

Beavermead Campground

Gatehouse

Peterborough, Ontario

City of Peterborough Tender ITT-30-21



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Design for the Human Spirit

Specifications

Project No. 20-120

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AMR Engineering Ltd.

Structural Engineering Consultants

Durham Energy Specialist Ltd.

Mechanical & Electrical Engineering Consultants

Engage Engineering Inc.

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<p>CONSULTANT'S SEAL</p> <p>This seal governs all Documents and Sections of these Specifications, except Section 00 30 00 – Existing Conditions and all documents referenced therein.</p>	
<p>MECHANICAL SUBCONSULTANT'S SEAL</p> <p>This seal governs :</p> <p>Division 21 – Fire Suppression (all Sections)</p> <p>Division 22 – Plumbing (all Sections)</p> <p>Division 23 – HVAC (all Sections)</p> <p>Division 25 – Integrated Automation (all Sections)</p>	
<p>ELECTRICAL SUBCONSULTANT'S SEAL</p> <p>This seal governs :</p> <p>Division 26 – Electrical (all Sections)</p> <p>Division 27 – Communications (all Sections)</p> <p>Division 28 – Electronic Safety and Security (all Sections)</p>	

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END OF SECTION

1 GENERAL

- .1 Information on existing conditions made available to bidders under this section, is included in the Bid Documents for information purposes only, and does not form part of the Contract Documents.
- .2 The Owner and Consultant assume no responsibility for the scope and accuracy of the information contained in the documents listed herein.
- .3 The Contractor shall be responsible for conducting an on-site evaluation of conditions which can be observed and for correlation of these conditions with the information included under this section.
- .4 Information contained in documents listed here may be used by the Contractor to assist in an assessment of existing conditions. Evaluation of the information shall remain the responsibility of the Contractor.

2 HAZARDOUS MATERIALS ABATEMENT

- .1 Designated Substances Survey
 - .1 A Designated Substances Survey was undertaken on behalf of the Owner by Cambium Inc. The following document is appended to this section:
 - .1 Designated Substances Survey
Beavermead Gatehouse Building
2011 Ashburnham Drive
Peterborough Ontario
Dated: 2021-08-06
Ref No.: 13516-001

END OF SECTION

1 SUMMARY OF WORK

- .1 Work under this Contract covers the construction of a new Gatehouse at Beavermead Campground for the City of Peterborough;
 - .1 Demolition and removal of existing gatehouse and site elements as noted,
 - .2 Construction of new Gatehouse
 - .1 Cross-Laminated Timber (CLT) walls
 - .2 Metal siding on exterior walls
 - .3 Metal roofing on wood structure
 - .4 Hollow metal doors and frames
 - .5 Sealed concrete floor finish
 - .6 Mechanical services and equipment
 - .7 Electrical services and equipment.
 - .8 Concrete paving
 - .9 Asphalt paving
 - .10 Exterior grading and landscaping.

2 WORK RESTRICTIONS

- .1 Contractor's Use Of Site
 - .1 Use of site is limited to areas of work. Areas designated for storage of material and equipment (Marshaling Yard) as determined by the Owner.
 - .2 Do not unreasonably encumber site with materials or equipment.
 - .3 Move stored products or equipment which interfere with operations of Owner, or other contractors.
 - .4 Obtain and pay for use of off-site additional storage, or work areas as required by the Work.
- .2 Hours of Work
 - .1 Hours of work for this contract are generally confined to regular daily business hours of 7am to 5pm Monday to Friday. Where required by sequencing of the Work, or where shutdown of building services is required, portions of the Work may be required to be performed outside of regular daily business hours, or on weekends, at no additional cost to the Owner.

END OF SECTION

- 1 GENERAL
 - .1 Include all allowances listed below in the Bid Price.
 - .2 Expend Cash Allowances as directed by the Consultant.
 - .3 Each Cash Allowance will be adjusted to actual cost as defined hereunder and Contract Price will be amended accordingly by written order.
 - .4 Progress payments for work and material authorized under Cash Allowances will be made in accordance with GC 5.3 of the Contract.
 - .5 Cash allowances do not include H.S.T.
- 2 MATERIAL ALLOWANCES (SUPPLY ONLY)
 - .1 Material cash allowance shall include and provide payment for:
 - .1 Net cost of material.
 - .2 Applicable duties and taxes.
 - .3 Delivery to site.
 - .2 Include in the Bid Price, in addition to the material cash allowance, costs for the following:
 - .1 Handling at site, including unloading, uncrating, storage and hoisting.
 - .2 Protection from damage by elements or otherwise.
 - .3 Labour for installation and finishing.
 - .4 Other expenses required to complete installation.
 - .5 Overhead and profit.
- 3 ASSEMBLY ALLOWANCES (SUPPLY AND INSTALL)
 - .1 Assembly cash allowance shall include and provide payment for:
 - .1 Net cost of material.
 - .2 Applicable duties and taxes.
 - .3 Delivery to site.
 - .4 Assembly contractors'/suppliers' only, expenses relating to the following:
 - .1 Handling at site, including unloading, uncrating, storage and hoisting.
 - .2 Protection from damage by elements or otherwise.
 - .3 Labour installation and finishing.
 - .4 Other expenses required to complete installation.
 - .5 Overhead and profit.
 - .2 Include in the Bid Price any overhead and profit or related General Contractor costs.
- 4 TESTING & LABORATORY SERVICES
 - .1 Testing & Laboratory Services allowances shall include and provide payment for:
 - .1 Transportation costs to and from the site,
 - .2 Equipment required to perform tests or inspections,
 - .3 Costs of shipping samples to laboratory for testing,
 - .4 Applicable duties and taxes,
 - .2 Include cash allowances in the Bid Price for material inspection and testing of the following:
 - .1 Soil compaction and subgrade testing
 - .2 Cast-in-place concrete and reinforcement for footings, foundations, slabs, walks
 - .3 Fill compaction for paving
 - .4 Asphalt Paving

5 ALLOWANCE AMOUNTS

- .1 The Total Cash Allowance to be included in the Stipulated Price is **Twenty-Five Thousand Dollars (\$25,000)**, in Canadian Dollars. The cash allowance shall provide payment for the following:
- .1 Independent Inspections and Testing (as per list in 4.2 above)..... \$5,000
- .2 General Cash Allowance..... \$20,000

END OF SECTION

1 MODIFICATIONS TO CONTRACT

- .1 Supplemental Instruction: as issued by the Consultant, consistent with the intent of the Contract Documents, and will not involve an adjustment in Contract Price or Contract Time.
- .2 Proposed Change: as issued by the Consultant, will notify the Construction Manager of an impending or Proposed Change to the Work, and will require submission of a quotation from the Construction Manager and all affected Subcontractors for each item noted. Submit quotation within the time period stipulated on the form, and indicate separate line items for labour and materials in each case. Work outlined in a Proposed Change must not proceed without the issuance of a Change Order signed by the Owner.
- .3 Change Directive: as issued by the Consultant, where an immediate response is required to an on-site condition. This form will authorize the Construction Manager and all affected Subcontractors to proceed with the change, with the stipulation that accurate accounts of costs be recorded, and may contain an upset cost, as agreed upon by the Owner and the Construction Manager.
- .4 Change Order: as issued by the Consultant, upon review and approval of quotations for a Proposed Change, or a Change Directive, and authorizes the Construction Manager to proceed with the change(s) proposed. A Change Order may amend the Contract Price, and/or the Contract Time.

2 UNIT PRICES

- .1 Apply Unit Prices quoted in Bid Forms, to extras to the Contract Price. Apply Unit Prices for credits from the Contract Price at a rate not less than 85% of the quoted Unit Price.
- .2 Work covered by Unit Prices will be executed in accordance with the Contract Documents. Unit Prices include all costs related to materials, labour, equipment, delivery and handling, statutory charges, overhead and profit, other related charges, and inclusive of all applicable duties and taxes (excluded HST), measured in place prior to excavation, or compacted/complete in place.

3 FEES FOR CHANGES IN THE WORK

- .1 The following fees will apply to the Contract Price for changes to the Work not covered by Unit Prices listed in Appendix UP, and shall include all statutory charges, applicable duties and taxes, charges required by labour agreements in force, charges related to site and/or office overhead, project management and administration, all shop and field supervision, clerical, engineering, bonding costs, permits, all associated payroll costs, tools and equipment, travel and accommodation, and other charges incidental to the work including but not limited to handling, equipment warranty, identification, coordination, scheduling, Bill 208 and WHMIS.
- .2 The Fees For Changes In The Work shall apply only to extras to the Contract. Construction Manager or Subcontractor mark-up will not be applied to credits.
- .3 For all Changes to the Work which may be ordered by the Owner, the maximum net mark-ups for overhead and profit for adjustments in Contract Price, shall be in accordance with the Contract.

END OF SECTION

1 APPLICATIONS FOR PAYMENT

- .1 Applications for payment on account may be made monthly as the Work progresses, and shall be preceded by the submission of a Schedule of Values (Progress Draw) for review by the Consultant, in accordance with the General Conditions of the Contract.
- .2 The second and all subsequent applications for payment shall include a statement based on the Schedule of Values, a statutory declaration (CCDC 9B), and a standard WHSI Certificate of Clearance.
- .3 Applications for Payment must take the form of a *Proper Invoice* and shall mean a written bill or other request for payment for services and/or materials comprising the *Work* performed under this *Contract* issued by the *Contractor*, provided such bill or request:
 - .1 Contains the information set out in Section 6.1 of the *Construction Act*, which for certainty includes the following:
 - .1 The *Contractor's* name and address;
 - .2 The date of the invoice and the period during which the services or materials were supplied;
 - .3 Information identifying the authority, whether in this *Contract* or otherwise, under which the services or materials were supplied;
 - .4 A description, including quantity where appropriate, of the services or materials that were supplied;
 - .5 The amount payable for the services or materials that were supplied, and the payment terms;
 - .6 The name, title, telephone number and mailing address of the person at the *Contractor* to whom payment is to be sent; and
 - .7 Any other information that may be prescribed by the *Construction Act*."
 - .2 Contains the following information and meets the following requirements:
 - .1 The name of the Owner's project manager for the Project;
 - .2 The Owner's full legal name;
 - .3 The amount invoiced must not exceed the amount of the Owner's purchase order to which the invoice relates;
 - .4 Includes the applicable purchase order number, tax registration number and project number applicable to the Work;
 - .5 The amount invoiced must not be combined with any other invoices when issued;
 - .6 Outlines the aggregate amount of the holdback retained by the Owner under the Contract and the amount of the holdback retained under and applicable to the amount invoiced;
 - .7 The amount invoiced must accurately reflect all required components of the Work and the values attributed to these components; and
 - .8 The invoice must include a statement in large font all in uppercase as follows: "THE CONSTRUCTION ACT, AS REVISED, IS APPLICABLE TO THIS INVOICE",
 - .3 Meets the additional requirements with respect to process and contain such information as required by Owner.

2 SCHEDULE OF VALUES

- .1 Submit Schedule of Values in spreadsheet form acceptable to the Consultant.
- .2 Identify on each Schedule of Values, the following information:
 - .1 Date of Issue
 - .2 Project name
 - .3 Owner's name

- .4 Subcontractor's name
- .5 Payment period
- .6 Payment certificate number
- .3 Items of work listed shall include, but not be limited to, separate line items for the following:
 - .1 General Accounts
 - .2 Mobilization
 - .3 Supervision
 - .4 Bonds and Insurance
 - .5 All trades or portions of the Work, generally in chronological order
 - .6 Provision of other Products and/or services
 - .7 Cash Allowance expenditures
 - .8 Changes in the Work
- .4 The total Contract amount for each trade or portion of the Work shall be listed beside each item.
- .5 The Values of the Work shall be listed as to the aggregate percentage and dollar value completed, under the following major headings:
 - .1 Initial Contract Amounts for each line item,
 - .2 Progress to Date,
 - .3 Percent Complete,
 - .4 Current Invoice,
 - .5 Previous Billings,
 - .6 Contract Balance
- .6 Work shall be subtotaled under original Contract amounts, Cash Allowance expenditures, and Changes to the Work.
- .7 Final totals shall identify:
 - .1 Total amount
 - .2 Holdback deducted
 - .3 Holdback released
 - .4 Amount invoiced to date
 - .5 Net amount
 - .6 HST
 - .7 Amount due this Certificate

END OF SECTION

1 PROJECT MANAGEMENT & COORDINATION

.1 Project Coordination

- .1 The Contractor is responsible for the overall coordination of the Work. Coordinate the work of all subcontractors, and provide such assistance as is necessary, including but not limited to;
 - .1 Providing site dimensions and layout,
 - .2 Providing temporary facilities and controls,
 - .3 Scheduling subcontractors work to prevent conflicts,
 - .4 Scheduling and administering regular subtrade scheduling and coordination meetings throughout progress of the Work.
 - .5 Scheduling and administering regular subtrade safety meetings throughout progress of the Work.
 - .6 Coordinate construction sequences and schedules including all components of the Work, including all Divisions with interdependent responsibilities.
- .2 The Contractor shall facilitate production of interference drawings where necessary for coordination of the Work. Provide such interference drawings to the Consultant for review.

.2 Project Supervision

- .1 The Contractor shall provide and maintain supervision on site. The supervisor shall be responsible for the overall coordination on site between subtrades.
- .2 The supervisor shall coordinate the work of all subcontractors, and provide such assistance as is necessary, including but not limited to;
 - .1 Layout,
 - .2 Rough carpentry work for blocking, strapping, nailers, etc.

.3 Project Meetings

- .1 The Consultant shall schedule and administer regular project progress meetings throughout progress of work. Frequency of meetings as agreed by Owner, Consultant and Contractor at start-up meeting.
- .2 Distribute written notice of each meeting to all parties four days in advance of meeting date.
- .3 Location and frequency of meetings shall be as determined at the Start-up meeting.
- .4 The Consultant shall record minutes of all general site meetings, and distribute copies of minutes after each meeting to meeting participants and affected parties not in attendance.

.4 Project Site Administration

- .1 Maintain at job site, one copy each of the following:
 - .1 Contract drawings.
 - .2 Project manual.
 - .3 Addenda and Bid Revisions.
 - .4 Reviewed shop drawings.
 - .5 Change orders and other Contract modifications.
 - .6 Field test and inspection reports.
 - .7 Approved schedules.
 - .8 Manufacturer's installation and application instructions.

2 SCHEDULES

- .1 Construction Progress Schedule.
 - .1 Prepare schedule in horizontal chart form, with weekly horizontal time scale identifying first/last work day of each week. Schedule must utilize "critical path" method.
 - .2 Indicate separate line for each trade or operation of the Work. Arrange trades in chronological order for commencement of that part of the Work.
 - .3 Identify projected major milestones in the course of the Work such as completion of foundation work, structure, closing in, major inspections by building officials, Substantial Performance, etc.
- .2 Submittal Schedule
 - .1 Provide schedule for submittal of all Shop Drawings, Product Data and Samples.
 - .2 Provide complete list of all manufactured products to be used in the course of the Work, including those amended by addenda.
- .3 Cash Flow Schedule
 - .1 Prepare proposed cash flow schedule in horizontal bar chart form. Cash Flow Schedule to coincide with Construction Progress Schedule, and will project monthly progress draws, for Owner's financial planning purposes.
- .4 Submission of Schedules
 - .1 Submit schedules in softcopy form (PDF).
 - .2 Submit one copy of each schedule to the Consultant for review, prior to first progress billing. Amend schedules as required.
 - .3 Submit copy of each subsequent issue of schedules to the Consultant.
 - .4 Update schedule on a regular basis or as requested by the Consultant.

3 ADDITIONAL DOCUMENTS

- .1 Consultant may issue additional documents in the form of drawings, specifications, schedules, or written instructions to assist proper execution of the Work. These documents shall take one of the following forms as defined in the Contract;
 - .1 Supplemental Instruction: no adjustment in Contract Price or Contract Time.
 - .2 Change Order: amendment to the Contract recommended by the Consultant, and agreed upon by the Owner and the Contractor.

4 SUBMITTAL PROCEDURES

- .1 Submit to Consultant, all items specified for review, with reasonable promptness and in orderly sequence so as to not cause delay in the Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Schedule submissions at least 10 days before reviewed submissions will be needed.
- .3 Do not proceed with work affected by the submittal until review is complete.
- .4 Review all submittals prior to submission to the 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 the requirements of the Work and the

Contract Documents. Submittals not stamped, signed, and dated will be returned without review.

- .5 Verify field measurements and affected adjacent work are coordinated.
- .6 Contractor's responsibility for errors and omissions in submission, or deviations from requirements of Contract Documents, is not relieved by Consultant's review of submittals.
- .7 Keep one reviewed copy of each submission on site.
- .8 Shop Drawings
 - .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by the Contractor to illustrate details of a portion of the Work.
 - .2 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of the Section under which the adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
 - .3 Adjustments made on shop drawings by the Consultant are not intended to change the Contract Price. If adjustments affect the value of Work, state such in writing to the Consultant prior to proceeding with the Work.
 - .4 Make changes in shop drawings as the Consultant may require, consistent with Contract Documents. When resubmitting, notify the Consultant in writing of any revisions other than those requested.
 - .5 Submit electronic (PDF) copy only of all shop drawings.
 - .6 Shop drawings submitted by FAX, or as copies of FAX transmissions are not acceptable as shop drawings, and will not be reviewed.
 - .7 Reproductions of Consultants' drawings are acceptable for the purpose of creating Shop Drawings, provided they indicate all necessary fabrication, erection, construction, and installation details, in addition to the detail shown on the Consultants' drawings.
 - .8 Electronic files of Architectural Drawings may be obtained for the purpose of creating Shop Drawings. Make arrangements with the Consultant.
 - .9 Shop drawings not submitted in the scale type of the contract documents (ie. metric for metric drawings) will not be reviewed.
- .9 Product Data Sheets
 - .1 Manufacturer's standard schematics, catalogue sheets, diagrams, schedules, performance charts, illustrations and other descriptive data are acceptable in lieu of shop drawings, where specified.
 - .2 Product Data Sheets are acceptable provided they conform to the following:
 - .1 Information not applicable to project has been deleted.
 - .2 Supplement standard information to provide additional information applicable to project.

- .3 Show dimensions and clearances required.
 - .4 Show performance characteristics and capacities.
 - .5 Show wiring diagrams, when requested, and controls.
- .3 Submit product data sheets or brochures for requirements requested in specification Sections and as the Consultant may reasonably request where shop drawings will not be prepared due to standardized manufacture of product.
- .4 Submit electronic copy (PDF) only of all WHMIS Data Sheets.
- .5 Submit electronic copy (PDF) only of Product Data Sheets.
- .6 Product data sheets submitted by FAX, or as copies of FAX transmissions will not be accepted.
- .10 Return of Submissions
 - .1 If upon review by the Consultant, no errors or omissions are discovered or if only minor corrections are made, the shop drawing transparency or one copy of the product data will be returned and fabrication and installation of Work may proceed.
 - .2 If shop drawings or data sheets are rejected, noted copy will be returned and resubmission of corrected shop drawings or data sheets through the same procedure indicated above, shall be performed before fabrication and installation of Work may proceed.
- .11 Samples
 - .1 Submit samples for review, in duplicate, in sizes requested in respective specification sections. Label samples as to origin and intended use in the Work.
 - .2 Where colour, pattern or texture is criteria, submit full range of samples.
 - .3 Deliver samples prepaid to Consultant's office.
 - .4 Notify the Consultant in writing, at the time of submission of deviations in samples from requirements of Contract Documents.
 - .5 Adjustments made on samples by the Consultant are not intended to change the Contract Price. If adjustments affect the value of Work, state such in writing to the Consultant prior to proceeding with the work.
 - .6 Make changes in samples which the Consultant may require, consistent with Contract Documents.
 - .7 Reviewed samples or mock-ups will become standards of workmanship and material against which installed work will be checked on project.
- .12 Submission Requirements
 - .1 Accompany submissions with transmittal letter containing:
 - .1 Date,
 - .2 Project title and number,
 - .3 Contractor's name and address,
 - .4 Drawing/page numbers of each shop drawing or data sheet,
 - .5 Identification (ie. "Structural Steel Shop Dwgs."), and
 - .6 Number of copies submitted.

- .2 Submissions shall include (where applicable) :
 - .1 Date and revision date,
 - .2 Project title and number,
 - .3 Name of Contractor, Subcontractor(s), Supplier/Manufacturer,
 - .4 Identification of product or material,
 - .5 Relation to adjacent structure or materials,
 - .6 Field dimensions, clearly identified as such,
 - .7 Reference standards (CSA, CGSB, ASTM, etc.), and
 - .8 Contractor's stamp, initialled or signed, certifying review of submission, and verification of field measurements.
- .13 Distribution of Submittals after Review
 - .1 Distribute copies of shop drawings and product data which carry Consultant's stamp as follows (where applicable):
 - .1 Job site file (Record documents),
 - .2 General Contractor's office,
 - .3 Subcontractors, and
 - .4 Suppliers or Fabricators.

END OF SECTION

- 1 GENERAL
 - .1 Provide construction photographs in accordance with procedures and submission requirements specified in this section.
 - .2 Photographs shall be taken using a digital camera.
- 2 PROGRESS PHOTOGRAPHS
 - .1 Provide digital sets of construction photographs, documenting progress of the Work, with each monthly progress draw. Submit digital images on a USB Drive.
 - .2 Submit progress photographs with each monthly progress draw, and at the following milestones;
 - .1 Completion of new footings and foundations,
 - .2 Pouring of concrete slab,
 - .3 Completion of exterior walls,
 - .4 Completion of roof framing,
 - .5 Completion of roofing and sheet metal,
 - .6 Completion of interior partition work,
 - .7 Completion of mechanical and electrical rough-in work,
 - .8 Completion of window and door work,
 - .9 Completion of interior finish.
 - .3 Orientation of Photographs: provide photos from 2 general viewpoints, as well as specific views as required by milestones specified above, and as determined by Consultant prior to first Progress Draw.
- 3 FINAL PHOTOGRAPHS
 - .1 Submit USB copy of all progress photographs, organized by date, with Operations & Maintenance Manuals at the completion of the project.
 - .2 Orientation of Photographs: provide final photos as follows:
 - .1 General viewpoints as defined above,
 - .2 Views of all exterior elevations,
 - .3 Interior views of all spaces.

END OF SECTION

1 GENERAL

1.1 SECTION INCLUDES

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

1.2 REFERENCE STANDARDS

- .1 CSA A23.1; Concrete Materials and Methods of Concrete Construction.
- .2 CSA A23.2; Methods of Test for Concrete.
- .3 CSA S16.1; Limit States Design of Steel Structures.
- .4 CSA W47.1; Certification of Companies for Fusion Welding of Steel Structures.
- .5 CSA W59; Welded Steel Construction (Metal Arc Welding).
- .6 CISC; Code of Standard Practice for Structural Steel.
- .7 OPSS; Ontario Provincial Standard Specifications.

1.3 REGULATORY REQUIREMENTS

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

1.4 INDEPENDENT INSPECTION AND TESTING

- .1 Independent Inspection and Testing Consultants will be engaged by the Contractor on behalf of the Owner, for the purpose of inspecting and/or testing individual portions of the Work. The initial cost of such services will be included in the Contract Price, as allocated under Section 01 21 00, Allowances.

1.5 RESPONSIBILITIES

- .1 Inspection and Testing Consultants
 - .1 Inspection and Testing Consultants shall;
 - .1 Provide inspection and testing specified,
 - .2 Inform the Contractor and Consultant immediately upon observance of materials, systems, or procedures not in compliance with the specifications, and
 - .3 Submit complete reports to the Contractor and the Consultant in a timely manner.
- .2 Contractor
 - .1 Contractor shall:
 - .1 Provide access to the Work for Inspection/Testing Consultants, and
 - .2 Inform the Inspection/Testing Consultants in advance of day and time required for inspection and tests.
 - .2 It is the responsibility of the General Contractor to ensure the quality control requirements of the Contract are implemented.
- .3 Consultant
 - .1 The Consultant will make final decisions on changes to the scope of work of inspection and testing that may affect the Contract Price.
 - .2 When informed of of any material procedure or test result that does not meet or exceed the specifications, the Consultant will respond in an expedient manner to resolve the issue.

1.6 ACCESS TO WORK

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

1.7 EARTHWORK

- .1 All earthwork shall be subject to inspection and testing as specified herein. Inspection and Testing shall include:
 - .1 Inspection of excavations for foundations.
 - .2 Inspection of subgrade and granular fill materials.
 - .3 Inspection of backfill operations.
 - .4 Inspection and testing of backfill compaction.
 - .5 Inspection of trenching & bedding associated with underground services.
 - .6 Inspection and testing of fill & compaction associated with underground services.

1.8 CAST-IN-PLACE CONCRETE

- .1 All cast-in-place concrete shall be subject to inspection and testing as specified herein. Inspection and Testing shall include:
 - .1 Verification of materials delivered to site.
 - .2 Slump tests.
 - .3 Sampling of cylinders, and compressive strength tests.

1.9 REPORTS

- .1 Submit PDF copy of inspection and test reports to the Consultant.
- .2 Provide copies to Subcontractor of work being inspected or tested, manufacturer or fabricator of material being inspected or tested.
- .3 Submit one copy of inspection and test reports to the Building Official having jurisdiction, where required by that official.
- .4 The cost of tests beyond those called for in the Contract Documents or beyond those required by the law of the Place of Work shall be appraised by the Consultant and may be authorized as recoverable.

1.10 MOCK-UPS

- .1 Provide mock-ups as specified under individual materials and assemblies specifications sections. Mock-ups may form part of the finished Work unless otherwise specified.
- .2 Notify Consultant upon completion of mock-up(s) and allow time for review and approval. Approval time for mock-ups shall not be reason to affect schedule.
- .3 Once approved mock-ups shall become the minimum benchmark for the quality of work and materials.
- .4 If rejected, remove mock-up materials and re-construct, or amend mock-up as directed by the Consultant and request additional review.

2 PRODUCTS

(RESERVED)

3 EXECUTION

3.1 INSPECTION AND TESTING - PROCEDURES

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

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

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

3.2 QUALITY OF THE WORK

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

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

3.3 DEFECTIVE MATERIALS AND WORK

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

.2 Tests, inspections, or surveys carried out under these circumstances will be made at the Contractor's expense in the event of defective work, or at the Owner's expense where work is in conformance. Where tests incorporate a number of samples, payment will be assessed, by the Consultant, based on the ratio of conforming to non-conforming results.

END OF SECTION

1 CODES AND STANDARDS

.1 Codes

- .1 All construction shall conform to the Ontario Building Code, the National Building Code (NBC) and the National Fire Code (NFC) latest editions including all supplements and amendments.
- .2 Conform to all other codes, by-laws and regulations as specified within individual sections of the specifications.

.2 Industry Standards

- .1 Industry Standards are specified within individual sections as applicable to those portions of the Work. The latest editions of all industry standards shall be the standards for which quality of work shall be assessed.
- .2 Comply with all relevant codes, standards and industry-accepted practices, as specified herein, or as applicable to the Work.

2 AUTHORITIES HAVING JURISDICTION

- .1 The Chief Building Official of the Municipality of the Place of the Work, is the primary Authority Having Jurisdiction for compliance with all codes, by-laws and regulations as they apply to all construction.
- .2 Other Authorities Having Jurisdiction may be required to review and approve certain portions of the Work. The Chief Building Official of the Municipality of the Place of the Work, will determine the requirements for such involvement.

3 PERMITS AND FEES

- .1 No construction work may commence without a valid, posted Building Permit.
- .2 The Owner is responsible for obtaining all necessary information and applying for the Building Permit, including payment of associated fees. The Contractor shall pick up the approved permit from the Building Department.
- .3 The Contractor is responsible for applying for, and obtaining all necessary permits, licenses, or certificates required by the Work.
- .4 Authorities Having Jurisdiction may levy fees for issuing permits, licenses, or certificates under their jurisdiction. The Contractor shall pay all such fees as required, and shall include the cost of such fees in their Contract Price.
- .5 Furnish certificates and permits from other Authorities Having Jurisdiction when so requested by the Consultant.
- .6 Prior to commencement of construction, post the Building Permit at the Place of the Work.
- .7 Maintain copy of reviewed and approved permit drawings on site.

END OF SECTION

Abbreviations listed, when used in the Specifications, shall have the following meanings:

ABBREVIATION	MEANING
AA	ALUMINUM ASSOCIATION
AAMA	ARCHITECTURAL ALUMINUM MANUFACTURERS' ASSOCIATION
AASHO	AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS
ACI	AMERICAN CONCRETE INSTITUTE
AGA	AMERICAN GAS ASSOCIATION
AIA	AMERICAN INSTITUTE OF ARCHITECTS
AIMA	ACOUSTICAL & INSULATING MATERIALS ASSOCIATION
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
AISI	AMERICAN IRON AND STEEL INSTITUTE
AMCA	AIR MOVING AND CONDITIONING ASSOCIATION INC.
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
ASHRAE	AMERICAN SOCIETY OF HEATING, REFRIGERATING & AIR CONDITIONING ENGINEERS
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
AWI	ARCHITECTURAL WOODWORK INSTITUTE (USA)
AWMAC	ARCHITECTURAL WOODWORK MANUFACTURERS ASSOCIATION OF CANADA
AWS	AMERICAN WELDING SOCIETY
CCA	CANADIAN CONSTRUCTION ASSOCIATION
CCRC	CANADIAN CODE FOR RESIDENTIAL CONSTRUCTION
CEC	CANADIAN ELECTRICAL CODE
CFUA	CANADIAN FIRE UNDERWRITERS ASSOCIATION
CGA	CANADIAN GAS ASSOCIATION
CGSB	CANADIAN GENERAL STANDARDS BOARD
CIQS	CANADIAN INSTITUTE OF QUANTITY SURVEYORS
CISC	CANADIAN INSTITUTE OF STEEL CONSTRUCTION
CITC	CANADIAN INSTITUTE OF TIMBER CONSTRUCTION
CLA	CANADIAN LUMBERMEN'S ASSOCIATION
CMHC	CANADA MORTGAGE & HOUSING CORPORATION
COFI	COUNCIL OF FOREST INDUSTRIES OF BRITISH COLUMBIA
CPCI	CANADIAN PRESTRESSED CONCRETE INSTITUTE
CRCA	CANADIAN ROOFING CONTRACTORS ASSOCIATION
CSA	CANADIAN STANDARDS ASSOCIATION
CSC	CONSTRUCTION SPECIFICATIONS CANADA
CSI	CONSTRUCTION SPECIFICATIONS INSTITUTE (USA)
CSPI	CORRUGATED STEEL PIPE INSTITUTE
CSSBI	CANADIAN SHEET STEEL BUILDING INSTITUTE
CUA	CANADIAN UNDERWRITERS' ASSOCIATION
CWB	CANADIAN WELDING BUREAU
CWC	CANADIAN WOOD COUNCIL
DND	DEPARTMENT OF NATIONAL DEFENCE, CANADA
FM	FACTORY MUTUAL ENGINEERING CORPORATION
FS	FEDERAL SPECIFICATION (USA)
IES	ILLUMINATING ENGINEERING SOCIETY
IGMAC	INSULATED GLASS MANUFACTURERS ASSOCIATION OF CANADA
LTIC	LAMINATED TIMBER INSTITUTE OF CANADA
MIA	MARBLE INSTITUTE OF AMERICA
MPMDD	MODIFIED PROCTOR MAXIMUM DRY DENSITY
NAAMM	NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (USA)
NBFU	NATIONAL BOARD OF FIRE UNDERWRITERS
NBC	NATIONAL BUILDING CODE OF CANADA

NBS	NATIONAL BUREAU OF STANDARDS (USDC)
NEMA	NATIONAL ELECTRICAL MANUFACTURERS' ASSOCIATION
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NHLA	NATIONAL HARDWOOD LUMBER ASSOCIATION (USA)
NLGA	NATIONAL LUMBER GRADES AUTHORITY
NRC	NATIONAL RESEARCH COUNCIL
OBC	ONTARIO BUILDING CODE
OHSA	OCCUPATIONAL HEALTH AND SAFETY ACT
OPSS	ONTARIO PROVINCIAL STANDARD SPECIFICATIONS
PCA	PORTLAND CEMENT ASSOCIATION
PCI	PRESTRESSED CONCRETE INSTITUTE
SDI	STEEL DECK INSTITUTE
SPMDD	STANDARD PROCTOR MAXIMUM DRY DENSITY
SSPC	STEEL STRUCTURES PAINTING COUNCIL
TTMAC	TERRAZZO, TILE & MARBLE ASSOCIATION OF CANADA
ULC	UNDERWRITERS LABORATORIES CANADA
UL	UNDERWRITERS LABORATORIES (USA)
USAS	UNITED STATES OF AMERICA STANDARDS INSTITUTE
WSIB	WORKPLACE SAFETY AND INSURANCE BOARD

END OF SECTION

1 REFERENCES

- .1 Occupational Health and Safety Act and Regulations for Construction Projects.
- .2 National Fire Code of Canada
- .3 Ontario Fire Code
- .4 Ontario Building Code

2 INSTALLATION AND REMOVAL

- .1 Provide temporary utilities, facilities and controls in order to execute the work expeditiously. Remove from site all such work after use.

