# Specification Manual

## Issued for Tender

**02 April 2020**

## Grand-Pré National Historic Site Memorial Church and Monuments Repointing

**Parks Canada Agency**
**PCA PROJECT NO. 1241**

Parks Canada Parcs Canada

# Specification Manual

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## Grand-Pré National Historic Site Memorial Church and Monuments Repointing

**Parks Canada Agency**
**PCA PROJECT NO. 1241**

Parks Canada Parcs Canada

**Division 01 - General Requirements**



**Division 02 - Existing Conditions**



**Division 03 - Concrete**



**Division 04 - Masonry**



**Division 06 - Wood, Plastics and Composites**

**END OF TABLE**

**Division 01 - General Requirements**



**Division 02 - Existing Conditions**



**Division 03 - Concrete**

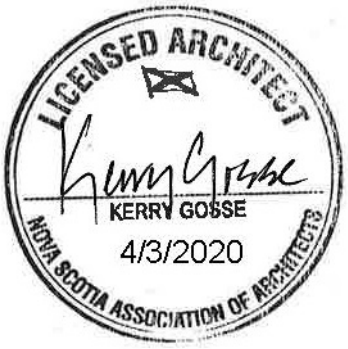


**Division 04 - Masonry**



**Division 06 - Wood, Plastics and Composites**

**END OF TABLE**

| DISCIPLINE | SIGNATURE | DATE | STAMP |
|---|---|---|---|
| Structural Specifications | David Bulger<br>approved | 2020-04-01 |  |
| Architectural Specifications | Kerry Gosse<br>approved | 2020-04-01 |  |





| No. | Date | Revision |
|---|---|---|
| 1 | 2020-04-02 | Issued for Tender |
| | | |
| | | |

**END OF SECTION**

## Part 1 General

### 1.1 WORK COVERED BY CONTRACT DOCUMENTS

.1 This contract shall include the provisions of all labour, materials, equipment and methods to complete the Work as shown and described on the drawings and specifications prepared by Stantec, including but not limited to:

- .1 Building and monument exterior masonry removal, repairs/replacement.
- .2 Wall and monument base replacement.
- .3 Masonry accessories, repointing and reinforcing as indicated.
- .4 Site work surface and base redevelopment.
- .5 Work includes photographic documentation.

### 1.2 PROJECT PHASING

.1 Project is in one phase, but work may be completed in separate but continuing stages.

### 1.3 CONTRACTOR USE OF PREMISES

.1 Contractor has limited use of the facility with exception to construction area of work as identified on drawings and in specifications. This an occupied and operational building site.

.2 Coordinate Work and access to area outside of the construction area with PCA Representative and do not inconvenience the occupants or in any manner hinder site use.

.3 Construction personnel shall use areas of the site only as directed and only while Work is in progress. Prohibit lounging on facility site.

.4 Smoking is not allowed on the site – post signs on construction site.

.5 Schedule noisy operation and vibration generated work with PCA Representative.

.6 Parking of Construction staff is to be coordinated with PCA Representative.

.7 Construction area is limited and contractor shall only store material in areas as directed by the PCA Representative.

.8 Within 5 days after the contract award arrange meeting with PCA Representative to conduct a walk-through of the site for coordination of the project.

### 1.4 RESTRICTIONS

.1 Conduct work adjacent to occupied areas only in time scheduled, coordinated, and approved by PCA Representative.

.2 Carry out the noise generating and vibration generating work only Monday to Friday from 10:00 to 15:00 hours and on Saturdays, Sundays and statutory holidays: only in time scheduled, coordinated and approved by PCA Representative.

**1.5 EXISTING SERVICES**

.1 Where work involves breaking into or connecting to existing services, give PCA Representative 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions to a minimum. Carry out interruptions in hours as directed by PCA Representative.

**1.6 MEASUREMENTS**

.1 Before commencing installation of work, verify that its layout is accurate in accordance with the intent of the drawings, and that positions, levels and clearances to adjacent work are maintained.

.2 If work is installed in the wrong location, rectify it before other work concerned proceeds.

**1.7 PROTECTION OF WORK, PROPERTY AND PERSON**

.1 Include in work necessary methods, materials and construction to ensure that no damage or harm to work, materials, property, and persons results from the work of this Contract.

.2 Protect finished surfaces of completed work from damage by restriction of access or by use of physical means suitable to the material and surface location. Establish with each Sub-Contractor the suitability of such protection in each case.

.3 Protect existing mechanical, electrical, telephone, and similar services from damage. If necessary, relocate active services to ensure that they function continuously in safety and without risk of damage.

.4 Cap off and remove unused mechanical and electrical services encountered during work after approval is given by the PCA Representative. Relocation, removal, protection, and capping of existing services shall be performed only by licensed mechanics.

**1.8 SECURITY REGULATIONS**

.1 Perform work in conformance to the security regulations of the institution as directed by the PCA Representative and site requirements.

**1.9 FIELD TESTING**

.1 Inspection and testing of concrete and concrete materials, stone masonry, brick masonry, and mortar will be carried out by testing laboratory designated by PCA Representative for review to CSA A23.1/A23.2.

.2 PCA Representative will pay for costs of tests.

**Part 2 Products**

**2.1 NOT USED**

.1 Not used.

**Part 3 Execution**

**3.1 NOT USED**

.1 Not used.

**END OF SECTION**

## 1.1 PRECEDENCE

.1 For work performed for the federal government, the Sections of Division 1 will take precedence over Specifications Sections of other divisions.

## 1.2 1.2 GENERAL WORK INFORMATION

.1 This Section sets out the parts of the Work under allowance.

.2 Total bid amount must include all Work covered by plans and Specifications and all costs of performing it.

.3 Allowances must include general expenses, administration, General Contractor and subcontractor profit, licences, and all other expenses (transportation, scaffolding, machinery, equipment, tools, etc.).

.3 The parts of the Work contemplated in this Section do not constitute the entire Work. Contractor must document all tasks not identified and described in plans and Specifications but necessary to complete the Work.

.4 Such tasks are in addition to the scope of Work set out in the plans and Specifications and will be added during construction as required.

## 1.3 CASH AND SPACE ALLOWANCES

.1 Include in Contract Price specified cash allowances.

.2 Cash allowances, unless otherwise specified, cover net cost of services, products, construction machinery and equipment, freight, handling, unloading, storage, installation, and other authorized expenses incurred in performing Work.

.3 Contract Price will be adjusted by written order to provide for excess or deficit to each cash allowance.

## 1.4 PARTS OF WORK UNDER ALLOWANCE (see Appendix 1 - Combined Price Form)

.1 Allowance 1: $40,000 - Unforeseen masonry conditions deemed necessary by PCA Representative. Supply and Install.

.2 Allowance 2: $10,000 - Unforeseen carpentry conditions deemed necessary by PCA Representative. Supply and Install.

**END OF SECTION**

## Part 1 General

### 1.1 RELATED SECTIONS

.1 Section 01 11 10 - Summary of Work.

.2 Section 01 35 43 - Environmental Procedures.

.3 Section 01 51 00 - Temporary Utilities.

.4 Section 01 77 00 - Closeout Procedures.

.5 Section 01 78 00 - Closeout Submittals.

### 1.2 DESCRIPTION

.1 Coordination of progress schedules, submittals, temporary utilities, construction facilities.

### 1.3 PROJECT MEETINGS

.1 Schedule and administer monthly project meetings throughout progress of work.

.2 Attend meetings called by the PCA Representative.

.3 Distribute minutes of meeting to various sub-trade contractors for implementation at earliest possible opportunity.

### 1.4 CONSTRUCTION ORGANIZATION AND START-UP

.1 Within 15 days after award of Contract, or as otherwise determined appropriate by PCA, attend a start-up meeting of parties in contract to discuss and resolve administrative procedures and responsibilities with PCA Representative

.2 Attendance will be as determined by PCA Representative.

### 1.5 ON-SITE DOCUMENTS

.1 Maintain at job site, one copy each of the following:

- .1 Contract drawings.
- .2 Specifications.
- .3 Addenda.
- .4 Reviewed shop drawings.
- .5 Change orders.
- .6 Other modifications to Contract.
- .7 Field test reports.
- .8 Copy of approved Work Schedule.
- .9 Manufacturers' installation and application instructions.

**1.6 SCHEDULES REQUIRED**

.1 Submit schedules as follows:

.1 Construction Progress Schedule.

.2 Shutdown or closure activity.

**1.7 PROJECT SCHEDULE**

.1 Submit preliminary construction progress schedule.

.2 See section 01 32 00 - Construction Progress Documentation.

**1.8 SUBMITTALS**

.1 Make submittal to PCA Representative.

.2 Sub-contractors to submit preliminary shop drawings, product data and samples in accordance with Section 01 33 00 - Submittal Procedures for review for compliance with Contract Documents; for field dimensions and clearances, for relation to available space, and for relation to Work of other contracts. After review by General Contractor, revise and resubmit for transmittal to PCA Representative.

.3 Submit requests for payment for review, and for transmittal to PCA Representative.

.4 Submit requests for interpretation (RFI's)of Contract Documents, and obtain instructions through PCA Representative.

.5 Process substitutions through PCA Representative.

.6 Process change orders through PCA Representative.

.7 Delivery closeout submittals for review and preliminary inspections, for transmittal to PCA Representative.

**1.9 CLOSEOUT PROCEDURES**

.1 Notify PCA Representative in writing when Work is considered ready for scheduled pre-delivery inspections and for Substantial Performance.

.2 Accompany PCA Representative on preliminary inspection to determine items listed for completion or correction.

.3 Comply with PCA Representative instructions for correction of items of Work listed in executed certificate of Substantial Performance and for access to PCA-occupied areas.

.4 Notify PCA Representative of instructions for completion of items of Work determined in final inspection reports.

**Part 2 Products**

**2.1 NOT USED.**

.1 Not used.

**Part 3 Execution**

**3.1 NOT USED.**

Not used.

**END OF SECTION**

## Part 1 General

### 1.1 RELATED SECTIONS

.1 Section 01 31 00 - Project Management and Coordination.

.2 Section 01 32 33 - Photographic Documentation

.3 Section 01 77 00 - Closeout Procedures.

.4 Section 01 78 00 - Closeout Submittals.

### 1.2 SCHEDULES REQUIRED

.1 Submit schedules as follows:

- .1 Construction Progress Schedule.
- .2 Submittal Schedule for Shop Drawings and Product Data.
- .3 Submittal Schedule for Samples.
- .4 Product Delivery Schedule.
- .5 Shutdown or closure activity.

### 1.3 FORMAT

.1 Prepare schedule in form of a horizontal bar chart.

.2 Provide a separate bar for each major item of work or operation.

.3 Split horizontally for projected and actual performance.

.4 Provide horizontal time scale identifying first work day of each week.

.5 Format for listings: Table of Contents of this specification.

.6 Identification of listings: By Systems description.

### 1.4 PROJECT SCHEDULE

.1 Provide at start-up meeting, or within five (5) Working Days after award of contract, whichever occurs first, proposed schedule showing anticipated progress stages and final completion of work within time period required by Contract documents.

- .1 The schedule shall be based upon a detailed, complete and itemized work breakdown structure of the Work consistent with all the elements of the reviewed Schedule of Values. All construction resources including time duration as well as labour, equipment and material costs etc. will be allocated to all relevant components of the work breakdown structure.
- .2 The proposed construction schedule shall be submitted to PCA Representative for review in both hard copy and electronically in PDF format.

.3 The construction schedule will form the baseline for comparison with proposed schedules for calculating extensions of Contract Time, if applicable.

.2 PCA Representative will review schedule and return reviewed copy within 5 days after receipt.

.3 Re-submit finalized schedule within 3 days after return of reviewed copy.

.4 Interim reviews of work progress based on work schedule will be conducted bi-weekly by PCA Representative, and schedule updated by Contractor shall be submitted to PCA Representative for review. Identify following:

.1 As construction proceeds, record the progress for each of the items in the work breakdown structure, including, but not limited to, document submissions, deliverables, items in schedule of values, and milestone deadlines.

.2 The above schedule information is to be submitted bi-weekly or more often if necessary.

.5 Submit up to date progress schedule with each Application for Payment.

.6 Distribute copies of revised schedule to PCA Representative.

.7 Instruct recipients to report to Contractor within 5 days, any problems anticipated by timetable shown in schedule.

.8 Conduct work adjacent to occupied areas only in time scheduled, coordinated and approved by PCA Representative.

.9 Carry out the noise generating and vibration generating work only in times as approved by PCA Representative.

**1.5 SUBMITTALS SCHEDULE**

.1 Provide in form acceptable to PCA Representative, within ten (10) working days after Contract award, proposed schedule showing dates for:

.1 Submission of shop drawings, material lists and samples.

.2 Delivery of following, but not limited to, materials and major milestone events such as; demolitions, mechanical and electrical items removal, exterior windows and doors, and EIFS finish, electrical and mechanical items reinstallation, etc.

**1.6 PHOTOGRAPHS**

.1 See Section 01 32 33 - Photographic Documentation.

**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 DOCUMENTS

.1 Drawings and general provisions of the Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

.1 Section includes administrative and procedural requirements for the following:

.1 Preconstruction photographs.

.2 Final completion construction photographs.

### 1.3 RELATED SECTIONS

.1 Section 01 77 00 - Closeout Procedures

.2 Section 02 41 00.08 - Demolition for Minor Works.

### 1.4 INFORMATIONAL SUBMITTALS

.1 Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.

.2 Digital Photographs: Submit with progress claims image files taken within three (3) days of submission.

.1 Submit photos on CD-ROM. Include copy of key plan indicating each photograph's location and direction.

.2 Identification: Provide the following information with each image description in file metadata tag:

.1 Name of Project.

.2 Name and contact information for photographer.

.3 Name of General Contractor.

.4 Name of Contractor.

.5 Date photograph was taken.

.6 Description of location, vantage point, and direction.

.7 Unique sequential identifier keyed to accompanying key plan.

### 1.5 FORMATS AND MEDIA

.1 Digital Photographs: Provide color images in JPG format, produced by a digital camera with minimum sensor size of 12 megapixels, and at an image resolution of not less than 3200 by 2400 pixels**,** and with vibration-reduction technology. Use flash in low light levels or backlit conditions.

.2 Digital Images: Submit digital media as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

.3 Metadata: Record accurate date and time and GPS location data from camera.

.4 File Names: Name media files with date and Project name and sequential numbering suffix.

**1.6 CONSTRUCTION PHOTOGRAPHS**

.1 Photographer: Engage a qualified photographer to take construction photographs.

.2 General: Take photographs with maximum depth of field and in focus.

.1 Maintain key plan with each set of construction photographs that identifies each photographic location.

.3 Preconstruction Photographs: Before commencement of demolition, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by PCA Representative.

.1 Take 30 photographs to show existing conditions of exterior conditions of Building and monuments. PCA Representative will advise photographer of desired vantage points.

.4 Final Completion Construction Photographs: Take 30 photographs after date of Substantial Completion for submission as Project Record Documents. PCA Representative will advise photographer of desired vantage points.

.5 Progress Construction Photographs: Submit electronic and hard copy of colour digital photography in jpg format, standard resolution monthly with progress statement as directed by PCA Representative.

.1 Project identification: name and number of project and date of exposure indicated.

.2 Number of viewpoints:

.1 Viewpoints and their location as determined by PCA Representative.

.3 Frequency of photographic documentation: monthly.

.6 Additional Photographs will be taken by PCA Representative as required.

**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 SECTIONS

.1 Section 01 11 00 - Summary of Work.

.2 Section 01 35 43 - Environmental Procedures

.3 Section 01 77 00 - Closeout Procedures.

.4 Section 01 78 00 - Closeout Submittals.

.5 All technical specifications on drawings.

### 1.2 ADMINISTRATIVE

.1 Submit to PCA 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 Review submittals prior to submission. 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.

.4 Notify PCA Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.5 Verify field measurements and affected adjacent Work are co-ordinated.

.6 Contractor's responsibility for errors and omissions in submission is not relieved by review of submittals by PCA Representative.

.7 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by PCA Representative.

.8 Keep one reviewed copy of each submission on site.

### 1.3 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 Submit shop drawings bearing stamp and signature of qualified professional engineer registered or licensed in Province of Nova Scotia, Canada, where required in sections.

.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 for fourteen (14) days for review of each submission by PCA Representative.

.5 Adjustments made on shop drawings by PCA are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to PCA Representative prior to proceeding with Work.

.6 Make changes in shop drawings as required by PCA, consistent with Contract Documents. When resubmitting, notify PCA Representative in writing of revisions other than those requested.

.7 Accompany submissions with transmittal letter, 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 shall 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 review by PCA, distribute copies.

.10 Submit electronic shop drawings for each requirement requested in specification Sections and as PCA may reasonably request.

.11 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by PCA 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 PCA

.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 three (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 PCA 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 manufacturer’s instructions for requirements requested in specification Sections and as requested by PCA Representative

.1 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 PCA Representative.

.1 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

.16 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by PCA Representative.

.17 Delete information not applicable to project.

.18 Supplement standard information to provide details applicable to project.

.19 If upon review by PCA, 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.

**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 prepaid to PCA Representative at address to be provided.

.3 Notify PCA 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 PCA Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to PCA Representative prior to proceeding with Work.

.6 Make changes in samples which PCA 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.

**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 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
- .1 Safety Data Sheets (SDS).

.3 Province of Nova Scotia
- .1 Occupational Health and Safety Act, S.N.S. - Updated 2013, Part 21: Fall Protection.

.4 CSA Group (CSA)
- .1 CSA Z797-18, Code of Practice for access scaffold.

### 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 found in work plan.

.3 Submit two (2) copies of Contractor's authorized representative's work site health and safety inspection reports to PCA Representative.

.4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.

.5 Submit copies of incident and accident reports.

.6 Submit WHMIS Safety Data Sheets (SDS).

.7 PCA Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 7 days after receipt of plan. Revise plan as appropriate and resubmit plan to PCA Representative within 3 days after receipt of comments from PCA Representative.

.8 PCA 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.

.9 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to PCA Representative.

.10 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

**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 Sub-Contractors and PCA Representative prior to commencement of Work.

**1.5 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 PCA Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

**1.6 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 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.

**1.7 COMPLIANCE REQUIREMENTS**

.1 Comply with Occupational Health and Safety Act, Occupational Safety General Regulations, N.S. Reg. Part 21: Fall Protection.

.2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

**1.8 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 PCA Representative verbally and in writing.

.2 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, advise Health and Safety co-ordinator and follow procedures in accordance with Acts and Regulations of Province having jurisdiction and advise PCA Representative verbally and in writing.

**1.9 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 PCA Representative.

**1.10 CORRECTION OF NON-COMPLIANCE**

.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by PCA Representative.

.2 Provide PCA Representative with written report of action taken to correct non-compliance of health and safety issues identified.

.3 PCA Representative may stop Work if non-compliance of health and safety regulations is not corrected.

**1.11 BLASTING**

.1 Blasting or other use of explosives is not permitted without prior receipt of written instruction by PCA Representative.

**1.12 POWDER ACTUATED DEVICES**

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

**1.13 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 CONSTRUCTION FIRE SAFETY

.1 The Contractor shall provide construction fire safety in accordance with the National Fire Code of Canada.

### 1.2 FIRE DEPARTMENT BRIEFING

.1 PCA Representative will co-ordinate arrangements for Pre-Commencement Meeting following contract award. Contractors will be briefed on Fire Safety by the Fire Chief or his designated representative before work starts.

### 1.3 REPORTING FIRES

.1 The Contractor shall inform the PCA Representative and Fire Chief of all fire incidents at the construction site, regardless of size.

.2 Know location of nearest fire alarm pull station and telephone, including emergency phone number.

.3 Report immediately fire incidents to Fire Department as follows:

.1 Activate nearest fire alarm pull station.

.2 Telephone.

.4 Person activating fire alarm pull station will remain at the front entrance to direct Fire Department to scene of fire.

.5 When reporting fire by telephone, give location of fire, name or number of building and be prepared to verify location.

### 1.4 FIRE SAFETY PLAN

.1 Submit a fire safety plan for the construction site prior to commencement of construction work. The fire safety plan shall conform to the National Fire Code of Canada.

.2 The fire safety plan shall be submitted to the PCA Representative for review by local fire department. Any comments by local fire department shall be implemented by the Contractor.

.3 The fire safety plan shall be limited to the area of construction only. Contractor is not responsible for amending fire safety plans in existing buildings.

.4 Post the fire safety plan at the entrance to the construction site or near the construction site’s health and safety board.

.5 The fire safety plan shall conform to the National Fire Code of Canada, and shall contain, at minimum:

.1 Emergency procedures to be used in case of fire, including

.1 Sounding the fire alarm;

.2 Notifying the fire department;

.3 Instructing occupants on procedures to be followed when the fire alarm sounds;

.4 Evacuating occupants, including special provisions for persons requiring assistance; and

.5 Confining, controlling and extinguishing fires.

.2 The appointment and organization of designated supervisory staff to carry out fire safety duties.

.3 The training of supervisory staff and other occupants in their responsibilities for fire safety.

.4 Documents including diagrams, showing the type, location and operation of building fire emergency systems.

.5 The holding of fire drills (where applicable).

.6 The control of fire hazards in the building.

.7 The inspection and maintenance of building facilities provided for the safety of occupants.

## 1.5 FIRE WARNING SYSTEM

.1 A fire warning shall be provided to notify construction personnel of a fire emergency in the construction area.

.2 The system used shall be capable of being heard throughout the building.

## 1.6 INTERIOR AND EXTERIOR FIRE PROTECTION AND ALARM SYSTEMS

.1 Fire protection and alarm system will not be:

.1 Obstructed.

.2 Shut-off.

.3 Left inactive at end of working day or shift without prior written authorization from the Fire Chief.

.2 Do not use Fire hydrants, standpipes or hose systems for other than fire-fighting purposes unless authorized by the Fire Chief.

## 1.7 FIRE PROTECTION SYSTEM IMPAIRMENT

.1 Notify the PCA Representative and the Fire Chief 48 hours prior to shutting down any active fire protection system, including water supply, fire suppression, fire detection and life safety systems.

.2 Where a fire protection system that provides fire alarm monitoring is impaired in an existing building, a fire watch may be required at the discretion of the Fire Chief.

.3 Implement all fire protection system impairments in accordance with the National Fire Code of Canada and Base Fire Orders. Fire Orders will be provided at the Pre-Commencement Meeting.

## 1.8 FIRE EXTINGUISHERS

.1 In addition to other requirements of this specification, supply fire extinguishers, as scaled by the Fire Chief, necessary to protect work in progress and contractor's physical plant on site.

.2 Fire extinguishers may be required in the following areas as directed by the Fire Chief

- .1 Adjacent to hot works;
- .2 In areas where combustibles are stored;
- .3 Near or on any internal combustion engines;
- .4 Adjacent to areas where flammable liquids or gases are stored or handled;
- .5 Adjacent to temporary oil fired or gas fired equipment; and
- .6 Adjacent to bitumen heating equipment.

.3 Extinguishers shall be sized as 4-A:40-B:C (20 lbs) unless otherwise directed by the Fire Chief.

.4 Extinguishers shall be of the dry chemical type unless otherwise required by the hazard being protected.

.5 The Contractor may assume the quantity of extinguishers based on a maximum travel distance between extinguishers of 75 feet.

## 1.9 ACCESS FOR FIRE FIGHTING

.1 Access for firefighting shall be provided in accordance with the National Fire Code of Canada.

.2 Advise the Fire Chief of work that would impede fire apparatus response. This includes violation of minimum horizontal and overhead clearance, as prescribed by the Fire Chief, erecting of barricades and digging of trenches.

.3 Minimum horizontal clearance: clear width of not less than 5m, or as defined by the Fire Chief.

.4 Minimum vertical clearance: overhead height of not less than 6m, or as defined by the Fire Chief.

## 1.10 SMOKING PRECAUTIONS

.1 Smoking is prohibited in all buildings. Observe posted smoking restrictions near existing buildings.

## 1.11 RUBBISH AND WASTE MATERIALS

.1 Keep rubbish and waste materials at minimum quantities.

.2 Burning of rubbish is prohibited.

.3 Remove rubbish from work site at end of work day or shift or as directed.

.4 Storage:

.1 Store oily waste in approved receptacles to ensure maximum cleanliness and safety.

.2 Deposit greasy or oily rags and materials subject to spontaneous combustion in approved receptacles and remove specified.

## 1.12 FLAMMABLE AND COMBUSTIBLE LIQUIDS

.1 Handle, store and use of flammable and combustible liquids in accordance with the National Fire Code of Canada. Emergency Responding unit is the Truro Fire Department 911.

.2 Keep flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use in quantities not exceeding 22 litres provided they are stored in as per requirements of CFB Halifax fire Department (902) 427-6614 Dave Crowe Or (902) 427-3505 Contractor Regulations. Obtain written authorization from Shearwater Fire and Emergency Services Chief for storage of quantities of flammable and combustible liquids exceeding 22 litres.

.3 Do not transfer flammable or combustible liquids inside buildings or on jetties.

.4 Do not transfer flammable or combustible liquids in vicinity of open flames or any type of heat-producing devices.

.5 Do not use flammable liquids having flash point below 38 degrees C such as naphtha or gasoline as solvents or cleaning agents.

.6 Store flammable and combustible waste liquids, for disposal, in approved containers located in safe ventilated area. Contact CFB Halifax fire Department (902) 427-6614 Dave Crowe Or (902) 427-3505 via PCA representative when ready to dispose of any flammable materials.

## 1.13 HOT WORKS

.1 The Contractor shall implement a hot works program in accordance with the National Fire Code of Canada and NFPA 51 Standard for Fire Prevention during Welding, Cutting and Other Hot Work.

.2 The Contractor shall obtain from the Fire Chief a "Hot Work" permit for all hot works in the construction area. Frequency of renewal for hot works permits is at the discretion of the Fire Chief.

.3 When Work is carried out in dangerous or hazardous areas involving use of heat, provide fire watchers equipped with sufficient fire extinguishers. Determination of dangerous or hazardous areas along with level of protection necessary for Fire Watch is at discretion of the Fire Chief.

.4 Provide fire watch service for work on scale established and in conjunction with the Fire Chief as defined in the Fire Department Briefing. Fire watchers shall be trained in the use of fire extinguishing equipment.

.5 Area of hot works

.1 Hot works shall be carried out in an area free of combustible and flammable content.

.2 Where 1.14.5.1 is not possible,

.1 All flammable and combustible materials within 15m of the hot works shall be protected in accordance with the National Fire Code of Canada;

.2 A fire watch shall be provided during the hot work and for a period of not less than 60 minutes unless otherwise directed by the Fire Chief;

.3 A final inspection of the hot work area shall be conducted not less than 4 hours after the completion of hot works unless otherwise directed by the Fire Chief.

.3 Where there is a possibility of sparks leaking onto combustible materials in areas adjacent to the areas where the hot work is carried out

.1 Openings in walls, floors or ceilings shall be covered or closed to prevent the passage of sparks to such adjacent areas, or

.2 Sentence 1.14.5.2 shall apply for those areas.

.6 Protection of flammable and combustible materials

.1 Any combustible or flammable material, dust or residue shall be

.1 Removed from the area where hot works is carried out; or

.2 Protected from ignition by non-combustible materials.

.7 Fire extinguisher

.1 A fire extinguisher shall be provided within 3 m of all hot works. Minimum size shall be 20lbs ABC unless otherwise directed by Fire Chief.

## 1.14 HAZARDOUS SUBSTANCES

.1 Work entailing use of toxic or hazardous materials, chemicals and/or explosives, or otherwise creating hazard to life, safety or health, shall be in accordance with National Fire Code of Canada.

.2 Provide ventilation where flammable liquids, such as lacquers or urethanes are used. Eliminate all sources of ignition. Inform the Fire Chief prior to and at completion of such work.

## 1.15 PARTIAL OCCUPANCY

.1 Implement partial occupancy procedures as defined in the drawings and specifications. Partial occupancy is where construction occurs adjacent to work areas occupied by PCA or Canadian Forces personnel. This includes:

.1 Phased new construction.

.2 Early or partial occupancy of new construction.

.3 New construction being added onto an existing building.

.4 Renovation or recapitalization of an existing building.

.5 Phased renovation or recapitalization of an existing building.

.2 In all respects follow the Fire Marshal Directive (FMD) 4005 where Partial Occupancy is to be implemented.

.3 Where partial occupancy occurs, Contractor shall implement requirements as per Fire Marshal Directive (FMD) 4005. This may include construction of a rated fire separation between occupied and construction areas as required by the National Fire Code.

