# Window Installation Methods for Frame Walls with Foam Sheathing

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Applied Building Technology Group (ABTG) is committed to using sound science and generally accepted engineering practice to develop research supporting the reliable design and installation of foam sheathing. ABTG's educational program work with respect to foam sheathing is supported by the Foam Sheathing Committee (FSC) of the American Chemistry Council.

ABTG is a professional engineering firm, an approved source as defined in Chapter 2 and independent as defined in Chapter 17 of the IBC.

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Foam sheathing research reports, code compliance documents, educational programs and best practices can be found at www.continuousinsulation.org.

Foam Plastic Applications for Better Building

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# Outline

- Background
- Key Principles
- Scope
- Applicability
- Installation Details
- Installation Steps

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# Background

- There are many acceptable ways to mount and detail windows for support and weather resistance.
- This presentation covers representative solutions for integrating windows with Foam Plastic Insulating Sheathing (FPIS).
- It is the responsibility of the user to verify the appropriateness of any specific detail for their specific conditions.

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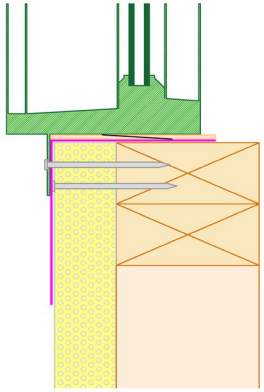
# Key Principles

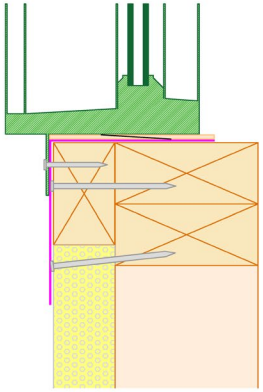
- The intent of any acceptable detail for integrating windows with FPIS is:
  - To provide adequate structural support to the window unit.
  - To prevent water penetration at the window-wall interface by flashing to direct water onto the exterior surface of the WRB layer and/or cladding and away from the window opening.
  - Ensure the detail is consistent with or meets the intent of window, flashing, and WRB manufacturers' installation instructions.

# Scope

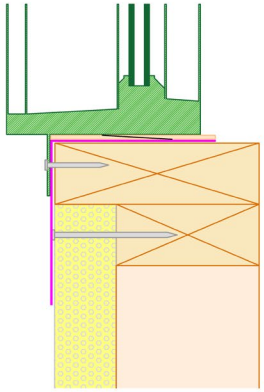
- Four installation methods are featured in this presentation
- Other wall components not shown include:
  - Cladding (various types)
  - Structural sheathing (if required for bracing)
  - Interior finish (e.g., gypsum wallboard)
  - Vapor retarder (various types or “classes” as required by code)



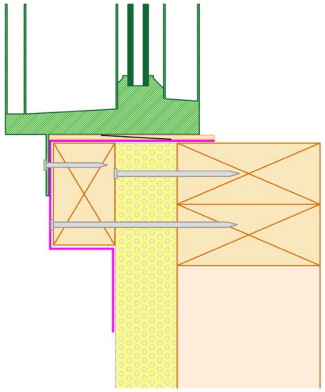
Standard



Picture Frame



Window Buck



Rainscreen (furred siding)

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# Applicability

- The “standard” method is traditionally used for FPIS up to 1-1/2” thick and windows not more than 6’ wide
- The “picture frame” method is used where additional window support is needed and with FPIS of ¾” to 1-1/2” thick to match typical 1x or 2x lumber thickness
- The “window buck“ method also is used where additional window support is needed and usually when the FPIS is over 1-1/2” thick.
- The “rainscreen” method is used with rainscreen (furred) cladding installation.


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# Applicability

- The installation methods featured in the presentation assume use of windows with integral mounting flanges (i.e., nail fin).
  - Although, some methods (like the window buck and picture frame methods) are relevant to "block frame" windows without a flange
- Fasteners are installed through the pre-punched holes in the flange and flashing and sealants are applied to the flange during installation
  - Be sure that the flange fastener length is increased to accommodate the thickness of FPIS when using the "standard" installation method.

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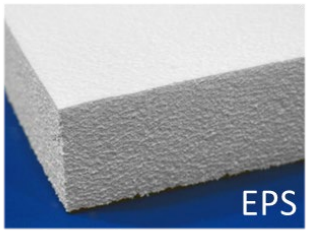
# Applicability

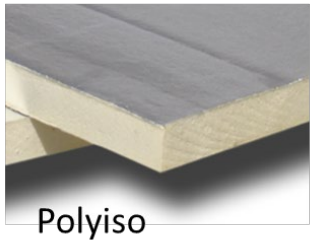
- Similar installation methods can be used for flanged door installations
  - Thresholds should always have full support (e.g., blocking equal to thickness of FPIS – similar to that used for the “picture frame” method)
  - Where frame/hinge anchors are required into rough opening framing, in-swing exterior doors generally allow for FPIS thickness of up to 1-1/2 inches. Beyond that, use of a “window buck” is recommended.
    - Outswing exterior doors generally require use of a “window buck” where FPIS thickness exceeds 1”

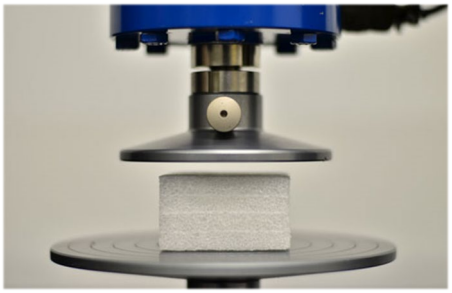
# Applicability

- FPIS materials comply with the following standards:
  - Expanded Polystyrene (EPS) - ASTM C578,
  - Extruded Polystyrene (XPS) - ASTM C578, or
  - Polyisocyanurate (Polyiso) - ASTM C1289
- Where the window flange bears directly on FPIS, the FPIS must have a minimum compressive strength of 15 psi per the above standards (equivalent to 2,160 PSF bearing capacity).







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# Applicability

- The installation methods featured in this presentation assume use of FPIS as a water-resistive-barrier (WRB) system.
  - Refer to DrJ DRR 1410-05 for a listing of FPIS manufacturers with code-approved FPIS WRB systems and installation instructions.
  - Use of a separate WRB material layer is also common and acceptable with appropriate installation and detailing.

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# Applicability

- Use flashing materials and sealants recommended by the window, FPIS, and/or WRB manufacturers.
- Flexible adhered flashing is featured in this presentation, but fluid-applied flashings also may be used in similar fashion.
- Follow sealant and flashing manufacturer's instructions to ensure adhesion and durability.

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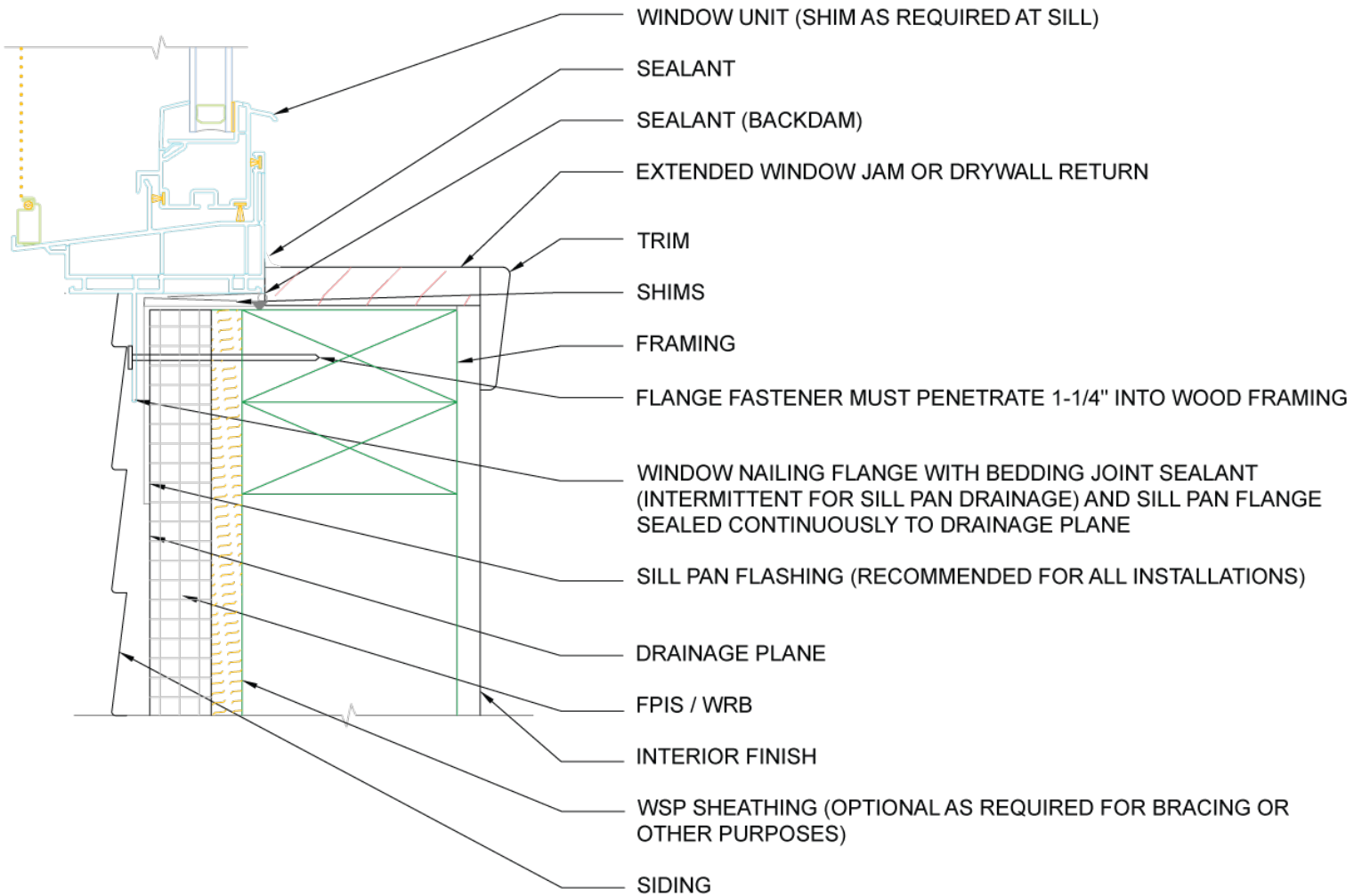
# Installation Details

