Measure depth of saturated sand (S), which will be less than depth of damp sand.
    - .4 Calculate percentage bulking using formula:  $(D-S) \times 100\% / S =$  percentage bulking; where D = depth of damp sand, and S = depth of saturated sand.
  - .3 Increase volume of sand by percentage bulking shown in test.

### 3.3 PREPARATION OF MORTAR

- .1 Lime Mortar:
  - .1 Prepare measuring boxes to ensure accurate proportioning of dry lime putty and sand.
  - .2 Mix dry lime and sand thoroughly in mortar mill, spiral- blade mechanical mixer for minimum 3 minutes. Do not add water. No spots or streaks of lime to remain upon completion of mixing.
  - .3 Add water as required.
- .2 Lime-Cement Mortar:
  - .1 Prepare measuring boxes to ensure accurate proportioning of dry lime putty and sand.

- .2 Mix dry lime and sand thoroughly in mortar mill, spiral- blade mechanical mixer for minimum 3 minutes. Do not add water. No spots or streaks of lime to remain upon completion of mixing.
- .3 Add water as required.
- .3 Lime Putty Mortar:
  - .1 Prepare lime putty from hydrated mason's lime by adding dry bagged hydrated lime to water. Stir and hoe the mass to form a thick cream.
  - .2 Seal containers.
  - .3 Label and date all containers.
  - .4 Keep prepared material from freezing. Discard frozen material.
  - .5 Allow to stand at least 48 hours in covered containers before use, preferably longer.
  - .6 Take lime putty from bins, siphon off water by screening lime through muslin, or cheesecloth, to remove excess water. Rework lime without adding water until it regains its plasticity by beating, ramming and chopping.
  - .7 Adjust sand for bulking as described in article 3.2.
  - .8 Mix lime putty with sand as required.

### **3.4 PREPARATION OF LIME-SAND ROUGHAGE (COARSE STUFF)**

- .1 Store lime sand roughage in air-tight plastic bins.
- .2 Keep prepared material from freezing. Discard frozen material.
- .3 Maintain measuring containers for correct quantity of materials for use in batches.
- .4 Thoroughly clean mortar boards, measuring boxes and mixers between batches.

### **3.5 MIXING**

- .1 General:
  - .1 Use batching box.
  - .2 Follow proper batching procedure.
  - .3 Monitor mixing time.
- .2 Mortar:
  - .1 Mix Characteristics:
    - .1 Pointing mortar: slightly stiffer than bedding mortar with a consistency such that the mortar can be hand-formed into a stiff ball.
    - .2 Record amount of water required to reach this consistency and use for subsequent mixes.
  - .2 Prepare only enough mortar to be used within two hours. Do not retemper mortar beyond this time.
- .3 Follow manufacturer instructions when premixed mortar is used.

- .4 Contractor to appoint 1 individual to mix mortar for duration of project. If this individual must be changed, mortar mixing must cease until new individual is trained, and mortar mix is tested.

### **3.6 CONSTRUCTION**

- .1 Do masonry mortar and grout work in accordance with CAN/CSA-A179 except where specified otherwise.

### **3.7 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Remove droppings and splashings using clean sponge and water.
- .4 Clean masonry with low pressure 15 to 45 psi clean water and soft natural bristle brush.
- .5 Obtain approval of Departmental Representative prior to using other cleaning methods for persistent stains.

### **3.8 PROTECTION OF COMPLETED WORK**

- .1 Cover completed and partially completed work not enclosed or sheltered at end of each work day.
- .2 Enclose and protect work using wetted burlap.
- .3 Cover with waterproof tarps to prevent weather from eroding recently laid material.
  - .1 Maintain tarps in place for minimum of 2 weeks after laying.
  - .2 Ensure that bottoms of tarps permit airflow to reach mortar in joints.
- .4 Anchor coverings securely in position.

**END OF SECTION**

**Part 1            General**

**1.1            RELATED REQUIREMENTS**

- .1            Section 02 41 99 – Demolition for Minor Works.
- .2            Section 04 03 42 – Historic – Replacing Stone

**1.2            ADMINISTRATIVE REQUIREMENTS**

- .1            Conduct a pre-dismantling meeting with Departmental Representative to verify project requirements, equipment, procedures and assigned storage areas. Comply with Section 01 31 19.

**1.3            ACTION AND INFORMATIONAL SUBMITTALS**

- .1            Provide submittals in accordance with Section 01 33 00.
- .2            Shop Drawings:
  - .1            Submit drawings stamped and signed by professional engineer registered or licensed in Province of Alberta.
  - .2            Provide drawings for shoring and bracing of laterally unsupported masonry as a result of dismantling stone.
  - .3            Photographically record stonework before and after dismantling.

**1.4            QUALITY ASSURANCE**

- .1            Qualifications:
  - .1            Mason: in accordance with Section 04 05 10.
  - .2            Site Superintendent: in accordance with Section 04 05 10.
  - .3            Dismantlers:
    - .1            Experience: minimum 5 year record of successful historic masonry dismantling on projects of similar size and complexity as this project.

**1.5            DELIVERY, STORAGE AND HANDLING**

- .1            Deliver, store and handle materials in accordance with Section 01 61 00
- .2            Salvage existing stones for stone repair materials:
  - .1            Stone units designated for replacement are to be selected and used for repair of stone units to remain and as repair materials.

**1.6            SITE CONDITIONS**

- .1            Ambient conditions:
  - .1            Loosen wet masonry only when temperature is above 5°C.
- .2            In temperature 5°C and below:

- .1 Keep stones dry.
- .2 Protect wet stones from freezing.

## **Part 2 Products**

### **2.1 NOT USED**

- .1 Not Used.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Examine masonry, staging and storage areas and notify Departmental Representative in writing of conditions detrimental to acceptable and timely completion of Work.

### **3.2 SITE VERIFICATION OF CONDITIONS**

- .1 Report in writing, to Departmental Representative areas of deteriorated stone not identified in the documents. Obtain Departmental Representative's approval and instructions for repair of stone before proceeding.
- .2 Stop work in that area and report to Departmental Representative immediately evidence of hazardous materials.

### **3.3 PREPARATION**

- .1 Obtain Departmental Representative's approval for alternative methodology and tools to be employed before commencing the work.
- .2 Clean stone surface of dust and stone chips.

### **3.4 PROTECTION**

- .1 Prevent damage to building which is to remain. Make good damage incurred.
- .2 Protect surrounding components from damage during work.
- .3 Make good damage to historic fabric.
- .4 Obtain Departmental Representative's approval for repair methodology.

### **3.5 SPECIAL TECHNIQUES**

- .1 Mark stone, on face, before removal using marking product which can be completely erased when required without damaging masonry unit:
  - .1 Ball-point pen on diachylon, attached to stone.
  - .1 Waxless chalk directly on stone.



- .2 Tracking relocated stones and other masonry units:
  - .1 Use numbering, marking, and positioning system to approval of Departmental Representative.
- .3 Mark/Identify:
  - .1 Stones and other elements or components to show identity and position.
  - .2 Wood platforms or other equipment used to transport and store stones.
  - .3 Work and storage areas.
  - .4 Location from which stones are removed on drawings, photographs and chart or card-index.
- .4 Stone location recording system.
  - .1 Prepare chart or card index to:
    - .1 Help locate stones or units when necessary.
    - .2 To manage availability of platforms.
    - .3 To manage work and storage areas.
  - .2 Keep chart or card index up-to-date and, if required, produce copy every day.
  - .3 Prepare chart or card index to contain relevant information system to approval of Departmental Representative.
- .5 Ensure that temporary marking will remain in use resistant to weather, handling and cleaning until final marking of stones.
- .6 Remove markings and adhesive without damaging units:
  - .1 Brush with vegetable fibre brush: either dry or with water.
  - .2 Use no solvent, acid or other chemical product

### **3.6 SALVAGE AND REUSE**

- .1 Removed stones intended to be replaced must be salvaged and catalogued. They may be used for repairs if each individual unit meets the following criteria:
  - .1 Sound.
  - .2 Free of salts.

### **3.7 METHOD FOR LOOSENING STONES**

- .1 Use approved methods to loosen stones which will cause no damage either to stones or to other architectural elements.
- .2 Use hand tools only.
- .3 Obtain Departmental Representative's approval for use of power tools before commencing work.

### **3.8 DISMANTLING AND MOVING STONES**

- .1 Avoid damaging arises of stone when removing mortar and freeing up.
- .2 Remove excess mortar using hand tools.

- .3 Use wood wedges where required to remove or dislocate stone.
  - .1 Use flat pry bars protected with impact absorbing protection (burlap, cardboard).
- .4 Use nylon hoisting belts. Use minimum 2 belts per stone.
- .5 Protect stone from damage when hoisting and lifting from position.
  - .1 Use wood shims to isolate units from hoisting belts.
- .6 Where damage occurs to stone, report to Departmental Representative.
- .7 Make good damage incurred at no additional cost to Contract.
- .8 Obtain review and approval of repaired damage by Departmental Representative.

### **3.9 HANDLING**

- .1 Usage of Lewis bolts for handling stone is permitted.
- .2 Place detached stones on wood surfaces during handling. Prevent contact with metal.
- .3 When stones are lowered to ground, place directly on wooden platform used for transport or storage.
- .4 Transport and keep stones on wooden platforms.
- .5 Ensure that sharp edges of stones do not come into contact with hard objects.

