SPECIFICATION

CAPE SPEAR NHS
LIGHTHOUSE DOME RECAPITALIZATION
St. John's, NL
PCAN582.00

Prepared for:

Parks Canada Parcs Canada

Canada

Prepared by:

GIBBONS SNOW ARCHITECTS INC.

CAPE SPEAR NHS
LIGHTHOUSE DOME RECAPITALIZATION
ST. JOHN'S, NL

SPECIFICATIONS

ISSUED FOR TENDER

FEBRUARY 9, 2018

CONSULTANTS:

Prime Consultant & Architects **Gibbons Snow Architects Inc.**

PCAN Project No. 582.00
GSA Project No. 16-6100-01

Division 01
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Division 02
EXISTING CONDITIONS

Division 04
MASONRY

Division 06
WOOD, PLASTICS AND
COMPOSITES

Division 07

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1.1 DESCRIPTION OF WORK

.1 In general work of this contract consists of restoration of the Cape Spear Lighthouse.
.2 The overall facility will be unoccupied during the proposed construction window. Coordinate all activities with the Departmental Representative.
.3 This building is located approximately 16km from St. John’s, NL, accessed by road.

1.2 FAMILIARIZATION WITH SITE

.1 Before submitting a bid, it is recommended that bidders visit the site to review and verify the form, nature and extent of the work, materials needed, the means of access and the temporary facilities required to perform the Work.

.2 Obtain prior permission from the Departmental Representative before carrying out such site inspection.

1.3 CODES AND STANDARDS

.1 Perform work in accordance with the National Building Code of Canada (NBC) 2015 and National Fire Code of Canada (NFC) 2010 NFPA 101-2015 Life Safety Code, and any other code of provincial or local application, including all amendments up to bid closing date, provided that in any case of conflict or discrepancy, the more stringent requirement shall apply.

.2 Materials and workmanship must meet or exceed requirements of specified standards, codes and referenced documents.

1.4 INTERPRETATION OF DOCUMENTS

.1 For Federal Government projects, Division 01 Sections take precedence over technical specification sections in other Divisions of this Project Manual.

1.5 TERM ENGINEER

.1 Unless specifically stated otherwise, the term Engineer where used in the Specifications and on the Drawings shall mean the Departmental Representative as defined in the General Conditions of the Contract.

1.6 SETTING OUT WORK

.1 Assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.

.2 Provide devices needed to lay out and construct work.

.3 Supply such devices as straight edges and templates required to facilitate Departmental Representative's inspection of work.

.4 Supply stakes and other survey markers required for laying out work.

1.7 COST BREAKDOWN

.1 Before submitting first progress claim submit breakdown of Contract Amount in detail as directed by Departmental Representative and aggregating contract amount. Required forms will be provided for application of progress payment.

.2 List items of work numerically following the same division/section number system of the specification manual and thereafter sub-divide into major work components and building systems as directed by Departmental Representative.

.3 Upon approval, cost breakdown will be used as basis for progress payment.

1.8 MEASUREMENT PROCEDURES

.1 Notify Departmental Representative sufficiently in advance of operations to permit required measurement procedures.

1.9 DOCUMENTS REQUIRED

.1 Maintain at job site, one copy each of the following:
- .1 Contract Drawings.
- .2 Specifications.
- .3 Addenda and amendments.
- .4 Reviewed Shop Drawings.
- .5 List of outstanding shop drawings.
- .6 Change Orders.
- .7 Other modifications to Contract.
- .8 Field Test Reports.
- .9 Copy of Approved Work Schedule.
- .10 Health and Safety Plan and other safety related documents.
- .11 Other documents as stipulated elsewhere in the Contract Documents.

1.10 PERMITS

.1 In accordance with the the General Conditions, obtain and pay for building permit, certificates, licenses and other permits as required by municipal, provincial and federal authorities.

.2 Provide appropriate notifications of project to municipal and provincial inspection authorities.

.3 Obtain compliance certificates as prescribed by legislative and regulatory provisions of municipal, provincial and federal authorities as applicable to the performance of work.

.4 Submit to Departmental Representative, copy of application forms and approval documents received from above referenced authorities.

1.11 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

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

.2 Where security has been reduced by work of Contract, provide temporary means to maintain security.

.3 Provide temporary dust screens, barriers, warning signs in locations where renovation and alteration work is adjacent to areas which will be operative during such work or where public may be present.

1.12 ROUGHING-IN

.1 Be responsible for obtaining manufacturer's literature and for correct roughing-in and hook-up of equipment & fixtures.

1.13 CUTTING, FITTING AND PATCHING

.1 Ensure that cutting and patching required by all trades is included in total bid amount submitted for the work.

.2 Execute cutting including excavation, fitting and patching required to make work fit properly.

.3 Where new work connects with existing and where existing work is altered, cut, patch and make good to match existing work. [This includes patching of openings in existing work resulting from removal of existing services].

.4 Do not cut, bore, or sleeve load-bearing members, except where specifically approved by Departmental Representative.

.5 Make cuts with clean, true, smooth edges. Make patches inconspicuous in final assembly.

.6 Fit work airtight to pipes, sleeves ducts and conduits.

1.14 CONCEALMENT

.1 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

1.15 LOCATION OF FIXTURES

.1 Location of equipment, fixtures and outlets, shown or specified shall be considered as approximate. Actual location shall be as required to suit conditions at time of installation and as is reasonable.

.2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.

.3 Inform Departmental Representative when impending installation conflicts with other new or existing components. Follow directives for actual location.

.4 Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative.

1.16 EXISTING SERVICES

.1 Where work involves breaking into or connecting to existing services, carry out work at times directed by governing authorities, with minimum of disturbance to pedestrian, vehicular traffic and tenant operations.

.2 Before commencing work, establish location and extent of service lines in area of work and notify Departmental Representative of findings.

.3 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility. This includes disconnection of electrical power and communication services to tenant's operational areas. Adhere to approved schedule and provide notice to affected parties.

.4 Provide temporary services [when directed by Departmental Representative] to maintain critical building and tenant systems.

.5 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.

.6 Protect, relocate or maintain existing active services as required. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction over service. Record locations of maintained, re-routed and abandoned service lines.

1.17 BUILDING SMOKING ENVIRONMENT

.1 Comply with smoking restrictions.

1.18 ASBESTOS DISCOVERY

.1 Demolition of spray or trowel-applied asbestos can be hazardous to health. Should material resembling spray or trowel-applied asbestos be encountered in course of work, stop work and notify Departmental Representative immediately. Do not proceed with relevant work until written instructions have been received from Departmental Representative.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Title and description of Work.
.2 Contract Method.
.3 Work by others.
.4 Work sequence.
.5 Contractor use of premises.
.6 Owner occupancy.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

.1 In general work of this contract consists of the restoration of the Cape Spear Lighthouse as indicated in these documents.

1.3 WORK SEQUENCE

.1 Coordinate Progress Schedule and coordinate with Department Representative Occupancy during construction.
.2 Maintain fire access/control.
.3 Work is to begin immediately upon contract award.

1.4 CONTRACTOR USE OF PREMISES

.1 Coordinate use of premises under direction of Department Representative.
.2 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.

1.5 OWNER OCCUPANCY

.1 Cooperate with Department Representative in scheduling operations to minimize conflict and to facilitate Owner access.

1.6 PROPOSED CONSTRUCTION SCHEDULE

Funding Approval	December 2017
Tender	January - February 2018
Award	March 2018
Mobilization and Preparation	April 2018
Exterior Restoration Work (Painting and Windows)	April - September 2018
Mobilization and Preparation for Dome and Related Work	October 2018
Dome Removal and Off-site Restoration	November 2018 - May 2019
Related Exterior Work and Other Interior Work	November 2018 - May 2019
Project Completion	May 2019

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 SUBMITTALS

.1 Upon acceptance of bid and prior to commencement of work, submit to Departmental Representative the following work management documents:
- .1 Work Schedule as specified herein.
- .2 Shop Drawing Submittal Schedule specified in section 01 33 00.
- .3 Hot Work Procedures specified in section 01 35 24.
- .5 Health and Safety Plan specified in section 01 35 29.
- .6 List of workers requiring security clearance and those to be placed on Site Security Control list as specified in section 01 35 54.
- .7 Dust Control Plan specified in section 01 50 00 Temporary Facilities and Controls.
- .8 Construction/Demolition Waste Management & Disposal Plan specified in section 01 74 21.

1.2 WORK SCHEDULE

.1 Upon acceptance of bid submit:
- .1 Preliminary work schedule within 7 calendar days of contract award.
- .2 Detailed work schedule within 21 calendar days of contract award.

.2 Schedule to indicate all calendar dates from commencement to completion of all work within the time stated in the accepted bid.

.3 Provide sufficient details in preliminary schedule to clearly illustrate entire implementation plan, depicting efficient coordination of tasks and resources, to achieve completion of work on time and permit effective monitoring of work progress in relation to established milestones.

.4 Preliminary work schedule content to include as a minimum the following:
- .1 Bar (GANTT) Charts, indicating all work activities, tasks and other project elements, their anticipated durations, planned dates for achieving key activities and major project milestones supported with;
- .2 Written narrative on key elements of work illustrated in bar chart, providing sufficient details to demonstrate a reasonable implementation plan for completion of project within designated time.
- .3 Generally Bar Charts derived from commercially available computerized project management system are preferred but not mandatory.

.5 Detailed Work Schedule:
- .1 Prepare by use of Critical Path Method (CPM) indicating:

.1 Complete and detailed sequence of all construction activities. Show projected start and completion dates for each activity.
.2 Number of calendar days required to carryout each activity.
.3 Critical path items with resulting critical dates, non-critical activities and resulting float time.
.4 Actual workdays from non-working days such as weekend and statutory days etc.
.5 Projected and actual percentage of work completed for each major work activity.

.2 Prepare CPM schedule by use of well recognized and widely used electronic software. Submit copy of schedule in paper format and one electronic version on diskette for each submission.

.3 Accompany CPM with written narrative as required and in sufficient detail to fully describe work and demonstrate a reasonable implementation plan for completion of project within designated time.

.6 Work schedule must take into consideration and reflect the work phasing, required sequence of work, special conditions and operational restrictions as specified below and indicated on drawings.

.7 Schedule work in cooperation with the Departmental Representative. Incorporate within Detailed Work Schedule, items identified by Departmental Representative during review of preliminary schedule.

.8 Completed schedule shall be approved by Departmental Representative. When approved, take necessary measures to complete work within scheduled time. Do not change schedule without Departmental Representative's approval.

.9 Ensure that all sub-trades and subcontractors are made aware of the work restraints and operational restrictions specified.

.10 Schedule Updates:
.1 Submit on a monthly basis when requested by Departmental Representative.
.2 Provide information and pertinent details explaining reasons for necessary changes to implementation plan.
.3 Identify problem areas, anticipated delays, impact on schedule and proposed corrective measures to be taken.

.11 Departmental Representative will make interim reviews and evaluate progress of work based on approved schedule. Frequency of such reviews will be as decided by Departmental Representative. Address and take corrective measures on items identified by reviews and as directed by Departmental Representative. Update schedule accordingly.

.12 In every instance, change or deviation from the Work Schedule, no matter how minimal the risk or impact on safety or inconvenience

to tenant or public might appear, will be subject to prior review and approval by the Departmental Representative.

1.3 PROJECT PHASING

.1 Unless indicated or approved otherwise, complete all work of a particular phase prior to commencement of another phase. Obtain Departmental Representative's permission prior to moving between phases.

1.4 OPERATIONAL RESTRICTIONS

.1 Contractor to meet with the Departmental Representative on a weekly basis to identify intended work areas, activities and scheduling for the coming week.

.2 Safety Signage:
.1 Provide on site, and erect as required during progress of work, proper bilingual signage, mounted on self-supporting stands, warning the public and building occupants of construction activities in progress and alerting need to exercise caution in proceeding through disturbed areas of the facility, and directing building occupants through any detours which may be required.
.2 Signage to be professionally printed and mounted on wooden backing, coloured and to express messages as directed by the Departmental Representative.
.3 Generally maximum size of sign should be in the order of 1.0 square meters. Number of signs required will be dependent on number of areas in facility under renovation at any one time.
.4 Include costs for the supply and installation of these signs in the bid amount.

.3 Dust and Dirt Control:
.1 See Section 01 50 00 and 01 74 11 for dust control and cleaning requirements.
.2 Effectively plan and implement dust control measures and cleaning activities as an integral part of all construction activities. Review all measures with the Departmental Representative before undertaking work, especially for major dust generating activities.
.3 Do not allow demolition debris and construction waste to accumulate on site and contribute to the propagation of dust.
.4 As work progresses, maintain construction areas in a tidy condition at all times. Remove gross dust accumulations by cleaning and vacuuming immediately following the completion of any major dust generating activity.

.5 Immediately remove all debris and dust from within occupied areas as generated by work therein during a given workshift.
.6 Disconnect and seal-off ductwork of HVAC servicing the construction area to stop spread of dust into other areas of Facility.

.7 Avoid situations and practices which results in dust and dirt being brought from the construction areas or from the exterior and tracked inside the building into occupied areas used by tenants and the public.
.8 Stop workers with soiled footwear from entering building. This includes roofing mechanics and heavy civil workers.
.9 Inform workers and make them sensitive to the need for dust and dirt control. Stringently enforce rules and regulations, immediately address non-compliance.
.10 Keep access doors to work areas closed at all times. Use only designated doors for entry or egress.

.4 Ensure that all sub-trades are made aware of and abide by the contents of this section and in particularly the work restrictions specified herein due to tenant operational requirements.

1.5 PROJECT MEETINGS

.1 Schedule and administer project meetings, held on a minimum bi-weekly basis, for entire duration of work and more often when directed by Departmental Representative as deemed necessary due to progress of work or particular situation.

.2 Prepare agenda for meetings.

.3 Notify participants in writing 4 days in advance of meeting date.
.1 Ensure attendance of all subcontractors.
.2 Departmental Representative will provide list of other attendees to be notified.

.4 Hold meetings at project site or where approved by Departmental Representative.

.5 Preside at meetings and record minutes.
.1 Indicate significant proceedings and decisions. Identify action items by parties.
.2 Distribute to participants by mail or by facimile within 3 calendar days after each meeting.
.3 Make revisions as directed by Departmental Representative.
.4 Departmental Representative will advise whether submission of minutes by Email is acceptable. Decision will be based on compatibility of software among participants.

.6 Departmental Representative will arrange project meetings and assume responsibility for setting times and recording minutes.

.7 Pre-construction start-up meeting:
.1 Agenda: Site specific cultural (archaeological and FHBRO) and natural resource considerations and mitigation measures identified in the Parks Canada Basic Impact Analysis.

1.6 WORK COORDINATION

.1 General Contractor is responsible for coordinating the work of the various trades and predetermining where the work of such trades interfaces with each other.
.1 Designate one person from own employ having overall

responsibility to review contract documents and shop drawings, plan and manage such coordination.

.2 General Contractor shall convene meetings between trades whose work interfaces and ensure that they are fully aware of the areas and the extent of where interfacing is required.

.1 Provide each trade with the plans and specs of the interfacing trade, as required, to assist them in planning and carrying out their respective work.
.2 Develop coordination drawings when deemed required illustrating potential interference between work of various trades and distribute to all affected parties including structural trade.
.1 Pay particularly close attention to overhead work above ceilings and within or near to building structural elements.
.2 Coordination drawings to identify all building elements, services lines, rough-in points and indicate from where various services are coming.
.3 Review coordination drawings at purposely called meetings. Have subcontractors sign-off on drawings and publish minutes of each meeting.
.4 Plan and coordinate work in such a way to minimize quantity of service line offsets.
.5 Submit copy of coordination drawings and meeting minutes to Departmental Representative for information purposes.

.3 Submission of shop drawings and ordering of prefabricated equipment or prebuilt components shall only occur once coordination meeting for such items has taken place between trades and all conditions affecting the work of the interfacing trades has been made known and accounted for.

.4 Work Cooperation:
.1 Ensure cooperation between trades in order to facilitate the general progress of the work and avoid situations of spatial interference.
.2 Ensure that each trade provides all other trades reasonable opportunity for the completion of the work and in such a way as to

prevent unnecessary delays, cutting, patching and the need to remove and replace completed work.

.5 No extra costs to the Contract will be considered by the Departmental Representative as a result of Contractor's failure to effectively coordinate all portions of the Work. Disputes between the various trades as a result of their not being informed of the areas and extent of interface work shall be the sole responsibility of the General Contractor to be resolved at own cost.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Shop drawings and product data.
.2 Samples.
.3 Certificates and transcripts.

1.2 RELATED SECTIONS

.1 Section 01 45 00 - Quality Control.
.2 Section 01 78 00 - Closeout Submittals.

1.3 ADMINISTRATIVE

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

1.4 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 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 coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.3 Allow 14 days for Department Representative and commissioning manager’s review of each submission.

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

.5 Make changes in shop drawings as Department Representative may require, consistent with Contract Documents. When resubmitting, notify Department Representative in writing of any revisions other than those requested.

.6 Accompany submissions with transmittal letter, in duplicate containing:

- .1 Date.
- .2 Project title and number.
- .3 Contractor's name and address.
- .4 Identification and quantity of each shop drawing, product data and sample.
- .5 Other pertinent data.

.7 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.
- .4 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.
.11 Include independent testing laboratory test results demonstrating compliance with specifications.
.12 Include letter of certification of compatibility between products.
.13 Drawings to include professional seal where required.

.8 After Department Representative review distribute copies.

.9 Submit on opaque paper 4 prints which will be retained by the Department Representative plus number contractor requires for distribution.

.10 Delete information not applicable to project.

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

.12 If upon review by Department Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and re-submission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

.13 The review of shop drawings by Parks Canada (PC) is for sole purpose of ascertaining conformance with general concept. This review shall not mean that PC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting all requirements of construction and Contract Documents. Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of all sub-trades.

1.5 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 Department Representative business address.

.3 Notify Department 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. Colours are, however pre-selected in accordance with the facility colours/materials scheme.

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

.6 Make changes in samples which Department Representative may require, consistent with Contract Documents.

.7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.6 CERTIFICATES AND TRANSCRIPTS

.1 Immediately after award of Contract, submit Workers' Compensation Board status.

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 SECTION INCLUDES

.1 Fire Safety Requirements

.2 Hot Work Permit

.3 Existing Fire Protection and Alarm Systems

1.2 RELATED WORK

.1 Section 01 35 29 Health and Safety Requirements

1.3 REFERENCES

.1 Standard for Fire Safety Planning and Fire Emergency Organization -Chapter 3-1

.2 FCC standards may be viewed at:
.1 http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=12562.
.2 The Fire Commissioner of Canada
Operations Program, Labour Canada
Ottawa, Ontario, K1A 0J2

1.4 DEFINITIONS

.1 Hot Work defined as: working in the vicinity of flammable substances with a potential source of ignition. The following are examples.
.1 Welding work
.2 Cutting of materials by use of torch or other open flame devices
.3 Grinding with equipment which produces sparks.
.4 Use of open flame torches.

1.5 SUBMITTALS

.1 Submit copy of Hot Work Procedures and sample of Hot Work permit to Departmental Representative for review, within 14 calendar days of acceptance of bid.

.2 Submit in accordance with section 01 33 00

1.6 FIRE SAFETY REQUIREMENTS

.1 Implement and follow fire safety measures during Work. Comply with following:
.1 National Fire Code.
.2 Fire Protection Standards FCC 301 and FCC 302.
.3 Federal and Provincial Occupational Health and Safety Acts and Regulations.

.2 In event of conflict between any provisions of above authorities the most stringent provision will apply. Should a dispute arise in

determining the most stringent requirement, Departmental Representative will advise on the course of action to be followed.

1.7 HOT WORK AUTHORIZATION

.1 Obtain Departmental Representative’s written "Authorization to Proceed" before conducting any form of Hot Work on site.

.2 To obtain authorization submit to Departmental Representative:
.1 Contractor's typewritten Hot Work Procedures to be followed on site as specified below.
.2 Description of the type and frequency of Hot Work required.
.3 Sample Hot Work Permit to be used.

.3 Upon review and confirmation that effective fire safety measures will be implemented and followed during performance of hot work, Departmental Representative will give authorization to proceed as follows:
.1 Issue one written "Authorization to Proceed" covering the entire project for duration of work or;
.2 Subdivide the work into pre-determined, individual activities, each activity requiring a separately written authorization to proceed.

.4 Requirement for individual authorization will be based on:
.1 Nature or phasing of work;
.2 Risk to Facility operations;
.3 Quantity of various trades needing to perform hot work on project or;
.4 Other situation deemed necessary by Departmental Representative to ensure fire safety on premises.

.5 Do not perform any Hot Work until receipt of Departmental Representative's written "Authorization to Proceed" for that portion of work.

.6 In tenant occupied Facility, coordinate performance of Hot Work with Facility Manager through the Departmental Representative. When directed, perform Hot Work only during non-operative hours of the Facility. Follow Departmental Representative's directives in

this regard.

1.8 HOT WORK PROCEDURES

.1 Develop and implement safety procedures and work practices to be followed during the performance of Hot Work.

.2 Hot Work Procedures to include:
.1 Requirement to perform hazard assessment of site and immediate work area beforehand for each hot work event in accordance with Safety Plan specified in section 01 35 29.
.2 Use of a Hot Work Permit system with individually written permit issued by Contractor's Superintendent to specific worker or subcontractor granting permission to proceed with Hot Work.
.3 Permit required for each Hot Work event.
.4 Designation of a person on site as a Fire Safety Watcher responsible to conduct a fire safety watch for a minimum duration of 60 minutes immediately following the completion of the Hot Work.
.5 Compliance with fire safety codes, standards and occupational health and safety regulations specified.
.6 Site specific rules and procedures in force at the site as provided by the Facility Manager.

.3 Generic procedures, if used, must be edited and supplemented with pertinent information tailored to reflect specific project conditions. Label document as being the Hot Work Procedures for this contract.

.4 Procedures shall clearly establish responsibilities of:
.1 Worker performing hot work,
.2 Person issuing the Hot Work Permit,
.3 Fire Safety Watcher,
.4 Subcontractor(s) and Contractor.

.5 Brief all workers and subcontractors on Hot Work Procedures and of Permit system. Stringently enforce compliance.

.6 Failure to comply with fire safety procedures may result in the issue of a Non-Compliance notification as specified in Section 01 35 29.

1.9 HOT WORK PERMIT

.1 Hot Work Permit to include the following:
.1 Project name and project number;
.2 Building name and specific room or area where hot work will be performed;
.3 Date of issue;
.4 Description of hot work type needed;
.5 Special precautions to be followed, including type of fire extinguisher needed;
.6 Name and signature of permit issuer.
.7 Name of worker to which the permit is issued.
.8 Permit validity period not to exceed 8 hours. Indicate star time/date and termination time/date.
.9 Worker's signature with time/date of hot work completion.
.10 Stipulated time period of safety watch.
.11 Fire Safety Watcher’s signature with time/date.

.2 Permit to be typewritten form. Industry Standard forms shall only be used if all data specified above is included on form.

.3 Each Hot Work Permit to be completed in full, signed and returned to Contractor's Superintendent for safe keeping on site.

1.10 FIRE PROTECTION AND ALARM SYSTEMS

.1 Fire protection and alarm systems shall not be
1 Obstructed.
.2 Shut-off, unless approved by Departmental Representative.
.3 Left inactive at the end of a working day or shift.

.2 Do not use fire hydrants, standpipes and hose systems for purposes other than fire fighting.

.3 Costs incurred, from the fire department, Facility owner and tenants, resulting from negligently setting off false alarms will be charged to the Contractor in the form of financial progress payment reductions and holdback assessments against the Contract.

1.11 DOCUMENTS ON SITE

.1 Keep Hot Work Permits and Hazard assessment documentation on site for duration of Work.

.2 Upon request, make available to Departmental

Representative or to authorized safety Representative for inspection.

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 RELATED SECTIONS

.1 Section 01 35 24: Special Procedures on Fire Safety Requirements.

1.2 DEFINITIONS

.1 COHS: Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code.

.2 Competent Person: means a person who is:
.1 Qualified by virtue of personal knowledge, training and experience to perform assigned work in a manner that will ensure the health and safety of persons in the workplace, and;
.2 Knowledgeable about the provisions of occupational health and safety statutes and regulations that apply to the Work and;
.3 Knowledgeable about potential or actual danger to health or safety associated with the Work.

.3 Medical Aid Injury: any minor injury for which medical treatment was provided and the cost of which is covered by Workers' Compensation Board of the province in which the injury was incurred.

.4 PPE: personal protective equipment.

.5 Work Site: where used in this section shall mean areas, located at the premises where Work is undertaken, used by Contractor to perform all of the activities associated with the performance of the Work.

1.3 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00.

.2 Submit site-specific Health and Safety Plan prior to commencement of Work.
.1 Submit within 7 work days of notification of Bid Acceptance. Provide 3 copies.
.2 Departmental Representative will review Health and Safety Plan and provide comments.
.3 Revise the Plan as appropriate and resubmit within 5 work days after receipt of comments.
.4 Departmental Representative's review and comments made of the Plan shall not be construed as an endorsement, approval or implied warranty of any kind by Canada and does not reduce Contractor's overall responsibility for Occupational Health and Safety of the Work.
.5 Submit revisions and updates made to the Plan during the course of Work.

.3 Submit name of designated Health and Safety Site Representative and support documentation specified in the Safety Plan.

.4 Submit building permit, compliance certificates and other permits obtained.

.5 Submit copy of Letter in Good Standing from Provincial Workers Compensation or other department of labour organization.
.1 Submit update of Letter of Good Standing whenever expiration date occurs during the period of Work.

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

.7 Submit copies of incident reports.

.8 Submit WHMIS MSDS - Material Safety Data Sheets.

1.4 COMPLIANCE REQUIREMENTS

.1 Comply with Occupational Health and Safety Act for Province of Newfoundland and Labrador, and Occupational Health & Safety Regulations made pursuant to the Act.

.2 Comply with Canada Labour Code - Part II (entitled Occupational Health and Safety) and the Canada Occupational Health and Safety Regulations as well as any other regulations made pursuant to the Act.
.1 The Canada Labour Code can be viewed at: www.http://laws-lois.justice.gc.ca/eng/acts/L-2 fulltext.html.
.2 Canadian Occupational Health and Safety Regulations can be viewed at: http://laws-lois. justice.gc.ca/eng/regulations/SOR-86-304/ index.html.
.3 A copy may be obtained at: Canadian Government Publishing Public Works & Government Services Canada Ottawa, Ontario, K1A 0S9 Tel: 819-956-4800 or 1-800-635-7943 Publication No. L31-85/2000 (E or F).

.6 Treasury Board of Canada Secretariat (TBS):
.1 Treasury Board, Fire Protection Standard April 1, 2015 www.tbs-sct.gc.ca/pol/doc-eng.aspx ?id=17316&section=text.

.7 Canadian Standards Association (CSA):
.1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.

.8 Observe construction safety measures of:
.1 NBC 2010, Division B, Part 8.
.2 Municipal by-laws and ordinances.

.9 In case of conflict or discrepancy between above specified requirements, the more stringent shall apply.

.10 Maintain Workers Compensation Coverage in good standing for duration of Contract. Provide proof of clearance through submission of Letter in Good Standing.

.11 Medical Surveillance: Where prescribed by legislation or regulation, obtain and maintain worker medical surveillance documentation.

1.5 RESPONSIBILITY

.1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons and environment adjacent to the site to extent that they may be affected by conduct of Work.

.2 Comply with and enforce compliance by all workers, sub-contractors and other persons granted access to Work Site with safety requirements of Contract Documents, applicable federal, provincial, and local by-laws, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.6 SITE CONTROL AND ACCESS

.1 Control the Work and entry points to Work Site. Approve and grant access only to workers and authorized persons. Immediately stop and remove non-authorized persons.

.1 Departmental Representative will provide names of those persons authorized by Departmental Representative to enter onto Work Site and will ensure that such authorized persons have the required knowledge and training on Health and Safety pertinent to their reason for being at the site, however, Contractor remains responsible for the health and safety of authorized persons while at the Work Site.

.2 Isolate Work Site from other areas of the premises by use of appropriate means.

.1 Erect fences, hoarding, barricades and temporary lighting as required to effectively delineate the Work Site, stop non-authorized entry, and to protect pedestrians and vehicular traffic around and adjacent to the Work and create a safe environment. [See Section [01 50 00] for minimum acceptable requirements].

.2 Post signage at entry points and other strategic locations indicating restricted access and conditions for access.

.3 Use professionally made signs with bilingual message in the 2 official languages or international known graphic symbols.

.3 Provide safety orientation session to persons granted access to Work Site. Advise of hazards and safety rules to be observed while on site.

.4 Ensure persons granted site access wear appropriate PPE. Supply PPE to inspection authorities who require access to conduct tests or perform inspections.

.5 Secure Work Site against entry when inactive or unoccupied and to

protect persons against harm. [Provide security guard where adequate protection cannot be achieved by other means].

1.7 PROTECTION

.1 Give precedence to safety and health of persons and protection of environment over cost and schedule considerations for Work.

.2 Should unforeseen or peculiar safety related hazard or condition become evident during performance of Work, immediately take measures to rectify situation and prevent damage or harm. Advise Departmental Representative verbally and in writing.

1.8 FILING OF NOTICE

.1 File Notice of Project with pertinent provincial & federal health and safety authorities prior to beginning of Work.
.1 Departmental Representative will assist in locating address if needed.

1.9 PERMITS

.1 Post permits, licenses and compliance certificates, specified in section 01 10 10 General Instructions, at Work Site.