.4 A watch, with tours at intervals of not less than one hour, shall be provided throughout demolition sites when there are occupants in the portion of the building not being demolished.

.5 Except where a building is provided with a fire alarm system or similar equipment, a watch, with tours at intervals of not more than one hour, shall be provided when a portion of the building is occupied while construction operations are taking place.

**1.16 QUESTIONS AND/OR CLARIFICATION**

.1 Direct questions or clarification on Fire Safety in addition to above requirements to the PCA Representative.

.2 PCA is responsible to obtain clarifications from the Fire Chief. The Contractor is not to liaise directly with the Fire Chief for notification, authorization or any requests unless the situation constitutes an immediate emergency.

**1.17 FIRE INSPECTION**

.1 Co-ordinate site inspections by the Fire Chief through PCA Representative.

.2 Allow the Fire Chief unrestricted access to work site.

.3 Co-operate with the Fire Chief during routine fire safety inspection of work site.

.4 Immediately remedy unsafe fire situations observed by the Fire Chief.

## 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 SECTIONS

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

### 1.2 DEFINITIONS

.1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.

.2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

### 1.3 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.2 Within 7 working days of contract award, submit Environmental Protection Plan for review by PCA Representative. Environmental Protection Plan is to present comprehensive overview of known or potential environmental issues which must be addressed during the project.

.3 Address topics below at level of detail commensurate with environmental issue and required construction tasks.

.4 Environmental protection plan: include:

.1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.

.2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.

.3 Names and qualifications of persons responsible for training site personnel. Person responsible for training must be considered competent person as defined by the Nova Scotia Occupational Health and Safety Act.

.4 Descriptions of environmental protection personnel training program.

.5 Erosion and sediment control plan which identifies type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measure are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.

.6 Drawings showing locations of material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials to be contained on site.

.7 Traffic control plans.

.8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use. Plan to include measures for marking limits of use areas.

.9 Spill Control Plan: including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.

.10 Non-Hazardous and hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.

.11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, do not become air borne and travel off project site.

.12 Contaminant prevention plan that: identifies potentially hazardous substances to be used on job site; identifies intended actions to prevent introduction of such materials into air, water, or ground; and details provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.

.13 Historical, archaeological, cultural resources, biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.

.14 Halocarbon Management Plan, including a clear process to complete the DND Halocarbon Management Forms and inspection/leak and decommissioning service logs (notices) in accordance with the Federal Halocarbon Regulations

.5 Environmental protection and mitigation measures shall reflect the need to comply with Section 36(3) of the Fisheries Act and Section 5.1(1) of the Migratory Bird Convention Act.

## 1.4 EMERGENCY NOTIFICATION

.1 The actions noted in this Article shall be taken when an accidental release of any of the following occurs:

.1 Flammable, poisonous or caustic gas;

.2 Flammable, poisonous or caustic liquid;

.3 Bio-hazardous/infections substances;

.4 PCB;

.5 Sewage;

.6 Contaminated water; or

.7 Asbestos.

.2 An environmental incident has occurred when there has been an uncontrolled or unintended release of a hazardous waste, hazardous liquid, hazardous gas and/or dangerous good.

.3 Take the following action when any of the above have occurred:

.1 Control the release, if possible;

.2 Contact DND Fire Hall or 911;

.3 Contact PCA Representative. PCA Representative will inform DND PM and MARLANT Safety and Environment.

**1.5 FIRES**

.1 Fires and burning of rubbish on site not permitted.

**1.6 DISPOSAL OF WASTES AND SOIL**

.1 Do not bury Construction and Demolition (C&D) Debris, rubbish and waste materials on site. C&D Debris means materials which are normally used in the construction of buildings, structures, roadways, walls and other landscaping material, and includes, but is not limited to, soil, asphalt, brick, mortar, drywall, plaster, cellulose, fiberglass, fibres, gyproc, lumber, wood, asphalt shingles, and metals;

.2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

**1.7 DUST CONTROL**

.1 The application of clean water is the preferred method of dust suppression and shall be considered for use by Contractor wherever economical and practical to use.

.2 If either calcium chloride or magnesium chloride is considered for use as a dust suppressant, it shall only be used in accordance with guidance offered in the Environment Canada report entitled, Best Practices for the Use and Storage of Chloride-Based Dust Suppressants at: http://www.ec.gc.ca/nopp/roadsalt/reports/chlorideBP/en/toc.cfm

**1.8 POLLUTION CONTROL**

.1 Control emissions from equipment and plant to local authorities' emission requirements.

.2 Prevent sandblasting/hydroblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.

.3 Provide petroleum spill kits at the work site to quickly cleanup and contain petroleum spills from plant, should they occur. Ensure site personnel are familiar with and trained in the use of site petroleum spill kits.

**1.9 WORK NEAR WATER BODIES**

.1 Filling, dredging or the use of explosives in the work shall not be allowed.

.2 Carry out work in a manner that does not result in the deposit of toxic or deleterious substances (e.g. sediment, uncured concrete, fuel, lubricants, etc.) into water frequented by fish.

.3 Equipment shall at no time enter the water.

.4 Waste construction materials shall not enter the water.

**1.10 ENVIRONMENTAL MANAGEMENT**

.1 Any vehicles and equipment present in the project areas, when not in use, are not to be left idling.

## 1.11 ENVIRONMENT OF INCIDENT OR EMERGENCY

.1 In the event of an environmental incident or emergency such as:

- .1 Chemical spill or petroleum spill.
- .2 Poisonous or caustic gas emission.
- .3 Biological or chemical explosion.
- .4 Hazardous material spill.
- .5 Sewage spill.
- .6 Release of contaminated water into waterways.

.2 The Contractor or his employees shall:

- .1 Notify the Contractor's job superintendent.
- .2 Notify PCA Representative and give type of emergency.

.3 The Contractor is to submit to PCA Representative a copy of Environmental Protection Plan, and Spill Response Plan for approval within seven (7) days of contract award.

## 1.12 VEHICLE REFUELING

.1 Refueling of equipment to be performed in locations as directed by PCA Representative.

.2 Do not refuel equipment within 30 metres of any watercourse or storm water catch basin unless protection against spills is in place and location is approved by PCA Representative.

.3 Contractors to have drip pans sized for amounts of product to be recovered and customized to fit under pieces of equipment to perform routine maintenance to equipment while maintaining equipment on property. Drip pans to be used whenever leaving equipment on site or parking overnight when not in use.

.4 Parking of equipment on site to be in locations away from watercourses and as approved by PCA Representative. Equipment with leaks or poor mechanical repair to be removed from site when so ordered by PCA Representative.

.5 Use petroleum containers approved for products with no spill fill spouts, equipped with a self closing valve, for dispensing fuels. Prevent any flow of fuel until the nozzle is inserted into the receiving container. On removal from the receiving container the slide valve should close to eliminate any fuel spill. The nozzle to be equipped with an automatic vent, eliminating the need for the user to open or close air inlets on the pouring container.

.6 Nozzle to support the weight of the pouring container. Nozzles to automatically stop the flow when the receiving container becomes full. The nozzle to be such that it reduces evaporation losses of volatile organic compounds during the fuel transfer.

.7 All spills of hydrocarbon based products such as gasoline, kerosene, naptha, lubricating oils, engine oils, greases and de-icing fluids or antifreeze be reported immediately to PCA Representative.

## 1.13 SPILLS

.1 The Contractor is to submit a copy of its Spill Response Plan for review to PCA Representative within seven (7) working days of Contract award.

.2 Disposal of spilled materials to be off property and at approved locations for materials to be disposed of.

.3 When parking of equipment on site, the equipment is to be secured from entry and inspected for fluid leaks.

.4 Contractor to protect all wells, catch basins, dry wells, drains and water courses from contamination in the event of a spill.

.5 All equipment to be used for the Work of the Contract will be free of fluid leaks and in good working order. Equipment will be inspected for fluid leaks before each use and at regular intervals during use. Equipment not in good repair to be immediately removed from use.

.6 All spills regardless of size must be reported to the PCA Representative. The PCA Representative will be responsibly to report the spill to MARL SE. For example, but not limited to:

- .1 POL products.
- .2 glycol, hydraulic oil, concrete form oil.
- .3 Battery acid spill.
- .4 Any other hazardous/deleterious substance.
- .5 Any release of halocarbons, including releases from refrigerators, chillers, air conditioners (vehicles and building).
- .6 Any spill that enters a drain, ditch or water body regardless of amount.

.7 For spills occurring, the Contractor is to immediately remove as much or all of the contaminated soils created by the spill as possible.

.8 Contaminated soils/materials to be placed in leak proof containers compatible with the contaminates spilled and shall be covered to prevent ingress of weather.

.9 Any remaining clean-up to be performed at no extra cost to PCA. Clean-ups to be completed to the PCA Representative's satisfaction.

.10 Report any spills of petroleum or other hazardous materials to the Base /Wing Fire Hall and the PCA Representative.

## 1.14 SPILL CONTROL KITS

.1 Contractor to have at the work site a spill control kit consisting of the following equipment, at a minimum:

- .1 A spaded shovel.
- .2 A stable broom.
- .3 A broad nose shovel.

.4 Container(s) suitable, compatible to and of sufficient size to contain petroleum products being used with equipment.

.5 Absorbents.

.6 Rags.

.7 Metal container for soiled rags.

.8 Booms when working next to a water course.

.2 Spill control kit to be inspected and approved by PCA Representative prior to start of work. Spill control kits to be available to Contractor employees at all areas where Work is being performed and until completion of the Work.

.3 Contractor employees to be trained in the use of spill control kits and the equipment they contain.

## 1.15 NOTIFICATION

.1 PCA Representative 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 PCA Representative of proposed corrective action and take such action for approval by PCA Representative.

.3 PCA 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.

.5 Any changes in the plans shall be reported to the PCA Representative who will report to the DND PM who will report to MARLANT Safety and Environment who will report to the appropriate authority having jurisdiction, prior to the commencement of any work.

## 1.16 HALOCARBON MANAGEMENT

.1 If work activities are to take place on equipment or infrastructure containing halocarbons:

.1 The contractor is to ensure that all works adhere to the 2003 Federal Halocarbon Regulations (FHR) and other applicable federal, provincial, and municipal legislature.

.2 The contractor is to complete MARLANT’s Halocarbon Management Information Form (HMS Form) and provide a copy of the Form and a copy of the contractors service logs (affixed notice) to the PCA Representative within 72 hours of the completion of these work activities. Ensure all required fields are completed and accurate. Ensure that a copy of the contractor control document (service log) is included with the submission and the control document number is recorded in the Leak Test Notice # field on the form. Forms not complete or inaccurate or missing contractor control documents will be rejected. The PCA Representative will provide the latest version form to contractor after project award.

.3 Annual Inspections: Complete Annual Inspection. If Leak is detected complete Leak/Repair HMS form only with both Inspection and repair. Complete Leak Repair Annual HMS form. Complete Service Log and Inspection notice

.4 Leak/Repair: Report leak immediately to the PCA representative. Complete Leak Repair Annual HMS form. If Leak is detected during annual inspection complete Leak Repair Annual HMS Form with both Inspection and repair info. Complete service log and notice where required.

.5 Decommissioning: Prior to decommissioning contractor must coordinate a meeting with PCA and DND to review the requirements. Inventory list to be requested from PCA/DND to verify unit information is consistent with information completed on form and contractor control documents. Complete Decommissioning. Complete Decommissioning HMS form. Complete service log and affix federal notice and Provincial ODS sticker.

.6 Installation: Prior to installation contractor must coordinate a meeting with PCA and DND to review the requirements. Complete Installation. Complete **Installation HMS form**. Complete service log and affix notice where required

**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 SECTIONS

.1 Section 01 11 00 - Summary of Work.

.2 Section 01 77 00 - Closeout Procedures.

.3 All technical specifications on drawings

### 1.2 INSPECTION

.1 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by PCA instructions, or law of Place of Work.

.2 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.

.3 PCA Representative may order any 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. If such Work is found in accordance with Contract Documents, PCA shall pay cost of examination and replacement.

.4 Contractor shall obtain and pay for electrical permit and inspections.

.5 Contractor shall secure “Hot work permit” if required for work.

### 1.3 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies may be engaged by PCA Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by PCA Representative.

.2 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

.3 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 PCA Representative at no cost to PCA Representative. Pay costs for retesting and re-inspection.

### 1.4 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.

### 1.5 PROCEDURES

.1 Notify appropriate agency and PCA Representative in advance of requirement for tests, in order that attendance arrangements can be made.

.2 Submit samples and/or materials required for testing, as specifically requested in specifications and on drawings. 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.

**1.6 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 PCA Representative 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 PCA Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, PCA Representative 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 PCA Representative.

**1.7 REPORTS**

.1 Submit electronic copies of inspection and test reports to PCA Representative.

**1.8 EQUIPMENT AND SYSTEMS**

.1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.

.2 Refer to drawings for definitive requirements.

**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 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.

### 1.2 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.

### 1.3 LAND ACCESS

.1 Provide and maintain adequate access to and exit from project site.

.2 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractor's use of roads.

.3 Repair damage to existing land, roads, vegetation or structures resulting from Contractor's equipment and operations. Restore to original condition at no additional cost to PCA Representative

.4 Contractor to restrict activities to within limits of Work and access road between and limits of Work as indicated on Contract Documents

.5 Immediately upon award of contract Contractor will submit for approval details of proposed access routes and works other than indicated. No claim will be entertained arising out of delay in such approval being obtained or if approval is not given.

### 1.4 OFFICES

.1 Provide office heated to 22 C, adequately lighted and ventilated with internet service. Office to be of sufficient size to accommodate site meetings and furnished with drawing laydown table.

.1 Provide private washroom facilities adjacent to office complete with flush or chemical type toilet, lavatory and mirror and maintain supply of paper towels and toilet tissue.

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

**1.5 EQUIPMENT, TOOL AND MATERIALS STORAGE SHED**

.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.

**1.6 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.

**1.7 SITE ENCLOSURES**

.1 In accordance with Section 01 56 00 Temporary Barriers and Enclosures.

**1.8 CONSTRUCTION SIGNAGE**

.1 Provide and erect project sign, within 3 weeks of signing Contract, in a location designated by PCA Representative.

.2 Construction sign 1m x 1m, of wood frame and plywood construction painted with exhibit lettering produced by a professional sign painter.

.3 Indicate on sign, name of Owner and Contractor of design style as and in location as directed by PCA Representative.

.4 No other signs or advertisements, other than warning signs, are permitted on site.

.5 Signs and notices for safety and instruction in both official languages Graphic symbols to CAN/CSA-Z321.

.6 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 PCA Representative.

**1.9 SCAFFOLDING**

.1 Scaffolding in accordance with CAN/CSA-S269.2.

.2 Scaffolding to be comprised of ‘system scaffolding’, including all components and decking.

.3 Scaffolding to be founded on a suitable substrate.

.4 Scaffolding levelness to be achieved with screw jacks and maintained through use of scaffolding.

.5 Scaffolding anchorage and stability to be achieved by using system component bracing as well as counterweights and or ground anchors with guy wires.

.6 Scaffolding is not to be anchored to existing building or monuments.

**Part 2 Products**

**2.1 NOT USED**

.1 Not Used.

**Part 3 Execution**

**3.1 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 requirements of authorities having jurisdiction sediment and erosion control drawings 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 construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

**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.

.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 in storage shed.

.3 Waste Management: 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.

**END OF SECTION**

## Part 1 General

### 1.1 RELATED SECTIONS

.1 Section 01 11 00 - Summary of Work

.2 Section 01 56 00 - Temporary Barriers and Enclosures.

### 1.2 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

### 1.3 WATER SUPPLY

.1 PCA will provide continuous supply of potable water for construction use.

### 1.4 TEMPORARY HEATING AND VENTILATION

.1 Maintain temperatures of minimum 10 degrees C in areas where construction is in progress.

.2 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 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.

.3 Existing heating system of building may be used during Work, if available.

### 1.5 TEMPORARY POWER AND LIGHT

.1 Existing electrical power and lighting systems may be used for construction requirements. Make good damage to electrical system caused by use under this Work.

### 1.6 FIRE PROTECTION

.1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction and governing codes, regulations and bylaws.

## 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 SECTIONS

.1 Section 01 11 00 - Summary of Work.

.2 Section 01 35 43 - Environmental Procedures.

.3 Section 01 51 00 - Temporary Utilities.

### 1.2 INSTALLATION AND REMOVAL

.1 Provide temporary barriers and controls in order to execute Work expeditiously.

.2 Remove from site all such work after use.

### 1.3 DUST TIGHT SCREENS

.1 Provide dust tight screens to localize dust generating activities, and for protection of staff and clients, workers, finished areas of Work and public.

.2 Maintain and relocate protection until such work is complete.

### 1.4 ACCESS TO SITE

.1 Contractor's staff will have access to the site as directed by PCA Representative.

### 1.5 PROTECTION OF EXISTING BUILDING FINISHES

.1 Provide protection for existing building finishes and equipment in areas immediately affected by construction site during performance of Work. Provide necessary dust and weather screens and covers.

.2 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 RELATED SECTIONS

.1 Section 01 11 00 - Summary of Work.

.2 Section 01 45 00 - Quality Control.

### 1.2 REFERENCES

.1 Within text of each specifications section, reference may be made to reference standards. Conform to these reference standards, in whole or in part as specifically requested in specifications.

### 1.3 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. Should disputes arise as to quality or fitness of products, decision rests strictly with PCA Representative based upon requirements of Contract Documents.

.4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

.5 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.

### 1.4 AVAILABILITY

.1 Immediately upon award, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify PCA 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 PCA at commencement of Work and should it subsequently appear that Work may be delayed for such reason, PCA reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

## 1.5 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 Store sheet materials on flat, solid supports and keep clear of ground.

.6 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.

.7 Remove and replace damaged products at own expense and to satisfaction of PCA.

.8 Touch-up damaged factory finished surfaces to satisfaction of PCA. Use touch-up materials to match original. Do not paint over name plates.

## 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 PCA in writing, of potential conflicts between specifications and manufacturer's instructions, so that PCA will establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes PCA to require removal and re-installation at no increase in Contract Price or Contract Time.

.4 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify PCA representative if required Work is such as to make it impractical to produce required results.

.5 Do not employ anyone unskilled in their required duties. PCA reserves right to require dismissal from site, workers deemed incompetent or careless.

.6 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with PCA, whose decision is final.

## 1.7 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.

## 1.8 REMEDIAL WORK

.1 Section 01 73 03 - 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.

**1.9 LOCATION OF FIXTURES**

.1 Location of existing outlets, and mechanical and electrical items indicated on the drawings are graphical interpretations of existing location. Inform PCA of conflicting installation. Install as directed.

**1.10 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 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.

.4 Keep exposed fastenings to a minimum, space evenly and install neatly.

.5 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

**1.11 FASTENINGS - EQUIPMENT**

.1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service. Coordinate with electrical, mechanical, and structural directions on drawings.

.2 Bolts may not project more than one diameter beyond nuts. Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

**1.12 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 PCA.

## 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 SECTIONS

.1 Section 01 11 00 - Summary of Work.

.2 Section 01 33 00 - Submittal Procedures

### 1.2 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 element.
- .5 Work of PCA 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 PCA 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 Obtain approval of PCA Representative before cutting, boring or sleeving load-bearing members

**1.5 EXECUTION**

.1 Execute cutting, fitting, and patching including excavation and fill, to complete Work. Cut and patch as required to make work fit. Make cuts with clean, true, smooth edges.

.2 Where new work connects with existing and where existing work is altered, cut, patch and make good to match existing work.

.1 Make good materials, and prepare surfaces and refinish all finished surfaces damaged, marred, replaced, or otherwise remedied in the existing building.

.2 Finish new surfaces flush with existing surfaces. Make junctions between existing and new work, or at replaced or remedial Work undetectable under conditions of normal vision. Make surfaces adjacent to one another of the same material, unit sizes, colour, and texture. If this is impossible, make a proposal of intended method of making good for approval, before installation.

.3 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 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.

.6 Pneumatic or impact tools not allowed on masonry work without prior approval.

.7 Restore work with new products in accordance with requirements of Contract Documents.

.8 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

.9 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

**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 SECTIONS

.1 Section 01 11 00 - Summary of Work

.2 Section 01 35 43 - Environmental Procedures

.3 Section 01 77 00 - Closeout Procedures

### 1.2 PROJECT CLEANLINESS

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by PCA or other Contractors.

.2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by PCA Representative. Do not burn waste materials on site.

.3 Provide on-site containers for collection of waste materials and debris.

.4 Dispose of waste materials and debris at designated dumping areas off site.

.5 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations. Use vacuums with HEPA filters.

.6 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

.7 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

.8 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

.9 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

### 1.3 FINAL CLEANING

.1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.

.3 Prior to final review remove surplus products, tools, construction machinery and equipment.

.4 Remove waste products and debris other than that caused by PCA or other Contractors.

.5 Remove waste materials from site at regularly scheduled times.

.6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.7 Clean and polish glass, hardware, stainless steel, chrome, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.

.8 Remove stains, spots, marks and dirt from electrical and mechanical fixtures, walls, floors and all surfaces.

.9 Clean lighting reflectors, lenses, and other lighting surfaces.

.10 Vacuum clean and dust building interiors areas of work, behind grilles, louvres and screens. Use vacuums with HEPA filters.

## 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 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.

.2 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products

.3 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

.4 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:

- .1 Salvaging reusable materials from re-modeling projects, before demolition stage, for resale, reuse on current project.
- .2 Returning reusable items including pallets or unused products to vendors.

.5 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.

.6 Separate Condition: refers to waste sorted into individual types.

.7 Source Separation: acts of keeping different types of waste materials separate beginning from first time they became waste.

.8 Waste Management Co-ordinator (WMC): Contractor representative responsible for supervising waste management activities.

### 1.2 STORAGE, HANDLING AND PROTECTION

.1 Store, materials to be reused, recycled and salvaged in locations as directed by PCA Representative.

.2 Unless specified otherwise, materials for removal become Contractor's property.

.3 Protect, stockpile, store and catalogue salvaged items.

.4 Protect surface drainage, mechanical and electrical from damage and blockage.

.5 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.

- .1 On-site source separation is recommended.
- .2 Remove co-mingled materials to off-site processing facility for separation.
- .3 Provide waybills for separated materials.

.6 Do not store waste and debris on site for excessive time periods. Remove waste from site at regular intervals.

## 1.3 SUBMITTALS

.1 Within seven (7) working days of contract award, submit Waste Reduction Plan and Waste Audit Worksheet for review and approval by PCA Representative. Waste Reduction Plan describes the general management of waste and is to include but not be limited to:

- .1 Destinations of materials listed.
- .2 Deconstruction/disassembly techniques and sequencing.
- .3 Schedule for deconstruction/disassembly.
- .4 Location.
- .5 Security.
- .6 Protection.
- .7 Clear labeling of storage areas.
- .8 Details on materials handling and removal procedures.
- .9 Quantities for materials to be salvaged for reuse or recycled and materials sent to landfill.
- .10 Letters from receiving facilities confirming acceptance of project materials
- .11 Frequency of waste removals.

## 1.4 DISPOSAL OF WASTES

.1 Do not bury asphalt, C&D Debris, rubbish or waste materials on-site.

.2 Do not dispose of waste, volatile materials, mineral spirits, oil or paint thinner into waterways, storm, or sanitary sewers.

.3 Keep records of construction waste including:

- .1 Number and size of bins.
- .2 Waste type of each bin.
- .3 Total tonnage generated.
- .4 Tonnage reused or recycled.
- .5 Reused or recycled waste destination.

.4 Dispose of waste materials in accordance with Town of Truro.

.5 Submit copies of all weigh bills from Waste Management Disposal facilities to PCA Representative as work advances.

## 1.5 SCHEDULING

.1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

## 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 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.

.2 Clean-up work area as work progresses.

.3 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 PCA Representative, and consistent with applicable fire regulations.

.1 Mark containers or stockpile areas.

.2 Provide instruction on disposal practices.

.2 On-site sale of materials is not permitted.

.3 Processing of C&D Debris and Waste is only permitted at the source site or at Town of Truro approved C&D Recycling/processing facilities in accordance with Town of Truro.

### 3.4 WASTE REDUCTION PLAN/WASTE AUDIT WORKSHEET

.1 Complete the Waste Reduction Plan/Waste Audit Worksheet for all waste materials. Refer to Annex A.

.2 Submit and update Waste Reduction Plan/Waste Audit Worksheet to PCA Representative at regular intervals and to satisfaction of PCA Representative.

**END OF SECTION**

## Part 1 General

### 1.1 RELATED SECTIONS

.1 Section 01 11 00 - Summary of Work

.2 Section 01 32 33 - Photographic Documentation

.3 Section 01 33 00 - Submittal Procedures

.4 Section 01 35 43 - Environmental Procedures

.5 Section 01 78 00 - Closeout Submittals

### 1.2 INSPECTION AND DECLARATION

.1 Notify PCA in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.

.1 Request Substantial Completion Inspection by PCA Representative.

.2 PCA Inspection: PCA Representative and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor to correct Work accordingly.

.3 Completion: submit written certificate that following have been performed:

.1 Work has been completed and inspected for compliance with Contract Documents.

.2 Defects have been corrected and deficiencies have been completed.

.3 Equipment and systems have been tested, adjusted and balanced and are fully operational.

.4 Certificates required by Office of the Fire Marshal, Utility companies, have been submitted.

.5 Operation of systems have been demonstrated to PCA Representative.

.6 Work is complete and ready for final inspection.

.4 Final Inspection: when items noted above are completed, request final inspection of Work by PCA Representative and Contractor. If Work is deemed incomplete by PCA Representative, complete outstanding items and request re-inspection. Cost of additional re-inspections due to lack of completion of work will be invoiced to contractor.

.5 Declaration of Substantial Performance: when PCA Representative consider deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for certificate of Substantial Performance. Refer to Standard Contract – General Conditions of the Contract for specifics to application.

.6 Commencement of Lien and Warranty Periods: date of PCA Representative’s acceptance of submitted declaration of Substantial Performance shall 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: when PCA Representative consider final deficiencies and defects have been corrected and it appears requirements of Contract have been totally performed, make application for final payment. Refer to Standard Contract – General Conditions of the Contract. If Work is deemed incomplete by PCA Representative, complete outstanding items and request re-inspection. Cost of additional re-inspections due to lack of completion of work will be invoiced to contractor.

.8 Payment of Holdback: after issuance of certificate of Substantial Performance of Work, submit an application for payment of holdback amount in accordance with Standard Contract – General Conditions of the Contract.

**1.3 CLEANING**

.1 In accordance with Section 01 74 11 - Cleaning.

**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 SECTIONS

.1 Section 01 11 00 - Summary of Work

.2 Section 01 33 00 - Submittal Procedures

.3 Section 01 35 43 - Environmental Procedures

.4 Section 01 77 00 - Closeout Procedures

### 1.2 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.2 Prepare instructions and data using personnel experienced in maintenance and operation of described products.

.3 Copy will be returned after final inspection, with PCA comments.

.4 Revise content of documents as required prior to final submittal.

.5 Three weeks prior to Substantial Performance of the Work, submit to PCA Representative one (1) final copies of operating and maintenance manuals and one (1) electronic copy in English for review.

.6 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.

.7 Furnish evidence, if requested, for type, source and quality of products provided.

.8 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

.9 Pay costs of transportation.

### 1.3 FORMAT

.1 Organize data as instructional manual.

.2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 215 x 279 mm with spine and face pockets.

.3 When multiple binders are used correlate data into related consistent groupings. 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 systems, 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. Bind in with text; fold larger drawings to size of text pages.

.9 Provide 1:1 CAD files in dwg format on CD. Included in Binder in plastic CD holder page.

## 1.4 CONTENTS

.1 Table of Contents: provide title of project; Date of submission; names.

.1 Addresses, and telephone numbers of PCA Representative and Contractor with name of responsible parties.

.2 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. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

## 1.5 AS-BUILTS AND SAMPLES

.1 Maintain, in addition to requirements in General Conditions, at site for PCA Representative 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. Field test records.

.6 Inspection certificates.

.7 Manufacturer's certificates.

.2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.

.3 Label record documents and file in accordance with Section number listings in List of Contents of this specification. Label each document "PROJECT RECORD" in neat, large, printed letters.

.4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.

.5 Keep record documents and samples available for inspection by PCA Representative.

