Waterloo Region District School Board

DESIGN BRIEF FOR EXTERIOR WINDOWS, ENTRANCE & CURTAIN WALL SYSTEMS

For:

Waterloo Region District School Board

Prepared:

March 2015

Δ Updated as notes by WRDSB October 19, 2015

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This Design Brief is to provide the design consultant a parameter for the design for the building envelop closures and access points.

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1 Design Parameters

Design parameters are to meet the latest Ontario Building Code Compendium SB-10 prescriptive method for Energy Conservation for all building envelope and access point closures and shall follow the WRDSB requirements outlined in this document.
An Energy Assessment Analysis for retrofit projects may be required at the request of the WRDSB.

a) Maximum Ratio Glazing vs. Building Envelope

- Overall building vertical fenestration-to-wall-ratio (FWR) shall not exceed 25%. The method of calculating the FWR shall match that required for demonstrating compliance with OBC energy provisions. Areas of vertical fenestration ratio exceeding the 25% requires WRDSB approval at the design stage.
- Exterior spandrel glazing area ratio shall not exceed 7.5% of the overall building vertical surface area. (All exterior spandrel glazing within a glazing system shall have an insulated back pan.)
- Vision glass area in teaching spaces should be targeted at10% of the floor area of the room. Vision glass area for Child Care rooms shall be a minimum of 10% of the floor area of the room.

b) Skylights

- The use of skylights is not permitted in new construction by the WRDSB. Clerestory fenestration is an acceptable option in lieu of skylights.

2 Framing

Exterior Fenestration:

- Thermally broken extruded aluminum framing.
- Non-thermally broken hollow metal framing kept to a minimum and shall be used at exterior entrances for the following spaces: Shipping & Receiving, Storage Room, Utility Room. The non-thermally broken hollow metal frames shall be filled solid with spray foam insulation.
- Locate thermal break of the aluminum framing in line with the exterior building envelope insulation space to obtain maximum thermal resistance at the transition.
- Suggested classroom window sill heights: 800mm A.F.F. to allow millwork positioning below the window sill at ground floor levels and 1000mm A.F.F. at upper floors.
  Suggested kindergarten window sill height: 400mm A.F.F.
  Where snow build-up may occur at exterior wall locations where there is typically no snow removal carried out, a minimum 400mm sill height above finished grade shall be provided.

2 Framing (cont'd.)

Δ *Window sills – prefinished extruded aluminum, as shown on drawings, colour and finish to match exterior finish of window frames.* ***Site-fabricated bend aluminum plates/sheet sills are not acceptable.***

1. *Drip deflectors (end dams, rounded cap) at all ends*
2. *Joint covers where sills are not continuous lengths, and at mitres*
3. *Align intermediate joints with mullions*

4. *Round off all protruding edges and corners*
5. *Precast concrete window sills preferred, if possible*

- All fenestration above roof levels shall have a minimum sill height of 500mm above the finished roof below.
- All spandrel glazing shall have sealed insulated metal back pans to maximize insulation value. (Minimum R value of the insulated back pan shall be R-14 or the full depth of the back frame in which the spandrel panel is installed in, but in no case less than R-14)
- All framing shall be secured with stainless steel fasteners and sealed to the building envelop opening perimeters to form a continuous barrier.
- All exterior doors aluminum entrance doors shall be thermally broken door frames.

3 Glazing

a) Glazing Types and Locations

The following glazing types shall be provided at the following locations:

- Exterior entrance doors and sidelight glazing, Sliding doors, Exterior ground floor glazing, Exterior glazing above ground floor :
  Outer Light Glass: 6mm (1/4") Tempered Glass
  Inner Light Glass: 6mm (1/4") Tempered Glass
- Exterior and interior glazing not protected by a guard and below guard height adjacent to a minimum 600mm grade differential: Glazing shall be designed to withstand the loads on guards as per Division B, Section 4 and SB-13 of the O.B.C.
- Interior doors and sidelight glazing: 6mm tempered clear vision glass
- Fire rated glazing: 5mm (3/16") minimum thick Firelite safety premium grade (impact resistant) glass, conforming to CAN/CGSB - 12.11-M90, ASTM E2010, CAN 4 S-104 and CAN 4 S-106 and thickness required by manufacturer for fire rating required in the assembly in which the glazing is installed.
- No Georgian Wire Glazing shall be used for interior/exterior glazing applications.
- Insulating units conforming to CAN/CGSB - 12.8 - M90 and
  - IGUs shall be double-glazed.
  - IGUs shall include an argon-filled inter-pane gap (minimum 90% argon). The gap thickness shall be approximately 12.7 mm (0.50 inches).
  - IGUs shall include low-e coating on surface #2. (low-e on surface 3 for tinted glazing)
  - Center-of-glass U-value shall not exceed 1.53 W/m2/°C (0.27 btu/hr/ft2/°F) (NFRC or CSA rating).
  - Center-of-glass SHGC shall not exceed 0.40 (NFRC or CSA rating).
  - Center-of-glass VT (visible transmittance) shall not be less than 0.60 (NFRC or CSA rating).

The low-e coating products listed below are examples of products that will typically meet all the above requirements for U-value, SHGC, and VT (when used in an IGU with argon fill).

- PPG Solarban 60
- Guardian Sunguard SuperNeutral 68
- Cardinal LoE²-270

3 Glazing

a) Glazing types and Locations (cont'd.)

- Glass tinting is recommended for all new facilities & all wholesale glass replacement projects. Glass tinting for partial re-glazing projects to be reviewed with School Board project coordinator.

- Spandrel Glass Panels: 6mm (1/4") tempered glass with opaci-coat back . (Spandrel glazing requires a sealed insulated metal back pan with min R-14 insulating value)
- Translucent Insulated Glazing Units :
  Acid-etched application on glass surface 3
  Glass Outer Lite – 6mm tempered glass
  Inner Lite – 6mm clear tempered glass
  Acid-etched texture & tinting, if required, to be confirmed to maximize natural light transmission.
- Consult the WRDSB to identify areas where high impact glazing may be required i.e. near play areas, sport areas or known high vandalized areas. Suggest 10mm (3/8") thick tempered exterior or interior glazing pane. Thick glazing pane to be installed on the side of direction of impact.

b) Maximum Glazing Panels

It is recommended that the maximum glazing panel sizes shall be kept within the following limits:

- For all types of glass 1220 x 2440mm (48"x96") – The dimension in only one direction may exceed 1220mm (48")

4 Operable Windows

- Operable Windows: Recommended for all teaching spaces, meeting rooms, administration/staff areas or where constant supervision is available. The operable vent area shall be a min. of 1% of the floor area in which the vent is located.
- Operable Window Type: Slider windows preferred in buildings without air conditioning.
  Slider window operation shall be located within 1200mm (4'-0") above the finished floor. Provide slider stop on operable windows located on upper floor levels to prevent opening the vent more than 100mm (4").

4 Operable Windows (cont'd.)

- Alternate Operable Window Type: Awning window type (top hinged, out swinging) preferred in buildings with air conditioning.

All out swinging operators shall be minimum 2100mm (6'-11") above exterior grade with crank operation at maximum1200mm above finished floor or have a maximum outswing operation of 100mm (4") with the vent projection not extending beyond the exterior window sill projection, whichever is less.

- Insect screens on all operable windows.

5 Hardware

- All hardware to be supplied under Hardware Allowance.
- Exterior doors with continuous weather stripping and maximum 12.7mm (1/2") high thresholds.
- Exterior doors: Roton concealed leaf geared hinges.
- Interior doors: stainless steel ball bearing hinges.
- Locking and security to be coordinated with School Board hardware expert.
- All entrance hardware operators shall be compatible with accessibility devices and security operation.

6 Blinds

- All teaching and administration spaces to receive manual rolling blinds at all exterior windows.
- Automatic operated rolling blinds to be provided at all high ceiling spaces exceeding 3000mm (10'-0").
- Rolling blinds to be 1% open weave flame retardant fabric for teaching spaces and libraries and 3% for administration areas.

