



Civic recreation Centre (CRC) SKYLIGHT REPLACEMENT

location

**555 Rossland Road East
Whitby, Ontario**

February 2026

Metric Project No. 24224

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END OF SECTION

1. GENERAL

1.1 General

- .1 The building shall remain in use . Ensure that normal building operations and maintenance may be carried out without disruption, except as otherwise noted herein or stated in the Bid.
- .2 The Contractor shall co-ordinate their work schedule with the Owner to minimize disruptions to site operations. All work shall be performed after approval obtained from the Owner.
- .3 Contractor access, parking space requirement and traffic routing shall be shown on the map in the appendix. If additional parking space or building access is required the Contractor shall provide the Owner with a schedule that lists all building access and, or restrictions at least five (5) working days prior to the work. Any required road closures and traffic rerouting shall be coordinated in advance at least five (5) working days with the Owner.

1.2 Schedule

- .1 Contractor to confirm project start date. All work outlined in these specifications are to be completed within a construction schedule of four (5) weeks.
- .2 Within five (5) working days of contract award, the Contractor shall provide the Consultant and the Owner's Representative with a detailed project schedule that includes the following information
 - .1 Start date and completion date for each Phase of the work.
 - .2 Monthly, weekly, and daily schedule for onsite operations to include crew size, working hours, and proposed equipment.
- .3 If progress of the Work falls behind the approved project schedule, the Contractor shall, upon the Owner's request, provide a mitigation schedule outlining corrective actions and shall increase on-site labour, resources, and/or weekly working hours as necessary to regain compliance with the approved schedule. All such measures shall be implemented at no additional cost to the Owner
- .4 .

1.3 Working Hours

- .1 Work shall be permitted only between the hours of 7:00 a.m. and 8:00 p.m., seven days a week. All work shall be executed in accordance with the start date and duration specified in the Bid Documents

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- .2 Daytime Noise Restriction: Noise-generating work that may disrupt interior activities shall not be permitted between 8:00 a.m. and 5:00 p.m., Monday to Friday, to avoid disturbance to building occupants. Such work may only be performed outside of this time period with prior approval from the Owner.
 - .3 .
 - .4 A minimum of seventy-two (72) hours' written notice shall be provided to the Consultant and the Owner for any work proposed outside the designated working hours, where such work is permitted
 - .5 The Superintendent shall remain the same individual for the full duration of the project. Should a change be necessary, submit a written request to the Consultant/Owner detailing the reason for the change, the qualifications of the proposed new Superintendent, and confirmation that the replacement will remain in the role until project completion.
 - .6 .
 - .7 All workers shall be knowledgeable in the installation of the specified products and systems. Each worker shall have a minimum of two (2) years of experience and must have successfully completed at least two (2) prior projects of comparable scope and complexity
 - .8 Upon request of the Consultant or the Owner, the Contractor shall provide documentation confirming that workers have received the Manufacturer's training required for installation of the specified systems.
- 1.4 Submittals
- Submit the following items at the time noted below or when requested by the Consultant.

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- .1 Before Commencing Work:
 - .1 Certificate of Liability Insurance
 - .2 Clearance Certificate from the Workplace Safety & Insurance Board
 - .3 Performance Bond
 - .4 Labour and Materials Payment Bond
 - .5 Permits
 - .6 Workmen Trade Certificate (Upon request)
 - .7 Construction Schedule
 - .8 Sample Progress Claim Form showing breakdown of contract amount.
 - .2 Before Commencing Affected Work:
 - .1 Shop Drawings, Products Data, and Samples in accordance with the contract documents
 - .2 Samples and Mock-ups
 - .3 Material Safety Data Sheets (MSDS)
 - .4 Layout Data
 - .3 During Construction:
 - .1 Construction Daily Tracking Sheet
 - .2 Progress Reports
 - .3 Applications for Payment
 - .4 At Substantial Performance:
 - .1 Statutory Declaration
 - .2 As-built Drawings
 - .3 Inspection Reports
 - .4 Operating and Maintenance Manuals (if applicable)
 - .5 Guarantees, Warranties and Bonds
- 1.5 Shop Drawings, Samples, and Mock-ups
- .1 Submit shop drawings to the Consultant for review in accordance with the Contract Documents. Do not proceed with any Work related to the associated product until the submittal has been reviewed
 - .2 Submit samples in the specified sizes and quantities. Where colour selection is required, provide the full range of available colours
 - .3 Construct field samples and mock-ups at locations acceptable to the Consultant. Each sample or mock-up shall be fully completed, incorporating all trades required to demonstrate the finished work

- .4 Approved samples or mock-ups will become standards of workmanship and material with which installed work will be required to comply.
- .5 Approved samples or mock-ups can remain as part of the finished work where appropriate.

1.6 Quality Control and Testing Services

- .1 Related Requirements Specified Elsewhere.
 - .1 Detailed requirements for inspection and testing are specified under various sections of the Contract.
- .2 Appointment and Payment
 - .1 The Owner will appoint and pay for services of a testing laboratory except for the following:
 - .1 Inspections and testing required by laws, ordinances, rules, regulations or orders of public authorities.
- .3 Contractor's Responsibilities to Inspection and Testing Authorities
 - .1 To furnish labor and facilities to:
 - .1 Provide access to work to be inspected and tested.
 - .2 Facilitate inspections and tests.
 - .3 Make good work distributed by inspection and test.
- .4 Detailed requirements for inspection and testing are specified under various sections of the Contract.
- .5 Testing to be coordinated with the Consultant.

1.7 Mobilization, Demobilization, Site Safety and Administration

- .1 Mobilize and demobilize all forces including labor, material, equipment, site office and safety hoarding/fencing necessary to carry out all of the work.
- .2 Mobilization also includes all bonding, insurance, permits, schedules, and shop drawings.
- .3 This item includes all site safety and project administration.
- .4 Payment for this item will be equivalent to the portion of Work completed.

1.8 Applications for Payment

- .1 Submit progress claims to the Consultant in triplicate dated the last working day of the month. Provide progress claims in a format approved by the Consultant and containing the following information:
 - .1 Progress Claim No.
 - .2 For Work Completed To-Date
 - .3 Total Contract Amount
 - .4 Approved Change Orders
 - .5 Revised Contract Amount
 - .6 % complete for each item
 - .7 Amounts claimed for each item
 - .8 Less specified holdback
 - .9 Less Previous Claims
 - .10 Amount Due

1.9 Equivalents

- .1 Please refer to the Town's standard requirements – **Part A Instructions to Bidders - Equivalents**

1.10 Material and Equipment

- .1 Unless otherwise specified, comply with the manufacturer's most current published instructions for materials and installation method
- .2 Where more than one manufacturer or model number is identified for a specific product or piece of equipment, the design and drawings are based on the equipment listed in the schedules; where no schedule exists, the basis of design shall be the first-named manufacturer or model
- .3 Alternative equipment, if approved, may be utilized. However, if one of the approved alternatives is used, the cost of any changes made necessary to accommodate the substitution shall be borne by the Contractor.

1.11 Co-ordination

- .1 Coordinate the Work and cooperate fully to enable other Contractors to perform their duties and obligations. The Owner and the Consultant shall not be held responsible for any deficiencies arising from inadequate coordination or cooperation between Contractors

-
- .2 Maintain all existing operations throughout the construction period. Cooperate closely with the Owner's representatives to minimize disruptions to building operations and services. Provide the Consultant with sufficient advance notice of any proposed service shutdowns so that the Owner may be consulted regarding potential impacts on their operations.
 - .3 Coordinate all tie-ins and service shutdowns with building operations. Complete required tie-in work as efficiently as possible. Certain tie-ins and shutdowns may need to be carried out after hours, if required no additional costs shall be borne by the Owner.
 - .4 Maintain continual awareness of the need to coordinate and schedule work in areas where two or more services are to be routed through the same space

1.12 Project Meetings

- .1 The Consultant will arrange a pre-construction meeting to establish the overall project requirements, expectations, and timelines prior to the commencement of the Work.
- .2 The Consultant will schedule progress meetings throughout the construction period. The Consultant will complete the minutes of the meeting and distribute to all parties within 48 hours. The Contractor shall ensure that appropriate project representatives are present at these meetings

1.13 Temporary Utilities

- .1 Provide all required temporary services; including power, lighting, heating, cooling, ventilation, telephone service, water, sanitary facilities, first aid facilities, fire protection, and temporary construction—to support the full scope of the Work, including that of all sub-trades, for the entire duration of the project.
- .2 The Contractor shall be responsible for all costs associated with the temporary operation of any system prior to Substantial Performance, including the supply and replacement of filters and strainers, as well as the complete vacuum cleaning of equipment, plenums, and ductwork if required.
- .3 Repair any damage to permanent services resulting from their use during construction and ensure that all warranties remain fully intact and unaffected.

1.14 Barriers

- .1 Provide and install all required temporary hoarding, fencing, protective measures for site components, landscaping, and trees, as well as barricades wherever necessary. Remove all such temporary measures upon completion of the Work or when directed by the Consultant.

1.15 Access Roads and Parking Areas

- .1 Provide and maintain access to and from all driveways and loading bays.
- .2 Restore all existing site work damaged as a result of construction and related activities, to their original condition.
- .3 Where required, provide vehicular and pedestrian access to

adjacent properties to a standard acceptable to the property
Owner's requirements.

- .4 Contractor setup and staging permitted at: The Shipping and Receiving/Loading Dock located at the northwest corner of the building, along the west side of the building, and the courtyard, providing a layout plan is provided and approved by the Client and building entrance/exits and fire routes are not blocked. See a map location for the GC Laydown area in appendix.

1.16 Project Identification and Signs

- .1 Display no signs or advertisements without the Owner's approval.
- .2 When signs are permitted, maintain them in good condition during the Work and remove them as directed by the Owner upon completion of the Work.

1.17 Qualifications of Workers

- .1 Provide a site superintendent who will oversee all work carried out at the site. The site superintendent shall be present at all times that work is being carried out. For installation of various items of work, or for finishing work of any trade, use only personnel thoroughly trained and experienced.
- .2 Provide a 24-hour emergency contact number of the Contractor's representative.

1.18 Protection of Property

- .1 Review conditions and identify occupancy below the area of Skylight to be replaced.
- .2 Provide vent covers and interior protection tarp cover at all spaces and areas where Skylight replacement is being conducted above. Extra precautions should be taken to protect spaces and equipment in the building interiors, where the roof deck is exposed. Contractor to review and inspect daily to ensure protection covers are intact.
- .3 Provide precautions required to prevent dust and debris from interfering with building operations. Provide precautions to maintain a watertight building at all times throughout the project duration.
- .4 Protect sidewalks, pavements, and landscaped areas around the building. Reinstate and make good if damaged during construction.
- .5 Take all necessary precautions to contain all wind-blown debris on the roof.