## 1.6 RECORDING ACTUAL SITE CONDITIONS

.1 Record information on set of black line opaque drawings, and in copy of Project Manual, provided by PCA.

.2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.

.3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.

.4 Contract Drawings and shop drawings: mark each item to record actual construction, including:

.1 Field changes of dimension and detail.
.2 Changes made by change orders.
.3 Details not on original Contract Drawings.
.4 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 manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

## 1.7 EQUIPMENT AND SYSTEMS.

.1 Include any modifications and changes to the existing re-installed equipment and wiring.

.2 Additional requirements: as specified in electrical and mechanical specification and drawings.

## 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. 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 Additional Requirements: as specified in individual specifications sections.

**1.9 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 site in location as directed; place and store.

.4 Receive and catalogue items. Submit inventory listing to PCA Representative. Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit prior to final payment.

**1.10 MAINTENANCE 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 site in location as directed; place and store.

.4 Receive and catalogue items. Submit inventory listing to PCA Representative for review and final copy to PCA Representative. Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit prior to final payment.

**1.11 PHOTOGRAPHIC DOCUMENTATION**

.1 In accordance with Section 01 32 33 - Photographic Documentation.

**1.12 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 site in location as directed; place and store. Receive and catalogue items. Submit inventory listing to PCA. Include approved listings in Maintenance Manual.

**1.13 STORAGE, HANDLING AND PROTECTION**

.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 to satisfaction of PCA Representative.

**1.14 WARRANTIES**

.1 Submit, warranty information made available during construction phase, to PCA, for review prior to each monthly pay estimate.

.2 Assemble approved information in binder and submit upon acceptance of work. 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, 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 until time specified for submittal.

.3 Except for items put into use with PCA permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.

.4 Conduct quarterly joint warranty inspection, measured from time of substantial Completion to the end of contractor's warranty period.

.5 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 for commissioned systems such as fire protection, alarm systems, and sprinkler systems.

.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 each quarterly 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.

.6 Respond in a timely manner to oral or written notification of required construction warranty repair work.

.7 Written verification will follow oral instructions. Failure to respond will be cause for the PCA 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 SECTIONS

.1 Section 01 35 29.06 – Health and Safety Requirements

.2 Section 01 35 35 – Fire Safety Requirements

.3 Section 01 35 43 - Environmental Procedures

.4 Section 01 74 11 – Cleaning

.5 Section 01 74 21 Construction/ Demolition Waste Management

.6 Section 02 83 11 – Lead-Based Paint Abatement – Intermediate Precautions

### 1.2 SUMMARY

.1 This Section includes the following:

.1 Demolition and removal of buildings and structures

### 1.3 REFERENCE STANDARDS

.1 CSA Group (CSA)

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

.2 National Fire Protection Association (NFPA)

.1 NFPA 241 - 2012, Standard for Safeguarding Construction, Alteration, and Demolition Operations

.3 National Research Council Canada (NRC)

.1 National Building Code of Canada 2015 (NBC).

.2 National Fire Code of Canada 2015 (NFC).

### 1.4 DEFINITIONS

.1 Demolition: rapid destruction of building following removal of hazardous materials.

.2 Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, may include but not limited to: asbestos PCB s, CFC s, HCFC s poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or wellbeing or environment if handled improperly.

.3 Waste Management Coordinator (WMC): Contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.

.4 Construction Waste Management Plan (CWM Plan): Written plan addressing opportunities for reduction, reuse, or recycling of materials prepared in accordance with Section 01 74 21- Construction/Demolition Waste Management and Disposal.

## 1.5 ADMINISTRATIVE REQUIREMENTS

.1 Coordination: Coordinate with PCA Representative for the material ownership including but not limited to:

.1 Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain PCA Representatives property, demolished materials shall become Contractor's property and shall be removed from Project site.

.2 Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to PCA Representative that may be encountered during demolition remain PCA Representatives property.

.2 Pre-Demolition Meetings:

.1 Convene pre-installation meeting 1 week prior to beginning work of this Section, with PCA Representative and Contractor in accordance with Section 01 31 00 - Project Management and Coordination.

.3 Scheduling:

.1 Employ necessary means to meet project time-lines without compromising specified minimum rates of material diversion.

.2 In event of unforeseen delay notify PCA Representative in writing.

## 1.6 ACTION AND INFORMATIONAL SUBMITTALS

.1 Action Submittals: Provide the following submittals before starting any work of this Section:

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Schedule of Demolition Activities: Coordinate with Section 01 32 00 - Construction Progress Documentation.

.2 Informational Submittals: Provide the following submittals when requested by the PCA Representative:

.1 Qualification Data: Submit information for companies and personnel indicating their capabilities and experience to perform work of this Section including; but not limited to, lists of completed projects with project names and addresses, names and addresses of Client Representative for work of similar complexity and extent.

## 1.7 QUALITY ASSURANCE

.1 Regulatory Requirements: Ensure Work is performed in compliance with CEPA, applicable Provincial/Territorial and Municipal regulations.

.2 Comply with hauling and disposal regulations of Authority Having Jurisdiction.

.3 Standards: Comply with ANSI A10.6 and NFPA 241.

## 1.8 SITE CONDITIONS

.1 Part 1 Related Sections and take precautions to protect environment.

.2 If material resembling spray or trowel-applied asbestos or other designated substance listed as hazardous be encountered, stop work, take preventative measures, and notify PCA Representative immediately.

.1 Proceed only after receipt of written instructions have been received from PCA Representative.

.3 Notify PCA Representative before disrupting building access or services.

.4 Environmental protection:

.1 Ensure Work is done in accordance with Section 01 35 43 - Environmental Procedures.

**1.9 EXISTING CONDITIONS**

.1 Hazardous Materials: Asbestos, mercury and lead may be encountered in the existing building.

.1 Hazardous materials will be as defined in the Hazardous Materials Act.

.2 Hazardous materials are to be abated in advance of demolition by Qualified abatement contractors.

## Part 2 Products

**2.1 NOT USED**

.1 Not used.

## Part 3 Execution

**3.1 EXAMINATION**

.1 Survey existing conditions and correlate with requirements indicated to determine extent of demolition required.

.2 Review Project Record Documents of existing construction provided by PCA Representative.

.3 PCA Representative does not guaranty that existing conditions are the same as those indicated in Project Record Documents.

.4 Inventory and record the condition of items being removed and salvaged.

.5 When unanticipated mechanical, electrical, or structural elements are encountered, investigate and measure the nature and extent of the element.

.6 Promptly submit a written report to PCA Representative.

.7 Verify that hazardous materials have been remediated before proceeding with demolition operations.

**3.2 PREPARATION**

.1 Protection of In-Place Conditions:

.1 Prevent movement, settlement, or damage to adjacent utilities, and parts of building structures, and landscaping features 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 Section 01 70 12 - Health and Safety Requirements.

.2 Remove following materials and equipment, store, protect, and reinstall in new building, using qualified tradespeople. Store in location designated by PCA Representative:

.1 Demolish stone portions of existing building and monuments as indicated on the Contract Documents.

.2 Remove parts of existing building and monuments to permit new construction.

.3 At end of each days work, leave Work in safe and stable condition.

.4 Protect interiors of parts not to be demolished from exterior elements at all times.

.5 Demolish to minimize dusting. Keep materials wetted as directed by PCA Representative.

.6 Remove wood trim, facia, soffit and decorative elements on building as indicated

.7 Remove existing flashings on building as indicated.

.8 Remove gutters and downspouts as indicated.

.9 Remove stone monument bases as indicated.

.10 Remove stone at Herbin Cross as indicated.

.11 Remove plaques at all monuments, Evangeline figure and concrete bust at Longfellow monument.

## 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 sentence 3.2.3 above for items to be salvaged for reuse.

.4 Waste Management: separate waste materials for reuse and recycling 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.

**END OF SECTION**

## Part 1 General

### 1.1 SUMMARY

.1 Comply with requirements of this Section when performing following Work:

.1 Removal of lead based paint by scraping or sanding using non-powered hand tools.

### 1.2 RELATED REQUIREMENTS

.1 Section 02 82 00.01 - Asbestos Abatement – Minimum Precautions.

### 1.3 REFERENCE STANDARDS

.1 Department of Justice Canada

.1 Canadian Environmental Protection Act, 1999 (CEPA).

.2 Health Canada

.1 Workplace Hazardous Materials Information System (WHMIS).

.1 Safety Data Sheets (SDS).

.3 Human Resources and Social Development Canada (HRSDC)

.1 Canada Labour Code Part II, - SOR 86-304 - Occupational Health and Safety Regulations.

.4 Transport Canada (TC)

.1 Transportation of Dangerous Goods Act, 1992 (TDGA).

.5 U.S. Environmental Protection Agency (EPA)

.1 EPA 747-R-95-007-(1995), Sampling House Dust for Lead.

.6 U.S. Department of Health and Human Services/Centers for Disease Control and Prevention/National Institute for Occupational Safety and Health (NIOSH)

.1 NIOSH 94-113 - NIOSH Manual of Analytical Methods (NMAM), 4th Edition (1994).

.7 U.S. Department of Labour - Occupational Safety and Health Administration (OSHA) - Toxic and Hazardous Substances

.1 Lead in Construction Regulation - 29 CFR 1926.62-1993.

.8 Underwriters Laboratories of Canada (ULC)

.9 Province of Nova Scotia

.1 Occupational Health and Safety Act, S.N.S. - Updated 2013.

## 1.4 DEFINITIONS

.1 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.

.2 Authorized Visitors: PCA Representative or designated representatives and representatives of regulatory agencies.

.3 Occupied Area: areas of building or work site that is outside Work Area.

.4 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must be appropriate capacity for scope of work.

.5 Airlock: ingress or egress system, without permitting air movement between contaminated area and uncontaminated area. Consisting of two curtained doorways at least 2 m apart.

.6 Curtained doorway: arrangement of closures to allow ingress and egress from one room to another. Typically constructed as follows:

.1 Place two overlapping polyethylene sheets over existing or temporarily framed doorway, securing each along top of doorway, securing vertical edge of one sheet along one vertical side of doorway, and secure other sheet along opposite vertical side of doorway.

.2 Reinforce free edges of polyethylene with duct tape and add weight to bottom edge to ensure proper closing.

.3 Overlap each polyethylene sheet at openings 1.5 m on each side.

.7 Action level: employee exposure, without regard to usage of respirators, to an airborne concentration of lead of 50 micrograms per cubic metre of air calculated as 8 hour time-weighted average (TWA). Intermediate precautions for lead abatement are based on airborne lead concentrations greater than 0.05 milligrams per cubic metre of air within Work Area.

.8 Competent person: PCA Representative and/or individuals capable of identifying existing lead hazards in workplace and taking corrective measures to eliminate them.

.9 Lead in Dust: wipe sampling on vertical and/or horizontal surfaces, dust and debris is considered to be lead contaminated if it contains more than 40 micrograms of lead in dust per square foot.

## 1.5 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Provide proof satisfactory to PCA Representative that suitable arrangements have been made to dispose of lead based paint waste in accordance with requirements of authority having jurisdiction.

.3 Provide: Provincial requirements for Notice of Project Form.

.4 Provide proof of Contractor s General and Environmental Liability Insurance.

.5 Quality Control:

.1 Provide PCA Representative necessary permits for transportation and disposal of lead based paint waste and proof that it has been received and properly disposed.

.2 Provide proof satisfactory to PCA Representative that employees have had instruction on hazards of lead exposure, respirator use, dress, entry and exit from Work Area, and aspects of work procedures and protective measures.

.3 Provide proof that supervisory personnel have attended lead abatement course, of not less than two days duration, approved by PCA Representative. Minimum of one supervisor for every ten workers.

.6 Product data:

.1 Provide documentation including test results, fire and flammability data, and WHMIS Safety Data Sheets (SDS) for chemicals or materials including:

.1 Encapsulants.

.2 Amended water.

.3 Slow drying sealer.

## 1.6 QUALITY ASSURANCE

.1 Regulatory Requirements: comply with Federal, Provincial, Territorial and local requirements pertaining to lead paint, in case of conflict among those requirements or with these specifications more stringent requirement applies. Comply with regulations in effect at time work is performed.

.2 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06Health and Safety Requirements.

.2 Safety Requirements: worker and visitor protection.

.1 Protective equipment and clothing to be worn by workers and visitors in Work Area includes:

.1 Respirator NIOSH approved and equipped with filter cartridges with assigned protection factor of 50, acceptable to Authority having jurisdiction. Suitable for type of lead and level of lead dust exposure in Lead Work Area. Provide sufficient filters so workers can install new filters following disposal of used filters and before re-entering contaminated areas.

.2 Disposable type protective clothing that does not readily retain or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.

.2 Requirements for workers:

.1 Remove street clothes in clean change room and put on respirator with new filters or reusable filters, clean coveralls and head covers before entering Equipment and Access Rooms or Work Area. Store street clothes, uncontaminated footwear, towels, and similar uncontaminated articles in clean change room.

.2 Remove gross contamination from clothing before leaving work area. Place contaminated work suits in receptacles for disposal with other lead - contaminated materials. Leave reusable items except respirator in Equipment and Access Room. When not in use in Work Area, store work footwear in Equipment and Access Room. Upon completion of lead abatement, dispose of footwear as contaminated waste or clean thoroughly inside and out using soap and water before removing from Work Area or from Equipment and Access Room.

.3 Enter unloading room from outside dressed in clean coveralls to remove waste containers and equipment from Holding Room of Container and Equipment Decontamination Enclosure system. Workers not to use this system as means to leave or enter work area.

.3 Eating, drinking, chewing, and smoking are not permitted in Work Area.

.4 Ensure workers are fully protected with respirators and protective clothing during preparation of system of enclosures prior to commencing actual lead abatement.

.5 Ensure workers wash hands and face when leaving Work Area. Facilities for washing are to be determined.

.6 Provide and post in Clean Change Room and in Equipment and Access Room the procedures described in this Section, in both official languages.

.7 Ensure no person required to enter Work Area has facial hair that affects seal between respirator and face.

.8 Visitor Protection:

.1 Provide protective clothing and approved respirators to Authorized Visitors to Work Areas.

.2 Instruct Authorized Visitors in use of protective clothing, respirators and procedures.

.3 Instruct Authorized Visitors in proper procedures to be followed in entering into and exiting from Work Area.

## 1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse or recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal regulations.

.3 Disposal of lead waste generated by removal activities must comply with Municipal Federal, Provincial, regulations. Dispose of lead waste in sealed double thickness 0.15 mm bags or leak proof drums. Label containers with appropriate warning labels.

.4 Provide manifests describing and listing waste created. Transport containers by approved means to licensed landfill for burial.

**1.8 EXISTING CONDITIONS**

.1 Reports and information pertaining to lead based paint to be handled, removed, or otherwise disturbed and disposed of during this Project are available for inspection through the PCA Representative.

.2 Notify PCA Representative of lead-based paint discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material until instructed by PCA Representative.

**1.9 SCHEDULING**

.1 Not later than two days before beginning Work on this Project notify the following in writing, where appropriate:

.1 Appropriate Regional or Zone Director of Medical Services Branch, Health Canada.

.2 Provincial Ministry of Labour.

.3 Disposal Authority.

.4 Environment Council of Ontario (EACO).

.2 Inform sub trades of presence of lead-containing materials identified in Existing Conditions.

.3 Provide PCA Representative copy of notifications prior to start of Work.

**Part 2 Products**

**2.1 MATERIALS**

.1 Polyethylene: 0.15 mm unless otherwise specified; in sheet size to minimize joints.

.2 FR polyethylene: 0.15 mm woven fibre reinforced fabric bonded both sides with polyethylene.

.3 Tape: fibreglass-reinforced duct tape suitable for sealing polyethylene under dry conditions and wet conditions using amended water.

.4 Slow-drying sealer: non-staining, clear, water-dispersible type that remains tacky on surface for at least 8 hours and designed for trapping residual lead paint residue.

.5 Lead waste containers: metal or fibre type acceptable to dump operator with tightly fitting covers and 0.15 mm sealable polyethylene liners.

.1 Label containers with pre-printed bilingual cautionary Warning Lead clearly visible when ready for removal to disposal site.

**Part 3 Execution**

**3.1 SUPERVISION**

.1 Approved Supervisor must remain within Lead Work Area during disturbance, removal, or other handling of lead based paints.

**3.2 PREPARATION**

.1 Remove and wrap items to be salvaged or reused, and transport and store in area specified by PCA Representative.

.2 Work Area:

.1 Shut off and isolate HVAC system to prevent dust dispersal into other building areas. Conduct smoke tests to ensure duct work is airtight.

.2 Pre-clean fixed casework, and equipment within work areas, using HEPA vacuum and cover with polyethylene sheeting sealed with tape.

.3 Clean work areas using HEPA vacuum. If not practicable, use wet cleaning method. Do not use methods that raise dust, such as dry sweeping, or vacuuming using other than HEPA vacuum.

.4 Seal off openings, corridors, doorways, windows, skylights, ducts, grilles, and diffusers, with polyethylene sheeting sealed with tape.

.5 Cover floor surfaces in work area from wall to wall with FR polyethylene drop sheets to protect existing floor during removal.

.6 Build airlocks at entrances and exits from work areas to ensure work areas are always closed off by one curtained doorway when workers enter or exit.

.7 At point of access to work areas install warning signs in both official languages in upper case Helvetica Medium letters reading as follows where number in parentheses indicates font size to be used:

.1 CAUTION LEAD HAZARD AREA (25 mm).

.2 NO UNAUTHORIZED ENTRY (19 mm).

.3 WEAR ASSIGNED PROTECTIVE EQUIPMENT AND RESPIRATOR (19 mm).

.4 BREATHING LEAD CONTAMINATED DUST CAUSES SERIOUS BODILY HARM (7 mm).

.8 Maintain emergency and fire exits from work areas, or establish alternative exits satisfactory to Authority having jurisdiction.

.9 Where water application is required for wetting lead containing materials, provide temporary water supply by use of appropriately sized hoses for application of water as required.

.10 Provide electrical power and shut off for operation of powered tools and equipment. Provide 24 volt safety lighting and ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard. Ensure safe installation of electrical lines and equipment.

.3 Worker Decontamination Enclosure System:

.1 Worker Decontamination Enclosure System includes Equipment and Access Room and Clean Room, as follows:

.1 Equipment and Access Room: construct between exit and work areas, with two curtained doorways, one to the rest of suite, and one to work area. Install waste receptor and storage facilities for workers shoes and protective clothing to be re-worn in work areas. Build large enough to

accommodate specified facilities, equipment needed, and at least one worker allowing sufficient space to change comfortably.

.2 Clean Room: construct with curtained doorway to outside of enclosures. Provide lockers or hangers and hooks for workers street clothes and personal belongings. Provide storage for clean protective clothing and respiratory equipment. Install mirror to permit workers to fit respiratory equipment properly.

.4 Construction of Decontamination Enclosures:

.1 Construct framing for enclosures or use existing rooms. Line enclosure with polyethylene sheeting and seal with tape, apply two layers of FR polyethylene on floor.

.2 Construct curtain doorways between enclosures so when people move through or waste containers and equipment are moved through doorway, one of two closures comprising doorway always remains closed.

.5 Separation of Work Areas from Occupied Areas

.1 Barriers between Work Area and occupied area to be constructed as follows:

.1 Construct floor to ceiling lumber stud framing, cover with polyethylene sheeting and seal with duct tape. Apply 9 plywood over polyethylene sheeting. Seal plywood joints and between adjacent materials with surface film forming sealer, to create airtight barrier.

.2 Cover plywood with polyethylene sheeting and sealed with duct tape.

.6 Maintenance of Enclosures:

.1 Maintain enclosures in clean condition.

.2 Ensure barriers and polyethylene linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately.

.3 Visually inspect enclosures at beginning of each work day.

.4 Use smoke test method to test effectiveness of barriers as directed by PCA Representative.

## 3.3 LEAD-BASE PAINT ABATEMENT

.1 Removal of lead based paint to be performed by scraping or sanding using non-powered hand tools, or manual demolition of lead-painted plaster walls or building components by striking a wall with sledgehammer or similar tool.

.2 Remove lead based paint in small sections and pack as it is being removed in sealable 0.15 mm plastic bags and place in labelled containers for transport.

.3 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove from immediate working area to Staging Area. Clean external surfaces thoroughly again by wet sponging before moving containers to decontamination Washroom. Wash containers thoroughly in decontamination Washroom, and store in Holding Room pending removal to Unloading Room and outside. Ensure containers are removed from Holding Room by workers who have entered from uncontaminated areas dressed in clean coveralls.

.4 After completion of stripping work, wire brush and wet sponge surface from which lead based paint has been removed to remove visible material. During this work keep surfaces wet.

.5 After wire brushing and wet sponging to remove visible lead based paint, and after encapsulating lead containing material impossible to remove, wet clean work area including equipment and access room, and equipment used in process. After inspection by PCA Representative, apply continuous coat of slow drying sealer to surfaces. Do not disturb work for 8 hours with no entry, activity, ventilation or disturbance during this period.

.6 After enclosing lead painted surfaces, wet clean work area and equipment and access room. During settling period no entry, activity, or ventilation will be permitted.

## 3.4 INSPECTION

.1 Perform inspection to confirm compliance with specification and governing authority requirements. Deviations from these requirements not approved in writing by PCA Representative will result in work stoppage, at no cost to PCA.

.2 PCA Representative will inspect work for:

.1 Adherence to specific procedures and materials.

.2 Final cleanliness and completion.

.3 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

.3 When lead dust leakage from Work Area occurs PCA Representative may order Work shutdown.

.1 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

## 3.5 LEAD SURFACE SAMPLING - WORK AREAS

.1 Final lead surface sampling to be conducted as follows:

.1 After Work Area has passed a visual inspection for cleanliness approved by PCA Representative and acceptable coat of lock-down agent has been applied to surfaces within enclosure, and appropriate setting period of 8 hours has passed. PCA Representative will perform lead wipe sampling in Work Area.

.1 Final lead wipe sampling results from horizontal and vertical surfaces where lead based paints have been removed must show lead levels of less than 40 micrograms of lead in dust per square foot. Samples must be collected and analyzed in accordance with EPA 747-R-95-007.

.2 If wipe sampling results show levels of lead in excess of 40 micrograms per square foot, re-clean work area at contractor s expense and apply another acceptable coat of lock-down agent to surfaces.

.3 Repeat as necessary until fibre levels are less than 40 micrograms per square foot.

**3.6 FINAL CLEANUP**

.1 Following specified cleaning procedures, and when lead wipe sampling is below acceptable concentrations proceed with final cleanup.

.2 Remove polyethylene sheet by rolling it away from walls to centre of work area. Vacuum visible lead containing particles observed during cleanup, immediately, using HEPA vacuum equipment.

.3 Place polyethylene seals, tape, cleaning material, clothing, and other contaminated waste in plastic bags and sealed labelled waste containers for transport.

.4 Clean-up Work Areas, Equipment and Access Room, and other contaminated enclosures.

.5 Clean-up sealed waste containers and equipment used in Work and remove from work areas, via Container and Equipment Decontamination Enclosure System, at appropriate time in cleaning sequence.

.6 Conduct final check to ensure no dust or debris remains on surfaces as result of dismantling operations.

**3.7 RE-ESTABLISHMENT OF OBJECTS AND SYSTEMS**

.1 Repair or replace objects damaged in course of work to their original state or better, as directed by PCA Representative.

**END OF SECTION**

## Part 1 General

### 1.1 RELATED REQUIREMENTS

.1 Section 03 20 00 – CONCRETE REINFORCING.

.2 Section 03 30 00 – CAST-IN-PLACE CONCRETE.

### 1.2 REFERENCE STANDARDS

.1 CSA Group (CSA)

.1 CSA A23.1-14 /A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CAN/CSA O86-14, Engineering Design in Wood.

.3 CSA O121-17, Douglas Fir Plywood.

.4 CSA O151-17, Canadian Softwood Plywood.

.5 CAN/CSA O325.0-16, Construction Sheathing.

.6 CSA S269.1-16, Falsework and Formwork.

.2 Underwriters' Laboratories of Canada (ULC)1

.1 CAN/ULC-S701-11, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

### 1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-installation Meetings: convene pre-installation meeting one week prior to beginning concrete works.

.1 Ensure PCA Representative attend.

.1 Verify project requirements.

### 1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submittals in accordance with Section 01 33 00- Submittal Procedures.

.1 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts. Comply with CSA S269.1, for falsework drawings. Comply with CAN/CSA-S269.3, for formwork drawings.

.2 Indicate formwork design data, such as permissible rate of concrete placement, and temperature of concrete, in forms.

.3 Indicate sequence of erection and removal of formwork/falsework for approval by PCA Representative.

### 1.5 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Section 01 45 00- Quality Control.

.2 Retain a professional engineer registered or licensed in Nova Scotia, Canada, with experience in formwork and falsework design of comparable complexity and scope, to perform following services as part of Work of this Section:

.1 Design of formwork

.2 Review, stamp, and sign fabrication and erection Shop Drawings, design calculations and amendments.

.3 Conduct on-site inspections and prepare and submit inspection reports verifying this part of Work is in accordance with Contract Documents and reviewed Shop Drawings.

## 1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store, and handle materials in accordance with manufacturer's written instructions and 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, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect formwork from damage.

.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove for recycling or reuse pallets, crates, padding, packaging materials as specified in accordance with Section 01 74 21- Construction/Demolition Waste Management and Disposal.

# Part 2 Products

## 2.1 MATERIALS

.1 Formwork materials:

.1 For concrete without special architectural features, use wood and wood product formwork materials to CAN/CSA O86.

.2 For concrete with special architectural features, use formwork materials to CSA A23.1/A23.2.

.3 Rigid insulation board: to CAN/ULC-S701.

.2 Form ties:

.1 For concrete not designated 'Architectural': removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes minimum 25 mm diameter in concrete surface.

.2 For Architectural concrete; snap ties complete with plastic cones and light grey concrete plugs.

.3 Form liner:

.1 Plywood: Canadian Softwood Plywood to CSA O151, medium density overlay Douglas Fir to CSA O121, square.

.4 Form release agent: Proprietary, non volatile material not to stain concrete or impair subsequent application of finishes or coatings to surface of concrete, derived from agricultural sources, non petroleum containing, biodegradable, non-toxic.

.5 Falsework materials: to CSA S269.1.

.6 Sealant: to Section 07 92 00- Joint Sealants.

## Part 3 Execution

### 3.1 FABRICATION AND ERECTION

.1 Verify lines, levels, and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.

.2 Fabricate and erect falsework in accordance with CSA S269.1.

.3 Refer to architectural drawings for concrete members requiring architectural exposed finishes.

.4 Do not place shores and mud sills on frozen ground.

.5 Provide site drainage to prevent washout of soil supporting mud sills and shores.

.6 Fabricate and erect formwork in accordance with CAN/CSA S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA A23.1/A23.2.

.7 Align form joints and make watertight.

.1 Keep form joints to minimum.

.8 Use 25 mm chamfer strips on external corners and 25 mm fillets at interior corners, joints, unless specified otherwise.

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

.10 Construct forms for architectural concrete, and place ties as indicated and/or as directed.

.1 Joint pattern not necessarily based on using standard size panels or maximum permissible spacing of ties.

.11 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections.

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

.12 Clean formwork in accordance with CSA A23.1/A23.2, before placing concrete.

### 3.2 REMOVAL AND RESHORING

.1 Leave formwork in place for following minimum periods of time after placing concrete.

.1 2 days for walls and sides of beams.

.2 2 days for columns.

.3 2 days for footings.

.2 Remove formwork when concrete has reached 70 % of its 28-day design strength or minimum period noted above, whichever comes later, and replace immediately with adequate reshoring.

.3 Re-use formwork and falsework subject to requirements of CSA A23.1/A23.2.

## 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 Waste Management: separate waste materials for recycling 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.

**END OF SECTION**

## Part 1 General

### 1.1 RELATED REQUIREMENTS

.1 Section 03 10 00 - CONCRETE FORMING AND ACCESSORIES.

.2 Section 03 30 00 - CAST-IN-PLACE CONCRETE.

### 1.2 REFERENCE STANDARDS

.1 American Concrete Institute (ACI)

.1 SP-66-04, ACI Detailing Manual 2004.

.2 ASTM International (ASTM)

.1 ASTM A123/A123M-17 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.2 ASTM A143/A143M-07 (2014), Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.

.3 ASTM A641/A641M-09a (2014), Standard Specification for Zinc–Coated (Galvanized) Carbon Steel Wire.

