Conseil scolaire Viamonde

CONSEIL SCOLAIRE VIAMONDE

RFQ #25-48

RENOVATIONS AT ÉCOLE ÉLÉMENTAIRE FELIX-LECLERC

50 CELESTINE DRIVE, Ontario

"ISSUED FOR PERMIT & TENDER"

Project 24194

DATE March 10, 2025

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DIVISION 00 PROCUREMENT AND CONTRACTING REQUIREMENTS

DIVISION 01 – GENERAL REQUIREMENTS

DIVISION 02 – EXISTING CONDITIONS

DIVISION 03 – CONCRETE

DIVISION 04 – MASONRY

DIVISION 05 – METALS

DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

End of Section

LIST OF DRAWINGS

Dwg. No.	Title	Issue No.	Rev. No.	Issue Date
ARCHITECTURAL				
A000	OBC Matrix, Drawing List and Location Plan	1	-	March 10, 2025
A201	Overall Floor Plans	1	-	March 10, 2025
A202	Part Demolition Floor Plan	1	-	March 10, 2025
A203	Part Floor Plan	1	-	March 10, 2025
A204	Part Roof Plan	1	-	March 10, 2025
A205	Part Reflected Ceiling Plan	1	-	March 10, 2025
A206	Part Enlarged Floor Plans	1	-	March 10, 2025
A401	Wall Sections	1	-	March 10, 2025
A601	Plan Details	1	-	March 10, 2025
A701	Interior Elevations	1	-	March 10, 2025
A702	Interior Elevations	1	-	March 10, 2025
A801	Millwork Plans, Elevations & Sections	1	-	March 10, 2025
A901	Schedules	1	-	March 10, 2025
STRUCTURAL				
S201	General Notes & Part Roof Framing Plan	1	-	March 10, 2025
MECHANICAL				
M-0	Title Sheet	2	-	Mar. 07, 2025
M-1.1	Mechanical Specifications I	2	-	Mar. 07, 2025
M-1.2	Mechanical Specifications II	2	-	Mar. 07, 2025
M-1.3	Mechanical Legend	2	-	Mar. 07, 2025
M-1.4	Mechanical Schedules I	2	-	Mar. 07, 2025
M-1.5	Mechanical Schedules II and Details I	2	-	Mar. 07, 2025
M-1.6	Mechanical Details II	2	-	Mar. 07, 2025
M-1.7	Mechanical Details III	2	-	Mar. 07, 2025
M-2.1	Part Ground Floor Demolition Plan - HVAC	2	-	Mar. 07, 2025
M-2.2	Part Ground Floor Demolition Plan - Hydronic	2	-	Mar. 07, 2025
M-2.3	Part Ground Floor New Plan - HVAC	2	-	Mar. 07, 2025
M-2.4	Part Roof New Plan - HVAC	2	-	Mar. 07, 2025
M-2.5	Part Ground Floor New Plan - Hydronic	2	-	Mar. 07, 2025
M-2.6	Boiler Room New Plan - Hydronic	2	-	Mar. 07, 2025

Dwg. No.	Title	Issue No.	Rev. No.	Issue Date
M-3.1	Part Ground Floor Demolition Plan – Plumbing & Drainage	2	-	Mar. 07, 2025
M-3.2	Part Ground Floor New Plan – Plumbing & Drainage	2	-	Mar. 07, 2025
ELECTRICAL				
E-1.1	Electrical Legend and Details	2	-	March 12, 2025
E-1.2	Electrical Details	2	-	March 12, 2025
E-1.3	Electrical Details	2	-	March 12, 2025
E-1.4	Electrical Details	2	-	March 12, 2025
E-1.5	Electrical Details	2	-	March 12, 2025
E-2.0	Electrical Facility Plan	2	-	March 12, 2025
E-2.1	Electrical Plan	2	-	March 12, 2025
E-2.2	Electrical Roof Plan	2	-	March 12, 2025
E-3.1	Reflected Ceiling Plan	2	-	March 12, 2025
E-5.1	Electrical Demolition Plan	2	-	March 12, 2025
E-6.1	Reflected Ceiling Demolition Plan	2	-	March 12, 2025
E-7.1	Electrical Single Line Diagram	2	-	March 12, 2025
COMMUNICATIONS				
C-1.1	Communications Legend and Details	1	-	March 12, 2025
C-2.0	Communications Facility Plan	1	-	March 12, 2025
C-2.1	Communications Plan	1	-	March 12, 2025
C-4.1	Communications Demolition Plan	1	-	March 12, 2025

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Work covered by contract documents
.2 Owner
.3 Location of the site
.4 Scheduling requirements
.5 Site access .
.6 Work sequence
.7 Contractor use of premises
.8 Work by others
.9 Engineer design
.10 Designated substances: ACM and others
.11 Building smoking environment
.12 Special conditions
.13 Integrated systems testing
.14 Site security
.15 “By Others”
.16 Protection of Drawings

1.2 Work Covered by Contract Documents

.1 Work of this Contract comprises the renovations to École Élémentaire Felix Leclerc as indicated on the Contract Drawings and specifications.

1.3 Owner

.1 Conseil Scolaire Viamonde

1.4 Place of the Work

.1 The Work of this Contract is located at 50 Celestine Drive, Toronto, ON.

1.5 Scheduling Requirements

.1 Refer to Instructions to Bidders

1.6 Metric Project

.1 This project is to be based on The International System of Units (SI). Measurements are expressed in metric (SI) units.

.2 All dimensions are to be shown in meters and millimeters.

1.7 Site Access

.1 Access to the site to be arranged by the Owner.

.2 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work

.3 Provide secure construction fencing as specified and where indicated.

1.8 Work Sequence

.1 Construct Work continuously.

1.9 Contractors Use of Premises

.1 Contractor has restricted use of site until Substantial Performance.

1.10 Work by Others

.1

1.11 Engineer Design

.1 Where specifications require work to be designed by an engineer, engage an engineer licensed in the Province of Ontario to design such work. Refer to Section 01 78 00.

1.12 Designated Substances: ACM and Others

.1 The Owner shall provide any prospective constructor or contractor a copy of building ACM surveys and information on designated substances that are known or suspected of being present within the area or scope of work.

.2 The General Contractor shall ensure that a copy of the ACM survey is provided to each contractor and subcontractor who will be working on the Project.

.3 Any findings of undeclared ACM, or damaged ACM that could pose a risk to workers is to be brought to the attention of the Owner immediately, and work is to be stopped.

.4 All project design and construction activities must be carried out in compliance with the Regulations and the Owner's Asbestos Management Program.

.5 No asbestos-containing materials, as defined by O. Reg. 278/05, may be specified or used in any project.

1.13 Verification

.1 All dimensions shall be verified on site, and all necessary modifications and adjustments shall be made as necessary to suit.

1.14 Building Smoking Environment

.1 Smoking and vaping are prohibited in all work places within the Owner's buildings and on the Owner's property.

1.15 Special Conditions

.1 The following general and special conditions apply:
  .1 All existing surfaces and finishes are to be repaired wherever damaged during the course of the Work.
  .2 Wherever existing floor and wall finishes are to be removed, include full removal down to the existing substrate of all tile, base, mortars, grouts, waterproofing membranes and adhesives in accordance with TTMAC recommended procedures. Patch and repair existing substrate to the quality required by the new finish material manufacturer for the installation of their products.

.3 All openings in existing fire rated assemblies or fire separations which are created by the removal of existing services, plumbing, conduit, ductwork, fittings fixtures or accessories are to be firestopped to maintain the integrity of the existing construction.
.4 All exposed interior surfaces except prefinished surfaces shall be painted whether referred to in the specifications and drawings or not.

1.16 Site Security

.1 Daily Inspection: Provide inspection of the work areas daily while the work is in progress and take whatever measures are necessary to secure the construction zones from theft, vandalism and unauthorized entry.

1.17 “By Others”

.1 The term "by others" where it is used in the contract documents means that work shown or described in the contract documents and labeled with this designation is not included in the specific sub-trade's scope of work but will be required to be done within the General Contractor's contract.

1.18 Use of Drawings

.1 Drawings are not to be scaled.

.2 Copies of architectural and structural “issued for construction” drawings in digital format will be made available for the contractors use under the following conditions.
.1 Copyright remains with BBA.
.2 The drawings will only be used for shop drawings for this project and not be put to any other use.
.3 BBA assumes no liability for errors or omissions in the drawings. The Contractor assumes all risk and expenses associated with the use of drawings in the production of his work.
.4 References to BBA and other Consultants must be deleted from the title block.
.5 The Contractor signs a release available from BBA that addresses the above items in more detail. (Sample attached as Appendix ‘A’)

.3 Arrangements for use of Sub-Consultant drawings must be made with the Appropriate Sub-Consultant.

1.19 Protection of Drawings

.1 Copyright of electronic document belongs to the Consultant. Electronic documents may not be forwarded to others, transmitted, downloaded or reproduced in any format, whether print or electronic, without the express, written permission of the copyright owner.

.2 Drawings, specifications and other contract related documents which are posted on Contractor controlled websites for access by sub-trades and suppliers, shall be posted only on password protected platforms with access only to those parties with an expressed interest in the Project.

.3 Provide Consultant and Owner with access to such websites as noted above.

PART 2 PRODUCTS

3.1 Not Used

.1 Not used

PART 3 EXECUTION

3.2 Not Used

.1 Not used

End of Section

SAMPLE

[Date]

[CONTRACTOR'S COMPANY

ADDRESS

CITY, PROVINCE, POSTAL CODE]

Attention: [INSERT CONTACT NAME]

At your request, BBA will provide electronic files for your convenience and use in the preparation of your shop drawings for Project Name, subject to the following terms and conditions:

Our electronic files are compatible with [AutoCAD 2020 (**)]. We make no representation as to the compatibility of these files with your hardware or your software beyond the specified release of the referenced drawings.

Data contained on these electronic files are part of our instruments of service, and at all times remain the exclusive property of Barry Bryan Associates and copyright is reserved. The electronic files shall not be used by you for any purpose other than as a convenience in the preparation of shop drawings for the referenced project. You further agree not to transfer these electronic files to others without the prior written consent of Barry Bryan Associates. Any other use or reuse by you or by others will be at your sole risk and without liability or legal exposure to us. You agree to make no claim and hereby waive, to the fullest extent permitted by law, any claim or cause of action of any nature against us, our officers, directors, employees, agents or other project consultants that may arise out of or in connection with your use of the electronic files.

Furthermore, you shall, to the fullest extent permitted by law, indemnify and hold us harmless against all damages, liabilities or costs, including reasonable attorneys' fees and defence costs, arising out of or resulting from your use of these electronic files, or from the use by others, should they have obtained them from you.

These electronic files are not construction documents. Differences may exist between these electronic files and corresponding hard-copy construction documents. We make no representation regarding the accuracy or completeness of the electronic files you receive. In the event that a conflict arises between the hard-copy construction documents prepared by us and the electronic files, the hard-copy construction documents shall govern. You are responsible for determining if any conflict exists.

Due to the nature of the design and construction process, the drawings on these electronic files may not be fully coordinated, may change, and may not incorporate revisions, change orders, or addenda. By your use of these electronic files, you are not relieved of your duty to fully comply with the contract documents, including, and without limitation, the need to check, confirm and coordinate all dimensions and details, take field measurements, verify field conditions and coordinate your work with that of other contractors for the project.

Because information presented on the electronic files can be modified, unintentionally or otherwise, we require all indications of our ownership and/or involvement be removed from each electronic display.

We will furnish you electronic files upon your written request.

Under no circumstances shall delivery of the electronic files for use by you be deemed a sale by us, and we make no warranties, either express or implied, of merchantability of fitness for any particular purpose. In no event shall we be liable for any loss of profit or any consequential damages as a result of your use or reuse of these electronic files.

_____	_____
Barry Bryan Associates	[CONTRACTOR FIRM NAME]

PART 1 GENERAL

1.1 Consultants

.1 ARCHITECT:
Barry Bryan Associates
201 - 250 Water Street
Whitby, Ontario L1N 0G5
Tel: (905) 666-5252
Fax: (905) 666-5256
Attention: Mr. William Weima, OAA

.2 STRUCTURAL ENGINEER:
Barry Bryan Associates
201 - 250 Water Street
Whitby, Ontario L1N 0G5
Tel: (905) 666-5252
Fax: (905) 666-5256
Attention: Mr. Doug McLaughlin, P. Eng.

.3 MECHANICAL ENGINEER:
Giallanardo Engineering Inc.
220-4450 Highway #7
Woodbridge, Ontario L4L 4Y7
Tel: (905) 265-1052
Attention: Mr. Jeremy Hogan, P.Eng.

.4 ELECTRICAL ENGINEER:
HCC Engineering Limited
40 Eglinton Avenue East, Suite 401
Toronto, Ontario M4P 3A2
Tel: (416) 932-8393
Attention: Mr. Ken Zhong, P. Eng.

PART 2 PRODUCTS

3.1 Not Used

.1 Not used

PART 3 EXECUTION

3.2 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Access and Egress
.2 Use of Site and Facilities
.3 Alterations, Additions or Repairs to Existing Buildings
.4 Existing Services
.5 Special Requirements
.6 Security
.7 Building Smoking Environment

1.2 Access and Egress

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

1.3 Use of Site and Facilities

.1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Owner to facilitate work as stated.

.2 Maintain existing services to building and provide for personnel and vehicle access.

.3 Where security is reduced by work provide temporary means to maintain security.

.4 Owner will assign sanitary facilities for use by Contractor's personnel. Keep facilities clean.

.5 Protect walls of passenger elevators, to approval of Owner prior to use.

.6 Accept liability for damage, safety of equipment and overloading of existing equipment.

.7 Closures: protect work temporarily until permanent enclosures are completed.

1.4 Alterations, Additions or Repairs to Existing Buildings

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

1.5 Existing Services

.1 Notify, Owner, utility companies of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services, give Owner 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.

.3 Provide for personnel, pedestrian and vehicular traffic.
.4 Construct barriers in accordance with Section 01 56 00.

1.6 Special Requirements

.1 Paint and carpet public or Owner occupied areas Monday to Friday from [18:00] to [07:00] hours only [and on [Saturdays,] [Sundays,] [and statutory holidays]].

.2 Carry out noise generating Work Monday to Friday from [18:00] to [07:00] hours [and on [Saturdays,] [Sundays,] [and statutory holidays]].

.3 Submit schedule in accordance with Section [01 32 00 - Construction Progress Documentation] [01 32 16 - Construction Schedule - Bar (GANTT) Chart].

.4 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.

.5 Keep within limits of work and avenues of ingress and egress.

.6 Deliver materials outside of peak traffic hours 17:00 to 07:00 and 13:00 to 15:00 unless otherwise approved by Owner.

.7 Prior to cutting or drilling horizontal or vertical surfaces including concrete, concrete block or other structural substrate, determine location of reinforcing, service lines, pipes, conduits or other items by x-ray, ground penetrating radar or other appropriate method. Submit findings to Owner prior to cutting or drilling.

1.7 Security

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

.2 Security clearances:
- .1 Personnel employed on this project will be subject to security check. Obtain clearance, as instructed, for each individual who will require to enter premises.
- .2 Personnel will be checked daily at start of work shift and provided with pass which must be worn at all times. Each pass must be returned at end of work shift and personnel checked out.

1.8 Building Smoking Environment

.1 Comply with smoking restrictions. Smoking and vaping is not permitted.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Cash Allowances

1.2 References

.1 Canadian Construction Documents Committee CCDC2-2020 Stipulated Price Contract including the Supplementary Conditions.

1.3 Cash Allowances

.1 Refer to General Conditions, GC4.1.

.2 Unless otherwise specified, Cash Allowances shall cover the cost of the materials and equipment delivered F.O.B. job site, and all applicable taxes, except Harmonized Sales Tax. The Contractor's handling costs on the site, labour, installation costs, overhead and profit and other expenses shall be included separately in the Stipulated Price and not in the Cash Allowance.

.3 Where it is specified that a Cash Allowances is to include both supply and installation costs, such allowances shall cover the cost of the materials and equipment delivered and unloaded at the site, all applicable taxes and the contractor’s handling costs on the site, labour and installation costs and other expenses, except overhead and profit which shall be included separately in the Stipulated Price.

.4 If the cost of the Work covered by Cash Allowances, when determined, is more or less than the allowance, the Contract Sum shall be adjusted accordingly.

.5 In the event that the cost of the work covered by Cash Allowances should exceed the cash allowance, while the Contract Sum will be adjusted in conformity therewith, there shall be no adjustment to the Contractor's fee or other expenses such as overhead or profit, it being understood and agreed that the contract sum includes the Contractor's expenses and profit for all Cash Allowances whether or not they are exceeded.

.6 Progress payments on accounts of work authorized under Cash Allowances shall be included in monthly certificate for payment.

.7 Expenditures from Cash Allowances shall be authorized by Site Instruction, Change Directive or Change Order.

.8 Cash Allowance for independent inspection and testing shall cover the cost of such services as provided by independent testing agency only. The Contractor's cost for labour, overhead and other expenses related to independent inspection and testing shall be included separately in the Stipulated Price and not in the Cash Allowance.

.9 Cause the work covered by Cash Allowances to be performed for such amounts and by such persons as the Consultant may select and direct or as required by the project drawings and specifications.

.10 Amount of each allowance, for Work specified in respective specification Sections is as follows:

.1 Independent Inspection and Testing:
.2 Supply only of Finishing Hardware:

.3 Communications Work:

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Requests for Information.
.2 Submittal Procedures.
.3 Screening of RFI's.
.4 Response to RFI's.
.5 Response Timing.

1.2 Request for Information (RFI)

.1 A request for information (RFI) is a formal process used during the Work to obtain an interpretation of the Contract Documents or to obtain additional information.

.2 An RFI shall not constitute notice of claim for a delay.

1.3 Submittal Procedures

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Number RFI's consecutively in one sequence in order submitted, in numbering system as established by the Contractor.

.3 Submit one distinct subject per RFI form. Do not combine unrelated items on one form.

.4 RFI Form:
  .1 Submit a draft "Request for Information" form to be approved by the Owner and Consultant.
  .2 Submit RFI's to the Consultant on approved "Request for Information" form. The Consultant shall not respond to an RFI except as submitted on this form.
  .3 Where RFI form does not have sufficient space to provide complete information thereon, attach additional sheets as required.
  .4 Submit with RFI form all necessary supporting documentation.

.5 RFI Log:
  .1 Maintain log of RFI's sent to and responses received from the Consultant, complete with corresponding dates.
  .2 Submit updated log of RFI's at each construction meeting.

.6 Submit RFI's sufficiently in advance of affected parts of the Work so as not to cause delay in the performance of the Work. Costs resulting from failure to do so will not be paid by the Owner.

.7 Only the Contractor shall submit RFI's to the Consultant.

.8 RFI's submitted by Subcontractors or Suppliers directly to the Consultant will not be accepted.

1.4 Screening of RFI's

.1 Contractor shall satisfy itself that an RFI is warranted by undertaking a thorough review of the Contract Documents to determine that the claim, dispute, or other matters in question relating to the performance of the Work or the Interpretation of the Contract Documents cannot be resolved by direct reference to the Contract Documents. Contractor shall describe in detail this review on the RFI form as part of the RFI submission. RFI submittals that lack such detailed review

description, or where the detail provided is, in the opinion of the Consultant, insufficient, shall not be reviewed by the Consultant and shall be rejected.

1.5 Response to RFI's

.1 Consultant shall review RFI's from the Contractor submitted in accordance with this section with the following understandings:
  .1 Consultant's response shall not be considered as a Change Order or Change Directive, nor does it authorize changes in the Contract Price or Contract Time or changes in the Work.
  .2 Only the Consultant shall respond to RFI's. Responses to RFI's received from entities other than the Consultant shall not be considered.

1.6 Response Timing

.1 Allow 5 Working Days for review of each RFI by the Consultant.

.2 Consultant's review of RFI commences on date of receipt of RFI submission by the Consultant from Contractor and extends to date RFI returned by Consultant.

.3 When the RFI submission is received by Consultant before noon, review period commences that day. When RFI submittal is received by Consultant after noon, review period begins on the next Working Day.

.4 If, at any time, the Contractor submits a large enough number of RFI's or the Consultant considers the RFI to be of such complexity that the Consultant cannot process these RFI's within 5 Working Days, the Consultant will confer with the Contractor within 3 Working Days of receipt of such RFI's, and the Consultant and the Contractor will jointly prepare an estimate of the time necessary for processing same as well as an order of priority among the RFI's submitted. The Contractor shall accommodate such necessary time at no increase in the Contract Time and at no additional cost to the Owner.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Submittals.
.2 Schedules.
.3 Format.
.4 Submission.
.5 Critical Path Scheduling.
.6 Submittals Schedule.

1.2 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

1.3 Schedules Required

.1 Submit schedules as follows:
  .1 Construction Progress Schedule.
  .2 Submittal Schedule for Shop Drawings and Product Data.
  .3 Submittal Schedule for Samples.
  .4 Product Delivery Schedule.
  .5 Cash Allowance Schedule for purchasing Products or Services.
  .6 Shutdown or closure activity.

1.4 Format

.1 Prepare schedule in form of a horizontal bar chart using Microsoft Project 2016 or later.

.2 Provide a separate bar for each major item of work, trade or operation.

.3 Split horizontally for projected and actual performance.

.4 Provide horizontal time scale identifying first work day of each week.

.5 Format for listings: chronological order of start of each item of work.

.6 Identification of listings: By Systems description.

1.5 Submission

.1 Submit initial format of schedules within 10 working days after award of Contract.

.2 Submit schedules in electronic format, by email as PDF files.

.3 Consultant will review schedule and return reviewed copy within 10 days after receipt.

.4 Resubmit finalized schedule within 7 days after return of reviewed copy.

.5 During progress of Work revise and resubmit schedule as directed by Consultant.

.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.
.4 Instruct recipients to report to Contractor within 10 days, any problems anticipated by timetable shown in schedule.

.8 Table current and up to date schedule at each regular site meeting.

1.6 Critical Path Scheduling

.1 Include complete sequence of construction activities.

.2 Schedules shall represent a practical plan to complete the work within the Contract period, and shall convey the plan to execute the work. Schedules as developed shall show the sequence and interdependencies of activities required for complete performance of the work.

.3 The submittal of schedules shall be understood to be the Contractor's representation that the schedule meets the requirements of the Contract Documents and that the work will be executed in the sequence and duration indicated in the schedule.

.4 Failure to include any element of work required for performance of the Contract or failure to properly sequence the work shall not excuse the Contractor from completing all work within the Contract Time.

.5 All schedules shall be developed utilizing industry standard 'best practices' including, but not limited to:
.1 No open-ended activities.
.2 No use of constraints other than those defined in the Contract Documents without the prior approval of the Consultant.
.3 No negative leads or lags.
.4 No excessive leads or lags without prior justification and approval from the Consultant.
.5 For individual schedule construction activities, do not exceed 14 days in duration without prior approval of the Consultant. Subdivide activities exceeding 14 days in duration to an appropriate level.
.6 Sufficiently describe schedule activities to include what is to be accomplished in each work area. Express activity durations in whole days. Clearly define work that is to be performed by subcontract.
.7 Create the schedule in conformance with the work-hours and constraints set forth in these Contract Documents.

.6 Include dates for commencement and completion of each major element of construction.

.7 Show 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 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.

.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.

1.7 Submittals Schedule

.1 Include schedule for submitting shop drawings, product data, and samples. Indicate manufacture and delivery lead times into the shop drawing submittal schedule.

.2 Indicate dates for submitting, review time, resubmission time, and last date for meeting fabrication schedule.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Construction Documentation.

1.2 Construction Documentation

.1 This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
.1 Daily construction reports.
.2 Material location reports.
.3 Field condition reports.
.4 Special reports.

1.3 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Field Condition Reports: Submit at time of discovery of differing conditions.

.3 Special Reports: Submit at time of occurrence.

1.4 Coordination

.1 Coordinate preparation and processing of reports with performance of construction activities and with reporting of separate Contractors.

1.5 Reports

.1 Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project Site:
.1 List of Subcontractors at Project Site.
.2 Approximate count of personnel at Project Site.
.3 Equipment at Project Site.
.4 Material deliveries.
.5 High and low temperatures and general weather conditions.
.6 Accidents.
.7 Meetings and significant decisions.
.8 Stoppages, delays, shortages, and losses.
.9 Meter readings and similar recordings.
.10 Emergency procedures.
.11 Orders and requests of authorities having jurisdiction.
.12 Change Orders received and implemented.
.13 Work Change Directives received and implemented.
.14 Clarifications requested, received, and implemented.
.15 Services connected and disconnected.
.16 Equipment or system tests and startups.
.17 Partial Completions and occupancies.
.18 Substantial Performances authorized.

.2 Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project Site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project Site.

.3 Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a request for interpretation. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

1.6 Special Reports

.1 Prepare Coordination Memoranda for distribution to each Contractor involved outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings. Provide copy to the Consultant.

.2 Prepare similar memoranda for the Owner and separate Contractors where coordination of their Work is required. All such memoranda must be directed through the Consultant.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Administrative
.2 Requests for Information
.3 Shop Drawings and Product Data
.4 Interference Drawings
.5 Progress Photographs
.6 Samples
.7 Mock-Ups
.8 Certificates and Transcripts

1.2 Administrative

.1 Submit to Consultant submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Work affected by submittal shall not proceed until review is complete.

.3 Present shop drawings, product data, samples and mock-ups in metric units.

.4 Where items or information is not produced in metric units converted values are acceptable.

.5 Verify field measurements and affected adjacent work are coordinated.

.6 Contractor's responsibility for errors and omissions in submission is not relieved by Consultant's review.

.7 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant’s review.

.8 Keep one reviewed copy of each submission on site.

1.3 Requests for Information (RFI’s)

.1 Refer to Section 01 26 15 – Requests for Information

1.4 Shop Drawings and Product Data

.1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures, product data and other data which the Contractor provides to illustrate details of a portion of Work.

.2 Coordinate each submission with requirements of Work and Contract Documents. Individual submissions will not be reviewed until all related information is available.

.3 Submit shop drawings bearing stamp and signature of qualified professional Engineer registered or licensed in the Province of Ontario where required by the individual specification sections. Each submittal and each resubmittal must bear the stamp of the Engineer

.4 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.

.5 Prior to submission to Consultant, review all submitted drawings. By this review, Contractor represents to have determined and verified field measurements, site conditions, materials, catalogue number and similar data and to have checked and coordinated each drawing with the requirements of Work and of Contract Documents. Contractor's review of each drawing shall be indicated by stamp, date and signature of a responsible person.

.6 At time of submission, notify Consultant in writing of any deviations in drawings from the requirements of the Contract Documents.

.7 Allow ten days for Consultant's review of each submission.

.8 Adjustments made on shop drawings by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.

.9 Make any changes in submitted drawings which Consultant may require, consistent with Contract Documents and resubmit unless otherwise directed by Consultant. When resubmitting, notify Consultant in writing of any revisions other than those requested by Consultant.

.10 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.

.11 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 adjacent work.

.12 After Consultant's review, distribute copies.

.13 Submit one electronic copy in PDF format of shop drawings for each requirement requested in specification Sections and as Consultant may reasonably request.

.14 Submit electronic copy in PDF format of product data sheets or brochures for requirements requested in Specification Sections and as requested by Consultant where shop drawings will not be prepared due to standardized manufacture of product.

.15 Delete information not applicable to project.

.16 Supplement standard information to provide details applicable to project.

.17 If upon review by Consultant, no errors or omissions are discovered or if only minor corrections are made, copies will be returned, and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

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

1.5 Interference Drawings

.1 Prepare interference drawings to coordinate the installation of the work of all sections, within available space. Conflicts between trades which could be determined beforehand, by the careful coordination and preparation of interference drawings, shall be corrected at no expense to the Owner.

.2 Prepare interference drawings of all buried services as necessary to avoid conflicts with new or existing structures, foundations or services.

.3 Submit interference and equipment placing drawings as specified in Section 01 71 00, when requested by the Consultant.

1.6 Progress Photographs

.1 Progress photograph to be electronically formatted and labelled as to location and view.

1.7 Samples

.1 Submit for review samples as requested in respective specification Sections. Label samples with origin, manufacturer, product information, applicable specification section, and intended use.

.2 Notify Consultant in writing, at time of submission of deviations in samples from requirements of Contract Documents.

.3 Where colour, pattern or texture is criterion, submit full range of manufacturer’s samples.

.4 Adjustments made on samples by Consultant 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 samples which Consultant may require, consistent with Contract Documents.

.6 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.8 Mock-Ups

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

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Administrative
.2 Fires
.3 Disposal of Wastes
.4 Drainage
.5 Site Clearing and Plant Protection
.6 Pollution Control
.7 Unanticipated Soil Contamination

1.2 References

.1 Statutes of Canada 1999 Chapter 33.
  .1 Canadian Environmental Protection Act 1999.
  .2 SOR/2003-289. Federal Halocarbon Regulations, 2003.
  .3 Transportation of Dangerous Goods Act, 1992 (1992, c. 34)
.2 OPSS 805 “Construction Specification for Temporary Erosion and Sediment Control Measures”.
.3 Province of Ontario Environmental Protection Act, R.S.O. 1990, c. E.19
.4 Ontario Regulation O Reg 406/19 On-Site and Excess Soil Management

1.3 Administrative

.1 Comply with all federal, provincial, and municipal regulatory requirements and guidelines for environmental protection and natural resource conservation, including those referenced above.

.2 Failure to comply with environmental requirements may result in a stop work order or assessment of damages commensurate with repair of damage.

.3 It is the Contractor’s responsibility to be aware of environmental requirements and the best management practices and pollution control measures necessary to meet them.

.4 It is the Contractor’s responsibility to obtain and abide by permits, licenses and compliance certificates at appropriate times and frequencies as required by the authorities having jurisdiction.

.5 All hazardous materials are to be stored with secondary containment

1.4 Fires

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

1.5 Disposal of Wastes

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.6 Drainage

.1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.

.2 Do not pump water containing deleterious substances into waterways, sewer or drainage systems.

.3 Protect storm drains against entry by sediment, debris, oil, or chemicals.

.4 Control disposal or runoff of water containing deleterious substances or other harmful substances in accordance with local authority requirements.

1.7 Site Clearing and Plant Protection

.1 Protect trees and plants on site and adjacent properties.

.2 Wrap in burlap, trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m.

.3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.

.4 Restrict tree removal to areas indicated.

.5 Prevent unnecessary disturbance of topsoil and underlying soil from vehicles and heavy equipment.

.6 Minimize stripping of topsoil and vegetation.

.7 Comply with the requirements of Ontario Regulation O. REG 406/19, “On-Site and Excess Soil Management”, for the importation of new soils and fill materials and the exportation, removal and disposal off-site, of excavated materials. Complete testing of imported and exported materials as required. Unless noted elsewhere, costs for such testing is the responsibility of the contractor and is not included in any allowances. Maintain and submit to authorities having jurisdiction all required test reports, certificates and documentation.

1.8 Pollution Control

.1 Maintain, inspect, and repair temporary erosion and pollution control features installed under this contract on a weekly basis. Submit inspection logs to the Owner when requested.

.2 Control emissions from equipment and plant to conform to federal, provincial, and municipal requirements.

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

.4 Take all measures necessary to prevent material and mud tracking on adjacent roads and streets.

.5 Use mechanical sweepers as often as necessary to keep adjacent roads and streets clean of material and mud that is deposited from this project.

.6 On site disposal or clean out of concrete trucks is not permitted. Any spillage of concrete onto asphalt or other surfaces must be cleaned up before spillage sets.

1.9 Unanticipated Soil Contamination

.1 Should unanticipated soil contamination be discovered:
  .1 Stop work and assess the situation for safety.
  .2 If situation does not appear to be safe, evacuate workers from area.
  .3 If safe to do so, take immediate steps to control any spread of contamination, in accordance with Contractor’s spill prevention and response plan.
  .4 Immediately contact the Consultant.

.2 Removal and disposal off site of contaminated materials shall comply with the requirements of Ontario Regulation O Reg 406/19 On-Site and Excess Soil Management.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Requirements for quality of work.
.2 Requirements for material inspection and testing.
.3 Requirements for determination of defective materials and work.

1.2 References

.1 CSA Group (CSA)
  .1 CSA-A23.1-14/ CSA-A23.2:19 Concrete Materials and Methods of Concrete Construction/ Methods of Test Methods and Standard Practice for Concrete.
  .2 CSA S16.1:19 Design of Steel Structures.
  .3 CSA S304.1-04 (R2019) - Design of Masonry Structures
  .4 CSA W47.1:19 Certification of Companies for Fusion Welding of Steel Structures.
  .5 CSA W59-18 Welded Steel Construction (Metal Arc Welding)
.2 Canadian Institute of Steel Construction (CISC)
  .1 CISC Code of Standard Practice for Structural Steel.
.3 OPSS Ontario Provincial Standard Specifications.

1.3 Regulatory Requirements

.1 Products and services provided to complete the Work shall meet or exceed requirements of specified standards, municipal by-laws, building codes and referenced documents.

1.4 Independent Inspection and Testing

.1 Independent Inspection and Testing Consultants will be engaged on behalf of the Owner, for the purpose of inspecting and/or testing individual portions of the Work. The initial cost of such services will be included in the Contract Price, as allocated under Section 01 21 13 - Cash Allowances.

1.5 Responsibilities

.1 Inspection and Testing Consultants shall;
  .1 Provide inspection and testing specified,
  .2 Inform the Contractor and Consultant immediately upon observance of materials, systems, or procedures not in compliance with the specifications, and
  .3 Submit complete reports to the Contractor and the Consultant in a timely manner.

.2 Contractor shall:
  .1 Ensure the quality control requirements of the Contract are implemented.
  .2 Provide access to the Work for Inspection/Testing Consultants, and
  .3 Inform the Inspection/Testing Consultants in advance of day and time required for inspection and tests.

.3 Consultant
  .1 The Consultant will make final decisions on changes to the scope of work of inspection and testing that may affect the Contract Price.
  .2 When informed of any material procedure or test result that does not meet or exceed the specifications, the Consultant will respond in an expedient manner to resolve the issue.

1.6 Access to Work

.1 Allow inspection & testing company's access to the Work, as well as off-site manufacturing and fabrication plants.

1.7 Work Subject to Inspection and Testing

.1 Refer to individual specification sections for requirements for inspection and testing.

.2 Provide additional inspection and testing beyond that listed in the specifications where directed by the Consultant.

1.8 Reports

.1 Submit inspection and test reports to the Consultant.

.2 Provide copies to Subcontractor of work being inspected or tested, manufacturer or fabricator of material being inspected or tested.

.3 Submit one copy of inspection and test reports to the Building Official having jurisdiction, where required by that official.

.4 The cost of tests beyond those called for in the Contract Documents or beyond those required by the law of the Place of Work shall be appraised by the Consultant and may be authorized as recoverable.

1.9 Mockups

.1 Refer to Section 01 45 00 – Quality Control.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Inspection and Testing – General

.1 Furnish test results and mix designs as may be requested.

.2 The cost of tests and mix designs beyond those called for in the Contract Documents or beyond those required by the law of the Place of Work shall be appraised by the Consultant and may be authorized as recoverable.

3.2 Inspection and Testing – Procedures

.1 Notify the appropriate agency and Consultant in advance of the requirement for tests, in order that attendance arrangements can be made.

.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in the Work.

.3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store, cure and inspect test samples.

3.3 Quality of Work

.1 Quality of the Work shall be first class, executed by workers experienced and skilled in the respective duties for which they are employed. Immediately notify the Consultant if required work is such as to make it impractical to produce required results.

.2 Do not employ any unfit person or anyone unskilled in their required duties. The Consultant reserves the right to require the dismissal from the site, of workers deemed incompetent, careless, insubordinate or otherwise objectionable.

3.4 Defective Materials and Work

.1 Where evidence exists that defective work has occurred, or that work has been carried out incorporating defective products, the Consultant may have independent tests, inspections, or surveys performed in order to determine if work is defective.

.2 Tests, inspections, or surveys carried out under these circumstances will be made at the Contractor's expense in the event of defective work, or at the Owner's expense where work is in conformance. Where tests incorporate a number of samples, payment will be assessed, by the Consultant, based on the ratio of conforming to non-conforming results. This does not include re-testing of soil compaction during placement, where evidence exists of non-conformance with the Contract documents, but rather only if re-testing is called for after completion of compaction.

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 References
.2 Owner's Regulations
.3 Standards and Definitions
.4 Designated Substances
.5 Hazardous Materials
.6 Spills Reporting
.7 Protection of Water Quality
.8 Potable Water Systems
.9 Soils Management
.10 Access for Inspection and Testing
.11 Other Regulatory Requirements

1.2 References

.1 Perform Work in accordance with Ontario Building Code (OBC), National Fire Code of Canada (NFC), the Canadian Electrical Code CSA C22.1:21, including all Supplements and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.

.2 Where a material is designated in the Contract Documents for a certain application, unless otherwise specified, that material shall conform to standards designated in the Code. Similarly, unless otherwise specified, installation methods and standards of workmanship shall also conform to standards invoked by the aforementioned Code.

.3 Meet or exceed requirements of:
.1 Contract documents.
.2 Specified standards, codes and referenced documents.
.3 Manufacturer's instructions.

.4 Where requirements of Contract Documents exceed Code requirements provide such additional requirements.

.5 Where the Building Code or the Contract Documents do not provide all information necessary for complete installation of an item, then the manufacturer's instructions for first quality workmanship shall be strictly complied with.

1.3 Owner's Regulations

.1 Conform to requirements, regulations and procedures of the Owner.

1.4 Standards and Definitions

.1 Where a reference is made to specification standards produced by various organizations and agencies, conform to latest edition of standards, as amended and revised to date of Contract.

.2 Have a copy of each specified standard which relates to your work available on the site to be produced immediately on Consultant's request.

1.5 Designated Substances

.1 Known designated substances are identified in the Designated Substance Report provided by the Owner.

.2 Stop work immediately when material resembling asbestos, mould or any other designated substance which is not identified in the Designated Substance Report is encountered during the course of the work. Notify Owner and Consultant immediately.

.3 The Owner will arrange for independent testing of suspected designated substances and removal of such substances encountered on the site during the course of the work which are not identified in the Designated Substance Report.

1.6 Hazardous Materials

.1 Definition: "Hazardous Material" is material, in any form, which by its nature, may be flammable, explosive, irritating, corrosive, poisonous, or may react violently with other materials, if used, handled or stored improperly. Included are substances prohibited, restricted, designated or otherwise controlled by law.

.2 Provide SDS for all materials brought to the Place of Work.

.3 Hazardous Materials will not be introduced for experimental or any other use prior to being evaluated for hazards.

.4 Make known to the Consultant those hazardous materials or designated substances intended to be used in the workplace and receive permission to use before introducing to the Owner’s property.

.5 Many common construction materials such as asbestos pipe and various insulations are designated substances and shall not be used under any circumstances.

1.7 Spills Reporting

.1 Spills or discharges of pollutants or contaminants under the control of the Contractor, and spills or discharges of pollutants or contaminants that are a result of the Contractor's operations that cause or are likely to cause adverse effects shall forthwith be reported to the Consultant. Such spills or discharges and their adverse effects shall be as defined in the Environmental Protection Act R.S.O. 1999.

.2 All spills or discharges of liquid, other than accumulated rain water, from luminaries, internally illuminated signs, lamps, and liquid type transformers under the control of the Contractor, and all spills or discharges from this equipment that are a result of the Contractor's operations shall, unless otherwise indicated in the Contract, be assumed to contain PCB's and shall forthwith be reported to the Consultant.

.3 This reporting will not relieve the Contractor of his legislated responsibilities regarding such spills or discharges.

1.8 Protection of Water Quality

.1 No waste or surplus organic material including topsoil is to be stored or disposed of within 30 metres of any watercourses. Run-off from excavation piles will not be permitted to drain directly into watercourses. Where this measure is not sufficient or feasible to control sediment entering the watercourses, sedimentation traps or geo-textile coverage will be required.

.2 If de-watering is required, the water shall be pumped into a sedimentation pond or diffused onto vegetated areas a minimum of 30 metres from any watercourses and not pumped directly into the

watercourses.

.3 Provide all de-watering and sedimentation control required to properly complete the work of this contract.

.4 Supply, install and maintain silt/sediment control fencing along the edge of the site to intercept construction runoff silt, to the satisfaction of the Owner.

1.9 Potable Water Systems

.1 Potable water systems in completed buildings must meet criteria and guidelines established by Provincial and Municipal authorities, prior to occupancy by the Owner.

.2 Upon completion, submit testing certificates verifying water quality and water systems meets all applicable Provincial and Legislated Standards

1.10 Soils Management

.1 Comply with the requirements of Ontario Regulation O. REG 406/19, “On-Site and Excess Soil Management”, for the importation of new soils and fill materials and the exportation, removal and disposal off-site, of excavated materials. Complete testing of imported and exported materials as required. Unless noted elsewhere, costs for such testing is the responsibility of the contractor and is not included in any allowances. Maintain and submit to authorities having jurisdiction all required test reports, certificates and documentation.

1.11 Access for Inspection and Testing

.1 Cooperate fully with and provide assistance to, all outside authorities including Building Inspectors, utilities, testing agencies and consultants, with the inspection of the Work.

1.12 Other Regulatory Requirements

.1 Conform to the requirements of the Ontario Ministry of Transportation, Regional and Local authorities regarding transportation of materials.

.2 Obtain required road occupancy permits.

.3 Pay any required roadway damage deposits required by the local municipality.

.4 Conform to the requirements of the Ontario Ministry of the Environment.

.5 Conform to the requirements of the Ontario Ministry of Labour.

.6 Conform to the requirements of the local Conservation Authority.

.7 Conform to all applicable local by-laws, regulations and ordinances.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Inspection
.2 Independent Inspection Agencies.
.3 Access to Work
.4 Procedures
.5 Rejected Work
.6 Reports
.7 Contractors Responsibilities
.8 Tests and Mix Designs
.9 Mock-Ups
.10 Equipment and Systems.

1.2 Inspection

.1 Contractor is responsible for Quality Control (QC).

.2 Allow Owner and Consultant access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.3 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Consultant instructions, or law of Place of Work.

.4 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

.5 Consultant will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Owner shall pay cost of examination and replacement.

1.3 Independent Inspection Agencies

.1 Independent Inspection and Testing Agencies will be engaged by Contractor for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by the Contractor and paid from the cash allowances specified in Section 01 21 13. Refer to Section 01 29 83 - Payment Procedures for Testing Laboratory Services.

.2 Provide equipment required for executing inspection and testing by appointed agencies.

.3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

.4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Consultant at no cost to Owner. Pay costs for retesting and re-inspection.

1.4 Access to Work

.1 Allow inspection and testing agencies access to Work, off site manufacturing and fabrication plants.

.2 Co-operate to provide reasonable facilities for such access.

1.5 Procedures

.1 Notify Owner and Consultant 48 hours in advance of requirement for tests, in order that attendance arrangements can be made.

.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.

.3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples

1.6 Rejected Work

.1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Consultant as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

.2 Make good other work damaged by such removals or replacements promptly.

.3 If in opinion of Consultant it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Consultant will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Consultant.

1.7 Reports

.1 Submit electronic .pdf format inspection and test reports to Consultant.

.2 Provide copies to Subcontractor of work being inspected or tested or manufacturer or fabricator of material being inspected or tested.

1.8 Contractors Responsibilities

.1 Be responsible for the execution of the Construction Quality Plan and is to pay all costs for the execution of the Construction Quality Plan. Designate an experienced site representative for carrying out the Construction Quality Plan.

.2 Provide the Owner with a completed quality product for the Work. Contractor shall be responsible for any costs associated with re-testing and reperforming the Work as a result of the Contractor's poor performance or workmanship or other failure to comply with the Contract Documents.

.3 All Work shall be done by persons qualified in their respective trades, and the workmanship shall be first-class in every respect. Contractor is responsible for ensuring employees are appropriately trained. All materials and equipment furnished shall be the best of their respective kinds for the intended use and unless otherwise specified, same shall be new and of the latest design.

.4 The Consultant will have the authority to reject Work that does not conform to the Contract Documents or may require special inspection or testing, whether or not such Work is to be then fabricated, installed or completed.

.5 Failure by a Contractor to conduct its operations, means and methods and coordinate proper sequencing of the Work may cause the Owner to withhold payment or any other means deemed

necessary to correct non-conforming Work.

.6 The Owner shall engage a testing firm to perform such engineering laboratory services and on-site inspection as deemed necessary by the Owner. The testing firm will determine compliance with the requirements of the Contract Documents. This Work will not be a service to the Contractors for the performing of tests and checking of materials required of the Contractors.

.7 Copies of test and inspection reports will be furnished to the Contractor. The laboratory and its representatives will be instructed to promptly call to the attention of the Contractor, any instance of non-compliance with the requirements of the Contract Documents. Failure to so notify the Contractor shall not relieve the Contractor of any of its responsibilities for compliance or making good workmanship or materials which are not in compliance with the requirements of the Contract Documents. The agency shall notify the Consultant and the Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services

.8 Contractor's construction materials, procedures and work shall be subject to specified testing procedures and shall be in conformance with the Contract Documents as verified by Testing Agency.

.9 Cooperate with the testing firm and provide labor to assist with sample preparations where applicable.

.10 Except where specifically indicated to be provided by another entity as identified, inspections, tests, and similar quality control services including those specified to be performed by independent agency are the Contractor’s responsibility, and costs thereof are not to be included in contract sum.

.11 Cooperate with independent agencies performing required inspections, tests, and similar services. Provide auxiliary services as reasonably requested, including access to Work, the taking of samples or assistance with the taking of samples, delivery of samples to test laboratories, and security and protection for samples and test equipment at Project site.

.12 Coordination: Contractor and each engaged independent agency performing inspections, tests, and similar services for project are required to coordinate and sequence activities so as to accommodate required services with minimum delay of Work and without the need of removal/replacement of work to accommodate inspections and tests. Scheduling of times for inspections, tests, taking of samples, and similar activities is Contractor’s responsibility.

.13 Where sampling and testing is required for Sections of Work listed in the Contract Documents, the tests shall be performed by an independent testing lab and paid for by the Contractor.

.14 Test procedures to be used shall be submitted for approval of the Consultant where other than those specified are recommended by the testing agency.

.15 Testing Agency Duties: The independent Testing Agency engaged to perform inspections, sampling and testing of materials and construction specified in individual Specification Sections shall cooperate with the Owner, the Consultant and Contractors in performance of its duties, and shall provide qualified personnel to perform required inspections and tests.

.16 Contractor is responsible for scheduling times for inspections, tests, taking samples and similar activities.

1.9 Tests and Mix Designs

.1 Furnish test results and mix designs as requested.

1.10 Mockups

.1 Prepare mockups for Work specifically requested in specifications.

.2 Construct in locations acceptable to Consultant.

.3 Prepare mockups for Consultant's review with reasonable promptness and in orderly sequence, to not cause delays in Work.

.4 Failure to prepare mockups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.5 Mock-ups may remain as part of Work unless indicated otherwise.

1.11 Equipment and Systems

.1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Temporary utilities

1.2 Installation and Removal

.1 Provide temporary utilities and controls in order to execute work expeditiously.

.2 Remove from site all such work after use.

1.3 Dewatering

.1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.

1.4 Water Supply

.1 Existing sources of water can be made available to the Contractor at no charge, subject to operational requirements. Arrange for connection and pay all costs for installation, maintenance and removal. Conversions or alterations to existing sources of water to meet construction requirements are the responsibility of the Contractor.

.2 The points of delivery and limits on amount available will be determined on site by the Owner whose written permission must be obtained before any connection is made.

1.5 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 flameless type. Solid fuel salamanders are not permitted, unless prior approval is given by the Consultant.

.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° 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 Permanent heating system of building may not be used when available, unless there are savings to the Contract Price and Consultant's written permission is obtained stating conditions of use, provisions relating to guarantees on equipment and operation and maintenance of system. Be responsible for damage to heating system if use is permitted.

.7 On completion of Work for which permanent heating system is used, replace filters.

.8 Ensure Date of Substantial Performance and warranties for heating system do not commence until entire system is in as near original condition as possible and is certified by Consultant.

.9 Pay costs for maintaining temporary heat, when using permanent heating system. Owner will pay utility charges when temporary heat source is existing building equipment.

.10 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.

.11 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.6 Temporary Power and Light

.1 Existing sources of electric power can be made available to the Contractor. Conversions or alterations to existing sources of electric power to meet construction requirements are the responsibility of the Contractor.

.2 The points of delivery and limits on amount available will be determined on site by the Owner whose written permission must be obtained before any connection is made.

.3 Electrical power and lighting systems installed under this Contract may be used for construction requirements only with prior approval of Consultant provided that guarantees are not affected.

1.7 Temporary Communication Facilities

.1 Provide and pay for temporary telephone, fax, cellular data, lines and all equipment necessary for Contractor’s own use.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Construction aids.
.2 Site storage.
.3 Construction parking
.4 Offices
.5 Equipment, tool and material storage.
.6 Sanitary facilities.
.7 Signage.
.8 Shoring

1.2 References

.1 CSA Group (CSA)
  .1 CAN/CSA Z321-96 (R2006) Signs and Symbols for the Workplace
  .2 CAN/CSA Z797-18 Code of Practice for Access Scaffold

1.3 Installation and Removal

.1 Provide construction facilities in order to execute work expeditiously.

.2 Remove from site all such work after use.

1.4 Scaffolding

.1 Scaffolding in accordance with CSA Z797.

.2 Provide and maintain scaffolding, ramps, ladders, swing staging, platforms and temporary stairs.

.3 Enclose and heat scaffolding during cold weather.

1.5 Hoisting

.1 Provide, operate and maintain hoists and cranes required for moving of workers, materials and equipment.

.2 Hoists and cranes shall be operated by qualified operator.

1.6 Site Storage/Loading

.1 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.

1.7 Construction Parking

.1 Parking will be permitted on site at areas designated by the Owner provided it does not disrupt performance of Work or ongoing Owners operations.

.2 Provide and maintain adequate access to project site.

.3 If authorized to use existing roads for access to project site, maintain such roads for duration of

Contract and make good damage resulting from Contractors' use of roads.

1.8 Offices

.1 General Contractor and Subcontractors may provide their own offices as necessary and subject to site constraints. Direct location of these offices.

1.9 Equipment, Tool and Material 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.

1.10 Construction Signage

.1 Direct requests for approval to erect a Contractor signboard to Consultant.

.2 Signs and notices for safety and instruction shall be in English. Graphic symbols shall conform to CAN/CSA Z321.

.3 Post "Construction Zone" signage outside barrier and entrance to all work areas.

.4 Maintain approved signs and notices in good condition for duration of project and dispose of off-site on completion of project.

.5 Install signage to direct site traffic and deliveries to the Construction work areas.

1.11 Shoring

.1 Examine the site to determine the conditions under which work will be performed.

.2 Contractor shall formulate his own conclusions as to the extent of the existing conditions and shoring required.

.3 The method of shoring shall be according to the Contractor's and his Engineer's directions.

.4 All existing loads must be shored prior to commencement of demolition and removal of load bearing elements.

.5 All shoring and frame braces must be supplied with a safe load rating which must not be exceeded. Install in accordance with manufacturer's recommended procedures and safety guidelines. Ensure that the safe load conditions of the shoring are not exceeded by dead, live or construction loads.

.6 All shoring shall be subject to the Consultant's review and approval prior to commencing demolition work.

.7 Completely remove all shoring after new structure is installed and all concrete is set.

.8 Submit shoring drawings and a proposed installation procedure stamped by a professional engineer registered in the Province of Ontario. Procedures shall follow the information provided on these drawings. The shoring design engineer shall be retained and paid for by the Contractor. The shoring engineer shall review all existing conditions on site prior to completing shoring design.

.9 Removal of existing materials without proper engineered shoring is a safety hazard and will not be permitted.

.10 Make good all damage to the existing structure and adjoining structures and bear full responsibility for failure to provide adequate shoring.

.11 The failure or refusal of the Consultant to suggest the use of shoring, shall not in any way or to any extent relieve the Contractor of any responsibility concerning the condition of the work or of any of their obligations under the Contract, nor impose any liability on the Owner or their agents; nor shall any delay, whether caused by any action or want of action on the part of the Contractor, or by any act of the Owner, or their agents, or employees, relieve the Contractor from necessity of properly and adequately protecting the existing structure from collapse or damage, nor from and of his obligations under the Contract relating to injury to persons or property, nor entitle him to any claims for extra compensation or an extension in schedule.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Product quality, availability, storage, handling, protection, and transportation.
.2 Manufacturer's instructions.
.3 Quality of Work, coordination and fastenings.
.4 Dielectric Separation
.5 Tolerances for Execution of Work.
.6 Protection of Work in progress.
.7 Existing Utilities

1.2 Definition – Basis of Design

.1 Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.
  .1 Evaluation of Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification. Manufacturer's published attributes and characteristics of basis-of-design product also establish salient characteristics of products for purposes of evaluating comparable products.

.2 Comparable Product Request Submittal: An action submittal requesting consideration of a comparable product, including the following information:
  .1 Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.

.3 Basis-of-Design Product Specification Submittal: An action submittal complying with requirements in Section 01 33 00 -Submittal Procedures.

1.3 Quality

.1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish 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 Consultant based upon requirements of Contract Documents.

.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.

1.4 Availability

.1 Review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Consultant of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

.2 In event of failure to notify Consultant at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Consultant reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.5 Storage, Handling and Protection

.1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.

.2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

.3 Store products subject to damage from weather in weatherproof enclosures.

.4 Store cementitious products clear of earth or concrete floors, and away from walls.

.5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

.6 Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.

.7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.

.8 Remove and replace damaged products at own expense and to satisfaction of Consultant.

.9 Touch up damaged factory finished surfaces to Consultant's satisfaction. Use touch up materials to match original. Do not paint over name plates.

1.6 Transportation

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

.2 Transportation cost of products supplied by Owner will be paid for by Owner. Contractor shall be responsible for the unloading, handling and storage of such products.

1.7 Manufacturer’s Instructions

.1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.

.2 Notify Consultant in writing, of conflicts between specifications and manufacturer's instructions, so that Consultant may establish course of action.

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

Contract Time.

1.8 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.

.2 Immediately notify Consultant if required Work is such as to make it impractical to produce required results.

.3 Do not employ anyone unskilled in their required duties. Consultant reserves right to require dismissal from site, workers deemed incompetent or careless.

.4 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Consultant, whose decision is final.

1.9 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.

1.10 Concealment

.1 In finished areas, conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.

.2 Before installation, inform Consultant if there is interference. Install as directed by Consultant.

1.11 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.

1.12 Location of Fixtures

.1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.

.2 Inform Consultant of conflicting installation. Install as directed.

1.13 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.

1.14 Fastenings – Equipment

.1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

.2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.

.3 Bolts may not project more than one diameter beyond nuts.

.4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.15 Dielectric Separation

.1 Ensure that a dielectric separator is provided in a permanent manner over entire contact surfaces to prevent electrolytic action (galvanic corrosion) between dissimilar materials. Similarly, prevent corrosion to aluminum in contact with alkaline materials such as contained in cementitious materials.

1.16 Tolerances for Execution of Work

.1 Unless specifically indicated otherwise, Work shall be installed plumb, level, square and straight.

.2 Unless acceptable tolerances are otherwise specified in specification sections, or are otherwise required for proper functioning of equipment, site services and mechanical and electrical systems:
- .1 “Plumb and level” shall mean plumb or level within 1 mm in 1m.
- .2 “Square” shall mean not in excess of 10 seconds lesser or greater than 90 degrees.
- .3 “Straight” shall mean within 1 mm under a 1 m long straight edge.
- .4 “Flush” shall mean within:
  - .1 6 mm for exterior concrete, masonry and paving materials.
  - .2 1 mm for interior concrete, masonry, tile and similar surfaces.
  - .3 0.5 mm for other interior surfaces.

.3 Allowable tolerances shall not be cumulative

1.17 Protection of Work in Progress

.1 Adequately protect Work completed or in progress. Work damaged or defaced due to failure in providing such protection is to be removed and replaced, or repaired, as directed by Consultant, at no increase in Contract Price or Contract Time.

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

1.18 Existing Utilities

.1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and/or building occupants and pedestrian and vehicular traffic.

.2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

1.19 Hazardous Materials

.1 Report any found or suspected hazardous materials to the Owner.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Safety Requirements
.2 Fire Protection
.3 Accident Reporting
.4 Records on Site

1.2 References

.1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
.2 Fire Commissioners of Canada, FC 301, Standard for Construction Operations.
.3 National Fire Protection Agency (NFPA)
  .1 NFPA 241 Standard for Safeguarding Construction, Alteration, and Demolition Operations
.4 Occupational Health and Safety Act.
  .1 R.R.O. 1990, Reg. 860: Workplace Hazardous Materials Information System (WHMIS)
  .2 O. Reg. 632/05: Confined Spaces
.5 Ontario Building Code.

1.3 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit to Owner and Consultant copies of the following documents, including updates issued:
  .1 Notice of Project filed with Provincial Ministry of Labour or equivalent for Place of Work
  .2 Site-specific Health and Safety Plan prior to commencement of work on the work site. Plan shall include but not be limited to the following:
    .1 Name and contact info of Contractor's Health and Safety Representative for Work Site; including twenty-four (24) hour emergency contact phone numbers.
    .2 Phone numbers of local fire, police, and ambulance outside of 911 services.
    .3 Location of nearest medical facility and level of injury that each can service.
  .3 Submit to the Owner, Consultant and Municipal Fire Department, for review, a “Fire Safety Plan” conforming to Section 2.14 of the National Fire Code of Canada. Maintain a copy of the “Fire Safety Plan” on site.
  .4 Copies of certification for all employees on site of applicable safety training including, but not limited to:
    .1 WHMIS.
    .2 Fall arrest and protection.
    .3 Suspended Access Equipment.
    .4 Erection of Scaffolding.
    .5 License for powder actuated devices.
  .5 On-site Contingency and Emergency Response Plan addressing:
    .1 Standard procedures to be implemented during emergency situations.
    .2 Preventative planning and protocols to address possible emergency situations.

.3 Guidelines for handling, storing, and disposing of hazardous materials that maybe encountered on site, including measures to prevent damage or injury in case of an accidental spill.

.4 Incident and accident reports, promptly if and upon occurrence
  .1 Reports or directions issued by authorities having jurisdiction, immediately upon issuance from that authority.
  .2 Accident or Incident Reports, within 24 hours of occurrence.

.5 Submit other data, information and documentation upon request by the Consultant as stipulated elsewhere in this section.

1.4 Compliance Requirements

.1 Comply with the latest edition of the Ontario Occupational Health and Safety Act, and the Regulations made pursuant to the Act.

1.5 Constructor

.1 Notify all regulatory bodies required for construction activities, (i.e., Notice of Project, employer notification, etc.). Notifications shall include, but not be limited to, the notification requirements laid out in OHSA Sec 51-53 and the requirements of Ontario Regulation 213/91 for Construction Projects, Sections 5, 6 and 7. For the purpose of this contract the Contractor shall be the "Constructor".

.2 The “Constructor” will be solely responsible for the safety of all persons on the Site.

1.6 Safety Requirements

.1 Observe and enforce all construction safety measures and comply with the latest edition and amending regulations of the following documents and in the event of any differences among those provisions, the most stringent shall apply:
.1 Occupational Health and Safety Act and Regulations for Construction Projects, August 1997, Ontario Regulation 213/91 including amendments.
.2 Hazardous Products Act and Canada Labour Code.
.3 The Workplace Safety and Insurance Board, O. Reg 454.
.4 Ontario Building Code Act, Ontario Regulation 332/12 including amendments.
.5 National Building Code of Canada, Part 8: Safety Measures on Construction and Demolition Sites.
.6 National Fire Code of Canada.
.7 NFPA 241 Standard for Safeguarding Construction, Alteration, and Demolition Operations, 2013 Edition
.8 Environmental Protection Act.
.9 The Power Commission Act.
.10 The Boiler and Pressure Vessels Act.
.11 The Elevators and Lifts Act.
.12 The Operating Engineer's Act.
.13 Municipal statutes.

.2 Obey all Federal, Provincial and Municipal Laws, Acts, Statutes, Regulations, Ordinances and By-laws which could in any way, pertain to the work outlined in the Contract, or to any employees of the Contractor. Satisfy all statutory requirements imposed by the Occupational Health and Safety Act and Regulations made thereunder, on a Contractor, and Constructor and/or Employer with respect to or arising out of the performance of the Contractors obligations under this Contract.

.3 Working at Heights: The supervisor of the project, will be responsible to ensure that his employees and subcontractors/suppliers have current Working at Heights and Fall Protection certification.

.4 The supervisor of the project will be responsible for his employees and subcontractors/suppliers maintaining standard safety practices, as well as the specific safety rules listed below, while working on the Owner’s property.

.5 The Owner reserves the right to order individuals to leave the site if the individual is in violation of

any safety requirement or any Act. Any expense incurred will be the responsibility of the Contractor.

.6 Notify the Owner should any hazardous condition become apparent.

.7 Enforce the use of CSA approved hard hats, reflective vests and safety boots for all persons entering or working at the construction site. Refuse admission to those refusing to conform to this requirement.

.8 Provide safeguard and protection against accident, injury or damage to any person on the site, adjacent work areas and adjacent property.

1.7 Confined Space

.1 Confined Space: Where applicable, provide the Consultant and all Regulatory Authorities with a copy of the Contractors' Confined Space Entry Procedure. In the event that defined procedures are not available, abide by the applicable requirements of the Occupational Health and Safety Act and all regulations made thereunder.

.2 Persons intended to work in confined spaces, as defined by the Owner, must have formal training in performing work in confined spaces.