- .6 Where traffic is expected over roofing, or where materials are to be stored on roof surfaces, protect the roofing with plywood sheathing no less than 12 mm (½ inch) thick.
- .7 In order to contain the debris and limit dust generation, material disposal from the roof to grade level, containers shall be in closed bags if hoisting or via an enclosed chute.
- .8 Access to work areas and roofs shall be from the building exterior, the Contractor will not be permitted inside the building. Contractor to allow for any necessary scaffolding and portable washrooms.
- .9 The Contractor will be permitted inside the building for the installation of interior protection and tarps as necessary only, the Contractor's crew shall wear clean footwear at all times.

1.19 Permits

- .1 Contractor shall secure and pay for all permits (including the Building Permit), fees and inspections required by all authorities having jurisdiction.
- .2 The Owner will reimburse the Contractor for the cost of the Building Permit only. Attach a copy of the receipt for the Building Permit fee to the next Progress Claim.
- .3 Forward a copy of the Building Permit to the Owner and the Consultant. Keep a copy of all permits on site.

1.20 Clean-up

- .1 Leave work areas in a tidy, safe, and secure condition at the end of each workday.
- .2 Supply a disposal bin for temporary storage of debris at locations authorized by the Owner. Do not locate bins on a structural slab.
- .3 As work proceeds and at the completion of the work each day collect all debris and garbage and store in the disposal bin. Protect all debris and material from wind uplift and displacement.
- .4 Upon completion of work, leave areas affected in a condition the same or better than the original.
- .5 Power wash paved surfaces to remove contamination resulting from construction.

1.21 Make Good

- .1 Make good, repair, or replace any damage to the Owner's property, including building exterior, interior finishes, and all interior equipment, resulting from work performed under this Contract. Restore affected areas to match adjacent existing conditions seamlessly.
- .2 Unless otherwise specified, or where code requirements dictate a particular standard, make good all new work to match the existing conditions
- .3 Where existing work is to be restored, the new work shall match the existing in material, construction, and finish, unless otherwise noted or specified

1.22 Cold Weather Construction

- .1 The intent of this Contract is that the Work proceed continuously once cold-weather conditions have passed. If any Work must be performed when ambient temperatures are unsuitable, it shall be executed in strict accordance with cold-weather construction requirements established by the Consultant and based on the manufacturer's written instructions. These requirements may include, but are not limited to, providing temporary heat and protection. The Contractor shall bear all costs associated with any procedures required to postpone or continue the Work under such conditions
- .2 Certain materials require application and curing at or above specified minimum temperatures. Provide temporary protection including enclosures, heating, and ventilation as necessary to maintain the proper conditions for material application and curing
- .3 Protect all areas of the Work from cold, wind, and rain by enclosing the area with tarps and heating the enclosure.

1.23 Sub-contractors

- .1 Ensure that all Subcontractors review the Drawings and Specifications related to their own work, as well as any work by other Subcontractors that may impact or interface with their scope.
- .2 It is the Contractor's responsibility to ensure that all work is carried out in compliance with the Contract Documents and to accept responsibility for delays or costs arising from his failure to inspect or adequately co-ordinate a Subcontractor's work.

- .3 Ensure that Subcontractors and other trades cooperate fully with any Subcontractors whose work connects to, or is affected by, their own. Confirm that all necessary adjustments are made to allow proper integration and attachment of adjoining work.

1.24 Safety

- .1 Comply with the provisions set out in the Occupational Health and Safety Act, Regulations of the Ontario Ministry of Labour, Workplace Hazardous materials Information System (WHMIS) Regulations and Canadian Construction Safety Code. Follow the recommendations of the Canadian Health & Safety Manual issued by the Construction Safety Association of Ontario.
- .2 Work in conjunction with the proper safety associations operating under the authority of the Ontario Worker's Compensation Act. Do not, in any manner, endanger safety or unlawfully interfere with the convenience of the public. Be solely responsible for all safety related to the Work.
- .3 Maintain on site, readily accessible to those who may be exposed to hazardous material, a list of all hazardous material proposed for use together with current MSDS.
- .4 Safety precautions are part of the construction techniques and processes for which the Contractor is solely responsible.
- .5 The Owner and/or the Consultant have the right to stop the Work for reasons of safety. This in no way shall limit or diminish the Contractor's sole responsibility for safety.
- .6 When performing hot work, maintain appropriate fire-suppression equipment within the immediate work area. Provide a two-hour fire watch or conduct an infrared scan and address any detected hot spots before leaving the site

1.25 Parking

- .1 Contractor's parking is limited within the building parking lot during the construction period. Parking locations have been indicated in the map in the appendix. For additional parking, obtain the Owners approval for parking of the Contractor's vehicles. Provide a minimum of 72 hours' notice to the Owner for the temporary removal of vehicles from parking areas affected by the Work.

1.26 Site Conditions

- .1 Report in writing to the Consultant prior to commencing the Work, any conditions or defects encountered on the site upon which the Work depends and which any adversely affect the performance of the Work. Do not commence Work until such conditions or defects have been investigated and corrected.
- .2 Before commencing the Work, inspect all the building components and property within the area of the Work. Report in writing, any damage or items not functioning.
- .3 Commencement of the Work implies acceptance of surfaces and conditions. No claim for damages or resulting extra work will be accepted except where such conditions cannot be determined prior to construction and brought to the Consultant's attention prior to disturbances of conditions.
- .4 Be responsible for making good, repair and restoration of existing conditions on public and private properties as part of the tendered prices. In all cases, blend with existing conditions.

End of Section

1 General

- .1 Work under this contract is to remove and replace existing sloped glazing system and vertical gable ends (existing skylight) above the main atrium at the Civic Recreation Centre at 555 Rossland Road East, in Whitby.

2 Scope of Work

The work includes, but is not limited to, the following:

2.1 General

- .1 Mobilization/Demobilization: all labour, equipment and materials necessary to carry out the work of this contract. Upon completion of the work, demobilize all equipment and unused materials from the site, clean the site of all debris and repair any damage caused by the work.
- .2 Installation Crew: The contractor will ensure that the same installation crew will be on site for the duration of the entire project, provided they remain employed by the Contractor and provide acceptable performance.
- .3 Grade Level Protection: Supply, install and maintain a construction barrier around the grade level work area throughout the course of the work. Provide overhead protection at the area of work.
- .4 Exterior Access: Provide all access equipment, safety supervision, engineering, temporary support, etc., as necessary to facilitate the performance and inspection of the work described herein. This shall be provided to allow all installation from the exterior. The contractor shall review exterior access and conditions prior to bid submission. All work and material delivery shall be carried out from the building exterior, except for the work related to the interior finishes around the skylights.
- .5 The building shall be fully operational during construction. Access to all building entrances/exits must be maintained at all times.
- .6 Interior Protection: The Contractor shall provide scaffolding and overhead protection at the areas where work is carried out above. The Contractor shall provide interior protection as required to avoid damaging the existing building components, furniture, and finishes, etc.

- .7 Fall Protection: Where a worker may be exposed to a fall hazard, the employer is responsible for providing and ensuring that all such workers are adequately trained and protected by a fall protection system that meets the requirements of the Occupational Health and Safety Act - Ontario Regulation 213/91 - Section 26.

2.2 Submittals and Mock-Ups

- .1 Submissions: With the bid submission provide all bonding, insurance, permits, and schedules.
- .2 Test Reports: With the bid submission provide a test report which demonstrate compliance with the performance levels specified.
- .3 Shop Drawings: Submit shop drawings signed and sealed by a Professional Engineer licensed to practice in the place of work. Shop Drawings shall include anchorage design, material specifications, product compatibility, sealant type, drainage provision (e.g., weep holes), and membrane support.
- .4 Mock-Up: At a location selected by the Owner, complete a full installation for review and testing by the Consultant. The Contractor shall provide assistance to the Consultant if water testing is performed.

2.3 Replacement of the Sloped Glazing

- .1 Removal: The existing skylight glazing and all existing frames shall be removed and disposed of. Inspect and prepare the rough opening prior to new installation as specified.
- .2 Interior Finishes: Make necessary repairs to the damaged wall finishes, drywall is to be mudded, sanded, primed and painted. Any damage (as determined by the Consultant) to the interior finishes and elements shall be repaired at the Contractor expense with no cost to the Owner. Notify the Consultant for review of such locations immediately upon discovery. Repairs to locations where notice is not provided shall be paid for at the Contractor's expense.
- .3 Perimeter Insulation, Seal, and Trim: Repair existing air barrier/vapour retarder at wall opening after removal of existing skylight glazing and frame. Install new air barrier/vapour retarder at the perimeter of wall

openings and tie into the existing air barrier/vapour retarder for a continuous seal.

- .4 Inject spray foam around the perimeter of the opening. Where perimeter gaps exceed tolerances identified in Section 07 62 00, install interior/exterior trim into fresh foam. Once the foam has cured, cut away the excess foam and apply sealant to the full interior and exterior perimeters, including both sides of trim pieces and butt joints in trim. Seal exterior metal-to-metal joints at frames.
- .5 Installation: Installation shall be by an installer approved by the manufacturer. Erect and secure skylight units plumb, square, shimmed and level, free from warp, twist and superimposed loads, and cleaned. Anchor the new skylight into the rough opening of the existing exterior wall as detailed in shop drawings prepared by a Professional Engineer and according to the manufacturer's written instructions.

2.4 Miscellaneous Work

Complete minor repairs to address unanticipated conditions as found to be necessary, and as directed by the Consultant in writing. Payment for this work shall be from a Contingency Allowance on the basis of time and materials or quoted fixed price, as agreed to prior to the work proceeding.

- .1 Interior Drywall Repairs: In lieu of the Owner repairing the pre-existing interior finish damage, repair all existing damage, including priming.
- .2 Paint Touch-Ups: Paint all plaster repairs using a single standard paint colour selected by the Owner.

End of Section

1 General

1.1 Description of Work

- .1 Supply labour, materials, services and equipment necessary to complete the work of this section. Work includes temporary hoarding and protection:
 - .1 Design, supply, erect and maintain covered overhead protection and scaffolding at work area under the sloped glazing system.

1.2 Reference Standards

- .1 CAN/CSA S269.2-M87 (R2003), "Access Scaffolding for Construction Purposes".
- .2 Comply with National Building Code of Canada, Part 8, "Safety Measures at Construction and Demolition Sites", and Provincial requirements.
- .3 Occupational Health and Safety Act and the Occupational Health and Safety Regulations, Ontario (R.S.O. 1990).

1.3 Waste Management and Disposal

- .1 Separate waste materials generated from demolition for recycling where appropriate. Materials to be recycled include but are not limited to the following:
 - .1 All metal flashings.
 - .2 All aluminum framing components (where feasible).
 - .3 All deteriorated steel stud framing components removed.
 - .4 All masonry and mortar.

