Revision 1: 2018-09-18

PROJECT TITLE

PARRY SOUND, ONTARIO
28 WAUBEEK STREET
CANADIAN COAST GUARD BASE
BUILDING ENVELOPE UPGRADES

PROJECT NUMBER

R.064667.005

PROJECT DATE

2016-05-30

END OF SECTION

Consultant for Building Code Review:

Building Code Designation Number (BCDN):

END OF SECTION

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END OF SECTION

## PART 1 - GENERAL

**1.1 SECTION INCLUDES**

.1 Title and description of Work.

.2 Contract Method.

.5 Work sequence.

.6 Contractor use of premises.

.7 Owner occupancy.

.8 Alterations to existing building.

**1.2 PRECEDENCE**

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

**1.3 WORK COVERED BY CONTRACT DOCUMENTS**

.1 Work of this Contract comprises building envelope and guard house HVAC upgrades of Parry Sound Canadian Coast Guard Base, located at 28 Waubeek Street; and further identified as building envelope upgrades.

**1.4 CONTRACT METHOD**

.1 Construct work under lump sum contract.

.2 Relations and responsibilities between Contractor and subcontractors and suppliers assigned by Owner are as defined in Conditions of Contract. Assigned Subcontractors must, in addition:

.1 Furnish to Contractor, bonds covering faithful performance of subcontracted work and payment of obligations thereunder when Contractor is required to furnish such bonds to Departmental Representative.

.2 Purchase and maintain liability insurance to protect Contractor from claims for not less than limits of liability which Contractor is required to provide to Departmental Representative.

1.5 COST BREAKDOWN

.1 Within 48 hours of notification of acceptance of bid furnish a cost breakdown by Section aggregating contract price.

.2 Show separately cost of equipment purchased exempt from Ontario Retail Sales Tax under your Ontario Sales Tax licence number.

.3 Within 48 hours of acceptance of bid submit a list of subcontractors.

1.6 WORK SEQUENCE

.1 Construct Work in stages to accommodate Owner's continued use of premises during construction.

.2 Maintain access to all exterior doors at all times. Procedure statement to be provided to Departmental Representative for approval.

.2 Coordinate Progress Schedule and coordinate with Owner Occupancy during construction.

.3 Maintain fire access/control.

1.7 CONTRACTOR USE OF PREMISES

.1 Contractor shall limit use of premises for Work, for storage, and for access, to allow
   .1 Owner occupancy.
   .2 Work by other contractors.

.2 Coordinate use of premises under direction of Departmental Representative.

.3 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.

1.8 OWNER OCCUPANCY

.1 Owner will occupy premises during entire construction period for execution of normal operations.

.2 Cooperate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

1.9 ALTERATIONS TO EXISTING BUILDING

.1 Remove and recycle, compost, anaerobically digest, sell material for reuse or dispose of:
.1 All removed building materials.
.2 Mechanical and electrical items as indicated.

.2 Remove, temporarily store, clean, and reinstall the following:
.1 Exterior light fixtures.

.2 Provide new openings required in existing construction.

.3 Block in openings where items removed with material and finish to match existing adjoining construction.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

## PART 1 - GENERAL

### 1.1 ACCESS AND EGRESS

.1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

### 1.2 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.

.2 Maintain existing services to building and provide for personnel and vehicle access.

.3 Where security is reduced by work provide temporary means to maintain security.

.4 Departmental Representative will assign sanitary facilities for use by Contractor's personnel. Keep facilities clean.

.5 Use only elevators, existing in building for moving workers and material.
.1 Protect walls of passenger elevators, to approval of Departmental Representative prior to use.
.2 Accept liability for damage, safety of equipment and overloading of existing equipment.

.6 Closures: protect work temporarily until permanent enclosures are completed.

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

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

1.4 EXISTING SERVICES

.1 Notify, Departmental Representative utility companies of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.

.3 Provide for personnel and vehicular traffic.

.4 Construct barriers in accordance with Section 01 56 00.

1.5 SPECIAL REQUIREMENTS

.1 Carry out Work Monday to Friday from 07:30 to 16:00 hours.

.2 Submit schedule in accordance with Section 01 32 16.

.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 Prior to cutting or drilling horizontal or vertical surfaces including concrete, concrete block or other structural substrate, determine location of reinforcing, service lines, pipes, conduits or other items by x-ray, ground penetrating radar or other appropriate method. Submit findings to Departmental Representative prior to cutting or drilling.

1.6 SECURITY

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

.2 Security clearances:

1.6 SECURITY (Cont'd)

.2 (Cont'd)

.1 Personnel employed on this project will be subject to security check. Obtain clearance, as instructed, for each individual who will require to enter premises.

.2 Personnel will be checked daily at start of work shift and provided with pass which must be worn at all times. Pass must be returned at end of work shift and personnel checked out.

1.7 BUILDING SMOKING ENVIRONMENT

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

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

## PART 1 - GENERAL

### 1.1 ADMINISTRATIVE

.1 Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative.

.2 Prepare agenda for meetings.

.3 Distribute written notice of each meeting 4 days in advance of meeting date to Departmental Representative.

.4 Provide physical space and make arrangements for meetings.

.5 Preside at meetings.

.6 Unless directed otherwise by Departmental Representative, record minutes of meetings. Minutes shall be circulated to attending parties and affected parties not in attendance within 3 days after meeting.

.7 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

### 1.2 PRECONSTRUCTION MEETING

.1 Within 15 days after award of Contract, request meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.2 Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.

.3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.

.4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.

.5 Agenda to include:

1.2 PRECONSTRUCTION MEETING (Cont'd)

.5 (Cont'd)

.1 Appointment of official representative of participants in the Work.

.2 Schedule of Work: in accordance with Section 01 32 16.

.3 Schedule of submission of shop drawings, samples, mock-ups, colour chips. Submit submittals in accordance with Section 01 33 00.

.4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00.

.5 Site security in accordance with Section 01 56 00.

.6 Health and safety in accordance with Section 01 35 29.

.7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.

.8 Owner provided products.

.9 Record drawings and specifications in accordance with Sections 01 33 00 and 01 78 00.

.10 Maintenance manuals in accordance with Section 01 78 00.

.11 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00.

.12 Monthly progress claims, administrative procedures, photographs, hold backs.

.13 Appointment of inspection and testing agencies or firms.

.14 Insurances, transcript of policies.

1.3 PROGRESS MEETINGS

.1 During course of Work and two weeks prior to project completion, schedule progress meetings biweekly.

.2 Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance.

.3 Notify parties minimum 3 days prior to meetings. Unexpected or urgent meetings require minimum 24 hours notice.

.4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 3 days after meeting.

.5 Agenda to include the following:

1.3 PROGRESS MEETINGS (Cont'd)

.5 (Cont'd)

.1 Review, approval of minutes of previous meeting.

.2 Review of Work progress since previous meeting.

.3 Field observations, problems, conflicts.

.4 Problems which impede construction schedule.

.5 Review of off-site fabrication delivery schedules.

.6 Corrective measures and procedures to regain projected schedule.

.7 Revision to construction schedule.

.8 Progress schedule, during succeeding work period.

.9 Review submittal schedules: expedite as required.

.10 Maintenance of quality standards.

.11 Review proposed changes for affect on construction schedule and on completion date.

.12 Other business.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

## PART 1 - GENERAL

### 1.1 RELATED SECTIONS

.1 Section 01 77 00 - Closeout Procedures.

### 1.2 PROGRESS PHOTOGRAPHS

.1 Viewpoints: interior and exterior locations: viewpoints determined by Departmental Representative.

.2 Frequency: monthly with progress statement as directed by Departmental.

.3 Submit all digital files of coloured prints before final acceptance of building.

.4 Insert C.D.'s of files in envelopes and identify with name and number of project. Indicate exposure dates and view points of each frame of 35 mm film strips.

### 1.3 ELECTRONIC COPY

.1 Submit electronic and hard copy of colour digital photography in jpg format, standard resolution.

.2 Identification: name and number of project and date of exposure indicated.

.3 Number of viewpoints: 4. Locations of viewpoints determined by Departmental Representative.

.4 Frequency: as directed by Departmental Representative.

## PART 2 - PRODUCTS

### 2.1 NOT USED

.1 Not Used.

## PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

END OF SECTION

## PART 1 - GENERAL

### 1.1 DEFINITIONS

.1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.

.2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.

.3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.

.4 Construction Work Week: Monday to Friday, inclusive, will provide five day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.

.5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.

.6 Master Plan: summary-level schedule that identifies major activities and key milestones.

.7 Milestone: significant event in project, usually completion of major deliverable.

.8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.

1.1 DEFINITIONS (Cont'd)

.9 Project Planning, Monitoring and Control System: overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.

1.2 REQUIREMENTS

.1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.

.2 Plan to complete Work in accordance with prescribed milestones and time frame.

.3 Limit activity durations to maximum of approximately 10 working days, to allow for progress reporting.

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

1.3 SUBMITTALS

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

.2 Submit to Departmental Representative within 10 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.

.3 Submit Project Schedule to Departmental Representative within 5 working days of receipt of acceptance of Master Plan.

1.4 MASTER PLAN

.1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).

.2 Departmental Representative will review and return revised schedules within 5 working days.

1.4 MASTER PLAN (Cont'd)

.3 Revise impractical schedule and resubmit within 5 working days.

.4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.5 PROJECT SCHEDULE

.1 Develop detailed Project Schedule derived from Master Plan.

.2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:

.1 Award.
.2 Shop Drawings, Samples.
.3 Permits.
.4 Mobilization.
.10 Siding and Roofing.
.11 Interior Architecture (Walls, Floors and Ceiling).
.12 Plumbing.
.13 Lighting.
.14 Electrical.
.15 Piping.
.16 Controls.
.17 Heating, Ventilating, and Air Conditioning.
.18 Millwork.
.19 Fire Systems.
.20 Testing and Commissioning.
.21 Supplied equipment long delivery items.
.22 Departmental Representative supplied equipment required dates.

1.6 PROJECT SCHEDULE REPORTING

.1 Update Project Schedule on weekly 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.

1.7 PROJECT MEETINGS

.1 Discuss Project Schedule at regular site meetings specified in Section 01 31 19, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.

.2 Weather related delays with their remedial measures will be discussed and negotiated.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

## PART 1 - GENERAL

### 1.1 ADMINISTRATIVE

.1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Do not proceed with Work affected by submittal until review is complete.

.3 Present shop drawings, product data, samples and mock-ups in SI Metric units.

.4 Where items or information is not produced in SI Metric units converted values are acceptable.

.5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

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

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

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

.9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.

1.1 ADMINISTRATIVE (Cont'd)

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

.11 Submit number of hard copies specified for each type and format of submittal and also submit in electronic format as pdf files. Forward pdf, NMSEdit Professional spp, MS Word, MS Excel, MS Project and Autocad dwg files on USB compatible with PWGSC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

1.2 SHOP DRAWINGS AND PRODUCT DATA

.1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.

.2 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario of 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 co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.4 Allow 3 working 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.

1.2 SHOP DRAWINGS AND PRODUCT DATA (Cont'd)

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

.7 Accompany submissions with transmittal letter, in duplicate, containing:
- .1 Date.
- .2 Project title and number.
- .3 Contractor's name and address.
- .4 Identification and quantity of each shop drawing, product data and sample.
- .5 Other pertinent data.

.8 Submissions shall include:
- .1 Date and revision dates.
- .2 Project title and number.
- .3 Name and address of:
  - .1 Subcontractor.
  - .2 Supplier.
  - .3 Manufacturer.
- .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .5 Details of appropriate portions of Work as applicable:
  - .1 Fabrication.
  - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
  - .3 Setting or erection details.
  - .4 Capacities.
  - .5 Performance characteristics.
  - .6 Standards.
  - .7 Operating weight.
  - .8 Wiring diagrams.
  - .9 Single line and schematic diagrams.
  - .10 Relationship to adjacent work.

.9 After Departmental Representative's review, distribute copies.

.10 Submit one electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.

1.2 SHOP DRAWINGS AND PRODUCT DATA (Cont'd)

.11 Submit three hard copies and one electronic copy 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 three hard copies and one electronic copy of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
.1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
.2 Testing must have been within 3 years of date of contract award for project.

.13 Submit three hard copies and one electronic copy 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 three hard copies and one electronic copy 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 three hard copies and one electronic copy 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.

1.2 SHOP DRAWINGS AND PRODUCT DATA (Cont'd)

.17 Submit three hard copies and one electronic copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.

.18 Delete information not applicable to project.

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

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

.21 The review of shop drawings by Public Works and Government Services Canada (PWGSC) is for sole purpose of ascertaining conformance with general concept.

.1 This review shall not mean that PWGSC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.

.2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.3 SAMPLES

.1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.

.2 Deliver samples prepaid to Departmental Representative's business address.

1.3 SAMPLES (Cont'd)

.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.

1.4 MOCK-UPS

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

1.5 PHOTOGRAPHIC DOCUMENTATION

.1 Refer to Section 01 32 00.

1.6 CERTIFICATES AND TRANSCRIPTS

.1 Immediately after award of Contract, submit Workers' Safety and Insurance Board Experience Report.

1.7 FEES, PERMITS AND CERTIFICATES

.1 Provide authorities having jurisdiction with information requested.

.2 Pay fees and obtain certificates and permits required.

.3 Furnish certificates and permits.

1.7 FEES, PERMITS AND CERTIFICATES (Cont'd)

.4 Submit acceptable certificate stating that suspended ceiling systems provide adequate support for electrical fixtures, as required by current bulletin of Electrical Safety Authority (ESA).

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

## PART 1 - GENERAL

### 1.1 REFERENCES

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

.2 National Building Code 2010 (NBC):
.1 NBC 2010, Division B, Part 8 Safety Measures at Construction and Demolition Sites.

.3 National Fire Code 2010 (NFC):
.1 NFC 2010, Division B, Part 5 Hazardous Processes and Operations, subsection 5.6.1.3 Fire Safety Plan.

.4 Province of Ontario:
.1 Occupational Health and Safety Act Revised Statutes of Ontario 1990, Chapter O.1 as amended, and Regulations for Construction Projects, O. Reg. 213/91 as amended.
.2 O. Reg. 490/09, Designated Substances.
.3 Workplace Safety and Insurance Act, 1997.
.4 Municipal statutes and authorities.

.5 Treasury Board of Canada Secretariat (TBS):
.1 Treasury Board, Fire Protection Standard April 1, 2010 www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=17316&section=text.

### 1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00.

.2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
.1 Results of site specific safety hazard assessment.
.2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.

.3 Measures and controls to be implemented to address identified safety hazards and risks.

1.2 ACTION AND INFORMATIONAL SUBMITTALS (Cont'd)

.3 Provide a Fire Safety Plan, specific to the work location, in accordance with NBC, Division B, Article 8.1.1.3 prior to commencement of work. The plan shall be coordinated with, and integrated into, the existing Emergency Procedures and Evacuation Plan in place at the site. Departmental Representative will provide Emergency Procedures and Evacuation Plan. Deliver two copies of the Fire Safety Plan to the Departmental Representative not later than 14 days before commencing work.

.4 Contractor's and Sub-contractors' Safety Communication Plan.

.5 Contingency and Emergency Response Plan addressing standard operating procedures specific to the project site to be implemented during emergency situations. Coordinate plan with existing Emergency Response requirements and procedures provided by Departmental Representative.

.6 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 7 days after receipt of comments from Departmental Representative.

.7 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.

.8 Submit names of personnel and alternates responsible for site safety and health.

.9 Submit records of Contractor's Health and Safety meetings when requested.

.10 Submit 2 copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative, weekly.

.11 Submit copies of orders, directions or reports issued by health and safety inspectors of the authorities having jurisdiction.

1.2 ACTION AND INFORMATIONAL SUBMITTALS (Cont'd)

.12 Submit copies of incident and accident reports.

.13 Submit Material Safety Data Sheets (MSDS).

.14 Submit Workplace Safety and Insurance Board (WSIB)- Experience Rating Report.

1.3 FILING OF NOTICE

.1 File Notice of Project with Provincial authorities prior to commencement of Work.

1.4 WORK PERMIT

.1 Obtain building permits related to project prior to commencement of Work.

.2 Obtain Hot Work Permit from Property Manager.

1.5 SAFETY ASSESSMENT

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

1.6 MEETINGS

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

1.7 REGULATORY REQUIREMENTS

.1 Comply with the Acts and regulations of the Province of Ontario.

.2 Comply with specified standards and regulations to ensure safe operations at site.

1.8 PROJECT/SITE CONDITIONS

.1 Work at site may involve contact with designatedor hazardous substances. Contractor shall coordinate and take necessary precautions and/or measures in accordance with information on hazardous or designated substances provided by Departmental Representative.

1.9 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 either accepting or requesting improvements.

.3 Relief from or substitution for any portion or provision of minimum Health and Safety standards specified herein or reviewed site-specific Health and Safety Plan shall be submitted to Departmental Representative in writing.

1.10 COMPLIANCE REQUIREMENTS

.1 Comply with Ontario Occupational Health and Safety Act, R.S.O. 1990 Chapter 0.1, as amended.

1.11 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.

.3 Where applicable the Contractor shall be designated "Constructor", as defined by Occupational Health and Safety Act and Regulations for Construction Projects for the Province of Ontario.

1.12 UNFORSEEN HAZARDS

.1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, immediately stop work and advise Departmental Representative verbally and in writing.

1.12 UNFORSEEN HAZARDS (Cont'd)

.2 Follow procedures in place for Employees Right to Refuse Work as specified in the Occupational Health and Safety Act for the Province of Ontario.

1.13 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 of Ontario, and in consultation with Departmental Representative.

.1 Contractor's Safety Policy.
.2 Constructor's Name.
.3 Notice of Project.
.4 Name, trade, and employer of Health and Safety Representative or Joint Health and Safety Committee members (if applicable).
.5 Ministry of Labour Orders and reports.
.6 Occupational Health and Safety Act and Regulations for Construction Projects for Province of Ontario.
.7 Address and phone number of nearest Ministry of Labour office.
.8 Material Safety Data Sheets.
.9 Written Emeregency Response Plan.
.10 Site Specific Safety Plan.
.11 Valid certificate of first aider on duty.
.12 WSIB "In Case of Injury At Work" poster.
.13 Location of toilet and cleanup facilities.

1.14 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.

1.15 BLASTING

.1 Blasting or other use of explosives is not permitted.

1.16 POWDER ACTUATED DEVICES

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

1.17 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.

.2 Assign responsibility and obligation to Competent Supervisor to stop or start Work when, at Competent Supervisor's discretion, it is necessary or advisable for reasons of health or safety. Departmental Representative may also stop Work for health and safety considerations.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

## PART 1 - GENERAL

### 1.1 GENERAL

.1 This section specifies general requirements and procedures for fire safety. Additional requirements may be specified in individual sections elsewhere in specifications.

### 1.2 REPORTING FIRES

.1 The Departmental Representative will co-ordinate arrangements for the Contractor to be briefed at the pre-construction meeting concerning Building's fire safety protocol.

.2 Building Manager will supply a copy of "Fire Safety Emergency Evacuation Plan" in effect for this building. Contractor shall comply with outlined fire safety requirements.

.3 Know location of nearest fire alarm box and telephone, including emergency phone number.

.4 Report immediately all fire incidents to Fire Department as follows:
.1 activate nearest fire alarm box; or
.2 telephone.

.5 Person activating fire alarm box will remain at box to direct Fire Department to scene of fire.

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

### 1.3 FIRE WATCH

.1 Appoint a Fire Watch at locations where welding and soldering, torching or roofing is to take place.

.2 A dedicated Fire Watch is not required. A competent person from the workforce on site may be assigned as Fire Watch for duration of work.

.3 Assign a person who is knowledgeable in the correct use of fire extinguishers on the project.

1.3 FIRE WATCH (Cont'd)

.4 Have work inspected by the Fire Watch up to 1.5 hours after work stoppage for each work period.

