Transmittal

BARRY BRYAN ASSOCIATES
Architects
Engineers
Project Managers

To:	RH Gay Holdings Company	**Project No.:**	21046
Address:	55 King Street East	**Date:**	September 20, 2024
	Bowmanville, Ontario L1C 1N4		
Attention:	Lawson Gay		
Project Name:	Courtice Mixed Use Seniors Development at 1697 Highway # 2 in Courtice, ON		

For your:	■	Approval	**Via:**	❑	Mail
	❑	Distribution		❑	Courier
	■	Information and use		❑	By hand
	❑	Review and comment		❑	To be picked up
Action taken:	❑	Reviewed		❑	Fax
	❑	Reviewed as noted		■	E-mail
	❑	Revise and resubmit			
	❑	Not reviewed			

Qty.:	Drawing No.:	Issue No.:	Revision No.:	Description:
1	Copy	-	-	Addendum No. 3 dated September 20, 2024

cc: Robin George, Barry Bryan Associates
Nick Swerdfeger, Barry Bryan Associates
Matthew Ficara, Barry Bryan Associates

Shivanie Motielal

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BARRY BRYAN
ASSOCIATES
Architects
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Addendum No. 3

Project No.: 21046

Date: September 20, 2024

Project: **Courtice Mixed Use Seniors Development at 1697 Highway # 2**
RH GAY HOLDINGS COMPANY

The following information supplements and/or supersedes the bid documents issued on September 10 2024

This Addendum forms part of the contract documents and is to be read, interpreted, and coordinated with all other parts. The cost of all contained herein is to be included in the contract sum. The following revisions supersede the information contained in the original drawings and specifications issued for the above-named project to the extent referenced and shall become part thereof. Acknowledge receipt of this Addendum by inserting its number and date on the Tender Form. Failure to do so may subject bidder to disqualification.

SPECIFICATIONS

3.1 SPECIFICATION -

.1 Attached Architectural Specifications; September 20, 2023 (attached; 340 pages)

QUESTION AND ANSWER

3.2 **Question:** **The assembly detailed on drawing A112 specifies a TPO membrane but does not indicate the method of installation. Could you please confirm whether it should be fully adhered or mechanically fastened?**

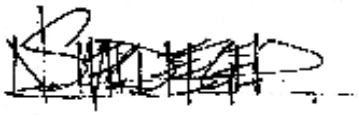
Answer: *Our specification is for a fully adhered system with some components below the membrane mechanically fastened (this will be specified).*

3.3 **Question:** **The drawing also references 100-200 tapered polyiso. Is it required to install a layer of polyiso prior to the tapered polyiso? If so, could you please specify the required thickness of this base layer?**

Answer: *Yes, providing a continuous insulation layer of R25 minimum CI (150mm based on insulation type) will be required with the tapered in addition to the SB-10 OBC 2012 requirement; we will follow up with a minor addenda to this as a clarification.*

End of Addendum No. 3

Barry Bryan Associates
Architects, Engineers, Project Managers



Nicholas B. Swerdfeger, OAA, MRAIC, M.Arch, B.Arch Sci

NS/sm

Attachments: Architectural Specifications as noted in Table of Contents (340 Pages)

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I/We hereby acknowledge receipt of this Addendum.

Signature (signing officer of firm)

Position

Name of Firm

One copy of the addendum must be signed and returned with the completed tender, or the tender submitted shall be rejected.

Courtice Mixed Use Development BLDG #3

1697 Durham Regional Hwy. 2, Courtice

Project 21046 **DATE September 20, 2024**

BARRY BRYAN ASSOCIATES
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End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Work covered by contract documents
.2 Work sequence
.3 Contractor use of premises
.4 Pre-ordered materials and equipment
.5 Work by others
.6 Engineer design
.7 Designated substances: ACM and others
.8 Building smoking environment
.9 Special conditions
.10 Integrated systems testing
.11 Site security
.12 “By Others”
.13 Protection of Drawings

1.2 Work Covered by Contract Documents

.1 Work of this Contract comprises the construction of the Courtice Mixed Use Development, Building #3, 1697 Durham Regional Highway 2, Courtice, Ontario as indicated on the Contract Drawings and specifications.

1.3 Metric Project

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

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

1.4 Site Access

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

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

1.5 Work Sequence

.1 Construct Work continuously.

1.6 Engineer Design

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

1.7 Designated Substances: ACM and Others

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

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

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

.4 All project design and construction activities must be carried out in compliance with the Regulations.

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

1.8 Verification

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

1.9 Building Smoking Environment

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

1.10 Special Conditions

.1 The following general and special conditions apply:
  .1 All exposed interior surfaces except prefinished surfaces shall be painted whether referred to in the specifications and drawings or not.

1.11 Site Security

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

1.12 “By Others”

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

1.13 Use of Drawings

.1 Drawings are not to be scaled.

.2 Copies of architectural and structural “issued for construction” drawings in digital format will be made available for the contractors use under the following conditions.
  .1 Copyright remains with BBA.
  .2 The drawings will only be used for shop drawings for this project and not be put to any other use.
  .3 BBA assumes no liability for errors or omissions in the drawings. The Contractor assumes all risk and expenses associated with the use of drawings in the production of his work.
  .4 References to BBA and other Consultants must be deleted from the title block.

.5 The Contractor signs a release available from BBA that addresses the above items in more detail.

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

1.14 Protection of Drawings

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

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

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

PART 2 PRODUCTS

3.1 Not Used

.1 Not used

PART 3 EXECUTION

3.2 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

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

1.2 Administrative

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

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

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

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

.5 Review submittals prior to submission to Consultant. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

.6 Notify Consultant in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

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

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

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

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

1.3 Requests for Information (RFI’s)

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

1.4 Shop Drawings and Product Data

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

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

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

.4 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

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

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

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

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

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

.10 Accompany submissions with transmittal letter containing:
- .1 Date.
- .2 Project title and number.
- .3 Contractor's name and address.
- .4 Identification and quantity of each shop drawing, product data and sample.
- .5 Other pertinent data.

.11 Submissions shall include:
- .1 Date and revision dates.
- .2 Project title and number.
- .3 Name and address of:
  - .1 Subcontractor.
  - .2 Supplier.
  - .3 Manufacturer.
- .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .5 Details of appropriate portions of Work as applicable:
  - .1 Fabrication.
  - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
  - .3 Setting or erection details.
  - .4 Capacities.
  - .5 Performance characteristics.

.6 Standards.
.7 Operating weight.
.8 Wiring diagrams.
.9 Single line and schematic diagrams.
.10 Relationship to adjacent work.

.12 After Consultant's review, distribute copies.

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

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

.15 Delete information not applicable to project.

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

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

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

1.5 Interference Drawings

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

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

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

1.6 Progress Photographs

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

1.7 Samples

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

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

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

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

.5 Make changes in samples which Consultant may require, consistent with Contract Documents.

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

1.8 Mock-Ups

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

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

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

1.2 References

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

1.3 Administrative

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

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

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

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

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

1.4 Fires

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

1.5 Disposal of Wastes

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

1.6 Drainage

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

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

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

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

1.7 Site Clearing and Plant Protection

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

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

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

.4 Restrict tree removal to areas indicated.

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

.6 Minimize stripping of topsoil and vegetation.

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

1.8 Pollution Control

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

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

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

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

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

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

1.9 Unanticipated Soil Contamination

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

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

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

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

1.2 References

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

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

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

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

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

1.3 Owner's Regulations

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

1.4 Standards and Definitions

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

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

1.5 Designated Substances

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

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

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

1.6 Hazardous Materials

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

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

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

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

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

1.7 Spills Reporting

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

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

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

1.8 Protection of Water Quality

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

.2 If de-watering is required, the water shall be pumped into a sedimentation pond or diffused onto

vegetated areas a minimum of 30 metres from any watercourses and not pumped directly into the watercourses.

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

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

1.9 Potable Water Systems

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

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

1.10 Soils Management

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

1.11 Access for Inspection and Testing

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

1.12 Other Regulatory Requirements

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

.2 Obtain required road occupancy permits.

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

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

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

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

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

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

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

1.2 Inspection

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

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

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

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

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

1.3 Independent Inspection Agencies

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

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

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

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

1.4 Access to Work

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

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

1.5 Procedures

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

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

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

1.6 Rejected Work

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

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

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

1.7 Reports

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

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

1.8 Contractors Responsibilities

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

1.9 Tests and Mix Designs

.1 Furnish test results and mix designs as requested.

1.10 Mockups

.1 Prepare mockups for Work specifically requested in specifications.

.2 Construct in locations acceptable to Consultant.

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

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

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

1.11 Equipment and Systems

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

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Barriers.
.2 Environmental Controls.
.3 Traffic Controls.
.4 Fire Routes.

1.2 Installation and Removal

.1 Provide temporary controls in order to execute Work expeditiously.

.2 Remove from site all such work after use.

1.3 Site Fencing

.1 Provide temporary fencing around whole work site. Use modular free-standing fencing: galvanized, minimum 1.8m high, chain link or welded steel mesh, pipe rail. Provide one lockable truck entrance gate and at least one pedestrian door as directed. Equip all gates with locks and keys. Maintain fence in good repair.

1.4 Guard Rails and Barricades

.1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs and wherever else necessary to prevent accidental falls.

.2 Provide as required by governing authorities.

1.5 Traffic Barriers

.1 Where indicated, provide precast concrete barriers conforming to ASTM C825 - 19 Standard Specification for Precast Concrete Barriers.

.2 Provide sufficient barriers as necessary to protect the public and Owner from construction traffic.

.3 Remove barriers on completion.

1.6 Weather Enclosures

.1 Provide weather tight closures to unfinished door and window openings, tops of shafts and other openings in floors and roofs.

.2 Close off floor areas where walls are not finished; seal off other openings; enclose building interior work for temporary heat.

.3 Design enclosures to withstand wind pressure and snow loading.

1.7 Dust Tight Screens

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

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

1.8 Protection for Off Site and Public Property

.1 Protect surrounding private and public property from damage during performance of Work.

.2 Be responsible for damage incurred.

1.9 Protection of Building Finishes

.1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.

.2 Provide necessary screens, covers, and hoardings.

.3 Confirm with Consultant locations and installation schedule 3 days prior to installation.

.4 Be responsible for damage incurred due to lack of or improper protection.

1.10 Protection of Surrounding Work

.1 Provide protection for finished and partially finished Work from damage.

.2 Provide necessary cover and protection.

.3 Be responsible for damage incurred due to lack of or improper or inappropriate protection.

1.11 Public Traffic Flow

.1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect the public.

1.12 Fire Routes

.1 Maintain access to property including overhead clearances for use by emergency response vehicles.

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

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

1.2 Definition – Basis of Design

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

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

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

1.3 Quality

.1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.

.2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

.3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Consultant based upon requirements of Contract Documents.

.4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

.5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.4 Availability

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

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

1.5 Storage, Handling and Protection

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

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

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

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

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

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

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

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

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

1.6 Transportation

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

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

1.7 Manufacturer’s Instructions

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

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

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

Contract Time.

1.8 Quality of Work

.1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed.

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

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

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

1.9 Coordination

.1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.

.2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.10 Concealment

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

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

1.11 Remedial Work

.1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.

.2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.12 Location of Fixtures

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

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

1.13 Fastenings

.1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.

.2 Prevent electrolytic action between dissimilar metals and materials.

.3 Use non corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.

.4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.

.5 Keep exposed fastenings to a minimum, space evenly and install neatly.

.6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.14 Fastenings – Equipment

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

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

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

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

1.15 Dielectric Separation

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

1.16 Tolerances for Execution of Work

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

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

.3 Allowable tolerances shall not be cumulative

1.17 Protection of Work in Progress

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

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

1.18 Existing Utilities

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

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

1.19 Hazardous Materials

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

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Field Engineering survey services.
.2 Survey services to establish and confirm inverts for Work.
.3 Recording of subsurface conditions found.

1.2 References

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

1.3 Submittals

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

.2 Submit name and address of Surveyor to Consultant.

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

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

1.4 Examination of Work and Site

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

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

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

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

1.5 Qualifications of Surveyor

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

1.6 Survey Reference Points

.1 Existing control points are designated on drawings.

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

.3 Make no changes or relocations without prior written notice to Consultant.

.4 Report to Consultant when reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations.

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

1.7 Survey Requirements

.1 Establish two permanent bench marks on site, referenced to established bench marks by survey control points. Record locations, with horizontal and vertical data in Project Record Documents.

.2 Establish lines and levels, locate and lay out, by instrumentation.

.3 Stake for grading, fill and topsoil placement and landscaping features.

.4 Stake slopes and berms.

.5 Establish pipe invert elevations.

.6 Stake batter boards for foundations.

.7 Establish foundation and floor elevations.

.8 Establish lines and levels for mechanical and electrical work.

1.8 Existing Services

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

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

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

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

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

1.9 Location of Services, Equipment and Fixtures

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

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

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

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

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

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

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

.8 Ensure that clearances required by jurisdictional authorities and clearances for proper maintenance and access are indicated and maintained.

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

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

1.10 Records

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

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

1.11 Subsurface Conditions

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

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

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 Section Includes

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

1.2 Submittals

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

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

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

1.3 Materials

.1 As specified and required for original installation.

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

1.4 Definitions

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

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

PART 2 PRODUCTS

2.1 Materials

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

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

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

PART 3 EXECUTION

3.1 Preparation

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

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

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

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

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

3.2 General

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

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

.3 Make good all finishes as required.

.4 Repaint damaged wall surfaces.

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

.6 Uncover Work to install ill-timed Work.

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

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

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

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

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

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

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

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

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

3.3 Cutting and Patching

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

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

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

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

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

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

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

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

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

refinishing.

.1 Clean piping, conduit, and similar features before applying paint or other finishing materials.

.2 Restore damaged pipe covering to its original condition.

.3 Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, colour, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform colour and appearance.

.1 Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

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

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

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

3.4 Subfloor Levelling

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

3.5 Fire Barrier Seals

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

End of Section

PART 1 GENERAL

1.1 Section Includes

.1 Progressive Cleaning
.2 Final Cleaning

1.2 References

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

1.3 Project Cleanliness

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

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

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

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

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

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

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

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

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

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

PART 2 PRODUCTS

2.1 Products

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

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

PART 3 EXECUTION

3.1 Final Cleaning

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

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

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

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

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

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

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

.8 Thoroughly vacuum clean interior of electrical equipment.

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

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

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

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

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

.14 Remove dirt and other disfiguration from exterior surfaces.

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

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

.17 Remove snow and ice from access to building.

3.2 Waste Management and Disposal

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

End of Section

PART 1 GENERAL

1.1 Section Includes

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

1.2 References

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

1.3 Submittals

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

.2 Submit a completed Waste Management Plan (WMP) including Waste Reduction Workplan (WRW) and Materials Source Separation Program description prior to project start-up.

1.4 Definitions

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

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

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

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

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

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

1.5 Waste Management Goals for the Project

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

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

1.6 Documents

.1 Maintain at job site, one copy of following documents:
.1 Waste Audit
.2 Waste Reduction Workplan
.3 Material Source Separation Plan

1.7 Waste Management Plan

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

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

1.8 Waste Audit

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

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

1.9 Waste Reduction Work Plan

.1 Prepare WRW prior to project start-up.

.2 Reduce construction and demolition waste in compliance with O. Reg. 102/94.

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

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

1.10 Materials Source Separation Program

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

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

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

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

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

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

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

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

1.11 Disposal of Wastes

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

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

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

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

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

.6 Do not permit waste to accumulate onsite.

.7 Burying of rubbish and waste materials is prohibited.

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

1.12 Scheduling

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

1.13 Storage, Handling and Protection

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

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

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

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Application

.1 Do work in compliance with Waste Management Plan.

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

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

3.2 Designated Substances

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

3.3 Diversion of Materials

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

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

End of Section

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PART 1 GENERAL

1.1 Section Includes

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

1.2 References

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

1.3 Inspection and Declaration

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

.2 Consultant's Review: Consultant and Contractor will perform review of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.

.3 Completion: submit written certificate that following have been performed:
  .1 Work has been completed and inspected for compliance with Contract Documents.
  .2 Defects have been corrected and deficiencies have been completed.
  .3 Equipment and systems have been tested, adjusted and balanced and are fully operational.
  .4 Certificates required by Boiler Inspection Branch, Fire Commissioner, Utility companies, TSSA, ESA and other regulatory agencies have been submitted.
  .5 Operation of systems have been demonstrated to Owner's personnel.
  .6 Work is complete and ready for Final Review by the Consultant.

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

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

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

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

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

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

.

PART 1 GENERAL

1.1 Section Includes

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

1.2 Submittals

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

1.3 Submission

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

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

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

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

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

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

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

1.4 Format

.1 Organize data in the form as instructional manual.

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

.3 When multiple binders are used correlate data into related consistent groupings. Identify contents of each binder on spine.

.4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project

and identify subject matter of contents.

.5 Arrange content by Section numbers and sequence of Table of Contents.

.6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

.7 Text: manufacturer's printed data, or typewritten data.

.8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

.9 Provide 1:1 scaled CAD files in .dwg format. Provide duplicate copies on memory stick.

1.5 Contents Each Volume

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

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

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

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

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

1.6 As-Builts and Samples

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

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

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

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

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

1.7 Recording Actual Site Conditions

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

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

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

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

.5 Specifications: legibly mark each item to record actual construction, including:
- .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
- .2 Changes made by Addenda and change orders.

.6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

1.8 Final Survey

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

1.9 Equipment and Systems

.1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with Engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

.2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.

.3 Include installed colour coded wiring diagrams.

.4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

.5 Maintenance Requirements: include routine procedures and guide for troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

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

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

.8 Include sequence of operation by controls manufacturer.

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

.10 Provide installed control diagrams by controls manufacturer.

.11 Provide Contractor’s co-ordination drawings, with installed colour coded piping diagrams.

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

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

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

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

1.10 Materials and Finishes

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

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

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

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

1.11 Spare Parts

.1 Provide spare parts, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

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

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

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

1.12 Maintenance Materials

.1 Provide maintenance and extra materials, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

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

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

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

1.13 Special Tools

.1 Provide special tools, in quantities specified in individual specification section.

.2 Provide items with tags identifying their associated function and equipment.

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

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

1.14 Storage, Handling and Protection

.1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.

.2 Store in original and undamaged condition with manufacturer's seal and labels intact.

.3 Store components subject to damage from weather in weatherproof enclosures.
.4 Store paints and freezable materials in a heated and ventilated room.

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

1.15 Warranties and Guarantees

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

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

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

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

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

.6 Co-execute submittals when required.

.7 Retain warranties and guarantees until time specified for submittal.

1.16 Independent Specialty Engineers Sign-Off

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

PART 2 PRODUCTS

2.1 Not Used

.1 Not used

PART 3 EXECUTION

3.1 Not Used

.1 Not used

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 11 19 Insulating Concrete Forming
.2 Section 03 20 00 Concrete Reinforcing
.3 Section 03 30 00 Cast-in-Place Concrete
.4 Section 05 50 00 Metal Fabrications
.5 Section 31 23 10 Excavating, Trenching and Backfilling

1.3 References

.1 American Concrete Institute (ACI)
  .1 ACI 117-10 Specifications for Tolerances for Concrete Construction and Materials.
  .2 ACI 347R-14 Guide to Formwork for Concrete
  .3 ACI SP-4-14 Formwork for Concrete
.2 CSA Group (CSA)
  .1 CSA A23.1:19/A23.2:19 Concrete Materials and Methods of Concrete Construction/ Methods of Test Methods and Standard Practice for Concrete
  .2 CSA B111-1974 (R2003) Wire Nails, Spikes and Staples
  .3 CSA O86:19 Engineering Design in Wood
  .4 CSA O121-2017 (R2022) Douglas Fir Plywood
  .5 CSA O141:23 Canadian Standard Lumber
  .6 CSA S269.1-16 (R2021) Falsework and Formwork
.3 Canadian General Standards Board (CGSB)
  .1 CGSB 41-GP-35M Polyvinyl Chloride Waterstop.
.4 Ontario Provincial Standard Specifications (OPSS)
  .1 OPSS 1204 Material Specification for Polyvinyl Chloride Waterstops

1.4 Submittals

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

.2 Shop Drawings:
  .1 Submit shop drawings showing type, extent and locations of items to be built into concrete.
  .2 Sleeving Drawings: Submit drawings showing sleeves required through floors, roof and other structural members.
  .3 Submit drawings showing size and spacing of conduits and piping.
  .4 Coordinate with other Divisions prior to submittal.
  .5 Prior to submission to Consultant, review all submitted drawings. By this review, Contractor represents to have determined and verified field measurements, site conditions, materials, catalogue number and similar data and to have checked and coordinated each drawing with the requirements of Work and of Contract Documents. Contractor's review of each drawing shall be indicated by stamp, date and signature of a responsible person.
  .6 At time of submission, notify Consultant in writing of any deviations in drawings from the requirements of the Contract Documents.
  .7 Consultant will review and return submitted drawings in accordance with an agreed schedule. Consultant's review will be for conformity to design concept and for general arrangement and

shall not relieve Contractor of responsibility for errors or omissions in submitted drawings or of responsibility for meeting requirements of Contract Documents.

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

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

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

.3 Required by Regulatory Agencies: Submit shop drawings bearing signature and seal of Professional Engineer responsible for formwork design, as may be required by regulatory Agencies. Proceed with construction of formwork only with their approval.

1.5 Quality Assurance

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

.2 Design of Formwork: Assume full responsibility for complete structural design and construction of formwork in accordance with CSA S269.1 and CSA O86, as applicable.

.1 The design and engineering of the formwork, as well as its' construction, shall be the responsibility of the Contractor.

.3 Formwork shall be designed for the loads and lateral pressures outlined in the ACI publication "SP-4 Formwork for Concrete" and wind pressures and allowable stresses as set down in the National Building Code and in accordance with CSA A23.1 and A23.2. Formwork shall be of sufficient strength and rigidity to support all concrete and construction loads, taking into account proposed rate and method of pouring concrete so that the resultant finished concrete shall conform to the shapes, lines and dimensions of the members shown on the drawings.

1.6 Shipping, Handling and Storage

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

.2 Protect formwork to prevent functional damage and damage to faces affecting appearance of concrete surfaces exposed to view.

1.7 Waste Management and Disposal

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

PART 2 PRODUCTS

2.1 Materials

.1 All materials shall be new, in accordance with referenced standards.

.2 Plywood: Douglas Fir, conforming to CSA O121. Sound undamaged sheets finished one side, fabricated especially for use as concrete form panels, with sealed edges. Minimum 17mm thickness.

.3 Lumber: Conforming to CSA O141, with grade stamp clearly visible.

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

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

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

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

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

.9 Nails, Spikes and Staples: Galvanized, conforming to CSA B111.

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

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

.12 For concrete surfaces exposed to view, provide panels smooth and free of defects which would be reproduced as concrete blemishes.

PART 3 EXECUTION

3.1 Examination

.1 Before starting this work, examine work done by others which affects this work.

.2 Notify the Consultant of any conditions which would prevent proper completion of this work.

.3 Commencement of work implies acceptance of existing conditions.

3.2 Erection

.1 Verify lines, levels and centres before proceeding with formwork. Ensure dimensions agree with drawings.

.2 Align joints and make watertight, to prevent leakage of cement paste and disfiguration of concrete.

.3 Construct formwork to produce concrete with dimensions, lines and levels within tolerances specified in ACI 347R-14.

.4 Provide formed openings where required for pipes, conduits, sleeves and other work to be embedded in and passing through concrete members.

.5 Install chamfers at all external corners exposed to view.

.6 Waterstops:
.1 Install waterstops to provide continuous water seal.
.2 Do not distort or pierce waterstop in way as to hamper performance.
.3 Do not displace reinforcement when installing waterstops.
.4 Use equipment to manufacturer's requirements to field splice waterstops.
.5 Tie waterstops rigidly in place.
.6 Use only straight heat sealed butt joints in field.
.7 Use factory welded corners and intersections unless otherwise approved by Consultant.

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

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

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

.10 Be responsible for safety of the structure both before and after the removal of forms, until the concrete has reached its specified 28 day strength.

3.3 Built-In Work

.1 Form openings and build in anchors, inserts, sub-frames, key-ways, sleeves, miscellaneous metal items, reglets and similar items furnished under Work of other Sections, which are indicated on Drawings and on shop drawings of other trades, and as required for proper completion of Work.

.2 Do not embed wood in concrete.

.3 Anchor Bolts: Tie anchor bolts securely in position to prevent movement during concrete placing. Use template to locate bolts. Verify that bolts have specified projection above concrete.

.4 Openings or Sleeves Not Shown on Structural Drawings:
.1 Obtain Consultant's written approval before forming openings of sleeves through columns and beams, or through slabs within 1800 mm of their supports.
.2 Obtain Consultant's written approval before forming openings or sleeves larger than 200 mm square in any location.

.5 Embedded Pipe or Conduit Not Shown or Detailed on Structural Drawings:
.1 Obtain Consultant's written approval before placing conduit or pipe which would be embedded in finished structure.

.6 Confirm that built-in items that penetrate surface waterproofing are installed to meet requirements of waterproofing trade.

3.4 Construction Joints

.1 Form construction and expansion joints with bulkheads to ensure straight lines. Immediately before subsequent pour at construction joint, remove bulkhead and tighten forms so that concrete surfaces will be on same plane with no overlapping of concrete.

.2 Review with Consultant proposed location and details of construction joints in walls, columns, beams and slabs.
  .1 Construction joints shall present appearance of normal form panel joint.
  .2 Install continuous shear key in construction joints in walls and framed floors which are 152mm or more thick.
  .3 Provide vertical construction joints in walls at not more than 20 metres centre to centre.
  .4 Provide waterstops in accordance with manufacturer's instructions at construction joints in walls which retain earth. Waterstops shall be continuous.

3.5 Treatment of Formwork Surfaces

.1 Form Release Agent:
  .1 Coat formwork with form release agent before reinforcement, anchors, accessories, and other built in items are installed.
  .2 Do not coat plywood forms pre-treated with release agent.
  .3 On surfaces to receive finish materials, adhesives, sealers, paint or other coatings or materials, use a compatible release agent.

3.6 Stripping of Formwork

.1 Strip formwork on vertical surfaces when concrete has hardened sufficiently that no damage will result from stripping operations.

.2 Do not remove plywood formwork by jerking loose or by metal pinch bars. Use wood wedges and gradually force panels loose. Leave plywood forms in place as long as possible to permit maximum shrinkage away from concrete.

.3 Take particular care not to damage external corners when stripping formwork.

.4 When forms are stripped during curing period, cure and protect exposed concrete in accordance with Section 03 30 00 - Cast-in-Place Concrete.

3.7 Defective Work

.1 Movement and displacement of formwork during construction, variations in excess of specified tolerances, marked and disfigured surfaces, and failure of materials or workmanship to meet requirements of this specification, and which cannot be repaired by approved methods, will be considered defective work.

.2 Replace defective work, as directed by Consultant.

.3 Pay for additional inspection and testing, redesign, corrective measures, and related expenses, if work has proven to be deficient.

.4 Reconstruct defective formwork and replace concrete and reinforcement placed in defective formwork at no additional cost.

3.8 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 10 00 Concrete Forming and Accessories
.2 Section 03 11 19 Insulating Concrete Forming
.3 Section 03 30 00 Cast-in-Place Concrete
.4 Section 04 05 19 Masonry Anchorage and Reinforcing
.5 Section 04 22 00 Concrete Unit Masonry
.6 Section 04 27 00 Multiple Wythe Unit Masonry
.7 Section 05 50 00 Metal Fabrications

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM A143/A143M-07(2020) Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement
  .2 ASTM A1064/A1064M-22 Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
.2 American Concrete Institute (ACI)
  .1 ACI SP-66 (04) ACI Detailing Manual
.3 CSA Group (CSA)
  .1 CSA A23.1:19/A23.2:19 Concrete Materials and Methods of Concrete Construction/ Methods of Test Methods and Standard Practice for Concrete
  .2 CSA A23.3:19 Design of Concrete Structures
  .3 CSA G30.18:21 Carbon Steel Bars for Concrete Reinforcement
  .4 CSA G40.20-13/G40.21-13 (R2018) General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel
  .5 CSA W186:21 Welding of Reinforcing Bars in Reinforced Concrete Construction
.4 Reinforcing Steel Institute of Canada (RSIC)
  .1 RSIC Reinforcing Steel Manual of Standard Practice

1.4 Submittals

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

.2 Shop Drawings:
  .1 Submit shop drawings, including placing drawings and bar lists.
  .2 Prepare placing drawings and bar lists in accordance with the American Concrete Institute (ACI) Detailing Manual, and the Reinforcing Steel Institute of Canada (RSIC) Reinforcing Steel Manual of Standard Practice and the typical details included with Contract Documents.
  .3 Prepare placing drawings to minimum scale of 1:50.
  .4 Submit placing drawings and bar lists sufficiently detailed and dimensioned to permit correct placement of reinforcement and accessories without reference to architectural or structural Drawings.
  .5 Show reinforcement, including dowels, in elevation on placing drawings for wall reinforcement.
  .6 Show concrete cover to reinforcement.
  .7 Show location of construction joints.

.3 Inspection Reports: Inspection and Testing Company shall:
.1 Submit written reports of inspection and tests.
.2 Distribute reports as follows:
.1 Consultant.
.2 Contractor.

.4 Quality Assurance Submittals:
.1 Mill Test Report: provide Consultant with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 4 weeks prior to beginning reinforcing work.
.2 Submit in writing proposed source of reinforcement material to be supplied.

1.5 Quality Assurance

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

.2 Qualifications: Welding: Undertake welding of reinforcement only by a fabricator or Subcontractor approved by Canadian Welding Bureau to requirements of CSA W186.

.3 Source Quality Control: Source Quality Control may be performed by an Inspection and Testing Company appointed by Consultant.

.4 Review provided by Inspection and Testing Company does not relieve Contractor of his sole responsibility for quality control over Work. Performance or non-performance of Inspection and Testing Company shall not limit, reduce, or relieve Contractor of his responsibilities in complying with the requirements of the Specification.

.5 Identify and correlate reinforcing steel from Canadian mills with test reports for compliance with requirements specified.

.6 Test unidentified reinforcing steel at expense of Contractor. Perform testing for each 1 tonne or part thereof supplied for incorporation in Work.

1.6 Shipping, Handling and Storage

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

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

1.7 Waste Management and Disposal

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

PART 2 PRODUCTS

2.1 Materials

.1 In accordance with reference standards.

.2 Substitute different size bars only if permitted in writing by Consultant.
.3 Bar Reinforcing Steel:
.1 Bars which are to be welded by arc-welding process: to CSA G30.18, Grade 400W.
.2 Other bars: to CSA G30.18, Grade 400R.

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

.5 Welded Wire Fabric: to ASTM A1064/A1064M and in flat sheets, not rolls.

.6 Cold-drawn annealed steel wire ties: to ASTM A497.

.7 Chairs, bolsters, bar supports, spacers: to CSA A23.1.

.8 Mechanical splices: subject to approval of Consultant.

2.2 Fabrication

.1 Fabricate reinforcing steel only in permanent fabricating shop.

.2 Fabricate reinforcing steel in accordance with shop drawings.

.3 Tag reinforcing bars to indicate placement as designated on shop drawings.

.4 Splices:
.1 Provide splices only where specifically indicated on Drawings.
.2 Stagger alternate mechanical splices 750 mm apart.
.3 Stagger alternate end bearing splices 750 mm apart.
.4 Install on threaded splices, plastic internal coupler thread protector and plastic bar end thread protector.

PART 3 EXECUTION

3.1 Examination

.1 Before starting this work, examine work done by others which affects this work.

.2 Examine formwork to verify that it has been completed, and adequately braced in place.

.3 Notify the Consultant of any conditions which would prejudice proper completion of this work.

.4 Commencement of work implies acceptance of existing conditions.

3.2 Installation

.1 Place reinforcing steel in accordance with reviewed placing drawings, typical details, and CSA A23.3.

.2 Adequately support reinforcing and secure against displacement within tolerances permitted.

.3 Place reinforcing steel to provide minimum spacing and proper concrete cover as noted on drawings.

.4 Do not cut reinforcement to incorporate other Work.

.5 Relocate or rebend bars only on written instructions of Consultant.

.6 Tie reinforcement in place. Do not weld.

3.3 Adjusting

.1 Adjust and secure reinforcement in correct position immediately before concrete is placed.

.2 Remove contaminants which lessen bond between concrete and reinforcement.

3.4 Field Quality Control

.1 Provide competent supervisor, with at least three years of experience in reinforcement placement, to direct placement of reinforcement.

.2 Inspect placement of reinforcement for conformance with Drawings and Specifications, before each concrete placement, and correct as necessary.

.3 Consultant's periodic review of selected areas of reinforcement are for verification of conformity to design concept and general arrangement only and shall not relieve Contractor of responsibility for quality control, errors, or omissions, or conformance with requirements of Contract Documents.

3.5 Defective Work

.1 Incorrectly fabricated, misplaced or omitted reinforcement will be considered defective Work.

.2 Replace or adjust defective reinforcement before concrete is placed as directed by Consultant.

.3 Replace or strengthen concrete work which is deficient as a result of incorrectly fabricated, misplaced, or omitted reinforcement, which was not corrected before concrete was placed.

.4 Pay for additional inspection and testing, redesign, corrective measures, and related expenses, if Work has proven to be deficient.

3.6 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 10 00 Concrete Forming and Accessories
.2 Section 03 11 19 Insulating Concrete Forming
.3 Section 03 20 00 Concrete Reinforcing
.4 Section 04 05 19 Masonry Anchorage and Reinforcing
.5 Section 04 22 00 Concrete Unit Masonry
.6 Section 05 31 00 Steel Deck
.7 Section 05 50 00 Metal Fabrications
.8 Section 07 92 00 Joint Sealants

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM C260/C260M-10a (2016) Standard Specification for Air Entraining Admixtures for Concrete
  .2 ASTM C295/C295M-19 Standard Guide for Petrographic Examination of Aggregates for Concrete
  .3 ASTM C309-19 Standard Specification for Liquid Membrane Forming Compounds for Curing Concrete
  .4 ASTM C330/C330M-17a Standard Specification for Lightweight Aggregates for Structural Concrete
  .5 ASTM C494/C494M-19 Standard Specification for Chemical Admixtures for Concrete
  .6 ASTM C881/C881M-20a Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
  .7 ASTM C1017/C1017M-13e1 Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
  .8 ASTM C1107/C1107M-20 Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
  .9 ASTM D412-16 Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
  .10 ASTM D570-98(2018) Standard Test Method for Water Absorption of Plastics
  .11 ASTM D624-00(2020) Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
  .12 ASTM D638-14 Standard Test Method for Tensile Properties of Plastics
  .13 ASTM D1259-06(2018) Standard Test Methods for Nonvolatile Content of Resin Solutions
  .14 ASTM D1751-18 Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
  .15 ASTM D2240-15e1 Standard Test Method for Rubber Property—Durometer Hardness
  .16 ASTM D5329-20 Standard Test Methods for Sealants and Fillers, Hot-Applied, for Joints and Cracks in Asphalt Pavements and Portland Cement Concrete Pavements
.2 American Concrete Institute (ACI)
  .1 ACI 117-10 Specifications for Tolerances for Concrete Construction and Materials.
  .2 ACI 232.1R-12 Report on the Use of Raw or Processed Natural Pozzolans in Concrete
.3 CSA Group (CSA)
  .1 CSA A23.1:19/A23.2:19 Concrete Materials and Methods of Concrete Construction/ Methods of Test Methods and Standard Practice for Concrete.

.2 CSA A283:19 Qualification Code for Concrete Testing Laboratories.
.3 CSA A3000-18 Cementitious Materials Compendium
.4 Ontario Provincial Standard Specifications (OPSS)
.1 OPSS 1010 Material Specification for Aggregates - Granular A, B, M and Select Subgrade Material.
.2 OPSS 1212 Material Specification for Hot-Poured Rubberized Asphalt Joint Sealing Compound.
.5 Government of Canada Treasury Board Secretariat (TBS)
.1 Standard on Embodied Carbon in Construction

1.4 Submittals

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

.2 Samples: Submit for inspection, material samples of specified mix designs.

.3 Concrete Mix Designs:
.1 Submit concrete mix designs for review. Specify intended use for each mix design.
.2 Review of mix design does not relieve Contractor from responsibility for compliance with Contract Documents.
.3 Provide certification that mix proportions selected will produce concrete of specified quality and yield and that strength will comply with CSA A23.1. Mix design shall be adjusted to prevent alkali aggregate reactivity problems.
.4 Provide certification that plant, equipment, and all materials to be used in concrete comply with the requirements of CSA A23.1.
.5 Submit written requests for use of admixtures not specified, for site mixing of concrete, and for use of bonding agents.
.6 Submit in writing, proposed method of in-situ strength testing.

.4 Inspection Reports: Inspection and Testing Company shall:
.1 Submit written reports of inspection and tests.
.2 Distribute reports as follows:
.1 Consultant;
.2 Contractor.
.3 On concrete cylinder test reports, include:
.1 Specific location of concrete represented by sample
.2 Design strength.
.3 Unit weight of sample
.4 Class of exposure
.5 Aggregate size and mixtures incorporated
.6 Date, hour and temperature at time sample taken
.7 Percentage air content
.8 Test strength of cylinder
.9 Type of failure if test fails to meet specification.

1.5 Quality Assurance

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

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

Establish work progress and sequencing schedules and procedures for material testing, inspection and certifications.

.3 Source Quality Control:
- .1 Both source quality control, and field quality control specified in Article 1.5.4, may be performed by an Inspection and Testing Company appointed by Consultant.
- .2 Review provided by Inspection and Testing Company does not relieve the Contractor of his sole responsibility for quality control over Work. Performance or non- performance of Inspection and Testing Company shall not limit, reduce, or relieve Contractor of his responsibilities in complying with the requirements of the Specification.
- .3 Inspection and Testing Company shall be certified under CSA A283, Qualification Code for Concrete Testing Laboratories, for Category 1 Certification.
- .4 Payment for specified Work performed by Inspection and Testing Company will be made from Cash Allowance.
- .5 Payment for additional tests (including testing of structure and its performance and load testing) required by changes of materials or mix design requested by Contractor, and failure of completed Work to meet specified requirements, shall be made at Contractor's expense.
- .6 Perform Work of source quality control in accordance with CSA A23.2 and to include:
  - .1 Verification that ready-mix supplier is qualified to supply concrete in accordance with Specification.
  - .2 Review of proposed concrete mix designs.
  - .3 Sampling, inspection, and testing of materials as may be required.

.4 Field Quality Control:
- .1 Inspection and Testing Company, when appointed as specified for Source Quality Control, shall perform sampling, inspection and testing of concrete work at site.
- .2 Perform sampling, inspection and testing in accordance with CSA A23.2, and to include:
  - .1 Making of standard slump tests.
  - .2 Obtaining of three standard specimens for strength tests from each 100 m of concrete, or fraction thereof, of each mix design of concrete placed in any one day. In addition, for slabs-on-grade, obtain beam specimens for determination of modulus of rupture.
  - .3 Verification that test specimens are stored within an enclosure, maintained at specified temperatures.
  - .4 Making compression tests of each set of three specimens, one at 7 days and two at 28 days; modulus of rupture tests at 90 days.
  - .5 Verification of air content of air-entrained concrete.
    - .1 For Class of exposure F-1, and C-2, test at frequency in accordance with CSA A23.1.
    - .2 Make first test before placing any concrete.
    - .3 After stable air content has been established, frequency of tests will be determined by Consultant.
    - .4 For other Classes of exposure, test at time of obtaining strength test specimens.
- .3 Inspection for Tolerances:
  - .1 Confirm that concrete work meets specified tolerance requirements.
  - .2 Use the elevation survey records of elevations of finished concrete surfaces specified in Section 03 10 00 and this section as basis for judging compliance.
  - .3 Use approved aluminum straightedge to judge compliance with specified slab tolerances, except use dipstick equipment where F-number tolerance is specified.
- .4 Slabs-on-Grade:
    - .1 Observe application of curing compound to sample slab, recording rate of application.
    - .2 Monitor on a random basis acceptable to the Consultant, that slab is being saw cut before slab temperature starts to fall.

.3 Qualifications: Floor finishing shall be undertaken only by contractors with at least 10 years of experience.
.4 Sample of Finish Flooring:
.1 Finish an area of floor slab where directed by Consultant to provide sample of finish for approval.
.2 Protect new sample area until finish is approved.
.3 If liquid membrane curing compound is to be used on Project, determine and apply correct quantity required to meet rate of coverage recommended by manufacturer for measured test area.
.4 Approved sample will provide standard by which subsequent finishing will be judged and will be incorporated into Work.

1.6 Tolerances

.1 In accordance with ACI 117 and CSA A23.1.

.2 Difference between elevation of high point and low point in specified area not to exceed:
.1 In any bay up to 100 m^2: 12 mm.
.2 In any bay up to 400 m^2: 25 mm.

.3 Straightedge method: Finish floor slabs to meet following tolerances when measured at 72 +/- 12 hours after completion of floor finishing, before shores are removed from formed slabs, by placing a freestanding unleveled straight edge anywhere on slab and allowing it to rest on two high points. Gap between straightedge placed on two high points and slab not to exceed:
.1 3 metre straightedge: 8 mm (Class A).
.2 2 metre straightedge: 4 mm.

1.7 Shipping, Handling and Storage

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

1.8 Job Conditions

.1 Protect floor slabs, and concrete surfaces exposed to view or on which finishes are to be applied, from grease, oil, and other soil which will affect the appearance of the concrete, or impair the bond of finish material.

.2 Environmental Conditions: In addition to Cold Weather and Hot Weather Requirements of CSA A23.1, the following shall apply to Work of this Section:
.1 Provide protection or heat, or both, so that temperature of concrete at surfaces is maintained at not less than 21 ° C for three days after placing, not less than 10 ° C for the next two days and above freezing for the next two days.
.2 Do not permit alternate freezing and thawing for fourteen days after placing.
.3 Vent exhaust gases from combustion type heaters to atmosphere outside protection enclosures.
.4 Provide protection to maintain concrete continuously moist during curing period.
.5 For field cured cylinders representing strength development of in-situ concrete, provide same specified hot and cold weather protection for storage of each concrete compression specimen as for concrete from which it was taken, until it is sent to testing laboratory.
.6 Do not place concrete during rain. Should rain commence during placing, cover freshly placed concrete.
.7 Do not place bonded toppings on rough slabs that are less than 15 °C.

.8 Do not grout at ambient air temperatures or concrete surface temperatures less than 5 ° C, or when temperature is forecast to fall to less than 5 ° C within 24 hours of grouting.
.9 Do not apply sealants at ambient air temperatures or concrete surface temperatures less than 5 ° C.

1.9 Project Records

.1 Maintain record of all concrete pour related to time, date, delivery slip serial number and location of each concrete pour and identify related test cylinders. Keep records on site until project is completed.
.2 Delivery Records: File duplicate copies of concrete delivery slips on which shall be recorded: supplier, serial number of slip, date, truck number, contractor, Project, Class of exposure, cementing materials content, air content, volume in load, and time of first mixing of aggregate, cementing materials and water.

.3 Record Drawings:
.1 Record on a set of Drawings:
.1 founding elevations of all footings
.2 variations of foundation Work from that indicated on Drawings.
.2 Make record drawings available for Consultant's inspection at all times.

1.10 Waste Management and Disposal

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

PART 2 PRODUCTS

2.1 Materials

.1 To meet specified requirements of referenced Standards.

.2 Cement:
.1 Portland Cement: to CSA A3000.
.2 Cementitious Hydraulic Slag: to ACI 232.1R

.3 Fine Aggregate: For slabs-on-grade, fineness modulus of fine aggregate to be between 2.7 and 3.1.

.4 Coarse Aggregates:
.1 20 mm to 5 mm (No. 4 sieve) except as specified below.
.2 For slabs-on-grade 125 mm and thicker: 40 mm to 5 mm (No. 4 sieve); combine at least two of the single sizes specified in Table 5 Group II of CSA A23.1, one of which is to be 40 mm, to obtain maximum bulk density (unit weight) and optimum grading, in accordance with an approved procedure.
.3 For slabs-on-grade: Abrasion loss not to exceed 35%. Petrographic number of aggregate not to exceed 125 when tested in accordance with ASTM C295.
.4 For toppings 50 mm thick and less and for slabs over open web steel joists: 12 mm to 5 mm (No. 4 sieve).

.5 Admixtures:
.1 Conform to Reference Standards for chemical and air-entraining admixtures.
.2 Provide only admixtures that are free of chlorides.

.3 When requested, provide evidence acceptable to Consultant that superplasticizer does no increase shrinkage of concrete.

.6 Curing-Sealing Compound: Membrane curing-sealing compound formulated from chlorinated rubber resins, or acrylic emulsion, solvent free for use in occupied buildings, to ASTM C309, type 1.
.1 Basis-of-Design Product: Euclid Chemical Company; Diamond Clear 350 or a comparable product by one of the following:
.1 BASF Corporation - Construction Systems.
.2 Sika Corporation
.3 W.R. Meadows

.7 Bonding Agent: To ASTM C881, 100% reactive, 2 component, low viscosity, high modulus bonding adhesive.

.8 Saw Cut Filler: Semi-rigid epoxy or polyurea in accordance with ACI 302.1R for joint fillers used in control and construction joints.
.1 Basis of Design Euco 700 or Euco QWIKjoint UVR by Euclid Chemical.

.9 Premoulded Joint Fillers: Bituminous impregnated fiber board: to ASTM D1751.

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

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

.12 Weep hole tubes: plastic.

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

2.2 Concrete Mixes

.1 Ready Mix, with 28 day compressive strength as indicated on Drawings.

.2 Design concrete mix in conformance with CSA A23.1, Tables 1, 2, 5 (Alternative 1) and 17, and as follows. Provide concrete meeting water/cementing materials ratio and air content of Table 14 in accordance with Class of exposure specified in following sub-paragraphs, and minimum strength specified on Drawings. Note that concrete designed in accordance with water/cementing materials ratio of Table 14 may yield strength exceeding minimum strength specified on Drawings.
.1 Class of exposure C-2 with 25 percent Portland cement replaced with cementitious hydraulic slag: for pavements, sidewalks, curbs and gutters.
.2 Class of exposure F-2 with 25 percent Portland cement replaced with cementitious hydraulic slag: for grade beams, and for exposed exterior beams, columns, walls and slabs.
.3 Slabs-on-Grade:
.1 Use type 20 Portland cement, or replace 35 percent Portland cement with cementitious hydraulic slag.
.2 When mean daily temperature exceeds 25 ° C at time of placement, replace 25 percent of type 20 cement, or 50 percent of type 10 cement, with cementitious hydraulic slag.
.3 Use water/cementing materials ratio 0.45 maximum.
.4 Use aggregates specified in paragraphs 2.1.3.
.5 Cementing materials content 325 kg/m.
.6 Modulus of rupture 3.5 MPa average, 3.0 MPa minimum.

.7 Slump at delivery, before addition of superplasticizer, 50 mm; add superplasticizer, not water, to bring slump to level acceptable to floor finisher for placement.

.4 Interior Concrete, other than specified above, and not exposed to freezing and thawing or the application of deicing chemicals: select water/cementing materials ratio and cementing materials content on basis of strength, workability, and finishing requirements.

.3 Submit evidence, and material samples, if requested, acceptable to the Inspection and Testing Company, to verify that the proposed concrete mix design will produce specified quality of concrete.

.4 List all proposed admixtures in mix design submission. Do not change or add admixtures to approved design mixes without Consultants approval.

.5 Concrete Weight: Air dry unit weight: minimum 2,300 kg/m; adjusted proportionally for maximum air content listed in CSA A23.1, Clause 15, Table 10.

.6 Concrete supplier to provide documentation indicating the requirements of TBS Standard on Embodied Carbon in Construction have been met.

2.3 Admixtures

.1 Chemical Admixture: To ASTM C494. Incorporate water-reducing admixture, type WN, in all concrete.

.2 Air Entraining Agent: To ASTM C260. Incorporate air-entraining agent in addition to chemical admixture in concrete of relevant Class of exposure, in accordance with CSA A23.1, Clause 15, Table 10.

.3 Chloride: Do not use calcium chloride or admixtures containing chloride in concrete.

2.4 Concrete Toppings

.1 Provide topping with minimum 28 day compressive strength of 32 MPa.

2.5 Premixed Grout

.1 Non-Shrink Metallic: Non-catalyzed metallic grout to ASTM C1107, Compressive strength at 28 days: 48 MPa.

.2 Non-Shrink, Non Stain, Non-Metallic: to ASTM C1107. Compressive strength at 28 days: 59 MPa.

.3 Flowable Grout: High-tolerance Non-shrink, Non-metallic shrinkage compensating grout to ASTM C1107. Compressive strength at 28 days: 59 MPa.

PART 3 EXECUTION

3.1 Examination

.1 Before starting this work, examine work done by others which effects this work.

.2 Notify Consultant of any condition which would prejudice proper completion of this work.

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

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

.5 Commencement of work implies acceptance of existing conditions.

3.2 Treatment of Formed Surfaces

.1 Conform to the requirements of CSA A23.1, and as additionally specified herein.

.2 Treat concrete surfaces which will be exposed or painted in the completed building to provide a "Smooth Rubbed Finish" in accordance with CSA A23.1, uniform in colour and texture.

.3 Plugs at Recessed Ties:
.1 Clean tie holes to remove all foreign matter.
.2 Coat plugs by dipping in adhesive and insert in hole.
.3 Remove excess adhesive immediately with thinner which will not stain concrete, as recommended by manufacturer.

.4 Obtain Consultant's approval of finished exposed concrete and grind or otherwise correct to the satisfaction of the Consultant.

3.3 Placing Concrete

.1 Place concrete in accordance with requirements CSA A23.1/A23.2.

.2 Notify Consultant and inspection and testing firm at least 24 hours prior to commencement of concrete placing operation and 24 hours before wall forms are closed in.

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

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

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

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

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

.8 Joint fillers:
.1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Consultant.
.2 When more than one piece is required for joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
.3 Locate and form isolation, construction and expansion joints as indicated.
.4 Install joint filler.
.5 Use 12 mm thick joint filler to separate slabs-on-grade from vertical surfaces and extend joint filler from bottom of slab to within 12 mm of finished slab surface unless indicated otherwise.

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

.10 Place floor slabs to depth indicated on the drawings with 25 MPa minimum concrete unless otherwise noted on drawings but consistent with minimum cement content specified for exposed floors in this specification.

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

3.4 Finishing Concrete

.1 Perform finishing operations on plastic concrete surfaces in accordance with CSA A23.1, and as specified herein.

.2 Refer to the drawings for floor finishes and coverings.

.3 Screed the top of rough floor slabs to an even level or sloping surface at the proper elevation to receive the finish or topping specified on the drawings and in finish schedule.

.4 Provide a smooth steel trowel finish on all areas scheduled to receive a covering, or painted finish.

.5 Exposed Floor Surfaces: Provide hard, smooth, dense, steel troweled surface, free from blemishes, and of uniform appearance.

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

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

.8 Hardened Floor Finish:
- .1 Apply premixed material to total of 7.5 kg/m² of floor surface.
- .2 Apply in two shakes, of half total specified amount in each shake; the second shake at right angles to the first.
- .3 Follow manufacturer's special finishing instructions if concrete is air entrained.

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

3.5 Curing

.1 Cure concrete in accordance with CSA A23.1 and as specified herein.

.2 Curing Compound Method:
- .1 Use curing and sealing compound specified except:
  - .1 On surfaces to receive epoxy or similar paint finish.
  - .2 On surfaces to which architectural finishes will be adhered, the adhesives for which are incompatible with the curing compound.
  - .3 Air-entrained concrete for exterior slabs and sidewalks placed between October 1st and March 31st.

.3 Select acrylic water compound except that if ambient conditions extend drying time unduly and if area is well ventilated and unoccupied by other workers, solvent based compound may be used.

.4 Apply curing compound in accordance with manufacturer's instructions, increasing application rate as necessary to cover surface completely.

.5 Curing Blanket or Wet Burlap Method: For exterior sidewalks and other finished concrete surfaces that will be exposed to freezing and thawing or deicing chemicals:
.1 Cover with curing blanket or wet burlap overlaid with 0.102 mm thick polyethylene and maintain in place for the additional curing for durability period in accordance with CSA A23.1 but in no case for less than 7 days.
.2 Wet blanket or burlap regularly to maintain in moist condition. Do not allow to dry out.

.6 Cure finished concrete surface with an approved curing and sealing compound which will leave the surface with a uniform appearance and with a minimum of discolouration after drying. Ensure that the curing compound will be compatible with the architectural finishes or adhesives for finishes to be applied later. Apply the compound in strict accordance with the manufacturer's instructions.

.7 Protect surface which will be exposed to direct sunlight during the curing period, with a light coloured, laminated waterproof paper immediately after the curing and sealing compound has hardened sufficiently for the paper to be placed without damage to the sealed surface. Lap the paper a minimum of 100 mm and seal the laps. Leave the paper in place for at least seven days.

3.6 Grouting

.1 Mix prepackaged grout with water in accordance with manufacturer's printed instructions.

.2 Dampen concrete surfaces immediately before installing grout.

.3 Use non-shrink and shrinkage-compensating grouts only when grout will be contained against expansion and self-disintegration.

.4 Slope grout beyond edge of plate at 45 degrees.

.5 Provide same environmental protection and curing as specified for concrete.

3.7 Joint Sealant

.1 Apply sealant specified in Section 07 92 00 to thoroughly dry surfaces only, at ambient air temperatures above 5 ° C.

.2 Provide sealant on top of joint filler with a polyethylene bond breaker between joint filler and joint sealant applied in accordance with manufacturer's direction.

.3 Confirm that preformed joint filler and backer rod are compatible with sealant.

.4 Caulk joints in accordance with the following:
.1 Do not commence joint preparation until concrete is at least 28 days old.
.2 Thoroughly clean sides of joints with mason's router, or power saw, equipped with double blade where necessary to suit joint width.
.3 Blow clean with compressed air with oil trap on line, or vacuum clean.

.4 Install backer rod of diameter 25 percent greater than joint width, and type recommended by sealant manufacturer to be compatible with sealant. Locate backer rod to provide for sealant depth of one-half joint width, but not less than 12 mm.
.5 Prime joint if required, as recommended by sealant manufacturer.

3.8 Defective Work

.1 Variations in excess of specified tolerances and marked and disfigured surfaces that cannot be repaired by approved methods will be considered defective work.

.2 Replace or modify concrete that is out of place or does not conform to lines, detail or grade as directed by the Consultant.

.3 Replace or repair defectively placed or finished concrete as directed by the Consultant.

.4 Testing and Replacement of Deficient Concrete in Place:
.1 Pay for additional testing and related expenses if concrete has proven to be deficient.
.2 Replace or strengthen deficient concrete work as directed by the Consultant, and pay for all testing and related expenses for replaced work until approved by the Consultant.

3.9 Cleaning

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

.2 Clear away from the building site excess and waste materials and debris resulting from Work of this Section.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 10 00 Concrete Forming and Accessories
.2 Section 03 20 00 Concrete Reinforcing
.3 Section 03 30 00 Cast-in-Place Concrete
.4 Section 05 50 00 Metal Fabrications
.5 Section 09 67 72 Concrete Floor Sealer

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM C1107/C1107M-20 Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
.2 CSA Group (CSA)
  .1 CSA A23.1:19/A23.2:19 Concrete Materials and Methods of Concrete Construction/ Methods of Test Methods and Standard Practice for Concrete
  .2 CSA A23.3:19 Design of Concrete Structures
  .3 CSA A23.4-16 Precast Concrete-Materials and Construction
  .4 CSA A3000-18 Cementitious Materials Compendium
  .5 CSA G30.18-09 (R2014) Carbon Steel Bars for Concrete Reinforcement
  .6 CSA G40.20-13/G40.21-13 General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel
  .7 CSA G164-18 Hot Dip Galvanizing of Irregularly Shaped Articles
  .8 CSA G279-M1982 (R1998) Steel for Prestressed Concrete Tendons
  .9 CSA S16-2014 Design of Steel Structures
  .10 CSA W48-18 Filler Metals and Allied Materials for Metal Arc Welding
  .11 CSA W59-18 Welded Steel Construction (Metal-Arc Welding)
  .12 CSA W186-M1990 (R2016) Welding of Reinforcing Bars in Reinforced Concrete Construction
.3 Canadian General Standards Board (CGSB)
  .1 CAN/CGSB-1.40-97 Anti-corrosive Structural Steel Alkyd Primer
  .2 CAN/CGSB-1.181-99 Ready-Mixed Organic Zinc-Rich Coating
.4 American Concrete Institute (ACI)
  .1 ACI 347 Guide to Formwork for Concrete
  .2 ACI 232.1R-12 Use of Raw or Processed Natural Pozzolans in Concrete

1.4 Submittals

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

.2 Shop Drawings:
  .1 Prepare and submit fully detailed shop and erection drawings to the consultant for review.
  .2 Show all pertinent information in regard to the fabrication and erection of the precast concrete stairs including:
    .1 Details of stairs bearing on different landings to a scale of 1:50 (minimum), showing all dimensions, to match landing details proposed on Architectural Drawings.
    .2 Location of each unit in the completed structure and identifying marks for each unit.
    .3 Size and dimensions of each stair and complete details of connections.

.4 Reinforcing details, grade of reinforcement, concrete strength and admixtures.
.5 Locations and details for lifting hooks and handling points.
.6 Sequence of erection and special instructions that may be required in handling, setting and temporary bracing.

.3 Shop drawings to bear the seal and signature of an Engineer registered to practice in the Province of Ontario, employed by the precast contractor and to include complete design calculations for the stair certifying to the adequacy of the stairs to meet code requirements and to safely support the superimposed loads without failure.

.3 Provide certificates of testing for the period of manufacture. Testing to be performed by a professional testing company based on standard procedures set out in ACI codes.
.1 Provide duplicate copies of reports showing 7 day and 28 day compressive strength for each unit.

1.5 Design Criteria

.1 Design stair units, brackets and anchorage devices to meet requirements of the Ontario Building Code, CSA A23 Series and CSA S16, to withstand handling stresses, live and dead loads

.2 In addition to the gravity loads and forces required by governing codes, design work to include the effects caused by moisture and temperature changes, shrinkage, creep in component materials and handling, within deflection limitations governing structural design.

.3 Match details of stair bearing on landings shown on Architectural Drawings without compromising the structural integrity of the connection.

.4 Design connections and anchorage to transfer forces to structure and in conformity with structural and architectural constraints. Reinforce bearing areas against diagonal tension, splitting, rupture and flexure. Place extra ties, stirrups and reinforcing bars at support points. Do not allow bearing pressure in edges of unreinforced sections.

.5 Design units with maximum deflection of L/360 fully loaded.

.6 Seismic Loads: Design and size components to withstand seismic loads and sway displacement as calculated in accordance with the Ontario Building Code.

.7 Design connections to provide means of compensating for deviations of the building structure, minimize width of joints and gaps to allow for backing and sealing.

.8 Allow for expansion and contraction in both panels and structure, within fastening system.

.9 Allow for structural deflection of span/360 due to live load and distortion of structure, under design criteria conditions, without imposing load on stair assembly.

.10 Where required, design precast stair units to withstand all stresses from attachment of guardrails. Note OBC requirements for design loading on guardrails and make adequate provision.

1.6 Qualifications

.1 Fabricate and erect precast concrete elements using manufacturing plant certified by CSA Group in appropriate categories to CSA A23.4.

.2 Precast concrete manufacturer to be certified in accordance with CSA's certification procedures

for precast concrete plants.

.3 Only precast elements fabricated in such certified plants to be acceptable, and plant certification to be maintained for duration of fabrication, erection until warranty expires.

1.7 Quality Assurance

.1 Fabricate work in accordance with CSA A23.4, and CPCI Architectural Precast Concrete Manual.

.2 Design all precast concrete members and connectors not already designed by the Consultant, under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the Province of Ontario

.3 Welding: to CSA W59 and CSA W186.

.4 Welders: Certified to CSA W47.1. Submit certificates for each welder.

.5 Tolerances: Comply with the more stringent tolerances limits set out in ACI 347 and CSA A23.4.

.6 In addition to quality control test requirements of CSA A23.4, an independent inspection and testing company may be appointed by the Owner to verify compliance with this specification. Cooperate with Inspector to facilitate his work.

.7 Coordination: Provide other Sections with detailed drawings and setting information so that connection material can be readily erected in its required location, special precautions to be taken by other Sections affecting work of this Section

1.8 Shipping, Handling and Storage

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

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

.3 Design lifting devices for the stair units to ensure that they will be safely and efficiently handled and not produce distortion, cracking or deflection nor strain or adversely affect the unit.

.4 Support precast stair unit uniformly while curing. Keep a daily check to discover development of warpage or other distortion. Rearrange supports as required to compensate for warpage or distortion, if required.

.5 Precast stair units to be handled and adequately protected during fabrication, curing, storage and transport by methods that will prevent damage, warping, cracking, breakage, chipping, staining or other disfigurement. Units shall not be permitted to contact the earth or be stored so as to be exposed to splashing of earth, mud, and the like.

.6 Precast stair units are to be delivered to the site clearly marked in an acceptable manner as indicated on the shop drawings, showing final position on the building. The sequence of delivery to the site to conform to an erection schedule. The timing of the delivery to be scheduled to suit the storage space available and the handling and erection operations.

.7 Allow for storage and protection of fabricated stair units in the plant at no extra cost to Contractor, until units are required at the job site to meet construction schedule.

1.9 Project Conditions

.1 Maintain ambient and surface temperatures at minimum 5 degree C during grouting and until grout has cured.

1.10 Waste Management and Disposal

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

1.11 Warranty

.1 Warrant that the precast elements will not spall or show visible evidence of cracking, for a period of five years from the date of Substantial Performance.

PART 2 PRODUCTS

2.1 Manufacturer

.1 The precast concrete manufacturer shall be certified in accordance with CSA A251, Qualification Code for Manufacturers of Architectural and Structural Precast Concrete, certification procedures for precast concrete plants prior to submitting his bid and shall specifically verify as part of his bid that his plant is currently certified in the appropriate categories. Only precast elements fabricated in such certified plants shall be acceptable to the Owner. Precast plant certification shall be maintained for the duration of the fabrication and erection for this project. Provide evidence of certification to Consultant for review within five (5) days of Consultant's request.

2.2 Materials

.1 Supply materials meeting or exceeding the requirements of CSA A23.4 and as follows:
.1 Cement: grey Portland, Type 10, to CSA A3000
.2 Aggregates: to requirements of CSA A23.1.
.3 Reinforcement: to requirements of CSA A23.1, galvanized if less than 25 mm cover.
.4 Steel inserts, anchors, plates and rods: to CSA A23.1.
.5 Non-slip inserts: Extruded aluminum base with aluminum oxide abrasive, complete with cast in anchors, Type 610 by Wooster Stair Products, or acceptable equivalent. Standard colour.
.6 Non-shrink grout: non-metallic material aggregate grout non-shrinking, damp-pack application to ASTM C1107.
.7 Sealer: as specified in Section 09 67 72.

2.3 Concrete Mix Design

.1 Design concrete mix for normal weight concreter having a minimum 35 MPa at 28 days to CSA A23.4, and as required to meet design criteria.

2.4 Finishes

.1 Ensure exposed-to-view finish surfaces of precast concrete members are uniform in colour and appearance.

.2 Cure members under identical conditions to develop required concrete quality, and minimize appearance blemishes such as uniformity, staining, or surface cracking.

.3 Smooth finish: as cast using smooth steel form liners

.4 Finish members to:
.1 CSA A23.4 Clause 26 Finish Grade A; Remove fins and protrusions, grind edges and ends, flat face surfaces.
.2 Ensure exposed-to-view finish surfaces are uniform in colour and appearance.

2.5 Fabrication

.1 Make thorough examination of drawings details, check interfacing with work of other Sections and other factors influencing the design and performance of the work and be fully cognizant of the requirements.

.2 Match details of stair bearing on landings shown on Architectural Drawings without compromising the structural integrity of the connection.

.3 Consult reviewed shop drawings relating to interface elements and confirm exact location of inserts and anchors required to be cast in precast units to receive such items.

.4 Fabricate precast concrete stairs to the requirements specified in CSA A23.4 and to riser and tread dimensions for the various stairs as called for on the Drawings.

.5 Cast in non-slip inserts in accordance with manufacturer's instructions.

.6 All forms to be steel, accurately constructed, well braced and stiffened to avoid deformations under pressure of wet concrete and vibrators. All surfaces to have smooth finish without pinholes, form marks or rough edges. The quality of forms to be such that all dimensional tolerances and exposed concrete quality can be consistently maintained.

.7 Aluminum forms to be manufactured to produce raised non-slip continuous parallel ridges near the tread nosing. Nosing to be rounded and junction of tread and riser coved.

.8 Accurately set reinforcing steel and weld at intersections. Weld lifting hooks and inserts to reinforcement. Vibrate continuously during casting of concrete.

.9 Bearing areas to be reinforced against diagonal tension, splitting, rupture and flexure. Extra ties, stirrups and reinforcing bars to be placed at support points.

.10 Design reinforcing to permit all necessary drilling for the installation of hand rail pickets without spalling, cracking or damage to the stair finish.

.11 Provide minimum 19 mm concrete cover over reinforcing steel.

.12 Provide hardware or sleeves as s indicated for supporting guardrails supplied by Section 05 50 00.

.13 Cast in lifting devices required for erection of the precast concrete stair units. Ensure that lifting devices used externally or cast into units are capable of supporting the precast units in all positions that the units may be in during course of manufacture, transportation and installation. Ultimate capacity of lifting devices to be sufficient to resist forces obtained by applying load factor of 2.5 to weight of precast concrete work.

.14 The underside of all precast stairs to have a smooth trowel finish (no type of screed finish is acceptable).

.15 Apply coat of sealer specified in Section 09 67 72 to finished stair units to assist in easy cleanup of stairs at completion of project.

.16 Mark each precast unit to correspond to identification mark on shop drawings for location.

.17 Mark each precast unit with date cast.

.18 Markings shall be on part of unit which will not be exposed.

PART 3 EXECUTION

3.1 General

.1 Do precast concrete work in accordance with CSA A23.4 and CSA A23.3.

3.2 Examination

.1 Before commencing work, examine all surfaces and report in writing to the Consultant conditions which will adversely affect successful erection. Do not begin work until these conditions have been corrected.

.2 Ensure bearing surfaces are clean, smooth and level, and provision has been made for proper anchorage.

.3 Commencement of work shall imply acceptance of prepared surfaces.

3.3 Preparation

.1 Provide and install sufficient temporary bracing to brace precast components adequately, at all stages of construction, so that precast components will safely withstand loads to which they may be subjected. This temporary bracing shall remain in position until required connections have been completed.