.3 Provide proof of valid certificates of such training for all workers prior to entry of such workers into confined spaces.

.4 Provide all necessary safety equipment for entry into confined spaces.

.5 Where workers are required to enter a confined space, as defined by the OHSA, O. Reg. 632/05 Section 221.2, ensure that workers of the Contractor and all Subcontractors follow the requirements of the above legislation, including but not limited to:

.1 Having a method for recognizing each confined space to which the program applies
.2 Having a method for assessing the hazards to which workers may be exposed
.3 Having a method for the development of confined space entry plans (which include on-site rescue procedures)
.4 Having a method for training workers
.5 Having an entry-permit system.
.6 Supply the necessary tools and equipment to perform the confined space entry. These items include, but are not limited to, required documentation, gas detectors, breathing equipment, fall protection and rescue equipment.

1.8 Safety Meetings

.1 Site toolbox safety meetings will be held weekly for all Contractor employees and all sub trade contractors.

.2 Where a Joint Health and Safety Committee is required on a project, workers and supervisors, selected, as members of the committee must attend.

1.9 Workplace Hazardous Materials Information System (WHMIS)

.1 Be familiar with WHIMIS regulations and be responsible for compliance.

.2 Provide to the Consultant a list of Designated Substances that will be brought to the site prior to commencing work. Safety Data Sheets (SDS) and the hazardous material inventory for each substance listed must be kept on the Project.

.3 Be responsible for all other requirements of regulations as applicable to Employers.

.4 All controlled products to be properly labelled and stored.

.5 Immediately inform Owner and Consultant if any unforeseen or peculiar safety-related factor, hazard, or condition becomes evident during performance of Work.

1.10 Fire Protection

.1 Provide and maintain safeguard and protection against fire in accordance with current fire codes and regulations.

.2 Provide temporary fire protection throughout the course of construction. Particular attention shall be paid to the elimination of fire hazards.

.3 Comply with the requirements of FCC No. 301 Standards for Construction Operations issued by the Fire Commissioner of Canada and the National Building Code.

.4 Provide and maintain portable fire extinguishers during construction, in accordance with Part 6 of the National Fire Code of Canada 2015 and NFPA 241.

.5 Maintain unobstructed access for firefighting at all areas in accordance with the National Building Code of Canada.

1.11 First Aid

.1 Provide such equipment and medical facility as required by WSI Act to supply first aid services to anyone who may be injured at the place of Work. Report all accidents or injuries to the proper authorities and to the Owner and Consultant.

1.12 Accident Reporting

.1 Investigate and report incidents and accidents as required by Occupational Safety and Health Act, and the Regulations made pursuant to the Act.

1.13 Records on Site

.1 Maintain on site a copy of the safety documentation as specified in this Section and any other safety related reports and documents issued to or received from the authorities having jurisdiction.

.2 Upon request, make copies available to the Consultant.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Field Engineering survey services.
.2 Recording of subsurface conditions found.

1.2 References

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

1.3 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit name and address of Surveyor to Consultant.

.3 On request of Consultant, submit documentation to verify accuracy of field engineering work.

.4 Submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform and do not conform to Contract Documents.

1.4 Examination of Work and Site

.1 Examine the site and existing building to be fully informed of their particulars as related to the Work.

.2 Verify dimensions of completed Work in place before fabrication of Work to be incorporated with it. Ensure that all necessary job dimensions are taken for the proper execution of the work. Assume complete responsibility for the accuracy and completeness of such dimensions.

.3 No claims for extra payment will be paid for extra work made necessary or for difficulties encountered due to conditions of the site which were visible or reasonably inferable from an examination of the site at the time prior to tender closing date and furthermore, failure of the Contractor to visit and examine the site shall be deemed a waiver of all claims for extra payment due to any condition of the site existing prior to tender closing date.

.4 As-found damage: Record by photography and submit evidence to Consultant before commencing work, any found damaged surfaces or materials adjacent to new work, and not included under scope of this new work. Remedial work to any damage, not so recorded, shall be the responsibility of the Contractor.

1.5 Qualifications of Surveyor

.1 Qualified registered land surveyor, licensed to practice in Place of Work, acceptable to Consultant.

1.6 Survey Reference Points

.1 Existing control points are designated on drawings.

.2 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.

.3 Make no changes or relocations without prior written notice to Consultant.
.4 Report to Consultant when reference point is lost or destroyed or requires relocation because of

necessary changes in grades or locations.

.5 Require surveyor to replace control points in accordance with original survey control.

1.7 Existing Services

.1 Before commencing work, establish location and extent of service lines in area of Work and notify Consultant of findings. The Contractor is responsible for coordination of all utility locates.

.2 Remove abandoned service lines within 2 m of structures. Cap or otherwise seal lines at cut off points as directed by Consultant.

.3 Where Work involves breaking into or connecting to existing services, carry out work at times directed by authorities having jurisdiction, with minimum of disturbance to building occupants, pedestrian and vehicular traffic.

.4 Where unknown services are encountered, immediately advise Consultant and confirm findings in writing.

.5 Install temporary drain plugs to prevent construction debris from blocking pipes downstream of the work.

.6 All existing concrete floor slabs shall be scanned prior to any cutting or breaking of concrete. Employ a qualified concrete scanning company or inspection and testing agency to scan and map floor slabs for reinforcing, plastic and metal conduit, piping, grounding cables, embedment and the like. Map all slabs and provide copies to the Owner and Consultant.

1.8 Location of Services, Equipment and Fixtures

.1 Location of services, equipment, fixtures and outlets indicated on drawings or specified are to be considered as approximate.

.2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance. Include existing equipment which affects or will be affected by the work.

.3 Inform Consultant of impending installation and obtain approval for actual location.

.4 Location of site services where required, is approximate and is based on information provided by the Owner. Undertake all locates to determine exact locations of existing services and lay out new services to avoid any conflicts with new building elements, including site improvements, building foundations and other new or existing services.

.5 Submit field drawings and interference drawings to indicate relative position of various services and equipment. Refer to requirements for interference drawings specified elsewhere.

.6 Prepare interference and equipment placing drawings to ensure that all components will be properly accommodated within the spaces provided.

.7 Prepare drawings to indicate coordination and methods of installation of a system with other systems where their relationship is critical. Ensure that all details of equipment apparatus and connections are coordinated.

.8 Ensure that clearances required by jurisdictional authorities and clearances for proper

maintenance and access are indicated and maintained.

.9 Submit interference drawings to Owner and Consultant in accordance with Section 01 33 00.

.10 Unless specifically indicated by the Consultant, interference drawings will be received for information only and will not be reviewed.

1.9 Records

.1 Maintain a complete, accurate log of control and survey work as it progresses.

.2 Record locations of maintained, re-routed and abandoned service lines.

1.10 Subsurface Conditions

.1 Promptly notify Consultant in writing if subsurface conditions at Place of Work differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.

.2 After prompt investigation, should Consultant determine that conditions do differ materially, instructions will be issued for changes in Work.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

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

1.2 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit written request and obtain Consultant's approval in advance of cutting or alteration which affects:
- .1 Structural integrity of any element of Project.
- .2 Integrity of weather exposed or moisture resistant elements.
- .3 Efficiency, maintenance, or safety of any operational element.
- .4 Visual qualities of sight exposed elements

.3 Include in request:
- .1 Identification of project.
- .2 Location and description of affected Work.
- .3 Statement on necessity for cutting or alteration.
- .4 .Description of proposed Work, and products to be used.
- .5 Alternatives to cutting and patching.
- .6 Effect on Work of Owner or separate contractor.
- .7 Date and time work will be executed.

1.3 Materials

.1 As specified and required for original installation.

.2 Requests for change in materials shall include documentation indicating conformance to project requirements and intent.

1.4 Definitions

.1 Cutting: Removal of in-place construction necessary to permit installation or performance of other work.

.2 Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

PART 2 PRODUCTS

2.1 Materials

.1 General: Comply with requirements specified in other Sections.

.2 In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

.3 If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Consultant for the visual and functional performance of in-place materials.

PART 3 EXECUTION

3.1 Preparation

.1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.

.2 After uncovering, inspect conditions affecting performance of Work.

.3 Beginning of cutting or patching means acceptance of existing conditions.

.4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.

.5 Provide protection from elements for areas which may be exposed by uncovering work; maintain excavations free of water.

3.2 General

.1 Carry out all cutting, fitting and patching required for the work of the Contract.

.2 Repair all wall and floor surfaces where items have been removed.

.3 Make good all finishes as required.

.4 Repaint damaged wall surfaces.

.5 Fit several parts together, to integrate with other Work.

.6 Uncover Work to install ill-timed Work.

.7 Remove and replace defective and non-conforming Work.

.8 Provide cutting and patching of all openings in non-structural elements of Work as necessary to complete installation of mechanical and electrical Work. Include complete removal and replacement of such elements as necessary to provide construction access.

.9 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.

.10 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.

.11 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools are not allowed on masonry work without prior approval.

.12 Restore work with new products in accordance with requirements of Contract Documents.

.13 Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

.14 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with “ULC approved firestopping material, full thickness of the construction element. Include any openings in existing building elements created by removal of existing services or equipment.

.15 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

3.3 Cutting and Patching

.1 General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

.2 Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

.3 Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

.4 Temporary Support: Provide temporary support of work to be cut.

.5 Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

.6 Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 01 10 00 - Summary of Work.

.7 Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

.8 Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
   .1 In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
   .2 Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
   .3 Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
   .4 Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
   .5 Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
   .6 Proceed with patching after construction operations requiring cutting are complete.

.9 Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
   .1 Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
   .2 Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and

refinishing.
.1 Clean piping, conduit, and similar features before applying paint or other finishing materials.
.2 Restore damaged pipe covering to its original condition.

.3 Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, colour, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform colour and appearance.
.1 Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

.4 Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.

.5 Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

.10 Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.4 Subfloor Levelling

.1 Where existing flooring is to be removed from floor slabs to remain, including ceramic tile flooring, carefully remove all flooring, grout, adhesives, waterproofing membranes and the like down to the base slab. Clean, patch and repair slab where damaged with concrete or acceptable leveling compound in accordance with new flooring manufacturer's instructions and ASTM F710. Refer to original building drawings and remove and replace existing concrete floor toppings as necessary and where required.

.2 Where new flooring is to be installed on new concrete slab or on framed floors, subfloor shall be levelled in accordance with flooring manufacturer's specifications and tolerances and with ASTM F710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

3.5 Fire Barrier Seals

.1 Ensure fire separations are maintained as indicated on the drawings. patch and firestop all penetrations accordingly.

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Progressive Cleaning
.2 Final Cleaning

1.2 References

.1 National Fire Protection Association (NFPA)
  .1 NFPA 241-22 Standard for Safeguarding Construction, Alteration, and Demolition Operations.

1.3 Project Cleanliness

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris.

.2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by the Owner. Do not burn waste materials on site.

.3 Clear snow and ice from access to building, bank/pile snow in designated areas only.

.4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.5 Provide on-site containers for collection of waste materials and debris.

.6 Provide and use clearly marked separate bins for recycling.

.7 Clean interior areas prior to start of finishing work and maintain areas free of dust and other contaminants during finishing operations.

.8 Store volatile waste in covered metal containers and remove from premises at end of each working day.

.9 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

.10 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

PART 2 PRODUCTS

2.1 Products

.1 All cleaning materials and products shall be low VOC type. Submit list of cleaning products including SDS for approval prior to commencement of cleaning operations.

.2 Use only cleaning materials recommended by manufacturer of surface to be cleaned and recommended by cleaning material manufacturer.

PART 3 EXECUTION

3.1 Final Cleaning

.1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.2 Remove waste products and debris other than that caused by others and leave Work clean and suitable for occupancy.

.3 Prior to final review remove surplus products, tools, construction machinery and equipment.

.4 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.

.5 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, floors and ceilings.

.6 Clean lighting reflectors, lenses, and other lighting surfaces. Clean and/or replace lamps, light fixtures, grilles and lenses.

.7 HEPA vacuum clean and dust building interiors, behind grilles, louvres and screens.

.8 Thoroughly vacuum clean interior of electrical equipment.

.9 Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.

.10 Clean and seal concrete floor surfaces with non-skid matte sealer.

.11 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

.12 Clean equipment and fixtures to a sanitary condition; clean or replace filters of mechanical equipment.

.13 Broom clean and wash exterior paved areas, walks, steps and surfaces; rake clean other surfaces of grounds.

.14 Remove dirt and other disfiguration from exterior surfaces.

.15 Clean and sweep roofs. Clear all drains, scuppers, gutters and downspouts.

.16 Remove debris and surplus materials from crawl spaces and other accessible concealed spaces.

.17 Remove snow and ice from access to building.

.18 Under direction of Consultant, aim adjustable luminaires.

3.2 Waste Management and Disposal

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 – Construction Waste Management and Disposal.

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 References.
.2 Submittals.
.3 Definitions.
.4 Waste Management Goals for the Project.
.5 Documents.
.6 Waste Management Plan.
.7 Materials Source Separation Program.
.8 Disposal of Wastes.
.9 Scheduling.
.10 Storage, Handling and Protection.
.11 Application.
.12 Diversion of Materials.

1.2 References

.1 O. Reg. 102/94 Waste Audits and Waste Reduction Work Plans.
.2 O. Reg. 278/05 Occupational Health and Safety Act

1.3 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit a completed Waste Management Plan (WMP) prior to project start-up.

1.4 Definitions

.1 Waste Management Plan (WMP): Contractor's approved overall strategy for waste management including waste reduction workplan and materials source separation program.

.2 Materials Source Separation Program (MSSP): Consists of a series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.

.3 Separate Condition: Refers to waste sorted into individual types.

1.5 Waste Management Goals for the Project

.1 The Owner has established that this Project shall generate the least amount of waste possible and that processes shall be employed that ensure the generation of as little waste as possible including prevention of damage due to mishandling, improper storage, contamination, inadequate protection or other factors as well as minimizing over packaging and poor quantity estimating.

.2 Of the waste that is generated, the waste materials designated in this specification shall be salvaged for reuse and or recycling. Waste disposal in landfills or incinerators shall be minimized.

1.6 Waste Management Plan

.1 Waste Management Plan: Submit a Waste Management Plan within 10 calendar days after receipt of Notice of Award of Contract, or prior to any waste removal, whichever occurs sooner. The Plan shall contain the following:
  .1 Analysis of the proposed job site waste to be generated, including the types of recyclable and waste materials generated (by volume or weight). In the case of demolition, a list of each item proposed to be salvaged during the course of the project should also be prepared
  .2 Alternatives to Land Filling: Contractor shall designate responsibility for preparing a list of each material proposed to be salvaged, reused, or recycled during the course of the Project.

.2 Post WMP or summary where workers at site are able to review its content.

1.7 Materials Source Separation Program

.1 The Waste Management Plan shall include a Source Separation Program for recyclable waste and shall be in accordance with the established policies currently in place at the local Municipality, and the requirements of O. Reg. 102/94.

.2 Prepare MSSP and have ready for use prior to project start-up.

.3 Implement MSSP for waste generated on project in compliance with approved methods and as approved by Consultant.

.4 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and/or recyclable materials.

.5 Provide containers to deposit reusable and/or recyclable materials.

.6 Locate containers to facilitate deposit of materials without hindering daily operations.

.7 Locate separated materials in areas which minimize material damage.

.8 Collect, handle, store on-site, and transport off-site, salvaged materials in separate condition.

1.8 Disposal of Wastes

.1 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.2 Provide appropriate on-site containers for collection of waste materials and debris. Containers for volatile wastes shall be closed containers and shall be removed from site daily.

.3 Provide and use clearly marked separate bins for recycling.

.4 Remove waste materials from site at regularly scheduled times or dispose of as directed by Consultant. Do not burn waste materials on site.

.5 Remove waste material and debris from site and deposit in waste container at end of each working day.

.6 Do not permit waste to accumulate onsite.

.7 Burying of rubbish and waste materials is prohibited.

.8 Disposal of waste into waterways, storm or sanitary sewers is prohibited.

1.9 Scheduling

.1 Coordinate work with other activities at site to ensure timely and orderly progress of the Work.

1.10 Storage, Handling and Protection

.1 Store, materials to be reused, recycled and salvaged in locations as directed by Owner.

.2 Materials from building demolition to be salvaged or re-used are to be removed and salvaged.

.3 Unless specified otherwise, materials for removal become Contractor's property.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Application

.1 Do work in compliance with Waste Management Plan.

.2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

.3 Source separate materials to be reused/recycled into specified sort areas.

3.2 Designated Substances

.1 All designated substances abatement, removal and disposal shall be completed in accordance with O. Reg 278/05 and all other applicable legislation.

3.3 Diversion of Materials

.1 Separate materials from general waste stream and stockpile in separate piles or containers, to approval of Owner, and consistent with applicable fire regulations. Mark containers or stockpile areas.

.2 On-site sale of materials is not permitted.

End of Section

.

PART 1 GENERAL

1.1 Section Includes

.1 Administrative procedures preceding preliminary and final inspections of Work.

1.2 References

.1 Canadian Construction Documents Committee
  .1 CCDC 2-2020 Stipulated Price Contract including Supplementary Conditions.
.2 OAA/OGCA Document 100 - Recommended Procedures Regarding Substantial Performance of Construction Contracts and Completion Takeover of Projects.
.3 The Construction Act.

1.3 Inspection and Declaration

.1 Contractor's Inspection: The Contractor shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents. Submit duplicate copies of the deficiency list to the Owner and Consultant.
  .1 Notify Consultant in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
  .2 Request Consultant's review.

.2 Consultant's Review: Consultant and Contractor will perform review of Work to identify obvious defects or deficiencies. Contractor shall correct 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 Boiler Inspection Branch, Fire Commissioner, Utility companies, TSSA, ESA and other regulatory agencies have been submitted.
  .5 Operation of systems have been demonstrated to Owner's personnel.
  .6 Work is complete and ready for Final Review by the Consultant.

.4 Final Inspection: when items noted above are completed, request final review of Work by Consultant, and Contractor. If Work is deemed incomplete by the Consultant, complete outstanding items and request re-review.

.5 Declaration of Substantial Performance: when Consultant consider deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for certificate of Substantial Performance. Refer to CCDC 2, General Conditions Article GC 5.4 - Substantial Performance of Work and Payment of Holdback for specifics to application.

.6 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance shall be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.

.7 Final Payment: When Consultant considers final deficiencies and defects have been corrected and it appears requirements of Contract have been totally performed, make application for final payment. Refer to CCDC 2, General Conditions Article GC 5.5 – Final Payment for specifics to application.

.8 Payment of Holdback: After issuance of certificate of Substantial Performance of Work, submit an application for payment of holdback amount in accordance with CCDC 2, General Conditions Article 5.4 - Substantial Performance of Work and Payment of Holdback.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

.

PART 1 GENERAL

1.1 Section Includes

.1 As built, samples, and specifications.
.2 Equipment and systems.
.3 Product data, materials and finishes, and related information.
.4 Operation and maintenance data.
.5 Spare parts, special tools and maintenance materials.
.6 Warranties and bonds.
.7 Final site survey.

1.2 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

1.3 Submission

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

.2 At least 2 weeks prior to commencement of scheduled commissioning activities, submit 2 copies of the draft Operating and Maintenance Manuals, for Consultants review and use during the commissioning activities. After the completion of the commissioning activities, the Consultant will return to the Contractor 1 draft copy, with review comments, for revision. Submit 1 copy of the revised Operating and Maintenance for approval prior to the production of final copies. Prior to the Issuance of the Final Certificate of Completion, and within 10 working days after Substantial Performance, submit 2 copies of the final Operating and Maintenance Manuals.

.3 Building will not be deemed ready for use unless the draft copies of the Operating and Maintenance Manuals and the "As-built" Record Documents have been submitted and reviewed by the Consultant.

.4 Building will not be deemed ready for use unless the completed and submitted Operating and Maintenance Manuals and "As-built" Record Documents have been accepted by the Consultant.

.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.

1.4 Format

.1 Organize data in the form as instructional manual.

.2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.

.3 When multiple binders are used correlate data into related consistent groupings. 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 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 1:1 scaled CAD files in .dwg format. Provide duplicate copies on memory stick.

1.5 Contents Each Volume

.1 Table of Contents: provide title of project;
- .1 Date of submission; names.
- .2 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.
- .3 Schedule of products and systems, indexed to content of volume.

.2 For each product or system:
- .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

.3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.

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

.5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

1.6 As-Builts and Samples

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

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

.3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.

.4 Maintain record documents in clean, dry and legible condition. Do not use record documents for

construction purposes.

.5 Keep record documents and samples available for inspection by Consultant.

1.7 Recording Actual Site Conditions

.1 Record information on set of drawings, provided by Consultant.

.2 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.

.3 Contract Drawings and shop drawings: mark each item to record actual construction, including:
- .1 Measured depths of elements of foundation in relation to finish first floor datum.
- .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
- .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
- .4 Field changes of dimension and detail.
- .5 Changes made by Change Orders.
- .6 Details not on original Contract Drawings.
- .7 References to related shop drawings and modifications.

.4 Submit following drawings:
- .1 Record changes in red. Mark on one set of prints and at completion of project prior to final inspection, produce electronic “as-built” records on disk using latest version of AutoCad. Annotate “AS-BUILT RECORD” in each drawing title block.
- .2 All changes shall be shown on a separate drawing layer named "as-built".
- .3 At least 2 weeks prior to commencement of scheduled commissioning activities, submit one copy of the draft “As-built” Project Record Documents for Consultants review and use during the commissioning activities. After the completion of the commissioning activities, the Consultant will return to the Contractor the draft copy, with review comments, for revision. Prior to the Issuance of the Final Certificate of Completion, and within 10 working days after Substantial Performance, submit 2 copies of the final “As-built” Project Record Documents and disk of “as-built” record drawings.

.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, field test records, required by individual specifications sections.

1.8 Final Survey

.1 Submit final site survey certificate in accordance with Section 01 71 00 - Examination and Preparation, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

1.9 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 troubleshooting; 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 co-ordination drawings, with installed colour coded piping diagrams.

.12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

.13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

.14 Include test and balancing reports as specified in Section 01 45 00 - Quality Control.

.15 Additional requirements: as specified in individual specification sections.

1.10 Materials and Finishes

.1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations.

.2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.3 Moisture-Protection and Weather-Exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.4 Additional Requirements: as specified in individual specifications sections.

1.11 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 Spare parts as identified in individual sections are to be delivered to the Owner prior to the Contractor's application for Substantial Performance.

.4 Receive and catalogue items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit prior to final payment.

1.12 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 Maintenance materials are to be delivered to the Owner prior to the Contractor's application for Substantial Performance.

.4 Receive and catalogue items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.

.5 Obtain receipt for delivered products and submit prior to final payment.

1.13 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 Special tools are to be delivered to the Owner prior to the application for Substantial Performance.

.4 Receive and catalogue items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.

1.14 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.

1.15 Warranties and Guarantees

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

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

.3 Obtain warranties and guarantees, executed in duplicate by subcontractors, suppliers, and

manufacturers, within ten 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 guarantees until time specified for submittal.

1.16 Independent Specialty Engineers Sign-Off

.1 Prior to Substantial Performance, provide copies of signed and stamped engineers review and sign-off letters stating that the work has been built in accordance with their drawings and designs. Conditional or vague letters of sign-off will not be accepted. All specialty design engineers for all sub-contractors and suppliers will be required to review the work in progress at appropriate intervals to ensure compliance with their designs and drawings and shall provide final sign-off letters. Provide copies of all field reports issued by specialty engineers. Carry all costs associated with full compliance with this requirement.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 31 23 10 Excavating, Trenching and Backfilling

1.3 References

.1 The National Building Code of Canada 2020, Part 8-Safety Measures on Construction and Demolition Sites.
.2 CSA Group (CSA)
  .1 CSA S350-M1980 (R2003) Code of Practice for Safety in Demolition of Structures
.3 ASTM International (ASTM)
  .1 ASTM F710-22 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
.4 Ontario Provincial Regulations
  .1 Ontario Regulation 102/94 Waste Audits and Waste Reduction Work Plans.
  .2 Ontario Regulation 103/94 Environmental Protection Act.
  .3 Ontario Regulation 213/07 The Fire Code.
  .4 Ontario Regulation 232/98 Landfilling Sites.
  .5 Ontario Regulation 278/05 Designated Substance - Asbestos on Construction Projects and in Buildings and Repair Operations.
  .6 Ontario Regulation 347 Environmental Protection Act, General — Waste Management.
  .7 Ontario Regulation 332/12 The Building Code.
.5 The Workplace Health and Safety Act, and Regulations for Construction Projects.
.6 The Contractors Health and Safety Policy.
.7 Laws, rules and regulations of other authorities having jurisdiction.

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit detailed written schedule, methodology and proposed procedures for demolition, including a Safe Work Plan for review prior to commencement of demolition.

.3 Where required by authorities having jurisdiction, submit for approval drawings, diagrams or details clearly showing sequence of disassembly work or supporting structures and underpinning.

.4 Drawings for structural elements of the demolition process including shoring, underpinning and installation of new lintels or beams in existing load bearing walls, shall bear signature and stamp of qualified professional engineer registered in the Province of Ontario.

.5 Submit proposed dust-control measures.

.6 Submit proposed noise-control measures.

.7 Submit schedule of demolition activities indicating the following:
  .1 Detailed sequence of demolition and removal work, including start and end dates for each activity.
  .2 Dates for shutoff, capping, and continuation of utility services.

.8 If hazardous materials are encountered and disposed of, landfill records indicating receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

.9 At Project Closeout: Submit record drawings in accordance with Section 01 78 00. Identify and accurately locate capped utilities and other subsurface structural, electrical, or mechanical conditions

1.5 Permits

.1 Obtain and pay for all permits and comply with all laws, rules, ordinances, and regulations relating to Demolition of Building and preservation of Public Health and Safety.

.2 The Consultant will complete General Review during demolition in accordance with the Ontario Building Code. All other engineering required for shoring design and for other structural elements of the demolition work will be completed by the Contractor's own engineer and paid for by the Contractor.

1.6 Waste Management Plan

.1 All work of this section shall be completed in accordance with the contractors approved Waste Management Plan specified in Section 01 74 19.

1.7 Definitions

.1 Chemical Waste: Includes petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, organic chemicals and inorganic wastes.

.2 Demolition Waste: Building materials and solid waste resulting from construction, remodeling, repair, cleanup, or demolition operations that are not hazardous. This term includes, but is not limited to, asphalt concrete, Portland cement concrete, brick, lumber, gypsum wallboard, cardboard and other associated packaging, roofing material, ceramic tile, carpeting, plastic pipe, and steel. The materials may include rock, soil, tree stumps, and other vegetative matter resulting from land clearing and landscaping for construction or land development projects.

.3 Environmental Pollution and Damage: The presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human or animal life; affect other species of importance to humanity; or degrade the utility of the environment for aesthetic, cultural or historical purposes.

.4 Inert Fill: A permitted facility that accepts inert waste such as asphalt and concrete exclusively for the purpose of disposal.

.5 Inert Solids/Inert Waste: Non-liquid solid waste including, but not limited to, soil and concrete that does not contain hazardous substances or soluble pollutants at concentrations in excess of water-quality standards established by a regional water board and does not contain significant quantities of decomposable solid waste.

.6 Landfill: A landfill that accepts non-hazardous materials such as household, commercial, and industrial waste, resulting from construction, remodeling, repair, and demolition operations. A landfill must have a solid waste facilities permit from the Ministry of the Environment and be in conformance to O. Reg 232/98.

.7 Recycling: The process of sorting, cleansing, treating and reconstituting materials for the purpose of using the altered form in the manufacture of a new product. Recycling does not include burning, incinerating or thermally destroying solid waste.

.8 Remove: Remove and legally dispose of items, except those identified for use in recycling, re-use, and salvage programs.

.9 Reuse: The use, in the same or similar form as it was produced, of a material which might otherwise be discarded.

.10 Solid Waste: All putrescible and non-putrescible solid, semisolid, and liquid wastes, including garbage, trash, refuse, paper, demolition and construction wastes, abandoned vehicles and parts thereof, discarded home and industrial appliances, dewatered, treated, or chemically fixed sewage sludge which is not hazardous waste, manure, vegetable or animal solid and semisolid wastes, and other discarded solid and semisolid wastes. "Solid waste" does not include hazardous waste, radioactive waste, or medical waste as defined or regulated by law.

1.8 Quality Assurance

.1 Demolition Firm Qualifications: Demolition contractor shall be an experienced firm that has successfully completed demolition Work similar to that indicated for this Project.

.2 Regulatory Requirements: Comply with governing regulations before starting demolition. Comply with hauling and disposal regulations of authorities having jurisdiction. Obtain and pay for all permits required.

.3 Pre-demolition Conference: Conduct a conference at Project site.
.1 Review the environmental goals of this Project and make a proactive effort to increase awareness of these goals among all labor forces on site.
.2 Review schedule and scheduling procedures.
.3 Review health and safety procedures.
.4 Review of Project conditions including review of record photographs.

1.9 Project Conditions

.1 Construct safety barriers, barricades, fencing and hoarding to separate public from work areas as described in Section 01 56 00.

.2 The Owner assumes no responsibility for the actual condition of the structures to be demolished.

.3 Conditions existing at the time of inspection for bidding purposes will be maintained by the Owner insofar as practicable. Variations within the structures may occur by the Owner's salvage operations prior to start of demolition.

1.10 Designated Substances

.1 Refer to Pre-Renovation Designated Substances and Hazardous Materials Survey, for École élémentaire Felix-Leclerc, 50 Celestine Drive, Toronto, Ontario by Arcadis dated March 14, 2025.

.2 Should any other material not identified in the above referenced reports resembling asbestos or other hazardous substances be encountered in course of demolition work, immediately stop work and notify the Owner’s Representative. Refer to Section 01 41 00.

.3 All designated substances abatement, removal and disposal shall conform to the abatement plan. All work shall be completed in accordance with O. Reg 278/05 and all other applicable legislation. Refer to Specifications included in the Designated Substance Survey for abatement requirements.

PART 2 PRODUCTS

2.1 Materials

.1 Provide all materials necessary for temporary shoring. On completion, remove temporary materials from site.

.2 All building materials removed from the building shall become the property of the Contractor unless specified otherwise and shall be reused in new construction or removed from the Site.

.3 All concrete, masonry, asphalt and similar materials shall be crushed prior to disposal.

2.2 Salvage

.1 All items of salvageable value must be salvaged.

.2 Provide a schedule of items to be salvaged and clearly indicate which items are to be retained by Owner. Clearly identify and tag each salvageable item.

.3 Transport salvaged items from the site as they are removed.

.4 Items of salvageable value to the Contractor may be removed from the structure as the work progresses, if such items are not claimed by the Owner.

2.3 Reuse

.1 Salvage and reuse materials as indicated on the drawings.

2.4 Recycle

.1 All materials from demolition and land clearing which can be recycled through local municipal programs and which is not scheduled for salvage shall be sorted and separated in accordance with Regional, Provincial and Municipal standards and regulations.

.2 Provide recycling receptacles for the duration of construction activities at the building site.

PART 3 EXECUTION

3.1 Examination

.1 Survey existing conditions and correlate with requirements indicated to determine extent of demolition, salvage and recycling required.

.2 Verify that utilities have been disconnected and capped.

.3 Survey condition of the building to determine whether removing any element might result in a structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during demolition.

.4 Retain a licensed and qualified civil or structural engineer to provide analysis, including calculations, necessary to ensure the safe execution of the demolition work.

.5 Perform surveys and tests as the Work progresses to detect hazards resulting from demolition activities.

.6 Preliminary Survey:
- .1 The Demolition Plans indicate the general extent of existing conditions based upon drawings provided by the Owner and existing site conditions. Review all areas of work to determine full extent of areas to be demolished, altered or renovated and become familiar with actual conditions and extent of work required.
- .2 Before commencing demolition operations, examine Site and provide engineering survey to determine type of construction, condition of structure, and Site conditions. Assess strength and stability of damaged or deteriorated structures.
- .3 Assess potential effect of removal of any part or parts on the remainder of structure before such part(s) are removed.
- .4 Assess effects of demolition at adjacent structures and consider need for underpinning, shoring and/or bracing.
- .5 Investigate for following conditions:
  - .1 load bearing walls and floors
  - .2 structure suspended from another
  - .3 effects of soils, water, lateral pressures on retaining or foundations walls
  - .4 presence of tanks and other piping systems
  - .5 presence of designated substances and hazardous materials.

.7 After determining demolition methods, determine area of possible vibration. Carefully inspect beyond those adjacent areas. List potential damage areas and photograph each for record purposes before starting work.

3.2 Preparation

.1 Erect and maintain dustproof and weatherproof partitions as required to prevent spread of dust, fumes and smoke to other parts of building. Maintain fire exits. On completion, remove partitions and make good surfaces to match adjacent surfaces of building.

.2 Provide all shoring and bracing required for the execution of the work.

.3 Ensure all sedimentation controls as required are in place prior to commencement of demolition activities.

.4 Before commencing demolition, verify that existing water, gas, electrical and other services in areas being demolished are cut off, capped diverted or removed as required. Post warning signs on electrical lines and equipment which must remain energized to serve adjacent areas during period of demolition.

.5 Conduct demolition operations and remove materials from demolition to ensure minimum interference with roads, streets, walks, and other adjacent occupied and utilized facilities.

.6 Do not close or obstruct streets, walks, or other adjacent occupied or utilized facilities without permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

3.3 Utilities

.1 Contact authorities or utility companies for assistance in locating and marking services passing under, through, overhead or adjacent to structure to be demolished. Such services include:
- .1 Electrical power lines
- .2 Gas mains
- .3 Communication cables
- .4 Fibre optic cables
- .5 Water lines.
- .6 Drainage piping (storm and sanitary).

.2 Before disconnecting, removing, plugging or abandoning any existing utilities serving the building:
- .1 Notify the Owner, applicable utility companies, and local authorities having jurisdiction.
- .2 Cut off and cap utilities at the mains on the property or in the street as required by the Owner and responsible utility company. Maintain fire protection to the existing buildings at all times.
- .3 Remove, cut off and plug, or cap all utilities within the existing building areas to be demolished, except those designated to remain

3.4 Protection

.1 Erect and maintain temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction. Maintain such areas free of snow, ice, water and debris. Lighting levels shall be equal to that prior to erection.

.2 Provide safe access and egress from working areas using entrances, hallways, stairways or ladder runs, protected to safeguard personnel using them from falling debris.

.3 Do not interfere with use and activities of adjacent buildings and site. Maintain free and safe passage to and from buildings.

.4 Where demolition operations prevent normal access to adjacent properties, provide and maintain suitable alternative access.

.5 Provide flagmen where necessary or appropriate, to provide effective and safe access to site to vehicular traffic and protection to Owner’s personnel. Refer to Division 1 for safety requirements.

.6 Protect existing site improvements, appurtenances, that are designated to remain in place.

.7 Ensure that all necessary controls are in place at the beginning of each work period which will prevent the spread of contaminated material beyond the work area limits. Stop work immediately if there exists any possibility of the spread of contaminated materials.

.8 Keep dust from entering existing facilities and areas of building not affected by the Work. Comply with Ministry of Health requirements regarding debris control.

.9 Ensure scaffolds, ladders, equipment and other such equipment are not accessible to public. Protect with adequate fencing or remove and dismantle at end of each day or when no longer required.

.10 Take precautions to guard against movement, settlement or collapse of adjacent structures, services or driveways. Be liable for such movement, settlement or collapse caused by failure to take necessary precautions. Repair promptly such damage when ordered.

.11 If Owner considers additional bracing and shoring necessary to safeguard and prevent such movement or settlement, install bracing or shoring upon Owner's orders.

.12 Particular attention shall be paid to prevention of fire and elimination of fire hazards which would endanger new work or existing premises.

.13 Protect existing adjacent work against damages which might occur from falling debris or other causes due to work of this Section.

.14 At all times protect the structure from overloading.

.15 Provide protection around floor and/or roof openings.

.16 Protect from weather, parts of adjoining structures not previously exposed.

.17 Protect interiors of building parts not to be demolished from exterior elements at all times.

.18 At end of each day's work, leave work in safe condition so that no part is in danger of toppling or falling.

3.5 Temporary Ventilation

.1 Provide all required temporary ventilation for demolition work.

3.6 Environmental Controls

.1 Comply with provincial and municipal regulations pertaining to water, air, solid waste, recycling, chemical waste, sanitary waste, sediment and noise pollution.

.2 Protection of Natural Resources:
- .1 Preserve the natural resources.
- .2 Confine demolition activities to areas defined by public roads, easements, and work area limits indicated on the drawings.
- .3 Water Resources: Comply with applicable regulations concerning the direct or indirect discharge of pollutants to underground and natural surface waters. Provide sedimentation control where necessary.
- .4 Store and service construction equipment at areas designated for collection of oil wastes.
- .5 Oily Substances: Prevent oily or other hazardous substances from entering the ground, drainage areas, or local bodies of water in such quantities as to affect normal use, aesthetics, or produce a measurable ecological impact on the area.

.3 Dust Control, Air Pollution, and Odour Control: Prevent creation of dust, air pollution and odors.
- .1 Use temporary enclosures and other appropriate methods to limit dust and dirt rising and scattering in air to lowest practical level.
- .2 Store volatile liquids, including fuels and solvents, in closed containers.
- .3 Properly maintain equipment to reduce gaseous pollutant emissions.

.4 Noise Control: Perform demolition operations to minimize noise.
- .1 Provide equipment, sound deadening devices, and take noise abatement measures that are necessary to comply with municipal regulations.

.5 Salvage, Re-Use, and Recycling Procedures:
- .1 Identify re-use, salvage, and recycling facilities.

.2 Develop and implement procedures to re-use, salvage, and recycle demolition materials.
.3 Identify materials that are feasible for salvage, determine requirements for site storage, and transportation of materials to a salvage facility.
.4 Source-separate clean and uncontaminated demolition materials including, but not limited to the following types:
.1 Concrete, Concrete Block, Concrete Masonry Units (CMU), Brick.
.2 Metal (ferrous and non-ferrous).
.3 Wood.
.4 Glass.
.5 Plastics and Insulation.
.6 Gypsum Board.
.7 Porcelain Plumbing Fixtures.
.8 Fluorescent Light Tubes.
.9 Paper: Bond, Newsprint, Cardboard, Paper, Packaging Materials.
.10 Other materials as appropriate.

3.7 Performance

.1 Ensure demolition work is supervised by competent foreman at all times.

.2 Demolition shall proceed safely in systematic manner. Work on each floor level shall be complete before commencing work on supporting structure and safety of its supports are impaired. Parts of building which would otherwise collapse prematurely shall be securely shored. Walls and piers shall not be undermined.

.3 Until acceptance, maintain and preserve active utilities traversing premises.

.4 Provide enclosed chutes for disposal of debris from heights more than 1 storey in accordance with CSA S350.

.5 Maintain safety of site by shoring below-grade-structures and excavations resulting from demolition against collapse.

3.8 Demolition

.1 Review demolition procedures to ensure no personnel or equipment are located or working without additional safe working platforms or working surface adequate to support the operations.

.2 Any damage caused to the adjacent buildings or properties by the neglect of the Contractor or any of his forces shall be made good at the expense of the Contractor including all costs and charges which may be claimed by the Owner for damages suffered.

.3 Demolish in a manner to minimize dusting. Keep dusty materials wetted at all times.

.4 Demolition: Use methods required to complete Work within limitations of governing regulations and as follows:
.1 Locate demolition equipment throughout the building and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
.2 Demolish concrete and masonry in sizes that will be suitable for acceptance at recycling or disposal facilities.
.3 Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.

.4 Break up and remove concrete slabs on grade in small sizes, suitable for acceptance at recycling or disposal facilities, unless otherwise shown to remain.
.5 Remove all disconnected, abandoned utilities.
.6 Remove all finishes, fixtures, fitments and services as indicated
.7 Damages: Promptly repair damages to adjacent facilities caused by demolition operations.
.8 Prevent access to excavations by means of fences or hoardings.

3.9 Selective Demolition

.1 Carefully dismantle and remove all items in as shown and as necessary to complete the work.

.2 Salvage items scheduled for reuse or to be handed over to the Owner.

.3 Particular attention shall be paid to prevention of fire and elimination of fire hazards which would endanger the existing buildings.

.4 Where existing flooring is to be removed from floor slabs to remain, including ceramic tile flooring, carefully remove flooring, grout, adhesives, waterproofing membranes and the like down to the base slab. Patch and repair slab where damaged with concrete or acceptable leveling compound in accordance with new flooring manufacturer's instructions and ASTM F710. Refer to original building drawings and remove and replace existing concrete floor toppings as necessary and where required.

.5 Return areas to condition existing prior to the start of the work unless indicated otherwise.

.6 At exterior and interior bearing walls to be removed, include breaking out and removal of existing concrete foundations to a minimum of 200 mm below new finished floor level.

3.10 Handling of Demolished Materials

.1 Conform to the approved Waste Management Plan.

.2 Do not allow demolished materials to accumulate or be stored on-site for more than 5 days.

.3 Do not burn, bury or otherwise dispose of rubbish and waste materials on project site.

.4 Pallet and shrink-wrap materials scheduled for re-use and stockpile where directed on site.

.5 Disposal: Transport demolished materials off Owner's property and legally reuse, salvage, recycle, or dispose of materials. Legally transport and dispose of materials that cannot be delivered to a source separated or mixed recycling facility to a transfer station or disposal facility that can legally accept the materials for the purpose of disposal.

.6 Deliver to facilities that can legally accept new construction, excavation and demolition materials for purpose of re-use, recycling, composting, or disposal.

3.11 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

.2 Clean adjacent streets and driveways of dust, dirt and materials caused by demolition operations.

.3 Reinstate areas and existing works outside areas of demolition to conditions that existed prior to

commencement of work.

.4 Upon completion of demolition work, remove debris, trim surfaces and leave work site clean.

.5 Video storm and sanitary sewers and jet clean where debris may have accumulated

End of Section

ASBESTOS ABATEMENT SPECIFICATIONS
École élémentaire Félix-Leclerc

TABLE OF CONTENTS

At Rear:

Drawing No 30247688-1 - Locations of Work Areas – Main Floor Plan

Electrician’s Submittal Form

1.0 PART 1 – GENERAL

1.1 GENERAL

.1 The requirements as set out in these specifications may, at times, exceed the procedures detailed in the various applicable regulations. All work shall be done in compliance with the specifications AND the regulations. Should there be any discrepancy or conflict between the documents, the most stringent shall apply.

1.2 ASBESTOS ABATEMENT OUTLINE OF WORK

.1 The intent of the work is to remove, and dispose select accessible asbestos-containing materials, to the extent practicable, prior to and during building renovation operations.

.2 Replacement of the removed materials is not part of this contract unless otherwise noted.

.3 Coordinate all work with the General Contractor and sub trades as required.

.4 Refer to Architectural, Mechanical and Electrical Drawings and contract specifications for additional details and locations.

.5 Isolation and disconnects of light fixtures, communication, and life safety systems in T-bar ceiling assemblies and ceilings with 12” x 12” asbestos-containing acoustic ceiling tiles slated for demolition by the asbestos abatement contractor, will be performed by the General Contractor’s licensed electrician.

.6 Florescent light tubes in light fixtures in T-bar ceiling assemblies and in light fixtures affixed to 12” x 12” asbestos-containing acoustic ceiling tiles slated for demolition by the asbestos abatement contractor, will be performed by the General Contractor’s sub trades.

.7 Removal of millwork, mechanical systems and other attachments to facilitate the removal of asbestos-containing materials, will be performed by the General Contractor’s sub trades.

.8 Electrical hookups of GFI panels and temporary panels for power equipment will be performed by the General Contractor’s licensed electrician in compliance to all regulatory requirements and codes.

.9 Each negative pressure unit shall be integrity tested at the work site prior to commencement of asbestos removal operations.

.10 Supply and install scaffolding and/or lift equipment (scissor lift, zoom-boom lift, etc.) in accordance with all applicable regulations, in order to provide sufficient and safe access to the work areas.

.11 **Abatement work will be performed in two phases: Phase1 and Phase 2. Phase 1 referred to as (Abatement Phase) will be performed as part of the first mobilization. Phase 2 referred to as the (Rebuild Phase) may be performed as several separate mobilizations.**

.12 Provide all supervision, labour, equipment, tools, materials, waste management, haulage and disposal, and other services, as required, for undertaking and completing all of the work, as detailed below.

.13 **Work Area 1 – Phase 1 (Abatement Phase) - Room 104**

.1 Prepare the areas as indicated above and on the attached floor plans for a Type 2 Enclosure asbestos removal operation.

.2 Erect a three-chamber decontamination facility at the entrance to the work areas using wood or steel plates and studs covered with rip-proof polyethylene sheeting on both sides and sealed with duct tape.

.1 Change room/wash station and dirty room should have double-overlapping, flaps at both ends of the rooms.

.3 Establish a measurable negative pressure differential in the enclosure work areas by using fan/filter units equipped with High Efficiency Particulate Air (HEPA) filters. Units must be integrity-tested on site and are to be exhausted directly outdoors.

.4 Remove and dispose the following as clean demolition waste:

.1 Entire T-bar ceiling assembly, including but not limited to, light fixtures, acoustic ceiling tiles, and T-bar ceiling support systems.

.2 All vinyl baseboards attached to drywall applications.

.5 Remove and dispose as asbestos waste, all vinyl baseboards attached to concrete block walls with asbestos-containing paint applications.

.1 In areas where concrete block wall sections are not slated for demolition or new wall framing materials are not being attached to concrete block walls, remove mastic to an extent that only a thin layer of mastic remains on concrete block walls. The General Contractor will clearly identify walls sections where full mastic removal is not required.

.2 In areas where concrete block walls sections are slated for demolition or new wall framing materials are being attached to concrete block walls, using power tools (power grinders) that are attached to dust collecting devices equipped with HEPA filters, completely remove mastic from concrete block walls. The General Contractor will clearly identify walls sections where full mastic removal is required. For costing purposes allow for the removal of baseboard mastic from approximately six (6) linear metres of walls.

.6 Remove and dispose as asbestos waste, all non-asbestos asbestos-containing vinyl floor tiles and associated asbestos-containing mastic.

.1 Using power tools (power grinders) that are attached to dust collecting devices equipped with HEPA filters, remove and dispose as asbestos waste, all asbestos-containing vinyl floor tile mastic. Mastic is to be completely removed from concrete floors. **Chemical and/or water-based mastic removers are not to be used.**

.1 Dust collecting devices with HEPA filters (HEPA vacuums) that are attached to power tools, must have adequate CFM capacity to properly collect mastic and residual dust generated by the power grinding operations.

.2 All power tools used to remove mastics, must have an integrated shrouding system designed to properly contain dust and debris generated by the power grinding operations.

.7 Using chemical paint removers and/or power tools (power grinders) that are attached to dust collecting devices equipped with HEPA filters, remove and dispose as asbestos waste, select areas of asbestos-containing paint applied to concrete block walls where walls sections are slated for demolition and new wall framing materials are being attached to concrete block walls wall. Paint is to be completely removed from concrete block walls in these areas. Coordinate with the General Contractor to remove adequate areas of paint from concrete block to allow the General Contractor's sub trades to remove concrete block wall sections, install steel lintels for new wall openings, and attach new wall framing materials without the use of special procedures. The General Contractor will clearly identify all areas for paint removals. For costing purposes, allow for the removal of approximately twenty (20) square metres of paint from concrete block.

.14 **Work Area 2 – Phase 1 (Abatement Phase) - Rooms 137 and 139**

.1 Prepare the areas as indicated above and on the attached floor plans for Type 2 Enclosure asbestos removal operations.

.2 Erect a three-chamber decontamination facility at the entrance to the work areas using wood or steel plates and studs covered with rip-proof polyethylene sheeting on both sides and sealed with duct tape.

.1 Change room/wash station and dirty room should have double-overlapping, flaps at both ends of the rooms.

.3 Establish a measurable negative pressure differential in the enclosure work areas by using fan/filter units equipped with High Efficiency Particulate Air (HEPA) filters. Units must be integrity-tested on site and are to be exhausted directly outdoors

.4 Remove and dispose as asbestos waste, all ceiling light fixtures and 12" x 12" asbestos-containing acoustic ceiling tiles and associated mastic. Light fixtures may be disposed as clean demolition waste provided, they are thoroughly cleaned of all dust and debris.

.5 Using power tools (power grinders) that are attached to dust collecting devices equipped with HEPA filters, remove and dispose as asbestos waste, all ceiling tile mastic applied to concrete roof decks. Mastic is to be completely removed from concrete roof decks.

.15 **Work Area 3 – Phase 1 (Abatement Phase) – Room 132**

.1 Prepare the areas as indicated above and on the attached floor plans for a Type 1 asbestos removal operation.

.2 Remove and dispose as asbestos waste, all vinyl baseboards attached to concrete block walls with asbestos-containing paint applications. Remove mastic to an extent that only a thin layer of mastic remains on concrete block walls.

16. **Work Areas 1, 3 and 4 – Phase 2 (Rebuild Phase) – Rooms 104, 131, 132, 133 and 134**

.1 Prepare locations pre-determined by the General Contractor inside areas as indicated above and on the attached floor plans for Type 2 Non-Enclosure asbestos removal operations.

.2 Supply and install scaffolding, in accordance with all applicable regulations, in order to provide sufficient and safe access to the work areas.

.3 Assist the General Contractor's sub trades in attaching items such as T-bar ceiling assembly components, millwork and other attachments to concrete block walls with asbestos-containing paint.

.4 Using power tools attached to dust collecting devices equipped with HEPA filters, mechanically fasten items supplied by the General Contractor to concrete block walls with asbestos-containing paint. The General Contractor will supply mechanical fasteners and items to be fastened and will clearly identify locations where attachments are required.

.17 **Work Area 5 (Rebuild Phase) – To Be Determined**

.1 Prepare locations pre-determined by the General Contractor for Type 2/glovebag asbestos removal operations.

.2 Supply and install scaffolding, in accordance with all applicable regulations, in order to provide sufficient and safe access to the work areas.

.3 Remove and dispose, as asbestos waste, accessible asbestos-containing thermal insulation applied to select pipe fittings and pipe straight sections to allow for removal of piping, modifications to mechanical systems and mechanical tie-ins. The General Contractor will clearly mark all locations for thermal insulation removals.

.4 For costing purposes, allow for twelve glovebag removal operations of less than one square metre of asbestos thermal insulation per glovebag location and tools, materials, disposal, expenses and labour costs (two workers over a 10-hour shift during regular business hours including travel time) per mobilization. Allow for two (2) separate mobilizations.

.18 **Work Area 6 – Phase 2 (Rebuild Phase) - Areas To be Determined**

.1 Prepare locations pre-determined by the General Contractor for Type 2 Non-Enclosure asbestos removal operations.

.2 Perform localized removal of asbestos-containing paint from concrete block walls, removal of mastic applied to concrete block walls with asbestos-containing paint or make attachments to asbestos-containing vinyl floor tiles or concrete block walls with asbestos-containing paint to facilitate renovation work.

.3 If required, supply and install scaffolding, in accordance with all applicable regulations, in order to provide sufficient and safe access to the work areas.

.4 Using hand tools, chemical paint or mastic removers and/or power tools attached to dust collecting devices equipped with HEPA filters, remove and dispose as asbestos waste, select sections of asbestos-containing paint from concrete block walls and/or mastic applied to concrete block walls with asbestos-containing paint.

.5 Using power tools attached to dust collecting devices equipped with HEPA filters, mechanically fasten items supplied by the General Contractor to concrete block walls with asbestos-containing paint and/or asbestos- containing vinyl floor tiles. The General Contractor will supply mechanical fasteners and items to be fastened and will clearly identify locations where attachments are required.

.6 For costing purposes allow for allow for tools, materials, disposal, expenses and labour costs (two workers over a 10-hour shift during regular business hours including travel time) per mobilization. Allow for two (2) separate mobilizations.

.19 Paint on concrete block walls contains 2% chrysotile asbestos. 12" x 12" acoustic ceiling tiles contain 2.5% amosite asbestos. Thermal insulation on pipe fittings contains 60% chrysotile asbestos. Thermal insulation on pipe straights (*"Air-Cell"* Type) contains 60% chrysotile asbestos. Vinyl floor tiles contain 5.6% chrysotile asbestos. Vinyl floor tile mastic contains 2% chrysotile asbestos.

.20 All waste is to be removed from the site and disposed. Asbestos waste disposal bins are not to be left on School property unless fully enclosed with an integral metal roof system and locked. Disposal bins must be removed immediately on completion of work.

.21 Schedule

.1	Mobilization	To be Coordinated with the General Contractor
.2	Complete Work and Demobilization	To be Coordinated with the General Contractor

1.3 GENERAL REQUIREMENTS

.1 The location and availability of utilities including water, sewer and electrical power is to be determined on site. The Asbestos Contractor shall co-operate with all others on site. Should there be any disagreement, or should Contractors be unable to reach a satisfactory working arrangement, the Arcadis Canada Inc. Consultant shall determine the manner for proceeding. The Asbestos Contractor shall not be entitled to any additional payment.

.2 The Asbestos Contractor is responsible for all electrical connects and disconnects. All work must be performed by a licensed electrician in compliance to all regulatory requirements and codes.

.3 The Asbestos Contractor is responsible for making all arrangements, and for paying for the disposal of all waste materials in accordance to all applicable government laws and regulations including local, provincial and federal.

.4 The Asbestos Contractor is advised that extended hours of work may be required to meet the schedules as detailed in the Scope of Work and shall allow for the cost thereof including shift premiums and overtime. The Arcadis Canada Inc. Consultant shall be advised in writing at least four days in advance of the proposed working hours.

.5 The Asbestos Contractor shall furnish and post on site the name and current phone number of an authorized representative(s) who can be contacted on a 24-hour basis in case of an emergency.

.6 All precautions will be taken to prevent the spread of contaminated material and to protect all parties including Asbestos Contractor's personnel, Owner's employees and the public from asbestos dust exposure during the course of the work. The documents outline the minimum levels of precaution to be taken.

.7 All work in work areas that are confined spaces shall comply with all requirements respecting confined spaces specified in O. Reg. 632/05, as amended 346/15, November 26, 2015.

.8 **All work shall be done in compliance with the specifications and the Ontario Regulation 278/05 – *Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations* – made under the *Occupational Health and Safety Act***. Should there be any discrepancy or conflict between the documents, the most stringent shall apply.

.9 Contract conditions include, but are not limited to, complying with all Regulations, taking all precautions necessary to control the release of asbestos fibres within the work areas, preventing the release of asbestos fibres outside the work areas, and providing appropriate protection from exposure to asbestos fibres for all parties. Failure to meet any of these conditions will be considered a fundamental breach of the Contract.

.10 The Arcadis Canada Inc. Consultant will visit the site at his/her discretion to familiarize himself/herself with the progress and quality of the Work and to determine if the Work is proceeding in accordance with the Contract Documents.

.11 The Arcadis Canada Inc. Consultant shall have the authority to immediately stop the Work through a written instruction if, in his opinion, the Work does not conform to the requirements of the Contract Documents, or if continuance of the Work could subject the Owner, his employees or the public to a hazardous condition. The Work shall not recommence until such time as the deficiency or hazardous situation has been corrected and a written notice to proceed has been issued by the Arcadis Canada Inc. Consultant.

.12 If the Asbestos Contractor fails to comply with requirements dealing with the control of asbestos fibres and the health and safety of Asbestos Contractor employees, Arcadis Canada Inc. Consultant and Owner personnel or the Public, the Owner, or the Owner's representative, may verbally instruct the Asbestos Contractor to cease work immediately with written confirmation to follow within two working days. If the Arcadis Canada Inc. Consultant gives a written statement to the Owner and the Asbestos Contractor that sufficient cause exists, the Owner may notify the Asbestos Contractor in writing that he is in default of his contractual obligations.

.13 Any employee shall be replaced, at the written request of the Arcadis Canada Inc. Consultant, if working, or causing others to work, in violation of O.Reg. 278/05.

.14 The Asbestos Contractor's insurance coverage limits, per occurrence, shall equal or exceed the following and shall name the Owner, General Contractor and Arcadis Canada Inc. as additional insureds:

.1 General Liability $5 million;

.2 Automotive Liability $2 million;

.3 Pollution Liability $5 million including asbestos operations.

.15 The supervisor must have proven experience and proficiency in the type of Work being undertaken under this Contract.

.16 The supervisor shall be replaced, at the written request of the Arcadis Canada Inc. Consultant, if found to be incompetent or inattentive to the needs of the project.

.17 Where standards of performance are specified or implied and the Work does not comply with the performance specified or implied, such deficiencies shall be corrected as directed by the Arcadis Canada Inc. Consultant. Any subsequent testing shall be done at the Asbestos Contractor's expense.

1.4 DEFINITIONS

.1 *HEPA Vacuum:*

.1 High Efficiency Particulate Aerosol (HEPA) filtered vacuum equipment acceptable to Health and Welfare Canada and meeting U.S. Military Standard 282. This vacuum equipment shall have a filtering system capable of collecting and retaining asbestos fibres to an efficiency of 99.97% for fibres of 0.3 micrometer or larger.

.2 *Polyethylene sheeting sealed with tape:*

.1 Polyethylene sheeting of thickness specified sealed with tape along all edges, around penetrating objects, over cuts and tears, and elsewhere as required to provide a continuous polyethylene membrane to protect underlying surfaces from water damage or damage by sealants, and to prevent escape of asbestos fibres through the sheeting into a clean area.

.3 *Inspector:*

.1 Representative of Arcadis Canada Inc. designated by the owner to provide inspection and air monitoring of the Contractor's work.

.4 *Authorized Visitor:*

.1 Representative of the building owner, Arcadis Canada Inc., and/or persons representing regulatory agencies.

.5 *Amended Water:*

.1 Water with a non-ionic surfactant added to reduce water tension to allow thorough wetting of asbestos fibres.

.6 *Airlock:*

.1 A system for permitting ingress or egress without permitting air movement between a contaminated area and an uncontaminated area typically consisting of two curtained doorways at least 1.5 m apart.

.7 *Curtained Doorways:*

.1 An arrangement of closures to allow ingress and egress from one room to another while permitting minimal air movement between rooms, typically constructed by placing two overlapping sheets of polyethylene over an existing or temporarily framed doorway, securing each along the top of the doorway, securing the vertical edge of one sheet along one vertical side of the doorway and securing the vertical edge of the other sheet along the opposite vertical side of the doorway.

.2 All free edges of polyethylene shall be reinforced with duct tape and the bottom edge shall be weighted to ensure proper closing. Each polyethylene sheet shall overlap openings an additional 1/3 of the doorway width.

.8 *Operating Area:*

.1 Area where no removal or repair Work is underway.

.9 *Clean Area:*

.1 Either an operating area or an area in which removal Work has already been completed.

.10 *Work Area:*

.1 Where the actual removal of asbestos-containing materials take place.

.11 *Negative Pressure:*

.1 A system which extracts air from the work area and discharges this air directly outside the building, sufficient to maintain a minimum pressure differential of 0.5 mm (0.02 inch) of water column relative to adjacent areas outside of work areas. This

air extraction system is to be equipped with a High Efficiency Particulate Aerosol filtering system before discharge.

.12 *Confined Space:*

.1 A fully or partially enclosed space,

.1 that is not both designed and constructed for continuous human occupancy, and

.2 in which atmospheric hazards may occur because of its construction, location or contents or because of work that is done in it.

1.5 REGULATORY AGENCIES

.1 Comply with Federal, Provincial, and local requirements pertaining to asbestos, provided that in any case of conflict among those requirements or with these Specifications the more stringent requirement shall apply. These include, but are not limited to, the following:

.1 Ontario Ministry of Labour, Occupational Health and Safety Division, *Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations*, O. Reg. 278/05, as amended 62/18, March 2, 2018 – made under the *Occupational Health and Safety Act, R.S.O. 1990, c. E. 19, as amended.*

.2 Ontario Ministry of the Environment *Regulation 347* under the Environmental Protection Act, 19 as amended by O. Reg. 509/21, June 30, 2021.

.2 Government of Canada *Regulations Respecting the Handling, Offering for Transport and Transporting of Dangerous Goods*. (Extract from the Canada Gazette Part II, dated February 6, 1985.)

.3 Government of Ontario *Occupational Health and Safety Act, -R.S.O. 1990, c. E. 19, as amended, and Regulations for Construction Projects* O. Reg. 213/91, as amended.

.4 Office of the Fire Commissioner of Canada.

.5 Ontario Electrical Safety Code.

.6 Government of Ontario, Building Code O. Reg. 332/12, as amended 137/19, May 2, 2019.

.2 *Patents:*

.1 It shall be the Contractor's responsibility to ensure that all applicable patent laws are complied with.

1.6 FIRE SAFETY PLAN

.1 Prior to initiating any work on the site, the Contractor shall prepare and submit in writing to the Engineer a Fire Safety Plan. The Plan shall be in accordance to the requirements set forth in Section 2.14, Construction and Demolition Sites, of the National Fire Code and shall include:

.1 the designation and organization of site personnel to carry out fire safety duties, including fire water services if applicable;

.2 the emergency procedures to be used in the case of fire, including:

.1 sounding the fire alarm;

.2 notifying the fire department;

.3 instructing site personnel on procedures to be followed when the alarm sounds; and

.4 firefighting procedures;

.3 the control of fire hazards in and around the building;

.4 maintenance of firefighting facilities; and

.5 special requirements as may be identified by the building owner.

.2 Implementation of the Fire Safety Plan shall be the sole responsibility of the Contractor, and the above shall, in no way, limit the Contractor's statutory and regulatory obligations. During the work, the Fire Safety Plan shall be prominently displayed at the site and its requirements included in site safety training and awareness programs.