### **3.10 TEMPORARY STORAGE STAGING AREA**

- .1 Place stones in designated area of site for detailed inspection and for final marking, before storage.
- .2 Make stones accessible and retrievable when required.
- .3 If sufficient area is not available on site based on area shown on Drawings, arrange and pay for off-site storage of dismantled stone, including all transportation costs associated with moving stone to storage facility and delivery back to site for reinstallation.
  - .1 Ensure sufficient and appropriate protection and packaging of stone to prevent damage to stone during transportation and storage.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 04 03 08 – Historic – Mortaring
- .2 Section 04 03 39 – Historic – Dismantling Stone Masonry

**1.2 REFERENCES**

- .1 Definitions:
  - .1 Lewis: instrument inserted at top of stone as means of attachment in raising and lowering. Holds stone by means of keys or wedges fitted to dovetailed recess.
  - .2 Dogs: metal appliance for securing parts or members together by means of one or more projecting teeth or bent portions, lug, cramp.
  - .3 Fabricator: company having sufficient capacity to quarry, cut, and deliver stonework on schedule.
  - .4 Installer: company or person specializing in commercial stone work with 10 years documented experience. Employ skilled stone masons on site to do necessary field cutting as stones are set.
- .2 Reference Standards:
  - .1 ASTM International
    - .1 ASTM C97/C97M-09, Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone.
    - .2 ASTM C170/C170M-09, Standard Test Method for Compressive Strength of Dimension Stone.
    - .3 ASTM C503/C503M-10, Standard Specification for Marble Dimension Stone.
    - .4 ASTM C568/C568M-10, Standard Specification for Limestone Dimension Stone.
    - .5 ASTM C615/C615M-11, Standard Specification for Granite Dimension Stone.
    - .6 ASTM C616/C616M-10, Standard Specification for Quartz-Based Dimension Stone.
  - .2 CSA Group
    - .1 CAN/CSA-A179-04(R2014), Mortar and Grout for Unit Masonry.
    - .2 CSA A370-14, Connectors for Masonry.
    - .3 CAN/CSA-A371-04(R2014), Masonry Construction for Buildings.
  - .3 South Coast Air Quality Management District (SCAQMD)
    - .1 SCAQMD Rule 1168-A2011, Adhesive and Sealant Applications.

### **1.3 ADMINISTRATIVE REQUIREMENTS**

- .1 Pre-installation meetings:
  - .1 Convene a pre-installation meeting two weeks before the start of masonry work. Require attendance of parties directly affecting the work of this Section, including Contractor, Departmental Representative, and applicator.

### **1.4 QUALITY ASSURANCE**

- .1 Qualifications:
  - .1 Execute work by personnel experienced in preservation of historic masonry.
  - .2 Masons engaged by Masonry Contractor to have experience with historic masonry.
  - .3 Departmental Representative has right to reject masons who do not demonstrate appropriate abilities or experience. Refer to Section 01 61 00 - Common Product Requirements.
  - .4 Masons employed on this project throughout course of project must meet above requirements. Where, during course of project, masons leave work force, replacement masons must also meet requirements.

### **1.5 SITE CONDITIONS**

- .1 Ambient conditions:
  - .1 Maintain ambient temperature of minimum 10 degrees C after repointing masonry for:
    - .1 Minimum 7 days in summer.
    - .2 Minimum 30 days in cold weather conditions using dry heated enclosures.

## **Part 2 Products**

### **2.1 EXISTING STONE**

- .1 Use hard, sound, and clean existing stone salvaged on site.

### **2.2 MORTAR**

- .1 Mortar: in accordance with Section 04 03 08 - Historic - Mortaring.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify masonry, staging and storage areas and notify Consultant in writing of conditions detrimental to acceptable and timely completion of Work.
  - .1 Visually inspect substrate in presence of Departmental Representative.

- .2 Inform in writing Departmental Representative areas of deteriorated masonry not previously identified.
- .3 Obtain Consultant's approval and instructions for repair and replacement of masonry units before proceeding with repair work.
- .4 Stop work immediately and report to Departmental Representative evidence of hazardous materials.

### **3.2 PREPARATION**

- .1 Move and lift stone units using means to prevent damage. Submit stone units dropped or impacted to Departmental Representative for inspection and approval. Do not make holes or indentations for Lewises or dogs on face or top side of stone.
- .2 Indicate bedding planes of stone units. Duplicate bedding marks on usable pieces of cut stone.
- .3 Install and remove self-supporting scaffolding in accordance with Section 01 52 00 - Construction Facilities.
- .4 Protection of in-place conditions:
  - .1 Cover adjacent plant material and fragile surfaces.

### **3.3 RESETTING**

- .1 Fix dislodged masonry units in correct location with firm mortar.
- .2 Insert and compress firm mortar to within 50 mm of pointing surface. Allow mortar to set 24 hours. Damp cure required for minimum 7 days before pointing.
- .3 Pull out wood wedges when dried and shrunken and fill voids with mortar.
- .4 Point to surface in two layers.

### **3.4 STONE REMOVAL**

- .1 Stone removal in accordance with Section 04 03 39 - Historic - Dismantling Stone Masonry.
- .2 Remove loose material from stones. Create level surface 50 mm from masonry face for setting of stone face plates.
- .3 Clean dust, mortar and stone fragments from slot.

### **3.5 RAKING JOINTS**

- .1 Use manual raking tool to obtain clean masonry surfaces.
  - .1 Remove deteriorated and adhered mortar from masonry surfaces to sound mortar leaving square corners and flat surface at back of cut.
  - .2 Clean out voids and cavities encountered
- .2 Remove mortar without chipping, altering or damaging masonry units.
- .3 Clean by moderate water wash surfaces of joints without damaging texture of exposed joints or masonry units.

- .4 Flush open joints and voids; clean open joints and voids with low pressure water and if not free draining blow clean with compressed air.
- .5 Leave no standing water.
- .6 Where use of power tools to remove mortar is deemed appropriate by the Departmental Representative:
  - .1 Rake out using maximum 86 mm diameter blades to the centre of the joint only, to a maximum depth that is equal to half of the joint width. Mortar must remain on each side of the saw cut. Raking must not touch the masonry units.
  - .2 Stop saw cut 50 to 75 mm from end of vertical and discontinuous horizontal joints. Do not cut into masonry units.
  - .3 Notify the Departmental Representative to inspect the raking, prior to removing the remaining mortar with hand tools.
  - .4 Remove remaining mortar with hand tools.

### **3.6 STONE REPLACEMENT**

- .1 Co-ordinate bond pattern, coursing height and joint width with existing stonework in area selected by Departmental Representative.
- .2 Clean dust and stone fragments from slot.
- .3 Clean stone by washing with water and natural fibre brush before laying.
- .4 Before proceeding with Work, inspect cleaned surface with DCC Representative.
- .5 Install masonry ties, connectors and flashings in accordance with CSA A370 and CAN/CSA-A371 unless indicated otherwise.
  - .1 Apply asphalt emulsion to masonry ties.
  - .2 Obtain approval of Departmental Representative of placement of ties and connectors prior to placing mortar.
  - .3 Use non-corrosive ties and connectors.
- .6 Install anchors, dowels and cramps.
  - .1 Obtain approval of DCC Representative of placement of anchors, dowels and cramps prior to placing mortar.
  - .2 Use non-corrosive anchors, dowels and cramps to fix stone face plates.
- .7 Dampen slot's surfaces before applying mortar.
- .8 Apply bedding mortar.
  - .1 Lay stones on full beds of mortar.
  - .2 Lay heavy stones and projecting stones after mortar in courses below has hardened sufficiently to support weight.
  - .3 Prop and anchor projecting stones until wall above is set.
  - .4 Set large stones on water-soaked softwood wedges to support stone in proper alignment until mortar has set. Remove wedges when dry, do not break off.
  - .5 Set stones to match alignment of adjacent stones in full bed of mortar with vertical joints buttered and placed full except where otherwise specified.

- .6 Fill anchor completely, dowel and lifting holes and voids left by removed edges .
- .9 Fill vertical joints buttered and placed full in face, and at vertical joint between wythes.
- .10 Tool joints with a round jointer to provide smooth joints compressed uniformly concave.
- .11 Rake bedding mortar back to a minimum depth of 25 mm and make ready for pointing with pointing mortar in separate operation.
  - .1 Provide minimum 3-day damp cure to bedding mortar prior to pointing.
  - .2 Remove mortar dropping from face of stone before mortar is set. Sponge stone free of mortar along joints as work progresses.

### **3.7 REPOINTING**

- .1 Dampen joints and porous masonry units.
- .2 Keep masonry damp during performance of pointing.
- .3 Completely fill joint with mortar.
  - .1 Masonry units with worn rounded edges: maintain joint width by pointing back from exterior face.
  - .2 Avoid feather edges.
  - .3 Pack mortar solidly into voids and joints.
  - .4 Build-up pointing in layers not exceeding 25 mm in depth.
    - .1 Allow each layer to set before applying subsequent layers.
    - .2 Maintain joint width.
- .4 Tool and finish joints to match existing profile.
- .5 Remove excess mortar from masonry face before it sets.

### **3.8 PROTECTION OF WORK**

- .1 Cover completed and partially completed work not enclosed or sheltered at end of each work day.
  - .1 Extend membranes 0.5 m beyond surface area of work.
    - .1 Prevent finished work from drying out too rapidly.
- .2 Cover with waterproof tarps to prevent weather from eroding recently repointed material.
  - .1 Maintain tarps in place for minimum of 4 weeks after repointing.
  - .2 Ensure that bottoms of tarps permit airflow to reach mortar in joints.
- .3 Anchor coverings securely in position.
- .4 Damp cure:
  - .1 Provide damp cure for pointing mortars.
    - .1 Install and maintain wetted burlap protection during the curing process:
      - .1 Minimum 3 days.
    - .2 Wet mist burlap only - ensure no direct spray reaches surface of curing mortar.

- .3      Shade areas of work from direct sunlight and maintain constant dampness of burlap.
- .5      Protect from drying winds. Pay particular attention at corners.
- .6      Cover with waterproof tarps to prevent weather from eroding recently laid material.
  - .1      Maintain tarps in place for minimum of 4 weeks after laying.
  - .2      Ensure that bottoms of tarps permit airflow to reach mortar in joints.
- .7      Inspect tarps daily for duration of curing.

