Parks, Forestry & Recreation

CITY OF TORONTO

OAKRIDGE COMMUNITY CENTRE TEACHING KITCHEN

63 Pharmacy Avenue, Toronto, Ontario

SPECIFICATIONS

ISSUED FOR BID

OWNER WORK ASSIGNMENT NO.:	**GC2015-33660**
OWNER PROJECT NAME:	**ALLIED COMMUNITY KITCHEN / FRIENDS OF OAKRIDGE – UPGRADE TO ACCESSIBLE TEACHING KITCHEN**
CONSULTANT PROJECT NUMBER	**1914**
ISSUE DATE	**November 18, 2020**

LAPTISTE ARCHITECTURE INC.
1137A QUEEN STREET EAST, TORONTO, ONTARIO M4M 1K9

DIVISION 00 PROCUREMENT AND CONTRACTING REQUIREMENTS

DIVISION 01 GENERAL REQUIREMENTS

DIVISION 02 EXISTING CONDITIONS

DIVISION 03 CONCRETE

DIVISION 05 METALS

DIVISION 06 WOOD, PLASTICS AND COMPOSITES

END OF SECTION

LIST OF DRAWINGS

Dwg. No.	Title	Issue No.	Rev. No.	Issue Date
ARCHITECTURAL				
A000	Cover	-	-	Nov. 18, 2020
A200	Demolition Plans	-	-	Nov. 18, 2020
A210	Proposed Plan	-	-	Nov. 18, 2020
A501	Interior Elevations and Details	-	-	Nov. 18, 2020
A701	Millwork Details	-	-	Nov. 18, 2020
A702	Millwork Details	-	-	Nov. 18, 2020
MECHANICAL				
M-1	Part HVAC Plan – HVAC Demolition and New	4	-	Nov. 18, 2020
M-2	Part HVAC Plan – Plumbing and Drainage Demolition and New	4	-	Nov. 18, 2020
M-3	Part Kitchen Plan – Fire Protection	4	-	Nov. 18, 2020
M-4	Mechanical Specifications and Legend, Schedules and Drawing List	4	-	Nov. 18, 2020
ELECTRICAL				
E-1.1	Electrical Legend and Details	-	3	Nov. 18, 2020
E-1.2	Electrical Details	-	3	Nov. 18, 2020
E-1.3	Electrical Details	-	1	Nov. 18, 2020
E-2.0	Electrical Facility Plan	-	2	Nov. 18, 2020
E-2.1	Electrical Plan	-	3	Nov. 18, 2020
E-3.1	Reflected Ceiling Plans	-	3	Nov. 18, 2020
E-5.1	Electrical Demolition Plans	-	3	Nov. 18, 2020
E-6.1	Electrical Ceiling Demolition Plans	-	3	Nov. 18, 2020
E-7.1	Electrical Single Line Diagram	-	3	Nov. 18, 2020

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 Contractor traffic route
.7 Work sequence
.8 Contractor use of premises
.9 References and codes
.10 Engineer design
.11 Hazardous material discovery
.12 Building smoking environment
.13 Special conditions
.14 Site security
.15 “By Others”
.16 Use of Drawings
.17 Protection of Drawings

1.2 WORK COVERED BY CONTRACT DOCUMENTS

.1 Work of this Contract comprises selective demolition and renovations of the Oakridge Community Centre Teaching Kitchen, located at 63 Pharmacy Avenue, Toronto, Ontario, for Parks, Forestry and Recreation, City of Toronto and additional work as shown in the Contract Documents.

1.3 OWNER

.1 The Owner is the City of Toronto.

1.4 LOCATION OF WORK

.1 The Work of this Contract is located at 63 Pharmacy Avenue, Toronto, Ontario.

1.5 METRIC PROJECT

.1 This project is to be based on Metric Units. Measurements are expressed in millimeters.

1.6 SITE ACCESS

.1 Access to the site to be arranged by the Contractor based n the Owner’s approval and acceptance.

1.7 CONTRACTOR’S TRAFFIC ROUTE(S)

.1 Maintain fire department access/control.

1.8 WORK SEQUENCE

.1 Execute Work continuously.
.2 Execute work in conjunction with and in coordination with the Owner’s operational requirements.

1.9 REFERENCES AND CODES

.1 Perform Work in accordance with:

.1 Ontario Building Code (OBC).
.2 Ontario Regulation 213/07: Fire Code.
.3 Canadian Electrical Code CSA C22.1-15.
.4 Other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.

.2 Meet or exceed requirements of:

.1 Contract documents.
.2 Specified standards, codes and referenced documents.

1.10 ENGINEERING AND THIRD PARTY ENGINEERING 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.

1.11 HAZARDOUS MATERIALS DISCOVERY

.1 Refer to Section 02 32 00 – Available Project Information and 02 32 00.1 – Hazardous Building Materials Survey.

.2 Should hazardous materials be discovered that are not identified in the Hazardous Building Materials Survey, stop work in that area and notify the Owner immediately.

1.12 BUILDING SMOKING POLICY

.1 Smoking is prohibited in all work places within the Owner’s buildings.

1.13 SPECIAL CONDITIONS

.1 The following general and special conditions apply:

.1 All existing surfaces and finishes are to be repaired or replaced, if they are damaged during the course of the Work.

.2 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.

.3 All exposed interior surfaces, except prefinished surfaces, shall be painted or re-painted, whether referred to in the specifications and drawings or not.

1.14 SITE SECURITY

.1 Daily Security Reviews: Full-time security guard will not be specifically required, but the Contractor shall provide reviews of the building and site, daily, while the Work is in progress and shall take whatever measures are necessary to secure the building from theft, vandalism and unauthorized entry.

1.15 TERM “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.

1.16 USE OF DRAWINGS

.1 Copies of architectural “Issued for Construction” Drawings in digital format will be made available for the Contractor’s use under the following conditions.

.1 Copyright remains with Laptiste Architecture Inc.

.2 The drawings will only be used for producing shop drawings for this project and not for any other use.

.3 Laptiste Architecture Inc. 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 Laptiste Architecture Inc. and other Consultants must be deleted from the title blocks.

.5 The Contractor must sign a release available from Laptiste Architecture Inc. that addresses the above items in more detail.

.2 Arrangements for use of sub-consultant drawings must be made with the appropriate sub-consultant.

1.17 PROTECTION OF DRAWINGS

.1 Copyright of electronic document belongs to the applicable authoring 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’s controlled websites for access by sub-trades and suppliers; shall be posted only on password protected and secure websites approved by the Consultant, to limit access to only those parties with an expressed interest in the Project.

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

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 Section Includes

.1 Consultants

1.2 Consultants

.1 ARCHITECT:
Laptiste Architecture Inc.
1137a Queen Street East
Toronto, Ontario M4M 1K9
(416) 919-4525
Attention: Shane Laptiste

.2 MECHANICAL ENGINEER:
Madonna Engineering Inc.
10-93 Woodstream Blvd
Woodbridge, Ontario L4L 7Y7
(905) 265-1911
Attention: Ravi Shukla

.3 ELECTRICAL ENGINEER:
HCC Engineering Limited
40 Eglinton Avenue East, Suite 600
Toronto, Ontario M4P 3A2
(416) 932-2423
Attention: Phoenix Chen

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 INTENT

.1 This Section is to be read in conjunction with the General Conditions of Contract.

1.2 DEFINITIONS

.1 “Administrative Fee” means the fee permitted for the administration of all paperwork related to a change in the work and any other work not covered by Direct Cost and Overhead Cost. The Administrative Fee does not cover profit.

.2 "Construction Equipment Cost" means the cost of rented or owned equipment, including cost of loading, transportation, unloading, erection, maintenance, fuel, dismantling and removal. This excludes small tools customarily used to carry out the Work by workers and valued at less than $500.00.

.3 “Direct Cost" means actual costs of material and labour as used in the valuation of changes as described in the General Conditions of Contract. Direct Cost is the sum of costs directly related to or necessarily and properly incurred by Contractor, Subcontractors and Sub-subcontractors in the performance of a change in the Work. Direct Cost shall exclude Overhead Cost and profit but shall include:

.1 Operation and maintenance of site offices,
.2 Administration at site offices,
.3 Material Cost,
.4 Total Labour Cost,
.5 Travel and Subsistence Cost,
.6 Temporary Work Cost,
.7 Construction Equipment Cost,
.8 additional bonding and insurance cost,
.9 salaries and other compensation of on-site superintendents and other supervisory personnel,
.10 planning, estimating, and scheduling of work costs,
.11 consumable and expendable materials for small tools, and
.12 Schedule Impact Cost, only where the change has an impact on critical path items,

.4 "Direct Labour Cost" means base wage costs of employees, including overtime premium where applicable, but excludes Payroll Burden Cost.

.5 "Material Cost" means cost of all Materials, including transportation and storage thereof. All rebates, refunds, returns from sale of surplus Materials, and trade discounts other than prompt payment discounts, shall be credited to the Owner.

.6 "Overhead Cost" means Contractor's, Subcontractors' and Sub-subcontractors' costs related to:

.1 operation and maintenance of head offices and branch offices,
.2 administration at head offices and branch offices,
.3 general management, legal, audit, and accounting services,
.4 buying organization,
.5 corporate tax,
.6 financing and other bank charges,
.7 salaries and other compensation of off-site personnel,

.8 recruitment and training of on-site staff, and
.9 all other costs not defined as direct costs.

.7 "Payroll Burden Cost" means actual costs paid by the employer for statutory charges and benefit costs additional to Direct Labour Cost. It includes the employer's contributions to Canada Pension Plan, Employment Insurance, Workers' Compensation Board, vacation pay, statutory holiday pay, health and wellness plan, and pension plan. It also includes the actual employer paid incentives for expendable and non-expendable small tools with a value of less than $500.00, safety and protective equipment, education and training, and other payroll costs which are hourly wage dependent.

.8 "Schedule Impact Cost" means Contractor's, Subcontractors' and Sub-subcontractors' costs related to an increase in the Contract Time where the change has an impact on the Project's critical path.

.9 "Temporary Work Cost" means cost of temporary structures, facilities, services, controls, and other temporary items used in the performance of a Change in the Work, including maintenance, dismantling and removal, less any residual value after dismantling and removal.

.10 "Total Labour Cost" means sum of Direct Labour Cost and Payroll Burden Cost.

.11 "Travel and Subsistence Cost" means travel and subsistence costs incurred by employees when working beyond a reasonable commuting distance from their normal place of residence.

1.3 SCHEDULE OF LABOUR RATES

.1 Submit to the Owner a Schedule of Labour Rates for the Project.

.2 Labour rates stated in the Schedule shall be the hourly labour rates that will be applied when estimating increases and decreases in cost resulting from changes in the Work. Assume that work will be performed during regular working hours, not premium time.

.3 The approved Schedule of Labour Rates will be used solely for evaluating Contractor Proposals for changes in the Work. Nothing specified herein, nor the submission of a Schedule of Labour Rates by the Contractor, shall be construed to mean that the Owner has established, or will establish, minimum wages or benefits applicable to the Work, other than those required by law.

.4 Include all trades that will be employed in the Work, including trades employed by Subcontractors and Sub subcontractors.

.5 Provide a breakdown indicating hourly labour rates for Direct Labour Cost, Payroll Burden Cost, and the resulting Total Labour Cost for journeymen, apprentices, foremen and other applicable classifications within each trade.

.6 Labour rates stated in Schedule shall be consistent with rates that will actually be paid in the normal performance of the Work, during regular working hours, and shall not exceed the following:

.1 Where collective agreements apply:

.1 rates for Direct Labour Cost shall not exceed rates established by collective agreements, and

.2 rates for Payroll Burden Cost shall not exceed rates established by collective agreements and statutory charges.

.2 Where collective agreements do not apply:

.1 rates for Direct Labour Cost shall not exceed rates prevailing in the locality of the Project, and

.2 rates for Payroll Burden Cost shall not exceed 45% of rates for Direct Labour Cost.

.7 The Owner's approval of rates provided in the Schedule of Labour Rates will be conditional upon compliance with the foregoing requirements. Approval will be based on most current information available to the Owner on Ontario construction industry wages and benefits.

.8 Contractor may request an amendment to an approved rate stated in the Schedule of Labour Rates, if and when required on account of a change in the rate that will actually be paid in the normal performance of the Work. If Contractor can prove to the Owner's satisfaction that a different rate will actually be paid, the Owner may, at its sole discretion, approve such a change in rate.

1.4 CHANGE ORDER PROCEDURES - LUMP SUM METHOD OF VALUATION

.1 The Owner through the Consultant will issue a Request for Proposal to the Contractor.

.2 Contractor shall submit a Contractor Proposal stipulating:

.1 a lump sum increase, decrease, or no change in the Contract Price, and
.2 an increase, decrease, or no change in the Contract Time,

on account of the proposed change in the Work.

.3 Include in the Contractor Proposal a detailed breakdown of lump sum increase or decrease, indicating Contractor's, and where applicable Subcontractors' and Sub subcontractors':

.1 itemized direct costs applicable to the proposed change in the Work, and
.2 applicable amounts for overhead and profit, in accordance with percentages specified in the General Conditions of Contract.

Do not include costs that would otherwise be incurred in the normal performance of the Work.

.4 Include in detailed breakdown of the Contractor Proposal a further breakdown of the total labour cost component indicating, for each applicable trade and trade classification, the labour rate(s) and the number of hours from which the total labour cost is derived.

.5 Include in detailed breakdown of the Contractor Proposal only those labour rates included in Schedule of Labour Rates and previously approved by the Owner, in writing, unless the extra work cannot be performed during regular working hours and the Owner has given approval, in writing, for premium time labour rates.

.6 Upon the Owner's approval and acceptance of the Contractor Proposal, a "Change Order" will be issued to the Contractor.

1.5 FIELD ORDER PROCEDURES

.1 The Owner through the Consultant may issue a Field Order to the Contractor to have the work of a required change proceed without undue delay in the event of any of the following:

.1 the work is required to proceed to avoid progress delays in the Work;

.2 the required changes in the work are of an urgent nature, or

.3 the Owner and the Contractor cannot come to an agreement in price for required changes in the Work.

.2 In the event of 5.1.1, the Field Order will be issued subject to the Owner's acknowledgement of the Contractor's estimate for that change in the Work.

.1 Following the Owner's review, agreement, and approval of cost; the Owner though the Consultant will issue a Change Order for that work.

.2 If the Owner and the Contractor cannot come to an agreement in price for the required work in 5.1.1, then the Field Order procedures in 5.3 will apply.

.3 In the event of circumstances identified in 5.1.2, 5.1.3 or 5.2.2, the Field Order will contain a maximum upset amount as determined by the Owner which the Contractor shall not exceed without the Owner's written consent based on the Contractor's submitted written rationale for the excess.

.1 Upon receipt of a Field Order, the Contractor shall proceed with the work of the required change on a time and material basis with records signed daily by the Contractor. Labour and equipment costs must be approved by the Owner prior to commencement of that work.

.2 Once the work of the required change has been completed, the Owner will issue a Change Order for that work based on the actual time and material expended in the performance of that work.

.4 If the Field Order was issued due to a disagreement in the pricing of a change and the Owner and the Contractor comes to an agreement during the performance of that work, the Owner will issue a Change Order for that agreed amount and the recorded time and material expended will no longer be required or considered.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 GENERAL COORDINATION

.1 Coordinate all construction activities as required to ensure efficient and orderly installation of each part of the Work.

.2 Where installation of one (1) part of the Work is dependent on installation of other components, either before or after its own installation, schedule and coordinate construction activities in the sequence required to obtain the best results.

.3 Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.

.4 Make adequate provisions to accommodate items scheduled for later installation under separate contract or by the Owner's own forces.

.5 Make adequate provisions to accommodate Owner's on-going operations.

1.2 ADMINISTRATIVE PROCEDURES

.1 Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the Work. Such administrative activities shall include, but not be limited to, the following:

.1 Preparation of schedules.
.2 Installation and removal of temporary facilities.
.3 Delivery and processing of submittals.
.4 Progress meetings.
.5 Contract acceptance procedures.
.6 Phasing of the Work, if required.

1.3 GENERAL INSTALLATION PROVISIONS

.1 Require the installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

.2 Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.

.3 Inspect Materials immediately upon delivery and again prior to installation. Reject damaged and defective items.

.4 Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and building movement.

.5 Provide uniform joint widths in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Consultant for final decision.

.6 Install each component during weather conditions and Project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.

.7 Coordinate temporary enclosures with required inspections and tests, to minimize the

necessity of uncovering completed construction for that purpose.

.8 Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Consultant for final decision.

.9 Supervise construction activities to ensure that no part of the Work, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

1.4 CUTTING AND REMEDIAL WORK

.1 Do the cutting and remedial work required to make the several parts of the Work come together properly.

.2 Coordinate the Work to ensure that this requirement is kept to a minimum.

.3 Cutting and remedial work shall be performed by specialists familiar with Materials affected and shall be performed in a manner to neither damage nor endanger the Work.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 32 16 – Construction Schedules.

1.2 PRE-CONSTRUCTION MEETING

.1 Schedule a pre-construction meeting within fifteen (15) days after date of commencement of the Contract and prior to commencement of activities at the Place of the Work.

.2 Purpose: To review personnel assignments, responsibilities, and administrative and procedural requirements.

.3 Location: To be determined.

.4 Meeting chaired by the Owner's Consultant representative.

.5 Attendees:

.1 Contractor's Representatives: Contractor's senior management, Contractor's project manager, Contractor's site superintendent, representatives of major Subcontractors,

.2 Owner's Representatives: as determined by the Owner.

.3 Consultants, Sub-Consultant's representatives and others as necessary.

.6 Agenda:

.1 Introduction of the Owner's and Contractor's representatives.

.2 Review of significant contractual responsibilities and administrative and procedural requirements.

.3 Other business.

1.3 CONSTRUCTION PROGRESS MEETINGS

.1 Schedule regular construction progress meetings during the course of the Work.

.2 Purpose: To monitor construction progress and to identify problems and action required for their solution, to expedite the Work.

.3 Frequency: Every two weeks, or as otherwise directed by the Owner or Consultant.

.4 Location: Contractor's site office.

.5 Attendees:

.1 Contractor's representatives: Contractor's project manager, Contractor's site superintendent and when so requested by the Owner, Subcontractors, suppliers and other parties involved in the Work. Contractor's representatives shall be qualified and authorized to act on behalf of the party each represents.

.2 Owner's representatives: as determined by the Owner.

.6 Meeting Chaired By: Owner’s Consultant representative.

.7 Agenda:

.1 Review and approval of minutes of previous meeting.

.2 Review of items of significance that could affect progress.

.3 Other topics for discussion as appropriate to current status of the Work.

.8 Minutes: The Owner's prime consultant will record minutes and distribute copies to all attendees within seven Days after meeting.

1.4 WARRANTY MEETINGS

.1 Warranty meetings shall be held between Final Acceptance of the Work and Total Completion of the Work.

.2 Purpose: To bring to Contractor's attention Contract Deficiencies identified during warranty period, determine action required for their correction, and monitor progress of Contract Deficiency correction.

.3 Frequency: Called by the Owner on an as-needed basis.

.4 Location: As agreed to between the Owner and Contractor.

.5 Attendees: Same as construction progress meetings.

.6 Meeting Chaired By: Owner’s Consultant representative.

.7 Agenda:

.1 Review and approval of minutes of previous meeting.

.2 Review of progress of Contract Deficiency correction.
.3 Identification of problems impeding Contract Deficiency correction.

.4 Review of outstanding Contract Deficiencies.

.5 Other business.

.8 Minutes: same as construction progress meetings.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 11 00 – Summary of Work.

.2 Section 01 33 23 – Shop Drawings, Product Data and Samples.

1.2 CONSTRUCTION PROGRESS SCHEDULE

.1 Form of Schedule:

.1 Horizontal bar chart of sufficient size to clearly indicate all required information.

.2 Divide time into months, weeks, and days. Identify first work day of each week.

.3 Allow space for revisions.

.2 Content of Schedule:

.1 List and provide a separate bar for each activity.

.2 Indicate start and completion dates for each activity and for milestones.

.3 Indicate projected percentage of completion for each activity as of first day of each month.

.4 Provide a separate bar for each specified Allowance, except for Allowances for Unforeseen Work. List each definable activity for each Allowance. Include dates for receipt of documentation or information pertaining to work covered by Cash Allowances.

.5 Provide a separate bar for Contractor start-up of:

.1 Each Electrical system
.2 Each Mechanical system

.6 Provide a schedule with critical path, successors, predecessors, and AON (Activity on Nodes) as the requested by the Owner. The provided schedule to be free from password protection.

.3 Progress Revisions:

.1 Keep schedule on site and up-to-date for duration of Contract.

.2 Indicate actual progress of Work.

.3 Indicate major changes in scope.

.4 Revise projections of progress and completion as required.

.5 When requested by the Owner, submit an updated recovery schedule within seven days of the request.

.6 Provide two week look ahead Schedules.

.4 Submissions:

.1 Within 15 days after date of commencement of Contract, submit a copy of an initial Construction Schedule for the Owner's review and acceptance, at the pre-construction meeting.

.2 Revise and resubmit Schedule as required by the Owner.

.3 Submit copy of updated Schedule when requested by the Owner.

.4 Submit an updated schedule with each progress claim.

1.3 SUBSCHEDULES

.1 Provide sub-schedules to define the following portions of prime Construction Progress Schedule in greater detail:

.1 Mechanical.

.2 Electrical.

.3 Project Phasing.

.4 Contractor Start-Up.

.2 Form of Sub-Schedules: Same as Construction Progress Schedule.

.3 Content of Mechanical, Electrical, Project Sub-Schedules: Same as Construction Progress Schedule, except more detailed.

.4 Content of Contractor Start-up Sub-schedules:

.1 List and provide a parent bar for the following:

.1 Each mechanical system specified in Division 20 - 25.

.2 Each electrical system specified in Division 26 - 28.

.2 Include milestone dates for the completion of Construction Progress Schedule tasks which are linked to the start dates for Contractor Start-up tasks.

.3 Group Contractor Start-up tasks by system and provide a separate bar for the one or more tasks within each of the following activities:

.1 Pre-start tests and inspections.

.2 Start-up procedures, including manufacturer’s site services where required.

.3 Testing, adjusting, and balancing.

.4 Preparation of reports.

.5 Province’s review of systems and reports.

.6 Contract Deficiency correction.

.4 Indicate start and completion dates for each activity.

.5 Progress Revisions: Same as Construction Progress Schedule. Confirm sub-schedules remain coordinated with Construction Progress Schedule.

.6 Submissions: Submit sub-schedules together with Construction Progress Schedule.

1.4 SUBMITTALS SCHEDULE

.1 Prepare a schedule of shop drawings, product data and samples which are proposed to be submitted during the course of the Contract.

.3 Submit Submittals Schedule for the Province's review within 15 days after date of commencement of Contract.

.4 After review, the Owner may require submission of additional information or request that some proposed submittals not be submitted. Submittals not requested may not be processed or reviewed by the Owner.

.5 Submittals Schedule may be part of Construction Progress Schedule.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 32 16 – Construction Schedules.

.2 Section 01 33 23 – Shop Drawings, Product Data and Samples.

.3 Section 01 78 00 – Closeout Submittals.

1.2 WORKPLACE SAFETY AND INSURANCE BOARD CERTIFICATE

.1 Before commencement of activities at the Place of the Work, obtain and submit to the Province a clearance certificate from the Workplace Safety and Insurance Board.

1.3 CASH FLOW FORECAST

.1 Before submission of first application for payment, submit to the Owner for approval, a forecast of approximate monthly progress payments for the duration of the Contract.

.2 Submit revised cash flow forecasts as required as the work progresses or when requested by the Owner.

1.4 PHOTOGRAPHS

.1 Provide progress photographs taken every two (2) weeks.

.2 Take progress photos from two (2) separate viewpoints determined by the Owner.

.3 In addition, illustrate any special operation, phase of construction, or special detail of unusual interest for record purposes.

.4 Take photos of primary entrance at Substantial Completion.

.5 Forward digital photographs in .jpg format, 150 dpi resolution minimum, 3MB maximum of each photograph, along with monthly progress estimates. Provide the following information on each photograph:

Date:
Name of Contractor:
Name of Project:
Set Number:

.6 All photographs will become the Owner's property to be used for whatever purposes the Owner may desire.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 INTENT

.1 Submit to the Owner for review, shop drawings, product data, and samples called for by the Contract Documents and for such other items as the Owner may reasonably request.

.2 Until submittal is reviewed, do not proceed with Work involving the relevant product.

1.2 RELATED SECTIONS

.1 Section 01 32 16 – Construction Schedules.

.2 Section 01 33 00 – Submittal Procedures.

1.3 SHOP DRAWINGS

.1 Shop Drawings: Means technical data specially prepared for Work of this Contract; including drawings, diagrams, performance curves, data sheets, schedules, templates, patterns, reports, calculations, instructions, measurements, and similar information not in standard printed form.

.2 Present shop drawings in a clear and thorough manner to appropriately illustrate the Work.

.

.3 Identify field dimensions on Drawings.

.4 Identify shop drawings by appropriate references to sheet, detail, schedule, or room numbers.

.5 Maximum Drawing Size: 860 x 1120 mm.

.6 Leave a clear space of 100mm x 75mm on each sheet of shop drawings for placement of the Consultant's review stamp.

.7 Submit one (1) set of mylars for each required shop drawing.

1.4 PRODUCT DATA

.1 Product Data: Means standard printed information describing materials, products, equipment, and systems not specially prepared for Work of this Contract, other than the designation of selections.

.2 Clearly mark product data to identify products.

.3 Manufacturer's standard schematic drawings, catalogue sheets, diagrams, schedules, performance charts, illustrations, and descriptive data will be accepted in lieu of shop drawings, provided that:

.1 information not applicable to work of this Contract is deleted, and

.2 standard information is supplemented with information specifically applicable to the work of this Contract.

.4 Submit electronic information as follows:

.1 One (1) electronic PDF for product data, shop drawings and material safety data sheets.

1.5 SAMPLES

.1 Samples means cuts or containers of materials or partial sections of manufactured or fabricated components which are physically identical to products proposed for use and which establish minimum standards by which the work will be judged.

.2 Label samples as to origin and intended use in the Work.

1.6 SUBMITTAL PREPARATION

.1 Review, date, and sign shop drawings, product data, and samples prior to submission.

.2 Determine and verify:

.1 Field measurements.

.2 Field construction criteria.

.3 Catalogue numbers and similar data.

.4 Conformance with Contract Documents.

.3 Coordinate each submittal with requirements of Work and Contract Documents. Individual Drawings will not be reviewed until all related shop drawings and product data are available.

.4 Notify the Province in writing on the submittal and at the time of submission, of deviations from requirements of Contract Documents.

1.7 SUBMISSION REQUIREMENTS

.1 Make submittals sufficiently in advance of date that reviewed submittals will be required, and in such sequence as to cause no delay in the Work.

.2 Accompany submittals with transmittal letter containing:

.1 Date.

.2 Project title and number.

.3 Contractor's name and address.

.4 Number of each shop drawing, product data, and sample submitted.

.5 Other pertinent data.

.3 Submittals shall include:

.1 Date and revision dates.

.2 Project title and number.

.3 Name of:

.1 Contractor.
.2 Subcontractor.
.3 Supplier.
.4 Manufacturer.
.5 Name of detailer when details not prepared by Contractor, Subcontractor, or supplier.

.4 Contractor's stamp, initialed or signed, certifying review of submittal, verification of field measurements, and compliance with Contract Documents.

.4 Make corrections or changes to rejected submittals and resubmit, as specified for initial submission.

1.8 RESPONSIBILITY FOR ERRORS, OMISSIONS AND DEVIATIONS

.1 The Consultant's review of submittals does not relieve Contractor from responsibility for errors and omissions, nor deviations from requirements of the Contract Documents.

1.9 REPRODUCTION OF SUBMITTALS

.1 After final review, the Consultant will reproduce at their expense (if required), the number of copies required and return reviewed reproducible documents. Contractor shall reproduce at his expense the number of copies required for performance of the Work.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 INTENT

.1 These procedures apply to requirements for patching and making good around new and existing Work.

1.2 SITE VISIT

.1 Review existing site conditions during bid period. Investigate ceiling plenums, duct shafts, wall structures and other building systems affected by the Work.

.2 Confirm dimensions of applicable existing equipment with field measurements.

.3 Use visit to note required materials which may be difficult to provide and notify the Owner as soon as possible.

1.3 SUBMITTALS

.1 Comply with requirements of Section 01 33 00 – Submittal Procedures.

.2 Submit Drawings of Structural alterations and temporary support systems for the Province's review before proceeding with Structural alterations.

.3 Provide Drawings fully detailing alterations to structure, signed and sealed by a professional Structural Engineer registered to practice in the Province of Ontario.

.4 Submit for the Owner’s approval, details of methods other than specified coring, drilling, or cutting.

1.4 STRUCTURAL ALTERATIONS

.1 Do not cut, cut into or alter any building structure, or bearing walls and partitions until proposed methods and procedures for doing so, including temporary support system, are reviewed by the Owner and the Consulting Team.

.2 Conform strictly to approved details. Cut or remove only to extent shown on Engineer's Drawing reviewed by the Owner.

1.5 SPECIAL PROTECTION REQUIREMENTS

.1 Protect unaffected finishes, equipment, and adjacent work from damage caused by cutting, moving, removal, and patching operations. Protect surfaces which will remain as part of finished work.

.2 Notify the Owner immediately of damage to fireproofing coatings.

.3 Protect fireproofing coating to structural members. If damaged due to Work of this Contract, restore damaged areas to original condition using materials to match existing colour, texture, and required fire protection rating.

.4 Protect personnel, building occupants, and the public from airborne dust and contaminants when cleaning spray fireproofing or contaminant-generating materials from structure.

.5 Protect area below welding work from sparks and molten metal, using wet double canvas blankets.

1.6 CUTTING, REMOVAL AND FITTING

.1 Make cuts with clean, true, smooth edges. Provide patches inconspicuous in final assembly.

.2 Use electric percussion tools to cut clay tile, plaster and concrete blocks.

.3 Carefully remove material being cut. Do not cut services discovered.

.4 Where required, carefully remove modular, manufactured-type finishes, including lay-in ceiling tiles in component ceiling systems.

.5 Fit alteration work airtight to pipes, sleeves, ducts, conduits, and other required penetrations through building elements.

1.7 MATERIALS

.1 Obtain new products to patch, match, or extend existing products; meet or exceed quality of existing products.

.2 Quality of existing products, available for assessment during Pre-Bid Site Visit, shall serve as basis for requirements for appearance and performance of materials used in the Work.

.3 Where existing material cannot be matched with new, salvaged material may be used subject to approval by the Owner.

.4 Where matching materials are not available, the Owner will consider similar product(s) which meets same performance requirements as existing.

.5 Obtain acceptance of the Owner before installing any materials not matching existing.

1.8 PATCHING, EXTENDING AND MAKING GOOD EXISTING WORK

.1 Patch, extend, and make good existing Work using skilled workers able to match existing quality. Quality of Work shall meet technical requirements for similar components throughout Specifications.

.2 Where a portion of existing finished surface is damaged, lifted, stained, or otherwise imperfect, patch or replace with matching materials. Match existing finishes unless specified otherwise.

.3 If patched or imperfect surface was painted or coated, repaint or recoat entire surface area.

.4 Replace damaged lay-in type ceiling tile and other components with new.

.5 Patch surfaces and materials exposed by partition removal with finishes to match adjacent.

.6 Restore existing Work damaged during construction to a condition matching existing finishes.

1.9 TRANSITIONS

.1 Make transitions as smooth as possible where new Work abuts or finishes flush with existing Work.

.2 Match existing adjacent Work in texture and appearance, providing transition invisible to the eye from a distance of 6'-0".

.3 When smooth transition is not practicable, e.g. from a smooth finish to masonry, tile, or plaster, terminate existing surface along a straight line at a natural point of division and provide trim; to the Owner's approval.

.4 Where two (2) or more spaces become one (1) space and planes are nominally continuous, re-work floors, walls, and ceilings to provide planes meeting without breaks, steps, or bulkheads.

.5 Where change of plane exceeds 3", obtain instructions from the Consultant for method of executing transition.

1.10 EXISTING SERVICES

.1 Establish location and extent of services in area of Work and notify the Consultant of findings before starting Work.

.2 Inform the Consultant immediately of unknown services that are encountered. Confirm findings in writing.

1.11 ALTERATIONS TO MECHANICAL AND ELECTRICAL SERVICES

.1 Refer to Mechanical and Electrical Drawings, for extent of Mechanical and Electrical alterations.

.2 Perform alterations with minimum disturbance to existing work.

.3 Access service runs in ceiling spaces through light fixture openings and ceiling access panels where possible. Subject to the Owner's approval, provide bulkheads to conceal services where ceiling spaces are not accessible.

.4 Except in Mechanical and Electrical Rooms, conceal the following using chases and cut-outs in walls and floors, under-floor ducts, and ceiling spaces:

.1 ducts
.2 pipes
.3 raceways
.4 conduit runs
.5 junction boxes

.5 Patch and make good existing work, where damaged due to alterations to and installation of services.

1.12 CORING, DRILLING, AND SAW-CUTTING CONCRETE

.1 Complete an x-ray inspection of affected concrete area before coring. Employ the services of an experienced x-ray inspector. Confirm with the Owner before coring or

drilling, location of reinforcing steel and raceways that may be present.

.2 Perform coring and drilling after normal working hours, unless specified otherwise. Confirm coring and drilling times with the Owner.

.3 Wet or dry core drilling and saw-cutting are acceptable. Reduce amount of cooling water used to minimum required, and collect water used in suitable containers or use a suitable vacuum system that will collect water.

.4 Do not core structural beams or cut conduits or reinforcing steel without written permission from the Structural Consultant.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 DEFINITIONS

.1 Regulatory requirements mean laws, bylaws, ordinances, rules, regulations, codes, orders of Authorities Having Jurisdiction, and other legally enforceable requirements applicable to the Work and which are or become in force during the performance of the Work.

1.2 GENERAL

.1 Comply with regulatory requirements.

.2 Except as otherwise specified, apply for, obtain, and pay all fees associated with permits, licenses, certificates, and approvals required by regulatory requirements and the Contract Documents, based on:

.1 regulatory requirements and fees in force on date of Tender submission, and

.2 any change in regulatory requirements or fees scheduled to become effective after date of Tender submission and of which public notice has been given prior to date of Tender submission.

.3 The Owner will obtain permanent easements and rights of servitude which may be required for performance of the Work.

.4 Contractor shall give all notices required by regulatory requirements.

1.3 CONTRACT DOCUMENTS

.1 Contractor shall not be responsible for verifying that Contract Documents comply with regulatory requirements. If Contract Documents are at variance therewith, or changes which require modification to Contract Documents are made to regulatory requirements by Authorities Having Jurisdiction subsequent to date of Tender closing, Contractor shall notify the Owner in writing requesting direction immediately as such variance or change becomes known to him. The Owner may make changes required to Contract Documents, and any resulting change in Contract Price or Contract Time will be made in accordance with the General Conditions of Contract.

.2 If Contractor fails to notify the Owner in writing and obtain the Owner's direction as required in Paragraph 3.1, and performs Work knowing it to be contrary to regulatory requirements, Contractor shall be responsible for and shall correct violations thereof; and shall bear costs, expenses, and damages attributable to his failure to comply with provisions of such regulatory requirements.

1.4 ONTARIO BUILDING CODE

.1 Conform to and perform Work in accordance with the Ontario Building Code, current edition, except as otherwise indicated in Contract Documents.

1.5 PERMITS

.1 Building Permit:

.1 The Owner will apply for, obtain, and pay for Building Permit.

.2 Contractor shall display the Building Permit and such other permits in a conspicuous location at the Place of the Work.

.1 Occupancy Permits:

.1 Where required by Authority Having Jurisdiction, Contractor shall apply for, obtain, and pay for Occupancy Permits, including Partial Occupancy Permits.

.2 Where Contract Document deficiencies are required to be corrected in order to obtain Occupancy Permits, including Partial Occupancy Permits, the Owner will issue appropriate instructions to correct the Work.

.3 Turn Occupancy Permits over to the Owner.

.4 Other Permits:

.1 Contractor is responsible for obtaining and paying for all other Permits associated with executing the Work of this Contract.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 TESTING BY CONTRACTOR

.1 Contractor shall furnish to the Owner upon request, test results from testing performed by Contractor.

1.2 TESTING BY THE OWNER

.1 The Owner reserves the right to employ services of independent testing agencies to establish if Work complies with Contract Documents. The Owner will appoint and pay for services of such testing agency.

.2 Where tests or inspections by the Owner appointed testing agency indicate Work is not in accordance with the Contract Documents, additional tests or inspections as the Owner may require, to verify acceptability of corrected Work, shall be paid for by Contractor.

.3 Testing Agencies appointed by the Owner will review their appropriate scopes of work and report on finding and testing through the Prime Consultant and the Owner.

.4 Testing Agencies appointed by the Owner do not have authority to direct work on site, regardless of whether the work is in accordance with the Contract Documents or not. Additional Work and remedial Work must be directed through the Prime Consultant and the Owner before it is executed on site.

.5 Testing Agencies appointed by the Owner must provide written or electronic reports of all site reviews, or inspections within 72 hours of the review or inspection.

.6 Contractor is responsible to provide unencumbered access to the Work for the purposes of the Owner appointed Testing Agencies to conduct inspections.

.7 Contractor is responsible to coordinate the independent testing agencies, provide reasonable notification time (minimum forty-eight (48) hours) of testing requirements.

1.3 REVIEW OF LINES AND LEVELS

.1 When the setting out of main lines for the building is complete and floor elevations established, request the Consultants in writing to review this Work.

.2 Do not proceed with any further Work until this review is made and confirmed in writing.

1.4 REFERENCE STANDARDS

.1 Within the text of these Specifications, reference may be made to the following standards and possibly additional standards not listed here:

.1 ANSI – American National Standards Institute.

.2 ASTM – American Society for Testing and Materials.

.3 CGSB – Canadian General Standards Board.

.4 CSA – Canadian Standards Association.

.5 CAN – National Standard of Canada (published by CGSB).

.6 FM – Factory Mutual Engineering Corporation.

.7 ULC – Underwriters' Laboratories of Canada.

.2 The referenced standard and any amendments in force on the day of receipt of Bids shall be applicable to the Work during the duration of the Contract.

1.5 REVIEW

.1 Refer to the General Conditions.

.2 The Owner and the Consultant Team shall have access to the Work. If parts of the Work are in preparation at locations other than the Place of the Work, access shall be given to such Work whenever it is in progress.

.3 Give timely notice requesting site review if Work is designated for special tests, Site reviews, or approvals by Consultant Team instructions, or the law of the Place of the Work.

.4 If the Contractor covers Work, or permits to be covered Work that has been designated for special tests, site reviews, or approvals before such are made, the Contractor shall uncover such Work, have the site reviews or tests satisfactorily completed and make good such Work, at their own cost.

.5 The Owner may order any part of the Work to be examined if the Work is suspected to not be in accordance with the Contract Documents. If, upon examination, such Work is found not in accordance with the Contract Documents, the Contractor will correct such Work and pay the cost for the examination and correction.

1.6 CONTRACTOR'S PROJECT CONTROL

.1 Ensure that only specified or approved materials are used.

.2 Provide and maintain an effective Quality Control Program and perform sufficient inspections and tests of all items of the Work, including those of Subcontractors, to ensure compliance with Contract Documents.

