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PART 1 - GENERAL

1.01 INTERFERENCE WITH EXISTING FACILITY OPERATIONS

- .1 Operation of Owner's facilities continues 24 hours per day seven days per week. As a result, Work must be executed in a way that does not create a hazard to, or interrupt daily functions and on-going operations of areas affected by the Work, and maintenance procedures of maintenance staff.
- .2 Maintain normal operations of building. Take every precaution and care to ensure that interference or disruptions to patrons, staff and management are minimized.
- .3 Work to be performed in phased sequence of areas and times acceptable to Owner. Owner will provide guidance but be responsible for ensuring that safe work conditions and respect for facilities operations, building occupants, visitors, and staff are maintained at all times.
- .4 Perform and complete work at times as approved and coordinated with Owner and reviewed with Consultant.

1.02 MEETINGS

.1 General

- .1 Hold Project and coordination meetings on site or other pre-arranged location, on a regular basis coordinated and confirmed with Owner and reviewed with Consultant.
- .2 Organize each meeting and send out appropriate notices to Owner, Consultants, Subcontractors, and any other persons whose attendance is required.
- .3 Attendance by Contractors is mandatory.
- .4 Take minutes of meetings and submit copies of minutes to parties present and any other party as necessary.

.2 Start-up Meeting

- .1 Within five (5) working days prior to construction start-up meeting, submit construction schedule for review with Consultant and approval by Owner.
- .2 Schedule and arrange start-up meeting as reviewed with Consultant and approved by Owner, for attendance by parties in Contract to discuss and resolve administrative procedures and responsibilities.
- .3 Agenda to include but not be limited to following:
 - .1 appointment of official representative of participants in Work;
 - .2 schedule of Work, progress scheduling;
 - .3 ordering of and delivery schedule of specified equipment;
 - .4 shop drawing submissions;
 - .5 site security, emergencies, protective measures;
 - .6 supplementary instructions, contemplated changes, change orders, procedures, approvals required, mark up percentages permitted, time extension, overtime, administrative requirements;
 - .7 record drawings, maintenance manuals, take over procedures, acceptance, warranties;
 - .8 administrative procedures, holdbacks;
 - .9 insurances, transcripts of policies, Workers' Compensation.

.3 Progress Meeting

- .1 During course of Work, administer and schedule weekly progress meetings and any additional as may be required until project completion.
- .2 Agenda to include but not be limited to 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 corrective measures and procedures to regain projected schedule;
- .6 revisions to construction schedule;
- .7 progress schedule during succeeding work period and effect on occupants;
- .8 review submittal schedules for samples and shop drawings and expedite as required;
- .9 maintenance of quality standards;
- .10 pending changes and substitutions;
- .11 review proposed changes for effect on construction schedule and on completion date;
- .12 other business deemed necessary to project.

1.03 CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, and following review with Consultant, submit Workplace Safety and Insurance Board/Workers' Compensation Board status, transcription of insurances, and specified Performance Bond and Labour and Material Payment Bond.

1.04 BOOKS AND RECORDS OF CONTRACTOR

- .1 Maintain proper books and records showing expenditures in connection with construction of Work. Retain onsite, a permanent written record of construction schedule coordinated and accepted by Owner and reviewed with Consultant, of progress of work showing dates of commencement and completion of parts of work. Make this record available for inspection by Consultant's representative at all times.
- .2 Maintain on site or at some other location reviewed with Consultant, records relevant to valuation of the Work, including books of account, invoices, and statements. Make records available at all reasonable times for inspection by Consultant, Owner and Federal and Provincial Auditors.
- .3 Assist such inspection for purpose of establishing and determining quantity, quality and cost of materials and equipment purchased and used in the Work.

1.05 PROGRESS AND SUBMITTALS SCHEDULES

- .1 Submit following schedules to Consultant within ten (10) working days from date of award of Contract unless otherwise specified herein:
 - .1 Progress schedule:
 - .1 Prepare a progress schedule of the Work consistent with Work Schedule. Allow time for preparing and reviewing shop drawings, delivery of major items and equipment, and completion of work of each Subcontractor or special operation required to perform Work. Coordinate Progress Schedule with Schedule of Service shutdowns.
 - .2 Maintain progress schedule up to date and advise parties concerned of changes.
 - .3 Print and issue copies to parties concerned. Issue revised copies at suitable intervals.
 - .2 Submittals schedules:
 - .1 Prepare and submit schedule listing Shop Drawings showing anticipated date of submission and date review is required.