### **3.9            CLEANING**

- .1      Confirm acceptance of mock-up cleaning operations to demonstration from Consultant before starting cleaning work.
- .2      Clean stone work surfaces after repairs have been completed and mortar has set.
- .3      Clean stone surfaces of adhesive or mortar residue resulting from work performed without damaging stone or joints.
- .4      Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1      Leave Work area clean at end of each day.
- .5      Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
  - .1      Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- .6      Protect plants, grass vegetation and soil from accumulation of water used for cleaning.

**END OF SECTION**



**Part 1            General**

**1.1            RELATED REQUIREMENTS**

- .1            Section 07 56 00 - Protected Membrane Roofing.

**1.2            REFERENCES**

- .1            Journal of ASTM International (Vol.8, No. 9) Paper ID- JAI 103772 - Electrical Conductance Methods for Locating Leaks in Roofing and Waterproof Membranes.

**1.3            SYSTEM DESCRIPTION**

- .1            Installation of permanent active monitoring grid and access closure with related testing and measuring apparatus to facilitate detection of membrane leak locations. The leak locate function is performed at the grid access closure and monitored by remote computer system connected by internet to the building intelligence monitoring center.

**1.4            ADMINISTRATIVE REQUIREMENTS**

- .1            Coordination: Coordinate with other work having a direct bearing on work of this section.
- .2            Pre-installation Meeting: Convene four (4) weeks before starting work of membrane roofing.
  - .1            Review preparation and installation procedures and coordinating and scheduling required with related work.

**1.5            ACTION AND INFORMATIONAL SUBMITTALS**

- .1            Submit in accordance with Section 01 33 00. – Submittal Procedures.
- .2            Qualifications: Proof of survey company qualifications.
- .3            Equipment information: Provide manufacture's catalogue pages indicating survey equipment capabilities.
- .4            Test Protocol: Manufacturer's written description of testing method and protocol.
- .5            Test Reports: Test reports from approved testing agency certifying that leak detection system conforms to performance characteristics and testing requirements specified.

**1.6            QUALITY ASSURANCE**

- .1            Survey Company Qualifications: Company specializing in conducting leak detection surveys on the types of membranes specified for this Project with a minimum of five (5) years documented experience.

**1.7 SITE CONDITIONS**

- .1 Environmental Requirements: Do not perform survey(s) during rain or in freezing conditions.
- .2 Existing Conditions:
  - .1 Membranes to be surveyed must be non-conductive, broom-clean and be free of overburden, construction materials, equipment and debris.

**Part 2 Products**

**2.1 SURVEY COMPANIES**

- .1 Conduct survey using one of the following companies or their authorized agents:
  - .1 Detec Systems Ltd.: 1.855.753.3832 [info@detecsystems.com](mailto:info@detecsystems.com)
  - .2 SMT Research Ltd.: 778-373-2070 or 778-373-2071. [www.smtresearch.ca](http://www.smtresearch.ca)
  - .3 Other preapproved survey company.

**2.2 EQUIPMENT**

- .1 Roof Membrane Integrity Survey (RMIS): Wheel-mounted sweeper unit with metering gauges and audible alert.

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Verify existing conditions before starting work.
- .2 Verify that the waterproof membrane extends above all overburden to avoid unintended electrical paths to ground.
- .3 Verify availability of hose and water supply of sufficient length to reach all points on surfaces to be surveyed.
- .4 Coordinate with Construction Manager to correct unsatisfactory conditions.
- .5 Commencement of work by surveyor is acceptance of installation conditions.

**3.2 SURVEY PROCEDURE**

- .1 Membrane Integrity Survey: Survey horizontal and vertical surfaces as specified including inside and outside corners of parapets and equipment curbs. Use Roof Membrane Integrity Scanner (RMIS) and/or Vertical Surface Leak Locate (VSL) test units as appropriate to surfaces being surveyed and as selected by surveyor.
- .2 Mark breach locations on membrane with approved marker.

- .3 Daily Field report:
  - .1 Identify date, time, and weather conditions when survey was conducted. Provide general description of survey/survey equipment and process. Describe membrane breaches located and areas not accessible by surveying equipment. Document with photographs, plan view scale drawing with approximate location of breaches noted.
- .4 Perform surveys as follows:
  - .1 Immediately following installation of roof membrane.
  - .2 Just prior to installation of materials above system.

### **3.3 FIELD QUALITY CONTROL**

- .1 Require site attendance of roofing manufacturer representative during installation of the Work.
- .2 Correct identified defects or irregularities.
- .3 Field Reports: Identify date, time, and weather conditions when surveys are conducted.
  - .1 Provide general description of scan/survey equipment and process.
  - .2 Describe typical membrane breaches located and areas not accessible by scanning equipment.
  - .3 Document survey with photographs and plan view scale drawings with approximate location of breaches noted.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1        Section 07 56 00 – Protected Membrane Roofing.
- .2        Section 07 92 00 – Joint Sealants.

**1.2                ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Product Data:
  - .1        Submit manufacturer's instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical properties, finish and limitations.
  - .2        Manufacturer's product data to describe:
    - .1        Surface preparation.
    - .2        Primers.
    - .3        Application instructions
    - .4        Compatibility with other waterproofing materials which cementitious crystalline waterproofing may come in contact with.

**1.3                CLOSEOUT SUBMITTALS**

- .1        Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2        Operation and Maintenance Data: submit operation and maintenance data for incorporation into manual.

**1.4                DELIVERY, STORAGE AND HANDLING**

- .1        Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2        Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3        Storage and Handling Requirements:
  - .1        Deliver all materials and store in their original unopened packages, in undamaged condition with manufacturer's seals and labels intact.
  - .2        Store materials in waterproof and weatherproof shelters, built with floor off ground.
  - .3        All material that becomes lumpy will be rejected.

**1.5                SITE CONDITIONS**

- .1        Ambient Conditions:
  - .1        Follow all manufacturer's specifications and recommendations for storage temperatures ambient air temperatures and surface application conditions.

- .2 Substrate Conditions:
  - .1 Proceed with installation only after contaminants capable of interfering with adhesion are removed from joint substrates

## **1.6 ENVIRONMENTAL REQUIREMENTS**

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Health Canada.
- .2 Ventilate area of work as directed by Departmental Representative by use of approved portable supply and exhaust fans.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Concrete Waterproofing: premixed compound comprised of chemicals, quartz, sand and cement supplied in a powder form ready to mix with water. One of the following acceptable products:
  - .1 Kryton Krystol T1 & T2.
  - .2 Tremco "Permaquik Super 200".
  - .3 Xypex "Concentrate" slurry coat.
  - .4 Vandex "Super".
  - .5 W.R. Meadows "CEM-KOTE CW PLUS".
- .2 Mortar: to form coves, fill cracks and honey combs, fill form tie holes, fill reglets formed over construction joints. One of the following acceptable products:
  - .1 Kryton Krystol Grout.
  - .2 Tremco "Permaquik Mortar 300".
  - .3 Xypex "Concentrate" Dry-Pac.
  - .4 Vandex "Premix" mortar consistency.
  - .5 W.R. Meadows "Meadowcrete OV".

## **Part 3 Execution**

### **3.1 CONDITION OF SURFACE**

- .1 Examine work of other trades for defects or discrepancies which will prejudice a proper installation of the work of this Section, and if such conditions exist, notify the Departmental Representative in writing.
- .2 Obtain the Departmental Representative's acceptance before commencing any corrective measures required to work of other trades.
- .3 Commencement of installation of any part of this work constitutes acceptance of the work done under other Sections.

### **3.2 PROTECTION**

- .1 Prior to installation, protect materials against freezing and high temperatures detrimental to stability of the product.
- .2 Following installation of the work, protect application against damage by abrading and the like.
- .3 When required by limitations of product, protect materials used for work of this Section against freezing prior to, during and following installation.

### **3.3 PREPARATION**

- .1 Prior to application of coating, clean surfaces of concrete, remove loose scale, grease, oil and dirt. Form tie cones are to be removed and all metal broken back.
- .2 Route out all faulty materials back to sound concrete including honeycombed areas.
- .3 Fill all holes with cement mix. Point up holes, cracks and remove concrete fins.
- .4 Concrete surface to be moist but not wet.
- .5 Prepare concrete surfaces in accordance with manufacturer's specifications and recommendations.

### **3.4 MIXING**

- .1 Use separate buckets for measuring waterproofing products and water by volume. Use only clean water for mixing with waterproofing products. Ensure that water temperature is above 15°C.
- .2 Mix thoroughly in the proportion of 2 1/2 parts powder to 1 part water by volume or as otherwise noted in the manufacturer's printed literature.
- .3 Mix only enough slurry that can be applied within 20 to 30 minutes. Stir frequently but do not add more water to restore workability.

### **3.5 WATERPROOFING/APPLICATION**

- .1 Do not apply waterproofing until surfaces have been prepared and are ready to receive waterproofing.
- .2 Apply cementitious waterproofing to the inside face of walls and to top surface of floor in locations indicated.
- .3 Apply waterproofing material in slurry consistency in two passes. Apply the second pass while the first pass is still tacky (approximately 10 - 15 minutes). Apply at rate as noted in the manufacturer's literature to suit application. Apply the material to provide a uniform coating using a stiff masonry brush and worked into every irregularity across the concrete surface.
- .4 Carry waterproofing up walls to main floor slab level.
- .5 The application is to be made immediately after the forms are removed and no free water is apparent on the surface.
- .6 Fill all form tie holes with the material in a mortar consistency. Apply one slurry coat of material on all routed areas then follow up with the second coat before the first has reached its initial set.

