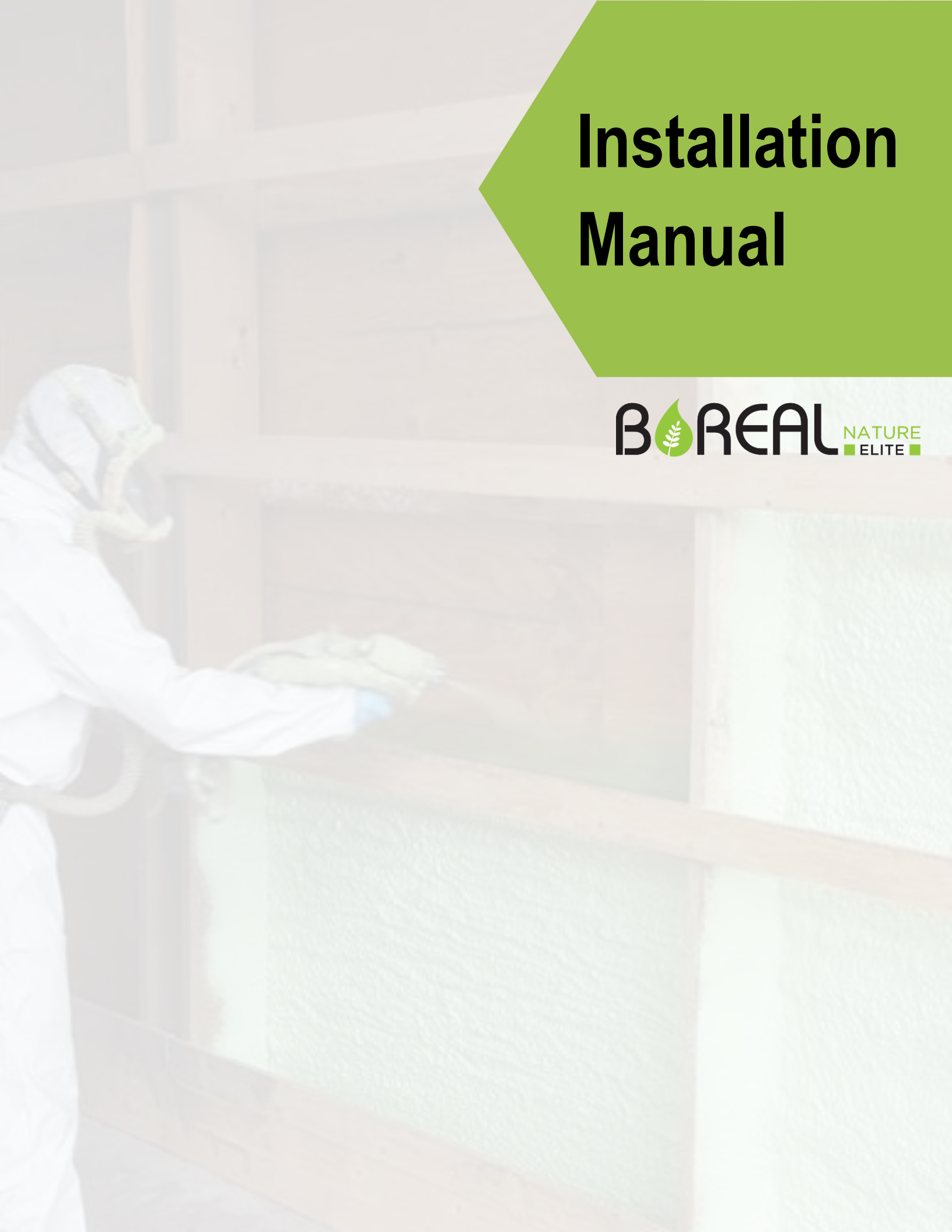
Installation Manual



Boreal Nature Elite Polyurethane Spray Foam Insulation

APPLICATION GUIDE

1. GENERAL PROCESSING:

This document concerns the installation and materials required for the adequate installation of Boreal Nature Elite Spray foam insulation system.

References:

- CAN/ULC-S705.1-01 : 2015 Standard from the Thermal Insulation Spray Applied Rigid Polyurethane Foam, Medium Density, Material Specification.
- CAN/ULC-S705.2 (replaces CAN/CGSB-51.39.92) : Standard for Thermal Insulation – Spray Applied Rigid Polyurethane Foam, Medium Density and Installer's Responsibilities Specifications.
- CCMC xxxxx-L Evaluation Listing for BOREAL Nature Elite Spray Foam insulation system having met the standard for Thermal insulation.

Related Sections

• Concrete Curing	Section 03 39 00 03300
• Structural Pre-Cast Concrete	Section 03 40 00 03400
• Unit Masonry	Section 04 05 00 04200
• Metal Decking	Section 05 10 00 05300
• Cold Formed Metal Framing	Section 05 40 00 05400
• Rough Carpentry	Section 06 10 00 06100
• Waterproofing	Section 07 10 00 07100
• Vapor Barrier	Section 07 26 00 07260
• Air Barrier	Section 07 27 00 07260
• Flexible Flashing	Section 07 65 00 07270
• Roof and Walls Specialties	Section 07 70 00 07400
• Fire and Smoke Protection	Section 07 80 00 07800
• Thermal Barrier	Section 07 81 29 07840
• Fire Stopping	Section 07 84 00
• Plaster and Gypsum Board	Section 09 20 00 09250

Quality Assurance

- Contractor must be licensed under UFC (Urethane Foam Consultants).
- Applicators must be trained and certified under UFC (Urethane Foam Consultants)
- As required by UFC's Quality Assurance Program, applicators must perform site tests.
- As required by CAN/ULC S705.2 Standard, the contractor's quality control report must be available for review.
- The manufacturer's field applied product quality control report must be available for review.

Packaging, Delivery & Storage

- The BOREAL Nature Elite Spray Foam Insulation System's components (part A and B) must be delivered in sealed totes or unopen drums and clearly labeled with the BOREAL's product identification: Manufacture date, lot numbers, use before date, CAN/ULC-S705.1 and LTTR (50 mm).
- Resin Containers must be stored at a temperature between 15 and 25ºC in a dry and well-ventilated area protected from weather and direct sunlight. The resin shelf life is 6 months.
- Polymeric Isocyanate A-2732 containers must be stored at a temperature between 15 and 38ºC in a dry and well-ventilated area protected from weather and direct sunlight. The isocyanate shelf life is 12 months.
- All materials must be first stored in compliance with local safety requirements and as per Genyk's requirements (see upper instructions).
- Empty containers must be removed from site on a daily basis in accordance with CAN/ULC-S705.2.

Site Conditions

- BOREAL Nature Elite Spray Foam Insulation System should be applied to substrates when ambient air and surface temperatures fall within -10 to 35 ºC (See Technical Data Sheet for more details).
- Boreal Spray foam Insulation System must be applied with the equipment designed for this application.
- The substrates to which the insulation is applied must be clean, dry, and free from frost, ice, debris and contaminates that will affect the adhesion

of the spray foam insulation. All surfaces must be prepared in accordance with CAN/ULC-S705.2 standard.
- For best results, relative humidity degree must be lower than 80%.

Safety Requirements

- The area that will be spray insulate must be well ventilated in order to remove overspray particles during the spraying.
- The safety of workers has to be in accordance with local regulations and the manufacturer's MSDS.
- To spray into occupied buildings, please refer to CAN/ULC-S705.2 (appendix D.7) to get the adequate procedure.
- In case of exposure to higher levels of MDI (greater than 1 ppm) or for entry into confined spaces, for their own security, workers must wear either a self-contained breathing apparatus, with full face piece, operated in a pressure-demand or other positive-pressure mode, or a combination respirator, including a Type C air-supplied respirator, with full face piece, operated in a pressure demand or other positive-pressure mode, or an auxiliary self-contained breathing apparatus, operated in a pressure-demand or other positive-pressure mode.
- Waste materials must be properly disposed, in compliance with CAN/ULC-S-705.2 standard (Appendix G) and/or federal/provincial/local regulations.
- In accordance with OSHA standards, all personal protective clothing should be worn to meet this standard.

Availability

- GENYK will provide Technical Data Sheet and Material Safety Data Sheets.
- All relevant Technical Data.
- See documents in annexe.
- Certified contractors and applicators must have license available upon request.

2. PHYSICAL PROPERTIES:

Test on the insulation must be conducted daily as per the CAN/ULC-S705.2 national standard and results entered in the daily report as required by the UFC training Program. Once the curing time required by the membrane manufacturer

has elapsed, a test must be conducted to verify adhesion between the membrane and the substrate. All the foam physical properties on the site must be performed in accordance with CAN/ULC-S705.2 and the UFC Training Program.

3. PROCEEDINGS

The substrates to which BOREAL NATURE ELITE Spray Foam System is applied must be clean, dry and free of frost, ice, loose debris and contaminates that could affect the adhesion of the spray foam insulation. Don't spray foam into electrical boxes.

Wood

- Plywood must not contain more than 19% of water, as measured in accordance with ASTM D-449 and 4444-84.
- BOREAL NATURE ELITE Spray Foam System can be applied directly to dry wood. Priming may be necessary in certain cases.

Metal

- Before application, bare milled aluminum must be primed with a red oxide primer.
- Bare Steel surfaces must be free of contaminants, such as grease, oil, debris, rust, and paint. Use the appropriate cleaning solutions to prime surfaces before application of the Spray Foam.
- Primed metal surfaces must be free of contaminants, such as grease, oil, debris, rust, and paint. Use the appropriate cleaning solutions to prime surfaces before application of the Spray Foam.

Masonry & Concrete

- They must be cured (28 days) and free of loose dirt and contaminants such as asphaltic materials. If necessary, prime with red oxide primer (1 gal. / 200 ft^2).

Sheathing Board & Drywall

- Sheathing board or drywall doesn't need to be primed prior to the application of BOREAL NATURE ELITE Spray Foam System.

Mock Ups

- Create samples that are in compliance with the specifications (shop drawings, data sheets and samples).
- Create a sample of $5m^2$ ($54\ sq^2$) minimum, showing both inner and outer corners. This sample may be part of the completed structure.
- Using the insulation sample that was sprayed in place and the transition membrane, make the necessary tests as per CAN/ULC-S705.2 standards and the CCMC report # xxxxx-L
    - Verify core density.
    - Verify adhesion between the transition membrane and the substrate.
    - Verify cohesion/adhesion between the insulation material and the substrate.
    - Enter the results in the daily report, under the UFC Training Program.

Site Work

Perform adhesion tests on all corners and building angles, wall to concrete slab and wall to roof intersection as follows:

- Perform transition membrane adhesion tests at perimeter openings as follows:
    - Eleven openings or more: perform tests on 15% of openings.
    - Ten openings or fewer: perform tests on 30% of openings.
    - Perform adhesion tests on the transition membranes at every tenth column or beam.
    - Adhesion tests are not required if the membrane is mechanically attached.
    - The installation of BOREAL NATURE ELITE Spray Foam System CCMC #xxxxx-L must be completed by a UFC certified applicator. When the transition membrane is to be installed by another trade for warranty purpose (i.e. windows installer), the adhesion tests must

be done, approved and documented by the UFC certified applicator prior to spraying.

- On request, submit a copy of all completed forms to the Consultant prior to making application for payment.
- Allow site access to any UFC representatives for the purpose of technical assistance, verification of operator certification or for a review under the GENYK field Quality Assurance Program as requested in the specification.

- All transition membranes must be installed prior to application of the polyurethane foam. These membranes must be installed in accordance with the manufacturer's recommendations. Adhesion of the membranes to the substrate must be efficient to resist the stress applied by the polyurethane foam during the curing process.
- All the following must be completed prior to application of the BOREAL NATURE ELITE Spray Foam System.
    - Installation of masonry anchoring system.
    - Installation of wood blocking required at all openings.
    - Installation of any electrical or mechanical penetrations.
    - Transition membranes.
    - Sub-girt clip angles and sub-girt framing angle for exterior cladding.
- Self-adhering transition membrane : SBS modified bitumen, self-adhering sheet membrane complete with a cross-laminated polyethylene film and having the following physical properties :
    - Thickness: 1.0 mm (40 mils) minimum.
    - Air leakage: <0.005 L/s•m^2 @ 75 Pa to ASTM E283-91.
    - Vapour permeance: 2.8 ng/Pa•m^2 (005 Perms) to ASTM E96.
    - Low temperature Flexibility: -30°C to CGSB 37-GP-56M.
    - Elongation: 200% to ASTM D412-modified.
        - Acceptable material: Blue Skin® SA as manufactured by Bakor or equivalent.
- Primer for self-adhering membrane: Synthetic rubber based adhesive type, quick setting, having the following physical properties:
    - Color: Blue.
    - Weight: 0.8kg/l.

        - Solids by weight: 35%.
        - Drying time (initial set): 30 minutes.
            - Acceptable material: Blue skin® Primer by Bakor or equivalent.
- Since the foundation wall is designated as part of the air barrier system, in this case, a transition membrane with sealant must sealed to the foundation wall to maintain the continuity of the plane of airtightness.
        - Acceptable material: Bakor 570-05 or equivalent.
- Sealant (warm side of window and door frames).
        - Acceptable material: Tremco Dymonic sealant.
        - Refer to technical drawings included at the end of this document.
- Primer for Thermally Fused Membrane: Use a primer for thermo fusible sheet membrane and hot applied rubberized asphalt membranes when applied to concrete, masonry, wood, drywall and metal surfaces.
        - Acceptable material: Bakor 930-18 primer or equivalent.
- Primer for self-adhering membranes: Synthetic rubber based adhesive type.
        - Acceptable material: Blue Skin® primer by Bakor or equivalent.
- Recommended materials. Refer to technical drawings included at the end of this document. The following materials must be used in all cases:
        - 20 gauge steel studs, installed at 16" OC.
        - Transition membranes approved.
        - #6 TEK drywall screws, 1¼"
        - Substrate
        - Exterior Gypsum wallboard, minimum ½".
        - OSB, 7/16" minimum.
        - Plywood, 7/16" minimum.
        - Concrete block, 6" minimum.
        - Poured concrete wall.
        - Metal tie. Refer technical drawings in the BOREAL technical manual.
        - Surface mechanical connectors such as Dur-o-wal model #d/a 213, which are attached using threated rod pins with

bolt, e.g. Dur-o-pair by Dur-o-wal. Horizontal trussed design reinforcement with built-in masonry connectors, such as Dur-o-eye by Dur-o-wal.

- Adjustable mechanical connectors built into the wall framing, such as the Bailey Brick Connector 10-18.
- Compressible foam pressure gasket in all openings.
- Fiberglass in all openings where requested. At all openings, Tremco Dymonic sealant.
- At the edge of the membrane on the concrete slab, a bituminous polymer based sealant, i.e. Bakor 570-05 or equivalent.
- Galvanized Z Bar (if requested).

- Specification note: The following sections may be added IF required by local jurisdiction.

- The 2 following paragraphs may be used for reference only. We recommend that the following information be checked to be in compliance with your area, province or national's building code standards. Warranty on these products provided by the manufacturers.
    - Horizontal fire stopping: A performed angle comprising at least 1.2mm (18 ga) of steel core zinc coating, as stipulated in ASTM A-525 (galvanized steel G-90). Dimensions should be sufficient to allow the horizontal section to extend beyond the outside polyurethane foam surface in order than a 50% compressed mineral fiber fire stop can be installed in the remaining space.

    - Vertical fire stopping: A performed angle comprising at least 0.38mm (28 ga) of steel core zinc coating, as stipulated in ASTM A-525 (galvanized steel G-90). Dimensions should be sufficient to allow the section perpendicular to the depth of the cavity in order to close off the cavity. Sheet steel fire stop angles corners should be mechanically attached to the substrate at 200 mm (8 inches) OC.

4. PREPARATION

Wall assembly

- All excessively wide joints should be covered or filled before applying BOREAL NATURE ELITE Spray Foam System.
- Install transition membranes in all places recommended in technical drawings included at the end of this document.
- Install a polymer-based caulking strip sealant at outside edge of the transition membrane installed horizontally on the concrete wall foundation recommended in drawing com.2 included at the end of this document.
- BOREAL NATURE ELITE Spray Foam System should be sprayed as per the Standard CAN/ULCS-705.2 with a tolerance of ±6mm (±¼") in relation to the specified thickness.
- Avoid the formation of sub-layer air pockets when applying.
- Avoid spraying foam on any surfaces other than those indicated. Use drop sheets of masking tape to protect other surfaces.
- Once the foam has hardened, remove all overspray from non-prescribed surfaces.
- Do not allow polyurethane foam to be damaged during work by other trades.
- Ensure subsequent coverage of insulating foam will be completed within the prescribed time frame. Refer to the BOREAL NATURE ELITE Spray Foam technical Date Sheet.
- Spray BOREAL NATURE ELITE Spray Foam System in overlapping layers so as to obtain a smooth, uniform surface.
- Do not spray insulation closer than 75mm (3") from chimneys, heating vents, steam pipes, recessed lighting fixtures and other heat sources. Do not spray the interior of any exit openings or electrical junction boxes.
- In temperatures below 10°C, use transition membranes formulated for low temperature application with the proper primer. Adhesion test must be conducted. If adhesion has not occurred, secure the membranes mechanically. Refer to the membrane manufacturer's instructions.
- All mechanical fixtures should be covered with polyurethane foam in order to reduce thermal bridging.