- .2 Prepare and submit schedule listing samples showing anticipated date of submission and date review is required.
 - .3 Prepare and submit a schedule for delivery of equipment showing anticipated date of arrival.
 - .4 Coordinate these schedules with progress schedule.
 - .3 Cost breakdown and cash flow schedule:
 - .1 Prepare cost breakdown for each section of the Work and a monthly cash flow schedule coordinated with progress schedule.
 - .2 Submit draft format for review with Consultant.
 - .3 Submit cost breakdown and cash flow schedule fifteen (15) working days or more prior to first application for payment.
 - .4 Maintain cash flow schedule up to date with progress schedule and advise Consultant of changes.
 - .5 Issue revised copies to Consultant at time of each change.
- 1.06 PROGRESS AND DAILY REPORTS
 - .1 Progress reports:
 - .1 Submit to Consultant monthly progress reports with each progress payment claim consisting of a concise description and marked-up schedule showing physical percentage complete by item and in total.
 - .2 Daily reports:
 - .1 Maintain in field office at Place of the Work a written daily record of progress of parts of the Work available for review with Consultant. Show dates of commencement and completion of parts of the Work, daily high and low temperatures and other weather particulars, number of people engaged on the Work (including sub-trades) broken down in groups for each part of the Work.
- 1.07 REQUEST FOR INFORMATION (RFI)
 - .1 Where information is required during construction period, submit Request For Information (RFI) to Consultant in writing, clearly identifying:
 - .1 Contractor's company name, address and telephone number, and designated contact person;
 - .2 project title and Consultant's project number;
 - .3 name of Consultant's contact person;
 - .4 RFI tracking number and date of submission;
 - .5 description of information required with related specification section number, page number and paragraph number referenced; or if drawing related, drawing number with co-ordinates or note number referenced, as applicable.
 - .2 RFI process of submission:
 - .1 At start-up meeting review RFI process requirements with Consultant.
 - .2 Unless otherwise noted by or reviewed with Consultant, allow Consultant minimum of seven (7) working days to respond to RFI, from Consultant's date of acknowledged receipt, and based upon a regular and reasonable flow of RFIs.
 - .3 If, for any reason, Consultant requires additional time beyond seven (7) working days, Consultant to provide Contractor with notice indicating additional time required.

- .4 If, at any time, Contractor submits unusually large number of RFIs or RFIs of a complex nature, such that Consultant cannot process these RFIs within seven (7) working days, Consultant to advise Contractor of estimate of time necessary for processing.

1.08 SUBMITTALS

- .1 Within (5) five days after award of contract, the Contractor shall submit the following information for review:
 - .1 General Liability Insurance
 - .2 Bonding
 - .3 WSIB
 - .4 Construction Schedule
- .2 Submit the following additional information for Consultant review:
 - .1 Shop Drawings;
 - .2 Engineered Submittals;
 - .3 Samples;
 - .4 product data;
 - .5 certification and verification of performance;
 - .6 mock-ups and quality control panels;
 - .7 Operating and Maintenance Manuals;
 - .8 As-built and Record Documents;
 - .9 progress and submittals schedules;
 - .10 progress and daily reports;
 - .11 inspection and test reports;
 - .12 warranties;
 - .13 certificates and transcripts;
 - .14 other items requested by Consultant.
- .3 Submittals shall be submitted with reasonable promptness and in an orderly sequence so as to not cause delay in Work. Failure to submit with ample time for Consultant review is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .4 Work affected by Submittal is not to proceed until review by Consultant is complete.
- .5 Review Submittals prior to submission to Consultant. Review represents that necessary requirements have been considered and verified, and that each Submittal has been checked and coordinated with requirements of the Contract Documents and the Work or other Trades. Submittals that are not specific project, not stamped, not signed, not dated, nor identified as having been reviewed by the Contractor will be returned without further examination by the Consultant.
- .6 Verify site conditions using field measurements and coordinate affected areas of the Work.
- .7 Contractor's failure to properly coordinate Submittals prior to ordering equipment is not relieved by the Consultant's review of Submittal(s).
- .8 Deviations from requirements of Contract Documents made in Contractor's Submittal(s) is not relieved by Consultant's review.
- .9 Maintain minimum one (1) reviewed copy of each Submittal at job site.