1.7 SUBMITTALS

1.7.1 Submittals Before Commencing Work

.1 The following documentation shall be submitted to the Inspector with a dated covering letter listing attachments a minimum 48 hours prior to commencement of the Work:

.1 *Permits and Notifications:*

.1 All necessary permits for transporting and disposal of asbestos waste. Submit proof satisfactory to Inspector that suitable arrangements have been made to receive and properly dispose of asbestos waste. Copies of all Notifications required by Section 1.11.

.2 *Safety Data Sheets:*

.1 Safety Data Sheets, or equivalent, for any sealant, surfactant or other material proposed for use. Include a separate attachment for each sheet indicating the specific worker protective equipment proposed for use with the material indicated.

.3 *Supervisory Personnel:*

.1 Names of supervisory personnel who will be responsible for work area(s). **One of these supervisors must remain on site at all times asbestos removal or cleanup is occurring**. Submit proof that supervisory personnel have over 2000 hours experience on asbestos abatement projects, have performed supervisory functions on at least two other asbestos projects and have achieved the level of training as set out by the Regulation.

.4 *Schedule:*

.1 Provide a bar chart indicating planned progress for critical activities as required under **Scope of Work** as well as additional information listed below a minimum of 48 hours prior to commencement of any preparatory work indicating:

.1 shifts to be worked;

.2 proposed workforce;

.3 starting date;

.4 estimated date of commencement of asbestos removal;

.5 estimated date of completion of asbestos removal;

.6 estimated completion date.

.5 *Insurance:*

.1 Provide a Certificate signed by the insurance agency naming the Owner, General Contractor and Arcadis Canada Inc. as co-insureds.

2. The Asbestos Contractor's insurance coverage limits, per occurrence, shall equal or exceed the following:

.1 General Liability $5 million;

.2 Automotive Liability $2 million;

.3 Pollution Liability $5 million including asbestos operations.

.3 The Asbestos Contractor must provide thirty (30) days' notice of cancellation or amendment of coverage.

.6 *Fire Safety Plan*:

.1 In accordance to Article 1.6 above.

.7 *Confined Space:*

.1 If a work area, or part thereof, is a confined space, the contractor shall submit:

.1 a co-ordination document (see Section 1.13.1.1);

.2 a written program (see Section 1.13.1.2);

.3 a written plan (see Section 1.13.1.4).

.8 *Asbestos Training:*

.1 A letter certifying that:

(a) every worker involved in a Type 3 operation has successfully completed the Asbestos Abatement Worker Training Program approved by the Ministry of Training, Colleges and Universities; and

(b) every supervisor of a worker involved in a Type 3 operation has successfully completed the Asbestos Abatement Supervisor Training Program approved by the Ministry of Training, Colleges and Universities. O.Reg. 278/05, s. 20(1).

1.7.2 Submittals Before Commencing Asbestos Removal

.1 Results of negative pressure unit integrity tests.

.2 Proposed Work Area emergency exit procedures.

.3 Proposed locations of decontamination facilities and negative pressure units and exhaust routing.

.4 Evidence (letter or other suitable documentation) of proper construction, inspection and installation of GFI panel by licensed electrician in compliance to all regulatory requirements and codes.

1.7.3 Submittals Upon Completion of Work

.1 Asbestos waste haulage and disposal documentations including Bills of Lading, waste transfer documents and dump receipts.

.2 All documentation as specified in the contract General Conditions including, but not limited to, Workplace Safety and Insurance Board Certificate, Statutory Declarations and Proof of Publication of Substantial Performance.

1.8 EXISTING CONDITIONS

.1 Paint on concrete block walls contains 2% chrysotile asbestos. 12” x 12” acoustic ceiling tiles contain 2.5% amosite asbestos. Thermal insulation on pipe fittings contains 60% chrysotile asbestos. Thermal insulation on pipe straights (*“Air-Cell”* Type) contains 60% chrysotile asbestos. Vinyl floor tiles contain 5.6% chrysotile asbestos. Vinyl floor tile mastic contains 2% chrysotile asbestos.

.2 Existing conditions are documented in a report prepared by Arcadis Canada Inc. for the Conseil scolaire Viamonde titled “*Pre-Renovation Designated Substances and Hazardous Materials Survey, École élémentaire Félix-Leclerc, 50 Celestine Drive, Toronto, Ontario*”, dated January 30, 2025, which is included with the tender documents.

.3 Masonry applications may contain silica. Paint applications contain lead and may contain mercury. Appropriate dust control procedures and respiratory protective equipment are to be used if disturbing these materials.

1.9 RESTRICTIONS

.1 Do not allow smoking, eating or drinking in the work area.

.2 Do not allow entry to work area by unauthorized persons.

.3 Compressed air shall not be used in the work area.

.4 Open flames will not be permitted in the work area (including but not limited to torches and propane-fired heaters).

1.10 WORKER PROTECTION

.1 *Instructions:*

.1 Before commencing Work, instruct workers in all aspects of work procedures and protective measures.

.2 *Respiratory Protection:*

.1 Provide workers with personally issued and marked respiratory equipment acceptable to the Occupational Health and Safety Division of the Ontario Ministry of Labour, suitable for the asbestos exposure in the work area.

.2 Ensure that suitable respiratory protective equipment is worn by every worker who enters the work area. A respirator provided by an employer and used by a worker:

.1 shall be in accordance to O.Reg. 278/05, Section 13, respirators;

.2 shall be fitted so that there is an effective seal between the respirator and the worker's face;

.3 shall be assigned to a worker for the worker's exclusive use;

.4 shall be used and maintained in accordance with the procedures specified by the equipment manufacturer;

.5 shall be cleaned, disinfected and inspected after use on each shift, or more often if necessary;

.6 shall have damaged or deteriorated parts replaced prior to being used by a worker; and

.7 when not in use, shall be stored in a convenient, clean and sanitary location.

.3 *Protective Clothing:*

.1 Provide workers with protective clothing which shall:

.1 be worn by every worker who enters the work area;

.2 be made of a material which does not readily retain nor permit penetration of asbestos fibres;

.3 consist of full body covering including head covering with snug fitting cuffs at the wrists, ankles and neck;

.4 include suitable footwear; and

.5 be repaired or replaced if torn.

1.11 NOTIFICATIONS

.1 Notify, in writing, the local Fire Department of the extent of the work, including a copy of the Fire Safety Plan detailed in Article 1.6 above.

.2 Notify, orally and in writing, an inspector at the office of the Ministry of Labour nearest the work place of the operation. O.Reg. 278/05, Section 11.

.1 The written notice required by subsection (1) shall set out:

.1 the name and address of the person giving the notice;

.2 the name and address of the owner of the place where the work will be carried out;

.3 the municipal address or other description of the place where the work will be carried out sufficient to permit the inspector to locate the place, including the location with respect to the nearest public highway;

.4 a description of the work that will be carried out;

.5 the starting date and expected duration of the work; and

.6 the name and address of the supervisor in charge of the work.

.3 Notify the Inspector a minimum of eight hours prior to initiation of the following phases of the project:

.1 commencement of asbestos removal;

.2 commencement of sealant application;

.3 dismantling of the enclosure; and

.4 removing asbestos waste from the work area.

1.12 PROTECTION, REPAIR AND REPLACEMENT OF EQUIPMENT AND MATERIALS

.1 All equipment within and surrounding the work area shall be suitably protected by the Contractor during the work periods.

.2 All equipment damaged by the Contractor shall be replaced by the Contractor at no additional cost to the Owner.

1.13 CONFINED SPACES

.1 If any work area, or part thereof, is a confined space, the contractor shall comply with all requirements respecting confined spaces specified in O. Reg. 632/05, as amended 346/15, November 26, 2015, including but not limited to:

.1 preparation of a co-ordination document;

.2 development of a written program;

.3 assessment of hazards;

.4 development and implementation of an adequate written plan;

.5 provision of adequate worker training; and

.6 issuance of entry permits.

.2 The contractor shall perform adequate air tests while a worker is in a confined space to ensure that acceptable atmospheric levels are maintained in the confined space, including during any inspections and during final clearance air monitoring performed by Arcadis Canada Inc.

.3 The contractor shall provide an attendant for communications and rescue response whenever a worker is to enter a confined space, including during inspections and final clearance air monitoring by Arcadis Canada Inc.

.4 The contractor shall provide Arcadis Canada Inc. with calibration records for air testing equipment and copies of all records of atmospheric monitoring of confined space.

.5 The co-ordination document (see Section 1.13.1.1) shall refer to the contractor's responsibilities for air testing, communications and rescue response specified in Sections 1.13.2 and 1.13.3, above.

2.0 PART 2 – PRODUCTS

2.1 MATERIALS

.1 *Polyethylene:*

.1 In 0.15 mm (6 mil) minimum thickness unless otherwise specified; in sheet size to minimize joints.

.2 *Tape:*

.1 Reinforced duct tape suitable for sealing polyethylene under both wet conditions using amended water, and dry conditions.

.3 *Wetting Agent:*

.1 50% polyoxethylene ester and 50% polyglycol or polyxyethylene ether, or equivalent approved product, and shall be mixed with water to a concentration to provide adequate penetration and wetting of asbestos-containing material.

.4 *Asbestos Waste Receptors:*

.1 0.15 mm (6 mil) minimum thickness appropriately labelled, sealable polyethylene bags and 0.15 mm (6 mil) minimum thickness sealable clear polyethylene bags.

.5 *Rip-Proof Polyethylene:*

.1 0.20 mm (8 mil) fabric made up from 0.13 mm (5 mil) weave and 2 layers 0.04 mm (1.5 mil) poly laminate, in sheet size to minimize joints.

.6 *Sealant:*

.1 Slow-drying sealant which remains tacky on surface for a minimum of 8 hours for purpose of trapping residual airborne fibre during settling period. Product must have flame spread and smoke development ratings both less than 50. **Product shall leave a clear finish when dry. Acceptable products "Childers Chil-Lock CP-240" or equivalent.**

2.2 EQUIPMENT

.1 All equipment brought on site must be thoroughly clean and free of all fibre, asbestos or otherwise, to the satisfaction of the Field Inspector. The Contractor will be fully responsible for the replacement of equipment rejected by the Inspector and for all costs resulting from site contamination due to dirty or faulty equipment.

.2 *Airless Sprayer:*

.1 Spray equipment for the application of amended water and sealant such as Graco Hydrospray or equivalent:

.1 Fine atomizing spray nozzle: Nozzle for airless sprayer capable of delivering not less than 4.5 L per minute of fine particle spray of amended water.

.3 *Garden Sprayer:*

.1 Hand pump-type pressure-can garden sprayer fabricated out of either metal or plastic equipped with a wand at the end of a hose that can deliver a stream or spray of liquid under pressure. **Only to be used on small removal and repair projects with the approval of the site inspector.**

.4 *HEPA Vacuum:*

.1 High Efficiency Particulate Aerosol filtered vacuum equipment. Must have a filtering system capable of collecting and retaining asbestos fibres to an efficiency of 99.97% for fibres of 0.3 um or larger. HEPA filters must have been individually tested and certified by the manufacturer.

.2 All HEPA vacuums brought onto the job site shall be visibly clean, shall be in a good state of repair and shall be maintained in such state through completion of the project.

.5 *Glovebag:*

.1 Prefabricated, purposely made, 0.20 mm minimum thickness, polyvinyl chloride bag with integral 0.25 mm thick polyvinyl chloride gloves.

.2 Bag equipped with reversible double-pull, double-throw zipper on top to facilitate installation on pipe and progressive movement along pipe, with straps for sealing ends of bag around pipe, and with plastic flap under zipper for strength on pipe and to provide effective seal and with “ziploc” feature. Bags shall be secured using manufacturer’s prescribed securing devices. Approval must be obtained from the Inspector for use of Glovebags. Bag must be acceptable to the Inspector for use.

.3 Bag must have valves to allow insertion of a vacuum hose and the nozzle of a water sprayer while maintaining the seal to the pipe, duct or similar structure.

.6 *Negative Pressure Units:*

.1 Exhaust units fitted with High Efficiency Particulate Aerosol (HEPA) filters used to effect a negative pressure differential in the work area as compared to the immediate surrounding or clean area. The filtering system must be capable of collecting and retaining asbestos fibres to an efficiency of 99.97% for fibres of

0.3 um or larger. The HEPA filters must have been individually tested and certified by the manufacturer and bear a label certifying performance. The unit is to be fitted with instrumentation to indicate pressure differential across the HEPA filter with an audible alarm to sound at a preset low differential pressure.

.2 Construction of HEPA filter/fan cabinet units shall be airtight and all joints shall be caulked. The gasket seal between the filter housing and the retaining frame inside the cabinet shall provide a zero-leakage seal to avoid filter bypassing.

.3 **Each negative pressure unit shall be integrity tested at the work site prior to commencement of asbestos removal.** The procedure must include the testing of the integrity of the entire cabinet. Written confirmation of the test results are to be provided to the Inspector. Retesting may be requested by the Inspector and performed by the Contractor should the unit be damaged or modified during the work.

.7 *Differential Pressure Recorder:*

.1 Instrument to monitor and record the differential pressure between the Work Area and Clean Area.

.1	sensitivity:	0.025 mm (0.001 inches) WC increments between +0.25 mm to -2.5 mm (+0.010 to -0.100 inches) WC
.2	accuracy:	+/- 1 %
.3	pressure alarms:	audible high and low level alarm programmable within operating range
.4	printout:	minimum 24 hr period at 15 minute intervals

.8 *Ground Fault Panel:*

.1 Electrical Panel equipped with ground fault circuit breakers of sufficient capacity to power all electrical equipment and lights in work area. All breakers shall have 5 mA ground fault protection. Panel should be complete with all necessary accessories including ground fault interrupter lights, test switch to ensure unit is working, and reset switch. Ground fault receptacles on extension cords shall not be used without written authorization by the Arcadis Canada Inc. Consultant.

.2 The GFI Panel must be constructed under the direction of a licensed Electrician and inspected by a licensed Electrician on a regular basis. Evidence of such construction and inspection shall be submitted to the Arcadis Canada Inc. Consultant prior to installation of the Panel on site.

3.0 PART 3 – EXECUTION

3.1 MAJOR ASBESTOS WORK (TYPE 3 OPERATIONS)

Not Applicable.

3.2 ASBESTOS REMOVAL (GLOVEBAG METHOD)

.1 Before performing work:

.1 Prepare site by placing new 0.15 mm (6 mil) polyethylene plastic drop sheets on all surfaces immediately below and within 3.0 m of the work area.

.2 Remove all obstructions from around pipes to allow access for repair work.

.3 Inspect all glovebags for defects before using. A defective bag shall not be used.

.4 Ensure that any knife to be used inside the glovebag has a retractable blade and that any saw used inside the glovebag is of the flexible wire type; and brush used inside a glovebag shall not have metal bristles.

.2 Perform removal operations using the following procedures (in accordance to the manufacturer's instructions):

.1 Place any tools necessary to remove insulation in bottom of the containment bag.

.2 Install the bag on the pipe or fitting using shoulder straps and zipper provided. **Duct tape is not to be substituted for shoulder straps.** Support bag as necessary to avoid damage to the piping system or the bag itself.

.3 Insert nozzle of spray pump prefilled and primed with water and surfactant mixture (amended water) into the bag through the valve provided. Place hands in gloves and relocate the tools to the tool pouch.

.4 Cut or remove exterior insulation jacket, where applicable, to expose asbestos pipe covering. Wet exposed pipe covering with sufficient amended water to suppress any dust. Remove insulation and arrange in bottom of bag to obtain maximum capacity for the bag. Wash down exposed portion of pipe and top section of bag ensuring that insulation in lower portion of bag as well as any exposed end of insulation is thoroughly saturated. Use one hand and a cloth or sponge to aid in washing process.

.5 Ensure that pipe and other surfaces are clean of visual residue, dirt or dust prior to removal of the containment bag and seal all surfaces with encapsulant. Seal exposed ends of remaining asbestos insulation with encapsulant.

.6 If the glovebag is ripped, cut or opened in any way, work that may disturb friable material shall cease immediately. If the rip, cut or opening is small and easy to repair then the glovebag shall be repaired immediately with tape. Work may continue once the repairs are complete. If the rip, cut or opening is not small and cannot be easily repaired, place the glovebag immediately within a suitable asbestos waste container. Any spilled material containing asbestos shall be cleaned up and removed by using a vacuum equipped with a HEPA filter.

.7 To remove bag after completion of stripping, wash top section and tools thoroughly. Put all tools in one hand (glove), pull hand out inverted, twist to create a separate pouch, double tape to seal ends, cut and place in the next glovebag or into a water bucket, open pouch under water and clean and then allow to dry. Tools may also be cleaned and handed out during the dismantling of the bag while taking all precautions to prevent release of asbestos.

.8 Remove all air inside the glovebag by means of a vacuum equipped with a HEPA filter. Seal lower portion of bag and place bag into appropriate waste container.

.9 After removal of bag, ensure pipe is clean of all residue. If necessary after removal of each section of asbestos, vacuum all surfaces of pipe, using HEPA Filtered Vacuum equipment.

.10 Welds and folds of glovebags are to remain intact without modification to manufacturer's design.

.11 Glovebags, disposal bags, cloth rags and any porous materials are to be handled and disposed as hazardous waste.

.12 Frequently, and at regular intervals during the work and immediately upon completion of the work, glovebags containing asbestos-contaminated dust and waste shall be placed in a suitable waste container and shall be removed from the workplace.

.13 Immediately after removal of asbestos, clean all surfaces and equipment within the work area using a HEPA vacuum and damp wiping.

.14 Remove polyethylene floor covering, fold inward, and place in 6-mil polyethylene waste bags. Seal bags tightly.

.15 Place sponges, brushes, etc., in double polyethylene bags and seal tightly.

.16 Make arrangements for disposal of all asbestos-containing waste material.

3.3 TYPE 2 ENCLOSURE METHOD

.1 Preparation

.1 Separate the work area from the rest of the building using rope barriers, signage and other appropriate means. The extent of the work area will depend on the amount of work to be done, potential for fibre release and the height of the work above floor level.

.2 Identify the work area with clearly visible warning signs.

.3 Construct a frame for the enclosure from 50 mm x 100 mm (2” x 4”) studs or other suitable material (scaffolding, for example); if the potential exists for the disturbance of asbestos-containing material during the construction of the enclosure, wear a respirator and suitable protective clothing; ensure that the enclosure is of adequate size to permit the storage of equipment and waste.

.4 If the room where the work is to take place is small, the room itself may serve as an enclosure, provided that all openings are sealed, the mechanical ventilation system servicing the room is disabled and the ventilation ducts to and from the work area are sealed.

.5 Shut off the source of heat for piping systems (i.e., boiler or steam line header), where possible.

.6 Cover the walls, floor and ceiling of the enclosure with clear 0.15 mm polyethylene sheeting sealed with duct tape. Curtains of polyethylene sheeting must be fitted on each side of the entrance to the enclosure (curtain flaps may require weights at the bottoms to ensure proper closing).

.7 Disable the ventilation system servicing the enclosure; seal ventilation ducts to and from the work area.

.8 Shut off and lock out electrical power within the enclosure.

.9 Wear an appropriate respirator approved for use with asbestos and suitable protective equipment. Only persons wearing protective clothing and equipment shall be allowed to enter the work area. If the type of asbestos is other than chrysotile, a powered air purifying respirator shall be used.

.10 Do not use compressed air.

.11 Do not eat, drink, smoke or chew in the work area.

.12 Vacuum surfaces of insulated material in the work area using a HEPA vacuum.

.2 Asbestos Removal and Cleanup

.1 Only non-powered hand-tools, or power tools **FITTED WITH A DUST COLLECTION DEVICE AND HEPA FILTER** are permitted to be used.

.2 Do not eat, drink, chew or smoke within the work area.

.3 *Thermal insulation:* (piping and equipment) Ensure that heat sources to all piping systems, tanks, etc., have been shut off before work commences. Carefully cut open the outer cover of thermal insulation while spraying a mist of amended water on the section being worked on; thoroughly soak the underlying asbestos-containing material with amended water, using airless spray equipment. Spray the asbestos material repeatedly during the work process to maintain saturation and to minimize asbestos fibre dispersion.

.4 *Paint and Coatings*: Apply amended water to the surface of the material using an airless sprayer. Application of a fine mist at low volumes will avoid excessive water dripping to the floor. Remove painted material by hand, using a chemical paint stripper or power tools fitted with a dust collection device and HEPA filter. Place directly into waste receptor. Do not throw or allow waste to fall to the floor from the work area. Spray the asbestos material repeatedly during the work process to maintain saturation and to minimize asbestos fibre dispersion. Double bag when removing debris from work area.

.5 *Mastics:* Apply amended water as required to reduce dust. Remove material by hand and place immediately into waste receptor. Do not throw asbestos waste. If power tools are used to remove mastic, power tools must be fitted with HEPA filtered dust collection device. Double bag when removing debris from work area.

.6 Remove the saturated asbestos material in small sections. Do not allow saturated asbestos to dry out. As it is being removed, pack the material into a waste receptor (polyethylene bag).

.1 Spray the asbestos material repeatedly during the work process to maintain saturation and to minimize asbestos fibre dispersion.

.2 Mist the air periodically with water.

.3 Excess water is to be treated as asbestos waste and is to be placed into a waste receptor (polyethylene bag). Refer to Waste Handling for cleaning and removal of bagged asbestos waste.

.7 After completion of asbestos removal, all surfaces from which asbestos has been removed shall be brushed and wet-sponged to remove all visible material and residues. During this Work the surfaces shall be kept wet.

.8 Clean all surfaces and equipment within the work area, including polyethylene sheeting, using a HEPA vacuum or by damp wiping.

.9 Seal all surfaces of pipe or other equipment, enclosure, and ends of exposed insulation with a suitable encapsulant.

.10 After satisfactory completion of cleaning and before leaving the work area, decontaminate protective clothing (including boots) and equipment, etc., using a HEPA vacuum or by damp wiping.

.11 Dismantle the enclosure and wet and dispose of all polyethylene sheeting, brushes and sponges as asbestos waste.

.12 Dispose of protective clothing as asbestos waste.

.13 Wash hands and face at the completion of the work (before leaving the work area); damp wipe the respirator and store in a proper place.

.14 Make arrangements for disposal of all asbestos-containing waste material.

3.4 TYPE 2 NON-ENCLOSURE METHOD

.1 Preparation

.1 Control the spread of dust from the work being performed by use of drop sheets, keeping doors closed, providing signage, etc. Ensure that appropriate equipment and materials are at hand.

.2 Restrict access to the work area using rope barriers, barricades, and other appropriate measures.

.3 Disable ventilation systems servicing the work area.

.4 Provide and wear a non-powered air purifying respirator with high efficiency cartridges approved for use with asbestos and disposable coveralls including hood, elasticized cuffs and zipper over work clothes.

.2 Asbestos Removal and Cleanup

.1 Only non-powered hand-tools, or power tools **FITTED WITH A DUST COLLECTION DEVICE AND HEPA FILTER** are permitted to be used.

.2 Do not eat, drink, chew or smoke within the work area.

.3 *Paint and Coatings*: Apply amended water to the surface of the material using an airless sprayer. Application of a fine mist at low volumes will avoid excessive water

dripping to the floor. Remove painted material by hand, using a chemical paint stripper or power tools fitted with a dust collection device and HEPA filter. Place directly into waste receptor. Do not throw or allow waste to fall to the floor from the work area. Spray the asbestos material repeatedly during the work process to maintain saturation and to minimize asbestos fibre dispersion. Double bag when removing debris from work area.

.4 *Mastics:* Apply amended water as required to reduce dust. Remove material by hand and place immediately into waste receptor. Do not throw asbestos waste. If power tools are used to remove mastic, power tools must be fitted with HEPA filtered dust collection device. Double bag when removing debris from work area.

.5 Do not allow waste to accumulate.

.6 Clean dust and debris at regular intervals and at the end of each shift with a damp cloth or HEPA vacuum.

.7 Ensure that there is no visible airborne dust in the work area during the removal and cleanup operation.

.8 All duct tape, polyethylene sheets, disposable clothing and other consumables used for, and during the removal of asbestos shall be contained and disposed as asbestos waste.

.9 After satisfactory completion of cleaning and before leaving the work area, decontaminate protective clothing (including boots) and equipment, etc., using a HEPA vacuum or by damp wiping.

.10 Dispose of protective clothing as asbestos waste.

.11 Wash hands and face prior to taking breaks and at completion of the work before leaving the work area. Damp-wipe the respirator after use and store in an appropriate place.

.12 Make arrangements for disposal of all asbestos-containing waste material.

3.5 TYPE 1 OPERATION

.1 *Preparation*

.1 Control the spread of dust from the work being performed by use of drop sheets, keeping doors closed, providing signage, etc. Ensure that appropriate equipment and materials are at hand.

.2 Restrict access to the work area using rope barriers, barricades, and other appropriate measures.

.3 Disable ventilation systems servicing the work area.

.4 Provide and wear a non-powered air purifying respirator with high efficiency cartridges approved for use with asbestos and disposable coveralls including hood, elasticized cuffs and zipper over work clothes.

.2 *Asbestos Removal and Cleanup*

.1 Do not use any power tools. All work is to be completed by non-powered hand tools only.

.2 Do not eat, drink, chew or smoke within the work area.

.3 *Mastic and Paints and Coatings*: Place polyethylene sheet over all floor and adjacent surfaces in the work area to prevent contamination. Apply amended water as required to reduce dust. Remove material by hand with minimal breakage and place immediately into waste receptor. Do not throw or allow the asbestos waste to fall to the floor from the work area. Double bag when removing debris from work area.

.4 Do not allow waste to accumulate.

.5 Clean dust and debris at regular intervals and at the end of each shift with a damp cloth or HEPA vacuum.

.6 Ensure that there is no visible airborne dust in the work area during the removal and cleanup operation.

.7 All duct tape, polyethylene sheets, disposable clothing and other consumables used for, and during the removal of asbestos shall be contained and disposed as asbestos waste.

.8 After satisfactory completion of cleaning and before leaving the work area, decontaminate protective clothing (including boots) and equipment, etc., using a HEPA vacuum or by damp wiping.

.9 Dispose of protective clothing (where applicable) as asbestos waste.

.10 Wash hands and face prior to taking breaks and at completion of the work before leaving the work area. Damp-wipe the respirator (where appliable) after use and store in an appropriate place.

.11 Make arrangements for disposal of all asbestos-containing waste material.

3.6 WASTE DISPOSAL

.1 Asbestos-containing wastes shall be disposed of in accordance with procedures established by the Ontario Ministry of the Environment *Regulation 347 (as amended) under the Environmental Protection Act* and the Government of Canada *Transportation of Dangerous Goods Regulations*.

.2 All waste is to be removed from the site and disposed. Disposal containers are not to be left on the property unattended unless fully enclosed and locked. Bins must be removed immediately on completion of work.

.3 Both sides of every vehicle used for the transportation of asbestos and every waste container must display in large easily legible letters that contrast in colour with the background the word “CAUTION” in letters not less than 10 cm in height and the words:

CONTAINS ASBESTOS FIBRES
Avoid Creating Dust and Spillage
Asbestos May Be Harmful To Your Health
Wear Approved Protective Equipment

.4 Both sides of every waste container must display in large easily legible letters the words **‘ASBESTOS, WHITE, PRODUCT IDENTIFICATION NUMBER 2590’** or **‘ASBESTOS, BLUE, PRODUCT IDENTIFICATION NUMBER 2212’** in accordance with the type of asbestos being transported.

.5 Every vehicle used for the transportation of asbestos waste shall display a Class 9 placard on the front, back and two sides of the vehicle.

.6 The waste must be transported in a fully-enclosed truck, or alternatively, in a waste disposal skip. The driver must be familiar with cleanup and handling procedures and be trained to deal with spills or container breakage.

.7 The truck must be equipped with a shovel and broom, wetting agent, protective clothing, respiratory protective equipment, polyethylene bags of at least 0.15 mm (6 mil) thickness, and bag closures and duct tape.

.8 All waste must be transported with a **Bill of Lading** directly from the work area to the waste disposal site. The Bill of Lading is to indicate the source and type of asbestos, the Carrier, the amount, the destination (disposal site) and date all in accordance to applicable regulations. A copy of the Bill of Lading and disposal site receipt is to be provided to the Inspector.

3.7 AIR MONITORING

.1 Air tests will be taken at the discretion of the Asbestos Consultant using the Phase Contrast Microscopy (PCM) method from the time asbestos-containing materials may be disturbed until the final visual inspection of the work area(s). PCM will be used for final clearance air monitoring analysis.

.1 *Outside Asbestos Removal Work Areas:*

.1 The maximum allowable fibre concentration outside the Work Areas during asbestos removal or cleanup shall be 0.05 f/cc. Should readings exceed this value, the work shall stop at the discretion of the inspector and proceed only after the cause of the high fibre counts has been remedied.

.2 All costs associated with the cleaning, monitoring, and disruption caused by excessive fibre levels outside the Work Area and related to the work, are to be borne by the Asbestos Contractor including but not limited to:

.1 thorough cleaning with wet wiping and HEPA vacuuming by the Asbestos Contractor to the extent and satisfaction of the Inspector,

.2 all activities deemed necessary by the Inspector including area isolation, personnel relocation, additional visual inspections and air monitoring to confirm that the area has been adequately cleaned,

.3 disruption of plant production, office routine, and delays.

.2 *Final Clearance Test:*

Not Applicable.

END OF SECTION

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
C:\Users\km7685\DCACCDocs\Arcadis ACC US\ACA-99999999-CONSEIL SCOLAIRE VIAMONDE_NORTH YORK_ON\Project Files\10_WIP\10T_ARC_ENV\20250101-DWG\30247688 Felix Leclerc\30247688 Felix Leclerc DSHMS-MAIN FLOOR.dwg LAYOUT: 1ST FLOOR SAVED: 3/17/2025 3:28 PM ACADVER:
24.2S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 3/17/2025 3:28 PM BY: K. MAHENDRA
XREFS: IMAGES: PROJECTNAME: ----

LEGEND:

- 125 FUNCTIONAL SPACE
- WORK AREA 1
- WORK AREA 2
- WORK AREA 3
- WORK AREA 4

NOTES:

1.

REVISIONS:

No.	Date:	By:	Revisions

REFERENCE:

1.

ARCADIS

CONSEIL SCOLAIRE VIAMONDE

ASBESTOS ABATEMENT SPECIFICATIONS

LOCATIONS OF WORK AREAS

ÉCOLE ÉLÉMENTAIRE FÉLIX-LECLERC
50 CELESTINE DRIVE, TORONTO,ON

MAIN FLOOR PLAN

Drawn By: M.K.R	Approved By: J.D	Project No: 30247688	
Date: MARCH 2025	Scale: N.T.S	Drawing No: 30247688-1	

ASBESTOS ABATEMENT
ELECTRICIAN'S SUBMITTAL FORM

Abatement Contractor _____

Project Site _____

I hereby certify the following:

1. All electrical work has been performed by a licensed electrician and complies with the latest edition of the Ontario Electrical Safety Code and any other local codes and requirements.

2. Arrangements have been made for all inspections and approvals which may be required by government regulations, Electrical Safety Authority and any other authorities having jurisdiction.

3. The GFI panel has been properly constructed, inspected and installed by a licensed electrician in compliance to all regulatory requirements and codes.

4. All electrical circuits in the work area have been de-energized and locked out wherever practicable.

5. All systems that cannot be de-energized have been clearly identified.

6. Any electrical conditions which need special protection or consideration have been clearly identified.

Electrical Contractor _____

Electrician's Name (print) _____

Electrician's Signature _____

Electrician's License No. _____

Date _____

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 20 00 Concrete Reinforcing
.2 Section 03 30 00 Cast-in-Place Concrete
.3 Section 05 50 00 Metal Fabrications
.4 Section 31 23 10 Excavating, Trenching and Backfilling

1.3 References

.1 American Concrete Institute (ACI)
  .1 ACI 117-10 Specifications for Tolerances for Concrete Construction and Materials.
  .2 ACI 347R-14 Guide to Formwork for Concrete
  .3 ACI SP-4-14 Formwork for Concrete
.2 CSA Group (CSA)
  .1 CSA A23.1:19/A23.2:19 Concrete Materials and Methods of Concrete Construction/ Methods of Test Methods and Standard Practice for Concrete
  .2 CSA B111-1974 (R2003) Wire Nails, Spikes and Staples
  .3 CSA O86:19 Engineering Design in Wood
  .4 CSA O121-2017 (R2022) Douglas Fir Plywood
  .5 CSA O141:23 Canadian Standard Lumber
  .6 CSA S269.1-16 (R2021) Falsework and Formwork
.3 Ontario Provincial Standard Specifications (OPSS)
  .1 OPSS 1204 Material Specification for Polyvinyl Chloride Waterstops

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Shop Drawings:
  .1 Submit shop drawings showing type, extent and locations of items to be built into concrete.
  .2 Sleeving Drawings: Submit drawings showing sleeves required through floors, roof and other structural members.
  .3 Submit drawings showing size and spacing of conduits and piping.
  .4 Coordinate with other Divisions prior to submittal.
  .5 Do not commence placing sleeves, conduits, or piping before drawings have been reviewed and Consultant's comments incorporated on drawings issued to site.
  .6 Assume responsibility for accuracy of Work. Review of submitted shop drawings does not relieve Contractor from compliance with requirements of Contract Documents.

.3 Required by Regulatory Agencies: Submit shop drawings bearing signature and seal of Professional Engineer responsible for formwork design, as may be required by regulatory Agencies. Proceed with construction of formwork only with their approval.

1.5 Quality Assurance

.1 Obtain a copy of CSA A23.1/A23.2 and maintain on site

.2 Design of Formwork: Assume full responsibility for complete structural design and construction of formwork in accordance with CSA S269.1 and CSA O86, as applicable.
.1 The design and engineering of the formwork, as well as its' construction, shall be the responsibility of the Contractor.

.3 Formwork shall be designed for the loads and lateral pressures outlined in the ACI publication "SP-4 Formwork for Concrete" and wind pressures and allowable stresses as set down in the National Building Code and in accordance with CSA A23.1 and A23.2. Formwork shall be of sufficient strength and rigidity to support all concrete and construction loads, taking into account proposed rate and method of pouring concrete so that the resultant finished concrete shall conform to the shapes, lines and dimensions of the members shown on the drawings.

1.6 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Protect formwork to prevent functional damage and damage to faces affecting appearance of concrete surfaces exposed to view.

1.7 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

.1 All materials shall be new, in accordance with referenced standards.

.2 Plywood: Douglas Fir, conforming to CSA O121. Sound undamaged sheets finished one side, fabricated especially for use as concrete form panels, with sealed edges. Minimum 17mm thickness.

.3 Lumber: Conforming to CSA O141, with grade stamp clearly visible.

.4 Chamfers: Cut from 19mm x 19mm wood, smooth with no open defects.

.5 Joint Tape: non-staining, water impermeable, self-release.

.6 Nails, Spikes and Staples: Galvanized, conforming to CSA B111.

.7 Dovetail Anchor Slots: As specified in Section 04 05 19.

.8 Form Release Agent: Colourless mineral oil which will not stain concrete.

.9 For concrete surfaces exposed to view, provide panels smooth and free of defects which would be reproduced as concrete blemishes.

PART 3 EXECUTION

3.1 Examination

.1 Before starting this work, examine work done by others which affects this work.

.2 Notify the Consultant of any conditions which would prevent proper completion of this work.

.3 Commencement of work implies acceptance of existing conditions.

3.2 Erection

.1 Verify lines, levels and centres before proceeding with formwork. Ensure dimensions agree with drawings.

.2 Align joints and make watertight, to prevent leakage of cement paste and disfiguration of concrete.

.3 Construct formwork to produce concrete with dimensions, lines and levels within tolerances specified in ACI 347R-14.

.4 Provide formed openings where required for pipes, conduits, sleeves and other work to be embedded in and passing through concrete members.

.5 Install chamfers at all external corners exposed to view.

.6 Adequately brace and shore formwork to sustain loads (both concrete and working loads) applied during construction.

.7 Be responsible for safety of the structure both before and after the removal of forms, until the concrete has reached its specified 28 day strength.

3.3 Built-In Work

.1 Form openings and build in anchors, inserts, sub-frames, key-ways, sleeves, miscellaneous metal items, reglets and similar items furnished under Work of other Sections, which are indicated on Drawings and on shop drawings of other trades, and as required for proper completion of Work.

.2 Do not embed wood in concrete.

.3 Anchor Bolts: Tie anchor bolts securely in position to prevent movement during concrete placing. Use template to locate bolts. Verify that bolts have specified projection above concrete.

.4 Openings or Sleeves Not Shown on Structural Drawings:
  .1 Obtain Consultant's written approval before forming openings of sleeves through columns and beams, or through slabs within 1800 mm of their supports.
  .2 Obtain Consultant's written approval before forming openings or sleeves larger than 200 mm square in any location.

.5 Embedded Pipe or Conduit Not Shown or Detailed on Structural Drawings:
  .1 Obtain Consultant's written approval before placing conduit or pipe which would be embedded in finished structure.

.6 Confirm that built-in items that penetrate surface waterproofing are installed to meet requirements of waterproofing trade.

3.4 Construction Joints

.1 Form construction and expansion joints with bulkheads to ensure straight lines. Immediately before subsequent pour at construction joint, remove bulkhead and tighten forms so that concrete surfaces will be on same plane with no overlapping of concrete.

.2 Review with Consultant proposed location and details of construction joints in walls, columns, beams and slabs.
.1 Construction joints shall present appearance of normal form panel joint.
.2 Install continuous shear key in construction joints in walls and framed floors which are 152mm or more thick.
.3 Provide vertical construction joints in walls at not more than 20 metres centre to centre.
.4 Provide waterstops in accordance with manufacturer's instructions at construction joints in walls which retain earth. Waterstops shall be continuous.

3.5 Treatment of Formwork Surfaces

.1 Form Release Agent:
.1 Coat formwork with form release agent before reinforcement, anchors, accessories, and other built in items are installed.
.2 Do not coat plywood forms pre-treated with release agent.
.3 On surfaces to receive finish materials, adhesives, sealers, paint or other coatings or materials, use a compatible release agent.

3.6 Stripping of Formwork

.1 Strip formwork on vertical surfaces when concrete has hardened sufficiently that no damage will result from stripping operations.

.2 Do not remove plywood formwork by jerking loose or by metal pinch bars. Use wood wedges and gradually force panels loose. Leave plywood forms in place as long as possible to permit maximum shrinkage away from concrete.

.3 Take particular care not to damage external corners when stripping formwork.

.4 When forms are stripped during curing period, cure and protect exposed concrete in accordance with Section 03 30 00 - Cast-in-Place Concrete.

3.7 Defective Work

.1 Movement and displacement of formwork during construction, variations in excess of specified tolerances, marked and disfigured surfaces, and failure of materials or workmanship to meet requirements of this specification, and which cannot be repaired by approved methods, will be considered defective work.

.2 Replace defective work, as directed by Consultant.

.3 Pay for additional inspection and testing, redesign, corrective measures, and related expenses, if work has proven to be deficient.

.4 Reconstruct defective formwork and replace concrete and reinforcement placed in defective formwork at no additional cost.

3.8 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 10 00 Concrete Forming and Accessories
.2 Section 03 30 00 Cast-in-Place Concrete
.3 Section 04 05 19 Masonry Anchorage and Reinforcing
.4 Section 04 22 00 Concrete Unit Masonry
.5 Section 05 50 00 Metal Fabrications

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM A143/A143M-07(2020) Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement
  .2 ASTM A1064/A1064M-22 Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
.2 American Concrete Institute (ACI)
  .1 ACI SP-66 (04) ACI Detailing Manual
.3 CSA Group (CSA)
  .1 CSA A23.1:19/A23.2:19 Concrete Materials and Methods of Concrete Construction/ Methods of Test Methods and Standard Practice for Concrete
  .2 CSA A23.3:19 Design of Concrete Structures
  .3 CSA G30.18:21 Carbon Steel Bars for Concrete Reinforcement
  .4 CSA G40.20-13/G40.21-13 (R2018) General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel
  .5 CSA W186:21 Welding of Reinforcing Bars in Reinforced Concrete Construction
.4 Reinforcing Steel Institute of Canada (RSIC)
  .1 RSIC Reinforcing Steel Manual of Standard Practice

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Shop Drawings:
  .1 Submit shop drawings, including placing drawings and bar lists.
  .2 Prepare placing drawings and bar lists in accordance with the American Concrete Institute (ACI) Detailing Manual, and the Reinforcing Steel Institute of Canada (RSIC) Reinforcing Steel Manual of Standard Practice and the typical details included with Contract Documents.
  .3 Prepare placing drawings to minimum scale of 1:50.
  .4 Submit placing drawings and bar lists sufficiently detailed and dimensioned to permit correct placement of reinforcement and accessories without reference to architectural or structural Drawings.
  .5 Show reinforcement, including dowels, in elevation on placing drawings for wall reinforcement.
  .6 Show concrete cover to reinforcement.
  .7 Show location of construction joints.

.3 Inspection Reports: Inspection and Testing Company shall:
  .1 Submit written reports of inspection and tests.
  .2 Distribute reports as follows:

.1 Consultant.
.2 Contractor.

.4 Quality Assurance Submittals:
.1 Mill Test Report: provide Consultant with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to beginning reinforcing work.
.2 Submit in writing proposed source of reinforcement material to be supplied.

1.5 Quality Assurance

.1 Obtain a copy of CSA A23.1/A23.2 and maintain on site.

.2 Qualifications: Welding: Undertake welding of reinforcement only by a fabricator or Subcontractor approved by Canadian Welding Bureau to requirements of CSA W186.

.3 Source Quality Control: Source Quality Control may be performed by an Inspection and Testing Company appointed by Consultant.

.4 Review provided by Inspection and Testing Company does not relieve Contractor of his sole responsibility for quality control over Work. Performance or non-performance of Inspection and Testing Company shall not limit, reduce, or relieve Contractor of his responsibilities in complying with the requirements of the Specification.

.5 Identify and correlate reinforcing steel from Canadian mills with test reports for compliance with requirements specified.

.6 Test unidentified reinforcing steel at expense of Contractor. Perform testing for each 1 tonne or part thereof supplied for incorporation in Work.

1.6 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer’s printed instructions.

1.7 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

.1 In accordance with reference standards.

.2 Substitute different size bars only if permitted in writing by Consultant.
.3 Bar Reinforcing Steel:
.1 Bars which are to be welded by arc-welding process: to CSA G30.18, Grade 400W.
.2 Other bars: to CSA G30.18, Grade 400R.

.4 Plain round bars: to CSA G40.20-04/G40.21.

.5 Welded Wire Fabric: to ASTM A1064/A1064M and in flat sheets, not rolls.

.6 Cold-drawn annealed steel wire ties: to ASTM A497.

.7 Chairs, bolsters, bar supports, spacers: to CSA A23.1.

.8 Mechanical splices: subject to approval of Consultant.

2.2 Fabrication

.1 Fabricate reinforcing steel only in permanent fabricating shop.

.2 Fabricate reinforcing steel in accordance with shop drawings.

.3 Tag reinforcing bars to indicate placement as designated on shop drawings.

.4 Splices:
.1 Provide splices only where specifically indicated on Drawings.
.2 Stagger alternate mechanical splices 750 mm apart.
.3 Stagger alternate end bearing splices 750 mm apart.
.4 Install on threaded splices, plastic internal coupler thread protector and plastic bar end thread protector.

PART 3 EXECUTION

3.1 Examination

.1 Before starting this work, examine work done by others which affects this work.

.2 Examine formwork to verify that it has been completed, and adequately braced in place.

.3 Notify the Consultant of any conditions which would prejudice proper completion of this work.

.4 Commencement of work implies acceptance of existing conditions.

3.2 Installation

.1 Place reinforcing steel in accordance with reviewed placing drawings, typical details, and CSA A23.3.

.2 Adequately support reinforcing and secure against displacement within tolerances permitted.

.3 Place reinforcing steel to provide minimum spacing and proper concrete cover as noted on drawings.

.4 Do not cut reinforcement to incorporate other Work.

.5 Relocate or rebend bars only on written instructions of Consultant.

.6 Tie reinforcement in place. Do not weld.

3.3 Adjusting

.1 Adjust and secure reinforcement in correct position immediately before concrete is placed.

.2 Remove contaminants which lessen bond between concrete and reinforcement.

3.4 Field Quality Control

.1 Provide competent supervisor, with at least three years of experience in reinforcement placement, to direct placement of reinforcement.

.2 Inspect placement of reinforcement for conformance with Drawings and Specifications, before each concrete placement, and correct as necessary.

.3 Consultant's periodic review of selected areas of reinforcement are for verification of conformity to design concept and general arrangement only and shall not relieve Contractor of responsibility for quality control, errors, or omissions, or conformance with requirements of Contract Documents.

3.5 Defective Work

.1 Incorrectly fabricated, misplaced or omitted reinforcement will be considered defective Work.

.2 Replace or adjust defective reinforcement before concrete is placed as directed by Consultant.

.3 Replace or strengthen concrete work which is deficient as a result of incorrectly fabricated, misplaced, or omitted reinforcement, which was not corrected before concrete was placed.

.4 Pay for additional inspection and testing, redesign, corrective measures, and related expenses, if Work has proven to be deficient.

3.6 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 10 00 Concrete Forming and Accessories
.2 Section 03 20 00 Concrete Reinforcing
.3 Section 04 05 19 Masonry Anchorage and Reinforcing
.4 Section 04 22 00 Concrete Unit Masonry
.5 Section 05 50 00 Metal Fabrications
.6 Section 07 92 00 Joint Sealants

1.3 References

.1 ASTM International (ASTM)
- .1 ASTM C260/C260M-10a (2016) Standard Specification for Air Entraining Admixtures for Concrete
- .2 ASTM C295/C295M-19 Standard Guide for Petrographic Examination of Aggregates for Concrete
- .3 ASTM C309-19 Standard Specification for Liquid Membrane Forming Compounds for Curing Concrete
- .4 ASTM C330/C330M-17a Standard Specification for Lightweight Aggregates for Structural Concrete
- .5 ASTM C494/C494M-19 Standard Specification for Chemical Admixtures for Concrete
- .6 ASTM C881/C881M-20a Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
- .7 ASTM C1017/C1017M-13e1 Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
- .8 ASTM C1107/C1107M-20 Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
- .9 ASTM D412-16 Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
- .10 ASTM D570-98(2018) Standard Test Method for Water Absorption of Plastics
- .11 ASTM D624-00(2020) Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
- .12 ASTM D638-14 Standard Test Method for Tensile Properties of Plastics
- .13 ASTM D1259-06(2018) Standard Test Methods for Nonvolatile Content of Resin Solutions
- .14 ASTM D1751-18 Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
- .15 ASTM D2240-15e1 Standard Test Method for Rubber Property—Durometer Hardness
- .16 ASTM D5329-20 Standard Test Methods for Sealants and Fillers, Hot-Applied, for Joints and Cracks in Asphalt Pavements and Portland Cement Concrete Pavements

.2 American Concrete Institute (ACI)
- .1 ACI 117-10 Specifications for Tolerances for Concrete Construction and Materials.
- .2 ACI 232.1R-12 Report on the Use of Raw or Processed Natural Pozzolans in Concrete

.3 CSA Group (CSA)
- .1 CSA A23.1:19/A23.2:19 Concrete Materials and Methods of Concrete Construction/ Methods of Test Methods and Standard Practice for Concrete.
- .2 CSA A283:19 Qualification Code for Concrete Testing Laboratories.
- .3 CSA A3000-18 Cementitious Materials Compendium

.4 Ontario Provincial Standard Specifications (OPSS)

.1 OPSS 1010 Material Specification for Aggregates - Granular A, B, M and Select Subgrade Material.
.2 OPSS 1212 Material Specification for Hot-Poured Rubberized Asphalt Joint Sealing Compound.

.5 Government of Canada Treasury Board Secretariat (TBS)
.1 Standard on Embodied Carbon in Construction

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Samples: Submit for inspection, material samples of specified mix designs.

.3 Concrete Mix Designs:
.1 Submit concrete mix designs for review. Specify intended use for each mix design.
.2 Review of mix design does not relieve Contractor from responsibility for compliance with Contract Documents.
.3 Provide certification that mix proportions selected will produce concrete of specified quality and yield and that strength will comply with CSA A23.1. Mix design shall be adjusted to prevent alkali aggregate reactivity problems.
.4 Provide certification that plant, equipment, and all materials to be used in concrete comply with the requirements of CSA A23.1.
.5 Submit written requests for use of admixtures not specified, for site mixing of concrete, and for use of bonding agents.
.6 Submit in writing, proposed method of in-situ strength testing.

.4 Inspection Reports: Inspection and Testing Company shall:
.1 Submit written reports of inspection and tests.
.2 Distribute reports as follows:
.1 Consultant;
.2 Contractor.
.3 On concrete cylinder test reports, include:
.1 Specific location of concrete represented by sample
.2 Design strength.
.3 Unit weight of sample
.4 Class of exposure
.5 Aggregate size and mixtures incorporated
.6 Date, hour and temperature at time sample taken
.7 Percentage air content
.8 Test strength of cylinder
.9 Type of failure if test fails to meet specification.

1.5 Quality Assurance

.1 Obtain a copy of CSA A23.1/A23.2 and maintain on site.

.2 Source Quality Control:
.1 Both source quality control, and field quality control specified in Article 1.5.4, may be performed by an Inspection and Testing Company appointed by Consultant.
.2 Review provided by Inspection and Testing Company does not relieve the Contractor of his sole responsibility for quality control over Work. Performance or non- performance of Inspection and Testing Company shall not limit, reduce, or relieve Contractor of his responsibilities in complying with the requirements of the Specification.

.3 Inspection and Testing Company shall be certified under CSA A283, Qualification Code for Concrete Testing Laboratories, for Category 1 Certification.
.4 Payment for specified Work performed by Inspection and Testing Company will be made from Cash Allowance.
.5 Payment for additional tests (including testing of structure and its performance and load testing) required by changes of materials or mix design requested by Contractor, and failure of completed Work to meet specified requirements, shall be made at Contractor's expense.
.6 Perform Work of source quality control in accordance with CSA A23.2 and to include:
.1 Verification that ready-mix supplier is qualified to supply concrete in accordance with Specification.
.2 Review of proposed concrete mix designs.
.3 Sampling, inspection, and testing of materials as may be required.

.3 Field Quality Control:
.1 Inspection and Testing Company, when appointed as specified for Source Quality Control, shall perform sampling, inspection and testing of concrete work at site.
.2 Perform sampling, inspection and testing in accordance with CSA A23.2, and to include:
.1 Making of standard slump tests.
.2 Obtaining of three standard specimens for strength tests from each 100 m of concrete, or fraction thereof, of each mix design of concrete placed in any one day. In addition, for slabs-on-grade, obtain beam specimens for determination of modulus of rupture.
.3 Verification that test specimens are stored within an enclosure, maintained at specified temperatures.
.4 Making compression tests of each set of three specimens, one at 7 days and two at 28 days; modulus of rupture tests at 90 days.
.5 Verification of air content of air-entrained concrete.
.1 For Class of exposure F-1, and C-2, test at frequency in accordance with CSA A23.1.
.2 Make first test before placing any concrete.
.3 After stable air content has been established, frequency of tests will be determined by Consultant.
.4 For other Classes of exposure, test at time of obtaining strength test specimens.
.3 Inspection for Tolerances:
.1 Confirm that concrete work meets specified tolerance requirements.
.2 Use the elevation survey records of elevations of finished concrete surfaces specified in Section 03 10 00 and this section as basis for judging compliance.
.3 Use approved aluminum straightedge to judge compliance with specified slab tolerances, except use dipstick equipment where F-number tolerance is specified.
.4 Slabs-on-Grade:
.1 Observe application of curing compound to sample slab, recording rate of application.
.2 Monitor on a random basis acceptable to the Consultant, that slab is being saw cut before slab temperature starts to fall.
.3 Qualifications: Floor finishing shall be undertaken only by contractors with at least 10 years of experience.
.4 Sample of Finish Flooring:
.1 Finish an area of floor slab where directed by Consultant to provide sample of finish for approval.
.2 Protect new sample area until finish is approved.
.3 If liquid membrane curing compound is to be used on Project, determine and apply correct quantity required to meet rate of coverage recommended by manufacturer for measured test area.
.4 Approved sample will provide standard by which subsequent finishing will be judged and will be incorporated into Work.

1.6 Tolerances

.1 In accordance with ACI 117 and CSA A23.1.

.2 Difference between elevation of high point and low point in specified area not to exceed:
.1 In any bay up to 100 m^2: 12 mm.
.2 In any bay up to 400 m^2: 25 mm.

.3 Straightedge method: Finish floor slabs to meet following tolerances when measured at 72 +/- 12 hours after completion of floor finishing, before shores are removed from formed slabs, by placing a freestanding unleveled straight edge anywhere on slab and allowing it to rest on two high points. Gap between straightedge placed on two high points and slab not to exceed:
.1 3 metre straightedge: 8 mm (Class A).
.2 2 metre straightedge: 4 mm.

1.7 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

1.8 Job Conditions

.1 Protect floor slabs, and concrete surfaces exposed to view or on which finishes are to be applied, from grease, oil, and other soil which will affect the appearance of the concrete, or impair the bond of finish material.

.2 Environmental Conditions: In addition to Cold Weather and Hot Weather Requirements of CSA A23.1, the following shall apply to Work of this Section:
.1 Provide protection or heat, or both, so that temperature of concrete at surfaces is maintained at not less than 21 ° C for three days after placing, not less than 10 ° C for the next two days and above freezing for the next two days.
.2 Do not permit alternate freezing and thawing for fourteen days after placing.
.3 Vent exhaust gases from combustion type heaters to atmosphere outside protection enclosures.
.4 Provide protection to maintain concrete continuously moist during curing period.
.5 For field cured cylinders representing strength development of in-situ concrete, provide same specified hot and cold weather protection for storage of each concrete compression specimen as for concrete from which it was taken, until it is sent to testing laboratory.
.6 Do not place concrete during rain. Should rain commence during placing, cover freshly placed concrete.
.7 Do not place bonded toppings on rough slabs that are less than 15 °C.
.8 Do not grout at ambient air temperatures or concrete surface temperatures less than 5 ° C, or when temperature is forecast to fall to less than 5 ° C within 24 hours of grouting.
.9 Do not apply sealants at ambient air temperatures or concrete surface temperatures less than 5 ° C.

1.9 Project Records

.1 Maintain record of all concrete pour related to time, date, delivery slip serial number and location of each concrete pour and identify related test cylinders. Keep records on site until project is completed.
.2 Delivery Records: File duplicate copies of concrete delivery slips on which shall be recorded: supplier, serial number of slip, date, truck number, contractor, Project, Class of exposure,

cementing materials content, air content, volume in load, and time of first mixing of aggregate, cementing materials and water.

.3 Record Drawings:
.1 Record on a set of Drawings:
.1 founding elevations of all footings
.2 variations of foundation Work from that indicated on Drawings.
.2 Make record drawings available for Consultant's inspection at all times.

1.10 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

.1 To meet specified requirements of referenced Standards.

.2 Cement:
.1 Portland Cement: to CSA A3000.
.2 Cementitious Hydraulic Slag: to ACI 232.1R

.3 Fine Aggregate: For slabs-on-grade, fineness modulus of fine aggregate to be between 2.7 and 3.1.

.4 Coarse Aggregates:
.1 20 mm to 5 mm (No. 4 sieve) except as specified below.
.2 For slabs-on-grade 125 mm and thicker: 40 mm to 5 mm (No. 4 sieve); combine at least two of the single sizes specified in Table 5 Group II of CSA A23.1, one of which is to be 40 mm, to obtain maximum bulk density (unit weight) and optimum grading, in accordance with an approved procedure.
.3 For slabs-on-grade: Abrasion loss not to exceed 35%. Petrographic number of aggregate not to exceed 125 when tested in accordance with ASTM C295.
.4 For toppings 50 mm thick and less and for slabs over open web steel joists: 12 mm to 5 mm (No. 4 sieve).

.5 Admixtures:
.1 Conform to Reference Standards for chemical and air-entraining admixtures.
.2 Provide only admixtures that are free of chlorides.
.3 When requested, provide evidence acceptable to Consultant that superplasticizer does no increase shrinkage of concrete.

.6 Curing-Sealing Compound: Membrane curing-sealing compound formulated from chlorinated rubber resins, or acrylic emulsion, solvent free for use in occupied buildings, to ASTM C309, type 1.
.1 Basis-of-Design Product: Euclid Chemical Company; Diamond Clear 350 or a comparable product by one of the following:
.1 BASF Corporation - Construction Systems.
.2 Sika Corporation
.3 W.R. Meadows

.7 Bonding Agent: To ASTM C881, 100% reactive, 2 component, low viscosity, high modulus bonding adhesive.

.8 Saw Cut Filler: Semi-rigid epoxy or polyurea in accordance with ACI 302.1R for joint fillers used in control and construction joints.
.1 Basis of Design Euco 700 or Euco QWIKjoint UVR by Euclid Chemical.

.9 Premoulded Joint Fillers: Bituminous impregnated fiber board: to ASTM D1751.

.10 Sealant: Refer to Section 07 92 00 – Joint Sealants

.11 Mechanical Anchors: 'Kwik' Bolts, 'Cinch' Anchors or Parabolts.

.12 Weep hole tubes: plastic.

2.2 Concrete Mixes

.1 Ready Mix, with 28 day compressive strength as indicated on Drawings.

.2 Design concrete mix in conformance with CSA A23.1, Tables 1, 2, 5 (Alternative 1) and 17, and as follows. Provide concrete meeting water/cementing materials ratio and air content of Table 14 in accordance with Class of exposure specified in following sub-paragraphs, and minimum strength specified on Drawings. Note that concrete designed in accordance with water/cementing materials ratio of Table 14 may yield strength exceeding minimum strength specified on Drawings.
.1 Class of exposure C-2 with 25 percent Portland cement replaced with cementitious hydraulic slag: for pavements, sidewalks, curbs and gutters.
.2 Class of exposure F-2 with 25 percent Portland cement replaced with cementitious hydraulic slag: for grade beams, and for exposed exterior beams, columns, walls and slabs.
.3 Slabs-on-Grade:
.1 Use type 20 Portland cement, or replace 35 percent Portland cement with cementitious hydraulic slag.
.2 When mean daily temperature exceeds 25 ° C at time of placement, replace 25 percent of type 20 cement, or 50 percent of type 10 cement, with cementitious hydraulic slag.
.3 Use water/cementing materials ratio 0.45 maximum.
.4 Use aggregates specified in paragraphs 2.1.3.
.5 Cementing materials content 325 kg/m.
.6 Modulus of rupture 3.5 MPa average, 3.0 MPa minimum.
.7 Slump at delivery, before addition of superplasticizer, 50 mm; add superplasticizer, not water, to bring slump to level acceptable to floor finisher for placement.
.4 Interior Concrete, other than specified above, and not exposed to freezing and thawing or the application of deicing chemicals: select water/cementing materials ratio and cementing materials content on basis of strength, workability, and finishing requirements.

.3 Submit evidence, and material samples, if requested, acceptable to the Inspection and Testing Company, to verify that the proposed concrete mix design will produce specified quality of concrete.

.4 List all proposed admixtures in mix design submission. Do not change or add admixtures to approved design mixes without Consultants approval.

.5 Concrete Weight: Air dry unit weight: minimum 2,300 kg/m; adjusted proportionally for maximum air content listed in CSA A23.1, Clause 15, Table 10.

.6 Concrete supplier to provide documentation indicating the requirements of TBS Standard on Embodied Carbon in Construction have been met.

2.3 Admixtures

.1 Chemical Admixture: To ASTM C494. Incorporate water-reducing admixture, type WN, in all concrete.

.2 Air Entraining Agent: To ASTM C260. Incorporate air-entraining agent in addition to chemical admixture in concrete of relevant Class of exposure, in accordance with CSA A23.1, Clause 15, Table 10.

.3 Chloride: Do not use calcium chloride or admixtures containing chloride in concrete.

2.4 Concrete Toppings

.1 Provide topping with minimum 28 day compressive strength of 32 MPa.

2.5 Premixed Grout

.1 Non-Shrink Metallic: Non-catalyzed metallic grout to ASTM C1107, Compressive strength at 28 days: 48 MPa.

.2 Non-Shrink, Non Stain, Non-Metallic: to ASTM C1107. Compressive strength at 28 days: 59 MPa.

.3 Flowable Grout: High-tolerance Non-shrink, Non-metallic shrinkage compensating grout to ASTM C1107. Compressive strength at 28 days: 59 MPa.

PART 3 EXECUTION

3.1 Examination

.1 Before starting this work, examine work done by others which effects this work.

.2 Notify Consultant of any condition which would prejudice proper completion of this work.

.3 Confirm that surfaces on which concrete is to be placed are free of frost and water before placing.

.4 Confirm that reinforcement, dowels, control joints, inserts and all other built in work are in place and secured.

.5 Commencement of work implies acceptance of existing conditions.

3.2 Treatment of Formed Surfaces

.1 Conform to the requirements of CSA A23.1, and as additionally specified herein.

.2 Treat concrete surfaces which will be exposed or painted in the completed building to provide a "Smooth Rubbed Finish" in accordance with CSA A23.1, uniform in colour and texture.

.3 Plugs at Recessed Ties:
.1 Clean tie holes to remove all foreign matter.
.2 Coat plugs by dipping in adhesive and insert in hole.
.3 Remove excess adhesive immediately with thinner which will not stain concrete, as recommended by manufacturer.

.4 Obtain Consultant's approval of finished exposed concrete and grind or otherwise correct to the satisfaction of the Consultant.

