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**Part 1            General**

**1.1                DESCRIPTION OF WORK**

- .1        In general, work under this contract consist of:
  - .1        Demolition of Existing Chlorination Huts
  - .2        Construction of new Chlorination Laboratory Building.
- .2        Site of Work is at: Saint Andrew, New Brunswick.

**1.2                FAMILIARIZATION WITH SITE**

- .1        Before submitting a bid, it is recommended that bidders visit the site to review and verify the form, nature and extent of the work, materials needed, the means of access and the temporary facilities required to perform the Work.
- .2        Obtain prior permission from the Departmental Representative before carrying out such site inspection.

**1.3                CODES AND STANDARDS**

- .1        Perform work in accordance with the National Building Code of Canada (NBCC ) 2015 New Brunswick and National Fire Code of Canada (NFC) 2015, and any other code of provincial or local application, including all amendments up to bid closing date, provided that in any case of conflict or discrepancy, the more stringent requirement shall apply.
- .2        Materials and workmanship must meet or exceed requirements of specified standards, codes and referenced documents.

**1.4                INTERPRETATION OF DOCUMENTS**

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

**1.5                TERM ENGINEER**

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

**1.6                SETTING OUT WORK**

- .1        Departmental Representative will provide only those survey control points and set such stakes as necessary to define general location, alignment and elevations of work. Give Departmental Representative reasonable notice of requirements for such control points and stakes.
- .2        Set grades and lay out work in detail from control points and grades established by Departmental Representative.

- .3 Assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.
- .4 Provide devices needed to lay out and construct work.
- .5 Supply such devices as straight edges and templates required to facilitate Departmental Representative's inspection of work.
- .6 Supply stakes and other survey markers required for laying out work.

#### **1.7 COST BREAKDOWN**

- .1 Before submitting first progress claim submit breakdown of Contract Amount in detail as directed by Departmental Representative and aggregating contract amount. Required forms will be provided for application of progress payment.
- .2 List items of work numerically following the same division/section number system of the specification manual and thereafter sub-divide into major work components and building systems as directed by Departmental Representative.
- .3 Upon approval, cost breakdown will be used as basis for progress payment.

#### **1.8 MEASUREMENT PROCEDURES**

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

#### **1.9 DOCUMENTS REQUIRED**

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

#### **1.10 PERMITS**

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

- .2 Provide appropriate notifications of project to municipal and provincial inspection authorities.
- .3 Obtain compliance certificates as prescribed by legislative and regulatory provisions of municipal, provincial and federal authorities as applicable to the performance of work.
- .4 Submit to Departmental Representative, copy of application forms and approval documents received from above referenced authorities.

**1.11 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING**

- .1 Execute work with least possible interference or disturbance to building operations, occupants, and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.
- .2 Where security has been reduced by work of Contract, provide temporary means to maintain security.
- .3 Provide temporary dust screens, barriers, warning signs in locations where renovation and alteration work is adjacent to areas which will be operative during such work.

**1.12 ROUGHING-IN**

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

**1.13 CUTTING, FITTING AND PATCHING**

- .1 Ensure that cutting and patching required by all trades is included in total bid amount submitted for the work.
- .2 Execute cutting, fitting and patching required to make work fit properly.
- .3 Where new work connects with existing and where existing work is altered, cut, patch and make good to match existing work. This includes patching of openings in existing work resulting from removal of existing services.
- .4 Do not cut, bore, or sleeve load-bearing members, except where specifically approved by Departmental Representative.
- .5 Make cuts with clean, true, smooth edges. Make patches inconspicuous in final assembly.
- .6 Fit work airtight to pipes, sleeves ducts and conduits.

**1.14 CONCEALMENT**

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

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**1.15 LOCATION OF FIXTURES**

- .1 Location of equipment, fixtures and outlets, shown or specified shall be considered as approximate. Actual location shall be as required to suit conditions at time of installation and as is reasonable.
- .2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .3 Inform Departmental Representative when impending installation conflicts with other new or existing components. Follow directives for actual location.
- .4 Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative.

**1.16 EXISTING SERVICES**

- .1 Where work involves breaking into or connecting to existing services, carry out work at times directed by governing authorities, with minimum of disturbance to pedestrian, vehicular traffic and tenant operations.
- .2 Before commencing work, establish location and extent of service lines in area of work and notify Departmental Representative of findings.
- .3 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility. This includes disconnection of electrical power and communication services to tenant's operational areas. Adhere to approved schedule and provide notice to affected parties.
- .4 Provide temporary services when directed by Departmental Representative to maintain critical building and tenant systems.
- .5 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.
- .6 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
- .7 Protect, relocate or maintain existing active services as required. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction over service. Record locations of maintained, re-routed and abandoned service lines.

**1.17 BILINGUAL NOTATIONS**

- .1 Any items supplied and installed under this contract which have operating instructions on them such as door hardware, washroom accessories, push button activation controls, powered hand dryers, mechanical equipment such as water coolers, etc., and which can be expected to be used by the public and building tenants, must have such operating instructions in bilingual format - English and French.

- .2 Factory embossed or recessed symbols illustrating equipment operation is an acceptable alternate to lettering.
- .3 Items supplied with factory - embossed or recessed lettering in one official language with an applied sticker or decal representing the second official language is not acceptable unless the Departmental Representative gives prior approval before any such items are ordered.
- .4 Internationally recognized colour coding such as red and blue center pieces for plumbing brass is acceptable.
- .5 No extra costs will be paid for re-stocking or re-ordering of materials and equipment due to Contractor's failure to fully meet bilingual signage requirements specified herein.
- .6 Ensure that all trades are made aware of above requirements.

#### **1.18 BUILDING SMOKING ENVIRONMENT**

- .1 Comply with smoking restrictions.

#### **1.19 ASBESTOS DISCOVERY**

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

**END OF SECTION**

**Part 1 General**

**1.1 SUBMITTALS**

- .1 Upon acceptance of bid and prior to commencement of work, submit to Departmental Representative the following work management documents:
  - .1 Work Schedule as specified herein.
  - .2 Shop Drawing Submittal Schedule specified in section 01 33 00.
  - .3 Waste Management Plan specified in section 01 74 22.
  - .4 Environmental Plan specified in section 01 35 43.
  - .5 Health and Safety Plan specified in section 01 35 29.
  - .6 Dust Control Plan specified in section 01 50 00.
  - .7 List of workers requiring security clearance and those to be placed on Site Security Control list.

**1.2 WORK SCHEDULE**

- .1 Upon acceptance of bid submit:
  - .1 Detailed work schedule within 14 calendar days of contract award.
- .2 Schedule to indicate all calendar dates from commencement to completion of all work within the time stated in the accepted bid.
- .3 Provide sufficient details in preliminary schedule to clearly illustrate entire implementation plan, depicting efficient coordination of tasks and resources, to achieve completion of work on time and permit effective monitoring of work progress in relation to established milestones.
- .4 Work schedule content to include as a minimum the following:
  - .1 Bar (GANTT) Charts, indicating all work activities, tasks and other project elements, their anticipated durations, planned dates for achieving key activities and major project milestones supported with;
  - .2 Written narrative on key elements of work illustrated in bar chart, providing sufficient details to demonstrate a reasonable implementation plan for completion of project within designated time.
  - .3 Generally, Bar Charts derived from commercially available computerized project management system are preferred but not mandatory.
- .5 Detailed Work Schedule:
  - .1 Prepare by use of Critical Path Method (CPM) indicating:
    - .1 Complete and detailed sequence of all construction activities. Show projected start and completion dates for each activity.
    - .2 Number of calendar days required to carryout each activity.

- .3 Critical path items with resulting critical dates, non-critical activities and resulting float time.
- .4 Actual workdays from non-working days such as weekend and statutory days etc.
- .5 Projected and actual percentage of work completed for each major work activity.
- .2 Prepare CPM schedule by use of well recognized and widely used electronic software. Submit copy of schedule in paper format and one electronic version on diskette for each submission.
- .3 Accompany CPM with written narrative as required and in sufficient detail to fully describe work and demonstrate a reasonable implementation plan for completion of project within designated time.
- .6 Work schedule must take into consideration and reflect the special conditions and operational restrictions as and indicated on drawings.
- .7 Schedule work in cooperation with the Departmental Representative. Incorporate within Detailed Work Schedule, items identified by Departmental Representative during review of preliminary schedule.
- .8 Completed schedule shall be approved by Departmental Representative. When approved, take necessary measures to complete work within scheduled time. Do not change schedule without Departmental Representative's approval.
- .9 Ensure that all subtrades and subcontractors are made aware of the work restraints and operational restrictions specified.
- .10 Schedule Updates:
  - .1 Submit on a monthly basis when requested by Departmental Representative.
  - .2 Provide information and pertinent details explaining reasons for necessary changes to implementation plan.
  - .3 Identify problem areas, anticipated delays, impact on schedule and proposed corrective measures to be taken.
- .11 Departmental Representative will make interim reviews and evaluate progress of work based on approved schedule. Frequency of such reviews will be as decided by Departmental Representative. Address and take corrective measures on items identified by reviews and as directed by Departmental Representative. Update schedule accordingly.
- .12 In every instance, change or deviation from the Work Schedule, no matter how minimal the risk or impact on safety or inconvenience to tenant or public might appear, will be subject to prior review and approval by the Departmental Representative.

### **1.3 PROJECT PHASING**

- .1 Be aware that Facility and tenants must be kept operational for the full duration of work of this contract. Building services to areas under use by tenants must also be maintained

at all times during the Facility's operational hours and as specifically defined in operational restrictions specified in this section.

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

#### **1.4 OPERATIONAL RESTRICTIONS**

- .1 The Contractor must recognize that building occupants will be affected by implementation of this Contract. The Contractor must perform the work with utmost regard to the safety and convenience of building occupants and users. All work activities must be planned and scheduled with this in mind. The Contractor will not be permitted to disturb any portion of the building without providing temporary facilities as necessary to ensure safe and direct passage through disturbed or otherwise affected areas.
- .2 Contractor to meet with the Departmental Representative on a weekly basis to identify intended work areas, activities and scheduling for the coming week.
- .3 Security Requirements:
  - .1 Special security requirements which must be observed in the course of work.
  - .2 Provision of security personnel by Contractor as part of the Work.
- .4 Safety Signage:
  - .1 Provide on site, and erect as required during progress of work, proper bilingual signage, mounted on self-supporting stands, warning the public and building occupants of construction activities in progress and alerting need to exercise caution in proceeding through disturbed areas of the facility, and directing building occupants through any detours which may be required.
  - .2 Signage to be professionally printed and mounted on wooden backing, coloured and to express messages as directed by the Departmental Representative.
  - .3 Generally maximum size of sign should be in the order of 1.0 square meters. Number of signs required will be dependent on number of areas in facility under renovation at any one time.
  - .4 Include costs for the supply and installation of these signs in the bid amount.
- .5 Dust and Dirt Control:
  - .1 See sections 01 50 00 and 01 74 11 for dust control and cleaning requirements.
  - .2 Effectively plan and implement dust control measures and cleaning activities as an integral part of all construction activities. Review all measures with the Departmental Representative before undertaking work, especially for major dust generating activities.
  - .3 Do not allow demolition debris and construction waste to accumulate on site and contribute to the propagation of dust.
  - .4 As work progresses, maintain construction areas in a tidy condition at all times. Remove gross dust accumulations by cleaning and vacuuming immediately following the completion of any major dust generating activity.



- .5 Immediately remove all debris and dust from within occupied areas as generated by work therein during a given work shift.
- .6 Disconnect and seal-off ductwork of HVAC servicing the construction area to stop spread of dust into other areas of Facility.
- .7 Avoid situations and practises which results in dust and dirt being brought from the construction areas or from the exterior and tracked inside the building into occupied areas used by tenants and the public.
- .8 Stop workers with soiled footwear from entering building. This includes roofing mechanics and heavy civil workers.
- .9 Inform workers and make them sensitive to the need for dust and dirt control. Stringently enforce rules and regulations, immediately address non-compliance.
- .10 Keep access doors to work areas closed at all times. Use only designated doors for entry or egress.
- .11
- .6 Ensure that all sub-trades are made aware of and abide by the contents of this section and in particularly the work restrictions specified herein due to tenant operational requirements.

## **1.5 PROJECT MEETINGS**

- .1 Schedule and administer project meetings, held on a minimum bi-weekly basis, for entire duration of work and more often when directed by Departmental Representative as deemed necessary due to progress of work or particular situation.
- .2 Prepare agenda for meetings.
- .3 Notify participants in writing 4 days in advance of meeting date.
- .4 Ensure attendance of all subcontractors.
- .5 Departmental Representative will provide list of other attendees to be notified.
- .6 Hold meetings at project site or where approved by Departmental Representative.
- .7 Preside at meetings and record minutes.
- .8 Indicate significant proceedings and decisions. Identify action items by parties.
- .9 Distribute to participants by mail or by facsimile within 3 calendar days after each meeting.
- .10 Make revisions as directed by Departmental Representative.
- .11 Departmental Representative will advise whether submission of minutes by Email is acceptable. Decision will be based on compatibility of software among participants.

