

Specifications

Issued for 100% Review

Hawthorne Cottage Site Recapitalization Project

PROJECT NO. 592

PARKS CANADA

September 15th, 2017

DISCIPLINE

DATE

STAMP

Architectural
Specifications

January 31, 2018



Structural
Specifications

January 31, 2018



END OF SECTION

PROCUREMENT AND CONTRACTING DOCUMENTS GROUP

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PART 1 GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

- .1 Work of this Contract generally involves exterior renovation and/or restoration work at Hawthorne Cottage National Historic Site, located between Irishtown Road and Main Road in Brigus, NL.
 - .1 The Work of this Contract includes, but is not necessarily limited to:
 - .1 Site work consisting of repair and/or replacing wooded picket fence and minor regrading and removal of accumulated organic material adjacent to part of the building.
 - .2 Structural upgrades and repairs including: new foundations for the veranda piers and new wooden piers and deck structure as illustrated; concealed steel angle framing to support veranda roof; replacement/restoration of wooden columns and pilasters supporting the veranda roof.
 - .3 Complete removal and replacement of all roofing material and flashings, including areas of wood shingles and membrane roofing. Some existing membrane roofing contains asbestos.
 - .4 Repointing of chimneys and replacement of damaged brick (on the exterior only).
 - .5 Clean and repair mortar/parging on fieldstone foundation wall.
 - .6 Repair and/or replace localized areas of wood trim and clapboard to match existing.
 - .7 Repair and/or replace localized areas of wooden windows and doors.
 - .8 Remove and dispose of all lead-containing exterior paint.
 - .9 Paint/repaint all exterior wood work, including clapboard, trims, structural elements, windows and doors.
 - .2 Refer to the complete set of Contract Documents for further information.
- .2 Background Information on Hawthorne Cottage National Historic Site:
 - .1 Hawthorne Cottage is considered a rare Newfoundland example in the cottage orné style of the Picturesque movement of the late 18th and early 19th centuries. The building was designed by merchant John Leamon as part of his country estate eight kilometers outside of Brigus and was constructed in 1830. Approximately three or four years later, the structure was moved from its original site to a spacious lot in Brigus. Since that time, the original structure has been extended with a two-storey kitchen/bathroom addition, roof dormers, projecting bay windows and an ornate wrap-around verandah. The most recent alterations (1995) were modifications for accessibility at the exterior porch entryway and within the interior. The building is currently used as a house museum.

- .2 Hawthorne Cottage has been designated as a Classified Heritage Building because of its historical associations, environmental significance and architectural design. The site is associated with two individuals of historical importance. The first is its builder, John Leamon, a local merchant with connections to the seal and fishery trades who also held numerous posts including membership in the House of Assembly. The second is Captain Robert Abram (Bob) Bartlett. Designated a person of national historic significance in 1972, Bartlett is famous for his northern explorations and his study of Arctic archeology, flora and fauna. His association with Hawthorne Cottage comes from his sporadic residency between voyages.
 - .3 The construction of Hawthorne Cottage is an early and compelling case illustrating the growing wealth of Brigus when it was a key sealing, fishing and shipbuilding port between 1830 and 1870, during the first years of the Newfoundland outpost “golden age.” It is a well-known landmark within the town and region for its early date of construction and for its association with the Leaman family and later with the Bartletts.
 - .4 The heritage character of Hawthorne Cottage resides in all aspects of its form, stylistic references, fenestration, materials, interior layout and site relationships.
- .3 Description of Existing Site:
- .1 The massing of Hawthorne Cottage consists of a square one-and-one-half storey form with hip roof, dormer windows, bellcast-roofed veranda, a two-storey kitchen/bathroom addition with a low-pitch roof and a lean-to coal shed addition (that is currently used as the accessible entrance). The building has an approximate gross floor area of 378 m². The high field-stone foundation, constructed when the house was moved, and the projecting side bay windows contribute to the form of the house. These components contribute to the distinctive massing which is intrinsic to the Picturesque aesthetic.
 - .2 The details of the roof, chimney, variety of window and door configurations, building finishes and the characteristic verandah are important to the character of the building. The ornate verandah runs across the front facade and sweeps around to enclose two thirds of the length of each sidewall. It consists of a series of bays detailed with arched wood fretwork which frame the view of windows and doors, and with balustrades which are alternating combinations of spindles or crosses. A strong horizontality is created by its roof, which parallels the eave of the hip roof of the house.
 - .3 The interior layout on both floors is largely intact and is characterized by a centre-hall plan. The stair and hallway are the principal organizing features of the layout. The stairs occupy an area off the front entryway and are placed parallel to the front wall. The hallway pierces an enormous central chimney which serves both the parlour and the dining room.

1.02 CONTRACT METHOD

- .1 Construct Work under a stipulated price contract with a unit price component for some aspects of the work.

1.03 CONTRACTOR USE OF PREMISES

- .1 The Contractor will have limited access to the site under supervision by a Departmental Representative. The purpose of this limitation is to mitigate potential issues involving Contractor access to areas of the site that may contain artifacts or other items of importance or value. In addition, the entire area of the property is considered to be an integral part of Hawthorne Cottage National Historic Site and as such, damage to the surrounding landscape must be avoided or kept to the absolute minimum when it is impossible to avoid impacts.
 - .1 Although access will be controlled, the Contractor will be granted supervised access to areas of the site and building as required to complete the Work of this Contract. Supervised access will be available up to six days per week during typical construction-trade working hours on a predetermined schedule agreed to between the Departmental Representative and the Contractor prior to the commencement of Work.
- .2 The site/grounds are considered part of the historic status for the building therefore no vehicular access is permitted within the fence boundary at any time without approval from Departmental Representative.
- .3 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .4 Keep within limits of work and avenues of ingress and egress.
- .5 Co-ordinate use of premises under direction of Departmental Representative.
- .6 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
 - .1 Storage and/or laydown areas will not be provided on the landscape portions of the Hawthorne Cottage National Historic Site.
 - .2 It may be possible to utilize Town-owned or private property adjacent to the Hawthorne Cottage National Historic Site for storage and/or staging purposes. The Contractor is responsible to obtain permission for and pay for any such usage and is advised to inquire as to the availability and cost of such areas before submitting a Bid.
- .7 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .8 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.
- .9 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

1.04 OWNER OCCUPANCY

- .1 Owner will occupy premises during entire construction period but the site will be closed to the general public.

- .2 Co-operate with Departmental Representative in scheduling operations to minimize conflict and to facilitate Owner usage.

1.05 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

- .1 Execute work with least possible interference or disturbance to building operations. Arrange with Departmental Representative to facilitate execution of work.

1.06 EXISTING SERVICES

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

1.07 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy each document as follows:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Reviewed Shop Drawings.

- .5 List of Outstanding Shop Drawings.
- .6 Change Orders.
- .7 Other Modifications to Contract.
- .8 Field Test Reports.
- .9 Copy of Approved Work Schedule.
- .10 Health and Safety Plan and Other Safety Related Documents.
- .11 Other documents as specified.

PART 2 PRODUCTS

2.01 NOT USED

- .1 Not used.

PART 3 EXECUTION

3.01 NOT USED

- .1 Not used.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 29 83 – Quality Control.
- .2 Section 03 30 00 – Cast in Place Concrete.

1.02 APPOINTMENT AND PAYMENT

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

1.03 CONTRACTOR'S RESPONSIBILITIES

- .1 Provide labour, equipment and facilities to:
- .2 Provide access to Work for inspection and testing.
- .3 Facilitate inspections and tests.
- .4 Make good Work disturbed by inspection and test.
- .5 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.
- .6 Notify Departmental Representative 48 hours minimum sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.
- .7 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.
- .8 Pay costs for uncovering and making good Work that is covered before required inspection or testing is completed and approved by Departmental Representative.

PART 2 PRODUCTS

2.01 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 32 16.07 – Construction Progress Schedule Bar (Gantt) Chart.
- .2 Section 01 33 00 - Submittal Procedures.
- .3 Section 01 78 00 - Closeout Submittals

1.02 ADMINISTRATIVE

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

1.03 PRECONSTRUCTION MEETING

- .1 Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum seven days before meeting.
- .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .5 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work: in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.

- .3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
- .5 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
- .6 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .7 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.
- .8 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
- .9 Monthly progress claims, administrative procedures, photographs, hold backs.
- .10 Appointment of inspection and testing agencies or firms.
- .11 Insurances, transcript of policies.

1.04 PROGRESS MEETINGS

- .1 During course of Work schedule progress meetings monthly.
- .2 Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance.
- .3 Notify parties minimum seven days prior to meetings.
- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 14 days after meeting.
- .5 Agenda to include the following (as a minimum):
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule and corrective measures and procedures to regain projected schedule.
 - .5 Progress schedule, during succeeding work period.
 - .6 Review submittal schedules: expedite as required.
 - .7 Maintenance of quality standards.
 - .8 Review proposed changes for affect on construction schedule and on completion date.
 - .9 Other business.

PART 2 PRODUCTS

2.01 NOT USED

PART 3 EXECUTION

3.01 NOT USED

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 31 19 – Project Meetings.

1.02 DEFINITIONS

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

1.03 REQUIREMENTS

- .1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.
- .3 Limit activity durations to maximum of approximately 10 working days, to allow for progress reporting.

- .4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

1.04 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental Representative within 15 days of Award of Contract a Bar (GANTT) Chart for planning, monitoring and reporting of project progress.

1.05 PROJECT MILESTONES

- .1 Project milestones targets for Project Schedule.

1.06 PROJECT SCHEDULE

- .1 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
 - .1 Award.
 - .2 Shop Drawings, Samples.
 - .3 Permits.
 - .4 Mobilization.
 - .5 Excavation.
 - .6 Backfill.
 - .7 Veranda footings/foundation.
 - .8 Siding and Roofing.
 - .9 Testing and Commissioning.

1.07 PROJECT SCHEDULE REPORTING

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

1.08 PROJECT MEETINGS

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

PART 2 PRODUCTS

2.01 NOT USED

.1 Not used.

PART 3 EXECUTION

3.01 NOT USED

.1 Not used.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 31 19 – Project Meetings.
- .2 Section 01 45 00 - Quality Control.

1.02 ADMINISTRATIVE

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

1.03 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 Submit drawings stamped and signed by professional engineer registered or licensed in the province of Newfoundland and Labrador, Canada.

- .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .4 Allow 14 days for Departmental Representative's review of each submission.
- .5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
- .7 Accompany submissions with transmittal letter containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .8 Submissions include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.

- .8 Wiring diagrams.
- .9 Single line and schematic diagrams.
- .10 Relationship to adjacent work.
- .9 After Departmental Representative's review, distribute copies.
- .10 Submit electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
- .11 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .12 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
 - .2 Testing must have been within three years of date of contract award for project.
- .13 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract complete with project name.
- .14 Submit electronic copies of manufacturers instructions for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .15 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
- .16 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .17 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
- .18 Delete information not applicable to project.
- .19 Supplement standard information to provide details applicable to project.

- .20 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, electronic files will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .21 The review of shop drawings by Public Works and Government Services Canada (PSPC) is for sole purpose of ascertaining conformance with general concept.
 - .1 This review shall not mean that PSPC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
 - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.04 SAMPLES

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

1.05 MOCK-UPS

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

1.06 PHOTOGRAPHIC DOCUMENTATION

- .1 Submit electronic copy of colour digital photography in jpg format, fine resolution monthly with progress statement or as directed by Departmental Representative.
- .2 Project identification: name and number of project and date of exposure indicated.

- .3 Viewpoints and their location as determined by [Departmental Representative].
- .4 Frequency of photographic documentation: as directed by Departmental Representative.

1.07 CERTIFICATES AND TRANSCRIPTS

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

PART 2 PRODUCTS

2.01 NOT USED

- .1 Not Used.

PART 3 EXECUTION

3.01 NOT USED

- .1 Not Used.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 41 00 - Regulatory Requirements.
- .3 Section 02 82 00.01 – Asbestos Abatement – Minimum Precautions.
- .4 Section 02 83 11 – Lead-Base Paint Abatement – Intermediate Precautions.

1.02 REFERENCE STANDARDS

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2 Province of Newfoundland and Labrador
 - .1 Occupational Health and Safety Act, R.S.N. - Updated [2012].

1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan: Within 15 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operation.
 - .3 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.
- .3 Submit electronic copy of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative.
- .4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .5 Submit copies of incident and accident reports.
- .6 Submit WHMIS MSDS - Material Safety Data Sheets.
- .7 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 14 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within five days after receipt of comments from Departmental Representative.

- .8 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .9 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.

1.04 SAFETY ASSESSMENT

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

1.05 MEETINGS

- .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work. This may coincide with initial project meeting.

1.06 REGULATORY REQUIREMENTS

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

1.07 GENERAL REQUIREMENTS

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

1.08 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.09 COMPLIANCE REQUIREMENTS

- .1 Comply with Newfoundland and Labrador Occupational Health and Safety Act, R.S.N. - Updated [2012].
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.10 UNFORSEEN HAZARDS

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

1.11 POSTING OF DOCUMENTS

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

1.12 CORRECTION OF NON-COMPLIANCE

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

1.13 POWDER ACTUATED DEVICES

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

1.14 WORK STOPPAGE

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

PART 2 PRODUCTS

2.01 NOT USED

- .1 Not used.

PART 3 EXECUTION

3.01 NOT USED

.1 Not used.

END OF SECTION

PART 1 GENERAL

1.01 DEFINITIONS

- .1 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.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.

1.02 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review Departmental Representative.
- .3 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.
- .4 Address topics at level of detail commensurate with environmental issue and required construction task[.
- .5 Include in Environmental Protection Plan:
 - .1 Name[s] of person[s] responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Name[s] and qualifications of person[s] responsible for manifesting hazardous waste to be removed from site.
 - .3 Name[s] and qualifications of person[s] responsible for training site personnel.
 - .4 Descriptions of environmental protection personnel training program.
 - .5 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.
 - .6 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
 - .7 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
 - .8 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.

- .9 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.

1.03 BATS: DISCOVERY AND ACCOMMODATION

- .1 If bats are discovered living in or adjacent to any element of the property that will be disturbed by the Work of this contract; the Contractor is to notify the Departmental Representative immediately.
 - .1 Three species of bats have been confirmed to live on the island of Newfoundland: Little Brown Bat (*Myotis lucifugus*), the Northern Long-eared Bat [*Myotis keenii* (*septentrionalis*)], and the Hoary Bat (*Lasiurus cinereus*).
- .2 The Contractor must stop all work in the area of the bat habitat and may not be able to continue until bats are relocated by wildlife authorities. Departmental Representative will notify the Contractor in writing what action will be taken.

1.04 FIRES

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

1.05 SITE CLEARING AND PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties as indicated.
- .2 Protect trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m minimum.
- .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.
 - .1 Avoid unnecessary traffic, dumping and storage of materials over root zones.

1.06 WORK ADJACENT TO WATERWAYS

- .1 Waterways to be kept free of excavated fill, waste material and debris.

1.07 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment and plant in accordance with local authorities' emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.
 - .1 Provide temporary enclosures where indicated.

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

1.08 HISTORICAL/ ARCHAEOLOGICAL CONTROL

- .1 Plan: include methods to assure protection of known or discovered resources and identify lines of communication between Contractor personnel and Departmental Representative.

1.09 NOTIFICATION

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

PART 2 PRODUCTS

2.01 NOT USED

- .1 Not Used.

PART 3 EXECUTION

3.01 NOT USED

- .1 Not Used.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 02 82 00.01 - Asbestos Abatement - Minimum Precautions
- .2 Section 02 83 11 – Lead-Base Paint Abatement – Intermediate Precautions.

1.02 REFERENCES AND CODES

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

1.03 HAZARDOUS MATERIAL DISCOVERY

- .1 Asbestos: demolition of spray or trowel-applied asbestos is hazardous to health. Stop work immediately when material resembling spray or trowel-applied asbestos is encountered during demolition work. Notify Departmental Representative.
 - .1 Refer to Section 02 82 00.01 - Asbestos Abatement - Minimum Precautions
- .2 PCB: Polychlorinated Biphenyl: stop work immediately when material resembling Polychlorinated Biphenyl is encountered during demolition work. Notify Departmental Representative.
- .3 Mould: stop work immediately when, other than where indicated on wood siding surface, material resembling mould is encountered during demolition work. Notify Departmental Representative.

1.04 BUILDING SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions and municipal by-laws.

1.05 NATIONAL PARKS ACT

- .1 Perform Work in accordance with National Parks Act when projects are located within boundaries of National Park.

PART 2 PRODUCTS

2.01 NOT USED

- .1 Not Used.

PART 3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 29 83 – Payment Procedures for Testing Laboratory Services.
- .2 Section 01 78 00 – Closeout Submittals.

1.02 INSPECTION

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

1.03 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work.
 - .1 Refer to Section 01 29 83 – Payment Procedures for Testing Laboratory Services.
- .2 Provide equipment required for executing inspection and testing by appointed agencies.
- .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Owner. Pay costs for retesting and reinspection.

1.04 ACCESS TO WORK

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

1.05 PROCEDURES

- .1 Notify appropriate agency and Departmental Representative 48 hours in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.06 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.

1.07 REPORTS

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

1.08 TESTS AND MIX DESIGNS

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

1.09 MOCK-UPS

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

- .7 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

1.10 MILL TESTS

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

1.11 EQUIPMENT AND SYSTEMS

PART 2 PRODUCTS

2.01 NOT USED

- .1 Not Used.

PART 3 EXECUTION

3.01 NOT USED

- .1 Not Used.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

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

1.02 INSTALLATION AND REMOVAL

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

1.03 DEWATERING

- .1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.

1.04 WATER SUPPLY

- .1 Departmental Representative will provide access to potable water for construction use.

1.05 TEMPORARY HEATING AND VENTILATION

- .1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.
- .2 Construction heaters used must be vented to outside or be non-flameless type. Solid fuel salamanders are not permitted.
- .3 Provide temporary heat and ventilation in temporarily enclosed (hoarded) areas as required to:
 - .1 Facilitate progress of Work.
 - .2 Protect Work and products against dampness and cold.
 - .3 Prevent moisture condensation on surfaces.
 - .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
 - .5 Provide adequate ventilation to meet health regulations for safe working environment.
- .4 Unless otherwise required for specific material installation, maintain temperatures of minimum 10 degrees C in areas where construction is in progress.
- .5 Ventilating:
 - .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.

- .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
- .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
- .4 Ventilate storage spaces containing hazardous or volatile materials.
- .5 Ventilate temporary sanitary facilities.
- .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.
- .6 Pay costs for maintaining temporary heating appliances that cannot be powered from the building's existing electrical system (see 1.06 below).
- .7 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 damage to finishes.
 - .4 Vent direct-fired combustion units to outside.
- .8 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.06 TEMPORARY POWER AND LIGHT

- .1 Departmental Representative will provide and pay for temporary power during construction for temporary lighting and operating of power tools that can be operated from the building's existing power system.

Temporary power for equipment that cannot be powered from the existing building's electrical service is the responsibility of Contractor.

1.07 FIRE PROTECTION

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

PART 2 PRODUCTS

2.01 NOT USED

PART 3 EXECUTION

3.01 NOT USED

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 11 00 – Summary of Works.
- .2 Section 01 51 00 – Temporary Utilities.
- .3 Section 01 56 00 – Temporary Barriers and Enclosures.

1.02 REFERENCE STANDARDS

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1/A23.2-[04], Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-0121-[M1978(R2003)], Douglas Fir Plywood.
 - .3 CAN/CSA-S269.2-[M1987(R2003)], Access Scaffolding for Construction Purposes.
 - .4 CAN/CSA-Z321-[96(R2001)], Signs and Symbols for the Occupational Environment.

1.03 INSTALLATION AND REMOVAL

- .1 Provide construction facilities in order to execute work expeditiously.
- .2 Remove from site all such work after use.

1.04 SCAFFOLDING

- .1 Scaffolding in accordance with CAN/CSA-S269.2.
- .2 Provide and maintain scaffolding, ramps, ladders, platforms, temporary stairs and other components as required.

1.05 HOISTING

- .1 Provide, operate and maintain hoists and/or cranes required for moving of workers, materials and equipment.
- .2 Hoists and/or cranes to be operated by qualified operator.

1.06 SITE STORAGE/LOADING

- .1 Confine work and operations of employees as noted in Section 01 11 00 – Summary of Works. Do not unreasonably encumber premises with products.
- .2 Do not load or permit to load any part of Work with weight or force that will endanger Work.

1.07 CONSTRUCTION PARKING

- .1 Parking will not be permitted on site.
- .2 Provide and maintain adequate access to project site.

1.08 SECURITY

- .1 Contractor will be responsible to ensure that the site including the building and all its contents are secured at the end of each day when leaving site.

1.09 OFFICES

- .1 The provision of a site office is not required.

1.10 EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds or other means of storage for storage of tools, equipment and materials. Refer to Section 01 11 00 – Summary of Works for restrictions.

1.11 SANITARY FACILITIES

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

1.12 CONSTRUCTION SIGNAGE

- .1 Signs and notices for safety and instruction in both official languages Graphic symbols to CAN/CSA-Z321.
- .2 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.

1.13 PROTECTION AND MAINTENANCE OF TRAFFIC

- .1 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs
- .2 Protect travelling public from damage to person and property.
- .3 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
- .4 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.

1.14 CLEAN-UP

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable.
- .4 Stack stored new or salvaged material not in construction facilities.

PART 2 PRODUCTS

2.01 NOT USED

- .1 Not Used.

PART 3 EXECUTION

3.01 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 51 00 – Temporary Utilities.
- .2 Section 01 52 00 – Construction Facilities.
- .3 01 74 21 - Construction/Demolition Waste Management and Disposal

1.02 REFERENCE STANDARDS

- .1 Canadian General Standards Board (CGSB)
 - .1 CGSB 1.59-[97], Alkyd Exterior Gloss Enamel.
 - .2 CAN/CGSB 1.189-[00], Exterior Alkyd Primer for Wood.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA-O121-[M1978(R2003)], Douglas Fir Plywood.

1.03 INSTALLATION AND REMOVAL

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

1.04 HOARDING

- .1 Erect temporary site enclosure when/where existing fence is removed during repair/replacement using new 1.2 m high snow fence wired to rolled steel "T" bar fence posts spaced at 2.4 m on centre. Maintain fence in good repair.
- .2 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

1.05 GUARD RAILS AND BARRICADES

- .1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs.
- .2 Provide as required by governing authorities.

1.06 WEATHER ENCLOSURES

- .1 Provide weather tight closures to unfinished door and window openings, tops of shafts and other openings in floors and roofs.
- .2 Provide weather tight closures to protect wall areas during painting operations and chimney and foundations areas during masonry repair.

- .3 Close off floor areas where walls are not finished; seal off other openings; enclose building interior work for temporary heat.
- .4 Design enclosures to withstand wind pressure and snow loading.

1.07 DUST TIGHT SCREENS

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

1.08 ACCESS TO SITE

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

1.09 PUBLIC TRAFFIC FLOW

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

1.10 FIRE ROUTES

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

1.11 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

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

1.12 PROTECTION OF BUILDING FINISHES

- .1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.
- .2 Provide necessary screens, covers, and hoardings.
- .3 Be responsible for damage incurred due to lack of or improper protection.

1.13 WASTE MANAGEMENT AND DISPOSAL

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

PART 2 PRODUCTS

2.01 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 73 00 – Execution.

1.02 REFERENCE STANDARDS

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

1.03 QUALITY

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

1.04 AVAILABILITY

- .1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.
- .2 In event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.05 STORAGE, HANDLING AND PROTECTION

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

1.06 TRANSPORTATION

- .1 Pay costs of transportation of products required in performance of Work.

1.07 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative will establish course of action.

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

1.08 QUALITY OF WORK

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

1.09 CO-ORDINATION

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

1.10 REMEDIAL WORK

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

1.11 LOCATION OF FIXTURES

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

1.12 FASTENINGS

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

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

1.13 FASTENINGS - EQUIPMENT

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

1.14 PROTECTION OF WORK IN PROGRESS

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

1.15 EXISTING UTILITIES

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

PART 2 PRODUCTS

2.01 NOT USED

- .1 Not Used.

PART 3 EXECUTION

3.01 NOT USED

- .1 Not Used.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 78 00 – Closeout Submittals.

1.02 REFERENCE STANDARDS

- .1 Owner's identification of existing survey control points and property limits.