.3 Ensure that installation is in accordance with the Specifications and to manufacturer's directions, or to methods which have been submitted and approved in writing by the Consultant prior to proceeding with the Work. The Project Superintendent shall ensure that these requirements are made clear to the trade foremen immediately before the Work of their trade commences at the site.

1.7 TESTING BY CONTRACTOR

.1 Upon request, the Contractor shall furnish to the Owner test results from testing performed by the Contractor.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 INTENT

.1 Provide temporary facilities and controls specified in this Section and as otherwise required for performance of Work of the Contract.

1.2 REFERENCE DOCUMENTS

.1 Canadian General Standards Board (CGSB):

.1 CAN/CGSB 1.189-00: Exterior Alkyd Primer for Wood.

.2 CGSB 1.59-97: Alkyd Exterior Gloss Enamel.

.2 Canadian Standards Association (CSA):

.1 CSA-A23.1/A23.2-04: Concrete Materials and Methods of Concrete Construction / Methods of Test and Standard Practices for Concrete.

.2 CSA-0121-M1978(R2003): Douglas Fir Plywood.

.3 CAN/CSA-S269.2-M1987: Access Scaffolding for Construction Purposes.

.4 CAN/CSA-Z321-96(R2001): Signs and Symbols for the Occupational Environment.

1.3 SUBMITTALS

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

1.4 DESIGN OF TEMPORARY FACILITIES

.1 Contractor shall be responsible for design and safety of temporary facilities. Temporary facilities of such nature that engineering proficiency is required for their design to ensure safety during construction shall be designed by a Professional Engineer in the employ of the Contractor. Before the temporary structure is used, the person responsible for the design or his representative, shall inspect the structure and issue a certificate stating that it has been constructed according to his design.

1.5 FIELD OFFICES AND SHEDS

.1 Contractor's Office: Provide and maintain, during the entire progress of the work, a suitable office or offices on the site, for own use and sub-trade use, with suitable tables or benches for the examination of Drawings, Specifications, etc., and where all notices and instructions from the Province may be received and acknowledged.

.2 Materials Storage: Provide suitable weather and waterproof storage buildings for the storage and protection of materials. These buildings shall be under lock and key and maintained in good condition until the completion of the building.

.3 Off Site Materials Storage: There may be off-site materials storage requirements on this project. If required, the Contractor will be responsible for the procurement and payment of all off-site storage. Contractor is to endeavor to avoid off-site material storage.

1.6 UTILITIES

.1 Sanitary Facilities: Provide and maintain during the work, temporary toilets for the use of all workmen employed on the work. Toilets in the finished portion of the building shall not be used by workmen. Comply with the Provincial Board of Health Regulations under the Public Health Act. Provide separate facilities for both sexes as required.

.2 Water Supply: Contractor will be permitted use of existing water supply, for construction purposes, at no cost to the Contractor. Contractor shall be responsible for all connections, disconnections, service lines, valves, etc., required to provide service and removal of same to the satisfaction of the Owner upon completion of the Work.

.3 Temporary Light and Power: Contractor will be permitted use of existing lights and power for construction purposes at no cost to the Contractor. Contractor will be responsible for all connections, disconnections, switches, service lines, etc., and removal of same upon completion of the Work.

.4 Temporary Heating (if required): Make provision for heating the building during its erection and until date of Substantial Performance of the Work. Ensure the temporary heating system will maintain a minimum temperature of 16°C in the building enclosure from shell construction to completion of the interior work. For this purpose, heaters and radiators specified for the project may be used and temporarily installed. Pay all costs for temporary heating up to the date of Substantial Performance of the Work. The cost of any boilers, chimneys, pumps, piping, valves, heaters, radiators, etc., necessary for a temporary hookup shall be borne by the Contractor. Any portion of the building's heating or ventilating system used by the Contractor shall be restored to "new" condition, placed in permanent positions as indicated on Drawings before acceptance by the Owner. Warranty period on equipment used temporarily shall commence on date of Substantial Performance of the Work.

.5 Telephone: Arrange and pay for cellular telephone service to the above-mentioned offices for the duration of the Contract.

.6 Contractor is responsible for dewatering of the site for the entire duration of the Contract.

1.7 BARRIERS

.1 Hoarding (if required): Supply and erect hoarding at job site to locations indicated on Drawings. Hoarding shall be 2400mm high consisting of wood uprights set firmly in the ground, faced with new 12.5mm Fir, Pine, or Poplar plywood, rough sheathing grade plywood, factory pre-treated, pre-stained green with wood preservative on both sides. Maintain in good condition during construction. When hoarding is no longer required, it shall be removed from the site. Demolished material shall become property of Contractor.

.2 Fencing: Supply and erect temporary chain link fencing or similar temporary construction fencing 1800mm high as required for protection of the work and for public safety.

.3 Contractor is to supply and erect barricades as required to control on-site and off-site traffic both vehicular and pedestrian for execution of the Work.

.4 Supply, erect, and maintain barricades, sidewalk sheds (if required), catch platforms, and accessories as required by Authorities Having Jurisdiction. When no longer required, remove from the site. Demolished material shall become property of Contractor.

.5 Dust Tight Screens

.1 Provide dust tight screens or partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.

.2 Maintain and relocate protection until such work is complete.

1.8 CONSTRUCTION AIDS

.1 Appliances and Scaffolding: Furnish all necessary transportation, scaffolding, forms, labour, tools and mechanical appliances, machinery, services and material required for executing the Work.

Such aids may include but are not limited to:

Construction Hoist or Crane
Temp. & Moisture Control
Construction Stairs
Dust Tight Screens
Ramps/Ladders/Handrails
Special Equipment

1.9 TEMPORARY ENCLOSURES

.1 Requirements specified herein are additional to and are intended to supplement requirements pertaining to temporary enclosures specified elsewhere in the Contract Documents.

.2 Provide temporary barriers and enclosures as required to ensure that construction work and activities continue uninterrupted and unhampered by adverse weather conditions for duration of construction period.

.3 Cold Weather Conditions:

.1 In advance of expected cold weather and freezing temperatures, take necessary action to protect construction from adverse effects of weather and to maintain temperatures at specified levels.

.2 During storage, handling and installation, maintain materials at specified temperatures. Do not allow materials to freeze or become coated with ice and snow.

.3 Provide enclosures for each phase of construction so that Work may be carried out under temperature-controlled conditions.

1.10 ENCLOSURE OF BUILDING

.1 As soon as construction of building envelope is sufficiently advanced, temporarily enclose and protect openings in envelope by means of temporary doors, barriers and screens.

.2 Cover unglazed window and door openings with heavy translucent sheeting.

1.11 VEHICULAR ACCESS

.1 Contractor to use existing municipal crossings for vehicle access onto the site.

.2 Vehicular access and control is otherwise at the discretion of the Contractor.

.3 Coordinate on-site parking for both users and Staff as well as Contractor forces with the Owner.

1.12 PROTECTION OF THE PUBLIC AND FIRE SAFETY

.1 Comply with requirements of the Ontario Building Code, current edition except as specified otherwise.

.2 Provide and maintain temporary fire protection equipment during performance of Work in accordance with governing codes, regulations, and bylaws.

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

1.13 SECURITY

.1 Provide and pay for responsible security personnel, or provide security cameras acceptable to the Owner, to guard site and contents of site after working hours and during holidays.

.2 Equip exterior temporary doors with hardware and locks.

.3 Secure building against illegal entry at end of each work day.

.4 Contractor to maintain existing site lighting, new site lighting or temporary site lighting for the parking lot and exterior building light fixtures during the entire course of construction. Coordinate new and existing lighting so the site is never left un-lit.

1.14 DRAINAGE CONTROLS

.1 Provide temporary drainage and pumping systems required to keep open basements, excavations and site free from accumulations of water.

.2 Dispose of water containing silt in suspension in accordance with local authority requirements. Do not pump into sewer or drainage system.

1.15 ACTIVITIES GENERATING VIBRATION, NOISE or SAFETY CONCERNS

.1 Operations considered by the Owner to generate vibration, noise or safety concerns include, but are not limited to, the following:

.1 Jack hammering.
.2 Shotblasting.
.3 Sandblasting.
.4 Cutting and coring of concrete.
.5 Use of powder actuated fasteners.
.6 Site vibratory equipment, i.e. packers.

.2 Do the following when Work generating vibration, noise, or safety concerns may affect user or user operations.

.1 Coordinate with the Owner and User Representative.

.2 Schedule and coordinate hours of work with User Representative.

.3 Stop operations generating vibration, noise or safety concerns when instructed verbally or in writing by the Owner. Do not resume such operations until authorized by the Owner.

1.16 PREVENTING MOULD DURING CONSTRUCTION

.1 Monitor interior relative humidity conditions in relation to surface temperatures to prevent generation of moisture that may contribute to mould growth on the surface of organic construction materials.

.2 If using temporary heaters, use a type that exhausts combustion products directly to the exterior of building enclosures. Do not use temporary heaters that exhaust combustion products into building enclosures.

.3 Install insulation concurrently with air and vapour retarder.

.4 Protect all organic construction materials from the elements, before, during, and after their installation.

.5 Refer to CCA 82-2004 Mould Guidelines for the Canadian Construction Industry, published by the Canadian Construction Association, for additional information about mould, its implications and recommendations on its prevention.

.6 Promptly report to the Owner any mould growth observed at the work site. If the Owner determines that such mold growth was caused by the Contractor's operations, the Contractor shall promptly remove it in accordance with procedures prescribed by the Owner, at no cost to the Owner.

1.17 CLEANING DURING CONSTRUCTION

.1 At regular intervals during progress of work, clean-up building premises and site and dispose of waste material, rubbish, and debris.

.2 Do not allow waste material, rubbish, and debris to accumulate and become an unsightly or hazardous condition. Maintain site in a clean and orderly condition.

.3 Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

.4 Do not allow waste material, rubbish, and windblown debris to reach and contaminate adjacent properties.

.5 Sprinkle dusty debris with water as required.

.6 Lower waste material in a controlled manner; do not drop or throw materials from heights.

.7 Clean interior building areas prior to commencement of site painting and finishing operations and continue cleaning on an as-needed basis and to eliminate dust, until building is ready for occupancy.

.8 Ensure that each Subcontractor engaged on the Work bears his full responsibility for cleaning up during and upon completion of his work in accordance with provisions of this Article.

1.18 WASTE DISPOSAL REQUIREMENTS

.1 Comply with Construction Waste Management Plan for Construction Waste Management. Comply with Section 01 74 19 – Waste Management and Disposal.

.2 Comply with Provincial and Municipal laws, rules, and regulations pertaining to disposal operations.

.3 Provide on-site metal containers with lids, for collection and temporary storage of waste material, rubbish, and debris.

.4 Dispose of waste material, rubbish, and debris at disposal areas away from site.

.5 Do not burn or bury waste material, rubbish and debris on site.

.6 Do not dispose of wastes into brooks, streams, rivers, waterways, lakes, or ponds.

.7 Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.

1.19 CLEANING OF STREETS AND SIDEWALKS

.1 Take precautions to prevent depositing of mud or debris on roadways, sidewalks, and paved areas. Promptly clean up any mud or debris so deposited.

.2 A City of Toronto Bylaw requires, in part, that all snow, ice, dirt, debris or other obstruction, formed or deposited on any public sidewalk adjoining a property shall be cleared away and removed by owner/occupant within twenty-four (24) hours of the time when such snow, ice, dirt or other obstruction was formed or deposited thereon. For purposes of this requirement, Contractor shall be deemed to be owner/occupant during construction period.

.3 Neglect of these requirements will cause the Owner to have necessary clean-up work carried out and to charge all costs to Contractor.

1.20 REMOVAL AND RESTORATION

.1 Remove temporary facilities specified in this Section, prior to request for inspection for Final Acceptance.

.2 Clean and repair damage caused by installation or use of temporary facilities. Restore existing facilities used during construction to original condition.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 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 Existing Utilities.

1.2 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.

1.3 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.

1.4 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.

1.5 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.

1.6 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.

1.7 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.

1.8 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.

1.9 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.

1.10 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.

1.11 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.

1.12 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.

1.13 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.

1.14 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 Consultant.

1.15 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.

1.16 HAZARDOUS MATERIALS

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

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

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 Waste Audit.

.8 Waste Reduction Work Plan.

.9 Materials Source Separation Program.

.10 Disposal of Wastes.

.11 Scheduling.

.12 Storage, Handling and Protection.

.13 Application.

.14 Diversion of Materials.

1.2 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures.

.2 Section 01 74 11 – Cleaning.

1.3 SUBMITTALS

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

1.4 DEFINITIONS

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

.2 Waste Audit (WA): Relates to projected waste generation. Involves measuring and estimating quantity and composition of waste, reasons for waste generation, and operational factors which contribute to waste.

.3 Waste Reduction Work Plan (WRW): Written report which addresses opportunities for reduction, reuse, or recycling of materials. WRW is based on information acquired from WA.

.4 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.

.5 Waste Management Coordinator (WMC): Designate individual who is in attendance on-site, full-time. Designate, or have designated, individuals from each Subcontractor to be responsible for waste management related to their trade and for coordinating activities with WMC.

.6 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 inevitable 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. On new construction projects this means careful recycling of job site waste.

1.6 DOCUMENTS

.1 Maintain at job site, one copy of following documents:

.1 Waste Audit.
.2 Waste Reduction Workplan.
.3 Material Source Separation Plan.

1.7 WASTE MANAGEMENT PLAN

.1 Waste Management Plan: Within 10 calendar days after receipt of Notice of Award of Contract, or prior to any waste removal, whichever occurs sooner, submit to the Owner and Consultant a Waste Management Plan. 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.

1.8 WASTE AUDIT

.1 Prepare Waste Audit prior to project start-up.

.2 Record, on Waste Audit, extent to which materials or products used consist of recycled or reused materials or products.

1.9 WASTE REDUCTION WORK PLAN

.1 Prepare WRW prior to project start-up.

.2 Reduce construction and demolition waste in compliance with regulations.

.3 Reduction will involve action to minimize quantity of waste at source. Reuse products which would become waste where practical. Recycling will involve collection and source separation at the site, of materials for use as feedstock in manufacturing of new products.

.4 Conform to local Municipal and Regional Landfill Solid waste management requirements. Consider reduction, reuse and recycling of waste generated during construction such as dimensional lumber, clean drywall, concrete, brick, scrap metal and corrugated cardboard.

1.10 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 the regulations.

.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.

1.11 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.

.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.

1.12 SCHEDULING

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

1.13 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

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. Provide instruction on disposal practices.

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

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Section 01 33 00 – Submittals.

.2 Section 01 74 19 – Waste Management and Disposal.

.3 Section 01 77 20 – Contract Acceptance Procedures.

1.2 SUBMITTALS

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

1.3 DELIVERY, STORAGE AND HANDLING

.1 Protect packaging during delivery, storage and handling to prevent development of mould and mildew on packaging and on products.

.2 Request that suppliers provide cleaning materials to minimize packaging and equipment.

.3 Deliver materials in recyclable, or in reusable packaging, such as cardboard, wood paper, or reusable blankets which will be reclaimed by supplier or manufacturer for recycling.

1.4 CLEANING MATERIALS

.1 Use cleaning materials only on surfaces recommended by material manufacturer.

1.5 FINAL CLEANING

.1 Perform final cleaning operations specified herein prior to request for inspection for Substantial Performance of the Work.

.2 Use experienced workers or professional cleaners for final cleaning.

.3 Remove grease, paint spots, dirt, dust, stains, labels, fingerprints, and other foreign matter from interior and exterior surfaces; vacuum and dust behind grilles, louvres, and screens; wash floor surfaces not otherwise finished; clean metal doors and frames; clean metal work; clean equipment and hardware; clean and polish glass on both sides; clean and polish mirrors.

.4 Repair, patch and touch-up marred surfaces to match adjacent finishes.

.5 Replace cracked and broken glass.

.6 Ensure that cleaning agents and methods do not remove finishes and permanent protective coatings on surfaces being cleaned. Follow manufacturer’s printed maintenance requirements for cleaning.

.7 Broom clean or remove snow and ice from all exterior paved areas designed for pedestrian or vehicular traffic, including parking areas. Remove snow from gravel surfaced areas.

.8 Leave all surfaces in perfectly clean and unsoiled condition to the Owner’s satisfaction.

.9 Remove waste, surplus materials, and temporary facilities from the site.

1.6 WASTE DISPOSAL REQUIREMENTS

.1 Comply with Construction Waste Management Plan for Construction Waste Management.

.2 Comply with Section 01 74 19 – Waste Management and Disposal.

.3 Remove all waste generated during cleaning operations from site.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 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 1 copy of the DRAFT Operating and Maintenance Manual, 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.

.8 Pay costs of transportation.

1.4 FORMAT

.1 Organize data in the form as instructional manual.

.2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 8-1/2” x 11” 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 scaled CAD files in .dwg format on a 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 OCCUPANT MANUAL

.1 Submit Occupant Manual to Consultant’s requirements.

.2 Occupant Manual to include:

.1 General building information.
.2 Building management.
.3 Building operations.
.4 Safety.
.5 Security.
.6 Environmental considerations.
.7 Communications.
.8 Contact List.
.9 Other/Miscellaneous.

1.7 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.

1.8 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.

1.9 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 trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

.6 Provide servicing and lubrication schedule, and list of lubricants required.

.7 Include manufacturer's printed operation and maintenance instructions.

.8 Include sequence of operation by controls manufacturer.

.9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

.10 Provide installed control diagrams by controls manufacturer.

.11 Provide Contractor’s 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.

.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

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 INTENT

.1 Perform starting of each system and each item of equipment in accordance with the general requirements specified herein.

1.2 RELATED SECTIONS

.1 Section 01 91 10 – Testing, Adjusting and Balancing.

1.3 PREPARATION

.1 Have Contract Documents, shop drawings, product data, and operation and maintenance data at hand during starting process.

.2 Coordinate sequence for starting of various equipment and systems.

1.4 MANUFACTURERS' SITE SERVICES

.1 When specified in Divisions 02 – 32, or when otherwise requested by the Owner, require manufacturer to provide authorized representative to be present at site to do the following:

.1 Inspect, check and approve equipment and systems installation prior to starting.

.2 Supervise placing equipment and systems in operation.

.3 Provide a written report verifying that equipment:

.1 has been properly installed and lubricated,
.2 is in accurate alignment,
.3 is free from any undue stress imposed by connecting lines or anchor bolts, and
.4 has been satisfactorily operated under load conditions.

1.5 STARTING

.1 Verify that each item of equipment has been checked for proper lubrication, drive rotation, belt tension, control sequence, and other conditions affecting starting and operation.

.2 Take corrective action as necessary.

.3 Execute starting under supervision of Contractor's personnel and, when specified or requested by the Owner, manufacturer's authorized representative.

.4 Place equipment and systems in operation in proper sequence and in accordance with approved Contractor Start-Up Sub-schedule.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 INTENT

.1 Contractor shall be responsible for testing, adjusting, and balancing of all:

.1 piped, ducted, wired and wireless services and systems, including all components and equipment forming part thereof, and

.2 manually and mechanically operated systems including all components and equipment forming part thereof.

.2 Contractor shall perform testing, adjusting, and balancing with Contractor's qualified personnel, or employ and pay for a qualified organization to perform such services.

.3 Perform testing, adjusting, and balancing after starting of equipment and systems.

.4 Provide personnel, operate systems at designated times and under conditions required for proper testing, adjusting, and balancing.

.5 Report to the Owner any deficiencies or defects noted during testing, adjusting, and balancing, which cannot be promptly corrected.

1.2 PREPARATION

.1 Prepare each system and item of equipment for testing, adjusting, and balancing.

.2 Verify that each system and equipment installation is complete and in continuous operation.

.3 Verify ambient conditions.

1.3 TESTING, ADJUSTING AND BALANCING

.1 Testing: Perform tests to confirm compliance with requirements of Contract Documents. Take corrective action as necessary.

.2 Adjusting: Perform adjustments to ensure proper, efficient, and safe operation.

.3 Balancing: Perform balancing to ensure that the various parts of system are in a proper state of equilibrium.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

1.1 RELATED WORK

.1 All parts of the Contract Documents apply to and are governed by the information of this Section.

1.2 DESIGNATED SUBSTANCE SURVEY

.1 The following Designated Substance Survey has been used by the Consultant Team in design and preparation of Contract Documents and is included for information in the Project Specifications.

.1 Assessment Prepared By:
CCI Group
7900 Keele Street, Suite 2000
Concord, Ontario L4K 2A3
CCI Project Number: 135121
May 2014

End of Section

Part 1 General

1.1 GENERAL

.1 Conform to the requirements of Division 01.

1.2 RELATED SECTIONS

.1 Division 01.

1.3 REFERENCES

.1 The National Building Code of Canada, Part 8 - Safety Measures on Construction and Demolition Sites.

.2 Ontario Regulation 102/94, Waste Audits and Waste Reduction Work Plans.

.3 Ontario Regulation 103/94, Environmental Protection Act.

.4 Ontario Regulation 213/07 -The Fire Code.

.5 Ontario Regulation 232/98 - Landfilling Sites.

.6 Ontario Regulation 278/05 -Designated Substance - Asbestos on Construction Projects and in Buildings and Repair Operations.

.7 Ontario Regulation 347- Environmental Protection Act, General — Waste Management.

.8 Ontario Regulation 332/12 - The Building Code.

.9 The Workplace Health and Safety Act, and Regulations for Construction Projects.

.10 The Contractors Health and Safety Policy.

.11 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 to Consultant and Owner 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 a construction waste management plan including demolition and removal procedures under provisions of Section 01 74 19 – Construction Waste Management and Disposal.

.6 Submit proposed dust-control measures.

.7 Submit proposed noise-control measures.

.8 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.

.3 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 Refer to Section 01 41 00 – Regulatory Requirements.

.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 – Construction Waste Management and Disposal.

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 SITE CONDITIONS

.1 Construct safety barriers, barricades, fencing and hoarding to separate public from work areas as described in Section 01 50 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 section 02 32 00.

Part 2 Products

2.1 MATERIALS

.1 Conform to requirements of Division 1, in particular, articles on Design and Safety Requirements for Temporary Work. 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 and as noted below:

.1 Existing Door hardware including locksets, door closers and panic bars.

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 EXMAMINATION

.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 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

3.3 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 Cease operations and notify the Owner immediately for special protective and disposal instructions when asbestos materials or other hazardous materials, other than those identified are uncovered during the work of this project.

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

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

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

.6 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.

.7 Protect existing site improvements, appurtenances, and landscaping that are designated to remain in place.

.8 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.

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

.10 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.

.11 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.

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

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

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

.15 At all times protect the structure from overloading.

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

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

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

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

3.4 PREPARATION

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

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

.3 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.

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

.5 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.

3.5 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 CAN S350-M.

.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 Prevent movement, settlement or damage of adjacent structures, services, adjacent grades, and existing building to remain. Make good damage caused by demolition.

.5 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 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.

.5 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 F710-03. Refer to original building drawings and remove and replace existing concrete floor toppings as necessary and where required.

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

.7 At exterior and interior bearing walls to be removed, include breaking out and removal of existing concrete foundations to a minimum of 8" 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

Part 1 General

1.1 REFERENCE DOCUMENTS

.1 American National Standards Institute (ANSI):

.1 ANSI A10.8 – 2011 – Safety Requirements for Scaffolding.

.2 Canadian Standards Association (CSA):

.1 CSA S350 M1980 (R2003) – Code of Practice for Safety in Demolition of Structures.

.3 Hazardous Materials Information Review Act, 1985.

.4 Motor Vehicle Safety Act (MVSA), 1995.

.5 National Fire Protection Association (NFPA):

.1 NFPA 241-13 – Standard for Safeguarding Construction, Alteration and Demolition Operations.

1.2 EXISTING CONDITIONS

.1 Visit and examine the site and note all characteristics and irregularities affecting the work of this Section.

1.3 PROTECTION

.1 Take precautions to guard against damage to adjacent work. Be liable for any damage or injury caused.

.2 Cease operations and notify the Owner if safety or any adjacent work appears to be endangered. Do not resume operations until reviewed with the Owner.

.3 Ensure safe passage of building occupants around and through area of demolition.

.4 Cease operations and notify the Owner immediately for special protective and disposal instructions when asbestos materials or other hazardous materials are suspected or uncovered during the work of this project.

.5 Protect temporarily suspended work that is without continuous supervision to prevent access by unauthorized persons.

1.4 TEMPORARY PARTITIONS

.1 Erect and maintain dustproof partitions, seal off ducts as required to prevent spread of dust and fumes to other parts of the building. On completion, remove partitions and make good surfaces to match adjacent surfaces.

1.5 SALVAGEABLE AND RECYCLABLE MATERIALS

.1 Except where otherwise specified, all materials indicated or specified to be permanently removed from the Place of the Work shall become Construction Manager's property. Maximize to the fullest extent possible, salvage and recycling of such materials, consistent with proper economy and expeditious performance of the Work.

.2 To reduce the quantity of material otherwise destined for disposal at a landfill, the Contractor is encouraged to consider utilizing the services of businesses and non-profit organizations that specialize in salvage and recycling of used building materials, but does so at his own option and risk.

.3 A current listing of recyclers specializing in specific categories of materials is available from the Authority Having Jurisdiction.

Part 2 Products

2.1 MATERIALS AND EQUIPMENT

.1 Provide materials and equipment as required to perform the work of this Section.

Part 3 Execution

3.1 MATERIALS TO BE RETAINED BY OWNER

.1 Consult with the Owner for identification of objects to be removed from areas to be renovated.

.2 Carefully remove the following materials and equipment as identified to be retained by the Owner. Obtain instructions from the Owner regarding location of storage.

3.2 MATERIALS TO BE REUSED

.1 Carefully remove, store and protect for possible re-installation materials and/or equipment, the Owner has requested to be salvaged for its own use or re-use.

3.3 DEMOLITION

.1 Unless otherwise specified, carry out demolition in accordance with CSA S350.

.2 Completely demolish the items scheduled and immediately remove materials from the premises.

.3 Carry out demolition work in a manner to least inconvenience adjacent occupied building area.

.4 Carry out demolition in an orderly and careful manner.

.5 Lower waste materials in a controlled manner; do not drop or throw materials from heights.

3.4 EXISTING SERVICES

.1 If required, disconnect all electrical and telephone service lines in the areas to be demolished. Post warning signs on all electrical lines and equipment which must remain energized to serve other areas during period of demolition. Disconnect electrical and telephone service lines in demolition areas to the requirements of local authority having jurisdiction.

.2 If required, disconnect and cap all mechanical services in accordance with requirements of local authority having jurisdiction. Natural gas supply lines shall be removed by the gas company or by a qualified tradesman in accordance with gas company instructions.

.3 Essential Services: Maintain fire alarm, sprinkler system, emergency lighting and all essential services to all areas.

.4 In each case notify the affected utility company in advance and obtain approval where required, before commencing with the work on main services.

3.5 RESTORATION

.1 Make good any demolition to the existing work beyond that necessary for carrying out new work, at no expense to the Owner.

3.6 CLEAN UP

.1 Remove all debris and rubbish away from site at regular intervals.

.2 Remove all tools and equipment from site.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Conform to the requirements of Division 01.

1.2 RELATED SECTIONS

.1 Section 01 61 00 – Common Product Requirements.

.2 Section 01 74 11 – Cleaning.

.3 Section 01 74 19 – Construction Waste Management and Disposal.

.4 Section 02 41 19 – Selective Demolition.

1.3 REFERENCE STANDARDS

.1 Canadian Environmental Protection Act, 1999 (CEPA 1999).

.1 Export and Import of Hazardous Waste Regulations (SOR/2002-300).

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).

.1 Material Safety Data Sheets (MSDS).

.3 National Fire Code of Canada 2005.

.4 Transportation of Dangerous Goods Act (TDG Act) 1999, (c. 34).

.5 Transportation of Dangerous Goods Regulations (T-19.01-SOR/2003-400).

1.4 SUBMITTALS

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

.2 Product Data:

.1 Submit to Consultant current Material Safety Data Sheet (MSDS) for each hazardous material required prior to bringing hazardous material on site.

.2 Maintain MSDS in proximity to where materials are being used. Communicate this location to personnel who may have contact with hazardous materials.

.3 Submit hazardous materials management plan to Consultant that identifies hazardous materials, their use, their location, personal protective equipment requirements, and disposal arrangements

1.5 DEFINITIONS

.1 Dangerous Goods: product, substance, or organism that is specifically listed or meets hazard criteria established in Transportation of Dangerous Goods Regulations.

.2 Hazardous Material: product, substance, or organism that is used for its original purpose; and that is either dangerous goods or a material that may cause adverse impact to environment or adversely affect health of persons, animals, or plant life when released into the environment.

.3 Hazardous Waste: any hazardous material that is no longer used for its original purpose and that is intended for recycling, treatment or disposal.

.4 Workplace Hazardous Materials Information System (WHMIS): Canada-wide system designed to give employers and workers information about hazardous materials used in workplace. Under WHMIS, information on hazardous materials is provided on container labels, material safety data sheets (MSDS), and worker education programs. WHMIS is put into effect by combination of federal and provincial laws.

1.6 SHIPPING, STORAGE AND HANDLING

.1 Refer to Section 01 61 00 – Common Product Requirements.

.2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.

.3 Co-ordinate storage of hazardous materials with Consultant and abide by internal requirements for labeling and storage of materials and wastes.

.4 Storage requirements for quantities of hazardous materials and wastes in excess of 5 kg for solids, and 5 litres for liquids:

.1 Store hazardous materials and wastes in closed and sealed containers.

.2 Label containers of hazardous materials and wastes in accordance with WHMIS.

.3 Store hazardous materials and wastes in containers compatible with that material or waste.

.4 Segregate incompatible materials and wastes.

.5 Ensure that different hazardous materials or hazardous wastes are not mixed.

.6 Store hazardous materials and wastes in secure storage area with controlled access.

.7 Maintain clear egress from storage area.

.8 Store hazardous materials and wastes in location that will prevent them from spilling into environment.

.9 Have appropriate emergency spill response equipment available near storage area, including personal protective equipment.

.10 .Maintain inventory of hazardous materials and wastes, including product name, quantity, and date when storage began.

.5 Ensure personnel have been trained in accordance with Workplace Hazardous Materials Information System (WHMIS) requirements.

.6 Report spills or accidents immediately to Consultant. Submit a written spill report to Consultant within 24 hours of incident.

1.7 TRANSPORTATION

.1 Transport hazardous materials and wastes in accordance with federal Transportation of Dangerous Goods Act, Transportation of Dangerous Goods Regulations, and applicable provincial regulations.

.2 If hazardous waste is generated on site:

.1 Co-ordinate transportation and disposal with Consultant.

.2 Ensure compliance with applicable federal, provincial and municipal laws and regulations for generators of hazardous waste.

.3 Use licensed carrier authorized by provincial authorities to accept subject material.

.4 Prior to shipping material obtain written notice from intended hazardous waste treatment or disposal facility that it will accept material and that it is licensed to accept this material.

.5 Label containers with legible, visible safety marks as prescribed by federal and provincial regulations.

.6 Ensure that trained personnel handle, offer for transport, or transport dangerous goods.

.7 Provide photocopy of shipping documents and waste manifests to Consultant.

.8 Track receipt of completed manifest from consignee after shipping dangerous goods. Provide a photocopy of completed manifest to Consultant.

.9 Report discharge, emission, or escape of hazardous materials immediately to Consultant and appropriate provincial authority. Take reasonable measures to control release.

Part 2 Products

2.1 MATERIALS

.1 Only bring on site quantity of hazardous materials required to perform work.

Part 3 Execution

3.1 DISPOSAL

.1 Dispose of hazardous waste materials in accordance with applicable federal and provincial acts, regulations, and guidelines. Refer to Section 01 74 11 – Cleaning.

.2 Recycle hazardous wastes for which there is approved, cost effective recycling process available.

.3 Send hazardous wastes to authorized hazardous waste disposal or treatment facilities.

.4 Burning, diluting, or mixing hazardous wastes for purpose of disposal is prohibited.

.5 Disposal of hazardous materials in waterways, storm or sanitary sewers, or in municipal solid waste landfills is prohibited.

.6 Dispose of hazardous wastes in timely fashion in accordance with applicable provincial regulations.

.7 Minimize generation of hazardous waste to maximum extent practicable. Take necessary precautions to avoid mixing clean and contaminated wastes.

.8 Identify and evaluate recycling and reclamation options as alternatives to land disposal, such as:

.1 Hazardous wastes recycled in manner constituting disposal.

.2 Hazardous waste burned for energy recovery.

.3 Lead-acid battery recycling.

.4 Hazardous wastes with economically recoverable precious metals.

END OF SECTION

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

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM D1751-04(2013)e1 Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
  .2 ASTM D1752-04a(2013) Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction
.2 American Concrete Institute (ACI)
  .1 ACI 117-10, Standard Specifications for Tolerances for Concrete Construction and Materials.
  .2 ACI 347R-14 Guide to Formwork for Concrete
  .3 SP-4 Formwork for Concrete
.3 Canadian Standards Association (CSA)
  .1 CSA A23.1-14/A23.2-14 Concrete Materials and Methods of Concrete Construction / Test Methods and Standard Practices for Concrete
  .2 CAN/CSA S269.3-M92 (R2013) Concrete Formwork.
  .3 CSA O86-14 Engineering Design in Wood
.4 Canadian General Services Board (CGSB)
  .1 CGSB 41-GP-35M Polyvinyl Chloride Waterstop.

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, if requested by Consultant.
  .4 Coordinate with other Divisions prior to submittal.
  .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 Consultant will review and return submitted drawings in accordance with an agreed schedule. Consultant's review will be for conformity to design concept and for general arrangement, and shall not relieve Contractor of responsibility for errors or omissions in submitted drawings or of responsibility for meeting requirements of Contract Documents.
  .8 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.

.9 Do not commence placing sleeves, conduits, or piping before drawings have been reviewed and Consultant's comments incorporated on drawings issued to site.

.10 Assume responsibility for accuracy of Work. Review of submitted shop drawings does not relieve Contractor from compliance with requirements of Contract Documents.

.3 Submit shop drawings as follows:
- .1 4 copies for review before any Work commences.
- .2 1 additional copy for distribution as directed by Consultant.
- .3 1 copy to Inspection and Testing Company.

.4 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 Requirements of Regulatory Agencies

.1 Conform to local and provincial regulations, including construction safety regulations.

1.6 Quality Assurance

.1 Obtain a copy of CSA A23.1-14/A23.2-14 and maintain on site

.2 Design of Formwork: Assume full responsibility for complete structural design and construction of formwork in accordance with CAN/CSA S269.3-M92 (R2013) and CAN/CSA O86-14, 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 CAN3-A23.1&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.

1.7 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.

1.8 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 O121-08. 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 O141-05 (R2009), with grade stamp clearly visible.

.4 Chamfers: Cut from 19mm x 19mm wood, smooth with no open defects.

.5 Form Ties: snap ties, with spreader washer and 25mm break back.

.6 Void Form: Honeycomb cellular core structure manufactured from kraft fibre. Top and sides protected with wax coated corrugated board, and bottom unprotected.

.7 Round Column Fibre Forms: Sonotube “W” Coated, by Sonoco Limited.

.8 Joint Tape: non-staining, water impermeable, self-release.

.9 Nails, Spikes and Staples: Galvanized, conforming to CSA B111-1974 (R2003).

.10 Waterstops: PVC Waterstop to CGSB 41-GP-35M, types 2 and 3 and OPSS 1204:
- .1 Construction Joints, Internal Waterstop. 150 mm wide, ribbed, centre bulb style tapered thickness varying from 9.5 mm minimum near centre to 6.4 mm minimum near edge.
  - .1 Wirestop PVC Waterstop type CR-6380, with steel wire fastening loops, by Paul Murphy Plastics Company.
  - .2 Vinylex PVC Waterstop type RB6-38 ribbed with centre bulb, by Gamco Inc.
  - .3 Durajoint PVC Waterstop type 5, by Durajoint Concrete Accessories.
  - .4 PVC Waterstop Type 6380, by W. R. Meadows of Canada Ltd.

.11 Form Release Agent: Colourless mineral oil which will not stain concrete.

.12 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 Provide waterstops in accordance with manufacturer's instructions at construction joints in walls which retain earth, and wherever else indicated or detailed. Waterstops shall be continuous.

.7 Bed mud sills on sand, gravel or crushed stone placed on unfrozen, dry, solid and stable subgrade.

.8 Adequately brace and shore formwork to sustain loads (both concrete and working loads) applied during construction.

.9 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.

.10 Voidform: Install voidform and place 7.5 mm thick plywood over voidform, to provide firm surface for supporting reinforcement.

.11 Round Fibre Forms:
- .1 At concealed locations, provide uncoated fibre form.
- .2 Provide round fibre form where indicated for piers, equipment bases, light pole bases, fence foundation and wherever indicated or required.

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 05 50 00 Metal Fabrications

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM A143/A143M-07(2014) Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement
  .2 ASTM A1064/A1064M-15 Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
  .3 ASTM A775/A775M-07b(2014) Standard Specification for Epoxy-Coated Steel Reinforcing Bars
.2 American Concrete Institute (ACI)
  .1 ACI SP-66 (04) ACI Detailing Manual.
.3 Canadian Standards Association (CSA)
  .1 CSA A23.1-14/A23.2-14 Concrete Materials and Methods of Concrete Construction / Test Methods and Standard Practices for Concrete
  .2 CSA A23.3-14, Design of Concrete Structures.
  .3 CSA G30.18-09, Carbon Steel Bars for Concrete Reinforcement.
  .4 CSA G40.20-13/G40.21-13 General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  .5 CSA W186-M1990 (R2012) 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, 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.
  .8 Prior to submission to Consultant, review all shop 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 shop drawing with the requirements of Work and Contract Documents.

.9 Review of each shop drawing shall be indicated by stamp, date, and signature of a responsible person.
.10 At time of submission, notify Consultant in writing of any deviations in shop drawings from requirements of Contract Documents.
.11 Consultant will review and return shop drawings in accordance with the agreed schedule. Consultant's review will be for conformity to design concept and for general arrangement, and shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of Contract Documents.
.12 Make any changes in shop 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.
.13 Do not commence fabrication of reinforcement before drawings have been reviewed and Consultant's comments incorporated on drawings issued to fabricating shop.

.3 Inspection Reports: Inspection and Testing Company shall submit reports of inspections and tests.
.1 Distribute inspection reports as follows:
.1 2 copies to Consultant.
.2 1 copy to Contractor.

.4 Quality Assurance Submittals:
.1 Mill Test Report: upon request, 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 Upon request submit in writing to Consultant proposed source of reinforcement material to be supplied.

1.5 Quality Assurance

.1 Obtain a copy of CSA A23.1-09, and maintain on site.

.2 Qualifications:
.1 Welding: Undertake welding of reinforcement only by a fabricator or Subcontractor approved by Canadian Welding Bureau to requirements of CSA W186-M1990 (R2012).

.3 Source Quality Control:
.1 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 G30.18-09, Grade 400W.
  .2 Other bars: to CSA G30.18-09, Grade 400R.

.4 Plain round bars: to CSA G40.20-04/G40.21-04 (R2009).

.5 Epoxy Coated Bar Reinforcing Steel: to ASTM A775/A775M-07b(2014).

.6 Welded Wire Fabric: to CSA G30.5-M1983 (R1998) and ASTM A1064/A1064M-15 and in flat sheets, not rolls.

.7 Cold-drawn annealed steel wire ties: to ASTMA497/A497M-07.

.8 Chairs, bolsters, bar supports, spacers: to CSA A23.1-09.

.9 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 A23.3-04.

.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, do not weld, reinforcement in place.