3 VEHICULAR ACCESS & PARKING

- .1 Where site access for construction vehicles necessitates use of public roads, regularly remove mud and dirt from such roads where contaminated by construction vehicles.
- .2 Traffic Control: Provide and maintain flagpersons, traffic signals, barricades and flares, lights, or lanterns as required to perform the work and protect the public.
- .3 Construction Parking
 - .1 Parking for construction equipment vehicles will be limited to the site or immediate areas of work, and as designated by the Owner.
 - .2 Parking for Contractors' and Subcontractors' personal vehicles will be permitted on site. Designated parking areas will be as indicated by the Owner. Make good any damage.

4 TEMPORARY UTILITIES

- .1 Temporary Electricity and Lighting
 - .1 Connect to existing power supply in accordance with Ontario Electrical Code, and Construction Safety Association's "Temporary Wiring Standards on Construction Sites". Provide meter for monitoring use.
 - .2 Electrical power and lighting systems installed under this contract can be used for construction requirements provided that guarantees are not affected thereby. Make good damage. Replace lamps which have been used more than a period of 3 months.
 - .3 Provide temporary lighting in all areas of construction, to 1.5x the minimum requirements of the Occupational Health and Safety Act.
- .2 Temporary Water Supply
 - .1 Provide water supply for construction usage.
 - .2 Permanent water supply system installed under this contract can be used for construction requirements provided that guarantees are not affected thereby. Make good damage.

5 CONSTRUCTION FACILITIES

- .1 Equipment, Tools and Materials Storage
 - .1 Provide adequate weathertight enclosures with raised floors, for storage of materials, tools, and equipment subject to damage by weather.
 - .2 Temporary enclosures required by subtrades as workshops shall be provided by those trades.

- .2 Site Storage and Overloading
 - .1 Confine the Work and the operations of employees to limits indicated by the Contract Documents. Do not unreasonably encumber the premises with Products.
 - .2 Do not load or permit to be loaded any part of the Work with a weight or force that will endanger the Work.
- .3 Sanitary Facilities
 - .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances. Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition. Where portable toilet facilities are provided, empty and sanitize such facilities on a weekly basis, or more frequently if required.
- .4 First Aid Facilities
 - .1 Provide first aid facilities and supplies necessary to supply first aid to injured workers, in accordance with WSIB regulations.
- 6 CONSTRUCTION SAFETY MEASURES
 - .1 Observe all construction safety measures as required by the General Conditions of the Contract, the Occupational Health and Safety Act and Regulations for Construction Projects, and by all authorities having jurisdiction, provided that in case of conflict or discrepancy, the more stringent requirements shall apply.
 - .2 Provide and maintain fences, guard rails, barriers, night lights, and appropriate warning signage as required for the protection of the public, and of public and private property; as required by the General Conditions of the Contract, the Occupational Health and Safety Act and Regulations for Construction Projects, and by all authorities having jurisdiction. Erect and maintain sturdy railings around shafts, and the like, to protect workmen and the public from injury.
 - .3 Workplace Hazardous Materials Information System
 - .1 Comply with all requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of material safety data sheets.
 - .2 Include copies of all WHMIS data sheets in Operations and Maintenance Manuals.
- 7 TEMPORARY BARRIERS & ENCLOSURES
 - .1 Hoarding & Site Fencing: shall consist of temporary modular welded wire mesh fencing, by CanFence Rentals Ltd., or equivalent. Enclose entire site with fencing.
 - .1 Fencing shall be minimum 2440mm high.
- 8 TEMPORARY CONTROLS
 - .1 Drainage & Erosion Control
 - .1 Refer to Section 01 57 19 – Temporary Environmental Controls.
 - .2 Site Signs and Notices
 - .1 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Consultant.

- .2 No other signs or advertisements of any description except notices regarding safety and instruction, shall be put up around the building, or site, without the approval of the Owner.

END OF SECTION

1 REFERENCES

- .1 National Building Code of Canada
- .2 National Fire Code of Canada
- .3 Ontario Fire Code
- .4 Guidelines for Maintaining Fire Safety during Construction in Existing Buildings, (10/31/88) Ontario Ministry of the Solicitor General, Office of the Fire Marshal.
- .5 Ontario Building Code.

2 FIRE SAFETY

- .1 Fire Fighting Equipment
 - .1 Provide and maintain in working order, ULC labelled, 9kg 4A 60BC type fire extinguishers, and locate in prominent positions to approval of authorities having jurisdiction.
- .2 Fire Department Access
 - .1 Provide and maintain fire access routes as designed, as soon as construction sequence will allow. Access routes must have compacted granular subbase, and base in place before superstructure of building may proceed.
 - .2 Construction activities must not obstruct access routes designated for fire department equipment. If necessary that existing access be obstructed or deleted, alternative access, acceptable to the fire department, must be provided prior to commencement of construction, in accordance with Ontario Building Code location and design criteria for required access routes.
- .3 Control of Combustible Materials
 - .1 The stockpiling of construction materials adjacent to the existing building must be carefully controlled in accordance with the Ontario Fire Code. Materials stored, and their proximity to, equipment used in construction may create a fire hazard. Control of combustibles on a construction site is regulated under the Occupational Health and Safety Act.
- .4 Hot Work
 - .1 Conform to the requirements of the Occupational Health and Safety Act – Regulations for Construction Projects.
 - .2 Provide all necessary guards and barriers to protect workers, property, and the public when performing hot work such as torching, cutting or coring. Protect all adjacent combustible materials.
 - .3 Provide a "Fire Watch" for a minimum of 3 hours after each instance of discontinuing hot work.

END OF SECTION

1 DEFINITIONS

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

2 FIRES

- .1 Fires and burning of rubbish on Site is strictly prohibited.

3 DISPOSAL OF WASTES

- .1 Burying of rubbish or waste materials on Site is strictly prohibited.
- .2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

4 DRAINAGE & EROSION CONTROL

- .1 Provide erosion and sediment control plan that identifies type and location of erosion and sediment controls to be provided. Plan: include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.
- .2 Storm Water Pollution Prevention Plan (SWPPP) may be substituted for erosion and sedimentations control plan.
- .3 Provide temporary drainage and pumping as necessary to keep excavations and Site, free from water.
- .4 Do not pump water containing suspended materials into waterways, sewer or drainage systems.
- .5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.
- .6 Provide and maintain temporary drainage and pumping as necessary to keep excavations and site free from excess water.
- .7 Provide silt fencing at site perimeters and where required by local authorities to prevent contamination of adjoining properties from silt and water drainage.

5 TREE AND PLANT PROTECTION

- .1 Protect existing trees and plants on all adjacent properties, where in close proximity to construction activities, or where construction access passes within 3m of trees or plants, whether indicated on drawings or not.
- .2 Conform to all local By-Laws regarding tree preservation and protection.
- .3 Protect existing trees and plants on site as indicated.

- .4 Restrict tree removal to those designated by Consultant. Wrap in burlap trees and shrubs adjacent to construction work, storage areas and trucking lanes. Encase trees and shrubs with protective wood framework from grade level to height of 2134mm.
 - .5 Protect roots to minimum 1m beyond dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones of protected trees. Minimize stripping of topsoil and vegetation.
 - .6 The Minimum Tree Protection Zone will be the drip line. Within this tree protection zone there will also be no construction activity including but not limited to no root cutting, no alteration or disturbance to existing grades of any kind, no changes to the grade by adding fill, excavating or scraping, no storage of construction materials or equipment, no stockpiling of soil, debris or construction waste, & no movement or storage of heavy vehicles or equipment. Tree protection barriers must be included and priced as part of the project. For short term project (up to 2 months), standard T-bars and plastic safety fence can be used. For a longer term project, use 10 gauge chain link fence and standard T-bars. In all cases, standard T-bars should not be spaced more than 6 to 7 feet apart. These protection barriers must be erected before the project starts, must be maintained throughout the project, and taken down when final inspection and signoffs are completed.
- 6 POLLUTION CONTROL
- .1 Maintain temporary erosion and pollution control features installed under this Contract.
 - .2 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area, by providing temporary enclosures.
 - .3 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.
- 7 NOTIFICATION
- .1 Consultant will notify Contractor in writing of observed non-compliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan. Contractor shall, after receipt of such notice, inform Consultant of proposed corrective action and take such action for approval by Consultant.
 - .2 Consultant will issue stop order of Work until satisfactory corrective action has been taken.
 - .3 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

END OF SECTION

1 PRODUCT OPTIONS

- .1 Provide products specified under individual specification sections. Where Specification lists two or more Products, or two or more manufacturers of the same product, the Contractor may select one of the listed Products or manufacturers. Confirm selection of Products and manufacturers when requested by the Consultant.
- .2 When only one Product or manufacturer is listed in the specifications, it is intended that only that product or manufacturer is acceptable.

2 PRODUCT SUBSTITUTION PROCEDURES

- .1 Substitution Procedures During the Bidding Process.
 - .1 Refer to Instructions to Bidders.
- .2 Substitution Procedures During Construction
 - .1 Products may only be substituted during the Construction period for one or more of the following reasons:
 - .1 Insolvency of the product manufacturer.
 - .2 Inability of the manufacturer to provide the Product(s) in the timeframe required to maintain the construction schedule.
 - .3 Product specified has been discontinued.
 - .4 Substitution proposed offers better performance than that specified, at no additional cost.
 - .5 Substitution offers equivalent performance to that specified, at a reduced cost to the Owner (reduction in Contract Price).
 - .2 Items 1.2, and 1.3 will require a letter from the manufacturer, confirming their inability to provide the Products specified, or inability to meet the schedule. The Contractor must demonstrate that Products and services were ordered within sufficient time to be delivered to the Place of the Work, in order to maintain the Construction Schedule.
 - .3 Items 1.4, and 1.5 will be at the discretion of the Owner.

3 AVAILABILITY

- .1 Immediately upon signing Contract, review Product delivery requirements, and identify lead times for supply of all Products. If lead times in supply of Products may affect the Construction Schedule, notify the Consultant in order that appropriate action may be authorized in ample time to prevent delay in performance of the Work.
- .2 The Contractor shall order Products and materials in a timely fashion so as to ensure that delivery of such Products and materials shall coincide with the Construction Schedule. Failure of the Contractor or their Subcontractors to order Products and materials in a timely fashion, shall not be cause for substitution in accordance with the criteria set out under Article 2 – Product Substitution Procedures.
- .3 In the event of failure to notify the Consultant of Product delivery problems at the commencement of the Work, and should it appear that the Work may be delayed for such reason, the Consultant reserves the right to substitute more readily available Products of similar character of their choosing, at no increase in Contract Price.

4 REFERENCE STANDARDS

- .1 Within the specifications, reference standards are identified. Conform to these standards, in whole or part, as specifically requested.

- .2 If there is question as to whether any product or system is in conformance with applicable standards, the Consultant reserves the right to have such products or systems tested to prove or disprove conformance.
 - .3 The cost for such testing will be born by the Owner in the event of conformance with Contract Documents or by the Contractor in the event of non-conformance.
 - .4 Conform to latest date of issue of referenced standards in effect on date of submission of bids, except where a specific date of issue is specifically noted.
- 5 **PRODUCT TRANSPORTATION & DELIVERY**
- .1 Transportation and delivery costs of Products required in the performance of the Work, are included in the Contract Price.
 - .2 Transportation and delivery costs of Products supplied by the Owner will be paid for by the Owner. Unload, handle, and store such Products on site.
 - .3 Products must be appropriately crated, skidded, boxed, shrink-wrapped, or otherwise packaged to protect such products from damage during shipment. Products which arrive at the site in a damaged condition must be rejected and returned to the supplier/manufacturer for immediate replacement.
 - .4 Advise the Owner 30 days in advance of anticipated delivery dates for materials and equipment supplied by the Owner.
- 6 **PRODUCT STORAGE, HANDLING AND PROTECTION**
- .1 Handle and store Products in a manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions.
 - .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 the 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 paints in a 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 the satisfaction of the Consultant.

7 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise indicated in the specifications, install or erect Products in accordance with manufacturer's printed 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 the specifications and manufacturer's instructions, so that Consultant may establish correct course of action.
- .3 Improper installation or erection of Products, due to failure in complying with these requirements, authorizes the Consultant to require removal, replacement where necessary, and re-installation at no increase in Contract Price.

8 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 the affected specification Section.
- .4 Space anchors within limits of load limit or shear capacity and ensure that 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.
- .7 Obtain Consultant's approval before using explosive actuated fastening devices.

9 QUALITY OF MATERIALS

- .1 Products, materials, equipment and articles (referred to as Products throughout the specifications) incorporated in the Work shall be new, not damaged or defective, and of the best quality (compatible with specifications) for the purpose intended. If requested, furnish evidence as to type, source and quality of Products provided.
- .2 Products relying on uniformity of colour and pattern for appearance, such as resilient flooring, carpeting, fabrics, and vinyl wallcovering, shall be from one dye lot for the project. All products delivered to the site must be labeled as to dye lot, or production run number, as well as production date.
- .3 Defective products, whenever identified prior to the completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is a precaution against oversight or error. Remove and replace defective Products at own expense and be responsible for delays and expenses caused by rejection.
- .4 Should any dispute arise as to the quality or fitness of Products, the Consultant may request additional testing based upon the requirements of the Contract Documents, to confirm acceptability of products or materials. Refer to Article 10 - Defective Materials And Work, and Section 01 40 00.

- .5 Unless otherwise indicated in the specifications, maintain uniformity of manufacture for any particular or like item throughout the building.
- .6 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.

10 DEFECTIVE MATERIALS AND WORK

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

12 WARRANTIES & GUARANTEES

- .1 Warrant all products and labour forming part of the Work for the period specified in the Contract, unless otherwise specified herein.
- .2 Warrant products and assemblies for the specified periods of time where in excess of the Contract Warranty, as specified within their respective sections.
- .3 Guarantee aspects of the Work for the specified periods of time where in excess of the Contract Warranty, as specified within their respective sections.
- .4 Warranties and Guarantees shall commence at Date of Substantial Performance of the Contract as certified by the Consultant.
- .5 Warranties and Guarantees shall be original copies, printed on company letterhead, or on a standard company warranty certificate, bearing the name of the company.
- .6 Warranties and Guarantees shall indicate:
 - .1 Name of the Principal (the Manufacturer/Subcontractor),
 - .2 Name of the Obligee (the Owner),
 - .3 Name and address of Project,
 - .4 Commencement date (Date of Substantial Performance),
 - .5 Duration of warranty or guarantee,
 - .6 Clear statement of what is included, and what if any exclusions there are, and
 - .7 Signature of Principal's representative having signing authority.

END OF SECTION

1 EXAMINATION

.1 Acceptance of Conditions

- .1 The General Contractor shall examine all existing or pre-determined conditions, prior to commencing work in that area, and report to the Consultant all conditions unacceptable for work to proceed. Commencement of work shall imply acceptance of conditions as is.
- .2 Subcontractors shall examine all existing or pre-determined conditions affecting their portion of the Work, prior to commencing such work, and report to the Contractor all conditions unacceptable for work to proceed. Commencement of work shall imply acceptance of conditions as is.

2 PREPARATION

.1 Field Engineering

- .1 Locate, confirm and protect control points prior to starting the Work. Preserve permanent reference points during construction.
- .2 Establish reference lines and elevations. Locate and lay out by instrumentation.

.2 Records

- .1 Maintain a complete, accurate log of control points and survey work as work progresses.
- .2 On completion of foundations and major site improvements, prepare certified survey showing dimensions, locations, angles and elevations of foundation work.

3 CUTTING AND PATCHING

.1 Submit a written request in advance, for approval of cutting or alteration which affects:

- .1 Structural integrity of any element of Project.
- .2 Integrity of weather-exposed or moisture-resistant elements.
- .3 Efficiency, maintenance, or safety of any operational element.
- .4 Visual qualities of sight-exposed elements.
- .5 Work of Owner or separate contractor.

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

.3 After uncovering, inspect conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

.4 Perform cutting, fitting and patching, including excavation and fill, to complete the Work. Perform work to avoid damage to other work.

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

.6 Cut rigid materials using power saw or core drill. Pneumatic or impact tools not allowed.

.7 Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces. At penetration of fire-rated wall, ceiling, or floor construction, completely seal voids with fire stopping material, full thickness of construction element.

- .8 Refinish surfaces to match adjacent finishes; for continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit.
 - .9 Provide all openings greater than 200mm in non-structural elements of work for penetrations of mechanical and electrical work. Mechanical and Electrical Subcontractors shall provide all sleeves and locations for sleeves. The cost of all cutting and patching required by Mechanical and Electrical Subcontractors shall be paid for by those trades.
 - .10 Ensure that all cutting and patching work, including that paid for by Mechanical and Electrical Subcontractors, is properly performed by the respective trades skilled in that line of work. Restore work with new products in accordance with Contract Documents.
- 4 LOCATION OF EQUIPMENT AND FIXTURES
- .1 Location of mechanical and electrical equipment, fixtures and devices indicated or specified, are to be considered as approximate. Final location of such items will be determined on site, based on integration with structural and architectural elements, and as required by coordination with other trades. In the event of a conflict, final determination of location of these items rests with the Consultant.
 - .2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
 - .3 Request a review of items by Consultant once rough-in is underway, prior to final installation, and obtain approval for actual locations.
- 5 CONCEALMENT
- .1 Conceal pipes, ducts and wiring in construction of finished areas, except where indicated otherwise.
- 6 EXISTING SERVICES
- .1 Where work involves the interruption of, or connection to existing services, carry out such work as directed by governing authorities, with minimum of disturbance to pedestrian and vehicular traffic.
 - .2 Before commencing work, establish location and extent of service lines in area of work and notify Consultant of findings.
 - .3 Submit schedule to, and obtain approval from Consultant for any shutdown or closure of active service or facility. Adhere to approved schedule and provide notice to affected parties.
 - .4 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.
 - .5 Where unknown services are encountered, immediately advise Consultant and confirm findings in writing.
 - .6 Record locations of maintained, re-routed and abandoned service lines.

7 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 the Consultant, at no increase in Contract Price.
- .2 Prevent overloading of any part of the building. Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated, without written approval of Consultant.
- .3 Protect finished surfaces with overlays of protective materials such as Kraft paper, cardboard, or plywood, as required for individual applications to provide adequate protection.

END OF SECTION

- 1 GENERAL
 - .1 Conduct cleaning and disposal operations to comply with local ordinances and environmental protection legislation.
 - .2 Store volatile wastes in covered metal containers, and remove from premises at end of each working day.
 - .3 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- 2 CLEANING DURING CONSTRUCTION
 - .1 Maintain the Work in tidy condition, free from accumulation of waste products and debris, other than that caused by the Owner or other Contractors.
 - .2 Remove waste material and debris from the work areas and deposit in waste container at the end of each working day.
 - .3 Vacuum clean interior areas prior to start of finishing work. Maintain areas free of dust and other contaminants during finishing operations.
 - .4 Individual Subcontractors are responsible for the daily clean-up and removal of debris related to, or generated by, their own work. The overall responsibility for project cleanliness rests with the Contractor.
- 3 WASTE MANAGEMENT
 - .1 Audit, separate and dispose of construction waste generated by new construction or by demolition of existing structures in whole or in part, in accordance with Ontario Regulations 102/94 and 103/94 made under the Environmental Protection Act.
 - .2 Fires, and burning of rubbish or waste on site is prohibited.
 - .3 Burying of rubbish or waste materials, except as specified herein, is prohibited.
 - .4 Disposal of waste or volatile materials such as mineral spirits, oil, gasoline or paint thinner into ground, waterways, or sewer systems is prohibited.
 - .5 Empty waste containers on a regular basis to prevent contamination of site and adjacent properties by wind-blown dust or debris.
- 4 FINAL CLEANING OPERATIONS
 - .1 Immediately following Date of Substantial Performance, and prior to Owner occupancy of the building or portion of the building affected by the Work, conduct full and complete final cleaning operations.
 - .2 Final cleaning operations shall be performed by an experienced professional cleaning company, possessing equipment and personnel sufficient to perform full building cleaning operations.
 - .3 Remove all surplus products, tools, construction machinery and equipment not required for the performance of remaining work, and thereafter remove any remaining materials, equipment, waste and debris.
 - .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

- .5 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .6 Cleaning operations shall include the removal of all stains, spots, scuff marks, dirt, dust, remaining labels, adhesives or other surface imperfections.
- .7 Remove all paint spots or overspray from all affected surfaces.
- .8 Clean and polish all glass and mirrors. Replace broken, scratched or disfigured glazing. Remove remaining manufacturer's and safety "X" labels.
- .9 Clean and polish all finished metal surfaces such as enamelled or stainless steel, chrome, aluminum, brass, and bronze.
- .10 Clean and polish all vitreous surfaces such as plumbing fixtures, ceramic tile, porcelain enamel, or other such materials.
- .11 Clean all ceramic tile surfaces in accordance with the manufacturer's instructions, and apply final coat of sealer where specified.
- .12 Vacuum, clean and dust behind grilles, louvres and screens.
- .13 Broom clean and spray wash all exterior paved surfaces where contaminated by construction operations.
- .14 Remove dirt and other disfiguration from exterior surfaces where contaminated by construction operations.
- .15 Clean all roofs, gutters, downspouts, areaways, drywells, and drainage systems where contaminated by construction operations.
- .16 Clean all equipment and fixtures to a sanitary condition, clean or replace filters of mechanical equipment.

END OF SECTION

- 1 INSPECTION AND DECLARATION PROCEDURES
 - .1 Arrange for, conduct and document final inspections, close-out and commissioning at the completion of the Work in accordance with the procedures described in the General Conditions of the Contract, and OAA/OGCA Document 100.
- 2 SUBSTANTIAL PERFORMANCE
 - .1 Contractor's Inspection
 - .1 Refer to OAA/OGCA Document 100 – STAGE 2.
 - .2 The Contractor and all Subcontractors shall conduct an inspection of the work, identify deficiencies and defects, and make corrections as required to conform with the Contract Documents. Notify Consultant in writing of satisfactory completion of Contractor's Inspection and that corrections have been made. Request a Consultant's Inspection.
 - .2 Contractor's Application for Substantial Performance of the Work
 - .1 Refer to OAA/OGCA Document 100 – STAGE 3.
 - .2 When the Contractor has carried out the steps in Stage 2 of OAA/OGCA Document 100, and has determined that the requirements of the Contract have been substantially performed as defined by local Lien legislation, the Contractor shall make application for Substantial Performance of the Work.
 - .3 In addition to the requirements of OAA/OGCA Document 100, the following items shall accompany the Contractor's application for Substantial Performance. These items must be complete in all respects, and all verification certificates and reports having been submitted and approved by the Consultants:
 - .1 Completed Maintenance Manuals for all disciplines,
 - .2 As-Built Drawings for all disciplines,
 - .3 Plumbing Inspection,
 - .4 Domestic Water Quality Test Report,
 - .5 Emergency lighting verification,
 - .6 ESA Certificate, and
 - .7 Systems operations have been demonstrated to Owner's personnel.
 - .3 Consultant's Inspection
 - .1 The Consultants shall perform an inspection of the Work to assess the validity of the Contractors application, and shall identify in separate lists, unfinished work and deficiencies. Contractor shall correct work accordingly.
 - .4 Certificate of Substantial Performance
 - .1 Refer to OAA/OGCA Document 100 – STAGE 4.
 - .2 Should the Consultant concur with the Contractor's application for Substantial Performance, the Consultant shall notify the Contractor of approval of the application for Substantial Performance and issue a Certificate of Substantial Performance.
 - .3 The Contractor shall publish a copy of the Certificate of Substantial Performance in a construction trade newspaper, and shall provide the Consultant with proof of the date of publication.
- 3 LIEN PERIOD AND RELEASE OF BASIC HOLDBACK
 - .1 Refer to OAA/OGCA Document 100 – STAGE 5.

- .2 Commencement of Lien Periods
 - .1 The day following the date of publication of Certificate of Substantial Performance shall be the date of commencement of the Lien Period prior to release of basic holdback, unless required otherwise by lien statute of the Place of the Work.
 - .2 When the Contractor has carried out the required steps in OAA/OGCA Document 100, the Contractor shall make application for Release of Basic Holdback.
 - .3 The Consultant shall prepare the Certificate for Payment for release of basic holdback, and promptly upon receipt of the necessary documentation, issue the Certificate for Payment to the Owner.
- 4 DEFICIENCY REVIEW
 - .1 Following the issuance of the Certificate of Substantial Performance and prior to the Contractor's application for Final Payment, the Contractor shall continue to complete unfinished work and correct deficiencies. At the request of the Contractor, the Consultants shall conduct up to two general deficiency reviews during this period.
 - .2 The first review will be undertaken only if the Contractor has inspected the Work, and states in writing that the unfinished work noted in their application for Substantial Performance has been completed, and at least 50% of all deficiencies have been corrected.
 - .3 The second review will be undertaken only if the Contractor has inspected the Work, and states in writing that 100% of the deficiencies have been corrected.
 - .4 Should further review by Consultants be required due to failure of the Work to comply with Contract Documents or the criteria set out above, the Owner will deduct amount of Consultant's compensation for reinspection services from monies owed to the Contractor.
- 5 FINAL INSPECTION AND PAYMENT
 - .1 Refer to OAA/OGCA Document 100 – STAGES 6, 7, 8.
 - .2 Submit a signed statement stating following have been performed:
 - .1 Work has been reviewed for compliance with Contract Documents,
 - .2 All deficiencies have been corrected,
 - .3 All unfinished work has been completed, and
 - .4 Work is complete and ready for Final Inspection.
 - .3 When items noted above are completed, a final inspection of the Work will be performed by the Owner, the Consultants, and the Contractor.
 - .4 If the Work is deemed to be incomplete, complete outstanding items and request a reinspection.
 - .5 If the Work is deemed to be complete, the Consultant will issue a Final Certificate for Payment.

END OF SECTION

- 1 REFERENCES
 - .1 OAA/OGCA Document 100; OAA/OGCA Take-Over Procedures.
- 2 OPERATION AND MAINTENANCE MANUALS
 - .1 General
 - .1 Prepare Operation and Maintenance Manual during the course of construction and have completed prior to Date of Substantial Performance.
 - .2 Submission
 - .1 Maintain the Operation and Maintenance Manual for periodic review and comment, as requested by the Consultant during the course of construction.
 - .2 Submit final copy in PDF format on USB Flashdrive with the application for Substantial Performance in accordance with OAA/OGCA Document 100.
 - .3 Format
 - .1 The O&M Manuals shall be submitted in PDF format on USB Flashdrive.
 - .2 Provide table of contents with hyperlinked items to each section of the manual.
 - .3 Provide drawings as required. Group drawings as to content, and index for quick reference.
 - .4 Contents - Each Volume
 - .1 Table of Contents: provide title of Project, Date of submission and names:
 - .1 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties;
 - .2 Schedule of products and systems, indexed to content of volume.
 - .2 For each product or system: List names, addresses and telephone numbers of sub-contractors and suppliers, including local source of supplies and replacement parts.
 - .3 Product Data: mark each to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
 - .4 Operation and Maintenance Manuals shall contain, as a minimum, the following information:
 - .1 List of Contents; cross-referenced to each Volume.
 - .2 Contact information for maintenance and repairs
 - .3 Warranty and guarantee certificates
 - .4 Equipment start-up and troubleshooting instructions
 - .5 Equipment schematics & diagrams
 - .6 Catalogue of all maintenance materials and quantities
 - .7 Complete list of Contractor, Subcontractors and suppliers, indicating name, address, telephone & fax numbers, email addresses, name of contact person and description of work done.
 - .8 Complete list of products used in the work, indicating product name and manufacturer for each listing.
 - .9 Copy of Finish Hardware List, complete with all amendments and revisions, if applicable.
 - .10 Schedule of paints and coatings. Include sufficient explanation to fully identify each surface with the applicable paint or coating used. Enclose copy of Colour Schedule.
 - .11 All "reviewed" shop drawings.
 - .12 Maintenance instructions for all finished surfaces.

