

**TERMS OF REFERENCE AND CONSTRUCTION SPECIFICATIONS
FOR
DESIGN, SUPPLY AND INSTALLATION OF TWO
SPRINKLER SYSTEMS AT DES TOUCHES & DE GANNES BUILDINGS
FORTRESS OF LOUISBOURG, NOVA SCOTIA**

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PART 1 - GENERAL

1.1 REFERENCES

- .1 National Building Code of Canada (NBC) 2010 including all amendments up to bid closing date
- .2 National Fire Code of Canada
- .3 Provincial Government Act and Regulations; including, but not limited to:
 - .1 Provincial Building Code Act
 - .2 Occupational Health and Safety Act revised Statutes of Nova Scotia 1996, Chapter 7 and regulations
 - .3 Worker's Compensation Act
 - .4 Fire Prevention Act
 - .5 Dangerous Goods Transportation Act

1.2 REFERENCE
STANDARDS

- .1 Where edition date is not specified, consider that references to manufacturer's and published codes, standards and specifications approved by the issuing organization, current at the date of this Specification.
- .2 Reference Standards and specifications are quoted in this Project Manual to establish minimum standards. Work which in quality exceeds these minimum standards shall be considered to conform.
- .3 Should the Contract Documents conflict with specified reference standards or specifications the General Conditions of the Contract shall govern.
- .4 Where reference is made to manufacturer's directions, instructions or specifications they shall include full information on storing, handling, preparing, mixing, installing, erecting, applying, or other matters concerning the materials pertinent to their use and their relationship to materials with which they are incorporated and written to suit this specific project.
- .5 Have a copy of each code, standard and specification and manufacturer's directions, instructions and specifications, to which reference is made in this Project Manual, always available at construction site, when requested by Departmental Representative.
- .6 Standards, specifications, associations, and regulatory bodies are generally referred to throughout the project manual by their abbreviated designations.

1.3 WORK COVERED BY
CONTRACT DOCUMENTS

- .1 Work of this Contract comprises of the complete design and construction of two new sprinkler systems for the DesTouches and DeGannes buildings at the Parks Canada

Fortress of Louisbourg (FOL) site, 259 Park Service Road, Louisbourg, NS, a complete description of the scope of work is included in the attached specifications along with drawings of DesTouches building in Appendix A and DeGannes building in Appendix B.

Both of the buildings in this contract DesTouches and DeGannes are located on the period site at FOL and have period exteriors. The DesTouches building is primarily used for office space and modern activities while the De Gannes building is used for period interpretation and is open to the public to visit during the operating season. It is critical that the contractor disguises all sprinkler system components during installation and the absolute minimum amount of piping is located in public areas. Particular attention must be paid to camouflage piping on the main floor of the DeGannes building. Contractor must use extreme care during the installation of these sprinkler systems to ensure no loss of cultural integrity or damage to the existing buildings.

Contractor must provide all labour, materials, equipment, etc. to design, supply, install, inspect, test, commission and certify to Fire Marshall's requirements two new dry drop sprinkler systems at DesTouches and DeGannes buildings.

Contractor will be required to provide full design, supply, installation, inspection, test, commissioning and certification services for all sprinkler alarm requirements and electrical installations required to operate the two new sprinkler systems at DesTouches and DeGannes.

The Contractor is required to design build a complete new fire alarm system to support the new sprinkler systems in each of the buildings, DesTouches and DeGannes. This will require the design and installation of all new fire alarm circuitry.

Wiring of system monitoring devices (tamper switches alarm switches, etc.) is by others.

Contractor to maintain fire access / controls throughout the duration of the project.

Parks Canada will provide the network connection for each new fire alarm panel

installed in DesTouches and DeGannes buildings.

The Contractor is to ensure the new alarm panels to be installed in both buildings are compatible with the existing FOL electrical and alarm infrastructure.

The Contractor is required to get full approval from the Fire Marshall's office or their Certified Representative for all components of the design / build project including mechanical and electrical commissioning. The Contractor as part of this approval will be required to remove the existing alarm systems in their entirety from both buildings.

As part of the sprinkler installation the Contractor will be required to paint all sprinkler piping and appurtenances to blend with existing wall, ceiling, etc. colors as per requirements in Section 09 91 23. Parks Canada will provide color samples / numbers for the Contractor upon request to match existing infrastructure. The Contractor must obtain color approval prior to commencing painting operations.

The Contractor is not permitted to drill into or make any holes in existing timber beams in this project unless authorized by Department Representative which will only be granted in exceptional circumstances.

All sprinkler piping and fittings to be galvanized.

Contractor must use dry drops where at all possible to disguise sprinkler piping.

A site visit will be hosted during the tender period to show the above site locations and conditions.

The Design / Build Contractor at the completion of the installation of these two sprinkler systems must fully commission both systems and have an Engineer licensed to practice in the Province of Nova Scotia provide a written certification report witnessing the commissioning and certifying the two new sprinkler systems comply with all Fire Marshall's regulations.

The specifications for each of the buildings are included in Appendix A and B along with the following descriptions.

DesTouches building is a two storey building with an attic and a full basement in addition to the two stories which must be provided with a complete new sprinkler system installed as part of this project all levels of the building. DesTouches is used primarily for office and storage space. Appendix A shows drawings

for the existing DesTouches building.

DesTouches has an existing 150mm diameter watermain entering the building which is to be used as the starting connection for the project. The location of this main is shown in drawings in Appendix A. No existing electrical drawings exist so the Contactor must confirm existing electrical infrastructure. The alarm diagrams for this building have been included in Appendix A.

The DeGannes building is a two story building with a crawl space basement both stories and the basement must be provided with a complete new sprinkler system. The first floor of the DeGannes building is used for interpretation so the sprinkler system must be totally disguised. The second floor is not in use so this floor can be used to run sprinkler piping in combination with dry pendant heads to protect the integrity of the main floor.

The sprinkler piping for the main floor of the building should be disguised as much as possible using the existing exposed beams to disguise in combination with dry drops.

DeGannes has an existing 150mm diameter watermain entering the building which is to be used as the starting connection for the project. The location of this main is shown in drawings in Appendix B. No existing electrical drawings exist so the Contactor must confirm existing electric infrastructure. The alarm diagrams for this building have been included in Appendix B.

Appendix B shows drawings for the existing DeGannes building. All floors of the DeGannes building must be provided with adequate sprinkler protection.

The Contractor will provide a complete copy of test results on the sprinkler system certified by the Engineering consultant that designed the system.

The Agency expects the Supplier to maintain a high standard of engineering design, based upon recognized design principles. All design elements, planning, engineering and architecture must be fully coordinated, and consistent in adherence to good design principles. The engineering drawings for this project must be approved by the Fire Commissioners office in addition to being a fully stamped set of engineering drawings. The engineered drawings must be stamped by an Engineer licensed to practice engineering in the province of Nova Scotia. The client at the

completion of the project will be provided with both a digital and hard copy of the drawings.

The Contractor will be responsible for the production of stamped set of engineered drawings and specifications suitable for design and construction of **dry pipe sprinkler systems** at the DesTouches and DeGannes Buildings at the Fortress of Louisbourg.

The Summary of Work is provided as part of this package for information only. Verification of measurements, site conditions and design requirements are the full responsibility of the Design Build Contractor. It is also the Contractors full responsibility to produce AutoCAD drawings for this project, Parks Canada does not currently have digital as built information for the buildings in CADD form so drawings provided in Appendix A and B are in PDF form only. Contractor will be fully responsible to produce all digital drawings for design and asbuilt information. The Contractor shall examine site conditions prior to developing a design build proposal in order to ensure that details are appropriate to existing conditions.

The Contractor is responsible for all related structural mechanical and electrical engineering along with any other sub-consultants required.

Design consultants and engineers engaged by the Contractor must be fully qualified, accredited professionals, licensed to practice in Nova Scotia. The Consultant's must be identified in the Contractor's proposal.

Up to 2 drawing reviews by Parks Canada, Fire Commissioners Office or Certified Representative may be required in the design development stage. The Contractor is responsible for obtaining any and all inspections and permits. Contractor is responsible to obtain the Fire Commissioners office or Certified Representative approval for the complete set of construction drawings.