3.3 Placing Concrete

.1 Place concrete in accordance with requirements CSA A23.1/A23.2.

.2 Notify Consultant and inspection and testing firm at least 24 hours prior to commencement of concrete placing operation and 24 hours before wall forms are closed in.

.3 Obtain Geotechnical Engineer's confirmation that thickness, elevation and compaction of sub-grade meets specifications before placing concrete.

.4 Do not place concrete in water or open frozen surfaces.

.5 Remove contaminants which lessen concrete bond to reinforcement before concrete is placed.

.6 Maintain accurate records of cast in place concrete items. Record date, location of pour, quantity, air temperature and test samples taken.

.7 Ensure that reinforcement, inserts, embedded items, formed expansion joints and the like, are not disturbed during concrete placement.

.8 Joint fillers:
- .1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Consultant.
- .2 When more than one piece is required for joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
- .3 Locate and form isolation, construction and expansion joints as indicated.
- .4 Install joint filler.
- .5 Use 12 mm thick joint filler to separate slabs-on-grade from vertical surfaces and extend joint filler from bottom of slab to within 12 mm of finished slab surface unless indicated otherwise.

.9 Provide construction joint as indicated on the drawings. Ensure dowels are adequately anchored and placed at right angles to the joint before placing concrete.

.10 Place floor slabs to depth indicated on the drawings with 25 MPa minimum concrete unless otherwise noted on drawings but consistent with minimum cement content specified for exposed floors in this specification.

.11 Sloping Surfaces and Slabs: commence concrete placement at bottom of sloping surfaces.

3.4 Finishing Concrete

.1 Perform finishing operations on plastic concrete surfaces in accordance with CSA A23.1, and as specified herein.

.2 Refer to the drawings for floor finishes and coverings.

.3 Screed the top of rough floor slabs to an even level or sloping surface at the proper elevation to receive the finish or topping specified on the drawings and in finish schedule.

.4 Provide a smooth steel trowel finish on all areas scheduled to receive a covering, or painted finish.

.5 Exposed Floor Surfaces: Provide hard, smooth, dense, steel troweled surface, free from blemishes, and of uniform appearance.

3.5 Curing

.1 Cure concrete in accordance with CSA A23.1 and as specified herein.

.2 Curing Compound Method:
.1 Use curing and sealing compound specified except:
.1 On surfaces to receive epoxy or similar paint finish.
.2 On surfaces to which architectural finishes will be adhered, the adhesives for which are incompatible with the curing compound.
.3 Air-entrained concrete for exterior slabs and sidewalks placed between October 1st and March 31st.

.3 Select acrylic water compound except that if ambient conditions extend drying time unduly and if area is well ventilated and unoccupied by other workers, solvent based compound may be used.

.4 Apply curing compound in accordance with manufacturer's instructions, increasing application rate as necessary to cover surface completely.

.5 Curing Blanket or Wet Burlap Method: For exterior sidewalks and other finished concrete surfaces that will be exposed to freezing and thawing or deicing chemicals:
.1 Cover with curing blanket or wet burlap overlaid with 0.102 mm thick polyethylene and maintain in place for the additional curing for durability period in accordance with CSA A23.1 but in no case for less than 7 days.
.2 Wet blanket or burlap regularly to maintain in moist condition. Do not allow to dry out.

.6 Cure finished concrete surface with an approved curing and sealing compound which will leave the surface with a uniform appearance and with a minimum of discolouration after drying. Ensure that the curing compound will be compatible with the architectural finishes or adhesives for finishes to be applied later. Apply the compound in strict accordance with the manufacturer's instructions.

.7 Protect surface which will be exposed to direct sunlight during the curing period, with a light coloured, laminated waterproof paper immediately after the curing and sealing compound has hardened sufficiently for the paper to be placed without damage to the sealed surface. Lap the paper a minimum of 100 mm and seal the laps. Leave the paper in place for at least seven days.

3.6 Grouting

.1 Mix prepackaged grout with water in accordance with manufacturer's printed instructions.

.2 Dampen concrete surfaces immediately before installing grout.

.3 Use non-shrink and shrinkage-compensating grouts only when grout will be contained against expansion and self-disintegration.

.4 Slope grout beyond edge of plate at 45 degrees.

.5 Provide same environmental protection and curing as specified for concrete.

3.7 Joint Sealant

.1 Apply sealant specified in Section 07 92 00 to thoroughly dry surfaces only, at ambient air temperatures above 5 ° C.

.2 Provide sealant on top of joint filler with a polyethylene bond breaker between joint filler and joint sealant applied in accordance with manufacturer's direction.

.3 Confirm that preformed joint filler and backer rod are compatible with sealant.

.4 Caulk joints in accordance with the following:
- .1 Do not commence joint preparation until concrete is at least 28 days old.
- .2 Thoroughly clean sides of joints with mason's router, or power saw, equipped with double blade where necessary to suit joint width.
- .3 Blow clean with compressed air with oil trap on line, or vacuum clean.
- .4 Install backer rod of diameter 25 percent greater than joint width, and type recommended by sealant manufacturer to be compatible with sealant. Locate backer rod to provide for sealant depth of one-half joint width, but not less than 12 mm.
- .5 Prime joint if required, as recommended by sealant manufacturer.

3.8 Defective Work

.1 Variations in excess of specified tolerances and marked and disfigured surfaces that cannot be repaired by approved methods will be considered defective work.

.2 Replace or modify concrete that is out of place or does not conform to lines, detail or grade as directed by the Consultant.

.3 Replace or repair defectively placed or finished concrete as directed by the Consultant.

.4 Testing and Replacement of Deficient Concrete in Place:
- .1 Pay for additional testing and related expenses if concrete has proven to be deficient.
- .2 Replace or strengthen deficient concrete work as directed by the Consultant, and pay for all testing and related expenses for replaced work until approved by the Consultant.

3.9 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

.2 Clear away from the building site excess and waste materials and debris resulting from Work of this Section.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 04 22 00 Concrete Unit Masonry
.2 Section 05 12 23 Structural Steel
.3 Section 05 50 00 Metal Fabrications

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM A153/A153M-23 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
.2 CSA Group (CSA)
  .1 CSA A23.1:19/A23.2:19 Concrete Materials and Methods of Concrete Construction / Test Methods and Standard Practices for Concrete.
  .2 CSA S304-14 (R2019) Design of Masonry Structures.
  .3 CSA A370-14 (R2018) Connectors for Masonry.
  .4 CAN/CSA A371-14 (R2019) Masonry Construction for Buildings.
  .5 CSA G30.3-M1983 (R1998) Cold-Drawn Steel Wire for Concrete Reinforcement.
  .6 CSA G30.18-09 (R2014) Carbon Steel Bars for Concrete Reinforcement
  .7 CSA W186-M1990 (R2016) Welding of Reinforcing Bars in Reinforced Concrete Construction
.3 American Concrete Institute (ACI)
  .1 Detailing Manual
.4 Reinforcing Steel Institute of Canada (RSIC)
  .1 Reinforcing Steel Manual of Standard Practice

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit the following samples:
  .1 Two of each type of masonry reinforcing and connector specified.

.3 Product Data: Submit manufacturer's printed product literature, specifications and data sheets.

.4 Shop Drawings:
  .1 Submit shop drawings for all masonry reinforcing. Include placing drawings, bar lists and details. Indicate clearly reinforcing bar sizes, spacing, bending details, lap details, dowels to adjacent construction location and quantities of reinforcement and connectors.
  .2 Prepare placing drawings and bar lists in accordance with the American Concrete Institute (ACI) Detailing Manual, and the Reinforcing Steel Institute of Canada (RSIC) Reinforcing Steel Manual of Standard Practice, the typical details included with Contract Documents.
  .3 Prepare placing drawings to minimum scale of 1:50.
  .4 Submit placing drawings and bar lists sufficiently detailed and dimensioned to permit correct placement of reinforcement and accessories without reference to architectural or structural Drawings.
  .5 Show reinforcement, including dowels, in elevation on placing drawings for wall reinforcement.

.6 Show cover to reinforcement
.7 Show location of construction joints.

1.5 Design Criteria

.1 Non-conventional Masonry Connectors
.1 Deflection: maximum 2.0 mm, including free play when acted upon by 0.45 kN lateral load, in all possible positions of adjustment.
.2 Positive restraint at position of maximum adjustment.

.2 Multi-component Ties - Free Play: Maximum 1.2 mm, when assembled in any possible configuration.

1.6 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.7 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

.1 All metal components: hot dipped zinc galvanized to CSA S304 unless otherwise indicated.

.2 Bar Reinforcement: To CSA A371 and CSA G30.18, grade 400R, deformed billet steel bars.

.3 Column Ties: Fero CAT Tie (Column Adjustable Tie), spot weld to columns at 400 mm c/c.

.4 Connectors: to CSA A370 and CSA S304.
.1 Finish: Steel components, hot dip galvanized to CAN/CSA A370.
.2 Side Mounting Rap Ties:
.1 Flat-Plate: Length to suit steel stud width and thickness of gypsum sheathing, membrane and insulation.
.2 V-Tie: Length to provide placement of legs at centerline of solid unit veneer.
.3 Insulation support.
.4 Basis of Design: Side Mounting Rap Ties by Fero Corporation

.3 Strip Ties: Prescriptive corrugated strip tie. 100 mm x 22 mm x 0.91 mm thick corrugated tie conforming to CSA A370.

.5 Wire Reinforcement: To CSA A371 and CSA G30.3.
.1 Interior walls: hot dipped galvanized to CSA S304
.1 4.76 mm wire diameter hot dipped galvanized to CSA S304 for interior bearing walls.
.2 3.66 mm wire diameter bright wire finish, standard duty for interior non-bearing walls and partitions
.3 Truss Type: Blok-Trus BL-30 by Blok-Lok Ltd. for non-vertically reinforced walls
.4 Ladder Type: Blok-Trus BL-10 by Blok-Lok Ltd. for vertically reinforced walls

.6 Equivalent products as manufactured by the following manufacturer's may be used subject to submission and acceptance by the Consultant of technical data:
.1 Hohmann and Barnard Inc.

.7 Epoxy Adhesive: Hilti HIT-HY 2270 Adhesive anchor.

2.2 Fabrication

.1 Fabricate reinforcing in accordance with CSA A23.1 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Ontario.

.2 Obtain Consultant's approval for locations of reinforcement splices other than shown on placing drawings.

.3 Upon approval of Consultant, weld reinforcement in accordance with CSA W186.

.4 Ship reinforcement clearly identified in accordance with drawings.

PART 3 EXECUTION

3.1 Installation

.1 Install masonry reinforcement, connectors and anchors in accordance with CSA A370, CSA A371, CSA A23.1 and CSA S304 unless indicated otherwise.

3.2 Reinforcement

.1 Unless otherwise noted, all masonry walls shall be reinforced with joint reinforcement.

.2 Reinforcement shall be installed in the first and second bed joints, 200 mm apart immediately above lintels and below sill at openings, and in bed joints at 400 mm vertical intervals elsewhere. Reinforcement in the second bed joint above or below openings shall extend 600 mm beyond the jambs. All other reinforcement shall be continuous except that it shall not pass through vertical masonry control joints. Side rods shall be lapped at least 150 mm at splices.

.3 Use prefabricated corner and tee sections for continuous reinforcement at corners and intersecting walls.

.4 Vertical reinforcement shall have a minimum clearance of 13 mm from the masonry and not less than one bar diameter between bars.

.5 All block cores containing vertical reinforcing and/or anchor bolts shall be solidly filled with non-shrink grout.

.6 Place reinforcement and ties in grout spaces prior to grouting.

.7 Cleanouts: Provide cleanouts in the bottom course of masonry for each grout pour when the grout pour height exceeds 1.5 m.

.8 Construct cleanouts so that the space to be grouted can be cleaned and inspected. In solid grouted masonry, space cleanouts horizontally a maximum of 800 mm on center.

.9 Construct cleanouts with an opening of sufficient size to permit removal of debris. The minimum opening dimension shall be 76 mm.

.10 After cleaning, close cleanouts with closures braced to resist grout pressure.

3.3 Bonding and Tying

.1 Bond walls of two or more wythes using seismic connectors and ladder type reinforcement in accordance with CSA S304, CSA A371 and as indicated.

.2 Tie masonry veneer to backing in accordance with CSA S304, CSA A371 and as indicated.

.3 Masonry ties shall be installed as per the requirements of CSA A371 with maximum spacing of 400 mm vertically and 400 mm horizontally.

3.4 Metal Anchors

.1 Do metal anchors as indicated.

3.5 Lateral Support and Anchorage

.1 Do lateral support and anchorage in accordance with CSA S304 and as indicated.

.2 Anchor new masonry to existing with steel dowels as indicated. Drill into existing masonry and set reinforcing bars in epoxy adhesive in accordance with manufacturer’s instructions.

3.6 Control Joints

.1 Terminate reinforcement 25 mm short of each side of control joints unless otherwise indicated.

.2 Control joints shall be stepped to avoid cutting lintel beams. Under no circumstance shall the control joints be placed to compromise the bearing for the lintel.

3.7 Field Bending

.1 Do not field bend reinforcement and connectors except where indicated or authorized by Consultant.

.2 When field bending is authorized, bend without heat, applying a slow and steady pressure.

.3 Replace bars and connectors which develop cracks or splits.

3.8 Field Touch Up

.1 Touch up damaged and cut ends of galvanized reinforcement steel and connectors with compatible finish to provide continuous coating.

3.9 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1	Section 03 10 00	Concrete Forming and Accessories
.2	Section 03 20 00	Concrete Reinforcing
.3	Section 03 30 00	Cast-in-Place Concrete
.4	Section 04 05 19	Masonry Anchorage and Reinforcing
.5	Section 05 12 23	Structural Steel
.6	Section 05 50 00	Metal Fabrications
.7	Section 06 10 00	Rough Carpentry
.8	Section 07 84 00	Firestopping
.9	Section 07 92 00	Joint Sealants
.10	Section 08 11 00	Metal Doors and Frames
.11	Section 09 21 16	Gypsum Board
.12	Section 09 91 23	Interior Painting

1.3 References

.1 ASTM International (ASTM)
- .1 ASTM C90-22 Standard Specification for Loadbearing Concrete Masonry Units
- .2 ASTM C129-22 Standard Specification for Nonloadbearing Concrete Masonry Units
- .3 ASTM C150/C150M-22 Standard Specification for Portland Cement
- .4 ASTM C207-18 Standard Specification for Hydrated Lime for Masonry Purposes.
- .5 ASTM D2240-15(2021) Standard Test Method for Rubber Property—Durometer Hardness.
- .6 ASTM D5249-10(2021) Standard Specification for Backer Material for Use with Cold and Hot Applied Joint Sealants in Portland Cement Concrete and Asphalt Joints.

.2 CSA Group (CSA)
- .1 CSA A23.1-14/A23.2:19 Concrete Materials and Methods of Concrete Construction / Test Methods and Standard Practices for Concrete.
- .2 CSA A165 Series-14 (R2019) CSA Standards on Concrete Masonry Units.
- .3 CSA A179-14 (R2019) Mortar and Grout for Unit Masonry
- .4 CSA A370-14 (R2018) Connectors for Masonry.
- .5 CSA A371-14 (R2019) Masonry Construction for Buildings.
- .6 CSA S304-14 (R2019) Design of Masonry Structures.

.3 Canadian Concrete Masonry Producers Association (CCMPA) Quality Assurance Program.

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Data: Submit manufacturer's printed product literature, specifications and data sheets

.3 Submit the following samples:
- .1 Two (2) of each type of concrete masonry units specified.
- .2 Two (2) of each type of masonry accessory specified.

.4 Submit shop drawings for all masonry reinforcing. Include placing drawings, bar lists and details. Indicate clearly reinforcing bar sizes, spacing, bending details, lap details, dowels to adjacent construction location and quantities of reinforcement and connectors.

.5 Submit engineered temporary bracing design drawings for temporary support of masonry walls. Drawings shall be prepared by, and bear the seal of a Professional Engineer, licensed in the Province of Ontario.

.6 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.7 Inspection Reports: Inspection and Testing Company shall submit reports of inspections and tests.
- .1 Distribute inspection reports as follows:
  - .1 Consultant.
  - .2 Structural Engineer
  - .3 Contractor.

1.5 Quality Assurance

.1 The masonry sub-contractor shall have a minimum of five years of continuous documented Canadian experience in work of the type and quality shown and specified. Proof of experience shall be submitted when requested by the Consultant and shall be subject to the approval of the Consultant.

.2 Pre-installation meeting: conduct pre-installation meeting to verify project requirements manufacturer's instructions and manufacturer's warranty requirements.

.3 Field Quality Control:
- .1 Inspection and testing will be carried out by Testing Laboratory designated by Owner.
- .2 Payment for specified Work performed by Inspection and Testing Company will be made from Cash Allowance.
- .3 Inspection and Testing Company shall perform sampling, inspection and testing of masonry work at site, in accordance with referenced standards, including but not limited to the following:
  - .1 Masonry Placement Inspection
  - .2 Reinforcing Steel Placement
  - .3 Grout and Mortar Testing
  - .4 CMU Testing
- .4 Review provided by Inspection and Testing Company does not relieve Contractor of his sole responsibility for quality control over Work. Performance or non-performance of Inspection and Testing Company shall not limit, reduce, or relieve Contractor of his responsibilities in complying with the requirements of the Specification.
- .5 Provide access to Work for inspectors.

1.6 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer’s printed instructions.

.3 Materials shall be kept clean and dry.

.4 Deliver cement, lime and mortar ingredients with manufacturer's seal and labels intact.

.5 Cementitious material and aggregates shall be stored in accordance with the requirements of CSA A23.1.

.6 Exposed units which become stained or chipped, surface marked or scratched, and materials which are affected by inadequate protection shall be replaced, at no additional expense to the Owner.

1.7 Project Conditions

.1 Provide heat enclosures and heat as required.

.2 Work to be undertaken shall be carried out according to CAN3-A371, Clause 5.15.2.

.3 Maintain temperature of mortar between 5 ° C and 50 ° C until batch is used.

.4 Keep masonry dry using secure waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven snow, rain and dirt, until masonry work is completed and protected by flashings or other permanent construction.

.5 Protect masonry and other work from marking and other damage. Protect completed work from mortar droppings. Use non-staining coverings.

1.8 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

.1 Masonry Units: Concrete Block: Modular, conforming to CCMPA requirements and CSA A165.1.
  .1 H/20/A/M concrete masonry units to be used at all load bearing masonry walls.
  .2 H/15/A/M concrete, masonry units, at all other locations unless noted otherwise.
  .3 SS/15/A/M semi-solid concrete masonry units to be used at all 2 hour rated fire walls.
  .4 Refer to drawings for Fire Resistance Ratings. Type of concrete and block to conform to Table 5.0, Fire Resistance Rating of Concrete Block in Hours, of the Canadian Concrete Masonry Producers Association Handbook.
  .5 Special shapes: provide special shapes indicated or required including bullnose and corner blocks, base blocks, fillers, and the like as may be required. Provide purpose made shapes for lintels and bond beams.
  .6 Exposed block shall all be made by one manufacturer and shall be uniform in colour, shade and texture.

.2 Bar Reinforcement, wire reinforcement, connectors and ties: as specified in Section 04 05 19 - Masonry Anchorage and Reinforcing.

.3 Control Joint Filler: to ASTM D5249-10, Type 1, Round, flexible, continuous-length, nonabsorbent, nongassing, nonstaining, and nonshrinking. Extruded from a cross-linked polyethylene. Flexibile foam, heat-Resistant Backer Rod. 9.5 mm thick by width of wall.

.4 Pre-manufactured Masonry Control Joint: Pre-manufactured polyvinylchloride control joints may be used in lieu of the specified built-up type of joint.

.5 Mortar: Conforming to CSA A179.
  .1 Use same brand of material and source of aggregate for entire project.
  .2 Aggregate: CSA A179, fine grain aggregates.

.3 Cement: normal Portland to ASTM C150, Type 10.
.4 Water shall be clean, potable and free of deleterious amounts of acid, alkalies, or organic materials.
.5 Hydrated Lime: Type ‘S’ to ASTM C207.
.6 Type 'S' mortar shall be used for all concrete block masonry work.
.7 Proprietary Mortar Mixes: conform to mix requirements specified
.8 Mortar colour for concrete unit masonry work shall be grey.
.9 Admixtures of any kind are not allowed.

.6 Grout: to CSA A179, Table 3: Premixed, non-shrink non-metallic grout.

.7 Other materials not specifically described but required for a complete and proper installation of masonry, shall be as selected by the Contractor subject to approval by the Consultant

2.2 Mixes

.1 Mixing: Prepare and mix mortar materials under strict supervision, and in small batches only for immediate use.

.2 Mix proprietary mortars in strict accordance with manufacturer's instructions to produce the specified mortar types in accordance with CSA A179. Do not use re-tempered mortars.

.3 Take representative samples for testing consistency of strength and colour according to CSA A179.

2.3 Accessories

.1 Mechanical Fasteners: As recommended by manufacturer of material to be fastened, and in accordance with the reference standards, corrosion resistant.

PART 3 EXECUTION

3.1 Examination

.1 Examine work of other trades for defects or discrepancies and report same in writing to Consultant.

.2 Installation of any part of this work shall constitute acceptance of such surfaces as being satisfactory.

3.2 General

.1 Do masonry work in accordance with CSA A371 except where specified otherwise.

.2 A competent masonry foreman shall supervise and direct the work and only skilled masons shall execute the work of this Section.

.3 Coordinate work of this Section with others such as, field welding of anchors to steel work, insulation application, and the like. Prepare all items for built-in as the work proceeds, either supplied and installed by other trades or installed under this Section.

.4 Unless otherwise indicated on the drawings, all interior masonry partitions shall extend from floor level to the underside of floor or roof structures above.

3.3 Installation

.1 Build masonry plumb, level, and true to line, with vertical joints in alignment.

.2 Lay out coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.

.3 Lay block with webs to align plumb over each other with thick ends of webs up. The top course of all partitions which do not pass through a ceiling or up to the underside of a roof deck shall have the open cells filled solid.

.4 Cut exposed block with power driven abrasive cutting disc or diamond cutting wheel for flush mounted electrical outlets, grilles, pipes, conduits, leaving 3 mm maximum clearance.

.5 Fill all vertical and bed joints, including plain end faces, through the entire wall thickness solidly with mortar.

.6 Do not break bond of exposed walls where partitions intersect and if bond would show through on exposed face of walls. Bond these partitions to walls they intersect with prefabricated intersection masonry reinforcement in each course.

.7 Bond intersecting block walls in alternate courses.

.8 Terminate non load bearing walls within 20 mm of structure above unless indicated otherwise.

.9 Where walls are pierced by structural members, ducts, pipes, fill voids with mortar to within 20 mm of such members.

.10 Buttering corners of units, throwing mortar droppings into joints, deep or excessive furrowing of bed joints, is not permitted. Do not shift or tap units after mortar has taken initial set. Where adjustment must be made after mortar has started to set, remove mortar and replace with fresh supply.

.11 Do not wet concrete masonry before or during laying in wall.

.12 Bed and vertical joints shall be evenly and solidly filled with mortar.

.13 Provide reinforced bond beams where indicated on structural drawings.

.14 Provide vertical reinforcement as indicated on structural drawings. Fill all reinforced cores solid with grout as indicated. Provide cleanout port at bottom of each grouted core when required by Consultant.

3.4 Exposed Masonry

.1 Do not use chipped, cracked or stained, and otherwise damaged units or unsatisfactory material in exposed and load bearing masonry walls.

.2 Lay all joints 10 mm thick (uniform). All joints shall be full of mortar except where specifically designated to be left open.

.3 All joints shall be slightly concave. Use sufficient force to press mortar tight against masonry units on both sides of joints. Remove excess material or burrs left after jointing by means of a trowel or rubbing with burlap bag.

.4 Provide bullnose block at all exposed masonry corners.

3.5 Tolerances

.1 Tolerances in notes to Clause 5.3 of CSA A371 apply.

3.6 Reinforcement and Connectors

.1 Refer to Section 04 05 19 - Masonry Anchorage and Reinforcing.

3.7 Loose Steel Lintels

.1 Install loose steel lintels. Centre over opening width.

.2 Lintels supplied under Section 05 50 00 – Metal Fabrications.

3.8 Control Joints

.1 Provide continuous joints as indicted and at spacing not to exceed 6000 mm c/c unless noted otherwise on drawings.

.2 Break vertical mortar bond with extruded neoprene gasket or building paper.

.3 Prime control joint to prevent drying out of caulking material.

3.9 Support of Loads

.1 Use 25 MPa concrete unless specified otherwise on the Drawings, where concrete fill is used in lieu of solid units.

.2 Use grout to CSA A179 where grout is used in lieu of solid units.

.3 Install building paper below voids to be filled with grout. Keep paper 25 mm back from face of units.

3.10 Lateral Support and Anchorage

.1 Do lateral support and anchorage of masonry in accordance with CSA S304.1 and as indicated.

3.11 Grouting

.1 Grout masonry in accordance with CSA S304.1 and as indicated.

3.12 Temporary Wall Bracing

.1 Design and provide all required temporary engineered wall bracing.

.2 Brace masonry walls to resist wind pressure and other lateral loads during construction period.

.3 Provide temporary bracing of masonry work during and after erection until mortar has cured and

permanent lateral support is in place

3.13 Built-ins

.1 Build in items required to be built into masonry and provided by other Sections, including bearing plates, door frames, anchor bolts, sleeves and inserts. Build in items to present a neat, rigid, true and plumb installation. Leave wall openings required for ducts, grilles, pipes and other items.

.2 Prevent displacement of built-in items during construction. Check plumb, location and alignment frequently, as work progresses.

.3 Brace door jambs to maintain plumb. Fill voids between masonry and metal frames with masonry mortar or insulation, as indicated on drawings or as required to provide a neat, finished appearance.

.4 Set wall plates on masonry in non-shrink grout in accordance with manufacturer's instructions.

.5 Do all cutting, fitting, drilling, patching and making good for other trades in masonry work.

3.14 Protection

.1 Protect masonry units from damage resulting from subsequent construction operations.

.2 Use protection materials and methods which will not stain or damage masonry units.

.3 Remove protection materials upon Substantial Performance, or when risk of damage is no longer present.

3.15 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

.2 Allow mortar droppings on unglazed concrete masonry to partially dry then remove by means of trowel, followed by rubbing lightly with small piece of block and finally by brushing.

.3 Remove mortar from concrete floor slabs and leave entire area vacuum clean.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 30 00 Cast-in-Place Concrete
.2 Section 04 22 00 Concrete Unit Masonry
.3 Section 05 50 00 Metal Fabrications
.4 Section 09 91 23 Interior Painting

1.3 References

.1 ASTM International, (ASTM)
  .1 ASTM A108-18 Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
  .2 ASTM A123/A123M-17 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
  .3 ASTM A153/A153M-23 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
  .4 ASTM A307-21 Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
  .5 ASTM A653/A653M-23 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  .6 ASTM A1011/A1011M-23 Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
  .7 ASTM F3125/F3125M-22 Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength
.2 CSA Group (CSA)
  .1 CSA G40.20/G40.21-13 (R2018) General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel
  .2 CSA G164-18 Hot Dip Galvanizing of Irregularly Shaped Articles.
  .3 CSA S16:19 Design of Steel Structures.
  .4 CSA S136-16 North American Specification for the Design of Cold Formed Steel Structural Members
  .5 CSA W47.1:19 Certification of Companies for Fusion Welding of Steel Structures.
  .6 CSA-W48.1-M1991 (R1998) Carbon Steel Covered Electrodes for Shielded Metal Arc Welding
  .7 CSA-W55.3-08 (R2013) Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
  .8 CSA W59-18 Welded Steel Construction (Metal Arc Welding).
  .9 CSA W178.1-18 Certification of Welding Inspection Organizations.
  .10 CSA W178.2-18 Certification of Welding Inspectors.
.3 American Welding Society (AWS)
  .1 AWS A2.4:2020 Standard Symbols for Welding, Brazing, and Nondestructive Examination
.4 Structural Steel Painting Council
  .1 SSPC-SP 6-91 Commercial Blast Cleaning.
.5 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturer's Association (CPMA)

.1 CISC/CPMA 1-73a Quick-Drying, One-Coat Paint for Use on Structural Steel.

.6 American Institute of Steel Construction (AISC)

.1 Code of Standard Practice for Steel Buildings and Bridges, Section 10, Architectural Exposed Structural Steel, latest edition.

.7 The National Building Code of Canada.

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit shop and erection drawings. Submit typical details of connections and any special connections for review before preparation of shop drawings. Assume responsibility for the accuracy of Work. Review of submitted shop drawings is to ensure only that the Contract Documents are being correctly interpreted.

.3 Professional Engineer responsible for connection design shall sign and seal each shop drawing.

.4 Show on shop drawings the size, spacing, and the location of structural steel members; connections; attachments; reinforcing; anchorage and required inserts; and all necessary plans, elevations and details.

.5 Show splice locations and details.

.6 Welded connections shall be designated by welding symbols in compliance with AWS A2.4:2020 and indicate clearly net weld lengths.

.7 Submit design calculations if requested by the Consultant.

.8 Submit diagrams showing methods of erection.

.9 Field Work Drawings shall be submitted as shop drawings.

.10 Notify Consultant in writing of any deviations in shop drawings from the requirements of the Contract Documents.

.11 Submit a schedule of fabrication to the Consultant and the Testing Agency, prior to commencement of fabrication.

1.5 Qualifications

.1 Undertake welding and/or welding inspection by welders fully approved to one or more of the reference codes and standards where applicable.

1.6 Quality Assurance

.1 Connections:

.1 Connections designed by Engineer: Submission of shop drawings for connection which have been detailed on Drawings shall represent acceptance by Contractor that connection can be executed successfully.

.2 Design of other connections which cannot be selected from standard designs tabulated in CISC Handbook of Steel Construction shall be by a Professional Engineer, licensed in the Province of Ontario, experienced in structural steel connection design.

.3 Consultant will review connection arrangement to verify general conformance with overall design concept of structure.
.4 Connection design engineer shall be insured for professional liability in accordance with section 74 subsection (1) of Regulation 941 of the Ontario Professional Engineers Act. The alternative of compliance with subsection (2) is not acceptable.
.5 Provide connections adequate to resist reaction of beam, when beam is loaded to maximum flexural capacity under uniformly distributed load, unless reaction or connection detail is shown on Drawings.
.1 Provide flexible beam connections for unrestrained members in accordance with CSA S16.1, unless shown otherwise on Drawings.
.2 Select connections, wherever possible, from standard designs tabulated in current edition of CISC Handbook of Steel Construction, except that length of beam web angles shall not be less than half the depth of beam, and single angles shall not be used.
.3 Provide direct connections to flanges of spandrel beams (exterior perimeter beams) to restrain twisting.

.2 Design:
.1 Connections:
.1 Provide bolted or welded connections, unless shown otherwise on Drawings.
.2 Use high strength bolts to ASTM F3125 for all connections.
.3 Use slip resistant (friction-type) connections for bolted joints designed to resist reversible forces.
.4 Provide tension adjustment hardware at rod type bracing and at flat bar type bracing.
.5 Do not permit connections to encroach on clearance lines required for installation of Work of other Sections.

.3 Random Splicing: Obtain in writing from Consultant, prior to commencement of shop drawings, special requirements that will be imposed as a necessary condition of acceptance of members with randomly located butt welded splices.

.4 All edge perimeter angles and bent plates installed at roof framing level shall be joined by butt weld splices designed for full tension capacity of members being joined.

1.7 Tolerances

.1 In addition to tolerances specified in CSA S16, erect shelf angles and sash angles attached to steel frame within a tolerance of 3 mm plus or minus, with abutting ends of members at the same level.

1.8 Inspection and Testing

.1 Refer to Section 01 45 00 – Quality Control.

.2 Inspection and testing of materials and shop fabrication of Work of this Section, and field quality control, will be performed by an independent Inspection and Testing Company. Refer to Section 01 45 00 - Quality Control.

.3 The Inspection and Testing Company shall meet qualification requirements of CSA W178.1 and shall be certified by the Canadian Welding Bureau in Category 1 Buildings.

.4 Welding Inspectors and supervisors shall be certified by Canadian Welding Bureau to CSA W178.2, to minimum level 2 certification.

.5 Provide free access for inspectors to all places work is being performed, whether on site or off.

.6 Mill inspection shall ensure that materials conform to specified requirements. Mill test reports, properly correlated to the materials, will be accepted in lieu of physical tests.

.7 Shop inspection shall ensure that structural steel is fabricated in accordance with the shop drawings, and the specified fabrication and welding procedures.

.8 The cost of inspection and testing of splices introduced by the fabricator and not required on the Contract Documents will be paid by the Contractor.

.9 Inspection and Testing Company when appointed shall carry out shop inspection to verify:
- .1 Structural materials and paint conform to Specifications. Mill test reports, properly correlated to the materials, will be accepted in lieu of physical tests of structural materials.
- .2 Fabrication and welding conforms to Specifications and dimensioned shop drawings.
- .3 Shop cleaning and preparation and prime painting to conform to specified requirements.
- .4 Surfaces inaccessible for cleaning and painting after assembly are treated before assembly.
- .5 For surfaces painted with zinc rich paint or zinc primer, specified surface preparation is followed and specified paint thickness is applied.

.10 Non-destructive Testing of Welded Connections: Carry out non-destructive testing of welded connections chosen at random as follows:
- .1 Check and record steel member sizes for 20% of columns, beams and girders.
- .2 Check 5% of all welds by magnetic particle inspection.
- .3 Check 25% of moment connections and all connections subject to direct tension involving use of full penetration groove welds by ultrasonic testing.
- .4 Check 10% (minimum 2 per connection) in accordance with Section 23 of CSA S16 of pretensioned connections including main building bracing connections.

.11 More frequent testing and inspection shall be completed if random tests described above are not satisfactory. These costs are to be paid by the Contractor.

1.9 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver products that are only supplied under work of this Section to those who are responsible for their installation, to the work site as directed and to meet construction schedule.

.3 Handle and store structural steel in such a manner that no damage, including corrosion, is caused to the stored or erected work, or to other property.

.4 Store structural steel off of ground on timber supports.

1.10 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

.1 Rolled shapes, hollow structural sections, plates and rods: new steel, in compliance with CSA and/or ASTM Standards indicated on Structural Drawings.

.2 Welding Electrodes: to meet the requirements set forth in the applicable standard of the CSA W48 Series on welding electrodes. (Any process which produces deposited weld metal meeting the requirements of the applicable W48 Series Standard for any grade of arc welding electrodes shall be accepted as equivalent to the use of such electrodes.)

.3 High Strength Bolts: to meet specified requirements of ASTM F3125

.4 Machine Bolts: to meet specified requirements of ASTM A307.

.5 Anchor Bolts: To CSA-G40.20/G40.21, Grade 300W.

.6 Shop Coat Paint:
.1 Interior structural steel: To meet specified requirements of CISC/CPMA 1-73a and compatible with Master Painters Institute INT 5.1S or 5.1X Institutional low odour/low VOC semi-gloss finish. Colour to be grey.

.7 Galvanizing: hot dipped with zinc coating to CSA G164, ASTM A123 or ASTM A153.

PART 3 EXECUTION

3.1 Fabrication

.1 Fabricate work of this Section in compliance with CSA S16, and as specified following.

.2 Connections:
.1 Make bolted or welded connections.
.2 Use high strength bolts unless otherwise noted on Drawings.
.3 Use friction type high strength bolts for the connections of bracing members (diagonal kickers) resisting the effects of applied lateral loads. Provide tension adjustment at flat bar and rod type lateral bracing.
.4 Do not permit connections to encroach on the clearance lines required for the installation of work of this Section.

.3 Beam Connections:
.1 Provide beam connections adequate to resist the reactions produced by the framing or load conditions.
.2 Provide beam to column connections that apply vertical reaction with negligible eccentricity at the connecting face of the column, such as single or double beam web connections, end plate connections or un-stiffened seats, unless otherwise shown on Drawings. Submit for review, in advance of the preparation of shop drawings, connections which do not meet these requirements.
.3 Provide connections complying with the requirements of the CISC Handbook of Steel Construction, except that the length of beam web angles shall not be less than half the depth of the beam and single angles shall not be used.
.4 Provide direct connections to flanges of spandrel beams to restrain twisting.

.4 Holes in Structural Members:
.1 Punch holes 11 mm to 27 mm in diameter as required for attaching the work of other Sections to structural steel members. Locate holes so that no appreciable reduction of the strength of members is caused.

.2 Provide holes for pipes and ducts, and reinforce openings as indicated on drawings. Cutting of holes in structural members in the field will not be permitted except with written approval of the Consultant.
.3 Provide effective drainage holes to prevent the accumulation of water in tubular members.

.5 Member Separators: Provide separators at approximate spacing of 1200 mm o.c. for double beams and channels as follows:
.1 For beams and channels 225 mm or less in depth: one or two rows of pipe separators.
.2 For beams and channels over 225 mm in depth: channel separators, unless otherwise detailed on Drawings.

.6 Built up Compression Members General Requirements: Comply with the requirements of CSA-S16, for all built up compression members.

.7 Column Bearing Plates: Mill column bearing plates under column bearing unless plate is sufficiently flat to give adequate contact bearing between column and plate.

.8 Structural Steel Painting: All prime painting shall be shop applied and the responsibility of the steel fabricator. Refer to specific priming requirements specified in Section 09 91 23 - Interior Painting.
.1 Paint in accordance with manufacturer's published directions. Paint steel in the shop under cover. Keep painted members under cover until the paint has dried.
.2 Clean and prepare surfaces, as appropriate for paint specified, in accordance with Commercial Blast Cleaning is only required where zinc rich paint is to be applied. All other steel to be or clean steel in compliance with SSPC SP6 where zinc rich paint is shop applied.
.3 Where paint is applied adjacent to welded joints, remove it to bare metal for a distance of at least 50 mm beyond sides of joints.
.4 Do not paint surfaces and edges to be field welded, contact surfaces of friction type connections assembled by high strength bolts, surfaces encased in or in contact with concrete.

.9 Galvanizing: Galvanize members as indicated and in accordance with reference standards, after shop welding is complete.
.1 Steel members, fabrications, and assemblies shall be galvanized after fabrication by the hot dip process in accordance with CSA G164 or ASTM A123.
.2 Bolts, nuts, washers, iron, and steel hardware components shall be galvanized in accordance with CSA G164 or ASTM A153.
.3 Coating Requirements:
.1 Weight: the weight of the galvanized coating shall conform with Table 1 of CSA G164 or paragraph 6.1 of ASTM A123 and Table 1 of ASTM A153 (as appropriate).
.2 Surface Finish: The galvanized coating shall be continuous, adherent, as smooth and evenly distributed as possible and free from any defect that is detrimental to the stated end use of the coated article.
.4 The integrity of the coating shall be determined by visual inspection and coating thickness measurements.
.5 Adhesion: the galvanized coating shall be sufficiently adherent to withstand normal handling.

3.2 Examination

.1 Verify, before delivery of structural steel, that work of other Sections on which work of this Section is dependent is correctly installed and located.

3.3 Preparation

.1 Supply anchor bolts, base and bearing plates and other members to be built in under work of other Sections as the work progresses. Cooperate with installers of this work and provide instructions for setting items to be built in.

3.4 Erection

.1 Comply with CSA S16 and work site safety plans in erection of work of this Section.

.2 Make adequate provision for horizontal and vertical erection loads and for sufficient temporary bracing to keep structural frame plumb and in true alignment until the completion of erection, and the installation of masonry, concrete work, and floor and roof decks which provide the necessary permanent bracing.

.3 Provide temporary steel members as may be required for erection purposes and remove them when no longer required.

.4 Installation of Bearing and Column Base Plates: Install bearing plates and standard wall anchors for beams bearing on masonry or concrete.
.1 Set loose beam bearing plates and column base plates, at proper elevation, true and level, with steel shims, ready for grouting as specified under work of other Sections.
.2 Set loose bearing plates and/or levelling plates to be cast into concrete.

3.5 Coating Touch-Up

.1 Clean welds with wire brushes and wash down with clean water to ensure no residue from electrodes is present.

.2 After erection, give one coat of prime coat or zinc rich paint as applicable and specified for shop coat to field bolts, field connections, burnt areas, and abrasions or damage to shop coats.

.3 Touch up all areas with a specified paint film thickness.

.4 Give areas of bare metal on galvanized members two coats of zinc-rich paint. Repair coating on architecturally exposed galvanized metals in accordance with reference standards and as directed by the Consultant. Replace any materials where damage cannot be repaired to the satisfaction of the Consultant.

3.6 Field Quality Control

.1 Inspection and Testing Company, when appointed as specified in Source Quality Control elsewhere in this Section, shall perform:
.1 Inspection of erection and fit-up, including placing, plumbing, levelling and temporary bracing and conformance with specified tolerances.
.2 Inspection of bolted connections, including verification that ASTM A307, ASTM F3125 snug tight only bolts, and ASTM F3125 pre-tensioned bolts have been installed and used appropriately, and that threads are excluded from shear plane where required.
.3 Inspection of welded joints, including slag removal.
.4 General inspection of field cutting and alterations; report immediately to Consultant, any alterations or cutting not shown on reviewed shop drawings.
.5 General inspection of shop coating touch-up.

.6 Inspection of zinc primer and zinc-rich paint, including surface preparation and coating thickness.

3.7 Defective Work

.1 Variations in excess of specified tolerances, and failure of materials or workmanship to meet requirements of this specification, and which cannot be repaired by approved methods, will be considered defective Work performed by this Section.

.2 Replace defective Work, as directed by Consultant.

.3 Pay for additional inspection and testing, redesign, corrective measures, and related expenses if Work has proven to be deficient.

3.8 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 30 00 Cast-in-Place Concrete
.2 Section 04 05 19 Masonry Anchorage and Reinforcing
.3 Section 04 22 00 Concrete Unit Masonry
.4 Section 05 12 23 Structural Steel
.5 Section 06 10 00 Rough Carpentry
.6 Section 06 20 00 Finish Carpentry
.7 Section 09 21 23 Interior Painting

1.3 References

.1 The Ontario Building Code.
.1 MMAH Supplementary Standard SB-8, September 14, 2012. Design, Construction and Installation of Anchorage Systems for Fixed Access Ladders.
.2 ASTM International (ASTM)
.1 ASTM A53/A53M-22 Standard Specification for Pipe, Steel, Black and Hot Dipped, Zinc Coated, Welded and Seamless.
.2 ASTM A123/A123M-17 Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.
.3 ASTM A153/A153M-23 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
.4 ASTM A240/A240M-23a Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
.5 ASTM A264-12(2019) Standard Specification for Stainless Chromium-Nickel Steel-Clad Plate
.6 ASTM A269/A269M-22 Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
.7 ASTM A276/A276M-24a Standard Specification for Stainless Steel Bars and Shapes
.8 ASTM A307-21 Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
.9 ASTM A312/A312M-24b Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes
.10 ASTM A380/A380M-17 Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems
.11 ASTM A385/A385M-22 Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip)
.12 ASTM A511/A511M-21a Standard Specification for Seamless Stainless Steel Mechanical Tubing and Hollow Bar
.13 ASTM A1008/A1008M-23e1 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High Strength Low Alloy, High Strength Low Alloy with Improved Formability, Solution Hardened, and Bake Hardenable
.14 ASTM A1011/A1011M-23 Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
.15 ASTM C1107/C1107M-20 Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
.16 ASTM D1187/D1187M-97(2018) Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal
.17 ASTM D6386-22 Standard Practice for Preparation of Zinc (Hot Dip Galvanized) Coated Iron

and Steel Product and Hardware Surfaces for Painting
.18 ASTM F593-22 Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
.19 ASTM F594-22 Standard Specification for Stainless Steel Nuts
.20 ASTM F3125/F3125M-23 Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength

.3 CSA Group (CSA)
.1 CSA G40.21-13 General Requirements for Rolled or Welded Structural Quality Steel.
.2 CSA G164-18 Hot Dip Galvanizing of Irregularly Shaped Articles.
.3 CSA-S16.1-M Limit States Design of Steel Structures.
.4 CSA S136-12 Cold Formed Steel Structural Members.
.5 CSA W47.1-09 (R2014) Certification of Companies for Fusion Welding of Steel Structures.
.6 CSA W59-18 Welded Steel Construction
.7 CSA W178.1-18 Certification of Welding Inspection Organizations
.8 CSA W178.2-18 Certification of Welding Inspectors

.4 Canadian General Standards Board (CGSB)
.1 CAN/CGSB 1.40-97 Anticorrosive Structural Steel Alkyd Primer
.2 CAN/CGSB 1.181-99 Ready Mixed, Organic Zinc Rich Coating.

.5 Canadian Sheet Steel Building Institute (CSSBI)

.6 Steel Structures Painting Council, Systems and Specifications Manual.
.1 CISC/CPMA 1-73a-1975 A Quick drying One-coat Paint for Use on Structural Steel.
.2 CISC/CPMA 2-75-1975 A Quick Drying Primer for Use on Structural Steel.

.7 American Welding Society AWS D1.6, Structural Welding Code - Stainless Steel.

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Shop Drawings:
.1 Submit Shop and Erection Drawings for review.
.2 Verify site dimensions before proceeding with shop fabrication and to suit field conditions and field openings.
.3 Show and describe in detail all the work of this Section including large scale detail of members and materials, of connection and jointing details, and of anchorage devices, dimensions, thicknesses, description of materials, metal finishing, as well as all other pertinent data and information, including type, size and description of all fasteners and anchors.
.4 Indicate connections to building structure.
.5 Shop drawings for all metal fabrications shall be stamped and signed by a Professional Engineer registered in the Province of Ontario. Each submission of the shop drawings shall bear the seal of the Engineer.

.3 Submit duplicate minimum 300 x 300 mm samples of stainless steel materials in specified finish.

1.5 Qualifications

.1 Work of this Section shall be executed by a firm thoroughly conversant with laws and regulations which govern and capable of workmanship of best grade of modern shop and field practice known to recognized manufacturers specializing in this work and having a minimum ten (10) years proven experience in the fabrication of high quality metal fabrications. Use workmen skilled in work of this Section.

.2 Welding shall be performed by trades persons certified by The Canadian Welding Bureau under CSA Standard W47.1.

1.6 Design Requirements

.1 Design metal stair, handrail, guardrail, landing and ladder construction and connections to OBC vertical and horizontal live load requirements.

.2 Stairs shall be designed and constructed to safely sustain a live load of 4.8 kPa evenly distributed over treads and landings with a maximum deflection of L/360. Furnish all supporting members required to connect to the building.

.3 Design service access ladders, stairs and guards to Ministry of Labour requirements.

.4 All access ladders shall be designed to the minimum requirements noted on the drawings and MMAH Supplementary Standard SB-8, whichever is more stringent. This shall include through-bolting anchors at masonry walls.

.5 Elevator pit access ladders shall meet requirements of the elevator supplier and TSSA.

.6 Except where specified otherwise, and where required by applicable codes, detail and fabricate stairs to NAAMM Metal Stairs Manual.

.7 Design trench drain grates and frame assemblies, in accordance with OBC loading requirements for vehicular traffic.

1.7 Examination

.1 All dimensions shall be taken from the drawings and checked against the building. Be responsible for the correctness of such measurements and report to the Consultant in writing all discrepancies between measurements at building and those shown on drawings prior to commencing work. Verify location of anchor bolts and embedded steel and ensure that work prepared by other trades is at a proper elevation, on line, level and true.

1.8 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Label, tag or otherwise mark work supplied for installation by other Sections to indicate its function, location and shop drawing description.

.3 Protect work from damage and deliver to a location at the site in order to meet the scheduling requirements.

.4 Protect architecturally exposed materials during fabrication, delivery, handling, storage and erection to prevent marring of surfaces exposed to view, by marking, bending, denting or coarse grinding.

1.9 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

.1 Structural Steel Sections and Steel Plate: CSA G40.20-13/G40.21-13, Grade 350W.

.2 Architectural and Miscellaneous Mild Steel: CSA G40.20-13/G40.21-13, Grade 300W.

.3 High Strength Bolts and Nuts: ASTM F3125. Dimensions, sizes, thread, strength, quality and type of items shall be designed for the work intended. Exposed fasteners and anchors shall be same material, colour and finish as the metal to which they are applied.

.4 Sheet Steel: (Commercial Quality) ASTM A1008 stretcher leveled or temper rolled.

.5 Steel Pipe: ASTM A53 Schedule 40, Grade B.

.6 Welding Materials: CSA W59.

.7 Welding Electrodes: CSA W48 Series.

.8 Composite Metal Deck: As specified in Section 05 31 00.

.9 Sulphur: Commercial Grade for setting of steel posts.

.10 Grout: non-shrink, non-metallic, non-stain, flowable, to ASTM C1107, 15 MPa at 24 hours.

.11 Isolation Coating: Alkali resistant bituminous paint to ASTM D1187.

.12 Adhesive Anchors: HILTI or Rawl Epoxy Adhesive Anchors sized to suit loading conditions, suitable for substrate. Adhesive to be low VOC type (maximum 250 g/l) to SCAQMD Rule 1168-03, Adhesives and Sealants Applications.

2.2 Stainless Steel

.1 Stainless steel shall be grade and type designated below for each form required:

.1	Plate	ASTM A264	Type 316L
.2	Bar Stock	ASTM A276	Type 316L
.3	Tubing	ASTM A511	Type 316L
.4	Pipe	ASTM A312	Type 316L
.5	Sheet	ASTM A167	Type 316L
.6	Tubing	ASTM A269	Type 316L
.7	Bolts	ASTM A593	Type 316L
.8	Nuts	ASTM A594	Type 316L

.9 Pickle and passivate stainless steel prior to fabrication and installation to remove any latent black steel to ASTM A380.

.2 Stainless Steel Bolts and Nuts: To ASTM F593 and ASTM F594

2.3 Finishes

.1 Primers: All primers for metal fabrications are to be factory applied under the requirements of this Section. Refer to Finish Schedules in Section 09 91 23 for types of primers required for each application. Colour to be grey.

.2 Pre Paint Finish: For galvanized surfaces to be exposed and finish painted, to ASTM D6386.

.3 Galvanizing: hot dipped with zinc coating to CSA G164, ASTM A123 or ASTM A385.
.1 Bolts, nuts, washers, iron, and steel hardware components shall be galvanized in accordance with CSA G164 or ASTM A153.
.2 Galvanized coatings on products fabricated from rolled, pressed and forged steel shapes, plates, bars and strips: Galvanized after all welding and grinding complete. No welding or grinding of galvanized products allowed.

.4 Zinc Rich Primer: zinc rich, organic, ready mix to CAN/CGSB 1.181. Low VOC type.

PART 3 EXECUTION

3.1 Fabrication

.1 Fabricate to reviewed shop drawings and in general to details, sizes and materials indicated on drawings and specified herein.

.2 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.

.3 Fabricate work complete with all components required for anchoring; bolting or welding to structural frame; standing free or resting in frames or sockets; in a safe and sure manner.

.4 Where possible fit and shop assemble various sections of the work and deliver to site in largest practicable sections. Where shop fabricating is not possible, make trial assembly in shop.

.5 Ensure exposed welds are continuous for length of each joint.

.6 Grind and fill all welds after inspection and acceptance and leave ready for prime painting.

.7 Fill all open joints, depressions, seams with metallic paste filler or by continuous brazing or welding and grind smooth to true sharp arises and profiles.

.8 Fit joints and intersecting members accurately. Make work in true planes with adequate fastenings.

.9 Supply all fastenings, anchors, accessories required for fabrication and erection of work of this Section. Make thread dimensions such that nuts and bolts will fit without re-threading or chasing threads.

.10 Welding shall be done by the shielded metal-arc method in accordance with the requirements CSA W59 and AWS D1.6 for stainless steel. The welding operators shall be currently certified under CSA W47.1 for the work they are performing.

.11 Make exposed metal fastenings and accessories of same material, texture, colour and finish as base metal on which they occur unless otherwise shown or specified. Keep exposed fastenings to an absolute minimum evenly spaced and neatly laid out. Make fastenings of permanent type unless otherwise indicated.

.12 Surfaces to be welded shall be free from loose scale, rust, paint, or other foreign matter. Where weld material is deposited in two or more layers, each layer shall be cleaned before the next layer is deposited. Care shall be taken to minimize stresses due to heat expansion, contraction and distortion by using proper sequence in welding and by approved methods.

.13 Appearance, quality of welds made, methods of correcting defective work shall be in accordance with CSA W59.

3.2 Shop Painting

.1 Cleaning Steel:
  .1 Clean steel, whether it is to be painted or not, to the degree required by CISC/CPMA 1-73a, except as specified below.
  .2 Prepare galvanized items scheduled to be painted in accordance with the requirements of Section 09 91 23, and ASTM D6386.
  .3 Steel to receive a shop or field paint finish shall be cleaned in accordance with Sections 09 91 23 or SSPC SP6, whichever produces a surface which has less rust and mill scale.
  .4 Clean steel which is specified to be painted to CISC/CPMA 2-75 in accordance with that Standard.
  .5 Clean steel which is specified to receive an organic zinc-filled epoxy primer, or zinc-rich paint, or inorganic zinc primer, in accordance with SSPC-SP 6, Commercial Blast Cleaning.
  .6 Clean welds by wire brushing and wash down with clean water, to remove the chemical residues left by the electrodes, prior to painting.

.2 The following surfaces shall not be painted:
  .1 Surfaces and edges to be field welded. If painted, remove paint for field welding for a distance of at least 50 mm on all sides of the joint, to ensure proper fusion of the metal.
  .2 The contact surfaces of friction type connections assembled by high strength bolts.
  .3 Portions of steel members which are to be encased in or in contact with concrete or masonry.
  .4 Galvanized items not specifically indicated to be painted.

.3 Preparation and priming of all metal work which will be exposed to view and which is scheduled to be finish painted, shall be in accordance with the requirements of Section 09 91 23.

.4 All other concealed or unpainted ferrous metal work shall be given one prime paint coat type CGSB 1.40 and in accordance with CISC/CPMA 2-75. Work paint into all corners and all joints. Metal parts in contact shall be primed before shop assembly. Priming damaged during erection or through lack of protection shall be cleaned and touched up.

.5 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 ° C.

.6 Metals in contact with other dissimilar metals, concrete or masonry materials shall be insulated or separated from one another to prevent corrosion, staining or electrolysis by use of bituminous paint.

3.3 Galvanizing

.1 Steel members, fabrications, and assemblies shall be galvanized after fabrication by the hot dip process in accordance with CSA G164 or ASTM A123.

.2 Galvanizing of architecturally exposed steel shall be completed by a company recognized in the application of High Quality galvanized finishes and in accordance with ASTM A385.

.3 Prepare metals to be galvanized and painted in accordance with requirements of ASTM D6386.

.4 Bolts, nuts, washers, iron, and steel hardware components shall be galvanized in accordance with CSA G164 or ASTM A153.

.5 Coating Requirements:
  .1 Weight: the weight of the galvanized coating shall conform to Table 1 of CSA G164, ASTM A123 or ASTM A153 (as appropriate).
  .2 Surface Finish: The galvanized coating shall be continuous, adherent, as smooth and evenly

distributed as possible and free from any defect that is detrimental to the stated end use of the coated article. The integrity of the coating shall be determined by visual inspection and coating thickness measurements.

.3 Adhesion: the galvanized coating shall be sufficiently adherent to withstand normal handling.

3.4 Miscellaneous Framing and Supports

.1 General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

.2 Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

.1 Furnish inserts for units installed after concrete is placed.

.3 Galvanize miscellaneous framing and supports where indicated.

.4 Prime miscellaneous framing and supports with primer specified in Section 09 91 13 - Exterior Painting or Section 09 91 23 - Interior Painting.

3.5 Angle Lintels

.1 Provide all loose steel angle lintels required to support openings and recesses in masonry walls, whether indicated on the drawings or not. Refer to Architectural, Structural and Mechanical drawings for locations of openings. Lintels shall be as scheduled on the Structural drawings.

.2 Steel angles: CSA G40.21, Grade 300W, sizes indicated for openings. Provide 150 mm minimum bearing at ends unless otherwise indicated.

.3 Weld or bolt back-to-back angles to profiles as indicated.

.4 Supply for installation by Sections 04 22 00 and 04 27 00.

.5 Lintels shall be prime painted unless otherwise indicated.

3.6 Miscellaneous Steel Trim

.1 Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.

.2 Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.

.1 Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.

.3 Galvanize exterior miscellaneous steel trim.

3.7 Installation

.1 Supervise the setting of bases, anchor bolts, and other steel to concrete connections. Cutting of base plates to accommodate anchor bolts is cause for rejection of base plates.

.2 Provide all bracing and shoring required to support the work of this Section during installation.

.3 Work shall be fabricated and erected square, plumb and true, straight, level and accurately fitted to size detailed on reviewed Shop Drawings. All joints shall be welded unless otherwise indicated. Exposed welds shall be ground smooth and/or flush. Exposed work shall be finished smooth and even, close joints and neat connections. Exposed welds continuous for full length of joints.

.4 Where anchors or fastenings, sleeves, have to be built in by other trades, supply all necessary templates, instructions and supervision to ensure satisfactory installation.

.5 Do all drilling, cutting and fitting necessary to attach this work to adjoining work and make it complete.

.6 Provide all components required for anchoring. Make anchoring in concealed manner where possible. Exposed anchors shall be approved by the Consultant, shall be neat, and of the same material, colour, texture and finish of base metal on which they occur. Exposed fastenings shall be evenly spaced.

.7 Grind all field welds smooth.

.8 Touch up shop coat of prime paint where damaged by field erection.

.9 Touch up galvanized finishes with zinc rich paint.

3.8 Fasteners and Anchors

.1 Use methods for fastening or anchoring metal fabrications to building construction as shown or specified.

.2 Securely anchor components in place. Unless otherwise indicated, anchor components as follows:
.1 To concrete and solid masonry with expansion or epoxy adhesive type anchors.
.2 To hollow construction with toggle bolts.
.3 To thin metal with screws or bolts.
.4 To thick metal with bolts or by welding.
.5 Fill space between railing members and sleeves with non-shrink grout.

.3 Where fasteners and anchors are not shown, design the type, size, location and spacing to resist the loads imposed without deformation of the members or causing failure of the anchor or fastener, and suit the sequence of installation.

.4 Use material and finish of the fasteners compatible with the kinds of materials which are fastened together and their location in the finished work.

.5 Fasteners for securing metal fabrications to new construction only, may be by use of threaded or wedge type inserts or by anchors for welding to the metal fabrication for installation before the concrete is placed or as masonry is laid.

.6 Fasteners for securing metal fabrication to existing construction or new construction may be expansion bolts, toggle bolts, power actuated drive pins, welding, self-drilling and tapping screws or bolts.

3.9 Schedule

.1 General:
.1 Supply and install all metal fabrications indicated on Drawings, and not included in the work of

other Sections.

.2 Coordinate and sequence the work to ensure timely delivery to the site, of all items to be built in.

.3 Where items are required to be built into masonry, concrete or other work supply such items to respective Sections with all anchors and accessories for building in.

.4 All items shall be of sizes and as detailed on drawings.

.5 Coordinate with Section 09 91 13 and 09 91 23 for preparation of exposed metal items required to have finish coatings applied in the field.

.6 Review all coordination drawings prior to installation of materials, to ensure that no interferences with the work of other Sections will occur.

3.10 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

.2 Clean exposed prefinished and plated items and items fabricated from stainless steel as recommended by the metal manufacturer and protect from damage until Substantial Performance of the project.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 10 00 Concrete Forming and Accessories
.2 Section 03 30 00 Cast-In-Place Concrete
.3 Section 04 22 00 Concrete Unit Masonry
.4 Section 05 50 00 Metal Fabrications
.5 Section 06 20 00 Finish Carpentry
.6 Section 08 11 00 Metal Doors and Frames

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM A123/A123M-17 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
  .2 ASTM A653/A653M-23 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealled) by the Hot-Dip Process.
  .3 ASTM D2559 - 12a(2018) Standard Specification for Adhesives for Bonded Structural Wood Products for Use Under Exterior Exposure Conditions
  .4 ASTM F1667-21a Standard Specification for Driven Fasteners: Nails, Spikes, and Staples
.2 CSA Group (CSA)
  .1 CSA A247- M86 (R1996) Insulating Fiberboard.
  .2 CSA B111-1974(R2003) Wire Nails, Spikes and Staples.
  .3 CSA G164-18 Hot Dip Galvanizing of Irregularly Shaped Articles.
  .4 CSA O80 SERIES-15 Wood Preservation
  .5 CSA O86-14 Engineering Design in Wood
  .6 CSA O121-17 Douglas Fir Plywood.
  .7 CSA O141:23 Canadian Standard Lumber.
  .8 CSA O151-17 Canadian Softwood Plywood
  .9 CSA O437 Series-93 (R2011) Standards on OSB and Waferboard
  .10 CSA Z809-08 Sustainable Forest Management
.3 Underwriters Laboratories Canada (ULC)
  .1 ULC 102-2018 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
.4 National Lumber Grading Authority (NGLA)
  .1 Standard Grading Rules for Canadian Lumber, Latest Edition.
.5 Forest Stewardship Council (FSC)
  .1 FSC-STD-01-001-2004 FSC Principle and Criteria for Forest Stewardship.
  .2 FSC-STD-20-002-2004 Structure and Content of Forest Stewardship Standards V2-1
  .3 FSC Accredited Certified Bodies.

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 When required by authorities having jurisdiction, submit sequential erection drawings indicating all necessary false work, temporary construction bracing and hoisting.

.3 Submit shop drawings for wood trusses stamped and signed by a Professional Engineer registered in the Province of Ontario. Include statement that manufactured wood trusses and beams are designed in accordance with the referenced standards.

