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Part 1 General**1.1 WORK COVERED BY CONTRACT DOCUMENTS**

- .1 Work of this Contract comprises construction of a new Trades and Storage building and renovation of the exterior wall and roof assemblies of the Headquarters building and adjacent garage, at the Parks Canada Kluane National Park Headquarters located at Logan Street, Haines Junction, Yukon as described in the attached plans and specifications.
- .2 Work related to the KNPHQ Siding/Roofing Replacement scope under this contract includes the supply of all labour and materials for the installation of new exterior siding and roofing including new windows and doors on the existing 892 square meter KNPHQ main building, but is not limited to the following:
 - .1 Demolition of: all existing siding, strapping, trims and flashings; existing wood decking; asbestos concrete grade strip; lead painted guardrail; plywood sheathing and fiberglass batt insulation where indicated; roofing as indicated; doors and windows as indicated.
 - .1 Includes abatement of hazardous materials.
 - .2 Removal and re-installation of mechanical and electrical components.
 - .3 Installation of new air barrier, strapping and aluminum siding, including new trims and flashings.
 - .4 Installation of new membrane.
 - .5 Installation of new aluminum curtainwall and doors, fiberglass windows, metal doors and frames.
 - .6 Installation of new guardrail
 - .7 Protection of existing foamed plastics.
 - .8 Modification of existing mechanical and electrical penetrations as necessary to accommodate new wall assembly and flashings.
 - .9 Re-painting of existing doors
 - .10 Airtightness testing of building envelope on main building.
 - .11 Modification of existing communications line support mast.
 - .12 Sealing all gaps in the building envelope 4 mm or larger to prevent bat entry into the building.
- .3 Work related to the KNPHQ Siding/Roofing Replacement scope under this contract also includes installation of new roof trusses and roofing, and new siding on the existing 124 square meter garage, but is not limited to the following:
 - .1 Demolition of: all existing siding, strapping, trims and flashings; roofing as indicated; doors and windows as indicated
 - .2 Installation of new air barrier, strapping and siding, including new trims and flashings.

- .3 Installation of new pre-engineered wood roof trusses and sheathing on existing garage.
- .4 Installation of new membrane and sheet metal roofing.
- .4 Work related to the Trades and Storage Building Construction scope under this contract includes the supply of all labour and materials for the construction of a 329 sq.m. Trades building including a double vehicle bay, storage, carpentry, and trail crew shop, mechanical room, washroom, and office. Site works including pre-construction removals and a compacted gravel surface and 19 powered parking stalls are also included.
- .5 The following duties under this contract also include:
 - .1 Co-ordination of sub-contractors.
 - .2 Liaison with Owner and Consultant team members including architects and engineers.
 - .3 Securing and paying for all fees and permits.
 - .4 Mobilization and demobilization costs.
 - .5 All work within the extent of contract.
 - .6 Provision of dumpster, construction fencing, office and coordination of all rental costs (including all heavy and light equipment).
 - .7 Coordination and management of all staging areas.
 - .8 Site cleanliness, including progressive cleaning.

1.2 CONTRACT METHOD

- .1 Construct Work under stipulated price contract.

1.3 WORK BY OTHERS

- .1 Co-operate with other Contractors on site in carrying out their respective works and carry out instructions from Departmental Representative. The Contractor will be the Prime Contractor on site for the duration of the Works.
 - .1 Data cabling services for the KNPHQ Trades Building will be provided by Shared Services Canada.
- .2 Work of Project executed prior to start of Work of this Contract, and which is specifically excluded from this Contract:
 - .1 Removal of existing wood siding and strapping from three sides of the penthouse as indicated.
 - .2 Modification of existing mechanical vents to reduce size of openings to prevent bat ingress

1.4 COMPLETION DATE

- .1 All Work related to the KNPHQ Building Siding & Roofing Replacement to be substantially completed by November 30, 2018.
- .2 All Work related to the KNP Trades Building to be completed by August 31, 2019.

1.5 WORK SEQUENCE

- .1 The requirements below relate to the KNPHQ Building Siding and Roofing Replacement scope of Work.
- .2 Construct Work in stages to accommodate Owner's continued use of premises during construction.
- .3 Co-ordinate Progress Schedule and co-ordinate with Owner Occupancy during construction.
- .4 Construct Work in stages to ensure all building envelope areas remain watertight and bat proof. No part of the envelope is to be removed which cannot be replaced and can be made watertight and bat proof under climatic conditions existing at the time.
- .5 Maintain fire access/control.

1.6 WORK SCHEDULE

- .1 Within 10 days after contract award, submit a critical path method bar chart construction schedule for the work, indicating anticipated progress stages within time of completion.
- .2 Minimum stages include:
 - .1 Mobilization,
 - .2 Shop drawings,
 - .3 Product data MSDS sheets and samples submittal,
 - .4 Order and delivery of major components and equipment,
 - .5 Commencement and completion of work of each section of the specifications or trade for each phase as outlined,
 - .6 Major approvals stages,
 - .7 Interim and final inspection times,
 - .8 Commissioning timeframes,
 - .9 Final deficiency corrections,
 - .10 Training,
 - .11 Demobilization
 - .12 Close-out manuals submission.
- .3 When schedule has been reviewed and approved by the Departmental Representative take necessary measures to complete work within scheduled times. Do not change schedule without written approvals from the Departmental Representative.
- .4 Submit updated schedule with each Progress Draw. Progress draws will not be reviewed unless accompanied by an updated schedule.

1.7 CONTRACTOR USE OF PREMISES

- .1 Limit use of premises for Work, for storage, and for access, to allow:
 - .1 Owner occupancy of Headquarters Building.

- .2 Work by other contractors.
- .3 Public usage.
- .2 Co-ordinate use of premises under direction of Departmental Representative.
- .3 Areas for temporary offices, lay down of materials and equipment and storage will be defined and agreed to during the project start up meeting.
- .4 Do not unreasonably encumber site, with material or equipment.
- .5 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .6 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Consultant.
- .7 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

1.8 OWNER OCCUPANCY

- .1 Owner will occupy premises during entire construction period for execution of normal operations.
- .2 Maintain pedestrian access and service vehicle access for Owner operations from Logan Street to the Headquarters building throughout construction.
- .3 Co-operate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

1.9 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

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

1.10 EXISTING SERVICES

- .1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hours' notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to tenant operations.
- .3 Provide alternative routes for personnel, pedestrian and vehicular traffic.
- .4 Establish location and extent of service lines in area of work before starting Work. Notify Departmental Representative of findings.
- .5 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.

- .6 Provide temporary services when directed by Departmental Representative to maintain critical building and tenant systems.
- .7 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic, construction traffic and emergency vehicles.
- .8 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
- .9 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.
- .10 Record locations of maintained, re-routed and abandoned service lines.
- .11 Construct barriers in accordance with Section 01 50 00- Temporary Facilities and Controls.

1.11 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy each document as follows:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Reviewed Shop Drawings.
 - .5 List of Outstanding Shop Drawings.
 - .6 Change Orders.
 - .7 Other Modifications to Contract.
 - .8 Field Test Reports.
 - .9 Copy of Approved Work Schedule.
 - .10 Health and Safety Plan and Other Safety Related Documents.
 - .11 Manufacturers' installation and application instructions.
 - .12 One set of record drawings and specifications for "as-built" purposes.
 - .13 National Building Code of Canada 2015
 - .14 Building Safety Plan
 - .15 Permits and Inspection Reports
 - .16 Other documents as specified.

1.12 SCHEDULE OF VALUES

- .1 Before submitting first progress claim, submit Schedule of Values to Departmental Representative. After approval, it will be used as the basis for progress payments.

1.13 CONSTRUCTION SAFETY MEASURES

- .1 Observe and enforce construction safety measures required by the Canada Labour Code Part II, Occupational Health and Safety, Yukon Occupational Health and Safety Act and

municipal statutes and authorities and site specific Health and Safety Policies and Directives

- .2 In the event of conflict between any provisions of above authorities, the most stringent will apply.
- .3 Provide and maintain guardrails, fences, barricades, lights, signs and other devices required for protection of workmen and public in accordance with the requirements of the Canada Labour Code Part II, Occupational Health and Safety, Yukon Occupational Health and Safety Act and Regulations for Construction Projects and Local by-laws. All signs shall be bilingual or CSA universal pictograms.
- .4 Ensure the safety of building personnel at all times when performing work.
- .5 Refer to Specifications Section 01 35 29 - Health and Safety for additional requirements

1.14 FIRE SAFETY REQUIREMENTS

- .1 Comply with the National Building Code of Canada for fire safety in construction and the National Fire Code of Canada for fire prevention, firefighting and life safety in building in use.
- .2 Comply with Human Resources Development Canada (HRDC), Fire Commissioner of Canada (FCC) Standards;
 - .1 No. 301: Standard for Construction Operations
 - .2 No. 302: Standard for Welding and Cutting
 - .3 No. 374: Fire Protection Standard for General Storage (Indoor and Outdoor)
 - .4 Available from Fire Protection Engineering Services, Labour program, HRDC or following internet site:
http://www.hrsdc.gc.ca/eng/labour/fire_protection/policies_standards/index.shtml
 - .5 Retains all fire safety documents on site.
- .3 Refer to Section 01 35 29 - Health and Safety for further information on Health and Safety

1.15 REGULATORY REQUIREMENTS

- .1 The following codes and Standards are in place for work under this contract. The latest edition applicable at the time to be utilized.
 - .1 National Building Code of Canada (NBC) 2010.
 - .2 National Fire Code of Canada (NFC) 2010.
 - .3 Canadian Electric Code.
 - .4 National Plumbing Code of Canada (NPC) 2010.
 - .5 Canada Labour Code Part II and Federal Occupational Health and Safety Policies
 - .6 Construction Standards and/or any other Code or bylaw of local application.
- .2 Comply with applicable local bylaws, rules and regulations enforced at the location concerned.

- .3 Meet or exceed requirements of Contract documents, specified standards, codes and referenced documents.
- .4 In any case of conflict or discrepancy, the most stringent requirements shall apply

1.16 CONTRACT DOCUMENTS

- .1 The Contract documents, drawings and specifications are intended to complement each other, and to provide for and include everything necessary for the completion of the work.
- .2 Drawings are, in general, diagrammatic and are intended to indicate the scope and general arrangement of the work. Drawings have been prepared in colour for clarity purposes and are intended to be printed in colour. Contractor is responsible for any misinterpretations caused as a result of printing in black and white.

1.17 SPECIFICATIONS

- .1 The specifications are subdivided in accordance with the current 6-digit National Master Specifications System.
- .2 A division may consist of the Work of more than 1 subcontractor. Responsibility for determining which subcontractor provides the labour, material, equipment and services required to complete the Work rests solely with the Contractor.
- .3 In the event of discrepancies or conflicts when interpreting the drawings and specifications, the specifications govern.
- .4 This Division 01 specification set applies to all scopes of Work in the Contract.
- .5 There are two packages of Technical Specifications under the Contract. One for the KNPHQ Building Siding/Roofing Replacement scope of work and Trades Building Construction scope of work, respectively. Those specification packages apply only to the scope of work they are intended for.

1.18 FEES

- .1 Obtain and pay for all permits required by the Government of Yukon, Certificates, Licenses and other permits required by regulatory municipal, provincial or federal authorities to complete the work.
- .2 Provide inspection authorities with plans and information required for issue of acceptance certificates.
- .3 Furnish inspection certificates in evidence that the work installed conforms to the requirements of the authority having jurisdiction.
- .4 Submit to the Electrical Inspection Authority the necessary number of working drawings and specifications for examination and approval prior to commencement of work and pay all associated fees.
 - .1 Obtain and pay for all electrical inspection fees.
 - .2 On completion of the work provide copies of the Electrical Inspection Authority inspection approval certificates.

1.19 EXAMINATION

- .1 Examine Site and be familiar and conversant with existing conditions likely to affect Work, including Contaminated Waste.
- .2 Provide photographs of surrounding properties, objects and structures liable to be damaged or be the subject of subsequent claims.

1.20 ACCEPTANCE OF SUBSTRATES

- .1 Each trade will examine surfaces prepared by others and job conditions which may affect his work, and will report defects to the Departmental Representative. Commencement of Work will imply acceptance of prepared Work or substrate surfaces.

