PROJECT MANUAL for:

HWDSB Gordon Price Elementary School – Chiller & Cooling Tower Replacement

SITE:
11 Guildwood Dr.
Hamilton – Ontario

OWNER:
Hamilton Wentworth District School Board
20 Education Court
Hamilton, ON L8N 3L1

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LIST OF CONSULTANTS

1.1 THE CONSULTANT – MECHANICAL (M)
McCallum Sather Architects Inc.
Westinghouse HQ, 2nd Floor
286 Sanford Ave. N.
Hamilton, Ontario L8L 6A1

1.2 STRUCTURAL: (S)
Quinn Dressel Associates
498 Eagle Street North, Suite 207
Cambridge, Ontario N3H 1C2

1.3 ELECTRICAL: (E)
Seguin Engineering Inc.
12 Argyle St. N.
Caledonia, ON N3W 1B6

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DR- indicates discipline responsible for preparation of listed documents:

S Structural Consultant M Mechanical Consultant
E Electrical Consultant

The specification documents listed by the Architect are governed under the seal of the Architect. All other specification sections listed below are not included under, nor governed by, McCallum Sather Architects Inc's seal.

Division 03 & 05
Refer to Structural Drawing S01 for specifications.

Division 20, 21, 22, 23 and 25
Refer to Mechanical Drawing M5.01 for specifications.

Division 26, 27 and 28
Refer to Electrical Drawing E050 for specifications.

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SPECIFICATIONS AND DOCUMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Words and terms.
.2 Complementary documents.
.3 Precedence of Documents.
.4 Specification grammar.

1.2 RELATED DOCUMENTS

.1 Document 00 in its entirety.
.2 Document 00 72 01 – Form of Contract.
.3 Document 00 08 00 – Supplementary General Conditions.
.4 Section 01 10 00 – Summary of Work.
.5 This section describes requirements applicable to all sections within Divisions 02 to 49.

1.3 WORDS AND TERMS

.1 The following words and terms are applicable to the Contract Documents for this project:
  .1 **Addendum**: A document that amends the Bid Documents during the Bidding Period and becomes part of the Contract Documents when a Contract is executed. (Plural: Addenda)
  .2 **Agreement**: The signed and sealed legal instrument binding parties in a Contract, describing in strict terms their mutual arrangement, roles and responsibilities, commencement, and completion responsibilities.
  .3 **Alternative Price**: The amount stipulated by a Bidder for an Alternative and stated as an addition, a deduction, or no change to the Bid Price.
  .4 **Bid**: To offer as a Bid stating for what price a Contractor will assume a Contract.
  .5 **Bid Documents**: A set of documents consisting of the Instructions to Bidders, Bid Form, Contract Documents, and other information issued for the benefit of Bidders to prepare and submit a Bid.
  .6 **Bid Form**: The specific and detailed form used to collect information about a Bid.
  .7 **Bidding**: The process of preparing and submitting a Bid.
  .8 **Construction Documents**: The Drawings and Project Manual. When combined with a Contract and Contract conditions, these documents form the Contract Documents.
  .9 **Contingency Allowance**: An additional monetary amount added to a Project cost estimate and designated to cover unpredictable or unforeseen items of Work. The amount is usually based on some percentage of the estimated cost and expended and adjusted by Change Order. It is not intended to cover additions to the scope of Work.
  .10 **Cost Plus Contract**: A Contract under which a Contractor is reimbursed for the direct and indirect costs for the performance of a Contract and, in addition, is paid a Fee for services. The Fee is usually stated as a stipulated price or as a percentage of cost.
  .11 **General Conditions**: That part of the Contract Documents which sets forth many of the rights, responsibilities and relationships of the parties involved in a Contract.
  .12 **Instructions to Bidders**: Instructions contained in the Bid Documents to convey an Owner's expectations and criteria associated with submitting a Bid.

.13 **Itemized Price:** The amount stipulated by a Bidder for a portion of work that forms part of the base bid price.
.14 **Provide**: Supply and Install.
.15 **Section**: A portion of a Project Specification covering one or more segments of the total Work or requirements. Sections are included in a Project manual as required to meet Project requirements.
.16 **Separate Price**: A separate price for work to be added to the base price if selected by the Owner. This price type is not a part of the base bid price.
.17 **Standard**: A document describing a grade or a level of quality, which has been established by a recognized agency or organization, utilizing an internal voting process.
.18 **Stipulated Price**: An amount set forth in a Stipulated Price Contract as the total payment for the performance of the Work. Sometimes referred to as a stipulated sum or a lump sum stipulated price.
.19 **Tender**: A term that was formally abandoned by CCDC and the Canadian Construction industry in the early 1980's in favour of the preferred term Bid.
.20 **Unit Price**: The amount payable for a single unit of Work as stated in a Schedule of Prices.
.21 **Install**: To remove from site storage, move or transport to intended location, install in position, connect to utilities, repair site caused damage, and make ready for use.
.22 **Supply**: To acquire or purchase, ship or transport to the site, unload, remove packaging to permit inspection for damage, re-package, replace damaged items, and safely store on-site.

1.4 COMPLEMENTARY DOCUMENTS

.1 Generally, drawings indicate graphically, the dimensions and location of components and equipment. Specifications indicate specific components, assemblies, and identify quality.
.2 Drawings, specifications, diagrams and schedules are complementary, each to the other, and what is required by one, to be binding as if required by all.
.3 Should any conflict or discrepancy appear between documents, which leaves doubt as to the intent or meaning, obtain guidance or direction from Architect.
.1 Trades are advised that all items, systems and information described in the Specifications, and all lines, surfaces, items and information noted on the Drawings (referred to as items) have a value associated with them. The Trades price must include a price for all items noted.
.2 If a discrepancy within the Contract Documents is discovered, a Site Instruction will be issued by the Architect clarifying the discrepancy and, if in the opinion of the Architect, the clarification involves the deletion of an item from the Contract, a Contemplated Change Notice will be issued and a credit to the Contract will be determined.
.4 Examine all discipline drawings, specifications, schedules, diagrams and related Work to ensure that Work can be satisfactorily executed.
.5 All specification sections of the Project Manual and Drawings are affected by requirements of Division 01 sections.

1.5 PRECEDENCE OF DOCUMENTS

.1 In the event of conflict within and between the Contract Documents, the order of priority within specifications and drawings for this project are - from highest to lowest:
.1 the Agreement and Definitions between the Owner and the Contractor,
.2 the Definitions,
.3 Supplementary Conditions,

.4 the General Conditions,
.5 Sections of Division 01 of the specifications,
.6 Sections of Divisions 02 through 49 of the specifications,
.7 Schedules and Keynotes:
  .1 Material and finishing schedules within the specifications, then
  .2 Material and finishing schedules on drawings, then
  .3 Keynotes [and definitions thereto], then
.8 Diagrams,
.9 Drawings:
  .1 Drawings of larger scale shall govern over those of smaller scale of the same date, then
  .2 Dimensions shown on drawings shall govern over dimensions scaled from drawings, then
  .3 Location of utility outlets indicated on architectural detail drawings takes precedence over positions or mounting heights located on mechanical or electrical drawings.
.10 Later dated documents shall govern over earlier documents of the same type.

.2 In the event of conflict between documents, the decision of the Architect shall be final.