1.4 Submittal

- .1 Submit erection drawings to the consultant for covered overhead protection and scaffolding at work area under the sloped glazing system. Erection drawings are to be signed and sealed by a professional Engineer licensed in the province of Ontario.

1.5 Notice

- .1 If hazardous material is encountered in the course of demolition work, stop work and notify the Consultant immediately. Do not proceed until written instructions have been received from the Consultant.

2 Products

- 2.1 Not Used.

3 Execution

3.1 Construction Hoarding and Overhead Protection

- .1 Design, supply, erect and maintain covered overhead protection and scaffolding at work area under the sloped glazing system. Design scaffolding and overhead protection in accordance with CAN/CSA S269.2 and the Occupational Health and Safety Act. Design of all overhead protection must maintain a similar level of building security and lighting as existing and allow the building to remain in use as intended.
- .2 Supply, erect and maintain construction fencing in accordance with the Occupational Health and Safety Act.
- .3 Review layout and construction of hoarding/fencing with consultant prior to proceeding.
- .4 Construction fencing to consist of panelized, 6-foot high, heavy duty, welded wire steel fencing on a sturdy tubular frame. Lock or clamp sections of fencing together.
- .5 Post construction signage indicating "non-authorized access to area of work".

3.2 Environmental Separation

- .1 Construct a temporary continuous environmental separation located below the sloped glazing system or in areas where the sloped glazing removal work creates excessive dust/debris (as determined by the consultant). In these areas the contractor will be required to protect the interior from

demolition debris and dust. Minimum dust screen construction requirements include the following:

- .1 Polyethylene tarps secured to 2x4 framing and clamped between the floor and ceiling surfaces with telescoping poles. Protect existing floor and ceiling surfaces from damage.

3.3 Preparation/Protection

- .1 Provide drop sheets, tarps and/or other means to protect all existing interior finishes designated to remain during removal and replacement of the sloped glazing system.
- .2 Keep noise, dust, and inconvenience to occupants to minimum.
- .3 Protect all interior and exterior building components and finishes designated to remain in place from damage. Make good any items damaged as a result of the work to the satisfaction of the owner and consultant at no additional cost.
- .4 Protect all building systems, services and equipment.
- .5 Provide temporary dust screens, covers, railings, supports and other protection as required, by the owner and/or consultant.
- .6 Comply with the requirements of the Occupational Health and Safety Act and the contractor's project specific health and safety plan, with respect to worker personal protective equipment.

3.4 Preparation

- .1 Do not disrupt active or energized utilities intended to remain undisturbed.
- .2 Do not disrupt, disconnect or otherwise affect services or utilities without written approval from the owner and/or consultant.
- .3 Building is to remain occupied throughout duration of project.

3.5 Removals

- .1 Remove and dispose of all identified sloped glazing system components and surrounding wall finishes as indicated on the drawings or specified herein.

- .2 Remove existing equipment, services, and obstacles where required for refinishing or making good of existing surfaces and replace as work progresses.
- .3 Dispose of removed materials, except where noted otherwise, in accordance with authorities having jurisdiction.
- .4 Protect all interior finishes, assemblies and components not being removed from damage at all times. Make good any items damaged as a result of the work at no additional cost to the owner.

3.6 Removals

- .1 Following completion of all work. The contractor will be required to wipe clean and vacuum all interior surfaces using a high-efficiency particulate air filter (HEPA) vacuum and clean all interior surfaces with a damp cloth and/or mop and detergent solution.

End of Section

1 General

1.1 Section Includes

- .1 Labour, material, equipment, and services necessary for installation of pre-finished galvanized sheet metal flashings for roofing according to the Contract Documents.

1.2 Reference Standards

- .1 CAN/CSA G164-18, Hot Dip Galvanizing of Irregularly Shaped Articles
- .2 Factory Mutual Loss Prevention Data Sheet 1-49
- .3 SMACNA (Sheet Metal and Air Conditioning Contractors National Associations Inc.), latest edition
- .4 CRCA Roofing Manual, Canadian Roofing Contractors Association

1.3 Protection

- .1 Protect the work of this section from damage. Damaged work which cannot be satisfactorily repaired, restored or cleaned, shall be replaced at no cost to the Owner.

2 Products

2.1 Fastening Strips

- .1 20-gauge pre-painted galvanized sheet metal
- .2 Fastening strips 2 gauges heavier than the sheet metal (e.g., use a 24-gauge fastening strip with 26-gauge sheet metal or a 22-gauge fastening strip with 24-gauge sheet metal).

2.2 Finished Sheet Metal

- .1 All flashing to match style and color of the roof areas recently replaced along the east side of the building.
- .2 24-gauge galvanized prefinished sheet steel sized to project requirements. Any chipped, scratched, or dented material shall be rejected.
- .3 Colour(s) to be selected to match the roof areas recently replaced and confirmed by the Owner.

- .4 Isolation coating: Alkali resistant bituminous paint.
- .5 Sealant: 100% Silicone sealant refer to section 079200.
- .6 Cleats and starter strips: Starter strips to be continuous, of same material as flashing used, 1.2 mm thick. Cleats to be minimum 50 mm wide and 90 mm high.
- .7 Fasteners: Self-drilling prefinished cap screws with neoprene washers, suitable for metal flashing application. All fasteners shall be suitably coated to prevent corrosion or galvanic action.
- .8 Touch-up paint: Same colour and material as pre-painted sheet steel, as recommended by prefinished coating manufacturer.
- .9 Self-adhesive membrane: Blueskin SA by Bakor Inc or Soprseal Stick 1100 by Soprema Inc. or approved equal.

2.3 Fabrication

- .1 Fabricate copings, flashings, curb counter flashings, starter strips, scuppers, downspouts, and miscellaneous flashings according to CRCA FL details and to match configuration of the recently replaced roof areas at the east side of the building.
- .2 Breakform pre-painted sheet material. Make end joints where adjacent lengths of metal flashing meet, according to jointing method specified.
- .3 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints.
- .4 Hem exposed edges 13 mm minimum on underside for appearance and stiffness. Mitre and seal corners with sealant in sliplock fashion to allow for thermal expansion.
- .5 Fabricate flashing to have with a 25 mm drip edge.

3 Execution

3.1 Examination

- .1 Verify condition and dimensions of previously installed work upon which this Section depends. Notify the Consultant of any defects.
Commencement of Work means acceptance by the Contractor of existing conditions.

3.2 Installation

- .1 Install coping flashings, curb flashings, starter strips, and miscellaneous flashings according to CRCA.
- .2 Use concealed fasteners.
- .3 Apply isolation coating to metal surfaces in contact with concrete or mortar.
- .4 Install continuous starter strips to present a true, non-waving, leading edge. Anchor to back-up for a rigid, secure installation.
- .5 All metal base flashing shall extend to base of cants. Exposed flashing sheet will not be accepted.
- .6 Make end joints using an S-lock joint. Insert end coping length in 25 mm deep S lock formed in end of adjacent length. Extend concealed portion of S lock 25 mm outwards and secure to substrate. Face fastening of joints will not be permitted. Fasten into vertical surfaces only. No fastening into canted surfaces will be accepted.
- .7 Corners shall be square and surface straight and true to plains. All metal shall have hemmed edges.
- .8 Seal where necessary to form weather-tight seal between flashing and adjoining surfaces and between flashing and other Work. Seal Work by bedding between members where possible. Tool sealant to concave profile where exposed.
- .9 Install new metal counterflashing on perimeters, walls, curbs, expansion joints, flashed sleepers, and projections. Owner to select colour from standard colours, except as indicated in the Products section above.

- .10 Finish joints at horizontal mitred joints and canted corners with folded standing seams.

End of Section

1 General

1.1 Description of Work

- .1 Provide labour, material, services and equipment necessary to complete the work of this section. Work includes, but is not limited to the following:
 - .1 Installation of new exterior sealant at the perimeter of new sloped glazing system (includes all joints between metal flashing and new sloped glazing system and all joints between metal flashing and existing cladding and/or roof materials).
 - .2 Installation of new interior paintable latex sealant at the perimeter of all new sloped glazing systems, and at all joints in new interior trim.
 - .3 Installation of new sealant at all other locations as indicated on the drawings or specified herein.

1.2 References

- .1 CAN/CGSB-19.13-M87, Sealing Component, Elastomeric, Chemical Curing.
- .2 CAN/CGSB-19.17-M90, One-Component Acrylic Emulsion Base Sealing Compound.
- .3 CAN/CGSB-19.18-M87, Sealing Compound, One Component, Silicone Base, Solvent Curing.
- .4 CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.
- .5 CAN/CGSB-19-GP-5M (R1984), Sealing Compound, One Component, Acrylic Base, Solvent Curing
- .6 CAN/CGSB-19-GP-14-M76 (R1984), Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing
- .7 ASTM C 834-10, Standard Specification for Latex Sealants
- .8 ASTM C 920-11, Standard Specification for Elastomeric Joint Sealants
- .9 ASTM C 1193-12, Standard Guide for Use of Joint Sealants
- .10 ASTM C 1521-09e1, Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints.

1.3 Submittal

- .1 Submit manufacturers technical data for each sealant material to be utilized on this project for review and acceptance by the consultant, prior to ordering materials. Submittals must include:
 - .1 Sealant compound.
 - .2 Manufacturers colour pallet of available colours for selection by owner.
 - .3 Cured samples of exposed sealants for each color where required to match adjacent material.
 - .4 Recommended Primers.
 - .5 Sealing compound, type and colour, including compatibility when different sealants are in contact with each other.
 - .6 Installation instructions for each product used.

1.4 Project Conditions

- .1 Environmental Limitations:
- .2 Do not proceed with installation of joint sealants under following conditions:
 - .1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer.
 - .2 When joint substrates are wet.
- .3 Joint-Width Conditions:
 - .1 Do not proceed with installation of joint sealants where joint widths are less than or greater than, those allowed by joint sealant manufacturer for applications indicated.
- .4 Joint-Substrate Conditions:
 - .1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.5 Delivery, Storage, and Handling

- .1 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with ground or floor.
- .2 Deliver, handle, store and protect materials in accordance with manufacturers' written instructions.

1.6 Environmental and Safety Requirements

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Safety Data Sheets (SDS).
- .2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

1.7 Inspection and Testing

- .1 Arrange for the sealant manufacturer to have a qualified technical representative visit site prior to commencement of work to review and assess the conditions and surfaces to which the new exterior sealant will be applied, and to discuss the surface preparation requirements, application procedures and to provide recommendations should adverse conditions exist. Prior to commencing with the sealant installation work, the sealant manufacturer must provide written certification that they have reviewed and accepted the existing substrate(s) for application of the new exterior sealants, in order to provide the full product system warranties.
- .2 Arrange for the qualified technical representative from the manufacturer to visit the site to complete adhesion testing of sealant installation mock-ups to ensure that the full product system warranties can be provided.
- .3 Arrange for the qualified technical representative from the manufacturer to visit the site at regular intervals during application and upon completion of work to ensure compliance of the sealant application with the manufacturer's installation requirements, and to check the quality of work. The manufacturer is responsible to visit and inspect the sealant installation

work (as necessary) to ensure that the full product system warranties can be provided.