.4 ASTM A775/A775M-17, Standard Specification for Epoxy-Coated Steel Reinforcing Bars.

.5 ASTM A884/A884M-14 Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement.

.6 ASTM A1064/A1064M-17, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

.3 CSA Group (CSA)

.1 CSA A23.1-14 /A23.2-14, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CAN/CSA A23.3-14, Design of Concrete Structures.

.3 CSA G30.18-09 (R2014), Carbon Steel Bars for Concrete Reinforcement.

.4 CSA G40.20/G40.21-13 (R2014), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.5 CSA W186-M1990(R2016), Welding of Reinforcing Bars in Reinforced Concrete Construction.

.4 Reinforcing Steel Institute of Canada (RSIC)

.1 RSIC-2004, Reinforcing Steel Manual of Standard Practice.

### 1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-installation Meetings: convene pre-installation meeting one week prior to beginning concrete works.

.1 Ensure PCA Representative attend.

.1 Verify project requirements.

## 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 proprietary materials used in Cast-In-Place Concrete and additives and include product characteristics, performance criteria, physical size, finish, and limitations.

.2 When Chromate solution used as replacement for galvanizing non-prestressed reinforcement, provide product description for review by PCA Representative prior to its use.

.3 Submit Electronic copies of WHMIS Safety Data Sheet (SDS) in accordance with Section 01 35 29.06 - Health and Safety Requirements and 01 35 43- Environmental Procedures.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Nova Scotia.

.1 Prepare reinforcement drawings in accordance with RSIC Manual of Standard Practice.

.2 Indicate placing of reinforcement and:

.1 Bar bending details.

.2 Lists.

.3 Quantities of reinforcement.

.4 Sizes, spacings, locations of reinforcement and mechanical splices if approved by PCA Representative, with identifying code marks to permit correct placement without reference to structural drawings.

.5 Indicate sizes, spacings and locations of chairs, spacers and hangers.

.3 Detail lap lengths and bar development lengths to CAN/CSA A23.3, unless otherwise indicated.

.1 Provide Class B Tension lap splices unless otherwise indicated.

.4 Quality Assurance Submittals:

.1 Submit in accordance with Section 01 45 00- Quality Control and as described in PART 2 - SOURCE QUALITY CONTROL.

.2 Mill Test Report: upon request, submit to PCA Representative certified copy of mill test report of reinforcing steel, minimum 4 weeks prior to beginning reinforcing work.

.3 Upon request submit in writing to PCA Representative proposed source of reinforcement material.

## 1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00- Common Product Requirements and 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, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Replace defective or damaged materials with new.

# Part 2 Products

## 2.1 MATERIALS

.1 Substitute different size bars only if permitted in writing by PCA Representative.

.2 Reinforcing steel: billet steel, grade 400, deformed bars to CSA G30.18, unless indicated otherwise.

.3 Reinforcing steel: weldable low alloy steel deformed bars to CSA G30.18.

.4 Cold-drawn annealed steel wire ties: to ASTM A1064/A1064M.

.5 Deformed steel wire for concrete reinforcement: to ASTM A1064/A1064M.

.6 Welded steel wire fabric:

.1 In accordance ASTM A1064/A1064M, fabricated from as drawn steel wire into flat sheets; sizes as indicated on Drawings.

.2 Provide in flat sheets only.

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

.8 Tie wire: 1.5 mm diameter annealed wire.

.9 Mechanical splices: subject to approval of PCA Representative.

.10 Plain round bars: to CSA G40.20/G40.21.

## 2.2 FABRICATION

.1 Fabricate reinforcing steel in accordance with CSA A23.1/A23.2 and the Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.

.2 Obtain PCA Representative's written approval for locations of reinforcement splices other than those shown on placing drawings.

.3 Upon approval of PCA Representative, weld reinforcement in accordance with CSA W186.

.4 Ship bundles of bar reinforcement clearly identified in accordance with bar bending details and lists.

## 2.3 SOURCE QUALITY CONTROL

.1 Upon request, provide PCA Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to beginning reinforcing work.

.2 Upon request inform PCA Representative of proposed source of supplied material.

# Part 3 Execution

## 3.1 FIELD BENDING

.1 Do not field bend or field weld reinforcement except where indicated or authorized by PCA Representative.

.2 When field bending authorized, bend without heat, applying slow and steady pressure.

.3 Replace bars, which develop cracks or splits.

## 3.2 PLACING REINFORCEMENT

.1 Cutting or puncturing vapour retarder is not permitted; repair damage and reseal vapour retarder before placing concrete.

.2 Place reinforcing steel as indicated on placing drawings in accordance with CSA A23.1/A23.2.

.3 Use plain round bars as slip dowels in concrete.

.1 Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint.

.2 Apply thick even film of mineral lubricating grease when paint is dry.

.4 Prior to placing concrete, obtain PCA Representative approval of reinforcing material and placement.

.5 Maintain cover to reinforcement during concrete pour.

.6 Protect paint coated portions of bars with covering during transportation and handling.

## 3.3 FIELD TOUCH-UP

.1 Touch up damaged and cut ends of galvanized reinforcing steel with compatible finish to provide continuous coating.

## 3.4 FIELD QUALITY CONTROL

.1 Site inspections: conduct inspections as follows in accordance with Section 01 45 00-Quality Control and submit report as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.

.1 Reinforcing steel and welded wire fabric.

.2 PCA Representative will pay for costs of inspections.

.3 Inspection or testing by Consultant not to augment or replace Contractor quality control nor relieve Contractor of contractual responsibility.

**3.5 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 recycling or 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.

**END OF SECTION**

## Part 1 General

### 1.1 RELATED REQUIREMENTS

.1 Section 03 10 00 - CONCRETE FORMING AND ACCESSORIES

.2 Section 03 20 00 - CONCRETE REINFORCING

### 1.2 REFERENCE STANDARDS

.1 ASTM International

.1 ASTM C260/C260M-10a (2016), Standard Specification for Air-Entraining Admixtures for Concrete.

.2 ASTM C309-11, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

.3 ASTM C494/C494M-17, Standard Specification for Chemical Admixtures for Concrete.

.4 ASTM C1017/C1017M-13e1, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.

.5 ASTM C1059/C1059M-13, Standard Specification for Latex Agents for Bonding Fresh To Hardened Concrete.

.6 ASTM D412-16, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.

.7 ASTM D624-00(2012), Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.

.8 ASTM D1751-04(2013) e1, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

.3 CSA Group

.1 CSA A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CSA A283-06 (R2016), Qualification Code for Concrete Testing Laboratories.

.3 CSA A3000-13, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

### 1.3 ABBREVIATIONS AND ACRONYMS

.1 Portland Cement: hydraulic cement, blended hydraulic cement (XXb - b denotes blended) and Portland-limestone cement types:

.1 GU, GUb and GUL - General use cement.

.2 Fly ash types:

.1 F - with CaO content maximum 8%.

.2 CI - with CaO content 15 to 20%.

.3 CH - with CaO minimum 20%.

.3 GGBFS - Ground, granulated blast-furnace slag.

## 1.4 ADMINISTRATIVE REQUIREMENTS

.1 Pre-installation Meetings: in accordance with Section 01 31 00- Project Management and Coordination, convene pre-installation meeting one week prior to beginning concrete works.

.1 Ensure concrete producer, Consultant, testing laboratories, key personnel, PCA Representative attend.

.1 Verify project requirements.

## 1.5 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00- Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for proprietary materials used in Cast-In-Place Concrete and additives and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit electronic copies of WHMIS SDS in accordance with Section 01 35 43 - Environmental Procedures, 01 35 29.06- Health and Safety Requirements

.3 Site Quality Control Submittals:

.1 Provide testing & inspection results/reports for review by PCA Representative and do not proceed without written approval when deviations from mix design or parameters found.

.2 Concrete pours: provide accurate records of poured concrete items indicating date and location of pour, quality, air temperature and test samples taken as described in PART 3 - FIELD QUALITY CONTROL.

.3 Concrete hauling time: provide for review by PCA Representative deviations exceeding maximum allowable time of 120 minutes for concrete delivered to site of Work and discharged after batching.

## 1.6 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Section 01 45 00- Quality Control.

.2 Provide PCA Representative, minimum 4 weeks prior to starting concrete work, with valid and recognized certificate from plant delivering concrete.

.1 Provide test data and certification by qualified independent inspection and testing laboratory that materials and mix designs used in concrete mixture meet specified requirements.

.3 At least 4 weeks prior to beginning Work, inform PCA Representative of source of fly ash.

.1 Changing source of fly ash without written approval of PCA Representative is prohibited.

.4 Minimum 4 weeks prior to starting concrete work, provide proposed quality control procedures for review by PCA Representative on following items:

.1 Falsework erection.

.2 Hot weather concrete.

.3 Cold weather concrete.

.4 Curing.

.5 Finishes.

.6 Formwork removal.

.7 Joints.

.5 Quality Control Plan: provide written report to PCA Representative verifying compliance that concrete in place meets performance requirements of concrete as established in PART 2 - PRODUCTS.

## 1.7 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements:

.2 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.

.1 Modifying maximum time limit without receipt of prior written agreement from PCA Representative and concrete producer as described in CSA A23.1/A23.2. is prohibited.

.2 Deviations submitted for review by PCA Representative.

.3 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

.3 Packaging Waste Management: remove for reuse and recycling of padding, pallets, crates, packaging materials in accordance with Section 01 74 21- Construction/Demolition Waste Management and Disposal.

## 1.8 SITE CONDITIONS

.1 Placing concrete during rain or weather events that could damage concrete is prohibited.

.2 Protect newly placed concrete from rain or weather events in accordance with CSA A23.1/A23.2.

.3 Cold weather protection:

.1 Maintain protection equipment, in readiness on Site.

.2 Use such equipment when ambient temperature below 5°C, or when temperature may fall below 5°C before concrete cured.

.3 Placing concrete upon or against surface at temperature below 5°C is prohibited.

.4 Hot weather protection:

.1 Protect concrete from direct sunlight when ambient temperature above 27°C.

.2 Prevent forms of getting too hot before concrete placed. Apply accepted methods of cooling not to affect concrete adversely.

.5 Protect from drying.

## Part 2 Products

### 2.1 DESIGN CRITERIA

.1 Performance: to CSA A23.1/A23.2 and as described in MIXES of PART 2 - PRODUCTS.

### 2.2 PERFORMANCE CRITERIA

.1 Quality Control Plan: ensure concrete supplier meets performance criteria of concrete as established by PCA Representative and provide verification of compliance as described in PART 1 - QUALITY ASSURANCE.

### 2.3 MATERIALS

.1 Portland Cement: to CAN/CSA-A3001, Type GU.

.1 Reduction in cement from Base Mix to Actual Supplementary Cementing Materials (SCMs) Mix, as percentage.

.2 Supplementary cementing materials: with maximum 10 % fly ash replacement, by mass of total cementitious materials to CSA A3001.

.3 Water: to CSA A23.1.

.4 Aggregates: to CSA A23.1/A23.2.

.5 Admixtures:

.1 Air entraining admixture: to ASTM C260.

.2 Chemical admixture: to ASTM C494/ASTM C1017. PCA Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.

.6 Shrinkage compensating grout: premixed compound consisting of non-metallic, Portland cement, water reducing and plasticizing agents to CSA A23.1/A23.2.

.1 Compressive strength: 50MPa @ 28 days.

.2 Net shrinkage at 28 days: maximum

.7 Non-premixed dry pack grout: composition of non-metallic aggregate Portland cement with sufficient water for mixture to retain its shape when made into ball by hand and capable of developing compressive strength of 50 MPa

.8 Premoulded joint fillers:

.1 Bituminous impregnated fibre board: to ASTM D1751.

.9 Weep hole tubes: plastic.

.10 Dampproofing:

.1 Emulsified asphalt, mineral colloid type, unfilled

.11 Polyethylene film: 10 mil thickness (min.)

**2.4 MIXES**

.1 Concrete mix to CSA A23.1.

.1 Ensure materials used in concrete mix have been submitted for testing and meet requirements of CSA A23.1.

.2 Co-ordinate construction methods to suit PCA Representative concrete mix proportions and parameters.

.3 Identify and report immediately to PCA Representative when concrete mix design and parameters pose anticipated problems or deficiencies related to construction.

.2 Proportion normal density concrete in accordance with CSA-A23.1/A23.2-14, to give quality and yield for all concrete as indicated on the contract drawings.

.1 Foundations: F-2, 25 MPa at 28 days
Air - 6% ± 1%, Slump 75 mm ± 25 mm

**Part 3 Execution**

**3.1 PREPARATION**

.1 Obtain PCA Representative's written approval before placing concrete.

.1 Provide 24 hours minimum notice prior to placing of concrete.

.2 Place concrete reinforcing in accordance with Section 03 20 00- Concrete Reinforcing.

.3 During concreting operations:

.1 Development of cold joints not allowed.

.2 Ensure concrete delivery and handling facilitate placing with minimum of re-handling, and without damage to existing structure or Work.

.4 Pumping of concrete permitted only after approval of equipment and mix.

.5 Disturbing reinforcement and inserts during concrete placement is prohibited.

.6 Prior to placing of concrete obtain PCA Representative's approval of proposed method for protection of concrete during placing and curing in adverse weather.

.7 Protect previous Work from staining.

.8 Clean and remove stains prior to application for concrete finishes.

.9 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, workability, air content, temperature and test samples taken.

.10 In locations where new concrete dowelled to existing work, drill holes in existing concrete.

.1 Place steel dowels and pack solidly with epoxy grout to anchor and hold dowels in positions as indicated.

.11 Do not place load upon new concrete until authorized by PCA Representative.

## 3.2 INSTALLATION/APPLICATION

.1 Do cast-in-place concrete work to CSA A23.1/A23.2.

.2 Sleeves and inserts:

.1 Do not permit penetrations, sleeves, ducts, pipes or other openings to pass through joists, beams, column capitals or columns, except where indicated or approved by PCA Representative.

.2 Where approved by PCA Representative, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere.

.3 Sleeves and openings greater than 100 x 100 mm not indicated reviewed by PCA Representative .

.4 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain written approval of modifications from PCA Representative before placing of concrete.

.5 Confirm locations and sizes of sleeves and openings shown on drawings.

.6 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.

.3 Anchor bolts:

.1 Set anchor bolts to templates in co-ordination with appropriate trade prior to placing concrete.

.2 Grout anchor bolts in preformed holes or holes drilled after concrete has set only after receipt of written approval from PCA Representative.

.1 Drilled holes: to manufacturers' recommendations

.3 Protect anchor bolt holes from water accumulations, snow and ice build-ups.

.4 Set bolts and fill holes with epoxy grout.

.4 Grout under base plates and machinery using procedures in accordance with manufacturer's recommendations which result in 100 % contact over grouted area.

.5 Finishing and curing:

.1 Finish concrete to CSA A23.1/A23.2.

.2 Use procedures as reviewed by PCA Representative or those noted in CSA A23.1/A23.2 PCA Representative to remove excess bleed water. Ensure surface not damaged.

.3 Use curing compounds compatible with applied finish on concrete surfaces.

.4 Finish concrete floor to CSA A23.1/A23.2. Class B.

.5 Provide broom finish unless otherwise indicated.

.6 Rub exposed sharp edges of concrete with carborundum to produce 3 mm minimum radius edges unless otherwise indicated.

Joint fillers:

.7 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by PCA Representative.

.8 When more than one piece required for joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.

.9 Locate and form isolation, construction and expansion joints as indicated.

.10 Install joint filler.

.11 Use 12 mm thick joint filler to separate slabs-on-grade from vertical surfaces and extend joint filler from bottom of slab to within 12 mm of finished slab surface unless indicated otherwise.

## 3.3 SURFACE TOLERANCE

.1 Concrete tolerance to CSA A23.1 Straightedge Method to FF = 25: FL = 20.

## 3.4 FIELD QUALITY CONTROL

.1 Site tests: conduct tests as follows in accordance with Section 01 45 00- Quality Control and submit report as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.

.1 Concrete pours.

.2 Slump.

.3 Air content.

.4 Compressive strength at 7 and 28 days.

.5 Air and concrete temperature.

.2 Inspection and testing of concrete and concrete materials carried out by testing laboratory designated by PCA Representative for review to CSA A23.1/A23.2.

.1 Ensure testing laboratory certified to CSA A283.

.3 Ensure test results are distributed for discussion at pre-pouring concrete meeting between testing laboratory and PCA Representative.

.4 PCA Representative will pay for costs of tests.

.5 PCA Representative will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.

.6 Non-Destructive Methods for Testing Concrete: to CSA A23.1/A23.2.

.7 Inspection or testing by Consultant not to augment or replace Contractor quality control nor relieve Contractor of contractual responsibility.

## 3.5 CLEANING

.1 Clean in accordance with Section 01 74 11- Cleaning.

.2 Waste Management: separate waste materials for reuse and /or recycling in accordance with Section 01 74 21- Construction/Demolition Waste Management and Disposal.

.1 Divert unused concrete materials from landfill to local quarry or facility after receipt of written approval from PCA Representative.

.2 Provide appropriate area on job site where concrete trucks and be safely washed.

.3 Disposal of unused admixtures and additive materials into sewer systems, into lakes, streams, onto ground or in other location to pose health or environmental hazard is prohibited.

.4 Prevent admixtures and additive materials from entering drinking water supplies or streams.

.5 Using appropriate safety precautions, collect liquid or solidify liquid with inert, non-combustible material and remove for disposal.

.6 Dispose of waste in accordance with applicable local, Provincial/Territorial and National regulations.

**END OF SECTION**

## Part 1 General

### 1.1 RELATED REQUIREMENTS

.1 Section 01 45 00 - Quality Control

.2 Section 04 03 01.13 - Period Masonry Cleaning

.3 Section 04 03 05.13 - Period Masonry Mortaring

.4 Section 04 03 05.21 - Period Masonry Repointing

.5 Section 04 03 43.13 - Period Stone Repairing

.6 Section 04 03 43.16 - Period Stone Replacing

.7 Section 04 03 43.19 - Period Stone Dismantling

.8 Section 04 05 00 - Common Work Results for Masonry

.9 Section 04 05 19 - Masonry Anchorage and Reinforcing

### 1.2 SECTION INCLUDES

.1 Work in this section includes cleaning of all stone masonry surfaces in contract area, to remove surface soiling present on stone surface, to restore stone, as much as is feasible, to its' original appearance.

.2 Stones shall be cleaned for purposes of removing stains and soiling without damaging the surface of the stone either physically or chemically.

.3 Extent of stone and brick cleaning: The entire surface of the existing stonework which is not replaced must be cleaned to a uniform appearance in accordance with the approved mock up (trial) area.

### 1.3 ALTERNATES

.1 Obtain, in writing from PCA Representative authorization for changes of cleaning method, cleaning medium, tools, pressure, and flow rates.

### 1.4 REFERENCES

.1 Mine Safety and Health Administration/National Institute for Occupational Safety and Health (MSHA/NIOSH) Standards.

### 1.5 SUBMITTALS

.1 Samples

.1 Demonstrate machinery, tools and nozzles for approval by PCA

Representative.

.2 Submit samples of all cleaning materials for approval of PCA Representative.

.2 Test Reports

.1 Submit test results in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit 2 copies of test results describing water cleaning method, water pressure at compressor tools, nozzle size and distance from masonry surface, used for cleaning of each test patch.

.3 Submit 2 copies of test results describing laser cleaning method, pulse power and maximum fiber length.

.4 Proceed with cleaning upon written approval by PCA Representative concerning tested cleaning methods.

.3 Mock-ups

.1 Mock-ups tests in accordance with Section 01 33 00 - Submittal Procedures.

.2 Water Cleaning

.1 Conduct tests on building in discreet location to determine effectiveness of low pressure wash cleaning methods.

.2 Conduct tests to determine effectiveness of 0.3 kPa water pressures, four hour time periods, types of nozzles, spraying distances from wall surface. Use particulate filter to prevent against metallic staining.

.3 Test pressure at each storey height determines effect of "line drop" on effectiveness of water jets.

.4 Test gentle brushing and spraying as alternative to pressure washing. Use successful tests.

.3 Low Pressure Micro-Abrasive Cleaning

.1 Conduct tests in discreet location on building to determine effectiveness of cleaning method without damage to stone surface.

.2 Conduct tests to determine effectiveness of low water pressures, time periods, types of nozzles, and spraying distances from wall surface.

.4 Locate test patches in inconspicuous places directed by PCA Representative.

.5 Desired result and degree of cleanliness will be determined at mock-up, to the satisfaction of PCA Representative.

.6 Test patches to be 2 m square.

.7 Protect approved test patches to ensure subsequent cleaning can be measured against the standard.

.8 Notify PCA Representative 48 hours before commencing cleaning of each test patch.

.1 Do not start without approval of PCA Representative.

.9 Determine effect of cleaning operations on surrounding historic material and plants.

.10 Stop work when cleaning has detrimental effect on surrounding material and plants.

.11 Proceed after written instructions are received from PCA Representative.

.12 Protect masonry openings from water infiltration during cleaning.

**1.6 ENVIRONMENTAL REQUIREMENTS**

.1 Do not use wet cleaning methods when there is threat of frost within a 48 hour period.

.2 Provide shading to wall to avoid cleaning in full, hot sunlight.

.3 Do not carry out chemical cleaning work when surface temperature of stone is below 15ºC.

**1.7 DELIVERY, STORAGE AND HANDLING**

.1 Deliver, store and handle materials in accordance with manufacturer's requirements.

.2 Follow manufacturer's instructions for delivery, setup and removal of equipment.

.3 Waste Management and Disposal

.1 Remove from site and dispose of packaging materials at appropriate recycling facilities.

**1.8 EXISTING CONDITIONS**

.1 Report to PCA Representative conditions of deteriorated masonry or pointing found during cleaning.

.2 Record existing conditions, using photographs, before and after cleaning. Advise PCA Representative of potential cleaning problems.

.3 Do not clean areas of deteriorated masonry without prior written approval of PCA Representative.

**1.9 SCHEDULING**

.1 Complete work within approved schedule time.

.1 Do not change Schedule without written approval of PCA Representative.

.2 Co-ordinate cleaning work schedule with other work on site.

**Part 2 Products**

**2.1 MATERIALS**

.1 Water: clean, potable and free from contaminants.

.2 Treat water which has high metal content before use in cleaning.

.3 Use air free from oil or other contaminants.

.4 Masking material to approval of PCA Representative.

.5 Paint Strippers.
- .1 Gel form, with active ingredient Methylene Dichloride:
- .2 Stripper systems: Single application, heavy duty paint removal system, non-toxic, zero VOC, as recommended for stone surfaces.

.6 Attapulgite or Diatomaceous clay (Fullers Earth): for use as poultice medium.

.7 Amended Water: Non-sudsing surfactant in water to soak stains and environmental soiling.

## 2.2 TOOLS AND EQUIPMENT

.1 Use only brushes with natural or soft plastic bristles.

.2 Use only scrapers of wood or plastic.

.3 Low Pressure Micro-Abrasive System:

- .1 Product 1: Rotec Vortex Cleaning System
- .2 Product 2: JOS TORC Cleaning System
- .3 Or approved alternate.

.4 Use water pumps fitted with accurate pressure regulators and gauges capable of being preset and locked at maximum specified levels.
- .1 Water pumps to have rating of 0.3 kPa.

.5 Use air compressors equipped with on-line oil filters to avoid spraying oil onto masonry.

.6 Use gun equipped with pressure gauge at nozzle end and particulate filter.

.7 Use plastic or non-ferrous metal piping and fittings.

.8 Use nozzles that give nebulized droplet spray. Use nozzles with 12mm opening.

.9 Vacuum cleaner designed for industrial use, HEPA type.

**Part 3 Execution**

**3.1 PREPARATION**

.1 Place safety devices and signs near work areas as indicated and directed.

.2 Seal or repair openings and joints where there is potential risk of water infiltration.

.3 Cover surfaces not to be cleaned.

.4 Dry brush or scrape accumulations from walls, ledges and cornices.

.5 Cover and protect surfaces and non-masonry finishes in areas to be cleaned.

**3.2 PROTECTION**

.1 Mask or seal vents, windows, and other openings, to prevent water entry or fine dust residue.

.2 Mask wood, glass, and metal adjacent to masonry.

.3 Protect plants and shrubs from excessive watering.

.4 Hang sheeting material from scaffolding to enclose water spray.

.5 Ensure workers wear eye, head, and face protection, and protective gloves, coveralls, boots and filter mask to MSHA/NIOSH standard.

.6 Protect cleaned surfaces which are to be painted from contact with rain and snow.

.7 Protect rainwater leaders, eaves troughs and gutters from being blocked by residue.

.8 Protect finished Work from damage until take-over.

.9 Protect adjacent Work from spread of dust and dirt beyond work areas.

.10 Protect operatives and other site personnel from hazards.

**3.3 EXECUTION OF CLEANING**

.1 Use brushing and scraping only to supplement water washing.

.2 Soak stains and environmental soiling with amended water. Rinse with clean water.

.3 Soften and loosen heavy deposits with prolonged water spray, then brush. Remove thick incrustations with wooden or plastic scrapers.

.4 Low Pressure Water Cleaning:

.1 Pre-wet masonry surface when necessary by soaking with a low-pressure misting system to swell and loosen soiling. Work from top of wall

downwards.

.2 Avoid prolonged wetting and excessive water penetration.

.3 Do not exceed maximum pressure at nozzle or have nozzle closer to masonry than approved by PCA Representative at tests.

.4 Heavy soiled areas will require proportionately more soaking time than cleaning open areas. Avoid running streams of water down wall elevations and excessive soaking of masonry with subsequent damage to wall envelope. Concealed iron fittings and structural components can be seriously damaged by prolonged wetting of masonry, leading to spalling, severe staining and structural damage. Avoid steel or iron pipes and spray heads/nozzles. Provide plastic piping and fittings for general use.

.5 Low Pressure Micro-Abrasive Cleaning:

.1 Ensure handler is skilled in period stone masonry cleaning techniques.

.6 Ensure masonry is cleaned after removal of scaffolding to eliminate possible staining from tie-backs.

.7 Ensure finishpointing mortar is sufficiently cured prior to final cleaning. Mortar joints damaged during final cleaning must be raked out, and finishpointing reinstalled.

## 3.4 CLEANING OF BIRD DROPPINGS

.1 Note that pigeon droppings are considered a hazardous substance. Take all required safety precautions, when handling and disposing of pigeon droppings.

.2 As no single method will remove this soiling, provide the means and equipment to clean difficult stains as may be necessary.

.3 Remove all thick deposits with non-ferrous trowels and remove from work site immediately.

.4 Carry out trial cleans using wet poultices of solvents mixed with diatomaceous clay and/or mythylene dichloride based stripper. Leave on surface for 2 hours, covered to prevent drying. Remove. Vigorously scrub surface of stone with stiff bristle brush while blotting softened dirt with cotton rags soaked in the chemical. If method is successful, continue on remainder of affected surface.

.5 Should chemical removal of pigeon related soiling fail to work sufficiently, carry out trial cleaning using low pressure micro-abrasive cleaning system. Should method be successful, continue cleaning affected areas to approved level of clean. Over cleaning and damage to stone must be avoided.

## 3.5 CAULKING REMOVAL

.1 Note, caulking contains hazardous materials. Take all safety precautions when handling and disposing.

.2 Scrape surfaces with non-ferric scrapers to fully remove caulking.

**3.6 CLEAN-UP**

.1 Rinse off masonry to satisfaction of PCA Representative.

.2 Rinse from bottom to top and from top to bottom.

.3 Clean up work area as work progresses. At end of each work day remove debris and waste from site.

.4 Upon completion, clean and restore areas used for work to condition at least equal to that previously existing.

**END OF SECTION**

## Part 1 General

### 1.1 RELATED REQUIREMENTS

.1 Section 01 45 00 - Quality Control

.2 Section 04 03 01.13 - Period Masonry Cleaning

.3 Section 04 03 05.21 - Period Masonry Repointing

.4 Section 04 03 43.16 - Period Stone Replacing

.5 Section 04 03 43.19 - Period Stone Dismantling

.6 Section 04 05 00 - Common Work Results for Masonry

.7 Section 04 05 19 - Masonry Anchorage and Reinforcing

### 1.2 ALTERNATIVES

.1 Obtain PCA Representative's approval before changing manufacturer's brands or sources of supply of mortar materials during entire contract or other methods of mixing mortar specified elsewhere in this specification.