1.6 SPECIFICATION GRAMMAR

.1 Specifications are written in the imperative (command) mode, in an abbreviated form.
.2 Imperative language of the technical sections is always directed to the Contractor identified as a primary constructor, as sole executor of the Contract, unless specifically noted otherwise.
  .1 This form of imperative (command) mode statement requires the primary constructor to perform such action or Work.
  .2 Perform all requirements of the Contract Documents whether stated imperatively or otherwise.
.3 Division of the Work among subcontractors, suppliers, or others is solely the prime constructor's responsibility. The Consultant(s) and specification authors assume no responsibility to function or act as an arbiter to establish subcontract scope or limits between sections or divisions of Work.

END OF SECTION

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ALLOWANCES

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Cash allowances include:
- .1 Roofing work
- .2 Data/Communications
- .3 Third Party Testing and Inspection
- .4 Other allowances as requested by the Owner or Consultant.

1.2 RELATED SECTIONS

.1 Section 01 29 00 - Payment Procedures.

.2 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.3 CASH ALLOWANCES

.1 Costs Included in Cash Allowances: Cost of Product to Contractor, less applicable trade discounts; delivery to site, and applicable taxes.

.2 If a Cash Allowance item described in the Allowances Schedule below indicates the inclusion of installation, include in the Cash Allowance amount, provision for Product handling at the site, including unloading, un-crating, storage, protection of Products from elements and from damage, labour for installation and finishing, insurance, labour costs, taxes, bonding if applicable, equipment rental, overhead and profit.

.3 If a Cash Allowance item described in the Allowances Schedule below indicates supply only, include in the Contract Price costs not included in Cash Allowances but included in the Contract Price: Product handling at the site including unloading, un-crating, storage, protection of Products from elements and from damage, labour for installation and finishing, insurance, labour costs, taxes, bonding if applicable, equipment rental, overhead and profit.

.4 Contractor Responsibilities:
- .1 Assist Consultant in selection of Products, suppliers and installers.
- .2 Obtain proposals from suppliers and installers and offer recommendations.
- .3 On notification of selection by Consultant or Owner, execute purchase agreement with designated supplier and installer.
- .4 Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
- .5 Promptly inspect Products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.

Section/Division:	Work:	Amount:
N/A	Roofing, Data/Communications, Testing & Inspections	$ 20,000.00

END OF SECTION

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PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Schedule of values.
.2 Applications for progress payments.
.3 Release of hold-back procedures.
.4 Substantial performance procedures.
.5 Payment of hold-back upon substantial performance of the Work.
.6 Final payment.

1.2 SCHEDULE OF VALUES

.1 Submit a printed schedule of values on CCDC paper forms to permit an authorized signature.
.2 Submit Schedule of Values within fifteen (15) days after date of Owner-Contractor Agreement.
.3 Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the primary associated specification section. Also identify site mobilization, bonds and insurance, hoarding, supervision, etc.
.4 Include in each line item, the amount of Allowances specified in this section.
.5 Include within each line item, the Contractor's overhead and profit.
.6 Revise schedule to list approved Change Orders, with each Application For Payment.

1.3 APPLICATIONS FOR PROGRESS PAYMENT

.1 Submit a CCDC 24 electronic form using an authorized electronic signature.
.2 Make applications for payment on account as provided in Agreement monthly as Work progresses.
.3 Accompany applications with a CCDC 9A-2001 Statutory Declaration form.
.4 Date applications for payment last day of agreed payment period and ensure amount claimed is for value, proportionate to amount of Contract, of Work performed and Products delivered to Place of Work as of that date.
.5 Submit to Architect for review, minimum fifteen (15) calendar days before first application for payment, schedule of values for parts of Work, Cash-flow projections, aggregating total amount of Contract Price, so as to facilitate evaluation of applications for payment.
.6 Submit required support documentation with applications for payment, including statutory declarations, workers' compensation clearance certificates, updated construction schedule and cash-flow projections and summary of change orders and change directives.
.7 Architect will issue to Owner, no later than ten (10) working days after receipt of an application for payment, certificate for payment in amount applied for or in such other amount as Architect determines to be properly due.
.8 If Architect amends application, Architect will give notification in writing giving reasons for amendment.

1.4 PROGRESSIVE RELEASE OF HOLD-BACK

.1 Where legislation permits, if Architect has certified that Work has been performed prior to Substantial Performance of the Work, Owner will pay hold-back amount retained for such Work, or products supplied, on day following expiration of hold-back period for such Work stipulated in lien legislation applicable to Place of the Work.
.2 Notwithstanding provisions of preceding paragraph, and notwithstanding wording of such certificates, ensure that Subcontract Work or Products is protected pending issuance of final certificate for payment and be responsible for correction of defects

or Work not performed regardless of whether or not such was apparent when such certificates were issued.

1.5 SUBSTANTIAL PERFORMANCE OF THE WORK

.1 Submit a schedule of payments on CCDC 24 printed copy with an authorized signature.
.2 Accompany applications with a CCDC 9A-2001 Statutory Declaration form.
.3 Prepare and submit to Architect a comprehensive list of items to be completed or corrected. Failure to include an item on the list does not alter responsibility to complete the Contract.
.4 Request Architect review to establish Substantial Performance of the Work.
.5 Where permitted by local lien legislation, Contractor may apply for substantial performance of a designated portion of the Work, subject to Owner acceptance of that portion of the Work being substantially performed.
.6 No later than twenty (20) calendar days after receipt of list and application, Architect will review Work to verify validity of application, and will notify Contractor if the Work, or the designated portion of the Work, is substantially performed in writing, or will issue a certificate of substantial performance.
.7 Architect will state in their certificate the date of Substantial Performance of the Work, or the date of the designated portion of the Work, as applicable.
.8 Immediately following issuance of certificate of Substantial Performance of the Work, in consultation with Architect, establish reasonable date for finishing Work.

1.6 PAYMENT OF HOLD-BACK UPON SUBSTANTIAL PERFORMANCE OF THE WORK

.1 After issuance of certificate of Substantial Performance of the Work:
  .1 Submit an application for payment of hold-back amount.
  .2 Submit sworn statement that all accounts for labour, subcontracts, products, construction machinery and equipment, and other indebtedness which may have been incurred in Substantial Performance of the Work and for which Owner might in any way be held responsible have been paid in full, except for amounts properly retained as hold-back or as identified amount in dispute.
.2 After receipt of application for payment and sworn statement, Consultant will issue certificate for payment of hold-back amount.
.3 Where hold-back amount has not been placed in a separate hold-back account, Owner will, ten (10) calendar days prior to expiry of hold-back period stipulated in lien legislation applicable to Place of the Work, place hold-back amount in bank account in joint names of Owner and Contractor.
.4 Amount authorized by certificate for payment of hold-back amount is due and payable on day following expiration of hold-back period stipulated in lien legislation applicable to Place of the Work.
  .1 Where lien legislation does not exist or apply, hold-back amount is due and payable in accordance with other legislation, industry practice, or provisions which may be agreed to between parties.
  .2 Owner may retain out of hold-back amount any sums required by law to satisfy any liens against Work or, if permitted by lien legislation applicable to Place of the Work, other third party monetary claims against Contractor which are enforceable against Owner.

1.7 FINAL PAYMENT

.1 Submit an application for final payment on a CCDC 24 electronic form using an authorized electronic signature. Printed form copy with an authorized signature.]
.2 Architect will, no later than ten (10) calendar days after receipt of an application for final payment, review Work to verify validity of application. Consultant will give

notification that application is valid or give reasons why it is not valid, no later than seven (7) days after reviewing Work.

