

Part 1 General

1.1 WORK COVERED BY CONTRACT DOCUMENTS

- .1 Work of this Contract comprises the installation of a new diesel fuelled emergency power generator, complete with required transfer switches and distribution system, upgrades to the emergency lighting system, upgrades to the fire pump and connection of the fire pump to the new emergency power generator at the JD Higenbotham Building, 700-4th Ave South, Lethbridge, AB; further identified as Emergency Power Upgrade.

1.2 CONTRACT METHOD

- .1 Construct Work under single, stipulated price contract.
- .2 Relations and responsibilities between Contractor and subcontractors assigned by Department Representative are as defined in Conditions of Contract. Assigned Subcontractors must, in addition:
 - .1 Furnish to Contractor, bonds covering faithful performance of subcontracted work and payment of obligations there under when Contractor is required to furnish such bonds to Department Representative.
 - .2 Purchase and maintain liability insurance to protect Contractor from claims for not less than limits of liability which Contractor is required to provide to Department Representative.

1.3 WORK BY OTHERS

- .1 Co-operate with other Contractors in carrying out their respective works and carry out instructions from Department Representative.
- .2 Co-ordinate work with that of other Contractors. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to Department Representative, in writing, any defects which may interfere with proper execution of Work.

1.4 WORK SEQUENCE

- .1 Construct Work in stages to accommodate Departmental Representative's continued use of premises during construction.
- .2 Co-ordinate Progress Schedule and co-ordinate with Department Representative Occupancy during construction.
- .3 Construct Work in stages to provide for continuous public usage. Do not close off public usage of facilities until use of one stage of Work will provide alternate usage.
- .4 Maintain fire access/control.

1.5 CONTRACTOR USE OF PREMISES

- .1 Limit use of premises for Work, for storage, and for access, to allow:
 - .1 Tenant Representative occupancy.
 - .2 Co-ordinate use of premises under direction of Departmental Representative.
 - .3 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
 - .4 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.
 - .5 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

1.6 TENANT OCCUPANCY

- .1 Departmental Representative will occupy premises during entire construction period for execution of normal operations.
- .2 Co-operate with Departmental Representative in scheduling operations to minimize conflict and to facilitate Departmental Representative usage.

1.7 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

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

1.8 EXISTING SERVICES

- .1 Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hours notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to tenant operations.
- .2 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.

1.9 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy each document as follows:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Reviewed Shop Drawings.

- .5 List of Outstanding Shop Drawings.
- .6 Change Orders.
- .7 Other Modifications to Contract.
- .8 Field Test Reports.
- .9 Copy of Approved Work Schedule.
- .10 Health and Safety Plan and Other Safety Related Documents.
- .11 Other documents as specified.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

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

1.2 PRECONSTRUCTION MEETING

- .1 Within 15 days after award of Contract, request a meeting of parties in contract to discuss
 and resolve administrative procedures and responsibilities.
- .2 Senior representatives of Departmental Representative, Contractor, major Subcontractors,
 field inspectors and supervisors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum 5 days before
 meeting.
- .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to
 signing.
- .5 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work.
 - .3 Schedule of submission of shop drawings.
 - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities,
 fences.
 - .5 Delivery schedule of specified equipment.
 - .6 Site security.

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

1.3 PROGRESS MEETINGS

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

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

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

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 Submit drawings stamped and signed by professional engineer registered or licensed in Province 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, in duplicate, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .8 Submissions include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent work.
- .9 After Departmental Representative's review, distribute copies.
- .10 Submit 6 prints of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.

- .11 Submit 6 copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .12 Submit 6 copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
 - .2 Testing must have been within 3 years of date of contract award for project.
- .13 Submit 6 copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract complete with project name.
- .14 Submit 6 copies of manufacturer's instructions for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .15 Submit 6 copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
- .16 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .17 Submit 6 copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
- .18 Delete information not applicable to project.
- .19 Supplement standard information to provide details applicable to project.
- .20 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .21 The review of shop drawings by Public Works and Government Services Canada (PWGSC) is for sole purpose of ascertaining conformance with general concept.
 - .1 This review shall not mean that PWGSC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions

in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.