1.09 SHOP DRAWINGS

- .1 At start-up meeting, review with Consultant products to be included in shop drawing submission. Prepare and submit list of products to Consultant for review.
- .2 Submit electronic copies of shop drawings unless otherwise directed by Consultant. Review exact requirements with Consultant.
- .3 Submit for review, drawings showing in detail design, construction, and performance of equipment and materials as requested in Specification. Submit shop drawings to Consultant for review prior to ordering and delivery of product to site. Include minimally for preparation and submission of following, as applicable:
 - .1 product literature cuts;
 - .2 equipment data sheets;
 - .3 equipment dimension drawings;
 - .4 system block diagrams;
 - .5 sequence of operation;
 - .6 connection wiring schematic diagrams;
 - .7 functionality with integrated systems.
- .4 Each shop drawing or product data sheet is to be properly identified with project name and product drawing or specification reference. Shop drawing or product data sheet dimensions are to match dimension type on drawings.
- .5 Where any item of equipment is required by Code or Standard or By-Law to meet a specific energy efficiency level, or any other specific requirement, ensure this requirement is clearly indicated on submission.
- .6 Ensure proposed products meet each requirement of Project. Endorse each shop drawing copy "CERTIFIED TO BE IN ACCORDANCE WITH ALL REQUIREMENTS". Include company name, submittal date, and sign each copy. Shop drawings that are received and are not endorsed, dated and signed will be returned.
- .7 Consultant to review shop drawings and indicate review status by stamping shop drawing copies as follows:
 - .1 "REVIEWED" or "REVIEWED AS NOTED" (appropriately marked) - If Consultant's review of shop drawing is complete;
 - .2 "RETURNED FOR CORRECTION" - If Consultant's review of shop drawing is not final, Consultant to stamp shop drawing as stated above, mark submission with comments, and return submission. Revise shop drawing in accordance with Consultant's notations and resubmit.
- .8 Following is to be read in conjunction with wording on Consultant's shop drawing review stamp applied to each and every shop drawing or product data sheet submitted:

"THIS REVIEW BY CONSULTANT IS FOR SOLE PURPOSE OF ASCERTAINING CONFORMANCE WITH GENERAL DESIGN CONCEPT. THIS REVIEW DOES NOT MEAN THAT CONSULTANT APPROVES DETAILED DESIGN INHERENT IN SHOP DRAWINGS, RESPONSIBILITY FOR WHICH REMAINS WITH CONTRACTOR. CONSULTANT'S REVIEW DOES NOT RELIEVE CONTRACTOR OF RESPONSIBILITY FOR ERRORS OR OMISSIONS IN SHOP DRAWINGS OR OF CONTRACTOR'S RESPONSIBILITY FOR MEETING REQUIREMENTS OF CONTRACT DOCUMENTS. CONTRACTOR TO BE 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 COORDINATION OF WORK OF SUB-TRADES.

IT IS THE CONTRACTOR'S RESPONSIBILITY TO BRING TO THE ATTENTION OF THE CONSULTANT ALL PHYSICAL, PERFORMANCE OR OTHER DEVIATIONS FROM THE CONTRACT REQUIREMENTS."

- .9 Submit each system and each major component as separate shop drawing. Submit together, shop drawings for common equipment such as equipment with the same function from the same manufacturer.
- .10 Obtain shop drawings for submission from product manufacturer's authorized representatives and supplemented with additional items specified herein.
- .11 Where extended warranties are specified for equipment items, submit specified extended warranty with shop drawing submittal.
- .12 Refer to specific requirements in other Sections.
- .13 Applicable mechanical equipment has been selected to meet energy efficiency requirements of ANSI/ASHRAE/IES 90.1, and shop drawings/product data submittals for such equipment must indicate compliance with this Standard or they will be returned for correction and re-submittal.