.2 Where a particular permit or compliance certificate cannot be obtained, notify Departmental Representative in writing and obtain approval to proceed before carrying out applicable portion of work.

1.10 HAZARD ASSESSMENTS

.1 Perform site specific health and safety hazard assessment of the Work and its site.

.2 Carryout initial assessment prior to commencement of Work with further assessments as needed during progress of work, including when new trades and subcontractors arrive on site.

.3 Record results and address in Health and Safety Plan.

.4 Keep documentation on site for entire duration of the Work.

1.11 MEETINGS

.1 Attend pre-construction health and safety meeting, convened and chaired by Departmental Representative, prior to commencement of Work, at time, date and location determined by Departmental Representative. Ensure attendance of:
.1 Superintendent of Work.
.2 Designated Health & Safety Site Representative.
.3 Subcontractors.

.2 Conduct regularly scheduled tool box and safety meetings during the Work in conformance with Occupational Health and Safety regulations.

.3 Keep documents on site.

1.12 HEALTH AND SAFETY PLAN

.1 Prior to commencement of Work, develop written Health and Safety Plan specific to the Work. Implement, maintain, and enforce Plan for entire duration of Work and until final demobilization from site.

.2 Health and Safety Plan shall include the following components:
.1 List of health risks and safety hazards identified by hazard assessment.
.2 Control measures used to mitigate risks and hazards identified.
.3 On-site Contingency and Emergency Response Plan as specified below.
.4 On-site Communication Plan as specified below.
.5 Name of Contractor's designated Health & Safety Site Representative and information showing proof of his/her competence and reporting relationship in Contractor's company.
.6 Names, competence and reporting relationship of other supervisory personnel used in the Work for occupational health and safety purposes.

.3 On-site Contingency and Emergency Response Plan shall include:
.1 Operational procedures, evacuation measures and communication process to be implemented in the event of an emergency.
.2 Evacuation Plan: site and floor plan layouts showing escape routes, marshalling areas. Details on alarm notification methods, fire drills, location of fire fighting equipment and other related data.
.3 Name, duties and responsibilities of persons designated as Emergency Warden(s) and deputies.
.4 Emergency Contacts: name and telephone number of officials from:
.1 General Contractor and subcontractors.
.2 Pertinent Federal and Provincial Departments and Authorities having jurisdiction.
.3 Local emergency resource organizations.
.5 Harmonize Plan with Facility's Emergency Response and Evacuation Plan. Departmental Representative will provide pertinent data including name of Parks Canada Agency, Fisheries & Oceans Canada, and Facility Management contacts.

.4 On-site Communication Plan:
.1 Procedures for sharing of work related safety information to workers and subcontractors, including emergency and evacuation measures.
.2 List of critical work activities to be communicated with Facility Manager which have a risk of endangering health and safety of Facility users.

.5 Address all activities of the Work including those of subcontractors.

.6 Review Health and Safety Plan regularly during the Work. Update as conditions warrant to address emerging risks and hazards, such as whenever new trade or subcontractor arrive at Work Site.

.7 Departmental Representative will respond in writing, where deficiencies or concerns are noted and may request re-submission of the Plan with correction of deficiencies or concerns.

.8 Post copy of the Plan, and updates, prominently on Work Site.

1.13 SAFETY SUPERVISION

.1 Employ Health & Safety Site Representative responsible for daily supervision of health and safety of the Work.

.2 Health & Safety Site Representative may be the Superintendent of the Work or other person designated by Contractor and shall be assigned the responsibility and authority to:

.1 Implement, monitor and enforce daily compliance with health and safety requirements of the Work

.2 Monitor and enforce Contractor's site-specific Health and Safety Plan.

.3 Conduct site safety orientation session to persons granted access to Work Site.

.4 Ensure that persons allowed site access are knowledgeable and trained in health and safety pertinent to their activities at the site or are escorted by a competent person while on the Work Site.

.5 Stop the Work as deemed necessary for reasons of health and safety.

.3 Health & Safety Site Representative must:

.1 Be qualified and competent person in occupational health and safety.

.2 Have site-related working experience specific to activities of the Work.

.3 Be on Work Site at all times during execution of the Work.

.4 All supervisory personnel assigned to the Work shall also be competent persons.

.5 Inspections:

.1 Conduct regularly scheduled safety inspections of the Work on a minimum bi-weekly basis. Record deficiencies and remedial action taken.

.2 Conduct Formal Inspections on a minimum bi-weekly basis. Use standardized safety inspection forms. Distribute to subcontractors.

.3 Follow-up and ensure corrective measures are taken.

.6 Cooperate with Facility's Occupational Health and Safety representative should one be designated by Departmental Representative.

.7 Keep inspection reports and supervision related documentation on site.

1.14 TRAINING

.1 Use only skilled workers on Work Site who are effectively trained in occupational health and safety procedures and practices pertinent to their assigned task.

.2 Maintain employee records and evidence of training received. Make data available to Departmental Representative upon request.

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

1.15 MINIMUM SITE SAFETY RULES

.1 Notwithstanding requirement to abide by federal and provincial health and safety regulations; ensure the following minimum safety rules are obeyed by persons granted access to Work Site:
.1 Wear appropriate PPE pertinent to the Work or assigned task; minimum being hard hat, safety footwear, safety glasses and hearing protection.
.2 Immediately report unsafe condition at site, near-miss accident, injury and damage.
.3 Maintain site and storage areas in a tidy condition free of hazards causing injury.
.4 Obey warning signs and safety tags.

.2 Brief persons of disciplinary protocols to be taken for non compliance. [Post rules on site].

1.16 CORRECTION OF NON-COMPLIANCE

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

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

.3 Departmental Representative will stop Work if non-compliance of health and safety regulations is not corrected in a timely manner.

1.17 INCIDENT REPORTING

.1 Investigate and report the following incidents to Departmental Representative:
.1 Incidents requiring notification to Provincial Department of

Occupational Safety and Health, Workers Compensation Board or to other regulatory Agency.
.2 Medical aid injuries.
.3 Property damage in excess of $10,000.00,
.4 Interruptions to Facility operations resulting in an operational lost to a Federal department in excess of $5,000.00.

.2 Submit report in writing.

1.18 HAZARDOUS PRODUCTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS).

.2 Keep MSDS data sheets for all products delivered to site.
.1 Post on site.
.2 Submit copy to Departmental Representative.

SPEC NOTE: Delete following clause when not applicable.

.3 For interior work in an occupied Facility, post additional copy in one or more publically accessible locations.

1.19 BLASTING

.1 Blasting or other use of explosives is not permitted on site [without prior receipt of written permission and instructions from Departmental Representative].

1.20 POWDER ACTUATED DEVICES

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

1.21 CONFINED SPACES

.1 Abide by occupational health and safety regulations regarding work in confined spaces.

.2 Obtain an Entry Permit in accordance with Part XI of the Canada Occupational Health and Safety Regulations for entry into an existing identified confined space located at the Facility or premises of Work.
.1 Obtain permit from Facility Manager.
.2 Keep copy of permit issued.

.3 Safety for Inspectors:
.1 Provide PPE and training to Departmental Representative and other persons who require entry into confined space to perform inspections.
.2 Be responsible for efficacy of equipment and safety of persons during their entry and occupancy in the confined space.

1.22 SITE RECORDS

.1 Maintain on Work Site copy of safety related documentation and reports stipulated to be produced in compliance with Acts and Regulations of authorities having jurisdiction and of those documents specified herein.

.2 Upon request, make available to Departmental Representative or authorized Safety Officer for inspection.

1.23 POSTING OF DOCUMENTS

.1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on Work Site in accordance with Acts and Regulations of Province having jurisdiction.

.2 Post other documents as specified herein, including:
- .1 Site specific Health and Safety Plan.
- .2 WHMIS data sheets.

END OF SECTION

1.1 RELATED SECTIONS

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

1.2 DEFINITIONS

.1 Hazardous Material: Product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to the environment or adversely affect health of persons, animals, or plant life when released into the environment.

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

.3 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.

1.3 FIRES

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

1.4 HAZARDOUS MATERIAL HANDLING

.1 Store and handle hazardous materials in accordance with applicable federal and provincial laws, regulations, codes and guidelines. Store in location that will prevent spillage into the environment

.2 Label containers to WHMIS requirements and keep MSDS data sheets on site for all hazardous materials.

.3 Maintain inventory of hazardous materials and hazardous waste stored on site. List items by product name, quantity and date when storage began. Storage location to be determined by Departmental Representative and store under lock and key.

.4 Store and handle flammable and combustible materials in accordance with National Fire Code.

.5 Transport hazardous materials in accordance with federal Transportation of Dangerous Goods Regulations and applicable Provincial regulations.

1.5 DISPOSAL OF WASTES

.1 Do not bury rubbish and waste materials on site. Dispose in accordance with project waste management requirements specified in section 01 74 21 Construction/Demolition Waste Management & Disposal.

.2 Do not dispose of hazardous waste or volatile materials, such as mineral spirits, paints, thinners, oil or fuel into waterways, storm or sanitary sewers or waste landfill sites.

.3 Dispose of hazardous waste in accordance with applicable federal and provincial laws, regulations, codes and guidelines.

1.6 DRAINAGE

.1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.

.2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.

.3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with governing regulations and requirements.

.4 Provide control devices such as filter fabrics, sediment traps and settling ponds to control drainage and prevent erosion of adjacent lands. Maintain in good order for duration of work.

1.7 SITE AND PLANT PROTECTION

.1 Protect trees and plants on site and adjacent properties where indicated.

.2 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.

.3 Minimize stripping of topsoil and vegetation.

.4 Trees are not to be removed unless approved by Departmental Representative.

1.8 WORK ADJACENT TO WATERWAYS

.1 Do not dump excavated fill, waste material or debris in waterways.

.2 Do not refuel any type of equipment within 100 meters of a water body. Maintain equipment in good working condition with no fluid leaks, loose hoses or fittings.

1.9 POLLUTION CONTROL

.1 Maintain temporary erosion and pollution control features installed under this Contract.

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

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

.4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads and around entire construction site.

.5 Have appropriate emergency spill response equipment and rapid clean-up kit on site located adjacent to hazardous materials storage area. Provide personal protective equipment required for clean-up.

.6 Report, spills of petroleum and other hazardous materials as well as accidents having potential of polluting the environment to Newfoundland and Labrador Regional Office, Canadian Coast Guard, Fisheries and Oceans Canada 709-772-2083 or 1-800-563-9089.
.1 Notify Departmental Representative and submit a written spill report to Departmental Representative within 24 hours of occurrence.

1.10 WILDLIFE PROTECTION

.1 Should nests of migratory birds be encountered during work, immediately notify Departmental Representative for directives to be followed.
.1 Never approach or harass wildlife (e.g., feeding, baiting, luring) and
.2 If wildlife is observed at or near the work site, allow the animal(s) the opportunity to leave the work area.
.3 If active nests, dens or roosts are discovered, stop work and contact the Departmental Representative immediately for direction.
.4 The Little Brown Myotis and Northern Myotis, are species of bats classified as Endangered under the Species at Risk Act and have the potential to be found at Cape Spear. Should any bat be encountered, the Contractor must:
.1 Immediately notify the Departmental Representative for directives to be followed.
.2 Stop all activities in the immediate area and do not disturb the bat(s); allow the bat to exit the area on its own.
.3 Do not initiate activities until the bat vacates the premises. The expected time frame for a male bat to vacate the premises would be in the order of 1-3 days. In the event a maternity roost is discovered (females with pups), the expected time frame

for the bats to vacate the premises would be in the order of 1-3 weeks.

.4 The Departmental Representative will make the final decision regarding shut-down times and work return times, as it relates to the discovery of bats. Note that there will be no additional cost to Canada for downtime associated with the discovery of endangered bats and the subsequent no-work periods established by the Departmental Representative.

1.11 BASIC IMPACT ANALYSIS

.1 Implement mitigation measures identified in the Parks Canada Basic Impact Analysis (Appendix B).

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES	.1	References and Codes.
	.2	Discovery of Asbestos.
1.2 REFERENCES AND CODES	.1	Perform Work in accordance with National Building Code of Canada (NBC) including all amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
	.2	Meet or exceed requirements of: .1 Contract documents. .2 All applicable standards, codes and documents.
1.3 HAZARDOUS MATERIAL DISCOVERY	.1	Asbestos: Demolition of spray or trowel -applied asbestos is hazardous to health. Should material resembling spray or trowel-applied asbestos be encountered in course of demolition work, immediately stop work and notify Department Representative.
1.4 BUILDING SMOKING ENVIRONMENT	.1	Comply with smoking restrictions.

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 ABBREVIATIONS AND ACRONYMS

.1 The abbreviations and acronyms are commonly found in the Project Manual and represent the associated organizations or terms.

1.2 MATERIALS, EQUIPMENT AND METHODS

.1 A:
.1 AC: acoustic.
.2 AC PAN: acoustic panel.
.3 ACU: acoustic unit ceiling.
.4 AFF: above finished floor.
.5 AC PLAS: acoustic plaster.
.6 ACT: acoustic tile.
.7 ACR CU LVR: acrylic cube louvre.
.8 ADH: adhesive.
.9 ADJ: adjustable.
.10 A/C: air conditioner.
.11 AL: aluminum.
.12 AB: anchor bolt.
.13 ANOD: anodized.
.14 ARCH: architecture.
.15 ARCH BLK: architectural block.
.16 AVB: air vapour barrier.

.2 B:
.1 B: base.
.2 BEAST: benthic assessment of sediment.
.3 BH: bore hole.
.4 BL: bottom layer.
.5 BLK: block.
.6 BLKD: bulkhead.
.7 BM: beam.
.8 BOT: bottom.
.9 BMP: best management practice.
.10 B PL: base plate.
.11 BRG: bearing.
.12 BRK: brick.
.13 BSMT: basement.
.14 BTEX: benzene, toluene, ethylbenzene and xylenes.
.15 BUR: built-up roof.

.3 C:

.1 CAL: caliper.
.2 CANTIL: cantilever.
.3 CB: catch basin.
.4 CC: centre to centre.
.5 CCN: contemplated change notice.
.6 CDF: controlled density fill.
.7 CEC: Canadian Electical Code.
.8 CF: chair fabric.
.9 CHAN: channel.
.10 CHS: Canadian hydrographic service.
.11 CJ: construction joint.
.12 CL: centreline.
.13 CK: cork.
.14 CLG: ceiling.
.15 CLR: clear.
.16 COL: column.
.17 CONC: concrete.
.18 CONC BLK: concrete block.
.19 CONC BRK: concrete brick.
.20 CONT: continuous.
.21 CONT J: control joint.
.22 COMPL: complete.
.23 CM: centimetre. (Nursery stock).
.24 CPL: cement plaster.
.25 CPM: critical path method.
.26 CPT: carpet.
.27 CPTT: carpet tile.
.28 CT: ceramic tile.
.29 CVT: conductive vinyl tile.
.30 C/W: complete with.

.4 D:

.1 D: deep.
.2 DD: dutch door.
.3 DEG: degree.
.4 DF: drinking fountain.
.5 DIA: diameter.
.6 DIM: dimension.
.7 DL: dead load.
.8 DMNT: demountable.
.9 DP: dampproofing.
.10 DR: door.
.11 DRP: drapery.
.12 DWL: dowel.

.5 E:

.1 EA: each.
.2 EC: epoxy coating.
.3 ECF: engineered containment facility.
.4 EE: each end.

.5 EF: each face.
.6 EL: elevation.
.7 ELEC: electric.
.8 ELEV: elevator.
.9 EM: expanded metal.
.10 ENCL: enclosure.
.11 EQ: equal.
.12 EXH: exhaust.
.13 EXIST: existing.
.14 EXPJ: expansion joint.
.15 EXP STRUCT: exposed structure.
.16 EXT: exterior.
.17 EW: each way.

.6 F:
.1 FC: fuel contributed.
.2 FD: floor drain.
.3 FDN: foundation.
.4 FEAT W: feature wall.
.5 FEXT: fire extinguisher.
.6 FH: fire hose.
.7 FHC: fire hose cabinet.
.8 FHR: fire hose rack.
.9 FIN: finish.
.10 FIP: federal identity program.
.11 FL: floor.
.12 FLD: field.
.13 FLUOR: fluorescent.
.14 FR: frame.
.15 FRR: fire resistance rating.
.16 FTG: footing.

.7 G:
.1 GALV: galvanized steel.
.2 GB: grab bar.
.3 GBD: gypsum board.
.4 GC: General Conditions.
.5 GF: ground floor.
.6 GFCI: ground fault circuit interrupter.
.7 GL: glass or glazing.
.8 GL BLK: glass block.
.9 GPC: gypsum plaster ceiling.
.10 GPW: gypsum plaster wall.
.11 GT: glass tile.

.8 H:
.1 HB: hose bib.
.2 HC: hollow core.
.3 HCWD: hollow core wood door.
.4 HD: hand dryer.

.5 HDW: hardware.
.6 HDWD: hardwood.
.7 HM: hollow metal.
.8 HOR: horizontal.
.9 HOR EF: horizontal each face.
.10 HP: hydro pole.
.11 HPA: Hamilton Port Authority.
.12 HR: hour.
.13 HRV: heat recovery ventilator.
.14 HT: height.
.15 HTR: heater.
.16 HWT: hot water tank.
.17 HYD: hydrant.

.9 I:
.1 ICF: insulated concrete formwork.
.2 ID: inside diameter.
.3 INS: insulation.
.4 INTLK: interlock.

.10 J:
.1 JT: joint.

.11 K:
.1 KPL: kick plate.

.12 L:
.1 LAV: lavatory.
.2 LDG: landing.
.3 LG: long.
.4 LINO: linoleum.
.5 LL: live load.
.6 LT: light.

.13 M:
.1 MAS: masonry.
.2 MAS FL: masonry flashing.
.3 MAX: maximum.
.4 MBG: metal bar grating.
.5 MCL: metal cube louvre.
.6 MECH: mechanical.
.7 MET: metal.
.8 MET DK: metal deck.
.9 MET FL: metal flashing.
.10 MET GRID CLG: metal grid ceiling.
.11 MET GRTG: metal grating.
.12 MET LIN CLG: metal linear ceiling.
.13 MET T PTN: metal toilet partition.
.14 MH: maintenance hole.
.15 MIN: minimum.

.16 MLP: metal lath and plaster.
.17 MO: masonry opening.
.18 MR: marble.
.19 MT: metal threshold.
.20 MWP: membrane waterproofing.

.14 N:
.1 NBC: national building code.
.2 NF: near face.
.3 NFC: national fire code.
.4 NIC: not in contract.
.5 NO: number.
.6 NRC: noise reduction coefficient.
.7 NRP: non removable pin.
.8 NTS: not to scale.

.15 O:
.1 OBC: Ontario building code.
.2 OC: on centre.
.3 OD: outside diameter.
.4 OPNG: opening.
.5 OPR: operator.
.6 OVHD: overhead.
.7 OWSJ: open web steel joist.

.16 P:
.1 P: prefinished.
.2 PAH: polynuclear aromatic hydrocarbons.
.3 PARG: parging.
.4 PCC: precast concrete.
.5 PCT: porcelain ceramic tile.
.6 PED ACS FLG: pedestal access flooring.
.7 PF: panel fabric.
.8 PL: plate.
.9 PLAM: plastic laminate.
.10 PLAS: plaster.
.11 PLYWD: plywood.
.12 PR: pair.
.13 PREFAB: prefabricated.
.14 PREFIN: prefinished.
.15 PRFL: profile.
.16 PT: paint.
.17 PTD: paper towel dispenser.
.18 PTN: partition.
.19 PVC: polyvinyl cholide.

.17 Q:
.1 QTB: quarry tile base.
.2 QTF: quarry tile floor.
.3 QTR: quarry tile roof.

.18 R:

.1 R: radius.
.2 RA: return air.
.3 RB: resilient base.
.4 RC: reinforced concrete.
.5 RCPT: receptacle.
.6 RD: roof drain.
.7 REINF: reinforced/reinforcing.
.8 REQD: required.
.9 REQT: requirement.
.10 RFT: rubber floor tile.
.11 RM: room.
.12 RO: rough opening.
.13 RP: radiant panel.
.14 RRS: recycled rubber sheet.
.15 RRT: recycled rubber tile.
.16 RSD: rolling steel door.
.17 RSF: rubber sheet flooring.
.18 RTU: roof top unit.
.19 RWL: rain water leader.

.19 S:

.1 SAN SEW: sanitary sewer.
.2 SCHED: schedule.
.3 SC: solic core.
.4 SCRN: screen.
.5 SCWD: solid core wood door.
.6 SD: smoke developed.
.7 SDT: static dissipative tile.
.8 SECT: section.
.9 SH: sill height.
.10 SIM: similar.
.11 SL: sliding.
.12 SLR: sealer.
.13 SPEC: specification.
.14 SS: stainless steel.
.15 STD: standard.
.16 STL: steel.
.17 STL BM: steel beam.
.18 STC: sound tranmission class.
.19 STL FL DK: steel floor deck.
.20 STL PL: steel plate.
.21 STN: stone.
.22 STR: structure or structural.
.23 ST SEW: storm sewer.
.24 S&U: stain and urethane.
.25 S&V: stain and varnish.
.26 SVT: solid vinyl tile.

.20 T:
- .1 T: top.
- .2 T&B: top and bottom.
- .3 TCB: turbidity control plan.
- .4 TEL: telephone.
- .5 TER: terrazzo.
- .6 TERT: terrazzo tile.
- .7 THKNS: thickness.
- .8 THR: threshold.
- .9 TMPD: tempered.
- .10 TOPG: topping.
- .11 TRANSV: transverse.
- .12 TYP: typical.

.21 U:
- .1 U: urethane.
- .2 UCUT: undercut.
- .3 UGRD: underground.
- .4 UNO: unless noted otherwise.
- .5 UOS: unless otherwise specified.
- .6 U/S: underside.
- .7 UR: urinal.

.22 V:
- .1 VCF: vinyl coated fabric.
- .2 VCT: vinyl compositition tile.
- .3 VERT: vertical.
- .4 VERT B: vertical blinds.
- .5 VERT EF: vertical each face.
- .6 VSF: vinyl sheet flooring.
- .7 VT: vinyl tile.
- .8 VWC: vinyl wall covering.

.23 W:
- .1 WC: water closet.
- .2 W-C: wall connectors.
- .3 WD: wood.
- .4 WDV: wood veneer.
- .5 WH: wall hydrant.
- .6 WHMIS: workplace hazardous materials information system.
- .7 WP: waterproofing.
- .8 WR: washroom.
- .9 WSIB: workplace safety and insurnace board.
- .10 WT: weight.
- .11 WTP: water treatment plant.

SPEC NOTE: Edit provincal organizations to suit the location of the project, ie, OPSS, OPSD, etc.

1.3 STANDARDS ORGANIZATIONS

.1 Standards writing organizations:
.1 AA - Aluminum Association.
.2 ACPA - American Concrete Pipe Association.
.3 ANSI - American National Standards Institute.
.4 ASHRAE - American Society of Heating and Refrigerating and Air-Conditioning Engineers.
.5 ASTM - American Society for Testing and Materials.
.6 AWI/AWMAC - Architectural Woodwork Institute/Architectural Woodwork Manufacturers Association of Canada.
.7 AWPA - American Wood Preservers' Association.
.8 AWWA - American Water Works Association.
.9 BHMA - Builders Hardware Manufacturers Association.
.10 CCDC - Canadian Construction Documents Committee.
.11 CCMPA - Canadian Concrete Masonry Producers Association.
.12 CGSB - Canadian General Standards Board.
.13 CNTA - Canadian Nursery Trades Association.
.14 CPCA - Canadian Painting Contractors Association.
.15 CRCA - Canadian Roofing Contractors Association.
.16 CSA - Canadian Standards Association.
.17 CSC - Construction Specifications Canada.
.18 CSDMA - Canadian Steel Door Manufacturers Association.
.19 CSI - Construction Specifications Institute.
.20 CSSBI - Canadian Sheet Steel Building Institute.
.21 CRCA - Canadian Roofing Contractors Association.
.22 DHI - Door and Hardware Insitute.
.23 EEMAC - Electrical and Electronic Manufacturer's Association of Canada.
.24 ESA - Electrical Safety Authority.
.25 FCC - Fire Commissioner of Canada.
.26 FSC - Forest Stewardship Council.
.27 GANA - Glass Association of North America.
.28 HMMA - Hollow Metal Manufacturers Association.
.29 IEEE - Institute of Electrical and Electronics Engineers Inc.
.30 ISO - International Organization for Standardization.
.31 IWFA - International Window Film Association.
.32 LEED - LEED Canada, Leadership in Energy and Environmental Design.
.33 MPI - Master Painters Insitute.
.34 NAAMM - National Association of Architectural Metal Manufacturers.
.35 NCPI - National Clay Pipe Institute.
.36 NEMA - National Electrical Manufacturers Association.
.37 NFPA - National Fire Protection Association.
.38 OPSD - Ontario Provincial Standard Drawings.
.39 OPSS - Ontario Provincial Standard Specifications.
.40 PPI - Plasctics Pipe Institute.
.41 SDI - Steel Door Intitute.
.42 SCAQMD - South Coast Air Quality Management District.
.43 TIA - Telecommunications Industry Association.

.44 TIAC - Thermal Insulation Association of Canada.
.45 TTMAC - Terrazzo Tile and Marble Association of Canada.
.46 UL - Underwriters Laboratories.
.47 ULC - Underwriters Laboratories of Canada.
.48 US EPA - United States Environmental Protection Agency.
.49 WH - Warnock Hersey.

1.4 FEDERAL GOVERNMENT DEPART- MENTS AND AGENGIES

.1 Departments, agencies and crown corporations.
.1 CEAA - Canadian Environmental Assessment Agency.
.2 CSC - Correctional Service Canada.
.3 CRA - Canada Revenue Agency.
.4 DND - Department of National Defence.
.5 EC - Environment Canada.
.6 FHBRO - Federal Heritage Buildings Review Office.
.7 HC - Health Canada.
.8 HCD - Heritage Conservation Directorate.
.9 LC - Labour Canada.
.10 PC - Parks Canada.
.11 PWGSC - Public Works and Government Services Canada.
.12 RCMP - Royal Canadian Mounted Police.
.13 TBS - Treasury Board Secretariat.
.14 TC - Transport Canada.

1.5 PROVINCIAL GOVERNMENT DEPART- MENTS AND AGENGIES

.1 MOEE - Ontario Ministry of Environment and Energy.

.2 MOL - Ontario Ministry of Labour.

.3 MTO and MOT - Ontario Ministry of Transportation.

.4 TSSA - Technical Standards and Safety Authority.

1.6 INTERNATIONAL GOVERNMENT DEPART- MENTS AND AGENCIES

.1 DOHMH - New York City Department of Health and Mental Hygiene, USA.

.2 GSA - Government Services Administration, USA.

1.7 UNITS OF MEASURE METRIC

.1 The following abbreviations of units of measure are commonly found in the Project Manual:

.1 C: Celsius.
.2 cm: centimetre.
.3 kg: kilogram.
.4 kg/mü: kilogram per cubic metre.
.5 kN: kilonewton.
.6 kPa: kilopascals.
.7 kw: kilowatts.
.8 l/s: litre per second.
.9 m: metre.
.10 mü: cubic metre.
.11 mg/kg: milligrams per kilogram.
.12 mg/L: milligrams per litre.
.13 mm: millimetres.
.14 MPa: megapascal.
.15 NTU: nephelometric turbidity unit.
.16 ppm: parts per million.
.17 ug/L: micrograms per litre.
.18 ug/mü: micrograms per cubic metre.

1.8 UNITS OF MEASURE IMPERIAL

.1 The following abbreviations of units of measure are commonly found in the Project Manual:
.1 F: Fahrenheit.
.2 ft: foot/feet.
.3 ga: guage.
.4 gpm: gallons per minute.
.5 in: inches.
.6 lbs: pounds.
.7 NTU: nephelometric turbidity unit.
.8 psi: pounds-force per square inch.
.9 ppm: parts per million.

1.9 LEED TERMS

.1 Acronyms specific to LEED:
.1 CI: commercial interiors.
.2 EQ: environmental quality.
.3 MR: material and resources.
.4 NC: new construction.

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 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.
.2 Section 01 42 13 - Abbreviations & Acronyms.
.3 Section 01 78 00 - Closeout Submittals.

1.2 INSPECTION

.1 Give timely notice requesting inspection of Work designated for special tests, inspections or approvals by Departmental Representative or by inspection authorities having jurisdiction.

.2 In accordance with the General Conditions, Departmental Representative may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents.

.3 If Contractor covers or permits to be covered Work designated for special tests, inspections or approvals before such is made, uncover Work until particular inspections or tests have been fully and satisfactorily completed and until such time as Departmental Representative gives permission to proceed.

.4 Pay costs to uncover and make good work disturbed by inspections and tests.

1.3 TESTING

.1 Tests on materials, equipment and building systems as specified in various sections of the Specifications is the responsibility of the Contractor except where stipulated otherwise.
.1 Provide all necessary instruments, equipment and qualified personnel to perform tests.

.2 At completion of tests, turn over 2 sets of fully documented tests reports to the Departmental Representative. Submit in accordance with Section 01 33 00 Submittal Procedures.
.1 Obtain additional copies for inclusion of a complete set in each of the maintenance manuals specified in Section 01 78 00 Closeout Submittals.

.3 Unspecified tests may also be made by Departmental Representative, at the discretion of the Departmental Representative. The costs of these tests will be paid for by the Departmental Representative.

.4 Where tests or inspections reveal work not in accordance with contract requirements, Contractor shall pay costs for additional

tests and inspections incurred by Departmental Representative as required to verify acceptability of corrected work.

