

### **1.01 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.

### **1.02 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 at all times throughout the Work.
- .5 Closures: protect work temporarily until permanent enclosures are completed.
- .6 Green Gables Heritage Place is of national significance. Damage to the site and facilities is not permitted, and all damage shall be repaired and restored to original condition at the direction and sole approval of the Departmental Representative. Reparations, if required, shall be at the sole expense of the Contractor. Work of Contract is permitted.

### **1.03 EXISTING SERVICES**

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

- .2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 72 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions outside of Hours of Operation and after normal working hours of staff, or as approved by Departmental Representative.
- .3 Provide for personnel, pedestrian and vehicular traffic.
- .4 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

#### **1.04 SPECIAL REQUIREMENTS**

- .1 Green Gables Heritage Place Hours of Operation (Open to the Public):
  - .1 April 15<sup>th</sup> to 30<sup>th</sup>: open by special appointment only; consult with Departmental Representative to determine appointment dates and hours scheduled.
  - .2 May 1<sup>st</sup> to October 31<sup>st</sup>: open daily 9am to 5pm.
  - .3 November 1<sup>st</sup> to 30<sup>th</sup>: open by special appointment only; consult with Departmental Representative to determine appointment dates and hours scheduled.
  - .4 December 1<sup>st</sup> to April 14<sup>th</sup>: closed for the season.
- .2 During Hours of Operation (Open to the Public): Paint and carpet occupied areas from 6pm to 8am only unless otherwise approved by Departmental Representative. During seasonal closure and non-operating times, Work times at Contractor's discretion in conformance with Employment Standards Act and Regulations of PEI.
- .3 During Hours of Operation (Open to the Public): Carry out noise generating Work from 6pm to 8am only unless otherwise approved by Departmental Representative. During seasonal closure and non-operating times, Work times at Contractor's discretion in conformance with Employment Standards Act and Regulations of PEI.
- .4 Submit schedule in accordance with Section 01 32 16.07 - Construction Progress Schedule - Bar (GANTT) Chart.
- .5 Ensure Contractor's personnel employed on site become familiar with and obey regulations, including safety, fire, traffic and security regulations.

- .6 Keep within limits of work and avenues of ingress and egress.
- .7 Ingress and egress of Contractor vehicles at site is limited to existing roadways.
- .8 During Hours of Operation (Open to the Public): Deliver materials from 6pm to 8am only unless otherwise approved by Departmental Representative. During seasonal closure and non-operating times, Work times at Contractor's discretion in conformance with Employment Standards Act and Regulations of PEI.
- .9 Arrange for site visit with Departmental Representative during the tender period and prior to tender submission to examine existing site conditions as necessary.

#### **1.05 SECURITY**

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

#### **1.06 BUILDING SMOKING ENVIRONMENT**

- .1 Comply with smoking restrictions. Smoking and "vaping" (use of electronic cigarettes, vaporizers and e-liquids) are not permitted.

**END OF SECTION**

### **1.01 APPOINTMENT AND PAYMENT**

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

### **1.02 CONTRACTOR'S RESPONSIBILITIES**

- .1 Provide labour, equipment and facilities to:
  - .1 Provide access to Work for inspection and testing.
  - .2 Facilitate inspections and tests.
  - .3 Make good Work disturbed by inspection and test.
  - .4 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.
- .2 Notify Departmental Representative 72 hours minimum sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.
- .3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.
- .4 Pay costs for uncovering and making good Work that is covered before required inspection or testing is completed and approved by Departmental Representative.

**END OF SECTION**

### **1.01 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 four days in advance of meeting date to Departmental Representative.
- .4 Provide physical space and make arrangements for meetings.
- .5 Preside at meetings.
- .6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .7 Reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants and, affected parties not in attendance, and Departmental Representative whether in attendance or absent.
- .8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.
- .9 The Contractor shall appoint one person as the point of contact and all communication shall flow through that person only.

### **1.02 PRECONSTRUCTION MEETING**

- .1 Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Senior representatives of 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 7 days before meeting.
- .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.

- .5 Agenda to include:
  - .1 Appointment of official representative of participants in the Work.
  - .2 Schedule of Work: in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.
  - .3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
  - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
  - .5 Delivery schedule of specified equipment in accordance with Section 01 14 00.
  - .6 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
  - .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
  - .8 Departmental Representative provided products.
  - .9 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
  - .10 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.
  - .11 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
  - .12 Monthly progress claims, administrative procedures, photographs, hold backs.
  - .13 Appointment of inspection and testing agencies or firms.
  - .14 Insurances, transcript of policies.

### **1.03 PROGRESS MEETINGS**

- .1 During course of Work and 2 weeks prior to project completion, schedule progress meetings monthly.
- .2 Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance.
- .3 Notify parties minimum three days prior to meetings.

- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within three days after meeting.
- .5 Agenda to include the following:
  - .1 Review, approval of minutes of previous meeting.
  - .2 Review of Work progress since previous meeting.
  - .3 Field observations, problems, conflicts.
  - .4 Problems which impede construction schedule.
  - .5 Review of off-site fabrication delivery schedules.
  - .6 Corrective measures and procedures to regain projected schedule.
  - .7 Revision to construction schedule.
  - .8 Progress schedule, during succeeding work period.
  - .9 Review submittal schedules: expedite as required.
  - .10 Maintenance of quality standards.
  - .11 Review proposed changes for affect on construction schedule and on completion date.
  - .12 Other business.

**END OF SECTION**

## 1.01 DEFINITIONS

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

## **1.02 REQUIREMENTS**

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

## **1.03 ACTION AND INFORMATION SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental Representative within 15 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 7 working days of receipt of acceptance of Master Plan.

## **1.04 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 7 working days.
- .3 Revise impractical schedule and resubmit within 7 working days.
- .4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

## **1.05 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:

PSPC

Green Gables-Phase 4

Fire Protection and Emergency Power

Queens Co., PEI

Project No. R.081199.001

SECTION 01 32 16.07

CONSTRUCTION PROGRESS

SCHEDULE - BAR (GANTT) CHART

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- .1 Award.
- .2 Shop Drawings, Samples.
- .3 Permits.
- .4 Mobilization.
- .5 Structure Demolition and related site works.
- .6 Selective Demolition at Barn.
- .7 Siding and Roofing.
- .8 Interior Architecture (Walls, Floors and Ceiling).
- .9 Plumbing.
- .10 Lighting.
- .11 Electrical.
- .12 Piping.
- .13 Controls.
- .14 Heating, Ventilating, and Air Conditioning.
- .15 Millwork.
- .16 Testing and Commissioning.
- .17 Supplied equipment long delivery items.

#### **1.06 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.

#### **1.07 PROJECT MEETINGS**

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

**END OF SECTION**

### **1.01 ADMINISTRATIVE**

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

## **1.02 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 Prince Edward Island, 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 7 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.
- .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 triplicate, containing:
  - .1 Date.
  - .2 Project title and number.
  - .3 Contractor's name and address.
  - .4 Identification and quantity of each shop drawing, product data and sample.
  - .5 Other pertinent data.

- .8 Submissions include:
  - .1 Date and revision dates.
  - .2 Project title and number.
  - .3 Name and address of:
    - .1 Subcontractor.
    - .2 Supplier.
    - .3 Manufacturer.
  - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
  - .5 Details of appropriate portions of Work as applicable:
    - .1 Fabrication.
    - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
    - .3 Setting or erection details.
    - .4 Capacities.
    - .5 Performance characteristics.
    - .6 Standards.
    - .7 Operating weight.
    - .8 Wiring diagrams.
    - .9 Single line and schematic diagrams.
    - .10 Relationship to adjacent work.
- .9 After Departmental Representative's review, distribute copies.
- .10 Submit electronic copy in PDF format (one password protected and one editable version) of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
- .11 Submit electronic copy in PDF format (one password protected and one editable version) of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .12 Submit electronic copy in PDF format (one password protected and one editable version) of test reports for requirements requested in specification Sections and as requested by Departmental Representative.

- .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
- .2 Testing must have been within 3 years of date of contract award for project.
- .13 Submit electronic in PDF format (one password protected and one editable version) of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
  - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
  - .2 Certificates must be dated after award of project contract complete with project name.
- .14 Submit electronic in PDF format (one password protected and one editable version) of manufacturers instructions for requirements requested in specification Sections and as requested by Departmental Representative.
  - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .15 Submit electronic in PDF format (one password protected and one editable version) of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
- .16 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .17 Submit electronic in PDF format (one password protected and one editable version) of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
- .18 Delete information not applicable to project.
- .19 Supplement standard information to provide details applicable to project.

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

### **1.03 SAMPLES**

- .1 Submit for review samples in triplicate as requested in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples prepaid to Departmental Representative's business address, or site office as directed by Departmental Representative.
- .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.

#### **1.04 MOCK-UPS**

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

#### **1.05 PHOTOGRAPHIC DOCUMENTATION**

- .1 Submit electronic copy of colour digital photography in Tagged Image File Format 6.0 (TIFF 6.0), fine resolution with progress statement and as directed by Departmental Representative.
- .2 Project identification: name and number of project and date of exposure indicated.
- .3 Number of viewpoints: 4 locations.
  - .1 Viewpoints and their location as determined by Departmental Representative.
- .4 Frequency of photographic documentation: weekly or as otherwise directed by Departmental Representative.
  - .1 Upon completion of: demolition and selective demolition, excavation, foundation, framing and services before concealment, of Work, and as directed by Departmental Representative.

**END OF SECTION**

## **1.01 GENERAL PROTECTION**

- .1 Work shall comply with or exceed the requirements of the following:
  - .1 Canada National Parks Act (S.C. 2000, c. 32), including amendments up to tender closing date.
  - .2 National Parks Building Regulations (C.R.C., c. 1114).

## **1.02 PRESERVATION OF PROPERTY**

- .1 At direction of Departmental Representative, a start up meeting will be held on site involving the Contractor and primary sub-contractors. The meeting shall be to ensure primary construction personnel are aware of the environmental concerns, laws, rules and regulations pertaining to Green Gables Heritage Place.
- .2 All site regulations, relevant federal and provincial acts, regulations, guidelines and codes of good practice apply to all Work and activities associated with this project.
- .3 The Work shall be performed in a manner that will not have a significant environmental impact on Green Gables Heritage Place property and its natural resources, including but not limited to flora, fauna or natural objects, or pose a danger to health and safety.
- .4 Equipment and machinery shall be minimally invasive in size, vibration potential, and weight. When practicable for the task, use light duty construction equipment, such as mini-excavator, skid steers, portable hand-held equipment, single axle truck cranes ( $\leq 19,000$  GVW), and similar light weight equipment options, or as approved by Departmental Representative.
- .5 Do not use equipment or vehicles that impose loads in excess of the load capacity of site roads and parking areas. If load capacity of existing roads and parking lots is not available or is otherwise uncertain, assume that they have been designed as low-volume roads and parking lots and not for heavy use and heavy loads.