1.10 ENGINEERED SUBMITTALS

- .1 Submittals for items required to be sealed by a professional engineer (engineered) are to be duly prepared, sealed, and signed under direct control and supervision of a qualified professional engineer licensed in jurisdiction of the work. Professional engineer is to conform to requirements specified in Section 01 10 05 "*General Instructions*", Article entitled "*Requirements for Contractor Retained Engineers*".
- .2 Engineered submittals are to include, but not be limited to, following:
 - .1 complete CAD layout drawings indicating equipment, piping schematic, pipe/conduit routing and sizing, zones, devices, wiring schematics, and any other pertinent data;
 - .2 listing of design data used to determine system layout and sizing;
 - .3 complete copies of design calculations and listing of design data used in preparing calculations;
 - .4 list detailing standards, codes, regulations, and other criteria used when designing system;
 - .5 engineered designs required in other Sections of the Specification.
- .3 Professional engineer responsible for engineered submittals is to perform periodic field reviews, including review of associated mock-ups where applicable, at locations wherever work as described by engineered submittal is in progress, during fabrication and installation of such work, and submit a field review report after each visit. Submit field review reports to Consultant and authorities having jurisdiction as required.
- .4 Field reviews are to be at intervals as necessary and appropriate to progress of work described by engineered submittal to allow engineer to be familiar with progress and quality of such work and to determine if work is proceeding in general conformity with Contract Documents including reviewed shop drawings and design calculations.
- .5 Upon completion of work as described by engineered submittal, professional engineer responsible for preparation of engineered submittal and for performing periodic field reviews is to prepare and submit to Consultant and, if applicable, authorities having jurisdiction, a letter certifying that work has been supplied and installed in accordance with requirements of Contract Documents, authorities having jurisdiction and engineered submittal.

1.11 SAMPLES

- .1 Unless more are requested in individual specifications sections, or as may otherwise be agreed with the Consultant and the Owner, submit for review Samples in triplicate for products and assemblies as requested in respective Specification Sections. Label Samples as to date, project number, Specifications Section, origin, and intended use in the Work.

- .2 Unless otherwise reviewed with the Consultant, deliver Samples prepaid to site office. Include costs for delivery and handling, assembly, and return to supplier of Samples if applicable.
- .3 Notify Consultant in writing, at time of submission of deviations in Samples from requirements of Contract Documents.
- .4 Consultant adjustments and comments made during review of Samples are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with the Work.
- .5 Make changes in Samples that Consultant may require, consistent with Contract Documents.
- .6 Should any change of material, colour, texture, finish, dimensions, performance, function, operation, construction, joining, fastening, fabrication techniques, service characteristics, and other qualities be made to a product after Consultant's initial Sample review has been made, resubmit Sample for Consultants review and acceptance of revised characteristics .
- .7 Each product incorporated in Work to be precisely same in every detail as per accepted Sample.

1.12 LIFT PLAN

- .1 A Lift Plan (crane schedule/plan) shall be submitted to the Consultant and the Owner detailing the Contractor's safe execution of lifting operations using a crane.
- .2 The Lift Plan shall include details regarding the crane's capabilities, the load characteristics, rigging requirements, and the roles of all personnel involved.
- .3 The Method of Procedure (MOP) shall be included with the Lift Plan, focusing on the specific sequence of actions to be taken during the Lift.
- .4 The Lift Plan (crane schedule/plan) shall be considered the overarching document, while the MOP is a specific section within the Lift Plan detailing the step-by-step execution of the Lift.
- .5 Key components of a Lift Plan (crane schedule/plan) to be addressed by the Contractor are:
 - .1 Crane Specifications:
 - .1 This includes the crane's capacity, boom length, jib length, and any specific limitations or restrictions.
 - .2 Load Details:
 - .1 Shall provide details regarding the weight of the load, its dimensions, center of gravity, and the presence of any lifting points.
 - .3 Rigging Requirements:
 - .1 Shall provide details regarding the type and capacity of slings, shackles, and other rigging gear needed for the Lift.
 - .4 Lift Method:
 - .1 Shall provide details outlining the sequence of steps involved in the lifting operation, including how the load will be lifted, moved, and placed.
 - .5 Personnel Roles:
 - .1 Shall provide details regarding the individuals involved in the Lift and their specific responsibilities, such as the Lift director, crane operator, and signal person.
 - .6 Environmental Conditions:
 - .1 Shall provide details regarding potential hazards related to weather, ground conditions, and other environmental factors affecting the Lift.
 - .7 Communication:
 - .1 Shall provide details regarding how personnel will communicate with each other during the Lift, often using hand signals, or other electronic (radio, or similar) communication.