1.4 INDEPENDENT INSPECTION AGENCIES

.1 Departmental Representative may engage and pay for service of Independent Inspection and Testing Agencies for purpose of inspecting and testing portions of Work except for the following which remain part of Contractor's responsibilities:
.1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
.2 Inspection and testing performed exclusively for Contractor's convenience.
.3 Performance verification tests before building commissioning procedures commences.
.4 Mill tests and certificates of compliance.
.5 Tests as specified within various sections designated to be carried out by Contractor under the supervision of Departmental Representative.
.6 Additional tests as specified in Clause [1.3.4] above.

.2 Provide sufficient advance notice to Departmental Representative of time when the Work will be ready for testing by designated Testing Agency in order for Departmental Representative to make attendance arrangements with such Agency. When directed by Departmental Representative notify the Agency directly.

.3 When specified or directed, submit Representative samples of materials, in required quantities, to Testing Agency for testing purposes. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.

.4 Provide labour and facilities to obtain, handle and deliver samples.

.5 Provide sufficient space on site for Testing Agency's exclusive use to store equipment and cure test samples.

.6 Employment of Independent Inspection and Testing Agencies by Departmental Representative does not relax responsibility to perform Work in accordance with Contract Documents.

1.5 ACCESS TO WORK

.1 Facilitate Departmental Representative's access to Work. If part of Work is being fabricated at locations other than construction site, make preparations to allow access to such Work whenever it is in progress.

.2 Furnish labour and facility to provide access to the work being inspected and tested.

.3 Co-operate to facilitate such inspections and tests.

1.6 REJECTED WORK

.1 Remove and replace defective Work, whether result of poor workmanship, use of defective or damaged products and whether incorporated in Work or not, which has been identified by Departmental Representative as failing to conform to Contract Documents.

.2 Make good damages to new and existing construction and finishes resulting from removal or replacement of defective work.

1.7 MOCK-UPS

.1 Prepare mock-ups of certain work as specified in various sections of the Specifications. Include in each mock-up all related work components representative of final assembly.

.2 Construct in locations acceptable to Departmental Representative.

.3 Prepare mock-ups for Departmental Representative's review with reasonable promptness and in an orderly sequence, so as not to cause any delay in Work.

.4 Failure to prepare mock-ups in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.

.5 If requested, Departmental Representative will assist in preparing a schedule fixing dates for preparation.

.6 Dismantle and remove mock-up when directed by Departmental Representative, unless approval is given for mock-up to remain as part of the Work.

END OF SECTION

1.1 SITE ACCESS AND PARKING

.1 The Departmental Representative will designate Contractor's access to project site as well as parking facilities for equipment and workers.

.2 Maintain existing roads and parking areas at site, where used by Contractor, for duration of contract.
- .1 Keep clean and free of mud and dirt by washing on a regular basis.
- .2 Provide snow removal in areas located within construction site or enclosed by work as well as access road to site.
  - .1 In the event of a winter storm there is no snow clearing or road salting control on Blackhead Road past 1600 Blackhead Rd to Cape Spear.
- .3 Make good and repair damage resulting from Contractor's use of existing roads, asphalted areas and lawns on site.

.3 Staging areas, material/equipment drop sites, and parking areas must be identified, including duration of use, within an existing disturbed footprint (e.g., roadway, gravel surface, previously disturbed area with high resiliency) or as approved by the Departmental Representative.

.4 Use existing roadways, trails, disturbed areas or other areas as approved by the Departmental Representative for site access, travel within the site and construction activities.

1.2 BUILDING ACCESS

.1 Use only access doors, and circulation routes within building as designated by Departmental Representative to access interior work.

1.3 CONTRACTOR'S SITE OFFICE

.1 Be responsible for and provide own site office, if required, including electricity, heat, lights and telephone. Locate site office as directed by Departmental Representative.

1.4 MATERIAL STORAGE

.1 Locate site storage trailers where directed by Departmental Representative. Place in location of least interference with existing Facility operations.

.2 Material storage space on site is limited. Coordinate delivery to minimize storage period on site before being needed for incorporation into work.

.3 Make arrangements elsewhere in the city as deemed required and pay all costs for storage of materials not ready for incorporation into work.

1.5 SITE ENCLOSURES

.1 Provide temporary fence to enclose various construction areas of work site.

.2 Erect portable steel fence using new 2400 mm high galvanized steel wire fence fabric supported by steel posts spaced at maximum 2.4 m oc.
- .1 Provide one truck gate and one pedestrian gate.
- .2 Maintain fence in good repair.
- .3 Advisory: Wind gusts are extreme and fencing must be sufficiently ballasted or anchored to prevent toppling and damage in the wind.

.3 Make all gates lockable and provide keyed padlocks. 2 key copies are required for PCA Asset Management and VE Team leader

.4 Obtain Departmental Representative's approval beforehand of location and layout of all temporary fence enclosures.

.5 Provide battery powered lanterns around the perimeter of the site enclosure to clearly mark its location at night.

.6 Provide warning signs affixed to all fenced areas, identifying those enclosed areas as "Construction Zones" with access restricted to only those persons so authorized by General Contractor.

.7 Do not construe fencing as an acceptable replacement for pedestrian walkway and hoarding requirements specified below.

1.6 PEDESTRIAN WALKWAYS AND HOARDING

.1 Ensure maximum safety and security to facility users during the course of work.

.2 Be responsible for and provide temporary 2.4 metre high galvanized wire fence construction hoarding when work is adjacent to exterior sidewalks and circulation routes used by facility employees [and public].

.3 Maintain access and egress to building entrances and fire exits designated by Departmental Representative to remain in use. Provide enclosed walkways when work is adjacent to such doors as follows:

.1 Erect wooden pedestrian walkway complete with roof and side covers.
.2 Install walkways as soon as work is in the vicinity of entrance and exit doors and poses a potential danger to facility users.
.3 Provide signage and lighting.
.4 Submit details of walkway size, location, layout and construction to Departmental Representative beforehand and obtain approval.

.4 Adequately frame and brace hoarding and walkways to resist wind, and other weather or site conditions.

.5 Erect such protective devices during Facility's non-operational off hour periods.

.6 Obtain Departmental Representative's concurrence prior to removal of hoarding and walkways.

1.7 INTERIOR DUST CONTROL AND DUST BARRIERS

.1 Control creation and spread of dust and dirt to building interior.

.2 Develop and implement a dust control plan, addressing effective measures to carry out work with least amount of dust being created and propagated.
.1 Carefully evaluate the type of work to be undertaken and the physical layout of each work area on site.
.2 Provide specifically tailored strategy for each work area.
.3 Pre-determine location and placement of dust barriers to confine resulting dust to immediate work area.
.4 Inform Departmental Representative of the proposed dust control measures to be followed at each work area and for each major dust generating activities. Obtain Departmental Representative's approval before proceeding with work.

.3 Dust control plan to incorporate as a minimum the following dust protection and cleaning requirements:
.1 Erect dustproof partitions completely around work area to fully isolate construction from other parts of the building.

.2 Construct dust partitions as follows:
.1 Use 12 mm thick plywood installed to steel stud framing spaced at 400 o.c. [for areas located in public and corridors in use by occupants]
.1 Erect from floor to underside of ceiling above, sheeting applied to occupied side of partition.
.2 Scribe, cut and fit sheathing tight to shape of other obstructions in ceiling space and abutting walls.
.3 Use compressible neoprene gaskets around perimeter

of partition and at all protrusions to achieve airtight construction.

.4 Where partition is exposed to public view, tape and finish drywall joints and paint surface to color approved by the Departmental Representative.

.3 Provide a "dust tight" and lockable access door(s) within dust partition or between rooms for worker entry into work area. This is of particular importance for situations where excessive dust will be generated.

.4 Provide additional dust barriers, placed tightly to underside of the floor/roof deck above, in locations where existing walls are used as part of the dust barrier system but simply terminate at the finished ceiling level resulting in an open space above, or other similar condition, permitting dust to migrate beyond the construction areas.

.5 Make all dust barriers airtight, effectively blocking and stopping all dust migration.

.6 Inspect dust barriers at various intervals during each work shift. Immediately fix tears, unsealed edges and maintain barriers effectively sealed for the entire work duration.

.7 Shut down existing ventilation system feeding construction space, or disconnect and seal-off supply and return air ducts to stop dust from contaminating other areas.

.8 Immediately clean areas in use by occupants and public contaminated by work.

.1 Vacuum carpets, wash floors and walls. Remove accumulated dust from all surfaces. Clean and remove smears, scuffs and marks.

.4 Meager attempts at controlling dust will not be tolerated. Failure to provide effective dust control during work and to perform satisfactory cleaning thereafter will result in Departmental Representative to proceed and obtain a separate cleaning service agency to perform cleaning to tenant's satisfaction with cost for such services being charged against this Contract in the form of financial holdbacks.

.5 Obtain Departmental Representative's approval before erecting any dust partitions simply to underside of finish ceiling.

.6 Construction of dust barriers, enclosures and placement of temporary protective devices to be performed during Facility non-operational off-hour periods.

1.8 SANITARY FACILITIES

.1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.

.2 Post notices and take such precautions as required by local health

authorities. Keep area and premises in sanitary condition.

1.9 ENCLOSURE OF STRUCTURE

.1 Provide temporary weathertight enclosures and protection for exterior openings until permanently enclosed.

.2 Provide weathertight and heated enclosures to conduct exterior work during winter and other inclement weather conditions. Erect to allow accessibility for installation of materials and working inside of enclosure.

.3 Design enclosures to withstand wind pressure and snow loading.

1.10 POWER

.1 Limited Power supply is available and will be provided for construction usage at no cost.
.1 Make arrangements for the use of such services through the Departmental Representative.
.2 Departmental Representative will designate and approve each location of existing power source to which connections can be made to obtain temporary power service.
.3 Connect to existing power supply in accordance with CSA C22.1-12, Canadian Electrical Code.

.2 Provide and maintain temporary lighting to conduct work. Ensure illumination level is not less than [162] lx in all locations.

.3 Existing electrical power and lighting systems can be used for construction requirements provided that guarantees are not affected thereby. Make good damage. Replace lamps which have been used over period of 3 months.

1.11 WATER SUPPLY

.1 Water supply is not available in existing building. Make arrangements for the use and transportation of such services to work area through the Departmental Representative.

1.12 SCAFFOLDING

.1 Design, construct and maintain scaffolding in rigid, secure and safe manner in accordance with CSA Z797-09, Code of Practice for Access Scaffold.

.2 Erect scaffolding independent of walls. Remove when no longer required.

1.13 HEATING AND VENTILATING

.1 Supply, install and pay for costs of temporary heat and ventilation used during construction, including costs of installation, fuel, operation, maintenance and removal of equipment. Use of direct-fired heaters discharging waste products into work areas will not be permitted.

.2 Provide temporary heat and ventilation in enclosed areas as required to:
.1 Facilitate progress of work.
.2 Protect work and products against dampness and cold.
.3 Prevent moisture condensation on surfaces.
.4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
.5 Provide adequate ventilation to meet health regulations for safe working environment.

.3 Maintain minimum temperature of 10 degrees C, or higher where specified, as soon as finishing work is commenced and maintain until acceptance of structure by Departmental Representative.
.1 Maintain ambient temperature and humidity levels as required for comfort of office personnel.

.4 Ventilating:
.1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
.2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
.3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
.4 Ventilate storage spaces containing hazardous or volatile materials.
.5 Ventilate temporary sanitary facilities.
.6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.

.5 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
.1 Conform with applicable codes and standards.
.2 Enforce safe practices.
.3 Prevent abuse of services.
.4 Prevent damage to finishes.
.5 Vent direct-fired combustion units to outside.

1.14 CONSTRUCTION SIGN AND NOTICES

.1 Upon request by Departmental Representative, erect a self supporting project sign in location indicated.

.2 Departmental Representative will provide a vinyl sign facing for installation by Contractor on sign framework. Sign frame to be plywood face of approximately [1200 x 2400] mm in size complete with required wood framing at 400 mm o.c and support posts.

.3 Install sign plumb and level in neat wood framework and securely anchor in ground by posts to withstand wind pressure of 160 km/h.

.4 Contractor or subcontractor advertisement signboards are not permitted on site.

.5 Safety and Instruction Signs and Notices:
.1 Signs and notices for safety and instruction shall be in both official languages or commonly understood graphic symbols conforming to CAN/CSA-Z321-96(R2006).

.6 Maintenance and Disposal of Site Signs:
.1 Maintain approved signs and notices in good condition for duration of project and dispose of off site on completion of project or earlier if directed by Departmental Representative.

1.15 REMOVAL OF TEMPORARY FACILITIES

.1 Remove temporary facilities from site when directed by Departmental Representative.

END OF SECTION

1.1 GENERAL

.1 Use new material and equipment unless otherwise specified.

.2 Within 7 days of written request by Departmental Representative, submit following information for any materials and products proposed for supply:
- .1 Name and address of manufacturer.
- .2 Trade name, model and catalogue number.
- .3 Performance, descriptive and test data.
- .4 Compliance to specified standards.
- .5 Manufacturer's installation or application instructions.
- .6 Evidence of arrangements to procure.
- .7 Evidence of manufacturer delivery problems or unforseen delays.
- .8 Alternative Materials and Substitutions must be equivalent to materials replaced meeting specification and with an equal or greater warranty period.

.3 Provide material and equipment of specified design and quality, performing to published ratings and for which replacement parts are readily available.

.4 Use products of one manufacturer for equipment or material of same type or classification unless otherwise specified.

.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.

1.2 PRODUCT QUALITY

.1 Contractor shall be solely responsible for submitting relevant technical data and independent test reports to confirm whether a product or system proposed for use meets contract requirements and specified standards.

.2 Final decision as to whether a product or system meets contract requirements rest solely with the Departmental Representative in accordance with the General Conditions of the Contract.

1.3 ACCEPTABLE MATERIALS AND ALTERNATIVES

.1 Acceptable Materials: When materials specified include trade names or trade marks or manufacturer's or supplier's name as part of the material description, select and only use one of the names

listed for incorporation into the Work.

.2 Alternative Materials: Submission of alternative materials to trade names or manufacturer's names specified must be done during the bidding period following procedures indicated in the Instructions to Bidders, and must be of an equal or greater warranty period.

.3 Substitutions: After contract award, substitution of a specified material will be dealt with as a change to the Work in accordance with the General Conditions of the Contract.

1.4 MANUFACTURERS INSTRUCTIONS

.1 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods to be used. Do not rely on labels or enclosure provided with products. Obtain written instructions directly from manufacturers.

.2 Notify Departmental Representative in writing of any conflict between these specifications and manufacturer’s instructions, so that Departmental Representative will designate which document is to be followed.

1.5 AVAILABILITY

.1 Immediately notify Departmental Representative in writing of unforeseen or unanticipated material delivery problems by manufacturer. Provide support documentation as per clause [1.1.2] above.

1.6 WORKMANSHIP

.1 Ensure quality of work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed.

.2 Remove unsuitable or incompetent workers from site as stipulated in the General Conditions of the Contract.

.3 Ensure cooperation of workers in laying out work. Maintain efficient and continuous supervision on site at all times.

.4 Coordinate work between trades and subcontractors. [See section 01 14 10 in this regard].

.5 Coordinate placement of openings, sleeves and accessories.

1.7 FASTENINGS - GENERAL

.1 Provide metal fastenings and accessories in same texture, colour and finish as base metal in which they occur. Prevent electrolytic action between dissimilar metals. Use non- corrosive fasteners, anchors and spacers for securing exterior work and in humid areas.

.2 Space anchors within limits of load bearing or shear capacity and ensure that they provide positive permanent anchorage. Wood or organic material plugs not acceptable.

.3 Keep exposed fastenings to minimum, space evenly and lay out neatly.

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

.5 Do not use explosive actuated fastening devices unless approved by Departmental Representative. See section on Health and Safety Requirements in this regard.

1.8 FASTENINGS - EQUIPMENT

.1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

.2 Use heavy hexagon heads, semi-finished unless otherwise specified.

.3 Bolts may not project more than one diameter beyond nuts.

.4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur and, use resilient washers with stainless steel.

1.9 STORAGE, HANDLING AND PROTECTION

.1 Deliver, handle and store materials in manner to prevent deterioration and soiling and in accordance with manufacturer's instructions when applicable. [Provide same degree of protection to materials supplied by Departmental Representative].

.2 Store packaged or bundled materials in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work. Provide additional cover where manufacturer's packaging is insufficient to provide adequate protection.

.3 Store products subject to damage from weather in weatherproof enclosures.

.4 Store cementitious products clear of earth or concrete floors, and away from walls.

.5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

.6 Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.

.7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.

.8 Immediately remove damaged or rejected materials from site.

.9 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.10 CONSTRUCTION EQUIPMENT AND PLANT

.1 Maintain construction equipment and plant in good operating order.

END OF SECTION

1.1 GENERAL

.1 Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.

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

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

1.2 MATERIALS

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

1.3 CLEANING DURING CONSTRUCTION

.1 Maintain all work site and work areas in a tidy condition, free from accumulations of waste material and debris. Clean areas on a daily basis.

.2 Keep building entrances, corridors, stairwells and tenant occupied areas of building in a clean dust free condition at all times. Conduct thorough cleaning of these areas at end of each workshift when used by workers or affected by the Work.

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

.4 Use separate collection bins, clearly marked as to purpose, for source separation and recycling of waste and debris in accordance with waste management requirements specified.

.5 Remove waste materials, and debris from site on a daily basis.

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

.7 Provide dust barriers, dividers, seals on doors and employ other dust control measures as required to ensure that dust and dirt, generated by work, are not transmitted to other, new, existing areas of building. Should dust migrate into tenant occupied and public areas of the building, employ such means as may be necessary to immediately clean all contaminated surfaces to the satisfaction of the Departmental Representative.

.1 See Section 01 50 00 Temporary Facilities for requirements

on dust control and for erection of dust partitions.

.8 Immediately clean all dust, dirt, smears, scuffs and soiled surfaces in lobbies, corridors, stairwells and within tenant occupied areas resulting from the Work.
.1 Perform cleaning, dusting and washing operations, carpet vacuuming (including shampooing if deemed required by Departmental Representative) and floor washing as necessary to thoroughly clean all soiled surfaces.

.9 Remove snow and ice from access doors used by workforce.

1.4 FINAL CLEANING

.1 In preparation for acceptance of the completed work perform final cleaning.

.2 Remove grease, dust, dirt, stains, labels, fingerprints, marks and other foreign materials, from interior and exterior finished surfaces. Clean and polish surfaces including glass, mirrors, hardware, wall tile, stainless steel, chrome, baked enamel, plastic laminate, mechanical and electrical fixtures.

.3 Replace items with broken pieces, scratches or disfigured.

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

.5 Vacuum clean and dust building interiors, behind grilles, louvres and screens.

.6 Wax, seal, shampoo or prepare floor finishes as recommended by manufacturer.

.7 Inspect finishes, fitments and equipment. Ensure specified workmanship and operation.

.8 Broom clean and wash exterior paved surfaces and walks; rake clean other surfaces of grounds.

.9 Remove debris and surplus materials from crawl areas, roof areas and other accessible concealed spaces.

.10 Clean equipment, washroom and kitchen fixtures to a sanitary condition. Replace filters of mechanical equipment.

END OF SECTION

PART 1 - GENERAL

1.1 WASTE MANAGEMENT GOALS

.1 Prior to start of Work conduct meeting with Departmental Representative to review and discuss PWGSC's Waste Management Plan and Goals.

.2 PWGSC's Waste Management Goal 75 percent of total Project Waste to be diverted from landfill sites. Provide documentation certifying that waste management, recycling, reuse of recyclable and reusable materials have been extensively practiced.

.3 Accomplish maximum control of solid construction waste.

.4 Preserve environment and prevent pollution and environment damage.

1.2 DEFINITIONS

.1 Class III: non-hazardous waste - construction renovation and demolition waste.

.2 Cost/Revenue Analysis Workplan (CRAW): based on information from WRW, and intended as financial tracking tool for determining economic status of waste management practices.

.3 Demolition Waste Audit (DWA): relates to actual waste generated from project.

.4 Inert Fill: inert waste - exclusively asphalt and concrete.

.5 Materials Source Separation Program (MSSP): consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.

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

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

.8 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.

.9 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 or for storage for use on future projects
.2 Returning reusable items including pallets or unused products to vendors.

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

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

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

.13 Waste Audit (WA): detailed inventory of materials in building. Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project. Indicates quantities of reuse, recycling and landfill. Refer to Schedule A.

.14 Waste Management Co-coordinator (WMC): contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.

.15 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials. Refer to Schedule B. WRW is based on information acquired from WA (Schedule A).

1.3 SUBMITTALS

.1 Submittals in accordance with Division 1 – Submittal Procedures

.2 Prepare and submit following prior to project start-up:
.1 Submit copies of Materials Source Separation Program (MSSP) description.

1.4 MATERIALS SOURCE SEPARATION PROGRAM (MSSP)

.1 Prepare MSSP and have ready for use prior to project start-up.

.2 Implement MSSP for waste generated on project in compliance with approved methods and as reviewed by Departmental Representative.

.3 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.

.4 Provide containers to deposit reusable and recyclable materials.

.5 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.

.6 Locate separated materials in area which minimize material damage.

.7 Collect, handle, store on-site, and transport off-site, salvaged materials in separate condition. Transport to approved and authorized recycling facility.

1.5 STORAGE, HANDLING, AND PROTECTION

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

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

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

.4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.

.5 Protect structural components not removed for demolition from movement or damage.

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

.7 Separate and store materials produced during dismantling of structures in designated areas.

.8 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.

1.6 DISPOSALS OF WASTES .1 Do not bury rubbish or waste materials.

.2 Do not dispose of waste 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 Remove materials from deconstruction as deconstruction/disassembly Work progresses.

1.7 USE OF SITE AND FACILITIES .1 Execute work with least possible interference or disturbance to normal use of premises.

.2 Maintain security measures established by existing facility.

1.8 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 Do Work in compliance with WRW.

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

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

END OF SECTION

1.1 SECTION INCLUDES

.1 Administrative procedures preceding inspection and acceptance of Work by Departmental Representative.

1.2 RELATED SECTIONS

.1 Section 01 78 00: Closeout Submittals.

1.3 INSPECTION AND DECLARATION

.1 Contractor's Inspection: Coordinate and perform, in concert with subcontractors, an inspection and check of all Work. Identify and correct deficiencies, defects, repairs and perform outstanding items as required to complete work in conformance with Contract Documents.

.1 Notify Departmental Representative in writing when deficiencies from Contractor's inspection have been rectified and that Work is deemed to be complete and ready for Departmental Representative's inspection of the completed work.

.2 Departmental Representative's Inspection: Accompany Departmental Representative during all substantial and final inspections of the Work.

.1 Address defects, faults and outstanding items of work identified by such inspections.

.2 Advise Departmental Representative when all deficiencies identified have been rectified.

.3 Note that Departmental Representative will not issue a Certificate of Substantial Performance of the work until such time that Contractor performs following work and turns over the specified documents:

.1 Project record as-built documents;
.2 Final Operations and Maintenance manuals;
.3 Maintenance materials, parts and tools;
.4 Compliance certificates from applicable authorities;
.5 Reports resulting from designated tests;
.6 Demonstration and training complete with user manuals;
.7 Manufacturer's Guarantee certificates.
.8 Testing, adjusting and balancing of equipment and systems complete with submission of test reports.
.9 Commissioning of equipment and systems specified.
.10 Verification that CONSTRUCTION-DEMOLITION WASTE MANAGEMENT Procedures have been carried out.

.4 Correct all discrepancies before Departmental Representative will issue the Certificate of Completion.

1.1 SECTION INCLUDES

.1 Project Record Documents.

.2 Operations and Maintenance data.

1.2 RELATED SECTIONS

.1 Section 01 79 00: Demonstration and Training.

1.3 PROJECT RECORD DOCUMENTS

.1 Departmental Representative will provide 2 white print sets of contract drawings and 2 copies of Specifications Manual specifically for "As-Built" purposes.

.2 Maintain at site one set of the contract drawings and specifications to record actual As-Built site conditions.

.3 Maintain up-to-date, real time as-built drawings and specifications in good condition and make available for inspection by the Departmental Representative upon request.

.4 As-Built Drawings:

.1 Record changes in red ink on the prints. Mark only on one set of prints and at completion of work, neatly transfer notations to second set (also by use of red ink).

.2 Submit both sets to Departmental Representative prior to application for Certificate of Substantial Performance.

.3 Stamp all drawings with "As-Built". Label and place Contractor's signature and date.

.4 Show all modifications, substitutions and deviations from what is shown on the contract drawings.

.5 Record following information:

.1 Depths of various elements of foundation in relation to basement level, first floor level, survey datum.

.2 Horizontal and vertical location of exterior underground utilities and appurtenances referenced to permanent surface improvements.

.3 Horizontal and vertical location of various elements in relation to Geodetic Datum;

.4 Location of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure;

.5 Field changes of dimension and detail;

.6 Location of all capped or terminated services and utilities.

.7 Chases for mechanical, electrical and other services;

.8 Ceiling and floor elevations;

.9 Reflected ceiling plan condition showing finished layout of all ceiling-mounted services and devices;
.10 Plumbing, heating, air conditioning and ventilation, sprinkler and electrical service installation locations; all to be dimensioned and referenced to building columns or load bearing walls;
.11 All structural steel installations to be fully dimensioned;
.12 All design elevations, sections, floor plans and details dimensioned and marked-up to consistently report finished installation conditions;
.13 Any details produced in the course of the contract by the Departmental Representative to supplement or to change existing design drawings;
.14 All change orders issued over the course of the contract must be documented on the finished As-Built documents, accurately and consistently depicting the changed condition as it applies to all affected drawing details.

.5 As-Built Specifications: legibly mark in red each item to record actual construction, including:

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly items substituted from that specified.
.2 Changes made by Addenda and Change Orders.
.3 Mark up both copies of specifications; stamp "As-Built", sign and date similarly to drawings as per above clause.

.6 Maintain As-Built documents current as the contract progresses. Departmental Representative will conduct reviews and inspections of the documents on a regular basis. Failure to maintain as-builts current and complete to satisfaction of the Departmental Representative shall be subject to financial penalties in the form of progress payment reductions and holdback assessments.

.7 Submit on paper and in electronic format as pdf files. Forward pdf and in the native program format, NMSEdit Professional spp, MS Word, MS Excel, MS Project and Autocad dwg and photograph jpg files on USB compatible with PWGSC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

1.4 REVIEWED SHOP DRAWINGS

.1 Provide a complete set of all shop drawings reviewed for project to incorporate into each copy of the Operations and Maintenance Manuals.

.2 Submit full sets at same time and as part of the contents of the

Operation and Maintenance Manuals specified.

1.5 UPDATING OF DIGITAL DRAWINGS

.1 Obtain and pay for the services of a qualified drafting firm to update the digital files which were used to produce the contract drawings.
.1 Update the digital drawing files with the same As-Built information as specified for the paper As-Built drawings.
.2 Supply of digital documents does not replace the requirement to provide marked-up white prints specified above.
.3 PWGSC National Standards and encryption to be incorporated.

.2 The Departmental Representative will provide a copy of the digital drawing files.

.3 Incorporate the as-built changes to the digital drawings by following the standards specified in the latest version of the PWGSC National CADD Standard. A copy of this manual will be provided by the Departmental Representative.

.4 Make revisions to electronic files found to be in non-conformance with the PWGSC National CADD Standard as directed by Departmental Representative.

.5 In regards to updating the digital files to reflect changes resulting from Change Orders, the change in cost of completing the As-Built documentation of changes is to be included in the amount for each Change Order issued. The amount included will constitute only the increase or decrease in CADD related costs resulting directly from the change. In determining the cost difference, full consideration will be given to the fact that other clauses of this section require As-Built CADD updates to the drawings irrespective of any Change Orders.

.6 Deliver the digital As-Built information in same format and sequence as the contract drawings and specifications.
.1 Submit on PWGSC encrypted USB.
.2 Provide 1 full set of paper plots.
.3 Submit the digital As-Builts at the same time as the marked-up paper white prints.

1.6 OPERATIONS & MAINTENANCE MANUAL

.1 O&M Manual - Definition: an organized compilation of operating and maintenance data including detailed technical information, documents and records describing operation and maintenance of individual products or systems as specified in individual sections of the specifications.

.2 Manual Language: final manuals to be in [English] [French] [both English and French] languages.

.3 Number of copies required:
.1 Submit [2] interim copies of the manual for review and inspection by Departmental Representative. Make revisions and additions as directed and resubmit.
.2 Upon review and acceptance by Departmental Representative, submit [3] [4] final copies. Interim copies are not to be considered as part of the final copies unless they have been fully revised and are identical to the final approved version.

.4 Submission Date: submit complete operation and maintenance manual to Departmental Representative 3 weeks prior to application for Certificate of Substantial Performance of the work.

.5 Binding:
.1 Assemble, coordinate, bind and index required data into Operation and Maintenance Manual.
.2 Use vinyl, hard covered, 3 "D" ring binders, loose leaf, sized for 215 x 280 mm paper, with spine pocket.
.3 Where multiple binders are needed, correlate data into related consistent groupings.
.4 Identify contents of each binder on spine.
.5 Organize and divide data following same numerical system as the section numbers of the Specification Manual.
.6 Dividers: separate each section by use of cardboard dividers and labels. Provide tabbed fly leaf for each individual product and system and give description of product or component.
.7 Type lists and notes. Do not hand write.
.8 Drawings, diagrams and manufacturers' literature must be legible. Provide with reinforced, punched binder tab. Bind in with text; fold larger drawings to size of text pages.