.3 Architect will issue final certificate for payment when application for final payment is found valid.

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CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Schedules, form, content, submission.
.2 Construction progress scheduling.
.3 Critical path scheduling.
.4 Progress photographs.
.5 Submittals schedule.

1.2 SCHEDULES

.1 Submit schedules as follows:
  .1 Submittal Schedule for Shop Drawings and Product Data.
  .2 Submittal Schedule for Samples.
  .3 Submittal Schedule for timeliness of Owner-furnished Products.
  .4 Product Delivery Schedule.
  .5 Cash Allowance Schedule for acquiring Products only or Products and Installation, or Installation only.
  .6 Shutdown or closure activity.
  .7 Inspection and Testing Schedule
.2 Schedule Format
  .1 Prepare schedule in form of a horizontal Gantt bar chart.
  .2 Provide a separate bar for each item of work.
  .3 Split horizontally for projected and actual performance.
  .4 Provide horizontal time scale identifying first Working Day of each week.
  .5 Format for listings: chronological order of start of each item of work.
  .6 Identification of listings: By systems description.
.3 Schedule Submission
  .1 Submit initial format of schedules within 15 days after award of Contract.
  .2 Submit schedules in electronic format, through e-mail as *.pdf files.
  .3 Submit one (1) hard copy to be retained by Consultant.
  .4 Consultant will review schedule and return review copy within 10 working days after receipt.
  .5 Resubmit finalized schedule within 7 days after return of review copy.
  .6 Submit revised progress schedule with each application for payment.
  .7 Distribute copies of revised schedule to:
    .1 Job site office.
    .2 Subcontractors.
    .3 Other concerned parties.
  .8 Instruct recipients to report to Contractor within 10 days, any problems anticipated by timetable shown in schedule.

1.3 CONSTRUCTION PROGRESS SCHEDULING

.1 Submit initial schedule in duplicate within fifteen (15) days after date of Owner-Contractor Agreement.
.2 Revise and resubmit as required.
.3 Submit revised schedules with each Application for Payment, identifying changes since previous version.

.4 Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.
.5 Indicate estimated percentage of completion for each item of Work at each submission.
.6 Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates, including those furnished by Owner and required by Allowances.
.7 Indicate projected percentage of completion of each item as of first day of month.
.8 Indicate progress of each activity to date of submission schedule.
.9 Indicate changes occurring since previous submission of schedule:
  .1 Major changes in scope.
  .2 Activities modified since previous submission.
  .3 Revised projections of progress and completion.
  .4 Other identifiable changes.
.10 Provide a narrative report to define:
  .1 Problem areas, anticipated delays, and impact on schedule.
  .2 Corrective action recommended and its effect.
  .3 Effect of changes on schedules of other prime contractors.

1.4 CRITICAL PATH SCHEDULING

.1 Include complete sequence of construction activities.
.2 Show projected percentage of completion of each item as of first day of month.
.3 Indicate progress of each activity to date of submission schedule.
.4 Show changes occurring since previous submission of schedule:
  .1 Major changes in scope.
  .2 Activities modified since previous submission.
  .3 Revised projections of progress and completion.
  .4 Other identifiable changes.
.5 Provide a narrative report to define:
  .1 Problem areas, anticipated delays, and impact on schedule.
  .2 Corrective action recommended and its effect.
  .3 Effect of changes on schedules of other prime contractors.

1.5 PROGRESS PHOTOGRAPHS

.1 Digital Photography
  .1 Submit electronic copy of colour digital photography in *.jpg format, minimum 10 megapixel resolution.
  .2 Identification: name and number of project and date of exposure indicated.
.2 Frequency: minimum monthly with progress statement.

1.6 SUBMITTALS SCHEDULE

.1 Include schedule for submitting shop drawings, product data, samples,
.2 Indicate dates for submitting, review time, resubmission time, and last date for meeting fabrication schedule.
.3 Include dates when delivery will be required for Owner furnished products.
.4 Include dates when reviewed submittals will be required from Architect.

END OF SECTION

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SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Shop drawings and product data.
.2 Samples.
.3 Certificates and transcripts.

1.2 RELATED SECTIONS

.1 Document 00 in its entirety.
.2 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.3 ADMINISTRATIVE

.1 Submit to Architect submittals listed for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
.2 Work affected by submittal shall not proceed 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 manufactured or produced in SI Metric units, converted values within the metric measurement tolerances are acceptable.
.5 Review submittals prior to submission to Architect. 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.
.6 Submittals not stamped, signed, dated, identified as to specific project, and attesting to their being reviewed will be returned without being examined and shall be considered rejected.
.7 Notify Architect, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
.8 Verify that field measurements and affected adjacent Work are coordinated.
.9 Contractor's responsibility for errors and omissions in submission is not relieved by Architect's review of submittals.
.10 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Architect review.
.11 Keep one reviewed copy of each submission on site.

1.4 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 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 coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
.3 Allow ten (10) working days for Architect's review of each submission.
.4 Adjustments made on shop drawings by Architect are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.

.5 Make changes in shop drawings as Architect may require, consistent with Contract Documents. When resubmitting, notify Architect in writing of any revisions other than those requested.

.6 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.

.7 Submissions shall 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 other parts of the Work.

.8 After Architect's review, distribute copies.

.9 Submit two (2) paper copies of the shop drawings to the General Contractor. The shop drawings must be named as per the naming standards below AND they must include on the front cover or on large format drawings - in the bottom right hand corner – a space for the General Contractors Stamp, and spaces for EACH of the reviewing consultants stamps.

.10 The two paper copies are submitted to the General Contractor, one is kept by the General Contractor, the other single copy and one digital *.pdf copy is sent to the primary consultant for the trade (i.e. the steel drawings will go first to the Structural Engineers), and the owner. The primary consultant then forwards the marked up drawing and/or *.pdf to the next consultant for review, and so on, until the final review is performed by the Architect. The architect returns the submission to the General Contractor. The General Contractor then scans/digitizes the drawings, names the resultant *.pdf as per the naming standards, and distributes to all parties.

.11 Drawing Names and Numbers MUST follow the following system. *.pdf's must also be named using the same convention to allow for easy electronic filling and retrieval.

Example: 04 20 00 D01-2 Brick Ties .Pdf
- .1 Section Number
  04 20 00 D01-2 Brick Ties.Pdf
- .2 Submission and drawing number for the item in the shop drawing
  04 20 00 **D01**-2 Brick Ties.Pdf
- .3 Submission revision or version number for the item in the shop drawing
  04 20 00 D01**-2** Brick Ties.Pdf
- .4 Title of the item in the shop drawing

04 20 00 D01-2 **Brick Ties**.Pdf

.12 Submit one (1) copy of product data sheets or brochures for requirements requested in specification sections and as requested by Architect where shop drawings will not be prepared due to standardized manufacture of product.
.13 Delete information not applicable to project.
.14 Supplement standard information to provide details applicable to project.
.15 If upon review by Architect, 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 re-submission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

1.5 SAMPLES

.1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.
.2 Deliver samples prepaid to Consultant's business address.
.3 Notify Architect 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 Architect are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.
.6 Change samples as required by Architect, consistent with Contract Documents.
.7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.6 LEED® SUBMITTALS

.1 Not applicable.

