

# High Performance Window Flashing

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Project Engineer, SME*



# Outline

- Windows of the past
- Window Design vs. Flashing Design
- Sample Window Flashing Design
- Window Flashing Case Study

# Back When...

# Back When...

An overhang  
protects the wall





# Back When...



# Back When...



Shutters are closed during the rain



# Back When...





# Back When...



Vatican Museum

# Window Performance Tests

- 1965 – Air Leakage (ASTM E 283)
- 1967 – Uniform Static Water Leakage (ASTM E 331)
- 1967 – Structural Wind Pressure (ASTM E 330)
- 1975 – Cyclic Static Water Leakage (ASTM E 547)
- 1980 – Condensation Resistance (AAMA 1503.1 0)
- 1983 – Dynamic Water Leakage (AAMA 501.1)
- 1983 – Interstory Drift (AAMA 501.4)
- 1983 – Thermal Expansion/Contraction (AAMA 501.5)
- 1991 – Thermal Transmittance (ASTM E 1423)
- 1995 – Acoustical Performance (AAMA 1801)



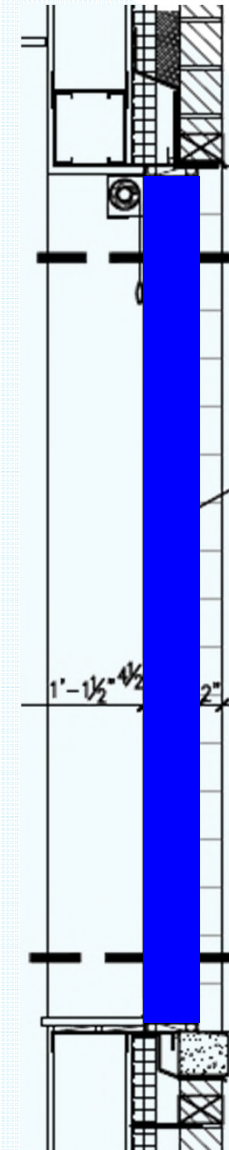
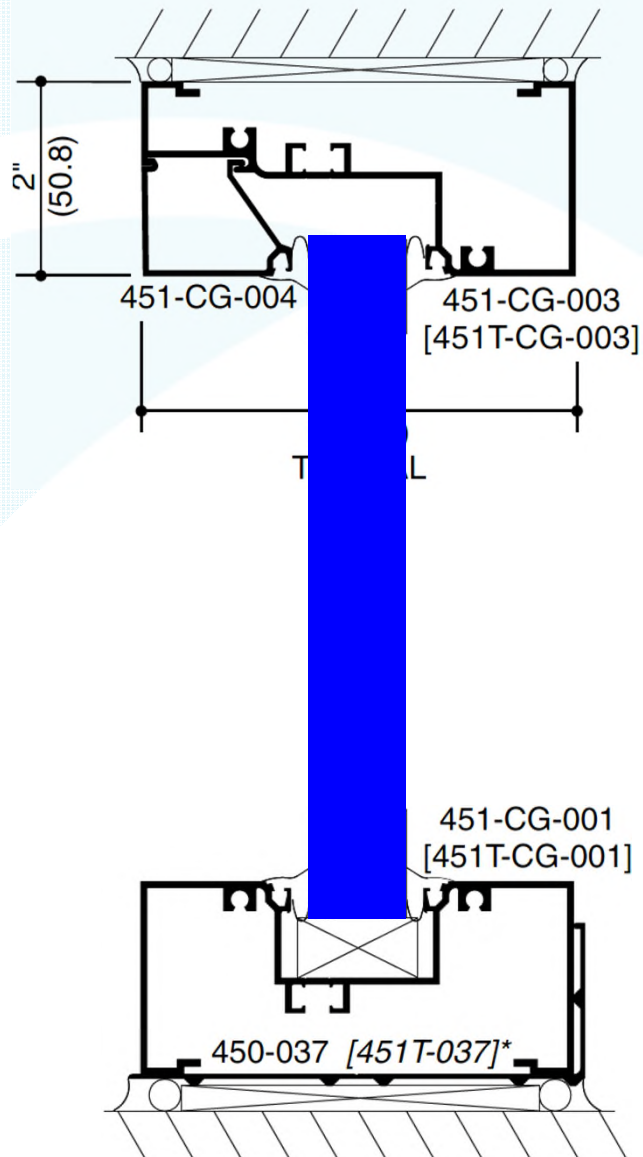
## Through Trial and Error – Window Manufacturers Figured It Out



# Window Design vs. Flashing Design

- Windows are flashed into walls just like glass is flashed into windows.

# Window Design vs. Flashing Design



# Window Design vs. Flashing Design

- Window Manufacturers have the benefit of controlling all aspects of the glass-to-frame interface.



# Window Design vs. Flashing Design

- ASTM E 2112-07 (2001)
  - The requirements promulgated in this practice have...been identified as necessary to ensure that as-installed performance is roughly equivalent to performance in laboratory testing.
  - Window Flashings
    - Sill pan flashing should:
      - be used under all windows and doors
      - form a three-sided pan
      - collect and drain water toward the exterior
      - integrate with the surrounding flashings
      - be sloped to drain
      - not be punctured by window fasteners
    - Provide an air seal around windows that does not impede drainage.