3.3 Adjusting and Cleaning

.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 Be aware that 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 31 00 Steel Deck
.6 Section 05 50 00 Metal Fabrications
.7 Section 07 92 00 Joint Sealants

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM C150/C150M-15 Standard Specification for Portland Cement
  .2 ASTM C260/C260M-10a Standard Specification for Air Entraining Admixtures for Concrete
  .3 ASTM C309-11 Standard Specification for Liquid Membrane Forming Compounds for Curing Concrete
  .4 ASTM C330/C330M-14 Standard Specification for Lightweight Aggregates for Structural Concrete
  .5 ASTM C494/C494M-15a Standard Specification for Chemical Admixtures for Concrete
  .6 ASTM C881/C881M-14 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-14a Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
  .9 ASTM D412-06a(2013) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
  .10 ASTM D624-00(2012) Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
  .11 ASTM D1751-04(2013)e1 Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
  .12 ASTM D1752-04a(2013) Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction
  .13 ASTM D2240-05(2010) Standard Test Method for Rubber Property—Durometer Hardness
.2 American Concrete Institute (ACI)
  .1 ACI 117-10, Standard Specifications for Tolerances for Concrete Construction and Materials.
  .2 ACI 232.1R-12, Use of Raw or Processed Natural Pozzolans in Concrete
.3 Canadian Standards Association (CSA International)
  .1 CSA A3000-13 Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005), Includes Update No. 1 (2014), Update No. 2 (2014), Update No. 3 (2014)
  .2 CSA A23.1-14 Concrete Materials and Methods of Concrete Construction
  .3 CSA A23.2-14 Test Methods and Standard Practices for Concrete.
  .4 CSA A283-06 (R2011), Qualification Code for Concrete Testing Laboratories.
.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.

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; when optimum bulk density of aggregates is specified, provide supporting evidence of compliance with requirements.
.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 A23.1-14, Clause 7. 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 A23.1-14.
.5 Submit mix design for each type of concrete. Specify intended use for each mix design.
.6 Submit written requests for use of admixtures not specified, for site mixing of concrete, and for use of bonding agents.
.7 Submit in writing, proposed method of in-situ strength testing.
.8 Review of submittals by the Consultant is for the sole purpose of ascertaining conformance with the general design concept. This review does not mean approval of detail design inherent in submittals, the responsibility for which remains with the Contractor submitting same. Contractor is responsible for conditions to be confirmed and correlated at the job site, for information that pertains solely to the fabrication, or to techniques of construction and installation, and for co-ordination of work of all trades.

.4 Inspection Reports: Inspection and Testing Company shall:
.1 Submit written reports of inspection and tests.
.2 Distribute reports as follows:
.1 2 copies to Consultant;
.2 1 copy to Consulting Structural Engineer;
.3 1 copy to 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 A23.1-14/A23.2-14, and maintain on site.

.2 Pre-Construction Conference:
.1 At least 35 days prior to the start of concrete construction schedule, conduct a meeting to review proposed mix designs and to discuss detailed requirements of the proposed concrete

operations. Review requirements for submittals, coordination, and availability of materials. Establish work progress and sequencing schedules and procedures for material testing, inspection and certifications.

.3 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 A283-06 (R2011), 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 A23.2-09 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.

.4 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 A23.2-14, 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 A23.1-14.
    - .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 117-10 and CSA A23.1-14.

.2 Difference between elevation of high point and low point in specified area not to exceed:
.1 In any bay up to 100 m2: 12 mm.
.2 In any bay up to 400 m2: 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 A23.1-14, 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^{O}C for three days after placing, not less than 10^{O}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^{O}C.

.8 Do not grout at ambient air temperatures or concrete surface temperatures less than 5^{O}C, or when temperature is forecast to fall to less than 5^{O}C within 24 hours of grouting.
.9 Do not apply sealants at ambient air temperatures or concrete surface temperatures less than 5^{O}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 ASTM C150/C150M-12.
.2 Cementitious Hydraulic Slag: to ACI 232.1R-12

.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 A23.1-14, 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/C295M-12 Standard Guide for Petrographic Examination of Aggregates for Concrete.
.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 .Premoulded Expansion Joint Filler:
.1 Asphalt impregnated fibreboard conforming to ASTM D1751-04(2008), sizes indicated on drawings.

.7 Curing Compound:
.1 Membrane curing compound formulated from chlorinated rubber resins, or acrylic emulsion, solvent free to ASTM C309-11, type 1.

.8 Bonding Agent: To ASTM C881/C881M-10, 100% reactive, 2 component, low viscosity, high modulus bonding adhesive.

.9 Saw Cut Filler: Semi-rigid flexible epoxy joint filler shall be a two-component, pourable, moisture insensitive formulation and possess the following characteristics:
.1 Compliance to ACI 302.1R for joint fillers used in control and construction joints.
.2 Solids, % by weight, ASTM D1259-06(2012): 100%.
.3 Tensile adhesion to concrete 24^{O} C, ASTM D5329-09: 290 psi.
.4 Shore D Hardness (7 days), ASTM D2240 - 05(2010): 60.
.5 Shore A Hardness (7 days), ASTM D2240 - 05(2010): 95.
.6 Tensile Strength, ASTM D638-10.
.1 24^{O} C, (3 days): 660 psi.
.2 24^{O} C, (7 days): 770 psi.
.7 Elongation, ASTM D638-10.
.1 24^{O} C, (3 days): 72%.
.2 24^{O} C, (7 days): 53%
.8 Water Absorption 24^{O} C (24 hrs.), ASTM D570-98(2010)e1: 0.56% by weight.

.10 Sealant: Refer to Section 07 92 00 – Joint Sealants

.11 Mechanical Anchors: 'Kwik' Bolts, 'Cinch' Anchors or Parabolts.

.12 Stair Tread Inserts:
.1 Abrasive stair tread inserts for exterior concrete steps as specified in Section 10 80 00.

2.2 Concrete Mixes

.1 Ready Mix, with 28 day compressive strength as indicated on Drawings.
.2 Design concrete mix in conformance with CSA A23.1-14, 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 type Portland cement with cementitious hydraulic slag.

.2 When mean daily temperature exceeds 25^{O}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 A23.1-14, Clause 15, Table 10.

2.3 Admixtures

.1 Chemical Admixture: Incorporate water-reducing admixture, type WN, in all concrete.

.2 Air Entraining Agent: Incorporate air-entraining agent in addition to chemical admixture in concrete of relevant Class of exposure, in accordance with CSA A23.1-14, 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/C1107M-14a, Compressive strength at 28 days: 48 MPa.
.2 Non-Shrink, Non Stain, Non-Metallic: to ASTM C1107/C1107M-14a. Compressive strength at 28 days: 59 MPa.

.3 Flowable Grout: High-tolerance Non-shrink, Non-metallic shrinkage compensating grout to ASTM ASTM C1107/C1107M-14a. 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 Commencement of work implies acceptance of existing conditions.

.4 Confirm that surfaces on which concrete is to be placed are free of frost and water before placing.

.5 Confirm that reinforcement, dowels, control joints, inserts and all other built in work are in place and secured.

3.2 Treatment of Formed Surfaces

.1 Conform to the requirements of CSA A23.1-14, 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 A23.1-14, 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 A23.1-14.

.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 Do not place concrete in water or open frozen surfaces.

.4 Remove contaminants which lessen concrete bond to reinforcement before concrete is placed.

.5 Maintain accurate records of cast in place concrete items. Record date, location of pour, quantity, air temperature and test samples taken.

.6 Ensure that reinforcement, inserts, embedded items, formed expansion joints and the like, are not disturbed during concrete placement.

.7 Provide construction joint as indicated on the drawings. Ensure dowels are adequately anchored and placed at right angles to the joint before placing concrete.

.8 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.

.9 Sloping Surfaces and Slabs: commence concrete placement at bottom of sloping surfaces.

.10 Obtain Geotechnical Engineer’s confirmation that thickness, elevation and compaction of sub-grade meets specifications before placing concrete.

3.4 Finishing Concrete

.1 Perform finishing operations on plastic concrete surfaces in accordance with CSA A23.1-14, 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 trowelled surface, free from blemishes, and of uniform appearance

.6 Non-slip Surfaces: Provide swirl trowel or broom finish of texture acceptable to Consultant.

.7 Curb Edging: Finish external corners of curbs rounded and smooth.

.8 Stair Tread Non-Slip Inserts:
- .1 Install one non-slip insert specified in Section 10 80 00 at each tread and landing; place 40 mm from edge of nosings and extend for full width of nosings except for 80 mm at each end.
- .2 Install in accordance with manufacturer's instructions.

3.5 Curing

.1 Cure concrete in accordance with CSA A23.1-14, 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 1 and April 1.

.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 A23.1-14 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 to thoroughly dry surfaces only, at ambient air temperatures above 5ºC.

.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 General

1.1 WORK INCLUDED

.1 Provide all labour, materials, products, equipment, and services to finish and cure concrete floors and horizontal concrete surfaces, as required and/or indicated on the Drawings and specified herein.

1.2 RELATED SECTIONS

.1 Section 03 30 00 - Cast-in-Place Concrete.

.2 Section 07 92 00 – Joint Sealants.

1.3 REFERENCE DOCUMENTS

.1 American Society for Testing and Materials (ASTM):

.1 ASTM C309-11 Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

.2 Canadian Standards Association (CSA):

.1 CSA A23.1-14/A23.2-14 Concrete Materials and Methods of Concrete Construction / Test Methods and Standard Practices for Concrete.

.3 Canadian General Standards Board (CGSB):

.1 CAN/CGSB 25.20-95 Surface Sealer for Floors.

1.4 QUALIFICATIONS

.1 Work of this Section shall be performed by an approved, established concrete finishing company having a proven record of satisfactory workmanship for a period of at least five (5) years. Submit proof of this requirement to the Consultant well in advance of concrete finishing operations.

1.5 ADMINISTRATIVE REQUIREMENTS

.1 A Site Coordination Meeting is required to review complete process of placing and finishing of concrete. Meeting shall involve Owner, Contractor, Concrete Supplier, Concrete Finisher, Structural Engineer, Inspection Laboratory, and Consultant.

.2 Coordinate the Work of this Section, as required for hardeners, sealers, and colouring agents to ensure proper application.

1.6 QUALITY ASSURANCE

.1 A qualified representative of the sealer and waterproofing membrane supplier shall be present during application of materials.

.2 Representative shall supply written certification that the sealer and waterproofing membrane has been applied and finished in accordance with the manufacturer's instructions.

1.7 SUBMITTALS

.1 Submit maintenance instruction for finishes supplied under this Section.

.2 Submit technical bulletins for sealer, hardener, and joint sealing materials to Structural Consultant prior to installation of concrete.

.3 Submit product data for each product, in accordance with Division 01.

.4 Submit application instructions for each product supplied under this Section.

.5 Submit WHMIS and MSDS for each product.

1.8 DELIVERY, STORAGE, AND HANDLING

.1 Deliver materials to site in containers sealed and labeled by manufacturers.

.2 Comply with requirements of WHMIS regarding storage, handling, and disposal of hazardous materials.

1.9 JOB CONDITIONS

.1 Environmental Requirements:

.1 Perform Work only when environmental conditions are met as specified.

.2 Ensure that adequate temporary heating is provided, as required for cold weather work.

.3 Provide adequate moisture, sun shades, and wind barriers to prevent too rapid drying of concrete during hot weather.

.4 Building must be well ventilated during concrete placement and finishing. No equipment with CO or CO_2 emissions permitted during concrete placement. Provide CO and CO_2 emission monitors throughout during floor slab pour.

.5 Provide temporary lighting as required to finish floors.

.6 Ensure substrate is within moisture limits prescribed by product manufacturers.

1.10 PROTECTION

.1 During placement of concrete, control equipment and truck access so as not to damage compacted base. Keep traffic which would affect or disturb the curing procedures off the finished surfaces for a period of seven (7) days minimum.

.2 Protect exposed concrete finishes against damage until the building is accepted by the Owner. Protect floors with plywood as required after concrete pours.

.3 Protect floors which are to receive an architectural finish against contamination by oil, paint, or other deleterious materials.

.4 Protect items set into floors from damage; ensure that alignment is not disturbed.

.5 Before pouring concrete, provide protection to wall and column surfaces to a height of 1220mm with 10mil polyethylene sheeting.

1.11 WARRANTY

.1 The Construction Manager shall provide a written warranty for a period of two (2) years commencing from the date of Substantial Performance of the Work.

2 Products

2.1 MATERIALS

.1 Unless specified otherwise, materials shall meet requirements of the Structural Drawings.

.2 Ensure that concrete supplied for slabs contain no admixtures which would be incompatible with floor hardener materials or other applied finishes.

.3 Curing materials shall be compatible with finish to be applied to concrete.

.4 Plastic Film: 10 mil thick polyethylene sheet.

.5 Liquid Chemical Sealer: To CAN/CGSB-25.20, Type-2, water based, clear.

.1 Location: Service Rooms, areas with exposed concrete floors, and all other rooms listed on the Drawings to receive sealer.

.2 Product: Penta-Sil, or approved equivalent.

.3 Surface sealers manufactured or formulated with aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, hexavelant Chromium and their compounds will not be accepted.

.6 Joint Filler: Self-leveling, 2-component, solvent-free, moisture-insensitive epoxy resin.

.1 Product: Loadflex by Sika, or approved equivalent.

.7 Joint Filler for Control Joints in Floors Which Will be Covered by an Architectural Finish: Same as specified for exposed control joints, or use sand, cement, and additive grout mixture (mixed two (2) parts sand, one (1) part cement, one (1) part additive.

.8 Additive: Thoro Acryl 60 by Harris Specialty Chemicals, Surfacrete Concentrate by Sternson Limited, or approved equivalent.

.9 Grout: For filling Cracks and Control Joints: one (1) part cement to two (2) parts fine concrete sand wetted with additive/water solution to manufacturer's directions, to provide suitable mix. Colour, texture, and strength to match adjacent surfaces.

3 Execution

3.1 LEVELLING AND FLOATING

.1 Strike off concrete after it is placed level and flush, and then level and consolidate with a wooden or steel darby or bullfloat. Complete leveling and consolidation before free moisture (bleeding) rises to surface.

.2 Where possible or practical, use laser-guided screed machine to level floors.

.3 When concrete has stiffened sufficiently to sustain foot pressure, and after removing free bleed water, float concrete with hand or power float.

.4 Assure that fibers are not visible at surface of concrete slab.

.5 Power floats shall not stop or rest on new concrete, no exception.

3.2 CONTROL JOINTS

.1 Provide sawcut control joints in concrete slabs in accordance with locations, orientation, and depths indicated on Drawings and Specifications. Sawcut as soon as it is practicable to work the slab without tearing out course aggregate.

.2 Control joints shall not be filled until ninety (90) days after concrete pour.

.3 Fill control joints with epoxy type filler where exposed; fill control joints to be covered with architectural finish using either epoxy joint filler as for exposed locations, or the sand/cement/grout mixture specified under Materials.

.4 Rake out dirt in joints with an appropriate tool. Blow dirt out of joints with compressed air. Clean the floor surface by vacuuming with industrial type vacuum cleaner.

.5 Apply filler in accordance with manufacturer's instructions, using the recommended application method.

3.3 STEEL TROWEL FINISH

.1 After floating, trowel surface with steel hand or float trowel, keeping blade flat at first and raising blade angle a little more on subsequent passes. Leave surface smooth, dense, and of fine, uniform texture without a swirl.

3.4 BROOM FINISH FOR BOND (Tiled Floor Areas)

.1 After floating, broom the substrate with a stiff bristle broom in one (1) direction, where bonding of additional floor finishes is required.

3.5 COMBINATION CURING AND SEALING COMPOUND

.1 Seal all exposed concrete surfaces with sealer and protect from drying. Apply sealer as soon as all surface water has disappeared, and concrete surface will not be marred by walking. Apply evenly, avoid puddling.

.2 Apply combination curing and sealing compounds in strict accordance with manufacturers' specifications, and as required to properly cure and seal the surfaces.

.3 Apply one (1) coat at completion of floor finishing.

3.7 WET CURING

.1 Where required or specified, wet cure floor slabs by continuous dampening for seven (7) days, to CSA A23.1/A23.2.

3.8 PLASTIC FILM CURING METHOD

.1 Keep surfaces moist. Cover the concrete with 10 mil thick polyethylene sheets.

.2 Lap all edges 150mm minimum and seal laps.

.3 Leave in place with surface continually wet for a minimum of seven (7) consecutive days, or as otherwise approved by the Owner's representative.

3.9 REMEDIAL WORK

.1 Grind floor levels which do not comply with specified tolerances to the tolerances required, or level with epoxy or latex compound.

.2 Obtain approval of method for correcting tolerances before proceeding.

.3 Immediately prior to installation of applied floor finishes but not sooner than twenty-eight (28) days after concrete has been placed, examine concrete floor surfaces and repair cracks. Rout cracks which exceed 1mm in width with mechanical router to 13mm square cross section. Clean and fill cracks as specified for control joints.

3.10 TOLERANCES

.1 Flooring applications shall be to CSA A23.1/A23.2 Standards. Levels of finished concrete floors shall not vary more than 3mm in 3000mm from dead level, except where slopes to drain are required.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Cast-in-Place Concrete – Refer to Structural Drawings.

.2 Section 04 20 00 – Basic Masonry Materials and Methods.

.3 Section 05 41 00 – Wind Load Bearing Steel Studs.

.4 Section 06 10 00 – Rough Carpentry.

.5 Section 09 91 00 – Painting.

1.2 REFERENCE DOCUMENTS

.1 American Society for Testing and Materials (ASTM):

.1 ASTM A53/A53M-12: Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

.2 ASTM A269/A269M-15: Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.

.3 ASTM A307-14: Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength.

.2 Canadian Standards Association (CSA):

.1 CAN/CSA G40.20-13/G40.21-13: General Requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steel.

.2 CAN/CSA G164-M92 (R2003): Hot Dip Galvanizing of Irregularly Shaped Articles.

.3 CAN/CSA S16-14: Design of Steel Structures.

.4 CSA W48-14: Filler Metals and Allied Materials for Metal Arc Welding.

.5 CSA W55.3-08 (R2013): Certification of Companies for Resistance Welding of Steel and Aluminum.

.6 CSA W59-13: Welded Steel Construction (Metal Arc Welding), Includes Update No. 1 (2014), Update No. 3 (2015), Update No. 4 (2015).

.7 CSA W47.1-09 (R2014): Certification of Companies for Fusion Welding of Steel.

.8 CSA G30.18-09 (R2014): Carbon steel bars for concrete reinforcement, Includes Update No. 1 (2012).

.3 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturer's Association (CPMA):

.1 CISC/CPMA 2-75: A Quick Drying Primer for use on Structural Steel.

.4 Green Seal Standards:

.1 GC-3: Green Seal Environmental Criteria for Anti-Corrosive Paints, Second Edition, January 7, 1997.

.5 Master Painters Institute (MPI):

.1 MPI Green Performance™ Standard GPS-1-08 and GPS-2-08 For Paints and Coatings.

.6 The Society for Protective Coatings (SSPC):

.1 SSPC SP 6/NACE No. 3: Commercial Blast Cleaning.

.2 Surface Preparation Standards, latest editions.

1.3 PRODUCTS SUPPLIED BUT NOT INSTALLED UNDER THIS SECTION

.1 Supply following products for installation under other Sections:

.1 Anchor bolts, bearing plates, sleeves and other inserts to be built into concrete and masonry as required for anchorage and support of fabricated steel components.

.2 Fabricated steel components to be built into concrete and masonry.

.2 Supply instructions and templates as required for accurate setting of inserts and components.

1.4 SUBMITTALS

.1 Comply with requirements of Division 01.

.2 Submit shop drawings clearly indicating:

.1 Components.

.2 Core metal thicknesses.

.3 Finishes.

.4 Dimensions.

.5 Fabrication details.

.6 Installation details.

.3 Submit paint manufacturer's product data.

.4 Submit certificates of welder qualifications specified in this Section.

1.5 QUALITY ASSURANCE

.1 Qualifications of Welders:

.1 Welding of load supporting components shall be performed by companies certified by Canadian Welding Bureau in accordance with CSA W47.1.

.2 Welders shall be qualified by Canadian Welding Bureau for classification of Work being performed.

.2 Workmanship Standards:

.1 Resistance Welding: to CSA W55.3.

.2 Fusion welding: to CSA W59.

.3 Prime Painting of Steel Fabrications:

.1 The painting and finishing specifications for new, not previously painted or finished, substrates are based on and make reference to the "Master Painters Institute Architectural Painting Specification Manual", latest edition, including the "MPI Approved Products Lists" (MPI).

1.6 PRODUCT DELIVERY AND STORAGE

.1 Schedule delivery of components to site to coincide with installation of this work.

.2 Store components to prevent damage and distortion.

.3 Protect finishes from scratches and soiling.

2 Products

2.1 MATERIALS

.1 Steel sections and plates: to CAN/CSA-G40.20-13/G40.21-13, Grade 260W.

.2 Deformed steel bars: of billet steel to CSA G30.18, grade 300.

.3 Bolts and nuts: to ASTM A307, hot dip galvanized where noted.

.4 Shop paint primer: Refer to Section 09 91 00 - Painting.

.5 Zinc rich paint and touch-up primer for interior surfaces: meeting requirements of Green Seal Standard GC-3, for VOC content to be less than 250 g/l.

.6 Isolation coating: acid and alkali resistant asphaltic paint.

.7 Refer to drawings for handrails, guardrails, stairs, ladders, angles, bollards, embeds and other miscellaneous metal details.

.8 Stainless Steel: sheet product, 304 grade, 16 Ga., #4 finish, or as specified.

2.2 FABRICATION

.1 Shop fabricate components where possible.

.2 Fabricate components square, straight, true, free from warpage and other defects. Accurately cut, machine, file and fit joints, corners, copes and mitres.

.3 Exposed joints and connections shall be tight, flush and smooth unless otherwise indicated.

.4 Where work of other Sections is to be attached to work of this Section, prepare work by drilling and tapping holes as required to facilitate installation of such work.

.5 Work of this Section, supplied for installation under other Sections, shall be prepared as required ready for installation.

2.3 SURFACE PREPARATION

.1 Thoroughly clean and suitably pretreat steel prior to finishing.

.2 Remove loose mill scale, rust, oil, grease, dirt and other foreign matter using one or more of the following methods:

.1 solvent cleaning

.2 wire brushing

.3 power wire brushing

.4 sandblasting

.3 Grind smooth sharp projections.

2.4 FINISHES

.1 Prime Paint all fabrications – suppliers standard colour.

.2 Prime Paint:

.1 Shop apply one (1) coat of prime paint to components prior to assembly.

.2 Use primer as prepared by manufacturer without thinning or adding admixtures. Apply primer to properly prepared surfaces at temperature above 7 degrees Celsius to a dry film thickness of 50 to 75 micrometers.

.3 Leave surfaces to be welded unpainted.

.3 Galvanized:

.1 Hop dip galvanize components to CAN/CSA G164.

.2 Minimum zinc coating of 600 g/m^2.

.3 Where size permits galvanize components after assembly.

.4 Zinc Rich Paint:

.1 Clean metal in accordance with surface preparation requirements of the SSPC.

.2 Apply one coat of zinc rich paint to all surfaces exposed after assembly to minimum dry film thickness of 60 micrometres. Apply coating immediately after cleaning.

.5 Isolation Coating:

.1 Apply an isolation coating to contact surfaces of following components in contact with cementitious materials and dissimilar metals except stainless steel: (1) exterior components (2) interior components exposed to high humidity conditions.

.6 Interior Finished Steel: Prime steel ready for finish paint system refer to Section 09 91 00 – Painting. Use only acceptable materials listed in MPI Manual:

.1 Work the primer paint into all corners; touch up bare or worn areas on site after installation.

.2 Leave surfaces to be welded unpainted.

.3 Standard red oxide primer, or deviations from the MPI system will not be acceptable.

.7 Exterior Finished Steel: Prime steel ready for finish paint system refer to Section 09 91 00 – Painting. Use only acceptable materials listed in MPI Manual:

.1 Work the primer paint into all corners; touch up bare or worn areas on site after installation.

.2 Leave surfaces to be welded unpainted.

.3 Standard red oxide primer, or deviations from the MPI system will not be acceptable.

.8 Carry out surface preparation of finished steel items and paint application to the requirements specified in MPI Manual.

.9 Stainless Steel:

.1 Material and finish as per manufacturers recommended stainless steel type, grade and finish.

.2 All stainless steel flatwork is to be a minimum 304 grade stainless, 16 Ga., with a #4 brushed finished, unless noted otherwise.

3 Execution

3.1 INSTALLATION

.1 Install components square, straight and true to line.

.2 Securely anchor components in place. Unless otherwise indicated, anchor components as follows:

.1 To concrete and solid masonry with expansion shields and bolts.

.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 To wood with bolts for heavy and medium duty fastenings; with screws for light duty fastenings.

.3 After installation, site clean and refinish damaged finishes, welds, bolt heads and nuts. Refinish with primer or zinc rich paint to match original finish.

3.2 COMPONENTS / FABRICATIONS

.1 All miscellaneous metal items shall be as detailed on the drawings. Contractor is responsible to provide all metal components as described on the drawings. Miscellaneous metal may include, but shall not be limited to the following:

.1 Trench grating and frames. (Note: Gratings to be bolted in place.)

.2 Custom stainless steels as described on drawings.

.3 Hot dip Galvanized Metal Angles and Loose Lintels for masonry support.

.4 Miscellaneous steel angle clips and interior concrete block wall head supports connecting to building structure.

.5 Structural embed plates and related studs.

.6 Other miscellaneous items indicated on the drawings.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

.1 Conform to the requirements of Division 1.

1.2 REFERENCE STANDARDS

.1 Canadian Standards Association (CSA):

.1 CSA-080-M Wood Preservation.

.2 CSA-080.1 Preservative Treatment of all Timber Products by Pressure Processes.

.3 CSA 080.9 Preservative Treatment of Plywood by Pressure Processes.

.4 CSA 086.1 Engineering Design in Wood (Limit States Design).

.5 CSA 0121-M Douglas Fir Plywood.

.6 CSA 0141 Softwood Lumber.

.7 CSA 0151-M Canadian Softwood Plywood.

.8 CAN3-0437.0-M85 Waferboard and Strandboard.

.9 CSA B111 Wire Nails, Spikes and Staples.

.10 CSA G164 Hot Dip Galvanizing of Irregularly Shaped Articles.

.2 Canadian General Services Board (CGSB):

.1 CAN/CGSB 71.26 Adhesive for Field Gluing Plywood to Lumber Framing for Floor Systems.

.3 Underwriters Laboratories Canada (ULC):

.1 CAN/ULC-S102 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.

1.3 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.

1.4 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 All workmanship and installation shall conform to the requirements of the Ontario Building Code, Part 9.

.3 Design of wood roof structural system including wood trusses and stick framed roof members (rafters, joists, ties etc.) and design of wood stairs shall be in accordance with the Ontario Building Code and CSA 086. Design loads shall be as required by the Ontario Building Code, the National Building Code Supplement and as indicated on the drawings.

.4 Design roof framing connections to resist uplift loads required by the referenced standards.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Materials shall not be delivered before they are required for proper conduct of the work.

.2 Protect materials, under cover, both in transit and on the site.

.3 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.

.4 Protect work from damage during storage, handling, installation and until the building is turned over to the Owner. Make good damage and loss without additional expense to the Owner.

.5 Store sheathing materials level and flat, in a dry location. Protect panel edges from moisture at all times.

Part 2 Products

2.1 MATERIALS

.1 General: Use materials specified herein.

.2 Timber Material shall be 'Grade Stamped'.

.3 Construction Lumber: To CAN/CSA 0141 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 0151-M, standard construction, good one or both sides as required, thickness as shown or specified.

.1 Douglas Fir Plywood: To CSA 0121-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 CAN3-0437.0, square edge, 12.7 mm thickness.

.5 Soffit Materials: Exterior Grade, Select Western Red Cedar slats, minimum 89 mm wide x 19 mm thick. Beveled edge.

.6 Nails, Spikes and Staples: To CSA B111.

.7 Bolts: 12.5 mm diameter, galvanized, complete with nuts and washers.

.8 Proprietary Fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, recommended for purpose by manufacturer.

.9 Nailing Discs: flat caps, minimum 25 mm diameter, minimum 26 gauge thick, sheet metal, formed to prevent dishing.

.10 Roof Sheathing H-Clips: formed “H” shape, thickness to suit panel material, extruded 6063-T6 aluminum alloy.

.11 Galvanizing: To CAN/CSA-G164.

.12 Sealant: 'Mono' as manufactured by Tremco Manufacturing Ltd. or equivalent by Dow-Corning.

.13 Wood Preservative to CAN/CSA-080-M.

.14 Adhesive: Contractors gun grade cartridge loaded wood adhesive, general purpose, to CSA 0112 Series and CAN/CGSB-71.26.

.15 Building Paper: to CAN2-51.32-M, 15# asphalt impregnated paper.

.16 Vapour Retardant: 0.152 mm polyethylene film to CAN/CGSB 51.34 Type 1.

.17 Fibreglass Insulation: to CSA A101, loose batt type, minimum density of 1.5 pcf.

.18 Connectors: Simpson Strong Tie galvanized steel connectors, brackets, gussets and the like as required, and as designed by the Truss Engineer.

.1 Joist Hangers: Minimum 1.0 mm thick sheet steel, galvanized ZF001 coating designation, 6672 N bearing strength. Provide engineered galvanized hangers for all special support conditions. Joist and truss hangers for wood I joists and laminated wood beams shall be supplied by joist manufacturer, engineered to suit framing and loading conditions.

.19 Galvanizing: to CAN/CSA-G164. Use galvanized fasteners, and hardware for exterior work, preservative treated lumber, and materials in contact with concrete or masonry.

.20 Fire Retardant Treatment:

.1 Arch Wood Protection, Inc., "Dricon FRT" or equivalent by Chemical Specialties, Inc., D-Blaze", Hoover Treated Wood Products "Pyro-Guard" or Osmose Wood Preserving Co., Inc. "FirePRO" interior Type A fire-retardant wood treatment.

.2 Pressure impregnate lumber and plywood with fire-retardant chemicals to comply with AWPA C20 (lumber) and C27 (Plywood), respectively, for treatment type indicated; identify "fire-retardant-treated wood" with appropriate classification marking of Underwriters Laboratories, Inc., or other testing and inspecting agency acceptable to authorities having jurisdiction.

.1 Treated materials shall meet FR-S ratings of not more than 25 for flame spread, smoke developed and fuel contributed when tested in accordance with UL 723 or ASTM E84, with no increase in flame spread and evidence of significant progressive combustion upon continuation of test for additional 30 minutes.

.2 No increase in above ratings when subjected to standard ASTM D2898 rain test.

.3 For interior locations use fire-retardant chemical formulation that produces "Interior Type A" treated lumber and plywood with the following properties under conditions present after installation:

.1 No reduction takes place in bending strength, stiffness and fastener holding capacities below values published by manufacturer of chemical formulation that are based on tests by a qualified independent testing laboratory of treated wood products identical to those indicated for this Project under elevated temperature and humidity conditions simulating installed conditions.

.2 No other form of degradation occurs due to acid hydrolysis or other causes related to manufacture and treatment.

.3 No corrosion of metal fasteners results from their contact with treated wood.

.4 Inspect each piece of treated lumber or plywood after drying and discard damaged or defective pieces.

.5 Kiln-dry all lumber and plywood materials after treatment to maximum 15% moisture content.

Part 3 Execution

3.1 INSTALLATION

.1 Workmanship:

.1 Comply with the requirements of the Ontario Building Code, Part 9.

.2 Execute work using skilled mechanics according to best practice, as specified here.

.3 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:

.1 Work shall include rough hardware such as nails, bolts, nuts, washers, screws, clips, hangers, connectors, strap iron, and operating hardware for temporary enclosures.

.3 Erection of Framing Members:

.1 After removal of existing siding and trim, inspect existing framing members for rot and deterioration before proceeding.

.2 Report doubtful conditions to the Consultant.

.3 Remove and replace deteriorated members as directed by Consultant.

.4 Provide new strapping to match existing where required.

.5 Install members true to line, levels and elevations.

.6 Space framing members and frame all openings as detailed on the drawings.

.7 Construct continuous members from pieces of longest practical length.

.8 Install spanning members with crown edge up.

.9 Anchor wood framing to supporting walls with galvanized metal strap ties.

.4 Erection of Wood Trusses:

.1 Install roof trusses in accordance with reviewed shop drawings and erection procedures.

.2 Install roof trusses true to line, level and plumb.

.3 Provide adequate bracing to support trusses until installation of sheathing is complete.

.4 Install galvanized metal strap ties at truss bearing points to resist uplift forces. Design of ties to conform to the Ontario Building Code.

.5 Install multiple trusses where shown on the reviewed shop drawings. Fasten multiple trusses together with metal connectors as required.

.6 Supply and install all supplementary framing required for a complete roof structure as required by the reference standards and in accordance with engineered drawings.

.5 Roof Sheathing (if required):

.1 Roof sheathing shall be 12.5 mm thick Douglas Fir plywood.

.2 Install roof sheathing in accordance with requirements of the Ontario Building Code.

.3 Support edges of roof sheathing between framing members, with aluminum ‘H’ Clips.

.6 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.

.7 Electrical Equipment Backboard: provide backboards for mounting electrical equipment as indicated. Use 19 mm thick fir face veneer fire retardant softwood plywood on 19 mm x 38 mm furring around perimeter and at maximum of 305 mm intermediate spacing.

.8 Blocking: Provide solid wood backing to support equipment and fixtures as required.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

.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 07 92 00 Joint Sealants
.4 Section 08 80 05 Glazing
.5 Section 09 21 16 Gypsum Board
.6 Section 09 91 00 Painting
.7 Section 10 90 00 Miscellaneous Manufactured Specialties
.8 Section 11 30 13 Appliances

1.3 REFERENCE STANDARDS

.1 ASTM International (ASTM)
  .1 ASTM F1667 - 17 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, Mat-Formed Wood Particleboard
  .2 ANSI/NEMA LD 3-2005 High-Pressure Decorative Laminates (HPDL)
  .3 ANSI/HPVA HP-1-09 American National Standard for Hardwood and Decorative Plywood
.4 Canadian Standards Association (CSA)
  .1 CSA O121-08 (R2013) Douglas Fir Plywood
  .2 CSA O151-17 Canadian Softwood Plywood
  .3 CSA O153-13 Poplar Plywood
.5 Canadian General Services Board (CGSB)
  .1 CAN/CGSB-11.3-M, Hardboard

1.4 Submittals

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

.2 Submit detailed shop drawings for cabinetwork showing proposed assembly, connections, anchorage, materials, dimensions, thickness, and finishes.

.3 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.

.4 Submit full range of manufacturer's standard plastic laminates for selection by the Consultant.

.5 Submit sample of each type of cabinet hardware component used.

1.5 Quality Control

.1 Mock-up: Prepare mock-ups in accordance with Section 01 45 00 – Quality Control. Shop prepare one base cabinet unit, wall cabinet, counter top and shelving unit complete with hardware and shop applied finishes, and install on project at designated location for Owner's review.

1.6 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.

1.7 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.

1.8 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 against damage, including damage by excessive changes in moisture content, during delivery and storage. Maintain minimum storage temperature of 16^0 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.

1.9 Protection

.1 Provide coverings as necessary to protect finish carpentry components from damage of any kind during storage and after installation.

1.10 Waste Management and Disposal

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

1.11 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of two (2) 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 Solid Wood:
- .1 Unless otherwise indicated, provide AWMAC Premium 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 0141, dressed all sides used in concealed locations.

.2 Plywood:
  .1 At all areas unless noted otherwise
    .1 To ANSI/HPVA HP-1-09, Grade A face, book matched, flat cut maple face and No. 3 edge.
    .2 Veneer core: to ANSI/HPVA HP-1-09, minimum five (5) plies.
  .2 Soft Plywood: to CSA 0151-M Standard Grade, solid two sides. Use in concealed locations only, except as indicated.
  .3 At areas with exposed edges
    .1 Exterior BB/CP grade, flat cut Baltic birch.

.3 Hardboard: To CGSB 11-GP-3M, Type 2, 6 mm thick or as indicated.

.4 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: CAN3-0188.1M, Grade R.
  .3 Laminating adhesive: CAN3-0112 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.
  .6 Up to three (3) colours and patterns will be selected by the Consultant.

.5 Melamine Overlaid Panels:
  .1 Melamine overlay, heat and pressure laminated with phenolic resin to 12.7 mm thick particle board.
  .2 Overlay bonded to both faces where exposed two sides, and when panel material require surface on one side only, reverse side to be overlaid with a plain balancing sheet.
  .3 Furniture finish: solid colour as selected by the Consultant.
  .4 Edge Finishing: matching melamine and polyester overlay edge strip with self-adhesive.

.6 Fasteners and Adhesive:
  .1 Nails and staples: ASTM F1667, galvanized, spiral head nails.
  .2 Screws: To CSA B35.4 zinc, cadmium or chrome plated steel.
  .3 Splines: wood or metal, to suit application.
  .4 Adhesive: To CSA 0112-M, type as appropriate for the intended application waterproof. 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.

.7 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 Shelf Standards: Knape & Vogt KV80, Anochrome finish.
  .2 Brackets: Knape & Vogt KV180, Anochrome finish.
  .3 Hinges: Blum concealed hinges, 125° clip and 125° opening with self-closing spring. Full or half overlay. Nickel plated steel.
  .4 Cabinet Pulls with antimicrobial clear coating:
    .1 CP1 CBH Charlie Bar Pull, 5”, Antique Brass.
    .2 CP2 CBH Charlie Round Appliance Pull, 12”, Satin Stainless Steel.

.3 CP3 CBH Charlie Round Appliance Pull, 18", Antique Brass.
.4 CP4 CBH Charlie Round Edge Tab, 4", Matte Black Finish.
.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 Door and Drawer Bumpers: "Quietex" bumpers.
.9 Roller Casters: Colson Casters Ltd. Series 3 tread lock swivel casters with 76 mm diameter polyurethane wheels, zinc plated steel brake pedals, rubber brake shoes, complete with screws to suit. Wheels: polyurethane HI-TECH treads mounted on ribbed polyolefin cores. Alternate: Richelieu Faultless swivel caster series.
.10 Provide other hardware and hardware accessories as detailed or required.

.8 Stainless Steel:
.1 Materials:
.1 Stainless-Steel Sheet: ASTM A 240/A 240M, Type 316.
.2 Sealant for Countertops: Manufacturer's standard sealant of characteristics indicated below that complies with applicable requirements in Section 07 92 00 - Joint Sealants.
.3 Mildew-Resistant Joint Sealant: Mildew resistant, single component, non-sag, neutral curing, silicone.
.1 Colour: Clear.
.2 Countertops: Fabricate from 15-gauge, stainless-steel sheet. Provide smooth, clean exposed tops and edges in uniform plane, free of defects.
.1 Joints: Fabricate countertops without field-made joints.
.2 Weld shop-made joints.
.3 Sound deaden the undersurface with heavy-build mastic coating.
.4 Where stainless-steel sinks occur in stainless-steel tops, factory weld into one integral unit.
.3 Finish: Grind and polish surfaces to produce uniform, directional satin finish matching No. 4 finish, with no evidence of welds and free of cross scratches. Run grain with long dimension of each piece. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces clean.

2.1 Fabrication

.1 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.

.2 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.

.3 Plastic Laminate Components:
.1 Assembly: Bond plastic laminate to core with adhesive, under pressure.
.2 Core: unless otherwise indicated: 19 mm thick.