- .4 The above supervision shall be performed at no extra cost to the Owner.

1.8 Warranty

- .1 The Contractor shall repair all defects and deficiencies at no cost to the Owner.
- .2 Defects or deficiencies shall include, but are not limited to joint leakage, cracking, melting, running, shrinkage, sagging, loss of adhesion, loss of cohesion, loss of colour, staining or damage of adjacent work surfaces.
- .3 Warranty Period: 2 year

1.9 Qualifications

- .1 Surface preparation and sealant installation shall be carried out by a recognized specialized applicator who has a minimum 5 years of experience and is thoroughly trained and competent in all aspects of this work.

1.10 Site Examination

- .1 Examine the site, and Specifications to determine the extent of the work involved, together with other necessary conditions affecting the work. In no circumstances will any claims against the Owner or the Owner's representative be allowed resulting from failure to ascertain the extent of such work herein described or implied.

2 PRODUCTS

2.1 Silicone Sealants - General

- .1 Type 1 Sealants (for all exterior joints, within glazing framing, metal to glass joints, metal to masonry joints):
 - .1 Use one of the following: Single component, elastomeric, moisture curing silicone sealant, conforming to CAN/CGSB-19.13-M (latest edition):
 - .1 795 by Dow Corning Canada Inc.

- .2 Spectrem 2 by Tremco Ltd.
- .3 Or Approved Equivalent
- .2 Interior Air Seals (for perimeter of sloped glazing system)
 - .1 Use one of the following: Single component, acrylic latex sealant conforming to CAN/CGSB-19.17-M or meeting the requirement of ASTM C834:
 - .1 Tremflex 834 by Tremco Ltd.
 - .2 GE RCS20 Acrylic Siliconized sealant by Momeptive Performance Group

2.2 Sealant Accessories

- .1 Bond Breaker Tape: Pressure sensitive polyethylene bond breaker tape which will not bond to surface, as recommended by sealant manufacturer.
- .2 Preformed Compressible back-up materials: Composed of Polyethylene, Urethane, Neoprene or Vinyl Foam compatible with exterior sealant.
 - .1 Extruded closed cell foam backer rod.
 - .1 Size: oversize 30% to 50%.
- .3 Joint Cleaner: Non-corrosive and non-staining type, compatible with joint forming materials and sealant as recommended by sealant manufacturer.
- .4 Primer: As recommended by manufacturer.

3 EXECUTION

3.1 Site Inspection

- .1 Arrange for sealant manufacturer to have qualified technical representative visit site prior to commencement of work to discuss with Contractor, Subcontractor (applicator) and Consultant, the surface preparation requirements, joint profiles and sealant application procedures required for this project to maintain product and system warranties, and make alternative recommendations should adverse conditions exist. Sealant manufacturer to submit a letter in writing summarizing their site visit and recommendations provided.

- .2 Sealant manufacturer to arrange for the qualified technical representative to visit site periodically during sealant application work and upon substantial completion of all work to ensure adherence to sealant manufacturer's recommendations and installation instructions.

3.2 Protection

- .1 Protect installed work of other trades from staining or contamination.

3.3 Preparation of Joint Surfaces

- .1 Clean, remove and dispose of all existing sealant and backup materials.
- .2 Clean all concrete, masonry surfaces and ferrous metals of all foreign materials by wire brushing, grinding or sanding. Use a dry clean stream of compressed air if necessary to clean the joint of all particulate matter.
- .3 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
- .4 Prepare all existing substrate surfaces in strict accordance with manufacturer's installation instructions and as specified herein.
- .5 Ensure that bonding joint surfaces are structurally sound and free of all harmful matter including dust, rust oil, grease, old caulking, loose mortar and other residue which may adversely affect the adhesion of the sealing materials. Use 'two cloth' method for solvent cleaning.
- .6 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
- .7 Ensure joint surfaces are dry and frost free.
- .8 Wipe metal surfaces to be caulked with cellulose sponges or clean rags soaked with joint cleaning material (Xylene solution). Followed by a second wiping of all surfaces with a clean dry cloth (two cloth cleaning method). Clean pre-coated metals with solutions or compounds which will not injure finish and which are compatible with primer and sealant. All surfaces to be caulked must be wiped with the appropriate cleaner as recommended by the sealant manufacturer before application of caulking.

- .9 Test sealant for indications of staining or poor adhesion in accordance with CAN/CGSB-19.24-M90 before any sealing is commenced. Submit in writing to the Consultant.

3.4 Priming

- .1 If recommended, prime surfaces to receive sealants as per the sealant manufacturer's specifications. Follow the sealant manufacturer's recommendations for application and cure time.
- .2 Take sufficient precautions to prevent staining of adjacent surfaces and priming the backer rod/bond breaker. Where necessary to protect adjacent surfaces, mask surfaces with suitable tape prior to primer and/or sealant installation.
- .3 Prime only as much area as can be sealed in one hour. If primed areas are exposed to rain or contaminants (dirt, dust, etc.), the surface must be cleaned and re-primed.
- .4 Protect the surfaces that do not require primer. If primer is installed accidentally on surfaces other than the one specified, it should be removed immediately with the help of a clean cloth dampened with the recommended cleaner.

3.5 Joint Backing

- .1 At large open cavities fill cavity with batt insulation or spray foam insulation prior to the installation of the backer rod.
- .2 Install backer rod or apply bond breaker tape prior to sealant installation.
- .3 Tightly install backer rod without stretching, twisting, braiding or puncturing its outer skin.
- .4 Use an approved installation tool that is blunt surfaced and developed to accurately set the backer rod at the required depth to achieve recommended sealant profile.
- .5 Where joint shape does not permit installation of backer rod, install bond breaker tape.
 - .1 In a tensile bead or butt joint configuration, install tape only at bottom of gap (width of tape shall be same as width of gap). Do not install tape on surfaces of joint where sealant will be applied.

- .2 In an angle or fillet bead configuration, install tape directly over joint/gap to prevent three sided adhesion of sealant. Minimum width of tape shall be 12mm (1/2").
- .6 Joint backing must be thoroughly dry. Do not install more joint backing/bonbreaker tape that can be sealed in one working day.

3.6 Sealant Bead Profile

- .1 Maintain the minimum and maximum sealant depths as recommended by the manufacturer. Provide a sealant depth that is 1/2 the joint width where possible within these limits.
- .2 Minimum sealant profile dimensions shall be achieved at all locations. Increase average sealant size as required to accommodate application tolerances.
- .3 Sealant adhesion surface shall be equal or greater than the sealant depth, and not less than 9mm.
- .4 Unless otherwise approved by the Consultant, joint widths shall be greater than 10mm. Identify any joint widths less than this width to the Consultant for direction.
- .5 Angle beads shall have a minimum 15mm sealant width. Where angle joint widths are less than 10mm, a bond breaker shall be employed to assure a minimum total 12mm unbonded surface.
- .6 For joints wider than 19mm, application of sealant in several passes may be required (depending on joint configuration, weather conditions, access and material type). Follow the sealant manufacturer's recommendations for maximum joint width and application methods.

3.7 Sealant Application

- .1 Read other Sections of the specifications and examine drawings for extent of caulking. Do all other caulking specified or required.
- .2 Apply sealant using equipment approved by, and in accordance with the manufacturer's written instructions.
- .3 Immediately after application, tool the sealant to ensure firm, full contact with the faces of the joint.

- .1 Neatly tool the surfaces to a slight concave profile. Avoid pulling the sealant out of the joint by frequent cleaning of the tooling instrument.
- .2 Surface of sealant to be smooth, free from ridges, wrinkles, sags, air pockets and embedded impurities.
- .4 Ensure drainage holes provided for wall systems are not blocked by the sealant material.
- .5 Joining Silicone to Urethane Sealants: Time the application to assure silicone and urethane sealants are placed in contact with each other in a wet to wet condition, prior to skinning over. The sealants shall be detailed so as to provide a watertight seal, including lapping in order to provide proper shedding of water flowing with gravity. Where initial lengths of sealant are required to assure the appropriate lap, apply silicone first.

3.8 Cleaning

- .1 Remove sealant smears and droppings on completion of sealant installation in affected areas.
- .2 For non-porous surfaces (i.e. metal and glass), it is recommended to immediately remove all excess sealant adjacent to the joint with one of the recommended solvents as work progress.
- .3 For porous surfaces, it is recommended to allow sealant to develop initial cure, then remove by abrasion or other mechanical means. Caution should be exercised to maintain original surface integrity.
- .4 Remove masking tape immediately after tooling of joints.
- .5 Cleaning solutions and methods to be recommended in advance by the sealant manufacturer.

End of Section

1 General

1.1 Description of Work

- .1 Provide labour, equipment and materials necessary to complete the work of this section. Work includes, but is not limited to the following:
- .2 Provide all labour, material, equipment, and services necessary for the removal of existing sloped and vertical (gable) glazing system, the supply, fabrication and installation of the thermally broken aluminum curtain wall system and sloped glazing systems. The scope of work includes, but is not limited to:
 - .1 Prepare and submit all specified sloped glazing shop drawings, product data and test reports, as specified herein or as indicated on the drawings.
 - .2 Remove and dispose all existing sloped and vertical glazing systems as indicated on the drawings. Work generally includes removal and disposal of the designated glazing and frames, caps, glazing, gasket, and related components to fully expose the structural supports.
 - .3 Supply and install a new thermally broken aluminium sloped glazing system and new vertical glazing system at gable ends of the sloped glazing, complete with exterior flashing, glazing, and all required interior trim and sealants. New sloped glazing system to have interior condensation gutter with evaporator tray, and be a rain screen design, with provisions to drain the glazing rabbet to the outside.

1.2 Reference Standards

- .1 AAMA 1600, "AAMA/WDMA Voluntary Specification for Skylights"
- .2 AAMA-501.2, "Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefront, Curtain Walls, and Sloped Glazing Systems".
- .3 AAMA-503, "Voluntary Specification for Field Testing of Storefronts, Curtain Walls, and Sloped Glazing Systems".
- .4 IGMA, "Glazing Recommendations for Sealed Insulating Glass Units"

- .5 National Building Code, and/or Ontario Building Code, latest edition.
- .6 AAMA CW-13 - Structural Sealant Glazing Systems.
- .7 ASTM C1036 - Standard Specification for Flat Glass.
- .8 ASTM C1048 - Standard Specification for Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass.
- .9 ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass
- .10 ASTM C1401 - Standard Guide for Structural Sealant Glazing.
- .11 ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
- .12 ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- .13 ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform Static Air Pressure Difference.

1.3 Protection

- .1 Protect the work of this section from damage. Damaged work which cannot be satisfactorily repaired, restored or cleaned, shall be replaced at no cost to the Owner.