### 1.3 REFERENCE STANDARDS

.1 ASTM International (ASTM)

.1 ASTM C109/C109M-11b, Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 50-mm Cube Specimens).
.2 ASTM C185-08, Test Method for Air Content of Hydraulic Cement Mortar.
.3 ASTM C207, Mortar for Unit Masonry
.4 ASTM C207-06, Specification for Hydrated Lime for Masonry Purposes.
.5 ASTM C348-02, Test Method for Flexural Strength of Hydraulic-Cement Mortars.
.6 ASTM C780-12, Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
.7 ASTM C940-98a (2003), Test Method for Expansion and Bleeding of Freshly Mixed Grouts for Preplaced Aggregate-Concrete in the Laboratory.

.2 CSA Group (CSA)

.1 CSA A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CAN/CSA-A179-14, Mortar and Grout for Unit Masonry.

.3 CAN/CSA-A3000-18, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

### 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 mortar and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Prior to mixing or preparation of mortars submit for review to PCA Representative confirmation of source or product data sheet of:

.1 Aggregate.

.2 Cement.

.3 Lime.

.4 Premixed products.

.5 Pigments.

.3 Submit copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's for mortar, grout, parging, and admixtures.

.3 Samples:

.1 Provide samples in quantity and size in accordance with CAN/CSA-A179.

.2 Submit three 50 mm cube samples of mortar per day's activity.

.3 Prior to the mixing or preparation of mortars submit for approval to the PCA Representative, confirmation of source or product data sheet of:

.1 Aggregate and Sand.

.2 Premixed Products

.4 Test reports:

.1 Submit test results during site work as directed by PCA 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, 14 and 28 days or otherwise required.

.5 Field data:

.1 Submit daily recordings of temperature and humidity on a weekly basis.

## 1.5 QUALITY ASSURANCE

.1 Qualifications:

.1 Manufacturers:

.1 Filling mortar: manufactured by company specializing in production of cementitious restoration materials with documented experience in production of filling mortar products and with a record of satisfactory in-service performance.

.2 Masonry Contractor:

.1 Work of this Section: executed by contractor specializing in historic stone conservation work of this nature, using similar stone repair techniques with proven experience in historic stone and brick masonry repair and conservation work required for this Contract.

.3 Foreperson:

.1 Masonry Contractor to employ a Project Supervisor with documented successful experience of historic masonry repair and conservation work of required for this Contract. Project Supervisor to be present on site full-time for duration of Work.

.2 Demonstrate competence levels to satisfaction of PCA Representative before undertaking Work.

.4 Masons:

.1 Masons to have certificate of qualification with proven experience in historic stone and brick masonry repair and conservation work required for this Contract.

.2 Masons to have proof of licence certification for proprietary restoration mortars.

.3 One thoroughly experienced, reliable and competent worker shall be in charge of all mortar mixing for the duration of the project. The experience must include mixing mortar for a minimum of three projects similar in nature and scope, to this project. Identify this individual to the PCA Representative at the start of the project.

.2 Certificates:

.1 Submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Pre-Installation Meetings:

.1 Conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

.4 Mock-ups:

.1 Refer to Section 04 03 05.21 Period Masonry Repointing.

## 1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and 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, in dry location 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.

.7 Replace defective or damaged materials with new.

.8 Provide 10 extra bags of pre-bagged mortar material for future maintenance. Ensure extra pre-bagged mortar material is sealed in plastic wrapping.

.4 Develop Construction Waste Management Plan related to Work of this Section.

**1.7 SITE CONDITIONS**

.1 Ambient Conditions:

.1 Provide weather-tight enclosure to store all mortar, masonry substrate and masonry units and materials and mix mortars, maintain air temperature between 5° to 25° C at all times, or per accordance to manufacturer's specification, whichever is more stringent.

.2 Maintain maximum/minimum thermometers and relative humidity gauges on site and in enclosures.

.1 Install relative humidity and temperature equipment in locations as approved by the PCA Representative.

.2 Maintain a daily record of temperature and humidity.

.3 When temperature is 5°C or less:

.1 Store cements and sands for immediate use within heated enclosure. Temperature in enclosure should be maintained at or above 5°C. Allow these materials to reach minimum temperature of 5°C (that is equilibrium with air temperature in enclosure).

.2 Heat water to minimum of 20°C and maximum of 30°C

.3 At time of use temperature of mortar to be minimum of 15°C and maximum of 30°C.

.4 Do not mix cement with water or with aggregate or with water-aggregate mixtures having higher temperature than 30°C.

.2 Prepare and maintain mortar temperature between 5° C and 30° C until used.

.3 Execute work when ambient temperature is above 5° C. When ambient temperature is below 5° C, protect and heat Work as directed by the PCA Representative.

**Part 2 Products**

**2.1 MATERIALS**

.1 Water: potable, clean and free from contaminants.

.2 Use same brands of materials and source of aggregate for entire project.

.3 Mortar and grout: to CAN/CSA A179.

.4 Colour: ground coloured natural aggregates or metallic oxide pigments. Colour of sand to match existing. Acceptable material:

.1 Inorganic mineral oxide colouring pigments in accordance with the manufacturer's written recommendations. Provide a sample of the mortar to the PCA Representative prior to commencement of the work.

.5 Water: potable or from approved non-potable supply.

.6 Calcium chloride is not to be used for any mortar.

.7 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 (0.60 mm) | 50 | 20 |
| No. 50 (0.30 mm) | 30 | 20 |
| No. 100 (0.15 mm) | 15 | 15 |
| No. 200 (0.075 mm) | 0 | 15 |

.1 Sharp, screened and washed pit sand, free of organic material, with final grading and colour to approval of PCA Representative.

.8 Portland cement: to CAN/CSA-A3000.

.9 Masonry cement: to CAN/CSA-A3000.

.10 Lime:

.1 Processed Lime (Quicklime): to ASTM C5, fresh, finely ground and crushed; high calcium, 3/16 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:

.4 Lime putty.

.11 Additives:

.1 Obtain written approval of PCA Representative before using additives.

.12 Air entrainment:

.1 Vinsol resin type: to ASTM C260/C260M.

## 2.2 PROPERTIES

.1 Bedding and pointing mortar for stonework: type S based on proportion specifications. Range for compressive strength; 8 MPa at 7 days to 20 MPa at 28 days.

.1 Limestone use 1:2:6 cement; lime: aggregate mix for severe exposure, such as upper stone details, and for a distance of 2m above grade.

.2 Limestone: use 1:2:8 cement; lime: aggregate mix for all other locations.

.3 For all walls adjacent to pathways, footpaths and roadways, for joints to 1200mm above grade, add polymer latex admixture as per manufacturer's instructions.

.2 Restoration mortar; premix to manufacturer's instructions:

.1 1:2:6 mix for severe exposure;

.2 1:2:9 mix for all other locations.

.3 Testing method: Vicat Cone Penetration for Stonework: to ASTM C780.

.1 Pointing Mortar: 15-20mm

.2 Bedding Mortar: 20-30mm

.4 Allowable air content for all Lime Mortars; 8% to 14%.

.5 Do not add air entraining admixture to mortar mix.

## 2.3 MORTAR MIXES

.1 Mortar for exterior masonry above grade:

.1 Type S based on proportion and compressive strength specifications. Acceptable Manufacturers:

.1 Manufacturer 1: Daubois

.2 Manufacturer 2: King

.3 Or approved alternate.

.2 Property requirements:

.1 Mixes: as required to achieve specified performance criteria, functionally compatible with adjacent materials and components.

.2 Obtain written approval of PCA Representative before changing mix proportions. Change mix proportions only as directed by PCA Representative.

## 2.4 GROUT MIXES

.1 Hydraulic lime based injection and reinforcement grout, conforming to CAN/CSA A179, ASTM C348 and ASTM C940, control water content to conform to CAN/CSA A179, Clause 4.2.1.2 or Clause 4.3.1.5.

.1 Acceptable Manufacturers:

.1 Manufacturer 1: Daubois

.2 Manufacturer 2: King

.3 Or approved alternate.

.2 Minimum compressive strength of 20 MPa at 28 days. Maximum aggregate size and grout slump in accordance with CAN/CSA-A179.

**2.5 ALLOWABLE TOLERANCES**

.1 Mortar compressive strength to be compatible with period masonry to a maximum of 20 MPa at 28 days.

.2 If mortar fails to meet 7 day compressive strength requirements, but meets 28 day compressive strength requirement, it is acceptable. If mortar fails to meet 7 day compressive strength requirement, but its strength at 7 days exceeds two thirds of value required for 7 day strength, contractor may elect to continue work at his own risk while awaiting results of 28 day tests, or to take down work affected.

.3 The PCA Representative reserves the right to reject mortar which falls more than 20% outside of the 56-day compressive strength range required, and to have the Contractor remove it from the wall.

**Part 3 Execution**

**3.1 MANUFACTURER'S INSTRUCTIONS**

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

**3.2 CONSTRUCTION**

.1 Do masonry mortar and grout work in accordance with CSA A179 and CSA A371 except where specified otherwise.

.2 The masonry concrete batch area environment shall be totally controlled and the temperature of this area shall not be less than 10°C or greater than 25°C.

.3 See Item 1.7 for environmental requirements for materials.

**3.3 MORTAR AND GROUT MIXING**

.1 Use pre-blended, pre-coloured mortar and grout prepackaged under controlled factory conditions. Ingredient batching limitations to be within 1% accuracy.

.2 Mix mortar and grout ingredients in accordance with CAN/CSA-A179 in quantities needed for immediate use.

.1 Mortar and grout mixing as per manufacturer’s instructions.

.2 All pointing mortar can be mixed using a regular paddle mixer. Only electric motor mixers are permissible. Mixers run on hydrocarbons are not permitted, due to fumes.

.3 Mixing by hand must be pre-approved by the PCA Representative, as follows:

.1 Hand mixing must be carried out using high speed, 2500 Rpm drill, with paddle mixer attachment. Mixing to be completed in sufficiently small container so as to allow full contact of the paddle with the mortar during the mixing process, thus ensuring thorough incorporation of ingredients and air entrainment.

.2 Submit masonry tools and container for approval prior to starting pointing work.

.4 Clean all mixing boards and mechanical mixing machine between batches.

.5 Mortar and grout must be weaker than the masonry units it supports.

.6 Mortar and grout must not contain elements detrimental to the original masonry or surrounding materials.

.7 Appoint one individual to mix, for duration of project. In the event that this individual must be replaced, mortar mixing must cease until the replacement individual is trained, and mixes are tested.

.8 Thoroughly mix in a power mixer for a period of not less than 5 minutes after all materials have been placed in the mixer.

.9 The method of proportioning materials for the mortar and grout used in construction shall be such that the specified proportions of the mortar materials can be controlled and accurately maintained.

.10 After the initial mixing, keep mortar tempered by adding water as required, so that the mortar will contain the maximum amount of water consistent with good workability.

.11 Discard mortar not used within the following time limits: temperature 27°C or higher - 2 hours, temperature from 27°C to 10°C - 3 hours, under 10°C - 2 hours.

.12 Do not use anti-freeze compounds including calcium chloride or chloride based compounds.

.13 Do not add air entrainment.

.14 Add mortar admixture in accordance with the manufacturer's instructions. Provide uniformity of mix.

**3.4 MORTAR PLACEMENT**

.1 Install mortar in accordance with manufacturer's instructions.

.2 Install mortar in accordance with CAN/CSA-A179.

.3 Butter end of units with mortar and push into place.

.4 When mortar is thumbprint hard, strike joints with a trowel and tool to a hard concave surface.

.5 Remove excess mortar from grout spaces.

.6 All work must be finished to a standard acceptable for exposed and finished masonry.

**3.5 GROUT PLACEMENT**

.1 Fill voids with grout in accordance with manufacturer's instructions.

.2 Install grout in accordance with CAN/CSA-A179.

.3 Do not install gout in lifts greater than 400mm, without consolidating grout by rodding.

.4 Do not displace reinforcement while placing grout.

## 3.6 FIELD QUALITY CONTROL

.1 Site Tests, Inspection: in accordance with Section 04 05 00 - Common Work Results for Masonry supplemented as follows:

.1 Test and evaluate mortar prior to and during construction in accordance with CAN/CSA A179.

.2 Test and evaluate grout prior to during construction to CAN/CSA A179; test in conjunction with masonry unit sections specified.

.3 Refer to Section 04 03 05.21 Period Masonry Repointing for laboratory tests for mortar.

## 3.7 CLEANING

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

.2 Remove droppings and splashings using clean sponge and water.

.3 Clean masonry with low pressure clean water and soft natural bristle brush.

.4 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/ Demolition Waste Management and Disposal

## 3.8 PROTECTION DURING CURING PROCESS

.1 In accordance with Section 04 03 05.21 - Period Masonry Repointing.

**END OF SECTION**

## Part 1 General

### 1.1 RELATED REQUIREMENTS

.1 Section 01 45 00 - Quality Control

.2 Section 04 03 01.13 - Period Masonry Cleaning

.3 Section 04 03 05.13 - Period Masonry Mortaring

.4 Section 04 03 43.13 - Period Stone Repairing

.5 Section 04 03 43.16 - Period Stone Replacing

.6 Section 04 03 43.19 - Period Stone Dismantling

.7 Section 04 05 00 - Common Work Results for Masonry

.8 Section 04 05 19 - Masonry Anchorage and Reinforcing

### 1.2 REFERENCE STANDARDS

.1 ASTM International

.1 ASTM C1713-17 Standard Specification for Mortars for the Repair of Historic Masonry

.2 CSA Group (CSA)

.1 CSA A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CAN/CSA-A179-14, Mortar and Grout for Unit Masonry.

.3 CAN/CSA A371-04 (R2009), Masonry Construction for Buildings.

### 1.3 DEFINITIONS

.1 Raking: removal of loose/deteriorated mortar with hand tools to a depth suitable for repointing until sound mortar, but not less than a depth of 30mm.

.2 Repointing: filling and finishing of masonry joints from which mortar is missing, has been raked out or has been omitted.

.3 Backpointing: filling of masonry joints for the depth from which mortar has been raked out to a point 30 mm from the stone face.

.4 Finishpointing: filling and finishing of masonry joints from which mortar has been raked out, for a depth of 30 mm.

.5 Tooling: finishing of masonry joints using tool to provide final contour.

.6 Low-pressure water cleaning: water soaking of masonry using less than 350 kPa (50 psi) water pressure, measured at nozzle tip of hose.

.7 Cutting: the careful use of a power tool, where permitted by PCA Representative to break or cut the middle of the mortar joint to facilitate raking out process without damaging masonry.

## 1.4 SYSTEM DESCRIPTION

.1 Work of this Section includes but is not limited to:

- .1 Visually inspecting for obvious signs of deteriorated masonry.
- .2 Raking all joints as noted on Contract Documents.
- .3 Preparation of masonry surface including joints surface cleaning, flushing of voids and open joints, and masonry wetting.
- .4 Repointing of all masonry joints, including backpointing and finishpointing.
- .5 Removal of loose portions on stone surface.
- .6 Ensuring cure of mortar.
- .7 Grouting by hand, small voids.

## 1.5 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Informational Submittal:

- .1 Provide written submittal indicating all activities and tools related to raking, cutting and repointing for review and approval by PCA Representative.

.3 Product Data:

- .1 Submit manufacturer's instructions, printed product literature and data sheets for all materials.

.4 Samples:

- .1 Provide labelled samples of materials to be used on project for approval before work commences.

.5 Test and Evaluation Reports:

- .1 Provide certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Provide laboratory test reports certifying compliance of mortar ingredients with specifications requirements.

## 1.6 QUALITY ASSURANCE

.1 Qualifications:

- .1 Manufacturers: In accordance with 04 03 05.13 - Period Masonry Mortaring.
- .2 Masonry Contractor: In accordance with 04 03 05.13 - Period Masonry Mortaring.
- .3 Foreperson: In accordance with 04 03 05.13 - Period Masonry Mortaring.
- .4 Masons: In accordance with 04 03 05.13 - Period Masonry Mortaring.

.2 Grouting: grouting activities should be undertaken by workers experienced in manipulation and grouting methods.

.3 PCA Representative reserves the right to reject Masonry Contractor or proposed Project Supervisor, mason or apprentice if, documentation provided does not demonstrate level of experience or skill required for successful completion of Work of this Contract.

.4 Obtain written approval from PCA Representative for changes to qualified personnel.

.5 The PCA Representative will inspect the quality of the work on a regular basis.

.6 Notify PCA Representative prior to cutting joints so that the stone masonry can be recorded photographically. Provide clear access to permit this photography to occur.

.7 Provide the PCA Representative with a minimum of 24 hour notice for required inspections.

.8 Approval of raked out condition of joints must be received in writing by the contractor before the next procedure can proceed.

.9 Mock-ups:

.1 Mock-ups to be constructed as a sample board and not directly on the church or monuments.

.2 Construct mock-up in accordance with Section 01 45 00 - Quality Control.

.2 Construct 1200 mm x 1800 mm mock-up sample boards or each of the following:

.1 Cutting of joints

.2 Raking of joints.

.3 Backpointing of joints.

.4 Finishpointing of joint; tooling and colour to match existing.

.3 Construct mock-up under supervision of PCA Representative to demonstrate a full understanding of specified procedures, techniques and formulations are achieved before work commences.

.4 Construct mock-up where directed.

.5 Allow 24 hours for inspection of mock-up by PCA Representative before proceeding with masonry repointing and repair work.

.6 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.

.7 Notify PCA Representative minimum of 3 business days prior to construction of the mock-up.

.8 Construct mock-up under supervision of PCA Representative to demonstrate a full understanding of specified procedures, techniques and formulations is achieved before work commences.

.9 Construct mock-up where directed by PCA Representative.

.10 Work not to proceed prior to approval of mock-up. Allow 48 hours for inspection of mock-up by PCA Representative before proceeding with masonry repointing work.

.11 Repeat mock-up until results obtained are to satisfaction of PCA Representative.

.12 Mock-up will be used to:

.1 Judge quality of work, substrate preparation, operation of equipment, material preparation and application, and curing methods.

.2 Determine joint finish required.

.3 Test to determine compliance with property requirements.

.13 Accepted mock-up will demonstrate minimum standard for this work. Mock-up will remain as part of finished work.

.10 Laboratory tests for mortar:

.1 Contractor to include costs for provision of laboratory testing of pointing mortars during mock-ups and on a continuing weekly basis.

.2 Test following properties, at a minimum, will be tested:

.1 Compressive strength: 7 day, 14 day and 28 day.

.2 Air entrainment percentage.

.3 Sample mortar for testing purposes directly on site.

.4 Testing laboratory to be approved in writing by PCA Representative.

## 1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and 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 in dry location 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. Keep sand dry, in conformance with CAN/CSA A179, Clause 5.3.6. Sand that does not conform will be rejected.

.3 Store lime putty in plastic lined sealed drums.

.4 Keep material dry. Protect from weather, freezing and contamination.

.5 Remove rejected or contaminated material from site.

.6 Replace defective or damaged materials with new.

## 1.8 SITE CONDITIONS

.1 Existing Conditions

.1 Report in writing, to PCA Representative areas of deteriorated masonry revealed during work. Obtain PCA Representative's approval and instructions of repair and replacement of masonry units before proceeding with repair work.

.2 Protection

.1 At end of each working day, cover unprotected work with waterproof membranes. Extend membranes to 0.5 m beyond the perimeter of work area and install securely to prevent finished work from drying out too rapidly.

.2 Protect adjacent finished work against damage which may be caused by on-going work. This includes newly installed flashings. Stained flashings will be replaced at the Contractor's cost.

.3 Cover all sills and projecting courses with rigid protection, secured into joints, for the duration of the work.

.4 Protect all exposed window/door frames, wall fixtures and any other existing surfaces which may be damaged by mortar stains. Damaged or stained material to be replaced at Contractor's cost.

.5 All methods of enclosure and protection to be approved by PCA Representative.

.6 Protect newly laid from excessive exposure to rain and full sunlight until the surface is thumb-print hardened.

.7 Provide and maintain protection for masonry walls at all times when work is suspended to prevent water from entering partially repointed masonry.

.8 Protection shall consist of non-staining 6 mil polyethylene sheets, tarpaulins or burlap, secured to prevent lifting in high winds.

.9 Provide protection boards to exposed corners and all openings such as doors and windows which may be damaged by construction activities. Maintain protection for the duration of operations. Remove and dispose of protective materials as directed by the PCA Representative.

.3 Ambient Conditions

.1 When temperature is 5°C or less:

.1 Store cements and sands for immediate use within heated enclosure. Temperature in enclosure should be maintained at or above 5°C. Allow these materials to reach minimum temperature of 5°C (that is equilibrium with air temperature in enclosure).

.2 Heat water to minimum of 20°C and maximum of 30°C

.3 At time of use temperature of mortar to be minimum of 15°C and maximum of 30°C.

.4 Do not mix cement with water or with aggregate or with water-aggregate mixtures having higher temperature than 30°C.

.2 Protection requirements are specified in Section 04 05 00 - Common Work Results for Masonry.

.3 Obtain approval from PCA Representative for methods of enclosure and protection.

## Part 2 Products

### 2.1 MATERIALS

.1 Mortar: in accordance with Section 04 03 05.13 - Period Masonry Mortaring

.2 Proportions: in accordance with Section 04 03 05.13 - Period Masonry Mortaring.

.3 Anchorage and Reinforcing: in accordance with Section 04 05 19 - Masonry Anchorage and Reinforcing

## Part 3 Execution

### 3.1 GENERAL

.1 Perform work in accordance with CAN/CSA A371. Extent of raking out and repointing is as noted on the Contract Documents.

.2 Remove deteriorated mortar and ensure that no masonry units are chipped/ altered/ damaged by work to remove mortar. Tools for cutting out must be narrower than the joint.

.3 Tool and compact using jointing tool to force mortar into joint.

.4 Finish joints to match existing joints, except where specified otherwise.

.5 Use suitable approved jointing tool unless otherwise specified to form compacted joints. Tool length for finishpointing not to exceed 50 mm.

.6 Do not cut or rake out mortar joints where ambient temperature is below 5°C in the Springtime or 0°C in the Fall, as the mortar in the joints may be frozen. Any attempt to remove frozen mortar will result in damage to the masonry. Damaged masonry resulting from removal of frozen mortar must be replaced at Contractor's cost.

### 3.2 EXAMINATION

.1 Verification of Conditions: verify masonry, staging and storage areas and notify PCA Representative in writing of conditions detrimental to acceptable and timely completion of Work.

.1 Visually inspect substrate in presence of PCA Representative.

.2 Inform in writing PCA Representative areas of deteriorated masonry not previously identified.

.2 Notify PCA Representative immediately if evidence of hazardous materials is discovered in work area.

.3 Stop work in that area and report to PCA Representative immediately evidence of hazardous materials.

### 3.3 PROTECTION OF IN-PLACE CONDITIONS

.1 Protection requirements are specified in Section 04 05 00 - Common Work Results for Masonry.

### 3.4 SPECIAL TECHNIQUES

.1 Test visually deteriorated mortar joints.

.1 Procedure of testing: examine joints visually for signs of deteriorated masonry such as dense cement-rich mortar, loose or missing mortar, voids, spalled surfaces.

### 3.5 RAKING JOINTS

.1 Rake out all joints as noted on Contract Documents.

.2 Rake unsound joints free of deteriorated and loose mortar, dirt and other undesirable material.

.3 Cutting of joints is to be power tools as approved by PCA Representative. Great care must be taken so as not to damage masonry units adjacent to joints. Cut away from the arrises to prevent breaking the masonry.

.4 Where the use of power tools is permitted to remove existing mortar, proceed as follows:

.1 Cut the centre of the joint only, to a maximum width of half of the joint width. Mortar must remain on each side of the cut. Tool must not touch the stone.

.2 For vertical joints, and discontinuous horizontal joints, stop cut 50 mm from end of joint. Do not cut masonry.

.3 Notify the PCA Representative to inspect the cutting, prior to removing the remaining mortar with hand tools.

.4 The remaining mortar must be removed by hand tools.

.5 Permission to use power tools will be based on the Contractor's ability to comply with the above conditions, as observed in the mock-up.

.6 If these requirements are not complied with, the Contractor will be required to remove all mortar by using hand tools, at no extra cost to the PCA.

.5 Include removal of all existing excess mortar that may have been applied to masonry face due to overpointing. Do not damage arris or finish on masonry face.

.6 Clean joints to full depth of deteriorated mortar but in no case to less than 30 mm. Clean out voids and cavities encountered.

.7 Clean by compressed air, surfaces of joints without damaging texture of exposed joints.

.8 Flush open joints and voids; clean open joints and voids with low pressure water and if not free draining, blow clean with compressed air.

.9 Leave no standing water.

.10 Damaged masonry includes widening of existing joints, nicks, gouges and chipped or scratched surfaces from cutting out tools, resulting from improper workmanship. Stone damaged as a result of careless raking, or cutting, shall be replaced at no cost to the PCA.

.11 Joints cannot be raked out for more than two floors in height, prior to repointing, unless approved by the PCA Representative.

.12 If masonry unseats or bond is broken, remove unit and reset.

## 3.6 REPOINTING

.1 When required repair and replacement work is complete carry out repointing.

.2 Before repointing, wash down wall to be repointed and allow to dry to damp, but not wet. Ensure that dust and debris are removed from joints and wall surfaces prior to repointing.

.3 Keep masonry damp while pointing is being performed.

.4 Completely fill joint with mortar.

.1 If surface of masonry units has worn rounded edges keep pointing back 1 mm from surface to maintain same width of joint

.2 Avoid feathered edges.

.3 Pack mortar firmly into voids and joints, ensuring full contact with back and sides of joint and leaving no voids.

.5 Build-up backpointing in layers not exceeding 50 mm in depth up to 100 mm from face of stone.

.1 Allow each layer to set before applying subsequent layers.

.2 Maintain joint width.

.3 Notify PCA Representative to review backpointing when it is within 100mm and 30mm of the face of the stone.

.6 Build-up finishpointing in layers not exceeding 30 mm in depth.

.1 Allow each layer to set before applying subsequent layers.

.2 Maintain joint width.

.7 Tool joints to match existing profile or as directed by PCA Representative.

.1 Tool, compact and finish using jointing tool to force mortar into joint. Ensure jointing tool fits within width of joint. Use tools of varying widths to meet this requirement.

.2 Provide final exposed aggregate texture when mortar has dried to thumb-print hardness by striking surface of joint with a stiff bristle brush or with a lightly moistened sponge.

.8 Remove excess mortar from masonry face before it sets.

## 3.7 PROTECTION DURING CURING PROCESS

.1 Cover completed and partially completed work not enclosed or sheltered at end of each work day.

.1 Membranes should extend to 0.5 m over surface area of work and be tightly installed to prevent finished work from drying out too rapidly.

.2 Cover with waterproof tarps to protect newly laid mortar from frost, rainfall and rapid drying conditions such as wind.

.1 Maintain tarps in place for minimum of 2 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 back pointing and finish pointing mortars, at a minimum temperature of 10°C.

.2 Damp cure freshly pointed joints by covering with moist burlap enclosure and polyethylene sheeting, for minimum of 3 days after finishpointing. Keep wall and burlap misted.

.3 Wet mist burlap only - ensure no direct spray reaches surface of curing mortar.

.4 Ensure burlap is not in contact with masonry. Leave air space of minimum 50 mm between burlap and masonry.

.5 Shade areas of work from direct sunlight and maintain constant dampness of burlap.

.6 Provide for off-hours and week-end work as required to maintain specified curing conditions.

.5 Protect from drying winds. Pay particular attention at corners of structure.

.6 Maintain ambient temperature of minimum 10°C after repointing masonry for:

.1 Minimum 7 days in summer.

.2 Minimum 30 days in cold weather conditions using dry heated enclosures.

## 3.8 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 surfaces thoroughly of mortar droppings, stains and other blemishes resulting from work of this contract on a daily basis, as work progresses.

.3 Carry out further cleaning after mortar has set and cured.

.4 Clean masonry with stiff natural bristle brushes and plain water only. Vinegar or chemicals are not to be used unless instructed in writing by PCA Representative.

.5 Clean stone masonry to remove accumulated environmental soiling, see Section 04 03 01.13 - Period Masonry Cleaning

.6 Remove all debris from stone faces, ledges and sills, as scaffolding is being removed.

.7 Obtain approval of PCA Representative prior to using other cleaning methods for persistent stains.

.8 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

## 3.9 PROTECTION OF COMPLETED WORK

.1 Protect adjacent finished work against damage which may be caused by on-going work.