- .8 Emergency Procedures:
 - .1 The Lift Plan shall include procedures for dealing with potential emergencies encountered during the lift.
- .9 Method of Procedure (MOP):
 - .1 As a sub-section of the Lift Plan, the MOP shall include a detailed, step-by-step guide for the crane operation, breaking down the Lift into smaller, specific tasks that identify exactly how each action shall be performed.
 - .2 The MOP shall ensure that all personnel understand their roles and responsibilities, and that the Lift is executed safely and efficiently.
- .6 All Lifts shall be executed in accordance with the Ontario Regulation 213/91, "Construction Projects" and the construction health and safety "Technical guideline on requirements for cranes at construction projects"
- .7 Do not execute any Lift(s) without first obtaining approval of the Lift Plan from the Consultant and Owner.

1.13 OPERATING AND MAINTENANCE MANUALS

- .1 For each item of equipment for which a shop drawing is required (except for simple equipment), supply a minimum of one (1) hard copy, three (3) USB soft copy sticks, and an FTP file transfer link for downloading soft copy of the Operating and Maintenance (O&M) Manuals. Consolidate each copy of data in an identified hard cover three "D" ring binder. Each Operating and Maintenance (O&M) Manual to include:
 - .1 Front cover: project name label; wording to identify respective Division of Work - "Name of Division" Systems Operating and Maintenance Manual"; and date;
 - .2 Introduction sheet listing Consultant, Contractor, and Subcontractor names, street addresses, telephone and fax numbers, and e-mail addresses;
 - .3 Equipment manufacturer's authorized contact person name, telephone number and company website;
 - .4 Table of Contents sheet, and corresponding index tab sheets;
 - .5 Copy of each "REVIEWED" or clean, updated "REVIEWED AS NOTED" shop drawing, product data sheet, with manufacturer's/supplier's name, telephone and fax numbers, email address, company website address, and email address for local source of parts and service. When shop drawings are returned marked "REVIEWED AS NOTED" with revisions marked on shop drawing copies, they are to be revised by equipment supplier to incorporate comments marked on "reviewed" shop drawings and a clean updated copy is to be included in operating and maintenance manuals;
 - .6 Additional general information as follows:
 - .1 description of each system and its controls;
 - .2 wiring and connection diagrams, and control schematics;
 - .3 explanation of operational principles with operational instruction for each system and each component;
 - .4 description of actions to be taken in event of emergencies and/or equipment failure;
 - .5 items requested specifically in Section Articles.
 - .7 Maintenance data as follows:
 - .1 operation and trouble-shooting instructions for each item of equipment and each system;
 - .2 schedules of tasks, frequency, tools required, and estimated task time;

- .3 recommended maintenance practices and precautions including warnings of any maintenance practice that will damage or disfigure equipment/systems;
- .4 complete parts lists with numbers.
- .8 Performance data as follows:
 - .1 equipment and system start-up data sheets;
 - .2 equipment performance verification and test results, and final commissioning reports;
 - .3 warranties;
 - .4 inspection certificates issued by regulatory authorities.
- .9 As applicable, additional information for Mechanical Divisions as follows:
 - .1 pressure test reports, and certificates issued by governing authorities;
 - .2 control schematics for equipment/systems including building environmental controls;
 - .3 if applicable, BAS architecture and required operating data;
 - .4 description of operation of each system at various loads together with reset schedules and seasonal variances;
 - .5 adjusting and balancing reports;
 - .6 valve tag schedule, and flow diagrams to indicate valve locations.
- .10 As applicable, additional information for Electrical Divisions of copies of additional and revised panel board directories.
- .2 Generally, binders are not to exceed 75 mm (3") thick and not to be more than 2/3 full.
- .3 O&M Manuals are to relate to job specific equipment supplied under this project and related to Owner's building. Language used in O&M Manuals is to contain simple practical operating terms and language easy for in-house maintenance staff to understand how to operate and maintain each system.
- .4 Before applying for a Certificate of Substantial Performance of the Work, assemble one (1) draft copy of O&M Manual and submit to Consultant for review prior to assembling remaining copies. Incorporate Consultant's comments into final submission.
- .5 Supply digital copies of contents of O&M Manuals and load complete set onto USB type flash drive. Submit minimum two (2) sets (two (2) flash drives) to Consultant. Prepare digital copies using version of Adobe Acrobat Portable Document Format or equal as reviewed with Consultant and enhanced with bookmarks and internal document links.