- .7 At the junction of the wall and floors, fill the rivelets with the material in a mortar consistency. Do not apply mortar until sealant bead has been installed and sufficiently cured.
- .8 Broadcast waterproofing to horizontal concrete surfaces at time of initial set and mechanically float into the concrete. Do not leave waterproofing material as a layer on the concrete. Apply waterproofing to ensure that concrete will not spall. Apply at rate as noted in the manufacturer's literature to suit application.
- .9 Keep all waterproof coated walls and slabs from dehydrating too quickly. Moisture cure all waterproof coatings for a minimum of 2 days after application. Do not flood surfaces that have been floated with waterproofing products for a minimum of 24 hours after application.
- .10 Do not use perforated hoses to trickle water over waterproofed surfaces.
- .11 Do not allow waterproof coating to freeze or to be applied in below freezing temperatures.
- .12 Allow for air circulation in enclosed areas.

**END OF SECTION**

**Part 1            General**

**1.1               RELATED REQUIREMENTS**

- .1       Section 07 92 00 – Joint Sealants.

**1.2               REFERENCE STANDARDS**

- .1       ASTM International
  - .1       ASTM A653/A653M-11: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .2       ASTM A792/A792M-10, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot Dip Process.
- .2       UL Canada (ULC):
  - .1       CAN/ULC-S102-10: Surface Burning Characteristics of Building Materials and Assemblies.
- .3       Sheet Metal and Air Conditioning Contractors National Association Inc. (SMACNA):
  - .1       Architectural Sheet Metal Manual, 7th edition, 2012.

**1.3               ADMINISTRATIVE REQUIREMENTS**

- .1       Pre-installation Meeting: Conduct a pre-installation meeting at the job site attended by Departmental Representative, Panel Installer, and Contractors of related trades. Coordinate requirements in relation to insulated wall panel assembly, installation of any separate air/water barriers, treatment of fenestration, and other requirements specific to the project.

**1.4               SUBMITTALS**

- .1       Submit shop drawings to the Departmental Representative for review in accordance with Section 01 33 00.
- .2       Show all pertinent dimensions, materials, details, flashings, trim, fastenings and as required to completely describe installation including all junctures of panels with other materials.
- .3       Submit 150 mm x 150 mm corner sample of formed back pan, insulation and flashing material.

**Part 2           Products**

**2.1               PERFORMANCE REQUIREMENTS**

- .1       Install insulated metal panels to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking or fastener disengagement.



- .2 Provide insulated metal panel and trim that do not allow water infiltration into the building interior.

## **2.2 MATERIALS**

- .1 Sheet steel for back pan: 0.91 mm thick base metal, commercial quality sheet steel to ASTM A653/A653M with Z275 designation zinc coating.
- .2 Sheet steel for flashing: Factory precoated .76 mm sheet steel to ASTM A653/A653M, structural quality, grade 230, with Z275 zinc coating, or aluminum-zinc alloy coated steel sheet: to ASTM A792/A792M, commercial quality, grade 33 with AZ180 coating.
  - .1 Finish: Factory finish by coil coating process, colours as indicated on the Drawings, using one of the following coatings:
    - .1 Silicone Modified Polyester (SMP). to CSSBI S8.
- .3 Mineral Fibre Insulation: mineral fibre, semi-rigid board insulation, 4 lb/ft<sup>3</sup> density, 610 mm x 1219 mm board size, asbestos free, minimum R value of 4.2 per inch, surface burning characteristics when tested in accordance with CAN/ULC S102, not to exceed flame spread of 5 and smoke developed of 0. thickness as indicated, one of the following:
  - .1 Johns Manville Cladstone.
  - .2 Rockwool CavityRock.
  - .3 Thermafiber RainBarrier 45.
- .4 Waterproofing membrane: Multi-component, flexible PMMA resin and polyester fleece reinforcement fabric, Parapro 123 Flashing System as manufactured by Siplast, or preapproved alternative product.
- .5 Sealant: as specified in Section 07 92 00.
- .6 Fasteners: 300 series stainless steel, non-corrosive.
- .7 Bituminous Paint: alkali resistant bituminous paint.

## **2.3 FABRICATION**

- .1 Field measure openings or obtain guaranteed dimensions from the Contractor.
- .2 Fabricate metal flashing and other sheet metal work to applicable SMACNA specifications and according to details.
- .3 Apply specified finishes to conformance with manufacturer's standards and according to coating manufacturer's instructions.
- .4 Form materials square, true and accurate to size, free from distortions and other defects detrimental to appearance or performance.
- .5 Fit insulation into the back panels and secure in place by being impaled onto welded pins and retained by integral discs.

**Part 3            Execution**

**3.1                INSPECTION**

- .1        Examine substrates and related work prior to installation. Do not proceed until all defects have been brought to the attention of the Departmental Representative and General Contractor and have been corrected.

**3.2                INSTALLATION**

- .1        Install panels as detailed on the drawings and reviewed shop drawings.
- .2        Place trim and trim fasteners only as indicated per details on the approved shop drawings.
- .3        Back paint sheet metal with bituminous paint on surfaces in contact with concrete, masonry, other cementitious materials, or dissimilar metal, including aluminum flashing.
- .4        Mix and install waterproofing membrane in strict accordance with manufacturer's instructions. Completely waterproof back panel and lap waterproofing membrane onto adjacent surfaces as detailed. Permit membrane to cure in accordance with manufacturer's instructions.
- .5        Install all flashings as detailed on the drawings and reviewed shop drawings. Caulk all joints between flashing sections to form a complete watertight installation.
- .6        Place a continuous bead silicone sealant around perimeter of panel.
- .7        Repair or replace all damaged materials to the satisfaction of the Departmental Representative. Charge the cost of repairing or replacing damaged panels to the trade responsible.

**3.3                CLEANING AND PROTECTION**

- .1        Touch-up, repair or replace metal panels and trim that have been damaged.

**END OF SECTION**

**Part 1            General**

**1.1               RELATED REQUIREMENTS**

- .1       Section 07 01 53 – Membrane Integrity Survey.
- .2       Section 07 16 00 – Cementitious Crystalline Waterproofing.
- .3       Section 07 92 00 – Joint Sealants

**1.2               REFERENCES**

- .1       ASTM International
  - .1       ASTM C578-11be1, Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
  - .2       ASTM C726-12, Standard Specification for Mineral Fiber Roof Insulation Board.
  - .3       ASTM C728-05(2010), Standard Specification for Perlite Thermal Insulation Board.
  - .4       ASTM C1002-07, Standard Specification for Steel Self-Piercing, Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
  - .5       ASTM C1177/C1177M-08, Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
  - .6       ASTM D41/D41M-11, Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
  - .7       ASTM D312-00(2006), Asphalt Used in Roofing.
  - .8       ASTM D448-08, Standard Classification for Sizes of Aggregate for Road and Bridge Construction.
  - .9       ASTM D2178-04, Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing.
  - .10      ASTM D6162-00a(2008), Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fibre Reinforcements.
  - .11      ASTM D6163-00(2008), Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fibre Reinforcements.
  - .12      ASTM D6164/6164M-11, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
- .2       Canadian General Standards Board (CGSB)
  - .1       CGSB 37-GP-9Ma-83, Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
  - .2       CGSB 37-GP-56M-80b(A1985), Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.

- .3 CAN/CGSB-51.33-M89, Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.
- .3 Canadian Roofing Contractors Association (CRCA)
  - .1 CRCA Roofing Specifications Manual, 2011.
- .4 CSA International
  - .1 CAN/CSA-A123.4-04(R2008), Asphalt for Construction of Built-Up Roof Coverings and Waterproofing Systems.
  - .2 CAN/CSA-A123.16-04(R2009), Asphalt-Coated Glass-Base Sheet.
- .5 International Organization for Standardization (ISO):
  - .1 ISO 10545-6-2012, Ceramic tiles -- Part 6: Determination of resistance to deep abrasion for unglazed tiles.
- .6 National Floor Safety Institute (NFSI):
  - .1 ANSI/NFSI B101.3-2012, Test Method for Measuring Wet DCOF of Common Hard-Surface Floor Materials.
- .7 Underwriters' Laboratories of Canada (ULC)
  - .1 CAN/ULC-S701-11, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
  - .2 ULC - List of Equipment and Materials for:
    - .1 Building Materials.
    - .2 Fire Resistance.
    - .3 Fire Stop Systems and Components.

### **1.3 PREINSTALLATION MEETING**

- .1 Before commencement of work on site, arrange a site meeting to be attended by the General Contractor's superintendent, the membrane manufacturer, the Subcontractor's representative, the Subcontractor's foreman for this project, the membrane integrity survey firm representative and the Departmental Representative.
- .2 Review requirements for waterproofing, including surface preparation specified under other Sections, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

### **1.4 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties.
- .3 Provide product data on all components of the inverted roof assembly.
- .4 Shop Drawings: Show locations and extent of waterproofing.

- .5 Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins to adjoining waterproofing, and other termination conditions.
- .6 Samples: For the following products:
  - .1 300 mm square of flashing sheet.
  - .2 300 mm square of insulation.
  - .3 300 mm square sample of drainage panel.
- .7 Installer Certificates: Signed by manufacturers certifying that installers comply with requirements.
- .8 Certifications:
  - .1 Certification from manufacturer that membrane material is produced at facility having full time quality control, with each batch of material tested to assure conformance with published physical properties.
  - .2 Certification from manufacturer that all waterproofing components are being supplied by a single-source manufacturer.
  - .3 Certification from manufacturer and installer that they have reviewed and approved all waterproofing material systems and specific materials for this project and that they are in agreement that the proposed materials are appropriate for each surface and condition.
  - .4 Certification from manufacturer that all components of the green roof assembly are being supplied and warranted by a single source.
- .9 Product Test Reports: From a qualified independent testing agency indicating and interpreting test results of waterproofing for compliance with requirements, based on comprehensive testing of current waterproofing formulations.
- .10 Sample Warranty: Copy of special waterproofing manufacturer's and installer's warranty stating obligations, remedies, limitations, and exclusions before starting waterproofing.