- .13 Brochures and cuts of all equipment and fixtures.
 - .14 Operating and maintenance instructions for all equipment.
 - .15 All Warranties and Guarantees required by the Specifications for this Work.
 - .5 Refer to Mechanical & Electrical Specifications for more specific data required beyond the requirements of this section.
 - .6 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
 - .7 Typewritten Text: as required to supplement Product Data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.
- 3 AS-BUILT DRAWINGS
- .1 Record information on a clean set of black line opaque drawings.
 - .2 Maintain as-built drawings on site and update as construction progresses. Allow periodic review by Consultant as requested.
 - .3 Record information concurrently with construction progress. Do not conceal work until required information is recorded.
 - .4 Contract drawings and shop drawings: legibly mark each item to record actual construction, including:
 - .1 Measured depths of elements of foundation in relation to finish first floor datum.
 - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
 - .4 Field changes of dimension and detail.
 - .5 Changes made by change orders.
 - .6 Details not on original Contract Drawings.
 - .7 References to related shop drawings and modifications.
 - .5 Contractor shall submit to the Consultant to enter as-built information from marked-up drawings to a digital format of AutoCAD (latest version) on CD-ROM. Information to be entered on layers to Owner standard.
 - .1 Submit marked-up hardcopy to the Consultant who will transfer updated to the digital drawing file on application for Certificate of Substantial Performance.
- 4 EQUIPMENT AND SYSTEMS
- .1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
 - .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
 - .3 Include installed colour coded wiring diagrams.
 - .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

- .5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
 - .6 Provide servicing and lubrication schedule, and list of lubricants required.
 - .7 Include manufacturer's printed operation and maintenance instructions.
 - .8 Include sequence of operation by controls manufacturer.
 - .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
 - .10 Provide installed control diagrams by controls manufacturer.
 - .11 Provide Contractor's coordination drawings, with installed colour coded piping diagrams.
 - .12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
 - .13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
 - .14 Include all test and balancing reports
 - .15 Additional requirements: As specified in individual specification sections.
- 5 MATERIALS AND FINISHES
- .1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.
 - .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
 - .3 Moisture-protection and Weather-exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
 - .4 Additional Requirements: as specified in individual specifications sections.
- 6 MAINTENANCE MATERIALS, SPARE PARTS & TOOLS
- .1 Provide spare parts in quantities specified in individual specification sections. Provide identical items to those installed in the Work.
 - .2 Provide maintenance materials in quantities specified in individual specification sections. Provide identical items of same manufacturer, dye lot or production run as items in the Work.
 - .3 Provide special tools in quantities specified in individual specification sections, and tag items identifying their function and equipment or products to which they are associated.
 - .4 Receive and catalogue all items. Check inventory and include approved listings in Operations and Maintenance Manual.

- .5 Obtain receipts for delivered products and submit prior to Substantial Performance.
- .6 Quality
 - .1 Spare parts, maintenance materials and special tools provided shall be new, not damaged or defective, and of the same quality and manufacture as products provided in the Work.
 - .2 If requested, furnish evidence as to type, source and quality of Products provided.
 - .3 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.
- .7 Delivery, Storage, And Handling
 - .1 Deliver all materials required as maintenance materials, spare parts or special tools, to the site, include shipping costs, and store as directed.
 - .2 Store spare parts, maintenance materials and special tools in a manner to prevent damage, or deterioration.
 - .3 Store in original and undamaged containers with manufacturer's seals or labels intact.
 - .4 Store materials subject to damage from severe climatic changes in a climate-controlled, weatherproof enclosure.
 - .5 Store paints and freezable materials in a moderately heated and ventilated room.
- 7 PHOTOGRAPHIC DOCUMENTATION
 - .1 Provide all final photographic documentation on USB Flashdrive as specified in Section 01 32 33.
- 8 WARRANTIES AND BONDS
 - .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
 - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
 - .3 Obtain warranties and bonds, 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 bonds until time specified for submittal.

END OF SECTION

1. General

1.1. Section Includes

1. This section includes all demolition, removal and disposal of the structure at the site and site rehabilitation.

1.2. Related Requirements

1. Section 31 23 10 Excavating, Trenching, and Backfilling
2. Designated Substances Survey – Beavermead Gatehouse Building, 2011 Ashburnham Drive, Peterborough, Ontario, dated August 6, 2021, Cambium File No. 13516-001.

1.3. Reference Standards

1. The Work of this Section shall be executed in accordance with the latest edition of the Ontario Building Code, Fire Code and Occupational Health and Safety Act. The Contractor shall be responsible for enforcing and ensuring that their employees and sub trades abide by the rules and regulations outline in these acts.

1.4. Submittals

1. Submit proposed procedures for conducting the Work to the Project Manager for approval no later than one (1) week prior to the commencement of the demolition.
 1. The procedures must provide safe working conditions, including methodology to provide necessary supports, lateral bracing and shoring, when required, and protection of adjacent properties to remain undisturbed.
 2. The procedures shall include a detailed description of the methodology and equipment to be used for the various stages of demolition, and the sequence of work.
2. Submit all waste disposal documentation to the Project Manager prior to completion of the work.
 1. Submit digital copies of certified weigh bills, bills of lading, receipts from authorized disposal sites and reuse and recycling facilities for material removed from site on a monthly basis.

1.5. Administrative Requirements

1. Pre-demolition meeting:
 1. Convene pre-demolition meeting 1 week prior to beginning of work of this Section, with Contractor's representative, a representative of each major sub-trades, Owner's representative and Consultant in accordance with Section 01 30 00, 1.3 Project Meetings to:
 1. Verify project requirements.
 2. Verify existing site conditions adjacent to demolition work.

3. Coordinate with sub-trades.
2. Schedule:
 1. Employ necessary means to meet project timelines without compromising specified minimum rates of material diversion.
 2. In event of unforeseen delay notify in writing to Project Manager.

1.6. Protection

1. Prevent movement, settlement or damage of adjacent structures, road, and services. Make good damage and be liable for injury caused by demolition.
2. Take precautions to support structures and if safety of area being demolished or adjacent structures, roadways or services appear to be endangered, cease operations and contact the Project Manager.
3. Provide adequate protection to safeguard public, neighbors and adjacent properties from any flying debris during demolition and excavation.
4. Prevent debris from blocking surface drainage systems or encroaching upon adjacent properties.
5. Temporary protection: Erect temporary protection, such as walkways, fences, railings, etc., where required by authorities having jurisdiction.
 1. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities.
 2. Remove temporary barriers and protections where hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barrier and protections in place.

1.7. Site Conditions

1. Take over structures to be demolished based on condition as is on date that the Bid is submitted.

1.8. Existing Utilities

1. Existing public and private locates are to be obtained by the Contractor prior to commencement of the work.
2. Verify that services are cut off, capped, diverted and/or removed as required by local regulating authorities. It is the Contractor's responsibility to ensure all services are in the proper state prior to commencing work.
3. No claims will be considered which are based on delays or inconvenience resulting from the removal or relocation of services not being completed prior to the start of this Contract.

1.9. Permits

1. The Demolition Permit will be obtained by the Owner.
2. Obtain and pay for all other necessary permits, fees and inspections required by authorities having jurisdiction.
3. Keep a copy of all permits on-site for the duration of the project.

2. Products – Not Used

3. Execution

3.1. Existing Conditions

1. After determining the methods of demolition, determine the area of possible vibration. Carefully inspect adjacent properties. Annotate and photograph any potential damage areas, including existing cracks, etc., for the purpose of recording existing damage prior to commencement of the work.

3.2. Preparation

1. Inspect the site and verify with the Project Manager, items designated for removal and items to be preserved.
2. Locate and protect utility lines. Preserve in operating condition any active utilities traversing the site.
3. Examine the site for satisfactory working conditions.
4. Confirm the means of access, nature and quantity of work required before commencing the work. No allowance will be made to the Contractor by reason of error, omission or negligence on their part in this respect.

3.3. Reporting

1. Through data gathered from weigh bills and bills of lading, report the following information:
 1. Description of material.
 2. Weight/volume/quantity of material.
 3. Breakdown of reuse, recycling and landfill quantities.
 4. End destination of material.

3.4. Demolition

1. Use of explosives, mechanical demolition (wrecking ball), open burning or burying are not permitted.
2. Remove all designated substances from the structure prior to demolition. The Designated Substance Survey is included in this bid package.
3. Provide all shoring and bracing required as deemed necessary of the safe execution of work.
4. All existing concrete, masonry foundations, footings, walls, floor slabs and all other structural foundations shall be removed completely, to suitable subgrade material.
5. Remove and dispose of all demolition debris, including concrete, timber, steel, organic materials, mechanical, plumbing, electrical equipment and interior/exterior cladding, etc. All non-recycled debris shall be disposed of at a MECP approved Landfill site(s).
6. Control the movement of silt and/or dust to adjacent properties.

7. At the end of each workday, leave the work site in a secure and safe condition so that no part of the project is in danger of rolling, toppling or falling, with no tripping or fall hazards.
8. Remove hazardous or dangerous materials from the site and dispose of such materials in a safe manner to minimize danger at the site or during disposal.
9. Remove all existing debris and refuse from within the project property lines (interior/exterior).
10. Remove and dispose of all walkways, slabs, driveways, decks and patios attached or otherwise within identified project property lines.
11. Make every effort to preserve all surrounding vegetation, unless otherwise directed by the Project Manager to remove any necessary trees and/or shrubs interfering with the site access or demolition work.
12. Do not sell materials on site. Demolition materials shall be disposed of in accordance with authorities having jurisdiction. The Contractor shall meet the requirements of all local by-laws and environmental regulations.

3.5. Cleaning

1. Remove recycling containers and bins from site and dispose of materials at appropriate facility.
2. Divert excess materials from landfill to site approved by Consultant.
3. Designate appropriate security resources/measures to prevent vandalism, damage and theft.
4. Stockpile materials designated for alternative disposal in location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.
 1. Label stockpiles, indicating material type and quantity.
5. Separate from general waste stream each of following materials. Stockpile material in neat and orderly fashion in location and as directed by Consultant for alternate disposal. Stockpile materials in accordance with applicable fire and safety regulations.
 1. Wiring and conduit.
 2. Outlets/switches.
 3. Metal duct work, baffles, HVAC equipment.
 4. Insulation batts.
 5. Miscellaneous metals.
2. Sheet metal and metal flashings.
3. Metal wall panels and roof panels.
4. Wood fascia and soffit
5. Masonry.
6. Concrete.
6. Supply separate, clearly marked disposal bins for categories of waste material. Do not remove bins from site until inspection and approved by Consultant. Notify Consultant 24 hours prior to removal of bins from site.
7. Remove stockpiled material when it interferes with operations of project construction.

8. Remove stockpiles of like materials by alternate disposal option once collection of material is complete
9. Transport material designated for alternate disposal using approved facilities, haulers, and receiving organizations listed in Waste Reduction Workplan and in accordance with applicable regulations.
 1. Written authorization from Consultant is required to deviate from haulers, receiving organizations and facilities listed in Waste Reduction Workplan.
10. Dispose of materials not designated for alternate disposal in accordance with applicable regulations.
 1. Disposal facilities must be those approved of and listed in Waste Reduction Workplan.
 2. Written authorization from Consultant is required to deviate from disposal facilities listed in Waste Reduction Workplan.

End of Section

1 GENERAL

1.1 GENERAL REQUIREMENTS

- .1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.
- .2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.
- .3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.
- .4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES.

- .1 Methods and procedures for demolishing, salvaging, recycling and removing sitework items designated to be removed in whole or in part, as indicated on the drawings.
 - .1 Asphalt and concrete paving removal.
 - .2 Sod and topsoil

1.3 REFERENCES

- .1 Canadian Council of Ministers of the Environment (CCME).
 - .1 PN1326, Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products.
- .2 Department of Justice Canada (Jus).
 - .1 Canadian Environmental Assessment Act (CEAA), 1995, c. 37.
 - .2 Canadian Environmental Protection Act, 1999 (CEPA), c. 33.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
- .4 Transport Canada (TC).
 - .1 Transportation of Dangerous Goods Act, 1992 (TDGA), c. 34.

1.4 DEFINITIONS

- .1 Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, may include but not limited to: asbestos PCB's, CFC's, HCFC's poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or well being or environment if handled improperly.
- .2 Waste Audit (WA): detailed inventory of materials. Indicates quantities of reuse, recycling and landfill.
 - .1 Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project.
 - .2 Indicates quantities of reuse, recycling and landfill.
- .3 Waste Management Coordinator (WMC): subcontractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.

- .4 Waste Reduction Workplan (WRW): written report, which addresses opportunities for reduction, reuse, or recycling of materials. WRW is based on information acquired from WA.
- 1.5 QUALITY ASSURANCE
 - .1 Regulatory Requirements: ensure Work is performed in compliance with Federal, Provincial, Regional and Municipal regulations.
 - .2 Site Meetings.
 - .1 Convene pre-installation meeting prior to beginning work of this Section and on-site installations to:
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.
 - .2 Arrange for site visit with Consultant to examine existing site conditions adjacent to demolition work, prior to start of Work.
 - .3 Ensure all key personnel attend.
 - .4 Provide written report on status of waste diversion activity at each meeting.
- 1.6 DELIVERY, STORAGE AND HANDLING
 - .1 Storage and Protection.
 - .1 Protect existing items designated to remain and items designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of Consultant and at no cost to Owner .
 - .2 Remove and store materials to be salvaged, in manner to prevent damage.
 - .3 Store and protect in accordance with requirements for maximum preservation of material.
 - .4 Handle salvaged materials as new materials.
- 1.7 WASTE MANAGEMENT AND DISPOSAL.
 - .1 Separate waste materials for reuse and recycling in accordance with Federal, Provincial, Regional and Municipal regulations.
 - .2 Divert excess materials from landfill to site approved by Owner .
 - .3 Separate for reuse and recycling and place in designated containers.
 - .4 Place materials defined as hazardous or toxic in designated containers.
 - .5 Handle and dispose of hazardous materials in accordance with Federal, Provincial, Regional and Municipal regulations.
 - .6 Label location of salvaged material's storage areas and provide barriers and security devices.
 - .7 Ensure emptied containers are sealed and stored safely.
 - .8 Source separate for recycling materials that cannot be salvaged for reuse including wood, metal, concrete and asphalt, and gypsum.

- .9 Remove materials that cannot be salvaged for reuse or recycling and dispose of in accordance with applicable codes at licensed facilities.

1.8 SITE CONDITIONS

- .1 Site Environmental Requirements.
 - .1 Ensure that selective demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
 - .2 Do not dispose of waste of volatile materials including but not limited to, mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.
 - .3 Ensure proper disposal procedures are maintained throughout the project.
 - .4 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties.
 - .5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities as directed by Consultant.
 - .6 Protect trees, plants and foliage on site and adjacent properties where indicated.

1.9 SCHEDULING

- .1 Employ necessary means to meet project time lines without compromising specified minimum rates of material diversion.
- .2 Notify Consultant in writing when unforeseen delays occur.

2 PRODUCTS

2.1 EQUIPMENT

- .1 Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

3 EXECUTION

3.1 PREPARATION

- .1 Inspect site with Consultant and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.
- .2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.
- .3 Notify and obtain approval of utility companies before starting demolition.
- .4 Disconnect and cap designated services.
- .5 Other Underground Services: remove and dispose of as indicated as directed by Consultant .

3.2 REMOVAL OPERATIONS

- .1 Remove items as indicated.
- .2 Do not disturb items designated to remain in place.
- .3 Removal of Pavements, Curbs and Gutters:
 - .1 Square up adjacent surfaces to remain in place by saw cutting or other method approved by Consultant .
 - .2 Protect adjacent joints and load transfer devices.
 - .3 Protect underlying and adjacent granular materials .
 - .4 Prevent contamination with base course aggregates, when removing asphalt pavement for subsequent incorporation into hot mix asphalt concrete paving,
 - .5 Excavate at least 300 mm below pipe invert, when removing pipes under existing or future pavement area.

- .6 Decommission water wells and monitoring wells in accordance with Municipal, Provincial, Federal guidelines & regulations .
- .7 Remove only designated trees during demolition.
- .8 Obtain written approval of Consultant prior to removal of trees not designated .
- .9 Grind, chip, or shred other vegetation for mulching and composting, or use as mill pulp or process fuel .
- .10 Stockpile topsoil for final grading and landscaping.
- .11 Provide erosion control and seeding if not immediately used.

3.3 REMOVAL FROM SITE

- .1 Remove all existing material from the site, unless designated for salvage, and re-use.
- .2 Transport material designated for alternate disposal using approved haulers facilities receiving organizations and in accordance with applicable regulations.
- .3 Written authorization from Consultant is required to deviate from haulers facilities receiving organizations listed in Waste Reduction Workplan .
- .4 Dispose of materials not designated for alternate disposal in accordance with applicable regulations.
- .5 Disposal Facilities: approved and listed in Waste Reduction Workplan .
- .6 Written authorization from Consultant is required to deviate from disposal facilities listed in Waste Reduction Workplan .

3.4 RESTORATION

- .1 Restore areas and existing works outside areas of demolition to conditions that existed prior to beginning of Work match condition of adjacent, undisturbed areas.
- .2 Use soil treatments and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

3.5 FIELD QUALITY CONTROL

- .1 Verification requirements include:
 - .1 Storage and collection of recyclables.
 - .2 Construction waste management.

3.6 CLEANING

- .1 Remove debris, trim surfaces and leave work site clean, upon completion of Work.
- .2 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

- .1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.
- .2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.
- .3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.
- .4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

- .1 Requirements for the curing and finishing of concrete floors and slabs.

1.3 QUALITY ASSURANCE

- .1 Manufacturer/Fabricator
 - .1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.
- .2 Installation/Application
 - .1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.
- .3 Documentation
 - .1 If requested by the Consultant, submit documentation to support the competency of firms and personnel.

1.4 SUBMITTALS

- .1 Product Data
 - .1 Provide product data in accordance with section 01 30 00, as follows:
 - .1 Submit three copies of the manufacturer's printed product literature, MSDS sheets, test data and application instructions for the floor sealer.
- .2 Samples
 - .1 Provide samples in accordance with section 01 30 00 as follows:
 - .1 Submit a 300 mm x 300 mm sample of each type of material (absorptive mat, fabric, plastic film, waterproof paper etc.) that will be used to wet cure the concrete.

1.5 PROTECTION

- .1 Keep traffic which would affect or disturb the curing procedures off the finished surfaces for a period of 7 days minimum the minimum period of cure time specified for the concrete mix proposed by the Contractor and concrete supplier and as reviewed and approved by the Consultant.
- .2 Protect exposed concrete finishes against damage.
- .3 Protect floors which are to receive applied coatings and finishes against contamination by oil, paint or other deleterious materials.
- .4 Protect items set into floors from damage and ensure that alignment is not disturbed.

2 PRODUCTS

2.1 MATERIALS

- .1 Curing membrane: Laminated waterproof paper consisting of laminations of kraft paper and water resistant materials capable of retaining the moisture in the concrete and tough enough to remain intact for the specified curing time.
- .2 Curing compound: to ASTM C309, Type 1, Class B.

3 EXECUTION

3.1 QUALITY OF WORK

- .1 General
 - .1 Comply with the requirements of CAN/CSA A23.1, except where greater requirements are specified herein.
 - .2 Comply with requirements of section 03 30 00, as applicable, and except where greater requirements are specified herein.
 - .3 Ensure surfaces are free of trowel marks and wash-boarding.
 - .4 Use compatible curing compounds, additives, admixtures, sealers and hardeners.
 - .5 Do not sprinkle dry cement or dry cement and sand mixture over concrete surfaces.
 - .6 Curing methods and materials shall be compatible with subsequent applied finishes.
- .2 Tolerances
 - .1 Completed surfaces shall not vary more than 6mm in 3000mm from dead level except where slopes, and slopes to drains are required.

3.2 FINISHING

- .1 Moist/Wet Curing
 - .1 All new concrete shall be wet cured where scheduled as such, as follows:
 - .1 Curing Procedure: All interior concrete slabs shall be protected from premature drying for a minimum of five days, as required in ACI 301, using moisture-retaining cover. Previously used cover material that is clean, in good condition, and free of tears can be reused. Cover concrete surfaces with moisture-retaining cover, placed in widest practical width with sides and ends lapped at least 75mm and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape. Remove curing cover and allow

concrete to air dry for at least twelve (12) hours prior to applying liquid densifier/sealer.

- .1 Acceptable Moisture-Retaining Cover:
 - .1 "Transguard EG" by Reef Industries
 - .2 "Hydrasorb 2" by Firstline Corp.
 - .3 "UltraCure NCF" by McDonald Technology Group
- .2 Curing Compounds
 - .1 Apply curing compounds in accordance with manufacturer's directions and as required to properly cure the surfaces.
 - .2 Apply curing compounds immediately after final finishing.
- .3 Levelling and Floating
 - .1 Strike off concrete after it is placed, level and flush and then level and consolidate with a wooden Darby or bullfloat. Complete levelling and consolidation before free moisture (bleeding) rises to surface.
 - .2 When concrete has stiffened sufficiently to sustain foot pressure and after removing free bleed water, float concrete with hand or power float.
- .4 Remedial Work
 - .1 Grind floor levels which do not comply with the specified tolerances to the tolerances required or level with an approved epoxy or latex modified cementitious compound.
 - .2 Obtain approval of method for correcting tolerances before proceeding.
 - .3 Immediately prior to installation of applied floor finishes but not sooner than 28 days after concrete has been placed, examine concrete floor surfaces and repair cracks. Rout cracks which exceed 0.8 mm in width with mechanical router to 13 mm square cross section. Clean and fill cracks as specified for control joints.

3.3 SCHEDULE

- .1 Following curing methods and finishes to be applied to corresponding surfaces:

SURFACE	CURING METHOD	CONCRETE FINISH
Exposed concrete floors and toppings and mechanical and electrical bases	curing and sealing compound	steel trowel
Concrete to receive special flooring, seamless flooring and similar, thin, fluid applied finishes including sealer	moist cure/ Wet cure (refer to 3.2.3)	steel trowel Class A to CSA A23.1

- .2 Should the Contractor elect to use a cure and seal cure method in lieu of where moist/wet cure specified, the cost of blast tracking the resultant surface to make it suitable to accept the applied finish shall be borne by the Contractor.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

- .1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.
- .2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.
- .3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.
- .4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

- .1 Provision of all labour, materials, equipment and incidental services necessary to provide all miscellaneous metal fabrications. Specific items herein do not represent a full and complete inventory of all miscellaneous metals items. The Subcontractor is responsible for providing all items as specified herein and as shown on the drawings.

1.3 REFERENCE STANDARDS

- .1 ASTM-A325; Specification for High Strength Bolts for Structural Steel Joints.
- .2 ASTM-A563; Specification for Carbon and Alloy Steel Nuts.
- .3 CSA-W47.1; Certification of Companies for Fusion Welding of Steel Structures.
- .4 CSA-W55.3; Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
- .5 CSA-W59; Welded Steel Construction (Metal Arc Welding).
- .6 CSA-G40.20/G40.21; General Requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steels.
- .7 CAN/CSA-G164; Hot Dip Galvanizing of Irregular Shaped Articles.
- .8 CAN/CGSB-1.40; Primer, Structural Steel, Oil Alkyd Type.
- .9 CAN/CGSB-1.181; Ready-Mixed Organic Zinc-Rich Coating.

1.4 QUALITY ASSURANCE

- .1 Manufacture & Fabrication
 - .1 Companies to be certified under Division 1 or 2.1 of CSA-W47.1 for fusion welding, and CSA-W55.3 for resistance welding. Provide certification that all welded joints are certified by Canadian Welding Bureau.
- .2 Installation
 - .1 Work shall be performed in strict accordance with reviewed shop drawings.

1.5 SUBMITTALS

- .1 Shop Drawings
 - .1 Submit shop drawings in accordance with Section 01 30 00.
 - .2 Each shop drawing submitted shall bear the stamp and signature of a qualified Professional Engineer registered in the Place of the Work who has coverage of minimum \$1,000,000 liability insurance.

- .3 Submit all necessary shop drawings, bearing the professional seal and signature of the Subcontractor's Engineer, including design calculations for review by the Consultant. Shop drawings to include all necessary shop details and erection diagrams with;
 - .1 member sizes, locations, thickness (exclusive of coatings), metallic coatings and mechanical properties,
 - .2 connection details for attaching framing to itself and to the structure,
 - .3 dimensions, requirements of related work, and critical installation procedures,
 - .4 temporary bracing required for erection purposes,
 - .5 design loads, and
 - .6 welds indicated by welding symbols as defined in CSA-W59.
- .4 Submit copies of engineering calculations and/or certified data verifying the capacity of members, connectors, connections, and the ability of assemblies to meet the design requirements, signed and sealed by the Subcontractor's Engineer.
- .5 Do not fabricate until submittals are reviewed and approved by Consultant.

2 PRODUCTS

2.1 MATERIALS

- .1 Steel Sections & Plates: to CAN/CSA-G40.21, grade 300W.
- .2 Steel Pipe: to ASTM-A53/A53M, standard weight, yield strength 240 MPa, black or galvanized finish.
- .3 Welding Materials: to CSA-W59.
- .4 Bolts And Nuts: to ASTM-A325 and ASTM-A563.
- .5 Galvanizing: hot dipped galvanizing with minimum zinc coating in accordance with Table 1 of CAN/CSA-G164.
- .6 Shop Primer: oil-alkyd type, to CAN/CGSB-1.40.
- .7 Galvanized Primer: zinc-rich, ready mix to CAN/CGSB-1.181.
- .8 Perforated Aluminum Sheet: to ASTM B209, 6063-T54 alloy and temper.
 - .1 Supplied by Hedrick Manufacturing, distributed by Unalloy IWRC.
 - .2 Prefinished (fluoropolymer) (3/16") 4.76mm thick perforated aluminum sheet. (painted post perforated).
 - .3 Hole size; 6mm Dia. x 9.5mm centers.
 - .4 Open percentage; 40%.
 - .5 Pattern name; HMC-112F.
 - .6 Provide 25mm solid border around each sheet.
- .9 Aluminum Members: Alcan 6063-T54 alloy and temper.
 - .1 Extruded Aluminum: to ASTM B221.
 - .2 Sheet & Plate Aluminum: ASTM B209.

2.2 FABRICATION

- .1 Fabricate work square, true, straight, and accurate to required size, with joints closely fitted and properly secured.

- .2 Use self-tapping shake-proof oval headed screws on items requiring assembly by screws. Use screws for interior metal work. Use welded connections for exterior metal work unless otherwise detailed or approved by Consultant.
- .3 Where possible, fit and shop assemble work, ready for erection.
- .4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.
- .5 Sections for Millwork Supports: prime painted steel angles and channels, in sizes indicated. Supply loose to millwork fabricator.
- .6 Lintel Angles: Steel angles, prime painted in sizes indicated. Provide 150mm minimum bearing at ends. Weld back-to-back angles to profiles where indicated.
- .7 Perforated Metal Panels: perforated metal sheets welded to 38mm x 38mm aluminum angle frame as detailed on the drawings.

2.3 FINISHES

.1 Steel

.1 Shop Prime Painting

- .1 Apply one shop coat of alkyd steel primer to metal items, with exception of galvanized or concrete encased items.
- .2 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7°C.
- .3 Clean surfaces to be field welded; do not paint.

.2 Field Painting & Finishing

- .1 Refer to Section 09 91 16 for field painting, and Section 09 97 13.23 for exterior high performance finishes.

.2 Aluminum

.1 Fluoropolymer Paint: Kynar 500® based, factory-applied, thermosetting, 2-coat fluoropolymer paint system, to AAMA 605.2, consisting of a prime coat, and colour top coat. Colour as selected by Consultant.

- .1 Duranar (2 Coat System), by PPG Canada Inc.
- .2 Fluoropon (2 Coat System), by The Valspar Corporation.

3 EXECUTION

3.1 ERECTION

- .1 Install all miscellaneous metals items specified herein and as detailed on the drawings.
- .2 Do welding work in accordance with CSA-W59 unless specified otherwise.
- .3 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .4 Provide suitable means of anchorage acceptable to Consultant such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.

- .5 Exposed fastening devices to match finish and be compatible with material through which they pass.
- .6 Provide components for building-in by other sections in accordance with shop drawings and schedule.
- .7 Make field connections with high tensile bolts, or weld.
- .8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection, with primer.
- .9 Touch-up galvanized surfaces burned by field welding with zinc rich primer.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

- .1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.
- .2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.
- .3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.
- .4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

- .1 Provision of all labour, materials, equipment and incidental services necessary to provide rough carpentry work, including but not limited to, the following:
 - .1 Miscellaneous furring and blocking,
 - .2 Sheathing, nailers, and curbs for roofing,
 - .3 Electrical mounting boards, and
 - .4 Rough blocking for support of door and window frames.

1.3 REFERENCES

- .1 CSA-B111; Wire Nails, Spikes and Staples.
- .2 CAN/CSA-G164; Hot Dip Galvanizing of Irregularly Shaped Articles.
- .3 CSA-O80 Series; CSA Standards for Wood Preservation.
- .4 CSA-O86-01; Engineering Design in Wood (Working Stress Design).
- .5 CSA-O112 Series; CSA Standards for Wood Adhesives.
- .6 CSA-O121; Douglas Fir Plywood.
- .7 CAN/CSA-O141; Softwood Lumber.
- .8 CSA-O151; Canadian Softwood Plywood.
- .9 CAN/CSA-O325.0; Construction Sheathing.
- .10 CAN/ULC-S102; Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
- .11 National Lumber Grades Authority (NLGA) Special Products Standard for Finger joined Structural Lumber.
- .12 National Lumber Grades Authority (NLGA) Standard Grading Rules for Canadian Lumber.

1.4 QUALITY ASSURANCE

- .1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood identification: by grade mark in accordance with applicable CSA standards.

2 PRODUCTS

2.1 LUMBER MATERIAL

- .1 Lumber: SPF softwood, NLGA No. 2 Grade or better, S4S, kiln-dried with moisture content 19% or less in accordance with CAN/CSA-O141.
- .2 Machine stress-rated lumber is acceptable for all purposes.
- .3 Furring, blocking, nailing strips, grounds, rough bucks, curbs, fascia backing, and sleepers:
 - .1 S2S is acceptable.
 - .2 Board sizes: "Standard" or better grade.
 - .3 Dimension sizes: "Standard" light framing or better grade.
- .4 Pressure Preservative Treated Lumber: SPF softwood, NLGA No. 2 Grade or better, S4S, kiln-dried with moisture content 19% or less in accordance with CAN/CSA-O141; pressure preservative treated with Copper Azole (CBA-A or CA-B), or Alkaline Copper Quaternary (ACQ) to CSA-O80 Series.
- .5 Cross Laminated Timber: refer to Structural Drawings of CLT panels.

2.2 PANEL MATERIALS

- .1 Construction Sheathing: to CAN/CSA-O325.0, thickness as indicated.
- .2 Canadian Softwood Plywood: to CSA-O151, standard construction, thickness as indicated.
- .3 Pressure Preservative Treated Plywood: Canadian softwood plywood (CSP) to CSA-O151, standard construction; pressure preservative treated with Copper Azole (CBA-A or CA-B), or Alkaline Copper Quaternary (ACQ) to CSA-O80.9 and kiln-dried to a moisture content of 15% or less. Thickness as indicated.
- .4 Fire Retardant Treated Plywood: Douglas Fir Plywood (DFP) to CSA-O121, standard construction; fire retardant treated to CSA-O80.27, kiln-dried to a moisture content of 15% or less, Flame Spread Rating of less than 25 to CAN/ULC-S102. Product must be UL or ULC labeled. Thickness as indicated.