System is to be designed and installed to meet or exceed all applicable codes and standards including, but not limited to: the National Building Code of Canada (2010), the National Fire Code, Canada Labour Code, The Nova Scotia Standard Specification for Municipal Services, CSA and The Nova Scotia Building Code and Regulations.

Contractors must be prepared to submit a detailed design / construction schedule and demonstrate that

they can meet the deadlines on this schedule.

Contractor is required to submit a site specific health and safety plan, and an environmental protection plan.

The Contractor is cautioned that this is a National Historic Site and every effort should be made to incorporate the sprinkler system with minimal visual impact while still achieving compliancy with current codes and standards.

The Contractor is not permitted to cut any beams or other structural components within the National Historic building without prior consent from the Owner.

Execute work with least possible interference to building operations, occupants, and the public. All work to be completed starting after October 20, 2014, and must be completed by January 31, 2015. Design work can commence immediately upon award of contract.

The Contractor shall use the best available methods of performing the work and shall employ only skilled and competent staff thereon, who will be under the supervision of a senior member of the Contractor's staff.

Drawings and documents or copies thereof required for the work shall be exchanged between the Contractor and the Agency on a reciprocal basis. All drawings and documents prepared by the Contractor for the Agency shall be the property of the Agency, free from all claims by the Contractor of any nature and kind whatsoever.

The Agency may, in writing, at any time increase/decrease or otherwise alter the whole or any part of the work. Payment for the contract adjustment will be subject to price negotiation.

The Contractor agrees to obtain the consent of the Agency before publishing or issuing any account of the project.

Drawings shall be prepared in SI units in standard size sheets using the title block and format acceptable to the Agency

Drawings shall be produced using CADD and the final working drawings shall be accompanied by the appropriate electronic format acceptable for use by the Agency. No other systems are acceptable.

The Contractor shall not be entitled to payment in

respect to cost incurred by the Contractor in remedying errors and omissions in the services that are attributable to the Contractor, the Contractor's employees, or persons for whom the Contractor has assumed responsibility in performing the services.

1.4 CONTRACT METHOD

- .1 Construct Work under design-build lump sum price contract.

1.5 CODES/STANDARDS

- .1 Meet or exceed requirements of:
.1 contract documents
.2 specified standards, codes and referenced documents.

1.6 TOLERANCES

- .1 Meet or exceed requirements of:
.1 ~~Unless acceptable tolerances~~ are otherwise specified in specified standards, codes and referenced documents.
.1 "Plumb and level" shall mean plumb or level within 3mm in 3m (1/8" in 10'0")
.2 "Square" shall mean not in excess of 10 seconds less or greater than 90.
.3 "Straight" shall mean within 3mm under a 3m (1/8" under a 10' -0") long straightedge.

1.7 WORK SEQUENCE

- .1 Provide at start-up meeting or within 10 Working Days after award of contract, whichever occurs first, schedule showing anticipated progress stages and final completion of work within time period required by Contract Documents
- .2 Provide in form acceptable to Consultant, within 10 working days after Contract award, schedule showing dates for:
.1 Submission of shop drawings.
.2 Delivery of items of equipment and materials to each site.
.3 Final completion date within time period required by Contract documents.
- .3 Interim reviews of work progress based on work schedule will be conducted as decided by Departmental Representative.

1.8 CONTRACTOR USE OF PREMISES

- .1 Co-ordinate use of premises under direction of Departmental Representative.

- .2 The Parks Canada Fortress of Louisbourg site is not open to the public during the projected work period; however, some visitors may arrive by scheduled tours. The contractor will be expected to ensure visitors are accommodated and their safety is respected during these scheduled visits. The Contractor will also attempt to confine all their work and work materials to the building they will be installing the new sprinkler system in and will ensure fire controls are in place.
- .3 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

1.9 OWNER OCCUPANCY

- .1 Owner will occupy DesTouches during entire construction period for execution of normal operations. Owner will not have full time staff in DeGannes for the duration of the contract; however, periodic staff visits will be necessary for routine maintenance activities.
- .2 Co-operate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

1.10 SETTING OUT OF WORK

- .1 Assume full responsibility for design and construction of the Work and execute complete layout of work to locations, lines and elevations as indicated in the program.
- .2 Provide devices needed to design, layout and construct work.

1.11 EXECUTION OF THE WORK

In general, the work shall be carried out in accordance with the National Fire Code and National Building Code of Canada (NBCC).

The installation is to be carried out in accordance with the drawings and specifications submitted and approved for construction.

Qualified and experienced trades people shall be employed in the erection and installation of the sprinkler system.

The construction and erection work shall be executed under the continuous supervision and direction of a competent supervisor.

The Contractor will provide on-site finished, quality products as specified and shown on the shop drawings. Burning, cutting, welding, or other on-site modifications to the existing building structure will not be permitted

unless approved by the Departmental Representative.

Once started, the installation shall be continuous until completion.

The Contractor is to obtain approval from the Departmental Representative for any shutdown or interruption of active service, facility, or operations in the work area. The contractor shall adhere to any approved interruption schedule.

The Contractor shall keep the site free from debris and shall store his equipment and material on site so as to not interfere with the operations on the site. Work is to be completed between October 20, 2014 and January 31, 2015, during this time the Fortress of Louisbourg period site is closed to visitors and the contractor will be permitted to drive vehicles / equipment onsite and have access to the building. However, in the event there are any delays and the contractor has to work into the visitor season the Contractor will not be permitted to bring vehicles onto the site during operating hours.

The Contractor shall be responsible for the storage and security of his own materials and equipment. The Agency will not be held liable for any materials or equipment which are stolen or damaged at the site.

The Contractor shall be responsible for temporary power and water.

The Contractor shall be responsible for the removal and disposal of all materials and debris remaining after the work has been completed and the overall cleanup of the site.

Total performance for the project occurs when the sprinkler system is complete and the Departmental Representative has issued notification of acceptance. Issuance of a certificate of Total Performance will require written certification from the Contractor's design engineer that the structure has been constructed and tested in accordance with the approved design/working drawings and specifications and meets Fire Marshall's requirements.

Contractor to maintain fire access / control throughout the duration of the project.

A final inspection of the structure and written report to the Departmental Representative must be undertaken by the manufacturer upon completion of the work. The Contractor is required to coordinate the scheduling of the final inspection with the Departmental Representative.

Upon completion of the project, two (2) copies of an Operation and Maintenance Manual prepared and written by the Manufacturer shall be supplied to the Owner outlining

recommended maintenance, repair, and inspection procedures for the structure.

At the completion of the project the Contractor will be required to provide a training seminar to Parks Canada on the new systems operation which must be scheduled a minimum of 48 hours in advance of training.

1.12 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 pedestrian, and vehicular traffic.
- .3 Provide alternative routes for personnel and vehicular traffic if required.
- .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 systems.
- .7 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
- .8 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.
- .9 Record locations of maintained, re-routed and abandoned service lines.

1.13 DOCUMENTS
REQUIRED

- .1 Maintain at job site, one copy each document as follows:
 - .1 Contract Documents.
 - .2 Contractor's Consultant's Drawings and Specifications.
 - .3 Addenda.
 - .4 Reviewed Shop Drawings.
 - .5 Change Orders.
 - .6 Other Modifications to Contract.
 - .7 Field Test Reports.
 - .8 Copy of Approved Work Schedule.
 - .9 Health and Safety Plan and Other Safety Related Documents.
 - .10 Manufacturers' installation and application instructions
 - .11 Other documents as specified.

1.14 DRAWINGS

- .1 Additional Drawings

Departmental Representative may furnish additional drawings for clarification of the Contract Documents. These additional drawings have same meaning and intent as if they were included with plans referred to in Contract drawings.

.2 Design and Shop Drawings

The Contractor shall provide two sets of design drawings for each of the new **dry pipe sprinkler** systems. These drawings are to be stamped by a Professional Engineer who is registered and licensed to practice in the province of Nova Scotia. These drawings must be reviewed and approved by Parks Canada Agency and the Fire Commissioners Office or their Certified Representative. Approval will not release the engineer whose professional stamp appears on the drawings or the Contractor from responsibility for conformity to specifications, codes, correct details, or adequacy design.

The Contractor shall allow a minimum of fourteen (7) days for review each shop drawing/submission, etc.