.6 Manual Contents:
.1 Cover sheet containing:
.1 Date submitted.
.2 Project title, location and project number.
.3 Names and addresses of Contractor, and all Sub-Contractors.
.2 Table of Contents: provide full table of contents in each binder(s), clearly indicate which contents are in each binder.
.3 List of maintenance materials.
.4 List of spare parts.
.5 List of special tools.
.6 Original or certified copy of warranties and product guarantees.
.7 Copy of approval documents and certificates issued by Inspection Authorities.

.8 Copy of reports and test results performed by Contractor as specified.

.9 Product Information (PI Data) on materials, equipment and systems as specified in various sections of the specifications. Data to include:

.1 List of equipment including manufacturer's name, supplier, local source of supplies and service depot(s). Provide full addresses and telephone numbers.

.2 Nameplate information including equipment number, make, size, capacity, model number and serial number.

.3 Parts list.

.4 Installation details.

.5 Operating instructions.

.6 Maintenance instructions for equipment.

.7 Maintenance instructions for finishes.

.7 Shop drawings:

.1 Include complete set of reviewed shop drawings into each copy of the operations and maintenance manual.

.2 Fold and bind material professionally in a manner that corresponds with the specification section numbering system.

.3 When large quantity of data is submitted, place into separate binders of same size as O&M binders.

.8 Equipment and Systems Data: the following list indicates the type of data and extent of information required to be included for each item of equipment and for each system:

.1 Description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

.2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.

.3 Include installed colour coded wiring diagrams.

.4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

.5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

.6 Servicing and lubrication schedule, and list of lubricants required.

.7 Manufacturer's printed operation and maintenance instructions.

.8 Sequence of operation by controls manufacturer.

.9 Provide original manufacturer's parts list, illustrations,

assembly drawings, and diagrams required for maintenance.
.10 Provide installed control diagrams by controls manufacturer.
.11 Provide Contractor's coordination drawings, with installed colour coded piping diagrams.
.12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
.13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
.14 Include test and balancing reports.
.15 Additional requirements as specified in individual specification sections.

.9 Materials and Finishes Maintenance Data:
.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 Moisture-protection and Weather-exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
.4 Additional Requirements: as specified in individual specifications sections.

1.7 SPARE PARTS, TOOLS AND MAINTENANCE MATERIALS

.1 Provide spare parts, special tools and extra materials for maintenance purposes in quantities specified in individual specification sections.

.2 Tag all items with associated function or equipment.

.3 Provide items of same manufacture and quality as items in Work.

.4 Deliver to site in well packaged condition. Store in location as directed by Departmental Representative.

.5 Clearly mark as to contents indicating:
.1 Part number.
.2 Identification of equipment or system for which parts are applicable.
.3 Installation instructions or intended use as applicable.
.4 Name, address and telephone number of nearest supplier.

.6 Prepare and submit complete inventory list of items supplied. Include list within Maintenance Manual.

PART 1 – GENERAL

1.1 DESCRIPTION

.1 This section specifies requirements for demolishing and removing wholly or in part various items designated to be removed or partially removed to accommodate the new site grading plan.

PART 2 – PRODUCTS

NOT APPLICABLE

PART 3 – EXECUTION

3.1 EXECUTION

.1 Inspect site and verify with Departmental Representative objects designated for removal.

.2 Locate and protect utility lines. Preserve in operating condition active utilities traversing site.

3.2 REMOVAL

.1 Remove in their entirety all materials and objects specified for removal.

.2 Do not disturb adjacent work designated to remain in place.

3.3 DISPOSAL OF MATERIAL

.1 All demolished materials will become property of contractor and will be removed from site and disposed of to satisfaction of Departmental Representative and in accordance with environmental guidelines. This includes excavated/grubbed fill materials, as required, to achieve the new grades. It is the sole responsibility of the contractor to dispose of all demolished materials at an approved disposal site. Ensure that disposal site is approved and willing to accommodate any materials disposed of from work site. Note that the existing fence may have to be removed and reinstated to accommodate the new grading plan (see drawings). Damage to the existing fence will have to be replaced at no additional contract cost.

.2 Contractor shall obtain and pay for all necessary

permits and disposal fees for use of an approved waste disposal site.

3.4 RESTORATION

.1 Upon completion of work, remove debris, trim surfaces and leave work site in clean condition.

.2 Reinstate areas and existing works outside areas of demolition to conditions that existed prior to commencement of work.

PART 1 - GENERAL

1.1 Related Sections

.1 Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

1.2 Performance Requirements

.1 Ensure materials, equipment and procedures safely support existing structure and construction live loads; that allow work to be accomplished and that minimize risk of damage to historic and archaeological elements.

1.3 Shop Drawings

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

.2 Provide schematic drawings showing suggested alternative specific or equivalent procedure for transporting structure.

.3 Provide shoring, bracing and temporary framing plans including lifting points.

.4 Provide identification of numbering system ,recording of photographs & dimensions for components to be temporarily removed.

1.4 Regulatory Requirements

.1 Arrange and pay in advance to keep work on schedule:

.1 For special services for moving or passage.

.2 Obtain easements or written permission from Municipality.

.3 No allowance for delay will be made due to requirements under this heading.

1.5 Existing Conditions

.1 Refer to Contract Drawings showing existing conditions.

.2 Before starting work verify existing conditions and variations from original contract documents and notify Engineer Consultant.

.3 Request direction from Departmental Representative regarding treatment of artifacts and objects.

1.6 Scheduling

.1 Submit schedule of activities, showing dates and estimated duration to Consultant not later than 7 days before moving work.

.2 Notify Consultant in writing at least 1 working days before starting work, start of moving and transport, before lowering structure on new foundation, and to completion of work, ready for final inspection.

1.7 Waste Management and Disposal

.1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

PART 1 GENERAL

1.1 DESCREIPTION

On September 19, 2017 and October 6, 2017, a hazardous materials assessment was completed on select exterior and interior elements of the Cape Spear Lighthouse, Cape Spear, Newfoundland and Labrador. The hazardous materials assessment included testing for lead in paint from various building materials, including the dome interior and exterior; and exterior siding, windows, steps and trim/molding.

Lead was detected above the Surface Coating Materials Regulations (SCMRs) in all of the ten paint samples analysed. Further, the lead concentration in seven of the ten samples collected exceeded the traditional 5000 mg/kg threshold definition of lead-based paint (which is also pertinent with respect to landfill disposal). Lead leachate results from leachability testing completed on two flaking paint samples exceeded the applicable limits for landfill disposal of lead-paint debris. Flaking paint must therefore be treated as a Hazardous Waste and shall be stored within containers/drums with air-tight lids. This flaking paint is considered a dangerous good/hazardous waste and shall be transported by an approved transporter to an approved hazardous waste facility out-of-Province. Based on consultation with the NLDME demolition debris with adhered lead-based paint with lead leachate results in the range of 50 mg/L to 73 mg/L is permitted for disposal at the Robin Hood Bay Waste Management facility. This waste must still be treated as a special waste with all pertinent TDG guidelines observed. Also, as with any demolition project, the operator of the waste management facility must first be contacted and approval granted prior to shipment. The waste containing lead-based paint shall be wrapped in 6 mil poly-ethylene plastic (or equivalent) with all seams taped shut. During handling and transport, maintain integrity of waste packaging to prevent release into the environment. During transport, all materials shall be covered.

Table 1 Summary of Laboratory Results (Lead in Paint) Cape Spear Lighthouse Cape Spear, Newfoundland and Labrador		
Sample ID.	**Description**	**Results**
CS-P1	Red-brown - dome interior	1700 mg/kg
CS-P2	White – dome interior	**12 000 mg/kg**
CS-P3	White – dome exterior	180 mg/kg
CS-P4	White - exterior siding	**96 000 mg/kg**
CS-P5	White – exterior window frame	**17 000 mg/kg**
CS-P6	Black – exterior false window	**10 000 mg/kg**
CS-P7	White – exterior skirting	**35 000 mg/kg**
CS-P8	White – exterior siding (corner)	**88 000 mg/kg**
CS-P9	White – exterior siding (porch)	3200 mg/kg
CS-P10	Grey – exterior steps at entrance	**44 000 mg/kg**
Surface Coating Materials Regulations for lead = 90 mg/kg; Landfill disposal limit for lead = 5000 mg/kg in bulk sample/paint flakes or 5 mg/L where leachability analysis completed		

1.2 SUMMARY

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

.1 Removal of lead-based paint from exterior painted surfaces in preparation for re-painting and finishing.

1.3 RELATED REQUIREMENTS

.1 Section 01 41 00 – Regulatory Requirements

.2 Section 01 35 29.06 - Health and Safety Requirements.

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

.4 Section 02 85 00.01 – Mould Remediation – Minimum Precautions

1.4 REFERENCES

.1 Department of Justice Canada

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

.2 Health Canada

.1 Workplace Hazardous Materials Information System (WHMIS), Material Safety Data Sheets (MSDS).

.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)

1.5 DEFINITIONS

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

.2 Authorized Visitors: Departmental Representative, the Consultant or designated representative(s) 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 milligram per cubic metre of air within Work Area.

.8 Competent person: 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 are considered to be lead contaminated if it contains more than 40 micrograms of lead in dust per square foot.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Provide proof satisfactory to the Consultant 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 the Consultant 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 the Consultant 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 the Consultant. Minimum of one supervisor for every ten workers.

.6 Product data:

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

.1 Encapsulants.

.2 Amended water.

.3 Slow drying sealer.

.7 Contractor is to provide a layout of the proposed enclosure and decontamination set up to the Consultant two weeks prior to start up.

1.7 QUALITY ASSURANCE

.1 Regulatory Requirements: comply with Federal, Provincial/Territorial and local requirements per-taining to lead paint, in case of conflict among those requirements or with these specifications, more strin-gent requirement applies. Comply with regulations in effect at time work is per-formed.

.2 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health 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 include:

.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 shall be shown on the layout plan provided by the Contractor prior to project start-up.

.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.

1.8 WASTE MANAGEMENT AND DISPOSAL

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

.2 Handle and dispose of dangerous goods and hazardous materials in accordance with CEPA, TDGA, Regional and Municipal regulations. This includes items categorized as "Special Wastes".

.3 Flaking Lead-Based Paint shall be collected and stored within labelled containers (or drums) with tight lids. This waste is considered a dangerous good/hazardous waste and shall be transported to an approved hazardous waste facility. Manifest shall be forwarded to Joan Hann (joanhann@gov.nl.ca).

.4 Damaged wood that is being removed for disposal, that has paint firmly adhered, shall be permitted to be disposed-of at Robin Hood Bay Waste Management and Recycling Facilities. The waste must be treated and labelled as "Special Waste". The operator of the applicable facility must be contacted prior to shipment and disposal.

.5 Items being treated as "Special Waste" shall be wrapped in 6 mil polyethylene plastic (or equivalent) with all seams taped shut. During handling and transport, maintain the integrity of waste packaging to prevent release into the environment. During transport, all materials shall be covered.

1.9 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 bound into this specification immediately after Section 02 82 00.01.

.2 Notify the Consultant 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 the Consultant.

1.10 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.

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

.3 Provide the Consultant copy of notifications prior to start of Work.

.4 Hours of Work: perform work involving lead paint located at the primary building entrance outside of normal working hours. Include in Contract Sum additional costs due to this requirement.

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 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 re-used, and transport and store in area specified by the Consul-tant.

.2 Work Area:

.1 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.

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

.3 Place polyethylene sheets under the work area out 6 metres from the edge of the building. The poly-ethylene sheets shall be adhered to the building 0.3 metre off the ground to ensure entrapment of falling debris.

.4 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.

.5 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).

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

.7 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.

.8 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 adjacent to work areas. 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 around the building main entrance to be constructed as follows:

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

.2 Cover plywood with polyethylene sheeting and seal 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 the Consultant.

3.3 LEAD - BASE PAINT ABATEMENT

.1 Removal of lead-based paint to be performed by scraping or sanding using non-powered hand tools. Chemical stripping may be considered but a detailed plan must be provided to the Consultant.

.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 the Consultant, 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 the Consultant will result in work stoppage, at no cost to Owner.

.2 The Consultant 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, the Consultant 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 the Consultant and acceptable coat of lock-down agent has been applied to surfaces within enclosure, and appropriate setting period of 8 hours has passed. The Consultant 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 concentrations 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 clean-up.

.2 Remove polyethylene sheet by rolling it away from walls to centre of work area. Vacuum visible lead-containing particles observed during clean-up 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 the Consultant.

END OF SECTION

PART 1 GENERAL

On September 19, 2017 and October 6, 2017, a hazardous materials assessment was completed on select exterior and interior elements of the Cape Spear Lighthouse, Cape Spear, Newfoundland and Labrador. The hazardous materials assessment included observation and testing for mould from wallpaper at various interior locations, as shown in Table 1.

Table 1 Summary of Laboratory Results (Bulk Mould)
Cape Spear Lighthouse
Cape Spear, Newfoundland and Labrador

Sample ID.	Description	Results
CS-M1	Wallpaper under southeast window (Room # 2)	**Fungal growth indicated (*Cladosporium, Penicillium*)**
CS-M2	Wallpaper under southeast window (Room # 2)	**Fungal growth indicated (*Cladosporium, Penicillium; traces Aspergillus*)**
CS-M3	Wallpaper under northeast window (Room # 2)	Fungal growth not indicated (traces *Aspergillus, Cladosporium*)
CS-M4	Wallpaper under southeast window (Room # 2)	Fungal growth not indicated (traces *Penicillum*)
CS-M5	Wallpaper under southeast window (Room # 3)	**Fungal growth indicated (traces *Cladosporium, Penicillium*)**
CS-M6	Wallpaper under southeast window (Room # 3)	**Fungal growth indicated (*Aspergillus*, *Cladosporium)***
CS-M7	Wallpaper under southwest window (Room # 3)	**Fungal growth indicated (*Cladosporium)***
CS-M8	Wallpaper under southwest window (Room # 3)	**Fungal growth indicated (*Cladosporium*)**

Some evidence of water staining and possible mould was noted on the wallpaper (which was placed over wooden sheathing) under the windows in Room # 2 and Room # 3, both located on the southeast side of the building. Eight samples (labelled CS-M1 through CS-M8) of potentially-impacted wallpaper were submitted for laboratory analysis for bulk mould, as indicated in Table 4.5 Summary of Laboratory Results (Bulk Mould).

Based on the laboratory testing, six of the eight samples (CS-M1 through CS-M2, and CS-M5 through CS-M8) had fungal growth indicated (at least one or more of Cladosprium, Penicillium, and Aspergillus).

1.1 RELATED REQUIREMENTS

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

1.2 REFERENCES

.1 American Conference of Governmental Industrial Hygienists (ACGIH), Bioaerosols Assessment and Control [1999].

.2 American Industrial Hygiene Association, Recognition, Evaluation and Control of Indoor Mould, 2008.

.3 American Industrial Hygiene Association, Position Statement on Mold and Dampness in the Built Environment, 2013.

.4 Canadian Construction Association, Mould Guidelines for the Canadian Construction Industry, 2004.

.5 Federal Provincial Committee on Environmental and Occupational Health, Fungal Contamination in Public Buildings: A Guide to Recognition and Management, 2004.

.6 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.7 New York City Department of Health - Bureau of Environmental and Occupational Disease Epidemiology's Guidelines on the Assessment and Remediation of Fungi in Indoor Environment [2000]

.8 United States Department of Labor Occupational Safety and Health Administration (OSHA)

.1 29 CFR 1910.134 - Respiratory Protection.

.2 29 CFR 1910.1200 - Hazard Communication.

1.3 DEFINITIONS

.1 Cleaning solution: detergent solution.

.2 Competent person: individuals Departmental Representative or Consultant who can demonstrate that mould remediation training has been obtained, is capable of identifying existing microbial hazards in workplace and selecting appropriate control strategy for microbial exposure.

.3 Contractor: remediation contractor providing demolition and removal services as defined in specification.

.4 Fibre reinforced polyethylene sheet (FRPS): rip-proof fibre reinforced polyethylene sheet sheeting with added fibre reinforced adhesive tape along edges.

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

.6 HVAC: heating ventilating and air-conditioning system[s] which serve occupied areas. Includes but is not limited to air handling units, duct work, terminal boxes and vents.

.7 Mould Contaminated Work Area: specific area or location where actual work is being performed or such other areas of a facility where it has been determined that it may be hazardous to public health as result of mould remediation.

.8 Occupied Area: areas of building or work site that is outside of Mould Contaminated Work Area.

.9 PPE: Personnel Protection Equipment.

.10 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must have a minimum of [six] litres capacity for work.

1.4 REGULATORY REQUIREMENTS

.1 Comply with regulations in effect at time work is performed. In case of conflict among these requirements or with these specifications the more stringent requirement applies. If no regulations exist, follow guidelines most widely accepted by recognized professional organizations such as occupational hygienists, health professionals or environmental engineers as listed in paragraph 1.2 References.

1.5 CLOSEOUT SUBMITTALS

.1 Maintain general log to provide permanent record of project. Maintain logs and other required documentation as part of permanent project file.

1.6 INSTRUCTION AND TRAINING

.1 Before commencing work, provide to Departmental Representative and the Consultant satisfactory proof that every worker has had instruction and training in potential heath hazards of mould exposure, handling of hazardous materials, and in use of disposable respirators and protective clothing. This training can be performed as part of program to comply with requirements of OSHA Hazard Communication Standard 29 CFR 1910.1200.

.2 Instruction and training must be provided by designated construction safety advisor.

1.7 WORKER PROTECTION

.1 Non-powered disposable filter-type respirator of type N95 OSHA 29 CFR 1910.134, suitable for protection against mould and acceptable to Provincial Authority having jurisdiction.

.2 Gloves and eye protection.

.3 Disposable paper coveralls are recommended.

.4 No person required to enter Mould Contaminated Work Area to have facial hair that affects seal between respirator and face.

.5 Eating, drinking and chewing are not permitted in Mould Contaminated Work Area.

.6 Before leaving Mould Contaminated Work Area, dispose of protective clothing as waste as specified.

.7 Facilities for washing hands and face shall be provided close to the Mould Contaminated Work Area.

.8 Ensure workers wash hands and face after leaving Mould Contaminated Work Area.

1.8 HOURS OF WORK

.1 Typical work schedule – Work shall be performed outside of open tourist season.

PART 2 Products

2.1 MATERIALS

.1 Drop Sheets: 0.15 mm thick woven fibre reinforced fabric bonded both sides with fibre reinforced poly-ethylene sheet.

.2 Disposal bags: dust-tight 0.15 mm clear polyethylene waste bags.

.3 Wetting Agent: water to mist mould-containing material.

.4 Cleaning solution: scent free detergent solution for damp wipe and/or mop.

.5 Fibre reinforced adhesive tape: used in sealing joints of fibre reinforced polyethylene sheets and for attachment of fibre reinforced polyethylene sheet to finished and unfinished surfaces. Fibre-reinforced adhesive tape must be capable of adhering under both dry and wet conditions.

.6 Materials: provide materials such as fibre reinforced polyethylene sheeting, lumber, nails, and hardware necessary to construct and dismantle barriers that isolate Mould Contaminated Work Area.

2.2 TOOLS AND EQUIPMENT

.1 Tools and equipment: suitable for use with microbial contamination and must be able to withstand de-contamination.

.2 Personnel protective equipment (protective clothing, disposable respirators): provided in sufficient quantities for duration of project.

.3 Vacuum cleaners: equipped with HEPA filters.

.4 Ladders and/or scaffolds: adequate length, strength and sufficient quantity to support work schedule.

PART 3 EXECUTION

3.1 PREPARATION OF MOULD WORK AREA (<1 to 3 SQUARE METRES IN OCCUPIED SPACE)

.1 Mould Contaminated Work Area and areas adjacent and around area: to be unoccupied. Vacating people from spaces adjacent to Mould Work Area is not necessary but is recommended in case of infants (less than 12 months old), elderly people, persons having undergone recent surgery, immune-suppressed people, or people with chronic inflammatory lung diseases.

.2 Clean movable objects within proposed Mould Contaminated Work Area using HEPA filtered vacuum equipment, damp-wipe surfaces, and remove such objects from Mould Contaminated Work Area to secure and clean area.

.3 Remove visible dust from surfaces in Mould Contaminated Work Area where dust is likely to be disturbed during course of work. Use HEPA vacuum and damp-wipe area.

.4 Do not use compressed air to clean up or remove dust from surfaces.

.5 Seal off return air grills in Mould Contaminated Work Area with fibre-reinforced polyethylene sheeting and fibre-reinforced adhesive tape to minimize migration of contaminants to other parts of building.

.6 Use 0.15 mm fibre-reinforced polyethylene drop sheets tightly sealed with fibre-reinforced adhesive tape over flooring in Mould Contaminated Work Area[s].

3.2 MICROBIAL REMEDIATION MOULD WORK AREA (<1 TO 3 SQUARE METRES IN OCCUPIED SPACE)

.1 Use sprayer (low-velocity, fine-mist) to mist (not wet) materials containing mould to be cut or scraped. Perform work in a manner to reduce dust creation to lowest levels practicable.

.2 Non-porous and semi-porous materials can be cleaned using detergent solution and re-used, depending on depth to which microbial growth has penetrated substrate. Wood to be discarded if fungal growth has affected its soundness.

.3 Semi-porous and porous structural materials such as wood and concrete can be cleaned if they are structurally sound.

.4 Porous materials wall paper, ceiling tiles, insulation, wallboards (gyproc or plaster) with more than small area of mould contamination and/or dampness to be removed, discarded, and replaced.

.5 Porous materials identified as lightly contaminated that can be cleaned by HEPA vacuuming, washing and/or damp wiped can be reused, but to be discarded and replaced if possible.

.6 Dispose of contaminated building materials as specified.

.7 During remediation, should the Departmental Representative and/or Consultant suspect contamination of areas outside Mould Contaminated Work Area, contractor to stop remediation work and immediately decontaminate these affected areas. Eliminate causes of such contamination. Unprotected individuals are prohibited from entering contaminated areas until a visual inspection determines areas are free from contamination.

.8 Notify Departmental Representative and the Consultant of mould contaminated material discovered during work and not apparent from drawings, specifications or report pertaining to work. Do not disturb such material pending instructions from Departmental Representative and the Consultant.

3.3 REPAIR AND CLEAN-UP

.1 Clean, frequently during work and immediately after completion of work, Mould Contaminated Work Area using a HEPA vacuum and/or by damp mopping with cleaning solution.

.2 Perform restoration of designated Mould Contaminated Work Area as specified.

.3 Leave areas dry and visibly free from contamination, debris, and dust.

.4 Perform final thorough clean-up of work areas and adjacent areas affected by work using HEPA vacuum and/or damp mopping with scent-free detergent solution.

3.4 WASTE DISPOSAL

.1 Place dust and mould-containing waste in doubled-bagged dust-tight 0.15 mm clear polyethylene waste bags. Treat drop sheets and disposable protective clothing as waste; fold these items to contain dust, and place in plastic bags. Securely seal bags.

.2 Clean exterior of each waste-filled bag using damp cloths and cleaning solution or HEPA vacuum prior to removal from Mould Contaminated Work Area.

.3 Remove waste bags from site and dispose. There is no special requirements for disposal of mouldy materials, as such they can be disposed-of in landfill.

3.5 RE-ESTABLISHMENT OF OBJECTS AND SYSTEMS

.1 Re-locate objects moved to temporary locations to their proper positions. Ensure objects are cleaned before been moved into cleaned areas.

.2 Remount objects removed to former positions.

.3 Re-establish mechanical and electrical systems to proper working order.

3.6 FINAL CLEARANCE

.1 The Consultant to conduct thorough visual inspection to detect visible accumulations of dust or bulk materials remaining in work area. Should dust, debris, microbial contamination, or residue be detected repeat cleaning until area meets approval.

END OF SECTION

PART 1 - GENERAL

1.1 SUBMITTALS

.1 Submit samples of proposed sod to Departmental Representative, for approval.

.2 Submit samples of proposed topsoil to Departmental Representative, for approval. External topsoil source must be approved by the Departmental Representative and be free of invasive species.

.3 Obtain approval of samples by Departmental Representative.

.4 All materials used on site to be free of invasive plant species. Coordination with the Departmental Representative and Parks Canada will be required to ensure the materials used at the site are acceptable. Where sods are shown on the drawings, intent is only to sod those areas where bedrock outcrops are not present (coordinate placement to approval of Departmental Representative).

1.2 QUALITY ASSURANCE

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

1.3 SCHEDULING

.1 Schedule sod installation when frost has left ground.

.2 Schedule sod laying to coincide with preparation of soil surface.

Part 2 – PRODUCTS

2.1 MATERIALS

.1 Number One Turf Grass Nursery Sod: sod that has been especially sown and cultivated in nursery fields as turf grass crop.

.1 Number one named cultivars: Nursery sod grown from certified seed.
.2 Turf Grass Nursery Sod Quality:
.1 Not more than 2 broadleaf weeds on 10 other weds per 40 square metres.
.2 Density of sod sufficient so that no soil is visible from height of 1500mm when mown to height of 50 mm.
.3 Mowing height limit: 35 to 65 mm.
.4 Soil portion of sod: 15 mm in thickness.

.2 Water:
.1 Potable, free of impurities.

.3 Fertilizer:
.1 To Canada "Fertilizers Act" and "Fertilizers Regulations".
.2 Complete, synthetic, slow release with 65% of nitrogen content in water insoluble form.

.4 Topsoil: mixture of mineral 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 Free from:
.1 Debris and stones over 50 mm diameter.
.2 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.
.4 Consistence: friable when moist.

2.2 SOURCE QUALITY CONTROL

.1 Obtain approval from Departmental Representative of sod at source.

.2 When proposed source of sod is approved, use no other source without written Authorization from the Departmental Representative.

Part 3 – EXECUTION

3.1 PREPARATION

.1 Contractor is responsible for grading plan. Consider new grades shown on contract drawings to be approximate. The intent is to excavate/grub high points and fill depressions/low points providing positive site drainage away from the existing building with no low points that could create water ponding.

.2 Do not perform work under adverse field conditions such as frozen soil, excessively wet soil or soil covered with snow, ice, or standing water.

.3 Fine grade surface free of humps and hollows to smooth, even grade, surface to drain naturally.

.4 Remove and dispose of weeds; debris; stones 50 mm in diameter and larger; and other deleterious materials; off site.

.5 Cultivate fine grade approved by Departmental Representative to 25mm depth immediately prior to sodding.

.6 Spread topsoil in uniform layers not exceeding 150 mm, over unfrozen subgrade free of standing water.

3.2 SOD PLACEMENT

.1 Lay sod within 24 hours of being lifted.

.2 Lay sod sections in rows, longitudinally, along contours of slopes, joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with sharp implements.

.3 Roll sod as directed by Departmental Representative. Provide close contact between sod and soil by light rolling. Use of heavy roller to correct irregularities in grade is not permitted.

.4 The first 3 sod rows parallel to the apron, are to be staked, to prevent potential lifting due to proximity to apron area.

3.3 FERTILIZING PROGRAM .1 Fertilize during establishment and warranty periods to program agreed to by Departmental Representative.

3.4 ACCEPTANCE .1 Turfgrass Nursery Sod areas will be accepted by Departmental Representative provided that:
.1 Sodded areas are properly established.
.2 Sod is free of bare and dead spots, and without weeds.
.3 No surface soil is visible from height of 1500 mm when grass has been cut to height of 50 mm.
.4 Sodded areas have been cut minimum 2 times, and within 24 hours prior to acceptance.
.5 Fertilizing in accordance with fertilizer program has been carried out at least once.

3.5 WARRANTY .1 Perform following operations from time of acceptance until end of warranty period:
.1 Water sodded Turfgrass Nursery Sod at weekly intervals to obtain optimum soil moisture conditions to depth of 100 mm.
.2 Repair and re-sod dead or bare spots to satisfaction of Departmental Representative.
.3 Cut grass and remove clippings as directed by Departmental Representative.
  .1 Turf Grass Nursery Sod:
    .1 50 mm during normal growing conditions.
.4 Fertilize areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles.
.5 Eliminate weeds by mechanical means to extent acceptable to Departmental Representative.

3.6 CLEANING .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

PART 1 - GENERAL

1.1 Section Includes

.1 Work in this section includes cleaning of masonry surfaces in contract area where indicated.

1.2 Alternates

.1 Obtain, in writing from Consultant authorization for changes of cleaning method, cleaning medium, tools, pressure, and flow rates.

1.3 Related Sections

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

.3 Section 01 45 00 - Quality Control.

.4 Section 04 03 07 – Masonry Re-Pointing & Repair

1.4 References

.1 Canadian Environmental Assessment Act (CEAA) 1995

1.5 Submittals

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

.2 Comply with the requirements of Workplace Hazardous Materials Information System Sheet (WHMIS) and submit documentation to Consultant.

1.6 Samples

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

.2 Demonstrate machinery, tools and nozzles for

approval by Consultant.

.3 Submit samples of all cleaning materials for approval of Consultant.

1.7 Quality Assurance

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

.2 Submit copies of test results describing method of cleaning of each test patch.

.3 Proceed with cleaning upon written approval by Consultant concerning tested cleaning methods.

1.8 Waste Management and Disposal

.1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper plastic polystyrene corrugated cardboard packaging material in appropriate on-site for recycling in accordance with Waste Management Plan.

.4 Divert unused cleaning agents from landfill to official hazardous material collections site approved by Consultant.

.5 Do not dispose of unused cleaning agents into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard

1.9 Environmental Requirements

.1 Do not use wet cleaning methods when there is threat of frost.