Δ *Cassette design shall be a one piece aluminum extruded box closed on all four sides, top, back, sides and bottom return. Cassette sections to be square profile. Cassette section with internal groove to accommodate a self-cleaning brush to insure fabric maintenance as well as a gap brush on top back side of cassette to provide for a light seal.*

Δ *Finish clear anodized aluminum or custom painted in colour section by Consultant.*

Δ *Operating chain (manual shades)shall be no. 10 qualified heavy duty stainless steel bead chain 90 lb. load test formed in a continuous loop with stops at highest and lowest positions to prevent over winding and unrolling.*

7 Installation, Inspection & Testing

- Installation shall be in accordance with ASTM E2112 – "Standard Practice for Installation of Exterior Windows, Doors & Skylights"
- The cost of inspection and testing will be paid out of an allowance specified.
- Inspection and Testing Companies for trades will be selected from competitive bids obtained by the General Contractor for review and recommendation.
- Provide full size mock-up of typical window installation within wall opening at start of construction for review and approval.
- Provide inspection and testing reports prepared by independent Inspection and Testing Agency of the building envelope components (air-barrier, insulation,

flashing, transition membranes, etc.) tied to the fenestration including a blower door test in accordance with ASTM E783 – "Standard Test Method for Filed Measurement of Air Leakage Through Installed Exterior Windows and Doors" Suggested intervals of inspection at following stages of installation:

- Air/vapour barrier window perimeter installation.
- Window frame installation.
- Window perimeter seal to wall installation.
- Glass installation.

- Provide thermography testing of all fenestration during the first heating season after Substantial Completion.

8 Maintenance

- All maintenance within the warranty period, pertaining to the operation of the components specified, shall be included in the tender amount.
- Maintenance and Operation Manuals shall be submitted for the components supplied and installed to the School Board upon completion of the project.

9 Warranty

The following warranties are to be provided and shall include labour and materials:

- Aluminum Windows, Entrance Framing & Doors 5 years
- Glazing 10 years

∆ *10 LIST OF APPROVED VENDORS*

Acceptable Manufacturers

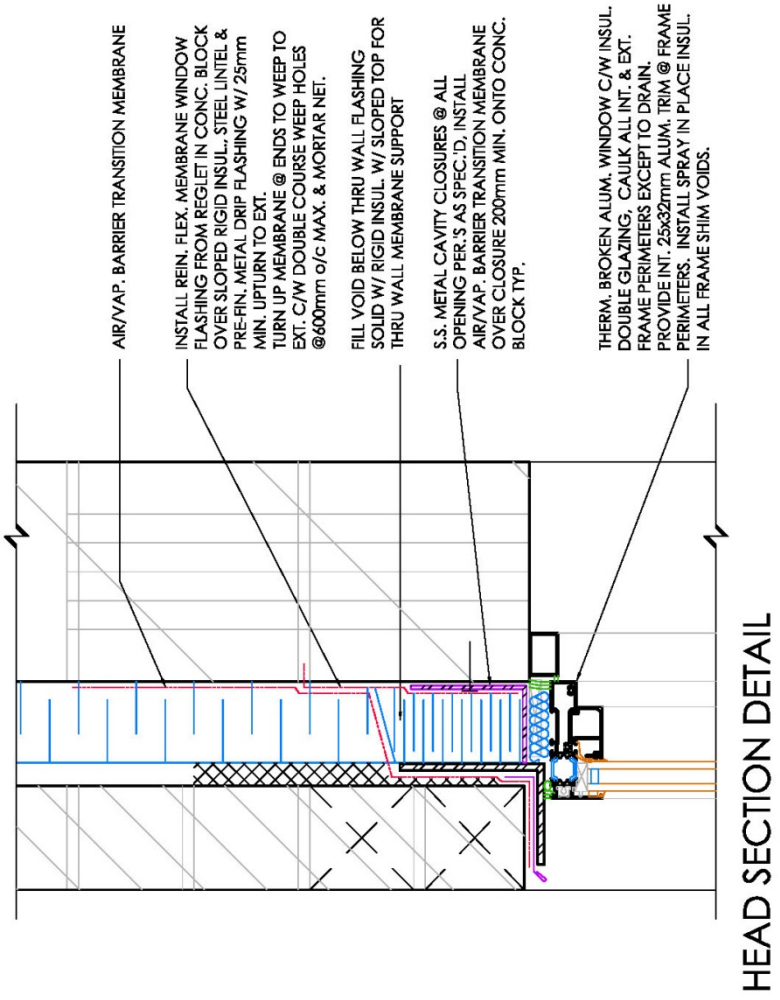
- *Kawneer Company Inc*
- *Alumicor Ltd.*
- *Sherwood Windows Group*
- *Aerloc Industries Ltd.*