.2 Supply anchors for precast components required to be cast into the concrete for installation. Provide such items in ample time to meet construction program. Supply layout drawings locating all cast-in items to be installed by other Sections.

3.4 Installation

.1 Non-cumulative erection tolerances in accordance with CSA A23.4.

.2 Before final connection is made, set elevations between units to within allowable tolerances before connecting units.

.3 Install units level, straight, plumb, square and true. Shim as required using acceptable materials and methods.

.4 Fasten precast units in place as indicated on reviewed shop drawings.

.5 Do not weld or secure bearing details at sliding joints.

.6 Clean field welds with wire brush and touch-up (shop primer with primer) (galvanized finish with zinc-rich primer).

.7 Fill joints between ends of stairs and cast in place landings with non-shrink grout flush to top and underside.
.8 Allow minimum 13 mm space between walls and stairs for caulking by others.

3.5 Protection

.1 Protect components from damage caused by field welding or erection operations performed by work of this trade.

.2 Provide non-combustible shields during welding operations.

.3 Protect cast in stair tread inserts from damage caused by foot traffic during construction. Provide plywood or other acceptable covers on each stair tread, securely fastened in place.

3.6 Cleaning

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

.2 Clean surfaces exposed to view after joint treatment is complete and grout has cured.

.3 Use fibre brushes, water and mild cleaning agents as recommended by manufacturer of the precast concrete units.

.4 Remove deposit of foreign material, dirt, soil and stains. Do not use materials, tools or methods which will damage the units. Rinse thoroughly with clean water after cleaning.

.5 Protect adjoining work from damage during cleaning.

3.7 Defective Work

.1 Repair damaged units, where permitted by Consultant, in accordance with the recommendations of the manufacturer using a mix design to match the adjacent area and applied with an approved bonding agent.

.2 Replace any damaged or deteriorated stair tread inserts which are damaged due to lack of adequate protection, during construction.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 30 00 Cast-in-Place Concrete
.2 Section 06 10 00 Rough Carpentry

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM C1708/C1708M-19 Standard Test Methods for Self-leveling Mortars Containing Hydraulic Cements

1.4 Submittals

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

.2 Submit manufacturers product data and installation instructions.

1.5 Quality Assurance

.1 Applicators shall be licensed or approved by material manufacturer and shall use equipment and tools as recommended by manufacturer.

1.6 Shipping, Handling and Storage

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

.2 Deliver materials in their original unopened packages and protect from freezing, direct sun exposure and exposure to moisture.

1.7 Environmental Requirements

.1 Comply with manufacturer's recommendations for ambient job site conditions.

1.8 Waste Management and Disposal

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

PART 2 PRODUCTS

2.1 Materials

.1 Materials shall conform to ASTM C1708.

.2 Underlayment shall meet the following requirements:
  .1 Self levelling.
  .2 Free of shrinkage cracks and spalling.
  .3 Minimum compressive strength 24 MPa.

.4 Cementitious based (gypsum based products are not acceptable)

.3 Primer for self levelling underlayment: one of the following and compatible with underlayment:
.1 Ardex P-51 by Ardex Inc.
.2 Top X Primer by Ultratex.
.3 Equivalent product approved by Consultant.

.4 Underlayment: cement based, self levelling, one of the following:
.1 Ardex K-15 by Ardex Inc.
.2 Top X by Ultratex.
.3 Equivalent product approved by Consultant.

.5 Water: clean and potable.

2.2 Mixing

.1 Mix materials to proportions and with equipment as directed by manufacturer.

.2 Mix thoroughly for a sufficient time to obtain a lump free mixture.

PART 3 EXECUTION

3.1 Preparation

.1 Clean and prepare substrate in accordance with manufacturer's surface preparation instructions. All surfaces shall be solid, thoroughly clean and properly primed.

.2 Wood subfloors shall be free of oil, grease, dirt, curing compound and any other substance which might act as a bond breaker.

.3 Concrete subfloors shall be free of oil, grease, dirt, curing compound and any other substance which might act as a bond breaker. Mechanically clean by shot blasting or other suitable method.

.4 Prime substrates with primer. Apply evenly. Do not leave any bare spots. Remove puddles and excess primer. Allow to dry to clear thin film.

3.2 Underlayment, Self Levelling

.1 Pour liquid underlayment where indicated; spread in place with suitable spreader. Use smoother for featheredge and touch up.

.2 Workmen shall wear footwear with cleats to avoid leaving marks in underlayment.

.3 Pour underlayment to thickness required; apply multiple layers if necessary. Provide forms where required to retain underlayment.

3.3 Protection

.1 Provide protection to allow underlayment to cure for length of time recommended by manufacturer before allowing installation of finish flooring.

3.4 Cleaning

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

End of Section

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PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 04 21 13 Brick Masonry
.2 Section 06 10 00 Rough Carpentry
.3 Section 05 50 00 Metal Fabrications

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM A153/A153M-23 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
.2 CSA Group (CSA)
  .1 CSA S304-14 (R2019) Design of Masonry Structures.
  .2 CSA A370-14 (R2018) Connectors for Masonry.
  .3 CAN/CSA A371-14 (R2019) Masonry Construction for Buildings.

1.4 Submittals

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

.2 Submit the following samples:
  .1 Two of each type of masonry reinforcing and connector specified.

.3 Product Data: Submit manufacturer's printed product literature, specifications and data sheets.

.4 Shop Drawings:
  .1 Submit shop drawings for all masonry reinforcing. Include placing drawings, bar lists and details. Indicate clearly reinforcing bar sizes, spacing, bending details, lap details, dowels to adjacent construction location and quantities of reinforcement and connectors.
  .2 Prepare placing drawings and bar lists in accordance with the American Concrete Institute (ACI) Detailing Manual, and the Reinforcing Steel Institute of Canada (RSIC) Reinforcing Steel Manual of Standard Practice, the typical details included with Contract Documents.
  .3 Prepare placing drawings to minimum scale of 1:50.
  .4 Submit placing drawings and bar lists sufficiently detailed and dimensioned to permit correct placement of reinforcement and accessories without reference to architectural or structural Drawings.
  .5 Show reinforcement, including dowels, in elevation on placing drawings for wall reinforcement.
  .6 Show cover to reinforcement
  .7 Show location of construction joints.

1.5 Design Criteria

.1 Non-conventional Masonry Connectors
  .1 Deflection: maximum 2.0 mm, including free play when acted upon by 0.45 kN lateral load, in all possible positions of adjustment.

.2 Positive restraint at position of maximum adjustment.

.2 Multi-component Ties - Free Play: Maximum 1.2 mm, when assembled in any possible configuration.

1.6 Shipping, Handling and Storage

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

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

1.7 Waste Management and Disposal

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

PART 2 PRODUCTS

2.1 Materials

.1 All metal components: hot dipped zinc galvanized to CSA S304 unless otherwise indicated.

.2 Connectors: to CSA A370 and CSA S304.
.1 Finish: Steel components, hot dip galvanized to CAN/CSA A370.
.2 For wood stud/masonry veneer application; length to suit combined total wall thickness; with polyethylene insulation support where required.
.3 Strip Ties: Prescriptive corrugated strip tie. 100 mm x 22 mm x 0.91 mm thick corrugated tie conforming to CSA A370.

.3 Equivalent products as manufactured by the following manufacturer's may be used subject to submission and acceptance by the Consultant of technical data:
.1 Hohmann and Barnard Inc.

.4 Epoxy Adhesive: Hilti HIT-HY 2270 Adhesive anchor.

PART 3 EXECUTION

3.1 Installation

.1 Install masonry connectors and anchors in accordance with CSA A370, CSA A371, CSA A23.1 and CSA S304 unless indicated otherwise.

3.2 Bonding and Tying

.1 Tie masonry veneer to backing in accordance with CSA S304, CSA A371 and as indicated.

.2 Masonry ties shall be installed as per the requirements of CSA A371 with maximum spacing of 400 mm vertically and 400 mm horizontally.

3.3 Metal Anchors

.1 Do metal anchors as indicated.

3.4 Lateral Support and Anchorage

.1 Do lateral support and anchorage in accordance with CSA S304 and as indicated.

.2 Anchor new masonry to existing with steel dowels as indicated. Drill into existing masonry and set reinforcing bars in epoxy adhesive in accordance with manufacturer's instructions.

3.5 Control Joints

.1 Terminate reinforcement 25 mm short of each side of control joints unless otherwise indicated.

.2 Control joints shall be stepped to avoid cutting lintel beams. Under no circumstance shall the control joints be placed to compromise the bearing for the lintel.

3.6 Field Touch Up

.1 Touch up damaged and cut ends of galvanized reinforcement steel and connectors with compatible finish to provide continuous coating.

3.7 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 04 05 19 Masonry Anchorage and Reinforcing
.2 Section 06 10 00 Rough Carpentry
.3 Section 07 27 00 Vapour Permeable Air Barriers
.4 Section 07 92 00 Joint Sealants

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM C216-22 Standard Specification for, Facing Brick (Solid Masonry Units Made of Clay or Shale)
.2 CSA Group (CSA)
  .1 CSA A82-14 (R2018) Fired Masonry Brick Made from Clay or Shale.
  .2 CSA A179-14 (R2019) Mortar and Grout for Unit Masonry
  .3 CSA A371-14 (R2019) Masonry Construction for Buildings.
  .4 CSA A3000-18 Cementitious Materials Compendium
  .5 CSA S304-14 (R2019) Design of Masonry Structures
.3 Brick Industry Association (BIA)
  .1 Technical Note No. 20-2006 Cleaning Brick Work.

1.4 Submittals

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

.2 Product Data:
  .1 Submit manufacturer's instructions, printed product literature and data sheets for brick masonry and include product characteristics, performance criteria, physical size, finish and limitations.
  .2 Samples: submit duplicate samples of brick in colour and texture specified.

1.5 Quality Assurance

.1 Test Reports: submit certified test reports including sand gradation tests in accordance with CSA A179 showing compliance with specified performance characteristics and physical properties, and in accordance with Section 04 05 00.

.2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.3 Mock-ups:
  .1 Construct mock-ups in accordance with Section 01 45 00.
  .2 Construct mock-up panel of exterior brick construction 1200 x 1800 mm.

1.6 Shipping, Handling and Storage

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

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

.3 Storage and Handling Requirements:
.1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Store and protect brick masonry from nicks, scratches, and blemishes.
.3 Replace defective or damaged materials with new

1.7 Project Conditions

.1 Ambient Conditions: assemble and erect components only when temperature is above 4 ° C.

1.8 Waste Management and Disposal

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

PART 2 PRODUCTS

2.1 Materials

.1 Face brick Types:
.1 Fired clay brick to CSA A82.
.1 Type: Brampton Brick Contemporary Series.
.2 Grade: EG.
.3 Size: Metric Norman.
.4 Colour and texture: Provide Blend of; 50% St. John, 25% Westville & 25% Venetian as selected by the Consultant.

.2 Reinforcement:
.1 Reinforcement in accordance with Section 04 05 19.

.3 Connectors:
.1 Connectors in accordance with Section 04 05 19.

.4 Mortar Mixes
.1 Conforming to CSA A179
.2 Use same brand of material and source of aggregate for entire project.
.3 Aggregate: CSA A179 coarse sharp clean sand, free from salt, alkaline or other organic substances, specifically graded for masonry use.
.4 Cement: To CSA A3000, masonry cement. Type S. Blended mixes of Portland cement to CSA A3000 and double hydrated lime to ASTM C207.
.5 Water shall be clean, potable and free of deleterious amounts of acid, alkalies, or organic materials.
.6 Hydrated Lime: Type 'S' to ASTM C207.
.7 Type 'S' mortar shall be used for all masonry work.
.8 Proprietary Mortar Mixes: St. Lawrence Cement Company, Blue Circle Cement, Daubois Inc., Lafarge Canada. Mortar mixes shall conform to mix requirements specified.
.9 Mortar for facebrick units shall be coloured with ground coloured natural aggregates.
.10 Coloured mortar: colouring admixture not exceeding 10% of cement content by mass, or integrally coloured masonry cement, to produce coloured mortar to match approved sample.
.11 Admixtures of any kind are not allowed except as specified for coloured mortar.

.5 Grout Mixes:
.1 Grout: to CSA A179, Table 3.
.2 Premixed, non-shrink non-metallic grout: Non Shrink Grout by C.P.D., V3 Grout by W.R. Meadows of Canada, NS Grout by Euclid

.6 Control Joint Filler: to ASTM D5249, Type 1, Round, flexible, continuous-length, nonabsorbent, non-gassing, non-staining, and non-shrinking. Extruded from a cross-linked polyethylene. Flexible foam, heat-Resistant Backer Rod. 9.5 mm thick by width of wall.

.7 Damp Course and Flashings
.1 Fully compatible with air barrier membrane specified in Section 07 27 13. Self-adhesive modified SBS bitumen membrane reinforced with proprietary glass screen, minimum thickness of 1.0 mm:
.1 Vedagard Non-slip by Bakor Inc.
.2 Perm-A-Barrier Wall Flashing by W.R. Grace & Co.
.3 Mel-Dek by W.R. Meadows
.4 Enverge Flashguard by Firestone.
.2 Lap Sealant: recommended by flashing manufacturer.
.3 Surface primers and conditioners as recommended by membrane manufacturer.

.8 Cavity Vents and Weepholes: purpose made PVC vents, with pest resisting design, size to suit masonry units. Cell-Vent with mortar net, or Mor-Control by Dur-O-Wal Inc. Colour to match mortar colour.

.9 Mechanical Fasteners: As recommended by manufacturer of material to be fastened, and in accordance with the reference standards, corrosion resistant.

.10 Packing Insulation: loose glass fibre insulation or mineral wool with minimum density of 17.6 kg/m³.

.11 Cleaning Compounds:
.1 Use low VOC products in compliance with SCAQMD Rule 1168.
.2 Compatible with substrate and acceptable to masonry manufacturer for use on products.
.3 Cleaning compounds compatible with brick masonry units and in accordance with manufacturer's written recommendations and instructions.

PART 3 EXECUTION

3.1 Examination

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for brick masonry installation in accordance with manufacturer's written instructions.
.1 Visually inspect substrate in presence of Consultant.
.2 Inform Consultant of unacceptable conditions immediately upon discovery.
.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.2 Preparation

.1 Protect adjacent finished materials from damage due to masonry work.

3.3 Installation

.1 Construction to conform to CSA A371.

.2 Jointing: concave.

.3 Mixing and blending: mix units within each pallet and with other pallets to ensure uniform blend of colour and texture.

.4 Reinforcement: Install reinforcing in accordance with Section 04 05 19.

.5 Connectors: Install connectors in accordance with Section 04 05 19.

.6 Mortar Placement: conform to CSA A371.

.7 Grout Placement: Grout masonry in accordance with CSA S304 and as indicated.

.8 Repair/Restoration: Upon completion of masonry, fill holes and cracks, remove loose mortar and repair defective work.

.9 Tolerances: To CSA A371.

3.4 Moisture Control

.1 Place continuous dampcourse and flashing membrane at the bottom of all exterior walls, including at bottom of walls and over all openings. Extend flashing from exterior face of exterior wythe, turned up backing face minimum 150 mm and bonded to sheathing with adhesive, unless otherwise indicated. Lap all joints 150 mm and seal with adhesive.

.2 Install weep hole vents in vertical joints immediately over flashings, in exterior wythes of cavity wall and masonry veneer wall construction, at maximum horizontal spacing of 600 mm on centre.

.3 Mortar diverters: install purpose made diverters in cavities where indicated and as directed, size and shape to suit purpose and function.

.4 Grout screens: install purpose made diverters in cavities where indicated and as directed, size and shape to suit purpose and function.

3.5 Cleaning

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

.2 Perform cleaning as soon as possible after installation to remove construction and accumulated environmental dirt.

.3 Clean unglazed clay masonry: 10 m^2 area of wall designated by Consultant as directed below and leave for one week. If no harmful effects appear and after mortar has set and cured, protect windows, sills, doors, trim and other work, and clean brick masonry as follows.
   .1 Remove large particles with wood paddles without damaging surface. Saturate masonry with clean water and flush off loose mortar and dirt.
   .2 Scrub with solution of 25 ml trisodium phosphate and 25 ml household detergent dissolved in 1 L of clean water using stiff fibre brushes, then clean off immediately with clean water using hose. Alternatively, use proprietary compound recommended by brick masonry manufacturer

in accordance with manufacturer's directions.

.3 Repeat cleaning process as often as necessary to remove mortar and other stains.

.4 Use acid solution treatment for difficult to clean masonry as described in Technical Note No.20 by the Brick Industry Association.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 30 00 Cast-in-Place Concrete
.2 Section 05 31 00 Steel Deck
.3 Section 05 50 00 Metal Fabrications

1.3 References

.1 ASTM International, (ASTM)
  .1 ASTM A108-18 Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
  .2 ASTM A123/A123M-17 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
  .3 ASTM A153/A153M-23 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
  .4 ASTM A307-21 Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
  .5 ASTM A653/A653M-23 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  .6 ASTM A1011/A1011M-23 Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
  .7 ASTM F3125/F3125M-22 Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength
.2 CSA Group (CSA)
  .1 CSA G40.20/G40.21-13 (R2018) General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel
  .2 CSA G164-18 Hot Dip Galvanizing of Irregularly Shaped Articles.
  .3 CSA S16:19 Design of Steel Structures.
  .4 CSA S136-16 North American Specification for the Design of Cold Formed Steel Structural Members
  .5 CSA W47.1:19 Certification of Companies for Fusion Welding of Steel Structures.
  .6 CSA-W48.1-M1991 (R1998) Carbon Steel Covered Electrodes for Shielded Metal Arc Welding
  .7 CSA-W55.3-08 (R2013) Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
  .8 CSA W59-18 Welded Steel Construction (Metal Arc Welding).
  .9 CSA W178.1-18 Certification of Welding Inspection Organizations.
  .10 CSA W178.2-18 Certification of Welding Inspectors.
.3 American Welding Society (AWS)
  .1 AWS A2.4:2020 Standard Symbols for Welding, Brazing, and Nondestructive Examination
.4 Structural Steel Painting Council
  .1 SSPC-SP 6-91 Commercial Blast Cleaning.
.5 Canadian Institute of Steel Construction (CISC)/Canadian Paint Manufacturer's Association (CPMA)

.1 CISC/CPMA 1-73a Quick-Drying, One-Coat Paint for Use on Structural Steel.

.6 American Institute of Steel Construction (AISC)

.1 Code of Standard Practice for Steel Buildings and Bridges, Section 10, Architectural Exposed Structural Steel, latest edition.

.7 The National Building Code of Canada.

1.4 Submittals

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

.2 Submit shop and erection drawings. Submit typical details of connections and any special connections for review before preparation of shop drawings. Assume responsibility for the accuracy of Work. Review of submitted shop drawings is to ensure only that the Contract Documents are being correctly interpreted.

.3 Professional Engineer responsible for connection design shall sign and seal each shop drawing.

.4 Show on shop drawings the size, spacing, and the location of structural steel members; connections; attachments; reinforcing; anchorage and required inserts; and all necessary plans, elevations and details.

.5 Show splice locations and details.

.6 Welded connections shall be designated by welding symbols in compliance with AWS A2.4:2020 and indicate clearly net weld lengths.

.7 Submit design calculations if requested by the Consultant.

.8 Submit diagrams showing methods of erection.

.9 Field Work Drawings shall be submitted as shop drawings.

.10 Notify Consultant in writing of any deviations in shop drawings from the requirements of the Contract Documents.

.11 Submit a schedule of fabrication to the Consultant and the Testing Agency, prior to commencement of fabrication.

1.5 Qualifications

.1 Undertake welding and/or welding inspection by welders fully approved to one or more of the reference codes and standards where applicable.

1.6 Quality Assurance

.1 Connections:

.1 Connections designed by Engineer: Submission of shop drawings for connection which have been detailed on Drawings shall represent acceptance by Contractor that connection can be executed successfully.

.2 Design of other connections which cannot be selected from standard designs tabulated in CISC Handbook of Steel Construction shall be by a Professional Engineer, licensed in the Province of Ontario, experienced in structural steel connection design.

.3 Consultant will review connection arrangement to verify general conformance with overall design concept of structure.
.4 Connection design engineer shall be insured for professional liability in accordance with section 74 subsection (1) of Regulation 941 of the Ontario Professional Engineers Act. The alternative of compliance with subsection (2) is not acceptable.
.5 Provide connections adequate to resist reaction of beam, when beam is loaded to maximum flexural capacity under uniformly distributed load, unless reaction or connection detail is shown on Drawings.
.1 Provide flexible beam connections for unrestrained members in accordance with CSA S16.1, unless shown otherwise on Drawings.
.2 Select connections, wherever possible, from standard designs tabulated in current edition of CISC Handbook of Steel Construction, except that length of beam web angles shall not be less than half the depth of beam, and single angles shall not be used.
.3 Provide direct connections to flanges of spandrel beams (exterior perimeter beams) to restrain twisting.

.2 Design:
.1 Connections:
.1 Provide bolted or welded connections, unless shown otherwise on Drawings.
.2 Use high strength bolts to ASTM F3125 for all connections.
.3 Use slip resistant (friction-type) connections for bolted joints designed to resist reversible forces.
.4 Provide tension adjustment hardware at rod type bracing and at flat bar type bracing.
.5 Do not permit connections to encroach on clearance lines required for installation of Work of other Sections.

.3 Random Splicing: Obtain in writing from Consultant, prior to commencement of shop drawings, special requirements that will be imposed as a necessary condition of acceptance of members with randomly located butt welded splices.

.4 All edge perimeter angles and bent plates installed at roof framing level shall be joined by butt weld splices designed for full tension capacity of members being joined.

1.7 Tolerances

.1 In addition to tolerances specified in CSA S16, erect shelf angles and sash angles attached to steel frame within a tolerance of 3 mm plus or minus, with abutting ends of members at the same level.

1.8 Inspection and Testing

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

.2 Inspection and testing of materials and shop fabrication of Work of this Section, and field quality control, will be performed by an independent Inspection and Testing Company. Refer to Section 01 45 00 - Quality Control.

.3 The Inspection and Testing Company shall meet qualification requirements of CSA W178.1 and shall be certified by the Canadian Welding Bureau in Category 1 Buildings.

.4 Welding Inspectors and supervisors shall be certified by Canadian Welding Bureau to CSA W178.2, to minimum level 2 certification.

.5 Provide free access for inspectors to all places work is being performed, whether on site or off.

.6 Mill inspection shall ensure that materials conform to specified requirements. Mill test reports, properly correlated to the materials, will be accepted in lieu of physical tests.

.7 Shop inspection shall ensure that structural steel is fabricated in accordance with the shop drawings, and the specified fabrication and welding procedures.

.8 The cost of inspection and testing of splices introduced by the fabricator and not required on the Contract Documents will be paid by the Contractor.

.9 Inspection and Testing Company when appointed shall carry out shop inspection to verify:
- .1 Structural materials and paint conform to Specifications. Mill test reports, properly correlated to the materials, will be accepted in lieu of physical tests of structural materials.
- .2 Fabrication and welding conforms to Specifications and dimensioned shop drawings.
- .3 Shop cleaning and preparation and prime painting to conform to specified requirements.
- .4 Surfaces inaccessible for cleaning and painting after assembly are treated before assembly.
- .5 For surfaces painted with zinc rich paint or zinc primer, specified surface preparation is followed and specified paint thickness is applied.

.10 Non-destructive Testing of Welded Connections: Carry out non-destructive testing of welded connections chosen at random as follows:
- .1 Check and record steel member sizes for 20% of columns, beams and girders.
- .2 Check 5% of all welds by magnetic particle inspection.
- .3 Check 25% of moment connections and all connections subject to direct tension involving use of full penetration groove welds by ultrasonic testing.
- .4 Check 10% (minimum 2 per connection) in accordance with Section 23 of CSA S16 of pretensioned connections including main building bracing connections.

.11 More frequent testing and inspection shall be completed if random tests described above are not satisfactory. These costs are to be paid by the Contractor.

1.9 Shipping, Handling and Storage

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

.2 Deliver products that are only supplied under work of this Section to those who are responsible for their installation, to the work site as directed and to meet construction schedule.

.3 Handle and store structural steel in such a manner that no damage, including corrosion, is caused to the stored or erected work, or to other property.

.4 Store structural steel off of ground on timber supports.

1.10 Waste Management and Disposal

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

PART 2 PRODUCTS

2.1 Materials

.1 Rolled shapes, hollow structural sections, plates and rods: new steel, in compliance with CSA and/or ASTM Standards indicated on Structural Drawings.

.2 Welding Electrodes: to meet the requirements set forth in the applicable standard of the CSA W48 Series on welding electrodes. (Any process which produces deposited weld metal meeting the requirements of the applicable W48 Series Standard for any grade of arc welding electrodes shall be accepted as equivalent to the use of such electrodes.)

.3 High Strength Bolts: to meet specified requirements of ASTM F3125

.4 Machine Bolts: to meet specified requirements of ASTM A307.

.5 Anchor Bolts: To CSA-G40.20/G40.21, Grade 300W.

.6 Shop Coat Paint:
.1 Interior structural steel: To meet specified requirements of CISC/CPMA 1-73a and compatible with Master Painters Institute INT 5.1S or 5.1X Institutional low odour/low VOC semi-gloss finish. Colour to be grey.

.7 Galvanizing: hot dipped with zinc coating to CSA G164, ASTM A123 or ASTM A153.

PART 3 EXECUTION

3.1 Fabrication

.1 Fabricate work of this Section in compliance with CSA S16, and as specified following.

.2 Connections:
.1 Make bolted or welded connections.
.2 Use high strength bolts unless otherwise noted on Drawings.
.3 Use friction type high strength bolts for the connections of bracing members (diagonal kickers) resisting the effects of applied lateral loads. Provide tension adjustment at flat bar and rod type lateral bracing.
.4 Do not permit connections to encroach on the clearance lines required for the installation of work of this Section.

.3 Beam Connections:
.1 Provide beam connections adequate to resist the reactions produced by the framing or load conditions.
.2 Provide beam to column connections that apply vertical reaction with negligible eccentricity at the connecting face of the column, such as single or double beam web connections, end plate connections or un-stiffened seats, unless otherwise shown on Drawings. Submit for review, in advance of the preparation of shop drawings, connections which do not meet these requirements.
.3 Provide connections complying with the requirements of the CISC Handbook of Steel Construction, except that the length of beam web angles shall not be less than half the depth of the beam and single angles shall not be used.
.4 Provide direct connections to flanges of spandrel beams to restrain twisting.

.4 Holes in Structural Members:

.1 Punch holes 11 mm to 27 mm in diameter as required for attaching the work of other Sections to structural steel members. Locate holes so that no appreciable reduction of the strength of members is caused.
.2 Provide holes for pipes and ducts, and reinforce openings as indicated on drawings. Cutting of holes in structural members in the field will not be permitted except with written approval of the Consultant.
.3 Provide effective drainage holes to prevent the accumulation of water in tubular members.

.5 Member Separators: Provide separators at approximate spacing of 1200 mm o.c. for double beams and channels as follows:
.1 For beams and channels 225 mm or less in depth: one or two rows of pipe separators.
.2 For beams and channels over 225 mm in depth: channel separators, unless otherwise detailed on Drawings.

.6 Built up Compression Members General Requirements: Comply with the requirements of CSA-S16, for all built up compression members.

.7 Column Bearing Plates: Mill column bearing plates under column bearing unless plate is sufficiently flat to give adequate contact bearing between column and plate.

.8 Structural Steel Painting: All prime painting shall be shop applied and the responsibility of the steel fabricator. Refer to specific priming requirements specified in Section 09 91 23 - Interior Painting.
.1 Paint in accordance with manufacturer's published directions. Paint steel in the shop under cover. Keep painted members under cover until the paint has dried.
.2 Clean and prepare surfaces, as appropriate for paint specified, in accordance with Commercial Blast Cleaning is only required where zinc rich paint is to be applied. All other steel to be or clean steel in compliance with SSPC SP6 where zinc rich paint is shop applied.
.3 Where paint is applied adjacent to welded joints, remove it to bare metal for a distance of at least 50 mm beyond sides of joints.
.4 Do not paint surfaces and edges to be field welded, contact surfaces of friction type connections assembled by high strength bolts, surfaces encased in or in contact with concrete.
.5 Do not paint surfaces to receive cementitious fireproofing.
.6 Prime steel members to receive Intumescent Fireproofing in accordance with fireproofing manufacturer's recommendations. Refer to Section 07 81 23.

.9 Galvanizing: Galvanize members as indicated and in accordance with reference standards, after shop welding is complete.
.1 Steel members, fabrications, and assemblies shall be galvanized after fabrication by the hot dip process in accordance with CSA G164 or ASTM A123.
.2 Bolts, nuts, washers, iron, and steel hardware components shall be galvanized in accordance with CSA G164 or ASTM A153.
.3 Coating Requirements:
.1 Weight: the weight of the galvanized coating shall conform with Table 1 of CSA G164 or paragraph 6.1 of ASTM A123 and Table 1 of ASTM A153 (as appropriate).
.2 Surface Finish: The galvanized coating shall be continuous, adherent, as smooth and evenly distributed as possible and free from any defect that is detrimental to the stated end use of the coated article.
.4 The integrity of the coating shall be determined by visual inspection and coating thickness measurements.

.5 Adhesion: the galvanized coating shall be sufficiently adherent to withstand normal handling.

3.2 Examination

.1 Verify, before delivery of structural steel, that work of other Sections on which work of this Section is dependent is correctly installed and located.

3.3 Preparation

.1 Supply anchor bolts, base and bearing plates and other members to be built in under work of other Sections as the work progresses. Cooperate with installers of this work and provide instructions for setting items to be built in.

3.4 Erection

.1 Comply with CSA S16 and work site safety plans in erection of work of this Section.

.2 Make adequate provision for horizontal and vertical erection loads and for sufficient temporary bracing to keep structural frame plumb and in true alignment until the completion of erection, and the installation of masonry, concrete work, and floor and roof decks which provide the necessary permanent bracing.

.3 Provide temporary steel members as may be required for erection purposes and remove them when no longer required.

.4 Installation of Bearing and Column Base Plates: Install bearing plates and standard wall anchors for beams bearing on masonry or concrete.
.1 Set loose beam bearing plates and column base plates, at proper elevation, true and level, with steel shims, ready for grouting as specified under work of other Sections.
.2 Set loose bearing plates and/or levelling plates to be cast into concrete.

3.5 Coating Touch-Up

.1 Clean welds with wire brushes and wash down with clean water to ensure no residue from electrodes is present.

.2 After erection, give one coat of prime coat or zinc rich paint as applicable and specified for shop coat to field bolts, field connections, burnt areas, and abrasions or damage to shop coats.

.3 Touch up all areas with a specified paint film thickness.

.4 Give areas of bare metal on galvanized members two coats of zinc-rich paint. Repair coating on architecturally exposed galvanized metals in accordance with reference standards and as directed by the Consultant. Replace any materials where damage cannot be repaired to the satisfaction of the Consultant.

3.6 Field Quality Control

.1 Inspection and Testing Company, when appointed as specified in Source Quality Control elsewhere in this Section, shall perform:
.1 Inspection of erection and fit-up, including placing, plumbing, levelling and temporary bracing and conformance with specified tolerances.

.2 Inspection of bolted connections, including verification that ASTM A307, ASTM F3125 snug tight only bolts, and ASTM F3125 pre-tensioned bolts have been installed and used appropriately, and that threads are excluded from shear plane where required.
.3 Inspection of welded joints, including slag removal.
.4 General inspection of field cutting and alterations; report immediately to Consultant, any alterations or cutting not shown on reviewed shop drawings.
.5 General inspection of shop coating touch-up.
.6 Inspection of zinc primer and zinc-rich paint, including surface preparation and coating thickness.

3.7 Defective Work

.1 Variations in excess of specified tolerances, and failure of materials or workmanship to meet requirements of this specification, and which cannot be repaired by approved methods, will be considered defective Work performed by this Section.

.2 Replace defective Work, as directed by Consultant.

.3 Pay for additional inspection and testing, redesign, corrective measures, and related expenses if Work has proven to be deficient.

3.8 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 05 12 23 Structural Steel
.2 Section 06 10 00 Rough Carpentry

1.3 References

.1 ASTM International, (ASTM)
  .1 ASTM A653/A653M-23 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
.2 CSA Group (CSA)
  .1 CSA S16:19 Design of Steel Structures
  .2 CSA S136-16 North American Specification for the Design of Cold Formed Steel Structural Members, Includes Update No. 1 (2009), Update No. 2 (2010)
  .3 CSA W47.1:19 Certification of Companies for Fusion Welding of Steel Structures.
  .4 CSA W48:23 Filler Metals and Allied Materials for Metal Arc Welding
  .5 CSA W55.3-08 Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
  .6 CSA W59-18 Welded Steel Construction (Metal Arc Welding)
.3 Canadian General Standards Board (CGSB)
  .1 CAN/CGSB 1.181-99 Ready-Mixed Organic Zinc-Rich Coating

1.4 Submittals

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

.2 Submit drawings stamped and signed by qualified professional engineer registered or licensed in Province of Ontario, Canada. Each submission of the shop drawings shall bear the seal of the Engineer.
  .1 Indicate deck plan, profile, dimensions, base steel thickness, metallic coating designation, connections to supports and spacings, projections, openings, reinforcement details and accessories.

.3 Submit design calculations if requested by Consultant.

1.5 Design Requirements

.1 Design steel deck using limit states design in accordance with CSA S136 and CSSBI 10M.

.2 Steel deck and connections to steel framing to carry dead, live and other loads including lateral loads, diaphragm action, and uplift as indicated.

.3 Deflection under specified live load not to exceed 1/240 of span, except that when gypsum board ceilings are hung directly from deck, live load deflection not to exceed 1/360 of span.

.4 Where vibration effects are to be controlled as indicated, dynamic characteristics of decking system to be designed to be in accordance with CSA S16.

1.6 Shipping, Handling and Storage

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

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

1.7 Waste Management and Disposal

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

PART 2 PRODUCTS

2.1 Materials

.1 Sheet Steel: ASTM A653 minimum Grade 230 with a base steel design thickness or 0.76 mm or greater and a minimum zinc-iron alloy coating designation of ZF75.

.2 Closures: in accordance with manufacturer's recommendations.

.3 Cover plates, cell closures and flashings: steel sheet with minimum base steel thickness of 0.76 mm. Metallic coating same as deck material.

.4 Primer: zinc rich, ready mix to CAN/CGSB-1.181.

2.2 Types of Decking

.1 Deck shall conform to the depths noted on the drawings.

.2 Steel roof deck: to CSSBI 10M non-cellular, interlocking side laps.Base steel thickness, depth & profile as shown on the drawings.

PART 3 EXECUTION

3.1 General

.1 Structural steel work: in accordance with CSA S136 and CSSBI 10M.

.2 Welding: in accordance with CSA W59, except where specified otherwise.

.3 Companies to be certified under Division 1 or 2.1 of CSA W47.1 for fusion welding of steel and/or CSA W55.3 for resistance welding.

3.2 Erection

.1 Erect steel deck as indicated and in accordance with CSA S136, CSSBI 10M, CSSBI 12M and with reviewed erection drawings.

.2 Lap ends: to 50 mm minimum.

.3 Place and support reinforcing steel as indicated.

.4 Immediately after deck is permanently secured in place, touch up metallic coated top surface with compatible primer where burned by welding.

3.3 Closures

.1 Install closures in accordance with approved details.

3.4 Openings and Areas of Concentrated Loads

.1 No reinforcement required for openings cut in deck which are smaller than 150 mm square.

.2 Frame deck openings with any one dimension between 150 to 300 mm as recommended by manufacturer, except as otherwise indicated.

.3 For deck openings with any one dimension greater than 300 mm and for areas of concentrated load, reinforce in accordance with structural framing details, except as otherwise indicated.

3.5 Connections

.1 Install connections in accordance with CSSBI recommendations as indicated.

3.6 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 30 00 Cast-in-Place Concrete
.2 Section 03 41 23 Precast Concrete Stairs
.3 Section 05 12 23 Structural Steel
.4 Section 05 31 00 Steel Deck
.5 Section 06 10 00 Rough CarpentrySection 06 20 00 Finish Carpentry
.6 Section 09 21 23 Interior Painting

1.3 References

.1 The Ontario Building Code.
.1 MMAH Supplementary Standard SB-8, September 14, 2012. Design, Construction and Installation of Anchorage Systems for Fixed Access Ladders.
.2 ASTM International (ASTM)
.1 ASTM A53/A53M-22 Standard Specification for Pipe, Steel, Black and Hot Dipped, Zinc Coated, Welded and Seamless.
.2 ASTM A123/A123M-17 Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.
.3 ASTM A153/A153M-23 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
.4 ASTM A240/A240M-23a Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
.5 ASTM A264-12(2019) Standard Specification for Stainless Chromium-Nickel Steel-Clad Plate
.6 ASTM A269/A269M-22 Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
.7 ASTM A276/A276M-24a Standard Specification for Stainless Steel Bars and Shapes
.8 ASTM A307-21 Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
.9 ASTM A312/A312M-22a Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes
.10 ASTM A380/A380M-17 Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems
.11 ASTM A385/A385M-22 Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip)
.12 ASTM A511/A511M-21a Standard Specification for Seamless Stainless Steel Mechanical Tubing and Hollow Bar
.13 ASTM A1008/A1008M-23e1 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High Strength Low Alloy, High Strength Low Alloy with Improved Formability, Solution Hardened, and Bake Hardenable
.14 ASTM A1011/A1011M-23 Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
.15 ASTM C1107/C1107M-20 Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
.16 ASTM D1187/D1187M-97(2018) Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal
.17 ASTM D6386-22 Standard Practice for Preparation of Zinc (Hot Dip Galvanized) Coated Iron

and Steel Product and Hardware Surfaces for Painting
.18 ASTM F593-22 Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
.19 ASTM F594-22 Standard Specification for Stainless Steel Nuts
.20 ASTM F3125/F3125M-23 Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength

.3 CSA Group (CSA)
.1 CSA G40.21-13 General Requirements for Rolled or Welded Structural Quality Steel.
.2 CSA G164-18 Hot Dip Galvanizing of Irregularly Shaped Articles.
.3 CSA-S16.1-M Limit States Design of Steel Structures.
.4 CSA S136-12 Cold Formed Steel Structural Members.
.5 CSA W47.1-09 (R2014) Certification of Companies for Fusion Welding of Steel Structures.
.6 CSA W59-18 Welded Steel Construction
.7 CSA W178.1-18 Certification of Welding Inspection Organizations
.8 CSA W178.2-18 Certification of Welding Inspectors

.4 Canadian General Standards Board (CGSB)
.1 CAN/CGSB 1.40-97 Anticorrosive Structural Steel Alkyd Primer
.2 CAN/CGSB 1.181-99 Ready Mixed, Organic Zinc Rich Coating.

.5 Canadian Sheet Steel Building Institute (CSSBI)

.6 Steel Structures Painting Council, Systems and Specifications Manual.
.1 CISC/CPMA 1-73a-1975 A Quick drying One-coat Paint for Use on Structural Steel.
.2 CISC/CPMA 2-75-1975 A Quick Drying Primer for Use on Structural Steel.

.7 American Welding Society AWS D1.6, Structural Welding Code - Stainless Steel.

1.4 Submittals

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

.2 Shop Drawings:
.1 Submit Shop and Erection Drawings for review.
.2 Verify site dimensions before proceeding with shop fabrication and to suit field conditions and field openings.
.3 Show and describe in detail all the work of this Section including large scale detail of members and materials, of connection and jointing details, and of anchorage devices, dimensions, thicknesses, description of materials, metal finishing, as well as all other pertinent data and information, including type, size and description of all fasteners and anchors.
.4 Indicate connections to building structure.
.5 Shop drawings for all metal fabrications shall be stamped and signed by a Professional Engineer registered in the Province of Ontario. Each submission of the shop drawings shall bear the seal of the Engineer.

.3 Submit duplicate minimum 300 x 300 mm samples of stainless steel materials in specified finish.

1.5 Qualifications

.1 Work of this Section shall be executed by a firm thoroughly conversant with laws and regulations which govern and capable of workmanship of best grade of modern shop and field practice known to recognized manufacturers specializing in this work and having a minimum ten (10) years proven experience in the fabrication of high quality metal fabrications. Use workmen skilled in work of this Section.

.2 Welding shall be performed by trades persons certified by The Canadian Welding Bureau under

CSA Standard W47.1.

1.6 Design Requirements

.1 Design metal stair, handrail, guardrail, landing and ladder construction and connections to OBC vertical and horizontal live load requirements.

.2 Stairs shall be designed and constructed to safely sustain a live load of 4.8 kPa evenly distributed over treads and landings with a maximum deflection of L/360. Furnish all supporting members required to connect to the building.

.3 Design service access ladders, stairs and guards to Ministry of Labour requirements.

.4 All access ladders shall be designed to the minimum requirements noted on the drawings and MMAH Supplementary Standard SB-8, whichever is more stringent. This shall include through-bolting anchors at masonry walls.

.5 Elevator pit access ladders shall meet requirements of the elevator supplier and TSSA.

.6 Except where specified otherwise, and where required by applicable codes, detail and fabricate stairs to NAAMM Metal Stairs Manual.

1.7 Examination

.1 All dimensions shall be taken from the drawings and checked against the building. Be responsible for the correctness of such measurements and report to the Consultant in writing all discrepancies between measurements at building and those shown on drawings prior to commencing work. Verify location of anchor bolts and embedded steel and ensure that work prepared by other trades is at a proper elevation, on line, level and true.

1.8 Shipping, Handling and Storage

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

.2 Label, tag or otherwise mark work supplied for installation by other Sections to indicate its function, location and shop drawing description.

.3 Protect work from damage and deliver to a location at the site in order to meet the scheduling requirements.

.4 Protect architecturally exposed materials during fabrication, delivery, handling, storage and erection to prevent marring of surfaces exposed to view, by marking, bending, denting or coarse grinding.

1.9 Waste Management and Disposal

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

PART 2 PRODUCTS

2.1 Materials

.1 Structural Steel Sections and Steel Plate: CSA G40.20-13/G40.21-13, Grade 350W.

.2 Architectural and Miscellaneous Mild Steel: CSA G40.20-13/G40.21-13, Grade 300W.

.3 Machine Bolts and Nuts: ASTM Standard A307-10 low carbon steel externally and internally threaded standard fasteners. Dimensions, sizes, thread, strength, quality and type of items shall be designed for the work intended. Exposed fasteners and anchors shall be same material, colour and finish as the metal to which they are applied.

.4 High Strength Bolts and Nuts: ASTM F3125. Dimensions, sizes, thread, strength, quality and type of items shall be designed for the work intended. Exposed fasteners and anchors shall be same material, colour and finish as the metal to which they are applied.

.5 Sheet Steel: (Commercial Quality) ASTM A1008 stretcher leveled or temper rolled.

.6 Steel Pipe: ASTM A53 Schedule 40, Grade B.

.7 Welding Materials: CSA W59.

.8 Welding Electrodes: CSA W48 Series.

.9 Composite Metal Deck: As specified in Section 05 31 00.

.10 Sulphur: Commercial Grade for setting of steel posts.

.11 Grout: non-shrink, non-metallic, non-stain, flowable, to ASTM C1107, 15 MPa at 24 hours.

.12 Isolation Coating: Alkali resistant bituminous paint to ASTM D1187.

.13 Adhesive Anchors: HILTI or Rawl Epoxy Adhesive Anchors sized to suit loading conditions, suitable for substrate. Adhesive to be low VOC type (maximum 250 g/l) to SCAQMD Rule 1168-03, Adhesives and Sealants Applications.

.14 Wire Mesh: McNichols Quality Square Welded Wire Mesh, Plain Steel Cold Rolled, 50 mm Square Opening, 6.4 mm Wire Diameter, Welded Untrimmed, 77% Open Area, Sheet, 1524 x 3048 mm.

2.2 Stainless Steel

.1 Stainless steel shall be grade and type designated below for each form required:

.1	Plate	ASTM A264	Type 316L
.2	Bar Stock	ASTM A276	Type 316L
.3	Tubing	ASTM A511	Type 316L
.4	Pipe	ASTM A312	Type 316L
.5	Sheet	ASTM A167	Type 316L
.6	Tubing	ASTM A269	Type 316L
.7	Bolts	ASTM A593	Type 316L
.8	Nuts	ASTM A594	Type 316L

.9 Pickle and passivate stainless steel prior to fabrication and installation to remove any latent black steel to ASTM A380.

.2 Stainless Steel Bolts and Nuts: To ASTM F593 and ASTM F594

2.3 Finishes

.1 Primers: All primers for metal fabrications are to be factory applied under the requirements of this Section. Refer to Finish Schedules in Section 09 91 23 for types of primers required for each application. Colour to be grey.

.2 Pre Paint Finish: For galvanized surfaces to be exposed and finish painted, to ASTM D6386.

.3 Galvanizing: hot dipped with zinc coating to CSA G164, ASTM A123 or ASTM A385.
.1 Bolts, nuts, washers, iron, and steel hardware components shall be galvanized in accordance with CSA G164 or ASTM A153.
.2 Galvanized coatings on products fabricated from rolled, pressed and forged steel shapes, plates, bars and strips: Galvanized after all welding and grinding complete. No welding or grinding of galvanized products allowed.

.4 Zinc Rich Primer: zinc rich, organic, ready mix to CAN/CGSB 1.181. Low VOC type.

.5 Stainless Steel: NAAMM AMP-504 Finish No. 4.

PART 3 EXECUTION

3.1 Fabrication

.1 Fabricate to reviewed shop drawings and in general to details, sizes and materials indicated on drawings and specified herein.

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

.3 Fabricate work complete with all components required for anchoring; bolting or welding to structural frame; standing free or resting in frames or sockets; in a safe and sure manner.

.4 Where possible fit and shop assemble various sections of the work and deliver to site in largest practicable sections. Where shop fabricating is not possible, make trial assembly in shop.

.5 Ensure exposed welds are continuous for length of each joint.

.6 Grind and fill all welds after inspection and acceptance and leave ready for prime painting.

.7 Fill all open joints, depressions, seams with metallic paste filler or by continuous brazing or welding and grind smooth to true sharp arises and profiles.

.8 Fit joints and intersecting members accurately. Make work in true planes with adequate fastenings.

.9 Supply all fastenings, anchors, accessories required for fabrication and erection of work of this Section. Make thread dimensions such that nuts and bolts will fit without re-threading or chasing threads.

.10 Welding shall be done by the shielded metal-arc method in accordance with the requirements CSA W59 and AWS D1.6 for stainless steel. The welding operators shall be currently certified under CSA W47.1 for the work they are performing.

.11 Make exposed metal fastenings and accessories of same material, texture, colour and finish as base metal on which they occur unless otherwise shown or specified. Keep exposed fastenings to an absolute minimum evenly spaced and neatly laid out. Make fastenings of permanent type unless

otherwise indicated.

.12 Surfaces to be welded shall be free from loose scale, rust, paint, or other foreign matter. Where weld material is deposited in two or more layers, each layer shall be cleaned before the next layer is deposited. Care shall be taken to minimize stresses due to heat expansion, contraction and distortion by using proper sequence in welding and by approved methods.

.13 Appearance, quality of welds made, methods of correcting defective work shall be in accordance with CSA W59.

3.2 Shop Painting

.1 Cleaning Steel:
- .1 Clean steel, whether it is to be painted or not, to the degree required by CISC/CPMA 1-73a, except as specified below.
- .2 Prepare galvanized items scheduled to be painted in accordance with the requirements of Section 09 91 23, and ASTM D6386.
- .3 Steel to receive a shop or field paint finish shall be cleaned in accordance with Sections 09 91 23 or SSPC SP6, whichever produces a surface which has less rust and mill scale.
- .4 Clean steel which is specified to be painted to CISC/CPMA 2-75 in accordance with that Standard.
- .5 Clean steel which is specified to receive an organic zinc-filled epoxy primer, or zinc-rich paint, or inorganic zinc primer, in accordance with SSPC-SP 6, Commercial Blast Cleaning.
- .6 Clean welds by wire brushing and wash down with clean water, to remove the chemical residues left by the electrodes, prior to painting.

.2 The following surfaces shall not be painted:
- .1 Surfaces and edges to be field welded. If painted, remove paint for field welding for a distance of at least 50 mm on all sides of the joint, to ensure proper fusion of the metal.
- .2 The contact surfaces of friction type connections assembled by high strength bolts.
- .3 Portions of steel members which are to be encased in or in contact with concrete or masonry.
- .4 Galvanized items not specifically indicated to be painted.

.3 Preparation and priming of all metal work which will be exposed to view and which is scheduled to be finish painted, shall be in accordance with the requirements of Section 09 91 23.

.4 All other concealed or unpainted ferrous metal work shall be given one prime paint coat type CGSB 1.40 and in accordance with CISC/CPMA 2-75. Work paint into all corners and all joints. Metal parts in contact shall be primed before shop assembly. Priming damaged during erection or through lack of protection shall be cleaned and touched up.

.5 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 ° C.

.6 Metals in contact with other dissimilar metals, concrete or masonry materials shall be insulated or separated from one another to prevent corrosion, staining or electrolysis by use of bituminous paint.

3.3 Galvanizing

.1 Steel members, fabrications, and assemblies shall be galvanized after fabrication by the hot dip process in accordance with CSA G164 or ASTM A123.

.2 Galvanizing of architecturally exposed steel shall be completed by a company recognized in the

application of High Quality galvanized finishes and in accordance with ASTM A385.

.3 Prepare metals to be galvanized and painted in accordance with requirements of ASTM D6386.

.4 Bolts, nuts, washers, iron, and steel hardware components shall be galvanized in accordance with CSA G164 or ASTM A153.

.5 Coating Requirements:
.1 Weight: the weight of the galvanized coating shall conform to Table 1 of CSA G164, ASTM A123 or ASTM A153 (as appropriate).
.2 Surface Finish: The galvanized coating shall be continuous, adherent, as smooth and evenly distributed as possible and free from any defect that is detrimental to the stated end use of the coated article. The integrity of the coating shall be determined by visual inspection and coating thickness measurements.
.3 Adhesion: the galvanized coating shall be sufficiently adherent to withstand normal handling.

3.4 Bollards

.1 Steel pipe bollards schedule 40 standard weight, steel pipe of size shown, complete with anchors and sleeves, install plumb and free of defects detrimental to appearance and performance. Bollards shall be one piece construction no welds allowed.

.2 Concrete supplied and installed under the works of Section 03 30 00.

.3 Finish: prime painted except where cast into concrete.

3.5 Miscellaneous Framing and Supports

.1 General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

.2 Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
.1 Furnish inserts for units installed after concrete is placed.

.3 Galvanize miscellaneous framing and supports where indicated.

.4 Prime miscellaneous framing and supports with primer specified in Section 09 91 13 - Exterior Painting or Section 09 91 23 - Interior Painting.

3.6 Angle Lintels

.1 Provide all loose steel angle lintels required to support openings and recesses in masonry walls, whether indicated on the drawings or not. Refer to Architectural, Structural and Mechanical drawings for locations of openings. Lintels shall be as scheduled on the Structural drawings.

.2 Steel angles: CSA G40.21, Grade 300W, sizes indicated for openings. Provide 150 mm minimum bearing at ends unless otherwise indicated.

.3 Weld or bolt back-to-back angles to profiles as indicated.

.4 Supply for installation by Sections 04 22 00 and 04 27 00.

.5 Lintels shall be prime painted unless otherwise indicated.

3.7 Railings

.1 Definition: the term railing shall be taken to mean balustrades, guards, rails and handrails.

.2 Design and fabricate railings to conform to all applicable Ontario Building Code requirements.

.3 Unless otherwise indicated, fabricate railings as follows:
- .1 Fabricate handrails and guardrails as detailed.
- .2 Pipe rails shall have an outside diameter of not more than 38 mm. Close open ends of tubular members with welded steel plugs.
- .3 Extend handrails horizontally at top and bottom of each flight of stairs as shown on the drawings but not less than 305 mm beyond stair nosing at top of stair and 610 mm at bottom of stair.
- .4 Turn handrails down at exposed ends or turn into wall as detailed.
- .5 Support railings at each end, and at maximum 1070 mm centres unless indicated otherwise or required to meet loading requirements of the Ontario Building Code.
- .6 Minimum wall thicknesses of tubular railings: 2.5 mm.
- .7 At corners, angles and intersections, cope or mitre railings, weld and grind smooth.
- .8 Pickets shall be minimum 13 mm diameter solid steel bars at 100 mm centres.

.4 Exterior railings as detailed, galvanized

.5 Exterior Juliet Balcony guards to be anodized aluminum guards to meet Ontario Building Code requirements in selected colour by consultant.

3.8 Stair Trim

.1 Provide 5 mm steel plate stair trim closure plate for precast concrete stairs as detailed.

.2 Predrill plate and supply 13 mm diameter anchor bolts for fastening to concrete.

.3 Trim shall be prime painted.

3.9 Ladders

.1 Conform to Ministry of Labour and Ontario Building Code requirements where applicable.

.2 Unless otherwise detailed, construct ladders as follows:
- .1 Stringers shall be minimum 19 x 38 mm steel bar extending from 150 mm above floor or roof, to minimum 1220 mm above top rung.
- .2 Rungs shall be 19 mm solid steel bars, 400 mm long, spaced at 300 mm o.c. vertically and welded to stringers.
- .3 Attach stringers to walls with 10 mm x 38 mm steel bar yokes, U-shaped, spaced at maximum 1220 mm o.c. vertically. Locate centre line of rungs not less than 150 mm from face of walls.
- .4 Provide safety cages to Ministry of Labour standard details where indicated.
- .5 Where indicated, provide horizontal and vertical returns or stringers.
- .6 Exterior ladders shall be galvanized. Rungs all have knurled rungs or non-slip finish.
- .7 Interior ladders shall be prime painted. Rungs shall have knurled rungs or non-slip finish.

.3 Provide elevator pit access ladder to meet requirements of Elevator supplier.
- .1 Elevator pit access ladder shall meet all requirements of the elevator supplier and TSSA. Rungs shall have knurled rungs or non-slip paint finish.

3.10 Miscellaneous Steel Trim

.1 Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.

.2 Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
.1 Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.

.3 Galvanize exterior miscellaneous steel trim.

3.11 Steel Weld Plates and Angles

.1 Provide steel weld plates and angles not specified in other Sections, for items supported from concrete or masonry construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete or masonry.

3.12 Installation

.1 Supervise the setting of bases, anchor bolts, and other steel to concrete connections. Cutting of base plates to accommodate anchor bolts is cause for rejection of base plates.

.2 Provide all bracing and shoring required to support the work of this Section during installation.

.3 Work shall be fabricated and erected square, plumb and true, straight, level and accurately fitted to size detailed on reviewed Shop Drawings. All joints shall be welded unless otherwise indicated. Exposed welds shall be ground smooth and/or flush. Exposed work shall be finished smooth and even, close joints and neat connections. Exposed welds continuous for full length of joints.

.4 Where anchors or fastenings, sleeves, have to be built in by other trades, supply all necessary templates, instructions and supervision to ensure satisfactory installation.

.5 Do all drilling, cutting and fitting necessary to attach this work to adjoining work and make it complete.

.6 Provide all components required for anchoring. Make anchoring in concealed manner where possible. Exposed anchors shall be approved by the Consultant, shall be neat, and of the same material, colour, texture and finish of base metal on which they occur. Exposed fastenings shall be evenly spaced.

.7 Grind all field welds smooth.

.8 Touch up shop coat of prime paint where damaged by field erection.

.9 Touch up galvanized finishes with zinc rich paint.

3.13 Fasteners and Anchors

.1 Use methods for fastening or anchoring metal fabrications to building construction as shown or specified.

.2 Securely anchor components in place. Unless otherwise indicated, anchor components as follows:
.1 To concrete and solid masonry with expansion or epoxy adhesive type anchors.
.2 To hollow construction with toggle bolts.
.3 To thin metal with screws or bolts.
.4 To thick metal with bolts or by welding.
.5 Fill space between railing members and sleeves with non-shrink grout.

.3 Where fasteners and anchors are not shown, design the type, size, location and spacing to resist the loads imposed without deformation of the members or causing failure of the anchor or fastener, and suit the sequence of installation.

.4 Use material and finish of the fasteners compatible with the kinds of materials which are fastened together and their location in the finished work.

.5 Fasteners for securing metal fabrications to new construction only, may be by use of threaded or wedge type inserts or by anchors for welding to the metal fabrication for installation before the concrete is placed or as masonry is laid.

.6 Fasteners for securing metal fabrication to existing construction or new construction may be expansion bolts, toggle bolts, power actuated drive pins, welding, self-drilling and tapping screws or bolts.

3.14 Schedule

.1 General:
.1 Supply and install all metal fabrications indicated on Drawings, and not included in the work of other Sections.
.2 Coordinate and sequence the work to ensure timely delivery to the site, of all items to be built in.
.3 Where items are required to be built into masonry, concrete or other work supply such items to respective Sections with all anchors and accessories for building in.
.4 All items shall be of sizes and as detailed on drawings.
.5 Coordinate with Section 09 91 13 and 09 91 23 for preparation of exposed metal items required to have finish coatings applied in the field.
.6 Review all coordination drawings prior to installation of materials, to ensure that no interferences with the work of other Sections will occur.

3.15 Cleaning

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

.2 Clean exposed prefinished and plated items and items fabricated from stainless steel as recommended by the metal manufacturer and protect from damage until Substantial Performance of the project.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 10 00 Concrete Forming and Accessories
.2 Section 03 30 00 Cast-In-Place Concrete
.3 Section 05 50 00 Metal Fabrications
.4 Section 06 20 00 Finish Carpentry
.5 Section 07 21 13 Building Insulation
.6 Section 07 26 00 Vapour Retarders
.7 Section 07 54 23 TPO Roofing
.8 Section 08 11 00 Metal Doors and Frames

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM A123/A123M-17 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
  .2 ASTM A653/A653M-23 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealled) by the Hot-Dip Process.
  .3 ASTM D2559 - 12a(2018) Standard Specification for Adhesives for Bonded Structural Wood Products for Use Under Exterior Exposure Conditions
  .4 ASTM F1667-21a Standard Specification for Driven Fasteners: Nails, Spikes, and Staples
.2 CSA Group (CSA)
  .1 CSA A247- M86 (R1996) Insulating Fiberboard.
  .2 CSA B111-1974(R2003) Wire Nails, Spikes and Staples.
  .3 CSA G164-18 Hot Dip Galvanizing of Irregularly Shaped Articles.
  .4 CSA O80 SERIES-15 Wood Preservation
  .5 CSA O86-14 Engineering Design in Wood
  .6 CSA O121-17 Douglas Fir Plywood.
  .7 CSA O141:23 Canadian Standard Lumber.
  .8 CSA O151-17 Canadian Softwood Plywood
  .9 CSA O437 Series-93 (R2011) Standards on OSB and Waferboard
  .10 CSA Z809-08 Sustainable Forest Management
.3 Underwriters Laboratories Canada (ULC)
  .1 ULC 102-2018 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
.4 National Lumber Grading Authority (NGLA)
  .1 Standard Grading Rules for Canadian Lumber, Latest Edition.
.5 Forest Stewardship Council (FSC)
  .1 FSC-STD-01-001-2004 FSC Principle and Criteria for Forest Stewardship.
  .2 FSC-STD-20-002-2004 Structure and Content of Forest Stewardship Standards V2-1
  .3 FSC Accredited Certified Bodies.

1.4 Submittals

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

.2 Certified Wood: Submit listing of wood products and materials used, produced from wood obtained from forests certified by FSC Accredited Certification Body in accordance with FSC-STD-01-001.

1.5 Quality Assurance

.1 Sawn lumber shall be identified by the grade stamp of an association or independent grading agency certified by the Canadian Lumber Standards Accreditation Board.

.1 Design of wood structural systems shall be in accordance with the Ontario Building Code and CSA 086. Design loads shall be as required by the Ontario Building Code, the National Building Code Supplement and as indicated on the drawings.

.2 Provide Independent Specialty Engineer's letters of review and sign-off letters as specified in Section 01 78 00 for engineered lumber.

1.2 Shipping, Handling and Storage

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

.2 Store materials to prevent deterioration or the loss or impairment of their structural and other essential properties. Do not store materials in areas subject to high humidity and areas where masonry and concrete work are not completely dried out.

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

1.3 Waste Management and Disposal

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

PART 2 PRODUCTS

2.1 Materials

.1 Timber Material shall be 'Grade Stamped'.

.2 CSA Z809 or FSC Certified.

.3 Construction Lumber: To CSA O141 Softwood Lumber graded to NLGA Standard Grading Rules for Canadian Lumber, published by the National Lumber Grades Authority. All lumber shall bear grade stamps. Moisture content of softwood lumber not to exceed 19% at time of installation.
.1 Framing lumber, plates, furring, blocking, No. 1 SPF.
.2 Nailing strips, furring and strapping: No. 4 S-P-F.
.3 Fitment framing: No. 1 S-P-F.

.4 Canadian Softwood Plywood: to CSA O151-M, standard construction, good one or both sides as required, thickness as shown or specified.
.1 Douglas Fir Plywood: To CSA O121-M, standard construction, good one side, thickness as shown on the drawings.
.2 Plywood used for exposed interior work shall have select grade veneer, one or both faces where exposed, with fire retardant finish. Fire retardant shall be in accordance with CAN/CSA-080.1, and all treated materials shall bear a ULC approval stamp.

.3 Poplar Plywood: to CSA 0153, standard construction.
.4 Mat formed structural panel board (oriented strand board): to CSA O437, square edge, 12.7 mm thickness.

.5 Nails, Spikes and Staples: To ASTM F1667.

.6 Bolts: 12.5 mm diameter, galvanized, complete with nuts and washers.
.7 Proprietary Fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, recommended for purpose by manufacturer.

.8 Nailing Discs: flat caps, minimum 25 mm diameter, minimum 0.627 mm thick, sheet metal, formed to prevent dishing.

.9 Wood Preservative to CSA O80 SERIES.

.10 Adhesive: Contractors gun grade cartridge loaded wood adhesive, general purpose, to ASTM D2559.

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

.12 Vapour Retardant: 0.152 mm polyethylene film to CGSB 51.34 Type 1.

.13 Fibreglass Insulation: to CSA A101, loose batt type, minimum density of 24 kg/m^3.

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

PART 3 EXECUTION

3.1 Installation

.1 Workmanship
.1 Execute work using skilled mechanics according to best practice, as specified here.
.2 Lay out work carefully and to accommodate work of other trades. Accurately cut and fit; erect in proper position true to dimensions; align, level, square, plumb, adequately brace, and secure permanently in place. Join work only over solid backing.

.2 Rough Hardware: Include rough hardware such as nails, bolts, nuts, washers, screws, clips, hangers, connectors, strap iron, and operating hardware for temporary enclosures.

.3 Provide treated wood nailers, blocking, cants, grounds, furring and similar members where shown and where required for screeding or attachment of other work and surface applied items. Attach to substrate as required to support applied loading.

.4 Erection of Framing Members
.1 Install members true to line, levels and elevations. Space framing members and frame all openings as detailed on the drawings.
.2 Construct continuous members from pieces of longest practical length.
.3 Install spanning members with crown edge up.
.4 Anchor wood framing to supporting walls with galvanized metal strap ties.

.5 Blocking: Provide solid wood backing to support millwork, cabinetwork, equipment, fixtures, railings and accessories and the like, as required. Coordinate with work of other Sections and install all required backing. Any such equipment mounted on gypsum wallboard assemblies or similar assemblies shall be adequately supported.
  .1 Provide solid wood blocking in all partitions where wall stops are specified in the hardware schedule.

.6 Roof Blocking, Curbs and Copings:
  .1 Provide and install framing, blocking, curbs and copings as indicated on the drawings. Anchor blocking securely in permanent manner.
  .2 Provide minimum 10 mm Douglas Fir plywood copings on all built-up wood copings and curbs as detailed.
  .3 All wood curbs shall be filled with fibrous insulation specified in Section 07 21 13.
  .4 Provide shims and blocking necessary for levelling of roof hatches and equipment curbs.

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

3.2 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 06 10 00 Rough Carpentry

1.3 References

.1 American National Standards Institute (ANSI)/The Engineered Wood Association (APA)
  .1 APA PRI-400- 2013 Performance Standard for APA EWS I Joists (Limit States Design), Canadian Edition
  .2 APA PRI-405- 2012 Performance Standard for APA EWS Commercial I-Joists
  .3 APA PRR-401- 2019 Performance Standard for APA Rim Boards
.2 ASME International (ASME)
  .1 ASME B18.6.1- 1981 Wood Screws (Inch Series)
.3 ASTM International (ASTM)
  .1 ASTM A36/A36M-19 Standard Specification for Carbon Structural Steel
  .2 ASTM A153/A153M-23 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
  .3 ASTM A307-21 Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
  .4 ASTM D5055-19e1 Standard Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists
  .5 ASTM D5456-21e1 Standard Specification for Evaluation of Structural Composite Lumber Products
  .6 ASTM D7612-21 Standard Practice for Categorizing Wood and Wood-Based Products According to Their Fiber Sources
  .7 ASTM F1667/F1667M-21a Standard Specification for Driven Fasteners: Nails, Spikes, and Staples
.4 CSA Group (CSA)
  .1 CSA O86:19 Engineering design in wood
.5 National Lumber Grades Authority (NLGA):
  .1 Standard Grading Rules for Canadian Lumber 2017.
  .2 NLGA SPS 1- 2013 Fingerjoined Structural Lumber
  .3 NLGA SPS 2- 2013 Machine Graded Lumber
  .4 NLGA SPS 4- 2020 Fingerjoined Machine Graded Lumber

1.4 Submittals

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

.2 Product Data:
  .1 submit manufacturer's installation instructions and special handling criteria, installation sequence, printed product literature, catalogue pages and data sheets clearly identifying products used for the Project.
.3 Shop Drawings:
  .1 indicate applicable dimensions, fasteners, erection details and connection materials and finishes.

.2 Indicate applicable grades, shop-applied finishes, camber, cuts, ledgers, holes and connection details.
.3 Indicate temporary bracing required for installation.

.4 Informational Submittals:
.1 Test and Evaluation Reports:
.1 Submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.

.5 Source Quality Control Submittals: Submit proof that components and products supplied to the project are obtained from a single manufacturing source, and that accessory connectors are obtained from a manufacturer recommended source.

1.5 Definitions

.1 Structural Composite Lumber (SCL): Fabricated structural wood units that form the primary structural elements for the Project consisting of [framing,][columns,] beams, joists, purlins, rim boards and accessory components described in this Section that are fabricated under factory-controlled conditions from exterior grade adhesives and strand/veneer wood manufactured in accordance with ASTM D5456.

.2 Composite Wood Joists (I-Joists): Fabricated structural wood units that form the primary structural elements for the Project consisting of joists, headers, blocking panels and rim boards described in this Section that are fabricated under factory-controlled conditions in accordance with ASTM D5055[,][and][APA PRI-400][and][APA PRI-405].