.3 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.
.4 Use largest practicable plastic laminate sheet size.
.5 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.
.6 Construct countertops post formed or self-edged as detailed on drawings.
.7 Apply self-edged minimum 1.0 mm thick plastic laminate to exposed ends of countertops.
.8 Construct splash backs minimum 100 mm high or higher where indicated. Do not return post formed splash back at ends except where specifically called for.
.9 Openings and cut-outs:
.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.

.10 Stainless Steel Countertops: Fabricate stainless steel counters and vanities with stainless steel sheeting bonded under pressure to exterior grade high density overlaid DFP plywood, 19 mm thick. Provide all returns and radii to present a clean neat finish. Provide splashbacks, 100 mm high at adjacent walls. Weld all seams and grind smooth.

2.2 Cabinetwork

.1 Except where otherwise detailed, use flush overlaid construction. 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.

.2 Construct cabinetwork components of plastic laminate faced particle board as indicated and in accordance with AWMAC Custom grade.

.3 Rout gables for pilaster strips where adjustable shelving is required.

.4 Construct shelving as indicated with edge moulding to match. Shelving to cabinetwork to be adjustable unless otherwise noted.

.5 Construct doors fronts of 19 mm plastic laminate faced plywood.

.6 Construct doors 19 mm thick with sides tongued into front and back housed into sides.

.7 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.

.8 Apply moisture repellent sealer to concealed backs of cabinetwork.

.9 Install rubber wiring grommets at work surfaces where indicated.

.10 Install keyboard tray complete with hardware.

.11 Coordinate installation of wiring for electrical work with Electrical.

2.3 Finishes

.1 All exposed exterior surfaces: plastic laminate as indicated. Colours selected by the Consultant.

.2 Stainless Steel: Type 316 stainless steel, brushed finish.

.3 Wood Finish: 3 coats clear polyurethane finish on all sides as specified in Section 09 91 23. Factory finish wherever practical.

.4 All exposed interior surfaces: melamine unless indicated otherwise.

.5 Cabinet and case backs unexposed to view shall be back primed with one coat of moisture repellent sealer.

.6 Apply finishes in accordance with the AWMAC Manual and Section 09 91 23.

Part 3 Execution

3.1 Installation

.1 Verify adequacy of backing and support framing. Advise Contractor of areas and surfaces requiring further modifications for plumb, level, even or square fitting.

.2 Verify HVAC controls and systems are operating properly.

.3 Install work in accordance with AWMAC Installation Manual, Premium grade.

.4 Install cabinetwork components plumb, true and level and securely fasten in place.

.5 Accurately scribe and closely fit components to irregularities of adjacent surfaces.

.6 Accurately fit joints in true plane, locate joints over bearing or supporting surfaces.

.7 Provide mechanical fastening devices such as nails, screws and bolts required for fastening wood components. Unless permitted, provide concealed fastening of components.

.8 Where permitted, nail with small headed finishing nails. Countersink nail heads with nail setter.

.9 Install plastic laminate components using concealed fastening devices.

.10 Where components are fastened with screws or bolts, countersink screw and bolt heads and provide wood plugs matching surrounding wood.

.11 Where cabinetwork abuts other building elements, provide wood trim matching cabinetwork except where otherwise detailed.

.12 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.

.13 Provide for wiring and cable management systems wiring grommets as indicated on the drawings.

.14 Apply mildew resistant silicone sealant to perimeter of all countertops as specified in Section 07 92 00.

3.2 Adjustment

.1 Upon completion of installation, inspect work of this Section and touch-up, where required, minor or damaged surface finish to restore it to original condition.

.2 Touch up exposed job made nail and screw holes, raw finishes resulting from job fitting, scratches and mars.

.3 Check operation of all moveable parts and, if necessary, adjust to ensure proper and smooth function.

.4 Replace damaged components which, in the opinion of the Consultant, cannot be satisfactorily repaired.

3.3 Cleaning

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

.2 Clean all surfaces.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Foam-in-place insulation to exterior hollow metal door frames and exterior aluminum window and doorframes.

.2 Foam-in-place insulation around protrusions through the exterior wall envelope and juncture of different cladding materials.

.3 Install at additional locations as detailed on Drawings.

1.2 SECTION INCLUDES

.1 This Section includes requirements for:

.1 A spray-applied rigid cellular polyurethane thermal insulation foam product applied where indicated on Drawings, so as to connect and provide a continuous air seal.

.2 A spray-applied thermal barrier over the polyurethane. Thermal barrier may or may not be required.

1.3 RELATED WORK

.1 Section 07 26 00 – Air and Vapour Retarders.

.2 Section 09 21 00 – Interior Steel Studs and Furring.

1.4 REFERENCE DOCUMENTS

.1 American Society of Testing and Materials (ASTM):

.1 ASTM D1621-10 – Standard Test Method for Compressive Properties Of Rigid Cellular Plastics.

.2 ASTM D1622 / D1622M-14 – Standard Test Method for Apparent Density of Rigid Cellular Plastics.

.3 ASTM D1623-09 – Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.

.4 ASTM D2126-15 – Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.

.5 ASTM D2842-12 – Standard Test Method for Water Absorption of Rigid Cellular Plastics.

.6 ASTM E84-15a – Standard Test Method for Surface Burning Characteristics of Building Materials.

.7 ASTM E96 / E96M-15 – Standard Test Methods for Water Vapor Transmission of Materials.

.2 Underwriters' Laboratories of Canada (ULC):

.1 CAN/ULC-S102-10 – Standard Method of Test for Surface Burning Characteristics of building Materials and Assemblies.

1.5 SUBMITTALS

.1 Comply with requirements of Division 01.

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications, and data sheets in accordance with Section 01 33 00 – Submittal Procedures.

.2 Provide copies of most recent data sheets describing materials' physical properties and include product characteristics, performance criteria, physical size, finish, and limitations.

1.6 QUALITY ASSURANCE

.1 Regulatory Agency Approvals:

.1 Whichever of the following products is used, Contractor shall be responsible for obtaining approval for use in intended applications from Authority Having Jurisdiction:

.1 Spray applied polyurethane foam containing integral fire inhibitors.

1.7 MOCK-UPS

.1 Erect mock-up in accordance with Division 01.

.2 Refer to Contract Documents for applicable locations.

.3 Allow twenty-four (24) hours for review of mock-up by Consultant before proceeding with coating work.

1.8 DELIVERY, STORAGE, AND HANDLING

.1 Deliver and store materials undamaged, in original wrappings, in a suitable environment.

.2 Store to protect materials from wind, moisture, sunlight, and accidental ignition.

1.9 PROTECTION

.1 Ventilate area to receive insulation by introducing fresh air and exhausting air continuously during and twenty-four (24) hours after application to maintain non-toxic, unpolluted, safe working conditions.

.2 Provide temporary enclosures to prevent spray from contaminating air beyond application area.

.3 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of insulation materials.

1.10 ENVIRONMENTAL REQUIREMENTS

.1 Apply insulation only when surfaces and ambient temperatures are within manufacturer's prescribed limits for minimum twenty-four (24) hours before, during, and seventy-two (72) hours after completion of application.

Part 2 Products

2.1 PRODUCT OPTIONS

.1 Provide spray-applied polyurethane foam containing integral fire inhibitors. An additional separate thermal barrier is not required.

2.2 SPRAY-APPLIED POLYURETHANE FOAM

.1 Spray-Applied Polyurethane Foam: Rigid, cellular thermal insulation with the following properties when applied:

Property	Test Method	Requirement
Density	ASTM D1622	42 kg/m^3 max. 10 kg/m^3 min.
Compressive Strength	ASTM D1621	104 kPa with maximum 10% deformation
Tensile Strength	ASTM D1623	138 kPa min.
Response to Thermal and Humid Aging	ASTM D2126	12% maximum volume change
Water Absorption	ASTM D2842	5% maximum by volume
Water vapour permeability	ASTM E96/E96M	Core: max180 ng/(Pa.s.m^2) Skins: max 60 ng/(Pa.s.m^2)

.2 Spray-Applied Polyurethane Foam Containing Integral Fire Inhibitors: Same properties as specified in 2.1.1, with following additional fire hazard classification properties when tested to CAN/ULC-S102 or ASTM E96:

.1 Flame Spread: Maximum 10.

.2 Smoke Developed: Maximum 500.

.3 Fuel Contributed: 0.

2.3 THERMAL BARRIER

.1 Thermal Barrier: Spray-applied fire-retardant overcoat meeting applicable requirements of the Ontario Building Code current edition for a thermal barrier over foamed plastic.

Part 3 Execution

3.1 VERIFICATION OF CONDITIONS

.1 Inspect areas to receive Work of this Section and ensure conditions are suitable to begin application.

.2 Ensure that all work penetrating through air seal is complete.

.3 Ensure that appropriate backup material has been installed in all large voids.

3.2 PROTECTION OF EXISTING WORK

.1 Protect from overspray all finish surfaces which will be exposed to view.

3.3 PREPARATION

.1 Examine substrates receiving foamed-in-place insulation to verify suitability.

.2 Clean substrates of dirt, dust, grease, oil, loose material, and other matter which may affect bond of insulation.

.3 If recommended by manufacturer, prime substrates in accordance with manufacturer's recommendations.

.4 Remove oil from galvanized sheet steel substrates and apply prime coating in accordance with manufacturer's instructions.

3.4 APPLICATION

.1 Spray-apply polyurethane foam in accordance with manufacturer's instructions. Use equipment recommended by manufacturer.

.2 Apply material as indicated and in sufficient thickness to achieve a complete air seal.

.3 Wall / Decking Junctures: Provide continuous gusset profiled seal extending 6” vertically and horizontally from juncture. Ensure application leaves no voids.

.4 Windows and Doors: Apply only enough product to form an effective air seal toward warm side of frames; do not fill entire cavity with foam. If application deforms frames, remove foam, restore frame alignment, and re-apply foam.

.1 Fill pressed steel doorframes 75% full with foam-in-place insulation prior to installation of doorframes. Fill the remainder of the frame after installation through the gap between the frame and the wall construction. In masonry walls, fill the frame members as the wall is being built, at lifts no greater than 48”, unless otherwise permitted by the material manufacturer.

.5 Install foam-in-place insulation around protrusions through the exterior building envelope to achieve and maintain the continuity of air/vapour seal.

.6 Install foam-in-place insulation through all structural elements that penetrate the building envelope. Install foam-in-place insulation to warm side of structural elements to provide a

thermal barrier to interior of heated spaces where structural elements are continuous form interior to exterior of building envelope.

.7 Spray-apply fire retardant overcoat to spray applied polyurethane foam surfaces, in sufficient thickness to provide a thermal barrier meeting the Ontario Building Code current edition and requirements of authority having jurisdiction.

.8 Cut back excess foam-in-place insulation once cured; flush with surrounding surfaces, or recess back for application of sealant.

.9 Upon completion of foam-in-place insulation work, clean adjacent surfaces of over-spray and dusting to the satisfaction of the Consultant.

.10 Allow Consultant to review installation prior to enclosing.

END OF SECTION

Part 1 General

1.1 INTENT

.1 Provide firestopping to meet or exceed requirements of the Ontario Building Code current edition as specified in this Section.

1.2 REFERENCE DOCUMENTS

.1 Ontario Building Code current edition.

.2 Underwriters Laboratories of Canada (ULC):

.1 CAN/ULC S115-11: Standard Method of Fire Tests of Firestop Systems.

.2 ULC-FS-15: Firestop Systems and Components 2015 Edition.

.3 Warnock Hersey (WH) Certification Listings, current edition.

1.3 PERFORMANCE REQUIREMENTS

.1 Firestopping shall provide a rating equal to that of the separation, when tested to ULC S115, for a rating period applicable to the fire separation.

.2 Firestopping of electrical and communications cables shall be easily re-enterable and re-sealable with negligible risk of damage to cables and shall not require de-rating of electrical cables.

.3 Firestopping used to fill voids in floors having openings 4” diameter or larger, and which are accessible to the public, shall support floor design loading.

1.4 SUBMITTALS

.1 Comply with requirements of Division 01.

.2 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 – Submittal Procedures. Include manufacturer’s printed instructions for installation.

.3 Data shall indicate conformance with requirements of this Section, including ULC or Warnock Hersey system number.

1.5 COORDINATION AND SEQUENCING

.1 Coordinate construction of fire separations and penetrations through fire separations with work of this Section.

.2 Ensure penetrations have been completed prior to installing firestopping.

.3 Install firestopping prior to insulation of piping, unless insulation is part of a tested firestop system meeting requirements.

1.6 QUALITY ASSURANCE

.1 Provide site mock-up of each proposed type of firestop system at locations designated by and for approval by the Consultant.

.2 Approved mock-up shall establish minimum standard and may be incorporated into work of this Section.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials in original, unopened packaging bearing manufacturer's seals and labels intact.

.2 Store materials off ground, under cover and away from moisture.

Part 2 Products

2.1 SYSTEMS AND MATERIALS

.1 Firestopping systems: as listed under ULC-FS-15 Firestop Systems and Components 2015 Edition, or as listed in WH Listings under "Through-Penetration Firestopping Systems".

.2 Firestopping materials, whether used in a tested system or not, shall be:

.1 listed under ULC-FS-15 or under WH Listings,

.2 labelled with applicable ULC or WH label, and

.3 compatible with applicable substrates and openings.

.3 Provided that all other specified requirements can be met use any of the following products, either singly or in combination:

.1 Elastomeric sealant.
.2 Elastomeric coating.

.3 Mineral fibre.

.4 Mortar.

.5 Intumescent putty.

.6 Poured-in-place silicone foam.

.7 Preformed silicone foam.

.8 Multi-cable transit system.

.9 Any other product which meets all other specified requirements.

.4 Primer: as recommended by firestopping manufacturer for applicable substrate.

Part 3 Execution

3.1 VERIFICATION OF CONDITIONS

.1 Examine condition of voids to be filled to ensure suitability for firestop systems.

.2 Verify installation of service penetrations and adjacent construction has been completed.

3.2 PREPARATION

.1 Prepare substrates and surfaces to a clean, dry, and frost-free condition, ready to receive firestopping.

.2 Prime substrates and surfaces to manufacturer's recommendations.

3.3 INSTALLATION

.1 Provide tested firestopping systems meeting specified performance requirements wherever the continuity of a fire separation is interrupted by mechanical, electrical or other service penetrations, or by any other openings, gaps or discontinuities.

.2 Install tested firestopping systems in accordance with manufacturer's recommendations and in strict conformance with tested systems.

.3 In locations for which there are no applicable tested firestopping systems, provide firestopping materials where indicated and as detailed on drawings. Install materials in accordance with manufacturer's recommendations.

.4 Where applicable, neatly tool or trowel firestopping surfaces remaining exposed and make flush with surrounding exposed surfaces.

END OF SECTION

Part 1 General

1.1 RELATED WORK SPECIFIED IN OTHER SECTIONS

.1 All Sections of this specification apply to this Section.

1.2 SUBMITTALS

.1 Comply with requirements of Division 01.

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 – Submittal Procedures. Submittals shall describe the following:

.1 Cleaning compound.

.2 Sealant.

.3 Primers.

.3 Samples:

.1 Submit samples of each type of material and colour to be used.

.2 Cure samples under identical conditions to job site, before submission.

1.3 QUALITY ASSURANCE

.1 Sealant manufacturer’s representative shall review site conditions, joint design and installers qualifications. Report unsatisfactory conditions to the Consultant.

.2 Representative shall check container labels, random inspect preparation of substrate materials and random test installed work.

.3 Make 150mm long cut tests to random locations of installed work. Certify thickness, hardness and surface finish conforms to intended design. Report to the Consultant.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Receive and store materials as recommended by materials manufacturer.

.2 Maintain containers and labels in undamaged condition.

1.5 EXISTING CONDITIONS

.1 Examine substrate materials, joint voids and note temperature/humidity conditions. Report unacceptable conditions to the Consultant.

.2 Commencement of work implies acceptance of conditions.

Part 2 Products

2.1 MATERIALS

.1 Joint Cleaner: Non-corrosive solvent recommended by sealant manufacturer for applicable substrate material.

.2 Primer: Non-staining type recommended by sealant manufacturer.

.3 Joint Back-Up: Round closed cell foam, extruded neoprene, Shore A hardness of 20, tensile strength 140 to 200 kPa, outsized 30-50%, compatible with sealant and primer, non-adhering to sealant.

.4 Bond breaker: Pressure sensitive polyethylene tape, not bondable to sealant.

.5 Sealant: Polysulphide base, one (1) component, to CAN/CGSB-19.13-M87, Shore A hardness 15-25.

.6 Sealant: Polysulphide base, two (2) component, to CAN/CGSB-19.24-M90 Type 1(horizontal) and 2 (vertical), Shore A hardness 15-25.

.7 Sealant: Silicone base, one (1) component to CAN/CGSB-19.13-M87, Shore A hardness 15-25.

.8 Sealant: Silicone base, two (2) component, to CAN/CGSB-19.24-M90, Shore A hardness 15-25.

.9 Sealant: Polyurethane base, one (1) component, to CAN/CGSB-19.13-M87 type 1 and 2, Shore A hardness 20-35.

.10 Sealant: Polyurethane base, multi-component, to CAN/CGSB-19.24-M90 type 1 and 2, Shore A hardness 20-35.

.11 Colours: Sealant and caulking colours shall match adjacent materials and be selected by Consultant from manufacturer's standard colour range.

2.2 SEALANTS

Type	Description and Standard	Attributes
S = Sealant		
Type S-1	Polysulphide base, two (2) component, non-sag, to CAN/CGSB-19.24-M90, Type 2	Shore A hardness 15-25, joint movement range +/- 25%
Type S-2	Polysulphide base, two (2) component, self-levelling, to CAN/CGSB-19.24-M90, Type 2	Shore A hardness 15-25, joint movement range +/- 25%
Type S2A	Polysulphide base, two (2) component, self-levelling, to CAN/CGSB-19.3-M90,	PRC Rubber Caulk 250, no substitution.
Type S-3	Polysulphide base, one (1) component, non-sag, to CAN/CGSB-19.13-M87, Type 1 and 2	Shore A hardness 15-25, joint movement range +/- 25%

Type S-4	Silicone base, one (1) component to CAN/CGSB-19.13-M87 chemical curing	Shore A hardness 15-25, joint movement range +/- 25%
Type S-5:	Silicone base, one (1) component to CAN/CGSB-19.18-M87 solvent curing	Shore A hardness 15-25, joint movement range +/- 25%
Type S-6	Silicone base, one (1) component, non-sag, to CAN/CGSB-19.22-M89 mildew resistant	Shore A hardness 20-25
Type S-7	Silicone base, two (2) component, non-sag, to CAN/CGSB-19.24-M90, Type 2 chemical curing	Shore A hardness 15-25, joint movement range +/- 25%
Type S-8	Polyurethane base, one (1) component, non-sag, to CAN/CGSB-19.13-M87, Type 1 and 2	Shore A hardness 15-25, joint movement range +/- 25%
Type S-9	:Polyurethane base, multi-component, non-sag, to CAN/CGSB-19.24-M90 type 2	Shore A hardness 20-35, , joint movement range +/- 25%

Type	Description and Standard	Attributes
C = Caulking		
Type C-1	Acrylic Base, one (1) component to CAN/CGSB-19.17-M90 emulsion base.	Joint movement range +/- 7.5%
Type C-2	Butyl-Polyisobutylene Polymer Base, solvent curing, one (1) comoponent butyl rubber caulking to 19-GP-14 M	Joint movement range +/- 0.5%
Type C-3	Sealing and Bedding Compound Acoustical, one (1) component, to CAN/CGSB-19.21-M87, non-drying, non- hardening, synthetic rubber	

Part 3 Execution

3.1 PREPARATION

.1 Remove dust, paint, loose mortar and all foreign matter; dry joint surfaces.

.2 Remove rust, mill scale and coatings from ferrous metals by wire brush, grinding or sandblasting.

.3 Remove oil, grease and other coatings from non-ferrous metals with appropriate solvent.

.4 Prepare concrete, masonry, glazed and vitreous surfaces as recommended by sealant manufacturer.

.5 Examine joint dimensions and size materials to achieve joint depth which is half the width of the joint with minimum width and depth of 1/8", maximum width 1".

.6 Install joint back-up to achieve correct joint depth.

.7 To prevent staining, mask adjacent surfaces with tape prior to priming.

.8 Apply bond breaker tape in accordance with manufacturer's directions.

.9 Prime sides of joints to manufacturer's directions immediately prior to caulking.

3.2 APPLICATION

.1 Select sealant to suit applications as recommended by manufacturer. Apply sealant in accordance with manufacturer's directions, using a gun with proper size nozzle, to leave a weathertight, air tight installation. Use sufficient pressure to fill voids and joints solid. Superficial pointing with skin bead is not acceptable.

.2 Form surface of sealant smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities. Neatly tool surface to a slight concave joint.

.3 In masonry cavity construction, vent caulked joints from cavity to 3 mm beyond external face of wall by inserting 1/8” diameter plastic tubing at bottom of each joint and maximum of 5’-0” on centre vertically.

.4 Clean adjacent surfaces immediately and leave work neat and clean. Remove excess sealant and droppings, using recommended cleaners as work progresses. Remove masking tape after tooling of joints.

3.3 SEALANT APPLICATION SCHEDULE

Movement	Application	Sealant Types
Significant +25 or -25%	Vertical or inclined joints such as panel, coping, expansion, precast planks, prestressed concrete joints and sloped pavement.	S-1, 3
Significant +25 or -25%	Horizontal joints not exposed to fuel or gas.	S-2A
Minimal +25 or -25%	Vertical or inclined joints such as perimeter of doors, windows, wall penetrations.	S-1, 3, 9,
Minimal +25 or -25%	Glazing sealant for non-structural glazing.	S-4, 5
Low +5 or -5%	Interior joints such as steel door frames in drywall or masonry, drywall control joints	C-1
	Exposed acoustical	S-5
	Non-exposed acoustical	S-5, C-3

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 92 00 Joint Sealants
.3 Section 08 71 10 Door Hardware
.4 Section 08 80 05 Glazing
.5 Section 09 29 00 Gypsum Board
.6 Section 09 22 16 Non-Structural Metal Framing
.7 Section 09 91 00 Painting

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM A653/A653M-15e1 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  .2 ASTM B29-14 Standard Specification for Refined Lead
  .3 ASTM B749-14 Standard Specification for Lead and Lead Alloy Strip, Sheet and Plate Products.
  .4 ASTM E90-09 (2016) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
  .5 ASTM E330/E330M-14, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
  .6 ASTM E413-16 Classification for Rating Sound Insulation.
  .7 ASTM E1332-16, Standard Classification for Rating Outdoor-Indoor Sound Attenuation.
.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 Canadian Standards Association (CSA International)
  .1 CSA-G40.20-13/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  .2 CSA W59-13, Welded Steel Construction (Metal Arc Welding).
.4 Canadian Steel Door Manufacturers' Association (CSDMA)
  .1 CSDMA, Recommended Specifications for Commercial Steel Doors and Frames, 2006.
  .2 CSDMA, Selection and Usage Guide for Commercial Steel Door and Frame Products, 2009.
.5 Underwriters Laboratories Canada (ULC)
  .1 CAN/ULC-S104-10, Standard Method for Fire Tests of Door Assemblies.
  .2 CAN/ULC-S105-09, Standard Specification for Fire Door Frames Meeting the Performance Required by CAN/ULC-S104.
  .3 CAN/ULC-S701-11, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
  .4 CAN/ULC-S702-14, Standard for Thermal Insulation, Mineral Fibre, for Buildings.
  .5 CAN/ULC-S704-11, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
.6 National Fire Protection Association(NFPA)
  .1 NFPA 80-2013, Standard for Fire Doors and Other Opening Protectives.
  .2 ANSI/NFPA 252-2012 Standard Methods of Fire Tests of Door Assemblies.
  .3 ANSI/UL10B Fire Tests of Door Assemblies.
  .4 ANSI/UL10C Standard for Positive Pressure Fire Tests of Door Assemblies.

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, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, glazed louvred, arrangement of hardware, and finishes.
  .2 Indicate each type frame material, core thickness, reinforcements, location of anchors and exposed fastenings, reinforcing, fire rating and finishes.
  .3 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.

1.5 System Description

.1 Design Requirements
  .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 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 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 CAN4-S104M (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 CAN4-S104, ASTM E 152 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.

1.8 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 CAN4-S104 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 A224.1 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.

1.9 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 one (1) year 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 Hot dipped galvanized steel sheet: to ASTM A 653M, ZF75, minimum base steel thickness in accordance with CSDMA Table 1 - Thickness for Component Parts.

.2 Reinforcement channel: to CSA G40.20/G40.21, Type 44W, coating designation to ASTM A 653M, ZF75.

2.2 Door Core Material

.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.

2.3 Primer

.1 Touch-up prime CAN/CGSB-1.181, organic zinc rich, rust inhibitive.
.1 Maximum VOC limit 50 g/L to GC-03.

2.4 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 Polyisocyanurate: heat resistant, epoxy resin based, low viscosity, contact cement.

.4 Lock-seam doors: fire resistant, resin reinforced polychloroprene, high viscosity, low VOC sealant/adhesive or U.L.C. approved equivalent.

2.5 Accessories

.1 Door silencers: single stud rubber/neoprene type, to CGSB-60-GP6 Type 6/180.

.2 Glazing Stops: Minimum 20 gauge (0.9 mm) base thickness sheet steel with wipe zinc finish to ASTM A525-80a. Fasteners to be #6 x 32 mm cadmium plated oval head scrulox (self drilling) type screws. Tamper proof screws.

.3 Exterior top caps: rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19Ma.

.4 Metallic paste filler: to manufacturer's standard.

.5 Sealant: As specified in Section 07 92 00.

.6 Fiberglass: to CAN/ULC-S702-09-AM1, loose batt type, minimum density of 24 kg/m³.

2.6 Frame Fabrication - General

.1 Fabricate frames in accordance with CSDMA specifications.

.2 Fabricate frames to profiles and maximum face sizes as indicated.

.3 Frames: 1.6 mm welded type construction.

.4 Blank, reinforce, drill and tap frames for mortised, templated hardware, and electronic hardware using templates provided by finish hardware supplier. Reinforce frames for surface mounted hardware.

.5 Protect mortised cutouts with steel guard boxes.

.6 Prepare frame for door silencers, 3 for single door, 2 at head for double door.

.7 Manufacturer's nameplates on frames and screens are not permitted.

.8 Conceal fastenings except where exposed fastenings are indicated.

.9 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.

.10 Prepare frames to receive electrical conduit for door operators where indicated and required.

.11 Thermally broken Frames: Fleming TB Series frames or equivalent. Frames shall be manufactured with a P.V.C. spline which eliminates through metal contact, substantially decreasing the thermal conductivity experienced in a normal steel frame.
.1 Manufactured from 16 gauge paintable galvanneal steel
.2 Jamb depth 5 ¾" unless shown otherwise.
.3 Exceed standards for insulated steel frames CAN/CGSB-82.5-M88, Insulated Steel Doors
.4 High frequency hinge reinforcing
.5 Hinge reinforcing dimpled for conversion from standard weight to heavy weight reinforcing.

2.7 Frame Anchorage

.1 Provide appropriate anchorage to floor and wall construction.

.2 Locate each wall anchor immediately above or below each hinge reinforcement on hinge jamb and directly opposite on strike jamb.

.3 Provide 2 anchors for rebate opening heights up to 1520 mm and 1 additional anchor for each additional 760 mm of height or fraction thereof.

.4 Locate anchors for frames in existing openings not more than 150 mm from top and bottom of each jambs and intermediate at 660 mm on centre maximum.

2.8 Frames – Welded Type

.1 Welding in accordance with CSA W59.

.2 Accurately miter or mechanically joint frame product and securely weld on inside of profile.

.3 Cope accurately and securely weld butt joints of mullions, transom bars, 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 Securely attach floor anchors to inside of each jamb profile.

.6 Weld in 2 temporary jamb spreaders per frame to maintain proper alignment during shipment.

2.9 Door Fabrication - General

.1 Exterior doors to CAN/CGSB-82.5-M88, Insulated Steel Doors

.2 Doors: swing type, flush.

.3 All interior doors: insulated steel construction with honeycomb core laminated to face sheets under pressure.

.4 All exterior doors: insulated steel construction with polyisocyanurate core laminated to face sheets under pressure.

.5 Fabricate doors with longitudinal edges locked seam locked seamed, adhesive assisted welded. Seams: visible grind welded joints to a flat plane, fill with metallic paste filler and sand to a uniform smooth finish.

.6 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.

.7 Blank, reinforce, drill doors and tap for mortised, templated hardware and electronic hardware.

.8 Factory prepare holes 12.7 mm diameter and larger except mounting and through-bolt holes, on site, at time of hardware installation.

.9 Reinforce doors where required, for surface mounted hardware.

.10 Fabricate transom panels to match door construction.

.11 Provide inverted, recessed, spot welded channels to top and bottom of interior doors.

.12 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.

.13 Manufacturer's nameplates on doors are not permitted.

2.10 Hollow Steel Construction

.1 Form face sheets for exterior doors from 1.6 mm sheet steel.

.2 Form face sheets for interior doors from 1.2 sheet steel.

.3 Reinforce doors with vertical stiffeners, securely welded to face sheets at 150 mm on centre maximum.

.4 Fill voids between stiffeners of exterior doors with polyisocyanurate core.

.5 Fill voids between stiffeners of interior doors with temperature rise rated core.

2.11 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.

2.12 Finishes

.1 Doors and frames shall wipe coat zinc, ready for painting.

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 data sheets.

3.2 Installation – General

.1 Install doors and frames to CSDMA Installation Guide, NAAMM-HMMA 840, Installation Guide for Commercial Steel Doors and Frames and for fire rated product, NFPA 80.

3.3 Frame Installation

.1 Set frames plumb, square, level and at correct elevation.

.2 Secure anchorages and connections to adjacent construction.

.3 Make allowances for deflection of structure to ensure structural loads are not transmitted to frames.

.4 Brace frames rigidly in position while building-in. Install temporary horizontal wood spreader at third points of door opening to maintain frame width. Provide vertical support at center of head for openings over 1200 mm wide. Remove temporary spreaders after frames are built-in.

.5 Caulk perimeter of frames.

3.4 Door Installation

.1 Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08 71 10 - Door Hardware.

.2 Install transom panels using concealed fasteners.

.3 Provide even margins between doors and jambs and doors and finished floor and thresholds as follows:
.1 Hinge side: 1.0 mm.
.2 Latchside and head: 1.5 mm.
.3 Finished floor and thresholds: 13 mm.
.4 Adjust operable parts for correct function.

.4 Coordinate with Section 08 71 10 for preparation and installation of automatic door operators.

3.5 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.

3.6 Cleaning

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

End of Section

Part 1 General

1.1 SECTION INCLUDES

.1 Fire-rated and non-fire-rated access panels in masonry walls, gypsum board walls, and gypsum board ceilings.

1.2 RELATED SECTIONS

.1 Section 09 21 00 – Interior Steel Studs and Furring.
.2 Section 09 29 00 – Gypsum Board.
.3 Section 09 91 00 – Painting.
.4 Mechanical Drawings.
.5 Electrical Sections.

1.3 REFERENCE DOCUMENTS

.1 American Society for Testing and Materials (ASTM):
  .1 ASTM A568/A568M-15: Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled.
  .2 ASTM A879/A879M-12: Standard Specification for Steel Sheet, Zinc Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on Each Surface.
  .3 ASTM A653/A653M-15: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  .4 ASTM A1008/A1008M-15: 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.
  .5 ASTM B221-14: Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
  .6 ASTM C1396/C1396M-14a: Standard Specification for Gypsum Board.

.2 National Fire Protection Association (NFPA):
  .1 NFPA 80: Standard for Dire Doors and Other Opening Protectives, 2016 edition.

.3 Underwriters' Laboratories of Canada (ULC):
  .1 UL 10B: Standard for Fire Tests of Door Assemblies.

1.4 SUBMITTALS

.1 Submit in accordance with Division 01.

.2 Submit shop drawings indicating panel construction, anchor method, hardware, and finishes.

.3 Provide product data for each type of door and frame indicated, including construction details relative to materials, individual components and profiles, finishes, and fire ratings (if required) for access doors and frames.

Part 2 Products

2.1 ACCESS PANELS

.1 Acceptable manufacturers or approved equivalents:

.1 Acudor Acorn Limited.
.2 Inryco/Milcor.
.3 Steelcraft.
.4 Or approved equivalent.

.2 Construction:
.1 Rated assemblies insulated.
.2 Minimum 1.6mm thick sheet steel frame and door leaf.
.3 Frame with integral mounting flange.
.4 Prime painted, zinc chromate, rust inhibitive type.

.3 Hardware:
.1 Concealed rod hinge.
.2 Tamperproof latch and stop.
.3 Labeled assemblies self-closing and self-latching.

.4 Size:
.1 Unless otherwise detailed, minimum size to be 16” x 16” clear opening.
.2 For access to above ceiling mechanical equipment coordinate size of hatch with maximum size of equipment to be removed for maintenance purposes.

.5 Finish:
.1 All hatches to be delivered primed. Unless noted otherwise, hatches to be painted onsite to match adjacent colour of wall or ceiling they occur in.
.2 All hatches in kitchen to be stainless steel.

Part 3 Execution

3.1 INSTALLATION

.1 Prior to installation of ceiling access panels coordinate location with Consultant. Ceiling access panels to aligned on a common X and Y axis, align access panels with ceiling mounted electrical and mechanical fixtures and devices on a common X and Y axis.

.2 Coordinate with Electrical and Mechanical trades for optimum location of equipment service access locations.

.3 Install in place in accordance with manufacturer’s directions, level, and flush with top of wall and ceiling surfaces.

.4 Install rated access panels in rated wall and ceiling assemblies. Install non-rated access panels in non-rated wall and ceiling assemblies.

.5 After installation, fit, align, and adjust access panels to provide proper operation.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 This Section includes supply and installation of the following:

.1 Surface mounted, enclosed, electro-mechanical operator.

.2 Electronic controls of Entrance doors to operate from single activation devices.

.3 Activating devices.

.4 Accessories.

1.2 RELATED SECTIONS

.1 Section 08 41 00 – Aluminum Doors and Frames.

.2 Section 08 43 00 – Aluminum Storefront Windows.

.3 Section 08 70 10 – Door Hardware Groups.

.4 Electrical Sections and Drawings.

1.3 REFERENCE DOCUMENTS

.1 American National Standards Institute (ANSI) and Builders Hardware Manufacturers Association Inc. (BHMA):

.1 ANSI/BHMA A156.10-2011: Power Operated Pedestrian Doors.

.2 ANSI/BHMA A156.19-2013: Power Assist and Low Energy Power Operated Doors.

.2 American Society for Testing and Materials (ASTM):

.1 ASTM A653/A653M-15: Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.3 Canadian Standards Association (CSA):

.1 CAN/CSA G40.20-13/G40.21-13: General Requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steel.

.2 CAN/CSA G164-M92 (R2003): Hot Dip Galvanizing of Irregularly Shaped Articles.

.4 National Research Council of Canada (NRCC):

.1 NRCC 22432-83: Measures for Energy Conservation in New Buildings.

.5 Underwriters' Laboratories of Canada (ULC):

.1 CAN/ULC S524-14: Standard for the Installation of Fire Alarm Systems.

.2 CAN/ULC S533-08: Egress Door Securing and Releasing Devices.

.6 Construction Specifications Canada (CSC):

.1 CSC TEK.AID O8460-91: Automatic Entrance Doors.

1.4 DEFINITIONS

.1 Low Energy Power Operated Doors: Doors with a power mechanism that opens and closes the door upon receipt of an actuating signal and does not generate more kinetic energy than specified in ANSI/BHMA A156.19. Closing of doors is linked to, and integral with, power operator mechanism.

.2 Low Energy Power Open Doors: Self-closing doors with a power mechanism that opens the door upon receipt of an actuating signal and does not generate more kinetic energy than specified in ANSI/BHMA A156.19. Closing of doors is independent of power operator mechanism.

1.5 PERFORMANCE REQUIREMENTS

.1 Meet or exceed performance requirements of ANSI/BHMA A156.19.

.2 Doors shall operate smoothly, quietly, safely, and consistently.

.3 Force required to manually open doors shall not be more than force required in event of operator failure.

.4 Exterior doors shall operate as specified under local wind pressure applied against opening and closing cycles, and in a temperature range of -45°C to 32°C.

.5 Hold-Open Time:

.1 Push Plate/Button Activation: Field-adjustable from five (5) to thirty (30) seconds.

.2 Door Movement Switch Activation: Less than one (1) second.

.6 Locking electric strikes shall disable door operator activation devices. Momentary release of electric strikes during off-hours shall enable door operator activation devices for a period of time; field-adjustable from one (1) to thirty (30) seconds.

.7 Operators shall open doors 90 degrees from closed position.

.8 Wireless activation devices shall perform reliably in a temperature range of -45°C to 32°C, and a relative humidity range of 5 to 75 %.

1.6 ADMINISTRATIVE REQUIREMENTS

.1 Coordinate with door hardware supplied and installed by others.

1.7 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, Specifications, and data sheets in accordance with Section 01 33 00 – Submittal Procedures.

.2 Shop Drawings

.1 Submit shop drawings in accordance with Division 01.

.2 Clearly indicate the following:

.1 Components, materials, and finishes.

.2 Dimensions and relationship to surrounding construction, using plan view, elevation views, and section details.

.3 Plan view showing door swing in relation to surrounding construction.

.4 Installation wiring diagrams.

.3 Submit duplicate samples of finishes of exposed system components.

1.8 CLOSEOUT SUBMITTALS

.1 Submit operation and maintenance data including the following:

.1 Parts lists referenced to isometric exploded view of door operator.

.2 Schematic wiring diagrams including all components, switching devices and current characteristics.

.3 Manufacturer's recommendations for servicing frequencies, adjustments, and operations applicable to each component.

.4 Description of remedial action required to correct possible operational deficiencies.

1.9 DELIVERY, STORAGE AND HANDLING

.1 Delivery operator to site in manufacturer’s standard packaging.

.2 Do not delivery to site until operator can be installed directly to door and frame.

Part 2 Products

2.1 OPERATORS

.1 Type: Electro-mechanical, surface mounted to doorframe header, connected to door with pivoting linkage arm.

.2 Motor: Electric, permanent magnet, minimum 1/12 HP 60W DC motor, equipped with circuit protection, connections for power and control wiring, and suited to building's electrical service at point of installation.

.3 Provide semi-concealed, readily accessible, ‘on-off’ switch.

.4 Gears shall be in an airtight, gasketed gear box concealed within operator enclosures.

.5 Operators shall be equipped with a clutch mechanism as required to meet performance and regulatory requirements.

.6 Provide manufacturer's standard surface mounted enclosure, designed to prevent entry of dust.

.7 Enclosure shall allow ready access for adjustments, servicing and maintenance of operator and controls.

.8 Enclosure Finish:

.1 Plastic: Colour of finish shall be compatible with adjacent doorframe.

.2 Aluminum: Clear anodized to match curtainwall frames and doors.

2.2 ELECTRONIC CONTROLS

.1 Electronic controls shall be solid state, low voltage compatible with card access system where required; supplied and installed under other Sections.

.2 Swing doors controls shall include provision for time delay from one (1) to thirty (30) seconds before closing, and individually adjustable closing and opening speeds.

.3 Both Entrance operable doors shall be interconnected to each other so they open and close together from one activation device. Doors are to be hold-open timed accordingly to allow for safe passage of users through both doors after activation.