- Ordered by installation method:
  - Sill details
  - Jamb details
  - Head details

# Standard Method – Sill Detail

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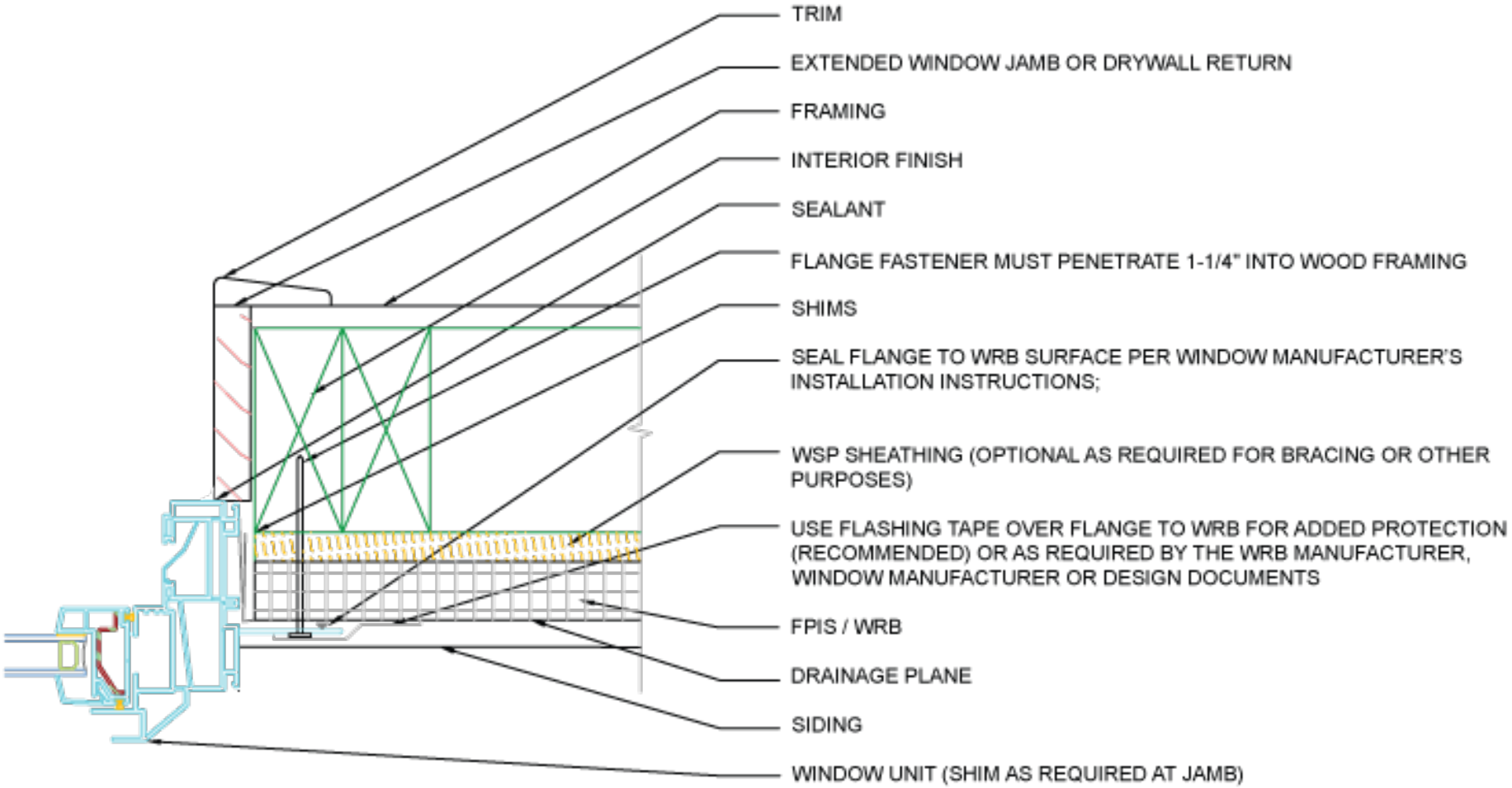
# Standard Method – Jamb Detail

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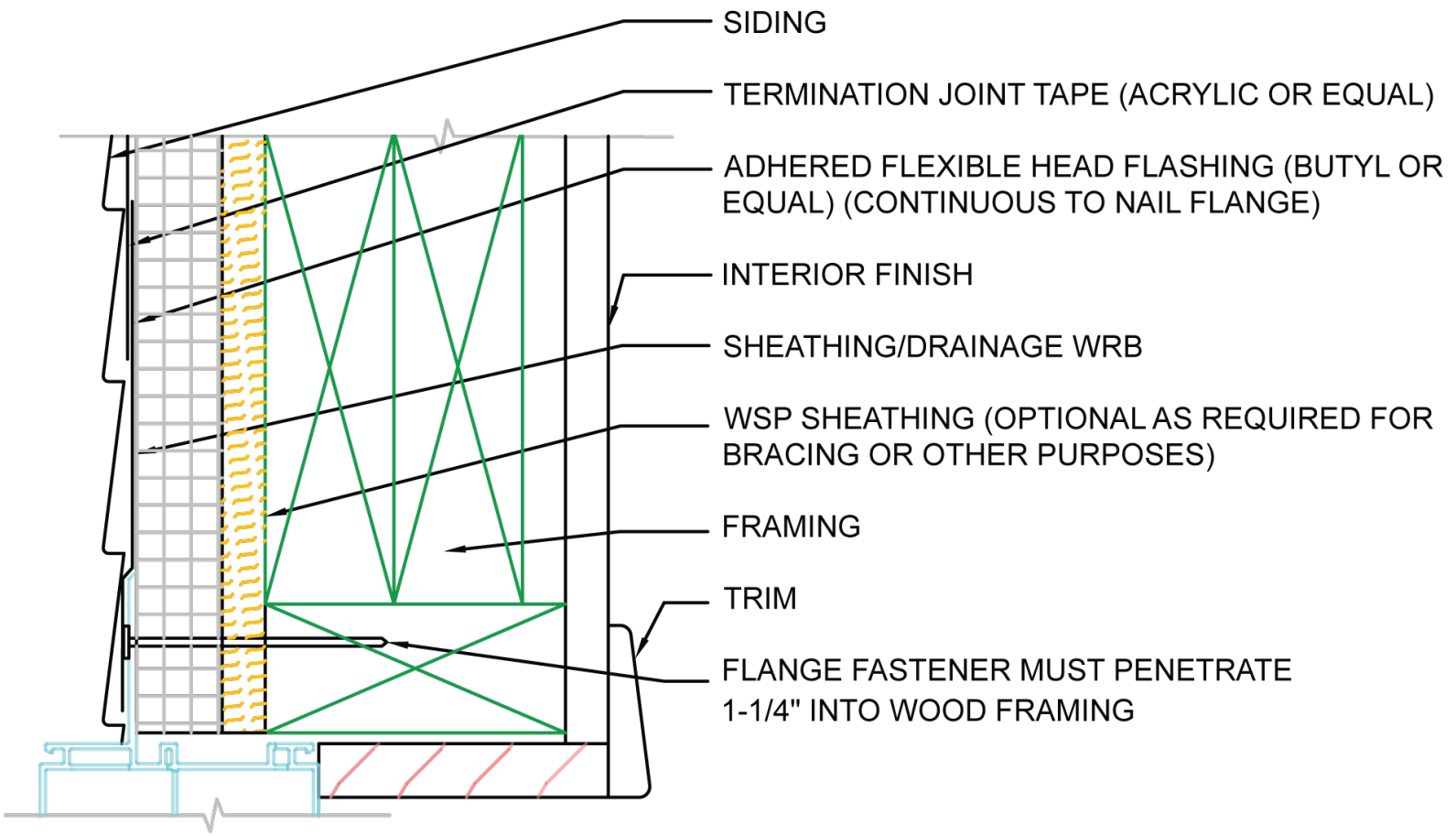
# Standard Method – Head Detail