1.6 Administrative Requirements

.1 Coordination: Coordinate installation of structural wood products with work specified in other Sections that may have items supported by or built into structural wood components described in this Section as follows:
.1 Coordinate temporary protective measures required by this Section to prevent exposure to weather and other deleterious environmental conditions in accordance with Section [01 35 43 - Environmental Procedures].]
.2 Coordinate installation of structural connections to adjacent building components.
.3 Coordinate fabrication of miscellaneous steel, anchorages and fasteners required by shop-fabricated wood components for complete installation dependent on work of any other Section listed under RELATED REQUIREMENTS.
.4 Coordinate and interface with other Sections of Work including the following:
.1 transitions to other assemblies
.2 anchorage to structural support components
.3 separation of differing or non compatible materials
.4 sequences of installation
.5 site tolerances
.6 other conditions affecting installation of materials specified in this Section.
.2 Pre-Construction Meeting: Conduct a pre-construction meeting on site in accordance with Section [01 31 19 - Project Meetings] attended by Constructor, Subcontractor, Consultant and other Subcontractors affected by work of this Section to verify project requirements, and review methods and procedures related to structural wood products, including the following:
.1 Provide a minimum 72 hours notice to Consultant before starting work of this Section; increase notice period when notification date occurs on weekends or statutory holidays.

.2 Review materials used on the project and any required changes to design for use of different materials than those specified.
.3 Review installation, substrate and structure conditions affecting work of this Section.
.4 Review requirements of this Section for connection to substrates and structures provided by other Sections.
.5 Review of metal fabrications, anchors and fasteners required by and provided by this Section to other components of the Work.
.6 Review and finalize construction schedule and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.
.7 Review location and alignment of vertical and horizontal elements as they relate to the aesthetic criteria and technical requirements indicated on the shop drawings.
.8 Review concealed connection and exposed connection details.
.9 Review written installation instruction requirements.
.10 Review other or additional installation requirements not otherwise covered by the suggested list of topics.

1.7 Shipping, Handling and Storage

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

.2 Delivery and Acceptance Requirements:
.1 Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
.2 Carefully unload materials using forklifts or cranes, to avoid damage.
.3 Keep lumber stored in wrapped and strapped bundles stacked not to exceed manufacturer's height restrictions.
.4 Support bundles to prevent excessive bowing.
.5 Support and separate bundles with 38 mm x 89 mm or larger dimension lumber spaced in accordance with manufacturer's written instructions.
.6 Keep wrapping in place until right before installation of materials; slit wrapping on underside to prevent moisture build up.

.3 Storage and Handling Requirements:
.1 Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.
.2 Keep materials dry.
.3 Handle individual pieces to prevent physical damage during measuring, cutting and erection; use padded or non-marring slings when lifting.
.4 Store components on a hard, dry, level surface.
.5 Do not store components in contact with the ground.
.6 Do not allow components to have prolonged exposure to weather.
.7 Protect corners using wood blocking.

1.8 Project Conditions

.1 Site Measurements: Verify dimensions by site measurements before fabrication and indicate measurements on shop drawings where anchorages, connectors and other structural components are indicated to fit between or around other construction or embedded into other construction; coordinate fabrication schedule with construction progress to avoid delaying the Work.

.2 Established Dimensions: Establish dimensions and proceed with fabricating glued-laminated construction systems without site measurements where doing so would delay the Work; coordinate

construction so that actual site dimensions correspond to established dimensions; allow for trimming and fitting

1.9 Waste Management and Disposal

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

1.10 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of two years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Manufacturer
2.2
2.3 Description

.1 Regulatory Requirements
  .1 Manufacture shop-fabricated structural wood in accordance with [ASTM D5055][and][ASTM D5456], or proprietary Products in plant certified by certification agency accredited by the Standards Council of Canada; and bearing accredited stamp noting the name and plant number of manufacturers, grade, and Canadian Construction Materials Centre (CCMC) [report][certificate] number (if applicable) and quality control agency.
.2 Sustainability Characteristics
  .1 Environmental Product Declaration (EPD): Submit an Industry-wide EPD or Product-specific EPD for each lumber specified. Provide EPD with at least a cradle-to-gate scope, identifying the following impact categories:
    .1 Global Warming Potential (GWP): All GWP information submitted in the form of kgCO ¨ eq/kg.
    .2 Ozone Depletion Potential (ODP): All ODP information submitted in the form of kgCFC-11/kg.
    .3 Acidification Potential (AP): All AP information submitted in the form of kgSO ¨ /kg.
    .4 Eutrophication Potential (EP): All EP information submitted in the form of kg N/kg.
    .5 Photochemical Ozone Creation/Smog Formation Potential (SFP): All SFP information submitted in the form of kgO § /kg.
  .2 Certified Wood Sourcing: Extract and source wood products (dimensional lumber, plywood, and similar materials) used for the Project from USGBC-recognized sustainable forestry certification agencies. Responsibly source wood products demonstrating compliance to legal extraction methods with proof of chain-of-custody from one of the following agencies:
    .1 American Tree Farm System (ATFS)
    .2 Canadian Standards Association (CSA)
    .3 Forest Stewardship Council (FSC)
    .4 Programme for the Endorsement of Forest Certification (PEFC)
    .5 Sustainable Forestry Initiative (SFI)
  .3 Alternative to Certified Sourcing Requirements: Consultant will consider the use of an Alternate compliance path (ACP) based on certification requirements described in ASTM D7612, using defined third-party certified sourcing categories as follows:
    .1 Legally Compliant (Non-controversial) Sources
    .2 Responsible Sources
    .3 Certified Sources (Chain-of-Custody)

.4 Material Toxicity:
.1 [Materials must not contain any materials or chemicals that are harmful to the comfort and well-being of installers and building occupants; exceptions will be permitted when documented exceptions are available and replacement components are not yet commercially viable, materials must meet material ingredient reporting requirements for HPD.]
.2 Low Emitting Materials: Materials must demonstrate volatile organic compound (VOC) emissions equal to or less than the maximum permitted for the materials described in this Section, meeting formaldehyde emissions for composite wood products for ultra-low emitting formaldehyde or no added formaldehyde in accordance with California Air Resources Board, Airborne Toxic Control Measures (ATCM).
.3 [Durable Construction: Provide products and installation practices that are rot and insect resistant and improve the performance of the building through the use of appropriately sourced and durable products for [fire resistant assemblies][,][mass timber construction][foundations and piles][exposed structures][exterior finish carpentry][and][exterior pedestrian surfaces].]

2.4 Design Criteria

.1 Source Limitation: Obtain shop fabricated structural wood components and accessories from a single manufacturing source and manufacturer recommended connectors source.

.2 Lumber Grades: Provide lumber products that are all sides finished (S4S) in nominal dimensions required for the project; grade marked by accredited agencies of the Canadian Lumber Standards Accreditation Board and conform to National Grading Rules published by the National Lumber Grades Authority (NLGA), and as follows:
.1 Grading: Machine grading, visual grading, or both based on material type.
.2 Moisture Content: Kiln dry, 19% or less.
.3 Structural Design Properties: Strength and related properties in accordance with CSA O86 and NLGA SPS 2.
.4 Acceptable Alternative Products: Lumber products meeting requirements of the American Lumber Standards Committee designated ALS Program Lumber and that are accepted by the Canadian Lumber Standards Accreditation Board may be acceptable for the Project when proof of compliance with strength and related properties meeting CSA O86 are submitted before purchasing any structural wood Products.

.3 Finger-jointed Lumber:
.1 Provide machine-graded lumber (MSR) products meeting requirements of NLGA SPS 1 and SPS 4 acceptable to AHJ
.2 Provide MSR products meeting stress design requirements indicated in the NBC that are grade marked by accredited agencies of the Canadian Lumber Standards Accreditation Board and conform to National Grading Rules published by the NLGA.

.4 Structural Performance Requirements:
.1 Design shop-fabricated structural wood component connections to allow for building movements without damage or over-stressing; connection failures; and without imparting undue strain on fasteners and anchors.
.2 Account for the following structural performance requirements:
.1 Dead Loads: As indicated on Drawings.
.2 Live Loads: As indicated on Drawings.
.3 Roof Loads: As indicated on Drawings.
.4 Snow Loads: As indicated on Drawings.

.5 Live Load Deflection Limit: As indicated on Drawings.
.6 Permanent Load Deflection Limit: As indicated on Drawings.
.7 Total Load Deflection Limit: As indicated on Drawings.

2.5 Materials

.1 Laminated Veneer Lumber (LVL): Structural composite lumber comprised of laminated veneers glued together using manufacturer's proprietary waterproof adhesives and bonded under pressure and heat to provide design stresses based on 100% load duration and with the following properties:
.1 Water Resistant Coating: [Not required][Manufacturer's proprietary coating].
.2 Grade: [2.0E][1.7E][1.5E][As scheduled on Drawings].
.3 Dimensions: [As scheduled on Drawings][Thickness x Depth] mm, comprised of [[1 ply][2][3][4] plies].
.4 [Basis-of-Design: Include product and manufacturer information when required to differentiate design values and construction solutions.]

.2 Laminated Strand Lumber (LSL): Structural composite lumber comprised of laminated strands oriented along length of members glued together using manufacturer's proprietary waterproof adhesives and bonded under pressure and heat to provide design stresses based on 100% load duration, and with the following properties:
.1 Water Resistant Coating: [Not required][Manufacturer's proprietary edge and end seal coating].
.2 Grade: [1.7E][1.5E][1.3E][As scheduled on Drawings].
.3 Dimensions: [As scheduled on Drawings][Thickness x Depth] mm, comprised of [[1 ply][2][3][4] plies].
.4 [Basis of Design: Include product and manufacturer information when required to differentiate design values and construction solutions.]

.3 Parallel Strand Lumber (PSL): Large section structural composite lumber comprised of laminated strands oriented along length of members glued together using manufacturer's proprietary waterproof adhesives and bonded under pressure and heat to provide design stresses based on 100% load duration, and with the following properties:
.1 Water Resistant Coating: [Not required][Manufacturer's proprietary coating].
.2 Grade: [2.0E][As scheduled on Drawings].
.3 Dimensions: [As scheduled on Drawings][Thickness x Depth] mm.
.4 [Basis-of-Design: Include product and manufacturer information when required to differentiate design values and construction solutions.]

.4 Prefabricated Wood I-Joists: Structural member fabricated in accordance with ASTM D5055, comprised of sawn or structural composite lumber flanges and structural composite panel webs bonded using manufacturer's proprietary waterproof adhesives to form an I-cross sectional shape with the following properties:
.1 Type: [Residential, meeting requirements of APA PRI-400][Commercial, meeting requirements of APA PRI-405]
.2 Flange Stock: Sawn-lumber or structural composite lumber as standard with manufacturer.
.3 Web Material: Structural composite lumber as standard with manufacturer.
.4 Stiffness Capacity (E I): [As scheduled on Drawings][Insert value].
.5 Shear Capacity (V): [As scheduled on Drawings][Insert value].
.6 Moment Capacity (M): [As scheduled on Drawings][Insert value].
.7 Dimensions: [As scheduled on Drawings][Thickness x Depth] mm.
.8 [Basis-of-Design: Include product and manufacturer information when required to differentiate design values and construction solutions.]

2.6 Accessories

.1 Sheathing: Provide [wall sheathing][subfloor sheathing][roof sheathing] as specified in Section [06 10 00 - Rough Carpentry].

.2 Wood Framing and Blocking: Provide sawn lumber materials as specified in Section 06 10 00 - Rough Carpentry.

.3 Rim Boards: Structural composite lumber with [fire-rated composition] and a moisture protection coating, meeting requirements of APA PRR-401 for performance rated rim boards and manufactured in accordance with ASTM D5456.

.4 Ancillary Wood Components: Provide permanent bridging and bracing; headers and support framing at openings, and sheathing supports; blocking panels and other framing accessories required for complete and functional installation in accordance with manufacturer's written installation requirements.

.5 Prefabricated Metal Anchoring Systems, Framing Connectors and Hangers: Prefabricated, pre-engineered [hot-dipped zinc coated steel][stainless steel] products tested or designed in accordance with CSA O86; types and configurations as indicated on Drawings.

.6 Pre-Engineered Shear Plate Connections: Pre-manufactured, pre-engineered components designed in accordance with CSA O86; and as follows:
.1 Pressed Steel Type: Fabricated from hot rolled carbon steel shapes, plates and bars, meeting requirements of ASTM A36.

.7 Driven Fasteners: Steel nails, spikes, brads and staples meeting requirements of ASTM F1667
.1 Ensure length is sufficient to penetrate connecting solid wood materials.
.2 Exterior Work: Hot-dipped galvanized.
.3 Interior High Humidity Work: Hot-dipped galvanized.
.4 Interior Work: Electroplated zinc plated, or cadmium plated.

.8 Rough Hardware - manufacturer recommended fastening devices and anchors, including bolts, nuts, drift pins, and washers meeting requirements of ASTM A307:
.1 Exterior Work: Hot-dipped galvanized in accordance with ASTM A153, Class C or D depending on diameter.
.2 Interior High Humidity Work: Hot-dipped galvanized in accordance with ASTM A153, Class C or D depending on diameter.
.3 Interior Work: Electroplated zinc coating, or cadmium plated.

.9 Wood Screws - use steel screws meeting requirements of ASME B18.6:
.1 Exterior Work: Galvanized, ceramic coated or stainless steel.
.2 Interior Work: Galvanized.

2.7 Fabrication

.1 Fabricated Structural Wood:
.1 Fabricate structural composite lumber [and composite wood joists] in accordance with the Drawings and Specifications, and the reviewed shop drawings.
.2 Mark all members for identification; mark top surface of straight beams clearly.
.3 Do not splice or join members in locations other than those shown on the Drawings.

.4 Apply specified sealer to exposed areas of structural composite lumber after fabrication; double treat exposed ends of laminates.
.5 Fasten plies of engineered lumber by nailing, screwing or through bolting as recommended by manufacturer; additional fasteners may be required to correct cupping and crowing of plies in built-up members.

PART 3 EXECUTION

3.1 Examination

.1 Verify that site conditions are acceptable for installation of structural composite lumber in accordance with manufacturer's written instructions and as follows:
.1 Report any discrepancies to the Consultant immediately upon discovery.

.2 Proceed with installation of shop-fabricated structural wood laminated components after unacceptable conditions are corrected.

3.2 Preparation

.1 Protection Before Installation: Protect shop-applied protective sealers, finishes and wrapping materials from damage before installation; touch up damaged finishes in accordance with manufacturer's written instructions.

.2 Notification: Notify Consultant] a minimum of 24 hours before installing any structural composite lumber units to allow for site review.

3.3 Installation

.1 Install shop-fabricated structural lumber in accordance with reviewed shop drawings and manufacturer's written instructions.

.2 Erection Aids:
.1 Securely brace shop-fabricated structural lumber components during construction; anchored to the ground, foundation, a braced wall or other completed, stable section of the structure.
.2 Remove temporary bracing as sheathing is attached, use caution to ensure that installed components remain stable.
.3 Support members laterally at end bearings and cantilevers.

.3 Site Modifications: Structural composite lumber that requires notching, cutting or drilling arising from site conditions and that does not meet manufacturer's standard details must be performed in accordance with manufacturer's written recommendations, as directed by the Consultant. The following modifications will not be permitted:
.1 Holes spaced closer to supports than recommended by manufacturer.
.2 Cut holes that are larger than recommended by manufacturer.
.3 Hole locations spaced differently than recommended by manufacturer.
.4 Going through bolts, or using nails or screws not recommended by the manufacturer to fasten composite or built-up members.

.4 Damaged Components: Do not use structural composite lumber components that exhibit visible damage; damaged components will require replacement with material of same quality and performance as specified Products.

3.4 Protection

.1 Protect installed work from damage arising from subsequent construction activity on the site.

3.5 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 05 50 00 Metal Fabrications
.2 Section 06 10 00 Rough Carpentry
.3 Section 06 40 00 Architectural Woodwork
.4 Section 07 92 00 Joint Sealants
.5 Section 08 11 00 Metal Doors and Frames
.6 Section 08 71 10 Door Hardware
.7 Section 09 21 16 Gypsum Board
.8 Section 09 91 23 Interior Painting

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM E1333-22 Standard Test Method for Determining Formaldehyde Concentrations in Air and Emissions Rates from Wood Products Using a Large Chamber.
  .2 ASTM F1667-21a Standard Specification for Driven Fasteners: Nails, Spikes, and Staples
.2 CSA Group (CSA)
  .1 CSA B111-1974 (R2003) Wire Nails, Spikes and Staples.
  .2 CSA G164-18 Hot Dip Galvanizing of Irregularly Shaped Articles.
  .3 CSA O112 SERIES-M1977 (R2006) Standards for Wood Adhesives
  .4 CSA O121-17 Douglas Fir Plywood.
  .5 CSA O141:23 Canadian Standard Lumber.
  .6 CSA O151-17 (R2022) Canadian Softwood Plywood
  .7 CSA O153-13 (R2017) Poplar Plywood.
  .8 CSA Z760-94 (R2001) Life Cycle Assessment
.3 American National Standards Institute (ANSI)
  .1 ANSI A208.1-2009 Particleboard.
  .2 ANSI A208.2-2016 Medium Density Fibreboard (MDF) for Interior Applications.
  .3 ANSI/HPVA HP-1-2016 Standard for Hardwood and Decorative Plywood.
  .4 ANSI/NEMA LD 3-2005 High Pressure Decorative Laminates
.4 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)
  .1 Architectural Woodwork Quality Standards Illustrated.
.5 Canadian Plywood Association (CanPly)
  .1 The Plywood Handbook 2005.
.6 Forest Stewardship Council (FSC)
  .1 FSC-STD-01-001-V4-0 FSC Principle and Criteria for Forest Stewardship.
  .2 FSC-STD-20-002-2004, Structure and Content of Forest Stewardship Standards V2-1
  .3 FSC Accredited Certified Bodies.
.7 National Hardwood Lumber Association (NHLA)
  .1 Rules for the Measurement and Inspection of Hardwood and Cypress 1998.
.8 National Lumber Grades Authority (NLGA)
  .1 Standard Grading Rules for Canadian Lumber 2005.
.9 South Coast Air Quality Management District (SCAQMD), California State (SCAQMD)
  .1 SCAQMD Rule 1168-03 Adhesives and Sealants Applications

1.4 Submittals

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

.2 Submit shop drawings.
.1 Indicate details of construction, profiles, jointing, fastening and other related details.
.2 Indicate materials, thicknesses, finishes and hardware.

.3 Submit duplicate 300 mm long samples of each type of solid wood or 300 x 300 mm square type of plywood to receive stain or natural finish.

.4 Submit duplicate 300 mm long samples of each type of casing and trim.

.5 Submit samples of plastic laminate materials.

1.5 Quality Assurance

.1 Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

.2 Plywood, particleboard, OSB and wood based composite panels in accordance with CSA and ANSI standards.

.3 Wood materials certified by Forestry Stewardship Council.

1.6 Shipping, Handling and Storage

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

.2 Protect materials against dampness during and after delivery.

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

1.7 Waste Management and Disposal

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

PART 2 PRODUCTS

2.1 Lumber Materials

.1 Softwood lumber: unless specified otherwise, S4S, moisture content 19% or less in accordance with following standards:
.1 CSA O141.
.2 NLGA Standard Grading Rules for Canadian Lumber.
.3 AWMAC custom premium grade, moisture content as specified.
.4 AWMAC premium grade, moisture content 19% or less for standing and running trim
.5 Machine stress-rated lumber is acceptable.

2.2 Panel Materials

.1 Douglas Fir Plywood (DFP): to CSA O121, standard construction.
.1 Forestry Stewardship Council (FSC) certified.

.2 Urea-formaldehyde free.

.2 Canadian Softwood Plywood (CSP): to CSA O151, standard construction.
.1 Forestry Stewardship Council (FSC) certified.
.2 Urea-formaldehyde free.

.3 Particleboard: to ANSI A208.1.
.1 Forestry Stewardship Council (FSC) certified.
.2 Urea-formaldehyde free.

.4 Medium density fibreboard (MDF): to ANSI A208.2, density 640-800 kg/m³.
.1 Forestry Stewardship Council (FSC) certified.
.2 Urea-formaldehyde free.

2.3 Plastic Laminate

.1 Plastic Laminate Facing Sheet: ANSI/NEMA LD 3-2005 High-Pressure Decorative Laminates (HPDL) PF-S and GP-S;
.1 Backing sheet: BK Grade by manufacturer of facing sheet.
.2 Core: CSA O151
.3 Laminating adhesive: CSA O112.
.4 Core sealer: clear water resistant synthetic resin sealer.
.5 Colours, pattern, gloss and texture will be selected by Consultant from full range of products by one of the following:
.1 Formica,
.2 Arborite,
.3 Wilsonart.
.6 Up to three colours and patterns will be selected by the Consultant.

2.4 Accessories

.1 Rough Hardware: Bolts, lag screws, anchors, nails and expansion shields required to secure this portion of work. Rough hardware hot dip galvanized conforming to latest edition of CSA G164. All fasteners used in damp or wet areas to be suitable for use in corrosive environment. Use hot dipped galvanized or other material approved by the Consultant.

.2 Nails and staples: to ASTM F1667 galvanized.

.3 Wood screws: to CSA B35.4 plain type and size to suit application.

.4 Stainless Steel hardware: Type 316 Stainless steel for exposed or wet locations, tamper proof.

.5 Splines: wood or metal to suit application.

.6 Adhesive: recommended by manufacturer, waterproof type, maximum VOC limit 30 g/L SCAQMD Rule 1168 - Adhesives and Sealants Applications.

PART 3 EXECUTION

3.1 Construction

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

securely.

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

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

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

.2 Interior and exterior frames: Set frames with plumb sides, level heads and sills, and secure.

3.2 Fabrication

.1 General:

.1 Field measure all dimensions.

.2 Fabricate all finish carpentry items to AWMAC premium grade, and in accordance with the reviewed shop drawings.

.3 Set nails and screws, apply stained plain wood filler to indentations, sand smooth and leave ready to receive finish.

.4 Provide 10 mm thick solid matching wood strip on plywood and particle board edges 13 mm or thicker, exposed in final assembly.

.5 Ease edges of solid lumber components to 1.6 mm radius.

.2 Plastic Laminate Components

.1 Fabricate plastic laminate window stools as detailed. Stools shall be minimum 19 mm thick plastic laminate plywood, with edge banding on all exposed faces. Fabricate in one piece, without joins, wherever as possible. Where necessary, joins shall be centred on window mullions and tightly butted together with concealed splines.

.2 Fabricate vanities and change room shelving units as detailed.

.3 Unless otherwise specified herein, comply with requirements of ANSI/NEMA LD 3 Annex 'A'.

.4 Assembly: Bond plastic laminate to core with adhesive, under pressure.

.5 Core: unless otherwise indicated: 19 mm thick.

.6 Balanced construction: plastic laminate covered components shall be of balanced construction, with plastic laminate on both faces of core. Seal core edges not covered with plastic laminate.

.7 Use largest practicable plastic laminate sheet size.

.8 Provide joints symmetrically; provide joints as corners and at changes in superficial areas; provide concealed draw bolt anchors and joints. All butt joints shall have a blind spine.

.9 Openings and cutouts:

.1 Radius internal corners at least 3 mm and chamfer edges.

.2 Where core edge is to remain exposed, cover with plastic laminate edging.

.3 Where core edge is to be concealed, seal with sealer.

3.3 Installation

.1 Do finish carpentry to Quality Standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), except where specified otherwise.

.2 All fastenings shall be concealed.

.3 Provide heavy duty grounds as necessary for secure installation of finish carpentry work.

.4 All wood surfaces shall be sanded smooth, ready to receive finish.

.5 Scribe and cut as required, fit to abutting walls and surfaces, fit properly into recesses and to

accommodate piping, columns, fixtures, outlets or other projecting, intersecting or penetrating objects.

.6 Form joints to conceal shrinkage.

.7 Set and secure materials and components in place, rigid plumb and square.

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

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

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

.11 Install window stools with wood levelling shims, after installation of windows and interior finishing is complete. Screw levelling shims to metal stud framing with self-tapping sheet metal screws. Bond stools to shims with waterproof adhesive. Tightly butt all joints and bond together with adhesive and concealed splines. Cut to fit tight to all penetrations.

.12 Apply mildew resistant sealant to perimeter of all vanity tops and window stools as specified in Section 07 92 00.

3.4 Standing and Running Trim

.1 Fabricate trim to profile indicated or selected by the Consultant.

.2 Solid pine. Premium grade.

.3 Butt and cope internal joints of casing and trim to make snug, tight, joint. Cut right angle joints of casing and base with mitred joints.

.4 Fit backs of casing snugly to wall surfaces to eliminate cracks at junction of base and casing with walls.

.5 Make joints in baseboard where necessary using a 45 degrees scarf type joint. Install in maximum practical lengths. Accumulation of short pieces is not permitted.

.6 Install door and window trim in single lengths without splicing.

3.5 Door Installation

.1 Install doors in accordance with instructions in Section 08 11 00 and Section 08 14 16 and manufacturer’s printed instructions.

3.6 Finish Hardware Installation

.1 Finish hardware will be supplied for installation under this Section.

.2 Prepare doors and frames in accordance with manufacturer’s instructions and templates. Install finish hardware complete in all respects, hang doors and make adjustments necessary.

.3 Doors shall swing freely. Where thresholds are to be used, door bottom shall be finished to suit thresholds as required.

.4 Where indicated on door schedules or drawings, under-cut doors.

3.7 Miscellaneous

.1 Install Toilet and Bath Accessories as specified in Section 10 28 10, including accessories supplied by Owner.

3.8 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 05 50 00 Metal Fabrications
.2 Section 06 10 00 Rough Carpentry
.3 Section 06 20 00 Finish Carpentry
.4 Section 07 92 00 Joint Sealants
.5 Section 09 21 16 Gypsum Board

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM F1667/F1667M-21a Standard Specification for Driven Fasteners: Nails, Spikes, and Staples
.2 Architectural Woodwork Manufacturer's Association of Canada (AWMAC)
  .1 Architectural Woodwork Standards Manual
.3 American National Standards Institute (ANSI)
  .1 ANSI A208.1-2009 Particleboard
  .2 ANSI/NPA A208.2-2009 Medium Density Fibreboard (MDF)
  .3 ANSI/NEMA LD 3-2005 High-Pressure Decorative Laminates (HPDL)
  .4 ANSI/HPVA HP-1-2009 Standard for Hardwood and Decorative Plywood
.4 CSA Group (CSA)
  .1 CSA O112 SERIES-M1977 (R2006) Wood Adhesives
  .2 CSA O121-08 (R2013) Douglas Fir Plywood
  .3 CSA O151-17 (R2022) Canadian Softwood Plywood
  .4 CSA O153:19 Poplar Plywood
  .5 CSA Z809-08 Sustainable Forest Management
.5 Canadian General Services Board (CGSB)
  .1 CAN/CGSB-11.3-M, Hardboard
.6 Forest Stewardship Council (FSC)
  .1 FSC-STD-01-001-2004 FSC Principle and Criteria for Forest Stewardship.
  .2 FSC-STD-20-002-2004 Structure and Content of Forest Stewardship Standards V2-1
  .3 FSC Accredited Certified Bodies.

1.4 Submittals

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

.2 Submit shop drawings conforming to AWMAC's STANDARDS (NAAWS).
  .1 Show proposed assembly, connections, anchorage, materials, dimensions, thickness, and finishes.
  .2 On casework and countertop elevations show location of backing required for attachment within walls.

.3 Samples:
  .1 Submit duplicate, 300 mm long samples of each type of solid wood and 300 x 300 mm samples of each type of plywood used in exposed work and scheduled to receive stained or natural finish, complete with specified finish, prior to fabrication of cabinetwork.

.2 Veneer samples minimum 304 mm x 304 mm. Each sample set of three to represent range of colour and grain expected.
.3 Submit full range of manufacturer's standard plastic laminates for selection by the Consultant.
.4 Submit sample of each type of cabinet hardware component used.

1.5 Quality Assurance

.1 Unless otherwise specified, carry out finish carpentry work in accordance with the requirements of "Millwork Standards" (latest issue) of Architectural Woodwork Manufacturers' Association of Canada (AWMAC), Custom Grade.

.2 Woodwork Manufacturer Qualifications:
.1 Minimum 5 years of production experience similar to this project, whose qualifications indicate ability to comply with requirements of this Section.

.3 Preinstallation Conference:
.1 Before framing completed hold a meeting with the contractor, casework manufacturer, casework installer, and framing sub-contractor.
.2 Review locations of backing required for casework installation as shown on casework shop drawings.
.3 Review method of attachment for backing to wall system as shown on architectural drawings.

.4 Mock-up: Prepare mock-ups in accordance with Section 01 45 00 – Quality Control.
.1 Provide mockups of one base cabinet, one wall hung cabinet, and one countertop. Base cabinet to have minimum one drawer. Mockup of material and finish to be provided. Approved mockup may be incorporated in the project.

1.6 Definition

.1 "Exposed" when referred to in this Section, shall mean all parts which can be viewed and shall include interiors of cabinets, backs of doors, shelving and gables.

1.7 Shipping, Handling and Storage

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

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

.3 Protect against damage, including damage by excessive changes in moisture content, during delivery and storage. Maintain minimum storage temperature of 16 ° C, and relative humidity of 25% to 55%.

.4 Cover plastic laminate faces at shop with heavy Kraft paper.

.5 Do not deliver finish carpentry components to site before all wet trades are completed, the building is closed in and humidity conditions on site are acceptable. Do not deliver during rain or damp weather

.6 Store materials on site in such a way as to prevent deterioration or loss or impairment of essential properties. Prevent excessive moisture gain of materials.

1.8 Protection

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

1.9 Waste Management and Disposal

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

1.10 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of two years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Materials

.1 All materials CSA Z809 or FSC Certified.

.2 Solid Wood:
  .1 Unless otherwise indicated, provide AWMAC Custom Grade.
  .2 All wood materials shall be new, straight and clean, free of sap, knots, pitch, and other defects, except as permitted by applicable grading rules.
  .3 All wood shall be kiln dried to a maximum moisture content of 7%.
  .4 Softwood: to CSA O141, dressed all sides used in concealed locations.

.3 Plywood:
  .1 Soft Plywood: to CSA O151-M Standard Grade, solid two sides. Use in concealed locations only, except as indicated.

.4 Particleboard: Meeting requirements of AWMAC’s STANDARDS (NAAWS). To ANSI A208.1 , minimum density of 720kg/m3 Grade "R".

.5 MDF: Medium Density Fiberboard meeting requirements of AWMAC’s STANDARDS (NAAWS).

.6 Edgeband
  .1 For wood veneer casework: Veneer of same species and cut as exposed surfaces.
  .2 For plastic laminate casework: High Pressure Decorative Laminate (HPDL).

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

.8 Plastic laminate facing sheet: ANSI/NEMA LD 3 High-Pressure Decorative Laminates (HPDL) PF-S and GP-S;
  .1 Backing sheet: BK Grade by manufacturer of facing sheet.
  .2 Core: CAN3-0188.1M, Grade R.
  .3 Laminating adhesive: CAN3-O112 Series M.
  .4 Core sealer: clear water resistant synthetic resin sealer.
  .5 Colours, pattern, gloss and texture will be selected by Consultant from full range of products by one of the following:
    .1 Formica,

.2 Arborite,
.3 Pionite,
.4 Nevamar
.5 Wilsonart.

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

.10 Fasteners and Adhesive:
.1 Nails and staples: ASTM F1667, galvanized, spiral head nails.
.2 Screws: Zinc, cadmium or chrome plated steel.
.3 Splines: wood or metal, to suit application.
.4 Adhesive: Type 1 waterproof. To CSA O112-M, type as appropriate for the intended application. Complying with ANSI/WDMA I.S-1 series. Contact bond not acceptable.
.5 Avoid the use of adhesives, preservatives, synthesizing agents and finish coatings that contain formaldehyde and high V.O.C. content.

.11 Stainless Steel: Type 316 with AISI No. 4 finish, 1.80 mm thick.

.12 Cabinet Hardware: Products listed are a standard of acceptance. Products by other manufacturers, of equal quality and similar appearance may also be accepted subject to review and approval by Consultant.
.1 Draw bolt fasteners: Knape & Vogt KV 516
.2 Recessed Shelf Standard:
.1 Knape & Vogt KV 255, Zinc, finish.
.2 Knape & Vogt KV 256AL Series Aluminum Shelf Support Clip
.3 Hinges: Blum concealed hinges, 125° clip and 125° opening with self-closing spring. Soft close. Full or half overlay. Nickel plated steel.
.4 Cabinet Pulls: Richelieu D-Pull No: 30134-170, 96 mm c.c. brushed stainless steel.
.5 Catches: Type optional with manufacturer.
.6 Drawer Slides: Knape & Vogt 8450FM Soft-Close Full-Extension Drawer Slide
.7 Door and Drawer Bumpers: “Quietex” bumpers.
.8 Provide other hardware and hardware accessories as detailed or required.
.9 All exposed hardware to have Platinum (Mica) finish by Teknion or equivalent unless noted otherwise.

2.2 Fabrication

.1 Materials and methods of construction to meet requirements of AWMAC's STANDARDS (NAAWS) for grade or grades specified.
.1 If there is conflict between plans and/or specifications and AWMAC's STANDARDS (NAAWS), plans and specifications shall govern.

.2 Wood Casework: AWMAC Standard Custom Grade.

.3 Construction Type: Frameless

.4 Cabinet and door interface: Flush overlay.

.5 Exposed joints and edges:
.1 Uniformly space exposed joints unless otherwise indicated.
.2 No edge grain shall be visible; mitre external corners, house internal fasteners. Glue mitred corners.
.3 All exposed edges of plywood and particle board shall have solid wood edging, pressure glued. AWMAC No. 3 edge.
.4 Ease edges of solid lumber components to 1.6 mm radius.

.6 Mechanical Fasteners:
.1 Inconspicuously locate mechanical fasteners. Wherever possible, conceal fastenings.
.2 Countersink nail heads.
.3 Where exposed to view, countersink screw and bolt heads and fill holes with matching wood plugs.
.4 Cutting and fitting: make cut-outs in work of this Section as required to accommodate work of other Sections.
.5 Make provisions in cabinetwork to accept built-in appliances, provided by others.

2.3 Plastic Laminate Casework

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

.2 Tenon, dado, dowel, or rabbet interior construction with all parts well glued. Shoulder mitre all exposed corners. Open ends or skeleton frames against walls are not permitted. Unless otherwise permitted by Consultant, use unitized construction system for all components.

.3 Exposed Surfaces: High Pressure Decorative Laminate (HPDL), meeting requirements of AWMAC's Standards (NAAWS) for Grade specified.

.4 Construct door and drawer fronts of 19 mm plastic laminate faced MDF.

.5 Exposed interior surfaces: LPDL of a colour and pattern compatible with exposed surfaces

.6 Semi-exposed surfaces: LPDL

.7 Apply self-edged minimum 1.0 mm thick plastic laminate to exposed ends of countertops.

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

.9 Construct shelving with edge moulding to match. Shelving to cabinetwork to be adjustable unless otherwise noted.

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

.11 Install cabinet hardware in accord with hardware manufacturer's directions. Unless otherwise indicated, provide each door with pull and with minimum two hinges. Provide locks where indicated.

2.4 Drawers

.1 Sides: Particle board with melamine surfaces.

.2 Bottoms: MDF or hardboard with melamine surfaces

.3 Joinery: Meeting requirements of AWMAC's STANDARDS (NAAWS) for Grade specified.

2.5 Laminated Plastic Countertops

.1 Core material: exterior grade hardwood plywood with a non-telegraphing grain.

.2 Use largest practicable plastic laminate sheet size.

.3 Back splashes: as indicated, 100 mm high.

.4 Front edges: As indicated

.5 Provide joints symmetrically; provide joints as corners and at changes in superficial areas; provide concealed draw bolt anchors and joints. All butt joints shall have a blind spine.

2.6 Finishes

.1 All exposed exterior surfaces: plastic laminate as indicated. Colours selected by the Consultant.

.2 All exposed interior surfaces: melamine unless indicated otherwise.

.3 Cabinet and case backs unexposed to view shall be back primed with one coat of moisture repellent sealer.

.4 Apply finishes in accordance with the AWMAC Manual.

.5 Stainless Steel: Type 316 stainless steel, brushed finish.

PART 3 EXECUTION

3.1 Examination

.1 Verify mechanical, electrical, plumbing, HVAC and other building components, affecting work in this Section are in place and ready.

.2 Verify HVAC controls and systems are operating properly.

.3 Verify adequacy of backing and support framing. Advise Contractor of areas and surfaces requiring further modifications for plumb, level, even or square fitting.

3.2 Installation

.1 Install work in accordance with AWMAC Installation Manual, Custom grade.

.2 Secure all work in place, square, plumb, and level.

.3 Accurately scribe and closely fit components to irregularities of adjacent surfaces.

.4 Accurately fit joints in true plane, locate joints over bearing or supporting surfaces.

.5 Countersink mechanical fasteners used at exposed and semi-exposed surfaces, excluding

installation attachment screws and those securing cabinets end to end.

.6 Where permitted, nail with small headed finishing nails. Countersink nail heads with nail setter.

.7 Install plastic laminate components using concealed fastening devices.

.8 Where components are fastened with screws or bolts, countersink screw and bolt heads and provide wood plugs matching surrounding wood.

.9 Where cabinetwork abuts other building elements, provide wood trim matching cabinetwork except where otherwise detailed.

.6 Cut equipment cutouts shown on plans using templates provided.
.1 Radius internal corners at least 3 mm and chamfer edges.
.2 Where core edge is to remain exposed, cover with plastic laminate edging.
.3 Where core edge is to be concealed, seal with sealer.

.10 Where access is required to valves and other mechanical and electrical components, located behind cabinetwork, provide removable plywood access panels of size required and secure with four brass screws.

.11 Apply mildew resistant silicone sealant to perimeter of all countertops as specified in Section 07 92 00.

3.3 Adjustment

.1 Adjust all moving and operating parts to function smoothly and correctly.

.2 Fill and retouch all nicks, chips and scratches. Replace all un-repairable damaged items.

.3 Replace damaged components which, in the opinion of the Consultant, cannot be satisfactorily repaired.

3.4 Cleaning

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

.2 Upon completion of installation, clean installed items of pencil and ink marks and broom clean the area of operation.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

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

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM C39/C39M-21 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
  .2 ASTM C94/C94M-23 Standard Specification for Ready Mix Concrete.
  .3 ASTM C260/C260M-10a(2016) Standard Specification for Air-Entraining Admixtures for Concrete
  .4 ASTM C309-19 Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
  .5 ASTM C494/C494M-19e1 Standard Specification for Chemical Admixtures for Concrete
  .6 ASTM C666/C666M-15 Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
.2 CSA Group (CSA)
  .1 CSA A23.1:19/A23.2:19 Concrete materials and methods of concrete construction/Test methods and standard practices for concrete.
.3 American Concrete Institute (ACI)
  .1 ACI 212.3R-10 Report on Chemical Admixtures for Concrete; Chapter 15-Permeability-reducing admixtures.
  .2 ACI 224R-01 Control of Cracking in Concrete Structures (Reapproved 2008).
  .3 ACI 301-16 Specifications for Structural Concrete.
  .4 ACI 305R-10 Guide to Hot Weather Concreting.
  .5 ACI 306R-10 Guide to Cold Weather Concreting.
  .6 ACI 308.1-11 Specification for Curing Concrete.
  .7 ACI 309R-05 Guide for Consolidation of Concrete.

1.4 Submittals

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

.2 Certificates of Conformance or Compliance: before delivery of the materials a copy of the manufacturer's certificates, attesting that materials meet the requirements specified, shall be submitted to and approved by the Consultant.

.3 Product Literature: Manufacturer's descriptive product literature shall be submitted and shall consist of detailed specifications, available performance test data and instructions for additive addition.

.4 Certified Laboratory Test Reports: Before delivery of materials copies of the reports of all tests specified herein or in reference publications shall be submitted to and approved by the Consultant.

.5 Test reports shall be accompanied by certificates from the manufacturer certifying that the previously tested material is of the same type, quality, manufacturer and make as that proposed for this project.

.6 Provide all written materials and concrete mix design to complete the installation as herein specified.

1.5 Quality Assurance

.1 Longevity: Product must have a history of over ten years of successful use and must be accompanied by a list of job sites of a similar nature.

.2 The addition of waterproofing admixture to the pre-approved mix design shall be by a concrete ready-mix supplier approved by the manufacturer. Addition of waterproofing admixture by a non-approved supplier must be under direct supervision of a manufacturer's representative or an independent materials engineering company.

.3 The concrete waterproofing admixture shall comply with CAN/CSA A266 – 1-M in the latest edition as both a WR type water reducing admixture and optionally as an air entraining admixture and ASTM C494 and as a Type D, water-reducing set retarding admixture.

.4 Waterproofing admixture to be certified by International Code Council (ICC) as a Chemical Admixture Used in Concrete (AC198).

.5 Applicator: Waterproofing applicator shall be experienced in the installation of cementitious crystalline waterproofing materials as demonstrated by previous successful installations, and shall be approved by the manufacturer in writing.

.6 Pre-Installation Conference: Prior to installation of waterproofing, conduct meeting with waterproofing applicator, installers of work adjacent to or which penetrates waterproofing, Consultant, owner's representative, and waterproofing manufacturer's representative to verify and review the following:
.1 Project requirements for waterproofing as set out in Contract Documents.
.2 Manufacturer's product data including application instructions.
.3 Substrate conditions, and procedures for substrate preparation and waterproofing installation.

1.6 Shipping, Handling and Storage

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

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

.3 Deliver materials in unbroken original packages bearing the manufacturer's name and brand designation, batch number and date of manufacture.

.4 Store in a dry storage area to avoid contact with moisture.

1.7 Waste Management and Disposal

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

1.8 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of ten years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

.2 Provide manufacturer's warranty document authorized by manufacturer's representative for 25 year material warranty from date of Substantial Performance.

PART 2 PRODUCTS

2.1 Manufacturer

.1 Specification is based on KIM waterproofing admixture, cementitious Krystol Waterstop System for construction joints and related system components as manufactured by Kryton International Inc., Vancouver, BC, Canada, or approved equivalent.

.2 Equivalent products approved by the Consultant and manufactured by the following are acceptable:
.1 Euclid Chemical Company
.2 Tremco
.3 W.R. Meadows
.4 Xypex

2.2 Concrete Waterproofing System

.1 Cementitious admixture shall consist of cement, quartz silica and other hydrophilic chemicals which promote the growth of insoluble hydration crystals within the concrete.

.2 The waterproofing admixture shall not contain chlorides.

.3 The waterproofing admixture shall not provide waterproofing by way of hydrophobic materials such as oils, stearates, silanes, silicate salts or other hydrophobic treatment. Manufacturer must certify in writing the absence of these materials.

.4 Provide a concrete admixture that when added to the plastic mix will permanently waterproof, water reduce and air entrain the hardened concrete by way of chemically promoting the total hydration through a catalyst form of water bearing crystals.

.5 Obtain all crystalline waterproofing products from a single source.

2.3 System Components

.1 Cementitious admixture: to ASTM C494 Type D, Krystol Internal Membrane (KIM) consisting of Portland cement, quartz silica and other chemicals which when properly added to an approved mix design and delivered by an approved concrete producer, shall produce concrete that complies with specified requirements in Section 03 30 00 and the following:
.1 Krystol Growth: Evidenced by scanning electron microscope photographs comparing KIM treated concrete to untreated concrete.
.2 Permeability: No measurable leakage through KIM treated concrete when tested in accordance with COE CRD-C 48 at 140 m of head or 1400 kPa.
.3 Chemical Resistance: Minimum 20% less weight loss compared to untreated specimen after exposure to 5% sulfuric acid for 70 days.

.4 Compressive Strength: At least 10 percent increase in strength compared to samples prepared without admixture, when tested in accordance with ASTM C39 after 28 days.
.5 Chloride Penetration Resistance: Rating of Low to Very Low for KIM treated concrete when tested using AASHTO T277.
.6 Drying Shrinkage: Minimum 20% reduced drying shrinkage compared to untreated concrete when tested according to BS 1881-5.
.7 Self-Sealing: Enhanced autogenous crack sealing of concrete compared to untreated concrete up to 0.5 mm; verified by independent testing.
.8 Carbonation Resistance: No increase in rate of carbonation compared to untreated concrete when exposed to a 4% carbon dioxide atmosphere for 28 days.
.9 Sulfate Resistance: Improved resistance to sulfate attack compared to untreated concrete when tested to the US Bureau of Reclamation Accelerated Method.
.10 Potable Water Contact Approval: NSF certification for use on structures holding potable water, based on testing in accordance with NSF 61.

.2 Waterstop Slurry: KIM Waterstop Slurry cementitious powder containing high-growth organic producing chemicals with the ability to grow and penetrate to a minimum depth of 100 mm in both directions from the coated surface.

.3 Construction joint waterstop cap material: Krystol Bari-Cote.

.4 Crack Repair and Surface Treatment: Krystol T1 and Krystol T2.

.5 Grouting mortar for the cold joint or cracks shall be compatible with the cementitious crystal producing chemicals and contain no chlorides or artificial accelerators. Grouting material shall be non-shrink, non-toxic, fast setting (initial 25 minutes) and contain high growth organic chemicals: Krystol Plug.

.6 The admixture shall be provided mixed into concrete produced by a ready-mix supplier approved by the manufacturer. The concrete supplier must ensure that the admixture is being stored, added and mixed according to the manufacturer's written procedures.

.7 Notwithstanding other requirements, the concrete and jointing shall be cured and protected in accordance with CSA A23.1.

PART 3 EXECUTION

3.1 Manufacturer's Instructions

.1 Comply with manufactures written instructions and procedures.

3.2 General

.1 Coordinate work of this Section, including addition of waterproofing admixtures to ready mixed concrete, with other Sections.

.2 Admixture: In accordance with referenced standards, concrete shall be designed in accordance with the standard recommended practices for selecting proportions for concrete, ACI - 221, waterproofing admixture shall be added to the pre-approved plastic mix design at a rate of two percent of the cementitious content at the ready-mix plant or, in a case where it is difficult to guarantee that the mix will be placed within thirty minutes, the admixture may be added at the job site. Waterproofing admixture shall be in addition to the total weight of the cementitious content.

Admixture shall be mixed for a minimum of ten minutes and shall be strictly added as per manufacturer's written instructions.

.3 Manufacturers Technical Representative: Application of waterstop materials shall be performed in accordance with the manufacturer's written instructions. Employ the services of a technical representative approved by the manufacturer to be present at the site of work to provide instruction for the proper surface preparation, application and curing procedures of the waterstop system.

.4 Construction joint design: Construction joints shall be treated with a coat of waterstop slurry at a rate of 1 kg per square metre. Waterstop block out shall be installed using wood spacers to the required size of 45 mm x 45 mm (tapering to 35 mm). At the time that the forms are removed, the block out strip will be removed and filled with a dry mix of waterstop grout.

3.3 Concrete Mixing and Placing

.1 Comply with requirements of Section 03 30 00.

.2 Cementitious admixture:
- .1 Concrete shall be designed in accordance with the standard recommended practices for selecting proportions for concrete; ACI 211.
- .2 Cementitious admixture shall be added to the pre-approved mix design in the plastic state at a rate of 2% of the cementitious content (including fly ash) to a maximum of 8 Kg per cubic meter at the ready-mix plant or when pre-approved by the manufacturer added at the job site.
- .3 Cementitious admixture shall be added in addition to the total weight of the cementitious materials.
- .4 Cementitious admixture shall be mixed for a minimum of 10 minutes.
- .5 Cementitious admixture shall be strictly added as per the manufacturer's written instructions.
- .6 Provide concrete with a maximum water-to-cementing materials ratio of 0.45 proportioned to meet all other structural and exposure criteria cited elsewhere in the documents. The Portland cement content shall not be less than 250 Kg per cubic meter.

.3 Trial mixes made under typical project conditions shall be used to determine that the setting time, slump, air content and compressive strength of the concrete are suitable for the project.

.4 Moist cure concrete in accordance with ACI 308; if moist curing is not possible, use curing compound complying with ASTM C309.

3.4 Construction Joints

.1 The waterstop system shall be installed in all non-moving construction joints according to the manufacturer's instructions.

.2 All pipe penetrations shall be treated as per the manufacturer's instructions.

.3 After completion of pour, all tie-holes shall be soaked to a surface saturated condition and packed with grouting mortar and waterproof cap in accordance with the manufacturer's instructions.

3.5 Cracks and Defects

.1 Leaking cracks that do not self-seal in the time required by other construction, or are larger than 0.5 mm, shall be repaired according to the manufacturer's instructions.

.2 Rock pockets and honeycombing shall be repaired as per the manufacturer's instructions.

3.6 Field Quality Control

.1 Manufacturer's Site Services: Provide manufacturer's site services consisting of product recommendations and site visits to verify batching and installation procedures when required by manufacturer.

.2 Where applicable, water test structures capable of holding water for 24 hours after conclusion of curing period. Repair identified leaks and repeat water testing until structure is watertight.

3.7 Protection

.1 Protect waterproofed concrete from damage during construction.

.2 When backfilling occurs less than 7 days after installation, use moist backfill material.

.3 Concrete must be cured a minimum of 28 days before applying finishes.

3.8 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1	Section 03 30 00	Cast-in-Place Concrete
.2	Section 04 22 00	Concrete Unit Masonry
.3	Section 05 41 00	Structural Metal Stud Framing
.4	Section 06 10 00	Rough Carpentry
.5	Section 07 13 13	Bituminous Sheet Waterproofing
.6	Section 07 21 29	Sprayed Insulation
.7	Section 07 26 00	Vapour Retarders
.8	Section 07 27 13	Modified Bituminous Sheet Air Barriers
.9	Section 07 52 16	Modified Bituminous Roofing
.10	Section 07 92 00	Joint Sealants
.11	Section 08 11 00	Metal Doors and Frames
.12	Section 08 50 00	Aluminum Doors, Windows and Screens
.13	Section 31 23 10	Excavating, Trenching and Backfilling

1.3 References

.1 ASTM International (ASTM)
- .1 ASTM C423-23 Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
- .2 ASTM C518-21 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
- .3 ASTM C578-22 Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
- .4 ASTM C612-14(2019) Standard Specification for Mineral Fiber Block and Board Thermal Insulation
- .5 ASTM C665-23 Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing
- .6 ASTM C1620-16(2023) Standard Specification for Aerosol Polyurethane and Aerosol Latex Foam Sealants
- .7 ASTM D1621-16(2023) Standard Test Method for Compressive Properties of Rigid Cellular Plastics
- .8 ASTM D1623-17(2023) Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics
- .9 ASTM E1677-19 Standard Specification for Air Barrier (AB) Material or System for Low-Rise Framed Building Walls
- .10 ASTM E84-23d Standard Test Method for Surface Burning Characteristics of Building Materials

.2 CSA Group (CSA)
- .1 CSA B111-1974 (R2003) Wire Nails, Spikes and Staples

.3 Underwriters Laboratories Canada (ULC)
- .1 ULC 701.1 Standard for Thermal Insulation, Polystyrene Boards
- .2 ULC 702.1 Standard for Thermal Insulation Mineral Fibre for Buildings
- .3 ULC 704 Standard for Thermal Insulation Polyurethane and Polyisocyanurate, Boards, Faced.

.4 Underwriters Laboratories (UL)

.1 UL 1715 - Fire Test of Interior Finish Material

.5 Canadian General Services Board (CGSB)

.1 CGSB 71-GP-24M Adhesive, Flexible, for Bonding to Cellular Polystyrene Insulation.

.2 CAN 2-51.32 Sheathing, Membrane, Breather Type.

.6 Uniform Building Code (UBC)

.1 UBC 26-3 Room Fire Test Standard for Interior of Foam Plastic Systems

1.4 Submittals

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

.2 Submit insulation manufacturer's product literature including specified physical properties for each type of insulation specified.

.3 Submit installation instructions.

.4 Submit certification that product complies with specification requirements and is suitable for the use indicated.

1.5 Environmental Requirements

.1 Insulation shall not be produced with, or contain, any of the regulated CFC compounds listed in the Montreal Protocol of the United Nations Environmental Program.

1.6 Shipping, Handling and Storage

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

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

.3 Deliver material to the site in the original unbroken packages bearing the name of manufacturer.

.4 Store materials in an approved manner at the site preceding application and protect from damage at all times.

.5 Remove damaged or deteriorated materials from site.

1.7 Waste Management and Disposal

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

1.8 Warranty

.1 Provide written warranty that the actual thermal resistance of the extruded polystyrene foam insulation will not vary by more than 10% from its published thermal resistance.

.2 Warranty period is 15 years after date of Substantial Performance.

PART 2 PRODUCTS

2.1 Board Insulation

.1 Rigid insulation at perimeter of ground floor slab and below grade: extruded expanded polystyrene to ULC S701.1 TYPE 4. HFO blowing agents. Thickness as detailed, 400 x 2440 mm boards with butt edges. Material shall have the following characteristics when tested to the reference standards:
- .1 Compressive Strength: ASTM D1621: 210 kPa.
- .2 Water Absorption: ASTM D2842: maximum 0.7% by volume.
- .3 Water Absorption: ASTM C272: maximum 0.1% by volume.
- .4 Water Vapour Permeance, ASTM E96: 52 ng/Pa•s•m2
- .5 Thermal resistance RSI: ASTM C518: 0.88/25 mm
- .1 Basis of Design: Soprema XPS-30

.2 Rigid Insulation above grade, cast into tilt-up concrete sandwich wall panels: Extruded polystyrene insulation to ULC 701.1 Type 3. Insulation shall have a minimum compressive strength of 170 KPa, RSI value of not less than 0.99/25 mm and a moisture absorption rate of not more than 0.7% by volume. Insulation boards shall be 100 mm thick or as detailed, 600 x 2400 mm with butt edges.
- .1 Styrofoam Panelmate Ultra Insulation as manufactured by DuPont de Nemours Inc.
- .2 Owens Corning Foamular 400

.3 High Density Rigid Insulation: to ULC 701.1 Type 4. HFO blowing agents. Thickness shall be 2 layers, 38 mm each; 400 x 2440 mm boards with butt edges. Material shall have the following characteristics when tested to the reference standards:
- .1 Compressive Strength: ASTM D1621: 415 kPa
- .2 Water Absorption: ASTM D2842: less than 0.6% by volume.
- .3 Water Absorption: ASTM C272: maximum 0.1% by volume
- .4 Water Vapour Permeance, ASTM E96: 52 ng/Pa•s•m2
- .5 Thermal resistance RSI: ASTM C518: 0.88/25 mm
  - .1 Basis of Design: Soprema HPS-60

.4 Rigid Polyisocyanurate Insulation:

.5 Foil Faced Polyisocyanurate Rigid Foam Board Insulation
- .1 High performance rigid insulation board consisting of ULCS704, Type 2, Class 1 closed-cell polyisocyanurate foam core laminated between a coated foil facer on front side of board and a reflective foil facer on the back side of the board. 1219 mm x 2438 mm or factory cut to 406 mm x 2438 mm EnergyShield manufactured by Atlas Roofing Corporation.
  - .1 Provide foil faced polyisocyanurate board insulation with the following thickness, RSI Value, and R-values:

Thickness (mm)	RSI Value	R value
13	0.58	3.3
19	0.88	5.0
25	1.14	6.5
38	1.73	9.8
41	1.84	10.5
51	2.31	13.1
64	2.82	16.0
76	3.47	19.7

- .2 Facer Materials: foil facer on each face of insulation.
- .3 Flame Spread and Smoke Developed: Less than 500 when tested in accordance CAN/ULC S102.

.4 Water Vapour Permeance: Less than 60 ng/ (Pa s m2) at 25.4 mm when tested in accordance with ASTM E96, Desiccant Method.
.5 Compressive Strength: Greater than 140 kPa when tested in accordance with ASTM D1621.
.6 Water Absorption: Less than 3.5% by volume when tested in accordance with ASTM C209.
.7 Dimensional Stability: Less than 2% linear change when tested in accordance with ASTM D2126.
.8 Service Temperatures: -73ºC to +122ºC.
.9 Produced without using HCFC, CFC and HFC blowing agents

.6 Drainage Board Insulation: Rigid drainage board insulation at perimeter of basement walls: extruded expanded polystyrene to ASTM C578 Type IV, ULC S701.1 Type 4 and CCMC Class A Type 2 drainage requirements. Shiplapped. Insulation shall have minimum compressive strength of 210 kPa, RSI value of not less than 0.87/25 mm, and a moisture absorption rate of not more than 0.9% by volume and grooved drainage channels. Thickness as detailed, 400 x 2440 mm boards with butt edges.
.1 Styrofoam Perimate Insulation as manufactured by DuPont de Nemours Inc.
.2 Premier Drainage Board by Fransyl.

2.2 Concrete Faced Insulated Perimeter Wall Panels

.1 Panel Performance:
.1 Wall Panel System Fire Test:
.1 Meets Uniform Building Code (UBC) 26-3 Room Fire Test Standard for Interior of Foam Plastic Systems. Criteria are to maintain coverage of foam substrate up to 2438 mm from interior corner, over the duration of the test.
.2 Equivalent to current UL 1715 and UBC 97 revised.
.2 Negative Wind Load And Gravity Shear Load Tests:
.1 Clips spaced at 610 mm along each horizontal joint can safely carry the wall panel vertical weight and support the panel under negative wind pressures of up to 1.2 kPa with a safety factor of 2.

.2 Construction: Perimeter Foundation Insulation: Extruded polystyrene board to ASTM C578 (ULC 701.1) Type IV, rigid, closed cell, with integral high density skin, c/w integral 8 mm thick latex-modified concrete facing.
.1 Board Size: 610 mm by 1219 mm by thickness indicated.
.2 Edges: Tongue and groove sides, square edge ends.
.3 Maximum Use Temperature: 74 °C.
.4 Thermal Resistance ASTM C518: Long term aged R-value of 0.03 sm K/W per mm.
.5 Foam Compressive Strength, ASTM D1621, minimum: 240 kPa.
.6 Compressive Strength: to ASTM D1621, minimum 275.6 kPa
.7 Water Absorption ASTM D2842: <0.1 (0.7% by volume maximum).
.8 Water VapoUr Permeance (ASTM E96): 50 ng/Pas m.
.9 Coefficient of Lineal Thermal Expansion (ASTM D696, mm/m x degree C: 6.3 x 10-.

.3 Material: WallGUARD Concrete Faced Insulated Perimeter Wall Panels as manufactured by FinPan.

.4 Accessories:
.1 Metal Cap Flashing: 0.61mm galvanized steel J-channel; 57mm wide, 102 mm long leg and 57mm short leg; prefinished in colour as selected.

.2 Clips and Fasteners: corrosion-resistant type, sized to suit application; as supplied by insulation manufacturer.

2.3 Exterior Wall Sheathing

.1 Non-combustible, rigid, water repellent, mineral wool insulation board for exterior non-structural commercial and industrial high performance insulation sheathing applications to ASTM C612, Type IVB and ULC S702, Type 1. Thickness as indicated.
- .1 Fire Performance:
  - .1 Non-combustibility: To CAN/ULC S114.
  - .2 Surface Burning Characteristics:
    - .1 Flame spread: 0.
    - .2 Smoke developed: 0.
- .2 Thermal Resistance (RSI value/25.4 mm at 24 º C: 0.70 m2K/W to ASTM C518.
- .3 Moisture resistance:
  - .1 Moisture sorption: 0.05 % maximum to ASTM C1104/C1104M.
  - .2 Water vapour transmission: 1768 ng/Pa·s·m2 to ASTM E96, Desiccant Method.
- .4 Corrosive Resistance
  - .1 Steel to ASTM C665: Non-corrosive.
  - .2 Stainless steel to ASTM C795: Non-corrosive.
- .5 Density: 128 kg/m^3 to ASTM C167
- .6 Compressive strength: To ASTM C165.
  - .1 21 kPa at 10 %.
  - .2 50 kPa at 25 %.
- .7 Recycled content: 16 % minimum.
- .8 Fungi resistance: To ASTM C1338.
- .9 Material Rockwool Comfortboard

2.4 Semi Rigid Mineral Wool Insulation

.1 Mineral fibre board: to ASTM C612 and ULC 702.1.
- .1 Type: IVB Compliant.
- .2 Density: 70 kg/m3.
- .3 Surfaces: unsurfaced
- .4 Thickness: as indicated.
- .5 Product: Roxul Cavityrock or approved equivalent.

.2 Adhesives: As recommended by material manufacturer, compatible with insulation and substrate membrane, waterproof, conforming to CGSB 71-GP-24M.
- .1 Air-Bloc 21 by Monsey Bakor
- .2 Shur Stik 99 by The GH Company
- .3 PL Premium by LePage

.3 Primer for concrete and masonry surfaces recommended by the adhesive manufacturer for the materials to be adhered.

2.5 Batt Insulation

.1 Fibreglass friction fit batts or mineral fibre to CAN/ULC 702.1 Type 1 for wall application, width and thickness as shown on details:
- .1 Owens Corning ProPink Wall Insulation, unfaced.

.2 Owens Corning Thernmafiber Ultrabatt
.3 Roxul Batt Insulation.

2.6 Wood Framed Floor Acoustic Insulation

.1 To ASTM C423 and ULC S702 Type 1, non-combustible stone wool insulation, thickness as indicated.
.1 Fire performance:
.1 Non-combustibility: To CAN/ULC S114.
.2 Surface Burning Characteristics: To CAN/ULC S102.
.1 Flame spread: 0.
.2 Smoke developed: 0.
.2 Density: 40 kg/m^3 to ASTM C167.
.3 Recycled content: 40 % minimum.
.4 Acoustical Performance (ASTM C423)

Thickness	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	NRC
76 mm	0.52	0.96	1.18	1.07	1.05	1.05	1.05

.5 Material: Rockwool Safe'n' Sound

2.7 Sprayed Insulation

.1 Sprayed insulation for exterior wall assemblies is specified in Section 07 21 29.

2.8 Acoustic Insulation

.1 Acoustic insulation for gypsum board partitions is specified in Section 09 21 16.

2.9 Spray Foam Insulation

.1 Spray Foam Insulation: to ASTM C1620, one component expanding polyurethane or polyisocyanurate foam, ULC approved and compatible with rigid insulating materials, with Class 1 fire rating to ASTM E84 for window and door frame application:
.1 Ultra Seal PF-100 Gun Foam by Nuco Inc.
.2 Handi-Foam by Fomo Products Inc.
.3 Pinkseal by Owens Corning.
.4 Hilti CF 812 Window and Door Pro.

2.10 Accessories

.1 Sealing Tape: minimum 65 mm width, polypropylene sheathing tape with acrylic adhesive.

.2 Rough Hardware: Nails and staples as required for installation of insulation and membrane materials, galvanized to CSA B111 and B34.

.3 Mechanical Fastening: galvanized screw type fasteners with 25 mm galvanized plate washers. Screws shall be 13 mm longer than the combined thickness of the insulation and sheathing.

.4 Joint Tape: Joint tape suitable for use with foil facers. Ensure compatibility prior to use by field testing.

.5 Vapour Retarder: As specified in Section 07 26 00.

PART 3 EXECUTION

3.1 Installation – General

.1 Install insulation of types indicated, or, where not indicated, as appropriate, to provide a continuously un-interrupted building envelope in accordance with the requirements of the reference standards.

.2 Install insulation after building substrate materials are dry.

.3 Install insulation to maintain continuity of thermal protection to building elements and spaces.

.4 Fit insulation tightly around all structural angles, penetrations and other protrusions.

.5 Cut and trim insulation neatly to fit spaces. Butt joints tightly; offset vertical joints.

.6 Insulation board materials shall be free from chipped or broken edges.

.7 Sizes of materials shall be consistent with the module of the system.

.8 Do not enclose or conceal insulation until it has been inspected by the Consultant.

3.2 Perimeter Insulation

.1 Do not proceed with installation until concrete surfaces are dry and cured, and water proofing membranes have been inspected and approved.

.2 Install perimeter insulation vertically just prior to backfilling.

.3 Prime porous concrete surfaces.

.4 Apply adhesive in gobs or pads to the back of the insulation board in accordance with manufacturer’s instructions. Joints shall be left dry with joints brought into tight contact. Apply insulation to the wall with a slight sliding motion to ensure good contact.

.5 Protect insulation from damage until time for backfilling.

.6 Following backfilling and prior to placement of underslab vapour barriers, install horizontal insulation. Install rigid insulation at perimeter of all exterior walls and for extent as indicated. Tightly butt joints.

3.3 Foil Faced Board Installation

.1 General:
  .1 Comply with manufacturer's instructions for installation of polyisocyanurate rigid foam board insulation.
  .2 Do not install polyisocyanurate rigid foam board insulation that has become soiled, wet, or has not been properly protected from sunlight.
  .3 Dry fit polyisocyanurate rigid foam board insulation prior to final installation. Neatly trim board around conduits, pipes, and other items that will penetrate insulation.

.2 Adhesive Attachment:
.1 Apply adhesive in accordance with the manufacturers written instructions. Ensure insulation is well bonded to the substrate at all joints between boards and at all penetrations.

.3 Mechanical Attachment:
.1 Select a mechanical fastener appropriate for the intended substrate. Fasten insulation board to substrate with mechanical anchors spaced no greater than 9.5 mm from edge of board or opening, 305 mm on center at perimeter edges and openings and no greater than 406 mm on center in both directions within the field of the perimeter. The washer of a single 44.5 mm washer style fastener may be used to bridge adjoining boards.

.4 Joint Treatment: For joints, gaps, and openings less that 13 mm wide, install continuous bead of joint treatment to form a seal at all board joints and openings.

.5 Expanding Foam Sealant: For joints, gaps, and openings greater than 13 mm wide, install sealant in a continuous ribbon between adjacent board edges, working sealant in to joint for a full depth bead of sealant.

.6 Tape: Install tape to form a continuous seal between adjacent boards. Ensure compatibility and maintain adequate overlaps.

3.4 Drainage Board Insulation

.1 Verify that all masonry joints are struck flush and that other conditions are satisfactory for proper installation.

.2 Remove concrete fins and mortar projections that interfere with placement of insulation boards.

.3 Vertical Insulation:
.1 Apply insulation boards to exterior face of exterior foundation walls except where otherwise indicated.
.2 Extend insulation at least 610 mm down from immediately under floor slabs-on-grade.
.3 Adhere insulation to wall by applying 50 mm diameter spots of adhesive to insulation boards 400 mm o.c. both ways.

.4 Cut insulation to fit snugly around pilasters, projections, curves and irregularities on the wall surface. Fill voids with insulation.