## **1.6 WORK COORDINATION**

- .1 General Contractor is responsible for coordinating the work of the various trades and predetermining where the work of such trades interfaces with each other.
  - .1 Designate one person from own employ having overall responsibility to review contract documents and shop drawings, plan and manage such coordination.
- .2 General Contractor shall convene meetings between trades whose work interfaces and ensure that they are fully aware of the areas and the extent of where interfacing is required.
  - .1 Provide each trade with the plans and specs of the interfacing trade, as required, to assist them in planning and carrying out their respective work.
  - .2 Develop coordination drawings when deemed required illustrating potential interference between work of various trades and distribute to all affected parties including structural trade.
    - .1 Pay particularly close attention to overhead work above ceilings and within or near to building structural elements.
    - .2 Coordination drawings to identify all building elements, services lines, rough-in points and indicate from where various services are coming.
  - .3 Review coordination drawings at purposely called meetings. Have subcontractors sign-off on drawings and publish minutes of each meeting.
  - .4 Plan and coordinate work in such a way to minimize quantity of service line offsets.
  - .5 Submit copy of coordination drawings and meeting minutes to Departmental Representative for information purposes.
- .3 Submission of shop drawings and ordering of prefabricated equipment or prebuilt components shall only occur once coordination meeting for such items has taken place between trades and all conditions affecting the work of the interfacing trades has been made known and accounted for.
- .4 Work Cooperation:
  - .1 Ensure cooperation between trades in order to facilitate the general progress of the work and avoid situations of spatial interference.
  - .2 Ensure that each trade provides all other trades reasonable opportunity for the completion of the work and in such a way as to prevent unnecessary delays, cutting, patching and the need to remove and replace completed work.
- .5 No extra costs to the Contract will be considered by the Departmental Representative as a result of Contractor's failure to effectively coordinate all portions of the Work. Disputes between the various trades as a result of their not being informed of the areas and extent of interface work shall be the sole responsibility of the General Contractor to be resolved at own cost.

**END OF SECTION**

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**Part 1            General**

**1.1            MATERIAL SUPPLIED**

- .1        The Departmental Representative will supply certain material and equipment in the Contract for installation and incorporation into the Work by the Contractor.

**1.2            DELIVERY REQUIREMENTS**

- .1        Materials supplied by the Departmental Representative will be turned over to the Contractor immediately upon receipt.
- .2        Within three [3] calendar days of receipt of material supplied by Departmental Representative, the Contractor must:
  - .1            Conduct a complete audit to verify that all materials have been received, including loose parts and accessories associated with a particular item;
  - .2            Acknowledge receipt, identify any missing or damaged items, in writing;
  - .3            Provide copy of delivery slips submitted by manufacturer and shipping company.
- .3        Unless shortages of material or damaged items are identified in writing to the Departmental Representative within the above specified period, the Contractor will become responsible to supply all missing materials and repair or replace damaged items and missing parts discovered thereafter at own expense.
- .4        Failure to make a complete check of supplied materials or to acknowledge receipt of same shall not relieve Contractor's responsibility to replace or repair any item subsequently found to be missing or damaged.
- .5        Departmental Representative will make final determination as to whether an item can be repaired or must be replaced.
- .6        In the event of failure on the part of the Contractor to submit written proof within the specified verification period, Departmental Representative reserves the right to:
  - .1            Proceed with the supply or repair of missing items through independent sources and;
  - .2            Charge costs of such items, including related shipping charges, to the General Contractor through financial holdback assessments against the Contract.

**1.3            CONTRACTOR'S DUTIES**

- .1        Take possession of the supplied material immediately upon delivery to the site by shipping company.
- .2        Promptly inspect delivered material. Report missing, damaged or defective items in writing to Departmental Representative in accordance with delivery requirements specified above.

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- .3 Obtain and pay costs to load and transport to work area.
  - .4 Unload and handle at site, including lifting, uncrating etc.
  - .5 Store material on site at a location designated by Departmental Representative. Protect against inclement weather and site damage by use of appropriate covers.
  - .6 Make all arrangements and pay associated costs to provide temporary storage from date of receipt and until ready for incorporation into the work.
    - .1 Type and location of storage to meet with Departmental Representative's approval.
  - .7 Be responsible for the protection of such material against damage, loss, theft and fire from date of receipt, during transportation, loading, unloading, temporary storage and until final installation of work is accepted by the Departmental Representative.
  - .8 Any damage or loss of such material shall result in the Contractor being responsible for replacement or repair of equipment at no additional cost to the Contract.
  - .9 The decision as to whether damaged items may be repaired or must be replaced with new equipment shall be the Departmental Representative's decision.
  - .10 Install such material and equipment and incorporate into the work. Perform assembly and make all connections as required to make item functional.
  - .11 Dispose of containers, crating and protective covering off site as directed by the Departmental Representative.

**END OF SECTION**

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**Part 1            General**

**1.1            RELATED SECTIONS**

- .1        Section 01 78 00: Closeout Submittals.

**1.2            SUBMITTAL GENERAL REQUIREMENTS**

- .1        Submit to Departmental Representative for review requested submittals specified in various sections of the specifications including shop drawings, samples, permits, compliance certificates, test reports, work management plans and other data required as part of the work.
- .2        Submit with reasonable promptness and in orderly sequence so as to allow for Departmental Representative's review and not cause delay in Work. Failure to submit in ample time will not be considered sufficient reason for an extension of Contract time and no claim for extension by reason of such default will be allowed.
- .3        Do not proceed with work until relevant submissions have been reviewed.
- .4        Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .5        Where items or information is not produced in SI Metric units, provide soft converted values.
- .6        Review submittals prior to submission. Ensure that necessary requirements have been determined and verified and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents.
  - .1        Submittals not stamped, signed, dated and identified as to specific project will be returned unexamined by Departmental Representative and considered rejected.
- .7        Verify field measurements and affected adjacent Work are coordinated.
- .8        Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .9        Contractor's responsibility for errors, omissions or deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative's review.
- .10      Submittal format:
  - .1        Submit paper originals, or alternatively clear and fully legible photocopies of originals. Facsimiles are not acceptable, except in special circumstances pre-approved by Departmental Representative. Poorly printed non-legible photocopies or facsimiles will not be accepted and be returned for resubmission.
  - .2        Submit in electronic format as pdf files. Forward pdf and in the native program format, compatible with PWGSC encryption requirements or through email or

alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

- .11 Make changes or revision to submissions which Departmental Representative may require, consistent with Contract Documents and resubmit as directed by Departmental Representative. When resubmitting, identify in writing of any revisions other than those requested.
- .12 Keep one reviewed copy of each submittal document on site for duration of Work.

### **1.3 SHOP DRAWINGS AND PRODUCT DATA**

- .1 The term "shop drawings" means fabrication drawings, erection drawings, diagrams, illustrations, schedules, performance charts, technical product data, brochures, specifications, test reports installation instructions and other data which are to be provided by Contractor to illustrate compliance with specified materials and details of a portion of work.
- .2 Shop Drawing Submittal Schedule:
  - .1 Submit within 15 working days of acceptance of bid a schedule listing all shop drawings to be submitted for project.
  - .2 Schedule shall be in format acceptable to Departmental Representative and indicate proposed submission date for each item, status of review and anticipated product delivery date to site. Track all submissions for entire project.
  - .3 Revise schedule as work progresses. Identify items which have been reviewed and finalized and indicating those outstanding.
  - .4 Update schedule at stipulated dates or project time intervals predetermined and agreed upon with Departmental Representative at commencement of Work.
- .3 Shop Drawing Quantities: submit sufficient copies required by the General Contractor and sub-contractors plus 3 copies which will be retained by Departmental Representative.
  - .1 Ensure sufficient copies are submitted to enable one complete set to be included in each of the maintenance manuals specified in 01 78 00.
- .4 Shop Drawings Format:
  - .1 Opaque white prints or photocopies of original drawings or standard drawings modified to clearly illustrate work specific to project requirements. Maximum sheet size to be 1000 x 707 mm.
  - .2 Product Data from manufacturer's standard catalogue sheets, brochures, literature, performance charts and diagrams, used to illustrate standard manufactured products, to be original full colour brochures, clearly marked indicating applicable data and deleting information not applicable to project.
  - .3 Non or poorly legible drawings, photocopies or facsimiles will not be accepted and returned not reviewed.
- .5 Shop Drawings Content:

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- .1 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where items or equipment attach or connect to other items or equipment, confirm that all interrelated work has been coordinated, regardless of section or trade from which the adjacent work is being supplied and installed.
  - .2 Supplement manufacturer's standard drawings and literature with additional information to provide details applicable to project.
  - .3 Delete information not applicable to project on all submittals.
  - .4 Equipment installation/start-up data: include manufacturer's recommended installation instructions, pre-start and start-up checklists for those pieces of equipment and systems designated to be commissioned as specified in section 01 91 13.
  - .6 Allow 14 calendar days for Departmental Representative's review of each submission.
  - .7 Adjustments or corrections made on shop drawings by Departmental Representative are not intended to change Contract Amount. If adjustments affect value of Work, advise Departmental Representative in writing prior to proceeding with Work.
  - .8 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections and comments are made, fabrication and installation may proceed upon receipt of shop drawings. If shop drawings are rejected and noted to be Resubmitted, do not proceed with that portion of work until resubmission and review of corrected shop drawings, through same submission procedures indicated above.
  - .9 Be advised that costs and expenses incurred by Departmental Representative to conduct more than one review of incorrectly prepared shop drawing submittal for a particular material, equipment or component of work may be assessed against the Contractor in the form of a financial holdback to the Contract.
  - .10 Accompany each submission with transmittal letter, in duplicate, containing:
    - .1 Date.
    - .2 Project title and project number.
    - .3 Contractor's name and address.
    - .4 Identification and quantity of each shop drawing, product data and sample.
    - .5 Other pertinent data.
  - .11 Submissions shall include:
    - .1 Date and revision dates.
    - .2 Project title and project 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 Cross references to particular details of contract drawings and specifications section number for which shop drawing submission addresses.
- .6 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.
- .12 After Departmental Representative's review, distribute copies.
- .13 The review of shop drawings by the Departmental Representative is for sole purpose of ascertaining conformance with general concept. This review shall not mean that Canada approves the detail design inherent in the shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting all requirements of the construction and Contract Documents. Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of all sub-trades.

#### **1.4 SAMPLES**

- .1 Submit for review samples as specified in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples to Departmental Representative's office or to other address as directed. Do not drop off samples at construction site except for pre-approved circumstances previously approved 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 Amount. If adjustments will result in a cost increase to the Contract notify Departmental Representative in writing 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.

**END OF SECTION**

**Part 1            General**

**1.1                REFERENCES**

- .1        National Fire Code 2015
- .2        National Building Code 2015

**1.2                DEFINITIONS**

- .1        Hot Work defined as:
  - .1        Welding work.
  - .2        Cutting of materials by use of torch or other open flame devices.
  - .3        Grinding with equipment which produces sparks.
  - .4        Use of open flame torches such as for roofing work.

**1.3                SUBMITTALS**

- .1        Submit copy of Hot Work Procedures and sample of Hot Work permit to Departmental Representative for review, within 14 calendar days of acceptance of bid.
- .2        Submit in accordance with section 01 33 00.

**1.4                FIRE SAFETY REQUIREMENTS**

- .1        Implement and follow fire safety measures during Work. Comply with following:
  - .1        National Fire Code 2015.
  - .2        National Building Code 2015.
  - .3        Federal and Provincial Occupational Health and Safety Acts and Regulations.
- .2        In event of conflict between any provisions of above authorities the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, Departmental Representative will advise on the course of action to be followed.

**1.5                HOT WORK AUTHORIZATION**

- .1        Obtain Departmental Representative's written "Authorization to Proceed" before conducting any form of Hot Work on site.
- .2        To obtain authorization submit to Departmental Representative:
  - .1        Contractor's typewritten Hot Work Procedures to be followed on site as specified below.
  - .2        Description of the type and frequency of Hot Work required.
  - .3        Sample Hot Work Permit to be used.

- .3 Upon review and confirmation that effective fire safety measures will be implemented and followed during performance of hot work, Departmental Representative will give authorization to proceed as follows:
  - .1 Issue one written "Authorization to Proceed" covering the entire project for duration of work or;
  - .2 Subdivide the work into pre-determined, individual activities, each activity requiring a separately written authorization to proceed.
- .4 Requirement for individual authorization will be based on:
  - .1 Nature or phasing of work;
  - .2 Risk to Facility operations;
  - .3 Quantity of various trades needing to perform hot work on project or;
  - .4 Other situation deemed necessary by Departmental Representative to ensure fire safety on premises.
- .5 Do not perform any Hot Work until receipt of Departmental Representative's written "Authorization to Proceed" for that portion of work.
- .6 In tenant occupied Facility, coordinate performance of Hot Work with Facility Manager through the Departmental Representative. When directed, perform Hot Work only during non-operative hours of the Facility. Follow Departmental Representative's directives in this regard.