.4 Provide readily accessible, semi-concealed ‘on-off’ switch.

.5 Electronic controls shall be electronically shut down from a central point in the administration area when the building is in lock-down mode. Coordinate this function with the single point shut down.

2.3 ACTIVATING DEVICES

.1 Provide hard-wired touchless actuators as indicated on Drawings.

.2 Actuator: CM-331/42R-SGLR Round 6" Stainless Steel Faceplate with Light Ring by Camden Controls, or equivalent.

2.4 OPERATOR ENCLOSURES

.1 Where practical, conceal operator in doorframe header, specified in Section 08 43 00 – Aluminum Storefront Windows. Otherwise, surface mount.

2.5 ACCESSORIES

.1 Provide recessed International Symbol of Accessibility (ISA) and the following clearly legible wording under ISA: ‘WAVE TO OPEN’, on push plates or on identification plates adjacent to activating device.

.2 Push plates and identification plates shall be stainless sheet steel, satin finish. Letters on plates shall be recessed, in colour matching Symbol of Accessibility, in upper case, and Helvetica Medium Font.

.3 Identification plates shall be minimum 4” x 4”.

.4 Fasteners:

.1 Materials for Fastening Metals to Metals: Aluminum, nonmagnetic stainless steel, finished to match adjacent material.

.2 Materials for Fastening Metals to Concrete and Masonry: Stainless steel or carbon steel, hot dip galvanized to CAN/CSA-G164.

.3 Provide tamper-resistant exposed fasteners for mounting devices and to replace batteries in exterior locations and interior public spaces.

.5 Provide concealed overhead door holder at each door to receive operator, finish to match existing hinges.

2.6 FINISHES

.1 Factory finish components.

.2 Hardware: Match door hardware.

.3 Stainless Steel: No. 4 satin finish.

.4 Aluminum: Manufacturer's standard clear.

.5 Exposed Steel: Apply finishes as follows:

.1 Primer: Vinyl wash primer, to Canadian General Standards Board standards.

.2 Finish Coats: Two (2) coats of quick drying gloss enamel, to Canadian General Standards Board Standards.

Part 3 Execution

3.1 INSTALLATION

.1 Install components to manufacturer's recommendations at locations indicated on Drawings.

.2 Install door holders to limit doors to opening swing specified.

.3 Install operators on interior side of exterior entrances.

.4 Install rubber dampening devices to sound isolate operators from doorframes.

.5 Isolate aluminum surfaces from contact with cementitious materials, using thick coating of bituminous paint. Let paint dry before installation of aluminum component.

.6 Conceal wiring between activating devices, electric locking system and operators. Conceal wiring in rails and posts.

3.2 ADJUSTING

.1 After completing installation, adjust for optimum, smooth operation.

.2 Adjust door hold open time to ten (10) seconds or as directed by the Owner.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section includes: Cold-rolled steel windows.

1.2 RELATED SECTIONS

.1 Section 05 50 00 – Metal Fabrications.

.2 Section 07 62 00 – Metal Flashing and Trim.

.3 Section 07 84 00 – Firestopping.

.4 Section 07 92 00 – Joint Sealants.

.5 Section 08 81 00 – Glass and Glazing.

1.3 REFERENCES

.1 American Architectural Manufacturers Association (AAMA):

.1 AAMA/WDMA/CSA 101/I.S.2/A440 North American Fenestration Standard / Specification for Windows, Doors and Skylights.

.2 American Society for Testing and Materials (ASTM):

.1 Fire safety related:

.1 ASTM E119: Methods for Fire Tests of Building Construction and Materials.

.2 Material related:

.1 ASTM A 1008/A 1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength, Low Alloy, and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2007.

.2 ASTM A 1011/A 1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2006b.

.3 Canadian Standards:

.1 CAN-S101 Fire Endurance Tests of Building Construction and Materials.
.2 CAN4-S106-M, Standard Method for Fire Tests of Window and Glass Block Assemblies.

.4 National Fire Protection Association (NFPA):

.1 NFPA 80: Fire Doors and Windows.
.2 NFPA 251: Fire Tests of Building Construction & Materials.
.3 NFPA 257: Fire Test of Window Assemblies.

.5 Underwriters Laboratories, Inc. (UL):

.1 UL 9: Fire Tests of Window Assemblies.
.2 UL 10 C: Positive Pressure Fire Tests of Window & Door Assemblies.
.3 UL 263: Fire tests of Building Construction and Materials.

.6 American National Standards Institute (ANSI):

.1 ANSI Z97.1: Standard for Safety Glazing Materials Used in Buildings:

.7 Consumer Product Safety Commission (CPSC):

.1 CPSC 16 CFR 1201: Safety Standard for Architectural Glazing Materials.

.8 American Society of Civil Engineers (ASCE):

.1 ASCE 7 – Minimum Design Loads for Buildings and Other Structures; 2005.

1.4 SUBMITTALS

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

.2 Product Data:

.1 Technical Information: Submit latest edition of manufacturer's product data providing product descriptions, technical data, Underwriters Laboratories, Inc. listings and installation instructions.

.3 Shop Drawings: Include plans, elevations and details of product showing component dimensions; framing opening requirements, dimensions, tolerances, and attachment to structure.

.4 Samples for following products:

.1 Glass sample-as provided by manufacturer.

.2 Sample of frame.

.3 Verification of sample of selected finish.

.5 Glazing Schedule: Use same designations indicated on drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

.6 Warranties: Submit manufacturer's warranty.

.7 Certificates of compliance from glass and glazing materials manufacturers attesting that glass and glazing materials furnished for project comply with requirements.

.1 Separate certification will not be required for glazing materials bearing manufacturer's permanent label designating type and thickness of glass, provided labels represent a quality control program involving a recognized certification agency or independent testing laboratory acceptable to authority having jurisdiction.

1.5 QUALITY ASSURANCE

.1 Testing Agency Qualifications according to:

.1 International Accreditation Service for a Type A Third-Party Inspection Body (Field Services ICC-ES Third-Party Inspections Standard Operating Procedures, 00-BL-S0400 and S0401).

.2 International Accreditation Service for Testing Body-Building Materials and Systems.

.1 Fire Testing:

.1 ASTM Standards E 119.
.2 CPSC Standards 16 CFR 1201.
.3 NFPA Standards 251, 252, 257.
.4 UL Standards 9, 10B, 10C, 1784, UL Subject 63.
.5 BS 476; Part 22: 1987.
.6 EN 1634-1.
.7 CAN Standards S 101, S 104, S 106.

.2 Fire-Rated Window Assemblies: Assemblies complying with NFPA 80 that are classified and labeled by UL, for fire ratings indicated, based on testing according to NFPA 257 and UL 9. For 45-minute assemblies only.

.3 Fire-Rated Wall Assemblies: Assemblies complying with ASTM E119 that are classified and labeled by UL, for fire ratings indicated, based on testing in accordance with UL 263, ASTM E119.

.4 Listings and Labels - Fire Rated Assemblies: Under current follow-up service by Underwriters Laboratories® maintaining a current listing or certification. Label assemblies accordance with limits of manufacturer’s listing.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle under provisions specified by manufacturer.

1.7 PROJECT CONDITIONS

.1 Obtain field measurements prior to fabrication of frame units. If field measurements will not be available in a timely manner coordinate planned measurements with the work of other sections.

.2 Note whether field or planned dimensions were used in the creation of the shop drawings.

.3 Coordinate the work of this section with others effected including but not limited to: other interior and/or exterior envelope components and door hardware beyond that provided by this section.

1.8 WARRANTY

.1 When warranties are required, verify with Owner's counsel that special warranties stated in this Article are not less than remedies available to Owner under prevailing local laws.

.2 Provide the manufacturer’s glass and frame standard five-year manufacturer warranty.

Part 2 Products

2.1 MANUFACTURERS

.1 Basis-of-Design Product: Subject to compliance with requirements, provide Fyre-Tec; Series 900 Steel Windows, supplied by Edwards Door Systems Limited, London, Ontario, or one of the following:

.1 Dynamic Architectural Windows & Doors, Inc.
.2 Optimum Window Mfg Corp.
.3 Or approved equivalent.

2.2 PERFORMANCE REQUIREMENTS

.1 Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more-stringent requirements are indicated.

.1 Window Certification: AAMA certified with label attached to each window.

.2 Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:

.1 Minimum Performance Grade: 45.

.3 Structural wind load: As required by the Ontario Building Code current edition.

.4 Member deflection: Design glass framing system to limit lateral deflections of glass edges to less than 1/175 of glass-edge length or 19 mm, whichever is less, at design pressures.

.5 Structural: Test in accordance with ASTM E330 as follows:

.1 When tested at positive and negative wind-load design pressures, cold-rolled steel windows do not evidence deflection exceeding specified limits.

.6 Fire-Test-Response Characteristics: Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing in accordance with UL 9.

.1 Labelled Fire Rating: 1 hour.

2.3 COLD-ROLLED STEEL WINDOWS

.1 Types: Provide the following operating types in locations indicated on Drawings:

.1 Horizontal sliding.
.2 Fixed.

.2 Cold-Rolled Steel Windows: Provide frame and sash members mechanically formed from metallic-coated, low-carbon, cold-rolled steel sheet complying with ASTM A653/A653M. Comply with AAMA/WDMA/CSA 101/I.S.2/A440 specifications for combined weight of frame and sash members and front-to-back depth of frame or sash members.

.3 Window Finish: Baked Enamel

.1 Colour: As selected by Architect from manufacturer's full range.

.4 Mullions: Formed of cold-rolled steel matching window units; with anchors for support to structure and for installation of window units and having sufficient strength to withstand design pressure indicated. Provide mullions of profile indicated and with cover plates. Allow

for erection tolerances and provide for movement of window units due to thermal expansion and building deflections.

.5 Sill Cap/Track: Designed to comply with performance requirements indicated and to drain to the exterior.

.6 Glazing Stops: Provide screw-applied glazing stops; coordinate with Section 08 81 00 Glass and Glazing and with glazing system indicated. Provide glazing stops to match panel frames. Finish glazing stops to match window units if fabricated of steel; otherwise, provide manufacturer's standard finish.

.7 Weather Stripping: Manufacturer's standard compressible weather stripping, complying with AAMA 701/702, ASTM C509, or ASTM C864 and designed for permanently resilient sealing under compression and for complete concealment when sash is closed.

2.4 GLAZING

.1 Fire-Rated Ceramic Glazing System: 4.76 mm ULC Listed; in compliance with IAW/NFPA 80 and CPSC 16CFR1201 (Cat I and II).

.1 Basis-of-Design Product: Subject to compliance with requirements, provide TGP; an Allegion Brand.; FireLite or approved equivalent.

2.5 HARDWARE

.1 General: Provide manufacturer's standard[nonremovable], white bronze, burnished hardware, with operating components of stainless steel, complying with AAMA 907, brass, bronze, or other corrosion-resistant material designed to smoothly operate, tightly close, and securely lock cold-rolled steel window sash; and sized to accommodate sash weight and dimensions.

.2 Self-Closing Device for Fire-Rated Windows: Manufacturer's standard heat-activated self-closing device, complying with NFPA 80.

.3 Horizontal-Sliding Window Hardware:

.1 Rollers: Steel, lubricated, ball-bearing rollers.

.2 Lock: Manufacturer's standard, designed to allow unobstructed movement of the sash across adjacent sash in direction indicated and to operate from the inside only.

.3 Limit Device: Manufacturer's standard.

.4 Pull Handle: Manufacturer's standard.

2.6 ACCESSORIES

.1 Fasteners: Use fasteners fabricated from Type 304 or Type 316 stainless steel.

.1 Exposed Fasteners: Do not use exposed fasteners to the greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened. Screws and bolts shall conform to ASTM B766, ASME B18.6.3, and ASME B18.6.4.

.2 Glazing Gaskets:

.1 Glazing gaskets for interior or exterior applications: ASTM C 864 (extruded EPDM rubber that provides for silicone adhesion) or ASTM C1115 Standard Specification for Dense Elastomeric Silicone Rubber Gaskets and Accessories (extruded silicone).

.3 Intumescent Tape: As supplied by frame manufacturer.

.4 Setting Blocks: ¼" Calcium silicate.

.5 Perimeter Anchors: Steel.

.6 Silicone Sealant: One-Part Low Modulus, neutral cure High Movement-Capable Sealant: Type S; Grade NS; Class 25 with additional movement capability of 100 percent in extension and 50 percent in compression.

.1 Available Products:

.1 Dow Corning 790, 795 - Dow Corning Corp.
.2 Momentive.
.3 Tremco.

.7 Intumescent Caulk: Single component, latex-based, intumescent caulk designed to stop passage of fire, smoke, and fumes through fire-rated separations; permanently flexible after cure; will not support mold growth; flame spread/smoke developed 10/10. Available Products: 3M CP-25 WP+.

2.7 FABRICATION

.1 Obtain reviewed shop drawings prior to fabrication.

.2 Fabrication Dimensions: Fabricate fire-rated assembly to field dimensions.

.3 Fabricate cold-rolled steel windows of type and in sizes indicated to comply with AAMA/WDMA/CSA 101/I.S.2/A440 standards. Include a complete system for assembly of components and anchorage of window units.

.4 Provide units that are reglazable without dismantling framing.

.5 Subframes and Operable Sash: Formed of cold-rolled steel of profile indicated. Miter or cope corners, and weld and dress joints smooth.

2.8 METALLIC-COATED STEEL SHEET FINISHES

.1 Surface Preparation: Clean surfaces of oil and other contaminants. Use cleaning methods that do not leave residue. After cleaning, apply a conversion coating compatible with the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas and apply galvanizing repair paint, complying with SSPC-Paint 20, to comply with ASTM A780.

.2 Baked-Enamel or Powder-Coat Finish: After cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat to a minimum dry film thickness of 0.05 mm.

Part 3 Execution

3.1 EXAMINATION

.1 Site Verification of Conditions: Verify substrate conditions are acceptable for product installation in accordance with manufacturer's instructions. Verify openings are sized to receive curtain wall system and sill plate is level in accordance with manufacturer's acceptable tolerances.

.2 Notify Architect of any conditions which jeopardize the integrity of the proposed fire wall / window system. Do not proceed until such conditions are corrected.

3.2 INSTALLATION

.1 See manufacturer's recommendations and Installation Manual.

.2 Install windows level, plumb, square, true to line, without distortion or impediment to thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.

.3 Separate corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials in accordance with ASTM E2112.

3.3 ADJUSTING, PROTECTION AND CLEANING

.1 Protect glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove non-permanent labels, and clean surfaces.

.2 Do not clean with astringent cleaners. Use a clean "grit free" cloth and a small amount of mild soap and water or mild detergent.

.3 Adjust operating sashes, screens, hardware, and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.

.4 Clean factory-finished steel surfaces immediately after installing windows. Comply with manufacturer's written recommendations for final cleaning and maintenance. Avoid damaging protective coatings and finishes.

.5 Do not use any of the following:

.1 Steam jets.

.2 Abrasives.

.3 Strong acidic or alkaline detergents, or surface-reactive agents.

.4 Detergents not recommended in writing by the manufacturer.

.5 Do not use any detergent above 77 degrees F.

.6 Organic solvents including but not limited to those containing ester, ketones, alcohols, aromatic compounds, glycol ether, or halogenated hydrocarbons.

.7 Metal or hard parts of cleaning equipment must not touch the glass surface.

.6 Protect glass from contact with contaminating substances resulting from construction

operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.

.7 Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

END OF SECTION

1.1 DOOR HARDWARE GROUPS

SET: 1.0
DOORS: 116A

3	HINGE, SWING CLEAR	TA2895 4-1/2"	US26D	MK
1	CLASSROOM LOCK	LC 8237 CRMI	US32D	SA
1	CYLINDER	TO MATCH EXISTING OWNERS STANDARD C/W CAM AS REQ'D		OT
1	ELECTRIC STRIKE W/ LATCH MONITOR	1500C-LM	630	HS
1	CONC OVERHEAD STOP	1-X36	630	RF
1	AUTOMATIC OPENER (PUSH)	6331	689	NO
1	KICK PLATE	K1050 200MM X SIZE TO SUIT SA BEV	US32D	RO
1	SMOKE SEAL	S88BL (1 X DOOR WIDTH, 2X DOOR HEIGHT)		PE
1	ELECTROLYNX HARNESS (IN FRAME)	QC-C1500P		MK
2	DOOR ACTUATOR SWITCH, 6" ROUND	Refer to Section 08 42 30.		
2	RECESSED MOUNTING BOX	Coordinate with Section 08 42 30.		

NOTES: DIVISION 26 TO PROVIDE; 120VAC POWER TO FRAME HEADER, FINAL CONNECTION OF AUTO DOOR OPERATOR, ALL BACK BOXES, AND CONDUIT WITH LOW-VOLTAGE WIRING.

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 42 30 Low Energy Swing Door Operators
.4 Section 08 70 10 Door Hardware Groups
.5 Section 08 71 13 Automatic Door Operators

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/BHMA A156.1-2013, American National Standard for Butts and Hinges.
  .3 ANSI/BHMA A156.2-2011, Bored and Preassembled Locks and Latches.
  .4 ANSI/BHMA A156.3-2014, Exit Devices.
  .5 ANSI/BHMA A156.4-2013, Door Controls - Closers.
  .6 ANSI/BHMA A156.5-2014, Auxiliary Locks and Associated Products.
  .7 ANSI/BHMA A156.6-2010, Architectural Door Trim.
  .8 ANSI/BHMA A156.8-2010, Door Controls - Overhead Stops and Holders.
  .9 ANSI/BHMA A156.10-2011, Power Operated Pedestrian Doors.
  .10 ANSI/BHMA A156.12-2013, Interconnected Locks and Latches.
  .11 ANSI/BHMA A156.13-2012, Mortise Locks and Latches Series 1000.
  .12 ANSI/BHMA A156.14-2013, Sliding and Folding Door Hardware.
  .13 ANSI/BHMA A156.15-2011, Release Devices - Closer Holder, Electromagnetic and Electromechanical.
  .14 ANSI/BHMA A156.16-2013, Auxiliary Hardware.
  .15 ANSI/BHMA A156.17-2014, Self-closing Hinges and Pivots.
  .16 ANSI/BHMA A156.18-2012, Materials and Finishes.
  .17 ANSI/BHMA A156.19-2013, Power Assist and Low Energy Power - Operated Doors.
  .18 ANSI/BHMA A156.20-2006 (R2012), Strap and Tee Hinges and Hasps.
  .19 ANSI/BHMA A156.21-2014, Thresholds.
  .20 ANSI/BMHA A156.22-2012, Door Gasketing and Edge Seal Systems
.2 Canadian Steel Door and Frame Manufacturers' Association (CSDFMA).
  .1 CSDFMA Canadian Metric Guide for Steel Doors and Frames (Modular Construction): standard hardware location dimensions.
.3 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:
  .1 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:
.1 Submit manufacturer's installation instructions.

.6 Closeout Submittals
.1 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 Maintenance

.1 Provide maintenance materials in accordance with Section 01 78 00 – Closeout Submittals.

1.9 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 (10) 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 hardware shall be supplied as specified in the Finishing Hardware Schedule.

.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 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 Keying

.1 New buildings locksets must be by one manufacturer and the master key system documentation must be supplied as part of the Operations and Maintenance manual specified in Section 01 78 00.

.2 Keying shall be to Owners Master Key system.

.3 Provide construction cores which will be removed at Substantial Performance.

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 Install hardware to standard hardware location dimensions in accordance with Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by Canadian Steel Door and Frame Manufacturers' Association.

.2 Installation of hardware shall be in accordance with ANSI A115.1G, manufacturer’s templates and instructions.

.3 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.

.4 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.

.5 Install all materials as listed in the Finishing Hardware Schedule on the doors and frames listed. Interchanging of hardware will not be allowed.

.6 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.

.7 Where door stop contacts door pulls, mount stop to strike bottom of pull.

.8 Remove construction cores when directed by Owner’s Representative.

.9 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 Adjusting

.1 Adjust door hardware, operators, closures 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.

3.6 Inspection

.1 After installation of all hardware and before building is accepted, inspect the installation of all hardware and certify in writing to the Consultant that the hardware is properly installed and supplied in accordance with the manufacturer's recommendations, and finishing hardware schedule.

3.7 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.

3.8 Demonstration

.1 Maintenance Staff Briefing:
  .1 Brief maintenance staff regarding:
    .1 Proper care, cleaning, and general maintenance of projects complete hardware.
    .2 Description, use, handling, and storage of keys.
    .3 Use, application and storage of wrenches.
  .2 Demonstrate operation, operating components, adjustment features, and lubrication requirements.

End of Section

Part 1 General

1.1 SECTION INCLUDES

.1 This Section includes requirements for all glazing work and shall include, but shall not necessarily be limited to, the following:

.1 Glazing in windows and doors.

.2 Glazing of miscellaneous project items.

1.2 RELATED SECTIONS

.1 Section 05 50 00 – Metal Fabrications.

.2 Section 08 41 00 – Aluminum Doors and Frames.

.3 Section 08 43 00 – Aluminum Storefront Windows.

1.3 REFERENCE DOCUMENTS

.1 Canadian General Standards Board (CGSB):

.1 CAN/CGSB 12.1-M90: Tempered or Laminated Safety Glass.

.2 CAN/CGSB 12.3-M91: Flat, Clear Float Glass.

.3 CAN/CGSB 12.4-M91: Heat Absorbing Glass.

.4 CAN/CGSB 12.6-M91: Transparent (One-Way) Mirrors.

.5 CAN/CGSB-12.8-97: Insulating Glass Units.

.6 CAN/CGSB-12.9-M91: Spandrel Glass.

.7 CAN2-12.10-M76: Glass, Light and Heat Reflecting.

.8 CAN/CGSB-12.11-M90: Wired Safety Glass.

.9 CAN/CGSB-12.12-M90: Plastic Safety Glazing Sheets.

.2 Canadian Standards Association (CSA):

.1 CAN/CSA-A440.2-14/A440.3-14: Fenestration Energy Performance / User Guide to CSA A440.2-14, Fenestration Energy Performance.

.2 CSA Certification Program for Windows and Doors, current program.

.3 American Society for Testing and Materials (ASTM):

.1 ASTM C1036-11e1: Standard Specification for Flat Glass.

.2 ASTM C1048-12e1: Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass.

.3 ASTM C1376-15: Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass.

.4 ASTM E2190-10: Standard Specification for Insulating Glass Unit Performance and Evaluation.

.5 ASTM E330/E330M-14: Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference.

.4 CPSC 16CFR-1201: Safety Standard for Architectural Glazing Materials.

.5 GANA Glazing Manual.

.6 Environmental Choice Program: Sealants and Caulking.

.7 Flat Glass Manufacturers Association (FGMA): FGMA Glazing Manual, current edition.

.8 Laminators Safety Glass Association (LSGA): LSGA Laminated Glass Design Guide, current edition.

1.4 PRODUCT OPTIONS AND SUBSTITUTIONS

.1 Refer to Division 01 – General Requirements for requirements pertaining to product options and substitutions.

1.5 PERFORMANCE REQUIRMENTS

.1 Source Limitations for Glass Sputter-Coated with Solar-Control Low E Coatings: Obtain sputter-coated solar control Low E-coated glass in fabricated units from a fabricator that is certified by coated glass manufacturer that has a certified fabricator program.

.2 Provide continuity of building enclosure vapour and air barrier using glass and glazing materials utilizing inner lite of multiple light-sealed units for continuity of air and vapour seal.

.3 Size glass to withstand wind loads, deck loads and positive and negative live loads acting normal to plane of glass to a design pressure of 75 kPa as measured in accordance with ANSI/ASTM E330.

.4 Limit glass deflection to 1/200 with full recovery glazing materials.

1.6 SUBMITTALS

.1 Submit in accordance with Division 01.

.2 Submit manufacturer’s printed product literature, Specifications, and data sheets in accordance with Section 01 33 00 – Submittal Procedures.

.3 Submit 12” x 12” sized samples of each type of glass, clearly labeled with manufacturer's name and glass type. Reference glass types to those scheduled and specified herein.

.4 Manufacturer to provide the results of thermal stress tests prior to fabricating the glazing units.

.5 Provide shop inspection for glass.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver and store packaged materials in their original containers, with manufacturer's labels intact; and as directed by the manufacturer.

.2 Suitably protect glass products to prevent damage from weather and breakage. Individually wrap accessory materials to protect them from damage.

.3 Store glass vertically, off the ground, on 'A' frames, braced or blocked to prevent racking, twisting, or sagging.

.4 Take special care to protect edges of insulating glass units from damage but do not apply tape or other materials to edges.

.5 Protect glass products from exposure to moisture or condensation prior to installation.

.6 Install glass as soon as possible after delivery to site.

.7 Handle glass carefully to its place of installation. Prevent damage to glass, adjacent materials, and surfaces.

1.8 SITE CONDITIONS

.1 Coordinate the Work of this Section with the installation of frames to ensure a continuous, uninterrupted sequence, and to prevent the undue exposure of unprotected frames to the weather.

.2 Do not install any glass until all nearby welding is completed.

.3 As each lite of glass is installed, mark it in a manner to make it visible and obvious to all persons. Do not use materials which may permanently mar, discolour or disfigure the glass.

1.9 COORDINATION

.1 Confirm requirements for tolerances, clearance, and bite; and confirm with related sections.

.2 Confirm compatibility of glazing with adjacent sealants.

1.10 WARRANTY

.1 Provide manufacturer's standard form guarantee for the following types of glass listed, against defects in materials and workmanship for the period indicated, commencing from the date of Substantial Performance of the Work:

.1 Sealed double-glazed units against moisture collection or misting, dusting, filming, seal failure, thermal shock breaks, or other impairments: for ten (10) years.

Part 2 Products

2.1 GLASS MATERIALS

.1 Clear Float Glass: To CAN/CGSB 12.3, glazing quality, 1/4” thick.

.2 Safety Glass (if required): To CAN/CGSB-12.1, fully tempered, Type 2, Class A, 1/4", 1/2" or 5/8” thick, as engineered by supplier and as required to perform in designed location.

.3 Laminated Glass (if required): To CAN/CGSB-12.1, clear, 1/8” tempered glass, 0.75mm interlayer lamination, 1/8” or 1/4" float glass.

.4 Fire Rated Glass: Comprised of ceramic glass, laminated with transparent intumescent material, providing distortion-free viewing through the pane and as follows:

.1 Thickness: As required by manufacturer to meet structural requirements for performance range specified, minimum 3/8”.

.2 Impact Safety Rating: Category II, 2000 J/m in accordance with ANSI Z97.1.

.3 Temperature Rise Rating: Required.

.4 Fire Rating: As indicated in Door and Frame Schedule, or in rated sidelites.

.5 Labeled: Permanent logo listing name of product, manufacturer, testing laboratory, fire rating period, and safety requirements.

.6 Basis-of-Design Materials: Vetrotech Saint-Gobain SGG Keralite FR-L, or approved equivalent.

2.2 GLAZING AND SEALING COMPOUND MATERIALS

.1 Sealant Compound: One-component, silicone base, solvent curing to Canadian General Standards Board (CGSB) Standards. Colour to match adjacent materials, as directed by Consultant.

.2 Sealant Compound: Multi-component, chemical curing to Canadian General Standards Board (CGSB) Standards, Type 2, Class A. Colour to match adjacent materials, as directed by Consultant.

.3 Glazing Tape: Preformed butyl tape, integral spacing device, 10-15 durometer hardness, paper release.

.4 Setting Blocks: Neoprene, Shore ‘A’ Durometer hardness 80, 100mm long x 6mm high x width to suit glass thickness.

.5 Spacer Shims: Neoprene, Shore ‘A’ Durometer hardness as recommended by window manufacturers. Do not use metal, plastic, or wood shims.

.6 Glazing Splines: Polyvinyl-chloride manufacturer's standard dry glazing splines to suit aluminum extrusions.

.7 Glazing Points and Wire Spring Clips: Corrosion-resistant, manufacturer's standard.

.8 Primer-Sealers and Cleaners: To glass and gasket manufacturer's standard.

2.3 FABRICATION, GENERAL

.1 Cut all glass to field measurements with proper clearances; cut to produce clean, straight edges with no chips, cracks, or flaws.

2.4 FABRICATION, INSULATING GLASS

.1 Shop-fabricate sealed glass units to CAN/CGSB. 12.8 and IGMAC certification, as a minimum.

.2 Sealed units shall have a minimum of 1/2" air space giving a total overall thickness of not less than 1” (double-glazed). Edge spacer shall not bow in or out more than 4/16” over full length of a side.

.3 Sealed units shall be assembled and air space sealed in a clean, dry environment, in a location with the same barometric air pressure as the job site.

.4 Sealed units having pressure-venting or equalizing holes in spacer for site sealing will be rejected.

.5 Edges of sealed units shall be clean and not have metal or tape binding or facings.

.6 Unit types, make-up and colour shade as listed at end of this Section.

Part 3 Execution

3.1 WORKMANSHIP

.1 Remove protective coatings, clean contact surfaces with solvent, and wipe dry.

.2 Apply primer-sealer to contact surfaces.

.3 Place setting blocks as per manufacturer's instructions.

.4 Install glass; rest on setting blocks and ensure full contact and adhesion at perimeter.

.5 Install removable stops without displacing tape or sealant.

.6 Provide edge clearance of 1/8” minimum.

.7 Insert spacer shims to center glass in space. Place shims at 24” on center and keep 1/4" below sight line.

.8 Apply cap bead of sealant at exterior void.

.9 Apply sealant to uniform and level line, flush with sightline and tooled or wiped with solvent to smooth appearance.

.10 Do not cut or abrade tempered, heat treated, or coated glass.

.11 Install tempered glass in all glazed interior doors and side lites and all interior glazing.

.12 Supply glass with draw lines that will run horizontally when installed.

.13 Leave labels on glass until final cleaning.

.14 Be responsible for any faulty glazing and sealing to windows and doors. Re-seal and make good any damage attributed to faulty glazing.

3.2 EXAMINATION

.1 Verify that openings for glass are correctly sized and within tolerance.

.2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

3.3 INSTALLATION

.1 Install in accordance with manufacturer's written instructions and the Contract Documents, plumb, true, level, and rigid.

.2 Do not glaze when ambient or surface temperatures are less than 4°C. Glazing rebates, stops and glass shall be dry, free from ice, frost slick, grease, oil, dust, rust, or other matter detrimental to adhesion, of tape, glazing compounds, and sealant.

.3 Installation of glass shall be by workmen skilled in this trade, in strict accordance with manufacturer's directions, to produce a first-class installation.

.4 Center and support glass on setting blocks at quarter points; as required, shim sides.

.5 Glass shall be free from contact with the frames and stops.

.6 Label each lite to show manufacturer's name or trademark, quality, and thickness.

.7 Glaze interior doors with foam or cork tape on both sides. For wired glass, use glazing tape. Trim tape even with the sight line.

.8 Use sealant at exterior doors, sealing water- and weather-tight.

3.4 CLEANING

.1 Immediately remove sealant and compound droppings from finished surfaces.

.2 Remove dirt, scum, plaster, paint spatter, and other harmful or deleterious matter from glass promptly and completely, before they establish tight adhesion.

.3 Use clean water or proprietary glass cleaning solutions that will not damage glass surfaces. Avoid using abrasives, steel wool, razor blades, solvents, alkaline or other harsh cleaning agents.

3.5 PROTECTION

.1 Identify glazed openings immediately following glass installation.

.2 Protect glass against scratches, pitting and other surface damage.

END OF SECTION

Part 1 General

1.1 GENERAL

.1 Conform to the requirements of Division 1.

1.2 RELATED SECTIONS

.1 Section 09 29 00 Gypsum Board

1.3 REFERENCES

.1 ASTM International (ASTM).
  .1 ASTM A653/A653M-17 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  .2 ASTM C645-14e1 Standard Specification for Nonstructural Steel Framing Members
  .3 ASTM C754-17 Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products
  .4 ASTM C1002-16 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 E90-09(2016) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
  .6 ASTM E814 - 13a(2017) Standard Test Method for Fire Tests of Penetration Firestop Systems
  .7 ASTM E1966-15 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 Submit WHMIS Material Data Safety Sheets (MSDS) for all products, prior to delivery of products to the site.

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 Gauge of materials to conform to referenced standards unless noted otherwise.

.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 Metal Furring Runners, Hangers, Tie Wires, Inserts, Anchors: To CSA A82.30-M, 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 Hangers: minimum 4.1 mm diameter (or as required by ULC fire rating design requirements) mild steel rods.

2.3 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 CSA A82.31-M, and ASTM C1002, self-drilling, self-tapping, case hardened, length to suit board thickness and provide minimum 12 mm penetration into support.

2.4 ACCESSORIES

.1 Acoustic sealant: To ASTM E814 and ASTM E1966, with STC performance rating of 55 to ASTM E90.

.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 ERECTION

.1 Unless otherwise indicated on the drawings, all gypsum board partitions shall extend from floor level to the underside of floor or roof structures above.

.2 Align partition tracks at floor and ceiling and secure at 600 mm on centre maximum.

.3 Install damp proof course under stud shoe tracks of partitions on slabs on grade.

.4 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.

.5 Erect metal studding to tolerance of 1:1000.

.6 Attach studs to bottom and ceiling track using screws.

.7 Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.

.8 Co-ordinate erection of studs with installation of door/window frames and special supports or anchorage for work specified in other Sections.

.9 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.

.10 Install heavy gauge single jamb studs at openings.

.11 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.

.12 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers.

.13 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.

.14 Install steel studs or furring channel between studs for attaching electrical and other boxes.

.15 Extend partitions to minimum 200 mm above ceiling height except where noted otherwise on drawings.

.16 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to

studs. Use 50 mm leg ceiling tracks.

.17 Install continuous insulating strips to isolate studs from un-insulated surfaces.

.18 Install two continuous beads of acoustical sealant under studs and tracks around perimeter of sound control partitions.

3.2 WALL FURRING

.1 Install wall furring for gypsum board wall finishes in accordance with CSA A82.31-M, except where specified otherwise and shown 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.

3.3 SUSPENDED AND FURRED CEILINGS AND BULKHEADS

.1 Erect hanger and runner channels for suspended gypsum board ceilings in accordance with CSA A82.31-M 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 gauge 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.

3.4 GYPSUM BOARD

.1 Installation of gypsum board is specified in Section 09 29 00

3.5 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 06 10 00 Rough Carpentry
.2 Section 07 92 00 Joint Sealants
.3 Section 09 22 16 Non-Structural Metal Framing
.4 Section 09 91 00 Painting

1.3 REFERENCES

.1 ASTM International (ASTM)
  .1 ASTM C475/C475M-17 Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
  .2 ASTM C514-04(2014) Standard Specification for Nails for the Application of Gypsum Board
  .3 ASTM C840-17a Standard Specification for Application and Finishing of Gypsum Board
  .4 ASTM C954-15 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
  .5 ASTM C1002-16 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 C1047-14a Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base
  .7 ASTM C1177/C1177M-17 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
  .8 ASTM C1178/C1178M-13 Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel
  .9 ASTM C1280 - 13a Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing.
  .10 ASTM C1396/C1396M - 17 Standard Specification for Gypsum Board
  .11 ASTM E90-09 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
  .12 ASTM E814-13a Standard Test Method for Fire Tests of Penetration Firestop Systems
  .13 ASTM E1966-15 Standard Test Method for Fire-Resistive Joint Systems
.2 Canadian General Services 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
.3 CAN/ULC-S102, Building Materials and Assemblies, Standard Method of Test for Surface Burning Characteristics of.
.4 Underwriters Laboratories of Canada (ULC)
  .1 ULC List of Equipment and Material, Volume III, Fire Resistance Ratings.

1.4 SUBMITTALS

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

.2 Submit WHMIS Material Data Safety Sheets (MSDS) for all products, prior to delivery of products to the site.

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.

1.6 MOCK-UPS

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

.2 Construct mockup gypsum board wall installation including one inside corner and one outside corner. Mock-up may be part of finished work.

.3 Allow two (2) 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.

1.7 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 Use all means necessary to 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 ENVIRONMENTAL REQUIREMENTS

.1 Maintain temperature minimum $10^{O}C$, maximum $21^{O}C$ 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 CSA A82.27-M and 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 Glass mat water-resistant gypsum board: to ASTM C1178/C1178M with glass mat facings, both sides, regular and Type X, thicknesses as indicated on drawings, 1200 mm wide x maximum practical length, ends square cut, long edges tapered.

.3 Abuse Resistant Gypsum Board: CGC Fibrerock abuse resistant fibre / gypsum panels, 16 mm thickness.

.4 Water and Moisture Resistant Board: to CSA A82.27 and ASTM C1396, 12.7 mm thick, 1220 mm wide with tapered edges.

.5 Glass Mat Exterior Gypsum Sheathing: to ASTM C1177, Georgia Pacific DENS-Glass Gold, 12.7 mm thick, 1219 mm wide x 2440 mm long, square edge with water repellant glass mat facings.
- .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: Pan head Buildex S-12 climaseal polymer coated, corrosion resistant 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 inch, self-adhering fibreglass joint tape and Borden HPPG Elmer’s Siliconized Acrylic Latex Caulk.

.6 Laminating Compound: To CSA A82.31-M, asbestos-free.

2.3 ACOUSTIC INSULATION

.1 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/m2:
  - .1 AFB Acoustical Fire Batts manufactured by Roxul Inc.
- .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 STC contribution and fire resistance (hr): Refer to NBC 2015, tables A-9.10.3.1-A/-B and Product Data Sheet for various assemblies contributing to acoustic performance and fire resistance.

.4 Surface burning characteristics to CAN/ULC-S102:
.1 flame spread: 15
.2 smoke developed: 5
.3 Smoulder resistance: to ULC S129.
.4 Non-combustible: to CAN4-S114.

.5 Thickness to suit depth of wall framing and as indicated.

.2 Acoustic sealant: To CGSB 19-GP-21M, ASTM E814 and ASTM E1966, with STC performance rating of 55 to ASTM E90-09.

2.4 ACCESSORIES

.1 Casing Beads, Corner Beads and Edge Trim: To ASTM C 1047, 0.5 mm gauge base thickness commercial grade sheet steel with G90 zinc finish to ASTM A525-80A; 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 Control Joints shall be DRM-50-25 2PC extruded aluminum as manufactured by Fry Reglet Corporation to provide a ¼" reveal.

.4 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 C 840 except where specified otherwise.

.2 Do not apply gypsum board until bucks, anchors, blocking, electrical, and mechanical work are approved.

.3 Do not apply gypsum board to ceilings until insulation, vapour retarder and air seals have been installed and inspected by others, including consultant, owner and municipal building inspectors.

.4 Apply gypsum board at right angles to framing members or furring using screw fasteners. Maximum spacing of screws 300 mm o.c.

.5 Install fibre gypsum abuse resistant panels at all ceilings and bulkheads except as noted below. Treat joints with fibreglass reinforced joint tape in accordance with manufacturer's instructions.

.6 Apply water resistant gypsum wallboard where indicated. Apply water resistant sealant to edges, ends and cut outs which expose gypsum core.

.7 Install Hi-Density Water Resistant Gypsum Sheathing in showers and other wet areas.

.8 Laminate gypsum board to existing masonry wall surfaces where indicated.

.9 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 GYPSUM SHEATHING

.1 Install exterior gypsum sheathing horizontally on all exterior walls where indicated. Stagger joints between adjacent sheets.

.2 Screw-attach gypsum sheathing to each stud with 32 mm self-drilling corrosion resistant sheathing screws spaced 10 mm from ends and edges 200 mm o.c. Drive fasteners to bear tight against and flush with surface of sheathing. Do not countersink. Apply sealant around sheathing perimeter at interface with other materials and install flashing as indicated on the drawings.