1.4 INTERIOR AND EXTERIOR FIRE PROTECTION AND ALARM SYSTEMS

.1 Fire protection and alarm system will not be:
.1 obstructed;
.2 shut-off; or
.3 left inactive at end of working day or shift.

.2 Fire hydrants, standpipes and hose systems will not be used for other than fire-fighting purposes unless authorized by Departmental Representative.

.3 Provide and maintain free access to fire extinguishing equipment. Maintain exit facilities. Keep means of egress free from materials, equipment and obstructing.

1.5 FIRE EXTINGUISHERS

.1 Supply fire extinguishers, as necessary to protect work in progress and contractor's physical plant on site.

1.6 BLOCKAGE OF ROADWAYS

.1 Advise Departmental Representative of any work that would impede fire apparatus response. This includes violation of minimum required overhead clearance.

1.7 SMOKING PRECAUTIONS

.1 Smoking is not permitted within areas of work or site storage.

1.8 RUBBISH AND WASTE MATERIALS

.1 Rubbish and waste materials are to be kept to a minimum.

.2 Burning of rubbish is prohibited.

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

.4 Storage:

1.8 RUBBISH AND WASTE MATERIALS (Cont'd)

.4 (Cont'd)

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

.2 Deposit greasy or oily rags and materials subject to spontaneous combustion in approved receptacles and remove from site daily or at the end of each shift.

1.9 FLAMMABLE AND COMBUSTIBLE LIQUIDS

.1 Handling, storage and use of flammable and combustible liquids are to be governed by the current National Fire Code of Canada.

.2 Flammable and combustible liquids such as gasoline, kerosene and naphtha will be kept for ready use in quantities not exceeding 45 litres provided they are stored in approved safety cans bearing Underwriters' Laboratory of Canada or Factory Mutual seal of approval. Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires permission of local Building Manager.

.3 Transfer of flammable and combustible liquids is prohibited within buildings or jetties.

.4 Transfer of flammable and combustible liquids will not be carried out in vicinity of open flames or any type of heat-producing devices.

.5 Flammable liquids having a flash point below 38°C such as naphtha or gasoline will not be used as solvents or cleaning agents.

.6 Flammable and combustible waste liquids, for disposal, will be stored in approved containers located in a safe ventilated area. Quantities are to be kept to a minimum and Fire Department is to be notified when disposal is required.

1.10 HAZARDOUS SUBSTANCES

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

1.10 HAZARDOUS SUBSTANCES (Cont'd)

.2 Obtain from local Building Manager a "Hot Work" permit for work involving welding, burning or use of blow torches and salamanders, in buildings or facilities.

.3 When Work is carried out in dangerous or hazardous areas involving use of heat, provide fire watchers equipped with sufficient fire extinguishers. Determination of dangerous or hazardous areas along with level of protection necessary for Fire Watch is at discretion of the local Building Manager. Contractors are responsible for providing fire watch service for work on a scale established and in conjunction with Building Manager at pre-construction meeting.

.4 Where flammable liquids, such as lacquers or urethanes are to be used, proper ventilation will be assured and all sources of ignition are to be eliminated. Building Manager is to be informed prior to and at cessation of such work.

1.11 WELDING, BURNING AND CUTTING

.1 Contractor performing work of this section must notify Departmental Representative in advance of commencing work.

.2 Use non-combustible shields for electric and gas welding or cutting executed within 3 m of combustible material or in occupied spaces.

.3 Place cylinders supplying gases as close to work as possible. Secure cylinders in upright position, free from exposure to sun or high temperature.

.4 Locate fire extinguishing equipment near all welding, cutting and soldering operations.

.5 Contractor's mechanics shall be properly equipped with required protective clothing, including goggles or welding hood or face mask, gloves, etc.

.6 Contractor is responsible for the protection of his work and the Departmental Representative's property.

1.11 WELDING, BURNING AND CUTTING (Cont'd)

.7 Provide Fire Watch on standby with approved fire extinguisher while burning or welding is in progress.

1.12 QUESTIONS AND/OR CLARIFICATIONS

.1 Direct any questions or clarification on Fire Safety in addition to above requirements to local Building Manager.

1.13 FIRE INSPECTION

.1 Site inspections by Building Manager will be coordinated through Departmental Representative.

.2 Allow local Building Manager unrestricted access to work site.

.3 Co-operate with Building Manager during routine fire safety inspection of work site.

.4 Immediately remedy all unsafe fire situations observed by Building Manager.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

## PART 1 - GENERAL

### 1.1 DEFINITIONS

.1 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.

### 1.2 REFERENCES

.1 U.S. Environmental Protection Agency (EPA)/Office of Water
.1 EPA 832/R-92-005-92, Storm Water Management for Construction Activities, Chapter 3.
.2 EPA General Construction Permit (GCP) 2012.

### 1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00.

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for products and include product characteristics, performance criteria, physical size, finish and limitations.
.2 Submit 2 copies of WHMIS MSDS.

.3 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative.

.4 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.

1.3 ACTION AND INFORMATIONAL SUBMITTALS (Cont'd)

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

.6 Include in Environmental Protection Plan:

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

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

.3 Names and qualifications of persons responsible for training site personnel.

.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 and EPA 832/R-92-005, Chapter 3.

.6 Drawings indicating locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.

.7 Traffic Control Plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather.

.1 Plans to include measures to minimize amount of material transported onto paved public roads by vehicles or runoff.

.8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.

.1 Plan to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.

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

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

1.3 ACTION AND INFORMATIONAL SUBMITTALS (Cont'd)

.6 (Cont'd)

.11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.

.12 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.

.13 Waste Water Management Plan identifying methods and procedures for management and discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.

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

.15 Pesticide treatment plan to be included and updated, as required.

1.4 FIRES

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

1.5 DRAINAGE

.1 Develop and submit erosion and Sediment Control Plan (ESC) identifying type and location of erosion and sediment controls provided. Plan to include 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, EPA 832/R-92-005, Chapter 3.

.2 Storm Water Pollution Prevention Plan (SWPPP) to be substituted for erosion and sediment control plan.

1.5 DRAINAGE (Cont'd)

.3 Provide temporary drainage and pumping required to keep excavations and site free from water.

.4 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.

.5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.6 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.

.4 Restrict tree removal to areas indicated.

1.7 WORK ADJACENT TO WATERWAYS

.1 Construction equipment to be operated on land only.

.2 Use waterway beds for borrow material only after written receipt of approval from Departmental Representative.

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

.4 Design and construct temporary crossings to minimize erosion to waterways.

.5 Do not skid logs or construction materials across waterways.

1.7 WORK ADJACENT TO WATERWAYS (Cont'd)

.6 Avoid indicated spawning beds when constructing temporary crossings of waterways.

.7 Blasting is allowed only above water and 100 m minimum from indicated spawning beds.

1.8 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 directed by Departmental Representative.

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

1.9 HISTORICAL/ ARCHAEOLOGICAL CONTROL

.1 Provide historical, archaeological, cultural resources, biological resources, and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands known to be on project site: and identifies procedures to be followed if historical archaeological, cultural resources, biological resources and wetlands not previously known to be onsite or in area are discovered during construction.

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

1.10 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

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 CLEANING

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

.2 Bury rubbish and waste materials on site where directed after receipt of written approval from Departmental Representative.

.3 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.

.4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11.

3.1 CLEANING (Cont'd)

.5 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 20.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

## PART 1 - GENERAL

**1.1 REFERENCES AND CODES**

.1 Perform Work in accordance with National Building Code of Canada (NBC) 2010, National Fire Code of Canada (NFC) 2010 and Ontario Building Code (OBC) 2012, including all amendments up to bid closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply as directed by the Departmental Representative.

.2 Meet or exceed requirements of:
.1 Contract documents.
.2 Specified standards, codes and referenced documents.

**1.2 HAZARDOUS MATERIAL DISCOVERY**

.1 Stop work immediately and notify Departmental Representative if materials which may contain designated substances or PCB's, other than those identified in Section 01 35 29 are discovered in course of work.

**1.3 BUILDING SMOKING ENVIRONMENT**

.1 Comply with smoking restrictions.

**1.4 IAQ - INDOOR C AIR QUALITY**

.1 Comply with CSA-Z204-94(R1999), Guideline for Managing Indoor Air Quality in Office Buildings and CSA B651-12.

**1.5 ACCESSIBLE DESIGN**

.1 Comply with CSA B651-12, Accessible Design for the Built Environment, unless specified otherwise. In any case of conflict or discrepancy between the building codes and CSA B651, the requirements of CSA B651 shall apply.

**1.7 TAXES**

.1 Pay applicable Federal, Provincial and Municipal taxes.

1.8 EXAMINATION

.1 Examine existing conditions and determine conditions affecting work.

.2 Conduct concrete floor moisture testing using Calcium Chloride moisture tests.
.1 Submit test results to Departmental Representative for approval prior to installing any flooring. Conduct one test per 100 $m^2$ of area being covered.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

.1 Inspection and testing, administrative and enforcement requirements.

.2 Tests and mix designs.

.3 Mock-ups.

.4 Mill tests.

.5 Equipment and system adjust and balance.

### 1.2 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 may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

1.3 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work, above and beyond those required of the Contractor. Cost of such services will be borne by Departmental Representative.

.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 Departmental Representative. Pay costs for retesting and reinspection.

1.4 ACCESS TO WORK

.1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.

.2 Co-operate to provide reasonable facilities for such access.

1.5 PROCEDURES

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

.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.

.3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.6 REJECTED WORK

.1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by 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.

.3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Departmental Representative may deduct from Contract Amount difference in value between Work performed and that called for by Contract Documents, amount of which shall be determined by Departmental Representative.

1.7 REPORTS

.1 Submit 4 copies of inspection and test reports to Departmental Representative.

.2 Provide copies to Subcontractor of work being inspected or tested, manufacturer or fabricator of material being inspected or tested.

1.8 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as may be requested.

.2 The cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work shall be appraised by Departmental Representative and may be authorized as recoverable.

1.9 MOCK-UPS

.1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of all Sections required to provide mock-ups.

.2 Construct in all locations acceptable to Departmental Representative.

1.9 MOCK-UPS (Cont'd)

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

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

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

.6 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 requested.

1.11 EQUIPMENT AND SYSTEMS

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

.2 Submit Commissioning Documentation in accordance with Section 01 91 13.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

## PART 1 - GENERAL

**1.1 SECTION INCLUDES**

.1 Temporary utilities.

**1.2 SUBMITTALS**

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

**1.3 INSTALLATION AND REMOVAL**

.1 Provide temporary utilities controls in order to execute work expeditiously.

.2 Remove from site all such work after use.

**1.4 DEWATERING**

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

**1.5 WATER SUPPLY**

.1 Provide continuous supply of potable water for construction use.

.2 Arrange for connection with appropriate utility company and pay all costs for installation, maintenance and removal.

.3 Pay for utility charges at prevailing rates.

**1.6 TEMPORARY HEATING AND VENTILATION**

.1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.

.2 Construction heaters used inside building must be vented to outside or be non-flameless type. Solid fuel salamanders are not permitted.

.3 Provide temporary heat and ventilation in enclosed areas as required to:
.1 Facilitate progress of Work.
.2 Protect Work and products against dampness and cold.

1.6 TEMPORARY HEATING AND VENTILATION (Cont'd)

.3 (Cont'd)
.3 Prevent moisture condensation on surfaces.
.4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
.5 Provide adequate ventilation to meet health regulations for safe working environment.

.4 Maintain temperatures of minimum 10°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 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.7 TEMPORARY POWER AND LIGHT

.1 Provide and pay for temporary power during construction for temporary lighting and operating of power tools, to a maximum supply of 120 volts 15 amps.

.2 Arrange for connection with appropriate utility company. Pay all costs for installation, maintenance and removal.

.3 Temporary power for electric cranes and other equipment requiring in excess of above is responsibility of Contractor.

1.7 TEMPORARY POWER AND LIGHT (Cont'd)

.4 Provide and maintain temporary lighting throughout project. Ensure level of illumination on all floors and stairs is not less than 162 lx.

.5 Electrical power and lighting systems installed under this Contract may be used for construction requirements only with prior approval of Departmental Representative provided that guarantees are not affected. Make good damage to electrical system caused by use under this Contract. Replace lamps which have been used for more than 3 months.

1.8 TEMPORARY COMMUNICATION FACILITIES

.1 Provide and pay for temporary telephone and data hook up, lines and equipment necessary for own use and use of Departmental Representative.

1.9 FIRE PROTECTION

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

.2 Burning rubbish and construction waste materials is not permitted on site.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

END OF SECTION

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

.1 Construction aids.

.2 Office and sheds.

.3 Parking.

.4 Project identification.

### 1.2 REFERENCES

.1 Canadian Standards Association (CSA International)
.1 CSA Z797-09(R2014), Code of practice for Access Scaffold.
.2 CAN/CSA-Z321-96(R2006), Signs and Symbols for the Occupational Environment, withdrawn but still available from CSA, CCOHS and Techstreet.

### 1.3 SUBMITTALS

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

### 1.4 INSTALLATION AND REMOVAL

.1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.

.2 Identify areas which have to be gravelled to prevent tracking of mud.

.3 Indicate use of supplemental or other staging area.

.4 Provide construction facilities in order to execute work expeditiously.

.5 Remove from site all such work after use.

1.6 HOISTING

.1 Provide, operate and maintain hoists/cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.

.2 Hoists/cranes shall be operated by qualified operator.

1.7 ELEVATORS

.1 Designated existing elevators may be used by construction personnel and transporting of materials. Co-ordinate use with Departmental Representative.

.2 Provide protective coverings for finish surfaces of cars and entrances.

1.8 SITE STORAGE/LOADING

.1 Confine work and operations of employees to areas defined by Contract Documents. Do not unreasonably encumber premises with products.

.2 Do not load or permit to load any part of Work with a weight or force that will endanger the Work.

1.9 CONSTRUCTION PARKING

.1 Parking will be permitted outside entrance gate provided it does not disrupt performance of Work.

.2 Provide and maintain adequate access to project site.

.3 Build and maintain temporary roads where indicated or directed by Departmental Representative and provide snow removal during period of Work.

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

.5 Clean construction runways and taxi areas where used by Contractor's equipment.

1.10 OFFICES

.1 Provide office heated to 22°C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.

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

.3 Subcontractors may provide their own offices as necessary. Direct location of these offices.

1.11 EQUIPMENT, TOOL AND MATERIALS STORAGE

.1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

.2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.

1.12 SANITARY FACILITIES

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

.2 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.13 CONSTRUCTION SIGNAGE

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

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

.3 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Departmental Representative.

1.14 PROTECTION AND MAINTENANCE OF TRAFFIC

.1 Provide access and temporary relocated roads as necessary to maintain traffic.

.2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.

.3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs

.4 Protect travelling public from damage to person and property.

.5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.

.6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.

.7 Construct access and haul roads necessary.

.8 Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.

.9 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.

.10 Dust control: adequate to ensure safe operation at all times.

.11 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative.

.12 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.

.13 Provide snow removal during period of Work.

1.14 PROTECTION AND MAINTENANCE OF TRAFFIC (Cont'd)

.14 Remove, upon completion of work, haul roads designated by Departmental Representative.

1.15 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.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

## PART 1 - GENERAL

**1.1 SECTION INCLUDES**

.1 Barriers.

.2 Environmental Controls.

.3 Traffic Controls.

.4 Fire Routes.

**1.2 REFERENCES**

.1 Canadian General Standards Board (CGSB):
.1 CAN/CGSB-1.189-2000, Exterior Alkyd Primer for Wood.
.2 CAN/CGSB-1.59-97, Alkyd Exterior Gloss Enamel.

.2 Canadian Standards Association (CSA):
.1 CSA O121-08(R2013), Douglas Fir Plywood.

**1.3 INSTALLATION AND REMOVAL**

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

.2 Remove from site all such work after use.

**1.4 GUARD RAILS AND BARRICADES**

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

.2 Provide as required by governing authorities.

**1.5 WEATHER ENCLOSURES**

.1 Provide weather tight closures to unfinished door and window openings, tops of shafts and other openings in floors and roofs.

.2 Close off floor areas where walls are not finished; seal off other openings; enclose building interior work for temporary heat.

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

1.6 DUST TIGHT SCREENS

.1 Provide dust tight screens or insulated partitions to localize dust generating activities, and for protection of workers, finished areas of Work.

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

1.7 ACCESS TO SITE

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

1.8 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 the public.

1.9 FIRE ROUTES

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

1.10 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.

1.11 PROTECTION OF BUILDING FINISHES

.1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.

.2 Provide necessary screens, covers, and hoardings.

.3 Confirm with Departmental Representative locations and installation schedule 3 days prior to installation.

.4 Be responsible for damage incurred due to lack of or improper protection.

## PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

## PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

END OF SECTION

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

.1 Product quality, availability, storage, handling, protection, and transportation.

.2 Manufacturer's instructions.

.3 Quality of Work, coordination and fastenings.

.4 Existing facilities.

### 1.2 REFERENCES

.1 Within text of specifications, reference may be made to reference standards.

.2 Conform to these standards, in whole or in part as specifically requested in specifications.

.3 If there is question as to whether any product or system is in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.

.4 The 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.

.5 Conform to latest date of issue of referenced standards in effect on date of submission of Bids, except where specific date or issue is specifically noted.

.6 OPSS Ontario Provincial Standard Specifications and OPSD Ontario Provincial Standard Drawings quoted in these specifications are available online at http://www.raqsa.mto.gov.on.ca/techpubs/ops.nsf/OPSHomepage.

1.3 QUALITY

.1 Products, materials, equipment and articles (referred to as products throughout specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of Products provided.

.2 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.

.3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.

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

.5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.4 AVAILABILITY

.1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for any 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.

1.4 AVAILABILITY (Cont'd)

.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.

1.5 METRIC SIZED MATERIALS

.1 SI metric units of measurement are used exclusively on the drawings and in the specifications for this project.

.2 The Contractor is required to provide metric products in the sizes called for in the Contract Documents except where a valid claim can be made that a particular product is not available on the Canadian market.

.3 Claims for exemptions from use of metric sized products shall be in writing and fully substantiated with supportive documentation. Promptly submit application to Departmental Representative for consideration and ruling. Non-metric sized products may not be used unless Contractor's application has been approved in writing by the Departmental Representative.

.4 Difficulties caused by the Contractor's lack of planning and effort to obtain modular metric sized products which are available on the Canadian market will not be considered sufficient reasons for claiming that they cannot be provided.

.5 Claims for additional costs due to provision of specified modular metric sized products will not be considered.

1.6 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.

1.6 STORAGE, HANDLING AND PROTECTION (Cont'd)

.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 metal panels 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.

1.7 TRANSPORTATION

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

1.8 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.

1.8 MANUFACTURER'S INSTRUCTIONS (Cont'd)

.2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative may 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.

1.9 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.

1.10 CO-ORDINATION

.1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.

.2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.11 CONCEALMENT

.1 In finished areas, conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.

.2 Before installation, inform Departmental Representative if there is interference. Install as directed by Departmental Representative.

1.12 REMEDIAL WORK

.1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.

.2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.13 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.

1.14 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.

1.15 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.

1.16 PROTECTION OF WORK IN PROGRESS

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

1.17 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, and/or building occupants and pedestrian and vehicular traffic.

.2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

## PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

END OF SECTION

## PART 1 - GENERAL

### 1.1 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00.

.2 Submit written request in advance of cutting or alteration which affects:
.1 Structural integrity of elements of project.
.2 Integrity of weather-exposed or moisture-resistant elements.
.3 Efficiency, maintenance, or safety of operational elements.
.4 Visual qualities of sight-exposed elements.
.5 Work of Owner or separate contractor.

.3 Include in request:
.1 Identification of project.
.2 Location and description of affected Work.
.3 Statement on necessity for cutting or alteration.
.4 Description of proposed Work, and products to be used.
.5 Alternatives to cutting and patching.
.6 Effect on Work of Owner or separate contractor.
.7 Written permission of affected separate contractor.
.8 Date and time work will be executed.