## **1.5 QUALITY ASSURANCE**

- .1 Perform Work in accordance with Manufacturer's instructions.
- .2 Maintain 1 copy of each document on site.
- .3 Qualifications:
  - .1 Manufacturer: company specializing in manufacturing products specified in this section with 10 years documented experience.
  - .2 Applicator: company specializing in performing work of this section approved by membrane manufacturer.
- .4 Obtain waterproofing materials, sheet flashings, protection course, and drainage panels through one source from a single manufacturer.
- .5 Mock-ups:
  - .1 Construct mock-up of roof membrane assembly and associated components and accessories to Section 01 45 00 - Quality Control.

- .2 Mock-up size: 3 x 3 m including membrane, insulation, filter fabric, pedestals, and pavers.
- .3 Locate mock-up where directed by the Departmental Representative.
- .4 Mock-up may not remain as part of the Work.

## **1.6 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store rolls of felt and membrane in upright position. Store membrane rolls with selvage edge up.
  - .3 Remove only in quantities required for same day use.
  - .4 Place plywood runways over work to enable movement of material and other traffic.
  - .5 Store sealants at +5 degrees C minimum.
  - .6 Store and protect roofing materials from nicks, scratches, and blemishes.
  - .7 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section 01 35 21 - LEED Requirements.
- .5 Packaging Waste Management: remove for reuse by manufacturer of crates, as specified in Waste Reduction Workplan in accordance with Section Section 01 35 21 - LEED Requirements.

## **1.7 FIRE PROTECTION**

- .1 Fire Extinguishers: maintain cartridge operated type with hose and shut-off nozzle, ULC labelled for A, B and C class protection. Size 9 kg or as indicated on roof per torch applicator, within 10 m of torch applicator.
- .2 Maintain fire watch for 1 hour after each days roofing operations cease.

## **1.8 SITE CONDITIONS**

- .1 Ambient Conditions:
  - .1 Do not install roofing during inclement weather when temperature remains below -18 degrees C for torch application, or to manufacturers' recommendations for mop application.
  - .2 Minimum temperature for solvent-based adhesive is -5 degrees C.
  - .3 Install roofing on dry deck, free of snow and ice, use only dry materials and apply only during weather that will not introduce moisture into roofing system.

- .4 Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.

## **1.9 WARRANTY**

- .1 Upon completion of the work, the contractor must supply the Departmental Representative with a No dollar limit (NDL) warranty direct from the waterproofing materials manufacturer covering the watertightness of the membrane and, material integrity of the other system components.
- .2 Total System Warranties. Covers watertightness of the roof membrane (labour and material) and material integrity of the roof assembly components. Duration: 15 Years.

## **Part 2 Products**

### **2.1 SYSTEM DESCRIPTION**

- .1 Hot rubberized asphalt protected membrane roofing patio (starting at top surface):
  - .1 Patio pavers.
  - .2 Paving pedestals
  - .3 Filter Fabric
  - .4 Insulation
  - .5 Drainage mat.
  - .6 Separation Sheet
  - .7 Waterproofing membrane.
  - .8 Surface Conditioner.

### **2.2 MANUFACTURERS - MEMBRANE MATERIALS**

- .1 Design based on Hydrotech MM6125EV.
- .2 Other acceptable manufacturers offering similar products.
  - .1 Henry Inc.
  - .2 Tremco.
- .3 Substitutions: refer to Section 01 61 00 - Common Product Requirements.

### **2.3 DECK PREPARATION AND COVERING**

- .1 Surface Conditioner: Cutback asphalt to CGSB 37-GP-9Ma.

### **2.4 COMPONENTS**

- .1 Membrane: Rubberized asphalt, to CAN/CGSB-37.50-M89.
- .2 Expansion joint sheet: manufacturer's recommended product equal to Hydrotech Heavy duty Elastosheet 6146.
- .3 Construction joint sheet: manufacturer's recommended product equal to Hydrotech Elastosheet 6147.

- .4 Reinforcing sheet for hair line cracks less than 1 mm: Reemay 2016 spun bonded polyester sheet as manufactured by Dupont.
- .5 Joint and corner reinforcement: Non-woven synthetic fibre sheet as recommended by the membrane manufacturer.
- .6 Joint Cover Sheet: High grade rubber sheets, supplied in uncut rolls, meeting manufacturer's specifications.
- .7 Separation Sheet 5 mm thick modified bitumen sheet or as recommended by the membrane manufacturer, equal to Hydrotech Hydroflex 30.
- .8 Insulation: extruded type polystyrene to CAN/ULC S701-05, Type 4, with 0.88 RSI per inch thickness; thickness as indicated on the drawings; types as follows:
  - .1 Provide insulation with a compressive strength of 414 kPa (60 p.s.i.); one of the following:
    - .1 Styrofoam Highload 60
    - .2 Owens Corning Foamular 600
- .9 At drains, waterproofing flange: manufacturer's recommended product equal to Hydrotech Elastosheet 6147 or 6148.
- .10 Expansion Joint Covers: waterproof expansion joint covers, comprising of a continuous material strip compounded from a specially formulated high grade rubber base elastomer with a reinforcing fabric embedded into the gelling elastomer matrix during manufacturing, with selvage edge on both sides of joint; expansion joint to accommodate up to 50 mm movement: Acceptable product:
  - .1 RedLine ROG as manufactured by Situra.
  - .2 Duoflex expansion sheet complete with Tremco uncured neoprene sheet.
- .11 Flexible Flashing: self adhering type, one of the following:
  - .1 "Bituthene 3000" as manufactured by Grace Construction Materials Ltd.
  - .2 "Hydrotech 5160" membrane as manufactured by Hydrotech Membrane Corporation.
  - .3 "Blue Skin SA" as manufactured by Henry Inc.
- .12 Protection Board: polypropylene co-polymer flexible hollow core board, minimum 2 mm nominal thickness, 36" x 48" size. Acceptable types:
  - .1 "Hydro-Shield waterproofing protection board.
  - .2 990-31 Protection Board as manufactured by Henry.
  - .3 3 mm thick asphaltic solid core board compatible with waterproofing membrane.
- .13 Retrofit roof drain: Thaler RDX30-A-RR Retrofit Roof Drain, or preapproved product.
- .14 Drainage mat: Prefabricated drain, complete with filter fabric. one of the following:
  - .1 Delta-Drain 9000 as manufactured by Cosella Dorken.
  - .2 Henry DB 9000.
  - .3 Hydrotech Hydordrain 700.
- .15 Filter Fabric/Geomat: Light top filter as supplied by Hydrotech Membrane Corporation.



- .16 Patio Pavers: Hydrapressed porcelain, square edged, factory cast for use as roof pavers:
  - .1 Size: 600 mm x 600 mm x 20 mm.
  - .2 Compressive strength: 200 MPa, minimum, ASTM C 140M.
  - .3 Flexural strength: 20 Mpa minimum, CSA A231.1.
  - .4 Water absorption: 0.2% maximum, CSA A23.2.
  - .5 Abrasion resistance: 140 mm<sup>3</sup> maximum, ISO 10545-6.
  - .6 Slip resistance: Dynamic Coefficient of Friction to ANSI/NFSI B101.3:
    - .1 Wet: Minimum 0.7
    - .2 Dry: Minimum 0.6
  - .7 Colour: Crema.
  - .8 Basis of design product: Landstone 2 cm Series Porcelain Paver, as distributed by Ames Tile & Stone.
- .17 Pedestal Supports: Fully adjustable pedestal supports for pavers: as recommended by the paver manufacturer.
  - .1 Versadjust Adjustable Pedestals, as manufactured by Bison.

### **Part 3 Execution**

#### **3.1 EXAMINATION**

- .1 Do examination, preparation and roofing Work in accordance with Roofing Manufacturer's Specification Manual.
- .2 Inspect with Departmental Representative deck conditions including parapets, construction joints, roof drains, plumbing vents and ventilation outlets to determine readiness to proceed.
  - .1 Verify that surfaces and site conditions are ready to receive work.
  - .2 Verify deck is clean and smooth, free of depressions, waves, or projections, properly sloped to drains.
  - .3 Verify deck surfaces are dry and free of snow or ice; do not use calcium or salt for ice or snow removal.
  - .4 Confirm dry deck by moisture meter with 12% moisture maximum.
  - .5 Verify roof openings, curbs, pipes, conduit, sleeves, ducts, and vents through roof are solidly set, and and reglets are in place.
  - .6 Verify roof drain is set to achieve weep drainage at membrane level and top grating of drain at finish deck level.
  - .7 Do not install roofing materials during rain or snowfall.
  - .8 Correct deficiencies before starting roofing application Work.

#### **3.2 PRE-INSTALLATION PROTECTION**

- .1 Cover wall, walks, sloped roofs and adjacent work where materials hoisted or used.
- .2 Use warning signs and barriers; maintain in good order until completion of Work.

- .3 Clean off drips and smears of bituminous material immediately.
- .4 Dispose of rain water off roof and away from face of building until roof drains or hoppers installed and connected.
- .5 Protect roof from traffic and damage during roof installation and material handling.
  - .1 Install protective boardwalks over installed roofing materials to enable passage of people and products.
- .6 At end of each day's work and when stoppage occurs due to inclement weather, provide protection for completed Work and materials out of storage.

### **3.3 PREPARATION - CONCRETE DECK**

- .1 Ensure concrete topping is installed according to Structural, and ensure all surfaces are adequately sloped to drain in accordance with the drawings?
- .2 Prior to application of the waterproof membrane, apply surface conditioner as a fine spray evenly at a rate of approximately 0.1 to 0.2 litres/m<sup>2</sup> depending on the condition of the concrete surface, or as otherwise recommended by the Manufacturer.
- .3 Do not permit primer to collect in pools. Prevent seepage through joints. Allow primer to dry and/or cure thoroughly.
- .4 Install retrofit roof drain in accordance with manufacturer's instructions and drawings.