1.03 QUALIFICATIONS OF SURVEYOR

- .1 Qualified registered land surveyor, licensed to practice in Place of Work, acceptable to Departmental Representative.

1.04 EXISTING SERVICES

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

1.05 LOCATION OF EQUIPMENT AND FIXTURES

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

1.06 RECORDS

- .1 Maintain a complete, accurate log of control and survey work as it progresses.
- .2 On completion of foundations and major site improvements, prepare a certified survey showing dimensions, locations, angles and elevations of Work.
- .3 Record locations of maintained, re-routed and abandoned service lines.

1.07 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit name and address of Surveyor to Departmental Representative.

- .2 On request of Departmental Representative, submit documentation to verify accuracy of field engineering work.
- .3 Submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform [and do not conform] with Contract Documents.

1.08 SUBSURFACE CONDITIONS

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

PART 2 PRODUCTS

2.01 NOT USED

- .1 Not Used.

PART 3 EXECUTION

3.01 NOT USED

- .1 Not Used.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 01 61 00 – Common Product Requirements.
- .3 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.02 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit written request in advance of cutting or alteration which affects:
 - .1 Structural integrity of elements of project not otherwise addressed in documents.
 - .2 Integrity of weather-exposed or moisture-resistant elements not otherwise addressed in documents.
 - .3 Efficiency, maintenance, or safety of operational elements.
 - .4 Visual qualities of sight-exposed elements.
- .3 Include in request:
 - .1 Identification of project.
 - .2 Location and description of affected Work.
 - .3 Statement on necessity for cutting or alteration.
 - .4 Description of proposed Work, and products to be used.
 - .5 Alternatives to cutting and patching.
 - .6 Date and time work will be executed.

1.03 MATERIALS

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

1.04 PREPARATION

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work.
- .3 Prepare photographic record of all areas to be modified prior to, during and after uncovering.

- .4 Beginning of cutting or patching means acceptance of existing conditions.
- .5 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .6 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

1.05 EXECUTION

- .1 Execute cutting, fitting, and patching [including excavation and fill,] to complete Work.
- .2 Fit several parts together, to integrate with other Work.
- .3 Uncover Work to install ill-timed Work. Coordinate with Departmental Representative.
- .4 Remove and replace defective and non-conforming Work.
- .5 Remove samples of installed Work for testing, if required.
- .6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .7 Pneumatic or impact tools not allowed on masonry work without prior approval.
- .8 Restore work with new products in accordance with requirements of Contract Documents.
- .9 Fit Work to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .10 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

1.06 WASTE MANAGEMENT AND DISPOSAL

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

PART 2 PRODUCTS

2.01 NOT USED

- .1 Not Used.

PART 3 EXECUTION

3.01 NOT USED

- .1 Not Used.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

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

1.02 PROJECT CLEANLINESS

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

1.03 FINAL CLEANING

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste products and debris.
- .5 Remove waste materials from site at regularly scheduled times. Do not burn waste materials on site.

- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Clean and polish glass and hardware. Replace broken, scratched or disfigured glass if directed by Departmental Representative.
- .8 Remove stains, spots, marks and dirt resulting from new work from walls, ceilings and floors.
- .9 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .10 Remove dirt and other disfiguration from exterior surfaces.
- .11 Clean and sweep roofs, gutters, areaways, and sunken wells.
- .12 Sweep and wash clean paved areas.
- .13 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.
- .14 Clean roofs, downspouts, and drainage systems.
- .15 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.
- .16 Remove snow and ice from access to building.

1.04 WASTE MANAGEMENT AND DISPOSAL

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

PART 2 PRODUCTS

2.01 NOT USED

- .1 Not Used.

PART 3 EXECUTION

3.01 NOT USED

- .1 Not Used.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 73 00 – Execution.
- .2 Section 01 74 11 – Cleaning.
- .3 Section 02 82 00.01 - Asbestos Abatement - Minimum Precautions
- .4 Section 02 83 11 – Lead-Base Paint Abatement – Intermediate Precautions.

1.02 REFERENCE STANDARDS

- .1 Canadian Construction Association (CCA)
 - .1 CCA 81-2001: A Best Practices Guide to Solid Waste Reduction. Public Works and Government Services Canada (PSPC)
 - .1 2002 National Construction, Renovation and Demolition Non-Hazardous Solid Waste Management Protocol.
 - .2 CRD Waste Management Market Research Report (available from PSPC's Environmental Services).
 - .3 Sustainable Development Strategy 2007-2009: Target 2.1 Environmentally Sustainable Use of Natural Resources.

1.03 DEFINITIONS

- .1 Approved/Authorized recycling facility: waste recycler approved by applicable provincial authority or other users of material for recycling approved by the Departmental Representative.
- .2 Class III: non-hazardous waste - construction renovation and demolition waste.
- .3 Construction, Renovation and/or Demolition (CRD) Waste: Class III solid, non-hazardous waste materials generated during construction, demolition, and/or renovation activities
- .4 Inert Fill: inert waste - exclusively asphalt and concrete.
- .5 Waste Source Separation Program (WSSP): implementation and co-ordination of ongoing activities to ensure designated waste materials will be sorted into pre-defined categories and sent for recycling and reuse, maximizing diversion and potential to reduce disposal costs.
- .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-modelling 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: act of keeping different types of waste materials separate beginning from the point they became waste.

1.04 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prepare and submit on monthly basis, throughout project or at intervals agreed to by Departmental Representative the following:
 - .1 Receipts, scale tickets, waybills, and/or waste disposal receipts that show quantities and types of materials reused, recycled, or disposed of.

1.05 USE OF SITE AND FACILITIES

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

1.06 QUALITY ASSURANCE

- .1 After award of Contract, a mandatory site examination will be held for this Project for Contractor responsible for construction, renovation demolition/deconstruction waste management.
 - .1 Date, time and location will be arranged by Departmental Representative.

1.07 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 and reuse do not become Contractor's property.

- .3 Protect, stockpile, store and catalogue salvaged items.
- .4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.
- .5 Protect structural components not removed and salvaged materials from movement or damage.
- .6 Support affected structures. If safety of building is endangered, cease operations and immediately notify Departmental Representative.
- .7 Protect surface drainage, mechanical and electrical from damage and blockage.
- .8 Provide on-site facilities and containers for collection and storage of reusable and recyclable materials.
- .9 Separate and store materials produced during project in designated areas.
- .10 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated processing facilities.
 - .1 On-site source separation is recommended.
 - .2 Remove co-mingled materials to off site processing facility for separation.
 - .3 Obtain waybills, receipts and/or scale tickets for separated materials removed from site.
 - .4 Materials reused on-site are considered to be diverted from landfill and as such are to be included in all reporting.

1.08 DISPOSAL OF WASTES

- .1 Do not bury rubbish or waste materials.
- .2 Do not dispose of waste, volatile materials, mineral spirits, oil or paint thinner into waterways, storm, or sanitary sewers.
- .3 Keep records of construction waste including:
 - .1 Number and size of bins.
 - .2 Waste type of each bin.
 - .3 Total tonnage generated.
- .4 Remove materials on-site as Work progresses.

1.09 SCHEDULING

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

PART 2 PRODUCTS

2.01 NOT USED

- .1 Not Used.

PART 3 EXECUTION

3.01 APPLICATION

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

3.02 DIVERSION OF MATERIALS

- .1 From following list, separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by Departmental Representative, and consistent with applicable fire regulations.
 - .1 Recyclable metals.
 - .2 Paper and cardboard packaging.
 - .3 Recyclable beverage containers or other such miscellaneous items generated by workforce.
- .2 Mark containers or stockpile areas.
- .3 On-site sale of salvaged, recovered, reusable or recyclable materials is not permitted.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 78 00 Closeout Submittals.

1.02 ADMINISTRATIVE REQUIREMENTS

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

PART 2 PRODUCTS

2.01 NOT USED

.1 Not Used.

PART 3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 31 19 – Project Meetings.
- .2 Section 01 33 00 – submittal Procedures.
- .3 Section 01 45 00 - Quality Control
- .4 Section 01 71 00 - Examination and Preparation.
- .5 Section 01 77 00 – Closeout Procedures.

1.02 ADMINISTRATIVE REQUIREMENTS

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

1.03 ACTION AND INFORMATIONAL SUBMITTALS

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

1.04 FORMAT

- .1 Organize data as instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf [219 x 279] mm with spine and face pockets.
- .3 When multiple binders are used correlate data into related consistent groupings.
 - .1 Identify contents of each binder on spine.
- .4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5 Arrange content under Specification Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Text: manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab.
 - .1 Bind in with text; fold larger drawings to size of text pages.

1.05 CONTENTS - PROJECT RECORD DOCUMENTS

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

1.06 AS -BUILT DOCUMENTS AND SAMPLES

- .1 Maintain at site for Departmental Representative one record copy of:

- .1 Contract Drawings.
- .2 Specifications.
- .3 Addenda.
- .4 Change Orders and other modifications to Contract.
- .5 Reviewed shop drawings, product data, and samples.
- .6 Field test records.
- .7 Inspection certificates.
- .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction.
 - .1 Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
 - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition.
 - .1 Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative.

1.07 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

- .1 Record information on set of black line opaque drawings.
- .2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress.
 - .1 Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: mark each item to record actual construction, including:
 - .1 Measured depths of elements of foundation in relation to finish first floor datum.
 - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
 - .4 Field changes of dimension and detail.
 - .5 Changes made by change orders.
 - .6 Details not on original Contract Drawings.
 - .7 Referenced Standards to related shop drawings and modifications.

- .5 Specifications: mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
- .6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.
- .7 Provide digital photos, if requested, for site records.

1.08 FINAL SURVEY

- .1 Submit final site survey certificate in accordance with Section 01 71 00 - Examination and Preparation, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

1.09 MATERIALS AND FINISHES

- .1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.
 - .1 Provide information for re-ordering custom manufactured products.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Moisture-protection and weather-exposed products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Additional requirements: as specified in individual specifications sections.

1.10 MAINTENANCE MATERIALS

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

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

1.11 DELIVERY, STORAGE AND HANDLING

- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
- .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
- .3 Store components subject to damage from weather in weatherproof enclosures.
- .4 Store paints and freezable materials in a heated and ventilated room.
- .5 Remove and replace damaged products at own expense and for review by [Departmental Representative].

1.12 WARRANTIES AND BONDS

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Submit warranty management plan, 30 days before planned pre-warranty conference, to Departmental Representative approval.
- .3 Warranty management plan to include required actions and documents to assure that Departmental Representative receives warranties to which it is entitled.
- .4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.
- .5 Submit, warranty information made available during construction phase, to Departmental Representative for approval prior to each monthly pay estimate.

- .6 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:
 - .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
 - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
 - .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within 10 days after completion of applicable item of work.
 - .4 Verify that documents are in proper form, contain full information, and are notarized.
 - .5 Co-execute submittals when required.
 - .6 Retain warranties and bonds until time specified for submittal.
- .7 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.
- .8 Conduct joint 10 month warranty inspection, measured from time of acceptance, by Departmental Representative.
- .9 Written verification to follow oral instructions.
 - .1 Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

PART 2 PRODUCTS

2.01 NOT USED

- .1 Not Used.

PART 3 EXECUTION

3.01 NOT USED

- .1 Not Used.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 61 00 - Common Product Requirements.
- .3 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.02 REFERENCE STANDARDS

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A 325 [10e1,] Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength.
 - .2 ASTM A 490 [12], Standard Specification for High Strength Steel Structural Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints [Metric].
- .2 Canadian Standards Association (CSA International)
 - .1 CSA B111-[1974(R2003)], Wire Nails, Spikes and Staples.
 - .2 CSA-G40.20-[13]/G40.21-[13], General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .3 CAN/CSA O86-[14], Engineering Design in Wood.
 - .4 CSA O121-[08(R2013)], Douglas Fir Plywood.
 - .5 CSA O122-[06(R2011)], Structural Glued-Laminated Timber.
 - .6 CSA O151-[09(R2014)], Canadian Softwood Plywood.
 - .7 CSA O153-[13], Poplar Plywood.
 - .8 CSA-S16-[14], Design of Steel Structures.
 - .9 CAN/CSA S136 [12], PACKAGE Consists of S136-12 - North America Specification for the Design of Cold Formed Steel Structural Members and S136.1-12 - Commentary on North American specification for the design of cold-formed steel structural members.
 - .10 CSA W59-[13], Welded Steel Construction (Metal Arc Welding).
- .3 National Lumber Grading Authority (NLGA)
 - .1 NLGA Standard Grading Rules for Canadian Lumber (2014).

1.03 DEFINITIONS

- .1 Bracing: temporary support installed in excavation or structure to stabilize against deformations or failure. (Resisting lateral loads)
- .2 Shoring: temporary support installed in an excavation or structure to relieve loads.

- .3 Poling board: a timber plank driven into soft soil, or held in place by waling planks and struts, to support the sides of an excavation
- .4 Soldier pile: a vertical member which takes the side thrust from horizontal sheeting and which is supported by struts across an excavation. A vertical member used to prevent the movement of formwork; is held in place by struts, bolts, or wires.

1.04 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide shop drawings: in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Provide drawings stamped and signed by professional engineer registered or licensed in Newfoundland and Labrador, Canada.
 - .2 Provide shoring, bracing and temporary framing drawings signed by professional engineer registered or licensed in Newfoundland and Labrador, Canada.

1.05 DELIVERY, STORAGE AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Packaging Waste Management:
 - .1 Separate waste in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

PART 2 PRODUCTS

2.01 MATERIALS

- .1 Structural wood members: select structural or No. 1.
- .2 Structural steel members: to CSA G40.21.
- .3 Wood connections: Canadian soft wood plywood to CSA O151 sheathing grade.
- .4 Steel connections: steel gusset plates and angles to CSA G40.21.
- .5 Nails: to CSA B111.
- .6 Bolts: lag screws, nuts and washers to CAN/CSA O86.1.
- .7 High-tensile bolts: to ASTM A 325M or ASTM A 490M.
- .8 Welding materials: CSA W59.

2.02 PERFORMANCE CRITERIA

- .1 Ensure that materials, equipment and procedures:

- .1 Safely support existing structure and construction live loads.
- .2 Allow work to be accomplished.
- .3 Minimize risk of damage to historic and archaeological elements.

PART 3 EXECUTION

3.01 EXAMINATION

- .1 Before starting work, verify existing conditions and variations from original Contract Documents and notify Departmental Representative.

3.02 PREPARATION

- .1 Before beginning shoring, drain excavation and/or ground to support bracing. Maintain area free of standing water for duration of the Work.
- .2 Before beginning shoring or bracing, protect historic elements, materials and finishes in direct contact with bracing and shoring components.

3.03 INSTALLATION - GENERAL

- .1 Commence work as per Departmental Representative instructions.
- .2 Obtain approval from Departmental Representative before execution, for alteration to bracing or shoring system.
- .3 Support individual elements that become loose during shoring or bracing installation.
- .4 Erect structural timber to CAN/CSA O86.1.
- .5 Erect structural steel work to CAN/CSA-S16 and CAN/CSA-S136.
- .6 Weld to CSA W59.

3.04 BRACING OF STRUCTURES

- .1 Compensate for unevenness of wall surfaces:
 - .1 Install packing behind wall pieces.
- .2 Install protection.
- .3 Install and use bracing system to correct and/or stabilize deformations, as directed by Departmental Representative.

3.05 SHORING OF COLUMNS FOR UNDERPINNING

- .1 Provide constant monitoring of apparatus during shoring operation.

3.06 ADJUSTMENT

- .1 Monitor bracing or shoring system performance and maintain its effectiveness by making adjustments, replacing or repairing damaged and weakened elements of system, or other repairs and/or maintenance as required until final completion of project.

3.07 CONSTRUCTION WASTE MANAGEMENT

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

END OF SECTION

Part 1 - **General**

On 10 May 2017 a hazardous materials assessment was completed on the exterior elements of the Hawthorne Cottage. The hazardous materials assessment included testing for asbestos from various building materials including roofing materials (membrane, shingles and underlay), window putty, and chimney mortar.

ACMs were identified in the following materials:

- Roofing (asphalt shingle, felt with tar) in one sample (HC-A4) from the veranda roof.

All roofing materials (including asphalt shingles, felt and tar) from the veranda roof should be considered asbestos containing and shall be removed as per the scope of work outlined herein.

1.1 **SUMMARY**

- .1 Comply with requirements of this Section when performing following work:
 - .1 Removing non-friable asbestos-containing materials, other than ceiling tiles, if the material is installed or removed without being broken, cut, drilled, abraded, ground, sanded or vibrated at [locations indicated on drawings].
 - .2 Break, cut, grind, sand, drill, scrape, vibrate or abrade non-friable asbestos containing materials using non-powered hand-held tools, and the material is wetted to control the spread of dust or fibres.

1.2 **RELATED REQUIREMENTS**

- .1 Section [____]. (to be updated based on TOC)
- .2 Section 01 35 29.06 - Health and Safety Requirements.
- .3 Section 01 74 21 - Construction/Demolition Waste Management and Disposal

1.3 **REFERENCES**

- .1 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .2 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).

1.4 **DEFINITIONS**

- .1 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.
- .2 Amended Water: water with non-ionic surfactant wetting agent added to reduce water tension to allow thorough wetting of fibres.

- .3 Asbestos-Containing Materials (ACMs): materials that contain 0.5 per cent or more asbestos by dry weight (> 1% for sites within the jurisdiction of Newfoundland and Labrador) and are identified under Existing Conditions including fallen materials and settled dust.
- .4 Asbestos Work Area: area where work takes place which will, or may, disturb ACMs.
- .5 Authorized Visitors: Engineer[s], Consultant[s] or designated representative[s], and representative[s] of regulatory agencies.
- .6 Competent worker [person]: in relation to specific work, means a worker who:
 - .1 Is qualified because of knowledge, training and experience to perform the work.
 - .2 Is familiar with the [provincial] [federal] laws and with the provisions of the regulations that apply to the work.
 - .3 Has knowledge of all potential or actual danger to health or safety in the work.
- .7 Friable material: means material that:
 - .1 When dry, can be crumbled, pulverized or powdered by hand pressure, or
 - .2 is crumbled, pulverized or powdered.
- .8 Non-Friable Material: material that when dry cannot be crumbled, pulverized or powdered by hand pressure.
- .9 Occupied Area: any area of the building or work site that is outside Asbestos Work Area.
- .10 Polyethylene: polyethylene sheeting or rip-proof polyethylene sheeting with tape along edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide protection and isolation.
- .11 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Must have appropriate capacity for work.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit proof satisfactory to the Consultant that suitable arrangements have been made to dispose of asbestos-containing waste in accordance with requirements of authority having jurisdiction.
- .3 Submit Provincial and/or local requirements for Notice of Project Form.
- .4 Submit proof of Contractor's Asbestos Liability Insurance.
- .5 Submit to the Consultant necessary permits for transportation and disposal of asbestos-containing waste and proof that asbestos-containing waste has been received and properly disposed.
- .6 Submit proof that all asbestos workers and/or supervisor have received appropriate training and education by a competent person in the hazards of asbestos exposure, good personal hygiene and work practices while working in Asbestos Work Areas, and the use, cleaning and disposal of respirators and protective clothing.

- .7 Submit proof satisfactory to the Consultant that employees have respirator fitting and testing. Workers must be fit tested (irritant smoke test) with respirator that is personally issued.

1.6 QUALITY ASSURANCE

- .1 Regulatory Requirements: comply with Federal, Provincial/Territorial, and local requirements pertaining to asbestos, provided that in case of conflict among these requirements or with these specifications, more stringent requirement applies. Comply with regulations in effect at time Work is performed.
- .2 Health and Safety:
 - .1 Perform construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.
 - .2 Safety Requirements: worker protection.
 - .1 Protective equipment and clothing to be worn by workers while in Asbestos Work Area include:
 - .1 Air purifying half-mask respirator with N-100, R-100 or P-100 particulate filter, personally issued to worker and marked as to efficiency and purpose, suitable for protection against asbestos and acceptable to Provincial Authority having jurisdiction. The respirator to be fitted so that there is an effective seal between the respirator and the worker's face, unless the respirator is equipped with a hood or helmet. The respirator to be cleaned, disinfected and inspected after use on each shift, or more often if necessary, when issued for the exclusive use of one worker, or after each use when used by more than one worker. The respirator to have damaged or deteriorated parts replaced prior to being used by a worker; and, when not in use, to be stored in a convenient, clean and sanitary location. The employer to establish written procedures regarding the selection, use and care of respirators, and a copy of the procedures to be provided to and reviewed with each worker who is required to wear a respirator. A worker not to be assigned to an operation requiring the use of a respirator unless he or she is physically able to perform the operation while using the respirator.
 - .2 Disposable-type protective clothing that does not readily retain or permit penetration of asbestos fibres. Protective clothing to be provided by the employer and worn by every worker who enters the work area, and the protective clothing shall consist of a head covering and full body covering that fits snugly at the ankles, wrists and neck, in order to prevent asbestos fibres from reaching the garments and skin under the protective clothing to include suitable footwear, and to be repaired or replaced if torn.
 - .2 Eating, drinking, chewing, and smoking are not permitted in Asbestos Work Area.

- .3 Before leaving Asbestos Work Area, the worker can decontaminate his or her protective clothing by using a vacuum equipped with a HEPA filter, or by damp wiping, before removing the protective clothing, or, if the protective clothing will not be reused, place it in a container for dust and waste. The container to be dust tight, suitable for asbestos waste, impervious to asbestos, identified as asbestos waste, cleaned with a damp cloth or a vacuum equipped with a HEPA filter immediately before removal from the work area, and removed from the work area frequently and at regular intervals.
- .4 Facilities for washing hands and face shall be provided within or close to the Asbestos Work Area.
- .5 Ensure workers wash hands and face when leaving Asbestos Work Area.
- .6 Ensure that no person required to enter an Asbestos Work Area has facial hair that affects seal between respirator and face.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling in accordance with Section 01 74 21 - 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 for recycling in accordance with Waste Management Plan.
- .4 Separate for recycling and place in designated containers steel, metal and plastic waste in accordance with Waste Management Plan.
- .5 Place materials defined as hazardous or toxic in designated containers.
- .6 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.
- .7 Fold up metal banding, flatten and place in designated area for recycling.
- .8 Disposal of asbestos waste generated by removal activities must comply with Federal, Provincial, Territorial and Municipal regulations. Dispose of asbestos waste in sealed double thickness 6 mils bags or leak proof drums. Label containers with appropriate warning labels.
- .9 Provide manifests describing and listing waste created. Transport containers by approved means to licensed landfill for burial.

1.8 EXISTING CONDITIONS

- .1 Reports and information pertaining to ACMs to be handled, removed, or otherwise disturbed and disposed of during this project are bound into this specification immediately after this Section.
- .2 Notify the Consultant of friable material discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material pending instructions from the Consultant.

1.9 SCHEDULING

- .1 Hours of Work: perform work involving asbestos located on the veranda roof outside of normal working hours. Set up of enclosures and work access will include provisions to maintain access into the building. Include in Contract Sum additional costs due to this requirement.

1.10 PERSONNEL TRAINING

- .1 Before beginning Work, provide the Consultant satisfactory proof that every worker has had instruction and training in hazards of asbestos exposure, in personal hygiene and work practices, and in use, cleaning, and disposal of respirators and protective clothing.
- .2 Instruction and training related to respirators includes, following minimum requirements:
 - .1 Fitting of equipment.
 - .2 Inspection and maintenance of equipment.
 - .3 Disinfecting of equipment.
 - .4 Limitations of equipment.
- .3 Instruction and training must be provided by a competent, qualified person.

Part 2 - Products

2.1 MATERIALS

- .1 Drop Sheets:
 - .1 Polyethylene: 0.15 mm thick.
 - .2 FR polyethylene: 0.15 mm thick woven fibre reinforced fabric bonded both sides with polyethylene.
- .2 Wetting Agent: 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with water in a concentration to provide thorough wetting of asbestos-containing material.
- .3 Waste Containers: contain waste in two separate containers.
 - .1 Inner container: 0.15 mm thick sealable polyethylene waste bag.
 - .2 Outer container: sealable metal or fibre type where there are sharp objects included in waste material; otherwise outer container may be sealable metal or fibre type or second 0.15 mm thick sealable polyethylene bag.
 - .3 Labelling requirements: affix pre-printed cautionary asbestos warning in both official languages that is visible when ready for removal to disposal site.
- .4 Slow - drying sealer: non-staining, clear, water - dispersible type that remains tacky on surface for at least 8 hours and designed for purpose of trapping residual asbestos fibres.
- .5 Tape: fibreglass - reinforced duct tape suitable for sealing polyethylene under both dry conditions and wet conditions using amended water.