2.3 ACCESSORIES

- .1 Sealants: in accordance with Section 07 92 00.
- .2 General Purpose Adhesive: to CSA-O112 Series.
- .3 Nails, Spikes And Staples: to CSA-B111.
- .4 Proprietary Fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, explosive actuated fastening devices, recommended for purpose by manufacturer.
- .5 Nailing Discs: flat caps, minimum 25mm diameter, minimum 0.4mm thick, sheet metalplastic, formed to prevent dishing. Bell or cup shapes not acceptable.

- .6 Finishes
 - .1 Hot-dip galvanized connectors and fasteners to CAN/CSA-G164 minimum 610g/m² coating for:
 - .1 Exterior work (outside of building vapour barrier)
 - .2 Interior highly humid areas
 - .3 Pressure-preservative treated wood, and
 - .4 Fire-retardant treated wood
 - .7 Surface-applied wood preservative: to CAN/CSA-O80 Series; Copper Azole (CBA-A or CA-B) or Alkaline Copper Quaternary (ACQ).

3 EXECUTION

3.1 PREPARATION

- .1 Treat cut surfaces of pressure preservative treated material exposed by cutting, trimming, or boring, with wood preservative before installation.
- .2 Apply preservative by dipping, or by brush to completely saturate and maintain wet film on surface for minimum 3 minute soak on lumber and 1 minute soak on plywood.

3.2 INSTALLATION

- .1 Install members true to line, levels and elevations, square and plumb.
- .2 Construct continuous members from pieces of longest practical length.
- .3 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding, electrical equipment mounting boards, and other work as required.
- .4 Align and plumb faces of furring and blocking to tolerance of 1:600.
- .5 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
- .6 Install fire retardant plywood backboards for all electrical panel applications, and secure using galvanized steel fasteners, in accordance with sheathing manufacturer's recommendations and fire rating requirements.
- .7 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .8 Countersink bolts where necessary to provide clearance for other work.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

- .1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.
- .2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.
- .3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.
- .4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

- .1 Provision of all labour, materials, equipment and incidental services necessary to provide all Finish Carpentry work including the following:
 - .1 Supply and installation of all miscellaneous wood & trim.
 - .2 Installation of all wood doors.
 - .3 Installation of all hollow metal doors and frames.
 - .4 Installation of all finish hardware.
 - .5 Installation of architectural wood casework and hardware.

1.3 REFERENCES

- .1 CSA-B111; Wire Nails, Spikes and Staples.
- .2 CAN/CSA-G164; Hot Dip Galvanizing of Irregularly Shaped Articles.
- .3 CSA-O115; Hardwood and Decorative Plywood.
- .4 CSA-O112 Series; CSA Standards for Wood Adhesives.
- .5 CAN/CSA-O141; Softwood Lumber.
- .6 CSA-O151; Canadian Softwood Plywood.
- .7 CAN/CGSB-11.3; Hardboard.
- .8 ANSI A208.1; Particleboard, Mat-formed Wood.
- .9 ANSI A208.2; Medium Density Fiberboard.
- .10 AWMAC / AWI Quality Standards Illustrated.
- .11 National Lumber Grades Authority (NLGA) Standard Grading Rules for Canadian Lumber.
- .12 National Hardwood Lumber Association (NHLA) Rules for the Measurement and Inspection of Hardwood and Cypress.

1.4 SAMPLES

- .1 Submit samples of each type and profile of all standing and running trim, in accordance with Section 01 30 00. Submit samples of finished Carpentry items in the finishes specified for review by the Consultant. Approved samples shall represent the minimum quality of work for this section.

1.5 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 30 00.

.2 Indicate details of construction, profiles, jointing, fastening and other related details.

.3 Indicate all materials, thicknesses, finishes and hardware.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Protect materials against dampness during and after delivery.

.2 Store materials in ventilated areas, protected from extreme changes of temperature or humidity.

2 PRODUCTS

2.1 LUMBER MATERIALS

.1 Hardwood Lumber for Finished Work - Exposed to View: AWMAC/AWI QSI - Section 100 Grade II and the following requirements: with straight vertical grain, of quality suitable for transparent finish;

.1 Trim, edging and other solid members exposed to view, minimum 19mm thick, sizes as noted on the drawings:

.1 Species:

.1 Rift cut White (Hard) Maple (straight grain) for trim.

.2 Softwood Lumber for Concealed Work (interior blocking and furring): AWMAC/AWI QSI - Section 100 Grade 3, of quality suitable for opaque finish;

.1 Cabinet Frame and Internal Construction(concealed):

.1 Species: Eastern or Northern Pine, Yellow Poplar, Yellow Birch, Basswood or equivalent "whitewood".

2.2 PANEL MATERIALS

.1 Shelving: 19mm thickness for spans up to 700, 25mm thickness for longer spans. Poplar or Birch hardwood core veneers, White Birch face veneer.

.2 Canadian Softwood Plywood: to CSA-O151, G2S, standard construction, thickness as indicated.

.3 Particleboard: interior mat-formed wood, to ANSI-A208.1, Grade M-2, minimum density 700 kg/m³, thickness as indicated.

.4 Hardboard: to ANSI A135.4, Class 1 (tempered), thickness as indicated.

.5 Medium Density Fibreboard: to ANSI-A208.2, Grade 130, density 769 kg/m³, thickness as indicated.

2.3 ACCESSORIES

.1 Nails and staples: to CSA-B111; galvanized to CAN/CSA-G164 for exterior work, interior humid areas and for treated lumber; plain steel finish elsewhere.

.2 Wood screws: to CSA-B35.4, electroplated steel, type and size to suit application.

.3 Splines: wood or metal.

2.4 ADHESIVES

.1 Contact Adhesive: conforming to CAN/CGSB-71.20.

.2 Hot Melt Adhesive: waterproof type, as approved by the Consultant.

.3 Sealer: water-resistant sealer or glue.

2.5 FINISHES

.1 Shop finish work of this section in accordance with AWMAC/AWI QSI Section 1500 and the following; field finish only where shop finish is not practical or desirable.

.2 Provide Custom Grade Finish as amended by the following:

.1 Finish of concealed areas and back priming: apply two coats of sealer to concealed surfaces and backs.

.3 Finish System (Interior): Conversion Varnish:

.1 Sealer (conversion varnish reduced).

.2 Sand (240-320 Grit) to expose 75% of wood grain.

.3 Top Coat satin sheen (25-35 Units @60°), high solids content conversion varnish.

.4 Use wood filler which matches surrounding surfaces and of types recommended for applied finishes.

3 EXECUTION

3.1 INSTALLATION

.1 Do finish carpentry to AWMAC/AWI Quality Standards Illustrated (QSI), except where specified otherwise.

.2 Scribe and cut as required, fit to abutting walls, and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets, or other projecting, intersecting or penetrating objects. Form joints to conceal shrinkage.

.3 Perform door and frame installation in accordance with National Fire Codes, Volume 4, produced by National Fire Protection Association (NFPA) 80.

3.2 CONSTRUCTION

.1 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.

.2 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.

.3 Set finishing nails to receive filler. Where screws are used to secure members, countersink screw in round cleanly cut hole and plug with wood plug to match material being secured.

.4 Replace items of finish carpentry with damage to wood surfaces including hammer and other bruises.

.5 Panelling: Secure panelling using concealed French Cleat hangers.

3.3 DOOR INSTALLATION

.1 Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08 71 00.

- .2 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 top of carpet and thresholds: 13 mm (6 mm at rated doors).
 - .3 Adjust operable parts for correct function.
- 3.4 **FRAME INSTALLATION**
- .1 Set frames plumb, square, level and at correct elevation.
 - .2 Secure anchorages and connections to adjacent construction.
 - .3 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 centre of head for openings over 1200 mm wide. Remove temporary spreaders after frames are built-in.
 - .4 Make allowances for deflection of structure to ensure structural loads are not transmitted to frames.
 - .5 Touch up galvanized finishes damaged during installation with zinc-rich primer.
- 3.5 **INSTALLATION OF FINISH HARDWARE**
- .1 Install finish hardware in accordance with manufacturer's supplied templates and installation instructions. Where application of finishing hardware has not been done in a first class manner, replace such work.
 - .2 Adjust all hardware for correct function.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

- .1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.
- .2 The Construction Manager shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.
- .3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Construction Manager for correction prior to commencing the work of this section.
- .4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

- .1 Provision of all labour, materials, equipment and incidental services necessary to provide prefinished steel siding, as follows:
 - .1 Siding stock (face sheets)
 - .2 Corner and edge trims
 - .3 Fasteners
 - .4 Z-girts & support framing
 - .5 Underlayment membranes
 - .6 Sealants
 - .7 Installation

1.3 SYSTEM DESCRIPTION

- .1 Siding Assemblies
 - .1 Wall assemblies are based on prefabricated metal siding mounted on a metal subframe fastened to the building substrate. Refer to wall assembly schedules on the drawings.
- .2 Design Requirements
 - .1 Use Limit States Design Principles using factored loads and resistances.
 - .2 Refer to Structural drawings for loads. Load factors shall be in accordance with the National Building Code of Canada.
 - .3 Deflection of sheet steel cladding components due to uniformly distributed loads (wind, snow) shall not exceed L/90 of the span for walls.
- .3 Performance Requirements
 - .1 All materials provided under this section shall meet or exceed CSSBI 20M.
 - .2 Appearance: Concealed fasteners; exposed surfaces free of distortion, twist, waves and buckles.

- .3 Structural Loads: resist positive and negative wind pressures expected in this geographical region with a maximum allowable deflection of 1/180 of span. Components shall not vibrate when subjected to the effects of wind.
- .4 Moisture control: prevent infiltration of water and snow into wall system. Provide means of draining space between insulation and exterior cladding.
- .5 Thermal Movement: accommodate expansion and contraction of component parts without causing buckling, failure of joint seals, undue stress on fasteners and other detrimental effects.
- .6 Structural Movement: accommodate movement between wall system and building structure caused by structural movement, without permanent distortion, racking of joints, breakage of seals or water penetration.

1.4 REFERENCES

- .1 ASTM A653/A653M; Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 ASTM A792/A792M; Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- .3 ASTM A924/A924M; Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- .4 ASTM A1008/A1008M; Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, and High-Strength Low-Alloy with Improved Formability.
- .5 ASTM-D523; Test Method for Specular Gloss.
- .6 ASTM-D822; Practice for Conducting Tests on Paint and Related Coatings and Materials using Operating Light -and water - Exposure Apparatus (Carbon-Arc Type) for Testing.
- .7 ANSI B18.6.4; Screws, Tapping and Metallic Drive, Inch Series, Thread Forming and Cutting.
- .8 CSSBI 20M; Standard for Sheet Steel Cladding for Architectural, Industrial and Commercial Building Applications.
- .9 CSA S16.1; Steel Structures for Buildings, Limit States Design.
- .10 CSA-S136; Cold Formed Steel Structural Members.

1.5 COORDINATION

- .1 Sequence work so that installation of steel siding panels and support framing coincides with installation of substrate preparation without causing delay to the Work.

1.6 QUALITY ASSURANCE

- .1 Manufacturer/Fabricator
 - .1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.
- .2 Installation/Application
 - .1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

- .3 Documentation
 - .1 If requested by the Consultant, submit documentation to support the competency of firms and personnel.
- 1.7 DELIVERY, STORAGE AND HANDLING
 - .1 Deliver Products to site in manufacturer's original crating or packaging, with labels clearly identifying materials and installation locations.
 - .2 At the time of delivery, visually inspect all materials for damage. Note any damaged to materials on the receiving ticket and immediately report to the shipping company and the material manufacturer. Remove damaged materials from the site immediately.
 - .3 Store materials in accordance with the manufacturer's instruction until ready for installation. Store materials in a covered area, away from water, on a flat, level surface with adequate support to prevent sagging.
 - .4 Protect materials during handling to prevent damage.
 - .5 Acclimatization: All components shall be removed from the packaging and stacked flat with spacers between the pieces in their final environment for a minimum 3-4 days prior to installation.
- 1.8 PROJECT CONDITIONS
 - .1 Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.
- 1.9 ENVIRONMENTAL CONDITIONS
 - .1 Maintain material and ambient temperature minimum 10°C during installation and for at least 24 hours after installation.
- 1.10 EXTENDED WARRANTY
 - .1 Submit to the Owner a standard Warranty Certificate from the panel system manufacturer warranting the siding for a period of ten (10) years from date of Substantial Performance.
- 2 PRODUCTS**
 - 2.1 MATERIALS
 - .1 Furring Sections: cold-rolled, commercial grade structural quality sheet steel (SS), minimum (18 gauge) 1.519mm base metal thickness; zinc-coated to ASTM A653/A653M, coating designation Z275. Provide "hat" section furring strips where indicated.
 - .2 Fasteners: screws to ANSI B18.6.4, self-drilling, self-tapping, cadmium-plated steel, with colour-matched heads. Use concealed fasteners wherever possible.
 - .3 Prefinished Steel Siding Sheets
 - .1 G-90 Grade and AZ150 Grade A. Sheets shall be full height with no intermediate seams.

- .2 Finish: system shall be factory-applied on a continuous coil coating line. Top (exposed) side colour coated to dry film thickness of 17.5 to 22.5 microns over 6.25 to 8.75 micron prime coat, for total dry film thickness of 23.75 to 31.25 microns. Bottom (reverse) side primer coated, dry film thickness of 6.25 microns. Finish shall conform to all tests for adhesion, flexibility, and longevity specified by the coating supplier.
 - .1 Bottom (Reverse Side): Silicon-Modified Polyester Paint; factory-applied, thermosetting, 2-coat silicon-modified polyester paint system; colour - primer grey.
 - .2 Top (Exposed Side): factory-applied, thermosetting, 2-coat silicon-modified polyester paint system.
- .4 Profile/Systems
 - .1 Siding System:
 - .1 Profile: (32") concealed fastener system, 813mm wide panels, with no intermediate rib or fold; Architectural Panel, by Havelock Metal Co., or approved equivalent.
 - .1 Thickness: 26 gauge G-90 Grade and AZ150 Grade A.
 - .2 Colour:
 - .1 Base Bid: Standard Finish – Regent Grey.
 - .2 Alternative Price: Textured Matte Finish - Textured Charcoal.
- .5 Flashing and Trims: 24 gauge profiles and shapes as required to be supplied by the Manufacturer to complete installation of metal siding. Colour and finish to match siding sheet.
 - .1 G-90 Grade A and AZ150 Grade A; profiles and shapes as indicated on the drawings including any custom project specific flashings and trims determined by the Contractor and Siding Subcontractor and approved by Consultant.
- .6 Substructure:
 - .1 Vertical & Horizontal Girts:
 - .1 Vertical girts supporting panels are 1.2mm (18 gauge) thick, galvanized zinc-coated steel to ASTM A653 with Grade A coating Z275.
 - .2 Preformed galvanized metal sheet, 1.2mm (18 gauge) thick, minimum base steel nominal thickness, notched or perforated for drainage.
 - .3 Girt locations as determined and approved by structural engineer, to align with modular panel fasteners spaced based on manufacturer's panel load data.
 - .4 Front fastened systems:
 - .1 Girts behind panels to be vertical to allow vertical ventilation.
 - .2 Preformed galvanized steel girts to be used at inside and outside corners to ensure corners are straight and closed visually, and used at intermediary panel locations and where panels come together.
 - .3 Girts provided by Engineered Assemblies; (905) 816-2218, or an approved equivalent.
 - .5 Cavity behind panel: Minimum 10mm (3/8"); maximum 25mm (1") of unrestricted space.
 - .6 Substructure to account for control joints of building to ensure a girt is not connected across the control joint.

- .7 Install panels across one set of vertical girts to ensure that expansion and contraction of the substrate is controlled within framing members.
- .2 Flashings: Prefinished steel as specified in Section 07 62 00.
 - .1 Flashings at edges, top and bottom of panel system as per architectural drawings.

3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalogue installation instructions and product carton instructions for installation.

3.1 EXAMINATION

- .1 Do not begin installation until substrates have been properly prepared.
- .2 Verification of Conditions:
 - .1 Examine substrates to receive work and surrounding adjacent surfaces for conditions affecting installation. Coordinate with related sections to ensure proper dimensions are maintained.
 - .2 Verify site dimensions by accurate field measurements so that work will be accurately designed, fabricated and fitted to the structure.
 - .3 All penetrations through the façade for the work of other trades shall be fitted with a watertight sleeve. Verify flashings are in place, sealed with waterproof membrane and covered with building membranes.
 - .4 Maintain sheathing membrane integrity.
- .3 Notify Contractor in writing of any conditions that are not acceptable.
- .4 Proceed with installation after verification and correction of surface conditions acceptable to manufacturer.

3.2 INSTALLATION

- .1 General
 - .1 Install cladding in accordance with manufacturer's written instructions.
 - .2 Maintain joints in exterior cladding, true to line, tight fitting, hairline joints.
 - .3 Attach components in manner not restricting thermal movement.
- .2 Application
 - .1 Fasten girts to substrate using self-drilling, hex-head, stainless steel anchor screws at 305mm o.c. maximum. Spacing shall be in accordance with engineered design.
 - .2 Install cap sheets to support frame with colour-matched screws.
 - .3 Install continuous coping, outside corners, edgings, drip-cap, and other flashings as indicated, and as required to complete the siding installation.

- .4 Provide all trims and flashings as required. Cut and fit around penetrations allowing 3mm gap only.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

- .1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.
- .2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.
- .3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.
- .4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

- .1 Provision of all labour, materials, equipment and incidental services necessary to provide pre-finished metal roofing systems for sloped applications.

1.3 REFERENCES

- .1 ANSI B18.6.4-1981; Screws, Tapping and Metallic Drive, Inch Series, Thread Forming and Cutting.
- .2 ASTM A591/A591M-98; Specification for Steel Sheet, Electrolytic Zinc-Coated for Light Coating Mass Applications.
- .3 ASTM-A653/A653M-00; Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .4 ASTM D523-89 (1999); Test Method for Specular Gloss.
- .5 ASTM D822-96; Practice for Conducting Tests on Paint and Related Coatings and Materials using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus.
- .6 CSA-S136-94; Cold Formed Steel Structural Members.
- .7 CSA B111-1974; Wire Nails, Spikes and Staples.

1.4 Design Criteria

- .1 Design complete roof system to withstand dead loads, snow load and build-up, and wind loads including uplift, calculated in accordance with National Building Code of Canada and applicable local regulations or as shown on the drawings.
- .2 Design roof panel system to allow for thermal movement of components.

1.5 SUBMITTALS

- .1 Samples: Submit duplicate 300mm x 300mm samples of roofing material, of colour and profile specified in accordance with Section 01 30 00.
- .2 Shop Drawings
 - .1 Submit shop drawings in accordance with Section 01 30 00.
 - .2 Indicate arrangement of pre-finished roof sheet including joints, types and locations of supports, fasteners, and any special shapes.

- .3 Fully detail all components of the system.
- .4 Each drawing shall bear the signature and stamp of a Professional Engineer registered to practice in the Province of Ontario.

1.6 QUALITY ASSURANCE

- .1 Manufacturer/Fabricator
 - .1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.
- .2 Installation/Application
 - .1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.
- .3 Documentation
 - .1 If requested by the Consultant, submit documentation to support the competency of firms and personnel.

2 PRODUCTS

2.1 MATERIALS

- .1 Sheet Steel: Cold-rolled, commercial grade structural quality sheet steel (SS), to ASTM A924/A924M minimum 26 gauge base metal thickness;
 - .1 Zinc-Coated (Galvanized) & Zinc-Iron Alloy-Coated (Galvannealed): ASTM A653/A653M, coating designation AZ150.

2.2 ROOF SYSTEM COMPONENTS

- .1 Underlayment: to ASTM-D1970, Self-adhesive rubberized asphalt, 1.13mm thick, with slip-resistant surface;
 - .1 Ice & Water Shield, by W.R. Grace and Co.
 - .2 Bakor Eaveguard, by Canada Specialty Products.
 - .3 ArmourGard by IKO Industries Ltd.
 - .4 GripGard by EMCO Limited.
 - .5 Weather Watch, by GAF Materials Corporation.
- .2 Prefinished Roof Sheet: Cold-rolled, commercial grade sheet steel, in accordance with 2.2.1, minimum 26 gauge base metal thickness. Finish system shall be factory-applied on a continuous coil coating line. Top (exposed) side colour coated to dry film thickness of 17.5 to 22.5 microns over 6.25 to 8.75 micron prime coat, for total dry film thickness of 23.75 to 31.25 microns. Bottom (reverse) side primer coated, dry film thickness of 6.25 microns. Finish shall conform to all tests for adhesion, flexibility, and longevity specified by the coating supplier. Strippable film shall be applied to the topside of the painted coil to protect the finish during fabrication, shipping, and field handling.
 - .1 Silicon-Modified Polyester Paint (SMP): factory-applied, thermosetting, 2-coat silicon-modified polyester paint system; Colour as selected by the Consultant from the manufacturer's full available colour range;
 - .1 *Weather XL™*, by VicWest,

- .2 Profile: 405mm wide, 25mm depth, 25mm high standing seam, Legacy Mechanical Profile by Havelock Metal, Peterborough, no intermediate rib, snap lock seaming, 26 gauge, colour as selected by Consultant.
 - .3 Metal Flashing and Trim: Material and finish to match roof sheet.
- 2.4 ACCESSORIES
 - .1 Fasteners: nails to CSA B111, screws to ANSI B18.6.4, purpose made cadmium plated steel.
 - .2 Sealants: Refer to Section 07 92 00.
- 2.5 FABRICATION
 - .1 Fabricate roof components to comply with dimensions, profiles, gauges and details as shown on the shop drawings, including roof, and all required flashings.
 - .2 Fabricate roof components factory ready for field installation.
- 3 EXECUTION**
 - 3.1 ROOFING INSTALLATION
 - .1 Roll out and apply underlayment in shingle fashion starting at low edge of roof. Overlap minimum 50mm. Smooth out all wrinkles and fish-mouths. Do not pierce membrane to remove trapped air. Install membrane underlayment over entire deck, using methods recommended by manufacturer.
 - .2 Install exterior pre-finished roof panels, using manufacturer's proper construction procedure. Ensure batten is positively locked for full length of roof. Field cut miters where applicable and install batten cap.
 - .3 Provide notched and formed closures, sealed against weather penetration at ridges.
 - 3.2 FLASHING INSTALLATION
 - .1 Use concealed fasteners where appropriate. Exposed fasteners to be of same colour as roof sheet.
 - .2 Lock end joints and caulk to provide weather-tight seal.
 - .3 All metal flashing shall have flexible membrane flashing back-up.
 - 3.3 SEALANTS
 - .1 Caulk joints between siding and adjacent materials in accordance with Section 07 92 00.
 - 3.4 TOUCH-UP AND CLEANING
 - .1 Touch up minor paint abrasions with touch-up paint.
 - .2 Clean roof by dry-wiping.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

- .1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.
- .2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.
- .3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.
- .4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

- .1 Provision of all labour, materials, equipment and incidental services necessary to provide sheet metal flashing and trim.

1.3 REFERENCE STANDARDS

- .1 ASTM A653; Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality.
- .2 ASTM D523; Test Method for Specular Gloss.
- .3 ASTM D822; Recommended Practice for Operating Light -and water - Exposure Apparatus (Carbon-Arc Type) for Testing Paint, Varnish, Lacquer and related Products.
- .4 CSA B111; Wire Nails, Spikes and Staples.
- .5 Canadian Roofing Contractors Association.

1.4 SAMPLES

- .1 Submit duplicate 50x50mm samples of each type of sheet metal material, colour and finish in accordance with Section 01 30 00.

2 PRODUCTS

2.1 MATERIALS

- .1 Sheet Steel Flashing (pre-finished): Factory finish baked enamel paint meeting standards specified in C.S.S.B.I. Technical Bulletin 20M-91 zinc-coated steel meeting ASTM A653 Grade A. Steel metal core thickness of 0.617mm (24 gauge) minimum. Galvanized zinc-coating designation Z275 to ASTM A653. All exterior finishes shall conform to C.S.S.B.I. Technical Bulletin 20M-91.
 - .1 Colour: as selected by Consultant.

2.2 MISCELLANEOUS MATERIALS

- .1 Flashing nails: 2.67mm hot dipped zinc coated, annular ringed.
- .2 Flashing screws: Hot dipped zinc coated, self-drilling.
- .3 Dielectric separator: Bituminous paint: Isolation coating, acid and alkali resistant asphaltic paint in accordance with MPI Architectural Painting Specification Manual "Approved Product" listing MPI#35.

- .4 Plastic cement: To CAN/CGSB-37.5-M.
- .5 Flexible Flashing:
 - .1 Not less than 0.5 mm (20 mils) thick and be compatible with all other materials being used.
 - .2 Mastic compatible and approved for use with the flashing material.
 - .3 Acceptable manufacturers:
 - .1 Vycor® Plus Self-Adhered Flashing, by W.R. Grace & Co.,
 - .2 Blueskin TWF, self-adhering, by Monsey Bakor, Inc.
 - .3 Flam Stick 1100, self-adhering, by Soprema Inc.
 - .4 Sealtight Air-Shield, by W.R. Meadows of Canada.

2.3 FABRICATION

- .1 Make flashing of pre-finished sheet steel for all cap flashings, for all flashings adjacent to roofing at roof edges and where exposed to view from ground. Make flashing for other locations, of plain galvanized metal as follows:
 - .1 Use 0.617mm metal core thickness (24 gauge) except where otherwise indicated.
 - .2 Use 0.711mm metal core thickness (22 gauge) for concealed fastening strips.
- .2 Where indicated on drawings, fabricate aluminum flashings from minimum 2mm thick sheet aluminum, with Class 1 clear anodized finish.
- .3 All straight run joints shall be S-Lock in roof flashings.
- .4 Make joints to allow for thermal movement, space S-Lock joints at 1500mm maximum centres.
- .5 Make flashings for building into masonry and concrete so joints can be lapped 100 mm or more.
- .6 Strengthen free edges of metal flashings by folding to form 13 mm hem.
- .7 Make flashings to curbs, walls, and parapets a minimum of 200 mm high, where possible, unless noted otherwise on Drawings.
- .8 Where curb-mounted roof penetrations are not required, provide flashing sleeves and collars for pipes and conduit extending through roof. Sleeves soldered to piece of sheet metal extending at least 150 mm onto surrounding roof.
- .9 Make joints for corners and intersections with standing seams except where exposed of pre-finished metal when seams shall be flat locked.
- .10 All bends machine made and sharp, straight and true to line.
- .11 Flashings back painted with bituminous paint prior to installation.
- .12 All flashing exposed to view shall be equal length sections.

3 EXECUTION

3.1 INSTALLATION

- .1 Install sheet metal work in accordance with CRCA FL series details and as detailed on the drawings.

- .2 Use concealed fastenings except where approved before installation.
- .3 Provide underlay under sheet metal. Secure in place and lap joints minimum 100mm.
- .4 Counter-flash roof membrane flashings at intersections of roof with vertical surfaces. Flash joints using S-lock seams forming tight fit over hook strips as detailed.
- .5 Lock end joints and caulk with sealant.
- .6 Install surface mounted reglets true and level. Turn top edge of flashing 13mm out from surface of reglet.
- .7 Caulk flashing at all reglets with sealant.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

- .1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.
- .2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.
- .3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.
- .4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

- .1 Provision of all labour, materials, equipment and incidental services necessary to provide caulking and sealing of joints between building components, including joint preparation.
 - .1 Exterior Joints
 - .1 Perimeter of opening frames in walls.
 - .2 Joints between dissimilar materials.
 - .2 Interior Joints
 - .1 Perimeter of opening frames in walls.

1.3 REFERENCE STANDARDS

- .1 ASTM C920; Standard Specification for Elastomeric Joint Sealants.
- .2 CAN/CGSB-19-GP-5M; Sealing Compound, One Component, Acrylic Base, Solvent Curing.
- .3 CAN/CGSB-19-GP-14M; Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.
- .4 CAN/CGSB-19.17; Sealing Compound, One Component, Acrylic Emulsion Base.
- .5 CAN/CGSB-19.13; Sealing Compound, One Component, Elastomeric, Chemical Curing.
- .6 CAN/CGSB-19.24; Sealing Compound, Multi-Component, Chemical Curing.

1.4 QUALITY ASSURANCE

- .1 Manufacturer/Fabricator
 - .1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.
- .2 Installation/Application
 - .1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

- .3 Documentation
 - .1 If requested by the Consultant, submit documentation to support the competency of firms and personnel.
- .4 Pre-installation Meeting
 - .1 Convene a pre-installation meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:
 - .1 Contractor (Site Superintendent & Project Manager),
 - .2 Installation Subcontractor (Site Foreman & Project Manager),
 - .3 Product Manufacturer and/or Distributor (Technical Representatives),
 - .4 Related Subcontractors (ie. Mechanical and/or Electrical), and
- 1.5 MOCK-UP
 - .1 Test sealant in contact with samples of materials to be caulked to ensure that proper adhesion will be obtained and no staining of the material will result. Prepare sample joints at the site of each type of sealant for each joint condition to provide mock-up as specified in Section 01 30 00.
- 1.6 SUBMITTALS
 - .1 Submit product list with manufacturer's product name for each sealant to be used for this project, along with recommendations for use of the sealant, before commencing joint sealing.
- 1.7 ENVIRONMENTAL CONDITIONS
 - .1 Apply sealants only to completely dry surfaces, and at air and material temperatures above minimum established by manufacturer's specifications.
- 1.8 EXTENDED WARRANTY
 - .1 Submit a warranty for the work of this Section for a period of three(3) years from the Date of Substantial Performance, including materials and application.
 - .2 Replacement of joint sealants shall include removal of defective materials, preparation for and application of new material, and the repair and making good of damaged adjacent materials.
 - .3 Defective joint sealant installation shall include, but not be restricted to, joint leakage, hardening, cracking, crumbling, melting, bubbling, shrinkage, running, sagging, change of colour, loss of adhesion, loss of cohesion, and staining of adjoining of adjacent materials or surfaces.
- 2 PRODUCTS**
- 2.1 MATERIALS
 - .1 All materials utilized in a sealant system shall be compatible and non-staining.
 - .2 Specified proprietary products are minimum acceptable quality. Products of other manufacturers of equal or superior quality will be acceptable where specifically approved by Consultant.
 - .3 Provide sealant formulation recommended by manufacturer for type of joint, substrate and service conditions applicable.
- 2.2 SEALANTS

- .1 Refer to Caulking Schedule for utilization of the following sealants:
 - .1 **Sealant Type 1:** not used.
 - .2 **Sealant Type 2:** One-part, moisture-cure (fast cure) polyurethane sealant, to CAN/CGSB-19.13, Classification MC-2-25-B-N; colours as selected by the Consultant;
 - .1 DYMONIC FC or Vulkem 116, by Tremco (Canada) Ltd.
 - .2 "Dynatrol® I-XL", by Pecora Corporation.
 - .3 "Sonnenborn Sonnolastic® NP 1™", by BASF Building Materials.
 - .3 **Sealant Type 3:** One-part, acrylic latex sealant, to CAN/CGSB-19-GP-5M;
 - .1 "TREMIFLEX® 834", by Tremco (Canada) Ltd.
 - .2 "RCS20 Acrylic Urethane", by GE Advanced Materials.
 - .3 "AC20™", by Pecora Corporation.
 - .4 **Sealant Type 4:** to ASTM C920, Type S, Grade NS, Class 25, Use NT, G, A, and O, one component acetoxysilicone containing non-toxic fungicidal agents; colours as selected by the Consultant. Acceptable products are:
 - .1 "Dow Corning® 786", by Dow Corning Canada Limited.
 - .2 "Sanitary SCS1700", by GE Advanced Materials.
 - .3 "Tremsil® 200", by Tremco (Canada) Ltd.
 - .4 "Sonnenborn OmniPlus™", by BASF Building Materials.
 - .5 **Sealant Type 5:** One-part, medium modulus, neutral cure silicone sealant, to CAN/CGSB-19.13, Classification MCG-2-25-A-L;
 - .1 SPECTREM® 2, by Tremco (Canada) Ltd.
 - .2 "Dow Corning® 795", by Dow Corning Canada Limited.
 - .6 **Sealant Type 6:** not used.
 - .7 **Sealant Type 7:** not used.
 - .8 **Sealant Type 8:** One-part, low modulus, non-staining, neutral-cure silicone sealant, to CAN/CGSB-19.13; colour as selected by the Consultant;
 - .1 "SPECTREM® 3", by Tremco (Canada) Ltd.
 - .2 "Dow Corning® 791", by Dow Corning Canada Limited.
 - .3 "Silpruf® SCS 2000", by GE Advanced Materials.
 - .4 "Sika-Sil®C 995", by Sika Canada Inc.
 - .5 "Sonnenborn Omniseal 50™", by BASF Building Materials.
 - .6 "864" by Pecora.
 - .2 Colours of sealants will be selected by the Consultant from manufacturers full available ranges of colour.
- 2.3 ACCESSORIES
- .1 Primer: Type recommended by sealant manufacturer.
 - .2 Backer Rods: 30% greater diameter than joint width, with Shore-A hardness of 20, and 830-900Kpa tensile strength;
 - .1 Vertical Surfaces: extruded polyolefin rod; SofRod by Tremco Canada (div. of RPM Canada).
 - .2 Horizontal Surfaces: closed cell polyethylene rod; Standard Backer Rod by Tremco Canada (div. of RPM Canada).