1.14 RECORD AS-BUILT DRAWINGS

- .1 Drawings for this project have been prepared on a CAD system using AutoCAD software of release version reviewed with Consultant. For purpose of producing record "as-built" drawings, copies of Contract Drawings can be obtained from Consultant.
- .2 As Work progresses at site, clearly mark in red in a neat and legible manner on a set of bound white prints of Contract Drawings, changes and deviations from routing of services and locations of equipment shown on Contract Drawings, on a daily basis. Changes and deviations include those made by addenda, change orders, and site instructions. Use notes marked in red as required. Maintain white print red line as-built set at site for exclusive use of recording as-built conditions, keep set up-to-date, and ensure set is available for periodic review. As-built set is also to include following:
 - .1 dimensioned location of inaccessible concealed work;
 - .2 locations of control devices with identification for each;

- .3 location and identification of devices in concealed locations such as accessible ceiling spaces and raised floors;
 - .4 for underground piping and ducts, record dimensions, invert elevations, offsets, fittings, cathodic protection and accessories if applicable, and locate dimensions from benchmarks to be preserved after construction is complete;
 - .5 location of concealed services terminated for future extension and work concealed within building in inaccessible locations.
 - .6 location of piping system air vents;
 - .7 for fire protection systems, record actual locations of equipment, sprinkler heads, and valves, drains, and test locations, and deviations of pipe routing and sizing from that shown on the drawings;
 - .8 location of fire alarm devices and include addresses of devices; identify fire alarm zones;
 - .9 identify routing and location of concealed conduits/ducts of diameter 50mm (2") and greater.
- .3 Before applying for a Certificate of Substantial Performance of the Work, update a clean copy of Contract Drawing set in accordance with marked up set of "as-built" white prints including deviations from original Contract Drawings, thus forming an "as-built" drawing set. Submit "as-built" site drawing prints to Consultant for review. Make necessary revisions to drawings as per Consultant's comments, to satisfaction of Owner and reviewed with Consultant.
 - .4 Use final reviewed "as-built" drawing set to update Consultant's CAD files of Record Drawings thus forming true "as-built" set of Contract Drawings. Identify set as "Project Record Copy". Load digital copies of final reviewed with Consultant as-built drawings onto USB type flash drive. Provide two (2) complete sets of "as-built" drawings on separate USB flash drives. Submit "as-built" sets of white prints and USB flash drives to the Consultant.
 - .5 Submitted drawings are to be of same quality as original Contract Drawings. CAD drawing files are to be compatible with AutoCAD software release version reviewed with Consultant.
 - .6 Failure to maintain accurate record drawings will incur additional 5% holdback on progress claims until drawings are brought up to date to satisfaction of Owner and reviewed with Consultant.
 - .7 Replace existing posted single line electrical distribution drawings with revised to reflect renovations and revisions to electrical distribution equipment. Drawings to be of type to match existing as confirmed with Owner and reviewed with Consultant.
 - .8 Supply electronic files of format confirmed with Owner and reviewed with Consultant for following:
 - .1 fire alarm system test report devices and addresses;
 - .2 network cabling system test report devices and labelling of each device and cable.

1.15 EQUIPMENT AND SYSTEM MANUFACTURER'S CERTIFICATION

- .1 When equipment/system installation is complete, but prior to start-up procedures, arrange and pay for equipment/system manufacturer's authorized representative to visit site to examine installation, and after any required corrective measures have been made, to certify in writing to Consultant that equipment/system installation is complete and in accordance with equipment/system manufacturer's instructions.

1.16 EQUIPMENT AND SYSTEM START-UP

- .1 When installation of equipment/systems is complete but prior to commissioning, perform start-up for equipment/systems as specified in respective work Sections in accordance with following requirements:
 - .1 submit a copy of each equipment/system manufacturer's start-up report sheet to Consultant for review, and incorporate any comments made by Consultant;

- .2 under direct on-site supervision and involvement of equipment/system manufacturer's representative, start-up equipment/systems, make any required adjustments, document procedures, leave equipment/systems in proper operating condition, and submit to Consultant complete set of start-up documentation sheets signed by manufacturer/supplier and Contractor.