.4 Certified Wood: Submit listing of wood products and materials used, produced from wood obtained from forests certified by FSC Accredited Certification Body in accordance with FSC-STD-01-001.

1.5 Quality Assurance

.1 Sawn lumber shall be identified by the grade stamp of an association or independent grading agency certified by the Canadian Lumber Standards Accreditation Board.

.2 Provide Independent Specialty Engineer's letters of review and sign-off letters as specified in Section 01 78 00 for pre-engineered roof trusses and engineered lumber.

1.6 Shipping, Handling and Storage

.1 Protect materials, under cover, both in transit and on the site.

.2 Store materials to prevent deterioration or the loss or impairment of their structural and other essential properties. Do not store materials in areas subject to high humidity and areas where masonry and concrete work are not completely dried out.

.3 Store sheathing materials level and flat, in a dry location. Protect panel edges from moisture at all times.

1.7 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

.1 Timber Material shall be 'Grade Stamped'.

.2 CSA Z809 or FSC Certified.

.3 Construction Lumber: To CSA O141 Softwood Lumber graded to NLGA Standard Grading Rules for Canadian Lumber, published by the National Lumber Grades Authority. All lumber shall bear grade stamps. Moisture content of softwood lumber not to exceed 19% at time of installation.
.1 Framing lumber, plates, furring, blocking, No. 1 SPF.
.2 Nailing strips, furring and strapping: No. 4 S-P-F.
.3 Fitment framing: No. 1 S-P-F.

.4 Canadian Softwood Plywood: to CSA O151-M, standard construction, good one or both sides as required, thickness as shown or specified.
.1 Douglas Fir Plywood: To CSA O121-M, standard construction, good one side, thickness as shown on the drawings.
.2 Plywood used for exposed interior work shall have select grade veneer, one or both faces where exposed, with fire retardant finish. Fire retardant shall be in accordance with CAN/CSA-080.1, and all treated materials shall bear a ULC approval stamp.
.3 Poplar Plywood: to CSA 0153, standard construction.

.4 Mat formed structural panel board (oriented strand board): to CSA O437, square edge, 12.7 mm thickness.

.5 Nails, Spikes and Staples: To ASTM F1667.

.6 Bolts: 12.5 mm diameter, galvanized, complete with nuts and washers.

.7 Proprietary Fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, recommended for purpose by manufacturer.

.8 Nailing Discs: flat caps, minimum 25 mm diameter, minimum 0.627 mm thick, sheet metal, formed to prevent dishing.

.9 Wood Preservative to CSA O80 SERIES.

.10 Adhesive: Contractors gun grade cartridge loaded wood adhesive, general purpose, to ASTM D2559.

.11 Building Paper: to CAN2-51.32-M, 15# asphalt impregnated paper.

.12 Vapour Retardant: 0.152 mm polyethylene film to CGSB 51.34 Type 1.

.13 Fibreglass Insulation: to CSA A101, loose batt type, minimum density of 24 kg/m^3.

.14 Connectors: Simpson Strong Tie galvanized steel connectors, brackets, gussets and the like as required, and as designed by the Truss Engineer.

.15 Galvanizing: to CSA-G164. Use galvanized fasteners, and hardware for exterior work, preservative treated lumber, and materials in contact with concrete or masonry.

PART 3 EXECUTION

3.1 Installation

.1 Workmanship
- .1 Execute work using skilled mechanics according to best practice, as specified here.
- .2 Lay out work carefully and to accommodate work of other trades. Accurately cut and fit; erect in proper position true to dimensions; align, level, square, plumb, adequately brace, and secure permanently in place. Join work only over solid backing.

.2 Rough Hardware: Include rough hardware such as nails, bolts, nuts, washers, screws, clips, hangers, connectors, strap iron, and operating hardware for temporary enclosures.

.3 Provide treated wood nailers, blocking, cants, grounds, furring and similar members where shown and where required for screeding or attachment of other work and surface applied items. Attach to substrate as required to support applied loading.

.4 Blocking: Provide solid wood backing to support millwork, cabinetwork, equipment, fixtures, railings and accessories and the like, as required. Coordinate with work of other Sections and install all required backing. Any such equipment mounted on gypsum wallboard assemblies or similar assemblies shall be adequately supported.
- .1 Provide solid wood blocking in all partitions where wall stops are specified in the hardware schedule.

.5 Roof Blocking, Curbs and Copings:
- .1 Provide and install framing, blocking, curbs and copings as indicated on the drawings. Anchor blocking securely in permanent manner.
- .2 Provide minimum 10 mm Douglas Fir plywood copings on all built-up wood copings and curbs as detailed.
- .3 All wood curbs shall be filled with fibrous insulation specified in Section 07 21 13.
- .4 Provide shims and blocking necessary for levelling of roof hatches and equipment curbs.

3.1 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1	Section 05 50 00	Metal Fabrications
.2	Section 06 10 00	Rough Carpentry
.3	Section 06 40 00	Architectural Woodwork
.4	Section 06 61 16	Solid Surfacing
.5	Section 07 92 00	Joint Sealants
.6	Section 08 11 00	Metal Doors and Frames
.7	Section 08 14 16	Flush Wood Doors
.8	Section 08 71 10	Door Hardware
.9	Section 09 21 16	Gypsum Board
.10	Section 09 91 23	Interior Painting

1.3 References

.1 ASTM International (ASTM)
- .1 ASTM E1333-22 Standard Test Method for Determining Formaldehyde Concentrations in Air and Emissions Rates from Wood Products Using a Large Chamber.
- .2 ASTM F1667-21a Standard Specification for Driven Fasteners: Nails, Spikes, and Staples

.2 CSA Group (CSA)
- .1 CSA B111-1974 (R2003) Wire Nails, Spikes and Staples.
- .2 CSA G164-18 Hot Dip Galvanizing of Irregularly Shaped Articles.
- .3 CSA O112 SERIES-M1977 (R2006) Standards for Wood Adhesives
- .4 CSA O121-17 Douglas Fir Plywood.
- .5 CSA O141:23 Canadian Standard Lumber.
- .6 CSA O151-17 (R2022) Canadian Softwood Plywood
- .7 CSA O153-13 (R2017) Poplar Plywood.
- .8 CSA Z760-94 (R2001) Life Cycle Assessment

.3 American National Standards Institute (ANSI)
- .1 ANSI A208.1-2009 Particleboard.
- .2 ANSI A208.2-2016 Medium Density Fibreboard (MDF) for Interior Applications.
- .3 ANSI/HPVA HP-1-2016 Standard for Hardwood and Decorative Plywood.
- .4 ANSI/NEMA LD 3-2005 High Pressure Decorative Laminates

.4 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)
- .1 Architectural Woodwork Quality Standards Illustrated.

.5 Canadian Plywood Association (CanPly)
- .1 The Plywood Handbook 2005.

.6 Forest Stewardship Council (FSC)
- .1 FSC-STD-01-001-V4-0 FSC Principle and Criteria for Forest Stewardship.
- .2 FSC-STD-20-002-2004, Structure and Content of Forest Stewardship Standards V2-1
- .3 FSC Accredited Certified Bodies.

.7 National Hardwood Lumber Association (NHLA)
- .1 Rules for the Measurement and Inspection of Hardwood and Cypress 1998.

.8 National Lumber Grades Authority (NLGA)
- .1 Standard Grading Rules for Canadian Lumber 2005.

.9 South Coast Air Quality Management District (SCAQMD), California State (SCAQMD)
- .1 SCAQMD Rule 1168-03 Adhesives and Sealants Applications

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit shop drawings.
.1 Indicate details of construction, profiles, jointing, fastening and other related details.
.2 Indicate materials, thicknesses, finishes and hardware.

.3 Submit duplicate 300 mm long samples of each type of solid wood or 300 x 300 mm square type of plywood to receive stain or natural finish.

.4 Submit samples of plastic laminate materials.

1.5 Quality Assurance

.1 Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

.2 Plywood, particleboard, OSB and wood based composite panels in accordance with CSA and ANSI standards.

.3 Wood materials certified by Forestry Stewardship Council.

1.6 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Protect materials against dampness during and after delivery.

.3 Store materials in ventilated areas, protected from extreme changes of temperature or humidity.

1.7 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Lumber Materials

.1 Softwood lumber: unless specified otherwise, S4S, moisture content 19% or less in accordance with following standards:
.1 CSA O141.
.2 NLGA Standard Grading Rules for Canadian Lumber.
.3 AWMAC custom premium grade, moisture content as specified.
.4 Machine stress-rated lumber is acceptable.

.2 Hardwood Lumber: To NHLA requirements, moisture content of 6% maximum, maple species, AWMA Custom Grade.
.1 Bench Slats: Select Grade Maple.

2.2 Panel Materials

.1 Douglas Fir Plywood (DFP): to CSA O121, standard construction.
.1 Forestry Stewardship Council (FSC) certified.
.2 Urea-formaldehyde free.

.2 Canadian Softwood Plywood (CSP): to CSA O151, standard construction.
.1 Forestry Stewardship Council (FSC) certified.
.2 Urea-formaldehyde free.

.3 Hardwood Veneered Plywood: To CSA O115, of thickness indicated, Type II Select Grade Maple, where transparent finish is required and Solid Grade where paint finish is required. Good two sides for work with two sides exposed to view; good one side for work with one side exposed to view. Use particle board core with Type I bond.

.4 Particleboard: to ANSI A208.1.
.1 Forestry Stewardship Council (FSC) certified.
.2 Urea-formaldehyde free.

.5 Medium density fibreboard (MDF): to ANSI A208.2, density 640-800 kg/m³.
.1 Forestry Stewardship Council (FSC) certified.
.2 Urea-formaldehyde free.

2.3 Plastic Laminate

.1 Plastic Laminate Facing Sheet: ANSI/NEMA LD 3-2005 High-Pressure Decorative Laminates (HPDL) PF-S and GP-S;
.1 Backing sheet: BK Grade by manufacturer of facing sheet.
.2 Core: CSA O151
.3 Laminating adhesive: CSA O112.
.4 Core sealer: clear water resistant synthetic resin sealer.
.5 Colours, pattern, gloss and texture will be selected by Consultant from full range of products by one of the following:
.1 Formica,
.2 Arborite,
.3 Wilsonart.
.6 Up to three colours and patterns will be selected by the Consultant.

2.4 Accessories

.1 Rough Hardware: Bolts, lag screws, anchors, nails and expansion shields required to secure this portion of work. Rough hardware hot dip galvanized conforming to latest edition of CSA G164. All fasteners used in damp or wet areas to be suitable for use in corrosive environment. Use hot dipped galvanized or other material approved by the Consultant.

.2 Nails and staples: to ASTM F1667 galvanized.

.3 Wood screws: to CSA B35.4 plain type and size to suit application.

.4 Stainless Steel hardware: Type 316 Stainless steel for exposed or wet locations, tamper proof.

.5 Splines: wood or metal to suit application.

.6 Adhesive: recommended by manufacturer, waterproof type, maximum VOC limit 30 g/L SCAQMD Rule 1168 - Adhesives and Sealants Applications.

PART 3 EXECUTION

3.1 Construction

.1 Fastening:
- .1 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.
- .2 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.
- .3 Set finishing nails to receive filler. Where screws are used to secure members, countersink screw in round smooth cut hole and plug with wood plug to match material being secured.
- .4 Replace items of finish carpentry with damage to wood surfaces including hammer and other bruises.

.2 Interior and exterior frames: Set frames with plumb sides, level heads and sills, and secure.

3.2 Fabrication

.1 General:
- .1 Field measure all dimensions.
- .2 Fabricate all finish carpentry items to AWMAC premium grade, and in accordance with the reviewed shop drawings.
- .3 Set nails and screws, apply stained plain wood filler to indentations, sand smooth and leave ready to receive finish.
- .4 Provide 10 mm thick solid matching wood strip on plywood and particle board edges 13 mm or thicker, exposed in final assembly.
- .5 Ease edges of solid lumber components to 1.6 mm radius.

.2 Plastic Laminate Components
- .1 Fabricate plastic laminate window stools as detailed. Stools shall be minimum 19 mm thick plastic laminate plywood, with edge banding on all exposed faces. Fabricate in one piece, without joins, wherever as possible. Where necessary, joins shall be centred on window mullions and tightly butted together with concealed splines.
- .2 Fabricate vanities and change room shelving units as detailed.
- .3 Unless otherwise specified herein, comply with requirements of ANSI/NEMA LD 3 Annex 'A'.
- .4 Assembly: Bond plastic laminate to core with adhesive, under pressure.
- .5 Core: unless otherwise indicated: 19 mm thick.
- .6 Balanced construction: plastic laminate covered components shall be of balanced construction, with plastic laminate on both faces of core. Seal core edges not covered with plastic laminate.
- .7 Use largest practicable plastic laminate sheet size.
- .8 Provide joints symmetrically; provide joints as corners and at changes in superficial areas; provide concealed draw bolt anchors and joints. All butt joints shall have a blind spine.
- .9 Openings and cutouts:
  - .1 Radius internal corners at least 3 mm and chamfer edges.
  - .2 Where core edge is to remain exposed, cover with plastic laminate edging.
  - .3 Where core edge is to be concealed, seal with sealer.

3.3 Installation

.1 Do finish carpentry to Quality Standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), except where specified otherwise.

.2 All fastenings shall be concealed.

.3 Provide heavy duty grounds as necessary for secure installation of finish carpentry work.

.4 All wood surfaces shall be sanded smooth, ready to receive finish.

.5 Scribe and cut as required, fit to abutting walls and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets or other projecting, intersecting or penetrating objects.

.6 Form joints to conceal shrinkage.

.7 Set and secure materials and components in place, rigid plumb and square.

.8 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.

.9 Set finishing nails to receive filler. Where screws are used to secure members, countersink screws in round, cleanly cut hole and plug with wood plug to match material being secured.

.10 Replace items of finish carpentry with damage to wood surfaces including hammer and other bruises.

.11 Install window stools with wood levelling shims, after installation of windows and interior finishing is complete. Screw levelling shims to metal stud framing with self-tapping sheet metal screws. Bond stools to shims with waterproof adhesive. Tightly butt all joints and bond together with adhesive and concealed splines. Cut to fit tight to all penetrations.

.12 Apply mildew resistant sealant to perimeter of all vanity tops and window stools as specified in Section 07 92 00.

3.4 Door Installation

.1 Install doors in accordance with instructions in Section 08 11 00 and Section 08 14 16 and manufacturer's printed instructions.

3.5 Finish Hardware Installation

.1 Finish hardware will be supplied for installation under this Section.

.2 Prepare doors and frames in accordance with manufacturer's instructions and templates. Install finish hardware complete in all respects, hang doors and make adjustments necessary.

.3 Doors shall swing freely. Where thresholds are to be used, door bottom shall be finished to suit thresholds as required.

.4 Where indicated on door schedules or drawings, under-cut doors.

3.6 Miscellaneous

.1 Install Toilet and Bath Accessories as specified in Section 10 28 10, including accessories supplied by Owner.

3.7 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 05 50 00 Metal Fabrications
.2 Section 06 10 00 Rough Carpentry
.3 Section 06 20 00 Finish Carpentry
.4 Section 06 61 16 Solid Surfacing
.5 Section 07 92 00 Joint Sealants
.6 Section 09 21 16 Gypsum Board
.7 Section 09 91 23 Interior Painting

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM F1667/F1667M-21a Standard Specification for Driven Fasteners: Nails, Spikes, and Staples
.2 Architectural Woodwork Manufacturer's Association of Canada (AWMAC)
  .1 Architectural Woodwork Standards Manual
.3 American National Standards Institute (ANSI)
  .1 ANSI A208.1-2009 Particleboard
  .2 ANSI/NPA A208.2-2009 Medium Density Fibreboard (MDF)
  .3 ANSI/NEMA LD 3-2005 High-Pressure Decorative Laminates (HPDL)
  .4 ANSI/HPVA HP-1-2009 Standard for Hardwood and Decorative Plywood
.4 CSA Group (CSA)
  .1 CSA O112 SERIES-M1977 (R2006) Wood Adhesives
  .2 CSA O121-08 (R2013) Douglas Fir Plywood
  .3 CSA O151-17 (R2022) Canadian Softwood Plywood
  .4 CSA O153:19 Poplar Plywood
  .5 CSA Z809-08 Sustainable Forest Management
.5 Canadian General Services Board (CGSB)
  .1 CAN/CGSB-11.3-M, Hardboard
.6 Forest Stewardship Council (FSC)
  .1 FSC-STD-01-001-2004 FSC Principle and Criteria for Forest Stewardship.
  .2 FSC-STD-20-002-2004 Structure and Content of Forest Stewardship Standards V2-1
  .3 FSC Accredited Certified Bodies.

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit shop drawings conforming to AWMAC's STANDARDS (NAAWS).
  .1 Show proposed assembly, connections, anchorage, materials, dimensions, thickness, and finishes.
  .2 On casework and countertop elevations show location of backing required for attachment within walls.

.3 Samples:
  .1 Submit duplicate, 300 mm long samples of each type of solid wood and 300 x 300 mm samples of each type of plywood used in exposed work and scheduled to receive stained or

natural finish, complete with specified finish, prior to fabrication of cabinetwork.
.2 Veneer samples minimum 304 mm x 304 mm. Each sample set of three to represent range of colour and grain expected.
.3 Submit full range of manufacturer's standard plastic laminates for selection by the Consultant.
.4 Submit sample of each type of cabinet hardware component used.

1.5 Quality Assurance

.1 Unless otherwise specified, carry out finish carpentry work in accordance with the requirements of "Millwork Standards" (latest issue) of Architectural Woodwork Manufacturers' Association of Canada (AWMAC), Custom Grade.

.2 Woodwork Manufacturer Qualifications:
.1 Minimum 5 years of production experience similar to this project, whose qualifications indicate ability to comply with requirements of this Section.

.3 Preinstallation Conference:
.1 Before framing completed hold a meeting with the contractor, casework manufacturer, casework installer, and framing sub-contractor.
.2 Review locations of backing required for casework installation as shown on casework shop drawings.
.3 Review method of attachment for backing to wall system as shown on architectural drawings.

.4 Mock-up: Prepare mock-ups in accordance with Section 01 45 00 – Quality Control.
.1 Provide mockups of one base cabinet, one wall hung cabinet, and one countertop. Base cabinet to have minimum one drawer. Mockup of material and finish to be provided. Approved mockup may be incorporated in the project.

1.6 Definition

.1 "Exposed" when referred to in this Section, shall mean all parts which can be viewed and shall include interiors of cabinets, backs of doors, shelving and gables.

1.7 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

.3 Protect against damage, including damage by excessive changes in moisture content, during delivery and storage. Maintain minimum storage temperature of 16 ° C, and relative humidity of 25% to 55%.

.4 Cover plastic laminate faces at shop with heavy Kraft paper.

.5 Do not deliver finish carpentry components to site before all wet trades are completed, the building is closed in and humidity conditions on site are acceptable. Do not deliver during rain or damp weather

.6 Store materials on site in such a way as to prevent deterioration or loss or impairment of essential properties. Prevent excessive moisture gain of materials.

1.8 Protection

.1 Provide coverings as necessary to protect finish carpentry components from damage of any kind during storage and after installation.

1.9 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.10 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of two years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Materials

.1 All materials CSA Z809 or FSC Certified.

.2 Solid Wood:
  .1 Unless otherwise indicated, provide AWMAC Custom Grade.
  .2 All wood materials shall be new, straight and clean, free of sap, knots, pitch, and other defects, except as permitted by applicable grading rules.
  .3 All wood shall be kiln dried to a maximum moisture content of 7%.
  .4 Softwood: to CSA O141, dressed all sides used in concealed locations.

.3 Veneers: As required by AWMAC's STANDARDS (NAAWS) for its use and Grade specified. Flat sliced maple veneers from architectural grade flitches to provide uniform grain pattern and colour throughout, free of dark streaks and blemishes. Sharp variation of grain patterns and colour between adjacent jointed pieces is not acceptable.

.4 Plywood:
  .1 Veneer core plywood: hardwood with a non-telegraphing grain manufactured with exterior glue. To ANSI/HPVA HP-1-09, minimum five (5) plies.
  .2 Soft Plywood: to CSA O151-M Standard Grade, solid two sides. Use in concealed locations only, except as indicated.
  .3 To ANSI/HPVA HP-1-09, Grade A face, book matched, flat cut maple face and No. 3 edge.

.5 Particleboard: Meeting requirements of AWMAC’s STANDARDS (NAAWS). To ANSI A208.1 , minimum density of 720kg/m3 Grade "R".

.6 MDF: Medium Density Fiberboard meeting requirements of AWMAC’s STANDARDS (NAAWS).

.7 Edgeband
  .1 For wood veneer casework: Veneer of same species and cut as exposed surfaces.
  .2 For plastic laminate casework: High Pressure Decorative Laminate (HPDL).

.8 Hardboard: To CGSB 11-GP-3M, Type 2, 6 mm thick or as indicated.

.9 Plastic laminate facing sheet: ANSI/NEMA LD 3 High-Pressure Decorative Laminates (HPDL) PF-S and GP-S;

.1 Backing sheet: BK Grade by manufacturer of facing sheet.
.2 Core: CAN3-0188.1M, Grade R.
.3 Laminating adhesive: CAN3-O112 Series M.
.4 Core sealer: clear water resistant synthetic resin sealer.
.5 Colours, pattern, gloss and texture will be selected by Consultant from full range of products by one of the following:
.1 Formica,
.2 Arborite,
.3 Pionite,
.4 Nevamar
.5 Wilsonart.

.10 Fasteners and Adhesive:
.1 Nails and staples: ASTM F1667, galvanized, spiral head nails.
.2 Screws: Zinc, cadmium or chrome plated steel.
.3 Splines: wood or metal, to suit application.
.4 Adhesive: Type 1 waterproof. To CSA O112-M, type as appropriate for the intended application. Complying with ANSI/WDMA I.S-1 series. Contact bond not acceptable.
.5 Avoid the use of adhesives, preservatives, synthesizing agents and finish coatings that contain formaldehyde and high V.O.C. content.

.11 Cabinet Hardware: Products listed are a standard of acceptance. Products by other manufacturers, of equal quality and similar appearance may also be accepted subject to review and approval by Consultant.
.1 Draw bolt fasteners: Knape & Vogt KV 516
.2 Recessed Shelf Standard:
.1 Knape & Vogt KV 255, Zinc, finish.
.2 Knape & Vogt KV 256AL Series Aluminum Shelf Support Clip
.3 Hinges: Blum concealed hinges, 125° clip and 125° opening with self-closing spring. Soft close. Full or half overlay. Nickel plated steel.
.4 Cabinet Pulls: Richelieu D-Pull No: 30134-170, 96 mm c.c. brushed stainless steel.
.5 Cabinet Locks: CCL 0737 pin tumbler MK & KA by room.
.6 Catches: Type optional with manufacturer.
.7 Drawer Slides: Knape & Vogt 8450FM Soft-Close Full-Extension Drawer Slide
.8 Keyboard Slides: Knape & Vogt 8157 Keyboard slide with shelf tabs.
.9 Door and Drawer Bumpers: “Quietex” bumpers.
.10 Provide other hardware and hardware accessories as detailed or required.
.11 Desk Grommet Cable Outlet: Richelieu 9004490 plastic cable grommet with removable cap.
.12 All exposed hardware to have Platinum (Mica) finish by Teknion or equivalent unless noted otherwise.

2.2 Fabrication

.1 Materials and methods of construction to meet requirements of AWMAC's STANDARDS (NAAWS) for grade or grades specified.
.1 If there is conflict between plans and/or specifications and AWMAC's STANDARDS (NAAWS), plans and specifications shall govern.

.2 Wood Casework: AWMAC Standard Custom Grade.

.3 Construction Type: Frameless

.4 Cabinet and door interface: Flush overlay.

.5 Exposed joints and edges:
.1 Uniformly space exposed joints unless otherwise indicated.
.2 No edge grain shall be visible; mitre external corners, house internal fasteners. Glue mitred corners.
.3 All exposed edges of plywood and particle board shall have solid wood edging, pressure glued. AWMAC No. 3 edge.
.4 Ease edges of solid lumber components to 1.6 mm radius.

.6 Mechanical Fasteners:
.1 Inconspicuously locate mechanical fasteners. Wherever possible, conceal fastenings.
.2 Countersink nail heads.
.3 Where exposed to view, countersink screw and bolt heads and fill holes with matching wood plugs.
.4 Cutting and fitting: make cut-outs in work of this Section as required to accommodate work of other Sections.
.5 Make provisions in cabinetwork to accept built-in appliances, provided by others.

2.3 Wood Casework

.1 Materials and methods of construction to meet requirements of AWMAC's STANDARDS (NAAWS) for grade or grades specified.

.2 If there is conflict between plans and/or specifications and AWMAC's STANDARDS (NAAWS), plans and specifications shall govern.

.3 Wood Casework:
.1 Grade: AWMAC's STANDARDS (NAAWS) Custom Grade

.4 Exposed Surfaces [[species], [cut]], [[book][slip] matched] [material suitable for opaque finish]] meeting requirements of AWMAC's STANDARDS (NAAWS) for Grade specified.

.5 Exposed interior surfaces: Veneer of same species and cut [and grade] as exposed exterior surfaces.

2.4 Plastic Laminate Casework

.1 Construct cabinetwork components of plastic laminate faced particle board as indicated and in accordance with AWMAC Custom grade.
.2 Tenon, dado, dowel, or rabbet interior construction with all parts well glued. Shoulder mitre all exposed corners. Open ends or skeleton frames against walls are not permitted. Unless otherwise permitted by Consultant, use unitized construction system for all components.

.3 Exposed Surfaces: High Pressure Decorative Laminate (HPDL), meeting requirements of AWMAC's Standards (NAAWS) for Grade specified.

.4 Exposed interior surfaces: LPDL of a colour and pattern compatible with exposed surfaces

.5 Semi-exposed surfaces: LPDL

.6 Apply self-edged minimum 1.0 mm thick plastic laminate to exposed ends of countertops.

.7 Rout gables for pilaster strips where adjustable shelving is required.

.8 Construct shelving with edge moulding to match. Shelving to cabinetwork to be adjustable unless otherwise noted.

.9 Apply moisture repellent sealer to concealed backs of cabinetwork.

.10 Install cabinet hardware in accord with hardware manufacturer's directions. Unless otherwise indicated, provide each door with pull and with minimum two hinges. Provide locks where indicated.

.11 Install rubber wiring grommets at work surfaces where indicated.

.12 Coordinate installation of wiring for electrical work with Electrical.

2.5 Drawers

.1 Sides: Particle board with melamine surfaces.

.2 Bottoms: MDF or hardboard with melamine surfaces

.3 Joinery: Meeting requirements of AWMAC's STANDARDS (NAAWS) for Grade specified.

2.6 Solid Surface Countertops

.1 As specified in Section 06 61 16

2.7 Finishes

.1 All exposed exterior surfaces: plastic laminate as indicated. Colours selected by the Consultant.

.2 Wood Finish: 3 coats clear polyurethane finish on all sides as specified in Section 09 91 23. Factory finish wherever practical.

.3 All exposed interior surfaces: melamine unless indicated otherwise.

.4 Cabinet and case backs unexposed to view shall be back primed with one coat of moisture repellent sealer.

.5 Apply finishes in accordance with the AWMAC Manual.

PART 3 EXECUTION

3.1 Examination

.1 Verify mechanical, electrical, plumbing, HVAC and other building components, affecting work in this Section are in place and ready.

.2 Verify HVAC controls and systems are operating properly.

.3 Verify adequacy of backing and support framing. Advise Contractor of areas and surfaces requiring further modifications for plumb, level, even or square fitting.

3.2 Installation

.1 Install work in accordance with AWMAC Installation Manual, Custom grade.

.2 Accurately scribe and closely fit components to irregularities of adjacent surfaces.

.3 Accurately fit joints in true plane, locate joints over bearing or supporting surfaces.

.4 Countersink mechanical fasteners used at exposed and semi-exposed surfaces, excluding installation attachment screws and those securing cabinets end to end.

.5 Where permitted, nail with small headed finishing nails. Countersink nail heads with nail setter.

.6 Install plastic laminate components using concealed fastening devices.

.7 Where components are fastened with screws or bolts, countersink screw and bolt heads and provide wood plugs matching surrounding wood.

.8 Where cabinetwork abuts other building elements, provide wood trim matching cabinetwork except where otherwise detailed.

.6 Cut equipment cutouts shown on plans using templates provided.
- .1 Radius internal corners at least 3 mm and chamfer edges.
- .2 Where core edge is to remain exposed, cover with plastic laminate edging.
- .3 Where core edge is to be concealed, seal with sealer.

.9 Where access is required to valves and other mechanical and electrical components, located behind cabinetwork, provide removable plywood access panels of size required and secure with four brass screws.

.10 Provide for wiring and cable management systems wiring grommets as indicated on the drawings.

.11 Apply mildew resistant silicone sealant to perimeter of all countertops as specified in Section 07 92 00.

3.3 Adjustment

.1 Adjust all moving and operating parts to function smoothly and correctly.

.2 Fill and retouch all nicks, chips and scratches. Replace all un-repairable damaged items.

.3 Replace damaged components which, in the opinion of the Consultant, cannot be satisfactorily repaired.

3.4 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

.2 Upon completion of installation, clean installed items of pencil and ink marks and broom clean the area of operation.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 06 40 00 Architectural Woodwork
.2 Section 07 92 00 Joint Sealants

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM E84-24 Standard Test Method for Surface Burning Characteristics of Building Materials
.2 CSA Group (CSA)
  .1 CSA O151-17 Canadian Softwood Plywood
.3 Architectural Woodwork Institute (AWI)
  .1 AWI/AWMAC/WI's Architectural Woodwork Standards
.4 International Surface Fabricators Association (ISFA)
  .1 ISFA 2-01 (2013) Classification and Standards for Solid Surfacing Material
.5 American National Standards Institute (ANS)
  .1 ANSI ICPA-SS-1 (2001) Performance Standard for Solid Surface Materials

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Product Data: Include detailed specification of construction and fabrication, manufacturer's installation instructions, and manufacturer's detailed recommendations for handling, storage, installation, protection, and maintenance.

.3 Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, terminations, and cutouts.
  .1 Show locations and details of joints.
  .2 Show direction of directional pattern, if any.

.4 Samples:
  .1 Full range of colours and patterns for initial selection by Consultant.
  .2 Samples of three colours, 76 x 76 mm for final selection by Consultant.

.5 Certificates: For the following certifications:
  .1 United States Food and Drug Administration (FDA) compliance for food contact materials described in 21 CFR 174 to 21 CFR 190.
  .2 ANSI/NSF 51 "food zone" and FDA "direct-food contact" compliant.

.6 Provide maintenance data for solid surface material countertops for incorporation into Operation and Maintenance Manual specified in Section 01 78 00 – Closeout Submittals.

1.5 Quality Assurance

.1 Source Limitations: Obtain materials and products from single source.
.2 Fabricator Qualifications: Certified solid surface fabricator/installer.

.3 Installer Qualifications: Firm experienced in installation or application of systems similar in complexity to those required for this Project, including specific requirements indicated. Acceptable to or licensed by manufacturer.

1.6 Field Conditions

.1 Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.

.2 Coordinate locations of utilities that will penetrate countertops or backsplashes.

1.7 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

.3 Handle in a manner to prevent breakage. Brace parts if necessary. Transport in the near vertical position with finished face toward finished face. Do not allow finished surfaces to rub during shipping and handling.

.4 Store in racks in near vertical position. Prevent warpage and breakage. Store Inside away from direct exposure to sunlight.

1.8 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.9 Warranty

.1 Furnish manufacturer's 10-year material warranty.

PART 2 PRODUCTS

2.1 Manufacturer

.1 Manufacturer List: Products of following manufacturers are acceptable subject to conformance to requirements of drawings and specifications:
.1 Corian by DuPont
.2 Wilsonart
.3 Formica

2.2 Solid Surface Material

.1 Composition Solid-Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1 and ISFA-2.

.2 Panel thickness: 12.7 mm.

.3 Panel weight: 21.5 kg/m^2

.4 Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

.1 Flame-Spread Index: 25 or less.
.2 Smoke-Developed Index: 50 or less.
.3 Flammability: To NFPA 101, Class A.

.5 Pattern and Finish: Colour to be selected by the Consultant from manufacturer's full range of available selections.

.6 Plywood: Exterior softwood plywood complying with CSA O151, CSP, B1 face, C-C inner plies and back. Touch Sanded.

2.1 Accessories

.1 Adhesive for Bonding to other products: as recommended by solid surface material manufacturer.

.2 Sealant for Countertops: Comply with applicable requirements in Section 07 92 00.

.3 Heat Reflecting Tape: Manufacturer's standard aluminum foil tape, with required thickness, for use with cutouts near heat sources.

.4 Insulating Fabric: Manufacturer's standard for use with conductive tape in insulating solid surface material from adjacent heat source.

2.2 Fabrication

.1 Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI Architectural Woodwork Standards.

.2 Grade: Premium.

.3 Configuration:
.1 Front: Pencil round edge 3.0 mm radius.
.2 Backsplash and side splash: Pencil round edge 3.0 mm radius.

.4 Countertops: 12.7 mm thick, solid surface material with front edge built up with same material.

.5 Fabricate tops with shop-applied edges unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

.6 Fabricate with loose backsplashes and end splashes for field assembly.

.7 Joints: Fabricate countertops in sections for joining in field, with joints at locations indicated on reviewed shop drawings.
.1 Joint Locations: Not within 76 mm of a cutout or cooktop, 25 mm from inside corner for conventional seams, and not where countertop sections less than 900 mm long would result, unless unavoidable.

.2 Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.

PART 3 EXECUTION

3.1 Examination

.1 Examine substrates to receive solid surfacing. Identify conditions detrimental to proper or timely installation. Do not commence installation until conditions have been corrected.

.2 Verify that substrates supporting solid surfacing are plumb, level, and flat to within 3.0 mm/3.0 metres.

3.2 Preparation

.1 Precondition solid surfacing in accordance with manufacturer's printed instructions.

3.3 Installation

.1 Install components plumb and level, in accordance with reviewed shop drawings, Project installation details, and manufacturer's printed instructions.

.2 Joints between adjacent pieces of surfacing shall be flush, tight fitting, level, and neat. Securely join adjacent pieces with manufacturer's adhesive. Fill joints level to polished surface.

.3 Install countertops level to a tolerance of 3 mm in 2.4 m, 6 mm maximum. Do not exceed 0.4 mm difference between planes of adjacent units.

.4 Fasten countertops by adhering with 100-percent silicone material in dab format (not bead format) to base units into underside of countertop at 457 to 610 mm o.c. Shim as needed to align subtops in a level plane.

.5 Align adjacent surfaces and, using adhesive in colour to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

.6 Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.

.7 Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.

.8 Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.

.9 Apply mildew resistant silicone sealant to perimeter of all countertops as specified in Section 07 92 00.

3.4 Protection

.1 Protect surfaces from damage until date of Substantial Performance. Repair or replace damaged components that cannot be repaired to Consultant’s satisfaction.

3.5 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1	Section 04 22 00	Concrete Unit Masonry
.2	Section 06 10 00	Rough Carpentry
.3	Section 07 92 00	Joint Sealants
.4	Section 08 14 16	Flush Wood Doors
.5	Section 08 71 10	Door Hardware
.6	Section 08 71 13	Automatic Door Operators
.7	Section 08 80 05	Glazing
.8	Section 08 88 13	Fire Resistant Glazing
.9	Section 09 21 16	Gypsum Board
.10	Section 09 22 16	Non-Structural Metal Framing
.11	Section 09 91 23	Interior Painting

1.3 References

.1 ASTM International (ASTM)
- .1 ASTM A653/A653M-23 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
- .2 ASTM C177-19e1 Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus
- .3 ASTM C518-21 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
- .4 ASTM C553-13(2019) Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications
- .5 ASTM C591-22 Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation
- .6 ASTM C1289-22a Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
- .7 ASTM D6386-22 Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting
- .8 ASTM D7396-14(2020) Standard Guide for Preparation of New, Continuous Zinc-Coated (Galvanized) Steel Surfaces for Painting
- .9 ASTM E90-09(2016) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
- .10 ASTM E330/E330M-14(2021) Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

.2 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-1.181-99 Ready-Mixed Organic Zinc-Rich Coating.
- .2 CGSB 41-GP-19M-84 Rigid Vinyl Extrusions for Windows and Doors.

.3 CSA Group (CSA)
- .1 CSA-G40.20-13/G40.21-13 General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .2 CSA W59-18 Welded Steel Construction (Metal Arc Welding).

.4 Canadian Steel Door Manufacturers' Association (CSDMA)
- .1 CSDMA Recommended Dimensional Standards for Commercial Steel Doors and Frames, 2000

.2 CSDMA Recommended Specifications for Commercial Steel Doors and Frames, 2006.
.3 CSDMA Selection and Usage Guide for Commercial Steel Door and Frame Products, 2009.

.5 Underwriters Laboratories Canada (ULC)
.1 ULC 104-2015 Standard Method for Fire Tests of Door Assemblies.
.2 ULC 105- 2016 Standard Specification for Fire Door Frames Meeting the Performance Required by CAN/ULC-S104.
.3 ULC 106-2015 Standard Method for Fire Tests of Window and Glass Block Assemblies
.4 ULC 701-2011 Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
.5 ULC 702.1- 2014 Standard for Thermal Insulation, Mineral Fibre, for Buildings.
.6 ULC 704-11 Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

.6 Underwriters Laboratories (UL)
.1 UL10B Fire Tests of Door Assemblies.
.2 UL10C Standard for Positive Pressure Fire Tests of Door Assemblies.

.7 National Fire Protection Association (NFPA)
.1 NFPA 80-22 Standard for Fire Doors and Other Opening Protectives.
.2 NFPA 252-2017 Fire Tests of Door Assemblies.

.8 American National Standards Institute (ANSI)
.1 ANSI 250.4-2018 Test Procedure and Acceptance Criteria for — Physical Endurance for Steel Doors, Frames and Frame Anchors
.2 ANSI 250.10-2011 Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Provide shop drawings
.1 Indicate each type of door, frame, steel, construction and core.
.2 Indicate fire ratings.
.3 Indicate material thicknesses, mortises, reinforcements, anchorages, location of exposed fasteners, openings, arrangement of hardware, and finishes.
.4 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.

1.5 System Description

.1 Design exterior frame assembly to accommodate expansion and contraction when subjected to minimum and maximum surface temperature of -35° C to 35° C.

1.6 Defining Opening Sizes

.1 Width - Widths of openings shall be measured from inside to inside of frame jamb rabbets. (Referred to as "frame rabbet width" or "nominal door width")

.2 Height - Heights of openings shall be measured from the finished floor (exclusive of floor coverings) to the head rabbet of the frame. (Referred to as "frame rabbet height" or "nominal door height")

.3 Door Sizes - Doors shall be sized so as to fit the above openings and allow a 3 mm nominal clearance at jambs and head of frame. A clearance of 13 mm maximum shall be allowed between the bottom of the door and the finished floor (exclusive of floor coverings).

.4 Tolerances - Doors and frame product shall be manufactured and installed in accordance with the CSDMA's, "Recommended Dimensional Standards for Commercial Steel Doors and Frames".

1.7 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.8 Requirements of Regulatory Agencies

.1 Steel fire rated doors and frames: labeled and installed by an organization accredited by Standards Council of Canada in conformance with ULC 104 or NFPA 252 for ratings specified or indicated.

.2 Provide fire labeled frame products for those openings requiring fire protection ratings, as scheduled. Test products in strict conformance with ULC 104 or NFPA 252 and list by nationally recognized agency having factory inspection service and construct as detailed in Follow-up Service Procedures/Factory Inspection Manuals issued by listing agency to individual manufacturers.

1.9 Testing and Performance

.1 Fire labeled products shall be provided for those openings requiring fire protection ratings as scheduled on the drawings. Products shall be tested in strict conformance with ULC 104 and listed by Underwriters Laboratory of Canada Ltd. or Warnock Hersey under an active Factory Inspection Program.

.2 Product quality shall meet the standards established by the Canadian Steel Door Manufacturer's Association.

.3 Door construction shall meet acceptance criteria of ANSI A250.10 and shall be certified as meeting Level A (1,000,000 cycles) and Twist Test Acceptance Criteria deflection not to exceed 6.4 mm/13.6 kg force, total deflection at 136.1 kg force not to exceed 64 mm and permanent deflection not to exceed 3.0 mm when tested in strict conformance with ANSI A250.4. Test shall be conducted by an independent nationally recognized accredited laboratory.

.4 Core materials for insulated doors shall attain a thermal resistance rating of RSI 2.17 when tested in accordance with ASTM C177 or ASTM C518.

1.10 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

.1 Acceptable Materials
  .1 Steel doors and frame product manufactured in accordance with this Specification by CSDMA members, are eligible for use on this project.

.2 Steel: Commercial grade steel to ASTM A653, CS, Type B, Coating Designation ZF75 (A25) minimum. Minimum steel thicknesses shall be in accordance with Appendix 1 of the CSDMA, Recommended Specifications for Commercial Steel Door and Frame Products unless noted otherwise.

.3 Reinforcement channel: to CSA G40.20/G40.21, Type 44W, coating designation to ASTM A653, ZF75.

.4 Door Core Materials
.1 Interior Doors: Structural small cell, 24.5mm maximum kraft paper 'honeycomb'. Weight 36.3 kg per ream minimum, density: 16.5 kg/m³ minimum sanded to required thickness. ULC approved.
.2 Temperature Rise Rated (TRR): Core composition to provide the fire-protection rating and limit the temperature rise on the unexposed side of door to 250°C at 30 or 60 minutes, as determined by governing building code requirements. Core to be tested as part of a complete door assembly, in accordance with ULC 104 and shall be listed by a nationally recognized testing agency having a factory inspection service.

.5 Primers:
.1 Touch-up prime CAN/CGSB-1.181, organic zinc rich, rust inhibitive.
.1 Maximum VOC limit 50 g/L to GC-03.

2.2 Adhesives

.1 Adhesive: maximum VOC content 50 g/L to SCAQMD Rule 1168.

.2 Honeycomb cores and steel components: heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement.

.3 Lock-seam doors: fire resistant, resin reinforced polychloroprene, high viscosity, low VOC sealant/adhesive or U.L.C. approved equivalent.

2.3 Accessories

.1 Glazing Stops: Minimum 0.9 mm base thickness sheet steel with wipe zinc finish to ASTM A525. Fasteners to be #6 x 32 mm cadmium plated oval head scrulox self-drilling type screws. Tamper proof screws.

.2 Frame Thermal Breaks: Rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19MA.

.3 Door silencers: single stud rubber/neoprene type.

.4 Fiberglass: to ULC 702, loose batt type, minimum density of 24 kg/m³.

.5 Metallic paste filler: to manufacturer's standard.

.6 Sealant: As specified in Section 07 92 00.

2.4 Fabrication - Frame Products

.1 General
.1 Fabricate frames in accordance with CSDMA specifications.
.2 Fabricate frames to profiles and maximum face sizes as indicated.
.3 Exterior frame product shall be 1.60 mm welded type construction, thermally broken.
.4 Interior frame product shall be 1.60 mm. Interior frames, transoms, sidelights and window assemblies shall be welded type construction.

.5 Blank, reinforce, drill and tap frames for templated hardware and electronic hardware using templates provided by finish hardware supplier. Reinforce frames for surface mounted hardware.
.6 Prepare frames to receive electrical conduit for door operators where indicated and required.
.7 Protect mortised cutouts with steel guard boxes.
.8 Provide anchorage appropriate to floor, wall and frame construction. Each wall anchor shall be located immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on the strike jamb. For rebate opening heights up to and including 1520 mm provide two (2) anchors, and an additional anchor for each additional 760 mm of height or fraction thereof, except as indicated below. Frames in previously placed concrete, masonry or structural steel shall be provided with anchors located not more than 150 mm from the top and bottom of each jamb, and intermediate anchors at 660 mm on centre maximum. Fasteners for such anchors shall be provided by others.
.9 Minimum reinforcing, anchor and other component thickness shall be in accordance with Table 1 of the CSDMA, "Recommended Specifications for Commercial Steel Door and Frame Products".
.10 Each interior door opening shall be prepared for single stud rubber door silencers, three (3) for single door openings, two for double door openings, except on gasketed frame product.
.11 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.
.12 Fire-rated frame products shall be provided for those openings requiring fire protection as determined and scheduled by the Consultant. Frames, transom and sidelight assemblies shall be listed for conformance with ULC 104. Window assemblies shall be listed for conformance with ULC 106. All fire-rated frame products shall bear the label of and be listed by a nationally recognized testing agency having a factory inspection service. Labeling shall be in accordance with NFPA 80, the listing authority's policies and label materials, and shall identify the manufacturer. Fire-rated frame products shall be constructed as listed for labeling in the Follow-Up Service Procedures/Factory Inspection Manuals issued by the listing agency to individual manufacturers.

.2 Welded Type
.1 Welding in accordance with CSA W59.
.2 Accurately mitre or mechanically joint frame product and securely weld on inside of profile.
.3 Cope accurately and securely weld butt joints of mullions, centre rails and sills.
.4 Grind welded joints and corners to a flat plane, fill with metallic paste and sand to uniform smooth finish.
.5 Where frame product is to be installed prior to the adjacent partition, a floor anchor shall be securely attached to the inside of each jamb profile. Each floor anchor shall be provided with two holes for securing to the floor. For conditions that do not permit the use of a floor anchor, an additional wall anchor, located within 150 mm of the base of the jamb, shall be substituted.
.6 Weld in two temporary jamb spreaders per door opening to maintain proper alignment during shipment and handling, which shall not be used for installation.
.7 Glazing stops shall be formed steel channel, minimum 16 mm height, accurately fitted, butted at corners and fastened to frame sections with counter-sunk oval head sheet metal screws.
.8 When required due to site access, when advised by the contractor responsible for coordination or installation, as specified on the drawings or due to shipping limitations, frame product for large openings shall be fabricated in sections as designated on the approved submittal drawings, with splice joints for field assembly and welding by others.
.9 Prior to shipment, mark each frame product with an identification number as shown on the approved submittal drawings.
.10 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.
.11 Manufacturer's nameplates on frames and screens are not permitted

2.5 Fabrication - Doors

.1 General
.1 Interior doors: insulated steel construction with honeycomb core laminated to minimum 1.19 mm nominal thickness steel face sheets under pressure.
.2 Voids between vertical stiffeners shall be filled with fiberglass batt type insulation.
.3 Doors: swing type, flush.
.4 Doors: manufacturers' proprietary construction, tested and/or engineered as part of a fully operable assembly, including door, frame, gasketing and hardware in accordance with ASTM E330.

.2 Longitudinal edges shall be mechanically inter-locked, adhesive assisted. Seams: visible grind welded joints to a flat plane, fill with metallic paste filler and sand to a uniform smooth finish.

.3 Doors shall be mortised, blanked, reinforced, drilled and tapped at the factory for templated hardware and electronic hardware, in accordance with the approved hardware schedule and templates provided by the hardware supplier.

.4 Holes 12.7 mm diameter and larger shall be factory prepared, except mounting and through-bolt holes, which are by others, on site, at time of hardware installation. Holes less than 12.7 mm diameter shall be factory prepared only when required for the function of the device (for knob, lever, cylinder, thumb or turn pieces) or when these holes over-lap function holes.

.5 Doors shall be reinforced where required, for surface mounted hardware, anchor hinges, thrust pivots, pivot reinforced hinges, or non-templated hardware.

.6 Provide top and bottom of doors with inverted, recessed, welded steel channels. Exterior doors shall be provided with rigid PVC top caps.

.7 Minimum reinforcing and component thickness shall be in accordance with Table 1 of the CSDMA, "Recommended Specifications for Commercial Steel Door and Frame Products".

.8 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.

.9 Fire-rated doors shall be provided for those openings requiring fire protection and temperature rise ratings, as indicated. Such products shall be listed for conformance with ULC 104. All fire-rated doors shall bear the label of and be listed by a nationally recognized testing agency having a factory inspection service. Labeling shall be in accordance with NFPA 80, the listing authority's policies and label materials, and shall identify the manufacturer. Fire-rated doors shall be constructed as listed for labeling in the Follow-Up Service Procedures/Factory Inspection Manuals issued by the listing agency to individual manufacturers.

.10 Prior to shipment, mark each door with an identification number as shown on the approved submittal drawings.

.11 Manufacturer's nameplates on doors are not permitted.

2.6 Glazing Stops

.1 Glazing stops shall be accurately fitted, butted at corners with removable stops located on push side of door.

.2 Provide tamper proof screws on all doors and screens.

2.7 Finishes

.1 Doors and frames shall wipe coat zinc, ready for painting.

PART 3 EXECUTION

3.1 Manufacturer's Instructions

.1 Comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheets.

3.2 Installation

.1 Install doors and frames to CSDMA Installation Guide, NAAMM-HMMA 840, Installation Guide for Commercial Steel Doors and Frames.

.2 Fire-rated door and frame product shall be installed in accordance with NFPA-80.

.3 Prior to installation, remove temporary shipping spreaders.

.4 Prior to installation, the area of floor on which the frame is to be installed, and within the path of the door swing, shall be checked and corrected for flatness.

.5 Check door and frame product for correct size, swing, rating and opening number.

.6 The supplier shall be advised of any discrepancies prior to installation.

.7 Set frames plumb, square, level and at correct elevation.

.8 Secure anchorages and connections to adjacent construction.

.9 Brace frames rigidly in position while building-in. Install wood spreaders at third points of frame rebate height to maintain frame width. Provide vertical support at centre of head for openings exceeding 1200 mm in width.

.10 During the setting of frame product, check and correct as necessary for opening width, opening height, square, alignment, twist and plumb, in accordance with the CSDMA "Recommended Dimensional Standards for Commercial Steel Doors and Frames".

.11 Remove wood spreaders after frames have been built-in.

.12 Make allowance for deflection to ensure structural loads are not transmitted to frame product.

.13 Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08 71 10 - Door Hardware. Coordinate with Section 08 71 10 for preparation and installation of automatic door operators.

.14 Adjust operable parts for correct clearances and function.

.15 Install louvers, glazing and door silencers.

.16 Provide even margins between doors and jambs and doors and finished floor and thresholds as follows:
- .1 Hinge side: 1.0 mm.
- .2 Latch side and head: 1.5 mm.
- .3 Finished floor and thresholds: 13 mm.

.17 Caulk perimeter of frames. Refer to Section 07 92 00 – Joint Sealants.

3.3 Finish Repairs

.1 Touch up with primer finishes damaged during installation.

.2 Fill exposed frame anchors and surfaces with imperfections with metallic paste filler and sand to a uniform smooth finish.

3.4 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 06 20 00 Finish Carpentry
.2 Section 08 11 00 Metal Doors and Frames
.3 Section 08 71 10 Door Hardware
.4 Section 09 91 23 Interior Painting

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM D1761-20 Standard Test Methods for Mechanical Fasteners in Wood and Wood-Based Materials
  .2 ASTM D5456-21e1 Standard Specification for Evaluation of Structural Composite Lumber Products
  .3 ASTM E90-09(2016) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
  .4 ASM E413-22 Classification for Rating Sound Insulation
  .5 ASTM E1332-22 Standard Classification for Rating Outdoor-Indoor Sound Attenuation
  .6 ASTM E2235-04(2020) Standard Test Method for Determination of Decay Rates for Use in Sound Insulation Test Methods
.2 CSA Group (CSA)
  .1 CSA O115-M1982 (R2001) Hardwood and Decorative Plywood.
  .2 CSA O132.2 Series-90 (R1998) Wood Flush Doors
.3 Canadian General Services Board (CGSB)
  .1 CAN/CGSB-71.19 Adhesive, Contact, Sprayable
  .2 CAN/CGSB-71.20 Adhesive, Contact, Brushable
.4 American National Standards Institute (ANSI)
  .1 ANSI A208.1 Standard for Particleboard.
.5 Underwriters Laboratories Canada (ULC)
  .1 ULC 104-2015 Standard Method for Fire Tests of Door Assemblies.
.6 National Fire Protection Association (NFPA)
  .1 NFPA 80 Standard for Fire Doors and Other Opening Protectives.
  .2 NFPA 252 Standard Method of Fire Test for Door Assemblies.
.7 Architectural Woodwork Manufacturers Association of Canada (AWMAC): Quality Standards for Architectural Woodwork
.8 Window and Door Manufacturer’s Association (WDMA)
  .1 ANSI/WDMA I.S. 1A-21 Interior Architectural Wood Flush Doors
.9 South Coast Air Quality Management District (SCAQMD), California State
  .1 SCAQMD Rule 1113-06 Architectural Coatings.
  .2 SCAQMD Rule 1168-03 Adhesives and Sealants Applications.
.10 Green Seal Environmental Standards
  .1 Standard GS-11-97 Architectural Paints.

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit manufacturer's printed product literature, specifications and data sheets for door materials and adhesives.

.3 Submit shop drawings and door schedules.
.1 Indicate door types and cutouts for sizes, core construction and cutouts.

.4 Submit samples.
.1 Submit one 300 x 300 mm corner sample of each type wood door.
.2 Show door construction, core, glazing detail and faces.

.5 Manufacturer's Instructions:
.1 Submit manufacturer's installation instructions.

1.5 Quality Assurance

.1 The “Quality Standards” of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), 1991 Edition, together with authorized additions and amendments, shall be used as a reference standard and shall form part of this project specification.

.2 Where modifications to the AWMAC Quality Standards contained within the Manual are included in this project specification, then such modifications shall govern in case of conflict.

.3 Any reference to Custom or Premium grade in this specification shall be as defined in the AWMAC Quality Standards.

.4 Any item not given a specific quality grade shall be Custom grade as defined in the AWMAC Quality Standards.

.5 References in this specification to part and item numbers mean those parts and items contained within the AWMAC Quality Standards Manual.

.6 Regulatory Requirements: Wood fire rated doors: labelled and listed by an organization accredited by Standards Council of Canada.

.7 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.8 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.6 Shipping, Handling and Storage

.1 Refer to Section 01 16 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer’s printed instructions.

.3 Wood door delivery, storage and handling shall be in accordance with Part 6, Item 3, of the AWMAC Quality Standards.

.4 Do not deliver wood doors until the building and storage areas are sufficiently dry so that the wood doors will not be damaged by excessive changes in moisture content.

.5 Delivered materials which are damaged in any way or do not comply with these specifications will be rejected by the Consultant and shall be removed from the job site and replaced with acceptable materials.

1.7 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.8 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of two years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Manufacturers

.1 Acceptable Manufacturers: Member in good standing of the Architectural Woodwork Manufacturers Association of Canada (AWMAC) with minimum 5 years of production experience similar to this project, whose qualifications indicate ability to comply with requirements of this Section.

2.2 Materials

.1 All door materials to conform to CSA O132.2.

.2 Doors shall be constructed of solid laminated wood core with 3.0 mm thick Grade A face, book matched, flat cut birch, 50 mm stiles and 76 mm top and bottom rails. Stiles to be No. 3 birch edge.

.3 Core shall consist of low density wood blocks, random lengths with staggered joints. All cores shall be drum sanded both sides.

.4 Door thickness: as indicated.

.5 Adhesive: To CSA 0132.2, Type II, water resistant, for interior use.

PART 3 EXECUTION

3.1 Fabrication

.1 Fabricate doors in accordance with CSA 0132.2.

.2 Provide No. 3 vertical edge strips to match face veneer.

.3 Bevel vertical edges of single acting doors 3.0 mm on lock side and 1.6 mm on hinge side.

.4 Prepare doors for hardware.

.5 Fabricate doors with reinforced openings for louvres, door grilles and glazed lites. Provide manufacturer’s standard trim and stops.

.6 Sand and prepare doors to receive clear urethane finish as indicated on the Room Finish and Door Schedules.

3.2 Installation

.1 Unwrap and protect doors in accordance with CSA-O132.2 Series, Appendix A.

.2 Install doors and hardware in accordance with manufacturer's printed instructions and CSA-0132.2 Series, Appendix A.

.3 Adjust hardware for correct function.

.4 Doors to receive clear urethane finish as specified in Section 09 91 23.

3.3 Final Adjustment

.1 Re-adjust doors and hardware just prior to completion of building to function freely and properly

3.4 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 06 20 00 Finish Carpentry
.2 Section 08 11 00 Metal Doors and Frames
.3 Section 08 14 16 Flush Wood Doors

1.3 References

.1 American National Standards Institute (ANSI) / Builders Hardware Manufacturers Association (BHMA)
  .1 ANSI/DHI A115.1G-1994 Installation Guide for Doors and Hardware
  .2 ANSI/ICC A117.1-2017 Accessible and Usable Buildings and Facilities
  .3 ANSI/BHMA A156.1-2013 American National Standard for Butts and Hinges.
  .4 ANSI/BHMA A156.2-2011 Bored and Preassembled Locks and Latches.
  .5 ANSI/BHMA A156.3-2014 Exit Devices.
  .6 ANSI/BHMA A156.4-2013 Door Controls - Closers.
  .7 ANSI/BHMA A156.5-2014 Auxiliary Locks and Associated Products.
  .8 ANSI/BHMA A156.6-2010 Architectural Door Trim.
  .9 ANSI/BHMA A156.8-2010 Door Controls - Overhead Stops and Holders.
  .10 ANSI/BHMA A156.10-2011 Power Operated Pedestrian Doors.
  .11 ANSI/BHMA A156.12-2013 Interconnected Locks and Latches.
  .12 ANSI/BHMA A156.13-2012 Mortise Locks and Latches Series 1000.
  .13 ANSI/BHMA A156.15-2011 Release Devices - Closer Holder, Electromagnetic and Electromechanical.
  .14 ANSI/BHMA A156.16-2013 Auxiliary Hardware.
  .15 ANSI/BHMA A156.18-2012 Materials and Finishes.
  .16 ANSI/BHMA A156.19-2013 Power Assist and Low Energy Power - Operated Doors.
  .17 ANSI/BHMA A156.21-2014 Thresholds.
  .18 ANSI/BMHA A156.22-2012 Door Gasketing and Edge Seal Systems
.2 Canadian Steel Door Manufacturers' Association (CSDMA)
  .1 CSDMA Canadian Metric Guide for Steel Doors and Frames (Modular Construction): Standard Hardware Location Dimensions.
.3 National Wood Window and Door Association (NWWDA)
.4 Door Hardware Institute (DHI)
.5 Accessibility for Ontarians with Disabilities Act (AODA)

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Product Data: Submit manufacturer's printed product literature, specifications and data sheets.

.3 Samples:
  .1 Identify each sample by label indicating applicable specification paragraph number, brand name and number, finish and hardware package number.
  .2 After approval samples will be returned for incorporation in the Work.

.4 Hardware List:

.1 Submit contract hardware list.
.2 Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information.

.5 Manufacturer's Instructions: Submit manufacturer's installation instructions.

.6 Provide operation and maintenance data for door closers, locksets, door holders, electrified hardware and fire exit hardware for incorporation into Operations and Maintenance Manuals specified in Section 01 78 00 - Closeout Submittals.

1.5 Quality Assurance

.1 Regulatory Requirements:
.1 Hardware for doors in fire separations and exit doors certified by a Canadian Certification Organization accredited by Standards Council of Canada.
.2 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
.3 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.2 Pre-installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.6 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer’s printed instructions.

.3 Package each item of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.

.4 Receive the delivery of the Finishing Hardware and identify all items against the Finishing Hardware Schedule. Ensure each hardware item is accompanied by the correct template, installation instructions, special tools, fastening devices and other loose items. Advise the finish hardware supplier and Consultant in writing of errors or omissions.

.5 Storage and Protection: Store finishing hardware in locked, clean and dry area.

.6 Remove all hardware from doors and frames prior to painting. After painting is complete and dry, reinstall all hardware to manufacturer’s recommendations.

1.7 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.8 Warranty

.1 Warrant all hardware against defects of workmanship and material, for a period of one year, except for door closers which shall be warranted for ten years from the date of Substantial Performance

and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Materials

.1 A Finishing Hardware Schedule shall be prepared & submitted for review.

.2 All finishes shall be as indicated in the Finishing Hardware Schedule by international codes.

.3 All door handles shall be lever type meeting requirements of the referenced accessibility standards and the Ontario Building Code.

.4 Power Door Operators and controls shall be CSA approved and shall meet the requirements of the Ontario Building Code and the Accessibility for Ontarians with Disabilities Act (AODA).

2.2 Fastenings

.1 Use only fasteners provided by manufacturer. Failure to comply may void warranties and applicable licensed labels.

.2 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.

.3 Exposed fastening devices to match finish of hardware.

.4 Where pull is scheduled on one side of door and push plate on other side, supply fastening devices, and install so pull can be secured through door from reverse side. Install push plate to cover fasteners.

.5 Use fasteners compatible with material through which they pass.

2.3 Electrified Devices

.1 Electrified exit devices shall conform to all traditional exit device standards as specified above. All power requirements for exit devices used must utilize a continuous circuit electric hinge for clean design and no visible means of interrupting power to device.

.2 All exit devices with electric latch retraction shall provide for a remote means of unlocking for momentary or maintained periods of time.

.3 Exit devices with electrified trim shall be fail-secure unless otherwise specified.

2.4 Keying

.1 Keying: All permanent cylinders to be grandmaster-keyed as directed by the Owner. The factory shall key all locks and cylinders and maintain keying records. The factory shall establish a System Information Document (SID) to designate primary system administrators and require a separate letter of authorization for all future shipments of keyed products.

.2 Remove all construction cores and install all permanent cores. Unless otherwise directed by the Owner.

.3 Construction master/change keys are to be delivered by the contractor directly to The Owner.

.4 Ship all permanent cylinders and keys separately. Identify door number and keyset symbol on each envelope for direct factory delivery to the owner.