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HEALTH AND SAFETY

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Safety requirements and adherence.

1.2 RELATED SECTIONS

.1 Document 00 in its entirety.
.2 Division 01 in its entirety.
.3 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.3 REFERENCES

.1 Province of Ontario: Occupational Health and Safety Act, including requirements for a "Prime Contractor" as defined by the Act.

1.4 SAFETY PLAN

.1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to commencing any site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
.2 Consultant may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.5 RESPONSIBILITY

.1 The "Prime Contractor" according applicable local jurisdiction, is 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.
.3 Should any unforeseen or peculiar safety related factor, hazard, or condition become evident during performance of Work, and follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of the Province having jurisdiction. Advise Consultant verbally and in writing.

1.6 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00.
.2 Submit site specific Health and Safety Plan: Within seven (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.
    .3 Submit one (1) copy of Contractor's authorized representative's work site health and safety inspection reports to Consultant.
    .4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
    .5 Submit copies of incident and accident reports.
    .6 Submit Material Safety Data Sheets (MSDS) to Consultant.
.3 Consultant will review Contractor's site specific Health and Safety Plan and provide comments to Contractor within seven (7) days after receipt of plan. Revise plan as appropriate and resubmit plan to Consultant within three (3) days after receipt of comments from Consultant.

.4 Consultant'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.

.5 Medical Surveillance: Where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Consultant.

1.7 SAFETY ACTIVITIES

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

.2 Schedule and administer Health and Safety meeting with Consultant prior to commencement of Work.

.3 Perform Work in accordance with Section 01 41 00 - Regulatory Requirements and this section.

1.8 HEALTH AND SAFETY COORDINATOR

.1 Employ and assign to Work, competent and authorized representative as Health and Safety Coordinator. Health and Safety Coordinator must:

.1 Have minimum two (2) years' site related working experience specific to activities associated with construction in a hospital setting.

.2 Have working knowledge of occupational safety and health regulations.

.3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.

.4 Be responsible for implementing, enforcing daily and monitoring site specific Contractor's Health and Safety Plan.

.5 Be on site during execution of Work.

1.9 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.

1.10 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction, Owner or by Consultant.

.2 Provide Owner and Consultant with written report of action taken to correct non-compliance of health and safety issues identified.

.3 Consultant may stop Work if non-compliance of health and safety regulations is not corrected.

1.11 WORK STOPPAGE

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

1.12 FIRE PROTECTION

.1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction and governing codes, regulations and bylaws.

.2 Burning rubbish and construction waste materials is not permitted on site.

END OF SECTION

REGULATORY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Laws, notices, permits and fees.
.2 Discovery of hazardous materials.

1.2 RELATED SECTIONS

.1 Document 00 in its entirety.
.2 Division 01 in its entirety.
.3 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.3 LAWS, NOTICES, PERMITS AND FEES

.1 The laws of the Place of the Work shall govern the Work.
.2 The Owner shall obtain and pay for the building permit, permanent easements and rights of servitude. The Contractor shall be responsible for permits, licenses or certificates necessary for the performance of the Work which were in force at the date of executing the Agreement.
.3 Give the required notices and comply with the laws, ordinances, rules, regulations or codes which are or become in force during the performance of the Work and which relate to the Work, to the preservation of the public health and to construction safety.
.4 If the Contractor knowingly performs or allows work to be performed that is contrary to any laws, ordinances, rules, regulations or codes, the Contractor shall be responsible for and shall correct the violations thereof; and shall bear the costs, expenses and damages attributable to the failure to comply with the provisions of such laws, ordinances, rules, regulations or codes.
.5 Determine detailed requirements of authorities having jurisdiction.
.6 Pay construction damage deposits levied by municipality in connection with the issuance of a building permit.

1.4 HAZARDOUS MATERIAL DISCOVERY

.1 Should any subsurface construction or objects containing Hazardous Materials or any Hazardous Materials be encountered during the Work of this contract, notify the Architect and Owner and do not proceed with removal or cutting until directed.

1.5 PERSONNEL SMOKING

.1 Comply with regulatory and Owner imposed smoking restrictions during execution of the Work within or outside the premises.

END OF SECTION

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TEMPORARY UTILITIES

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Temporary utilities.
.2 Salvaging products for reuse.

1.2 RELATED SECTIONS

.1 Document 00 in its entirety.
.2 Section 01 52 00 - Construction Facilities.
.3 Section 01 53 00 - Temporary Construction.
.4 Division 01 in its entirety.
.5 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.3 INSTALLATION AND REMOVAL

.1 Provide temporary utilities controls in order to execute work expeditiously.
.2 Salvage and assist in recycling products for potential reuse.
.3 Remove from site all such work after use.

1.4 DEWATERING

.1 General Contractor is ultimately responsible for providing temporary drainage and pumping facilities to keep excavations and site free from standing water.

1.5 WATER SUPPLY

.1 Provide continuous supply of potable water for construction use.
.2 Make arrangements with the Owner for connection of existing water service for a continuous supply of potable water for construction use, separate from water required for fire protection.

1.6 TEMPORARY HEATING AND VENTILATION

.1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.
.2 Construction heaters used inside building must be vented to outside or be non-flameless type. Solid fuel salamanders are not permitted.
.3 Provide temporary heat and ventilation in enclosed areas as required to:
  .1 Facilitate progress of Work.
  .2 Protect Work and products against dampness and cold.
  .3 Prevent moisture condensation on surfaces.
  .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
  .5 Provide adequate ventilation to meet health regulations for safe working environment.
.4 Maintain temperatures of minimum 10 degrees C in areas where construction is in progress.
.5 Ventilating:
  .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
  .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
  .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
  .4 Ventilate storage spaces containing hazardous or volatile materials.

.5 Ventilate temporary sanitary facilities.
.6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.

.6 On completion of Work for which permanent heating system is used, replace filters.
.7 Ensure date of Substantial Performance of the Work and Warranties for heating system do not commence until entire system is in as near original condition as possible and is certified by Consultant.
.8 Pay costs for maintaining temporary heat, when using permanent heating system.
.9 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
.1 Conform to applicable codes and standards.
.2 Enforce safe practices.
.3 Prevent abuse of services.
.4 Prevent damage to finishes.
.5 Vent direct – fired combustion units to outside.
.10 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.7 TEMPORARY POWER AND LIGHT

.1 Provide a source for and pay the costs of temporary power during construction for temporary lighting and operating of power tools, as required.
.2 Arrange for connection with appropriate utility company. Pay all costs for installation, maintenance and removal.
.3 If required, relocation of temporary power source during construction is the responsibility of the Electrical Contractor.
.4 Provide and pay for temporary power for electric cranes and other equipment requiring temporary power in excess of above noted requirements.
.5 Provide and maintain temporary lighting throughout project. Ensure level of illumination is not less than 162 lx.
.6 Electrical power and lighting systems installed under this Contract may be used for construction requirements only with prior approval of Architect provided that guarantees are not affected. Make good damage to electrical system caused by use under this Contract. Replace lamps which have been used for more than three (3) months.

1.8 TEMPORARY COMMUNICATION FACILITIES

.1 Provide and pay for temporary communications as required for own use.

END OF SECTION

CONSTRUCTION FACILITIES

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Construction aids.
.2 Office and sheds.
.3 Parking.
.4 Project identification.