Part 3 - Execution

3.1 PROCEDURES

- .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .2 Construct work platforms to access the veranda roofing in a manner that will not hinder access and egress to the building.
- .3 The enclosure shall cover both the work platform and the veranda roofing material to be removed.
- .4 Before beginning Work, isolate Asbestos Work Area using, minimum, preprinted cautionary asbestos warning signs in both official languages that are visible at access routes to Asbestos Work Area.
 - .1 Remove visible dust from surfaces in the work area where dust is likely to be disturbed during course of work.
 - .2 Use HEPA vacuum or damp cloths where damp cleaning does not create a hazard and is otherwise appropriate.
 - .3 Do not use compressed air to clean up or remove dust from any surface.
- .5 Prevent spread of dust from Asbestos Work Area using measures appropriate to work to be done.
 - .1 Use FR polyethylene drop sheets over work platforms erected to gain access to the Asbestos Work Area where dust and contamination cannot otherwise be safely contained. Drop sheets are not to be reused.
- .6 Wet materials containing asbestos to be cut, ground, abraded, scraped, drilled, or otherwise disturbed unless wetting creates hazard or causes damage.
 - .1 Use garden reservoir type low - velocity fine - mist sprayer.
 - .2 Perform Work to reduce dust creation to lowest levels practicable.
 - .3 Work will be subject to visual inspection and air monitoring.
 - .4 Contamination of surrounding areas indicated by visual inspection or air monitoring will require complete enclosure and clean-up of affected areas.
- .7 Frequently and at regular intervals during Work and immediately on completion of work:
 - .1 Dust and waste to be cleaned up and removed using a vacuum equipped with a HEPA filter, or by damp mopping or wet sweeping, and placed in a waste container, and
 - .2 Drop sheets to be wetted and placed in a waste container as soon as practicable.
- .8 Cleanup:
 - .1 Place dust and asbestos containing waste in sealed dust-tight waste bags. Treat drop sheets and disposable protective clothing as asbestos waste; wet and fold these items to contain dust, and then place in plastic bags.

- .2 Clean exterior of each waste-filled bag using damp cloths or HEPA vacuum and place in second clean waste bag immediately prior to removal from Asbestos Work Area.
 - .3 Seal waste bags and remove from site. Dispose of in accordance with requirements of Provincial/Territorial and Federal Authority having jurisdiction. Supervise dumping and ensure that dump operator is fully aware of hazardous nature of material to be dumped and that the appropriate guidelines and regulations for asbestos disposal are followed.
 - .4 Perform final thorough clean-up of Work areas and adjacent areas affected by Work using HEPA vacuum.
- .9 Air Monitoring
- .1 Air samples taken each shift should include the air downwind of the removal area, around workers in the removal area and personal sampling of workers performing the removal. Personal samples should be taken at least once per day. The Contractor will be responsible for collection and analysis of both removal area and personal air samples. The Consultant will perform any downwind perimeter monitoring.

END OF SECTION

Part 1 - General

On 10 May 2017 a hazardous materials assessment was completed on the exterior elements of the Hawthorne Cottage. The hazardous materials assessment included testing for lead in paint from various exterior building materials including siding; trim; windows; and veranda posts, rails and decking.

Lead was detected above the Health Canada Surface Coating Material Regulations in all paint samples analysed. Further, the lead concentration in 11 of the 12 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 done on three composite paint samples exceeded the applicable limits for landfill disposal of lead-paint debris.

Table 4.2 Summary of Laboratory Results (Lead in Paint) Hawthorne Cottage – Brigus, Newfoundland and Labrador		
Sample ID.	Description	Results
HC-P1	Green Paint – (Storm Window)	25 000 mg/kg
HC-P2	White Paint – Two-storey Section (Clapboard)	14 000 mg/kg
HC-P2 Duplicate	Lab Duplicate of HC-P2	13 000 mg/kg
HC-P3	White Paint – Original Building (Clapboard)	57 000 mg/kg
HC-P4	White Paint – Porch (Clapboard)	29 000 mg/kg
HC-P5	Blue-Grey Paint – Porch (Trim)	23 000 mg/kg
HC-P6	Blue Grey Paint – Two-storey Section (Storm Window)	26 000 mg/kg
HC-P7	Blue Grey Paint – Veranda (Rail/Post)	11 000 mg/kg
HC-P8	Blue Grey Paint – Veranda (Rail/Post)	26 000 mg/kg
HC-P9	Grey Red Paint - Veranda (Deck)	25 000 mg/kg
HC-P10	Blue Grey Paint – Original Building (Entrance Panel)	75 000 mg/kg
HC-P11	Grey Paint – Veranda (Deck)	2800 mg/kg
HC-P12	White Paint – Two-storey Section (Trim)	56 000 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 Nd = non-detect		

On this basis, all paint and painted materials removed from the building must be treated as a hazardous waste and disposed-of at an approved facility.

NOTE: Mercury and mould were also found on the exterior envelope. It is anticipated that the procedures contained within this Section will deal with these materials.

Once the paint is removed, areas of the bare wood clapboard exhibiting traces of mould should be treated via chemical cleaning or physical stripping via sanding. If the mould/moisture damage is found to be penetrating into the wood greater than 5 mm, then the material should be replaced. When re-painting, consideration should be given to using a paint with a mould-inhibiting additive.

1.1 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.

1.2 RELATED REQUIREMENTS

- .1 Section [____]. See Park Canada TOC to update.

1.3 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)

1.4 DEFINITIONS

- .1 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.
- .2 Authorized Visitors: 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 meter of air calculated as 8 hour time-weighted average (TWA). Intermediate precautions for lead abatement are based on airborne lead concentrations greater than 0.05 milligrams per cubic meter 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 is considered to be lead contaminated if it contains more than 40 micrograms of lead in dust per square foot.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide proof satisfactory to 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.

1.6 QUALITY ASSURANCE

- .1 Regulatory Requirements: comply with Federal, Provincial/Territorial and local requirements pertaining to lead paint, in case of conflict among those requirements or with these specifications more stringent requirement applies. Comply with regulations in effect at time work is performed.
- .2 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - 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 includes:
 - .1 Respirator NIOSH approved and equipped with filter cartridges with assigned protection factor of 50, acceptable to Authority having jurisdiction. Suitable for type of lead and level of lead dust exposure in Lead Work Area. Provide sufficient filters so workers can install new filters following disposal of used filters and before re-entering contaminated areas.
 - .2 Disposable type protective clothing that does not readily retain or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.
 - .2 Requirements for workers:
 - .1 Remove street clothes in clean change room and put on respirator with new filters or reusable filters, clean coveralls and head covers before entering Equipment and Access Rooms or Work Area. Store street clothes, uncontaminated footwear, towels, and similar uncontaminated articles in clean change room.
 - .2 Remove gross contamination from clothing before leaving work area. Place contaminated work suits in receptacles for disposal with other lead - contaminated materials. Leave reusable items except respirator in Equipment and Access Room. When not in use in Work Area, store work footwear in Equipment and Access Room. Upon completion of lead abatement, dispose of footwear as contaminated waste or clean thoroughly inside and out using soap and water before removing from Work Area or from Equipment and Access Room.

- .3 Enter unloading room from outside dressed in clean coveralls to remove waste containers and equipment from Holding Room of Container and Equipment Decontamination Enclosure system. Workers not to use this system as means to leave or enter work area.
- .3 Eating, drinking, chewing, and smoking are not permitted in Work Area.
- .4 Ensure workers are fully protected with respirators and protective clothing during preparation of system of enclosures prior to commencing actual lead abatement.
- .5 Ensure workers wash hands and face when leaving Work Area. Facilities for washing 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.

1.7 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 hazardous materials in accordance with CEPA, TDGA, Regional and Municipal regulations.
- .3 Disposal of lead waste generated by removal activities must comply with Federal, Provincial and Municipal regulations. Dispose of lead waste in sealed double thickness 6 ml bags or leak proof drums. Label containers with appropriate warning labels.
- .4 Provide manifests describing and listing waste created. Transport containers by approved means to licensed landfill for burial.

1.8 EXISTING CONDITIONS

- .1 Reports and information pertaining to lead based paint to be handled, removed, or otherwise disturbed and disposed of during this Project are 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.

1.9 SCHEDULING

- .1 Not later than two days before beginning Work on this Project notify the following in writing, where appropriate:
 - .1 Appropriate Regional or Zone Director of Medical Services Branch, Health Canada.
 - .2 Provincial Ministry of Labour.
 - .3 Disposal Authority.
- .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 reused, and transport and store in area specified by the Consultant.
- .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 polyethylene sheets shall be adhered to the building 0.3 metres off of 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:

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- .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 airtight barrier.
 - .2 Cover plywood with polyethylene sheeting and sealed with duct tape.
- .6 Maintenance of Enclosures:
 - .1 Maintain enclosures in clean condition.
 - .2 Ensure barriers and polyethylene linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately.
 - .3 Visually inspect enclosures at beginning of each work day.
 - .4 Use smoke test method to test effectiveness of barriers as directed by 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 cleanup.

- .2 Remove polyethylene sheet by rolling it away from walls to centre of work area. Vacuum visible lead containing particles observed during cleanup, immediately, using HEPA vacuum equipment.
- .3 Place polyethylene seals, tape, cleaning material, clothing, and other contaminated waste in plastic bags and sealed labelled waste containers for transport.
- .4 Clean-up Work Areas, Equipment and Access Room, and other contaminated enclosures.
- .5 Clean-up sealed waste containers and equipment used in Work and remove from work areas, via Container and Equipment Decontamination Enclosure System, at appropriate time in cleaning sequence.
- .6 Conduct final check to ensure no dust or debris remains on surfaces as result of dismantling operations.

3.7 RE-ESTABLISHMENT OF OBJECTS AND SYSTEMS

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

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 32 16.07 - Construction progress schedule - bar (GANTT).
- .2 Section 01 33 00 - Submittal procedures.
- .3 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .4 Section 03 20 00 – Concrete Reinforcing.
- .5 Section 03 30 00 – Cast-in-place Concrete.
- .6 Section 07 90 00 – Joint Sealants.

1.02 REFERENCES

- .1 Canadian Standards Association (CSA)/CSA International
 - .1 CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-O86S1-F05, Supplement No. 1 to CAN/CSA-O86-D09, Engineering Design in Wood.
 - .3 CSA O121-08(R2013), Douglas Fir Plywood.
 - .4 CSA O151-09, Canadian Softwood Plywood.
 - .5 CSA O153-13, Poplar Plywood.
 - .6 CAN/CSA-O325-07(R2013), Construction Sheathing.
 - .7 CSA O437 Series-F93 (C2011), Standards for OSB and Waferboard.
 - .8 CSA S269.1-1975(R2003), Falsework for Construction Purposes.
 - .9 CAN/CSA-S269.3-FM92 (C2013), Concrete Formwork, National Standard of Canada.

1.03 SCOPE OF WORK

- .1 Provide labour, equipment and material to build and install the formwork as specified on all plans and required for the complete and correct execution of the work.
- .2 Provide and install the blade seals, if applicable.
- .3 Make the construction, control and expansion joints as specified in the plans and specifications.
- .4 Install all of the anchors, plates, supports, bolts and accessories that must be incorporated into the concrete works or required by other disciplines.
- .5 Remove all of the formworks and waste generated in the course of the work.
- .6 Make all of the openings in the formworks required by other disciplines.

- .7 Caulk all of the construction, control and expansion joints.
- .8 Implement and verify all of the levels and dimensions of the structures covered by this section.
- .9 Provide and install the temporary shoring and braces, when required.

1.04 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit shop drawings for formwork and falsework.
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Newfoundland, Canada.
 - .2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section [].
 - .3 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts. Comply with CSA S269.1, for falsework drawings Comply with CAN/CSA A23.1 and CAN/CSA-S269.3 for formwork drawings.
 - .4 Indicate formwork design data: permissible rate of concrete placement, and temperature of concrete, in forms.
 - .5 Indicate sequence of erection and removal of formwork/falsework as directed by Departmental Representative in accordance with the work sequence in section 01 32 16.07 - Construction Progress Schedule - Bar (Gantt) Chart.

1.05 DELIVERY, STORAGE AND HANDLING

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

PART 2 PRODUCTS

2.01 MATERIALS

- .1 Formwork materials:
 - .1 For concrete without special architectural features, use wood and wood product formwork materials to CAN/CSA-O86 and CAN/CSA A23.1.
- .2 Round Concrete Forms:
 - .1 Description: Multiple layers of 100 percent recycled paperboard, spirally wound, and laminated with adhesive.
 - .2 Interior Surface: Smooth with spiral seam. Alathon release and moisture barrier coating.
 - .3 Exterior Surface: Micryl moisture barrier coating.
 - .4 Spiral Mark: Impart visible spiral mark on concrete columns.

- .5 1-piece, 1-time-use forms.
- .6 Recyclable.
- .3 Form ties
 - .1 For concrete not designated 'Architectural', use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm diameter in concrete surface and fitted with polyethylene cones for apparent surfaces. After the removal of the formwork, no part of the tie-beams must appear less than 16 mm from the surface.
 - .2 For Architectural concrete, use snap ties complete with plastic cones and light grey concrete plugs. Filling of the tie-beam cones: Quick setting, two-component cement based mortar modified with polymers, cement gray in colour. Compressive strength 20 MPa minimum after 24 hours and 50 MPa after 28 days.
 - .3 Form oil: Chemical in nature, consisting of components that react with the free lime in the concrete to form water-insoluble soaps and that keep concrete from sticking to the forms, such as Grace's Releaser, ChemRex's Cast-Off or Euclid's Formshield Pure.
 - .4 Falsework materials: to CSA-S269.1.

2.02 FABRICATION AND ERECTION

- .1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings. The formwork contractor must take into account that tolerance regarding excavation bottoms is 100 mm and that additional formwork is not admissible for this value.
- .2 Hand trim sides and bottoms and remove loose earth from earth forms before placing concrete and obtain the approval of the Departmental Representative.
- .3 Fabricate and erect falsework in accordance with CSAS269.1.
- .4 Do not place shores and mud sills on frozen ground.
- .5 Provide site drainage to prevent washout of soil supporting mud sills and shores.
- .6 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1/A23.2.
- .7 Align form joints and make watertight.
 - .1 Keep form joints to minimum.
- .8 Unless otherwise indicated, use 30 mm bevel strips for any visible edges and all edges in contact with a waterproof liner or membrane.
- .9 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .10 Construct forms for architectural concrete, and place ties as indicated.

- .1 Joint pattern not necessarily based on using standard size panels or maximum permissible spacing of ties.
- .11 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections.
 - .1 Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
- .12 If the formwork and temporary structures must be used again, comply with the CAN3-A23.1 standard, Article 11.
 - .1 Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete.

2.03 REMOVAL OF FORMWORKS AND RESHORING

- .1 Once the concrete is poured, in weather conditions near 15 C, the Contractor may remove the forms after the following periods of time, providing that the curing method for free surfaces complies with the specifications and that they are satisfactory to the Departmental Representative:
 - .1 12 hours for footings and abutments.
- .2 Remove formwork when concrete has reached 75% of its design strength or minimum period noted above, whichever comes later, and replace immediately with adequate reshoring. The curing method for the free surfaces must comply with the specifications and prove to be satisfactory to the Departmental Representative.
- .3 Provide necessary reshoring of members where early removal of forms may be required or where members may be subjected to additional loads during construction as required.
- .4 Re-use formwork and falsework subject to requirements of CSA-A23.1/A23.2.
- .5 Round concrete forms:
 - .1 Remove column forms in accordance with manufacturer's instructions.
 - .2 Remove forms as soon as removal operations will not damage concrete, a minimum of 24 hours and a maximum of 5 days after placing concrete.

2.04 TOLERANCES

- .1 The following tolerances apply to exposed surfaces where alignment, level or plumb inaccuracies hinder the work of the other trades, reduce resistance under that which is specified or affect the functionality of the structure in any way:

The following variations are accepted:

Variations in vertical and horizontal lines and surface flatness

- .1 Walls, edges, slabs, columns and construction joints:
 - .1 Over a distance of 3 metres: 6 mm
 - .2 Over a distance of 12 metres or more: 20 mm
 - .3 Maximum offset *versus* the theoretical position 10 mm
- .2 For exposed corners, edges in contact with other materials, construction joints, grooves in formworks and other obvious lines:
 - .1 Over a distance of 3 metres: 3 mm
 - .2 Over a distance of 12 metres or more: 12 mm
 - .3 Maximum offset *versus* the theoretical position: 6 mm
- .3 Acceptable offsets regarding the position 6 mm and elevation of the elements to be integrated into concrete other than anchor bolts
- .4 Acceptable offsets regarding the relative position 3 mm and elevation of the anchor bolts of a same column or group in compliance with Appendix D of the Code of Standard Practice for Structural Steel published by the Canadian Institute of Steel Construction
- .5 Acceptable offset regarding the dimensions 6 mm and location of openings
- .6 Acceptable offsets regarding the dimensions+ 12 mm / of column cross-section and beams - 6 mm and the thickness of walls and slabs
- .7 Acceptable offset for the implementation 6 mm of reference axis for anchor bolts

2.05 INSPECTION OF THE FORMWORK PRIOR TO CONCRETING

- .1 Immediately prior to the pouring of concrete, inspect the formworks to make sure they are positioned correctly, adequately rigid, leak tight, clean, and that the walls have been adequately primed and free of snow, ice or other foreign substances.
- .2 Make temporary openings at the bottom of deep elements, such as columns and walls, to facilitate cleaning and inspection. Regarding elements where space is restricted, the openings must be located where water can be used to flush out debris and then sealed at the same level as the bottom of the wall.

2.06 PREPARATION OF THE FORMWORK PRIOR TO CONCRETING

- .1 Use form oil on all of the prepared form walls. Use form oil that will not stain or modify the colour of the exposed concrete surfaces. Use only the required quantity and remove the form oil where it came in contact with the reinforcement structure. If a coating is applied to the concrete surface, make sure it is compatible with the form oil. If necessary, use another product for form removal.
- .2 Wet all untreated formwork surfaces to avoid shrinkage and wet the surfaces again immediately prior to concreting.

2.07 LINES AND LEVELS

- .1 Mark all level and reference points.
- .2 During concreting, verify the lines, levels and alignment of the formworks.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 45 00 - Quality Control.
- .3 Section 01 74 11 - Cleaning.
- .4 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .5 Section 03 10 00 – concrete Forming and Accessories
- .6 Section 03 30 00 – Cast-in-Place Concrete.

1.02 REFERENCES

- .1 American Concrete Institute (ACI)
 - .1 SP-66-04, ACI Detailing Manual 2004.
 - .2 ANSI/ACI 315, Details and Detailing of Concrete Reinforcement.
- .2 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A 82/A 82M-07, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
 - .2 ASTM A 143/A 143M-07, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
 - .3 ASTM A 185/A 185M-07, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
 - .4 ASTM A 775/A 775M-07b, Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
- .3 Canadian Standards Association (CSA)
 - .1 CSA-A23.1-F09/A23.2-F09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-A23.3-F04 (R2010), Design of Concrete Structures.
 - .3 CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement.
 - .4 CSA-G40.20/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .5 CAN/CSA-G164-FM92 (C2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .6 CSA W186-FM1990 (C2007), Welding of Reinforcing Bars in Reinforced Concrete Construction.

1.03 SCOPE OF WORK

- .1 Provide all material, equipment and labour required to build and install the steel framework required on all of the plans and/or required for the complete and correct execution of the structure.
- .2 Provide and install all rod chairs, anchor bars and spacers in reinforced concrete inverts, walls, slabs and beams required to support the reinforcing steel.
- .3 Provide and install the cement bricks required to support the reinforcing steel and/or metal mesh in the slab on ground, footings and inverts.
- .4 Protect the extremities of the reinforcement bars exposed by the cutting or drilling of concrete buttresses in order to install new drains. Refer to the specifications' section on materials to select the appropriate protection product.

1.04 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prepare reinforcement drawings in accordance with RSIC Manual of Standard Practice.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Newfoundland, Canada.
 - .1 Indicate placing of reinforcement and:
 - i. Bar bending details.
 - ii. Lists.
 - iii. Quantities of reinforcement.
 - iv. Sizes, spacings, locations of reinforcement and mechanical splices if approved by Departmental Representative, with identifying code marks to permit correct placement without reference to structural drawings.
 - v. Indicate sizes, spacings and locations of chairs, spacers and hangers.
 - vi. The details related to the installation of reinforcement, when required for special conditions.
 - .4 Unless otherwise indicated, overlapping lengths, extension lengths of bars beyond critical points and rod overlapping lengths must comply with the CAN/CSA-A23.3 standard.
 - .5 Generally speaking, all of the reinforcing steel must be bent so that it is parallel to the face of the concrete structures, as specified in the plans. The shaping must be done at the plant, in compliance with the shop drawings.

- .6 The corrections or comments on the shop drawings during their review do not relieve the General Contractor from his obligation to comply with the requirements of the plans and specifications. The verification only aims to control the general conformity of design and of the application of the information specified in the contract. The General Contractor is responsible for the confirmation and correlation of all degrees of quality and sizes, for choosing the building processes and techniques and for the safe execution of his work.
- .7 When Chromate solution is used as replacement for galvanizing non-prestressed reinforcement, provide product description for review by Departmental Representative prior to its use.

1.05 QUALITY ASSURANCE

- .1 Submit in accordance with Section 01 45 00 - Quality Control and as described in PART 2 - SOURCE QUALITY CONTROL.
 - .1 Mill Test Report: upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, minimum 2 weeks prior to beginning reinforcing work.
 - .2 Upon request submit in writing to Departmental Representative proposed source of reinforcement material to be supplied.

1.06 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .2 Storage and Handling Requirements:
 - .1 Store materials off ground, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area to avoid rust formation.
 - .2 Protect the reinforcing steel if it must remain unused for long periods of time.
 - .3 Remove all important traces of rust from the steel before its installation, subject to the approval of the Engineer.
 - .4 Replace defective or damaged materials with new.

PART 2 PRODUCTS

2.01 MATERIALS

- .1 Substitute different size bars only if permitted in writing by Departmental Representative.
- .2 Reinforcing steel: billet steel, grade 400, deformed bars to CSA-G30.18, unless indicated otherwise.
- .3 Reinforcing steel to be welded to steel elements incorporated in concrete: weldable low alloy steel deformed bars to CSA-G30.18, nuance 400W.
- .4 Cold-drawn annealed steel wire ties: to ASTM A 82/A 82M and G30.3.
- .5 Deformed steel wire for concrete reinforcement: to ASTM A 82/A 82M and G30.3.

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- .6 Epoxy Coating of non-prestressed reinforcement: to ASTM A 775/A775M.
 - .7 If required, Galvanizing of non-prestressed reinforcement: to CAN/CSA-G164, minimum zinc coating 610 g/m².
 - .1 Protect galvanized reinforcing steel with chromate treatment to prevent reaction with Portland cement paste.
 - .2 If chromate treatment is carried out immediately after galvanizing, soak steel in aqueous solution containing minimum 0.2% by weight sodium dichromate or 0.2% chromic acid.
 - .1 Temperature of solution equal to or greater than 32 degrees and galvanized steels immersed for minimum 20 seconds.
 - .3 If galvanized steels are at ambient temperature, add sulphuric acid as bonding agent at concentration of 0.5% to 1%.
 - .1 In this case, no restriction applies to temperature of solution.
 - .4 Chromate solution sold for this purpose may replace solution described above, provided it is of equivalent effectiveness.
 - .1 Provide product description as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
 - .8 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2 and related supplements, with sufficient strength and appropriate for the frame used. The General Contractor must use vinyl covered chairs.
 - .9 Mechanical splices: subject to approval of Departmental Representative.
 - .10 Plain round bars: to CSA-G40.20/G40.21.

2.02 FABRICATION

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
- .2 Unless otherwise indicated in the plan, hooks must be standard and sizes must comply with the Reinforcing Steel Institute of Canada's manual of standards.
- .3 Obtain Departmental Representative's written approval for locations of reinforcement splices other than those shown on placing drawings.
- .4 Upon approval of Departmental Representative, weld reinforcement in accordance with CSA W186.
- .5 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.
 - .1 Ship epoxy coated bars in accordance with ASTM A 775A/A775M.