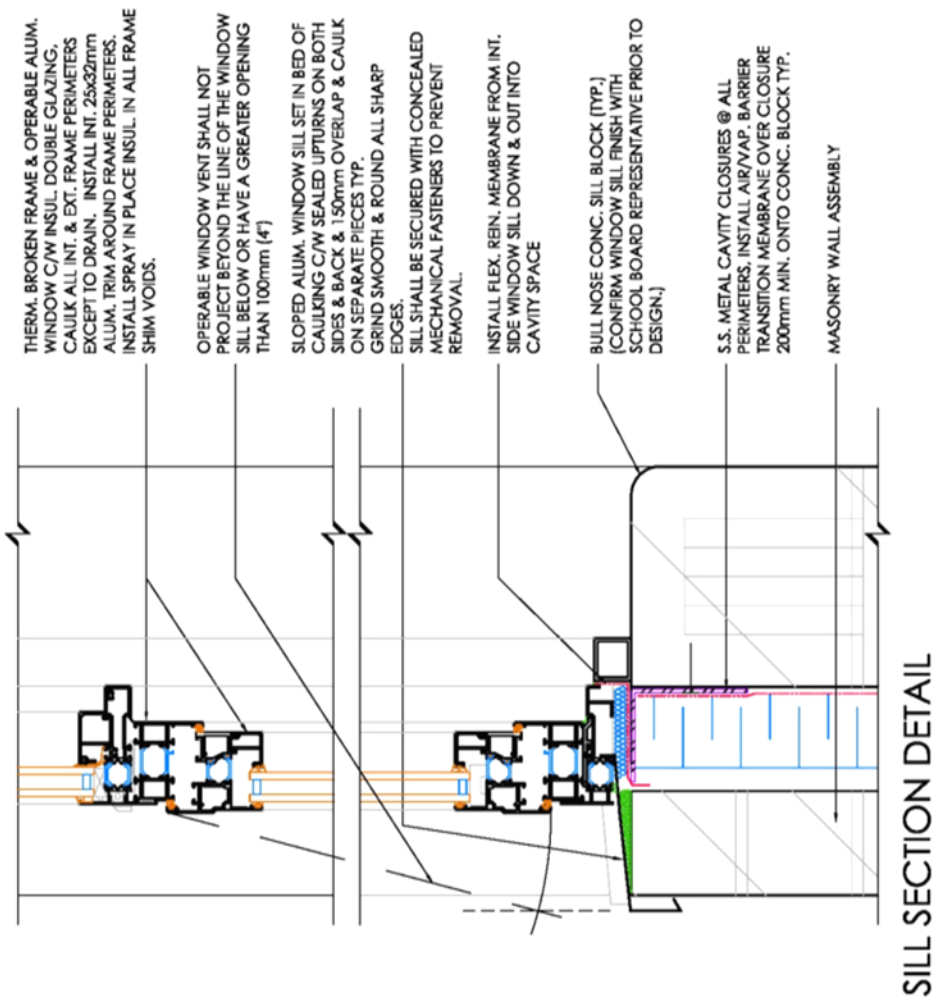
Installers

- *See record of vendor list from purchasing*

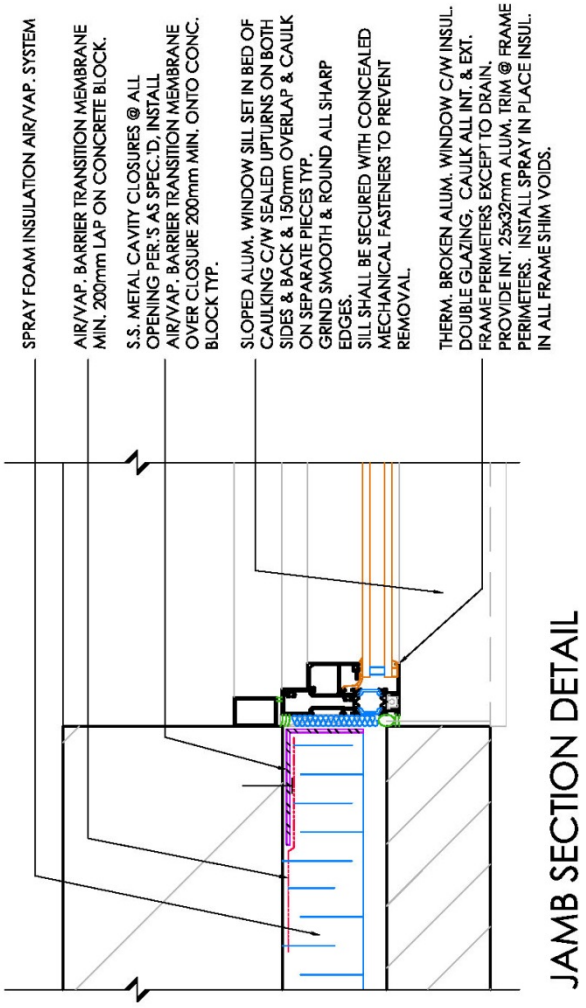
Not to be modified without approval from Board