.3 Apply fiberglass joint treatment to all joints, overlapping at intersections by the width of the tape. Apply 10 mm bead of sealant along the joint and embed the sealant into the entire surface of the tape with a trowel. Apply enough sealant to each exposed fastener to cover completely when troweled smooth.

3.5 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. Miter 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. Control joints shall be supported with metal studs or furring channels on both sides of the joint. Control joints shall be provided:

.1 At abutting structural elements, steel columns.
.2 At expansion or control joints in the substrate;
.3 At maximum 20’ spacings on long partition and bulkhead runs;
.4 At each door jamb.

3.6 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.

3.7 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.

.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.

3.8 CLEANING

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

End of Section

Part 1 General

1.1 RELATED SECTIONS

.1 Division 03.

.2 Section 09 29 00 – Gypsum Board.

1.2 REFERENCE DOCUMENTS

.1 American National Standards Institute (ANSI):

.1 ANSI A108/A118/A136.1:2013: American National Specifications for the Installation of Ceramic Tile - Version 2013.1.

.2 ANSI A137.1:2012: American National Standards Specifications for Ceramic Tile.

.2 American Society for Testing and Materials (ASTM):

.1 ASTM C207-06 (2011): Standard Specification for Hydrated Lime for Masonry Purposes.

.2 ASTM C267-01 (2012): Standard Test Methods for Chemical Resistance of Mortars, Grouts, and Monolithic Surfacing and Polymer Concretes.

.3 ASTM C499 - 09(2014): Standard Test Method for Facial Dimensions and Thickness of Flat, Rectangular Ceramic Wall and Floor Tile.

.4 ASTM C627-10: Standard Test Method for Evaluating Ceramic Floor Tile Installation Systems Using the Robinson-Type Floor Tester.

.5 ASTM C648-04(2014): Standard Test Method for Breaking Strength of Ceramic Tile.

.6 ASTM C778-13: Standard Specification for Standard Sand.

.7 ASTM C847-14a: Standard Specification for Metal Lath.

.8 ASTM C920-14a: Standard Specification for Elastomeric Joint Sealants.

.9 ASTM E84-15a: Standard Test Method for Surface Burning Characteristics of Building Materials.

.3 Canadian Standards Association (CSA):

.1 CSA A5-A8-A362:1998: Portland Cement; Masonry Cement; Blended Hydraulic Cement.

.2 CAN/CSA-A3000-13: Cementitious Materials Compendium.

.4 Canadian General Standards Board (CGSB):

.1 CGSB 71-GP-22M: Adhesive, Organic, for Installation of Ceramic Wall Tile.

.5 Terrazzo, Tile and Marble Association of Canada (TTMAC):

.1 Specification Guide 09 30 00 Tile Installation Manual 2012-2014.

.2 Hard Surface Maintenance Guide, latest version.

.6 Underwriters' Laboratories of Canada (ULC):

.1 CAN/ULC-S102-10: Standard Method of Test for Surface Burning Characteristics of building Materials and Assemblies.

1.3 PRODUCT OPTIONS AND SUBSTITUTIONS

.1 Refer to Division 01 – General Requirements for requirements pertaining to product options and substitutions.

1.4 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, Specifications, and data sheets in accordance with Section 01 33 00 – Submittal Procedures.

.2 Shop Drawings:

.1 Submit shop drawings of ceramic tile work in accordance with Division 01.

.3 Samples:

.1 Submit duplicate 12" x 12" sample panels of each colour, texture, size, and pattern of tile required for this Project.

.2 Submit two (2) sections of each accessory specified, minimum 12" in length.

.3 Obtain approval of each tile and grout sample prior to supplying material to Project.

1.5 EXTRA MATERIAL

.1 Provide maintenance materials in accordance with Division 01.

.2 Provide minimum 5% of each type and colour of tile required for Project, for maintenance use. Store where directed by the Owner.

.3 Maintenance material to be of same production run as installed material.

1.6 ENVIRONMENTAL CONDITIONS

.1 Maintain air temperature and structural base temperature at ceramic tile installation area above 13°C for twenty-four (24) hours before, during, and after installation.

.2 Apply tile only to surfaces sufficiently dry, clean, firm, level, plumb, and free from oil or wax or any other material which may act as a bond breaker.

.3 Maintain adequate ventilation where Work of this Section generates toxic gases or where there is a risk of raising relative humidity to levels that could damage building finishes and

assemblies.

1.7 QUALITY ASSURANCE

.1 Work of this Section shall be undertaken by a company that is a member in good standing of the Tile, Terrazzo and Marble Association of Canada.

.2 Materials and workmanship shall be in accordance with the Specifications and recommendations of TTMAC and the requirements of the ANSI A108.1 Series of Standards. Refer to TTMAC Detail 317SP and Notes to the Professional for placement and detailing of movement joints, and for substrate preparation details.

.3 Execute Work of this Section using qualified personnel skilled in ceramic tile installation, having a minimum of five (5) years experience; and that have completed tile installations similar in material, design, and extent to that indicated for this Project.

.4 Conduct a pre-activity meeting at Project site in accordance with Division 01. The purpose of this meeting will be to discuss installation techniques, confirm compatibility of materials, identify any concerns arising from site conditions and identify any concerns of the installer. Attendees shall include General Contractor, Consultant, tile installer, tile supplier, mortar and grout representative, and waterproof membrane representative.

.5 Tile Application System (if used): Self-leveling underlayment, slurry coat, mortar bed, waterproof and crack isolation membrane, bond coat, grout and sealer, provided from a single manufacturer, to ensure compatibility.

1.8 DELIVERY, STORAGE AND HANDLING

.1 Deliver packaged materials in original unopened containers.

.2 Keep delivered material dry and free from stains. Store cementitious material off damp surfaces.

1.9 WARRANTY

.1 Tile Application System Warranty shall be provided. Tile Application System manufacturer, through the Installation Contractor, shall warranty the products, materials, and installation labour for a period of five (5) years commencing from the date of Substantial Performance of the Work.

.2 Individual product warranties for all specified products shall be provided. The warranties shall cover defects in product manufacturing for a period of five (5) years commencing from the date of Substantial Performance of the Work.

Part 2 Products

2.1 MATERIALS

.1 Ceramic Wall Tile (WT-1 as noted on the Drawings).
- .1 Size: 2”x 8”, Chevron.
- .2 Colour: Arctic White, Bright.
- .3 Grout: MAPEI Silver 27.
- .4 Manufacturers / Products: Olympia Tile, or approved equivalent.
- .5 Series: Colour & Dimension.

.2 Porcelain Floor Tile (PFT-1 as noted on the Drawings).
.1 Size: 600mmx600mm.
.2 Colour: Rivoli.
.3 Grout: MAPEI Silver 27.
.4 Manufacturers / Products: Cera Gres, or approved equivalent.
.5 Series: Autore.

.3 Thin-Set Mortar: To ANSI A118.4 when combined with acrylic mortar admix, shear bond strength: 440 psi (7-day), compressive strength: 3000 psi (7-day).

.4 Water-Resistant Backing Panel for Wall Tiled Areas (where not installed to concrete block): Durock Cement Board, or Dens Shield Tile Guard by Georgia Pacific Company, or CGC Tile Backer board, or approved equivalent.

.5 Wall Tile Adhesive: Organic Tile: To meet or exceed ANSI A136.1, Type 1, low VOC, solvent-free, non-flammable and non-toxic.

2.2 SEALER

.1 Sealer: Tile sealer, as recommended by the tile setting system manufacturer for the specific tile type of each application area, or approved equivalent.

2.3 SEALANT

.1 Sealant: Flexible polyurethane based sealant recommended for use in water immersion conditions, and compatible with PVC drains and pipes and other system fittings and fixtures.

2.4 ACCESSORIES

.1 Tile Edge Trims: Extruded aluminum type with mill finish, purpose to suit application, match to thickness of each tile / transition application.

.1 Acceptable Manufacturer: Schluter, or approved equivalent.

.1 Description: Anodized aluminum profile with textured, sloped exposed surface, tapered leading edge, integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer.

.2 Locations and Profile:

a) Provide Schluter ‘QUADEC’ edge trims for all exposed edges of wall tile.

b) Provide Schluter ‘JOLLY’ edge trims for tops and exposed side edges of all tile fields.

.3 Colour: AE Satin Anodized Aluminum.

.4 Height: as required to work with tile, not to exceed 1/2” final height.

.2 Metal Lathe: To ASTM C 847 galvanized finish.

.3 Tile Control Joints (if required): Contractor to locate tile controls joints in tile on concrete cold-joint locations and pour break joint locations, extent to be determined on site. Install tile control joints based on TTMAC details and recommendations.

2.5 MEMBRANES

.1 Preformed Waterproofing Membrane System (if required): To ANSI A118.10, soft polyethylene membrane with fleece webbing laminated on both sides complete with special cut rolls and special shapes for corners and pipe sleeves, and manufacturer's standard floor drain assembly.

.2 Liquid applied waterproof membranes can be used, with suitable Contract credit to the Owner.

.3 Location (if required): Behind and/or under all tile in shower floors, walls, curbs and gutters, and where shown, or to extent shown on Drawings.

2.6 FLOOR LEVELLING COMPOUND

.1 Sika Canada Inc. Sikafloor Level 25ca, cementitious self-levelling floor screed. One component, polymer modified, pumpable cementitious screed. Rapid drying, with 4 hour walk time.

Part 3 Execution

3.1 WORKMANSHIP

.1 Do tile work in accordance with Installation Manual, produced by TTMAC, except where specified otherwise.

.2 Apply tile or backing coats to non-frozen frost free surfaces.

.3 Fit tile units around corners, fitments, fixtures, drains and other built-in objects to maintain uniform joint appearance. Make cut edges smooth, even and free from chipping. Edges resulting from splitting are not acceptable.

.4 Make joints between tiles uniform and approximately 1/16", plumb, straight, true, even, and with adjacent tile flush. Ensure sheet layout not visible after installation.

.5 Align patterns.

.6 Lay out tiles so that perimeter tiles are minimum 1/2 size.

.7 Sound tiles after setting and replace hollow sounding units to obtain full bond.

.8 Clean installed tile surfaces after installation cured.

.9 Maintain building expansion joints. Keep free of mortar or grout.

.10 Make internal angles square, external angles square. Use finished edge tiles for square external angles.

3.2 INSTALLATION

.1 Install tile on substrates to TTMAC details.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 This Section includes all labour, materials, tools and other equipment, services and supervision required to complete all exterior and interior painting and surfaces to full extent of the drawings and specifications to the requirements of the **Architectural Specifications Manual**, current edition, including the latest edition of the **Approved Products List**, published by **The Master Painters Institute (MPI)**.

.2 The painting and finishing specifications for previously painted or finished substrates are based on, and make reference to the **Maintenance Repainting Manual**, current edition, including the latest edition of the **Approved Products Lists**, published by **The Master Painters Institute (MPI)**.

.3 Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections, and as follows:

.1 Surface preparation of substrates including cleaning, small crack repair, patching, caulking and making good surfaces and areas.

.2 Surface preparation and prime painting surfaces for wall coverings before installation in accordance with wall covering manufacturer's written instruction.

.3 Prime painting and back-priming of surfaces except where pre-primed with an MPI-approved primer under other Sections of the Work.

.4 Paint exposed and semi-exposed items and surfaces, except where Specifications indicate that the surface or material is not painted or is to remain natural, as follows:

.1 Paint item or surface same as similar adjacent materials or surfaces where item or surface is not specifically mentioned.

.2 Consultant will select from Standard colours and finishes available where a colour of finish is not specified.

.3 Painting including field painting of exposed bare and covered conduit, pipes and dusts including colour coding, hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory applied final finish.

.4 Painting of semi-concealed areas such as inside of light valances, behind grills, and projecting edges below sight lines.

.5 Provision of safe and adequate ventilation as required over and above temporary ventilation supplied by Contractor, where toxic, volatile, or flammable materials are being used.

.6 Touch-ups and field painting necessary to complete work shown, scheduled, or specified.

.7 Site touch-up of pre-finished wood doors.

.8 Painting of exposed to view mechanical heating, ventilation and plumbing services, and equipment such as ducts, sprinkler piping, and electrical work to extent specified unless pre-finished.

.5 The reference document is available from:

The Master Painters Institute
2800 Ingleton Avenue, Burnaby, BC Canada V5C 6G7
Tel: toll free 1-888-674-8937 Fax: toll free 1-888-211-8708
Email: info@paintinfo.com Website: www.paintinfo.com

1.2 RELATED SECTIONS

.1 Section 05 50 00 – Metal Fabrications.

.2 Section 08 31 00 – Access Doors and Panels.

.3 Section 09 29 00 – Gypsum Board.

1.3 REFERENCES

.1 American Society for Testing and Materials (ASTM):

.1 ASTM D16-14: Standard Terminology for Paint, Related Coatings, Materials, and Applications.

.2 ASTM E84-15a: Standard Test Method for Surface Burning Characteristics of Building Materials.

.2 Canadian Standards Association (CSA):

.1 CSA A23.1-14/A23.2-14: Concrete Materials and Methods of Concrete Construction / Test Methods and Standard Practices for Concrete.

.3 Canadian General Standards Board (CGSB):

.1 CGSB 1 Series of Standards contained in the MPI Manual Description of Products, for products forming part of the specified systems.

.4 Green Seal Standards:

.1 GC-3: Green Seal Environmental Criteria for Anti-Corrosive Paints, Second Edition, January 7, 1997.

.2 GS-11: Green Seal Standard for Paints and Coatings, Third Edition, August 17, 2011.

.5 Environmental Choice Program (ECP):

.1 Paints and Surface Coatings, Low VOC Product Listings.

.6 The Master Painters Institute (MPI):

.1 Architectural Painting Specification Manual.

.7 The Society for Protective Coatings (SSPC):

.1 Coating Material Guide.

.2 Surface Preparation Guidelines.

1.4 SUBMITTALS

.1 Provide required information in accordance with Division 01.

.2 Submit list of all painting materials used for the Work, to Consultant for review prior to ordering materials for each paint system indicated, including cleaning agents, block fillers, and primers:

.1 Material List: An inclusive list of required coating materials indicating each material and cross reference specific coating, finish system, and application; identify each material by manufacturer's catalogue number and general classification.

.2 Manufacturer's Information: Manufacturer's product technical information, including label analysis and instructions for handling, storing, and applying each coating material.

.3 Manufacturer's printed product literature, Specifications, and data sheets in accordance with Section 01 33 00 – Submittal Procedures.

.3 Sample for Verification:

.1 Provide samples of each colour and material, with texture to simulate actual conditions, on representative samples of the actual substrates.

.2 Provide stepped samples, defining each separate coat, including block fillers and primers.

.3 Resubmit until required sheen, colour, and texture are achieved.

.4 Provide a list of materials and applications for each coat of each sample.

.5 Label each sample for location and application.

1.5 MAINTENANCE MATERIAL SUBMITTALS

.1 Extra Stock Materials:

.1 Leave on premises not less than 4L of new material of each colour and finish sheen used.

.2 Provide maintenance materials in new containers, full, tightly sealed, and clearly labelled. Remnants of used materials are not acceptable.

1.6 QUALITY ASSURANCE

.1 Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated in this Project, whose work has resulted in applications with a record of successful service performance, and as follows:

.1 Have a minimum of five (5) years proven satisfactory experience and shall show proof before commencement of work that he will maintain a qualified crew of painters throughout the duration of the Work.

.2 Only qualified journeymen who have a Tradesman Qualification Certificate of Proficiency shall be engaged in painting and decorating work.

.3 Apprentices may be employed provided they work under the direct supervision of a qualified journeyman in accordance with trade regulations.

.2 Source Limitations:

.1 Use only paint manufacturers and products as listed under the Approved Products Section of the MPI Architectural Painting Specification Manual.

.3 Installation:

.1 The following requirements establish the standard of acceptance for the Work, when viewed using the final lighting source.

.1 Vertical surfaces: No defects visible from a distance of 1m at 90 degrees to surface.

.2 Horizontal surfaces: No defects visible from a distance of 1m at 45 degrees to surface.

.3 Ceilings: No defects visible from floor at 45 degrees to surface.

.4 Final coat shall exhibit uniformity of sheen across full surface area.

.2 Defects include brush marks, streaks, runs, laps, drips, heavy stippling, pile up of paints, roller tracking, inadequate hiding of substrate, skipped or missed areas, and foreign materials in paint.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver materials to Project site in manufacturer’s original, unopened packages and containers bearing manufacturer’s name and label, and the following:

.1 Product name or title of material.

.2 Product description.

.3 Manufactures stock number and date of manufacture.

.4 Contents by volume.

.5 Thinning instructions.

.6 Application instructions.

.7 Colour name and number.

.2 Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 10°C.

.1 Protect materials from freezing.

.2 Store material off concrete slabs on raised pallets.

.3 Keep storage area neat and orderly.

.4 Remove oily rags and waste daily.

.5 Maintain toxic, volatile, and explosive or flammable materials in a safe environment.

.6 Provide one (1) 9kg ABC fire extinguisher with all temporary heating equipment, and in close proximity to where paint and coating materials are being stored.

.3 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling, where possible.

.2 Place materials defined as hazardous or toxic in designated containers.

.3 Handle and dispose of hazardous materials in accordance with regional and municipal regulations.

.4 Ensure emptied containers are sealed and stored safely.

.5 Unused paint and coating materials must be disposed of at official hazardous material collections site as approved by the Owner.

.6 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.

.7 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.

.8 To reduce amounts of contaminants entering waterways, sanitary/storm drain systems, or into ground, follow these procedures:

.1 Retain cleaning water for water-based materials to allow sediments to be filtered out.

.2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.

.3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.

.4 Dispose of contaminants in approved legal manner in accordance with hazardous waste regulations.

.5 Empty paint cans are to be dry prior to disposal or recycling (where available).

.9 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.

1.8 PROJECT CONDITIONS

.1 Maintain temperatures of surfaces and surrounding air between the following temperatures for a minimum of twenty-four (24) hours before, during, and after application or until paints and coatings are fully cured, whichever is greater:

.1 Waterborne Paints and Coatings: 10°C to 32°C.

.2 Solvent-Thinned Paints and Coatings: 7°C to 35°C.

.3 Maintain temperatures during application and until materials are fully cured.

.2 Maintain surfaces free from:

.1 Snow, rain, fog or mist, dampness, or wetness that could impair bond.

.2 Relative humidity in excess of 85%.

.3 Temperatures less than 3°C above the dew point.

.4 Painting may continue during inclement weather if surfaces and areas are enclosed and heated within temperature limits specified above.

.3 Maintain surfaces at less than maximum moisture content indicated below; test wood and plaster surfaces using a properly calibrated electronic moisture meter.

.1 12% for concrete and masonry, test concrete surfaces in accordance with ASTM F1869 and as follows:

.1 Do not paint concrete or masonry surfaces for a minimum of sixty (60) days after installation.

.2 Concrete and masonry surfaces must be visually dry on both sides and tested for maximum moisture content.

.3 This is not to be construed as including a wetting down process that may be required for latex or filler coatings.

.2 15% for wood.

.3 12% for plaster and gypsum board.

.4 Test concrete, masonry, and plaster surfaces for alkalinity as required.

.5 Maintain a minimum lighting level of 323 Lux (30 foot candles) on surfaces where paint or coatings are being applied.

.6 Maintain adequate continuous ventilation and sufficient heating facilities to maintain specified air and substrate temperatures.

.7 Maintain a dust free environment in area of site painting.

1.9 WARRANTY

.1 Provide a two (2) year warranty commencing from the date of Substantial Performance of the Work.

Part 2 Products

2.1 MATERIALS

.1 Provide materials (cleaning agents, primers, coatings, varnishes, lacquers, fillers, solvents, thinners) in accordance with the MPI Manual Architectural Painting Specification Manual, Chapter 5 Approved Product Listing.

.2 Paint materials for each coating formula to be products of a single manufacturer.

.3 Use only MPI approved products from the MPI Approved Product List corresponding to the specified finishing systems.

.4 All paint materials shall have good flowing and brushing properties and shall dry or cure free of blemishes, sags, air entrapment, etc.

.5 Where required, paints and coatings shall meet flame spread and smoke developed ratings designated by local Code requirements and/or Authorities Having Jurisdiction.

2.2 MIXING

.1 Except as otherwise specified, paint shall be ready-mixed. Re-mix prior to application to ensure colour and gloss uniformity. Materials in paste or powder form, or to be field-catalyzed, shall be field mixed in accordance with manufacturer's directions. Perform colour tinting operations prior to site delivery.

.2 Paste, powder or catalyzed paint mixes shall be mixed in strict accordance with manufacturer's written instructions.

.3 Where thinner is used, addition shall not exceed paint manufacturer's recommendations. Do not use kerosene or any such organic solvents to thin water-based paints.

.4 If required, thin paint for spraying according in strict accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Consultant.

2.3 COLOURS

.1 Paint colours and other finishes will be selected by the Consultant.

.2 Colour Scheme: For bidding purposes, colour schemes will be generally as follows unless noted otherwise:

.1 Maximum two (2) colours for walls within room or area.

.2 Maximum two (2) colours for ceilings.

.3 Maximum two (2) colours for doors, frames, trims, etc.

2.4 GLOSS / SHEEN RATINGS

.1 Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following MPI values:

Gloss Level	Description	Units at 60 degrees	Units at 85 degrees
G1	Matte or Flat Finish	0 to 5	10 max.
G2	Velvet Finish	0 to 10	10 to 35
G3	Eggshell Finish	10 to 25	10 to 35
G4	Satin Finish	20 to 35	35 min.
G5	Semi-Gloss Finish	35 to 70	
G6	Gloss Finish	70 to 85	
G7	High-Gloss Finish	> 85	

.2 Except as otherwise specified, provide the following gloss levels for specified locations and substrates:

.1 Interior Paint Finishes:

.1 Flat Finish - G1

.2 Velvet Finish - G2

.3 Eggshell Finish - G3

.4 Satin Finish - G4

.5 Semi-Gloss Finish - G5

.6 Gloss Finish - G6

.7 High-Gloss Finish - G7

.2 Interior Transparent Finishes:

.1 Satin Finish - G4

.2 Gloss Finish - G6

.3 Exterior Paint Finishes:

.1 Flat Finish - G1

.2 Semi-Gloss Finish - G5
.3 Gloss Finish - G6

.4 Exterior Transparent Finishes:

.1 Satin Finish - G4

.2 Gloss Finish - G6

.3 Where gloss level is not specified, confirm required gloss level with Consultant prior to proceeding with finish coats.

Part 3 Execution

3.1 VERIFICATION OF CONDITIONS

.1 Ensure all dust generating activities have been terminated and dust removed.

.2 Prior to commencement of painting and finishing work, thoroughly examine substrates scheduled to receive coatings.

.3 Do not apply coatings to substrates whose condition will adversely affect execution, permanence, or quality of work and which cannot be put into an acceptable condition through preparatory work specified herein.

.4 Ensure that site applied paints and finishes are compatible with primers or other finishes applied in the shop or factory.

.5 Verify compatibility of any previously applied coatings with specified coatings.

.6 Notify Consultant of any incompatibilities.

3.2 PREPARATION OF SURFACES

.1 Prepare new surface in accordance with the Master Painters Institute (MPI) Architectural Painting Specification Manual, current edition.

.2 Protect adjacent surfaces from spray, splashing's, and droppings.

.3 Remove electrical plates, surface hardware, fixtures, fittings, and fastenings etc., prior to painting operations, unless approved by the Consultant in writing.

.4 Keep sprinkler heads and smoke detectors free of paint. Replace those that do receive paint.

.5 Properly prepare each surface to obtain correct and sufficient adhesion of next coat of material.

.6 Mildew Removal: Scrub with solution of TSP and bleach, rinse with clear water, and allow surface to dry completely.

.7 Remove dirt, oil, grease, and sand as necessary to provide adhesion key, and when asphalt, creosote or bituminous surfaces required paint finish.

.8 Remove contamination from wall surfaces and prime to show defects, if any. Carry on with paint coating after defects have been remedied.

.9 Wood: Sandpaper to a smooth and even surface. Remove dust. Ensure that moisture content is less than 15%.

.10 Gypsum Wallboard and Plaster: Fill minor irregularities with spackling compound and sand to a smooth, level surface. Avoid raising nap of paper.

.11 Concrete: Remove loose mortar, scale powder, and foreign matter. Remove oil and grease with a solution of TSP, rinse well and allow to thoroughly dry. Fill holes which are too large to be filled by block filler as required to produce a uniform texture.

.12 Concrete Floors: Remove contamination, acid etch and rinse with clear water and assure acid-alkali balance is achieved, let dry thoroughly.

.13 Masonry: Remove loose mortar, scale powder and foreign matter. Remove oil and grease with a solution of TSP, rinse well and allow to thoroughly dry. Fill holes which are too large to be filled by block filler as required to produce a uniform texture. This applies only to Change Rooms and the Natatorium; other block wall locations to be stoned or rubbed only with thinned paint application. Refer to Room Finish Schedule for locations.

.14 Unprimed Steel: Clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts and nuts are similarly cleaned. Prime surfaces to indicate defects, if any. Commence with painting immediately after defects have been remedied.

.15 Primed Metal: Remove dirt and grease by cleaning with solvent. Feather shoulders of uneven primer to prevent edges from telegraphing through finish coats. Touch up of damaged shop coating and touch up patches inconspicuous. Prime all bare steel surfaces.

.16 Galvanized Metal: Clean with detergent and solvent to etch surface, as spray, product per MPI Manual.

.17 Apply paint only to dry, clean, properly cured and adequately prepared surfaces in areas where dust is no longer generated by construction activities such that airborne particles will not affect the quality of finished surfaces.

.18 Remove all oil and grease then clean substrates that could impair bond of the various coatings before applying paint or other surface treatments.

3.3 APPLICATION

.1 Refer to SSPC and to the MPI Architectural Painting Specification Manual, as a general reference for application techniques, requirements, and precautions **MPI Manual Premium Grade Finish Requirements (three (3) coat system).**

.2 Finishes specified are intended to cover surfaces satisfactorily when applied in accordance with the manufacturer's recommendations. Re-paint surfaces to achieve hiding of substrate and uniform finish.

.3 Mix materials thoroughly before application and apply evenly, free from sags, and other defects. Perform cutting-in neatly.

.4 Lightly sandpaper each coat before the next coat is applied. After the prime coat is applied, fill holes and sand smooth when dry.

.5 The filler must match the colour of the wood when a clear finish is used. Work filler well into the grain before it has set. Wipe excess from the surface.

.6 Tint each coat slightly darker than the preceding coat, unless otherwise approved by the Consultant.

.7 Ensure that finish work is uniform in sheen, colour and texture and free from roller or brush hair, with no indication of base coat visibility. Telegraphing through of the base colours is not acceptable and will be considered a deficiency.

.8 Clean droppings and overspray as work progresses.

.9 Use brush application on doors and metal surfaces, unless otherwise directed. On other surfaces, airless spray or roller work is acceptable, but if this does not prove to give satisfactory results, repaint rejected surfaces with brush at no additional cost to the Owner.

.10 Apply each coat at the proper consistency in accordance with the manufacturer's directions.

.11 Each coat of finish should be dry and hard before a following coat is applied unless the manufacturer's directions state otherwise. Allow each coat of finish to dry twenty-four (24) hours before a following coat is applied, unless directed otherwise by the Consultant.

.12 Finish a whole panel, door, or frame etc., rather than spot painting of facing off where a portion of the finish has been damaged or is unsatisfactory.

.13 Paint top and bottom edges of metal doors to match faces. Finish edges of clear finished doors.

.14 For concrete and concrete block and where block filler would be used, ensure that sufficient primer/sealer is used to totally fill and seal the surfaces and produce a uniform surface colouration of sealer so that the block colour does not telegraph through. Re-coat as required to achieve. Apply block filler at a rate sufficient to fill all voids. Work block filler into surface leaving no pinholes or unsealed voids in the surface.

3.4 INTERIOR FINISHES

.1 Concrete Vertical Surfaces

INT 3.1C High Performance Architectural Latex G3/G5 (over waterborne alkali resistant primer)

1st coat	WB Alkali Resistant Primer	MPI# 3
2nd coat	High Performance Architectural Latex	MPI# 139, 141
3rd coat	High Performance Architectural Latex	MPI# 139, 141

.1a Concrete Vertical Surfaces (Storage Room, Garbage Room, Washrooms, Change Rooms etc.)

INT 3.1C Epoxy Modified Latex G5

1st coat	Epoxy Modified Latex	MPI# 115

2nd coat	Epoxy Modified Latex	MPI# 115
3rd coat	Epoxy Modified Latex	MPI# 115

.2 Concrete Masonry Units

INT 4.2D High Performance Architectural Latex G3/G5 (over block filler)

1st coat	Latex Block Filler	MPI# 4
2nd coat	High Performance Architectural Latex	MPI# 139, 141
3rd coat	High Performance Architectural Latex	MPI# 139, 141

For areas listed above that will not have block filler, paint system specified final coat material is to be thinned and applied in three (3) coats.

.2a Concrete Masonry Unit Vertical Surfaces (Storage Room, Garbage Room, Washrooms, Change Rooms etc.)

INT 4.2J Epoxy Modified Latex G5

1st coat	Latex Block Filler	MPI# 4
2nd coat	Epoxy Modified Latex	MPI# 115
3rd coat	Epoxy Modified Latex	MPI# 115

.3 Metal Fabrications and Structural Steel columns, beams, joists, angles, channels brackets, plates, clips

INT 5.1R High Performance Architectural Latex G5 (over QD metal primer)

1st coat	Anti –Corrosive Alkyd Primer	MPI# 79
2nd coat	High Performance Architectural Latex	MPI# 141
3rd coat	High Performance Architectural Latex	MPI# 141

.3a Metal Fabrications and Structural Steel columns, beams, joists, angles, channels brackets, plates, clips (Washrooms, Change Rooms etc.)

INT 5.1H Polyurethane Pigmented (over inorganic zinc & high build epoxy)

1st coat	Inorganic Zinc Primer	MPI# 19
2nd coat	High Build Epoxy	MPI# 108
3rd coat	Polyurethane Pigmented	MPI# 72

.4 Galvanized Metal (doors, frames, railings, misc. steel, pipes, overhead decking, ducts, etc.):

INT 5.3K WB Light Industrial Coating G5 (over w.b. primer)

1st coat	WB Galvanized Primer	MPI# 134
2nd coat	WB Light Industrial Coating	MPI# 153
3rd coat	WB Light Industrial Coating	MPI# 153

.4a Galvanized Metal (Washrooms, Change Rooms etc.):

INT 5.3D Epoxy Modified (over epoxy primer) INT 5.1G Polyurethane Pigmented (over high build epoxy)

1st coat	Epoxy Primer	MPI# 101

2nd coat	High Build Epoxy	MPI# 108
3rd coat	Polyurethane Pigmented	MPI# 72

.5 Copper

INT 5.5H Latex G5

1st coat	QD Primer	MPI# 95
2nd coat	Latex	MPI# 54
3rd coat	Latex	MPI# 54

.6 Dimension Lumber (columns, beams, exposed joists, underside of decking, etc.):

INT 6.2M – WB Varnish G4 (over semi-transparent stain)

1st coat	Semi Transparent Stain	MPI# 90
2nd coat	WB Varnish	MPI# 128
3rd coat	WB Varnish	MPI# 128
4th coat	WB Varnish	MPI# 128

.7 Dressed Lumber (including doors, door and window frames, casings, molding, etc.):

INT 6.3Z Polyurethane Clear (2 component)

1st coat	Aliphatic Polyurethane Clear	MPI# 78
2nd coat	Aliphatic Polyurethane Clear	MPI# 78
3rd coat	Aliphatic Polyurethane Clear	MPI# 78

.8 Plaster and Gypsum Board Surfaces (gypsum wallboard, drywall, sheet rock type material, etc., and textured finishes):

INT 9.2A Latex (over latex sealer) G1 (ceilings and bulkheads)

1st coat	Latex Sealer	MPI# 50
2nd coat	Latex	MPI# 53
3rd coat	Latex	MPI# 53

INT 9.2B High Performance Architectural Latex G3/G5 (over latex sealer)

1st coat	Latex Sealer	MPI# 50
2nd coat	High Performance Architectural Latex	MPI# 139, 141
3rd coat	High Performance Architectural Latex	MPI# 139, 141

.8a Plaster and Gypsum Board Surfaces (Washrooms, Change Rooms etc.):

INT 9.2F Epoxy Modified Latex G5

1st coat	Latex Block Filler	MPI# 4
2nd coat	Epoxy Modified Latex	MPI# 115
3rd coat	Epoxy Modified Latex	MPI# 115

.9 Canvas and Cotton Coverings

INT 10.1A Latex G1

1st coat	Latex Sealer	MPI# 50

2nd coat	Latex	MPI# 53
3rd coat	Latex	MPI# 53

.10 Bituminous Coated Surfaces (cast iron pipe, concrete, etc.):

INT 10.2A Latex G5

1st coat	WB Rust Inhibitive Primer	MPI# 107
2nd coat	Latex	MPI# 54
3rd coat	Latex	MPI# 54

3.5 EXTERIOR FINISHES

.1 Metal Fabrications and Structural Steel, Bollards, Angles, Brackets, Plates, Clips, etc.

EXT 5.1 W.B. Light Industrial Coating (over alkyd primer) Premium Grade G5

1st coat	Alkyd Metal Primer	MPI# 79
2nd coat	WB Light Industrial Coating	MPI# 163
3rd coat	WB Light Industrial Coating	MPI# 163

.2 Galvanized Metal and Pressed Steel Doors and Frames.

EXT 5.3 W.B. Light Industrial Coating (over WB primer) Premium Grade G5

1st coat	W.B. Primer	MPI# 79
2nd coat	WB Light Industrial Coating	MPI# 163
3rd coat	WB Light Industrial Coating	MPI# 163

3.8 FIELD QUALITY CONTROL / STANDARD OF ACCEPTANCE

.1 All surfaces, preparation and paint applications shall be reviewed.

.2 Painted exterior surfaces shall be considered to lack uniformity and soundness if any of the following defects are apparent to the reviewer:

.1 brush / roller marks, streaks, laps, runs, sags, drips, heavy stippling, hiding or shadowing by inefficient application methods, skipped, or missed areas, and foreign materials in paint coatings.

.2 evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners, and re-entrant angles.

.3 damage due to touching before paint is sufficiently dry or any other contributory cause.

.4 damage due to application on moist surfaces or caused by inadequate protection from the weather.

.5 damage and/or contamination of paint due to blown contaminants (dust, spray paint, etc.).

.3 Painted surfaces shall be considered unacceptable if any of the following are evident under natural lighting source for exterior surfaces:

.1 visible defects are evident on vertical surfaces when viewed at normal viewing

angles from a distance of not less than 39”.

.2 visible defects are evident on horizontal surfaces when viewed at normal viewing angles from a distance of not less than 39”.

.3 visible defects are evident on ceiling, soffit and other overhead surfaces when viewed at normal viewing angles.

.4 when the final coat on any surface exhibits a lack of uniformity of color, sheen, texture, and hiding across full surface area.

.4 Painted surfaces rejected by the reviewer shall be made good at the expense of the Contractor. Small, affected areas may be touched up; large affected areas or areas without sufficient dry film thickness of paint shall be repainted. Runs and sags of damaged paint shall be removed by scraper or by sanding prior to application of paint.

END OF SECTION

Part 1 General

.1 The Contractor shall examine all Drawings and Specifications to ascertain the Scope of Work of this Section, including all related Mechanical and Electrical Drawings.

1.1 RELATED SECTIONS

.1 All Sections can affect the work of this Section.

1.2 WORK INCLUDED

.1 Furnish products, labour, and materials to complete miscellaneous specialties work specified herein.

1.3 MATERIALS

.1 Materials: Applicable to their respective Divisions.

1.4 SAMPLES

.1 Submit samples of Work specified herein if specifically required to select colours, finishes, or if required by the Consultant.

1.5 SUBMITTALS AND SHOP DRAWINGS

.1 Submit shop drawings in accordance with Division 01.

.2 Submit manufacturer's printed product literature, Specifications, and data sheets for approval; and for Operation and Maintenance Manuals as required in Division 01.

1.6 VERIFYING CONDITIONS

.1 Verify measurements in field as required for work fabricated to fit the building conditions.

.2 Before starting Work, examine adjoining Work on which Work is in any way dependent for perfect workmanship and fit. Do such corrosive work to adjoining work as may be necessary to make Work perfect in all respects.

1.7 PRODUCT ALTERNATES

.1 Products and materials, as specified herein, are selected for the design, performance and construction required for that particular specialty. Other products and materials, which, in the Consultant's opinion are comparable to those specified, will be accepted as alternates, subject to approval of manufacturer’s product literature.

1.8 QUALITY ASSURANCE

.1 Other than the specified manufacturers, only manufacturer's properly equipped, who have manufactured and installed work of the same size and character as that indicated in this Section for each product, will be considered for this Work.

1.9 WARRANTY

.1 For all specified products of this Section, manufacturer/supplier to provide a minimum one (1) year warranty against manufacturer's defects, commencing from the date of Substantial Performance of the Work.

Part 2 Products

2.1 LIFT FOR COUNTERTOP

.1 Supply and install electrically height adjustable, wall mounted countertop lifts as noted on the drawings. Coordinate with Section 06 40 00, Section 11 30 13, Mechanical Drawings, Electrical Drawings and Specifications and other applicable sections.

.1 Manufacturer: Pressalit, or approved equivalent.
.2 Products:
  .1 LF1: RK1710
  .2 LF2: RK1713

2.2 FLEXIBLE PIPING

.1 Supply and install flexible feed and waste system to be used at all sinks installed at countertops supported by Counterop Lift. Coordinate with Section 06 40 00, Section 11 30 13, Mechanical Drawings and other applicable sections.

.1 Manufacturer: Pressalit, or approved equivalent.
.2 Product: RK9061, Flexible feed and waste system.

2.3 STOOLS

.1 Provide assembled stackable stools.

.1 Manufacturer: Gaber, supplied by Augustus Jones, 33 Davies Avenue, Level 1, Toronto, Ontario, or approved equivalent.
.2 Product: Easy 67 counter stool.
.3 Quantity: 16
.4 Colour:
  .1 Frame: 67 NAB - White Painted
  .2 Seat: 42 (Green)
.5 Dimensions 370mm W x 360mm D x SH 670mm

2.4 FIRE EXTINGUISHER CABINETS

.1 Supply and install recessed fire extinguisher cabinets. Refer to mechanical drawings for fire extinguisher information.

.1 Manufacturer: National Fire Equipment, or approved equivalent.
.2 Model No: CE-950-4
.3 Finish: Stainless Steel

2.5 COMMUNICATIONS DISPLAYS

.1 Supply and install communications displays.

.1 Manufacturer: Frost, or approved equivalent.
.2 Product: 1120-Event Log / Communication Display.
.3 Quantity: 5
.4 Location: To be determined on site.

2.6 FOOD SERVICE SINKS

.1 Supply and install sink. Provide seamless welds to countertop.
.2 Single Sink. ADA / CSA B651 Compliant.
.1 Manufacturer: Blanco, or approved equivalent.
.2 Product: Quatrus U 1 Medium ADA CSA
.3 Faucet: LKAV3032BK - Avado Single Hole Bar Faucet with Pull-down Spray and Lever Handle, Black Stainless by Elkay, or approved equivalent.
.3 Double Sink.
.1 Material: Stainless Steel.
.2 Size: Double pot washing sink with 2 - 18"X18" basins, 14” depth.
.3 Faucet: Blancoculina, 401222 by Blanco, or approved equivalent.