Primer Application

- When required, primer shall be applied to prepared substrate in accordance with the manufacturer's guidelines in order to achieve a minimum thickness of dry mils. Many primers require a curing time of 24 hours prior to application of spray polyurethane foam or other products. Refer to the appropriate primer data sheet for application procedures.

Spray polyurethane Foam Application

- BOREAL NATURE ELITE Spray Foam System's components A and B processed in accordance with instructions found on the BOREAL NATURE ELITE Spray Foam System Data Sheet.
- Applicators must recognize and anticipate climatic conditions prior to application in order to ensure the highest quality foam and to maximize yield. Ambient air and substrate temperatures, moisture and wind velocity are all critical determinants of foam quality. Variations in ambient air and substrate temperature will influence the chemical reaction of the components, directly affecting the expansion rate, rise, yield, adhesion and the resultant physical properties of the insulation. To obtain optimum results, BOREAL NATURE ELITE Spray Foam System should be spray-applied to substrates when ambient air and surface temperatures fall within the range indicated on the Technical Data Sheet.
- Spray Foam application must be installed with a Thermal Barrier, which must be installed in a manner such that the foam plastic insulation is not exposed.
- Application with minimum ½" gypsum board. In attics, spray foam insulation may be spray-applied to the underside of roof sheathing and roof rafters. In crawlspaces, closed-cell spray foam insulation may be spray-applied to the underside of floors as described in this section.
- Use on Attic Floors: Spray foam insulation must be separated from the area beneath the attic by an approved thermal barrier.

Vapour Retarder Application

- When less than 50 mm (2”) of closed-cell foam is applied, a vapour retarder shall be applied to the substrate to be insulated or to the finished foam insulation. The predominant direction of the vapour drive determines the location of the vapour retarder relative to the insulation. Within most building codes, a minimum 50mm (2”) depth of BOREAL NATURE ELITE Spray Foam System constitutes a vapour retarder.
- Apply thermal barriers and vapour retarder (if required) according to local building code recommendations.

Thermal Barrier Application

- The national building Codes require that sprayed polyurethane foam be separate from the interior of a building by a thermal barrier which is applied over the foam to slow thermal rise during a fire and delay its involvement in a fire. A building code definition of an approved thermal barrier is one that is equal in fire resistance to ½” gypsum board. Thermal barriers limit the temperature rise of the underlying foam to not more than 121°C (250°F) after 15 minutes of fire exposure in compliance with the ASTM-E119 test. A thermal barrier meeting this standard is designated a “15 Minute Thermal Barrier” or classified as having an index of 15. GENYK recommends that an approved thermal barrier be used to separate foam insulation from the building interior unless waived by a local building code official.

- There are exceptions to the thermal barrier requirement:
    - Code authorities may approve coverings based on fire tests specific to the application. For example, covering systems that successfully pass large scale tests may be approved by code authorities in lieu of a thermal barrier.
    - Foam insulation protected by 1” thick masonry does not require a thermal barrier. Certain materials that offer protection from ignition, called “ignition barriers”, may not be considered as thermal barrier alternatives unless they comply with ASTM E-119. A material advertised as a “thermal barrier” or “ignition barrier” may not have been tested in conjunction with foam insulation and approved by a code agency or a local code official. Applicators should request test data and code body approvals or other written indications of

acceptability under the code to be certain that a product offers code-compliant protection.

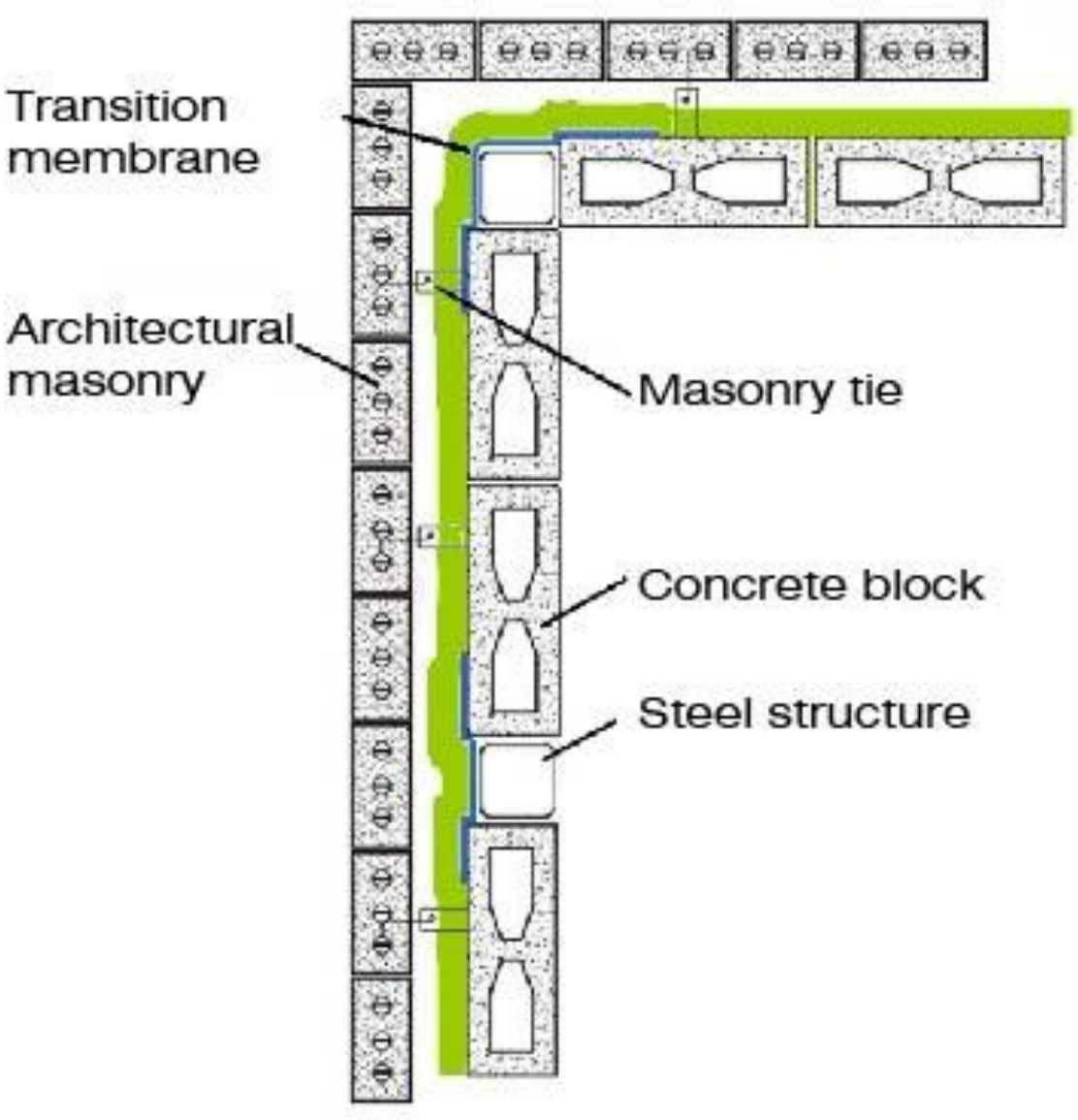
Cleaning

- At the end of each work day, remove rubbish, empty containers, rags, and other discarded items from the site. After completing work, clean glass and spattered surfaces.

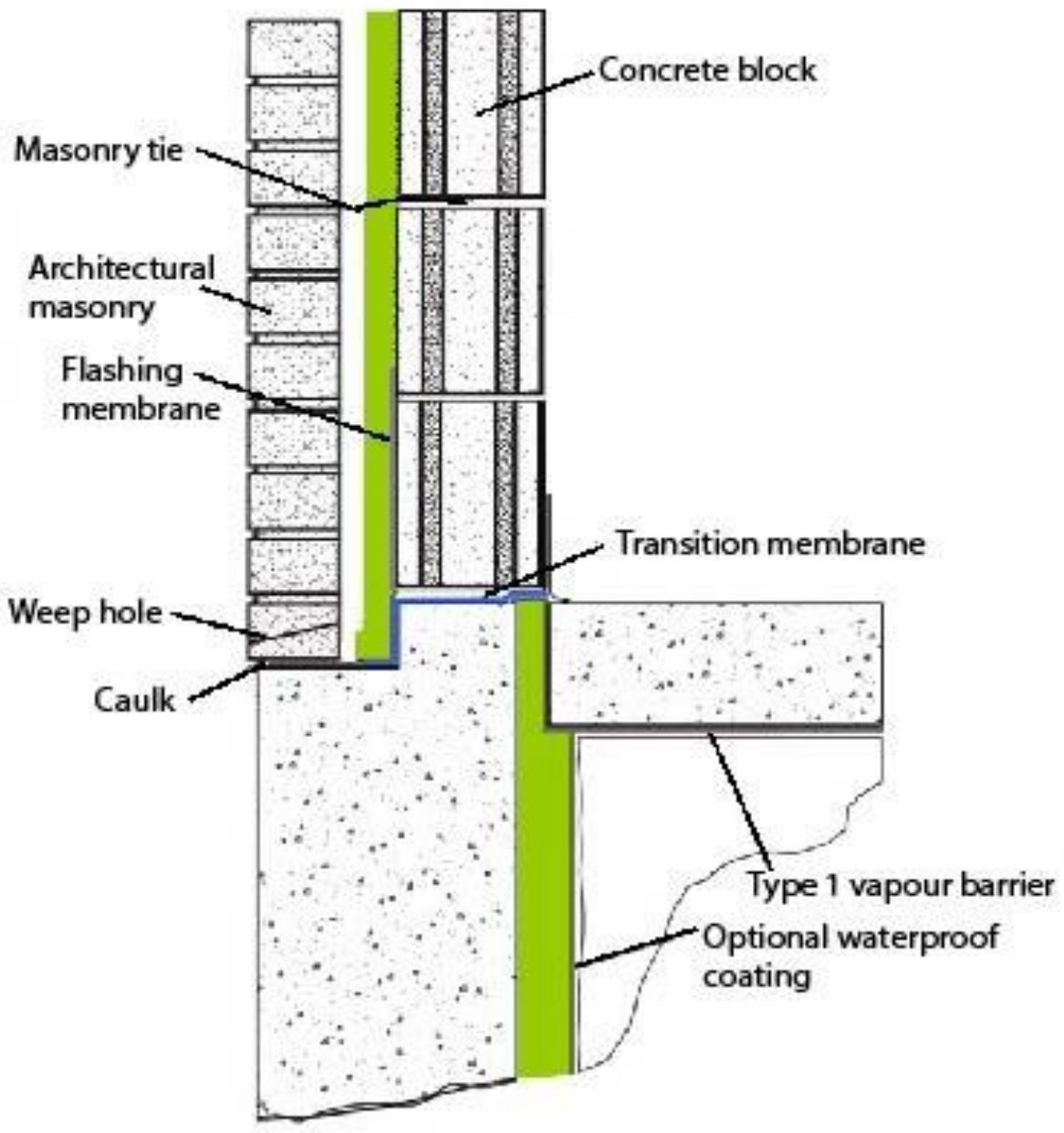
5. TECHNICAL DRAWINGS (FOLLOWING PAGES)

- The following pages contain the GENYK Commercial and residential series of technical drawings.