1.21 COORDINATION

- .1 Coordinate work of sub trades.
 - .1 Designate one person to be responsible for review of contract documents and shop drawings and managing coordination of Work.
- .2 Convene meetings between subcontractors whose work interfaces and ensure awareness of areas and extent of interface required.
 - .1 Develop coordination drawings when required, illustrating potential interference between work of various trades and distribute to affected parties.
 - .2 Pay particular close attention to overhead work above ceilings and within or near to building structural elements.
 - .3 Identify on coordination drawings, building elements, service lines, rough-in points and indicate location services entrance to site.
 - .4 Facilitate meeting and review coordination drawings. Ensure subcontractors agree and sign off on drawings.
 - .5 Publish minutes of each meeting.
 - .6 Plan and coordinate work in such a way to minimize quantity of service line offsets.
 - .7 Submit copy of coordination drawings and meeting minutes to Departmental Representative for information purposes.
 - .8 Submit shop drawings and order of prefabricated equipment or rebuilt components only after coordination meeting for such items has taken place.
- .3 Work coordination:
 - .1 Ensure cooperation between trades in order to facilitate general progress of Work and avoid situations of spatial interference.
 - .2 Ensure that each trade provides all other trades reasonable opportunity for completion of Work and in such a way as to prevent unnecessary delays, cutting, patching and removal or replacement of completed Work.
 - .3 Ensure disputes between subcontractors are resolved.

- .4 Departmental Representative is not responsible for, or accountable for extra costs incurred as a result of Contractor's failure to coordinate Work.
- .5 Maintain efficient and continuous supervision. Full-time site superintendent required throughout project.

1.22 CONTRACTOR PROJECT SUPERINTENDENT

- .1 The Contractor shall, upon award of contract, designate a Project Superintendent. The Contractor shall provide the name, cellular phone number to the Departmental Representative at the preconstruction meeting.
- .2 The Project Superintendent shall have full responsibility for the project and shall be authorized to accept and act upon any notice or direction provided by the Consultant. Project Superintendent shall be available on site at all times that work is being performed under this contract.
- .3 Supervise and direct all persons engaged in the work, including all tradesmen and suppliers. Become familiar with the requirements of each trade. Coordinate delivery and work operations. Examine the work of all trades during work operations to ensure compliance with the contract requirements. Expedite all work to maintain the contract schedule.
- .4 Cooperate with all other contractors working on site in parallel or related projects.
- .5 Attend coordination and project meetings at the direction of the Departmental Representative.

1.23 CONTRACTOR AND SUB-CONTRACTORS

- .1 The Contractor agrees to employ those sub-contractors proposed by him in writing as listed in the Contractor's tender submission.
- .2 Do not change or substitute approved contractor for sub-contractors without prior authorization from the design authority.
- .3 Contractor and sub-contractor personnel shall be qualified as per definitions under the Trades Qualification and Apprenticeship Acts and as required by regulatory agencies in the Yukon Territory.
 - .1 Electrical work shall be carried out by qualified and licensed electrical contractors as per Yukon Territory regulations.
 - .2 Plumbing work shall be carried out by qualified and licensed plumbing contractors as per Yukon Territory regulations.

1.24 MATERIALS OTHER THAN SPECIFIED

- .1 Secure in writing, permission from the Departmental Representative to use any materials other than those specified.
- .2 The listed suppliers/manufacturers are acceptable for their ability to meet the general design intent, quality and performance characteristics of the specified product. The

listed equipment/materials does not endorse the acceptability of all products available from the listed manufacturers/suppliers.

- .3 It remains the responsibility of the contractor to ensure the products supplied are equal to the specified products in every aspect, operate as intended, and meet the performance specifications and physical dimensions of the specified product.
- .4 The contractor shall be fully responsible for any additional materials, to accommodate the use of equipment from the acceptable manufacturer and suppliers list.

1.25 PROPOSED SUBSTITUTIONS

- .1 Where equivalent products have been submitted without specifics, it is the contractor's responsibility to provide detailed specifications highlighting differences to the specified unit prior to requesting for acceptance as equal. Requests without inclusion of sufficient details will automatically be rejected. Provide differences and clear quantifiable characteristics why, how and where the unit meets performance and other requirements. Requests for substitution must be made to the Departmental Representative.
- .2 Products specified serves to set minimum standard. Substituted equipment shall meet performance requirements and physical limitations, including fitting within space constraints.

1.26 SUBMISSION OF TENDER

- .1 Submission of a tender is deemed to be confirmation of the fact that the Tenderer has analyzed the Contract Documents and is fully conversant with all conditions.

1.27 LOCATION OF EQUIPMENT AND FIXTURES

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

1.28 CUTTING AND PATCHING

- .1 Make cuts with clean, true, smooth edges. Make patches inconspicuous in final assembly.
- .2 Fit work airtight to pipes, sleeves ducts and conduits.
- .3 Conceal pipes, ducts and wiring in wall and ceiling construction of finished areas except where indicated otherwise.

- .4 Install firestops and smoke seals in accordance with ULC-S115, around pipe ductwork, cables and other objects penetrating fire separations to provide fire resistance not less than the fire resistance of surrounding floor, ceiling and wall assembly.

1.29 SETTING OUT OF WORK

- .1 Assume full responsibility for and execute complete layout of work to locations, lines and elevations indicated.
- .2 Provide devices needed to lay out and construct work.
- .3 Supply such devices as templates required to facilitate Departmental Representative's inspection of work.

1.30 RELICS AND ANTIQUITIES

- .1 Relics and antiquities and items of historical or scientific interest shall remain property of Department. Protect such articles and request directives from Departmental Representative.
- .2 Give immediate notice to Departmental Representative if evidence of archeological finds are encountered during excavation/construction, and await Departmental Representative's written instructions before proceeding with work in this area.

1.31 TESTING AND INSPECTION

- .1 Particular requirements for inspection and testing to be carried out by testing service or laboratory approved by the Departmental Representative.
- .2 The Contractor will appoint and pay for the services of testing agency or testing laboratory as specified, and where required for the following:
 - .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
 - .2 Inspection and testing performed exclusively for Contractor's convenience.
 - .3 Testing, adjustment and balancing of conveying systems, mechanical and electrical equipment and systems.
- .3 Where tests or inspections by designated testing laboratory reveal work is not in accordance with the Contract requirements, Contractor shall pay costs for additional tests or inspections as the Departmental Representative may require to verify acceptability of correct work.
- .4 Contractor shall furnish labour and facilities to:
 - .1 Notify Departmental Representative in advance of planned testing.
- .5 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.
- .6 Pay costs for uncovering and making good work that is covered before required inspection or testing is completed and approved by Departmental Representative.

- .7 Provide Departmental Representative with 2 copies of testing laboratory reports as soon as they are available.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General**1.1 CO-ORDINATION WITH THE DEPARTMENTAL REPRESENTATIVE**

- .1 Co-operate with the Departmental Representative to coordinate the work restrictions.
- .2 Immediately modify work procedures as necessary to ensure compliance with the requirements of this section.

1.2 ACCESS AND EGRESS

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

1.3 USE OF SITE AND FACILITIES

- .1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
- .2 Maintain existing services to building and provide for personnel and vehicle access.
- .3 Where security is reduced by work provide temporary means to maintain security.
- .4 Departmental Representative will assign sanitary facilities for use by Contractor's personnel. Keep facilities clean.
- .5 Closures: protect work temporarily until permanent enclosures are completed.

1.4 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

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

1.5 EXISTING SERVICES

- .1 Notify, Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.
- .3 Antennas: Existing communication antennas located on main KNPHQ building must remain operational at all times, as they are used 24 hours a day, 7 days a week. Contractor to coordinate relocation with Departmental Representative, and phase work so that no communication downtime occurs.
- .4 Provide for personnel, pedestrian and vehicular traffic.

- .5 Construct barriers in accordance with Section 01 50 00 - Temporary Facilities and Controls.

1.6 SPECIAL REQUIREMENTS

- .1 Paint indoor occupied areas Monday to Friday from 18:00 to 07:00 hours only and on Saturdays, Sundays, and statutory holidays.
- .2 Submit schedule in accordance with Section 01 11 55 – General Instructions.
- .3 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .4 Keep within limits of work and avenues of ingress and egress.
- .5 Ingress and egress of Contractor vehicles at site is limited to the locations as indicated.

1.7 SECURITY

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

1.8 BUILDING SMOKING ENVIRONMENT

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

1.9 HOURS OF WORK

- .1 The Contractor is permitted to work seven days a week. Construction equipment shall not be operated between 19:00h and 09:00h on Saturdays, Sundays or statutory holidays.
- .2 Adhere to the bylaws of the Village of Haines Junction.
- .3 Construction equipment shall not be operated between 23:00h and 07:00h without written permission from the Village of Haines Junction.

Part 2 Products**2.1 NOT USED**

- .1 Not Used.

Part 3 Execution**3.1 NOT USED**

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 REFERENCE STANDARDS**

- .1 Project General Conditions
- .2 Project Supplementary Conditions

1.2 CASH ALLOWANCES

- .1 Refer to GC 4.1.
- .2 Included in Contract Price is a total Prime Cost Sum of \$10,000.
- .3 Prime Cost Sum, unless otherwise specified, covers net cost to Contractor of services, products, construction machinery and equipment, freight, handling, unloading, storage, installation and other authorized expenses incurred in performing Work.
- .4 Prime Cost Sum provided for in the Lump Sum Table is not a sum due to the Contractor. Rather, payment will be made against it for miscellaneous work not included in the Lump Sum table under the General Conditions of the Contract.
- .5 Contract Price, and not the Prime Cost Sum, includes Contractor's overhead and profit in connection with such cash allowance.
- .6 Include progress payments on accounts of work authorized under Prime Cost Sum in Consultant's monthly certificate for payment.
- .7 Prepare schedule jointly with Consultant and Contractor to show when items called for under Prime Cost Sum must be authorized by Consultant for ordering purposes so that progress of Work will not be delayed.
- .8 Such Work to be covered under the Prime Cost Sum is as follows:
 - .1 Removal of bat guano, urine, waste or dead bats on existing material to remain as specified in Section 02 21 19 - Selective Demolition.
 - .1 Payment for Work under Prime Cost Sum will be made using a negotiated rate to include use of any temporary facilities or equipment required to gain access to the area where cleaning is required or to perform cleaning.

Part 2 Products**2.1 NOT USED**

- .1 Not Used.

Part 3 Execution**3.1 NOT USED**

.1 Not Used.

END OF SECTION

Part 1 General**1.1 ADMINISTRATIVE**

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

1.2 PRECONSTRUCTION MEETING

- .1 Within 15 working days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.
- .4 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work: in accordance with 01 32 16.07 – Construction Progress Schedules – Bar (GANTT) Chart.
 - .3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00- Submittal Procedures.
 - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences, and site security in accordance with Section 01 50 00 - Temporary Controls.
 - .5 Delivery schedule of specified equipment
 - .6 Site security in accordance with Section 01 56 00 – Temporary Barriers and Enclosures.

- .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
- .8 Owner provided products.
- .9 Record drawings in accordance with Section 01 33 00- Submittal Procedures.
- .10 Maintenance manuals in accordance with Section 01 78 00- Closeout Submittals.
- .11 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00- Closeout Submittals.
- .12 Monthly progress claims, administrative procedures, photographs, hold backs.
- .13 Appointment of inspection and testing agencies or firms.
- .14 Insurances, transcript of policies.

1.3 PROGRESS MEETINGS

- .1 During course of Work schedule progress meetings bi-weekly.
- .2 Contractor, major Subcontractors involved in Work, and Departmental Representative are to be in attendance.
- .3 Notify parties minimum 5 working days before meeting.
- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 3 working days.
- .5 Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Review of off-site fabrication delivery schedules.
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Revision to construction schedule.
 - .8 Progress schedule, during succeeding work period.
 - .9 Review submittal schedules: expedite as required.
 - .10 Maintenance of quality standards.
 - .11 Review proposed changes for effect on construction schedule and on completion date.
 - .12 Safety
 - .13 Other business.

Part 2 Products**2.1 NOT USED**

.1 Not Used.

Part 3 Execution**3.1 NOT USED**

.1 Not Used.

END OF SECTION

Part 1 General**1.1 DEFINITIONS**

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

1.2 REQUIREMENTS

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

progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit to Departmental Representative within 15 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.
- .3 Submit Project Schedule to Departmental Representative within 5 working days of receipt of acceptance of Master Plan.

1.4 MASTER PLAN

- .1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).
- .2 Departmental Representative will review and return revised schedules within 5 working days.
- .3 Revise impractical schedule and resubmit within 5 working days.
- .4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.5 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
 - .1 Award.
 - .2 Shop Drawings, Samples.
 - .3 Permits.
 - .4 Mobilization.
 - .5 Interior Architecture (Walls, Floors and Ceiling).
 - .6 Plumbing.
 - .7 Lighting.
 - .8 Electrical.
 - .9 Piping.
 - .10 Controls.

- .11 Heating, Ventilating, and Air Conditioning.
- .12 Millwork.
- .13 Fire Systems.
- .14 Testing and Commissioning.
- .15 Supplied equipment long delivery items.
- .16 Staff change rooms.

1.6 PROJECT SCHEDULE REPORTING

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

1.7 PROJECT MEETINGS

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

Part 2 Product

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General**1.1 ADMINISTRATIVE**

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

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 Submit drawings stamped and signed by professional engineer registered or licensed in Yukon, Canada.
- .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .4 Allow Departmental Representative 10 working days review of each submission.