PART 3 EXECUTION

3.1 Manufacturer's Instructions

.1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

.2 Furnish metal door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.

.3 Furnish manufacturers' instructions for proper installation of each hardware component.

3.2 Examination

.1 Before installing any hardware, carefully check all architectural drawings of the work requiring hardware, verify door swings, door and frame materials and operating conditions, and assure that all hardware will fit the work to which it is to be attached.

.2 Check all shop drawings and frame and door lists affecting hardware type and installation, and certify to the correctness thereof, or advise the hardware supplier and Consultant in writing of required revisions.

3.3 Templates

.1 Check the hardware schedule, drawings and specifications, and furnish promptly to the applicable trades any patterns, templates, template information and manufacturer's literature required for the proper preparation for and application of hardware, in ample time to facilitate the progress of the work.

3.4 Installation

.1 Installation of hardware shall be in accordance with ANSI A115.1G, manufacturer's templates and instructions.

.2 Install each item of mechanical and electromechanical hardware and access control equipment to comply with the manufacturer's written instructions and according to specifications. All items to be installed with fasteners identified by manufacturer's installation instructions unless otherwise noted.

.3 Mounting Heights: Install door hardware at heights indicated in the following applicable publications unless; specifically indicated or required by local governing regulations, requirements to match for special templates, necessary coordination with door elevations, and or to ensure consistency with pairs of doors.

.1 DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames"
.2 DHI's "Recommended Locations for Architectural Hardware for Wood Flush Doors"
.3 ANSI/ICC A117.1 Accessibility Guidelines for Buildings and Facilities
.4 NWWDA
.5 AODA

.4 Power door operator products and accessories are required to be installed by an AAADM certified technician as approved by the manufacturer. Adjust for proper opening and closing operation after final balancing of HVAC system.

.5 Coordinate installation of electric door strikes, keypad locks, card readers, washroom duress systems, and other electronic door control and security devices with Electrical contractor including supply and installation of wiring and all terminations.

.6 All hardware shall be installed by carpenters, skilled in the application of architectural hardware and satisfactory to the hardware supplier. Refer to Section 06 20 00 - Finish Carpentry. Instruction sheets, details and templates shall be read and understood before installation.

.7 Install all materials as listed in the Finishing Hardware Schedule on the doors and frames listed. Interchanging of hardware will not be allowed.

.8 Use only manufacturer's supplied fasteners. Failure to comply may void manufacturer's warranties and applicable licensed labels. Use of "quick" type fasteners, unless specifically supplied by manufacturer, is unacceptable.

.9 Where door stop contacts door pulls, mount stop to strike bottom of pull.

.10 Remove construction cores when directed by Owner’s Representative.

.11 After installation, templates, installation instructions and details shall be put in a file and turned over to the Owner, when building is Substantially Performed.

3.5 Field Quality Control

.1 Conduct periodic inspections to ensure that door frames are installed plumb, level and square with verification by installer prior to installation of doors and door hardware.

.2 Hardware supplier to attend site meetings as required to ensure proper execution of the guidelines set forth herein.

.3 Hardware supplier will perform final field inspection of installed door hardware after final adjustment of all products and will document and report any deficiencies or omissions for correction and written acceptance by the Contractor.

3.6 Adjusting

.1 Adjust door hardware, operators, closers and controls for optimum, smooth operating condition, safety and for weather tight closure.

.2 Lubricate hardware, operating equipment and other moving parts.

.3 Adjust door hardware to provide tight fit at contact points with frames.

3.7 Demonstration

.1 Instruct Owner’s maintenance personnel in the proper adjustment, operation and maintenance of mechanical and electromechanical door hardware, electronic devices and maintenance of finishes.

3.8 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

.2 Perform cleaning after installation to remove construction and accumulated environmental dirt.

.3 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacturer's instructions.

.4 Remove protective material from hardware items where present.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 08 11 00 Metal Doors and Frames
.2 Section 08 71 10 Door Hardware

1.3 References

.1 American National Standards Institute/Builders Hardware and Manufacturers Association (ANSI/BHMA):
  .1 BHMA A156.10- 2017 Power Operated Pedestrian Doors
.2 CSA Group (CSA)
  .1 CSA C22.1:21 Canadian Electrical Code
.3 Canadian General Standards Board (CGSB)
  .1 CAN/CGSB 1.108-M89 Bituminous Solvent Type Paint
.4 Ontario Building Code.
.5 Accessibility for Ontarians with Disabilities Act (AODA)

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Shop Drawings: Submit shop drawings for review indicating all components, required clearances, electrical hook-up and coordination required with the work of related trades.
  .1 Indicate materials, thickness, anchorage, finishes and operation. Indicate minimum acceptable clearances required.
  .2 Provide layout for installation of door controller paddles and devices including mounting heights and conduit requirements.
  .3 Submit wiring diagrams and schematics.

.3 Provide maintenance data for automatic door operators complete with operation and maintenence instructions, pertinent details and spare parts list for incorporation into Maintenance Manuals specified in Section 01 78 00 – Closeout Submittals.

1.5 Maintenance

.1 Instruct Owner in operation and maintenance of door operators.

1.6 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer’s printed instructions.

1.7 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.8 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of two years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 General

.1 Power Door Operators and controls shall be CSA approved and shall meet the requirements of the Ontario Building Code and the Accessibility for Ontarians with Disabilities Act (AODA).

.2 Manufacturer: This specification is based on Stanley Access technologies Magic Swing Door Operators. Equivalent products by the following manufacturers are acceptable, subject to approval of the Consultant:
- .1 Besam/Assa -Abloy
- .2 Dormakaba
- .3 Dor-O-Matic.
- .4 Horton Automatics.
- .5 Rhinotek

2.2 Material/Design/Operation

.1 Operator
- .1 Shall be Stanley Magic-Swing, electro-mechanical system sealed against dirt, dust and corrosion in a cast aluminum case and fully lubricated to minimize wear and friction of the moving parts between temperature extremes of -20 ° C and +60 ° C. The entire operator shall be removable from the header as a unit.
- .2 Size operators to suit weight of doors as indicated on the Door and Frame Schedule.
- .3 Aluminum header extrusions to be minimum 3.0 mm wall thickness and have a clear anodized finish to match adjacent frames.
- .4 Back paint all aluminum in contact with steel with bituminous paint to CGSB 1.108 and install PVC isolating strips.
- .5 All automatic entrance equipment is to comply with all sectors of ANSI A-156.10 and be C.S.A. approved.

.2 Power Opening: The operator shall open the door with a 1/8 hp DC motor through reduction gears, ball screw actuator and a forged steel rack and pinion. Opening time to back-check (approximately 75°) shall be 1.25-1.6 seconds. The drive train shall have positive, constant engagement. A force no greater than 25 lbF at the lock stile shall stop the door from opening. The operator shall stop the door in the open position by electrically reducing the motor voltage and holding against an adjustable 90° stop.

.3 Spring Closing: The operator shall close the door by spring energy. Closing speed shall be controlled by employing the motor as a dynamic brake and closing to latch check (approximately 10°) shall be in 3 seconds. Closing through last 10° shall be in 1.5 seconds minimum. The closing spring shall be a helical compression spring, pre-loaded for positive closing action at a low material stress level for long spring life.

.4 Emergency Release: The operator shall have built in emergency release with controlled spring return to the closed position without manual resetting. While the door is in the emergency release mode, a disconnect switch shall prevent powered operation. No header or jamb mounted stops or cams shall be required for emergency function. Not more than 50 lbF at the lock stile shall be required for emergency use per ANSI A-156.10.

.5 Manual Use: The operator shall function as a manual door closer in the direction of swing with or without electrical power.
- .1 Entrapment Protection: the forces and speeds of power opening, manual opening in both directions of swing, and spring closing in both directions of swing shall conform to the requirements of ANSI-A-156.10.

.6 Electrical Control: A solid state, completely enclosed electronic control with quick connect plugs shall incorporate the following features:
- .1 A “safety plus” - 1 ½ second extension of both operate and safety signals after pressure has been removed from the control mats.
- .2 A 2 ½ ampere current limiting circuit which limits the opening force of the operator to a maximum of 24 lbF at the lock stile.
- .3 A “soft-start” motor driving circuit that reduces power to the motor after seven seconds of maintained opening speed.
- .4 A cam actuated emergency breakout switch to disconnect power to the motor when the door is manually pushed in the emergency direction. The operator shall then automatically reset and power will be resumed.

.7 Door Arm
- .1 Linkage assembly shall provide positive control of door through entire swing; shall permit use on butt hung doors.
- .2 Header shall be 140 mm wide by 152 mm high extruded aluminum of 3.0 mm thickness. Access to the operator and electronic control box shall be by a full length removable cover, edge rabbited to the header to insure flush fit. Finish to be anodized.

.8 Controls
- .1 Shall be manufacturer’s standard Touchless, stainless steel push plate embossed with Handicap Symbol and “WAVE TO OPEN”. Size of plate to meet Code requirements.
  - .1 BEA 10MS31U Universal Wave to Open Touchless Actuator or Camden 325. Black.
- .2 Provide CSA approved 50 x 100 mm minimum galvanized steel junction box or size to match frames.
- .3 Control devices shall be weatherproof.
- .4 Where indicated, install junction box/control on door control pedestal. Pedestal shall be stainless steel, brushed finish purpose made for door operator controls.
  - .1 152 x 152 mm stainless steel pedestal.
  - .2 1220 mm high with sloped top.
  - .3 1 single gang and 2 double gang openings. (Intercom/Card Reader/Door operator). Centrelines between 900mm and 1100mm to meet OBC Barrier Free requirements.

PART 3 EXECUTION

3.1 Examination

.1 Inspect the site to ensure that no defects are present in the completed phases of the work which would result in poor application or installation or cause latent defects of the automatic door equipment.

3.2 Installation

.1 Install components and wire operators in accordance with Manufacturer's instructions.

.2 Power door operator products and accessories are required to be installed by an AAADM certified technician as approved by the manufacturer. Adjust for proper opening and closing operation after final balancing of HVAC system

.3 Coordinate installation of operators with other Sections. Supply material to be built into the work when required.

.4 Install control switches at heights in accordance with referenced standards and reviewed shop drawings.

.5 Pedestals for automatic door operators shall be mounted on concrete foundations in accordance with manufacturer's recommendations and installation instructions. Exterior air entrained concrete as specified in Section 03 30 00.

.6 Maintain minimum headroom requirements at doors as indicated on the reviewed shop drawings.

.7 Adjust door operating components to ensure smooth opening and closing of doors.

.8 Instruct the Owner in the correct operation, care and maintenance of the door operators.

3.3 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 07 92 00 Joint Sealants
.2 Section 08 11 00 Metal Doors and Frames
.3 Section 08 80 05 Glazing

1.3 References

.1 National Fire Protection Association (NFPA)
  .1 NFPA 80 - 2022 Standard for Fire Doors and Other Opening Protectives
  .2 NFPA 252 - 2022 Standard Methods of Fire Tests of Door Assemblies.
  .3 NFPA 257 - 2022 Standard on Fire Test for Window and Glass Block Assemblies.
.2 Underwriters Laboratories, Inc. (UL)
  .1 UL 9 Fire Tests of Window Assemblies.
  .2 UL 10B for Fire Tests of Door Assemblies.
  .3 UL 10C Positive Pressure Fire Tests of Door Assemblies.
.3 Underwriters Laboratories of Canada (ULC)
  .1 CAN/ULC S104-15 Standard Method for Fire Tests of Door Assemblies
  .2 CAN/ULC S106-15 Standard Method for Fire Tests of Window and Glass Block Assemblies
.4 Consumer Products Safety Commission (CPSC)
  .1 CPSC 16 CFR 1201 Safety Standard for Architectural Glazing Materials.
.5 Glass Association of North America (GANA)
  .1 GANA – Glazing Manual
  .2 FGMA – Sealant Manual

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Shop Drawings: Submit shop drawings showing layout, profiles and product components.

.3 Samples: Submit 150 x 150 mm glass samples.

.4 Technical Information: Submit latest edition of manufacturer’s product data.

.5 Provide maintenance data for fire resistant glazing for incorporation into Operation and Maintenance Manual specified in Section 01 78 00 – Closeout Submittals.

1.5 System Description

.1 Performance Requirements: Provide a fire rating glazing manufactured, fabricated and installed to maintain performance criteria stated by manufacturer without defects, damage or failure.
  .1 Fire Rating: Fire resistant glazing shall be fire rated from 20-180 minutes with hose stream and is impact safety rated to meet CPSC 16 CFR 1201 Category I and II.
  .2 Fire resistant glazing shall be tested in accordance with NFPA 80, NFPA 252, NFPA 257, UL 9, UL 10B, UL 10C, ULC 104 and ULC 106.

.3 Testing Laboratory: Fire test shall be conducted by a nationally recognized independent testing laboratory.

.2 Listings and Labels: Fire rated glazing shall be under current follow-up service by a nationally recognized independent testing laboratory approved by OSHA and maintain a current listing or certification. Assemblies shall be labeled in accordance with limits of listings.

1.6 Project Conditions

.1 Field Measurements: Verify actual measurements for openings by field measurements before fabrication. Show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

1.7 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.8 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.9 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of five years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Fire Rated Glazing

.1 Material:
.1 Fire protective impact safety rated laminated glass ceramic with hose stream, fire rating as indicated.
.2 Conforming to CAN/ULC S104 and CAN/ULC S106

.2 Product and Manufacturer:
.1 PYRAN Platinum L as manufactured by SCHOTT Technical Glass Solutions
.2 Keralite Select L as manufactured by VETROTECH SAINT-GOBAIN NORTH AMERICA INC
.3 Firelite Plus Premium as manufactured by Nippon Glass.

.3 Design Requirements:
.1 Thickness: 8 mm thick.
.2 Weight: 19.5 kg/m^2
.3 Sound Transmission Rating: 36 STC.
.4 Appearance: Neutral colouration free of amber tints.
.5 Fire Rating: Fire rated from 20-180 minutes with hose stream.
.6 Impact Safety Rating: Meet CPSC 16 CFR 1201 Category I & II.
.7 Cradle to Cradle Certification: Must be C2C Silver Certified.
.8 Polished finish.
.9 ANZI Z97 Impact Safety Filmed and Laminated

.10 Environmental Impact: Manufacturing process and final composition free from toxins or hazardous heavy metals.

.4 Each piece of fire-rated glazing material shall be labeled with a permanent logo including name of product, manufacturer, testing laboratory and fire rating.

2.2 Accessories

.1 Glazing Accessories: Manufacturer recommended fire rated glazing accessories as follows:
.1 Glazing tape: Closed cell polyvinyl chloride (PVC) foam, Pemko Manufacturing Company, FG3000S90 or Unifax Corporation Fiberfrax Alumino-Silicate fiber glazing tape.
.2 Setting blocks: Calcium silicate or hardwood.
.3 Cleaners, primers, sealers: Type recommended by manufacturer of glass and gaskets.

2.3 Related Products

.1 Glazing shall be installed in an equally rated framing system.

2.4 Source Quality

.1 Obtain fire rated glazing products from a single manufacturer.

.2 Fabrication Dimensions: Fabricate to required dimensions.

PART 3 EXECUTION

3.1 Manufacturer's Instructions

.1 Comply with manufacturer's product data including product technical bulletins and installation instructions.

3.2 Examination

.1 Verify substrate conditions, have been previously installed under other sections, and are acceptable for product installation in accordance with manufacturer's instructions.

3.3 Installation

.1 Comply with referenced GANA manuals and instructions of manufacturers of glass, glazing sealants and glazing compounds.

.2 Protect glass from edge damage during handling and installation. Inspect glass during installation and set aside pieces with edge damage that could affect performance.

.3 Set units of glass in each series with uniformity of pattern, draw, bow and similar characteristics.

.4 Cut glazing tape to length and set against permanent stops, flush with sight lines to fit openings exactly, with stretch allowance during installation.

.5 Arrange two setting blocks located at quarter points of glass with edge block no more than 150 mm from corners.

.6 Glaze vertically into labeled fire rated frames or fire rated walls with the same fire rating as the glass and push against tape for full contact at perimeter of pane or unit.

.7 Place glazing tape on free perimeter of glazing in same manner described above.

.8 Install removable stop and secure without displacing the tape.

.9 Install so that appropriate markings remain permanently visible.

.10 Field cutting or tampering is strictly prohibited.

3.4 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

.2 Protect glass from contact with contaminating substances resulting from construction operations. Remove such substances by method approved by manufacturer.

.3 Wash glass on both faces not more than four days prior to date schedule for inspections intended to establish date of Substantial Performance. Wash glass by method recommended by glass manufacturer.

.4 Remove temporary coverings and protection of adjacent work areas.

.5 Remove construction debris from project site and legally dispose of debris.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 06 10 00 Rough Carpentry
.2 Section 07 84 00 Firestopping
.3 Section 07 92 00 Joint Sealants
.4 Section 09 22 16 Non-Structural Metal Framing
.5 Section 09 91 23 Interior Painting

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM C514-04(2020) Standard Specification for Nails for the Application of Gypsum Board
  .2 ASTM C840-20 Standard Specification for Application and Finishing of Gypsum Board
  .3 ASTM C954-22 Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness
  .4 ASTM C1002-22 Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
  .5 ASTM C1047-19 Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base
  .6 ASTM C1177/C1177M-17 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
  .7 ASTM C1178/C1178M-18 Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel
  .8 ASTM C1278/C1278M-17 Standard Specification for Fiber-Reinforced Gypsum Panel
  .9 ASTM C1280 - 18 Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing.
  .10 ASTM C1288-17 Standard Specification for Fiber-Cement Interior Substrate Sheets
  .11 ASTM C1325-22 Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units
  .12 ASTM C1396/C1396M - 17 Standard Specification for Gypsum Board
  .13 ASTM C1629/C1629M-19 Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels
  .14 ASTM E90-09(2016) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
  .15 ASTM E814-13a(2017) Standard Test Method for Fire Tests of Penetration Firestop Systems
  .16 ASTM E1966-15(2019) Standard Test Method for Fire-Resistive Joint Systems
.2 American National Standards Institute (ANSI)
  .1 ANSI A118.9-1992 Test Methods and Specifications for Cementitious Backer Units.
.3 Canadian General Standards Board (CGSB)
  .1 CAN/CGSB-51.34 Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
  .2 CAN/CGSB 19-GP-21M Sealing and Bedding Compound for Acoustical Purposes
.4 Underwriters Laboratories of Canada (ULC)
  .1 ULC 102-2018 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
  .2 ULC 114-2018 Standard Method of Test for Determination of Non-Combustibility in Building Materials

.3 ULC 129- 2015 Standard Method of Test for Smoulder Resistance of Insulation (Basket Method)
.4 ULC List of Equipment and Material, Volume III, Fire Resistance Ratings.
.5 Gypsum Association (GA)
.1 GA-214-2022 Recommended Levels of Gypsum Board Finish.
.2 GA-216-2021 Application and Finishing of Gypsum Board.
.3 GA-253-2021 Application of Gypsum Sheathing
.6 Wall and Ceiling Bureau (WCB)
.1 Technical Bulletin Control Joint Placement in Gypsum Board Assemblies

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for gypsum board assemblies and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Samples:
.1 Submit for review and acceptance of each unit.
.2 Samples will be returned for inclusion into work.

1.5 Quality Assurance

.1 Dry wall installers: minimum 5 years proven experience.

.2 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.3 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.4 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

.5 Mock-Ups
.1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
.2 Construct mock-up gypsum board wall installation including one inside corner and one outside corner. Mock-up may be part of finished work.
.3 Allow two working days for inspection of mock-up by Consultant before proceeding with rest of the work.
.4 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.

1.6 Design Requirements

.1 Where indicated provide minimum sound transmission rating of installed partitions of STC 50 tested to ASTM E90.

.2 Provide fire resistance rating of installed partitions as indicated and according to referenced ULC design.

1.7 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

.3 Protect gypsum board materials before, during and after installation and to protect the installed work and materials of other trades affected by this work. Store materials in a dry area inside the building. Do not remove wrapping until ready for use. Prevent damage to all edges and surfaces.

1.8 Project Conditions

.1 Maintain temperature minimum 10 ° C, maximum 21 ° C for 48 hours prior to and during application of gypsum boards and joint treatment, and for at least 48 hours after completion of joint treatment.

.2 Apply board and joint treatment to dry, frost free surfaces.

.3 Ventilation: Ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.

1.9 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Gypsum Board

.1 To ASTM C1396/C1396M. Standard for non-rated applications, Type X for rated applications, 1220 mm wide x maximum practical length, ends square cut, edges tapered with round edge, 12.7 mm thick or to thickness indicated on drawings. All fire rated board shall be minimum 16 mm thickness.

.2 Water and Moisture Resistant Board: to ASTM C1396, 12.7 mm thick, 1220 mm wide with tapered edges.
  .1 Flexural Strength, Parallel (ASTM C473): 80 lbf, parallel.
  .2 Humidified Deflection (ASTM C1177): Not more than 6.0 mm.
  .3 Permeance (ASTM E96): Not less than 23 perms.
  .4 R-Value (ASTM C518): 0.56.
  .5 Mold Resistance (ASTM D3273): 10, in a test as manufactured.
  .6 Microbial Resistance (ASTM D6329, UL Environmental GREENGUARD 3-week protocol): Will not support microbial growth.
    .1 CGC Securock
    .2 Georgia Pacific DENS-Glass Gold
    .3 Certainteed GlasRoc

2.2 Fastening and Adhesives

.1 Drywall Screws: To ASTM C954 or ASTM C1002 self-drilling, self-tapping, case hardened, length to suit board thickness and provide minimum 12 mm penetration into support.

.2 Sheathing Screws: To ASTM C1002, corrosion resistant, heat treated self-tapping sheet metal screws minimum 32 mm long.

.3 Joint Tape: To ASTM C475, 50 mm perforated with preformed seam, mould and mildew resistant.
  .1 Joint tape for abuse resistant gypsum board: CGC Mould Resistant Fiberglass Drywall Tape.

.4 Joint Filler and Topping: To ASTM C475 vinyl or latex base, slow setting.

.5 Joint Treatment for Gypsum Sheathing: 50 mm wide, 10 x 10 woven threads per 25 mm, self-adhering fibreglass joint tape and Borden HPPG Elmer's Siliconized Acrylic Latex Caulk.

.6 Laminating Compound: as recommended by manufacturer, asbestos-free.

2.3 Acoustic Insulation

.1 Acoustic Attenuation: Min 50 STC in accordance with ASTM E90.

.2 Acoustic Insulation: Mineral or Glass Fibre Acoustic Insulation:
- .1 Mineral Fibre Acoustic Insulation: To ASTM C665, Mineral fibre blanket insulation, minimum density of 40 kg/m^3:
  - .1 AFB Acoustical Fire Batts manufactured by Roxul Inc.
  - .2 Creased SAFB manufactured by Owens Corning Canada.
- .2 Glass Fibre Acoustic Blanket Insulation: To CAN/ULC-S702, type 1, pre-formed unfaced glass fibre batt acoustic insulation.
  - .1 QUIETZONE Acoustic Blanket insulation manufactured by Owens Corning Canada.

.3 Surface burning characteristics to ULC 102:
- .1 Flame spread: 15
- .2 Smoke developed: 5
- .3 Smoulder resistance: to ULC 129.
- .4 Non-combustible: to ULC 114

.4 Thickness to suit depth of wall framing and as indicated.

.5 Acoustic sealant: as specified in Section 07 92 00 - Joint Sealants.

2.4 Accessories

.1 Casing beads, corner beads, control joints and edge trim: to ASTM C1047, zinc-coated by hot-dip process 0.5 mm base thickness, perforated flanges, one piece length per location.

.2 Insulating Strip: Rubberized, moisture resistant, 3.0 mm thick, 12 mm wide closed cell neoprene strip, with self-sticking permanent adhesive on one face; lengths as required.

.3 Sealants: as specified in Section 07 92 00 - Joint Sealants.

PART 3 EXECUTION

3.1 General

.1 Prior to installation of gypsum wallboard, ensure that all required vapour barriers, air seals, gaskets and the like installed under another Section have been inspected and accepted by Municipal authorities and the Consultant. Failure to do so will result in removal of all gypsum board installed prior to approval and replacement, at no additional cost to the Owner.

.2 Unless otherwise indicated on the drawings, all gypsum board partitions shall extend from floor level to the underside of floor or roof structures above.

3.2 Acoustic Insulation

.1 Install acoustic blankets full width and length, with tight joints, between wall framing and around penetrating electrical service boxes, piping, air ducts and frames.

.2 Place acoustic blankets where indicated on the Drawings and to thickness required to obtain acoustic performance indicated for the assembly.

.3 Place acoustic blankets between studs ensuring friction fit, free of sags, folds or open joints that may let sound pass through.

.4 Install blankets from the bottom up, tightly adjusted and trim accurately with a utility knife.

3.3 Gypsum Board Application

.1 Do application and finishing of gypsum board in accordance with ASTM C840 and/or GA-216 except where specified otherwise.

.2 Do not apply gypsum board until bucks, anchors, blocking, electrical, and mechanical work are approved.

.3 Apply gypsum board at right angles to framing members or furring using screw fasteners. Maximum spacing of screws 300 mm o.c.

.4 Apply water or moisture resistant gypsum wallboard where indicated. Apply water resistant sealant to edges, ends and cut outs which expose gypsum core.

.5 Carry gypsum board from floor to underside of floor or roof structure above. Furr out and carry gypsum board around any structural members as may be required. Neatly cope gypsum board to fill deck flutes where gypsum board abuts floor or roof deck.

3.4 Accessories

.1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges.

.2 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated.

.3 Install insulating strips continuously at edges of gypsum board or casing beads abutting exterior door or window frames, to provide thermal break.

.4 Install continuous bead of acoustic sealant at all penetrations through sound control partitions.

.5 Provide control joints in gypsum board facing. Construct control joints in accordance with ASTM C840 and as described in Wall and Ceiling Bureau Technical Bulletin “Control Joint Placement in Gypsum Board Assemblies”. Place control joints consistent with lines of building spaces as indicated. Where not indicated install as directed at maximum 6.0 m spacing. Control joints shall be supported with metal studs or furring channels on both sides of the joint Construct joints using back-to-back casing beads filled with a low modulus sealant capable of flexible joint movement. Maintain fire-resistance rating of wall assemblies. Control joints shall be provided:
   .1 At abutting structural elements, steel columns.
   .2 At expansion or control joints in the substrate.
   .3 At each door jamb.

3.5 Access Doors

.1 Install access doors to electrical and mechanical fixtures specified in respective Sections.

.2 Rigidly secure frames to furring or framing systems, to satisfy fire rating requirements.

3.6 Taping and Filling

.1 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces. Finish to GA-214 Level 5.

.2 Finish corner beads, control joints and trims as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.

.3 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after painting is completed.

.4 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.

.5 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for painting.

3.7 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 05 41 00 Structural Metal Stud Framing
.2 Section 09 21 16 Gypsum Board

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM A653/A653M-23 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  .2 ASTM C645-18 Standard Specification for Nonstructural Steel Framing Members
  .3 ASTM C754-20 Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products
  .4 ASTM C841-03(2018) Standard Specification for Installation of Interior Lathing and Furring.
  .5 ASTM C1002-22 Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
  .6 ASTM E90-09(2016) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
  .7 ASTM E814-13a(2017) Standard Test Method for Fire Tests of Penetration Firestop Systems
  .8 ASTM E1966-15(2019) Standard Test Method for Fire-Resistive Joint Systems
.2 Canadian General Services Board (CGSB)
  .1 CAN/CGSB-1.40-97 Primer, Structural Steel, Oil Alkyd Type.
.3 Underwriters Laboratories of Canada (ULC)
  .1 ULC List of Equipment and Material, Volume III, Fire Resistance Ratings.
.4 CSSBI Lightweight Steel Framing Manual

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Product Data:
  .1 Submit manufacturer's instructions, printed product literature and data sheets for metal framing and include product characteristics, performance criteria, physical size, finish and limitations.

1.5 Quality Assurance

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.6 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.7 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Metal Stud Framing Systems

.1 Non-load bearing channel stud framing: to ASTM C645, stud size as indicated, roll formed from 0.53 mm thickness hot dipped galvanized steel sheet, for screw attachment of gypsum board. Knock-out service holes at 460 mm centres.
  .1 Thickness of materials to conform to referenced standards unless noted otherwise.
  .2 Thickness of materials shall be selected from manufacturer's standard span tables to suit total height requirements.

.2 Floor and ceiling tracks: to ASTM C645, in widths to suit stud sizes, 32 mm flange height.

.3 Metal channel stiffener: 1.4 mm thick cold rolled steel, coated with rust inhibitive coating.

.4 Tie Wire: 0.90 mm, galvanized, soft annealed, steel wire or clip as recommended by the manufacturer of furring channels.

.5 Wind bearing light weight steel stud framing for exterior wall applications is specified in Section 05 41 00.

2.2 Metal Furring and Suspension Systems

.1 Channel framing: to ASTM C645, stud size as indicated, roll formed from 0.53 mm thickness hot dipped galvanized steel sheet, for screw attachment of gypsum board.
  .1 Thickness of materials to conform to referenced standards unless noted otherwise.

.1 Metal Furring Runners, Hangers, Tie Wires, Inserts, Anchors: to ASTM C645 , electro-zinc coated steel.

.2 Runner Channels: 38 x 19 x 0.59 mm and 38 x 9.5 x 0.45 mm, hot dip or electro-galvanized sheet steel. Use of various sizes governed by applied loads and applicable spans.

.3 Drywall Furring Channel: Channel shaped furring member for screw attachment of drywall with knurled face. For interior use. Furring masonry or concrete surfaces. Cross furring under steel joist or suspended metal channels in suspended ceiling systems: 70 x 22 x 0.9 mm with knurled face, hot dip or electro-galvanized sheet steel. Bailey D-1001.

.4 Deflection Track: Bailey Multi-Slot Track MST 250, size to suit studs, and top deflection clips TDC 350 and TDC 587.

.5 Horizontal Flange attachment: Bailey Horizontal Flange Attachment Clip (HFA Clip)

.6 Hangers: minimum 4.1 mm diameter (or as required by ULC fire rating design requirements) mild steel rods.

2.2 Fasteners

.1 Powder activated fasteners: to suit structural conditions and fastening requirements and in accordance with manufacturer's recommendations: Ramset; Hilti; or approved equivalent.

.2 Sheet Metal Screws: To ASTM C1002, self-drilling, self-tapping, case hardened, length to suit board thickness and provide minimum 12 mm penetration into support.

2.3 Accessories

.1 Acoustic sealant: As specified in Section 07 92 00.

.2 Insulating strip: rubberized, moisture resistant 3 mm thick foam strip, 12 mm wide, with self-sticking adhesive on one face, lengths as required.

.3 Zinc Rich Paint: to CGSB 1-GP-181M. Low VOC type.

PART 3 EXECUTION

3.1 Examination

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for non-structural metal framing application in accordance with manufacturer's written instructions.
  .1 Visually inspect substrate in presence of Consultant.
  .2 Inform Consultant of unacceptable conditions immediately upon discovery.
  .3 Proceed with installation only after unacceptable conditions have been remedied [and after receipt of written approval to proceed from Consultant.

3.2 Erection

.1 Comply with ASTM C754.

.2 All gypsum board shall be supported with steel framing whether indicated or not.

.3 Unless otherwise indicated on the drawings, all gypsum board partitions shall extend from floor level to the underside of floor or roof structures above.

.4 Align partition tracks at floor and ceiling and secure at 600 mm on centre maximum. Provide top deflection tracks where indicated or as required to permit structural deflection. Install top deflection clips as necessary to increase load capacity.

.5 Install damp proof course under stud shoe tracks of partitions on slabs on grade.

.6 Place studs vertically at 400 mm on centre unless noted otherwise and not more than 50 mm from abutting walls, and at each side of openings and corners. Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.

.7 Erect metal studding to tolerance of 1:1000.

.8 Attach studs to bottom and ceiling track using screws.

.9 Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs

ensure web openings are aligned.

.10 Co-ordinate erection of studs with installation of door/window frames and special supports or anchorage for work specified in other Sections.

.11 Provide two studs extending from floor to ceiling at each side of openings wider than stud centres specified. Secure studs together, 50 mm apart using column clips or other approved means of fastening placed alongside frame anchor clips.

.12 Install heavy thickness single jamb studs at openings.

.13 Erect track at head of door/window openings and sills of window openings to accommodate intermediate studs. Secure track to studs at each end, in accordance with manufacturer's instructions. Install intermediate studs above and below openings in same manner and spacing as wall studs.

.14 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers.

.15 Provide 40 mm stud or furring channel secured between studs for attachment of fixtures behind lavatory basins, toilet and bathroom accessories, and other fixtures including grab bars and towel rails, attached to steel stud partitions.

.16 Install steel studs or furring channel between studs for attaching electrical and other boxes.

.17 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs. Use 50 mm leg ceiling tracks.

.18 Install continuous insulating strips to isolate studs from un-insulated surfaces.

.19 Install two continuous beads of acoustical sealant under studs and tracks around perimeter of sound control partitions.

3.3 Wall Furring

.1 Install wall furring for gypsum board wall finishes in accordance ASTM C754 and ASTM C841 except where specified otherwise and indicated on drawings.

.2 Frame openings and around built-in equipment, cabinets, access panels, etc., on four sides. Extend furring into reveals. Check clearances with equipment suppliers.

.3 Furr duct shafts, beams, columns, pipes and exposed services where indicated.

3.4 Suspended and Furred Ceilings and Bulkheads

.1 Erect hanger and runner channels for suspended gypsum board ceilings and bulkheads in accordance with ASTM C754 and ASTM C841 except where specified otherwise and indicated on drawings.

.2 Securely anchor hanger to structural supports 1220 mm o.c. maximum along runner channels and not more than 150 mm from ends. Under no circumstances shall hanger wires be secured to or supported from mechanical or electrical materials or equipment or penetrate mechanical ductwork.

.3 Space runner or furring channels as shown on drawings and not more than 610 mm o.c.

maximum nor 150 mm from walls. Run channels in long direction of board. Bend hanger sharply under bottom flange of runner and securely wire in place with a saddle tie. Provide channels below mechanical or electrical equipment and mechanical ductwork to maintain maximum spacing.

.4 Install furring channels transversely across runner channels in short direction of wallboard at 610 mm o.c. maximum or 150 mm from walls and interruptions in ceiling continuity. Secure channels to support with furring clips or wire. Where splicing is necessary lap minimum 200 mm and wire tie each end with double loops of 0.90 mm galvanized tie wire, 25 mm from each end of overlap.

.5 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 610 mm around perimeter of fixture. Coordinate with Electrical.

.6 Install work level to tolerance of 1:1200.

.7 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, grilles, etc.

.8 Install furring channels parallel to, and at exact locations of steel stud partition header track.

.9 Furr for gypsum board faced vertical bulkheads within or at termination of ceilings.

3.5 Gypsum Board

.1 Installation of gypsum board is specified in Section 09 21 16

3.6 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

.2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 30 00 Cast-in-Place Concrete
.2 Section 04 20 00 Concrete Unit Masonry
.3 Section 07 92 00 Joint Sealants
.4 Section 09 21 16 Gypsum Board
.5 Section 09 65 19 Resilient Tile Flooring
.6 Section 09 91 23 Interior Painting

1.3 References

.1 ASTM International (ASTM)
  .1 ACTM C144-18 Standard Specification for Aggregate for Masonry Mortar
  .2 ASTM C150/C150M-22 Standard Specification for Portland Cement
  .3 ASTM C207-18 Standard Specification for Hydrated Lime for Masonry Purposes
  .4 ASTM C627-18e1 Standard Test Method for Evaluating Ceramic Floor Tile Installation Systems using the Robinson-Type Floor Tester
.2 American National Standards Institute (ANSI)
  .1 ANSI A108/A118/A136.1:2017 American National Specifications for the Installation of Ceramic Tile.
  .2 ANSI A118.10 Waterproof Membrane
  .3 ANSI A137.1: 2017 American National Standard Specifications for Ceramic Tile
.3 Canadian General Standards Board (CGSB)
  .1 CGSB 71-GP 22M 1978 Adhesive, Organic, for Installation of Ceramic Wall Tile
.4 International Standards Organization (ISO)
  .1 ISO 10545 Series Ceramic Tiles, Standards for Testing
  .2 ISO 13006-2012 Ceramic Tiles, Definitions, Classifications, Characteristics and Marking.
  .3 ISO 13007-2010 Ceramic Tiles, Grouts and Adhesives.
.5 Terrazzo, Tile and Marble Association of Canada (TTMAC)
  .1 TTMAC 2019-2021 Specifications Guide 09 30 00, Tile Installation Manual.
  .2 TTMAC Hard Surface Maintenance Guide.

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Provide product data. Include manufacturer's information on:
  .1 Ceramic tile, marked to show each type, size, and shape required.
  .2 Mortar and grout.
  .3 Divider strip.
  .4 Levelling compound.
  .5 Waterproofing isolation membrane.

.3 Submit duplicate samples of tile. Samples to be submitted on 300 x 600 mm sample board for each colour, texture, size and pattern of tile. Grout sample joints for representative sample of final installation.
.4 Trim and Accessories: submit duplicate samples of each trim.

.5 Maintenance Data: Provide maintenance data for tile work, for incorporation into Maintenance Manuals specified under Section 01 78 00.

1.5 Quality Assurance

.1 Do tile work in accordance with Installation Manual 200, Ceramic Tile, by Terrazzo, Tile and Marble Association of Canada (TTMAC), except where this specification is more stringent.

.2 For the installation of ceramic tile, use only skilled tradesmen who are familiar with the referenced standards and with the requirements for this Work.

.3 The setting material manufacturer's representative shall review the details with the Contractor prior to the start of work. Instruct the Contractor on the proper installation procedures to ensure compliance with the guarantee requirements.

1.6 Performance Requirements

.1 Floor Traffic Load Bearing performance: Provide installations rated for the following load bearing performance in accordance with ASTM C627 for ceramic tile installed on walkway surfaces:
.1 Moderate: passes cycles 1 through 10.

1.7 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver packaged materials in original unopened containers.

.3 Keep delivered material dry and free from stains. Store cementitious material off damp surfaces.

.4 Use all means necessary to protect materials, before, during and after installation and to protect the installed work and materials of all other trades.

.5 In the event of damage, immediately make all repairs and replacements necessary to the approval of the Consultant and at no additional cost to the Owner.

.6 Deliver, handle and store materials in accordance with manufacturer’s printed instructions.

1.8 Project Conditions

.1 Maintain air temperature and structural base temperature at ceramic tile installation area above 12 °C for 48 hours before, during and after installation.

.2 Do not install tiles at temperatures less than 12 °C or above 38 °C.

.3 Do not apply epoxy mortar and grouts at temperatures below 15 °C or above 25 °C.

.4 Provide and maintain temporary lighting. Lighting levels shall be sufficient to complete work including inspections. Provide minimum lighting levels of 400 lux at work areas.

1.9 Qualifications

.1 Installer of ceramic tiles shall have a minimum of 10 years of experience including at least five projects of similar scope and scale. Submit documented proof of experience prior to commencing work of this Section.

1.10 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.11 Maintenance

.1 Upon completion of the installation and as a condition of acceptance, deliver to the Owner 2% of tile and accessory tiles in each colour and pattern of ceramic tiles installed under this Section for the Owners maintenance program. Identify each carton for location and installation date. Submission must be made all at one time and prior to Substantial Performance.

1.12 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of five years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Materials

.1 Materials shall be graded and containers grade sealed, delivered to the job site in their original packages or containers with the manufacturer's labels and seals intact.

.2 Tile and grout colours shall be selected by the Consultant from the manufacturer's standard range of colours.

.3 Tile shall conform to ANSI A137.1.

.4 Floor tile shall have coefficient of slip resistance conforming to ANSI A137.1.

.5 Provide coves, corners, reveals, surf caps, inners and outers as required to complete the work.

.6 Metal Lath: ASTM C847 corrosion resistant. 1.4 kg/m^2.

2.2 Ceramic Tile

.1 CT1: Ceramic Wall Tile (Washrooms): Daltile RetroSpace Remix Series 76 mm x 152 m, glazed, Glossy Finish Ceramic Tile. Colour shakk be Modern White, RS30

.2 CT2: Ceramic Floor Tile: Daltile Fabrique Series 305 x 305 mm. Matte Finish. Colour shall be Blanc Linen, P685

2.3 Mortar, Adhesives and Grout Material

.1 Primer: Low VOC, low viscosity primer as recommended by manufacturer to suit substrate and site conditions; provide proof of bonding ability of setting systems where manufacturer recommends that a primer is not necessary to installation.

.2 Surface Preparation Materials:
  .1 Portland Cement Mortar: Scratch and bond coat, levelling bed containing the following:
    .1 Portland Cement: Meeting or exceeding requirements of CSA A3000, Type GU.
    .2 Hydrated Lime: Meeting or exceeding requirements of ASTM C207, Type N.

.3 Sand: Meeting or exceeding requirements of ASTM C144, passing 16 mesh.
.4 Water: Potable.

.2 Self Levelling and Smoothing Underlayment: Cementitious and self levelling smoothing underlayment meeting or exceeding requirements of ANSI A108.1, Type 2.

.3 Wall Tile Systems:
.1 Thin Set Interior Installation: Dry set mortar meeting or exceeding requirements of ANSI A118.1 formulated for thin set applications, factory sanded mortar consisting of Portland cement, sand and additives requiring only addition of potable water for installation complete with bond enhancing latex additive.

.4 Floor Tile Systems:
.1 Thin Set Interior Installation: Latex-Portland cement mortar meeting or exceeding requirements of ANSI A118.1, rated for floor traffic load bearing performance indicated above.

.5 Adhesive Systems:
.1 Epoxy Adhesive: Thin set adhesive system using 100% solids epoxy resin and epoxy hardener meeting or exceeding requirements of ANSI A108.1; stain proof, chemical resistant and having high temperature resistance and water cleanable.
.2 Organic Adhesive: Thin set wall tile adhesive system using non-flammable, water resistant, latex adhesives for interior use meeting or exceeding requirements of ANSI A108.1, Type 1.

.6 Tile Grout Systems:
.1 Colours: To be selected by consultant.
.2 Unsanded Portland Cement Grout: factory blended dry-set stain resistant, latex modified Portland cement meeting or exceeding requirements of ANSI A118.6, specifically formulated for joints less than or equal to 3 mm in width.
.3 Sanded Portland Cement Grout: Factory blended dry-set stain resistant, latex modified Portland cement and graded silica sand meeting or exceeding requirements of ANSI A118.6, specifically formulated for joints greater than 3 mm in width.
.4 Polymer Modified Grout: factory blended stain resistant polymer modified Portland cement meeting or exceeding requirements of ANSI A118.7, specifically formulated for joints greater than 3 mm in width.

2.4 Patching and Levelling Compound

.1 Portland cement base, acrylic polymer compound, manufactured specifically for resurfacing and levelling concrete floors, capable of being applied in layers up to 50 mm thick, being brought to feather edge, and being trowelled to smooth finish and having not less than the following physical properties:
.1 Compressive strength: 25 MPa.
.2 Tensile strength: 7 MPa.
.3 Flexural strength: 7 MPa.
.4 Density: 1.9
.5 Products containing gypsum are not acceptable.

.2 Levelling Compound: Laticrete 3701 latex or 226 Mapecem mortar mixed with Planicrete 50.

2.5 Floor Sealer and Protective Coating

.1 To tile and grout manufacturer’s recommendations.

2.6 Accessories

.1 Reducers, edge trim, and transition strips: Schluter Systems purpose made aluminum.

.2 CT Edge Protection: Schluter RONDEC, size to suit tile thickness. Satin anodized aluminum. Trim to come with all connectors or end caps required for a complete and finished installation. As a minimum, provide edge protection at the following locations:
.1 Top of CT Base;
.2 Top of CT wall tile;
.3 All outside corners of wall tile or porcelain ceramic tile base.

.3 Transition Strip: (Porcelain ceramic tile to resilient flooring): Schluter RENO.V, satin anodized aluminum transition strips.

.4 Sealant: as specified in Section 07 92 00.

2.7 Mixes

.1 Mix premanufactured mortars and grouts in accordance with referenced standards, and mortar and grout manufacturer's written instructions; mix site mixed materials as follows:
.1 Scratch Coat (by volume): Mix 1 part Portland cement, 4 parts sand, and latex additive where required by TTMAC detail.

PART 3 EXECUTION

3.1 Surface Conditions

.1 Surfaces on which tile is to be applied, shall be thoroughly cleaned down.

.2 Verify that concrete substrates have been allowed to cure for a minimum of 28 days in accordance with TTMAC requirements.

.3 Verify that substrates for bonding tile are firm; dry; clean; free from oil, waxy films, and curing compounds; and are within starting flatness tolerances as specified in Section 03 30 00 and are ready for application of levelling materials specified in this Section.

.4 Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of Work, and similar items located in or behind tile have been completed before installing tile.

.5 Drywall surfaces on which wall and floor tile is to be applied, shall be free from dust, excess plaster and shall be plain and true without any irregularities. Prepare existing gypsum board surfaces as recommended by TTMAC and product manufacturer to support tile installation.

.6 Existing painted masonry or concrete wall surfaces to receive ceramic tile shall be thoroughly cleaned of all paint down to concrete or concrete block surfaces using paint stripper. Prepare painted surfaces in accordance with manufacturer's instructions and TTMAC recommendations.

.7 In the event of discrepancies, immediately notify the Consultant and do not proceed with installation in such areas until all such discrepancies have been fully resolved.

.8 Check that conditions of temperature, humidity, traffic and usage are suitable as required by Installation Manual specifications. Minimum temperature to be not less than 10°C.

.9 Check that surfaces ready to receive tiling are cured, level and/or graded, plumb, smooth, firm, free from loose particles, droppings, projection, grease, solvent, paint and other foreign matter and from other unsuitable conditions.

.10 Install transition strips, reducers and edge trim at exposed edges of all tiled walls and floors in accordance with manufacturer's instructions.

3.2 Installation

.1 Install tiling in accordance with requirements of TTMAC Tile Installation Manual and parts of ANSI A108 Series of tile installation standards that apply to types of bonding and grouting materials, and to methods required for complete tile installation.

.2 Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions:
- .1 Terminate Work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- .2 Make cut edges smooth, even and free from chipping.
- .3 Do not split tile.

.3 Accurately form intersections and returns; perform cutting and drilling of tile without marring visible surfaces:
- .1 Cut, drill, and fit tile to accommodate work of other subcontractors penetrating or abutting work of this Section.
- .2 Carefully grind cut edges of tile abutting trim, finish, or built in items for straight aligned joints.
- .3 Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so that plates, collars, or covers overlap tile and to provide a uniform joint appearance.

.4 Lay tile in pattern indicated on Drawings and as follows:
- .1 Align joints when adjoining tiles on floor, base, walls, and trim are the same size.
- .2 Centre tile patterns between control and movement joints; notify Consultant for further instructions where tile patterns do not align with control or movement joints.
- .3 Cut tile accurately and without damage.
- .4 Smooth exposed cut edges with abrasive stone, where exposed.
- .5 Chipped or split edges are not acceptable.

.5 Bonding Bed: Set tile in place while bond coat is wet and tacky and as follows:
- .1 Adjust amount of bonding materials placed on substrates based on temperature and humidity to prevent skinning over of bonding materials.
- .2 Use sufficient bond coat to provide a minimum 80% contact for tiles smaller than 300 mm x 300 mm with bonding material evenly dispersed and pressed into back of tile; refer to back buttering requirements for larger materials and installations having Moderate or higher Load Bearing Performance requirements.
- .3 Notch bond coat in horizontal straight lines and set on freshly placed bonding material while moving (sliding) tile back and forth at 90° to notches.
- .4 Verify that corner and edges are fully supported by bonding material.
- .5 Set tiles to prevent lippage greater than 1 mm over a 3 mm grout joint.
- .6 Keep two-thirds of grout joint depth free of bonding materials.
- .7 Clean excess bonding materials from tile surface prior to final set.
- .8 Sound tiles after bonding materials have cured and replace hollow sounding tile before grouting.

.6 Back Buttering: Obtain 100% mortar coverage in accordance with applicable requirements for back buttering of tile in referenced TTMAC and ANSI A108 series of tile installation standards for

the following applications:
.1 Tile installed with chemical resistant mortars and grouts
.2 Tile 300 mm or larger in any direction
.3 Tile with raised or textured backs
.4 Tile installation rated for Heavy or Extra Heavy Duty.
.5 All porcelain tiles with more than 20% of the tile backs covered with firing release dust back buttered so that 100% of the back is covered with adhesive mortar rated for C627, Extra Heavy Duty rating.

.7 Install prefabricated edge strips and control at locations indicated or where exposed edge of floor tile meets different flooring materials and exposed substrates.

.8 Protect exposed edges of floor tile with properly sized transition strips, use sloped reducer strips where uneven transitions between 6 mm and 13 mm occur.

.9 Control and Movement Joints: Install control joints and expansion joints in tile work in accordance with TTMAC Detail 301MJ; keep control and expansion joints free of bonding materials and as follows:
.1 Cut tiles to establish line of joints; sawn joints after installation of tiles will not be acceptable.
.2 Locate joints in tile surfaces directly above joints in concrete substrates.
.3 Provide floor control joints over structural control joints.
.4 Install prefabricated joint profiles in accordance with manufacturer's written instructions, set with top surface of joint profile slightly below top surface of tile.
.5 Prepare joints and apply sealants in accordance with requirements of Section 07 92 00.
.6 Keep control and movement joints free from setting materials.
.7 Form an open joint for sealant in tile wherever a change in backing material occurs, at all vertical interior corners, around penetrating pipes and fixtures, and where tile abuts other materials or fixtures.
.8 Install control joints where indicated or at not less than the flowing spacings:

Environment	Minimum	Maximum	Joint Width (minimum)
Interior/Shaded	4800 mm	6100 mm	6 mm

3.3 Grouting

.1 Grouting: Install grout in accordance with manufacturer's written instructions, the requirements of TTMAC, and as follows:
.1 Allow proper setting time before application of grout.
.2 Pre-seal or wax tiles requiring protection from grout staining.
.3 Force grout into joints to a smooth, dense finish.
.4 Remove excess grout in accordance with manufacturer's written instructions and polish tile with clean cloths.

.2 Grout all tile using specified grout in strict accordance with manufacturers written instructions all to give a flush, hard joint.

.3 Joints in tile shall be filled solid and flush with grout.

.4 Prepare joints and mix grout in accordance with manufacturer's printed instructions. Force maximum amount of grout into joints, avoiding air traps or voids.

.5 Remove all excess grout by washing diagonally across the joints. Check for voids, air pockets and gaps and fill same. Remove all discoloured grout and replace with new.

.6 Cure all joints.

3.4 Floor Sealer and Protective Coatings

.1 Apply in accordance with manufacturer's instructions.

3.5 Cleaning and Protection

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

.2 Cleaning: Clean tile surfaces so they are free of foreign matter using manufacturer recommended cleaning products and methods after completion of placement and grouting and as follows:
.1 Remove grout residue from tile as soon as possible.
.2 Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's written instructions, but no sooner than 10 days after installation; protect metal surfaces, cast iron, and vitreous plumbing fixtures from effects of acid cleaning.
.3 Flush surface with clean water before and after cleaning.

.3 Protection: Leave finished installation clean and free of cracked, chipped, broken, unbonded, or other tile deficiencies as follows:
.1 Protect finished areas from traffic until setting materials have sufficiently cured in accordance with TTMAC requirements.
.2 Protect floor areas from traffic after grouting is completed in accordance with manufacturer's written instructions.
.3 Prevent foot and wheel traffic from floors for a minimum of 24 hours after completion of grouting.
.4 Provide protective covering until Substantial Performance of the Work.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 09 21 16 Gypsum Board
.2 Section 09 53 00 Acoustical Suspension

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM C423-23 Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
  .2 ASTM E84-24 Standard Test Method for Surface Burning Characteristics of Building Materials
  .3 ASTM E1264-22 Standard Classification for Acoustical Ceiling Products
  .4 ASTM E1414/E1414M-21a Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum
  .5 ASTM E1477-98a(2022) Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers
.2 Underwriters Laboratories of Canada (ULC)
  .1 ULC 102-2018 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.
  .1 Acoustical Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, each carton of material must carry an approved independent laboratory classification of NRC, CAC, and AC.

.3 Submit duplicate 300 x 300 mm samples of each type of acoustical units.

.4 Provide maintenance data for acoustic panel ceilings for incorporation into Operation and Maintenance Manual specified in Section 01 78 00 – Closeout Submittals.

1.5 Quality Assurance

.1 Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.

.2 Coordination of Work: Coordinate acoustical ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

.3 Mock-up:
  .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.

.2 Construct mock-up 10 m² minimum of acoustical panel tile ceiling including one inside corner and one outside corner.
.3 Construct mock-up where directed.
.4 Allow 48 hours for inspection of mock-up by Consultant before proceeding with ceiling work.
.5 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of the finished work.

1.6 Project Conditions

.1 Permit wet work to dry before beginning to install.

.2 Maintain uniform minimum temperature of 15° C and humidity of 20-40% before and during installation.

.3 Store materials in work area 48 hours prior to installation.

.4 Building areas to receive ceilings shall be free of construction dust and debris.

1.7 Performance Requirements

.1 Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
.1 Surface Burning Characteristics: As follows, tested per ASTM E84 and complying with ASTM E1264 Classification.
.2 Fire Resistance: As follows tested per ASTM E119 and listed in the appropriate floor or roof design in the Underwriters Laboratories Fire Resistance Directory

.2 Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to applicable code.

1.8 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer’s printed instructions.

.3 Protect on site stored or installed absorptive material from moisture damage.

1.9 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.10 Extra Materials

.1 Provide extra materials of acoustic units in accordance with Section 01 78 00 - Closeout Submittals.

.2 Provide acoustical units amounting to 5% of gross ceiling area for each pattern and type required for project.

.3 Ensure extra materials are from same production run as installed materials.

PART 2 PRODUCTS

2.1 Materials

.1 Acoustic units for suspended ceiling system: to ASTM E1264

.2 Panel Type 1: CGC Fissured.
.1 Class A.
.2 Composition: Water Felted Mineral Fiber
.3 Pattern regular fissured.
.4 Texture: medium.
.5 Flame spread: ASTM E1264, Class A (U.L.C.), 25 or less.
.6 Smoke developed 50 or less in accordance with ULC 102.
.7 Noise Reduction Coefficient (NRC): ASTM C423; Classified with UL label, 0.55
.8 Ceiling Attenuation Class (CAC): ASTM C1414; Classified with UL label, 35
.9 Light Reflectance (LR) range of 0.81 to ASTM E1477.
.10 Dimensional Stability: Standard
.11 Edge Profile: Square Lay-In
.12 Colour: White.
.13 Size 610 x 1219 x 16 mm thick.
.14 Shape flat.
.15 Surface coverings: Ecolabel certified paint.

.3 Alternate manufacturer: Products as manufactured by the following are acceptable, subject to Consultants approval of style, finish, performance characteristics and texture:
.1 Armstrong Industries
.2 Certainteed

.4 Ceiling Suspension System: as specified in Section 09 53 00.

PART 3 EXECUTION

3.1 Examination

.1 Do not install acoustical panels until work above ceiling has been inspected by Consultant.

3.2 Installation

.1 Co-ordinate with Section 09 53 00 - Acoustical Suspension.
.2 Coordinate layout and installation of ceilings with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, and fire-suppression system.

.3 Install acoustical panels and tiles in ceiling suspension system.

.4 Install acoustical units parallel to building lines with edge unit not less than 50% of unit width, with directional pattern running in same direction. Refer to reflected ceiling plan.

.5 Scribe acoustic units to fit adjacent work. Butt joints tight, terminate edges with moulding.

3.3 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 05 12 23 Structural Steel
.2 Section 09 21 16 Gypsum Board
.3 Section 09 51 13 Acoustic Panel Ceilings
.4 Division 23 Mechanical
.5 Division 26 Electrical

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM A307-21 Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
  .2 ASTM A641/A641M-19 Standard Specification for Zinc–Coated (Galvanized) Carbon Steel Wire.
  .3 ASTM A653 / A653M – 23 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  .4 ASTM A1011/A1011M-23 Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
  .5 ASTM C635/C635M-22 Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay in Panel Ceilings.
  .6 ASTM C636/C636M-19 Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
  .7 ASTM E84-24 Standard Test Method for Surface Burning Characteristics of Building Materials
  .8 ASTM E119-22 Standard Test Methods for Fire Tests of Building Construction and Materials
  .9 ASTM E1264-22 Standard Classification for Acoustical Ceiling Products

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.

.3 Acoustical Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards.

.4 Submit one representative model of each type of ceiling suspension system.
  .1 Ceiling system to show basic construction and assembly, treatment at walls, recessed fixtures, splicing, interlocking, finishes, acoustical unit installation.

1.5 Design Requirements

.1 Determine the superimposed loads that will be applied to suspension systems by components of the building other than the ceiling and ensure that adequate hangers are installed to support the

additional loads in conjunction with the normal loads of the system.

.2 Design supplemental suspension members and hangers where width of ducts and other construction within ceiling plenum produces hanger spacing that interferes with location of hangers at required spacing to support standard suspension system members:
  .1 Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

.3 Rigidly secure acoustic ceiling system including integral mechanical and electrical components with maximum deflection of L/360 to ASTM C635 deflection test.

1.6 Performance Requirements

.1 Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.
  .1 Surface Burning Characteristics: Tested per ASTM E84 and complying with ASTM E1264 Classification.

.2 Seismic Performance: Acoustical ceiling shall withstand the effects of earthquake motions determined according to applicable code.

1.7 Quality Assurance

.1 Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.

.2 Coordination of Work: Coordinate acoustical ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

.3 Where required, provide fire-resistance rated suspension system: certified by a Canadian Certification Organization accredited by Standards Council of Canada.

.4 Construct mock-ups in accordance with Section 01 45 00 - Quality Control and as described in Section 09 51 13.

1.8 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer’s printed instructions.

1.9 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

PART 2 PRODUCTS

2.1 Materials

.1 Components: All main beams and cross tees, base metal and end detail shall be commercial quality hot-dipped galvanized steel as per ASTM C635. Main beams and cross tees shall be double-web steel construction with type exposed flange design. Exposed surfaces chemically cleansed, capping pre-finished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.

.2 Face width: 22 mm

.3 Edge Moldings and Trim: Hemmed angle moulding to match main beams and cross tees.

.4 Structural Classification: Intermediate Duty System, ASTM C635.

.5 Colour: White and match the actual colour of the specified ceiling tile.

.6 Standard of Acceptance:
- .1 Armstrong Prelude XL
- .2 Donn DXT
- .3 Certainteed Classic Environmental Stab.

.7 Attachment Devices: Size for five times design load indicated in ASTM C635, Table 1, Direct Hung unless otherwise indicated or required.

.8 Threaded Rod: to ASTM A397. Galvanized or zinc plated.

.9 Wire for Hangers and Ties: ASTM A641, Class 1 zinc coating, soft annealed, with a yield stress load of at least time three design load, but not less than 2.06 mm thick.

.10 Channel Framing and Fittings: Strut type metal framing and components to ASTM A1011 or ASTM A653. Unistrut P1000SL or equivalent. Galvanized.

PART 3 EXECUTION

3.1 Manufacturer’s Instructions

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

3.2 Examination

.1 Do not proceed with installation until all wet work such as concrete, plastering and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturer's printed recommendations.

3.3 Preparation

.1 Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.

.2 Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.
- .1 Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.

3.4 Installation

.1 Install suspension system and panels in compliance with ASTM C636; CISCA Seismic Guidelines and in accordance with the manufacturer's installation instructions.

.2 Install wall moldings at intersection of suspended ceiling and vertical surfaces.

.3 Do not erect ceiling suspension system until work above ceiling has been inspected by Consultant.

.4 Secure hangers to overhead structure using attachment methods as indicated by manufacturer. Do not suspend ceiling systems from building services including plumbing lines, conduit, cable trays or duct work.

.5 Hanger and bracing wires shall not attach to or bend around obstructions including but not limited to: piping, ductwork, conduit and equipment. Provide trapeze or other supplementary support members at obstructions to allow typical hanger spacing. Brace assemblies must be configured and/or located in order to avoid obstructions in addition to maintaining the required brace assembly spacing.

.6 Install hangers spaced at maximum 1219 mm centres and within 152 mm from ends of main tees. Install hanger wires plumb and straight.

.7 Lay out centre line of ceiling both ways, to provide balanced borders at room perimeter with border units not less than 50% of standard unit width.

.8 Ensure suspension system is coordinated with location of related components.

.9 Completed suspension system to support super-imposed loads, such as lighting fixtures, diffusers, grilles, and speakers.

.10 Support at light fixtures and diffusers with additional ceiling suspension hangers within 150 mm of each corner and at maximum 610 mm around perimeter of fixture.

.11 Interlock cross member to main runner to provide rigid assembly.

.12 Frame at openings for light fixtures, air diffusers, speakers and at changes in ceiling heights.

.13 Install access splines to provide ceiling access.

.14 Finished ceiling system to be square with adjoining walls and level within 1:1000

3.5 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

.2 Touch up scratches, abrasions, voids and other defects in painted surfaces.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 30 00 Cast-in-Place Concrete

1.3 References

.1 ASTM International (ASTM)
- .1 ASTM E492 Standard Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using Tapping Machine
- .2 ASTM E648-23 Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
- .3 ASTM E662 – 21ae1 Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
- .4 ASTM E989 Classification for Determination of Impact Insultation Class (IIC)
- .5 ASTM F710-22 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
- .6 ASTM F970-22 Standard Test Method for Measuring Recovery Properties of Floor Coverings after Static Loading
- .7 ASTM F1344 Standard Specification for Rubber Tile Floor Covering Without Backing
- .8 ASTM F1515 Test Method for Measuring Light Stability of Resilient Flooring By Color Change
- .9 ASTM F1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor using Anhydrous Calcium Chloride
- .10 ASTM F2170-19a Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes
- .11 ASTM G21-15(2021)e1 Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Provide current printed data sheets for all Products Supplied.