- .6 Areas adjacent to designated work areas may be sensitive ecosystems or historically significant that can be easily damaged and harmed; in order to limit risk of damaging adjacent Park property and sensitive ecosystems or historically designated elements, restrict work, workers and equipment, including staging and storage areas, to designated work areas.
  - .1 Do not permit equipment to stray from work locations, and only extend work to adjacent areas as minimally necessary to complete the Work, and only as authorized by Departmental Representative; submit workplans and work layout drawings to Departmental Representative for review and approval.

### **1.03 HOT WORK**

- .1 During and for 1-hour after any activity with potential to produce ignition sources or excess heat, ensure the attendance of trained fire-watch personnel to monitor, investigate and respond to conditions.
- .2 Submit hot works policy and procedure manual to Departmental Representative prior to commencing Work at site.
- .3 Take precautions to prevent fires. Provide and maintain temporary fire protection equipment of a type appropriate to the hazard anticipated in accordance with authorities having jurisdiction, governing Codes, Regulations, and Ordinances. Every worker who may be required to use fire extinguishing equipment shall be trained in its proper use.

**END OF SECTION**

### **1.01 REFERENCE STANDARDS**

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
- .2 Province of Prince Edward Island
  - .1 Occupational Health and Safety Act, R.S.P.E.I. - Updated 2015.
  - .2 Occupational Health and Safety Act, General Regulations, R.S.P.E.I. - Updated 2013.

### **1.02 ACTION AND INFORMATION SUBMITTALS**

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

- .9 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.
- .10 On-site Contingency and Emergency Response Plan: in consultation with Departmental Representative, address standard operating procedures to be implemented during emergency situations.

### **1.03 FILING OF NOTICE**

- .1 File Notice of Project with Provincial authorities prior to beginning of Work.
- .2 Contractor shall agree to install proper site separation and identification in order to maintain time and space at all times throughout life of project.

### **1.04 SAFETY ASSESSMENT**

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

### **1.05 MEETINGS**

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

### **1.06 REGULATORY REQUIREMENTS**

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

### **1.07 GENERAL REQUIREMENTS**

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

### **1.08 RESPONSIBILITY**

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

### **1.09 COMPLIANCE REQUIREMENTS**

- .1 Comply with the following:
  - .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
  - .2 Province of Prince Edward Island:
    - .1 Occupational Health and Safety Act, R.S.P.E.I. - Updated 2015.
    - .2 Occupational Health and Safety Act, General Regulations, R.S.P.E.I. - Updated 2013.

### **1.10 UNFORESEEN HAZARDS**

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

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

- .1 Employ and assign to Work competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
  - .1 Have site-related working experience specific to the Work of Contract.
  - .2 Have working knowledge of occupational safety and health regulations.
  - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.

- .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
- .5 Be on site during execution of Work and report directly to and be under direction of site supervisor.

#### **1.12 POSTING OF DOCUMENTS**

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

#### **1.13 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.

#### **1.14 BLASTING**

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

#### **1.15 POWDER ACTUATED DEVICES**

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

#### **1.16 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.

**END OF SECTION**

## **1 GENERAL**

### **1.01 RELATED REQUIREMENTS**

- .1 Special Procedures for National Historic Sites  
Section 01 35 13.13

### **1.02 REFERENCE STANDARDS**

- .1 Canadian Construction Documents Committee (CCDC)
  - .1 CCDC 2-2008 Stipulated Price Contract.
- .2 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].

### **1.03 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.

### **1.04 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements
- .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.

- .5 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .6 Include in Environmental Protection Plan:
  - .1 Name of person responsible for ensuring adherence to Environmental Protection Plan.
  - .2 Name and qualifications of person responsible for manifesting hazardous waste to be removed from site.
  - .3 Name and qualifications of person 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.
  - .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.

#### **1.05 FIRES**

- .1 Fires and burning of rubbish on site permitted only when approved by Departmental Representative.
- .2 Where fires or burning is permitted, prevent staining or smoke damage to structures, materials or vegetation which is to be preserved.
  - .1 Restore, clean and return to new condition stained or damaged work.
- .3 Provide supervision, attendance and fire protection measures as directed.

#### **1.06 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] [US EPA General Construction Permit].
- .2 Storm Water Pollution Prevention Plan (SWPPP) to be

substituted for erosion and sediment control plan.

- .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.

#### **1.07 SITE CLEARING AND PLANT PROTECTION**

- .1 Protect trees and plants on site and adjacent properties.
- .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 Minimize stripping of topsoil and vegetation.
- .5 Restrict tree removal to areas indicated or designated by Departmental Representative.

#### **1.08 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.
- .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.

#### **1.09 POLLUTION CONTROL**

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

#### **1.10 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.

#### **1.11 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.

## **2 PRODUCTS**

### **2.01 NOT USED**

- .1 Not Used.

## **3 EXECUTION**

### **3.01 CLEANING**

- .1 Progress Cleaning: Leave Work area clean at end of each day.
- .2 Do not Bury rubbish and waste materials on site.
- .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.
- .5 Waste Management: separate waste materials for reuse and recycling in accordance with local regulations.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION**

### **1.01 REFERENCES AND CODES**

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

### **1.02 HAZARDOUS MATERIAL DISCOVERY**

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

### **1.03 NATIONAL PARKS ACT**

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

**END OF SECTION**

### **1.01 DEFINITIONS**

- .1 Corrective Action: Steps that are taken to remove the causes of an existing non-conformity or undesirable situation. The corrective action process is designed to prevent the recurrence of non-conformities or undesirable situations. It tries to make sure that existing non-conformities and situations do not happen again. It tries to prevent recurrence by eliminating causes.
- .2 Hold Point: A mandatory verification point beyond which a Work Process cannot proceed without authorization by Departmental Representative. Hold Points may be nominated by Departmental Representative. The issuance of a Non-Conformance or Corrective Action report by Departmental Representative automatically creates a Hold Point for the Work Processes affected.
- .3 Non-Conformance: When one or more characteristics of an installation fail to meet specified requirements, it is referred to as Non-conformance. When an installation deviates from specified requirements, it fails to conform. Non-conformance must be identified and rectified.

### **1.02 INSPECTION**

- .1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections, or approvals by Departmental Representative instructions, or law of Place of Work. Identify and confirm Hold Points in consultation with Departmental Representative for each technical specification section. Prepare and submit for review and approval detailed list of Hold Points, organized by specification section number, to Departmental Representative 7 working days prior to commencement of Work on site.

- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections, or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

### **1.03 INDEPENDENT INSPECTION AGENCIES**

- .1 Independent Inspection/Testing Agencies will be selected by Departmental Representative for purpose of inspecting and/or testing portions of Work. 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 re-inspection.

### **1.04 ACCESS TO WORK**

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

### **1.05 PROCEDURES**

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

### **1.06 REJECTED WORK**

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

### **1.07 REPORTS**

- .1 Submit electronic copy in PDF format (one password protected and one editable version) of inspection and test reports to Departmental Representative.
- .2 Provide printed or electronic copies to subcontractor of work being inspected or tested, or manufacturer or fabricator of material being inspected or tested, as the case may be.

### **1.08 TESTS AND MIX DESIGNS**

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

### **1.09 MOCK-UPS**

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

### **1.11 EQUIPMENT AND SYSTEMS**

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

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**END OF SECTION**

### **1.01 REFERENCES**

- .1 ANSI/ASHRAE 52.2-2017: Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size.
- .2 ANSI/ASHRAE 62.1-2016: Ventilation for Acceptable Indoor Air Quality.
- .3 EPA: EPA Protocol for Environmental Requirements, Testing for Indoor Air Quality Baseline IAQ.
- .4 Sheet Metal and Air Conditioning Contractors National Association (SMACNA)
  - .1 SMACNA 008-2008 (Chapter 3), IAQ Guidelines for Occupied Buildings Under Construction, 2<sup>nd</sup> Edition.

### **1.02 SPECIAL PRACTICES**

- .1 Do not use permanent HVAC for demolition/construction site conditioning; provide means of temporary ventilation, with exhaust vented to the exterior, for work areas as required.
- .2 Clean HVAC ducts within each work area after completion of the work in that work area.
- .3 Fully seal all permanent HVAC air intake openings within demolition/construction areas immediately prior to entering work area for the purposes of demolition and construction.
- .4 Use MERV 13 filters for ventilation systems during demolition/construction, and fully seal/tape around filter edges to prevent passage of contaminants through filter bypass at edges. Change filters frequently to ensure optimum filtration performance.
- .5 Establish negative air pressure at work areas relative to adjacent occupied areas using portable fans and flex pipe as required; vent to exterior. Occupied areas to have positive air pressure relative to work areas. Adjust HVAC equipment as required.
- .6 Vacuum clean work areas daily using HEPA filtered vacuum systems.
- .7 Enclose and seal work areas while adhesives, paints and sealants are curing and off-gassing; provide adequate ventilation, vented to exterior.

- .8 Use low-VOC adhesives, paints and sealants when available and suitable to purpose and conditions: coordinate with trade contractors as required to ensure compliance.

### **1.03 CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT PLAN**

- .1 The intent of this plan is to prevent construction and future indoor air quality problems that may result from demolition/construction affecting the comfort and health of construction workers and building occupants.
- .2 The provision of the Construction Indoor Air Quality Management Plan or IAQ Management Plan is the responsibility of the Contractor.
- .3 Provide a fully developed IAQ Management Plan implemented through demolition/construction and pre-occupancy including the following activities:
  - .1 Meet or exceed the recommended Design Approaches in SMACNA 008 (Chapter 3) and other requirements as detailed in this specification during all construction activities. These design approaches shall be applicable for all buildings regardless of whether it is a new construction or renovation.
  - .2 Protect construction workers and building occupants from indoor air quality problems resulting from construction activities and building materials.
  - .3 Protect all stored and installed absorptive materials from moisture or dust, chemical and gas damage as specified in Section 01 61 00 - Common Product Requirements.
  - .4 Construction use of air handling units, heat recovery ventilators, fans or any associated equipment and systems for ventilation, heating, de-humidification, humidification, dust control or any other use is strictly prohibited.
  - .5 Replace all filtration equipment for air handling units, heat recovery ventilators and fans with new filter media at the end of construction.
- .4 Provide the following submittals to the requirements of Section 01 33 00 - Submittal Procedures:
  - .1 IAQ Management Plan:
    - .1 Provide a draft documented IAQ Management plan in writing for review by the Departmental Representative within 21 days of award of contract.