- .5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .6 Make changes in shop drawings Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
- .7 Accompany submissions with transmittal letter, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .8 Submissions include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent work.
- .9 After Departmental Representative's review, distribute copies.
- .10 Submit electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.

- .11 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .12 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
 - .2 Testing must have been within 3 years of date of contract award for project.
- .13 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract complete with project name.
- .14 Submit electronic copies of manufacturer's instructions for requirements requested in specification Sections and as requested by Consultant.
 - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .15 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .16 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
- .17 Delete information not applicable to project.
- .18 Supplement standard information to provide details applicable to project.
- .19 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

1.3 SAMPLES

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

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

1.4 MOCK-UPS

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

1.5 PHOTOGRAPHIC DOCUMENTATION

- .1 Submit electronic copy of colour digital photography in jpg format, standard resolution monthly with progress statement and as directed by Departmental Representative.
- .2 Project identification: name and number of project and date of exposure indicated.
- .3 Number of viewpoints: minimum 8 locations.
 - .1 Viewpoints and their location as determined by Departmental Representative.

1.6 CERTIFICATES AND TRANSCRIPTS

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

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 REFERENCES**

- .1 Appendix 1 – Hazardous Building Materials Assessments

1.2 REFERENCE STANDARDS

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2 Yukon Territory
 - .1 Occupational Health and Safety Act, R.S.Y.
- .3 Canadian Standards Association (CSA) as amended:
 - .1 CSA Z797-2009 Code of Practice for Access Scaffold
 - .2 CSA S269.1-1975 (R2003) Falsework for Construction Purposes
 - .3 CSA S350-M1980 (R2003) Code of Practice for Safety in Demolition of Structures
 - .4 CSA Z1006-10 Management of Work in Confined Spaces.
 - .5 CSA Z462- Workplace Electrical Safety Standard
- .4 American National Standards Institute (ANSI):
 - .1 ANSI A10.3, Operations – Safety Requirements for Powder-Actuated Fastening Systems.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan: Within 7 working days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.
 - .3 A Traffic Management Plan to address management of vehicle and pedestrian access through and around the site.
 - .4 List hazardous materials to be brought on site as required by work.
 - .5 Indicate Engineering and administrative control measures to be implemented at the site for managing identified risks and hazards.
 - .6 Identify personal protective equipment (PPE) to be used by workers.
 - .7 Identify personnel and alternates responsible for site safety and health.
 - .8 Identify personnel training requirements and training plan, including site orientation for new workers.
 - .9 Develop the plan in collaboration with all subcontractors. Ensure that work/activities of subcontractors are included in the hazard assessment and are reflected in the site specific safety plan.

- .10 Revise and update Site Specific Safety Plan as required, and re-submit to the Departmental Representative.
- .11 Departmental Representative's review of the Site Specific Safety Plan shall not relieve the Contractor of responsibility for errors or omissions in final Site Specific Safety Plan or of responsibility for meeting all requirements of construction and Contract documents.
- .3 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .4 Submit copies of incident and accident reports.
- .5 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01- Hazardous Materials.
- .6 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 5 working days.
- .7 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .8 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.
- .9 On-site Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.
- .10 Use of hazardous products shall be in accordance with Section 02 81 00 Hazardous Materials.
- .11 Activities involving asbestos shall be carried out in accordance with Section 02 82 00 Asbestos Abatement.

1.4 FILING OF NOTICE

- .1 File Notice of Project with Territorial authorities prior to beginning of Work.

1.5 SAFETY ASSESSMENT

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

1.6 MEETINGS

- .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work and attend all subsequent meetings called by the Departmental Representative.

1.7 PROJECT/SITE CONDITIONS

- .1 Work at site will involve contact with:

- .1 Asbestos.
- .2 Lead Paint.

1.8 GENERAL REQUIREMENTS

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.
- .3 Provide safety barricades and lights around work site as required to provide a safe working environment for workers and protection for pedestrian and vehicular traffic.
- .4 Ensure that non-authorized persons are not allowed to circulate in designated construction areas of the work site.
 - .1 Provide appropriate means by use of barricades, fences warning signs, traffic control personnel, and temporary lighting as required.
 - .2 Secure site at night time [or provide security guard] as deemed necessary to protect site against entry.

1.9 UTILITY CLEARANCES

- .1 The constructor is solely responsible for all utility detection and clearances prior to starting the work.
- .2 The constructor will not rely solely upon the Reference Drawings or other information provided for utility locations.

1.10 RESPONSIBILITY

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

1.11 COMPLIANCE REQUIREMENTS

- .1 Comply with Occupational Health and Safety Act, General Safety Regulations, O.I.C.
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations and the Yukon Territory Occupational Health and Safety Act.

1.12 UNFORSEEN HAZARDS

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

1.13 POSTING OF DOCUMENTS

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

1.14 CORRECTION OF NON-COMPLIANCE

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

1.15 POWDER ACTUATED DEVICES

- .1 Use powder actuated devices only after receipt of written permission from Departmental Representative in accordance with ANSI A10.3.

1.16 WORK STOPPAGE

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

1.17 ELECTRICAL LOCKOUT

- .1 Develop, implement and enforce use of established procedures to provide electrical lockout and to ensure the health and safety of workers for every event where work must be done on any electrical circuit or facility.
- .2 Prepare the lockout procedures in writing, listing step-by-step processes to be followed by workers, including how to prepare and issue the request/authorization form. Have procedures available for review upon request by the Departmental Representative.
- .3 Keep the documents and lockout tags at the site and list in a logbook for the full duration of the Contract. Upon request, make such data available for viewing by Departmental Representative or by any authorized safety representative.

1.18 ELECTRICAL SAFETY REQUIREMENTS

- .1 Comply with authorities and ensure that, when installing new facilities or modifying existing facilities, all electrical personnel are completely familiar with existing and new electrical circuits and equipment and their operation.

- .1 Before undertaking any work, coordinate require energizing and de-energizing of new and existing circuits with Departmental Representative.
- .2 Maintain electrical safety procedures and take necessary precautions to ensure safety of all personnel working under this Contract, as well as safety of other personnel on site.
- .3 Ensure no part of work is subjected to a load which will endanger its safety or will cause permanent deformation.

1.19 FALSEWORK

- .1 Design and construct false work in accordance with CSA S269.1-1975 (R2003).

1.20 SCAFFOLDING

- .1 Design, construct and maintain scaffolding in a rigid, secure and safe manner, in accordance with CSA Z797-2009 and applicable territorial regulations.

1.21 CONFINED SPACES

- .1 Carry out work in confined spaces in compliance with Territorial Regulations (as amended).

1.22 FIRE SAFETY REQUIREMENTS

- .1 Store oily/paint-soaked rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
- .2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.
- .3 Portable gas and diesel fuel tanks are not permitted on most federal work sites. Approval from the DR is required prior to any gas or diesel tank being brought onto the work site. Details related to use and storage of fuel tanks on the work sites must be included in the Environmental Management Plan.

Part 2 Products**2.1 NOT USED**

- .1 Not used.

Part 3 Execution**3.1 NOT USED**

- .1 Not used.

END OF SECTION

Part 1 General**1.1 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29 - Health and Safety Requirements.
- .3 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.
- .4 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .5 A copy of the project specific Environmental Assessments will be provided to the Contractor upon award. The Contractor's Environmental Protection Plan should detail how the Contractor will meet mitigations as required in these documents.
- .6 Include in Environmental Protection Plan:
 - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
 - .3 Names and qualifications of persons responsible for training site personnel.
 - .4 Descriptions of environmental protection personnel training program.
 - .5 Erosion and Sediment Control Plan including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather.
 - .1 Plans to include measures to minimize amount of material transported onto paved public roads by vehicles or runoff.
 - .6 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.
 - .1 Plan to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.
 - .7 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.

- .8 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
- .9 Air pollution control plan detailing provisions to assure that dust, debris, materials and trash are contained on project site
- .10 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Territorial, and Municipal laws and regulations for storage and handling of these materials.
- .11 Waste Water Management Plan identifying methods and procedures for management for discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.
- .12 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.
- .13 Pesticide treatment plan to be included and updated, as required.

1.2 FIRES

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

1.3 SITE CLEARING AND PLANT PROTECTION

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

1.4 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment and plant in accordance with local authorities' emission requirements.
- .3 If any suspected contaminated ground is encountered it will be stockpiled in a manner that will not release any runoff until proper testing can be conducted. If it is found to be contaminated it will be dealt with according to the appropriate disposal requirements as determined by the nature and extent of the contamination.

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

1.5 HISTORICAL/ARCHAEOLOGICAL CONTROL

- .1 If a historical artifact is uncovered as part of this work, the Contractor shall:
 - .1 Stop Work immediately
 - .2 Notify the Departmental Representative
 - .3 Resume the Work upon the approval of the Departmental Representative
- .2 If significant historical or archaeological artifacts, or human remains are discovered, stop work, report it immediately to the Departmental Representative Park Site Manager or alternatively the Resource Conservation Officer.

1.6 NOTIFICATION

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

1.7 WILDLIFE AND STRUCTURES

- .1 Notify the Environmental Surveillance Officer (SO) immediately of any nests, carcasses, wildlife encounters, or observations on or around the worksite.
- .2 If Wildlife is observed at or near the work site, allow the animal(s) the opportunity to leave the work area to the surrounding habitat and away from areas of potential conflict.
- .3 Secure all materials that might attract wildlife (eg. Petroleum products, human food, recyclable food and drink containers and garbage).
- .4 No feeding, baiting or luring of any wildlife (including bears, small mammals, birds); do not approach or harass wildlife in any way. Notify the SO immediately if wildlife obtain garbage or human food.
- .5 KNPR's administration and operations building has been identified as roosting location for the little brown myotis (*Myotis lucifugus*), an endangered species on Schedule 1 of the Species at Risk Act (SARA). This project will prevent the little brown myotis from accessing the roosting location which constitutes a permanent exclusion of bats from a habitually-occupied residence and contravenes s.33 of SARA (protection of residences). Parks Canada has applied and received an exception under SARA for reasons of public and employee health. The Park

has also provided alternative, artificial roosting sites for the bats, as well as additional mitigations and monitoring, including the following by the Contractor:

- .1 Notifying the Departmental Representative immediately if any roosts, carcasses or other observations of any bats on or around the worksite.
- .2 Stopping work and awaiting direction from the Departmental Representative if any roosts, carcasses, or other observations of bats on or around the worksite. The stoppage may be localized.
- .3 Restricting the timing windows from April 15 to September 30, or as determined by Parks Canada Resource Conservation staff.

Part 2 Product

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.
- .3 The Contractor will establish procedures for use of the local landfill with the Village of Haines Junction and follow their recommendations for disposal. Any hazardous waste produced will be taken to the appropriate site to be disposed of safely.
- .4 No construction waste (sawdust, soil, vegetation, debris, pumped water, hydrocarbon, chemicals, cement, asphalt, etc.) shall be allowed to enter an aquatic habitat or be deposited on undisturbed lands unless the said lands are part of the project works and approved for temporary waste storage.
- .5 Construction, trade, hazardous waste and domestic waste materials shall not be burned, buried or discarded at the construction site or elsewhere on the site. These wastes shall be contained and removed in a timely and approved manner and disposed at an appropriate waste landfill site located outside the site.
- .6 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 -Cleaning.

END OF SECTION

Part 1 General**1.1 INSPECTION**

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

1.2 INDEPENDENT INSPECTION AGENCIES

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

1.3 ACCESS TO WORK

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

1.4 PROCEDURES

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

- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.5 REJECTED WORK

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

1.6 REPORTS

- .1 Submit electronic copies of inspection and test reports to Departmental Representative.
- .2 Provide copies to subcontractor of work being inspected or tested.

1.7 MOCK-UPS

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

Part 2 Products**2.1 NOT USED**

.1 Not Used.

Part 3 Execution**3.1 NOT USED**

.1 Not Used.

END OF SECTION

Part 1 General**1.1 INSTALLATION AND REMOVAL**

- .1 Provide temporary utilities controls in order to execute work expeditiously.
- .2 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.
 - .1 Identify areas which have to be gravelled to prevent tracking of mud.
 - .2 Indicate use of supplemental or other staging area.
- .3 Provide construction facilities in order to execute work expeditiously.
- .4 Provide temporary controls in order to execute Work expeditiously.
- .5 Remove from site all such work after use.

1.2 WATER SUPPLY

- .1 Departmental Representative will provide supply of potable water for construction use.

1.3 TEMPORARY HEATING AND VENTILATION

- .1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.
- .2 Construction heaters used inside building must be non-flameless type. Solid fuel salamanders are not permitted.
- .3 Provide temporary heat and ventilation in enclosed areas as required to:
 - .1 Facilitate progress of Work.
 - .2 Protect Work and products against dampness and cold.
 - .3 Prevent moisture condensation on surfaces.
 - .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
 - .5 Provide adequate ventilation to meet health regulations for safe working environment.
- .4 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 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.4 TEMPORARY POWER AND LIGHT

- .1 The Contractor will be responsible to pay for temporary power during construction for temporary lighting and operating of power tools.
- .2 Arrange for connection with appropriate utility company for any additional temporary power requirements. Pay costs for installation, maintenance and removal.