1.4 Environmental Conditions

- .1 Protect the work of this section from damage. Damaged work which cannot be satisfactorily repaired, restored or cleaned, shall be replaced at no cost to the Owner.
- .2 Work shall not proceed if weather at time of installation, or if immediate forecast is for weather which may result in damage to exposed wall elements or interior finishes and furnishings of building.
- .3 Glazing installation on site shall not be carried out at temperatures below 5°C. Should it become necessary to carry out the work at temperatures

below 5°C, inform Consultant and consult the glazing sealant manufacturer's representative. Proceed on their written instructions only.

- .4 Fabrication of unitized frame and application of structural silicone sealant shall be carried in a controlled environment by a qualified and pre-approved sealant manufacturer applicator. The application of the sealant shall be approved and reviewed by the sealant manufacturer.

1.5 Design and Performance Requirements

- .1 Design curtain wall and sloped glazing systems to withstand and to allow for the anticipated movement of the building structure, without any detrimental effects to appearance and performance, wind loads, snow loads, and temperature range expected in geographical area of this project (as per Ontario Building Code, latest edition, climatic information, 1 in 50-year probability, unless specified otherwise).
- .2 Sloped and vertical glazing systems shall meet the following minimum performance levels:
 - .1 Air Leakage Resistance: Air leakage shall not exceed 0.04 cfm per square foot (0.2 L/(s*m²)) of fixed wall areas when tested in accordance with ASTM E283) at a static air pressure difference of 1.57 psf (75 Pa) and 6.26 psf (300Pa).
 - .2 Water Penetration Resistance: No uncontrolled water penetration when curtain wall and sloped glazing systems are tested in accordance with ASTM E331 (Field Test: AAMA 501.2), static air pressure difference used in the test shall not be less than 20% of the inward acting design wind load with a minimum of 300Pa.
 - .3 Design Loads: Refer to As-Built Structural Drawings.
- .3 Glazing system shall be designed to support dead loads plus live loads in accordance with applicable codes, taking into account snow accumulation and unbalanced loading, as well as wind and interior pressure, as appropriate.
- .4 Structural loads due to climate as per 2024 OBC for the site location.
- .5 Aluminum design shall conform to CAN3-S157-M83, Strength Design in Aluminum.

- .6 Glass shall be designed in conformance with CAN/CGSB-12.20-M89, Structural Design of Glass for Buildings.
- .7 Aluminum glazing system will be self-supporting, unless shown on the drawings to be otherwise supported by structural building elements.
- .8 Design and install with provision for thermal movement that will not overstress components, cause joint or glazing failure, or other detrimental effects. Fixing method shall not work loose due to thermal expansion or building movement.
- .9 Structural performance shall be based on CSA standard CAN3-S157 "Strength Design in Aluminum" and a maximum deflection of 1/175 of the span, with full recovery of glazing materials.
- .10 Isolate aluminum from dissimilar metals by use of an inert material or bituminous coating.
- .11 Follow IGMA recommendations for IGU installation. Moving setting blocks closer than 150mm from the corner of the opening is not acceptable. Size insulating glass units, glazing gasket and glazing tape to ensure proper compression of tape and gaskets.

1.6 Submittals

- .1 After bid submission:
 - .1 A copy of laboratory test reports for the sloped glazing systems indicating compliance with performance levels specified in this section, and including detailed drawings of test specimen, stamped and signed by certified testing agency. Testing agencies to be certified and accredited to perform all lab performance tests required in this section. Lab tested sloped glazing s shall be identical in every respect to sloped glazing to be installed in building.
 - .2 Proposed typical details including but not limited to perimeter of the opening (curb and head/roof flashing details) and connections to adjacent assemblies, conforming to the requirements of this Section.
- .2 After contract award and prior to mock-up installation:

- .1 Sample(s) of proposed sloped glazing, including all seals, glazing materials, IGUs and all hardware for operable window inserts. Submit color samples of specified finishes. Sample(s) submitted shall be complete and identical in every respect to system to be installed in building.
 - .2 Submit production run samples of all components to be used for the structurally glazed sloped glazing system for adhesion and compatibility testing by the silicone sealant manufacturer. Provide a written recommendation on the surface preparation required and compatibility for each component.
 - .3 Based on design windload and project dimensions, submit calculation for the sealant bite for the structural glazing tensile bead (between IGU and sloped glazing frame) and the IGU secondary sealant (between inner and outer lites).
- .3 On completion of work:
- .1 Supply three (3) copies of operations, maintenance and glazing instructions.

1.7 Shop Drawings

- .1 Submit shop drawings indicating the configuration, connections details, and materials to be used during the installation of the sloped glazing system.
- .2 Drawings shall include sizes, shapes, location and fastening details of aluminum extrusions, anchoring/fasteners, flashing, air barrier, vapour barrier details, finishes, sealants, glass types, purlins (if required), and drainage paths.
- .3 Drawings shall be stamped by a Professional Engineering, licensed to practice in the Province of Ontario, and shall indicate design loads and maximum support reactions.

1.8 Mock-Up

- .1 Construction Installation Mock-Up:
 - .1 The intent of the mock-up is to provide an opportunity to review site conditions, to make adjustments as necessary, to check anchoring

and deflection requirements and verify that the installation is carried out in a manner satisfactory to Owners and Consultant. Mock-up to be complete and identical in every aspect and shall be representative of the work for the remainder of this project. The mock up will be used as a reference for the quality of the work to be expected for the duration of the work.

- .2 Mock-up shall be the installed by same installers who will perform the general installation.
- .3 Arrange for Consultant to be present during installation to view components which may become concealed as installation proceeds (ie. structural anchorage, perimeter insulation, etc.).

1.9 Qualifications

- .1 Curtain wall/ sloped glazing contractors shall be an approved applicator for the type of curtain wall and/or sloped glazing systems to be installed and have a minimum of 5 year experience in this line of work.

1.10 Quality Assurance

- .1 Consultant may visit manufacturer and/or fabricator's facilities during manufacturing and/or assembly of curtain wall/ sloped glazing systems for this project to examine assembly and materials. Any deviations noted from approved sample and from descriptions in laboratory test report for compliance with the project specification shall be corrected by the Contractor.
- .2 Consultant may undertake random on-site testing to verify that air and water leakage resistance complies with required performance levels. If tests indicate failure, Contractor shall undertake remedial work and retesting necessary to demonstrate compliance with specified performance requirements, at no cost to the Owner. Testing shall be in accordance with the latest edition of AAMA 501.2.
- .3 Site review of installation will be carried out by the Consultant and/or Owner. Provide a minimum of 24 hour notice to the Consultant and Owner for review of installation at key project milestone(s) before further proceeding with additional work. The milestones will be identified by Consultant after the mock-up.

1.11 Delivery, Storage, Handling and Protection

- .1 Keep handling on-site to a minimum. Exercise particular care to avoid damage to finishes of materials. Deliver, store and handle work of this section in accordance with AAMA CW-10-15 Care and Handling of Architectural Aluminum from Shop to Site.
- .2 All components of the wall shall be identified after fabrication by marks clearly indicating their location on the building as shown on the drawings. Packaging, if necessary, shall be the minimum necessary to protect the parts from damage during shipping and hoisting. Protect prefinished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.
- .3 Storage:
 - .1 Store material in a location and in a manner to avoid damage. Stacking shall be done in a way which will prevent bending, excessive pressure or abrasion of the finishes surfaces or so that water cannot accumulate on or within materials.
 - .2 Store aluminum components and materials in a clean, dry location. Cover with waterproof paper, tarpaulin or polyethylene sheeting in a manner that will permit circulation of air inside the covering.
- .4 Contractor to take all precautions necessary to protect materials, before and after installation, from lime, mortar, water run-off from concrete or copper, careless handling of tools, weld splatter, acids, roofing tar, solvents, abrasive cleaners, and other items that could damage the glass surfaces and aluminum finishes. Do not rely on use of protective films to protect materials.

1.12 Warranty

- .1 Warrant the work of this Section (curtain wall and sloped glazing systems) against defects in materials and workmanship for a period of 5 years. Warrant that work will be water and weather tight, structurally sound and free from distortion and deformation under load; that materials and finishes will not develop excessive fading or non-uniformity of colour, and will not crack, peel, delaminate or otherwise deteriorate or corrode; that glazing splines, sealants and gaskets will be free from deterioration from

sunlight, weather and oxidation, and will be free from permanent deformation under load.

- .2 Warrant the insulating glass units (IGUs) against defects for period of 10 years. Warrant that the insulating glass units be free from material obstruction of vision as a result of dust or film formation on the internal glass surfaces by any cause, under normal conditions, other than extrinsic glass breakage, but including breakage due to thermal shock and temperature differential due to inherent glass or glazing faults. Warrant that the mechanical performance characteristics such as U value, solar heat gain and reflectivity shall remain consistent within the warranty period.
- .3 Warrant the laminated glass against defects for period of 10 years. Warrant that the laminated glass shall be free from any delamination or visual defects by any cause, other than extrinsic glass breakage, but including breakage due to thermal shock and temperature differential due to inherent glass or glazing faults.
- .4 Warrant all structural silicone sealant work against defects for a period of 20 years. Warrant that the sealant shall remain free from failure, surface crazing or discolouration.
- .5 Warranties shall include the prompt remedy of defects upon written notification from the Owner that defects exist. Remedy shall include labour, materials, equipment and services required to make good defective areas of the work, and in the case of factory-fabricated components, to supply and install new components, all at no cost to the Owner and at times convenient to the Owner. Warranties shall also include making good other building parts and finishes and other Owner's property damaged or disturbed in the course of remedying defects.
- .6 Warranties shall commence on the date of Substantial Performance

2 Products

2.1 Sloped Glazing System

- .1 Sloped glazing system: vertical (rafter) and horizontal (purlin) stick members shall be aluminium extrusions designed with internal drainage (drained and vented). Aluminium frame sections (all components, including pressure plates and cover caps) shall be from AA 6063-T6 alloy.
- .2 Preferred and acceptable sloped glazing systems are:
 - .1 Preferred
 - .1 Kawneer 2000 Skylight System, by Kawneer Company Canada Limited; and
 - .2 IBG Skylight by IBG Canada.
 - .2 Alternatives (Subject to Approval)
 - .1 BMS 3000 by Oldcastle Building Envelope; and
 - .2 Skyview 2300 by Alumicor.
- .3 System to be designed with sloped glazing to match existing configuration.
- .4 Purlins shall allow condensation from inner glass to discharge into an interior condensation gutter on the rafters and drain to the sill for evaporation.
- .5 All joints shall be interlocking and be designed to be air and water tight. All mechanical joints shall be sealed with gunnable sealant compatible with structural silicone sealants and designed to prevent air and water infiltration. Provide expansion and/or stack joints as required and recommended by manufacturer.
- .6 At rafters, retain glazing with conventional pressure plates and cover caps. At purlins, retain glazing with structural silicone sealant and provide silicone sealant weather seal at exterior.
- .7 Fasteners shall be 300 series stainless steel or 400 series stainless steel cadmium plated and of sufficient size and quantity to perform their intended function.
- .8 The entire sloped glazing system shall be based on the rain screen principle (drained and vented). The system shall provide:

- .1 glazing pocket and spandrel cavity to be vented and drained to the exterior;
- .2 gaskets, corner blocks, baffles, overlaps and seals as required to provide a "rain screen" barrier to effectively deter rain entry into cavities of the system; and
- .3 air and vapour seals required to minimize air/vapour exfiltration from the building into the system cavities and vice versa;

2.2 Exterior and Interior Finishes

- .1 All aluminum components and associated trim exposed to view on the interior shall be provided with finishes as selected by the Owner. Unless otherwise indicated, new components visible to view to match existing.
- .2 Finish of exterior cover caps and new all frames to be 2-coat system meeting AAMA 2605 Voluntary Specification Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels. Duranar XL, colour to be bronze to match existing, with samples to be approved by Owner. Provide warranty of ten (10) years.