The Contractor is to work closely with the Departmental Representative to ensure total co-ordination of all design aspects of the project.

1.15 RECORD
DOCUMENTS

- .1 Record information on a set of asbuilt drawings and in a copy of a Project Manual. A digital and hard copy of these drawings are to be supplied to the Department Representative.
- .2 Record information concurrently with construction progress. Do not conceal work until required

- information is recorded.
- .3 Specifications: legibly mark each item to record actual construction including manufacturer, trade name, and catalog number of each project actually installed.
 - .4 Other Documents: Maintain manufacturer's field test records and any other documents required by individual contract documents.

PART 2 - PRODUCTS

- 2.1 NOT USED .1 Not used.

PART 3 - EXECUTION

- 3.1 NOT USED .1 Not used.

Part 1 General

1.1 EXISTING SERVICES

- .1 Provide for staff or scheduled visitor visits for the duration of the construction.

1.2 USE OF THE WORK SITE

- .1 The Work Site shall be specified by PCA and shall only be used for the purposes of the Work. The Work Site will be made available by PCA to the Contractor for its non-exclusive use for the duration of the Work, unless otherwise provided in the Contract Documents. The Contractor's work or equipment shall not exceed the contract boundaries.
- .2 The Contractor shall keep the Work Site clean and free from accumulation of waste materials and rubbish regardless of source.
- .3 Damage to the Work Site caused by the Contractor shall be repaired by the Contractor at their expense.

1.3 UTILITIES

- .1 The Contractor shall coordinate an on-site inspection with the Agency Representative to locate any utility prior to starting work. The Contractor shall be responsible for work related to the protection or relocation of all utilities.
- .2 The locations of Utilities, if any, shown or not shown are subject to verification by the Contractor.
- .3 Whenever working in the vicinity of Utilities, the Contractor shall locate such Utilities and expose those that may be affected by the Work, using hand labour as required.
- .4 The Contractor shall immediately report any damage to Utilities to the Agency Representative and to the Utility company or authority affected, and shall promptly undertake such remedial measures as are necessary at no additional cost to the Owner.

1.4 SURVEY OF EXISTING PROPERTY CONDITIONS

- .1 Submission of tender is deemed to be confirmation that the Contractor has inspected the site and is conversant with all conditions affecting execution and completion of work.

- .2 The Contractor shall regularly monitor the condition of the Work Site and of property on and adjoining the Work Site throughout the construction period, and shall immediately notify the Owner if any deterioration in condition is detected. Such monitoring shall cover all pertinent features and property including, but not limited to, buildings, structures, roads, walls, fences, slopes, sewers, culverts and landscaped areas.

1.5 PROTECTION OF PERSONS AND PROPERTY

- .1 The Contractor shall comply with all applicable safety regulations of the Workers' Compensation Board of Nova Scotia including, but not limited to, WCB's Industrial Health and Safety Regulations, Industrial First Aid Regulations, and Workplace Hazardous Materials Information System Regulations.
- .2 The Contractor shall take all necessary precautions and measures to prevent injury or damage to persons and property on or near the Work Site.
- .3 The Contractor shall promptly take such measures as are required to repair, replace or compensate for any loss or damage caused by the Contractor to any property or, if PCA so directs, shall promptly reimburse to PCA the costs resulting from such loss or damage.

1.6 USE OF PUBLIC AREAS

- .1 The Contractor shall ensure that its vehicles and equipment do not cause nuisance in public areas. All vehicles and equipment leaving the Work Site and entering public roadways shall be cleaned of mud and dirt clinging to the body and wheels of the vehicle. All vehicles arriving at or leaving the Work Site and transporting materials shall be loaded in a manner which will prevent dropping of materials or debris on the roadways, and where contents may otherwise be blown off during transit such loads shall be covered by tarpaulins or other suitable covers. Spills of materials in public areas shall be removed or cleaned immediately by the Contractor at no cost to the Owner. All activities shall be in accordance with Section 01 35 43 - Environmental Procedures.

1.7 MEETINGS

- .1 The Work includes attending meetings between the Contractor and the Agency Representative. The meetings will be called and chaired by the Contractor. The Contractor shall be represented

at such meetings to the satisfaction of the Department Representative.

- .2 The Departmental Representative will schedule an initial meeting to be held on site after award notification.
- .3 Cost of attending the above meetings shall be considered incidental to the contract price proposal.

1.8 WASTE DISPOSAL

- .1 All surplus, unsuitable and waste materials shall be removed from the job site to appropriate sites outside of the Fortress of Louisbourg National Historic Site.
- .2 Deposit of any construction debris into any waterway is strictly forbidden.
- .3 Cost for Waste Disposal described above shall be considered incidental to the contract price; no additional payment will be made.

END OF SECTION

PART 1 - GENERAL

1.1 General Requirements

- .1 The Form of Tender includes lump sum priced items.
- .2 The Contractor in submitting their Tender for the project understand that they will only be entitled to payment under the lump sum price item when prior written authorization has been received from the Departmental Representative for utilization and then only to the extent of the work authorized by the Departmental Representative.
- .3 Additional instructions for measurement and/or payment for items of the work may be contained in specific sections of the Technical Specifications. In the case of a conflict between the instructions for measurement for payment contained in this section with that of any other section, the requirement of this section shall apply.
- .4 The submitted tender prices will be inclusive of all costs for the complete supply and installation of all materials, labour and equipment required to complete design, inspection and commissioning of the two new sprinkler systems in the DesTouches and DeGannes buildings. No separate payment will be made for any testing, inspections and approvals required by Contractor.

1.2 Lump Sum Items

.1 INGONISH EXCAVATOR ONLY SUPPLY

Unit of Measure: Lump Sum

Description of Measurement

- .1 Lump Sum Price: all labour, equipment and materials required to supply design, construction and commissioning service for two new sprinkler systems at DesTouches and DeGannes buildings at the Fortress of Louisbourg as per the enclosed specifications.
- .2 The Offeror must indicate a price to perform work at the Foretress of Louisbourg National Historic Site, Louisbourg, NS.

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 21 00 00 AND Section 23 05 00.

1.02 ADMINISTRATIVE

- .1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with Work affected by submittal until review is complete.
- .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and 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.

1.03 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Nova Scotia of Canada.
- .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information

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

- .11 Submit 1 electronic copy of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Report signed by authorized official of Fire Marshall's Office or Certified Representative 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 1 year of date of contract award for project.
- .12 Submit 1 electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Statements printed on manufacturer's or Consultant'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.
- .13 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .14 Submit 1 electronic copies and 2 hard copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
- .15 Delete information not applicable to project.
- .16 Supplement standard information to provide details applicable to project.
- .17 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.

The review of shop drawings by Parks Canada is for sole purpose of ascertaining conformance with general concept.

- .1 This review shall not mean that Parks Canada approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
- .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.04 SAMPLES

- .1 Submit for review samples 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.

1.05 CERTIFICATES AND TRANSCRIPTS

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

2 PRODUCTS

2.01 NOT USED

- .1 Not Used.

3 EXECUTION

3.01 NOT USED

- .1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION
INCLUDES

- .1 Health and safety considerations required to ensure that PWGSC shows due diligence towards health and safety on construction sites, and meets the requirements laid out in PWGSC/RPB Departmental Policy DP 073 - Occupational Health and Safety - Construction.

1.2 REFERENCES

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .3 Province of Nova Scotia
 - .1 Occupational Health and Safety Act, S.N.S. [1996].

1.3 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.
- .3 Submit [2] copies of Contractor's authorized representative's work site health and safety inspection reports to Department Representative.
- .4 Submit copies of reports or directions issued by Federal, Provincial health and safety inspectors.
- .5 Submit copies of incident and accident reports.
- .6 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section [01 47 15 - Sustainable Requirements: Construction] and Section [02 81 01 - Hazardous Materials].
- .7 Department Representative will review Contractor's

site-specific Health and Safety Plan and provide comments to Contractor within [3] days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within [3] days after receipt of comments from Department Representative.

- .8 Department Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .9 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

1.4 SAFETY ASSESSMENT

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

1.5 MEETINGS

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

1.6 REGULATORY REQUIREMENTS

- .1 Comply with Nova Scotia Temporary Workplace Traffic Control Manual requirements.