.2 Do not use chemical cleaners when temperature is below 10° C.

.3 Provide shading to wall to avoid cleaning in full, hot sunlight.

.4 Do not clean if there is risk of chemicals spray being blown onto publicly accessible areas.

1.10 Existing Conditions

.1 Report to Consultant conditions of deteriorated masonry or pointing found during cleaning.

.2 Record existing conditions, using photographs, before and after cleaning. Advise Consultant of potential cleaning problems.

.3 Do not clean areas of deteriorated masonry without prior written approval of Consultant.

1.11 Scheduling

.1 Submit Work schedule indicating progress of stages within time of final completion shown in Tender documents, and in accordance with Section 01 33 00 - Submittal Procedures.

.2 Complete Work within approved schedule time.

.1 Do not change Schedule without written approval of Consultant.

.3 Co-ordinate cleaning work schedule with other work on site.

PART 2 - PRODUCTS

2.1 Materials

.1 Use clean potable water 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 Use non-ionic surfactant (detergent) in concentration less than 2% by volume.

2.2 Hot Water

.1 Hot water/steam to be generated in flash boilers or other suitable appliance.

2.3 Tools and Equipment

.1 Use only brushes with natural or soft plastic bristles.

.2 Use only scrapers of wood or plastic.

.3 Use water pumps fitted with accurate pressure regulators and gauges capable of being preset and locked at maximum specified levels.

.4 Use air compressors equipped with on-line oil filters to avoid spraying oil onto masonry.

.5 Use gun equipped with pressure gauge at nozzle end.

.6 Use plastic or non-ferrous metal piping and fittings.

.7 Use nozzles that give nebulized droplet spray. Use nozzles with 12 mm opening.

2.4 Tests

.1 Do mock-ups tests in accordance with Section 01 45 00 - Quality Control.

.2 Conduct tests on building to determine effectiveness of low pressure wash cleaning methods.

.3 Conduct tests to determine effectiveness of water pressures, time periods, flow rates and water temperatures, types of nozzles,

spraying distances from wall surface.

.4 Test pressure at each storey height determines effect of "line drop" on effectiveness of water jets.

.5 Test brushing and spraying as alternative to pressure washing. Use successful tests.

.6 Add increasing amount of [surfactant] until cleaning can be done efficiently.

.7 Locate test patches in inconspicuous places directed by Consultant.

.8 Test patches to be 2m square.

.9 Notify Consultant 48 hours before commencing cleaning of each test patch.
.1 Do not start without approval of Consultant.

.10 Determine effect of cleaning operations on surrounding historic material and plants.

.11 Stop work when cleaning has detrimental effect on surrounding material and plants.

.12 Proceed after written instructions are received from Consultant.

.13 Protect masonry openings from water/chemical infiltration during cleaning.

.14 Collect, neutralize and dispose of water and chemicals in accordance with contract requirements, applicable regulations and Canadian Environmental Protection Act, (CEPA).

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/chemical 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 to be cleaned.

.6 Prepare lime trenches to contain acids.

3.2 Protection

.1 Mask or seal vents, windows, and other openings, to prevent water entry.

.2 Mask wood, glass, and metal adjacent to masonry.

.3 Protect plants, gardens, shrubs from excessive watering and chemicals.

.4 Hand 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 Moderate Pressure Water Cleaning:
.1 Pre-wet masonry surface when necessary. Work from bottom of wall upwards.
.2 Remove dirt with moderate pressure 1400 kPa max wash-down at flow rate of 0.25 L/s.
.3 Use 12mm nozzle and lower pressure on cut stone and tooled stone.
.4 Avoid prolonged wetting and excessive water penetration.
.5 Use previously tested detergent only approved by Consultant. Follow manufacturer's recommended dwell time.
.6 Use previously tested heated water approved by Consultant.
.7 Do not exceed maximum pressure at nozzle or have nozzle closer to masonry than approved by Consultant at tests.

.2 Use brushing and scraping only to supplement water washing.

.3 Soften and loosen heavy deposits with prolonged water spray, then brush. Remove thick incrustations with wooden or plastic scrapers.

.4 Use detergent solutions approved by Consultant for stain and soil removal.

3.4 Clean-up

.1 Rinse off masonry [to satisfaction of Consultant until no indications of chemicals are present.

.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.

PART 1 - GENERAL

1.1 References

.1 Canadian Standards Association (CSA)
- .1 CSA A23.1-14/A23.2-14 UP1
- .2 CAN/CSA-A371-14

1.2 Definitions

.1 Raking: the removal of loose/deteriorated mortar until sound mortar is reached.

.2 Repointing: filling and finishing of masonry joints from which mortar is missing or has been raked out.

.3 Tooling: finishing of masonry joints using tool to provide final contour.

1.3 System Description

.1 Work of this Section includes but is not limited to:
- .1 Visually inspecting for obvious signs of deteriorated masonry and testing/verification of masonry joints.
- .2 Raking identified unsound joints.
- .3 Preparation of masonry surface including joints surface cleaning, flushing of voids and open joints, and masonry wetting.
- .4 Repointing of identified masonry joints.
- .5 Ensuring cure of mortar.

1.4 Samples

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

.2 Submit labelled samples of materials used on project for approval before work commences.

1.5 Qualifications

.1 Contractor-Mason:
- .1 Use single Contractor-mason for all masonry work. Ensure Contractor-mason has 10 years minimum in historic masonry work.
- .2 Ensure mason has certificate of qualification with experience in stone masonry. Ensure that all masonry work is strictly undertaken by certified masons.
- .3 Ensure Contractor-mason has good level of understanding of structural behaviour of masonry walls if masonry work involves replacing or repairing stones which are part of structural masonry work.

1.6 Mock-ups

.1 Construct mock-up in accordance with Section 01 61 00 - Common Product Requirements.

.2 Construct mock-up 1.5m x 1.5m to demonstrate repair procedure for each type of masonry material specified.

.3 Construct mock-up under supervision of Consultant 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 Consultant 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.

1.7 Delivery, Storage and

.1 Deliver, store, handle and protect materials in accordance with Section

Handling

01 61 00 - Common Product Requirements.

.2 Store cementitious materials and aggregates in accordance with CSA A23.1.

.3 Store lime putty in plastic lined sealed drums.

.4 Keep material dry. Protect from weather, freezing and contamination.

.5 Ensure that manufacturer's labels and seals are intact upon delivery.

.6 Remove rejected or contaminated material from site.

1.8 Storage and Protection

.1 Deliver, store, handle and protect materials of this section in accordance with Section 01 61 00 - Common Product Requirements.

.2 At end of each working day, cover unprotected work with waterproof membranes. 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.

.3 Protect adjacent finished work against damage which may be caused by on-going work.

1.9 Existing Conditions

.1 Report in writing, to Consultant areas of deteriorated masonry revealed during work. Obtain Consultant's approval and instructions of repair and replacement of masonry units before proceeding with repair work.

1.10 Environmental Requirements

.1 When temperature is 10°C or less:

.1 Store cements and sands for immediate use within heated enclosure Allow these materials to reach minimum

temperature of 10°C (that is equilibrium with air temperature in enclosure).

.2 Heat water to minimum of 20°C and maximum of 30°C:

.1 At time of use temperature of mortar to be minimum of 15°C and maximum of 30°C.

.2 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 Consultant for methods of enclosure and protection.

PART 2 - PRODUCTS

2.1 Materials

.1 Mortar materials: to Section 04 03 08 – Historic Mortaring

PART 3 - EXECUTION

3.1 General

.1 Perform work in accordance with CAN3-A371.

.2 Tool and compact using jointing tool to force mortar into joint.

.3 Finish joints to match existing joints, except where specified otherwise.

.4 Use suitable approved jointing tool to form compacted concave tooled joints.

3.2 Repointing

.1 Procedure of testing: inspect joints visually for obvious signs of deteriorated masonry. Test joints not visually deteriorated as follows:

.1 Test for voids and weakness by using hammers or other approved means.
.2 Perform testing in co-operation with Consultant so that unsound joints can be marked and recorded.

.2 Raking joints:
.1 Rake unsound joints free of deteriorated and loose mortar, dirt and other undesirable material.
.2 Clean joints to full depth of deteriorated mortar but in no case to less than 50 mm. Clean out voids and cavities encountered.

.3 Clean surfaces of joints without damaging texture of exposed joints.

.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.

.3 Repointing:
.1 Dampen joints and completely fill with mortar. If surface of masonry units/ stone has worn rounded edges keep pointing back from surface to keep same width of joint. Avoid feather edges. Pack mortar solidly into voids and joints.
.2 Keep masonry damp while pointing is being performed.
.3 Do no pointing in freezing weather. See Section 01 56 00 Temporary Barriers and Enclosures for protection required for work in this Section.
.4 Build-up pointing in layers not exceeding 12 mm in depth. Allow bottom layers to set before applying subsequent layers. Maintain joint width.
.5 Tool joints behind masonry face with

identical tools used for weathered joints. Match weathered joint.

.6 Remove excess mortar from masonry face before it sets. Finish jointing neatly as specified.

3.3 Cleaning

.1 Clean surfaces of mortar droppings, stains and other blemishes resulting from work of this contract as work progresses.

.2 Do further cleaning after mortar has set and cured.

.3 Clean masonry with stiff natural bristle brushes and plain water only. Vinegar or chemicals are not to be used unless instructed in writing by Consultant.

PART 1- GENERAL

1.1 REFERENCES

.1 ASTM C 207-79(1988) Specification for Hydrated Lime for Masonry.

.2 CSA A82.56-1950 (R1971) Aggregate for Masonry Mortar.

.3 CSA A179-M1976 Mortar and Grout for Unit Masonry.

1.2 ALLOWABLE TOLERANCES

.1 Mortar compression strength:
- .1 CSA A23.2.8A
- .2 7 Day, 1.0 MPa (145 psi)
- .3 28 Day, 2.2 MPa (320 psi)
- .4 90 Day, 3.5 MPa (510 psi)
- .5 365 Day, 4.5 MPa (650 psi)

.2 Air content: ASTM C 231, 8-15%

.3 Flow: ASTM C 1437, 100-115%

.4 If the mortar fails to meet the 7day compressive strength requirements, but meets the 28day compressive strength requirement, it is to be accepted. If the mortar fails to meet the 7day compressive strength requirement, but its strength at 7days exceeds two thirds of the value required for the 7day strength, the contractor may elect to continue work at his own risk whilst awaiting the results of the 28day tests, or to take down the work affected.

1.3 SAMPLES

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

.2 Submit samples in quantity and size in accordance with CSA A179M.

1.4 TEST REPORTS

.1 Submit 3 sets of test results to show that properties are appropriate to particular mortar mix.

1.5 EXISTING CONDITIONS

.1 Investigate possible structural problems and report before beginning masonry work.

.2 Study pointing styles and methods of reproducing them, and submit sample for approval before starting work.

.3 Examine horizontal and vertical joints to determine which were struck first and whether they are same style, as well as other aspects of workmanship which establish authenticity of original work.

1.6 ENVIRONMENTAL REQUIREMENTS

.1 Execute work when ambient temperature is above 0°C. When ambient temperature is below 0°C care and heat work as directed by Engineer.

.2 The substrate and mortar temperature should be $5^{o}C$ and $38^{o}C$ ($40^{o}F$ and $100^{o}F$) and maintained in this range for 72 hours after mortar application.

1.7 SCHEDULING OF WORK

.1 Submit work schedule indicating anticipated progress stages within time of final completion shown in bid document.

.2 Take measures necessary to complete work within approved schedule time. Schedule may not be changed without approval.

1.8 ALTERNATIVES

.1 Obtain Departmental 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.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Pre-blended, pre-packaged mortar specifically designed for use with stone masonry.

.2 Mortar is a blend of natural hydraulic lime, hydrated type S lime and masonry sand.

.3 Colour: to match existing mortar.

2.2 MORTAR

.1 Mortar contains natural hydraulic lime and hydrated lime.

.2 Repointing: new mortar to be used in repointing is to match the existing mortar as specified .

.3 Allow lime mortar to set for 72 hours before subjecting to load.

.4 Colouring: Colouring agents as required to match existing.

PART 3 - EXECUTION

3.1 MIXING

.1 Prepare pre-blended mortar using manufacturer's instructions.

3.2 FIELD QUALITY CONTROL

.1 Follow proper batching procedure.

.2 Use batching box.

.3 Monitor mixing time.

3.3 CLEANING

.1 Remove droppings and splashings using clean sponge and water.

.2 Clean masonry with low pressure clean water and soft natural bristle brush.

3.4 PROTECTION OF COMPLETED WORK

.1 Cover completed and partially completed work not enclosed or sheltered with waterproof covering at end of each work day. Anchor securely in position.

.2 Provide if necessary temporary bracing as specified in Section 01 56 00 Temporary Barriers and Enclosures.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 General Requirements Division 1

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

- .1 CSA B111-1974(R1998), Wire Nails, Spikes and Staples.
- .2 CAN/CSA-G164-M92(R1998), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .3 CAN/CSA-O141-91(R1999), Softwood Lumber.

.2 National Lumber Grades Authority (NLGA)

- .1 Standard Grading Rules for Canadian Lumber 2000.

1.3 QUALITY ASSURANCE

.1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

PART 2 - PRODUCTS

2.1 LUMBER MATERIAL

.1 Lumber: unless specified otherwise, softwood, S4S, moisture content 19% or less in accordance with following standards:

- .1 CAN/CSA-O141.
- .2 NLGA Standard Grading Rules for Canadian Lumber.

.2 Furring, blocking, nailing strips, grounds, rough bucks.

- .1 Board sizes: "Standard" or better grade.
- .2 Dimension sizes: "Standard" light framing or better grade.

.3 Lumber (Historic): Rough saw lumber of full dimension to match existing in all respects.

2.2 ACCESSORIES

.1 Nails, spikes and staples: to CSA B111.

.2 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.

.3 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.

2.3 FINISHES

.1 Galvanizing: to CAN/CSA-G164, use galvanized fasteners for exterior work pressure-preservative treated lumber.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Comply with requirements of NBC, supplemented by the following paragraphs.
.2 Install furring and blocking as required to space-out and support facings, fascia, soffit, siding and other work as required.
.3 Align and plumb faces of furring and blocking to tolerance of 1:600.
.4 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
.5 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized fasteners.
.6 Install wood backing, dressed, tapered and recessed slightly below top surface of roof insulation for roof hopper.
.7 Install sleepers as indicated.
.8 Use caution when working with particle board. Use dust collectors and high quality respirator masks.

3.2 ERECTION

.1 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
.2 Countersink bolts where necessary to provide clearance for other work.

3.3 LIMITED REPLACEMENT (Historic)

.1 If repair by stabilization, consolidation, and conservation proves inadequate, the next level of intervention involves the limited replacement in kind of extensively deteriorated or missing parts of features when there are surviving prototypes.
Replacement material to match the old both physically and visually. With the exception of hidden structural reinforcement and new mechanical system components, substitute materials are not appropriate in the preservation treatment.
If prominent features are missing, then a rehabilitation or restoration treatment may be more appropriate.

PART 1 - GENERAL

1.1 RELATED SECTIONS
.1 Section 01 11 00 - Summary of Work

1.2 REFERENCES
.1 American National Standards Institute (ANSI)
  .1 ANSI A208.1-1989, Particleboard, Mat formed Wood.
  .2 ANSI A208.2-1994, Medium Density Fiberboard (MDF).
.2 Architectural Woodwork Manufacturers Association of Canada (AWMAC)
  .1 AWMAC Quality Standards for Architectural Woodwork 1991.
.3 Canadian General Standards Board (CGSB)
  .1 CAN/CGSB-11.3-M87, Hardboard.
.4 Canadian Standards Association (CSA)
  .1 CSA B111-1974, Wire Nails, Spikes and Staples.
  .2 CAN/CSA-G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.
  .3 CSA O121-M1978, Douglas Fir Plywood.
  .4 CAN/CSA O141-91, Softwood Lumber.
  .5 CSA O151-M1978, Canadian Softwood Plywood.
  .6 CSA O153-M1980, Poplar Plywood.
.5 National Hardwood Lumber Association (NHLA)
  .1 Rules for the Measurement and Inspection of Hardwood and Cypress January 1986.
.6 National Lumber Grades Authority (NLGA)
  .1 Standard Grading Rules for Canadian Lumber 1996.

1.3 DELIVERY, STORAGE, AND HANDLING
.1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 – Common Product Requirements.
.2 Protect materials against dampness during and after delivery.
.3 Store materials in ventilated areas, protected from extreme changes of temperature or humidity.

1.4 QUALITY ASSURANCE
.1 All fabrications shall be in accordance with the quality standard manual of Architectural Woodwork Manufacturers Association of Canada (AWMAC).

PART 2 - PRODUCTS

2.1 LUMBER MATERIAL

.1 Softwood lumber: unless specified otherwise, S4S, moisture content 19% or less in accordance with following standards:
  .1 CAN/CSA O141.
  .2 NLGA Standard Grading Rules for Canadian Lumber.
  .3 AWMAC premium grade, moisture content as specified, pine species.
.2 Manufacturing process must adhere to Lifecycle Assessment (LCA) Standards as per CSA Z760-94 LCA Standards.
.3 Lumber (Historic): Rough saw lumber of full dimension to match existing in all respects.

2.2 ACCESSORIES

.1 Nails and staples: to CSA B111; galvanized to CAN/CSA-G164 for exterior work, interior humid areas and for treated lumber; plain steel finish elsewhere.
.2 Wood screws: to CSA B35.4 plain type and size to suit application.
.3 Splines: wood
.4 Adhesive: recommended by manufacturer.
.5 Use least toxic sealants, adhesives, sealers, and finishes necessary to comply with requirements of this section.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Do finish carpentry to Quality Standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), except where specified otherwise.
.2 Scribe and cut as required, fit to abutting walls, and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets, or other projecting, intersecting or penetrating objects.
.3 Form joints to conceal shrinkage.

3.2 CONSTRUCTION

.1 Fastening.
  .1 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.

.2 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.
.3 Set finishing nails to receive filler. Where screws are used to secure members, countersink screw in round cleanly cut hole and plug with wood plug to match material being secured.
.4 Replace items of finish carpentry with damage to wood surfaces including hammer and other bruises.

.2 Interior and exterior frames.
.1 Set frames with plumb sides and level heads and sills and secure.

.3 Hardware.
.1 Install as detailed and as required.

.4 Standing and running trim
.1 Butt and cope internal joints of baseboards to make snug, tight joint. Cut right angle joints of casing and base with mitre joints.
.2 Fit backs of baseboards and casing snugly to wall surfaces to eliminate cracks at junction of base and casing with walls.
.3 Make joints in baseboard, where necessary using a 45^0 scarf type joint.

3.3 LIMITED REPLACEMENT (Historic)

.1 If repair by stabilization, consolidation, and conservation proves inadequate, the next level of intervention involves the limited replacement in kind of extensively deteriorated or missing parts of features when there are surviving prototypes. Replacement material to match the old both physically and visually. With the exception of hidden structural reinforcement and new mechanical system components, substitute materials are not appropriate in the preservation treatment.
If prominent features are missing, then a rehabilitation or restoration treatment may

be more appropriate.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Materials and installation methods providing primary air/vapour barrier materials and assemblies.

.2 Air/vapour barrier materials to provide continuous seal between components of building envelope and building penetrations.

1.2 RELATED SECTIONS

.1 Section 01 45 00 - Quality Control.

.2 Section 01 61 00 - Common Product Requirements.

.3 Section 07 92 10 - Joint Sealants.

1.3 REFERENCES

.1 Codes and standards referenced in the section refer to the latest edition thereof.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-19.13M, Sealing Compound, One Component, Elastomeric Chemical Curing.

.2 CAN/CGSB-19.18M, Sealing Compound, One Component, Silicone Base Solvent Curing.

.3 CAN/CGSB-19.24M, Multi-Component, Chemical Curing Sealing Compound.

.4 CGSB 19-GP-14M, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.

.3 National Building Code of Canada (NBCC)

.1 NBCC, Part 5 - Environmental Separation

.4 Sealant and Waterproofer's Institute - Sealant and Caulking Guide Specification.

1.4 SUBMITTALS

.1 Submit manufacturer’s product data sheets.

.2 Submit manufacturer’s installation instructions.

1.5 QUALITY ASSURANCE

.1 Perform Work in accordance with Sealant and Waterproofer's Institute - Sealant and Caulking Guide

.2 Specification requirements for materials and installation.

.3 Perform Work in accordance with National Air Barrier Association - Professional Contractor Quality Assurance Program and requirements for materials and installation.

.4 Manufacturer’s Representative:

.1 Inspect substrate prior to commencement of work, twice during application of membrane and at commissioning to ascertain that air/vapour barrier system is installed according to membrane manufacturer’s most current published specifications and details.

.2 Provide technical assistance to applicator and assist where required in correct installation of membrane.

.3 Provide certificate of quality compliance upon satisfactory completion of installation.

.5 Maintain one copy of documents on site.

1.6 QUALIFICATIONS

.1 Applicator: Company specializing in performing work of this section with minimum 5 years documented experience with installation of air/vapour barrier systems. Complete installation must be approved by the material manufacturer.

.2 Applicator: Company who is currently licensed by certifying organization must maintain their license throughout the duration of the project.

1.7 MOCK-UP

.1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.

.2 Construct typical panel, 10 m^2 minimum, incorporating wall openings, insulation, building corner condition, illustrating materials interface and seals.

.3 Locate where directed.

.4 Mock-up may remain as part of the Work.

.5 Allow 48 h for inspection of mock-up by Departmental Representative before proceeding with air/vapour barrier Work.

1.8 PRE- INSTALLATION MEETINGS

.1 Convene one week prior to commencing work of this section.

1.9 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver, store and handle materials in accordance with manufacturer's written instructions. Deliver membrane materials in factory wrapped packaging indicating name of manufacturer and product.

.3 Avoid spillage. Immediately notify Departmental Representative if spillage occurs and start clean up procedures.

.4 Clean spills and leave area as it was prior to spill.

.5 Store roll materials on end in original packaging.

.6 Store primers at temperatures of 5°C and above to facilitate handling. Keep solvent away from open flame and excessive heat.

1.10 PROJECT ENVIRONMENTAL REQUIREMENTS

.1 Do not install solvent curing sealants or vapour release adhesive materials in enclosed spaces without ventilation.

.2 Maintain temperature and humidity recommended by materials manufactures before, during and after installation.

1.11 WARRANTY

.1 Provide a written warranty for work of this section from Manufacturer for failure due to defective

materials and from contractor for failure due to defective installation workmanship for ten (10) years respectively.

.2 Include coverage of installed sealant and sheet materials which fail to achieve air tight and

watertight seal, exhibit loss of adhesion or cohesion or do not cure.

PART 2 PRODUCTS

2.1 SHEET MATERIALS

.1 Sheet Seal: Triple_Layer, spunbonded, polypropylene nominal total thickness of 0.58 mm.

.1 Membrane Physical Properties

.1 Tensile strength min 4.79N/mm

.2 Water vapour permeance 0.008mg/Pa.s.m² (156.1 perms)

.3 Air Leakage at 75 Pa 0.0002L/Sm²

.4 Air Leakage of the 3000 Pa test No change

2.2 SEALANTS

.1 Sealants in accordance with Section 07 92 10 - Joint Sealants.

.2 Primer: recommended by sealant manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Verify that surfaces and conditions are ready to accept the Work of this section.

.2 Ensure all surfaces are clean, dry, sound, smooth, continuous and comply with air barrier manufacturer’s requirements.

.3 Report any unsatisfactory conditions to the Departmental Representative in writing.

.4 Do not start work until deficiencies have been corrected.

3.2 PREPARATION

.1 Remove loose or foreign matter which might impair adhesion of materials.

.2 Ensure all substrates are clean of oil or excess dust; all masonry joints struck flush, and open joints filled; and all concrete surfaces free of large voids, spalled areas or sharp protrusions.

.3 Ensure all substrates are free of surface moisture prior to application of membrane and primer.

.4 Ensure metal closures are free of sharp edges and burrs.

.5 Prime substrate surfaces to receive adhesive and sealants in accordance with manufacturer's instructions.

3.3 INSTALLATION (SHEET MEMBRANE)

.1 Install materials in accordance with manufacturer's instructions.

.2 Install with printed side out, in shingle style to form a continuous membrane over the entire area, allowing water to drain to the exterior.

.3 Avoid blockages that would otherwise obstruct the wate flow.

.4 Starting at base of wall, unroll membrane horizontally across wall. Overlap through wall flashings by a minimum of 150mm and extend a minimum of 150mm over starting corner.

.5 Fasten at top and bottom of roll within 50mm of edge, 300mm on centre and at a maximum of 600mm on centre in field.

.6 Shingle next layers of membrane ensuring minimum 150mm horizontal and minimum 300mm vertical laps.

.7 If installed vertically, overlap vertical seams a minimum of 150mm and apply tape to all vertical seams.

.8 Where penetrations are encountered refer to “Penetrations” section of this document. Ensure

membrane is slipped under bottom edge of penetration "skirt" for positive drainage to the exterior.

.9 Do not place vertical laps within 600mm of a window or door opening.

.10 Apply tape to ALL vertical seams.

.11 If the installation of the primary cladding is delayed use adequate fasteners to resist the potential wind conditions. Temporary battens, roofing nails or screws with washers can be used.

.12 Do not enclose membrane until it has been inspected and approved by Departmental Representative. Inform Departmental Representative 48 hours prior to required inspection.

.13 Form a continuous air barrier at all details using the tapes.

.14 Tie in to membranes installed by others including at the roof, base of wall.

.15 Install fasteners at a maximum spacing of 300mm on centre vertically and 600mm on centre horizontally.

.16 Tape all laps and seams (vertical and horizontal) using seam tape.

.17 In wood frame construction, install membrane between sill plate and foundation gasket and seal to foundation wall with a bead of compatible sealant or tape.

.18 Where shelf angles exist, seal membrane to the shelf angle using tape.

.19 Do not install fasteners within 50mm of sills, jambs, window heads or other flashed penetrations.

3.4 PROTECTION OF WORK

.1 Protect finished Work in accordance with Section 01 61 00 - Common Product Requirements.

.2 Do not permit adjacent work to damage work of this section.

.3 Ensure finished Work is protected from climatic conditions.

3.5 INSPECTION

.1 Carefully inspect for continuity of air barrier prior to placement of insulation.

.2 Repair all deficient membrane areas.

.3 Misaligned or inadequately lapped seams, punctures or other damage must be repaired with a patch of air

barrier membrane extending 50mm in all directions from edge of damaged areas.

.4 Cover membrane immediately after Departmental Representative’s inspection to protect from damage by other trades.

3.6 TESTING .1 Air leakage testing as directed by Departmental Representative and paid for by contractor will be performed by professional testing agency for the locations selected at random for penetrations, laps, corners, etc.

2 Testing will be witnessed by Departmental Representative and test reports will be signed by tester, site representative and contractor.

.3 Inform Departmental Representative 48 hours prior to required testing.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Requirements for installation of plywood, hardboard and lumber siding.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 19 - Construction/Demolition Waste Management and Disposal.

.3 Section 06 10 11 – Rough Carpentry

.4 Section 07 27 00.01 – Air Barriers

.5 Section 07 62 00 - Sheet Metal Flashing and Trim.

.6 Section 07 92 10 - Joint Sealing.

.7 Section 09 03 61 – Historic Repainting Exterior Surfaces (Wood).

1.3 REFERENCES

.1 American Society for Testing and Materials International, (ASTM).

.1 ASTM D 5116-[97], Standard Guide For Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products.

.2 Canadian General Standards Board (CGSB).

.1 CAN/CGSB-11.3-M87, Hardboard.

.2 CAN/CGSB-11.5-M87, Hardboard, Precoated, Factory Finished, for Exterior Cladding.

.3 CAN/CGSB-11.6-[M87], Installation of Exterior Hardboard Cladding.

.4 CAN/CGSB-51.32-[M77], Sheathing,

Membrane, Breather Type.

.3 Canadian Standards Association (CSA International).
.1 CSA B111-[1974(R2003)], Wire Nails, Spikes and Staples.
.2 CSA O121-[M1978(R1998)], Douglas Fir Plywood.
.3 CSA O151-[M1978(R1998)], Canadian Softwood Plywood.
.4 CAN/CSA-Z808-[96], A Sustainable Forest Management System: Guidance Document.

.4 Environmental Choice Program (ECP).
.1 CCD-045-[95], Sealants and Caulking Compounds.

.5 National Lumber Grades Authority (NLGA).
.1 NLGA Standard Grading Rules for Canadian Lumber [2003].

1.4 SUBMITTALS

.1 Product Data:
.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
.2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's for caulking materials during application.

.2 Samples:
.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.3 Manufacturer's Instructions:
.1 Submit manufacturer's installation instructions.

1.5 QUALITY ASSURANCE

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal recycling in accordance with Waste Management Plan.

.4 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.

.5 Divert unused wood materials from landfill to facility approved by Consultant.

.6 Divert unused caulking material from landfill to official hazardous material collections site approved by Consultant.

.7 Do not dispose of unused caulking materials into the sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Bevel siding: western lodgepole pine or Eastern Spruce, No. 1 select or better grade, factory finished, saw texture, cove or V-joint pattern, 16mm thickness, 150mm width.

.2 Accessories: Fascia & Trim.

.3 Fasteners: nails to CSA B111, hot galvanized steel, sized as required, smooth shank type with flat head.

.4 Finish: Pre-Finished; colour to be selected from manufacturer’s standard range.

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 INSTALLATION

.1 Install hardboard to CGSB 11-GP-6M and manufacturers' instructions.

.2 Install one layer self-adhesive air barrier.