**END OF SECTION**

## Part 1 General

### 1.1 RELATED REQUIREMENTS

.1 Section 01 45 00 - Quality Control

.2 Section 04 03 01.13 - Period Masonry Cleaning

.3 Section 04 03 05.13 - Period Masonry Mortaring

.4 Section 04 03 05.21 - Period Masonry Repointing

.5 Section 04 03 43.13 - Period Stone Repairing

.6 Section 04 03 43.19 - Period Stone Dismantling

.7 Section 04 05 00 - Common Work Results for Masonry

.8 Section 04 05 19 - Masonry Anchorage and Reinforcing

### 1.2 REFERENCE STANDARDS

.1 ASTM International

.1 ASTM C97/C97M-18, Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone.

.2 ASTM C170/C170M-17, Standard Test Method for Compressive Strength of Dimension Stone.

### 1.3 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 historic stone masonry restoration with documented experience. Employ skilled stone masons on site to do necessary field cutting as stones are set.

### 1.4 ADMINISTRATIVE REQUIREMENTS

.1 Pre-installation meetings:

.1 Masons employed on this project must attend orientation session provided free-of-charge by PCA Representative

## 1.5 INDEPENDENT TESTING AGENCIES

.1 The Owner will engage an independent testing agency to provide sand stone density tests to determine the final mix for the mortar to the following standards:
- .1 ASTM C97/C97M – 18 Absorption and Bulk Specific Gravity of Dimension Stone
- .2 ASTM C99/C99M – 18 Modulus of Rupture of Dimension Stone
- .3 ASTM C170/C170M – 17 Compressive Strength of Dimension Stone

.2 The Contractor shall co-ordinate all aspects of the testing with the independent testing company and have the findings reported to the Owner for their final decision.

## 1.6 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 masonry materials and reinforcing and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:

- .1 Submit drawings stamped and signed by professional engineer with experience in rehabilitating historic structures registered or licensed in Province of Nova Scotia.
- .2 Submit drawings describing method of stone replacement, including removal, shoring and erection.

.4 Samples:

- .1 Submit samples of replacement stones not less than 60 days before masonry work begins.
  - .1 Submit 2 of each type of masonry unit specified sandstone.
  - .2 Submit 1 of each type of masonry accessory specified.
  - .3 Submit 1 of each type of masonry reinforcement and tie proposed for use.
  - .4 Submit as required for testing purposes.
- .2 Submit samples from original quarry of replacement stones from quarry supplying original stone as follows:
  - .1 representing full range of colour, pattern and inclusions.
  - .2 sized and dressed to match existing stone units.
  - .3 Select samples from currently worked bed of quarry and accompanied by quarry certification.
    - .1 Certification: issued within last 5 years.
- .3 Submit samples from substitute quarry of replacement stones from quarry having similar stone as original quarry. Submit 4 sets of stones as follows:
  - .1 representing full range of colour, pattern and inclusions.

.2 Select samples from currently worked bed of quarry and accompanied by quarry certification.

.4 Submit samples with same face size as existing complete with tooling (depth not to exceed 76 mm).

## 1.7 CLOSEOUT SUBMITTALS

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

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

## 1.8 QUALITY ASSURANCE

.1 Allow PCA Representative access to mason s workshop for inspection of current work-in-progress.

.2 Qualifications:

.1 Execute work by personnel experienced in preservation of historic masonry with a minimum of 10 years of documented experience.

.2 Masons engaged by Masonry Contractor to have experience with historic masonry.

.3 PCA 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.

.3 Mock-ups:

.1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.

.2 Construct mock-up

.3 Do not use existing stonework when constructing job mock-up.

.4 Construct mock-up where directed by PCA Representative.

.5 Notify PCA Representative minimum of 48 hours prior to construction of mock-up.

.6 Work not to proceed prior to approval of mock-up. Allow 48 hours for inspection of mock-up by PCA Representative before proceeding with stone repair work.

.7 Perform mock-up of masonry cleaning with low pressure 1 to 3 bar clean water and soft natural bristle brush.

.8 When accepted, mock-up will demonstrate minimum standard for this work.

.9 Retain accepted mock-up as part of finished work.

## 1.9 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section with manufacturer s written instructions and 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 Prevent damage and soiling of finishes when transporting, storing and handling.

.4 Keep materials dry. Protect against weather, freezing and any source of contamination.

.5 Do not place stones directly on the ground.

.6 Packaging Waste Management: remove for reuse of packaging materials, crates, pallets, as specified in Construction Waste Management Plan in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

**1.10 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 MATERIALS**

.1 Obtain new stone from a single quarry source acceptable to PCA Representative.

.1 Ensure single quarry source has resources to provide materials of consistent quality and matching existing stone.

.2 New stone is to be seasoned and from a blast free quarry

.3 Procurement of stones to meet approved schedule.

.2 Field stone: to ASTM C616/C616M, class I - colour and texture to match approved sample

.3 Stones:

.1 Good quality, free of cracks, quarrying marks, pick marks and other defects impairing structural integrity of material.

.2 Stone: quarry without blasting.

**2.2 STONE CHARACTERISTICS**

.1 Field Stone:

.1 Local White Rock and Cambridge Mountain quarries are potential locations for replacement stone. Contractor to verify suitability and provide samples for review.

**2.3 STONE BEDDING PLANES**

.1 Naturally-bedded: cornice.

**2.4 STONE FABRICATION**

.1 Cut stone to shape and dimensions and full to square with joints as indicated.
- .1 Dress exposed faces true.
- .2 Cut stone for cornices, to lay on its natural quarry bed.

.2 Cut-in reglets for flashings where indicated.

.3 Execute profiled work from full size details and templates.
- .1 Make exposed arises in true alignment and ease slightly to prevent snipping.

.4 Back-check stone contacting structural members as indicated.
- .1 Allow minimum of 25 mm clearance between back of stone and steel and concrete structural members.
- .2 Shape beds of stone resting on structural work to fit supports.

.5 Cut stones for anchors, cramps, dowels and support systems.
- .1 Provide Lewis pin and clamp holes in pieces which can not be manually lifted.
- .2 Do not cut holes in exposed surfaces.

.6 Finish exposed faces and edges of stones to comply with requirements indicated for finish and match mock-ups and existing construction.

.7 Roughen stone surfaces of new cut stone against which mortar is to be placed (if face is smooth as a result of sawing) by scoring with saw grinder.
- .1 Space score lines maximum 25 mm on center and minimum 3 mm in depth.

**2.5 FABRICATION TOLERANCES**

.1 Fabricate granite dimension stone to the following tolerances:
- .1 Unit Length: plus or minus 3 mm.
- .2 Unit Height: plus or minus 3 mm.
- .3 Deviation From Square: plus or minus 3 mm, with measurement taken using the longest edge as the base.
- .4 Bed Depth: plus or minus 3 mm.

**2.6 MORTAR**

.1 Mortar: in accordance with Section 04 03 05.13 - Period Masonry Mortaring.

**2.7 ACCESSORIES**

.1 Obtain each type of stone necessary, sealant and other materials from a single manufacturer.

.2 Sealant and backer rod: non-staining type, in accordance with Section 07 92 00 - Joint Sealants.

## Part 3 Execution

### 3.1 EXAMINATION

.1 Verification of Conditions: verify masonry, staging and storage areas and notify PCA Representative in writing of conditions detrimental to acceptable and timely completion of Work.

.1 Visually inspect substrate in presence of PCA Representative.

.2 Inform in writing PCA Representative areas of deteriorated masonry not previously identified.

.3 Obtain PCA Representative's approval and instructions for repair and replacement of masonry units before proceeding with repair work.

.4 Stop work immediately and report to PCA 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 PCA 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 Place safety devices and signs near work area as directed in accordance with Section 01 56 00 - Temporary Barriers and Enclosures

.4 Install and remove self-supporting scaffolding in accordance with Section 01 56 00 – Temporary Barriers and Enclosures.

.5 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 12 hours

.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 43.19 - Period Stone Dismantling.

.2 Remove loose material from deteriorated 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 with non-ferrous brush 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 PCA 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 PCA Representative to inspect the raking, prior to removing the remaining mortar with hand tools.

.4 Remove remaining mortar with hand tools.

## 3.6 CUTTING/SIZING OF STONE

.1 Use calipers, squares and levels to measure hole for new stone. Allow for mortar joints.

.2 Sill stones:

.1 Provide 1:10 slope on top face of stone unit, sloping down to front face.

.3 Coping stones

.1 Provide 1:10 slope on top face of stone unit, sloping down to front face.

## 3.7 MOVING STONES

.1 Use dogs to lift stones to working level.

.2 Move stones horizontally on carts.

.3 Slide stones into place on wood ramps.

.4 Protect edges of stone from damage when hoisting and lifting from position. Use separators to isolate units from hoisting belts.

.1 Incorporate only undamaged stone in Work.

## 3.8 STONE REPLACEMENT

.1 Co-ordinate bond pattern, coursing height and joint width with existing stonework in area selected by PCA 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 PCA 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 connectors, concrete surfaces.
- .2 Obtain approval of PCA 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 PCA 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 plumb, true, level 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.

## 3.9 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 2 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 2 weeks after laying.

.2 Ensure that bottoms of tarps permit airflow to reach mortar in joints.

.7 Inspect tarps daily for duration of curing.

## 3.10 CLEANING

.1 Confirm acceptance of mock-up cleaning operations to demonstration from PCA Representative 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.

.6 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.

.7 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 01 45 00 - Quality Control

.2 Section 04 03 01.13 - Period Masonry Cleaning

.3 Section 04 03 05.13 - Period Masonry Mortaring

.4 Section 04 03 05.21 - Period Masonry Repointing

.5 Section 04 03 43.13 - Period Stone Repairing

.6 Section 04 03 43.16 - Period Stone Replacing

.7 Section 04 05 00 - Common Work Results for Masonry

.8 Section 04 05 19 - Masonry Anchorage and Reinforcing

### 1.2 ADMINISTRATIVE REQUIREMENTS

.1 Conduct a pre-dismantling meeting with PCA Representative to verify project requirements, equipment, procedures and assigned storage areas.

### 1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit method of reference numbering for dismantling stone prior to start of stone removal to PCA Representative for approval.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer with experience in rehabilitating historic structures registered or licensed in Province of Nova Scotia.

.2 Submit drawings for shoring, temporary framing work, bracing.

.4 Site Quality Control Submittals:

.1 Provide up-to-date copies of stone location recording system chart or card index, as well as chronological information concerning each numbered unit (individual cards of units), when requested.

### 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. Include:

.1 Photographically record stonework to be dismantled and rebuilt.

.2 Record drawings of layout of stored stones.

## 1.5 QUALITY ASSURANCE

.1 Qualifications:

.1 Masonry Contractor:

.1 Work of this Section: executed by contractor specializing in historic stone masonry restoration with documented experience using similar stone dismantling techniques.

.2 Foreperson:

.1 Provide competent trade foreperson specializing in type of work required.

.2 Experience: experience in deconstruction of historic stone masonry. Must be present on site throughout Work.

.3 Dismantlers:

.1 Experience: record of successful masonry dismantling.

.2 Mock-ups:

.1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.

.2 Notify PCA Representative minimum of 48 hours prior to construction of mock-up.

.3 Perform mock-up where directed by PCA Representative.

.4 Work not to proceed prior to approval of mock-up. Allow 48 hours for inspection of mock-up by PCA Representative before proceeding with masonry dismantling work.

.5 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.

## 1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section with manufacturer s written instructions and 01 61 00 - Common Product Requirements.

.2 Protect and store stones to facilitate their resetting.

.1 Store dismantled masonry units on wood platforms, pallets, protected from exposure to water, elements, and potential mechanical damage fully covered under polyethylene.

.2 Submit storage and identification system to PCA Representative for review and comment.

.3 Develop Construction Waste Management Plan related to Work of this Section.

.4 Packaging Waste Management: remove for reuse of packaging materials crates, pallets, as specified in Construction Waste Management Plan in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal

## 1.7 AMBIENT CONDITIONS

.1 Loosen wet masonry only when temperature is above 5 degrees C.

.2 In temperature 5 degrees 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 PCA Representative in writing of conditions detrimental to acceptable and timely completion of Work.

.1 Visually inspect substrate in presence of PCA Representative.

.2 Inform PCA 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 PCA Representative.

.4 Report in writing, to PCA Representative areas of deteriorated stone not identified in the documents. Obtain PCA Representative's approval and instructions for repair of stone before proceeding.

.5 Stop work in that area and report to PCA Representative immediately evidence of hazardous materials.

### 3.2 PREPARATION

.1 Remove deteriorated portions of stones using low impact removal methods until sound surface is reached.

.2 Obtain PCA Representative's approval for alternative methodology and tools to be employed before commencing the work.

.3 Clean stone surface of dust and stone chips.

### 3.3 PROTECTION

.1 Prevent damage to bench marks, pavement, utility lines, trees natural features, landscaping, fencing, and building which are to remain.

.2 Make good damage incurred.

.3 Protect surrounding components from damage during work.

.4 Make good damage to historic fabric.

.5 Obtain PCA Representative's approval for repair methodology.

## 3.4 SPECIAL TECHNIQUES

.1 Number and identify stones and other elements on a photographic record.

.2 Before dismantling stones, indicate dimensions of each numbered stone in removal area on a chart and drawing.

.3 Temporary Marking and Recording:

- .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.
  - .2 Waxless chalk directly on stone.
- .2 Tracking relocated stones and other masonry units:
  - .1 Use numbering, marking, and positioning system shown on drawing
- .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 and chart.
- .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 or drawing to contain relevant information as indicated by example on drawing number
  - .4 Ensure that temporary marking will remain in use resistant to weather, handling and cleaning until final marking of stones.
- .5 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

## 3.5 TEMPORARY SHORING

.1 Construct shoring and cradling, and other temporary framing work needed to support structure, or parts of it, during removal operations and in anticipation of resetting, if structure is not to be completely dismantled, according to approved shop drawings.

## 3.6 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 Prior to removing a stone approved for replacement or re-installation, rout out existing mortar joints around the stone.

.3 Remove mortar from top, bottom and side joints, with the back surface of the joint square and of an even depth.

.4 Use only hand held tools with mallet or pneumatic driven percussion at low stroke speed.

.5 Obtain PCA Representative's approval for use of power tools before commencing work.

.6 Ensure that adjacent stones are not used as lever points in removal of stone.

.7 Loosen wet masonry when temperature is above freezing.

**3.7 DISMANTLING AND MOVING STONES**

.1 Avoid damaging arrises 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 regularly inspected nylon hoisting belts. Use minimum 2 belts per stone.

.5 Protect stone from damage when hoisting and lifting from position.

.1 Use separators to isolate units from hoisting belts.

.6 Where damage occurs to stone, report to PCA Representative and repair stone in accordance with Section 04 03 43.13 - Period Stone Repairing.

.7 Make good damage incurred at no additional cost to Contract.

.8 Obtain review of repaired damage by PCA Representative.

**3.8 HANDLING**

.1 Usage of Lewis bolts for handling stone is not 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.

**3.9 TEMPORARY STORAGE STAGING AREA**

.1 Place stones in designated area of site for cleaning, detailed inspection and for final marking, before storage.

.2 Make stones accessible and retrievable when required.

**3.10 CLEANING**

.1 Do cleaning in accordance with this section and Section 01 74 11 Cleaning.

.2 Do cleaning operations at above freezing temperature.

.1 After cleaning, protect wet stones against freezing until dry.

.3 Clean stones by wet scrubbing with vegetable fiber brush unless otherwise instructed by PCA Representative.

.1 Do not use high pressure water jet.

.2 Remove excess mortar with hand tools.

.4 Use chemical cleaning methods only with prior written approval of PCA Representative.

.5 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.6 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.7 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.

**3.11 FINAL MARKING**

.1 Do final marking after cleaning, on surface that supports good adhesion and legibility and will not be visible after resetting.

.2 Do marking in colour. Dimensions: legible from distance of 2 m.

.3 Ensure that marking product used will not affect mortar to stone adhesion when resetting.

.4 Ensure marking product used will survive storage until resetting of stone.

**3.12 FINAL STORAGE**

.1 When stones are placed under shelter:

.1 Design and ventilate shelter to keep condensation from forming on internal surfaces.

.2 Lay out storage so that each stone will have its numbered face visible, and be accessible or removable without having to move adjacent stones.

.3 Show layout of stones to be stored on record drawing.

**END OF SECTION**

## Part 1 General

### 1.1 RELATED REQUIREMENTS

.1 Section 01 45 00 - Quality Control

.2 Section 04 03 01.13 - Period Masonry Cleaning

.3 Section 04 03 05.13 - Period Masonry Mortaring

.4 Section 04 03 05.21 - Period Masonry Repointing

.5 Section 04 03 43.13 - Period Stone Repairing

.6 Section 04 03 43.16 - Period Stone Replacing

.7 Section 04 03 43.19 - Period Stone Dismantling

.8 Section 04 05 19 - Masonry Anchorage and Reinforcing

### 1.2 REFERENCE STANDARDS

.1 CSA Group (CSA)

- .1 CAN/CSA-A165 Series-14, CSA Standards on Concrete Masonry Units (Consists of A165.1, A165.2 and A165.3).
- .2 CAN/CSA-A179-14, Mortar and Grout for Unit Masonry.
- .1 CAN/CSA-A371-14, Masonry Construction for Buildings.

.2 International Masonry Industry All-Weather Council (IMIAC)

- .1 Recommended Practices and Guide Specification for Cold Weather Masonry Construction.

### 1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-installation meetings: comply with Section 01 31 00 - Project Management and Coordination. Conduct pre-installation meeting one week prior to commencing on-site installations to:

- .1 Verify project requirements, including mock-up requirements.
- .2 Verify substrate conditions.
- .3 Co-ordinate products, installation methods and techniques.
- .4 Sequence work of related sections.
- .5 Co-ordinate with other building subtrades.
- .6 Review manufacturer s installation instructions.
- .7 Review masonry cutting operations, methods and tools and determine worker safety and protection from dust during cutting operations.
- .8 Review warranty requirements.

### 1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittals.

.2 Product Data:

.1 Submit manufacturer s instructions, printed product literature and data sheets for masonry and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit copies of WHMIS SDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Nova Scotia, Canada.

.2 Submit shop drawings detailing temporary bracing required, designed to resist wind pressure and lateral forces during installation.

.4 Samples:

.1 Provide samples as follows:

.1 One of each type of masonry anchor proposed for use.

.2 One of each type of Restoration mortar.

.3 One sample of each type of stone to be used to replace existing stone.

.4 One sample of each type of masonry accessory specified.

.2 The approved samples denote the standard of material to be used.

.5 Certificates: submit manufacturer s product certificates certifying materials comply with specified requirements.

.6 Test and Evaluation Reports:

.1 Test reports to certify compliance of masonry units and mortar ingredients with specified performance characteristics and physical properties.

.2 Submit data for masonry units, in addition to requirements set out in referenced CSA and ASTM Standards, indicating initial rates of absorption.

.7 Installer Instructions: provide manufacturer s installation instructions, including storage, handling, safety and cleaning.

.8 Manufacturer s Reports: provide written reports prepared by manufacturer s on-site personnel to include:

.1 Verification of compliance of work with Contract.

.2 Site visit reports providing detailed review of installation of work, and installed work.

## 1.5 CLOSEOUT SUBMITTALS

.1 Submit manufacturer’s instructions for care, cleaning and maintenance of prefaced masonry units for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

## 1.6 EXTRA MATERIALS

.1 Submit manufacturer's instructions in accordance with Section 01 78 00 - Closeout Submittals covering maintenance requirements and parts catalogue, with cuts and identifying numbers.

## 1.7 QUALITY ASSURANCE

.1 Mock-ups:

- .1 Construct mock-ups in accordance with Section 01 33 00 - Submittals.
- .2 Construct mock-up panel of exterior and interior masonry wall construction 1200 x 1800 mm showing masonry colours and textures, use of reinforcement, ties, through-wall flashing, weep holes, jointing, pointing, coursing, mortar and quality of work.
- .3 Mock-up used:
  - .1 To judge quality of work, substrate preparation, operation of equipment and material application.
  - .2 For testing to determine compliance with performance requirements. Perform following tests.
    - .1 For stone units, in addition to requirements set out in referenced CSA and ASTM Standards include data indicating initial rate of absorption.
- .4 Construct mock-up where directed by PCA Representative.
- .5 Allow 48 hours for inspection of mock-up by PCA Representative before proceeding with work.
- .6 When accepted by PCA Representative, mock-up to demonstrate minimum standard for this work. Mock-up may remain as part of finished work.
- .7 Start work only upon receipt of written acceptance of mock-up by PCA Representative.

.2 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

.3 The principal stone mason and site superintendent, engaged by the Masonry Contractor must have proven experience with historic masonry conservation similar to this project, and can demonstrate an ability to pass a hands-on test of skills, if so administered by the PCA Representative. These individuals must be identified prior to signing of Contract. The PCA Representative has the right to reject either of these individuals, if their qualifications cannot be substantiated. The PCA Representative has the right to reject any mason who does not demonstrate the appropriate abilities or experience on the following tasks:

- .1 Raking joints by hand.
- .2 Cutting stone.
- .3 Carving stone.
- .4 Pinning techniques.

.5 Restoration mortar repairs: repairs involving proprietary stone restoration mortar shall be carried out by persons who have successfully completed the manufacturer's training course and have been certified by the manufacturer for the type of work required. Provide proof of accreditation by the manufacturer before work begins.

.6 Historical repointing.

.4 All masons employed on this project must demonstrate the ability to reproduce the mock up standards.

.5 All masons employed on this project must meet the above requirements. Where, during the course of the project, masons leave the work force, all replacement masons must also meet requirements.

## 1.8 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 in dry location indoors off ground and in accordance with manufacturer s recommendations in clean, dry, well-ventilated area.

.2 Store and protect material packages from nicks, scratches, and blemishes.

.3 Keep materials dry until use except where wetting of bricks is specified.

.4 Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.

.5 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan and Waste Reduction Workplan related to Work of this Section in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.5 Packaging Waste Management: remove for reuse and return of packaging materials crates, pallets, padding, as specified in Construction Waste Management Plan and Waste Reduction Workplan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

## 1.9 SITE CONDITIONS

.1 Ambient Conditions: assemble and erect components when temperatures are above 4 degrees C.

.2 Weather Requirements: to CAN/CSA-A371and to IMIAC - Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.

.3 Cold weather requirements:

.1 To CAN/CSA-A371 with following requirements.

.1 Maintain temperature of mortar between 5 degrees C and 50 degrees C until batch is used or becomes stable.

.2 Maintain ambient temperature of masonry work and it s constituent materials between 5 degrees C and 50 degrees C and protect site from windchill.

.3 Maintain temperature of masonry above 0 degrees C for minimum of 7 days, after mortar is installed.

.4 Preheat unheated wall sections in enclosure for minimum 72 hours above 10 degrees C, before applying mortar.

.4 Hot weather requirements:

.1 Protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings.

.2 Keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain, until masonry work is completed and protected by flashings or other permanent construction.

.5 Spray mortar surface at intervals and keep moist for maximum of 3 days after installation.

**1.10 WARRANTY**

.1 For Work in this Section 04 05 00 - Common Work Results for Masonry, and all related sections, 12 months warranty period is extended to 24 months.

**Part 2 Products**

**2.1 MATERIALS**

.1 Masonry materials are specified elsewhere in related Sections:

.1 Section 04 05 13 MASONRY MORTARING AND GROUTING (FOR BRICK MASONRY)

.2 Section 04 05 19 MASONRY ANCHORAGE AND REINFORCING

.3 Section 04 21 13 BRICK MASONRY

**Part 3 Execution**

**3.1 INSTALLERS**

.1 Experienced and qualified masons to carry out erection, assembly and installation of masonry work.

**3.2 EXAMINATION**

.1 Examine conditions, substrates and work to receive work of this Section.

.2 Examine openings to receive masonry units. Verify opening size, location, and that opening is square and plumb, and ready to receive work of this Section.

.1 Inform PCA Representative of unacceptable conditions immediately upon discovery.

.2 Proceed with installation after unacceptable conditions have been remedied and after receipt of written approval from PCA Representative.

.3 Verification of Conditions:

.1 Verify that:

.1 Substrate conditions which have been previously installed under other sections or contracts, are acceptable for product installation in accordance with manufacturer's instructions prior to installation of concrete block.

.2 Site conditions are acceptable and are ready to receive work.

.3 Built-in items are in proper location, and ready for roughing into masonry work.

.2 Commencing installation means acceptance of existing substrates.

## 3.3 PREPARATION

.1 Surface Preparation: prepare surface in accordance with manufacturer's written recommendations.

.2 Establish and protect lines, levels, and coursing.

.3 Protect adjacent materials from damage and disfiguration.

## 3.4 INSTALLATION

.1 Do masonry work in accordance with CAN/CSA-A371 except where specified otherwise.

.2 Build masonry plumb, level, and true to line, with vertical joints in alignment, respecting construction tolerances permitted by CAN/CSA-A371.

.3 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.

## 3.5 CONSTRUCTION

.1 Exposed masonry:

.1 Remove chipped, cracked, and otherwise damaged units, in accordance drawings.

.2 Jointing:

.1 Allow joints to set just enough to remove excess water, then tool with round jointer to provide smooth, joints true to line, compressed, uniformly concave joints where concave joints are indicated.

.2 Allow joints to set just enough to remove excess water, then rake joints uniformly to 6 mm depth and compress with square tool to provide smooth, compressed, raked joints of uniform depth where raked joints are indicated.

.3 Strike flush joints concealed in walls and joints in walls to receive plaster, tile, insulation, or other applied material except paint or similar thin finish coating.

.3 Cutting:

.1 Cut out for electrical switches, outlet boxes, and other recessed or built-in objects.

.2 Make cuts straight, clean, and free from uneven edges.

.4 Building-In:

.1 Build in items required built into masonry.

.2 Prevent displacement of built-in items during construction. Check plumb, location and alignment frequently, as work progresses.

.3 Brace door jambs to maintain plumb. Fill spaces between jambs and masonry with mortar.

.5 Wetting of bricks:

.1 Except in cold weather, wet bricks having initial rate of absorption exceeding 1 g/minute/1000 $mm^2$: wet to uniform degree of saturation, 3 to 24 hours before laying, and do not lay until surface dry.

.2 Wet tops of walls built of bricks qualifying for wetting, when recommencing work on such walls.

.6 Support of loads:

.1 Use 32 Mpa, where concrete fill is used instead of solid units.

.2 Use grout to CAN/CSA-A179 where grout is used instead of solid units.

.3 Install building paper below voids to be filled with concrete and grout; keep paper 25 mm back from faces of units.

.7 Provision for movement:

.1 Leave 3 mm space below shelf angles.

.2 Leave 6 mm space between top of non-load bearing walls and partitions and structural elements. Do not use wedges.

.3 Built masonry to tie in with stabilizers, with provision for vertical movement.

.8 Loose steel lintels:

.1 Install loose steel lintels. Center over opening width.

.9 Interface with other work:

.1 Cut openings in existing work as indicated.

.2 Openings in walls: reviewed by PCA Representative.

.3 Make good existing work. Use materials to match existing.

## 3.6 SITE TOLERANCES

.1 Tolerances in notes to CAN/CSA-A371 apply.

## 3.7 SITE QUALITY CONTROL

.1 Site Tests, Inspection:

.1 Perform site inspection and testing in accordance with Section 01 45 00 – Quality Control

.2 Notify inspection agency minimum of 48 hours in advance of requirement for tests.

.2 Manufacturer's Services:

.1 Have manufacturer of products supplied under this Section review work involved in handling, installation/application, and protection of its products, and submit written reports in acceptable format to verify compliance of work with Contract.

.2 Manufacturer s site services: provide manufacturer s site services, consisting of product use recommendations and periodic site visits for inspection of product installation, in accordance with manufacturer s instructions.

.3 Schedule site visits to review work as installation is about to begin.

.4 Schedule site visits to review work at stages listed:

.1 After delivery and storage of products, and when preparatory work on which work of this Section depends is complete, but before installation begins.

.2 Twice during progress of work at 25% and 60% complete.

.3 Upon completion of work, after cleaning is carried out.

.5 Obtain reports within 3 days of review and submit immediately to PCA Representative.

## 3.8 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Waste Management: separate waste materials for recycling and 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.

## 3.9 PROTECTION

.1 Temporary Bracing:

.1 Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.

.2 Bracing approved by PCA Representative.