1.7 PROJECT/SITE CONDITIONS

- .1 Work at site will involve contact with:
 - .1 Departmental Representative.
 - .2 Vehicular traffic using the Cabot Trail.

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 Department Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.9 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.

1.10 COMPLIANCE
REQUIREMENTS

- .1 Comply with Occupational Health and Safety Act, Occupational Safety General Regulations, N.S. Reg.

1.11 UNFORSEEN
HAZARDS

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

1.12 POSTING OF
DOCUMENTS

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

1.13 CORRECTION OF
NON-COMPLIANCE

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

1.14 BLASTING

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

1.15 POWDER

ACTUATED DEVICES

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

1.16 WORK STOPPAGE

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

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not used.

PART 1 - GENERAL

1.1 REFERENCES

- .1 Definitions:
 - .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.
 - .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.
- .2 Reference Standards:
 - .1 Canadian Construction Documents Committee (CCDC)
 - .1 CCDC 2-2008 Stipulated Price Contract.
 - .2 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832/R-92-005-[92], Storm Water Management for Construction Activities, Chapter 3.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals to Department Representative.
- .2 Prior to commencing construction activities or delivery of materials to site, provide Environmental Protection Plan for review and approval by Departmental Representative.
- .3 Ensure Environmental Protection Plan includes comprehensive overview of known or potential environmental issues to be addressed during construction.
- .4 Include in Environmental Protection Plan:
 - .1 Name[s] of person[s] responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Erosion and sediment control plan identifying

type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations[, EPA 832/R-92-005, Chapter 3 requirements.

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

1.3 FIRES

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

1.4 WORK ADJACENT TO WATERWAYS

- .1 Construction equipment to be operated on land only.
- .2 Do not use waterway beds for borrow material without Departmental Representative's approval.
- .3 Waterways to be free of excavated fill, waste material and debris.
- .4 Design and construct temporary crossings to minimize erosion to waterways.
- .5 Do not skid logs or construction materials across waterways.
- .6 Avoid indicated spawning beds when constructing temporary crossings of waterways.

1.5 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment and plant to local authorities' emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.
 - .1 Provide temporary enclosures where [indicated] directed by Departmental Representative.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.6

HISTORICAL/ARCHAEOLOGICAL CONTROL

- .1 Provide historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands known to be on project site: and/or identifies procedures to be followed if historical archaeological, cultural resources, biological resources and wetlands not previously known to be onsite or in area are discovered during construction.
- .2 Plan: include methods to assure protection of known or discovered resources and identify lines of communication between Contractor personnel and Departmental Representative.

1.7 NOTIFICATION

- .1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.
- .2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.
 - .1 Do not take action until after receipt of written approval by Departmental Representative.
- .3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 21 00 00 and 23 05 00.

1.02 ADMINISTRATIVE REQUIREMENTS

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

1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, two final copies of operating and maintenance manuals in English.

1.04 FORMAT

- .1 Organize data as instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf [219 x 279] mm with spine and face pockets.
- .3 When multiple binders are used correlate data into related consistent groupings.
 - .1 Identify contents of each binder on spine.
- .4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5 Arrange content by systems under Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

- .7 Text: manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab.
 - .1 Bind in with text; fold larger drawings to size of text pages.
- .9 Provide [1:1] scaled CAD files in dxf format on CD.

1.05 CONTENTS - PROJECT RECORD DOCUMENTS

- .1 Table of Contents for Each Volume: provide title of project;
 - .1 Date of submission; names.
 - .2 Addresses, and telephone numbers of Design-Builder 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 Training: to be provided by the Design / Build Contractor too Parks Canada staff on all new systems as per enclosed specifications.

1.06 AS -BUILT DOCUMENTS AND SAMPLES

- .1 Maintain, in addition to requirements in General Conditions, at site for Departmental Representative one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
- .2 Keep record documents and samples available for inspection by Departmental Representative.

1.07 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

- .1 Record information on set of black line drawings, and in copy of Project Manual.
- .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 References to related shop drawings and modifications.
- .5 Specifications: mark each item to record actual construction, including:
- .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
- .6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

1.08 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 Design-Builder's co-ordination drawings, with installed colour

coded piping diagrams.

- .12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- .13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

1.09 MATERIALS AND FINISHES

- .1 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.
- .2 Additional requirements: as specified in individual specifications sections.

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 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.
- .6 Include information contained in warranty management plan as follows:
 - .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.

- .2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include HVAC balancing, pumps, motors, and commissioned systems such as fire protection, alarm systems, sprinkler systems.
- .3 Provide list for each warranted equipment, item, feature of construction or system indicating:
 - .1 Name of item.
 - .2 Model and serial numbers.
 - .3 Location where installed.
 - .4 Name and phone numbers of manufacturers or suppliers.
 - .5 Names, addresses and telephone numbers of sources of spare parts.
 - .6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
 - .7 Cross-reference to warranty certificates as applicable.
 - .8 Starting point and duration of warranty period.
 - .9 Summary of maintenance procedures required to continue warranty in force.
 - .10 Cross-Reference to specific pertinent Operation and Maintenance manuals.
 - .11 Organization, names and phone numbers of persons to call for warranty service.
 - .12 Typical response time and repair time expected for various warranted equipment.
- .4 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.
- .7 Respond in timely manner to oral or written notification of required construction warranty repair work.
- .8 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.

2 PRODUCTS

2.01 NOT USED

.1 Not Used.

3 EXECUTION

3.01 NOT USED

.1 Not Used.

END OF SECTION

1 GENERAL

1.01 SUMMARY

- .1 Section Includes:
 - .1 Material and installation of site applied paint finishes to new interior surfaces, including site painting of shop primed surfaces.

1.02 REFERENCES

- .1 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act (CEPA), 1999, c. 33
- .2 Environmental Protection Agency (EPA)
 - .1 EPA Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 - [1995], (for Surface Coatings).
- .3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .4 Master Painters Institute (MPI)
 - .1 MPI Architectural Painting Specifications Manual, [2004].
- .5 National Fire Code of Canada - [1995]
- .6 Society for Protective Coatings (SSPC)
 - .1 SSPC Painting Manual, Volume Two, 8th Edition, Systems and Specifications Manual.
- .7 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34 .

1.03 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Contractor: minimum of five years proven satisfactory experience
 - .2 Journeymen: qualified journeymen who have "Tradesman Qualification Certificate of Proficiency" engaged in painting work.
 - .3 Apprentices: working under direct supervision of qualified trades person in accordance with trade regulations.
- .2 Mock-Ups:
 - .1 Construct mock-ups with the following:
 - .1 Provide 50 mm x 50 mm mock-up. Prepare and paint designated surface, area, room or item (in each colour scheme) to specified requirements, with specified paint or coating showing selected colours, gloss/sheen, textures.
 - .2 Mock-up will be used:
 - .1 To judge workmanship, substrate preparation, operation of equipment and material application and workmanship to MPI Architectural Painting Specification Manual standards.
 - .3 Allow 24 hours for inspection of mock-up before proceeding with

work.

- .3 Pre-Installation Meeting:
 - .1 Convene pre-installation meeting one week prior to beginning work of this Section and on-site installations to:
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Coordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.
- .4 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.04 SCHEDULING

- .1 Submit work schedule for various stages of painting to Departmental Representative for review. Submit schedule minimum of 48 hours in advance of proposed operations.
- .2 Obtain written authorization from Departmental Representative for changes in work schedule.
- .3 Schedule painting operations to prevent disruption of occupants.

1.05 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit product data and instructions for each paint and coating product to be used.
 - .2 Submit product data for the use and application of paint thinner.
 - .3 Submit one copy of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOCs during application and curing.
- .3 Samples:
 - .1 Submit full range colour sample chips to indicate where colour availability is restricted.
 - .2 Submit 200 x 300 mm sample panels of each paint, stain, clear coating, special finish with specified paint or coating in colours, gloss/sheen and textures required to MPI Architectural Painting Specification Manual standards submitted on following substrate materials:
 - .1 3 mm plate steel for finishes over metal surfaces.
 - .3 Retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface.
 - .4 Test reports: submit certified test reports for paint from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.
 - .1 Lead, cadmium and chromium: presence of and amounts.
 - .2 Mercury: presence of and amounts.