2.3 Isolation Coating

- .1 Surfaces of aluminum components in contact with concrete, masonry and structural steel shall be coated with bituminous paint, conforming to CAN/CGSB-1.108-M, "Bituminous Solvent Type Paint".

2.4 Shims

- .1 Shims shall hard plastic horseshoe shaped, sized for intended application.
- .2 Material maybe: vinyl (PVC) or polypropylene, polystyrene or polyethylene specifically formulated to resist compression set.

2.5 Fasteners

- .1 All fasteners shall be suitably coated/formulated to prevent corrosion or galvanic action.
- .2 Fasteners material, diameter, length to be of sufficient strength and quality to perform their designated function.

- .3 Fasteners shall not be installed through the drainage plane of the glazing system unless approved by the Consultant.

2.6 Insulation

- .1 At sloped glazing transition assembly between aluminium sheets: to be selected by manufacturer, suitable for application. Insulation to fill cavity to the extent possible.
- .2 At base of east elevation ground level curtain wall concrete curb: Concrete-faced insulated perimeter wall panels. Tech-Crete Insulated Panel Products, WallGUARD by TClear or equivalent. 50mm thick.
- .3 Polyurethane foam insulation: One component, non solvenated polyurethane foam, conforming to CAN/CGSB-51.23 (latest edition).

2.7 Sealant

- .1 Structural glazing sealant as approved by the glazing manufacturer.

2.8 Glass

- .1 Glass, Spandrel and insulating glass units (IGUs): conform to the requirements of Section 08 80 00, Glazing.

2.9 Glazing

- .1 Exterior and Internal Glazing seals:
 - .1 Between IGU and pressure plate: continuous extruded neoprene, Santoprene, silicone rubber, or EPDM, as recommended by framing system manufacturer, formulated to resist compression set, and compatible with insulating glass unit perimeter sealant.
 - .2 Between rafter and purlin shoulder and IGU:
 - .1 At pressure plate locations: continuous extruded neoprene, Santoprene, silicone rubber, or EPDM, as recommended by framing system manufacturer, formulated to resist compression set, and compatible with insulating glass unit perimeter sealant.
 - .2 At all structural silicone glazing application: continuous extruded silicone or silicone compatible rubber, formulated to resist compression set and compatible with insulating glass

unit perimeter sealant, as recommended by framing system manufacturer, such as Thermalbond by Saint-Gobain Performance Plastics

- .3 PVC type gaskets shall not be used in any of the applications.
 - .4 Thickness of tapes and gaskets to be selected based on the manufacturer specifications to provide the recommended compression necessary to ensure water tight seal of the curtain wall assembly.
- .2 Setting Blocks
- .1 Silicone or Silicone compatible rubber, conforming to IGMA “Glazing Recommendations for Sealed Insulating Glass Units”. Shore A durometer hardness shall be 85 ± 5 . PVC or other types of setting blocks shall not be used. Minimum thickness of setting blocks is 6mm. Setting block profile to allow for drainage at purlins.
 - .2 Follow section 5.0 of IGMA “Glazing Recommendations for Sealed Insulating Glass Units” regarding setting block size, thickness, etc., shall be the minimum requirements of this Section. Unless otherwise stated, the minimum setting block length shall be 100mm.

2.10 Interfaces – Transition Membrane

- .1 For application at the interface of the sloped glazing and its perimeter, use one of the following products:
 - .1 Henry Baker, Blue Skin WP with Blueskin Primer
 - .2 Grace Construction Products; Bituthene 3000 with P-3000 Primer
 - .3 Soprema; Colphene Black with Colphene Primer
 - .4 Tremco Proglaze ETA
 - .5 DOW Corning 123
- .2 Termination sealant shall be compatible with membrane flashing and as recommended by the membrane manufacturer.
- .3 Mechanically secure and seal the membrane into the glazing pocket of the sloped glazing or curtain wall systems.

- .4 Fastening bars: 18 Gauge galvanized sheet metal or extruded aluminum. Fastening bars shall be continuous.

2.11 Interfaces – Transition to Roof Curb

- .1 Formed aluminium break shape (AA 1100-H14 alloy) or extruded aluminium profile to meet intent of this specification, suitable for the application. Exposed pieces to be prefinished to match sloped glazing exterior finishes. Mill finish at faces not expose to view.
- .2 Insulation to fill enclosure with the highest R-value to the extent possible. Insulation to be selected by manufacturer, suitable for application.
- .3 Interior aluminium liner to be the drainage plane and air/vapour barrier.

3 Execution

3.1 Fabrication (In Plant)

- .1 Fabricate system components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- .2 The glazing systems shall be sized to fit within existing openings, without damaging interior finishes.
- .3 Provide individual compartments within the glazing systems in accordance with the rain screen principle.
 - .1 For the sloped glazing system, all purlins shall be sealed to rafters.
 - .2 For the curtain wall system, all rails shall be sealed to mullions.
- .4 All joints shall be accurately machined, assembled and sealed to provide neat weathertight joint.
- .5 For the sloped glazing system (including smoke vents) using structural silicone sealant, proceed with the installation of the insulating glass units in plant using two part silicone sealant. Structurally glazed all IGUs and spandrel glass panels according to silicone sealant manufacturer within the cassette system for veneer sloped glazing system.
- .6 Prepare components to receive anchor devices.

- .7 Arrange fasteners and attachments to ensure concealment from view, wherever possible
- .8 Welding requirements (for new steel framing, if required):
 - .1 All welding shall be done with electrodes and/or by methods recommended by the suppliers of the metals being welded. Type, size and spacing of welds shall be as shown on approved shop drawings.
 - .2 Welds behind finished surfaces shall be so done as to minimize distortion and/or discolouration on finished side. Weld spatter and welding oxides on finished surfaces shall be removed by descaling and/or grinding.
 - .3 All surfaces adjacent to weld area should be protected from weld spatter.

3.2 Site Preparation

- .1 Before beginning installation in any assigned area, the contractor shall examine all parts of the structure affecting installation of his work in this area. Should any errors be found in the location of offset lines or bench marks, and should any condition be found in the structure which, in his opinion, will prevent proper execution of his work, he shall report such errors and conditions in writing to the Consultant. Installation shall not proceed in the area until errors and unsatisfactory conditions have been corrected or adjusted.
- .2 Prior to removal of any components, examine all conditions, including environmental conditions, likely to affect the timely completion of the work of this section
- .3 As outlined in contract documents, where existing support frames are to be retained (HSS and aluminium frames), remove and dispose of existing caps, pressure plates, glazing, seals, etc. , taking precaution to not damage elements to be retained.
- .4 As outlined in contract documents, where entire glazing system (glazing and frames) are to be remove, remove and dispose of all components for clear rough opening.

- .5 At location of existing smoke vents on main east skylight, carefully examine motors and actuators and carefully disconnect prior to glazing removal. Protect equipment from damage during construction.
- .6 Remove debris from outside the building. General access for demolition will not be permitted inside building.
- .7 Take care to limit damage to sound interior finishes and exterior cladding. Damage to sound interior finishes and exterior cladding shall be repaired by the Contractor at no cost to the Owner.

3.3 Sloped Glazing Installation

- .1 Verify dimensions, tolerances, and methods of attachment with other work.
- .2 Install new curtain wall and sloped glazing systems in accordance with the manufacturer's instructions and approved shop drawings.
- .3 Isolate aluminum from concrete, mortar, plaster and dissimilar metals with bituminous paint.

3.4 Protection, Cleaning and Adjustment

- .1 All components of the curtain wall shall be protected from other building materials during and after installation until acceptance by the Consultant and Owner. Protect finished work from damage.
- .2 Remove protective elements and labels from glass and thoroughly clean aluminum and glass surfaces with solution of mild domestic detergent in warm water. Take care in removing dirt from corners. Wipe surfaces dry using soft cloths. Glass to be cleaned according to GANA Informational Bulletin GAA 01-0300, Proper Procedures for Cleaning Architectural Glass Products.
- .3 Remove excess sealant by moderate use of solvent acceptable to sealant and curtain wall manufacturer.

End of Section

1 General

1.1 Description of Work

- .1 This section specifies the design, fabrication, supply and all services necessary to complete glass and glazing work of this Section in accordance with the Contract Documents.

1.2 Reference Standards

- .1 CAN/CGSB-12.8, Insulating Glass Units
- .2 ASTM C1036 -16 - Standard Specification for Flat Glass.
- .3 ASTM C1048 - Standard Specification for Heat-Treated Flat Glass - Kind
- .4 HS, Kind FT Coated and Uncoated Glass.
- .5 ASTM C1087, Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems.
- .6 ASTM C1172-14 Standard Specification for Laminated Architectural Flat
- .7 Glass
- .8 ASTM C1376 - Standard Specification for Pyrolytic and Vacuum
- .9 Deposition Coatings on Glass.
- .10 ASTM E2188 - Standard Test Method for Insulating Glass Unit Performance.
- .11 ASTM E2189 - Standard Test Method for Testing Resistance to Fogging in Insulating Glass Units.
- .12 ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.
- .13 ASTM E 2269, Standard Test Method for Determining Argon Concentration in Sealed Insulating Glass Units using Gas Chromatography.
- .14 North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use”
- .15 IGMA TB-3001, "Guidelines for Sloped Glazing”.

- .16 AAMA GDSG-1, "Glass Design for Sloped Glazing",
- .17 AAMA TIR A7, "Sloped Glazing Guidelines".
- .18 Ontario Building Code (OBC) 2024.