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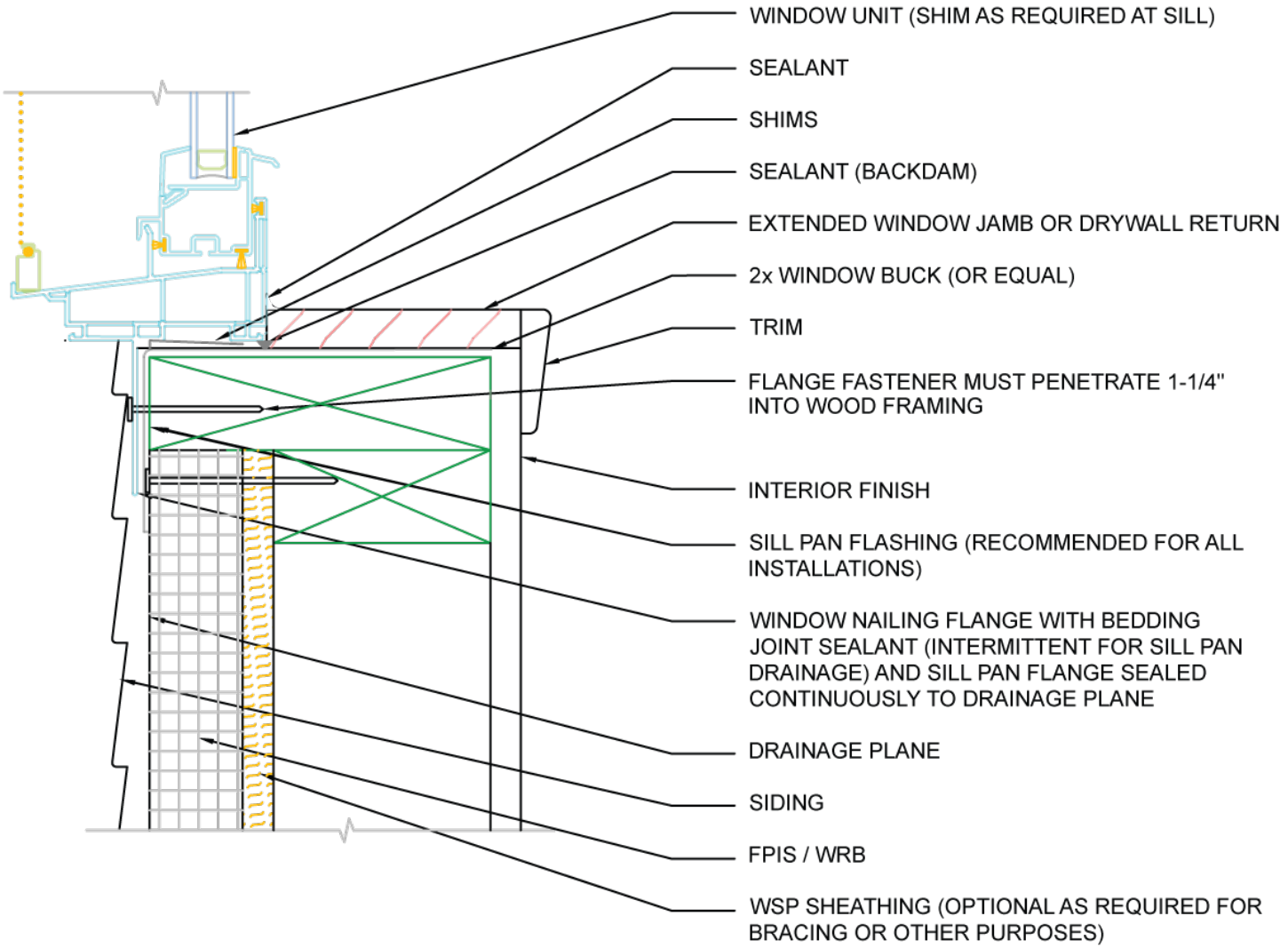
# Window Buck – Sill Detail

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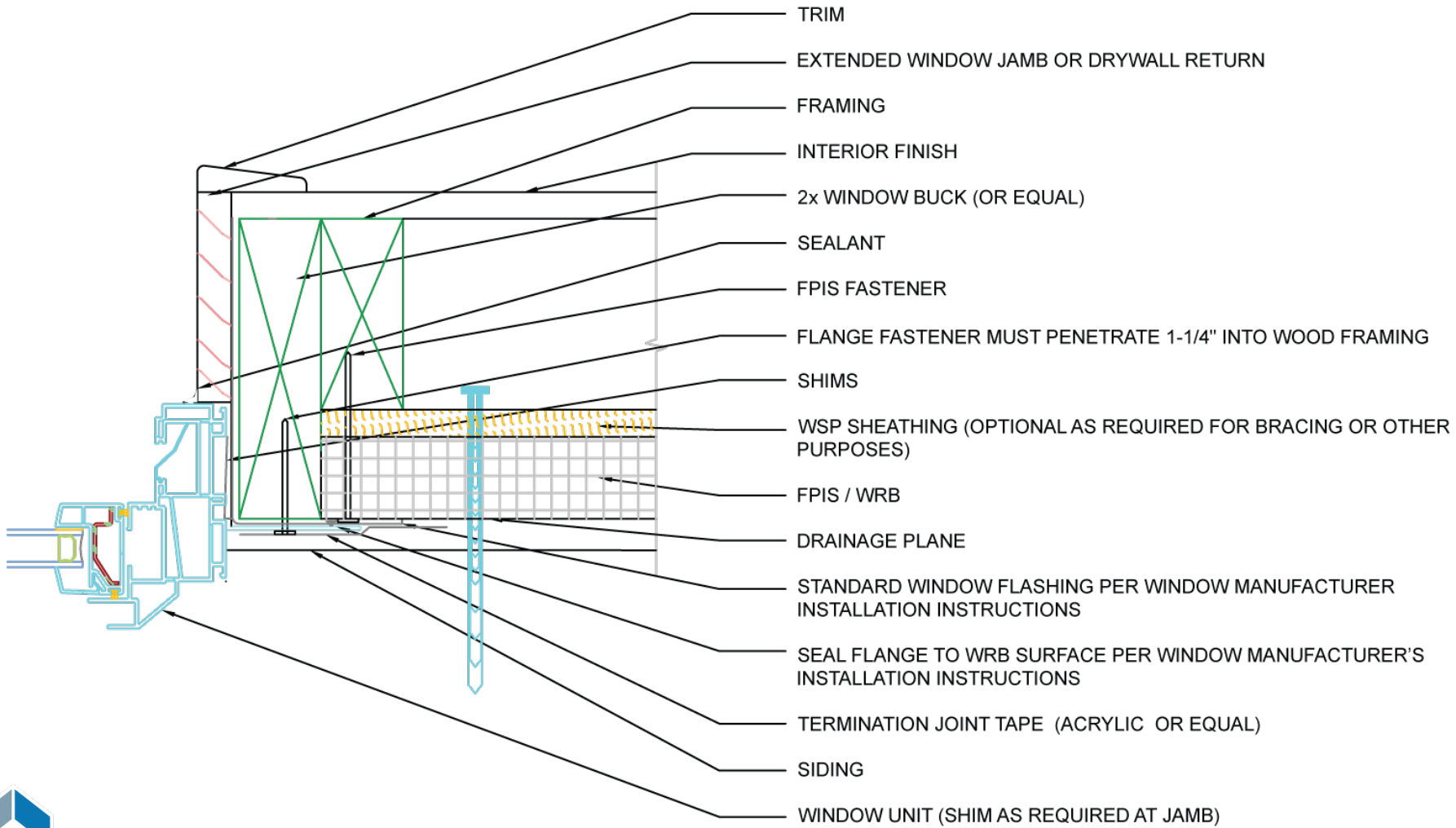
# Window Buck – Jamb Detail