- .2 The IAQ Management Plan submission is to include:
  - .1 Details of each management plan strategy including:
    - .1 The Design Approaches in SMACNA 008 (Chapter 3) including:
      - .1 HVAC Protection.
      - .2 Identification of sources of odours, dust, other contaminants.
      - .3 Identify construction activities likely to produce detectable odours and dust.
      - .4 Classify potential IAQ problems by relative risk.
      - .5 Identify available control options.
      - .6 Select control measures.
      - .7 Determine contingency measures for occupants that may have allergies or other sensitivity-enhancing pre-conditions.
      - .8 Source Control procedures.
      - .9 Pathway Interruption.
      - .10 Housekeeping.
      - .11 Scheduling.
      - .12 Reporting.
    - .2 Samples of reporting documents based SMACNA 008 (Chapter 3).
    - .3 Methods for protecting all stored and installed absorptive materials from moisture or dust, chemical and gas damage.
    - .4 Declaration that air handling units, heat recovery ventilators, fans or any associated equipment and systems will not be used during construction for ventilation, heating, de-humidification, humidification and dust control.
    - .5 Schedule for filter replacement as a component of the building start-up and Commissioning.

- .3 Format: submit 5 copies of reports, each in "D" ring binders, complete with index tabs for verification and review by Departmental Representative.
- .4 Make changes or additions to the draft IAQ Management Plan within the specified plan requirements to the satisfaction of the Departmental Representative and reissue as final draft.
- .5 Distribute the final IAQ Management Plan to all trades working on the site.
- .2 Construction Reporting
  - .1 During the course of construction provide the following reporting to the Departmental Representative for review:
    - .1 Photographs indicating the general conformance to the IAQ Management Plan.
    - .2 Completed Planning Checklist for all trades on the project indicating scheduling and the requirements of IAQ procedures with respect to scheduled construction activities for that week.
    - .3 Inspection sheets completed by the Site Superintendent reviewing that all trades completed the scheduled requirements of the IAQ procedures for that week including any deficiencies and corrective actions taken.
  - .2 Provide all reporting on a weekly basis unless otherwise approved by the Departmental Representative during periods of low IAQ risk construction or low construction activity.
- .5 Provide the following close out submittals to the requirements of Section 01 78 00 - Closeout Submittals:
  - .1 Provide all IAQ Management Plan submittals including the following:
    - .1 The final version of the Construction IAQ Management Plan.
    - .2 Digital copies of all weekly photographs in a CD ROM Format.
    - .3 All weekly planning checklists.
    - .4 All weekly inspection sheets.

- .5 Format: submit 5 copies of closeout report, each in "D" ring binders, complete with index tabs for verification and review by Departmental Representative.
- .6 Provide the following activities specified to meet or exceed the recommended Design Approaches in SMACNA 008 (Chapter 3) during all construction activities. These design approaches shall be applicable for all buildings regardless of whether it is a new construction or renovation:
  - .1 HVAC Protection:
    - .1 Use of air handling units, heat recovery ventilators, fans or any associated equipment and systems for ventilation, heating, de-humidification, humidification, dust control or any other use during Construction is strictly prohibited.
    - .2 Seal off all supply, return and exhaust air system openings to prevent the accumulation of dust and debris in the systems at all times unless work is being completed on the immediate area of the system using plastic seals to the approval of the Departmental Representative. This is to include overnight and longer work stoppages. All diffusers, grilles, and displacement ventilators are also to be sealed in plastic.
    - .3 Protect all stored and installed absorptive materials from moisture and dust, chemical and gas damage as specified in Section 01 61 00 - Common Product Requirements.
    - .4 Keep all operable doors on all air handling units closed at all times unless work is being completed on the immediate area of the system.
    - .5 Do not store construction or waste materials in Fan and Mechanical Rooms.
    - .6 Keep all construction areas clean and neat as specified elsewhere in this specification.
    - .7 Replace filtration equipment for air handling units, heat recovery ventilators and fans with new filter media at the end of construction.
    - .8 Where ducts become contaminated due to inadequate protection these ducts shall be cleaned professionally.

- .2 Source Control:
  - .1 Use of low VOC products as specified elsewhere are to be utilized at all times.
  - .2 Restrict traffic volume and idling of motor vehicles where emissions could be drawn into the building.
  - .3 Direct fired construction heaters are not acceptable. Vent all construction heater products of combustion to the outdoors.
  - .4 Cycle heating equipment off when not being used or needed.
  - .5 Exhaust all pollution sources to the outside with portable fan systems ensuring exhaust does not re-circulate back into the building.
  - .6 Keep containers of wet products closed as much as possible. Cover and seal waste materials, which can release odour or dust.
- .3 Pathway Interruption:
  - .1 Prevent dust from migrating to other areas with the use of dust curtains or temporary enclosures where applicable.
  - .2 Relocate pollutant sources as far away as possible from construction ventilation equipment, stored materials and areas occupied by workers when feasible. Any construction supply and exhaust systems that ventilate both areas where pollutant sources are being used and areas where they are not been used should be shut down or isolated during such activity with supplemental construction ventilation provided as required.
  - .3 Isolate during construction, areas of work to prevent contamination of clean or occupied areas. Utilize pressure differentials generated by mechanical means to prevent contaminated air from entering clean areas.
  - .4 Ventilate contaminated air from construction areas directly to the outside during installation of VOC emitting materials.
- .4 Housekeeping:
  - .1 Cleaning activities are specified in Section 01 74 11, however provide special emphasis on HVAC equipment and building spaces to remove contaminants from the building prior to operation of any permanent ventilation equipment.

- .2 Keep all coils, filters, fans and ductwork clean during installation as specified and clean all prior to performing the Testing, Adjusting and Balancing of the systems.
- .3 During construction suppress dust with wetting agents or sweeping compounds. Use efficient and effective dust collecting methods such as a damp cloth, wet mop, and vacuums with particulate filters, or wet scrubbers.
- .4 Remove accumulations of water inside the building during construction. Protect all porous materials such as insulation and ceiling tile from exposure to moisture.
- .5 Scheduling:
  - .1 Schedule work to ensure dust emitting work does not coincide with installation of absorbent materials (ceiling tiles, gypsum wall board joint compound wet application, fabric furnishings, carpet and insulation, for example) that may act as 'sinks' for dust.
  - .2 Do not schedule any construction activities that would require the use of VOC or dust emitting activities during occupancy without the approval of the Departmental Representative.
  - .3 Schedule all use of VOC emitting and high odorous materials before installing absorbent materials (ceiling tiles, gypsum wall board, fabric furnishings, carpet and insulation, for example) that may act as 'sinks' for VOCs, odours and other contaminants.

**END OF SECTION**

### 1.01 REFERENCES

- .1 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB 1.189-2000, Exterior Alkyd Primer for Wood.
  - .2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
- .2 Canadian Standards Association (CSA International)
  - .1 CSA-A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2 CSA O121-17, Douglas Fir Plywood.
  - .3 CAN/CSA-S269.2-16, Access Scaffolding for Construction Purposes.
  - .4 CAN/CSA-Z321-96(R2006), Signs and Symbols for the Occupational Environment.
- .3 Public Works Government Services Canada (PSPC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions 'C', In Effect as of: 2014-10-08.
- .4 U.S. Environmental Protection Agency (EPA) / Office of Water
  - .1 EPA 832/R-92-005 (September 1992), Storm Water Management for Construction Activities.

### 1.02 ACTION AND INFORMATION SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for products and accessories specified, and include product characteristics, performance criteria, layout of temporary construction facilities, and finishes.
- .3 Provide graphic design of each type of intended site sign for approval by Departmental Representative.

### **1.03 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 graveled 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.

### **1.04 SCAFFOLDING**

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

### **1.05 HOISTING**

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

### **1.06 SITE STORAGE/LOADING**

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

### **1.07 CONSTRUCTION PARKING**

- .1 Parking is limited during seasonal operations; make arrangements with Departmental Representative for suitable staging areas and parking.

- .2 Provide and maintain adequate access to project site.

#### **1.08 SECURITY**

- .1 To the extent that existing security is compromised by the Work, make suitable arrangements with Departmental Representative to establish and maintain security at levels comparable to that in place before commencement of the Work.

#### **1.09 CONTRACTOR'S SITE OFFICE**

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

#### **1.10 EQUIPMENT, TOOL AND MATERIALS STORAGE**

- .1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.
- .3 Locate site storage trailers where directed by Departmental Representative. Place in location of least interference with existing Facility operations.
- .4 Material storage space on site is limited. Coordinate delivery to minimize storage period on site before being needed for incorporation into work.

#### **1.11 SANITARY FACILITIES**

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

### **1.12 CONSTRUCTION SIGNAGE**

- .1 Upon request by Departmental Representative, erect a self supporting project sign in location indicated.
- .2 Departmental Representative will provide a vinyl sign facing for installation by Contractor on sign framework. Sign frame to be plywood face of approximately 1200 x 2400 mm in size complete with required wood framing at 400 mm on center and support posts.
- .3 Install sign plumb and level in neat wood framework and securely anchor in ground by posts to withstand wind pressure of 160 km/h.
- .4 Contractor or subcontractor advertisement signboards are not permitted on site.
- .5 Safety and Instruction Signs and Notices:
  - .1 Signs and notices for safety and instruction shall be in both official languages or commonly understood graphic symbols conforming to CAN3-Z321-96(R2006).
- .6 Maintenance and Disposal of Site Signs:
  - .1 Maintain approved signs and notices in good condition for duration of project and dispose of off site on completion of project or earlier if directed by Departmental Representative.

### **1.13 PROTECTION AND MAINTENANCE OF TRAFFIC**

- .1 Provide access 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.
- .14 Remove, upon completion of work, haul roads designated by Departmental Representative.