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

1.3 CERTIFICATES AND TRANSCRIPTS

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

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES AND CODES

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

1.2 HAZARDOUS MATERIAL DISCOVERY

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

1.3 BUILDING SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions and municipal by-laws.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 INSPECTION

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

1.2 ACCESS TO WORK

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

1.3 PROCEDURES

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

1.4 REJECTED WORK

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

1.5 REPORTS

- .1 Submit 4 copies of inspection and test reports to Departmental Representative.
- .2 Provide copies to subcontractor of work being inspected or tested.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Owner's identification of existing survey control points and property limits.

1.2 LOCATION OF EQUIPMENT AND FIXTURES

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

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 SUBMITTALS

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

1.2 MATERIALS

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

1.3 EXECUTION

- .1 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .2 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .3 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .4 Restore work with new products in accordance with requirements of Contract Documents.
- .5 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .6 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping material.

- .7 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.
- .8 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions "C", In Effect as Of: May 14, 2004.

1.2 PROJECT CLEANLINESS

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

1.3 FINAL CLEANING

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste products and debris other than that caused by Owner or other Contractors.
- .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.

- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
- .8 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and floors.
- .9 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .10 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 Products

1.1 REFERENCES

- .1 Canadian Environmental Protection Act (CEPA)
- .1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Acceptance of Work Procedures:
 - .1 Contractor's Inspection: Contractor: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
 - .2 Request Departmental Representative's inspection.
 - .2 Departmental Representative's Inspection:
 - .1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.
 - .2 Contractor to correct Work as directed.
 - .3 Completion Tasks: Confirm with Tenants Representative if certificates must be submitted in English or French. Submit written certificates in English and French that tasks have been performed as follows:
 - .1 Work: completed and inspected for compliance with Contract Documents.
 - .2 Defects: corrected and deficiencies completed.
 - .3 Equipment and systems: tested, and fully operational.
 - .4 Operation of systems: demonstrated to Owner's personnel.
 - .5 Work: complete and ready for final inspection.
 - .4 Final Inspection:
 - .1 When completion tasks are done, request final inspection of Work by Departmental Representative, and Contractor.
 - .2 When Work incomplete according to Owner and Departmental Representative, complete outstanding items and request re-inspection.
 - .5 Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.
 - .6 Final Payment:
 - .1 When Departmental Representative considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.
 - .2 Refer to CCDC 2: when Work deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection.

- .7 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

1.3 FINAL CLEANING

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

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

1.1 SUMMARY

- .1 A formal commissioning process is in place for this project. Work shall include but not limited to implementation of coordinated commissioning activities, executed by the Contractor and Commissioning Agents.
- .2 Work specified in this section is to be performed by an independent Agency specializing in this type of work and paid by the Departmental Representative.
- .3 This section describes the commissioning of the building components, equipment and systems and outlines the duties and responsibilities of the Commissioning Team.
- .4 The commissioning process shall be applied to listed building components, and all products, equipment and systems provided under Divisions 20 to 28.
- .5 The Commissioning Manager as directed by the Departmental Representative shall develop a Commissioning Plan.

1.2 DEFINITIONS

- .1 Commissioning Team
 - .1 Personnel that will be directly involved in the building commissioning process. The Commissioning Team shall comprise of Commissioning Manager, Commissioning Agents, Departmental Representatives, Contractors, and Independent Third Party Testing Agencies.
- .2 Commissioning Plan
 - .1 The Commissioning Plan defines the scope and approach to the Total Building Commissioning Program that is to be executed for the project.
- .3 Construction Manager
 - .1 The contracting firm responsible for management of the construction process for the project.
- .4 Contractor
 - .1 The construction firm and its sub-contractors that are responsible for physical construction of the project.
- .5 Departmental Representatives
 - .1 The Departmental Representatives that are responsible for production of the design drawings and specifications for the project as well as the base contract administration, inspection, quality assurance and acceptance activities.
 - .2 The design Department Representatives are not required to be involved in any of the commissioning verifications or performance testing programs, but may witness these activities at their discretion.
- .6 Third Party Testing Agencies