### 1.2 MATERIALS

.1 Required for original installation.

.2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00.

### 1.3 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.

1.3 PREPARATION (Cont'd)

.3 Beginning of cutting or patching means acceptance of existing conditions.

.4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.

.5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

1.4 EXECUTION

.1 Execute cutting, fitting, and patching to complete Work.

.2 Fit several parts together, to integrate with other Work.

.3 Uncover Work to install ill-timed Work.

.4 Remove and replace defective and non-conforming Work.

.5 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.

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

.7 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.

.8 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.

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

.10 Submit proposed materials, finishes and installation method for patching to Departmental Representative for approval, prior to patching.

1.4 EXECUTION (Cont'd)

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

.12 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping material for full thickness of the construction element.

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

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

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse, and recycling in accordance with Section 01 74 20.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

.1 Progressive cleaning.

.2 Final cleaning.

### 1.2 PROJECT CLEANLINESS

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

.2 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. 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 Provide and use clearly marked separate bins for recycling. Refer to Section 01 74 20.

.7 Remove waste material and debris from site and deposit in waste container at end of each working day.

.8 Dispose of waste materials and debris off site.

.9 Clean interior areas prior to start of finish work, and maintain areas free of dust and other contaminants during finishing operations.

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

1.2 PROJECT CLEANLINESS (Cont'd)

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

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

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

1.3 FINAL CLEANING

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

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

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

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

.5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. 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, hardware, stainless steel, chrome, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.

.8 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and floors.

1.3 FINAL CLEANING (Cont'd)

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

.10 HEPA vacuum clean and dust building interiors, behind grilles, louvres and screens.

.12 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

.13 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.

.14 Remove dirt and other disfiguration from exterior surfaces.

.15 Clean and sweep roofs, gutters, areaways, and sunken wells.

.16 Sweep and wash clean paved areas.

.17 Clean equipment and fixtures to a sanitary condition; clean or replace filters of mechanical equipment.
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.18 Clean roofs, downspouts, and drainage systems.

.19 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

## PART 1 - GENERAL

### 1.1 CONSTRUCTION & DEMOLITION WASTE

.1 Carefully deconstruct and source separate materials/equipment and divert, from D&C waste destined for landfill to maximum extent possible. Target for this project is 50% diversion from landfill. Reuse, recycle, compost, anaerobic digest or sell material for reuse except where indicated otherwise. On site sales are not permitted.

.2 Source separate waste and maintain waste audits in accordance with the Environmental Protection Act, Ontario Regulation 102/94 and Ontario Regulation 103/94.
.1 Provide facilities for collection, handling and storage of source separated wastes.
.2 Source separate the following waste:
.1 Brick and portland cement concrete.
.2 Corrugated cardboard.
.3 Wood, not including painted or treated wood or laminated wood.
.4 Gypsum board, unpainted.
.5 Steel.

.3 Submit a waste reduction workplan indicating the materials and quantities of material that will be recycled and diverted from landfill.
.1 Indicate how material being removed from the site will be reused, recycled, composted or anaerobically digested.

.4 Submit proof that all waste is being disposed of at a licensed land fill site or waste transfer site. A copy of the disposal/waste transfer site's license and a letter verifying that said landfill site will accept the waste must be supplied to Departmental Representative prior to removal of waste from the demolition site.

### 1.2 WASTE PROCESSING SITES

.1 Province of: Ontario.
.1 Ministry of Environment and Energy, 135 St. Clair Avenue West, Toronto, ON, M4V 1P5.
.2 Telephone: 800-565-4923 or 416-323-4321.
.3 Fax: 416-323-4682.

1.2 WASTE PROCESSING SITES (Cont'd)

.2 Recycling Council of Ontario: 215 Spadina Avenue, #225, Toronto, ON, M5T 2C7.
- .1 Telephone: 416-657-2797.
- .2 Fax: 416-960-8053.
- .3 Email: rco@rco.on.ca.
- .4 Internet: http://www.rco.on.ca/.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT

.1 Government Chief Responsibility for the Environment.

| Province | Address | General Inquiries | Fax |
|---|---|---|---|
| Ontario | Ministry of Environment and Energy 135 St Clair Avenue West Toronto, ON M4V 1P5 | (416) 323-4321 (800) 565-4923 | (416) 323-4682 |
| | Environment Canada Toronto, ON | (416) 734-4494 | |

END OF SECTION

## PART 1 - GENERAL

### 1.1 INSPECTION AND DECLARATION

.1 Contractor's Inspection: Contractor and all Subcontractors shall conduct an 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 that corrections have been made.
.2 Request Departmental Representative's Inspection.

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

.3 Completion: submit written certificate that following have been performed:
.1 Work has been completed and inspected for compliance with Contract Documents.
.2 Defects have been corrected and deficiencies have been completed.
.3 Equipment and systems have been tested, adjusted and balanced and are fully operational.
.4 Certificates required by PWGSC Fire Protection Engineer have been submitted.
.5 Operation of systems have been demonstrated to Owner's personnel.
.6 Work is complete and ready for final inspection.

.4 Final Inspection: when items noted above are completed, request final inspection of Work by Departmental Representative and Contractor. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request reinspection.

### 1.2 CLEANING

.1 In accordance with Section 01 74 11.

1.2 CLEANING (Cont'd)

.2 Remove waste and surplus materials, rubbish and construction facilities from the site in accordance with Section 01 74 20.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

.1 As-built, samples, and specifications.

.2 Equipment and systems.

.3 Product data, materials and finishes, and related information.

.4 Operation and maintenance data.

.5 Spare parts, special tools and maintenance materials.

.6 Warranties and bonds.

.7 Final site survey.

### 1.2 SUBMISSION

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

.2 Copy will be returned after final inspection, with Departmental Representative's comments.

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

.4 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, four final copies of maintenance manuals and commissioning documentation in English.

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

.6 If requested, furnish evidence as to type, source and quality of products provided.

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

.8 Pay costs of transportation.

1.3 FORMAT

.1 Organize data in the form of an 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. Identify contents of each binder on spine.

.4 Cover: Identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

.5 Arrange content by systems, under Section numbers and sequence of Table of Contents.

.6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

.7 Text: Manufacturer's printed data, or typewritten data.

.8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

.9 Provide 1:1 scaled CAD files in dwg format. Forward pdf, NMSEdit Professional spp, MS Word, MS Excel, MS Project and Autocad dwg files on USB compatible with PWGSC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

1.4 CONTENTS - EACH VOLUME

.1 Table of Contents: provide title of project;
.1 Date of submission; names,
.2 Addresses, and telephone numbers of 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.

1.4 CONTENTS - EACH VOLUME (Cont'd)

.3 Product Data: mark each sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information.

.4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

.5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00.

.6 Training: Refer to Section 01 79 00.

1.5 AS-BUILTS AND SAMPLES

.1 In addition to requirements in General Conditions, maintain at the site for Departmental Representative one record copy of:
.1 Contract Drawings.
.2 Specifications.
.3 Amendments and addenda.
.4 Change Orders and other modifications to the 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. 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. Label each document "PROJECT RECORD" in neat, large, printed letters.

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

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

1.5 AS-BUILTS AND SAMPLES (Cont'd)

.6 Turn one set, paper copy and electronic copy, of AS-BUILT drawings and specifications over to Departmental Representative on completion of work. Submit files on USB compatible with PWGSC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

.7 If project is completed without significant deviations from Contract drawings and specifications submit to Departmental Representative one set of drawings and specifications marked "AS-BUILT".

1.6 RECORDING ACTUAL SITE CONDITIONS

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

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

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

.4 Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:
.1 Measured depths of elements of foundation in relation to finish first floor datum.
.2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
.3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
.4 Field changes of dimension and detail.
.5 Changes made by change orders.
.6 Details not on original Contract Drawings.
.7 References to related shop drawings and modifications.

.5 Specifications: legibly mark each item to record actual construction, including:

1.6 RECORDING ACTUAL SITE CONDITIONS (Cont'd)

.5 (Cont'd)

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.

.2 Changes made by Amendments and change orders.

.6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

1.8 EQUIPMENT AND SYSTEMS

.1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

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

.3 Include installed colour coded wiring diagrams.

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

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

.6 Provide servicing and lubrication schedule, and list of lubricants required.

.7 Include manufacturer's printed operation and maintenance instructions.

.8 Include sequence of operation by controls manufacturer.

1.8 EQUIPMENT AND SYSTEMS (Cont'd)

.9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

.10 Provide installed control diagrams by controls manufacturer.

.11 Provide Contractor's coordination drawings, with installed colour coded piping diagrams.

.12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

.13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

.14 Include test and balancing reports as specified in Section 01 45 00 and 01 91 13.

.15 Additional requirements: As specified in individual specification sections.

1.9 MATERIALS AND FINISHES

.1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.

.2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.3 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 SPARE PARTS

.1 Provide spare parts, in quantities specified in individual specification sections.

1.10 SPARE PARTS (Cont'd)

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

.3 Deliver to location as directed; place and store.

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

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

1.11 MAINTENANCE MATERIALS

.1 Provide maintenance and extra materials, in quantities specified in individual specification sections.

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

.3 Deliver to location as directed; place and store.

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

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

1.12 SPECIAL TOOLS

.1 Provide special tools, in quantities specified in individual specification section.

.2 Provide items with tags identifying their associated function and equipment.

.3 Deliver to location as directed; place and store.

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

1.13 STORAGE, HANDLING AND PROTECTION

.1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.

.2 Store in original and undamaged condition with manufacturer's seal and labels intact.

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

.4 Store paints and freezable materials in a heated and ventilated room.

.5 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

1.14 WARRANTIES AND BONDS

.1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.

.2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

.3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work.

.4 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Certificate of Substantial Performance is determined.

.5 Verify that documents are in proper form, contain full information, and are notarized.

.6 Co-execute submittals when required.

.7 Retain warranties and bonds until time specified for submittal.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

## PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

END OF SECTION

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

.1 Procedures for demonstration and instruction of equipment and systems to Owner's O&M personnel.

.2 O&M personnel includes property facility manager, building operators, maintenenace staff, security staff and technical specialists, as applicable.

### 1.2 DESCRIPTION

.1 Demonstrate operation and maintenance of equipment and systems to Departmental Representative's personnel two weeks prior to date of substantial performance.

.2 Departmental Representative will provide list of personnel to receive instructions, and will coordinate their attendance at agreed-upon times.

### 1.3 QUALITY CONTROL

.1 When specified in individual Sections, require manufacturer to provide authorized representative to demonstrate operation of equipment and systems, instruct Owner's personnel, and provide written report that demonstration and instructions have been completed.

.2 Submit training schedule of time and date for demonstration and training of each item of equipment and each system in accordance with the training plan four weeks prior to designated dates, for Departmental Representative's approval.

.3 Submit reports within one week after completion of demonstration, that demonstration and instructions have been satisfactorily completed.

.4 Report shall give time and date of each demonstration and training, with list of persons present.

1.4 CONDITIONS FOR DEMONSTRATIONS

.1 Testing, adjusting, and balancing has been performed in accordance with Section 01 91 13 and equipment and systems are fully operational.

.2 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.

1.5 PREPARATION

.1 Verify that conditions for demonstration and instructions comply with requirements.

.2 Verify that designated O&M personnel are present.

1.6 DEMONSTRATION AND INSTRUCTIONS

.1 Demonstrate start-up, operation, control, adjustment, trouble-shooting,, servicing, and maintenance of each item of equipment at agreed upon times, at the designated location.

.2 Instruct personnel in all phases of operation and maintenance using operation and maintenance manuals as the basis of instruction.

.3 Review contents of manual in detail to explain all aspects of operation and maintenance.

.4 Prepare and insert additional data in operations and maintenance manuals when the need for additional data becomes apparent during instructions.

1.7 TIME ALLOCATED FOR INSTRUCTIONS

.1 Allow for amount of time required for instruction of each item of equipment or system as required and agreed upon with Departmental Representative.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

## PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

END OF SECTION

## PART 1 - GENERAL

### 1.1 SUMMARY

.1 Section Includes:
.1 General requirements relating to commissioning of project's components and systems, specifying general requirements to PV of components, equipment, sub-systems, systems, and integrated systems.

.2 Acronyms:
.1 AFD - Alternate Forms of Delivery, service provider.
.2 BMM - Building Management Manual.
.3 Cx - Commissioning.
.4 EMCS - Energy Monitoring and Control Systems.
.5 O&M - Operation and Maintenance.
.6 PI - Product Information.
.7 PV - Performance Verification.
.8 TAB - Testing, Adjusting and Balancing.

### 1.2 GENERAL

.1 Cx is a planned program of tests, procedures and checks carried out systematically on systems and integrated systems of the finished Project. Cx is performed after systems and integrated systems are completely installed, functional and Contractor's Performance Verification responsibilities have been completed and approved. Objectives:
.1 Verify installed equipment, systems and integrated systems operate in accordance with contract documents and design criteria and intent.
.2 Ensure appropriate documentation is compiled into the BMM.
.3 Effectively train O&M staff.

.2 Contractor assists in Cx process, operating equipment and systems, troubleshooting and making adjustments as required.
.1 Systems to be operated at full capacity under various modes to determine if they function correctly and consistently at peak efficiency. Systems to be interactively with each other as intended in accordance with Contract Documents and design criteria.

1.2 GENERAL (Cont'd)

.2 (Cont'd)
.2 During these checks, adjustments to be made to enhance performance to meet environmental or user requirements.

.3 Design Criteria: as per client's requirements or determined by designer. To meet Project functional and operational requirements.

1.3 COMMISSIONING OVERVIEW

.1 Refer to Mechanical and Electrical.

.2 Cx to be a line item of Contractor's cost breakdown.

.3 Cx activities supplement field quality and testing procedures described in relevant technical sections.

.4 Cx is conducted in concert with activities performed during stage of project delivery. Cx identifies issues in Planning and Design stages which are addressed during Construction and Cx stages to ensure the built facility is constructed and proven to operate satisfactorily under weather, environmental and occupancy conditions to meet functional and operational requirements. Cx activities includes transfer of critical knowledge to facility operational personnel.

.5 Departmental Representative will issue Certificate of Substantial Performance when:
.1 Completed Cx documentation has been received, reviewed for suitability and approved by Departmental Representative.
.2 Equipment, components and systems have been commissioned.
.3 O&M training has been completed.

1.4 NON-CONFORMANCE TO PERFORMANCE VERIFICATION REQUIREMENTS

.1 Should equipment, system components, and associated controls be incorrectly installed or malfunction during Cx, correct deficiencies, re-verify equipment and components within the unfunctional system, including related systems as deemed required by Departmental Representative, to ensure effective performance.

1.4 NON-CONFORMANCE TO PERFORMANCE VERIFICATION REQUIREMENTS (Cont'd)

.2 Costs for corrective work, additional tests, inspections, to determine acceptability and proper performance of such items to be borne by Contractor. Above costs to be in form of progress payment reductions or hold-back assessments.

1.5 PRE-CX REVIEW

.1 Before Construction:
.1 Review contract documents, confirm by writing to Departmental Representative.
.1 Adequacy of provisions for Cx.
.2 Aspects of design and installation pertinent to success of Cx.

.2 During Construction:
.1 Co-ordinate provision, location and installation of provisions for Cx.

.3 Before start of Cx:
.1 Have completed Cx Plan up-to-date.
.2 Ensure installation of related components, equipment, sub-systems, systems is complete.
.3 Fully understand Cx requirements and procedures.
.4 Have Cx documentation shelf-ready.
.5 Understand completely design criteria and intent and special features.
.6 Submit complete start-up documentation to Departmental Representative.
.7 Have Cx schedules up-to-date.
.8 Ensure systems have been cleaned thoroughly.
.9 Complete TAB procedures on systems, submit TAB reports to Departmental Representative for review and approval.
.10 Ensure "As-Built" system schematics are available.

.4 Inform Departmental Representative in writing of discrepancies and deficiencies on finished works.

1.6 CONFLICTS

.1 Report conflicts between requirements of this section and other sections to Departmental Representative before start-up and obtain clarification.

1.6 CONFLICTS (Cont'd)

.2 Failure to report conflict and obtain clarification will result in application of most stringent requirement.

1.7 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00.
.1 Submit no later than 4 weeks after award of Contract:
.1 Name of Contractor's Cx agent.
.2 Draft Cx documentation.
.3 Preliminary Cx schedule.
.2 Request in writing to Departmental Representative for changes to submittals and obtain written approval at least 8 weeks prior to start of Cx.
.3 Submit proposed Cx procedures to Departmental Representative where not specified and obtain written approval at least 8 weeks prior to start of Cx.
.4 Provide additional documentation relating to Cx process required by Departmental Representative.

1.8 COMMISSIONING DOCUMENTATION

.1 Departmental Representative to review and approve Cx documentation.

.2 Provide completed and approved Cx documentation to Departmental Representative.

1.9 COMMISSIONING SCHEDULE

.1 Provide detailed Cx schedule as part of construction schedule in accordance with Section 01 32 16.

.2 Provide adequate time for Cx activities prescribed in technical sections and commissioning sections including:
.1 Approval of Cx reports.
.2 Verification of reported results.
.3 Repairs, retesting, re-commissioning, re-verification.
.4 Training.

1.10 COMMISSIONING MEETINGS

.1 Convene Cx meetings following project meetings: Section 01 32 16 and as specified herein.

.2 Purpose: to resolve issues, monitor progress, identify deficiencies, relating to Cx.

.3 Continue Cx meetings on regular basis until commissioning deliverables have been addressed.

.4 At 60% construction completion stage. Section 01 32 16. Departmental Representative to call a separate Cx scope meeting to review progress, discuss schedule of equipment start-up activities and prepare for Cx. Issues at meeting to include:
.1 Review duties and responsibilities of Contractor and subcontractors, addressing delays and potential problems.
.2 Determine the degree of involvement of trades and manufacturer's representatives in the commissioning process.

.5 Thereafter Cx meetings to be held until project completion and as required during equipment start-up and functional testing period.

.6 Meeting will be chaired by Departmental Representative, who will record and distribute minutes.

.7 Ensure subcontractors and relevant manufacturer representatives are present at 60% and subsequent Cx meetings and as required.

1.11 STARTING AND TESTING

.1 Contractor assumes liabilities and costs for inspections. Including disassembly and re-assembly after approval, starting, testing and adjusting, including supply of testing equipment.

1.12 WITNESSING OF STARTING AND TESTING

.1 Provide 14 days notice prior to commencement.

1.12 WITNESSING OF STARTING AND TESTING (Cont'd)

.2 Departmental Representative to witness start-up and testing.

.3 Contractor's Cx Agent to be present at tests performed and documented by sub-trades, suppliers and equipment manufacturers.

1.13 MANUFACTURER'S INVOLVEMENT

.1 Factory testing: manufacturer to:
.1 Coordinate time and location of testing.
.2 Provide testing documentation for approval by Departmental Representative.
.3 Arrange for Departmental Representative to witness tests.
.4 Obtain written approval of test results and documentation from Departmental Representative before delivery to site.

.2 Obtain manufacturers installation, start-up and operations instructions prior to start-up of components, equipment and systems and review with Departmental Representative.
.1 Compare completed installation with manufacturer's published data, record discrepancies, and review with manufacturer.
.2 Modify procedures detrimental to equipment performance and review same with manufacturer before start-up.

.3 Integrity of warranties:
.1 Use manufacturer's trained start-up personnel where specified elsewhere in other divisions or required to maintain integrity of warranty.
.2 Verify with manufacturer that testing as specified will not void warranties.

.4 Qualifications of manufacturer's personnel:
.1 Experienced in design, installation and operation of equipment and systems.
.2 Ability to interpret test results accurately.
.3 To report results in clear, concise, logical manner.