.3 Brace masonry walls as necessary to resist wind pressure and lateral forces during construction.

.2 Moisture Protection:

.1 Keep masonry dry using waterproof, non staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain, until completed and protected by flashing or other permanent construction.

.2 Cover completed and partially completed work not enclosed or sheltered with waterproof covering at end of each work day. Anchor securely in position.

.3 Air Temperature Protection: protect completed masonry as recommended in 1.9, SITE CONDITIONS.

**END OF SECTION**

## Part 1 General

### 1.1 RELATED REQUIREMENTS

.1 Section 02 41 00.08 - Demolition Minor Works

.2 Section 04 03 01.13 - Period Masonry Cleaning

.3 Section 04 03 05.13 - Period Masonry Mortaring

.4 Section 04 03 05.21 - Period Masonry Repointing

.5 Section 04 03 43.13 - Period Stone Repairing

.6 Section 04 03 43.16 - Period Stone Replacing

.7 Section 04 03 43.19 - Period Stone Dismantling

.8 Section 04 05 00 - Common Work Results for Masonry

### 1.2 REFERENCE STANDARDS

.1 American Society for Testing and Materials (ASTM)

.1 ASTM A36/A36M-14, Standard Specification for Carbon Structural Steel.

.2 ASTM A307-14e1, Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.

.3 ASTM A580/A580M-18, Standard Specification for Stainless Steel Wire.

.4 ASTM F593, Standard Specification for Stainless Steel Bolts, Hex Caps, Screws and Studs.

.5 ASTM A6.41/A641M-09a (2014), Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.

.6 ASTM A666-15, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

.7 ASTM A1022/A1022M-16b, Standard Specification for Deformed and Plain Stainless Steel Wire and Welded Wire for Concrete Reinforcement.

.2 CSA Group (CSA)

.1 CSA A23.1/A23.2-14 (R2018), Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CAN/CSA-A179-14, Mortar and Grout for Unit Masonry.

.3 CAN/CSA-A370-14, Connectors for Masonry.

.4 CAN/CSA-A371-14, Masonry Construction for Buildings.

.5 CSA G30.18-09 (R2014), Carbon Steel Bars for Concrete Reinforcement.

.6 CSA S304-14 (R2015), Design of Masonry Structures.

.7 CSA W186-M1990 (R2016), Welding of Reinforcing Bars in Reinforced Concrete Construction.

.3 Reinforcing Steel Institute of Canada (RSIC)

.1 Reinforcing Steel Manual of Standard Practice, 2018.

## 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 anchorage and reinforcing materials and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit copies of WHMIS SDS in accordance with Section 01 70 12 - Health and Safety Requirements and 01 35 43 - Environmental Procedures.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Nova Scotia, Canada.

.2 Submit drawings detailing bar bending details, anchorage details lists and placement drawings

.3 On placement drawings, indicate sizes, spacing, location and quantities of reinforcement and connectors.

.4 Manufacturers Instructions: submit manufacturer s installation instructions.

## 1.4 QUALITY ASSURANCE

.1 Test Reports: submit certified test reports including sand gradation tests in accordance with CAN/CSA-A179 showing compliance with specified performance characteristics and physical properties, and in accordance with Section 04 05 00 - Common Work Results for Masonry.

.2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Mock-ups:

.1 Construct mock-ups in accordance with Section 04 05 00 - Common Work Results for Masonry.

## 1.5 SITE MEASUREMENTS

.1 Make site measurements necessary for proper fit of members.

## 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 Store materials indoors, in dry location, off ground and in accordance with manufacturer s recommendations in clean, dry, well-ventilated area.

.2 Store and protect anchorage and reinforcing materials from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan and Waste Reduction Workplan related to Work of this Section.

.5 Packaging Waste Management: remove for reuse of padding, pallets, packaging materials crates, as specified in Construction Waste Management Plan and Waste Reduction Workplan in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

## Part 2 Products

### 2.1 MATERIALS

.1 Anchors for Stone: Anchor rods to be Type 304 stainless steel. Diameter and spacing of anchors to be as per Drawings.

### 2.2 FABRICATION

.1 Fabricate connectors in accordance with CAN/CSA A370.

.2 Threaded rod manufactured in accordance with ASTM F593.

.3 Ship reinforcement and connectors clearly identified in accordance with drawings.

## 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 anchorage and reinforcing materials installation in accordance with manufacturer s written instructions.

.1 Visually inspect substrate in presence of PCA Representative.

.2 Inform PCA Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions remedied and after receipt of written approval to proceed from PCA Representative.

### 3.2 MANUFACTURERS INSTRUCTIONS

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

### 3.3 GENERAL

.1 Supply and install masonry connectors and reinforcement in accordance with ASTM C1242, CAN/CSA A370, CAN/CSA A371, CSA A23.1 and CSA S304.1 unless indicated otherwise.

.2 Prior to placing bedding mortar and Restoration Mortar, obtain PCA Representative's approval of placement of reinforcement and connectors. Supply and install additional reinforcement to masonry as indicated.

.3 The use of expansion type anchors for temporary or permanent applications is prohibited. For anchors in concrete supporting shelf angles, expansion type anchors will be used.

**3.4 ANCHORS**

.1 Supply and install stainless steel anchors as indicated.

.2 Screws to be installed in holes drilled with matched tolerance carbide-tipped drill bits. Installation to be in accordance with manufacturer's instructions.

**3.5 CEMENTITIOUS INJECTED GROUT ANCHORS**

.1 Drilling

.1 Drill holes dry with diamond core, non-percussive air cooled drills in accordance with the recommendations of the anchor manufacturer. Rotary percussive water cooled drills not allowed.

.2 Ensure holes are drilled die straight and to depths as required for proper anchorage.

.3 Mechanically hold drills to prevent wandering and damage to entry hole. Do not attach drills directly to the building – brace from scaffolding only.

.4 Mark every core indelibly with number and key the number to the appropriate location on the key plan. Store cores safely and turn over to PCA Representative on request.

.5 Where core is located in solid stone, roughen surface of core to improve bond.

.2 Installation

.1 Install grout anchors in accordance with manufacturer's written instructions and project details. Refer to schedule on drawings.

.2 Grout anchors to be installed by manufacturer approved and trained personnel.

.3 Seal ends of anchors with mortar plug.

**3.6 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 recycling 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.

**END OF SECTION**

## Part 1 General

### 1.1 REFERENCE STANDARDS

.1 ASTM International

.1 ASTM D2240-15, Standard Test Method for Rubber Property - Durometer Hardness.

.2 CSA Group (CSA)

.1 CAN/CSA-A371-14, Masonry Construction for Buildings.

.3 International Organization for Standardization (ISO)

.1 ISO 14021-2016), Environmental Labels and Declarations - Self Declared Environmental Claims (Type II Environmental Labelling).

.4 South Coast Air Quality Management District (SCAQMD)

.1 SCAQMD Rule 1168-05, Adhesive and Sealant Applications.

### 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 for masonry accessories and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Nova Scotia, Canada.

.2 Indicate on drawings:

.1 Flashing, installation details, sizes, spacing, location and quantities of fasteners.

.4 Samples:

.1 Submit 2 samples of masonry accessories as follows:

.1 Materials: cured, coloured samples, illustrating colour and colour range. Include:

.1 Movement joint filler.

.2 Lap adhesive.

.3 Mechanical fasteners.

.4 Reglets.

.5 Brick vents.

.2 Moisture control material samples, illustrating colour and colour range, size, and shape. Include:

.1 Weep hole vents.

.2 Mortar diverters.

.3 Grout screens.

.3 Flashing material samples, illustrating colour and colour range, size, shape, and profile. Include as specified:

.1 Sheet metal flashings.

.2 Composite flashings.

.3 Plastic and rubber flashings.

## 1.3 QUALITY ASSURANCE

.1 Test Reports: submit certified test reports including sand gradation tests in accordance with CAN/CSA-A179 showing compliance with specified performance characteristics and physical properties, and in accordance with Section 04 05 00 - Common Work Results for Masonry.

.2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Manufacturer s Instructions: submit manufacturer's instructions as follows:

.1 Submit installation instructions for weeps, fillers, adhesives, brick vents, diverters, flashings, reglets, vents, screens.

## 1.4 SITE MEASUREMENTS

.1 Make site measurements necessary to ensure proper fit of members.

## 1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer s written instructions and 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, in dry location and in accordance with manufacturer s recommendations in clean, dry, well-ventilated area.

.2 Store and protect masonry accessories from nicks, scratches, and blemishes.

.3 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 74 21 – Construction/Demolition Waste Management and Disposal.

.5 Packaging Waste Management: remove for reuse or recycling in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

## Part 2 Products

### 2.1 MATERIALS

.1 Movement joint filler: purpose-made elastomer

.1 Use low VOC products in compliance with SCAQMD Rule 1168.

.2 Material type: closed cell neoprene.

.2 Weep hole vents: purpose-made polypropylene fibre filter, colour to match brick/stone.

## Part 3 Execution

### 3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrate previously installed under other Sections or Contracts are acceptable for masonry accessories installation in accordance with manufacturer s written instructions.

.1 Visually inspect substrate in presence of PCA Representative.

.2 Inform PCA Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions remedied and after receipt of written approval to proceed PCA Representative.

### 3.2 INSTALLATION: MOISTURE CONTROL

.1 Install weep hole vents in vertical joints immediately over flashings, in exterior wythes of cavity wall and masonry veneer wall construction, at maximum horizontal spacing of 600 mm on centre.

### 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 Waste Management: separate waste materials for recycling or 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.

**END OF SECTION**

## Part 1 General

### 1.1 REFERENCE STANDARDS

.1 ASTM International
- .1 ASTM A123/A123M-17 , Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .2 ASTM A153/A153M-16a Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- .3 ASTM A307-14e1 Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60000 PSI Tensile Strength.
- .4 ASTM A653/A653M-17 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .5 ASTM F1667-18 Standard Specification for Driven Fasteners: Nails, Spikes and Staples.

.2 CSA Group (CSA)
- .1 CSA B111-1974 (R2003), Wire Nails, Spikes and Staples.
- .2 CSA O86-14 (R2019), Engineered Design in Wood
- .3 CSA O112.9-10 (R2014), Evaluation of Adhesives for Structural Wood Products (Exterior Exposure).
- .4 CSA O121-17, Douglas Fir Plywood good one side.
- .5 CSA O141-05(R2014), Softwood Lumber.
- .6 CSA O151-17, Canadian Softwood Plywood.

.3 National Lumber Grades Authority (NLGA)
- .1 Standard Grading Rules for Canadian Lumber 2010.

.4 National Research Council Canada (NRC)
- .1 National Building Code of Canada 2015 (NBC).

### 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 for wood products and accessories and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Submit manufacturer’s installation instructions.

.3 Shop Drawings:
- .1 For structural applications or conditions beyond the scope of the manufacturer’s pre-engineered design information, submit drawings stamped and signed by professional engineer registered or licensed in Province of Nova Scotia.
- .2 Include on drawings:
  - .1 Design data in accordance with CAN/CSA-O86 and CWC Engineering Guide for Wood Frame Construction.
  - .2 Indicate configuration and spacing of joists, hanger and connector types, fasteners, locations and design values; bearing details.

.3 Submit stress diagrams or print out of computer design indicating design loads for members. Indicate allowable load and stress increase.

.4 Indicate arrangement of webs or other members to accommodate ducts and other specialties.

**1.3 DELIVERY, STORAGE, AND HANDLING**

.1 Deliver, store and handle materials in accordance with Section 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, in dry location, indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store materials off ground with moisture barrier at both ground level and as a cover forming a well-ventilated enclosure, with drainage to prevent standing water.

.3 Stored in a manner to prevent warping.

.4 Replace defective or damaged materials with new.

.5 Store separated reusable wood waste convenient to cutting station and work areas.

**Part 2 Products**

**2.1 FURRING AND BLOCKING**

.1 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers:

.1 S2S is acceptable

.2 Board sizes: "Standard" or better grade.

.3 Dimension sizes: "Standard" light framing or better grade.

.4 Post and timbers sizes: "Standard" or better grade.

.2 Where indicated, provide pressure treated materials for furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers.

.3 Remove and reconstruct soffits and facias to existing profiles.

.4 Remove sill flashings and repair wood sills

**2.2 HEAVY TIMBER**

.1 Heavy timber construction materials shall be

.1 Kiln dried to 15% or less

.2 SPF No.1/2 in accordance with NLGA 2017 Standard Grading

.3 Nominal size as detailed on the drawings

.4 Dressing: Sanded 4 Sides (S4S)

.5 Fabrication: Shop fabricate timbers to the greatest extent practical, including predrilling.

.6 Connectors and Fasteners: Hot-dip galvanized steel.

**2.3 ACCESSORIES**

.1 Sealants: to Section 07 92 00.

.1 Maximum VOC limit to SCAQMD Rule 1168.

.2 General purpose adhesive: to CSA O112.9.

.1 Maximum VOC limit to SCAQMD Rule 1168.

.3 Nails, spikes and staples: to ASTM F1667.

.4 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.

.5 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, explosive actuated fastening devices, recommended for purpose by manufacturer.

.6 Nailing discs: flat caps, minimum 25 mm diameter, minimum 0.4 mm thick, sheet metal, formed to prevent dishing. Bell or cup shapes not acceptable.

.7 Fastener Finishes:

.1 Galvanizing: to ASTM A653, ASTM A123/A123M, use galvanized fasteners for interior highly humid areas and exterior work.

**Part 3 Execution**

**3.1 EXAMINATION**

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of PCA Representative.

.2 Inform PCA 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 PCA Representative.

**3.2 FRAMING INSTALLATION**

.1 Install members true to line, levels and elevations, square and plumb.

.2 Construct continuous members from pieces of longest practical length.

.3 Install spanning members with "crown-edge" up.

.4 Select exposed framing for appearance. Install lumber and panel materials so that grade-marks and other defacing marks are concealed or are removed by sanding where materials are left exposed.

.5 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.

.6 Countersink bolts where necessary to provide clearance for other work.

.7 Install specified panel product for each application.

.8 Use nailing disks for soft sheathing as recommended by sheathing manufacturer.

**3.3 FURRING AND BLOCKING**

.1 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding electrical equipment mounting boards, and other work as required.

.2 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.

.3 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized steel fasteners.

.4 Install sleepers as indicated.

**3.4 HEAVY TIMBER**

.1 Do not begin installation until substrates have been properly prepared.

.2 Erect timbers true and plumb, and in accordance with approved shop drawings.

.3 Repair or replace damaged timbers before Substantial Completion.

**3.5 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 21 - Construction/Demolition Waste Management and Disposal.

**3.6 PROTECTION**

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by rough carpentry installation.

**END OF SECTION**

## Part 1 General

### 1.1 RELATED SECTIONS

.1 Section 04 03 43.13 - Period Stone Repairing

.2 Section 06 10 53 - Miscellaneous Rough Carpentry

### 1.2 REFERENCE STANDARDS

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM B370-12, Standard Specification for Copper Sheet and Strip for Building Construction

.2 Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA)

.1 SMACNA Architectural Sheet Metal Manual, 7th Edition

### 1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Data: provide manufacturer's data on flashing materials, butyl tape, solder, sealant for flashing, and clips.

.2 Shop drawings:

.1 Indicate locations of flashing for shingle roofing.

.1 Coordinate flashing for sandstone caps with Section 04 03 43.13 – Period Stone Repair.

.2 Indicate materials, thicknesses, details for connections and fasteners, joints, method of anchorage, number of clips, solder, butyl tape and sealant. Indicate provisions for thermal movement.

.3 Samples: provide samples of copper and lead flashing.

### 1.4 PERFORMANCE REQUIREMENTS

.1 General: Sheet metal flashing and trim assemblies as indicated shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

.2 Fabricate and install roof edge flashing capable of resisting forces according to recommendations calculated in accordance with the NRC Wind-RCI for area of roof that flashing and copings are located.

.3 Material Compatibility

.1 Provide sheet metal materials and installation accessory materials that are compatible with one another under conditions of service and application

required, as demonstrated by the sheet metal manufacturer based on testing and field experience.

.4 Thermal Movements: Provide sheet metal flashing and trim that allows for thermal movements from ambient and surface temperature changes.

.1 Temperature Change (Range): 67° C, ambient; 100° C, material surfaces.

**1.5 QUALITY ASSURANCE**

.1 Fabricator Qualifications: Shop that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

.2 Sheet Metal Flashing and Trim Standard: Comply with SMACNA's Architectural Sheet Metal Manual unless more stringent requirements are specified or shown on drawings.

.1 Mock-up: flashing to be included in mock-up.

**1.6 DELIVERY, STORAGE, AND HANDLING**

.1 Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

## Part 2 Products

**2.1 SHEET METALS**

.1 Copper sheet: to ASTM B370, cold-rolled copper sheet, H00 or H01, 24-gauge.

**2.2 INSTALLATION ACCESSORIES**

.1 Butyl tape/sealant: to suit application, locations as noted on drawings and in Part 3 Execution.

.2 Solder: to suit application.

.3 Sealant for copper materials:

.1 Product 1: PE-150 Multipurpose Joint Sealant by Kemper System Canada.

.2 Or approved alternate.

.3 Primer: as recommended by sealant manufacturer

**2.3 FABRICATION, GENERAL**

.1 General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's Architectural Sheet Metal Manual that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.

.1 Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.

.2 Obtain field measurements for accurate fit before shop fabrication.

.3 Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.

.4 Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.

.2 Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 6 mm in 6 m on slope and location lines as indicated and within 3 mm offset of adjoining faces and of alignment of matching profiles.

.3 Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant.

.4 Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 25 mm deep, filled with butyl sealant concealed within joints.

.5 Do not use graphite pencils to mark metal surfaces.

**2.4 EAVES TROUGHS AND DOWNPIPES**

.1 Remove existing eave troughs inspect and repair with copper all areas that are not presently copper.

.2 Form eaves troughs and downpipes from copper 24 Ga..

.3 Sizes and profiles as indicated or to match existing.

.4 Provide goosenecks, outlets , strainer baskets and necessary fastenings.

.5 Form 600 x 600 mm splash pans from copper.

## Part 3 Execution

**3.1 EXAMINATION**

.1 Ensure existing flashing materials and fasteners are removed.

.2 Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of the Work.

.1 Verify existing flashing materials and fasteners have been removed from area of work.

.2 Verify compliance with requirements for installation tolerances of substrates.

.3 Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

.3 Proceed with installation only after unsatisfactory conditions have been corrected.

## 3.2 INSTALLATION

.1 General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use clips, solder, butyl tape and sealants to complete sheet metal flashing and trim system.

.1 Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, clips, and sealant.

.2 Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

.3 Do not use graphite pencils to mark metal surfaces.

.2 General: Install sheet metal flashing and trim to comply with performance requirements and SMACNA's *Architectural Sheet Metal Manual*. Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

.3 Roof Edge: Anchor to resist uplift and outward forces according to recommendations in according to NRC Wind-RCI Wind Uplift Calculations for location and use of building.

.4 Expansion Provisions: Provide for thermal movement of exposed flashing and trim. Space movement joints at a maximum of 3000 mm with no joints allowed within 600 mm of corner or intersection.

.5 Flashing joints at corners of chimneys and center back of crickets are to be soldered, NOT sealed.

.6 Seal joints as indicated and as required for watertight construction.

.7 Install flashing as indicated on shop drawings.

## 3.3 ERECTION TOLERANCES

.1 Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 6 mm in 6 m on slope and location lines as indicated and within 3 mm offset of adjoining faces and of alignment of matching profiles.

## 3.4 EAVES TROUGHS AND DOWNPIPES

.1 Install eaves troughs and secure to building at 750 mm on centre with eaves trough spikes through spacer ferrules.

.1 Slope eaves troughs to downpipes as indicated.

.2 Solder joints watertight.

.2 Install downpipes and provide goosenecks back to wall.

.1 Secure downpipes to wall with straps at 1800 mm on centre; minimum two straps per downpipe.

.2 Connect downpipes to drainage system and seal joint with plastic cement.

.3 Install splash pans as indicated.

## 3.5 CLEANING AND PROTECTION

.1 Clean off excess sealants and solder.

.2 Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touch-up or similar minor repair procedures.

**END OF SECTION**

## Part 1 General

### 1.1 RELATED REQUIREMENTS

.1 04 03 43.13 - Period Stone Repairing.

.2 04 03 43.16 - Period Stone Replacing

.3 04 03 43.19 - Period Stone Dismantling.

### 1.2 REFERENCE STANDARDS

.1 ASTM International

.1 ASTM C919-18, Standard Practice for Use of Sealants in Acoustical Applications.
.2 ASTM C 834-17 - Standard Specification for Latex Sealants.
.4 ASTM C 920-18 - Standard Specification for Elastomeric Joint Sealants.
.5 ASTM C 1330-18 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Safety Data Sheets (SDS).

.3 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards

.1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

### 1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittals.

.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.

.3 Submit 2 copies of WHMIS SDS in accordance with Section 01 70 12 - Health and Safety Requirements.

.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 Section 01 61 00 - Common Product Requirements and 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 indoors in dry location off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan related to Work of this Section.

## 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 Safety Data Sheets (SDS) acceptable to Health Canada.

## 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 Single Component, Non-Sag Polyurethane Sealant with plus or minus 25 percent movement capability for interior vertical joints; ASTM C 920, Type S, Grade NS, Class 25, uses NT, M, A, O.

.1 Acceptable material:
- .1 Product 1: Sonnolastic NP1
- .2 Product 2: Tremco Dymonic
- .3 Product 3: Sikaflex 1a
- .4 or approved alternate

.2 Multi-Component, Polyurethane Sealant with Plus or minus 25 percent joint movement capability for exterior vertical joints; ASTM C 920, Type M, Grade NS, Class 25, uses NT, M, A, and O; UL classified (fire resistance).

.1 Acceptable materials:
- .1 Product 1: Sonolastic NP2
- .2 Product 2: Tremco Dymeric 240
- .3 Product 3: Sikaflex 2C NS
- .4 or approved alternate

.3 Single component self-leveling polyurethane sealant with plus or minus 25 percent movement capability for exterior sidewalks and perimeter of interior floor slab joints and for other interior horizontal joints; ASTM C 920, Type S, Grade P, Class 25 uses T & M.

.1 Acceptable materials:
- .1 Product 1: Sonolastic SL1
- .2 Product 2: Vulkem 45
- .3 Product 3: Sikaflex 1C SL
- .4 or approved alternate

.4 Multi-Component, Self-Leveling Polyurethane Sealant with plus or minus 25 percent movement capability for exterior horizontal joints; ASTM C 920, Type M, Grade P, Class 25 uses T & M.

.1 Acceptable materials:
- .1 Product 1: Sonolastic SL2
- .2 Product 2: Vulkem THC 900
- .3 Product 3: Sikaflex 2C SL
- .4 or approved alternate

.5 Preformed compressible and non-compressible back-up materials:

.1 Polyethylene, urethane, neoprene or vinyl foam:

.1 Extruded closed 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$^3$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.

**2.3 SEALANT SELECTION**

.1 Perimeters of exterior openings where frames meet exterior facade of building. All other exterior applications.
.1 Sealant type: Multi-Component, Polyurethane Sealant

.2 Perimeters of interior door/window frames and surfaces, where required.
.1 Sealant type: Single Component, Non-Sag Polyurethane Sealant

.3 For locations not included in this schedule, consult with PCA Representative for proper selection of sealants.

**2.4 JOINT CLEANER**

.1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant in accordance with sealant manufacturer's written recommendations.

.2 Primer: in accordance with sealant manufacturer's written recommendations.

**2.5 COLOR**

1. Sealant Colors: Selected by PCA Representative:
1. Custom color matching submittal of job site substrate samples.

**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 PCA Representative.

.2 Inform PCA 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 PCA 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 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.

## 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 RELATED REQUIREMENTS

.1 Section 01 35 43 - Environmental Procedures

.2 Section 07 92 00 - Joint Sealants

### 1.2 REFERENCE STANDARDS

.1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Safety Data Sheets (SDS).

.2 Master Painters Institute (MPI)

.1 The Master Painters Institute (MPI)/Architectural Painting Specification Manual (ASM) - current edition.

.3 National Research Council Canada (NRC)

.1 National Fire Code of Canada 2015 (NFC).

.4 Society for Protective Coatings (SSPC)

.1 SSPC Painting Manual, Volume Two, 8th Edition, Systems and Specifications Manual.

### 1.3 ADMINISTRATIVE REQUIREMENTS

.1 Scheduling:

.1 Submit work schedule for various stages of painting to PCA Representative for review. Provide schedule minimum of 48 hours in advance of proposed operations.

.2 Obtain written authorization from PCA Representative for changes in work schedule.

.3 Schedule new additions to existing building coordinate painting operations with other trades.

### 1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Provide manufacturer's instructions, printed product literature and data sheets for paint and paint products and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit 2 copies of WHMIS SDS in accordance with Section 01 35 43 - Environmental Procedures 01 35 29.06Health and Safety Requirements.

.3 Confirm products to be used are in MPI's approved product list.

.3 Upon completion, provide records of products used. List products in relation to finish system and include the following:

.1 Product name, type and use.
.2 Manufacturer's product number.
.3 Colour numbers.
.4 MPI Environmentally Friendly classification system rating.
.5 Manufacturer's Safety Data Sheets (SDS).
.6 MPI #

.4 Samples:

.1 Submit full range colour sample chips to indicate where colour availability is restricted.

.2 Submit 200 x 300 duplicate mm sample panels of each paint with specified paint or coating in colours, gloss/sheen and textures required to MPI Architectural Painting Specification Manual standards submitted on following substrate materials:

.1 3 mm plate steel for finishes over metal surfaces.
.2 13 mm plywood for finishes over wood surfaces.
.3 50 mm concrete block for finishes over concrete or concrete masonry surfaces.
.4 13 mm gypsum board for finishes over gypsum board and other smooth surfaces.
.5 10 mm plywood for finishes over wood surfaces.

.3 Retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface.

.5 Test reports: Provide certified test reports for paint from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.

.1 Lead, cadmium and chromium: presence of and amounts.

.2 Mercury: presence of and amounts.

.3 Organochlorines and PCBs: presence of and amounts.

.6 Certificates: Provide certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties. MPI Gateway #.

.7 Manufacturer's Instructions:

.1 Provide manufacturer's installation application instructions.

## 1.5 CLOSEOUT SUBMITTALS

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

.2 Operation and Maintenance Data: Provide operation and maintenance data for painting materials for incorporation into manual.

.3 Include:

.1 Product name, type and use.
.2 Manufacturer's product number.
.3 Colour numbers.
.4 MPI Environmentally Friendly classification system rating.

## 1.6 MAINTENANCE MATERIAL SUBMITTALS

.1 Extra Stock Materials:

.1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

.2 Submit four 1 litre can of each type and colour of primer finish coating stain. Identify colour and paint type in relation to established colour schedule and finish system.

## 1.7 QUALITY ASSURANCE

.1 Qualifications:

.1 Contractor: to have a minimum of proven satisfactory experience. When requested, provide list of last 3 comparable jobs including, job name and location, specifying authority, and project manager.

.2 Qualified journeypersons as defined by local jurisdiction to be engaged in painting work.

.3 Apprentices: may be employed provided they work under direct supervision of qualified journeyperson in accordance with trade regulations.

.4 Conform to latest MPI requirements for exterior painting work including preparation and priming.

.5 Materials: in accordance with MPI Painting Specification Manual Approved Product listing and from a single manufacturer for each system used.

.6 Retain purchase orders, invoices and documents to prove conformance with noted MPI requirements when requested by PCA Representative.

.7 Standard of Acceptance:

.1 Walls: no defects visible from a distance of 1000 mm at 90 to surface.

.2 Soffits: no defects visible from floor at 45 to surface when viewed using final lighting source.

.3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

.2 Mock-Ups:

.1 When requested by PCA Representative, prepare and paint designated surface, area, room or item to requirements specified herein, with specified paint or coating showing selected colours, number of coats, gloss/sheen, textures and quality of work to MPI Painting Specification Manual standards for review and approval.

.2 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.

.1 Provide

.2 Mock-up will be used:

.1 To judge quality of work, substrate preparation, operation of equipment and material application and skill to MPI Architectural Painting Specification Manual standards.

.3 Locate where directed

.4 Allow 48 hours for inspection of mock-up before proceeding with Work.

.5 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

## 1.8 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions and 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.

.1 Labels: to indicate:

.1 Type of paint or coating.

.2 Compliance with applicable standard.

.3 Colour number.