# 1. Sill Pan Flashing Under All Windows

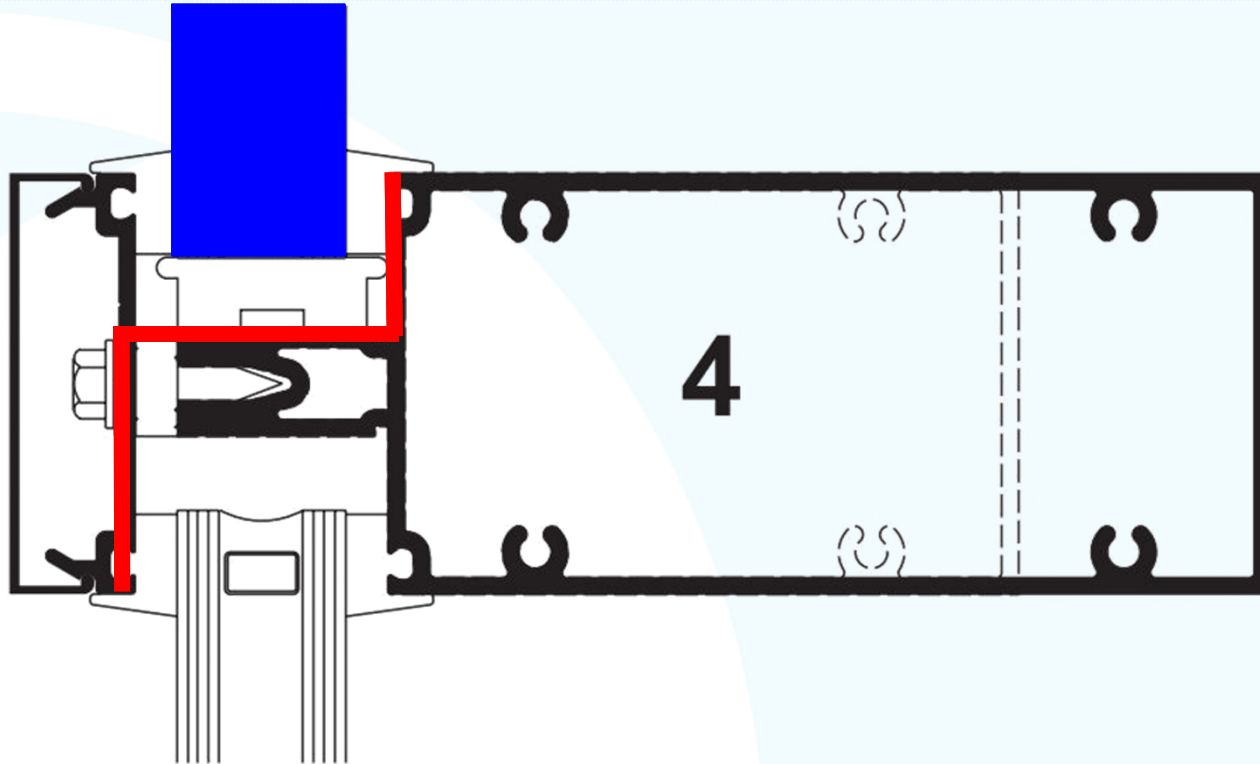


# 1. Sill Pan Flashing Under All Windows





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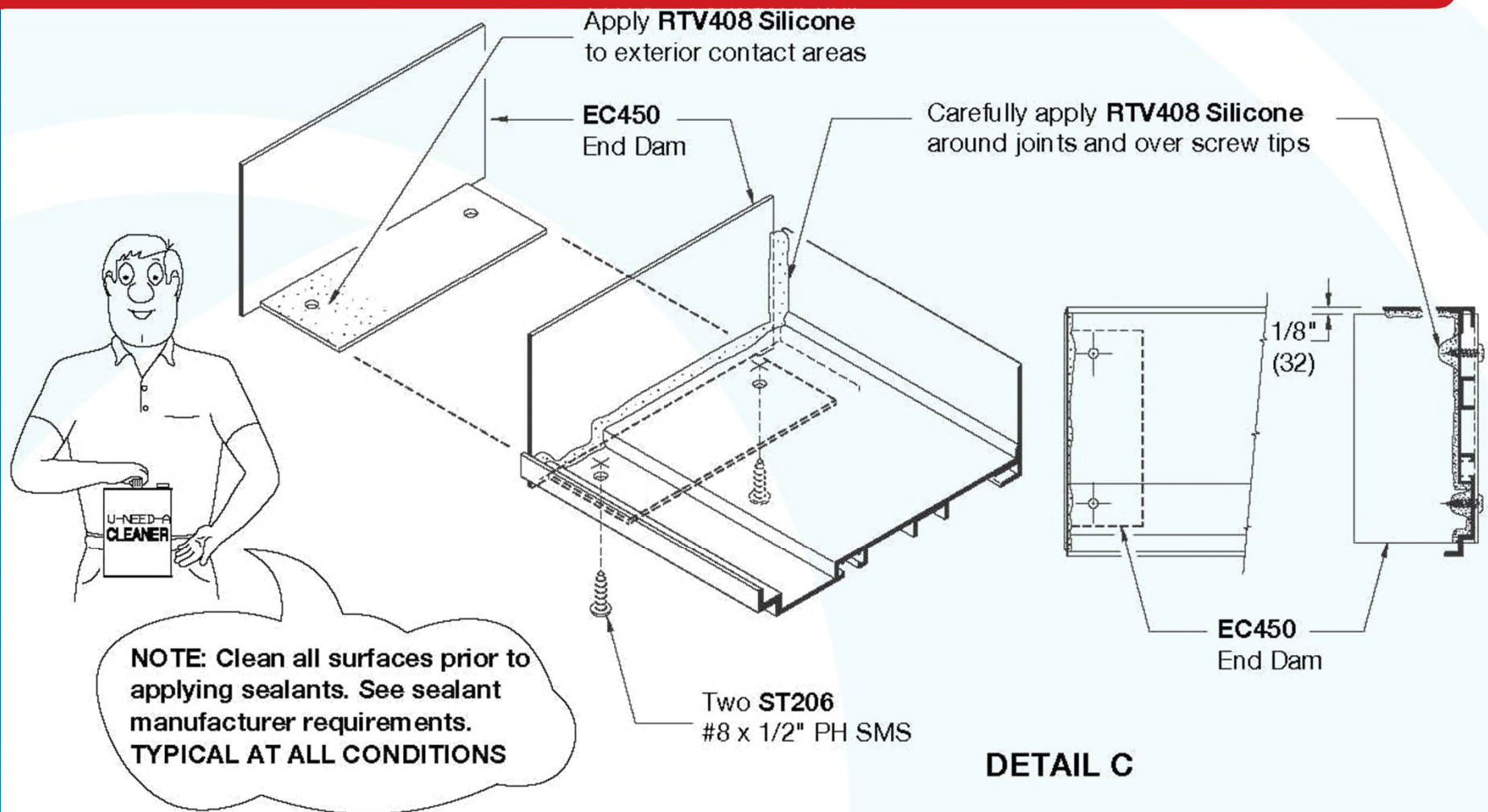


## 2. Three-Sided Sill Pan





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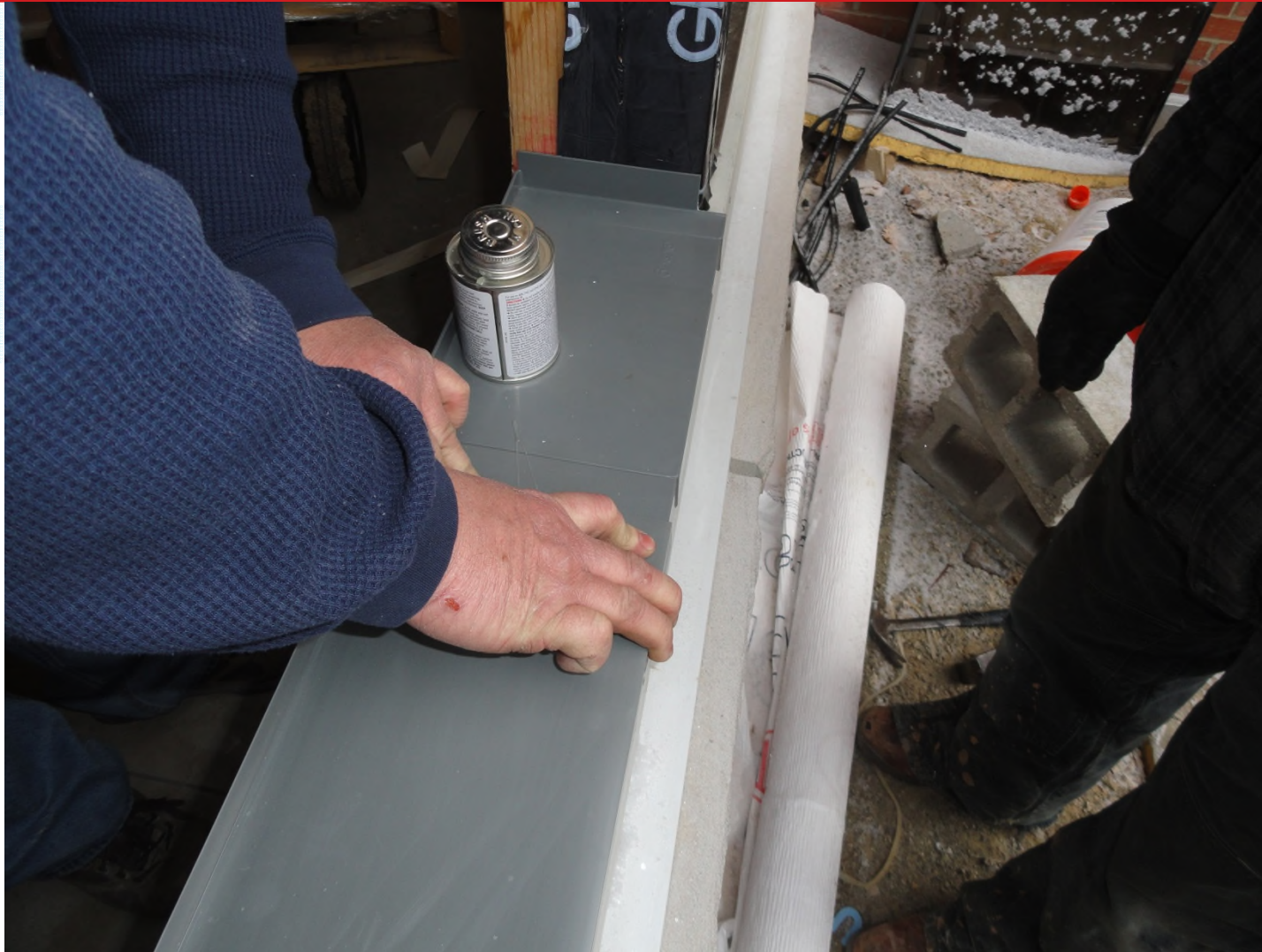