1.5 TEMPORARY COMMUNICATION FACILITIES

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

1.6 FIRE PROTECTION

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

1.7 SCAFFOLDING

- .1 Scaffolding in accordance with CAN/CSA-S269.2.
- .2 Provide and maintain scaffolding in a rigid, secure and safe manner.
- .3 Erect scaffolding independent of walls. Remove promptly when no longer required.

1.8 HOISTING

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

1.9 SITE STORAGE/LOADING

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

1.10 CONSTRUCTION PARKING

- .1 Parking will be permitted in designated area on site provided it does not disrupt performance of Work.
- .2 Provide and maintain adequate access to project site.

1.11 OFFICES

- .1 Provide office heated to 22 degrees C, lighted 750 lx and ventilated as necessary.
- .2 Provide marked and fully stocked first-aid case in a readily available location.
- .3 Subcontractors to provide their own offices as necessary. Direct location of these offices.

1.12 EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

1.13 CONSTRUCTION SIGNAGE

- .1 Signs and notices for safety and instruction in both official languages Graphic symbols to CAN/CSA-Z321.
- .2 Maintain approved signs and notices in good condition for duration of project, and dispose of off-site on completion of project.

1.14 PROTECTION AND MAINTENANCE OF TRAFFIC

- .1 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Consultant.
- .2 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs. All measures to be included in a Traffic Management Plan for the site.
- .3 Protect travelling public from damage to person and property.
- .4 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.

- .5 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.
- .6 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .7 Dust control: adequate to ensure safe operation at all times.
- .8 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.
- .9 Provide snow removal during period of Work.

1.15 CLEAN-UP

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.

1.16 HOARDING

- .1 Erect temporary site enclosure using 2.1 m high construction fence. Maintain fence in good repair.
- .2 Provide walk-through scaffolding as necessary to maintain access to entrances and exits.

1.17 GUARD RAILS AND BARRICADES

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

1.18 WEATHER ENCLOSURES

- .1 Provide weather tight closures to unfinished door and window openings, tops of shafts and other openings in floors and roofs.
- .2 Close off floor areas where walls are not finished; seal off other openings; enclose building interior work for temporary heat.
- .3 Design enclosures to withstand wind pressure and snow loading.

1.19 DUST TIGHT SCREENS

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

1.20 ACCESS AND DELIVERY

- .1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.
- .2 Obtain Departmental Representative's approval of access to site.

.3 All contractors are required to use only the loading dock entrance.

.1 Maintain for duration of Contract.

.2 Make good damage resulting from Contractor's use.

1.21 PUBLIC TRAFFIC FLOW

.1 Provide and maintain as per the Traffic Management Plan competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work, maintain access to the existing fire hall and to protect public.

1.22 FIRE ROUTES

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

1.23 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

.1 Protect surrounding private and public property from damage during performance of Work.

.2 Be responsible for damage incurred.

1.24 PROTECTION OF BUILDING FINISHES

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

.2 Provide necessary screens, covers, and hoardings.

.3 Confirm with Consultant locations and installation schedule 3 days prior to installation.

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

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General**1.1 REFERENCE STANDARDS**

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

1.2 QUALITY

- .1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.
- .3 Retain purchase orders, invoices and other documents to prove that all products utilized in this Contract meet the requirements of the specifications. Produce documents when requested by the Departmental Representative.
- .4 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .5 Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
- .6 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .7 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.

1.3 AVAILABILITY

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

1.4 STORAGE, HANDLING AND PROTECTION

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Store sheet materials, and lumber covered and off ground.
- .6 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.
- .7 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.
- .8 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.5 TRANSPORTATION

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

1.6 MANUFACTURER'S INSTRUCTIONS

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

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

1.7 QUALITY OF WORK

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

1.8 CO-ORDINATION

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

1.9 CONCEALMENT

- .1 In finished areas conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
- .2 Before installation inform Departmental Representative if there is interference. Install as directed by Departmental Representative.

1.10 REMEDIAL WORK

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

1.11 LOCATION OF FIXTURES

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

1.12 FASTENINGS

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.

- .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.13 FASTENINGS - EQUIPMENT

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

1.14 PROTECTION OF WORK IN PROGRESS

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

1.15 CONTRACTOR'S OPTIONS FOR SELECTION OF PRODUCTS FOR TENDERING

- .1 Products are specified by "Prescriptive" specifications: select any product meeting or exceeding specifications. Provide the Departmental Representative shop drawings or product information for approval.
- .2 Products specified under "Acceptable Products" (used for complex Mechanical or Electrical Systems): select any one of the indicated manufacturers, or any other manufacturer meeting or exceeding the Prescriptive specifications and indicated Products. Provide the Departmental Representative shop drawings or product information for approval.
- .3 Products specified by performance and referenced standard: select any product meeting or exceeding the referenced standard. Provide the Departmental Representative shop drawings or product information for approval.
- .4 Products specified to meet particular design requirements or to match existing materials: use only material specified Approved Product. Alternative products may be considered provided full technical data is received in writing by Departmental Representative in accordance with "Special Instructions to Tenderers".

- .5 When products are specified by a referenced standard or by Performance specifications, upon request of Departmental Representative obtain from manufacturer and independent laboratory report showing that the product meets or exceeds the specified requirements.

1.16 SUBSTITUTION AFTER CONTRACT AWARD

- .1 No substitutions are permitted without prior written approval of the Departmental Representative.
- .2 Proposals for substitution may only be submitted after Contract award. Such request must include statements of respective costs of items originally specified and the proposed substitution.
- .3 Proposals will be considered by the Departmental Representative if:
 - .1 products selected by tenderer from those specified are not available;
 - .2 delivery date of products selected from those specified would unduly delay completion of Contract, or
 - .3 alternative product to that specified, which is brought to the attention of considered by Departmental Representative as equivalent to the product specified, and will result in a credit to the Contract amount
- .4 Should the proposed substitution be accepted either in part or in whole, assume full responsibility and costs when substitution affects other work on the project. Pay for design or drawing changes required as result of substitution.
- .5 Amounts of all credits arising from approval of the substitutions will be determined by the Departmental Representative, and the Contract price will be reduced accordingly.

1.17 EXISTING UTILITIES

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

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General**1.1 ACTION AND INFORMATIONAL SUBMITTALS**

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

1.2 MATERIALS

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

1.3 PREPARATION

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.
- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

1.4 EXECUTION

- .1 Execute cutting, fitting, and patching including excavation and fill, to complete Work.

- .2 Fit several parts together, to integrate with other Work.
- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.
- .5 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .7 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .8 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .9 Restore work with new products in accordance with requirements of Contract Documents.
- .10 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .11 Provide firestopping to maintain the integrity of fire separations, including:
 - .1 Protecting penetrations at fire-resistance rated wall, ceiling or floor construction.
 - .2 Using construction joint fire stops and building perimeter fire stops to protect gaps at fire separations and between fire separations and other construction assemblies.
- .12 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.
- .13 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

Part 2 Products**2.1 NOT USED**

- .1 Not Used.

Part 3 Execution**3.1 NOT USED**

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 PROJECT CLEANLINESS**

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

1.2 FINAL CLEANING

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
- .5 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, floors, and walls.

- .6 Clean lighting reflectors, lenses, and other lighting surfaces.
- .7 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .8 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .9 Remove dirt and other disfiguration from exterior surfaces.
- .10 Clean and sweep roofs, gutters, areaways, and sunken wells.
- .11 Sweep and wash clean paved areas.
- .12 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.
- .13 Clean roofs, downspouts, and drainage systems.
- .14 Vacuum clean and dust building interiors, behind grilles, louvers and screens.
- .15 Wax, seal shampoo or prepare floor finishes as recommended by manufacturer.
- .16 Remove snow and ice from access to building

Part 2 Products**2.1 NOT USED**

- .1 Not Used.

Part 3 Execution**3.1 NOT USED**

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS**

- .1 Refer to every technical section for waste management and disposal.

1.2 DEFINITIONS

- .1 Waste Audit (WA): relates to projected waste generation. Involves controlled separation of waste.
- .2 Waste Reduction Workplan (WRW): a written report which addresses opportunities for reduction, re-use or recycling of materials.
- .3 Materials Source Separation Program (MSSP): consists of a series of ongoing activities to separate re-usable and recyclable waste material into material categories from other types of waste at point of generation.

1.3 MATERIALS SOURCE SEPARATION

- .1 Before project start-up, prepare Materials Source Separation Program. Provide separate containers for re-usable and/or recyclable materials of the following:
 - .1 Gypsum board.
 - .2 Metals.
 - .3 Wood.
 - .4 Plastics.
 - .5 Other materials as indicated in technical sections.
- .2 Implement Materials Source Separation Program for waste generated on project in compliance with approved methods and as approved by Departmental Representative.
- .3 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.
- .4 Locate separated materials in areas which minimize material damage.

1.4 DIVERSION OF MATERIALS

- .1 Create a list of materials to be separated from the general waste stream and stockpiled in separate containers, to the approval of the Departmental Representative and consistent with applicable fire regulations.
 - .1 Mark containers.
 - .2 Provide instruction on disposal practices.

1.5 STORAGE, HANDLING AND APPLICATION

- .1 Do work in compliance with Waste Reduction Workplan.
- .2 Handle waste materials not re-used, salvaged, or recycled in accordance with appropriate regulations and codes.
- .3 Materials in separated condition: collect, handle, store on site, and transport off-site to an approved and authorized recycling facility.
- .4 Materials must be immediately separated into required categories for re-use or recycling.
- .5 Unless specified otherwise, materials for removal become the Contractor's property.
- .6 On-site sale of salvaged/recyclable material is not permitted.
- .7 Provide Departmental Representative with receipts indicating quantity of material delivered to landfill.
- .8 Provide Departmental Representative with receipts indicating quantity and type of materials sent for recycling.

Part 2 Product**2.1 NOT USED**

- .1 Not Used.

Part 3 Execution**3.1 NOT USED**

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 REFERENCE STANDARDS****1.2 ADMINISTRATIVE REQUIREMENTS**

- .1 Acceptance of Work Procedures:
 - .1 Contractor's Inspection: Contractor: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
 - .2 Request Departmental Representative inspection.
 - .2 Departmental Representative Inspection:
 - .1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.
 - .2 Contractor to correct Work as directed.
 - .3 Completion Tasks: submit written certificates in English that tasks have been performed as follows:
 - .1 Work: completed and inspected for compliance with Contract Documents.
 - .2 Defects: corrected and deficiencies completed.
 - .3 Certificates required by authorities having jurisdiction: submitted.
 - .4 Certificates required by utility companies: submitted.
 - .5 Operation of systems: demonstrated to Owner's personnel.
 - .6 Commissioning of building envelope: completed in accordance with 01 91 19 – Facility Shell Commissioning.
 - .7 Commissioning of mechanical systems: completed in accordance with PSPC's commissioning plan and copies of final Commissioning Report submitted to Departmental Representative.
 - .8 Work: complete and ready for final inspection.
 - .4 Final Inspection:
 - .1 When completion tasks are done, request final inspection of Work by Departmental Representative, and Contractor.
 - .2 When Work incomplete according to Departmental Representative, complete outstanding items and request re-inspection.
 - .5 Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.

- .6 Commencement Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance to be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.
- .7 Final Payment:
 - .1 When Departmental Representative considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.
 - .2 When Work deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection.
- .8 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

1.3 FINAL CLEANING

- .1 Clean in accordance with Section 01 74 11- Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.

Part 2 Products**2.1 NOT USED**

- .1 Not Used.

Part 3 Execution**3.1 NOT USED**

- .1 Not Used.

END OF SECTION

Part 1 General**1.1 ADMINISTRATIVE REQUIREMENTS**

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

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

1.3 FORMAT

- .1 Organize data as instructional manual.
- .2 Binders: hard covered, expandable 4-post, loose leaf [219 x 279] mm with spine and face pockets.
- .3 When multiple binders are used correlate data into related consistent groupings.
 - .1 Identify contents of each binder on spine.
- .4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5 Arrange content by systems, under Section numbers and sequence of Table of Contents.

- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Text: manufacturer's printed data, or typewritten data.
- .8 As Built Drawings: provide with reinforced punched binder tab.
 - .1 Bind in with text; fold larger drawings to size of text pages.
- .9 Provided 1:1 scaled CAD files in DWG format on USB.

1.4 CONTENTS - PROJECT RECORD DOCUMENTS

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

1.5 AS -BUILT DOCUMENTS AND SAMPLES

- .1 Maintain, at site for Departmental Representative one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction.
 - .1 Provide files, racks, and secure storage.

- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
 - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition.
 - .1 Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative.