2.03 SOURCE QUALITY CONTROL

- .1 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 2 weeks prior to beginning reinforcing work.
- .2 Upon request inform Departmental Representative of proposed source of material to be supplied.

PART 3 EXECUTION

3.01 PREPARATION

- .1 If galvanized reinforcing steel is used, galvanizing is to include chromate treatment.
 - .1 Duration of treatment to be 1 hour per 25 mm of bar diameter.
- .2 If applicable, conduct bending tests to verify galvanized bar fragility in accordance with ASTM A 143/A 143M.

3.02 FIELD BENDING

- .1 Do not field bend or field weld reinforcement except where indicated or authorized by Departmental Representative.
- .2 When field bending is authorized, bend without heat, applying slow and steady pressure.
- .3 Replace bars, which develop cracks or splits.

3.03 PLACING REINFORCEMENT

- .1 Place reinforcing steel as indicated on placing drawings and in accordance with CSA-A23.1/A23.2.
- .2 Use plain round bars as slip dowels in concrete.
 - .1 Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint.
 - .2 When paint is dry, apply thick even film of mineral lubricating grease.
- .3 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.
- .4 Ensure cover to reinforcement is maintained during concrete pour.
- .5 Protect epoxy coated portions of bars with covering during transportation and handling.
- .6 Make mechanical splices where indicated on the shop drawings.
- .7 Clean the reinforcing elements prior to concreting.

- .8 In slabs on ground, footings and inverts, reinforcements and/or meshes will be installed on chairs, supports and/or cement bricks. The technique consisting in lifting the reinforcement and/or mesh with a hook when pouring the concrete is prohibited, as is the use of stones or wood pieces. Regarding structural slabs, the reinforcement of the lower bed must be installed on continuous supports. Steel wire supports for the reinforcement of the higher layers are prohibited. Use plasticsupports.
- .9 The technique consisting in moving a structural rod under a reinforcement bed in order to use it as an anchoring bar or support bar is prohibited. If bars are to be used for anchoring or support, they must be additional bars.
- .10 Welding the reinforcement bars shown on the plans is prohibited, unless otherwise specified. If welding is required, weldable steel compliant with the G30.18 nuance 400 W standard is required.
- .11 Wall and column bars must be installed using formworks or templates prior to concreting.

3.04 FIELD TOUCH-UP

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

3.05 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 7421 - Construction/Demolition Waste Management and Disposal.

3.06 INCORPORATION OF REINFORCEMENT IN CONCRETE (TYPICAL, UNLESS OTHERWISE INDICATED ON THE PLANS)

- .1 Incorporation in concrete must be measured from the surface of the concrete to the crenulation closest to the reinforcement or up to the surface of smooth bars or wires, as the case maybe.
- .2 The reinforcement includes bar filaments (or ligatures), stirrups and the mainsteel.
- .3 Regarding textured architectural surfaces, incorporation in concrete must be measured from the deepest point of the textured surface.
- .4 The minimum net depths (in mm) of the reinforcement bars in concrete is as follows, unless otherwise indicated:

SURFACE CONDITONS	EXPOSURE CLASSIFICATION		
	Unexposed ⁽¹⁾	Exposed to freeze-thaw cycle	Exposed to chlorides
Concrete against the ground and in permanent contact with the latter	75	75	
Strip footing	40	40	

(1) Unexposed concrete only applies to concrete that will continually be maintained as dry in a conditioned space, i.e. all of the elements will be inside the vapor barrier around the building.

3.07 SUPERVISION

- .1 For the entire duration of concreting, the General Contractor will assign a worker to the construction site, who will re-position the reinforcement steel bars and/or metal mesh that may move during the pouring.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT).
- .2 Section 01 33 00 - Submittal Procedures.
- .3 Section 01 45 00 - Quality Control.
- .4 Section 01 74 11 - Cleaning.
- .5 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .6 Section 03 10 00 – Concrete forming and Accessories.
- .7 Section 03 20 00 – Concrete Reinforcing.

1.02 REFERENCES

- .1 Abbreviations and Acronyms :
 - .1 Portland Cement: hydraulic cement, blended hydraulic cement (XXb - b denotes blended) and Portland-limestone cement.
 - .1 Type GU, GUb and GUL - General use cement.
 - .2 Type MS and MSb - Moderate sulphate-resistant cement.
 - .3 Type MH, MHb and MHL - Moderate heat of hydration cement.
 - .4 Type HE, HEb and HEL - High early-strength cement.
 - .5 Type LH, LHb and LHL - Low heat of hydration cement.
 - .6 Type HS and HSb - High sulphate-resistant cement.
 - .2 Fly ash :
 - .1 Type F - with CaO content less than 15%.
 - .2 Type CI - with CaO content ranging from 15 to 20%.
 - .3 Type CH - with CaO greater than 20%.
- .2 GGBFS - Ground, granulated blast-furnace slag.
- .3 Reference Standards:
 - .1 ASTM International
 - .1 ASTM C171-07, Standard Specification for Sheet Materials for Curing Concrete.
 - .2 ASTM C260/C260M-10a, Standard Specification for Air-Entraining Admixtures for Concrete.

- .3 ASTM C309-11, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
- .4 ASTM C494/C494M-13, Standard Specification for Chemical Admixtures for Concrete.
- .5 ASTM C1017/C1017M-013, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
- .6 ASTM C882/C882M-13a, Standard Test Method for Bond Strength of Epoxy-Resin Systems Used With Concrete By Slant Shear.
- .7 ASTM D412-06ae2, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
- .8 ASTM D624-00(2007), Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.
- .9 ASTM D1751-04(2008), Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
- .10 ASTM D1752-04a (2008), Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-37.2-M88, Emulsified Asphalt, Mineral Colloid-Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings.
 - .2 CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .3 CSA International
 - .1 CSA A23.1/A23.2-F09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA A283-06(R2011), Qualification Code for Concrete Testing Laboratories.
 - .3 CSA A3000-F08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .4 CSA-A5 / A8 / A362-98, Portland Cements / Masonry cements / Cement compounds.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - *Submittal Procedures*.
- .2 Provide testing results reports for review by Departmental Representative and do not proceed without written approval when deviations from mix design or parameters are found.
- .3 Submit two (2) copies of the most recent technical data sheets for the specified products. These sheets must show the physical properties of the material and include details on the installation method, restrictions, constraints and other manufacturer recommendations.

- .4 Provide a document produced by the manufacturer certifying that the latter officially recognizes the contractor in charge of the execution of the work as an authorized contractor.
- .5 Concrete pours: provide accurate records of poured concrete items indicating date and location of pour, quality, air temperature and test samples taken as described in

1.04 FIELD QUALITY CONTROL.

- .1 Concrete hauling time: provide for review by Departmental Representative deviations exceeding maximum allowable time specified in section 2.5 of Part 2 for concrete to be delivered to site of Work and discharged after batching.

1.05 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 45 00 - *Quality Control*.
- .2 Provide Departmental Representative, minimum 2 weeks prior to starting concrete work, with valid and recognized certificate from plant delivering concrete.
- .3 Provide test data and certification by qualified independent inspection and testing laboratory that materials and mix designs used in concrete mixture will meet specified requirements.
- .4 Minimum 2 weeks prior to starting concrete work, provide proposed quality control procedures for review by Departmental Representative on following items :
 - .1 Falsework erection.
 - .2 Hot weather concrete.
 - .3 Cold weather concrete.
 - .4 Curing.
 - .1 Finishes.
 - .2 Formwork removal.
 - .3 Joints.
- .5 Quality Control Plan: provide written report to Departmental Representative verifying compliance that concrete in place meets performance requirements of concrete as established in PART 2 - PRODUCTS.

1.06 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements:
 - .1 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.
 - .1 Do not modify maximum time limit without receipt of prior written agreement from Departmental Representative laboratory representative and concrete producer as described in CSA A23.1/A23.2.
 - .2 Deviations to be submitted for review by Departmental Representative.

- .2 Concrete delivery: ensure continuous concrete delivery from plant meets CSAA23.1/A23.2.
- .2 Packaging Waste Management: remove for reuse and return by manufacturer of packaging materials in accordance with Section 01 74 21 - *Construction/Demolition Waste Management and Disposal*.

PART 2 PRODUCTS

2.01 DESIGN CRITERIA

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

2.02 PERFORMANCE CRITERIA

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

2.03 MATERIALS

- .1 Cement: for general use, to CSA A-A5/A8/A362.
- .2 Water: to CSA A23.1.
- .3 Aggregates: to CSA A23.1/A23.2.
- .4 Admixtures:
 - .1 Air entraining admixture: to ASTM C260.
 - .2 Chemical admixture: to ASTM C494. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .5 Concrete adhesive: three-component (3) anticorrosion coating and binding agent, cement and modified water-based epoxy:
 - .1 Bonding strength/concrete (CAN/CSA A23.2-6B): 2-3 MPa.
 - .2 Bonding strength/steel (CAN/CSA A23.2-6B): 1-2 MPa.
 - .3 Bonding strength at 14 days (ASTM C882) fresh on fresh: 20.7 MPa.
 - .4 Bonding strength at 14 days (ASTM C882) curing time in the open 12 hours: 13.8 MPa.
- .6 Acceptable materials or products: When materials or products are specified by brand, consult the instructions to the bidders regarding the procedure for the approval of replacement materials or products.

2.04 MIXES

- .1 Refer to Structural Drawings for concrete mix design requirements.

PART 3 EXECUTION

3.01 PREPARATION

- .1 Obtain Departmental Representative's written approval before placing concrete.
 - .1 Provide 24 hours minimum notice prior to placing of concrete and specify the area of work involved and the estimated time of concrete placement.
- .2 Place concrete reinforcing in accordance with Section 03 20 00 - *Concrete Reinforcing*.
- .3 During concreting operations :
 - .1 Development of cold joints not allowed.
 - .2 Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or Work.
- .4 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .5 Prior to placing of concrete obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing in adverse weather.
- .6 Protect previous Work from staining.
- .7 Clean and remove stains prior to application for concrete finishes.
- .8 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .9 Do not place load upon new concrete until authorized by Departmental Representative or in accordance with Section 03 10 00 - *Concrete Forming and Accessories*.
- .10 Transport the concrete from the truck to its destination using means that will keep the concrete components from separating or from significantly altering its consistency.
- .11 The concrete dropping height must never exceed 1.5 m. The use of sliders and chutes placed to avoid concrete segregation must be used.
- .12 Concrete is compacted using vibrators plunged into its mass. Vibrators must be inserted fairly close together to obtain complete compactness. Excessive vibration that could cause the separation of the concrete's components must be avoided. Do not force the concrete into place horizontally with the vibrators.
- .13 An adequate number of vibrators must be kept on site. Emergency vibrators must be available at all times, in case the regular vibrators fail.
- .14 Prior to concrete placing, formworks must be cleaned and the water drained from them.
- .15 Concrete must not be placed in water without special permission and then, only strictly as specified and instructed by the Departmental Representative

- .16 Concrete curing and protection: As specified in the A23.1 standard and these specifications. The latter will prevail on the standard.
- .17 Prior to placing fresh concrete against hardened concrete, apply a concrete adhesive to the latter.

3.02 INSTALLATION/APPLICATION

- .1 Do cast-in-place concrete work to CSA A23.1/A23.2.
- .2 Sleeves and inserts :
 - .1 Do not permit penetrations, sleeves, ducts, pipes or other openings to pass through joists, beams, column capitals or columns, except where indicated or approved by Departmental Representative.
 - .2 Where approved by Departmental Representative, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere.
 - .3 Sleeves and openings greater than 100 x 100 mm not indicated, must be reviewed by Departmental Representative.
 - .4 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain written approval of modifications from Departmental Representative.
 - .5 Confirm locations and sizes of sleeves and openings shown on drawings.
 - .6 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.
- .3 Anchor bolts :
 - .1 Set anchor bolts to templates in co-ordination with appropriate trade prior to placing concrete.
 - .4 Grout under base plates and machinery using procedures in accordance with manufacturer's recommendations which result in 100 % contact over grouted area.

3.03 SURFACE TOLERANCE

- .1 Concrete tolerance to CSA A23.1.

3.04 FIELD QUALITY CONTROL

- .1 An independent laboratory retained and paid for by the Departmental Representative will take samples and conduct tests at regular intervals in order to determine if the concrete in place meets the specified quality requirements.
- .2 Inspection and testing of concrete and concrete materials will be carried out by testing laboratory designated by Departmental Representative for review to CSA A23.1/A23.2.
 - .1 Ensure that the testing laboratory is certified according to standard CSA A283.

- .3 The General Contractor must cooperate fully with this testing by granting access to the site and equipment, by supplying the labour and material necessary for the preparation of the tubes, and by storing the samples to avoid issues or losses. The General Contractor will provide a closed space available exclusively for the storage of the samples.
- .4 Three (3) tubes will be filled with concrete from the day's placement. If the day's placement exceeds 100 m³, three (3) additional tubes per 50 m³ will be filled with concrete.
- .5 The samples and tests must be processed as close as possible from the point of placement in the forms (e.g. at the outlet of the concrete pump, conveyor or bucket) in order to obtain accurate concrete properties.
- .6 The tubes will be stored and cured as laboratory specimens. One will be broken after 7 days and the other two after 28 days. Occasionally, the laboratory will fill a fourth tube, which will serve as a control specimen on site and will be broken at its request.
- .7 All of the testing methods (destructive or not) and storage and curing facilities must meet the requirements of the CSA-A23.1/A23.2 standard.
- .8 If the concrete is mixed at the plant, the air content and slump will be tested from each truck mixer. If the concrete is mixed at the construction site, control will take place every four (4) cubic meter of concrete or more frequently if required by the Departmental Representative.
- .9 For testing purposes, submit small and large aggregates to the Departmental Representative, as well as the mix formula, as specified in standard A23.2.

3.05 CURING

- .1 General
 - .1 Curing must begin immediately after placing and finishing and the temperature and humidity during the curing period must be suitable to ensure that the concrete will achieve proper strength, durability and other properties.
 - .2 All of the concrete surfaces must be cured (e.g. sides and top of walls).
 - .3 The material required to ensure the protection of the concrete and curing must be made available and be ready to be used prior to the beginning of concrete placement.
- .2 Curing types and duration
 - .1 Concrete must cure for a minimum duration of 7 consecutive days following placement. During that period, the temperature of the concrete must be higher than 10 °C. The duration of curing must be extended until the concrete achieves a degree of strength higher than 70 % of the specified strength.
- .3 Curing methods
 - .1 Forms in contact with the concrete's surface.
 - .1 Other water retaining materials approved by the Departmental Representative.

- .4 Curing materials
 - .1 Materials used to cure concrete must meet the requirements of one of the following standards:
 - .1 ASTM C171 Sheet Materials for Curing Concrete.
 - .2 ASTM C309 Liquid Membrane – Forming Compounds for Curing Concrete.
 - .2 The water used for curing must not have damaging effects on concrete.
 - .3 Notes on curing products:
 - .1 Most liquid curing products are not suitable for concrete surfaces that will be bonded with a subsequent layer of concrete or with another surface covering. However, they are suitable if the products are to be removed completely after curing through sandblasting or a known solvent, or if tests clearly show that traces of the product will not reduce bond below specified values.
 - .2 The curing products must be applied to form a film sufficiently thick and continuous on the concrete's surface. The mix and application method must comply with the manufacturer's recommendations. This film must be protected to ensure it remains intact for the entire curing period.
- .5 Reduction of the curing period
 - .1 Reducing the curing period through means to obtain the specified concrete strength over a shorter period of time must be authorized by the Departmental Representative.
- .6 Curing during extreme temperatures
 - .1 Curing in hot weather
 - .1 When the ambient temperature reaches 27°C or higher, curing during the first three (3) days must be achieved through uninterrupted watering or the use of a water retaining material maintained constantly wet, in order to use cooling as a result of evaporation.
 - .2 Curing in cold weather
 - .1 During freezing weather, curing with water must cease 12 hours before the end of the protection period.

3.06 CONCRETE PROTECTION

- .1 General
 - .1 Freshly placed and finished concrete must be adequately protected against unfavorable conditions, such as high winds, precipitation, frost, abnormally high temperatures, temperature variations, premature drying and loss of moisture during the period of time required for the concrete to achieve the desired characteristics. In addition, work or other disturbances near the concrete that may affect new concrete negatively, such as soil compaction, pile driving, vibrations, etc., must be taken into consideration when selecting the protection measures.

- .2 The General Contractor is responsible for the determination of the various criteria required to establish adequate protection methods based on site conditions. The data will be submitted to the Department Representative for verification and approval. In addition the measuring instruments will have to be made available, upon request from the Department Representative, for periodic validation. Protection against evaporation
- .3 If the evaporation rate of superficial moisture is higher than 0.50 kg/m², additional action must be taken to prevent the quick drying of the concrete's surface. The General Contractor must implement at least two of the most appropriate measures listed below:
 - .1 Water the support prior to concrete placement.
 - .2 Build sun screens above the concrete during finishing.
 - .3 Lower the temperature of the concrete to bring the evaporation rate under 0.50 kg/m²hr, while respecting the temperature restrictions applicable to the concrete at placement time.
 - .4 Cover the concrete surface with a white polyethylene sheet in between the various finishing operations.
 - .5 Spray water (fogging) on the concrete immediately after placement and before the finishing, taking care to avoid water accumulation that would alter the quality of the cement paste.
 - .6 Place and finish the concrete at night.

3.07 CONCRETING IN HOT WEATHER

- .1 When ambient temperature is 27°C or higher or when it is likely that temperature will reach 27°C during concrete placement (based on the weather forecasts for the area), the General Contractor must take special care to protect the concrete from the effects of hot and dry weather.
- .2 Under the intense dry conditions defined in Item 3.4.2 (protection against evaporation), the forms, framework, fresh concrete and concreting materials must be protected against direct sunlight or cooled through fogging.
- .3 The temperature of the concrete during placement must be as low as possible and must not in any way exceed the temperatures listed in the table entitled "Temperature Range for Concrete Placement". When the temperature of the concrete remains higher than 25°C during placement, the General Contractor must consider using an additive to delay setting, at his own expense.

3.08 CONCRETING IN COLD WEATHER

- .1 General
 - .1 If temperature is 5°C or lower, or if there is a possibility that it will drop under 5°C in the 24 hours following concrete placement (based on the weather forecasts in the area), all of the material required to protect the concrete and curing must be available on site and ready to use prior to concrete placement.

- .2 In addition, the concrete must be adequately protected during the entire curing period. During curing, the temperature of the concrete must be continually maintained above 10°C and the maximum temperature variation allowed between the concrete surface and the ambient temperature must not be exceeded.
 - .3 Protection must be ensured through heated shelters, blankets, insulation or a combination of all of the above.
- .2 Temperature range of concrete at placement time
 - .1 At placement time, the temperature of the concrete mix must comply with the following table:

TEMPERATURE RANGE FOR CONCRETE PLACEMENT

ELEMENT THICKNESS	TEMPERATURE (°C)	
	Minimum	Maximum
Less than 0.3 m	10	35
Between 0.3 m to less than 1 m	10	30
Between 1 m and 2 m	5	25
In excess of 2 m	5	20

- .3 Preparations for concrete placement in cold weather
 - .1 Prior to the placement of the concrete on the entire surface, snow and ice must be removed. Calcium chloride must not be used as a de-icing agent in the forms. Concrete must not be placed on a surface where the temperature is lower than 5°C or on a surface that could make the temperature of the concrete drop below the minimum range allowed in the table entitled "Temperature Range for Concrete Placement".
- .4 Protection methods
 - .1 Heated shelters
 - .1 The shelters must be built in such a way as to resist driving wind and snow and be reasonably air tight. There must be sufficient space between the concrete and the shelter to allow the circulation of heated air. The shelter must be heated with live steam, forced heated air or using fixed heating devices or others. At concrete placement time and during the curing period, the concrete surfaces must be protected against direct exposure to combustion gas or drying caused by heating devices, using forms or an impervious membrane.
 - .2 Avoid combustion gases inside the heated shelters by using indirect-fired heaters as this could cause severe health problems and the concrete surface could be damaged by carbonation and others.
 - .2 Protection blankets and insulation
 - .1 The type of protection blanket and the quantity of insulation required to ensure proper curing in cold weather must be determined by the General Contractor based on the ACI306R standard ("Guide to cold weather concreting"), and on the ambient temperature and wind speed (chill factor), the size and shape of the concrete structure

and on the bond strength of the concrete. Submit the calculations to the Departmental Representative for verification.

- .3 Minimum protection during curing
 - .1 When the exterior temperature is 5°C or lower, appropriate blankets and sufficient insulation must be properly placed on the concrete elements.
- .4 Maximum temperature variation allowed
 - .1 During the protection and curing period, the minimum variations between the temperature of the concrete surface and the ambient temperature must be respected in order to reduce cracking.
 - .2 In addition, to avoid cracking at the end of the curing period due to abrupt changes in temperature, some protection must be maintained until the temperature variation between the concrete and the ambient air is equal or lower than the variations indicated in the following table.

3.09 MAXIMUM TEMPERATURE VARIATION ALLOWED BETWEEN THE CONCRETE SURFACE AND AMBIENT AIR (WIND 25 KM/H AT MOST)

Concrete Thickness (m)	Maximum Temperature Variation Allowed (°C) Length/Height Ratio of the Structure *				
	0**	3	5	7	20 or more
< 0.3	29	22	19	17	12
0.6	22	18	16	15	12
0.9	18	16	15	14	12
1.2	17	15	14	13	12
> 1.5	16	14	13	13	12

- “Length” is the greatest restricted size and “Height” is the unrestricted size.
- Very high and thin elements, such as poles.

3.10 TEMPERATURE RECORDS

- .1 It is the responsibility of the General Contractor to determine and record the ambient temperature and that of the concrete during the protection and curing period. The records must include the date, time and location of each temperature measurement. In cold weather, the temperature of the shelters and concrete surfaces must be monitored, among other activities. In hot weather, the ambient temperatures and those of the concrete surface must be recorded, as well as wind speeds and relative humidity. The temperatures must be recorded on the form attached to this section. Upon request, the temperature records must be sent to the Departmental Representative for verification.

3.11 NON-CONFORM CONCRETE

- .1 The Departmental Representative may require the demolition, replacement or repairs with regard to any concrete deemed non-conform to the specifications.
- .2 If the strength of placed concrete measured through sampling proves to be inadequate versus the specifications, the Departmental Representative may require financial compensation

based on the provisions of the Contract. The control laboratory will be responsible for the calculation of the penalty.

3.12 OPENINGS IN CONCRETE

- .1 Make openings in existing concrete as instructed by the Departmental Representative and only after having received his approval. Use a carborundum saw blade or diamond drill.

3.13 CONSTRUCTION JOINTS

- .1 Clean the surface of the construction joint before starting the second concreting phase to remove the bleeding produced as a result of over-vibrating the concrete and any foreign substance.
- .2 The surface of the concrete previously placed must have a roughness amplitude of at least 5 mm.
- .3 Follow the specific instructions of the Departmental Representative if required by the nature of the work.

3.14 CLEANING

- .1 Clean in accordance with Section 01 74 11 - *Cleaning*.
- .2 Waste Management: separate waste materials for reuse/recycling in accordance with Section 01 74 21 - *Construction/Demolition Waste Management and Disposal*.
 - .1 Provide appropriate area on job site where concrete trucks and be safely washed.
 - .2 Divert unused admixtures and additive materials (pigments, fibres) from landfill to official hazardous material collections site as approved by Departmental Representative.
 - .3 Do not dispose of unused admixtures and additive materials into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.
 - .4 Prevent admixtures and additive materials from entering drinking water supplies or streams.
 - .5 Using appropriate safety precautions, collect liquid or solidify liquid with inert, non-combustible material and remove for disposal.
 - .6 Dispose of waste in accordance with applicable local, Provincial/Territorial and National regulations.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 20 00 – Unit Prices.
- .2 Section 01 29 83 – Payment Procedures for Testing Laboratory Services.
- .3 Section 01 61 00 - Common Product Requirements.
- .4 Section 04 03 31 Historic – Repairing Brickwork.

1.02 PRICE AND PAYMENT PROCEDURES

- .1 Work of this Section is included under a Unit Price and may be for repair of either the field stone foundation or brick chimneys.
- .2 Repair work will be paid for on a unit price basis according to pre-established unit prices. Measurement will be based on per square metre of surface area of repaired masonry in combination with the work of Section 04 03 31 Historic – Repairing Brickwork.