.3 Samples:
- .1 Provide samples, 150 x 150 mm for verification of such characteristics as colour and surface texture of each specified product.
- .2 Provide samples of welding thread for colour match verifications with each specified product.

.4 Provide shop drawings prepared for project illustrating layouts, details, dimensions and other data.

.5 Provide Manufacturer’s current printed substrate surface preparation guidelines.

.6 Provide Manufacturer’s current printed installation guidelines for Products Supplied.

.7 Submit operating and maintenance instructions for Rubber Sheet Flooring, for inclusion in the Operation and Maintenance Manuals specified in Section 01 78 00-Closeout Submittals.

1.5 Maintenance Materials

.1 Provide extra stock materials from original dye lots, for use in facility operations and maintenance (approximately 2% of the total floor surface for each colour, surface texture and format of manufactured product).

1.6 Quality Assurance

.1 Manufacturer must be certified ISO 9001 and ISO 14001.

.2 Manufacturer must have a minimum of fifteen years of experience in the manufacturing of prefabricated resilient rubber flooring.

.3 Manufactured Product must have undergone a vulcanization process; factory lamination will not be accepted as equivalent.

.4 Surfacing Contractor to be recognized and approved by the Manufacturer.

.5 Installer must be approved by the Surfacing Contractor and must have performed installations of the same scale in the last three years.

1.7 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

.3 Advise the carrier of any damaged material and indicate it on the packing slip.

.4 Store the flooring inside, sheltered from extreme hot or cold temperatures. Place the material on a smooth level floor or where there is uniform solid support in a clean, dry well-ventilated area. Unstack the palettes. The long-term storage temperature must be maintained between 18°C (65°F) and 29°C (85°F). protect adhesive and flooring material from freezing, extreme heat and direct sun exposure.

.5 Acclimatize the subfloor, all flooring material and adhesive for 48 hours before, during and after the installation by maintaining the room temperature between 18°C (65°F) and 29°C (85°F). The palettes should be unstacked 24 hours prior to use.

.6 Afterwards, maintain the room temperature between 13°C (55°F) and 38°C (100°F). Protect the material from direct sources of heat such as air vents and other types of heaters.

.7 Install the flooring after all other finishing work, including painting, have been completed.

1.8 Project Conditions

.1 Concrete slabs, on or below grade, must be installed over a permanent effective vapour retarder, respecting current versions of the standard practice ASTM E1643 and the standard specification ASTM E1745. The vapour retarder must be placed directly underneath the concrete slab, above the granular fill, as per manufacturer's instructions. The vapour retarder must have a perm rating of 0.1 or less and must have a minimum thickness of 10 mil.

.2 Ensure that no sealers or curing compounds are applied to or mixed into the concrete

.3 Installation of the resilient flooring to be carried out no sooner than the specified curing time of the concrete. Refer to ASTM F710 for additional information.

.4 Substrate surface must be free of all contaminants that can inhibit bond (paint, wax, dust, oil or grease, sealer, curing compound, solvent, asphalt, old adhesive residues, etc.). All contaminants must be removed from the surface via mechanical abatement. Use of abatement chemicals is not recommended.

.5 Concrete must have a smooth finish, proper density and be highly compacted with a tolerance of 3.2 mm in 3.05 m radius. Floor Flatness (FF) and Floor Levelness (FL) numbers are not recognized.

.6 Moisture and alkalinity tests must be performed on all concrete substrates, under in-service conditions. Turn on the HVAC system prior to performing moisture testing, in order to ensure stable testing conditions and accurate results. The concrete's surface pH should be between 7 and 10. Relative humidity of the concrete slab must not exceed the tolerance of the adhesive specified, in accordance with the current version of ASTM F2170 (in situ probes). Moisture vapour emissions from the concrete slab must not exceed the tolerance of the adhesive specified, in accordance with the current version of ASTM F1869 (anhydrous calcium chloride).

.7 Maintain stable room and substrate temperatures prior to moisture testing and flooring installation, during the flooring installation, as well as a minimum of 48 hours after the flooring has been completely installed. Recommended ambient temperature range is between 18 °C and 30 °C and recommended ambient humidity range is between 35% and 55%.

1.9 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.10 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of two years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Manufacturer

.1 American Biltrite
200 Bank Street
Sherbrooke, QC, Canada, J1H 4K3
Telephone: 819-829-3300
Toll free: 1-800-437-8743
Internet: www.american-biltrite.com

2.2 Materials

.1 ABPURE rubber tile flooring as manufactured by American Biltrite.
.1 Homogeneous prefabricated resilient rubber tile flooring.
.2 Thickness: 2 mm.
.3 Colours: Provided in standard, solid background colours with randomly dispersed coloured chips throughout the wear layer's entire depth.
.4 Surface Texture: Smooth.
.5 Size: 450 mm x 450 mm
.6 Fire rating: Class 1

.2 Performance of the Manufactured Product to conform to the following criteria:

Performance Criteria	Test Method	Requirement	Result
Critical Radiant Flux	ASTM E648	≥0.45 W/cm2	≥0.45 W/cm2 (Class 1)
Optical Density of Smoke	ASTM E662	≤450	≤450
Static Loading (tested at 250 psi)	ASTM F970	≤0.005 in	0.001 in.
Static Loading (tested at 800 psi)	ASTM F970	-	0.003 in.
Light resistance	ASTM F1515	ΔE ≤8.0	Compliant
Resistance to Fungi	ASTM G21	-	No growth

2.3 Accessories

.1 Subfloor repairs: use a good-quality Portland cement-based compound that has a minimal resistance to compression of 246 kg/cm^2 (3,500 lb./sq. in) to fill, smooth or level subfloor imperfections

.2 Self-levelling underlayment: use a Portland cement-based self-levelling underlayment that has minimal resistance to compression of 246 kg/cm^2 (3,500 lb./sq. in).

PART 3 EXECUTION

3.1 Preparation

.1 Installation of resilient flooring will not commence until the building is enclosed and all other trades have completed their work.

.2 Prepare substrate surface in accordance with manufacturer's current printed guidelines.

3.2 Installation

.1 Install tiles of resilient flooring following manufacturer's current printed guidelines.

.2 Install all accessories following manufacturer's current printed guidelines.

3.3 Protection

.1 Protect resilient flooring with 3 mm masonite during and after the installation, prior to Substantial Performance.

.2 Preserve the integrity of the installation and protect against direct sunlight/UV exposure; ensure windows and glass doors are fitted with blinds or UV film.

3.4 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

.2 Wait at least a minimum of 72 hours after the resilient flooring has been completely installed before performing initial maintenance. Maintain the resilient flooring following manufacturer's current printed guidelines.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 30 00 Cast-in-Place Concrete
.2 Section 09 65 16.33 Rubber Tile Floooring

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM E84-23d Standard Test Method for Surface Burning Characteristics of Building Materials
  .2 ASTM F710-21 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
  .3 ASTM F1066-04(2018) Standard Specification for Vinyl Composition Floor Tile
  .4 ASTM F1344-21a Standard Specification for Rubber Floor Tile
  .5 ASTM F1861-21 Standard Specification for Resilient Wall Base
.2 Underwriters Laboratories of Canada (ULC)
  .1 ULC 102.2-2018 Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies
.3 South Coast Air Quality Management District (SCAQMD), California State
  .1 SCAQMD Rule 1168-03, Adhesives and Sealants Applications.

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit duplicate samples of manufacturer’s full range of colours for specified products for selection of colours by the Consultant.

.3 Submit a complete list of all materials proposed to be furnished and installed under this portion of the Work, stating manufacturer's name and catalogue number for each item, and product samples in colours specified.
  .1 Submit two copies of the manufacturer's current recommended method of installation for each item.

.4 Provide maintenance data for resilient flooring for incorporation into Operation and Maintenance Manual specified in Section 01 78 00 – Closeout Submittals.

1.5 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer’s printed instructions.

.3 Use all means necessary to protect resilient flooring materials before, during and after installation and to protect the installed work and materials of all other trades.

1.6 Maintenance Materials

.1 Provide extra stock materials of resilient flooring, base and adhesives in accordance with Section 01 78 00 – Closeout Submittals.
  .1 Provide one carton of each colour, pattern and type flooring material required for this project for maintenance use.
  .2 Provide one container of adhesive.
  .3 Clearly identify each container of floor tile and each container of adhesive.

.2 Extra materials to be from same production run as installed materials.

1.7 Environmental Requirements

.1 Maintain air temperature and structural base temperature at floor installation area above 20° C for 48 hours before, during and after installation.

1.8 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.9 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of ten years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Materials

.1 Vinyl Composition Tile: to CSA A126.1 or ASTM F1066, 305 x 305 x 3.0 mm thick, non-asbestos, Class 2 through pattern tile with static load of not less than 517 kPa and U.L.C. flame spread rating of 75 or less.
  .1 Armstrong: Standard Excelon Imperial Texture.
  .2 Amtico: Commercial Color-Thru Duravinyl.

.2 Resilient Base: To ASTM F1861, 100 mm high thermoplastic rubber, not less than 3.0 mm thickness with preformed internal and external corners. Base at resilient tile shall have standard toe.
  .1 Johnsonite DuraCove DC Rubber Wall Base.
  .2 Roppe Pinnacle Rubber Base.
  .3 Amtico Marathon.
  .4 Burke Mercer BurkeBase.

.3 Primers, Adhesives and Caulking: non-flammable, solvent free, waterproof, recommended by flooring manufacturer for specific material on applicable substrate, above, at or below grade.

.4 Sub-floor filler and leveler shall be white premixed latex compatible with flooring products and adhesive as recommended by flooring manufacturer for specific flooring types.

.5 Metal edge strips: aluminum extruded, smooth, mill finish with lip to extend under floor finish, shoulder flush with top of adjacent floor finish.

.6 Transition strips, mouldings and adaptors shall be rubber or vinyl, manufactured by Johnsonite, Roppe or Burke Mercer with lip to extend under floor tile with tapered edge, colour matched to flooring.

.7 Sealer: water based, type recommended by flooring manufacturer.

.8 Wax: type recommended by flooring manufacturer.

.9 All colours and patterns shall be as selected by the Consultant from the complete range of manufacturer's colours and patterns.

PART 3 EXECUTION

3.1 Surface Conditions

.1 Conform to requirements of ASTM F710.

.2 Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

.3 Confirm that resilient flooring and base may be installed in accordance with the original design and the manufacturer's recommendations.

.4 Ensure concrete floors are dry, by using test methods recommended by tile manufacturer. Concrete must be cured a minimum of 35 days prior to commencement of resilient flooring application.

.5 In the event of discrepancy, immediately notify the Consultant. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

.6 Perform subfloor moisture testing in accordance with ASTM F1869 and Bond Tests as described in manufacturer's installation guidelines to determine if surfaces are dry; free of curing and hardening compounds, old adhesive, and other coatings; and ready to receive flooring. Relative humidity shall not exceed 80%. MVER shall not exceed 5 lbs./1000 sq. ft./24 hrs. On installations where both the Percent Relative Humidity and the Moisture Vapor Emission Rate tests are conducted, results for both tests shall comply with the allowable limits listed above. Do not proceed with flooring installation until results of moisture tests are acceptable. All test results shall be documented and retained.

3.2 Sub Floor Treatment

.1 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.

.2 Install sub floor and levelling compound to manufacturer's recommended standard limits and deviations. Levelling compound shall be applied to all subfloors and shall meet flatness requirements of flooring manufacturer and in accordance with ASTM F710.

.3 Remove all substance and materials affecting adhesive bond.

.4 Vacuum clean floors.

.5 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler is cured and dry.

.6 Prime or seal substrates to flooring and adhesive manufacturer's instructions.

.7 Allow for excessive leveling of existing slabs.

3.3 Application

.1 Provide a high ventilation rate, with maximum outside air, during installation, and for 48 hours after installation. Whenever possible, ventilate directly to outside. Do not allow contaminated air to re-circulate through the building ventilation system.

.2 Install all resilient flooring in strict accordance with the manufacturer's printed instructions and recommendations.

.3 Do not lay floor coverings and base until all trades, except painter, have completed their work and just prior to completion of the building.

.4 Apply adhesive uniformly with recommended trowels, at coverage as recommended by the manufacturer. Do not spread more adhesive than can be covered before initial set takes place.

.5 Lay flooring with joints parallel to building lines unless otherwise indicated, to produce symmetrical tile pattern. Patterns shall be as directed by the consultant. Allow for one field tile and one accent tile in each room or space. Border tiles shall be minimum ½ tile width.

.6 Install flooring to square grid pattern with all joints aligned unless otherwise indicated.

.7 As installation progresses, and after installation, roll flooring in 2 directions with a 45 kg roller to ensure full adhesion.

.8 Cut and fit tile neatly around fixed objects.

.9 Install feature strips or feature tiles where directed. Fit joints tightly.

.10 Continue flooring throughout areas to receive movable type partitions or fitments without interrupting floor pattern.

.11 Install flooring full depth of closets, toe spaces, and recesses.

.12 Terminate flooring at centre line of door in openings where adjacent floor finish or colour is dissimilar.

.13 Install transition strips at unprotected or exposed edges where flooring terminates. Locate transition strip at centre line of door where a door occurs.

3.4 Base Application

.1 Lay out base to keep number of joints to a minimum. Locate joints at maximum available spacing or at internal or pre moulded corners.

.2 Clean substrate and prime with one coat of adhesive.

.3 Apply adhesive to back of base.

.4 Set base against wall and floor surfaces tightly by using a 3 kg hand roller.

.5 Install straight and level to variation of 1:1000.

.6 Scribe and fit to door frames and other obstructions. Use pre-moulded end pieces at flush door frames.

.7 Cope internal corners. Use pre moulded corner units for right angle external corners. Use formed straight base materials for external corners of other angles, minimum 300 mm each leg.

.8 Provide rubber base at all locations specified, regardless of floor finish.

3.5 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

.2 Remove excess adhesive from resilient floor coverings, base and adjacent finished surfaces as the work progresses.

.3 Clean, seal and wax floor and base surfaces to manufacturer's instructions. In carpeted areas, clean base before installation of carpet.

3.6 Protection

.1 Protect new floors until time of final inspection.

.2 Prohibit traffic on floors for 48 hours after installation.

.3 Immediately prior to final inspection, remove protection, clean, dry or damp mop resilient flooring and apply one additional coat of wax.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 05 12 23 Structural Steel
.2 Section 05 50 00 Metal Fabrications
.3 Section 06 20 00 Finish Carpentry
.4 Section 08 11 00 Metal Doors and Frames
.5 Section 08 14 16 Flush Wood Doors
.6 Section 09 21 16 Gypsum Board

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM A780/A780M-20 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
.2 Environmental Protection Agency (EPA)
  .1 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings).
.3 Master Painters Institute (MPI)
  .1 MPI Architectural Painting Specifications Manual, 2018
  .2 MPI Standard GPS-1-12 and GPS-2-12 MPI Green Performance Standard for Painting and Coatings.
.4 Society for Protective Coatings (SSPC)
  .1 Systems and Specifications, SSPC Painting Manual 2009
.5 Underwriters Laboratories of Canada (ULC)
  .1 ULC 102-18 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
.6 South Coast Air Quality Management District, California State (SCAQMD)
  .1 SCAQMD Rule 1113-96, Architectural Coatings.
.7 Green Seal GS-11 Green Seal Environmental Standard for Paints and Coatings, January 1997.
.8 National Fire Code of Canada

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Product Data:
  .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Samples:
  .1 Submit full range colour sample chips.
  .2 Submit duplicate 200 x 300 mm sample panels of each paint, stain, clear coating and special finish with specified paint or coating in colours, gloss/sheen and textures required to MPI Architectural Painting Specification Manual standards.
  .3 Retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface.
.4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties and SCAQMD Rule 1113-96.

.5 Provide maintenance data for paint products for incorporation into Operating and Maintenance Manuals specified in Section 01 78 00- Closeout Submittals. Include following:
.1 Product name, number, type and use.
.2 Colour numbers.
.3 MPI Environmentally Friendly classification system rating.

1.5 Quality Assurance

.1 Qualifications:
.1 Contractor: to have a minimum of five years proven satisfactory experience.
.2 Qualified journeypersons as defined by local jurisdiction to be engaged in painting work.
.3 Apprentices: may be employed provided they work under direct supervision of qualified journeyperson in accordance with trade regulations.

.2 Conform to latest MPI requirements for painting work including preparation and priming.

.3 Materials: in accordance with MPI Painting Specification Manual "Approved Product" listing and from a single manufacturer for each system used.

.4 Paint materials to be highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and to be compatible with other coating materials as required.

.5 Retain purchase orders, invoices and documents to prove conformance with noted MPI requirements when requested by Consultant.

.6 Provide mock-up in accordance with Section 01 45 00 - Quality Control.
.1 Prepare and paint designated surface, area, room or item (in each colour scheme) to specified requirements, with specified paint or coating showing selected colours, gloss/sheen and textures. Locate where directed.
.2 Mock-up will be used to judge workmanship, substrate preparation, operation of equipment and material application and workmanship to MPI Architectural Painting Specification Manual standards.
.3 Allow 24 hours for inspection of mock-up before proceeding with work.
.4 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

1.6 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver and store materials in original containers, sealed, with labels intact. Labels to indicate:
.1 Manufacturer's name and address.
.2 Type of paint or coating.
.3 Compliance with applicable standard.
.4 Colour number in accordance with established colour schedule.

.3 Provide and maintain dry, temperature controlled, secure storage. Store materials and equipment in well-ventilated area with temperature range 7 ° C to 30 ° C. Store materials and supplies away from heat generating devices.

.4 Observe manufacturer's recommendations for storage and handling.

.5 Keep areas used for storage, cleaning and preparation, clean and orderly. After completion of

operations, return areas to clean condition.

.6 Remove paint materials from storage only in quantities required for same day use.

.7 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.

.8 Remove damaged, opened and rejected materials from site.

1.7 Fire Safety Requirements

.1 Provide one 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.

.2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

.3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada requirements.

1.8 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

.2 Place materials defined as hazardous or toxic in designated containers. Handle and dispose of hazardous materials in accordance with Municipal regulations.

.3 Unused materials must be disposed of at official hazardous material collections site.

.4 Paint and related materials are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from the Ministry of the Environment.

.5 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.

.6 Place materials defined as hazardous or toxic waste in containers or areas designated for hazardous waste.

1.9 Maintenance

.1 Extra Materials:
- .1 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Quantity: provide one four litre can of each type and colour of finish coating. Identify colour and paint type in relation to established colour schedule and finish system.
- .3 Deliver to Owner and store where directed.

1.10 Ambient Conditions

.1 Heating, Ventilation and Lighting:
- .1 Ventilate enclosed spaces in accordance with Section 01 51 00 – Temporary Utilities.
- .2 Provide heating facilities to maintain ambient air and substrate temperatures above 10 ° C for 24 hours before, during and after paint application until paint has cured sufficiently.
- .3 Provide continuous ventilation for seven days after completion of application of paint.
- .4 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from

existing system is inadequate to meet minimum requirements.
.5 Provide minimum lighting level of 323 Lux on surfaces to be painted.

.2 Temperature, Humidity and Substrate Moisture Content Levels:
.1 Unless pre-approved in writing by Consultant and product manufacturer, perform no painting when:
.1 Ambient air and substrate temperatures are below 10 ° C.
.2 Substrate temperature is above 32 ° C unless paint is specifically formulated for application at high temperatures.
.3 Substrate and ambient air temperatures are not expected to fall within MPI or paint manufacturer's prescribed limits.
.4 The relative humidity is under 85% or when the dew point is more than 3 ° C variance between the air/surface temperature. Paint should not be applied if the dew point is less than 3 ° C below the ambient or surface temperature. Use sling psychrometer to establish the relative humidity before beginning paint work.
.2 Ensure that conditions are within specified limits during drying or curing process, until newly applied coating can itself withstand 'normal' adverse environmental factors.
.3 Perform painting work when maximum moisture content of the substrate is below:
.1 Allow new concrete to cure minimum of 28 days.
.2 15% for wood.
.3 12% for plaster and gypsum board.
.4 Test for moisture using calibrated electronic Moisture Meter. Test concrete floors for moisture using "cover patch test".
.5 Test concrete and plaster surfaces for alkalinity as required.

.3 Surface and Environmental Conditions:
.1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
.2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits.
.3 Apply paint when previous coat of paint is dry or adequately cured.

PART 2 PRODUCTS

2.1 Materials

.1 Provide paint materials for paint systems from single manufacturer.

.2 Products to meet requirements of GS-11 or SCAQMD Rule 1113-96

.3 Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.

.4 Only qualified products with E2 or E3 "Environmentally Friendly" rating are acceptable for use.

.5 Linseed oil, shellac, and turpentine: highest quality product from approved manufacturer listed in MPI Architectural Painting Specification Manual, compatible with other coating materials as required.

.6 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids:
.1 Non-flammable, biodegradable.
.2 Manufactured without compounds which contribute to ozone depletion in the upper atmosphere.
.3 Manufactured without compounds which contribute to smog in the lower atmosphere.

.4 Do not contain methylene chloride, chlorinated hydrocarbons or toxic metal pigments.
.5 Recycled content of 15% post-consumer and ½ post-industrial waste.

.7 Formulate and manufacture water-borne surface coatings with no aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.

.8 Flash point: 61 °C or greater for water-borne surface coatings and recycled water-borne surface coatings.

2.2 Colours

.1 Consultant will provide Colour Schedule.

.2 Colour schedule will be based upon selection of eight base colours and six deep tint accent colours.

.3 Selection of colours will be from manufacturer's full range of colours.

.4 Where specific products are available in restricted range of colours, selection will be based on limited range.

.5 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 Mixing and Tinting

.1 Perform colour tinting operations prior to delivery of paint to site.

.2 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.

.3 Thin paint for spraying in accordance with paint manufacturer's instructions.

.4 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 Gloss/Sheen Ratings

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

Gloss Level Category/	Units @ 60 Degrees	Units @ 85 Degrees
G1 – matte finish	0 to 5	Max. 10
G2 – velvet finish	0 to 10	10 to 35
G3 – eggshell finish	10 to 25	10 to 35
G4 – satin finish	20 to 35	Min. 35
G5 – semi-gloss finish	35 to 70	
G6 – gloss finish	70 to 85	
G7 – high gloss finish	> 85	

.2 Gloss level ratings of painted surfaces as specified and as noted on Finish Schedule.

SPEC NOTE: SEE http://www.paintinfo.com/mpi/guide/fullspecREV.pdf FOR FULL MPI SPECIFICATION

2.5 Interior Painting Systems

.1 Structural Steel:
.1 INT 5.1X Latex G5 semi-gloss finish (over quick dry shop primer).

.2 Metal Fabrications:
.1 INT 5.3A Latex G5 semi-gloss finish

.3 Zinc Coated Metal Deck:
.1 INT 5.3H. Interior Latex semi-gloss, dry fog/fall type.

.4 Galvanized Metal: interior doors, frames, railings, misc. steel, pipes, and ducts.
.1 INT 5.3A Latex G5 semi-gloss finish

.5 Concrete Masonry:
.1 INT 4.2D High performance architectural latex G5 semi-gloss finish.

.6 Wood Clear Polyurethane Finish:
.1 INT 6.3K Polyurethane varnish G6 gloss finish.

.7 Electrical Equipment Backboards:
.1 INT 6.4P Fire retardant, pigmented coating. Low odour/low VOC. Semi-gloss (UL/ULC rated).

.8 Gypsum Board: Walls and Bulkheads.
.1 INT 9.2A Latex G3 eggshell finish over latex sealer.

.9 Gypsum Board: Ceilings and Bulkheads:
.1 INT 9.2A Latex G2 velvet finish over latex sealer.

.10 All other surfaces not noted above: high performance finish suitable for commercial and institutional environment and in accordance with MPI painting manual.

PART 3 EXECUTION

3.1 General

.1 Perform preparation and operations for interior painting in accordance with MPI Architectural Painting Specifications Manual except where specified otherwise.

.2 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and application instructions, and data sheets.

3.2 Examination

.1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report damages, defects, unsatisfactory or unfavourable conditions to Consultant before proceeding with work.

3.3 Preparation

.1 Protection:
.1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking and in accordance with paint manufacturers and MPI recommendations. If damaged, clean and restore surfaces as directed

by Consultant.
.2 Protect items that are permanently attached such as Fire Labels on doors and frames.
.3 Protect factory finished products and equipment.

.2 Surface Preparation:
.1 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
.2 Place "WET PAINT" signs in occupied areas as painting operations progress.

.3 Clean and prepare surfaces in accordance with MPI Architectural Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:
.1 Remove dust, dirt, and other surface debris by vacuuming, wiping with dry, clean cloths, or compressed air.
.2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
.3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
.4 Allow surfaces to drain completely and allow to dry thoroughly.
.5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
.6 Use trigger operated spray nozzles for water hoses.
.7 Many water-based paints cannot be removed with water once dried. Minimize use of mineral spirits or organic solvents to clean up water-based paints.

.4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.

.5 Where possible, prime non-exposed surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.
.1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.
.2 Apply wood filler to nail holes and cracks.
.3 Tint filler to match stains for stained woodwork.

.6 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements and SSPC-SP 6. Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes blowing with clean dry compressed air or vacuum cleaning.

.7 Touch up of shop primers with primer as specified.

.8 Do not apply paint until prepared surfaces have been accepted by Consultant.

3.4 Application

.1 Apply paint materials in accordance with paint manufacturer's written application instructions.

.2 Brush and Roller Application:
.1 Apply paint in uniform layer using brush and/or roller type suitable for application.
.2 Work paint into cracks, crevices and corners.
.3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
.4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces free of roller tracking and heavy stipple.

.5 Remove runs, sags and brush marks from finished work and repaint.

.3 Spray application:
.1 Provide and maintain equipment that is suitable for intended purpose, capable of atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
.2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
.3 Apply paint in uniform layer, overlapping at edges of spray pattern. Back roll first coat application.
.4 Brush out immediately all runs and sags.
.5 Use brushes and rollers to work paint into cracks, crevices and places which are not adequately painted by spray.

.4 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

.5 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.

.6 Sand and dust between coats to remove visible defects.

.7 Finish surfaces both above and below sight lines as specified for surrounding surfaces.

.8 Finish alcoves as specified for adjoining rooms.

.9 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.5 Mechanical/Electrical Equipment

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

.2 Mechanical and electrical rooms: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment.

.3 Other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.

.4 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.

.5 Do not paint over nameplates.

.6 Keep sprinkler heads free of paint.

.7 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.

.8 Paint fire protection piping red.

.9 Paint natural gas piping yellow.

.10 Paint both sides and edges of backboards for telephone and electrical equipment before installation. Leave equipment in original finish except for touch-up as required, and paint conduits,

mounting accessories and other unfinished items.

.11 Do not paint interior transformers and substation equipment.

3.6 Field Quality Control

.1 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

.2 Standard of Acceptance:
.1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.
.2 Ceilings: no defects visible from floor at 45 degrees to surface when viewed using final lighting source.
.3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

3.7 Cleaning and Restoration

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

.2 Remove protective coverings and warning signs as soon as practical after operations cease.

.3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.

.4 Protect freshly completed surfaces from paint droppings and dust to approval of Consultant. Avoid scuffing newly applied paint.

.5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Consultant.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 06 61 16 Solid Surfacing
.2 Section 08 80 05 Glazing
.3 Section 09 21 16 Gypsum Board

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM A653/A653M-23 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  .2 ASTM A924/A924M-22a Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
  .3 ASTM B456-17(2022) Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium
  .4 ASTM C1036-21 Standard Specification for Flat Glass
  .5 ASTM C1503-18 Standard Specification for Silvered Flat Glass Mirror
  .6 ASTM D1187/D1187M-97(2018) Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal
.2 Canadian General Standards Board (CGSB)
  .1 CAN/CGSB-1.81-M90 Air Drying and Baking Alkyd Primer for Vehicles and Equipment.
  .2 CAN/CGSB-1.88-92 Gloss Alkyd Enamel, Air Drying and Baking.
.3 CSA Group (CSA)
  .1 CSA/ASC B651:23 Accessible Design for the Built Environment.
  .2 CSA G164-18(R2023) Hot Dip Galvanizing of Irregularly Shaped Articles.

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Shop Drawings:
  .1 Indicate size and description of components, base material, surface finish inside and out, hardware and locks, attachment devices, description of rough-in-frame, building-in details of anchors for grab bars.

.3 Samples:
  .1 Submit samples when requested.
  .2 Samples to be returned for inclusion into work.

.4 Closeout Submittals:
  .1 Provide maintenance data for toilet and bath accessories for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.5 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.
.2 Deliver, handle and store materials in accordance with manufacturer’s printed instructions.

1.6 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.7 Extra Materials

.1 Provide special tools required for accessing, assembly/disassembly or removal for toilet and bath accessories in accordance with requirements specified in Section 01 78 00 - Closeout Submittals.

.2 Deliver special tools to Owner.

PART 2 PRODUCTS

2.1 Materials

.1 Sheet steel: to ASTM A653 with ZF001 designation zinc coating.

.2 Stainless steel sheet metal: Type 304, with Brushed finish.

.3 Stainless steel tubing: Type 304, commercial grade, seamless welded, minimum 1.2 mm wall thickness.

.4 Fasteners: concealed screws and bolts hot dip galvanized, exposed fasteners to match face of unit. Expansion shields fibre, lead or rubber as recommended by accessory manufacturer for component and its intended use.

2.2 Manufacturers

.1 Products and components listed are minimum standard of acceptance. Alternative products by recognized manufacturers of toilet and bath accessories may be accepted subject to review by the Consultant of manufacturer’s product information and specifications.

.2 Acceptable manufacturers include:
.1 Bobrick
.2 Bradley
.3 Frost
.4 Hafele
.5 Richelieu
.6 Watrous

2.3 Components

.1 TPD: Toilet Tissue Dispenser:
.1 Supplied by Owner, installed by Contractor.

.2 SD: Soap Dispenser: Liquid wall mounted soap dispenser.
.1 Supplied by Owner, installed by Contractor.

.3 GB1: Grab Bar, 38 mm diameter x 1.6 mm wall tubing of stainless steel, 76 mm diameter wall flanges, concealed screw attachment, flanges welded to tubular bar, provided with steel back plates and all accessories. Knurl bar at area of hand grips. Grab bar material and anchorage to withstand downward pull of 2.2 kN. 600 mm long.
.1 Bobrick B-6806.99 x 24

.4 GB3: Barrier Free Toilet Grab Bars 2 (L-shaped) 760 x 760 38 mm dia. Peened finish c/w mounting kits.
.1 Bobrick B-6898.99, 90° Angle Grab Bar.

.5 Framed Mirror: Bobrick B-165 1830.

.6 SND: Sanitary Napkin Disposal
.1 Bobrick B-35139 Sanitary Napkin Waste Receptacle

.7 Stainless Steel Shelf: To CSA B651. 455 mm long x 125mm wide, 1.2mm type 304 stainless steel, satin finish. 19mm return edge; front edge hemmed for safety. 1.6mm brackets.
.1 Bobrick B295 x 18

.8 Coat Hook: Bright polished stainless steel hook with 50 x 50 mm flange, hook 25 mm wide x 165 mm high. Concealed wall plate.
.1 Bobrick B-682

2.4 Fabrication

.1 Weld and grind joints of fabricated components flush and smooth. Use mechanical fasteners only where approved.

.2 Wherever possible form exposed surfaces from one sheet of stock, free of joints.

.3 Brake form sheet metal work with 1.5 mm radius bends.

.4 Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.

.5 Back paint components where contact is made with building finishes, to prevent electrolysis.

.6 Hot dip galvanize concealed ferrous metal anchors and fastening devices to CSA G164.

.7 Shop assemble components and package complete with anchors and fittings.

.8 Deliver inserts and rough-in frames to job site at appropriate time for building-in. Provide templates, details and instructions for building in anchors and inserts.

.9 Provide steel anchor plates and components for installation on studding and building framing.

2.5 Finishes

.1 Chrome and nickel plating: to ASTM B456, satin finish.

.2 Baked enamel: condition metal by applying one coat of metal conditioner to ASTM D1187, apply one coat Type 2 primer to CAN/CGSB-1.81 and bake, apply two coats Type 2 enamel to CAN/CGSB-1.88 and bake to hard, durable finish. Sand between final coats. Colour selected from standard range by Consultant.

.3 Manufacturer's or brand names on face of units not acceptable.

PART 3 EXECUTION

3.1 Installation

.1 Install toilet and bath accessories in accordance with the Ontario Building Code, CSA B651 and manufacturer's instructions.

.2 Install and secure accessories rigidly in place as follows:
- .1 Stud walls: install steel back-plate to stud prior to plaster or drywall finish. Provide plate with threaded studs or plugs.
- .2 Hollow masonry units or existing plaster/drywall: use toggle bolts drilled into cell/wall cavity.
- .3 Solid masonry or concrete: use bolt with lead expansion sleeve set into drilled hole.

.3 Install grab bars on built-in anchors provided by manufacturer.

.4 Use tamper proof screws/bolts for fasteners.

.5 Fill units with necessary supplies shortly before final acceptance of building.

.6 Install products in strict compliance with manufacturer's written instructions and recommendations, including the following:
- .1 Verify blocking has been installed properly.
- .2 Verify location does not interfere with door swings or use of fixtures.
- .3 Comply with manufacturer's recommendations for backing and proper support.
- .4 Use fasteners and anchors suitable for substrate and project conditions.
- .5 Install units rigid, straight, plumb, and level, in accordance with manufacturer's installation instructions and approved shop drawings.
- .6 Conceal evidence of drilling, cutting, and fitting to room finish.
- .7 Test for proper operation.

.7 Install electric hand dryers according to manufacturer's instructions. Installation shall be by an electrician and shall be completed in accordance with all relevant standards and Codes.

3.2 Schedule

.1 Locate accessories where indicated. Exact locations determined by Owner.

3.3 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

.2 Clean exposed surfaces of compartments, hardware, and fittings using methods acceptable to the manufacturer.

.3 Touch-up, repair or replace damaged products until Substantial Performance.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 06 10 00 Rough Carpentry
.2 Section 08 50 00 Aluminum Doors, Windows and Screens

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM D5116-17 Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products
  .2 ASTM D6670-18 Standard Practice for Full-Scale Chamber Determination of Volatile Organic Emissions from Indoor Materials/Products
.2 Underwriters Laboratories of Canada (ULC)
  .1 ULC 109-14 Flame Tests of Flame Resistant Fabrics and Films
.3 National Fire Protection Association (NFPA)
  .1 NFPA 701 Standard Methods of Fire Tests for Flame Propagation of Textiles and Films
.4 Canadian Electrical Code.

1.4 Submittals

.1 Make submittals in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit shop drawings. Clearly indicate, by large scale details, anchorage, assembly, materials, components, finishes, and perimeter construction conditions.

.3 Submit duplicate 300 mm x 300 mm samples of fabrics in selected colours.

.4 Submit manufacturer's maintenance data in the form of printed instructions for cleaning and maintaining roller shades, for inclusion in Operation and Maintenance Manuals specified in section 01 78 00 – Closeout Submittals

1.5 Quality Assurance

.1 Work of this Section shall be by forces in the direct employ or under control of the system manufacturer, skilled, trained and experienced in work of similar scope and complexity.

.2 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section, with a minimum of ten years of experience.

.3 Mock-Ups: Erect one full size mock-up of each roller shade type for review. Completed and accepted mock-up shall act as the standard to which the balance of the work will be judged.

1.6 Shipping, Handling and Storage

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Test all operable components prior to shipping.

.3 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

1.7 Waste Management and Disposal

.1 Refer to Section 01 74 19 – Construction Waste Management and Disposal.

1.8 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of two years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

.2 Manufacturer's Warranty: Submit manufacturer's standard 10 year product warranty executed by an authorized company official.

PART 2 PRODUCTS

Manufacturers

.1 Roller Shade System shall be manually operated Solar Shades as manufactured by Solarfective Products Limited or approved equivalent.

.2 Basis of Design: The Legrand Shading Systems Solarfective Teleshade (TS)

.3 Subject to compliance with the contract documents, acceptable equivalent products of the following manufacturers may be used upon approval:
.1 Elite Window Fashions
.2 Lighting Harvesting Shading Solutions
.3 Mechoshade Systems Inc.
.4 Nysan Solar Control
.5 Sun Glow Window Covering Products of Canada
.6 SunProject Inc.

2.2 Hardware – Manually Controlled Shades

.1 Chain Operated with infinite positioning. Left or right hand operation and banding as applicable to project conditions.
.1 Drive assembly:
.1 Must allow fingertip control and include a built-in shock absorber system to prevent chain breakage under normal operating conditions.
.2 Factory set for size and travel of shades.
.3 Capable of being field adjusted from the exterior of the shade unit without having to disassemble the hardware.
.4 Drive Chain: No. 10 stainless steel bead chain formed in a continuous loop. The chain shall have passed a 40kg load test. Chain may be positioned at either, or both ends of the shade without disassembly of the shade unit.
.1 Supply and install child safe chain retainers.
.5 Supply and install counter balancing mechanism designed to offset the weight of the shade and give fingertip control.

2.3 Assembly

.1 Supply and install fully factory assembled shade units consisting of 2 shade brackets, shade tube,

extruded aluminum fascia, hembar and fabric as specified.

.2 Factory modify housings where necessary to bypass columns and other obstructions.

.3 End Brackets: 2 piece molded ABS construction with nylon drive sprocket. Bracket colour coordinated with fascia colour.

.4 Shade tube; Minimum 1.52 mm thick extruded aluminum with 3 equally spaced continuous stiffening fins, non-sag design, maximum deflection under full load of fabric L/700.

.5 Fascia: One piece extruded aluminum 1.7 mm thickness complete with three continuous screw flutes. Anodized. Colour as selected by the Consultant. Extruded aluminum snap lock fascia which continuously fits on the end and center brackets as a one-piece section.

.6 Hembar: extruded aluminum with matching plastic end finials.

2.4 Shade Mounting System

.1 Extruded aluminum bracket designed to accept preassembled shade system.
.1 Brackets shall be used to facilitate the alignment with shade opening.

.2 Modular Construction: shades must be removable as a complete modular unit without any component disassembly required.

2.5 Aluminum Finish

.1 Exposed aluminum: Baked enamel, colour to be selected by the Consultant.

.2 Unexposed aluminum: mill finish.

2.6 Shade Fabric

.1 Sun control fabric: dimensionally stable shade fabric.
.1 Acceptable Products: 3% open area:
.1 Phifer Sheerweave, Style 4600.
.2 Colour: to be selected by the Consultant.

.2 Blackout shade fabric: dimensionally stable blackout fabric.
.1 To be selected from manufacturer’s full range.

.3 Performance: fabric shall hang flat, without buckling or distortion. Edge, where trimmed, shall hang true and straight. An unguided roller shade cloth shall roll true and straight, without shifting sideways more than + 3 mm in either direction due to warp distortion, or weave design.

.4 Fabric shall be certified by an independent laboratory to pass the small scale vertical burn requirements test ULC S109 and NFPA 701.

2.7 Fabrication

.1 Finished assemblies shall be square, true to size and free from distortion, twist or other defects that could affect their strength, operation or appearance.

.2 Factory applied finish shall be uniform, smooth and without blemishes.

.3 The fabric shall be colour fast, retain its shape, not be affected by moisture or heat, and shall be non-flammable. Cut fabric to eliminate glare and reflection from shining surfaces while maintaining exterior view. The top of the fabric shall be retained in the recessed spline of the shade roller and the bottom of the fabric shall be retained by the hem bar.

PART 3 EXECUTION

3.1 Installation

.1 Install shading devices in accordance with manufacturer's instructions.

.2 Take field measurements prior to fabrication to ensure fit.
.3 Fabric shall be premeasured and manufactured off-site.

.4 Install square, plumb, true to line, adequately anchored, maintaining uniform clearances, accurate alignment levels and parallel with the window plane. Fabric shall not travel more than 3 mm in either direction within channels after installation.

.5 Adjust operable parts for correct function.

.6 Secure with non-corrosive fasteners, concealed in final assembly.

.7 Black out shades shall be installed to eliminate passage of light from exterior.

.8 Electrical wiring, hook-up, switches, motorized shades: in accordance with Division 26 requirements.

.9 Adjust to provide for operation without binding.

.10 Refinish damaged or defective work so that no variation in surface appearance is discernable.

3.2 Demonstration

.1 Prior to acceptance of system, arrange for demonstration of equipment with authorized representatives of the Owner, to be performed by representative of shade manufacturer to assure proper function, operation and explanation.

.2 Conduct comprehensive demonstration for Owner’s staff on operation and care of interior window treatments.

3.3 Cleaning

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

End of Section

Electrical Specifications

for

Renovations at
École Élémentaire Felix-Leclerc
50 Celestine Drive
Toronto, Ontario

HCC PROJECT #24273

The undersigned has reviewed and takes responsibility for this design and has the qualifications and meets the requirements set out in the Ontario Building Code to be a designer.

*QUALIFICATION INFORMATION

Required unless design is exempt under DIV C 3.2.5.1 of the building code

HOWARD COHEN		24553
NAME	SIGNATURE	BCIN

*REGISTRATION INFORMATION

Required unless design is exempt under DIV C 3.2.4.1 of the building code

HCC ENGINEERING LIMITED	28954
FIRM NAME	BCIN

HCC ENGINEERING LIMITED
40 Eglinton Avenue East
Suite 600
Toronto, Ontario
M4P 3A2
Tel: (416) 932-2423

Issued for Permit and Tender
March 12, 2025

SECTION 26 05 00: GENERAL CONDITIONS.

1.1 Project Description:

1. The project encompasses the 50 Celestine Drive, Toronto facility. In general, the work shall include, without being limited to the following:

    1. Provide new 120/208 Volt utility power service.
    2. Provide communications conduit systems, grounding systems, lighting, lighting control, fire alarm system, paging system and security and CCTV conduit requirements, etc., as shown on the drawings.

2. The electrical contractor shall provide a comprehensive Methods of Procedures (MOP's) two weeks prior to each and every power shutdown. MOP's must include a detailed sequence of operations to be completed during the respective shutdown as well as a back out plan. MOP's must be approved by the client, landlord and the electrical engineer prior to any work taking place.

1.2 Sub-Contractors:

1. The Contractor may not assign or sub-contract any work without the prior written consent of the Construction Manager or his designated representative. A list of sub-contractors must be submitted with the tender response.

1.3 Substantial Completion Of Contract

1. All the equipment and wire must be cleaned and tested, before acceptance by the consultant.
2. This Contractor shall guarantee all equipment and work furnished under this Division for a period of **two (2) years** or such longer periods as may be provided in the warranty of the manufacturer of individual components, whichever is longer from the date of final acceptance by the Engineer. This contractor shall correct all defects developing as a whole or in part, due to defective workmanship, materials or defective arrangement of the various parts or materials damaged as a result of these defects or repairs. All defects shall be made good to the satisfaction of the Engineer at this Contractor's expense.
3. Replace, at no cost, all incandescent lamps burned out during a thirty (30) day period, all burned-out fluorescent and HID lamps for a period of ninety (90) days and all burned out LEDs based on a 70% lumen maintenance within a 5 year warranty period after date of issuance of certificate of Substantial Performance for the contract of this building.
4. Additional requirements as detailed in Section 26 05 00, paragraph 1.7, sentence 9.

1.4 Inquiries

1. All inquiries will be responded to in writing and will be distributed to all bidders. No questions or inquiries will be answered within 48hrs of the closing period of a bid.

1.5 Site Meeting

1. The site meeting will be scheduled during the tender period by the project manager.

1.6 Examination of Premises And Work

1. Visit and examine the site where the work is to be done. Become familiar with all features and characteristics of the site and/or any existing structure before submitting a bid. No allowances will be made by the Owner for any difficulties encountered by this Contractor due to any peculiarities of the site, surrounding public or private property that existed when the Tender was submitted.
2. This Contractor shall examine the structural, mechanical, architectural and electrical and any other drawings issued to satisfy himself that the work can be satisfactorily carried out. Before commencing work or prefabrication, examine the work of other trades and report at once any defect or interference affecting the work of the electrical trade.
3. Where variances occur between the drawings and the specifications, or within either document itself, the item or arrangement of better quality, greater quantity or higher cost shall be included in the contract sum. The Engineer will decide on the item and manner in which the work shall be installed.
4. All bidders shall familiarize themselves with and adhere to the owner's building standards and guidelines.

1.7 Terms And Conditions

1. DEFINITIONS

    1. The term Owner shall be understood to refer to Conseil Scolaire Viamonde.
    2. The term consultant shall be understood to refer to Howard Cohen, P. Eng., RCDD/LAN, MBA.
    3. Not used.
    4. The term electrical contractor shall be understood to refer to the successful bidder to this specifications package.
    5. The term Contract shall be understood to refer to all items and conditions of this specification, Drawings, the complete tender package, the Contractor's tender submission and any other future contractual arrangements. All such items and conditions shall be binding unless agreed otherwise by the Contractor, Consultant and Owner.
    6. The term Project shall be understood to refer to the complete supply and installation of the Electrical System and components, as defined in this specification and Drawings.
    7. Wherever the words "equal", "equivalent", "approved", or "approved equal" are used, it shall be understood to mean, "equal", "equivalent", "approved", or "approved equal" in the opinion of the Consultant only.
    8. Wherever the words "install", "provide", or "supply and install", are used it shall be understood to mean "provide and install, inclusive of all labour, materials, installation, testing, and connections" for the item to which referred.
    9. "Concealed" is defined as "out of sight" in "normal" viewing conditions, and includes buried in concrete, above acoustic tile or gypsum board ceilings, within masonry or gypsum board constructed walls, within cable trays of below raised access floors.

2. These specifications or the drawings shall not be used alone. Any item or subject omitted from one, but mentioned or reasonably implied in the other, shall be provided. Misinterpretation of any requirements of either the specification or drawings shall not result in any additional charge after submission of Tender. This Contractor shall, by careful study of the total requirements, include all necessary components to make each system workable. The consultant shall be contacted for written clarification on any point before the submission of Tenders.

3. All terms and conditions of the specifications, tender documents and accompanying Drawings shall be strictly adhered to by the Contractor, unless otherwise noted. Any inability to comply with these requirements must be stated in writing, in detail, with the response submission. Otherwise, it shall be understood that the Contractor is bound to compliance with the stated terms and conditions.
4. The Contractor shall co-operate fully with the Owner, Consultant, landlord and landlord's agent and all contractors, sub-contractors and other persons working on the site.
5. The Contractor shall do the complete installation in accordance with the latest editions of the National Building Code, Ontario Building Code, Canadian Electrical Safety Code, C.S.A., or other Codes or governing authorities of competent jurisdiction. In case of discrepancies with this or the manufacturer's specifications, the Contractor shall notify the Consultant immediately.
6. Obtain and pay for permits and ESA plans approvals (note: Building Permit obtained by owner) and inspections required for work performed. Provide Certificate (s) of Acceptance from the Authorities Inspection Department, upon completion of work.
7. Submit required Documents and shop drawings to authorities having jurisdiction in order to obtain approval for the Work. Copies of Contract Drawings and Specifications may be used for this purpose. Prepare any additional information, details and drawings which these authorities may require.
8. The Contractor must comply with all requirements of the Occupational Health & Safety Act.
9. In order to meet the requirements of substantial completion the electrical contractor must complete the following:
    1. Installation and successful testing of all electrical system devices as per mutually agreed to tests and commissioning plan.
    2. Overall system test demonstrating system operation and coordination of the utility systems.
    3. Commissioning of all systems including access control systems, intrusion systems, CCTV systems and duress systems
    4. Client training for all systems including access control systems, intrusion systems, CCTV systems and duress systems.
    5. Submission of all coordination and permit documentation for the Consultant's review.
    6. Submission of all record and As-built documentation.
    7. Correction of any deficiencies in the electrical system.

1.8 Schedule

1. Include for all necessary overtime required to carry out the project. The successful contractor will not be permitted claims as a consequence of this requirement. Successful Contractor to submit a full construction schedule before starting any work.
2. Sufficient manpower, materials, equipment, appliances and services are to be kept on site at all times to maintain the scheduled completion of work.
3. All work required to be done after office hours and weekends (including x-raying, core drilling and power shutdowns), shall be included in the tender price. Note: All x-raying and core drilling shall be provided by the electrical contractor.
4. Work associated with power shutdowns and with testing and commissioning of electrical systems must be carried out on Sunday mornings from 1am to 4 am. All shutdowns must be approved by Owner and by Landlord.
5. **Contractor must provide a dedicated onsite electrician for 8 hours on the Monday following each cutover.**

1.9 Contract Drawings

1. The Drawings for the electrical system work are diagrammatic performance Drawings, intended to convey the scope of work and indicate the approximate sizes and locations of equipment and outlets. The Drawings do not intend to show Designer's Architectural, Mechanical or Structural details.
2. Do not scale or measure Drawings, but obtain information regarding accurate dimensions, from the dimensions shown or by site measurements. Follow the Drawings to lay out the work.
3. Make, at no additional cost, any changes or additions to materials and equipment necessary to accommodate Structural conditions (offsets around beams, columns, etc.).
4. Alter at no additional cost, the location of materials and/or equipment as directed, provided that the changes are made before installation, and do not necessitate additional materials.
5. Change location of termination panels and devices at no extra cost providing cable length increase resulting from relocation does not exceed 3m (10') and information is given before installation.
6. Confirm at the site, the exact location of equipment.
7. Any miscellaneous materials, hardware, devices, wiring, etc., not specifically described, but required for the installation and operation of the electrical system, shall be provided and included as part of the Bid.

1.10 Materials And Equipment

1. All materials and equipment shall be completely new and unused products of only the most recent manufacturer model or version number, CSA certified, and manufactured to the Standards specified.
2. Where there is no alternative to supplying equipment which is not CSA certified, obtain special approval from the local Inspection Department.
3. No damaged, chipped or marked equipment or materials will be accepted and must not be installed.

1.11 Substitutes

1. All tenders must be based on specified items. Tenders shall show one price for the base bid and an itemized breakdown of all of substitutes showing "credit or cost" for each substitute.
2. Manufacturer's Basis of Design product part numbers and / or product photos have been included as part of this specifications package as the basis for the specification and tenders. and to clearly describe the quality of the product that is required for the work. A specific Manufacturer's name and model number also represents specific physical dimensions and operational requirements required on this project.
3. Substitutes will only be considered when submitted in sufficient time to review the proposal before tender closing. Proposals must be submitted at least two weeks prior to the deadline for Addenda Issues and for light fixtures must include detailed photometric plots for proposed light fixture substitutions. The photometric plots must be of the entire floor plan and must include all partitions and workstations (based on 5' high furniture panels). After reviewing the proposals, the Engineer will preliminarily accept or reject the proposed substitute(s). Addenda will be issued to confirm the preliminary acceptance of proposed substitutions. Preliminary acceptance of substitutes does not constitute approval for the use of those substitutes in the work.

4. It is the Contractor's responsibility to demonstrate in his proposal that the proposed substitutions are compatible with all related work and that the characteristics are equal to, or superior to the original specified items, including, but not limited to:
    - performance;
    - physical characteristics (i.e. dimensions, weights);
    - electrical characteristics (i.e. voltage, number of phases, rated load amperage);
    - availability;
    - noise characteristic (i.e. generated sound power, attenuation).
    - average max to min and average light levels (light fixtures).
    - lighting power density.
    - illuminated surface area.
    - lumen maintenance.

5. This Contractor shall be responsible for any additional costs necessary to accommodate substitutes.

6. All shop drawings submitted for approved substituted equipment shall be marked as such by the Contractor.

1.12 Operation And Maintenance Manuals

1. Provide five (5) hard copy sets of operation and maintenance manuals for equipment and products supplied.
2. Provide three (3) soft copy scanned sets of operation and maintenance manuals for equipment and products supplied. Media shall be USB drive.
3. Include the following information in the Operation and Maintenance manuals:
    - Names and address of local suppliers for the items included.
    - Technical data, product data, supplemented by bulletins, component illustrations, exploded views, technical descriptions of items and parts lists. Advertising or sales literature is not acceptable.
    - Details of design elements, construction features, component function and maintenance requirements, to permit effective start-up, operation, maintenance, repair, modification, extension and expansion of any portion or feature of the installation.

4. Review information provided in the maintenance instructions and manuals with the Owners' operating personnel to ensure a complete understanding of the electrical equipment and systems and their operation.

1.13 Progress Payments

1. Submit a complete breakdown of the Contract with each progress billing, indicating percentage of work complete, in a form acceptable to the Owner/Consultant.
2. The amount of monies to be allocated for close out documents must be 3% of contract value. This does not include monies allocated for testing, measurement and verification, commissioning, training, etc.

1.14 Shop Drawings

1. Submitted Shop Drawings must indicate details of construction, dimensions, capacities, weights and electrical performance and flame spread characteristics of equipment or materials, as well as specification reference Section number and project name.
2. Shop Drawings shall be provided with sufficient space on the front for all Consultant's and Contractor's "review" stamps.
3 Work affected by submittal shall not proceed until review is complete.
4. Review submittal prior to submission to Consultant. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of the work and Contract Documents and bears the Stamp of Communications Contractor.
5. Changes made to the Shop Drawings by the Consultant will not affect the Contract Price.
6. Submit Shop Drawings for all material and equipment referred to in contract document.

1.15 Field Supervision

1. Throughout the duration of the Project, a properly qualified Electrical Field Supervisor must be available at all times. The Supervisor who starts the work must not be changed unless requested by the project manager, or written permission from the project manager is obtained.
2. In addition, provide proper office supervision of the work. The person responsible for office supervision must visit the site as often as necessary, to ensure work is properly performed, and attend weekly site meetings when so requested.

1.16 Site Responsibilities

1. Maintain work areas to be free of construction debris and waste. The disposal of all materials shall be the responsibility of the Contractor.
2. Make all necessary arrangements to transport materials and equipment to and within the site. The Contractor shall be responsible for arranging for the use of any hoists, lifts, pulleys, winches, cranes or service elevators.
3. The Contractor is responsible for complete storage, handling, delivery, and installation of all materials used in the performance of the work.
4. Obtain a copy of the Landlord's leasehold design manual and ensure that all requirements are complied with.

1.17 Deliveries / Access

1. Coordinate all deliveries to site with the Building Manager. Book loading dock and service elevators 72 hours in advance. Contractor must pre-arrange all site access and authorization for all site personnel and subcontractor personnel with the Building Project Manager or his representative

1.18 Testing And Commissioning

1. Provide testing and commissioning as per Testing and Commissioning Plan to be reviewed and approved by the Consultant and Project Manager for all items and their related components.
2. Supply all required equipment maintenance and operations manuals, for owner's staff use.
3. Provide all required software for monitoring, annunciation and control/dispatch applications

1.19 Other

1. The tender documents shall remain the property of the Project Manager. Bidders are required to return the tender documents to the Project Manager with their bids.
2. It is the responsibility of the Contractor to perform all cutting, patching and repair related to the electrical system work.
3. Work by the electrical contractor shall be protected during erection against disfigurement, contamination or damage by mechanical abuse or harmful materials. Protective covers shall be installed where exposure to potential damage is likely. The contractor shall ensure that no eating, drinking or smoking is carried out in the finished areas. Damages resulting from a breach of these requirements shall be repaired at the cost of the electrical contractor.
4. Existing and adjacent finishes, work and structures shall be protected from damage resulting from work of this project.

1.20 Record and As-Built Drawings

1. The Contractor shall maintain two sets of drawings on site. Clearly mark on these drawings all changes and deviations from the contract drawings and in particular mark the actual location of all feeder conduit locations.
2. All deviations from the contract drawings shall be recorded on the "as-built" drawings, including those changes due to Addenda, Site Instructions or Change Orders.
3. After the date of Substantial Performance, obtain from the Consultant, a set of AutoCAD Version 2021 files of the most recent Electrical System Drawings. These Drawings shall be marked up to record clearly, neatly, accurately and promptly all locations of Electrical System deviations as a result of Change Orders, Consultant's or Owner's Instruction, site conditions, etc. Utilize normal recognized CAD procedures that match the original drafting methodology. Submit the revised As-Built AutoCAD CD and Drawings (three sets) with changes clearly indicated to the Consultant for review and final presentation to the Owner.
4. For the disk drawing submission described above, the electrical contractor must include as part of the lump sum price $750.00 plus HST to have HCC Engineering supply the AutoCAD floor plans denoted as 'Issued for Tender' on disks.

1.21 Drawings

1. For exact details and quantities, refer to the later sections of this document and to drawing E-1.1 through E-1.5 inclusive, E-2.0, E-2.1, E-2.2, E-3.1, E-5.1, E-6.1 and E-7.1 denoted as 'Issued For Permit and Tender March 12, 2025.'

1.22 Contract

1. Conform to the conditions stated in the Contract Form, Document CCDC-2.
2. A confidentiality agreement will form an integral part of the contract and will be provided to the successful contractor.

1.23 Cleaning

1. It is the responsibility of the Contractor to dispose of all waste related to this project.
2. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
3. On a daily basis, remove waste materials, rubbish, tools, equipment, machinery, surplus materials and clean all sight exposed surfaces.
4. All materials must be stacked neatly and safely.
5. Handle materials in a controlled manner with as few handlings as possible. Do not drop or throw materials from heights.

6. Cleaning operations shall include those areas used for temporary site access or used on a temporary basis to facilitate work.
7. The contractor will remove all garbage from site on a daily basis at his own expense.
8. Failure to provide housekeeping and/or maintain a clean work area to the satisfaction of the project manager will result in the project manager providing the necessary housekeeping and/or maintenance service with all related costs, including mark-ups, being charged to the electrical contractor.

1.24 Demolition

1. Disconnect and remove existing conduit and wiring in partitions to be demolished and existing 'BX' cables, conduit and wire in ceiling where existing outlets, lighting fixtures, devices and mechanical equipment are to be removed.
2. Remove all branch circuit wiring and raceways originating from the existing receptacle panels. Wiring and raceways shall be removed back to the source panel. Circuits utilized to feed existing to remain mechanical equipment and other 120/208 volt sources to remain must be maintained.
3. Remove all existing electrical outlets and light switches as well as the associated wiring and raceways not being reused and/or not required for new layout (note: existing outlets and switches to be removed are not shown on the drawings). Provide blank coverplates at all locations where electrical and/or communications devices were removed in which partitions are not being demolished.

1.25 Digital Photos

1. Provide digital photos of all progress to date on a weekly basis. Each photo submission must be reviewed and approved by the consultant prior to continuing with the installation.

End of Section

SECTION 26 05 01: COMMON WORK RESULTS - ELECTRICAL.

PART I: GENERAL

1.1 Reference:

1. This section forms part of every section of Division 26.

1.2 Access Doors:

1. Not Required.

1.3 Cleaning:

1. Clean devices and other surfaces that have been exposed to construction dust and dirt. Clean the insides and outsides of panels and other electrical equipment and completely remove all debris and tools from the project.

1.4 Codes and Standards:

1. Complete the installation of the work in accordance with latest editions of the Building Code, Canadian Electrical Safety Code, CSA, ULC, NFPA, OSHA or other codes, as required.
2. Comply with CEC Electrical Bulletins in force at time of Bid submission. While not identified and specified by number in this Division, they are to be considered as forming part of related Standards.
3. Abbreviations for electrical terms are as per CSA Z85.

1.5 Finishes:

1. All shop finished metal equipment and enclosure surfaces, must be prepared by removal of rust and scale from the raw metal, degreasing, cleaning, application of rust resistance primer inside and outside, and at least two coats of finish enamel paint. Use factory standard colours unless otherwise specified. Colour reference numbers are Sico.
2. Paint exterior surfaces of indoor electrical equipment to manufacturer's standard.
3. Clean and touch-up (to Consultant's acceptance) surfaces of shop-finished equipment that is scratched or marred during shipment or installation, so as to match original paint.
4. Leave with the Owner, 0.22 gal. of paint of each colour used, in the form of liquid or spray, to allow for future touch-up of damaged areas.

1.6 Inserts, Hangers and Sleeves:

1. Provide hangers, inserts, sleeves and supports as required.
2. Inserts are to be of lead shield type.
3. Hangers must not be welded to structural steel members and burning of holes in structural steel is prohibited.

4. Sleeves are to be of a type suitable for the application and be sealed and made watertight. Sleeves through concrete shall be sized for free passage of conduit, and installed flush with underside of concrete slab and extend 100mm (4") above finished floor unless otherwise shown.

1.7 Intent:

1. It is the intent of these drawings and specifications that the Contractor provide complete and operational systems as required.
2. Where differences occur, the maximum condition shall govern.
3. Any miscellaneous items, hardware, devices, wiring, etc., not specifically described, but required for the operation of the system, must be provided and included as part of the Bid.

1.8 Mounting Heights:

1. Mounting height of equipment is from finished floor to center line of equipment unless specified or indicated otherwise.
2. If mounting height of equipment is not indicated, verify with Consultant before proceeding with installation.

1.9 Owners Instruction and Trial Usage:

1. Instruct the Owner's operating personnel in the startup, operation, care and maintenance of all the equipment. All equipment to be tested, operational and commissioned before instruction. Provide sheets for signatures of Owner's representative and operating personnel present at each instruction period.
2. Arrange and pay for the service of the manufacturer's factory service Engineer/Technician to supervise the start-up of his equipment installation, and to check, adjust, balance and calibrate components.
3. Provide these services for such period and for as many visits as necessary to ensure that the Owner's operating personnel are conversant with all aspects of its care and operation.