1.6 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

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

1.7 EQUIPMENT AND SYSTEMS

- .1 For each item of equipment and each system include description of unit or system, and component parts.

- .1 Give function, normal operation characteristics and limiting conditions.
- .2 Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
- .3 Include installed colour coded wiring diagrams.
- .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences.
 - .1 Include regulation, control, stopping, shut-down, and emergency instructions.
 - .2 Include summer, winter, and any special operating instructions.
- .5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .6 Provide servicing and lubrication schedule, and list of lubricants required.
- .7 Include manufacturer's printed operation and maintenance instructions.
- .8 Include sequence of operation by controls manufacturer.
- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide installed control diagrams by controls manufacturer.
- .11 Provide Contractor's 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 reports as specified in Section 01 45 00- Quality Control and 01 91 13 - General Commissioning Requirements.
- .15 Aboveground storage tank inspection documentation, registration, forms, decommissioning and removal in accordance with CEPA SOR/2008-197.
- .16 Additional requirements: as specified in individual specification sections.

1.8 MATERIALS AND FINISHES

- .1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.
 - .1 Provide information for re-ordering custom manufactured products.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

- .3 Moisture-protection and weather-exposed products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Additional requirements: as specified in individual specifications sections.

1.9 MAINTENANCE MATERIALS

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

1.10 DELIVERY, STORAGE AND HANDLING

- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
- .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
- .3 Store components subject to damage from weather in weatherproof enclosures.
- .4 Store paints and freezable materials in a heated and ventilated room.

- .5 Remove and replace damaged products at own expense and for review by Departmental Representative.

1.11 WARRANTIES AND BONDS

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Submit warranty management plan, 30 days before planned pre-warranty conference, to Departmental Representative approval.
- .3 Warranty management plan to include required actions and documents to assure that Departmental Representative receives warranties to which it is entitled.
- .4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.
- .5 Submit, warranty information made available during construction phase, to Departmental Representative for approval prior to each monthly pay estimate.
- .6 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:
 - .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
 - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
 - .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within [ten] days after completion of applicable item of work.
 - .4 Verify that documents are in proper form, contain full information, and are notarized.
 - .5 Co-execute submittals when required.
 - .6 Retain warranties and bonds until time specified for submittal.
- .7 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.
- .8 Conduct joint 10-monthwarranty inspection, measured from time of acceptance, with Departmental Representative.
- .9 Include information contained in warranty management plan as follows:
 - .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.
 - .2 Provide list for each warranted equipment, item, feature of construction or system indicating:
 - .1 Name of item.
 - .2 Model and serial numbers.
 - .3 Location where installed.

- .4 Name and phone numbers of manufacturers or suppliers.
- .5 Names, addresses and telephone numbers of sources of spare parts.
- .6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
- .7 Cross-reference to warranty certificates as applicable.
- .8 Starting point and duration of warranty period.
- .9 Summary of maintenance procedures required to continue warranty in force.
- .10 Cross-Reference to specific pertinent Operation and Maintenance manuals.
- .11 Organization, names and phone numbers of persons to call for warranty service.
- .12 Typical response time and repair time expected for various warranted equipment.
- .3 Contractor's plans for attendance at 9-month post-construction warranty inspections.
- .4 Procedure and status of tagging of equipment covered by extended warranties.
- .5 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.
- .10 Respond in timely manner to oral or written notification of required construction warranty repair work.
- .11 Written verification to follow oral instructions.
 - .1 Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

1.12 WARRANTY TAGS

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

.7 Construction Contractor.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General**1.1 ADMINISTRATIVE REQUIREMENTS**

- .1 Demonstrate scheduled operation and maintenance of equipment and systems to Owner's personnel two weeks prior to date of final inspection.
- .2 Owner: provide list of personnel to receive instructions, and co-ordinate their attendance at agreed-upon times.
- .3 Preparation:
 - .1 Verify conditions for demonstration and instructions comply with requirements.
 - .2 Verify designated personnel are present.
 - .3 Ensure testing, adjusting, and balancing has been performed in accordance with Section 01 91 13 - General Commissioning (Cx) Requirements and equipment and systems are fully operational.
- .4 Demonstration and Instructions:
 - .1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at scheduled times, at the equipment location.
 - .2 Instruct personnel in phases of operation and maintenance using operation and maintenance manuals as basis of instruction.
 - .3 Review contents of manual in detail to explain aspects of operation and maintenance.
 - .4 Prepare and insert additional data in operations and maintenance manuals when needed during instructions.
- .5 Time Allocated for Instructions: ensure amount of time required for instruction of each item of equipment or system as follows:
 - .1 System: 2 days of instruction

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit schedule of time and date for demonstration of each item of equipment and each system two weeks prior to designated dates, for Departmental Representative's approval.
- .3 Submit reports within one week after completion of demonstration, that demonstration and instructions have been satisfactorily completed.

- .4 Give time and date of each demonstration, with list of persons present.
- .5 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.

1.3 QUALITY ASSURANCE

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

Part 2 Product**2.1 NOT USED**

- .1 Not Used.

Part 3 Execution**3.1 NOT USED**

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 General requirements relating to commissioning of the Kluane Trades Building specific components and systems, specifying general requirements to PV of components, equipment, sub-systems, systems, and integrated systems.
- .2 Refer to the Related Sections below for specific commissioning requirements for Architectural, Mechanical and Electrical Systems.

1.2 RELATED SECTIONS

- .1 Section 01 91 31 - Commissioning Plan
- .2 Section 01 91 33 - Commissioning Forms
- .3 Section 01 91 41 - Commissioning Training
- .4 Section 01 98 00 - Commissioning of Architectural Systems
- .5 Section 23 08 00 - Commissioning of Mechanical Systems
- .6 Section 26 08 00 - Commissioning of Electrical Systems

1.3 DEFINITIONS:

- .1 Acronyms:
 - .1 BMM - Building Management Manual.
 - .2 Cx - Commissioning.
 - .3 EMCS - Energy Monitoring and Control Systems.
 - .4 O&M - Operation and Maintenance.
 - .5 PI - Product Information.
 - .6 PV - Performance Verification.
 - .7 TAB - Testing, Adjusting and Balancing.
- .2 Cx - A required 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.

1.4 GENERAL

- .1 Cx is a planned program of tests, procedures and checks carried out systematically on systems and integrated systems of the finished Project. Cx is performed after

systems and integrated systems are completely installed, functional and Contractor's Performance Verification responsibilities have been completed and approved.

Objectives:

- .1 Verify installed equipment, systems and integrated systems operate in accordance with contract documents and design criteria and intent.
- .2 Ensure appropriate documentation is compiled into the BMM.
- .3 Effectively train O&M staff.
- .2 Contractor assists in Cx process, operating equipment and systems, troubleshooting and making adjustments as required.
 - .1 Systems to be operated at full capacity under various modes to determine if they function correctly and consistently at peak efficiency. Systems to operate 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.

1.5 COMMISSIONING OVERVIEW

- .1 For Cx responsibilities refer to Section 01 91 31 - Commissioning (Cx) Plan.
- .2 Cx to be a line item of Contractor's cost breakdown.
- .3 Cx activities supplement field quality and testing procedures described in relevant technical sections.
- .4 Cx is conducted in concert with activities performed during stage of project delivery. Cx identifies issues which are addressed during Construction and Cx stages to ensure the built facility is constructed and proven to operate satisfactorily under weather, environmental and occupancy conditions to meet functional and operational requirements. Cx activities includes transfer of critical knowledge to facility operational personnel.
- .5 Departmental Representative will issue Interim Acceptance Certificate when:
 - .1 Completed Cx documentation has been received, reviewed for suitability and approved by the Commissioning Authority.
 - .2 Equipment, components and systems have been commissioned.
 - .3 O&M training has been completed.

1.6 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 nonfunctional system, including related systems as deemed required by the Commissioning Authority.
- .2 Costs for corrective work, additional tests, inspections, to determine acceptability and proper performance of such items to be borne by the Contractor. Above costs to be in form of progress payment reductions or hold-back assessments.

1.7 PRE-CXREVIEW

- .1 Before Construction:
 - .1 Review contract documents, confirm by writing to Commissioning Authority.
 - .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 documentationshelf-ready.
 - .5 Understand completely design criteria and intent and special features.
 - .6 Submit complete start-up documentation to Commissioning Authority.
 - .7 Have Cx schedules up-to-date.
 - .8 Ensure systems have been cleaned thoroughly.
 - .9 Complete TAB procedures on systems, submit TAB reports to Commissioning Authority for review and approval.
 - .10 Ensure "As-Built" system schematics are available.
- .4 Inform Commissioning Authority in writing of discrepancies and deficiencies on finished works.

1.8 CONFLICTS

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

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

1.9 ACTION AND INFORMATIONAL SUBMITTALS

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

1.10 COMMISSIONING DOCUMENTATION

- .1 Refer to Section 01 91 33 - Commissioning (Cx) Forms: Installation Check Lists and Product Information (PI) / Performance Verification (PV) Forms for requirements and instructions for use.
- .2 Commissioning Authority to review and approve Cx documentation.
- .3 Provide completed and approved Cx documentation to Commissioning Authority.

1.11 COMMISSIONING SCHEDULE

- .1 Convene Cx meetings following project meetings and as specified herein.
- .2 Purpose: to resolve issues, monitor progress, identify deficiencies, relating to Cx.
- .3 Continue Cx meetings on regular basis until commissioning deliverables have been addressed.
- .4 At 60% construction completion stage Commissioning Authority 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 Commissioning Authority, who will record and distribute minutes.
- .7 Ensure subcontractors and relevant manufacturer representatives are present at 60% and subsequent Cx meetings and as required.

1.12 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 14 days notice prior to commencement.
- .2 Commissioning Authority to witness start-up and testing.
- .3 Contractor's Cx Agent to be present at tests performed and documented by sub-trades, suppliers and equipment manufacturers.
- .4 Contractor's Cx Agents(s) shall cooperate fully with the Commissioning Authority.

1.14 MANUFACTURER'S INVOLVEMENT

- .1 Factory testing: manufacturer to:
 - .1 Coordinate time and location of testing.
 - .2 Provide testing documentation for approval by Commissioning Authority.
 - .3 Arrange for Commissioning Authority to witness tests.
 - .4 Obtain written approval of test results and documentation from Commissioning Authority 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 Commissioning Authority;
 - .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 -GENERAL

- .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 Commissioning Authority after distinct phases have been completed and before commencing next phase.
- .4 Document require tests on approved PV forms.
- .5 Failure to follow accepted start-up procedures will result in re-evaluation of equipment by an independent testing agency selected by the Commissioning Authority. 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 Commissioning Authority.
 - .2 Major equipment/systems: if evaluation report concludes that damage is minor, implement corrective measures approved by Commissioning Authority.
 - .3 If evaluation report concludes that major damage has occurred, Commissioning Authority 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 Commissioning Authority 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 checklists.
 - .4 Start-up reports,
 - .5 Step-by-step description of complete start-up procedures, to permit Commissioning Authority 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 to Commissioning Authority 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 Commissioning Authority at least 21 days prior to start of Cx.
- .2 Start Cx after elements of building affecting start-up and performance verification of systems have been completed.

1.20 INSTRUMENTS / EQUIPMENT

- .1 Submit the following to the Commissioning Authority 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 accepted simulated 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 Commissioning Authority to witness activities and verify results. Sufficient notice shall be given for scheduling.

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 regulation of authority having jurisdiction.

.3 Provide copies to Commissioning Authority within 5 days of test and with Cx report.

1.24 COMMISSIONING CONSTRAINTS

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

1.25 EXTRAPOLATION OF RESULTS

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

1.26 EXTENT OF VERIFICATION

- .1 Provide manpower and instrumentation to verify up to 30 % of reported results, unless specified otherwise in other sections.
- .2 Number and location to be at discretion of Commissioning Authority.
- .3 Conduct tests repeated during verification under same conditions as original tests, using same test equipment, instrumentation.
- .4 Review and repeat commissioning of systems if inconsistencies found in more than 20% of reported results.
- .5 Perform additional commissioning until results are acceptable to Commissioning Authority.

1.27 REPEAT VERIFICATIONS

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

1.28 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.

1.29 DEFICIENCIES, FAULTS, DEFECTS

- .1 Correct deficiencies found during start-up and Cx to satisfaction of Commissioning Authority.
- .2 Report problems, faults or defects affecting Cx to Commissioning Authority in writing. Stop Cx until problems are rectified. Proceed with written approval from Commissioning Authority.

1.30 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 the Commissioning Authority

1.31 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.

1.32 TRAINING

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

1.33 MAINTENANCE MATERIALS, SPARE PARTS, SPECIAL TOOLS

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

1.34 OCCUPANCY

- .1 Cooperate fully with the Commissioning Authority during stages of acceptance and occupancy of facility.

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

1.36 PERFORMANCE VERIFICATION TOLERANCES

- .1 Application tolerances:
 - .1 Specified range of acceptable deviations of measured values from specified values or specified design criteria. Except for special areas, to be within +/- 10% of specified values.
- .2 Instrument accuracy tolerances:
 - .1 To be of higher order of magnitude than equipment or system being tested.