1.03 REFERENCE STANDARDS

- .1 CSA Group
 - .1 CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-A179-R2014, Mortar and Grout for Unit Masonry.

1.04 DEFINITIONS

- .1 Raking: removal of loose/deteriorated mortar to a depth suitable for repointing until sound mortar, and/or 4x joint thickness and/or a specified mm depth is reached.
- .2 Repointing: filling and finishing of masonry joints from which mortar is missing, has been raked out or has been omitted.
- .3 Back Pointing: repointing to depths greater than minimum raked depths specified, to bring mortar face to specified depth for raked joints.
- .4 Finish Pointing: repointing face of joint, to depth specified for raked joints.
- .5 Tooling: finishing of masonry joints using tool to provide final contour.
- .6 Low-pressure water cleaning: water soaking of masonry using less than 350 kPa (50 psi) water pressure, measured at nozzle tip of hose.

1.05 ACTION AND INFORMATIONAL SUBMITTALS

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

- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:
 - .1 Provide labelled samples of materials to be used on project for approval before work commences.
- .4 Test and Evaluation Reports:
 - .1 Provide certified test reports showing compliance with specified performance characteristics and physical properties.
 - .2 Provide laboratory test reports certifying compliance of mortar ingredients with specifications requirements.

1.06 QUALITY ASSURANCE

- .1 Masonry Contractor:
 - .1 Use single Masonry Contractor for masonry work.
 - .2 Masonry Contractor to have experience in historic stone and brick masonry repair and conservation work on projects of similar size and complexity to Work of this Contract.
 - .3 Masonry Contractor to have good level of understanding of structural behaviour of masonry walls when masonry work involves replacing or repairing stones and brick which are part of structural masonry work.
 - .4 Masonry Contractor will be responsible for all aspects of masonry work for duration of project.
- .2 Project Supervisor:
 - .1 Masonry Contractor to employ a Project Supervisor with documented successful experience of historic masonry repair and conservation work of required for this Contract. Project Supervisor to be present on site full-time for duration of Work.
 - .2 Demonstrate competence levels to satisfaction of Departmental Representative before undertaking Work.
- .3 Masons: Masons to have experience in historic stone and brick masonry repair and conservation work required for this Contract.
- .4 Grouting: grouting activities should be undertaken by workers experienced in manipulation and grouting methods.
- .5 Departmental Representative reserves the right to reject Masonry Contractor or proposed Project Supervisor, mason or apprentice if personnel cannot adequately demonstrate or provide proof of the level of experience or skill required for successful completion of Work of this Contract.
- .6 Obtain written approval from Departmental Representative for changes to qualified personnel.

- .7 Mock-ups:
 - .1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.
 - .2 Construct mock-up to demonstrate raking and repointing procedures for stone and brick masonry material specified in locations designated by Departmental Representative.
 - .1 Mock-up to include one side of one chimney and section of foundation wall, no more than 1 meter in length x full height of affected area.
 - .3 Notify Departmental Representative minimum of 48 hours prior to construction of the mock-up.
 - .4 Construct mock-up under supervision of Departmental Representative to demonstrate a full understanding of specified procedures, techniques and formulations is achieved before work commences.
 - .5 Construct mock-up where directed by Departmental Representative.
 - .6 Work not to proceed prior to approval of mock-up. Allow 5 days for inspection of mock-up by Departmental Representative before proceeding with masonry repointing work.
 - .7 Repeat mock-up until results obtained are to satisfaction of Departmental Representative.
 - .8 Mock-up will be used to:
 - .1 Judge quality of work, substrate preparation, operation of equipment, material preparation and application, and curing methods.
 - .2 Determine joint finish required.
 - .3 Test to determine compliance with property requirements.
 - .9 Accepted mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.
- .8 Laboratory tests for mortar:
 - .1 Refer to Section 01 29 83 – Payment Procedures for Testing Laboratory Services.
 - .2 Test following properties, at a minimum, will be tested:
 - .1 Compressive strength: 7 day and 28 day.
 - .2 Air entrainment percentage.
 - .3 Sample mortar for testing purposes directly on site.
 - .4 Testing laboratory to be approved in writing by Departmental Representative.

1.07 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:

- .1 Store materials off ground in a dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .2 Store cementitious materials and aggregates in accordance with CSA A23.1/A23.2.
- .3 Store lime putty in plastic lined sealed drums.
- .4 Keep material dry. Protect from weather, freezing and contamination.
- .5 Remove rejected or contaminated material from site.
- .6 Replace defective or damaged materials with new.

1.08 SITE CONDITIONS

- .1 Ambient conditions:
 - .1 When ambient temperature is below 10 degrees C or is forecast to fall below 5 degrees C within 24 hours:
 - .1 Maintain temperature of lime at or above 10 degrees C at all times.
 - .2 Store mortar materials for immediate use within heated enclosure. Allow mortar materials to reach minimum temperature of 10 degrees C before use.
 - .3 Heat sand and aggregate temperature to minimum 10 degrees C and maximum 30 degrees C.
 - .4 Heat water temperature to minimum of 20 degrees C and maximum of 30 degrees C.
 - .5 Provide enclosure system around curing area to ensure that stated conditions are maintained for curing period.
 - .6 Use heated temporary enclosures to maintain temperatures above 10 degrees C in cold weather only with written approval of material manufacturer and Departmental Representative.
 - .7 Submit enclosure system for approval from Departmental Representative.
 - .2 Remove work exposed to temperatures lower than 5 degrees C as directed by Departmental Representative.
 - .3 When ambient temperature is above 21 degrees C:
 - .1 Protect repointed areas from direct sunlight and wind.
 - .2 Use protective methods acceptable to the Departmental Representative.

PART 2 PRODUCTS

2.01 MORTAR

- .1 Mortar: in accordance with CAN/CSA-A179.
- .2 Proportion Specification:

- .1 In accordance with CAN/CSA-A179.
- .3 Property Specification:
 - .1 In accordance with CAN/CSA-A179, including Annex A.
 - .2 Bedding and finish pointing mortar for historic brickwork or minor foundation field stone repair: Type N, Course.
 - .i Mortar compressive strength at 7 days: minimum 2.0 MPa.
 - .ii Mortar compressive strength at 28 days: minimum 3.5 MPa.
 - .3 Foundation wall parging: Type K, Fine.
 - .i Mortar compressive strength at 7 days: minimum 0.2 MPa.
 - .ii Mortar compressive strength at 28 days: minimum 0.4 MPa.
 - .4 Appearance: New mortar to match appearance of existing with regard to colour and texture.

PART 3 EXECUTION

3.01 EXAMINATION

- .1 Verification of Conditions: verify masonry, staging and storage areas and notify Departmental Representative in writing of conditions detrimental to acceptable and timely completion of Work.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform in writing Departmental Representative areas of deteriorated masonry not previously identified.
- .2 Stop work and Notify Departmental Representative immediately if evidence of hazardous materials is discovered in work area.

3.02 SPECIAL TECHNIQUES

- .1 Examine mortar joints.
 - .1 Examine horizontal and vertical joints to determine which were struck first and whether they are the same style, as well as aspects of quality of work which establish authenticity of original work.
 - .2 Replicate the style selected by Departmental Representative.
- .2 Test mortar joints.

- .1 Procedure of testing: examine joints visually for signs of deteriorated masonry such as voids, spalled surfaces, loose or missing mortar, cracking or micro-cracking at edges of joints or across joints, and dense cement-rich mortar.
- .2 Test joints not visually deteriorated as follows:
 - .1 Test for voids and weakness by using hammers or other approved means.
 - .2 Perform examination and testing in co-operation with Departmental Representative so that unsound joints can be marked and recorded.

3.03 RAKING JOINTS

- .1 Use manual raking tool to obtain clean masonry surfaces.
 - .1 Remove deteriorated and adhered mortar from masonry surfaces to full depth of deteriorated mortar but in no case less than 20 mm leaving square corners and flat surface at back of cut.
 - .2 Clean out voids and cavities encountered.
- .2 Remove mortar without chipping, altering or damaging masonry units.
- .3 Where use of power tools to remove mortar is deemed appropriate by Departmental Representative:
 - .1 Rake out using maximum 86 mm diameter blades to centre of joint only, to a maximum depth of 20 mm. Mortar must remain on each side of saw cut. Raking must not touch masonry units.
 - .2 Stop saw cut 50 to 75 mm from end of vertical and discontinuous horizontal joints. Do not cut into masonry units.
 - .3 Notify Departmental Representative to inspect raking, prior to removing remaining mortar with hand tools.
 - .4 Remove remaining mortar with hand tools.
- .4 Clean surfaces of joints with compressed air or non-ferrous brush without damaging texture of exposed joints or masonry units.
- .5 Flush open joints and voids; clean open joints and voids with low pressure water and if not free draining blow clean with compressed air.
- .6 Leave no standing water.
- .7 Replace stone or brick damaged as a result of careless raking of saw cutting, at no cost to Owner.

3.04 REPOINTING

- .1 When required repair and replacement work is complete carry out repointing.
- .2 Before repointing, wash down wall to be repointed and allow to dry to damp, but not wet. Ensure that dust and debris are removed from joints and wall surfaces prior to repointing.

- .3 Keep masonry damp while pointing is being performed.
- .4 Completely fill joint with mortar.
 - .1 If surface of masonry units has worn rounded edges keep pointing back from surface to maintain same width of joint
 - .2 Avoid feathered edges.
 - .3 Pack mortar firmly into voids and joints, ensuring full contact with back and sides of joint and leaving no voids.
- .5 Build-up pointing in layers not exceeding 25 mm in depth.
 - .1 Allow each layer to set before applying subsequent layers.
 - .2 Maintain joint width.
- .6 Tool joints to match existing profile or as directed by Departmental Representative.
 - .1 Tool, compact and finish using jointing tool or mason's slick to force mortar into joint. Ensure jointing tool fits within width of joint. Use tools of varying widths to meet this requirement.
- .7 Remove excess mortar from masonry face before it sets.

3.05 PROTECTION DURING CURING PROCESS

- .1 Cover completed and partially completed work not enclosed or sheltered at end of each work day.
 - .1 Membranes should extend to 0.5 m over surface area of work and be tightly installed to prevent finished work from drying out too rapidly.
- .2 Cover with waterproof tarps to protect newly laid mortar from frost, rainfall and rapid drying conditions such as wind.
 - .1 Maintain tarps in place for minimum of 2 weeks after repointing.
 - .2 Ensure that bottoms of tarps permit airflow to reach mortar in joints.
- .3 Anchor coverings securely in position.
- .4 Protect from drying winds. Pay particular attention at corners of structure.
- .5 Maintain ambient temperature of minimum 5 degrees C after repointing masonry for:
 - .1 Minimum 7 days in summer.
 - .2 Minimum 14 days in cold weather conditions using dry heated enclosures.

3.06 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

- .1 Leave Work area clean at end of each day.
- .2 Clean surfaces thoroughly of mortar droppings, stains and other blemishes resulting from work of this contract on a daily basis, as work progresses.
- .3 Remove droppings and splashings using clean water and thick cotton rags.
- .4 Clean masonry with stiff natural bristle brushes and plain water only if mortar has fully cured.
- .5 Clean masonry with low pressure clean water and soft natural bristle brush.
- .6 Obtain approval of Departmental Representative prior to using other cleaning methods for persistent stains.
- .7 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.07 PROTECTION OF COMPLETED WORK

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

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 20 00 – Unit Prices.
- .2 Section 01 33 00 - Submittal Procedures.
- .3 Section 01 45 00 - Quality Control.
- .4 Section 01 61 00 - Common Product Requirements.
- .5 Section 01 74 11 – Cleaning.
- .6 Section 04 03 07 – Historic – Masonry Repointing.
- .7 Section 04 03 32 - Historic - Testing and Sampling Brick Units.

1.02 PRICE AND PAYMENT PROCEDURES

- .1 Repair work will be paid for on a unit price basis according to pre-established unit prices. Measurement will be based on per square metre of surface area of repaired masonry in combination with the work of Section 04 03 07 – Historic – Masonry Repointing.
- .2 Refer to Section 01 20 00 – Unit Prices.

1.03 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM C 73-[10], Standard Specification for Calcium Silicate Brick (Sand-Lime Brick).
 - .2 ASTM C 216-[13], Standard Specification for Facing Brick (Solid Masonry Units Made of Clay or Shale).
- .2 CSA Group
 - .1 CSA A82-[14], Fired Masonry Brick Made From Clay or Shale.
 - .2 CSA A370-[14], Connectors for Masonry.
 - .3 CAN/CSA-A371-[04(R2014)], Masonry Construction for Buildings.
 - .4 CSA S304.1-[04(R2010)], Design for Masonry Structures.

1.04 DEFINITIONS

- .1 Repair: using a variety of techniques to improve condition and serviceability of brick masonry.
- .2 Raking: removal of loose, deteriorated mortar to a depth suitable for repointing until sound mortar, and/or 4 times joint thickness and/or a specified mm depth is reached.

1.05 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-installation Meetings:
 - .1 Conduct pre-installation meeting to verify project requirements and procedures, manufacturer's installation instructions and manufacturer's warranty requirements.

1.06 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for brick and materials and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:
 - .1 Submit samples:
 - .1 2 of each type of masonry unit specified.
- .4 Certificates:
 - .1 Provide certificates signed by manufacturer certifying materials comply with specified performance characteristics, criteria and physical requirements.
- .5 Test Reports:
 - .1 Provide certified test reports showing compliance with specified performance characteristics and physical properties.

1.07 QUALITY ASSURANCE

- .1 Mock-ups:
 - .1 Prepare mock-up in accordance with Section 01 45 00 - Quality Control.
 - .2 Prepare mock-up of a portion of one chimney as directed by Departmental Representative to demonstrate specified brickwork repair procedures.
 - .3 Notify Departmental Representative minimum of 48 hours prior to construction of the mock-up.
 - .4 Construct mock-up under supervision of Departmental Representative to demonstrate understanding of specified procedures, techniques and formulations is achieved before work commences.
 - .5 Work not to proceed prior to approval of mock-up. Allow 24 hours for inspection of mock-up by Departmental Representative. Accepted mock-up becomes standard for this Work.
 - .6 Repeat mock-up until results obtained are to satisfaction of the Departmental Representative.
 - .7 Mock-up will be used to:

- .1 Judge quality of work, substrate preparation, operation of equipment, material preparation and application, repair procedures and curing methods.
- .2 Demonstrate bond pattern and colour match.
- .3 Test to determine compliance with performance requirements.
- .8 Proceed with pointing and repair work when mock-up is accepted. Mock-up may remain as part of finished Work.

1.08 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements:
 - .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
 - .2 Provide weather protection and construction protection in accordance with CSA S304.1.
 - .3 Provide weather protection to newly opened sections in assembly.
 - .4 Protect bricks and store bricks to facilitate their resetting.
 - .1 Store dismantled masonry units on wood pallets, protected from exposure to water, elements, and potential mechanical damage.
 - .2 Submit storage and identification system to Departmental Representative for review.
 - .3 Store detached face bricks, back-up bricks and bricks showing evidence of soluble salts on separate pallets.
 - .5 Place detached bricks on wood surfaces during handling. Prevent contact with metal.
 - .6 When bricks are lowered to ground, place directly on wooden platform that will be used for transport or storage.
 - .7 Transport and keep bricks on wooden platforms.
 - .8 Ensure that sharp edges of bricks do not come into contact with hard objects.
 - .9 At request of Departmental Representative, turn over any remaining salvaged bricks to Owner at completion of contract, separated and labelled as face bricks, back-up bricks and bricks with soluble salts.

1.09 SITE CONDITIONS

- .1 Ambient conditions:
 - .1 Maintain temperature of mortar materials in accordance with Section 04 03 07 - Historic - Masonry Repointing.
 - .2 Maintain masonry temperature between 5 and 27 degrees C for 30 days.
 - .3 Cold weather requirements: meet CAN/CSA-A371-04(R2014), Masonry Construction for Buildings recommended practices for cold weather masonry construction.

PART 2 PRODUCTS

2.01 NEW FACE BRICK

- .1 Burned clay brick: to CSA A82.
 - .1 Type: FBX.
 - .2 Grade: Exterior Grade (EG) as per CSA A82-06 / Severe Weather (SW) as per ASTM C216-07
 - .3 Compressive strength: > 21 MPa / > 3,000 psi
 - .4 Size: To match existing. Contractor to confirm on site, approximate measurements are:
 - .1 65 mm high x 225 mm long x 110 mm deep (not including mortar joints).
 - .i Appears to be typical 19th Century Imperial Size.
 - .5 Colour and texture: to match existing. Appearance match must be approved by Departmental Representative prior to ordering of replacement bricks.
 - .6 Maximum 5 hour boil water absorption: 17%.

2.02 EXISTING BRICK

- .1 Use hard, sound, and clean salvaged bricks only with Departmental Representative's approval. Use only bricks without evidence of soluble salts, compatible in appearance and performance with existing.
- .2 Test brick in accordance with Section 04 03 32 - Historic - Testing and Sampling Brick Units prior to use.

2.03 MORTAR

- .1 Proportion Specification:
 - .1 In accordance with CAN/CSA-A179.
- .2 Property Specification:
 - .1 In accordance with CAN/CSA-A179.
 - .2 Bedding and finish pointing mortar: Type S, Course.
 - .i Mortar compressive strength at 7 days: minimum 7.5 MPa.
 - .ii Mortar compressive strength at 28 days: minimum 12.5 MPa.

PART 3 EXECUTION

3.01 EXAMINATION

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

- .2 Inform in writing Departmental Representative areas of deteriorated masonry not previously identified.
- .2 Check for evidence of repairs, cracks, moisture, soluble salt contamination and other defects not noted on Contract Drawings, and report to Departmental Representative before starting Work.
- .3 Stop work in that area and report to Departmental Representative immediately evidence of hazardous materials.

3.02 PREPARATION

- .1 Place safety devices and signs near work area as directed in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
- .2 Install and remove self-supporting scaffolding in accordance with Section 1 52 00 - Construction Facilities.

3.03 BRICK REMOVAL

- .1 Verify locations and dimensions of areas of Work with Departmental Representative.
- .2 Identify deteriorated and salvageable bricks in areas of work with Departmental Representative.
- .3 Remove identified areas of deteriorated or salvageable brickwork as follows, taking care not to damage edges or face of bricks to be salvaged:
 - .1 Rake out face of mortar joints, in accordance with article Section 04 03 07 – Historic Masonry Repointing .
 - .2 Cut through unsupported load bearing and non-load bearing brickwork in accordance with direction from Departmental Representative.
 - .3 During removal, protect sound areas to remain. Use mechanical hand methods of removal. Obtain Departmental Representative's approval for use of power tools before commencing work.
 - .4 Remove adhered mortar from surface of adjacent bricks that remain in place.

3.04 BRICK SALVAGE

- .1 Carefully clean, and store bricks for re-use.

3.05 BRICK REPLACEMENT

- .1 Build in flashings in masonry in accordance with Contract Drawings and CAN/CSA-A371.
- .2 Install masonry ties and connectors in accordance with CSA A370 and CAN/CSA-A371 unless indicated otherwise. Prior to placing mortar, obtain approval of Departmental Representative of placement of ties and connectors.
- .3 Co-ordinate bond pattern, coursing height and joint width with existing brickwork in area selected by Departmental Representative.

- .4 Mix and blend brick units within each pallet and with other pallets to ensure uniform blend of colour and texture.
- .5 Except in cold weather, pre-wet bricks having an initial rate of absorption exceeding 30 g/minute 194 cm³ to uniform degree of saturation, 3 to 4 hours before laying. Do not lay until surface is dry or damp only, with no standing water.
- .6 Clean dust and brick fragments from slot. Before proceeding with Work, inspect cleaned surface with Departmental Representative.
- .7 Thoroughly dampen slot's surfaces before applying mortar.
- .8 Apply mortar and lay bricks.
 - .1 Lay bricks on full beds of mortar.
 - .2 Fill vertical joints buttered and placed full in face and back-up bricks, and at vertical joint between wythes.
 - .3 Lay bricks and tool joints in one operation, tooling with a round jointing tool to provide smooth joints compressed uniformly concave.
 - .4 Rake bedding mortar back to a minimum depth of 25 mm and make ready for pointing with pointing mortar in separate operation.
 - .1 Provide minimum 3 day damp cure to bedding mortar prior to pointing.
- .9 Apply pointing mortar, in accordance with article 3.7 REPOINTING:
 - .1 Fill raked joints with pointing mortar.
- .10 Finish joints to match those of existing brickwork, in area identified by Departmental Representative.
- .11 Inspect finished brickwork with Departmental Representative.

3.06 REPOINTING

- .1 Do pointing work in accordance with Section 04 03 07 - Historic - Masonry Repointing.

3.07 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Clean brick work surfaces after repairs have been completed and mortar has set.
- .3 Clean brick surfaces of adhesive or mortar residue resulting from work performed without damaging bricks or joints.
- .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.08 PROTECTION OF WORK

- .1 Cover completed and partially completed work not enclosed or sheltered at end of each work day.
 - .1 Membranes should extend to 0.5 m over surface area of work and be tightly installed to prevent finished work from drying out too rapidly.
- .2 Cover with waterproof tarps. Protect newly laid mortar from frost, rainfall, and rapid drying conditions such as wind.
 - .1 Maintain tarps in place for minimum of 2 weeks after repointing.
 - .2 Ensure that bottoms of tarps permit airflow to reach mortar in joints.
- .3 Anchor coverings securely in position.
- .4 Protect from drying winds. Pay particular attention at corners of structure.
- .5 Maintain ambient temperature of minimum 5 degrees C after repointing masonry for:
 - .1 Minimum 7 days in summer.
 - .2 Minimum 14 days in cold weather conditions using dry heated enclosures.
- .6 Protect adjacent finished work against damage which may be caused by on-going work.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 29 83 – Payment Procedures for Testing Laboratory Services.
- .2 Section 01 33 00 - Submittal Procedures.
- .3 Section 01 74 11 – Cleaning.
- .4 Section 04 03 31 – Historic – Repairing Brickwork.

1.02 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM C 216-[13], Standard Specification for Facing Brick (Solid Masonry Units Made of Clay or Shale).
- .2 CSA Group
 - .1 CSA A82-[2014], Fired Masonry Brick Made From Clay or Shale.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Test Reports:
 - .1 Provide laboratory test reports.

1.04 SCOPE OF WORK OF THIS SECTION

- .1 Departmental Representative may request testing of existing brick intended for reuse.
- .2 Laboratory testing procedures and payment will be as per Section 01 29 83 – Payment Procedures for Testing Laboratory Services.
- .3 Contractor to facilitate testing as/if requested by Departmental Representative and as per the requirements of this Section.

PART 2 PRODUCTS

2.01 NOT USED

- .1 Not Used.

PART 3 EXECUTION

3.01 EXAMINATION

- .1 Verification of Conditions: verify masonry, staging and storage areas and notify Departmental Representative in writing of conditions detrimental to acceptable and timely completion of Work.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform in writing Departmental Representative areas of deteriorated masonry not previously identified.
 - .3 Check for evidence of repairs, cracks, moisture, soluble salt contamination and other defects not noted on Contract Drawings, and report to Departmental Representative before starting Work.
 - .4 Stop work immediately and report to Departmental Representative evidence of hazardous materials.

3.02 APPLICATION

- .1 Samples:
 - .1 Submit samples of brick units for testing to Departmental Representative for approval.
 - .2 Consider identifying the individual bricks so that they can be replaced in the same spot where they were taken from.
 - .3 Prepare photographic, written or sketch records of wall area where samples are removed, before and after removal, in accordance with criteria set by Departmental Representative.
 - .4 Remove samples with minimum amount of damage to historic fabric of structure, under supervision of Departmental Representative.
 - .5 Protect walls from weather damage after removal of samples.
 - .6 Prevent damage to samples during delivery. Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.
- .2 Quality Control:
 - .1 Inspection and testing of bricks will be carried out by a testing Laboratory approved by Departmental Representative.

3.03 RE-INSTALLATION

- .1 Patch areas where brick has been removed for sampling.
 - .1 Obtain approval of replacement bricks before patching holes.
 - .2 Reuse original brick in original locations after testing where possible.
 - .3 Re-install brick with approved mortar mix and in accordance with Section 04 03 31 - Historic - Repairing Brickwork.