1.3 Design and Performance Requirements

- .1 Design and provide glazing systems capable to withstand, without any detrimental effects to appearance and performance, wind loads and thermal movement based on temperature range expected in accordance with local Codes, based on climatic information and 50 year probability.
- .2 Insulating glass unit manufacturers shall have certification to CGSB-12.8 or ASTM E 2190 and related standards for the IGU assembly to be provided (spacer, connector, desiccant, sealant, gas fill) in accordance with IGMAC seal durability test program (for CGSB-12.8 test standard) or IGMA/IGCC seal durability test programs (for ASTM E 2190 and related test standards). Certification shall be consistent with the requirements for IGU components as set out in this specification.
- .3 Structural performance of the glazing system shall meet requirements for anticipated live, dead, lateral, wind, seismic, handling, transportation, and erection loads, in accordance with CAN/CGSB-12.20-M – Structural Design for Glass in Buildings.
- .4 Glass thicknesses shall be determined by the shop drawing engineer based on the project-specific design loads and in-service conditions.
- .5 The shop drawing engineer shall analyze and confirm appropriate glass thicknesses using CAN/CGSB-12.20-M or other applicable standards.
- .6 Minimum glass thicknesses shall be as indicated in the shop drawings, meeting or exceeding project requirements.
 - .1 Design wind load: To be determined by the shop drawing engineer, based on local climatic conditions and building codes.
 - .2 Design snow load: To be determined by the shop drawing engineer, based on local climatic conditions and building codes.
 - .3 Probability of Breakage for Vertical Glazing: 8 lites per 1000 for lites set vertically or not more than 15 degrees off vertical and under wind action.

- .4 Probability of Breakage for Sloped Glazing: 1 lite per 1000 for lites set more than 15 degrees off vertical and under wind and snow action.
- .5 Maximum Lateral Deflection: For the following types of glass supported on all 4 edges, provide thickness required that limits center deflection at design wind pressure to 1/50 times the short side length or 1 inch (25 mm), whichever is less.
- .6 Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
- .7 Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:
 - .1 For laminated-glass lites, properties are based on products of construction indicated.
 - .2 For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
- .8 Thermal performance properties shall be based on manufacturer's published data, determined per:
 - .1 U-Factors: NFRC 100 expressed as Btu/ sq. ft. x h x deg F (W/sq. m x K).
 - .2 Solar Heat Gain Coefficient: NFRC 200.
 - .3 Solar Optical Properties: NFRC 300.
- .9 Unless otherwise indicated, select glass lite thickness and width of spacer to provide overall, nominal IGU thickness of 32mm for all fixed slope openings (for sizes up to 5' x 9') and laminate sloped glazing applications.
 - .1 Unless otherwise indicated, both inboard and outboard lites shall have the same thicknesses.
 - .2 Unless otherwise indicated, minimum Glass thickness to be not less than 6.0mm (1/4").

- .10 Size glazing unit to provide a minimum edge clearance between edge of unit and sloped glazing frame in accordance with IGMA recommendations.
- .11 Ensure continuity of building enclosure vapour and air barrier using glass and glazing materials as follow:
 - .1 Utilize inner lite of multiple lite sealed units and glazing sealants to fenestration system frames for continuity of air and vapour seal.
- .12 Ensure continuity of the air and vapour barrier using inner lites of sealed units and glazing sealants at fenestration system frames.

1.4 Submittals

- .1 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for glass, perimeter sealants, and glazing accessories and include product characteristics, performance criteria, physical size, finish and limitations
- .2 Samples:
 - .1 Submit two (2) samples of each type of finished glass products. Each sample to be 300 mm x 300 mm, clearly showing, tempered and laminated glass, low-e, warm edge spacer and sealant. Samples to show acid etching as specified. Samples to show surface-applied bird- friendly markings as specified
 - .2 Submit samples for review and written approval of the Owners prior to fabrication and/or placing order for project.
- .3 Preconstruction Adhesion and Compatibility Test Report: From glazing sealant manufacturer indicating glazing sealants were tested for adhesion to glass and glazing channel substrates and for compatibility with glass and other glazing materials.
- .4 Manufacturer's Documents: Installation instructions.
- .5 Test Reports: certified test reports from qualified testing agency showing compliance with specified performance characteristics and physical properties.

1.5 Quality Assurance

- .1 The Consultant and/or Owner may visit the IGU manufacturer's facilities during manufacture/fabrication of products to be installed on this project. If requested, the Contractor shall arrange for access for the Consultant to that manufacturer's facility to examine manufacture of the products for this project.
- .2 Assembly methods and materials will be examined during visit to manufacturer.
- .3 Manufacturer shall make IGMA required daily quality control records available for review by Consultant and Owner.
- .4 The Consultant will inspect the IGUs (on site and/or in plant). Destructive testing may be performed to confirm concealed details. IGUs not manufactured in accordance with IGMA certification and as otherwise detailed in this Section shall be replaced at no cost to the Owner. Causes for rejection may include:
 - .1 Both the primary and secondary seals shall provide a completely continuous seal around the perimeter of each unit. IGUs containing discontinuities in either the primary or secondary seals at the corners or along the length of the spacer will be rejected.
 - .2 Warm edge spacer shall be straight and evenly set into the glass units and the primary sealant shall not extend past the inside edge of the spacer into vision area.

1.6 Delivery, Storage, Handling and Protection

- .1 Deliver, store and handle all sealed glazing units in strict accordance with manufacturer's instructions and Insulating Glass Manufacturers Alliance (IGMA) recommendations.
- .2 Glass and glazing units must be kept upright, and blocked or strapped to prevent falling. Storage areas should be ventilated and dry. Glazing units should not be stored in direct sunlight, and cases stored outside must be covered and ventilated to prevent damage from rain and condensation.
- .3 When removing glazing units from cases or handling loose units extreme care must be taken to prevent breakage, edge damage or seal damage.

Carry glazing upright using straps or vacuum cups on both sides. Do not slide glazing on their sealed edges.

- .4 Loose glazing units must be set at a slight tilt off vertical on blocks as quarter points. Blocking must be tapered or wedged to provide a flush support so that the individual lites cannot slide out of alignment causing seal failure or breakage.

1.7 Warranty

- .1 For the work of this Section (material warranties) the warranty period is extended to the following from the date of substantial performance.
 - .1 Manufacturer's Special Warranty for Coated-Glass Products:
 - .1 Manufacturer's standard form, made out to Owner and signed by coated-glass manufacturer agreeing to replace coated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to
 - .2 Project site, within specified warranty period indicated below.
 - .1 Warranty Period: Ten (10) years from date of Substantial Completion.
 - .3 Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form, made out to Owner and signed by laminated-glass manufacturer agreeing to replace laminated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
 - .1 Warranty Period: Ten (10) years from date of Substantial Completion.
 - .4 Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form, made out to Owner and signed by insulating-glass manufacturer agreeing to replace insulating-glass units that deteriorate as defined below, within specified warranty period indicated below.
 - .5 Should premature glazing failure occur (or any defect or fault related to material installation), replace failed/defective product(s) with new products to be supplied and installed (matching the project requirements) at no additional charge to the Owners.

2 Products

2.1 Glass Components

- .1 Design of Glass:
 - .1 Clear Float glass: to ASTM C1036-06
 - .2 Design of glass thickness and type of glass for use in all window systems is to be performed by the contractor in accordance with CAN/CGSB-12.20 and the Ontario Building Code (latest edition). If not indicated, minimum glass thickness is defined further below.
 - .3 All safety glass to meet the requirements in accordance with CAN/CGSB-12.1-M, "Tempered or Laminated Safety Glass" as follows:
 - .1 Type 2 (Tempered)
 - .2 Class B (Float)
 - .3 Category II, as appropriate for size of lites.
 - .4 Tempering is to be performed using the horizontal tong-free method.
- .2 Laminated Glass: ASTM C 1172, and complying with CAN/CGSB-12.1, type 1, class B, and other requirements specified and with the following:
 - .1 Interlayer: Polyvinyl butyral (PVB), minimum thickness of 1.5mm with a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after laminating glass lites and installation.
 - .2 For polyvinyl butyral interlayers, laminate lites in autoclave with heat plus pressure.
 - .3 Laminating Process: Fabricate laminated glass to produce glass
 - .4 free of foreign substances and air or glass pockets.
- .3 Glass Type:
 - .1 Sloped glazing (Sloped application, including vertical glazing at gable ends): Overall IGU thickness of 32mm
 - .1 Outer Lite
 - .1 Thickness: min. 6mm
 - .2 Kind: Fully tempered

- .3 Tint Colour: "Pure Bronze" by AGC, Solarbronze by PPG, or approved equivalent
- .4 Coating: Low-E coating on Surface 2: "Energy Select 25" by AGC, Solarban 60 by PPG or approved equivalent.
- .2 Inner Lite: laminated glass consisting of 6mm HS clear glass pane with 1.5mm PVB interlayer and 6mm clear HS.

2.2 IGU Components

- .1 Insulating glass units shall include warm-edge spacer.
 - .1 Size spacer to provide minimum 12 mm (1/2 in.) cavity between glass panes (unless otherwise indicated).
 - .2 The spacer shall be continuous at all corners. Joints shall be
 - .3 welded/fused or if mechanically connected, provided with keys wrapped or injected with PIB. Spacer, corner and jointing method shall be in accordance with IGMAC or IGMA/IGCC certified assembly.
 - .4 Spacer shall include desiccant (molecular sieve, gel or approved equivalent) as listed under the IGMA certification program. The desiccant shall be suitable (type and quantity) for perimeter sealants used, and to avoid negative/inward deflection of the glass panes and/or inward migration of the spacer, and perimeter sealant system due to excessive adsorption of gasses other than water vapour.
- .2 Perimeter Sealant System: dual seal, with primary and secondary sealants as follows:
 - .1 Primary Seal: polyisobutylene (PIB). The post-fabrication width of the PIB when measured from the top to the bottom of the spacer shall be a minimum of 3mm (1/8"). Limit PIB migration to not more than 1mm.
 - .2 Secondary Seal: two component structural silicone seal such as Dow 983 by Dow Corning, IGS 3723 by Momentive Performance Products, or JS-562 by Tremco.

- .3 For non structural glazing application, The post fabrication thickness of the secondary sealant when measured from the bottom of the spacer to the glass edges shall be a minimum of 3mm (1/8").
- .4 For structural glazing application, the post fabrication thickness of the structural silicone secondary sealant shall be calculated by the insulating glass unit manufacturer based on the design loads and longest smallest dimension openings but should not be less than the minimum specified in previous paragraph.
- .5 IGU Inert Gas Fill:
 - .1 Use argon gas, minimum 90% concentration (initial fill), and 80% minimum after weather cycling. Size spacer to provide minimum 12 mm (1/2 in.) cavity between glass panes (unless otherwise indicated).