## 2. Three-Sided Sill Pan



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### 3. Sill Pan Collects and Drains Water



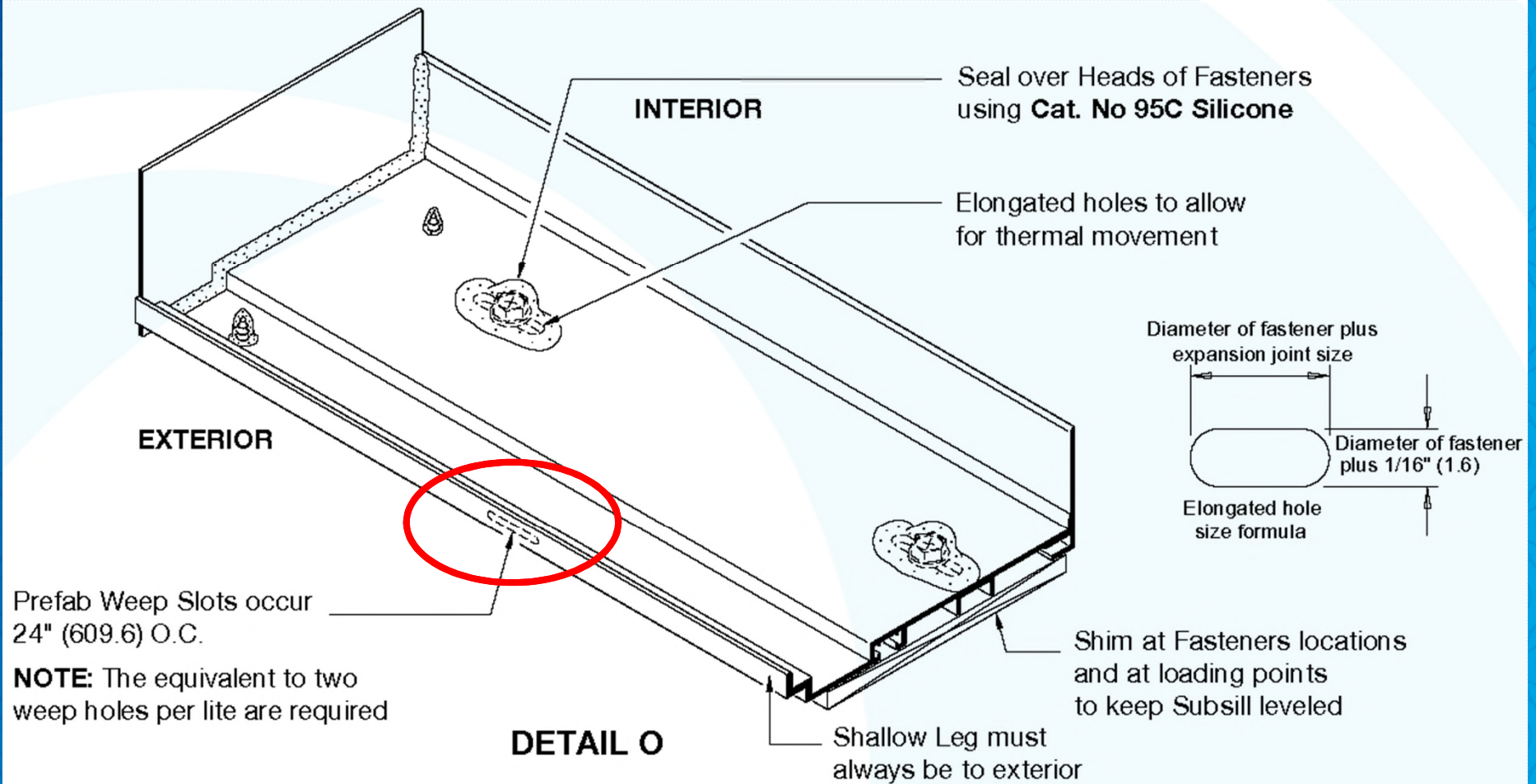


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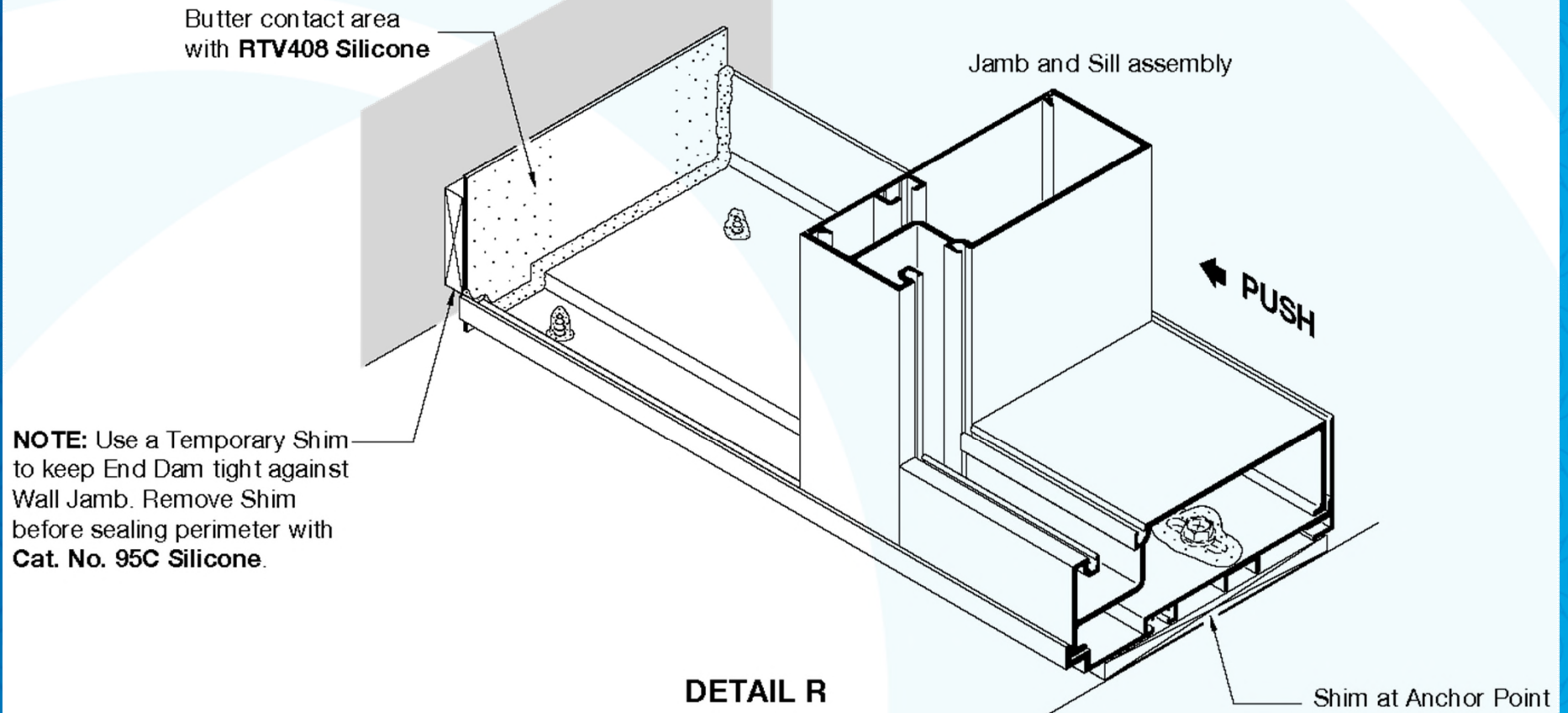