3.04 CLEANING

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

END OF SECTION

PART 1 GENERAL

1.01 RELATED WORK

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.02 REFERENCE STANDARDS

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM A123 / A123M - 09 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM A 307-10, Specification for Carbon Steel Bolts and Studs, 60,000psi Tensile. .3 ASTM A 653/A653M-11, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .3 ASTM F1267 - 12 Standard Specifications For Expanded Metal - Steel.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.40-M97, Primer, Structural Steel, Oil Alkyd Type.
 - .2 CAN/CGSB-1.181-99, Ready-Mixed, Organic Zinc-Rich Coating.

1.03 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 product data for fasteners.
- .2 Shop Drawings
 - .1 Submit shop drawings in accordance with Section 01 33 00 – Submittal Procedures.
 - .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.04 QUALITY ASSURANCE

- .1 Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .2 Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.05 DELIVERY, STORAGE AND HANDLING

- .1 Packing, Shipping, Handling and Unloading:
 - .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.

1.06 WASTE MANAGEMENT AND DISPOSAL

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

PART 2 PRODUCTS

2.01 MATERIALS

- .1 Steel sections and plates: to CSA-G40.21, Grade 300W.
- .2 Welding materials: to CSA W59.
- .3 Bolts and anchor bolts: to ASTM A307; corrosion resistant types to ASTM A325M, Type 3. Provide all required anchoring devices including anchor clips, drive pin anchors, expansion bolts and shields, and other devices designed to support and secure work.
- .4 Exterior fasteners: stainless steel or galvanized expansion type anchors/inserts
- .5 Galvanized sheet steel: commercial grade steel to ASTM A653M with ZF120 zinc wiped finish.
- .6 Galvanizing: hot dipped galvanizing with minimum zinc coating of 600 g/m² to ASTM A123. All ferrous metal fabrication for exterior locations to be galvanized after fabrication.
- .7 Shop coat primer: to CAN/CGSB-1.40M.
- .8 Galvanize touch-up primer: zinc rich, ready mix to CAN/CGSB-1.181.

2.02 FABRICATION

- .1 Build work square, true, straight and accurate to required size.

2.03 FINISHES

- .1 Shop coat primer: to CAN/CGSB-1.40M.
- .2 Galvanize touch-up primer: zinc rich, ready mix to CAN/CGSB-1.181.
- .3 Hot-dip galvanize

2.04 SHOP PAINTING

- .1 Remove scale rust, grease and other surface coating and apply one shop coat of primer to all ferrous metal items after fabrication, with exception of galvanized items.

- .2 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 deg. C.

PART 3 EXECUTION

3.01 ERECTION

- .1 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .2 Provide suitable means of anchorage as indicated or as acceptable to the Departmental Representative.
- .3 Fabricate items from steel as indicated.
- .4 Use self-tapping shake-proof countersunk flat headed screws on items requiring assembly by screws or as indicated. Use screws, bolts and expansion bolts for work as indicated. Use welded connections where indicated.
- .5 Where possible, fit and shop assemble work, match mark, ready for erection.
- .6 Ensure exposed welds are continuous for length of each joint. File or grind sharp edges of exposed welds flush.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .3 Section 06 08 99 – Rough Carpentry for Minor Works.

1.02 REFERENCE STANDARDS

- .1 American Wood-Preservers' Association (AWPA)
 - .1 AWPA M2, Standard Inspection of Treated Wood Products.
 - .2 AWPA M4, Standard for the Care of Preservative-Treated Wood Products.
 - .3 AWPA U1 User Specification for Treated Wood.
 - .4 AWPA T1 Processing and Treatment Standard.
 - .5 AWPA P5 Standard for Waterborne Preservatives.
- .2 CSA International
 - .1 CAN/CSA-O80 SERIES-15 - Wood preservation.
 - .2 CSA O80.20, Fire-Retardant Treatment of Lumbering Pressure Processes. This Standard applies to the fire-retardant treatment of lumber by pressure processes. Fire-Retardant Treatment of Lumber by Pressure Processes. This is not a standalone specification.
 - .3 CSA O80.27, Fire-Retardant Treatment of Plywood by Pressure Processes. This Standard covers the fire-retardant treatment of Douglas Fir, hardwood, softwood, and Poplar plywood by pressure processes. Fire-Retardant Treatment of Plywood by Pressure Processes. This not a standalone specification.
 - .4 CSA O80.201, Standard for Hydrocarbon Solvents for Preservatives. This Standard covers hydrocarbon solvents for preparing solutions of preservatives.- This is not stand alone specification
 - .5 CSA O322, Procedure for Certification of Pressure-Treated Wood Materials for Use in Preserved Wood Foundations.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 For products treated with preservative, fire-retardant by pressure impregnation submit following information certified by authorized signing officer of treatment plant:
 - .1 Information listed in AWPA M2 and revisions specified in CSA O80 Series, Supplementary Requirement to AWPA M2 applicable to specified treatment.

- .2 Moisture content after drying following treatment with water-borne preservative, fire-retardant.
- .3 Acceptable types of paint, stain, and clear finishes that may be used over treated materials to be finished after treatment.

1.04 WASTE MANAGEMENT AND DISPOSAL

- .1 Do not dispose of preservative treated wood through incineration.
- .2 Do not dispose of preservative treated wood with other materials destined for recycling or reuse.
- .3 Dispose of treated wood, end pieces, wood scraps and sawdust at sanitary landfill approved by Departmental Representative.
- .4 Dispose of unused wood preservative material at official hazardous material collections site approved by Departmental Representative.
- .5 Do not dispose of unused preservative material into sewer system, into streams, lakes, onto ground or in other location where they will pose health or environmental hazard.

PART 2 PRODUCTS

2.01 MATERIALS

- .1 Preservative: to CAN/CSA-O80 Series, stained finish.
- .2 Pressure treated wood products: to AWPA U1, T1 and P5 arsenic and chromium free pressure treated wood produced in accordance with ACQ Preserve® (quaternary ammonium compound).
- .3 Solvent: to CAN/CSA-O80.201.

PART 3 EXECUTION

3.01 APPLICATION: PRESERVATIVE

- .1 Treat lumber to CAN/CSA- O80 Series.
- .2 Following water-borne preservative treatment, dry material to maximum moisture content of 19%.
- .3 Use arsenic and chromium free pressure treated lumber in all instances where finished work is exposed to the elements and where lumber is in direct contact with unpainted concrete and for wood cants, fascia backing, curbs, nailers, sleepers and foot decking associated with roofing.

3.02 APPLICATION: FIELD TREATMENT

- .1 Comply with AWPA M4 and revisions specified in CAN/CSA-O80 Series, Supplementary Requirements to AWPA Standard M2.

- .2 Treat all field cuts with two (2) coats of clear copper naphthenate or 5% pentachlorophenol solution, water repellent preservative.
- .3 Remove chemical deposits on treated wood to receive applied finish.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 11 – Cleaning.
- .3 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .4 Section 06 05 73 – Wood Treatment.
- .5 Section 07 21 16 – Blanket Insulation.

1.02 REFERENCE STANDARDS

- .1 CSA International
 - .1 CSA B111-[1974(R2003)], Wire Nails, Spikes and Staples.
 - .2 CSA O121-[08], Douglas Fir Plywood.
 - .3 CSA O141-[05(R2009)], Softwood Lumber.
 - .4 CSA O151-[09], Canadian Softwood Plywood.
 - .5 CAN/CSA-O325.0-[07], Construction Sheathing.
 - .6 CAN/CSA-Z809-[08], Sustainable Forest Management.
 - .7 CAN/CSA-O80 SERIES-15 - Wood preservation
- .2 National Research Council Canada (NRC)
 - .1 National Building Code of Canada [2015] (NBC).
- .3 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber [2010].
- .4 American Wood Protection Association (AWPA) 2016 Standards U1, T1, and P5.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for [rough carpentry work] and include product characteristics, performance criteria, physical size, finish and limitations.

1.04 QUALITY ASSURANCE

- .1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood identification: by grade mark in accordance with applicable CSA standards.
- .3 Plywood, OSB and wood based composite panel construction sheathing identification: by grademark in accordance with applicable CSA standards.

1.05 DELIVERY, STORAGE AND HANDLING

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

PART 2 PRODUCTS

2.01 MATERIALS

- .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.
 - .3 CAN/CSA-Z809 or FSC or SFI certified.
- .2 Furring, blocking, nailing strips, grounds, rough bucks, [cants,] curbs, fascia backing and sleepers:
 - .1 Board sizes: "Standard" or better grade.
 - .2 Dimension sizes: "Standard" light framing or better grade.
 - .3 Post and timbers sizes: "Standard" or better grade.
- .3 Panel Materials:
 - .1 Douglas fir plywood (DFP): to CSA O121, standard construction.
 - .2 Canadian softwood plywood (CSP): to CSA O151, standard construction.
 - .3 Plywood, OSB and wood based composite panels: to CAN/CSA-O325.

- .4 Wood Preservative:
 - .1 Surface-applied wood preservative: to CAN/CSA-080 Series, stained finish.
 - .2 Pressure treated wood products: to AWPA U1, T1 and P5.
 - .1 Arsenic and chromium free products.
 - .2 Produced with quaternary ammonium compound.
- .5 Primers, Paints and Coatings: as per relevant Division 9 sections (interior/exterior).

2.02 ACCESSORIES

- .1 Fasteners: to CAN/CSA-G164, for exterior work.
- .2 Nails, spikes and staples: to CSA B111.
- .3 Bolts: Sizes as indicated on drawings, complete with nuts and washers.
- .4 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs or explosive actuated fastening devices, etc. as indicated on the drawings or recommended for purpose by manufacturer and approved by Departmental Representative.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

- .1 Treat surfaces of material with wood preservative, before installation.
- .2 Apply preservative by dipping, or by brush to completely saturate and maintain wet film on surface for minimum 3 minute soak on lumber and 1 minute soak on plywood.
- .3 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.
- .4 Treat material as indicated on drawings or as follows:
 - .1 Wood cants, fascia backing, curbs, nailers, sleepers on roof deck where bitumen membrane will be installed.

- .2 All wood structural supports in contact with or within 150 mm of the ground.

3.03 INSTALLATION

- .1 Comply with requirements of National Building Code of Canada (NBC), supplemented by the following paragraphs.
- .2 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, 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 or stainless steel fasteners, unless otherwise indicated on drawings.
- .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.
- .9 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .10 Countersink bolts where necessary to provide clearance for other work.

3.04 CLEANING

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

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 61 00 - Common Product Requirements.
- .3 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .4 Section 08 03 52 - Conservation Treatment for Period Wood Windows.
- .5 Section 09 03 61 - Historic – Repainting Exterior Surfaces.
- .6 Section 09 03 62 – Historic – Repainting Interior Surfaces.

1.02 REFERENCE STANDARDS

- .1 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)
 - .1 Architectural Woodwork Standards, 2nd edition.
- .2 CSA International
 - .1 CSA B111-[1974(R2003)], Wire Nails, Spikes and Staples.
 - .2 CSA O121-[08], Douglas Fir Plywood.
 - .3 CSA O141-[05(R2009)], Softwood Lumber.
 - .4 CSA O151-[09], Canadian Softwood Plywood.
- .3 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber [2010].

1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit shop drawings:
 - .1 Indicate details of construction, profiles, jointing, fastening and other related details.
 - .2 Indicate materials, thicknesses, finishes and hardware.

1.04 QUALITY ASSURANCE

- .1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood, OSB and wood based composite panel construction sheathing identification: by grademark in accordance with applicable CSA standards.

1.05 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Storage and Handling Requirements:
 - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect wood from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

PART 2 PRODUCTS

2.01 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.
 - .3 CAN/CSA-Z809 or FSC or SFI certified.
- .2 Machine stress-rated lumber is acceptable.
- .3 Hardwood lumber: moisture content 10 % or less in accordance with following standards:
 - .1 National Hardwood Lumber Association (NHLA).
 - .2 AWMAC custom grade, moisture content as specified.
- .4 Primers, Paints and Coatings: as per relevant Division 9 sections (interior/exterior).

2.02 PANEL MATERIAL

- .1 Douglas fir plywood (DFP): to CSA O121, standard construction.
- .2 Canadian softwood plywood (CSP): to CSA O151, standard construction.

2.03 ACCESSORIES

- .1 Nails and staples: to CSA B111; galvanized to CAN/CSA-G164 for exterior work, interior humid areas and for treated lumber; plain finish elsewhere.
- .2 Wood screws: plain, type and size to suit application.
- .3 Bolts: Sizes as indicated on drawings, complete with nuts and washers.

- .4 Storm window eye-bolts: 6 mm lag screw, gimlet point configuration with eyelet for installation; 75 mm long; 10 threads per 25 mm; complete with 19 mm diameter washer; hot dipped galvanized to CAN/CSA-G164.
- .5 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs or explosive actuated fastening devices, etc. as indicated on the drawings or recommended for purpose by manufacturer and approved by Departmental Representative.
- .6 Adhesive: polyurethane; passes ANSI test as Type PVA.
- .7 Felt: 3 mm thick, natural fibre felt strip 25 mm width.
- .8 Glazing points: purpose made, triangular, galvanized steel.

PART 3 EXECUTION

3.01 CONSTRUCTION AND INSTALLATION (GENERAL)

- .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.
- .4 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.

3.02 FABRICATION: STORM WINDOWS

- .1 Wood species: clear Eastern or Northern White Pine, Ponderosa Pine or Poplar; 38 mm thickness.
- .2 Four divided lites as indicated on the drawings. Bars horizontal; muntins vertical.
- .3 Joinery: slot mortise and tenon.
- .4 Exterior sticking rabbets: 13 x 13 mm.
- .5 Interior cut (back of rabbet): ovalo profile.

- .6 Confirm and match exterior sill taper.
- .7 Chamfer outside edge of head and stiles, 45°.
- .8 Glue storm window assemblies. Corner dowel with 10 mm hardwood (one per corner) after adhesive has fully cured and sand smooth.
- .9 Drill ventilation holes as indicated on drawings and provide 50 mm high x 220 mm long x 19 mm thick closures with 45° cut and attached with a single oval head #8 32 mm stainless steel screw at either end. Install closure after all painting works has been completed. Check to ensure pivot operation.
- .10 Glaze storm windows in accordance with Section 08 03 52 - Conservation Treatment for Period Wood Windows.
- .11 Drill storm windows to accept eye-bolt attachment.
- .12 Staple felt insulation strip to back of head and stiles, and to underside of sill prior to installation.

3.03 EXTERIOR FENCING

- .1 Cast post foundations in concrete sono tubes. Refer to Sections 03 20 00 and 03 30 00.
 - .1 Nominal coarse aggregate size: 20 mm.
 - .2 Compressive strength: 20 MPa minimum at 28 days.
- .2 Cast galvanized sleeves from sections of CAN/CGSB-138.2, galvanized steel pipe (chain link posts). Dimensions as indicated; predrilled to accept lag bolt.
- .3 Form posts from local black spruce trunks to suit sleeves. Trim branches off to trunk surface and peel bark. Allow 30 days to dry cure, then prime paint.
- .4 Set spruce poles into foundation sleeves and secure with lag bolt.
- .5 Fence rails: full dimension, rough cut 2x4s (51 x 102 mm). Ship-lap ends (at posts). Prime paint and allow full cure. Secure rails with #10 screws. Each rail to span a minimum of three post (typical running - not necessarily at corners). Stagger joints in top and bottom rails.
- .6 Fence palings: full dimension, rough cut 1x4s (25 x 102 mm). Prime paint. Nail to rails - two nails, diagonally staggered, at both top and bottom rails. Maintain consistent nailing pattern. Trim tops using chalk line after assembly and paint exposed ends.
- .7 Apply first and second coats of exterior paint to entire finished assembly.

3.04 STANDING AND RUNNING TRIMS

- .1 Butt and cope internal joints of all replacement trims to make snug, tight joint. Cut right angle joints of casing and trim with mitred joints.

- .2 Install door and window trim in single lengths without splicing.

END OF SECTION

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 61 00 - Common Product Requirements.
- .3 Section 06 08 99 – Rough Carpentry for Minor Works.

1.02 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM C 553-[13], Standard Specification for Mineral Fibre Blanket Thermal Insulation for Commercial and Industrial Applications.
 - .2 ASTM C 665-[12], Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 - .3 ASTM C 1320-[10], Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.
- .2 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S604-[2012], Standard for Factory-Built Type A Chimneys.
 - .2 CAN/ULC-S702-[2012], Standard for Mineral Fibre Insulation for Buildings.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.

1.04 DELIVERY, STORAGE AND HANDLING

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

PART 2 PRODUCTS

2.01 INSULATION

- .1 Batt and blanket mineral fibre:
 - .1 Unfaced fibre glass thermal insulation to [ASTM C 665]. Type: [1].
 - .2 ASTM E84: flame spread 25 or less, smoke developed 50 or less.
 - .3 Formaldehyde free.
 - .4 Thickness: as indicated.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 INSULATION INSTALLATION

- .1 Install insulation to maintain continuity of thermal protection to building elements and spaces.
- .2 Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.
- .3 Do not compress insulation to fit into spaces.
- .4 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls of CAN/ULC-S604 Type A chimneys and CSA B149.1 and CSA B149.2 Type B and L vents.
- .5 Do not enclose insulation until it has been inspected and approved by Departmental Representative.

END OF SECTION

PART 1 GENERAL

1.01 RELATED WORK

- .1 Section 01 33 00 – Submittal Procedures
- .2 Section 01 45 00 – Quality Control.
- .3 Section 06 08 99 - Rough Carpentry For Minor Works.
- .4 Section 06 20 00 – Finish Carpentry.
- .5 Section 07 62 00 – Sheet Metal flashings and Trim.

1.02 REFERENCES

- .1 CSA B111-1974 Wire Nails, Spikes and Staples.
- .2 ASTM B101-02 Specification for Lead Coated Copper Sheet and Strip for Building Construction.
- .3 ASTM B370-98 Specification for Copper Sheet and Strip for Building Construction.
- .4 ASTM D226/D226M-17 Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.

1.03 JOB MOCK-UP

- .1 Construct mock-up in accordance with Section 01 45 00 – Quality Control.
- .2 Construct 1200 x 1200 mm panel of shingle pattern including eave ridge and valley details.
- .3 Mock-up may be part of finished work.
- .4 Allow 24 h for inspection of mock-up by Departmental Representative before proceeding with shingle work.

1.04 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit duplicate full size shingles, of finish and profile specified.

1.05 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Indicate details of flashing installation.

1.06 STORAGE AND HANDLING

- .1 Provide and maintain dry, off-ground weatherproof storage.

- .2 Use boards to cover top of pile to keep out rain and prevent over-drying of bundles or loose shingles/shakes in top layer.
- .3 Remove only in quantities required for same day use.

1.07 PROTECTION

- .1 Workers to wear soft-soled shoes while applying shingle/shake roof, and under no circumstances wear hob-nailed or calked footwear.
- .2 If it is essential to walk over roof for any purpose, use boards for walk-way.
- .3 Scaffolding, toe-holts, shingling stools, applicators platforms and other apparatus employed by applicator should when removed, leave little or no trace of their presence and not compromise in any way weather tightness of roof.

PART 2 PRODUCTS

2.01 MATERIALS

- .1 Sawn Shingles:
 - .1 Species: eastern white cedar.
 - .2 Grade: Extra "A".
 - .3 Profile: Uniform, Tapered. Minimum thickness at butt is 10 mm, may be as thick as 12.5 mm at butt. All shingles on project to have same profile and thickness.
 - .4 Widths: random widths, 83 mm minimum - 275 mm maximum.
 - .5 Lengths: minimum 400 mm, maximum 405 mm.
 - .6 Grain: 100% edge grain.
 - .7 Wood: clear, free from excessive grain sweeps or bad cross-grain.
 - .8 Preparation: resquared and rebuted for square butt perpendicular to shingle edge.
- .2 Miscellaneous wood pieces or blocking required for roof installation, including pieces at eave gutters, valleys, gable rakes and rolls for flashing to be species group #1 Eastern White Cedar.
- .3 Underlayment:
 - .1 Waterproofing layer (installed directly on existing roof sheathing):
 - .1 Self-adhering SBS modified bitumen, glass-mat reinforced roofing underlayment.
 - .i Weight: 2.0 kg/m²
 - .ii Top face: sanded
 - .iii Underface: silicone release film
 - .iv Primer: liquid-applied primer as recommended by manufacturer.
 - .v Thickness: 1.6 mm

- .vi Standard of acceptance: Lastobond 240 by Soprema with Elastocol Stick primer.
- .2 Breathable rainscreen underlayment (installed over waterproofing layer, under shingles):
 - .1 Three-dimensional nylon matrix in roll form.
 - .i Dimensions:
 - 1. Width: 1,000 mm
 - 2. Length: 18,750 mm
 - 3. Thickness: 7.04 mm
 - .ii Weight: 9.7 lbs/roll
 - .iii Standard of acceptance: Cedar Breather by Benjamin Obdyke Inc.
 - .2 Accessories:
 - .i Nail-gunnable ridge vent on a roll for use with narrow hip and ridge shingles.
 - .ii Net free area: 80.6 cm²/305 mm length.
 - .iii Thickness: 16 mm.
 - .iv Standard of acceptance: Rapid Ridge 7 by Benjamin Obdyke Inc.
- .4 Interleaving organic felt:
 - .1 #30 Saturated felt underlayment as per ASTM D4869, Type 1.
 - .2 Width: 460 mm.
- .5 Flashing:
 - .1 Copper: ASTM B370; temper H00 (cold-rolled) except where temper 060 is required for forming; 16 oz. (0.55 mm). Provide lead coating in accordance with ASTM B101 on exposed copper surfaces.
- .6 Flashing nails to be of same material as sheet metal to CSA B113, flat head roofing nails of length and thickness suitable for metal flashing application.
- .7 Shingle nails: round head galvanized nails 50 mm.

PART 3 EXECUTION

3.01 STRIPPING OFF OF EXISTING FINISHES.

- .1 Remove existing roof and dormer finishes, of Existing flashings and underlay, and expose sheathing of roof and dormers.
- .2 Withdraw existing shingle and flashing nails, setting those which break off. Leave surfaces free from dirt and loose material.
- .3 Inspect roof framing and sheathing, taking up, cutting out and removing portions of sheathing boards and sections of rafters affected by fungal or insect attack.
- .4 Replace cut out portions of sheathing boards with boards of equal sectional dimensions, of specified grade, each end of the board being seated on a rafter, with at least 25 mm bearing, and secure to rafter with nails.

3.02 WATERPROOFING LAYER (SBS MODIFIED BITUMEN)

- .1 Self-adhered modified bitumen underlay to be installed over the entire roof area. Install over sheathing before the installation of breather materials.
- .2 Prime coat sheathing surface as per manufacturer's instructions.
- .3 Cut membrane material from roll into lengths 3 to 4.5 metres in length.
- .4 Align this material along the lower edge of the roof and reroll.
- .5 Peel back approximately 300-600 mm of release paper backing and adhere the peeled area.
- .6 Continue peeling the release paper as the membrane is unrolled while pressing the material in place.
- .7 Firmly roll the lower edge of the material to ensure secure bonding.
- .8 Repeat process working up the roof slope until the entire roof deck is covered. Successive widths may be applied from full rolls.
- .9 End laps shall be a minimum of 150mm and side laps a minimum of 100mm.

3.03 WATERPROOFING LAYER: VALLEYS, RIDGES & FLASHINGS

- .1 Prime coat surface as per manufacturer's instructions.
- .2 Cut membrane material from roll into lengths 1.2 to 1.8 metres in length and reroll.
- .3 Center over hips or ridge, and valleys starting at low points and working upwards.
- .4 Peel back release paper backing as required.
- .5 Press material into place working outwards.
- .6 End laps shall be a minimum of 150mm.
- .7 Counter-flash the full perimeter of all roof penetrations: vents, fans, chimneys, etc.

3.04 INSTALLATION OF LEAD COATED COPPER FLASHINGS

- .1 Valley flashings:
 - .1 Intersecting roof planes of equal pitch: valley sheets to extend from centre line of valley, up each side a distance of at least 300 mm.
 - .2 Intersecting roof planes of unequal pitch: valley sheets to extend from centre line of valley, up side of valley with steeper pitch at least 250 mm, and up side of valley with lower pitch a distance of 250 mm.
 - .3 Valley flashings for closed valleys to be discontinuous, interwoven with shingle courses and have headlap to match existing.