## **1.6 HOT WORK PROCEDURES**

- .1 Develop and implement safety procedures and work practices to be followed during the performance of Hot Work.
- .2 Hot Work Procedures to include:
  - .1 Requirement to perform hazard assessment of site and immediate work area beforehand for each hot work event in accordance with Safety Plan specified in section 01 35 29.
  - .2 Use of a Hot Work Permit system with individually issued permit by Contractor's Superintendent to worker or subcontractor granting permission to proceed with Hot Work.
  - .3 Permit required for each Hot Work event.
  - .4 Designation of a person on site as a Fire Safety Watcher responsible to conduct a fire safety watch for a minimum duration of 30-60 minutes immediately following the completion of the Hot Work.
  - .5 Compliance with fire safety codes, standards and occupational health and safety regulations specified.
  - .6 Site specific rules and procedures in force at the site as provided by the Facility Manager.
- .3 Generic procedures, if used, must be edited and supplemented with pertinent information tailored to reflect specific project conditions. Label document as being the Hot Work Procedures for this contract.
- .4 Procedures shall clearly establish responsibilities of:
  - .1 Worker performing hot work,

- .2 Person issuing the Hot Work Permit,
- .3 Fire Safety Watcher,
- .4 Subcontractor(s) and Contractor.
- .5 Brief all workers and subcontractors on Hot Work Procedures and of Permit system. Stringently enforce compliance.

## **1.7 HOT WORK PERMIT**

- .1 Hot Work Permit to include the following:
  - .1 Project name and project number;
  - .2 Building name and specific room or area where hot work will be performed;
  - .3 Date of issue;
  - .4 Description of hot work type needed;
  - .5 Special precautions to be followed, including type of fire extinguisher needed;
  - .6 Name and signature of permit issuer.
  - .7 Name of worker to which the permit is issued.
  - .8 Permit validity period not to exceed 8 hours. Indicate start time/date and termination time/date.
  - .9 Worker's signature with time/date of hot work completion.
  - .10 Stipulated time period of safety watch.
  - .11 Fire Safety Watcher's signature with time/date.
- .2 Permit to be typewritten form. Industry Standard forms shall only be used if all data specified above is included on form.
- .3 Each Hot Work Permit to be completed in full, signed and returned to Contractor's Superintendent for safe keeping on site.

## **1.8 FIRE PROTECTION AND ALARM SYSTEMS**

- .1 Fire protection and alarm systems shall not be:
  - .1 Obstructed.
  - .2 Shut-off, unless approved by Departmental Representative.
  - .3 Left inactive at the end of a working day or shift.
- .2 Do not use fire hydrants, standpipes and hose systems for purposes other than firefighting.
- .3 Costs incurred, from the fire department, Facility owner and tenants, resulting from negligently setting off false alarms will be charged to the Contractor in the form of financial progress payment reductions and holdback assessments against the Contract.

## **1.9 DOCUMENTS ON SITE**

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

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- .2      Upon request, make available to Departmental Representative or to authorized safety Representative for inspection.

**END OF SECTION**

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**Part 1            General**

**1.1            RELATED SECTIONS**

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

**1.2            DEFINITIONS**

- .1        COSH: Canada Occupational Health and Safety Regulations made under Part II of the Canada Labour Code.
- .2        Competent Person: means a person who is:
  - .1        Qualified by virtue of personal knowledge, training and experience to perform assigned work in a manner that will ensure the health and safety of persons in the workplace, and;
  - .2        Knowledgeable about the provisions of occupational health and safety statutes and regulations that apply to the Work and;
  - .3        Knowledgeable about potential or actual danger to health or safety associated with the Work.
- .3        Medical Aid Injury: any minor injury for which medical treatment was provided and the cost of which is covered by Workers' Compensation Board of the province in which the injury was incurred.
- .4        PPE: personal protective equipment.
- .5        Work Site: where used in this section shall mean areas, located at the premises where Work is undertaken, used by Contractor to perform all of the activities associated with the performance of the Work.

**1.3            SUBMITTALS**

- .1        Make submittals in accordance with Section 01 33 00.
- .2        Submit site-specific Health and Safety Plan prior to commencement of Work.
  - .1        Submit within 5 work days of notification of Bid Acceptance. Allow for 5-10 days for Department review and recommendations prior to the commencement of work. Provide 3 copies.
  - .2        Departmental Representative will review Health and Safety Plan and provide comments.
  - .3        Revise the Plan as appropriate and resubmit within 10 work days after receipt of comments.
  - .4        Departmental Representative's review and comments made of the Plan shall not be construed as an endorsement, approval or implied warranty of any kind by Canada and does not reduce Contractor's overall responsibility for Occupational Health and Safety of the Work.

- .5 Submit revisions and updates made to the Plan during the course of Work.
- .3 Submit name of designated Health and Safety Site Representative and support documentation specified in the Safety Plan.
- .4 Submit building permit, compliance certificates and other permits obtained.
- .5 Submit copy of Letter in Good Standing from Provincial Workers Compensation or other Department of Labour organization.
- .1 Submit update of Letter of Good Standing whenever expiration date occurs during the period of Work.
- .6 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .7 Submit copies of incident reports.
- .8 Submit WHMIS MSDS - Material Safety Data Sheets.

#### **1.4 COMPLIANCE REQUIREMENTS**

- .1 Comply with Occupational Health and Safety Act for Province of Prince Edward Island, and Occupational Health and Safety Regulations made pursuant to the Act.
- .2 Comply with Canada Labour Code - Part II (entitled Occupational Health and Safety) and the Canada Occupational Health and Safety Regulations as well as any other regulations made pursuant to the Act.
  - .1 The Canada Labour Code can be viewed at:  
[www.http://laws-lois.justice.gc.ca/eng/acts/L-2\\_fulltext.html](http://laws-lois.justice.gc.ca/eng/acts/L-2_fulltext.html).
  - .2 Canadian Occupational Health and Safety Regulations can be viewed at:  
<http://laws-lois.justice.gc.ca/eng/regulations/SOR-86-304/index.html>.
  - .3 A copy may be obtained at: Canadian Government Publishing Public Works & Government Services Canada Ottawa, Ontario, K1A 0S9 Tel: 819-956-4800 or 1-800-635-7943 Publication No. L31-85/2000 (E or F).
- .3 Treasury Board of Canada Secretariat (TBS):
  - .1 Treasury Board, Fire Protection Standard April 1, 2010  
[www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=17316&section=text](http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=17316&section=text).
- .4 Canadian Standards Association (CSA):
  - .1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.
- .5 Observe construction safety measures of:
  - .1 NBC 2015, Division B, Part 8.
  - .2 Municipal by-laws and ordinances.

- .6 In case of conflict or discrepancy between above specified requirements, the more stringent shall apply.
- .7 Maintain Workers Compensation Coverage in good standing for duration of Contract. Provide proof of clearance through submission of Letter in Good Standing.
- .8 Medical Surveillance: Where prescribed by legislation or regulation, obtain and maintain worker medical surveillance documentation.

## **1.5 RESPONSIBILITY**

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons and environment adjacent to the site to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by all workers, sub-contractors and other persons granted access to Work Site with safety requirements of Contract Documents, applicable federal, provincial, and local by-laws, regulations, and ordinances, and with site-specific Health and Safety Plan.

## **1.6 SITE CONTROL AND ACCESS**

- .1 Control the Work and entry points to Work Site. Approve and grant access only to workers and authorized persons. Immediately stop and remove non-authorized persons.
  - .1 Departmental Representative will provide names of those persons authorized by Departmental Representative to enter onto Work Site and will ensure that such authorized persons have the required knowledge and training on Health and Safety pertinent to their reason for being at the site, however, Contractor remains responsible for the health and safety of authorized persons while at the Work Site.
- .2 Isolate Work Site from other areas of the premises by use of appropriate means.
  - .1 Erect fences, hoarding, barricades and temporary lighting as required to effectively delineate the Work Site, stop non-authorized entry, and to protect pedestrians and vehicular traffic around and adjacent to the Work and create a safe environment. See Section 01 50 00 for minimum acceptable requirement.
  - .2 Post signage at entry points and other strategic locations indicating restricted access and conditions for access.
  - .3 Use professionally made signs with bilingual message in the 2 official languages or international known graphic symbols.
- .3 Provide safety orientation session to persons granted access to Work Site. Advise of hazards and safety rules to be observed while on site.
- .4 Ensure persons granted site access wear appropriate PPE. Supply PPE to inspection authorities who require access to conduct tests or perform inspections.



- .5 Secure Work Site against entry when inactive or unoccupied and to protect persons against harm. Provide security guard where adequate protection cannot be achieved by other means.

## **1.7 PROTECTION**

- .1 Give precedence to safety and health of persons and protection of environment over cost and schedule considerations for Work.
- .2 Should unforeseen or peculiar safety related hazard or condition become evident during performance of Work, immediately take measures to rectify situation and prevent damage or harm. Advise Departmental Representative verbally and in writing.

## **1.8 FILING OF NOTICE**

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

## **1.9 PERMITS**

- .1 Post permits, licenses and compliance certificates, specified in section 01 10 10, at Work Site.
- .2 Where a particular permit or compliance certificate cannot be obtained, notify Departmental Representative in writing and obtain approval to proceed before carrying out applicable portion of work.

## **1.10 HAZARD ASSESSMENTS**

- .1 Perform site specific health and safety hazard assessment of the Work and its site.
- .2 Carryout initial assessment prior to commencement of Work with further assessments as needed during progress of work, including when new trades and subcontractors arrive on site.
- .3 Record results and address in Health and Safety Plan.
- .4 Keep documentation on site for entire duration of the Work.

## **1.11 MEETINGS**

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

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

- .3 Keep documents on site.

## **1.12 HEALTH AND SAFETY PLAN**

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

- .2 Health and Safety Plan shall include the following components:

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

- .3 On-site Contingency and Emergency Response Plan shall include:

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

- .4 On-site Communication Plan:

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

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

- .6 Review Health and Safety Plan regularly during the Work. Update as conditions warrant to address emerging risks and hazards, such as whenever new trade or subcontractor arrive at Work Site.
- .7 Departmental Representative will respond in writing, where deficiencies or concerns are noted and may request re-submission of the Plan with correction of deficiencies or concerns.
- .8 Post copy of the Plan, and updates, prominently on Work Site.

### **1.13 SAFETY SUPERVISION**

- .1 Employ Health & Safety Site Representative responsible for daily supervision of health and safety of the Work.
- .2 Health & Safety Site Representative may be the Superintendent of the Work or other person designated by Contractor and shall be assigned the responsibility and authority to:
  - .1 Implement, monitor and enforce daily compliance with health and safety requirements of the Work
  - .2 Monitor and enforce Contractor's site-specific Health and Safety Plan.
  - .3 Conduct site safety orientation session to persons granted access to Work Site.
  - .4 Ensure that persons allowed site access are knowledgeable and trained in health and safety pertinent to their activities at the site or are escorted by a competent person while on the Work Site.
  - .5 Stop the Work as deemed necessary for reasons of health and safety.
- .3 Health & Safety Site Representative must:
  - .1 Be qualified and competent person in occupational health and safety.
  - .2 Have site-related working experience specific to activities of the Work.
  - .3 Be on Work Site at all times during execution of the Work.
- .4 All supervisory personnel assigned to the Work shall also be competent persons.
- .5 Inspections:
  - .1 Conduct regularly scheduled safety inspections of the Work on a minimum bi-weekly basis. Record deficiencies and remedial action taken.
  - .2 Conduct Formal Inspections on a minimum monthly basis. Use standardized safety inspection forms. Distribute to subcontractors.
  - .3 Follow-up and ensure corrective measures are taken.
- .6 Cooperate with Facility's Occupational Health and Safety representative should one be designated by Departmental Representative.
- .7 Keep inspection reports and supervision related documentation on site.

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**1.14 TRAINING**

- .1 Use only skilled workers on Work Site who are effectively trained in occupational health and safety procedures and practices pertinent to their assigned task.
- .2 Maintain employee records and evidence of training received. Make data available to Departmental Representative upon request.
- .3 When unforeseen or peculiar safety-related hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise Departmental Representative verbally and in writing.

**1.15 MINIMUM SITE SAFETY RULES**

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

**1.16 CORRECTION OF NON-COMPLIANCE**

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

**1.17 INCIDENT REPORTING**

- .1 Investigate and report the following incidents to Departmental Representative:
  - .1 Incidents requiring notification to Provincial Department of Occupational Safety and Health, Workers Compensation Board or to other regulatory Agency.
  - .2 Medical aid injuries.
  - .3 Property damage in excess of \$10,000.00,
  - .4 Interruptions to Facility operations resulting in an operational lost to a Federal department in excess of \$5,000.00.

- .2 Submit report in writing.

#### **1.18 HAZARDOUS PRODUCTS**

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS).
- .2 Keep MSDS data sheets for all products delivered to site.
  - .1 Post on site.
  - .2 Submit copy to Departmental Representative.
  - .3 For interior work in an occupied Facility, post additional copy in one or more publicly accessible locations.

#### **1.19 POWDER ACTUATED DEVICES**

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

#### **1.20 CONFINED SPACES**

- .1 Abide by occupational health and safety regulations regarding work in confined spaces.
- .2 Obtain an Entry Permit in accordance with Part XI of the Canada Occupational Health and Safety Regulations for entry into an existing identified confined space located at the Facility or premises of Work.
  - .1 Obtain permit from Facility Manager.
  - .2 Keep copy of permit issued.
- .3 Safety for Inspectors:
  - .1 Provide PPE and training to Departmental Representative and other persons who require entry into confined space to perform inspections.
  - .2 Be responsible for efficacy of equipment and safety of persons during their entry and occupancy in the confined space.

#### **1.21 SITE RECORDS**

- .1 Maintain on Work Site copy of safety related documentation and reports stipulated to be produced in compliance with Acts and Regulations of authorities having jurisdiction and of those documents specified herein. Upon request, make available to Departmental Representative or authorized Safety Officer for inspection.