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

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

**END OF SECTION**

### **1.01 INSTALLATION AND REMOVAL**

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

### **1.02 HOARDING**

- .1 Erect temporary site enclosures using 38 x 89 mm construction grade lumber framing at 600 mm centres and 1200 x 2400 x 13 mm exterior grade fir plywood in accordance with the requirements of Section 06 10 00 - Rough Carpentry.
- .2 Apply plywood panels vertically flush and butt jointed. Prime and finish paint as directed by Departmental Representative.
- .3 Provide one lockable truck entrance gate and at least one pedestrian door as directed and conforming to applicable traffic restrictions on adjacent streets. Equip gates with locks and keys.
- .4 Erect and maintain pedestrian walkways including roof and side covers complete with signs and electrical lighting as required by law.
- .5 Paint public side of site enclosure in selected colours with one coat exterior alkyd primer for wood and one coat alkyd exterior gloss enamel in accordance with requirements of Section 09 91 00 - Painting. Maintain public side of enclosure in clean condition.
- .6 Provide barriers around trees and plants designated to remain as required. Protect from damage by equipment and construction procedures.

### **1.03 GUARD RAILS AND BARRICADES**

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

#### **1.04 ACCESS TO SITE**

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

#### **1.05 PUBLIC TRAFFIC FLOW**

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

#### **1.06 FIRE ROUTES**

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

#### **1.07 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.

#### **1.08 WASTE MANAGEMENT AND DISPOSAL**

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

**END OF SECTION**

### **1.01 REFERENCES**

- .1 Within text of each specifications section, reference may be made to reference standards. List of standards reference writing organizations is contained in National Building Code of Canada (Code) and amendments up to date of Tender submission, including codes, standards, other documents and authorities as referenced by the Code.
- .2 Conform to these reference standards, in whole or in part, as specifically requested in specifications.
- .3 If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .4 Cost for such testing will be born by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

### **1.02 QUALITY**

- .1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.
- .3 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

- .4 Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
- .5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

### **1.03 AVAILABILITY**

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

### **1.04 STORAGE, HANDLING AND PROTECTION**

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.

- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.
- .9 Touch-up damaged factory finished surfaces to match adjacent undamaged finish. Use touch-up materials to match original. Do not paint over name plates.

#### **1.05 TRANSPORTATION**

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

#### **1.06 MANUFACTURER'S INSTRUCTIONS**

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

### **1.07 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.

### **1.08 COORDINATION**

- .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.

### **1.09 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 after interference has been resolved at instruction of Departmental Representative.

### **1.10 REMEDIAL WORK**

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

### **1.11 LOCATION OF FIXTURES**

- .1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.
- .2 Inform Departmental Representative of conflicting installation. Install after conflict resolved as approved by Departmental Representative.

### **1.12 FASTENINGS**

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

### **1.13 FASTENINGS - EQUIPMENT**

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

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

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

#### **1.15 EXISTING UTILITIES**

- .1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, site staff, and pedestrian and vehicular traffic.
- .2 Comply with requirements of Section 01 14 00 - Work Restrictions, and Section 01 51 00 - Temporary Utilities.
- .3 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

**END OF SECTION**

### **1.01 ACTION AND INFORMATION SUBMITTALS**

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

### **1.02 MATERIALS**

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

### **1.03 PREPARATION**

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.
- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.

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

#### **1.04 EXECUTION**

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

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**1.05 WASTE MANAGEMENT AND DISPOSAL**

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

**END OF SECTION**

### **1.01 PROJECT CLEANLINESS**

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

## **1.02 FINAL CLEANING**

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste products and debris.
- .5 Remove waste materials from site at regularly scheduled times 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, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, 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, floors and other exposed surfaces.
- .9 Clean lighting reflectors, lenses, and other lighting surfaces.
- .10 Vacuum clean and dust building interiors, behind grilles, louvres and screens.
- .11 Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.
- .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 sanitary condition; clean or replace filters of mechanical equipment.
- .18 Clean roofs, downspouts, and drainage systems.
- .19 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.
- .20 Remove snow and ice from access to building.

### **1.03 WASTE MANAGEMENT AND DISPOSAL**

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

**END OF SECTION**

### **1.01 WASTE MANAGEMENT REQUIREMENTS**

- .1 Prior to start of Work, conduct meeting with Departmental Representative to review and discuss Waste Management Plan.
- .2 Waste Management Requirements: Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 75% of construction wastes were recycled or salvaged.
- .3 The Contractor shall be responsible for the Material Recovery Plan, Waste Reduction Plan and Construction Management Plan, as required by the municipality. This information shall be submitted to the appropriate department of the municipality for approval prior to commencement of Work by the Contractor.
- .4 Minimize amount of non-hazardous solid waste generated by project and accomplish maximum source reduction, reuse and recycling of solid waste produced by CRD activities.
- .5 Protect environment and prevent environmental pollution damage.

### **1.02 REFERENCE STANDARDS**

- .1 Canadian Construction Association (CCA)
  - .1 CCA 81-2001: A Best Practices Guide to Solid Waste Reduction.
- .2 Public Works and Government Services Canada (PSPC)
  - .1 2002 National Construction, Renovation and Demolition Non-Hazardous Solid Waste Management Protocol.
  - .2 CRD Waste Management Market Research Report (available from PSPC's Environmental Services).
  - .3 Sustainable Development Strategy 2007-2009: Target 2.1 Environmentally Sustainable Use of Natural Resources.
    - .1 Real Property projects over \$1 million and in communities where industrial recycling is supported, implementation of CRD waste management practices will be completed, with waste materials being reused or recycled.
    - .2 Contractually ensure resources used in construction or maintenance are consumed and recovered in a sustainable manner.

- .3 Section 01 35 13.13 - Special Procedures for National Historic Sites.

### **1.03 DEFINITIONS**

- .1 Class III: non-hazardous waste - construction renovation and demolition waste.
- .2 Demolition Waste Audit (DWA): relates to actual waste generated from project.
- .3 Inert Fill: inert waste - exclusively asphalt and concrete.
- .4 Materials Source Separation Program (MSSP): consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.
- .5 Recyclable: ability of product or material to be recovered at end of its life cycle and re manufactured into new product for reuse.
- .6 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
- .7 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- .8 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:
  - .1 Salvaging reusable materials from re modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.
  - .2 Returning reusable items including pallets or unused products to vendors.
- .9 Salvage: removal of structural and non structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.
- .10 Separate Condition: refers to waste sorted into individual types.

- .11 Source Separation: acts of keeping different types of waste materials separate beginning from first time they became waste.
- .12 Waste Audit (WA): detailed inventory of materials in building. Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project. Indicates quantities of reuse, recycling and landfill. Refer to Schedule A.
- .13 Waste Management Coordinator (WMC): contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.
- .14 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials. Refer to Schedule B. WRW is based on information acquired from WA (Schedule A).

#### **1.04 DOCUMENTS**

- .1 Post and maintain in visible and accessible area at job site, one copy of following documents:
  - .1 Waste Audit.
  - .2 Waste Reduction Workplan.
  - .3 Material Source Separation Plan.
  - .4 Schedules A, B, and C completed for project.

#### **1.05 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prepare and submit following prior to project start-up:
  - .1 Submit 2 copies of completed Waste Audit (WA): Schedule A.
  - .2 Submit 2 copies of completed Waste Reduction Workplan (WRW): Schedule B.
  - .3 Submit 2 copies of completed Demolition Waste Audit (DWA): Schedule C.
  - .4 Submit 2 copies of Materials Source Separation Program (MSSP) description.

- .3 Prepare and submit on monthly basis throughout project or at intervals agreed to by Departmental Representative the following:
  - .1 Receipts, scale tickets, waybills, and/or waste disposal receipts that show quantities and types of materials reused, recycled, or disposed of.
  - .2 Written monthly summary report detailing cumulative amounts of waste materials reused, recycled and landfilled, and brief status of ongoing waste management activities.
- .4 Submit prior to final payment the following:
  - .1 Waste Diversion Report, indicating final quantities in tones by material types salvaged for reuse, recycling or disposal in landfill and recycling centres, re-use depots, landfills and other waste processors that received waste materials (See Schedule C).
  - .2 Provide receipts, scale tickets, waybills, waste disposal receipts that confirm quantities and types of materials reused, recycled or disposed of and destination.

#### **1.06 WASTE AUDIT (WA)**

- .1 Conduct WA prior to project start up.
- .2 Prepare WA: Schedule A.
- .3 Record, on WA - Schedule A, extent to which materials or products used consist of recycled or reused materials or products.

#### **1.07 WASTE REDUCTION WORKPLAN (WRW)**

- .1 Prepare WRW prior to project start up.
- .2 WRW should include:
  - .1 Destination of materials listed.
  - .2 Deconstruction/disassembly techniques and sequencing.
  - .3 Schedule for deconstruction/disassembly.
  - .4 Location.
  - .5 Security.
  - .6 Protection.
  - .7 Clear labelling of storage areas.
  - .8 Details on materials handling and removal procedures.

- .9 Quantities for materials to be salvaged for reuse or recycled and materials sent to landfill.
- .3 Describe management of waste.
- .4 Identify opportunities for reduction, reuse, and recycling of materials. Based on information acquired from WA.
- .5 Post WRW or summary where workers at site are able to review content.
- .6 Set realistic goals for waste reduction, recognize existing barriers and develop strategies to overcome these barriers.
- .7 Monitor and report on waste reduction by documenting total volume and cost of actual waste removed from project.

#### **1.08 DEMOLITION WASTE AUDIT (DWA)**

- .1 Prepare DWA prior to project start up.
- .2 Complete DWA: Schedule C.
- .3 Provide inventory of quantities of materials to be salvaged for reuse, recycling, or disposal.

#### **1.09 MATERIALS SOURCE SEPARATION PROGRAM (MSSP)**

- .1 Prepare MSSP and have ready for use prior to project start up.
- .2 Implement MSSP for waste generated on project in compliance with approved methods and as reviewed by Departmental Representative.
- .3 Provide on site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.
- .4 Provide containers to deposit reusable and recyclable materials.
- .5 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.
- .6 Locate separated materials in areas which minimize material damage.

- .7 Collect, handle, store on site, and transport off site, salvaged materials in separate condition.
- .8 Collect, handle, store on site, and transport off site, salvaged materials in combined condition.

#### **1.10 USE OF SITE AND FACILITIES**

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

#### **1.11 WASTE PROCESSING SITES**

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

#### **1.12 QUALITY ASSURANCE**

- .1 After award of Contract, a mandatory site examination will be held for this Project for Contractor and sub-contractors responsible for construction, renovation demolition/deconstruction waste management.
  - .1 Date, time and location will be arranged by Departmental Representative.
- .2 Waste Management Meeting: Waste Management Coordinator is to provide an update on status of waste diversion and management activities at each meeting. Written monthly Waste Diversion Report summary to be provided by Waste Management Coordinator (refer to the Waste Diversion Report form in Schedule C.

#### **1.13 STORAGE, HANDLING AND PROTECTION**

- .1 Store, materials to be reused, recycled and salvaged in locations approved by Departmental Representative.
- .2 Unless specified otherwise, materials for removal become Contractor's property.