1.14 PROCEDURES

.1 Verify that equipment and systems are complete, clean, and operating in normal and safe manner prior to conducting start-up, testing and Cx.

.2 Conduct start-up and testing in following distinct phases:
.1 Included in delivery and installation:
.1 Verification of conformity to specification, approved shop drawings and completion of PI report forms.
.2 Visual inspection of quality of installation.
.2 Start-up: follow accepted start-up procedures.
.3 Operational testing: document equipment performance.
.4 System PV: include repetition of tests after correcting deficiencies.
.5 Post-substantial performance verification: to include fine-tuning.

.3 Correct deficiencies and obtain approval from Departmental Representative after distinct phases have been completed and before commencing next phase.

.4 Document require tests on approved PV forms.

.5 Failure to follow accepted start-up procedures will result in re-evaluation of equipment by an independent testing agency selected by Departmental Representative. If results reveal that equipment start-up was not in accordance with requirements, and resulted in damage to equipment, implement following:
.1 Minor equipment/systems: implement corrective measures approved by Departmental Representative.
.2 Major equipment/systems: if evaluation report concludes that damage is minor, implement corrective measures approved by Departmental Representative.
.3 If evaluation report concludes that major damage has occurred, Departmental Representative shall reject equipment.
.1 Rejected equipment to be remove from site and replace with new.
.2 Subject new equipment/systems to specified start-up procedures.

1.15 START-UP DOCUMENTATION

.1 Assemble start-up documentation and submit to Departmental Representative for approval before commencement of commissioning.

.2 Start-up documentation to include:
.1 Factory and on-site test certificates for specified equipment.
.2 Pre-start-up inspection reports.
.3 Signed installation/start-up check lists.
.4 Start-up reports,
.5 Step-by-step description of complete start-up procedures, to permit Departmental Representative to repeat start-up at any time.

1.16 OPERATION AND MAINTENANCE OF EQUIPMENT AND SYSTEMS

.1 After start-up, operate and maintain equipment and systems as directed by equipment/system manufacturer.

.2 With assistance of manufacturer develop written maintenance program and submit Departmental Representative for approval before implementation.

.3 Operate and maintain systems for length of time required for commissioning to be completed.

.4 After completion of commissioning, operate and maintain systems until issuance of certificate of interim acceptance.

1.17 TEST RESULTS

.1 If start-up, testing and/or PV produce unacceptable results, repair, replace or repeat specified starting and/or PV procedures until acceptable results are achieved.

.2 Provide manpower and materials, assume costs for re-commissioning.

1.18 START OF COMMISSIONING

.1 Notify Departmental Representative at least 21 days prior to start of Cx.

.2 Start Cx after elements of building affecting start-up and performance verification of systems have been completed.

1.19 INSTRUMENTS / EQUIPMENT

.1 Submit to Departmental Representative for review and approval:
.1 Complete list of instruments proposed to be used.
.2 Listed data including, serial number, current calibration certificate, calibration date, calibration expiry date and calibration accuracy.

.2 Provide the following equipment as required:
.1 2-way radios.
.2 Ladders.
.3 Equipment as required to complete work.

1.20 COMMISSIONING PERFORMANCE VERIFICATION

.1 Carry out Cx:
.1 Under actual operating conditions, over entire operating range, in all modes.
.2 On independent systems and interacting systems.

.2 Cx procedures to be repeatable and reported results are to be verifiable.

.3 Follow equipment manufacturer's operating instructions.

.4 EMCS trending to be available as supporting documentation for performance verification.

1.21 WITNESSING COMMISSIONING

.1 Departmental Representative to witness activities and verify results.

1.22 AUTHORITIES HAVING JURISDICTION

.1 Where specified start-up, testing or commissioning procedures duplicate verification requirements of authority having jurisdiction, arrange for authority to witness procedures so as to avoid duplication of tests and to facilitate expedient acceptance of facility.

.2 Obtain certificates of approval, acceptance and compliance with rules and regulation of authority having jurisdiction.

1.22 AUTHORITIES HAVING JURISDICTION (Cont'd)

.3 Provide copies to Departmental Representative within 5 days of test and with Cx report.

1.23 COMMISSIONING CONSTRAINTS

.1 Since access into secure or sensitive areas will be very difficult after occupancy it is necessary to complete Cx of occupancy, weather, and seasonal sensitive equipment and systems in these areas before issuance of the Certificate of Substantial Performance, using, if necessary, simulated thermal loads.

1.24 EXTRAPOLATION OF RESULTS

.1 Where Cx of weather, occupancy, or seasonal-sensitive equipment or systems cannot be conducted under near-rated or near-design conditions, extrapolate part-load results to design conditions when approved by Departmental Representative in accordance with equipment manufacturer's instructions, using manufacturer's data, with manufacturer's assistance and using approved formulae.

1.25 EXTENT OF VERIFICATION

.1 Elsewhere:

.1 Provide manpower and instrumentation to verify up to 30% of reported results, unless specified otherwise in other sections.

.2 Number and location to be at discretion of Departmental Representative.

.3 Conduct tests repeated during verification under same conditions as original tests, using same test equipment, instrumentation.

.4 Review and repeat commissioning of systems if inconsistencies found in more than 20% of reported results.

.5 Perform additional commissioning until results are acceptable to Departmental Representative.

1.26 REPEAT VERIFICATIONS

.1 Assume costs incurred by Departmental Representative for third and subsequent verifications where:
.1 Verification of reported results fail to receive Departmental Representative's approval.
.2 Repetition of second verification again fails to receive approval.
.3 Departmental Representative deems Contractor's request for second verification was premature.

1.27 SUNDRY CHECKS AND ADJUSTMENTS

.1 Make adjustments and changes which become apparent as Cx proceeds.

.2 Perform static and operational checks as applicable and as required.

1.28 DEFICIENCIES, FAULTS, DEFECTS

.1 Correct deficiencies found during start-up and Cx to satisfaction of Departmental Representative.

.2 Report problems, faults or defects affecting Cx to Departmental Representative in writing. Stop Cx until problems are rectified. Proceed with written approval from Departmental Representative.

1.29 COMPLETION OF COMMISSIONING

.1 Upon completion of Cx leave systems in normal operating mode.

.2 Except for warranty and seasonal verification activities specified in Cx specifications, complete Cx prior to issuance of Interim Certificate of Completion.

.3 Cx to be considered complete when contract Cx deliverables have been submitted and accepted by Departmental Representative.

1.30 ACTIVITIES UPON COMPLETION OF COMMISSIONING

.1 When changes are made to baseline components or system settings established during Cx process, provide updated Cx form for affected item.

1.31 MAINTENANCE MATERIALS, SPARE PARTS, SPECIAL TOOLS

.1 Supply, deliver, and document maintenance materials, spare parts, and special tools as specified in contract.

1.32 OCCUPANCY

.1 Cooperate fully with Departmental Representative during stages of acceptance and occupancy of facility.

1.33 INSTALLED INSTRUMENTATION

.1 Use instruments installed under Contract for TAB and PV if:
.1 Accuracy complies with these specifications.
.2 Calibration certificates have been deposited with Departmental Representative.

.2 Calibrated EMCS sensors may be used to obtain performance data provided that sensor calibration has been completed and accepted.

1.34 PERFORMANCE VERIFICATION TOLERANCES

.1 Application tolerances:
.1 Specified range of acceptable deviations of measured values from specified values or specified design criteria. Except for special areas, to be within +/-10% of specified values.

.2 Instrument accuracy tolerances:
.1 To be of higher order of magnitude than equipment or system being tested.

.3 Measurement tolerances during verification:
.1 Unless otherwise specified actual values to be within +/-2% of recorded values.

1.35 OWNER'S PERFORMANCE TESTING

.1 Performance testing of equipment or system by Departmental Representative will not relieve Contractor from compliance with specified start-up and testing procedures.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

## PART 1 - GENERAL

### 1.1 SUMMARY

.1 Section Includes:
.1 This section is limited to portions of the Building Management Manual (BMM) provided to Departmental Representative by Contractor.

.2 Acronyms:
.1 BMM - Building Management Manual.
.2 Cx - Commissioning.
.3 HVAC - Heating, Ventilation and Air Conditioning.
.4 PI - Product Information.
.5 PV - Performance Verification.
.6 TAB - Testing, Adjusting and Balancing.
.7 WHMIS - Workplace Hazardous Materials Information System.

### 1.2 GENERAL REQUIREMENTS

.1 Standard letter size paper 216 mm x 279 mm.

.2 Methodology used to facilitate updating.

.3 Drawings, diagrams and schematics to be professionally developed.

.4 Electronic copy of data to be in a format accepted and approved by Departmental Representative.

### 1.3 APPROVALS

.1 Prior to commencement, co-ordinate requirements for preparation, submission and approval with Departmental Representative.

### 1.4 GENERAL INFORMATION

.1 Provide Departmental Representative the following for insertion into appropriate Part and Section of BMM:
.1 Complete list of names, addresses, telephone and fax numbers of Contractor, sub-contractors that participated in delivery of project - as indicated in Section 1.2 of BMM.

1.4 GENERAL INFORMATION (Cont'd)

.1 (Cont'd)

.2 Summary of architectural, structural, fire protection, mechanical and electrical systems installed and commissioned - as indicated in Section 1.4 of BMM.

.1 Including sequence of operation as finalized after commissioning is complete as indicated in Section 2.0 of BMM.

.3 Description of building operation under conditions of heightened security and emergencies as indicated in Section 2.0 of BMM.

.4 System, equipment and components Maintenance Management System (MMS) identification - Section 2.1 of BMM.

.5 Information on operation and maintenance of architectural systems and equipment installed and commissioned - Section 2.0 of BMM.

.6 Information on operation and maintenance of fire protection and life safety systems and equipment installed and commissioned - Section 2.0 of BMM.

.7 Information on operation and maintenance of mechanical systems and equipment installed and commissioned - Section 2.0 of BMM.

.8 Operating and maintenance manual - Section 3.2 of BMM.

.9 Final commissioning plan as actually implemented.

.10 Completed commissioning checklists.

.11 Commissioning test procedures employed.

.12 Completed Product Information (PI) and Performance Verification (PV) report forms, approved and accepted by Departmental Representative.

.13 Commissioning reports.

1.5 CONTENTS OF OPERATING AND MAINTENANCE MANUAL

.1 For detailed requirements refer to Section 01 78 00.

.2 Departmental Representative to review and approve format and organization within 12 weeks of award of contract.

.3 Include original manufactures brochures and written information on products and equipment installed on this project.

1.5 CONTENTS OF OPERATING AND MAINTENANCE MANUAL (Cont'd)

.4 Record and organize for easy access and retrieval of information contained in BMM.

.5 Include completed PI report forms, data and information from other sources as required.

.6 Inventory directory relating to information on installed systems, equipment and components.

.7 Approved project shop-drawings, product and maintenance data.

.8 Manufacturer's data and recommendations relating: manufacturing process, installation, commissioning, start-up, O&M, shutdown and training materials.

.9 Inventory and location of spare parts, special tools and maintenance materials.

.10 Warranty information.

.11 Inspection certificates with expiration dates, which require on-going re-certification inspections.

.12 Maintenance program supporting information including:
.1 Recommended maintenance procedures and schedule.
.2 Information to removal and replacement of equipment including, required equipment, points of lift and means of entry and egress.

1.6 LIFE SAFETY COMPLIANCE (LSC) MANUAL

.1 Samples of LSC Manual will be available from Departmental Representative.

.2 Content of Manual:
.1 All possible Emergency situations modes including: presence of fire and smoke, power failure, lose of water or pressure, chemical spills and refrigerant release.
.2 Failure of elevators and escalators.
.3 HVAC emergencies and fuel supply failures.
.4 Intrusion and security breach.
.5 Emergency provisions for natural disasters, bomb threats and other disruptive situations.

1.6 LIFE SAFETY COMPLIANCE (LSC) MANUAL (Cont'd)

.2 (Cont'd)

.6 Dedicated emergency generators for high security projects, medical facilities and computer systems.

.7 Emergency control procedures for fire, power and major equipment failure.

.8 Emergency contacts and numbers.

.9 Manual to be readily available and comprehensible to non-technical readers.

1.7 SUPPORTING DOCUMENTATION FOR INSERTION INTO SUPPORTING APPENDICES

.1 Provide Departmental Representative supporting documentation relating to installed equipment and system, including:

.1 General:

.1 Finalized commissioning plan.

.2 WHMIS information manual.

.3 Approved "as-built" drawings and specifications.

.4 Procedures used during commissioning.

.5 Cross-Reference to specification sections.

.2 Architectural and structural:

.1 Inspection certificates, construction permits.

.2 Roof anchor log books.

.3 PV reports.

.3 Fire prevention, suppression and protection:

.1 Test reports.

.2 Smoke test reports.

.3 PV reports.

.4 Mechanical:

.1 Installation permits, inspection certificates.

.2 Piping pressure test certificates.

.3 Ducting leakage test reports.

.4 TAB and PV reports.

.5 Charts of valves and steam traps.

.6 Copies of posted instructions.

.5 Electrical:

.1 Installation permits, inspection certificates.

.2 TAB and PV reports.

.3 Electrical work log book.

.4 Charts and schedules.

.5 Locations of cables and components.

.6 Copies of posted instructions.

1.7 SUPPORTING DOCUMENTATION FOR INSERTION INTO SUPPORTING APPENDICES (Cont'd)

.1 (Cont'd)
.5 (Cont'd)

.2 Assist Departmental Representative with preparation of BMM.

1.8 LANGUAGE

.1 English and French Language to be in separate binders.

1.10 USE OF CURRENT TECHNOLOGY

.1 Use current technology for production of documentation. Emphasis on ease of accessibility at all times, maintain in up-to-date state, compatibility with user's requirements.

.2 Obtain Departmental Representative's approval before starting Work.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

.1 Methods and procedures for deconstruction of structures and parts of structures.

### 1.2 REFERENCES

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

.2 Federal Legislation.
.1 Canadian Environmental Assessment Act (CEAA), 1992, c. 37.
.2 Canadian Environmental Protection Act (CEPA), 1999, c. 33.
.3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

### 1.3 DEFINITIONS

.1 Alternate Disposal: reuse and recycling of materials by designated facility, user or receiving organization which has valid Certificate of Approval to operate. Alternative to landfill disposal.

.2 Deconstruction: systematic dismantling of structure in a manner that achieves safe removal/disposal of hazardous materials and maximum salvage/recycling of materials.
.1 Ultimate objective is to recover potentially valuable resources while diverting from landfill what has traditionally been significant portion of waste system.

.3 Demolition: rapid destruction of structure with or without prior removal of hazardous materials.

.4 Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, including but not limited to: corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health, well being or environment if handled improperly.

1.3 DEFINITIONS (Cont'd)

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

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

.7 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:
.1 Salvaging reusable materials from remodelling 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.

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

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

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

1.4 SUBMITTALS

.1 Submittals in accordance with Section 01 33 00.

.2 Submit pre-demolition audit and deconstruction/disassembly plan prior to starting work in accordance with Section 01 74 20.

1.4 SUBMITTALS (Cont'd)

.3 Submit copies of certified bills of lading from authorized disposal sites and reuse and recycling facilities for material removed from site to Departmental Representative upon request.
.1 Written authorization from Departmental Representative is required to deviate from haulers listed in Waste Reduction Workplan.

.4 Include following information:
.1 Time and date of removal.
.2 Description of materials.
.3 Weight, volume, quantity of material.
.4 Breakdown of reuse, recycling and landfill quantities.
.5 End destination of materials.

.5 Workers, haulers and subcontractors must possess current, applicable permits to remove, handle and dispose of wastes categorized Provincially as hazardous.
.1 Provide proof of compliance within 24 hours upon written request of Departmental Representative.

1.5 QUALITY ASSURANCE

.1 Ensure Work is performed in compliance with CEPA, CEAA, TDGA, and applicable provincial regulations.

1.6 STORAGE, HANDLING AND PROTECTION

.1 Do in accordance with Section 01 74 20.

1.7 ENVIRONMENTAL REQUIREMENTS

.1 Do Work in accordance with Section 01 35 43.

.2 Refer to Section 01 35 43.

1.8 SITE CONDITIONS

.1 Existing Conditions.

.1 Should materials resembling spray or trowel applied asbestos or other designated substance listed as hazardous be encountered in course of deconstruction, stop work, take preventative measures, and notify Departmental Representative immediately. Do not proceed until written instructions have been received.

.2 Label and package component parts of mechanical and electrical material specified for salvage in accordance with Departmental Representative's instructions to prevent damage or loss.

.2 Protection.

.1 Prevent movement, settlement or damage of adjacent structures, services, walks, paving, trees, landscaping, adjacent grades. Provide bracing as required. Repair damage caused by deconstruction as directed by Departmental Representative.

.2 Support affected structures and, if safety of structure being deconstructed or adjacent structures appears to be endangered, take preventative measures. Cease operations and immediately notify Departmental Representative.

.3 Prevent debris from blocking surface drainage system, elevators, mechanical and electrical systems.

PART 2 - PRODUCTS

2.1 EQUIPMENT

.1 Leave equipment and machinery running only while in use, except where extreme temperatures prohibit shutting down.

.2 Where possible use water efficient wetting equipment/trucks/attachments when minimizing dust.

.3 Demonstrate that tools are being used in manner which allows for salvage of materials in best condition possible.

## PART 3 - EXECUTION

### 3.1 SITE VERIFICATION OF CONDITIONS

.1 Determine if Environmental Assessment (EA) is required under requirements of CEAA.
.1 If necessary, employ licensed consultant to perform EA.
.2 Communicate findings and conclusions in writing to Departmental Representative prior to start of Work.

### 3.2 PREPARATION

.1 Disconnect and re-route electrical, telephone and communication service lines entering buildings to be deconstructed. Post warning signs on electrical lines and equipment which must remain energized to serve other products during period of demolition.

.2 Locate and protect utility lines. Do not disrupt active or energized utilities traversing premises.

.3 Disconnect and cap designated mechanical services.
.1 Natural gas supply lines: as directed by Departmental Representative.
.2 Sewer and water lines: remove in accordance with requirements of authority having jurisdiction.
.3 Other underground services: remove and dispose of as directed by Departmental Representative.

### 3.3 REMOVAL OF HAZARDOUS WASTES

.1 Prior to start of deconstruction work remove contaminated or hazardous materials as defined by authorities having jurisdiction from site and dispose of at designated disposal facilities in safe manner in accordance with TDGA and other applicable regulatory requirements.

### 3.4 DISASSEMBLY

.1 Materials removed from designated structures are property of Departmental Representative.

3.4 DISASSEMBLY (Cont'd)

.2 Throughout course of deconstruction pay close attention to connections and material assemblies. Employ workmanship procedures which minimize damage to materials and equipment.

.3 Ensure workers and subcontractors are trained to carry out work in accordance with appropriate deconstruction techniques.

.4 Project supervisor with previous deconstruction experience must be present on site throughout project.

.5 Deconstruct in accordance with CSA S350 and other applicable safety standards.

.6 Workers must utilize adequate fall protection where Departmental Representative considers it necessary.

.7 Maintain structural integrity of structure.

.8 Systematically remove finishes, furnishings, and mechanical and electrical equipment as instructed by Departmental Representative.

.9 Carefully remove windows and doors from structure.

.10 Disassemble non-loadbearing interior partitions and remove materials from structure.

.11 Disassemble in sequence: roof, interior loadbearing partitions, exterior walls, floors, and foundation.

.12 Wherever possible, transfer material assemblies from heights to ground level for easier disassembly. Take appropriate measures to ensure safety.

.13 Separate from waste stream, material designated for alternate disposal.

.14 Remove and store materials to be salvaged, in manner to prevent damage.
.1 Store and protect in accordance with requirements for maximum preservation of material.

3.4 DISASSEMBLY (Cont'd)

.14 (Cont'd)

.2 Handle salvaged materials as new materials.