#### **1.22 POSTING OF DOCUMENTS**

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on Work Site in accordance with Acts and Regulations of Province having jurisdiction.
- .2 Post other documents as specified herein, including:
  - .1 Site specific Health and Safety Plan.

.2 WHMIS data sheets.

**END OF SECTION**

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**Part 1            General**

**1.1                RELATED SECTIONS**

- .1        Waste Management and Disposal: Section 01 74 22.

**1.2                DEFINITIONS**

- .1        Hazardous Material: Product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to the environment or adversely affect health of persons, animals, or plant life when released into the environment.
- .2        Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.
- .3        Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.

**1.3                FIRES**

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

**1.4                HAZARDOUS MATERIAL HANDLING**

- .1        Store and handle hazardous materials in accordance with applicable federal and provincial laws, regulations, codes and guidelines. Store in location that will prevent spillage into the environment
- .2        Label containers to WHMIS requirements and keep MSDS data sheets on site for all hazardous materials.
- .3        Maintain inventory of hazardous materials and hazardous waste stored on site. List items by product name, quantity and date when storage began.
- .4        Store and handle flammable and combustible materials in accordance with National Fire Code.
- .5        Transport hazardous materials in accordance with federal Transportation of Dangerous Goods Regulations and applicable Provincial regulations.

**1.5                DISPOSAL OF WASTES**

- .1        Do not bury rubbish and waste materials on site. Dispose in accordance with project waste management requirements specified in section 01 74 22.

- .2 Do not dispose of hazardous waste or volatile materials, such as mineral spirits, paints, thinners, oil or fuel into waterways, storm or sanitary sewers or waste landfill sites.
- .3 Dispose of hazardous waste in accordance with applicable federal and provincial laws, regulations, codes and guidelines.

## **1.6 DRAINAGE**

- .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with governing regulations and requirements.
- .4 Provide control devices such as filter fabrics, sediment traps and settling ponds to control drainage and prevent erosion of adjacent lands. Maintain in good order for duration of work.

## **1.7 POLLUTION CONTROL**

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment and plant to local authority's emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads and around entire construction site.
- .5 Have appropriate emergency spill response equipment and rapid clean-up kit on site located adjacent to hazardous materials storage area. Provide personal protective equipment required for clean-up.
- .6 Report, spills of petroleum and other hazardous materials as well as accidents having potential of polluting the environment to Federal and Provincial Department of the Environment.
  - .1 Notify Departmental Representative and submit a written spill report to Departmental Representative within 24 hours of occurrence.

**END OF SECTION**



**Part 1            General**

**1.1            ABBREVIATIONS AND ACRONYMS**

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

**1.2            MATERIALS, EQUIPMENT AND METHODS**

- .1        A:
  - .1        AC: acoustic.
  - .2        AC PAN: acoustic panel.
  - .3        ACU: acoustic unit ceiling.
  - .4        AFF: above finished floor.
  - .5        AC PLAS: acoustic plaster.
  - .6        ACT: acoustic tile.
  - .7        ACR CU LVR: acrylic cube louvre.
  - .8        ADH: adhesive.
  - .9        ADJ: adjustable.
  - .10       A/C: air conditioner.
  - .11       AL: aluminum.
  - .12       AB: anchor bolt.
  - .13       ANOD: anodized.
  - .14       ARCH: architecture.
  - .15       ARCH BLK: architectural block.
  - .16       AVB: air vapour barrier.
- .2        B:
  - .1        B: base.
  - .2        BEAST: benthic assessment of sediment.
  - .3        BH: bore hole.
  - .4        BL: bottom layer.
  - .5        BLK: block.
  - .6        BLKD: bulkhead.
  - .7        BM: beam.
  - .8        BOT: bottom.
  - .9        BMP: best management practice.
  - .10       B PL: base plate.
  - .11       BRG: bearing.
  - .12       BRK: brick.
  - .13       BSMT: basement.

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

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- .6 DIM: dimension.
- .7 DL: dead load.
- .8 DMNT: demountable.
- .9 DP: dampproofing.
- .10 DR: door.
- .11 DRP: drapery.
- .12 DWL: dowel.
- .5 E:
- .1 EA: each.
- .2 EC: epoxy coating.
- .3 ECF: engineered containment facility.
- .4 EE: each end.
- .5 EF: each face.
- .6 EL: elevation.
- .7 ELEC: electric.
- .8 ELEV: elevator.
- .9 EM: expanded metal.
- .10 ENCL: enclosure.
- .11 EQ: equal.
- .12 EXH: exhaust.
- .13 EXIST: existing.
- .14 EXPJ: expansion joint.
- .15 EXP STRUCT: exposed structure.
- .16 EXT: exterior.
- .17 EW: each way.
- .6 F:
- .1 FC: fuel contributed.
- .2 FD: floor drain.
- .3 FDN: foundation.
- .4 FEAT W: feature wall.
- .5 FEXT: fire extinguisher.
- .6 FH: fire hose.
- .7 FHC: fire hose cabinet.
- .8 FHR: fire hose rack.
- .9 FIN: finish.
- .10 FIP: federal identity program.
- .11 FL: floor.
- .12 FLD: field.
- .13 FLUOR: fluorescent.

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- .14 FR: frame.
- .15 FRR: fire resistance rating.
- .16 FTG: footing.
- .7 G:
- .1 GALV: galvanized steel.
- .2 GB: grab bar.
- .3 GBD: gypsum board.
- .4 GC: General Conditions.
- .5 GF: ground floor.
- .6 GFCI: ground fault circuit interrupter.
- .7 GL: glass or glazing.
- .8 GL BLK: glass block.
- .9 GPC: gypsum plaster ceiling.
- .10 GPW: gypsum plaster wall.
- .11 GT: glass tile.
- .8 H:
- .1 HB: hose bib.
- .2 HC: hollow core.
- .3 HCWD: hollow core wood door.
- .4 HD: hand dryer.
- .5 HDW: hardware.
- .6 HDWD: hardwood.
- .7 HM: hollow metal.
- .8 HOR: horizontal.
- .9 HOR EF: horizontal each face.
- .10 HP: hydro pole.
- .11 HPA: Hamilton Port Authority.
- .12 HR: hour.
- .13 HRV: heat recovery ventilator.
- .14 HT: height.
- .15 HTR: heater.
- .16 HWT: hot water tank.
- .17 HYD: hydrant.
- .9 I:
- .1 ICF: insulated concrete formwork.
- .2 ID: inside diameter.
- .3 INS: insulation.
- .4 INTLK: interlock.

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- .10 J:
- .1 JT: joint.
- .11 K:
- .1 KPL: kick plate.
- .12 L:
- .1 LAV: lavatory.
- .2 LDG: landing.
- .3 LG: long.
- .4 LINO: linoleum.
- .5 LL: live load.
- .6 LT: light.
- .13 M:
- .1 MAS: masonry.
- .2 MAS FL: masonry flashing.
- .3 MAX: maximum.
- .4 MBG: metal bar grating.
- .5 MCL: metal cube louvre.
- .6 MECH: mechanical.
- .7 MET: metal.
- .8 MET DK: metal deck.
- .9 MET FL: metal flashing.
- .10 MET GRID CLG: metal grid ceiling.
- .11 MET GRTG: metal grating.
- .12 MET LIN CLG: metal linear ceiling.
- .13 MET T PTN: metal toilet partition.
- .14 MH: maintenance hole.
- .15 MIN: minimum.
- .16 MLP: metal lath and plaster.
- .17 MO: masonry opening.
- .18 MR: marble.
- .19 MT: metal threshold.
- .20 MWP: membrane waterproofing.
- .14 N:
- .1 NBC: national building code.
- .2 NF: near face.
- .3 NFC: national fire code.
- .4 NIC: not in contract.

- 
- .5 NO: number.
- .6 NRC: noise reduction coefficient.
- .7 NRP: non-removable pin.
- .8 NTS: not to scale.
- .15 O:
- .1 OBC: Ontario building code.
- .2 OC: on centre.
- .3 OD: outside diameter.
- .4 OPNG: opening.
- .5 OPR: operator.
- .6 OVHD: overhead.
- .7 OWSJ: open web steel joist.
- .16 P:
- .1 P: prefinished.
- .2 PAH: polynuclear aromatic hydrocarbons.
- .3 PARG: parging.
- .4 PCC: precast concrete.
- .5 PCT: porcelain ceramic tile.
- .6 PED ACS FLG: pedestal access flooring.
- .7 PF: panel fabric.
- .8 PL: plate.
- .9 PLAM: plastic laminate.
- .10 PLAS: plaster.
- .11 PLYWD: plywood.
- .12 PR: pair.
- .13 PREFAB: prefabricated.
- .14 PREFIN: prefinished.
- .15 PRFL: profile.
- .16 PT: paint.
- .17 PTD: paper towel dispenser.
- .18 PTN: partition.
- .19 PVC: polyvinyl chloride.
- .17 Q:
- .1 QTB: quarry tile base.
- .2 QTF: quarry tile floor.
- .3 QTR: quarry tile roof.
- .18 R:
- .1 R: radius.

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.2	RA: return air.
.3	RB: resilient base.
.4	RC: reinforced concrete.
.5	RCPT: receptacle.
.6	RD: roof drain.
.7	REINF: reinforced/reinforcing.
.8	REQD: required.
.9	REQT: requirement.
.10	RFT: rubber floor tile.
.11	RM: room.
.12	RO: rough opening.
.13	RP: radiant panel.
.14	RRS: recycled rubber sheet.
.15	RRT: recycled rubber tile.
.16	RSD: rolling steel door.
.17	RSF: rubber sheet flooring.
.18	RTU: roof top unit.
.19	RWL: rain water leader.
.19	S:
.1	SAN SEW: sanitary sewer.
.2	SCHED: schedule.
.3	SC: solid core.
.4	SCRN: screen.
.5	SCWD: solid core wood door.
.6	SD: smoke developed.
.7	SDT: static dissipative tile.
.8	SECT: section.
.9	SH: sill height.
.10	SIM: similar.
.11	SL: sliding.
.12	SLR: sealer.
.13	SPEC: specification.
.14	SS: stainless steel.
.15	STD: standard.
.16	STL: steel.
.17	STL BM: steel beam.
.18	STC: sound transmission class.
.19	STL FL DK: steel floor deck.
.20	STL PL: steel plate.

- 
- .21 STN: stone.
  - .22 STR: structure or structural.
  - .23 ST SEW: storm sewer.
  - .24 S&U: stain and urethane.
  - .25 S&V: stain and varnish.
  - .26 SVT: solid vinyl tile.
  - .20 T:
    - .1 T: top.
    - .2 T&B: top and bottom.
    - .3 TCB: turbidity control plan.
    - .4 TEL: telephone.
    - .5 TER: terrazzo.
    - .6 TERT: terrazzo tile.
    - .7 THKNS: thickness.
    - .8 THR: threshold.
    - .9 TMPD: tempered.
    - .10 TOPG: topping.
    - .11 TRANSV: transverse.
    - .12 TYP: typical.
  - .21 U:
    - .1 U: urethane.
    - .2 UCUT: undercut.
    - .3 UGRD: underground.
    - .4 UNO: unless noted otherwise.
    - .5 UOS: unless otherwise specified.
    - .6 U/S: underside.
    - .7 UR: urinal.
  - .22 V:
    - .1 VCF: vinyl coated fabric.
    - .2 VCT: vinyl composition tile.
    - .3 VERT: vertical.
    - .4 VERT B: vertical blinds.
    - .5 VERT EF: vertical each face.
    - .6 VSF: vinyl sheet flooring.
    - .7 VT: vinyl tile.
    - .8 VWC: vinyl wall covering.
  - .23 W:
    - .1 WC: water closet.



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

### 1.3 STANDARDS ORGANIZATIONS

- .1 Standards writing organizations:
  - .1 AA - Aluminum Association.
  - .2 ACPA - American Concrete Pipe Association.
  - .3 ANSI - American National Standards Institute.
  - .4 ASHRAE - American Society of Heating and Refrigerating and Air-Conditioning Engineers.
  - .5 ASTM - American Society for Testing and Materials.
  - .6 AWI/AWMAC - Architectural Woodwork Institute/Architectural Woodwork Manufacturers Association of Canada.
    - .1 AWWPA - American Wood Preservers' Association.
    - .2 AWWA - American Water Works Association.
    - .3 BHMA - Builders Hardware Manufacturers Association.
    - .4 CCDC - Canadian Construction Documents Committee.
    - .5 CCMPA - Canadian Concrete Masonry Producers Association.
    - .6 CGSB - Canadian General Standards Board.
    - .7 CNTA - Canadian Nursery Trades Association.
    - .8 CPCA - Canadian Painting Contractors Association.
    - .9 CRCA - Canadian Roofing Contractors Association.
    - .10 CSA - Canadian Standards Association.
    - .11 CSC - Construction Specifications Canada.
    - .12 CSDMA - Canadian Steel Door Manufacturers Association.
    - .13 CSI - Construction Specifications Institute.
    - .14 CSSBI - Canadian Sheet Steel Building Institute.
    - .15 CRCA - Canadian Roofing Contractors Association.
    - .16 DHI - Door and Hardware Institute.
    - .17 EEMAC - Electrical and Electronic Manufacturer's Association of Canada.