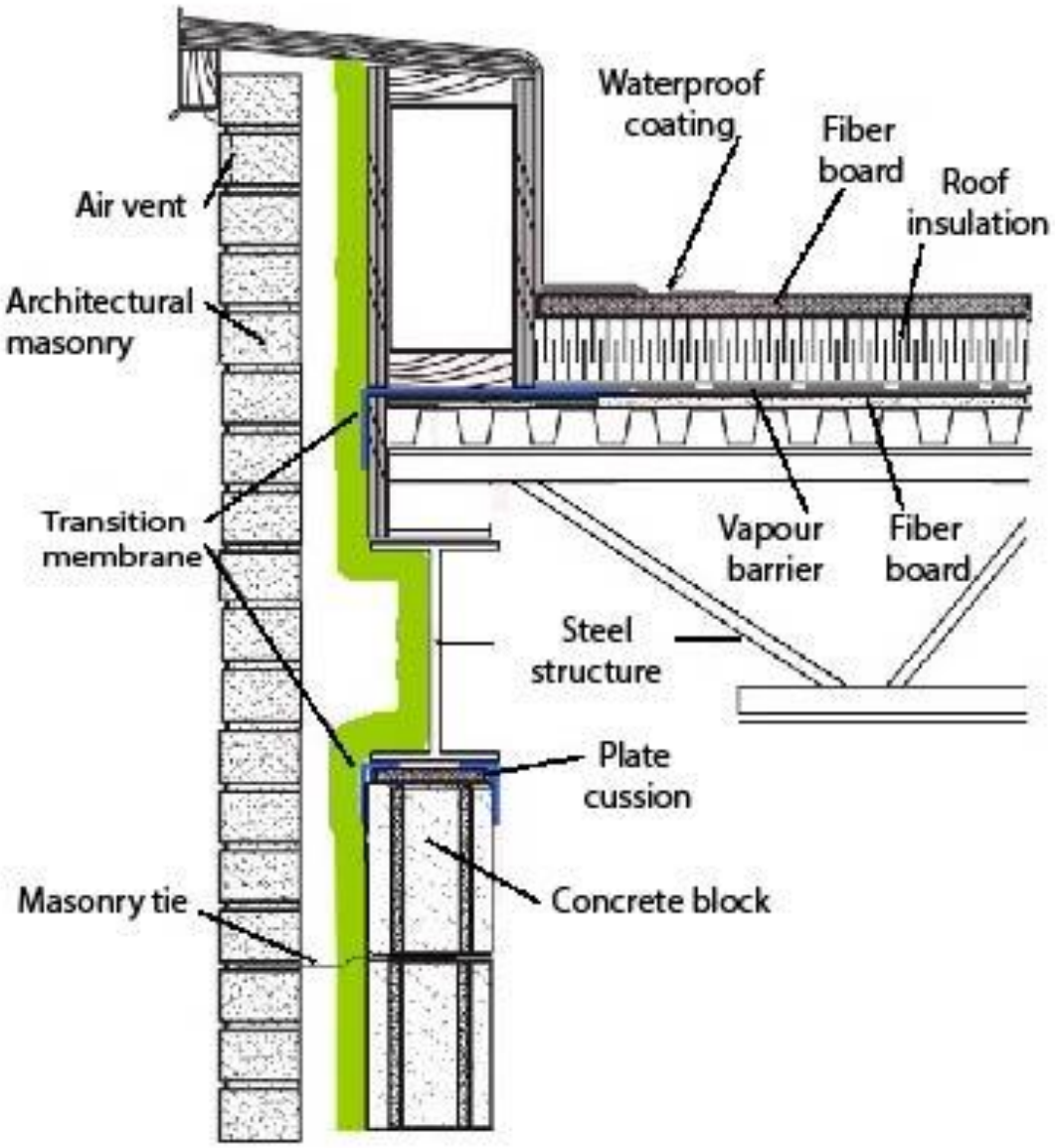
Wall Section, Masonry, Structure



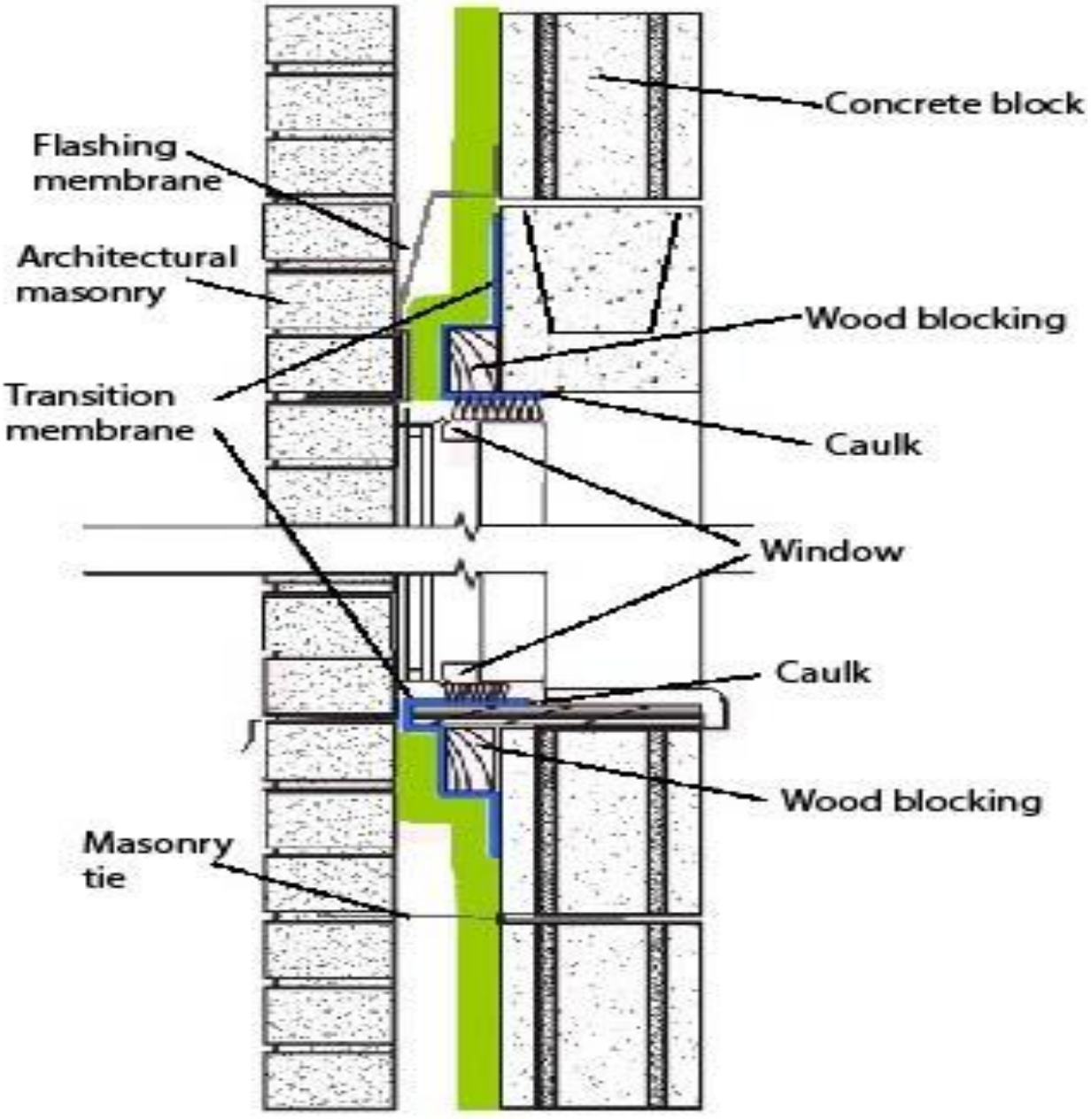
Wall Section, Masonry, Lower



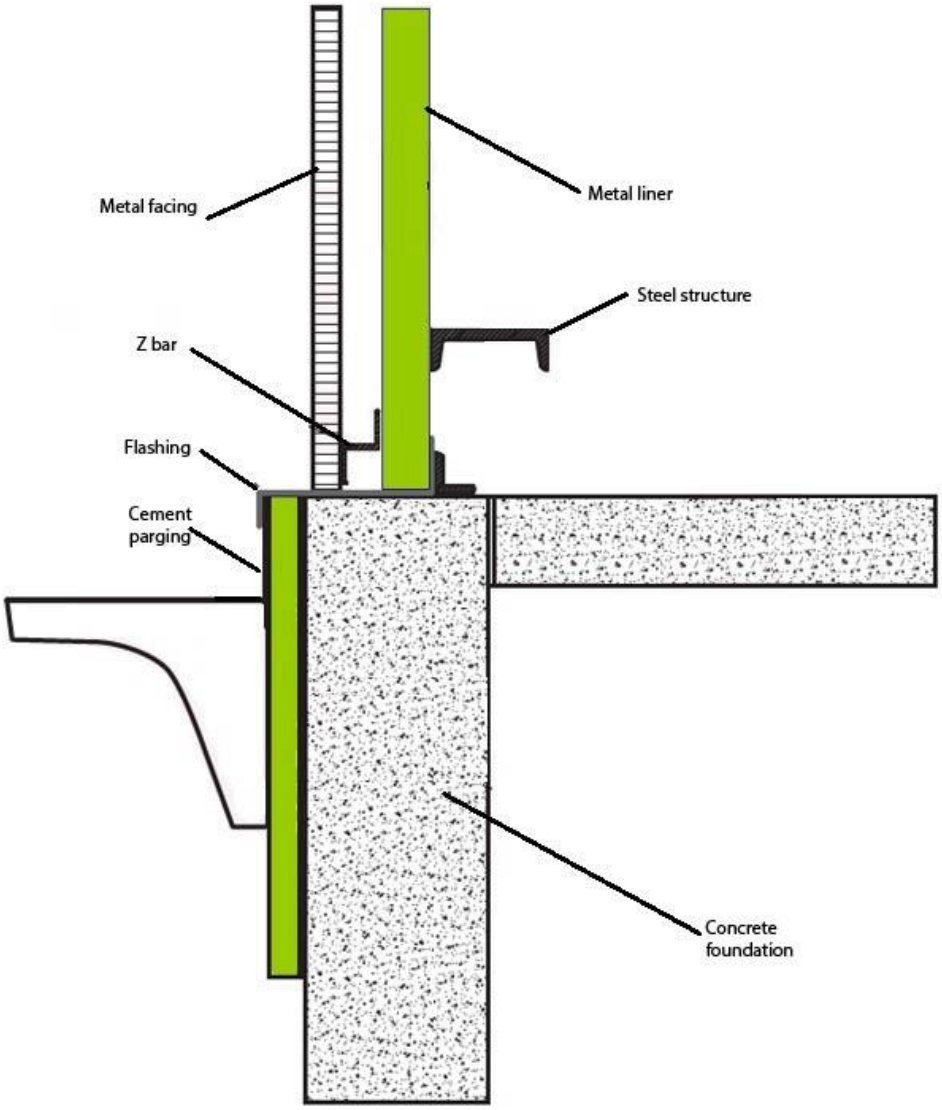
Wall Section, Masonry, Upper



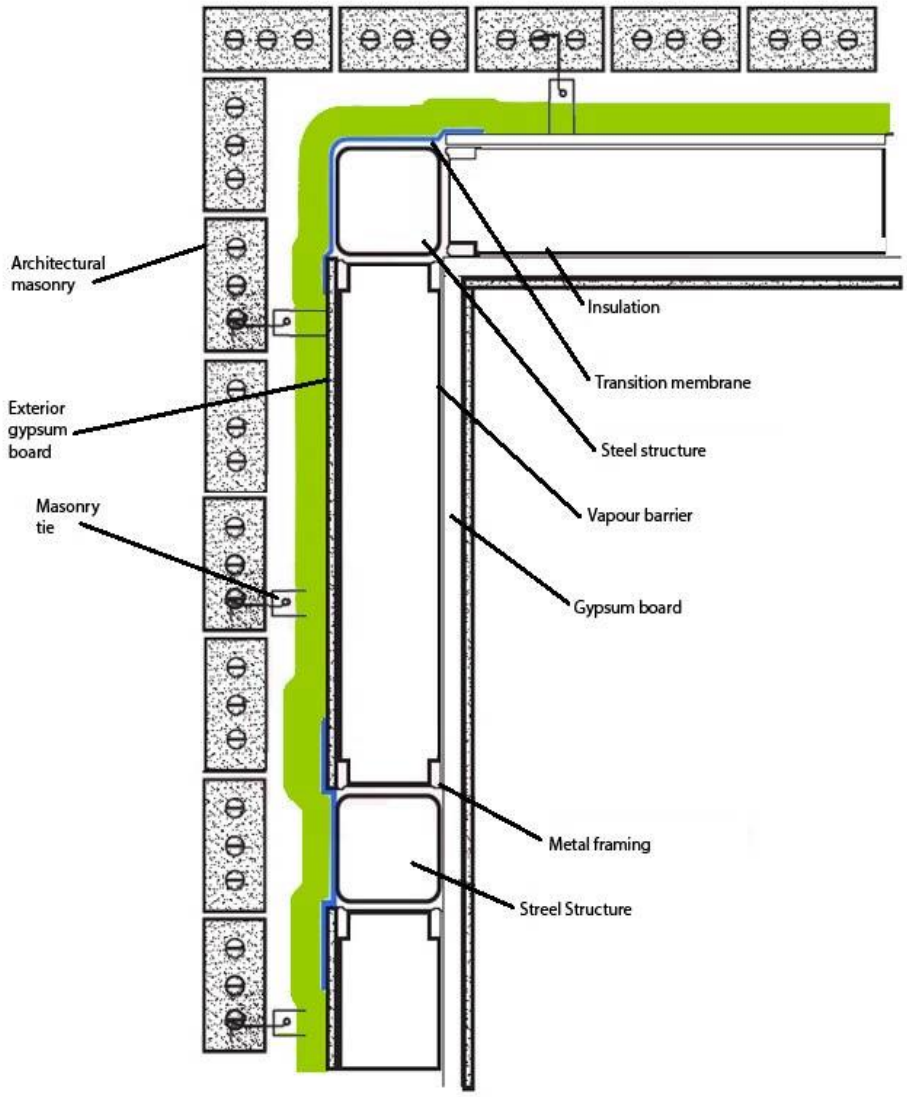
Wall Section, Masonry, Opening



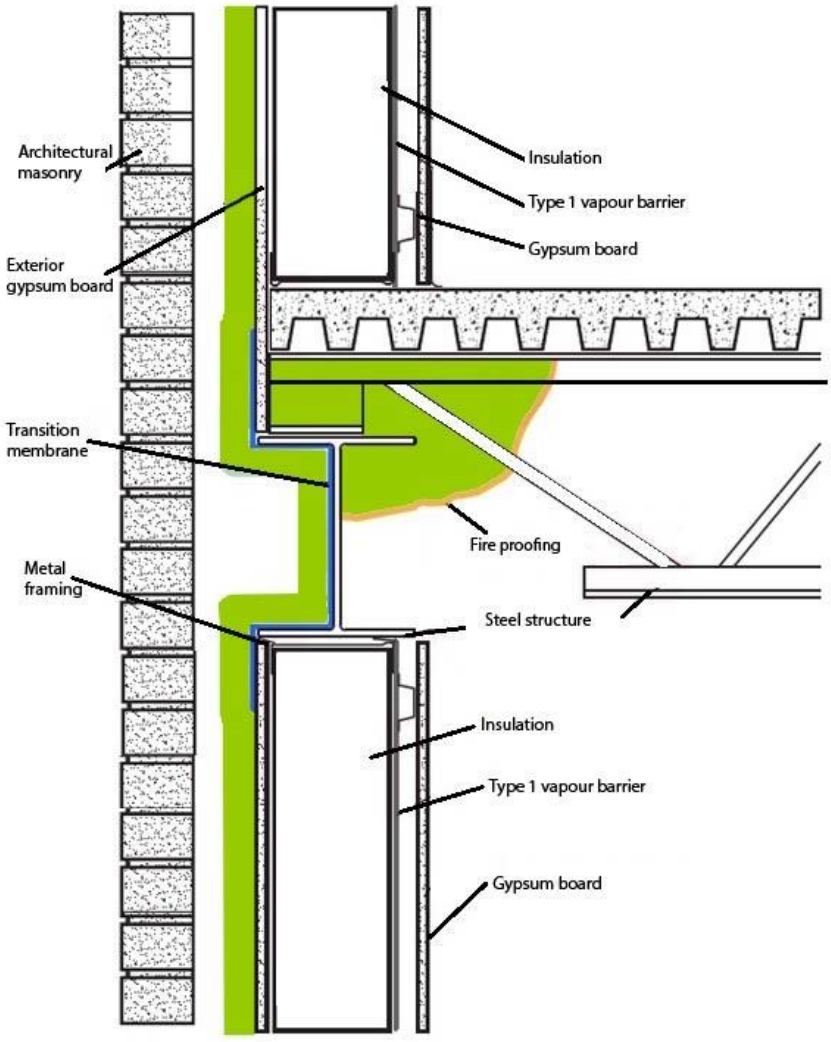
Wall Section, Gypsum Board, Lower



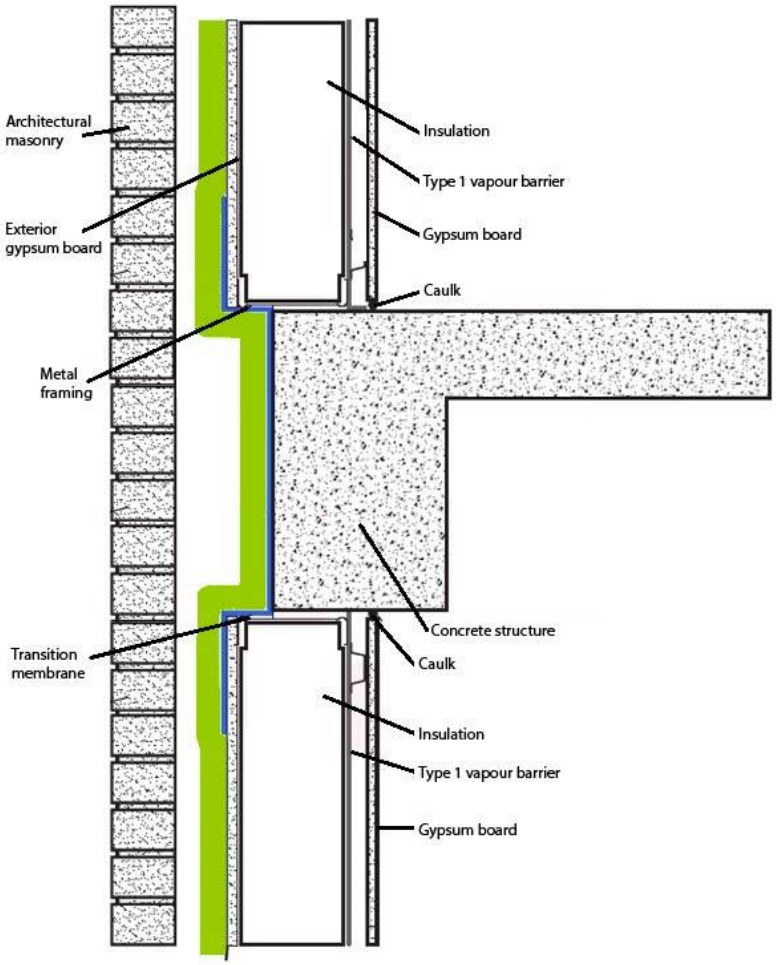
Wall Section, Gypsum Board, Structure



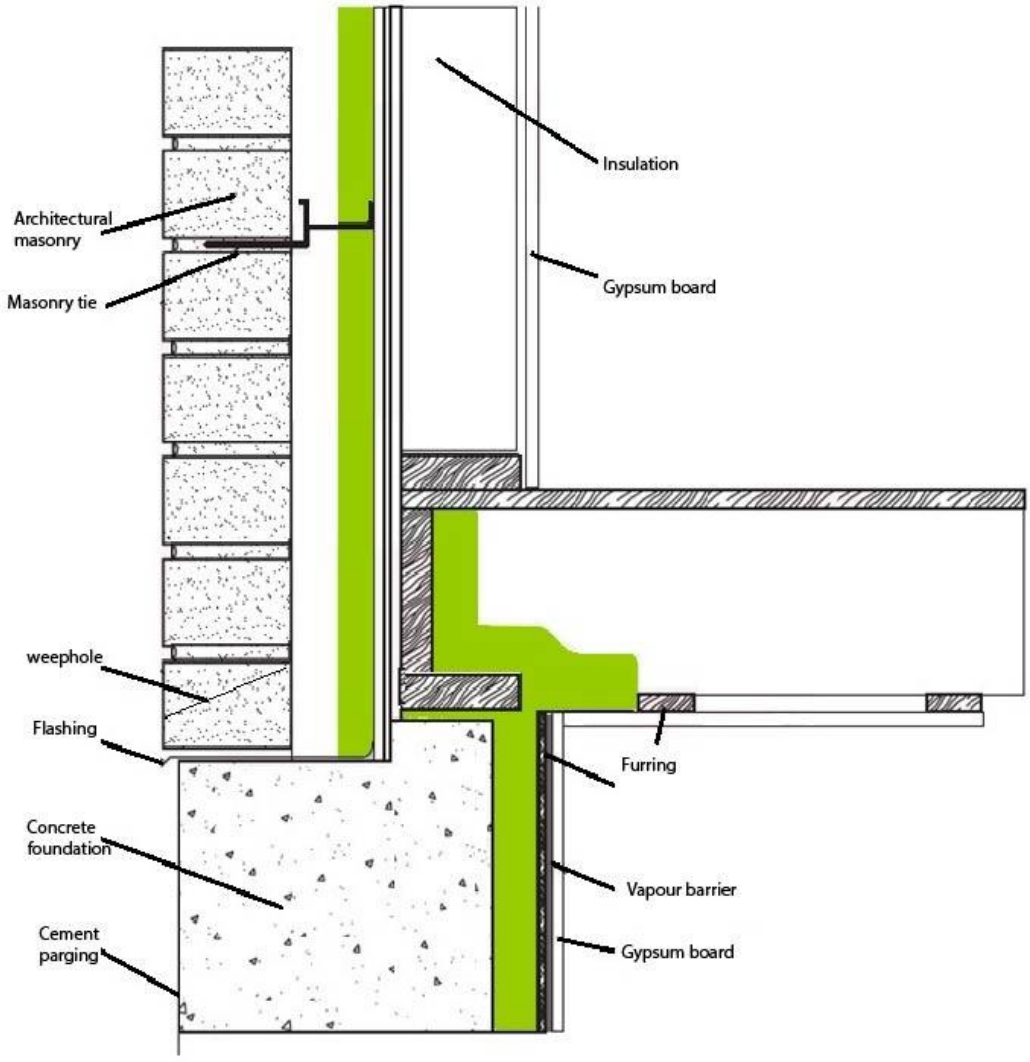
Wall Section, Gypsum Board, Floor / Wall