3.5 Concrete Faced Insulated Perimeter Wall Panel Installation

.1 Perimeter Insulation Substrate Examination
.1 Verify that the insulation boards and adjacent materials are compatible.
.2 Verify that the substrate is flat, sound, clean and remove any masonry irregularities or jagged surfaces on the foundation wall.

.2 Perimeter Insulation Installation:
.1 Layout concrete-faced insulation boards to maximize board sizes. Do not use boards less than 152 mm wide.
.2 Install concrete-faced insulation board system in orientation as indicated or to maximize full sheets. Complete with fastening clips and cap flashing in accordance with manufacturer's installation guidelines

3.6 Batt Insulation

.1 Install insulation to maintain continuity of thermal protection to building elements and spaces. Ensure that insulation is kept dry and not compressed.

.2 Install insulation in spaces as shown on drawings.

.3 Insulation shall be placed in all metal stud and header assemblies that will be inaccessible after their installation into the wall. Refer to Section 05 41 00.

.4 Install batt insulation in built up wood roof curbs where detailed.

.5 Pack loose insulation in crevices between exterior masonry and door and window frames and about lintels, frames, beams around ducts at holes and other places where shown or required to eliminate air infiltration.

.6 Pack loose insulation into voids around mechanical and electrical pipes and ducts where they pass through walls and slabs.

3.7 Acoustic Insulation

.1 Install acoustic insulation and acoustic cloth backing between furring in pool hall behind wood slat wall assemblies.

3.8 Spray Foam Insulation

.1 Completely fill all joints and penetrations in exterior walls, at door and window frames and where indicated, with expanding spray foam insulation, in accordance with manufacturer's instructions.

3.9 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 06 10 00 Rough Carpentry
.2 Section 07 26 00 Vapour Retarders
.3 Section 07 27 13 Modified Bituminous Sheet Air Barriers
.4 Section 07 62 00 Sheet Metal Flashing and Trim
.5 Section 07 92 00 Joint Sealants
.6 Section 08 11 00 Metal Doors and Frames
.7 Section 08 50 00 Aluminum Windows, Doors and Screens

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM C1382-16(2023) Standard Test Method for Determining Tensile Adhesion Properties of Sealants When Used in Exterior Insulation and Finish Systems (EIFS) Joints
  .2 ASTM C1481-12(2017) Standard Guide for Use of Joint Sealants with Exterior Insulation and Finish Systems (EIFS)
  .3 ASTM D4541-22 Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
  .4 ASTM E283/E283M-19 Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
  .5 ASTM E331-00(2023) Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
  .6 ASTM E2178-21a Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials
  .7 ASTM E2357-23a Standard Test Method for Determining Air Leakage Rate of Air Barrier Assemblies
.2 CSA Group (CSA)
  .1 CSA A3000-18 Cementitious Materials Compendium
.3 Underwriters Laboratories of Canada (ULC)
  .1 ULC 101-2014 Standard Methods of Fire Endurance Tests of Building Construction and Materials
  .2 ULC 102 2018 Surface Burning Characteristics of Building Materials and Assemblies
  .3 ULC 114-2018 Standard Method of Test for Determination of Non-combustibility in Building Materials
  .4 ULC 134-2013 Fire Test for Exterior Wall Assemblies
  .5 ULC S701 Annex A, Standard for Thermal Insulation, Polystyrene Boards and Pipe Covering
  .6 ULC S716.1-2012 Standard for Exterior Insulation and Finish Systems (EIFS) – Materials and Systems
  .7 ULC S716.2 Standard for Exterior insulation and Finish Systems (EIFS) – Installation
  .8 ULC S716.3 Standard for Exterior Insulation and Finish Systems (EIFS) – Design Application
.4 EIFS Council of Canada
  .1 EIFS Practice Manual Version

1.4 Submittals

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

.2 Product Data: Submit manufacturer's product data for each type of product specified and manufacturer's guide details.

.3 Samples for Initial Selection: Submit one sample panel, 150 mm x 150 mm for each colour and texture, for review by the Consultant, on backing of manufacturer's choice.

.4 Shop Drawings:
- .1 Indicate wall layout, details, connections, expansion joints, finish system, installation sequence, including interface with fascias, walls, air barriers, vapour retarders and other components.

.5 Samples for Verification: Submit two samples 300 mm x 300 mm for colour and texture verification for each finish specified in this Section prior to ordering products from continuous insulation cladding system manufacturer.

.6 Informational Submittals: Provide the following submittals when requested by the Consultant:
- .1 Evaluation reports and listings:
  - .1 Provide CCMC Evaluation Report as required to confirm the continuous insulation cladding system is in compliance with the National Building Code 2015 and ULC 716.1.
  - .2 Provide 3rd party listing to confirm the continuous insulation cladding system conforms to NBC Article 3.1.5.5.
  - .3 Provide 3rd party listing to confirm the continuous insulation cladding system conforms to NBC Clause 3.2.3.8 (1)(b).

.7 Operation and Maintenance Data: Submit manufacturer's written instructions for cleaning solutions, materials and procedures. Include name of original installer and contact information in accordance with Section 01 78 0 Closeout Submittals.
- .1 Provide specific warning of any maintenance practice or materials that may damage or disfigure the finished Work.
- .2 Provide a complete list of repair and replacement parts with cuts and identifying numbers.
- .3 Include:
  - .1 Finish coat colour batch numbers.
  - .2 Identification of each type of reinforcing mesh used.
  - .3 Identification of adhesive, base coat and finish coat products used.

1.5 Quality Assurance

.1 Qualifications: Provide proof of qualifications when requested by Consultant:
- .1 Contractor: Execute Work of this Section using qualified personnel skilled in installation of work of this Section, having a minimum of three years proven experience of installations similar in material, design, and extent to that indicated for this Project. Installation shall comply with ULC S716.2 in conjunction with manufacturer's installation guide and EIFS Practice Manual.

.2 Mock-Ups
- .1 Sample Installation: Construct a sample installation to verify selections made under sample submittals and to demonstrate aesthetic effects and to set quality standards for materials and execution of Work in accordance with Section 01 45 00 Quality Control.

.2 Construct mock-up of typical cladding/window assembly with specified tools and materials and test air and water infiltration resistance in accordance with ASTM E283 and ASTM E331 respectively, through independent testing agency.
.1 When tested to ASTM E283, verify that the assembly meets the air leakage requirements for an air barrier system of 0.2 L/s/m2 at 75 Pa.
.2 When tested to ASTM E331, verify that no water passes inbound of the air barrier system.
.3 Establish and conduct field water spray test method to verify no leakage of window assembly into the wall.
.3 Conduct cladding adhesion testing in accordance with frequency deemed by design professional or owner's quality assurance agent.
.4 Conduct wet sealant adhesion testing in accordance with sealant manufacturer's field quality control test procedure.
.5 Notify Consultant a minimum of seven days prior to testing.
.6 Once reviewed by Consultant, acceptable sample installation can form a permanent part of the Work and will form the basis for acceptance for the remainder of the project.

.3 Pre-Installation Conference: Conduct on-site pre-installation conference before installing continuous insulation cladding system and in conjunction with installation of mock-up attended by Contractor, Consultant, Owner, Cladding System Contractor, Adjacent Trades and Cladding System Manufacturer's Representative to:
.1 Review methods and procedures related to installation, including manufacturer's written instructions.
.2 Coordinate sequence of installation in connection with adjacent trades.
.3 Examine substrate conditions for compliance with manufacturer's installation requirements.
.4 Review temporary protection measures required during and after installation.

1.6 Performance Requirements

.1 Moisture Control:
.1 Prevent the accumulation of water into or behind the continuous insulation cladding system, either by condensation or leakage into the wall construction, in the design and detailing of the wall assembly.
.2 Provide corrosion-resistant flashing to protect exposed elements and to direct water to the exterior, including: above window and door heads, beneath window and door sills, at floor lines (when or as deemed necessary by the design professional), at roof/wall intersections, decks, abutments of lower walls with higher walls, above projecting features, and at the base of the wall.
.3 Air Leakage Prevention: Prevent excess air leakage in the design and detailing of the wall assembly. Provide continuity between air barrier components in the wall assembly.
.4 At expansion joints, back joints with transition membrane.
.5 Seal cladding system terminations with sealant in conformance ASTM C1382.

.2 Grade Condition:
.1 Provide minimum 200 mm clearance between finished earth grade and continuous insulation cladding system termination, minimum 51 mm clearance above finished grade (pavers/sidewalk). Provide increased clearance in freeze/thaw climate zones.

.2 Provide Durex® High Impact mesh (15.0 oz): A nominal 509 g/m2 (15.0 oz/yd2), flexible, open-weave, alkaline resistant glass fibre adhesive mesh, supplied in 965 mm (38") wide by 22.8 m (75') long rolls. Used for application over the field of the wall, providing a high-duty impact resistance followed by Durex® Standard Plus Mesh (5.0 oz): A nominal 170 g/m2

(5.0 oz/yd2), flexible, open-weave, alkaline-resistant glass-fibre adhesive mesh, supplied in 965 mm (38") wide by 45.7 m (150') long rolls as indicated on architectural drawings.

.3 Sloped Surfaces (trim, shapes, build-outs, and other projecting architectural features):
- .1 Avoid the use of continuous insulation cladding system on weather-exposed horizontal and low slope surfaces such as ledges, sills, and other projecting architectural features unless supported by framing or other structural support and protected with metal coping or flashing.
- .2 Build out trim from continuous insulation cladding system surface with insulation board. All EPS or GPS trim and projecting architectural features must have a minimum 1:2 (27 deg) slope along their top surface.
- .3 All EPS or GPS horizontal reveals must have a minimum 1:2 (27 deg) slope along their bottom surface. Increase slope for northern climates to prevent accumulation of ice/snow and water on surface.
- .4 Where EPS or GPS trim or bottom surface of reveal projects more than 50 mm from the face of the wall plane, protect the top surface with waterproof base coat. Limit EPS/GPS trim thickness to a maximum of 100 mm.

.4 Joints and Accessories:
- .1 Provide expansion joints in the continuous insulation cladding system where building movement is anticipated (refer to ULC S716.3, clause 13.1.1):
  - .1 at expansion joints, deflection joints, or other movement joints in the substrate or supporting construction,
  - .2 where the system is to be installed over dissimilar construction or substrates,
  - .3 at changes in building height, or any other areas of anticipated building movement or stress lines in the construction,
  - .4 at floor lines in wood frame construction or other construction types where vertical shrinkage is expected to occur,
  - .5 at cold or control joints in concrete, masonry, or concrete masonry.
- .2 Back expansion joints, deflection joints, and other movement joints with transition membrane to provide a secondary seal at the joint location.
- .3 Provide minimum 13 mm wide joints where the system abuts windows, doors and other through wall penetrations.
- .4 Provide appropriate sealant tested in accordance with ASTM C1382 at continuous insulation cladding system terminations.
- .5 Indicate location of joints, size of joints, and joint design on architectural drawings shop drawings to provide details and approval of consultant.

.5 Performance Criteria: Continuous Insulation: Expanded polystyrene insulation board compliant with ULC S701, Type 1 requirements.

.6 Air and Moisture Barrier:
- .1 Material Air Leakage Resistance, ASTM E2178: less than 0.02 L/s·m2 @ 75 Pa.
- .2 Assembly Air Leakage Resistance, ASTM E2357: less than 0.2 L/s·m2 @ 75 Pa

.7 Continuous Insulation Cladding System
- .1 Compliant with ULC S716.1.
- .2 Listed by CCMC as a cladding system CCMC ER No. 12416-R.
- .3 Where required to be tested per ULC S114, ULC S134, and to meet Article 3.1.5.5, of the National Building Code of Canada 2015, compliant system shall be listed by an independent 3rd party listing agency.

.4 Where required to be tested per ULC S101 and to meet Clause 3.2.3.8 (1)(b) of the National Building Code of Canada, compliant system shall be listed by an independent 3rd party listing agency.

1.7 Administrative Requirements

.1 Coordination: Coordinate the Work of this Section with the installation of substrate. Sequence work so that installation of continuous insulation cladding system coincides with installation of substrate materials without causing delay to the Work. Comply with continuous insulation cladding system manufacturer's written recommendations for sequencing construction operations with other Work.

1.8 Shipping, Handling and Storage

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

.2 Deliver and store packaged materials in their original containers with manufacturer's labels and seals intact.

.3 Store as recommended by manufacturer in a weatherproof enclosure and protect materials during handling and application to prevent damage.
- .1 Protect insulation materials from prolonged UV exposure, keep away from sources of heat, sparks, flame, flammable or volatile materials. Store on a clean, flat surface, off the ground in a dry area.
- .2 Store reinforcing mesh cartons on side (not upright) in dry area protected from sunlight.
- .3 Protect coatings (pail products) from freezing and temperatures in excess of 32° C and store away from direct sunlight.
- .4 Protect Portland cement based materials (bag products) from extreme heat, moisture, humidity and freezing. Store under cover, off the ground, and in a dry location.

1.9 Project Conditions

.1 Ambient Conditions: Proceed with installation when ambient and substrate temperature conditions are within limits permitted by manufacturer and when substrates are free from dirt or wetness arising from frost, condensation, or other causes detrimental to adhesion.

.2 Temperature Range: Above 4° C during application and for 24 hours minimum after set of continuous insulation cladding system components and finish materials.

.3 Provide supplementary heat for installation in temperatures less than 4° C such that material temperatures are maintained as indicated above. Prevent concentration of heat on uncured cladding system and vent fumes and other products of combustion to the outside to prevent contact with cladding system.

.4 Prevent uneven or excessive evaporation of moisture from cladding system during hot, dry or windy weather. Do not install cladding system materials if ambient temperatures are expected to rise above 38 ° C within a 24-hour period.

.5 Provide protection of surrounding areas and adjacent surfaces from application of materials.

1.10 Sequencing and Scheduling

.1 Installation of the EIFS System shall be coordinated with other construction trades.

.2 Sufficient manpower and equipment shall be employed to ensure a continuous operation, free of cold joints, scaffold lines, texture variations, etc.

1.11 Waste Management and Disposal

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

1.12 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of two years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Manufacturer

.1 All components of the Durex® “Quantum Select” system shall be manufactured and/or distributed by Durabond Products Ltd. or one of its authorized distributors. No substitutes of materials shall be allowed without prior written notice of the manufacturer.

2.2 WATER RESISTIVE BARRIER (WRB)

.1 Durex® Flexcrete, a two component, polymer-based cementitious air barrier, mixed with Flexcrete B in 1:1 ratio.

.2 Durex® Green Guard Plus, a ready to use, single component, water-based copolymer rubber air/vapour barrier.

.3 Durex® Blue Shield, a ready to use, single component, water-based copolymer rubber air barrier.

.4 Durex® Mastic 100, a ready to use, single component, water-based acrylic air barrier.

.5 Durex® Ecto-Flex “A”, a two component, polymer-based cementitious air/water/vapour resistive barrier, mixed with Ecto-Flex “B”.

.6 Durex® AirStop, a ready to use, single component, silicone modified acrylic copolymer air barrier.

.7 For selection of appropriate water resistive barrier please consult your Durabond Products Ltd. representative.

.8 The water resistive barrier system may also be designed to act as the wall assembly air barrier and/or vapour barrier material as determined by the consultant of the wall assembly.

2.1 SHEATHING JOINT REINFORCING

.1 Durex® Barrier Seam Tape, a polyester reinforcing mesh supplied in rolls 100 mm (4”).

2.4 TRANSITION MEMBRANE

.1 Durex® EIFS Tape, a 30 mil thick, self-adhering, Styrene Butadiene Styrene (SBS) modified rubberized asphalt membrane with a polyester top surface. Available in rolls 914 mm (36”), 457 mm (18”), 225 mm (9”), 152 mm (6”) and 102 mm (4”) wide. Durex® EIFS Tape requires the use of Durex® Flex-Seal Primer for proper adhesion.

.2 Durex® EIFS Tape Super Stick TM, a 17 mil, self-adhering, high performance tape with a polyester fabric top layer. Available in rolls 914 mm (36”), 457 mm (18”), 225 mm (9”), 152 mm (6”) and 102 mm (4”) wide. Durex® Super Stick TM requires the use of Durex® Flex-Seal primer for proper adhesion.

.3 Durex® Flex-Seal Membrane, a 40 mil thick, self-adhering, rubberized asphalt membrane with high density cross-laminated polyethylene reinforcement. Available in rolls 914 mm (36”), 457 mm (18”), 225 mm (9”), 152 mm (6”) and 102 mm (4”) wide. Durex® Flex-Seal Membrane requires the use of Durex® Flex-Seal Primer.

.4 Durex® Flex-Seal Primer, a primer specifically designed to enhance the adhesion of Durex® Flex-Seal Membrane and Durex® EIFS Tape on porous surfaces and cementitious coatings at temperatures above -30°C. It is composed of SBS synthetic rubbers, adhesive enhancing resins and volatile solvents. Durex® Flex-Seal Primer can be used on exterior gypsum boards, wood, metal and concrete.

2.5 INSULATION ATTACHEMENT

.1 Durex® Flexcrete, a two component, polymer based cementitious insulation adhesive. Mixed with Flexcrete B, in 1:1 ratio.

.2 Durex® Monobase, a single component, polymer based cementitious insulation adhesive. Mixed with potable water in 1 bag Monobase: 5 - 6 l water.

.3 Durex® V.C.A. 3.0, a two component, polymer based cementitious insulation adhesive. Mixed with Durex® V.C.A. 3.0 “B”, in 1:1 ratio.

2.6 INSULATION

.1 Durex® “Quantum Select EPS”: A Type 1 or Type 2 expanded polystyrene (EPS) insulation, conforming to CAN/ULC S701, measuring 1.2 m (4'-0") by 0.6 m (2'-0") and a minimum thickness of 50 mm (2"), total thickness as indicated on drawings. The board is pre-machined with rectangular drainage channels parallel to the short edge of the board to ensure vertical alignment of the channels that is required for positive drainage. The drainage channels are 50 mm wide, 50 mm apart, with a depth not less than 10mm (3/8”) and as required by the project specifications and/or the drawings. Consult manufacturer for project-specific thickness requirements.

.2 Durex® “Quantum Select” EIFS, using up to 152 mm (6") of Durex® “Quantum Select EPS” has been successfully tested in compliance with Article 3.1.5.5., Article 3.2.3.7. and Clause 3.2.3.8(1)(b) of Division B of the National Building Code (NBC) of Canada and the equivalent requirements of the related applicable provincial or territorial codes.

.3 Durex® Quantum Select Vent Board: A Type 1 or Type 2 expanded polystyrene insulation board conforming to CAN/ULC S701, measuring 200 mm (8”) wide by 2.4 m

(8'-0") long with a minimum thickness of 50 mm (2"). Durex® Quantum Select Vent Board is pre-machined with rectangular, vertical drainage channels that are parallel to the short edge of the board and is supplied complete with pre-back-wrapped with factory applied base coat and reinforcing mesh. The rectangular channels of the Durex® Quantum Select Vent Board are 10mm (3/8") deep, 50 mm (2") wide and 50 mm (2") o/c and as required by the project specifications and/or drawings.

.4 Durex® Boundary Board: A Type 1 or Type 2 expanded polystyrene insulation conforming to CAN/ULC S701, measuring 152 mm (6") wide by 2.4 m (8'-0") long with a minimum thickness of 50 mm (2"). The Durex® Boundary Board Type 1 or Type 2 is pre-back wrapped with factory applied base coat and reinforcing mesh.

2.7 REINFORCING MESH

.1 Durex® Detail Mesh: A nominal 152 g/m2 (4.5 oz/yd2), flexible, open-weave, alkaline-resistant glass-fibre mesh, supplied in 241 mm (9.5") wide by 45.7 m (150') long rolls. Used for standard back wrapping and aesthetic detailing applications.

.2 Durex® Adhesive Detail Mesh. A nominal 152 g/m2 (4.5 oz/yd2), flexible, open-weave, alkaline-resistant glass-fibre adhesive mesh, supplied in 241 mm (9.5") wide by 45.7 m (150') long rolls. Used for corner reinforcement and aesthetic detailing applications.

.3 Durex® Standard Mesh (4.3 oz): A nominal 146 g/m2 (4.3 oz/yd2), flexible, open-weave, alkaline-resistant glass-fibre adhesive mesh, supplied in 965 mm (38") wide by 45.7 m (150') long rolls. Used for application over the field of the wall, providing standard impact resistance.

.4 Durex® Standard Plus Mesh (5.0 oz): A nominal 170 g/m2 (5.0 oz/yd2), flexible, open-weave, alkaline-resistant glass-fibre adhesive mesh, supplied in 965 mm (38") wide by 45.7 m (150') long rolls. Used for application over the field of the wall, providing a medium impact resistance.

.5 Durex® Intermediate Mesh (6.0 oz): A nominal 203 g/m2 (6.0 oz/yd2), flexible, open-weave, alkaline-resistant glass-fibre adhesive mesh, supplied in 965 mm (38") wide by 45.7 m (150') long rolls. Used for application over the field of the wall, providing a moderately high-duty impact resistance.

.6 Durex® Intermediate Plus Mesh (11.0 oz): A nominal 373 g/m2 (11.0 oz/yd2), flexible, open-weave, alkaline-resistant glass-fibre adhesive mesh, supplied in 965 mm (38") wide by 22.8 m (75') long rolls. Used for application over the field of the wall, providing an intermediate high-duty impact resistance.

.7 Durex® High Impact mesh (15.0 oz): A nominal 509 g/m2 (15.0 oz/yd2), flexible, open-weave, alkaline resistant glass fibre adhesive mesh, supplied in 965 mm (38") wide by 22.8 m (75') long rolls. Used for application over the field of the wall, providing a high-duty impact resistance.

.8 Durex® Ultra Impact mesh (21.0 oz): A nominal 695 g/m2 (21.0 oz/yd2), flexible, open-weave, alkaline-resistant glass-fibre adhesive mesh, supplied in 965 mm (38") wide by 22.8 m (75') long rolls. Used for application over the field of the wall, providing an ultra-high-duty impact resistance.

.9 All areas requiring Impact Resistance Levels higher than "standard", as defined by Table 1.5.8 of this specification, shall be detailed in the project architectural drawings and shop drawings where applicable and described in the contract documents clearly identifying the Impact Resistance Classification, inclusive of the specific layers of reinforcing mesh applicable

2.8 BASE COAT

.4 Durex® Uniplast, a two-component polymer-modified cementitious base coat mixed with Acrybond S, a water-based 100% acrylic polymer additive in a ratio of 1 bag Durex® Uniplast to 5 l of Durex® Acrybond S.

.5 Durex® Monobase, a single component, polymer-based cementitious base coat which is mixed with water in a ratio of 1 bag Durex® Monobase to 5-6 l of potable water.

.6 Durex® Flexcrete, a two component, polymer-based cementitious base coat, mixed with Flexcrete B in 1:1 ratio.

.7 Where allowed by the applicable code through conformance to the prescribed fire protection requirements, Durex® Flexcrete, a two component, polymer-based cementitious base coat could be used as a base coat in the Durex® “Quantum Select” system. Consult your Durabond Products Ltd. for further assistance in the selection of the appropriate base coat

2.9 PRIMER

.1 Durex® Brush Coat Primer, a water-based, 100% acrylic coating, colour-tinted to suit the colour of the final finish coat.

2.10 FINISH COAT

.1 Durex® Architectural Coatings, Classic Series, a 100% acrylic, water-based, multi-coloured, textured, protective coating. (Colour and texture to be selected)

.2 Durex® Architectural Coatings, Premium Series, high build, multi-coloured, protective and decorative coating consisting of coloured quartz aggregates and oversized mica flakes embedded in a clear 100% acrylic resin, textured, protective coating. Colour and texture to be selected by consultant as per drawings, allow for a minimum of four (4) colours.

.3 Durex® Architectural Series, Artisan Series, a 100% acrylic, water-based, high-build, multi-coloured, textured with special patterns and artistic releifs, protective coating. Colour and texture to be selected by consultant as per drawings, allow for a minimum of four (4) colours.

.4 Durex® Architectural Series, Kolor Gard Series, a 100% acrylic, Fade Resistant Decorative High Build Protective Textured Coating for Accent & Bright Colours. Colour and texture to be selected by consultant as per drawings, allow for a minimum of four (4) colours.

.5 Durex® Architectural Coatings, Elastomeric FX Series, a 100% acrylic, water-based,

high-build, high flexibility, multi-coloured, textured, protective coating. Colour and texture to be selected by consultant as per drawings, allow for a minimum of four (4) colours.

2.11 TRIM ACCESSORIES

.1 As selected by the Consultant and recommended by Durabond Products Ltd.

2.12 ACCESSORY PRODUCTS

.1 Sealant: a low modulus sealant, as recommended and approved by Durabond Products Ltd. Standard colour shall be selected by consultant.

.2 Foamed-in-place Insulation: Class 1, single or two components, polyurethane foam, moisture cured with flame-spread rating of ≤ 25, fuel contribution 0 and smoke developed ≤ 20, as per (ULC S710.1). Must be ozone friendly and containing no fluorocarbons and have a density ≥ 27.2 kg/m3 (1.75 lb/ft3) and a minimum "RSI" value of 0.91 per 25 mm ("R" value of 5 per inch) thickness.

2.13 EQUIPMENT

.1 All mixing shall be carried out with a clean, rust-free paddle mixer that shall minimize air entrainment, powered by a power-drill at 400-500 rpm maximum speed.

.2 Hot knife or hot groover complete with all related accessories such as cutting blades and appropriately sized sleds

.3 Metal or paper rasps with a nominal size of #15 grit.

.4 Metal trowels, hawks, utility knives, corner trowels and plastic floats

.2 Related wall assembly components:
.1 Flashing: In accordance with Section 07 62 00.
.2 Joint Sealants: In accordance with Section 07 92 00

2.2 Mixes

.1 Mix materials in accordance with written instructions.
.1 Use only clean potable water, free of salts, other contaminates or deleterious materials to mix adhesive/base coat.
.2 Use clean, rust-free, high-speed mixer to stir finish to uniform consistency. Add small amounts of clean potable water to aid workability.
.3 Use of antifreeze agents, accelerators, rapid binders or other additives is not permitted.
.4 Mix only as much material as can readily be used.

2.3 Source Quality Control

.1 Consistent with ULC S716.2, ensure continuous insulation cladding system components, air and moisture barrier system, adhesive, base coat, primer, and finish coat materials are supplied by single manufacturer.

PART 3 EXECUTION

3.1 Examination

.1 Verification of Conditions: Verify that substrate conditions which have been previously installed under other sections or contracts meet design tolerances and are acceptable for product installation in accordance with manufacturer's Installation Guide prior to installation of cladding system.

.2 Inspect surfaces to determine conditions as follows:
- .1 Contamination from algae, chalkiness, dirt, dust, salts, efflorescence, form oil, fungus, grease, laitance, mildew or other foreign substances.
- .2 Surface absorption and chalkiness.
- .3 Surface cracks: Measure and record location.
- .4 Damage and deterioration.
- .5 Moisture content and moisture damage: Use moisture meter to determine if surface is dry enough to receive the fluid applied air and moisture barrier.
- .6 Inform Owner and Consultant of unacceptable conditions immediately upon discovery.
- .7 Proceed with installation after verification and correction of surface conditions.

3.2 Preparation

.1 Protect adjacent surfaces from damage or overspray resulting from continuous insulation cladding system work. Mask adjacent surfaces, fixtures, equipment, landscaping and other components to protect from over spraying.

.2 Remove loose or damaged materials.

.3 Resurface, patch or level surfaces to required tolerance and smoothness in accordance with written instructions.

.4 Ensure foundation waterproofing material and roof membrane materials are correctly terminated to properly transition with the fluid applied air/moisture barrier on the wall for air barrier continuity and waterproofing integrity.

3.3 Coordination

.1 Provide coordination such that earth grade terminates a minimum 200 mm below the continuous insulation cladding system, minimum 50 mm above finished grade (pavers/sidewalk). Provide increased clearance in freeze/thaw climate zones.

.2 Coordinate installation of foundation waterproofing, roofing membrane, windows, doors and other wall penetrations to provide a continuous air barrier and continuous moisture protection.

.3 Provide protection of rough openings before installing windows, doors, and other penetrations through the wall, and provide sill flashing.

.4 Coordinate installation of air and moisture barrier components with window and door installation to provide weatherproofing of the structure and to prevent moisture infiltration and excess air infiltration.

.5 Provide head flashing immediately after windows, doors, and similar elements are installed.

.6 Provide diverter flashings wherever water can enter the wall assembly to direct water to the exterior, for example, at lower-to-higher wall intersections.

.7 Install splices or tie-ins from the air/moisture barrier over back leg of flashings and similar details to form a shingle lap that directs incidental water to the exterior.

.8 Install copings and sealant immediately after installation of the cladding system when coatings are dry, and such that, where sealant is applied against the cladding system surface, it is applied against the base coat or primed base coat surface.

.9 Schedule work such that the air/moisture barrier is exposed to weather no longer than 30 days.

.10 Attach penetrations through continuous insulation cladding system to structural support and provide airtight and water tight seals at penetrations.

3.4 APPLICATION

.1 General:
- .1 Supply experienced and qualified installers and applicators to carry out the work.
- .2 Mix materials in accordance with manufacturer's instructions.
- .3 Install the exterior insulation and finish system in strict accordance with the approved mock-up and manufacturer's printed instructions and provided reviewed shop drawings as required.

.2 Water Resistive Barrier (WRB)
- .1 Apply the exterior insulation and finish system's moisture transition membrane at all vertical and horizontal sheathing board joints and all sheathing board corners.
- .2 Apply the selected insulation and finish system's water resistive barrier as per the manufacturer's application instructions, over the entire substrate surface, applying sufficient pressure in the troweling process to ensure full contact with the substrate.
- .3 Allow a minimum of 24 hours for drying and curing.
- .4 At all locations where the substrate material changes, install a 30 mm (12") strip of the system's moisture barrier transition membrane in strict accordance with the manufacturer's printed instructions to maintain continuity of the water resistive barrier.
- .5 Transition membranes used in conjunction with the WRB must be applied over clean, dry and contaminants free substrates that are primed with the specified primer. To ensure the proper level of adhesion and bond strength of the transition membrane, applicators must strictly follow the setting time, setting temperature conditions and tack characteristics of the primer.

.3 Insulation Board

.1 Install full size exterior insulation and finish system's insulation board, horizontally, over the water resistive barrier with the specified adhesive, beginning at one end, from a baseline to form an uninterrupted thermal barrier. Coordinate placement of the insulation boards with the system's pre-wrapped Vent board and Boundary Board.

.2Install the insulation boards in running bond pattern, offsetting the insulation's joints

with respect to joints in the substrate by a minimum of 200 mm (8") and having the pre-machined vertical channels in alignment.

.1 Organize board placement to align vertical edges with framing members or appropriate support system

.2 Butt the insulation boards to a moderately tight fit, avoiding gaps. Fill gaps with pieces cut to fit or fill with foamed-in-place polyurethane insulation. Ensure the thermal barrier is continuous throughout.

.3 Interlock board joints at all outside and inside corners. Use pre-cut and pre-back-wrapped “L-shaped” insulation boards around fenestration and openings to avoid alignment of insulation joints with corners of openings.

.4 Immediately after applying the insulation adhesive, before initial set begins, firmly press the insulation board into place.

.5 Where applicable, mark-out alignment and cut reveals in insulation boards as per architectural drawings. Ensure reveals are true to size, straight, plumb and level throughout.

.6 Rasp the entire insulation surface and edges to a tolerance of not more than 3 mm (1/8") in 3 m (10').

.4 Vent Board

.1 Install the pre-wrapped exterior insulation and finish system’s Vent Board at all heads of openings such as windows, doors, louvers etc., at the bases of the walls and at all horizontal interfaces/terminations between the exterior insulation and finish system and other cladding systems such as brick, stone, metal cladding, precast, metal flashing etc. Install the Vent Board by applying the selected system’s insulation adhesive using the specially cut notched steel trowel on the back of the Vent Board and placing it firmly over the cured water resistive barrier. Allow an approximate 12.7 mm (1/2”) space between the exterior insulation and finish system and the specified cladding system.

SPEC NOTE: Lap the reinforcing mesh of the Vent Board onto the front face of the insulation board by 100 mm (4”). Press the fabric of the Vent Board into a bed of base coat and smooth out ensuring that the reinforcing mesh is well embedded into the base coat.

.5 Boundary Board

.1 Install the Boundary Board at the top of the wall and at all vertical interfaces with dissimilar substrates, jambs and sills of fenestrations, at minor penetrations and other terminations by using the following procedure:

.1 Apply the specified insulation adhesive using a steel notched trowel, on the back of the Boundary Board and placing it over the cured specified water resistive barrier, using uniform pressure. Allow a space of approximately 12.7mm (1/2”) between the exterior insulation and finish system’s starter strip and the specified cladding system.

.2 Lap the reinforcing mesh of the Boundary Board onto the front face of the insulation board by 100 mm (4”). Press the fabric of the Boundary Board into a bed of base coat and smooth out ensuring that the reinforcing mesh is well embedded into the base coat.

.6 Insulation Adhesive

.1 The exterior insulation and finish system Adhesive Application Procedure A:

.1 Utilizing a specially cut notched steel trowel, apply the system’s selected insulation adhesive on the back of the insulation board, ensuring that there is a ribbon of insulation adhesive in the center of the upper side of

each pre-machined channel. Immediately install the insulation board over the cured, selected water resistive barrier with firm and uniform pressure. Apply the selected insulation adhesive so as to avoid excess material in the pre-machined channels. Ensure that the insulation board is installed so that the pre-machined channels are vertically aligned.

.2 The exterior insulation and finish system Adhesive Application Procedure B:

.1 Apply the selected system's adhesive at 2 mm (3/32") thick uniformly over the cured Water Resistive Barrier (WRB). Immediately adhere the system's insulation board, pressing it into the wet adhesive, ensuring full contact between them.

.7 Base Coat and Reinforcing Mesh

.1 Ensure that the insulation boards have been rasped and the surface is dry and free of loose insulation, dirt, yellowing from UV exposure, etc. and that detail work has been completed.

.2 At all areas where detail reinforcing mesh has been installed, apply a layer of base coat to the exposed edges and face of the insulation boards. Pull the detail reinforcing mesh into the base coat so that it is fully embedded. Using an edging tool, smooth the corner to render it square.

.3 Reinforce all corners of openings where no control joints are detailed with an additional strip of reinforcing mesh, 230 mm by 305 mm (9" by 12") installed diagonally across the corners.

.4 Apply a layer of base coat over the insulation surface, not less than 2 mm, applying sufficient pressure in the trowelling process to ensure full contact with the insulation. Immediately place the reinforcing mesh onto the wet base coat and trowel the mesh from the centre to the edges, filling all voids in the mesh until the mesh is completely embedded.

.5 Provide high impact reinforcing mesh where indicated on drawings. Tightly abut the edges; do not lap high impact mesh. Embed the mesh into the wet base coat and trowel the mesh from the centre to the edges, filling all voids in the mesh until the mesh is completely embedded. Allow the high impact mesh-reinforced base coat to dry before applying the successive standard reinforcing mesh.

.6 Install the reinforcing mesh tight, straight and free of wrinkles, ripples and waves.

.7 Embed the standard reinforcing mesh into the base coat with joints overlapped a minimum of 102 mm (4") and double wrapping inside and outside corners a minimum of 203 mm (8").

.8 Overlap detail reinforcing mesh with standard reinforcing mesh 100 mm (4") at all locations where detail reinforcing mesh has been installed.

.8 Final Base Coat

.1 In hot, dry weather, if the scratch coat surface is exceptionally dry, lightly dampen the surface with a fog mist of clean potable water. Do not over-saturate with water, as it will impair the bonding of the base coat.

.2 Trowel apply the base coat, applying sufficient pressure to ensure full bond with the base coat.

.3 Use a straight edge tool to featheredge the surface and bring it to a straight, even and true surface.

.4 Total thickness of base coat shall be achieved at an application rate not less than 7.2 kg/m2 (1.5 lb/ft2).

.5 When the base coat has taken initial set, use a wood or sponge float and work

the surface with light circular motions to remove all high points and to fill low points.

.6 Final surface shall be smooth, straight and true to a tolerance of not more than 3.2 mm in 3 m (1/8" in 10'-0"). Surface shall be free of trowel marks, irregularities and visible mesh pattern.

.7 Allow a minimum of 3 days for curing and drying.

.9 Finish Coat Primer

.1 Evenly apply the primer throughout with a high pile roller at a rate of 2.8 m2/l (600 ft2/pail). The substrate shall not be visible through the applied primer.

.2 Avoid excessive build-up in any one area.

.3 Allow minimum 4 hours for curing prior to application of finish coat.

.10 Finish Coat

.1 Apply the System's selected finish coat, within 3 days after application of the system's selected primer. Longer periods may be scheduled between operations provided that the primed surface is kept clean and in good condition.

.2 Apply the selected finish coat in strict accordance with manufacturer's printed instructions for the Selected finish.

.3 Apply the finish coat in such a way as to match the colour and texture of the approved site mock-up.

.4 Do not apply the finish coat onto surfaces that are intended to be caulked.

3.2 JOINTS

.1 Provide expansion joints in alignment with building expansion joints.

.2 Install expansion joints at all locations where dissimilar substrates meet.

.3 Install expansion joints at all locations of maximum stress, in the direction as shown on drawings.

.4 Install control joints and/or reveals horizontally and vertically so to divide the wall surface into panels of not more than 20 m2 (215 ft2). Neither dimension within the panel should be greater than 2.5 times the other.

.5 All horizontal joints shall be vented by means of the manufacturer's Vent Board and located and spaced at intervals not greater than three stories.

.6 Unless otherwise noted, provide all joints 12.7 mm (1/2") wide.

3.3 SEALANTS

.1 Seal and caulk all joints in the exterior insulation and finish system with the system's specified elastomeric sealant that shall be applied over a compatible closed-cell foam backer rod or bond breaker tape.

.2 Seal and caulk all expansion joints between the exterior insulation and finish system and dissimilar abutting building components.

.3 Apply sealant and/or sealant primer in strict accordance with the sealant manufacturers

printed instructions.

3.5 Field Quality Control

.1 Schedule site visits by third party quality assurance agent to conduct tests and review work as follows:

.2 Testing:
- .1 Continuous insulation cladding system adhesion (ASTM D4541) at once per 700 m^2.
- .2 Window water spray tests at [three per elevation.
- .3 Sealant field adhesion tests on each elevation.

3.6 Protection

.1 Provide protection of installed materials from water infiltration into or behind the system. Provide protection of installed primer and finish coat from dust, dirt, precipitation, freezing, and continuous high humidity until fully dry.

.2 Provide sealant tested in accordance with ASTM C1382 with backer material at continuous insulation cladding system terminations to protect against air, water and insect infiltration.

.3 Provide weeps at floor lines, window and door heads, and other areas to conduct incidental water to the exterior.

3.7 Cleaning

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

.2 All surrounding areas, where the system has been applied, shall be left free of debris and foreign substances resulting from the contractor's work. All excess materials shall be removed from the job site.

.3 Clean all surfaces so they are free of foreign matter using cleaners recommended by material manufacturer.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 30 00 Cast-in-Place Concrete
.2 Section 06 10 00 Rough Carpentry
.3 Section 07 21 13 Building Insulation
.4 Section 07 27 00 Vapour Permeable Air Barriers
.5 Section 07 92 00 Joint Sealants
.6 Section 09 21 16 Gypsum Board
.7 Section 31 23 10 Excavating, Trenching and Backfilling

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM E96/E96M-22ae1 Standard Test Methods for Water Vapor Transmission of Materials
  .2 ASTM E154/E154M-08a(2019) Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover
  .3 ASTM E1643-18a Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs
  .4 ASTM E1745-17(2023) Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs
  .5 ASTM F1249-20 Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor
.2 Canadian General Standards Board (CGSB)
  .1 CAN/CGSB-51.34 Vapour Barrier, Polyethylene Sheet, for Use in Building Construction
.3 American Concrete Institute (ACI)
  .1 ACI 302.1R Guide for Concrete Floor and Slab Construction

1.4 Submittals

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

.2 Submit manufacturer's product data including certification that materials meet the requirements of the reference standards, and application instructions.

1.5 Project Conditions

.1 Products specified are not intended for uses subject to abuse or permanent exposure to the elements.

.2 Do not apply membranes on frozen ground.

1.6 Quality Assurance

.1 Use an experienced installer and adequate number of skilled personnel who are thoroughly trained and experienced in the application of the vapor retarder.

.2 Obtain vapour retarder materials from a single manufacturer regularly engaged in manufacturing

the product.

.3 Provide products which comply with all federal, provincial and local regulations controlling use of volatile organic compounds (VOCs).

1.7 Shipping, Handling and Storage

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

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

.3 Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

.4 Store materials in a clean dry area in accordance with manufacturer's instructions. Stack membrane on smooth ground or wood platform to eliminate warping.

.5 Protect materials during handling and application to prevent damage or contamination.

.6 Ensure membrane is stamped with manufacturer's name, product name, and membrane thickness at intervals of no more than 220 cm.

1.8 Waste Management and Disposal

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

PART 2 PRODUCTS

2.1 Sheet Vapour Barrier

.1 Polyethylene film: to CAN/CGSB-51.34, 0.15 mm thick.

.2 Joint sealing tape: air resistant pressure sensitive adhesive tape, type recommended by vapour barrier manufacturer, 50 mm wide for all lap joints and perimeter seals.

.3 Mastic: as recommended by membrane manufacturer and compatible with substrate.

.4 Sealant: compatible with vapour retarder materials, recommended by vapour retarder manufacturer.

.5 Moulded box vapour barrier: factory-moulded polyethylene box for use with recessed electric switch and outlet device boxes.

2.2 Sheet Vapour Barrier for Below Concrete Slabs on Grade

.1 Vapour retarder membrane below slabs on grade shall be manufactured from virgin polyolefin resins and shall meet or exceed all requirements of ASTM E1745, Class A.
  .1 Maximum Water Vapour Permeance (ASTM E154 Sections 7, 8, 11, 12, 13, by ASTM E96, Method B or ASTM F1249)
    .1 As received: 0.0063 perms.
    .2 After Wetting and Drying: 0.0052 perms.
    .3 Resistance to Plastic Flow and Temperature: 0.0057 perms.
    .4 Effect Low Temperature and Flexibility: 0.0052 perms

.5 Resistance to Deterioration from Organisms and Substances in Contacting Soil: 0.0052 perms.
.6 Puncture Resistance (ASTM D1709): >3,200 grams.
.7 Tensile Strength ASTM E154, Section 9: 72 Lb. Force/Inch

.2 Thickness of Retarder (plastic), ACI 302.1R-96, not less than 15 mils.

.3 Acceptable product: Sealtight Perminator HP, as manufactured by W.R. Meadows or Stego Wrap Vapor Barrier by Stego Industries LLC.

.2 Seam Tape: High Density Polyethylene Tape with pressure sensitive adhesive. Minimum width 100 mm. Perminator Tape by W.R. Meadows or Stego Tape by Stego Industries LLC.

.3 Pipe Collars: Construct pipe collars from vapor barrier material and pressure sensitive tape per manufacturer's instructions.

PART 3 EXECUTION

3.1 Vapour Retarders in Walls

.1 Ensure services are installed and inspected prior to installation of vapour retarder.

.2 Use sheets of largest practical size to minimize joints. Install horizontally on wall surfaces.

.3 Adhere membrane to metal studs with continuous ribbons of mastic.

.4 Tape all joints.

.5 Seal perimeter of sheet vapour barrier as follows:
.1 Apply continuous bead of sealant to substrate at perimeter of sheets.
.2 Lap sheet over sealant and press into sealant bead.
.3 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

.6 Seal lap joints of sheet vapour barrier as follows:
.1 Attach first sheet to substrate using sealant/adhesive.
.2 Apply continuous bead of sealant over solid backing at joint.
.3 Lap adjoining sheet minimum 150 mm and press into sealant bead.
.4 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

.7 Seal electrical switch and outlet device boxes that penetrate vapour barrier as follows:
.1 Install moulded box vapour barrier.
.2 Apply sealant to seal edges of flange to main vapour barrier and seal wiring penetrations through box cover.

.8 Inspect for continuity. Repair punctures and tears with sealing tape before work is concealed.

.9 Refer to building elements schedule on the drawings and details for locations of vapour retarders.

3.2 Vapour Retarders Below Slabs

.1 Install sheet vapour retarder below all concrete slabs on grade.

.2 Prepare surfaces in accordance with manufacturers recommendations.

.3 Level, tamp, or roll earth or granular material beneath the slab base.

.4 Install vapour retarder below floor slab immediately prior to concrete reinforcement placement and in accordance with ASTM E1643

.5 Unroll vapour retarder with the longest dimension parallel with the direction of the pour.

.6 Lap vapour retarder over footings and seal to foundation walls.

.7 Overlap joints 150 mm and seal with manufacturer's tape.

.8 Seal all penetrations (including pipes and conduits) with manufacturer's pipe boot.

.9 No penetration of the vapour retarder is allowed except for reinforcing steel and permanent utilities.

.10 Repair damaged areas by cutting patches of vapour retarder, overlapping damaged area 150 mm and taping all four sides with tape.

.11 Restrict traffic over vapour retarder.

.12 Prior to placing concrete inspect vapour retarder and repair all tears and punctures.

3.3 Inspection

.1 Arrange for inspection of vapour retarders immediately prior to covering, by local building department and Consultant.

.2 Make all required repairs identified during inspection.

3.4 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 05 41 00 Structural Metal Stud Framing
.2 Section 06 10 00 Rough Carpentry
.3 Section 07 21 13 Building Insulation
.4 Section 07 62 00 Sheet Metal Flashing and Trim
.5 Section 07 92 00 Joint Sealants
.6 Section 09 21 16 Gypsum Board

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM D882-18 Standard Test Method for Tensile Properties of Thin Plastic Sheeting
  .2 ASTM D903-98(2017) Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
  .3 ASTM E84-23d Standard Test Method for Surface Burning Characteristics of Building Materials
  .4 ASTM E96/E96M-22 Standard Test Methods for Water Vapor Transmission of Materials
  .5 ASTM E283/E283M-19 Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
  .6 ASTM E330/E330M-14(2021) Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
  .7 ASTM E331-00(2016) Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
  .8 ASTM E1186-17 Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems
  .9 ASTM E2178-21a Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials
  .10 ASTM E2357-18 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
.2 National Air Barrier Association (NABA)
  .1 National Air Barrier Association's (NABA) Quality Assurance Program (QAP)

1.4 Submittals

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

.2 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Submit manufacturer’s complete set of standard details for air barriers.

.4 Quality Assurance Submittals: submit following in accordance with Section 01 45 00 - Quality Control.
  .1 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures.

1.5 Performance Requirements

.1 Select and install wall components and assemblies to resist air leakage caused by static air pressure across exterior wall assemblies, including windows, glass, doors, and other interruptions to integrity of wall systems; to maximum air leakage rate of 0.01 L/s.m² when subjected to pressure differential of 75 Pa as measured in accordance with ASTM E330.

.2 Select and install wall components and assemblies to resist air leakage caused by dynamic air pressure across exterior wall assemblies, including windows, glass, doors and other interruptions to integrity of wall systems; to maximum air leakage rate of 0.013 L/s.m² when subjected to hourly wind design loads in accordance with NBC, using 1 in 10 year probability, as measured in accordance with ASTM E330.

.3 If ongoing testing is required throughout air barrier system installation, perform qualitative testing methods in accordance with ASTM E1186 and ASTM D4541.

.4 Provide continuity of air barrier materials and assemblies in conjunction with materials described in other Sections.

1.6 Quality Assurance

.1 Quality Assurance Program: Submit evidence of current Contractor accreditation and Installer certification under the National Air Barrier Association's (NABA) Quality Assurance Program.

.2 Preconstruction Meeting: Convene a minimum of two weeks prior to commencing work of this Section. Agenda shall include, at a minimum, construction and testing of mock-up, sequence of construction, coordination with substrate preparation, air barrier materials approved for use, compatibility of materials, coordination with installation of adjacent and covering materials, and details of construction and chemical/fire safety plans. Attendance is required by representatives of related trades including covering materials, substrate materials and adjacent materials.

.3 Mock-Ups: Build mock-up representative of primary air barrier assemblies and glazing assemblies including backup wall and typical penetrations as acceptable to the Consultant. Mock-up shall be dimensions no less than 2.5 metres long by 2.5 metres high and include the materials and accessories proposed for use in the exterior wall assembly. Mock-ups shall be suitable for testing as specified in the following paragraph.

1.7 Sequencing

.1 Sequence work to permit installation of materials in conjunction with related materials and seals.

1.8 Shipping, Handling and Storage

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

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

1.9 Waste Management and Disposal

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

PART 2 PRODUCTS

2.1 Materials

.1 Materials: as required to achieve specified performance criteria; meeting specified reference standards and functionally compatible with adjacent materials and components.

.2 Air barrier membrane components and accessories must be obtained as a single-source from the membrane manufacturer to ensure total system compatibility and integrity.

2.2 Membranes

.1 Primary Sheet-Applied, Vapour Permeable Water Resistive Air Barrier (Basis of Design):
  .1 Self-adhered vapour permeable, water resistive air barrier consisting of a reinforced, modified polyolefin tri-laminate film surface and patented permeable adhesive technology with split-back poly-release film; having the following typical physical properties:
    .1 Thickness: 0.58 mm (23 mils)
    .2 Water Vapour Permeance (ASTM E96): 1658 ng/Pa.m2.s., (29 perms)
    .3 Air Leakage of Air Barrier Assemblies (ASTM E2357): Pass
    .4 Air Permeance (ASTM E2178): Pass
    .5 Nail Sealability (ASTM D1970): Pass
    .6 Dry Tensile Strength (ASTM D882):
      .1 41 lbf /182N MD
      .2 29 lbf /129N CD
    .7 Surface Burning Characteristics (ASTM E84):
      .1 Flame Spread: Class A
      .2 Smoke Development: Class A

.2 Acceptable Products:
  .1 Blueskin VP160 by Henry Company.
  .2 Sopraseal Stick VP by Soprema.
  .3 Delta-Vent SA by Dörken Systems Inc.

2.3 Adhesive and Primers

.1 As recommended by manufacturer.

.2 Low Application Temperature: -7 ° C.

2.4 Mastics & Termination Sealants

.1 As recommended by manufacturer.

PART 3 EXECUTION

3.1 Manufacturer’s Instructions

.1 Comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 General

.1 Perform Work in accordance with National Air Barrier Association - Professional Contractor Quality Assurance Program and requirements for materials and installation.

3.3 Examination

.1 Examine all surfaces to ensure conformance to the manufacturer's recommended surface conditions.

3.4 Preparation

.1 Prepare substrate surfaces in accordance with air barrier material manufacturer's instructions.

.2 All surfaces which are to receive flexible air barrier must be smooth, clean, dry, frost-free and in sound condition. All moisture, frost, grease, oils, loose mortar, dust, or other foreign materials which may impede the adhesion of the air barrier must be removed.

.3 New mortar must be cured 14 days and must be dry before air barrier membrane is applied.

.4 Concrete must be cured 28 days and dry before air barrier membrane is applied.

.5 Remove any and all sharp protrusions and repair any defects such as spalled or loose aggregate areas.

.6 Do not proceed with air barrier application until all substrate defects are repaired.

3.5 Installation

.1 Install air barrier materials continuously over substrate in accordance with manufacturer's instructions. Partial application is not acceptable, and the insulation specified elsewhere is not intended to perform as the sole air barrier.

.2 Prime surfaces and apply membrane in strict accordance with manufacturer's printed directions.

.3 Primed surfaces not covered by air barrier membrane during the same working day must be reprimed.

.4 Apply membrane by heating the surface in contact with the substrate with a trigger-activated propane torch, type as recommended by the manufacturer.

.5 Cut sheet membrane into manageable sizes, position membrane for alignment prior to removing protective film.

.6 Install membrane horizontally, in a shingle fashion starting at lowest point. Position membrane and remove protective film and press firmly into place. Ensure minimum 50 mm overlap at all end and side laps. Promptly roll the membrane surface and all laps with a countertop roller to ensure proper surface bond and effect the seal.

.7 Tie-in to window frames, door frames, roofing systems, cladding, concrete walls, and at the interface of dissimilar materials as indicated or as necessary to achieve a continuous air seal throughout the building envelope. Seal with air barrier tape. Refer to manufacturer’s standard details.

.8 All joints, interconnections, and penetrations of the air barrier components including lighting fixtures shall be indicated on manufacturer's standard details.

.9 Ensure all projections are properly sealed with a trowel or caulk application of specified sealant.

3.6 Inspection and Repair

.1 Inspect membrane thoroughly before covering and make any corrections to punctures, tears, voids and other obvious defects which would impede the membrane from performing as intended.

3.7 Cleaning and Protection

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

.2 Protect air barrier materials from damage during installation and the remainder of the construction period, according to material manufacturer's written instructions.

.3 Coordinate with installation of materials which cover the air barrier assemblies, to ensure exposure period does not exceed that recommended by the material manufacturer.

.4 Clean adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction and acceptable to the primary material manufacturer.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 05 12 23 Structural Steel

.2 Section 05 41 00 Structural Metal Stud Framing

.3 Section 07 62 00 Sheet Metal Flashing and Trim

.4 Section 07 92 00 Joint Sealants

1.3 References

.1 ASTM International (ASTM)

.1 ASTM A653/A653M-22 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

.2 ASTM C481-99(2016) Standard Test Method for Laboratory Aging of Sandwich Constructions

.3 ASTM D968-22 Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive.

.4 ASTM D3363-22 Standard Test Method for Film Hardness by Pencil Test

.5 ASTM E84-23d Standard Test Method for Surface Burning Characteristics of Building Materials

.2 CSA Group (CSA)

.1 CSA S136-12 North American Specification for the Design of Cold Formed Steel Structural Members

.2 CSA S157-17 Strength Design in Aluminum

.3 Canadian Sheet Steel Building Institute (CSSBI)

.1 CSSBI Standard Practice for Sheet Steel Cladding.

1.4 Submittals

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

.2 Submit shop drawings. Indicate dimensions, wall openings, head, jamb, sill and mullion details, materials and finish, attachment methods, compliance with design criteria and requirements of related work and accommodation of thermal movement. Show material profile, caulking, closures and expansion joint details. Include necessary plans, elevations and details. Details shall be drawn at not less than one half full size.

.1 All dimensions must be verified in the field prior to submission of shop drawings.

.3 Shop drawings shall be stamped and signed by a registered Professional Engineer licensed to practice in the Province of Ontario.

.4 Submit for approval duplicate 200 x 200 mm samples in the selected materials, colours and profiles.

.5 Submit cleaning and maintenance data for inclusion in Maintenance Manuals specified in Section 01 78 00.

1.5 Design Requirements

.1 Design, fabricate and erect a pressure equalized composite metal wall panel system to meet the requirements of this specification.

.2 Structural and thermal movement: Accommodate movement of supporting structural framing and movement caused by thermal expansion and contraction of system component parts without causing bowing, buckling, delamination, oil canning, failure of joint seals, excessive stress on fasteners or any other detrimental effects.

.3 Include expansion joints to accommodate movements in wall system and between wall system and building structure, caused by structural movements, without permanent distortion.

.4 Design framing members to withstand dead load and wind load as calculated in accordance with the National Building Code of Canada, (OBC climatic data, 100 year probability) to maximum allowable deflection of L/175 of span or 19 mm whichever is less for system supports.

.5 Provide for positive drainage of condensation occurring within wall construction and water entering at joints to exterior face of wall in accordance with NRC rain screen principles.

.6 Design wall system to accommodate erection tolerances of structure.

.7 Panel Removal: Design system to allow removal of individual panels within wall system.

1.6 Quality Assurance

.1 Panel fabricator and installer shall be experienced and acceptable to panel manufacturer.

.2 Maximum deviation from the vertical and horizontal alignment of erected panels shall be no more than 6 mm in 6.0 metres.

.3 Design engineer and panel supplier shall furnish calculations confirming structural adequacy if requested.

.4 Painted surfaces of composite panels shall meet all criteria printed in the manufacturer's literature.

.5 Field measurements shall be taken prior to completion of shop fabrication.

.6 Provide mockups on building consisting of complete cladding system, including but not limited to metal furring, panels, securement devices, flashings, trims and mouldings. All material shall be of the colour and finish specified.

.1 Locate mockups as directed by the Consultant.

.2 Modify mockups as necessary for Consultant's approval. Mockups may remain in place as part of completed work after approval.

.3 Approved mockups shall represent standard for remainder of work.

1.7 Shipping, Handling and Storage

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

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

.3 Metal wall cladding shall be handled and stored on the job in such a manner that no damage shall be done to the material or the structures.

.4 Materials showing evidence of improper handling and storage shall be rejected and removed from the site at no additional expense to the Owner.

.5 Protect panel finish and edges per panel manufacturer's recommendations.

1.8 Waste Management and Disposal

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

1.9 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of two years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

.2 Submit panel manufacturer's warrantee covering failure of factory applied exterior finish on composite metal panels within the warranty period; warrant aluminum finish per ASTM D4212 for chalk not in excess of 8NBS units and fade not in excess of 5 NBS units. Warranty period for finish: 20 years following date of Substantial Performance.

PART 2 PRODUCTS

2.1 Manufacturer

.1 Composite metal wall panels and systems manufactured by the following, and meeting the intent of this specifications, are acceptable:

.1 VicWest System 1

.2 Sobotec SL-2000

.3 Kanalco Ltd.

.4 Firestone UNA-CLAD

2.2 System Description

.1 Wall system shall be comprised of composite soffits, fascia panels, spandrel panels with aluminum facings, subframing system, and all necessary flashing, trim and accessories. The wall system shall be a dry joint system, without requiring gaskets or sealants at panel joints.

2.3 Materials

.1 Composite panels shall have a Class "A" building material rating when tested in accordance with ASTM E84 and shall exhibit a flame spread of 15 and a smoke developed rating of 120.

.2 Panel Thickness: Designed to accommodate design loads and conditions but not less than 4.0 mm.

.3 Panel Weight: 5.4 kg/m^2 minimum.

.4 Aluminum Panel Finishes:

.1 Coating shall be equivalent to Reynolds Metal Company, Colorweld 500 XL, fluoro polymer coating utilizing 70% Kynar 500 resins.

.2 Colour shall be selected by the Consultant from the full range of manufacturer’s standards.

.3 Coating shall be factory applied on a continuous process paint line.

.4 Coating shall consist of a 0.2 mil (approx.) prime coat and a 0.8 mil (approx.) finish coat containing 70% Kynar resins.

.5 Pencil Hardness - ASTM D3363 Shall be HB-H minimum.

.6 Impact Adhesion - ASTM D2794 Coating shall show no cracking and no loss of adhesion.

.7 Cure Test - NCCA 11-18 Coating shall withstand 50+ double rubs of MEK soaked cloth.

.8 Humidity Resistance - ASTM D2247 Coating shall show no blisters after 3000 hours of 100% humidity at 95° F.

.9 Salt Spray Resistance - ASTM B117 After 3000 hours of exposure to 5% salt fog, at 95°F, scored sample shall show none or few #8 blisters, and less than 3.0 mm average creepage from scribe.

.10 Weatherometer Test - ASTM D822/G23 Coating shall show no cracking, peeling, blistering or loss of adhesion after 2000 hours.

.1 Chalking Resistance: ASTM D659 No chalking greater than #8 after ten years Florida exposure at 45° F

.2 Colour Change: ASTM D2244 Colour change shall not exceed 5 NBS units after 10 years Florida exposure at 45°F. After 5000 hours in Atlas Weatherometer coating shall show no objectionable chalking or colour change.

.11 Abrasion Resistance: ASTM D968 Coating shall resist 65±15 litres/mil minimum of falling sand.

2.4 Panel Composition

.1 Composite material shall be composed of a thermoplastic compound core sandwiched between two facing sheets formed into a continuous process. Exterior Sheets: aluminum. Interior Sheets: aluminum.

.2 Bond integrity, per ASTM D1781 and ASTM C481 Cycle B, shall be a minimum of 40 in-lb./in. (Peel strength).

.3 Aluminum Face Sheets: Thickness: 0.5 mm. Aluminum Alloy shall be AA3105 H25.

2.5 Accessories

.1 Provide proprietary aluminum extrusions to manufacturer’s standard profiles for a complete installation.

.2 All exposed fasteners shall be self-tapping 306 Series Stainless Steel.

.3 Concealed fasteners shall be stainless steel or Climaseal coated.

.4 Self-drilling fasteners shall be protected with a corrosion resistant finish.

.5 Joint filler strip: Same material and colour as panels. Use of caulking at joints is not acceptable.

.6 Sealants: As specified in Section 07 92 00. To ASTM C920, Type S, Grade NS, Class 100/50, Use NT.

.7 Plastic Shims: as recommended by manufacturer, for thermal separation between extrusions and sub girts.

.8 Isolation Coating: insulating butyl tape or paint-on isolation coating to CAN/CGSB-1.108

.9 Gaskets: Type II closed cell neoprene foam.

.10 Copings and Flashings: Roof copings and flashings shall be same material, thickness and colour as adjacent wall panels, formed to profiles shown on the drawings.

.11 Strippable Protective Face Coating: Clear, polyethylene, nominal 0.063 mm thick

PART 3 EXECUTION

3.1 Fabrication

.1 Field verify all dimensions prior to fabrication.

.2 Panels to be factory fabricated in accordance with specifications and reviewed shop drawings.

.3 Bond panels using continuous process without using applied adhesives.

.4 Maximum allowable fabrication tolerances to be:

.1 Panel bow: 0.8% of panel dimensions.

.2 Width or length:

.1 ± 0.8 mm up to 1220 mm

.2 ± 1.6 mm from 1220 to 3600 mm

.3 Squareness: maximum 5.0 mm difference between diagonal measurements.

.5 Form all panels to specified dimensions with tolerances to accommodate thermal expansion and contraction between panels and structural members. Accurately form radii of curved panels in plant.

.6 Fabricate corner pieces as detailed, without joints. Bend panels to minimum radius permitted by panel thickness.

.7 Factory fabricate accessory and trim components, ready for installation.

.8 Ensure panel surfaces are free of fabrication scratches or marks, and that entire project is manufactured from single colour coil paint run to ensure colour uniformity.

.9 Ensure that exposed panel grain is maintained with no panel blank sizes rotated.

3.2 Examination

.1 Inspect building structure, panel substructure and sheathing prior to commencement of installation.

.2 Substructure shall be structurally sound, level, plumb and free of defects detrimental to work and erected in accordance with established building tolerances.

.3 Do not proceed until all satisfactory conditions have been corrected.

3.3 Installation

.1 Comply with manufacturer’s instructions and reviewed shop drawings.

.2 Install galvanized steel sub girts horizontally over substrate in conjunction with insulation application and fasten through to substructure in accordance with the shop drawings. Maximum fastener spacing in either direction: 400 mm.

.3 Erect panels level and plumb, in proper alignment and relation to substructure framing and established lines. Maintain tolerances specified and recommended by the manufacturer.

.4 Panel anchorage shall be structurally sound and in accordance with engineered shop drawings.

.5 Where panel materials come in contact with dissimilar materials, a bituminous paint or caulking tape shall be installed to insulate between the dissimilar materials.

3.4 Accessories

.1 Brake form metal copings and flashings to profiles shown, in maximum lengths.

.2 Where aluminum materials come in contact with dissimilar materials, install isolation shim or tape at fastening locations.

.3 Install head and sill flashings, edge trim, cap pieces and other metal profiles as detailed and as required for a complete, weather tight installation.

.4 Install expansion and control joints where indicated.

.5 Maintain following installation tolerances:

.1 Maximum variation from plane or location shown on approved shop drawings: 13 mm in 6.0 metres.

.2 Maximum offset from true alignment between two adjacent members abutting end to end, in line: 0.8 mm.

3.5 Cleaning

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

.2 Replace damaged panels.

.3 Clean all foreign material from panel system.

.4 Remove strippable film coating as soon as possible after surrounding material has been installed.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 05 31 00 Steel Deck
.2 Section 06 10 00 Rough Carpentry
.3 Section 07 27 00 Vapour Permeable Barriers
.4 Section 07 62 00 Sheet Metal Flashing and Trim
.5 Section 07 71 00 Roof Specialties and Accessories
.6 Section 07 92 00 Joint Sealants

1.2 References

.1 ASTM International (ASTM)
  .1 ASTM C726-17 Standard Specification for Mineral Wool Roof Insulation Board
  .2 ASTM C1177/C1177M-17 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
  .3 ASTM C1289-23 Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
  .4 ASTM C1396/C1396M-17 Standard Specification for Gypsum Board
  .5 ASTM C1549-16(2022) Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer
  .6 ASTM D6878/D6878M-21 Standard Specification for Thermoplastic Polyolefin Based Sheet Roofing
  .7 ASTM E96/E96M-22ae1Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials
.2 CSA Group (CSA)
  .1 CSA A123.21:20 Standard Test Method for the Dynamic Wind Uplift Resistance of Membrane Roofing Systems
  .2 CSA O121-17 (R2022) Douglas Fir Plywood.
  .3 CSA O151-17 (R2022) Canadian Softwood Plywood.
.3 Canadian General Standards Board (CGSB)
  .1 CAN/CGSB 51.33-M89 Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.
.4 Canadian Roofing Contractors Association (CRCA)
  .1 CRCA Roofing Specification Manual 1997
.5 Factory Mutual (FM Global).
  .1 FM Approval Standard # 4470, Class 1 Roof Covers.
.6 National Research Council Canada (NRC)/Institute for Research in Construction (IRC) - Canadian Construction Materials Centre (CCMC)
  .1 CCMC-2002, Registry of Product Evaluations.
.7 Underwriters' Laboratories of Canada (ULC).
  .1 ULC 107-10 Methods of Fire Tests of Roof Coverings.
  .2 ULC 704-11 Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
  .3 ULC 770-15 Standard Test Method for Determination of Long-Term Thermal Resistance of Closed-Cell Thermal Insulating Foams
.8 South Coast Air Quality Management District, California State (SCAMQD)
  .1 SCAQMD Rule 1168-03 Adhesives and Sealants Application.

1.3 Submittals

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

.2 Source Quality Control: Submit manufacturer's test reports verifying materials meet performance criteria specified, in accordance with Section 01 45 00 - Quality Control.

.3 Submit proof of manufacturer's CCMC Listing and listing number.

.4 Manufacturer's Instructions: Provide to indicate special handling criteria, installation sequence and cleaning procedures.

.5 Product Data:
- .1 Submit product data sheets for insulation and roofing membranes. Include:
  - .1 Product characteristics.
  - .2 Performance criteria.
  - .3 Limitations.

.6 Shop Drawings:
- .1 Submit engineered shop drawing showing layout of mechanical fasteners to achieve specified uplift ratings.
- .2 Indicate control joints, tapered insulation, penetrations, field fabricated seams and installation details.
- .3 Provide layout and sections for tapered insulation.