## 4. Sill Pan to Integrates with the Surroundings





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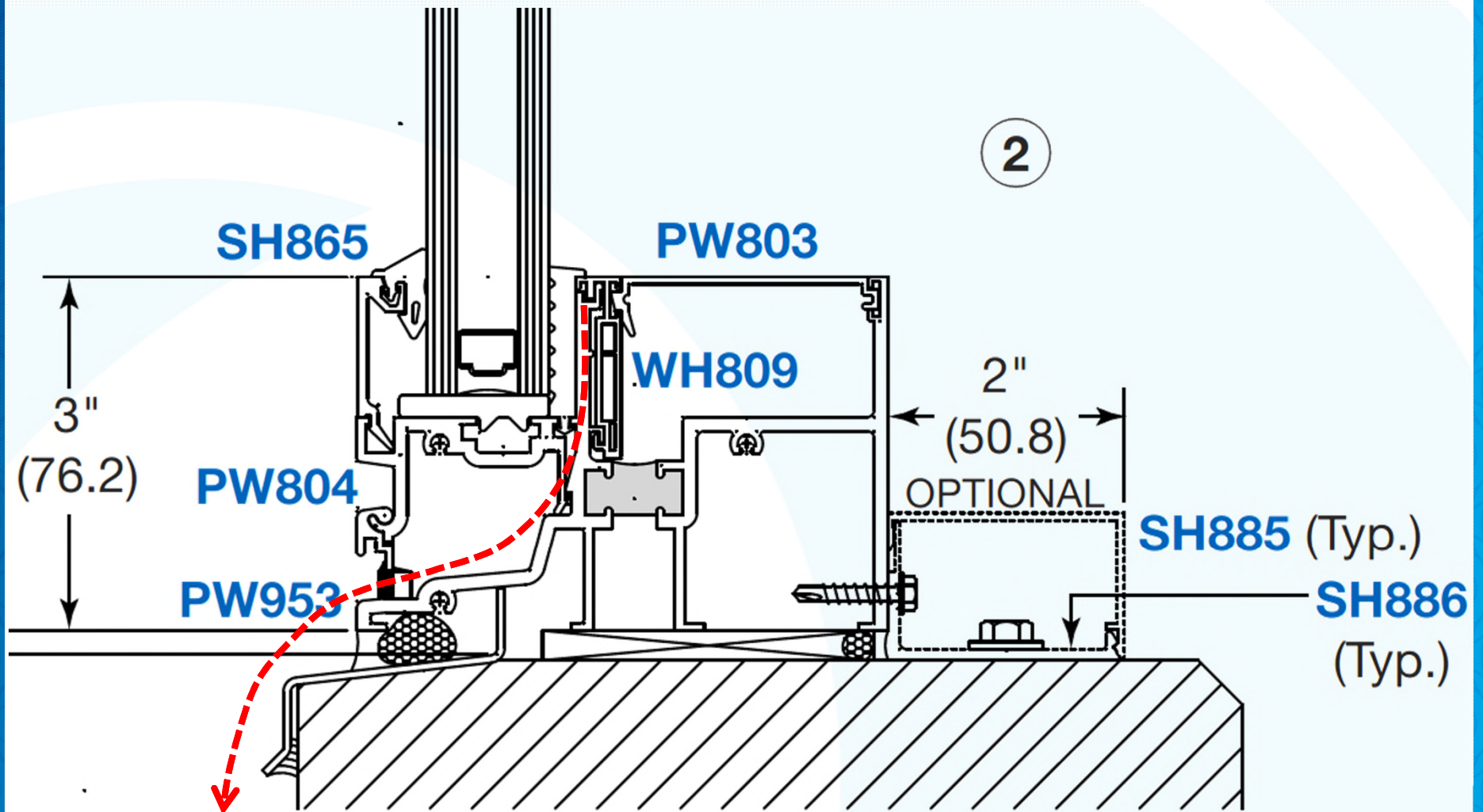




## 5. Sill Pan to be Sloped to Drain



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## 5. Sill Pan to be Sloped to Drain