- .18 ESA - Electrical Safety Authority.
- .19 FCC - Fire Commissioner of Canada.
- .20 FSC - Forest Stewardship Council.
- .21 GANA - Glass Association of North America.
- .22 HMMA - Hollow Metal Manufacturers Association.
- .23 IEEE - Institute of Electrical and Electronics Engineers Inc.
- .24 ISO - International Organization for Standardization.
- .25 IWFA - International Window Film Association.
- .26 LEED - LEED Canada, Leadership in Energy and Environmental Design.
- .27 MPI - Master Painters Institute.
- .28 NAAMM - National Association of Architectural Metal Manufacturers.
- .29 NCPI - National Clay Pipe Institute.
- .30 NEMA - National Electrical Manufacturers Association.
- .31 NFPA - National Fire Protection Association.
- .32 OPSD - Ontario Provincial Standard Drawings.
- .33 OPSS - Ontario Provincial Standard Specifications.
- .34 PPI - Plastics Pipe Institute.
- .35 SDI - Steel Door Institute.
- .36 SCAQMD - South Coast Air Quality Management District.
- .37 TIA - Telecommunications Industry Association.
- .38 TIAC - Thermal Insulation Association of Canada.
- .39 TTMAC - Terrazzo Tile and Marble Association of Canada.
- .40 UL - Underwriters Laboratories.
- .41 ULC - Underwriters Laboratories of Canada.
- .42 US EPA - United States Environmental Protection Agency.
- .43 WH - Warnock Hersey.

#### **1.4 FEDERAL GOVERNMENT DEPARTMENTS AND AGENCIES**

- .1 Departments, agencies and crown corporations.
- .2 CEAA - Canadian Environmental Assessment Agency.
- .3 CSC - Correctional Service Canada.
- .4 CRA - Canada Revenue Agency.
- .5 DND - Department of National Defence.
- .6 EC - Environment Canada.
- .7 FHBRO - Federal Heritage Buildings Review Office.

- .8 HC - Health Canada.
- .9 HCD - Heritage Conservation Directorate.
- .10 LC - Labour Canada.
- .11 PC - Parks Canada.
- .12 PWGSC - Public Works and Government Services Canada.
- .13 RCMP - Royal Canadian Mounted Police.
- .14 TBS - Treasury Board Secretariat.
- .15 TC - Transport Canada.

## **1.5 UNITS OF MEASURE METRIC**

- .1 The following abbreviations of units of measure are commonly found in the Project Manual:
  - .1 C: Celsius.
  - .2 cm: centimetre.
  - .3 kg: kilogram.
  - .4 kg/m<sup>3</sup>: kilogram per cubic metre.
  - .5 kN: kilonewton.
  - .6 kPa: kilopascals.
  - .7 kW: kilowatts.
  - .8 l/s: litre per second.
  - .9 m: metre.
  - .10 m<sup>3</sup>: cubic metre.
  - .11 mg/kg: milligrams per kilogram.
  - .12 mg/L: milligrams per litre.
  - .13 mm: millimetres.
  - .14 MPa: megapascal.
  - .15 NTU: nephelometric turbidity unit.
  - .16 ppm: parts per million.
  - .17 µg/L: micrograms per litre.
  - .18 µg/m<sup>3</sup>: micrograms per cubic metre.

## **1.6 UNITS OF MEASURE IMPERIAL**

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

- 
- .2 ft: foot/feet.
  - .3 ga: gauge.
  - .4 gpm: gallons per minute.
  - .5 in: inches.
  - .6 lbs: pounds.
  - .7 NTU: nephelometric turbidity unit.
  - .8 psi: pounds-force per square inch.
  - .9 ppm: parts per million.

**END OF SECTION**

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**Part 1            General**

**1.1            INSPECTION**

- .1      Give timely notice requesting inspection of Work designated for special tests, inspections or approvals by Departmental Representative or by inspection authorities having jurisdiction.
- .2      In accordance with the General Conditions, Departmental Representative may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents.
- .3      If Contractor covers or permits to be covered Work designated for special tests, inspections or approvals before such is made, uncover Work until particular inspections or tests have been fully and satisfactorily completed and until such time as Departmental Representative gives permission to proceed.
- .4      Pay costs to uncover and make good work disturbed by inspections and tests.

**1.2            TESTING**

- .1      Tests on materials, equipment and building systems as specified in various sections of the Specifications is the responsibility of the Contractor except where stipulated otherwise.
  - .1      Provide all necessary instruments, equipment and qualified personnel to perform tests.
- .2      At completion of tests, turn over 2 sets of fully documented tests reports to the Departmental Representative. Submit in accordance with Section 01 33 00.
  - .1      Obtain additional copies for inclusion of a complete set in each of the maintenance manuals specified in Section 01 78 00.
- .3      Unspecified tests may also be made by Departmental Representative, at the discretion of the Departmental Representative. The costs of these tests will be paid for by the Departmental Representative.
- .4      Where tests or inspections reveal work not in accordance with contract requirements, Contractor shall pay costs for additional tests and inspections incurred by Departmental Representative as required to verify acceptability of corrected work.

**1.3            INDEPENDENT INSPECTION AGENCIES**

- .1      Departmental Representative may engage and pay for service of Independent Inspection and Testing Agencies for purpose of inspecting and testing portions of Work except for the following which remain part of Contractor's responsibilities:
  - .1      Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.

- .2 Inspection and testing performed exclusively for Contractor's convenience.
- .3 Testing, adjustment and balancing of mechanical and electrical equipment and other building systems.
- .4 Performance verification tests before building commissioning procedures commences.
- .5 Mill tests and certificates of compliance.
- .6 Tests as specified within various sections designated to be carried out by Contractor under the supervision of Departmental Representative.
- .2 Provide sufficient advance notice to Departmental Representative of time when the Work will be ready for testing by designated Testing Agency in order for Departmental Representative to make attendance arrangements with such Agency. When directed by Departmental Representative notify the Agency directly.
- .3 When specified or directed, submit Representative samples of materials, in required quantities, to Testing Agency for testing purposes. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.
- .4 Provide labour and facilities to obtain, handle and deliver samples.
- .5 Provide sufficient space on site for Testing Agency's exclusive use to store equipment and cure test samples.
- .6 Employment of Independent Inspection and Testing Agencies by Departmental Representative does not relax responsibility to perform Work in accordance with Contract Documents.

#### **1.4 ACCESS TO WORK**

- .1 Facilitate Departmental Representative's access to Work. If part of Work is being fabricated at locations other than construction site, make preparations to allow access to such Work whenever it is in progress.
- .2 Furnish labour and facility to provide access to the work being inspected and tested.
- .3 Co-operate to facilitate such inspections and tests.

#### **1.5 REJECTED WORK**

- .1 Remove and replace defective Work, whether result of poor workmanship, use of defective or damaged products and whether incorporated in Work or not, which has been identified by Departmental Representative as failing to conform to Contract Documents.
- .2 Make good damages to new and existing construction and finishes resulting from removal or replacement of defective work.

**END OF SECTION**

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**Part 1            General**

**1.1            SITE ACCESS AND PARKING**

- .1      The Departmental Representative will designate Contractor's access to project site as well as parking facilities for equipment and workers.
- .2      The Contractor is advised that while parking facilities for his workers and subcontractors will be on property, such parking facilities may be remote from the actual site of the work. In any case, follow all instructions from the Departmental Representative in regard to parking facilities.
- .3      Maintain existing roads and parking areas at site, where used by Contractor, for duration of contract.
  - .1          Keep clean and free of mud and dirt by washing on a regular basis.
  - .2          Provide snow removal in areas located within construction site or enclosed by work.
  - .3          Make good and repair damage resulting from Contractor's use of existing roads, asphalted areas and lawns on site.

**1.2            BUILDING ACCESS**

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

**1.3            MATERIAL STORAGE**

- .1      Locate site storage trailers where directed by Departmental Representative. Place in location of least interference with existing Facility operations.
- .2      Material storage space on site is limited. Coordinate delivery to minimize storage period on site before being needed for incorporation into work.
- .3      Make arrangements elsewhere in the city as deemed required and pay all costs for storage of materials not ready for incorporation into work.

**1.4            INTERIOR HOARDING**

- .1      Erect hoarding inside building to isolate construction areas and protect occupants for duration of work.
- .2      Construct hoarding as follows:
  - .1          Height: to underside of floor or roof above.
  - .2          Framing type: 92mm steel stud spaced at 610 mm on centre.
  - .3          Scribed to underside and profile of ceiling above.
  - .4          Fill stud cavity with acoustic batt.

- .5 Covering: 13 mm thick gypsum board sheathing both sides. Taped and filled on one (1) side.
- .6 Finish: Prime plus one coat of 100% acrylic paint: public view only.
- .7 Apply acrylic sealant to abutting surfaces.
- .8 Access Door and Frame: one (1) wood 914x2134 mm door and frame sound sealed, dust tight and lockable.

## **1.5 INTERIOR DUST CONTROL AND DUST BARRIERS**

- .1 Control creation and spread of dust and dirt to building interior and in particular to areas within premises still under use by occupants.
- .2 Develop and implement a dust control plan, addressing effective measures to carry out work with least amount of dust being created and propagated.
  - .1 Carefully evaluate the type of work to be undertaken and the physical layout of each work area on site.
  - .2 Provide specifically tailored strategy for each work area.
  - .3 Pre-determine location and placement of dust barriers to confine resulting dust to immediate work area.
  - .4 Inform Departmental Representative of the proposed dust control measures to be followed at each work area and for each major dust generating activities. Obtain Departmental Representative's approval before proceeding with work.
- .3 Dust control plan to incorporate as a minimum the following dust protection and cleaning requirements:
  - .1 Erect dustproof partitions completely around work area to fully isolate construction from other parts of the building.
  - .2 Construct dust partitions as follows:
    - .1 Use 10 mil polyethylene installed and sealed tightly to abutting walls, ceilings and floor with continuous duct tape along all edges and seams. Support in position with 38 x 89 wood framing at 400 mm o.c. Locate seams only at framing members and overlap sheeting by minimum of 150 mm.
    - .2 Use 13 mm thick plywood installed to steel stud framing spaced at 400 mm o.c. for areas located in public and corridors in use by occupants
      - .1 Erect from floor to underside of ceiling above, sheeting applied to occupied side of partition..
      - .2 Scribe, cut and fit sheathing tight to shape of structural steel, deck profile and to other obstructions in ceiling space and abutting walls.
      - .3 Use compressible neoprene gaskets around perimeter of partition and at all protrusions to achieve airtight construction.
      - .4 Where partition is exposed to public view, tape and finish drywall joints and paint surface to color approved by the Departmental Representative.



- .3 Provide a "dust tight" and lockable access door(s) within dust partition or between rooms for worker entry into work area. This is of particular importance for situations where excessive dust will be generated.
- .4 Provide additional dust barriers, placed tightly to underside of the floor/roof deck above, in locations where existing walls are used as part of the dust barrier system but simply terminate at the finished ceiling level resulting in an open space above, or other similar condition, permitting dust to migrate beyond the construction areas.
- .5 Make all dust barriers airtight, effectively blocking and stopping all dust migration.
- .6 Inspect dust barriers at various intervals during each work shift. Immediately fix tears, unsealed edges and maintain barriers effectively sealed for the entire work duration.
- .7 Shut down existing ventilation system feeding construction space, or disconnect and seal-off supply and return air ducts to stop dust from contaminating other areas.
- .8 Immediately clean areas in use by occupants and public contaminated by work.
  - .1 Vacuum carpets, wash floors and walls. Remove accumulated dust from all surfaces. Clean and remove smears, scuffs and marks.
- .4 Meager attempts at controlling dust will not be tolerated. Failure to provide effective dust control during work and to perform satisfactory cleaning thereafter will result in Departmental Representative to proceed and obtain a separate cleaning service agency to perform cleaning to tenant's satisfaction with cost for such services being charged against this Contract in the form of financial holdbacks.
- .5 Obtain Departmental Representative's approval before erecting any dust partitions simply to underside of finish ceiling.
- .6 Construction of dust barriers, enclosures and placement of temporary protective devices to be performed during Facility non-operational off-hour periods.

## **1.6 SANITARY FACILITIES**

- .1 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.
- .2 Sanitary facilities are available at the site and may be used by Contractor's work force. Make arrangements for the use of such facilities through the Departmental Representative.

## **1.7 POWER**

- .1 Power supply is available and will be provided for construction usage at no cost.
  - .1 Make arrangements for the use of such services through the Departmental Representative.

- .2 Departmental Representative will designate and approve each location of existing power source to which connections can be made to obtain temporary power service.
- .3 Connect to existing power supply in accordance with CSA C22.1-12, Canadian Electrical Code.
- .2 Provide and pay all costs to supply and install temporary cabling, panel boards, switching devices and other equipment as required to connect into power source, provide adequate ground fault protection and extend power supply from existing source to work areas. Perform work and make all connections in accordance with the CSA C22.1-12 Canadian Electrical Code, in compliance with the federal and provincial Occupational Health and Safety Regulations as specified in section 01 35 29.
- .3 Provide and maintain temporary lighting to conduct work. Ensure illumination level is not less than 162 lx in all locations.
- .4 Electrical power and lighting systems installed under this Contract can be used for construction requirements provided that guarantees are not affected thereby. Make good damage. Replace lamps which have been used over period of 3 months.