1.2 RELATED SECTIONS

.1 Document 00 in its entirety.
.2 Section 01 51 00 - Temporary Utilities.
.3 Section 01 in its entirety.
.4 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.3 REFERENCES

.1 CAN/CSA-Z321- 96: Signs and Symbols for the Occupational Environment.

1.4 INSTALLATION AND REMOVAL

.1 Provide construction facilities in order to execute work expeditiously.
.2 Remove from site all such work after use.

1.5 SCAFFOLDING

.1 Provide and maintain scaffolding, ramps, ladders, platforms, temporary stairs and access as required to perform Work.

1.6 HOISTING

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

1.7 ELEVATORS/LIFTS – NOT REQUIRED THIS PROJECT

1.8 USE OF THE WORK

.1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with Products.
.2 Do not load or permit to load any part of Work with a weight or force that will endanger the Work.

1.9 CONSTRUCTION PARKING

.1 Parking will be permitted on site provided it does not disrupt performance of Work. HWDSB cannot guarantee parking will be available during the school year.
.2 Provide and maintain adequate access to project site.
.3 Build and maintain temporary roads where necessary and provide snow removal during period of Work.

1.10 SECURITY (IF APPLICABLE)

.1 Provide and pay for responsible security personnel to guard site, premises and materials at all times other than when supervised work is in progress.

1.11 EQUIPMENT, TOOL AND MATERIALS STORAGE

.1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
.2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.
.3 Lost, stolen, or damaged equipment, tools, and materials are the responsibility of the contractor.
.4 HWDSB caretaking equipment is not to be used by the contractor or subcontractors.

1.12 SANITARY FACILITIES

.1 School washrooms are not to be used at any time.
.2 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
.3 Post notices and take such precautions as required by local health authorities.
.4 Except where connected to municipal sewer system, periodically remove wastes from Site.
.5 New permanent facilities may not be used.
.6 Keep sanitary facilities clean and fully stocked with the necessary supplies at all times.

END OF SECTION

TEMPORARY CONSTRUCTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Site enclosure.
.2 Guardrails and barriers.
.3 Weather enclosures.
.4 Protection for off-site and public property.
.5 Protection of applied finishes and surrounding Work.

1.2 RELATED SECTIONS

.1 Document 00 in its entirety.
.2 Section 01 51 00 - Temporary Utilities.
.3 Section 01 in its entirety.
.4 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.3 INSTALLATION AND REMOVAL

.1 Provide temporary controls in order to execute Work expeditiously.
.2 Remove from site all such work after use.

1.4 SITE ENCLOSURE

.1 Contractor to secure site.
.2 Provide barriers around trees and plants designated to remain.

1.5 GUARD RAILS AND BARRIERS

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

1.6 WEATHER ENCLOSURES

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

1.7 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

.1 Protect surrounding private and public property from damage during performance of Work.
.2 Be responsible for damage incurred.

1.8 PROTECTION OF APPLIED FINISHES

.1 Provide protection for finished and partially finished surfaces and equipment during performance of Work.
.2 Confirm with Architect locations and installation schedule five days prior to installation.
.3 Be responsible for damage incurred due to lack of or improper protection.

END OF SECTION

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PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Product quality, availability, storage, handling, protection, and transportation.
.2 Product substitution procedures.
.3 Manufacturer's instructions.
.4 Quality of Work, coordination and fastenings.

1.2 RELATED SECTIONS

.1 Document 00 in its entirety.
.2 Section 01 42 00 - References and Definitions: Other terms used in the Project Manual.
.3 Division 01 in its entirety.
.4 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.3 TERMINOLOGY

.1 New: Produced from new materials.
.2 Renewed: Produced or rejuvenated from an existing material to like-new condition to serve a new or existing service.
.3 Defective: A condition determined exclusively by the Architect or Owner.

1.4 PRODUCT QUALITY

.1 Products, materials, equipment, parts or assemblies (referred to as Products) incorporated in Work: New, not damaged or defective, of best quality (compatible with specification requirements) for purpose intended. If requested, provide evidence as to type, source and quality of Products provided.
.2 Defective Products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility but is precaution against oversight or error. Remove and replace defective Products at own expense and be responsible for delays and expenses caused by rejection.
.3 Should any dispute arise as to quality or fitness of Products, decision rests strictly with Architect.
.4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
.5 Permanent labels, trademarks and nameplates on Products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.5 AVAILABILITY

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

1.6 STORAGE AND PROTECTION

.1 Store and protect Products in accordance with manufacturers' written instructions.
.2 Store with seals and labels intact and legible.
.3 Store sensitive Products in weather tight, climate controlled, enclosures in an environment favourable to Product.
.4 For exterior storage of fabricated Products, place on sloped supports above ground.
.5 Cover Products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of Products.
.6 Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
.7 Provide equipment and personnel to store Products by methods to prevent soiling, disfigurement, or damage.
.8 Arrange storage of Products to permit access for inspection. Periodically inspect to verify Products are undamaged and are maintained in acceptable condition.

1.7 TRANSPORTATION AND HANDLING

.1 Transport and handle Products in accordance with manufacturer's written instructions.
.2 Promptly inspect shipments to ensure that Products comply with requirements, quantities are correct, and Products are undamaged.
.3 Provide equipment and personnel to handle Products by methods to prevent soiling, disfigurement, or damage.

1.8 EXISTING UTILITIES

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

1.9 MANUFACTURER'S WRITTEN INSTRUCTIONS

.1 Unless otherwise indicated in specifications, install or erect Products in accordance with manufacturer's written instructions. Do not rely on labels or enclosures provided with Products. Obtain written instructions directly from manufacturers.
.2 Notify Architect in writing, of conflicts between specifications and manufacturer's instructions, so that Architect may establish course of action.
.3 Improper installation or erection of Products, due to failure in complying with these requirements, authorizes Architect to require removal and re-installation at no increase in Contract Price or Contract Time.

1.10 QUALITY OF WORK

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

1.11 COORDINATION

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

1.12 CONCEALMENT

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

1.13 REMEDIAL WORK

.1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.
.2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.14 LOCATION OF FIXTURES

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

1.15 FASTENINGS

.1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
.2 Prevent electrolytic action between dissimilar metals and materials.
.3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.
.4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
.5 Keep exposed fastenings to a minimum, space evenly and install neatly.
.6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.16 FASTENINGS – EQUIPMENT

.1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
.2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use Type 304 or 316 stainless steel for exterior areas.
.3 Bolts may not project more than one diameter beyond nuts.
.4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.17 PROTECTION OF WORK IN PROGRESS

.1 Prevent overloading of any part of the Project.
.2 Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated, without written approval of Architect.

END OF SECTION

CUTTING AND PATCHING

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Requirements and limitations for cutting and patching of Work.

1.2 RELATED SECTIONS

.1 Document 00 in its entirety.
.2 Section 01 61 00 - Product Requirements.
.3 Division 01 in its entirety.
.4 Individual Product Specification Sections:
  .1 Cutting and patching incidental to work of the section.
  .2 Advance notification to other sections of openings required in Work of those sections.
  .3 Limitations on cutting structural members.