- .1 Specialty firms or agencies retained to conduct acceptance tests on a system of component and provide a certificate of acceptance and conformance to governing standards.
- .7 Out of Contract Tests
 - .1 Testing requirements that are not covered as part of the construction documents but are required to be carried out by certified agencies. Examples would be high voltage testing programs, building envelope testing and air quality testing.
- .8 In Contract Tests
 - .1 Testing requirements that are defined in the contract documents and are the contractors responsibility to carry out. Tests may be witnessed by the Department Representative and Commissioning Agents. Documented test results are turned over for review.
- .9 Check Sheets
 - .1 Architectural, Mechanical and Electrical check sheets that are specific to systems and components for the project that are used for verifying and testing of the work.
 - .2 The commissioning check sheets will be layed out to record three types of site information; technical equipment data, static installation checks and operation checks. Sample check sheets are included at the end of this section.
 - .3 The check sheets will have the equipment's specified and approved shop drawing information input by the Commissioning Manager. The Contractors shall be responsible for completing the technical data section by verifying through the equipment nameplates on site that the equipment installed matches the approved shop drawings.
 - .4 The check sheet manuals will be turned over to site following approval of shop drawings.
- .10 Contractor Start-Up Program
 - .1 Contractor / Supplier checking of the physical installation of the work and reviewing the completeness of system installation and readiness for start-up prior to Commissioning verification activities occurring.
 - .2 Contractor start-up program activities are conducted by the mechanical and electrical contractors or their sub-trades and their equipment suppliers, and may be witnessed by the Department Representative and / or Commissioning Agents.
- .11 Static Inspections
 - .1 Systematic detailed inspections of mechanical and electrical systems and components carried out under the Commissioning Program by personnel from the Commissioning Team. Site personnel will utilize check sheets for recording installation readiness or deficiencies on a component system bases. Timing of

static inspections is tied to construction progress and occurs once contractor checks have been completed.

.12 Acceptance Inspections

- .1 A series of formal inspections carried out by the Department Representatives for systems that result in acceptance of the Work as complete.

.13 Performance Testing

- .1 Performance tests are specific hand-on tests conducted with test instruments; to prove that the systems as installed meet both the specified performance requirements for major pieces of equipment and that installed system performance meets the design intent and specified operating requirements.

1.3 GENERAL

.1 Provide a fully functional facility:

- .1 Systems, equipment and components meet user's functional requirements before date of acceptance, and operate consistently at peak efficiencies and within specified energy budgets under normal loads.
- .2 Facility user and O&M personnel have been fully trained in aspects of installed systems.
- .3 Optimized life cycle costs.
- .4 Complete documentation relating to installed equipment and systems.

.2 Use this Plan as master planning document for Commissioning:

- .1 Outlines organization, scheduling, allocation of resources, documentation, pertaining to implementation of Commissioning.
- .2 Communicates responsibilities of team members involved in Commissioning Scheduling, documentation requirements, and verification procedures.
- .3 Sets out deliverables relating to O&M, process and administration of Commissioning.
- .4 Describes process of verification of how built works meet Departmental Representative's design requirements.
- .5 Produces a complete functional system prior to issuance of Certificate of Occupancy.
- .6 Management tool that sets out scope, standards, roles and responsibilities, expectations, deliverables, and provides:
 - .1 Overview of Commissioning.
 - .2 General description of elements that make up Commissioning Plan.
 - .3 Process and methodology for successful Commissioning.

.3 Acronyms:

- .1 BAS - Building Automation System
- .2 BMM - Building Management Manual.
- .3 EMCS - Energy Monitoring and Control Systems.
- .4 MSDS - Material Safety Data Sheets.
- .5 PI - Product Information.

- .6 PV - Performance Verification.
- .7 TAB - Testing, Adjusting and Balancing.
- .8 WHMIS - Workplace Hazardous Materials Information System.
- .4 Commissioning terms used in this Section:
 - .1 Bumping: short term start-up to prove ability to start and prove correct rotation.
 - .2 Deferred Commissioning - activities delayed for reasons beyond Contractor's control due to lack of occupancy, weather conditions, need for heating/cooling loads.

1.4 REFINEMENT OF COMISSIONING PLAN

- .1 During construction phase, Commissioning Manager will revise, refine and update Plan to include:
 - .1 Changes resulting from Client program modifications.
 - .2 Approved design and construction changes.
- .2 Departmental Representative to include testing parameters at full range of operating conditions and check responses of equipment and systems.