### **3.4 INSTALLATION - MEMBRANE**

- .1 Apply membrane to vertical and horizontal surfaces in accordance with CAN/CGSB-37.51-M90 and manufacturer's recommendations.
- .2 Apply two coats membrane, each approximately 2.5 mm thick (total mass approximately 5 kg/m<sup>2</sup>). Between coats, install 'Cloth Reinforcing,' lapped 100 mm. At junction of horizontal deck and vertical surfaces, carry membrane up 10" minimum, unless indicated otherwise. Reinforce corners, as required, with 'Joint and Corner Reinforcement', covered with a coat of membrane.
- .3 To all cracks and non-working joints over 2.5 mm and not exceeding 6 mm in width:
  - .1 Apply a coat of membrane minimum 3 mm thick and centre a strip of 'Joint Cover Sheet', minimum 100 mm wide to maximum 300 mm wide depending on the width of the crack or joint, over the actual joint or crack and press into the membrane while still warm, squeezing out air pockets. Allow assembly to cool.
  - .2 Apply a second coat of membrane 5 mm thick extending at least 41 mm beyond strip edges, making certain the strip is completely embedded.
- .4 Where movement can occur between horizontal and vertical surfaces, embed 'Joint Cover Sheet' at least 150 mm wide to manufacturer's recommendations. Follow details if shown on drawings. Coat off the waterproof membrane, minimum 3 mm thick. At expansion joints install joint cover sheet in accordance with manufacturers recommendations.
- .5 Carry waterproof membrane up junction of horizontal deck and vertical surfaces, including at walls, parapets, curbs, concrete pads.

- .6 Turn membrane up at all walls, curbs, parapets, vent pipes, concrete pads and all other projections through waterproofing in accordance with manufacturer's recommendations. Properly flash around all protrusions through membrane such as drains, vent pipes, stacks, to provide a complete waterproofing seal, or sheet metal gum pocket, as recommended by the Membrane Manufacturer.
- .7 Coordinate transitions between walls and slabs, walls and roofs, between waterproofing membranes and adjacent waterproofing materials, and vapour barrier materials, in accordance with the manufacturer's recommendations and as detailed on the drawings and reviewed shop drawings.

### **3.5 INSTALLATION - TEMPORARY PROTECTION**

- .1 Ensure that necessary temporary protection is provided as required to prevent damage by mechanical gouging, scraping, squeezing, spillage of oil or solvents and traffic, prior to placing of insulation and other materials over the waterproof membrane.

### **3.6 INSTALLATION - SEPARATION SHEET**

- .1 When the membrane has cooled off but before the surface becomes dusty, apply separation sheet, lapping the joints slightly to ensure complete coverage.

### **3.7 INSTALLATION - PROTECTION BOARD**

- .1 Where required and where membrane is not otherwise protected with drainage mat or insulation, install protection board over entire membrane surface. Lap joints minimum 100 mm to ensure complete coverage and protection of membrane.

### **3.8 INSTALLATION - DRAINAGE MAT**

- .1 Where indicated, over separation sheet installations, install drainage mat unbonded with filter fabric side up. Overlap the fat taps. Overlap the fabric onto the preceding panels and adhere the overlapped fabric with adhesive or duct tape as necessary.
- .2 Commence installation of drainage plane at lowest point to ensure sound drainage and to create shingling effect of installation. Shingle panels in the direction of the water flow.
- .3 If any of the core material becomes exposed, cover with filter fabric.
- .4 Follow all other manufacturer's recommendations for installation of drainage plane.

### **3.9 INSTALLATION - INSULATION AND FILTER FABRIC**

- .1 Place insulation, channel cut face down, loose laid in parallel rows with ends staggered.
- .2 Slightly bevel insulation to allow snug fit at cants or protrusions. Cut neatly around penetrations through roof.
- .3 Place insulation boards to an irregular pattern to encourage close contact and fit.
- .4 Apply filter fabric unbonded over installed insulation in accordance with manufacturer's instructions.
  - .1 Overlap edges 300 mm minimum.

- .2 Cut fabric around roof drains, vents and other penetrations and extend under metal flashings.

### **3.10 INSTALLATION - PAVERS**

- .1 Install patio pavers on pedestals immediately after installation of insulation and filter fabric.
- .2 Installation of pavers to be completed after placement of curbs details as indicated on drawings.
- .3 Cut pavers to fit irregularly shaped areas and around protrusions as required. Install according to manufacturer's instructions.
- .4 Accurately align and place concrete pavers on pedestals to maintain a level upper surface with adjacent units.

### **3.11 FIELD QUALITY CONTROL**

- .1 Require site attendance of roofing materials manufacturer's representative during installation of Work.
- .2 Field quality control is under control of Contractor. Field quality assurance is monitored by Departmental Representative.
- .3 Conduct waterproofing membrane integrity survey in accordance with Section 07 01 53, prior to installation of any insulation or covering materials.
- .4 Additional inspection and testing of roofing application may be carried out by testing agency designated by Departmental Representative. Departmental Representative will pay for such additional tests as specified in Section 01 45 00 - Quality Control.
- .5 Contractor and manufacturer are fully responsible for their own quality assurance program. Inspections, tests, etc., that may be performed by or on behalf of the Departmental Representative in no way relieve the Contractor of his responsibilities in accordance with the contract documents and requirements.
- .6 Flood Test at Drains:
  - .1 Ensure that drains are connected to remove water in an accepted manner after test. Form dams using sandbags or other accepted means to ensure a depth of water at least 25 mm above the highest portion of the horizontal deck surface.
  - .2 Maintain required water depth for 48 hours. Every 6 hours, re-measure water depth to verify no leaks.
  - .3 If leakage is identified, immediately terminate water fill and permit immediate drainage. Repair membrane plus damage to facility. Repeat test.
- .7 Correct identified defects or irregularities.

### **3.12 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.

- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
  - .1 Remove bituminous markings from finished surfaces.
- .3 Waste Management: separate waste materials for reuse in accordance with Section 01 74 21.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### **3.13 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 In areas where finished surfaces are soiled caused by work of this Section, consult manufacturer of surfaces for cleaning advice and complying with written recommendations.
- .3 Repair damage to adjacent materials caused by membrane roofing installation.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1        Section 07 16 00 – Cementitious Crystalline Waterproofing
- .2        Section 07 56 00 – Protected Membrane Roofing.

**1.2                REFERENCES**

- .1        ASTM International
  - .1        ASTM C920-11, Standard Specification for Elastomeric Joint Sealants.
- .2        Canadian General Standards Board (CGSB):
  - .1        CAN/CGSB 19.24-M90: Multi-Component, Chemical Curing Sealing Compound.
- .3        General Services Administration (GSA) - Federal Specifications (FS)
  - .1        TT-S-00227E(COM-NBS)-1969, Sealing Compound: Elastomeric Type, Multi-Component (for Calking, Sealing, and Glazing in Buildings and Other Structures).

**1.3                ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Product Data:
  - .1        Submit manufacturer's instructions, printed product literature and data sheets for joint sealants and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2        Manufacturer's product to describe:
    - .1        Caulking compound.
    - .2        Primers.
    - .3        Sealing compound, each type, including compatibility when different sealants are in contact with each other.
    - .4        Conformance with specified Standards.
- .3        Samples:
  - .1        Submit 2 samples of each type of material and colour.
  - .2        Cured samples of exposed sealants for each colour where required to match adjacent material.
- .4        Manufacturer's Instructions:
  - .1        Submit instructions to include installation instructions for each product used.

**1.4                CLOSEOUT SUBMITTALS**

- .1        Submit in accordance with Section 01 78 00 - Closeout Submittals.

- .2 Operation and Maintenance Data: submit operation and maintenance data for incorporation into manual.

## **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect joint sealants from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

## **1.6 SITE CONDITIONS**

- .1 Ambient Conditions:
  - .1 Proceed with installation of joint sealants only when:
    - .1 Ambient and substrate temperature conditions are within limits permitted by joint sealant manufacturer or are above 4.4 degrees C.
    - .2 Joint substrates are dry.
    - .3 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.
- .2 Joint-Width Conditions:
  - .1 Proceed with installation of joint sealants only where joint widths are more than those allowed by joint sealant manufacturer for applications indicated.
- .3 Joint-Substrate Conditions:
  - .1 Proceed with installation of joint sealants only after contaminants capable of interfering with adhesion are removed from joint substrates.

## **1.7 ENVIRONMENTAL REQUIREMENTS**

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Health Canada.
- .2 Ventilate area of work as directed by Departmental Representative by use of approved portable supply and exhaust fans.

## **1.8 GUARANTEE**

- .1 Provide a written guarantee endorsed and issued in the name of the Parks Canada Agency stating that all sealant and caulking work is guaranteed against leakage, cracking and

deterioration, shrinkage, loss of cohesion, loss of adhesion, staining of adjacent surfaces, integral staining or failure to provide intended seal; for a period of three (3) years from date of Substantial Performance of the contract and that any defects will be replaced including related materials.

## **Part 2 Products**

### **2.1 SEALANT MATERIALS**

- .1 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.
- .2 When low toxicity caulks are not possible, confine usage to areas which off gas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off gas time.
- .3 Where sealants are qualified with primers use only these primers.