11. Typical Opening Details

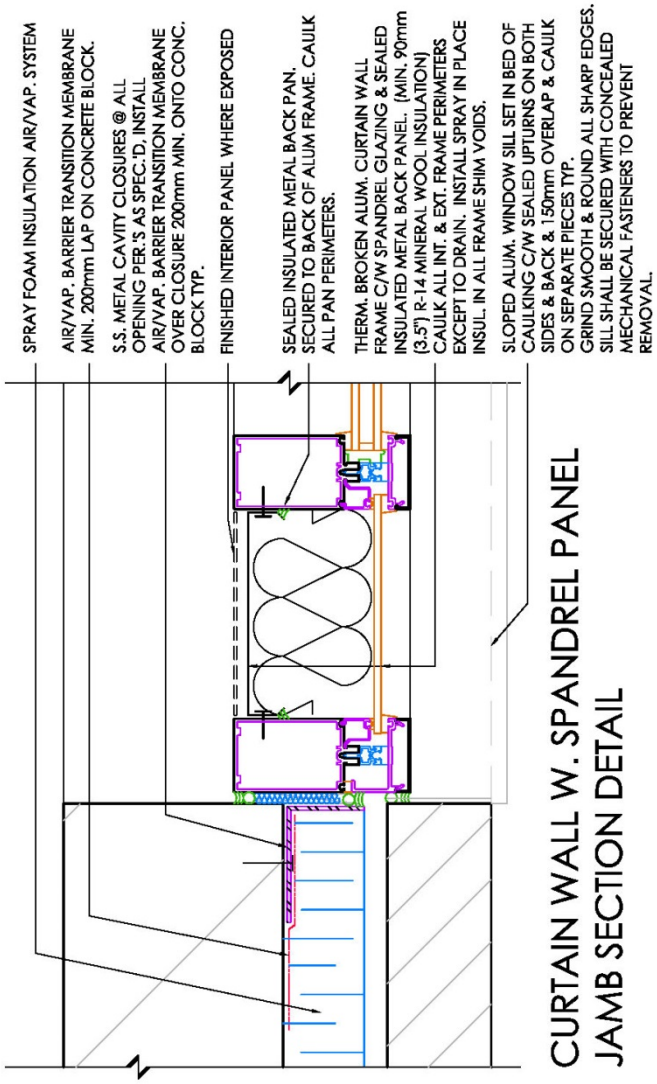




SILL SECTION DETAIL



JAMB SECTION DETAIL



CURTAIN WALL W. SPANDREL PANEL
JAMB SECTION DETAIL