.3 Install sill flashings, wood starter strips, strapping, edgings and flashings over openings.

.4 Fasten wood siding in straight, aligned lengths to strapping at 400 mm on centre maximum using nails at each fixing location. Intermediate butt joints are not permitted.

Stagger butt joints not less than 800 mm and distribute evenly over wall faces. Cut butt joints at 45 degrees and for vertical siding slope to outside. Seal cut surfaces.

3.3 CLEANING

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

PART l - GENERAL

1.1 RELATED WORK
.1 General Requirements Division 1
.2 Structure Demolition Section 02 41 16
.3 Rough Carpentry Section 06 10 10
.4 Sheet Metal Flashing & Trim Section 07 62 00
.5 Joint Sealants Section 07 92 10

1.2 REFERENCES
.1 CSA A82.27-M1977 Gypsum Board Products.
.2 CSA B35.3-1962 Tapping and Drive Screws (Slotted and Recessed Head, Thread).
.3 CSA O151-M1978 Canadian Softwood Plywood.
.4 CSA A123.21-10 Wind Uplift Resistance Testing
.5 CGSB 37-GP-56M-80 Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.
.6 CAN/CGSB-51.20-M87 Thermal Insulation, Polystyrene, Boards and Pipe Covering.
.7 CAN/CGSB-51.26-M86 Thermal Insulation, Urethane and Isocyanurate, Boards, Faced.
.8 CAN/CGSB-51.31-M84 Thermal Insulation, Mineral Fibre Board for Above Roof Decks.
.9 CAN/ULC-S107-01 Standard Method of Fire Tests of Roof Coverings.
.10 CAN/ULC-S126-M86 Standard Method of Test for Fire Spread Under Roof - Deck Assemblies.

1.3 SECTION INCLUDES
.1 Removal of membrane, membrane flashing, metal counter flashing, deck sheathing, and vapour retarder, exposing existing deck.
.2 Provision of new deck sheathing, vapour retarder, insulation, membrane, membrane flashing and metal counter flashing.

1.4 SHOP DRAIWNGS
.1 Submit shop drawings in accordance with Section 01 33 00 – Submittals, Product Data and Samples.
.2 Indicate flashing, control joints, tapered insulation details.
.3 Provide layout for tapered insulation.
.4 Provide requests for substitutions of materials and equipment under this specification section as per Section 0133 00 - Submittals

1.5 STORAGE AND HANDLING
.1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.
.2 Provide and maintain dry, off-ground weatherproof storage.

.3 Store rolls of felt and membrane in upright position. Store membrane rolls with selvage edge up.

.4 Remove only in quantities required for same day use.

.5 Place plywood runways over work to enable movement of material and other traffic.

.6 Store caulking at +5□¢ minimum.

.7 Store insulation protected from daylight and weather and deleterious materials.

1.6 ENVIRONMENTAL REQUIREMENTS

.1 Do not install roofing when temperature remains below -18□¢ for torch application, or to manufacturers' recommendations for mop application.

.2 Minimum temperature for solvent-based adhesive is -5□¢.

.3 Install roofing on dry deck, free of snow and ice, use only dry materials and apply only during weather that will not introduce moisture into roofing system.

1.7 PROTECTION .1 Fire Extinguishers: maintain one stored pressure rechargeable type with hose and shut-off nozzle, ULC labeled for A, B and C class protection. Size 9 kg on roof per torch applicator, within 10 m of torch applicator.

.2 Contractor to provide safety person on site at all times during the roofing process and shall remain on site two (2) hours after work has ceased or after torching has stopped. Safety person shall scan the perimeter and roof penetration details with a hand held infrared gun.

.3 Remove only as much existing roofing as can be replaced by the end of each working day.

1.8 WARRANTY .1 Provide a written guarantee signed and issued in the name of The Owner by the Roofing System Manufacturer stating that roofing membrane is free from manufacturing defects and that the system will stay in place and remain leak proof for a period of ten (10) years from date of Final Certificate of Completion, subject to the standard limitations and conditions of the manufacturer.

.2 Provide a written guarantee, signed and issued in the name of the Owner by the Contractor, stating that the roofing application has been performed in compliance with the plans and specifications, and for two (2) years from the date of Final Certificate of Completion, the Contractor shall repair, at no expense to the Owner, any defects which result of a failure to comply with the

plans and specifications.

.3 Defective work shall include, but not limited to: leaking, wind uplift, delamination of roofing materials, reduction of thermal value due to moisture in insulation, crazing and ridging.

.4 Warranty to be non-prorated.

1.9 COMPATIBILITY

.1 Compatibility between components of roofing system is essential. Provide written declaration to Engineer stating that materials and components, as assembled in system, meet this requirement.

1.10 QUALITY AND ASSURANCE

.1 Membrane: applied by applicator acceptable to Engineer approved by manufacturer for application of its products.

.2 Applicators: minimum 5 years proven experience.

.3 Manufacturer’s representative:

.1 Inspect roofing system at the start of construction , midway and at commissioning. Additional inspections shall be carried out at the discretion of the Roofing System Manufacturer.

.2 Provide technical assistance to applicator and assist where required in correct installation of roofing system.

1.11 MOCK-UP

.1 Construct mock up 10 m^2 minimum size showing typical membrane lap joint, one inside and one outside corner parapet flashing. Accepted mock-up may form part of complete work. Insulation and fastening method, vapour barrier lap, gypsum board and fastening method and workmanship.

.2 Allow 48 hours for inspection of mock-up by Engineer before proceeding with roofing work.

PART 2 - PRODUCTS

2.1 ROOFING SYSTEM

.1 System to comply with CSA A123.21-10 Wind Uplift Resistance Testing

2.2 VAPOUR RETARDER

.1 Description: Roofing membrane composed

of SBS modified bitumen and a composite, non-woven polyester, glass mat reinforcement. The upper surface is sanded, the underface is covered with a thermofusible plastic film.

.2 In conformance with: CAN/CGSB 37.56-M (9th Draft).

2.3 MEMBRANE .1 Description: Roofing membrane composed of SBS modified bitumen with a non-woven polyester reinforcement, factory laminated on a mineral wool board. Membrane measures 1m x 4.91m.. The surface is covered with a thermofusible plastic film. The thickness is 12.7mm.

.1 In conformance with: CGSB 37.56-M (9th Draft).

.2 Properties:

Properties:	MD	XD
Strain energy (kN/m)	9	7
Breaking strength (kN/m)	17	12.5
Ultimate elongation (%)	60	65
Tear resistance (N)	60	
Static puncture resistance (N)		400
Dimensional stability (%)	-0.4	0.3
Plastic flow (°C)	≥ 105	
Cold bending at -30 °C	No cracking	
Lap joint strength (kN/m)	Pass > 4 kN/m	

.2 Base Sheet Membrane for Flashings

Description: Membrane composed of SBS modified bitumen and, non-woven polyester, reinforcement. The surface is covered with a thermofusible plastic film and the underface is covered with a release protection film]. The surface shall be marked with three (3)chalk lines to ensure proper roll alignment.

.3 Roofing Cap Sheet Membrane for Field Surfaces

Description: Roofing membrane composed of SBS modified bitumen with a composite reinforcement and elastomeric bitumen. The surface is protected by coloured granules. The underface is

covered with a thermofusible plastic film. In conformance with ASTM D6162.

.4 Starter Roll

Description: Waterproofing membranes composed of SBS modified bitumen, covered with granules on surface, with a 100 mm selvedge on both sides. The underface is covered with a thermofusible plastic film. In conformance with: CGSB 37.56-M (9th Draft).

2.4 PRIMER .1 Primer for Thermofusible Membranes

Description: Primer made of bitumen, volatile solvents and adhesive resins. Used as primer to improve the adhesion of thermofusible waterproofing membranes.

2.6 ACCESSORY WATERPROOFING PRODUCTS

.1 Waterproofing Mastic

Description: Multi-purpose mastic composed of SBS modified bitumen, fibres, aluminium pigments, mineral fillers and solvents.

.2 Sealing Product

Description: Bitumen/polyurethane waterproofing mono- component resin and polyester reinforcement.

PART 3 - EXECUTION

3.1 SURFACE EXAMINATION & PREPARATION

.1 Surface examination and preparation must be completed in conformance with instructions in the membrane manufacturer’s technical documentation.

.2 Before roofing work begins, the owner's representative and roofing foreman will inspect and approve deck conditions (including slopes and wood grounds) as well as flashings at parapets, roof drains, plumbing vents, ventilation outlets and other construction joints. If necessary, a non-conformity notice will be issued to the contractor so that required corrections can be carried out. The start of roofing work will be

considered as acceptance of conditions for work completion.

.3 Do not begin any portion of work before surfaces are clean, smooth, dry, and free of ice and debris. Use of calcium or salt is forbidden for ice or snow removal.

.4 Be sure plumbing, carpentry and all other works have been duly completed.

.5 No materials will be installed during rain or snowfall.

3.2 METHOD OF EXECUTION

.1 Roofing work must be completed in a continuous fashion as surfaces are readied and as weather conditions allows it.

.2 It’s preferable to seal all joints that are not covered by a cap sheet membrane the same day. A second cap sheet cannot be installed if any moisture is present in joints.

.3 Ensure waterproofing of roofs at all times, including protection during installation work by other trades and protection as work is completed (e.g. vents, drains, etc.).

3.3 SITE PROTECTION

.1 Protect the exposed surfaces of finished work to avoid damage during roof installation and material transportation. Install walkways made of rigid boards over installed roofing materials to enable passage of people and transport of products. Assume full responsibility for any damage.

3.4 APPLICATION OF PRIMER

.1 Wooden, metallic, concrete, and masonry surfaces or gypsum insulation substrate will receive a coat of primer. All surfaces to be primed must be free of rust, dust or any residue that may hinder adherence. Primed surfaces must be covered with the roofing membrane as soon as possible (on the same day for self-adhesive membranes).

3.5 APPLICATION OF THERMOFUSIBLE VAPOUR BARRIER

.1 Primer must be dry prior to the installation of the vapour barrier membrane.

.2 Starting at the lowest point of the roof slope, the vapour barrier membrane must be heat-welded onto the substrate in conformance with manufacturer’s written recommendations.

.3 Overlap adjacent rolls of 75 mm and 100 mm. End laps must be 150 mm. Space end laps by at least 300 mm.

.4 The roof vapour barrier must meet and overlap the air/vapour barrier on adjoining walls to ensure total continuity.

3.6 INSTALLATION OF BOARDS AND FACTORY-LAMINATED BASE SHEET

.1 Adhere base sheet board using adhesive applied in continuous strips of 13 to 19mm width spaced 300 mm on the field surface. Corners and perimeters must be installed as per FM requirements listed in the PLPDS 1-29].

3.7 INSTALLATION OF SELF-ADHESIVE BASE SHEET ON FLASHINGS AND PARAPETS

.1 Apply base sheet flashing only after primer coat is dry.

.2 Before applying membranes, always burn the plastic film from the section to be covered if there is an overlap (inside and outside corners and field surface). For sanded base sheet membranes, apply primer for self-adhesive membrane on the area to be covered at the foot of the parapets.

.3 Cut off corners at end laps of areas to be covered by the next roll.

.4 Each selvedge will overlap the previous one along lines provided for this purpose, and by 150 mm at the ends.

.5 Position the pre-cut membrane. Remove 150 mm of the silicone release film to hold the membrane in place at the top of the parapet.

.6 Then, gradually peel off the remaining silicone release film, pressing down on the membrane with an aluminum applicator to ensure good adhesion. Use the aluminum applicator to ensure a perfect transition between the flashing and the field surface. Smooth the entire membrane surface with a membrane roller for full adhesion.

.7 Install a reinforcing gusset at all inside and outside corners.

.8 Always seal overlaps at the end of the workday.

.9 Avoid the formation of wrinkles, swellings or fishmouths.

3.12 INSTALLATION OF THERMOFUSIBLE CAP SHEET ON FIELD SURFACE

.1 Begin with double-selvedge starter roll. If starter roll is not used, side laps covered with granules must be de-granulated by embedding granules in torch-heated bitumen over a 75-mm width.

.2 Starting at drain, unroll the membrane on the base sheet, taking care to align the edge of the first selvedge with the edge of the roof.

.3 Cut off corners at end laps at areas to be covered by the next roll.

.4 Each selvedge will overlap the previous one along lines provided for this purpose, and will overlap by 150 mm at the ends. Space end laps a minimum of 300 mm.

.5 Heat-weld cap sheet membrane with a torch on the base sheet to create a bleed out of 3 to 6 mm.

.6 During installation, be careful not to overheat the membrane or its reinforcements.

.7 Avoid the formation of wrinkles, swellings or fishmouths.

.8 Avoid walking over finished surfaces; use rigid protective walkways as needed.

3.13 INSTALLATION OF THERMOFUSIBLE CAP SHEET ON FLASHINGS AND PARAPETS

.1 This cap sheet must be installed in one-metre-wide strips.

.2 Each selvedge will overlap the previous one laterally along lines provided for this purpose, and will overlap by 150 mm the field surface. Membranes for flashings must be spaced at least 100 mm with respect to the cap sheet membranes on the field surface, to avoid areas of excessive membrane thickness.

.3 Cut off corners at end laps on areas to be covered by the next roll.

.4 Use a chalk line to draw a straight line on the field surface, 150mm from flashings and parapets.

.5 Use a torch and round-nose trowel to embed the surface granules in the layer of hot bitumen, starting from the chalk line on the field surface to the bottom edge of the flashing or parapet, as well as on the granulated vertical surfaces to be overlapped.

.6 This cap sheet will be heat-welded directly to the base sheet membrane, proceeding from bottom to top.

.7 Avoid the formation of wrinkles, swellings or fishmouths.

.8 During installation, be careful not to overheat the membrane and its reinforcements.

3.14 WATERPROOFING FOR VARIOUS DETAILS

.1 Install waterproofing membranes at various roofing details in conformance with typical details indicated in technical documentation of the manufacturer.

END OF SECTION

PART 1- GENERAL

1.1 RELATED SECTIONS
.1 Rough Carpentry — Section 06 10 00
.2 Joint Sealants — Section 07 92 10

1.1 REFERENCES
.1 ASTM A653/A653M-95 Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
.2 ASTM A792/A792M-95 Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
.3 Aluminum Association Aluminum Sheet Metal Work in Building Construction - 1980.
.4 Canadian Roofing Contractors Association (CRCA).

1.2 SAMPLES
.1 Submit shop drawings in accordance with Section 01340 – Shop Drawings, Product Data and Samples.
.2 Submit duplicate 50 x 50 mm samples of each type of sheet metal material, colour and finish.

PART 2 - PRODUCTS

2.1 SHEET METAL MATERIALS
.1 Aluminum-zinc alloy coated steel sheet: to ASTM A792/A792M, commercial quality, grade 33 with AZ150 coating, regular spanglesurface, .60 mm base metal thickness. Pre-painted to CGSB -GP-71.

2.2 PREFINISHED ALUMINUM SHEET
.1 Prefinished sheet with factory applied silicone modified polyester.
.1 Class F1S
.2 Color as selected by Engineer from manufacturer' standard range.
.3 Specular gloss: 30 units +/- 5 in accordance with ASTM D523.
.4 Coating thickness: not less than 25 micrometres.
.5 Resistance to accelerated weathering for caulk rating of 8, color fade 5 units or less and erosion rate less than 20% to ASTM D822 as follows:
.1 Outdoor exposure period 1000 hours.
.2 Humidity resistance exposure period 1000 hours.

2.3 ACCESSORIES
.1 Isolation coating: alkali resistant bituminous paint.
.2 Plastic cement: to CAN/CGSB 37.5-M89.
.3 Underlay for metal flashing: No. 15 perforated asphalt felt to CSA A123.3.
.4 Sealants: Section 07 92 10 - Joint Sealants.
.5 Cleats: of same material, and temper as sheet

metal, minimum 50 mm wide. Thickness same as sheet metal being secured.

.6 Fasteners: of same material as sheet metal, to CSA B111, ring thread flat head roofing nails of length and thickness suitable for metal flashing application.

.7 Washers: of same material as sheet metal, 1 mm thick with rubber packings.

.8 Touch-up paint: as recommended by prefinished material manufacturer.

2.4 FABRICATION

.1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA 'FL' series details as indicated.

.2 Fabricate aluminum flashings and other sheet aluminum work in accordance with Aluminum Association Aluminum Sheet Metal Work in Building Construction.

.3 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints.

.4 Hem exposed edges on underside 12 mm. Miter and seal corners with sealant.

.5 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

.6 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

2.5 METAL FLASHINGS

.1 Form flashings, copings and fascias to profiles indicated of .60 mm thick prefinished steel.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Install sheet metal work in accordance with CRCA FL series details and as detailed.

.2 Use concealed fastenings except where approved before installation.

.3 Provide underlay under sheet metal. Secure in place and lap joints 100 mm.

.4 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs. Flash joints using S-lock forming tight fit over hook strips, as detailed.

.5 Lock end joints and caulk with sealant.

END OF SECTION

PART 1- GENERAL

1.1 RELATED WORK
.1 General Requirements Division 1

1.2 SUMMARY
.1 This Section specifies caulking and sealants not specified in other Sections.
.2 Refer to other sections for other caulking and sealants.

1.3 REFERENCES
.1 CAN/CGSB-19.13-M87 Sealing Compound, One-component, Elastomeric, Chemical Curing.

1.4 SAMPLES
.1 Submit samples in accordance with Section 01 33 00 Submittal Procedures.
.2 Submit duplicate samples of each type of material and colour.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 – Common Product Requirements.
.2 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with ground or floor.

1.6 ENVIRONMENTAL REQUIREMENTS

.1 Comply with requirements of Workplace Safety Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labeling and provision of material safety data sheets acceptable to Labour Canada.
.2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.
.3 Ventilate area of work as directed by Department Representative by use of approved portable supply and exhaust fans.

1.7 QUALITY ASSURANCE .1 Provide Certificate of Quality Compliance of the selection and application of sealant. Provide list of sealants used on the project and where applied.

PART 2 - PRODUCTS

2.1 SEALANT MATERIALS .1 Sealants and Caulking compounds must:

.1 Meet or exceed all applicable governmental and industrial safety and performance standards; and

.2 Be manufactured and transported in such a manner that all steps of the process, including the disposal of waste products arising there from, will meet the requirements of all applicable governmental acts, by laws and regulations including, for facilities located in Canada, the Fisheries Act and the Canadian Environmental Protection Act (CEPA).

.2 Sealant and caulking compounds must not be formulated or manufactured with: aromatic solvents, fibrous talc orasbestos, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium, barium or their compounds, except barium sulfate.

.3 Sealant and caulking compounds must not contain a total of volatile organic compound (VOC’s) in excess of 5% by height as calculated from records of the amounts of constituents used to make the product.

.4 Sealant and caulking compounds must be accompanied by detailed instructions for proper application so as to minimize health concerns and maximize performance, and information describing proper disposal methods.

.5 Caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant shall not be used in air handling units.

.6 When low toxicity caulks are not possible, confine usage to areas which off-gas to the exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off-gas time.

.7 Sealants acceptable for use on this project must be listed on CGSB Qualified Products List issued by CGSB Qualification Board for Joint Sealants. Where sealants are qualified with primers use only these primers.

2.2 SEALANT MATERIAL DESIGNATIONS

.1 Urethanes One Part.

.1 Non-Sag to CAN/CGSB-19.13, Type 2.

.2 Preformed Compressible and Non-Compressible

back-up materials.

.1 Polyethylene, Urethane, Neoprene or Vinyl Foam.
  .1 Extruded open 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/m3 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, Sealant Type CAN/CGSB- 19.13-M87.

2.4 JOINT CLEANER .1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.
.2 Primer: as recommended by manufacturer.

PART 3 - EXECUTION

3.1 PROTECTION .1 Protect installed work of other trades from staining or contamination.

3.2 PREPARATION OF JOINT SURFACES

.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 Cleanup.

.1 Clean adjacent surfaces immediately and leave work neat and clean.

.2 Remove excess and droppings, using recommended cleaners as work progresses.

.3 Remove masking tape after initial set of sealant.

END OF SECTION

PART 1 GENERAL

1.1 Related Sections

.1 01 33 00 – Submittal Procedures.

1.2 References

Environmental Protection Agency (EPA)

.1 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings).

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.3 The Master Painters Institute (MPI)

.1 Architectural Painting Specification Manual - February 2004.

.2 Standard GPS-1-05, MPI Green Performance Standard for Painting and Coatings.

.4 National Fire Code of Canada.

.5 Society for Protective Coatings (SSPC)

.1 Systems and Specifications, SSPC Painting Manual 2005.

1.3 Quality Assurance

.1 Qualifications:

.1 Qualified journeymen who has a "Tradesman Qualification Certificate of Proficiency" shall be engaged in painting work. Apprentices may be employed provided they work under the direct supervision of a qualified journeyman in accordance with applicable trade regulations.

.2 Conform to latest MPI requirements for exterior painting work including preparation and priming.

Materials: in accordance with MPI Painting Specification Manual "Approved Product" listing and from a single manufacturer for each system used.

.3 Paint materials such as linseed oil, shellac, and turpentine to be highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and to be compatible with other coating materials as required.

1.4 Performance Requirements

.1 Environmental Performance Requirements:

.1 Green Performance in accordance with MPI Standard GPS-1.

1.5 Scheduling

.1 Submit work schedule for various stages of painting to Engineer for approval. Submit schedule minimum of 48 hours in advance of proposed operations.

.2 Obtain written authorization from Engineer for changes in work schedule.

.3 Schedule painting operations to prevent disruption of occupants in and about building.

1.6 Submittals

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

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Upon completion, submit 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 Material Safety Data Sheets(MSDS).

.4 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.

.1 Submit duplicate 300 mm length sample panels of each paint, stain, clear coating with specified paint or coating in colours, gloss/sheen and textures required to MPI Painting Specification Manual standards submitted on the following substrate materials:

.1 13 mm clapboard siding for finishes over wood surfaces.

.2 When approved, samples shall become acceptable standard of quality for appropriate on-site surface with one of each sample retained on-site.

1.7 Quality Control

.1 Provide mock-up in accordance with Section 01 45 00 - Quality Control.

1.8 Maintenance

.1 Extra Materials:

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

.2 Submit one, four litre can of each type and colour of finish coating. Identify colour and paint type in relation to established colour schedule and finish system.

1.9 Delivery, Storage And Handling

.1 Deliver, store and handle as follows:

.1 Deliver and store materials in original containers, sealed, with

labels intact.

.2 Labels: to indicate:

.1 Manufacturer's name and address.

.2 Type of paint or coating.

.3 Compliance with applicable standard.

.4 Colour number in accordance with established colour schedule.

.3 Remove damaged, opened and rejected materials from site.

.4 Provide and maintain dry, temperature controlled, secure storage.

.5 Observe manufacturer's recommendations for storage and handling.

.6 Store materials and supplies away from heat generating devices.

.7 Store materials and equipment in well ventilated area with temperature range 7 degrees C to 30 degrees C.

.8 Store temperature sensitive products above minimum temperature as recommended by manufacturer.

.9 Keep areas used for storage, cleaning and preparation, clean and orderly. Remove paint materials from storage only in quantities required for same day use.

.10 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.

.11 Fire Safety Requirements:

.1 Provide one 9 kg Type ABC dry chemical 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.

.2 Waste Management and Disposal:

.1 Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc.) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.

.2 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.

.3 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.

.4 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into the ground the following procedures shall be strictly adhered to:

.1 Retain cleaning water for water-based materials to allow sediments to be filtered out.

.2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.

.3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.

.4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.

.5 Empty paint cans are to be dry prior to disposal or recycling

(where available).

.5 Close and seal tightly partly used sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.

1.10 Ambient Conditions

.1 Heating, Ventilation and Lighting:

Provide temporary ventilating and heating equipment. Do not perform painting work unless adequate and continuous ventilation and sufficient heating facilities are in place to maintain ambient air and substrate temperatures above 10 degrees C for 24 hours before, during and after paint application until paint has cured sufficiently.

.1 Where required, provide continuous ventilation for seven days after completion of application of paint.

.2 Perform no painting work unless a minimum lighting level of 323 Lux is provided on surfaces to be painted. Adequate temporary lighting facilities to be provided by General Contractor.

.2 Temperature, Humidity and Substrate Moisture Content Levels:

.1 Unless specifically pre-approved by specifying body, Paint Inspection Agency and, applied product manufacturer, perform no priming or painting work when:

.1 Ambient air and substrate temperatures are below 10 degrees C.

.2 Substrate temperature is over 32 degrees C unless paint is specifically formulated for application at high temperatures.

.3 Substrate and ambient air

temperatures are expected to fall outside MPI or paint manufacturer's prescribed limits.

.4 Relative humidity is above 85 % or when dew point is less than 3 degrees C variance between air/surface temperature.

.5 Rain or snow is forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.

.2 Perform no priming or painting work when maximum moisture content of substrate exceeds:

.1 14 % for wood.

.3 Conduct moisture tests using a properly calibrated electronic Moisture Meter.

.3 Surface and Environmental Conditions:

.1 Apply primer or paint to adequately prepared surfaces and to surfaces within moisture limits noted herein.

.2 Apply paint when previous coat of paint is dry or adequately cured.

.3 Apply paint finishes when conditions forecast for entire period of application fall within manufacturer's recommendations.

.4 Do not apply primer or paint when:

.1 Temperature is expected to drop below 10 degrees C before paint has thoroughly cured.

.2 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's limits.

.3 Surface to be painted is wet, damp or frosted.

.5 Provide and maintain cover when primer or paint must be applied in damp or cold weather. Heat substrates and surrounding air to comply with temperature and humidity conditions specified by manufacturer. Protect until paint is dry or until weather conditions are suitable.

.6 Schedule painting operations such that surfaces exposed to direct, intense sunlight are scheduled for completion during early morning.

.7 Remove primer or paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.

PART 2 PRODUCTS

2.1 Materials

.1 Raw, purified linseed oil: highest quality product of an approved manufacturer.

.2 Clean, filtered, purified raw linseed oil containing no proteins, no solvents, no VOCs.

.3 Allback Purified Linseed Oil, or approved equal.

.4 Minimum 2 coats of raw linseed oil to wood and metal surfaces.

.5 Linseed oil paint: highest quality product of an approved manufacturer.

.6 Cold-pressed, filtered, solvent-free, 100% linseed oil plus pigment, no VOCs.

.7 Allback Linseed Oil Paint, or approved equal

.8 Minimum 3 coats Linseed Oil Paint to wood surfaces.

2.2 Colours

.1 Colours to be custom colours as directed by Departmental Representative.

PART 3 EXECUTION

3.1 General Procedures

.1 Perform preparations and cleaning procedures in strict accordance with manufacturer's instructions and as herein specified, for each substrate condition. Progression of work from preparation to priming and painting shall proceed in a timely fashion so as to not allow time for bared, prepped or primed, unfinished or completely unfinished substrate to be unnecessarily exposed to weather before receiving finish coats.

.2 The goal of a historic painting project such as this is to provide a very high quality, durable paint finish, while retaining as much of the paint history as possible and protecting the historic substrate from any unnecessary damage.

.3 Take all necessary precautions to protect elements and finishes from damage by precipitation during work of this section.

.4 All manufacturer's printed instructions are to be followed unless otherwise instructed in this document or by the Owner directly.

3.2 Evaluate Substrate

.1 Thoroughly assess substrate to determine if any carpentry repairs are necessary prior to beginning priming.

.2 Identify all areas where repairs are suggested for Department Representative review.

.3 Contractor is not to perform any repairs prior to consultation with Departmental Representative.

3.3 Cleaning

.1 Clean wood surfaces exposed to maritime atmosphere:

.1 Clean surfaces with Allback Linseed Soap. Rinse Surface.

.2 Allow washed area to drain completely and allow to dry thoroughly.

.2 The use of tri-sodium phosphate (TSP) and other products containing phosphates or sodium salts is forbidden.

3.4 Paint Retention

.1 Preference shall always be given to well adhered paint.

3.5 Paint Removal

.1 Mechanical: Scrape with hand tools all surfaces exhibiting areas of loose or peeling paint, and areas of adhesion failure. Hand sand after scraping using a grit of no lower than 80, but appropriate to achieve a smooth surface but not remove substrate. Feather all rough edges to provide a smooth transition between paint layers and substrate. As it is imperative that the substrate be free of all marks from sanding and tools, a disc sander is not to be considered. Sandpaper to be industrial, open-coat. Sand paper of the appropriate grid to be used to sand rough or fuzzed areas left after priming, but must not expose substrate.

3.6 Manufacture Instructions

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.7 Preparation

.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 additional notes on the drawings.

3.8 Protection

.1 Protect factory finished products and equipment.

.2 Protect passing pedestrians, and general public in and about building.

.3 Remove light fixtures, surface hardware on doors, and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Store items and re-install after painting is completed.

.4 As painting operations progress, place "WET PAINT" signs in pedestrian and vehicle traffic areas to approval of Departmental Representative.

3.9 Application

.1 Conditioning

.1 Method of application to be approved by Departmental Representative. Apply oil by brush. Conform to manufacturer's application instructions unless specified otherwise.

.2 New wood to be oiled on all sides prior to installation.

.3 Brush and Roller Application:

.1 Apply oil in a uniform layer using brush and/or roller of types suitable for application.

.2 Work oil into cracks, crevices and

corners.

.3 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces shall be free of roller tracking and heavy stipple unless approved by Departmental Representative.

.4 Remove runs, sags and brush marks from finished work and re-oil.

.5 Apply oil as continuous film of uniform thickness.

.6 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.

.4 All joints or gaps around doors, windows or vertical joints of siding where water invasion may occur are to be filled with an approved latex caulk, not to be applied until primer is dry.