- .3 Organochlorines and PCBs: presence of and amounts.
- .5 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .6 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation and application instructions.
- .7 Closeout Submittals: submit maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals include following:
 - .1 Product name, type and use.
 - .2 Manufacturer's product number.
 - .3 Colour number[s].
 - .4 MPI Environmentally Friendly classification system rating.

1.06 DELIVERY, STORAGE AND HANDLING

- .1 Packing, Shipping, Handling and Unloading:
 - .1 Pack, ship, handle and unload materials in accordance with manufacturer's written instructions.
- .2 Acceptance at Site:
 - .1 Identify products and materials with labels indicating:
 - .1 Manufacturer's name and address.
 - .2 Type of paint or coating.
 - .3 Compliance with applicable standard.
 - .4 Colour number in accordance with established colour schedule.
- .3 Remove damaged, opened and rejected materials from site.
- .4 Storage and Protection:
 - .1 Provide and maintain dry, temperature controlled, secure storage.
 - .2 Store materials and supplies away from heat generating devices.
 - .3 Store materials and equipment in well ventilated area with temperature range [7] degrees C to [30] degrees C.
- .5 Store temperature sensitive products above minimum temperature as recommended by manufacturer.
- .6 Keep areas used for storage, cleaning and preparation clean and orderly. After completion of operations, return areas to clean condition.
- .7 Remove paint materials from storage only in quantities required for same day use.
- .8 Fire Safety Requirements:
 - .1 Provide one 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.
 - .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
 - .3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada requirements.
- .9 Waste Management and Disposal:
 - .1 Remove all waste from Parks Canada property and dispose of at

appropriate waste management facility.

1.07 SITE CONDITIONS

- .1 Heating, Ventilation and Lighting:
 - .1 Ventilate enclosed spaces.
 - .2 Provide heating facilities to maintain ambient air and substrate temperatures above [10] degrees C for 24 hours before, during and after paint application until paint has cured sufficiently.
 - .3 Coordinate use of existing ventilation system with Departmental Representative and ensure its operation during and after application of paint as required.
 - .4 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.
- .2 Temperature, Humidity and Substrate Moisture Content Levels:
 - .1 Unless pre-approved written approval by product manufacturer, perform no painting when:
 - .1 Ambient air and substrate temperatures are below [10] degrees C.
 - .2 Substrate temperature is above [32] degrees C unless paint is specifically formulated for application at high temperatures.
 - .3 Substrate and ambient air temperatures are not expected to fall within MPI or paint manufacturer's prescribed limits.
 - .4 The relative humidity is under [85]% or when the dew point is more than [3] degrees C variance between the air/surface temperature. Paint should not be applied if the dew point is less than [3] degrees C below the ambient or surface temperature. Use sling psychrometer to establish the relative humidity before beginning paint work.
 - .5 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.
 - .6 Ensure that conditions are within specified limits during drying or curing process, until newly applied coating can itself withstand 'normal' adverse environmental factors.
 - .2 Perform painting work when maximum moisture content of the substrate is below:
 - .1 Allow new concrete and masonry to cure minimum of 28 days.
 - .2 [15]% for wood.
 - .3 [12]% for plaster and gypsum board.
 - .3 Test concrete, masonry and plaster surfaces for alkalinity as required.
- .3 Surface and Environmental Conditions:
 - .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
 - .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits.
 - .3 Apply paint when previous coat of paint is dry or adequately cured.
- .4 Additional interior application requirements:

- .1 Apply paint finishes when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.

2 PRODUCTS

2.01 MATERIALS

- .1 Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.
- .2 Provide paint materials for paint systems from single manufacturer.
- .3 Only qualified products with E2, E3 "Environmentally Friendly" rating are acceptable for use on this project.
- .4 Conform to latest MPI requirements for interior painting work including preparation and priming.
- .5 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) in accordance with MPI Architectural Painting Specification Manual "Approved Product" listing.
- .6 Provide paint products meeting MPI "Environmentally Friendly" E1, E2, E3 ratings based on VOC (EPA Method 24) content levels.
- .7 Use MPI listed materials having minimum E2, E3 rating where indoor air quality (odour) requirements exist.
- .8 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids:
 - .1 Water-based
 - .2 non-flammable, biodegradable.
 - .3 Manufactured without compounds which contribute to ozone depletion in the upper atmosphere.
 - .4 Manufactured without compounds which contribute to smog in the lower atmosphere.
 - .5 Do not contain methylene chloride, chlorinated hydrocarbons, toxic metal pigments.
- .9 Formulate and manufacture water-borne surface coatings with no aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.
- .10 Flash point: [61.0] degrees C or greater for water-borne surface coatings and recycled water-borne surface coatings.
- .11 Ensure manufacture and process of both water-borne surface coatings and recycled water-borne surface coatings does not release:
 - .1 Matter in undiluted production plant effluent generating 'Biochemical Oxygen Demand' (BOD) in excess of [15] mg/L to natural watercourse or sewage treatment facility lacking secondary treatment.
 - .2 Total Suspended Solids (TSS) in undiluted production plant effluent in excess of [15] mg/L to natural watercourse or a sewage treatment

facility lacking secondary treatment.

- .12 Water-borne paints and stains, recycled water-borne surface coatings and water borne varnishes to meet minimum "Environmentally Friendly" E2 rating.
- .13 Recycled water-borne surface coatings to contain [50] % post-consumer material by volume.
- .14 Recycled water-borne surface coatings must not contain:
 - .1 Lead in excess of [600.0] ppm weight/weight total solids.
 - .2 Mercury in excess of [50.0]ppm weight/weight total product.
 - .3 Cadmium in excess of [1.0]ppm weight/weight total product.
 - .4 Hexavelant chromium in excess of [3.0] ppm weight/weight total product.
 - .5 Organochlorines or polychlorinated biphenyls (PCBS) in excess of [1.0] ppm weight/weight total product.

2.02 COLOURS

- .1 Departmental Representative will provide Colour Schedule after Contract award Submit proposed Colour Schedule to Departmental Representative for review.
- .2 Selection of colours from manufacturers full range of colours.

2.03 MIXING AND TINTING

- .1 Perform colour tinting operations prior to delivery of paint to site. Obtain written approval from Departmental Representative for tinting of painting materials.
- .2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.
- .3 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.
- .4 Thin paint for spraying in accordance with paint manufacturer's instructions.
- .5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.04 GLOSS/SHEEN RATINGS

- .1 Paint gloss is defined as sheen rating of applied paint, in accordance with following values:

	Gloss @ 60 degrees	Sheen @ 85 degrees
Gloss Level 1 - Matte Finish (flat)	Max. 5	Max. 10
Gloss Level 2 - Velvet-Like	Max.10	10 to 35

Finish
Gloss Level 3 10 to 25 10 to 35
- Eggshell
Finish
Gloss Level 4 20 to 35 min. 35
- Satin-Like
Finish
Gloss Level 5 35 to 70
- Traditional
Semi-Gloss
Finish
Gloss Level 6 70 to 85
- Traditional
Gloss
Gloss Level 7 More than 85
- High Gloss
Finish

- .2 Gloss level ratings of painted surfaces [as indicated] [and] [as noted on Finish Schedule] .