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

#### **1.14 DISPOSAL OF WASTES**

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

- .4 Tonnage reused or recycled.
- .5 Reused or recycled waste destination.

- .4 Remove materials from site as Work progresses.
- .5 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in the waste audit.

#### **1.15 SCHEDULING**

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

#### **1.16 APPLICATION**

- .1 Do Work in compliance with WRW.
- .2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

#### **1.17 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
  - .2 Source separate materials to be reused/recycled into specified sort areas.

#### **1.18 DIVERSION OF MATERIALS**

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

- .2 On-site sale of salvaged, recovered, reusable, recyclable materials is not permitted unless approved in writing by Departmental Representative.

#### **1.19 WASTE DIVERSION REPORT**

- .1 At completion of Project, prepare written Waste Diversion Report indicating quantities of materials reused, recycled or disposed of as well as the following:
  - .1 Identify final diversion results and measure success against goals from Waste Reduction Workplan.
  - .2 Compare final quantities/percentages diverted with initial projections in Waste Audit and Waste Reduction Workplan and explain variances.
    - .1 Supporting documentation.
    - .2 Waybills and tracking forms.
    - .3 Description of issues, resolutions and lessons learned.

#### **1.20 SCHEDULES**

- .1 Following Schedules are attached to this Specification for information and convenience only:
  - .1 Waste Audit - Schedule A.
  - .2 Waste Reduction Workplan Form - Schedule B.
  - .3 Demolition Waste Audit - Schedule C.

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### Schedule A Waste Audit (WA)

Material Category	Material Quantity Unit	Estimated Waste %	Total Quantity of Waste (unit)	Generation Point	% Recycled	% Reused
Wood and Plastics Material Description						
Off-cuts						
Warped Pallet Forms						
Plastic Packaging						
Cardboard Packaging						
Other						
Doors and Windows Material Description						
Painted Frames						
Glass						
Wood						
Metal						
Other						

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### Schedule B Waste Reduction Workplan (WRW)

Material Category	Person(s) Responsible	Total Quantity of Waste (unit)	Reused Amount (units) Projected	Actual	Recycled Amount (unit) Projected	Actual	Material(s) Destination
Wood and Plastics Material Description							
Chutes							
Warped Pallet Forms							
Plastic Packaging							
Cardboard Packaging							
Other							
Doors and Windows Material Description							
Painted Frames							
Glass							
Wood							
Metal							
Other							

**Schedule C Demolition Waste Audit (DWA)**

<b>Material Description</b>	<b>Quantity</b>	<b>Unit</b>	<b>Total</b>	<b>Volume (cum)</b>	<b>Weight (cum)</b>	<b>Remarks and Assumptions</b>
Wood						
Wood Stud						
Plywood						
WD Baseboard						
WD Door Trim						
Cabinet						
Doors and Windows						
Panel Regular						
Slab Regular						
Wood Laminate						
Bi-fold - Closet						
Glazing						

**END OF SECTION**

### **1.01 ADMINISTRATIVE REQUIREMENTS**

- .1 Acceptance of Work Procedures:
  - .1 Contractor's Inspection: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
    - .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
    - .2 Request Departmental Representative inspection.
  - .2 Departmental Representative Inspection:
    - .1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.
    - .2 Contractor to correct Work as directed.
  - .3 Completion Tasks: submit written certificates in English that tasks have been performed as follows:
    - .1 Work: completed and inspected for compliance with Contract Documents.
    - .2 Defects: corrected and deficiencies completed.
    - .3 Equipment and systems: tested, adjusted and balanced and fully operational.
    - .4 Certificates required by authorities having jurisdiction: submitted.
    - .5 Operation of systems: demonstrated to Departmental Representative's personnel.
    - .6 Work: complete and ready for final inspection.
  - .4 Final Inspection:
    - .1 When completion tasks are done, request final inspection of Work by Departmental Representative, and Contractor.
    - .2 When Work incomplete according to Departmental Representative, complete outstanding items and request re-inspection.

### **1.02 FINAL CLEANING**

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

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CLOSEOUT PROCEDURES

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**END OF SECTION**

## **1.01 ADMINISTRATIVE REQUIREMENTS**

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

## **1.02 ACTION AND INFORMATION SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prepare and submit Operations and Maintenance Manual, which shall include manufacturer's brochures and technical datasheets, MSDS, as-built drawings, maintenance and operating instructions, etc., as specified in this Section
- .3 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, four final copies of operating and maintenance manuals in English.
- .4 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.
- .5 Provide evidence, if requested, for type, source and quality of products supplied.

### **1.03 FORMAT**

- .1 Organize data as instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf  
219 x 279 mm with spine and face pockets.
- .3 When multiple binders are used correlate data into related  
consistent groupings. 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.
  - .1 Bind in with text; fold larger drawings to size of  
text pages.
- .9 Provide 1:1 scaled CAD files in dwg format on CD or DVD,  
and flash drive.

### **1.04 CONTENTS - PROJECT RECORD DOCUMENTS**

- .1 Table of Contents for Each Volume: provide title of  
project;
  - .1 Date of submission; names.
  - .2 Addresses, and telephone numbers of Departmental  
Representative and Contractor with name of responsible  
parties.
  - .3 Schedule of products and systems, indexed to content  
of volume.
- .2 For each product or system:
  - .1 List names, addresses and telephone numbers of  
subcontractors and suppliers, including local source  
of supplies and replacement parts.

- .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data.
  - .1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.
- .6 Training: refer to Section 01 79 00 - Demonstration and Training.

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

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

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

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

### **1.07 EQUIPMENT AND SYSTEMS**

- .1 For each item of equipment and each system include description of unit or system, and component parts.
  - .1 Give function, normal operation characteristics and limiting conditions.
  - .2 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.
  - .1 Include regulation, control, stopping, shut-down, and emergency instructions.
  - .2 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.
- .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 co-ordination 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 - Quality Control.
- .15 Additional requirements: as specified in individual specification sections.

#### **1.08 MATERIALS AND FINISHES**

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

#### **1.09 MAINTENANCE MATERIALS**

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

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

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

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

### **1.11 WARRANTIES AND BONDS**

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

- .9 Include information contained in warranty management plan as follows:
  - .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.
  - .2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include roofs, HVAC balancing, pumps, motors, transformers, and systems such as fire protection, alarm systems, etc..
  - .3 Provide list for each warranted equipment, item, feature of construction or system indicating:
    - .1 Name of item.
    - .2 Model and serial numbers.
    - .3 Location where installed.
    - .4 Name and phone numbers of manufacturers or suppliers.
    - .5 Names, addresses and telephone numbers of sources of spare parts.
    - .6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
    - .7 Cross-reference to warranty certificates as applicable.
    - .8 Starting point and duration of warranty period.
    - .9 Summary of maintenance procedures required to continue warranty in force.
    - .10 Cross-Reference to specific pertinent Operation and Maintenance manuals.
    - .11 Organization, names and phone numbers of persons to call for warranty service.
    - .12 Typical response time and repair time expected for various warranted equipment.
  - .4 Contractor's plans for attendance at 4 and 9 month post-construction warranty inspections.
  - .5 Procedure and status of tagging of equipment covered by extended warranties.
  - .6 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

- .10 Respond in timely manner to oral or written notification of required construction warranty repair work.
- .11 Written verification to follow oral instructions.
  - .1 Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

#### **1.12 WARRANTY TAGS**

- .1 Tag, at time of installation, each warranted item. Provide durable, oil and water resistant tag approved by Departmental Representative.
- .2 Attach tags with copper wire and spray with waterproof silicone coating.
- .3 Leave date of acceptance until project is accepted for occupancy.
- .4 Indicate following information on tag:
  - .1 Type of product/material.
  - .2 Model number.
  - .3 Serial number.
  - .4 Contract number.
  - .5 Warranty period.
  - .6 Inspector's signature.
  - .7 Construction Contractor.

**END OF SECTION**

### **1.01 ADMINISTRATIVE REQUIREMENTS**

- .1 Demonstrate at agreed times operation and maintenance of equipment and systems to personnel identified by Departmental Representative two weeks prior to date of interim completion.
- .2 Departmental Representative: provide list of personnel to receive instructions, and co-ordinate their attendance at agreed-upon times.
- .3 Preparation:
  - .1 Verify conditions for demonstration and instructions comply with requirements.
  - .2 Verify designated personnel are present.
  - .3 Ensure equipment has been inspected and put into operation in accordance with Section 01 77 00 - Closeout Procedures.
  - .4 Ensure testing, adjusting, and balancing has been performed in accordance with Section 01 77 00 - Closeout Procedures and equipment and systems are fully operational.
- .4 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 equipment location.
  - .2 Instruct personnel in phases of operation and maintenance using operation and maintenance manuals as basis of instruction.
  - .3 Review contents of manual in detail to explain aspects of operation and maintenance.
  - .4 Prepare and insert additional data in operations and maintenance manuals when needed during instructions.

- .5 Time Allocated for Instructions: ensure amount of time required for instruction of each item of equipment or system as follows:
  - .1 Pumps: 1 hour instruction.
  - .2 Tanks: 1 hour instruction.
  - .3 Plumbing: 2 hours instruction.
  - .4 Chemical: 1 hour instruction plus monthly visits.
  - .5 Fire Protection: 1 hour instruction.
  - .6 Glycol: ½-hour instruction.
  - .7 Air Handling: 1 hour instruction.
  - .8 Controls: 40 hours (overall) instruction and support as required during the first year following certificate of Substantial Performance.

#### **1.02 ACTION AND INFORMATION SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit schedule of time and date for demonstration of each item of equipment and each system two weeks prior to agreed 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 Give time and date of each demonstration, with list of persons present.
- .5 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.

#### **1.03 QUALITY ASSURANCE**

- .1 When specified in individual Sections requiring manufacturer to provide authorized representative to demonstrate operation of equipment and systems:
  - .1 Instruct Departmental Representative's personnel.
  - .2 Provide written report that demonstration and instructions have been completed.

**END OF SECTION**

### **1.01 RELATED SECTIONS**

- .1 Closeout Submittals: Section 01 78 00
- .2 Demonstration and Training: Section 01 79 00

### **1.02 BACKGROUND INFORMATION**

- .1 Commissioning (or the commissioning process), as understood by PSPC, is a planned program of activities conducted in concert with other activities performed during each stage of project delivery.
  - .1 The commissioning process identifies issues during the Planning and Design stages which are addressed during the Construction and Occupancy Stages of a Facility to ensure that the built facility is constructed and proven to operate satisfactorily under all weather, environmental and occupancy conditions to meet operational and user requirements.
  - .2 Commissioning activities during the Construction stage incorporates a third party verification process and a transfer of critical operational knowledge to Facility personnel.
- .2 Commissioning to occur during the construction stage and the early period of facility occupancy stage.