1.4 Quality Assurance

.1 Provide total roofing assembly confirmation of conformity to "ULC Class A" design criteria. Confirmation to include project specific Uniform Wind Uplift Load Capacity (required for each roof section). Installed roof system shall withstand negative (uplift) design wind loading pressures complying with site specific conditions and all local buildings codes. It is the responsibility of the manufacturer to provide the contractor with a detailed report endorsing the attachment methods proposed.

1.5 Project Conditions

.1 Apply roofing membrane only when surfaces and ambient temperatures are within manufacturer's prescribed limits.

.2 Do not install roofing membrane when air and substrate temperature remains below 5 degrees C in accordance with manufacturer's recommendations or when wind chill gives equivalent cooling effect.

.3 Install roofing membrane on dry substrate, free of snow and ice. Use only dry materials and apply only during weather that will not introduce moisture into system.

1.6 Shipping, Handling and Storage

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

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

.3 Provide and maintain dry, off-ground weatherproof storage.

.4 Store materials on supports to prevent deformation.

.5 Remove only in quantities required for same day use.

.6 Store uncured flashing and jointing materials to prevent premature curing and freezing.

.7 Store insulation protected from sunlight and weather and deleterious materials.

.8 Store roofing materials in accordance with manufacturer's written instructions, to prevent damage or loss of performance.

1.7 Waste Management and Disposal

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

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Place materials defined as hazardous or toxic in designated containers.

.5 Unused adhesive and sealant materials must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

.6 Divert unused metal materials from landfill to metal recycling facility as approved by Consultant.

.7 Divert wood materials from landfill to recycling facility approved by Consultant

.8 Collect, package and store membrane cut-offs and waste material for recycling and return to recycler in accordance with Waste Management Plan.

.9 Fold up metal banding, flatten and place in designated area for recycling.

1.8 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of two (2) years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

.2 Defects to include but not be restricted to leaking, failure to stay in place, undue expansion, lifting, deformation, loosening and splitting of seams, joint deformation, failure to adhere, deterioration, blisters, etc.

.3 Manufacturer's Extended Warranty: Provide manufacturers extended ten year warrantee to cover repair or replacement costs for Labour, Materials and Workmanship required to restore roof or system to watertight condition, after a leak has occurred, due to defective materials or system related failures. Warranty shall be Non Pro Rated and must be covered to the original installation cost for the full ten years from the date of Substantial Performance.

.4 Solar Reflectance Warranty: Provide membrane manufacturer’s guarantee that roof membrane will retain sufficient solar reflectivity to meet Energy Star requirements for a minimum of ten years following date of Substantial Performance.

PART 2 PRODUCTS

2.1 Compatibility

.1 Compatibility between components of system and adjacent materials is essential. Provide a written declaration to Consultant stating that all materials and components, as assembled in system, meet this requirement.

2.2 Roof Systems Description

.1 Refer to drawings for description and detailing of roof systems and components.

2.3 Underlayment Board

.1 To ASTM C1177, moisture resistant. 1220 x 2440 mm sheets, 15. 9 mm thickness, 1220 x 1220 mm size. Minimum compressive strength of 310 kPa.
.1 Georgia Pacific Dens Deck Prime Roof and Substrate Board
.2 CGC Securock Gypsum Fiber Roof Board

.2 Adhesive as recommended by the manufacturer.
.1 Low VOC type to conform to SCAQMD Rule 1168-03.

2.4 Vapour Retarder

.1 “Peel and stick” rubberized asphalt membrane with compatible film coating, 40-mil composite consisting of 35 mils of self-adhering rubberized asphalt laminated to a 5-mil polyolefin film.

.2 Vapour retarder is to be free of nicks and cuts and shall demonstrate an average moisture transmission rate of 0.04 perms when tested to ASTM E96, Procedure B

.3 Adhesives and primers as recommended by manufacturer to suit substrate, low VOC type to conform to SCAQMD Rule 1168-03.

2.5 Membrane

.1 Roof Membrane: To ASTM D6878, Energy Star listed, Non-Halogenated TPO (Thermoplastic Polyolefin), 1.5mm thick reinforced membrane manufactured with a 9 x 9, 1000 denier polyester reinforcement conforming to the following physical properties:

PROPERTY	TEST METHOD	TYPICAL TEST VALUES
Colour (Face)		White
Weight	ASTM D751	1.5 mm .21 lb/ft²
Thickness, Nominal	ASTM D751	.060”
Thickness Over Scrim, mm (in)	ASTM D4637 Optical Method	.381mm (.015”) Min.
Breaking Strength, min	ASTM D751	1 k/N Min
Elongation (unreinforced)	ASTM D421	500%
Tearing Strength, Min.	ASTM D751	245N
Properties after heat aging	ASTM D751	
a. Breaking Strength	ASTM D3045	90%
b. Tear Strength		90%

PROPERTY	TEST METHOD	TYPICAL TEST VALUES
c. Elongation		90 %
Brittleness Point	ASTM D2137	-40°C
Ozone Resistance	ASTM D1149	Pass
Water Absorption, Max.	ASTM D471	+/- 2%
Linear Dimensional Change, Max.	ASTM D1204	+/- 2%
Weather Resistance	ASTM G53	Pass (No Cracks)
Solar Reflectance	ASTM C1549	White: 75 min
Water Vapour Transmission	ASTM E96	13 (perm mils)
Puncture Resistance	FTM 101C Method 2031	200 lbs Min.
Fungus Resistance	ASTM G21 (21 days)	No sustained growth - Pass
Solar Reflectance, % 65% req'd for Energy Star	Albedo x 100 Spectrum Reflectometer	White: 75 min., 87 typical
Emmitance, IR	ASTM E408	0.92 typical

.2 Elastic flashings - Field fabricated with TPO membrane, 1.6 mm thick.

.3 Adhesive as recommended by membrane manufacturer, low VOC type to conform to SCAQMD Rule 1168.

2.6 Isocyanurate Insulation

.1 Polyisocyanurate Base Insulation to ULC 704, and ASTM C1289, Type II, Class 1, Grade 3 (25 psi), manufactured with HC blowing agent foam core laminated to medium weight non-asphaltic fiber-reinforced felt facers on top and bottom surfaces.
- .1 Meeting the requirements of ULC 107.
- .2 Evaluated and listed by current CCMC approvals guide and approved and listed by Factory Mutual Global for Class 1-60 windstorm classification and meeting FM 4450 approval requirements for Class 1A Fire as a component in roof deck construction.
- .3 Provide minimum 2 layers of insulation. Thickness as indicated.
- .4 Minimum compressive strength of 138 Kpa.
- .5 Size: 1220 x 2440 mm board sizes. Square edges

.2 Tapered Insulation: Polyisocyanurate foam with black glass/felt facers on one side and meeting the requirements of ULC 704 and ASTM C1289, compatible with roofing system, slope as shown on the drawings but not less than 2% starting thickness of 0 mm, factory tapered. 1220 x 1220 mm board size.

.3 Insulation adhesive: as recommended by manufacturer, low VOC type.

2.7 Sealants

.1 Sealants: Refer to Section 07 92 00 - Joint Sealants.

.2 Compatible with all roofing materials.

.3 Low VOC type.

2.8 Fasteners and Plates

.1 As recommended by manufacturer.

.2 Underlayment board to steel deck: No.12 flat head, self-tapping, Type A or AB, cadmium plated screws. Fasteners and plates must meet FMG 4470 for wind uplift and corrosion resistance. Fasteners must penetrate a minimum of 12 mm into steel deck.

.3 Insulation fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and provided by roofing system manufacturer.

2.9 Metal Edging and Membrane Termination

.1 As recommended by manufacturer.

.2 Fascia or coping system component designed per ANSI/SPRI ES-1 standard.

2.10 Walkway Pads

.1 Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface- textured protective surfacing for roof traffic shall be membrane manufacturer's standard TPO walkway rolls.

2.11 Adhesives, Tapes and Primers

.1 Adhesive, tapes and primers, in accordance with manufacturer's recommendations.

.2 Low VOC type to conform to SCAQMD Rule 1168.

PART 3 EXECUTION

3.1 Workmanship

.1 Do roofing work in accordance with applicable standard in CRCA Roofing Specifications Manual and manufacturer's instructions except where specified otherwise.

3.2 Substrate Examination

.1 Examine work of other trades and notify in writing to the Consultant that the work is acceptable or of any defects or discrepancies. Verify that work of other trades which penetrates roof deck or requires men and equipment to transverse roof deck has been completed or adequate protection is provided.

.2 Concrete deck shall be cured minimum 28 days prior to application of adhesive vapour retarders in accordance with manufacturer's instructions.

.3 Examine surfaces for inadequate anchorage, foreign material, moisture and unevenness which would prevent the execution and quality of application of the roofing system as specified. Do not proceed with application of the roof system until defects are corrected. Installation of any part of the work without the written acceptance of such surfaces shall require immediately removal of such installed work.

.4 Prior to beginning Work ensure: Substrates are firm, straight, smooth, dry, free of snow, ice or frost, and swept clean of dust and debris.

.5 Ensure curbs have been built and installed.

.6 Ensure drains have been installed at proper elevations relative to finished surfaces.

.7 Ensure plywood and lumber nailer plates have been installed to walls and parapets as indicated.

3.3 Protection

.1 Cover walls, walks and adjacent work where materials hoisted or used.

.2 Use warning signs and barriers. Maintain in good order until completion of Work.

.3 Dispose of rain water away from face of building until drains or hoppers are installed and connected.

.4 Protect from traffic and damage. Comply with precautions deemed necessary by Consultant.

.5 Place plywood runways over work to enable movement of material and other traffic.

.6 At end of each day's work or when stoppage occurs due to inclement weather, provide protection for completed Work and materials out of storage.

.7 Seal and ballast exposed edges.

.8 If metal connectors are used, treat connectors and decking with rust proofing.

3.4 Substrate Board

.1 Mechanically fasten glass mat gypsum board to steel deck with screws spaced 400 mm on centre each way.

.2 Place with long axis of each sheet transverse to steel deck ribs, with end joints staggered and fully supported on ribs.

3.5 Vapour Retarder

.1 Prime substrate and adhere roof vapour retarder over underlay board in accordance with manufacturer’s instructions.

.2 Overlap vapour retarder minimum 100 mm for side laps and 150 mm for end laps.

.3 Extend vapour retarder under cant strips and blocking. Extend to perimeter anddeck protrusions.

.4 Seal roof vapour retarder to wall air/vapour barrier system with flexible flashing membranes to ensure continuity of building air/vapour barrier envelope.

3.6 Insulation

.1 Loose lay insulation panels over vapour retarder ensuring panels are butt-edged together with a maximum separation of 2mm.

.2 Attachment of Base Layer with Mechanical Fasteners (Metal Deck):
.1 Base layer of insulation board shall be fully attached to the metal deck with an approved mechanical fastening system. As a minimum, the amount of fasteners shall be in accordance with engineered shop drawings for ULC Class A classification.

.2 Filler pieces of insulation require at least two fasteners per piece if size of insulation is less than 0.4 m^2.
.3 Spacing pattern of fasteners shall be as per manufacturer's recommendations and reviewed shop drawings, to meet the specified requirements. Placement of any fastener from edge of insulation board shall be a minimum of 76 mm, and a maximum of 152 mm.
.4 Minimum penetration into deck shall be as recommended by the fastener manufacturer but not less than 25mm.
.5 Install secondary layer to primary layer in full mopping of hot asphalt in accordance with manufacturer's instructions

.3 All cut insulation panels or cut parts shall have a minimum of two (2) fasteners.

.4 Adhere top layered insulation to base layer using adhesive. Place boards in parallel rows with ends staggered, and in firm contact with one another.

.5 Apply adhesive in continuous ribbons at 300 mm on centre.

.6 Cut end pieces to suit. Insulation shall be installed in two layers with joints offset by minimum 1/3 of the board width.

.7 Tapered insulation application.
.1 Mop insulation to top layer of insulation with adhesive at the rate recommended by the manufacturer.
.2 Install tapered insulation in accordance with shop drawings. Stagger joints between layers 150 mm minimum.

3.7 Exposed Membrane Application

.1 Membrane, adhered, exposed application.
.1 Position membrane over insulation starting at highest point.
.2 Allow membrane to relax for ½ hour.
.3 Apply adhesive to membrane and substrate in accordance with manufacturer's written instructions.

.2 Lap joints.
.1 Clean both mating surfaces, apply primer and splicing contact cement in accordance with manufacturer's written instructions.
.2 Apply double-sided adhesive tape in accordance with manufacturer's written instructions.
.3 Solvent clean edge and apply lap sealant.

.3 Perimeter securement with adhesive and mechanical fasteners in accordance with manufacturer's written instructions.

.4 Edge securement: Attach fastening strips to mechanically secure membrane. Ensure screws penetrate into deck or wood nailers.

.5 Flashings: Install 1.6 mm thick TPO membrane flashings in accordance with manufacturer's written instructions.

.6 Penetrations: Install vent stack covers and other penetration flashings and seal to membrane in accordance with manufacturer's recommendations and details.

3.8 Walkways

.1 Install walkway pads in accordance with manufacturer's instructions.

.2 Install walkway pads at all traffic concentration points and all locations as identified on the drawings.

3.9 Field Quality Control

.1 Inspection and testing of membrane application will be carried out by independent testing agency retained by the Contractor and approved by the Consultant. Refer to Section 01 45 00 – Quality Control.

3.10 Cleaning

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

.2 Check drains to ensure cleanliness and proper function, and remove debris, equipment and excess material from site.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 04 27 00 Multiple Wythe Unit Masonry
.2 Section 06 10 00 Rough Carpentry
.3 Section 07 46 13 Preformed Metal Siding
.4 Section 07 52 00 Modified Bituminous Roofing
.5 Section 07 71 00 Roof Specialties and Accessories
.6 Section 07 92 00 Joint Sealants

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM A653/A653M-23 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  .2 ASTM D523-14(2018) Standard Test Method for Specular Gloss
.2 CSA Group (CSA)
  .1 CSA B111 Wire Nails, Spikes and Staples
  .2 CSA S136-16 North American Specification for the Design of Cold-Formed Steel Structural Members
.3 Canadian General Services Board (CGSB)
  .1 CAN/CGSB 1.108-M Bituminous Solvent Type Paint
  .2 CAN/CGSB-37.5 Cutback Asphalt Plastic Cement
  .3 CAN/CGSB-51.32 Sheathing, Membrane, Breather Type.
.4 Canadian Sheet Steel Building Institute (CSSBI)
  .1 CSSBI Standard Practice for Sheet Steel Cladding.
  .2 CSSBI 20M-91 Sheet Steel Cladding for Architectural and Industrial Applications.
  .3 CSSBI B16-94 Prefinished Sheet Steel for Building Construction.
.5 Canadian Roofing Contractors Association (CRCA) Roofing Specifications Manual.

1.4 Submittals

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

.2 Submit duplicate 300 x 300 mm samples of each type of sheet metal material, colour and finish when requested by the Consultant.

1.5 Design and Performance Requirements

.1 Appearance: neatly and evenly lay out and install components. Exposed fastening devices not permitted.

.2 Effects of Wind: resist positive and negative wind pressures without detrimental effects.

.3 Water Control: prevent passage of water.

.4 Thermal Movement: accommodate expansion and contraction of component parts without buckling, failure of joints, undue stress on fasteners and other detrimental effects.

.5 Compatibility: components shall be compatible with dissimilar metals and materials with which they are in contact or fastened to so as to prevent corrosion, staining and other detrimental effects. If required, treat or separate contact surfaces with inert and non-staining insulation material to achieve compatibility.

1.6 Quality Assurance

.1 Work of this Section shall be performed by a qualified sheet metal contractor with a minimum of 5 years of experience in the type of work required and specified. Submit proof of experience where requested by the Consultant.

1.7 Shipping, Handling and Storage

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

.2 Materials shall be handled and stored on the job in such a manner that no damage shall be done to the material or the structures.

.3 Materials showing evidence of improper handling and storage shall be rejected and removed from the site at no additional expense to the Owner.

1.8 Waste Management and Disposal

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

1.9 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of five years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

.2 Submit manufacturer's warrantee that pre-finished materials will not lose film integrity for 25 years and will not chalk or fade for 20 years following date of Substantial Performance.

PART 2 PRODUCTS

2.1 General

.1 Ensure compatibility of all materials in contact with roof membrane.

2.2 Materials

.1 Sheet Metal: 0.48 mm thick galvanized sheet steel, commercial quality to ASTM A653 Grade 'A' with a minimum yield stress of 230 MPA, and a working stress of 144 MPA, to CSA S136. Material shall have Z275 designation zinc coating.

.2 Prefinished material shall be colour coated with manufacturer's standard finish system equivalent to Valspar WeatherXL coating system, utilizing silicone modified polyester resin, minimum dry film thickness of 1.0 ± 0.1 mils when tested to ASTM D1005. This Section shall supply all metal flashing for all roof and wall applications whether shown or not, and as necessary for the complete installation.

.1 Colour for all sheet metal flashing and trim shall be as selected by the Consultant from full range of manufacturer's standard colours.

.2 Up to three colours may be selected.

.3 Continuous hook on strips and metal bellows: 0.65 mm galvanized sheet steel, zinc coating designation ZF275.

.4 Isolation Coating: Alkali resistant exterior bituminous paint to CAN/CGSB 1.108-M.

.5 Plastic Cement: To CAN/CGSB 37.5.

.6 Nails, Bolts, Screws and Other Fastenings: same metal finish as sheet metal being used to CSA B111. The size of fastenings shall suit the applicable conditions.

.7 Underlay: No. 15 perforated asphalt felt to CSA A123.3-M or dry sheathing, breather type, to CAN/CGSB-51.32

.8 Cleats: Of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.

PART 3 EXECUTION

3.1 General

.1 Install sheet metal work in accordance with CRCA specifications and as detailed.

.2 Use concealed fastenings except where approved before installation.

3.2 Fabrication

.1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA specifications and as indicated.

.2 Form pieces in 2440 mm maximum lengths.

.3 Hem exposed edges on underside 13 mm. Mitre and seal corners with sealant.

.4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

.5 Apply isolation coating (two coats) to metal surfaces to be in contact with concrete or mortar or dissimilar metals.

.6 Install underlay under sheet metal in accordance with CRCA "FL" series details. Lap joints 100 mm.

.7 All seams shall be of the "slip lock type" that permit adequate movement without resulting in deformation or loosening of metal flashings. Lapped joints or exposed raw edges will not be accepted. Exposed edges shall be "double back" at least 13 mm. At eaves and parapets, metal shall be hooked over continuous starter strips minimum 1 gauge thicker than the metal used for flashing. Secure starter strips at 300 mm on centre or closer as required.

.8 Where metal terminates under fascia boards, secure metal at 610 mm centres using specified fasteners. At curbs to openings or at sleepers, provide locked or standing seams at corners. Solder mitred corners, pop rivet or form standing seams.

.9 Secure metal flashings in reglets at 610 mm centres and further secure metal to vertical surfaces at locks as required.

.10 All flashings shall be installed in straight lines. Irregular or badly fitted work will not be accepted. Exposed fastenings will only be permitted where concealed fastening is not possible. Provide neoprene washers for exposed fasteners.

.11 Imperfections in metal flashing work such as holes, dents, creases, or oil-canning will not be accepted.

.12 Fabricate and install scuppers as detailed and in accordance with CRCA specifications and standards.

3.3 Caulking of Flashings

.1 Sealants shall be as specified in Section 07 92 00 - Joint Sealants.

.2 Caulk all joints in flashing.

.3 Dissimilar metals in contact, or metals in contact with adjacent surfaces shall be separated from one another to prevent corrosion, staining, or electrolysis by use of approved methods and materials.

.4 Do caulking between metal flashing and concrete.

.5 Caulking compound shall be applied in strict accordance with the manufacturer's application instructions. Use proper surface primers where necessary.

.6 Colour of caulking compound shall be the integral colour of the abutting material.

3.4 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 05 50 00 Metal Fabrications
.2 Section 06 10 00 Rough Carpentry
.3 Section 07 21 13 Building Insulation
.4 Section 07 54 23 TPO Roofing
.5 Section 07 62 00 Sheet Metal Flashing and Trim
.6 Section 07 92 00 Joint Sealants

1.3 Submittals

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

.2 Submit shop drawings and manufacturers literature:
.1 Indicate size and description of components and materials, arrangement of hardware, operating mechanism, required clearances, fasteners, anchoring, and finishes.

1.4 Shipping, Handling and Storage

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

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

1.5 Waste Management and Disposal

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

1.6 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of two years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Roof Access Hatch

.1 914 mm wide x 915 mm long, single leaf roof access hatch.

.2 Basis of Design Product:
.1 Lexcor R-105/G/SB/460 mm Ladder Access Roof Hatch.

.3 Curb and door shall be 1.994 mm primer coated G-90 galvanized steel, neatly welded and ground at corners. Doors shall have 25 mm thick glass fibre insulation with a minimum density of 19 kg/m2 and a door liner of 1.311 mm primer coated galvanized steel. Reinforce doors to support a minimum live load of 1.9 kPa. Curb shall be 460 mm high with 25 mm thick high density rigid fibre insulation secured to the curb exterior. Curb shall have 90 mm wide pre-punched flanges.

.4 Roof hatch shall be completely assembled with heavy duty pintle hinges, torsion bar operated doors, latching mechanisms, interior padlock hasps and neoprene draft seals. Door shall have automatic hold open arm complete with rubber grip handle.

.5 All hardware shall be stainless steel.

.6 Hatches shall be factory finished with grey primer.

.7 Provide roof hatch with 35 mm diameter safety bar coated with 20 mil. PVC colour coated roof safety green. Safety bar shall be mounted so as to not impede operation of door.

.8 Fabrication:
- .1 Fabricate components free of twists, bends, or visual distortion and insulated. Weld corners and joints.
- .2 Ensure continuity of gasket seals.
- .3 Design and fabricate hatch assemblies to collect and lead off accumulated condensation.
- .4 Pre-drill flanges for anchoring to deck.
- .5 Assemble hatch components in accordance with reviewed shop drawings and deliver pre-fabricated units to site complete with anchoring hardware, safety bar and accessories.
- .6 Locate safety bar on side indicated or approved by the Consultant.

PART 3 EXECUTION

3.1 Roof Hatch

.1 Install in accordance with manufacturers printed instructions.

.2 Secure all hatches to deck with bolts to meet the manufacturer's specifications.

.3 Shim and level all curbs to suit roof slopes.

.4 Erect hatch level and plumb and in proper alignment.

.5 Ensure continuity of building envelope air barrier and vapour retarder systems.

.6 Adjust and seal assembly with provision for expansion and contraction of components.

.7 Install safety bar, securely anchored to curb with tamper proof screws or bolts.

3.2 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 41 16 Precast Concrete Slabs
.2 Section 04 22 00 Concrete Unit Masonry
.3 Section 05 31 00 Steel Deck
.4 Section 07 81 16 Cementitious Fireproofing
.5 Section 07 92 00 Joint Sealants
.6 Section 09 21 16 Gypsum Board

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM E84-23d Standard Test Method for Surface Burning Characteristics of Building Materials
  .2 ASTM E119-20 Standard Test Methods for Fire Tests of Building Construction and Materials
  .3 ASTM E136-19a Standard Test Method for Behavior of Material in a Vertical Tube Furnace at 750° C
  .4 ASTM E814-13a (2017) Standard Test Method for Fire Tests of Penetration Firestop Systems
  .5 ASTM E1966-15(2019) Standard Test Method for Fire-Resistive Joint Systems
  .6 ASTM E2307-20 Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus
.2 Underwriter's Laboratories of Canada (ULC)
  .1 ULC 101-2014 Standard Methods of Fire Endurance Tests of Building Construction and Materials
  .2 ULC 102.2-2018 Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies
  .3 ULC 115-2018 Standard Method of Fire Tests of Firestop Systems
.3 National Fire Protection Association (NFPA)
  .1 NFPA 252 Standard Methods of Fire Test and Door Assemblies
.4 South Coast Air Quality Management District (SCAQMD) California State
  .1 SCAQMD Rule 1168-03: Adhesives and Sealants.
.5 Ontario Building Code

1.4 Submittals

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

.2 Product Data: Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings: Submit shop drawings to show location, proposed material, reinforcement, anchorage, fastenings and method of installation. Construction details should accurately reflect actual job conditions.

.4 Samples: Submit duplicate 300 x 300 mm samples showing actual fire stop material proposed for

project.

.5 Quality Assurance Submittals: submit following in accordance with Section 01 45 00 - Quality Control.
.1 Test reports: in accordance with ULC 101 for fire endurance and ULC 102 for surface burning characteristics.
.2 Submit certified test reports from approved independent testing laboratories, indicating compliance of applied fire stopping with specifications for specified performance characteristics and physical properties
.3 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
.4 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures.

1.5 Definitions

.1 Fire Stop Material: device intended to close off opening or penetration during fire or materials that fill openings in wall or floor assembly where penetration is by cables, cable trays, conduits, ducts and pipes and poke-through termination devices, including electrical outlet boxes along with their means of support through wall or floor openings.

.2 Single Component Fire Stop System: fire stop material that has Listed Systems Design and is used individually without use of high temperature insulation or other materials to create fire stop system.

.3 Multiple Component Fire Stop System: exact group of fire stop materials that are identified within Listed Systems Design to create on site fire stop system.

1.6 Quality Assurance

.1 One installer shall install all firestopping on the project. Each trade shall not firestop their own service penetrations. Installer shall be certified by fire stopping manufacturer.

.2 Qualifications:
.1 Qualified Installer: specializing in fire stopping installations with 5 years documented experience approved and trained by manufacturer.

.3 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section, with contractor's representative and Consultant 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.

.4 Site Meetings:
.1 As part of Manufacturer's Services described in 3.5- Field Quality Control, schedule site visits, to review Work, at stages listed.
.2 After delivery and storage of products, and when preparatory Work is complete, but before installation begins.
.3 Twice during progress of Work at 25% and 60% complete.
.4 Upon completion of Work, after cleaning is carried out.
.5 Single Source Responsibility: Obtain through-penetration fire-stop systems for each kind of penetration and construction condition indicated from a single manufacturer.

.5 Field-Constructed Mockup: Prior to installing fire-stopping, erect mockups for each different through-penetration fire-stop system indicated to verify selections made and to demonstrate qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for final installations.
.1 Locate mockups on site in locations indicated or, if not indicated, as directed by Consultant.
.2 Notify Consultant one week in advance of the dates and times when mockups will be erected.
.3 Obtain Consultant's acceptance of mockups before start of final unit of Work.
.4 Retain and maintain mockups during construction in an undisturbed condition as a standard for judging completed unit of Work.
.5 Accepted mockups in an undisturbed condition at time of Substantial Performance may become part of completed unit of Work.

1.7 Sustainable Requirements

.1 Materials shall be Low VOC type conforming to SCAQMD Rule 1168-03. Maximum VOC level of firestopping materials shall be 250 g/l.

1.8 Project Conditions

.1 Environmental Conditions: Do not install fire-stopping when ambient or substrate temperatures are outside limits permitted by fire-stopping manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

.2 Ventilation: Ventilate fire-stopping per fire-stopping manufacturers' instructions by natural means or, where this is inadequate, forced air circulation.

1.9 Shipping, Handling and Storage

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

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

.3 Deliver materials to the site in undamaged condition and in original unopened containers, marked to indicate brand name, manufacturer, ULC markings.

.4 Storage and Protection:
.1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Replace defective or damaged materials with new.

1.10 Waste Management and Disposal

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

PART 2 PRODUCTS

2.1 Materials

.1 All fire stopping shall consist of ULC listed firestop system.

.2 Applications: Provide fire-stopping systems composed of materials specified in this Section that comply with system performance and other requirements.

.3 General: Provide fire-stopping systems that are produced and installed to resist the spread of fire, according to requirements indicated, and the passage of smoke and other gases.

.4 All firestopping material shall be:
.1 From one manufacturer;
.2 Intumescent where an appropriate system exists.

.5 Fire stopping and smoke seal systems: ULC listed in accordance with ULC 115.
.1 Asbestos-free materials and systems capable of maintaining effective barrier against flame, smoke and gases in compliance with requirements of ULC 115 and not to exceed opening sizes for which they are intended.

.6 Service penetration assemblies: ULC listed systems tested to ULC 115.

.7 Service penetration fire stop components: ULC listed and certified by test laboratory to ULC 115.

.8 Fire-resistance rating of installed fire stopping assembly in accordance with NBC.

.9 Fire stopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal.

.10 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.

.11 Primers: to manufacturer's recommendation for specific material, substrate, and end use.

.12 Water: potable, clean and free from injurious amounts of deleterious substances.

.13 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.

.14 F-Rated Through-Penetration Fire-stop Systems: Provide through-penetration fire-stop systems with F ratings indicated, but not less than that equaling or exceeding the fire-resistance rating of the constructions penetrated.

.15 T-Rated Through-Penetration Fire-stop Systems: Provide through-penetration fire-stop systems with T ratings, in addition to F ratings, where indicated and where systems protect penetrating items exposed to contact with adjacent materials in occupy-able floor areas. T-rated assemblies are required where the following conditions exist:
.1 Where fire-stop systems protect penetrations located outside of wall cavities.
.2 Where fire-stop systems protect penetrations located outside fire-resistive shaft enclosures.
.3 Where fire-stop systems protect penetrations located in construction containing doors required to have a temperature-rise rating.
.4 Where fire-stop systems protect penetrating items larger than a 100 mm diameter nominal pipe or 10,000 mm² in overall cross-sectional area.

.16 Fire-Resistive Joint Sealants: Provide joint sealants with fire-resistance ratings indicated, but not less than that equaling or exceeding the fire-resistance rating of the construction in which the joint occurs. Sealants for vertical joints: non-sagging.

.17 For fire-stopping exposed to view, traffic, moisture, and physical damage, provide products that

do not deteriorate when exposed to these conditions.

.1 For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration fire-stop systems.

.2 For floor penetrations with annular spaces exceeding 100 mm or more in width and exposed to possible loading and traffic, provide fire-stop systems capable of supporting the floor loads involved either by installing floor plates or by other means.

.3 For penetrations involving insulated piping, provide through-penetration fire-stop systems not requiring removal of insulation.

.18 For firestopping exposed to view, provide products with flame-spread values of less than 25 and smoke-developed values of less than 450.

.19 Compatibility: Provide fire-stopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by fire-stopping manufacturer based on testing and field experience.

.20 Accessories: Provide components for each fire-stopping system that are needed to install fill materials and to comply with "System Performance Requirements". Use only components specified by the fire-stopping manufacturer and approved by the qualified testing and inspecting agency for the designated fire resistance-rated systems. Accessories include but are not limited to the following items:

.1 Permanent forming/damming/backing materials including the following:

.1 Semi-refractory fibre (mineral wool) insulation.

.2 Ceramic fibre.

.3 Sealants used in combination with other forming/damming materials to prevent leakage of fill materials in liquid state.

.4 Fire-rated formboard.

.5 Joint fillers for joint sealants.

.2 Temporary forming materials.

.3 Substrate primers.

.4 Collars.

.5 Steel sleeves.

PART 3 EXECUTION

3.1 Manufacturer’s Instructions

.1 Compliance: comply with manufacturer's written recommendations or specifications.

3.2 Preparation

.1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials.

.2 Ensure that substrates and surfaces are clean, dry and frost free.

.3 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.

.4 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour retarder.

.5 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

3.3 Installation

.1 Install fire stopping and smoke seal material and components in accordance with manufacturer's certified tested system listing and as necessary to maintain fire resistance ratings of floor and wall assemblies.

.2 Provide fire stopping for all disciplines.

.3 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.

.4 Fill spaces between openings, ducts, pipes and unused sleeves passing through fire separations with firestop material and install firestopping systems in accordance with the appropriate ULC system number for the products and type of penetration.

.5 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.

.6 Tool or trowel exposed surfaces to neat finish.

.7 Remove excess compound promptly as work progresses and upon completion.

3.4 Sequences of Operation

.1 Proceed only when submittals have been reviewed by Consultant.

.2 Mechanical pipe insulation: certified fire stop system component.
.1 Ensure pipe insulation installation precedes fire stopping.

3.5 Field Quality Control

.1 Inspections: notify Consultant when ready for inspection and prior to concealing or enclosing fire stopping materials and service penetration assemblies.

.2 Employ a ULC accredited Designated Responsible Individual (DRI) to inspect and label all fire stop applications on site.

.3 Manufacturer's Field Services:
.1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in Article 1.4 - Submittals.
.2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
.3 Schedule site visits, to review Work, as directed in Article 1.6 - Quality Assurance.

3.6 Commissioning

.1 Employ a ULC accredited Designated Responsible Individual (DRI) to inspect and label all fire

stop applications on site. Submit DRI's written reports within 3 days of review, verifying compliance of Work.

.2 Perform a thorough examination of the fire stopping system to determine if the assembly is installed as per its ULC listing.

.3 Allow for destructive testing of installed firestopping. Repair all tested assemblies.

.4 The examination shall take place prior to close-up to confirm assembly components and installation configuration.

.5 Any and all deviations from the ULC listed system shall be considered grounds for rejection and replacement.

3.7 Schedule

.1 Fire stop and smoke seal at:
- .1 Penetrations through fire-resistance rated partitions and walls.
- .2 Perimeter of fire-resistance rated partitions.
- .3 Intersection of fire-resistance rated partitions.
- .4 Control and sway joints in fire-resistance rated partitions and walls.
- .5 Penetrations through fire-resistance rated floor slabs, ceilings and roofs.
- .6 Around mechanical and electrical assemblies penetrating fire separations.
- .7 Rigid ducts: greater than 129 cm²: fire stopping to consist of bead of fire stopping material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.
- .8 All electrical boxes installed in fire rated gypsum board assemblies.
- .9 All locations required by the Ontario Building Code.
- .10 Any other locations indicated.

3.8 Cleaning

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

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

.3 Remove temporary dams after initial set of fire stopping and smoke seal materials.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1	Section 03 30 00	Cast-in-Place Concrete
.2	Section 04 22 00	Concrete Unit Masonry
.3	Section 05 41 00	Structural Metal Stud Framing
.4	Section 06 10 00	Rough Carpentry
.5	Section 06 20 00	Finish Carpentry
.6	Section 06 40 00	Architectural Woodwork
.7	Section 07 13 13	Bituminous Sheet Waterproofing
.8	Section 07 21 13	Building Insulation
.9	Section 07 21 29	Sprayed Insulation
.10	Section 07 27 13	Modified Bituminous Sheet Air Barriers
.11	Section 07 46 13	Preformed Metal Siding
.12	Section 07 52 00	Modified Bituminous Roofing
.13	Section 07 62 00	Sheet Metal Flashing and Trim
.14	Section 07 84 00	Firestopping
.15	Section 08 11 00	Metal Doors and Fames
.16	Section 08 44 13	Glazed Aluminum Curtain Walls
.17	Section 08 50 00	Aluminum Doors, Windows and Screens
.18	Section 08 80 05	Glazing
.19	Section 32 16 23	Sidewalks

1.3 References

.1 ASTM International (ASTM)
- .1 ASTM C510-16(2022) Standard Test Method for Staining and Color Change of Single- or Multicomponent Joint Sealants
- .2 ASTM C661-15(2022) Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer
- .3 ASTM C679-15(2022) Standard Test Method for Tack-Free Time of Elastomeric Sealants
- .4 ASTM C719-22 Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle)
- .5 ASTM C793-05(2017) Standard Test Method for Effects of Laboratory Accelerated Weathering on Elastomeric Joint Sealants
- .6 ASTM C794-18(2022) Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants
- .7 ASTM C834-17 Standard Specification for Latex Sealants
- .8 ASTM C919-22 Standard Practice for Use of Sealants in Acoustical Applications
- .9 ASTM C920-18 Standard Specification for Elastomeric Joint Sealants
- .10 ASTM C1087-23 Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems
- .11 ASTM C1183/C1183M-13(2018) Standard Test Method for Extrusion Rate of Elastomeric Sealants
- .12 ASTM C1193-16 Standard Guide for Use of Joint Sealants
- .13 ASTM C1246-17(2022) Standard Test Method for Effects of Heat Aging on Weight Loss, Cracking, and Chalking of Elastomeric Sealants After Cure

.14 ASTM C1247-20 Standard Test Method for Durability of Sealants Exposed to Continuous Immersion in Liquids
.15 ASTM C1248-22 Standard Test Method for Staining of Porous Substrate by Joint Sealants
.16 ASTM C1311-22 Standard Specification for Solvent Release Sealants
.17 ASTM C1330-23 Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants.
.18 ASTM D412-16(2021) Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
.19 ASTM D2203-01(2023) Standard Test Method for Staining from Sealants
.20 ASTM E84-23d Standard Test Method for Surface Burning Characteristics of Building Materials
.21 ASTM E90-09(2016) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements

.2 Department of Justice Canada (Jus)
.1 Canadian Environmental Protection Act, 1999 (CEPA).

.3 U. S. Environmental Protection Agency (EPA)
.1 EPA 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings.

.4 U.S. Food and Drug Administration (FDA)
.1 FDA 21 CFR 177.2600 - Title 21 Part 177 Indirect Food Additives: Polymers.

.5 South Coast Air Quality Management District (SCAQMD) California State
.1 SCAQMD Rule 1168-03: Adhesives and Sealants.

1.4 Submittals

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

.2 Submit product data for all sealant materials and accessories including:
.1 Preparation instructions and recommendations.
.2 Standard drawings illustrating manufacturer's recommended sealant joint profiles and dimensions applicable to Project.

.3 Joint Sealant Schedule: Indicate joint sealant location, joint sealant type, manufacturer and product name, and colour, for each application. Utilize joint sealant designations included in this Section.

.4 Samples:
.1 Samples for Colour Selection: For each joint sealant type.
.2 Samples for Verification: For each joint sealant product, for each colour selected.

.5 Greenguard Certificates: For each sealant and accessory product specified to meet volatile organic emissions standards of the Greenguard Children and Schools Certification.

1.5 Quality Assurance

.1 Installer Qualifications: Company with minimum of three years of experience specializing in work of this section, employing applicators trained for application of joint sealants required for this project, with record of successful completion of projects of similar scope, and approved by manufacturer.

.2 Single Source Responsibility: Provide joint sealants by a single manufacturer responsible for testing of Project substrates to verify compatibility and adhesion of joint sealants.

.3 Caulking work shall be carried out in strict accordance with manufacturer's printed directions.

.4 Preconstruction Manufacturer Laboratory Compatibility, Staining, and Adhesion Testing: Submit samples of each substrate or adjacent material that will be in contact with or affect joint sealants. Current manufacturer test data of products on matching substrates will be acceptable.

.5 Adhesion: Use ASTM C719 and ASTM C794 to determine requirements for joint preparation, including cleaning and priming.

.6 Compatibility: Use ASTM C1087 to determine materials forming joints and adjacent materials do not adversely affect sealant materials and do not affect sealant colour.

.7 Stain Testing: Use ASTM C510, ASTM C1248, or ASTM D2203 to verify non-staining characteristics of proposed sealants on specified substrates.

Specifier: Retain "Immersion Adhesion" paragraph when sealant joints are designed for immersion service. Specify the contact liquid when the joints will be exposed to other than potable water.

.8 Immersion Adhesion: Use ASTM C1247 to determine performance of proposed immersed sealant in contact with potable water.

Specifier: Retain subparagraph below when project requirements are not complex and manufacturer's previous test results for identical sealant and substrate conditions are acceptable in lieu of more costly project-specific testing.

.9 Pre-construction manufacturer laboratory testing is not required when sealant manufacturer can furnish data acceptable to Consultant based on previous testing for materials matching those of the Work.

1.6 Shipping, Handling and Storage

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

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

1.7 Project Conditions

.1 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

.2 Ventilate area of work by use of approved portable supply and exhaust fans.

1.8 Scheduling

.1 Schedule work so waterproofing, water repellents and preservative finishes are installed after sealants, unless sealant manufacturer approves otherwise in writing.

.2 Ensure sealants are cured before covering with other materials.

1.9 Waste Management and Disposal

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

PART 2 PRODUCTS

2.1 Manufacturer

.1 Basis-of-Design Products: Provide joint sealant products manufactured by Tremco, Inc., Commercial Sealants and Waterproofing, 220 Wicksteed Avenue, Toronto, www.tremcosealants.com, or comparable products of other manufacturer approved by Consultant.

2.2 Materials, General

.1 VOC Content for Interior Applications: Provide sealants and sealant primers complying with the following VOC content limits per 40 CFR 59, Subpart D (EPA Method 24):
- .1 Architectural Sealants: 250 g/L.
- .2 Sealant Primers for Nonporous Substrates: 250 g/L.
- .3 Sealant Primers for Porous Substrates: 775 g/L.

.2 Low-Emitting Sealants for Interior Applications: Provide sealants and sealant primers complying with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

.3 Compatibility: Provide joint sealants and accessory materials that are compatible with one another, and with adjacent materials, as demonstrated by sealant manufacturer using ASTM C1087 testing and related experience.

.4 Joint Sealant Standard: Comply with ASTM C920 and other specified requirements for each joint sealant.

.5 Stain Test Characteristics: Where sealants are required to be non-staining, provide sealants tested per ASTM C1248 as non-staining on porous joint substrates specified.

.6 Food Contact Suitability: Where sealants are required to be suitable for contact with food provide sealants complying with 21 CFR 177.2600.

2.3 Silicone Joint Sealants

.1 SJS#1: Single-Component, Nonsag, Non-Staining, Moisture-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 100/50, Use NT; SWRI validated.
- .1 Basis of Design Product: Tremco Spectrem 1.
- .2 Volatile Organic Compound (VOC) Content: 1 g/L maximum.
- .3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
- .4 Staining, ASTM C1248: None on concrete, marble, granite, limestone, and brick.
- .5 Colour: As selected by Consultant from manufacturer's standard line.

.2 SJS#2: Single-Component, Nonsag, Non-Staining, Neutral-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 50, Use NT; SWRI validated.
- .1 Basis of Design Product: Tremco Spectrem 2.
- .2 Volatile Organic Compound (VOC) Content: 50 g/L maximum.
- .3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
- .4 Staining, ASTM C1248: None on concrete, marble, granite, limestone, and brick.

.5 Colour: As selected by Consultant from manufacturer's standard line.

.3 SJS#3: Single-Component, Nonsag, Non-Staining, Neutral-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 50, Use NT.
.1 Basis of Design Product: Tremco Spectrem 3.
.2 Volatile Organic Compound (VOC) Content: 20 g/L maximum.
.3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
.4 Staining, ASTM C1248: None on concrete, marble, granite, limestone, and brick.
.5 Colour: As selected by Consultant from manufacturer's standard line.

.4 SJS#4: Multi-Component, Nonsag, Non-Staining, Field-Tintable Neutral-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 50, Use NT.
.1 Basis of Design Product: Tremco Spectrem 4-TS.
.2 Volatile Organic Compound (VOC) Content: 20 g/L maximum.
.3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
.4 Staining, ASTM C1248: None on concrete, marble, granite, limestone, and brick.
.5 Colour: As selected by Consultant from manufacturer's standard line.

.5 SJS#5: Mildew-Resistant, Single-Component, Acid-Curing Silicone Joint Sealant: ASTM C920, Type S, Grade NS, Class 25, Use NT.
.1 Basis of Design Product: Tremco Tremsil 200 Sanitary.
.2 Volatile Organic Compound (VOC) Content: 1 g/L maximum.
.3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
.4 Colour: White and Clear.

2.4 Urethane Joint Sealants

.1 UJS#1: Single-Component, Nonsag, Moisture-Cure, Polyurethane Joint Sealant: ASTM C920, Type S, Grade NS, Class 50, Use NT; Greenguard certified.
.1 Basis of Design Product: Tremco Dymonic 100.
.2 Volatile Organic Compound (VOC) Content: 40 g/L maximum.
.3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
.4 Tensile Strength ASTM D412: 350 to 450 psi
.5 Percent Elongation ASTM D412: 800 to 900%
.6 Modulus at 100% ASTM D412: 75 to 85 psi
.7 Tear Strength ASTM D412: 65 to 75 psi
.8 Smoke Development ASTM E84: 5
.9 Colour: As selected by Consultant from manufacturer's standard line.

.2 UJS#2: Single-Component, Nonsag, Moisture-Cure, Polyurethane Hybrid Joint Sealant: ASTM C920, Type S, Grade NS, Class 35, Use NT; Greenguard certified.
.1 Basis of Design Product: Tremco Dymonic FC.
.2 Extrusion Rate ASTM C1183: 93.1 mL/min
.3 Weight Loss ASTM C1246: Pass
.4 Tack Free Time ASTM C679: 3 to 4 hours.
.5 Volatile Organic Compound (VOC) Content: 10 g/L maximum.
.6 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
.7 Colour: As selected by Consultant from manufacturer's standard line.

.3 UJS#3: Single-Component, Nonsag, Polyurethane Joint Sealant: ASTM C920, Type S, Grade NS, Class 25, Use NT.
.1 Basis of Design Product: Tremco Vulkem 116.
.2 Volatile Organic Compound (VOC) Content: 60 g/L maximum.
.3 Colour: As selected by Consultant from manufacturer's standard line.

.4 UJS#4: Immersible, Single-Component, Pourable, Traffic Grade Polyurethane Joint Sealant: ASTM C920, Type S, Grade P, Class 50, Use T and I.
.1 Basis of Design Product: Tremco Vulkem 45 SSL.
.2 Volatile Organic Compound (VOC) Content: 110 g/L maximum.
.3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
.4 Colour: As selected by Consultant from manufacturer's standard line.

.5 UJS#5: Immersible, Multi-Component, Pourable, Traffic-Grade Polyurethane Joint Sealant: ASTM C920, Type M, Grade P, Class 35, Use T, O, and I.
.1 Basis of Design Product: Tremco Vulkem 445SSL.
.2 Tensile Strength, ASTM D412: 1.7 MPa, at 100 percent elongation.
.3 Tear Strength, ASTM D412: 6.1 kN/m.
.4 Adhesion to Concrete, After Water, ASTM C794: 4.4 kN/m
.5 Hardness, ASTM C661: 40 durometer Shore A, minimum.
.6 Accelerated Weathering, ASTM C793: Pass.
.7 Volatile Organic Compound (VOC) Content: 106 g/L maximum.
.8 Colour: As selected by Consultant from manufacturer's standard line.

.6 UJS#6: Multi-Component, Non-sag, Polyurethane Joint Sealant: ASTM C920, Type M, Grade NS, Class 50, Use I.
.1 Basis of Design Product: Tremco Dymeric 240 FC.
.2 Volatile Organic Compound (VOC) Content: 0 g/L maximum.
.3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
.4 Colour: As selected by Consultant from manufacturer's standard line.

2.5 Latex Joint Sealants

.1 LJS#1: Latex Joint Sealant: Siliconized acrylic latex, ASTM C834, Type OP, Grade NF.
.1 Basis of Design Product: Tremco Tremflex 834.
.2 Volatile Organic Compound (VOC) Content: 35 g/L maximum.
.3 Volatile Organic Emissions (VOE): Not greater than Greenguard Children & Schools Certification emissions levels.
.4 Colour: White, paintable.

2.6 Solvent-Release-Curing Joint Sealants

.1 BJS#1: Butyl-Rubber-Based Joint Sealant: ASTM C1311.
.1 Basis of Design Product: Tremco Tremco Butyl Sealant.
.2 Volatile Organic Compound (VOC) Content: 250 g/L maximum.
.3 Colour: As selected by Consultant from manufacturer's standard colours.

2.7 Acoustical Sealants

.1 AJS#1: Acoustical/Curtainwall Sealant: Single-component, non-hardening, non-sag, paintable

synthetic rubber-tested to reduce airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing of similar assemblies according to ASTM E90.
.1 Basis of Design Product: Tremco Acoustical/Curtainwall Sealant.
.2 Volatile Organic Compound (VOC) Content: 160 g/L maximum.
.3 Colour: White, paintable.

2.8 Joint Sealant Accessories

.1 Cylindrical Sealant Backing: ASTM C1330, Type B non-absorbent, bi-cellular material with surface skin, or Type O open-cell polyurethane, as recommended by sealant manufacturer for application.

.2 Bond Breaker Tape: Polymer tape compatible with joint sealant and adjacent materials and recommended by sealant manufacturer.

.3 Joint Substrate Primers: Substrate primer recommended by sealant manufacturer for application.

.4 Cleaners: Chemical cleaners acceptable to joint sealant manufacturer.

.5 Masking tape: Non-staining, non-absorbent tape product compatible with joint sealants and adjacent joint surfaces.

PART 3 EXECUTION

3.1 Examination

.1 Examine joint profiles and surfaces to determine if work is ready to receive joint sealants. Verify joint dimensions are adequate for development of sealant movement capability. Verify joint surfaces are clean, dry, and adequately cured. Proceed with joint sealant work once conditions meet sealant manufacturer's written recommendations.

3.2 Preparation

.1 Joint Surface Cleaning: Clean joints prior to installing joint sealants using materials and methods recommended by sealant manufacturer. Comply with ASTM C1193.
.1 Remove curing compounds, laitance, form-release agents, dust, and other contaminants.
.2 Clean nonporous and porous surfaces utilizing chemical cleaners acceptable to sealant manufacturer.
.3 Protect elements surrounding the Work of this section from damage or disfiguration. Apply masking tape to adjacent surfaces when required to prevent damage to finishes from sealant installation.

3.3 Application

.1 Sealant and Primer Installation Standard: Comply with ASTM C1193 and manufacturer's written instructions.

.2 Joint Backing: Select joint backing materials recommended by sealant manufacturer as compatible with sealant and adjacent materials. Install backing material at depth required to produce profile of joint sealant allowing optimal sealant movement.
.1 Install joint backing to maintain the following joint ratios:
.1 Joints up to 13 mm wide: 1:1 width to depth ratio.
.2 Joints greater than 13 mm wide: 2:1 width to depth ratio; maximum 13 mm joint depth.

.2 Install bond breaker tape over substrates when sealant backings are not used.

.3 Masking: Mask adjacent surfaces to prevent staining or damage by contact with sealant or primer.

.4 Joint Priming: Prime joint substrates when recommended by sealant manufacturer or when indicated by preconstruction testing or experience. Apply recommended primer using sealant manufacturer's recommended application techniques.

.5 Liquid Sealant Application: Install sealants using methods recommended by sealant manufacturer, in depths recommended for application. Apply in continuous operation from bottom to top of joint vertically and horizontally in a single direction. Apply using adequate pressure to fill and seal joint width.
.1 Tool sealants immediately with appropriately shaped tool to force sealants against joint backing and joint substrates, eliminating voids and ensuring full contact.
.2 Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
.3 Tool exposed joint surface concave using tooling agents approved by sealant manufacturer for application.

.6 Cleaning: Remove excess sealant using materials and methods approved by sealant manufacturer that will not damage joint substrate materials.
.1 Remove masking tape immediately after tooling joint without disturbing seal.
.2 Remove excess sealant from surfaces while still uncured.

.7 Installation of Acoustical Sealant: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations on both sides of assemblies with a continuous bead of acoustical sealant. Comply with ASTM C919 and with manufacturer's written recommendations.

3.4 Field Quality Control

.1 Field-Adhesion Testing: Perform adhesion tests in accordance with manufacturer's instructions and with ASTM C1193, Method A.
.1 Perform 5 tests for the first 300 m of joint length for each kind of sealant and joint substrate, and one test for each 300 m of joint length thereafter or 1 test per each floor per building elevation, minimum.
.2 For sealant applied between dissimilar materials, test both sides of joint.

.2 Remove sealants failing adhesion test, clean substrates, reapply sealants, and re-test. Test adjacent sealants to failed sealants.

.3 Submit report of field adhesion testing to Consultant indicating tests, locations, dates, results, and remedial actions taken.

3.5 Exterior Joint Sealant Schedule

.1 Exterior concealed transition joints in air barrier.
.1 SJS#1: Single-component neutral-curing low-modulus silicone sealant.
.2 UJS#1: Single-component non-sag urethane sealant.
.3 Compatibility: Compatible with air barrier components specified in Section 07 27 13.

.2 Exterior construction joints in cast-in-place and tilt-up concrete.
.1 SJS#1, SJS#2: Single-component neutral-curing non-staining silicone sealant.

.2 SJS# 4: Multi-component neutral-curing non-staining field tintable silicone sealant.
.3 UJS#1, UJS#2, UJS#3: Single-component non-sag urethane sealant.

.3 Exterior movement joints in concrete unit masonry.
.1 SJS#1, SJS# 2: Single-component neutral-curing non-staining silicone sealant.
.2 SJS#4: Multi-component neutral-curing non-staining field tintable silicone sealant.
.3 UJS#1, UJS#2, UJS#3: Single-component non-sag urethane sealant.

.4 Exterior movement joints in brick masonry.
.1 SJS#1, SJS# 2: Single-component neutral-curing non-staining silicone sealant.
.2 SJS#4: Multi-component neutral-curing non-staining field tintable silicone sealant.
.3 UJS#1, UJS#2, UJS#3: Sing**l**e-component non-sag urethane sealant.

.5 Exterior movement joints in stone masonry.
.1 SJS#1, SJS#2: Single-component neutral-curing non-staining silicone sealant.
.2 UJS#1, UJS#2, UJS#3: Single-component non-sag urethane sealant.

.6 Exterior joints within exterior insulation finish systems (EIFS).
.1 SJS#1, SJS# 2: Single-component neutral-curing non-staining silicone sealant.
.2 SJS#4: Multi-component neutral-curing non-staining field tintable silicone sealant.
.3 UJS#2, UJS#6: Single-component non-sag urethane sealant.

.7 Exterior exposed joints in metal panel cladding systems.
.1 SJS#1: Single-component neutral-curing non-staining silicone sealant.
.2 SJS#4: Multi-component neutral-curing non-staining field tintable silicone sealant.

.8 Exterior concealed watertight joints in cladding systems.
.1 SJS#1: Single-component neutral-curing silicone sealant.
.2 UJS#1, UJS#2: Single-component non-sag urethane sealant.

.9 Exterior joints between different materials listed above.
.1 SJS#1, SJS# 2: Single-component neutral-curing non-staining silicone sealant.
.2 SJS#4: Multi-component neutral-curing non-staining field tintable silicone sealant.
.3 UJS#1, UJS#2: Single-component non-sag urethane sealant.

.10 Exterior perimeter joints at frames of doors, windows, storefront frames, curtain wall frames, and louvers.
.1 SJS#1, SJS# 2: Single-component neutral-curing non-staining silicone sealant.
.2 SJS#4: Multi-component neutral-curing non-staining field tintable silicone sealant.
.3 UJS#1, UJS#2: Single-component non-sag urethane sealant.

.11 Exterior joints within aluminum storefront framing, curtain walls, and window systems:
.1 SJS#1, SJS# 2: Single-component neutral-curing non-staining silicone sealant.

.12 Exterior joints within structural glazing, aluminum storefront framing, curtain walls, and window systems: Refer to Section 08 44 13 and Section 08 50 00

.13 All other exterior non-traffic joints.
.1 SJS#1, SJS# 2: Single-component neutral-curing non-staining silicone sealant.
.2 SJS#4: Multi-component neutral-curing non-staining field tintable silicone sealant.
.3 UJS#1, UJS#2: Single-component non-sag urethane sealant.

.14 Exterior horizontal traffic and traffic isolation joints:
.1 UJS# 4, UJS#5: Single-component pourable urethane sealant.

3.6 Interior Joint Sealant Schedule

.1 Interior vertical movement joints in interior concrete and unit masonry.
.1 UJS#1, UJS#2: Single-component non-sag urethane sealant.

.2 Interior movement joints in interior unit masonry.
.1 UJS#1, UJS#2: Single-component non-sag urethane sealant.

.3 Interior perimeter joints of exterior aluminum frames.
.1 UJS#1: Single-component non-sag urethane sealant.

.4 Interior perimeter joints of interior frames.
.1 UJS#2: Single-component non-sag urethane sealant.
.2 LJS#1: Siliconized acrylic latex

.5 Interior sanitary joints between plumbing fixtures, food preparation fixtures, and casework and adjacent walls, floors, and counters.
.1 SJS#5: Mildew-Resistant, Single-Component, nonsag, acid-curing silicone joint sealant.

.6 Interior traffic joints in floor and between floor and wall construction.
.1 UJS# 4, UJS#5: Single-component pourable urethane sealant.

.7 Interior non-moving joints between interior painted surfaces and adjacent materials.
.1 LJS#1: Siliconized acrylic latex
.2 Joint-Sealant Colour: Paintable.

.8 Interior concealed sealants at thresholds and sills.
.1 BJS#1: Butyl-rubber-based joint sealant.

.9 Interior exposed and non-exposed acoustical applications.
.1 AJS#1: Acoustical joint sealant.

3.7 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1	Section 04 22 00	Concrete Unit Masonry
.2	Section 06 10 00	Rough Carpentry
.3	Section 07 92 00	Joint Sealants
.4	Section 08 14 16	Flush Wood Doors
.5	Section 08 71 10	Door Hardware
.6	Section 08 71 13	Automatic Door Operators
.7	Section 08 80 05	Glazing
.8	Section 09 21 16	Gypsum Board
.9	Section 09 22 16	Non-Structural Metal Framing
.10	Section 09 91 13	Exterior Painting
.11	Section 09 91 23	Interior Painting

1.3 References

.1 ASTM International (ASTM)
- .1 ASTM A653/A653M-23 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
- .2 ASTM C177-19e1 Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus
- .3 ASTM C518-21 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
- .4 ASTM C553-13(2019) Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications
- .5 ASTM C591-22 Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation
- .6 ASTM C1289-22a Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
- .7 ASTM D6386-22 Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting
- .8 ASTM D7396-14(2020) Standard Guide for Preparation of New, Continuous Zinc-Coated (Galvanized) Steel Surfaces for Painting
- .9 ASTM E90-09(2016) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
- .10 ASTM E330/E330M-14(2021) Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.

.2 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-1.181-99 Ready-Mixed Organic Zinc-Rich Coating.
- .2 CGSB 41-GP-19M-84 Rigid Vinyl Extrusions for Windows and Doors.

.3 CSA Group (CSA)
- .1 CSA-G40.20-13/G40.21-13 General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .2 CSA W59-18 Welded Steel Construction (Metal Arc Welding).

.4 Canadian Steel Door Manufacturers' Association (CSDMA)

.1 CSDMA Recommended Dimensional Standards for Commercial Steel Doors and Frames, 2000
.2 CSDMA Recommended Specifications for Commercial Steel Doors and Frames, 2006.
.3 CSDMA Selection and Usage Guide for Commercial Steel Door and Frame Products, 2009.

.5 Underwriters Laboratories Canada (ULC)
.1 ULC 104-2015 Standard Method for Fire Tests of Door Assemblies.
.2 ULC 105- 2016 Standard Specification for Fire Door Frames Meeting the Performance Required by CAN/ULC-S104.
.3 ULC 106-2015 Standard Method for Fire Tests of Window and Glass Block Assemblies
.4 ULC 701-2011 Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
.5 ULC 702.1- 2014 Standard for Thermal Insulation, Mineral Fibre, for Buildings.
.6 ULC 704-11 Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

.6 Underwriters Laboratories (UL)
.1 UL10B Fire Tests of Door Assemblies.
.2 UL10C Standard for Positive Pressure Fire Tests of Door Assemblies.

.7 National Fire Protection Association (NFPA)
.1 NFPA 80-22 Standard for Fire Doors and Other Opening Protectives.
.2 NFPA 252-2017 Fire Tests of Door Assemblies.

.8 American National Standards Institute (ANSI)
.1 ANSI 250.4-2018 Test Procedure and Acceptance Criteria for — Physical Endurance for Steel Doors, Frames and Frame Anchors
.2 ANSI 250.10-2011 Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames

1.4 Submittals

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

.2 Provide shop drawings
.1 Indicate each type of door, frame, steel, construction and core.
.2 Indicate fire ratings.
.3 Indicate material thicknesses, mortises, reinforcements, anchorages, location of exposed fasteners, openings, arrangement of hardware, and finishes.
.4 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.

1.5 System Description

.1 Design exterior frame assembly to accommodate expansion and contraction when subjected to minimum and maximum surface temperature of -35° C to 35° C.

1.6 Defining Opening Sizes

.1 Width - Widths of openings shall be measured from inside to inside of frame jamb rabbets. (Referred to as "frame rabbet width" or "nominal door width")

.2 Height - Heights of openings shall be measured from the finished floor (exclusive of floor coverings) to the head rabbet of the frame. (Referred to as "frame rabbet height" or "nominal door height")

.3 Door Sizes - Doors shall be sized so as to fit the above openings and allow a 3 mm nominal clearance at jambs and head of frame. A clearance of 13 mm maximum shall be allowed between the bottom of the door and the finished floor (exclusive of floor coverings).

.4 Tolerances - Doors and frame product shall be manufactured and installed in accordance with the CSDMA's, "Recommended Dimensional Standards for Commercial Steel Doors and Frames".

1.7 Shipping, Handling and Storage

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

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

1.8 Requirements of Regulatory Agencies

.1 Steel fire rated doors and frames: labeled and installed by an organization accredited by Standards Council of Canada in conformance with ULC 104 or NFPA 252 for ratings specified or indicated.

.2 Provide fire labeled frame products for those openings requiring fire protection ratings, as scheduled. Test products in strict conformance with ULC 104 or NFPA 252 and list by nationally recognized agency having factory inspection service and construct as detailed in Follow-up Service Procedures/Factory Inspection Manuals issued by listing agency to individual manufacturers.

1.9 Testing and Performance

.1 Fire labeled products shall be provided for those openings requiring fire protection ratings as scheduled on the drawings. Products shall be tested in strict conformance with ULC 104 and listed by Underwriters Laboratory of Canada Ltd. or Warnock Hersey under an active Factory Inspection Program.

.2 Product quality shall meet the standards established by the Canadian Steel Door Manufacturer's Association.

.3 Door construction shall meet acceptance criteria of ANSI A250.10 and shall be certified as meeting Level A (1,000,000 cycles) and Twist Test Acceptance Criteria deflection not to exceed 6.4 mm/13.6 kg force, total deflection at 136.1 kg force not to exceed 64 mm and permanent deflection not to exceed 3.0 mm when tested in strict conformance with ANSI A250.4. Test shall be conducted by an independent nationally recognized accredited laboratory.

.4 Core materials for insulated doors shall attain a thermal resistance rating of RSI 2.17 when tested in accordance with ASTM C177 or ASTM C518.

1.10 Waste Management and Disposal

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

PART 2 PRODUCTS

2.1 Materials

.1 Acceptable Materials
  .1 Steel doors and frame product manufactured in accordance with this Specification by CSDMA members, are eligible for use on this project.

.2 Steel: Commercial grade steel to ASTM A653, CS, Type B, Coating Designation ZF75 (A25) minimum. Minimum steel thicknesses shall be in accordance with Appendix 1 of the CSDMA,

Recommended Specifications for Commercial Steel Door and Frame Products unless noted otherwise.

.3 Reinforcement channel: to CSA G40.20/G40.21, Type 44W, coating designation to ASTM A653, ZF75.

.4 Door Core Materials
- .1 Interior Doors: Structural small cell, 24.5mm maximum kraft paper 'honeycomb'. Weight 36.3 kg per ream minimum, density: 16.5 kg/m³ minimum sanded to required thickness. ULC approved.
- .2 Exterior Doors: Polyisocyanurate: Rigid, modified polyisocyanurate, closed cell board. Density; 32 kg/m3 minimum, thermal values; RSI 2.17 minimum, in accordance with ASTM C591 (un-faced) or ASTM C1289 (faced).
- .3 Temperature Rise Rated (TRR): Core composition to provide the fire-protection rating and limit the temperature rise on the unexposed side of door to 250°C at 30 or 60 minutes, as determined by governing building code requirements. Core to be tested as part of a complete door assembly, in accordance with ULC 104 and shall be listed by a nationally recognized testing agency having a factory inspection service.

.5 Primers:
- .1 Touch-up prime CAN/CGSB-1.181, organic zinc rich, rust inhibitive.
  - .1 Maximum VOC limit 50 g/L to GC-03.

2.2 Adhesives

.1 Adhesive: maximum VOC content 50 g/L to SCAQMD Rule 1168.

.2 Honeycomb cores and steel components: heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement.

.3 Polyisocyanurate: heat resistant, epoxy resin based, low viscosity, contact cement.

.4 Lock-seam doors: fire resistant, resin reinforced polychloroprene, high viscosity, low VOC sealant/adhesive or U.L.C. approved equivalent.

2.3 Accessories

.1 Glazing Stops: Minimum 0.9 mm base thickness sheet steel with wipe zinc finish to ASTM A525. Fasteners to be #6 x 32 mm cadmium plated oval head scrulox self-drilling type screws. Tamper proof screws.

.2 Exterior top caps: rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19Ma.

.3 Door silencers: single stud rubber/neoprene type.

.4 Fiberglass: to ULC 702, loose batt type, minimum density of 24 kg/m³.

.5 Metallic paste filler: to manufacturer's standard.

.6 Sealant: As specified in Section 07 92 00.

2.4 Fabrication - Frame Products

.1 General
- .1 Fabricate frames in accordance with CSDMA specifications.
- .2 Fabricate frames to profiles and maximum face sizes as indicated.
- .3 Exterior frame product shall be 1.60 mm welded type construction.
- .4 Interior frame product shall be 1.60 mm. Interior frames, transoms, sidelights and window assemblies shall be welded type construction.
- .5 Blank, reinforce, drill and tap frames for templated hardware and electronic hardware using templates provided by finish hardware supplier. Reinforce frames for surface mounted hardware.
- .6 Prepare frames to receive electrical conduit for door operators where indicated and required.
- .7 Protect mortised cutouts with steel guard boxes.
- .8 Provide anchorage appropriate to floor, wall and frame construction. Each wall anchor shall be located immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on the strike jamb. For rebate opening heights up to and including 1520 mm provide two (2) anchors, and an additional anchor for each additional 760 mm of height or fraction thereof, except as indicated below. Frames in previously placed concrete, masonry or structural steel shall be provided with anchors located not more than 150 mm from the top and bottom of each jamb, and intermediate anchors at 660 mm on centre maximum. Fasteners for such anchors shall be provided by others.
- .9 Minimum reinforcing, anchor and other component thickness shall be in accordance with Table 1 of the CSDMA, "Recommended Specifications for Commercial Steel Door and Frame Products".
- .10 Each interior door opening shall be prepared for single stud rubber door silencers, three (3) for single door openings, two for double door openings, except on gasketed frame product.
- .11 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.
- .12 Fire-rated frame products shall be provided for those openings requiring fire protection as determined and scheduled by the Consultant. Frames, transom and sidelight assemblies shall be listed for conformance with ULC 104. Window assemblies shall be listed for conformance with ULC 106. All fire-rated frame products shall bear the label of and be listed by a nationally recognized testing agency having a factory inspection service. Labeling shall be in accordance with NFPA 80, the listing authority's policies and label materials, and shall identify the manufacturer. Fire-rated frame products shall be constructed as listed for labeling in the Follow-Up Service Procedures/Factory Inspection Manuals issued by the listing agency to individual manufacturers.