2.05 INTERIOR PAINTING SYSTEMS

- .1 Structural steel and metal fabrications: columns, beams, joists:
- .1 INT 5.1A - Quick dry enamel [gloss] [semi-gloss] finish.
 - .2 INT 5.1B - Waterborne light industrial [insert gloss level] coating.
 - .3 INT 5.1C - Waterborne dry wall finish.
 - .4 INT 5.1CC - Waterborne dry wall finish (over quick dry shop primer) [for dry locations only].
 - .5 INT 5.1D - Alkyd dry wall finish.
 - .6 INT 5.1DD - Alkyd dry wall finish (over quick dry shop primer)[for dry locations only] .
 - .7 INT 5.1E Alkyd - [insert gloss level] finish.
 - .8 INT 5.1F - Pigmented polyurethane finish (over epoxy primer).
 - .9 INT 5.1G - Pigmented polyurethane finish (over high-build epoxy).
 - .10 INT 5.1H - Pigmented polyurethane finish (over epoxy and inorganic zinc).
 - .11 INT 5.1J - Pigmented polyurethane finish (over epoxy and epoxy zinc rich primer).
 - .12 INT 5.1K - Waterborne epoxy finish.
 - .13 INT 5.1L - Epoxy finish.
 - .14 INT 5.1M - Aluminum paint finish.
 - .15 INT 5.1N - Waterborne light industrial [insert gloss level] coating (over epoxy primer).
 - .16 INT 5.1P - High build epoxy (over epoxy zinc rich primer).
 - .17 INT 5.1Q - Latex [insert gloss level] finish (over alkyd primer).
 - .18 INT 5.1R - High performance architectural latex [insert gloss level] finish.
 - .19 INT 5.1S - Institutional low odour/low VOC [insert gloss level] finish.
 - .20 INT 5.1T - Alkyd [insert gloss level] finish (over surface tolerant primer).
 - .21 INT 5.1U - Epoxy finish (over self-priming epoxy).
 - .22 INT 5.1V - Pigmented polyurethane finish (over self-priming epoxy).
 - .23 INT 5.1W - Alkyd [insert gloss level] finish (over quick dry shop

- primer) [for dry locations only].
- .24 INT 5.1X - Latex [insert gloss level] finish (over quick dry shop primer) [for dry locations only].
- .25 INT 5.1Y - Not Applicable.
- .26 INT 5.1Z - Quick dry shop paint finish (for dry locations only) [do not topcoat].

- .2 Steel - high heat: (boilers, furnaces, heat exchangers, breeching, pipes, flues, stacks, etc., with temperature range as noted):
 - .1 INT 5.2A - Heat resistant enamel finish, maximum [205] degrees C.
 - .2 INT 5.2B - Heat resistant aluminum paint finish, maximum [427] degrees C.
 - .3 INT 5.2C - Inorganic zinc rich coating, maximum [400] degrees C.
 - .4 INT 5.2D - High heat resistant coating, maximum [593] degrees C.

- .3 Galvanized metal: doors, frames, railings, misc. steel, pipes, overhead decking, and ducts.
 - .1 INT 5.3A - Latex [insert gloss level] finish.
 - .2 INT 5.3B - Waterborne light industrial [insert gloss level] coating.
 - .3 INT 5.3C - Alkyd [insert gloss level] finish (over cementitious primer).
 - .4 INT 5.3D - Epoxy finish (over epoxy primer).
 - .5 INT 5.3E - Epoxy finish (over vinyl wash primer and epoxy primer).
 - .6 INT 5.3F - Alkyd dry wall finish [for use in low contact/low traffic areas only].
 - .7 INT 5.3G - Aluminum paint finish.
 - .8 INT 5.3H - Waterborne dry wall finish [for use in low contact/low traffic areas only].
 - .9 INT 5.3J - Latex [insert gloss level] finish (over waterborne primer).
 - .10 INT 5.3K - Waterborne light industrial [insert gloss level] coating (over waterborne primer).
 - .11 INT 5.3L - Alkyd [insert gloss level] finish (over non-cementitious primer).
 - .12 INT 5.3M - High performance architectural latex [insert gloss level] finish.
 - .13 INT 5.3N - Institutional low odour/low VOC [insert gloss level] finish.

- .4 Aluminum: unanodized:
 - .1 INT 5.4A - Alkyd [insert gloss level] finish.
 - .2 INT 5.4B - Epoxy finish.
 - .3 INT 5.4C - Pigmented polyurethane finish.
 - .4 INT 5.4D - Aluminum paint finish (for exposed aluminum).
 - .5 INT 5.4E - Waterborne light industrial [insert gloss level] coating.
 - .6 INT 5.4F - High performance architectural latex [insert gloss level] finish.
 - .7 INT 5.4G - Institutional low odour/low VOC [insert gloss level] finish.
 - .8 INT 5.4H - Latex [insert gloss level] finish.
 - .9 INT 5.4J - Alkyd [insert gloss level] finish (over quick dry primer).

- .5 Copper:
 - .1 INT 5.5A - Alkyd [insert gloss level for Premium Grade only] finish.
 - .2 INT 5.5B - Epoxy finish.
 - .3 INT 5.5C - Pigmented polyurethane finish.

- .4 INT 5.5D - Aluminum paint finish.
- .5 INT 5.5E - Waterborne light industrial [insert gloss level] coating.
- .6 INT 5.5F - High performance architectural latex [insert gloss level] finish.
- .7 INT 5.5G - Institutional low odour/low VOC [insert gloss level] finish.
- .8 INT 5.5H - Latex [insert gloss level] finish.

- .6 Stainless steel: unpolished:
 - .1 INT 5.6A - Waterborne light industrial [insert gloss level] coating (over bonding primer).
 - .2 INT 5.6B - Alkyd [insert gloss level] finish.
 - .3 INT 5.6C - Epoxy finish.
 - .4 INT 5.6D - Pigmented polyurethane finish.
 - .5 INT 5.6E - Aluminum paint finish.
 - .6 INT 5.6F - Waterborne light industrial [insert gloss level] coating (over quick dry primer).
 - .7 INT 5.6G - High performance architectural latex [insert gloss level] finish.
 - .8 INT 5.6H - Latex [insert gloss level] finish.

- .7 Plastic: lumber, panels, trims, fabrications, vinyl wall covering, PVA/PVC materials:
 - .1 INT 6.8A - High performance architectural latex [insert gloss level] finish.
 - .2 INT 6.8B - Alkyd [insert gloss level] finish.
 - .3 INT 6.8C - Waterborne light industrial [insert gloss level] coating.
 - .4 INT 6.8D - Multicolour finish.
 - .5 INT 6.8E - Latex [insert gloss level] finish.
 - .6 INT 6.8F - Institutional low odour/low VOC [insert gloss level] finish.

2.06 SOURCE QUALITY CONTROL

- .1 Perform following tests on each batch of consolidated post-consumer material before surface coating is reformulated and canned. Testing by laboratory or facility which has been accredited by Standards Council of Canada.
 - .1 Lead, cadmium and chromium are to be determined using ICP-AES (Inductively Coupled Plasma - Atomic Emission Spectroscopy) technique no. 6010 as defined in EPA SW-846.
 - .2 Mercury is to be determined by Cold Vapour Atomic Absorption Spectroscopy using Technique no. 7471 as defined in EPA SW-846.
 - .3 Organochlorines and PCBs are to be determined by Gas Chromatography using Technique no. 8081 as defined in EPA SW-846.

3 EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.

3.02 GENERAL

- .1 Perform preparation and operations for interior painting in accordance with MPI Architectural Painting Specifications Manual except where specified otherwise.
- .2 Apply paint materials in accordance with paint manufacturer's written application instructions.

3.03 EXAMINATION

- .1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Departmental Representative damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.
- .2 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter, except test concrete floors for moisture using simple "cover patch test". Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

3.04 PREPARATION

- .1 Protection:
 - .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces as directed by Departmental Representative.
 - .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
 - .3 Protect factory finished products and equipment.
 - .4 Protect building occupants and general public in and about the building.
- .2 Surface Preparation:
 - .1 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
 - .2 Place "WET PAINT" signs in occupied areas as painting operations progress. Signs to approval of Departmental Representative.
- .3 Clean and prepare surfaces in accordance with MPI Architectural Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:
 - .1 Remove dust, dirt, and other surface debris by vacuuming, wiping with dry, clean cloths.
 - .2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
 - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
 - .4 Allow surfaces to drain completely and allow to dry thoroughly.
 - .5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
 - .6 Use trigger operated spray nozzles for water hoses.
 - .7 Many water-based paints cannot be removed with water once dried.

Minimize use of mineral spirits or organic solvents to clean up water-based paints.

- .4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.
- .5 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.
- .6 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements. Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes, or vacuum cleaning.
- .7 Touch up of shop primers with primer as specified.
- .8 Do not apply paint until prepared surfaces have been accepted by Departmental Representative

3.05 APPLICATION

- .1 Method of application to be as approved by Departmental Representative. Apply paint by brush, roller. Conform to manufacturer's application instructions unless specified otherwise.
- .2 Brush and Roller Application:
 - .1 Apply paint in uniform layer using brush and/or roller type suitable for application.
 - .2 Work paint into cracks, crevices and corners.
 - .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
 - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces free of roller tracking and heavy stipple.
 - .5 Remove runs, sags and brush marks from finished work and repaint.
- .3 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .4 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .5 Sand and dust between coats to remove visible defects.
- .6 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.