.1 Sealing: Seal knots with pure shellac to prevent resin bleeding.

.2 Painting

.1 Method of application to be approved by Departmental Representative. Apply paint by brush only. Conform to manufacturer's application instructions unless specified otherwise.

.2 Add 20% zinc oxide to paint mixture to prevent mould/mildew growth.

.3 Upon completion of previous treatments, inspect all surfaces prior to paint application. Lightly hand sand rough or fuzzed areas. Care is to be taken not to expose substrate or re-priming will be necessary.

.4 Brush Application:

.1 Apply paint in a uniform

layer using brush of types suitable for application.

.2 Work paint into cracks, crevices and corners.

.3 Paint surfaces and corners not accessible to brush using daubers and/or sheepskins.

.4 Brush out runs and sags, and over-lap marks.

.5 Remove runs, sags and brush marks from finished work and repaint.

.6 Apply coats of paint as continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

.7 Allow surfaces to dry and properly cure for 24 hours between coats.

.5 Sand and dust between coats to remove visible defects.

.6 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as projecting ledges.

.7 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

.8 Apply additional paint coating where undercoats, stains, or other conditions show through paint film, until uniform finish colour is achieved.

.9 Provide a sample piece of clapboard siding (300mm length) with finish paint to Departmental Representative. Label the back of the sample with the following information: project Name; paint manufacturer; vendor; number of coats; date of application and Contractor name.

.10 Painting of Masonry: Add 30% water to linseed oil paint. Mix paint and water thoroughly using paint mixer attached to drill. Apply one coat. Apply with a stiff neutral paint brush. Clean up with linseed oil soap.

3.10 Field Quality Control

.1 Inspection:

.1 Advise Departmental Representative when each surface and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.

3.11 Restoration

.1 Clean and re-install hardware items removed before undertaken painting operations.

.2 Remove protective coverings and warning signs as soon as practical after operations cease.

.3 Protect freshly completed surfaces from paint droppings and dust to approval of Departmental Representative. Avoid scuffing newly applied paint.

.4 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Departmental Representative.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

.3 Section 01 45 00 - Quality Control.

.4 Section 01 61 00 - Common Product Requirements.

.5 Section 01 78 00 - Closeout Submittal.

1.2 References

.1 Architectural Painting Specifications Manual, Master Painters Institute (MPI).

.2 Systems and Specifications Manual, SSPC Painting Manual, Volume Two, Society for Protective Coatings (SSPC).

.3 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings) of the Environmental Protection Agency (EPA).

.4 National Fire Code of Canada.

1.3 Quality Assurance

.1 Contractor shall have a minimum of [five] years proven satisfactory experience. When requested, provide a list of last three comparable jobs including, job name and location, specifying authority, and project manager.

.2 Qualified journeymen who have a "Tradesman Qualification Certificate of Proficiency" shall be engaged in painting work. Apprentices may be employed provided they

work under the direct supervision of a qualified journeyman in accordance with trade regulations.

.3 Conform to latest MPI requirements for exterior painting work including preparation and priming.

.4 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) shall be in accordance with MPI Painting Specification Manual "Approved Product" listing and shall be from a single manufacturer for each system used.

.5 Other paint materials such as linseed oil, shellac, turpentine, etc. shall be the highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and shall be compatible with other coating materials as required.

.6 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Consultant.

.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.

1.4 Inspection Requirements

.1 Exterior painting and decorating work shall be inspected by a Paint Inspection Agency (inspector) acceptable to the specifying authority and local Painting Contractor's Association. Painting contractor shall notify the Paint

Inspection Agency a minimum of one week prior to commencement of work and provide a copy of project painting specification, plans and elevation drawings (including pertinent details) as well as a Finish Schedule.

.2 Exterior surfaces requiring painting shall be inspected by the Paint Inspection Agency who shall notify Consultant and General Contractor in writing of defects or problems, prior to commencing painting work, or after prime coat shows defects in substrate.

.3 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 shall provide as part of 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 Owner.

1.5 Scheduling of Work

.1 Submit work schedule for various stages of painting to Consultant for approval. Submit schedule minimum of 48 hours in advance of proposed operations.

.2 Obtain written authorization from Consultant for changes in work schedule.

.3 Schedule painting operations to prevent disruption of occupants in and about the building.

1.6 Submittals

.1 Submit product data and manufacturer's installation/application instructions for paints and coating products to be used in accordance with Section 01 33 00 -

Submittal Procedures.

.2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 61 33 - Hazardous Materials.

.3 Upon completion, submit 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 Material Safety Data Sheets (MSDS).

1.7 Samples

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

.2 Submit duplicate 200 x 300 mm sample panels of each paint with specified paint or coating in colours, gloss/sheen and textures required to MPI Painting Specification Manual standards submitted on the following substrate materials:
.1 3 mm plate steel for finishes over

.3 When approved, samples shall become acceptable standard of quality for appropriate on-site surface with one of each sample retained on-site.

.4 Submit full range of available colours where colour availability is restricted.

1.8 Quality Control

.1 Provide mock-up in accordance with Section 01 45 00 - Quality Control.

.2 When requested by the Consultant or Paint Inspection Agency, prepare and paint designated surface, area, room or item (in each colour scheme) to requirements

specified herein, with specified paint or coating showing selected colours, gloss/sheen, textures and workmanship to MPI Painting Specification Manual standards for review and approval. When approved, surface, area, room and/or items shall become acceptable standard of finish quality and workmanship for similar on-site work.

1.9 Extra Materials

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

.2 Submit one - four litre can of each type and colour of finish coating. Identify colour and paint type in relation to established colour schedule and finish system.

.3 Deliver to Contractor and store where directed.

1.10 Delivery, Handling and Storage

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements].

.2 Deliver and store materials in original containers, sealed, with labels intact.

.3 Labels shall clearly indicate:
.1 Manufacturer's name and address.
.2 Type of paint or coating.
.3 Compliance with applicable standard.
.4 Colour number in accordance with established colour schedule.

.4 Remove damaged, opened and rejected materials from site.

.5 Provide and maintain dry, temperature controlled, secure storage.

.6 Observe manufacturer's recommendations for

storage and handling.

.7 Store materials and supplies away from heat generating devices.

.8 Store materials and equipment in a well ventilated area with temperature range 7° C to 30° C.

.9 Store temperature sensitive products above minimum temperature as recommended by manufacturer.

.10 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Consultant. After completion of operations, return areas to clean condition to approval of Consultant.

.11 Remove paint materials from storage only in quantities required for same day use.

.12 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.

.13 Fire Safety Requirements:
.1 Provide one 9 kg Type ABC dry chemical 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.

1.11 Site Requirements

.1 Heating, Ventilation and Lighting:
.1 Perform no painting work unless adequate and continuous ventilation and sufficient heating facilities are in place

to maintain ambient air and substrate temperatures above 10° C for 24 hours before, during and after paint application until paint has cured sufficiently.

.2 Where required, provide continuous ventilation for seven days after completion of application of paint.

.3 Coordinate use of existing ventilation system with [Owner] [General Contractor] and ensure its operation during and after application of paint as required.

.4 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.

.5 Perform no painting work unless a minimum lighting level of 323 Lux is provided on surfaces to be painted. Adequate lighting facilities shall be provided by General Contractor.

.2 Surface and Environmental Conditions:

.1 Apply paint finish only 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 only to adequately prepared surfaces and to surfaces within moisture limits noted herein.

.3 Apply paint only when previous coat of paint is dry or adequately cured.

.4

1.12 Waste Management and Disposal

.1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

.2 Paint, stain and wood preservative finishes and related materials (thinners,

solvents, etc.) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.

.3 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.

.4 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.

.5 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into the ground the following procedures shall be strictly adhered to:
.1 Retain cleaning water for water-based materials to allow sediments to be filtered out.
.2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
.3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
.4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.
.5 Empty paint cans are to be dry prior to disposal or recycling (where available).

.6 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.

.7 Close and seal tightly partly used sealant and adhesive containers and store protected in well ventilated fire-safe

area at moderate temperature.

1.13 Warranty

.1 Provide a written guarantee signed and issued in the name of The Owner by Painting Manufacturer warranting for a period of thirty (30) years from date of Final Certificate of Completion, subject to the standard limitations and conditions of the manufacturer.

PART 2 - PRODUCTS

2.1 Materials

.1 Paint materials listed in the latest edition of the MPI Approved Products List (APL) are acceptable for use on this project.

.2 Part 1(Primer):
 .1 2 component, metallic zinc rich epoxy primer.
 .2 Gloss Level: matte
 .3 Volume Solids: 59%
 .4 Thickness: 3.4-5.1 mils wet
 .5 VOC: 152g/kg

.3 Part 2 (Maintenance Coating):
 .1 2 component, high build. High solids surface tolerant epoxy maintenance coating.
 .2 Gloss Level: Semi-Gloss
 .3 Volume Solids: 82%
 .4 Thickness: 4.9-12.2 mils wet
 .5 VOC: 114g/kg

.4 Part 3 (Finish Coating):
 .1 2 component acrylic polyurethane finish.
 .2 Gloss Level: High Gloss
 .3 Volume Solids: 57%
 .4 Thickness: 3.5-5.3 mils wet
 .5 VOC: 341g/kg

.5 Paints, coatings, adhesives, solvents,

cleaners, lubricants, and other fluids, shall:

.1 be manufactured without compounds which contribute to smog in the lower atmosphere.

.2 do not contain methylene chloride, chlorinated hydrocarbons, toxic metal pigments.

.6 The following must be performed on each batch of consolidated post-consumer material before surface coating is reformulated and canned. These tests must be performed at a laboratory or facility which has been accredited by the Standards Council of Canada.

.1 Lead, cadmium and chromium are to be determined using ICP-AES (Inductively Coupled Plasma - Atomic Emission Spectroscopy) technique no. 6010 as defined in EPA SW-846.

.2 Mercury is to be determined by Cold Vapour Atomic Absorption Spectroscopy using Technique no. 7471 as defined in EPA SW-846.

.3 Organochlorines and PCBs are to be determined by Gas Chromatography using Technique no. 8081 as defined in EPA SW-846.

2.2 Colours

.1 Consultant will provide Colour Schedule after Contract award. Submit proposed Colour Schedule to Consultant for approval.

.2 Colour schedule will be based upon selection of five base colours and three accent colours. No more than eight colours will be selected for the entire project and no more than [three] colours will be selected in each area.

.3 Selection of colours will be from manufacturers full range of colours.

.4 Where specific products are available in a restricted range of colours, selection will be based on the limited range.

.5 Second coat in a three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 Mixing and Tinting

.1 Perform colour tinting operations prior to delivery of paint to site. On-site tinting of painting materials is allowed only with Consultant's written permission.

.2 Paste, powder or catalyzed paint mixes shall be mixed in strict accordance with manufacturer's written instructions.

.3 Where thinner is used, addition shall not exceed paint manufacturer's recommendations. Do not use kerosene or any such organic solvents to thin water-based paints.

.4 Thin paint for spraying according in strict accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Consultant.

.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.

2.4 Gloss/Sheen Ratings

.1 Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following values:

Gloss Level	Units @ 60°/	Units @ 60°/

Category/		
G1 - matte finish	0 to 5	max. 10
G2 - velvet finish	0 to 10	10 to 35
G3 - eggshell finish	10 to 25	10 to 35
G4 - satin finish	20 to 35	min. 35
G5 - semi-gloss finish	35 to 70	
G6 - gloss finish	70 to 85	
G7 - high gloss finish	> 85	

.2 Gloss level ratings of painted surfaces shall be as specified herein and as noted on Finish Schedule.

PART 3 - EXECUTION

3.1 General

.1 Perform preparation and operations for exterior painting in accordance with MPI Painting Specifications Manual except where specified otherwise.

.2 Apply paint materials in accordance with paint manufacturer's written application instructions.

3.2 Existing Conditions

.1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Consultant damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.

3.3 Application

.1 Method of application to be as approved by

Consultant. Apply paint by brush, air sprayer (Air cap 704 or 765, Fluid Tip E), or airless sprayer. Conform to manufacturer's application instructions unless specified otherwise.

.2 Part 1 (Primer):

.1 Mixing: Material is supplied in two containers as a unit. Always mix a complete unit in the proportions supplied. Once the unit has been mixed, it must be used within the working pot life specified.
(1) Agitate Base (Part A) with a power agitator.
(2) Combine entire contents of Curing Agent (Part B) with Base (Part A) and mix thoroughly with power agitator.

.2 Mix Ratio: 4 parts: 4 Part by volume

.3 Working Pot Life:

24h at 5 degrees C.

12h at 15 degrees C

5h at 25 degrees C

2h at 40 degrees C

.3 Part 2 (Maintenance Coating):

.1 Mixing: Material is supplied in two containers as a unit. Always mix a complete unit in the proportions supplied. Once the unit has been mixed, it must be used within the working pot life specified.
(1) Agitate Base (Part A) with a power agitator.
(2) Combine entire contents of Curing Agent (Part B) with Base (Part A) and mix thoroughly with power agitator.

.2 Mix Ratio: 5.67 parts: 1 Part by volume

.3 Working Pot Life:

5h at 10 degrees C.

3h at 15 degrees C

2h at 25 degrees C

2h at 40 degrees C

.4 Part 3 (Finish Coating):

.1 Mixing: Material is supplied in two containers as a unit. Always mix a complete unit in the proportions supplied. Once the unit has been mixed, it must be used within the working pot life specified.
(1) Agitate Base (Part A) with a power agitator.
(2) Combine entire contents of Curing Agent (Part B) with Base (Part A) and mix thoroughly with power agitator.

.2 Mix Ratio: 6 parts: 1 Part by volume

.3 Working Pot Life:

26h at -5 degrees C.

12h at 5 degrees C

4h at 15 degrees C

2h at 25 degrees C

45min at 40 degrees C

.5 Spray Application:

.1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.

.2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation

or by intermittent agitation as frequently as necessary.

.3 Apply paint in a uniform layer, with overlapping at edges of spray pattern.

.4 Brush out immediately runs and sags.

.5 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray.

.6 Apply coats of paint as a continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

.7 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.

.8 Sand and dust between coats to remove visible defects.

.9 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as projecting ledges.

.10 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.4 Field Quality Control

.1 Field inspection of exterior painting operations to be carried out be independent inspection firm as designated by Consultant.

.2 Advise Consultant when each surface and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.

.3 Co-operate with inspection firm and provide access to areas of work.

3.5 Restoration

.1 Clean and re-install all hardware items removed before undertaken painting operations.

.2 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.

.3 Protect freshly completed surfaces from paint droppings and dust to approval of Consultant. Avoid scuffing newly applied paint.

.4 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Consultant.

SPECIFICATION

Cape Spear NHS
Lighthouse Dome Recapitalization
St. John's, NL
PCAN5582.00

Issued for Tender

DATE
February 9, 2018

ELECTRICAL PERMIT

PROVINCE OF NEWFOUNDLAND
PERMIT HOLDER
Class "A"
This Permit Allows
CROSBIE ENGINEERING LIMITED

To practice Professional Engineering
in Newfoundland and Labrador
Permit No. as issued by PEG-NL D0123
which is valid for the year 2018.

ELECTRICAL STAMP

DIVISION 26 - ELECTRICAL

END OF SECTION

DIVISION 26 – ELECTRICAL

Dwg. No.	**Drawing Title**
E1	Electrical Layouts
E2	Electrical Details

END OF SECTION

PART 1 - GENERAL

1.1 GENERAL

.1 This section covers items common to Sections of Division 26. This section supplements requirements of Division 01.

1.2 CODES AND STANDARDS

.1 Do complete installation in accordance with CSA C22.1-2015 except where specified otherwise.

.2 Do overhead and underground systems in accordance with CSA C22.3 No.1-M1987 except where specified otherwise.

.3 Abbreviations for electrical terms: to CSA Z85- 1983.

.4 Adhere to DFC Standards, latest editions.

.5 Adhere to Canadian Electrical Code – current edition.

1.3 CARE, OPERATION AND START-UP

.1 Instruct Departmental Representative and operating personnel in the operation, care and maintenance of systems, system equipment and components.

1.4 VOLTAGE RATINGS

.1 Operating voltages: to CAN3-C235-83.

.2 Control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard. Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

1.5 PERMITS, FEES AND INSPECTION

.1 Submit to Electrical Inspection Department and Supply Authority necessary number of drawings and specifications for examination and approval prior to commencement of work.

.2 Pay associated fees.

.3 Departmental Representative will provide drawings and specifications required by Electrical Inspection Department and Supply Authority at no cost.

.4 Notify Departmental Representative of changes required by Electrical Inspection Department prior to making changes.

.5 Furnish Certificates of Acceptance from Electrical Inspection Department and authorities having jurisdiction on completion of work to Departmental Representative.

1.6 MATERIALS AND EQUIPMENT

.1 Provide materials and equipment in accordance with Division 01.

.2 Equipment and material to be CSA certified. Where there is no alternative to supplying equipment which is not CSA certified, obtain special approval from Electrical Inspection Department.

.3 Factory assembles control panels and component assemblies.

1.7 FINISHES

.1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.

.2 Clean and touch up surfaces of shop painted equipment scratched or marred during shipment or installation, to match original paint.

.3 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

1.8 EQUIPMENT IDENTIFICATION

.1 Identify electrical equipment with nameplates as follows:

.2 Nameplates:

1. Lamicoid 3 mm thick plastic engraving sheet, black face, white core, mechanically attached with self tapping screws.

NAMEPLATE SIZES

Size 1	10 x 50 mm	1 line	3 mm high letters
Size 2	12 x 70 mm	1 line	5 mm high letters
Size 3	12 x 70 mm	2 lines	3 mm high letters
Size 4	20 x 90 mm	1 line	8 mm high letters
Size 5	20 x 90 mm	2 lines	5 mm high letters
Size 6	25 x 100 mm	1 line	12 mm high letters
Size 7	25 x 100 mm	2 lines	6 mm high letters

.3 Wording on nameplates and labels to be approved by Departmental Representative prior to manufacture.

.4 Allow for average of twenty-five (25) letters per nameplate.

.5 Identification to be provided in English.

1.9 TESTING, ACCEPTANCE AND GUARANTEE

.1 The work of this Contractor shall be tested and installed and any devices not operational shall be remedied immediately. Tests required by local authorities shall be the responsibility of the Contractor. When the work is completed, it shall be tested in its entirety, and shall be in good working order before the Certificate of Acceptance shall be issued.

.2 A written guarantee shall be supplied to Canada by the Contractor covering the prompt making good of any and all defects in material and workmanship for the period of one (1) year from the date of acceptance and the making good of any such defects shall be completely the responsibility of the Contractor.

.3 The Contractor will be responsible for the supply of sufficient power on a temporary basis to allow testing of all equipment and systems. These will be tested in the presence of the Departmental Representative.

1.10 WIRE IDENTIFICATION

.1 Identify wiring with permanent indelible identifying markings, either numbered or coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.

.2 Maintain phase sequence and colour coding throughout.

.3 Colour code: to CSA C22.1.

1.11 CONDUIT AND CABLE IDENTIFICATION

.1 Colour code conduits, boxes and metallic sheathed cables.

.2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.

.3 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

	Prime	Auxiliary
up to 250 V	Yellow	
up to 600 V	Yellow	Green

1.12 CONDUCTOR TERMINATIONS

.1 Lugs, terminals, screws used for termination of wiring to be suitable for either copper or aluminum conductors. Corrosion resistant to salt environment.

1.13 MANUFACTURERS AND CSA LABELS

.1 Visible and legible, after equipment is installed.

1.14 WARNING SIGNS

.1 As specified and to meet requirements of Electrical Inspection Department and Departmental Representative.

.2 Use decal signs, minimum size 175 x 250 mm.

1.15 MOUNTING HEIGHTS

.1 If mounting height of equipment is not indicated, verify before proceeding with installation.

.2 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.

1.16 LOAD BALANCE

.1 Measure phase current to panelboards with normal loads, (lighting), operating at time of acceptance. Adjust branch circuit connections as required to obtain best balance of current between phases and record changes.

1.17 FIELD QUALITY CONTROL

.1 All electrical work to be carried out by qualified, licensed electricians or apprentices as per the conditions of the Provincial Act respecting manpower vocational training and qualification. Employees registered in a provincial apprentices program shall be permitted, under the direct supervision of a qualified licensed electrician, to perform specific tasks - the activities permitted shall be determined based on the level of training attained and the demonstration of ability to perform specific duties.

.2 The work of this division to be carried out by a contractor who holds a valid Master Electrical contractor license as issued by the Province that the work is being constructed.

.3 Conduct and pay for following tests:
1. Circuits originating from branch distribution panels.

.4 Furnish manufacturer's certificate or letter confirming that entire installation as it pertains to each system has been installed to manufacturer's instructions.

.5 Insulation resistance testing.
1. Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.
2. Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument.

3. Check resistance to ground before energizing.

.6 Carry out tests in presence of Departmental Representative.

.7 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.

.8 Submit test results for Departmental Representative's review.

1.18 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

.1 Submit shop drawings in accordance with Division 01 - Section 01 33 00 – Submittal Procedures.

.2 Show on shop drawings details of construction, dimensions, capacities, weights and electrical performance characteristics of equipment or material.

.3 Where applicable, include wiring, single line and schematic diagrams.

.4 Include wiring drawings or diagrams showing interconnection with work of other divisions are required.

.5 Each shop drawing shall be stamped and signed by the Contractor before submitting, stating that he has checked the drawings against the requirements as called for in the contract documents, and also in the case here the equipment attached to or connects to other equipment, that it has been properly co-ordinated with this equipment, whether supplied under the Electrical Division or under other Divisions.

.6 Each shop drawing for non-catalogue items shall be prepared specifically for this project. If brochures are submitted for catalogue items, the brochures shall be marked definitely indicating the item or

items to be supplied.

.7 Work shall not be proceeded until final review of shop drawings are received by the Contractor.

.8 Shop Drawing Review is for general compliance with contract documents. No responsibility is assumed by the Departmental Representative for correctness of dimensions or details. Corrections or comments made on the shop drawings during the Departmental Representative's review do not relieve the Contractor from compliance with the requirements of the drawings and specifications.

1.19 OPERATION AND MAINTENANCE DATA

.1 Submit operation and maintenance data in accordance with Division 01.

.2 Include in manuals information based on following requirements:

1. Operation and maintenance instructions to be sufficiently detailed with respect to design elements, construction features and component function and maintenance requirements, to permit effective startup. Operation, maintenance, repair, modification, extension and expansion of any portion or feature of installation.
2. Technical data to be in the form of approved shop drawings, project data, supplemented by bulletins, component illustrations, exploded views technical descriptions of items, and parts lists. Advertising of sales literature will not be accepted.
3. Provide wiring and schematic diagrams and performance curves.
4. Include names and addresses of local suppliers for all items included in maintenance manuals.
5. Material to be in English.

1.20 MATERIAL SPECIFIED

.1 Where additional manufacturers are named under Articles entitled "Approved Manufacturers", the choice of which of the manufacturers named in reference to a particular article is to be used, shall be the Contractors.

.2 Materials or product specified without the clauses "or approved equal" or "approved manufacturers" shall be supplied as specified and no proposed substitution will be considered.

.3 Where approvals are granted for the use of other equipment any and all changes or additions required for the installation or operation of the approved equipment will be made by the Contractor at his own expense and no claims will be approved for any such changes, notwithstanding approval of shop drawings. Equipment that is accepted and installed and then does not perform as represented by original submitted data shall be replaced by the Contractor with equipment as specified, at no charge to the Canada.

1.21 QUALIFICATIONS OF WORKERS

.1 Qualified trades people shall be used for all disciplines of the electrical work required for this project.

1.22 EXAMINATION OF OTHER WORK

.1 This Division requires the examination of the material and work of all other Divisions upon which the work of this Section depends for proper completion. Any defect in work, levels, or materials, shall be reported to the Departmental Representative. The work of this Division shall not commence until such defects have been corrected.

1.23 DRAWINGS, CHANGES ACCESSIBILITY

.1 The drawings shall be considered to show the general character and scope of the work and not the exact details of the

installation.

.2 The installation shall be completed with all supports and accessories required for a complete operative and satisfactory installation.

.3 The location, arrangement and connection of equipment and material as shown on the drawings represents a close approximation to the intent and requirements of the Contract.

.4 The right is reserved by the Departmental Representative to make reasonable changes required to accommodate conditions arising during the progress of the work. Such changes shall be done at no extra cost to Canada, unless the location, arrangement or connection is more than 1.5 m from that shown.

.5 Actual location of existing services shall be verified in the field where necessary before work is commenced.

.6 Changes and modifications necessary to ensure co-ordination and to avoid interference or conflicts with other trades, or to accommodate existing conditions, shall be made at no extra cost to Canada.

1.24 AS-BUILT DRAWINGS

.1 The Departmental Representative will provide the Contractor with two (2) extra sets of white prints on which the Contractor shall clearly mark as the job progresses all changes and deviations from that shown on Contract drawings. On completion, forward to the Departmental Representative two (2) sets of drawings indicating all such changes and deviations.

1.31 CONTRIBUTION IN AID EXPENSE

.1 Contractor shall include all contribution-in-aid expenses incurred by power utility

company in contract price. Consult with power company prior to bidding for amount carried.

PART 2 - PRODUCTS NOT APPLICABLE TO THIS SECTION

PART 3 - EXECUTION NOT APPLICABLE TO THIS SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES .1 Materials and installation for Wire and Box Connectors 0-1000 V.

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

PART 2 - PRODUCTS

2.1 MATERIALS .1 Pressure type wire connectors: with current carrying parts of copper sized to fit copper conductors as required.

.2 Fixture type splicing connectors: with current carrying parts of copper sized to fit copper conductors 10 AWG or less.

PART 3 - EXECUTION

3.1 INSTALLATION .1 Remove insulation carefully from ends of conductors and:

1. Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CSA C22.2 C22.2 no 65.

PART 1 - GENERAL

1.1 RELATED SECTIONS

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

.2 Section 26 05 20 – Wire and Box Connectors 0 – 1000 V.

1.2 REFERENCES

.1 CSA C22.2 No .0.3-96, Test Methods for Electrical Wires and Cables.

.2 CAN/CSA-C22.2 No. 131-M1989 (R1994), type Teck 90 cable.

1.3 PRODUCT DATA

.1 Submit product data in accordance Division 01.

PART 2 - PRODUCTS

2.1 BUILDING WIRES

.1 Conductors: stranded for 10 AWG and larger. Minimum size: 12 AWG.

.2 Copper conductors: size as indicated, with 600V insulation of chemically cross-linked thermosetting polyethylene material rated RW90 XLPE and RWU90 XLPE as indicated.

.3 All wiring shall be installed in conduit as indicated.

PART 3 - EXECUTION

3.1 INSTALLATION OF BUILDING WIRES

.1 Install wiring as follows:

1. In conduit systems in accordance with Section 26 05 34 – Conduits, Conduit Fastenings and Conduit Fittings.
2. Terminate cables in accordance with Section 26 05 20 – Wire and Box Connectors 0 – 1000 V.

PART 1 GENERAL (NOT APPLICABLE)

PART 2 PRODUCTS

2.1 SUPPORT CHANNELS

.1 U shape, size 41 x 41 mm, 2.5 mm thick, surface mounted suspended or set in poured concrete walls and ceilings as required.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Secure equipment to hollow or solid masonry, tile and plaster surfaces with lead anchors or nylon shields.

.2 Secure equipment to poured concrete with expandable inserts.

.3 Secure equipment to hollow masonry walls or suspended ceilings with toggle bolts.

.4 Secure surface mounted equipment with twist clip fasteners to inverted T bar ceilings. Ensure that T bars are adequately supported to carry weight of equipment specified before installation.

.5 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.

.6 Fasten exposed conduit or cables to building construction or support system using straps.

.1 One-hole steel straps to secure surface conduits and cables 50 mm and smaller.

.2 Two-hole steel straps for conduits and cables larger than 50 mm.

.3 Beam clamps to secure conduit to exposed steel work.

.4 Strap AC-90 cable at box location plus every 900 mm.

.7 Suspended support systems.

.1 Support individual cable or conduit runs with 6 mm dia threaded rods and spring clips.

.2 Support 2 or more cables or conduits on channels supported by 6 mm dia threaded rod hangers where direct fastening to building construction is impractical.

.8 For surface mounting of two or more conduits use channels at 1.5 m on centre spacing.

.9 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.

.10 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.

.11 Do not use wire lashing, wood blocking, plastic strap or perforated strap to support or secure raceways or cables.

.12 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of Owner’s Representative.

.13 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and product data for cabinets in accordance with Division 01 - Submittal Procedures.

PART 2 - PRODUCTS

2.1 JUNCTION AND PULL BOXES

.1 Welded steel construction with screw-on flat covers for surface mounting.

.2 Covers with 25 mm minimum extension all around, for flush-mounted pull and junction boxes.

PART 3 - EXECUTION

3.1 JUNCTION & PULL BOX INSTALLATIONS

.1 Install pull boxes in inconspicuous but accessible locations.

.2 Mount cabinets with top not higher than 2 m above finished floor.

.3 Install terminal block as indicated in Type T cabinets.

.4 Only main junction and pull boxes are indicated. Install pull boxes so as not to exceed 30 m of conduit run between pull boxes.

3.2 IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 01 – Common Work Results - Electrical.

.2 Install size 2 identification labels indicating system name, voltage and phase.

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 26 05 00 – Common Work Results – Electrical.

.2 Section 26 05 29 – Hangers and Supports for Electrical Systems.

.3 Section 26 05 34 – Conduits, Conduit Fastenings and Fittings.