- .2 Ridge:
 - .1 Install flashing over wood ridge roll and secure with nails at bottom edges.
 - .2 Flashing to extend out over roof 25 mm from base of wood flashing substrate.
- .3 Base:
 - .1 Flashings shall be at least 230 mm high and shall project at least 200 mm out on roof.
 - .2 Where base flashing is stepped, steps shall be equal, horizontal width between 230mm and 300 mm and vertical height between 2 and 4 courses.
 - .3 On sloped intersections, sheets shall be lapped minimum of 75 mm.
 - .4 When run horizontally, sheets shall be flat locked and soldered.
 - .5 Vertical joints at corners of chimney to be lock seam.
- .4 Cap flashings or counter flashings:
 - .1 Flashings shall turn down over base flashings not less than 100 mm extend to within 25 mm of surface of finished roof.
- .5 Continuous flashings:
 - .1 Flashings shall be at least 150 mm high and shall project at least 100 mm out on roof.
 - .2 At sloped intersections, sheets shall be lapped a minimum of 100 mm and be soldered only on top.
- .6 Sidewall:
 - .1 Window caps and all other projections at points where rain water accumulates or snow piles, to be provided with flashings. Extend flashings up under shingles of side walls at least 150 mm.
 - .2 Mitred corners or "jointed" corners with square strip or moulding to have continuous narrow metal flashing strip. Woven inside corners shall be step flashed.

3.05 BREATHABLE RAINSCREEN UNDERLAYMENT

- .1 Install Cedar Breather underlayment as per manufacturer's instructions.

3.06 SHINGLE ROOFING

- .1 Starter course.
 - .1 Double shingles at eaves.
 - .2 Block up starter course sufficient to bring high points of all shingle courses into alignment.
 - .3 Project butts 25 mm from first sheathing board or face of felt moulding.
- .2 Typical course:
 - .1 Install shingles with weather exposure and having double thickness of shingles at any given point. Weather exposure to be no greater than 140mm.

- .2 Spacing:
 - .1 Shingles under 130 mm wide minimum: 3 mm joints.
 - .2 Shingles over 130 mm wide: 6-13 mm joints.
 - .3 Stagger joints minimum of 40 mm in succeeding courses. Ensure that in any 3 courses no two joints are in alignment.
- .3 Lay shingles with grain perpendicular to eaves, except at ridges and hips where grain should run parallel to the odd angle cut of the shingle.
- .4 In laying mixed flat and vertical grain shingles, avoid lining up joints with centre-lines of "hearts" and never break a joint directly below centre-lines of "hearts".
- .5 Wide flat grained shingles of lower grades, if entirely flat grained, should be split so that no shingles of this kind wider than 200 mm will be found in roof.
- .6 Shingles shall be kept 25 mm clear of any vertical flashing.
- .3 Install 460mm wide interleaved course of #30 felt over the top portion of the shingles and extend onto the cedar breather material (at each course of wood shingle).
- .4 Nailing:
 - .1 For concealed nailing, typical roof use 2 nails per roof per shingle up to 200 mm wide 3 nails per shingle in excess of 200 mm wide. Space nails 25 mm from edge with additional nails 100 mm apart across face of shingle and 25 mm above butt line of following course.
 - .2 Bottom shingles of double starter course to have additional line of nailing 13 mm back from overhang. Spacing to be similar to that of typical roof course.
 - .3 Extra nailing shall be provided final course of shingles at ridge, 25 mm plus down from ridge if sawing off, or breaking off of extra shingle length, in situ, is required.
 - .4 Drive nails flush but do not crush shingles.
 - .5 Drive nails flush but do not crush shingles and shakes.
- .5 Finishing gable rake:
 - .1 Place 150 mm tilting fillet of cedar bevel siding full length of each gable and with thick edge flush with sheathing edge.
 - .2 Butts of shingles which rest on tilting fillet to be cut back to produce a slight slant at an angle of 45° to side joint.
 - .3 Upper corner of edge shingles to be clipped off.
 - .4 Edge protection of shingles over end rafters or barge boards and mouldings to be 25 mm.
- .6 Finishing the hip ridges, alternate overlap side applied shingles:
 - .1 Select shingles of approximately same width and strictly vertical grain for use as ridge shingles.
 - .2 Carry slope shingles of main roof up to centreline of ridge.

- .3 Start laying the ridge cap at each end with a double starter course and proceed to centre. At that point nail a small saddle of shingles butts to splice two lines.
 - .4 First shingles nailed in place with one edge resting against a guide strip chalked line from centre-line of ridge.
 - .5 Edge of shingles projecting over centre of ridge to be cut back on a bevel.
 - .6 Shingles on opposite side applied and projecting edge cut back to fit.
 - .7 Apply shingles in following courses, alternately in reverse order.
 - .8 Weather exposure to be no greater than 140mm.
- .7 Ridge combing:
- .1 Butts of shingles comprising top courses, either side of ridge, to be placed against a guide strip down from centreline of ridge.
 - .2 Feather ends of shingles on leeward side to be cut flush with top of ridge.
 - .3 Feather ends of shingles on windward side to be run 25 or 50 mm over and past ends of the cut-off shingles.
 - .4 Install wood ridge roll blocking/trim and lead coated copper flashing cap as detailed.

END OF SECTION

PART 1 GENERAL

1.01 RELATED WORK

- .1 Section 06 08 99 – Rough Carpentry for Minor Works.
- .2 Section 09 03 61 – Historic – Repainting Exterior Surfaces.

1.02 REFERENCES

- .1 CSA B111-1974 Wire Nails, Spikes and Staples.
- .2 NLGA Standard Grading Rules for Canadian Lumber 1991 Select and Better (Subject to CAN/CSA 0141-91 and ALS PS 20-70).
- .3 National Building Code of Canada 1995, Part 9, Section 9.27.6.
- .4 Canadian Painting Contractors' Architectural (CPCA).
 - .1 Painting Specifications Manual 1993.
- .5 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-1.28-M89, Alkyd, Exterior House Paint.
 - .2 CAN/CGSB-1.126-M91, Vinyl Sealer for Wood.
 - .3 CGSB 1-GP-189M-78, Primer, Alkyd, Wood, Exterior.
 - .4 CGSB 85-GP-1M-78, Painting (New) Exterior Wooden Surfaces.

1.03 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit duplicate 150 x 150 mm size profile specified.

PART 2 PRODUCTS

2.01 MATERIALS

- .1 Lumber siding: to NLGA Standard Grading Rules for Canadian Lumber.
 - .1 Bevel siding: eastern white pine, No.1 select or better grade, factory finished, smooth texture, patterns as indicated on the drawings.
 - .1 Sizes to match existing, approximately 16 mm thick at bottom edge with 100 mm exposed to weather.
 - .2 Siding shall be kiln dried to maximum moisture content of 12% and shall be free of large knots, knot holes and loose knots.

- .2 Accessories:
 - .1 Nails: to CSA B111, 51 mm or 76 mm hot-dip galvanized with round head.
 - .2 Trims and mouldings: eastern white pine, No.1 select or better grade, sizes as indicated on the drawings.
 - .3 Sealants: As per Section 07 92 00 – Joint Sealants.

PART 3 EXECUTION

3.01 INSTALLATION

- .1 Install sill flashings, wood starter strips, inside corner flashings, edgings and flashings over openings.
- .2 Fasten wood siding in straight, aligned lengths to sheathing. Stagger butt joints not less than 800 mm and distribute evenly over wall faces. Cut butt joints at 45 degrees. Seal cut surfaces with a 1.6mm bead of sealant. Drive nails so that nail heads are just in contact with the siding surface.
- .3 Face nail siding 25mm from the bottom.

3.02 PAINTING

- .1 Refer to section 09 03 61 – Historic – Repainting Exterior Surfaces for painting of both existing clapboard and new replacement sections of wood siding.

END OF SECTION

PART 1 GENERAL

1.01 RELATED WORK

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 35 43 - Environmental Procedures.
- .3 Section 01 45 00 - Quality Control.
- .4 Section 01 61 00 - Common Product Requirements.
- .5 Section 01 74 11 - Cleaning.
- .6 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .7 Section 01 78 00 - Closeout Submittals.
- .8 Section 06 08 99 - Rough Carpentry for Minor Works.
- .9 Section 07 62 00 - Sheet Metal Flashing and Trim.
- .10 Section 07 92 00 - Joint Sealants.

1.02 REFERENCES

- .1 ASTM E 108 - 17, Standard Test Methods for Fire Tests of Roof Coverings.
- .2 CGSB 37-GP-19M, Cement, Plastic, Cutback Tar.
- .3 CAN/CGSB-37.29, Rubber- Asphalt Sealing Compound.
- .4 CGSB 37-GP-56M Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.
- .5 Canadian Roofing Contractors Association (CRCA): CRCA Specification Manual.
- .6 FM Global Group: "Approval Standard for Single Ply, Polymer-Modified Bitumen Sheet, Built-Up Roof (BUR) and Liquid Applied Roof Assemblies for use in Class 1 and Non-Combustible Roof Deck Construction" (Class No. 4470, April 2010) and Loss Prevention Data Sheet 1-28 "Wind Loads to Roof Systems and Roof Deck Securement" (January, 2012).
- .7 UL 1897 Standard for Safety for Uplift Tests for Roof Covering Systems.

1.03 SUBMITTALS

- .1 Submit manufacturer's printed product literature, specifications and data sheets.
- .2 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

- .1 Indicate in shop drawings flashings, control joints, tapered insulation details and all required roofing materials.
- .2 Indicate fastener pattern to meet performance standards for wind uplift.
- .3 Submit a letter stating that the roofing contractor is recognized and approved by the roofing materials manufacturer and that the manufacturer is prepared to issue the warranty.
- .4 Submit manufacturer's minimum maintenance requirements for meeting warranty requirements.

1.04 STORAGE AND HANDLING

- .1 Refer to Section 01 61 00 - Common Product Requirements for storage and handling requirements.
- .2 Provide and maintain dry, off-ground weatherproof storage.
- .3 Store materials in upright position. Store membrane rolls with selvage edge up, store as per manufacturer's requirements to meet warranty.
- .4 Remove only in quantities required for same day use.
- .5 Place plywood runways over work to protect work and enable work flow.
- .6 Store sealants at +5°C minimum.
- .7 All materials to be delivered and stored in conformance with the requirements described by the manufacturer; remain in their original packaging, displaying the manufacturer's name, product name, weight, and reference standards, as well as all other indications or references considered standard.
- .8 At all times, protect and store materials in a dry and properly ventilated area, away from any welding flame or spark and sheltered from the elements or any harmful substance. Only materials destined for same-day use can be removed from this storage area. In cold weather, store materials in a heated area at a minimum temperature of 10°C and removed prior to application. If rolls cannot be stored in a heated environment, they may be pre-conditioned before installation. Consult manufacturer's membrane application procedures.
- .9 Store adhesives and emulsion-based waterproofing mastics at a minimum 5°C. Store adhesives and solvent-based mastics at sufficiently high temperatures to ensure ease of application.
- .10 Avoid material overloads which may affect the structural integrity of specific roof areas.

1.05 ENVIRONMENTAL REQUIREMENTS

- .1 Do not install roofing when temperature remains below -18°C or manufacturer's minimum requirements, whichever is higher, for torch application, or to manufacturers' recommendations for mop application.

- .2 Minimum temperature for solvent-based adhesive is -5°C, or manufacturer's minimum requirements, whichever is higher.
- .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.

1.06 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.

1.07 WARRANTY

- .1 Provide a written 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 Substantial Certificate of Completion, subject to the standard limitations and conditions of the manufacturer.
- .2 Provide a written guarantee 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 Substantial Certificate of Completion, the Contractor shall repair, at no expense, any defects which result of a failure to comply with the plans and specifications.
- .3 Warranty to be non-prorated.

1.08 QUALITY ASSURANCE

- .1 Membrane: applied by applicator acceptable to Departmental Representative and approved by manufacturer for application of its products.
- .2 Refer to Section 01 33 00 – Submittal Procedures and Section 01 45 00 - Quality Control for submission procedures.
- .3 If requested, submit laboratory test reports certifying compliance of bitumens and membranes with specification requirements.

1.09 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management.
- .2 Separate metal and corrugated cardboard-packaging and place in designated areas for recycling.
- .3 Do not burn scrap at the project site.

1.10 PRE-INSTALLATION MEETING

- .1 Hold a pre-installation meeting prior to start of roofing works, with the roofing contractor's representative and the Departmental Representative. The purpose of this meeting is to review particular installation conditions specific to this project. Document a report of this meeting.

PART 2 PRODUCTS

2.01 ASPHALT PROTECTION BOARD

- .1 Semi-rigid asphalt roofing substrate composed of mineral core between glass fibre mats:
 - .1 Dimensions: 1200 x 1500 mm x 6.0 mm thick.
 - .2 Schedule:
 - .1 Install on all roof surfaces except the veranda roof.
 - .2 To be mechanically fastened to roof deck.

2.02 BASE SHEET

- .1 Base sheet: to CGSB 37-GP-56M, Styrene-Butadiene-Styrene (SBS) elastomeric polymer, prefabricated sheet, non-woven, polyester reinforcement, weighing 180 g/m².
 - .1 Type 2, fully adhered.
 - .2 Class C-plain surfaced.
 - .3 Grade heavy duty service.
 - .4 Top and bottom surfaces:
 - .1 Torch-applied: sanded/plastic film.
 - .2 Adhesive applied: sanded/sanded.
 - .5 Base sheet membrane properties:
 - .1 Strain energy (longitudinal/transversal): 9.0/7.0 kN/m.
 - .2 Breaking strength (longitudinal/transversal): 17.0/12.5 N/5 cm.
 - .3 Ultimate elongation (longitudinal/transversal): 60/65 %.
 - .4 Tear resistance: 60 N.
 - .5 Cold bending at -30 degrees C : no cracking.
 - .6 Static puncture resistance: > 400.
 - .7 Dimensional Stability: -0.3 / 0.3 %.

- .2 Schedule:
 - .1 Install on all roof surfaces.
 - .2 To be torch-applied to all roof areas except the veranda roof.
 - .3 Veranda roof to be adhered with cold-applied adhesive.

2.03 OPTIONAL COMBINATION BASE SHEET PANEL

- .1 On all roof areas except the veranda roof, the Contractor may use a base sheet panel mechanically fastened to the roof deck in lieu of asphalt protection board and separate base sheet.
- .2 Base sheet panel: SBS modified bitumen membrane with non-woven polyester reinforcement, factory laminated on asphaltic board.
 - .1 Total thickness: 7 mm.
 - .2 Selvage width: 90 mm.
 - .3 Top surface: plastic film.
 - .4 Underface: semi-rigid asphaltic film.

2.04 CAP SHEET

- .1 Note: Cap sheet is required to be installed in courses with 230 mm areas exposed between lap-joint/seams. This will require that the typical 1000 mm wide rolls be cut, allowing courses of 230 mm with a 100 mm selvage width for a total product width of 330 mm.
- .2 Cap sheet: to CGSB 37-GP-56M, Styrene-Butadiene-Styrene (SBS) elastomeric polymer, prefabricated sheet, glass, polyester reinforcement, weighing 250 g/m².
 - .1 Type 2, fully adhered.
 - .2 Class G-granule surfaced.
 - .3 Grade 2 - heavy duty service.
 - .4 Bottom surface:
 - .1 Torch-applied: plastic film.
 - .2 Adhesive applied: sanded.

- .5 Colour:
 - .1 Veranda roof: green.
 - .2 Other roof areas: black.
- .6 Cap sheet membrane properties:
 - .1 Strain energy (longitudinal/transversal): 10.0/10.0 kN/m.
 - .2 Breaking strength (longitudinal/transversal): 18.0/10.0 kN/m.
 - .3 Ultimate elongation (longitudinal/transversal): 60/65 %.
 - .4 Tear resistance: 75 N.
 - .5 Cold bending at -30 degrees C: No cracking.
 - .6 Static puncture resistance: > 420.
 - .7 Dimensional Stability: -0.8 / 0.2 %.
- .3 Minimum total thickness if base sheet and cap sheet combined to be 5.8 mm. Cap sheet and base sheet to be of same manufacturer.
- .4 Schedule:
 - .1 Install on all roof surfaces.
 - .2 To be torch-applied to all roof areas except the veranda roof.
 - .3 Veranda roof to be adhered with cold-applied adhesive.

2.05 BASE SHEET FLASHING

- .1 To CGSB 37-GP-56M, Type 2, Class C, Grade 2, non-woven polyester reinforced 180g/m², self-adhesive membrane with polyethylene top face and release film under face.

2.06 PRIMERS

- .1 A blend of elastomeric bitumen, volatile solvents and adhesive enhancing additives used to prime concrete or metal substrates to enhance the adhesion of torch-applied membranes.

2.07 COLD-APPLIED ADHESIVE

- .1 Liquid, trowel-applied, odourless, polyether based adhesive used to adhere SBS bituminous membranes on flashings and sloped surfaces > 3%.

- .1 Density: 1.3 kg/litre.
- .2 Ultimate elongation: 450%.
- .3 Viscosity, Brookfield a 25°C: 150,000 cP.
- .4 Solids by weight: 99%.
- .5 Curing time: 7 days at 25 deg. C / 50% RH.

2.08 SEALERS

- .1 Mastic made of synthetic rubbers, plasticized with bitumen and solvents with aluminum pigments to provide greater resistance to U.V.

2.09 PENETRATION FLASHINGS

- .1 Existing cast iron plumbing stacks are to remain as-is and are not to be cut down or otherwise altered.
- .2 Manufactured Pitch Pocket System:
 - .1 Part 1: half-round, 50 mm high solid urethane curb sections sized to suit pipe diameter.
 - .2 Part 2: Polyether adhesive/sealant to adhere curb sections to roof and seal critical areas around the penetration.
 - .3 Part 3: Two-part pourable self-leveling urethane sealant to fill pitch pocket once it is secured in place and sealed as per part 2.
 - .4 Colour: black.
 - .5 Standard of acceptance: M-Curb Pitch Pocket System by GAF.

2.10 FASTENERS

- .1 Fasteners for protection board: minimum #14 mechanical fasteners made of case-hardened carbon steel with corrosion resistance coating, complying with FM standards. 75 mm diameter round or hexagon stress plates complying with CSA B35.3 and FM 4470 approval standards, diameter and lengths as required to suit total assembly thickness. Ensure fasteners have the following deck penetration:
 - .1 For wood decks: minimum 25 mm.

PART 3 EXECUTION

3.01 STRIPPING OFF OF EXISTING FINISHES

- .1 Remove existing roof finishes, existing flashings and underlay, and expose sheathing of roof areas where membrane roofing is to be installed as indicated on the drawings.
- .2 Withdraw existing membrane and flashing nails, setting those which break off. Leave surfaces free from dirt and loose material.

- .3 Inspect roof framing and sheathing, taking up, cutting out and removing portions of sheathing boards and sections of rafters affected by fungal or insect attack.
- .4 Replace cut out portions of sheathing boards with boards of equal sectional dimensions, of specified grade, each end of the board being seated on a rafter, with at least 25 mm bearing, and secure to rafter with nails.

3.02 WORKMANSHIP

- .1 Do roofing work in accordance with manufacturer's minimum requirements, applicable standards in Canadian Roofing Contractors Association (CRCA) Roofing Specifications Manual and to FM Design No. 1-90, except where specified otherwise.
- .2 Roofing work must be completed in a continuous fashion as surfaces are readied and weather conditions permit.
- .3 Seal all seams that are not covered by a cap sheet membrane in the same day. The cap sheet cannot be installed if any moisture is present at/in the base sheet seams.
- .4 Ensure waterproofing conditions for roofs at all times, including protection during installation work by other trades and progressive protection as work is completed (e.g. vents).

3.03 ASPHALT PROTECTION BOARD

- .1 Loosely lay cover board over existing wood deck, parallel to slope.
- .2 Place boards in parallel rows with ends staggered and in firm contact with one another.
- .3 Cut end boards to suit.
- .4 Mechanically fasten asphalt protection board with plates and fasteners in accordance with FM Global Group Loss Prevention Data Sheet 1-28.
- .5 Fit boards tight together. Install fasteners based on design wind uplift securement requirements, for the building site location for protection board, in accordance with manufacturer's recommendations.

3.04 BASE SHEET APPLICATION

- .1 Do membrane application in accordance with manufacturer's recommendations.
- .2 On the veranda roof:
 - .1 Apply membrane adhesive over protection board substrate and base membrane with a 4.8 mm notched trowel in conformance with manufacturer's instructions at a rate of 0.8 litres/m² with a thickness of 31 mil on each surface.
 - .2 Wait 10 minutes before placing membrane on protection board substrate. Apply pressure on surface with a membrane roller.

- .3 On all other roof areas:
 - .1 Unroll and torch base sheet onto protection board taking care not to burn membrane or its reinforcement.
- .4 Starting at low point on roof, install base sheet perpendicular to slope.
- .5 Lap sheets 75 mm minimum for side laps and 150 mm minimum for end laps. Offset joints in cap sheet 300 mm minimum from those in base sheet.
- .6 Application to be free of blisters, fishmouths and wrinkles.

3.05 BASE FLASHINGS

- .1 Install metal perimeter edge/termination flashings with adhesive as described above, or using self-adhesive product, onto base sheet (prior to cap sheet application).
- .2 Install roof/wall base membrane flashings with adhesive (as described above). Lap flashing base sheet to membrane base sheet minimum 150 mm and seal.

3.06 CAP SHEET APPLICATION

- .1 Do membrane application in accordance with manufacturer's recommendations.
- .2 Cap sheet is required to be installed in courses with 230 mm areas exposed between lap-joint/seams.
- .3 Starting at low point on roof, parallel to slope / parallel to eave line, unroll cap sheet, align and reroll from both ends.
- .4 On the veranda roof:
 - .1 Apply membrane adhesive over protection board substrate and base membrane with a 4.8 mm notched trowel in conformance with manufacturer's instructions at a rate of 0.8 litres/m² with a thickness of 31 mil on each surface.
 - .2 Wait 10 minutes before placing membrane on protection board substrate. Apply pressure on surface with a membrane roller.
- .5 On all other roof areas:
 - .1 Unroll and torch cap sheet onto base sheet taking care not to burn membrane or its reinforcement.
- .6 Lap sheets 75 mm minimum for side laps and 100 mm minimum for end laps. Offset joints in cap sheet 300 mm minimum from those in base sheet.
- .7 Application to be free of blisters, fishmouths and wrinkles.

3.07 CAP FLASHINGS

- .1 Where called for on the drawings, torch cap sheet flashing onto substrate in 1 metre wide strips.

- .2 Lap flashing cap sheet to membrane cap sheet 250 mm minimum and torch weld.
- .3 Provide 75 mm minimum side lap and seal.
- .4 Properly secure flashings to their support, without sags, blisters, fishmouths or wrinkles.
- .5 Do work in accordance with manufacturer's recommendations.

3.08 ROOF PENETRATIONS

- .1 Install pitch pocket system at existing roof vent stacks and seal to membrane in accordance with the manufacturer's recommendations and details.

3.09 CLEANING

- .1 Perform in accordance with Section 01 74 11 - Cleaning.
- .2 Remove debris, equipment and excess material from all roof surfaces and dispose in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

END OF SECTION

PART 1 GENERAL

1.01 RELATED WORK

- .1 Section 06 10 00 - Rough Carpentry
- .2 Section 07 31 29 - Wood Shingles and Shakes
- .3 Section 07 46 23 - Wood Siding
- .4 Section 07 52 00 – Modified Bitumen Roofing

1.02 REFERENCES

- .1 ASTM B32-00 Specification for Solder Metal.
- .2 ASTM B101-02 Specification for Lead Coated Copper Sheet and Strip for Building Construction.
- .3 ASTM B370-98 Specification for Copper Sheet and Strip for Building Construction.
- .4 CSA A123.3-M1979 Asphalt or Tar Saturated Roofing Felt.
- .5 CSA B111-1974 Wire Nails, Spikes and Staples.
- .6 CAN/CGSB-37.5-M89 Cutback Asphalt Plastic Cement.
- .7 CAN/CGSB-51.32-M77 Sheathing, Membrane, Breather Type.
- .8 Copper Development Association (CDA) "Copper in Architecture Handbook"
- .9 Canadian Roofing Contractors Association (CRCA).

1.03 SAMPLES

- .1 Submit shop drawings in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit duplicate 50 x 50 mm samples of sheet metal material.

PART 2 PRODUCTS

2.01 SHEET METAL MATERIALS

- .1 Copper: ASTM B370; temper H00 (cold-rolled) except where temper O60 is required for forming; 16 oz. (0.55 mm). Provide lead coating in accordance with ASTM B101 on exposed copper surfaces.