Part 3 Execution

3.1 INSTALLATION

.1 Install all listed manufactured specialties as directed and outlined by the manufacturer/supplier and as detailed on the Drawings.

.2 Coordinate and connect all related mechanical and electrical connections to make equipment operational and usable for their manufactured and designed intent.

END OF SECTION

Part 1 General

.1 The Contractor shall examine all Drawings and Specifications to ascertain the Scope of Work of this Section, including all related Mechanical and Electrical Drawings.

1.1 RELATED SECTIONS

.1 Section 06 40 00 - Architectural Woodwork.
.2 Electrical Sections.
.3 Mechanical Drawings.

1.2 WORK INCLUDED

.1 Furnish products, labour, and materials to complete miscellaneous specialties work specified herein.

1.3 MATERIALS

.1 Materials: Applicable to their respective Divisions.

1.4 SAMPLES

.1 Submit samples of Work specified herein if specifically required to select colours, finishes, or if required by the Consultant.

1.5 SUBMITTALS AND SHOP DRAWINGS

.1 Submit shop drawings in accordance with Division 01. Include details of materials, construction and finish. Include relationship with adjacent construction.

.2 Submit manufacturer's printed product literature, Specifications, and data sheets for approval; and for Operation and Maintenance Manuals as required in Division 01.

1.6 VERIFYING CONDITIONS

.1 Verify measurements in field as required for work fabricated to fit the building conditions.

.2 Before starting Work, examine adjoining Work on which Work is in any way dependent for perfect workmanship and fit. Do such corrosive work to adjoining work as may be necessary to make Work perfect in all respects.

1.7 PRODUCT ALTERNATES

.1 Products and materials, as specified herein, are selected for the design, performance and construction required for that particular specialty. Other products and materials, which, in the Consultant's opinion are comparable to those specified, will be accepted as alternates, subject to approval of manufacturer’s product literature.

1.8 QUALITY ASSURANCE

.1 Other than the specified manufacturers, only manufacturer's properly equipped, who have manufactured and installed work of the same size and character as that indicated in this Section for each product, will be considered for this Work.

.2 Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.

.3 Installer Qualifications: Company specializing in performing Work of this section with minimum two years documented experience with projects of similar scope and complexity.

.4 Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

1.9 DELIVERY, STORAGE, AND HANDLING

.1 Store and handle in strict compliance with manufacturer's written instructions and recommendations.

.2 Protect from damage due to weather, excessive temperature, and construction operations.

1.10 PROJECT CONDITIONS

.1 Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.11 WARRANTY

.1 Manufacturer's Warranty: Provide manufacturer's standard limited warranty commencing from the date of Substantial Performance of the Work.

Part 2 Products

2.1 MANUFACTURERS

.1 Requests for substitutions will be considered in accordance with Division 01.

2.2 COOKING APPLIANCES

.1 **ER** - Slide-in Electric Ranges

.1 Manufacturer: Bosch, or approved equivalent.
.2 Product: HEI8056C.
.3 Quantity: As indicated on drawings.

.2 **CTP** - Electric Cooktop

.1 Manufacturer: Bosch, or approved equivalent.
.2 Product: NET8068UC.
.3 Quantity: As indicated on drawings.

.3 **WOV** - Wall Oven

.1 Manufacturer: Bosch, or approved equivalent.
.2 Product: HBLP451RUC.
.3 Quantity: As indicated on drawings.

.4 **MW1** - Undercounter Microwave Oven

.1 Manufacturer: JENNAIR, or approved equivalent.
.2 Product: JMDFS24JL
.3 Quantity: As indicated on drawings.

.5 **CF** – Coffee Machine

.1 Manufacturer: Bunn, or approved equivalent.
.2 Product: CWTF15-TC Thermal Carafe System
.3 Quantity: As indicated on drawings.

.6 **RH** – Range Hood

.1 Manufacturer: Zephyr, or approved equivalent.
.2 Product: 36” Monsoon II Insert
.3 Quantity: As indicated on drawings.
.4 Installation: Coordinate with fire suppression system. Refer to mechanical drawings.

2.3 REFRIGERATION APPLIANCES

.1 **REF** - Refrigerator

.1 Manufacturer: TRUE, or approved equivalent.
.2 Product: T-35-HC.
.3 Quantity: As indicated on drawings.

.2 **FRZ** - Freezer

.1 Manufacturer: TRUE, or approved equivalent.
.2 Product: T-23F-HC.
.3 Quantity: As indicated on drawings.

.3 **ICE** – Ice Machine

.1 Manufacturer: Brema, or approved equivalent.
.2 Product: CB 249.
.3 Quantity: As indicated on drawings.

2.3 DISHWASHERS

.1 **DW** - Dishwasher

.1 Manufacturer: Hobart, or approved equivalent.
.2 Product: LXeR Advansys Undercounter Commercial Dishwasher.
.3 Quantity: As indicated on drawings.

Part 3 Execution

3.1 INSTALLATION

.1 Install in accordance with manufacturer's instructions, approved submittals, in proper relationship with adjacent construction and as detailed on the Drawings.

.2 Coordinate and connect all related mechanical and electrical connections to make equipment operational and usable for their manufactured and designed intent.

.3 Test for operation and adjust until satisfactory results are obtained.

3.1 CLEANING AND PROTECTION

.1 Clean products in accordance with the manufacturer's recommendations.

.2 Touch-up, repair or replace damaged products before Substantial Performance.

END OF SECTION

Electrical Specifications

for

Oakridge Community Centre Teaching Kitchen Upgrade
63 Pharmacy Avenue
Toronto, Ontario

HCC PROJECT #20016

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 Tender
November 18, 2020

INSTRUCTIONS TO BIDDERS

1. Refer to Instructions prepared by City of Toronto and Laptiste Architecture.

2. The Contractor shall thoroughly review and comply with the landlord's Safety Guidelines and construction practices in addition to legislative construction practices.

3. The Contractor shall thoroughly review and comply with the General Contractor's Safety Guidelines and construction practices in addition to legislative construction practices.

6. Electrical Service Work Prequalification
    1. The following items have been prequalified by City of Toronto and will be assigned to the electrical contractor:

        - Schneider Electric Work Scope of Work as detailed in the quote included with these specifications.

    2. The successful electrical contractor's lump sum price shall include the requirement to issue a purchase order to Schneider for $7,250.00 plus taxes for the supply of the prequalified electrical service work as detailed in the quote included with these specifications.

    3. The service work noted above is for work specifically quantified in the quote. All other electrical systems scopes of work shown on the drawings and detailed in the specifications shall be included as part of the base bid price over and above the attached Schneider Electric Quote amount.

End of Instructions to Bidders Section

SUPPLEMENTARY TENDER FORM

PROJECT: Oakridge Community Centre Teaching Kitchen Upgrade
63 Pharmacy Avenue, Toronto

REFERENCE NO: Tender No. T-20016

Submitted By: _____

Of: _____
(Address)

_____
(Telephone)

Date: _____

1. Having carefully examined the:

Tender Documents including the Project Description, Terms and Conditions, Instructions to Bidders, Drawings, Schedules and Specifications for the supply and installation of the Electrical System for Oakridge Community Centre and the Amendments numbered ___ to ___ in accordance with the Specifications and Drawings, and having visited and investigated the site and examined all conditions affecting the work, the undersigned offers, if notified in writing of the acceptance of the Tender within ninety (90) days of the time set for the delivery of the Tenders, to furnish all plant, equipment, labour and material and perform all duties and services required, excluding all harmonized services taxes, for the lump sum price of:

_____ dollars ($_____).

Amount of H.S.T. Tax excluded from the
lump sum Tender Price stated above is_____

2. PRICE SCHEDULE AND VALUATION OF CHANGES

.1 We will submit, for approval, a complete breakdown of labour and material costs for all changes.

.2 The man hour labour units for changes are to be based on labour units from column 1 of the NECA Manual of Labour Units.

.3 Total mark-up including overhead and profit on the **material** shall be limited to 10%.

.4 Unit hourly composite cost to be used on all changes for labour, as required. The unit hourly composite cost shall contain all provincial taxes, overhead (i.e.: supervision, financing, estimating, project management, CADD, administration, parking, mileage, clean up, safety, truck fees, ESA fees, etc.), **profit** and associated costs for the work involved, excluding H.S.T. Unit hourly composite cost to remain in effect throughout the duration of this project.

1. Provide unit hourly composite cost for an electrician/technician to be on site during the times listed below:

Regular Time (7:00 am to 4:00 pm) $_____

Premium Time (Evenings/Weekends) $_____

SECTION 26 05 00: GENERAL CONDITIONS.

1.1 Project Description:

1. The project encompasses the 63 Pharmacy Avenue, 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, lighting, lighting control, fire alarm system 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 30 (thirty) day period, all burned-out fluorescent and HID lamps for a period of 90 (ninety) 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 City of Toronto.
    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, CSA, 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 for laying 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 ft.) 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 break down 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 sticks.
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 2020 CD 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 contractor must include as part of the base bid price $450.00 to have HCC Engineering supply the AutoCAD Version 2020 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, E-1.2, E-1.3, E-2.0, E-2.1, E-3.1, E-5.1, E-6.1 and E-7.1 denoted as 'Issued For Tender November 20, 2020.'

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-up's, 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 National Building Code, Canadian Electrical Safety Code, CSA, U.L.C., N.F.P.A, O.S.H.A. 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 ft) 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 UC.
        - At studs and bus bars - Burndy QQA (CU / AL).
        - Two or three conductors in parallel - Burndy Q2A or Q3Q (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, 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 (90degC ampacity).
    4. Home runs in excess of 25 m (75 ft.) 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 deg. 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 ft.) 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, AFCR's, 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 ft) of conduit run between boxes, and after every 2 (two) 90 deg. 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:

2. Bushing and connectors shall be with nylon insulated throats.
3. Provide knock-out fillers to prevent entry of foreign materials.
4. Use conduit outlet bodies for conduit up to and including 32 mm (1-1/4”) and pull boxes for larger conduits.
5. 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 1/10th 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 2 (two), 90 deg. bends, or equivalent up to 180 deg., will be permitted without installation of a pull box. Radius of bends must be no less than 10 (ten) 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 ft.) 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 ft.) spacing.
2. Install expansion fittings perpendicular to expansion joint.
3. Refer to structural drawings for location of expansion joints.

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 ‘Decora’ style switches shall be used for 120V circuits, in all finished areas.
5. White ‘Decora’ 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 fluorescent 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 51 00: INTERIOR LIGHTING.

PART I - GENERAL

1.1 SUMMARY

1. Section Includes:

    1. Interior lighting fixtures, lamps, ballasts, LEDs and drivers.
    2. Emergency lighting units.
    3. Exit signs.
    4. Lighting fixture supports.
    5. Retrofit kits for fluorescent lighting fixtures.

2. Related Sections:

    1. Section 26 09 23 "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.

1.2 REFERENCES

1. ANSI/NFPA 70, National Electrical Code

2. IESNA LM-79, Electrical and Photometric Measurements of Solid-State Lighting Products

3. IESNA LM-80, Approved Method for Measuring Lumen Maintenance of LED Light Sources

4. IESNA TM-21, Luminaire Classification System for Indoor Luminaires

5. UL1598, Standard for Safety of Luminaires

1.3 ACTION SUBMITTALS

1. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, and finishes.

2. Shop Drawings: Show details of nonstandard or custom lighting fixtures. Indicate dimensions, weights, methods of field assembly, components, features, and accessories. Product Certificates: For each type of ballast for bi-level and dimmer-controlled fixtures, from manufacturer.

1.4 INFORMATIONAL SUBMITTALS

1. Field quality-control reports.

1.5 QUALITY ASSURANCE

1. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2. Comply with NFPA 70.

3. Luminaires shall be fully assembled and individually electrically tested prior to shipment.

4. Manufacturers of LED luminaires shall demonstrate a suitable testing program to ensure system reliability and to substantiate lifetime claims.

5. The sole use of IESNA LM-80 data to predict luminaire lifetime is not acceptable.

6. At time of manufacture, electrical and light technical properties shall be recorded for each luminaire. At a minimum, this should include lumen output, CCT, and CRI. Each luminaire shall utilize a unique serial numbering scheme. Technical properties must be made available for a minimum of 5 years after the date of manufacture.

7. Luminaires shall be provided with a minimum 5 year warranty covering, LEDs, drivers and paint finish.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, product(s) indicated on Drawings.

2. LED, fluorescent and HID lamps shall be of 1 (one) manufacturer, either in total, or in groups defined by lamp type.

3. Drivers / ballast and lamps provided under this contract must be an approved combination by both respective manufacturers

2.2 GENERAL REQUIREMENTS FOR LIGHTING FIXTURES AND COMPONENTS

1. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.

2. Incandescent Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5A.

3. Fluorescent Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5 and NEMA LE 5A as applicable.

4. HID Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5B.

5. Metal Parts: Free of burrs and sharp corners and edges.

6. Sheet Metal Components: Steel unless otherwise indicated. Form and support to prevent warping and sagging.

7. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

8. Diffusers and Globes:

    1. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
        a. Lens Thickness: At least [0.125 inch (3.175 mm)] minimum unless otherwise indicated.
        b. UV stabilized.
    2. Glass: Annealed crystal glass unless otherwise indicated.

9. Fixture Bodies:
    1. Lighting fixture bodies shall be of minimum 20 gauge cold rolled prime steel of rigid construction with knockouts as required.
    2. Fixtures shall be finished in baked white enamel with exposed surfaces matching the exposed t-bar ceiling specified in other sections and shall resist chipping, corrosion, and discolouration. Before finishing, all metal shall be chemically degreased and neutralized. Finish shall not be less than two coats of enamel, sprayed and baked on. Reflecting surfaces shall be white with an average reflectance of not less than 85%.

2.3 BALLASTS FOR LINEAR FLUORESCENT LAMPS

1. General Requirements for Electronic Ballasts:

    1. Comply with UL 935 and with ANSI C82.11.
    2. Designed for type and quantity of lamps served.
    3. Ballasts shall be designed for full light output unless another BF, dimmer, or bi-level control is indicated.
    4. Sound Rating: Class
    5. Total Harmonic Distortion Rating: Less than 10 percent.
    6. Transient Voltage Protection: IEEE C62.41.1 and IEEE C62.41.2, Category A or better.
    7. Power Factor: 0.95 or higher.

2. Luminaires controlled by occupancy sensors shall have programmed-start ballasts.

3. Electromagnetic Ballasts: Comply with ANSI C82.1; energy saving, high-power factor, Class P, and having automatic-reset thermal protection.

    1. Ballast Manufacturer Certification: Indicated by label.

4. Single Ballasts for Multiple Lighting Fixtures: Factory wired with ballast arrangements and bundled extension wiring to suit final installation conditions without modification or rewiring in the field.

2.4 BALLASTS FOR COMPACT FLUORESCENT LAMPS

1. Description: Electronic-programmed rapid-start type, complying with UL 935 and with ANSI C 82.11, designed for type and quantity of lamps indicated. Ballast shall be designed for full light output unless dimmer or bi-level control is indicated:

    1. Lamp end-of-life detection and shutdown circuit.
    2. Automatic lamp starting after lamp replacement.
    3. Sound Rating: Class A.
    4. Total Harmonic Distortion Rating: Less than 20 percent.
    5. Transient Voltage Protection: IEEE C62.41.1 and IEEE C62.41.2, Category A or better.
    6. Operating Frequency: 20 kHz or higher.
    7. Lamp Current Crest Factor: 1.7 or less.
    8. BF: 0.95 or higher unless otherwise indicated.
    9. Power Factor: 0.95or higher.
    10. Interference: Comply with 47 CFR 18, Ch. 1, Subpart C, for limitations on electromagnetic and radio-frequency interference for non-consumer equipment.

2.5 BALLASTS FOR HID LAMPS

1. Electromagnetic Ballast for Metal-Halide Lamps: Comply with ANSI C82.4 and UL 1029. Include the following features unless otherwise indicated:

    1. Ballast Circuit: Constant-wattage autotransformer or regulating high-power-factor type.
    2. Minimum Starting Temperature: Minus 30˚C (Minus 22˚F) for single-lamp ballasts.
    3. Rated Ambient Operating Temperature: 40˚C (104˚F).
    4. Open-circuit operation that will not reduce average life.
    5. Low-Noise Ballasts: Manufacturers' standard epoxy-encapsulated models designed to minimize audible fixture noise.

2.6 DRIVERS FOR LED FIXTURES

1. Electronic Driver for LED Fixtures: Comply with UL 1310 Class 2 requirements for dry and damp locations. EMI compliance with FCC Part 15 Class A. Include the following features unless otherwise indicated:

    1. Rated for 50,000 hours of life, unless otherwise noted.
    2. Type: Constant current
    3. Sound Rating: Class A.
    4. Total Harmonic Distortion Rating: 20 percent or less.
    5. Power factor at full load: >0.90
    6. Efficiency at full load: >85%
    7. Input Voltage: 120V - 277V (+/- 10%)
    8. Frequency Range: 50 – 60 Hz (+/- 10%)
    9. Transient Protection: NEMA SSL – 2010, Non-Roadway 2.5KV
    10. Over voltage and load protection: Yes, non-latching
    11. Ambient Operating Temperature: -30˚C to 50˚C
    12. Dimming Control: DALI
    13. Dimming Range: 10% - 100%
    14. Source/Sink Current: 1mA max.

2.7 EXIT SIGNS

1. General Requirements for Exit Signs: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.

2. Internally Lighted Signs:

    1. Lamps for AC Operation: Fluorescent, two for each fixture, 20,000 hours of rated lamp life.
    2. Lamps for AC Operation: LEDs, 50,000 hours minimum rated lamp life.
    3. Self-Powered Exit Signs (Battery Type): Integral automatic charger in a self-contained power pack.

        a. Battery: Sealed, maintenance-free, nickel-cadmium type.
        b. Charger: Fully automatic, solid-state type with sealed transfer relay.
        c. Operation: Relay automatically energizes lamp from battery when circuit voltage drops to 80 percent of nominal voltage or below. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
        d. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
        e. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

2.8 EMERGENCY LIGHTING UNITS

1. General Requirements for Emergency Lighting Units: Self-contained units complying with UL 924.

    1. Battery: Sealed, maintenance-free, lead-acid type.
    2. Charger: Fully automatic, solid-state type with sealed transfer relay.
    3. Operation: Relay automatically turns lamp on when power-supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
    4. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
    5. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
    6. Wire Guard: Heavy-chrome-plated wire guard protects lamp heads or fixtures.
    7. Integral Time-Delay Relay: Holds unit on for fixed interval of 15 minutes when power is restored after an outage.

2.9 FLUORESCENT LAMPS

1. T8 rapid-start lamps, rated 32 W maximum, nominal length of 48 inches (1220 mm), 2800 initial lumens (minimum), CRI 85 (minimum), color temperature 4000K, and average rated life 40,000 hours unless otherwise indicated.

2. T8 rapid-start lamps, rated 17 W maximum, nominal length of 24 inches (610 mm), 1300 initial lumens (minimum), CRI 85 (minimum), color temperature 4000K, and average rated life of 40,000 hours unless otherwise indicated.

3. Compact Fluorescent Lamps: 4-Pin, CRI 85 (minimum), color temperature 4000K, average rated life of 12,000 hours at three hours operation per start, and suitable for use with dimming ballasts] unless otherwise indicated.

    1. 13 W: T4, double or triple tube, rated 900 initial lumens (minimum).
    2. 18 W: T4, double or triple tube, rated 1200 initial lumens (minimum).
    3. 26 W: T4, double or triple tube, rated 1800 initial lumens (minimum).
    4. 32 W: T4, triple tube, rated 2400 initial lumens (minimum).
    5. 42 W: T4, triple tube, rated 3200 initial lumens (minimum).
    6. 57 W: T4, triple tube, rated 4300 initial lumens (minimum).
    7. 70 W: T4, triple tube, rated 5200 initial lumens (minimum).

2.10 HID LAMPS

1. High-Pressure Sodium Lamps: ANSI C78.42, CRI 21 (minimum), color temperature 1900 K, and average rated life of 24,000 hours, minimum.

2. Metal-Halide Lamps: ANSI C78.43, with minimum CRI 70, and color temperature 4000 K.

3. Pulse-Start, Metal-Halide Lamps: Minimum CRI 70, and color temperature 4000 K.

2.11 LED FIXTURES

1. Except as otherwise indicated, provide LED luminaires, of types and sizes indicated on fixture schedules.

2. Include the following features unless otherwise indicated:
    1. Each Luminaire shall consist of an assembly that utilizes edge-lit LEDs as the light source. In addition, a complete luminaire shall consist of a housing, LED array, and electronic driver (power supply).
    2. Luminaire optics shall consist of precision formed optical assembly with positively retained high grade acrylic lenses using laser precise micro-prism patterns to provide directional distribution
    3. Each luminaire shall be rated for a minimum operational life of 100,000 hours utilizing a maximum ambient temperature of (25°C).
    4. Light Emitting Diodes tested under LM-80 Standards for a minimum of 10,000 hours.
    5. Color Rendering Index (CRI) of 85 at a minimum.
    6. Color temperature 4000K, unless otherwise indicated.
    7. Rated lumen maintenance greater than 92% lumen output for 100,000 hours and theoretical L70 hours greater than 448,000 for recessed LED troffers.
    8. Fixture efficacy of 115 Lumens/Watt, minimum
    9. Fixture depth shall be no greater than 3.25”
    10. 5 year luminaire warranty, minimum.
    11. Photometry must comply with IESNA LM-79.
    12. Luminaries shall be Design Lights Consortium Premium Qualified
    13. The individual LEDs shall be constructed such that a catastrophic loss of the failure of one LED will not result in the loss of the entire luminaire.

14. Luminaire shall be constructed such that driver may be replaced or repaired without the replacement of the whole fixture.

3. Technical Requirements

    1. The luminaire shall not consume power in the off state.
    2. Operation Voltage: The luminaire shall operate from a 50 HZ to 60 HZ AC line over a voltage ranging from 120 VAC to 277 VAC. The fluctuations of line voltage shall have no visible effect on the luminous output.
    3. Power Factor: The luminaire shall have a power factor of 0.9 or greater.
    4. THD: Total harmonic distortion (current and voltage) induced into an AC power line by a luminaire shall not exceed 20 percent.
    5. Operational Performance: The LED circuitry shall prevent visible flicker to the unaided eye over the voltage range specified above.

4. Thermal Management

    1. The thermal management (of the heat generated by the LEDs) shall be of sufficient capacity to assure proper operation of the luminaire over the expected useful life.
    2. The LED manufacturer's maximum thermal pad temperature for the expected life shall not be exceeded.
    3. Thermal management shall be passive by design. The use of fans or other mechanical devices shall not be allowed.
    4. The luminaire shall have a minimum heat sink surface such that LED manufacturer's maximum junction temperature is not exceeded at maximum rated ambient temperature.

2.12 LIGHTING FIXTURE SUPPORT COMPONENTS

1. Comply with Section 260529 "Hangers and Supports for Electrical Systems" for channel- and angle-iron supports and nonmetallic channel and angle supports.

2. Single-Stem Hangers: 1/2-inch (13-mm) steel tubing with swivel ball fittings and ceiling canopy. Finish same as fixture.

3. Twin-Stem Hangers: Two, 1/2-inch (13-mm) steel tubes with single canopy designed to mount a single fixture. Finish same as fixture.

4. Rod Hangers: 3/16-inch (5-mm) minimum diameter, cadmium-plated, threaded steel rod.

5. Hook Hangers: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.

2.13 RETROFIT KITS FOR FLUORESCENT LIGHTING FIXTURES

1. Ballast and Lamp Change Kit: UL 1598, Type II. Suitable for changing existing ballast, lamps, and sockets.

PART 3 - EXECUTION

3.1 INSTALLATION

1. Lighting fixtures: Set level, plumb, and square with ceilings and walls. Install lamps in each fixture.

2. Lamp and Driver / Ballast Installation:

    1. Refer to luminaire schedule and drawings, for lamp and driver / 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. 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.

4. Luminaire Support:

    1. All fixtures in finished ceilings must be chained by 2 points directly to main structure such that they are supported independently of the 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.

5. 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.

3.2 FIELD QUALITY CONTROL

1. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.

2. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

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 conduit.
- Use minimum 25 mm (1") high letters.
- The identification shall describe system voltage and service, i.e., "120 / 208 volt 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 120/208 v, 3 phase, 4 W MAINS 225 AMP 18KA RMS. Supplied from Panel BB".
    2. Disconnect switches and starters - Plates to be mounted externally on switch cover. Typical identification: "Fan S4, 208 v, 3 phase".
    3. Transformers - Plates to be mounted externally on case. Typical identification: "Transformer TR-UPSA 225 KVA/416/120/208 v, 3 PH / 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. Power and Lighting Conductors:

    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).

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. 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 Z462-15) 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.

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 00.02: 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
1	Fire Alarm System Bell
1	Fire Alarm System Strobe Light

End of Section

November 11, 2020 **Quote: CSL-126109**

Attention: Tina Rosales

HCC Engineering Ltd.,
40 Eglinton Ave E, Toronto,
ON M4P 3A2

Ref: **Oakridge Teaching Kitchen, 63 Pharmacy Avenue, Toronto ON**

Dear Tina:

With reference to the recent inquiry we are pleased to submit the below quotation for proposed breaker retrofit work:

ITEM	DESCRIPTION / SCOPE OF WORK	PRICE
1	**Site location:** Oakridge Teaching Kitchen 63 Pharmacy Avenue, Toronto ON **Scope:** Supply and install in existing FPE Panel: a) QTY-1 PowerPact J-frame breaker , 200A, thermal-Magnetic, JLL36200; Breaker kAIC is 50kA@600Vac. b) Qty- 1 CDP connector kit. - JDCMH c) Custom trims/covers.	**$7,250.00 (+HST)**

NOTES:
1. Terms and conditions of sale attached.
2. Where a shutdown is required, the cost and arrangement is the responsibility of the purchaser.
3. Price is based on work being performed during OFF Hours OVERTIME, excluding Sundays and statutory holidays.
4. All Back-up and Temporary Power shall be provided by Bidding Contractor and is not part of this offer.
5. All associated Temp-Panels, Cables etc., if required, shall be by others.
6. Allow 3 – 4 weeks from approvals, for delivery of parts.
7. A 3 - 4 Hour shutdown to be anticipated to compete the retrofit work.

Please feel free to contact us should you require anything further.

Thanks,

MOHAMED QISHAWI P.Eng
Solution Sales Representative
Cell: 905-966-2661
Email: mohamed.qishawi@se.com

CANADA
Integrated Conditions of Sale

1. Contract Terms

The purchaser, being the legal entity (“Purchaser”) procuring or obtaining goods (“Goods”) and/or services (“Services”) sold or provided by Schneider Electric Canada Inc. ("SE"), agrees to be bound by these Schneider Electric Canada Integrated Conditions of Sale (“Conditions of Sale”) unless SE and Purchaser have otherwise agreed by master agreement or other valid agreement. Any variation from these Conditions of Sale require the signed consent of an authorized SE representative.

2. Prices

Prices quoted are in Canadian dollars (CAD) and are valid for a period of 60 days. Any Goods and/or Services ordered must be scheduled for completion within 210 days of quote expiry. All quotations are based on standard SE packaging. SE reserves the right to vary pricing upon notice or to correct any pricing due to clerical or administrative incorrectness. Services Assumptions: SE’s work estimates are based on work performed during normal work hours (8 hours) between the hours of 06:00 and 18:00 local time, Monday to Friday, holidays excepted. Unless specified in writing the following are chargeable in addition to base rates: overtime or premium hours, travel costs, specialized tools and test goods, utility shutdowns, any delays or site issues not caused by SE, additional trips for postponement or delay. No on-site orientation, safety training, work required for site specific requirements is included in a quote unless expressly specified by SE. Current rates are in SE’s then current SE Field Services Demand Labour Rates document. Field specialists bill a 4-hour minimum charge for travel where Services are performed in less than 4 hours, and an 8-hour minimum charge for Services otherwise.

3. Taxes

Unless otherwise stated, prices do not include taxes, duties or any other governmental levies all of which are payable by Purchaser. Any changes in foreign exchange rates, sales taxes, customs tariffs or other taxes shall be chargeable to the Purchaser.

4. Terms of payment

Terms are net 30 days from date of invoice. Late payments will be subject to interest charges at the rate of two percent (2%) per month. Invoices for pro-rata payments become due on the date of shipment. If at Purchaser’s request, shipments are delayed beyond the scheduled date, payments for the Goods or Services completed to date will be invoiced to the Purchaser, as a percentage of the total Purchase Order price when SE was originally prepared to ship. Goods held for the Purchaser shall be at the risk and expense of the Purchaser. If completion of Services is delayed more than 30 days after originally scheduled delivery date and not caused solely by SE, SE reserves the right to ship all Goods to the Purchaser who will accept responsibility for Goods including payment. Failure to pay any applicable instalment on its due date shall automatically cause all installment amounts to become payable and in addition to SE’s other lawful remedies, SE reserves the right to suspend or cancel the PO. If Purchaser fails to pay SE for the Goods or Services, SE reserves the right to file liens, charges, security interests, or similar encumbrances against the applicable property, building, land, or Goods or Services and Purchaser consents to such filings and registrations.

5. Delivery and Schedule

Dates for delivery, schedule, or execution for Services or Goods set out on a PO are subject to confirmation by SE and until such confirmation may change solely based on SE’s circumstances. All confirmed dates are based on the prompt receipt by SE of all required information enabling achievement of such dates and SE reserves the right to change such dates in the event additional information is necessary or other information was not provided.

6. Risk of loss

Unless otherwise specifically agreed in the Purchase Order, the Goods are delivered Ex Works (Incoterm 2010) and the risk of loss or damage shall pass to the Purchaser upon collection of the Goods by the first carrier at SE’s premises, plants or warehouses. Delivery of Goods by SE will be deemed to be made to the Purchaser upon obtaining a signed receipt from the carrier showing receipt of the Goods in good order. Title passes on full payment.

7. Substitutions

SE may furnish suitable substitutes for Goods unobtainable because of priorities or regulations established by governmental authority or non-availability of materials from suppliers, provided such substitutions do not adversely affect the technical soundness of the Goods. SE assumes no liability for deviation from published dimensions and descriptive information not essential to proper performance of the Goods.

8. Shortage

Claims for shortages or errors must be submitted to SE within 30 days after invoice date, and failure to give such notice shall constitute unqualified acceptance and a waiver of all such claims by the Purchaser.

9. Instalments

SE reserves the right to make shipments in instalments, unless otherwise expressly stipulated in a specific PO; and all such instalments when separately invoiced shall be paid for when due per invoice without regard to subsequent

shipments. Delay in shipment of any installment shall not relieve Purchaser of its obligation to accept remaining shipments.

10. Force Majeure

SE will be excused from and not be liable for any non-performance of a PO if such delay or non-performance is due to any cause beyond the reasonable control of SE, or which SE could not reasonably foresee or reasonably provide against, and which prevents SE from carrying out the terms of the PO. This includes but is not limited to the following: war, revolution, insurrection or hostilities (whether declared or not), riot, economic upheaval, civil commotion or uprising, flood, earthquake, tempest, hurricane, lightning or other natural disaster; fire or explosion; strike, lockout or other industrial disturbance whether at SE or one of its suppliers; sabotage, accident, embargo, car shortage, wrecks or delays in transportation, non-delivery of materials or order or action of government authority. Any delay resulting from such cause shall extend the date of delivery accordingly. SE reserves the right to cancel a PO, if in its opinion such circumstances threaten or cause extended delay in the performance thereof.

11. Standard Warranty

SE warrants:

(a) Goods manufactured by SE under its own brands and supplied by SE as part of the PO, if any, against defects in material and workmanship of those Goods arising under normal use for a period of 12 months from the date of commissioning or 18 months from the date of shipment from SE, whichever occurs first.

(b) Services performed by SE's personnel as part of the PO, if any, will be performed by qualified personnel with care, skill and diligence, in accordance with the applicable generally accepted standards recognized by the industry for a period of 12 months from the date of invoice.

Exclusive Warranty Remedies: In the event of any warranty covered defects or deficiencies in Goods in subsections (a) above, or Services in subs. (b) above, the sole and exclusive obligation of SE shall be to re-perform the Services, or repair or replace the defective Goods or part of the Goods, at SE's sole discretion. Such warranty coverage is contingent on Purchaser providing prompt notification to SE once such defect or deficiency is reasonably apparent to Purchaser.

Exclusions & Limitations: This warranty shall not apply (a) to Goods not manufactured by SE, (b) Services not provided directly by SE, (c) to Goods or Services that has been repaired or altered by anyone other than SE so as, in SE's judgment, affects the same adversely, or (d) to Goods or Services that appear to be subjected to negligence, accident, or damage by circumstances beyond SE's control, or improper any non-SE operation, maintenance or storage, or to other than normal use or service. The foregoing warranties do not cover reimbursement for labor, transportation, removal, installation, temporary power, or any other expenses that may be incurred in connection with repair or replacement. These warranties, conditions, and exclusions are exclusive and in lieu of all other express or implied warranties, conditions, representations and guarantees (except warranties of title), including, but not limited, to implied warranties of merchantability, merchantable quality, and fitness for a particular purpose. Except, as may be provided in writing by SE, SE shall not be subject to any other obligations or liabilities whatsoever, other that as stated above with respects of Services rendered and Goods sold by SE.

Non-SE Goods or Services: With respect to Goods not manufactured by SE, or Services provided by non-SE providers, the warranty obligations of SE shall in all respects conform and be limited to the warranty actually extended to SE by such non-SE supplier.

12. Optional Warranties (only available on Goods / Services - located or provided in Canada) - If bought from SE by the Purchaser at SE's then current rates or SE otherwise agrees to provide these optional warranties (collectively "Purchased"):

Option 1 – Extended Warranty: up to 3 years from shipment. The standard warranty is extended for that period of time Purchased, such time not to exceed 3 years from the date of shipment from SE of the Goods.

Option 2- Special Warranty: Additional scope of coverage. The standard warranty scope of coverage is extended when Purchased, to cover reimbursement of the direct costs of a) Removal of non-conforming Goods or part thereof; b) Transporting Goods or parts to and from the place of repair; c) Offloading of truck and reinstallation at the original site. Such special warranty, which may be chosen to cover a period not exceeding that of the Standard warranty or extended warranty (see above) selected, will not include the cost of providing temporary power or removing or replacing other apparatus or structures, or costs of transportation beyond a common carrier free delivery point in Canada.

Option 3- Extended Warranty: Preventative maintenance agreement. A preventive maintenance agreement where Purchased to provide scheduled and/or priority maintenance on Goods. Terms of coverage and duration are set out in the preventive maintenance agreement that is Purchased.

Option 4- Extended Warranty: Field Services. If the invoice for the Purchaser includes "Schneider Electric Commissioning Services", SE warrants the Goods (excluding software) or Services included in the invoice, if any, supplied of its own manufacture or serviced by SE against defects in material or workmanship arising under normal use and service for an additional period of 12 months, which shall extend the standard warranty or any additional warranties bought by the Purchaser.

13. Return of Goods

No Goods may be returned without first obtaining SE's written permission and a returned material identification tag. Returned Goods must be of current manufacture, in the original packaging, unused, undamaged and in saleable condition. Returned Goods must be securely packed to reach SE without damage and labeled with the return authorization number. For any returns, SE will be pay the carrier and deduct the freight charges from the credit unless if returns result from SE error, freight charges will be paid by SE. Any cost incurred by SE to put Goods in first class condition will be charged to the Purchaser. Returns must originate from the original Purchaser account number. Returns will be credited at the original price paid as indicated on the invoice or Purchase Order associated to the Goods being returned as provided by the Purchaser. If no invoice number or Purchase Order number is provided, then credit will be issued based on the into stock price in effect 12 months prior to date of return authorization and will also have an additional 25% processing fee applied. SE Goods, which are listed in the current product list as returnable and which are accepted for credit, not involving a SE error, shall be assessed a restocking fee of 25% of the invoice price.

14. Intellectual Property

SE retains ownership of all right, title and interest (including copyright and patent rights) in and to the intellectual property relating to Goods and Services and work product relating to these. Nothing in these Conditions of Sale constitutes a transfer or conveyance of any right, title or interest in such intellectual property, including without limitation any software or firmware contained in those, except the limited right to use it as provided in the documentation. As to Goods proposed and furnished by SE, SE shall defend any suit or proceeding brought against Purchaser so far as based on a claim that such Goods constitutes an infringement of any copyright, trademark or patent in Canada. This obligation shall be effective only if Purchaser shall have made all payments then due hereunder and if SE is notified promptly in writing and given authority, information, and assistance at SE's expense for the defense of the same. In the event the use of such Goods by Purchaser is enjoined in such a suit, SE shall, at its expense, and at its sole option, either (a) procure for the Purchaser the right to continue using such Goods (b) modify such Goods to render it non-infringing, or (c) replace such Goods with non-infringing Goods. SE will not be responsible for any compromise or settlement made without its written consent. The foregoing states the entire liability of SE for patent, trademark or copyright infringement, and in no event shall SE be liable if any infringement charge is based on the use of SE Goods for a purpose other than that for which it was sold by SE. As to any Goods or Services furnished by SE to Purchaser and manufactured or provided in accordance with designs proposed by Purchaser, the Purchaser shall indemnify SE against any award made against SE for patent, trademark, or copyright infringements.

15. Software

Any software or computer information, in whatever form that is provided with Goods manufactured by SE or as part of Services, is licensed to Purchaser solely pursuant to standard licenses of SE or its supplier of such software or computer information which licenses are hereby incorporated by reference. SE does not warrant that such software or computer information will operate error free or without interruption, and warrants only that during the warranty period applicable to the Goods that the software will perform its essential functions. If such software or computer information fails to conform to such warranty, SE will, at its option, provide an update to correct the non- conformance or replace the software or computer information with the latest available version containing a correction. SE shall have no other obligation to provide updates or revisions.

16. LIMIT AND EXCLUSION OF LIABILITY

SE SHALL NOT BE LIABLE, WHETHER IN CONTRACT, TORT, OR OTHER LEGAL THEORY (INCLUDING WITHOUT LIMITATION NEGLIGENCE OR STRICT LIABILITY) OR OTHERWISE FOR ANY LIABILITY RELATING TO THE SERVICES OR GOODS SUPPLIED BY SE FOR ANY AMOUNT, WHICH IN AGGREGATE, EXCEEDS THE PURCHASE PRICE FOR THOSE SERVICES AND GOODS. PURCHASER FURTHER AGREES TO EXCLUDE, AND SE SHALL NOT BE LIABLE FOR, ANY SPECIAL, INDIRECT, CONSEQUENTIAL, OR PUNITIVE LOSS RELATING TO THE SERVICES OR GOODS SUPPLIED (INCLUDING WITHOUT LIMITATION LOSS OF PROFIT OR REVENUE, LOSS OF DATA, OR LOSS OF USE) HOWEVER CAUSED NON-DELIVERY OR THROUGH DEFECTS IN MATERIALS OR WORKMANSHIP OR FROM ANY OTHER CAUSE WHATSOEVER.

17. Insurance

SE shall obtain and maintain all appropriate insurance coverage (including, without limitation, commercial general liability, worker's compensation, auto, errors and omissions, professional liability insurance) and for such amounts in accordance with SE's industry practice. Certificate of insurance evidencing this may be provided on request.