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

1.37 OWNER'S PERFORMANCE TESTING

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

Part 2 Product

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Section Includes:
 - .1 Description of overall structure of Cx Plan and roles and responsibilities of Cx team.

1.2 REFERENCES

- .1 American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
 - .1 Guideline 0 - The Commissioning Process
 - .2 Guideline 1.1 - HVAC & R Technical Requirements for the Cx Process
 - .3 Standard 202 - Commissioning Process for Buildings and Systems
- .2 National Institute of Building Science (NIBS)
 - .1 Guideline 3 - Building Enclosure Commissioning Process
- .3 Canadian Standards Association (CSA)
 - .1 CSA Z320-11 - Commissioning Building Standard
- .4 Underwriters' Laboratories of Canada (ULC)

1.3 GENERAL

- .1 Provide a fully functional facility:
 - .1 Systems, equipment and components meet user's functional requirements before date of acceptance, and operate consistently at peak efficiencies and within specified energy budgets under normal loads.
 - .2 Facility user and O M personnel have been fully trained in aspects of installed systems.
 - .3 Optimized life cycle costs.
 - .4 Complete documentation relating to installed equipment and systems.
- .2 Term "Cx" in this section means "Commissioning".
- .3 Use this Cx Plan as master planning document for Cx:
 - .1 Outlines organization, scheduling, allocation of resources, documentation, pertaining to implementation of Cx.
 - .2 Communicates responsibilities of team members involved in Cx Scheduling,

documentation requirements, and verification procedures.

- .3 Sets out deliverables relating to O M, process and administration of Cx.
- .4 Describes process of verification of how built works meet design requirements.
- .5 Produces a complete functional system prior to issuance of Certificate of Occupancy.
- .6 Management tool that sets out scope, standards, roles and responsibilities, expectations, deliverables, and provides:
 - .1 Overview of Cx.
 - .2 General description of elements that make up CxPlan.
 - .3 Process and methodology for successful Cx.

.4 Acronyms:

- .1 Cx - Commissioning.
- .2 BMM - Building Management Manual.
- .3 EMCS - Energy Monitoring and Control Systems.
- .4 MSDS - Material Safety Data Sheets.
- .5 O&M - Operating & Maintenance
- .6 PI - Product Information.
- .7 PV - Performance Verification.
- .8 TAB - Testing, Adjusting and Balancing.
- .9 WHMIS - Workplace Hazardous Materials Information System.

.5 Commissioning terms used in this Section:

- .1 Bumping: short term start-up to prove ability to start and prove correct rotation.
- .2 Deferred Cx - Cx activities delayed for reasons beyond Contractor's control due to lack of occupancy, weather conditions, need for heating/cooling loads

1.4 DEVELOPMENT OF CX PLAN

- .1 Cx Plan to be 80% completed within 8 weeks of award of contract to take into account:
 - .1 Approved shop drawings and product data.
 - .2 Approved changes to contract.

- .3 Contractor's project schedule.
- .4 Cx schedule.
- .5 Contractor's, sub-contractor's, suppliers' requirements.
- .6 Project construction team's and Cx team's requirements.
- .2 Submit completed Cx Plan to Commissioning Authority and obtain written approval.

1.5 REFINEMENT OF CX PLAN

- .1 During construction phase, revise, refine and update Cx Plan to include:
 - .1 Changes resulting from Client program modifications.
 - .2 Approved design and construction changes.
- .2 Revise, refine and update every 4 weeks during construction phase. At each revision, indicate revision number and date.
- .3 Submit each revised Cx Plan to Commissioning Authority for review and obtain written approval.
- .4 Include testing parameters at full range of operating conditions and check responses of equipment and systems.

1.6 COMPOSITION, ROLES AND RESPONSIBILITIES OF CX TEAM

- .1 Project Manager is to maintain overall responsibility for managing the project and demonstrating to the client that the installed systems and overall facility meet the requirements of the TOR and the Technical Requirements.
- .2 Project Manager will select Cx Team consisting of following members:
 - .1 PWGSC Cx Manager
 - .1 Undertakes a quality assurance role on behalf of the PWGSC project team;
 - .2 Fulfills the PWGSC Commissioning Quality Management System requirements;
 - .3 Provides technical advice on O&M matters;
 - .4 Reviews commissioning documentation from the Commissioning Authority at all stages of the project delivery and provides support to the Project Manager in matters relating to commissioning.
 - .2 Design Consultant:
 - .1 Develops the design solutions to meet client requirements and performance specification requirements (Design Criteria);

- .3 Commissioning Authority (in-contract with construction team)
 - .1 Develops the initial commissioning plan, design intent, and system operating manual;
 - .2 Prepares commissioning specifications and other commissioning documentation including the Product Information (PI) and Performance Verification (PV) report forms;
 - .3 Develops the training plan;
 - .4 Monitors, witnesses, and certifies the performance of all commissioning activities as per the contract agreement;
 - .5 Responsible for design, construction, and warranty-related commitments for commissioning.
 - .6 Shall be an independent third party to the Design Consultant and Construction Team.
- .4 Commissioning Agents (in-contract with construction team)
 - .1 Carries out start-up and performance verification activities and performs acceptance tests and related procedures for all equipment, systems and integrated systems under the guidance of the Commissioning Authority.
 - .2 This individual also coordinates commissioning activities, conducts commissioning meetings, refines the commissioning plan, refines commissioning schedule, assembles maintenance manuals, and organizes training.
- .5 Construction Team (contractor, sub-contractors, suppliers and support disciplines)
 - .1 Responsible for construction/installation in accordance with contract documents, including testing, TAB, performance of specialized Cx activities.
 - .2 Delivery of training and Cx documentation.
 - .3 Assigning one person as point of contact with Consultant, Commissioning Authority, PWGSC Cx Manager and for administrative and coordination purposes.
- .6 Property Manager
 - .1 Represents lead role in Operation Phase and onwards
 - .2 Assigns operational personnel to witness systems and equipment testing and to participate in training.
 - .3 Day-to-day management and operation of the completed facility after it has been accepted from the project manager.

1.7 EXTENT OF CX

- .1 Commission the building systems and associated equipment
 - .1 Architectural Systems
 - .1 Building Envelope
 - .2 Air Leakage
 - .3 Water Penetration
 - .4 Thermal performance
 - .5 Security
 - .6 Doors and related hardware
 - .7 Wall assemblies and components
 - .8 Fenestrations and related hardware
 - .9 Floor/ceiling assemblies and components
 - .10 Common interior spaces assemblies
 - .2 Fire Protection systems:
 - .1 Portable fire extinguishers
 - .3 Mechanical and Plumbing systems:
 - .1 Indoor air quality
 - .2 All plumbing systems
 - .3 Site services
 - .4 Storm water systems
 - .5 Domestic hot water, domestic cold water
 - .6 Hydronic hot and cold water
 - .7 Drainage
 - .8 Fuel-oil piping
 - .9 All HVAC
 - .10 Heat recovery ventilators
 - .11 Exhaust fans
 - .12 Ductwork
 - .13 Grilles and diffusers

- .14 Air filters
- .15 Air intakes
- .16 Glycol systems
- .17 Heating and cooling units
- .18 Unit heaters
- .19 Boilers
- .20 Pumps
- .21 Baseboard heaters
- .22 Mechanical vibration control
- .23 Mechanical identification
- .24 Chemical treatment and procedures
- .4 Building Automation Systems
 - .1 EMCS
 - .2 Dampers
 - .3 Valves
- .5 Site Electrical Service
 - .1 Disconnects
- .6 Power Distribution
 - .1 Cabling (Electrical and Telecommunication)
 - .2 Cabling (Electrical and Telecommunication)
 - .3 Motor controls
- .7 Lighting
 - .1 Interior lighting
 - .2 Outdoor lighting
 - .3 Emergency lighting
- .8 Other
 - .1 Intrusion detection system

1.8 DELIVERABLES RELATING TO O M PERSPECTIVES

- .1 General requirements:

- .1 Compile English documentation.
- .2 Documentation to be computer-compatible format ready for inputting for data management.
- .2 Provide deliverables:
 - .1 Warranties.
 - .2 Project record documentation.
 - .3 Inventory of spare parts, special tools and maintenance materials.
 - .4 Maintenance Management System (MMS) identification system used.
 - .5 WHMIS information.
 - .6 MSDS data sheets.
 - .7 Electrical Panel inventory containing detailed inventory of electrical circuitry for each panel board. Duplicate of inventory inside each panel.

1.9 DELIVERABLES RELATING TO THE CX PROCESS

- .1 General:
 - .1 Start-up, testing and Cx requirements, conditions for acceptance and specifications form part of relevant technical sections of these specifications.
- .2 Definitions:
 - .1 Cx as used in this section includes:
 - .1 Cx of components, equipment, systems, subsystems, and integrated systems.
 - .2 Factory inspections and performance verification tests.
- .3 Deliverables: provide:
 - .1 Cx Specifications.
 - .2 Startup, pre-Cx activities and documentation for systems, and equipment.
 - .3 Completed installation checklists (ICL).
 - .4 Completed product information (PI) report forms.
 - .5 Completed performance verification (PV) report forms.
 - .6 Results of Performance Verification Tests and Inspections.
 - .7 Description of Cx activities and documentation.
 - .8 Description of Cx of integrated systems and documentation.

- .9 Tests of following witnessed by PWGSC Design Quality Review Team, and/or CxAuthority:
- .10 Tests performed by Owner/User.
- .11 Training Plans.
- .12 Cx Reports.
- .13 Prescribed activities during warranty period.
- .4 Consultant to witness and certify tests and reports of results provided to Cx Authority.
- .5 Commissioning Authority to participate.

1.10 PRE-CX ACTIVITIES AND RELATED DOCUMENTATION

- .1 Items listed in this Cx Plan include the following:
 - .1 Pre-Start-Up inspections: by Commissioning Authority prior to permission to start up and rectification of deficiencies to Commissioning Authority's satisfaction.
 - .2 Commissioning Authority to use approved check lists.
 - .3 Commissioning Authority will monitor some of these pre-start-up inspections.
 - .4 Include completed documentation with Cx report.
 - .5 Conduct pre-start-up tests: conduct pressure, static, flushing, cleaning, and "bumping" during construction as specified in technical sections. To be witnessed and certified by Commissioning Authority and does not form part of Cx specifications.
 - .6 Commissioning Authority will monitor some of these inspections and tests.
 - .7 Include completed documentation in Cx report.
- .2 Pre-Cx activities - ARCHITECTURAL:
 - .1 Doors, windows, related hardware:
 - .1 Complete installation checks and complete relevant documentation.
- .3 Pre-Cx activities - MECHANICAL:
 - .1 Plumbing systems:
 - .1 "Bump" each item of equipment in its "stand-alone" mode.
 - .2 Complete pre-start-up checks and complete relevant documentation.
 - .3 After equipment has been started, test related systems in conjunction

with control systems on a system-by-system basis.

.2 HVAC equipment and systems:

- .1 "Bump" each item of equipment in its "stand-alone" mode.
- .2 At this time, complete pre-start-up checks and complete relevant documentation.
- .3 After equipment has been started, test related systems in conjunction with control systems on a system-by-system basis.
- .4 Perform TAB on systems. TAB reports to be approved by Commissioning Authority.

.3 EMCS:

- .1 EMCS trending to be available as supporting documentation for performance verification.
- .2 Perform point-by-point testing in parallel with start-up.
- .3 Carry out point-by-point verification.
- .4 Demonstrate performance of systems, to be witnessed by Commissioning Authority prior to start of 30 day Final Acceptance Test period.
- .5 Perform final Cx and operational tests during demonstration period and 30 day test period.
- .6 Only additional testing after foregoing have been successfully completed to be "Off-Season Tests".

.4 Pre-Cx activities - ELECTRICAL:

.1 Low voltage distribution systems under 750 V:

- .1 Requires independent testing agency to perform pre- energization and post-energization tests.

.2 Lightingsystems:

- .1 Tests to include verification of lighting levels and coverage

1.11 START-UP

- .1 Start up components, equipment and systems.
- .2 Commissioning Authority to monitor all of these start-up activities.
 - .1 Rectify start-up deficiencies to satisfaction of Commissioning Authority.
- .3 Performance Verification (PV):

- .1 Approved Cx Agent to perform.
 - .1 Repeat when necessary until results are acceptable to Commissioning Authority.
- .2 Use procedures modified generic procedures to suit project requirements.
- .3 Commissioning Authority to witness and certify reported results using approved PI and PV forms.
- .4 Departmental Representative to approve completed PV reports and provide to Commissioning Authority.
- .5 Commissioning Authority verify up to 30% of reported results at random.
- .6 Failure of randomly selected item shall result in rejection of PV report or report of system startup and testing.