- .3 Bond Breaker: pressure sensitive plastic tape, for installation where minimum specified depth of joint is unobtainable; 3M #266/#481, or Valley Industries #40.

3 EXECUTION

3.1 EXAMINATION

- .1 Before commencing joint sealing, verify at the site that joint configuration and surfaces have been provided as specified in other Sections to meet intent of sealant specification.
- .2 Verify that joint conditions will not adversely affect execution, performance or quality of completed sealed joints, and that they can be put into acceptable condition by means of preparation specified in this Section. If in doubt, verify site conditions together with manufacturer's representative of the sealant to be applied.
- .3 Verify that sealers and coatings applied to sealant substrates are compatible with the sealant used and that full bond between sealant and substrate is attained. Request samples of the sealed or coated substrate from their fabricators for testing of compatibility and bond if necessary.
- .4 Verify that specified environmental conditions are ensured before commencing joint sealing.
- .5 Defective sealed joints resulting from application to unsatisfactory joint conditions will be considered the responsibility of this Section.
- .6 Examine joint sizes for anticipated movement, and for proper width/depth ratio per manufacturer's recommendations for specified sealant.

3.2 PREPARATION

- .1 Remove loose mortar, dust, oil, grease, oxidation, mill scale, coatings and all other materials affecting bond of compounds from surfaces to which sealant compounds must adhere, except for painted surfaces, by brushing, scrubbing, scraping or grinding.
- .2 Clean down caulked metal surfaces with clean cellulose sponges or rags soaked in solvent recommended by sealant manufacturer, and wipe dry with clean cloths. Ensure that solvent is not injurious to painted surfaces.
- .3 Use methods of preparation suitable for substrate as recommended by sealant manufacturer, and that does not damage adjacent surfaces.
- .4 Ensure that releasing agents, coatings or other treatments have either not been applied to joint surfaces, or that they are entirely removed.
- .5 Where necessary to protect adjacent surfaces, mask adjacent surfaces with tape prior to priming and/or caulking.

3.3 APPLICATION

- .1 Except where specified in other Sections, seal open joints in surfaces exposed to view, and to make the building weather-tight and airtight as applicable; as indicated typically on the Drawings, and as otherwise specified and instructed by Consultant. Refer to Caulking Schedule at the end of this section.

- .2 Prime surfaces to receive sealants as required by substrate and manufacturer's specifications to ensure positive and permanent adhesion, and to prevent staining.
- .3 Pack joints tightly with backer rod set at depth specified for sealant. Fill other voids with filler.
- .4 Install joint backing material or apply bond breaker tape to achieve correct joint depth and prevent three-sided adhesion. Install bond breaker tape in bottom of joints in lieu of sealant backing where proper depth cannot be obtained when backing is installed.
- .5 Maintain depth of sealant as follows:

JOINT WIDTH	JOINT DEPTH
6mm (minimum)	6mm
6 to 13mm	depth = joint width
13 to 20mm	depth = ½ joint width

- .6 Maximum widths of joints are as follows:
 - .1 Exterior: 20mm.
 - .2 Interior: 10mm.
- .7 Perform joint sealing in accordance with compound manufacturer's specifications, under manufacturer's supervision, and using pressure guns and other equipment as approved by the manufacturer.
- .8 Finish joints with a full bead so that they are smooth; and free from ridges, wrinkles, air pockets and embedded foreign materials. Tool surface of joints to a slight concave profile.
- .9 Caulk joints in site-painted materials after surfaces have been prime painted.
- .10 Do not allow sealants to cover or spot surfaces outside of joints. Use masking tape protection to prevent coating of adjacent surfaces if necessary.
- .11 All work shall be performed in accordance with manufacturer's specifications for sealants specified.

3.4 CLEANING

- .1 Remove sealant smears and droppings, and masking tape immediately on completion of joint sealing.
- .2 Do not use chemicals, scrapers, or other tools, which would damage surfaces from which excess compounds, or droppings are removed. Make good materials damaged by cleaning by the installer of the damaged material and at the expense of this Section.

3.5 CAULKING SCHEDULE

Sealant Type 2	<ul style="list-style-type: none">• Interior joints between dissimilar materials.• Interior joints at perimeter of metal door and window frames.
Sealant Type 3	<ul style="list-style-type: none">• Interior non-movement joints 6mm or less for painting (painter's caulk).
Sealant Type 4	<ul style="list-style-type: none">• Interior joints between millwork and wall surfaces.

Sealant Type 5	<ul style="list-style-type: none">• Glass to glass joints.• Glass to metal joints.
Sealant Type 8	<ul style="list-style-type: none">• Exterior joints between dissimilar building veneer materials.• Exterior joints at perimeter of all door and window frames.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

- .1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.
- .2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.
- .3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.
- .4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

- .1 Provision of all labour, materials, equipment and incidental services necessary to supply all steel (hollow metal) doors, frames, and screens.
- .2 This section shall provide all factory fabrication, hardware preparation, and accessories specified herein.

1.3 REFERENCE STANDARDS

- .1 ASTM A1008/A1008M; Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, and High-Strength Low-Alloy with Improved Formability.
- .2 ASTM A653/A653M; Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .3 ASTM A924/A924M; Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- .4 ANSI/BHMA A156 Series; Hardware.
- .5 CSA-G40.20/G40.21; General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .6 CSA W59; Welded Steel Construction (Metal Arc Welding).
- .7 CAN4-S104; Fire Tests of Door Assemblies.
- .8 CAN4-S105; Fire Door Frames.
- .9 CAN/ULC-S102; Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
- .10 CAN/ULC-S702; Standard for Mineral Fibre Thermal Insulation for Buildings.
- .11 CAN/ULC-S704; Standard for Thermal Insulation, Polyurethane and Polyisocyanurate, Boards, Faced.
- .12 CAN/ULC-S770; Standard for Determination of Long-Term Thermal Resistance of Closed-Cell Thermal Insulation Foams.
- .13 Canadian Steel Door and Frame Manufacturers' Association, (CSDFMA) Canadian Manufacturing Specifications for Steel Door and Frames, 1990.
- .14 CAN/CGSB-1.181; Ready Mixed Organic Zinc-Rich Coating.
- .15 CGSB 41-GP-19Ma; Rigid Vinyl Extrusions for Windows and Doors.
- .16 NFPA-80; Fire Doors and Fire Windows.
- .17 UL Building Materials Directory.
- .18 ULC List of Equipment and Materials, Volume 2.

- .19 ITS/WH Certification Listings.

1.4 REQUIREMENTS OF REGULATORY AGENCIES

- .1 Steel fire rated doors and frames shall be labelled and listed by an organization accredited by Standards Council of Canada in conformance with CAN4-S104 and CAN4-S105 for ratings specified or indicated.
- .2 Install labelled, fire resistance rated, steel doors and frames in accordance with NFPA-80 except where specified otherwise.

1.5 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 30 00.
- .2 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, glazed and louvred openings, arrangement of hardware and fire ratings.
- .3 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings and finishes.

2 PRODUCTS

2.1 MATERIALS

- .1 Steel Sheet: Cold-rolled, commercial grade steel sheet, Type A, to ASTM A1008/A1008M 1.519mm base metal thickness;
 - .1 Hot-dip Galvanized/Galvannealed: zinc-coated to ASTM A653/A653M, coating designation (G90) Z275, for all doors and frames.
- .2 Insulation (steel stiffened doors)
 - .1 Semi-Rigid Mineral Fibre: processed from rock, slag, or glass, to CAN/ULC-S702 Type 1, minimum density 24 kg/m³;
- .3 Primer: Zinc-rich rust inhibitive type to CAN/CGSB-1.181.

2.2 ACCESSORIES

- .1 Door Bumpers: Single stud rubber/neoprene type.

2.3 FABRICATION

- .1 General
 - .1 Fabricate doors and frames as detailed, to CSDFMA Specifications for Commercial Steel Doors and Frames, except where specified otherwise.
 - .2 Blank, reinforce, drill and tap doors and frames for all hardware. Mortised cutouts shall be protected with steel guard boxes.
 - .3 Reinforce doors and frames for surface mounted hardware.
 - .4 Formed edges shall be true and straight with a minimum radius for the thickness of steel used.
 - .5 Provide for appropriate anchorage to floor and wall construction. Each wall anchor shall be located immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on the strike jamb.

- .6 For rebate opening heights up to and including 1525mm, provide two anchors, and an additional anchor for each additional 760mm or fraction thereof.
- .7 Each door opening shall be prepared for rubber stud door silencers, three (3) for single doors, two (2) for double doors.
- .8 Factory-apply touch up primer to galvanized steel doors and frames where coating has been removed during fabrication.
- .9 Fire labelled doors and frames shall be provided for those openings requiring fire protection ratings. Doors and frames shall be tested in accordance with CAN4-S104.
- .10 Provide all required internal steel frame reinforcement to ensure structural rigidity and integrity, including connections to nearest building structure elements.
- .11 Door faces of all steel doors shall be fabricated without visible seams, free of scale, pitting, coil brakes, buckles and waves.
- .12 Construct stile and rail doors in same manner as flush doors.
- .13 Construct matching transom panels or inactive leaves in same manner as doors.
- .14 Longitudinal edges of interior doors shall be mechanically interlocked, adhesive assisted with edge seams tack welded, filled and sanded flush with no visible seam.
- .15 Lock and hinge edges shall be beveled 3mm in 50mm unless hardware or door swing dictates otherwise.
- .16 Top and bottom of doors shall be provided with inverted, recessed, 1.519mm steel end channels, welded to each face sheet at 152mm on center maximum.
- .17 Provide 1.519mm closer reinforcement channels at top of all doors.
- .18 Fire labelled doors shall be provided for those openings requiring fire protection ratings, as indicated. Such frames shall be tested in conformance with CAN4-S104.
- .2 Doors
 - .1 Face Sheets: 1.214mm base metal thickness.
 - .2 Door Cores
 - .1 Steel Stiffened: vertically stiffened with 0.912mm steel ribs at 152mm o.c. maximum, with all voids filled completely with semi-rigid mineral fibre insulation as specified above.
 - .2 Use Steel Stiffened for all doors.
 - .3 Hardware Preparation

- .1 Doors shall be factory blanked, reinforced, drilled and tapped for fully templated mortised hardware only, in accordance with the final approved schedule and templates provided by the hardware supplier.
 - .2 Doors shall be factory blanked and reinforced only for mortised hardware that is not fully templated.
 - .3 Doors shall be factory reinforced only for surface mounted hardware.
 - .4 Templated holes 13mm diameter and larger shall be factory prepared, except mounting and through bolt holes, which shall be by the contractor responsible for installation on site, at the time of application. Templated holes less than 13mm diameter shall be factory prepared only when required for the function of the device (for knobs, levers, cylinders, thumb or turn pieces) or when these holes over-lap function holes.
 - .5 Drilling and tapping for surface mounted hardware or mortised hardware that is not fully templated shall be by the contractor responsible for installation on site, at the time of application.
 - .6 Hinge and pivot reinforcements shall be 3.416 mm steel minimum high frequency type reinforcing.
 - .7 Doors in excess of 2450mm rabbet height shall be prepared for 114.3mm heavy weight 4.6mm hinges minimum.
 - .8 Lock, strike and flush bolt reinforcements shall be 1.519mm steel minimum.
 - .9 Reinforcements for concealed closers and holders shall be 2.657mm steel minimum.
 - .10 For surface mounted hardware, reinforcements shall be 1.519mm steel minimum.
 - .11 Where electrically or electronically operated hardware is specified on the schedules or details or the final approved schedule and templates provided by the hardware supplier, hardware enclosures and/or junction boxes, where indicated on the templates, shall be provided and inter-connected with CSA-approved 13mm diameter conduit and connectors.
- .4 Glazing
- .1 Make provision for glazing as indicated and provide necessary glazing stops in accordance with tested and labelled assemblies.
 - .2 All glazing rebates and bevelled stops for frames located in fire separations shall be minimum 20mm in height.
 - .3 Where glazing materials up to and including 8mm thick are specified, doors shall be provided with 0.912mm steel glazing trim and bevelled snap-in glazing stops.

- .4 Where glazing materials greater than 8mm thick are specified, doors shall receive 0.912mm steel trim and screw-fixed bevelled glazing stops. Screws shall be #6 x 31mm oval head, self-drilling type at 300mm on center maximum.
- .5 Glazing trim and stops shall be accurately fitted, butted at corners, with removable glazing stops located on the 'push' side of the door.
- .5 Louvers
 - .1 Where specified on the schedules or details, doors shall be prepared for door louver inserts.
- .6 Finishing
 - .1 Remove weld slag and splatter from exposed surfaces.
 - .2 All tool marks, abrasions and surface blemishes shall be filled and sanded to present smooth uniform surfaces.
 - .3 On exposed surfaces where zinc coating has been removed during fabrication, doors shall receive a factory applied touch-up primer.
 - .4 Primer shall be fully cured prior to shipment.
- .3 Frames
 - .1 Fabricate frames from tension leveled steel to ASTM A924, galvanized to ASTM A653/653M, Commercial Steel (CS), Type B.
 - .2 Fabricate frames from 1.519mm base metal thickness. Frames shall be supplied set-up and welded.
 - .3 Fabricate Reveal Edge frames as indicated on the Drawings.
 - .4 Corner joints shall be accurately mitered and tightly fitted with integral door stops mitered or butted when assembled.
 - .5 Corner joints shall be welded on the inside of the profiles' returns and faces for set-up and welded frames.
 - .6 Joints at mullions, transom bars, sills or center rails shall be coped accurately, butted and tightly fitted, with faces securely welded, matching corner joint faces.
 - .7 Frame product shall be fabricated with integral door stops having a minimum height of 16mm.
 - .8 Glazing stops shall be bevelled, formed 0.912mm steel, 16mm minimum bevelled height channel, accurately fitted, butted at corners and fastened to frame sections with #6 x 31mm oval head scrulox (self-drilling) type screws at 300mm on center maximum. Stops shall be 20mm high at all labelled frames.

- .9 Where required due to site access, as indicated on schedules, when advised by the contractor responsible for co-ordination or installation, or when shipping limitations so dictate, frame product shall be fabricated in sections for splicing in the field.
- .10 Field spliced jambs, heads and sills shall be provided with 1.519mm steel splice plates securely welded into one section, extending 100mm minimum each side of splice joint.
- .11 Field splices at closed sections (mullions or center rails) shall be 1.519mm steel splice angles securely welded to the abutting member. Face of splice angle shall extend 100mm minimum into closed sections when assembled.
- .12 Field splice joints shall be welded, filled and ground to present a smooth uniform surface.
- .13 On factory-assembled frame product, each door opening shall be provided with two (2) temporary steel jamb spreaders welded to the base of the jambs or mullions to maintain proper alignment during shipping and handling. Spreaders shall be removed prior to anchoring of frame to floor.
- .14 Each door opening shall be prepared for single stud door silencers, three (3) for single door openings, two (2) for double door openings. Silencers shall be shipped loose for installation after finish painting.
- .15 Hardware Preparation
 - .1 Frames shall be blanked, reinforced, drilled and tapped for fully templated mortised hardware only, in accordance with the final approved schedule and templates provided by the hardware supplier.
 - .2 Frames shall be factory blanked and reinforced only for mortised hardware that is not fully templated.
 - .3 Frames shall be reinforced only for surface mounted hardware.
 - .4 Drilling and tapping for surface mounted hardware or mortised hardware not templated shall be done at the time of installation.
 - .5 Hinge and pivot reinforcements shall be 3.416mm steel minimum reinforcing, high frequency type shall be provided.
 - .6 Strike reinforcements shall be 1.519mm steel minimum.
 - .7 Reinforcements for surface mounted hardware, concealed closers and holders and flush bolts shall be 2.657mm steel minimum.
 - .8 Mortised cutouts shall be protected with 0.759mm steel minimum guard boxes.

- .9 Where electrically or electronically operated hardware is specified on schedules or details, or the final approved schedule and templates provided by the hardware supplier, hardware enclosures and/or junction boxes where indicated on templates shall be provided and inter-connected with CSA-approved 13mm diameter conduit and connectors.
- .16 **Anchorage**
 - .1 Frames shall be provided with anchorage appropriate to floor, wall and frame construction.
 - .2 Each wall anchor shall be located immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on the strike jamb, except as indicated below.
 - .3 Frames installed in unit masonry partitions shall be provided with 4.0mm diameter steel wire anchors, 1.214mm steel adjustable stirrup and strap or "T" type anchors as conditions dictate.
 - .4 Where frame is installed prior to construction of the adjacent wall, each jamb shall be provided with 1.519mm steel floor anchors. Each anchor shall be provided with two (2) holes for mounting to the floor and shall be securely welded to the inside of the jamb profile designed so as not to permit thermal transfers from exterior to interior surfaces of the frame sections.
 - .5 Frame installed in steel stud and drywall partitions shall be provided with 0.912mm steel snap-in or "Z" type stud type anchors.
 - .6 Jambs of frames in previously placed concrete, masonry or structural steel shall be punched and dimpled to accept machine bolt anchors, 6.4mm diameter, located not more than 152mm from the top and bottom of each jamb. Anchor preparations and guides shall also be located immediately above or below the intermediate hinge reinforcements and directly opposite on the strike jamb. Each preparation shall be provided with 1.519mm anchor bolt guides.
 - .7 After sufficient tightening of the anchor bolt, the head shall be welded so as to provide a non-removable application. Welded bolt and dimple shall be filled and ground to present a smooth uniform surface, prior to finish painting.
 - .8 Where indicated on schedules or details, channel extensions shall be provided from the top of the frame assembly to the underside of the structure above. Extensions shall be fabricated from 2.657mm steel formed channels, mounting angles and adjusting brackets, with mounting angles welded to the inside of frame head. Formed channels, adjusting brackets and fasteners shall be shipped loose. Channels shall be mechanically connected to mounting angles and adjusting brackets with supplied fasteners on site.

- .9 For fire labeled frames, each strike jamb shall be provided with an additional snap-in anchor in each face, to be installed above or below the strike reinforcement. Each head for fire labeled pairs shall be provided with two (2) snap-in anchors, to be installed in the head faces at the center of the rabbet opening width.

.17 Finishing

- .1 Remove weld slag and spatter from exposed surfaces.
- .2 All tool marks, abrasions and surface blemishes shall be filled and sanded to present smooth and uniform surfaces.
- .3 On exposed surfaces where zinc has been removed during fabrication, frame product shall receive a factory applied touch-up primer.

2.4 SIZES AND TOLERANCES

- .1 Widths of door openings shall be measured from inside of frame jamb rabbet with a tolerance of +1.6mm - 0.8mm.
- .2 Heights of door openings shall be measured from the finished floor (exclusive of floor coverings) to the head rabbet of the frame with a tolerance of $\pm 1.2\text{mm}$.
- .3 Unless builders' hardware dictates otherwise, doors shall be sized so as to fit the above openings and allow a 3mm clearance at jambs and head. A clearance of 19mm between the bottom of the door and the finished floor (exclusive of floor coverings) shall be provided. Tolerances on door sizes shall be $\pm 1.2\text{mm}$.
- .4 Manufacturing tolerances on formed frame profiles shall be $\pm 0.8\text{mm}$ for faces, door stop heights and jamb depths. Tolerances for throat openings and door rabbets shall be $\pm 1.6\text{mm}$ and $\pm 0.4\text{mm}$ respectively. Hardware cutout dimensions shall be as per template dimensions, +0.4mm, - 0.

2.5 HARDWARE LOCATIONS

- .1 Hardware preparations in frame product shall be as noted below and locations on doors shall be adjusted for clearances specified above.
- .2 Hinge preparations shall be for continuous rotor style hinge as specified.
- .3 Strike preparations for unit, integral, cylindrical and mortise locks and roller latches shall be centered 1033mm from finished floor. Strikes for deadlocks shall be centered at 1220mm from finished floor. Strikes for panic or fire exit hardware shall be located as per device manufacturer's templates.
- .4 Push and/or pulls on doors shall be centered 1070mm from finished floor.
- .5 Preparations not noted above shall be as per hardware manufacturer's templates.
- .6 Hardware preparation tolerances shall comply with ANSI A156 Series standards.

3 EXECUTION

3.1 INSTALLATION

.1 General

- .1 Install all doors and frames in accordance with NFPA-80.

.2 Doors

- .1 Install doors in accordance with manufacturer's instructions and templates.
- .2 Install hardware in accordance with hardware templates, manufacturer's instructions and Section 08 71 00.
- .3 Provide maximum clearances at edges of doors as follows:
- .1 Between door and frame at head and jambs: 3mm.
- .2 At meeting edges pairs of doors and at mullions: 3mm.
- .3 At transom panels, without transom bars: 3mm.
- .4 At sills without thresholds: 16mm maximum above finish floor.
- .5 At sills with thresholds: 3mm above threshold.
- .4 Adjust operable parts for correct function.
- .5 Install louvres securely in doors.

.3 Frames

- .1 Set frames plumb, square, level and at correct elevation.
- .2 Secure anchorages and connections to adjacent construction.
- .3 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 centre of head for openings over 1220mm wide. Remove temporary spreaders after frames are built-in.
- .4 Make allowances for deflection of structure to ensure structural loads are not transmitted to frames.
- .5 Install all frame reinforcing where indicated or required for structural rigidity.

3.2 FINISH REPAIRS

- .1 Touch up with primer galvanized finish damaged during installation.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

- .1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.
- .2 The Construction Manager shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.
- .3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Construction Manager for correction prior to commencing the work of this section.
- .4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

- .1 Provision of all labour, materials, equipment and incidental services necessary to provide all aluminum windows including the following:
 - .1 Aluminum closure panels,
 - .2 aluminum sills, and
 - .3 Internal sealants and caulking.

1.3 REFERENCES

- .1 Aluminum Association (AA); DAF-45, Designation System for Aluminum Finishes.
- .2 ASTM B209-01; Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- .3 ASTM B221M-00; Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
- .4 ASTM E283, Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors.
- .5 ASTM E330, Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors.
- .6 ASTM E331-00; Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
- .7 ASTM E1105-00; Test Method for Field Determination of Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform or Cyclic Static Air Pressure Difference.
- .8 CAN/CSA-A440.2-M1991, Energy Performance Evaluation of Windows and Sliding Glass Doors.
- .9 CAN3-S157, Strength Design in Aluminum.

1.4 PERFORMANCE REQUIREMENTS

- .1 Structural performance shall be based on CAN3-S157, Strength Design in Aluminum, and a maximum deflection of 1/175 of the span.
- .2 Air infiltration shall not exceed $0.0003 \text{ m}^3/\text{s m}^2$ when tested in accordance with ASTM E283 at a pressure differential of 300Pa.
- .3 Design and size components to withstand dead and live loads caused by pressure and suction of wind acting normal to plane of system, as calculated in accordance with the Ontario Building Code.

- .4 Window frames shall meet the following minimum performance criteria in accordance with CAN/CSA A440:
 - .1 Perimeter Frames
 - .1 Air Tightness: A3/fixed
 - .2 Water Tightness: B7
 - .3 Wind Load Resistance: C4
 - .2 Vent Frames
 - .1 Air Tightness: A3
 - .2 Water Tightness: B7
 - .3 Wind Load Resistance: C4
- .5 System to provide for expansion and contraction within system components caused by a cycling temperature range of 95°C over a 12 hour period without causing detrimental affect to system components.
- .6 Drain water entering joints, condensation occurring in glazing channels or migrating moisture occurring within system, to the exterior by a weep drainage network. All proprietary internal drainage systems must be vented and drained to the exterior of the building envelope. All horizontal members shall be sealed to vertical members to provide individual compartments within the system in accordance with the rain screen principle
- .7 Maintain continuous air barrier and vapour retarder throughout assembly, primarily in line with inside pane of glass.

1.5 SUBMITTALS

- .1 Prior to preparation of shop drawings submit a letter from the system manufacturer, certifying that the subcontractor has issued a purchase order, letter of intent or otherwise entered into a contract with the manufacturer. The letter must be dated and include:
 - .1 Name of project.
 - .2 Name of subcontractor.
 - .3 Complete list of product series or style.
 - .4 Manufacturer's contact with telephone and telefax numbers.
- .2 Shop Drawings
 - .1 Submit shop drawings in accordance with Section 01 30 00.
 - .2 Indicate materials and large scale details for profiles of components, elevations of unit, anchorage details, required reinforcing, location of isolation coating, description of related components, finishes and fasteners.
- .3 Samples
 - .1 Submit 300 x 300mm sample representative of window frame system including prefinished framing, glass, metal panels, operable vents, and corner detail. Submit samples of all available sill profiles for selection by the Construction Manager.
- .4 Product Data
 - .1 Submit product data for the following, in accordance with Section 01 30 00:
 - .1 Material composition
 - .2 Finishes
 - .3 Hardware requirements

- .5 Test Reports
 - .1 Submit test report from approved independent testing laboratory, certifying windows comply to performance requirements of CAN/CSA-A440.2, and this specification.

1.6 QUALITY ASSURANCE

- .1 Manufacturer/Fabricator
 - .1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.
- .2 Installation/Application
 - .1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.
- .3 Documentation
 - .1 If requested by the Consultant, submit documentation to support the competency of firms and personnel.
- .4 Pre-application Meeting
 - .1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:
 - .1 Contractor (Site Superintendent & Project Manager)
 - .2 Application Subcontractor (Site Foreman & Project Manager)
 - .3 Product Manufacturer and/or Distributor (Technical Representatives)
 - .4 Related Subcontractors whose work is affected by that of this Section.
- .5 Mock-up
 - .1 Supply and install one full window in place, for review by the Construction Manager in accordance with Section 01 40 00.
 - .2 Construct mock-up to include all components including vision glass, aluminum sill, and all sealants.

1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Do not deliver aluminum windows to the site until installation can commence, or until adequate secure storage is provided.
- .2 Deliver all window frames shrink-wrapped in polyethylene. Do not remove wrapping until time of installation.

2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- .1 Products and systems provided under this section must be from one manufacturer for window frames, sills, and infill panels.

2.2 MATERIALS

- .1 Aluminum Members: Alcan 6063-T54 alloy and temper.

- .2 Screws, bolts and fasteners: for use with aluminum; 300 series stainless steel or 400 series stainless steel cadmium plated.
- .3 Glazing gaskets: extruded black EPDM, of sufficient durometer hardness.
- .4 Glazing Tape: exterior glazing; Tremco POLYSHIM II.
- .5 Vision Glass: clear tempered safety glass to Section 08 80 00.
- .6 Reinforcing, Supports and Anchors: aluminum or hot-dip galvanized steel.
- .7 Sealants: refer to section 07 92 00.
- .8 Isolation coating: alkali resistant, epoxy resin solution.
- .9 Perimeter Foam Sealant: single component polymeric low-expansion insulating sealant;
 - .1 Great Stuff PRO™, by Dow Chemical Company.
 - .2 CF812, by Hilti Corporation.

2.3 SLIDING WINDOW

- .1 Frames: extruded aluminum, single glazed, sliding window units;
 - .1 Acceptable Products
 - .1 SW1800A Satin Anodized by CR Laurence of Canada.
 - .2 or an approved equivalent.

2.4 SERVICE WINDOW

- .1 Frames: extruded aluminum, single glazed, sliding window units;
 - .1 Acceptable Products
 - .1 SW1800A Satin Anodized, by CR Laurence of Canada.
 - .2 or an approved equivalent.
- .2 Service Window Alternative: SC-9046CL Self-closing Transaction Window, as supplied by DK Hardware, clear anodized finish.

2.5 FABRICATION

- .1 Fabricate window frames from extrusions of size and configurations shown on drawings.
- .2 Fabricate in accordance with CAN/CSA-A440 supplemented as follows:
 - .1 Fabricate units square and true with maximum tolerance of plus or minus 1.5mm for units with a diagonal measurement of 1828mm or less and plus or minus 3mm for units with a diagonal measurement over 1828mm.
 - .2 Face dimensions detailed are maximum permissible sizes.
 - .3 Brace frames to maintain squareness and rigidity during shipment and installation.
 - .4 Provide all internal reinforcing as required for the proper structural design and support of the framing system.
 - .5 All joints shall be accurately machined, assembled and sealed to provide neat weathertight joints.

3 EXECUTION

3.1 INSTALLATION

- .1 Install in accordance with CAN/CSA-A440.
- .2 Erect and anchor all frames square and level using concealed fastenings where possible.