1.3 SUBMITTALS

.1 Submit written request in advance of cutting or alteration which affects:
  .1 Structural integrity of any element of Project.
  .2 Integrity of weather exposed or moisture resistant element.
  .3 Efficiency, maintenance, or safety of any operational element.
  .4 Visual qualities of sight exposed elements.
  .5 Work of Owner or separate contractor.
.2 Include in request:
  .1 Identification of Project.
  .2 Location and description of affected Work.
  .3 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.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Primary Products: Those required for original installation.
.2 Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 62 00.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Examine existing conditions prior to commencing Work, including elements subject to damage or movement during cutting and patching.
.2 After uncovering existing Work, assess conditions affecting performance of work.
.3 Beginning of cutting or patching means acceptance of existing conditions.

3.2 PREPARATION

.1 Provide temporary supports to ensure structural integrity of the Work. Provide devices and methods to protect other portions of Project from damage.
.2 Provide protection from elements for areas which may be exposed by uncovering work.
.3 Maintain excavations free of water.

3.3 CUTTING

.1 Execute cutting and fitting including excavation and fill to complete the Work.
.2 Uncover work to install improperly sequenced work.
.3 Remove and replace defective or non-conforming work.
.4 Remove samples of installed work for testing when requested.
.5 Provide openings in the Work for penetration of mechanical and electrical work.
.6 Employ skilled and experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
.7 Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

3.4 PATCHING

.1 Execute patching to complement adjacent Work.
.2 Fit Products together to integrate with other Work.
.3 Execute work by methods to avoid damage to other Work, and which will provide appropriate surfaces to receive patching and finishing.
.4 Employ original installer to perform patching for weather exposed and moisture resistant elements, and sight-exposed surfaces.
.5 Restore work with new Products in accordance with requirements of Contract Documents.
.6 Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
.7 At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated UL/ULC tested assemblies in accordance with Section 07 84 00 to full thickness of the penetrated element.
.8 Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

END OF SECTION

CLEANING

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Progressive cleaning.
.2 Cleaning prior to acceptance.

1.2 RELATED SECTIONS

.1 Document 00 in its entirety.
.2 Division 01 in its entirety.
.3 This section describes requirements applicable to all Sections within Divisions 02 to 49.

PART 2 PRODUCTS

2.1 CLEANING MATERIALS

.1 Cleaning Agents and Materials: Low VOC content.

PART 3 EXECUTION

3.1 PROGRESSIVE CLEANING

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.
.2 Remove waste materials from site at regularly scheduled times or dispose of as directed by Architect. Do not burn waste materials on site, unless approved by Consultant.
.3 Clear snow and ice from area of construction, bank or pile snow in designated areas only.
.4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
.5 Containers:
    .1 Provide on-site steel framed containers for collection of waste materials and debris.
    .2 Provide and use clearly marked, separate bins for recycling.
    .3 Refer to Section 01 35 41.
.6 Remove waste material and debris from site at end of each working day.
.7 Dispose of waste materials and debris off site.
.8 Clean interior areas prior to start of finish work, and maintain areas free of dust and other contaminants during finishing operations.
.9 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
.10 Provide adequate ventilation during use of volatile or noxious substances. Use of enclosure ventilation systems is not permitted for this purpose.
.11 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
.12 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

3.2 CLEANING PRIOR TO ACCEPTANCE

.1 Prior to applying for Substantial Performance of the Work, 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 including that caused by Owner or other Contractors.
.5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Architect. 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, floors and ceilings.
.9 Clean lighting reflectors, lenses, and other lighting surfaces.
.10 Vacuum clean and dust building interiors, behind grilles, louvres and screens.
.11 Clean and polish surface finishes, as recommended by manufacturer.
.12 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
.13 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
.14 Remove dirt and other disfiguration from exterior surfaces.
.15 Clean and sweep roofs, gutters, areaways, and sunken wells.
.16 Sweep and wash clean paved areas.
.17 Clean equipment and fixtures to a sanitary condition; replace filters of mechanical equipment.
.18 Clean roof surfaces, down-spouts, and drainage components.
.19 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.
.20 Remove snow and ice from access to facilities.

3.3 FINAL PRODUCT CLEANING

.1 Execute final cleaning prior to final project assessment. Refer to Section 01 74 00.
.2 Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
.3 Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
.4 Replace filters of operating equipment.
.5 Clean site; sweep paved areas, rake clean landscaped surfaces.
.6 Remove waste and surplus materials, rubbish, and construction facilities from the site.

END OF SECTION

START-UP PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Starting equipment in preparation for adjusting and commissioning.
.2 To bring the facility to a fully operational state, free of deficiencies, in the most efficient and timely manner achievable.
.3 Contractor's and Owner's responsibilities during each of the following successive sub phases of facility start-up:
  .1 Contractor start-up which leads to Interim Acceptance of the Work.
  .2 Performance Testing which leads to Practical Completion of the Work.

1.2 RELATED SECTIONS

.1 Document 0 in its entirety.
.2 Section 01 75 19 - Testing, Adjusting and Balancing.
.3 Section 01 79 00 - Demonstration and Training.
.4 Division 01 in its entirety.
.5 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.3 SUBMISSIONS

.1 Provide a sample of manufacturer's start-up forms for equipment or systems not included.

PART 2 PRODUCTS

2.1 NOT USED.

PART 3 EXECUTION

3.1 STARTING SYSTEMS

.1 Coordinate schedule for start-up of various equipment and systems.
.2 Notify Architect and Owner seven days prior to start-up of each item.
.3 Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.
.4 Verify tests, metre readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
.5 Verify that wiring and support components for equipment are complete and tested.
.6 Execute start-up under supervision of applicable [manufacturer's representative] [Contractors' personnel] in accordance with manufacturers' written instructions.
.7 When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
.8 Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.2 START-UP REPORT

.1 Provide start up report forms (check sheets) with the exception of controls.
.2 Contractor to develop, complete and provide the report forms for all control points, software and hardware

.3 Submit completed report forms to consultant for review within ninety (90) days of award of contract.
.4 Include manufacturer's equipment start-up reports and test certificates.
.5 The report forms are divided into three parts:
  .1 Technical Data
  .2 Static Checks
  .3 Operational Checks
.6 Contractor is to complete each part prior to verification by the consultant.
.7 Contractor is responsible for completing the report forms as follows and as indicated on the attached sample:
  .1 Technical Data
    .1 Specified: Consultant
    .2 Shop Drawing: Contractor
    .3 Installed: Contractor
    .4 Verified: Consultant
    .5 Date/Checked By: Contractor to sign when all shop drawing and installed information is completed.
  .2 Static Checks
    .1 Confirmation of Completion: Contractor to confirm all items listed are completed prior to verification by the consultant.
    .2 Date / Checked By: Contractor to sign when the installation of the equipment and or systems are complete and ready for the consultant to verify.
  .3 Operational Checks
    .1 Operational checks will be performed by the commissioning agent using the balancing report and control's forms.

3.3 CONTRACTOR START UP

.1 Contractor to perform the following during start-up:
  .1 Start equipment and systems.
  .2 Test, adjust and balance equipment and systems as specified in Section 01 75 19.
  .3 Demonstrate equipment and systems as specified in Section 01 79 00.
.2 Complete and submit start-up reports including:
  .1 Contractor's system and equipment start up reports.
  .2 Manufacturers' equipment start up reports.
.3 Review Contract Documents and inspect the Work to ensure completeness of the Work and compliance with requirements of Contract Documents.
.4 Correct Contract deficiencies and defects identified as a result of the foregoing and as may be identified by the Owner.
.5 Execute and complete approved Change Orders.
.6 Perform other work and activities required for fulfillment of prerequisites to Interim Acceptance of the Work.