1.12 CX ACTIVITIES AND RELATED DOCUMENTATION

- .1 Perform Cx by specified Cx agency using procedures developed by Commissioning Authority and approved by Commissioning Authority.
- .2 Commissioning Authority to monitor Cx activities.
- .3 Upon satisfactory completion, Cx agency performing tests to prepare Cx Report using approved PV forms.
- .4 Departmental Representative to witness, certify reported results of, Cx activities and forward to Commissioning Authority.
- .5 Commissioning Authority reserves right to verify a percentage of reported results at no cost to contract.

1.13 CX OF INTEGRATED SYSTEMS AND RELATED DOCUMENTATION

- .1 Cx to be performed by specified Cx specialist, using procedures developed by Commissioning Authority and approved by Commissioning Authority.
- .2 Tests to be witnessed by Commissioning Authority and documented on approved report forms.
- .3 Upon satisfactory completion, Cx specialist to prepare Cx Report, to be certified by Commissioning Authority and submitted to Departmental Representative for review.
- .4 Commissioning Authority reserves right to verify percentage of reported results.
- .5 Integrated systems to include:
 - .1 HVAC and associated systems forming part of integrated HVAC systems:.
 - .2 Life safety systems, fire alarm systems.
- .6 Identification:

- .1 In later stages of Cx, before hand-over and acceptance Commissioning Authority and Cx Agent to co-operate to complete inventory data sheets and provide assistance to Cx Manager in full implementation of MMS identification system of components, equipment, sub-systems, systems.

1.14 INSTALLATION CHECK LISTS (ICL)

- .1 Refer to Section 01 91 33 - Commissioning (Cx) Forms: Installation Check Lists and Product Information (PI) / Performance Verification (PV) Forms.

1.15 PRODUCT INFORMATION (PI) REPORT FORMS

- .1 Refer to Section 01 91 33 - Commissioning (Cx) Forms: Installation Check Lists and Product Information (PI) / Performance Verification (PV) Forms.

1.16 PERFORMANCE VERIFICATION (PV) REPORT

- .1 Refer to Section 01 91 33 - Commissioning (Cx) Forms: Installation Check Lists and Product Information (PI) / Performance Verification (PV) Forms.

1.17 DELIVERABLES RELATING TO ADMINISTRATION OF CX

- .1 General:
 - .1 Because of risk assessment, complete Cx of occupancy, weather and seasonal-sensitive equipment and systems in these areas before building is occupied.

1.18 CXSCHEDULES

- .1 Prepare detailed Cx Schedule and submit to Commissioning Authority for review and approval same time as project Construction Schedule. Include:
 - .1 Milestones, testing, documentation, training and Cx activities of components, equipment, subsystems, systems and integrated systems, including:
 - .1 Design criteria, design intents.
 - .2 Pre-TAB review: 28days after contract award, and before construction starts.
 - .3 Cx agents' credentials: 60 days before start of Cx.
 - .4 Cx procedures: 3 months after award of contract.
 - .5 Cx Report format: 3 months after award of contract.
 - .6 Discussion of heating/cooling loads for Cx: 3 months before start-up.
 - .7 Submission of list of instrumentation with relevant certificates: 21 days before start of Cx.

- .8 Notification of intention to start TAB: 21 days before start of TAB.
- .9 TAB: after successful start-up, correction of deficiencies and verification of normal and safe operation.
- .10 Notification of intention to start Cx: 14 days before start of Cx.
- .11 Notification of intention to start Cx of integrated systems: after Cx of related systems is completed 14 days before start of integrated system Cx.
- .12 Identification of deferred Cx.
- .13 Implementation of training plans.
- .14 Cx reports: immediately upon successful completion of Cx.
- .2 Detailed training schedule to demonstrate no conflicts with testing, completion of project and hand-over to Departmental Representative.
- .3 6 months in Cx schedule for verification of performance in all seasons and wear conditions.
- .2 After approval, incorporate Cx Schedule into Construction Schedule.
- .3 Consultant, Contractor, Contractor's Cx agent, and Commissioning Authority will monitor progress of Cx against this schedule.

1.19 CX REPORTS

- .1 Submit reports of tests, witnessed and certified by Departmental Representative to Commissioning Authority who will verify reported results.
- .2 Include completed and certified PV reports in properly formatted Cx Reports.
- .3 Before reports are accepted, reported results to be subject to verification by Commissioning Authority.

1.20 ACTIVITIES DURING WARRANTY PERIOD

- .1 Cx activities must be completed before issuance of Interim Certificate, it is anticipated that certain Cx activities may be necessary during Warranty Period, including:
 - .1 Fine tuning of HVAC systems.
 - .2 Adjustment of ventilation rates to promote good indoor air quality and reduce deleterious effects of VOCs generated by off-gassing from construction materials and furnishings.
 - .3 Full-scale emergency evacuation exercises.

1.21 TESTS TO BE PERFORMED BY OWNER/USER

- .1 None is anticipated on this project.

1.22 TRAINING PLANS

- .1 Refer to Section 01 91 41 - Commissioning (Cx) - Training.

1.23 FINAL SETTINGS

- .1 Upon completion of Cx to satisfaction of Commissioning Authority lock control devices in their final positions, indelibly mark settings marked and include in Cx Reports.

Part 2 Product

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

- .1 Commissioning forms to be completed for equipment, system and integrated system.

1.2 INSTALLATION/START-UP CHECK LISTS

.1 Include the following data:

- .1 Product manufacturer's installation instructions and recommended checks.
- .2 Special procedures as specified in relevant technical sections.
- .3 Items considered good installation and engineering industry practices deemed appropriate for proper and efficient operation.

.2 Equipment manufacturer's installation/start-up check lists are acceptable for use. As deemed necessary by Commissioning Authority supplemental additional data lists will be required for specific project conditions.

.3 Use check lists for equipment installation. Document check list verifying checks have been made, indicate deficiencies and corrective action taken.

.4 Certified Equipment Manufacture technician shall sign start-up report and check lists upon completion, certifying stated checks and inspections have been performed; contractor to submit completed reports to the Commissioning Agent, Commissioning Authority, and design Consultant. Check lists will be required during Commissioning and will be included in Building Maintenance Manual (BMM) at completion of project. Following Equipment Reports are required:

- .1 Major HVAC equipment;
- .2 Major Plumbing equipment;
- .3 Chemical Treatments;
- .4 Building Management Systems;
- .5 Motor Starters and Variable Frequency Drives units;
- .6 Communication Systems "Wiring" (Voice, Data system tests and certifications)
- .7 Insulation Resistance Testing of Electrical Feeders.
- .8 As required by individual divisions 21 to 26 of specification sections.

.5 Use of check lists will not be considered part of commissioning process but will be stringently used for equipment pre-start and start-up procedures.

1.3 SAMPLES OF COMMISSIONING FORMS

- .1 Commissioning Authority will provide blank forms to Contractor for customization into project-specific commissioning documents.
- .2 Contractor to complete Commissioning forms to suit project requirements as per reviewed shop drawings and return to Cx Authority for review and final approval at least 12 weeks prior to final commissioning.

1.4 CHANGES AND DEVELOPMENT OF NEW REPORT FORMS

- .1 When additional forms are required, but are not available from Commissioning Authority develop appropriate verification forms and submit to Commissioning Authority for approval prior to use.
 - .1 Additional commissioning forms to be in same format as provided by the Commissioning Authority.

1.5 COMMISSIONING FORMS

- .1 Use Commissioning forms to verify installation and record performance when starting equipment and systems.
- .2 Strategy for Use:
 - .1 Commissioning Authority provides Contractor project-specific Commissioning forms with Specification data included.
 - .2 Contractor will provide required shop drawings information and verify correct installation and operation of items indicated on these forms.
 - .3 Confirm operation as per design criteria and intent.
 - .4 Identify variances between design and operation and reasons for variances.
 - .5 Verify operation in specified normal and emergency modes and under specified load conditions.
 - .6 Record analytical and substantiating data.
 - .7 Verify reported results.
 - .8 Form to bear signatures of recording technician and reviewed and signed off by Commissioning Authority.
 - .9 Submit immediately after tests are performed.
 - .10 Reported results in true measured SI unit values.
 - .11 Provide Commissioning Authority with originals of completed forms.
 - .12 Maintain copy on site during start-up, testing and commissioning period.
 - .13 Forms to be both hard copy and electronic format with typed written results

in Building Management Manual.

1.6 LANGUAGE

- .1 To suit the language profile of the awarded contract.

Part 2 Product

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 SUMMARY

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

1.2 TRAINEES

- .1 Trainees: personnel selected for operating and maintaining this facility. Includes Facility Manager, building operators, maintenance staff, security staff, and technical specialists as required.
- .2 Trainees will be available for training during later stages of construction for purposes of familiarization with systems.

1.3 INSTRUCTORS

- .1 Commissioning Authority will provide:
 - .1 Descriptions of systems.
 - .2 Instruction on design philosophy, design criteria, and design intent.
- .2 Commissioning Authority, 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, PWGSC Cx Manager, Commissioning Authority, and Property 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 presentations.
 - .3 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.
- .3 Training to be completed prior to acceptance of facility.

1.7 RESPONSIBILITIES

- .1 Be responsible for:
 - .1 Implementation of training activities,
 - .2 Coordination among instructors,
 - .3 Quality of training, training materials,
- .2 Commissioning Authority will evaluate training and materials.

- .3 Upon completion of training, provide written report, signed by Instructors, witnessed by Commissioning Authority.

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.
 - .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.
- .3 Provide specialized training as specified in relevant Technical Sections of the construction specifications.

1.9 VIDEO-BASED TRAINING

- .1 Manufacturer's videotapes to be used as training tool with Commissioning Authority's review and written approval 3 months prior to commencement of scheduled training.
- .2 On-Site training videos:
 - .1 Videotape training sessions for use during future training.
 - .2 To be performed after systems are fully commissioned.
 - .3 Organize into several short modules to permit incorporation of changes.
- .3 Production methods to be high quality.

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Section Includes:
 - .1 This section is limited to portions of the Building Management Manual (BMM) provided to Departmental Representative by Contractor.
- .2 Acronyms:
 - .1 BMM - Building Management Manual.
 - .2 Cx - Commissioning.
 - .3 HVAC - Heating, Ventilation and Air Conditioning.
 - .4 PI - Product Information.
 - .5 PV - Performance Verification.
 - .6 TAB - Testing, Adjusting and Balancing.
 - .7 WHMIS - Workplace Hazardous Materials Information System.

1.2 GENERAL REQUIREMENTS

- .1 Standard letter size paper 216 mm x 279 mm.
- .2 Methodology used to facilitate updating.
- .3 Drawings, diagrams and schematics to be professionally developed.
- .4 Electronic copy of data to be in a format accepted and approved by Departmental Representative.

1.3 APPROVALS

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

1.4 GENERAL INFORMATION

- .1 Provide Departmental Representative the following for insertion into appropriate Part and Section of BMM:
 - .1 Complete list of names, addresses, telephone and fax numbers of contractor, sub-contractors that participated in delivery of project - as indicated in Section 1.2 of BMM.
 - .2 Summary of architectural, structural, fire protection, mechanical and electrical systems installed and commissioned - as indicated in Section 1.4 of

BMM.

- .1 Including sequence of operation as finalized after commissioning is complete as indicated in Section 2.0 of BMM.
- .3 Description of building operation under conditions of heightened security and emergencies as indicated in Section 2.0 of BMM.
- .4 System, equipment and components Maintenance Management System (MMS) identification - Section 2.1 of BMM.
- .5 Information on operation and maintenance of architectural systems and equipment installed and commissioned - Section 2.0 of BMM.
- .6 Information on operation and maintenance of fire protection and life safety systems and equipment installed and commissioned - Section 2.0 of BMM.
- .7 Information on operation and maintenance of mechanical systems and equipment installed and commissioned - Section 2.0 of BMM.
- .8 Operating and maintenance manual - Section 3.2 of BMM.
- .9 Final commissioning plan as actually implemented.
- .10 Completed commissioning checklists.
- .11 Commissioning test procedures employed.
- .12 Commissioning reports.

1.5 CONTENTS OF OPERATING AND MAINTENANCE MANUAL

- .1 For detailed requirements refer to Section 01 78 00 - Closeout Submittals.
- .2 Departmental Representative to review and approve format and organization within 12 weeks of award of contract.
- .3 Include original manufactures brochures and written information on products and equipment installed on this project.
- .4 Record and organize for easy access and retrieval of information contained in BMM.
- .5 Include completed PI report forms, data and information from other sources as required.
- .6 Inventory directory relating to information on installed systems, equipment and components.
- .7 Approved project shop-drawings, product and maintenance data.
- .8 Manufacturer's data and recommendations relating: manufacturing process, installation, commissioning, start-up, O & M, shutdown and training materials.
- .9 Inventory and location of spare parts, special tools and maintenance materials.