### **1.03 DEFINITIONS**

- .1 For the purpose of this contract, the various terms listed below, as they relate directly or indirectly to the commissioning process, shall be deemed to have the following meaning.
- .2 Commissioning Process: a planned program of tasks, activities and procedures carried out systematically during the Construction and Occupancy Stages in accordance with the commissioning objectives to:
  - .1 Verify whether the fully installed equipment, systems and integrated systems operate in accordance with contract documents and design criteria and;
  - .2 Compile appropriate documentation to effectively train O& M staff and prepare a comprehensive Building Management Manual (BMM).
- .3 Commission (i.e., to commission a building component or system): tests and checks conducted by Commissioning Agent on all systems and integrated systems of Facility; carried out only after they are fully installed, functional and Contractor's Performance Verification responsibilities have been completed and approved.
  - .1 Contractor provides assistance during this process by operating equipment and systems, by troubleshooting and

- making adjustments as may be required.
- .2 Systems are run under their full operation and under various modes to determine if they function correctly, consistently, at peak efficiency and interactively with each other as intended in accordance with Contract Documents and design criteria.
- .3 During these checks, adjustments may be made enhancing performance to meet environmental or user requirements.
- .4 Commissioning Agent: an appointed person, representing the Departmental Representative, responsible for the development of a Commissioning Plan and managing its implementation by overseeing and coordinating various activities and responsibilities to be performed by members of the Commissioning Team.
  - .1 In this project, the Commissioning Agent is part of the engineering consultant firm engaged by PSPC to prepare the final design and contract documents for this Work.
  - .2 Commissioning Agent plays a lead role in support to the Departmental Representative to ensure that the commissioning objectives are achieved.
- .5 Commissioning Manager: a PSPC departmental employee providing advice and guidance on commissioning requirements to the Commissioning Agent in support to the Departmental Representative.
  - .1 Commissioning Plan: The document which describes the organization, scheduling, allocation of resources, required documentation, target dates, and team roles and responsibilities for verification that the built works meet Contract Document and design criteria requirements.
  - .2 Contractor: means the General Contractor, however it also refers to any personnel from subcontractors, including the controls and TAB specialists, suppliers and manufacturer's technical persons which Contractor employs to carry out his/her designated commissioning duties and activities. The Contractor is responsible for the performance of their subcontractors.
  - .3 Design Consultant: persons from the civil, architectural, mechanical and electrical design disciplines of the engineering firm(s) which have been engaged by the Departmental Representative to prepare the final design and produce the contract documents. Design Consultant also has specifically identified commissioning activities for this project.
  - .4 Design Criteria: All those factors included in the design of a Facility prescribed by the tenant needs or as determined by the Design Consultant as necessary in order to meet all Facility functional and user operational requirements.
  - .5 Installation/Start-up Checks (sometimes referred to as pre-functional checks): a written compilation of checks and

- inspections to be performed by Contractor during the pre-start-up and start-up of a particular equipment or system component.
- .6 Checklist sheets are produced which include the following data:
    - .1 Product manufacturer's installation instructions and recommended checks and;
    - .2 Special procedures as specified in relevant sections of Specifications;
    - .3 Other items considered good installation and engineering industry practices deemed appropriate for proper and efficient operation.
  - .7 Standard Installation/Start-up Checklist sheets prepared by equipment manufacturer are acceptable for use. However, supplement with additional data representative of specific project conditions as deemed required by Commissioning Agent.
  - .8 Use Checklist sheets for all equipment installation. Document in writing on checklist the various checks made, deficiencies noted and corrective action taken.
  - .9 Installer to sign Checklist sheets upon completion, certifying that stated checks and inspections have been performed.
  - .10 Use of Installation/Start-up Checklists is not considered part of the commissioning process but will be stringently used for all equipment pre-start and start-up procedures.
  - .11 Return completed Installation/Start-up Checklist sheets after use to Commissioning Agent for retention. Checklists are required by Commissioning Agent when Facility is commissioned and will be included in the BMM manual at completion of project.
  - .12 Contractor to submit blank forms to Commissioning Agent before performing start-up. Sample forms (see forms 01 91 32A through H) may be used to develop equipment specific forms.
- .6 Performance Verification: (sometimes referred to Functional Testing) checks, running dynamic tests and adjustments carried out by Contractor on equipment and systems, upon their installation, to ensure they operate correctly, efficiently and function independently and interactively with other systems as intended in accordance with contract documents and manufacturer's recommendations.
- .1 Performance Verification will not be considered part of the commissioning process. It is however considered an essential and integral part of Contractor's responsibilities in the equipment installation process which must be stringently conducted, successfully completed and approved by Departmental Representative before a piece of equipment or system is considered fully installed and functional.
  - .2 Facility components and systems will not be commissioned by

Commissioning Agent until performance verification has been completed and approved.

- .7 Performance Verification Report Sheets (PV sheets): forms developed by Commissioning Agent for Contractor's use to record measured data and readings taken during functional testing and Performance Verification procedures. Equipment specific forms will be issued by Commissioning Agent after shop drawing review.
- .8 Product Information (PI Data): a compilation of data gathered on a particular piece of equipment, typically produced by manufacturer, which includes nameplate information, installation/startup instructions, parts list, operating instructions, maintenance guidelines and other pertinent technical data and recommended checks that is necessary to prepare for start-up and functional testing and used during operation and maintenance of such equipment. This documentation is included in the Building Management Manual (BMM) at completion of work.

#### **1.04 COMMISSIONING OBJECTIVES**

- .1 A Commissioning Plan has been prepared by the Commissioning Agent, on behalf of PSPC, which identifies, among other issues, specific commissioning activities to be carried out by the commissioning team during the Construction of the project.
- .2 The commissioning activities have the following objectives:
  - .1 Collect data on equipment and systems being supplied and document their installation;
  - .2 Conduct checks and tests on fully installed building components, equipment, systems and integrated systems to:
    - .1 Verify whether they operate in accordance with requirements of Contract Documents;
    - .2 Verify performance against design criteria and user requirements and measure peak capacities;
  - .3 Prepare a Building Management Manual (BMM) which contains operations and maintenance data, as-built record documents, commissioning reports, training data and other critical information for future use by Facility operational staff;
  - .4 Ensure transfer of knowledge on the operations, maintenance and management of the Facility to Tenant and Operational personnel by means of appropriate training.
- .3 Work to achieve the above objectives requires a collaborative effort from all members of the commissioning team.
  - .1 Contractor's commissioning activities and responsibilities are described in Clause 1.08 below.
- .4 Commissioning activities performed by the Commissioning Agent and the Design Consultant does not replace checks, tests, adjustments,

balancing and other performance verification procedures to be carried out by the Contractor as an integral part of performing the Work of this contract as specified in other sections of the Specifications.

#### **1.05 SYSTEMS TO BE COMMISSIONED**

- .1 The following systems and controls, complete with associated equipment and components, will be commissioned by the Commissioning Agent and requires related commissioning activities to be performed by Contractor as specified herein and in section(s):
  - .1 Air Handling Systems
  - .2 Heating Controls
  - .3 Plumbing Fixtures
  - .4 Sprinkler System
  - .5 Branch Circuit Panelboards
  - .6 Disconnects - Fused and Unfused
  - .7 Emergency Lighting Battery Unit
  - .8 Exit Sign
  - .9 Lighting
  - .10 Fire Alarm
  - .11 Fire Pump and Controller
  - .12 Jockey Pump and Controller
  - .13 Cistern Level Controls
  - .14 Ventilation Controls
  - .15 Fuel Storage Tank and Transfer Lines
  - .16 Fuel Level Monitoring System
  - .17 Generator
  - .18 Automatic Transfer Switch
  - .19 Motor Starters
  - .20 Intrusion Detection

#### **1.06 COMMISSIONING TEAM**

- .1 A commissioning team will be assembled to carryout various functions needed to effectively commission the Facility. Contractor will be part of this team with duties and responsibilities as specified in this section and in other sections of the Specifications.
- .2 Members of the Commissioning Team are as described in 01 91 31 - Commissioning Plan.

#### **1.07 CONTRACTOR'S COMMISSIONING ACTIVITIES**

- .1 Organize and arrange for the services of subcontractors, their specialists and manufacturer's technical representatives to perform Contractor's commissioning activities.
- .2 Confirm personnel forming part of the Commissioning Team are

qualified and knowledgeable of installed equipment and systems and with design intent.

- .3 Develop in conjunction with the Commissioning Agent a commissioning schedule as specified herein.
- .4 Notify Departmental Representative in writing when Facility is ready for be commissioned. Give 14 calendar day notice.
- .5 Commissioning will only commence once that full documentation has been received and installed equipment and systems have undergone successful performance verification.
- .6 Note that Certificate of Substantial Completion will only be issued when:
  - .1 All commissioning documentation has been received and found suitable by Departmental Representative;
  - .2 Designated equipment and systems have been commissioned and;
  - .3 Training has been completed.
- .7 Performance faults:
  - .1 Equipment and systems found not operating correctly or not performing as intended during commissioning shall be re-verified by checking 100% of all equipment and components of the un-functional system, including related controls as required to rectify the deficiencies and ensure correct performance.
  - .2 Costs to conduct additional tests and inspections, as deemed required by Departmental Representative, to determine acceptability and proper performance of such item to be paid for by Contractor.
- .8 Prior to Facility being Commissioned:
  - .1 Submit commissioning documentation as specified in clause 1.12 below.
  - .2 Submit the Installation/Start-up Checklist sheets to Commissioning Agent for review prior to conducting the pre-start and start-up of any piece of equipment. Incorporate additional start-up instructions onto checklist as determined by the Commissioning Agent's review.
  - .3 Conduct the pre-start and start-up of all equipment by following and filling out the approved Installation/Start-up Checklists.
  - .4 Conduct Performance Verification on all installed equipment and systems. Use and fill out the PV Report Sheets provided.
  - .5 Upon completion of start-up and performance verification process, submit signed copy of Checklist and PV sheets to Commissioning Agent as affidavit that required checks and tests were successfully conducted.
  - .6 Record performance measurements and data reading on PV sheets