    1. Prior to any instruction sessions, commissioning coordinator shall submit check lists of each system or equipment indicating their operation status for acceptance by the Owner.
    2. Coordinate all instruction sessions to suit Owner's operation personnel schedule. Submit proposed instruction session schedule c/w training agenda three weeks prior to session start date to Owner for review.

5. The Owner's operating personnel must be permitted to operate the systems under the contractor's supervision for a reasonable period of time prior to Substantial Completion of Contract. This use shall not be misconstrued as acceptance of the equipment.

1.10 Plywood Backboard:

1. Supply and install all plywood backboards required for the work of this Division. Plywood to be highest quality fire retardant fir. 1200 mm wide x 2400 mm high (4'-0" wide x 8'-0" high), 19mm (3/4") thick unless otherwise specified. Prime and paint backboards on both sides with fire retardant paint, equal to CGSB spec. #1-GP-151M, of a colour to match the equipment and services mounted thereon as defined in "Finishes" above. Do not paint over fire rated stamps.

2. Plywood backboards are to be provided for mounting the following surface wall mounted equipment:
   - Cabinets.
   - Contactors.
   - Control Panels
   - Disconnect Switches.
   - Junction Boxes 600mm (2') square and larger.
   - Pull Boxes.
   - Panel Boards.
   - Splitters
   - Transient Voltage Surge Suppression Units.
   - External Breakers

3. Where practical, group devices on a common backboard.

1.11 Protection:

1. Protect exposed live equipment during construction for personnel safety.
2. Shield and mark live parts "LIVE 600 VOLTS", or with appropriate voltage in English.

1.12 Sealing:

1. Where cables or conduits pass through non fire-rated floors, walls or roof, provide internal and external sealing thereto.
2. Retain the service of a specialty sealant contractor for the work required.
3. Comply with manufacturer's installation instructions for all sealant applications.
4. For non-fire rated locations, Sealant shall be silicone, that meets requirements of CGSB 19-GP-23, for the size of the joint required, and the types of materials being bonded.
5. For fire rated locations, the fire stop shall meet the requirements of ULC with regards to the type of assembly and the fire separation.
6. Provide architecturally approved air barrier seals and vapor barrier seals to electrical items passing through or terminating within walls, roofs and decks, humidity controlled areas and pressurized areas.
7. Engage the services of a third party architect to provide a sealed report for all fire stopping assemblies provided as part of this scope of work. Sealed report must detail compliance with the Ontario Building Code.

1.13 Sprinkler Proofing:

1. All areas of this building are protected by a wet sprinkler system. All electrical equipment to be configured for installation in such an environment.

1.14 Warning Signs:

1. Provide warning signs, as specified to meet requirements of Ministry of Labour Safety Inspection, Inspection Department, Authorities having jurisdiction and Consultant.
2. Use decal signs, in English minimum as required by Authorities.

1.15 Wire Pulling Lubricant:

1. Lubricant to be non-corrosive and CSA approved for the type of cable used.
2. Lubricants to be soap or wax based, depending upon application. Use soap based for short runs and for semi-conducting insulated wires, and wax based for long runs.

End of Section

SECTION 26 05 20: WIRE AND BOX CONNECTORS.

PART I - GENERAL

1.1 Work Included:

1. Provide all wire and box connectors required for a complete electrical system installation.

PART II - PRODUCTS

2.1 Materials:

1. Pressure type wire connectors are to be manufactured to CSA C22.2 No.65. Clamps and connectors are to be manufactured to CSA C22.2 No. 18.
2. Building Wire Connectors shall be:
    1. For wire sizes up to #6 AWG - Ideal “Wing Nut” or Gardner - Bender “Wing Gard”.
    2. For Wire Sizes #4 AWG and larger:
        - End to end splices - Burndy YS.
        - Parallel splices - Burndy YC & YH (CU) or YHO & YHD (CU / AL).
        - At studs and bus bars - Burndy YA (CU) or YA-A (CU / AL).
        - Two or three conductors in parallel - Burndy KA-U type (CU / AL).
3. Cable connectors shall be:
    1. For armored TECK cables, watertight type, with open compounded head - T&B series “Spin-on 2” with corrosion resistant boot.
    2. For armored cables steel type with nylon insulated throat - T&B “TITE-Bite”.
    3. Clamps or connectors for armored cable, flexible conduit, non-metallic sheathed cable shall be as required.

PART III - EXECUTION

3.1 Installation:

1. Remove insulation carefully from ends of conductors and:
    1. Install connectors and tighten as recommended by manufacturer.
       Installation shall meet secureness tests in accordance with CSA C22.2 No.65.
    2. Install bushing stud connectors in accordance with EEMAC 1Y-2.

End of Section

SECTION 26 05 21: WIRES AND CABLES.

PART I - GENERAL

1.1 Work Included:

1. Provide building wire as detailed below and as required for a complete electrical installation.

PART II - PRODUCTS

2.1 Materials

1. Wire in Conduit:

    1. Conductor material to be annealed commercial grade, copper, 98 percent conductivity, up to #10 AWG solid, with RW90 insulation, #8 and larger, stranded, with RW90 insulation, unless noted otherwise, 300V rating for fire alarm, security and other low voltage circuits, 600V rating for 120 / 208V circuits, 1000V rating for 240 / 416V circuits, 1000V rating for 277 / 480V circuits, 1000V rating for 347 / 600V circuits.

    2. Colour Coding:

        1. 120 / 208V, circuits:
        Two conductor, 1 phase: 1 black, 1 white
        Three conductor, 1 phase: 1 red, 1 black, 1 white
        Three conductor, 3 phase: 1 red, 1 black, 1 blue
        Four conductor, 3 phase: 1 red, 1 black, 1 blue, 1 white

        2. 347 / 600V, circuits:
        Two conductor, 1 phase: 1 orange, 1 white
        Three conductor, 1 phase: 1 orange, 1 brown, 1 white
        Three conductor, 3 phase: 1 orange, 1 brown, 1 yellow
        Four conductor, 3 phase: 1 orange, 1 brown, 1 yellow, 1 white

        3. Ground wires: green.

    3. Low voltage Armored Cables Type AC-90:

        1. Type to be AC-90, Multi-conductor, with solid, annealed commercial grade 98 percent conductivity tinned copper conductors and cross-linked polyethylene with R90 insulation, 600 volt rating, on #10 and #12 size only.

        2. Colour Coding:
        Two conductor, 1 phase: 1 black, 1 white
        Three conductor, 1 phase: 1 black, 1 red, 1 white

        3. Grounding to be uninsulated, solid copper, with impregnated paper separator.

4. Low voltage Armored Cables - TECK:

    1. Type to be TECK, single conductor with annealed. Class B, stranded copper conductors and cross linked polyethylene, RW90 insulation, 1000 volt rating for #8 AWG and larger.

    2. Grounding to be uninsulated tinned stranded copper, with non-hygroscopic filter material to maintain circular cross-section.

    3. The inner and outer jackets to be PVC “Flamenol” suitable for –40˚C, with mylar tape separator and aluminum strip, armour helically wound and interlocked.

PART III - EXECUTION

3.1 Installation:

1. General:

    1. Wire shall be installed in conduit and sized for the connected load (s) and protection as required, unless otherwise specified.
    2. All single neutrals ran with Phase ‘A’,’ B’,’ C’ conductors to be minimum #10 AWG. #12 AWG neutrals may be used when run from final junction box to wiring devices.
    3. Minimum power conductor wire size shall be #12 AWG. Use solid conductors for #10 and smaller and stranded conductors for #8 and larger. All wiring shall be copper conductors, RW90 (90°C ampacity).
    4. Home runs in excess of 25 m (75’) for circuits protected by a 15A over current device, shall be #10 AWG. Refer to drawings for additional requirements.
    5. The current carrying capacity of the feeders, subfeeders and branch circuit conductors shall be sized to equal or better than shown on the drawings. If wire or cable sizes with equivalent current carrying capacity other than that specified is used, ensure that the voltage drop shall not be more than 2%.
    6. The number of wires indicated for various systems is intended to show the general scheme only. The required number and type of wires shall be installed in accordance with the manufacturer’s diagrams and with the requirements of the installation.

2. Wire in Conduit:

    1. Provide pigtails at all outlets for wiring devices. All neutrals and branch circuits shall be connected in each outlet box to avoid a break in the neutral or the circuit wire when fixture or wiring device is disconnected.
    2. At each junction, pull and outlet box make a 360 degree loop of the stripped uncut ground conductor under the ground screws.

3. Low Voltage Armored Cables - (Feeders):

    1. Do not directly bury in or below concrete slabs or walls.
    2. Do not encircle single conductor cable with ferrous metal.
    3. No splices will be permitted.
    4. Single conductors of the three or four wire circuit shall be run with uniform spacing of not less than one cable diameter throughout the feeder length.
    5. Use wood throated cable clamps to ensure proper and uniform cable spacing.
    6. Where cables are installed on walls, provide mechanical protection over them up to 2.4m (8') above finished floor, using a 12 gauge U section aluminum cover.
    7. Cable connections to all enclosures, boxes and panels shall be by means of a watertight malleable aluminum connector.

End of Section

SECTION 26 05 27: GROUNDING.

PART I - GENERAL

1.1 Work Included:

1. Provide all grounding to conform with the Canadian Electrical Code and the latest instructions of the Inspection Authority, with any further requirements as noted herein.

PART II - PRODUCTS

2.1 Materials:

1. All grounding conductors stranded copper, bare or insulated as indicated on Drawings or in Specifications.
2. All ground wires are to be FT-4 rated factory green. Green tape, spray paint or any other means to alter the colour of the conductor is not permitted.
3. Use Cadweld or Burndy Thermoweld process for all weld connections. AMP of Canada Ltd. Wrench-Lok grounding connectors are an acceptable equivalent to welded connections.
4. All ground connectors to be designed and approved for grounding purposes.

PART III - EXECUTION

3.1 Installation:

1. Ground all conduit, and all non-current carrying metal parts, equipment cases, frames, bases, brackets, etc.
2. Grounding of all trays, AFCRs, racks, cabinets, etc. provided by the electrical contractor.
3. Ground each piece of fixed equipment back to the panel feeding that equipment, by one of the following methods:

    1. Conduit shall **not** be utilized for the ground return conductor.
    2. Where the conduit is flexible, install a separate bare soft drawn copper ground inside the conduit. At the switchboard or distribution panel, provide a grounding bushing, loop the ground conductor through the bushing, and connect to the switchboard ground bus. At the fixed equipment, connect to an internal ground bus, or connect to the inside of the metal enclosure utilizing approved screws and connectors (remove all paint). Run a separate (dedicated) insulated ground wire in all conduits to all devices and fixtures.
    4. Where equipment is fed by a multi-conductor power cable, provide a ground conductor in the cable. At the switchboard or panel, connect to the ground bus. Use a grounding connector on the cable for positive grounding of the metallic sheath. Loop the ground wire to the grounding connector.
    5. Run a separate ground wire in all flexible conduits. Connect each end to ground bus or lug or connector.
    6. Where mechanical protection is required for insulated grounding conductors install in rigid conduit.
    7. Provide weld connection or wrench type grounding connectors for:
    All connections between grounding conductors.

All connections to building steel.
All connections between grounding conductors and cable lugs.

8. Arrange grounding to provide the minimum impedance paths for ground fault currents. Provide any additional grounding required for approval by the inspecting authorities.

3.2 Equipment Grounding

1. Install grounding connections to typical equipment including non-current carrying metal parts of transformers, generators, motors, circuit breakers, cable sheaths, raceways, pipe work, screen guards, switchboards, meter and relay cases, any exposed building metal and building structural steel.

End of Section

SECTION 26 05 29: HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS.

PART I - GENERAL

1.1 Work Included:

1. Provide fastenings and supports as required for a complete electrical system installation.

PART II - PRODUCTS

2.1 Support Channels:

1. U shape pre-galvanized steel, size 41 mm x 41 mm x 22 mm (1-5/8” x 1-5/8” x 7/8”), for surface mounting, suspending, or inserting into poured concrete walls and ceilings as required.
2. All channel fittings to suit channel type.
3. All other fittings to suit equipment weight, location and surface as required.

PART III - EXECUTION

3.1 Installation:

1. Secure plywood backboards, channels, luminaires, equipment and fittings to wood with wood screws, to solid masonry, tile and plaster surfaces with lead anchors, to poured concrete with self-drilling expandable inserts, and to hollow masonry walls with toggle bolts.
2. All ceiling mounted equipment shall be independently supported from the structure. Do not support equipment from ceiling support system.
3. Support equipment, conduit or cable using clips, spring loaded bolts, or cable clamps designed as accessories to basic channel members.
4. Fasten exposed conduit or cables to building using:
    1. Two-hole steel straps to secure surface conduits and cables 50 mm (2”) and smaller.
    2. Two-hole steel straps for conduits and cables larger than 50 mm (2”).
    3. Beam clamps to secure conduit to exposed steel work.
5. For suspended support system:
    1. Support individual cable or conduit runs with 6 mm (1/4”) diameter threaded rods and spring clips.
    2. Support two or more cables or conduits on channels support by 6 mm (1/4”) diameter threaded rod hangers where direct fastening to building construction is impractical.
    3. Support suspended luminaire using two or more lengths of Weldless “Single Jack”, bright zinc plated steel chain, Canadian Standard #10 gauge, 13 links per foot.
6. Provide metal brackets, frames, hangers, clamps and related type of support structure where indicated or as required to support conduit and cable runs.
7. Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.

8. Do not use wire lashing or perforated strap to support or secure raceways or cables.
9. Do not use supports or equipment installed for other trades for conduit or cable support.
10. Install fastenings and supports as required for each type of equipment, cable and conduits, and in accordance with manufacturer's installation recommendations.
11. Hangers shall be spaced such that there is a hanger within 610mm (24") of every bend and that the maximum spacing does not exceed the limits indicated in OESC code.
12. All conduit or cable shall be supported at equipment mounted on spring isolators, with spring hangers for at least 4572mm (15').

End of Section

SECTION 26 05 31: SPLITTERS, JUNCTION, PULL BOXES AND CABINETS.

PART I - GENERAL

1.1 Work Included:

1. Provide splitters, junction boxes, pull boxes and cabinets as shown on the drawings and as required for a complete electrical installation.

PART II - PRODUCTS

2.1 Splitter Troughs:

1. Splitter trough construction is to be based on CSA C22.2 No. 76.
2. They shall have sheet steel enclosure, with welded corners and formed hinged cover suitable for locking in closed position.
3. Connection bars are to match required size and number of incoming and outgoing conductors as indicated.
4. Provide at least three spare terminals on each set of lugs in splitter troughs less than 400A and feed through lugs where required.
5. Provide double lugs for neutrals where required.
6. Enclosures shall be CSA/EEMAC Type 1 modified to sprinkler proof enclosure.

2.2 Junction and Pull boxes.

1. Junction and pull boxes construction is to be based on CSA C22.2 No. 40.
2. They shall be suitable for surface mounting and be of welded steel construction with screw-on flat covers.
3. For flush-mounted pull and junction boxes, provide covers with 25 mm (1”) minimum extension all around.

2.3 General Cabinets:

1. Type D or E to be sheet steel, for surface mounting, complete with screw on cover (D) or hinged door (E), and return flange overlapping sides, handle and catch.

PART III - EXECUTION

3.1 Splitter Installation:

1. Install splitter troughs where required. Mount plumb, true and square to the building lines.
2. Extend splitters for full length of equipment arrangement except where indicated otherwise.
3. Provide watertight connections for all services entering the top of the splitter trough.

3.2 Junction, Pull Boxes and Cabinet installation:

1. Install junction, pull boxes and cabinets in inconspicuous but accessible locations.
2. Only certain junction and pull boxes are indicated. Provide pull boxes so as not to exceed 30 m (100') of conduit run between boxes, and after every two (2) 90 degree bends.

3.3 Identification:

1. Install nameplates.

End of Section

SECTION 26 05 32: OUTLET BOXES, CONDUIT BOXES AND FITTINGS.

PART I - GENERAL

1.1 Work Included:

1. Provide outlet and conduit boxes and fittings as required for a complete electrical system installation.

PART II - PRODUCTS

2.1 Outlet and Conduit boxes - General

1. The construction of outlet boxes, conduit boxes and fittings is to be based on CSA C22.2 No.18.
2. Boxes shall be suitable for the utilization voltage.
3. Combination boxes shall have barriers where outlets for more than one system are grouped.
4. Recessed 100 mm (4”) square or larger outlet boxes shall be complete with single or ganged plaster rings to suit application.

2.2 Sheet Steel Outlet boxes:

1. Electro-galvanized steel single and multi-gang device boxes for flush installation, shall be minimum size 75 mm x 50 mm x 37 mm (3” x 2” x 1-1/2”) unless otherwise specified or required. 100 mm (4”) square outlet boxes shall be used when more than one conduit enters one side, with extension and plaster rings as required.
2. Boxes for door switches and push buttons shall be sized as required.
3. Utility boxes for connection to surface mounted EMT conduit, shall be minimum 100 x 54 x 48 mm (4" x 2-1/8” x 1-7/8”) size.
4. Square or octagonal outlet boxes for lighting fixture outlets, shall be minimum 100 mm (4”) size.
5. Square outlet boxes with extension and plaster rings for flush mounting devices in finished plaster or tile walls, shall be minimum 100 mm (4”) size.

2.3 Masonry Boxes:

1. Electro-galvanized steel masonry single and multi-gang MBD boxes shall be used for flush mounted devices in exposed block walls.

2.4 Concrete boxes:

1. Electro-galvanized sheet steel concrete boxes shall be used for flush mounting in concrete, with matching extension and plaster rings as required.

2.5 Conduit Boxes:

1. Cast FS or FD feraloy boxes with factory-threaded hubs and mounting feet shall be used for outlets connected to surface mounted rigid conduit.

2.6 PVC Boxes:

1. F series and octagon boxes shall be moulded type, with fastening ears and screwed secured covers as required.

2.7 Fittings - General:

1. Bushing and connectors shall be with nylon insulated throats.
2. Provide knock-out fillers to prevent entry of foreign materials.
3. Use conduit outlet bodies for conduit up to and including 32 mm (1-1/4”) and pull boxes for larger conduits.
4. Provide double locknuts and insulated bushings on sheet metal boxes.

PART III - EXECUTION

3.1 Installation:

1. Support boxes independently of connecting conduits.
2. Fill boxes with paper, foam sponges or similar approved material to prevent entry of construction material.
3. Size box wiring chambers in accordance with Canadian Electrical Safety Code.
4. Gang boxes together where wiring devices are grouped.
5. Provide matching blank cover plates for boxes without wiring devices.
6. Use combination boxes where outlets for more than one system or voltage are grouped.
7. For flush installations, mount outlets flush with finished wall using plaster rings to permit wall finish to come within 5mm (1/4”) of opening.
8. Provide correct size of openings in boxes for conduit and armored cable connections. Reducing washers are not allowed.

End of Section

SECTION 26 05 34: CONDUITS, CONDUIT FASTENINGS AND CONDUIT FITTINGS.

PART I - GENERAL

1.1 Work Included:

1. Provide conduits, conduit fastenings and conduit fittings as detailed below and as required for a complete electrical installation.

PART II - PRODUCTS

2.1 Conduits:

1. Rigid and epoxy coated conduit shall be threaded, galvanized steel and shall be manufactured to CSA C22.2 No. 45.
2. Electrical metallic tube (EMT) conduit and couplings shall be manufactured to CSA C22.2 No. 83.
3. Flexible metal conduit and liquid tight - flexible metal conduit shall be manufactured to CSA C22.2 No. 56.

2.2 Conduit Fastenings:

1. Conduit straps shall be steel, double hole for rigid or EMT conduit. Single hole straps are not acceptable.

2.3 Conduit Fittings:

1. Fittings for conduits shall be manufactured to CSA C22.2 No.18. Provide coatings as per conduit.
2. Fittings for rigid conduit shall be steel threaded type, and for EMT conduit, to be steel set screw type.
3. Fittings for EMT conduit in wash bays to be steel compression fitting type.
4. Fittings for flexible conduit and exposed conduit outdoors to be liquid-tight type, straight or angled threaded for rigid and compression for EMT conduit.
5. Expansion fittings for rigid or EMT conduits shall be of the watertight type, with an integral bonding assembly, suitable for deflection in all directions.

2.4 Pulling Cables:

1. Pulling cables shall be polypropylene and of a strength suitable for tension to be pulled.

2.5 Waterproof Membrane:

1. Conduits penetrating waterproof membranes shall be PEM #6372.

PART III - EXECUTION

3.1 Installation (General):

1. The conduits for the following circuits and systems shall be run separately:

   - 120/208 volt utility power distribution.
   - 347/600 volt utility power distribution.
   - Normal power to luminaries.
   - Emergency power to luminaries and exit signs.
   - Fire alarm system multiplex loop devices.
   - Fire alarm system signalling devices.
   - Security, Duress, Intrusion and CCTV system devices.
   - Telephone and data systems.
   - Control wiring.
   - Paging System

2. All conduits to be surface mounted (exposed, EMT) in mechanical and electrical service spaces and rooms and concealed elsewhere unless otherwise shown.
3. Wiring in ceiling spaces and in all partitions shall be EMT.
4. Exposed conduits shall be installed to conserve headroom and cause minimum interference in spaces through which they pass.
5. Use rigid conduit up to 2.4 m (8’-0”) above finished floor where exposed indoors
6. Use RGS conduit PVC coated galvanized rigid steel Robroy Permacote in all outdoor locations and in areas that are not environmentally controlled.
7. Use electrical metallic tubing (EMT) above grade, and above 2.4 m (8’-0”) above finished floor where exposed indoors.
8. Use flexible liquid tight metal conduit for connection to motors, and transformers.
9. Bend conduit without heating. Replace conduit if kinked or flattened more than $1/10^{th}$ of its original diameter.
10. Mechanically bend conduit over 20mm (3/4”) diameter.
11. Field threads on rigid conduit must be of sufficient length to draw conduits tight.
12. Install pulling cables in all conduits that are to remain “empty”.
13. A maximum of two (2) 90 degree bends, or equivalent up to 180 degrees, will be permitted without installation of a pull box. Radius of bends must be no less than ten (10) times the conduit diameter.
14. Conduits must be dry, before installing wires.
15. Support all branch conduits from building structure. Do not clip conduits to ceiling hangers, sprinkler pipes, plumbing or BAS wiring hangers.

3.2 Surface Conduits:

1. Surface conduits shall be run parallel or perpendicular to building lines.
2. Conduits located near any heat producing equipment shall have 1500 mm (5 ‘) clearance.
3. Conduits adjacent to structural steel, beams or columns shall be run within the flanged portion, unless otherwise shown.
4. Group exposed conduits on surface or suspended channels.
5. Do not pass conduits through structural members except where indicated and approved by Landlord.
6. Do not locate conduits less than 75 mm (3”) parallel to steam or hot water lines. Provide a minimum clearance of 25 mm (1”) at crossovers.

3.3 Conduit Size:

1. The minimum conduit size shall be 19 mm (3/4”).
2. All undimensioned conduits in the drawings are 19 mm (3/4”).

3.4 Expansion Fittings:

1. Conduit expansion fittings shall be provided on all conduits crossing expansion joints, and at maximum of 60 m (200’) spacing.
2. Install expansion fittings perpendicular to expansion joint.
3. Refer to structural drawings for location of expansion joints.

End of Section

SECTION 26 05 44: INSTALLATION OF CABLES IN TRENCHES AND IN DUCTS.

PART 1: GENERAL

1.1 Work Included:

1. Provide duct sealing compounds and install cables as detailed below and as required for a complete electrical installation.

PART II - PRODUCTS

2.1 Materials

1. Sand for cable shall be as defined in Division 2.

2.2 Duct Sealing Compound

1. Duct sealing compound shall be a non-thermoplastic compound and shall allow for expansion and contraction of ducts and cables without loss of sealing properties.

PART III - EXECUTION

3.1 Cable Installation in Trenches

1. Provide a minimum of 150 mm (6”) sand bed under cables.

2. Lay cables maintaining a minimum 75 mm (3”) clearance from trench sides.

3. Provide offsets for thermal action and minor earth movements. Offset cables 150 mm (6”) for each 60m (250’) runs, maintaining minimum cable separation and bending radius requirements.

4. Make splices and terminations in accordance with manufacturer’s instructions using approved splicing kits.

5. Minimum permitted radius at cable bends for rubber, plastic or lead covered cables, eight (8) times diameter of cable: for metallic armoured cables, twelve (12) times diameter of cables, or in accordance with manufacturer’s instructions, whichever is the least.

6. Maintain 75 mm (3”) minimum separation between cables of different circuits. Maintain 300 mm (12”) horizontal separation between low and high voltage cables. When low voltage cables cross high voltage cables maintain 300 mm (12”) vertical separation with low voltage cables in upper position. At crossover maintain 75 mm (3”) minimum vertical separation between low voltage cables and 150 mm (6”) between high voltage cables. Maintain 300mm (12”) minimum lateral and vertical separation for fire alarm and control cables when crossing other cables, with fire alarm and control cables in upper position.

7. Install treated planks on lower cables 600 mm (2’) in each direction at crossings.

8. Before backfilling, obtain approval from Consultant and local Hydro Inspection.

9. After cables installation cover cables with minimum 150 mm (6”) sand.

10. Install continuous cable protection on top of sand cover. Ensure protection extends a minimum of 50 mm (2”) beyond cables.

3.2 Cable Installation in Ducts

1. Before installation of cables, pull stiff bristle brush through each duct.

2. Install cables as indicated. Do not pull spliced cables inside ducts.

3. Install multiple cables in ducts simultaneously.

4. Use lubricant to reduce pulling tension.

5. To facilitate matching of colour coded multiconductor control cables, reel off in same direction during installation.

6. After installation of cables, seal duct ends with duct sealing compound.

End of Section

SECTION 26 27 26: WIRING DEVICES.

PART I - GENERAL

1.1 Work Included:

1. Provide all wiring devices indicated on drawings and described below.

PART II - PRODUCTS

2.1 Standards:

1. Construction of manually operated general purpose AC switches is to be based on CSA C22.2 No. 111, snap switches on CSA C22.2 No. 55, and receptacles, plugs and similar wiring devices on CSA C22.2 No. 42.
2. Devices shall be Specification Grade and of one manufacturer throughout

2.2 Switches:

1. Switches shall be suitable for the voltage and load controlled and shall be single pole or three way as indicated.
2. They shall have terminal holes approved for No. 10 AWG wire, silver alloy contacts, and urea or melamine moldings for parts subject to carbon tracking.
3. They shall be suitable for back and side wiring, and rated for tungsten filament and fluorescent lamps, and up to 80% of rated capacity of motor loads.
4. White decorator style switches shall be used for 120V circuits, in all finished areas.
5. White decorator style switches shall be used for 347V circuits in all areas.

2.3 Receptacles:

1. Duplex receptacles shall be CSA Type 5-15R, 125 volt, 15 Amp, U ground and CSA Type 5-20RA, 125 volt, 15/20 Amp, U Ground.
2. They shall be colour, as specified on site by interior designer, decorator style.
3. They shall be suitable for No. 10 AWG, back and side wiring, have break-off links for use as split receptacles and shall have eight (8) back wired entrances, four (4) side wiring screws and double wipe contacts with riveted grounding contacts.

2.4 Coverplates:

1. Coverplates shall be colour, as specified on site by interior designer in finished areas and stainless steel in unfinished areas.
2. Use die cast aluminum coverplates for wiring devices mounted for surface mounted FS or FD boxes, and pressed steel coverplates for utility surface boxes.
3. Use weatherproof spring-loaded, cast aluminum coverplates complete with gaskets for exterior mounted single receptacles and switches, or where indicated.

PART III - EXECUTION

3.1 Installation:

1. Switches:

    1. Install single throw switches with lever in “UP” position when switch closed.
    2. Install switches in gang type outlet box when more than one switch is required in one location.

2. Receptacles:

    1. Install receptacles in gang type outlet box when more than one device is required in one location.

3. Coverplates:

    1. Protect coverplate finish until painting and other work is finished or install after painting is complete.
    2. Do not use flush type coverplates on surface mounted boxes.

End of Section

SECTION 26 28 13.01: FUSES – LOW VOLTAGE.

PART I - GENERAL

1.2 Work Included:

1. Supply and install fuses in disconnect switches, etc. as required to complete this contract.

PART II - PRODUCTS

2.1 Fuses - General:

1. Plug and cartridge fuses shall be manufactured to CSA C22.2 No. 59.
2. HRC fuses shall be manufactured to CSA C22.2 No. 106 and to have interrupting capability of 200,000A symmetrical.
3. Fuses shall be the product of one manufacturer.
4. Fuse type reference L1, L2, J1, R1, etc. have been adopted for use in this specification.

2.2 Fuse Types:

1. HRCI - J fuses.
    1. Type J1, time delay, capable of carrying 500% of its rated current for 10 seconds minimum.
    2. Type J2, fast acting.
2. HRC - L.
    1. Type L1, time delay, capable of carrying 500% of its rated current for 10 seconds minimum.
    2. Type L2, fast acting.
3. HRC - R fuses (For UL Class RK1 fuses, peak let-through current and I^2t values not to exceed limits of UL 198E table 10.2.)
    1. Type R1, (UL Class RK1), time delay capable of carrying 500% of its rate current for 10 seconds minimum, to meet UL Class RK1 maximum let-through limits.
    2. Type R2, time delay, capable of carrying 500% of its rated current for 10 seconds minimum.
    3. Type R3, (UL Class RK1), fast acting Class R, to meet UL Class RK1 maximum let-through limits.
    4. HRCII - C fuses.

PART III - EXECUTION

3.1 Installation:

1. Install fuses in mounting devices immediately before energizing circuit.
2. Ensure circuit fuses fitted to physically matched mounting devices. Install Class R rejection clips for HRCI-R fuses.
3. Ensure correct fuses fitted to assigned electrical circuit.
4. Fuses protecting motor loads and transformers to be type J1 for up to and including 600A and L1 for ratings above 600A.
5. Fuses protecting feeder circuits to be type J2 for up to and including 600A and type L2 ratings above 600A.
6. Fuses protecting other services or equipment shall be of the type required for that purpose.

End of Section

SECTION 26 28 23: DISCONNECT SWITCHES - FUSED AND NON-FUSED.

PART I - GENERAL

1.1 Work Included:

1. Provide all disconnect switches shown on the drawings and as required for motors.

PART II - PRODUCTS

2.1 Equipment

1. Fuseholder assemblies to CSA C22.2 No. 39
2. Fusible and non-fusible disconnect switches shall be installed in CSA enclosures.
3. Provide for padlocking in “OFF” switch position by one lock.
4. Provide a mechanically interlocked door to prevent opening when handle in “ON” position.
5. Provide fuses sized as required.
6. Fuseholders in each switch shall be suitable without adapters, for type of fuse as specified.
7. Provide quick make, quick break action.
8. Provide ON-OFF switch position indication on switch enclosure cover.
9. Enclosures shall be CSA/EEMAC Type 1 modified to sprinkler proof enclosure.

PART III - EXECUTION

3.1 Installation:

1. Install disconnect switches with or without fuses as required.
2. Provide watertight connections for all services entering the top of the disconnect switches.

End of Section

SECTION 26 50 00: LIGHTING EQUIPMENT.

PART I - GENERAL

1.1 Work Included:

1. Provide Lighting fixtures as shown on the drawings and described below.

PART II - PRODUCTS

2.1 Lamp Standards:

1. Incandescent lamps shall be manufactured to CSA C22.2 No. 84.
2. Fluorescent lamps shall be manufactured to ANSI C78.
3. Incandescent, fluorescent and HID lamps shall be of 1 (one) manufacturer, either in total, or in groups defined by lamp type.
4. Ballast and lamps provided under this contract must be an approved combination by both respective manufacturers.

PART III - EXECUTION

3.1 Lamp and Ballast Installation:

1. Refer to luminaire schedule and drawings, for lamp and ballast requirements.
2. Install lamps only when the luminaires are clean.
3. Ensure that lamps are suitable for luminaires before energization and lamp length and colours are that as specified. Report any discrepancies to the consultant.

3.2 Luminaire Installation:

1. Install luminaires accurately and carefully aligned complete with all mounting hardware. Ensure any suspension rods are vertical.
2. All luminaires shall be supplied with accessory items such as yokes, plaster rings, frame adjusters, etc., where required for proper installation.
3. At the time of date of “Substantial Completion” all luminaires, lenses, louvers and lamps must be clean, and the lamps illuminated.

3.3 Luminaire Support:

1. All fixtures must be chained by 2 points directly to main structure such that they are supported independently of the lay-in ceiling system.
2. All fixtures in exposed ceiling areas (no T-bar or Drywall) shall be mounted on 1-5/8” unistrut, running the full length of the run of fixtures. The unistrut is to be suspended from the ceiling deck by 3/8” threaded rod from unistrut between the joists. Do not puncture ceiling deck.
3. All lighting feeds for suspended fixtures shall be dropped from the deck or slab straight down into the fixture or raceway. Fixture to fixture conduits will not be permitted. Conduit must go to the deck then to the next fixture.

3.4 Cleaning:

1. All luminaires must be cleaned before lamping and installing lenses or louvres.
2. Use dry, clean, soft cloths if luminaires are dusty. Use mild solvents to clean soiled luminaires.

End of Section

SECTION 26 60 01: ELECTRICAL IDENTIFICATION.

PART I - GENERAL

1.1 Work Included:

1. Identify electrical equipment as specified herein.

1.2 Manufacturer's Nameplates:

1. Have the manufacturer's nameplates affixed to each item of all equipment showing the size, name of equipment, serial number and all information usually provided, including voltage, cycle, phase, horsepower, etc., and the name of the manufacturer and his address. Ensure that all stamped, etched or engraved lettering on plates is perfectly legible. Ensure that nameplates are not painted over. Where apparatus is to be concealed, attach the nameplate in an approved location on the equipment support or frame.
2. Ensure that panels and other apparatus which have exposed faces in finished areas do not have any visible trademarks or other identifying symbols. Mount nameplates behind doors.

PART II - PRODUCTS

2.1 Lamacoid Plates:

1. Refer to drawings for lamacoid background and text colour. Minimum size 75mm x 25mm (3" x 1") and 3.2mm (1/8") thick laminated plastic and 6.4mm (1/4") deep engraved lettering.

2.2 Conductor Markers:

1. Cable diameter less than 13 mm (1/2") - Electrovert type Z.
2. Cable diameter 13 mm (1/2") and larger - Electrovert #510 strap-on.
3. Colour - white with black markings except fire alarm and life safety system which shall be white with red markings.

PART III - EXECUTION

3.1 Conduit Services - Power:

1. Locate identification:

- Behind each access door.
- At each change of direction and at junction boxes.
- At not more than 10 m (40') apart in straight runs of conduit behind removable enclosures such as lay-in type ceiling, but on both sides of sleeves through walls or floors.
- Above each floor or platform for vertical exposed conduits, preferably 1500 m (60") above floor or platform.

- Use stencils and stencil paint or lamacoid plates on all conduits.
- Use minimum 25 mm (1") high letters.
- The identification shall describe system voltage and service, i.e., "120 / 208V lighting to panel AA".

3.2 Conduits and outlet boxes:

1. Identify conduits and outlet boxes for the various systems by the use of the following distinctive colour paints. Apply a small area of paint to the inside of each outlet box, pull box and panel as it is being installed. Identify junction boxes in suspended ceiling areas with colour on both inside and outside.

    1. 120 / 208 volt system. - Black
    2. Fire Alarm systems. - Red
    3. 347/600 volt system. - Blue
    4. Security Alarm system - Orange

2. Use the colour coding as defined in CGSB Code 24-GP-3A and CSA Standard B53.
3. Where the existing colour coding differs from these Specifications, notify the Consultant of colours used and maintain existing colour coding.

3.3 Equipment Nameplates:

1. Identify all equipment listed below with lamacoid plates, letters 10 mm (0.4") high, unless otherwise noted.
    1. Lighting and Power Panels - Plates to be on outsides of door. Typical identification: "Lighting Panel C 120/208V, 3PH, 4W MAINS 225A 18KA RMS. Supplied from Panel BB".
    2. Disconnect switches and starters - Plates to be mounted externally on switch cover. Typical identification: "Fan S4, 208V, 3PH".
    3. Transformers - Plates to be mounted externally on case. Typical identification: "Transformer TR-UPSA 225 KVA/416/120/208V, 3PH / 4W fed from Panel UPS A".

2. Secure with mechanical fastening devices except on the inside of panel doors where gluing will be acceptable.

3.7 Wiring Colour Code:

1. <u>Power and Lighting Conductors:</u>

    1. Phase A - Red
    2. Phase B - Black
    3. Phase C - Blue
    4. Neutral - White
    5. Ground - Green

2. For sizes available in black only, use coloured tape markers at junction boxes and terminal points to match phase coding described above.
3. Band green isolated ground conductors with yellow tape.

4. Control conductors - Orange
5. Fire Alarm System Conductors.

    1. Alarm initiating devices and manual pull stations - red and blue.
    2. Alarm signaling devices - black and white.

3.8 Conductor Markers:

1. For power feeders, install markers at either end of the conductors where terminated inside of equipment to match wiring diagram conductor identification or panelboard circuit numbers. Typical identification Panel AA circuits - 21; use “AA-21”. For a three phase circuit provide identification on phase A conductor only. For a single phase circuit provide identification on the phase conductor.
2. For Branch circuits supplying single phase and three phase devices such as receptacles and connections to equipment identify conductors at panel and in device outlet box. Install marker on phase conductor inside outlet box. Typical identification if device is connected to Panel B - circuit 14, marker identification “B-14”.

End of Section

SECTION 26 60 02: TESTING AND COMMISSIONING OF ELECTRICAL SYSTEMS.

PART I - GENERAL

1.1 Description:

1. Include in work of this section, the testing and commissioning of all new electrical and component systems.
2. Include any specific testing of equipment required by the Hydro Inspection or Supply Authorities.
3. The complete costs of the site, load bank and factory testing and commissioning witnessing of Electrical Equipment is to be included in the Bid price.
4. Inform manufacturers of all factory and site testing requirements and include all their costs in the Bid price.
5. At their own discretion, testing is to be witnessed by the Owner and the Electrical Consultant.

1.2 Scope:

1. Include factory testing and approved certification, where required.
2. Coordinate with the equipment manufacturer, notify the Electrical Consultant in writing, 10 (ten) days before any factory testing to confirm Consultant's desired presence, and be present for all site testing.

1.3 Completion of Work:

1. All electrical systems and equipment shall be totally commissioned and operating before date of "Substantial Completion".
2. Coordinate with other trades and the building operations staff for work which affects the operation of the electrical systems, before submitting request for testing and commissioning. Failing to comply, bear all costs including Consultant's time cost, incurred for re-testing and re-commissioning.

PART II - PRODUCTS

2.1 Materials:

1. Provide all tools, equipment, labour and materials required to perform electrical testing and commissioning as specified. Provide the test results report (s).

2.2 Temporary Load Bank:

1. For testing of the UPS systems, provide resistive variable load banks.
2. Load banks must be complete with breakers to protect generators and UPS systems from cable faults.

PART III - EXECUTION

3.1 Installation:

1. Perform site testing and commissioning only after all equipment is installed and operational.
2. Furnish manufacturer's certificate or letter confirming that entire installation as it pertains to each system has been installed to manufacturer's instructions.
3. Provide 4 (four) copies of certificates of all factory and site testing in complete detail bearing in each case, the seal of the engineer responsible for the tests.
4. Submit all test results for Consultant's review.
5. All equipment or system deficiencies identified by factory or site testing procedures, to be corrected by the Contractor prior to obtaining a "Certificate of Substantial Completion".
6. Submit report, at completion of measurements, listing phase and neutral currents on panelboards, dry-type transformers and motor control centres, operating under normal load. Include hour and date on which load was measured, and voltage at time of test.
7. General operations: energize and operate electrical circuit and item. Repair, alter, replace, test and adjust as necessary for a complete and operating electrical system.
8. Test systems and obtain written confirmation from manufacturers that components have been installed correctly and system functioning as intended. Submit certification for power distribution, communications systems and emergency power to Owner's Consultant.
9. Provide labour, instruments, apparatus and pay expenses required for testing. Owner's Consultant reserves right to demand proof of accuracy of instruments used.
10. Perform the following tests on completed power systems:
    1. Supply voltage: measure line voltage of each phase at load terminals of main breakers and report results in writing to Owner's Consultant. Perform test with majority of electrical equipment in use.
    2. Motor loading: measure line current of each phase of motors with motor operating under load, and report results in writing to Owner's Consultants.
        1. Upon indications of imbalances or overloads, thoroughly examine electrical connections and rectify defective parts or wiring.
        2. If electrical connections are correct, report overloads due to defects in driven machines in writing to Owner's Consultant.
    3. Insulation resistance tests:
        1. Megger circuits, feeders and equipment up to 350V with a 500V instrument for at least one (1) minute.
        2. Megger 350-600V circuits, feeders and equipment with a 1000V instrument for at least one (1) minute.
        3. Check resistance to ground before energizing.
        4. Coordinate and carry out motor testing at same time as driven equipment is being tested. In addition to motor loading tests, provide labour and instruments to read and record motor load readings required to supplement tests on driven equipment through various load sequences, as required by driven equipment tests.
11. Immediately prior to occupancy, test entire electrical system by performing loss and return of utility power test. Demonstrate operation of:
    1. Low voltage service equipment and metering
    2. Exit and emergency lighting
    3. restabilization of systems after power return. Attach report printouts as evidence of expected operation on systems.
    4. User equipment shut-down and auto-restart.

3.2 Field Tests

1. Provide advance notice to Owner's Consultant of proposed testing schedule.
2. Perform tests at time of acceptance of work.
3. Conduct and pay for field tests:
    1. Power distribution, including phase voltage, grounding and load balancing.
    2. Circuits originating from branch distribution panels.
    3. Lighting and lighting control. Motors, heaters and associated control equipment, including sequenced operation.
    4. Emergency Power Systems
4. Perform tests in presence of Owner's Representative.
    1. Provide instruments, meters, equipment and personnel required to conduct required tests.
    2. Test systems to verify operation as specified.
5. Conduct di-electric tests, hi-pot tests, insulation resistance tests and ground continuity tests as required by nature of various systems and equipment

3.3 General Testing:

1. With the system completely connected, perform the following tests:

    1. Control and Switching - all circuits shall be tested for the correct operation of devices, switches and controls.
    2. Polarity Tests - all sockets shall be tested for correct polarity.
    3. Voltage Test - a voltage test shall be made at the last outlet of each circuit. The maximum drop in potential permitted will be 2% on 120 and 208 volt branch circuits and on 208 volt feeder circuits. Any deficiency in this respect shall be corrected.
    4. Phase Balance - measure the load on each phase at each splitter, and lighting and power panelboard and report the results in writing to the Consultant. Rearrange phase connections as necessary to balance the load on each phase as instructed by the Consultant, with the re-arrangement being restricted to the exchanging of connections at the distribution points mentioned in this paragraph. After making any such changes, make available to the Consultant drawings or marked prints showing the modified connections.
    5. General Operations - energize and put into operation each and every electrical circuit and item. Necessary repairs, alterations, replacements, tests and adjustments required shall be made for complete and satisfactory operating systems.

3.4 Sealing:

1. Ensure and verify that all penetrations of electrical equipment have been properly sealed with appropriate material and to the manufacturers' requirements.

3.5 Noise and vibration:

1. Ensure and verify that all isolation equipment has been installed where required and to the manufacturers' recommendations. Include the locations of and measurements of static deflection of spring isolators.

3.6 Coordination Study

1. For the entire electrical distribution system provided as part of this contract and for the existing high voltage base building switchgear and low voltage base building switchgear, supply a report from an independent test agency of the short circuit, protection, co-ordination study of the electrical distribution system. **An existing coordination study is not available for contractor's use.**

2. Procure (coordinate and pay for) the services of Krka Power Inc. David Bibic david@krka.ca, or Brosz Technical Services Kyle Bunte kbunte@brosz.net to prepare the coordination study and arc flash analysis.

3. Co-ordination of Protective Devices:
   .1 Ensure circuit protective devices such as overcurrent trips, relays, circuit breakers and fuses are installed to values and settings so as to provide protection by means of opening the closest device to the fault.
   .2 Submit a short circuit protection and co-ordination study as follows:
      1. Obtain and organize all electrical protection data for all the equipment. This will consist of obtaining the relay types and settings, transformer impedances, cable sizes, fuse sizes and types, motor data, etc.., required to carry out the short circuit.
      2. Perform a short circuit analysis to determine short circuit current levels at all critical points in the distribution system, having obtained the available short circuit current available from the Hydro Supply Authority.
      3. Generate appropriate settings for all relays and protective devices from the level of the Hydro Supply Authority feeder protective devices to the largest downstream device on all the feeder secondary distribution levels.
   .3 Provide a complete, comprehensive report at the conclusion of the short circuit, protection and co-ordination study consisting of the following:
      1. A set of time current curve characteristics of all protective devices in the system plotted on log/log graph paper with corresponding short circuit current levels.
      2. Time current damage curves for all transformers, large motors and cables are also to be plotted.
      3. Provide a complete schedule of all main protective relays, fuses and other protective device listing device locations, function number, manufacturer, model number, size, range, setting, etc.
      4. The complete study will illustrate and ensure that the settings and sizes of all protective devices for each voltage level have been chosen to ensure maximum or optional protection and co-ordination during electrical fault or overload conditions.
      5. These generated settings will then be applied by "in-field" testing methods to the respective devices.

3.7 Ground Fault Protection System

1. Inspect relays visually for condition and clean where necessary.
2. Check all connections for tightness.
3. Apply settings to each relay as specified in the short circuit, protection and co-ordination study and test operation by means of a relay test set.
4. Verify each protective system by means of a primary current injection through the zero phase sequence transformer. This will provide correct operation of both the transformer and relay as well as proper functioning of the circuitry through to the breaker tripping elements.

3.8 Arc Flash Analyses

1. For the entire electrical distribution system provided as part of this contract and the existing electrical distribution system shown on the drawings, conduct an electrical arc flash hazard analysis as prescribed under NFPA 70E (CSA Z462-18) and provide a written report summarizing the findings and recommended control measures to be taken. The arc flashing analysis results must be deemed acceptable prior to the equipment purchase.
2. The power systems software utilized to perform the study must be SKM Powertools
3. Provide appropriate labels for all equipment (including all prepurchased equipment and equipment supplied by owner). The labels shall warn a qualified worker who intends to open the equipment for analysis or work that a serious hazard exists and that the workers should follow appropriate work practices and wear appropriate personal protection equipment (PPE) for the specific hazard.
4. An existing coordination study is not available for the electrical contractor's use.
5. Procure (coordinate and pay for) the services of Krka Power Inc. David Bibic david@krka.ca, or Brosz Technical Services Kyle Bunte kbunte@brosz.net to prepare the coordination study and arc flash analysis.

3.9 Emergency Light Level Measurements

1. As part of this scope of work procure the services of a professional engineer to measure and record emergency lighting levels in foot candles throughout all scope of work areas with a calibrated light meter. Readings shall be taken based on a minimum of one reading for every 20' center in open office areas and corridors / hallways and one reading in each closed office, meeting room, boardroom and stairwell.
2. All light level readings are to be taken during non-daylight hours.
3. Provide a sealed letter identifying light level readings and stating that the emergency lighting levels meet the requirements of the National Building Code. Notify Owner and Consultant at least ten (10) days prior to proposed testing date and schedule testing at time and date acceptable to Owner and Consultant.

3.10 Test Results

1. Submit test results to Owner's Consultant for review.
2. Testing methods and test results: to CSA, CEC and authorities having jurisdiction.
3. Remove and replace conductors found damaged with new materials.
4. Provide required labour and tools, if during testing Owner's Representative requests equipment be opened and removed from their housings to examine equipment, terminations and connections.

End of Section

SECTION 28 13 00: ACCESS CONTROL.

PART I – GENERAL

1.1 Work Included:

1. All power and conduit work required and /or shown on drawings related to security system (ie: for electric strike hardware, maglocks, door release button, glass break detectors, etc) shall be included in the electrical contractor's tender price. Provide all conduit and junction boxes and all necessary accessories and devices to facilitate the complete installation of the security system. Obtain exact requirements (including power requirements) from the security contractor. Installation shall be under the direct guidance of, and to the manufacturer's recommendations.

PART II - PRODUCTS

2.1 Refer to drawings for product details.

2.2 Material Standards:

1. All equipment will be manufactured in accordance with applicable CEMA and NEMA specifications, and CSA/ULC standards.

End of Section

SECTION 28 13 00.02: FIRE ALARM SYSTEM.

PART I – GENERAL

1.1 Work Included:

1. All work required and /or shown on drawings related to life safety systems (ie: fire alarm, EVAC speakers, etc.) shall be included in the tenant electrical contractor's tender price. Employ and pay for the services of the landlord's contractor to provide all conduit, wiring, devices, final connections, modifications and provision of new interfacing devices in existing system control panels (ie: modules, relays, sub-panel, etc.). Ensure new devices to be used are compatible with the existing system. Maintain the integrity of the existing supervised circuits when new devices are to be connected. The system shall be tested and certified for proper operation upon completion of the work. Employ and pay for the services of the landlord's verification contractor.

2. Employ and pay for the services of the landlord's contractor to update the base building active graphic software system with all devices provided, deleted and relocated as part of this scope of work and with fire alarm system zone changes as part of this scope of work.

3. Employ and pay for the services of the landlord's contractor to update the base building passive graphics with all devices provided, deleted and relocated as part of this scope of work and with fire alarm system zone changes as part of this scope of work.

4. Employ and pay for the services of the landlord's contractor to provide additional power boosters, amplifiers and all other controls and accessories as required to ensure that the existing fire alarm system can accommodate all signaling devices shown on the drawings.

5. In **addition** to the field devices indicated on the drawings to be provided under this contract, include in the tender price to supply and install the following quantities of additional devices throughout the scope of contract floors, complete with 75'-0" of conduit and wiring, programming, testing and certification, labeling, verification and 100% repeat verification for each device post City Fire Department inspection. Reverify all existing fire alarm devices.

Quantity of Devices	Device Type
2	Fire Alarm System Horn
2	Strobe Light
1	Fire Alarm System Pull Station
4	Initiating Device Interface Zone Module
2	Fire Alarm System Smoke Detector

6. Test and verification in conformance with CAN/ULC S1001, Integrated Systems Testing Of Fire Protection And Life Safety Systems. Provide a satisfactory Integrated Testing Report. As part of the base bid price, electrical contractor must procure (engage, coordinate and pay for) an Integrated Testing Coordinator, responsible to develop and implement the Integrated Testing Plan. The systems which must be included as part of the integrated systems testing to be determined by the Integrated Testing Coordinator hired by the electrical contractor. All costs related to the integrated systems testing must be included as part of the base bid price. Electrical contractor is responsible to provide all requirements to all required trades through the construction manager / general contractor during the bid period. The integrated systems testing must be completed after hours.

7. Electrical contractor must include the following scopes of work as part of the base bid price specific to the CAN/ULC S1001, Integrated Systems Testing Of Fire Protection And Life Safety Systems:

    - Fire Alarm Technician required for operations and resetting of the fire alarm control panel for the duration.
    - Electrician required for operations and initiating alarms, demonstrating wiring, etc., for the duration.

End of Section

SECTION 33 65 73: CONCRETE ENCASED DUCT BANKS AND MANHOLES.

PART I - GENERAL

1.1 Work Included:

1. The correct routing, slopes, size, location and construction of all manholes, ductbanks, drainage pits and markers area within the scope of this Section.

PART II - PRODUCTS

2.1 Pulling Cable:

1. Pulling cable shall be 6mm (1/4”) stranded nylon or polypropylene rope.

2.2 Cable Racks:

1. Cable racks shall be manufactured from hot dipped galvanized steel and mounted on 12 x 100mm (1/2” x 4”) preset inserts.

2.3 Ductwork:

1. Rigid plastic power cable ducts shall be manufactured to CSA C22.2 No. 211.1.
2. PVC telecommunication and data cable ducts shall be manufactured to CSA B196.3.
3. Duct couplings, straight and angle fittings, expansion joints, plugs, caps, adaptors and solvent shall be as required to make a complete installation.

2.4 Formwork and Shoring:

1. Provide all required framework and shoring.

2.5 Markers:

1. Markers shall be pre-cast concrete type, with direction arrows.

PART III - EXECUTION

3.1 General:

1. Prior to any concrete pouring, obtain approval from both Consultant and local Utilities Inspectors.
2. Slope ductbank away from manhole and building towards property line. Provide drainage pit between manhole and building and between manhole and property line if above slope is not possible and at all low points in the system.
3. After completion of ductbank/manhole system, install pulling cables in each duct.

3.2 Drainage Pit:

1. Provide drainage pit at low points of ductbank where required. At pit, use perforated duct with openings on the underside and compacted Granular 'A' gravel drainage material. 1m (3ft.) dia. pre-cast concrete pipe sections shall form the exterior of the pit. Depth of pit shall be such that base is down to permeable material.

3.3 Ductbank:

1. Build the ductbank on undisturbed soil, or on well compacted granular fill, no less than 150mm (6") thick, compacted to 95% of maximum Proctor dry density and at the elevations as required and with a minimum slope of 0.3%, towards the property line unless otherwise shown.
2. Provide formwork and shoring as required when sides of excavation are not suitable for ductbank encasement.
3. Install base spacers at maximum intervals of 1.5m (5'-0").
4. Make transpositions, offsets and changes in direction using 5° bend sections, do not exceed a total of 20° with duct offset. Use Bell ends, at duct entry to building or manholes. At the end of a ductbank run, terminate duct with a duct coupling, set flush with the concrete envelope.
5. Lay ducts with configuration as indicated with preformed interlocking, rigid plastic, intermediate spacers to maintain spacing between ducts at not less than 75mm (3") horizontally and vertically unless otherwise shown. Stagger joints in adjacent duct layers at least 150mm (6") and make joints watertight. Clean and cap ducts before allowing any reinforcing or concrete work.
6. Use15M reinforcing rods that conform to CSA G30.12, grade 400, unless otherwise noted and form ductbank as required.
7. Ensure ductwork is encased with 75mm (3") thick 20MPA (3000 psi) concrete envelope unless otherwise shown. Ensure ducts do not move during reinforcing work or concrete pouring operation.
8. Immediately after placing of concrete, pull through each duct a (steel) mandrel not less than 300mm (12") long and of a diameter 6mm (1/4") less than internal diameter of duct, followed by stiff bristle brush to remove sand, earth and other foreign matter. Avoid disturbing or damaging ducts where concrete has not set completely.
9. Ensure concrete has attained 50% of its specified strength before any backfilling.
10. Install four (4) 3m (10') lengths of 15M reinforcing rods, one at each corner of ductbank, when connecting ductbank to manholes or buildings.

End of Section

Project: 24273

Panelboard: PANEL 2
Voltage (V):
Phase/Wire:
Bus and Lugs Rating (A):

CCT NO	Load	Breaker Amp	Breaker Pole		CCT NO	Load	Breaker Amp	Breaker Pole
1	EXISTING CCT	15	1		2	EXISTING CCT	15	1
3	EXISTING CCT	15	1		4	EXISTING CCT	15	1
5	EXISTING CCT	15	1		6	EXISTING CCT	15	1
7	EXISTING CCT	15	1		8	EXISTING CCT	15	1
9	EXISTING CCT	15	1		10	EXISTING CCT	15	1
11	EXISTING CCT	15	1		12	EXISTING CCT	15	1
13	EXISTING CCT	15	1		14	EXISTING CCT	15	1
15	EXISTING CCT	15	1		16	EXISTING CCT	15	1
17	EXISTING CCT	15	1		18	EXISTING CCT	15	1
19	EXISTING CCT	15	1		20	EXISTING CCT	15	1
21	EXISTING CCT	15	1		22	EXISTING CCT	15	1
23	EXISTING CCT	15	1		24	EXISTING CCT	15	1
25	EXISTING CCT	15	1		26	EXISTING CCT	15	1
27	EXISTING CCT	15	1		28	EXISTING CCT	15	1
29	EXISTING CCT	15	1		30	EXISTING CCT	15	1
31	EXISTING CCT	15	1		32	EXISTING CCT	15	1
33	EXISTING CCT	20	1		34	EXISTING CCT	15	1
35	EXISTING CCT	15	1		36	EXISTING CCT	15	1
37	EXISTING CCT	15	1		38			
39	CLASS ROOM LIGHTING	20	1		40			
41	CLASSROOM LIGHTING	20	1		42	EXISTING CCT	15	1

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Panelboard: PANEL 4
Voltage (V):
Phase/Wire:
Bus and Lugs Rating (A):

CCT NO	Load	Breaker Amp	Breaker Pole		CCT NO	Load	Breaker Amp	Breaker Pole
1	EXISTING CCT	15	1		2	EXISTING CCT	15	1
3	EXISTING CCT	15	1		4	EXISTING CCT	15	
5	EXISTING CCT	15	1		6			2
7	EXISTING CCT	15	1		8	EXISTING CCT	15	1
9	EXISTING CCT	20	1		10	EXISTING CCT	15	1
11	EXISTING CCT	30	1		12	EXISTING CCT	15	1
13	EXISTING CCT	15	1		14	EXISTING CCT	15	1
15	EXISTING CCT	15	1		16	EXISTING CCT	15	1
17	EXISTING CCT	15	1		18	EXISTING CCT	15	1
19	EXISTING CCT	15	1		20	EXISTING CCT	15	1
21	EXISTING CCT	15	1		22	EXISTING CCT	15	1
23	EXISTING CCT	20	1		24	EXISTING CCT	15	1
25	EXISTING CCT	20	1		26	EXISTING CCT	15	1
27	EXISTING CCT	30			28	EXISTING CCT	15	1
29			2		30	EXISTING CCT	15	1
31	EXISTING CCT	15	1		32	EXISTING CCT	15	1
33	EXISTING CCT	20	1		34	EXISTING CCT	15	1
35	EXISTING CCT	15	1		36	CLASSROOM LIGHTING	20	1
37	EXISTING CCT	15	1		38	EXISTING CCT	15	1
39	EXISTING CCT	15	1		40	EXISTING CCT	15	1
41					42	CLASSROOM LIGHTING	20	1

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Panelboard: PANEL K
Voltage (V):
Phase/Wire:
Bus and Lugs Rating (A):

CCT NO	Load	Breaker Amp	Breaker Pole		CCT NO	Load	Breaker Amp	Breaker Pole
1	EXISTING CCT	15			2	EXISTING CCT	15	1
3			2		4			
5	EXISTING CCT	15	1		6	EXISTING CCT	15	1
7					8	EXISTING CCT	15	1
9					10	EXISTING CCT	15	1
11	LIGHTING	15	1		12	EXISTING CCT	20	1
13	OFFICE LIGHTING / DC SOURCE M1	15	1		14	EXISTING CCT	20	1
15	EXISTING CCT	40			16			
17			2		18			

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Panelboard: PANEL M
Voltage (V):
Phase/Wire:
Bus and Lugs Rating (A):

CCT NO	Load	Breaker Amp	Breaker Pole		CCT NO	Load	Breaker Amp	Breaker Pole
1	CU-1	35			2	ADMIN OFFICE RECEPTACLE	20	1
3			2		4	ADMIN OFFICE RECEPTACLE	20	1
5	CU-2	35			6	ADMIN OFFICE AUDIOCABINET	20	1
7			2		8	PRINCIPAL OFFICE RECEPTACLES	20	1
9	CU-3	35			10	COPY ROOM RECPETACLE	20	1
11			2		12	COPY ROOM RECPETACLE	20	1
13	CU-4	35			14	COPY ROOM RECPETACLE	20	1
15			2		16	COPY ROOM PL RECEPTACLE	20	1
17	CU-5	35			18			
19			2		20			
21	CU-6	35			22			
23			2		24			
25	CU-7	35			26	STORAGE	20	1
27			2		28	WASHROOM RECEPTACLE	20	1
29	CU-8	36			30	HEALTH ROOM RECEPTACLE	20	1
31			2		32	EDH-1	15	1
33	CU-9	60			34	ERV-1	30	1
35			2		36	104 HOUSEKEEPING	20	1
37	SPARE	20	1		38	SPARE	15	1
39	SPARE	20	1		40	SPARE	15	1
41	SPARE	20	1		42	SPARE	15	1

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Panelboard: PANEL M
Voltage (V):
Phase/Wire:
Bus and Lugs Rating (A):

CCT NO	Load	Breaker Amp	Breaker Pole		CCT NO	Load	Breaker Amp	Breaker Pole
43	UV-1	15	1		44	CLASSROOM SMARTBOARD RECEPTACL	20	1
45	UV-2	15	1		46	CLASSROOM SMARTBOARD RECEPTACL	20	1
47	UV-3	15	1		48	CLASSROOM SMARTBOARD RECEPTACL	20	1
49	UV-4	15	1		50	CLASSROOM SMARTBOARD RECEPTACL	20	1
51	UV-5	15	1		52	CLASSROOM SMARTBOARD RECEPTACL	20	1
53	UV-6	15	1		54	CLASSROOM SMARTBOARD RECEPTACL	20	1
55	UV-7	15	1		56	CLASSROOM SMARTBOARD RECEPTACL	20	1
57	UV-8	15	1		58	CLASSROOM SMARTBOARD RECEPTACL	20	1
59					60	CLASSROOM SMARTBOARD RECEPTACL	20	1
61					62			
63					64			
65					66			
67					68			
69					70			
71					72			
73					74			
75					76			
77					78			
79					80			
81					82			
83					84			