3.06 MECHANICAL/ELECTRICAL EQUIPMENT

- .1 Paint finished area exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent

surfaces, except as indicated.

- .2 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.
- .3 Do not paint over nameplates.
- .4 Keep sprinkler heads free of paint.

3.07 FIELD QUALITY CONTROL

- .1 Interior painting and decorating work shall be inspected by a Paint Inspection Agency (inspector) acceptable to the specifying authority and local Painting Contractor's Association. Painting contractor shall notify Paint Inspection Agency a minimum of one week prior to commencement of work and provide a copy of project painting specification, plans and elevation drawings (including pertinent details) as well as a Finish Schedule.
- .2 Standard of Acceptance:
 - .1 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.
- .3 Field inspection of painting operations to be carried out by independent inspection firm as designated by Departmental Representative.
- .4 Advise Departmental Representative and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.
- .5 Cooperate with inspection firm and provide access to areas of work.
- .6 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Departmental Representative

3.08 RESTORATION

- .1 Clean and re-install hardware items removed before undertaken painting operations.
- .2 Remove protective coverings and warning signs as soon as practical after operations cease.
- .3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .4 Protect freshly completed surfaces from paint droppings and dust to approval of Departmental Representative. Avoid scuffing newly applied paint.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Departmental Representative.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 21 13 16.

1.02 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for both Des Touches and De Gannes sprinkler systems and include product characteristics, performance criteria, physical size, dimensions, finish performance rating and limitations.
- .3 Shop drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Nova Scotia, Canada.
 - .2 Drawings to show:
 - .1 Mounting arrangements.
 - .2 Operating and maintenance clearances.
 - .3 Drawings and product data accompanied by:
 - .1 Detailed drawings of bases, supports, and anchor bolts.
 - .2 Acoustical sound power data, where applicable.
 - .3 Points of operation on performance curves.
 - .4 Manufacturer to certify current model production.
 - .5 Certification of compliance to applicable codes.
 - .6 Wiring controls, piping diagrams, installation instruction, fabrication assembly and installation details.
 - .4 Submit shop drawings and product data sheets for major equipment listed in each section.
 - .5 Submit early enough to permit Project Schedules to be met.

1.03 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for complete with names and addresses of spare parts suppliers for incorporation into manual.
 - .1 Operation and maintenance manual approved by, and final copies deposited with, Departmental Representative before final inspection.
 - .2 Operation data to include:
 - .1 Control schematics for systems including environmental controls.
 - .2 Description of systems and their controls.
 - .3 Description of operation of systems at various loads together with reset schedules and seasonal variances.
 - .4 Operation instruction for systems and component.
 - .5 Description of actions to be taken in event of equipment failure.

- .6 Valves schedule and flow diagram.
- .7 Colour coding chart.
- .3 Maintenance data to include:
 - .1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.
 - .2 Data to include schedules of tasks, frequency, tools required and task time.
- .4 Performance data to include:
 - .1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.
 - .2 Equipment performance verification test results.
 - .3 Special performance data as specified.
 - .4 Testing, adjusting and balancing reports.
- .5 Approvals:
 - .1 Submit [2] copies of Operation and Maintenance Manual to Departmental Representative for approval. Submission of individual data will not be accepted unless directed by Departmental Representative.
- .6 As-Built drawings:
 - .1 Prior to start of Testing, Adjusting and Balancing for HVAC, finalize production of as-built drawings.
 - .2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).
 - .3 Perform testing, adjusting and balancing for HVAC using as-built drawings.
 - .4 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.
- .7 Submit copies of as-built drawings for inclusion in final TAB report.

1.04 GENERAL

- .1 "Provide" shall mean "supply, install and connect".
- .2 Provide new materials, equipment and plant of proven design and quality, and of current models with published ratings for which replacement parts are readily available.

1.05 CO-ORDINATION

- .1 Locate distribution systems, equipment and materials to provide minimum interference and maximum useable space.
- .2 Where interference occurs, Departmental Representative shall approve relocation of equipment and materials.

1.06 DRAWINGS

- .1 Working drawings, except where dimensioned, indicate general mechanical layouts only. Do not scale.
- .2 Existing equipment and services shown on the drawings:
 - .1 The information shown on the drawings is incomplete and is for reference only. Some of the existing equipment, ducts, pipes and other services are not shown on the drawings.

.2 The Contractor shall make arrangements to examine existing conditions, determine conditions affecting the work, and verify sizes and location of existing equipment, pipes and any other services. Refer to Section 01 11 00 for instructions regarding site visits.

.3 Unless the discrepancies are noted and reported to the Departmental Representative prior to close of the bid, the Contractor shall be responsible for the work to relocate existing equipment and to reroute existing ducts, pipes and any other services required for the installation of new work at no extra cost to the contract.

.3 If required by Departmental Representative, provide field drawings to show relative positions of various services. Obtain approval before beginning work.

1.07 EQUIPMENT DESIGN AND INSTALLATION

.1 Uniformity:

.1 For equipment or material of same type or classification, use product of one manufacturer.

.2 Installation:

.1 Install equipment to manufacturer's recommendations with adequate and easy access for inspection, servicing and lubrication.

.2 Install equipment to permit maintenance and disassembly with minimum disturbance to connecting piping and duct systems and without interference with building structure or equipment.

.3 Provide support brackets, bases, and all necessary fastenings.

1.08 ELECTRIC MOTORS AND CONTROLS

.1 Electrical equipment shall bear CSA label. Obtain inspection labels required by Provincial authority having jurisdiction.

.2 Use high efficiency motors. Minimum acceptable motor efficiency levels shall be based on the latest table of motor efficiency levels in accordance with CSA C390-10, Test methods, marking requirements, and energy efficiency levels for three-phase induction motors.

.3 Unless otherwise specified or indicated, motors ½ HP and larger shall be 3 phase.

1.09 PIPING INSTALLATION

.1 Conform to requirements of ASME B31.1-2007 Power Piping.

- .2 Provide dielectric couplings where piping of dissimilar metals are joined.
- .3 Provide easily accessible unions close to equipment, to permit easy removal of equipment with minimum disturbance to piping systems.
- .4 Valves:
 - .1 Provide easy access for servicing and operation. Install access doors where concealed.
 - .2 Install with stems above horizontal.
- .5 Drainage:
 - .1 Provide easily accessible drain valves at low points to permit complete drainage of piping systems.
 - .2 Extend equipment drain piping to discharge into floor or hub drain.

1.10 PIPE HANGERS AND SUPPORTS

- .1 Fabricate hangers, supports and sway braces in accordance with ASME B31.1-2007.
- .2 Provide adjustable clevis type hangers on all sizes of pipe except where roller type hangers are required.
- .3 Minimum 150 mm hanger rod length.
- .4 Provide hangers on piping as follows:
 - .1 Rigid hangers when rod length is 300 mm or more, pipe expansion to hanger rod length ratio is less than 1:24 and hanger is supported from top of structural steel.

1.11 TESTS

- .1 Give written notice of date when tests will be made.
- .2 Conduct tests in presence of Departmental Representative and representatives of agencies having jurisdiction.
- .3 Bear all costs in connection with all tests.
- .4 Obtain acceptance certificates from authorities having jurisdiction. Work shall not be considered complete until certificates are delivered to the Departmental Representative.
- .5 Piping pressure tests:
 - .1 Fill water piping with water and test at 1-1/2 times system operating pressure or at 860 kPa, whichever is greater.
 - .2 Maintain test pressures without loss for four hour period.
 - .3 Repair leaks and defects. Retest until approved by Departmental Representative.
- .6 Flushing and cleaning:
 - .1 After pressure tests are completed and approved, prior to start-up and placing into operation, flush and clean out piping systems.