.2 Welded Type
- .1 Welding in accordance with CSA W59.
- .2 Accurately mitre or mechanically joint frame product and securely weld on inside of profile.
- .3 Cope accurately and securely weld butt joints of mullions, centre rails and sills.
- .4 Grind welded joints and corners to a flat plane, fill with metallic paste and sand to uniform smooth finish.
- .5 Where frame product is to be installed prior to the adjacent partition, a floor anchor shall be securely attached to the inside of each jamb profile. Each floor anchor shall be provided with two holes for securing to the floor. For conditions that do not permit the use of a floor anchor, an additional wall anchor, located within 150 mm of the base of the jamb, shall be substituted.
- .6 Weld in two temporary jamb spreaders per door opening to maintain proper alignment during shipment and handling, which shall not be used for installation.
- .7 Glazing stops shall be formed steel channel, minimum 16 mm height, accurately fitted, butted at corners and fastened to frame sections with counter-sunk oval head sheet metal screws.

.8 When required due to site access, when advised by the contractor responsible for coordination or installation, as specified on the drawings or due to shipping limitations, frame product for large openings shall be fabricated in sections as designated on the approved submittal drawings, with splice joints for field assembly and welding by others.
.9 Prior to shipment, mark each frame product with an identification number as shown on the approved submittal drawings.
.10 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.
.11 Manufacturer's nameplates on frames and screens are not permitted

2.5 Fabrication - Doors

.1 General
.1 Interior doors: insulated steel construction with honeycomb core laminated to minimum 1.19 mm nominal thickness steel face sheets under pressure.
.2 Exterior doors: insulated steel construction with polyisocyanurate core laminated to minimum 1.19 mm nominal thickness steel face sheets under pressure.
.3 Voids between vertical stiffeners shall be filled with fiberglass batt type insulation.
.4 Doors: swing type, flush.
.5 Doors: manufacturers' proprietary construction, tested and/or engineered as part of a fully operable assembly, including door, frame, gasketing and hardware in accordance with ASTM E330.

.2 Longitudinal edges shall be mechanically inter-locked, adhesive assisted. Seams: visible grind welded joints to a flat plane, fill with metallic paste filler and sand to a uniform smooth finish.

.3 Doors shall be mortised, blanked, reinforced, drilled and tapped at the factory for templated hardware and electronic hardware, in accordance with the approved hardware schedule and templates provided by the hardware supplier.

.4 Holes 12.7 mm diameter and larger shall be factory prepared, except mounting and through-bolt holes, which are by others, on site, at time of hardware installation. Holes less than 12.7 mm diameter shall be factory prepared only when required for the function of the device (for knob, lever, cylinder, thumb or turn pieces) or when these holes over-lap function holes.

.5 Doors shall be reinforced where required, for surface mounted hardware, anchor hinges, thrust pivots, pivot reinforced hinges, or non-templated hardware.

.6 Provide top and bottom of doors with inverted, recessed, welded steel channels. Exterior doors shall be provided with rigid PVC top caps.

.7 Minimum reinforcing and component thickness shall be in accordance with Table 1 of the CSDMA, "Recommended Specifications for Commercial Steel Door and Frame Products".

.8 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.

.9 Fire-rated doors shall be provided for those openings requiring fire protection and temperature rise ratings, as indicated. Such products shall be listed for conformance with ULC 104. All fire-rated doors shall bear the label of and be listed by a nationally recognized testing agency having a factory inspection service. Labeling shall be in accordance with NFPA 80, the listing authority's policies and label materials, and shall identify the manufacturer. Fire-rated doors shall be constructed as

listed for labeling in the Follow-Up Service Procedures/Factory Inspection Manuals issued by the listing agency to individual manufacturers.

.10 Prior to shipment, mark each door with an identification number as shown on the approved submittal drawings.

.11 Manufacturer's nameplates on doors are not permitted.

2.6 Glazing Stops

.1 Glazing stops shall be accurately fitted, butted at corners with removable stops located on push side of door.

.2 Provide tamper proof screws on all doors and screens.

2.7 Finishes

.1 Doors and frames shall wipe coat zinc, ready for painting.

PART 3 EXECUTION

3.1 Manufacturer’s Instructions

.1 Comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheets.

3.2 Installation

.1 Install doors and frames to CSDMA Installation Guide, NAAMM-HMMA 840, Installation Guide for Commercial Steel Doors and Frames.

.2 Fire-rated door and frame product shall be installed in accordance with NFPA-80.

.3 Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08 71 10 - Door Hardware. Coordinate with Section 08 71 10 for preparation and installation of automatic door operators.

.4 Adjust operable parts for correct clearances and function.

.5 Install glazing and door silencers.

.6 Provide even margins between doors and jambs and doors and finished floor and thresholds as follows:
.1 Hinge side: 1.0 mm.
.2 Latch side and head: 1.5 mm.
.3 Finished floor and thresholds: 13 mm.

.7 Caulk perimeter of frames. Refer to Section 07 92 00 – Joint Sealants.

3.3 Finish Repairs

.1 Touch up with primer finishes damaged during installation.

.2 Fill exposed frame anchors and surfaces with imperfections with metallic paste filler and sand to a uniform smooth finish.

3.4 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 07 92 00 Joint Sealants
.2 Section 08 11 00 Metal Doors and Frames
.3 Section 08 71 10 Door Hardware
.4 Section 09 91 23 Interior Painting

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM D1037-12(2020) Standard Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials
.2 Window and Door Manufacturer's Association (WDMA)
  .1 ANSI/WDMA I.S. 6A-13 Interior Architectural Stile and Rails Doors
.3 Architectural Woodwork Institute
  .1 Architectural Woodwork Standards.

1.4 Submittals

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

.2 Shop Drawings: Submit in accordance with Section 01300. Indicate:
  .1 Door number
  .2 Door Type
  .3 Door Sizes
  .4 Handing
  .5 Door elevations
  .6 Hardware Set Numbers
  .7 Details of construction

.3 Samples :
  .1 Submit 300 x 300 mm door corner samples showing door construction, panel and sticking details as specified

1.5 Quality Assurance

.1 Manufacturer: Shall be a company specializing in the manufacture of stile and rail doors specified in this section for a minimum of 10 years. All stile and rail doors specified in this section MDF, wood doors shall be supplied and manufactured by one company. All details including panels, sticking and profiles shall match.

.2 Preinstallation Meeting
  .1 Prior to the doors being unwrapped from the factory packaging a meeting shall take place with the factory representative or the door manufacturer and the general contractor, door distributor, installers, finishers and any other trades responsible for the handling of the doors, to review the factory Care and Handling and Finishing Instructions.

1.6 Shipping, Handling and Storage

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

.2 Storage and Handling : Doors shall be stored and handled in accordance with the manufacturer's recommendations and the WDMA – Appendix Section – "Care and Installation at Job Site".
- .1 Doors shall be stored on a flat and level surface in a well ventilated dry building. Doors shall not be stored on edge and shall be protected from dirt, water and abuse.
- .2 Protect doors from exposure to light for veneers which are light sensitive.
- .3 Doors shall not be subjected to extreme heat or humidity. HVAC systems should be set to provide a temperature range of 15 – 32 °C and 25-55% relative humidity.
- .4 Handle doors with clean hands or gloves. Do not drag doors across floors or other surfaces.
- .5 Each Door shall be marked with the opening number.

1.7 Waste Management and Disposal

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

PART 2 PRODUCTS

2.1 Manufacturer

.1 Acceptable Manufacturers, subject to compliance with specifications:
- .1 TruStile Doors, LLC.
- .2 Simpson Door Company

2.2 Materials

.1 Type: MDF Interior Stile and rail doors
- .1 Door Construction 35 mm Raise Panel Doors: 17 mm Premium grade primed MDF (Medium Density Fiberboard) skins which sandwich individual raised panels. Provide 25 mm Fir Stiles on each vertical edge precision routed into and sandwiched between the MDF skins.

- .2 Style and panel type as indicated on drawings.

.2 Stile Construction
- .1 Core material to be constructed of engineered wood to resist moisture, warping, checking and improved screw pull.
- .2 Stiles are to be constructed for improved screw holding by use of solid wood edges. Hardwood stiles to match face veneers. Stiles and rails assembled with dowel construction.

2.3 Bifold Doors

.1 Bifold Doors shall match panel, sticking, profile and design of MDF/Wood Doors specified herein.

.2 All doors shall have hardwood wedge in the top rail of all door panels for improved screw holding and hardware attachment.

.3 Bifold Hardware: Manufacturer and Type: L.E. Johnson Products, Inc. Series 111FD folding door hardware set including track, hangers, hinges, pivots, knobs, brackets, screws and all other accessory items.

Louver Type:
- .1 Louver blades to be plantation type 10 mm x 57 mm with 54 mm visible.

2.4 Finishes

.1 MDF doors to be factory prime painted with low VOC, water based primer.

2.5 Fabrication

.1 Fabricate wood doors in accordance with requirements of WDMA I.S. 1 - 1997 Quality Standards.

.2 Machining for door hardware: All doors shall be machined for specified hardware that is not surface applied.

.3 Provide blocking for hardware per hardware manufacturers requirements for hardware to be installed without thru-bolts.

.4 Prefit and Bevel Doors 3 mm in 50 mm at lock stile..

.5 Doors shall be factory glazed with glass as specified unless otherwise indicated.

PART 3 EXECUTION

3.1 Examination

.1 Verification of Conditions: Comply with Section 01600:
.1 Before installation, verify that frames are proper size and type for door and are installed plumb and square as required for proper installation of doors.
.2 Inspect doors for any damage, manufacturing defects or prefinish inconsistency prior to installation.
.3 Notification: Notify General Contractor of unsatisfactory conditions in writing with copy to Consultant.

.2 Acceptance: Beginning of work will indicate acceptance of existing conditions by installer.

3.2 Preparation

.1 Conditioning: Condition doors to average humidity in installation area prior to hanging.

.2 Prefitting: Prefit doors to frames and machine for hardware to whatever extent not previously worked at factory as required for proper fit and uniform clearance at each edge.

.3 Sealing: Before installation of hardware brush apply primer to all job site cut or planed surfaces.
.1 Primer: Type recommended by manufacturer.

3.3 Installation

.1 General: Install doors in accordance with manufacturer's recommendations and to comply with WDMA IS 1A and NFPA 80.
.1 Installation: By skilled finish carpenters or factory authorized installers.
.2 Installer: Thoroughly familiar with the requirements of the manufacturer's door warranty as currently in effect and assure compliance with all provisions.

.2 Hanging:
.1 After sizing doors, fit for hardware as scheduled.
.2 Hang doors to be free of binding with hardware functioning properly.

3.4 Adjusting and Protection

.1 Adjustment: At completion of job, adjust doors and hardware as required and leave in proper operating condition.

.2 Protection: Advise General Contractor of proper procedures required to protect installed wood doors from damages or deterioration until acceptance of entire project.

.3 Replacement: Refinish or replace doors damaged during installation.
.1 Causes for Rejection: Include chips, scratches or gouges.

3.5 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 07 27 00 Vapour Permeable Air Barriers
.2 Section 07 92 00 Joint Sealants
.3 Section 08 53 13 Vinyl Windows

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM C1036-21 Standard Specification for Flat Glass
  .2 ASTM C1048-18 Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass
  .3 ASTM D1929-23 Standard Test Method for Determining Ignition Temperature of Plastics
  .4 ASTM D3656/D3656M-13(2021) Standard Specification for Insect Screening and Louver Cloth Woven from Vinyl-Coated Glass Yarns
  .5 ASTM E330/E330M-14(2021) Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
  .6 ASTM E1105-15(2023) Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference
.2 CSA Group (CSA)
  .1 CSA A440-17 North American Fenestration Standard/Specification for Windows, Doors, and Skylights
  .2 CSA A440.2-14/A440.3-14 Fenestration Energy Performance/User Guide to CSA A440.2-14, Fenestration Energy Performance
.3 American Architectural Manufacturers Association (AAMA)
  .1 AAMA 303 Voluntary Specification for Poly (Vinyl Chloride) (PVC) Exterior Profile Extrusions; American Architectural Manufacturers Association.
  .2 AAMA 502 Voluntary Specification for Field Testing of Newly Installed Fenestration Products
  .3 AAMA 613 Voluntary Performance Requirements and Test Procedures For Organic Coatings On Plastic Profiles.
.4 Screen Manufacturers Association (SMA)
  .1 SMA 1201 Specifications for Insect Screens for Windows, Sliding Doors and Swinging Doors.
.5 Ontario Ministry of Municipal Affairs and Housing (MMAH)
  .1 MMAH Supplementary Standard SB-10, Energy Efficiency Requirements.

1.4 Submittals

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

.2 Product Data: Submit manufacturer's product data, including installation instructions.

.3 Shop Drawings: Submit manufacturer's shop drawings, indicating dimensions, construction, component connections and locations, anchorage methods and locations, hardware locations, and installation details.

.4 Samples: Submit full-size or partial full-size sample of vinyl sliding patio doors illustrating glazing

system, quality of construction, and colour of finish.

.5 Submit test reports from approved independent testing laboratories, certifying compliance with specified performance characteristics and physical properties, for:
.1 Energy efficiency (MMAH SB-10 compliance for complete assembly including glass units)
.2 Windows classifications.
.3 Air infiltration
.4 Water tightness.
.5 Wind load resistance.
.6 Condensation resistance.
.7 Forced entry resistance.
.8 Mullion deflection.

.6 Manufacturer’s Certification: Submit manufacturer’s certification that materials comply with specified requirements and are suitable for intended application.

.7 Submit cleaning and maintenance instructions for vinyl sliding glass doors for inclusion in the Operation and Maintenance Manuals specified in Section 01 78 00-Closeout Submittals.

1.5 System Description

.1 Performance Requirements: Provide continuity of building enclosure vapour and air barrier using glass and glazing materials as follows:
.1 Utilize inner light of multiple light sealed units for continuity of air and vapour seal.

.2 Insulating glass units in combination with sliding door framing shall be designed by the supplier to comply with energy efficient requirements specified in MMAH Supplementary Standard SB-10.Submit engineered shop drawings, calculations and certificates certifying compliance with that standard.

1.6 Quality Assurance

.1 Installer's Qualifications:
.1 Installer regularly engaged, for past 5 years, in installation of vinyl sliding patio doors of similar type to that specified.
.2 Employ persons trained for installation of vinyl sliding patio doors.

.2 Mock-ups:
.1 Provide sample installation for field testing door performance requirements and to determine acceptability of door installation methods.
.2 Approved mock-ups shall represent minimum quality required for the Work
.3 Approved mock-ups shall remain in place within the Work.

1.7 Shipping, Handling and Storage

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

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

.3 Deliver doors to site undamaged in manufacturer's or sales branch's original, unopened containers and packaging, with labels clearly identifying manufacturer and product name.
.1 Include installation instructions.

.4 Store doors off ground and under cover.
.1 Provide full support under framework when storing, handling, and installing doors.
.2 Allow sufficient spacing between doors during storage for ventilation.
.3 Do not lift doors by head member only.
.4 Protect doors from weather, direct sunlight, and construction activities.
.5 Protect doors and finish during handling and installation to prevent damage.

1.8 Waste Management and Disposal

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

1.9 Warranty

.1 Warranty:
.1 10 year non-prorated product warranty.
.2 10 year non-prorated insulated glass warranty.
.3 Guarantee doors against defects in materials and workmanship including costs for parts and labour.

PART 2 PRODUCTS

2.1 Manufacturer

.1 Manufacture: The following manufacturers are considered as acceptable subject to approval by the Consultant, of supporting technical literature, samples, drawings, engineering and performance data.
.1 North Star Windows
.2 Nordic
.3 Aurora
.4 Rehau Industries
.5 Orion Windows

2.2 Materials

.1 Vinyl: Integral colour PVC compound containing impact-resistant solid plasticizer, titanium dioxide UV inhibitor, and surface and colour stabilizers. Optional exterior aluminum sub-frame with multiple exterior trim options constructed of extruded aluminum (6063 T5/T6 alloy).
.1 Comply with AAMA/WDMA/CSA 101/I.S. 2/A440.

2.3 Performance Requirements

.1 Performance:
.1 Meets or exceeds AAMA/WDMA/CSA 101/I.S.2/A440 Ratings: SD-R50, WDMA Hallmark Certified.
.2 Air Infiltration, 1.57 psf wind pressure: 0.30 cfm/ft2 of frame.
.3 Design Pressure: 50 psf.
.4 Water Resistance: 7.5 psf.

.2 Forced Entry Resistance, ASTM F 842, Minimum Security Grade: 10.

.3 Maximum Operating Force:
.1 Initiate Motion: 30 lbs.
.2 Maintain Motion: 20 lbs.

.4 Meets ENERGY STAR guidelines.

2.4 Sliding Door Types

.1 Vinyl Sliding Patio Doors:

.2 Frame:
- .1 Interior and Exterior Frame Surfaces: Extruded, rigid, polyvinyl chloride (uPVC) complying with AAMA 303, having minimum ignition temperature 824 degrees F. when tested in accordance with ASTM D 1929.
- .2 Overall Frame Depth: 152 mm
- .3 Frame Members: Mitered and heat fused to provide fully welded corner assembly.
- .4 Sill: Fitted with weeps.
- .5 Frame Type:
  - .1 Double Wall Flush Flange: For 140 mm wall depth.

.3 Door Panels:
- .1 Door Panel: Extruded, rigid, uPVC.
- .2 Panel Members: Mitered and heat fused to provide fully welded corner assembly.
- .3 Vent Panels:
  - .1 Fully operable for ventilation.
  - .2 Two adjustable rollers, set on stainless steel track cap.
- .4 Contains sealed insulating glass.
- .5 Wet glazed with polyurethane-reactive hotmelt.

.4 Insulating Glazing:
- .1 Float Glass: ASTM C1036.
- .2 Exterior face-glazed sealed insulating glass.
- .3 Dual-Pane Insulating Glass:
  - .1 Total Thickness: 25 mm.
  - .2 Tempered Safety Glass: ASTM C1048.
  - .3 Advanced Low-E coated, with argon.

2.5 Hardware

.1 Interior Handle and Thumb Lock: Finish: Satin Nickel.

.2 Exterior Handle: Finish: Match door exterior.

.3 Exterior Keylock: Schlage configured “C” key-way pin-lock cylinder.

.4 Multipoint Lock: Stainless steel.

.5 Door Rollers:
- .1 Adjustable.
- .2 Permanently sealed.
- .3 Material: Corrosion-resistant stainless steel with precision ball-bearing rollers.

.6 Fasteners: Corrosion-resistant, uPVC-compatible material.

2.6 Screens

.1 To ASTM E1748 and SMA 1201R on the ventilating portion of the windows.
.1 Insect screening mesh: count 18 x 14.
.2 Fasteners: tamper proof.
.3 Screen frames: aluminum colour to match window frames.
.4 Mount screen frames for exterior replacement.

2.7 Tolerances

.1 Doors shall accommodate the following opening tolerances:
.1 Horizontal Dimensions Between High and Low Points: Plus 3.0 mm, minus 0 mm.
.2 Width Dimensions: Plus 3.0 mm, minus 0 mm.
.3 Building Columns or Masonry Openings: Plus or minus 3.0 mm from plumb.

2.8 Finish

.1 Vinyl finishes: in accordance with AAMA/WDMA/CSA 101/I.S.2/A440, including appendices, supplemented as follows:
.1 Colour to be selected by Consultant from manufacturer’s standards

2.9 Installation Accessories

.1 Flashing/Sealant Tape:
.1 Aluminum-foil-backed butyl window and door flashing tape.
.2 Maximum Total Thickness: 0.33 mm
.3 UV resistant.
.4 Verify sealant compatibility with sealant manufacturer.

.2 Interior Insulating-Foam Sealant: Low-expansion, low-pressure polyurethane insulating window and door foam sealant.

.3 Exterior Perimeter Sealant: high quality, multi-purpose sealant as specified in Section. 07 92 00.

PART 3 EXECUTION

Examination

.1 Examine rough opening to receive vinyl sliding patio doors.
.1 Verify rough opening is plumb, level, square, and of proper dimensions.
.2 Verify a minimum of 38 mm of solid wood blocking is installed around perimeter of rough opening.

.2 Notify Consultant of conditions that would adversely affect installation or subsequent use.

.3 Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 Installation

.1 Install doors in framed walls in accordance with manufacturer’s installation instructions.

.2 Install vinyl sliding patio doors in accordance with manufacturer's instructions.

.3 Install doors plumb, level, square, and without distortion.

.4 Maintain alignment with adjacent work.

.5 Install doors to be weathertight.

.6 Install doors to be freely operating.

.7 Verify proper operation of operating hardware.

3.3 Cleaning

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

.2 Clean vinyl sliding patio doors in accordance with manufacturer's instructions.

.3 Do not use harsh cleaning materials or methods that could damage finish, vinyl, or glass.

.4 Remove labels and visible markings.

.5 Keep door tracks clear of dirt and debris.

.6 Keep weep holes open and clear of obstructions.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 06 10 00 Rough Carpentry
.2 Section 06 20 00 Finish Carpentry
.3 Section 07 21 13 Building Insulation
.4 Section 07 26 00 Vapour Retarders
.5 Section 07 27 15 Vapour Permeable Air Barriers.
.6 Section 07 92 00 Joint Sealants.
.7 Section 08 71 10 Finishing Hardware
.8 Section 08 80 05 Glazing

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM B221-21 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
  .2 ASTM B456-17(2022) Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium
  .3 ASTM B633-23 Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel
  .4 ASTM E330/E330M-14(2021) Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
  .5 ASTM E783-02(2018) Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors
  .6 ASTM E1105-15(2023) Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference
  .7 ASTM E1186-22 Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems
.2 Canadian General Standards Board (CGSB)
  .1 CAN/CGSB-1.40-97 Anticorrosive Structural Steel Alkyd Primer.
.3 CSA Group (CSA)
  .1 AAMA/WDMA/CSA 101/I.S.2/A440-11, NAFS - North American Fenestration Standard for Windows, Doors, and Skylights
  .2 CSA A440S1-09 Canadian Supplement to AAMA/WDMA/CSA 101/1.S.2/A440, NAFS - North American Fenestration Standard for Windows, Doors, and Skylights
  .3 CSA-A440.4-07(R2012) Window, Door, and Skylight Installation
  .4 CSA-A440.2-14/A440.3-14 Fenestration energy performance/User guide to CSA A440.2-14, Fenestration energy performance.
  .5 CSA G164-18 Hot Dip Galvanizing of Irregularly Shaped Articles.
.4 Aluminum Association (AA)
  .1 Designation System for Aluminum Finishes (2000)
.5 Ontario Ministry of Municipal Affairs and Housing (MMAH)
  .1 Ontario Building Code
  .2 MMAH Supplementary Standard SB-10, Energy Efficiency Requirements.

1.4 Submittals

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

.2 Submit shop drawings.
- .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
- .2 Indicate materials and details in full size scale for head, jamb and sill, profiles of components, interior and exterior trim, junction between combination units, elevations of unit, anchorage details, location of isolation coating, description of related components and exposed finishes, fasteners, and caulking. Indicate location of manufacturer's nameplates.
- .3 Submit point to point wiring diagrams for electric strikes.
- .4 Submit a complete finishing hardware schedule for each door.

.3 Submit test reports from approved independent testing laboratories, certifying compliance with specified performance characteristics and physical properties, for:
- .1 Energy efficiency (MMAH SB-10 compliance for complete assembly including glass units)
- .2 Windows classifications.
- .3 Anodized finish, weathering characteristics.
- .4 Air infiltration
- .5 Water tightness.
- .6 Wind load resistance.
- .7 Condensation resistance.
- .8 Forced entry resistance.
- .9 Mullion deflection.

.4 Certificates: submit product certificates signed by manufacturer certifying materials and assemblies comply with specified performance characteristics and criteria and physical requirements.

.5 Closeout Submittals: Provide operation and maintenance data for doors, windows and hardware for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.5 System Description

.1 Performance Requirements: Provide continuity of building enclosure vapour and air barrier using glass and glazing materials as follows:
- .1 Utilize inner light of multiple light sealed units for continuity of air and vapour seal.

.2 Insulating glass units in combination with aluminum window or storefront framing shall be designed by the supplier to comply with energy efficient requirements specified in MMAH Supplementary Standard SB-10.Submit engineered shop drawings, calculations and certificates certifying compliance with that standard.

1.6 Shipping, Handling and Storage

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

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

1.7 Waste Management and Disposal

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

1.8 Field Quality Control

.1 Manufacturer's field services: Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

.2 Schedule site visits to review work at stages listed:
.1 After delivery and storage of products, and when preparatory work on which work of this Section depends is complete, but before installation begins.
.2 Twice during progress of work at 25% and 60% complete.
.3 Upon completion of work, after cleaning is carried out.

.3 Field Tests: Consultant shall select units to be tested as soon as a representative portion of the project has been installed, glazed, perimeter caulked and cured. Conduct tests for air infiltration and water penetration with manufacturer’s representative present. Tests not meeting specified performance requirements and units having deficiencies shall be corrected as part of the contract amount.
.1 Testing: Testing shall be performed per AAMA 503 by a qualified independent testing agency. Refer to Testing Section for payment of testing and testing requirements.
.1 Air Leakage Tests: Conduct tests in accordance with ASTM E783. Allowable air leakage shall not exceed 1.5 times the amount indicated in the performance requirements or 0.09 cfm/ft2, whichever is greater.
.2 Water Infiltration Tests: Conduct tests in accordance with ASTM E1105. No uncontrolled water leakage is permitted when tested at a static test pressure of two-thirds the specified water penetration pressure but not less than 383 Pa.
.2 Evaluate installed system by thermo-photographic scan.

.4 Obtain reports within three days of review and submit immediately to Consultant.

1.9 Sequencing

.1 Co-ordinate work of this Section with air barrier placement, flashing placement, and other related components or materials.

1.10 Project Conditions

.1 Do not install sealants when ambient and surface temperature is less than 5 °C. Maintain this minimum temperature during and after installation of sealants

1.11 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of five years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

.2 Provide a warranty stating that the anodized finish will be non-fading, nonconvertible, and permanently a part of the metal surface for a period of five years from the date of Substantial Performance. The warranty shall state that any item showing failure during the warranty period will be replaced or refinished to the original condition, at no cost to the Owner.

PART 2 PRODUCTS

2.1 Manufacturers

.1 Manufacture: The following manufacturers are considered as acceptable subject to approval by the Consultant, of supporting technical literature, samples, drawings, engineering data and performance data:
- .1 Alumicor
- .2 Commdoor
- .3 CRL United States Aluminum
- .4 Kawneer
- .5 Oldcastle
- .6 Windspec
- .7 Zimmcor

2.2 Materials

.1 Materials: to AAMA/WDMA/CSA 101/I.S.2/A440 supplemented as follows:
- .1 All doors, windows and storefront framing shall be by same manufacturer.
- .2 Sash: aluminum, thermally broken.
- .3 Main frame: aluminum, thermally broken.
- .4 Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of storefront members are nominal and in compliance with AA Aluminum Standards and Data.

.2 Aluminum Extrusions: Alloy and temper recommended by manufacturer for strength, corrosion resistance, and application of required finish and not less than 1.8 mm wall thickness at any location for the main frame and complying with ASTM B221: 6063-T6 alloy and temper.

.3 Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum framing members, trim hardware, anchors, and other components. Manufacturer's standard corrosion-resistant, non-staining, nonbleeding fasteners and accessories compatible with adjacent materials. Stainless steel where exposed.

.4 Perimeter Anchors: When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.

.5 Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.

.6 Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.

.7 Sealant: For sealants required within fabricated systems, provide permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.

.8 Exterior aluminum sills and facings: extruded aluminum and brake formed aluminum sheet metal of type and size to suit job conditions; minimum 3 mm thick, complete with joint covers, jamb drip deflectors, chairs, anchors and anchoring devices.

2.3 Window and Screen Types

.1 Entrance Framing:
- .1 Exterior Units: Thermally Broken Storefront Framing: thermally broken, inside glazed.
  - .1 Classification rating: to CSA-A440/A440.1.
  - .2 Air Tightness: A3.
  - .3 Water tightness: B3.
  - .4 Wind load resistance: C3.
  - .5 Surface condensation control: compliant with standard CSA-A440.2/A440.3.
  - .6 Forced Entry: Pass test for resistance to forced entry.
  - .7 Basis of Design: Kawneer 451 T series
- .2 Interior Units: Non-Thermally Broken Storefront Framing.
  - .1 Basis of Design: Kawneer 451 series
- .3 Depth of framing units as indicated or as required by engineered design.

2.4 Doors

.1 Interior Doors
- .1 To size indicated on schedules and drawings.
- .2 Medium stile with intermediate horizontal rails where detailed.
- .3 Reinforce doors for continuous hinges.
- .4 Clear anodized finish.
- .5 Rails and stiles to be 90 mm ± wide, bottom rail 165 mm ± high. Frame 45 mm thick.
- .6 Door members to be 3.0 mm nominal thickness. Glazing mouldings to be lock in type with glazing gaskets.
- .7 Interior glass: clear, 6.0 mm thick, tempered specified in Section 08 80 05.

.2 Exterior Doors
- .1 To size indicated on schedules and drawings.
- .2 Thermally broken medium stile with intermediate horizontal rails where detailed.
- .3 The door stile and rail face dimensions of the entrance door will be as follows:
  - .1 Vertical Stile 103.2 mm,
  - .2 Top Rail 103.2 mm,
  - .3 Bottom Rail 179.4 mm
- .4 Major portions of the door members to be 3.2 mm nominal in thickness and glazing molding to be 1.3 mm thick.
- .5 Reinforce doors for continuous hinges.
- .6 Clear anodized finish.
- .7 Glazing gaskets shall be either EPDM elastomeric extrusions or a thermoplastic elastomer.
- .8 Provide adjustable glass jacks to help center the glass in the door opening.
- .9 Provide flush stops for insulating glass in exterior doors.
- .10 Exterior glass: 25 mm sealed units, insulating glass specified in Section 08 80 05.

2.5 Door Hardware

.1 Provide the following hardware for aluminum doors, as appropriate to location and configuration:

- .1 Exterior Doors:
  - .1 1 ½ pair stainless steel ball bearing butt hinges.

.1 Door width: Up to 915 mm: 114 mm x 102 mm hinge
.2 Door width: Over 915 mm: 127 mm x 114mm hinge.
.2 Adams Rite 1850A deadlock with interior thumbturn.
.1 Cylinder provided under Section 08 71 10.
.3 Style CO-12 Architects Classic Pull with clear anodized finish.
.4 Concealed heavy duty closer 2030 LCN.
.5 Kawneer controller locking system for paired doors.
.6 Extruded aluminum threshold for barrier free access, 102 mm wide x 12 mm high. Thermally broken.
.7 Weather-seal to head and jambs. Aluminum with sponge neoprene a minimum of 6.0 mm thick, width to suit frame. Type TW2000.
.8 Meeting stiles: adjustable astragal utilizing wool pile with polymeric fin.
.9 Door sweeps to be Sealeze EB 395 EPDM blade gasket x door width.
.10 Automatic Door Operator: SW200i X 626 (110 V to head frames by Electrical).
.11 Push to open button #CM-45/4 X 630 (single gang junction boxes and all low voltage wiring by Electrical)
.12 Electric Strike: Adams Rite 7130 electric strike. 24V AC.
.13 Card Readers (by security Contractor)

.2 Interior Doors:
.1 Continuous heavy duty hinge with stainless steel ball bearings and clear epoxy finish.
.2 Style CO-12 Architects Classic Pull with finish to match door.
.3 Style CP-II Architects Classic Single Acting Push Bar
.4 Concealed heavy duty closer 2030 LCN.
.5 Door Holder: Glynn Johnson. Door hold open device shall be fully compatible with door closer and shall be as recommended by manufacturer, for installation without requiring modification to doors or frames.
.6 Automatic Door Operator: SW200i X 626 (110 V to head frames by Electrical).
.7 Push to open button #CM-45/4 X 630 (single gang junction boxes and all low voltage wiring by Electrical)
.8 Electric Strike: Adams Rite 7130 electric strike. 24V AC.
.9 Card Readers (by security Contractor)

2.6 Glazing

.1 Glaze doors, windows and screens in accordance with AAMA/WDMA/CSA 101/I.S.2/A440.

.2 Glass: As scheduled and as specified in Section 08 80 05– Glazing.

2.7 Fabrication

.1 Fabricate in accordance with AAMA/WDMA/CSA 101/I.S.2/A440 supplemented as follows:
.1 Fabricate units square and true with maximum tolerance of plus or minus 1.5 mm for units with a diagonal measurement of 1800 mm or less and plus or minus 3 mm for units with a diagonal measurement over 1800 mm.
.2 Face dimensions detailed are maximum permissible sizes.
.3 Brace frames to maintain squareness and rigidity during shipment and installation.
.4 Finish steel clips and reinforcement with shop coat primer to CAN/CGSB-1.40.

2.8 Air Barrier and Vapour Retarder

.1 Equip frames with site installed air barrier and vapour retarder material for sealing to building air barrier and vapour retarder as follows:

.1 Material: identical to, or compatible with, building air barrier and vapour retarder materials to provide required air tightness and vapour diffusion control throughout exterior envelope assembly.
.2 Material width: adequate to provide required air tightness and vapour diffusion control to building air barrier and vapour retarder from interior.

2.9 Aluminum Finishes

.1 Finish exposed surfaces of aluminum components in accordance with Aluminum Association Designation System for Aluminum Finishes.

.2 Clear anodic finish: AA-M10C21A41 / AA-M45C22A41, AAMA 611, Architectural Class I Clear Anodic Coating not less than 18 micrometre thick.

2.10 Isolation Coating

.1 Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 0.762 mm thickness per coat.

PART 3 EXECUTION

3.1 Window and Screen Installation

.1 Install in accordance with AAMA/WDMA/CSA 101/I.S.2/A440, shop drawings and manufacturer's instructions.

.2 Arrange components to prevent abrupt variation in colour.

.3 Erect and secure window units in prepared openings, plumb and square, free from warp, twist or superimposed loads.

.4 Secure work accurately to structure and in a manner not restricting thermal movement of materials.

.5 Provide shims under sill frame at setting block locations, and as recommended by window frame manufacturer.

.6 Conceal all anchors and fitments. Exposed heads of fasteners not permitted.

.7 Mechanically fasten flexible membrane air and vapour seal to window frame with continuous aluminum channel as detailed on drawings.

.8 Maintain dimensional tolerances after installation. Maintain alignment with adjacent work.

.9 Isolate aluminum surfaces from dissimilar materials adjacent after installation, using coating of bituminous paint.

.10 Seal framing joints with butyl polyisobutylene or silicone sealant.

.11 Install glazing splines and gaskets uniformly, with accurately formed corners and bevels. Ensure that proper contact is made with glass and rabbet interfaces.

.12 Continuously and uniformly compress glazing splines and gaskets during installation.

3.2 Sill Installation

.1 Install metal sills with uniform wash to exterior, level in length, straight in alignment with plumb upstands and faces. Use one piece lengths at each location.

.2 Cut sills to fit window opening.

.3 Secure sills in place with anchoring devices located at ends and evenly spaced 600 mm on centre in between.

.4 Fasten joint cover plates and drip deflectors with self-tapping stainless steel screws.

.5 Maintain 6 to 9 mm space between butt ends of continuous sills. For sills over 1200 mm in length, maintain 3 to 6 mm space at each end.

3.3 Door Installation

.1 Erect and secure aluminum framing plumb, square and level, free from warp, twist or superimposed loads.

.2 Use concealed fastenings where possible. Where concealed fasteners are not feasible, use flat headed screws in countersink holes. Exposed bolt or nut heads are not permitted.

.3 Match exposed fastenings with finish or surfaces on which they occur.

.4 Assess each component for appearance and colour. Any variations in appearance and colour will not be permitted.

.5 Secure work adequately and accurately to the structure in the required position.

.6 Install and adjust hardware in accordance with hardware templates and manufacturer’s instructions.

.7 All hardware shall be installed by technicians skilled in the application of architectural hardware and satisfactory to the aluminum door supplier. Instruction sheets, details and templates shall be read and understood before installation.

.8 Coordinate installation of electrically operated hardware with Electrical and Security subcontractors.

.9 Coordinate installation of Automatic Door Operators with Section 08 71 10.

3.4 Caulking

.1 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.

.2 Apply sealant in accordance with Section 07 92 00 - Joint Sealants. Conceal sealant within window units except where exposed use is permitted by Consultant.

3.5 Protection

.1 Protect the work of this trade from damage. Protect work of other trades resulting from the work of this Section.

.2 Provide at the factory, strippable coatings on all exposed surfaces of aluminum. This coating and protective wrappings shall remain on the surfaces through the period that other trades' works proceed on the building and shall be removed on completion of the building.

.3 Make good all damaged work caused by failure to provide adequate protection. Remove unsatisfactory work and replace at no expense to the Owner.

3.6 Cleaning

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

.2 Wash down exposed interior metal surfaces using a solution of mild domestic detergent in warm water, applied with soft clean wiping cloths.

.3 Clean exposed exterior non-metal surfaces as recommended by manufacturer of the material.

.4 Clean interior and exterior surfaces as soon as adjacent construction which might soil surfaces, is completed.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 06 10 00 Rough Carpentry
.2 Section 07 21 13 Building Insulation
.3 Section 07 26 00 Vapour Retarders
.4 Section 07 27 00 Vapour Permeable Air Barriers.
.5 Section 07 92 00 Joint Sealants.
.6 Section 08 32 16 Vinyl Sliding Glass Doors

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM A123/A123M-17 Standard Specification for Zinc (Hot-Dip galvanized) Coatings on Iron and Steel Products
  .2 ASTM D3656/D3656M-13(2021) Standard Specification for Insect Screening and Louver Cloth Woven from Vinyl-Coated Glass Yarns
  .3 ASTM E330/E330M-14(2021) Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
  .4 ASTM E783-02(2018) Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors
  .5 ASTM E1186-22 Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems
  .6 ASTM E1748-95(2017) Standard Test Method for Evaluating the Engagement Between Windows and Insect Screens as an Integral System.
.2 Aluminum Association (AA)
  .1 AA DAF 45-03(R2009) Designation System for Aluminum Finishes
.3 CSA Group (CSA)
  .1 AAMA/WDMA/CSA 101/I.S.2/A440-11 NAFS - North American Fenestration Standard for Windows, Doors, and Skylights.
  .2 CSA A440-17 North American Fenestration Standard/Specification for Windows, Doors, and Skylights
.4 South Coast Air Quality Management District (SCAQMD)
  .1 SCAQMD Rule 1168-05 Adhesives and Sealants.
.5 Screen Manufacturers Association (SMA)
  .1 SMA 1201R-2002 Specification for Insect Screens for Windows, Sliding Doors and Swinging Doors.
.6 Ontario Ministry of Municipal Affairs and Housing (MMAH)
  .1 MMAH Supplementary Standard SB-10, Energy Efficiency Requirements.

1.4 Submittals

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

.2 Submit shop drawings.
  .1 Submit drawings stamped and signed by professional engineer licensed in Province of Ontario.

.2 Indicate materials and details in full size scale for head, jamb and sill, profiles of components, interior and exterior trim, junction between combination units, elevations of unit, anchorage details, location of isolation coating, description of related components and exposed finishes, fasteners, and caulking. Indicate location of manufacturer's nameplates.

.3 Submit test reports from approved independent testing laboratories, certifying compliance with specified performance characteristics and physical properties, for:
- .1 Energy efficiency (MMAH SB-10 compliance for complete assembly including glass units)
- .2 Windows classifications.
- .3 Air infiltration
- .4 Water tightness.
- .5 Wind load resistance.
- .6 Condensation resistance.
- .7 Forced entry resistance.
- .8 Mullion deflection.

.4 Certificates: submit product certificates signed by manufacturer certifying materials and assemblies comply with specified performance characteristics and criteria and physical requirements.

.5 Provide maintenance data for vinyl windows for incorporation into Operation and Maintenance Manual specified in Section 01 78 00 – Closeout Submittals.

1.5 System Description

.1 Performance Requirements: Provide continuity of building enclosure vapour and air barrier using glass and glazing materials as follows:
- .1 Utilize inner light of multiple light sealed units for continuity of air and vapour seal.

.2 Insulating glass units in combination with window framing shall be designed by the supplier to comply with energy efficient requirements specified in MMAH Supplementary Standard SB-10.Submit engineered shop drawings, calculations and certificates certifying compliance with that standard.

1.6 Design Requirements

.1 Design windows in accordance with Climatic Design Data as contained in the Ontario Building Code:
- .1 Design temperature: January 1%, July 2 ½%.
- .2 Wind (Hourly Wind Pressures): 1 in 30 year occurrence.

.2 Design windows to accommodate the following without detrimental effect:
- .1 Cyclic 40 °C daily, thermal swing of components.
- .2 Cyclic, dynamic loading and release of loads such as wind loads.
- .3 13 mm vertical deflection in the supporting structure and movement of supporting structure due to live, dead load, and creep or deflection, seismic load, sway displacement and similar items.

.3 Design window systems in accordance with following CSA-A440 classification ratings:
- .1 Air tightness: A2
- .2 Water tightness: B2
- .3 Wind Load resistance: C2
- .4 Temperature Index: 166.

.4 Energy ratings: windows to be Energy Star certified to Natural Resources Canada.

.5 Design and detail controlled drainage path to discharge water which enters into or forms within windows, to exterior. Prevent accumulation or storage of water within the windows.

.6 Prevent deflection and permanent or progressive glazing displacement. Restrict horizontal and vertical mullion deflection to L/175 maximum (under uniformly distributed positive load) and 10 mm maximum regardless of span.

.7 Design anchorage inserts for installation as part of other sections of the Work. Design anchorage assemblies to accommodate construction and installation tolerances.

.8 Design window glazing system ensuring a minimum STC rating of 30.

1.7 Quality Assurance

.1 Certifications: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.2 Mock-up:
- .1 Construct one field sample mock-up of window in location acceptable to Consultant.
- .2 Demonstrate installation of anchorage devices and air/vapor retarder sealing and relation of window to surrounding construction.
- .3 Arrange for Consultant's review and acceptance.
- .4 Mock-up may remain as part of the Work if accepted by Consultant.
- .5 Upon acceptance, mock-up shall serve as a minimum standard of quality for the balance of the work of this Section.

1.8 Shipping, Handling and Storage

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

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

.3 Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.4 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area. Protect windows from nicks, scratches, and blemishes. Replace defective or damaged materials with new.

1.9 Waste Management and Disposal

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

1.10 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of ten years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Manufacturers

.1 Manufacture: The following manufacturers are considered as acceptable subject to approval by the Consultant, of supporting technical literature, samples, drawings, engineering and performance data.
- .1 North Star Windows
- .2 Nordic
- .3 Aurora
- .4 Rehau Industries
- .5 Orion Windows

2.2 Materials

.1 Materials: to AAMA/WDMA/CSA 101/I.S.2/A440 supplemented as follows:
- .1 Sash: vinyl.
- .2 Main frame: vinyl, thermally broken.
- .3 Glass shall comply with requirements of AAMA/WDMA/CSA 101/I.S.2/A440, Section 10.2 and the GANA Glazing Manual.
  - .1 Insulating glass panels shall have an overall nominal thickness of not less than 22 mm.

.2 Weatherseals: Black polymer (EPDM) replaceable weatherseals:
- .1 Shapes, designs, and thickness as needed to satisfy performance requirements.
- .2 Weatherseals shall be provided in continuous lengths, butted firm to ends of races and to each other when in the same planes.

.3 Screens: To ASTM E1748 and SMA 1201R on the ventilating portion of the windows.
- .1 Insect screening mesh: count 18 x 14.
- .2 Fasteners: tamper proof.
- .3 Screen frames: aluminum colour to match window frames.
- .4 Mount screen frames for exterior replacement.

.4 Interior and exterior sills and facings brake formed aluminum sheet metal of type and size to suit job conditions; minimum 3 mm thick, complete with[joint covers, jamb drip deflectors, chairs, and anchoring devices.

.5 Fasteners: Stainless Steel: AISI 300 Series
- .1 Fasteners shall be selected to prevent galvanic reaction with any reinforcement materials fastened.
- .2 Above criteria is applicable to screws used to secure internal reinforcement and to fasteners used in window mulling connections, if required.
- .3 Avoid exposed fasteners to greatest extent possible.
- .4 Where exposed fasteners are unavoidable in finished surfaces, use flathead countersunk Phillips head screws.

.6 Sealants:
- .1 As specified in section 07 92 00.

2.3 Isolation Coating

.1 Primers, Coatings: in accordance with manufacturer's recommendations for surface conditions.

2.4 Glazing

.1 Factory glaze windows in accordance with AAMA/WDMA/CSA 101/I.S.2/A440.

.2 Insulating Glazing:
- .1 Float Glass: ASTM C1036.
- .2 Exterior face-glazed sealed insulating glass.
- .3 Dual-Pane Insulating Glass:
  - .1 Total Thickness: 25 mm.
  - .2 Tempered Safety Glass: ASTM C1048.
  - .3 Advanced Low-E coated, with argon.

2.5 Hardware

.1 Hardware: stainless steel or white bronze sash locks and aluminum handles to provide security and permit easy operation of units.

.2 Locks: provide operating sash with spring loading locking device, to provide automatic locking in closed position.

.3 Include special keyed opening device for windows normally locked.

2.6 Vinyl Finishes

.1 Vinyl finishes: in accordance with AAMA/WDMA/CSA 101/I.S.2/A440, including appendices, supplemented as follows:
- .1 Colour to be selected by Consultant from manufacturer's standards

2.7 Air Barrier and Vapour Retarder

.1 Equip frames with factory installed air barrier and vapour retarder material for sealing to building air barrier and vapour retarder as follows:
- .1 Material: identical to, or compatible with, building air barrier and vapour retarder materials to provide required air tightness and vapour diffusion control throughout exterior envelope assembly.
- .2 Material width: adequate to provide required air tightness and vapour diffusion control to building air barrier and vapour retarder from interior.

2.8 Fabrication

.1 Fabricate in accordance with CSA-A440/A440.1 supplemented as follows:
- .1 Fabricate units square and true with maximum tolerance of plus or minus 1.5 mm for units with a diagonal measurement of 1800 mm or less and plus or minus 3 mm for units with a diagonal measurement over 1800 mm.
- .2 Face dimensions detailed are maximum permissible sizes.
- .3 Brace frames to maintain squareness and rigidity during shipment and installation.
- .4 Finish steel clips and reinforcement with shop coat primer to CAN/CGSB-1.40.

PART 3 EXECUTION

3.1 Examination

.1 Verification of Conditions: verify conditions of substrates previously installed are acceptable for product installation in accordance with manufacturer's written instructions.
  .1 Visually inspect substrate.
  .2 Inform Consultant of unacceptable conditions immediately upon discovery.
  .3 Proceed with installation only after unacceptable conditions have been remedied [and after receipt of written approval to proceed from Consultant.

3.2 Installation

.1 Install in accordance with AAMA/WDMA/CSA 101/I.S.2/A440, shop drawings and manufacturer's instructions.

.2 Arrange components to prevent abrupt variation in colour.

.3 Install shims between windows and building frame at each installation screw location. Shim and fasten windows in accordance with manufacturer's recommendations and CAN/CSA A440.4.

.4 Sill installation:
  .1 Install metal sills with uniform wash to exterior, level in length, straight in alignment with plumb upstands and faces. Use one piece lengths at each location.
  .2 Cut sills to fit window opening.
  .3 Secure sills in place with anchoring devices located at ends and evenly spaced 600 mm on centre in between.

.5 Fasten drip deflectors with self-tapping stainless steel screws.

.6 Maintain 6 to 9 mm space between butt ends of continuous sills. For sills over 1200 mm in length, maintain 3 to 6 mm space at each end.

3.3 Caulking

.1 Seal joints between windows and surrounding construction, interior and exterior, 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.

.2 Apply sealant in accordance with Section 07 92 00 - Joint Sealants. Conceal sealant within window units except where exposed use is permitted by Consultant.

3.4 Cleaning

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

.2 Wash down exposed interior surfaces using a solution of mild domestic detergent in warm water, applied with soft clean wiping cloths.

.3 Clean exposed exterior surfaces as recommended by manufacturer of the material.

.4 Clean interior and exterior surfaces as soon as adjacent construction which might soil surfaces, is completed.

3.5 Protection

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by window installation.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 06 20 00 Finish Carpentry
.2 Section 08 11 00 Metal Doors and Frames
.3 Section 08 14 16 Flush Wood Doors
.4 Section 08 14 23.16 Plastic Laminate Faced Wood Doors
.5 Section 08 50 00 Aluminum Doors, Windows and Screens

1.3 References

.1 American National Standards Institute (ANSI) / Builders Hardware Manufacturers Association (BHMA)
  .1 ANSI/DHI A115.1G-1994 Installation Guide for Doors and Hardware
  .2 ANSI/ICC A117.1-2017 Accessible and Usable Buildings and Facilities
  .3 ANSI/BHMA A156.1-2013 American National Standard for Butts and Hinges.
  .4 ANSI/BHMA A156.2-2011 Bored and Preassembled Locks and Latches.
  .5 ANSI/BHMA A156.3-2014 Exit Devices.
  .6 ANSI/BHMA A156.4-2013 Door Controls - Closers.
  .7 ANSI/BHMA A156.5-2014 Auxiliary Locks and Associated Products.
  .8 ANSI/BHMA A156.6-2010 Architectural Door Trim.
  .9 ANSI/BHMA A156.8-2010 Door Controls - Overhead Stops and Holders.
  .10 ANSI/BHMA A156.10-2011 Power Operated Pedestrian Doors.
  .11 ANSI/BHMA A156.12-2013 Interconnected Locks and Latches.
  .12 ANSI/BHMA A156.13-2012 Mortise Locks and Latches Series 1000.
  .13 ANSI/BHMA A156.15-2011 Release Devices - Closer Holder, Electromagnetic and Electromechanical.
  .14 ANSI/BHMA A156.16-2013 Auxiliary Hardware.
  .15 ANSI/BHMA A156.18-2012 Materials and Finishes.
  .16 ANSI/BHMA A156.19-2013 Power Assist and Low Energy Power - Operated Doors.
  .17 ANSI/BHMA A156.21-2014 Thresholds.
  .18 ANSI/BMHA A156.22-2012 Door Gasketing and Edge Seal Systems
.2 Canadian Steel Door Manufacturers' Association (CSDMA)
  .1 CSDMA Canadian Metric Guide for Steel Doors and Frames (Modular Construction): Standard Hardware Location Dimensions.
.3 National Wood Window and Door Association (NWWDA)
.4 Door Hardware Institute (DHI)
.5 Accessibility for Ontarians with Disabilities Act (AODA)

1.4 Submittals

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

.2 Product Data: Submit manufacturer's printed product literature, specifications and data sheets.

.3 Samples:
  .1 Identify each sample by label indicating applicable specification paragraph number, brand name and number, finish and hardware package number.

.2 After approval samples will be returned for incorporation in the Work.

.4 Hardware List:
.1 Submit contract hardware list.
.2 Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information.

.5 Manufacturer's Instructions: Submit manufacturer's installation instructions.

.6 Provide operation and maintenance data for door closers, locksets, door holders, electrified hardware and fire exit hardware for incorporation into Operations and Maintenance Manuals specified in Section 01 78 00 - Closeout Submittals.

1.5 Quality Assurance

.1 Regulatory Requirements:
.1 Hardware for doors in fire separations and exit doors certified by a Canadian Certification Organization accredited by Standards Council of Canada.
.2 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
.3 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.2 Pre-installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.6 Shipping, Handling and Storage

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

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

.3 Package each item of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.

.4 Receive the delivery of the Finishing Hardware and identify all items against the Finishing Hardware Schedule. Ensure each hardware item is accompanied by the correct template, installation instructions, special tools, fastening devices and other loose items. Advise the finish hardware supplier and Consultant in writing of errors or omissions.

.5 Storage and Protection: Store finishing hardware in locked, clean and dry area.

.6 Remove all hardware from doors and frames prior to painting. After painting is complete and dry, reinstall all hardware to manufacturer’s recommendations.

1.7 Waste Management and Disposal

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

1.8 Warranty

.1 Warrant all hardware against defects of workmanship and material, for a period of one year, except for door closers which shall be warranted for ten years from the date of Substantial Performance

and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Materials

.1 All hardware shall be supplied as specified in the Finishing Hardware Schedule.

.2 All finishes shall be as indicated in the Finishing Hardware Schedule by international codes.

.3 All door handles shall be lever type meeting requirements of the referenced accessibility standards and the Ontario Building Code.

.4 Power Door Operators and controls shall be CSA approved and shall meet the requirements of the Ontario Building Code and the Accessibility for Ontarians with Disabilities Act (AODA).

2.2 Fastenings

.1 Use only fasteners provided by manufacturer. Failure to comply may void warranties and applicable licensed labels.

.2 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.

.3 Exposed fastening devices to match finish of hardware.

.4 Where pull is scheduled on one side of door and push plate on other side, supply fastening devices, and install so pull can be secured through door from reverse side. Install push plate to cover fasteners.

.5 Use fasteners compatible with material through which they pass.

2.3 Electrified Devices

.1 Electrified exit devices shall conform to all traditional exit device standards as specified above. All power requirements for exit devices used must utilize a continuous circuit electric hinge for clean design and no visible means of interrupting power to device.

.2 All exit devices with electric latch retraction shall provide for a remote means of unlocking for momentary or maintained periods of time.

.3 Exit devices with electrified trim shall be fail-secure unless otherwise specified.

2.4 Keying

.1 Keying: All permanent cylinders to be grandmaster-keyed as directed by the Owner. The factory shall key all locks and cylinders and maintain keying records. The factory shall establish a System Information Document (SID) to designate primary system administrators and require a separate letter of authorization for all future shipments of keyed products.

.2 Remove all construction cores and install all permanent cores. Unless otherwise directed by the Owner.

.3 Construction master/change keys are to be delivered by the contractor directly to The Owner.

.4 Ship all permanent cylinders and keys separately. Identify door number and keyset symbol on each envelope for direct factory delivery to the owner.

PART 3 EXECUTION

3.1 Manufacturer's Instructions

.1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

.2 Furnish metal door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.

.3 Furnish manufacturers' instructions for proper installation of each hardware component.

3.2 Examination

.1 Before installing any hardware, carefully check all architectural drawings of the work requiring hardware, verify door swings, door and frame materials and operating conditions, and assure that all hardware will fit the work to which it is to be attached.

.2 Check all shop drawings and frame and door lists affecting hardware type and installation, and certify to the correctness thereof, or advise the hardware supplier and Consultant in writing of required revisions.

3.3 Templates

.1 Check the hardware schedule, drawings and specifications, and furnish promptly to the applicable trades any patterns, templates, template information and manufacturer's literature required for the proper preparation for and application of hardware, in ample time to facilitate the progress of the work.

3.4 Installation

.1 Installation of hardware shall be in accordance with ANSI A115.1G, manufacturer's templates and instructions.

.2 Install each item of mechanical and electromechanical hardware and access control equipment to comply with the manufacturer's written instructions and according to specifications. All items to be installed with fasteners identified by manufacturer's installation instructions unless otherwise noted.

.3 Mounting Heights: Install door hardware at heights indicated in the following applicable publications unless; specifically indicated or required by local governing regulations, requirements to match for special templates, necessary coordination with door elevations, and or to ensure consistency with pairs of doors.
   .1 DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames"
   .2 DHI's "Recommended Locations for Architectural Hardware for Wood Flush Doors"
   .3 ANSI/ICC A117.1 Accessibility Guidelines for Buildings and Facilities
   .4 NWWDA

.5 AODA

.4 Power door operator products and accessories are required to be installed by an AAADM certified technician as approved by the manufacturer. Adjust for proper opening and closing operation after final balancing of HVAC system.

.5 Coordinate installation of electric door strikes, keypad locks, card readers, washroom duress systems, and other electronic door control and security devices with Electrical contractor including supply and installation of wiring and all terminations.

.6 All hardware shall be installed by carpenters, skilled in the application of architectural hardware and satisfactory to the hardware supplier. Refer to Section 06 20 00 - Finish Carpentry. Instruction sheets, details and templates shall be read and understood before installation.

.7 Install all materials as listed in the Finishing Hardware Schedule on the doors and frames listed. Interchanging of hardware will not be allowed.

.8 Use only manufacturer's supplied fasteners. Failure to comply may void manufacturer's warranties and applicable licensed labels. Use of "quick" type fasteners, unless specifically supplied by manufacturer, is unacceptable.

.9 Where door stop contacts door pulls, mount stop to strike bottom of pull.

.10 Remove construction cores when directed by Owner’s Representative.

.11 After installation, templates, installation instructions and details shall be put in a file and turned over to the Owner, when building is Substantially Performed.

3.5 Field Quality Control

.1 Conduct periodic inspections to ensure that door frames are installed plumb, level and square with verification by installer prior to installation of doors and door hardware.

.2 Hardware supplier to attend site meetings as required to ensure proper execution of the guidelines set forth herein.

.3 Hardware supplier will perform final field inspection of installed door hardware after final adjustment of all products and will document and report any deficiencies or omissions for correction and written acceptance by the Contractor.

3.6 Adjusting

.1 Adjust door hardware, operators, closers and controls for optimum, smooth operating condition, safety and for weather tight closure.

.2 Lubricate hardware, operating equipment and other moving parts.

.3 Adjust door hardware to provide tight fit at contact points with frames.

3.7 Demonstration

.1 Instruct Owner’s maintenance personnel in the proper adjustment, operation and maintenance of mechanical and electromechanical door hardware, electronic devices and maintenance of finishes.

3.8 Cleaning

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

.2 Perform cleaning after installation to remove construction and accumulated environmental dirt.

.3 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacturer's instructions.

.4 Remove protective material from hardware items where present.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 07 92 00 Joint Sealants
.2 Section 08 11 00 Metal Doors and Frames
.3 Section 08 50 00 Aluminum Doors, Windows and Screens

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM C162-05 (2015) Standard Terminology of Glass and Glass Products.
  .2 ASTM C542-05(2017) Standard Specification for Lock-Strip Gaskets
  .3 ASTM C1048-18 Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass
  .4 ASTM C1376-15 Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass
  .5 ASTM C1503-18 Standard Specification for Silvered Flat Glass Mirrors
  .6 ASTM D790-17 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
  .7 ASTM D1003-13 Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics
  .8 ASTM D1929-20 Standard Test Method for Determining Ignition Temperature of Plastics
  .9 ASTM D2240-15e1 Standard Test Method for Rubber Property—Durometer Hardness
  .10 ASTM E84-23d Standard Test Method for Surface Burning Characteristics of Building Materials
  .11 ASTM E330/E330M-14 Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
  .12 ASTM E1300-16 Standard Practice for Determining Load Resistance of Glass in Buildings
.2 American National Standards Institute (ANSI).
  .1 ANSI Z97.1 American National Standard for Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.
.3 National Fire Protection Association
  .1 NFPA 80 Standard for Fire Doors, Fire Windows.
.4 Canadian General Standards Board (CGSB)
  .1 CAN/CGSB-12.1-17 Safety Glazing
  .2 CAN/CGSB-12.2-91 (R2017) Flat, Clear Sheet Glass.
  .3 CAN/CGSB-12.3-91 (R2017) Flat, Clear Float Glass.
  .4 CAN/CGSB-12.4-91 (R2017) Heat Absorbing Glass
  .5 CAN/CGSB-12.8-17 Insulating Glass Units
.5 CSA Group (CSA)
  .1 AAMA/WDMA/CSA 101/I.S.2/A440-11, NAFS - North American Fenestration Standard for Windows, Doors, and Skylights.
.6 Consumer Product Safety Commission
  .1 CPSC 16 CFR 1201 Safety Standard for Architectural Glazing Materials.
.7 Environmental Choice Program (ECP).
  .1 CCD-045-95 Sealants and Caulking.
.8 Flat Glass Manufacturers Association (FGMA).
  .1 FGMA Glazing Manual - 1997.
.9 Glass Association of North America (GANA)
  .1 GANA Glazing Manual 50th Anniversary Edition-2008.

.2 GANA Laminated Glazing Reference Manual - 2009.
.3 GANA Sealant Manual-2008.
.4 GANA Guide to Architectural Glass (2010).
.5 GANA/PGC International Protective Glazing Manual (2010).
.10 South Coast Air Quality Management District, California State (SCAQMD)
.1 SCAQMD Rule 1168-03, Adhesives and Sealants Applications.
.11 Ontario Ministry of Municipal Affairs and Housing (MMAH)
.1 Ontario Building Code
.2 MMAH Supplementary Standard SB-10, Energy Efficiency Requirements.

1.4 Submittals

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

.2 Shop Drawings:
.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.

.3 Product Data: Submit manufacturer's printed product literature, specifications and data sheets.

.4 Certificates: submit product certificates signed by manufacturer certifying materials and assemblies comply with specified performance characteristics and criteria and physical requirements.

.5 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.6 Samples: Submit duplicate 300 x 300 mm size samples of glass and sealant material.

.7 Manufacturer's Instructions: Submit manufacturer's installation instructions.

.8 Provide maintenance data for glazing for incorporation into Operation and Maintenance Manual specified in Section 01 78 00 – Closeout Submittals.

1.5 Quality Assurance

.1 Perform work in accordance with FGMA Glazing Manual and Laminators Safety Glass Association Standards Manual for glazing installation methods.

.2 Installer: Company specializing in the installation of structural glazing with five years proven experience and approved by the manufacturer for installation of their products.

.3 Safety glass products shall comply with the testing requirements of CAN/CGSB-12.1, Type 1 for Laminated Glass and Type 2 for Tempered Glass.

.4 Provide safety glass permanently marked with the company name or logo and CAN/CGSB-12.1 if the product meets categories 1 and 2, or mark as CAN/CGSB 12.1M-1 if the product meets the requirements of Category 1 only.

.5 Comply with published recommendations of glass product manufacturers and organizations below, except where more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this section or referenced standards.
.1 GANA Publications
.2 AAMA Publications
.3 IGMA/IGMAC Publications

.6 Insulating Glass products are to be permanently marked either on spacers or at least one insulating unit component with appropriate certification label of the Insulating Glass Manufacturers Alliance (IGMA) or Insulating Glass Manufacturers Association of Canada (IGMAC)

.7 Single-source fabrication responsibility: All glass fabricated for each type shall be processed and supplied by a single fabricator.

.8 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.9 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.6 System Description

.1 Performance Requirements: Provide continuity of building enclosure vapour and air barrier using glass and glazing materials as follows:
.1 Utilize inner light of multiple light sealed units for continuity of air and vapour seal.

.2 Insulating glass units in combination with aluminum window or storefront framing specified elsewhere shall be designed by the supplier to comply with energy efficient requirements specified in MMAH Supplementary Standard SB-10.Submit engineered shop drawings, calculations and certificates certifying compliance with that standard.

1.7 Design Requirements

.1 Design glass, glazing channels, connections, attachments and glazing accessories to withstand loads designated by the Ontario Building Code and to accommodate all building deflections.

.2 Size glass to withstand wind loads, dead loads and positive and negative live loads acting normal to plane of glass to a design pressure of 1.2 kPa as measured in accordance with ANSI/ASTM E330.

.3 Limit glass deflection to 1/200 with full recovery of glazing materials.

.4 Glass thicknesses indicated are minimum and are for detailing only. Confirm glass thickness by analyzing project conditions, including in-service conditions and loads. Provide glass lites for various size openings in nominal thicknesses indicated but not less than required to meet performance requirements of referenced standards including energy efficiency requirements of MMAH-SB-10. Coordinate glass thicknesses with manufacturers of framing systems.

1.8 Project Conditions

.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 for 24 hours after installation of glazing compounds.

1.9 Shipping, Handling and Storage

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

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

.3 Provide glass units with interleaving protection between lites. Keep glass and interleaving dry and store cases in clean, cool, dry areas with temperatures above the dew point. Circulation of cool, dry air in storage areas is essential. Open cases and inspect units periodically for moisture accumulation.

.4 Do not store glass in direct sunlight without an opaque protective covering over same.

1.10 Waste Management and Disposal

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

1.11 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of ten years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

.2 Warrant insulating glass units for ten years from date of Substantial Performance against seal failure, interpane dusting, or interpane misting.

.3 Warrant low-emissivity coatings when applied to the second or third surfaces of an insulating glass unit, for ten years against peeling or coating deterioration due to product failure.

PART 2 PRODUCTS

2.1 Materials-Flat Glass

.1 Float glass: to CAN/CGSB-12.3, glazing quality, 6 mm thick minimum.

.2 Sheet glass: to CAN/CGSB-12.2, selected, 6 mm thick minimum.

.3 Tempered Safety Glass: To CAN/CGSB-12.1, transparent, 6.4 mm thick unless indicated otherwise. Type 2-tempered.
.1 Class B-float.
.2 Category 1
.3 Edge treatment: ground, bevel edge.

2.2 Insulating Glass Units

.1 Performance requirements for insulating glass units specified herein are the minimum permitted requirements. Provide engineered shop drawings and calculations showing that glazed assemblies including framing and glazing products in combination, meet or exceed the minimum requirements of MMAH Supplementary Standard SB-10.

.2 Insulating Glass Units: To CAN/CGSB-12.8-M, double glazed sealed units, 25 mm overall thickness.
.1 Glass: to CAN/CGSB-12.1(tempered)
.2 Glass thickness: 6.4 mm each light
.3 Inter-cavity space thickness: 12.7 mm with low conductivity spacers.
.4 Glass coating: surface number 2, low "E".
.5 Inert gas fill: argon.

2.1 Spandrel Glass

.1 Spandrel Glass: to CAN/CGSB-12.9, 8 mm thick.
.1 Type 2 Heat strengthened.
.2 Class A-Float.
.3 Style 1 Opacifying coating on the No. 2 (inboard) surface.
.4 Form M-Monolithic.
.5 Colour to be selected by the Consultant from full range of manufacturer's standards. Up to two (2) colours will be selected.

.2 .

2.2 Glazing Products

.1 Select appropriate glazing sealants, tapes, gaskets and other glazing materials of proven compatibility with other materials that they contact. These include glass products, insulating glass unit seals and glazing channel substrates under installation and service conditions, as demonstrated by testing and field experience.

.2 Setting blocks: Neoprene 80-90 Shore A durometer hardness to ASTM D2240, to suit glazing method, glass light weight and area.

.3 Spacer shims: Neoprene 50-60 Shore A durometer hardness to ASTM D2240, 75 mm long x one half height of glazing stop x thickness to suit application. Self-adhesive on one face.