.15 Source separate for recycling materials that cannot be salvaged for reuse including wood, metal, concrete and asphalt.

.16 Remove materials that cannot be salvaged for reuse or recycling and dispose of in accordance with applicable codes at licensed facilities.

.17 Where existing materials are to be re-used in Work, use special care in removal, handling, storage and re-installation to assure proper function in completed work.

3.5 PROCESSING

.1 Designate location for processing of materials which eliminates double handling and provides adequate space to maintain efficient material flow.

.2 Denail, strip, and separate materials to ensure best possible condition of salvaged materials.

.3 Keep processing area clean and free of excess debris.

.4 Supply separate, marked disposal bins for categories of waste material. Notify Departmental Representative prior to removal of bins from site.

.5 Separate processed materials into organized piles for stockpiling. Provide collection area for materials designated for alternate disposal. Pile materials on pallets to facilitate transport off-site.

3.6 STOCKPILING

.1 Label stockpiles, indicating material type and quantity.

.2 Designate appropriate security resources/measures to prevent vandalism, damage and theft.

3.6 STOCKPILING (Cont'd)

.3 Locate stockpiled materials convenient for use in new construction. Eliminate double handling wherever possible.

.4 Stockpile materials designated for alternate disposal in location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.

3.7 REMOVAL FROM SITE

.1 Transport material designated for alternate disposal to approved facilities listed in waste reduction workplan and in accordance with applicable regulations. Do not deviate from facilities listed in waste reduction workplan without prior written authorization from Departmental Representative.

.2 Dispose of materials not designated for alternate disposal in accordance with applicable regulations. Disposal facilities must be approved of and listed in waste reduction workplan. Do not deviate from disposal facilities listed in waste reduction workplan without prior written authorization from Departmental Representative.

3.8 CLEANING AND RESTORATION

.1 Keep site clean and organized throughout deconstruction.

.2 Upon completion of project, remove debris, trim surfaces and leave work site clean.

.3 Upon completion of project, reinstate areas parking surfaces, walkways, and light standards affected by Work to match condition of adjacent, undisturbed areas.

END OF SECTION

## PART 1- GENERAL

### 1.1 RELATED REQUIREMENTS

.1 Section 03 20 00: Concrete Reinforcing.

### 1.2 REFERENCES

.1 Canadian Standards Association (CSA International):
.1 CSA A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
.2 CSA A283-06 (R2016), Qualification Code for Concrete Testing Laboratories.
.3 CAN/CSA A3000-13, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

.2 ASTM International Inc.:
.1 ASTM C309-11, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
.2 ASTM D1751-04(2013)e1, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

### 1.3 QUALITY ASSURANCE

.1 Qualifications
.1 Concrete supplier to have a valid "Certificate of Ready Mixed Concrete Production Facilities" issued by the relevant Ready Mixed Concrete Association.

### 1.4 QUALITY CONTROL

.1 Submit in accordance with Section 01 45 00.

.2 Minimum two weeks prior to starting concrete work, provide valid certificate from plant delivering concrete.
.1 Provide test data and certification by qualified independent inspection and testing laboratory that materials and mix designs used in concrete mixture will meet specified requirements.

.3 Minimum four weeks prior to starting concrete work, provide proposed quality control procedures

on following items:
.1 Curing.
.2 Finishing.
.3 Protection.

1.5 ADMINISTRATIVE REQUIREMENTS

.1 Pre-installation Meeting: convene pre-installation meeting one week prior to beginning concrete works. Ensure key personnel to attend.

.2 Batch Logs: keep record of each batch delivered to site.

.3 Concrete Delivery Slips: Keep all concrete delivery slips ("driver's tickets") on site until building is completed. Record on delivery slip where concrete was placed, including time and date.

.4 Record Drawings: Record on a set of Structural Drawings extent of each pour including pour date and falsework removal date. Also record all field changes, including footing elevations.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Minimum 2 weeks prior to starting concrete work, submit all concrete mix designs, and indicate where each concrete mix is to be used.

.3 Minimum submission requirements for each concrete mix design shall include the following:
.1 Minimum specified compressive strength at 28 day.
.2 Maximum aggregate size.
.3 Aggregate type (if not normal density).
.4 Concrete density range, wet and dry (if not normal density).
.5 CSA exposure class.
.6 Cement type (if not type GU).
.7 Percentage and type of supplemental cementing materials.
.8 Maximum water/cemetitious ratio.
.9 Assumed method of placement of concrete.
.10 Corrosion inhibitor (name and quantity, if applicable).
.11 Alkali-aggregate resistance.
.12 Architectural requirements (colour of cement

and aggregate, if applicable).

.13 Maximum time from batching to placing concrete (if retarding admixtures are used).

.4 Concrete pours: provide accurate records of poured concrete items indicating date and location of pour, concrete mix used, ambient air temperature and test samples taken.

.5 On completion of the works, provide written report to Departmental Representative certifying that the concrete in place meets performance requirements established in PART 2 - PRODUCTS.

## PART 2- PRODUCTS

### 2.1 DESIGN CRITERIA

.1 To CSA A23.1/A23.2, Alternative 1 – Performance, and as described under Mixes and on Structural Drawings.

### 2.2 PERFORMANCE CRITERIA

.1 Concrete supplier to meet the concrete performance criteria established by the Departmental Representative and to provide verification of compliance.

### 2.3 MATERIALS

.1 Portland Cement: to CAN/CSA A3000.

.2 Cementitious hydraulic slag: to CAN/CSA A3000.

.3 Fly ash: to CAN/CSA A3000, Type CI.

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

.5 Aggregates: to CSA A23.1/A23.2.Do not use recycled concrete as aggregate.

.6 Admixtures: not to contain chlorides.

.7 Corrosion-inhibiting admixture: calcium nitrate solution.

.8 Non premixed dry pack grout: composition of non

metallic aggregate and Portland cement with sufficient water for mixture to retain its shape when made into ball by hand and capable of developing compressive strength of 40 MPa at 28 days.

.9 Curing/sealing compound: to CSA A23.1/A23.2 and ASTM C309, Type 1, Class B, water based acrylic, compatible with surface hardener where hardener is used.
.1 Floor surface hardener: Non-metallic, natural grey colour (unless other colour is requested by the Architect), premixed, Mohs Hardness 7 or better.

.10 Evaporation reducer: water based polymer liquid forming continuous monomolecular temporary film on fresh concrete surface.

.11 Penetrating sealer: single component, water based clear water repellent with 40% active ingredient Alkylalkoxysilane.

.12 Bonding adhesive: Synthetic latex.

.13 Rigid insulation: Extruded polystyrene boards per ASTM C578, structural grade, compressive strength 100 psi (690 kPa).

.14 Elastomeric bearing pads:
.1 Virgin natural polyisoprene or virgin polychloroprene (Neoprene) conforming to CSA S6.

.15 Crack Filler: low viscosity epoxy resin.

## 2.4 MIXES

.1 Use ready-mix concrete. Proportion concrete in accordance with CSA A23.1/A23.2, Alternative 1 - Performance Method for Specifying Concrete.

.2 Set performance characteristics of concrete in plastic state in coordination with all trades involved.

.3 Meet performance criteria of concrete in hardened state as shown on Structural Drawings and provide verification of compliance.

.4 Use water-reducing agent in all concrete.

.5 Do not use admixtures containing chlorides.

.6 Supplementary cementing materials (SCM):

.1 Conform to CSA A23.1/A23.2.
.2 Follow slag and fly ash manufacturers' directions for proportioning and mixing of concrete.
.3 Do not use SCM in architecturally exposed concrete.
.4 Use 15% SCM for concrete that is not architecturally exposed.
.5 Do not use fly ash.
.6 Reduce W/C ratio to 0.45 where using high SCM concrete for slabs and other horizontal finished surfaces, in order to reduce bleed water and to increase rate or strength gain.

## PART 3- EXECUTION

### 3.1 PREPARATION

.1 Provide minimum 24 hours' notice prior to placing of concrete/closing of wall forms.

.2 Remove water and disturbed soil from excavations before placing concrete.

.3 Before placing slab-on-grade, confirm that subgrade and backfill meet specifications and are free of frost and surface water.

### 3.2 PLACING CONCRETE

.1 Place concrete in accordance with CSA A23.1/A23.2.

.2 Deliver and place concrete with minimum re-handling.

.3 If concrete is pumped or placed pneumatically, control discharge velocity to prevent separation or scattering of concrete mix ingredients.

.4 Do not overload forms.

.5 Use rubber tipped vibrators for concrete containing epoxy coated reinforcement

.6 Cast slabs with a top surface that is level or sloping as required by the Drawings. Allow for cambering where required. Set top of slab below finished floor level by the distance required for

the type of applied finish.

.7 Concrete exposed to view:
.1 Exposed surfaces to be dense, even, uniform in colour, texture and distribution of exposed aggregate.
.2 Defects such as honeycombing, voids, loss of fines, visible flow lines, cold joints or excessive bug holes may be cause for rejection at the discretion of the Departmental Representative.

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

## 3.3 FINISHING CONCRETE

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

.2 Cooperate with any trade applying finishes to concrete surfaces and provide surfaces which will ensure adequate bond. Provide chases and reglets where required.

.3 Finishing Flatwork:
.1 Protect concrete during finishing process. Use evaporation reducer during severe drying conditions.
.2 Provide final finish in accordance with proposed use and as follows:
.1 Screeded and bull floated for: mud slabs and footings/pile caps.
.2 Screeded and bull floated with scratch finish for: base slabs which receive mortar setting beds or bonded toppings.
.3 Powered float finish for: roofs (except future floors) and slabs which receive a membrane.
.4 Wood float finish with brooming for: exterior exposed slabs.
.5 Powered steel trowel finish for: interior exposed slabs, slabs which receive resilient flooring, carpet, epoxy-based finishes, thin-set tiles, etc. and future floors. Do not trowel air entrained concrete.
.6 Steel trowel exposed interior concrete floors at least twice. Provide final spin trowelling when non-slip finish is required.
.3 Surface hardeners:
.1 Provide where hardened concrete is required by Architectural Drawings or Specifications.
.2 Use only liquid hardeners on air entrained

concrete; do not use dry-shake applied surface hardeners.
.3 Incorporate hardener into the surface of the concrete while concrete is still plastic.
.4 Follow manufacturer's recommendations for dosage and application procedure.
.5 Where coloured hardeners are required, colour will be selected from available colours by Departmental Representative.
.6 Hold pre-construction meeting with hardener technical representative and finisher to ensure proper application, curing and protection.

.4 Surface Tolerances:
.1 Concrete surface tolerance to CSA A23.1, Straightedge Method.
.2 Unless otherwise noted, conform to finish tolerance Class A.

.4 Finishing Formed Surfaces:
.1 Completely fill holes left by through-bolts with grout.
.2 Do not patch surfaces until instructed in writing by Departmental Representative.
.3 Concrete exposed to view:
.1 Provide smooth-form finish.
.2 Rub exposed sharp edges with carborundum to produce 3 mm (1/8") radius edges unless otherwise indicated.

## 3.4 CONCRETE CURING AND PROTECTION

.1 At a minimum cure and protect concrete in accordance with CSA A23.1/A23.2.

.2 Extend curing and protection period until concrete has reached following strength levels for structural safety:
.1 Framed slabs and beams: 75% of specified 28 day strength.
.2 Columns, walls, piers and footings: 50% of specified 28 day strength

.3 For concrete containing supplementary cementing materials, curing and protection times may need to be extended beyond those outlined by CSA A23.1/A23.2 to achieve the required structural properties.

.4 Cure slab surfaces immediately after finishing is completed. Unless otherwise noted, use a curing compound compatible with applied finishes.

.5 Do not use curing compound on parking garage slabs and where bonded topping is to be applied. Cover slab surfaces with absorptive mat or fabric and keep continuously wet.

.6 Slabs on grade and structural slabs receiving resilient floor or other moisture sensitive finishes:
.1 Apply 24 hours of wet curing. Start curing immediately after finishing slab.
.2 Cover slab for at least 72 hours using plastic sheets with joints taped and free edges covered.
.3 Protect finished and cured slab from surface water (i.e. rain, snow).
.4 Refer to Architectural Specifications for required testing methods prior to placing floor finishes.

.7 Concrete exposed to view:
.1 Protect during construction period from wear, damage, marking, discolouration, staining and becoming coated with concrete leakage.
.2 Unless rejected, repair damage and remove marks and stains to the approval of the Departmental Representative.

3.5 SLABS ON GRADE

.1 Construction joints and sawcut joints:
.1 Refer to drawing notes for maximum spacing requirements.
.2 Saw cut depth to be equal to one quarter of the concrete thickness.
.3 Locate joints on column lines wherever possible and on intermediate lines, which result in approximately square panels, without re-entrant corners.
.4 Do not create “L” shaped panels nor “T” shaped joint intersections.
.5 Protect edges of sawcuts from breakage.
.6 Clean out sawcuts in exposed concrete and fill with control joint filler after concrete is at least 120 days old.
.7 Sawcut top 25 mm (1") at construction joints in exposed concrete for a width of 5 mm (3/16") and fill with control joint filler after concrete is at least 120 days old.
.8 Clean out sawcuts in other concrete and fill with a sand-cement paste one month prior to installing floor coverings.

.2 Isolation Joints:

.1 Unless otherwise shown on structural drawings, provide min. 10mm (3/8”) thick premoulded joint filler of the same depth as the thickness of the concrete wherever slabs-on-grade abut foundation walls, columns and piers. Omit if slab is chased or dowelled into structure.

.2 Furnish filler for each joint in single piece for depth and width required for joint,

.3 When more than one piece of filler is required for a joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.

.3 Cracks in Slabs-on-Grade:

.1 Extensive cracking of slabs-on-grade or cracks in excess of 3mm (1/8”) in width may be cause for rejection of slab or portion of slab at Departmental Representative’s discretion.

.2 Protect edges of cracks in slabs-on-grade from breakage.

.3 Exposed slab on grade: Unless slab is rejected, repair cracks that are over 0.4 mm (0.016") wide:

.1 Fill cracks with a sand-cement grout after concrete is at least 120 days old.

.2 Seven days later, cut out top 20 mm (3/4") of crack for a width of 5 mm (3/16") and fill with control joint filler.

.4 Architectural slab on grade: Unless slab is rejected, repair cracks that are over 0.2 mm (0.008") wide:

.1 Fill cracks with epoxy after concrete is at least 180 days old.

.2 Take all measures necessary to prevent epoxy on surface of exposed slab.

.3 Have manufacturer’s technical representative present during initial repairs.

## 3.6 EXISTING STRUCTURE

.1 Take precautions to protect the existing structure from damage.

.2 Remove portions of existing concrete structure as required.

.3 Provide temporary shoring and bracing as required.

.4 Retain a Professional Engineer to design the temporary shoring and bracing and to review this

work on site.

.5 Obtain Departmental Representative's approval before coring or cutting existing slabs, beams or walls.

.6 Retain an independent testing company to locate existing reinforcement and conduit in the areas of proposed openings and to mark locations on the surfaces of slabs and walls on which the cores and cuts are to be started using a non destructive method.

.7 Remove toppings prior to locating reinforcement and conduit.

.8 Mark locations and sizes of cores and openings and locations of reinforcement and conduit using indelible markers as follows:
.1 Red for top bars
.2 Green for bottom bars
.3 Black for cores, openings and conduit.

.9 Relocate proposed openings and repeat process at no extra cost to the Contract if proposed locations are not acceptable to Departmental Representative.

.10 Save the complete length of all cores. Label each core with location taken. Make all cores available for review by Departmental Representative. Dispose of cores only with approval of Departmental Representative. See details on structural drawings for sawcutting procedure.

.11 If new reinforcement is required at an opening, install reinforcement before cutting opening or shore up structure until new reinforcement is installed.

.12 Roughening existing surfaces:
.1 Where drawings call for a roughened surface, bush hammer entire surface to a full amplitude of at least 5mm.

.13 Patching:
.1 Patch existing concrete where necessary to provide required smooth, flat surfaces for reinforcement and for other trades.

3.7 FIELD QUALITY .1 Refer to Section 01 45 00.

CONTROL

.2 Bring to the attention of the Departmental Representative any defects or deficiencies in the work together with a proposal for remedy. The Departmental Representative will decide what corrective action may be taken, and will issue the necessary instructions.

.3 Construction Review:
.1 General review during construction by the Departmental Representative will be carried out by examination of representative samples of the work.
.2 Construction review reports will outline any deficiencies found.

.4 Inspection and Testing:
.1 An independent Inspection and Testing Agency (certified under CSA A283 with category to suit testing provided) will be appointed to carry out inspection and testing of concrete and concrete materials and check conformance with applicable Standards and Contract documents.
.2 The Agency will submit reports to the Departmental Representative, Contractor / Construction Manager, Concrete Supplier and Municipal Authorities. Reports will include the Supplier’s mix design numbers, locations in structure to which the tests relate and comments on abnormal results and conditions. The reports will be provided not later than five working days after the testing is completed.
.3 Sampling and testing of concrete will be in accordance with CSA A23.1/A23.2.
.4 The Agency will review all submittals pertaining to concrete mix designs and certification of plant, equipment and materials.
.5 Inspection and testing by the Agency will not augment or replace the Contractor’s quality control nor relieve him of his contractual responsibility.
.6 Assist the Agency in its work. Notify the Agency as to the concreting schedule and before each pour. Provide concrete samples.

END OF SECTION

## PART 1 - GENERAL

### 1.1 REFERENCES

.1 Architectural Woodwork Manufacturers Association of Canada (AWMAC):
.1 AWI/AWMAC/WI Architectural Woodwork Standards, AWS Edition 2-2014.

.2 American Wood Protection Association (AWPA):
.1 AWPA P5-15, Standard for Waterborne Preservatives.
.2 AWPA P8-14, Standard for Oil-Borne Preservatives.

.3 Canadian General Standards Board (CGSB):
.1 CGSB 19-GP-5M(1984), Sealing Compound, One Component, Acrylic Base, Solvent Curing (Incorporating Amendment No. 1).
.2 CAN/CGSB-71.26-M88, Adhesive for Field-Gluing Plywood to Lumber Framing for Floor Systems.

.4 Canadian Standards Association (CSA):
.1 CAN/CSA-O80 Series-15, Consolidation, Wood Preservation.
.2 CSA-O86-14, Consolidation, Engineering Design in Wood.
.3 CSA O112 Series M1977(R2006), CSA Standards for Wood Adhesives.
.4 CSA O121-08(R2013), Douglas Fir Plywood.

.5 National Building Code of Canada, NBC 2010.

.6 National Lumber Grades Authority Standard Grading Rules for Canadian Lumber, 2014:
.1 Special Product Standard SP-1-April 2011.
.2 Special Product Standard SP-2-November 2010.

### 1.2 SHOP DRAWINGS

.1 Before fabrication submit shop drawings in accordance with Sections 01 33 00 and 01 78 00.

.2 Shop drawings shall bear the stamp of a Registered Professional Engineer, registered in the Province of Ontario.

1.2 SHOP DRAWINGS (Cont'd)

.3 Shop drawings shall show complete details of connections, hangers, bracing, bearings, bearing blocks and roof overhangs.

1.3 QUALITY ASSURANCE

.1 Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

.2 Plywood, particleboard, OSB and wood based composite panels in accordance with CSA and ANSI standards.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Wood: S-DRY, graded and stamped to National Lumber Grades Authority, Standard Grading Rules for Canadian Lumber, S4S.
.1 Studs: spruce, pine or fir (SPF), 121a. "STUD".
.2 Blocking, furring, strapping, curbs, battens, nailers, bracing, and cants: spruce, pine or fir (SPF), 121d. and pine, 113d.
.3 Exterior wood fabrications: wood species and grades as specified above in paragraphs 2.1.1 and 2.1.2; pressure treated with CCA to CAN/CSA-O80-Series, minimum retention 4.0 kg/$m^3$ by assay.
.1 Preservative: chromated copper arsenate (CCA) to AWPA P5 as amended by CAN/CSA-O80-Series.