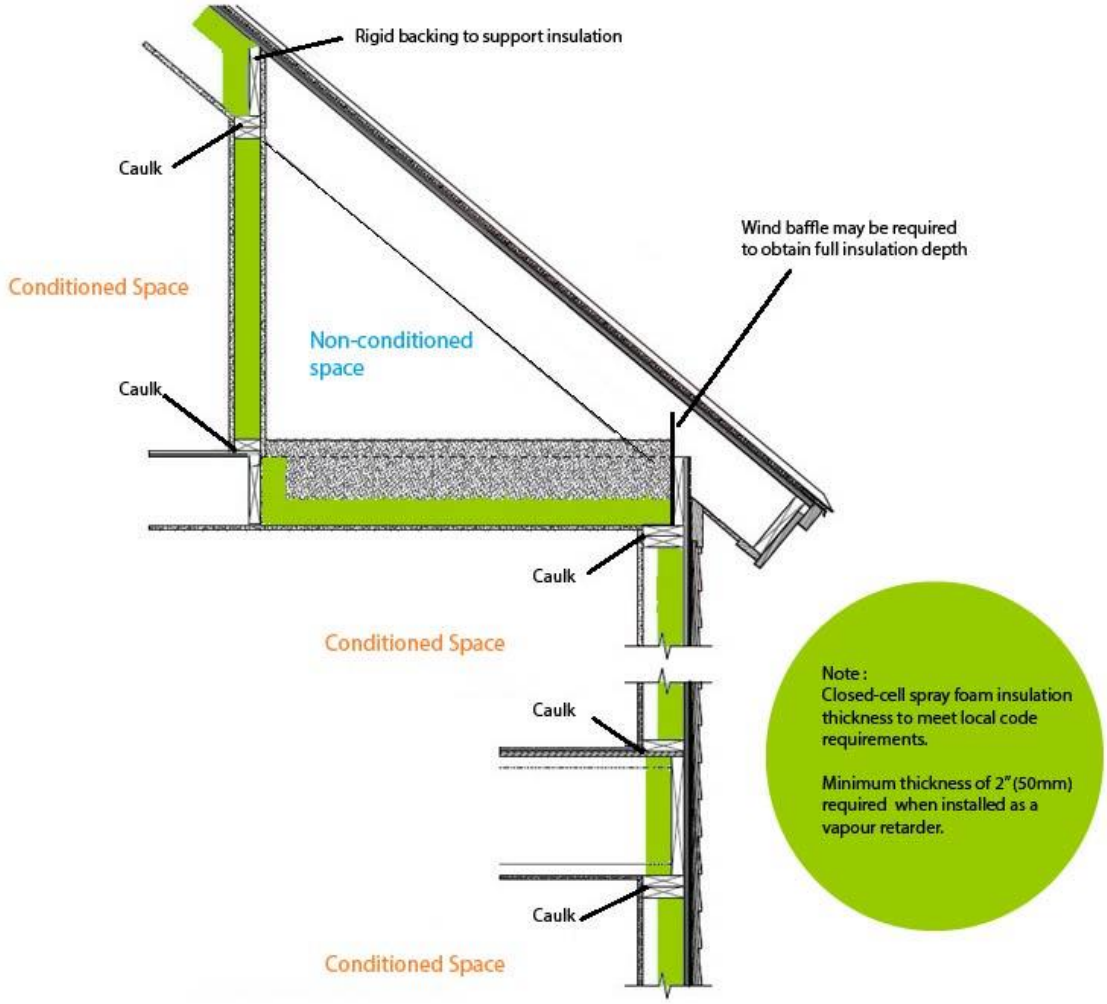
Wall Section, Gypsum Board, Floor / Wall



Wall Section, Wood-framed Masonry, Lower section



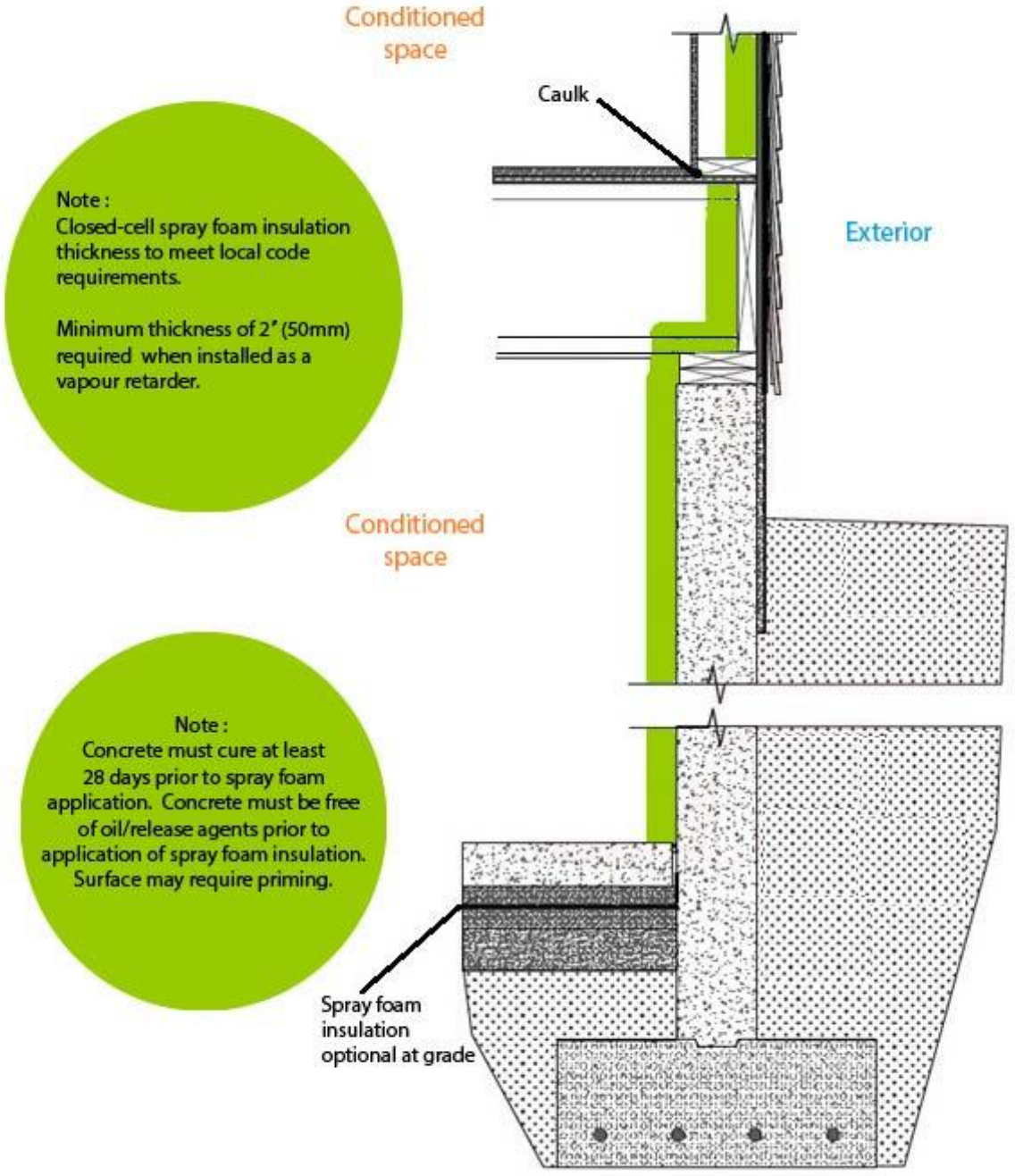
Two-story Wood-framed Construction, Option A