## 5. Sill Pan to be Sloped to Drain





## 6. No Unsealed Penetrations in Sill Pan

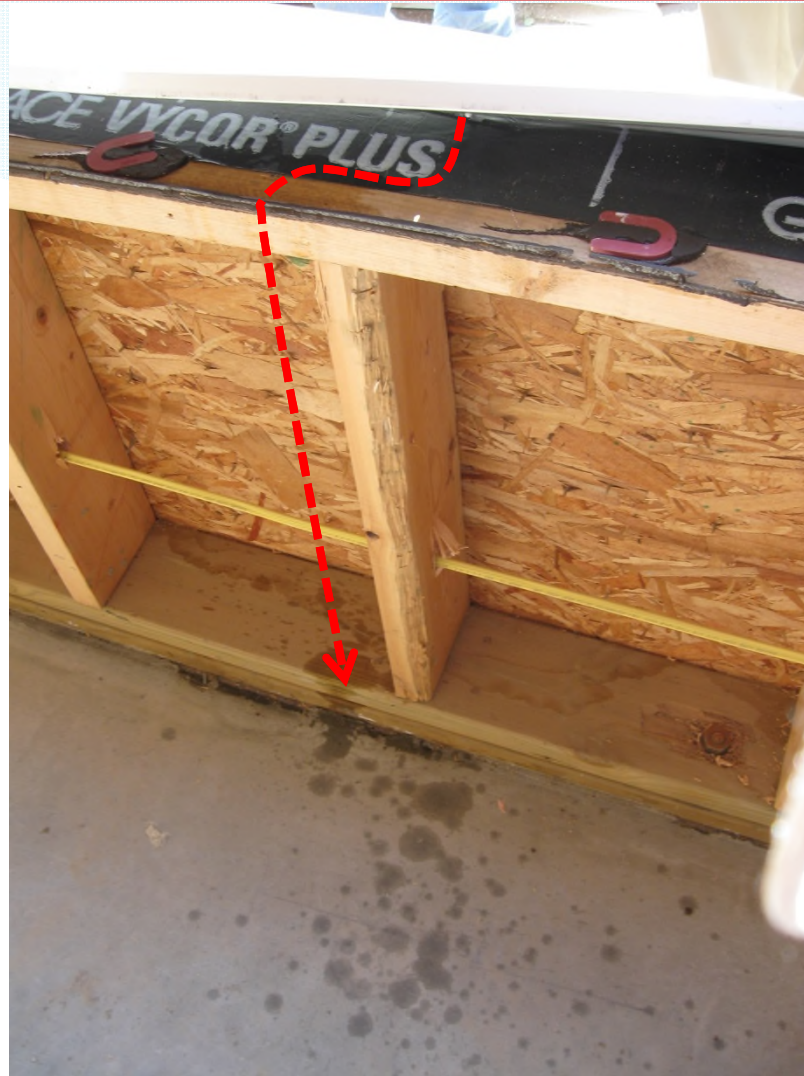


## 6. No Unsealed Penetrations in Sill Pan

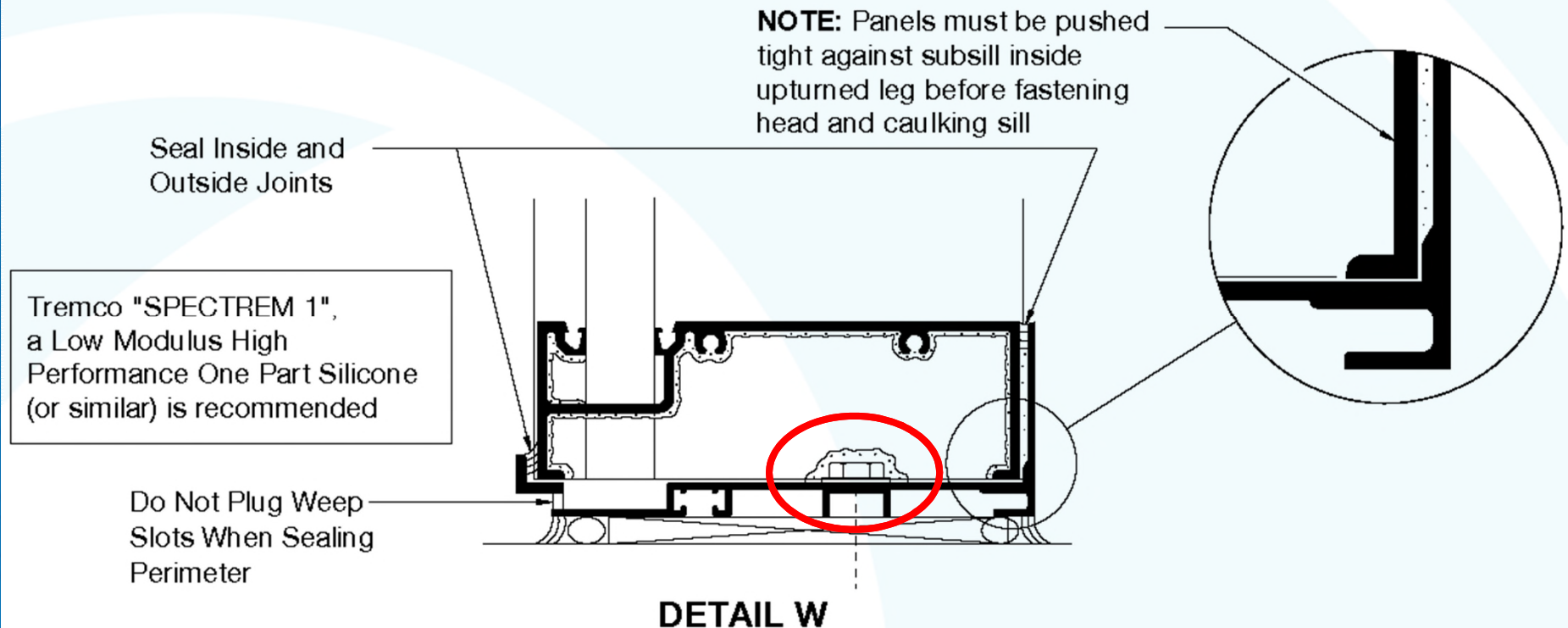




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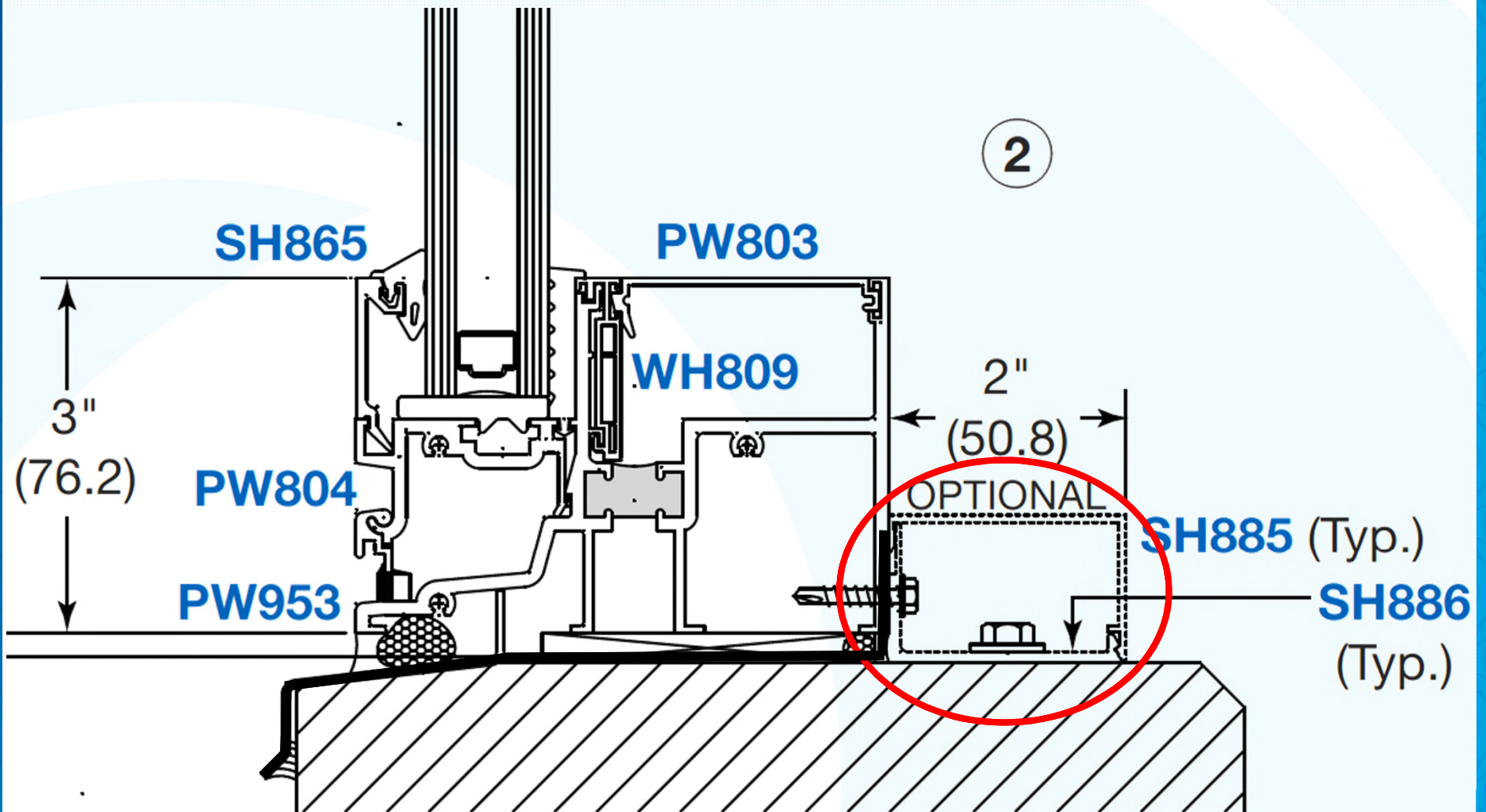