1.12 INSTRUCTION OF OPERATING STAFF

- .1 Furnish competent instructors to fully instruct operating staff in care, adjustment and operation of mechanical systems.
- .2 Instruct during regular work hours before systems accepted and turned over to operating staff for regular operation.
- .3 Where significant changes or modifications in equipment are made under terms of guarantee, instruct operating staff about changes or modifications.

2 EXECUTION

2.01 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

2.02 PAINTING REPAIRS AND RESTORATION

- .1 Do painting in accordance with Section 09 91 23 - Interior Painting.
- .2 Prime and touch up marred finished paintwork to match original.
- .3 Restore to new condition, finishes which have been damaged.
- .4 Contractor is responsible to paint all new sprinkler piping, fittings and appurtenances to ensure they blend with existing building colors.

2.03 DEMONSTRATION

- .1 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours (Mon. - Frid. 8:00am - 3:00pm), prior to acceptance.
- .2 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.

2.04 PROTECTION

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Section 21 05 01.

1.02 MINIMUM STANDARDS

- .1 FCC 403(M) - 1985 Sprinkler Systems
- .2 National Fire Protection Association (NFPA)
 - .1 NFPA 13-[2010], Standard for the Installation of Sprinkler Systems.
 - .2 NFPA 25-[2011], Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems.
- .3 Underwriter's Laboratories of Canada (ULC)
 - .1 CAN4 S543-[M1984], Standard for Internal Lug Quick Connect Coupling for Fire Hose.
- .4 National Building Code of Canada 2005
- .5 National Fire Code of Canada 2005

1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature and data sheets for equipment and systems, applicable series designation or style and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Nova Scotia, Canada.
 - .2 Shop drawings and product data sheets shall include the following equipment:
 - .1 Sprinkler system and components
 - .2 Hydraulic calculations
- .4 Calculations:
 - .1 Submit hydraulic calculations for review. Hydraulic calculations derived by computer shall be verified by the Insurers Advisory Organization Inc. (IAO) prior to submittal to Departmental Representative for review.
- .5 Fire Commissioners Inspection and Test:
 - .1 Notify the Departmental Representative that the installation of fire protection system is complete. Provide certificate that components are compatible and the systems conform to the requirements of the specifications, applicable codes and standards. A copy of the contractor's Material and Test Certificate shall be submitted prior

- to the final inspection.
- .2 Fire protection systems shall be subject to the final inspection and test of the Fire Commissioner of Canada or their authorized representative. Work shall not be considered complete until a satisfactory inspection report from the Fire Commissioner of Canada or their representative is obtained.
 - .6 Certificates:
 - .1 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

1.04 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- .2 Provide detailed hydraulic calculations including: summary sheet, Contractor's Material and Test Certificate for aboveground and underground piping, as well as other deliverables for incorporation into manual specified in Section 01 78 00 - Closeout Submittals, in accordance with NFPA 13.

1.05 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Installer: company or person specializing in dry sprinkler systems with documented experience and approved by manufacturer.

1.06 MAINTENANCE MATERIAL SUBMITTALS

- .1 Extra Materials:
 - .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

2 PRODUCTS

2.01 ENGINEERING DESIGN CRITERIA

- .1 Design system in accordance with NFPA 13, using following parameters:
 - .1 Hazard:
 - .1 To suit occupancy as indicated which is light hazard for office areas and ordinary hazard group 1 for storage area unless noted otherwise.
 - .2 Pipe size and layout:
 - .1 Hydraulic design
 - .2 Sprinkler head layout: to NFPA 13
 - .3 Water supply:
 - .1 Conduct flow and pressure test of water supply in vicinity of project to obtain criteria for bases of design in accordance with NFPA 13.
 - .4 Zoning:
 - .1 System zoning as indicated.

2.02 PIPE, FITTINGS AND VALVES

- .1 Pipe:
 - .1 Ferrous: to NFPA 13 for Sprinkler Systems.
- .2 Fittings and joints to NFPA 13 for Sprinkler Systems:
 - .1 Ferrous: screwed, welded, flanged or roll grooved.
- .3 Valves:
 - .1 ULC listed and labeled for fire protection service.
 - .2 Up to NPS 2: bronze, screwed ends, OS & Y gate.
 - .3 NPS 2 1/2 and over: cast or ductile iron, flanged or roll grooved ends, indicating butterfly valve.
 - .4 Swing check valves.
 - .5 Ball drip.
- .4 Pipe hangers:
 - .1 ULC listed for fire protection services.
- .5 Drain Valve
 - .1 NPS 1 complete with hose end cap and chain

2.03 SPRINKLERS

- .1 Provide standard upright type sprinklers of current manufacture.
- .2 Sprinklers shall be ULC listed and labeled
- .3 Provide minimum 12mm nominal diameter discharge orifice

2.04 ALARM CHECK VALVE

- .1 Alarm check valve to NFPA 13 and ULC listed for fire service.

2.05 SUPERVISORY SWITCHES

- .1 General: to NFPA 13 and ULC listed for fire service.
- .2 Valves:
 - .1 Mechanically attached to valve body, with normally open and normally closed contacts and supervisory capability.
- .3 Flow switch type:
 - .1 With normally open and normally closed contacts and supervisory capability.
- .4 Pressure alarm switch:
 - .1 With normally open and normally closed contacts and supervisory capability.

2.06 FIRE DEPARTMENT CONNECTION

- .1 To NFPA 13 and ULC listed, Siamese type, location as indicated. Thread specifications to be compatible with local fire department.
- .2 Polished bronze, chrome plated, recessed, exposed, with identifying sign

cast on plate. Threaded metal caps and chains.

- .3 Install a 90-degree elbow with drain connection at low-point near each fire department connection to allow for system drainage to prevent freezing.

2.07 DRY PIPE VALVE

- .1 ULC listed.
- .2 Cast or ductile iron, flanged or grooved end type, sized to suit water main.
- .3 Components:
 - .1 Accelerator.
 - .2 Air maintenance device with low pressure alarm.
 - .3 Alarm pressure switch with supervisory capability.
 - .4 Pressure gauges.
 - .5 Drain valve.
 - .6 Test valve with associated piping.
 - .7 Shut off valve - OS & Y with tamper-proof device wired back to fire alarm panel.
 - .8 Required air pressure 90 kPa (13 psi).
- .4 Provide valve complete with internal components that are replaceable without removing valve from installed position.

2.08 COMPRESSED AIR SUPPLY

- .1 Automatic Air Compressor.
- .2 ULC listed.
- .3 Capacity:
 - .1 To restore normal air pressure in system within 30 minutes.
 - .2 To provide air pressure in accordance with instruction sheet furnished with dry pipe valve.
- .4 Piping: ferrous, NPS 3/4 screwed joints and fittings, to NFPA 13.

2.09 PRESSURE GAUGES

- .1 ULC listed.
- .2 Maximum limit of not less than twice normal working pressure at point where installed.

2.10 RELIEF VALVE

- .1 ULC listed.

3 EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage

and installation instructions, and datasheet.

3.02 INSTALLATION

- .1 Install, inspect and test to acceptance in accordance with NFPA 13 and NFPA 25.
- .2 Testing to be witnessed by Fire Commissioner of Canada or their qualified representative.
- .3 Install material and fixtures in accordance with referenced standards and manufacturer's written instructions.
- .4 Pressure gauges:
 - .1 Location:
 - .1 On water side and [air] [nitrogen] side of dry pipe valve.
 - .2 At air receiver.
 - .3 In each independent pipe from air supply to dry pipe valve.
 - .4 At exhausters and accelerators.
 - .2 Install to permit removal.
 - .3 Locate so as not subjected to freezing.
- .5 Valve identification:
 - .1 Identify drain valve, by-pass valves and main shut-off valve and all auxiliary valves.

3.03 FIELD QUALITY CONTROL

- .1 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports.
- .2 Tests
 - .1 Conform to Section 23 05 00 for tests.
 - .2 Conduct tests in the presence of the Departmental Representative and the Representative of Fire Commissioner of Canada.
 - .3 Hydrostatically test sprinkler systems at 350 kPa in excess of nominal working pressure but at not less than 1.4 MPa for 2 h without loss under supervision of FCC or their representative.
 - .4 During tests, repair any leaks and remove and replace any defective parts. Repeat test until satisfactory results are obtained.
 - .5 Refer to other Sections for requirements of commissioning.

END OF SECTION