.2 Fastenings: to CSA-086.

.3 Douglas fir plywood: to CSA 0121, urea formaldehyde free.
.1 Subfloor and roof sheathing: SHG Sheathing Grade. Minimum thickness 19 mm., unsanded surfaces to Tables E-1 and E-2.
.2 Wall siding: MDO 1S - Medium Density Overly One Side. Nominal thickness 19 mm., sanded surfaces to Tables E-1 and E-2.

.4 Field applied wood preservative: copper napthenate to AWPA P8, green colour.

2.1 MATERIALS (Cont'd)

.5 Preservative treated plywood: Douglas Fir to CSA O121, G1S good one side, pressure treated with CCA to CSA-O80.9, minimum retention 4.0 kg/$m^3$ by assay.
.1 Preservative: chromated copper arsenate (CCA) to AWPA P5 as amended by CAN/CSA-O80-Series.

.6 Fire retardant treated plywood: Douglas Fir to CSA O121, G1S, fire retardant treated to CSA-O80.27, maximum flame spread 25, maximum smoke developed 25.
.1 Backboard: 19 mm thick, sanded, to Table E-1.

.7 Sealant: one-component, acrylic base, solvent curing to CGSB 19-GP-5M, Ecologo certified.

.8 Subflooring adhesive: to CAN/CGSB-71.26, cartridge loaded, Ecologo certified.

.9 Construction adhesive: to CSA O112 Series, cartridge loaded.
.1 Maximum allowable VOC limit 140 g/L.
.2 SCAQMD Rule 1168, Adhesives and Sealants Applications.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Apply wood preservative to wood in contact with concrete and masonry.

.2 Treat surfaces of pressure treated wood and plywood which are cut or bored after pressure treatment with field applied wood preservative.

.3 Wood frame construction to National Building Code of Canada 2010, Division B, Part 9.

.4 Do interior and exterior millwork to AWI/AWMAC/WI AWS Section 6.

.5 Set items in place plumb, straight and level to a tolerance of 1:600 and rigidly secure in place.

.6 Construct continuous members from pieces of longest practical length.

3.1 INSTALLATION (Cont'd)

.7 Install spanning members with "crown-edge" up.

.8 Select exposed framing for appearance. Install lumber and panel materials so that grade-marks and other defacing marks are concealed or are removed by sanding where materials are left exposed.

.9 Install subflooring with panel end-joints located on solid bearing, staggered at least 800 mm. In addition to mechanical fasteners, apply subflooring adhesive under panels installed on wood joists. Place continuous adhesive bead in accordance with manufacturer's instructions, single-bead on each joist and double-bead on joists where panel ends butt. When weather conditions are unsuitable for adhesive, use drywall screws for mechanical fasteners.

.10 Secure exterior work with galvanized or non-ferrous fasteners.

.11 Install roof sheathing perpendicular to framing; stagger end joints, locate ends over framing.

.12 Install battens for sheet metal roofing in direction of water flow ends flush with fascia.

.13 Apply continuous bead of sealant at junction between sill plate and concrete at exterior walls roof deck and abutting parapet wall.

.14 Install plywood backboards with countersunk screws.

.15 Install plywood sheathing over exterior face of framing.

END OF SECTION

## PART 1 - GENERAL

### 1.1 REFERENCES

.1 ASTM International:
.1 ASTM C919-12, Standard Practical for Use of Sealants in Acoustical Applications.
.2 ASTM C920-14, Standard Specification for Elastomeric Joint Sealants.

.2 Architectural Woodwork Manufacturers Association of Canada (AWMAC):
.1 AWI/AWMAC/WI AWS, Edition 2-2014.

.3 Canadian Standards Association (CSA):
.1 CSA B651-12, Accessible Design for the Built Environment.
.2 CSA O121-08(R2013), Douglas Fir Plywood.
.3 CSA O153-13, Poplar Plywood.

.4 National Electrical Manufacturers Association (NEMA)
.1 NEMA LD 3-2005, High-Pressure Decorative Laminates.

.5 National Lumber Grades Authority(NLGA):
.1 Standard Grading Rules for Candian Lumber - 2014.

.6 National Particleboard Association (NPA)
.1 NPA A208.1-2009, Particleboard.
.2 NPA A208.2-2009, Medium Density Fiberboard (MDF) for Interior Applications.

### 1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 and AWS Section 1.

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for architectural woodwork and include product characteristics, performance criteria, physical size, finish and limitations.
.2 Submit two copies of WHMIS MSDS.

.3 Shop Drawings:
.1 Submit two copies of drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.

1.2 ACTION AND INFORMATIONAL SUBMITTALS (Cont'd)

.3 (Cont'd)

.2 Indicate details of construction, profiles, jointing, fastening and other related details.

.1 Scales: profiles full size, details half full size.

.3 Indicate materials, thicknesses, finishes and hardware.

.4 Indicate locations of service outlets in casework, typical and special installation conditions, and connections, attachments, anchorage and location of exposed fastenings.

.4 Samples:

.1 Submit for review and acceptance of each unit.

.2 Samples will be returned for inclusion into work.

.3 Submit duplicate samples of hardwood, softwood, and plywood: sample size 300 x 300 mm or 300 mm long.

.4 Submit duplicate samples of laminated plastic for colour selection.

.5 Submit duplicate samples of laminated plastic joints, edging, cutouts and postformed profiles.

.5 Certifications: submit AWMAC GIS certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.1 Architectural woodwork shall be manufactured and/or installed to the current AWMAC Architectural Woodwork Standards and shall be subject to an inspection at the plant and/or site by an appointed AWMAC Certified Inspector.

.2 Inspection costs shall be included in the bid price for this project. Contact your local AWMAC Chapter for details of inspection costs.

.3 Shop drawings shall be submitted to the AWMAC Chapter office for review before work commences.

.4 Work that does not meet the AWMAC Architectural Woodwork Standards, as specified, shall be replaced, reworked and/or refinished by the architectural woodwork contractor, to the approval of AWMAC, at no additional cost to the. Departmental Representative.

.5 If the woodwork contractor is an AWMAC Manufacturer member in good standing, a two (2) year AWMAC Guarantee Certificate will be issued.

1.2 ACTION AND INFORMATIONAL SUBMITTALS (Cont'd)

.5 (Cont'd)

.6 The AWMAC Guarantee shall cover replacing, reworking and/or refinishing any deficient architectural woodwork due to faulty workmanship or defective materials supplied by the woodwork contractor, which may appear during a two (2) year period following the date of issuance.

.7 If the woodwork contractor is not an AWMAC Manufacturer member they shall provide the Departmental Representative with a two (2) year maintenance bond, in lieu of the AWMAC Guarantee Certificate, to the full value of the architectural woodwork contract.

1.3 ACCESSIBILITY

.1 Comply with CSA B651, Accessible Design for the Built Environment.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Exposed hardwood: to AWI/AWMAC/WI Architectural Woodwork Standards, Section 3: kiln dried wood, moisture content 6-12%, premium grade, birch species, uniform colour.

.1 Special characteristics: plain sawn; select.

.2 Exterior: heartwood only.

.3 Opaque finish: to Section 3, 4.2a.10.

.4 Transparent finish: to Section 3, 4.2a.11.

.2 Exposed softwood:

.1 AWI/AWMAC/WI AWS Section 3, premium grade, western red cedar species, uniform colour.

.2 Opaque finish: to Section 3, 4.2b.6.

.3 Transparent finish: to Section 3, 4.2b.7.

.3 Concealed blocking and framing: S-DRY, graded and stamped to National Lumber Grades Authority, Standard Grading Rules for Canadian Lumber 2014, SPF, 121c. "STUD" and 101d. "D" FINISH.

.4 Concealed plywood: douglas fir to CSA 0121, Good One Side, urea formaldehyde free alternative adhesive.

2.1 MATERIALS (Cont'd)

.5 High pressure decorative laminate (HDPL): to AWI/AWMAC/WI AWS, Section 4, Grade Horizontal, Type S standard.

.6 HDPL panel core: to AWI/AWMAC/WI AWS Section 4, 1.2.31 and 4.2c.
.1 Lumber core: poplar plywood to CSA 0153, Standard Construction, Interior Bond, BB Grade, urea formaldehyde free.

.7 Panel adhesive: to AWI/AWMAC/WI AWS Section 4, Ecologo certified.

.8 Sealant: 1 component, silicone base, solvent curing to ASTM C919 and ASTM C920, primerless, Type S, Grade NS, Class 50, SWRI validated, Ecologo certified, mould and mildew resistant.

.9 Bituminous paint: acid and alkali resistant to CAN/CGSB-1.108, Type 2, Ecologo certified.

.10 Construction adhesive: to CSA O112 Series, cartridge loaded.
.1 Maximum allowable VOC limit 140 g/L.
.2 SCAQMD Rule 1168, Adhesives and Sealants Applications.

2.2 FABRICATION

.1 Casework: to AWI/AWMAC/WI Architectural Woodwork Standards, Section 10, Type: High Pressure Decorative Laminate, Custom Grade: Section 10 and CSA B651.
.1 Door and applied drawer front profiles: to 1.2.16.1.1 square edge with thin applied band
.2 Construction Type: Type A Frameless.
.3 Interface Style 1, Type A, Flush Overlay.
.4 Layout: flush panel doors and drawer fronts, custom grade.
.5 Cabinet design series (CDS): As indicated.
.6 Adjustable shelf loading and deflection: 22.7 kg/sq cm (50 lbs/sq ft) to Section 10, 1.2.21.
.7 Dadoed drawer joints to AWI/AWMAC/WI details in Appendix A, Joinery Details.

.2 Countertops: to AWI/AWMAC/WI Architectural Woodwork Standards, Section 11 and Appendix B Section 11, Custom Grade, HDPL Option 6 post formed edge with coved splash and CSA B651.
.1 Splash option: 1 waterfall with scribe.

2.2 FABRICATION (Cont'd)

.2 (Cont'd)
.2 Deck option at splash: 3 coved.
.3 Front edge option: 4 waterfall.

.3 Shop assemble units in size to allow passage to installed location.

.4 Match grain and colour of adjoining exposed natural finished wood.
.1 Before finishing exposed surfaces of woodwork: remove handling marks or effects of exposure to moisture by thorough final sanding over all surfaces of exposed portions, using appropriate grit sandpaper and clean before applying sealer or finish.

.5 Cover exposed faces and edges with laminated plastic where indicated.

.6 Shop apply laminated plastic with hairline joints, chamfer exposed edges.

.7 Apply bituminous paint to edge of cutouts in laminated plastic tops at sinks.

.8 HDPL covered Plywood shelves and shelf gables.

.9 Seal all surfaces for site finishing to WDI/AWMAC/WI AWS Section 5.

2.3 SHOP FINISHING

.1 Shop finish exposed hardwood with water based polyurethane to WDI/AWMAC/WI AWS Section 5, System 12.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Set items in place, plumb, straight and level to a tolerance of 1:400 and rigidly secure in place in accordance with AWI/AWMAC/WI Architectural Woodwork Standards.

.2 Completely assemble units.

.3 Join abutting laminated plastic tops with draw bolts.

3.1 INSTALLATION (Cont'd)

.4 Apply sealant to junction of backsplash and adjacent wall finish.

END OF SECTION

## PART 1 - GENERAL

**1.1 RELATED SECTIONS**

.1 Section 07 20 00: Insulation.

**1.2 DESIGN CRITERIA**

.1 Fastener type and spacing to design wind loads and shear values to NBC 2010, Division B.

## PART 2 - PRODUCTS

**2.1 MATERIALS**

.1 Metal siding (Guard House): Prefinished aluminum of 1100-H14 alloy, minimum 1.27 mm thick, factory formed to profiles as indicated on drawings. Finish: Factory applied fluorocarbon coating, minimum 0.025 micrometers. Colour to match existing.

.2 Steel Canopy and soffit (over doors): to CAN/CGSB-93.4-92, Type Vertical Siding, Class Plain, low gloss.

.3 Vinyl siding (Storage Garage): to CAN/CGSB-41.24-95, horizontal siding, plain texture, low gloss, two 127 mm exposed faces.

.4 Accessories: casing, internal and external corners, cap strip, drip cap, undersill trim, starter strip, door and window trim of same material and finish as siding.

.5 Vented soffit, fascia and accessories: including casing of same material and finish as siding.

.6 Sealant: one component, elastomeric, chemical curing, to CAN/CGSB-19.13-M87, colour to match siding, Ecologo certified.

.7 Nails: alvanized or stainless steel, spiral shank, 9 mm diameter head, to CSA B111-1974(R2003), minimum 25 mm penetration into framing.

2.1 MATERIALS (Cont'd)

.8 Sheet metal flashing: 0.457 mm sheet steel, Z275 zinc coating designation to ASTM A653/A653M-13, pre-finished to CAN/CGSB-93.3-M91, Class F1S, colour to match siding.

.9 Air barrier: 0.152 mm thick, breather type, water resistant sheet of spunbonded olefin and 66 mm wide self-adhering pressure-sensitive polypropylene tape specially formulated for air barrier.

.10 Sheathing membrane and sheathing membrane flashing: to NBC 2010, Division B, 97.2.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Apply continuous air barrier over framing in accordance with manufacturer's instructions. Sealng joints with pressure-sensitive tape.

.2 Install sheet metal flashings at all projections, edges of siding and where indicated.

.3 Install sheet metal sill at bottom of sheathing.

.4 Install siding, soffit, fascia and accessories in accordance with CAN/CGSB-93.5-92 and CAN/CGSB-41.33-M87.

.5 Install level, plumb and straight to a tolerance of 1:500.

.6 Stagger adjoining laps minimum 1000 mm.

.7 Siding minimum 500 mm long.

.8 Wrap wood trim and plywood facing with sheet metal.

.9 Apply sealant where detailed, at junction with other materials and around door and window perimeters.

.10 Wash down surfaces with mild detergent.

END OF SECTION

## PART 1 - GENERAL

**1.1 RELATED SECTIONS**

.1 Section 07 46 00: Sealing siding, soffits and flashings.

.2 Section 07 61 13: Sealing sheet metal roofing.

.3 Section 08 80 00: Sealing glass.

**1.2 ENVIRONMENTAL CHOICE PROGRAM**

.1 Provide sealant products bearing the 'Ecologo' of the Environmental Choice Program, Department of the Environment, Canadian Environmental Protection Act, Environmental Choice Product Guidelines ECP/PCE-45-92 for Sealants and Caulking Compounds, except maximum VOC 60 g/L during application and curing.

.2 For primers and sealants, indicate VOC in g/L during application and curing.

**1.3 PRODUCT DATA**

.1 Submit manufacturer's literature indicating recommended surface preparation, sealant selection and primer for each substrate in accordance with Sections 01 33 00 and 01 78 00.

## PART 2 - PRODUCTS

**2.1 SEALANTS**

.1 Provide sealant products bearing Ecologo to ECP/PCE-45-92 with maximum VOC 60 g/L.

**2.2 SEALANT MATERIAL DESIGNATIONS**

.1 Urethanes One Part '2C'.
.1 Self-Leveling to CAN/CGSB-19.13-M87, Type 1.

.2 Silicones One Part '3'.
.1 To ASTM C920-14, primerless, Type S, Grade NS, Class 50, SWRI validated.

.3 Exterior glazing sealant: one part silicone to ASTM C920-14, Type S, Grade NS, Class 50.

2.2 SEALANT MATERIAL DESIGNATIONS (Cont'd)

.4 Preformed compressible and non-compressible back-up materials '10', CFC free.
.1 Polyethylene, urethane, neoprene or vinyl foam. Extruded closed cell foam backer rod. Size: oversize 30 to 50%.
.2 Bond breaker tape. Polyethylene bond breaker tape which will not bond to sealant.

2.3 SEALANT SELECTION

.1 Perimeters of exterior openings where frames meet exterior facade of building (ie. siding): Designation 3.

.2 Seal interior perimeters of exterior openings as detailed on drawings: Designation 3.

.3 Perimeters of interior frames, as detailed and itemized: Designation 3.

.4 Exposed interior control joints in drywall: Designations 2C.

2.4 JOINT CLEANER

.1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.

.2 Primer: to manufacturer's recommendations.

PART 3 - EXECUTION

3.1 PREPARATION OF JOINT SURFACES

.1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.

.2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair work.

.3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.

.4 Ensure joint surfaces are dry and frost free.

3.1 PREPARATION OF JOINT SURFACES (Cont'd)

.5 Prepare surfaces in accordance with manufacturer's directions.

3.2 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.

3.3 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.

3.4 MIXING

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

3.5 APPLICATION

.1 Ventilate interior spaces during application and curing of sealants to maintain VOCs less than 50 g/l. Coordinate with building manager to ensure existing ventilation system or temporary ventilation supllies sufficient outside air.

.2 Sealant.
.1 Protect installed work of other trades from staining or contamination.
.2 Apply sealant in accordance with manufacturer's application manual and written instructions.
.3 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint. remove tape after sealant applied.
.4 Apply sealant in continuous beads.
.5 Apply sealant using gun with proper size nozzle.
.6 Use sufficient pressure to fill voids and joints solid.

3.5 APPLICATION (Cont'd)

.2 (Cont'd)

.7 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.

.8 Tool exposed surfaces before skinning begins to give slightly concave shape.

.3 Curing.

.1 Cure sealants in accordance with sealant manufacturer's instructions.

.2 Do not cover up sealants until proper curing has taken place.

.4 Cleanup.

.1 Clean adjacent surfaces immediately and leave work neat and clean.

.2 Remove excess and droppings, using recommended cleaners as work progresses.

.3 Remove masking tape after initial set of sealant.

END OF SECTION

## PART 1 - GENERAL

### 1.1 PROJECT DATA

.1 Submit dupilcate copies of manufacturer's Product data in accordance with Section 01 33 00.

.2 Indicate performance criteria, characteristics, and limitations, product transportation, storage, handling and installation requirements.

### 1.2 SHOP DRAWINGS

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

.2 Indicate elevations, sections, details, materials, dimensions, thicknesses, weather stripping, trim and accessory pieces, and interfacing with adjacent construction.

.3 Provide methodology for replacement of fibre-glass panels, side rail bumpers, weather stripping, and restoration of entire door.

### 1.3 SAMPLES

.1 Submit following samples in accordance with Section 01 33 00.

.2 Two 300 x 300 mm samples of fibre-glass panels.

.3 Two 300 mm samples of each trim and accessory proposed for use.

### 1.4 CERTIFICATES

.1 Submit certification from material manufacturer that installation is in accordance with manufacturer's instructions.

1.5 QUALITY ASSURANCE

.1 Perform Work of this Section by a Company that has a minimum of three years proven experience in the installation of fibre-glass panels on project of a similar size and natiure and that is approved by manufacturer. Submit to Consultant, installer's current certificate of approval by the cladding of approval by the cladding manufacturer as proof of compliance.

.2 Construct one mock-up of fibre-glass panels in location acceptable to Consultant. Arrange for Consultant's and manufacturer's review and accptance prior to start installation. Mock-up may remain as part of Work if accepted by Consultant. Remove and dispose of mock-ups which do not form part of Work. Upon acceptance, mock-up shall serve as a minimum standard of quality for the balance of the work of this Section.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Fibre-glass panels: Translucent fibreglass FRP panels, 2 mm thick in sizes to match existing, with corrugation wave, heavy-duty to ASTM D3841.

.2 Fittings: New hardware and fittings as required to install new fibre-glass panels and return door to active service.

.3 Fasteners: aluminum or galvanized nails with Neoprene washers. Panels should be pre-drilled a minimum 1.5 mm larger that fastener diameter.

.4 Adhesive and sealant: Type as reccomended by panel manufacturer to suit intended application.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Remove existing panels at overhead doors in accordance with reviewed shop drawings.

3.1 INSTALLATION (Cont'd)

.2 Restore door in accordance with reviewed shop drawings.