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## 7. Provide an Air Seal that Does Not Prevent Drainage





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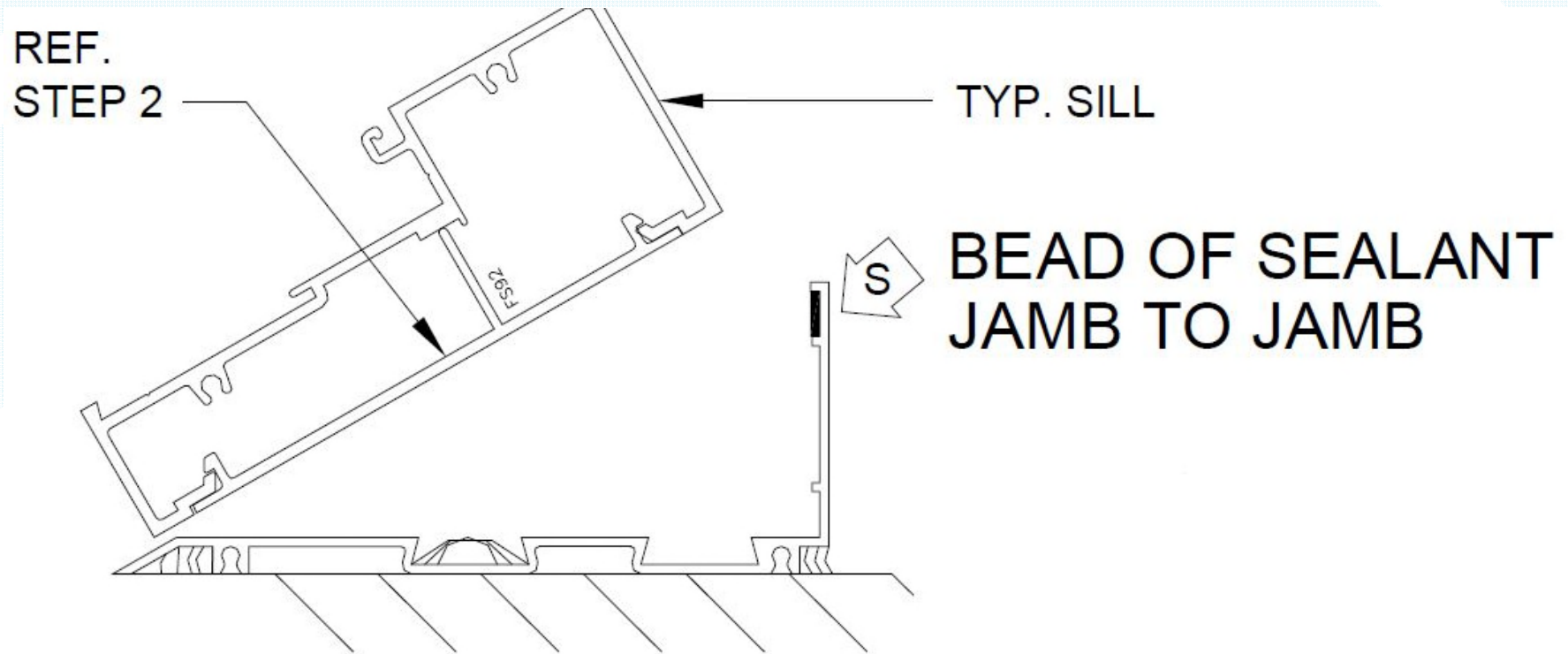


## 7. Provide an Air Seal that Does Not Prevent Drainage





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**NOTE:**

Frame members for Series FF450 shown. Series FF451, FT451, FF600, FF601, and FT601 will be similar.

Apply **RTV408 Silicone** to Joint thoroughly from underside.