- and return to Commissioning Agent for compilation.
- .7 Give Departmental Representative and Commissioning Agent a minimum of five (5) days notice for start-up and performance verification of equipment and systems which must be witnessed by Commissioning Agent as determined by Commissioning Agent beforehand on PV sheets.
- .8 Provide missing information and data as identified by Commissioning Agent and Departmental Representative during documentation review.
- .9 Submit above noted documentation before Commissioning will proceed.
- .10 Address deficiencies in Work identified during performance verification of equipment and systems. Conduct additional performance verification thereafter.
- .11 Arrange for special tools and devices, identified at commissioning meeting(s), as deemed required to assist with commissioning.
- .12 Provide access ladders, two way radios and other equipment required by Team when facility will be commissioned.
- .9 When Facility is being Commissioned:
  - .1 Provide qualified tradespersons to be present at site to assist Commissioning Agent.
  - .2 Assist in commissioning systems specified and as follows:
    - .1 Operate designated building component, mechanical/electrical equipment and system under all modes of operation and conduct checks and tests as directed by Commissioning Agent.
    - .2 Check and verify that building component, equipment, systems and integrated systems, including their controls, are functioning and responding correctly and interactively with each other.
    - .3 Test systems independently and then in unison with other related systems.
    - .4 Conduct all Commissioning checks and tests in presence of and witnessed by Commissioning Agent and Departmental Representative.
    - .5 Assist Design Consultant and other members of the commissioning team who will also be present to commission Facility.
  - .3 Specific procedures used to commission Facility will be provided by Commissioning Agent which includes:
    - .1 Sequential order of building component and system to be tested.
    - .2 Running systems under various anticipated modes and demands (example: high and low cooling or heating loads, duplicating outside temperature conditions, fire alarm and power failure conditions).
    - .3 Running building controls through all sequences of

- operation to verify and confirm that equipment and systems are responding as designed and intended.
- .4 Operating designated equipment at peak capacities, recording output data against design criteria.
- .5 Run component or systems as long as necessary to effectively commission all items as deemed required by Commissioning Agent and Departmental Representative.
- .6 Monitor equipment and system responses.
- .7 Record test results, measurements and other data on commissioning forms provided by Commissioning Agent.
- .8 Assist in analyzing results. Identify system deficiencies and components not responding as intended.
- .9 Correct deficiencies and system non-conformance issues. Adjust, calibrate or fine tune system components as required. Debug system software as may be required.
- .10 Retest systems when directed to confirm compliance.
- .10 Upon completion of Facility Commissioning:
  - .1 Provide training to maintenance & operational personnel as specified.
  - .2 Turn over any filled-in checks sheets or reports resulting from commissioning.

#### **1.08 COMMISSIONING ACTIVITIES OF OTHER TEAM MEMBERS**

- .1 Commissioning Agent:
  - .1 Represents the Departmental Representative during the commissioning process.
  - .2 Coordinates activities of the commissioning team members to ensure that commissioning activities are carried out properly and in a timely manner.
  - .3 Prepares commissioning schedule in concert with Contractor.
  - .4 Chairs commissioning meetings.
  - .5 Works with Contractor, subcontractors, equipment suppliers, Design Consultant resources, PSPC and Tenant Representatives to resolve technical problems which may arise during the process.
  - .6 Witnesses Contractor's pre-start, start-up and performance verification procedures for certain equipment and systems specified when deemed required due to their critical nature and function in the Facility.
  - .7 Verifies that Installation/Start-up Checklists and Performance Verification checks and tests are used and stringently followed by Contractor.
  - .8 Assists Contractor in coordination of training activities for facility staff.
  - .9 Submits final commissioning report to Departmental Representative.
- .2 Design Consultant (referred to as the "Departmental Representative"

throughout the technical sections):

- .1 Prepares in concert with Commissioning Agent the Commissioning Plan.
  - .2 Reviews Contractor's Installation/Start-up Checklists for completeness, incorporating supplement data not addressed on checklist. Provides to Contractor checklist for products which manufacturer does not provide installation and start-up instructions.
  - .3 Develops performance verifications report sheets for use by Contractor to record actual data and measurements against design data criteria.
  - .4 Includes, on performance verification report sheets, design data and anticipated performance values for equipment and systems to undergo verification.
  - .5 Compiles commissioning documentation submitted by Contractor. Prepares final Building Management Manuals.
  - .6 Assists Commissioning Agent in witnessing pre-start, start-up and performance verification activities.
  - .7 Approves type and method of calibration for instruments used by Contractor to conduct performance verification and commissioning tests.
  - .8 Assists Commissioning Agent in reviewing and analyzing tests results.
  - .9 Participate in the training sessions provided by Contractor to tenant O&M staff by giving introductory information on design philosophy, design intent and systems designs,
  - .10 Assist in the resolution of issues relating to commissioning.
- .3 Tenant Representative:
- .1 Participates with other team members to ensure that systems as installed meet the operational and functional requirements.
  - .2 Periodically attends commissioning meetings as required.
  - .3 Attends final commissioning activities.
  - .4 Assists in resolving technical problems by providing additional details on operational requirements.
- .4 Facility Operations and Maintenance Staff:
- .1 Participates in the commissioning process to obtain early introduction to the facility systems and to provide early operator feedback.
  - .2 Prime interest is in the familiarization and training of appropriate maintenance staff.
  - .3 Staff may attend certain critical equipment start-up and performance verification activities and provide comments and practical suggestions on issues which may arise during actual operation, maintenance and repair of the equipment and systems.
  - .4 Attends commissioning meetings periodically, depending on

- issues being discussed.
- .5 Identifies the appropriate staff which must receive the O & M training.

#### **1.09 COMMISSIONING MEETINGS**

- .1 General briefing on commissioning will be conducted at first project construction meeting at commencement of work.
  - .1 Issues discussed will include scope and extent of commissioning and clarify responsibilities of commissioning team members.
  - .2 All team members must attend, including subcontractors of equipment and systems to be commissioned.
- .2 Include commissioning as one agenda item at each construction meeting held and chaired by Contractor during construction. Give subject due consideration for each material and equipment supplied and for all matters of Work.
- .3 Whenever possible meetings will be held immediately following the construction meetings.
- .4 Meeting will be chaired by Contractor, who will record and distribute minutes.
- .5 Confirm all subcontractors and relevant manufacturer representatives are present at meetings as deemed required.

#### **1.10 COMMISSIONING SCHEDULE**

- .1 Address commissioning activities within the construction work schedule. Clearly identify allocated time period for commissioning and training activities.
- .2 Develop commissioning schedule in conjunction with Commissioning Agent. Indicate allocated time period and anticipated dates for:
  - .1 Submission of commissioning documentation, including O&M Manuals.
  - .2 Equipment and system start-up and performance verification, making them ready to be commissioned.
  - .3 Allocated period to commission designated building components and systems.
  - .4 Training period.
  - .5 Work during Warranty period.
- .3 Submit schedule to Departmental Representative for review.

#### **1.11 TRAINING**

- .1 Commence process of familiarizing Tenant and O&M personnel in the

early stages of work on purpose and operation of various equipment and systems. Continue process throughout the entire construction duration.

- .1 Provide informal briefings during occasional site visits, at planned commissioning meetings and during the final commissioning site activities.
- .2 Conduct formal demonstration and training sessions only after all identified systems have been commissioned by Commissioning Agent and Departmental Representative has given approval to proceed with the training process.
- .3 Provide training and demonstration on all new equipment, sub-systems, systems and integrated systems.
- .4 Carry out training in accordance with requirements of section 01 79 00.
- .5 Submit written agenda of training session(s) four (4) weeks beforehand for review by Commissioning Agent and Departmental Representative.
- .6 Coordinate content with Commissioning Agent. Design Consultant will provide introductory presentation giving general outline of each system design and intended function.
- .7 Submit training manuals for review two (2) weeks prior to actual training.
- .8 Keep required tools and O&M Manual on site for training and system demonstration.
- .9 As a minimum, the training sessions to cover the following information:
  - .1 Introduction.
  - .2 Description of the system with factory personnel being involved at appropriate times.
  - .3 Instructions on start-up procedures including seasonal procedures, system check-lists and emergency procedures.
  - .4 Operational procedures, including occupancy considerations, seasonal change-over, manual and automatic operations and emergency modes.
  - .5 Instruction on system shutdowns, including checklists.
  - .6 Instructions on all aspects of system maintenance, including routine servicing, lubrication, overhaul and factory servicing.
  - .7 Information concerning the scope of warranties and their use.
  - .8 A description of spare parts in stock and their service.
  - .9 A description of normal tools required for servicing the systems/equipment.

- .10 Submit typewritten record of training sessions given and list of attendees. Use forms of format approved by Departmental Representative.

#### **1.12 COMMISSIONING DOCUMENTATION**

- .1 Submit the following documentation for use during commissioning and for incorporation thereafter into a Building Management Manual (BMM):
  - .1 Operations and Maintenance Manuals, Project Record Documents and other data as specified in Section 01 78 00. Data to include:
    - .1 Equipment Product Information (PI Data) complete with:
      - .1 Nameplate info,
      - .2 Installation instructions,
      - .3 Operating procedures and
      - .4 Maintenance guidelines.
    - .2 Reviewed shop drawings,
    - .3 As-built record drawings and Specifications.
  - .2 Completed Installation/Start-up Checklist sheets used.
  - .3 Performance Verifications checks and tests procedures and completed report sheets used.
  - .4 Copy of any static and dynamic test and reports conducted.
  - .5 TAB report and other reports as specified in various trade sections.
- .2 Above documentation is required by Commissioning Agent to commission Facility. Submit data minimum three (3) weeks before commencement of commissioning.
- .3 Documentation to include detailed information and number of copies as specified for maintenance manuals of Section 01 78 00.
- .4 Commissioning Agent and Design Consultant will compile above documentation and produce a BMM manuals for operation/maintenance staff and tenant use.

**END OF SECTION**

## 1 GENERAL

### 1.01 PURPOSE OF THE COMMISSIONING PLAN

- .1 The purpose of the construction phase commissioning plan is to:
  - .1 Provide direction for the commissioning process during construction, particularly providing resolution for issues and providing details that cannot be, or were not, fully developed during design, such as scheduling, participation of various parties of this particular project, actual lines of reporting and approvals, coordination, etc.
  - .2 This plan does not provide a detailed explanation of required testing procedures. The detailed testing requirements and procedures are found in the Specifications. Additionally, this plan does not provide extensive narrative on all commissioning concepts, as may be provided in other commissioning guides.

### 1.02 COMMISSIONED SYSTEMS

- .1 See Section 01 91 13 for list of systems that will be commissioned in this project. All general references to equipment in this document refer only to equipment that is to be commissioned.