.3 Install fibre-glass panels in existing overhead doors in accordance with reviewed shop drawings and manufacturer's written instructions.

.4 Provide a minmum of one corrugation overlap at sides to overlap water.

.5 Fasten panels with recommended aluminum or galvanized fasteners with armored Neoprene washers.

.6 Vinyl lap seal and/or mastic must also be used to achieve effective seal.

END OF SECTION

## PART 1 - GENERAL

### 1.1 REFERENCES

.1 ASTM International
.1 ASTM C542-05(2011), Standard Specification for Lock-Strip Gaskets.
.2 ASTM D2240-15, Standard Test Method for Rubber Property - Durometer Hardness.

.2 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.
.2 CAN/CGSB-12.3-M91, Flat, Clear Float Glass.
.3 CAN/CGSB-12.8-97, Insulating Glass Units.
.4 CAN/CGSB-12.8-97 (Amendment), Insulating Glass Units.
.5 CAN/CGSB-12.11-M90, Wired Safety Glass.

.3 Glass Association of North American (GANA)
.1 GANA Glazing Manual 50th Anniversay Edition-2008.
.2 GANA Sealant Manual-2008.
.3 GANA Guide to Architectural Glass (2010).

### 1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00.

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for glass, sealants, and glazing accessories and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:
.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.

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

1.3 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00.

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

1.4 QUALITY ASSURANCE

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

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 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 Store and protect glazing from nicks, scratches, and blemishes.
.3 Replace defective or damaged materials with new.

1.6 AMBIENT CONDITIONS

.1 Ambient Requirements:
.1 Install glazing when ambient temperature is 10 degrees C minimum. Maintain ventilated environment for 24 hours after application.
.2 Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Design Criteria:

2.1 MATERIALS (Cont'd)

.1 (Cont'd)

.1 Ensure continuity of building enclosure vapour and air barrier using glass and glazing materials as follow:

.1 Utilize inner light of multiple light sealed units for continuity of air and vapour seal.

.2 Size glass to withstand wind loads, dead loads and positive and negative live loads to ASTM E330.

.3 Limit glass deflection to 1/200 with full recovery of glazing materials.

.2 Flat Glass:

.1 Wired glass (GL-1): to CAN/CGSB-12.11, minimum 6 mm thick.

.1 Type 1-polished both sides (transparent).

.2 Wire mesh style 3-square.

.2 Safety glass (GL-2): to CAN/CGSB-12.1, transparent, minimum 6 mm thick.

.1 Type 2-tempered.

.2 Class B-float.

.3 Float glass (GL-3): to CAN/CGSB-12.3, glazing quality, minimum 6 mm thick.

.3 Insulating Glass Units:

.1 Insulating glass units (GL-4): to CAN/CGSB-12.8, double unit, 25 mm overall thickness.

.1 Glass: to CAN/CGSB-12.1.

.2 Glass thickness: 6 mm each light.

.3 Inter-cavity space thickness: 13 mm.

.4 Inert gas fill: argon.

.2 Insulating glass units (GL-5): to CAN/CGSB-12.8, double unit, 25 mm overall thickness.

.1 Glass: to CAN/CGSB-12.3.

.2 Glass thickness: 6 mm each light.

.3 Inter-cavity space thickness: 13 mm.

.4 Inert gas fill: argon.

.3 Insulating glass units (GL-7): to CAN/CGSB-12.8, double unit, 25 mm overall thickness.

.1 Outer Glass: to CAN/CGSB-12.3.

.2 Inner Glass: to CAN/CGSB-12.11.

.3 Glass thickness: 6 mm each light.

.4 Inter-cavity space thickness: 13 mm.

.5 Inert gas fill: argon.

.4 Sealant: in accordance with Section 07 90 00.

2.2 ACCESSORIES

.1 Setting blocks: neoprene,80 Shore A durometer hardness to ASTM D2240, to suit glazing method, glass light weight and area.

.2 Spacer shims: neoprene, 50-60 Shore A durometer hardness to ASTM D2240, 75 mm long x one half height of glazing stop x thickness to suit application. Self adhesive on one face.

.3 Glazing tape:
.1 Preformed butyl compound with integral resilient tube spacing device, 10-15 Shore A durometer hardness to ASTM D2240; coiled on release paper; 3 x 9.5 mm size; black colour.
.2 Closed cell polyvinyl chloride foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume 2%, designed for compression of 25%, to effect an air and vapour seal.

.4 Glazing splines: resilient polyvinyl chloride, extruded shape to suit glazing channel retaining slot, colour as selected.

.5 Glazing clips: manufacturer's standard type.

.6 Lock-strip gaskets: to ASTM C542.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for glazing installation in accordance with manufacturer's written instructions.
.1 Verify that openings for glazing are correctly sized and within tolerance.
.2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.
.3 Visually inspect substrate in presence of Departmental Representative.
.4 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

3.1 EXAMINATION (Cont'd)

.1 (Cont'd)

.5 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 PREPARATION

.1 Clean contact surfaces with solvent and wipe dry.

.2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.

.3 Prime surfaces scheduled to receive sealant.

3.3 INSTALLATION: EXTERIOR - DRY METHOD (PREFORMED GLAZING)

.1 Manufacturer's Instructions: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

.2 Perform work in accordance with GANA Glazing Manual.

.3 Cut glazing tape spline to length; install on glazing light. Seal corners by butting tape spline and sealing junctions with sealant in accordance with GANA Sealant Manual.

.4 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners.

.5 Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.

.6 Install removable stops without displacing glazing tape spline. Exert pressure for full continuous contact.

.7 Trim protruding tape edge.

3.4 INSTALLATION: EXTERIOR WET/DRY METHOD (PREFORMED TAPE AND SEALANT)

.1 Perform work in accordance with GANA Glazing Manual for glazing installation methods.

.2 Cut glazing tape to length and set against permanent stops, 6 mm below sight line. Seal corners by butting tape and dabbing with sealant.

.3 Apply heel bead of sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete continuity of air and vapour seal.

.4 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners.

.5 Rest glazing on setting blocks and push against tape and heel head of sealant with sufficient pressure to attain full contact at perimeter of light or glass unit.

.6 Install removable stops with spacer strips inserted between glazing and applied stops 6 mm below sight line. Place glazing tape on glazing light or unit with tape flush with 16 mm below sight line.

.7 Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing, maximum 9 mm below sight line.

.8 Apply cap head of sealant along void between stop and glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.5 CLEANING

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

.1 Leave Work area clean at end of each day.

.1 Remove traces of primer, caulking.

.2 Remove glazing materials from finish surfaces.

.3 Remove labels.

.4 Clean glass using approved non-abrasive cleaner in accordance with manufacturer's instructions.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11.

3.5 CLEANING (Cont'd)

.2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 20.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.6 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 After installation, mark each light with an "X" by using removable plastic tape or paste.

.1 Do not mark heat absorbing or reflective glass units.

.3 Repair damage to adjacent materials caused by glazing installation.

END OF SECTION

## PART 1 - GENERAL

### 1.1 REFERENCES

.1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
.1 Material Safety Data Sheets (MSDS).

.2 The Master Painters Institute (MPI)
.1 Maintenance Repainting Manual 2004, Master Painters Institute (MPI), including Identifiers, Evaluation, Systems, Preparation and Approved Product List.

.3 National Fire Code of Canada, 2010 (NFC).

.4 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings) of the Environmental Protection Agency (EPA).

### 1.2 QUALITY ASSURANCE

.1 Qualifications:
.1 Contractor: to have a minimum of five years proven satisfactory experience. When requested, provide list of last three comparable jobs including, job name and location, specifying authority, and project manager.
.2 Qualified journeypersons as defined by local jurisdiction to be engaged in painting work.
.3 Apprentices: may be employed provided they work under direct supervision of qualified journeypersons in accordance with applicable trade regulations.

.2 Conform to latest MPI requirements for exterior repainting work including cleaning, preparation and priming.

.3 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, and solvents) to be in accordance with the latest edition of the MPI Approved Product List and to be from a single manufacturer for each system used.

1.2 QUALITY ASSURANCE (Cont'd)

.4 Paint materials such as linseed oil, shellac, and turpentine, to be the highest quality product of an approved manufacturer listed in MPI Maintenance Repainting Manual and shall be compatible with other coating materials as required.

.5 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Departmental Representative.

.6 Mock-ups:
.1 Provide a mock-up in accordance with requirements of Section 01 45 00 to Departmental Representative.
.2 Prepare and repaint mock-up designated exterior surface or item to requirements specified herein, with specified paint or coating showing selected colours, number of coats, gloss/sheen, textures and workmanship to MPI Maintenance Repainting Manual standards for review and approval.
.3 When approved, repainted surface and/or item shall become acceptable standard of finish quality and workmanship for similar on-site exterior repainting work.

1.3 SCHEDULING

.1 Submit work schedule for various stages of painting to Departmental Representative for review.

.2 Paint occupied facilities in accordance with approved schedule. Schedule operations to approval of Departmental Representative such that painted surfaces will have dried and cured sufficiently before occupants are affected.

.3 Obtain written authorization from Departmental Representative for changes in work schedule.

.4 Schedule repainting operations to prevent disruption by other trades if applicable and by occupants in and about building.

1.4 SUBMITTALS

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

.2 Provide samples in accordance with Section 01 33 00.
.1 Submit full range colour sample chips for review and selection. Indicate where colour availability is restricted.

.3 Provide product data and manufacturer's installation/application instructions for paints and coating products to be used.

.4 Provide WHMIS Material Safety Data Sheets (MSDS) for paints and coating materials to be used.

.5 Quality Assurance Submittals:
.1 Manufacturer's Instructions: manufacturer's installation instructions.

.6 Closeout Submittals:
.1 Provide maintenance data for incorporation into manual specified in Section 01 78 00.
.2 Provide records of products used. List products in relation to finish system and include following:
.1 Product name, type and use (i.e. materials and location).
.2 Manufacturer's product number.
.3 Colour code numbers.
.4 MPI Environmentally Friendly classification system rating.
.5 Manufacturer's Material Safety Data Sheets.

1.5 MAINTENANCE

.1 Extra Materials:
.1 Provide maintenance materials in accordance with Section 01 78 00.
.2 Provide one - four litre can of each type and colour of finish coating. Identify type and colour in relation to established colour schedule and finish system.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle materials in accordance with Section 01 61 00, supplemented as follows:

.1 Deliver and store materials in original containers, sealed, with labels intact.

.2 Labels to indicate:

.1 Manufacturer's name and address.

.2 Type of paint or coating.

.3 Compliance with applicable standard.

.4 Colour number in accordance with established colour schedule.

.3 Remove damaged, opened and rejected materials from site.

.4 Store and handle in accordance with manufacturer's recommendations.

.5 Store materials and equipment in secure, dry, well-ventilated area with temperature range between 7 degrees C to 30 degrees C. Store materials and supplies away from heat generating devices and sensitive products above minimum temperature as recommended by manufacturer.

.6 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Departmental Representative. Upon completion of operations, return areas to clean condition to approval of Departmental Representative.

.7 Remove paint materials from storage in quantities required for same day use.

.8 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.

.9 Fire Safety Requirements:

.1 Provide one 9 kg Type ABC fire extinguisher adjacent to storage area.

.2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site daily.

1.6 DELIVERY, STORAGE AND HANDLING (Cont'd)

.1 (Cont'd)

.1 (Cont'd)

.3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada.

.2 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20.

.2 Paint, stain and wood preservative finishes and related materials are hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.

.3 Materials that cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.

.4 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.

.5 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into the ground the following procedures shall be strictly adhered to:

.1 Retain cleaning water for water-based materials to allow sediments to be filtered out. In no case shall equipment be cleaned using free draining water.

.2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.

.3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.

.4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.

.5 Empty paint cans are to be dry prior to disposal or recycling (where available).

.6 Close and seal tightly partly used cans of materials including sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.

1.6 DELIVERY, STORAGE AND HANDLING (Cont'd)

.2 (Cont'd)

.6 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.

.7 Set aside and protect surplus and uncontaminated finish materials: Deliver to or arrange collection by employees, individuals or organizations for verifiable re-use or re-manufacturing.

1.7 AMBIENT CONDITIONS

.1 Temperature, Humidity and Substrate Moisture Content Levels:

.1 Unless specifically pre-approved by specifying body, Paint Inspection Agency and, applied product manufacturer.

.2 Do not perform repainting work when:

.1 Ambient air and substrate temperatures are below 10 degrees C.

.2 Substrate temperature is over 32 degrees C unless paint is specifically formulated for application at high temperatures.

.3 Substrate and ambient air temperatures are expected to fall outside paint manufacturer's prescribed limits.

.4 Relative humidity is above 85% or when dew point is less than 3 degrees C variance between air/surface temperature.

.5 Rain or snow is forecast to occur before paint has thoroughly cured.

.6 It is foggy, misty, raining or snowing at site.

.3 Conduct moisture tests using properly calibrated electronic Moisture Meter, except test existing painted concrete floors for moisture using simple "cover patch test" on failed areas.

.4 Do not perform repainting work when maximum moisture content of substrate exceeds:

.1 12% for concrete and masonry (clay and concrete brick/block).

.2 15% for wood.

.5 Test painted concrete, masonry and plaster surfaces for alkalinity as required.

.2 Application Requirements:

1.7 AMBIENT CONDITIONS (Cont'd)

.2 (Cont'd)

.1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind conditions are such that airborne particles will affect quality of finished surface.

.2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits noted.

.3 Apply paint when previous coat of paint is dry or adequately cured, unless otherwise pre-approved by specific coating manufacturer.

.4 Apply paint finishes when conditions forecast for entire period of application fall within manufacturer's recommendations.

.5 Do not apply paint when:

.1 Temperature is expected to drop below 10 degrees C before paint has thoroughly cured.

.2 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's limits.

.3 Surface to be painted is wet, damp or frosted.

.6 Provide and maintain cover when paint must be applied in damp or cold weather. Heat substrates and surrounding air to comply with temperature and humidity conditions specified by manufacturer. Protect until paint is dry or until weather conditions are suitable.

.7 Schedule repainting operations such that surfaces exposed to direct, intense sunlight are scheduled for completion during early morning.

.8 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.

## PART 2 - PRODUCTS

2.1 MATERIALS

.1 Paint materials listed in latest edition of MPI Approved Product List (APL) are acceptable for use on this project.

.2 Where required by authorities having jurisdiction, paints and coatings to provide fire resistant rating.

2.1 MATERIALS (Cont'd)

.3 Paint materials for repaint systems: products of single manufacturer.

.4 Paints, coatings, thinners, solvents, cleaners and other fluids used in repaintingto be as follows:
.1 Not contain methylene chloride, chlorinated hydrocarbons, toxic metal pigments.
.2 Be manufactured without compounds which contribute to ozone depletion in upper atmosphere.
.3 Be manufactured without compounds which contribute to smog in lower atmosphere.
.4 Be manufactured where matter generating 'Biochemical Oxygen Demand' (BOD) in undiluted production plant effluent discharged to natural watercourse or sewage treatment facility lacking secondary treatment does not exceed 15 mg/L.
.5 Be manufactured where total suspended solids (TSS) content in undiluted production plant effluent discharged to natural watercourse or sewage treatment facility lacking secondary treatment does not exceed 15 mg/L.

.5 Paints and coatings must be manufactured and transported in a manner that steps of processes, including disposal of waste products, will meet requirements of applicable governmental acts, by-laws and regulations including, for facilities located in Canada, Fisheries Act and Canadian Environmental Protection Act (CEPA).

.6 Paints and coatings must not be formulated or manufactured with formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.

2.2 COLOURS

.1 Departmental Representative will provide Colour Schedule.

.2 Selection of colours will be from manufacturers full range of colours.

2.2 COLOURS (Cont'd)

.3 Where specific products are available in restricted range of colours, selection will be based on limited range.

.4 First coat in two coat (Premium) repaint system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 MIXING AND TINTING

.1 Perform colour tinting operations prior to delivery of paint to site. On-site tinting of painting materials is allowed with Departmental Representative's written permission.

.2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.

.3 Where thinner is used, addition not to exceed paint manufacturer's recommendations. Do not use kerosene or such organic solvents to thin water-based paints.

.4 Thin paint for spraying in accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Departmental Representative.

.5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 GLOSS/SHEEN RATINGS

.1 Paint gloss: defined as sheen rating of applied paint, in accordance with following MPI gloss/sheen standard values:

| Gloss Level Category | Units @ 60 Degrees | Units @ 85 Degrees |
|---|---|---|
| G1 - matte finish | 0 to 5 | maximum 10 |
| G2 - velvet finish | 0 to 10 | 10 to 35 |
| G3 - eggshell | 10 to 25 | 10 to 35 |

| | | |
|---|---|---|
| finish | | |
| G4 - satin finish | 20 to 35 | minimum 35 |
| G5 - semi-gloss finish | 35 to 70 | |
| G6 - gloss finish | 70 to 85 | |
| G7 - high gloss finish | > 85 | |

.2 Gloss level ratings of repainted surfaces as specified and as noted on Finish Schedule.

2.5 EXTERIOR PAINTING SYSTEMS

.1 EXT 5.1 - Structural Steel and Metal Fabrications: (columns, beams, and joists).
.1 EXT 5.1S - Epoxy over self priming Epoxy.

.2 EXT 5.3 - Galvanized Metal: High Contact/High Traffic Areas (Doors, Frames, Railings, Pipes, and Handrail. Low Contact/Low Traffic Areas (Overhead Decking, Eavestrough (Gutters), Downpipes, and Ducts.
.1 EXT 5.3L - Pigmented polyurethane finish over epoxy primer.

.3 EXT 5.4G - Aluminum: Siding, sills, frames, etc.)
.1 EXT 5.4G - Waterborne light industrial G3 coating.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 EXAMINATION

.1 Exterior repainting work: inspected by MPI Accredited Paint Inspection Agency (inspector) acceptable to specifying authority and local Painting Contractor's Association. Painting contractor to notify Paint Inspection Agency minimum of one week prior to commencement of work and provide copy of project repainting specification and Finish Schedule (as well as plans and elevation drawings if available).

.2 Exterior surfaces requiring repainting: inspected by both painting contractor and Paint Inspection Agency who will notify Departmental Representative in writing of defects or problems, prior to commencing repainting work, or after surface preparation if unseen substrate damage is discovered.

.3 Where an assessed degree of surface degradation of DSD-1 to DSD-3 before preparation of surfaces for repainting is revealed to be DSD-4 after preparation, repair or replacement of such unforeseen defects discovered are to be corrected, as mutually agreed, before repainting is started.

.4 Where "special" repainting or recoating system applications (i.e. elastomeric coatings) or non-MPI listed products or systems are to be used, paint or coating manufacturer to provide as part of work, certification of surfaces and conditions for specific paint or coating system application as well as on site supervision, inspection and approval of their paint or coating system application as required at no additional cost to Departmental Representative.

3.3 PREPARATION

.1 Perform preparation and operations for exterior painting in accordance with MPI Maintenance Repainting requirements except where specified otherwise.

.2 Apply paint materials in accordance with paint manufacturer's written application instructions.

3.3 PREPARATION (Cont'd)

.3 Clean and prepare exterior surfaces to be repainted in accordance with MPI Maintenance Repainting Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:

.1 Remove dust, dirt, and surface debris by brushing, wiping with dry, clean cloths or compressed air.

.2 Wash surfaces with a biodegradable detergent (and bleach where applicable) and clean warm water using a stiff bristle brush to remove dirt, oil and surface contaminants.

.3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.

.4 Use trigger operated spray nozzles for water hoses.

.5 Allow surfaces to drain completely and to dry thoroughly.

.6 Use water-based cleaners in place of organic solvents where surfaces will be repainted using water based paints.

.7 Many water-based paints cannot be removed with water once dried. However, minimize the use of kerosene or such organic solvents to clean up water-based paints.