3 Execution

3.1 Fabrication

- .1 Fabricate units to requirements of CAN/CGSB-12.8, ASTM E 2190 and related standards.
- .2 Fabricate glazing units in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

3.2 IGU Assembly

- .1 Each IGU for this project consists of the following components: Outer and Inner lites (or laminated lite), Low-E coating, argon gas, perimeter seals and spacer with dessicant.
- .2 Fill spacer cavities with desiccant in accordance with desiccant manufacturer's instructions, and immediately assemble spacer frame.
- .3 If keys are used, seal each corner key individually with PIB by one of the following methods:

- .1 Wrapping corner key legs with extruded PIB ribbon prior to insertion of key into spacer;
- .2 Injection of PIB after insertion of key into spacer; or
- .3 Coating exposed portion of spacer with PIB after insertion into spacer.
- .4 Ensure the bond lines on the spacer and glass shall be free of debris, fingerprints or other substances which may adversely affect the bond and performance.
- .5 If required, edge delete to middle of PIB primary seal. Do not edge delete to sight line.
- .6 Apply sufficient PIB around the entire spacer frame assembly perimeter on both sides of the spacer to achieve complete PIB wet out onto glass surfaces #2 and #3.
- .7 Glass Edges (inner and outer glass panes):
 - .1 Edges of glass panes Shall be clean-cut, without shark teeth greater than 1/2 of pane thickness, deep serration hackle or serration hackle with spalls, chips greater than 1/4 in. (6 mm) in diameter or 1/2 thickness of glass pane in depth, and impact damage of any type.
 - .2 To mitigate risk of glass breakage, edges of tempered and heat treated glass panes shall be eased/arrissed to remove sharp edges and corners that can be easily damaged and cause glass to shatter.
- .8 Place spacer frame with all sides parallel to edges of glass pane. All sides of rame shall be equal dimension from the glass edge, unless specified otherwise.
- .9 Top units, compress as needed and fill with argon gas to specified minimum level. Once assembled and compressed (and before proceeding to the next work station, verify that:
 - .1 The PIB is continuous and in contact with glass and spacer around the entire perimeter of the assembly (on both glass surfaces).
 - .2 The post-fabrication width of the PIB is at least 3mm (1/8") as measured from the top to the bottom of the spacer.

- .3 The PIB does not extend past the opening sight line by more than 1mm.
- .4 The spacer is located such that the top portion of the spacer (visible through glass) is flushed with the sight line of the glazed assembly.
- .10 Apply and tool structural secondary sealant around the full perimeter of IGU as per the sealant manufacturer's recommendations. Verify that:
 - .1 The sealant is installed in a continuous operation around the entire perimeter of the assembly and to the full depth of the cavity created by the metal spacer in between glass surfaces #2 and #3.
 - .2 Once cured, the sealant is minimum 3mm (1/8") thick as measured from the bottom of the spacer to the glass edges.
- .11 Labelling:
 - .1 All glass shall bear manufacturers' labels indicating quality. Labels shall be left in place until final cleaning.
- .12 Store IGUs as per IGMA recommendations. IGUs shall not be stored in direct sunlight and shall not be stored outside during the curing period. Follow the sealant manufacturer's recommendations for curing prior to shipping to site. Secondary perimeter sealant shall be thoroughly cured before shipment to site.

3.3 IGU Installation

- .1 Preparation
 - .1 Remove all protective coatings. Verify that all surfaces to receive glazing, including glass edges, are prepared in accordance with manufacturer's recommendations. Protect all cleaned surfaces. Reclean any contaminated surfaces. Do not clean surfaces that cannot be glazed within two hours.
 - .2 Place each setting block at quarter points but no closer than 150mm (6") from the corners of IGU. Both IGU glass panes shall be fully supported by setting blocks.
 - .3 Ensure that setting blocks do not interfere with glazing pocket drainage.
 - .4 At pressure plate locations, do not stretch gasket during installation. Cut gasket about 12mm longer than pressure plate. Allow gasket to

relax for a minimum of 24 hours. Prior to glazing, cut gasket about 1.5mm longer than size of opening and crowd gasket. Trim or otherwise adjust so as to accommodate frame joint seals.

- .5 Locate IGU within opening to provide minimum edge and face clearances as recommended by IGMA. Install temporary retainers as required to secure the IGUs in place.
- .2 Installation of Pressure Plates/Cover Caps:
 - .1 Remove temporarily retainers. Remove protective paper. Install pressure plates with new fasteners. Once the pressure plates are installed, the top of the glazing tape should be paralleled with edges of the pressure plate (i.e. no depression).
 - .2 Install cover caps. Verify that sufficient allowance is provided for thermal movement of cover caps
 - .3 Install a full perimeter silicone cap bead at all openings, including sealing of all of the metal to metal joinery.

End of Section

1 General

1.1 Description of Work

- .1 Provide all labour, materials, products, equipment and services to clean and prepare surfaces for painting.
- .2 Complete priming and painting of:
 - .1 Where drywall repairs and cut and patch work is required to complete the work.
 - .2 Clean and paint HSS framing under main sloped skylight and at lower east skylight and at curtain wall.
 - .3 Paint exposed areas of skylight back pans exposed to interior.
 - .4 Metal siding standing seam roof (horizontal roof sections) under east skylight.
 - .5 Exposed sloped trusses, where metal panel truss covers have been removed.
 - .6 Exterior metal siding around louvres on east elevation

1.2 Quality Assurance

- .1 Arrange with paint manufacturer's representative to visit site prior to commencement of the painting operation to discuss painting and finishing procedures to be used and analyze the surface conditions in order that alternative recommendations may be made to the Owner, should adverse conditions exist.
- .2 Arrange with paint manufacturer to visit site at intervals during the surface preparation and painting operations to ensure the proper surface preparation has been completed, the specified paint products are being used, the proper number of coats are being applied and the agreed finishing procedures are being used.
- .3 Drawdowns of all paint colours and stain to be provided to the Owner for approval.

1.3 Examination of Site

- .1 Contractor to examine the site to verify quantities, dimensions and physical conditions of existing materials and conditions affecting the work.

- .2 Contractor to report any condition which may impair the proper installation of the wall covering to the Consultant prior to commencement of work.

1.4 Colour Samples

- .1 Submit two 12" x 8" samples for each paint colour and finish specified for approval.

1.5 Maintenance Data

- .1 Supply the Owner with detailed, printed instructions of maintenance and cleaning procedures as recommended by the manufacturer for maximum life and appearance. Instructions shall contain specific warning against maintenance methods and materials harmful to the appearance and durability of finishes.

1.6 Delivery and Storage

- .1 Deliver materials in their original wrappings with the manufacturer's labels and seals intact.
- .2 Store materials in the building areas designated by the Consultant.

1.7 Workmanship

- .1 Painting shall be applied by skilled workmen having a minimum 5 years proven experience. Proof of experience shall be submitted at the request of the Consultant.
- .2 Maintain area of work in clean orderly manner, removing scraps, debris and other superfluous matter.

1.8 Environmental

- .1 Do not commence interior painting in temperatures below 15°C or when adequately controlled ventilation is not available.

1.9 Signs

- .1 Provide legible signs throughout the Work reading "WET PAINT" in prominent positions during painting and while paint is drying.
- .2 Use 3" high letters on white card or board.

1.10 Temporary Covers and Protection

- .1 Protect floors and other surfaces with temporary covers such as dust sheets, polyethylene film or tarpaulins.
- .2 Mask identification plates and fire rating labels occurring on equipment, doors, switch boxes, and fire rating labels, etc. which require painting. Do not paint plates and labels. Protect all smoke/heat detectors.
- .3 Protect remove and replace hardware, accessories, lighting fixtures and similar items as required. Light switches and electrical outlet plates to be removed and reinstalled on completion of paint application.
- .4 Keep oily rags, waste and other similar combustible materials in closed metal containers. Take every precaution to avoid spontaneous combustion. Remove waste and combustible materials daily.
- .5 Clean surfaces soiled by spillage of paint, paint spattering and the like. If such cleaning operations damage the surface, repair and replace damaged work at no cost to the Owner.

1.11 Retouching

- .1 Do all retouching, etc. to ensure that the work may be handed over to the Owner in perfect condition, free of spatter, finger prints, rust, watermarks, scratches, blemishes or other disfigurations.

2 Products

2.1 General

- .1 Paint products to be listed in the MPI Approved Products List, exterior and interior systems as manufacturer's premium grade and quality Products.
- .2 All paint and primer for individual areas of work to be from one manufacturer. The mixing of manufacturers' product will not be allowed.
- .3 Acceptable paint manufacturers:
 - .1 Benjamin Moore & Co. Limited.
 - .2 Devoe Coatings brand by PPG Architectural Coatings Canada Inc.
 - .3 Dulux Paints, a division of PPG Architectural Coatings Canada Inc.

- .4 Glidden brand by Dulux Paints, a division of PPG Architectural Coatings Canada.
 - .5 PPG Architectural Coatings Canada Inc.
 - .6 PPG Canada, Inc., PPG Protective and Marine Coatings Division.
 - .7 RPM International Inc.
 - .8 The Sherwin-Williams Company.
- .4 Colour to be selected by Owner.

3 Execution

3.1 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 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.

3.2 Surface Preparation

- .1 Remove electrical cover plates, light fixtures, shelving, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re-installed after painting is completed.
- .2 Remove dust, dirt, and other surface debris by vacuuming, and or wiping with dry, clean cloths.
- .3 Remove all peeling or scaling paint by scraping. Sand these areas thoroughly to feather these edges smooth with the adjacent surfaces.
- .4 Cracks, holes and blemished areas should be filled and sanded flush with adjacent surfaces, and spot primed.
- .5 Surfaces that have been subjected to writing with marking pens, crayons or lipsticks are to be solvent washed, then spot primed to control residual "bleeding".

- .6 Sand glossy surfaces lightly with fine sandpaper to ensure proper adhesion.

3.3 Field Quality Control and Tolerances

- .1 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.
- .2 Ceilings: No defects visible from floor at 45 to 90 degrees to surface when viewed using final lighting source.

3.4 Application

- .1 Sand and dust between each coat to remove defects visible from a distance up to 4 feet.
- .2 Test all surfaces for moisture content before commencing painting. Do not apply paint to material when the moisture content exceeds 12% as determined by an approved moisture testing device.

3.5 3.5 Primer

- .1 All surfaces new and existing which are to be painted must receive a full coat of primer.

3.6 Paint coverage, Patching and Cover-Ups

- .1 Finish paint to provide satisfactory coverage to complete surface areas, with no patching, inconsistencies, or blemishes visible.
- .2 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .3 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .4 Sand and dust between coats to remove visible defects.
- .5 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces free of roller tracking and heavy stipple.
- .6 Remove runs, sags and brush marks from finished work and repaint.

- .7 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.
- .8 Apply additional coat of paint (at no cost to the Owner) to complete surface areas where coverage is deemed unacceptable by Consultant and or Owner.

3.7 Cleaning

- .1 Touch up scratches, abrasions, voids and other defects in painted surfaces.
- .2 Leave work area free of all foreign and surplus material, obstructions and hindrances. Work area shall be returned to its original condition.

End of Section