- .3 Anchors to be built into the structure shall be provided to the General Contractor for setting in accordance with the approved shop drawings.
 - .4 Frames shall be joined by coupling the split interlocking mullions after bedding compound has been applied to the female section.
 - .5 Manufacturer's name plates or labels shall not be installed on exterior of windows.
- 3.2 ISOLATION COATING
- .1 Isolate aluminum from following components, by means of isolation coating:
 - .1 All dissimilar metals except stainless steel, zinc, or white bronze.
 - .2 Concrete, masonry, and mortar.
 - .3 Wood.
- 3.3 CAULKING & SEALS
- .1 Fill all voids between window frames and building components with foam sealant. Allow for caulking and backer rod application.
 - .2 Seal joints between windows and window sills with sealant. Bed sill expansion joint cover plates and drip deflectors in bedding compound. Caulk between sill upstand and window-frame. Caulk butt joints in continuous sills.
 - .3 Apply sealants to full perimeter of interior and exterior of frames in accordance with Section 07 92 00.
- 3.4 CLEANING
- .1 During installation, remove all corrosive or foreign materials or droppings resulting from work of this or other trades.
 - .2 Perform initial cleaning operation of all window frames upon completion of installation. Remove all remaining labels, protective films, or other surface imperfections.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

- .1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.
- .2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.
- .3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.
- .4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

- .1 Provision of all labour, materials, equipment and incidental services necessary to supply finish hardware, including the following:
 - .1 Supply and delivery to the project all items of architectural finishing hardware specified herein,
 - .2 Supply and installation of low-energy door operators and hardware,
 - .3 Completion of all low voltage terminations by the hardware supplier.

1.3 REFERENCE STANDARDS

- .1 Canadian Metric Guide for Steel Doors and Frames; Canadian Steel Door and Frame Manufacturers' Association.
- .2 ANSI/DHI A115.1G-94; Installation Guide for Doors and Hardware.
- .3 CAN/CGSB 69.18-M90/ANSI/BHMA-A156.1; Butts & Hinges.
- .4 ANSI/BHMA-A156.2-1996; Bored & Preassembled Locks & Latches.
- .5 CAN/CGSB CAN/CGSSB-69.19-93/ ANSI/BHMA-A156.3; Exit Devices.
- .6 CAN/CGSB 69.20-M90/ANSI/BHMA-A156.4; Door Controls – Closers.
- .7 CAN/CGSB 69.21-M90/ANSI/BHMA-A156.5; Auxiliary Locks.
- .8 CAN/CGSB 69.22-M90/ ANSI/BHMA-A156.6; Architectural Door Trim.
- .9 CAN/CGSB 69.23-M90/ ANSI/BHMA-A156.7; Hinge Templates.
- .10 CAN/CGSB 69.26-96/ ANSI/BHMA-A156.10; Power Operated Pedestrian Doors.
- .11 CAN/CGSB 69.29-93/ ANSI/BHMA-A156.13; Mortise Locks & Latches.
- .12 CAN/CGSB 69.31-M89/ ANSI/BHMA-A156.15; Closer Holder Release Devices.
- .13 CAN/CGSB 69.34-93/ ANSI/BHMA-A156.18; Materials & Finishes.
- .14 CAN/CGSB 69.35-M89/ ANSI/BHMA-A156.19; Power Assist and Low-Energy Power-Operated Doors.
- .15 CAN/CGSB 69.37-93/ ANSI/BHMA-A156.21; Thresholds.
- .16 ANSI/BHMA-A156.28; Keying Systems.

1.4 DEFINITIONS

- .1 Architectural Hardware Consultant (AHC): person or persons skilled in selecting, coordinating and specifying architectural hardware, and certified by the Door and Hardware Institute.

- .2 Hardware Supplier: company or group of companies whose purpose is the manufacture and supply of architectural finish hardware.
- .3 Hardware Distributor: company whose purpose is the distribution of architectural finish hardware.

1.5 QUALITY ASSURANCE

- .1 Manufacturer/Fabricator
 - .1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.
- .2 Installation/Application
 - .1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.
- .3 Documentation
 - .1 If requested by the Consultant, submit documentation to support the competency of firms and personnel.
- .4 Pre-installation Meeting
 - .1 Convene a pre-installation meeting for the work specified in this section. Attendees must include, as a minimum, representatives of the following:
 - .1 Contractor (Site Superintendent & Project Manager)
 - .2 Installation Subcontractor (Site Foreman & Project Manager)
 - .3 Hardware Supplier/ Distributor (AHC)
 - .4 Hardware Installer
 - .5 Related Subcontractors (ie. Electrical, Security Systems)

1.6 SUBMITTALS

- .1 Updated Finish Hardware Schedule
 - .1 Prepare and submit digital copy of complete detailed hardware schedules prepared in 216mmx279mm DHI format.
- .2 Product Data
 - .1 Provide digital copies of product data sheets with the finish hardware schedule showing all items of hardware to be used on the project.
- .3 Samples
 - .1 When requested in writing, provide one sample of each hardware item requested complete with fasteners to the office of the Consultant. Samples to be clearly labeled with their hardware schedule designation and manufacturers' name and model number. Samples may be incorporated into the Work.
- .4 Templates
 - .1 Provide other sections with two (2) complete sets of hardware templates for related fabricating and installation.

- .5 Keying Schedule
 - .1 Provide digital copies of keying schedule for review. Include all special keying notes and stamping instructions. Locks and cylinders are not to be ordered until the key schedule has been approved by the Owner. The keying hardware to be compatible with the hardware at Beavermead Campground's washroom building.
- .6 Wiring Diagrams
 - .1 Provide a written description of the functional use of all electrical hardware. Include door and frame elevations showing the location of each item of electrical hardware to be installed, including a diagram showing number and size of all conductors. Include drawings showing all terminal connections. Where electrical hardware is to be supplied and installed provide the Contractor with riser diagrams listing the correct wire runs and back box sizes as well as 115V AC requirements.
- .7 Operations and Maintenance Data
 - .1 Prior to Substantial Performance, provide digital copies of the following information for inclusion in Operation And Maintenance Manuals in accordance with Section 01 78 00:
 - .1 Maintenance instructions for each hardware item,
 - .2 Catalogue cut sheets and Product Specifications or each product,
 - .3 Parts list for each product,
 - .4 Copy of final "as-built" finish hardware schedule, and
 - .5 Copy of final keying schedule.
- .8 Maintenance Materials
 - .1 Provide the following maintenance materials in accordance with Section 01 78 00:
 - .1 Five (5) of each installation tool used for locks/passage/privacy, all type of door closers, and all exit devices.
- 1.7 DELIVERY, STORAGE, AND HANDLING
 - .1 Deliver each hardware item in its original package complete with all fasteners, keys, templates, and installation instructions required for installation.
 - .2 Package hardware separately for each door or unit and state clearly on each package the number and description of the door or unit for which the hardware therein is intended. Group items accordingly.
 - .3 Clearly mark each container with the door opening number and the hardware schedule item or heading number.
 - .4 Store hardware in a locked room or other secure area, accessible by only the Contractor. Storage area must contain adequate storage provision to hold all hardware off the floor (temporary shelving or wood pallets). Ensure area is kept dry and clean.
 - .5 When requested, package items of hardware separately for delivery to other fabricators for their installation.
 - .6 Deliver and assist in unloading and sorting of hardware. All hardware must be checked in on site by the Contractor's Site Supervisor.

1.8 COORDINATION WITH OTHER TRADES

- .1 Supply finish hardware to those who are to install it, complete with templates and other complete installation instructions in sufficient time to avoid delaying the progress of the work.
- .2 Supply complete templates and instructions to all door and frame manufacturers for factory machining of products to receive Hardware.

1.9 INSPECTION

- .1 Hardware Distributor must perform the following inspections:
 - .1 Check all hardware when it has been installed and notify the Consultant of improper installation, defective materials, or products installed that were not specified. Replace defective hardware promptly.
 - .2 Check all door closers after they have been installed to make sure that all adjustments such as back-checking degree have been properly made. Notify the Consultant of any closers which have not been properly adjusted.

1.10 MAINTENANCE

Maintenance Service

Following occupancy of the building by the Owner, arrange with the Owner's maintenance staff for instruction of proper use, servicing, adjusting and lubrication of all finish hardware. Submit to the Consultant a list of attendees and meeting date.

1.11 EXTENDED WARRANTIES

- .1 Provide the following manufacturer's warranties beyond the date of expiration of the Contract warranty:
 - .1 Hinges 2 yrs.
 - .2 Pivot Sets 2 yrs.
 - .3 Locks (ND Series) 7 yrs.
 - .4 Exit Devices 3 yrs.
 - .5 Door closers -mechanical..... 10 yrs.
 - .6 Door Hold open Devices - Electro mechanical..... 2 yrs.
 - .7 Overhead stops/holders 1 yr.
 - .8 Floor/Wall stops 1 yr.
 - .9 Electric Strikes/Key Switches/Power Supplies..... 1 yr.
 - .10 All other hardware items 1 yr.

2 PRODUCTS

2.1 MATERIALS

- .1 Fabricate all hardware to template. Provide templates and template hardware together with the instructions necessary for door and frame preparation.
- .2 Supply all hardware with necessary screws, bolts or other fastening devices to anchor hardware in position neatly and properly in accordance with best practices.
- .3 Only products listed in the hardware schedule or the approved alternates noted in the following list are to be used on this project.
- .4 Use one manufacturer's products only for all similar items.

- .5 All exterior doors shall be fitted with complete perimeter weatherstripping and threshold where not provided by door or frame manufacturer.
- 2.2 FASTENINGS
 - .1 Supply all required bolts, screws, expansion shields, anchors, and other related accessories for satisfactory attaching or installing of all finish hardware.
 - .2 Exposed fasteners shall match finish of, and be of compatible material with hardware.
 - .3 Where push/pull hardware is scheduled, door pull must be through-fastened and have fasteners concealed by push plate on opposite side.
- 2.3 HINGES
 - .1 Continuous Hinges: ANSI/BHMA-A156.26, Grade 1.
 - .1 Aluminum: heavy-duty, edge-mount geared continuous hinges, fabricated from extruded 6063-T6 alloy aluminum, sized to door height. Finish as selected by the Consultant. Cycle testing 1,500,000 repetitions exceeding ANSI/BHMA-A156.1.
 - .1 Geared Continuous Hinges, by Select Hinges or Richelieu Hardware.
 - .2 Supply installation instructions to hardware installers for continuous hinges.
- 2.4 LOCKSETS, LATCHSETS, DEADLOCKS
 - .1 Grade 2 Cylindrical
 - .1 ANSI/BHMA-A156.2, Grade 2 heavy duty residential, light and medium duty commercial cUL listed for all functions up to 3-hour doors. Precision solid brass 6-pin cylinder with nickel silver keys.
 - .2 Cylindrical housing internal cold rolled steel mechanism corrosion treated for normal atmospheric conditions. Key removable outside knob for easy cylinder replacement. Snap-on inside rose conceals mounting plate and screws with long spindle bearing surfaces.
 - .2 Grade 2 Cylindrical-Lever
 - .1 ANSI/BHMA-A156.2, Grade 2 standard duty commercial exterior and interior cUL listed for all functions up to 3-hour doors. Levers to be solid pressure cast zinc with no plastic inserts. Precision solid brass 6-pin cylinder with nickel silver keys. Grade 2 lever sets to have through bolts to prevent chassis rotation with internal components and chassis constructed of cold rolled steel with zinc dichromate plating to resist corrosion. Lever sets to have independent heavy duty compression springs as well as precision laser cut stainless steel spindles with interlocking on keyed side.
 - .3 Grade 2 Deadbolt
 - .1 ANSI/BHMA-A156.5, Grade 2 deadbolt, cUL listed for 3 hour rated door, with fire cup and labeling. Deadbolt to be supplied with 76mm steel screws provide the added strength to prevent against break-in attacks as well as 25mm metal bolt with hardened steel roller pin to prevent kick-in attacks and sawing.
 - .4 Grade 1 Deadbolt
 - .1 ANSI/BHMA-A156.5, Grade 1 deadbolt supplied with solid brass or bronze trim rings and 25mm throw high-strength, steel alloy deadbolt with hardened steel roller resistant to sawing and kick-in attacks. Metal shield protects bolt from attack through the door as well as hardened steel balls that protect mounting screws

from drill attack. Exclusive wood frame reinforcer protects wood jamb against kick-in attacks.

.5 Grade 1 Cylindrical

- .1 ANSI/BHMA-A156.2, Grade 1 extra heavy duty residential, commercial, institutional and industrial applications. Latch bolts to be steel with minimum 13mm throw deadlocking on keyed and exterior functions. 19mm throw anti-friction latchbolt on pairs of fire doors. Provide manufacturer's standard wrought box strike for each latch or lock, with curved lip extended to protect frame. Lock case to be steel. Locks to incorporate one piece spring cage and spindle. Precision solid brass 6-pin cylinder with nickel silver keys. All levers to be solid with no plastic inserts. Locks and latchsets tested to exceed 3,000,000 cycles.

2.5 EXIT DEVICES

- .1 Medium Duty: ANSI/BHMA-A156.3, Grade 1 cUL listed for panic hardware and fire exit hardware. Supply exit devices and fire exit hardware featuring coil compression springs on all device mechanism subassemblies and dead latching mechanisms for all active latchbolts.
- .2 Device Trim
- .1 Supply device trim featuring recessed cylinder mounting and coil compression spring design with shear pin protection for all lever designs. Similar lever designs for exits as specified for locksets.
- .3 Exit devices installed on exterior doors must have dead latching bolts to ensure tamper proof security.

2.6 DOOR CLOSERS

- .1 Door closers to be Grade 1 ANSI/BMHA A156, and have the following features (see separate closer sections below for further information):
- .1 fully hydraulic, rack and pinion action with high strength cast iron cylinders and one piece forged steel pistons.
- .2 hydraulic fluid of a type requires no seasonal adjustments, and has constant temperature control from 49°C to -35°C.
- .3 hydraulic regulation controlled by tamper-proof, non-critical screw valves, adjustable with a hex wrench.
- .4 separate adjustments for backcheck, general speed and latch speed.
- .5 include high efficiency, low friction pinion bearings.
- .6 size 1 manual door closers to provide less than 22N opening force on a 914mm door leaf.
- .7 closers with painted finishes shall exceed a minimum 100-hour salt spray test, as described in ANSI/BHMA-A156 and ASTM B117.
- .8 closers detailed with plated finishes shall include plated covers (or finish plates) , arms and visible fasteners.
- .9 provided with all mounting plates required to mount on any special door and frame conditions.
- .2 Medium Duty Mechanical (Interior)
- .1 ANSI/BHMA-A156.4, non-sized (1-4) and non-handed cylinder body. Track closer cylinder body non-sized (1-3). Closers to have stamped main arm and forearm (forged steel main arm and forearm EDA and CUSH type arms). Optional arms to be interchangeable within the series of closers, except track arm type closers. Track arm type closers to have single lever arm with low friction track and roller

assembly and provisions for an optional bumper to assist backcheck. Closer to have standard metal cover not to exceed 45mm from face of the door.

- .3 Medium Duty Mechanical (Interior-Pull Side Mount)
 - .1 ANSI/BHMA-A156.4, sized (1,2,3 or 4) and handed cylinder body to have 32mm piston diameter with 16mm single heat-treated shaft. Closers to have forged steel main arms. Optional arms to be interchangeable within the series of closers. Standard plastic cover not to exceed 41mm from face of door.
- .4 Medium Duty Mechanical (Interior-Push Side Mount)
 - .1 ANSI/BHMA-A156.4, sized (1,2,3 or 4) and handed cylinder body to have 32mm piston diameter with 16mm single heat-treated shaft. Closers to have forged steel main arm and forearms. Optional arms to be interchangeable within the series of closers. Standard plastic cover not to exceed 41mm from face of door.

2.7 DOOR OPERATORS

- .1 Refer to Section 08 71 23.
 - .1 ANSI/BHMA-A156.19. Power operator to include:
 - .1 Provisions for separate conduits to carry high and low voltage wiring in compliance with the National Electrical code.
 - .2 Second Chance Function: program within the on-board computer monitoring resistance during opening cycle. If resistance is present operator pauses for a few seconds, then attempts to open door again. If resistance does not exist door will open normally. However if resistance still exists, door will pause and the unit will time out and door will close.
 - .3 Breakaway Drive System: System within the motor/clutch assembly. If the door is forced closed while in the opening cycle, the clutch slips preventing damage to the operator, door and frame.
 - .4 Soft Start Motor Control: required for controlled start once actuator is depressed to extend the service life of all drives components.
 - .5 Built in Power Supply to deliver 12V and 24V outputs up to a maximum of 1.0 amp.
 - .6 Certified by cUL for use on labeled doors.
 - .7 Independent adjustments for all electrically controlled functions within controller module.
- .2 Actuators
 - .1 Wall Type
 - .1 Wall mounted push button actuators. Refer to Section 08 71 23.
- .3 Low energy door operators will be supplied and installed by factory trained installers.

2.8 PULLS AND PLATES

- .1 Supply door trim as listed in hardware schedule. Supply pulls with back to back (BTB) or through bolt mounting as required. When push plates are listed with door pulls, install the push plate to conceal the through bolt.
- .2 All kickplates, push plates, and bumper plates must have all sides beveled and corners rounded to ensure no sharp edges. Supply plates with counter sunk screw holes. Supply double-sided tape for adhesive-mount.
- .3 Kick plates will be minimum 0.127mm thick unless listed otherwise; size to be door width less 35mm for single door, and less 25mm for pairs of doors. Heights as scheduled.

2.9 DOOR STOPS AND HOLDERS

- .1 Floor Stops (Doors with threshold or undercut doors)
 - .1 ANSI/BHMA-A156.6. Floor stops to be 25mm overall height with 14.3mm base height for use on doors with thresholds or undercut doors. Heavy-duty cast dome stop constructed of brass/bronze with gray, non-marring rubber bumper.
- .2 Wall Stops (No Button on Locking Hardware)
 - .1 ANSI/BHMA-A156.6. Wall stops to be constructed of heavy-duty brass base with special retainer cup that makes the rubber stop tamper resistant. Convex design of rubber bumper.
- .3 Wall Stops (Projecting Button on Locking Hardware)
 - .1 ANSI/BHMA-A156.6. Wall stops to be constructed of heavy-duty brass base with special retainer cup that makes the rubber stop tamper resistant. Concave rubber bumper to avoid damage to locks with projecting buttons.
- .4 Supply wall stops where wall conditions are sufficient to support impact loads, such as stud partitions with wood blocking, masonry, or concrete. Supply floor stops with sufficient height to suite the floor condition or undercut of doors.
- .5 Overhead stops and mechanical holders shall be surface mounted unless a conflict exists with door closers or other hardware. Provide door stays with friction action in locations that do not have door closers. Install all overhead stops and holders for 90° stop unless otherwise specified.
- .6 Electronic door holders will be supplied tri-voltage and be connected to the fire alarm system by Division 16 to release the door when signaled.

2.10 THRESHOLDS

- .1 Supply extruded aluminum thresholds to ensure the sweep or door bottom makes full contact. Supply thermally broken thresholds for all exterior door openings.
- .2 Threshold height shall not exceed 13mm for barrier-free path of travel.

2.11 FINISHES

- .1 Finishes are specified as follows:

Item	BHMA#	Finish Description	Base Material(s)
Hinges	630	satin stainless steel.....	stainless steel
Hinges	626	satin chrome plated	brass/bronze
Hinges	652	satin chrome plated	steel
Pivots.....	689	powder coat aluminum.....	steel
Lock Trim.....	626	satin chrome plated	brass/bronze
Exit Devices.....	626	satin chrome plated	brass/bronze
Dr Closer	689	powder coat aluminum.....	steel
Dr Pulls	630	satin stainless steel.....	stainless steel
Protective Plate	630	satin stainless steel.....	stainless steel
Door Stops/Holders			
Overhead.....	630	satin stainless steel.....	stainless steel
Wall/Floor	626	satin chrome plated	brass/bronze
Thresholds.....	628	anodized aluminum.....	aluminum
Weatherstrip	628	anodized aluminum.....	aluminum

Miscellaneous

Coat hooks	626	satin chrome plated	brass/bronze
Mullions	628	anodized aluminum.....	steel
Key Switches	630	satin stainless steel.....	stainless steel
Electric Strikes.....	630	satin stainless steel.....	stainless steel
Magnetic Locks.....	628	anodized aluminum.....	steel

2.12 KEYING

- .1 Provide temporary construction keying system during construction period. Permanent keying will be done by the Owner prior to occupancy. The keying hardware to be compatible with the hardware at Beavermead Campground's washroom building.

3 EXECUTION

3.2 EXAMINATION

- .1 Ensure that doors and frames are properly prepared and reinforced to receive finish hardware prior to installation.
- .2 Ensure that door frames and finished floor are sufficiently plumb and level to permit proper engagement and operation of hardware.
- .3 Submit to Consultant in writing a list of deficiencies determined as part of inspection required in 3.3.1 and 3.3.2, prior to installation of finished hardware.

3.3 INSTALLATION

- .1 Install hardware to ANSI/DHI-A115.1G.
- .2 Install hardware at mounting heights as specified in the manufacturers templates or specific references in approved hardware schedule or approved elevation drawings. Where mounting height is not otherwise specified herein, install hardware at the following mounting heights:
 - .1 Locksets: 1015mm.
 - .2 Exit device: 1015mm.
 - .3 Push/Pull: 1065mm.
 - .4 Deadlock: 1200mm.
- .3 Install hardware using only manufacturer supplied and approved fasteners in strict adherence with manufacturers published installation instructions.
- .4 Ensure that all locksets / latchsets / deadlocks are of the correct hand before installation to ensure that the cylinder is in the correct position. Handing is part of installation procedure.
- .5 Ensure that all exit devices are of the correct hand and adjust device cam for proper outside trim function prior to installation. Handing is part of installation procedure.
- .6 Follow all manufactures installation instructions. Adjustment is inclusive of spring power, closing speed, latching speed and back-check at the time of installation.
- .7 Install head seal prior to installation of parallel arm mounted door closers and push side mounted door stops/holders.
- .8 Counter sink through bolt of door pull under push plate during installation.

- .9 Mount all closers, automatic operators and hold-open devices with through bolts, as indicated in the finish hardware schedule.
 - .10 Where door stop contacts door pulls, mount stop to strike bottom of pull.
 - .11 Other trades installing hardware must follow all manufacturers instructions including door closer adjustment, handing of locksets as required, and degree of door swing.
- 3.3 FIELD QUALITY CONTROL
- .1 Perform bi-monthly on-site inspections during hardware installation and provide inspection reports listing progress of work, unacceptable work and corrective measures. Repair or replace as directed by the Consultant.
 - .2 Upon completion of hardware installation, arrange with the Owner to instruct the Owner's personnel in the proper operation, adjustment, and maintenance of all finish hardware supplied under this Contract.
 - .3 Before completion of the Work but after finish hardware installation has been completed, submit a certificate to the Consultant stating that final inspection has been made and that all hardware has been checked for installation and operation by representatives of both the Hardware Supplier and the Hardware Distributor, and that operation and maintenance of all hardware have been fully demonstrated to the satisfaction of the Owner's personnel.
- 3.4 ADJUSTING AND CLEANING
- .1 Check and make final adjustments to each operating item of hardware on each door to ensure proper operation and function.
 - .2 All hardware to be left clean and free of disfigurements.
- 3.5 PROTECTION
- .1 Protect hardware from damage during construction period by removing and reinstalling or where necessary, using temporary hardware to maintain finish in new condition and maintain manufacturers warranty.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

- .1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.
- .2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.
- .3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.
- .4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

- .1 Provision of all labour, materials, equipment and incidental services necessary to provide glass and glazing for:
 - .1 Doors and screens.
- .2 Section includes but is not limited to the provision of:
 - .1 Glass
 - .2 Glazing sealants, gaskets, tapes, and backing materials
 - .3 Miscellaneous glazing materials necessary to complete the work of this section

1.3 REFERENCE STANDARDS

- .1 ANSI/ASTM E330; Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
- .2 ASTM C509; Standard Specification for Elastomeric Cellular Gasket and Sealing Material.
- .3 ASTM C542; Specification for Lock-Strip Gaskets.
- .4 ASTM C864; Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
- .5 ASTM C920; Specification for Elastomeric Joint Sealants.
- .6 ASTM C1115; Specification for Dense Elastomeric Silicone Rubber Gaskets and Accessories.
- .7 ASTM D790; Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
- .8 ASTM D2240; Test Method for Rubber Property - Durometer Hardness.
- .9 ASTM E84; Test Method for Surface Burning Characteristics of Building Materials.
- .10 ASTM F1233; Test Method for Security Glazing Materials and Systems.
- .11 CAN/CGSB-12.1; Tempered or Laminated Safety Glass.
- .12 CAN/CGSB-12.5; Mirrors, Silvered.
- .13 Flat Glass Manufacturers Association (FGMA) Glazing Manual.
- .14 Laminators Safety Glass Association Standards Manual.

1.4 PERFORMANCE REQUIREMENT

- .1 Size glass to withstand wind loads, dead loads and positive and negative live loads acting normal to plane of glass to a design pressure measured in accordance with the Ontario Building Code and CAN/CGSB-12.20.

1.5 QUALITY ASSURANCE

- .1 Manufacturer/Fabricator
 - .1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.
 - .2 Installation/Application
 - .1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.
 - .3 Documentation
 - .1 If requested by the Consultant, submit documentation to support the competency of firms and personnel.

1.6 ENVIRONMENTAL REQUIREMENTS

- .1 Install glazing when ambient temperature is 10°C minimum. Maintain ventilated environment for 24 hours after application.
- .2 Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.7 MAINTENANCE DATA

- .1 Provide maintenance data including cleaning instructions for incorporation into Operations and Maintenance manual.

2 PRODUCTS

2.1 FLAT GLASS

- .1 Safety Glass
 - .1 Tempered Safety Glass: to CAN/CGSB-12.1, 6mm thick, tong free, roller marks free, with visible after installation factory-applied permanent impression in one corner identifying each pane as tempered.

2.2 GLAZING MATERIALS

- .1 Setting Blocks: EPDM or Neoprene, 80 – 90 (Shore A) durometer hardness to ASTM D2240, to suit glazing method, glass weight, and area.
- .2 Spacer Shims: EPDM or Neoprene, 50 – 60 (Shore A) durometer hardness to ASTM D2240, 75mm long x one half height of glazing stop x thickness to suit application. Self adhesive on one face.
- .3 Glazing Tapes
 - .1 Compression: 100% solids, preformed macro-polyisobutylene/butyl rubber with integral synthetic rubber spacing rod; coiled on release paper; size as required for frame stop heights; POLYSHIM II, by Tremco.

- .2 Non-compression: 100% solids, preformed butyl rubber to ASTM C1281, 66 (Shore 00) durometer hardness to ASTM D2240; coiled on release paper; size as required for frame stop heights; Tremco 440 tape.
- .4 Glazing Gaskets
 - .1 Dense Gaskets for Compression Glazing
 - .1 Extruded from ozone-resistant compound, resistant to sunlight, weathering, oxidation and permanent deformation under load. Gasket Configuration shall provide for mechanical engagement with the metal. Gaskets shall meet either ASTM C-864 Option II, or ASTM C-1115 Type C (for silicone compounds).
 - .1 Dense Neoprene extrusions: Tremco Incorporated, 50, 60 and 70 durometer hardness.
 - .2 Dense EPDM extrusions: Tremco Incorporated, 40, 50, 60 and 70 durometer hardness.
 - .3 Dense SCR-900 extrusions: Tremco Incorporated, 60 and 70 durometer hardness.
 - .4 Dense Silicone extrusions: Tremco Incorporated, 40, 60 and 70 durometer hardness.
 - .2 Cellular Gaskets for Compression Glazing:
 - .1 Extruded from ozone-resistant compound, resistant to sunlight, weathering, oxidation and permanent deformation under load. Gasket configuration shall provide for mechanical engagement with the metal. Gaskets shall meet ASTM C-509 Option II.
 - .1 Cellular extrusions: Tremco Incorporated, Closed Cell Neoprene extrusions.
 - .2 Cellular extrusions: Tremco Incorporated, Closed Cell EPDM extrusions.
- .5 Glazing Sealants
 - .1 Cap Beads
 - .1 Commercial Glazing: single or multi-component, non-acid curing silicone sealant to ASTM C920;
 - .1 One part neutral cure silicone; equivalent to Spectrem 2, by Tremco.
 - .2 Heel and Toe Beads
 - .1 Commercial Glazing: single or multi-component, non-acid curing silicone sealant to ASTM C920;
 - .1 One part medium modulus silicone sealant; equivalent to Tremsil 600, by Tremco.
 - .3 Perimeter Seals
 - .1 Single or multi-component, elastomeric sealant to ASTM C920;
 - .1 One part neutral cure silicone; equivalent to Spectrem 2, by Tremco.
 - .2 One part low modulus neutral cure silicone; equivalent to Spectrem 3, by Tremco.

3 EXECUTION

3.1 EXAMINATION

- .1 Verify that openings for glazing 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.

3.2 PREPARATION

- .1 Clean contact surfaces with solvent recommended for use by the sealant manufacturer, and wipe dry thoroughly.
- .2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- .3 Prime surfaces scheduled to receive sealant.

3.3 EXTERIOR GLAZING

- .1 Steel Frames - Tape / Sealant
 - .1 Cut glazing tape to length and set against permanent stops, 3mm below sight line. Seal corners by butting tape and dabbing with sealant.
 - .2 Place setting blocks at 1/4 points, with edge block maximum 150mm from corners.
 - .3 Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of light or glass unit.
 - .4 Install removable stops with spacer strips inserted between glazing and applied stops below sight line. Place glazing tape on glazing light or unit with tape 6mm below sight line.
 - .5 Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing, maximum 6mm below sight line.
 - .6 Apply cap bead of sealant along void between stop and glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.4 MIRROR INSTALLATION

- .1 Set mirrors with adhesive, applied in accordance with adhesive manufacturer's instructions. Install stainless steel Schluter Trim at all perimeter edges of mirror installation. Miter corners.
- .2 Place plumb and level, in locations indicated on the drawings.

3.5 CLEANING & PROTECTION

- .1 During installation, remove all corrosive or foreign materials or droppings resulting from work of this trade.
- .2 Perform initial cleaning operation of all glass and mirrors upon completion of installation. Do not remove labels or protective films until time of final cleaning.

- .3 After initial cleaning, mark large lites with an "X" by using removable plastic tape. Do not use masking tape. Do not mark heat absorbing or reflective glass units.
- .4 Provide instructions for the proper method and materials to be used in the cleaning and maintenance of finished surfaces. Remove all remaining labels and protective films at time of final cleaning.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

- .1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.
- .2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.
- .3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.
- .4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

- .1 Provision of all labour, materials, equipment and incidental services necessary to cover with paint the surfaces of the building or structure, and the building services and accessories not otherwise protected or covered, to the full intent of the drawings and specifications.
- .2 Surface preparation of substrates to receive painting and finishing is included in this section of work.
- .3 This section of work shall include the painting and finishing of all exposed surfaces of the following substrates:
 - .1 Steel (Prime painted)
 - .2 Steel (Galvanized)
 - .3 Wood.

1.3 REFERENCE STANDARDS

- .1 CAN2-85.100, National Standards of Canada, Painting.
- .2 Master Painters Institute (MPI) Architectural Painting Specification Manual.