2.02 ACCESSORIES

- .1 Isolation coating: alkali resistant bituminous paint.
- .2 Plastic cement: to CGSB 37-GP-5Ma.

- .3 Underlay for metal flashing: No. 30 perforated asphalt felt to CSA A123.3.
- .4 Paper Slip Sheet: 4 to 6-lb. rosin-sized building paper.
- .5 Sealants: refer to Section 07 92 00 – Joint Sealants.
- .6 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.
- .7 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.
- .8 Washers: of same material as sheet metal, 1 mm thick with rubber packings.
- .9 Solder: to ASTM B32, alloy composition 60/40 tin/lead for lead-coated copper, with rosin flux.
- .10 Flux: rosin, cut hydrochloric acid, or commercial preparation suitable for materials to be soldered.
- .11 Touch-up paint: as recommended by prefinished material manufacturer.

2.03 FABRICATION

- .1 Install sheet metal work as detailed.
- .2 Use concealed fastenings except where approved before installation.
- .3 Shop-fabricate work to greatest extent possible. Comply with details shown and with applicable requirements of Copper Development Association (CDA) "Copper in Architecture Handbook" and other recognized industry practices. Fabricate for waterproof and weather-resistant performance, with expansion provisions for running work, sufficient to permanently prevent leakage, damage, or deterioration of the work. Form work to fit substrates. Comply with material manufacturer instructions and recommendations for forming material. Form exposed copper work without excessive oil-canning, buckling, and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.
- .4 Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder. Rivet joints for additional strength where required.
- .5 Expansion Provisions: Where lapped or bayonet-type expansion provisions in work cannot be used or would not be sufficiently water/weatherproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
- .6 Sealant Joints: Where movable, nonexpansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant, in compliance with CDA standards.

PART 3 EXECUTION

3.01 INSTALLATION

- .1 General: Except as otherwise indicated, comply with manufacturer's installation instructions and recommendations and with CDA "Copper in Architecture Handbook". Anchor units of work securely in place by methods indicated, providing for thermal expansion of units; conceal fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weatherproof.
- .2 Underlayment: Where installation is to be directly on cementitious or wood substrates, install a slip sheet of red rosin paper on a course of asphalt saturated felt.
- .3 Bed flanges of work in a thick coat of bituminous roofing cement where required for waterproof performance.
- .4 Install reglets to receive counterflashing in manner and by methods indicated. Where shown in concrete, furnish reglets to trades of concrete work for installation as work of Division-3 sections. Where shown in masonry, furnish reglets to trades of masonry work, for installation as work of Section 04051.
- .5 Install counterflashing in reglets, either by snap-in seal arrangement or by soldering in place for anchorage and filling reglet with mastic or elastomeric sealant, as indicated and depending on degree of sealant exposure.

3.02 CLEANING

- .1 Clean exposed copper surfaces, removing substances that might cause discoloration of metal.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

- .1 Materials, preparation and application for caulking and sealants.
- .2 Text to complete other various Sections containing sealant or caulking specifications, including Section 07 52 00 - Modified Bituminous Membrane Roofing.

1.02 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 45 00 - Quality Control.
- .3 Section 01 61 00 - Common Product Requirements.
- .4 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .5 Section 06 08 99 – Finish Carpentry.
- .6 Section 07 31 29 – Wood Shingles and Shakes.
- .7 Section 07 46 23 – Wood Siding.
- .8 Section 07 52 00 – Modified Bituminous Membrane Roofing.
- .9 Section 07 62 00 - Sheet Metal Flashing and Trim.

1.03 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C719, Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants under Cyclic Movement (Hockman Cycle).
 - .2 ASTM C919, Standard Practice for Use of Sealants in Acoustical Applications.
 - .3 ASTM C920, Standard Specification for Elastomeric Joint Sealants.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-19.13, Sealing Compound, One-component, Elastomeric, Chemical Curing.
 - .2 CAN/CGSB-19.17-M90 One-Component, Acrylic Emulsion Base Sealing Compound.
 - .3 CAN/CGSB-19.21-M87 Sealing and Bedding Compound Acoustical.
 - .4 CAN/CGSB-19.22-M90 Mildew Resistant, Sealing Compound for Tubs and Tiles.
- .3 Department of Justice Canada:
 - .1 Canadian Environmental Protection Act (CEPA).

- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .5 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act (TDGA).

1.04 SUBMITTALS

- .1 Manufacturer's product to describe.
 - .1 Caulking compound.
 - .2 Primers.
 - .3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.
 - .4 Installation instructions, surface preparation and product limitations.
- .2 Submit duplicate samples of each type of material and colour.
- .3 Cured samples of exposed sealants for each color where required to match adjacent material.
- .4 Manufacturers' instructions to include installation instructions for each product used.
- .5 Manufacturer's maintenance information to include required review periods and maintenance requirements to maintain warranty coverage.

1.05 QUALITY ASSURANCE

- .1 Mock-Up
 - .1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.
 - .2 Construct mock-up to show location, size, shape and depth of joints complete with back-up material, primer, caulking and sealant. Mock-up may be part of finished work.
 - .3 Allow 24 hours for inspection of mock-up by Owner's Representative before proceeding with sealant work.
 - .4 Mock-up will be used:
 - .5 To judge workmanship, substrate preparation, operation of equipment and material application.
 - .6 When accepted, mock-up will demonstrate minimum standard of quality required for this Work.
- .2 Bond Testing
 - .1 Manufacturer to perform a bond test to confirm primer requirements for maximum adhesion based on actual flashing metal and colour of sealant.

- .2 Confirm any risk of adverse staining or discolouration that would impair the visual appearance of the substrate.
- .3 Manufacturer to submit verification report that includes all acceptable installation requirements for each intended use.

1.06 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.

1.07 ENVIRONMENTAL AND SAFETY REQUIREMENTS

- .1 Comply with requirements of Workplace 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.

1.08 PROJECT CONDITIONS

- .1 Environmental Limitations:
 - .1 Do not proceed with installation of joint sealants under following conditions:
 - .1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer, or are below 4.4°C.
 - .2 When joint substrates are wet.
 - .2 Joint-Width Conditions:
 - .1 Do not proceed with installation of joint sealants where joint widths are less than or greater than those allowed by joint sealant manufacturer for applications indicated.
 - .3 Joint-Substrate Conditions:
 - .1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates, per manufacturer's requirements.

PART 2 PRODUCTS

2.01 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 in the process, including the disposal of waste products arising therefrom, 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 or asbestos, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium, barium or their compounds, except barium sulphate.
- .3 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.
- .4 Where sealants are qualified with primers use only these primers.

2.02 SEALANT

- .1 For use in sealing air/vapour barrier penetrations: ASTM C920 Type S, Grade NS, Class 25, moisture cure, medium modulus one-part, low odor / VOC using silyl-terminated polyether polymer:
 - .1 ASTM C719 +/- 25%.
 - .2 Elongation, ultimate: 450-550 %.
 - .3 Modulus, 100%: 275 – 345 kPa (40-50 psi).
 - .4 Shore A Hardness: 25 ±5.
 - .5 Tensile Strength: 1034 – 1378 kPa (150-200 psi)
 - .6 Standard of acceptance: HE925BC – BES Sealant by Henry.
- .2 For general purpose masonry use: ASTM C920 Type S, Grade NS, Class 50 One-component, moisture cure, silicone sealing compound.
 - .1 Movement capability: ± 50%.
 - .2 Modulus, 50% extension: 193 kPa (28 psi).
 - .3 Elongation, ultimate: 1600.
 - .4 Shore A Hardness: 15.
 - .5 VOC: 22 g/L.
 - .6 Standard of acceptance: Contractor's Concrete Sealant by Dow Corning.
- .3 For general purpose exterior use: ASTM C920 Type S, Grade NS, Class 35 One-component, moisture cure, silicone sealing compound.
 - .1 Movement capability: ± 40%.

- .2 Modulus, 50% extension: 380 kPa (55 psi).
 - .3 Elongation, ultimate: 550.
 - .4 Shore A Hardness: 25 ±5.
 - .5 VOC: 35 g/L.
 - .6 Standard of acceptance: Contractor's Weatherproofing Sealant by Dow Corning.
- .4 For general roofing applications: CAN/CGSB 19.13 and ASTM C920, Type S, Grade NS, Class 50, Use NT, G, A & O.
- .1 Standard of acceptance:
 - .1 795 Silicone Building Sealant by Dow Corning.
 - .2 Spectrem 2 High Performance Silicone by Tremco.
 - .3 WS-290 by Sikasil.
 - .5 Preformed Compressible and Non-Compressible back-up materials.
 - .1 Polyethylene, Urethane, Neoprene or Vinyl Foam.
 - .1 Extruded closed cell foam backer rod.
 - .2 Size: oversize 30 to 50 %.
 - .2 Neoprene or Butyl Rubber.
 - .1 Round solid rod, Shore A hardness 70.
 - .3 High Density Foam.
 - .1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/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.

2.03 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

3.01 PROTECTION

- .1 Protect installed Work of other trades from staining or contamination.

3.02 SURFACE PREPARATION

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

3.03 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.

3.04 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.

3.05 MIXING

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

3.06 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

1.01 RELATED REQUIREMENTS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 35 29.06 - Health and Safety Requirements.
- .3 Section 01 45 00 - Quality Control.
- .4 Section 01 61 00 - Common Product Requirements.
- .5 Section 01 74 11 – Cleaning.
- .6 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .7 Section 01 78 00 - Closeout Submittals.
- .8 Section 02 83 11 – Lead-Base Paint Abatement – Intermediate Precautions.
- .9 Section 05 50 00 – Metal Fabrications.
- .10 Section 06 20 00 – Finish Carpentry.
- .11 Section 06 05 73 – Wood Treatment.
- .12 Section 07 46 23 – Wood Siding.

1.02 PRICE AND PAYMENT PROCEDURES

- .1 Alternates:
 - .1 Identify alternate products in writing for review of and approval by Departmental Representative.
 - .1 Requests for alternate approval: in writing and accompanied by manufacturer's literature and recommendations.
 - .2 Change of manufacturer's brands and/or sources of supply of painting materials from those previously approved only on approval of Departmental Representative.

1.03 REFERENCE STANDARDS

- .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .2 Master Painters Institute (MPI)
 - .1 Maintenance Repainting Manual [current edition], Master Painters Institute (MPI) including Identifiers, Evaluation, Systems, Preparation and Approved Products List.

- .3 National Fire Code of Canada (NFC), [2015].

1.04 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for paints and coating products and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Samples:
 - .1 Submit full range of coating colour sample matches for review and selection.

1.05 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for paints and coatings for incorporation into manual.
 - .1 Provide records of products used. List products in relation to finish system and include following:
 - .1 Product name, type and use (e.g. materials and location).
 - .2 Manufacturer's product number.
 - .3 Colour code numbers.
 - .4 Manufacturer's Material Safety Data Sheets.
- .3 Submit maintenance record of painting work.

1.06 MAINTENANCE MATERIAL SUBMITTALS

- .1 Extra Stock Materials:
 - .1 Submit one, 4 litre can of each type and colour of finish coating. Identify type and colour in accordance with established colour schedule and finish system.

1.07 QUALITY ASSURANCE

- .1 Regulatory Agency Sustainability Approvals:
 - .1 Conform to applicable standards and requirements for exterior repainting work including cleaning, preparation and priming.
 - .2 Retain purchase orders, invoices and other documents and produce when requested by Departmental Representative.

- .2 Qualifications:
 - .1 Contractor must have proven satisfactory experience with historic structures painting. When requested, provide list of last 3 comparable jobs including, job name and location, specifying authority, and project manager.
 - .2 Qualified journeypersons: as identified by local jurisdiction.
 - .3 Apprentices: work under direct supervision of qualified journeyperson in accordance with applicable trade regulations.
- .3 Mock-ups:
 - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
 - .2 Provide following mock-ups:
 - .1 Minimum 10 m² of exterior wood siding.
 - .2 Minimum 10 m² of veranda deck surface, railings and decorative woodwork.
 - .3 Minimum one complete window assembly including storm window.
 - .4 Minimum two linear meters of fencing, including one post.
 - .3 Allow 48 hours for inspection of mock-up by Departmental Representative before proceeding with work.
 - .4 When accepted, mock-up demonstrates minimum standard for this work. Mock-up may remain as part of finished work.

1.08 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
 - .1 Labels: to indicate:
 - .1 Type of paint or coating.
 - .2 Compliance with applicable standard.
 - .3 Colour number in accordance with established colour schedule.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, in a dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect paints and coatings.
 - .3 Keep areas for storage, cleaning and preparation, clean and orderly.
 - .4 Remove paint materials from storage in quantities required for same day use.

- .5 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
- .6 Store materials and equipment within temperature range between 7 degrees C to 30 degrees C.
- .7 Store materials and supplies away from heat generating devices and sensitive materials above minimum temperature as recommended by manufacturer.
- .8 Replace defective or damaged materials with new.
- .4 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 daily.
 - .3 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada (NFC).

1.09 AMBIENT CONDITIONS

- .1 Substrate and ambient temperatures: in accordance with limits prescribed by manufacturer.
- .2 Apply paint finish in areas where:
 - .1 Dust is no longer being generated by related construction operations.
 - .2 Wind conditions are such that airborne particles will not affect quality of finished surface.
- .3 Substrate and ambient air temperature, humidity and moisture content levels:
 - .1 Do not perform repainting work when:
 - .1 Ambient air and substrate temperatures are below 10 degrees C.
 - .2 Substrate temperature is over 35 degrees C.
 - .3 Substrate and ambient air temperatures are expected to fall outside paint manufacturer's prescribed limits.
 - .4 Substrate is wet, damp or frosted.
 - .5 Maximum moisture content of substrate exceeds: 15% for wood.
 - .6 Relative humidity is above 85%.
 - .7 Dew point is less than 3 degrees C variance between air/surface temperatures.
 - .8 Precipitation is forecast to occur before paint has thoroughly cured.
 - .9 It is foggy, misty, raining, icing or snowing at site.
 - .2 Damp and cold weather conditions:
 - .1 Provide and maintain cover for paint finish.

- .2 Heat substrates and surrounding air to comply with temperature and humidity conditions required.
- .3 Protect until paint is dry.
- .4 Protect until weather conditions are suitable.
- .4 Perform work on surfaces exposed to direct, intense sunlight in early morning.

PART 2 PRODUCTS

2.01 MATERIALS

- .1 Paints and coatings:
 - .1 Linseed Oil Paint containing only purified, boiled linseed oil, titanium dioxide, chalk and 20% pure zinc (to prevent mould/mildew growth).
 - .1 Linseed oil paint to be solvent free.
 - .2 VOC content less than 1.1%.
 - .3 Approved manufacturer: ALLBACK Linseed Oil Paint as supplied by Swede Paint Enterprises.
- .2 Accessories:
 - .1 For cleaning/preparation of soiled surfaces: Linseed Soap as recommended by manufacturer.
 - .2 For conditioning bare/new wood: Purified Raw Linseed Oil as recommended by manufacturer.
 - .3 For filling cracks/holes in existing woodwork: Linseed Oil Putty as recommended by manufacturer.
 - .4 For sealing knots in wood: Pure Shellac as recommended by paint manufacturer.
 - .5 Liquid paint remover: Ammonia, chlorine or Linseed Oil Soap as recommended by paint manufacturer.

2.02 SUSTAINABILITY CHARACTERISTICS

- .1 Sustainability characteristics for paints, coatings, thinners, solvents, cleaners and repainting fluids:
 - .1 Does not contain methylene chloride, chlorinated hydrocarbons, toxic metal pigments.
 - .2 Manufactured without formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.
 - .3 Manufactured without compounds that contribute to ozone depletion in upper atmosphere.
 - .4 Manufactured without compounds that contribute to smog in lower atmosphere.

2.03 COLOURS

- .1 Colour Schedule:
 - .1 All wood clapboard, windows and white trim boards: Allback White # 50248.
 - .2 All fence components except main gate posts: Allback White # 50248.
 - .3 Veranda deck, railings and decorative woodwork; storm windows, doors, accent-coloured trim boards: Allback Spruce Green #50012 / NCS 7010-G30Y.
 - .4 Underside of veranda roof: Allback Sea Mist #50005 / NCS 2502-Y.
- .2 Obtain written approval from Departmental Representative for change in Colour Schedule.

2.04 MIXING AND TINTING

- .1 Pigment to manufacturer's proprietary pigment of known performance.
- .2 Vehicle to manufacturer's proprietary vehicle of known performance.
- .3 Colouring matter to manufacturer's proprietary vehicle of known performance.
- .4 Perform colour tinting operations prior to delivery of paint to site.
- .5 Obtain Departmental Representative's written approval for on-site tinting of paint materials.
- .6 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.
- .7 Where thinner is used, addition not to exceed paint manufacturer's recommendations.
- .8 Do not use kerosene or other organic solvents to thin water-based paints.
- .9 Thin paint for brush and roller application or spraying in accordance with paint manufacturer's recommendations.
 - .1 Obtain instructions in writing from manufacturer and provide copy of instructions to Departmental Representative.
- .10 Re-mix paint in containers prior to and during application. Ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.05 GLOSS/SHEEN RATINGS

- .1 Gloss level ratings of painted surfaces as per manufacturer's standard for linseed oil paint system.

2.06 ACCESSORIES

- .1 Obtain approval of Departmental Representative for use of power tools.
- .2 Use tools that do not damage adjacent materials.

- .3 Spray equipment: capable of atomizing paint, equipped with pressure regulators and gauges.

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PROTECTION OF IN-PLACE CONDITIONS

- .1 Protect existing building surfaces and adjacent structures with non-staining covers, masking against paint spatters, markings and other damage.
- .2 Protect items permanently attached to surfaces.
- .3 Remove and safely secure and store light fixtures, surface hardware on doors, and surface mounted equipment, fittings and fastenings prior to undertaking painting operations.
- .4 Move and cover exterior furniture and portable equipment as necessary to carry out painting operations. Replace as painting progresses.
- .5 As painting operations progress, place "WET PAINT" signs in pedestrian and vehicle traffic areas.

3.03 SURFACE PREPARATION

- .1 Remove existing paint finish as per Contract requirements and Section 02 83 11 – Lead-Base Paint Abatement – Intermediate Precautions.
- .2 Clean and prepare exterior surfaces in accordance with paint system manufacturer's instructions:
 - .1 Remove dust, dirt, and surface debris by brushing or wiping with dry, clean cloths.
 - .2 Wash surfaces with linseed oil soap and clean warm water using a stiff bristle brush. If mould/mildew is present, first clean surface with pure ammonia, rinse and clean with linseed soap. Ensure existing substrate is not damaged by process.
 - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
 - .4 Do not use pressure/power washer equipment. Use trigger operated spray nozzles for water hoses at normal municipal supply pressure.
 - .5 Allow surfaces to drain completely and dry thoroughly.

- .6 Prevent contamination of cleaned surfaces by salts, acids, alkalis, corrosive chemicals, grease, oil and solvents before priming.
- .3 Condition bare wood with purified raw linseed oil.
 - .1 Apply as per manufacturer's recommendations.
 - .2 Allow raw linseed oil to dry for 24 hours prior to installing paint finish.
- .4 Fill cracks and/or holes in existing woodwork with linseed oil putty.
 - .1 Allow linseed oil putty to dry for 24 hours prior to installing paint finish. Or dust with chalk and paint immediately.
- .5 Seal knots in wood with pure shellac to prevent resin from bleeding through paint finish.
- .6 Obtain written approval of prepared surfaces by Departmental Representative before applying paint.

3.04 APPLICATION

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.
 - .1 Install a minimum of **three coats** of linseed oil paint on all surfaces requiring painting/repainting.
- .2 Apply paint materials in accordance with paint manufacturer's written application instructions.
 - .1 Apply paint:
 - .1 To adequately prepared surfaces and within moisture limits.
 - .2 When previous coat of paint is dry and adequately cured.
 - .3 In accordance with manufacturer's written instructions.
 - .2 Do not apply paint to silicone.
- .3 Apply paint with brush, roller or sprayer.
 - .1 Obtain Departmental Representative's approval of application method before commencing work.
 - .2 Thoroughly mix paint before and during painting
 - .3 Apply paint thinly, especially on non-porous surfaces.
 - .4 Thoroughly mix paint before and during painting.
- .4 Brush and Roller Application:
 - .1 Apply paint in a uniform layer using brush and/or roller suitable for application.
 - .2 Work paint into cracks, crevices and corners.
 - .3 Brush and/or roll out runs and sags, and overlap marks.

- .4 Remove runs and sags from finished work and repaint.
- .5 Spray Application:
 - .1 Maintain paint ingredients properly mixed in containers during paint application as frequently as necessary and as per manufacturer's recommendations.
 - .2 Apply paint in uniform layer, with overlapping at edges of spray pattern.
 - .3 Back roll spray applications and immediately brush out runs and sags.
 - .4 Use brushes to work paint into cracks, crevices and places that are not adequately painted by spray.
- .6 Difficult to access places: apply coating with dipping sheepskins, daubers or other special tools when no other method is practical. Obtain approval of method from Departmental Representative.
- .7 Apply paint coats in continuous manner.
- .8 Allow surfaces to dry and cure between coats for minimum time period as recommended by manufacturer.
 - .1 24 hours dry time between coats in ideal conditions. Environmental factors such as high humidity and/or low temperatures will increase dry and cure times. Adjust painting schedule to suit conditions.
- .9 Minimum dry film thickness of coats: not less than that recommended by manufacturer.
- .10 Repaint thin spots and bare areas before applying next coat of paint.
- .11 Sand and dust between coats to remove visible defects.
- .12 Prevent contamination of cleaned surfaces by salts, acids, alkalis, corrosive chemicals, grease, oil and solvents between applications of coats.
- .13 Finish to doors and windows: includes top, bottom and side edges.
 - .1 Paint surfaces concealed by hardware.

3.05 FIELD QUALITY CONTROL

- .1 Standard of acceptance:
 - .1 When viewed using natural prevailing sunlight at peak period of day (mid-day) on surface viewed, surfaces to indicate following:
 - .1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.
 - .2 Soffits: no defects visible from grade at 45 degrees to surface.
 - .3 Final coat: to exhibit uniformity of colour and sheen across full surface.

- .2 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 by Departmental Representative.
- .3 Co-operate with Paint Inspection Agency and provide access to areas of work.
- .4 Manufacturer's Field Services:
 - .1 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
- .5 Conduct moisture tests on substrates.
 - .1 Use calibrated electronic moisture meter.

3.06 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Reinstall and clean removed items after painting is completed.
- .3 Remove paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.
 - .1 Clean and restore as directed by Departmental Representative.
- .4 Wipe spills and spots immediately with a damp cloth.
- .5 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .6 Waste Management: separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .7 Reduce the amount of contaminants entering waterways, sanitary/storm drain systems and into the ground. Adhere to following procedures:
 - .1 Retain cleaning water for water-based materials. Allow sediments to be filtered out. Do not use free-draining water to clean equipment.
 - .2 Return oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
 - .3 Dry empty paint cans prior to disposal or recycling.
 - .4 Close and seal tightly partly used cans of materials including sealant and adhesive containers and store product in well-ventilated fire-safe area at moderate temperature.
- .2 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling facility.

- .3 Keep work area free from unnecessary accumulation of tools, equipment, surplus materials, and debris.
- .4 Remove combustible rubbish materials and empty paint cans each day and safely dispose of same in accordance with Federal, Provincial and Municipal regulations.
- .5 Clean equipment and dispose of wash water used for water borne materials, solvents used for oil based materials as well as cleaning and protective materials, paints, thinners, paint removers/strippers in accordance with Federal, Provincial and Municipal regulations.
- .6 Clean painting equipment in leak-proof containers that will permit particulate matter to settle out and be collected. Dispose of sediment remaining from cleaning operations in accordance with Federal, Provincial and Municipal regulations.

3.07 HARDWARE RE-INSTALLATION

- .1 Clean and re-install hardware items removed and stored previous to commencement of the Work.
- .2 Re-install hardware items in original locations.

3.08 PROTECTION

- .1 Protect freshly completed surfaces from paint droppings and dust. Avoid scuffing newly applied paint.
- .2 Remove paint splashings on exposed surfaces. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .3 Protect completed work from paint droppings. Use non-staining coverings.
- .4 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Departmental Representative].
- .5 Remove protective coverings and warning signs as soon as practical after operations cease.

END OF SECTION