.4 Where required, pressure wash exterior surfaces prior to repainting in accordance with MPI standards for type of surfaces and recommended pressures to ensure complete removal of loose paint, stains, dirt, and foreign matter. This work to be carried out by qualified workers experienced in pressure water cleaning. Use of spray equipment such as water hose cleaning will not be considered satisfactory unless specified. Allow sufficient drying time and test surfaces using an electronic moisture meter before commencing work.

.5 Clean metal surfaces to be repainted by removing rust, dirt, oil, grease and foreign substances in accordance with MPI requirements. Remove such contaminates from surfaces, pockets and corners to be repainted by brushing with clean brushes, blowing with clean dry compressed air, or brushing/vacuum cleaning as required.

3.3 PREPARATION (Cont'd)

.6 Prevent contamination of cleaned surfaces by salts, acids, alkalis, corrosive chemicals, grease, oil and solvents before priming and between applications of remaining coats. Touch-up, spot prime, and apply primer, paint, or pre-treatment as soon as possible after cleaning and before deterioration occurs.

.7 Do not apply paint until prepared surfaces have been accepted by Departmental Representative.

.8 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects from previously painting (e.g. runs, and sags) that are visible from distance up to 1000 mm.

3.4 EXISTING CONDITIONS

.1 Prior to commencing work, examine site conditions and existing exterior substrates to be repainted and report in writing to Departmental Representative damages, defects, unsatisfactory or unfavourable conditions of surfaces that will adversely affect this work.

.2 Conduct moisture testing of surfaces to be painted using a properly calibrated electronic moisture meter, except test concrete floors for moisture using a simple "cover patch test" and report findings to Departmental Representative. Maximum moisture content not to exceed specified limits.

.3 No repainting work to commence until such adverse conditions and defects have been corrected and surfaces and conditions are acceptable to Painting Subcontractor and Inspection Agency.

.4 Degree of surface deterioration (DSD) to be assessed using MPI Identifiers and Assessment criteria indicated in the MPI Maintenance Repainting Manual. MPI DSD ratings and descriptions are as follows:

| Condition | Description |
|---|---|
| DSD-0 | Sound Surface ( includes visual (aesthetic) defects that do not affect film's protective properties). |
| DSD-1 | Slightly Deteriorated Surface (indicating fading; gloss reduction, slight surface contamination, minor pin holes and scratches). |
| DSD-2 | Moderately Deteriorated Surface (small areas of peeling, flaking, slight cracking, and staining). |
| DSD-3 | Severely Deteriorated Surface (heavy peeling, flaking, cracking, checking, scratches, scuffs, abrasion, small holes and gouges). |
| DSD-4 | Substrate Damage (repair or replacement of surface required). |

3.5 PROTECTION

.1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore such surfaces as directed by Departmental Representative.

.2 Protect items that are permanently attached such as Fire Labels on doors and frames.

.3 Protect factory finished products and equipment.

.4 Protect general public and building occupants in and about the building.

.5 Removal of light fixtures, surface hardware on doors, and surface mounted equipment, fittings and fastenings to be done prior to undertaking painting operations. Store items and re-install after painting is completed.

.6 Move and cover exterior furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.

3.5 PROTECTION (Cont'd)

.7 As painting operations progress, place "WET PAINT" signs in pedestrian and vehicle traffic areas to approval of Departmental Representative.

3.6 APPLICATION

.1 Apply paint by method that is best suited for substrate being repainted. Conform to manufacturer's application instructions unless specified otherwise. In each case method of application to be as pre-approved by Departmental Representative before commencing work.

.2 Brush and Roller Application:
.1 Apply paint in a uniform layer using brush and/or roller of types suitable for application.
.2 Work paint into cracks, crevices and corners.
.3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
.4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces to be free of roller tracking and heavy stipple unless approved by Departmental Representative.
.5 Remove runs, sags and brush marks from finished work and repaint.

.3 Use dipping, sheepskins or daubers when no other method is practical in places of difficult access and when specifically authorized by Departmental Representative.

.4 Apply paint coats in a continuous manner and allow surfaces to dry and cure between coats for minimum time period as recommended by manufacturer. Minimum dry film thickness of coats not less than that recommended by manufacturer. Repaint thin spots or bare areas before next coat of paint is applied.

.5 Sand and dust between coats to remove visible defects.

3.6 APPLICATION (Cont'd)

.6 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as projecting ledges.

.7 Finish to doors include all edges including top and bottom edges. Surfaces concealed by door hardware be repainted unless otherwise pre-approved.

3.7 MECHANICAL / ELECTRICAL EQUIPMENT

.1 Unless otherwise noted, repainting to include exposed to view/previously painted exterior mechanical and electrical equipment and components (panels, conduits, piping, hangers, and ductwork).

.2 Touch up scratches and marks and repaint such mechanical and electrical equipment and components with colour and finish to match existing finish unless otherwise noted or scheduled.

.3 Do not paint over name plates or instruction labels.

.4 Standard of Acceptance: when viewed using natural prevailing sunlight at peak period of the 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 area.

3.8 FIELD QUALITY CONTROL

.1 Advise Departmental Representative and Paint Inspection Agency when each surface and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.

.2 Co-operate with Paint Inspection Agency and provide access to areas of work.

.3 Manufacturer's Field Services:

3.8 FIELD QUALITY CONTROL (Cont'd)

.3 (Cont'd)

.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.

3.9 CLEANING

.1 Proceed in accordance with Section 01 74 11.

.2 Remove paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.

.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 requirements of authorities having jurisdiction.

.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 (e.g. rags, drop cloths, and masking papers), paints, thinners, paint removers/strippers in accordance with the safety requirements of authorities having jurisdiction and as specified.

.6 Clean painting equipment in leak-proof containers that will permit particulate matter to settle out and be collected. Sediment remaining from cleaning operations to be recycled in manner acceptable to authorities having jurisdiction.

.7 Recycle paint and coatings in excess of repainting requirements as specified.

3.10 RESTORATION

.1 Clean and re-install hardware items removed before undertaken painting operations.

.2 Remove protective coverings and warning signs as soon as practical after operations cease.

3.10 RESTORATION (Cont'd)

.3 Remove paint splashings on affected exposed surfaces. Remove smears and spatter immediately as operations progress, using compatible solvent.

.4 Protect freshly completed surfaces from paint droppings and dust to approval of Departmental Representative. Avoid scuffing newly applied paint.

.5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Departmental Representative.

END OF SECTION

## PART 1 - GENERAL

### 1.1 RELATED SECTIONS

.1 Section 06 40 01 - Architectural Woodwork.

.2 Section 09 91 13 - Exterior Re-Painting.

### 1.2 REFERENCES

.1 Architectural Painting Specifications Manual, Master Painters Institute (MPI), 2010.

.2 Systems and Specifications Manual, SSPC Painting Manual, Volume Two, Society for Protective Coatings (SSPC).

.3 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings) of the Environmental Protection Agency (EPA).

.4 National Fire Code of Canada 2010 (NFC).

### 1.3 QUALITY ASSURANCE

.1 Contractor shall have a minimum of five years proven satisfactory experience. When requested, provide a list of last three comparable jobs including, job name and location, specifying authority, and project manager.

.2 Qualified journeymen who have a "Tradesman Qualification Certificate of Proficiency" shall be engaged in painting work. Apprentices may be employed provided they work under the direct supervision of a qualified journeyman in accordance with trade regulations.

.3 Conform to latest MPI requirements for interior painting work including preparation and priming.

.4 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) shall be in accordance with MPI Painting Specification Manual "Approved Product" listing and shall be from a single manufacturer for each system used.

1.3 QUALITY ASSURANCE (Cont'd)

.5 Other paint materials such as linseed oil, shellac, turpentine, etc. shall be the highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and shall be compatible with other coating materials as required.

.6 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Departmental Representative.

.7 Standard of Acceptance:
.1 Walls: No defects visible from a distance of 1000 mm at 90° to surface.
.2 Ceilings: No defects visible from floor at 45° to surface when viewed using final lighting source.
.3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

1.4 INSPECTION REQUIREMENTS

.1 Interior painting and decorating work shall be inspected by a Paint Inspection Agency (inspector) acceptable to the specifying authority and local Painting Contractor's Association. Painting contractor shall notify Paint Inspection Agency a minimum of one week prior to commencement of work and provide a copy of project painting specification, plans and elevation drawings (including pertinent details) as well as a Finish Schedule.

.2 Interior surfaces requiring painting shall be inspected by Paint Inspection Agency who shall notify Departmental Representative and General Contractor in writing of defects or problems, prior to commencing painting work, or after prime coat shows defects in substrate.

1.4 INSPECTION REQUIREMENTS (Cont'd)

.3 Where "special" painting, coating or decorating system applications (i.e. elastomeric coatings) or non-MPI listed products or systems are to be used, paint or coating manufacturer shall provide as part of this work, certification of surfaces and conditions for specific paint or coating system application as well as on site supervision, inspection and approval of their paint or coating system application as required at no additional cost to Departmental Representative.

1.5 SCHEDULING OF WORK

.1 Submit work schedule for various stages of painting to Departmental Representative for approval. Submit schedule minimum of 48 hours in advance of proposed operations.

.2 Obtain written authorization from Consultant for any changes in work schedule.

.3 Schedule painting operations to prevent disruption of occupants in and about the building.

1.6 SUBMITTALS

.1 Submit product data and manufacturer's installation/application instructions for each paint and coating product to be used in accordance with Section 01 33 00.

.2 Upon completion, submit records of products used. List products in relation to finish system and include the following:
.1 Product name, type and use.
.2 Manufacturer's product number.
.3 Colour numbers.
.4 MPI Environmentally Friendly classification system rating.
.5 Manufacturer's Material Safety Data Sheets (MSDS).

1.7 SAMPLES

.1 Submit full range colour sample chips in accordance with Section 01 33 00. Indicate where colour availability is restricted.

1.7 SAMPLES (Cont'd)

.2 Submit duplicate 200 x 300 mm sample panels of each paint with specified paint or coating in colours, gloss/sheen and textures required to MPI Painting Specification Manual standards submitted on the following substrate materials:
.1 3 mm plate steel for finishes over metal surfaces.
.2 13 mm birch plywood for finishes over wood surfaces.
.3 50 mm concrete block for finishes over concrete or concrete masonry surfaces.
.4 13 mm gypsum board for finishes over gypsum board and other smooth surfaces.

.3 When approved, sample panels shall become acceptable standard of quality for appropriate on-site surface with one of each sample retained on-site.

1.8 QUALITY CONTROL

.1 Provide mock-up in accordance with Section 01 45 00.

.2 When requested by Departmental Representative, prepare and paint designated surface, area, room or item (in each colour scheme) to requirements specified herein, with specified paint or coating showing selected colours, gloss/sheen, textures and workmanship to MPI Painting Specification Manual standards for review and approval. When approved, surface, area, room and/or items shall become acceptable standard of finish quality and workmanship for similar on-site work.

1.9 EXTRA MATERIALS

.1 Submit maintenance materials in accordance with Section 01 78 00.

.2 Submit one - four litre can of each type and colour of primer and finish coating. Identify colour and paint type in relation to established colour schedule and finish system.

.3 Deliver to Contractor and store where directed.

1.10 DELIVERY, HANDLING AND STORAGE

.1 Deliver, store and handle materials in accordance with Section 01 61 00.

.2 Labels shall clearly indicate:
.1 Manufacturer's name and address.
.2 Type of paint or coating.
.3 Compliance with applicable standard.
.4 Colour number in accordance with established colour schedule.

.3 Remove damaged, opened and rejected materials from site.

.4 Provide and maintain dry, temperature controlled, secure storage.

.5 Observe manufacturer's recommendations for storage and handling.

.6 Store materials and supplies away from heat generating devices.

.7 Store materials and equipment in a well ventilated area with temperature range 7°C to 30°C.

.8 Store temperature sensitive products above minimum temperature as recommended by manufacturer.

.9 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Consultant. After completion of operations, return areas to clean condition to approval of Departmental Representative.

.10 Remove paint materials from storage only in quantities required for same day use.

.11 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.

.12 Fire Safety Requirements:
.1 Provide one 9 kg Type ABC fire extinguisher adjacent to storage area.

1.10 DELIVERY, HANDLING AND STORAGE (Cont'd)

.12 (Cont'd)

.2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

.3 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

1.11 SITE REQUIREMENTS

.1 Heating, Ventilation and Lighting:

.1 Ventilate enclosed spaces in accordance with Section 01 51 00.

.2 Perform no painting work unless adequate and continuous ventilation and sufficient heating facilities are in place to maintain ambient air and substrate temperatures above 10°C for 24 hours before, during and after paint application until paint has cured sufficiently.

.3 Where required, provide continuous ventilation for seven days after completion of application of paint.

.4 Coordinate use of existing ventilation system with Departmental Representative and ensure its operation during and after application of paint as required.

.5 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.

.6 Perform no painting work unless a minimum lighting level of 323 Lux is provided on surfaces to be painted. Adequate lighting facilities shall be provided by Contractor.

.2 Temperature, Humidity and Substrate Moisture Content Levels:

.1 Unless specifically pre-approved by the specifying body, Paint Inspection Agency and the applied product manufacturer, perform no painting work when:

.1 Ambient air and substrate temperatures are below 10°C.

1.11 SITE REQUIREMENTS (Cont'd)

.2 (Cont'd)

.1 (Cont'd)

.2 Substrate temperature is over 32°C unless paint is specifically formulated for application at high temperatures.

.3 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's prescribed limits.

.4 The relative humidity is above 85% or when the dew point is less than 3°C variance between the air/surface temperature.

.5 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.

.2 Perform no painting work when the maximum moisture content of the substrate exceeds:

.1 12% for concrete and masonry (clay and concrete brick/block).

.2 15% for wood.

.3 12% for gypsum board.

.3 Conduct moisture tests using a properly calibrated electronic Moisture Meter, except test concrete floors for moisture using a simple "cover patch test".

.4 Test concrete, masonry and plaster surfaces for alkalinity as required.

.3 Surface and Environmental Conditions:

.1 Apply paint finish only in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.

.2 Apply paint only to adequately prepared surfaces and to surfaces within moisture limits noted herein.

.3 Apply paint only when previous coat of paint is dry or adequately cured.

.4 Additional Interior Application Requirements:

.1 Apply paint finishes only when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.

1.11 SITE REQUIREMENTS (Cont'd)

.4 (Cont'd)

.2 Apply paint in occupied facilities during silent hours only. Schedule operations to approval of Departmental Representative such that painted surfaces will have dried and cured sufficiently before occupants are affected.

1.12 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 20.

.2 Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc.,) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.

.3 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.

.4 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.

.5 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into ground the following procedures shall be strictly adhered to:

.1 Retain cleaning water for water-based materials to allow sediments to be filtered out.

.2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.

.3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.

.4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.

.5 Empty paint cans are to be dry prior to disposal or recycling (where available).

1.12 WASTE MANAGEMENT AND DISPOSAL (Cont'd)

.6 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.

.7 Set aside and protect surplus and uncontaminated finish materials: Deliver to or arrange collection by employees, individuals, or organizations for verifiable re-use or re-manufacturing.

.8 Close and seal tightly partly used sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.

## PART 2 - PRODUCTS

2.1 MATERIALS

.1 Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.

.2 Paint materials for paint systems shall be products of a single manufacturer.

.3 Only qualified products with E3 "Environmentally Friendly" rating are acceptable for use on this project.

.4 Both water-borne surface coatings and recycled water-borne surface coatings must be made by a process that does not release:
.1 Matter in undiluted production plant effluent generating a 'Biochemical Oxygen Demand' (BOD) in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.
.2 Total Suspended Solids (TSS) in undiluted production plant effluent in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.

.5 Water-borne paints and stains, recycled water-borne surface coatings and water borne varnishes must meet a minimum "Environmentally Friendly" E3 rating.

.6 Recycled water-borne surface coatings must contain 50% post-consumer material by volume.

2.1 MATERIALS (Cont'd)

.7 Recycled water-borne surface coatings must not contain:
.1 Lead in excess of 600.0 ppm weight/weight total solids.
.2 Mercury in excess of 50.0 ppm weight/weight total product.
.3 Cadmium in excess of 1.0 ppm weight/weight total product.
.4 Hexavelant chromium in excess of 3.0 ppm weight/weight total product.
.5 Organochlorines or polychlorinated biphenyls (PCBS) in excess of 1.0 ppm weight/weight total product.

.8 The following must be performed on each batch of consolidated post-consumer material before surface coating is reformulated and canned. These tests must be performed at a laboratory or facility which has been accredited by the Standards Council of Canada.
.1 Lead, cadmium and chromium are to be determined using ICP-AES (Inductively Coupled Plasma - Atomic Emission Spectroscopy) technique no. 6010 as defined in EPA SW-846.
.2 Mercury is to be determined by Cold Vapour Atomic Absorption Spectroscopy using Technique no. 7471 as defined in EPA SW-846.
.3 Organochlorines and PCBs are to be determined by Gas Chromatography using Technique no. 8081 as defined in EPA SW-846.

2.2 COLOURS

.1 Departmental Representative will provide Colour Schedule.

.2 Selection of colours will be from manufacturers full range of colours.

.3 Where specific products are available in a restricted range of colours, selection will be based on the limited range.

.4 Second coat in a three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 MIXING AND TINTING

.1 Perform colour tinting operations prior to delivery of paint to site. On-site tinting of painting materials is allowed only with Departmental Representative's written permission.

.2 Paste, powder or catalyzed paint mixes shall be mixed in strict accordance with manufacturer's written instructions.

.3 Where thinner is used, addition shall not exceed paint manufacturer's recommendations. Do not use kerosene or any such organic solvents to thin water-based paints.

.4 Thin paint for spraying according in strict accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Departmental Representative.

.5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 GLOSS/SHEEN RATINGS

.1 Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following values:

.2 Gloss level ratings of painted surfaces shall be as specified herein and as noted on Finish Schedule.

PART 3 - EXECUTION

3.3 PROTECTION

.1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore such surfaces as directed by Departmental Representative.

.2 Protect items that are permanently attached such as Fire Labels on doors and frames.

3.3 PROTECTION (Cont'd)

.2 (Cont'd)

.2 Protect items that are permanently attached such as Fire Labels on doors and frames.

.3 Protect factory finished products and equipment.

.4 Protect building occupants in and about the building.

.5 Removal of electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings shall be done prior to undertaking any painting operations by General Contractor. Items shall be securely stored and re-installed after painting is completed by General Contractor.

.6 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.

.7 As painting operations progress, place "WET PAINT" signs in occupied areas to approval of Departmental Representative.

3.6 MECHANICAL/ ELECTRICAL EQUIPMENT

.1 Unless otherwise specified, paint finished area exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as noted otherwise.

.2 Boiler room, mechanical and electrical rooms: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment.

.3 Other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.

.4 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.

3.6 MECHANICAL/ ELECTRICAL EQUIPMENT (Cont'd)

.5 Do not paint over nameplates.

.6 Keep sprinkler heads free of paint.

.7 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.

.8 Paint fire protection piping red.

.9 Paint disconnect switches for fire alarm system and exit light systems in red enamel.

.10 Paint natural gas piping yellow.

.11 Paint both sides and edges of backboards for telephone and electrical equipment before installation. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.

.12 Do not paint interior transformers and substation equipment.

3.7 FIELD QUALITY CONTROL

.1 Field inspection of painting operations to be carried out be independent inspection firm as designated by Departmental Representative.

.2 Advise Departmental Representative when surfaces and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.

.3 Co-operate with inspection firm and provide access to areas of work.

3.8 RESTORATION

.1 Clean and re-install all hardware items removed before undertaken painting operations.

.2 Remove protective coverings and warning signs as soon as practical after operations cease.

.3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.

3.8 RESTORATION (Cont'd)

.4 Protect freshly completed surfaces from paint droppings and dust to approval of Departmental Representative. Avoid scuffing newly applied paint.

.5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Departmental Representative.

END OF SECTION