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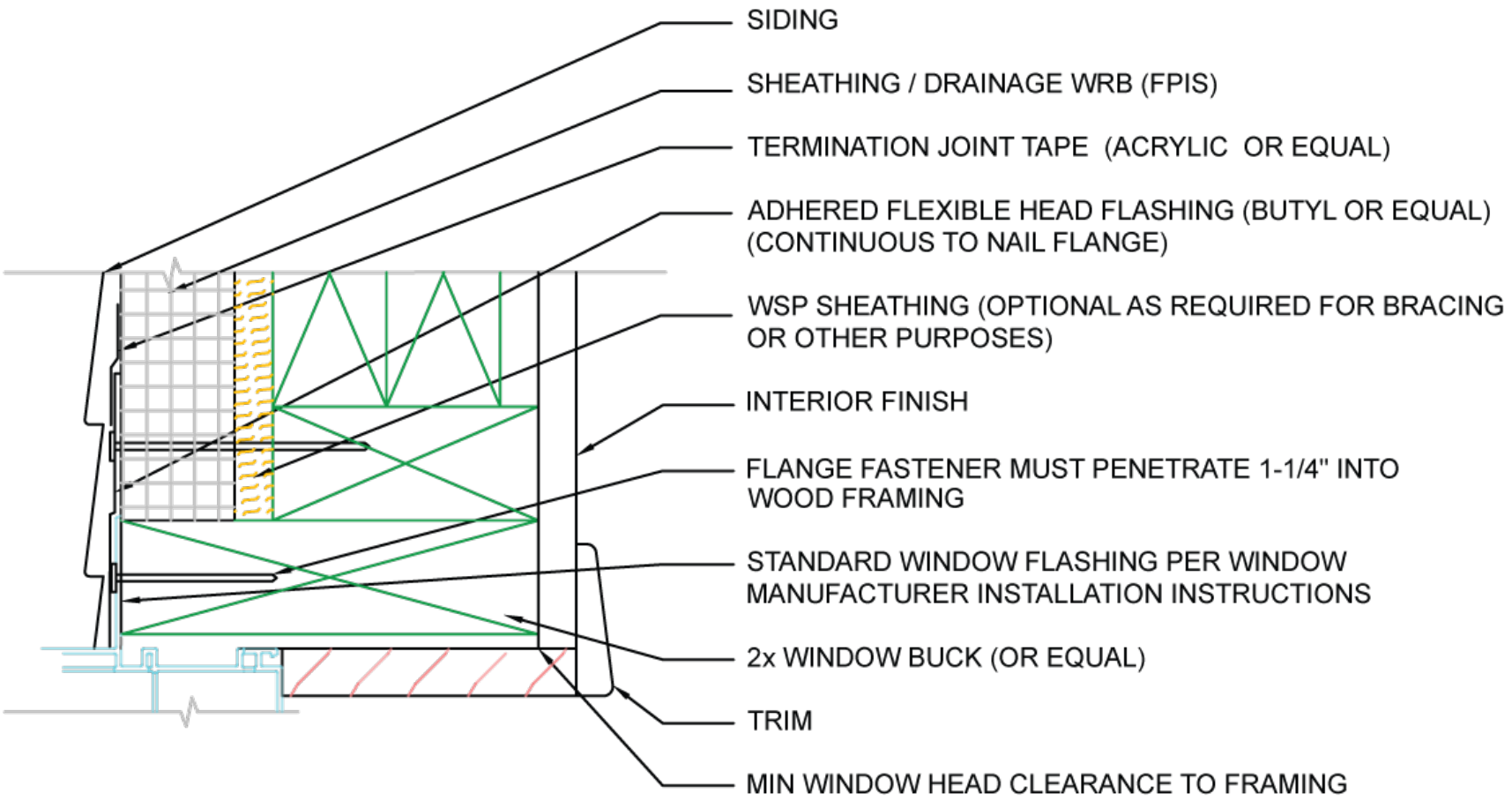
# Window Buck – Head Detail

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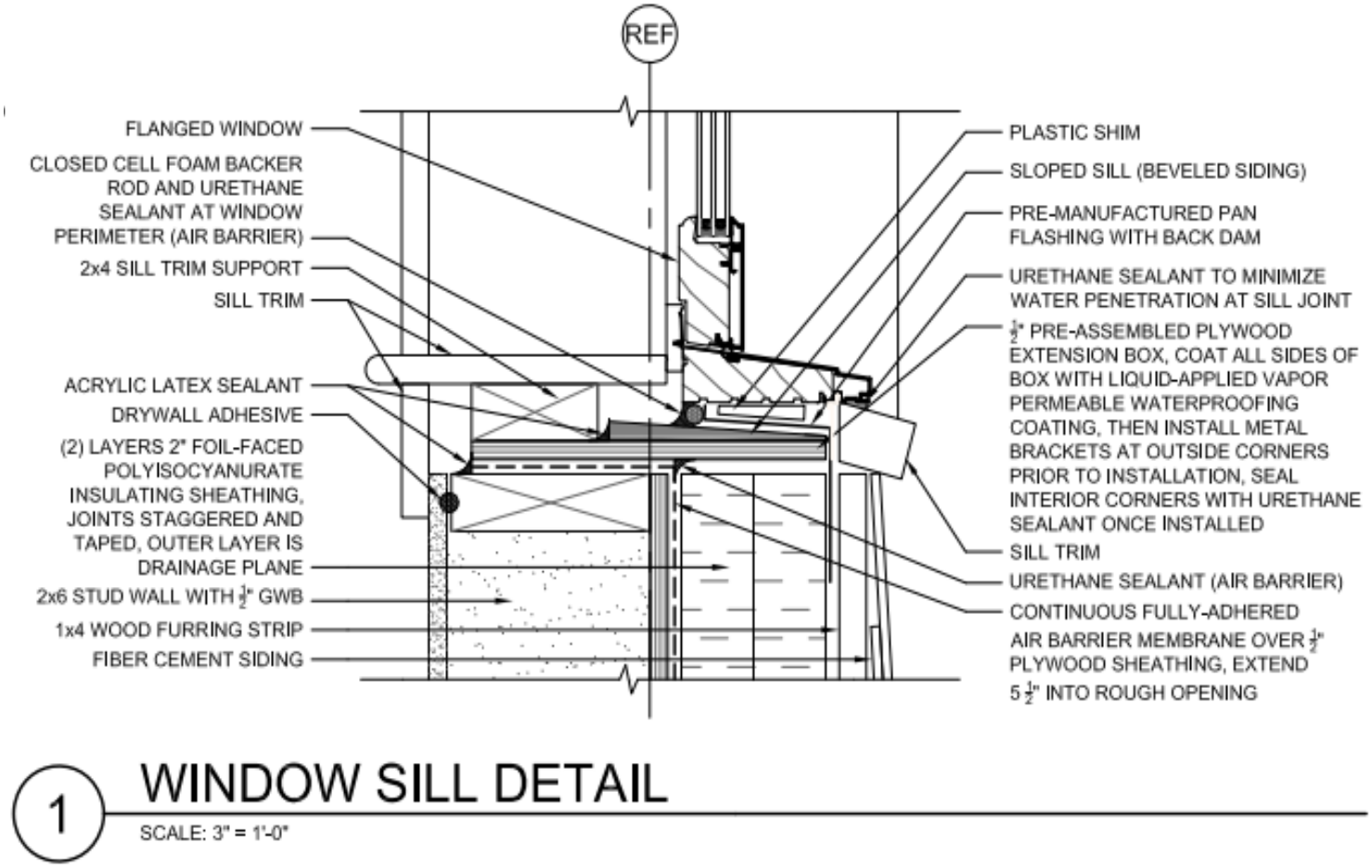
# Window Buck – Plywood Buck

## (alternative to 2x lumber buck)




1 WINDOW SILL DETAIL

SCALE: 3" = 1'-0"

https://www.nist.gov/system/files/nzertf-architectural-plans3-june2011.pdf

https://www1.eere.energy.gov/buildings/publications/pdfs/building_america/incorporating-thick-layers-exterior-insulation.pdf