1.4 MATERIALS AND EQUIPMENT NOT TO BE PAINTED

- .1 Surfaces not to be painted shall be left completely free of droppings, over-spray, or accidentally applied materials resulting from the work of this Section.
- .2 Items not to be painted include concealed structural elements, and equipment furnished with complete factory-applied, coloured paints and finish systems.

1.5 COOPERATION WITH OTHER TRADES

- .1 Schedule and coordinate this work with other trades and do not proceed until other work and/or job conditions are as required to achieve satisfactory results.
- .2 Examine all specification sections for materials and products, and become thoroughly familiar with all provisions regarding painting.

1.6 QUALITY ASSURANCE

- .1 Manufacturer/Fabricator

- .1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.
- .2 All paint and finish products shall be those listed in the Approved Products List of the MPI manual, latest edition unless otherwise specified or listed herein.
- .2 Installation/Application
 - .1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.
- .3 Documentation
 - .1 If requested by the Consultant, submit documentation to support the competency of firms and personnel.
- .4 Pre-application Meeting
 - .1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:
 - .1 Contractor (Site Superintendent & Project Manager)
 - .2 Application Subcontractor (Site Foreman & Project Manager)
 - .3 Product Manufacturer and/or Distributor (Technical Representatives)
 - .4 Related Subcontractors whose work is affected by that of this Section.
- 1.7 **MOCK-UP REQUIREMENTS**
 - .1 Finish one complete exterior element of each colour scheme required, showing selected materials, colours and textures. Have Consultant review mock-up for acceptance of colour and finish, prior to ordering of materials for further work.
 - .2 Consultant reserves the right to change colour and/or finish selection upon review of mock-up, if deemed unacceptable.
 - .3 Refinish rejected areas until acceptance is achieved.
 - .4 Once approved by the Consultant, mock-ups shall serve as the minimum acceptable standard for similar work throughout the Project.
- 1.8 **COLOUR SCHEDULE**
 - .1 The Consultant will prepare a colour schedule as the job progresses. The final selection of colours and surface textures of all finishes throughout shall rest solely with the Consultant.
- 1.9 **COMPLETION SCHEDULE**
 - .1 Furnish the Consultant with a schedule showing expected completion of the respective coats of paint for the various areas and surfaces. Keep this schedule current as the job progresses.
- 1.10 **SUBMITTALS**
 - .1 Product Codes

- .1 Submit a complete list of product codes from the manufacturer(s) proposed for use on this project, for all Products listed in finish systems specified herein, in accordance with Section 01 30 00.
 - .2 Samples
 - .1 Submit samples of all finishes specified herein, in accordance with Section 01 30 00.
 - .2 Submit duplicate (8" x 12") 200 x 300mm sample panels of each type of paint and finish application for approval by the Consultant.
 - .3 Where manufacturer of paint differs from that listed in the colour schedule, employ spectrograph technology to ensure accurate colour match. Selection of the "next nearest colour" by another manufacturer will not be acceptable.
 - .4 Finished work to match approved samples.
- 1.11 DELIVERY, STORAGE AND HANDLING
- .1 Paint and finish materials shall be delivered to the site in sealed original labelled containers bearing manufacturer's name, type of paint, brand name, colour designation and instructions for mixing and/or reducing.
 - .2 Store materials in a heated, dry, well-ventilated, indoor place having a minimum ambient temperature of (45°F) 7°C.
 - .3 Keep waste rags in metal drums and remove all rags, waste and trash from the building at the end of each working shift.
 - .4 Provide CO₂ fire extinguisher of minimum (20 lb) 9kg capacity in storage area.
 - .5 Ensure that health and fire regulations are complied with in storage area.
- 1.12 GENERAL COLOUR REQUIREMENTS
- .1 Refer to the Drawings and Schedules for types and extent of finishes, and to the Colour Schedule for individual colour and gloss/sheen selections.
 - .2 Where manufacturer of paint differs from that listed in the colour schedule, employ spectrograph technology to ensure accurate colour match. Selection of the "next nearest colour" by another manufacturer will not be acceptable.
- 1.13 ENVIRONMENTAL CONDITIONS
- .1 Temperatures: No painting shall be performed when substrate or ambient air temperatures are below (41°F) 5°C. Minimum allowable temperatures for application of Latex paints are (50°F) 10°C (exterior work).
 - .2 Relative humidity: shall not exceed 85%.
 - .3 Moisture content of substrates: Masonry and concrete materials shall be allowed to cure for a minimum of 28 days before application of paints. Substrates shall be measured by electronic moisture meter, to the following maximums:
 - .1 Masonry, concrete/concrete block: 12% for solvent based paints.
 - .2 Wood: 15%.

- .4 Lighting: Painting shall not proceed unless a minimum of (15 cd/ft²) 1.3 lx lighting is provided on the surfaces to be painted.
- .5 Ventilation: All areas where painting is proceeding require adequate continuous ventilation and sufficient heating facilities to maintain temperatures above (45°F) 7°C for 24 hours before during and after paint application.

1.14 MAINTENANCE MATERIALS

- .1 Supply Owner with one clearly identified, new and unopened gallon of each colour and type of paint, stain and varnish used for this work, in accordance with Section 01 78 00.
- .2 All colour mixing codes must be clearly labeled, and colour numbers (P1, P2, etc.) must be marked on the container.

1.15 EXTENDED WARRANTY

- .1 Provide upon completion of the work, a Warranty Certificate, in the name of the Owner, stating that the work of this section was performed in accordance with these specifications and the MPI manual (latest edition), and is warranted against defects in material or installation, for a period of two (2) years from Date of Substantial Performance.

2 PRODUCTS

2.1 MATERIALS

- .1 Paint, varnish, stain, enamel, lacquer and fillers shall be of a type and brand herein specified and/or listed under Chapter 5 (Approved Products List) of the MPI manual.
- .2 Paint materials such as linseed oil, shellac, turpentine, and any materials not specified herein but required for first class work with the finish specified shall be the highest quality product of an approved manufacturer. All materials shall be compatible with finish paint or coating materials.

2.2 MIXING

- .1 Paints shall be ready-mixed unless otherwise specified, except that any coating in paste or powder form, or to field-catalyzed shall be field-mixed in accordance with the directions of its manufacturer. Pigments shall be fully ground and shall maintain a soft paste consistency in the vehicle during storage that can and shall be dispersed readily and uniformly by paddle to a complete homogeneous mixture.
- .2 The paint shall have good flow and brush properties and shall dry or cure free of sags or runs to yield the desired finish specified.

2.3 GLOSS LEVELS

- | | | |
|--------------------------------|-------------------|-------------------|
| .1 MPI Gloss and Sheen Levels; | <u>Gloss @60°</u> | <u>Sheen @85°</u> |
| Level G1 – (Flat): | max. 5 | max. 10. |
| Level G2 – (Velvet): | max. 10 | 10-35. |
| Level G3 – (Eggshell): | 10-25 | 10-35. |
| Level G4 – (Satin): | 20-35 | min.35. |
| Level G5 – (Semi-Gloss): | 35-70. | |
| Level G6 – (Gloss): | 70-85. | |
| Level G7 – (High Gloss): | >85. | |

3 EXECUTION

3.1 INSPECTION OF SURFACES

- .1 Examine surfaces to receive paint finishes for defects which cannot be corrected by procedures specified herein, and which may result in unsatisfactory paint finishes. Report items to the Consultant and the Contractor in writing, prior to commencement of work of this section, or after initial prime coat shows defects in substrate.
- .2 The application of subsequent prime and finish coats shall be construed as acceptance of the surfaces, and thereafter this subcontractor shall be fully responsible for satisfactory work as required herein.

3.2 PREPARATION OF SURFACES

- .1 Refer to the MPI manual Chapter 3 for surface preparations not specified in this section.

3.3 PROTECTION

- .1 Protect all adjacent surfaces from paint and damage resulting from the work of this section, and make good any damage caused by failure to provide such protection.
- .2 Mask all adjacent finishes and surfaces with masking tape as required. Remove tape promptly after final finish coat has been applied and allowed to dry.
- .3 Furnish sufficient drop cloths, shields and protective equipment to prevent spray or dropping from fouling surfaces not being painted or where painting has been completed.
- .4 Cotton waste, cloths and material, which may constitute a fire hazard, shall be placed in closed metal containers and removed daily from the site.
- .5 Remove and protect, prior to painting operations, all hardware, accessories, device plates, lighting fixtures, factory finished work, and similar items, or provide ample in-place protection such as masking tape. If removed, these items shall be labelled, stored, cleaned if necessary and re-installed following successful completion of the work in each area. Solvents detrimental to lacquer finishes are not to be used for cleaning these items.

3.4 APPLICATION

- .1 Apply paints and coatings by currently accepted trade methods.
- .2 Painting coats specified are intended to cover surfaces satisfactorily when applied in strict accordance with manufacturer's recommendations. Where proper coverage has not been attained, the Consultant may ask for additional coats as required, at no additional cost.
- .3 Apply each coat at the proper consistency. Sand lightly between coats.
- .4 Tint primers to same colour range as finish coats.
- .5 Do not apply finishes on surfaces that are not sufficiently dry. Each coat of finish should be dry and hard before a following coat is applied unless specified otherwise by the manufacturer.
- .6 Spraying of paint on exterior surfaces is strictly prohibited, unless specified herein, or as approved by the Consultant.

- .7 Provide complete coverage and hide. When colour, stain, dirt or undercoats show through final coat of paint, provide additional coats until the paint film is of uniform finish, colour, appearance and coverage, at no additional cost to the Owner.
 - .8 Allow all coats to dry to manufacturer's recommendations before applying succeeding coats.
 - .9 Touch up all suction spots or "hot spots" in concrete after the application of the first coat, before applying the second coat.
 - .10 Barricade areas where finishing is in progress to prevent traffic or other activities, and otherwise protect work until dry. Post "Wet Paint" signs and remove when no longer required.
 - .11 Replace at the expense of this section, materials soiled or damaged by finishing materials which cannot be removed.
- 3.5 CLEAN-UP
- .1 Upon completion of the work, remove all paint and varnish spots from floors, glass and other surfaces. Remove from the premises all rubbish and accumulated materials of whatever nature, not caused by others, and leave this work in clean, orderly and acceptable conditions.
- 3.6 PAINTING AND FINISHING SCHEDULE
- .1 The following titles and code numbers refer to Chapter 2 of the MPI Manual, unless otherwise indicated for type of coating, grade, named products and their manufacturers.
 - .2 **Metal Finishing Systems**
 - .1 Non Fire-Rated Structural & Miscellaneous Steel (Shop-primed).
 - .1 High Performance Polyurethane Finish (2-component Epoxy / Polyurethane). Refer to Section 09 97 13.23.
 - .2 Galvanized Metals (not chromate passivated) – High Contact (Doors frames, railings balustrades, etc.) Premium Grade Finish.
 - .1 EXT. 5.3C; Epoxy (over epoxy primer), Gloss/Sheen – G5.
 - .3 **Wood Finishing Systems**
 - .1 Wood (CLT); Premium (3-coat) Grade Finish.
 - .1 Sikkens Cetol 1(1) + 23(2) finish, satin.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

- .1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.
- .2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.
- .3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.
- .4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

- .1 Provision of all labour, materials, equipment and incidental services necessary to cover with paint the interior surfaces of the building or structure, and the building services and accessories not otherwise protected or covered, to the full intent of the drawings and specifications.
- .2 Surface preparation of substrates to receive painting and finishing is included in this section of work.
- .3 This section of work shall include the painting and finishing of all exposed surfaces of the following substrates:
 - .1 Steel (Prime painted & Galvanized)
 - .2 Wood
 - .3 Concrete
 - .4 Exposed Mechanical and Electrical equipment (Conduit, Piping, Ductwork, etc. Including hangers)

1.3 REFERENCE STANDARDS

- .1 CAN2-85.100, National Standards of Canada, Painting.
- .2 Master Painters Institute (MPI) Architectural Painting Specification Manual.

1.4 MATERIALS AND EQUIPMENT NOT TO BE PAINTED

- .1 Surfaces not to be painted shall be left completely free of droppings, over-spray, or accidentally applied materials resulting from the work of this Section.
- .2 Items not to be painted include concealed structural elements, and equipment furnished with complete factory-applied, coloured paints and finish systems.

1.5 COOPERATION WITH OTHER TRADES

- .1 Schedule and coordinate this work with other trades and do not proceed until other work and/or job conditions are as required to achieve satisfactory results.
- .2 Examine all specification sections for materials and products, and become thoroughly familiar with all provisions regarding painting.

1.6 QUALITY ASSURANCE

.1 Material Manufacturers

.1 All paint and finish products shall be those listed in the MPI manual, latest edition unless otherwise specified or listed herein.

.2 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

.2 Installation/Application

.1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.

.3 Documentation

.1 If requested by the Consultant, submit documentation to support the competency of firms and personnel.

.4 Pre-application Meeting

.1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:

- .1 Contractor (Site Superintendent & Project Manager)
- .2 Application Subcontractor (Site Foreman & Project Manager)
- .3 Product Manufacturers and/or Distributors (Technical Representatives)
- .4 Related Subcontractors

.5 Mock-up

.1 If requested by the Consultant, finish one complete surface or item of each colour scheme required showing selected materials, colours and textures. If approved, the mock-up shall serve as a standard for similar work throughout the building.

.2 If requested by the Consultant, finish one complete room in colour scheme required showing selected materials, colours and textures. If approved, the mock-up shall serve as a standard for similar work throughout the building.

1.7 COMPLETION SCHEDULE

.1 Furnish the Consultant with a schedule showing expected completion of the respective coats of paint for the various areas and surfaces. Keep this schedule current as the job progresses.

1.8 COLOUR SCHEDULE

.1 The Consultant will prepare a colour schedule as the job progresses. The final selection of colours and surface textures of all finishes throughout shall rest solely with the Consultant.

1.9 SUBMITTALS

.1 Product Codes

.1 Submit a complete list of product codes from the manufacturer(s) proposed for use on this project, for all products listed in finish systems specified herein, in accordance with Section 01 30 00.

- .2 Samples
 - .1 Submit samples of all finishes specified herein, in accordance with Section 01 30 00.
 - .2 Submit duplicate 200 x 300mm sample panels of each type of paint and finish application for approval by the Consultant.
 - .3 Where manufacturer of paint differs from that listed in the colour schedule, employ spectrograph technology to ensure accurate colour match. Selection of the "next nearest colour" by another manufacturer will not be acceptable.
 - .4 Use birch plywood for wood finishes, gypsum board for paint finishes over smooth surfaces, and 100mm concrete block for concrete masonry.
 - .5 Finished work to match approved samples.

1.10 DELIVERY, STORAGE AND HANDLING

- .1 Paint and finish materials shall be delivered to the site in sealed original labelled containers bearing manufacturer's name, type of paint, brand name, colour designation and instructions for mixing and/or reducing.
- .2 Store materials in a heated, dry, well-ventilated, indoor place having a minimum ambient temperature of 7°C.
- .3 Keep waste rags in metal drums and remove all rags, waste and trash from the building at the end of each working shift.
- .4 Provide CO₂ fire extinguisher of minimum 9kg capacity in storage area.
- .5 Ensure that health and fire regulations are complied with in storage area.

1.11 GENERAL COLOUR REQUIREMENTS

- .1 Refer to the drawings for type and extent of finishes, and to the Room Finish Schedule and Colour Schedule for individual colour and sheen selections.
- .2 Where manufacturer of paint differs from that listed in the colour schedule, employ spectrograph technology to ensure accurate colour match. Selection of the "next nearest colour" by another manufacturer will not be acceptable.
- .3 The following, generally, will be painted colour, and sheen to match adjacent surfaces
 - .1 Access doors
 - .2 Exposed piping, conduit and ductwork
- .4 The following major items, generally, will be painted the same colour throughout the Work, but different colours from each other:
 - .1 Doors and door frames
 - .2 Ceilings
 - .3 Walls
 - .4 Railings and balustrades
 - .5 Exposed structural members and deck

1.12 ENVIRONMENTAL CONDITIONS

- .1 Temperatures: No painting shall be performed when substrate or ambient air temperatures are below 5°C. Minimum allowable temperature for application of Latex paints is 7°C.
- .2 Relative humidity: shall not exceed 85%.
- .3 Moisture content of substrates: Masonry and concrete materials shall be allowed to cure for a minimum of 28 days before application of paints. Substrates shall be measured by electronic moisture meter, to the following maximums:
 - .1 Plaster and Gypsum board: 12%.
 - .2 Masonry, concrete/concrete block: 12% for solvent based paints.
 - .3 Wood: 15%.
- .4 Lighting: Painting shall not proceed unless a minimum of 1.3 Lx lighting is provided on the surfaces to be painted.
- .5 Ventilation: All areas where painting is proceeding require adequate continuous ventilation and sufficient heating facilities to maintain temperatures above 7°C for 24 hours before during and after paint application.

1.13 MAINTENANCE MATERIALS

- .1 Supply Owner with one clearly identified, new and unopened gallon of each colour and type of paint, stain and varnish used for this work, in accordance with Section 01 78 00.
- .2 All colour mixing codes must be clearly labeled, and colour numbers (P1, P2, etc.) must be marked on the container.

1.14 EXTENDED WARRANTY

- .1 Provide upon completion of the work, a Warranty Certificate, in the name of the Owner, stating that the work of this section was performed in accordance with these specifications and the MPI manual (latest edition), and is warranted against defects in material or installation, for a period of two (2) years from Date of Substantial Performance.

2 PRODUCTS

2.1 MATERIALS

- .1 Paint, varnish, stain, enamel, lacquer and fillers shall be of a type and brand herein specified and/or listed under Chapter 5 (Approved Products List) of the MPI manual.
- .2 Paint materials such as linseed oil, shellac, turpentine, and any materials not specified herein but required for first class work with the finish specified shall be the highest quality product of an approved manufacturer. All materials shall be compatible with finish paint or coating materials.

2.2 MIXING

- .1 Paints shall be ready-mixed unless otherwise specified, except that any coating in paste or powder form, or to field-catalyzed shall be field-mixed in accordance with the directions of its manufacturer. Pigments shall be fully ground and shall maintain a soft paste consistency in the vehicle during storage that can and shall be dispersed readily and uniformly by paddle to a complete homogeneous mixture.
- .2 The paint shall have good flow and brush properties and shall dry or cure free of sags or runs to yield the desired finish specified.

2.3 GLOSS LEVELS

.1 MPI Gloss and Sheen Levels;	<u>Gloss @60°</u>	<u>Sheen @85°</u>
Level G1 – (Flat):	max. 5	max. 10.
Level G2 – (Velvet):	max. 10	10-35.
Level G3 – (Eggshell):	10-25	10-35.
Level G4 – (Satin):	20-35	min.35.
Level G5 – (Semi-Gloss):	35-70.	
Level G6 – (Gloss):	70-85.	
Level G7 – (High Gloss):	>85.	

3 EXECUTION

3.1 INSPECTION OF SURFACES

- .1 Examine surfaces to receive paint finishes for defects which cannot be corrected by procedures specified herein, and which may result in unsatisfactory paint finishes. Report items to the Consultant and the Contractor in writing, prior to commencement of work of this section, or after initial prime coat shows defects in substrate.
- .2 The application of subsequent prime and finish coats shall be construed as acceptance of the surfaces, and thereafter this subcontractor shall be fully responsible for satisfactory work as required herein.

3.2 PREPARATION OF SURFACES

- .1 Refer to the MPI manual Chapter 3 for surface preparations not specified in this section.

3.3 PROTECTION

- .1 Protect all adjacent surfaces from paint and damage resulting from the work of this section, and make good any damage caused by failure to provide such protection.
- .2 Mask all adjacent finishes and surfaces with masking tape as required. Remove tape promptly after final finish coat has been applied and allowed to dry.
- .3 Furnish sufficient drop cloths, shields and protective equipment to prevent spray or dropping from fouling surfaces not being painted or where painting has been completed.
- .4 Cotton waste, cloths and material, which may constitute a fire hazard, shall be placed in closed metal containers and removed daily from the site.
- .5 Remove and protect, prior to painting operations, all hardware, accessories, device plates, lighting fixtures, factory finished work, and similar items, or provide ample in-place protection such as masking tape. If removed, these items shall be labelled, stored, cleaned if necessary and re-installed following successful completion of the work in each area. Solvents detrimental to lacquer finishes are not to be used for cleaning these items.

3.4 APPLICATION

- .1 Apply paints and coatings by currently accepted trade methods.
- .2 Painting coats specified are intended to cover surfaces satisfactorily when applied in strict accordance with manufacturer's recommendations. Where proper coverage has not been attained, the Consultant may ask for additional coats as required, at no additional cost.

- .3 Apply each coat at the proper consistency. Sand lightly between coats.
 - .4 Tint primers to same colour range as finish coats.
 - .5 Do not apply finishes on surfaces that are not sufficiently dry. Each coat of finish should be dry and hard before a following coat is applied unless specified otherwise by the manufacturer.
 - .6 Tint filler to match wood for clear finishes. Work filler well into wood grain and remove excess prior to setting.
 - .7 Interior woodwork to receive paint or enamel finish shall be back-primed upon arrival on site with enamel undercoater.
 - .8 Spraying of paint will not be allowed, unless specified herein, or approved by the Consultant.
 - .9 Provide complete coverage and hide. When colour, stain, dirt or undercoats show through final coat of paint, provide additional coats until the paint film is of uniform finish, colour, appearance and coverage, at no additional cost to the Owner.
 - .10 Allow all coats to dry to manufacturer's recommendations before applying succeeding coats.
 - .11 Touch up all suction spots or "hot spots" in concrete after the application of the first coat, before applying the second coat.
 - .12 Surfaces to be stained shall appear uniform in shading with colour variations caused only by the natural wood grain.
 - .13 Barricade areas where finishing is in progress to prevent traffic or other activities, and otherwise protect work until dry. Post "Wet Paint" signs and remove when no longer required.
 - .14 Replace at the expense of this section, materials soiled or damaged by finishing materials which cannot be removed.
- 3.5 **CLEAN-UP**
- .1 Upon completion of the work, remove all paint and varnish spots from floors, glass and other surfaces. Remove from the premises all rubbish and accumulated materials of whatever nature, not caused by others, and leave this work in clean, orderly and acceptable conditions.
- 3.6 **PAINTING AND FINISHING SCHEDULE**
- .1 The following titles and code numbers refer to Chapter 4 of the MPI Manual, unless otherwise indicated for type of coating, grade, named products and their manufacturers.
 - .1 **Concrete Finishing Systems**
 - .1 Concrete Horizontal Surfaces; Premium Grade Finish.
 - .1 INT. 3.2F; Concrete Floor Sealer, Gloss/Sheen - G5.
 - .2 **Metal Finishing Systems**
 - .1 Galvanized Metals (not chromate passivated) – High Contact (HM Doors frames, railings, etc.) Premium Grade Finish.

.1 INT. 5.3D; Epoxy (over epoxy primer), Gloss/Sheen – G5.

.3 **Wood Finishing Systems**

.1 Wood (CLT); Premium (3-coat) Grade Finish.

.1 Sikkens Cetol 1(1) + 23(2) finish, satin.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

- .1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.
- .2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.
- .3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.
- .4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

- .1 Provision of all labour, materials, equipment and incidental services necessary to provide site grading.

1.3 REFERENCES

- .1 ASTM D698; Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft lbf/ft³ (600 KN-m/m³)).

1.4 DEFINITIONS

- .1 Native Topsoil: existing on-site material, capable of supporting good vegetative growth and suitable for use in finish grading for sodding or seeding.

1.5 SITE CONDITIONS

- .1 Underground and surface utility lines and buried objects affected by the Work, are indicated on the drawings.
- .2 Locate and confirm any and all on-site services prior to commencement of grading operations.

2 PRODUCTS

2.1 MATERIALS

- .1 Fill material: Types 2 and 3, in accordance with Section 31 23 00.
- .2 Excavated or graded material existing on site may be suitable to use as fill for grading work if approved by Consultant, subject to laboratory analysis.
- .3 Protect approved material from contamination.

3 EXECUTION

3.1 PROTECTION

- .1 Protect all existing fencing, trees, landscaping, natural features, bench marks, buildings, pavement, surface or underground utility lines which are to remain, as directed by Consultant. If damaged, restore to original condition unless directed otherwise.
- .2 Maintain access roads to prevent accumulation of mud on roads.

3.2 GRADING

- .1 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated.
- .2 Rough grade, using imported Type 2 fill material, to the following levels below finished grades:
 - .1 300mm for concrete paving and walks.
 - .2 250mm for crushed stone walks.
 - .3 250mm for asphalt paving.
- .3 Rough grade, using Type 3 fill material as required, to the following levels below finished grades:
 - .1 150mm for grassed areas.
 - .2 600mm for planting beds.
 - .3 1000mm for trees.
- .4 Slope rough grade away from building 1:50 minimum.
- .5 Prior to placing fill over existing ground, scarify surface to depth of 150mm. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.
- .6 Compact filled and disturbed areas to Standard Proctor Maximum Dry Density (SPMDD) in accordance with ASTM D698 as follows:
 - .1 98% under stone and concrete paved and walk areas, Type 2 fill.
 - .2 100% under asphalt paved areas, Type 2 fill.
 - .3 85% under landscaped areas, Type 3 fill.
- .7 Do not disturb soil within branch spread of trees or shrubs to remain.

3.3 INSPECTION & TESTING

- .1 An independent testing laboratory designated by the Owner will carry out inspection and testing of soil compaction.
- .2 Costs of testing will be paid from a Cash Allowance. Refer to Section 01 21 00 for allocation of allowances. Refer to Section 01 40 00 for extent and frequency of testing.

3.4 SURPLUS MATERIAL

- .1 Remove surplus material and material unsuitable for fill, grading or landscaping from site.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

- .1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.
- .2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.
- .3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.
- .4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

- .1 Provision of all labour, materials, equipment and incidental services necessary to supply, place, and grade topsoil, and provide finish grading to site.

1.3 DEFINITIONS

- .1 Native Topsoil: original topsoil stockpiled on site. Material subject to analysis by testing laboratory to ascertain suitability for use.
- .2 Imported Topsoil: topsoil imported from source off-site. Characteristics of imported topsoil are specified in this section. Provision of imported topsoil shall include all costs associated with shipping and handling, placement and grading on site, as well as the addition of all soil amendments to conform to this section.

1.4 SOURCE QUALITY CONTROL

- .1 Obtain Consultant's approval of Imported Topsoil source. Supplier of Imported Topsoil must submit test results performed within the last 4 months, for all topsoil to be provided to the Work, together with recommendations for soil amendments. Test results shall include the following data:
 - .1 Soluble salt content,
 - .2 Percentage of organic matter,
 - .3 pH value.

1.5 SUBMITTALS

- .1 Product Data
 - .1 Submit complete Product Data for all soil amendments to be used to supplement Native and/or Imported Topsoil, as recommended by soil analysis testing.

1.6 SCHEDULING OF WORK

- .1 Schedule placing of topsoil and finish grading to permit immediate sodding or seeding operations.

1.7 DELIVERY AND STORAGE

- .1 Deliver and store soil amendments showing/accompanied by documentation of the weight, analysis and name of manufacture.

2 PRODUCTS

2.1 TOPSOIL MATERIALS

- .1 Native Topsoil: original topsoil stockpiled on site. Material subject to analysis by testing laboratory before use.
- .2 Imported Topsoil: friable, neither heavy clay nor of very light sandy nature containing minimum of 4% organic matter for clay loams and 2% for sandy loams to maximum of 25% by volume. Free from subsoil, roots, grass, weeds, toxic materials, stones, foreign objects and with an acidity range pH of 5.5 to 7.5. Topsoil containing crabgrass, couch grass or noxious weeds is not acceptable.
- .3 Soil Amendments
 - .1 Peat Moss: decomposed plant material, fairly elastic and homogenous, free of decomposed colloidal residue, wood, sulphur and iron containing minimum 60% organic matter by weight and moisture content not exceeding 15%. Shredded particles may not exceed (1/4") 6mm in size. Minimum pH value of peat 4.5, maximum 6.0.
 - .2 Fertilizer: Complete commercial synthetic slow release fertilizer with maximum 35% water soluble nitrogen, formulation ratio 1:4:4.
 - .3 Lime:
 - .1 Ground agricultural limestone containing minimum 85% of total carbonates.
 - .2 Gradation requirements: percentage passing by weight, 90% passing 1.0mm sieve, 50% passing 125 micrometer sieve.
 - .3 Use lime as indicated by acidity analysis of topsoil to bring pH to required level.
 - .4 Bonemeal: steamed bonemeal, finely ground with a minimum analysis of 4% nitrogen and 20% phosphoric acid.
 - .5 Sand: hard, granular sharp sand to CSA A82.56, well washed and free of impurities, chemical or organic matter.
 - .6 Sulphur: finely crushed agricultural elemental sulphur, free of impurities.

3 EXECUTION

3.1 PREPARATION

- .1 Grade subgrade, eliminating uneven areas and low spots, ensuring positive drainage. Remove debris, roots, branches, stones in excess of (2") 50mm diameter and other deleterious materials. Remove subsoil that has been contaminated with oil, gasoline, or calcium chloride. Dispose of removed materials as directed.
- .2 Cultivate entire area which is to receive topsoil to depth of (4") 100mm. Repeat cultivation in those areas where equipment used for hauling and spreading has compacted subgrade.

3.2 SPREADING OF TOPSOIL

- .1 Do not spread topsoil until Consultant has inspected and approved subgrade.

- .2 Spread topsoil with adequate moisture in uniform layers during dry weather over approved, dry, unfrozen subgrade, where seeding or sodding is indicated.
- .3 Keep topsoil (1") 25mm below finished grade for sodded areas; elsewhere bring topsoil up to finished grade.
- .4 Apply topsoil to the following minimum depths:
 - .1 (8") 200mm for seeded or sodded areas.
 - .2 (18") 450mm for planting beds.
 - .3 (39") 1000mm for trees.
- .5 Remove stones, roots, grass, weeds, construction materials, debris and foreign non-organic objects from topsoil.

3.3 SOIL AMENDMENTS

- .1 Apply soil amendments to Native Topsoil as required by soil analysis. Refer to Geotechnical Report appended to Section 00 30 00. Apply at rates recommended by amendment manufacturers.
- .2 Apply soil amendments to Imported Topsoil as required by soil analysis test results, provided under this section. Apply at rates recommended by amendment manufacturers.
- .3 Mix soil amendments well into full depth of topsoil as required, by cultivating or roto-tilling prior to application of fertilizer.

3.4 APPLICATION OF FERTILIZER

- .1 Apply fertilizer at least one week after lime application and at least 6 days before sodding or seeding.
- .2 Spread fertilizer with mechanical spreaders over entire area of topsoil at [manufacturer's recommended rate of application][rate determined on basis of soil sample test][rate as directed].
- .3 Mix fertilizer thoroughly into upper (2") 50mm of topsoil.