3.4 PERFORMANCE TESTING

.1 Performance testing will be performed by the consultant and:
  .1 completed prior to Substantial Completion,
  .2 completed when all systems have been balanced and tested and are operating to the satisfactory of the Commissioning Agent, and
.2 Contractor to perform the following during Performance Testing:
  .1 Correct Contract deficiencies and defects previously outstanding and those identified during performance testing.

.2 Execute Change Orders.

.3 The following will be performed to an on-going cycle of:
- .1 Performance testing.
- .2 Documentation of results.
- .3 Diagnosis of problems.
- .4 Correction of Contract deficiencies, defects and execution of Change Orders as required.
- .5 Verification of results.

3.5 SEASONAL CONSTRAINTS

.1 Notwithstanding requirements in this section, additional separate cycles of Contractor start-up, performance testing and fine tuning may be necessitated at a later time on equipment and systems whose full operation is dependent on seasonal conditions.

.2 Contractor's responsibilities with respect to later facility start-up activities are specified in this section.

3.6 PARTIAL UTILIZATION OF WORK

.1 When partial utilization of the Work is required, the applicable requirements specified in this section apply to the part(s) of the Work to be utilized.

END OF SECTION

TESTING, ADJUSTING AND BALANCING

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Adjusting products and equipment required by all specifications sections for this Project.

1.2 RELATED SECTIONS

.1 Document 0 in its entirety.
.2 Section 01 74 00 - Cleaning.
.3 Section 01 75 16 - Start-Up Procedures.
.4 Division 01 in its entirety.
.5 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.3 PURPOSE

.1 Perform testing adjusting and balancing of operating systems in contract by an agency that will be selected by the Owner and consigned to this Contract:
.2 Prior to start of balancing, ensure systems are:
  .1 piped, ducted, wired and wireless services and systems, including components and equipment forming part thereof,
  .2 manually and mechanically operated, including components and equipment forming any part,
  .3 testing, adjusting and balancing will not be started until after all static checks have been completed for the system being balanced and signed off on the commissioning report forms,
  .4 Contractor to ensure systems are operated at designated times, under conditions required for proper testing, adjusting, and balancing,
  .5 report any deficiencies or defects which may affect the balancing or noted during testing, adjusting and balancing, which cannot be promptly corrected.

PART 2 PRODUCTS

2.1 NOT USED.

PART 3 EXECUTION

3.1 PREPARATION

.1 Prepare each system and item of equipment for testing, adjusting and balancing.
.2 Verify that each system and equipment installation is complete and in functional operation.
.3 Verify appropriate ambient conditions.

3.2 TESTING

.1 Tests will be conducted to confirm compliance with requirements of Contract Documents. Take corrective action as necessary

3.3 ADJUSTING

.1 Adjust operating Products and equipment to ensure smooth and unhindered operation.

.2 Provide equipment required to ensure proper, efficient and safe operation of all equipment including belts and sheaves.

3.4 BALANCING

.1 Cooperate with, and assist the balancing agent to ensure that the various parts of system are in a proper state of equilibrium.

END OF SECTION

CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Inspections and declarations.
.2 Closeout submittals
.3 Operation and maintenance manual format.
.4 Contents each volume.
.5 Recording actual site conditions.
.6 Record (as-built) documents and samples.
.7 Record documents.
.8 Final survey.
.9 Warranties and bonds.

1.2 RELATED SECTIONS

.1 Document 00 in its entirety.
.2 Section 01 33 00 - Submittal Procedures.
.3 Section 01 79 00 - Demonstration and Training.
.4 Division 01 in its entirety.
.5 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.3 INSPECTIONS AND DECLARATIONS

.1 Contractor's Inspection: Contractor and all Subcontractors shall conduct an inspection of the Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
  .1 Notify Architect in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
  .2 Request Architect's Inspection.
.2 Architect 's Inspection: Architect and Contractor will perform inspection of Work to identify defects or deficiencies. Correct defective and deficient Work accordingly.
.3 Completion: submit written certificate that following have been performed:
  .1 Work has been completed and inspected for compliance with Contract Documents.
  .2 Defects have been corrected and deficiencies have been completed.
  .3 Equipment and systems have been tested, adjusted and balanced and are fully operational.
  .4 Certificates required by authorities having jurisdiction have been submitted.
  .5 Operation of systems have been demonstrated to Owner's personnel.
  .6 Work is complete and ready for Final Inspection.
.4 Final Inspection: when items noted above are completed, request final inspection of Work by Owner and Architect, and Contractor. If Work is deemed incomplete by Owner and Architect, complete outstanding items and request re-inspection.
.5 Declaration of Substantial Performance: when Owner and Architect consider deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for Substantial Performance of the Work.
.6 Commencement of Warranty Periods: the date of Substantial Performance of the Work shall be the date for commencement of the warranty period.
.7 Commencement of Lien Periods: the date of publication of the certificate of Substantial Performance of the Work shall be the date for commencement of the lien period, unless required otherwise by the lien legislation applicable at the Place of the Work.

.8 Final Payment: When Owner and Architect consider final deficiencies and defects have been corrected and it appears requirements of Contract have been completed, make application for final payment.

.9 Payment of Hold-back: After issuance of certificate of Substantial Performance of the Work, submit an application for payment of hold-back amount.

1.4 CLOSEOUT SUBMITTALS

.1 Prepare instructions and data using personnel experienced in maintenance and operation of described products.

.2 Copy will be returned after final inspection, with Architect's comments.

.3 Revise content of documents as required prior to final submittal.

.4 Two weeks prior to Substantial Performance of the Work, submit to the Architect, four final copies of operating and maintenance manuals in Canadian English.

.5 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.

.6 If requested, furnish evidence as to type, source and quality of products provided.

.7 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

.8 Pay costs of transportation.

1.5 OPERATION AND MAINTENANCE MANUAL FORMAT

.1 Organize data in the form of an instructional manual.

.2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf letter size (8.5"x11") with spine and face pockets.

.3 When multiple binders are used, correlate data into related consistent groupings. 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. Bind in with text; fold larger drawings to size of text pages.

.9 Provide red-line as-builts reflecting installed condition for consultant to generate record drawings.

1.6 CONTENTS - EACH VOLUME

.1 Table of Contents: provide title of project;

- .1 date of submission;
- .2 names, addresses, and telephone numbers of Architect and Contractor with name of responsible parties; and
- .3 schedule of products and systems, indexed to content of volume.

.2 For each product or system, 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 clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00.

.4 Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

.5 Certificate of Acceptance: Relevant certificates issued by authorities having jurisdiction, including code compliance certificate, life safety systems performance certificate, pressure vessel acceptance.

.6 Training: Refer to Section 01 79 00.

1.7 RECORDING ACTUAL SITE CONDITIONS

.1 Record information on set of black line opaque drawings, and within the Project Manual, provided by Owner.

.2 Annotate with coloured felt tip marking pens, maintaining separate colours for each major system, for recording changed information.

.3 Record information concurrently with construction progress. Do not conceal Work of the Project until required information is accurately recorded.

.4 Contract drawings and shop drawings: legibly 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: legibly 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, and field test records, required by individual specifications sections.