18. Import and Export

Purchaser agrees that all Goods and Services require proper compliance with import and export laws and administrative requirements including the payment of all associated duties, taxes and fees.

19. Health and Safety Compliance

SE employees shall not perform Services that, in their sole opinion, is not free of reasonably foreseeable harm. This includes working on any equipment, whether provided by SE, Purchaser or otherwise, that in such SE employees' sole opinion has not been placed in an electrically safe working condition. Purchaser warrants that site and working

conditions shall meet or exceed those specified by applicable Occupational Health and Safety Act and Regulations. Purchaser shall inform SE of: (a) Known hazards, or reasonably foreseeable hazards, that are related to SE's scope of Services and the site where the Services will be performed; and (b) Information about the worksite necessary to identify hazards and assess risk for the protection of the health and safety of SE personnel. This information might include, but is not limited to: (i) Providing an accurate up-to-date single line diagram of the electrical distribution system; (ii) Providing relevant Workplace Hazardous Materials Information System (WHMIS) information such as Material Safety Data Sheets (MSDS) and floor plans indicating areas where hazardous materials are located and emergency exits for service rooms and other areas of operation; and (iii) Other site specific information relative to the Purchaser's operation, process and safety systems. Any hazardous materials requiring remediation in SE's sole opinion will be separately chargeable to Purchaser and will be a condition precedent to SE's performance of such Services.

20. Witness of Tests & Factory Inspections

Normal production schedules do not provide the opportunity for Purchaser to witness routine factory tests on Goods or make factory inspections. Witnessing of tests or factory inspections by the Purchaser may result in delays of production for which SE will not be responsible and which may result in additional charges and delayed scheduling to Purchaser. Witness testing and factory inspections must be requested at time of quotation, are subject to additional costs and must be confirmed at Purchase Order entry. Standard SE factory testing and inspection will apply. SE will notify Purchaser fourteen (14) calendar days prior to scheduled witness testing or inspection. In the event Purchaser is unable to attend, the Parties may mutually agree on a rescheduled date. However, SE, at its sole option, may consider the witness tests and/or inspection waived, and ship and invoice the Goods and the witness testing charges. Purchaser will be responsible for paying for all scheduled witness testing, whether or not Purchaser attends.

21. Patterns and Tools

Notice will be given if special patterns or tools are required to complete any Purchase Order. Charges for such patterns or tools do not convey title thereto or the right to remove them from SE's plant. If patterns or tools are not used for a period of two years, SE shall have the right to scrap them without notice.

22. Nuclear Applications

Unless otherwise agreed in writing by a duly authorized representative of SE, Goods sold hereunder are not intended for use in or in connection with any nuclear facility or activity. If so used, SE disclaims all liability for any damage, injury or contamination; and Purchaser agrees and indemnifies SE against any such liability, whether arising as a result of breach of contract, warranty or tort (including negligence) or otherwise.

23. Nature of Relationship

Purchaser agrees that SE is an independent contractor and nothing in these Conditions of Sales creates between SE and Purchaser a relationship of partners, joint venturers, or agents of each other, and no Party may so represent itself any of these manners.

24. Termination

Any PO may be terminated by the Purchaser only upon notice to SE and upon payment of reasonable and proper termination charges based on the price of the terminated PO and reimbursement of all direct costs and expenses associated with the order caused by such termination and shall include a reasonable profit. Special or custom ordered Goods is not cancelable after final acceptance of approval drawings for the commencement of manufacturing.

25. Cancellation

SE shall have the right to cancel any PO at any time by written notice for any material breach of these Conditions of Sale by the Purchaser, including material delays by Purchaser or its authorized representatives in releasing Goods for manufacture or approval drawings and excessive changes to specifications or drawings.

26. Amendments

No amendment, supplement, modification, waiver or termination of the PO or these Conditions of Sale is binding unless executed in writing by both parties.

27. Applicable Laws

All matters arising out of or relating to the execution, construction, interpretation or breach thereof, are to be governed by the provincial laws of the Province of Ontario and the federal laws of Canada applicable therein, excluding the provisions of the *United Nations Convention on Contracts for the International Sale of Goods*. SE agrees to bring any action claims or legal proceedings in any way pertaining to this Purchase Order, or the execution, construction, interpretation or breach thereof in the courts of the jurisdiction specified above and in no other court or tribunal whatsoever.

28. Langue Français / French Language

Les parties aux présentes ont demandé que les Conditions de vente soient rédigées en langue anglaise. The parties have requested that these Conditions of Sale be drawn up in the English language.

Project: OAKRIDGE COMMUNITY CENTRE KITCHEN #20016

Panelboard: RP-K
Voltage (V):
Phase/Wire:
Bus and Lugs Rating (A):

CCT NO	Load	Breaker Amp	Breaker Pole
1	CCT RELOCATED FROM PANEL K(EX)		
3	CCT RELOCATED FROM PANEL K(EX)		
5	CCT RELOCATED FROM PANEL K(EX)		
7	CCT RELOCATED FROM PANEL K(EX)		
9	CCT RELOCATED FROM PANEL K(EX)		
11	CCT RELOCATED FROM PANEL K(EX)		
13	CCT RELOCATED FROM PANEL K(EX)		
15	CCT RELOCATED FROM PANEL K(EX)		
17	CCT RELOCATED FROM PANEL K(EX)		
19	CCT RELOCATED FROM PANEL K(EX)		
21	CCT RELOCATED FROM PANEL K(EX)		
23	CCT RELOCATED FROM PANEL K(EX)		
25	CCT RELOCATED FROM PANEL K(EX)		
27	CCT RELOCATED FROM PANEL K(EX)		
29	CCT RELOCATED FROM PANEL K(EX)		
31	WALL OVEN	30	2
33			
35	COUNTER RECEPTACLE	20	1
37	COUNTER RECEPTACLE	20	1
39	COOKTOP	30	2
41			

CCT NO	Load	Breaker Amp	Breaker Pole
2	CCT RELOCATED FROM PANEL K(EX)		
4	CCT RELOCATED FROM PANEL K(EX)		
6	CCT RELOCATED FROM PANEL K(EX)		
8	CCT RELOCATED FROM PANEL K(EX)		
10	CCT RELOCATED FROM PANEL K(EX)		
12	CCT RELOCATED FROM PANEL K(EX)		
14	CCT RELOCATED FROM PANEL K(EX)		
16	CCT RELOCATED FROM PANEL K(EX)		
18	CCT RELOCATED FROM PANEL K(EX)		
20	CCT RELOCATED FROM PANEL K(EX)		
22	CCT RELOCATED FROM PANEL K(EX)		
24	CCT RELOCATED FROM PANEL K(EX)		
26	CCT RELOCATED FROM PANEL K(EX)		
28	CCT RELOCATED FROM PANEL K(EX)		
30	CCT RELOCATED FROM PANEL K(EX)		
32	ICE MAKER	15	2
34			
36	COFFEE MACHINE	20	1
38	COUNTER RECEPTACLE	20	1
40	COUNTER RECEPTACLE	20	1
42	COUNTER RECEPTACLE	20	1

Project: OAKRIDGE COMMUNITY CENTRE KITCHEN #20016

Panelboard: RP-K
Voltage (V):
Phase/Wire:
Bus and Lugs Rating (A):

CCT NO	Load	Breaker		CCT NO	Load	Breaker Amp	Breaker Pole
43	COUNTERTOP LIFTS	20	1	44	DISHWASHER	30	3
45	FIRE SUPPRESSION SYSTEM	15	1	46			
47	RANGE HOOD	15	1	48			
49	FIRE SUPPRESSION SYSTEM	15	1	50	STOVE	50	2
51	COUNTER RECEPTACLE	20	1	52			
53	COUNTER RECEPTACLE	20	1	54	MISC. RECEPTACLE	20	1
55	MICROWAVE	20	1	56	CEIILNG RECEPTACLE	20	1
57	FIRE SHUTTER	15	1	58	CEIILNG RECEPTACLE	20	1
59	DOOR OPERATOR	15	1	60	CEIILNG RECEPTACLE	20	1
61	FRIDGE	20	1	62	CEIILNG RECEPTACLE	20	1
63	FREEZER	20	1	64	CEIILNG RECEPTACLE	20	1
65	MISC. RECEPTACLE	20	1	66	CEIILNG RECEPTACLE	20	1
67	LIGHTING CIRCUIT/DC BATTERY UNIT	15	1	68	CEIILNG RECEPTACLE	20	1
69	ZONE CONTROLLER	15	1	70	CEIILNG RECEPTACLE	20	1
71				72	CEIILNG RECEPTACLE	20	1
73				74	CEIILNG RECEPTACLE	20	1
75				76			
77				78			
79				80			
81				82			
83	HOUSEKEEPING	20	1	84			

CCI GROUP
SCIENCE • ENGINEERING • SOLUTIONS
7900 KEELE STREET SUITE 200 CONCORD ON L4K 2A3

DESIGNATED SUBSTANCE SURVEY

at

Oakridge Community Centre
63 Pharmacy Avenue
Toronto, Ontario

Prepared for

City of Toronto
Parks, Forestry, and Recreation

CCI Project No: 135121

May 12, 2014

CONTENTS

EXECUTIVE SUMMARY

Material	Yes	No	Likely
Acrylonitrile		X	
Arsenic		X	
Asbestos			X
Benzene			X
Coke Oven Emissions		X	
Ethylene Oxide		X	
Isocyanates			X
Lead	X		
Mercury	X		
Silica			X
Vinyl Chloride			X
PCBs		X	
Ozone Depleting Substances	X		
Mould		X	

1.0 INTRODUCTION

In conjunction with the State-of-Good-Repair Audits, RFP 9117-13-5040, CCI Group Inc. carried out a Hazardous Materials Survey of the Oakridge Community Centre located at 63 Pharmacy Avenue, Toronto.

The purpose of the survey was to determine the presence of building materials containing certain materials referred to as Designated Substances throughout the location, prior to any scheduled renovations and/or demolition work. Designated Substances are defined as any biological, chemical, or physical agent or combination thereof prescribed as a Designated Substance to which exposure of a worker is prohibited, regulated, restricted, limited or controlled.

2.0 REGULATORY REQUIREMENTS

In Ontario, there are a total of eleven Designated Substances. These substances have been regulated under Ontario Regulation 490/09 — *Designated Substances*, made under the Ontario Health and Safety Act, which applies to controlling designated substances in the work place.

The Occupational Health and Safety Act (OHSA), R.S.O. 1990, c.0.1, s.30 (1) specifies that:

“Before beginning a project, the owner shall determine whether any Designated Substances are present at the project site and shall prepare a list of all Designated Substances that are present at the site”.

Designated Substances are defined as any biological, chemical, or physical agent or combination thereof prescribed as a Designated Substance to which exposure of a worker is prohibited, regulated, restricted, limited or controlled.

Section 30 of The Act requires that the list of Designated Substances be provided to prospective contractors and subcontractors who may do work on a site and come into contact at the site with Designated Substances.

The Ministry of Labour has designated the following substances:

Acrylonitrile	Isocyanates
Arsenic	Lead
Asbestos	Mercury
Benzene	Silica
Coke Oven Emissions	Vinyl Chloride
Ethylene Oxide	

Ontario Regulation 278/05 (O. Reg. 278/05), the Regulation respecting Asbestos on Construction Projects and in Buildings and Repair Operations, made under the Occupational Health and Safety Act (OHSA), requires owners of a building to identify Asbestos-containing Materials (ACMs) prior to potential disturbance of the materials.

In addition, an owner of a building is required to have an Asbestos Management Plan (AMP) if ACMs (friable or non-friable) are present in the building and are to remain in place. An inventory of ACMs must be kept on site. All ACMs must be routinely inspected to ensure no damage has occurred, and the inventory must be updated once in each 12-month period and as may be required based on expected changing site conditions, abatement and/or renovation activities. Removal of all asbestos containing materials is required prior to building demolition.

In addition to the Designated Substances, the building was also surveyed for the presence of other hazardous materials such as polychlorinated biphenyls (PCBs), radioactive materials, ozone depleting substances (ODSs), and mould.

We understand that this survey has been conducted to comply with the regulatory requirements of Ontario Regulation 278/05.

3.0 SURVEY METHODOLOGY

Samples may have been obtained to determine the presence of asbestos in building materials and/or lead in paint. Samples were obtained in typically inconspicuous locations so as not to reduce aesthetic qualities. Samples were not taken of materials which would damage the building envelope, such as window sealants and roof materials. When inaccessible areas were encountered during the survey (i.e. wall cavities) inferences were made based upon findings in adjacent spaces. Equipment such as motors, electrical panels, fire doors etc., were not de-energized or disassembled to examine internal components or materials. These items should be considered to contain hazardous materials until proven otherwise.

The survey included a visual assessment for the presence of asbestos, lead, mercury, other Designated Substances and Hazardous Materials. Photographs are included throughout the report.

4.0 SCOPE OF WORK

The Designated Substance survey entailed the following:

- Visual review of the building to identify materials which could contain Designated Substances,
- Recommendations for appropriate action where required.

This report details the hazardous substances found within the building, and was prepared for City of Toronto (the client). The assessment was directed on both the interior and exterior structure and finishes of the building. It does not report on possible contaminants in the soil under and surrounding the building, or contents of vessels, drums, etc. that may be concealed.

The survey was conducted on March 6, 2014. After that time, hazardous substances may have been removed from or added to the location. It is the owner's responsibility to disclose whether any hazardous substances have been added to or removed from the building.

This report should be made available to contractors tendering on any renovation or demolition work. In turn, all contractors requesting tenders from subcontractors shall furnish this report to subcontractors.

5.0 FIELD WORK AND FINDINGS

Property Description

The Survey Area consisted of a two (2) storey Community Centre with Fitness Club and Hot Tub Pool, which was constructed in 1990. The building does not include a basement. Floor finishes throughout the building include exposed poured concrete, vinyl tiles, rubber and ceramic tiles. Wall finishes include exposed and painted concrete block, ceramic tile, and painted gypsum wall board. Ceiling finishes include painted steel structure, lay-in ceiling tiles, and painted gypsum wall board. All domestic hot and cold water lines throughout the Survey Area appeared to be either uninsulated metal or PVC, or wrapped with fibreglass insulation and covered in PVC or canvas.

The following subsections detail our findings:

Asbestos

Background Information on Asbestos

Asbestos is a generic name that has been given to a group of naturally occurring fibrous minerals. In the past, asbestos was commonly used as a component in building materials such as insulation, fireproofing and acoustic or decorative panels. Although there are many types of asbestos, the three main forms of commercial importance in Ontario are chrysotile, amosite and crocidolite.

An Asbestos-Containing Material (ACM) is defined by O. Reg. 278/05 as a material that contains 0.5 % or more asbestos by dry weight. ACMs are placed into two general classes, “friable” and “non-friable” ACMs. Friable ACMs are those materials that when dry can be crumbled, pulverized and reduced to powder by hand pressure. Typical friable ACMs include acoustical or decorative texture coats, fireproofing, some ceiling tiles and thermal insulation. Non-friable ACMs are much more durable as they are held together by a binder such as cement, vinyl or asphalt. Typical non-friable ACMs include floor tiles, fire blankets, roofing materials and cementitious products such as wallboards, pipes or siding.

It has been recognized that hazardous situations may exist in buildings where asbestos-containing materials are found. This is especially true where asbestos fibres may become airborne as a result of material ageing, physical damage, and water damage or air movement.

In contrast, there is little reason for concern if the asbestos is in good condition, has not been damaged and is not in a location where it is likely to be disturbed.

Asbestos Survey Methodology

The asbestos survey included the identification of potential friable and non-friable asbestos-containing materials within the facility.

The likelihood of ACMs being present in inaccessible areas such as behind chases and bulkheads was determined by assessing the presence of asbestos-containing systems in adjacent areas.

Fiberglass insulation was not submitted for analysis as it can be identified visually as non-asbestos material.

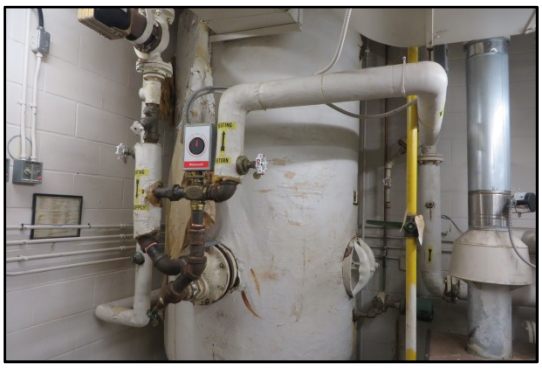
Past Designated Substance Surveys (DSS) completed by Kleinfeldt Consultants Limited were referenced during this survey. Additional samples were taken where necessary to comply with O. Reg. 287/05. Past results are included in Appendix A where applicable.

Asbestos Survey Findings

No suspected ACMs were found during the survey. Transite storm piping is considered to contain asbestos material.

- Mechanical Piping Insulation

Mechanical pipe straight and fitting insulation was observed throughout the Survey Area and was observed to contain fibre glass material. Insulation wrapping of the hot water storage tank was tested and found not to contain asbestos.



- Drywall Joint Compound

Gypsum board joint compound was sampled in the previous report and found not to contain asbestos. Additional samples were not taken as the material is not expected to contain asbestos due to age.

- Lay-in Ceiling Tiles

Lay-in ceiling tiles were sampled in the previous report and found not to contain asbestos. Additional samples were not taken as the material is not expected to contain asbestos due to age.

- Building Materials

White insulation at the ceiling in the Main Lobby was sampled in the previous report and found not to contain asbestos. Additional samples were not taken as the material is not expected to contain asbestos due to age.

- Vinyl Floor Tiles

White vinyl tiles at the north stairway were tested and found not to contain asbestos. Additional samples were not taken as the material is not expected to contain asbestos due to age.

- Exterior Door Caulking

Exterior door caulking was not sampled as it is not expected to contain asbestos.

- Roofing Material

To avoid damage and compromising the integrity of roofing material, no bulk samples of the roofing materials from roof sections were collected. The roofing materials are unlikely to contain asbestos.

- Storm Drainage Piping

Transite piping, which can contain asbestos, is frequently used in modern construction. The cementitious piping is often used for storm drainage piping. Visible storm drainage piping in Storage Room is transite and considered to contain asbestos. No samples were taken due to the nature and use of the material. Allow to maintain in good condition.

Lead

Background Information on Lead

Lead was a common additive in exterior and hard wearing paint applications. Lead was used to prolong shelf life of paint and to increase its flexibility and durability to wear and weather. Acute exposure to lead by inhalation or ingestion may cause headaches, fatigue, nausea, abdominal cramps and joint pain. Chronic exposures can cause reduced haemoglobin production and reduced lifespan. It has also been known to impact the body's central and peripheral nervous systems and brain function and has been linked to learning disabilities in children.

Currently in Ontario, there is no regulatory limit that determines what concentration of lead constitutes a "lead containing material". On October 21, 2010, Health Canada, under the *Hazardous Products Act*, stated that the lead content in surface-coating materials, furniture, toys and other articles for children, should not exceed 90mg/kg (0.009%, 90ppm). However, this is intended for the importation or sale of products within Canada. Therefore, this is not to be misconstrued as a limit established to define a lead-containing material or a limit with respect to lead on construction projects.

Exposure to lead-containing materials is regulated under Ontario Regulation 490/09, *Designated Substances* - made under the Occupational Health and Safety Act. Care must be taken to prevent lead-containing particles from becoming airborne during the disturbance of lead-containing surfaces (i.e., during renovation or demolition projects). All lead abatement work must follow procedures outlined in the Guideline Lead on Construction Projects, issued in September 2004 (amended in April 2011) by the Occupational Health and Safety branch of the Ministry of Labour.

Lead is known to have been used in solder on copper plumbing fixtures, in lead conduit pipes, in lead-calcium battery plates, ammunition, and in nuclear and X-ray shielding devices. However, these materials were not sampled during this investigation, but were noted where applicable.

Lead Findings

Low concentration of lead was found in the paint sample taken from the Activity Room. Lead may also be present in the soldered joints of copper piping found within this building.

Mercury

Mercury is known to cause poisoning in humans through the inhalation of vapours, ingestion of contaminated materials or skin absorption through direct contact with the liquid.

Precautions must be taken to prevent mercury vapours from becoming airborne during renovations or demolition of the building. Exposure to airborne mercury is regulated under the Revised O. Reg. 490/09 as amended – Regulation respecting Mercury – made under the Occupational Health and Safety Act; and under O. Reg. 558, which amended O. Reg. 347/90 (General - Waste Management), mercury is classified as a Schedule 2(b) Hazardous Waste Chemical. Its hazardous waste number is U151.

Mercury is found in products such as thermostats, temperature and pressure gauges, fluorescent lamps and batteries. Mercury in products can be released to the environment through breakage, or disposal at the end of a product's useful life. Improper disposal of these mercury products poses a health and environmental risk to everyone. In addition, the disposal of mercury-containing products can create wastes that are often classified as hazardous. Wastes that leach mercury in concentrations exceeding Ontario Regulation 347/90 (General - Waste Management) limits are also considered hazardous.

Thermostat Switches

The mercury in thermostats switch contains approximately 3-4 grams of mercury in a glass ampoule, typically attached to a metal coil. Mercury-containing switches have been used in thermostats for over 40 years.

CCI Group has identified mercury-containing thermostat switches within the Survey Area.

Fluorescent Light Tubes

Mercury is an essential component in fluorescent lamps and HID lamps. The mercury is in a vapour form and in the phosphor coating on the lamp tube. Estimates of the mercury content contained in compact, 4 foot, and 8-foot lamps are 10 mg and 23 mg respectively.

Most fluorescent lamps qualify as hazardous waste when removed from service and are therefore prohibited from disposal in the solid waste stream. Fluorescent lamps would be classified as 146T on your facility Generator Registration Report under O. Reg. 347/90 - General Waste Management, as amended by O. Reg. 558/00. Under this regulation, if the leachate results exceed 0.1 milligrams of mercury per litre for a given waste, then the facility must treat the waste as hazardous waste. Most fluorescent and HID lamps will exceed the leachate toxicity limit; therefore these wastes must be registered and treated as hazardous waste or sent for recycling.

CCI Group identified numerous fluorescent light fixtures with tubes throughout the Survey Area. Mercury is likely to be present in vapor form in the fluorescent light tubes.

Silica

Silica is expected to be present in building materials such as concrete, brick, mortar and ceramic tiles located throughout the structures.

Precautions must be taken to prevent silica-containing particles from becoming airborne during the disturbance of silica-containing surfaces, such as during renovation or demolition projects. Exposure to airborne silica is regulated under Ontario Regulation 490/09, *Designated Substances* - made under the Occupational Health and Safety Act. All work being carried with silica containing materials should be conducted following the Guide Silica on Construction Projects issued September 2004 by the Occupational Health and Safety branch of the Ministry of Labour.

Vinyl Chloride

Vinyl chloride (monomer) is likely to be present in stable form within poly vinyl-chloride (PVC) piping and conduits and as a component of interior finishes.

Acrylonitrile

Acrylonitrile was not noted and would not be expected to be present in the Survey Area.

Arsenic

Arsenic or arsenic compounds were not noted and are not expected to be present in the Survey Area.

Benzene

Benzene may be present in stable form in roofing materials, paints and adhesives located throughout the subject facility.

Coke Oven Emissions

Coke oven emissions were not noted and would not be expected to be present in the Survey Area.

Ethylene Oxides

Ethylene oxide was not noted, and would not be expected to be present in the Survey Area.

Isocyanates

Isocyanates compounds may be present in stable form in paint finishes, varnishes, and polyurethane plastics, synthetic rubbers, foams and adhesives.

Polychlorinated Biphenyls (PCBs)

Polychlorinated Biphenyls (PCBs) were commonly used as dielectric insulating fluid in electrical equipment such as transformers and capacitors, and in the fluorescent and HID lamp ballasts. The production of PCBs in the North America started in 1929 and was banned at the beginning of 1979. After 1981, no manufacturers produced fluorescent and HID lamps with PCB-containing ballasts.

PCBs are not a designated substance under the Occupational Health and Safety Act.

PCB Regulations (SOR/2008-273)

The *PCB Regulations* (the Regulations) set specific deadlines for ending the use of PCBs in concentrations at or above 50 mg/kg; eliminating all PCBs and equipment containing PCBs currently in storage and limiting the period of time PCBs can be stored before being destroyed. The Regulations also establish sound practices for the better management of the remaining PCBs in use (i.e. those with content of less than 50 mg/kg), until their eventual elimination, to prevent contamination of dielectric fluids and dispersion of PCBs in small quantities into other liquids.

- Light Ballasts/Transformers

The building is illuminated using T-8 fluorescent and compact fluorescent bulbs. The ballasts are not expected to contain PCBs. The transformers are non-PCB type ballasts.

Ozone Depleting Substances (ODS)

Within Ontario, the general use of ozone depleting substances (ODS) is controlled through Regulation 463/10 of the Environmental Protection Act. Production of ODS in the form of hydro chlorofluorocarbons (HCFCs) and chlorofluorocarbons (CFCs) ceased in Canada in 1993 as a result of their ozone-depleting characteristics. Importation of CFCs into Canada ceased in 1997 and total ban on their use from 2010. The use of these materials is still permitted in existing equipment, but equipment must be serviced by a licensed contractor such that CFCs are contained and not released to the environment during servicing or operation.

A visual assessment for equipment potentially containing ozone-depleting substances was conducted. **CCI Group** observed packaged rooftop units which contain R-22 refrigerant (chlorodifluoromethane), currently regulated as ozone depleting substance, however strict controls over their manufacture and supply are in place. Under the management of a licensed contractor, equipment containing R-22 does not represent a significant threat to human health or the environment. The refrigerants R-410A, R-404A, and R507 are non-ozone depleting substances.

No other ODS-content equipment was observed in the subject units at the time of site visit.

Mould

CCI Group did not observe any signs of mould in the Survey Area.

6.0 CONCLUSIONS AND RECOMMENDATIONS

On the basis of our investigations, representative sampling and laboratory analysis of suspected asbestos and lead containing materials, as well as mould-affected materials; the following conclusions and recommendations are presented:

Asbestos

No suspected ACMs were found during the survey. Transite storm piping is considered to contain asbestos material.

Lead

Maintain paint finishes in good condition. Provide water testing to confirm the presence of lead from copper solder in the water.

Mercury

Maintain HID, fluorescent fixtures and mercury based thermostats and dispose of as per Ontario Regulations 844 and 347.

Silica

Precautions should be taken as required during major renovations and demolition projects on concrete (i.e. coring through concrete slabs, demolition of masonry, etc.) to ensure that workers' exposure levels to airborne silica does not exceed 0.05 mg/m^3.

This can be achieved by:

- providing the workers with respiratory protection;
- wetting the surface of the materials to prevent dust emissions; and,
- Providing workers with facilities to properly wash prior to exiting the work area.
- Demolition work that is likely to impact silica-containing materials should be carried out in accordance with the requirement detailed in the Ontario Ministry of Labour document entitled "Guideline: Silica on Construction Projects", dated September 2004.

Ozone Depleting Substances (ODS)

A visual assessment for equipment potentially containing ozone-depleting substances was conducted. **CCI Group** observed rooftop units which were labelled to contain R-22 refrigerant. Under the management of a licensed contractor, equipment containing R-22 does not represent a significant threat to human health or the environment.

- Prior to the demolition/alteration/renovation of the units, all equipment containing ODS must be decommissioned by a licensed contractor such that ozone depleting substances are contained and not released to the environment during decommissioning

Other Designated Substances

Other Designated Substances (acrylonitrile, arsenic, coke oven emissions, ethylene oxide, isocyanates, benzene or vinyl chloride) are not expected to be present in the building in matrix or in sufficient quantities to cause an exceedence of Ministry of Labour exposure guidelines.

7.0 GENERAL CONSIDERATIONS AND LIMITATIONS

The information presented in this report is based on information provided by others, direct visual observation made by personnel with **CCI**, and the results of laboratory testing as identified herein.

It should be noted that there might be hazardous materials in locations not visible during our investigation. Prior to any demolition/dismantling of materials additional testing is recommended as a means of worker and occupant protection.

The findings detailed in this report are based upon the information available at the time of preparation of the report. No investigative method eliminates the possibility of obtaining imprecise or incomplete information. Professional judgement was exercised in gathering and analyzing the information obtained and in the formulation of our conclusions and recommendations.

CCI does not certify or warrant the environmental status of the property nor the building on the property.

Please note that the passage of time affects the information provided in the report. Environmental conditions of a site can change. Opinions relating to the site conditions are based upon information that existed at the time that the conclusions were formulated.

The client expressly agrees that it has entered into this agreement with **CCI**, both on its own behalf and as agent on behalf of its employees and principals.

The client expressly agrees that **CCI**'s employees and principals shall have no personal liability to the client in respect of a claim, whether in contract, tort and/or any other cause of action in law. Accordingly, the client expressly agrees that it will bring no proceedings and take no action in any court of law against any of **CCI**'s employees or principals in their personal capacity.

We trust that we have detailed our findings clearly and that we have satisfactorily addressed the scope of work you require at this time. In the event you wish us to review our findings with you, or require our services further in this regard, please do not hesitate to contact our office.

Sincerely,
CCI GROUP INC.

Prepared by:

Zack Salman, M. Eng., BSSO
Senior Project Manager
Corporate Projects

APPENDIX A – LAB ANALYSIS

IATL International Asbestos Testing Laboratories

9000 Commerce Parkway Suite B Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: EMC Scientific
5800 Ambler Drive, Suite 100
Mississauga ON L4W4J4

Report Date: 3/31/2008
Project: City Of Toronto, 2/8/08
Project No.: 3025

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3241089 **Description / Location:** Lt.Tan Ceiling Tile
Client No.: 72.1 @ Hallway 2nd Floor

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	35	Cellulose	30
		35	Fibrous Glass	

Lab No.: 3241090 **Description / Location:** Tan Floor Tile
Client No.: 72.2 @ Janitor Room 2nd Floor

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Note: Insufficient mastic provided for analysis.

Lab No.: 3241091 **Description / Location:** White Joint Compound
Client No.: 72.3 Wall @ Pump Room

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 3241092 **Description / Location:** White Insulation
Client No.: 72.4 @ Main Lobby Ceil.

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	50	Fibrous Glass	50

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

Analysis Method: EPA 600/R-93/116

Comments: (PC) Indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC-Trace) represents this limit of quantitation, (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: L. Solebello

Approved By:

Frank E. Ehrenfeld, III
Laboratory Director

Date: 3/1/2008

IATL International Asbestos Testing Laboratories

9000 Commerce Parkway Suite B Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: EMC Scientific
5800 Ambler Drive, Suite 100
Mississauga ON L4W4J4

Report Date: 3/31/2008
Project: City Of Toronto, 2/8/08
Project No.: 3025

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 3241093
Client No.: 72.5
Description / Location: Green Floor Tile @ Main Office

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

NIST-NVLAP No. 101165-0 **NY-DOH No. 11021** **AIHA Lab No. 100188**

Analysis Method: EPA 600/R-93/116

Comments: (PC) indicates Stratified Point Count Method performed. Method not performed unless stated. Quantification at <0.25% by volume is possible with this method. (PC-Trace) represents this limit of quantitation. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed. Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, negative PLM results cannot be guaranteed. Electron Microscopy can be used as a confirming technique. Regulatory Limit is based upon the sample matrix.

Analysis Performed By: L. Solebello

Date: 3/1/2008

IATL International Asbestos Testing Laboratories

9000 Commerce Parkway Suite B Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: CCI Group Inc
7900 Keele Street, Suite 200
Concord ON L4K 2A3

Report Date: 4/23/2014
Report No.: 331382
Project: Toronto-SGR; Oakridge CC
Project No.: 135121

BULK SAMPLE ANALYSIS SUMMARY

Lab No.: 5292058 **Description / Location:** White Floor Tile
Client No.: BS01.1 North Stairway

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 5292058 **Description / Location:** Black Mastic **Layer No.:** 2
Client No.: BS01.1 North Stairway

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	None Detected	None Detected	100

Lab No.: 5292059 **Description / Location:** White Insulation
Client No.: BS02.1 Boiler Room,HW Storage Tank,Pipe

% Asbestos	Type	% Non-Asbestos Fibrous Material	Type	% Non-Fibrous Material
None Detected	None Detected	50	Cellulose	50

Accreditations: NIST-NVLAP No. 101165-0 NY-DOH No. 11021 AIHA-LAP, LLC No. 100188

Analytical Method: US EPA 600/R-93/116 by Polarized Light Microscopy, (ELAP 198.1 where applicable)

Comments: Quantification at <0.25% by volume is possible with this method. (PC) Indicates Stratified Point Count Method performed. (PC-Trace) means that asbestos was detected but is not quantifiable under the Point Counting regimen. Analysis includes all distinct separable layers in accordance with EPA 600 Method. If not reported or otherwise noted, layer is either not present or the client has specifically requested that it not be analyzed (ex. analyze until positive instructions). Small asbestos fibers may be missed by PLM due to resolution limitations of the optical microscope. Therefore, PLM is not consistently reliable in detecting asbestos in non-friable organically bound (NOB) materials. Quantitative transmission electron microscopy (TEM) is currently the only method that can pronounce materials as non-asbestos containing.

Analysis Performed By: R. Caran

Approved By:

Frank E. Ehrenfeld, III
Laboratory Director

Date: 4/23/2014

IATL International Asbestos Testing Laboratories

9000 Commerce Parkway Suite B Mt. Laurel, NJ 08054
Telephone: 856-231-9449 Fax: 856-231-9818

CERTIFICATE OF ANALYSIS

Client: CCI Group Inc
7900 Keele Street, Suite 200
Concord ON L4K 2A3

Report Date: 4/22/2014
Report Number: 331252
Project: CityOfTorontoSGROakridgeCC
Project No.: 135121

LEAD PAINT SAMPLE ANALYSIS SUMMARY

Lab No.	Client No.	Location / Description	Concentration Lead By Weight (%)
5288188	Pb-01	Lead Paint Activity Rm	<0.0082

Accreditations: NATIONAL LEAD LABORATORY ACCREDITATION PROGRAM (NLLAP)
AIHA-LAP, LLC No. 100188 NYSDOH-ELAP No. 11021

Analytical Methods: ASTM D3335-85A "Standard Method To Test For Low Concentrations Of Lead In Paint By Atomic Absorption Spectrophotometry"
EPA SW846-(3050B:7000B) "Standard Method To Test For Low Concentrations Of Lead In Soils, Sludges and Sediments By AAS"

Comments: Regulatory limit is 0.5% lead by weight (EPA/HUD guidelines). Recommend multiple sampling for all samples less than regulatory limit for confirmation. All results are based on the samples as received at the lab. IATL assumes that appropriate sampling methods have been used and the data upon which these results are based have been accurately supplied by the client. Method Detection Limit (MDL) per EPA Method 40CFR Part 136 Apendix B. Reporting Limit (RL) based upon Lowest Standard Determined (LSD) in accordance with AIHA-ELLAP policies. LSD=0.2 ppm MDL=0.0044% by weight. RL= 0.010% by weight (based upon 100 mg sampled). * Insufficient sample provided to perform QC reanalysis (<200 mg) ** Not enough sample provided to analyze (<50 mg) *** Matrix / substrate interference possible. Sample results are not corrected for contamination by field or analytical blanks. This confidential report relates only to those item(s) tested and does not represent an endorsement by NIST-NVLAP, AIHA or any government agency. This report shall not be reproduced except in full, without written approval of the laboratory.

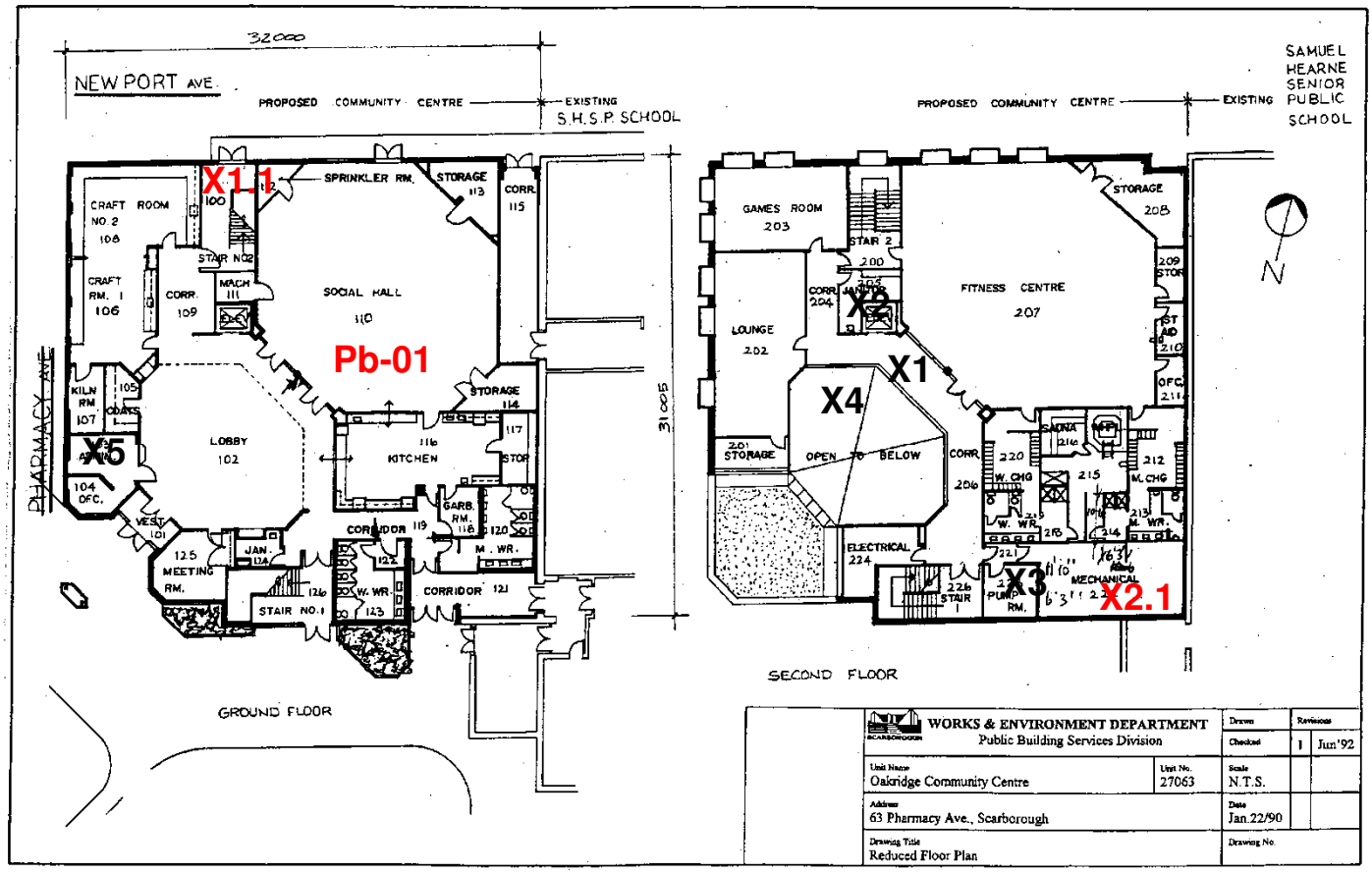
Date Received: 4/16/2014
Date Analyzed: 4/22/2014
Analyst: C. Shaffer

Approved By:

Frank E. Ehrenfeld, III
Laboratory Director

APPENDIX B – LOCATION PLAN

OAKRIDGE COMMUNITY CENTRE – SAMPLE LOCATION



204 6.56 x 17.06
2 x 5.2 m

10.5
6.25