1.5 COMISSIONING PARTICIPANTS

- .1 Ensure that Commissioning participant:
 - .1 Could complete work within scheduled time frame.
 - .2 Available for emergency and troubleshooting service during first year of occupancy by user for adjustments and modifications outside responsibility of O&M personnel, including:
 - .1 Modify ventilation rates to meet changes in off-gassing.
 - .2 Changes to heating or cooling loads beyond scope of EMCS.
 - .3 Changes to EMCS control strategies beyond level of training provided to O&M personnel.
 - .4 Redistribution of electrical services.
 - .2 Provide names of participants to Commissioning Manager and details of instruments and procedures to be followed for Commissioning 1 month prior to starting date of Commissioning for review and approval.

1.6 EXTENT OF COMISSIONING

- .1 Commissioning Structural and Architectural Systems:
- .2 Commission mechanical systems and associated equipment:
 - .1 HVAC and exhaust systems:
 - .1 HVAC systems:
 - .1 Computer Room Air Conditioning
 - .2 EMCS / BAS:
 - .1 Static Testing
 - .2 Dynamic Operational Test
 - .3 Energy Monitoring Systems for Domestic Water ; Power ; Natural Gas
- .3 Commission electrical systems and equipment:

- .1 Low voltage below 750 V:
 - .1 Power Distribution System
 - .2 Building System Grounding
 - .3 Load Balancing
- .2 Other systems and equipment:
 - .1 Voice / Data Cabling Test
 - .2 Motor Starters

1.7 DELIVERABLES RELATING TO O&M PERSPECTIVES

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

1.8 DELIVERABLES RELATING TO THE COMMISSIONING PROCESS

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

- .8 Description of Commissioning of integrated systems and documentation.
- .9 Training Plans.
- .10 Commissioning Reports.
- .11 Prescribed activities during warranty period.
- .4 Departmental Representative and Commissioning Manager to witness and certify tests and reports of results provided to by Contractor.

1.9 PRE-COMMISSIONING ACTIVITIES AND RELATED DOCUMENTATION

- .1 Items listed in this Commissioning Plan include the following:
 - .1 Pre-Start-Up inspections: by Commissioning Manager and Department Representative prior to permission to start up and rectification of deficiencies to Commissioning Manager and Department Representative satisfaction.
 - .2 Commissioning Agent to use approved check lists.
 - .3 Commissioning Manager and Department Representative will monitor some of these pre-start-up inspections.
 - .4 Include completed documentation with Commissioning report.
 - .5 Conduct pre-start-up tests: conduct pressure, static, flushing, cleaning, and "bumping" during construction as specified in technical sections. To be witnessed and certified by Commissioning Manager and Department Representative and does not form part of Commissioning specifications.
 - .6 Commissioning Manager and Department Representative will monitor some of these inspections and tests.
 - .7 Include completed documentation in Commissioning report.
- .2 Pre-Commissioning activities - MECHANICAL:
 - .1 Plumbing systems:
 - .1 Complete pre-start-up checks and complete relevant documentation.
 - .2 HVAC equipment and systems:
 - .1 "Bump" each item of equipment in its "stand-alone" mode.
 - .2 At this time, complete pre-start-up checks and complete relevant documentation.
 - .3 After equipment has been started, test related systems in conjunction with control systems on a system-by-system basis.
 - .3 EMCS:
 - .1 EMCS trending to be available as supporting documentation for performance verification.
 - .2 Perform point-by-point testing in parallel with start-up.
 - .3 Carry out point-by-point verification.
 - .4 Demonstrate performance of systems, to be witnessed by Commissioning Manager and Department Representative
 - .5 Perform final Commissioning and operational tests during demonstration period
 - .6 Only additional testing after foregoing have been successfully completed to be "Off-Season Tests".
- .3 Pre-Commissioning activities - LIFE SAFETY SYSTEMS

- .1 N/A
- .4 Pre-Commissioning activities - ELECTRICAL:
 - .1 Low voltage distribution systems under 750 V:
 - .1 Requires independent testing agency to perform pre- energization and post-energization tests.
 - .2 Load Balancing.
 - .2 Other systems and equipment:
 - .1 Voice / Data Cabling:
 - .1 Visual inspection.
 - .2 Manufacturers VAR testing requirements.