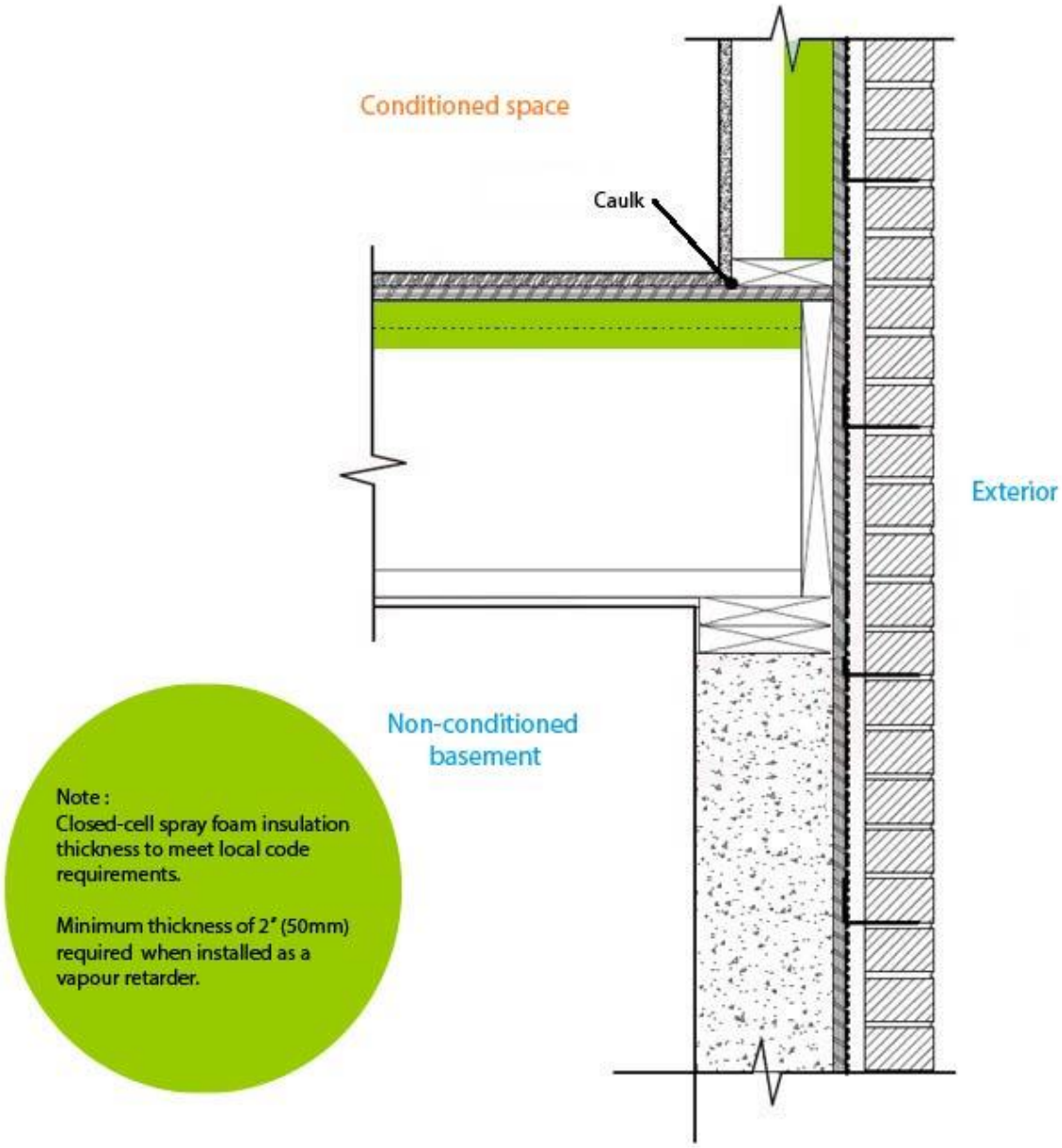
Two-story Wood-framed Construction,

Option B

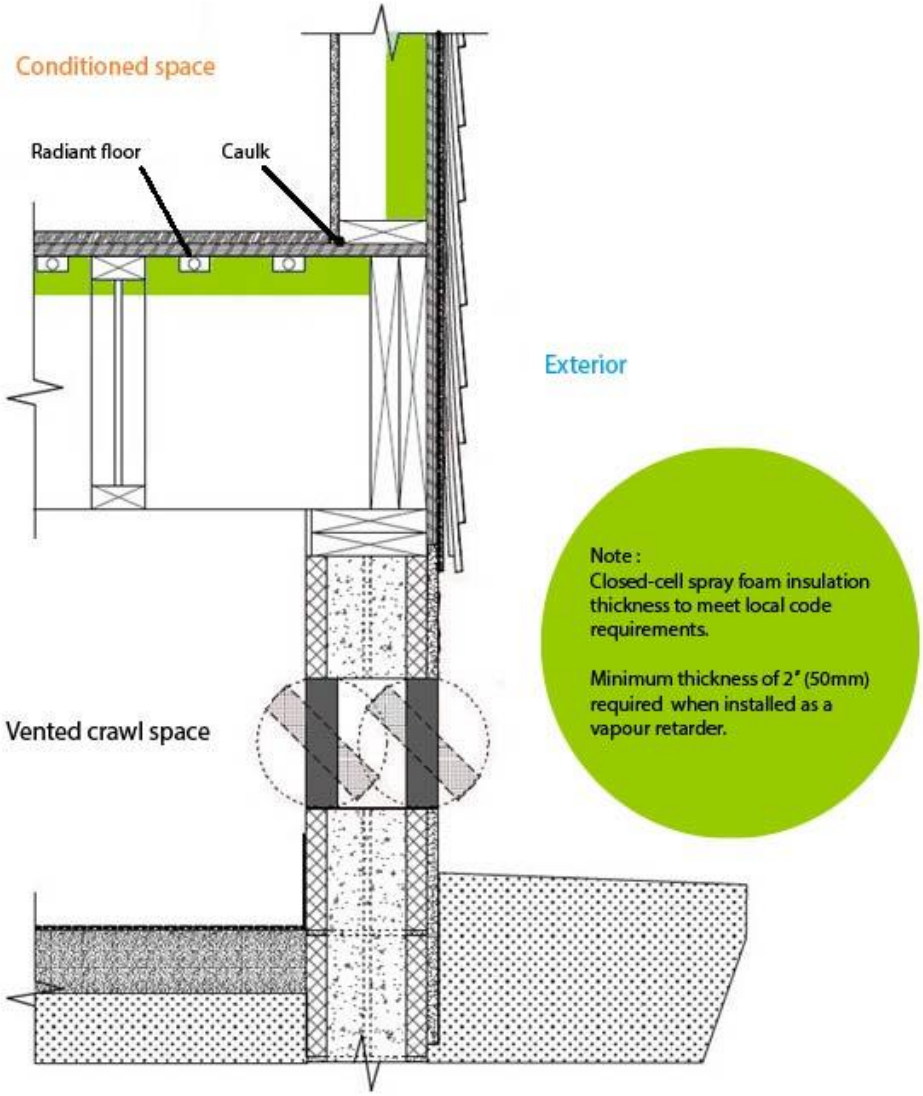
Wall Section: Conditioned Basement



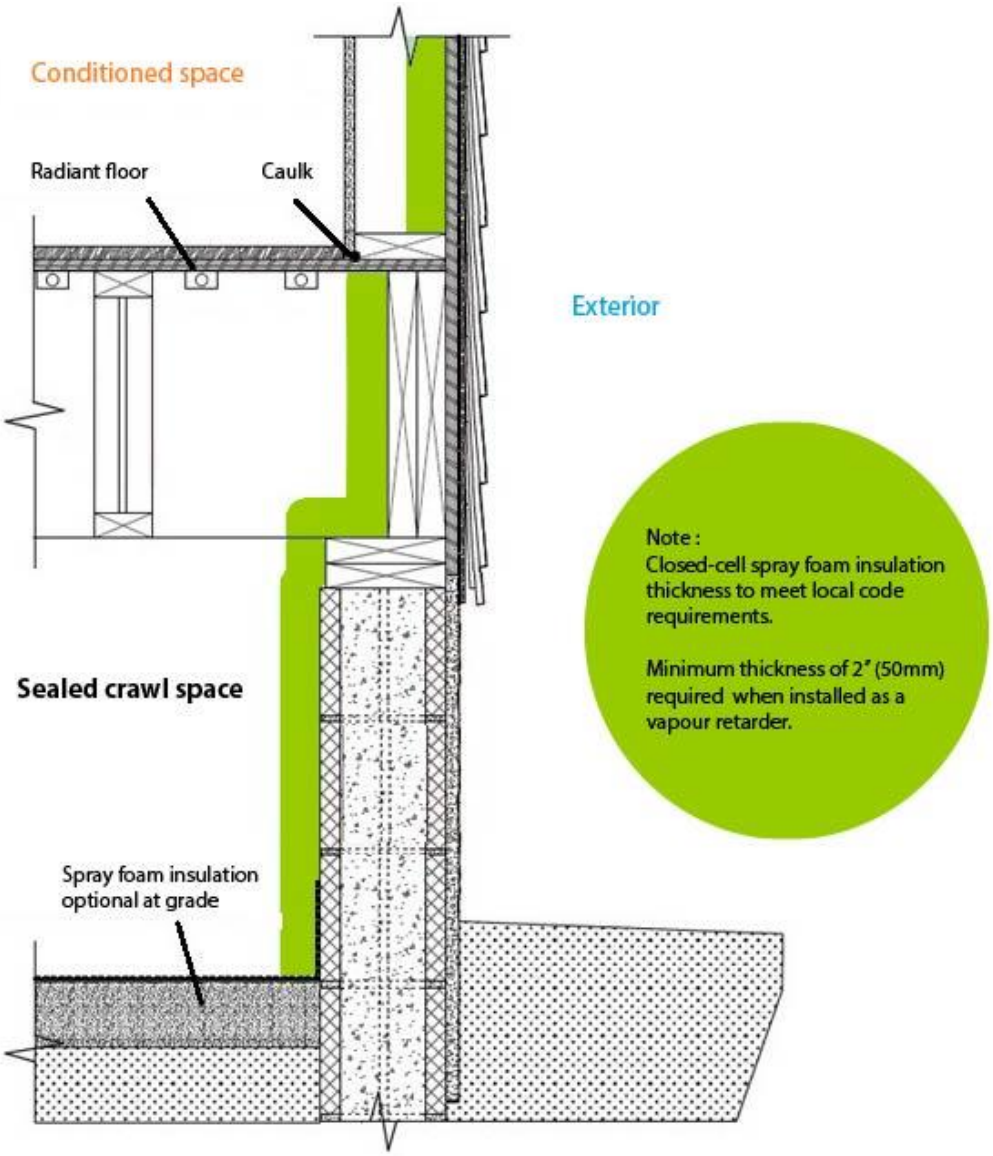
Wall Section: Non-conditioned Basement



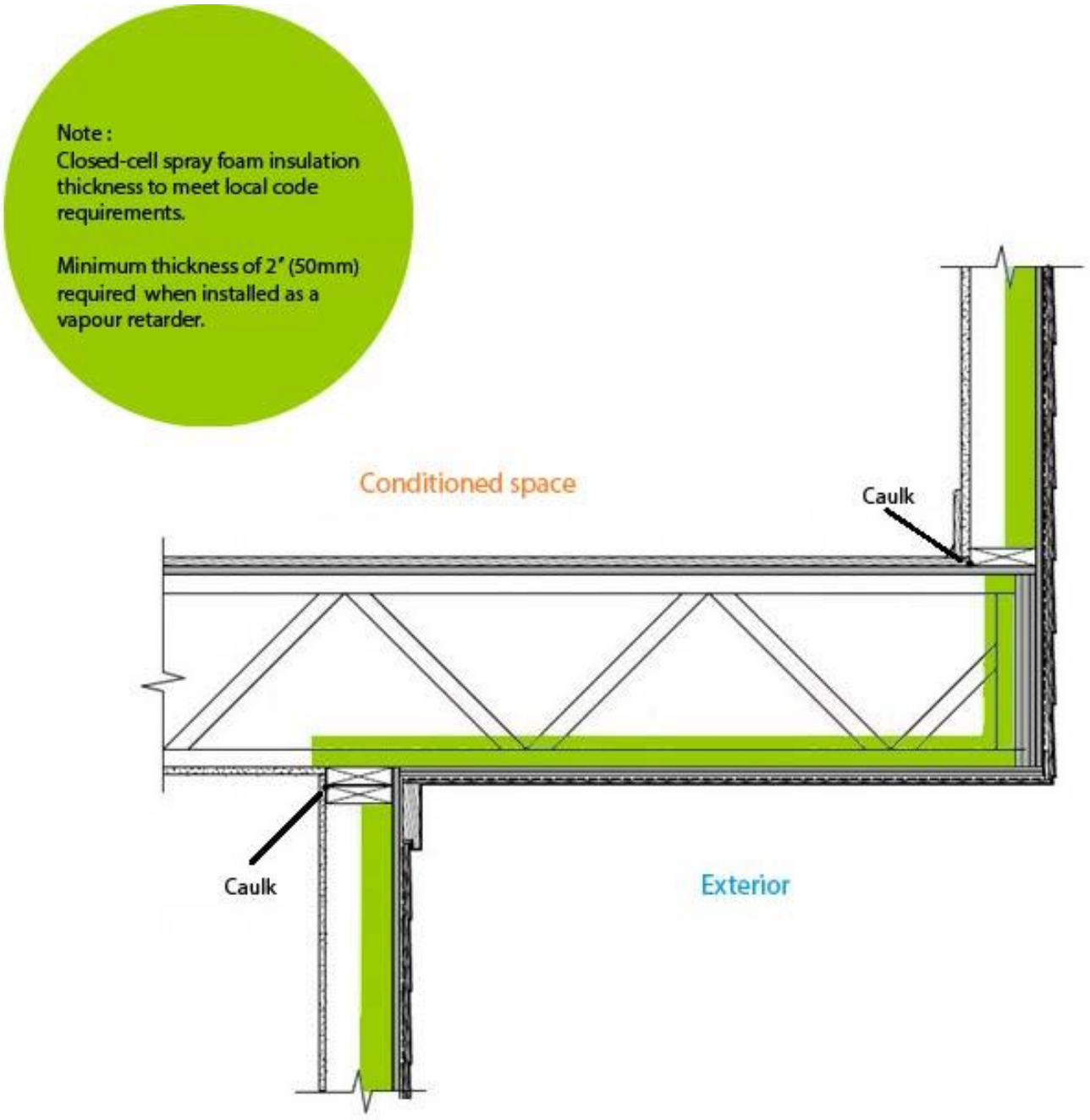
Wall Section: Vented Crawl Space



Wall Section: Sealed Crawl Space

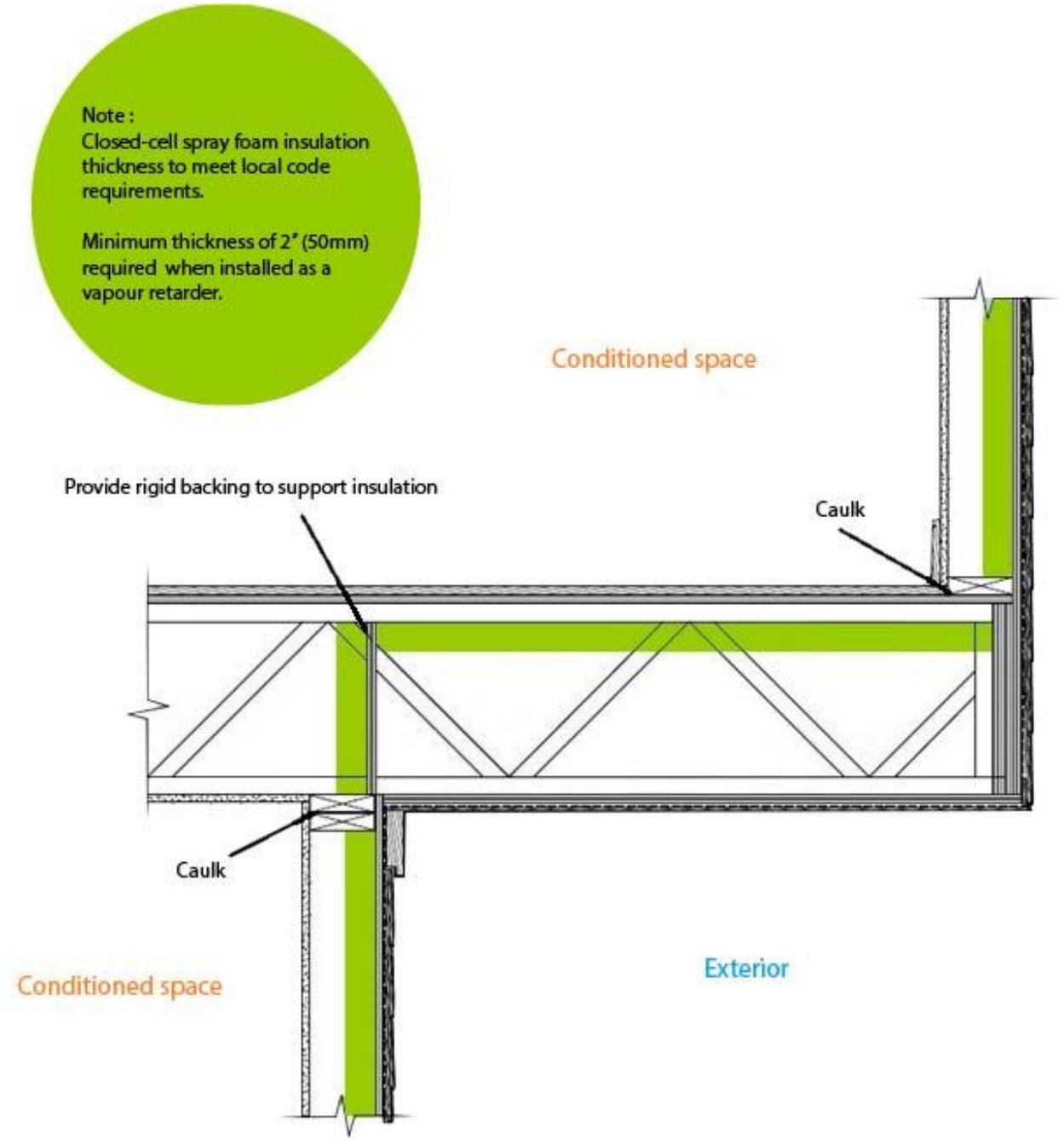


Wall Section: Cantilevered Floor, Option A

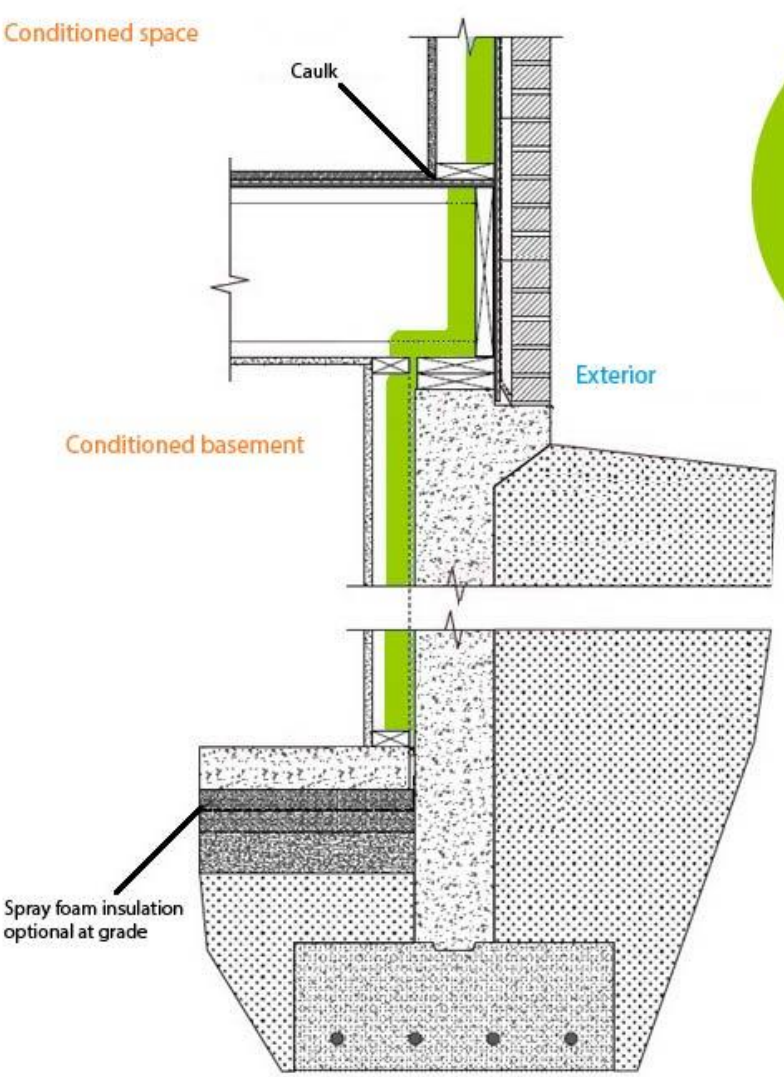


Wall Section: Cantilevered Floor,

Option B



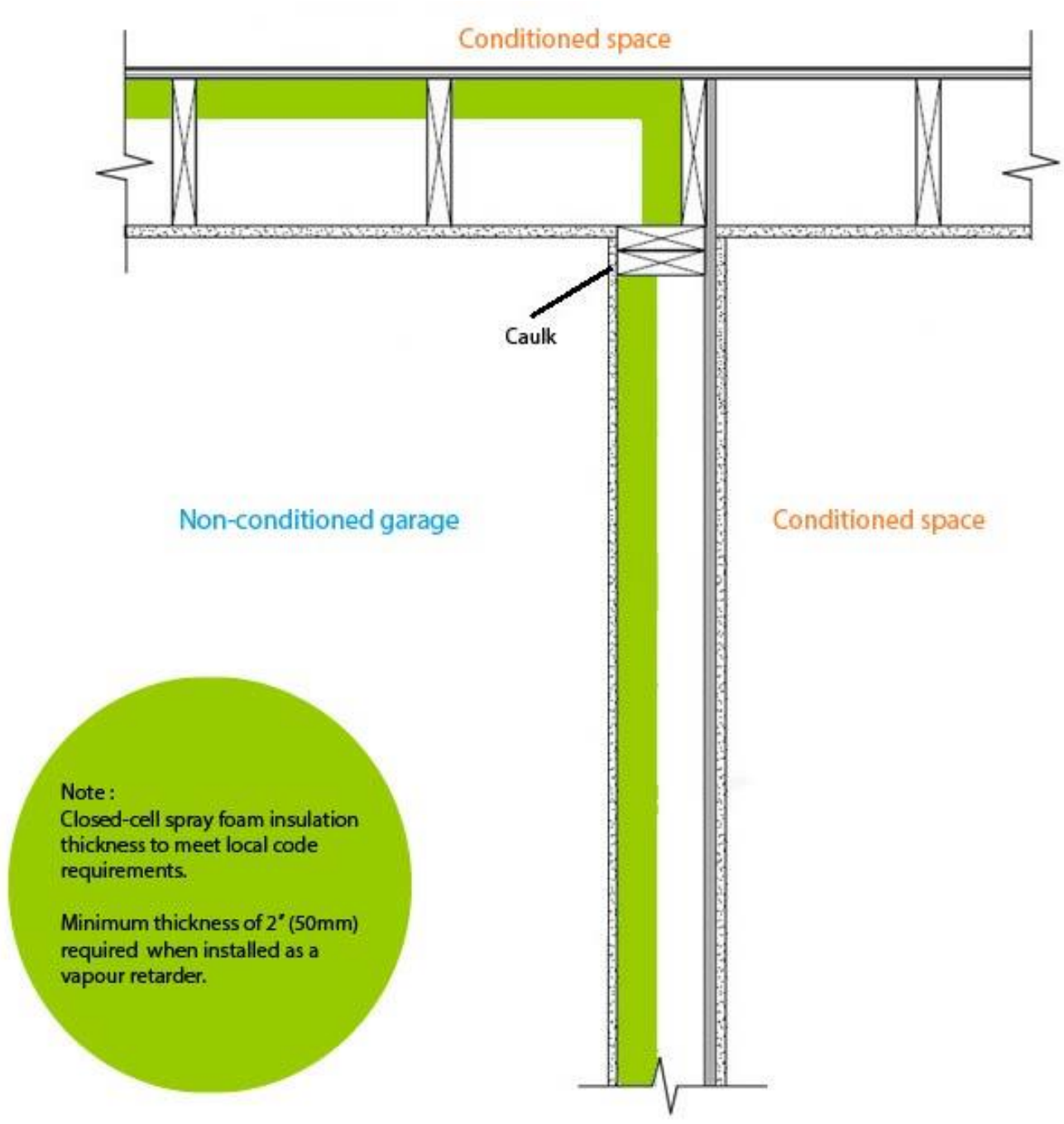
Wall Section: Finished Basement



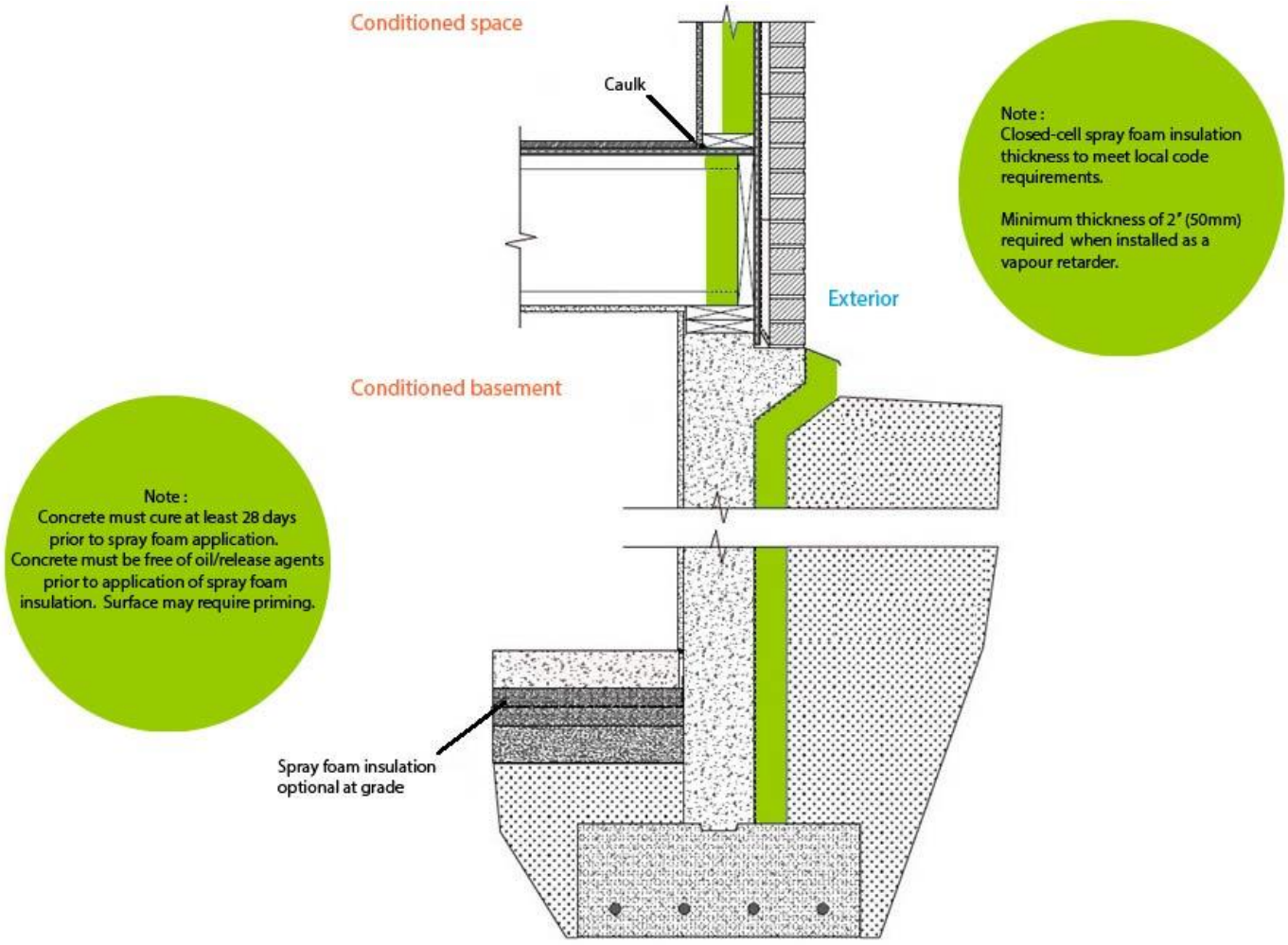