## **1.8 SCAFFOLDING**

- .1 Design, construct and maintain scaffolding in rigid, secure and safe manner in accordance with CSA Z797-09, Code of Practice for Access Scaffold.
- .2 Erect scaffolding independent of walls. Remove when no longer required.

## **1.9 HEATING AND VENTILATING**

- .1 Supply, install and pay for costs of temporary heat and ventilation used during construction, including costs of installation, fuel, operation, maintenance and removal of equipment. Use of direct-fired heaters discharging waste products into work areas will not be permitted.
- .2 Provide temporary heat and ventilation in enclosed areas as required to:
  - .1 Facilitate progress of work.
  - .2 Protect work and products against dampness and cold.
  - .3 Prevent moisture condensation on surfaces.
  - .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
  - .5 Provide adequate ventilation to meet health regulations for safe working environment.
- .3 Maintain minimum temperature of 10 degrees C, or higher where specified, as soon as finishing work is commenced and maintain until acceptance of structure by Departmental Representative.
  - .1 Maintain ambient temperature and humidity levels as required for comfort of office personnel.

- .4 Ventilating:
  - .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
  - .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
  - .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
  - .4 Ventilate storage spaces containing hazardous or volatile materials.
  - .5 Ventilate temporary sanitary facilities.
  - .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.
- .5 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
  - .1 Conform with applicable codes and standards.
  - .2 Enforce safe practices.
  - .3 Prevent abuse of services.
  - .4 Prevent damage to finishes.
  - .5 Vent direct-fired combustion units to outside.
- .6 Submit bid assuming existing equipment and systems will not be used for temporary heating and ventilating.
- .7 Upon acceptance of bid, Departmental Representative may permit use of permanent system providing agreement can be reached on:
  - .1 Conditions of use, special equipment, protection and maintenance.
  - .2 Saving on Contract price.
  - .3 Provisions relating to warranties on equipment.

#### **1.10 CONSTRUCTION SIGN AND NOTICES**

- .1 Contractor or subcontractor advertisement signboards are not permitted on site.
- .2 Safety and Instruction Signs and Notices:
  - .1 Signs and notices for safety and instruction shall be in both official languages or commonly understood graphic symbols conforming to CAN/CSA-Z321-96(R2006).
- .3 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.

**1.11            REMOVAL OF TEMPORARY FACILITIES**

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

**END OF SECTION**

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**Part 1            General**

**1.1            GENERAL**

- .1      Use new material and equipment unless otherwise specified.
- .2      Within seven (7) days of written request by Departmental Representative, submit following information for any materials and products proposed for supply:
  - .1      Name and address of manufacturer.
  - .2      Trade name, model and catalogue number.
  - .3      Performance, descriptive and test data.
  - .4      Compliance to specified standards.
  - .5      Manufacturer's installation or application instructions.
  - .6      Evidence of arrangements to procure.
  - .7      Evidence of manufacturer delivery problems or unforeseen delays.
- .3      Provide material and equipment of specified design and quality, performing to published ratings and for which replacement parts are readily available.
- .4      Use products of one manufacturer for equipment or material of same type or classification unless otherwise specified.
- .5      Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

**1.2            PRODUCT QUALITY**

- .1      Contractor shall be solely responsible for submitting relevant technical data and independent test reports to confirm whether a product or system proposed for use meets contract requirements and specified standards.
- .2      Final decision as to whether a product or system meets contract requirements rest solely with the Departmental Representative in accordance with the General Conditions of the Contract.

**1.3            ACCEPTABLE MATERIALS AND ALTERNATIVES**

- .1      Acceptable Materials: When materials specified include trade names or trade marks or manufacturer's or supplier's name as part of the material description, select and only use one of the names listed for incorporation into the Work.
- .2      Alternative Materials: Submission of alternative materials to trade names or manufacturer's names specified must be done during the bidding period following procedures indicated in the Instructions to Bidders.

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

#### **1.4 MANUFACTURER'S INSTRUCTIONS**

- .1 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods to be used. Do not rely on labels or enclosure provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Departmental Representative in writing of any conflict between these specifications and manufacturers instructions, so that Departmental Representative will designate which document is to be followed.

#### **1.5 AVAILABILITY**

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

#### **1.6 WORKMANSHIP**

- .1 Ensure quality of work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed.
- .2 Remove unsuitable or incompetent workers from site as stipulated in the General Conditions of the Contract.
- .3 Ensure cooperation of workers in laying out work. Maintain efficient and continuous supervision on site at all times.
- .4 Coordinate work between trades and subcontractors. See section 01 14 10 in this regard.
- .5 Coordinate placement of openings, sleeves and accessories.

#### **1.7 FASTENINGS - GENERAL**

- .1 Provide metal fastenings and accessories in same texture, colour and finish as base metal in which they occur. Prevent electrolytic action between dissimilar metals. Use non-corrosive fasteners, anchors and spacers for securing exterior work and in humid areas.
- .2 Space anchors within limits of load bearing or shear capacity and ensure that they provide positive permanent anchorage. Wood or organic material plugs not acceptable.
- .3 Keep exposed fastenings to minimum, space evenly and lay out neatly.
- .4 Fastenings which cause spalling or cracking of material to which anchorage is made, are not acceptable.
- .5 Do not use explosive actuated fastening devices unless approved by Departmental Representative. See section on Health and Safety Requirements in this regard.

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**1.8 FASTENINGS - EQUIPMENT**

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Use heavy hexagon heads, semi-finished unless otherwise specified.
- .3 Bolts may not project more than one diameter beyond nuts.
- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur and, use resilient washers with stainless steel.

**1.9 STORAGE, HANDLING AND PROTECTION**

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

**1.10 CONSTRUCTION EQUIPMENT AND PLANT**

- .1 On request, prove to the satisfaction of Departmental Representative that the construction equipment and plant are adequate to manufacture, transport, place and finish work to quality and production rates specified. If inadequate, replace or provide additional equipment or plant as directed.

**END OF SECTION**

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**Part 1            General**

**1.1            GENERAL**

- .1      Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
- .2      Store volatile waste in covered metal containers and remove from premises at end of each working day.
- .3      Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

**1.2            MATERIALS**

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

**1.3            CLEANING DURING CONSTRUCTION**

- .1      Maintain work areas in a tidy condition, free from accumulations of waste material and debris. Clean areas on a daily basis.
- .2      Keep building entrances, corridors, stairwells and tenant occupied areas of building in a clean dust free condition at all times. Conduct thorough cleaning of these areas at end of each work shift when used by workers or affected by the Work.
- .3      Provide on-site steel dump containers for collection of waste materials and debris.
- .4      Use separate collection bins, clearly marked as to purpose, for source separation and recycling of waste and debris in accordance with waste management requirements specified.
- .5      Remove waste materials, and debris from site on a daily basis.
- .6      Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.
- .7      Provide dust barriers, dividers, seals on doors and employ other dust control measures as required to ensure that dust and dirt, generated by work, are not transmitted to existing areas of building. Should dust migrate into tenant occupied and public areas of building, employ such means as may be necessary to immediately clean all contaminated surfaces to the satisfaction of the Departmental Representative.
  - .1      See Section 01 50 00 for requirements on dust control and for erection of dust partitions.
- .8      Immediately clean all dust, dirt, smears, scuffs and soiled surfaces in lobbies, corridors, stairwells and within tenant occupied areas resulting from the Work.



- .1 Perform cleaning, dusting and washing operations, carpet vacuuming (including shampooing if deemed required by Departmental Representative) and floor washing as necessary to thoroughly clean all soiled surfaces.
- .9 Remove snow and ice from access doors used by workforce.

#### **1.4 FINAL CLEANING**

- .1 In preparation for acceptance of the completed work perform final cleaning.
- .2 Remove grease, dust, dirt, stains, labels, fingerprints, marks and other foreign materials, from interior and exterior finished surfaces. Clean and polish surfaces including glass, mirrors, hardware, wall tile, stainless steel, chrome, baked enamel, plastic laminate, mechanical and electrical fixtures.
- .3 Replace items with broken pieces, scratches or disfigured.
- .4 Clean lighting reflectors, lenses, and other lighting surfaces.
- .5 Vacuum clean and dust building interiors, behind grilles, louvres and screens.
- .6 Wax, seal, shampoo or prepare floor finishes as recommended by manufacturer.
- .7 Inspect finishes, fitments and equipment. Ensure specified workmanship and operation.
- .8 Broom clean and wash exterior paved surfaces and walks; rake clean other surfaces of grounds.
- .9 Remove debris and surplus materials from crawl areas, roof areas and other accessible concealed spaces.
- .10 Clean equipment, washroom and kitchen fixtures to a sanitary condition. Replace filters of mechanical equipment.

**END OF SECTION**

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**Part 1            General**

**1.1            DEFINITIONS**

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

**1.2            WASTE MANAGEMENT**

- .1       Incorporate environmental and sustainable practises in managing waste resulting from work.
- .2       Divert as much waste as possible from landfill.
- .3       Coordinate work of subtrades and subcontractors to ensure all possible waste reduction and recycling opportunities are taken. Follow waste management requirements specified in trade sections of the Specifications.
- .4       Reduce waste during installation of new materials. Undertake practices which will optimize full use of materials and minimize waste.
- .5       Develop innovative procedures to reduce quantity of waste generated by construction such as by delivering materials to site with minimal packaging etc.
- .6       Provide on-site facilities to collect, handle and store anticipated quantities of reusable, salvageable and recyclable materials.
- .7       During demolition and removal work separate materials and equipment at source, carefully dismantling, labelling and stockpiling alike items for the following purposes:
  - .1       Reinstallation into the work where indicated.
  - .2       Salvaging reusable items not needed in project which Contractor may sell to other parties.
  - .3       Sending as many items as possible to locally available recycling facility.
  - .4       Segregating remaining waste and debris into various individual waste categories for disposal in a "non-mixed state" as recommended by waste processing/landfill sites.
- .8       Isolate product packaging and delivery containers from general waste stream. Send to recycling facility or return to supplier/manufacturer.
- .9       Send leftover material resulting from installation work for recycling whenever possible.
- .10      Establish methods whereby hazardous and toxic materials, and their containers used on site are properly handled, stored and disposed in accordance with applicable federal, provincial and municipal laws and regulations.

### **1.3 DISPOSAL REQUIREMENTS**

- .1 Burying or burning of rubbish and waste materials is prohibited.
- .2 Disposal of volatile materials, mineral spirits, oil, paint, and other hazardous materials into waterways, storm, or sanitary sewers is prohibited.
- .3 Dispose of waste only at approved waste processing facility or landfill sites approved by authority having jurisdiction.
- .4 Contact the authority having jurisdiction prior to commencement of work, to determine what, if any, demolition and construction waste materials have been banned from disposal in landfills and at transfer stations. Take appropriate action to isolate such banned materials at site of work and dispose in strict accordance with provincial and municipal regulations.
- .5 Transport and dispose of waste intended for waste processing plant or landfill facility in separated condition and to Operator's rules and recommendations in support of their effort to recycle, reduce and divert certain waste stream from general landfill.
- .6 Collect, bundle and transport salvaged materials to be recycled in separated categories and condition as directed by recycling facility. Ship materials only to approved recycling facilities.
- .7 Sale of salvaged items by Contractor to other parties not permitted on site.

**END OF SECTION**

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**Part 1            General**

**1.1            INSPECTION AND DECLARATION**

- .1 Contractor's Inspection: Coordinate and perform, in concert with subcontractors, an inspection and check of all Work. Identify and correct deficiencies, defects, repairs and perform outstanding items as required to complete work in conformance with Contract Documents.
  - .1 Notify Departmental Representative in writing when deficiencies from Contractor's inspection have been rectified and that Work is deemed to be complete and ready for Departmental Representative's inspection of the completed work.
- .2 Departmental Representative's Inspection: Accompany Departmental Representative during all substantial and final inspections of the Work.
  - .1 Address defects, faults and outstanding items of work identified by such inspections.
  - .2 Advise Departmental Representative when all deficiencies identified have been rectified.
- .3 Note that Departmental Representative will not issue a Certificate of Substantial Performance of the work until such time that Contractor performs following work and turns over the specified documents:
  - .1 Project record as-built documents;
  - .2 Final Operations and Maintenance manuals;
  - .3 Maintenance materials, parts and tools;
  - .4 Compliance certificates from applicable authorities;
  - .5 Reports resulting from designated tests;
  - .6 Demonstration and training complete with user manuals;
  - .7 Manufacturer's Guarantee certificates.
  - .8 Testing, adjusting and balancing of equipment and systems complete with submission of test reports.
  - .9 Commissioning of equipment and systems specified.
- .4 Correct all discrepancies before Departmental Representative will issue the Certificate of Completion.