- .10 Warranty information.
- .11 Inspection certificates with expiration dates, which require on-going re-certification inspections.
- .12 Maintenance program supporting information including:
 - .1 Recommended maintenance procedures and schedule.
 - .2 Information to removal and replacement of equipment including, required equipment, points of lift and means of entry and egress.

1.6 LIFE SAFETY COMPLIANCE (LSC) MANUAL

- .1 Samples of LSC Manual will be available from Departmental Representative.
- .2 Content of Manual:
 - .1 All possible Emergency situations modes including: presence of fire and smoke, power failure, loss of water or pressure, chemical spills and refrigerant release.
 - .2 HVAC emergencies and fuel supply failures.
 - .3 Intrusion and security breach.
 - .4 Emergency provisions for natural disasters, bomb threats and other disruptive situations.
 - .5 Dedicated emergency generators for high security projects, medical facilities and computer systems.
 - .6 Emergency control procedures for fire, power and major equipment failure.
 - .7 Emergency contacts and numbers.
 - .8 Manual to be readily available and comprehensible to non- technical readers.

1.7 SUPPORTING DOCUMENTATION FOR INSERTION INTO SUPPORTING APPENDICES

- .1 Provide Departmental Representative supporting documentation relating to installed equipment and system, including:
 - .1 General:
 - .1 Finalized commissioning plan.
 - .2 WHMIS information manual.
 - .3 Approved "as-built" drawings and specifications.
 - .4 Procedures used during commissioning.
 - .5 Cross-Reference to specification sections.

- .2 Architectural and structural:
 - .1 Inspection certificates, construction permits.
 - .2 PV reports.
- .3 Fire prevention, suppression and protection:
 - .1 Test reports.
 - .2 Smoke test reports.
 - .3 PV reports.
- .4 Mechanical:
 - .1 Installation permits, inspection certificates.
 - .2 Piping pressure test certificates.
 - .3 Ducting leakage test reports.
 - .4 TAB and PV reports.
 - .5 Charts of valves and steam traps.
 - .6 Copies of posted instructions.
- .5 Electrical:
 - .1 Installation permits, inspection certificates.
 - .2 TAB and PV reports.
 - .3 Electrical work logbook.
 - .4 Charts and schedules.
 - .5 Locations of cables and components.
 - .6 Copies of posted instructions.
- .2 Assist Departmental Representative with preparation of BMM.

1.8 LANGUAGE

- .1 The BMM shall be English Language.

1.9 USE OF CURRENT TECHNOLOGY

- .1 Use current technology for production of documentation. Emphasis on ease of accessibility at all times, maintain in up-to-date state, compatibility with user's requirements.
- .2 Obtain Departmental Representative's approval before starting Work.

Part 2 Product

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 PERFORMANCE SPECIFICATIONS

- .1 This section describes the general requirements relating to the performance criteria for the building envelope / cladding that ensures bats can not enter the building envelope through small gaps and cracks.
- .2 Bats can create a safety hazard for the building's occupants and therefore the building envelope must be constructed to prevent their infiltration.
- .3 In the Kluane National Park bats are an endangered and protected species, so due care and consideration must be used to protect them, especially during the construction process.

1.2 PERFORMANCE REQUIREMENTS

- .1 The cladding components and details must prevent bat infiltration and no gaps in the building exterior skin / envelope can be more than 9mm (3/8") width or diameter.
- .2 Gaps due to contraction or expansion can not exceed 6mm (1/4") so due care and attention is required for detailing the building's exterior.
- .3 Contractor to contact Consultant immediately if it is determined that a large gap is evident and a solution requires coordination for a proper detail that meets the performance criteria noted above. Once a solution is determined by the contractor, it must be reviewed for acceptance by the Owner and Consultant before
- .4 Corrugated metal cladding requires foam closure strips behind all 'J'-trim and corner trim. Contractor to provide photographic evidence of foam closure installation and that all gaps have been eliminated to the satisfaction of the Owner and Consultant.
- .5 Should the Owner or Consultant find gaps in the exterior skin / envelope that do not meet this criteria the Contractor shall revise and repair the gap(s) to the satisfaction of the Owner and Consultant.

1.3 PRE-CONSTRUCTION MEETING

- .1 During the pre-construction meeting the Contractor shall provide a detailed work plan that describes the proposed method of construction for sealing all gaps.
- .2 Within seven (7) days of this meeting the Contractor shall provide a Quality Assurance Plan (QAP) that details the process he/she will use to prevent gaps in the building envelope during construction.

Part 2 Product

2.1 NOT USED

PWGSC- A & E
Trades Building
Kluane National Park Headquarters
Project no. R.075647.001

Issued for Tender
BATMITIGATIONATBUILDING ENVELOPE
Haines Junction, YT
March 21,2018

01 91 70.15

2

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED WORK

- .1 This Section of the Specification forms part of the Contract Documents and is to be read, interpreted and coordinated with all other parts.

1.2 RELATED SECTIONS

- .1 Section 01 91 13 - General Commissioning
- .2 Section 01 91 31 - Commissioning Plan
- .3 Section 01 91 33 - Commissioning Forms
- .4 Section 01 91 41 - Commissioning Training
- .5 Section 23 08 00 - Commissioning of Mechanical Systems
- .6 Section 26 08 00 - Commissioning of Electrical Systems

1.3 QUALITY ASSURANCE

- .1 The commissioning shall be executed in accordance with the intent of Section 01 91 13 General Commissioning and referenced sections.

1.4 GENERAL

- .1 Be responsible for the performance and commissioning of all equipment supplied under the Sections of Divisions 3, 5, 6, 7, 8. Commissioning is the process of advancing the installation from the stage of static completion to full working order in accordance with the contract documents and design intent. It is the activation of the completed installation.
- .2 In consultation with the General Contractor, ensure that sufficient time is allowed and fully identified on the construction schedule for the proper commissioning of all mechanical systems.
- .3 Fully cooperate with the Commissioning Authority.
- .4 Refer to related sections for additional requirements.

1.5 COMMISSIONING AND DEMONSTRATION

- .1 The general contractor may engage the services of an approved independent specialist firm to coordinate the commissioning process specified under this division and those items of other Divisions which interact with work of this Division as outlined herein, including the complete life safety system.
- .2 The cooperation of all trades is essential for an efficient and planned process. A team comprising the following is recommended:

-
- .1 Commissioning Authority
 - .2 General Contractor
 - .3 Architect
 - .4 Property Manager
 - .5 Mechanical Trades: especially Controls Contractor and TAB Agency
 - .6 Electrical Trades
- .3 Submit a schedule for the commissioning phase of the work. This schedule shall show:
- .1 Installation schedule.
 - .2 Submission dates for the various documents required prior to substantial completion.
 - .3 Timing of the various phases of the commissioning, testing, and demonstration process.
- .4 Commissioning is concluded when the installation is in full working order and acceptable for use. The work will include the following:
- .1 Testing of windows and door equipment
 - .2 Testing of infiltration and exfiltration of building envelope (blower-door test)
- .5 At the conclusion of commissioning, demonstrate the operation of the systems to the Commissioning Authority, Consultant and then to the Owner's Operating Staff.
- .6 The verification process shall include the demonstration of the following:
- .1 Operation of operable doors, windows, or other operable devices.
 - .2 Operation of secure (lockable) doors, windows or other lockable devices.
 - .3 Operation of equipment and systems under normal operation, after-hours operation, emergency operation, and failure.
- .7 At the completion of the commissioning, testing, and demonstration submit the following to the Commissioning Authority:
- .1 A letter certifying that all work specified under this contract is complete, clean and operational in accordance with the specification and drawings.
 - .2 Completed copies of all commissioning check lists plus copies of test reports from specialty contractors and vendors.
 - .3 "AS-BUILT" record drawings, as specified.
 - .4 A list of all keys, alarm and protective devices tested, with the final operating settings, and storage locations.

1.6 CORRECTION OF DEFICIENCIES

- .1 Correct all contract deficiencies found during commissioning.

1.7 WITNESSING OF CONTRACTOR PROVING TESTS

- .1 Advise the Commissioning Authority in advance when testing is ready to commence. Consult with the Commissioning Authority to determine which procedures he may elect to witness. Provide advanced notice prior to commencement of each procedure or series of procedures to allow the Commissioning Authority to arrange for witnessing of tests as required.

1.8 ADDITIONAL TESTING CONDUCTED BY COMMISSIONING AUTHORITY

- .1 The Commissioning Authority may select and conduct at random: components, systems and/or integrated systems to be re-tested in addition to the specified tests.
- .2 Testing of any component, system, or integrated system by the Commissioning Authority does not reduce the commissioning agent's obligations for complete testing and start-up of systems as specified.
- .3 The commissioning agent will provide, without cost, support for these tests, including:
 - .1 Qualified personnel to operate the appropriate components, systems and/or integrated systems.
 - .2 Making all test equipment and instrumentation available to the Commissioning Authority.
 - .3 The commissioning agent can choose to witness any testing conducted by the Commissioning Authority.
- .4 Should any component or system fail under additional testing completed by the Commissioning Authority the commissioning agent will correct the deficiency and retest to the satisfaction of the Commissioning Authority at the Contractor's expense.

1.9 FINAL REPORT

- .1 The Commissioning agent shall be responsible for compiling the final reports.
- .2 Copies of the final report shall be provided to the commissioning authority. Final review shall be by the Commissioning Authority prior to handing over to the PWGSC Cx Manager.

Part 2 Testing

2.1 GENERAL

- .1 Building envelope thermal performance testing
- .2 Building envelope infiltration/exfiltration performance testing
- .3 Component (windows, doors, etc.) testing (see specification sections)
- .4 Acoustic testing

2.2 REFERENCES

- .1 CGSB-149-GP-2MP Manual for Thermographic Analysis of Building Enclosures (CGSB-149.10)
- .2 ASTM E90-09 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
- .3 ASTM E779-10 Standard Test Method for Determining Air Leakage Rate by Fan Pressurization

2.3 QUALITY ASSURANCE

- .1 The testing shall be executed in accordance with the intent of the References listed and the individual specification sections noted herein.

2.4 TESTING INSTRUMENTS

- .1 Provide two-way radios, ladders, tools, instruments and other equipment as required to complete the program and as outlined in this specification.
- .2 Provide all safety equipment required for personnel involved in the testing program.
- .3 Use instruments supplied or calibrated by the approved laboratory or
- .4 Show the Commissioning Authority the current calibration certificate for each instrument to be used. Provide a copy of the calibration certificates with test
- .5 Testing instruments:
 - .1 Infrared camera
 - .2 Blower door assembly
 - .3 Sound measuring devices
 - .4 And/or other.

Part 3 Execution

3.1 BLOWER DOOR TEST

- .1 To measure the air tightness of the building envelope a blower door test is to be conducted in accordance with ASTM E779-10 to determine the extent to which the

building leaks air through its perimeter walls, roof and floor. The air change rate must be below 1.0 airchanges per hour under test conditions. The blower door reference volume, called V_{n50} , is the full internal air volume of the building under test condition.

- .2 The test shall be conducted AFTER all vapor barriers, windows and doors (including overhead doors) and BEFORE drywall and plywood finishes are installed. Tests shall include the following:
 - .1 Test 1: positive pressure
 - .2 Test 2: negative pressure
 - .3 Test 3: positive pressure, Overhead doors sealed with polyethylene film
- .3 The report content to be included in the commissioning report shall contain at least the following information:
 - .1 All details necessary to identify the object tested: purpose of test; address and date
 - .2 Test object:
 - .1 Description of which parts of the building were subject to the test;
 - .2 Net floor area and internal volume of space (see definition below) subject to the test and other required dimensions of the building;
 - .3 Documentation of calculations so that the stated results can be verified;
 - .4 The status of all openings on the building envelope, latched, sealed, open, etc.;
 - .5 Detailed description of temporarily sealed openings, if any;
 - .6 The type of heating, ventilating and air conditioning system.
 - .3 Apparatus and procedure:
 - .1 Equipment and technique employed.
 - .4 Test data:
 - .1 Zero-flow pressure differences $\Delta p_{0,1+}$, $\Delta p_{0,1-}$, $\Delta p_{0,2+}$, $\Delta p_{0,2-}$, $\Delta p_{0,1}$ and $\Delta p_{0,2}$ for pressurization and depressurization test;
 - .2 Inside and outside temperatures;
 - .3 Wind speed, barometric pressure if it is part of the calculation;
 - .4 Table of induced pressure differences and corresponding air flow rates;

- .5 Air leakage graph;
- .6 Air change rate, n_{50} , at 50 Pa, for pressurization and/or depressurization and mean value;
- .7 Derived quantity.
- .5 Definitions:
 - .1 Internal volume: The internal volume, V , is the volume of air inside the measured building or part of building. The internal volume is calculated by multiplying the net floor area (see 6.1.3) with the mean net ceiling height. The volume of furniture is not subtracted.
 - .2 Net floor area: The net floor area AF is the total floor area of all floors belonging to the internal volume subject to the test. It is calculated according to national regulations.

END OF SECTION