### **2.2 SEALANT MATERIAL DESIGNATIONS**

- .1 Sealant: One component silicone sealant to ASTM C920, Type S, Grade NS, Class 50, for Use NT, G, A, and O; SWRI validation, shore A hardness of 24 – 35 durometer, non sag, neutral curing.
- .2 Horizontal joint sealant: multi component, chemical curing, self levelling, polyurethane sealant, conforming to CAN/CGSB-19.24-M90, type 1, Class B, and U.S Federal Specification TT-S-00227E, and ASTM C920, type M, Grade P, Class 25

### **2.3 ACCESSORIES**

- .1 Preformed compressible and non-compressible back-up materials:
  - .1 Polyethylene, urethane, neoprene or vinyl foam:
    - .1 Extruded open cell foam backer rod.
    - .2 Size: oversize 30 to 50 %.
  - .2 Neoprene or butyl rubber:
    - .1 Round solid rod, Shore A hardness 70.
  - .3 High density foam:
    - .1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m<sup>3</sup> density, or neoprene foam backer, size as recommended by manufacturer.
  - .4 Bond breaker tape:
    - .1 Polyethylene bond breaker tape which will not bond to sealant.
- .2 Joint Cleaner:
  - .1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant in accordance with sealant manufacturer's written recommendations.
- .3 Primer: in accordance with sealant manufacturer's written recommendations.



**Part 3            Execution**

**3.1                EXAMINATION**

- .1      Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for joint sealants installation in accordance with manufacturer's written instructions.
  - .1      Visually inspect substrate in presence of Consultant.
  - .2      Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3      Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

**3.2                SURFACE PREPARATION**

- .1      Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
- .2      Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work.
- .3      Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
- .4      Ensure joint surfaces are dry and frost free.
- .5      Prepare surfaces in accordance with manufacturer's directions.

**3.3                PRIMING**

- .1      Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
- .2      Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

**3.4                BACKUP MATERIAL**

- .1      Apply bond breaker tape where required to manufacturer's instructions.
- .2      Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

**3.5                MIXING**

- .1      Mix materials in strict accordance with sealant manufacturer's instructions.

**3.6                APPLICATION**

- .1      Sealant:
  - .1      Apply sealant in accordance with manufacturer's written instructions.

- .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
- .3 Apply sealant in continuous beads.
- .4 Apply sealant using gun with proper size nozzle.
- .5 Use sufficient pressure to fill voids and joints solid.
- .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
- .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
- .8 Remove excess compound promptly as work progresses and upon completion.
- .2 Curing:
  - .1 Cure sealants in accordance with sealant manufacturer's instructions.
  - .2 Do not cover up sealants until proper curing has taken place.

### **3.7 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
  - .2 Clean adjacent surfaces immediately.
  - .3 Remove excess and droppings, using recommended cleaners as work progresses.
  - .4 Remove masking tape after initial set of sealant.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

### **3.8 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by joint sealants installation.

**END OF SECTION**

## **Part 1            General**

### **1.1                REFERENCES**

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM C5-03, Standard Specification for Quicklime for Structural Purposes.
  - .2 ASTM C35-01(2005), Standard Specification for Inorganic Aggregates for Use in Gypsum Plaster.
  - .3 ASTM C206-03, Standard Specification for Finishing Hydrated Lime.
  - .4 ASTM C841-03, Standard Specification for Installation of Interior Lathing and Furring.
  - .5 ASTM C842-05, Standard Specification for Application of Interior Gypsum Plaster.
  - .6 ASTM C926-17, Standard Specification for Application of Portland Cement-Based Plaster.
  - .7 ASTM C932-06(2013), Standard Specification for Surface-Applied Bonding Compounds for Exterior Plastering.
  - .8 ASTM C1489-01, Standard Specification for Lime Putty for Structural Purposes.
- .2 Canadian Standards Association (CSA International)
  - .1 CAN/CSA-A3000-03, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

### **1.2                QUALITY ASSURANCE**

- .1 Qualifications: Work to be undertaken by skilled personal with a minimum 5 years experience, references to be made available upon request.
- .2 Mock-up: construct mock-up in accordance with Section 01 45 00 - Quality Control.
- .3 Locate where indicated by Departmental Representative.
- .4 Before application of each plaster coat, at location designated by Departmental Representative prepare 1 m<sup>2</sup> representative sample plastering coat.
- .5 Allow 24 hours for inspection of mock-up by Departmental Representative before proceeding with plaster work.
- .6 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may not remain as part of finished work. Remove mock-up and dispose of materials when no longer required and when directed by Departmental Representative.

### **1.3                DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store, and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
  - .1 Ensure bagged materials are delivered to site and stored in original containers.

- .2 Ensure loose material is delivered, clean, and stored to prevent contamination by foreign material.
- .3 Protect material from damage by moisture and freezing.
- .2 Waste Management and Disposal:
  - .1 Separate waste materials for reuse in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

#### **1.4 AMBIENT CONDITIONS**

- .1 Do plaster work when ambient temperature is between 13 degrees C and 21 degrees C under conditions specified in ASTM C842.
- .2 Ventilate and heat to facilitate proper application and curing of plaster in accordance with Section 01 51 00 - Temporary Utilities.
  - .1 Ensure that high temperatures do not effect drying process when spotlights are used during repair of existing plaster.
- .3 Maintain air moisture content at 15% relative humidity to facilitate proper curing of plaster and minimize cracking.
  - .1 Keep records of actual air moisture content for specified period of cure.

### **Part 2 Products**

#### **2.1 MATERIALS**

- .1 Water: Potable, free from contamination.
- .2 Cement:
  - .1 White Portland cement.
  - .2 Low-alkali cement is preferred. Gray Portland cement, though less expensive, is not suitable for use on historic concrete and masonry because of the high content of soluble salts that cause staining, efflorescence and crystallization stresses in weak concrete and masonry; salts such as sodium and calcium sulphates and hydroxides, and sodium silicates. Gray Portland cement that includes hydrated lime and cement in a pre-mixed state may be suitable, provided that the ratio of mix constituents conform generally to those established in 3.4 – Mix Formulae. Its use is suggested where excessive moisture is a problem.
- .3 Lime:
  - .1 Hydrated lime to ASTM C207-79 (1984).
  - .2 Lime putty slaked from fresh quicklime produces a superior, stronger base with greater plasticity and workability than putty run from hydrated lime (CSA A82).
- .4 Pigment:
  - .1 Pigments shall be dry, powdered, inorganic pigments, such as manufactured by Northern Pigment Ltd., Toronto, Ontario acceptable alternate.

- .2 Pigments have traditionally been made by heating various natural earth and metal oxide compounds to achieve various colours. Ochre, sienna and umber are examples of natural earth pigments. Yellow, brown and red tones are produced by heating iron oxides. Most pigments tend to fade under UV exposure.

.5 Aggregate:

- .1 The aggregate shall be a well-graded washed sand matching the texture and range of sizes found in the parging to be matched. The colour of the sand shall be an exact match of the original; a blending of sands may be required where appropriate.
- .2 The sand should contain a full range of sizes from fine to quite coarse. Asphalt sand is a readily available grade that gives such a range. Brick sand is generally too homogeneous in grade size. The addition of pigments for special effects is normally restricted to tuck pointing, sand being the general colouring agent.
- .3 Coarse sand may be dashed onto the parged base coat prior to second coat to create additional textural variation to match existing.
- .4 Fly Ash or Carbon may be added as a colouring agent.

**2.2 Bonding Agent:**

- .1 Bonding agents should be used with caution: synthetic admixtures can cause the formation of soluble salts, and increased shrinkage through the added water. Utilize pure acrylics such as Acryl 60 (Thorosystems Ltd.) or equivalent. Polyvinyl acetate (PVA) type, which breakdown under ultraviolet exposure, is not acceptable.

**2.3 PREPARATION OF HYDRATED LIME**

- .1 Putty can be made from hydrated mason's lime by adding dry bagged hydrated lime to water. The mass is stirred and hoed to form a thick cream. Allow to stand at least 24 hours before use - preferably longer.
- .2 Hydrated limes are produced from quicklime by the addition of a limited amount of water. The resulting dry powder is bagged. Dolomitic Finishing Hydrated Limes (Type S) develop superior plasticity than Mason's (Type N) Hydrated Limes. It is very important that quicklimes be fully slaked, as any unslaked particles will subsequently expand and disturb the rest of the work. It is for this reason that all putty be allowed to temper for at least two weeks before use.

**2.4 PREPARATION OF ROUGHAGE**

- .1 If the contractor desires, the lime and aggregate may be pre-mixed to produce what is known as roughage or coarse-stuff. This compound may be stored indefinitely if kept sealed from air and kept from freezing.
- .2 Lime hardens slowly through the absorption of carbon dioxide (carbonation), in contrast to hydraulic cements that set quickly through a reaction with water.
- .3 The sand and lime should be accurately proportioned using measuring boxes constructed to contain the exact volume of each ingredient required to make one batch. These materials are to be thoroughly mixed in a mechanical mixer for about ten minutes, then stored in plastic-lined drums and sealed until required.

- .4 When required for use the correct portion of gauging cement should be added, and the mix worked up as specified and used immediately.
- .5 As the strength and colour of even slightly different mixes varies dramatically, accurate portioning is a strict requirement of this specification.

## **2.5 CEMENT GAUGING OF PARGING**

- .1 The addition of hydraulic cements to lime and aggregate mixes must be done immediately before the use of the parging.
- .2 All parging must be used within two hours of gauging; do not re-temper mortars after this time has elapsed.
- .3 All batching is to be done with wooden boxes or plastic pails of known volume to ensure standardization and conformity of measurement. Shovel measurement of materials is not permitted. Boxes should be of such a size that a batch sufficient for one mixer load is measured out.
- .4 Cement should be added and mixed for about two minutes before use.
- .5 The amount of water required should be recorded and added at the start of mixing for future batches.
- .6 Parging must be mixed a total of at least 10 minutes before using to improve wearability, increase air entrainment and plasticity, and ensure thorough mixing.
- .7 All mixing boards and mechanical mixing machines must be cleaned between batches.
- .8 Strict control must be exercised so that masons refrain from using too wet a mix. The addition of water does improve workability but does so at the sacrifice of mechanical strength and the increase in final shrinkage.