**END OF SECTION**

**Part 1            General**

**1.1            PROJECT RECORD DOCUMENTS**

- .1      Departmental Representative will provide two (2) white print sets of contract drawings and two (2) copies of Specifications Manual specifically for "As-Built" purposes.
- .2      Maintain at site one set of the contract drawings and specifications to record actual As-Built site conditions.
- .3      Maintain up-to-date, real time as-built drawings and specifications in good condition and make available for inspection by the Departmental Representative upon request.
- .4      As-Built Drawings:
  - .1      Record changes in red ink on the prints. Mark only on one set of prints and at completion of work, neatly transfer notations to second set (also by use of red ink).
  - .2      Submit both sets to Departmental Representative prior to application for Certificate of Substantial Performance.
  - .3      Stamp all drawings with "As-Built". Label and place Contractor's signature and date.
  - .4      Show all modifications, substitutions and deviations from what is shown on the contract drawings.
  - .5      Record following information:
    - .1      Horizontal and vertical location of exterior underground utilities and appurtenances referenced to permanent surface improvements.
    - .2      Location of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure;
    - .3      Field changes of dimension and detail;
    - .4      Location of all capped or terminated services and utilities.
    - .5      Chases for mechanical, electrical and other services;
    - .6      Ceiling and floor elevations;
    - .7      Reflected ceiling plan condition showing finished layout of all ceiling-mounted services and devices;
    - .8      Plumbing, heating, air conditioning and ventilation, sprinkler and electrical service installation locations; all to be dimensioned and referenced to building columns or load bearing walls;
    - .9      All structural steel installations to be fully dimensioned;
    - .10     All design elevations, sections, floor plans and details dimensioned and marked-up to consistently report finished installation conditions;
    - .11     Any details produced in the course of the contract by the Departmental Representative to supplement or to change existing design drawings;

- .12 All change orders issued over the course of the contract must be documented on the finished As-Built documents, accurately and consistently depicting the changed condition as it applies to all affected drawing details.
- .5 As-Built Specifications: legibly mark in red each item to record actual construction, including:
  - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly items substituted from that specified.
  - .2 Changes made by Addenda and Change Orders.
  - .3 Mark up both copies of specifications; stamp "As-Built", sign and date similarly to drawings as per above clause.
- .6 Maintain As-Built documents current as the contract progresses. Departmental Representative will conduct reviews and inspections of the documents on a regular basis. Failure to maintain as-builts current and complete to satisfaction of the Departmental Representative shall be subject to financial penalties in the form of progress payment reductions and holdback assessments.

## **1.2 REVIEWED SHOP DRAWINGS**

- .1 Provide a complete set of all shop drawings reviewed for project to incorporate into each copy of the Operations and Maintenance Manuals.
- .2 Submit full sets at same time and as part of the contents of the Operation and Maintenance Manuals specified.

## **1.3 UPDATING OF DIGITAL DRAWINGS**

- .1 Obtain and pay for the services of a qualified drafting firm to update the digital files which were used to produce the contract drawings.
  - .1 Update the digital drawing files with the same As-Built information as specified for the paper As-Built drawings.
  - .2 Supply of digital documents does not replace the requirement to provide marked-up white prints specified above.
- .2 The Departmental Representative will provide a copy of the digital drawing files.
- .3 Incorporate the as-built changes to the digital drawings by following the standards specified in the latest version of the PWGSC National CADD Standard. A copy of this manual will be provided by the Departmental Representative.
- .4 Make revisions to electronic files found to be in non-conformance with the PWGSC National CADD Standard as directed by Departmental Representative.
- .5 In regard to updating the digital files to reflect changes resulting from Change Orders, the change in cost of completing the As-Built documentation of changes is to be included in the amount for each Change Order issued. The amount included will constitute only the increase or decrease in CADD related costs resulting directly from the change. In

determining the cost difference, full consideration will be given to the fact that other clauses of this section require As-Built CADD updates to the drawings irrespective of any Change Orders.

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

#### **1.4 OPERATIONS & MAINTENANCE MANUAL**

- .1 O&M Manual - Definition: an organized compilation of operating and maintenance data including detailed technical information, documents and records describing operation and maintenance of individual products or systems as specified in individual sections of the specifications.
- .2 Manual Language: final manuals to be in English languages.
- .3 Number of copies required:
  - .1 Submit 2 interim copies of the manual for review and inspection by Departmental Representative. Make revisions and additions as directed and resubmit.
  - .2 Upon review and acceptance by Departmental Representative, submit 3 final copies. Interim copies are not to be considered as part of the final copies unless they have been fully revised and are identical to the final approved version.
- .4 Submission Date: submit complete operation and maintenance manual to Departmental Representative three (3) weeks prior to application for Certificate of Substantial Performance of the work.
- .5 Binding:
  - .1 Assemble, coordinate, bind and index required data into Operation and Maintenance Manual.
  - .2 Use vinyl, hard covered, 3 "D" ring binders, loose leaf, sized for 215 x 280 mm paper, with spine pocket.
  - .3 Where multiple binders are needed, correlate data into related consistent groupings.
  - .4 Identify contents of each binder on spine.
  - .5 Organize and divide data following same numerical system as the section numbers of the Specification Manual.
  - .6 Dividers: separate each section by use of cardboard dividers and labels. Provide tabbed fly leaf for each individual product and system and give description of product or component.
  - .7 Type lists and notes. Do not hand write.

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- .8 Drawings, diagrams and manufacturers' literature must be legible. Provide with reinforced, punched binder tab. Bind in with text; fold larger drawings to size of text pages.
  - .6 Manual Contents:
    - .1 Cover sheet containing:
      - .1 Date submitted.
      - .2 Project title, location and project number.
      - .3 Names and addresses of Contractor, and all Sub-Contractors.
    - .2 Table of Contents: provide full table of contents in each binder(s), clearly indicate which contents are in each binder.
    - .3 List of maintenance materials.
    - .4 List of spare parts.
    - .5 List of special tools.
    - .6 Original or certified copy of warranties and product guarantees.
    - .7 Copy of approval documents and certificates issued by Inspection Authorities.
    - .8 Copy of reports and test results performed by Contractor as specified.
    - .9 Product Information (PI Data) on materials, equipment and systems as specified in various sections of the specifications. Data to include:
      - .1 List of equipment including manufacturer's name, supplier, local source of supplies and service depot(s). Provide full addresses and telephone numbers.
      - .2 Nameplate information including equipment number, make, size, capacity, model number and serial number.
      - .3 Parts list.
      - .4 Installation details.
      - .5 Operating instructions.
      - .6 Maintenance instructions for equipment.
      - .7 Maintenance instructions for finishes.
  - .7 Shop drawings:
    - .1 Include complete set of reviewed shop drawings into each copy of the operations and maintenance manual.
    - .2 Fold and bind material professionally in a manner that corresponds with the specification section numbering system.
    - .3 When large quantity of data is submitted, place into separate binders of same size as O&M binders.
  - .8 Equipment and Systems Data: the following list indicates the type of data and extent of information required to be included for each item of equipment and for each system:
    - .1 Description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.



- .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
- .3 Include installed colour coded wiring diagrams.
- .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- .5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .6 Servicing and lubrication schedule, and list of lubricants required.
- .7 Manufacturer's printed operation and maintenance instructions.
- .8 Sequence of operation by controls manufacturer.
- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide installed control diagrams by controls manufacturer.
- .11 Provide Contractor's coordination drawings, with installed colour coded piping diagrams.
- .12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- .13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .14 Include test and balancing reports.
- .15 Additional requirements as specified in individual specification sections.
- .9 Materials and Finishes Maintenance Data:
  - .1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.
  - .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
  - .3 Moisture-protection and Weather-exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
  - .4 Additional Requirements: as specified in individual specifications sections.

## **1.5 SPARE PARTS, TOOLS AND MAINTENANCE MATERIALS**

- .1 Provide spare parts, special tools and extra materials for maintenance purposes in quantities specified in individual specification sections.
- .2 Tag all items with associated function or equipment.
- .3 Provide items of same manufacture and quality as items in Work.

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- .4 Deliver to site in well packaged condition. Store in location as directed by Departmental Representative.
  - .5 Clearly mark as to contents indicating:
    - .1 Part number.
    - .2 Identification of equipment or system for which parts are applicable.
    - .3 Installation instructions or intended use as applicable.
    - .4 Name, address and telephone number of nearest suppliers.
  - .6 Prepare and submit complete inventory list of items supplied. Include list within Maintenance Manual.

**END OF SECTION**

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**Part 1            General**

**1.1            RELATED SECTIONS**

- .1       Operations and Maintenance Manual: Section 01 78 00.

**1.2            DESCRIPTION**

- .1       Demonstrate scheduled operation and maintenance of equipment and systems to Owner's personnel prior to date of final inspection.
- .2       Departmental Representative will provide a list of Owner's personnel to receive instructions,
- .3       Cooperate with Departmental Representative in coordinating time and attendance of Owner's personnel with manufacturer's training Representative(s).

**1.3            QUALITY CONTROL**

- .1       Ensure that only personnel from own forces, Subcontractors or Suppliers competent and fully knowledgeable in the particular material component, equipment or system installation are used to provide training and demonstrations.
- .2       When specified in individual Sections, obtain the manufacturers authorized Representative to demonstrate operation of equipment and systems, instruct Owner's personnel, and provide written report that demonstration and instructions have been completed.
- .3       Upon request, provide evidence to Departmental Representative of individual Trainor's knowledge and qualifications.

**1.4            SUBMITTALS**

- .1       Submit schedule of time, date and complete list of equipment and systems for which demonstration and training sessions will be provided. Submit schedule a minimum of two (2) weeks prior to designated dates, for Departmental Representative's approval.
- .2       Submit report within one (1) week after completion of demonstration, that demonstration and instructions have been satisfactorily completed. Provide time and date of when each demonstration was actually given, with list of persons present.

**1.5            CONDITIONS FOR DEMONSTRATIONS**

- .1       Prior to carrying out demonstration and training, ensure that equipment has been inspected and tested, is fully operational, has been performance verified and TAB has been carried out.
- .2       Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.

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**1.6 PREPARATION**

- .1 Verify that conditions for demonstration and instructions comply with requirements.
- .2 Verify that designated personnel are present.

**1.7 DEMONSTRATION AND INSTRUCTIONS**

- .1 Include the following items within the demonstration and training:
  - .1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each of equipment.
  - .2 Instruct personnel in all phases of operation and maintenance using operation and maintenance manuals as the basis of instruction.
  - .3 Review contents of manual in detail to explain all aspects of operation and maintenance.
  - .4 Prepare and insert additional data in operations and maintenance manuals when the need for additional data becomes apparent during instructions.
  - .5 Provide other specific training and instructions as specified in trade sections.

**1.8 TIME ALLOCATED FOR INSTRUCTIONS**

- .1 Observe the allocated time period specified in trade sections. Provide additional time when required to ensure all personnel fully understand all aspects of the information and instructions being provided. Allow for questions by participants.

**END OF SECTION**

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**Part 1            General**

**1.1                WORK INCLUDED**

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

**1.2                SUMMARY**

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

**1.3                GENERAL**

- .1        Cx is a planned program of tests, procedures and checks carried out systematically on systems and integrated systems of the finished Project. Cx is performed after systems and integrated systems are completely installed, functional and Contractor's Performance Verification responsibilities have been completed and approved. Cx to follow PWGSC Commissioning Guidelines. Objectives:
  - .1        Verify installed equipment, systems and integrated systems operate in accordance with contract documents and design criteria and intent.
  - .2        Ensure appropriate documentation is compiled into the BMM.
  - .3        Effectively train O M staff.
- .2        Contractor assists in Cx process, operating equipment and systems, troubleshooting and making adjustments as required.
  - .1        Systems to be operated at full capacity under various modes to determine if they function correctly and consistently at peak efficiency. Systems to be interactively with each other as intended in accordance with Contract Documents and design criteria.
  - .2        During these checks, adjustments to be made to enhance performance to meet environmental or user requirements.
- .3        Design Criteria: as per client's requirements or determined by designer. To meet Project functional and operational requirements.

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#### **1.4 COMMISSIONING OVERVIEW**

- .1 Cx to be a line item of Contractor's cost breakdown.
- .2 Cx activities supplement field quality and testing procedures described in relevant technical sections.
- .3 Cx is conducted in concert with activities performed during stage of project delivery. Cx identifies issues in Planning and Design stages which are addressed during Construction and Cx stages to ensure the built facility is constructed and proven to operate satisfactorily under weather, environmental and occupancy conditions to meet functional and operational requirements. Cx activities include transfer of critical knowledge to facility operational personnel.
- .4 Engineer will issue Certificate of Substantial Completion when:
  - .1 Completed Cx documentation has been received, reviewed for suitability and approved by Engineer.
  - .2 Equipment, components and systems have been commissioned.
  - .3 O M training has been completed.

#### **1.5 NON-CONFORMANCE TO PERFORMANCE VERIFICATION REQUIREMENTS**

- .1 Should equipment, system components, and associated controls be incorrectly installed or malfunction during Cx, correct deficiencies, re-verify equipment and components within the functional system, including related systems as deemed required by Engineer, to ensure effective performance.
- .2 Costs for corrective work, additional tests, inspections, to determine acceptability and proper performance of such items to be borne by Contractor. Above costs to be in form of progress payment reductions or hold-back assessments.

#### **1.6 PRE-CX REVIEW**

- .1 Before Construction:
  - .1 Review contract documents, confirm by writing to Engineer.
    - .1 Adequacy of provisions for Cx.
    - .2 Aspects of design and installation pertinent to success of Cx.
- .2 During Construction:
  - .1 Co-ordinate provision, location and installation of provisions for Cx.
- .3 Before start of Cx:
  - .1 Have completed Cx Plan up-to-date.
  - .2 Ensure installation of related components, equipment, sub-systems, systems is complete.
  - .3 Fully understand Cx requirements and procedures.
  - .4 Have Cx documentation shelf-ready.
  - .5 Understand completely design criteria and intent and special features.