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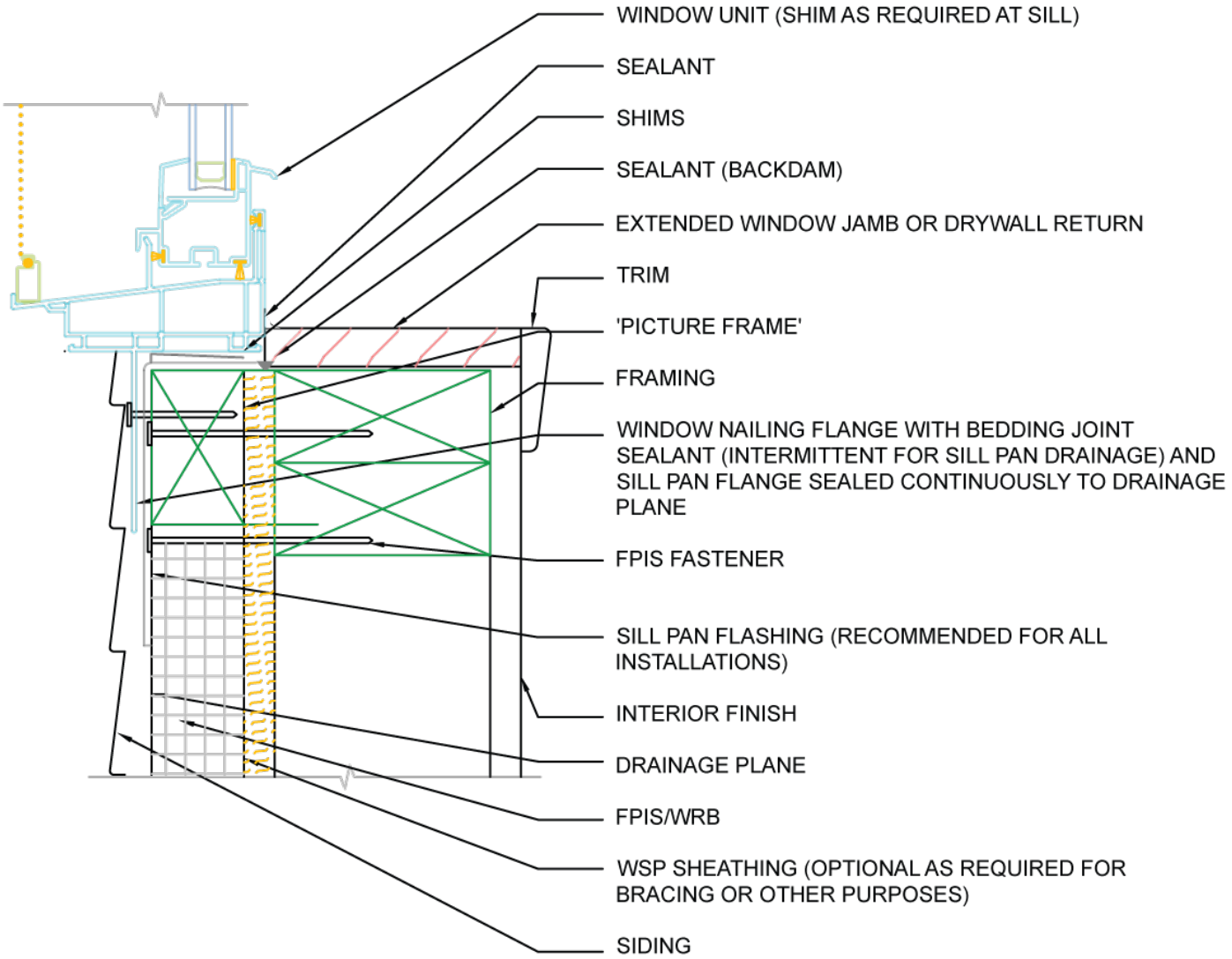
# Picture Frame – Sill Detail

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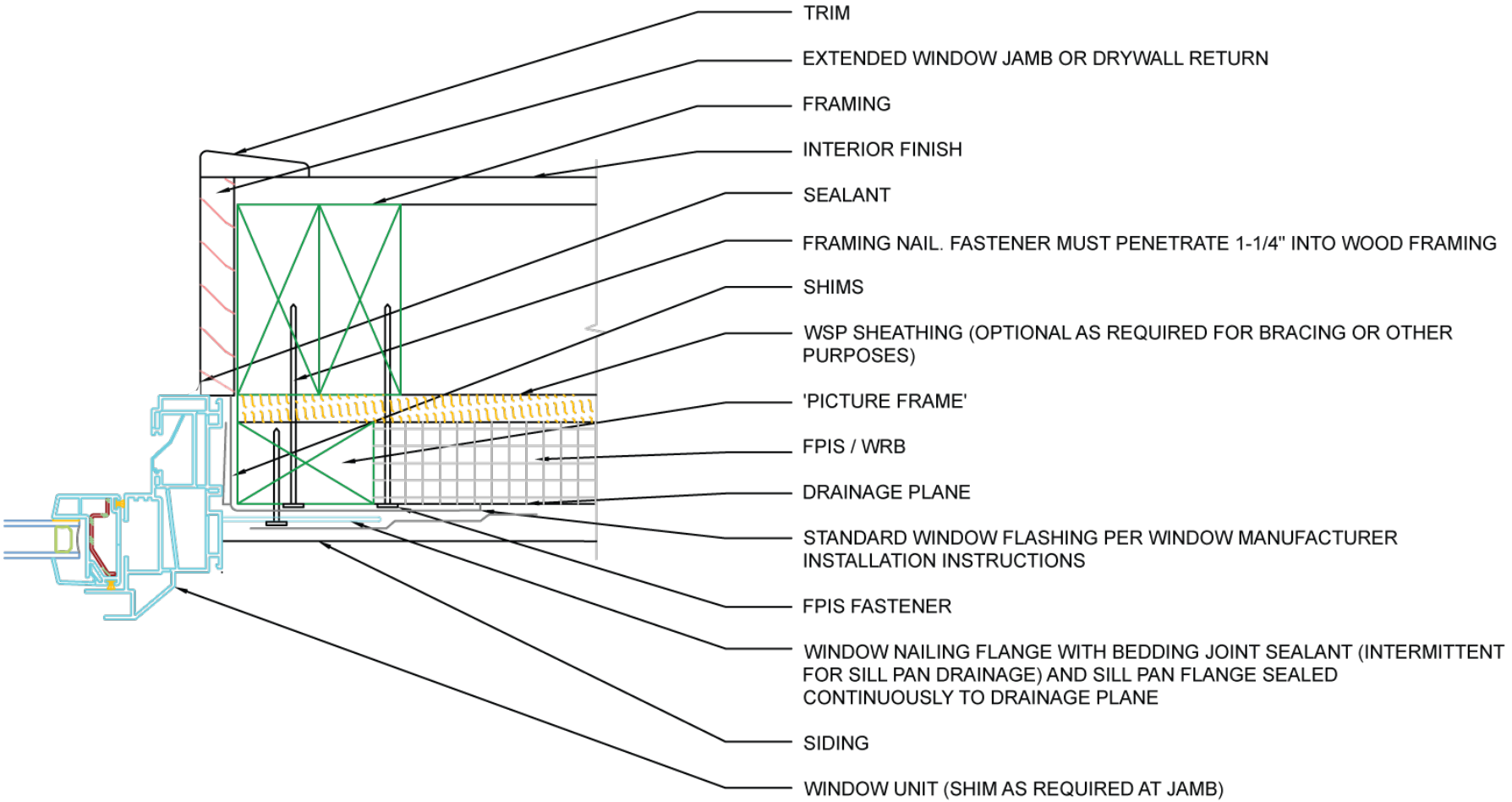
# Picture Frame – Jamb Detail

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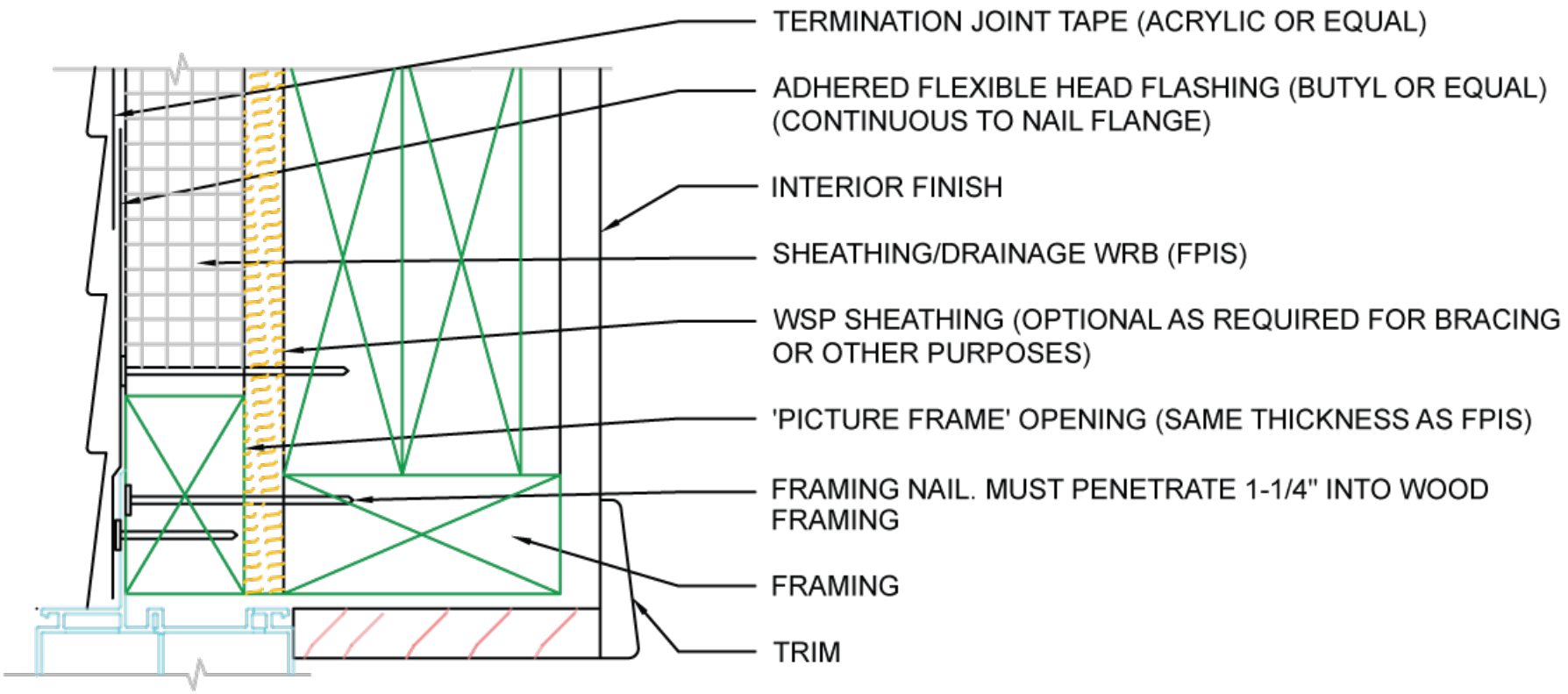
# Picture Frame – Head Detail