## **2.6 MIX FORMULAE**

- .1 Utilize the following parging mix ratio:
  - 1 part cement : 1 part lime : 6 parts sand
- .2 This formula are based upon the use of lime putty and white Portland cement. The use of lime-based parging requires considerable skill on behalf of the mason to produce first-class work.
- .3 Lime-based parging is extremely slow setting, progressively developing strength over several months. The initial set of the lime takes about three days under good conditions.
- .4 The small amount of white Portland cement provides a fast initial set to the mix; it requires however, a moist cure for about two days to achieve a reasonable strength. After this time the masonry should be kept quite dry, to assist in the carbonation of the lime.
- .5 Carbonation requires the entry of carbon dioxide gas in air to enter the mass through the porous structure of the parging. Heavy buildups of parging should be avoided if possible.

## **2.7 COLOURING OF PARGING**

- .1 Match existing coloured parging, at adjacent North Belvedere and at portions of South Belvedere where parging is undisturbed.

- .2 All matching must be done with unweathered samples of parging to determine the exact colour used. Final shading to match adjacent weathered parging can be obtained by using less colourant in many instances. Soiled parging should not be used as a match, because if the soiled parging is cleaned at a later date, any new repairs will show up as dirty. The overall colour of parging should come from the aggregate, not the binder. As parging weathers, the aggregate is gradually exposed and etched, and becomes the principal element affecting the overall colour.
- .3 A test sample of parging must be prepared, accurately proportioned to represent the final mix formula and amount of pigment.
- .4 The final colour of the parging must be determined only when it is dry. Accelerated drying of the sample can be accomplished by drying the parging sample in an oven or over a hot-plate.
- .5 No more than 10% by volume of pigment shall be added to parging.
- .6 Once proportions are determined, careful control during mixing is vital to ensure quality control. A measuring box should be made to hold the specified amount of pigment for each parging batch.
- .7 Suitable pigments to obtain certain colours are suggested below. The exact amount of each pigment to match existing samples must be determined by experiments.

Yellow-Beige	Sienna
Brown-Beige	Brown Umber
Red-Terra-Cotta	Burnt Sienna - Brown Umber
Limestone	Bone Black - Brown Umber
Gray Sandstone	Green Umber

### **Part 3      Execution**

#### **3.1      SITE VERIFICATION OF CONDITIONS**

- .1 Examine and report in writing to Departmental Representative, areas of deteriorated plaster not previously identified.
- .2 Obtain Departmental Representative's approval and instructions for repair and replacement of plaster before proceeding with repair work.

#### **3.2      PROTECTION**

- .1 Protect any fittings and surfaces adjacent to work by covering or masking.

#### **3.3      PREPARATION**

- .1 Remove loose plaster in the following areas as indicated on drawings.
- .2 Bevel edges of existing parging to accept new parging repair.
- .3 Obtain approval from Departmental Representative of preparation work prior to proceeding with installation.

**3.4 INSTALLATION**

- .1 Use bonding agents on masonry and concrete. Remove dust and other foreign materials.

**3.5 APPLICATION**

- .1 Immediately before parging operations commence, the area to be parged is to be thoroughly flushed with water to remove all dust and to wet the surface well until suction is controlled and the surface stays wet.
- .2 Build up parging coats to match existing coat, which varies from 3mm to 15mm.
- .3 All masons are to use identical tools for a uniform application.
- .4 Match the existing parging.
  - .1 A dash coat of coarse sand may be applied to the base coat prior to the second coat application, and stippling the surface with a stiff brush to give a textured, weathered appearance.

**3.6 CLEANING**

- .1 Remove droppings and splashings, immediately, using clean sponge and water.

**3.7 PROTECTION**

- .1 Protect finished adjoining work, during execution of plaster work, with polyethylene sheets or building paper.
- .2 Remove surplus material, tools, equipment and debris from work area on completion of work.

**3.8 CURING**

- .1 Cure plaster for as specified in ASTM C926.
- .2 Maintain temperature between 13 and 21 degrees C.
- .3 Maintain relative humidity between 30 % and 40 %.

**END OF SECTION**



**Part 1            General**

**1.1                INFORMATION AND ACTION SUBMITTALS**

- .1        Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2        Submit test reports of topsoil and analysis reports of fertilizers and sod.

**1.2                WARRANTY**

- .1        Provide one year warranty including one continuous growing season including coverage of sod from death or unhealthy conditions.

**1.3                MAINTENANCE SERVICE**

- .1        Maintain sodded areas immediately after placement until grass and plants for the entire warranty period.

**Part 2            Products**

**2.1                TOPSOIL MATERIALS**

- .1        Original topsoil from on site excavation: re-use topsoil stripped from site if it meets or is conditioned to meet the requirements of paragraph 2.1.2 below.
- .2        Topsoil (imported): natural, fertile, friable, agricultural soil containing not less than 6% of organic material with pH value ranging from 5.0 to 7.0. Salinity level for imported topsoil must not exceed 1.5. Soil reasonably free from subsoil, slag, clay, stone, lumps, live plants, roots, sticks, quack-grass, noxious weeds and foreign matter. Note: provide imported top soil only if there is insufficient quantity of suitable native topsoil to fulfil landscaping requirements.
- .3        All topsoil must be screened.

**2.2                SOD MATERIALS**

- .1        Fertilizer: Granular, uniform in composition, dry and free-flowing and delivered to the site in the original unopened containers bearing the manufacturer's analysis.
- .2        Complete commercial fertilizer, minimum of 50% of elements derived from organic sources. The Consultant may adjust specified fertilizer after topsoil test analysis results are received, with no change in Contract Price.
- .3        Nursery sod: freshly cut and healthy with strong fibrous root system, cultivated in nursery field as turf grass crop containing maximum of 2% of other grass species, and maximum of two broad leaf weeds and ten other weeds per 40 m2 area. Thickness of sod soil portion to be maximum of 40 mm and minimum of 25 mm.
- .4        Water: provide hoses, sprinklers and the like, and connect to existing designated water source on site.

**2.3 SOD TYPE**

- .1 Blue grass/Fescue grass sod: sod grown from minimum of 65% Kentucky Bluegrass blend, and 35% Creeping Red Fescue, or as otherwise required by the Departmental Representative.

**Part 3 Execution**

**3.1 RESTORATION GENERALLY**

- .1 Restore all existing areas and sitework damaged or disturbed due to work of this Contract, back to their original condition and as indicated on the drawings.

**3.2 PREPARATION OF SUBGRADE**

- .1 Remove foreign material, undesirable plants, roots, debris and soil contaminated with oil or gasoline from site.
- .2 Grade subgrade to eliminate uneven areas, low spots and ensure positive drainage. Finish subgrades 150 mm below final grade for sodded areas and 450 mm below final grade in shrub planting areas.
- .3 Cultivate subsoil to depth of 50 mm.
- .4 Re-cultivate subsoil compacted during hauling or spreading.

**3.3 PREPARATION OF FINAL GRADE**

- .1 Obtain Departmental Representative's acceptance of subgrade before placing topsoil.
- .2 Place topsoil over areas to be sodded to minimum depth after compaction of 150 mm and in shrub areas to a minimum depth after compaction of 450 mm. Place topsoil in dry weather on dry unfrozen subgrade.
- .3 Manually spread topsoil around trees and plants.
- .4 Cultivate topsoil to depth of 100 mm by roto-tilling or by hand methods where compaction has occurred.
- .5 Fine grade by hand raking, eliminating rough or low areas, until surface is smooth. Maintain levels, profiles, and contours of subgrade. Where new topsoil meets existing landscaping to remain, blend new topsoil into existing to provide for a smooth transition.
- .6 Remove stone, roots, grass, weeds, debris, and foreign material while spreading.
- .7 Cut smooth falls to catch basin rim, finish flush.
- .8 Do not cover catch basins, valve covers or inspection pits.
- .9 Fine grade to ensure positive drainage away from building, paving and sidewalks.
- .10 Roll placed topsoil.

- .11 Leave surface smooth, uniform and sufficiently firm to prevent sinkage pockets when irrigated.
- .12 Leave stockpile area and site clean and raked, ready to receive landscaping.
- .13 Apply fertilizer in accordance with manufacturer's instructions, but not less than at a rate of 3 kg/100 sq. m.

### **3.4 LAYING SOD**

- .1 Moisten prepared surface immediately prior to laying sod.
- .2 Lay sod immediately on delivery to site and within 24 hours after harvesting; with tight staggered joints.
- .3 Apply sod during growing season. Sodding during dry summer period, at freezing temperature or over frozen soil is not acceptable.
- .4 Lay sod as soon as possible after delivery to prevent deterioration.
- .5 Obtain Consultant's acceptance of sod bed finish grades, final tilth, surface flatness and fertilizer application before laying sod.
- .6 Firm sod bed by rolling before laying sod.
- .7 Do not place sod on frozen ground.
- .8 Rake topsoil over the sodded areas immediately prior to sodding, to produce a lawn surface that is true to line and grade, firm and free of irregularities and voids.
- .9 Lay sod in rows, smooth, even with adjoining areas and with joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with a sharp knife. Lay smooth and flush with adjoining paving and top surfaces of curbs, etc.
- .10 Place sod so that watering can be applied without interfering with other work.
- .11 After sod and soil has dried sufficiently to prevent damage, roll sodded areas to ensure a good bond between sod and soil and to remove minor depressions and irregularities. Ensure rolling equipment is of sufficient weight not over 113 kg or less than 68 kg.
- .12 Water immediately in sufficient quantities to obtain moisture penetration through sod and into upper 100 mm of topsoil.

**END OF SECTION**