.4 Glazing tape:
.1 Preformed butyl compound with integral resilient tube spacing device, 10-15 Shore A durometer hardness to ASTM D 2240; coiled on release paper; black colour.
.2 Closed cell polyvinyl chloride foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume 2%, designed for compression of 25%, to effect an air and vapour seal.

.5 Glazing splines: resilient polyvinyl chloride, extruded shape to suit glazing channel retaining slot, colour as selected.

.6 Lock-strip gaskets: to ASTM C542.

.7 Glazing Gaskets: To ASTM C864.

.8 Sealant: as specified in Section 07 92 00 – Joint Sealants. Low VOC.

PART 3 EXECUTION

3.1 Manufacturer's Instructions

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

3.2 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.

3.3 Preparation

.1 Clean contact surfaces with solvent and wipe dry.

.2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.

.3 Prime surfaces scheduled to receive sealant.

3.4 Installation – General

.1 Perform work in accordance with GANA Glazing Manual for glazing installation methods.

3.5 Installation: Exterior Dry Method- Preformed Glazing

.1 Cut glazing tape to length; install on glazing light. Seal corners by butting tape and sealing junctions with sealant.

.2 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners.

.3 Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.

.4 Install removable stops without displacing glazing tape. Exert pressure for full continuous contact.

.5 Trim protruding tape edge.

3.6 Installation: Exterior Wet/Dry Method (Preformed Tape and Sealant)

.1 Cut glazing tape to length and set against permanent stops, 6 mm below sight line. Seal corners by butting tape and dabbing with sealant.

.2 Apply heel bead of sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete continuity of air and vapour seal.

.3 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners.

.4 Rest glazing on setting blocks and push against tape and heel head of sealant with sufficient pressure to attain full contact at perimeter of light or glass unit.

.5 Install removable stops with spacer strips inserted between glazing and applied stops 6 mm below sight line.

.6 Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing, maximum 9 mm below sight line.

.7 Apply cap head of sealant along void between stop and glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.7 Installation: Interior - Dry Method

.1 Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing, maximum 9 mm below sight line.

.2 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 Cut glazing tape to length and set against permanent stops, projecting 1.6 mm above sight line.

.4 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners.

.5 Rest glazing on setting blocks and push against tape for full contact at perimeter of light or unit.

.6 Place glazing tape on free perimeter of glazing.

.7 Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.

.8 Knife trim protruding tape.

.9 Glaze hollow metal doors and pressed steel screens. Glass type as indicated.

.10 Install wired glass in fire rated doors and screens to meet requirements of NFPA 80.

3.8 Cleaning

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

.2 Perform cleaning to remove construction and accumulated environmental dirt.

.3 Remove traces of primer, caulking.

.4 Remove glazing materials from finish surfaces.

.5 Remove labels after work is complete.

.6 Clean glass using approved non-abrasive cleaner in accordance with manufacturer’s instructions.

.7 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

3.9 Protection of Finished Work

.1 After installation, mark light with an "X" by using removable plastic tape.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1	Section 06 10 00	Rough Carpentry
.2	Section 07 21 13	Building Insulation
.3	Section 07 26 00	Vapour Retarders
.4	Section 07 27 00	Vapour Permeable Air Barriers
.5	Section 07 84 00	Firestopping
.6	Section 07 92 00	Joint Sealants
.7	Section 09 21 16.13	Shaftwall Systems
.8	Section 09 81 16	Acoustic Blanket Insulation
.9	Section 09 91 23	Interior Painting

1.3 References

.1 ASTM International (ASTM)
- .1 ASTM C514-04(2020) Standard Specification for Nails for the Application of Gypsum Board
- .2 ASTM C840-20 Standard Specification for Application and Finishing of Gypsum Board
- .3 ASTM C954-22 Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness
- .4 ASTM C1002-22 Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
- .5 ASTM C1047-19 Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base
- .6 ASTM C1177/C1177M-17 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
- .7 ASTM C1178/C1178M-18 Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel
- .8 ASTM C1278/C1278M-17 Standard Specification for Fiber-Reinforced Gypsum Panel
- .9 ASTM C1280 - 18 Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing.
- .10 ASTM C1288-17 Standard Specification for Fiber-Cement Interior Substrate Sheets
- .11 ASTM C1325-22 Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units
- .12 ASTM C1396/C1396M - 17 Standard Specification for Gypsum Board
- .13 ASTM C1629/C1629M-19 Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels
- .14 ASTM E90-09(2016) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
- .15 ASTM E814-13a(2017) Standard Test Method for Fire Tests of Penetration Firestop Systems
- .16 ASTM E1966-15(2019) Standard Test Method for Fire-Resistive Joint Systems

.2 American National Standards Institute (ANSI)
- .1 ANSI A118.9-1992 Test Methods and Specifications for Cementitious Backer Units.

.3 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-51.34 Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .2 CAN/CGSB 19-GP-21M Sealing and Bedding Compound for Acoustical Purposes

.4 Underwriters Laboratories of Canada (ULC)

.1 ULC 102-2018 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
.2 ULC 114-2018 Standard Method of Test for Determination of Non-Combustibility in Building Materials
.3 ULC 129- 2015 Standard Method of Test for Smoulder Resistance of Insulation (Basket Method)
.4 ULC List of Equipment and Material, Volume III, Fire Resistance Ratings.

.5 Gypsum Association (GA)
.1 GA-214-2022 Recommended Levels of Gypsum Board Finish.
.2 GA-216-2021 Application and Finishing of Gypsum Board.
.3 GA-253-2021 Application of Gypsum Sheathing

.6 Wall and Ceiling Bureau (WCB)
.1 Technical Bulletin Control Joint Placement in Gypsum Board Assemblies

1.4 Submittals

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

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for gypsum board assemblies and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Samples:
.1 Submit for review and acceptance of each unit.
.2 Samples will be returned for inclusion into work.

1.5 Quality Assurance

.1 Dry wall installers: minimum 5 years proven experience.

.2 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.3 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.4 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.6 Design Requirements

.1 Where indicated provide minimum sound transmission rating of installed partitions of STC 50 tested to ASTM E90.

.2 Provide fire resistance rating of installed partitions as indicated and according to referenced ULC design.

1.7 Shipping, Handling and Storage

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

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

.3 Protect gypsum board materials before, during and after installation and to protect the installed work and materials of other trades affected by this work. Store materials in a dry area inside the building. Do not remove wrapping until ready for use. Prevent damage to all edges and surfaces.

1.8 Project Conditions

.1 Maintain temperature minimum 10 ° C, maximum 21 ° C for 48 hours prior to and during application of gypsum boards and joint treatment, and for at least 48 hours after completion of joint treatment.

.2 Apply board and joint treatment to dry, frost free surfaces.

.3 Ventilation: Ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.

1.9 Waste Management and Disposal

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

PART 2 PRODUCTS

2.1 Gypsum Board

.1 To ASTM C1396/C1396M. Standard for non-rated applications, Type X for rated applications, 1220 mm wide x maximum practical length, ends square cut, edges tapered with round edge, 12.7 mm thick or to thickness indicated on drawings. All fire rated board shall be minimum 16 mm thickness.

.2 Water and Moisture Resistant Board: to ASTM C1396, 12.7 mm thick, 1220 mm wide with tapered edges.

2.2 Cementitious Backer Board

.1 Cementitious backer board: cementitious, water durable, board; surfaced with fiberglass reinforcing mesh on front and back; long edges wrapped; to ANSI A118.9, ASTM C1288 and ASTM C1325, 13 mm thick, edges tapered, 1200 mm wide x maximum practical length. Compressive strength: Not less than 15.51 MPa when tested in accordance with ASTM D2394. Water absorption: Not greater than 8 percent when tested for 24 hours in accordance with ASTM C473.
.1 CGC Durock Brand
.2 Certainteed Diamondback

2.3 Fastening and Adhesives

.1 Drywall Screws: To ASTM C954 or ASTM C1002 self-drilling, self-tapping, case hardened, length to suit board thickness and provide minimum 12 mm penetration into support.

.2 Joint Tape: To ASTM C475, 50 mm perforated with preformed seam, mould and mildew resistant.
.1 Joint tape for abuse resistant gypsum board: CGC Mould Resistant Fiberglass Drywall Tape.

.3 Joint Filler and Topping: To ASTM C475 vinyl or latex base, slow setting.

.4 Laminating Compound: as recommended by manufacturer, asbestos-free.

.5 Resilient Drywall Furring: 0.5 mm base steel thickness galvanized steel for resilient attachment of gypsum board.

2.4 Acoustic Insulation

.1 Acoustic Attenuation: as specified in Section 09 81 16.

.2 Acoustic sealant: as specified in Section 07 92 00 - Joint Sealants.

2.5 Accessories

.1 Casing beads, corner beads, control joints and edge trim: to ASTM C1047, zinc-coated by hot-dip process 0.5 mm base thickness, perforated flanges, one piece length per location.

.2 Insulating Strip: Rubberized, moisture resistant, 3.0 mm thick, 12 mm wide closed cell neoprene strip, with self-sticking permanent adhesive on one face; lengths as required.

.3 Sealants: as specified in Section 07 92 00 - Joint Sealants.

PART 3 EXECUTION

3.1 General

.1 Prior to installation of gypsum wallboard, ensure that all required vapour barriers, air seals, gaskets and the like installed under another Section have been inspected and accepted by Municipal authorities and the Consultant. Failure to do so will result in removal of all gypsum board installed prior to approval and replacement, at no additional cost to the Owner.

.2 Unless otherwise indicated on the drawings, all gypsum board partitions shall extend from floor level to the underside of floor or roof structures above.

3.2 Acoustic Insulation

.1 Install acoustic blankets in wall, partition, floor and roof assemblies as specified in Section 09 81 16.

3.3 Gypsum Board Application

.1 Do application and finishing of gypsum board in accordance with ASTM C840 and/or GA-216 except where specified otherwise.

.2 Do not apply gypsum board until bucks, anchors, blocking, electrical, and mechanical work are approved.

.3 Apply gypsum board at right angles to framing members or furring using screw fasteners. Maximum spacing of screws 300 mm o.c.

.4 Install fibre gypsum abuse resistant panels at all ceilings and bulkheads except as noted below. Treat joints with fibreglass reinforced joint tape in accordance with manufacturer’s instructions.

.5 Apply water or moisture resistant gypsum wallboard where indicated. Apply water resistant sealant to edges, ends and cut outs which expose gypsum core.

.6 Carry gypsum board from floor to underside of floor or roof structure above. Furr out and carry gypsum board around any structural members as may be required. Neatly cope gypsum board to fill deck flutes where gypsum board abuts floor or roof deck.

3.4 Cementitious Backer Board

.1 Install cementitious backer board where indicated in shower and tub enclosures and other wet areas indicated.

.2 Install in accordance with manufacturer's instructions.

3.5 Accessories

.1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges.

.2 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated.

.3 Install insulating strips continuously at edges of gypsum board or casing beads abutting exterior door or window frames, to provide thermal break.

.4 Install continuous bead of acoustic sealant at all penetrations through sound control partitions.

.5 Provide control joints in gypsum board facing. Construct control joints in accordance with ASTM C840 and as described in Wall and Ceiling Bureau Technical Bulletin "Control Joint Placement in Gypsum Board Assemblies". Place control joints consistent with lines of building spaces as indicated. Where not indicated install as directed at maximum 6.0 m spacing. Control joints shall be supported with metal studs or furring channels on both sides of the joint Construct joints using back-to-back casing beads filled with a low modulus sealant capable of flexible joint movement. Maintain fire-resistance rating of wall assemblies. Control joints shall be provided:
   .1 At abutting structural elements, steel columns.
   .2 At expansion or control joints in the substrate.
   .3 At each door jamb.

.6 Erect drywall resilient furring transversely across studs and joists, spaced maximum 400 mm on centre and not more than 150 mm from ceiling/wall juncture. Secure to each support with 25 mm drywall screws.

.7 Install 150 mm continuous strip of 12.7 mm gypsum board along base of partitions where resilient furring installed.

3.6 Access Doors

.1 Install access doors to electrical and mechanical fixtures specified in respective Sections.

.2 Rigidly secure frames to furring or framing systems, to satisfy fire rating requirements.

3.7 Taping and Filling

.1 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces. Finish to GA-214 Level 5.

.2 Finish corner beads, control joints and trims as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.

.3 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after painting is completed.

.4 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.

.5 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for painting.

3.8 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 07 84 00 Firestopping
.2 Section 09 21 16 Gypsum Board

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM C423-23 Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
  .2 ASTM C475/C475M-17(2022) Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
  .3 ASTM C645-18 Standard Specification for Nonstructural Steel Framing Members
  .4 ASTM C754-20 Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products
  .5 ASTM C840-20 Standard Specification for Application and Finishing of Gypsum Board
  .6 ASTM C954-22 Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness
  .7 ASTM C1002-22 Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
  .8 ASTM C1047-19 Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base
  .9 ASTM C1396/C1396M-17 Standard Specification for Gypsum Board
  .10 ASTM D3273-21 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
  .11 ASTM E136-22 Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750° C
.2 Underwriters Laboratories of Canada (ULC)

1.4 Submittals

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

.2 Product Data: Manufacturers' product literature, specifications and installation instructions for each product specified.

.3 Submit Engineered shop drawings. Shop drawings shall be stamped by a professional engineer licensed in the Province of Ontario.

.4 Submit ULC designs specified or as necessary to meet required Fire Resistance ratings.

1.5 Shipping, Handling and Storage

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

.2 Packaging and Shipping: Have materials shipped in manufacturer's original packages showing

manufacturer's name and product brand name.

.3 Storage and Protection: Store materials inside and protected from damage by the elements.

.4 Protect ends, edges, and faces of gypsum boards from damage. Protect steel studs and accessories from bending.

1.6 Project Conditions

.1 Environmental Requirements: Establish and maintain application and finishing environment in accordance with ASTM C840.

1.7 Waste Management and Disposal

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

PART 2 PRODUCTS

2.1 Materials

.1 Studs: to ASTM C645. Depth as indicated, CH, or CT shaped studs, weighing 378, 476 and 613 kg per 30.48 lineal metres with minimum base steel of 0.835 mm, galvanized.

.2 Track: to ASTM C645. Depth as indicated. J shaped track with 57 mm leg, weighing 306, 376 and 470 kg per 30.48 lineal metres, 1.0 mm thick galvanized.

2.2 Gypsum Board

.1 Fire-Rated Gypsum Shaftliner Board: To ASTM C1396. To meet requirements of ULC design as indicated including: 25 mm thick shaftwall liner panels, beveled edge, 610 mm wide with ULC label.
.1 CGC Shaft Wall Liner Boards
.2 Georgia Pacific DENS Glass Shaftliner
.3 Certainteed GlasRoc Shaftliner
.4 National Gypsum Company Gold Bond BRAND Fire-Shield Shaftliner

.2 Fire-Rated Gypsum Board: To ASTM C1396 Type X. Gypsum core wall panel with additives to enhance fire resistance of the core and surfaced with paper on front, back, and long edges.
.1 Thickness: as indicated.
.2 Width: 1220 mm
.3 Edges: Tapered.

2.3 Semi Rigid Mineral Wool Insulation

.1 Acoustical and fire batt insulation to CAN/ULC S702, Type 1.
.1 Fire performance:
.1 Non-combustibility: To CAN/ULC S114.
.2 Surface Burning Characteristics: To CAN/ULC S102.
.1 Flame spread: 0.
.2 Smoke developed: 0
.3 Smoulder resistance: 0.09% to CAN/ULC S129.

.2 Acoustical Performance:

.1 Airborne sound transmission loss: To ASTM E90.

.2 Rating sound insulation: To ASTM E413.

.3 Sound absorption co-efficients: To ASTM C423.

.4 Impedence and absorption of acoustic materials: To ASTM E1050.

.3 Air erosion velocity: 5.08 m/s maximum to UL 181.

.4 Thermal resistance: To ASTM C518.

.5 Corrosive resistance: To ASTM C665, Corrosive to steel - Pass.

.6 Stainless steel stress corrosion: To ASTM C795.

.1 Density: To ASTM C167, 40 kg/m3 (thicknesses ≥ 76.2mm),

.2 45 kg/m3 (thicknesses < 76.2mm)

.2 Non-combustible, lightweight, mineral wool batt insulation to CAN/ULC S702, Type 1, that provides fire resistance to ASTM E136 and a sound control to ASTM E90 and ASTM E423.

.3 Thickness: as indicated

.4 Acceptable Material: ROCKWOOL AFB evo.

.5 Provide mechanical fasteners in accordance with insulation manufacturer's written recommendations.

2.4 Accessories

.1 Angle: Rolled steel angle, 50 x 50 mm by 20 gauge.

.2 Corner Bead: Formed galvanized steel angle, min. base steel 0.014 in. thick, and complying with ASTM C1047.

.3 Control Joint: Extruded vinyl formed with V shaped slot covered with removable flexible vinyl strip and complying with ASTM C1047.

.4 Control Joint: Bent zinc sheet formed with V shaped slot, covered with plastic tape, with perforated flanges and complying with ASTM C1047.

.5 Screws: ASTM C954 or ASTM C1002 or both with heads, threads, points, and finish as recommended by the manufacturer.

.6 Joint Treatment: To ASTM C475. Refer to Section 09 21 16.

PART 3 EXECUTION

3.1 Installation

.1 Install runners, studs, acoustic insulation, liner panels and finish panels for fire rated shaftwall assemblies, where indicated, and in accordance with system manufacturer's printed instructions, ASTM C754 and ASTM C840.

.2 Complete joint treatment as follows:

.1 Finish face panel joints and internal angles with joint system consisting of joint compound,

joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.

.2 Gypsum Board Finish: finish gypsum board walls and ceilings to following levels in accordance with AWCI Levels of Gypsum Board Finish:

.1 Level 5: embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; apply a thin skim coat of joint compound to entire surface; surfaces smooth and free of tool marks and ridges.

.2 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.

.3 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after surface finish is completed.

.4 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.

.3 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.

.3 Finished assembly shall meet requirements for ULC listed assembly indicated.

3.2 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

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

1.3 References

.1 ASTM International (ASTM)
- .1 ASTM B117-19 Standard Practice for Operating Salt Spray (Fog) Apparatus
- .2 ASTM C501-21 Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser
- .3 ASTM D543-21 Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents
- .4 ASTM D570-22 Standard Test Method for Water Absorption of Plastics
- .5 ASTM D638-22 Standard Test Method for Tensile Properties of Plastics
- .6 ASTM D695-15 Standard Test Method for Compressive Properties of Rigid Plastics
- .7 ASTM D790-17 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
- .8 ASTM E84-23d Standard Test Method for Surface Burning Characteristics of Building Materials
- .9 ASTM G151-19 Standard Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources
- .10 ASTM G155-21 Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Materials

.2 Accessibility for Ontarians with Disabilities Act (AODA)

1.4 Submittals

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

.2 Product Data: Submit manufacturer’s literature describing products, installation procedures and maintenance instructions.

.3 Samples for Verification Purposes: Submit two Tactile Warning Surface samples minimum 200 X 200 mm of the kind proposed for use. Samples shall be properly labeled and shall contain the following information: Manufacturer’s Name, and Catalog Number.

.4 Shop Drawings: Submit shop drawings showing all pertinent characteristics of the Cast in Place Tactile Warning Surface Tile (CIP).

.5 Material Test Reports: Submit current test reports from qualified, accredited independent testing laboratory in accordance with ASTM guidelines and indicating that materials proposed for use are in compliance with specification requirements and meet the properties indicated.

.6 Provide maintenance data for Tactile Warning Surface Tile floor for incorporation into Operating and Maintenance Manuals specified in Section 01 78 00.

1.5 Quality Assurance

.1 Provide Cast in Place Tactile Warning Surface Tiles (CIP) and accessories as produced by a single manufacturer with a minimum of five years of experience in manufacturing Cast In Place Composite Shell Tactile Warning Surface Tiles.

.2 Installer's Qualifications: Engage an experienced installer certified in writing by the Tactile Warning Surface manufacturer, who has successfully completed Tactile Warning Surface installations similar in material, design, and extent to that indicated for the Contract.

.3 Cast In Place Tactile Warning Surface Tiles (CIP) must be compliant with ADAAG and PROWAG, requirements.

.4 Cast In Place Tactile Warning Surface Tiles (CIP) shall meet or exceed the following test criteria using the most current test methods:
- .1 Compressive Strength: 28,900 psi minimum, when tested in accordance with ASTM D695.
- .2 Flexural Strength: 29,300 psi minimum, when tested in accordance with ASTM D790.
- .3 Water Absorption: Not to exceed 0.10%, when tested in accordance with ASTM-D570.
- .4 Slip Resistance: 1.05 minimum wet and 1.18 dry static coefficient of friction when tested in accordance with ASTM C1028.
- .5 Flame Spread: 25 maximum, when tested in accordance with ASTM E84.
- .6 Salt and Spray Performance of Tactile Warning Surface: No deterioration or other defects after 200 hours of exposure, when tested in accordance with ASTM-B117.
- .7 Chemical Stain Resistance: No reaction to 1% hydrochloric acid, motor oil, calcium chloride, gum, soap solution, bleach, and antifreeze, when tested in accordance with ASTM D543.
- .8 Abrasion Resistance: 500 minimum, when tested in accordance with ASTM C501.
- .9 Accelerated Weathering of Tactile Warning Surface when tested by ASTM-G155 or ASTM G151 shall exhibit the following result: $\Delta E<5.0$ at 2,000 hours minimum exposure.
- .10 Tensile Strength: 11,600 psi minimum, when tested in accordance with ASTM D638.
- .11 AASHTO-H20 Load Bearing Test: No Damage at 16,000# loading.
- .12 Freeze/Thaw/Heat: No deterioration when tested in accordance with ASTM C1026.

1.6 Shipping, Handling and Storage

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

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

.3 Cast-in- Place Tactile Warning Surface Tiles (CIP) shall be suitably packaged or crated to prevent damage in shipment or handling. Finished surfaces shall be protected by sturdy wrappings.

.4 Store CIP Tiles in an area that is within an acceptable temperature range (4- 32° C). Maintain Storage Facility in a clean dry condition to prevent contamination or damage to CIP Tiles.

1.7 Waste Management and Disposal

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

1.8 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of five years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Manufacturer

.1 Available manufacturers, subject to compliance with these Specifications include, but are not limited to, the following:
  .1 ADA Solutions Inc. of Chelmsford, MA (Phone: 800-372-0519, Web Site: www.adatile.com, or approved equal.

2.2 Materials

.1 Composition: CIP Tiles shall be manufactured using a matte finish exterior grade homogeneous (uniform colour throughout thickness of product) glass and carbon reinforced polyester based Sheet Molding Compound (SMC) composite material. Truncated domes shall contain fiberglass reinforcement within the truncated dome for superior structural integrity and impact resistance. Tactile Warning Surface shall have matte finish for superior slip resistance performance. Use of Tactile Warning Surface Products employing coatings or featuring layers of material with differing composition, performance, or colour properties is expressly prohibited under this Section.

.2 Colour: Colour shall be homogeneous throughout CIP Tile.
  .1 Federal Yellow (Y) per Federal Standard 595B Table IV, Colour No. 33538.

.3 Domes: Square grid pattern of raised truncated domes of 5 mm nominal height, base diameter of 23 mm and top diameter of 11.43 mm. The truncated dome spacing shall have a center-to-center (horizontally and vertically) spacing of 59 mm, measured between the most adjacent domes on square grid.

.4 Configuration: CIP Tile sizes shall be as indicated. CIP Tile shall feature internal embedment ribs at 76 mm on center maximum. The field area shall consist of a non-slip textured surface with a minimum static coefficient of friction of 0.80, wet and dry. At a minimum, CIP Tile thickness shall measure 5.08 mm (nominal).
  .1 The field area shall consist of a non-slip textured surface with a minimum static coefficient of friction of 0.80, wet and dry.

.5 Truncated Dome Surface of Composite CIP Tile shall be protected with factory installed plastic sheeting for cleanliness during the installation process.

.6 Dimensions: Cast In Place Tactile Warning Surface Tiles shall be held within the following dimensions and tolerances:
  .1 59 mm Dome Spacing: 610 x 914 mm.

.7 Cleaning materials used on site shall have low VOC solvent content and low flammability.

2.3 Equipment

.1 Provide all tools, equipment and services required for satisfactory installation per manufacturer's instructions.

PART 3 EXECUTION

3.1 Preparation

.1 The physical characteristics of the concrete shall be consistent with the Contract Specifications

while maintaining a slump range of 4 - 7 to permit solid placement of the CIP Tile. An overly wet mix will cause the CIP Tile to float. Under these conditions suitable weights such as 2 concrete blocks or sandbags (25 pounds) shall be placed on each CIP Tile.

.2 The concrete shall be poured and finished, true and smooth to the required dimensions and slope prior to CIP Tile placement.

3.2 Installation

.1 CIP Tile shall be installed per manufacturer's instructions.

.2 To the maximum extent possible, the CIP Tiles shall be oriented such that the rows of in-line truncated domes are parallel with the direction of the ramp. When multiple CIP Tiles regardless of size are used, the truncated domes shall be aligned between the tactile warning surface Tiles and throughout the entire tactile warning surface installation.

.3 CIP Tiles shall be tamped or vibrated into the fresh concrete to ensure that there are no voids or air pockets, and the field level of the CIP Tile is flush to the adjacent concrete surface or as the Drawings indicate to permit proper water drainage and eliminate tripping hazards between adjacent finishes.

.4 CIP Tiles shall be cut into size and configuration indicated using a 60 tooth carbide blade on a table saw or equivalent cutting device. Minimize any cantilever effect (to the maximum extent practicable) when cutting between successive embedment ribs. The top of the body of the CIP Tiles shall be fully seated and flush with the adjacent concrete substrate.

3.3 Protection

.1 Protect CIP Tiles against damage during construction period to comply with CIP Tiles manufacturer's Specifications.

.2 During and after the CIP Tiles installation and the concrete curing stage, it is imperative that there are no walking, leaning or external forces placed on the CIP Tiles to rock the CIP Tile, causing a void between the underside of the CIP Tile and the concrete.

3.4 Cleaning

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

.2 Remove Protective Plastic Sheeting from CIP Tile within 24 hours of installation of the CIP Tile.

.3 Clean CIP Tiles not more than four (4) days prior to date scheduled for inspection intended to establish date of Substantial Performance in each area of project. Clean CIP Tile by method specified by Tactile Warning Surface Products manufacturer.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 06 10 00 Rough Carpentry
.2 Section 07 92 00 Joint Sealants
.3 Section 09 21 16 Gypsum Board

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM C423-17 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
  .2 ASTM C665-12 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
  .3 ASTM C795-08(2013) - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.
  .4 ASTM C1104/C1104M-13a - Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation.
  .5 ASTM C1338-14 - Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.
  .6 ASTM E136-16a - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C.
.2 Underwriters Laboratories of Canada (ULC)
  .1 CAN/ULC-S102-10 - Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
  .2 CAN/ULC-S114-05 - Standard Method of Test for Determination of Non-Combustibility in Building Materials.
  .3 CAN/ULC-S129-15 - Standard Method of Test for Smoulder Resistance of Insulation (Basket Method).
  .4 CAN/ULC-S702-14 - Standard for Mineral Fibre Thermal Insulation for Buildings.

1.4 Submittals

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

.2 Product Data: Provide data on product characteristics, performance criteria and limitations.

.3 Manufacturer's Certificate: Certify that Products meet or exceed specified requirements

.4 Installation Data: Manufacturer's special installation requirements, including special procedures, and perimeter conditions requiring special attention.

1.5 Administrative Requirements

.1 Coordination:
  .1 Coordinate with other work having a direct bearing on work of this section.
  .2 Coordinate the work with Section 07 92 00 for installation of acoustic seal materials.

.3 Coordinate placement of loose-laid acoustic blanket insulation with weight limitations of suspended ceiling assemblies at Section [09 51 13].

1.6 Quality Assurance

.1 Sustainability Standards Certifications:
.1 Insulation products shall comply with the requirements of the Cradle to Cradle Certified Product Standard, evidenced by a Bronze Material Health Certificate.
.2 The manufacturer shall disclose insulation product's environmental impacts determined in accordance with ISO 14025, evidenced by an Environmental Product Declaration.

1.7 Shipping, Handling and Storage

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

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

.3 Deliver products in their original packages.

.4 Store products in weather protected environment, clear of ground and moisture and protected from direct exposure to sunlight.

1.8 Waste Management and Disposal

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

PART 2 PRODUCTS

2.1 Manufacturer

.1 Manufacturer - Basis of Design:
.1 Thermafiber Inc.

2.2 Performance Criteria

.1 Noise Reduction Coefficient (NRC): 1.20 at 102 mm, 1.20 at 152 mm thickness.

.2 Fire Resistance: Certified by ULC/UL for use in fire-resistant rated assemblies.

.3 Surface Burning Characteristics: CAN/ULC-S102.
.1 Flame Spread: 0.
.2 Smoke Developed: 0.

.4 Non-combustible when tested in accordance with CAN/ULC-S114.

.5 Smoulder resistance: 0.02% to CAN/ULC S129.

.6 Moisture Absorption to ASTM C1104: < 0.03% by volume.

.7 Fungi resistant when tested in accordance with ASTM C1338.

.8 Non-corrosive when tested in accordance with ASTM C665 (steel, aluminum and copper) and ASTM C795 (stainless steel).

.9 Recycled Content: Minimum 70%.

2.3 Material

.1 Mineral Wool Acoustic Batt Insulation: CAN/ULC-S702 Type 1; preformed mineral fibre, friction fit, conforming to the following:
  .1 Wood-framed applications:
    .1 Thickness and size as indicated

.2 Facing: Unfaced.

.3 Basis of Design Product: Thermafiber SAFB

2.4 Accessories

.1 Wood Strapping: Refer to Section 06 10 00.

PART 3 EXECUTION

3.1 Examination

.1 Examine installation conditions and ensure:
  .1 Substrate, adjacent materials, and insulation are dry and ready to receive insulation.
  .2 Acoustic sealants required at [steel][wood][stud framing][concrete masonry unit wall] junctions with adjacent building components or at mechanical, electrical and other services are installed.

.2 Ensure structural and firestop elements, mechanical and electrical services to be covered by the insulation have been inspected.

.3 Do not commence installation until base work has been corrected and inspections completed.

3.2 Installation

.1 Place acoustics blankets where indicated on drawings to thickness indicated on drawings]

.2 Partitions, floors and ceilings:
  .1 Install blankets friction-fit between framing, furring of wall, floor and ceiling spaces with tight fitting joints free of sags, folds, voids or open joints. Do not compress insulation.

.3 Cut and fit insulation tightly around mechanical and electrical services within the plane of insulation filling all voids. Cut insulation with a serrated knife for custom fitting. Do not compress insulation,

.4 Keep insulation minimum 75 mm from heat-emitting devices, such as recessed fixtures (which are not IC rated), and minimum 50 mm from sidewalls of CAN/ULC-S604 chimneys and CSA B149.1 and CSA B149.2 type B and L vents.

.5 Coordinate work of this section with construction of gypsum board specified in Section 09 21 16.

3.3 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 09 91 23 Interior Painting

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM A780/A780M-20 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
.2 Environmental Protection Agency (EPA)
  .1 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings)
.3 Master Painters Institute (MPI)
  .1 MPI Architectural Painting Specifications Manual, 2018
  .2 MPI Standard GPS-1-12 and GPS-2-12 MPI Green Performance Standard for Painting and Coatings.
.4 Society for Protective Coatings (SSPC)
  .1 Systems and Specifications, SSPC Painting Manual 2009
.5 South Coast Air Quality Management District, California State (SCAQMD)
  .1 SCAQMD Rule 1113-96 Architectural Coatings
.6 Green Seal GS-11 Green Seal Environmental Standard for Paints and Coatings, January 1997
.7 National Fire Code of Canada

1.4 Submittals

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

.2 Product Data: Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Samples:
  .1 Submit full range colour sample chips to indicate where colour availability is restricted.
  .2 Submit duplicate 200 x 300 mm sample panels of each paint, stain, clear coating and special finish with specified paint or coating in colours, gloss/sheen and textures required to MPI Architectural Painting Specification Manual standards.
  .3 Retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface.

.4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties and SCAQMD Rule 1113-96.

.5 Provide maintenance data for paint products for incorporation into Operating and Maintenance Manuals specified in Section 01 78 00- Closeout Submittals. Include following:
  .1 Product name, number, type and use.
  .2 Colour numbers.
  .3 MPI Environmentally Friendly classification system rating.

1.5 Quality Assurance

.1 Qualifications:
  .1 Contractor: to have a minimum of five years proven satisfactory experience. When requested, provide list of last three comparable jobs including, job name and location, specifying authority, and project manager.
  .2 Qualified journeypersons as defined by local jurisdiction to be engaged in painting work.
  .3 Apprentices: may be employed provided they work under direct supervision of qualified journeyperson in accordance with trade regulations.

.2 Conform to latest MPI requirements for exterior painting work including preparation and priming.

.3 Paint materials to be highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and to be compatible with other coating materials as required.

.4 Retain purchase orders, invoices and documents to prove conformance with noted MPI requirements when requested by Consultant.

.5 Provide mock-up in accordance with Section 01 45 00 - Quality Control.
  .1 Prepare and paint designated surface, area, room or item (in each colour scheme) to specified requirements, with specified paint or coating showing selected colours, gloss/sheen and textures. Locate where directed.
  .2 Mock-up will be used to judge workmanship, substrate preparation, operation of equipment and material application and workmanship to MPI Architectural Painting Specification Manual standards.
  .3 Allow 24 hours for inspection of mock-up before proceeding with work.
  .4 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

1.6 Shipping, Handling and Storage

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

.2 Deliver and store materials in original containers, sealed, with labels intact. Labels to indicate:
  .1 Manufacturer's name and address.
  .2 Type of paint or coating.
  .3 Compliance with applicable standard.
  .4 Colour number in accordance with established colour schedule.

.3 Provide and maintain dry, temperature controlled, secure storage. Store materials and equipment in well-ventilated area with temperature range 7 °C to 30 °C. Store materials and supplies away from heat generating devices.

.4 Observe manufacturer's recommendations for storage and handling.

.5 Keep areas used for storage, cleaning and preparation, clean and orderly. After completion of operations, return areas to clean condition.

.6 Remove paint materials from storage only in quantities required for same day use.

.7 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.

.8 Remove damaged, opened and rejected materials from site.

1.7 Fire Safety Requirements

.1 Provide one 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.

.2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

.3 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

1.8 Waste Management and Disposal

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

.2 Place materials defined as hazardous or toxic in designated containers. Handle and dispose of hazardous materials in accordance with Municipal regulations.

.3 Unused materials must be disposed of at official hazardous material collections site.

.4 Paint and related materials are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from the Ministry of the Environment.

.5 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.

.6 Place materials defined as hazardous or toxic waste in containers or areas designated for hazardous waste.

1.9 Maintenance

.1 Extra Materials:
- .1 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Quantity: provide one four litre can of each type and colour of finish coating. Identify colour and paint type in relation to established colour schedule and finish system.
- .3 Deliver to Owner and store where directed.

1.10 Ambient Conditions

.1 Heating, Ventilation and Lighting:
- .1 Ventilate enclosed spaces in accordance with Section 01 51 00 – Temporary Utilities.
- .2 Do not perform painting work unless adequate and continuous ventilation and sufficient heating facilities are in place to maintain ambient air and substrate temperatures above 10 °C for 24 hours before, during and after paint application until paint has cured sufficiently.
- .3 Provide continuous ventilation for seven days after completion of application of paint
- .4 Provide minimum lighting level of 323 Lux on surfaces to be painted.

.2 Temperature, Humidity and Substrate Moisture Content Levels:
- .1 Unless specifically pre-approved by Consultant and product manufacturer, perform no painting work when:
  - .1 Ambient air and substrate temperatures are below 10 °C.
  - .2 Substrate temperature is over 32 °C unless paint is specifically formulated for application at

high temperatures.
.3 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's prescribed limits.
.4 Relative humidity is above 85 % or when dew point is less than 3 °C variance between air/surface temperature.
.5 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.
.2 Perform no painting work when maximum moisture content of substrate exceeds 12%.
.3 Conduct moisture tests using a properly calibrated electronic Moisture Meter.
.4 Test concrete surfaces for alkalinity as required.

.3 Surface and Environmental Conditions:
.1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
.2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits noted herein.
.3 Apply paint when previous coat of paint is dry or adequately cured.
.4 Apply paint finishes when conditions forecast for entire period of application fall within manufacturer's recommendations.
.5 Do not apply paint when:
.1 Temperature is expected to drop below 10 °C before paint has thoroughly cured.
.2 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's limits.
.3 Surface to be painted is wet, damp or frosted.
.6 Provide and maintain cover when paint must be applied in damp or cold weather. Heat substrates and surrounding air to comply with temperature and humidity conditions specified by manufacturer. Protect until paint is dry or until weather conditions are suitable.
.7 Schedule painting operations such that surfaces exposed to direct, intense sunlight are scheduled for completion during early morning.
.8 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.

PART 2 PRODUCTS

2.1 Materials

.1 Paint materials listed in latest edition of MPI Approved Products List (APL) and from a single manufacturer for each system used are acceptable for use on this project.

.2 Paint materials for paint systems: to be products of single manufacturer.

.3 Only qualified products with E2 or E3 "Environmentally Friendly" ratings are acceptable for use on this project.

.4 Use only MPI listed ‘L’ rated materials.

.5 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids, to be as follows:
.1 Be water-based water soluble water clean-up.
.2 Be non-flammable biodegradable.
.3 Be manufactured without compounds which contribute to ozone depletion in upper atmosphere.
.4 Be manufactured without compounds which contribute to smog in the lower atmosphere.

.5 Do not contain methylene chloride, chlorinated hydrocarbons, toxic metal pigments.

.6 Water-borne surface coatings must be manufactured and transported in a manner that steps of processes, including disposal of waste products arising therefrom, will meet requirements of applicable governmental acts, by-laws and regulations including Fisheries Act and Canadian Environmental Protection Act (CEPA).

.7 Water-borne surface coatings must not be formulated or manufactured with aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavelant chromium or their compounds.

.8 Water-borne surface coatings and recycled water-borne surface coatings must have flash point of 61 °C or greater.

.9 Both water-borne surface coatings and recycled water-borne surface coatings must be made by a process that does not release:
.1 Matter in undiluted production plant effluent generating a 'Biochemical Oxygen Demand' (BOD) in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.
.2 Total Suspended Solids (TSS) in undiluted production plant effluent in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.

.10 Water-borne paints and stains, recycled water-borne surface coatings and water borne varnishes must meet a minimum "Environmentally Friendly" E2 or E3 rating.

.11 Recycled water-borne surface coatings must contain 50 % post-consumer material by volume.

.12 Recycled water-borne surface coatings must not contain:
.1 Lead in excess of 600.0 ppm weight/weight total solids.
.2 Mercury in excess of 50.0 ppm weight/weight total product.
.3 Cadmium in excess of 1.0 ppm weight/weight total product.
.4 Hexavelant chromium in excess of 3.0 ppm weight/weight total product.
.5 Organochlorines or polychlorinated biphenyls (PCBS) in excess of 1.0 ppm weight/weight total product.

.13 The following must be performed on each batch of consolidated post-consumer material before surface coating is reformulated and canned. These tests must be performed at a laboratory or facility which has been accredited by the Standards Council of Canada.
.1 Lead, cadmium and chromium are to be determined using ICP-AES (Inductively Coupled Plasma - Atomic Emission Spectroscopy) technique no. 6010 as defined in EPA SW-846.
.2 Mercury is to be determined by Cold Vapour Atomic Absorption Spectroscopy using Technique no. 7471 as defined in EPA SW-846.
.3 Organochlorines and PCBs are to be determined by Gas Chromatography using Technique no. 8081 as defined in EPA SW-846.

2.2 Colours

.1 Consultant will provide Colour Schedule.

.2 Exterior colour schedule will be based upon selection of three base colours and two deep tint accent colours.

.3 Selection of colours will be from manufacturer’s full range of colours.

.4 Where specific products are available in restricted range of colours, selection will be based on limited range.

.5 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 Mixing and Tinting

.1 Perform colour tinting operations prior to delivery of paint to site.

.2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.

.3 Add thinner to paint manufacturer's recommendations. Do not use kerosene or organic solvents to thin water-based paints.

.4 Thin paint for spraying according in accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Consultant.

.5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 Gloss/Sheen Ratings

.1 Paint gloss: defined as sheen rating of applied paint, in accordance with following values:

Gloss Level Category/	Units @ 60 Degrees	Units @ 85 Degrees
G1 – matte finish	0 to 5	Max. 10
G2 – velvet finish	0 to 10	10 to 35
G3 – eggshell finish	10 to 25	10 to 35
G4 – satin finish	20 to 35	Min. 35
G5 – semi-gloss finish	35 to 70	
G6 – gloss finish	70 to 85	
G7 – high gloss finish	> 85	

.2 Gloss level ratings of painted surfaces as specified.

2.5 Exterior Painting Systems

.1 Steel Doors, Frames and Metal Fabrications:
.1 EXT 5.1D – Alkyd G5 semi-gloss finish over alkyd primer.

PART 3 EXECUTION

3.1 General

.1 Perform preparation and operations for painting in accordance with MPI Architectural Painting Specifications Manual except where specified otherwise.

.2 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and application instructions, and data sheets.

3.2 Examination

.1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Consultant damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.

3.3 Preparation

.1 Perform preparation and operations for exterior painting in accordance with MPI Maintenance Repainting Manual except where specified otherwise.

.2 Clean and prepare exterior surfaces to be repainted in accordance with MPI Maintenance Repainting Manual requirements. Refer to the MPI Manual in regard to specific requirements and as follows:
- .1 Remove dust, dirt, and surface debris by vacuuming, wiping with dry, clean cloths or compressed air.
- .2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
- .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
- .4 Allow surfaces to drain completely and allow to dry thoroughly. Allow sufficient drying time and test surfaces using electronic moisture meter before commencing work.
- .5 Use water-based cleaners in place of organic solvents where surfaces will be repainted using water based paints.
- .6 Many water-based paints cannot be removed with water once dried. Minimize use of kerosene or such organic solvents to clean up water-based paints.

.3 Clean metal surfaces to be repainted by removing rust, dirt, oil, grease and foreign substances in accordance with MPI requirements and SSPC-SP 6. Remove such contaminates from surfaces, pockets and corners to be repainted by brushing with clean brushes, blowing with clean dry compressed air, or brushing/vacuum cleaning as required.

.4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before priming and between applications of remaining coats. Touch-up, spot prime, and apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.

3.4 Protection

.1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore such surfaces.

.2 Protect items that are permanently attached such as Fire Labels on doors and frames.

.3 Protect factory finished products and equipment.

.4 As painting operations progress, place "WET PAINT" signs in pedestrian and vehicle traffic areas.

3.5 Application

.1 Apply paint materials in accordance with paint manufacturer's written application instructions.

.2 Brush and Roller Application:
- .1 Apply paint in a uniform layer using brush and/or roller of types suitable for application.
- .2 Work paint into cracks, crevices and corners.

.3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
.4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces shall be free of roller tracking and heavy stipple unless approved by Consultant.
.5 Remove runs, sags and brush marks from finished work and repaint.

.3 Use dipping, sheepskins or daubers when no other method is practical in places of difficult access and when specifically authorized by Consultant.

.4 Apply coats of paint as continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

.5 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.

.6 Sand and dust between coats to remove visible defects.

.7 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as projecting ledges.

.8 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.6 Mechanical/Electrical Equipment

.1 Unless otherwise specified, paint exterior exposed conduits, piping, hangers, duct work and other mechanical and electrical equipment with colour and finish to match adjacent surfaces.

.2 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.

.3 Do not paint over nameplates.

3.7 Field Quality Control

.1 Standard of Acceptance:
.1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.
.2 Ceilings: no defects visible from floor at 45 degrees to surface when viewed using final lighting source.
.3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

3.8 Cleaning

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

.2 Remove paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.

3.9 Restoration

.1 Remove protective coverings and warning signs as soon as practical after operations cease.

.2 Protect freshly completed surfaces from paint droppings and dust to approval of Consultant. Avoid

scuffing newly applied paint.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 05 50 00 Metal Fabrications
.2 Section 06 20 00 Finish Carpentry
.3 Section 08 11 00 Metal Doors and Frames
.4 Section 09 21 16 Gypsum Board
.5 Section 09 91 13 Exterior Painting

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM A780/A780M-20 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
.2 Environmental Protection Agency (EPA)
  .1 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings).
.3 Master Painters Institute (MPI)
  .1 MPI Architectural Painting Specifications Manual, 2018
  .2 MPI Standard GPS-1-12 and GPS-2-12 MPI Green Performance Standard for Painting and Coatings.
.4 Society for Protective Coatings (SSPC)
  .1 Systems and Specifications, SSPC Painting Manual 2009
.5 Underwriters Laboratories of Canada (ULC)
  .1 ULC 102-18 Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
.6 South Coast Air Quality Management District, California State (SCAQMD)
  .1 SCAQMD Rule 1113-96, Architectural Coatings.
.7 Green Seal GS-11 Green Seal Environmental Standard for Paints and Coatings, January 1997.
.8 National Fire Code of Canada

1.4 Submittals

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

.2 Product Data:
  .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Samples:
  .1 Submit full range colour sample chips.
  .2 Submit duplicate 200 x 300 mm sample panels of each paint, stain, clear coating and special finish with specified paint or coating in colours, gloss/sheen and textures required to MPI Architectural Painting Specification Manual standards.
  .3 Retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface.
.4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties and SCAQMD Rule 1113-96.

.5 Provide maintenance data for paint products for incorporation into Operating and Maintenance Manuals specified in Section 01 78 00- Closeout Submittals. Include following:
.1 Product name, number, type and use.
.2 Colour numbers.
.3 MPI Environmentally Friendly classification system rating.

1.5 Quality Assurance

.1 Qualifications:
.1 Contractor: to have a minimum of five years proven satisfactory experience.
.2 Qualified journeypersons as defined by local jurisdiction to be engaged in painting work.
.3 Apprentices: may be employed provided they work under direct supervision of qualified journeyperson in accordance with trade regulations.

.2 Conform to latest MPI requirements for painting work including preparation and priming.

.3 Materials: in accordance with MPI Painting Specification Manual "Approved Product" listing and from a single manufacturer for each system used.

.4 Paint materials to be highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and to be compatible with other coating materials as required.

.5 Retain purchase orders, invoices and documents to prove conformance with noted MPI requirements when requested by Consultant.

.6 Provide mock-up in accordance with Section 01 45 00 - Quality Control.
.1 Prepare and paint designated surface, area, room or item (in each colour scheme) to specified requirements, with specified paint or coating showing selected colours, gloss/sheen and textures. Locate where directed.
.2 Mock-up will be used to judge workmanship, substrate preparation, operation of equipment and material application and workmanship to MPI Architectural Painting Specification Manual standards.
.3 Allow 24 hours for inspection of mock-up before proceeding with work.
.4 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

1.6 Shipping, Handling and Storage

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

.2 Deliver and store materials in original containers, sealed, with labels intact. Labels to indicate:
.1 Manufacturer's name and address.
.2 Type of paint or coating.
.3 Compliance with applicable standard.
.4 Colour number in accordance with established colour schedule.

.3 Provide and maintain dry, temperature controlled, secure storage. Store materials and equipment in well-ventilated area with temperature range 7 ° C to 30 ° C. Store materials and supplies away from heat generating devices.

.4 Observe manufacturer's recommendations for storage and handling.

.5 Keep areas used for storage, cleaning and preparation, clean and orderly. After completion of operations, return areas to clean condition.

.6 Remove paint materials from storage only in quantities required for same day use.

.7 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.

.8 Remove damaged, opened and rejected materials from site.

1.7 Fire Safety Requirements

.1 Provide one 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.

.2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.

.3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada requirements.

1.8 Waste Management and Disposal

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

.2 Place materials defined as hazardous or toxic in designated containers. Handle and dispose of hazardous materials in accordance with Municipal regulations.

.3 Unused materials must be disposed of at official hazardous material collections site.

.4 Paint and related materials are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from the Ministry of the Environment.

.5 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.

.6 Place materials defined as hazardous or toxic waste in containers or areas designated for hazardous waste.

1.9 Maintenance

.1 Extra Materials:
- .1 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Quantity: provide one four litre can of each type and colour of finish coating. Identify colour and paint type in relation to established colour schedule and finish system.
- .3 Deliver to Owner and store where directed.

1.10 Ambient Conditions

.1 Heating, Ventilation and Lighting:
- .1 Ventilate enclosed spaces in accordance with Section 01 51 00 – Temporary Utilities.
- .2 Provide heating facilities to maintain ambient air and substrate temperatures above 10 ° C for 24 hours before, during and after paint application until paint has cured sufficiently.
- .3 Provide continuous ventilation for seven days after completion of application of paint.
- .4 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.

.5 Provide minimum lighting level of 323 Lux on surfaces to be painted.

.2 Temperature, Humidity and Substrate Moisture Content Levels:
- .1 Unless pre-approved in writing by Consultant and product manufacturer, perform no painting when:
  - .1 Ambient air and substrate temperatures are below 10 ° C.
  - .2 Substrate temperature is above 32 ° C unless paint is specifically formulated for application at high temperatures.
  - .3 Substrate and ambient air temperatures are not expected to fall within MPI or paint manufacturer's prescribed limits.
  - .4 The relative humidity is under 85% or when the dew point is more than 3 ° C variance between the air/surface temperature. Paint should not be applied if the dew point is less than 3 ° C below the ambient or surface temperature. Use sling psychrometer to establish the relative humidity before beginning paint work.
- .2 Ensure that conditions are within specified limits during drying or curing process, until newly applied coating can itself withstand 'normal' adverse environmental factors.
- .3 Perform painting work when maximum moisture content of the substrate is below:
  - .1 Allow new concrete to cure minimum of 28 days.
  - .2 15% for wood.
  - .3 12% for plaster and gypsum board.
- .4 Test for moisture using calibrated electronic Moisture Meter. Test concrete floors for moisture using "cover patch test".
- .5 Test concrete and plaster surfaces for alkalinity as required.

.3 Surface and Environmental Conditions:
- .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
- .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits.
- .3 Apply paint when previous coat of paint is dry or adequately cured.

PART 2 PRODUCTS

2.1 Materials

.1 Provide paint materials for paint systems from single manufacturer.

.2 Products to meet requirements of GS-11 or SCAQMD Rule 1113-96

.3 Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.

.4 Only qualified products with E2 or E3 "Environmentally Friendly" rating are acceptable for use.

.5 Linseed oil, shellac, and turpentine: highest quality product from approved manufacturer listed in MPI Architectural Painting Specification Manual, compatible with other coating materials as required.

.6 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids:
- .1 Non-flammable, biodegradable.
- .2 Manufactured without compounds which contribute to ozone depletion in the upper atmosphere.
- .3 Manufactured without compounds which contribute to smog in the lower atmosphere.
- .4 Do not contain methylene chloride, chlorinated hydrocarbons or toxic metal pigments.

.5 Recycled content of 15% post-consumer and ½ post-industrial waste.

.7 Formulate and manufacture water-borne surface coatings with no aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.

.8 Flash point: 61 °C or greater for water-borne surface coatings and recycled water-borne surface coatings.

2.2 Colours

.1 Consultant will provide Colour Schedule.

.2 Colour schedule will be based upon selection of eight base colours and six deep tint accent colours.

.3 Selection of colours will be from manufacturer's full range of colours.

.4 Where specific products are available in restricted range of colours, selection will be based on limited range.

.5 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 Mixing and Tinting

.1 Perform colour tinting operations prior to delivery of paint to site.

.2 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.

.3 Thin paint for spraying in accordance with paint manufacturer's instructions.

.4 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 Gloss/Sheen Ratings

.1 Paint gloss: defined as sheen rating of applied paint, in accordance with following values:

Gloss Level Category/	Units @ 60 Degrees	Units @ 85 Degrees
G1 – matte finish	0 to 5	Max. 10
G2 – velvet finish	0 to 10	10 to 35
G3 – eggshell finish	10 to 25	10 to 35
G4 – satin finish	20 to 35	Min. 35
G5 – semi-gloss finish	35 to 70	
G6 – gloss finish	70 to 85	
G7 – high gloss finish	> 85	

.2 Gloss level ratings of painted surfaces as specified and as noted on Finish Schedule.

2.5 Interior Painting Systems

.1 Galvanized Metal: interior doors, frames, railings, misc. steel, pipes, and ducts.

.1 INT 5.3A Latex G5 semi-gloss finish

.2 Wood Clear Polyurethane Finish:
.1 INT 6.3K Polyurethane varnish G6 gloss finish.

.3 Interior Wood Doors
.1 INT 6.3A High performance architectural latex G5 semi-gloss finish.

.4 Electrical Equipment Backboards:
.1 INT 6.4P Fire retardant, pigmented coating. Low odour/low VOC. Semi-gloss (UL/ULC rated).

.5 Gypsum Board: Walls and Bulkheads.
.1 INT 9.2A Latex G3 eggshell finish over latex sealer.

.6 Gypsum Board: Ceilings and Bulkheads:
.1 INT 9.2A Latex G2 velvet finish over latex sealer.

.7 All other surfaces not noted above: high performance finish suitable for commercial and institutional environment and in accordance with MPI painting manual.

PART 3 EXECUTION

3.1 General

.1 Perform preparation and operations for interior painting in accordance with MPI Architectural Painting Specifications Manual except where specified otherwise.

.2 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and application instructions, and data sheets.

3.2 Examination

.1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report damages, defects, unsatisfactory or unfavourable conditions to Consultant before proceeding with work.

3.3 Preparation

.1 Protection:
.1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking and in accordance with paint manufacturers and MPI recommendations. If damaged, clean and restore surfaces as directed by Consultant.
.2 Protect items that are permanently attached such as Fire Labels on doors and frames.
.3 Protect factory finished products and equipment.

.2 Surface Preparation:
.1 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
.2 Place "WET PAINT" signs in occupied areas as painting operations progress.

.3 Clean and prepare surfaces in accordance with MPI Architectural Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:
.1 Remove dust, dirt, and other surface debris by vacuuming, wiping with dry, clean cloths, or

compressed air.
.2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
.3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
.4 Allow surfaces to drain completely and allow to dry thoroughly.
.5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
.6 Use trigger operated spray nozzles for water hoses.
.7 Many water-based paints cannot be removed with water once dried. Minimize use of mineral spirits or organic solvents to clean up water-based paints.

.4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.

.5 Where possible, prime non-exposed surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.
.1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.
.2 Apply wood filler to nail holes and cracks.
.3 Tint filler to match stains for stained woodwork.

.6 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements and SSPC-SP 6. Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes blowing with clean dry compressed air or vacuum cleaning.

.7 Touch up of shop primers with primer as specified.

.8 Do not apply paint until prepared surfaces have been accepted by Consultant.

3.4 Application

.1 Apply paint materials in accordance with paint manufacturer's written application instructions.

.2 Brush and Roller Application:
.1 Apply paint in uniform layer using brush and/or roller type suitable for application.
.2 Work paint into cracks, crevices and corners.
.3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
.4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces free of roller tracking and heavy stipple.
.5 Remove runs, sags and brush marks from finished work and repaint.

.3 Spray application:
.1 Provide and maintain equipment that is suitable for intended purpose, capable of atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
.2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
.3 Apply paint in uniform layer, overlapping at edges of spray pattern. Back roll first coat application.
.4 Brush out immediately all runs and sags.
.5 Use brushes and rollers to work paint into cracks, crevices and places which are not adequately painted by spray.

.4 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

.5 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.

.6 Sand and dust between coats to remove visible defects.

.7 Finish surfaces both above and below sight lines as specified for surrounding surfaces.

.8 Finish alcoves as specified for adjoining rooms.

.9 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.5 Mechanical/Electrical Equipment

.1 Paint finished area exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces.

.2 Mechanical and electrical rooms: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment.

.3 Other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.

.4 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.

.5 Do not paint over nameplates.

.6 Keep sprinkler heads free of paint.

.7 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.

.8 Paint fire protection piping red.

.9 Paint natural gas piping yellow.

.10 Paint both sides and edges of backboards for telephone and electrical equipment before installation. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.

.11 Do not paint interior transformers and substation equipment.

3.6 Field Quality Control

.1 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

.2 Standard of Acceptance:
.1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.
.2 Ceilings: no defects visible from floor at 45 degrees to surface when viewed using final lighting

source.

.3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

3.7 Cleaning and Restoration

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

.2 Remove protective coverings and warning signs as soon as practical after operations cease.

.3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.

.4 Protect freshly completed surfaces from paint droppings and dust to approval of Consultant. Avoid scuffing newly applied paint.

.5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Consultant.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 06 10 00 Rough Carpentry
.2 Section 09 21 16 Gypsum Board

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM A653/A653M-23 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  .2 ASTM A666-23 Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar
  .3 ASTM A879/A879M-22 Standard Specification for Steel Sheet, Zinc Coated by the Electrolytic Process for Applications Requiring Designation of the Coating Mass on Each Surface
  .4 ASTM A1008/A1008M-21a Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable
  .5 ASTM B209/B209M-21a Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
  .6 ASTM B221-21 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
.2 Canada Post
  .1 SOR/83-743 Mail Receptacles Regulations
  .2 Delivery Planning Standards Manual for Builders and Developers
.3 AODA Accessibility for Ontarians with Disabilities Act.

1.4 Submittals

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

.2 Product Data: Provide manufacturer's standard catalog data for specified products.

.3 Shop Drawings: Prepared specifically for this project; show dimensions of mail boxes, wall cuts, and interface with other products.

1.5 Quality Control

.1 Comply with Canada Post SOR/83-743 Mail Receptacles Regulations for wall-mounted centralized mailboxes.

.2 Comply with AODA Accessibility for Ontarians with Disabilities Act.

1.6 Quality Assurance

.1 Manufacturer Qualifications: Manufacturer shall have a Quality System in place to ensure and be able to substantiate that manufactured units conform to requirements and match the approved

design.

1.7 Shipping, Handling and Storage

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

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

.3 Inspect the materials upon delivery to assure that specified products have been received.

.4 Store materials protected from exposure to harmful weather conditions.

.5 Handle materials to prevent damage or marring of finish.

1.8 Waste Management and Disposal

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

1.9 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of five years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Manufacturer

.1 Acceptable Manufacturer: Canadian Mailbox Company, 5170 Saint Patrick Street, Montreal, Quebec, Canada Tel: (800) 363-8735: www.canadianmailbox.com

2.2 Mailboxes

.1 Canada Post approved Front-Loading interior mailboxes: Horizontal style complying with SOR/83-743 Mail Receptacles Regulations and the following.

.2 Constructed of heavy gauge reinforced extruded aluminum. Designed with a High Security Panel (HSP) to house the master lock and prevent the unit from being pried open.

.3 Model: CMC 1100 Front Load
- .1 Total Number of Doors: 40 Type A, 2 Type BV and 4 Type C.
- .2 Locks: 5 pin cylinder cam lock with 1000 different changes. Each lock shall have two (2) keys.
- .3 Mounting: Recessed
- .4 Box Identification: Engraved gravoply plastic (black on gray) in clear plastic window
- .5 Box Identification: Engraving directly on doors
- .6 Finish: All surfaces are clear anodized aluminum
- .7 Finish: Manufacturer's standard powder coat colour as selected by the Consultant.
- .8 rPartial door which allows to simultaneously use the master door and compartment
- .9 Mail slot: 12.7mm High x 127mm Wide.
- .10 Key return slot: 12.7 mm High x 76.2mm Wide
- .11 Combination lock, push button lock, thumb latch lock, spring latch lock
- .12 Master key, Additional keys
- .13 Matching anodized aluminum snap on trim

PART 3 EXECUTION

3.1 Examination

.1 Verify that openings in wall are correctly located, aligned, and sized for mailboxes.

.2 Installer's Examination:
- .1 Examine conditions under which construction activities of this section are to be performed; submit written notification if such conditions are unacceptable.
- .2 Beginning installation indicates acceptance of conditions.

3.2 Installation

.1 Install mail boxes in accordance with shop drawings and manufacturer's printed installation instructions.

.2 Distance to top of frame not to exceed 1701mm from finished floor.

.3 Distance to bottom of frame at least 457 mm above finished floor.

.4 One compartment is required to be a master door for postal service use.

.5 Align, plumb, and level; anchor in accordance with manufacturer's requirements.

.6 Adjust doors and locks to operate correctly.

3.3 Protection

.1 Protect finishes from damage by construction activities.

3.4 Cleaning

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

.2 Clean surfaces with mild dish detergent. Do not use harsh abrasive cleaners. Lubricate locks with graphite type lubricants only.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 30 00 Cast-in-Place Concrete
.2 Section 12 48 00 Foot Grilles

1.3 Reference Standards

.1 ASTM International (ASTM)
  .1 ASTM A312/A312M-22a Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes
.2 Aluminum Association (AA)
  .1 Aluminum Association Designation System for Aluminum Finishes
.3 Ontario Traffic Manual Book 5 Regulatory Signs.

1.4 Submittals

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

.2 Submit detailed shop drawings and where applicable complete colour charts or colour samples for each item specified herein.

.3 Submit manufacturer's preprinted technical literature for pre-manufactured products.

.4 Submit samples of metal finishes when requested by the Consultant.

.5 Submit operating and maintenance instructions for all manufactured products and specialties, for inclusion in the Operations and Maintenance Manuals specified in Section 01 78 00-Closeout Submittals.

1.5 Shipping, Handling and Storage

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

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

.3 Protect finished surfaces during shipment and installation.

1.6 Waste Management and Disposal

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

PART 2 PRODUCTS

2.1 Materials

.1 Items specified herein shall be standard manufactured items, modified if required and as specified to suit conditions of this project.

.2 Fabricate work true to dimensions, square and plumb, to suit site conditions.

.3 Thickness of metals shall be adequate for the various conditions with requirements specified as a minimum.

.4 Finished work shall be free from warping, open seams, weld marks, rattles and other defects. Drilling shall be reamed and exposed edges finished smooth.

.5 Provide all fastenings, anchorage and accessories as required to complete the work and as recommended by the manufacturer.

.6 Fastenings shall be concealed or theft-proof type where possible. Exposed fastenings shall be neatly executed and shall be of the same material and finish as the base metal on which they occur.

2.2 Products

.1 **Parking Signs:** Heavy-duty, 2.0 mm thick aluminum signs and sign-posts to Ontario Traffic Manual Book 5- Regulatory Signs and Municipal standards. Reflective Aluminum (RA) engineer grade reflective sign face designed to provide increased visibility in low-light conditions with UV-resistant inks to prevent fading during long-term outdoor use. Supplied with top and bottom center holes for post or fence mounting and galvanized steel post. Symbols and markings as indicated.
   .1 Fabricate posts from steel conforming to ASTM A36/A36M or ASTM A499 and having a minimum yield strength of 207 MPa 30 ksi and a minimum tensile strength of 345 MPa 50 ksi. Galvanize posts after punching in accordance with ASTM A123/A123M.
   .2 Hardware: Bolts, nuts, post clips, lock and flat washers must be either aluminum alloy or commercial quality stainless steel, hot-dip galvanized or cadmium plated after fabrication. Bolts/nuts must be tamper resistant design. Provide fiber washers of commercial quality.

PART 3 EXECUTION

3.1 Installation - General

.1 Install manufactured items in accordance with manufacturer's printed instructions and recommendations.

3.2 Installation - Parking Signage

.1 Signposts consist of a base post and signpost. Drive steel sign base posts with a suitable driving head. Attach signposts to base posts. Replace any base posts damaged during driving or otherwise at no additional cost to the Owner. Embed steel sign base posts in concrete.

.2 Locate and erect all signs in accordance with the drawings, municipal standards and codes. Vertically mount signs at right angles to the direction of, and facing, the traffic that they are intended to serve. Mounted signs must present a smooth flat surface varying no more than 10 mm from a 1.2 m straightedge placed in any position on the face of the sign after erection. Mount signs on traffic signal posts with strap or clamp type sign supports.

3.3 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 06 10 00 Rough Carpentry
.2 Section 07 92 00 Joint Sealants
.3 Section 09 21 16 Gypsum Board
.4 Section 09 91 23 Interior Painting

1.3 References

.1 Architectural Woodwork Manufacturer's Association of Canada (AWMAC)
  .1 Architectural Woodwork Standards Manual.
.2 CSA Group (CSA)
  .1 CSA O112.9:21 Evaluation of Adhesives for Structural Wood Products (Exterior Exposure)
  .2 CSA O141:23 Canadian Standard Lumber
  .3 CSA O151:17 (R2022) Canadian Softwood Plywood.
.3 American National Standards Institute (ANSI)
  .1 ANSI A208.1-2009 Particleboard
  .2 ANSI/NPA A208.2-2009 Medium Density Fibreboard (MDF)
  .3 ANSI/NEMA LD 3-2005 High-Pressure Decorative Laminates (HPDL)
  .4 ANSI/HPVA HP-1-2009 Standard for Hardwood and Decorative Plywood
.4 Canadian Kitchen Cabinet Association (CKCA)
  .1 Construction and Material Testing Standard for Kitchen Cabinets and Vanities.

1.4 Submittals

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

.2 Product Data: Manufacturers published literature on specified products.

.3 Shop Drawings: For cabinets show materials, finishes, filler panels, and hardware.

.4 Samples showing specified colours, textures and patterns for each type of material exposed to view.

1.5 Quality Assurance

.1 Quality Standard: Comply with the following standards:
  .1 Canadian Kitchen Cabinet Association (CKCA) Construction and Material Testing Standard for Kitchen Cabinets and Vanities.

.2 Mock-up: Upper and lower cabinets showing construction, materials, finishes and hardware.
  .1 Project Mock-up:
    .1 Upper and lower cabinet.
    .2 Approved mock-up may be incorporated into final project and will set standard for judging remaining installed cabinets.

1.6 Shipping, Handling and Storage

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

.2 Deliver, handle and store materials in accordance with manufacturer's printed instructions.
.3 Assure work remains undamaged during fabrication, installation. Store above ground, under cover and protected from damage.

.4 Do not deliver cabinets, fixture materials or products to job site until concrete, plaster and gypsum board installations are completed and are dry; 7 days minimum after application.

1.7 Project Conditions

.1 Permanent HVAC system to be in continuous operation. Maintain 10 °C temperature and 35 to 80 percent relative humidity.

.2 Maintain 30 ft.-candles minimum measured 900 mm. above floor during installation.

1.8 Field Measurements

.1 Verify dimensions of existing construction by field measurements before fabrication and indicate measurements on Shop Drawings.

.2 Provide fillers and scribes if necessary.

1.9 Coordination

.1 Coordinate layout and installation of blocking and reinforcement in partitions for support of casework.

.2 Coordinate requirements of plumbing and electrical work installed in casework.

.3 Coordinate casework with residential appliances.