Note :
Closed-cell spray foam insulation thickness to meet local code requirements.

Minimum thickness of 2" (50mm) required when installed as a vapour retarder.

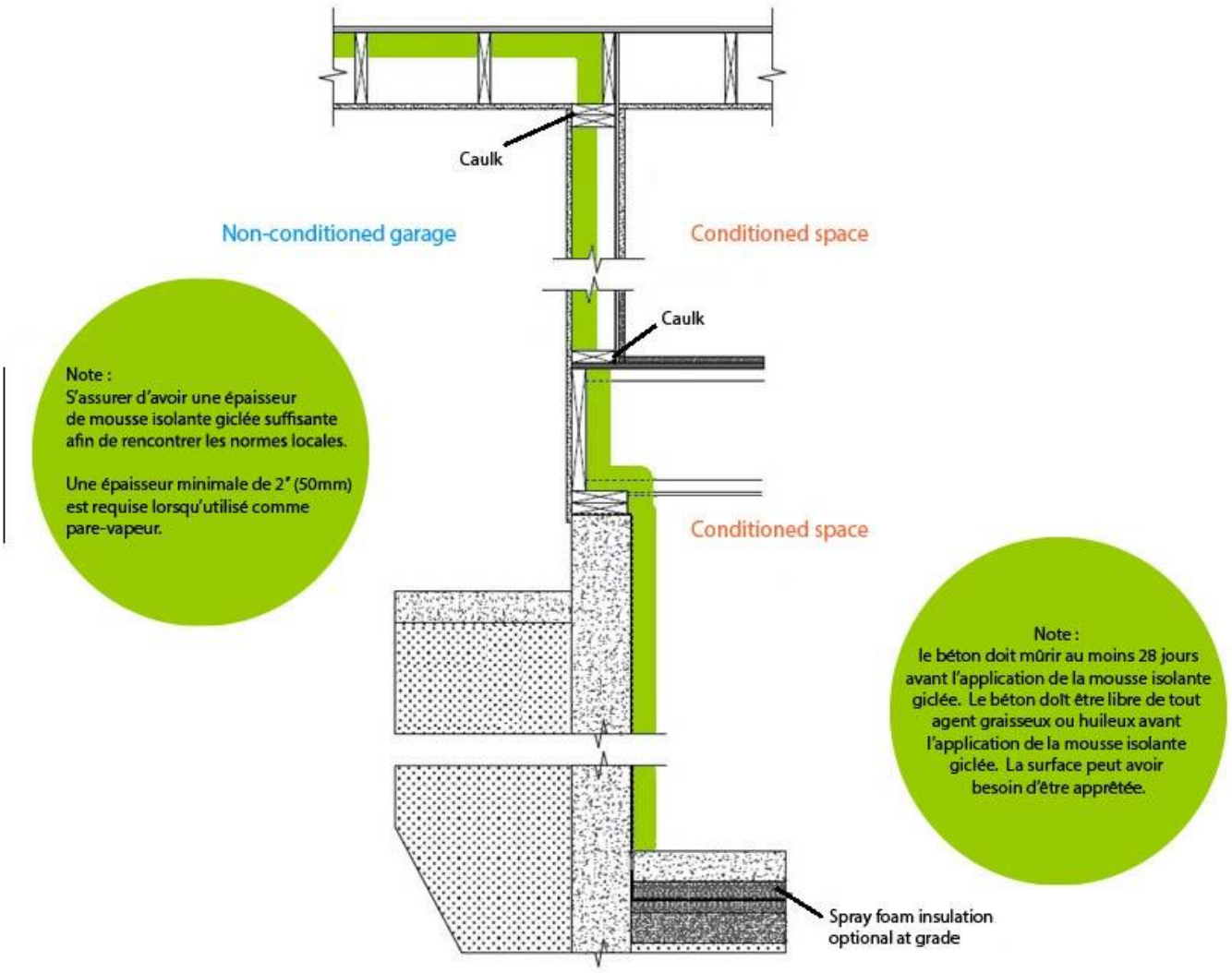
Wall Section: Garage with Conditioned Space Above and Adjoining



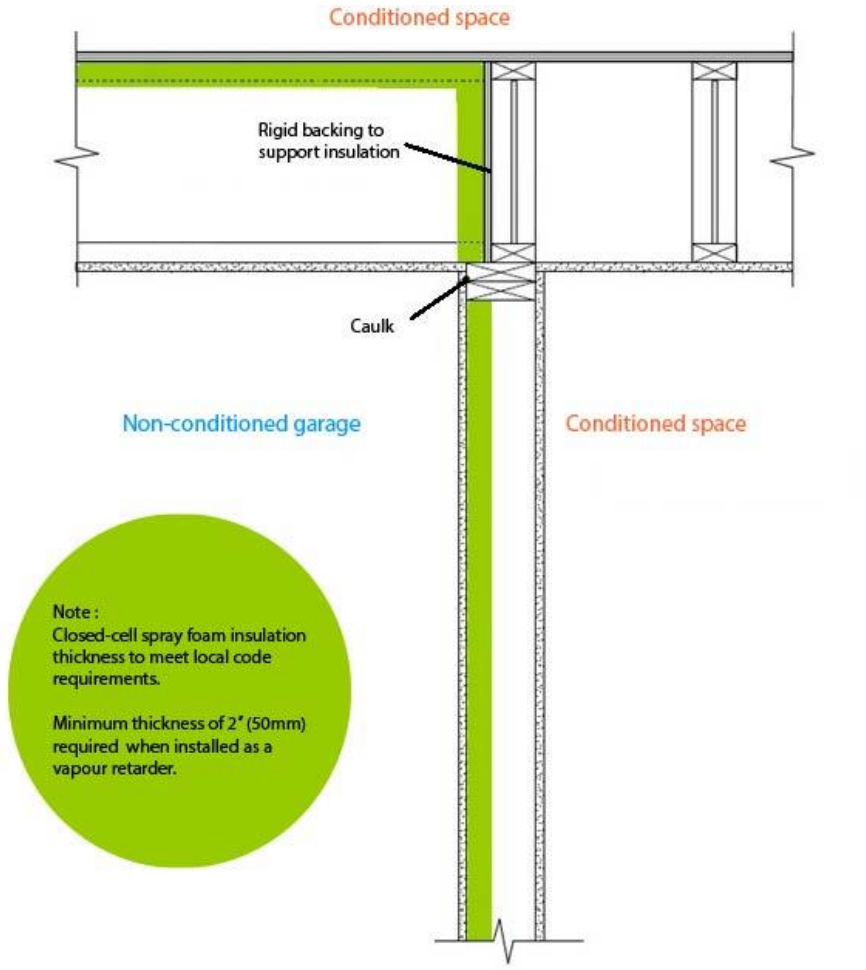
Wall Section: Basement Exterior



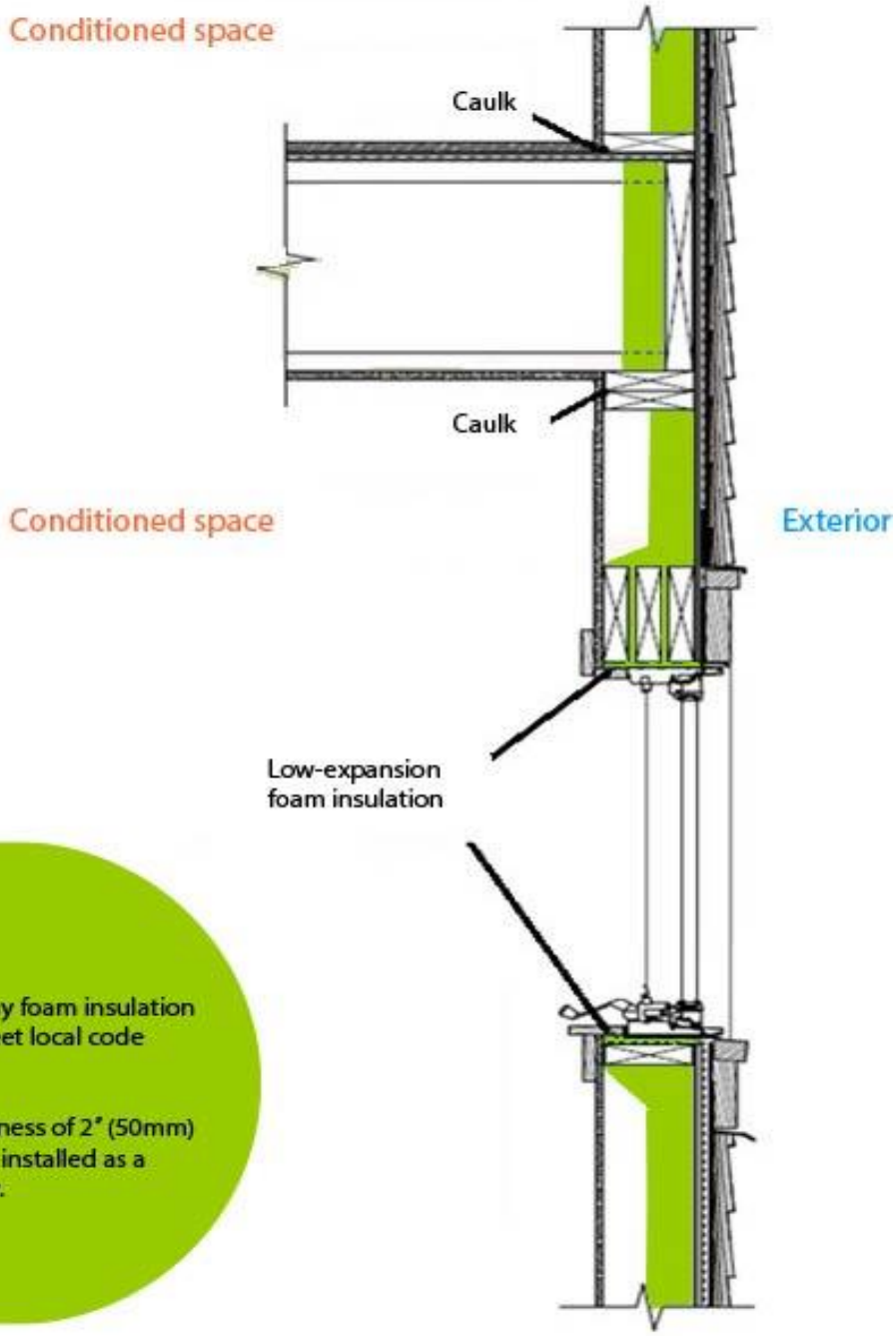
Wall Section: Garage with Conditioned Space Adjoining



Wall Section: Garage Wall Connection



Wall Section: Window Unit

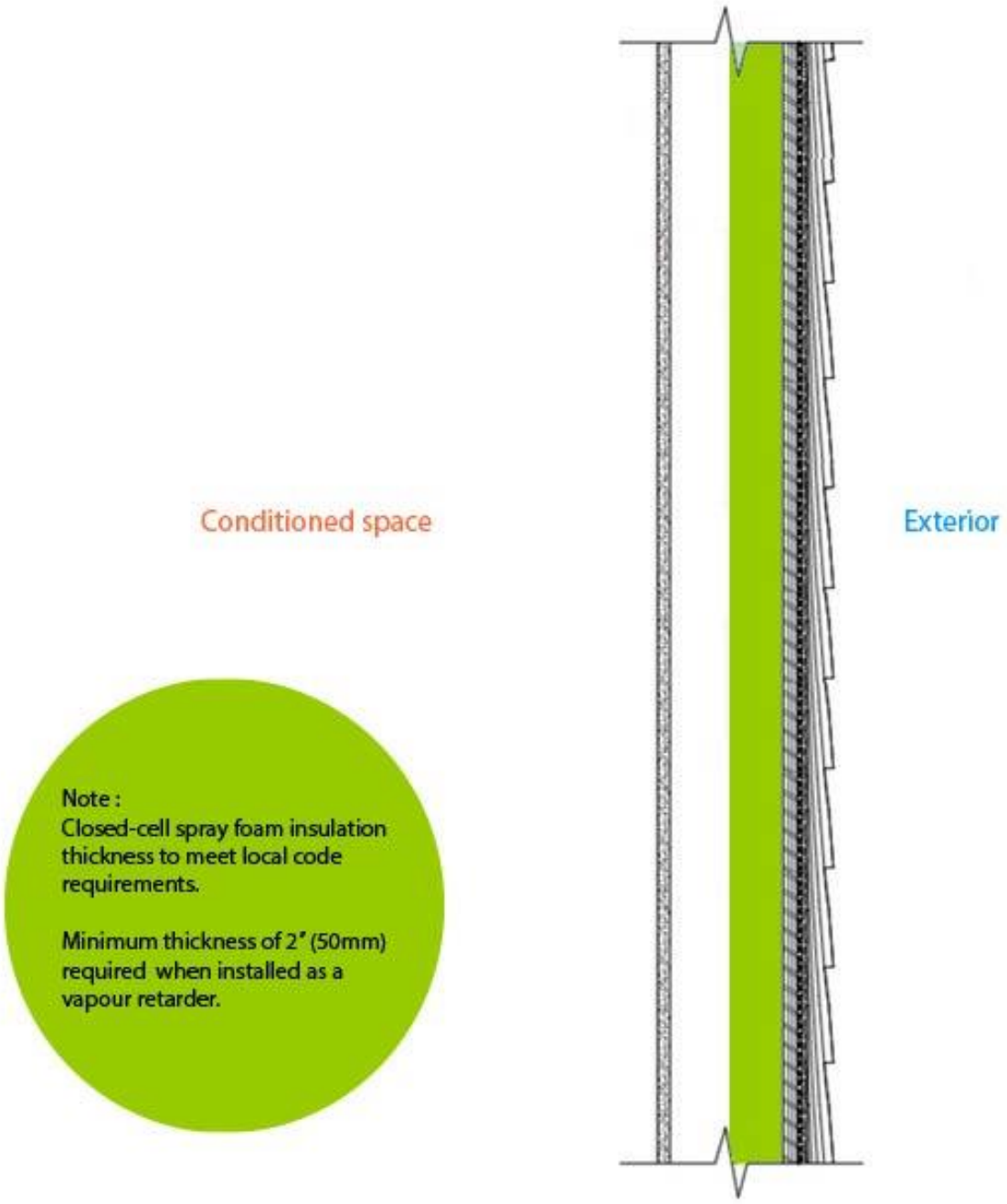


Note :
Closed-cell spray foam insulation thickness to meet local code requirements.