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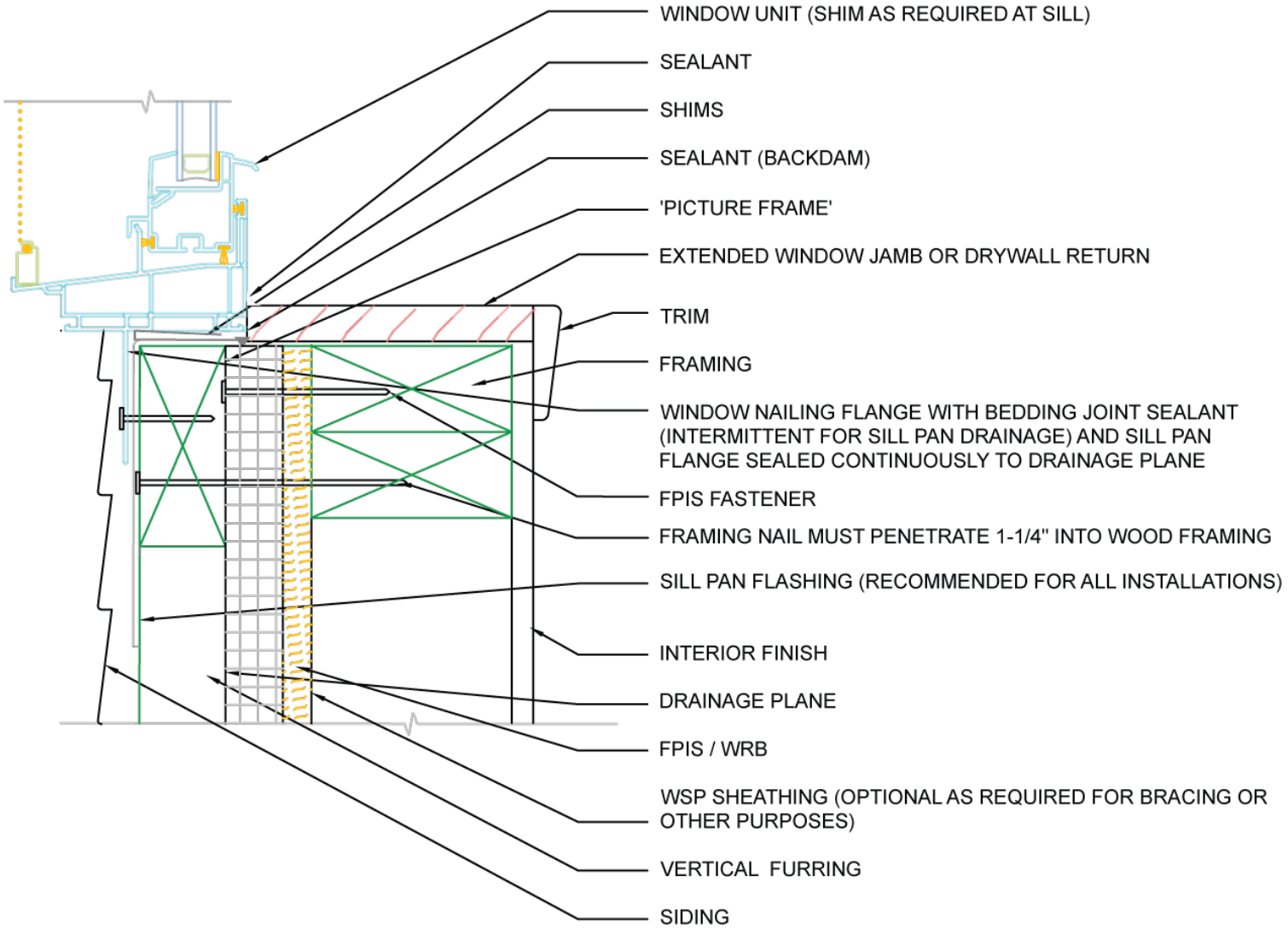
# Rainscreen Method – Sill Detail

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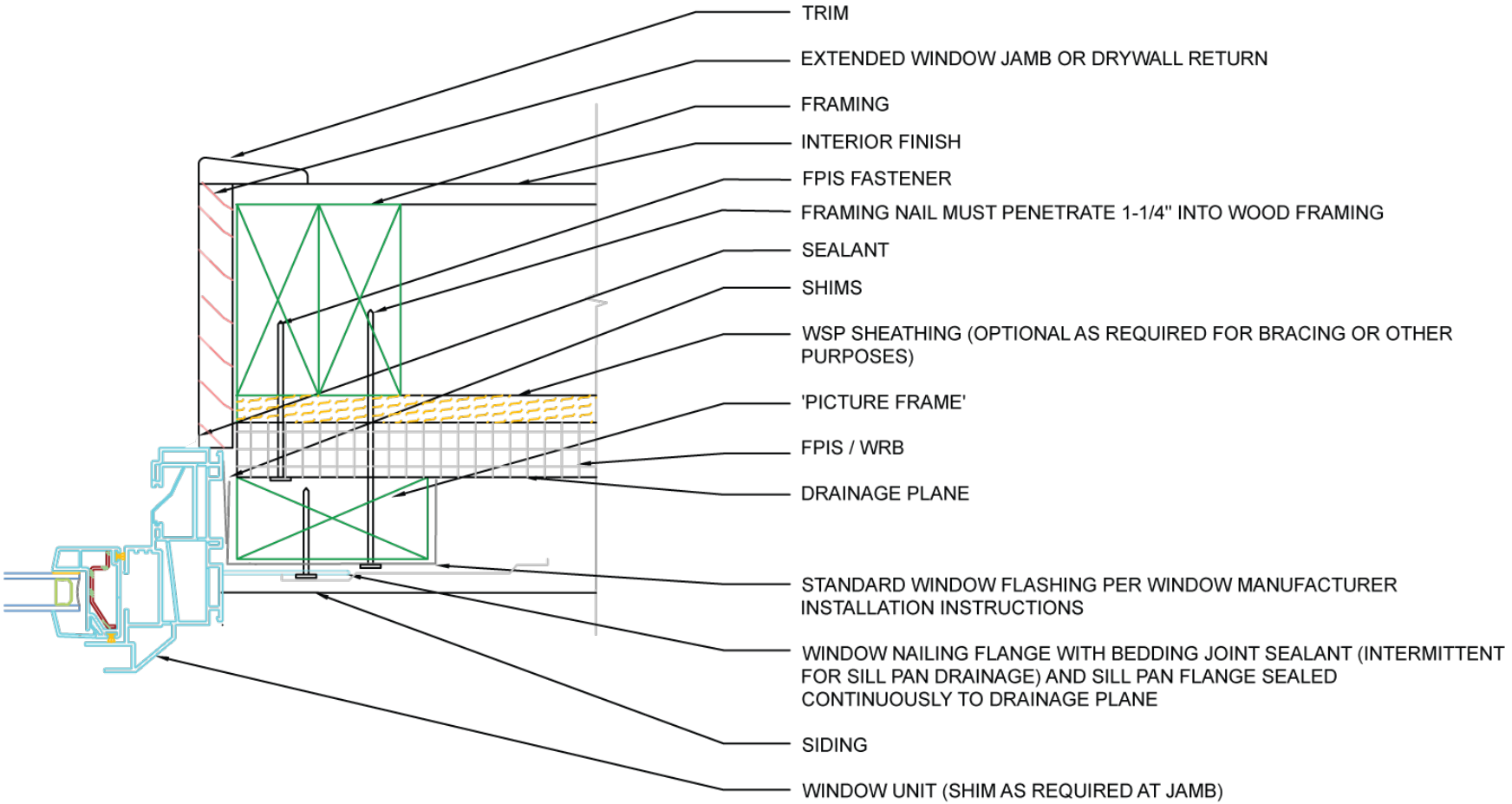
# Rainscreen Method – Jamb Detail