3.5 FINISH GRADING

- .1 Manually fine grade entire topsoil area to contours and elevations shown, and as directed by Consultant. Eliminate rough spots and low areas to ensure positive drainage.
- .2 Roll topsoil with (100lb.) 45kg roller, minimum (3'-0") 900mm wide, to compact and retain surface.
- .3 Leave surface smooth, uniform, and firm against deep foot printing, with a fine loose texture.

3.6 RESTORATION OF STOCKPILE SITES

- .1 Restore stockpile sites to a "rake clean" condition, ready for application of seed or sod.

3.7 SURPLUS MATERIAL

- .1 Dispose of surplus topsoil not required for fine grading and landscaping off site.

END OF SECTION

1. General

1.1. Section Includes

1. This section includes all excavations, grading and backfilling called for or implied by the Specifications, together with all necessary incidentals whether referred to or not, as will be required to complete the work to the full intent and meaning of the Specifications.
2. The work includes, but is not limited to, the following:
 1. Excavating
 2. Backfilling
 3. Compaction
 4. Grading
 5. Restoration of surfaces

1.2. Related Requirements

1. Section 02 41 16 Structure Demolition
2. Designated Substances Survey – Beavermead Gatehouse Building, 2011 Ashburnham Drive, Peterborough, Ontario, dated August 6, 2021, Cambium File No. 13516-001.

1.3. Reference Standards

1. Occupational Health and Safety Act
2. Ontario Building Code (latest edition)
3. OPSS.MUNI 1010, November 2013 – Material Specification for Aggregates – Base, Subbase, Select Subgrade, and Backfill Material
4. ASTM – D698-12e2 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³))

1.4. Submittals

1. Inform City, at least 4 weeks prior to start of work, the proposed source of fill materials and provide access for sampling of material.
2. Submit 70 kg samples of type of fill specified, including representative samples of excavated material.
3. Ship samples in tightly closed containers to prevent contamination.

1.5. Compacted Densities

1. Compaction densities are percentages of maximum densities obtainable from ASTM D698-12e2.
2. Perform all necessary excavating, including backfill with satisfactory material and compacted to at least 98% of the materials Standard Proctor Maximum Dry Density. The City reserves the right to perform any necessary test to ensure proper compaction and compliance with fill material specifications.

3. Backfilling to be performed on all pits, trenches and basements and other designated areas.

2. Products

2.1. Materials

1. All backfill materials shall be identified, tested and approved from a stockpile prior to backfilling.
2. Type 1 Fill: Approved, imported materials according to OPSS.MUNI 1010 Select Subgrade Materials (SMM) or equivalent sand, free from roots, weeds, topsoil, tree or shrub material, building debris, rocks larger than 75 mm, and having a moisture content not greater than 10% by weight.

3. Execution

3.1. Shoring

1. Shoring shall be furnished and installed as necessary to protect the workmen, banks, adjacent structures, and utilities in accordance with applicable codes and standards. Shoring, bracing, and sheeting shall be removed as excavations are backfilled, in a manner to prevent caving.

3.2. Excavating

1. Excavation shall be carried out to elevations and dimensions for removal of foundation, footings, concrete slabs and when required elsewhere to well-defined lines to minimize quantity of fill material required. Excavation to elevation required beyond the existing foundation level shall be approved by the Project Manager, prior to the start of the work.
2. A general excavation limit of the designated footprint of the structure to be removed shall be the existing foundation outline of the structure. Additional required excavation shall be established with approval of the City of Peterborough's Project Manager prior to the start of the work.
3. Soil excavated during the demolition will be separated and stored on site for the purpose of environmental impact testing by the City or their appointment designate. Cost of soil testing to be borne by the City.
4. Soils excavated during demolition and confirmed to have environmental impact shall be removed and disposed of in accordance with the Ministry of the Environment, Conservation and Parks (MECP) regulations and guidelines. Provide the Project Manager with waste documentation from MECP approved disposal facility.
5. At no time shall environmentally impacted soils be used for backfill material.
6. Remove and dispose of any obstructions encountered in course of excavation from site.

3.3. Backfilling

1. Do not commence backfilling until areas of work to be backfilled have been inspected by the City or their designate.
2. Satisfactory materials shall be used in bringing fills and backfills to the lines and grades indicated and for replacing unsatisfactory materials. Satisfactory materials shall be placed in horizontal lifts not exceeding 200 mm in compacted thickness. The backfilled materials should be placed and compacted at a water content within 2% +/- of the material's optimum moisture content. Water shall be added to the stockpile or in the borrow site to achieve this, as required. After placement, water shall be adjusted if necessary; each layer shall be separated, moisture added or aerated as necessary, thoroughly mixed and compacted as specified. Backfill shall be brought to indicated finish grade. Backfill shall not be placed in wet areas. Each layer of fill and backfill shall be completed to not less than the percentage of maximum density specified.
3. Areas to be backfilled shall be free from debris, snow, ice, water or frozen ground.
4. If, during progress of the work, tests indicate fills do not meet specified requirements or compaction, remove defective fills, replace, compact and retest at no extra charge to the City.

3.4. Grading

1. Grade the site to allow proper drainage.
2. Utilize silt and dust control to protect areas surrounding the site.
3. Grading shall provide a smooth transition to meet with the existing grades. Do not shed water onto neighboring properties.
4. Fine grade subgrade material, eliminating uneven areas and low spots, ensuring positive drainage.
5. Remove surface debris, roots, vegetation branches and stones in excess of 25 mm diameter.
6. Commencement of final grading assumes final acceptance of rough grading work.

3.5. Surplus Material

1. Remove from site any material which is unsuitable for fill, grading or landscaping and dispose of in accordance with MECP regulations. Provide the Project Manager with waste documentation from MECP-approved disposal facility.
2. Confirm to local by-law requirements for trucking and disposal. Pay cost for removal and conformance to by-laws.

3.6. Restoration of Surfaces

1. Upon completion of demolition or when ordered by the Project Manager, the Contractor shall restore all surfaces cut for trenching and excavation as well as other surfaces damaged by the Contractor's operations.
2. All disturbed areas shall be fine graded. The entire work shall be done in workmanlike manner, so that the appearance upon completion shall be as near as possible that of a good, natural growth in place.
3. Maintain the restored areas until germination of seed is established. Repeat hydro-seeding until healthy grass is properly established.

End of Section

1 GENERAL

1.1 GENERAL REQUIREMENTS

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- .2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.
- .3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.
- .4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

- .1 Provision of all labour, materials, equipment and incidental services necessary to provide the asphalt concrete pavement structure, including:
 - .1 Proof rolling of sub-base for compaction required,
 - .2 Placement, fine grading and final compaction of granular base material,
 - .3 Placement, compaction, and finishing of asphaltic concrete,

1.3 REFERENCE STANDARDS

- .1 OPSS-1010; Material Specification for Aggregates – Granular A, B, M and Select Subgrade Material (Ontario Provincial Standard Specification).
- .2 OPSS 1103; Material Specification for Emulsified Asphalt (Ontario Provincial Standard Specification).
- .3 OPSS-1150; Material Specification for Hot Mix, Hot Laid Asphaltic Concrete (Ontario Provincial Standard Specification).
- .4 OPSS-1154; Material Specifications for Hot Mixed, Hot Laid, Asphaltic Concrete Containing Reclaimed Asphalt Pavement (Ontario Provincial Standard Specification).
- .5 ASTM D698; Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft. lbf/ft³ (600 kN m/m³)).
- .6 ASTM D979; Practice for Sampling Bituminous Paving Mixtures.
- .7 ASTM D995; Specification for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.

1.4 PAVEMENT DESIGN

- .1 The following pavement designs are required. Thicknesses referenced are "after compaction". Refer to drawings for location and extent of paving types:
 - .1 Light Duty Asphalt
 - .1 SubBase Fill: (12") 300mm, Granular B fill.
 - .2 Base Fill: (6") 150mm, Granular A fill.
 - .3 Base: (2") 50mm, HDBC fill.
 - .4 Surface: (2") 50mm HL-1.

1.5 QUALITY ASSURANCE

- .1 Manufacturer/Fabricator
 - .1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in

the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.

- .2 Installation/Application
 - .1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/ shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.
- .3 Documentation
 - .1 If requested by the Consultant, submit documentation to support the competency of firms and personnel.
- .4 Pre-installation Meeting
 - .1 Convene a pre-installation meeting for the work specified in this section. Attendees must include, as a minimum, representatives of the following:
 - .1 Contractor (Site Superintendent & Project Manager)
 - .2 Installation Subcontractor (Site Foreman & Project Manager)
 - .3 Product Manufacturer and/or Distributor (Technical Representatives)
 - .4 Related Subcontractors (ie. Landscape, Concrete)

2 PRODUCTS

2.1 MATERIALS

- .1 Base Materials
 - .1 SubBase Fill: OPSS 1010.05; Granular "B".
 - .2 Base Fill: OPSS 1010.05; Granular "A".
 - .3 Base: OPSS 310; High Density Base Course (HDBC).
- .2 Asphalt Prime: MTO Primer, or SS-1 to OPSS 1103.05.
- .3 Sand Blotter: clean concrete sand, passing (3/16") 4.75mm sieve and free from organic matter or other deleterious materials.
- .4 Asphaltic Concrete: hot mix, hot laid asphaltic concrete, to OPSS 1150.05.
 - .1 Surface Course: HL-1.

2.2 PLANT AND MIXING REQUIREMENTS

- .1 To ASTM D995, and OPSS 1150.

2.3 EQUIPMENT

- .1 Pavers: mechanical grade controlled self powered pavers capable of spreading mix within specified tolerances, true to line, grade and crown indicated.
- .2 Rollers: sufficient number of rollers of type and weight to obtain specified density of compacted mix.
- .3 Vibratory Rollers
 - .1 Minimum drum diameter: (2'-6") 750mm.
 - .2 Maximum amplitude of vibration machine setting: (0.02") 0.5mm for lifts less than (1½") 40mm thick.

- .4 Haul trucks
 - .1 Adequate size, speed and condition to ensure orderly and continuous operation, and as follows:
 - .1 Boxes with tight metal bottoms.
 - .2 Covers of sufficient size and weight to completely cover and protect asphalt mix when truck fully loaded.
 - .3 In cool weather or for long hauls, insulate entire contact area of truck.
 - .5 Suitable hand tools.
- 2.4 SOURCE QUALITY CONTROL
 - .1 Submit mix designs from asphalt supplier for review by Consultant prior to mobilization for asphalt pavement work.
- 3 EXECUTION**
 - 3.1 PREPARATION
 - .1 Verify grades of subgrade drains, maintenance holes, catch basins, and other items set in paving area for conformity with elevations and sections before placing granular base materials.
 - .2 Where placement of granular base does not immediately follow sub-base, or where sub-base has suffered severe weather conditions, proof roll sub-base by numerous passes of compaction equipment to ensure that a uniform 98% Standard Proctor Maximum Dry Density (SPMDD) is achieved.
 - .3 Obtain approval of sub-base by Consultant before placing granular base.
 - .4 Place granular base material on clean unfrozen surface, properly shaped and compacted and free from snow and ice.
 - .5 Sub-excavate any loose or softened areas to competent material and backfill with compacted granular fill.
 - 3.2 BASE & SUBBASE COURSES
 - .1 SubBase Courses
 - .1 (12") 300mm compacted thickness of Granular B fill.
 - .2 Base Courses
 - .1 (6") 150mm compacted thickness of Granular A fill.
 - .3 Base
 - .1 (2.0") 50mm HDBC, after compaction (92% MRD).
 - .4 Grade to uniform levels or slopes between given elevations or between given elevations and existing surfaces, allowing for depth of asphalt surfacing.
 - .5 Place Base and SubBase Courses in lifts not exceeding (6") 150mm compacted thickness. Compact to 100% SPMDD in accordance with ASTM D698.
 - 3.3 ASPHALT PRIME
 - .1 Do not apply prime when air temperature is less than (41°F) 5°C or when rain is forecast within 2 hours.

- .2 If asphalt prime fails to set within 24 hours, spread sand blotter material in amounts required to absorb excess material. Sweep and remove excess blotter material.

3.4 ASPHALT CONCRETE PAVING

- .1 Pavement Thickness
 - .1 Light Duty Paving
 - .1 Surface Course: (2.0") 50mm HL-1, after compaction (92% MRD).
- .2 Obtain approval of base and primer from Consultant before placing asphalt mix.
- .3 Place asphalt mix only when base or previous course is dry and air temperature is above (41°F) 5°C.
- .4 Paint contact edges of catch basins, and maintenance holes with hot asphalt prime before the mixture is placed against them.
- .5 Apply hot asphalt prime to existing asphalt when repaving, or over binder course applied more than 7 days before surface course application. Power wash surface prior to applying prime, to remove any and all dirt, or other surface contamination. Allow to dry sufficiently.
- .6 Binder courses applied less than 7 days prior to surface course application shall be power-washed to remove any and all dirt, or other surface contamination, and allowed to dry sufficiently. Power washing may be done in lieu of applying prime, to the approval of the Consultant.
- .7 Place asphalt concrete in compacted layers not exceeding (2") 50mm.
- .8 Minimum (275°F) 135°C mix temperature required when spreading.
- .9 Maximum (320°F) 160°C mix temperature permitted at any time.
- .10 Compact each course with roller as soon as it can support roller weight without undue cracking or displacement.
- .11 Compact asphalt concrete to density not less than 95% of density obtained with Marshall specimens prepared in accordance with ASTM D1559 from samples of mix being used.
- .12 Roll until roller marks are eliminated. Keep roller speed slow enough to avoid mix displacement and do not stop roller on fresh pavement.
- .13 Moisten roller wheels with water to prevent mix adhesion.
- .14 Compact mix with hot tampers, or other equipment approved by Consultant, in areas inaccessible to roller.
- .15 Finish surface smooth, of uniform density and texture, true to grade to within (3/8") 10mm and with no irregularities greater than (3/8" in 14.75') 10mm in 4.5m.
- .16 Repair areas showing checking, rippling or segregation as directed by Consultant.

3.5 JOINTS

- .1 Remove surplus material from surface of previously laid strip. Do not deposit on surface of freshly laid strip.

- .2 For cold joints, cut back to full depth vertical face and tack face with hot asphalt.
 - .3 For longitudinal joints, overlap previously laid strip with spreader by (1" to 2") 25 to 50mm.
- 3.6 PROTECTION
- .1 Keep all traffic off newly paved areas until paving surface temperature has cooled below (100°F) 38°C. Do not permit stationary loads on pavement until 24 hours after placement.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

- .1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.
- .2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.
- .3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.
- .4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

- .1 Provision of all labour, materials, equipment and incidental services necessary to provide exterior concrete paving, curbs, walks, and gutters to configurations indicated.

1.3 REFERENCE STANDARDS

- .1 ASTM D698-91(1998); Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft. lbf/ft³ (600 kN m/m³)).
- .2 ASTM D1751-97; Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
- .3 CSA-A23.1-00; Concrete Materials and Methods of Concrete Construction.
- .4 CSA-A23.2-00; Methods of Test for Concrete.
- .5 CSA-A5-98; Portland Cement.
- .6 CSA-G30.5-M1983 (R1998); Welded Steel Wire Fabric for Concrete Reinforcement.
- .7 CAN/CSA-G30.18-M92 (R1998); Billet-Steel Bars for Concrete Reinforcement.

1.4 QUALITY ASSURANCE

- .1 Prior to starting concrete work, submit quality control procedures for Consultant's approval for following items:
 - .1 Hot weather concrete,
 - .2 Cold weather concrete,
 - .3 Curing,
 - .4 Finishes,
 - .5 Formwork removal.
- .2 Certification: Provide certification from the Ready-Mixed Concrete Association of Ontario (RMCAO) of the following:
 - .1 Certification of concrete production facilities,
 - .2 Mix proportions selected will produce concrete of specified quality and yield,
 - .3 Mix design is adjusted to prevent alkali aggregate reactivity, and
 - .4 Strength will comply with CSA-A23.1.

- .3 Pre-construction Meeting
 - .1 Convene a pre-construction meeting for the work specified in this section. Attendees must include, as a minimum, representatives of the following:
 - .1 Contractor (Site Superintendent & Project Manager)
 - .2 Installation Subcontractor (Site Foreman & Project Manager)
 - .3 Related Subcontractors (ie. Landscape)
 - .4 Consultant

1.5 ENVIRONMENTAL CONDITIONS

- .1 Do not pour concrete during, or for 24 hours after, rain/snow fall.
- .2 Examine subgrade and ensure soil material is not frozen or saturated with water. Do not use frozen base materials. Do not install base on frozen subgrade.

2 PRODUCTS

2.1 MATERIALS

- .1 Portland Cement: to CSA-A5.
- .2 Water: to CSA-A23.1.
- .3 Aggregates: to CSA-A23.1.
- .4 Reinforcing Steel: Canadian manufactured deformed steel to CSA G30 Series.
- .5 Welded steel wire fabric: to CSA G30.5. Provide in flat sheets only.
- .6 Air Entraining Admixture: to CSA-A23.1.
- .7 Joint Filler: asphalt impregnated fiberboard, to ASTM D1751.
- .8 Curing Compound: to CSA-A23.1.
- .9 Granular Base: Granular A to OPSS 1010.
- .10 Granular SubBase: Granular B to OPSS 1010.

2.2 CONCRETE MIX

- .1 Proportion normal density, sulfate resistant concrete in accordance with CSA-A23.1, and as follows:
 - .1 Cement: Type 10, grey Portland Cement.
 - .2 Minimum compressive strength at 28 days: 32MPa.
 - .3 Exposure Classification: C-2.
 - .4 Coarse Aggregate Size: 20mm, crushed (smooth aggregate not acceptable).
 - .5 Slump at time and point of discharge: 65 to 100mm.
 - .6 Air Content: 5 to 8%.

3 EXECUTION

3.1 PREPARATION

- .1 Perform subgrade preparation work in accordance with Section 31 22 13.

3.2 GRANULAR BASE & SUB-BASE

- .1 Obtain Consultant's approval of subgrade before placing granular material.
- .2 Place granular material in maximum lifts of 150mm.
- .3 SubBase: Minimum 150mm Granular B fill; compact to 98% of Standard Proctor Maximum Dry Density (SPMDD) to ASTM D698.
- .4 Base: Minimum 150mm Granular A fill; compact to 98% of Standard Proctor Maximum Dry Density (SPMDD) to ASTM D698.

3.3 PLACEMENT OF CONCRETE

- .1 Place reinforcing steel and welded wire fabric in accordance with details and reviewed shop drawings.
- .2 Obtain Geotechnical Engineer's approval of granular base prior to placing concrete. Obtain Consultant's approval of placement of reinforcing steel prior to placing concrete
- .3 Perform concrete work in accordance with CSA-A23.1.

3.4 EXPANSION AND ISOLATION JOINTS

- .1 Install expansion joints at maximum intervals of 6m, or as indicated on the drawings.
- .2 Install expansion/isolation joints around manholes and catch basins and along length adjacent to concrete curbs, catch basins, buildings or other permanent structure.
- .3 When sidewalk is adjacent to curb, align joints of curb, gutters and sidewalks.
- .4 Install 13mm thick joint filler of maximum practical length in expansion and isolation joints, from bottom of pour to within 6mm of finished surface.

3.5 FINISHING

- .1 Finish concrete in accordance with CSA-A23.1 and section 03 35 00. Use referenced procedures for removal of excess bleed water. Ensure surface is not damaged.
- .2 Float surface of concrete to CSA-A23.1, with wood float, and bring surface to true elevation.
- .3 Non-Slip Surfaces: provide uniform broom finish to concrete paving on sloped grades exceeding 3%, and to all sidewalks, by drawing broom across surface of concrete perpendicular to direction of travel.
- .4 Control Joints: install tooled transverse control joints as soon as possible after floating and brooming, when concrete is stiff, but still plastic, at intervals of 1.5m, or as indicated on the drawings.
- .5 Provide edging using 10mm radius edging tool.

3.6 CURING & PROTECTION

- .1 Protect surface from rapid moisture evaporation to avoid plastic shrinkage cracking, when severe drying conditions (sun, wind, humidity) are anticipated, in accordance with CSA A23.1.
- .2 Cure concrete in accordance with Section 21 of CSA A23.1.

- .3 Add curing compound evenly over entire surface of concrete in continuous film.
- .4 Allow concrete to cure minimum 7 days prior to backfilling or installing adjacent landscaping.

3.7 TOLERANCES

- .1 Surface tolerances to CSA-A23.1, Table 19, Class A.

3.8 FIELD QUALITY CONTROL

- .1 Inspection and testing of concrete will be carried out by an Inspection and Testing Laboratory designated by the Owner, in accordance with Section 01 45 00, and CAN/CSA-A23.2.
- .2 The cost of inspection and testing will be paid from a Cash Allowance as allocated in Section 01 21 00.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

- .1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.
- .2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.
- .3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.
- .4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

- .1 Provision of all labour, materials, equipment and incidental services necessary to provide pavement markings including:
 - .1 Line painting
 - .2 Zone marking
 - .3 Traffic symbols
 - .4 Barrier-free parking symbols

1.3 REFERENCE STANDARDS

- .1 CAN/CGSB 1-GP-74M; Alkyd Traffic Paint.

1.4 QUALITY ASSURANCE

- .1 Installer Qualifications
 - .1 Work shall be performed by mechanics having a minimum of 2 years documented experience in pavement markings and line painting. If requested, submit proof of experience to Consultant.
- .2 Installation
 - .1 Perform work in strict accordance with these specifications, standards referenced herein, and with all warranty requirements.
- .3 Pre-installation Meeting
 - .1 Convene a pre-installation meeting for the work specified in this section. Attendees must include, as a minimum, representatives of the following:
 - .1 Construction Manager (Site Superintendent & Project Manager)
 - .2 Installation Subcontractor (Site Foreman & Project Manager)
 - .3 Product Manufacturer and/or Distributor (Technical Representatives)
 - .4 Related Subcontractors

2 PRODUCTS

2.1 MATERIALS

- .1 Traffic Paint: to CAN/CGSB 1-GP-74M, fast-dry alkyd traffic paint;
 - .1 Colours: white, yellow, blue.

2.2 EQUIPMENT

- .1 Spray Equipment: walk-behind airless spray equipment, specific to pavement line painting operations.
- .2 Brushes: for commercial grade painting.
- .3 Templates: plywood symbol templates.

3 EXECUTION

3.1 PREPARATION

- .1 Clean pavement surfaces to be painted, of all dirt, oil, grease, or other foreign contaminants that will impair the adhesion of the paint.

3.2 PAINTED LINES & SYMBOLS

- .1 Apply paint by brush or spray, in accordance with manufacturer's written instructions. Do not apply at temperatures below (50°F) 10°C.
- .2 When spraying symbols, use approved plywood templates.

3.3 SCHEDULE

- .1 Refer to Site Plan drawings for locations and extent of line painting.
 - .1 Parking Lines: (4") 100mm wide solid yellow lines.
 - .2 Barrier Free Symbols: MTO standard yellow barrier free symbol, at each B.F. parking stall.
 - .3 Traffic Arrows: MTO standard white arrows; straight, left-turn, right turn.
 - .4 Stop Lines: (12") 305mm wide solid white line, from centre of road or drive to edge of pavement, at all stop signs.
 - .5 Centre Lines: (4") 100mm wide solid yellow line, (20'-0") 6m long from Stop Line, at centre of road or drive, at all stop signs.
 - .6 Safety Zones: (12") 305mm wide diagonal yellow lines and borders.

3.4 PROTECTION

- .1 Keep vehicular traffic off newly painted areas until paint has sufficiently dried.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

- .1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.
- .2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.
- .3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.
- .4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

- .1 Provision of all labour, materials, equipment and incidental services necessary to provide tactile warning surfacing items, including all associated hardware, fasteners, accessory materials and installation.

1.3 QUALITY ASSURANCE

- .1 Manufacturer/Fabricator
 - .1 Manufacturers or fabricators providing Products under this Section shall have sufficient plant, equipment and competent personnel to provide the Products, in accordance with the Contract Documents. Firm(s) shall have past experience in the manufacture or fabrication of the Products specified herein, and shall have successfully completed Projects of similar scope and type.
- .2 Installation/Application
 - .1 Installers or applicators of the Products specified herein, shall be competent in the skills required to perform such tasks. Installation/application shall be performed in accordance with industry standards specified herein, warranty requirements, and in accordance with generally accepted, industry best practices.
- .3 Documentation
 - .1 If requested by the Consultant, submit documentation to support the competency of firms and personnel.
- .4 Pre-application Meeting
 - .1 Convene a pre-application meeting for the Products specified in this section. Attendees must include, as a minimum, representatives of the following:
 - .1 Contractor (Site Superintendent & Project Manager)
 - .2 Application Subcontractor (Site Foreman & Project Manager)
 - .3 Product Manufacturer and/or Distributor (Technical Representatives)
 - .4 Related Subcontractors whose work is affected by that of this Section.

1.4 SUBMITTALS

.1 Shop Drawings

.1 Submit shop drawings in accordance with Section 01 30 00.

.2 Indicate system dimensions, tolerances, and adjacent construction. Also indicate profiles of components, elevations, anchorage details, required reinforcing, location of isolation coating, description of related components, finishes and fasteners.

.2 Samples

.1 Submit samples of all miscellaneous specialty items specified herein, in accordance with Section 01 30 00.

2 PRODUCTS

2.1 EXTERIOR TACTILE WALKING SURFACE INDICATORS

.1 Tactile Walking Surface Indicators shall be made of cast-iron plate, meeting CSA B651-2012 and Ontario Regulation 191/11, and meet the following requirements:

<u>Standard</u>	<u>Property</u>	<u>Minimum Result</u>
ASTM C1028	slip resistance	dry 0.8 min, wet 0.80 min
ASTM C501	wear resistance	wear index: > 500
ASTM D695	compressive strength	> 172MPa
ASTM D543	chemical resistance	no effect
ASTM B117	salt spray (300 hrs)	no effect

.1 Tile Size: (24"x24") 600mm x 600mm.

.2 Surface Pattern: truncated domes.

.3 Accessories: provide anchors and expansion shields.

.4 Acceptable Products:

.1 Cast Iron Plates by Neenah Enterprises Inc.

.2 Kinesik Advantage Cast Iron TWSI Plates with Dual Layered Paint System.

3 EXECUTION

3.1 INSTALLATION

.1 Locate and install tactile walking surface indicators as indicated on the drawings.

.2 Locate units in proper alignment with adjacent work.

.3 Install specialty items in accordance with manufacturer's installation instructions.

.4 INSTALLATION OF TSWIs

.1 Install tactile walking surface indicators using provided anchors and expansion shields, according to manufacturer's specifications and instructions.

3.2 CLEANING

- .1 During installation, remove all corrosive or foreign materials or droppings resulting from work of this trade.

END OF SECTION

1 GENERAL

1.1 GENERAL REQUIREMENTS

- .1 The General Conditions of the Contract, Supplementary Conditions, and the General Requirements of Division 1, form part of this section, and must be read in conjunction with the requirements of this section. The work of this section shall comply with all requirements of Division 1 – General Requirements.
- .2 The Contractor shall, together with any and all Subcontractors involved in the work of this section, examine all surfaces or conditions relating to the Work, in order to determine the acceptability of such surfaces or conditions for the work of this section to commence.
- .3 Subcontractors shall report in writing, any observed defects or deficiencies in any surfaces or conditions that would adversely affect the work of this section, to the Contractor for correction prior to commencing the work of this section.
- .4 Commencement of the work of this section shall imply acceptance of all surfaces and conditions.

1.2 SECTION INCLUDES

- .1 Provision of all labour, materials, equipment and incidental services necessary to Provide sodding.

1.3 DELIVERY, STORAGE & HANDLING

- .1 Deliver and store sod on wood pallets.
- .2 Deliver sod to site within 24 hours of being lifted and lay sod within 36 hours of being lifted.
- .3 Do not deliver small, irregular or broken pieces of sod.
- .4 During wet weather, allow sod to dry sufficiently to prevent tearing during lifting and handling.
- .5 During dry weather protect sod from drying, and water sod as necessary to ensure its vitality and prevent dropping of soil in handling. Dry sod will be rejected.

1.4 SCHEDULING

- .1 Schedule sod laying to coincide with topsoil and finish grading operations.

2 PRODUCTS

2.1 Materials

- .1 Nursery Sod: quality and source to comply with standards outlined in Section 17 of the Guide Specification for Nursery Stock (latest edition), published by Canadian Nursery Trades Association.
 - .1 Number One Kentucky Bluegrass Sod: grown from minimum mixture of 3 Kentucky Bluegrass cultivars.
- .2 Water: potable.
- .3 Fertilizer: complete, synthetic, slow release fertilizer, with maximum 35% water-soluble nitrogen.

2.2 SOURCE QUALITY CONTROL

- .1 Obtain approval of sod source from Consultant. Once approved, use no other source without written authorization.

3 EXECUTION

3.1 PREPARATION

- .1 Verify that grades are correct and prepared in accordance with Section 31 22 19. If discrepancies occur, notify Consultant immediately and do not commence work until instructed by Consultant to do so.
- .2 Do not perform work under adverse field conditions such as frozen, excessively wet or dry soil, or soil covered with snow, ice or standing water.
- .3 Fine grade surface free of any remaining humps and hollows to smooth even grade, to tolerance of \pm (3/8") 10mm.
- .4 Remove and dispose of any visible weeds, debris, stones, and contaminated soil.
- .5 Clean up immediately soil or debris spilled onto adjacent pavement and dispose of deleterious materials.

3.2 LAYING OF SOD

- .1 Prior to sodding, obtain approval from Consultant that finished grade and depth of topsoil are satisfactory.
- .2 Sodding during excessively wet conditions, at freezing temperatures or over frozen soil is not acceptable.
- .3 Lay sod in rows, perpendicular to slopes, smooth and even with adjoining areas, and with joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with sharp implements.
- .4 Provide close contact between sod and soil by light rolling. Use of heavy roller to correct irregularities in grade is not permitted.
- .5 Water sod immediately after laying to obtain moisture penetration into top (4") 100mm of topsoil.

3.3 MAINTENANCE

- .1 Maintain sodded area from time of installation until final acceptance of sod, subject to the conditions specified below.
- .2 Water sodded areas in sufficient quantities and at frequency required to maintain soil under sod continuously moist for depth of (3" to 4") 75 to 100mm.
- .3 Cut grass to (1½") 40mm when it reaches height of (2½") 65mm. Remove clippings which will smother grassed areas.
- .4 Maintain sodded areas weed-free.

- .5 Fertilize sodded areas one month after sodding with 2:1:1 ratio fertilizer. Spread evenly at recommended rate and water in well.

3.4 FINAL ACCEPTANCE

- .1 Sodded areas will be accepted at final inspection provided that:
 - .1 Sodded areas are properly established and indicated growth.
 - .2 Sod is free of bare and dead spots and without weeds.
 - .3 No surface soil is visible when grass has been cut to specified height.
 - .4 Sodded areas have been cut at least once.
- .2 Lawns sodded in fall will be eligible for acceptance one month after start of growing season in following spring, provided all acceptance conditions are fulfilled.

END OF SECTION