1.17 PROJECT INSPECTION, TESTING, START-UP AND VERIFICATION WORK

- .1 Perform complete inspection, testing, adjusting, start-up, and verification of systems and equipment. Prepare and submit copies of completed testing reports to Consultant.
- .2 Expedite and complete deficiencies and defects identified by Owner and Consultant.
- .3 Prior to application for Certificate of Substantial Performance of the Work carefully inspect Work and ensure it is complete, that major and minor construction deficiencies are complete and/or corrected and building is clean and in condition for occupancy. Notify Consultant in writing, of Satisfactory Completion of the Work and request an inspection. Arrange for a final inspection tour with Owner, Consultant, and appropriate Subcontractors present.
- .4 Submit to Consultant, written request for final inspection of systems. Include written certification that:
 - .1 deficiencies noted during job inspections have been completed,
 - .2 field quality control procedures have been completed, maintenance and operating data have been completed and submitted to, and reviewed with Consultant,
 - .3 tags and nameplates are in place and equipment identification have been completed;
 - .4 cleaning up is complete,
 - .5 spare parts and replacement parts specified have been provided and acknowledged by Consultant,
 - .6 as-built and record drawings have been completed and submitted to, reviewed and accepted by Consultant,
 - .7 Owner's staff has been instructed in operation and maintenance of systems,
 - .8 commissioning procedures have been completed to satisfaction of Owner, Consultant and Commissioning Authority,
 - .9 nameplates, signage and operating and maintenance manuals are to satisfaction of Owner and Consultant,
 - .10 systems have been tested and verified, and are ready for operation,
 - .11 fire alarm verification has been 100% completed and Verification Certificate has been submitted to and reviewed with Consultant.
- .5 After Consultants inspections, correct list of deficiencies and defects prepared by Consultant.
- .6 When Consultant considers deficiencies and defects have been properly corrected and it appears requirements of Contract have been performed, make an application for Certificate of Substantial Performance.

1.18 PROJECT CLOSE-OUT

- .1 Project close-out documents are to include, at a minimum:
- .2 Letters of Completion
 - .1 Final Statutory Declaration from Contractor and Sub-Trades (dated & signed),
 - .2 Compliance letter from the Consultants (dated & signed)
 - .3 Substantial Completion Certificate (signed Form 9)
- .3 Contact Info

- .1 Project contact from all parties (Names/Mobile#)
- .2 Warranty contact (Company Name, Contact information (Phone No., email address and similar))
- .4 Executed Warranty Certificate(s)
 - .1 General Warranty (workmanship, parts and labour)
 - .2 Equipment specific warranty(ies) (extended warranty from manufacturers)
- .5 Testing, Adjusting and Balancing Reports
 - .1 All Testing, Adjusting and Balancing reports
 - .2 Consultant's final field inspection report (confirmation that all deficiencies have been resolved)
- .6 Commissioning Reports
 - .1 Complete Commissioning procedure/Checklist
- .7 Inspection Certificates
 - .1 Certificates of Approval or Acceptance from Authorities Having Jurisdiction
- .8 Operating and Maintenance (O&M) Manual
 - .1 All major equipment
 - .2 Training manuals
- .9 Reviewed Shop Drawings
 - .1 Reviewed shop drawings bearing the Consultant's stamp,
 - .2 Complete As-Built drawings (.pdf and .dwg electronic files) and other reference completion records as specified,
- .10 Construction Site Photo Library
- .11 Additionally, adhere to all requirements for close-out documents as indicated within any other Sections within these Specifications.
- .12 Other required Project Close-Out documents include (as applicable):
 - .1 documentation in respect to requirements of the Construction Lien Act;
 - .2 Indemnification Forms;
 - .3 certificate of good standing from Workplace Safety and Insurance Board/Workers' Compensation Board for Prime Contractor and Subcontractors;
 - .4 certification that systems have been tested and commissioned, are ready for operation;
 - .5 certification that testing, adjusting and balancing of systems is completed;
 - .6 certification that Owner's operating personnel have been instructed in proper operation of systems and equipment and have received operating and maintenance manuals and other pertinent records and schedules;
 - .7 other documents specified in Technical Specifications for each Trade.
- .13 Submit material prior to final application for payment. For items of Work delayed materially beyond date of Substantial Completion, provide updated Submittal within ten (10) working days after acceptance, listing date of acceptance as start of warranty period.
- .14 Review Operating and Maintenance (O&M) Manual contents (operating, maintenance instructions, record "as-built" drawings, spare parts, materials) for completeness.
- .15 Review cash allowances in relation to Contract Price, change orders, holdbacks and other Contract Price of Adjustments. Submit a final statement of accounting giving total adjusted Contract Sum, previous payments and monies remaining due.