1.2 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CSA C22.1, Canadian Electrical Code, Part 1.

PART 2 PRODUCTS

2.1 OUTLET AND CONDUIT BOXES GENERAL

.1 Size boxes in accordance with CSA C22.1.

.2 102 mm square or larger outlet boxes as required for special devices.

.3 Gang boxes where wiring devices are grouped.

.4 Blank cover plates for boxes without wiring devices.

.5 Combination boxes with barriers where outlets for more than one system are grouped.

2.2 GALVANIZED STEEL OUTLET BOXES

.1 Electro-galvanized steel single and multi gang flush device boxes for flush installation, minimum size 76 x 50 x 38 mm or as indicated. 102 mm square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.

.2 102 mm square outlet boxes with extension and plaster rings for flush mounting devices in finished plaster walls.

2.3 CONDUIT BOXES

.1 Cast FS or FD aluminum boxes with factory-threaded hubs and mounting feet for surface wiring of switches and receptacle.

2.4 FITTINGS - GENERAL

.1 Bushing and connectors with nylon insulated throats.

.2 Knock-out fillers to prevent entry of debris.

.3 Conduit outlet bodies for conduit up to 32 mm and pull boxes for larger conduits.

.4 Double locknuts and insulated bushings on sheet metal boxes.

.5 Double split rings for AC-90 terminations.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Support boxes independently of connecting conduits.

.2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.

.3 For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm of opening.

.4 Provide correct size of openings in boxes for conduit, and armoured cable connections. Reducing washers are not allowed.

.5 Vacuum clean interior of outlet boxes before installation of wiring devices.

.6 Identify systems for outlet boxes as required.

END OF SECTION

PART 1 GENERAL

1.1 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CAN/CSA C22.2 No. 18, Outlet Boxes, Conduit Boxes, and Fittings and Associated Hardware, a National Standard of Canada.

.2 CSA C22.2 No. 45, Rigid Metal Conduit.

.3 CSA C22.2 No. 56, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.

.4 CSA C22.2 No. 83, Electrical Metallic Tubing.

.5 CSA C22.2 No. 211.2, Rigid PVC (Unplasticized) Conduit.

1.2 SUBMITTALS

.1 Product data: submit manufacturer's printed product literature, specifications and datasheets.

.1 Submit cable manufacturing data.

.2 Quality assurance submittals:

.1 Test reports: submit certified test reports.

.2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.3 Instructions: submit manufacturer's installation instructions.

PART 2 PRODUCTS

2.1 CONDUITS

.1 Rigid metal conduit: to CSA C22.2 No. 45, hot dipped galvanized steel threaded.

.2 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings.

.3 Rigid PVC conduit: to CSA C22.2 No. 211.2.

.4 Flexible metal conduit: to CSA C22.2 No. 56, aluminum liquid-tight flexible metal.

2.2 CONDUIT FASTENINGS

.1 One hole steel straps to secure surface conduits 50 mm and smaller. Two hole steel straps for conduits larger than 50 mm.

.2 Beam clamps to secure conduits to exposed steel work.

.3 Channel type supports for two or more conduits at 1.5 m oc.

.4 Threaded rods, 6 mm dia., to support suspended channels.

2.3 CONDUIT FITTINGS

.1 Fittings: manufactured for use with conduit specified. Coating: same as conduit.

.2 Factory "ells" where 90°, 45 ° or 22.5 ° bends are required for 25 mm and larger conduits.

.3 Ensure conduit bends other than factory “ells” are made with an approved bender. Making offsets and other bends by cutting and rejoining 90 degree bends are not permitted.

.4 Connectors and couplings for EMT. Steel set-screw type, size as required.

2.4 EXPANSION FITTINGS FOR RIGID CONDUIT

.1 Weatherproof expansion fittings with internal bonding assembly suitable for 100 mm linear expansion.

.2 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection in all directions.

.3 Weatherproof expansion fittings for linear expansion at entry to panel.

2.5 FISH CORD

.1 Polypropylene.

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 datasheets.

3.2 INSTALLATION

.1 Install all conduit, conduit fittings and accessories in accordance with the latest edition of the Canadian Electrical Code in a manner that does not alter, change or violate any part of the installed system components or the CSA/UL certification of these components.

.2 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.

.3 Conceal all new conduits except in mechanical and electrical service rooms and in unfinished areas.

.4 Surface mount conduits except in finished areas or as indicated.

.5 Use rigid hot dipped galvanized steel threaded conduit for exposed work below 2.4 m above finished floor.

.6 Use electrical metallic tubing (EMT) except in cast concrete and above 2.4 m not subject to mechanical injury, as well as concealed work in masonry construction.

.7 Use rigid PVC conduit underground and buried in or under concrete slab on grade.

.8 Minimum conduit size for power circuits: 21 mm.

.9 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.

.10 Mechanically bend steel conduit over 21 mm dia.

.11 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.

.12 Install fish cord in empty conduits.

.13 Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.

.14 Dry conduits out before installing wire.

3.3 SURFACE CONDUITS

.1 Run parallel or perpendicular to building lines.

.2 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.

.3 Run conduits in flanged portion of structural steel.

.4 Group conduits wherever possible on suspended channels.

.5 Do not pass conduits through structural members except as indicated.

.6 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

3.4 CONCEALED CONDUITS

.1 Run parallel or perpendicular to building lines.

.2 Do not install horizontal runs in masonry walls.

.3 Do not install conduits in terrazzo or concrete toppings.

3.5 CONDUITS UNDERGROUND

.1 Slope conduits to provide drainage.

.2 Waterproof joints (PVC accepted) with heavy coat of bituminous paint.

3.6 CLEANING

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

.2 On Completion and verification of performance of installation, remove surplus materials, excess materials rubbish, tools and equipment.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Receptacles, wiring devices, cover plates and their installation.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 91 13 – General Commissioning (Cx) Requirements.

.3 Section 26 05 00 – Common Work Results - Electrical.

1.3 REFERENCES

.1 Canadian Standards Association (CSA)

.1 CSA-C22.2 No.42, General Use Receptacles, Attachment Plugs and Similar Devices.

.2 CSA-C22.2 No.42.1, Cover Plates for Flush-Mounted Wiring Devices (Bi-national standard, with UL 514D).

.3 CSA-C22.2 No.55, Special Use Switches.

.4 CSA-C22.2 No.111, General-Use Snap Switches (Bi-national standard, with UL 20, twelfth edition).

PART 2 PRODUCTS

2.1 RECEPTACLES

.1 Duplex receptacles, CSA type 5-15 R, 125 V, 15 A, U ground, to: CSA-C22.2 No.42 with following features:

.1 White thermoplastic moulded housing.

.2 Suitable for No. 10 AWG for back and side wiring.

.3 Break-off links for use as split receptacles.

.4 Eight back wired entrances, four side wiring screws.

.5 Triple wipe contacts and rivetted grounding contacts.

.6 Specification grade.

.2 Single receptacles CSA type 5-15 R, 125 V, 15 A, U ground with following features:

.1 White thermoplastic moulded housing.

.2 Suitable for No. 10 AWG for back and side wiring.

.3 Four back wired entrances, 2 side wiring screws.

.3 Other receptacles with ampacity and voltage as indicated.

.4 Receptacles of one manufacturer throughout project.

.5 Acceptable products:

.1 Hubbel 5262-W,

.2 Leviton 5262-W,

.3 Pass and Seymour 5262-W.

2.2 COVERPLATES

.1 Coverplates for wiring devices to: CSA-C22.2 No.42.1.

.2 Cover plates from one manufacturer throughout project.

.3 Sheet steel utility box cover for wiring devices installed in surface-mounted utility boxes.

.4 Stainless steel cover plates as indicated, thickness 2.5 mm for wiring devices mounted in flush-mounted outlet box.

.5 Sheet metal cover plates for wiring devices mounted in surface-mounted FS or FD type conduit boxes.

.6 Weatherproof double lift spring-loaded cast aluminum cover plates, complete with gaskets for duplex receptacles as indicated.

.7 Weatherproof spring-loaded cast aluminum cover plates complete with gaskets for single receptacles or switches.

.8 All wiring device cover plates to be labeled using clear adhesive strips with black type identifying panel and circuit number for each device.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Receptacles:

.1 Install receptacles in gang type outlet box when more than one receptacle is required in one location.

.2 Mount receptacles at height in accordance with Section 26 05 00 – Common Work Results - Electrical.

.3 Where split receptacle has one portion switched, mount vertically and switch upper portion.

.2 Coverplates:

.1 Protect coverplate finish with paper or plastic film until painting and other work is finished.

.2 Install suitable common coverplates where wiring devices are grouped.

.3 Do not use cover plates meant for flush outlet boxes on surface-mounted boxes.

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

.1 Section Includes:
1. Moulded Case Circuit Breakers.

1.3 PRODUCT DATA

.1 Submit product data in accordance with Section 01 33 00 – Submittal Procedures.

.2 Include time-current characteristic curves for breakers with ampacity of 300 Amp and over with interrupting capacity of 10,000 A symmetrical (rms) and over at system voltage.

PART 2 - PRODUCTS

2.1 BREAKERS GENERAL

.1 Bolt-on moulded case circuit breaker: quick- make, quick-break type, for manual and automatic operation with temperature compensation for 40^{o}C ambient.

.2 Common-trip breakers: with single handle for multi-pole applications.

.3 Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting. Trip settings on breakers with adjustable trips to range from 3-8 times current rating.

.4 Circuit breakers with interchangeable trips as indicated.

.5 Interrupting capacity to match existing. Coordinate on site.

2.2 THERMAL MAGNETIC BREAKERS DESIGN A

.1 Moulded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping and instantaneous tripping for short circuit protection.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Install circuit breakers as indicated.

PART 1 - GENERAL

1.1 SCOPE OF WORK

.1 Testing and commissioning are called for throughout the individual specifications. This does not relieve this trade from providing all testing and commissioning necessary to ensure that systems and equipment operate as required and that they interface with other systems and equipment as required.

1.2 SECTION INCLUDES

.1 Commissioning of all building electrical systems and component including:

- .1 Testing and adjustment.
- .2 Demonstrations and Training.
- .3 Instructions of all procedures for Owner’s personnel.
- .4 Updating as-built data.
- .5 Co-ordination of Operation and Maintenance material.

1.3 RELATED SECTIONS

- .1 Section 01 78 00 – Closeout Submittals.
- .2 Section 26 05 01 – Common Work Results - Electrical.

1.4 REFERENCES

- .1 CSA (Canadian Standards Association).
- .2 Underwriters Laboratories of Canada.

1.5 QUALITY ASSURANCE

- .1 Provide qualified trades persons, certified testing agencies, factory trained and approved by the Commissioning Team Leader.
- .2 Submit the names of all personnel to be used during the Commissioning activities for Owner Approval.

1.6 COMMISSIONING

.1 The purpose of the commissioning process is to fully test all electrical components and operating procedures by challenging these systems to realistic operation conditions.

.2 The Commissioning activities shall be co-ordinated by the General Contractor.

.3 Commissioning activities for the electrical systems must have available up to date as-built drawing information and accurate Operations and Maintenance Manuals. These documents shall be a major part of this activity.

.4 Contractor shall be responsible to update all documentation with information and any changes duly noted during the Commissioning exercise.

.5 Contractor shall arrange for all outside suppliers, equipment manufacturers, test agencies and others as identified in the commissioning sections of this specification. The cost associated with this requirement shall be included as part of the tender price.

1.7 SUBMITTALS

.1 As-built drawings and data books must be available two weeks prior to commissioning for review and use by the consultant and Commissioning Team prior to the start of the commissioning activities.

1.8 PREPARATION

.1 Provide test instruments required for all activities as defined in the commissioning documents.

.2 Verify all systems are in compliance with the requirements of the commissioning documents prior to the

precommissioning check out operation.

.3 Confirm all scheduled activities have identified personnel available.

.4 Where systems or equipment do not operate as required, make the necessary corrections or modifications, re-test and re-commission.

1.9 SYSTEM DESCRIPTION

.1 Perform all start up operations, control adjustment, trouble shooting, servicing and maintenance of each item of equipment as defined in the commissioning documentation.

.2 Owner will provide list of personnel to receive instructions and will co-ordinate their attendance at agreed upon times.

.3 Prepare and insert additional data in the operations and maintenance manuals and update as-built drawings when need for additional data becomes apparent during the commissioning exercise.

.4 Where instruction is specified in the commissioning manual, instruct personnel in all phases of operation and maintenance using operation and maintenance manuals as the basis of instruction.

.5 Conduct presentation on Owner’s premises. Owner will provide space.

1.10 FINAL REPORT

.1 This trade shall assemble all testing data and commissioning reports and submit them to the Owner.

.2 Each form shall bear signature of recorder, and that of supervisor of reporting organizer.

1.11 SCHEDULE OF ACTIVITIES

.1 Commissioning activities shall be conducted based on pre-established schedule with all members of the commissioning team.

.2 Adhering to the established schedule is very important as the co-ordination and scheduling of the participants will be difficult to alter once this is established. Close co-ordination of this schedule is important.

.3 In the event project cannot be commissioned in the allotted time slot, the contractor shall pay for all costs associated with assembling the Commissioning Team at a later date. If the contractor has not performed his duties to reach commissioning stage as outlined earlier, he will incur all expenses of other trades and the Commissioning Team due to his non-compliance.

PART 2 - PRODUCTS NOT APPLICABLE TO THIS SECTION

PART 3 - EXECUTION NOT APPLICABLE TO THIS SECTION

PART 1 GENERAL

1.1 GENERAL

.1 This section describes the extent of services to be provided for wiring of equipment supplied by others.

.2 Within the context of this section, Others means:

.1 Other divisions of this specification.

.2 The Owner, as defined in the Contract.

.3 Other contractors supplying and installing equipment to the contract.

1.2 EXTENT OF SERVICES PROVIDED

.1 The work of this contract is to include all power and control wiring of equipment which is provided by Division 26.

.2 All power and control wiring associated with equipment supplied by Division 01 will be the responsibility of this contractor. Coordinate with general contractor for exact requirements.

1.3 RESPONSIBILITY OF DIVISION 26

.1 It is the responsibility of the Division 26 subcontractor to verify final requirements for wiring of all equipment noted. Verification of wiring requirements to include:

.1 Confirmation of electrical characteristics.

.2 Location of connection point.

.3 Method of connection (i.e. direct or plug-in etc.)

.2 Obtain and become familiar with shop drawings for all relevant equipment.

.3 No claim for extra will be entertained for wiring equipment which has been indicated, or changes to installed wiring where installation proceeded prior to verification of electrical requirements.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

APPENDIX 'A'

PARKS CANADA
ARCHAEOLOGY AND HISTORY DIRECTORATE

ARCHAEOLOGICAL OVERVIEW ASSESSMENT
CAPE SPEAR NHSC – NEWFOUNDLAND EAST
LIGHTHOUSE DOME RECAPITALIZATION - RPA nº 582

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Abstract

The Newfoundland East Field Unit has mandated a consultant firm to repair the dome structure located on top of the Cape Spear lighthouse building. The existing dome requires attention as over time it has been exposed to continuous extreme weather which has resulted in the structure beginning to suffer structural fatigue. This archaeological overview assessment evaluates the archaeological potential of the area aimed by the proposed work and assesses if an archaeological impact assessment is required.

Introduction

Located on a rugged sandstone cliff at our continent's most easterly point, Cape Spear Lighthouse National Historic Site host the oldest surviving lighthouse in Newfoundland and Labrador. Built in 1835 by the British Colony of Newfoundland to signal the approach to St. John's harbour, the Cape Spear Lighthouse is an iconic symbol of the island's mariner history. The Cape Spear lighthouse was erected three years after the colony was granted representative government in 1832 and shortly after the Commissioners of Lighthouses for the colony were appointed in 1834. It was the first coastal light in a network of lighthouses installed along the east coast for navigation. The Cape Spear lighthouse was designated a national historic site in 1962. Its heritage value lies in the remaining footprint of the original 1835 lighthouse building, its style and influence, its strategic location, and the isolated nature of its site (CIS 1999, p. 6, annexe C; Historic Sites and Monuments Board of Canada, March 1962 Minutes).

The early building consists of a 30 feet square-shaped two storey residential structure surrounding a central stone tower supporting the lantern and the dome (Fig. 1). A variety of alterations were made to the lighthouse during the 19th and 20th centuries, principally through construction of additions to accommodate the lightkeeper and his extended family (Fig. 2). A fog alarm shed, a well, an outhouse, a new light tower and several amenities and privies were also built and dismantled in the vicinity of the lighthouse during the course of the 19th and 20th centuries (CIS 1999, p. 2; Collins 2001, p. 19-22). The Cape Spear lighthouse is a skilful integration of two building types – a residence and a lighthouse – and is an elegant solution to a challenging functional program. The building solid construction also demonstrates the use of quality craftsmanship and materials some of which, such as the structural framing and interior masonry tower and lantern, have survived the harsh weather conditions for over a century (FHBRO 2000-198F, p. 10). Much altered over its life, the large scale restoration of the lighthouse in 1970's involved the removal of several additions and replacement of approximately 25% of the building's original fabric (FHBRO 2000-198F, p. 4). In 1976 a *Restoration Feasibility Study* was undertaken, culminating in restoration work undertaken in the summers of 1978 and 1980.

The lighthouse and some structural remains around it are directly associated with the site's national historic significance and are therefore, cultural resources of national historic significance. The lighthouse is rated as a «Classified» heritage building according to the FHBRO. Cape Spear lighthouse is a Classified Federal Heritage Building because of its historical associations, as well as its architectural and environmental values.

THE PROPOSED WORK

The overall objective of the lighthouse dome recapitalization project is to remove and repair the dome structure that covers the Cape Spear lighthouse. The existing dome requires attention as over time it has been exposed to continuous extreme weather which has resulted in some structural weaknesses. These weaknesses are creating entry points for rain water that leaks into the lighthouse structure and penetrate through the wooden material present. Rot and deterioration of the wood has begun, which unless addressed, will result in further structural degradation of the lighthouse tower.

A consultant was hired to develop tender-ready specifications and drawings to develop a rehabilitation plan and tender documents for the Cape Spear Lighthouse. The consultant have conducted a site visit to investigate the condition of the building. Architectural and structural analysis and recommendations are bases on the physical and visual inspection of the foundations, the exterior envelope and interior spaces. So far, the project involves **work on the building foundation and surrounding grade**, fireplace chimney, light tower interior-exterior, exterior walls and cladding, windows, doors, roof, flashings, lantern and dome, catwalk, interior re-painting, new camera and monitor. **Most of these proposed activities are planned on the building itself and won't have any impact on the buried archaeological resources. However, the work projected on the building's foundations and surroundings may generate an impact on the known and presumed archaeological resources**.

According to the consultant's report, the foundations appear to be in good condition from the outside as well as from the inside as seen in the crawl space. There are no signs of efflorescence (salt deposits) observed on exterior surface, and no cracks or spalls observed. The rubble foundation walls sit directly on bedrock. The mortar at the joints appears to be stable and intact although some openings in the stone foundation were observed (Gibbons Snow Architects inc. 2017, p. 4, 11). However, it was observed that the grass/grade is near or touches the trim boards in some areas, and that there is no positive slope away from the building. This could cause wood deterioration.

The consulting firm is thus recommending to 1) re-grade around perimeter of the building to provide positive drainage away from the foundation; 2) remove existing soil and sod and provide a layer of 300mm wide x 100mm depth of gravel 25mm maximum diameter on root barrier filter fabric, soil and sod around the perimeter of the foundation wall; and 3) install mesh screens in foundation openings to prevent vermin intrusions (Gibbons Snow Architects inc. 2017, p. 4, 11). The dimensions of the area/the perimeter covered by the proposed work have not yet been specified and more detailed information will be required from the consultant and the project manager to determine the full scope of the work.

POTENTIAL FOR CULTURAL RESOURCES

Cultural resources of national historic significance (formerly Level I) are numerous at the site and include the 1835 lighthouse and any structural remains related to the original lighthouse building and functioning.

Other structures close to the lighthouse include the outhouse and fencing. The outhouse is now constructed of new materials, but it is presumed to have been located approximately where it stands today. The tall pole visible on site is also a recreated signal staff that looks like the one erected in 1839 to communicate the arrival of ships with Signal Hill (FHBRO 2000-198F, p. 10-11).

Cultural resources of other significance (formerly Level II) are also known in the vicinity of the lighthouse. **These culture resources include the contemporary 1955's lighthouse complex, the structural remains of the lighthouse additions, fence and privy, footprints of additions to the original lighthouse, footprints and remains of ancillary structures, evidence of pathways/roadways and agricultural activities, the Historic Sites and Monuments Board Plaque, the Memorial Cross, and the plaque commemorating the site's opening. In addition, the archaeological collection and curatorial collection are also valued as level II resources**.

Several features belonging to the lighthouse complex and facilities were uncovered, mapped and recorded during archaeological excavations and field survey carried out at the site in 1976 and 1999 (Phillips Parmenter 1977; Luffman 1999; Parks Canada archaeological sites 5A1-5A5). The remains and vestiges of an attached fence and privy were uncovered during the course of archeological investigations that were undertaken during the restoration period and consist of post holes, wooden supports and a concrete foundation / sluiceway for the privy. In the case of the lighthouse additions, structural remains of the concrete foundations located outside of the original building footprint and iron and lead components of anchoring hardware and wooden planks were also found (CIS, p. 10; Phillips Parmenter 1977)

Remnants and evidence of pathways and roadways (between the outbuildings and between the complex and the coves on the south-eastern side of Cape Bay), ditches, wells and water holding basin (the latter consists of depressions left on or in the ground where water was collected for the fog alarm boiler installed in 1878), and the remains of a well near the footprint of the barn were also found in 1999 (Luffman 1999).

Evidence of agricultural activities such as gardening and grazing areas were also documented through hummocks and raised areas (where the outlines of former land uses exist such as gardens and rock walls), changes in natural vegetation patterns (that reflects the presence of non-native plants), and other landscape patterns that have not occurred as a result of natural processes (CIS, p. 11).

Finally, artifacts recovered from the site are numerous and fall under three categories: (a) those recovered during the course of the two excavations in 1976 and 1978 associated with the restoration of the lighthouse, (b) artifacts found near what may have been a dump area below the 1835 lighthouse, (c) an artifact found inside the lighthouse. The collection contains sherds from ceramic tableware, glass bottles and window panes, a pair of shoes, remnants of smoking pipes, fragments of slate pencils, shovel and tool fragments (CIS, p. 11). All these are of other historical value.

ARCHAEOLOGICAL REQUIREMENTS AND MITIGATION MEASURES

Based on the Gibbons Snow Architects' report, the project summary in the CRIA document, the Commemorative Integrity Statement and the existing documentation available at Parks Canada (which includes photographs, field archaeological reports and plans), our analysis of the project indicates that the area targeted by the proposed work around the lighthouse foundations has the potential to disturb and damage *in situ* archaeological features and presumed archaeological resources.

The 1976 archaeological investigation carried out in the vicinity of the lighthouse has yielded the remains of the front porch and of the first original doorway of the lighthouse on the north side of the building (Phillips Parmenter 1977, p. 3-5, figs. 2, 4-7). The excavation carried out on the west flank of the building also revealed some features related with the entrance of the 1836's kitchen extension. No archaeological investigation has ever been done on the east and south flanks of the building, but remains and/or footings of some of the lighthouse added rooms could be found (Figures 2, 4).

To ensure to protect and conserve the archaeological features that have been exposed in 1976 and to assess the archaeological potential of the east, west and south sides of the lighthouse, **Parks Canada Terrestrial Archaeology Unit recommends the archaeological monitoring of the area aimed by the re-grading and landscaping activities** planned around the lighthouse and especially the excavation that will be carried out on its south and east flanks to ensure a better drainage of the area. The subsurface perimeter around the current lighthouse building may have been partially or heavily disturbed by the 1977's restoration work carried out on the structure (Figure 5), but remains of the different additions made to the building – that are all of national historic significance – could still be found *in situ*. **Actually, the archaeological monitoring will be required only if the re-grading and sod removing work are performed mechanically. If these are made manually, we recommends an archaeological excavation beforehand**.

CONCLUSION

To conclude, we would like to inform the Newfoundland East Field Unit that the mitigation measures presented in this Archaeological Overview Assessment are subject to additions and alterations prior to and during the Cape Spear lighthouse dome recapitalisation project. If additional or modified scenarios are considered by the consulting engineering firm and/or the project manager, these mitigation measures will no longer apply and the new or modified plan must be sent to Parks Canada for review and evaluation.

In addition, if any cultural resource or artifact is encountered during the course of the project, the Newfoundland East Field Unit Project Manager or the consultant should immediately stop the ongoing work, record the find to the best of their ability and report their discovery to Parks Canada's Terrestrial Archaeology Unit for further guidance.

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- Phillips Parmenter, C. (1977), "Salvage Archaeology at Cape Spear Lighthouse, Newfoundland, September 1976", in Parks Canada National Historic Parks and Sites Branch Manuscript Report no 231 (1975-1976), Ottawa, p. 1-21;
- Canada's historic places website: http://historicplaces.ca/en/rep-reg/place-lieu.aspx?id=7404;
- http://www.encyclopediecanadienne.ca/fr/article/cap-spear/;

Illustrations

Figure 1. The Cape Spear Lighthouse in 2010.

Figure 2. Cape Spear Lighthouse reconstitutions at the Cape Spear Visitor Center.

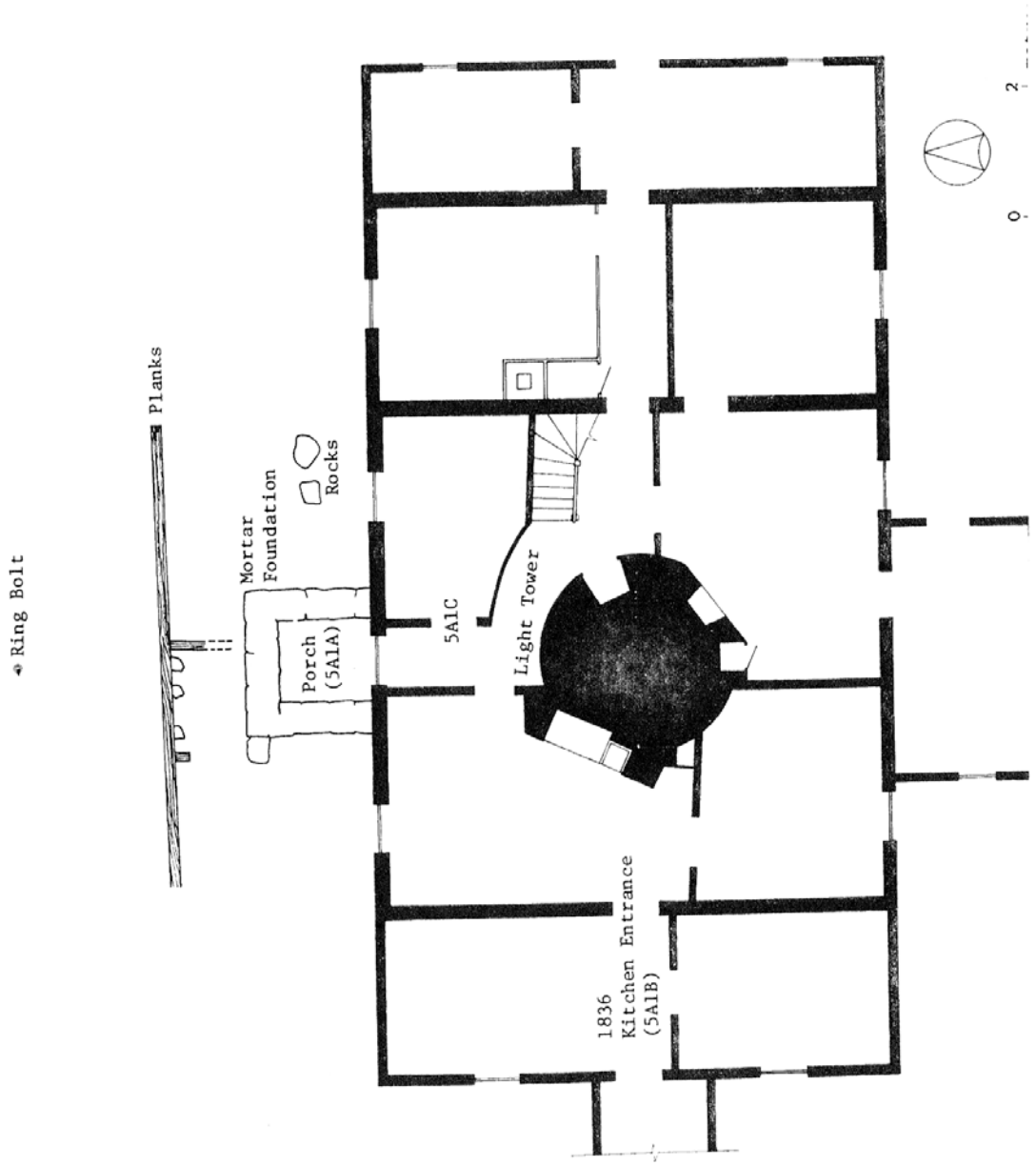

Figure 3: Plan of the Cape Spear lighthouse with the archaeological features uncovered in 1976 before the restoration program. (Phillips Parmenter 1977, p. 13, fig. 2).

Figure 4: Cape Spear lighthouse before the restoration program in 1968-1969. (Barlow *et al*. 1969, Figures 3-4).

Figure 5: The 1977s restoration program at the lighthouse and possible ground disturbances caused by the work on the west and south flanks of the building (FHBRO Report 2000, 00-198, p. 4, figs 9-10).