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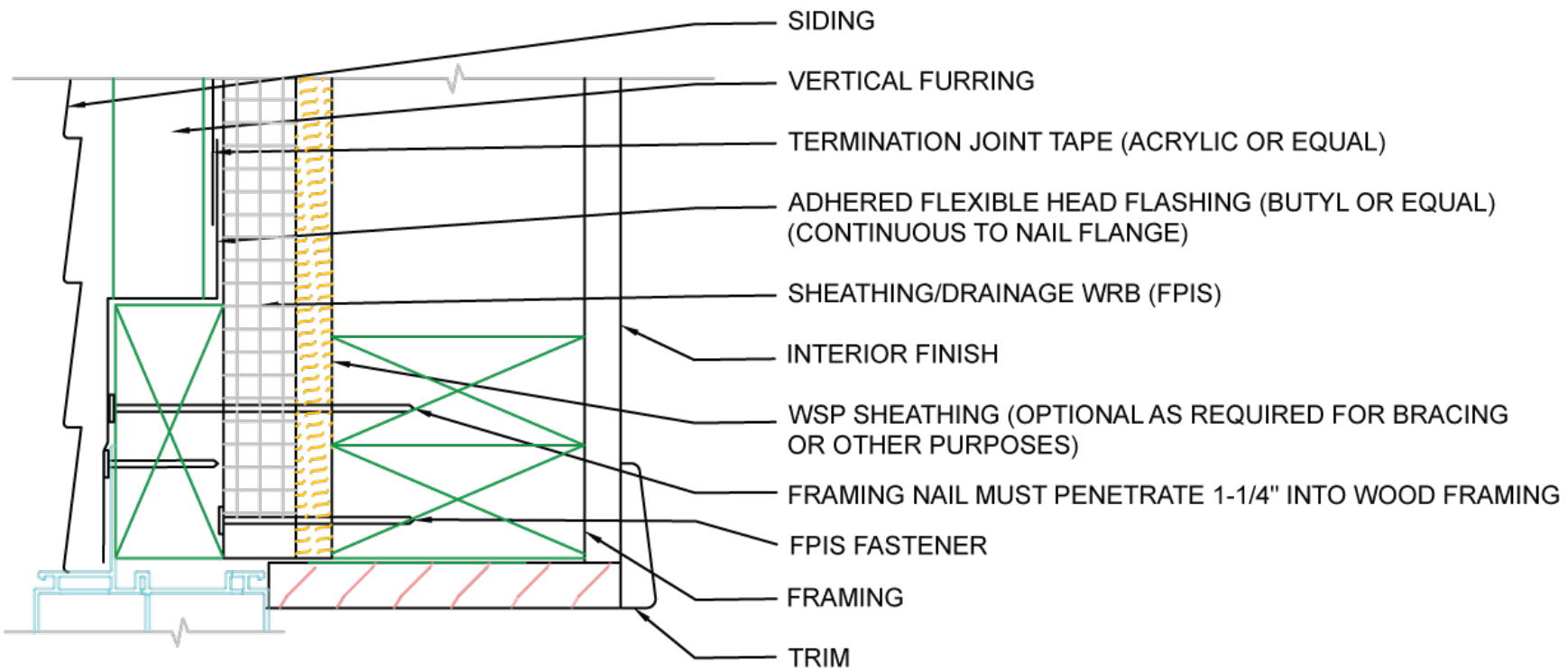
# Rainscreen Method – Head Detail

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# Basic Installation Steps

- The following installation steps are based on the “standard” method
- Similar steps apply to the other installation methods (see previous detail differences).
- For a printable installation instructions refer to CI’s Quick Guide on Window Installation.

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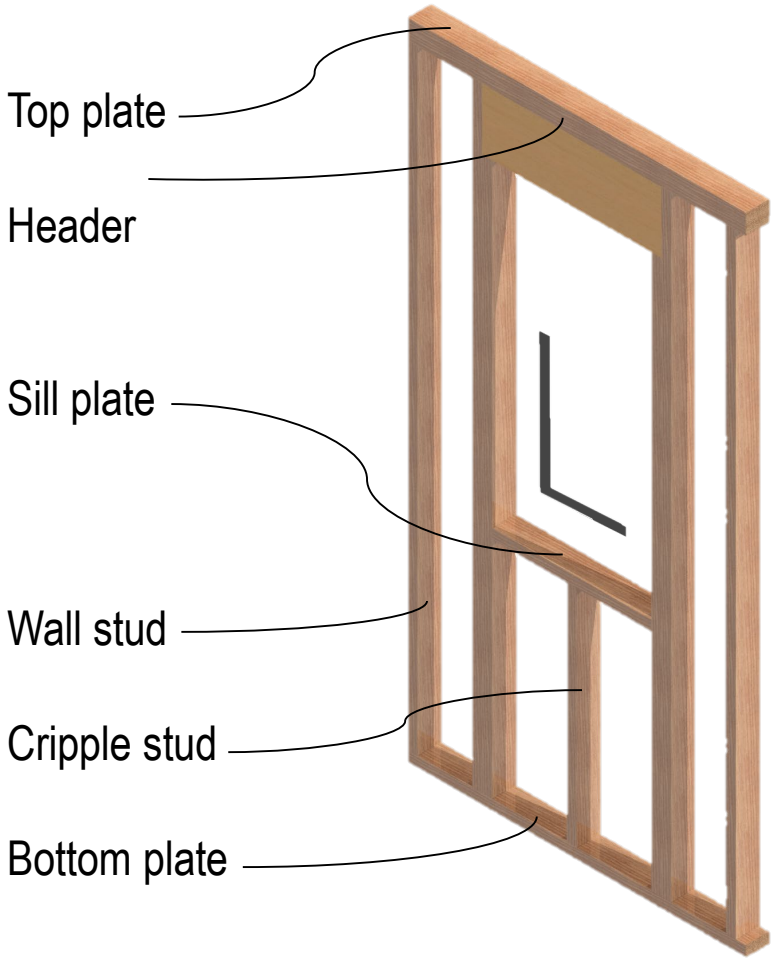
# STEP 1: Frame Window Opening

- Frame walls with wood or steel as required by the applicable code.
- Ensure window rough opening is square and plumb and of the size required for the window.
  - If using the “window buck” method, frame the buck into the rough opening or be sure to leave extra clearance for the buck to be installed after framing to accommodate the required window rough opening size.

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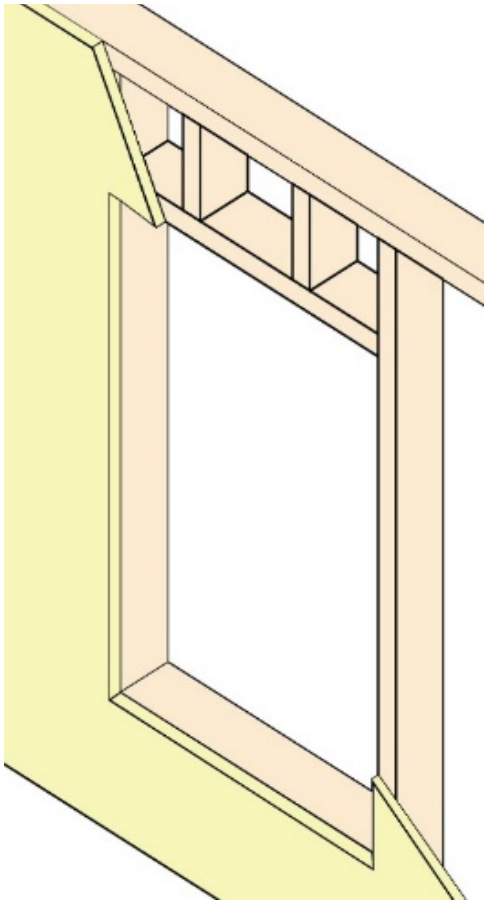
# STEP 2: Install FPIS

- Follow FPIS manufacturer's installation instructions
- If an FPIS WRB system, install flashing and joint sealing materials per manufacturer's instructions
  - Where a separate WRB is used, following the WRB manufacturer's installation instructions