- .16 Consultant will issue a final change order reflecting approved adjustments to Contract Sum not previously made.
- .17 Review inspection and testing reports to verify conformance to intent of documents and that changes, repairs or replacements have been completed.
- .18 Review condition of equipment which have been used in course of the work to ensure that, prior to turning over at Substantial Performance, equipment is in "as new condition" with warranties, dated, and certified from time of Substantial Performance of the Work.
- .19 Coordinate building accessibility, traffic, and Contractor's and Subcontractor's cleaning-up and completion activities with the Owner's moving-in of staff, furnishings, and equipment, all to suit Owner's work schedule and not disrupt Owner's productivity.
- .20 Provide on-going review, inspection and attendance to building call-back, maintenance and repair problems during the warranty period.

1.19 INSTRUCTIONS TO OWNER

- .1 Instruct Owner's designated representatives in aspects of operation and maintenance of systems and equipment listed in trade Sections governed by this Section. Obtain in writing from Consultant a list of Owner's representatives to receive instructions.
- .2 Include services of qualified service technicians and other manufacturer's representatives required for instruction of specialized portions of installation.
- .3 For each item of equipment and for each system for which training is specified, prepare training modules as specified below. Operating and Maintenance Manuals are to be used during training sessions, and training modules to include:
 - .1 Operational Requirements and Criteria: to include but not be limited to equipment function, stopping and starting, safeties, operating standards, operating characteristics, performance curves, and limitations.
 - .2 Troubleshooting: to include but not be limited to diagnostic instructions, test and inspection procedures.
 - .3 Documentation: to include but not be limited to equipment/system warranties, and manufacturer's/supplier's parts and service facilities, telephone numbers, email addresses, and like.
 - .4 Maintenance requirements: to include but not be limited to inspection instructions, types of cleaning agents to be used as well as cleaning methods, preventive maintenance procedures, and use of any special tools.
 - .5 Repair requirements: to include but not be limited to diagnostic instructions, disassembly, component removal and repair instructions, instructions for identifying parts and components, and review of any spare parts inventory.
- .4 Assemble training modules into a training manual and submit a copy to Consultant for review prior to scheduling training. Ensure that each participant in each training session has required training material.
- .5 Schedule demonstrations and training at mutually agreed to times with minimum of 10 working days' notice given to Owner and Consultant.
- .6 Training Session Recording: For equipment/system demonstration and training sessions as specified in work Sections, submit identified recording of session prepared by professional photographer with construction project technical training session experience.
- .7 Demonstration and Training Confirmation: Obtain a list of personnel to receive demonstration and training from Consultant, and after training session is completed, have each participant sign list to confirm their attendance and that person understood demonstration and training session.
- .8 Obtain signatures of Owner's representative to verify that they have received operating and maintenance instruction manuals and "As-built" record drawings.

- .9 Make requested submissions and additionally submit to Consultant prior to application for a Certificate of Substantial Performance of the Work, a complete list of systems for which instructions were given, stating for each system:
 - .1 date instructions were given to Owner's staff;
 - .2 duration of instruction;
 - .3 names of persons instructed;
 - .4 other parties present (manufacturer's representative, consultants, etc.).

1.20 ELECTRONIC DATA TRANSFER AGREEMENT

- .1 A copy of Electronic Data Transfer Agreement appended to end of this Section.
- .2 It is understood that the terms and conditions of the Electronic Data Transfer Agreement form part of the Contractor's contractual obligations, whether completed in writing or not.

PART 2 - PRODUCTS

2.01 NIL

PART 3 - EXECUTION

3.01 NIL

END OF SECTION 01 10 10