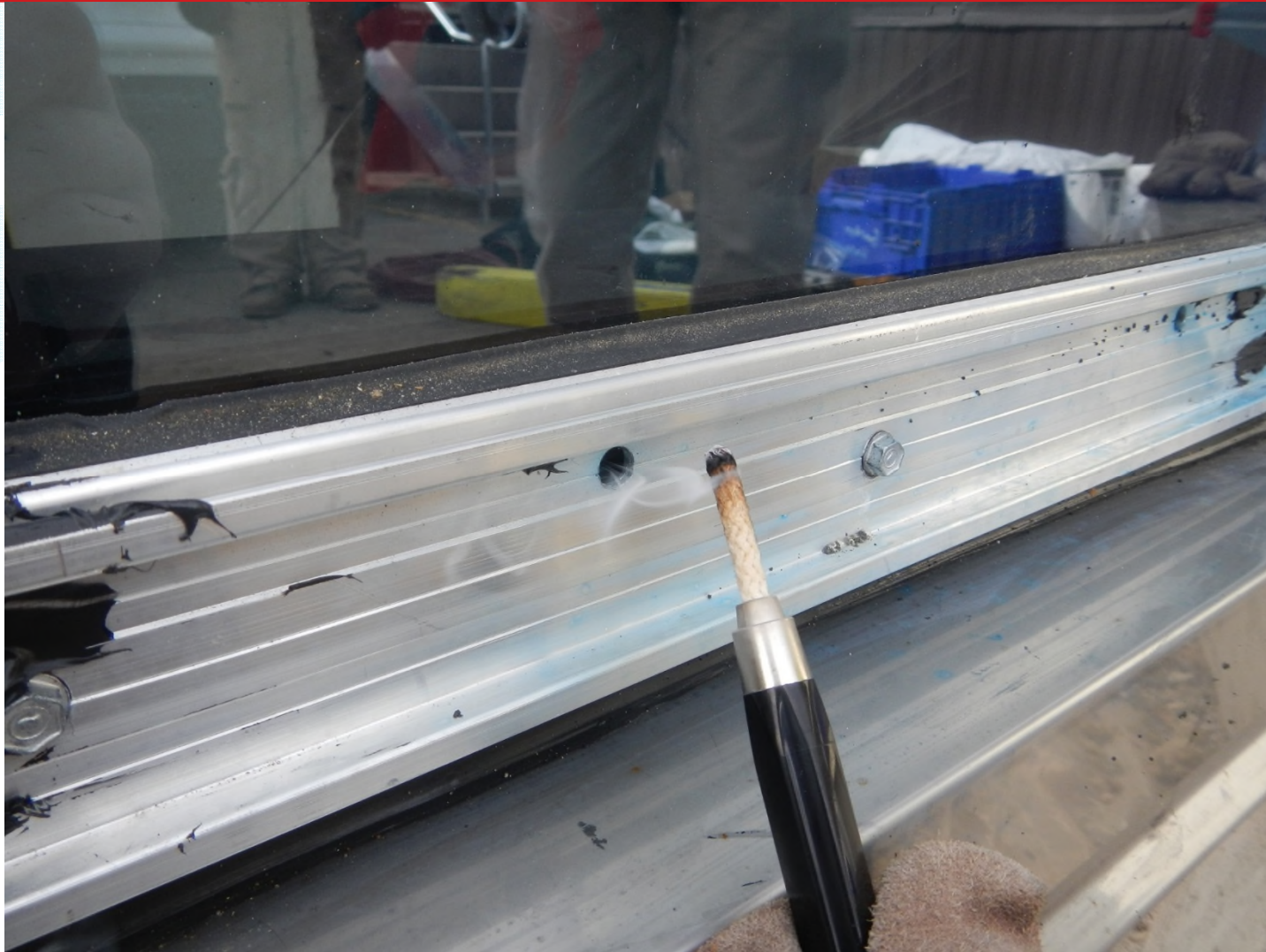
Interior Glazed Sill

This is a **CRITICAL SEAL AREA**

**DETAIL J**



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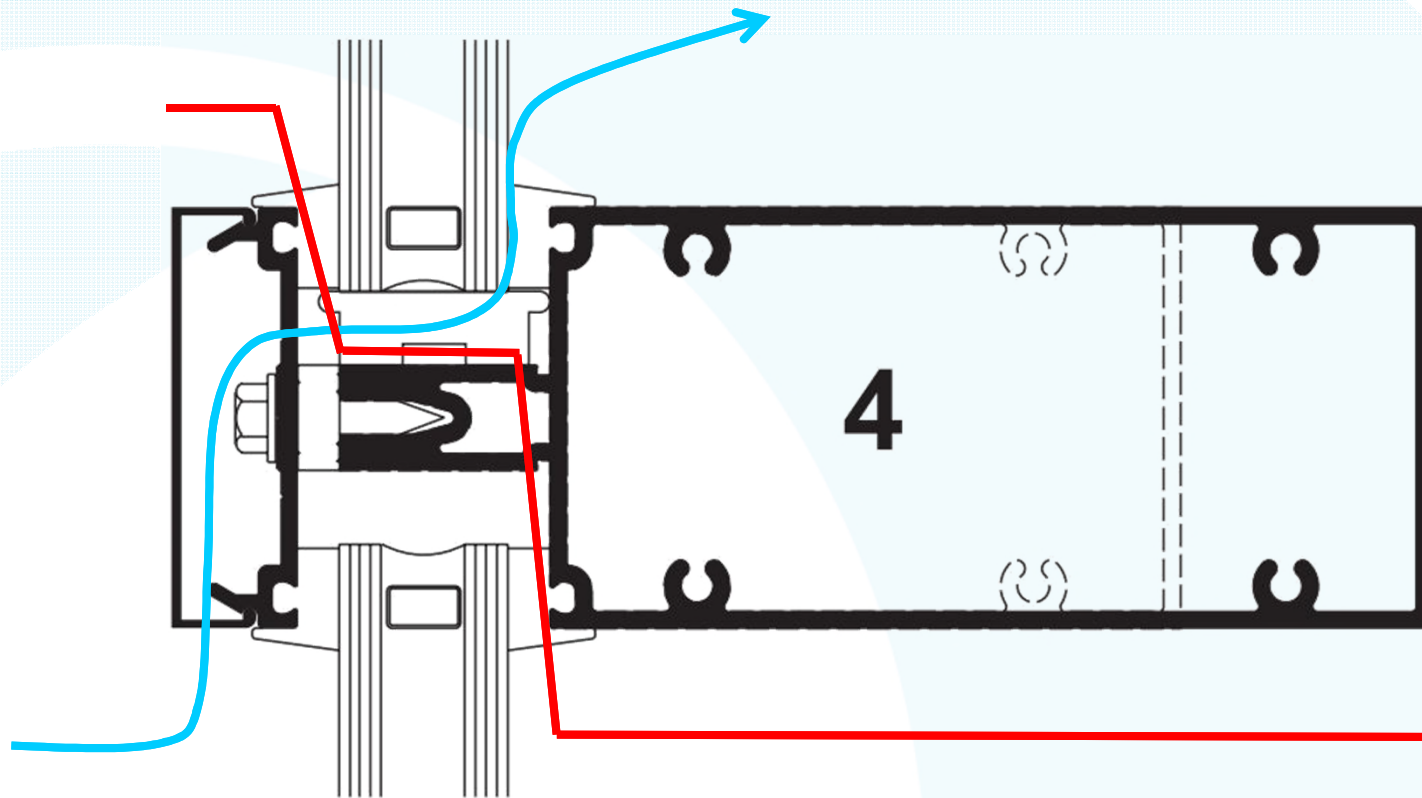