1.10 START-UP

- .1 Start up components, equipment and systems.
- .2 Performance Verification (PV):
 - .1 Approved Commissioning Agent to perform.
 - .1 Repeat when necessary until results are acceptable to Departmental Representative and Commissioning Manager
 - .2 Use procedures modified generic procedures to suit project requirements.
 - .3 Commissioning Manager to witness and certify reported results using approved PI and PV forms.
 - .4 Commissioning Manager and Departmental Representative to approve completed PV reports.
 - .5 Commissioning Manager and Departmental Representative reserves right to verify up to 30% of reported results at random.
 - .6 Failure of randomly selected item shall result in rejection of PV report or report of system start-up and testing.

1.11 COMMISSIONING ACTIVITIES AND RELATED DOCUMENTATION

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

1.12 COMMISSIONING OF INTEGRATED SYSTEMS AND RELATED DOCUMENTATION

- .1 Commissioning to be performed by specified Commissioning specialist, using procedures developed by Commissioning Manager and Departmental Representative.

- .2 Tests to be witnessed by Commissioning Manager and Departmental Representative and documented on approved report forms.
- .3 Upon satisfactory completion, Commissioning Agent to prepare Commissioning Report, to be certified by Commissioning Manager and Departmental Representative.
- .4 Commissioning Manager and Departmental Representative reserves right to verify percentage of reported results.
- .5 Integrated systems to include:
 - .1 HVAC and associated systems forming part of integrated HVAC systems
 - .2 Emergency lighting systems
- .6 Identification:
 - .1 In later stages of Commissioning, before hand-over and acceptance Contractor and Commissioning Manager to co-operate to complete inventory data sheets and provide assistance in full implementation of CMMS identification system of components, equipment, sub-systems, systems.

1.13 INSTALLATION CHECK LISTS (ICL)

- .1 Refer to attached samples

1.14 PERFORMANCE VERIFICATION (PV) REPORT

- .1 Refer to attached samples

1.15 DELIVERABLES RELATING TO ADMINISTRATION OF COMMISSIONING

- .1 General:
 - .1 Complete Commissioning of occupancy, weather and seasonal-sensitive equipment and systems in these areas before building is occupied.

1.16 COMMISSIONING SCHEDULES

- .1 Contractor to prepare detailed Commissioning Schedule and submit to Commissioning Manager for review and approval same time as project Construction Schedule. Include:
 - .1 Milestones, testing, documentation, training and Commissioning activities of components, equipment, subsystems, systems and integrated systems, including:
 - .1 Submission of list of instrumentation with relevant certificates
 - .2 Notification of intention to start TAB: 14 days before start of TAB.
 - .3 TAB: after successful start-up, correction of deficiencies and verification of normal and safe operation.
 - .4 Notification of intention to start Commissioning: 14 days before start of Commissioning.
 - .5 Notification of intention to start Commissioning of integrated systems: after Commissioning of related systems is completed 14 days before start of integrated system Commissioning.
 - .6 Identification of deferred Commissioning.
 - .7 Implementation of training plans.
 - .8 Commissioning reports: immediately upon successful completion of Commissioning.

- .2 Detailed training schedule to demonstrate no conflicts with testing, completion of project and hand-over.
- .3 Commissioning schedule for verification of performance in all seasons and wear conditions.
- .2 After approval, incorporate Commissioning Schedule into Construction Schedule.
- .3 Departmental Representative, Contractor and Contractor's Commissioning agent will monitor progress of Commissioning against this schedule.

1.17 COMMISSIONING REPORTS

- .1 Include completed and certified PV reports in properly formatted Commissioning Reports.
- .2 Before reports are accepted, reported results to be subject to verification by Commissioning Manager and Departmental Representative.

1.18 ACTIVITIES DURING WARRANTY PERIOD

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

1.19 TESTS TO BE PERFORMED BY DEPARTMENTAL REPRESENTATIVE

- .1 As required

1.20 FINAL SETTINGS

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

1.21 COMMISSIONING CHECK LIST SCHEDULE

- .1 Following Commissioning Check List and verification Lists are appended hereto:
 - .1 01 91 31.50 Structural Cabling System

END OF SECTION