.3 Storage and Handling Requirements:

.1 Store materials off ground in dry location indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Observe manufacturer's recommendations for storage and handling.

.3 Store materials and supplies away from heat generating devices.

.4 Store materials and equipment in well ventilated area with temperature range 7 C to 30 C.

.5 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of PCA Representative. After completion of operations, return areas to clean condition to approval of PCA Representative.

.6 Remove paint materials from storage only in quantities required for same day use.

.7 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.

.8 Fire Safety Requirements:

.1 Provide one 9 kg Type ABC fire extinguisher adjacent to storage area.

.2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

.3 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada (NFC).

.4 Develop Construction Waste Management Plan related to Work of this Section.

.5 Packaging Waste Management: remove for reuse of crates, packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

## 1.9 SITE CONDITIONS

.1 Ambient Conditions:

.1 Heating, Ventilation and Lighting:

.1 Ventilate enclosed spaces in accordance with Section 01 35 29.06 Health and Safety Requirements.

.2 Provide heating facilities to maintain ambient air and substrate temperatures above 10 C for 24 hours before, during and after paint application until paint has cured sufficiently.

.3 Provide minimum lighting level of 323 Lux on surfaces to be painted.

.2 Temperature, Humidity and Substrate Moisture Content Levels:

.1 Unless pre-approved written approval by product manufacturer, perform no painting when:

.1 Ambient air and substrate temperatures are below 10 C.

.2 Substrate temperature is above 32 C unless paint is specifically formulated for application at high temperatures.

.3 Substrate and ambient air temperatures are not expected to fall within MPI or paint manufacturer's prescribed limits.

.4 The relative humidity is under 85 % or when the dew point is more than 3 C variance between the air/surface temperature. Paint should not be applied if the dew point is less than 3 C below the ambient or surface temperature. Use sling psychrometer to establish the relative humidity before beginning paint work.

.5 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.

.6 Ensure that conditions are within specified limits during drying or curing process, until newly applied coating can itself withstand normal adverse environmental factors.

.2 Perform painting work when maximum moisture content of the substrate is below:

.1 15 % for wood.

.3 Test for moisture using calibrated electronic Moisture Meter. Test concrete floors for moisture using cover patch test.

.4 Test concrete, masonry and plaster surfaces for alkalinity as required.

.2 Surface and Environmental Conditions:

.1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.

.2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits.

.3 Apply paint when previous coat of paint is dry or adequately cured.

## Part 2 Products

### 2.1 PERFORMANCE REQUIREMENTS

.1 Environmental Performance Requirements:

.1 Provide paint products meeting MPI; Environmentally Friendly; E2 ratings based on VOC (EPA Method 24) content levels.

### 2.2 MATERIALS

.1 Only Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.

.2 Provide paint materials for paint systems from single manufacturer.

.3 Only qualified products with E2 Environmentally Friendly rating are acceptable for use on this project.

.4 Conform to latest MPI requirements for interior painting work including preparation and priming.

.5 Provide paint products meeting MPI ; Environmentally Friendly; E2 ratings based on VOC (EPA Method 24) content levels.

.6 Use MPI listed materials having minimum E2 rating where indoor air quality (odour) requirements exist.

.7 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids to be:

.1 Water-based, Water soluble, Water clean-up.
.2 non-flammable, biodegradable.
.3 Manufactured without compounds which contribute to ozone depletion in the upper atmosphere.
.4 Manufactured without compounds which contribute to smog in the lower atmosphere.
.5 Do not contain methylene chloride, chlorinated hydrocarbons, toxic metal pigments.

.8 Ensure manufacture and process of both water-borne surface coatings and recycled water-borne surface coatings does not release:

.1 Matter in undiluted production plant effluent generating Biochemical Oxygen Demand (BOD) in excess of 15 mg/L to natural watercourse or sewage treatment facility lacking secondary treatment.

.2 Total Suspended Solids (TSS) in undiluted production plant effluent in excess of 15 mg/L to natural watercourse or a sewage treatment facility lacking secondary treatment.

.9 Water-borne paints and stains, recycled water-borne surface coatings and water borne varnishes to meet minimum Environmentally Friendly E2 rating.

### 2.3 COLOURS

.1 Colours are to match existing. Provide samples for review and approval by PCA Representative.

.2 Selection of colours will be from manufacturers full range of colours.

.3 Where specific products are available in restricted range of colours, selection based on limited range.

.4 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats, if requested by PCA Representative

.5 For deep and ultra deep colours; 4 coats may be required.

**2.4 MIXING AND TINTING**

.1 Perform colour tinting operations prior to delivery of paint to site. Obtain written approval from PCA Representative for tinting of painting materials.

.2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.

.3 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.

.4 Thin paint for spraying in accordance with paint manufacturer's instructions.

.5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity. Strain as necessary.

**2.5 GLOSS/SHEEN RATINGS**

.1 Paint gloss is defined as sheen rating of applied paint, in accordance with following values:

| | Gloss @ 60 | Sheen @ 85 |
|---|---|---|
| Gloss Level 1 - Matte Finish (flat) | Max. 5 | Max. 10 |
| Gloss Level 2 - Velvet-Like Finish | Max.10 | 10 to 35 |
| Gloss Level 3 - Eggshell Finish | 10 to 25 | 10 to 35 |
| Gloss Level 4 - Satin-Like Finish | 20 to 35 | min. 35 |
| Gloss Level 5 - Traditional Semi-Gloss Finish | 35 to 70 | |
| Gloss Level 6 - Traditional Gloss | 70 to 85 | |
| Gloss Level 7 - High Gloss Finish | More than 85 | |

.2 Gloss level ratings of painted surfaces as indicated.

**2.6 SPECIAL FINISHES**

.1 New wood to be primed on all sides. Allow to dry before applying first coat of paint.

.2 Apply two coats of paint to new and salvaged wood components. Allow to dry between coats.

## Part 3 Execution

### 3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.

### 3.2 GENERAL

.1 Apply paint materials in accordance with paint manufacturer's written application instructions.

### 3.3 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable to be painted in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of PCA Representative.

.2 Inform PCA 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 PCA Representative.

.2 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter, except test concrete floors for moisture using simple cover patch test. Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

.1 Exterior surfaces requiring repainting: inspected by painting contractor who will notify PCA Representative in writing of defects or problems, prior to commencing repainting work, or after surface preparation if unseen substrate damage is discovered.

### 3.4 PREPARATION (EXTERIOR)

.1 Perform preparation and operations for exterior painting in accordance with MPI Maintenance Repainting Manual except where specified otherwise.

.2 Apply paint materials in accordance with paint manufacturer's written application instructions.

.3 Clean and prepare exterior surfaces to be repainted in accordance with MPI Maintenance Repainting Manual requirements. Refer to the MPI Manual in regard to specific requirements and as follows:

.1 Remove dust, dirt, and surface debris by vacuuming, wiping with dry, clean cloths.

.2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.

.3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.

.4 Allow surfaces to drain completely and allow to dry thoroughly. Allow sufficient drying time and test surfaces using electronic moisture meter before commencing work.

.5 Use water-based cleaners in place of organic solvents where surfaces will be repainted using water based paints.

.6 Many water-based paints cannot be removed with water once dried. Minimize use of kerosene or such organic solvents to clean up water-based paints.

.4 Clean metal surfaces to be repainted by removing rust, dirt, oil, grease and foreign substances in accordance with MPI requirements. Remove such contaminates from surfaces, pockets and corners to be repainted by brushing with clean brushes, blowing with clean dry compressed air, or brushing/vacuum cleaning as required.

.5 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before priming and between applications of remaining coats. Touch-up, spot prime, and apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.

.6 Do not apply paint until prepared surfaces have been accepted by PCA Representative.

.7 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1m.

## 3.5 APPLICATION

.1 Method of application to be as approved by PCA Representative.

.2 Brush and Roller Application:

.1 Apply paint in uniform layer using brush and/or roller type suitable for application.

.2 Work paint into cracks, crevices and corners.

.3 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces free of roller tracking and heavy stipple.

.4 Remove runs, sags and brush marks from finished work and repaint.

## 3.6 SITE TOLERANCES

.1 Vertical surfaces: no defects visible from a distance of 1m at 90 degrees to surface.

.2 Horizontal surfaces: no defects visible from floor at 45 degrees to surface.

.3 Final coat to exhibit uniformity of colour and uniformity of sheen.

## 3.7 FIELD QUALITY CONTROL

.1 Where special painting, coating or decorating system applications (i.e. elastomeric coatings) or non-MPI listed products or systems are to be used, paint or coating manufacturer will provide as part of this work, certification of surfaces and conditions for specific paint or coating system application as well as on site supervision, inspection and approval of their paint or coating system application as required at no additional cost to PCA Representative.

.2 Advise PCA Representative when surfaces and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.

.3 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by PCA Representative.

## 3.8 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 recycling in accordance with 01 74 21 – Construction/Disposal Waste Management and Disposal.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

## 3.9 RESTORATION

.1 Remove and clean hardware items removed before undertaken painting operations.

.2 Remove protective coverings and warning signs as soon as practical after operations cease.

.3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.

.4 Protect freshly completed surfaces from paint droppings and dust to approval of PCA Representative. Avoid scuffing newly applied paint.

.5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by PCA Representative.

**END OF SECTION**

## Part 1 General

### 1.1 RELATED REQUIREMENTS

.1 Section 01 35 30 - Health and Safety Requirements.

.2 Section 01 74 21 - Construction Waste Management and Disposal.

.3 Section 32 11 23 – Aggregate Base Courses.

### 1.2 REFERENCE STANDARDS

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM C117-17, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.

.2 ASTM C136/136M-14, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.3 ASTM D698-12e2, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/$m^3$).

.4 ASTM D1557-12e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (2,700 kN-m/$m^3$).

.5 ASTM D4318-17e1, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

.3 CSA Group (CSA)

.1 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

### 1.3 DEFINITIONS

.1 Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation.

.1 Rock: solid material in excess of 0.50 $m^3$ and which cannot be removed by means of heavy-duty mechanical excavating equipment with 0.95 to 1.15 $m^3$ bucket. Frozen material not classified as rock.

.2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.

.2 Unclassified excavation: excavation of deposits of whatever character encountered in Work.

.3 Topsoil:

.1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.

.4 Waste material: excavated material unsuitable for use in Work or surplus to requirements.

.5 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.

.6 Recycled fill material: material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.

.7 Unsuitable materials:

.1 Weak, chemically unstable, and compressible materials.

.2 Frost susceptible materials:

.1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM C136: Sieve sizes to CAN/CGSB-8.2.

.2 Table:

| Sieve Designation | % Passing |
|---|---|
| 2.00 mm | 100 |
| 0.10 mm | 45 - 100 |
| 0.02 mm | 10 - 80 |
| 0.005 mm | 0 - 45 |

.3 Coarse grained soils containing more than 20% by mass passing 0.075 mm sieve.

.8 Bedrock: Fluvial sandstone with minor units of shale/coal (<300mm thick).

## 1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Samples:

.1 Submit samples in accordance with Division 01.

.2 Inform PCA Representative at least 4 weeks prior to beginning Work, of proposed source of fill materials and provide access for sampling.

.3 Submit 70 kg samples of type of fill specified including representative samples of excavated material.

## 1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling and/or reuse in accordance with Section 01 74 21 - Construction Waste Management and Disposal.

## 1.6 EXISTING CONDITIONS

.1 Buried services:

.1 Before commencing work verify location of buried services on and adjacent to site.

.2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.

.3 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.

.4 Prior to beginning excavation Work, notify applicable PCA Representative and authorities having jurisdiction establish location and state of use of buried utilities and structures. Authorities having jurisdiction to clearly mark such locations to prevent disturbance during Work.

.5 Confirm locations of buried utilities by careful test excavations.

.6 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered as indicated.

.7 Where utility lines or structures exist in area of excavation, obtain direction of PCA Representative before removing or re-routing.

.8 Record location of maintained, re-routed and abandoned underground lines.

.9 Confirm locations of recent excavations adjacent to area of excavation.

.2 Existing buildings and surface features:

.1 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by PCA Representative.

## Part 2 Products

### 2.1 MATERIALS

.1 Type 1 fill: properties to Section 32 11 23 - Aggregate Base Courses.

.2 Construction Fence:

.1 High density polyethylene fence 1200 mm high, complete with steel “T” posts at 1200 mm O.C. at all open excavation areas.

## Part 3 Execution

### 3.1 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 requirements of authorities having jurisdiction.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

### 3.2 SITE PREPARATION

.1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

.2 Install temporary backfill material in areas required to accommodate access to the building.

**3.3 PREPARATION/PROTECTION**

.1 Protect existing features in accordance with applicable local regulations.

.2 Keep excavations clean, free of standing water, and loose soil.

.3 Protect buried services that are required to remain undisturbed.

**3.4 STRIPPING OF TOPSOIL**

.1 Begin topsoil stripping of areas as indicated or as directed by PCA Representative after area has been cleared of grasses, brush and weeds and removed from site.

.2 Strip topsoil to depths as indicated.

.1 Do not mix topsoil with subsoil.

.3 Stockpile in locations as directed by PCA Representative.

.1 Stockpile height not to exceed 2 m and should be protected from erosion.

.4 Dispose of unused topsoil as directed by PCA Representative.

**3.5 STOCKPILING**

.1 Stockpile fill materials in areas designated by PCA Representative.

.1 Stockpile granular materials in manner to prevent segregation.

.2 Protect fill materials from contamination.

.3 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.

**3.6 DEWATERING AND HEAVE PREVENTION**

.1 Keep excavations free of water while Work is in progress.

.2 Protect open excavations against flooding and damage due to surface run-off.

.3 Maintain excavation areas free of groundwater.

**3.7 EXCAVATION**

.1 Advise PCA Representative at least 3 days in advance of excavation operations, and submit site cross-sections for general review.

.2 Excavate to depths indicated and build up with specified fill required for proper bearing.

.3 Excavation must not interfere with bearing capacity of adjacent foundations.

.4 For trench excavation, unless otherwise authorized by PCA Representative in writing, do not excavate more than 30 m of trench in advance of installation operations and do not leave open more than 15 m at end of days operation.

.5 Dispose of surplus and unsuitable excavated material in approved location off site.

.6 Do not obstruct flow of surface drainage or natural watercourses.

.7 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

.8 Notify PCA Representative when bottom of excavation is reached.

.9 Obtain PCA Representative approval of completed excavation.

.10 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by PCA Representative.

.11 Correct unauthorized over-excavation as follows:

.1 Fill under bearing surfaces and footings with concrete specified for footings.

.2 Fill under other areas with Type 2 fill compacted to not less than 98% of corrected maximum dry density in accordance with Section 31 05 10 - Corrected Maximum Dry density for Fill.

.12 Hand trim make firm and remove loose material and debris from excavations.

.1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.

.2 Clean out rock seams and fill with concrete mortar or grout to approval of PCA Representative.

## 3.8 FILL TYPES AND COMPACTION

.1 Use types of fill as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D698.

.1 Under and around monuments use type 1 fill compacted to 95%

## 3.9 BEDDING AND SURROUND OF UNDERGROUND SERVICES

.1 Place and compact granular material for bedding and surround of underground services as indicated and as specified in sections of Division 33.

.2 Place bedding and surround material in unfrozen condition.

.3 Provide excavating, trenching and backfilling for all Mechanical, Civil and Electrical.

## 3.10 BACKFILLING

.1 Vibratory compaction equipment: suitable to produce the compaction densities as specified.

.2 Do not proceed with backfilling operations until completion of following:

.1 PCA Representative has inspected and approved installations.

.3 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.

.4 Do not use backfill material which is frozen or contains ice, snow or debris.

.5 Place backfill material in uniform layers not exceeding 300 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

.6 Backfilling around installations:

.1 Place bedding and surround material as specified elsewhere.

.2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.

.3 Place layers simultaneously on both sides of installed Work to equalize loading.

**3.11 RESTORATION**

.1 Upon completion of Work, remove waste materials and debris in accordance to Section 01 74 21 - Construction Waste Management and Disposal, trim slopes, and correct defects as directed by PCA Representative.

.2 Reinstate pavements, lawns and sidewalks disturbed by excavation to thickness, structure and elevation which existed before excavation.

.3 Remove any temporary backfill material used for building access.

.4 Clean and reinstate areas affected by Work as directed by PCA Representative.

**END OF SECTION**

## Part 1 General

### 1.1 RELATED SECTIONS

.1 Section 31 23 33.01 - EXCAVATION, TRENCHING AND BACKFILLING

.2 Section 32 91 19.13 - TOPSOIL PLACEMENT AND GRADING

### 1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C 117-95, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.

.2 ASTM C 136-96a, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

## Part 2 Products

### 2.1 MATERIALS

.1 Granular Subbase material (Type 1)

.1 Crushed rock, or gravel.

.2 Gradations to be within limits specified in the following Table when tested in accordance with ASTM C 136 and C 117.

.3 Table: oversize rocks to be removed from Work.

| ASTM Sieve Size | 25 mm Type 1 crushed rock %passing |
|---|---|
| 31.5 mm | - |
| 25 mm | 100 |
| 19 mm | 75-100 |
| 12.5 mm | - |
| 9.5 mm | 30-50 |
| 4.75 mm | 30-70 |
| 2.36 mm | 20-45 |
| 1.18 mm | 10 -25 |
| 300 µm - 75 µm | 3-8 |

.2 Granular topping:

.1 Screenings: hard, durable, crushed stone particles, free from clay lumps, cementation, organic material, frozen material and other deleterious materials.

.2 Gradations: within limits specified when tested to ASTM C117, ASTM C136.

| Sieve Designation | % Passing |
|---|---|
| 9.5 mm | 100 |
| 4.75 mm | 50-100 |
| 2.00 mm | 30-65 |
| 0.425 mm | 10-30 |
| 0.075 mm | 5-10 |

.3 Edging: Heavy duty 100 mm high PVC edging with perforated fastening holes to accept 100 mm long spikes.

.4 Geotextile: non-woven synthetic fibre fabric, supplied in rolls:

.1 Composed of: minimum 85% by mass of polypropylene with inhibitors added to base plastic to resist deterioration by ultra-violet and heat exposure.

.2 Physical Properties:

.3 Grab tensile strength and elongation: to ASTM D4632:

.1 Breaking force: minimum 600 N.

.2 Elongation: maximum 50%.

.4 Tearing Strength (Trapezoid Method): to ASTM D4533 minimum 250 N.

.5 Hydraulic Properties:

.1 Apparent opening size (AOS): to ASTM D4751, 50 to 250 micrometres.

.2 Permittivity: to ASTM D4491, 1.25 to 2.75 $Sec^{-1}$.

.6 Joint filler: Bituminous impregnated fiberboard to ASTM D1751.

## Part 3 Execution

### 3.1 PLACING

.1 Aggregate base materials not to be placed on inundated, soft, muddy, potholed rutted or frozen surfaces.

.2 Any ruts or potholes which appear in advance of the aggregate placement shall be eliminated by scarifying, shaping and compacting, or if necessary, by excavating the unsuitable material and placing and compacting new material of the same quality.

.3 The aggregate base shall be spread evenly and compacted in lifts minimizing the potential for segregation.

.4 Remove and replace portion of layer in which material has become segregated during spreading.

.5 The maximum lift thickness shall be determined on the prepared subgrade or aggregate subbase surface by use of a test strip to ensure the maximum effectiveness and the compatibility of the compaction equipment with respect to the material being placed.

.6 Test strip to be conducted in the presence of the PCA Representative.

.7 Place base after subgrade has been proof rolled and inspected by PCA Representative.

.8 Place material at the appropriate moisture content for compaction efficiency. In no case shall the moisture content of the material be less than 3%.

.9 Where the material is too dry, provide water to increase moisture content.

.10 Where the material is too wet, decrease the moisture content.

.11 Construct base to depth and grade in areas and to depths indicated.

.12 Ensure no frozen material is placed.

**3.2 COMPACTION**

.1 Compaction equipment to be capable of obtaining required material densities.

.2 Compact to density of not less than 95% maximum dry density in accordance with ASTM D 698.

.3 Shape and roll alternately to obtain smooth, even and uniformly compacted base.

.4 Apply water as necessary during compaction to obtain specified density.

.5 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by PCA Representative.

.6 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

**3.3 SITE TOLERANCES**

.1 Finished sub-base and base surface to be within 3 mm of elevation as indicated but not uniformly high or low.

**3.4 PROTECTION**

.1 Maintain finished base in condition conforming to this section until accepted by PCA Representative.

**3.5 REPAIRS DURING WARRANTY PERIOD**

.1 During the specified guarantee period, make good, any damage to walks, roads, etc., due to settlement of backfilled areas. All such repairs shall be made at the Contractor's expense upon notification by the PCA Representative.

.2 Should the Contractor fail to carry out the necessary maintenance within 5 days after receiving written instruction from the PCA Representative, the Owner will carry out the work and deduct the cost incurred from the money owing the Contractor.

**END OF SECTION**

## Part 1 General

### 1.1 RELATED REQUIREMENTS

.1 Section 01 32 00 - Construction Progress Documentation.

.2 Section 01 33 00 - Submittal Procedures.

.3 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

### 1.2 REFERENCE STANDARDS

.1 Agriculture and Agri-Food Canada

.1 The Canadian System of Soil Classification, Third Edition, 1998.

.2 Canadian Council of Ministers of the Environment (CCME)

.1 PN1340-2005, Guidelines for Compost Quality.

.3 Canadian Society of Landscape Architects (CSLA)/Canadian Nursery Landscape Association (CNLA)

.1 Canadian Landscape Standard 2016, First Edition

.2 Canadian Nursery Stock Standard 2017, Ninth Edition

### 1.3 DEFINITIONS

.1 Compost:

.1 Mixture of soil and decomposing organic matter used as fertilizer, mulch, or soil amendment.

.2 Compost is processed organic matter containing 40% or more organic matter as determined by Walkley-Black or Loss On Ignition (LOI) test.

.3 Product must be sufficiently decomposed (i.e. stable) so that any further decomposition does not adversely affect plant growth and contain no toxic or growth inhibiting contaminates.

.4 Composed bio-solids to: CCME Guidelines for Compost Quality.

### 1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Quality control submittals:

.1 Soil testing: submit certified test reports showing compliance with specified performance characteristics and physical properties as described in PART 2 - SOURCE QUALITY CONTROL.

.2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

**1.5 QUALITY ASSURANCE**

.1 Pre-installation meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements in accordance with Section 01 32 00 - Construction Progress Documentation.

.2 Qualifications: Provide proof of qualifications when requested by PCA Representative.

.3 Contractor Qualifications:

.1 Landscape Contractor: to be a Member in Good Standing of Landscape Nova Scotia Green for Life (LNS).

.2 Landscape Supervisor: Landscape Horticulturist Journeyperson or Landscape Industry Certified Technician with Softscape Installation designation or equivalent.

**1.6 WASTE MANAGEMENT AND DISPOSAL**

.1 Separate waste materials for recycling and/or reuse in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

.2 Divert unused soil amendments from landfill to official hazardous material collections site approved by PCA Representative.

.3 Do not dispose of unused soil amendments into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

**Part 2 Products**

**2.1 TOPSOIL**

.1 Topsoil for seeded areas: mixture of particulates, micro-organisms and organic matter which provides suitable medium for supporting intended plant growth.

.1 Soil texture based on The Canadian System of Soil Classification, to consist of 20 to 70% sand, minimum 7% clay, and contain 2 to 10% organic matter by weight.

.2 Contain no toxic elements or growth inhibiting materials.

.3 Finished surface free from:

.1 Debris and stones over 50 mm diameter.

.2 Coarse vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.

.4 Consistency: friable when moist.

**2.2 SOIL AMENDMENTS**

.1 Fertilizer:

.1 Fertility: major soil nutrients present in following amounts:

.2 Nitrogen (N): 20 to 40 micrograms of available N per gram of topsoil.

.3 Phosphorus (P): 40 to 50 micrograms of phosphate per gram of topsoil.

.4 Potassium (K): 75 to 110 micrograms of potassium per gram of topsoil.

.5 Calcium, magnesium, sulphur and micro-nutrients present in balanced ratios to support germination and/or establishment of intended vegetation.

.6 pH range of 6.5 to 8.0.

.2 Peatmoss:

.1 Derived from partially decomposed species of horticultural grade Sphagnum Mosses.

.2 Texture ranging from porous to spongy fibrous, fairly elastic, and substantially homogeneous.

.3 Free of wood and deleterious material which could prohibit growth.

.4 Shredded particle minimum size: 5 mm.

.5 pH range of 3.5 to 6.5.

.3 Sand: washed coarse silica sand, medium to coarse textured.

.4 Organic matter: compost Category A, B in accordance with CCME PN1340, unprocessed organic matter, such as rotted manure, hay, straw, bark residue or sawdust, meeting the organic matter, stability and contaminant requirements.

.5 Use composts meeting Category B in accordance with CCME requirements for landfill reclamation and large scale industrial applications.

.6 Limestone:

.1 Ground agricultural limestone.

.2 Gradation requirements: percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.

.7 Use industry accepted standard medium containing nitrogen, phosphorous, potassium and other micro-nutrients suitable to specific plant species or application or defined by soil test.

**2.3 SOURCE QUALITY CONTROL**

.1 Advise PCA Representative of sources of topsoil to be utilized with sufficient lead time for testing.

.2 Contractor is responsible for amendments to imported soil(s) as specified.

.3 Conduct soil testing by recognized testing facility for pH, Nitrogen (N), Phosphorous (P), and Potassium (K), and organic matter.

.4 Carry out testing of topsoil by testing laboratory designated by PCA Representative.

.1 Perform soil sampling, testing and analysis in accordance with applicable Provincial standards.

## Part 3 Execution

**3.1 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 requirements of authorities having jurisdiction.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

## 3.2 STRIPPING OF TOPSOIL

.1 Begin topsoil stripping of areas as indicated after area has been cleared of weeds, invasive and noxious plants and their reproductive parts, grasses, brush, stumps and rocks 100 mm and over and removed from site.

.2 Strip topsoil to depths as indicated.

.1 Avoid mixing topsoil with subsoil where textural quality will be moved outside acceptable range of intended application.

.3 Stockpile in locations as directed by PCA Representative.

.1 Stockpile height not to exceed 2 m.

.2 Protect stockpile from adverse weather conditions, contamination from invasive plant material, and compaction.

.3 Avoid placing stockpile in low areas where natural drainage or storm water could pond, or erode these materials during inclement weather.

.4 Dispose of unused topsoil in an environmentally responsible manner but do not use as landfill as directed by PCA Representative.

## 3.3 PREPARATION OF EXISTING GRADE

.1 Verify that grades are correct.

.1 If discrepancies occur, notify PCA Representative and do not start work until instructed by PCA Representative.

.2 Grade soil, eliminate uneven areas and low spots, ensure positive drainage.

.3 Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials.

.1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.

.2 Remove debris which protrudes more than 75 mm above surface.

.3 Dispose of removed material off site.

.4 Cultivate entire area which is to receive topsoil to minimum depth of 100 mm.

.1 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

## 3.4 PLACING AND SPREADING OF TOPSOIL/PLANTING SOIL

.1 Place topsoil after PCA Representative has accepted subgrade.

.2 Spread topsoil in uniform layers not exceeding 150 mm.

.3 Spread topsoil as indicated to the following minimum depths after settlement.

.1 150 mm for seeded areas.

.4 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

.5 Avoid spreading or grading in wet, frozen, or saturated state.

**3.5 FINISH GRADING**

.1 Grade to eliminate rough spots and low areas and ensure positive drainage.

.1 Prepare loose friable bed by means of cultivation and subsequent raking.

.2 Consolidate topsoil to required bulk density using equipment approved by PCA Representative.

.1 Leave surfaces smooth, uniform and firm against deep footprinting.

**3.6 ACCEPTANCE**

.1 PCA Representative will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading.

**3.7 SURPLUS MATERIAL**

.1 Dispose of surplus materials including not required topsoil where directed by PCA Representative.

**3.8 CLEANING**

.1 Proceed with cleaning in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area organized and tidy at end of each day.

.2 Keep pavement and area adjacent to site clean and free from mud, dirt, and debris at all times.

.2 Upon completion remove surplus materials, rubbish, tools and equipment.

.1 Clean and reinstate areas affected by Work.

.3 Waste Management: separate waste materials for reuse and/or recycling 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 an appropriate facility.

.2 Divert unused fertilizer from landfill to official hazardous material collections site approved by PCA Representative.

**END OF SECTION**