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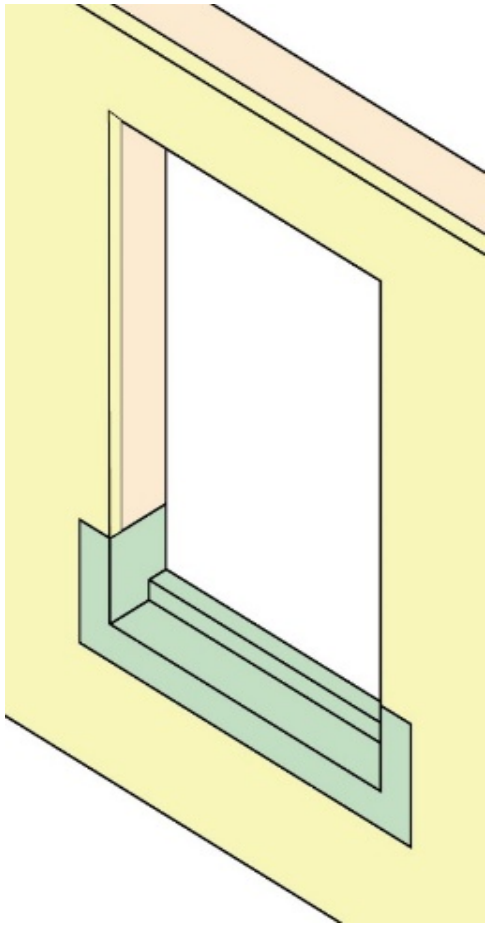
# STEP 3: Install Sill Pan Flashing

- Pan flashing is a recommended best practice and is required by some manufacturer's instructions.
- Apply flashing or sill pan component in accordance with manufacturer's instructions.
- Sloped sill is recommended, especially if sealant to window frame is used as the backdam (see STEP 8).



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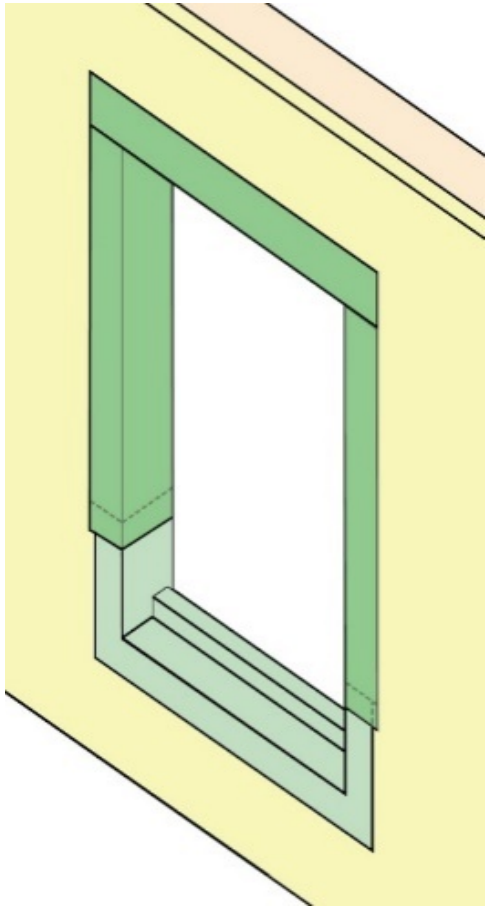
# STEP 4: Install Rough Opening Jamb and Head Flashings

- Recommended best practice for continuous air-barrier between wall and window.
- Sometimes required or recommended by manufacturer's instructions.
- Shingle lap jamb flashing over sill flashing and head flashing over jamb flashing



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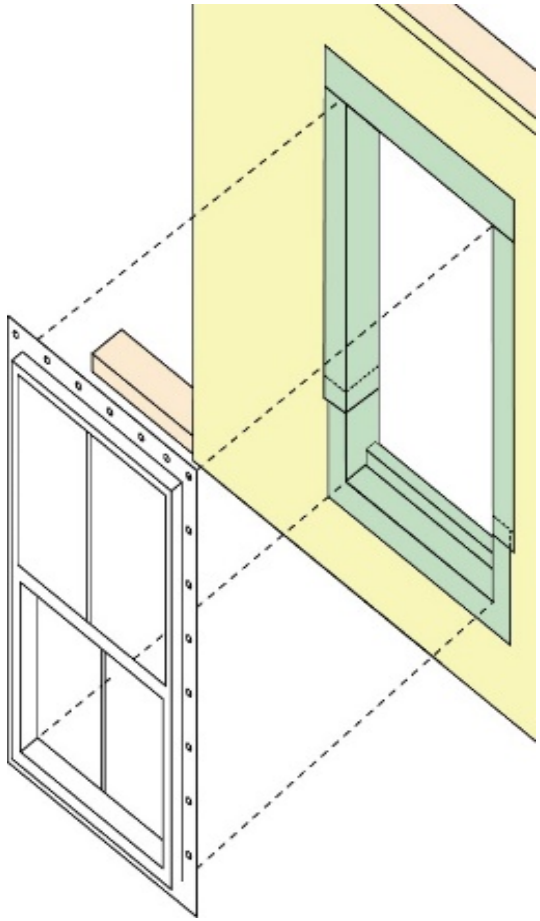
# STEP 5: Install Window

- Follow window manufacturer's instructions for flange fastening, support (e.g., shims), and additional anchorage if required (e.g., frame fasteners or brackets).
- Use flange fasteners of sufficient length to penetrate FPIS and framing
- Apply bedding sealant under flange per manufacturer's instructions
  - Omit at sill flange for drainage if using a sill pan



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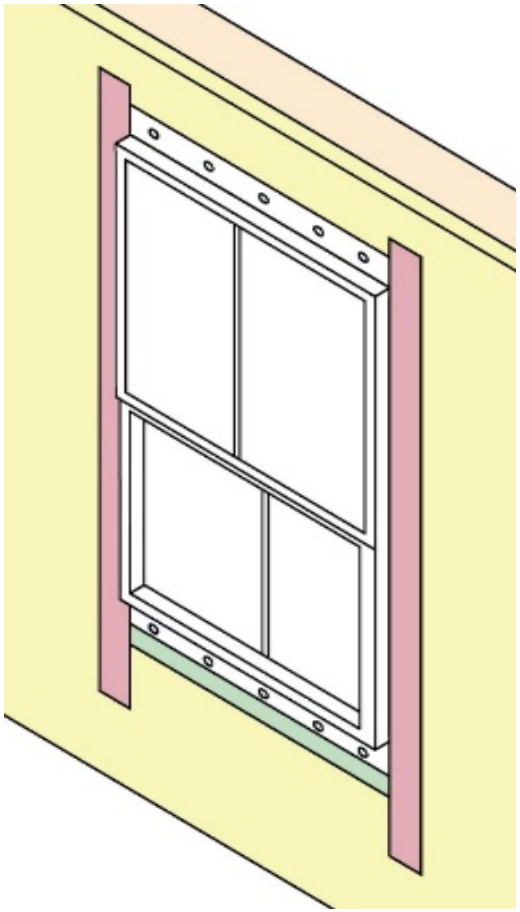
# STEP 6: Install External Jamb Flashings

- Follow flashing manufacturer's instructions for proper application



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# STEP 7: Install External Head Flashing

- Follow flashing manufacturer's instructions for proper application
- Where flexible adhered flashing is used, a best practice is to apply "termination tape" over the top edge of the adhered flashing for extra protection
  - FPIS WRB joint tape is often used for this purpose

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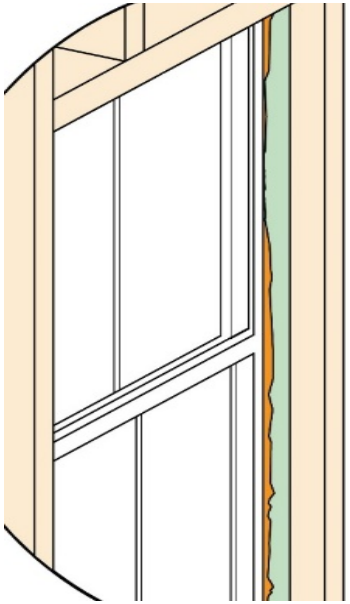
# Step 8: Apply Sealant

- Air seal window around entire perimeter on the interior with sealant or low-expanding foam made for this purpose.



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# Additional Resources

- For additional window installation resources refer to:
  - Window Installation Application page
  - CI's Quick Guide on Window Installation
  - ABTG Research Report 2104-01 – Installation & Performance of Flanged Fenestration Units Mounted on Walls with FPIS
  - Window Installation Details for Effective Sealing Practice (from the National Research Council of Canada)
  - Window Sill Details for Effective Drainage of Water (from the National Research Council of Canada)
- Always use product manufacturer's installation instructions as the primary resource!

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