Minimum thickness of 2" (50mm) required when installed as a vapour retarder.

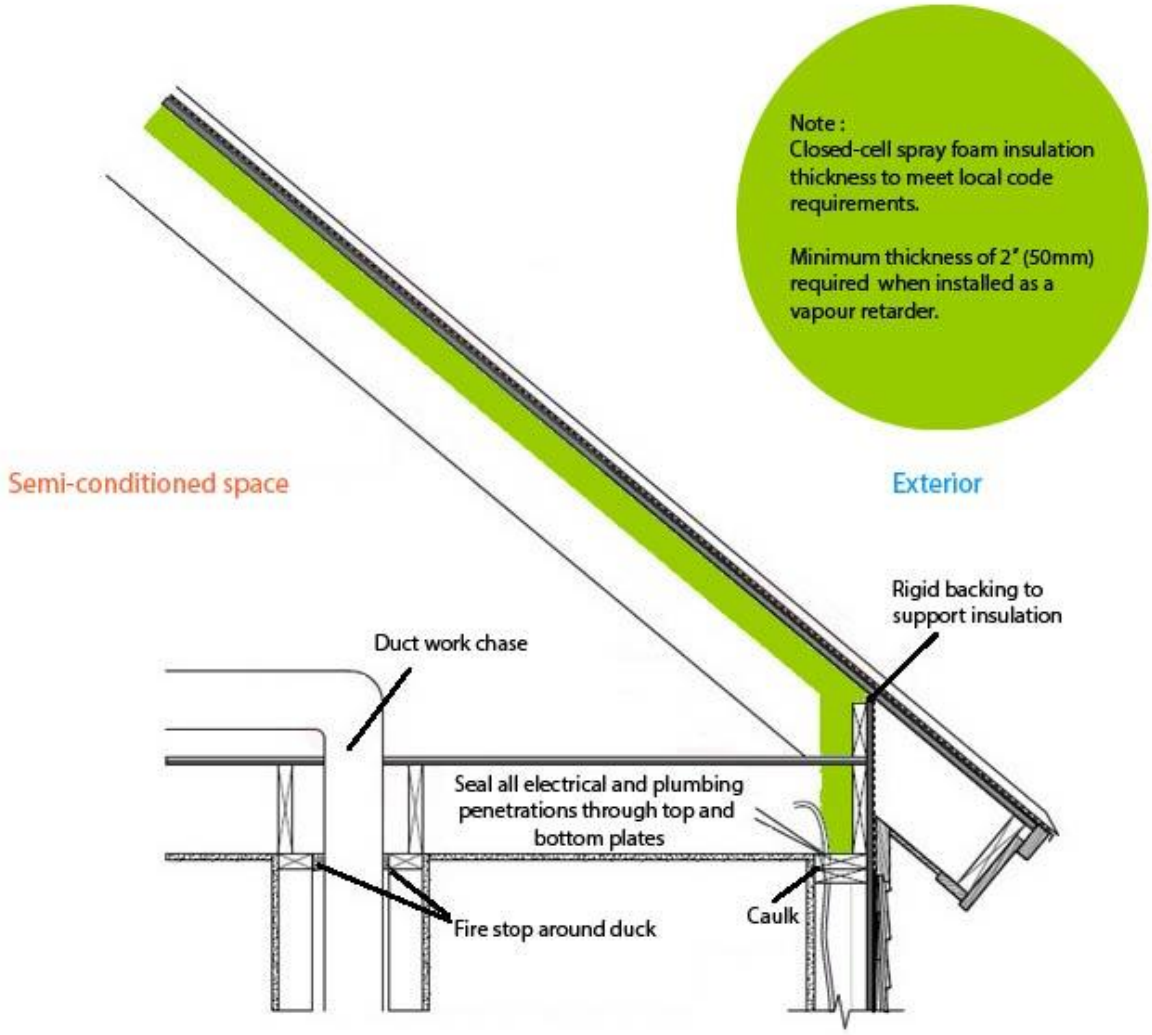
Wall Section: Typical Wood-framed

Wall with Siding



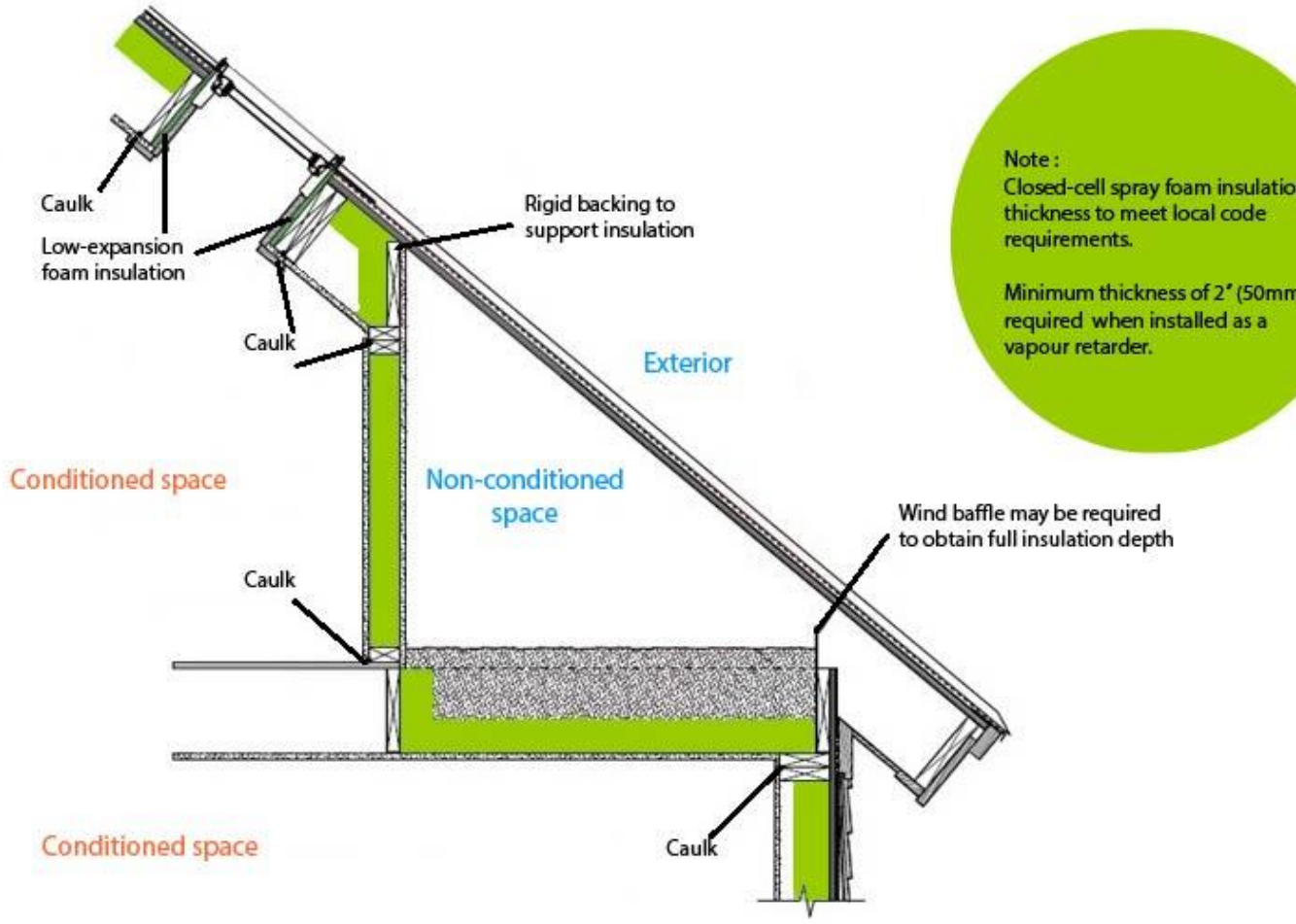
Wall Section: Typical Wood-framed Wall with Masonry Veneer