### 1.03 CONSTRUCTION/CX TEAM DATA (PRIMARY PARTIES)

Team Member	Co. & Contact Names	Voice, office, cell, fax, email, address
Owner Project Leader Project Manager (PM)	TBD	
Property Manager	TBD	
General Contractor Mechanical Contractor	TBD	
Commissioning Authority	TBD	TBD
Architect	TBD	TBD
Mechanical Designer/Eng.	TBD	TBD
Electrical Designer/Eng.	TBD	TBD
Mechanical Contractor HVAC Site Superintendent	TBD	TBD
Piping Contractor	TBD	TBD

Team Member	Co. & Contact Names	Voice, office, cell, fax, email, address
Sheet Metal Contractor	TBD	TBD
Electrical Contractor	TBD	TBD
Site Supervisor	TBD	TBD
TAB Contractor	TBD	TBD
Controls Contractor	TBD	TBD

#### 1.04 COMMISSIONING SCOPING MEETING

- .1 Conduct meetings as described in 01 91 13.

#### 1.05 SITE OBSERVATION

- .1 The CA and the Design Consultant will make periodic visits to the site, as necessary, to witness equipment and system installations.

#### 1.06 MISCELLANEOUS MEETINGS

- .1 The CA may review construction meeting minutes, change orders or Site instructions for the same purpose.
- .2 Later during construction, necessary meetings between various commissioning team parties will be scheduled by the CA, through the GC, as required.

#### 1.07 SUBMITTALS AND PROCEDURES

- .1 The CA may review submittals for commissioning requirements.

#### 1.08 INSTALLATION CHECKLISTS, TESTS AND STARTUP

- .1 Prefunctional checklists (PC) are important to ensure that the equipment and systems are hooked up and operational and that functional performance testing may proceed without unnecessary delays. Each piece of equipment receives full prefunctional checkout by the Contractor. No sampling strategies are used. In general, the prefunctional testing for a given system, must be successfully completed prior to formal functional performance testing of equipment or subsystems of the given system.
- .2 Prefunctional checklists, installation /start-up checks are as described in 01 91 13.

- .3 Prefunctional checklists to consist of startup and verification tests, plus any additional tests described in the attached forms or technical specification sections.
- .4 Prefunctional tests to include those recommended by the equipment manufacturer, or in the absence of specific recommendations by the manufacturer as agreed by the Contractor and the CA.
  - .1 Document prefunctional tests in writing by the installing technician. The CA will not witness much of the prefunctional checklisting, except for testing of larger or more critical pieces of equipment and some spot-checking.
  - .2 Submit the prefunctional checklists to the CA for review and inclusion in the commissioning binder.
  - .3 Start-up plan:
    - .1 Submit to the CA manufacturer installation, startup and checkout data, including actual field checkout sheets used by the field technicians from the contractor.
    - .2 Execution of Checklists and Startup:
      - .1 Four (4) weeks prior to startup, the Subs and vendors schedule startup and initial checkout with the GC and CA. The startup and initial checkout are directed and executed by the Sub or vendor. The CA, and GC if necessary, observe, the procedures. For components of equipment, (e.g., radiant panels, fans, heat pumps, etc.), the CA observes a sampling of the prefunctional and start-up procedures. To document the process of startup and checkout, the site technician performing the line item task initials and dates each paragraph of procedures in the "Startup Plan" and checks off items on the prefunctional and manufacturer field checkout sheets, as they are completed. Only individuals having direct knowledge of a line item being completed shall check or initial the forms. The Subs and vendors execute the checklists and tests and submit a signed copy of the completed start-up and prefunctional tests and checklists to the CA. Further details are found in the Specifications Section 01 91 13. The CA may review prefunctional checklists in progress, as necessary.
    - .3 Deficiencies and Non-Conformance:
      - .1 Clearly list any outstanding items of the initial start-up and prefunctional procedures that were not completed successfully at the bottom of the procedures form or on an attached sheet. The

- procedures form and deficiencies are provided to the CA within two days of test completion.
- .2 The Subs and vendors must correct and retest deficiencies or uncompleted items, involving the GC and others as necessary. The installing Subs or vendors correct all areas that are deficient or incomplete according to the checklists and tests.
- .4 TAB:
- .1 Submit the outline of the TAB plan and approach to the CA and the controls contractor eight weeks prior to starting the TAB. Included in the approach, is an explanation of the intended use of the building control system. The CA reviews the plan and approach for understanding and coordination issues and may comment, but does not "approve." The controls contractor reviews the feasibility of using the building control system for assistance in the TAB work.
  - .2 Functional performance testing does not begin until the TAB work is complete. A checklist form for reviewing the TAB plan is provided as one of the prefunctional checklists.
  - .3 TAB work will not begin until the control system has been prefunctionally tested and selective functional tests have been performed and approved by the CA.
- .5 Controls Checkout Plan:
- .1 Develop and submit a written step-by-step plan to the CA which describes the process they intend to follow in checking out the control system and the forms on which they will document the process. The Contractor will also meet with the TAB subcontractor prior to the start of TAB and review the TAB plan to determine the capabilities of the control system for use in TAB. The Contractor shall also provide a technician qualified to operate the controls to assist the TAB subcontractor in performing TAB.
  - .2 All controls prefunctional checklists, calibrations, start-up and selected functional tests of the system must be completed and approved by the CA prior to TAB. Execute the tests and trend logs assigned to them and remain on site for assistance for mechanical system functional tests as specified in the same sections.

## **1.09 DEVELOPMENT OF PERFORMANCE VERIFICATION PROCEDURES**

- .1 Overview: Performance Verification (PV) testing, also referred to as functional testing, is the dynamic testing of systems (rather than just components) under full operation. Systems are tested under various modes, such as during low heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc. The systems are run through all of the control system's sequences of operation and components are verified to be responding as the sequences state. The commissioning agent shall witness functional test procedures, but the testing is performed by the installing contractor or vendor. Tests shall be documented and submitted to the CA by the Contractor.
- .2 Functional testing to consist of all performance testing required for each piece of commissioned equipment described in this section or technical specification sections. A detailed description of the functional and prefunctional testing procedures and process is found in the Specifications, 01 91 13, Part 3.
- .3 Functional testing and verification may be achieved by manual testing (persons manipulate the equipment and observe performance) or by monitoring the performance and analyzing the results using the control system's trend log capabilities or by stand-alone dataloggers. According to the Specifications, not all pieces of identical equipment receive in-depth testing. The CA reviews factory or required acceptance tests and determines what further testing may be required to comply with the Specifications. Redundancy is minimized.

## **1.10 EXECUTION OF PERFORMANCE VERIFICATION PROCEDURES**

- .1 Overview and Process: The GC must schedule functional tests through the affected Subs and notify the PM and CA. For any given system, prior to performing functional testing, the CA shall wait until the prefunctional checklist has been submitted with the necessary signatures, confirming that the system is ready for functional testing.
  - .1 The CA will witness and document the functional testing of all equipment and systems according to the Specifications and the Cx Plan. The Subs execute the tests. The control system is tested before it is used to verify performance of other components or systems. The air balancing and water balancing is completed and debugged before functional testing of air-related or water-related equipment or systems. Testing proceeds from components to subsystems to systems and finally to interlocks and connections between

systems. Refer to specification section 01 91 13 for additional process details.

- .2 Deficiencies and Retesting: The CA documents the results of the test. Corrections of minor deficiencies identified are made during the tests at the discretion of the CA. The CA records the results of the test on the procedure or test form. Deficiencies or non-conformance issues are noted and reported to the CM. Subs correct deficiencies, notify the CA in writing certifying correction. The GC schedules retesting through the CM. Decisions regarding deficiencies and corrections are made at as low a level as possible, preferably between CA or GC and the Sub. For areas in dispute, final authority, besides the Owner's, resides with the A/E. The CA recommends acceptance of each test to the CM. The CM gives final approval on each test.
- .3 The Owner's facilities operating staff are encouraged to attend and participate in the testing process. The CA will notify the CM, who will then notify the facility staff when the commissioning events will occur.

#### **1.11 O&M MANUALS AND WARRANTIES**

- .1 Standard O&M Manuals: The CA reviews the O&M manuals, documentation and redline as-builts for systems that were commissioned to verify compliance with the Specifications. The CA recommends approval and acceptance of these sections of the O&M manuals to the CM. The CA also reviews each equipment warranty and verifies that all requirements to keep the warranty valid are clearly stated. Refer to Specifications 01 91 13 for further details.
- .2 Commissioning Record: The CA will compile a commissioning binder that represents the commissioning activities and submit it to the owner for their record.

#### **1.12 TRAINING AND ORIENTATION OF OWNER PERSONNEL**

- .1 Provide Owner training and orientation on equipment and systems in accordance with the project specifications and 01 91 13.
- .2 Submit records of the training activity, initialed by the attendees, to the CA for inclusion in the Commissioning Binder.

#### **1.13 WARRANTY PERIOD**

- .1 During the warranty period, seasonal testing and other deferred testing required is completed according to the Specifications.

Correct deficiencies and have testing witnessed by facilities staff. The CA will return to the project approximately 10 months into the 12 month warranty period. During this visit(s) the CA will review with facility staff the current building operation. The CA will identify areas that may come under warranty or under the original construction contract.

#### 1.14 SCHEDULE

- .1 The following sequential priorities must be followed:
  - .1 Equipment is not "temporarily" started (for heating or cooling), until pre-start checklist items and all manufacturer's pre-start procedures are completed and moisture, dust and other environmental and building integrity issues have been addressed.
  - .2 Functional testing is not begun until prefunctional and start-up and TAB is completed, for a given system (this does not preclude a phased approach).
  - .3 The controls system and equipment it controls are not functionally tested until all points have been calibrated and pre-functional testing completed.
  - .4 TAB is not performed until the controls system has been sufficiently functionally tested and approved by the CA for TAB work.
  - .5 TAB is not performed until the envelope is completely enclosed and ceiling complete, unless the return are is ducted.

#### 1.15 INITIAL COMMISSIONING SCHEDULE SUMMARY

Task / Activity	Estimated Start Date	Estimated End Date
Initial scoping meeting and final plan	TBD	
Submittals obtained and reviewed		
Begin construction site visits/inspections		
Prefunctional forms developed and distributed		
Startup and initial checkout plans		
Startup and initial checkout executed		
TAB: Water Air		
Functional performance tests		
O&M documentation review and verification		
Training and training verification		

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<b>Task / Activity</b>	<b>Estimated Start Date</b>	<b>Estimated End Date</b>
Final commissioning report		

END OF SECTION