1.10 Waste Management and Disposal

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

1.11 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of two years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Materials

.1 Solid Wood:
  .1 Unless otherwise indicated, provide AWMAC Custom Grade.
  .2 All wood materials shall be new, straight and clean, free of sap, knots, pitch, and other defects, except as permitted by applicable grading rules.
  .3 All wood shall be kiln dried to a maximum moisture content of 7%.
  .4 Softwood: to CSA O141, dressed all sides used in concealed locations.

.2 Plywood:
.1 Veneer core plywood: hardwood with a non-telegraphing grain manufactured with exterior glue. To ANSI/HPVA HP-1-09, minimum five plies.
.2 Soft Plywood: to CSA O151-M Standard Grade, solid two sides. Use in concealed locations only, except as indicated.

.3 Particleboard: To ANSI A208.1 , minimum density of 720kg/m3 Grade "R".

.4 MDF: Medium Density Fiberboard meeting requirements of AWMAC's STANDARDS (NAAWS).

.5 Edgeband
.1 For wood veneer casework: Veneer of same species and cut as exposed surfaces.
.2 For Plastic Laminate Casework: PVC.

.6 Plastic laminate facing sheet: ANSI/NEMA LD 3 High-Pressure Decorative Laminates (HPDL) PF-S and GP-S;
.1 Backing sheet: BK Grade by manufacturer of facing sheet.
.2 Core: CAN3-0188.1M, Grade R.
.3 Laminating adhesive: CAN3-O112 Series M.
.4 Core sealer: clear water resistant synthetic resin sealer.
.5 Colours, pattern, gloss and texture will be selected by Consultant from full range of products by one of the following:
.1 Formica,
.2 Arborite,
.3 Pionite,
.4 Nevamar
.5 Wilsonart.
.6 Up to three (3) colours and patterns will be selected by the Consultant.

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

.8 Fasteners and Adhesive:
.1 Nails and staples: ASTM F1667, galvanized, spiral head nails.
.2 Screws: Zinc, cadmium or chrome plated steel.
.3 Splines: wood or metal, to suit application.
.4 Adhesive: Type 1 waterproof. To CSA O112-M, type as appropriate for the intended application. Complying with ANSI/WDMA I.S-1 series. Contact bond not acceptable.
.5 Avoid the use of adhesives, preservatives, synthesizing agents and finish coatings that contain formaldehyde and high V.O.C. content.

2.2 Casework

.1 Subject to compliance with requirements.

.2 Residential Kitchen and Vanity Cabinets:

.1 Manufacturer: Member of the Canadian Kitchen Cabinet Association (KCKA)
.1 Selected by Consultant from full range of manufacturer' standards.
.2 Style: Selected by Consultant from full range of manufacturer' standards.
.3 Colour: Selected by Consultant from full range of manufacturer' standards.
.4 Hardware at Standard Units:
.1 Provide manufacturer's standard door and drawer pulls, soft-close drawer slides, self-closing concealed hinges, stops, adjustable shelf standards and clips etc. as required for a complete installation. Hardware at barrier free accessible units shall meet requirements of AODA and the Ontario Building Code.
.1 Hardware Components
.1 Drawer and Door Pulls: Selected by Consultant from manufacturer's standard range.
.2 Catches: Magnetic.
.3 Drawer Slides: Full extension arms, steel construction, soft-close.
.4 Hinges: Concealed, self-closing type.
.5 Door Bumpers: Resilient plastic with adhesive back; clear color; 9 mm diameter x 3.0 mm thick.
.6 Shelf Supports: steel pin; chrome colour.
.5 Cabinet Interiors: Melamine.
.6 Countertops: Plastic laminate on 19 mm particleboard, roll formed edges and integral splashback.
.1 Sidesplash: 19 mm thick, plastic laminate to match countertop.
.7 Kickboard: to match exposed face of cabinets.

2.3 Fabrication

.1 Fabricate residential casework including kitchen cabinets and bathroom vanities to meet standards of ANSI/KCMA A161.1-2017 Performance & Construction Standard for Kitchen and Vanity Cabinets.

.2 Finishes
.1 Quality Standard: Comply with AWI Section 1500 "Factory Finishing" for finishing preparation, including sanding, filling countersunk fasteners, and dealing with concealed surfaces and other preparations applicable to each unit of work.
.2 Colours selected by the Consultant.
.3 All exposed interior surfaces: melamine unless indicated otherwise.
.4 Cabinet and case backs unexposed to view shall be back primed with one coat of moisture repellent sealer.
.5 Apply finishes in accordance with the AWMAC Manual.

PART 3 EXECUTION

3.1 Installation

.1 Surface conditions:
.1 Examine areas and conditions under which work performed.
.2 Correct conditions detrimental to timely completion of work.
.3 Proceed when unsatisfactory conditions corrected.
.4 Protect work from damage.
.5 Verify required blocking and backing for secure attachment in place.

.2 Cut and fit work to receive, clear, engage, or support parts of work for interface with electrical,

plumbing, appliances and other units.

.3 Install work in accordance with:
.1 Construction documents
.2 Reviewed shop drawings.
.3 Pertinent requirement of governmental agencies having jurisdiction.
.4 Manufacturer's and referenced standard's installation procedures.
.5 Anchor components firmly into position plumb, level and true.
.6 Scribe units to wall, floor, and other surfaces with not more than 0.8 mm clear between cabinet or fixture and abutting permanent surface, with no change of clearance in excess of 0.25 mm in any 100 mm.

.4 Set each unit square, level, plumb, and aligned within tolerance of one in 1000 vertically and horizontally, and within 6 mm of designated location for freestanding work. Shims, if used, to be concealed.

.5 Provide continuous wood back in toe space of in-line base cabinets.

.6 Attach casework to backing with countersunk screws in secure manner.

.7 Miter corners; bevel cut and glue joints. Ease sharp external edges before finishing. Exposed finish nails to be set and puttied.

.8 Where casework abuts other finished work, scribe and cut for accurate fit.
.1 Provide filler strips, scribe strips, and moldings in finish to match casework face.

.9 Coordinate with availability of trades to make required utility connections.
.1 Provide adequate time period for trades to do testing before enclosing.

.10 Remove excess sealant and adhesive.

3.2 Adjustment

.1 Adjust casework and hardware so doors and drawers are centered in openings, reveals are equally spaced and operate smoothly without warp or bind.

.2 Lubricate operating hardware as recommended by manufacturer.

3.3 Cleaning and Protection

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

.2 Clean casework on exposed and semi-exposed surfaces.
.1 Use cleaning material recommended by manufacturer of surface to be cleaned.

.3 Clean out all cabinets and drawers.

.4 Touch up factory applied finishes to restore damaged or soiled areas.

.5 Provide protection to assure work remains undamaged during time between completion of installation and acceptance of total work.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 10 00 Concrete Forming and Accessories
.2 Section 03 30 00 Cast-in-Place Concrete

1.3 References

.1 ASTM International (ASTM).
  .1 ASTM B221-21 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes.
  .2 ASTM D2047-17 Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine.
  .3 ASTM E648-19ae1 Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
.2 Accessibility for Ontarians with Disabilities Act

1.4 Submittals

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

.2 Product Data Sheets. Including construction details, material descriptions, dimensions of individual components and profiles, and finishes for foot grilles and frames

.3 Submit complete shop drawings indicating size, location and details of each item. Include the following:
  .1 Items penetrating foot grilles and frames, including door control devices
  .2 Divisions between grille and sections
  .3 Perimeter floor moldings

.4 Submit duplicate copies full range of manufacturer's standard colours for selection by the Consultant.

.5 Submit manufacturer’s maintenance data in the form of printed instructions for cleaning and maintaining foot grilles, for inclusion in Operation and Maintenance Manuals specified in Section 01 78 00 – Closeout Submittals

1.5 Quality Assurance

.1 Slip resistance in accordance with ASTM D2047, Coefficient of Friction, minimum 0.60 for accessible routes.

.2 Deflection under live load: Design foot grilles to support a minimum uniform load of 1.7 kN applied over a 100 mm^2 surface with a maximum deflection of l/180.

.3 Single Source Responsibility: Obtain foot grilles and frames from one source of a single manufacturer.

.4 Flammability: in accordance with ASTM E648, Class 1, Critical Radiant Flux, minimum 0.45 watts/cm5.

1.6 Shipping, Handling and Storage

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

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

.3 Deliver materials to the project site ready for use and fabricated in as large sections and assemblies as practical, in unopened original factory packaging clearly labelled to identify manufacturer.

1.7 Project Conditions

.1 Field measurements: check actual openings for foot grilles by accurate field measurements before fabrication. Record actual measurements on final shop drawings.

.2 Coordinate frame installation with concrete construction to ensure recess and frame anchorage are accurate. Defer frame installation until building enclosure is complete and related interior finish work is in progress.

1.8 Waste Management and Disposal

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

1.9 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of twenty years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 General

.1 Items specified herein shall be standard manufactured items, modified if required and as specified to suit conditions of this project.

.2 Foot grilles shall be Pedigrid G1/M/PA/LBDP recess mounted, abrasive tread as manufactured by Construction Specialties Inc., Mississauga, Ontario.

.3 Equivalent products of the following manufacturers are approved, subject to compliance with the minimum levels of material and detailing specified herein:
.1 Grillage Bolar (Canada) Inc.
.2 K.N. Crowder.
.3 M.W. McGill
.4 Pawling Corp

.4 Floor Grid: G1- Pedigrid, extruded 6105-T5 aluminum alloy tread rails joined mechanically by extruded T6061-T6 aluminum alloy key lock bars. Welding or bolting is not permitted.

.5 Tread: PA- Poured Abrasive, factory bonded, two part epoxy containing aluminum oxide grit. Treads shall be locked into 6063-T5 aluminum alloy, continuously hinged tread rails, at 38 mm c/c
.1 Colour shall be selected by the Consultant from full range of manufacturer's standards.

.6 Grid Frame: LB- Level Base Frame, 6063-T5 alloy continuous extruded aluminum frame with 13 mm exposed surface and depth of 46 mm complete with manufacturer's standard anchors, fasteners. Provide 6 mm thick heavy gauge support cushions 25 mm long mounted to each continuous foot at 510 mm c/c. Frames in contact with concrete to be primer coated.

2.2 Materials

.1 Aluminum: ASTM B221, alloy 6105 T5 for rail extrusions and 6061 T6 for key lock bars.

.2 Flexible and prime PVC extrusions.

.3 Vinyl/Acrylic - High Impact PVC alloy.

PART 3 EXECUTION

3.1 Examination

.1 Verification of conditions: examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion. Do not proceed until unsatisfactory conditions have been corrected.

3.2 Preparation

.1 Provide templates and inserts for casting into concrete, in sufficient time to ensure a proper installation.

3.3 Fabrication

.1 Fabricate foot grilles in maximum practical sizes. Field splices shall be kept to a minimum. Where necessary, centre all splices between doors.

.2 Fabricate work true to dimensions, square and plumb, to suit site conditions.

.3 Thickness of metals shall be adequate for the various conditions with requirements specified as a minimum.

.4 Finished work shall be free from warping, open seams, weld marks, rattles and other defects. Drilling shall be reamed and exposed edges finished smooth.

.5 All fastenings shall be concealed.

3.4 Installation

.1 Install foot grilles in accordance with manufacturers printed instructions and recommendations.

.2 Apply two coats of waterproofing bituminous paint to the concrete base to avoid water infiltration.

.3 Foot grilles shall be installed on leveled concrete

.4 Install grilles with treads at right angles to traffic flow.

.5 Install foot grille, square and level with finished floor so as to permit easy manipulation of all sections.

.6 Frame members and intermediary supports are to be level and well supported on all their lengths in order to avoid any long term deflection.

.7 Coordinate top of grid surfaces with bottom of doors that swing across to provide ample clearance between door and mat/grid.

.8 Frames and pans are to be thoroughly cleaned before installing any grille section.

3.5 Protection

.1 After completing required frame installation and concrete work, provide temporary filler of plywood in recesses, and cover frames with plywood protective flooring. Maintain protection until construction traffic has ended and project is near time of Substantial Performance.

.2 Defer installation of floor mats/grids until time of Substantial Performance of Project.

3.6 Cleaning

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

.2 Clean the tread insert surface and recessed well immediately prior to Substantial Performance.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 10 00 Concrete Forming and Accessories
.2 Section 03 20 00 Concrete Reinforcing
.3 Section 03 30 00 Cast-in-Place Concrete
.4 Section 05 12 23 Structural Steel
.5 Section 05 50 00 Metal Fabrications
.6 Section 07 84 00 Firestopping
.7 Section 07 92 00 Joint Sealants

1.3 References

.1 National Fire Protection Association (NFPA)
  .1 NFPA 80-22 Standard for Fire Doors and Other Opening Protectives
.2 Underwriters Laboratories (UL)
  .1 UL 10B Fire Tests of Door Assemblies
.3 CSA Group (CSA)
  .1 ASME A17.1-2016/CSA B44-19 Safety Code for Elevators and Escalators (Bi-national standard, with ASME A17.1)
  .2 CSA B44.1-14/ASME-A17.5-2014 - Elevator and Escalator Electrical Equipment
  .3 CSA B44.2-10 (R2015) Maintenance Requirements and Intervals for Elevators, Dumbwaiters, Escalators, and Moving Walks.
  .4 CSA C22.1-18 Canadian Electrical Code.
.4 Ontario Building Code
.5 ISO 9001: 2000 - Quality Management Systems - Requirements.
.6 AODA Accessibility of Ontarions with Disabilities Act
.7 Technical Safety Standards Authority (TSSA)

1.4 Submittals

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

.2 Product Data: Submit manufacturer/installer's product data, including,
  .1 Descriptive brochures or detail drawings of car and hall fixtures, cab ceilings, and product features.
  .2 Power Information: Horsepower, starting current, running current, machine and control heat release, and electrical requirements.

.3 Shop Drawings: Submit manufacturer/installer's shop drawings, including plans, elevations, sections, and details, indicating location of equipment, loads, dimensions, tolerances, materials, components, fabrication, fasteners, hardware, finish, options, accessories, and other information to render totally functional elevators.

.4 Samples: Submit manufacturer/installer's samples of standard colours and finishes of finish materials.

.5 Operation and Maintenance Manual: Submit manufacturer/installer's operation and maintenance

manual; including operation, maintenance, adjustment, and cleaning instructions; trouble shooting guide; renewal parts catalogs; and electrical wiring diagrams for inclusion in the Operation and Maintenance Manuals specified in Section 01 78 00-Closeout Submittals.

.6 Warranty: Submit manufacturer/installer's standard warranty.

1.5 Design Requirements

.1 Arrange elevator components in control closet or machinery space so equipment can be removed for repairs or replaced with minimal disturbance to other equipment and components.

.2 Where permitted by code, provide all elevator equipment including controls, drives, transformers, and rescue features within the elevator hoistway.

1.6 Quality Assurance

.1 Manufacturer/Installer's Qualifications: Specialize in manufacturing and installing elevator equipment, with a minimum of 10 years successful experience.

.2 Regulatory Requirements:
- .1 Elevator design, clearances, construction, workmanship, materials, and installation, unless specified otherwise, shall be in accordance with ANSI/ASME A17.1, handicap accessibility, Americans with Disabilities Act, and other codes having legal jurisdiction.
- .2 ANSI/ASME A17.1 shall govern, except where codes having legal jurisdiction include more rigid requirements or conflict with ANSI/ASME A17.1.
- .3 Elevator shall follow design and manufacturing procedures certified in accordance with ISO 9001-2000 to meet product and service requirements for quality assurance for new products.
- .4 Where product is in variance to the published ANSI/ASME A17.1 model code, provide a 3rd party AECO certification demonstrating equivalent function, safety, and performance.

.3 Pre-installation Meeting:
- .1 Convene pre-installation meeting before start of installation of elevators.
- .2 Require attendance of parties directly affecting work of this section, including Contractor, Consultant, and elevator manufacturer/installer.
- .3 Review examination, installation, field quality control, adjusting, cleaning, protection, and coordination with other work.

1.7 Shipping, Handling and Storage

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

.2 Delivery: Deliver materials to site in manufacturer/installer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer/installer.

.3 Storage: Store materials in clean, dry area indoors in accordance with manufacturer/installer's instructions.

.4 Handling: Protect materials during handling and installation to prevent damage.

1.8 Permits and Fees

.1 Obtain, submit, and pay for necessary local and/or provincial permits and inspections. Submit to the Technical Standard Safety Authority (TSSA) registration of elevating devices and also pay all

costs in connection therewith, including costs associated with any and all tests to be performed by the TSSA in order to lawfully license the elevator for use by the general public. Submit all TSSA submission documents, test results, and approval certificates to the Owner prior to Date of Substantial Performance. Licenses for the elevating devices will be paid for directly by the Owner.

.2 Elevator contract shall include in base bid all costs associated with a 2nd TSSA inspection of all elevating devices regardless if the directives issued by the TSSA on the initial inspection have Trade Contractor and/or General Contractor/Owner items. Do not qualify this in the base bid price. No additional costs will be entertained or considered to meet with this 2nd TSSA Inspection requirement unless a 3rd TSSA inspection of the elevating device is warranted and/or required.

1.9 Project Conditions

.1 Temporary Electrical Power:
.1 Arrange for temporary 220 VAC, single-phase, 60 Hz., GFCI-protected electricity to be available for installation of elevator components.
.2 Comply with Section 01 51 00 - Temporary Utilities.

.2 Installation of the Elevator:
.1 General Contractor will provide permanent three-phase power prior to installation start.
.2 General Contractor will provide clear, rollable access to a 6.0 x 3.0 m secure and dry storage area prior to delivery.
.3 General Contractor will provide a clean, dry, and complete hoistway along with temporary installation platform and all required OSHA-compliant barricades prior to delivery.

.3 Temporary Use of Elevator:
.1 Owner will negotiate with manufacturer/installer for temporary use of elevator, if required.
.2 Temporary use of elevator shall be in accordance with terms and conditions of manufacturer/installer's temporary acceptance form.

1.10 Scheduling

.1 Coordinate elevator work with work of other trades, for proper time and sequence to avoid construction delays.

1.11 Waste Management and Disposal

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

1.12 Maintenance Service

.1 Elevator maintenance service shall be performed by elevator manufacturer/installer.

.2 Elevators shall receive regular maintenance on each unit for period of 12 months after completion of work specified herein or acceptance thereof by beneficial use, whichever is earlier.

.3 Trained employees shall make periodic examinations and perform work including necessary adjusting, greasing, oiling, and replacing parts to keep elevators in operation, except parts that require replacement because of accidents, vandalism, misuse, or negligence by parties other than manufacturer/installer.

.4 Manufacturer/installer shall perform all Work, except emergency minor adjustment call-back service, during regular working hours. Manufacturer/installer shall provide emergency minor

adjustment call-back service, 24 hours 7 days a week.

.5 Should Owner request that examinations, cleaning, lubrication, adjustments, repairs, replacements, or emergency minor adjustment call-back service, unless specified herein, be performed on other than manufacturer/installer's regular working hours of regular working days, manufacturer/installer shall absorb straight-time labor charges and Owner will compensate manufacturer/installer for overtime premium, travel time, and expense at normal billing rates.

.6 Elevator Control System:
- .1 Include built-in remote diagnostic module to relay constant status of elevators and control system to a 24-hour, 7-days-a-week central-monitoring facility.
- .2 Remote Monitoring Device: Transmit information on current status of elevators, including malfunctions, system errors, and shutdown.

1.13 Warranty

.1 Manufacturer/installer shall guarantee materials and workmanship of equipment installed under these specifications and make good, defects not due to ordinary wear or to improper use, which may develop within 1 year after date of Substantial Performance.

PART 2 PRODUCTS

2.1 Manufacturer

.1 Schindler Elevator Corporation, Website www.us.schindler.com.

.2 Elevator shall be installed by elevator manufacturer

2.2 Elevator System and Components

.1 Electric Traction Passenger Elevators: Basis of design Schindler 3300 MRL Gearless Traction Elevator.

.2 Elevator Equipment Summary:
- .1 Application: Machine Room Less (MRL)
- .2 Counterweight Location: Side
- .3 Machine Location: Top of the hoistway mounted on car and counterweight guide rails
- .4 Control Space Location: Top landing entrance frame or entrance frame at one floor below the top landing
- .5 Service Type: General Purpose Passenger Class A
- .6 Quantity: 1 Unit
- .7 Capacity: 2500 lbs
- .8 Speed: 150 fpm
- .9 Door Type: Two Speed Side Opening
- .10 Cab Type: 3300 Cab
- .11 Door Hand: Left/Right
- .12 Quantity of Landings: 5
- .13 Front Openings: 5
- .14 Rear Openings: No
- .15 Hoistway Entrance Dimensions: 3' 6" Wide X 7' 0" High
- .16 Travel Limits: 26.15m
- .17 Power Supply: 600 Volts 3 Phase 60 Hz
- .18 Cab Height: 7' 9"

.19 Cab Width: 6' 9 5/16"
.20 Cab Depth: 4' 10 13/16”
.21 Cab Walls: Plastic Laminate Finish
.22 Base, Frieze & Reveals: Aluminum
.23 Cab Ceiling: #4 Stainless Steel with Down Lit Led Lighting
.24 Cab Return & Transom: #4 Stainless Steel
.25 Cab Doors: #4 Stainless Steel
.26 Cab Handrail Mounting: Side Walls
.27 Cab Handrail Type and Finish: Straight Round Bushed Stainless Steel
.28 Cab Threshold: Aluminum
.29 Construction: Bolted Frames
.30 Frame Finishes - All Floors: #4 Stainless Steel
.31 Door Finishes - All Floors: #4 Stainless Steel
.32 Seismic Equipment: No
.33 Protective Pads: 1 Set

.3 Performance:
.1 Car Speed: -10% to +5% of contract speed under any loading condition or direction of travel.
.2 Car Capacity: Safely lower, stop and hold up to 125% of rated load per code.

.4 Ride Quality:
.1 Vertical Vibration (maximum): 25 mg
.2 Horizontal Vibration (maximum): 15 mg
.3 Vertical Jerk (maximum): 2 ft/sec^3
.4 Acceleration (maximum): 1.6 ft/sec^2
.5 In Car Noise: 53-60 dB(A)
.6 Stopping Accuracy: ±5mm
.7 Starts per hour (maximum): 180

.5 Elevator Operation:
.1 Simplex Collective Operation: Using a microprocessor based controller, operation shall be automatic by means of the car and hall buttons. When all calls have been answered, the car shall park at the last landing served.
.2 Group Automatic Operation with Demand-Based Dispatching: Provide reprogrammable group automatic system that assigns cars to hall calls based on a dispatching algorithm designed to minimize passenger waiting time.

.6 Operating Features - Standard:
.1 Door Light Curtain Protection
.2 Static AC Drive
.3 Phase Monitor Relay
.4 Cab Overload with Indicator
.5 Load-weighing
.6 Central Alarm
.7 Remote Monitoring
.8 Firefighter's Operation
.9 Automatic Evacuation
.1 When the main line power is lost for longer than 5 seconds the emergency battery power supply provides power automatically to the elevator controller. If the car is at a floor when the power fails, it remains at that floor, opens its doors, and shuts down. If the car is between floors, it is raised or lowered to the first available landing, opens doors, and shuts down.
.10 Independent Service

.7 Operating Features - Optional:
.1 Shunt Trip Protection

2.3 Equipment: Control Components and Control Space

.1 Controller: Provide microprocessor based control system to perform all of the functions of safe elevator operation, as well as perform car and group operational control.
.1 All high voltage (110v or above) contact points inside the inspection and test panel shall be protected from accidental contact in a situation where the access panels are open.
.2 The controller shall be distributed throughout the elevator system located in the overhead, cab and inspection and test panel. The inverter will be mounted in the overhead adjacent to the hoist machine and an inspection and test panel will be located in the door jamb at the top floor or one floor below the top floor. No elevator equipment mechanical rooms or closets are required.
.3 Provide multi-bus control architecture to reduce cabling, material and waste.
.2 Drive: Provide a Variable Voltage Variable Frequency AC Closed Loop drive system. Provide stable start without high peak current, quickly reaching a low energy consumption level.

.3 Inspection and Test Panel: Integrated control equipment, main inspection and test panel in door frame at top level served or at one floor below the top level served.

2.4 Equipment: Hoistway Components

.1 Machine:
.1 Gearless asynchronous AC motor with integral drive sheave, service and emergency brakes.
.2 Design machine to enable direct power transfer, thereby avoiding loss of power.
.3 Design machine to be compact, lightweight and durable to optimize material usage and save space.
.4 Mount to structural support channels on top of guide rail system as applicable in hoistway overhead.

.2 Governor:
.1 Tension type over-speed governor with remote manual reset.
.2 Mount to structural support channels as applicable in hoistway overhead.

.3 Buffers, Car and Counterweight: Compression spring type buffers to meet code.

.4 Hoistway Operating Devices:
.1 Emergency Stop switch in the pit.
.2 Terminal stopping switches.
.3 Emergency stop switch on the machine.

.5 Positioning System: System consisting of proximity sensors and door zone vanes.

.6 Guide Rails and Attachments: Provide Tee-section steel rails with brackets and fasteners. Side counterweight arrangements shall have a dual purpose bracket that combines both counterweight guide rails, and one of the car guide rails to building fastening.

.7 Suspension System: Non-circular Elastomeric coated suspension media with high tensile grade steel cords.

.8 Governor rope: Steel wire rope with 6 mm diameter.

2.5 Equipment: Hoistway Entrances

.1 Hoistway Doors and Frames:
- .1 UL rated with required fire rating.
- .2 Doors: Rigid flush panel construction with reinforcement ribs.
- .3 Frames: Securely fasten at corners to form unit frame. Frames shall be bolted.

.2 Finish:
- .1 Exposed Areas of Corridor Frames: Stainless Steel - All Floors
- .2 Doors: Stainless Steel - All Floors
- .3 Sills: Aluminum - All Floors

.3 Entrance Markings and Jamb Plates: Provide standard entrance jamb tactile markings on both jambs, at all floors. Plate Mounting: Refer to manufacturer drawings.

2.6 Equipment: Car Components

.1 Car Frame and Safety: Provide car frame with adequate bracing to support the platform and car enclosure. The safety shall be integral to the car frame and shall be flexible guide clamp type.

.2 Platform: Provide platform of steel construction with plywood subfloor and aluminum threshold.

.3 Car Guides: Provide sliding guide shoes mounted to top and bottom of both car and counterweight frame. Arrange each guide shoe assembly to maintain constant contact on the rail surfaces. Provide retainers in areas with Seismic design requirements.

.4 Provide central guiding system to reduce mechanical friction and energy consumption.

.5 Steel Cab:
- .1 Fire rating: Provide Class B fire rating for cab, or Class A fire rating where required by local Code.
- .2 Car wall finish: Steel Plastic Laminate Finish selected from manufacturer's standard selections.
- .3 Base and frieze: Aluminum.
- .4 Car front finish: Brushed stainless steel.
- .5 Car door finish: Brushed stainless steel.
- .6 Ceiling: Canopy ceiling, finished in Painted Silver Metallic with Compact Fluorescent Lighting. Provide lighting consisting of four compact fluorescent energy saving lights located in two semi-oval lateral cutouts located on the center-sides of the cab ceiling, Lexan lens cover.
- .7 Handrail: 1-3/8" Round and Curved Brushed Aluminum. Locate on Rear Wall.
- .8 Flooring: By others. Not to exceed 3/8" finished depth.
- .9 Ventilation: Provide one-speed fan in canopy.
- .10 Emergency Car Lighting: Provide an emergency power unit employing a 12 volt sealed rechargeable battery and static circuits to illuminate the elevator car and provide current to the alarm bell in the event of building power failure.
- .11 Emergency Siren: Provide siren mounted on top of the car that is activated when the Alarm button in the car operating panel is engaged.
- .12 Emergency Exit Switch: Provide an electrical contact to open the safety circuit when the emergency car top exit is opened. When the exit door is opened, the top exit switch shall signal the control and the car will be unable to move.
- .13 Emergency Exit Lock: Provide an emergency exit lock where required by local code.
- .14 Emergency Exit Guard: Provide emergency exit guard on top of car when required for hoistway wall to platform clearance exceeds 305 mm or for multiple cars in hoistway.

.15 Provide one (1) complete set of quilted protective pads for elevator complete with pads for front return, car station cutout, transoms, and side walls. Install permanent stainless steel pad pins on all walls, transoms, and return panels.

2.7 Door Operator and Reopening Devices

.1 Door Operator: Provide a closed loop VVVF high performance door operator with frequency controlled drive for fast and reliable operation to open and close the car and hoistway doors simultaneously.

.2 In case of interruption or failure of electric power, the doors can be readily opened by hand from within the car, in accordance with applicable code. Provide emergency devices and keys for opening doors from the landing as required by local code.

.3 Doors shall open automatically when the car has arrived at or is leveling at the respective landings. Doors shall close after a predetermined time interval or immediately upon pressing of a car button. Provide door open button in the car operating panel. Momentary pressing of this button shall reopen the doors and reset the time interval.

.4 Provide door hangers and tracks for each car and hoistway door. Contour tracks to match the hanger sheaves. Design hangers for power operation with provisions for vertical and lateral adjustment. Hanger sheaves shall have polyurethane tires and pre-lubricated sealed for life bearings.

.5 Electronic Door Safety Device: Equip car doors with concealed transmitter and receiver infrared beam devices to detect presence of object in process of passing through hoistway entrance and car doorway (light curtain device).
.1 Use multi-beam scanning without moving parts to detect obstructions in door opening.
.2 Detector Device: Prevent doors from closing, or if they have already started closing, cause doors to reopen and remain open while object is within detection zone.
.3 Horizontal Beams: Minimum of 33 infrared beams to fill doorway from ground level to a height of 6 feet.

2.8 Equipment: Signal Devices and Fixtures

.1 Car Operating Panel: Provide a car operating panel with all push buttons, key switches and message indicators for elevator operation.
.1 Full height car operating panel shall be surface-mounted on front return.
.2 Comply with handicap requirements.
.3 Push Buttons: Mechanical, illuminating using long-lasting LEDs for each floor served.
.4 Emergency Buttons: Provide in accordance with code. Emergency alarm button, door open and door close buttons.

.2 Features of the Car Operating Panel Shall Include:
.1 Audible chime to signal that the car is either stopping at or passing a floor served by the elevator.
.2 Raised markings and Braille provided to the left hand side of each push button.
.3 Car Lantern: Provide LED illuminated car lantern with direction arrows to comply with local code when hall lanterns are not provided.
.4 Door open and close push buttons.
.5 Firefighter's hat and Phase 2 Key-switch
.6 Inspection key-switch.
.7 Key-switch for optional Independent Service Operation

.8 Illuminated alarm button with raised marking.
.9 Elevator Data Plate marked with elevator capacity and car number.
.10 Help Button: Activation of help button will initiate two-way communication between car and a location inside the building, switching over to alternate location if call is unanswered, where personnel are available to take the appropriate action. Visual indicators are provided for call initiation and call acknowledgement.
.11 Two-Way Emergency Communications Visual Device complying with CSA B44 and IBC 2018/A17.1-2019 with video camera. Program device to connect to point of contact designated by the Owner.
.12 Certificate Frame.

.3 Hall Fixtures: Provide hall fixtures with necessary push buttons and key switches for elevator operation.
.1 Push buttons: Metallic tactile push buttons, up button and down button at intermediate floors, single button at each terminal floor.
.2 Height: Comply with handicap requirements.
.3 Illumination: Illuminating using long-lasting low power LEDs.

.4 Hall Lanterns and Position Indicators.
.1 LED illuminated direction arrows with audible and visible call acknowledgement.

.5 Hoistway access switches: Provide key-switch at top and/or bottom floor in entrance jamb as required by local code.

.6 Firefighter's Phase 1 Service: Key switch in brushed stainless steel cover plate.

.7 Fixture Cover Plates: For push buttons, hall lanterns and position indicators, resistant white back-printed glass, no screws required for mounting. Provide stainless steel cover plates for Firefighter's Phase I switch and hoistway access switches, with tamper resistant screws in same finish.

.8 Mounting: Mount hall fixtures in entrance frames.

PART 3 EXECUTION

3.1 Examination

.1 Examine hoistways, hoistway openings, and pits before starting elevator installation.

.2 Verify hoistway, pit, overhead, and openings are of correct size, within tolerances, and are ready for work of this section.

.3 Verify walls are plumb where openings occur and ready for entrance sill installation. Traditional sill angle or concrete sill support shall not be required.

.4 Verify hoistway is clear and plumb, with variations not to exceed -0 to +25 mm at any point. Verify projections greater than 100 mm must be beveled not less than 75 degrees from horizontal. No negative tolerance is permitted for minimum hoistway dimensions.

.5 Verify minimum 2-hour fire-resistance rating of hatch walls.

.6 Notify Consultant in writing of dimensional discrepancies or other conditions detrimental to proper installation or performance of elevators.

.7 Do not proceed with elevator installation until unsatisfactory conditions have been corrected in a manner acceptable to manufacturer/installer.

3.2 Installation

.1 Install elevators in accordance with manufacturer/installer's instructions and ASME A17.1/CSA B44.

.2 Set entrances in vertical alignment with car openings and aligned with plumb hoistway lines.

3.3 Field Quality Control

.1 Perform tests of elevator as required by ASME A17.1/CSA B44.

3.4 Adjusting

.1 Adjust elevators for proper operation in accordance with manufacturer/installer's instructions.

.2 Adjust elevators for smooth acceleration and deceleration of car so not to cause passenger discomfort.

.3 Adjust doors to prevent opening of doors at landing on corridor side, unless car is at rest at that landing, or is in leveling zone and stopping at that landing.

.4 Adjust automatic floor leveling feature at each floor to within 6 mm of landing.

.5 Repair minor damages to finish in accordance with manufacturer/installer's instructions and as approved by Consultant.

.6 Remove and replace damaged components that cannot be successfully repaired as determined by Consultant.

3.5 Protection

.1 Protect installed elevators from damage during construction in accordance with the negotiated temporary use agreement between Owner and manufacturer’s installer

3.6 Cleaning

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

.2 Clean elevators promptly after installation in accordance with manufacturer/installer's instructions.

.3 Do not use harsh cleaning materials or methods that could damage finish.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 07 62 00 Sheet Metal Flashing and Trim
.2 Section 07 84 00 Firestopping
.3 Section 07 92 00 Joint Sealants

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM A463/A463M-22 Standard Specification for Steel Sheet, Aluminum-Coated, by the Hot-Dip Process
.2 National Fire Protection Association (NFPA)
  .1 NFPA 82-2019 Standard on Incinerators and Waste and Linen Handling Systems and Equipment
.3 Underwriters Laboratories of Canada (ULC)

1.4 Submittals

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

.2 Product Data: Manufacturer's product specifications, standard details and recommendations for project conditions; indicate selected sizes and installation details specific to the project.

.3 Shop Drawings:
  .1 Plans: Indicate locations, dimensions, and required associated construction activities.
  .2 Elevations/Sections: indicate locations, dimensions, and required associated required construction activities.
  .3 Details: indicate:
    .1 Interface with adjacent construction
    .2 Dimensions and tolerances
    .3 Products required for installation of the trash chute, but not supplied by trash chute manufacturer.

.4 Quality Assurance/Control Submittals:
  .1 Contractor's Certification that:
    .1 Manufacturer's certification that installer of manufacturer's product is approved.
    .2 Applicable standards: National Fire Protection Association standards as referenced herein.

.5 Submit operating and maintenance instructions for trash chutes, for inclusion in the Operation and Maintenance Manuals specified in Section 01 78 00-Closeout Submittals.

1.5 Quality Assurance

.1 Qualifications:
  .1 Manufacturer: Minimum five years-documented experience producing products specified in this section.

.2 Installer: Approved by the manufacturer and having a minimum of five years experience.

.2 Pre-Installation Meetings:
- .1 Convene at job site a minimum of seven calendar days prior to scheduled beginning of construction activities of this section to review requirements of this section.
- .2 Require attendance by representatives of the following:
  - .1 Trash chutes manufacturer or designated representative
  - .2 Installer.
  - .3 Other entities directly affecting, or affected by, construction activities of this section.
  - .4 Notify Consultant four calendar days in advance of scheduled meeting date.

1.6 Shipping, Handling and Storage

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

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

1.7 Waste Management and Disposal

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

1.8 Warranty

.1 Warrant the work of this Section against defects of workmanship and material, for a period of two years from the date of Substantial Performance and agree to make good promptly any defects which occur or become apparent within the warranty period.

PART 2 PRODUCTS

2.1 Manufacturer

.1 Acceptable manufacturers: Wilkinson-Chutes Canada; 23 Racine Road, Toronto ON M9W 2Z4; Tel: (866) 535 0558.

2.2 Components

.1 Garbage chutes shall comply with NFPA 82 and shall be ULC labelled.

.2 The chute shall be 610 mm diameter of 1.524 mm aluminized steel conforming to ASTM A463.

.3 Intakes Door: Stainless steel, 381 mm wide x 457 mm high, bottom hinged, hand operated self-closing positive latching doors bearing 1½ hour, Underwriters Laboratories "B" Label designation and rated for a 121° C maximum door temperature rise over 30 minutes, with stainless steel trim in a UL approved, "B" Label, 1½ hour assembly. AODA compliant lever handle.

.4 Discharge: 1.524 mm galvanneal or aluminized steel type "A" open end chute discharge rolling steel door with 74 °C fusible link hold open on an inclined steel track at the bottom of the chute to close automatically when the ambient temperature reaches 74 °C. as required by provincial building and/or fire codes.

.5 Vent: Chute shall extend full diameter through roof to metal top vent cap 1220 mm above roof level with counter flashing and insect screen. A roof curb (1120 x 1120 mm x minimum of 200 mm high) is required for flat roof conditions and is to be provided by others.

.6 Accessories: 19 mm IPS flushing spray head and 13 mm sprinkler head above highest intake. Additional 13 mm sprinkler heads at every second intake (counting from the top) or as required by local code.

.7 Provide Disinfecting & Sanitizing unit for installation in line to the flushing spray head. Connection to flushing spray head, back flow prevention valve and electric control switch by others.

.8 Provide 380 mm wide x 380 mm high right side hinged, hand operated, self-closing, positive latching, UL 1 1/2-hour. “B” labeled, stainless steel plumbing access door having stainless steel door trim for installation by forces erecting enclosing shaft wall. Door to have master keyed lock. Cylinder provided by others. Door for access to disinfecting & sanitizing unit above the highest intake door of the chute.

.9 Offsets (bends) in the chute, if required, shall be made the same diameter as the chute of 1.524 mm aluminized steel and have an additional layer of 1.83 mm aluminized steel reinforcing the impact area. Offsets are not to deviate more than 150 mm off the vertical axis of the chute.

.10 Provide Daubert 932 sound coat (or equivalent) vibration dampening compound to the exterior of the chute only. Include sound isolator pads at each floor support frame.

.11 Sprinkler System: Chute shall be protected internally by automatic sprinklers. This requires a sprinkler at or above the top intake door of the chute, and in addition, a sprinkler shall be installed within the chute at alternate floor levels in building over two stories in height with mandatory sprinkler located at the lowest service level.

2.3 Fabrication

.1 The trash chute shall be fully factory assembled and all joints, except those required to separate the sections for shipment and installation shall be welded or lock-seamed tight. The floor intake doors shall be bolted in place on throats formed into the chute. All chute sections shall flash inside the sections below and there shall be no bolts, clips, or other projections inside the chute to snag the flow of material. Pre-positioned support frames shall assure proper intake levels and there shall be an expansion joint in the chute between all support joints. Discharge hoppers and offsets, where required, shall be reinforced and separately supported in the impact area.

PART 3 EXECUTION

3.1 Examination

.1 Verification of conditions:
  .1 Area in which system is to be located is correct size and location and is prepared for installation of trash chute and components.

.2 Installer’s examination:
  .1 Examine conditions under which construction activities of this section are to be performed, then submit written notification if conditions under which construction activities of this section are to be performed are unacceptable.
  .2 Beginning construction activities of this section before unacceptable conditions have been corrected is prohibited.
  .3 Verify and record chute alignment with installer immediately following installation.

3.2 Installation

.1 Install trash chute in accordance with shop drawings and manufacturer's printed installation instructions.

3.3 Demonstration

.1 Arrange demonstration of system operation, conducted by manufacturer's representative, to Owner's maintenance personnel.

3.4 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 30 00 Cast-In-Place Concrete
.2 Section 07 21 13 Building Insulation
.3 Section 33 46 13 Foundation Drainage

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM D698-12(2021) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3 (600 kN-m/m3))
  .2 ASTM D1557-12(2021) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3))
.2 Ontario Provincial Standard Specifications (OPSS)
  .1 OPSS 805 Construction Specification for Temporary Erosion and Sediment Control Measures
  .2 OPSS 180 General Specification for the Management of Excess Materials
  .3 OPSS 206 Construction Specification for Grading
  .4 OPSS 1010 Material Specification for Aggregates - Base, Subbase, Select Subgrade, and Backfill Material
.3 Ontario Provincial Standard Details (OPSD)
  .1 OPSD 219.130 Heavy Duty Silt Fence Barrier
  .2 OPSD 805 Temporary Erosion and Sediment Control Measures
.4 The Occupational Health and Safety Act.
.5 Ontario Regulation O Reg 406/19 On-Site and Excess Soil Management

1.4 Submittals

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

.2 Submit shop drawings of shoring and bracing required in connection with excavation. Drawings to show clearly procedural sequence to be followed.

1.5 Definitions

.1 Earth: Site excavated material, including shale, rubble rock, building debris, shrub and tree roots and soil.

.2 Soil: Site excavated material, free from shale, rubble rock, building debris, shrub and tree roots.

.3 Fill: Approved materials, other than earth, clay and unapproved soil. Approved soil may be used only with approval of the Consultant in writing.

.4 Rock: All solid rock in ledges, stratified deposits, unstratified masses, and all conglomerate deposits or any other material so firmly cemented by process of nature as to present all the characteristics of solid rock, being so hard or firmly cemented that it cannot be excavated and removed with a power shovel except after thorough and continuous drilling and blasting.

.5 Backfilling: The operation of supplying and installing fill and approved soil materials.

.6 Engineered Fill: Approved material used to build-up to design elevations.

1.6 Examination

.1 Examine the building site and determine the nature and extent of the materials to be removed or the additional fill required to provide depths and levels indicated on drawings. Field check the site to review existing conditions. Verify locations of all existing utilities and services that will affect the work.

.2 Refer to drawings for all building and site development details.

1.7 Geotechnical Report

.1 Refer to “Report on Geotechnical Investigation 109 Colborne Street West Oshawa, Ontario” dated August 14, 2023 and prepared by Toronto Inspection Ltd.. The report is available for review at the office of the Owner and Consultant.

.2 Information provided in this report is based on field records and is therefore subject to the usual limitations and reservations associated with such work (stated in the conclusion of the report).

.3 The use of this information is entirely at the risk of the Contractor.

.4 During examination of the site, carry out such investigations as necessary to determine subsurface conditions to be encountered in constructing the Works.

.5 Notify the structural engineer and the inspection and testing company when excavation work commences for inspection and verification of soil conditions.

1.8 Setting Out Work

.1 The drawings indicate the building components location and proposed and final grades. Be responsible to construct the work according to levels and locations shown on the drawings. Report any errors or discrepancies to the Consultant before commencing work.

.2 Commencement of any part of the work shall constitute acceptance of drawings as being correct.

.3 Employ a competent instrument man and provide all lines and levels, limit lines and boundary stakes for the execution of the work as required. All benchmarks shall be carefully protected.

.4 Provide and be responsible for, all lines, levels and dimensions which trades require to relate their work to the work of other trades. All trades shall be notified that all such levels and dimensions must be obtained from the Contractor.

1.9 Existing Underground Utilities

.1 Arrange underground locates of all utility assets prior to excavating. Do not commence excavation in a location prior to utility members marking the location of their utilities or indicating that none exist within the outlined excavation limits. Where necessary, employ the services of a private utility locator to ensure that all utilities are located in a timely manner.

.2 Verify the location and elevation of all existing utilities within the limits of the Work. Observe the

locations of the stake outs, prior to commencing the Work. In the event there is a discrepancy between the locations of the stake outs and the locations shown on the Contract Documents, that may affect the Work, immediately notify the Consultant and the affected utility companies, in order to resolve the conflict.

.3 All existing buried utilities located within the excavation zone and any other facilities adjacent to the excavation shall be carefully supported and protected from damage as a result of the Contractor's operations. Be responsible for repairing any damaged underground utilities, as a result of actions during the course of the work at no extra cost to the Owner.

.4 All costs associated with this work shall be considered incidental to all related items of work in the Contract. No separate payment will be made for costs incurred in obtaining utility locates.

1.10 Protection of Existing Services

.1 Notify the Owner, Public Utility or Municipal authorities in advance of planned excavations adjacent to their services.

.2 Take care not to damage or displace encountered known and unknown services.

.3 When such services are encountered during the execution of work, immediately notify the Consultant and protect, brace and support active services. Where repairs to these services become necessary use the following procedure:
.1 Known services, repair at no expense to the Owner.
.2 Unknown services, forward to the Consultant a complete breakdown of the estimated cost of such work. Proceed only upon written authorization.

.4 In the case of damage to, or cutting off of an essential service, notify Consultant, the Owner, and Public Utility or Municipal authorities immediately and repair the service under the Consultant's direction.

1.11 Inspection and Testing

.1 Provide proper and sufficient samples, ample opportunity and access at all times for the Consultant or Testing Agency to inspect materials, operations and completed works carried out under this Section.

.2 Sample and test excavated material prior to shipping to landfill off the site in accordance with the requirements of O. Reg. 406/19. Samples shall be tested for compliance of acceptable material for landfill. Furnish to the Owner the results of all testing and location of landfill site used. This testing will not be undertaken by the Owner's Inspection and Testing Agency.

.3 Provide 24 hours notice to inspection laboratory and request tests as follows:
.1 Sieve Analysis: Proposed fill materials will be tested to confirm stability for intended use and conformity with specifications.
.2 Density Test: Tests will be conducted on compacted fill, to ASTM D698.
.3 Frequency Test: Excavated Surfaces: When existing compacted fill surface is being prepared, make a series of three tests of surface for each 500 m² area.
.4 Fills under Pavement or Slabs on Grade: Make three tests for every two lifts of compacted fill for each 500 m² area.
.5 Backfill Structural Walls: Test each different material for approximately each 30 metres of wall being backfilled at depth increments of 610 mm.

1.12 Standards

.1 Carry out all work in accordance with the applicable OPSS, OPSD and site drawings. The applicable Ontario Provincial Standard Specifications are listed hereafter.

.2 The following shall apply:
- .1 OPS 180 Management and Disposal of Excess Material
- .2 OPS 206 Grading, Nov. 2005
- .3 OPS 314 Untreated Granular Subbase, Base, Surface, Shoulder and Stockpiling
- .4 OPS 408 Adjusting or Rebuilding Maintenance Holes, Catch Basins Ditch Inlets and Valve Chambers
- .5 OPS 805 Temporary Erosion and Sediment Control Measures

1.13 Shoring and Bracing

.1 Shoring and trench timbering, in addition to requirements of local authorities, shall be carried out in accordance with the requirements of The Occupational Health and Safety Act, "November 1992 Ontario Regulation 213/91" and Regulations for Construction Projects by Ontario Ministry of Labour and to Construction Safety Association brochure "Trenching Safety April 1994".

.2 Erect necessary shoring for excavations in such a manner that:
- .1 Whenever a trench or excavated face is necessary, shore and brace to prevent failure. Engage a registered Professional Engineer fully qualified in this line of work to design, stamp shop drawings and assume responsibility for the shoring and bracing. Submit shop drawings to the Consultant.
- .2 It will properly retain the banks of the excavations and prevent caving-in or displacement or damage to surrounding or adjacent buildings or other property.
- .3 All other work in connection with this Contract, including the Mechanical and Electrical Trades, may be carried out while it is still in place if necessary.
- .4 It will be entirely free of footings, foundation walls or other such work so that it may be removed entirely or in sections when it is no longer required or when directed, without causing any damage or injury to the structural work that has been completed.

1.14 Sedimentation Control

.1 Maintain and/or repair sedimentation control at all watercourses and catch basins to prevent contamination by excavated fill.

.2 Sedimentation control shall be in accordance with the Ontario Provincial Standard Specifications, OPSS 805 and local authorities.

.3 Refer to details and notes on site development drawings.

.4 Install additional sedimentation control as required and obtain Consultant’s approval prior to commencement of site works.

1.15 Dewatering

.1 Keep excavations and backfill dry at all times.

PART 2 PRODUCTS

2.1 Materials

.1 Type A Fill: Class "A" material conforming to OPSS1010, latest edition.

.2 Type B Fill: Class "B" material conforming to OPSS 1010, latest edition.

.3 Sand Fill: Clean, well graded compactable sand to OPSS 1010, Granular “M” fill.

.4 Crushed Stone: Crushed stone shall be composed of clean, hard, durable course gravel, or crushed rock fragments such that 100% of the particles pass the 18 mm sieve and not more than 10% of the particles pass the No. 4 sieve. No clay or other objectionable materials shall be present.

.5 Engineered Fill: fill placed below Type A and Type B fill to bring excavation to the design elevations. To be Type B fill or approved fill, approved in writing by the Consultant.

.6 Topsoil: Clean topsoil, imported material approved by the Consultant, and free from admixtures of subsoil, clay lumps, stones or roots over 25 mm diameter, free of toxic substances or any other foreign matter which would inhibit growth. Minimum 150 mm thickness and 500 mm at all planting beds.

.7 Silt fence: heavy duty geotextile, Mirafi Envirofence or equivalent.

PART 3 EXECUTION

3.1 Preparation

.1 Clearing: Refer to Section 31 10 00 - Site Clearing.

.2 Lines and Levels: Refer to Section 01 71 00 - Examination and Preparation.

.3 Stock Piles: Materials shall not be stockpiled on the site except with the prior approval of the Consultant. Where permitted, stockpile materials in a manner to prevent segregation and contamination. Piles not to exceed 2000 mm in height. Stockpile materials in a location and manner not interfering with ongoing operation and use of the site and building by the Owner.

.4 Install silt fencing as detailed and in accordance with reference standards.

3.2 Excavation Work

.1 Excavate to elevations and dimensions indicated or required by the work, plus sufficient space to permit erection of forms, shoring and inspection. Excavation shall be made to clean lines to minimize quantity of fill material required.

.2 Remove large rocks, stumps and other obstructions of whatever nature encountered in the course of excavation and haul away off the site. Remove all concrete, masonry, rubble or other construction debris encountered during the work.

.3 Unauthorized Excavation - Excavation to greater than required depth shall be corrected by the Contractor at his own expense in a manner as directed by the Consultant. Fill over-excavated areas under structure bearing surfaces and footings with concrete as specified for foundations.

.4 Keep excavation free of water by bailing, pumping or a system of drainage as required and provide pumps, suction and discharge lines or well points of sufficient capacity and maintain until such time

as the permanent drainage system is installed or until the Consultant's approval of removal of equipment is obtained. Take all necessary measures to prevent flow of water into the excavation.

.5 Protect the bottom and sides of excavated pits and trenches from freezing. Protect also from exposure to the sun and wet weather to prevent cave-ins and softening of the bed upon which concrete or drains rest.

.6 Excavations must not interfere with the normal 45 degree plane of bearing from the bottom of any footing.

.7 Keep bottoms of excavations clean and clear of loose materials levelled and stepped at changes of levels with exception of excavations made for drainage purposes and those to slope as required.

.8 If the excavations reveal seepage zones, springs or other unexpected sub-surface conditions which may necessitate revisions or additions to any drainage system, inform the Consultant immediately so that remedial action can be taken.

.9 If removal of earth causes displacement of adjacent earth, the earth so disturbed shall be removed at no additional cost to the Owner.

.10 Conditions of Excavated Surfaces
- .1 Excavate to a depth sufficient to expose firm undisturbed subsoil, free of organic matter and to the Testing Agency's approval.
- .2 Remove soft, wet or unconsolidated ground and organic material encountered in excavating.
- .3 Should the nature of the sub-soil at the depths shown prove to be unsatisfactory to the Consultant for the placing of the concrete work, then upon the Consultant's written order, the Contractor shall excavate to greater depth until a satisfactory bottom is reached.

.11 Tolerances: General excavation shall be to the elevations shown on the drawings, plus or minus 25 mm.

3.3 Hydro Excavation

.1 Utilize hydro excavation services when working near and around known utilities to avoid damage.

3.4 Backfilling

.1 Proceed promptly with backfilling as the building progresses, and as work to be backfilled has been inspected and approved by the Consultant. The backfill in areas where settlement cannot be tolerated, e.g. service and footing trenches under the floor slab, should be compacted to at least 100 per cent of its Standard Proctor Maximum Dry Density. The backfill should be placed in lifts not greater than 200 mm thick in the loose state, each lift being compacted with a suitable compactor to the specified density.

.2 Do not commence backfilling operations until mechanical and electrical services, site drainage systems, perimeter and underslab insulation has been inspected and approved by Consultant and authorities having jurisdiction.

.3 Existing floor subgrade must be proof rolled before backfilling.

.4 Withdraw shoring material during backfill. Lumber left in place without the Consultant's approval will not be paid for by the Owner.

.5 Backfill evenly on both sides of foundation walls to avoid unequal fill pressures on walls.

.6 Place fill around foundation walls and footings so that footings will have a minimum of 1200 mm coverage, measured at an angle of 45 degrees from bottom of footing to protect against frost until final grading is complete.

.7 Where fill is placed adjacent to structures or vulnerable building components or in restricted areas, the fill shall be compacted to the same degree as specified by suitable equipment approved by the Consultant. Avoid damage to or displacement of walls, columns, piers, underground services, and process/ production equipment.

.8 Add water in amounts required only to achieve the optimum moisture content, in accordance with ASTM D1557.

.9 Backfill shall be free of snow and ice, topsoil, construction debris and oversized boulders greater than 150 mm.

3.5 Rough Grading

.1 Preparation and Layout
- .1 Establish extent of grading by area and elevation.
- .2 Prior to commencement of grading work, establish location and extent of all underground utilities occurring in work areas. Maintain, reroute or extend as required. Pay all costs for this work, except costs borne by utilities companies.
- .3 Slope grade away from building as indicated on drawings.
- .4 Cut temporary drainage swales and create containment ponds and structures for temporary surface run-offs, until storm sewer system is installed.
- .5 Regrade all areas that retain or pond water.
- .6 Rough grade all areas to tolerance of plus or minus 50 mm.

3.6 Fills Unders Concrete Slab

.1 The fill shall be deposited in layers of such thickness that the equipment being used for compacting can produce the specified density but in no cases, more than 200 mm thickness. If lumps are present in the material each layer shall be continuously disced in order to ensure proper compaction.

.2 The exposed subgrade shall be proof rolled to ensure its integrity. If the subgrade consists of engineered fill, the fill shall be compacted to at least 98% of its maximum Standard Proctor Dry Density for native materials or 100% compaction for Granular “A” and “B” materials, using equipment approved by the Consultant. Any loose, wet or deleterious material shall be sub-excavated and replaced by the Contractor with Type B Engineered fill which must be compacted to 98% Standard Proctor Maximum Density.

.3 Immediately after levelling, each layer of fill shall be thoroughly compacted by the use of approved mechanical equipment.

3.7 Compaction Density

.1 Use approved equipment for compaction. Maintain materials at optimum moisture content to obtain required compaction. Special care shall be taken to prevent disturbance of the existing subgrade and adjacent structures and equipment.

.2 Be responsible for damage to the subgrade and installed materials due to improper compaction methods. Make good to approval of the Consultant.

.3 The minimum density of fill in place shall be the following values of Standard proctor densities for corresponding locations in accordance with ASTM D698.
- .1 Type A Fill: To 100% Standard Proctor Maximum Density.
- .2 Type B Fill: To 100% Standard Proctor Maximum Density.
- .3 Engineered Fill: To 98% Standard Proctor Maximum Density.

.4 If during progress of work, tests indicate that compacted materials do not meet specified requirements, remove defective work, replace and retest at own expense.

.5 Ensure compacted fills are tested and approved before proceeding with placement of surface materials.

3.8 Fill Locations

.1 Type A Fill:
- .1 Under all interior and exterior concrete slabs 150 mm minimum thickness.
- .2 Below all mechanical or electrical services, from 150 mm below invert, to springline.

.2 Type B Fill:
- .1 Around all footings, foundations, grade beams and walls up to the underside of Type A fill.
- .2 From top of approved compacted subgrade to underside of concrete slabs (interior or exterior) but not less than 200 mm thickness.
- .3 At all areas on the site indicated to be paved with asphalt.

.3 Sand Fill:
- .1 Below all mechanical or electrical services, minimum 150 mm deep.
- .2 Above all mechanical or electrical pipes and trenches, from springline to 300 mm above pipe obvert.

.4 Crushed Stone: around all foundation drainage and subdrainage piping, minimum 200 mm thick.

.5 Engineered Fill: All fill locations up to the underside of Type B fill and where required to fill up to design elevations.

.6 Topsoil: at all areas to receive sod or hydraulic seeding, and in planting beds. Minimum 100 mm thickness unless noted otherwise.

.7 Site excavated material: as backfill to exterior side of foundation walls only when permitted and approved by the Geotechnical engineer and below all sodded or seeded areas up to underside of topsoil, but not within 600 mm of foundation walls or structures.

3.9 Water on Prepared Surfaces

.1 Promptly remove, by approved methods, water rising from seeping of the soil or resulting from rainfall wherever such water is on the surface of sub-grade soil and compacted fill.

.2 Where proper drainage and pumping is not carried out as specified herein, and any prepared sub-grade soil for under structural work, and any compacted fill for under concrete slabs, is softened or disturbed by water due to improper drainage and pumping, the Contractor shall remove the unsatisfactory soil and fill, and bear all incidental costs in connection with additional excavation and placing and compacting of granular fill under floor slabs.

3.10 Adjustments

.1 All manhole frames and covers, catch basin frames and covers, drains and valves including those existing scheduled to remain, shall be adjusted and set flush with finished elevation.

.2 Adjustments to manholes and catch basins shall be done using concrete adjustment units as per OPSS 408 and OPSD 704.010

3.11 Surplus Soil Disposal

.1 Surplus soil and excavated material shall be promptly removed and disposed of off the site at legal dump sites. Conform to local bylaw requirements for trucking and disposal.

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

3.12 Cleaning

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

.2 As excavation proceeds, keep roads and aisles clean of dirt and excavated material.

.3 Clean up and wash down to remove all dirt and excavated materials caused by the work of this section daily.

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 32 12 16 Asphalt Paving

1.3 References

.1 Ontario Provincial Standard Specifications (OPSS)
  .1 OPSS 710 Construction Specification for Pavement Marking
  .2 OPSS 1716 Water-Borne Traffic Paint
  .3 OPSS 1750 Traffic Paint Reflectorizing Glass Beads
.2 United States Federal Standards
  .1 Federal Standard 595B, Colors Used in Government Procurement
.3 The Accessibility for Ontarians with Disabilities Act, 2005 (AODA)

1.4 Submittals

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

.2 Submit manufacturer's product data.

.3 Submit following material sample at least 4 weeks prior to commencing work.
  .1 Paint colour selection.
  .2 Mark samples with name of project and its location, paint manufacturer's name and address, name of paint, reference specification number and formulation number and batch number.

1.5 Shipping, Handling and Storage

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

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

1.6 Waste Management and Disposal

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

PART 2 PRODUCTS

2.1 Materials

.1 Paint:
  .1 To OPSS 1716.
  .2 Colour: Federal Standard FS Federal 595B, Yellow 33538.
    .1 Provide H.C. Blue (Pantone 293 C) to OPSS standards for accessible parking spaces.
  .3 Paint shall be non-slip.

.2 Glass beads: Overlay type: OPSS 1750 Traffic Paint Reflectorizing Glass Beads.

PART 3 EXECUTION

3.1 Equipment

.1 Paint applicator to be an approved pressure type mobile distributor capable of applying paint in single, double and dashed lines. Applicator to be capable of applying marking components uniformly, at rates specified, and to dimensions as indicated, and to have positive shut-off.

.2 Distributor to be capable of applying reflective glass beads as an overlay on freshly applied paint.

3.2 Condition of Surfaces

.1 Pavement surface to be dry, free from ponded water, frost, ice, dust, oil, grease and other foreign materials.

3.3 Application

.1 Lay out pavement markings.

.2 Unless otherwise approved by Consultant, apply paint only when air temperature is above 10° C, wind speed is less than 60km/h and no rain is forecast within next 4 hours.

.3 Apply traffic paint evenly at rate of 3m² /L.

.4 Do not thin paint unless approved by Consultant.

.5 Symbols and letters to conform to dimensions indicated.

.6 Paint lines to be of uniform colour and density with sharp edges.

.7 Paint accessible parking spaces blue with a painted pavement marking in the centre of the space, in contrasting colour to the pavement, 1000mm in length, with the International Symbol of Accessibility.

.8 Thoroughly clean distributor tank before refilling with paint of different colour.

.9 Apply glass beads at rate of 200g/m² of painted area immediately after application of paint.

3.4 Tolerance

.1 Paint markings to be within plus or minus 12 mm of dimensions indicated.

.2 Remove and replace incorrect markings.

3.5 Protection

.1 Protect pavement markings until dry.

3.6 Cleaning

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

End of Section

PART 1 GENERAL

1.1 General

.1 Conform to the requirements of Division 1.

1.2 Related Sections

.1 Section 03 30 00 Cast-in-Place Concrete
.2 Section 07 13 52 26 Self-Adhered Membrane Waterproofing
.3 Section 07 21 13 Building Insulation
.4 Section 31 23 10 Excavating, Trenching and Backfilling

1.3 References

.1 ASTM International (ASTM)
  .1 ASTM D1248-16 Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable
.2 CSA Group (CSA)
  .1 CSA A23.1:19 Concrete Materials and Methods of Concrete Construction
  .2 CSA B182.1 Plastic Drain and Sewer Pipe and Pipe Fittings
.3 Ontario Provincial Standard Specifications (OPSS)
  .1 OPSS 1840 Material Specification for Non-Pressure Polyethylene (PE) Plastic Pipe Products
.4 Ontario Building Code 2012, Part 7 - Plumbing

1.4 Submittals

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

.2 Submit manufacturer's technical literature and installation instructions.

1.5 Shipping, Handling and Storage

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

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

1.6 Waste Management and Disposal

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

PART 2 PRODUCTS

2.1 Materials

.1 Perforated plastic pipe and fittings: to CSA 182.1. Nominal pipe size 100 mm diameter. Manufactured from high density polyethylene resin which meets or exceeds the requirements of Type III, Category 4 or 5, Grade P33 or P34, Class C as per ASTM D1248.

.2 Joining System: snap, insert or split coupler

.3 Filter Sock: Woven polyester.

.4 Acceptable product: Big 'O' Perforated Corrugated with Polyester Sock Filter as manufactured by Armtec Ltd

.5 Coarse filter aggregate: to CSA-A23.1, Table 2, Group 1, 20-5 mm.

.6 Fine filter aggregate: to CSA-A23.1, Table 1.

.7 Filter Mat: Non-Woven Polypropylene Geotextile
.1 Terrafix 200R by Terrafix Geosynthetics Inc.
.2 Mirafi 140N by TC Mirafi.

.8 Drainage sheet: Terradrain 600 by Terrafix Geosynthetics Inc. or Mirafi Drainage Composite by TC Mirafi.

PART 3 EXECUTION

3.1 Layout

.1 Establish grades and inverts from appropriate bench marks. Lay out lines as shown on Drawings.

.2 Slope drainage pipes at least 1%. Pipe grade shall not vary more than 10% of internal diameter of pipe withing a given run. Such deviation shall be gradual and over a distance of not less than 9.0 m.

.3 Lay pipe in straight lines; turn corners using 45° bends.

3.2 Installation

.1 Coordinate work of this Section with that of other related Sections.

.2 Do not place pipe in direct contact with rigid materials such as rock, brick, or wood. Do not use grade stakes, stones, masonry or concrete fragments or any type of shim under pipe.

.3 Join pipe sections by means of couplings. Provide end plugs on open ends of pipe runs at high points. Provide fittings such as elbows, bends, tees, adapters, reducers, as required to form a complete drainage system. Carefully tap tapered fittings into pipe; do not overdrive.

.4 Install perforated pipe with holes and coupling slots facing down.

.5 Aggregate materials shall be damp when placed. If necessary, spray with water using fog nozzle to assist hydraulic consolidation.

.6 Place aggregate materials by hand around and above pipe in successive 150 mm lifts.

.7 Consolidate each lift by tamping moderately; prevent damage to pipes.

.8 Do not cover pipes until inspected and approved by Consultant.

.9 Supply rigid non-corrosive sleeves for insertion into foundation walls and other building elements where pipe penetrates such elements. Sleeve diameter shall be 50 mm larger than pipe diameter. Pack joint between pipe and sleeve with moisture resistant compressible pre-moulded filler.

3.3 Perimeter Drainage

.1 Provide perimeter drainage where indicated at base of foundation walls.

.2 Connect to existing subdrainage system.

.3 Place filter fabric into prepared excavation. Size filter fabric to completely wrap drainage course, lapping at joints minimum 300 mm.

.4 Place minimum 150 mm coarse filter aggregate on top of filter fabric and consolidate.

.5 Lay drainage pipe to layout shown. Unless other size is indicated, provide 100 mm diameter perforated pipe. Connect to existing outfall as directed by Owner's Representative.

.6 Provide minimum 150 mm thick coarse filter aggregate at sides and top of drainage pipe.

.7 Close filter fabric over top of drainage course and secure lap in place.

.8 Cover filter fabric with 300 mm fine filter aggregate.

3.4 Drainage Sheet

.1 Ensure that waterproof membranes have been inspected and approved prior to placing drainage sheet.

.2 Place panels with flat side against waterproofed foundation walls and filter fabric facing soil. Secure panels to substrate with two sided tape or adhesive, compatible with substrate material.

.3 Connect adjacent panels at the longitudinal edge by pulling the filter fabric back to expose the flange. Place flangeless panel edge on top of the flange of the adjacent panel and butt dimple to dimple.

.4 Complete panel and attachment by pulling the filter fabric back to expose two rows of dimpled core. Place end of the next panel over the two rows of dimples and interlock.

.5 Complete all connections in single fashion from top to bottom so that moisture will flow with the overlap and not against it.

.6 Overlap fabric in the direction of water flow. Secure all terminal edges with the filter fabric flap by tucking it behind the core.

.7 Overlap drain sheet filter fabric over perimeter drain filter fabric.

.8 Coordinate with Section 31 23 10 to ensure that drainage sheet is covered with backfill within maximum two weeks of its installation.

3.5 Inspection

.1 Arrange for inspection of foundation drainage systems by Municipal Inspectors and the Consultant prior to placing backfill.

3.6 Cleaning

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

End of Section