Wall Section: Unheated Attic with Mechanical Chase

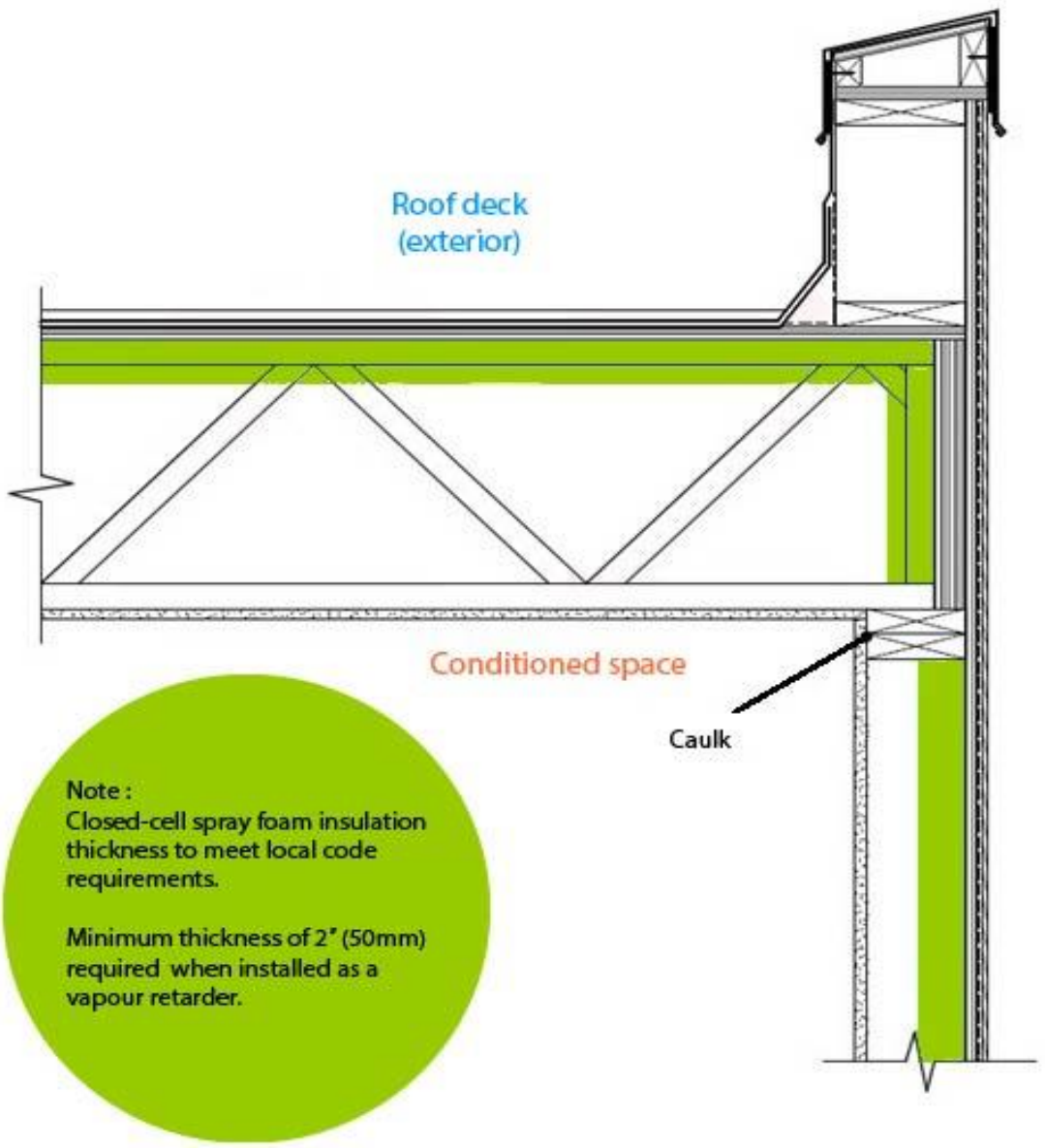


Wall Section: Cathedral

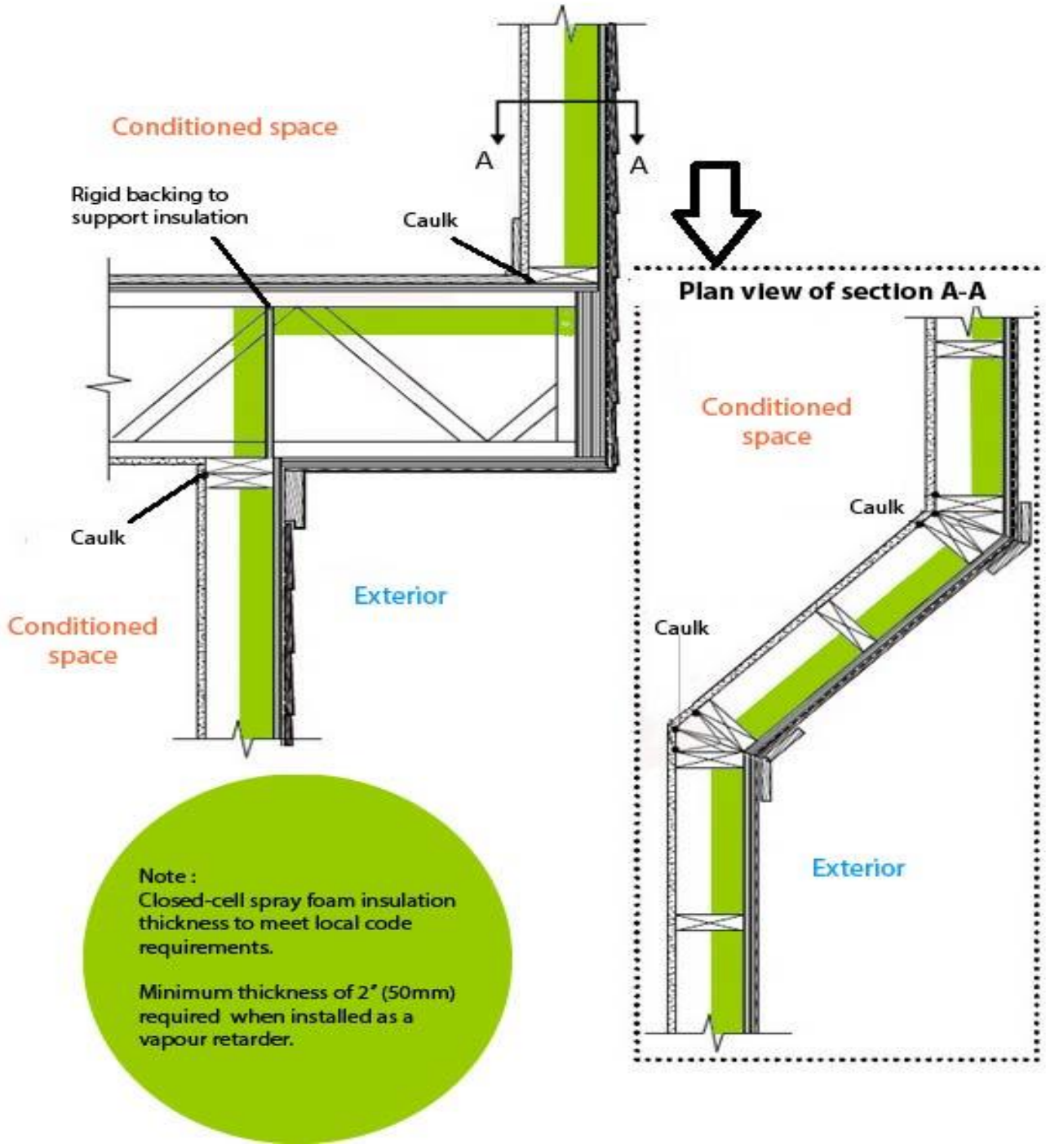
Ceiling with Skylight



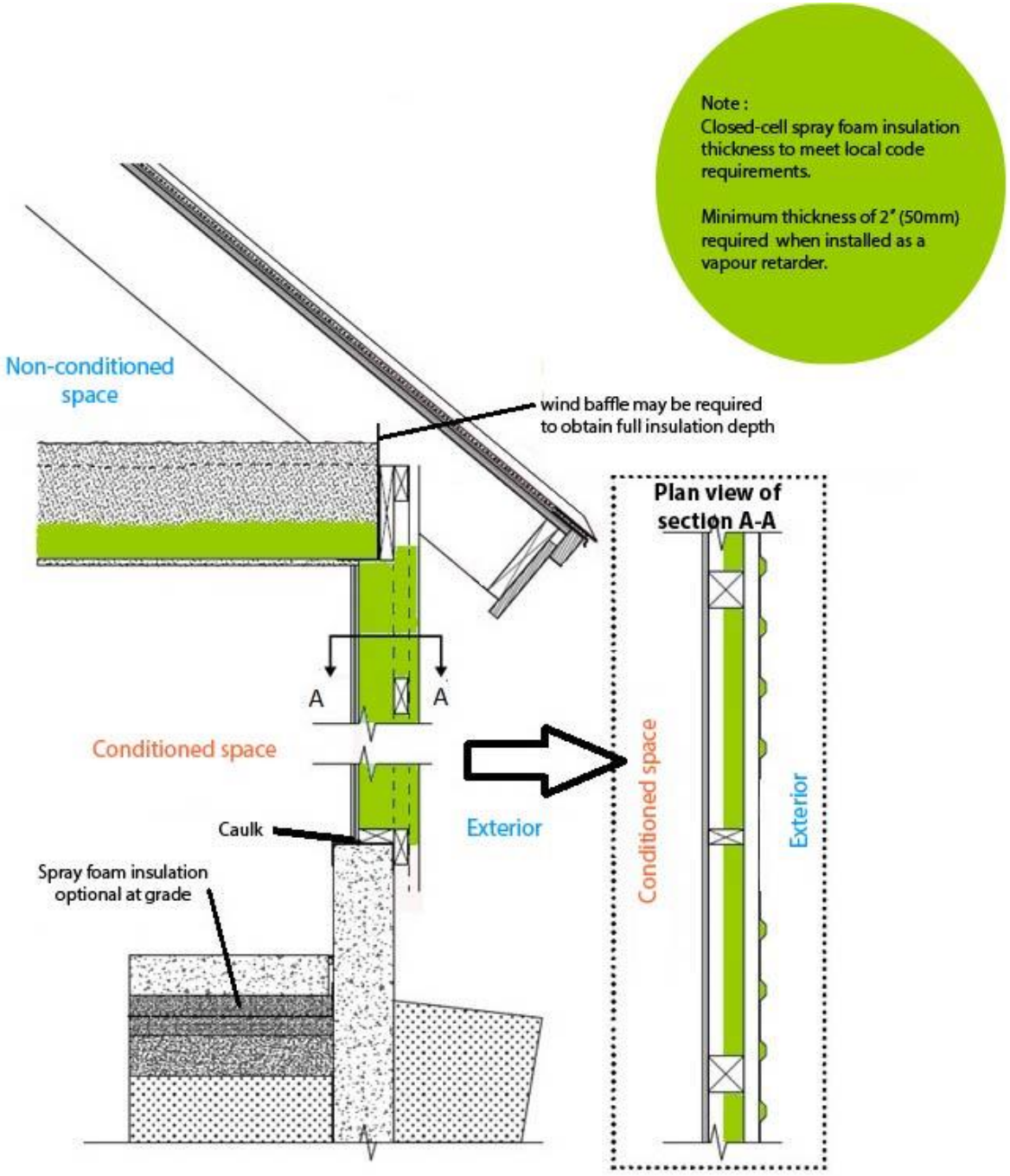
Wall Section: Flat Roof with Deck



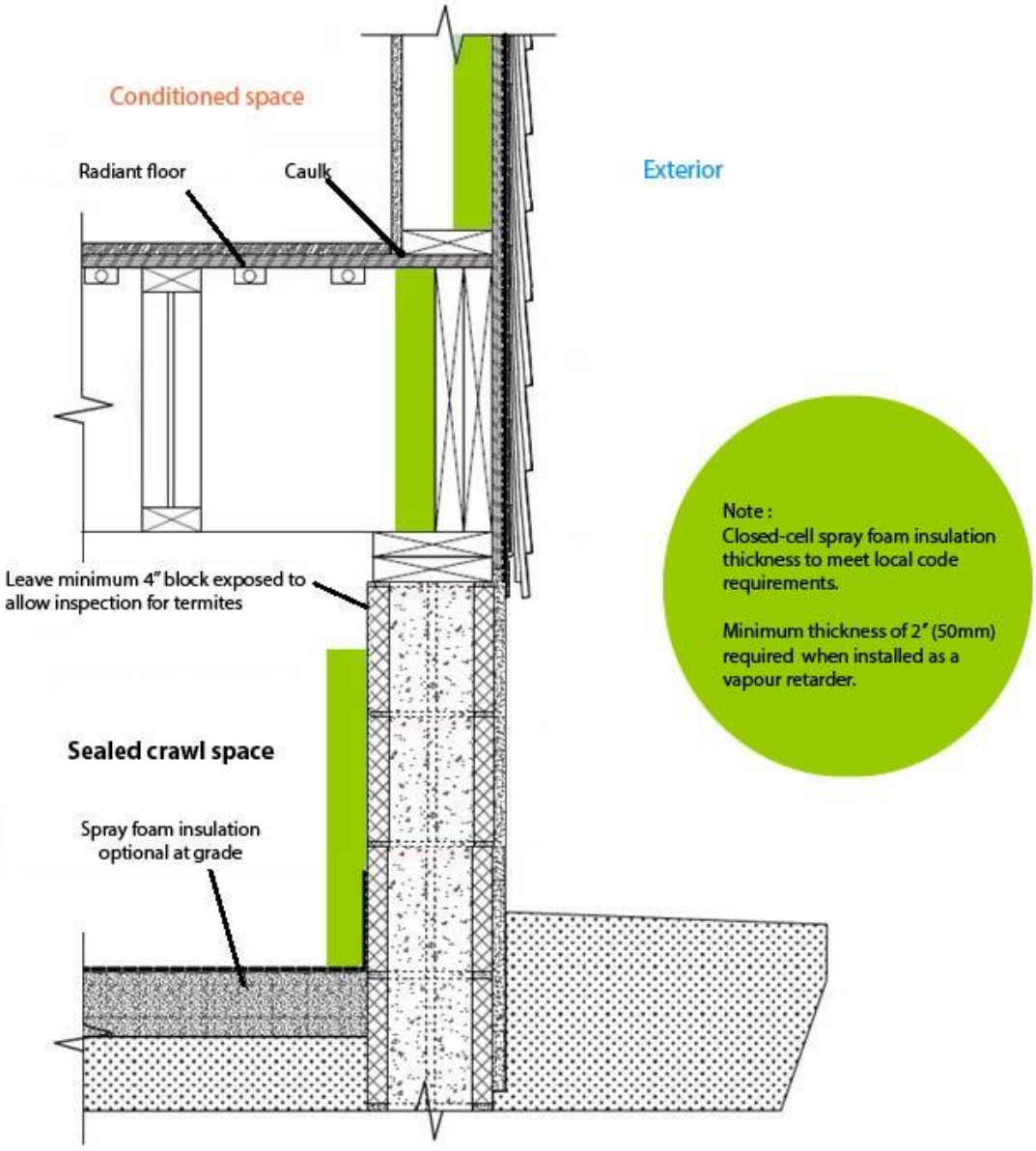
Wall Section: Cantilevered Bay Window



Wall Section: Pole-framed Structure

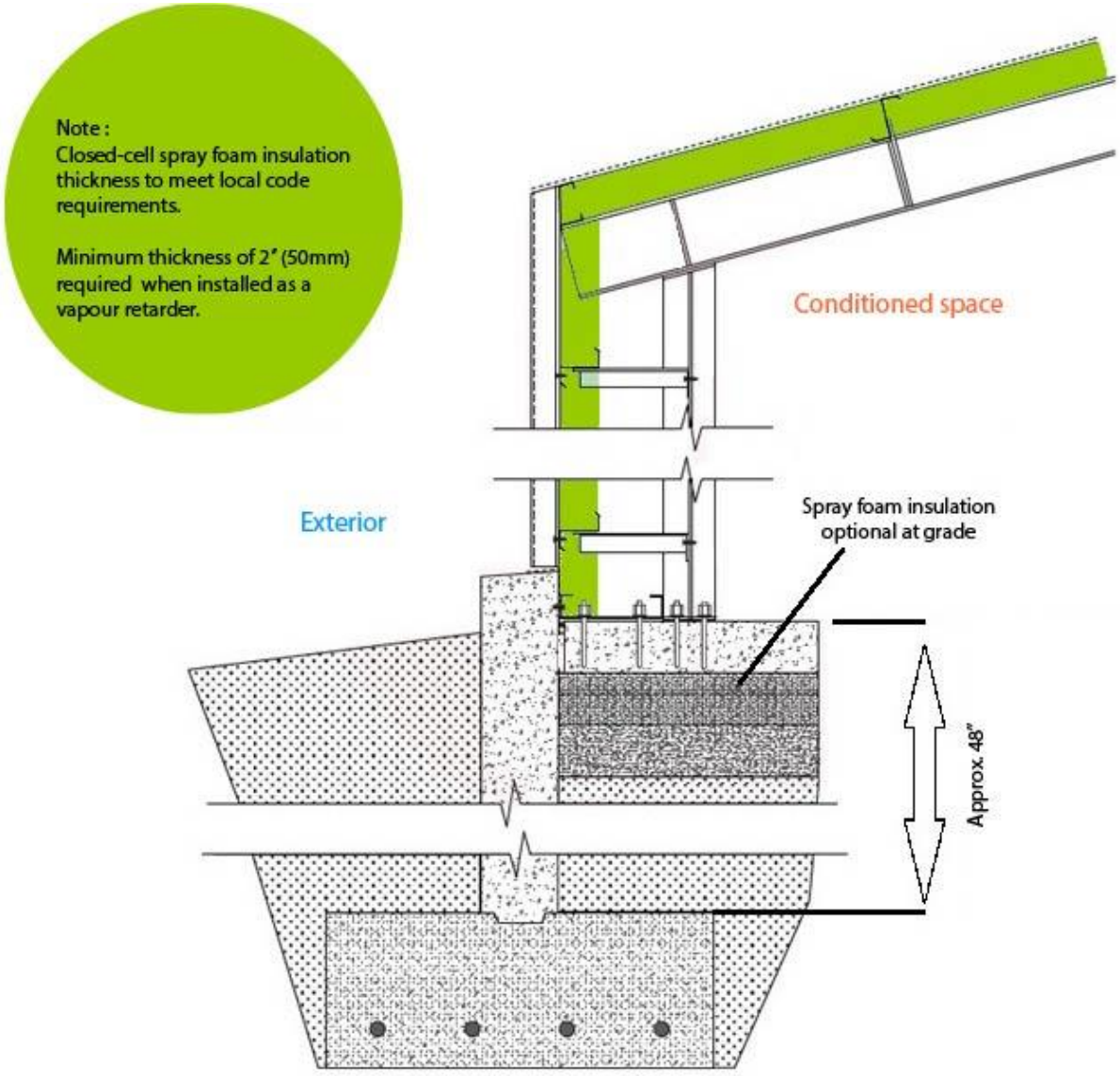


Wall Section: Sealed Crawl Space with Termite Inspection Area



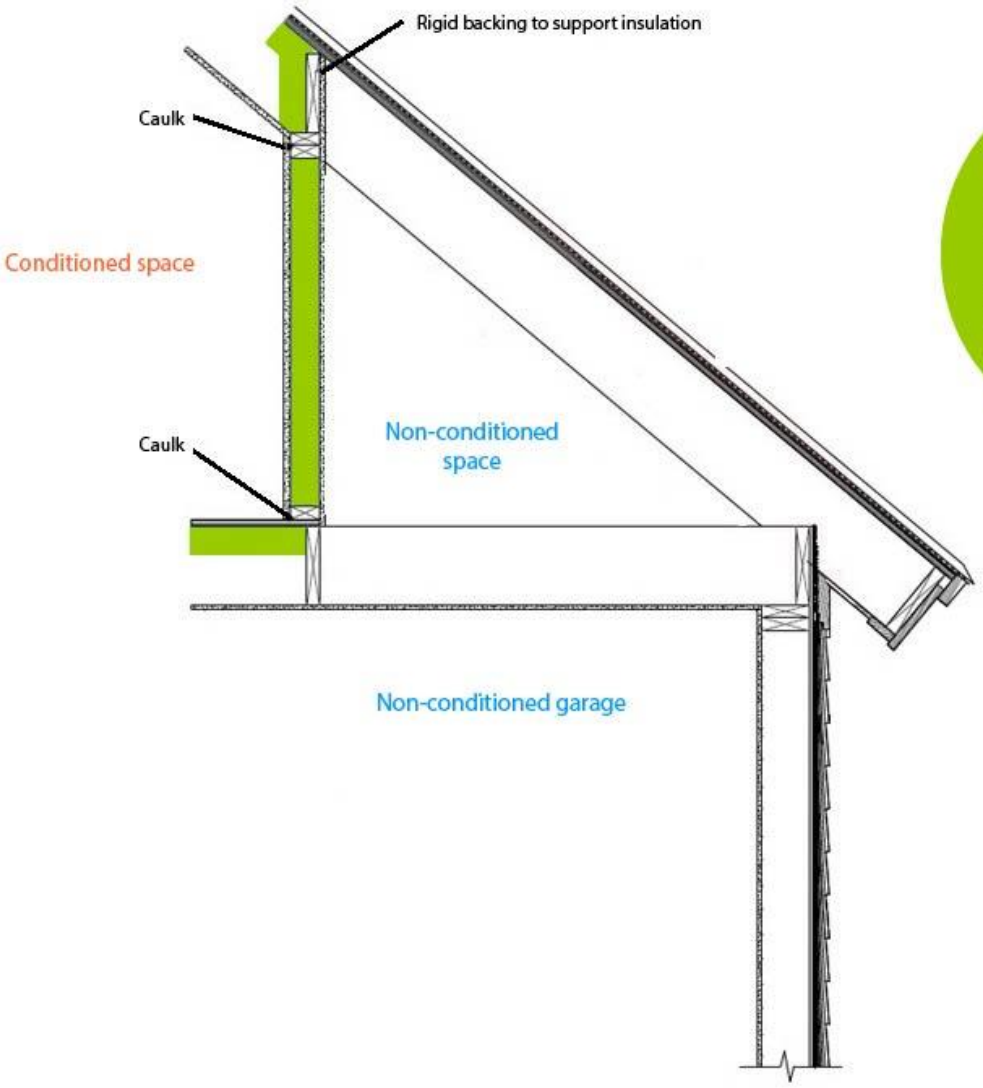
Wall Section: Steel-framed Construction

with Heated Interior



Wall Section: Finished Room Above

Non-Conditioned Garage



Note :
Closed-cell spray foam insulation thickness to meet local code requirements.

Minimum thickness of 2" (50mm) required when installed as a vapour retarder.

Wall Section: Sound-attenuating Wall