1.8 AS-BUILT DOCUMENTS AND SAMPLES

.1 In addition to requirements in General Conditions, maintain at the site for Architect and Owner one record copy each of:

.1 Contract Drawings.

.2 Specifications.

.3 Addenda.

.4 Change Orders and other modifications to the Contract.

.5 Reviewed shop drawings, product data, and samples.

.6 Field test records.

.7 Inspection certificates.

.8 Manufacturer's certificates.

.2 Store as-built documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.

.3 Label as-built documents and file in accordance with section number listings in List of Contents of the Project Manual. Label each document "AS-BUILT DOCUMENTS" in neat, large, printed letters.

.4 Maintain as-built documents in clean, dry and legible condition. Do not use as-built documents for construction purposes.

.5 Keep as-built documents and samples available for inspection by Architect.

1.9 RECORD DOCUMENTS

.1 Prior to Substantial Performance of the Work, provide on USB Flash drive the marked up information from the as-built documents to a master set of drawing and specification files provided by the Architect, as follows:
- .1 Drawings: Red-line as-builts.
- .2 Specifications: Red-line as-builts.

.2 Consultant will produce record drawings/specifications.

1.10 WARRANTIES AND BONDS

.1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.

.2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principals.

.3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten (10) days after completion of the applicable item of work.

.4 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial Performance is determined.

.5 Verify that documents are in proper form, contain full information, and are notarized.

.6 Co-execute submittals when required.

.7 Retain warranties and bonds until time specified for submittals.

END OF SECTION

MAINTENANCE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Equipment and systems.
.2 Materials and finishes.
.3 Spare parts.
.4 Maintenance manuals.
.5 Special tools.
.6 Storage, handling and protection.

1.2 RELATED SECTIONS

.1 Document 0 in its entirety.
.2 Division 01 in its entirety.
.3 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.3 EQUIPMENT AND SYSTEMS

.1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
.2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
.3 Include installed colour coded wiring diagrams.
.4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
.5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
.6 Provide servicing and lubrication schedule, and list of lubricants required.
.7 Include manufacturer's printed operation and maintenance instructions.
.8 Include sequence of operation by controls manufacturer.
.9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
.10 Provide installed control diagrams by controls manufacturer.
.11 Provide Contractor's coordination drawings, with installed colour coded piping diagrams.
.12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
.13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
.14 Include test and balancing reports as specified in Section 01 90 10.
.15 Additional requirements: As specified in individual specification sections.

PART 2 PRODUCTS

2.1 MATERIALS AND FINISHES

.1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.
.2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
.3 Moisture-protection and Weather-exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
.4 Building Envelope: include copies of drawings of building envelope components, illustrating the interface with similar or dissimilar items to provide an effective air, vapour and thermal barrier between indoor and outdoor environments. Include an outline of requirements for regular inspections and for regular maintenance to ensure that on-going performance of the building envelope will meet the initial building envelope criteria.
.5 Additional Requirements: as specified in individual specifications sections.

2.2 SPARE PARTS

.1 Provide spare parts, in quantities specified in individual specification sections.
.2 Provide items of same manufacture and quality as items in Work.
.3 Receive and catalogue all items. Submit inventory listing to Architect. Include approved listings in Maintenance Manual.
.4 Obtain receipt for delivered products and submit prior to final payment.

2.3 MAINTENANCE MATERIALS

.1 Provide maintenance and extra materials, in quantities specified in individual specification sections.
.2 Provide items of same manufacture and quality as items in Work.
.3 Receive and catalogue all items. Submit inventory listing to Architect. Include approved listings in Maintenance Manual.
.4 Obtain receipt for delivered products and submit prior to final payment.

2.4 SPECIAL TOOLS

.1 Provide special tools, in quantities specified in individual specification section.
.2 Provide items with tags identifying their associated function and equipment.
.3 Receive and catalogue all items. Submit inventory listing to Architect. Include approved listings in Maintenance Manual.

PART 3 EXECUTION

3.1 DELIVER TO SITE

.1 Deliver to site; place and store.

3.2 STORAGE, HANDLING AND PROTECTION

.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 to satisfaction of Consultant.

END OF SECTION

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DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Procedures for demonstration and instruction of Products, equipment and systems to Owner's personnel.
.2 Seminars and demonstrations.

1.2 RELATED SECTIONS

.1 Document 00 in its entirety.
.2 Division 01 in its entirety.
.3 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.3 DESCRIPTION

.1 Demonstrate operation and maintenance of equipment and systems to Owner's personnel two weeks prior to date of final inspection.
.2 Owner will provide list of personnel to receive instructions, and will coordinate their attendance at agreed-upon times.

1.4 COMPONENT DEMONSTRATION

.1 Manufacturer to provide authorized representative to demonstrate operation of equipment and systems.
.2 Instruct Owner's personnel, and provide written report that demonstration and instructions have been completed.

1.5 SUBMITTALS

.1 Submit schedule of time and date for demonstration of each item of equipment and each system two weeks prior to designated dates, for Architect's approval.
.2 Submit reports within one week after completion of demonstration, that demonstration and instructions have been satisfactorily completed.
.3 Give time and date of each demonstration, with list of persons present.

1.6 CONDITIONS FOR DEMONSTRATIONS

.1 Testing, adjusting, and balancing has been performed in accordance with Section 01 91 00, and equipment and systems are fully operational.
.2 Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 PREPARATION

.1 Verify that suitable conditions for demonstration and instructions are available.
.2 Verify that designated personnel are present.
.3 Prepare agendas and outlines.
.4 Establish seminar organization.
.5 Explain component design and operational philosophy and strategy.
.6 Develop equipment presentations.
.7 Present system demonstrations.

.8 Accept and respond to seminar and demonstration questions with appropriate answers.

3.2 PREPARATION OF AGENDAS AND OUTLINES

.1 Prepare agendas and outlines including the following:
- .1 Equipment and systems to be included in seminar presentations.
- .2 Name of companies and representatives presenting at seminars.
- .3 Outline of each seminar's content.
- .4 Time and date allocated to each system and item of equipment.
- .5 Provide separate agenda for each system.

3.3 SEMINAR ORGANIZATION

.1 Coordinate content and presentations for seminars.

.2 Coordinate individual presentations and ensure representatives scheduled to present at seminars are in attendance.

.3 Arrange for presentation leaders familiar with the design, operation, maintenance and troubleshooting of the equipment and systems. Where a single person is not familiar with all aspects of the equipment or system, arrange for specialists familiar with each aspect.

.4 Coordinate proposed dates for seminars with Owner and select mutually agreeable dates.

3.4 DEMONSTRATION AND INSTRUCTIONS

.1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at agreed upon times, at the equipment location.

.2 Instruct personnel in all phases of operation and maintenance using operation and maintenance manuals as the basis of instruction.

.3 Instruct personnel on control and maintenance of sensory equipment and operational equipment associated with maintaining energy efficiency and longevity of service.

.4 Review contents of manual in detail to explain all aspects of operation and maintenance.

.5 Prepare and insert additional data in operations and maintenance manuals when the need for additional data becomes apparent during instructions.

3.5 TIME ALLOCATED FOR INSTRUCTION

.1 Allocate time required for instruction of each item of equipment or system as follows:
- .1 Mechanical Systems:
  - .1 HVAC, Detection and Boiler Systems: 2.0 hours of instruction.
  - .2 Direct Digital Controls: 2.0 hours of instruction.

END OF SECTION

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