- .6 Submit complete start-up documentation to Engineer.
- .7 Have Cx schedules up-to-date.
- .8 Ensure systems have been cleaned thoroughly.
- .9 Complete TAB procedures on systems, submit TAB reports to Engineer for review and approval.
- .10 Ensure "As-Built" system schematics are available.
- .4 Inform Engineer in writing of discrepancies and deficiencies on finished works.

## **1.7 CONFLICTS**

- .1 Report conflicts between requirements of this section and other sections to Engineer before start-up and obtain clarification.
- .2 Failure to report conflict and obtain clarification will result in application of most stringent requirement.

## **1.8 ACTION AND INFORMATIONAL SUBMITTALS**

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

## **1.9 COMMISSIONING DOCUMENTATION**

- .1 Contractor to prepare his own Commissioning Cx) Forms and shall include at least the following: Installation Check Lists and Product Information (PI) / Performance Verification (PV) Forms for requirements and instructions for use.
- .2 Engineer to review and approve Cx documentation.
- .3 Provide completed and approved Cx documentation to Engineer.

## **1.10 COMMISSIONING SCHEDULE**

- .1 Provide detailed Cx schedule as part of construction schedule
- .2 Provide adequate time for Cx activities prescribed in technical sections and commissioning sections including:
  - .1 Approval of Cx reports.
  - .2 Verification of reported results.

- .3 Repairs, retesting, re-commissioning, re-verification.
- .4 Training.

#### **1.11 COMMISSIONING MEETINGS**

- .1 Convene Cx meetings as specified herein.
- .2 Purpose: to resolve issues, monitor progress, identify deficiencies, relating to Cx.
- .3 Continue Cx meetings on regular basis until commissioning deliverables have been addressed.
- .4 At 75% construction completion stage, Engineer to call a separate Cx scope meeting to review progress, discuss schedule of equipment start-up activities and prepare for Cx. Issues at meeting to include:
  - .1 Review duties and responsibilities of Contractor and subcontractors, addressing delays and potential problems.
  - .2 Determine the degree of involvement of trades and manufacturer's representatives in the commissioning process.
- .5 Thereafter Cx meetings to be held until project completion and as required during equipment start-up and functional testing period.
- .6 Meeting will be chaired by Engineer, who will record and distribute minutes.
- .7 Ensure subcontractors and relevant manufacturer representatives are present at subsequent Cx meetings, as required.

#### **1.12 STARTING AND TESTING**

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

#### **1.13 WITNESSING OF STARTING AND TESTING**

- .1 Provide 7 days notice prior to commencement.
- .2 Engineer to witness of start-up and testing.
- .3 Contractor's Cx Agent to be present at tests performed and documented by sub-trades, suppliers and equipment manufacturers.

#### **1.14 MANUFACTURER'S INVOLVEMENT**

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



- .2 Obtain manufacturers installation, start-up and operations instructions prior to start-up of components, equipment and systems and review with Engineer
  - .1 Compare completed installation with manufacturer's published data, record discrepancies, and review with manufacturer.
  - .2 Modify procedures detrimental to equipment performance and review same with manufacturer before start-up.
- .3 Integrity of warranties:
  - .1 Use manufacturer's trained start-up personnel where specified elsewhere in other divisions or required to maintain integrity of warranty.
  - .2 Verify with manufacturer that testing as specified will not void warranties.
- .4 Qualifications of manufacturer's personnel:
  - .1 Experienced in design, installation and operation of equipment and systems.
  - .2 Ability to interpret test results accurately.
  - .3 To report results in clear, concise, logical manner.

## **1.15 PROCEDURES**

- .1 Verify that equipment and systems are complete, clean, and operating in normal and safe manner prior to conducting start-up, testing and Cx.
- .2 Conduct start-up and testing in following distinct phases:
  - .1 Included in delivery and installation:
    - .1 Verification of conformity to specification, approved shop drawings and completion of PI report forms.
    - .2 Visual inspection of quality of installation.
  - .2 Start-up: follow accepted start-up procedures.
  - .3 Operational testing: document equipment performance.
  - .4 System PV: include repetition of tests after correcting deficiencies.
  - .5 Post-substantial performance verification: to include fine-tuning.
- .3 Correct deficiencies and obtain approval from Engineer after distinct phases have been completed and before commencing next phase.
- .4 Document required tests on approved PV forms.
- .5 Failure to follow accepted start-up procedures will result in re-evaluation of equipment by an independent testing agency selected by Engineer. If results reveal that equipment start-up was not in accordance with requirements, and resulted in damage to equipment, implement following:
  - .1 Minor equipment/systems: implement corrective measures approved by Engineer.
  - .2 Major equipment/systems: if evaluation report concludes that damage is minor, implement corrective measures approved by Engineer.
  - .3 If evaluation report concludes that major damage has occurred, Engineer shall reject equipment.

- .1 Rejected equipment to be remove from site and replace with new.
- .2 Subject new equipment/systems to specified start-up procedures.

#### **1.16 START-UP DOCUMENTATION**

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

#### **1.17 OPERATION AND MAINTENANCE OF EQUIPMENT AND SYSTEMS**

- .1 After start-up, operate and maintain equipment and systems as directed by equipment/system manufacturer.
- .2 With assistance of manufacturer develop written maintenance program and submit Engineer for approval before implementation.
- .3 Operate and maintain systems for length of time required for commissioning to be completed.
- .4 After completion of commissioning, operate and maintain systems until issuance of certificate of interim acceptance.

#### **1.18 TEST RESULTS**

- .1 If start-up, testing and/or PV produce unacceptable results, repair, replace or repeat specified starting and/or PV procedures until acceptable results are achieved.
- .2 Provide manpower and materials, assume costs for re-commissioning.

#### **1.19 START OF COMMISSIONING**

- .1 Notify Engineer at least 10 days prior to start of Cx.
- .2 Start Cx after elements of building affecting start-up and performance verification of systems have been completed.

#### **1.20 INSTRUMENTS / EQUIPMENT**

- .1 Submit to Engineer for review and approval:
  - .1 Complete list of instruments proposed to be used.
  - .2 Listed data including, serial number, current calibration certificate, calibration date, calibration expiry date and calibration accuracy.
- .2 Provide the following equipment as required:

- .1 2-way radios.
- .2 Ladders.
- .3 Equipment as required to complete work.

#### **1.21 COMMISSIONING PERFORMANCE VERIFICATION**

- .1 Carry out Cx:
  - .1 Under actual operating conditions, over entire operating range, in all modes.
  - .2 On independent systems and interacting systems.
- .2 Cx procedures to be repeatable and reported results are to be verifiable.
- .3 Follow equipment manufacturer's operating instructions.
- .4 EMCS trending to be available as supporting documentation for performance verification.

#### **1.22 WITNESSING COMMISSIONING**

- .1 Engineer to witness activities and verify results.

#### **1.23 AUTHORITIES HAVING JURISDICTION**

- .1 Where specified start-up, testing or commissioning procedures duplicate verification requirements of authority having jurisdiction, arrange for authority to witness procedures so as to avoid duplication of tests and to facilitate expedient acceptance of facility.
- .2 Obtain certificates of approval, acceptance and compliance with rules and regulations of authority having jurisdiction.
- .3 Provide copies to Engineer within 5 days of test and with Cx report.

#### **1.24 EXTENT OF VERIFICATION**

- .1 100% of supplied and installed equipment must be verified.
- .2 Perform additional commissioning until results are acceptable to Engineer.

#### **1.25 REPEAT VERIFICATIONS**

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

#### **1.26 SUNDRY CHECKS AND ADJUSTMENTS**

- .1 Make adjustments and changes which become apparent as Cx proceeds.
- .2 Perform static and operational checks as applicable and as required.

#### **1.27 DEFICIENCIES, FAULTS, DEFECTS**

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

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

#### **1.28 COMPLETION OF COMMISSIONING**

- .1 Upon completion of Cx, leave systems in normal operating mode.
- .2 Except for warranty and seasonal verification activities specified in Cx specifications, complete Cx prior to issuance of Interim Certificate of Completion.
- .3 Cx to be considered complete when contract Cx deliverables have been submitted and accepted by Engineer.

#### **1.29 ACTIVITIES UPON COMPLETION OF COMMISSIONING**

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

#### **1.30 TRAINING**

- .1 In accordance with Section 01 91 41 - Commissioning (Cx) - Training.

#### **1.31 MAINTENANCE MATERIALS, SPARE PARTS, SPECIAL TOOLS**

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

#### **1.32 OCCUPANCY**

- .1 Cooperate fully with Engineer during stages of acceptance and occupancy of facility.

#### **1.33 INSTALLED INSTRUMENTATION**

- .1 Use instruments installed under Contract for TAB and PV if:
  - .1 Accuracy complies with these specifications.
  - .2 Calibration certificates have been deposited with Engineer.
- .2 Calibrated EMCS sensors may be used to obtain performance data provided that sensor calibration has been completed and accepted.

#### **1.34 PERFORMANCE VERIFICATION TOLERANCES**

- .1 Application tolerances:
  - .1 Specified range of acceptable deviations of measured values from specified values or specified design criteria.
- .2 Instrument accuracy tolerances:
  - .1 To be of higher order of magnitude than equipment or system being tested.
- .3 Measurement tolerances during verification:
  - .1 Unless otherwise specified actual values to be within  $\pm 2$  % of recorded values.

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**1.35 OWNER'S PERFORMANCE TESTING**

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

**Part 2 Products**

**2.1 NOT USED**

- .1 Not used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not used.

**END OF SECTION**

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**Part 1            General**

**1.1                WORK INCLUDED**

- .1        This Section specifies roles and responsibilities of Commissioning and Training.

**1.2                TRAINEES**

- .1        Trainees: personnel selected for operating and maintaining this facility. Includes Operator and Manager, building operators, maintenance staff, security staff, technical specialists and management personnel as required.
- .2        Trainees will be available for training during later stages of construction for purposes of familiarization with systems. Training sessions are to be scheduled through the Owner for a time convenient for its staff.

**1.3                INSTRUCTORS**

- .1        Engineer will provide:
  - .1        Descriptions of systems.
  - .2        Instruction on design philosophy, design criteria, and design intent.
- .2        Contractor and certified factory-trained manufacturers' personnel: to provide instruction on the following:
  - .1        Start-Up, operation, shut-down of equipment, components and systems.
  - .2        Control features, reasons for, results of, implications on associated systems of, adjustment of set points of control and safety devices.
  - .3        Instructions on servicing, maintenance and adjustment of systems, equipment and components.
- .3        Contractor and equipment manufacturer to provide instruction on:
  - .1        Start-up, operation, maintenance and shut-down of equipment they have certified installation, started up and carried out PV tests.

**1.4                TRAINING OBJECTIVES**

- .1        Training to be detailed and duration to ensure:
  - .1        Safe, reliable, cost-effective, energy-efficient operation of systems in normal and emergency modes under all conditions.
  - .2        Effective on-going inspection, measurements of system performance.
  - .3        Proper preventive maintenance, diagnosis and trouble-shooting.
  - .4        Ability to update documentation.
  - .5        Ability to operate equipment and systems under emergency conditions until appropriate qualified assistance arrives.

**1.5                TRAINING MATERIALS**

- .1        Instructors to be responsible for content and quality.

- .2 Training materials to include:
  - .1 "As-Built" Contract Documents.
  - .2 Operating Manual.
  - .3 Maintenance Manual.
  - .4 Management Manual.
  - .5 TAB and PV Reports.
- .3 Project Manager and Commissioning Manager will review training manuals.
- .4 Training materials to be in a format that permits future training procedures to same degree of detail.
- .5 Supplement training materials:
  - .1 Transparencies for overhead projectors.
  - .2 Multimedia (ie Powerpoint) presentations.
  - .3 Manufacturer's training videos.
  - .4 Equipment models.

## **1.6 SCHEDULING**

- .1 Include in Commissioning Schedule time for training.
- .2 Deliver training during regular working hours, training sessions to be 3 hours in length unless otherwise indicated in individual specification sections.
- .3 Training to be completed prior to acceptance of facility.
- .4 Training to be scheduled for a time convenient to the Owner and Owner's personnel.

## **1.7 RESPONSIBILITIES**

- .1 Be responsible for:
  - .1 Implementation of training activities,
  - .2 Coordination among instructors,
  - .3 Quality of training, training materials,
- .2 Engineer will evaluate training and materials.
- .3 Upon completion of training, provide written report, signed by Instructors, witnessed by Engineer.

## **1.8 TRAINING CONTENT**

- .1 Training to include demonstrations by Instructors using the installed equipment and systems.
- .2 Content includes:
  - .1 Review of facility and occupancy profile.
  - .2 Functional requirements.
  - .3 System philosophy, limitations of systems and emergency procedures.

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- .4 Review of system layout, equipment, components and controls.
  - .5 Equipment and system start-up, operation, monitoring, servicing, maintenance and shut-down procedures.
  - .6 System operating sequences, including step-by-step directions for starting up, shut-down, operation of valves, dampers, switches, adjustment of control settings and emergency procedures.
  - .7 Maintenance and servicing.
  - .8 Trouble-shooting diagnosis.
  - .9 Inter-Action among systems during integrated operation.
  - .10 Review of O & M documentation.
  - .11 Communication training including:
    - .1 SCADA systems
    - .2 Pumping Controls
    - .3 Standby Generator and Transfer Switch
  - .3 Provide specialized training as specified in relevant Technical Sections of the construction specifications.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not used.

**END OF SECTION**