## 7a. Pressure-Equalized Systems

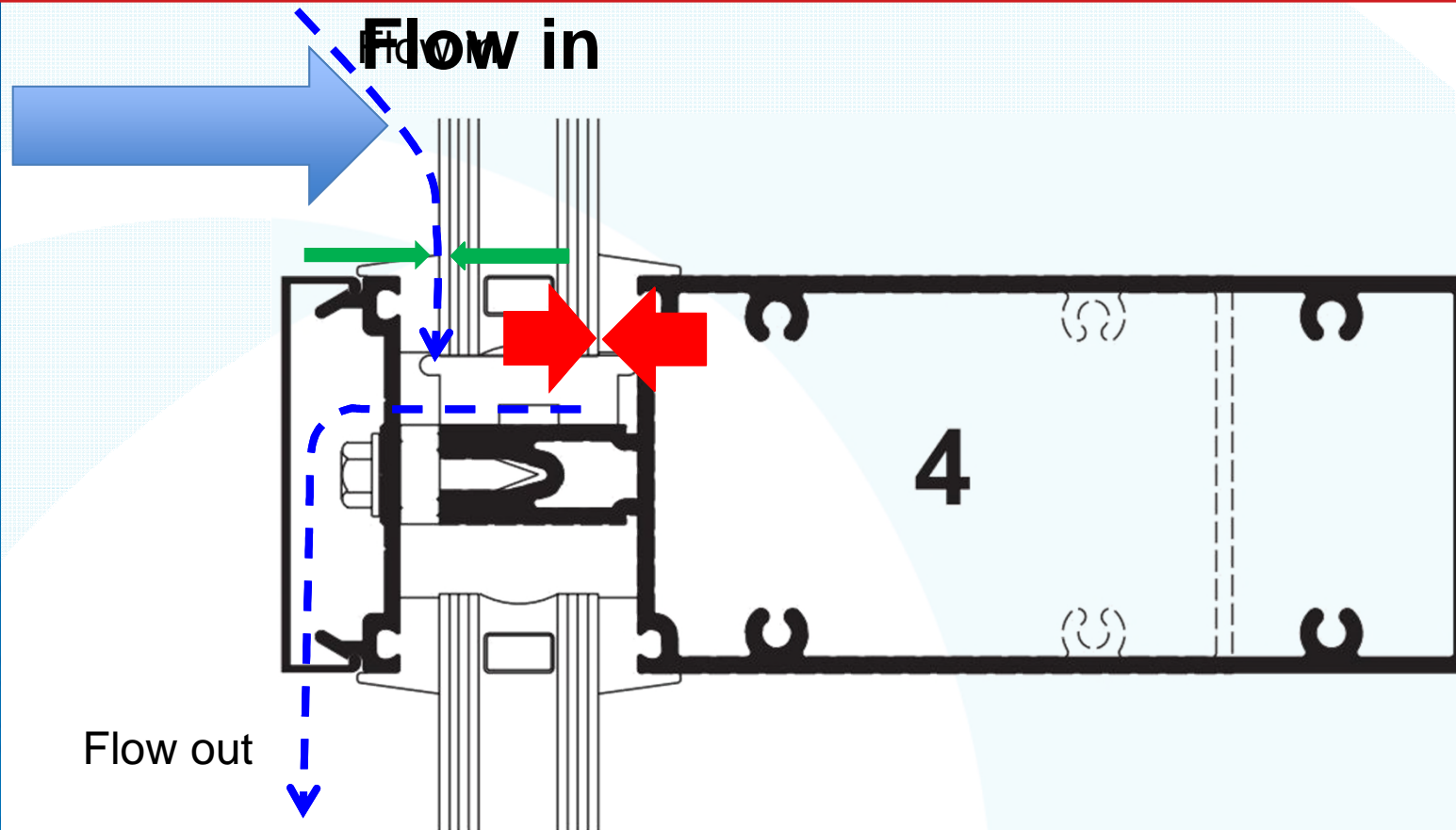


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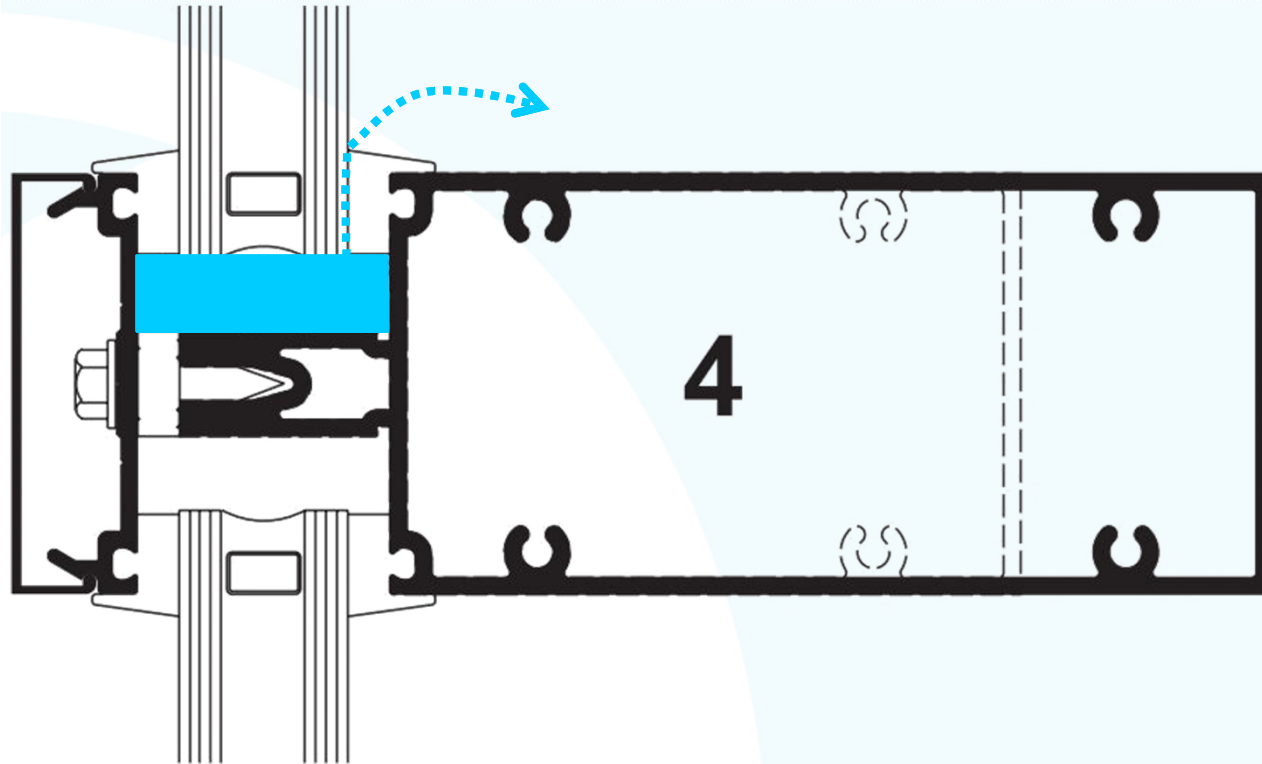




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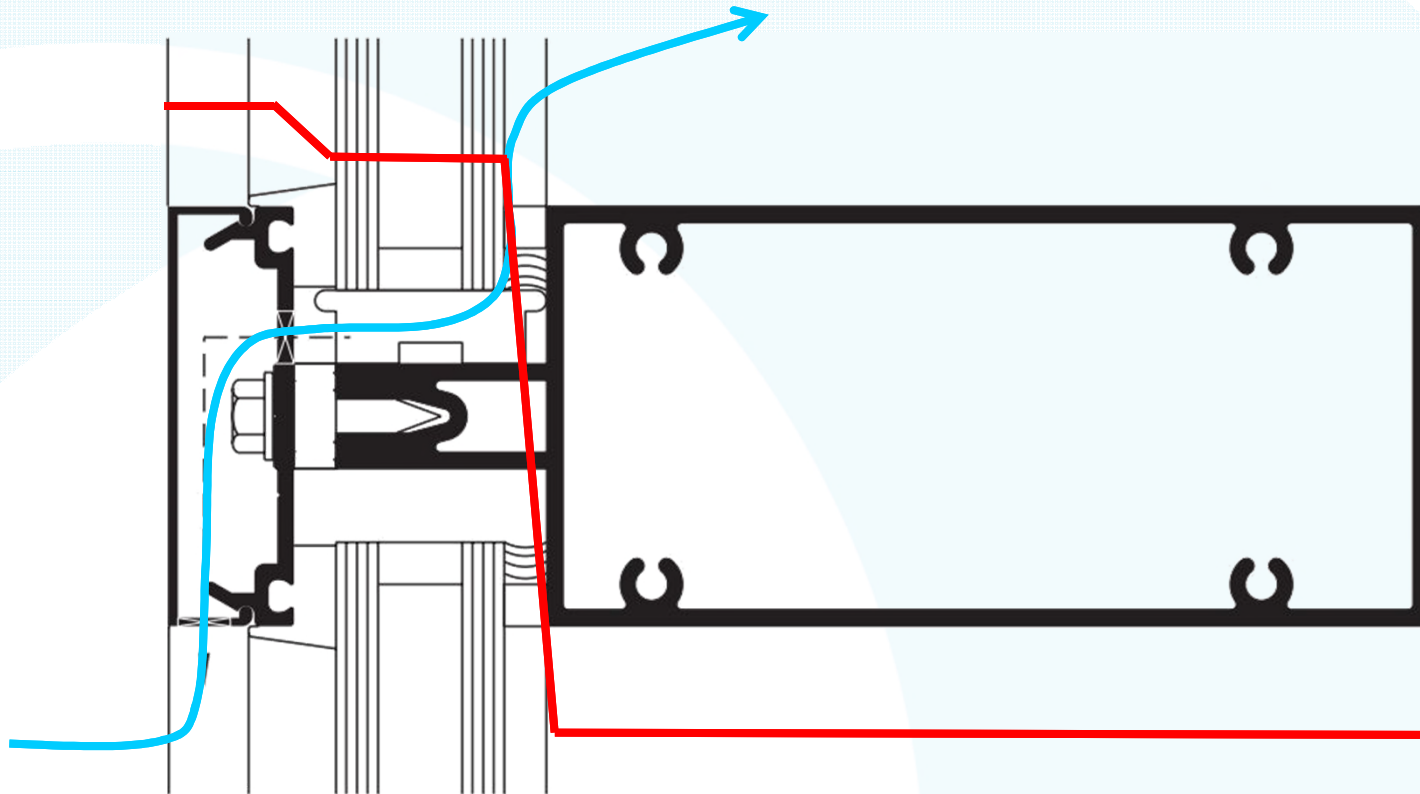




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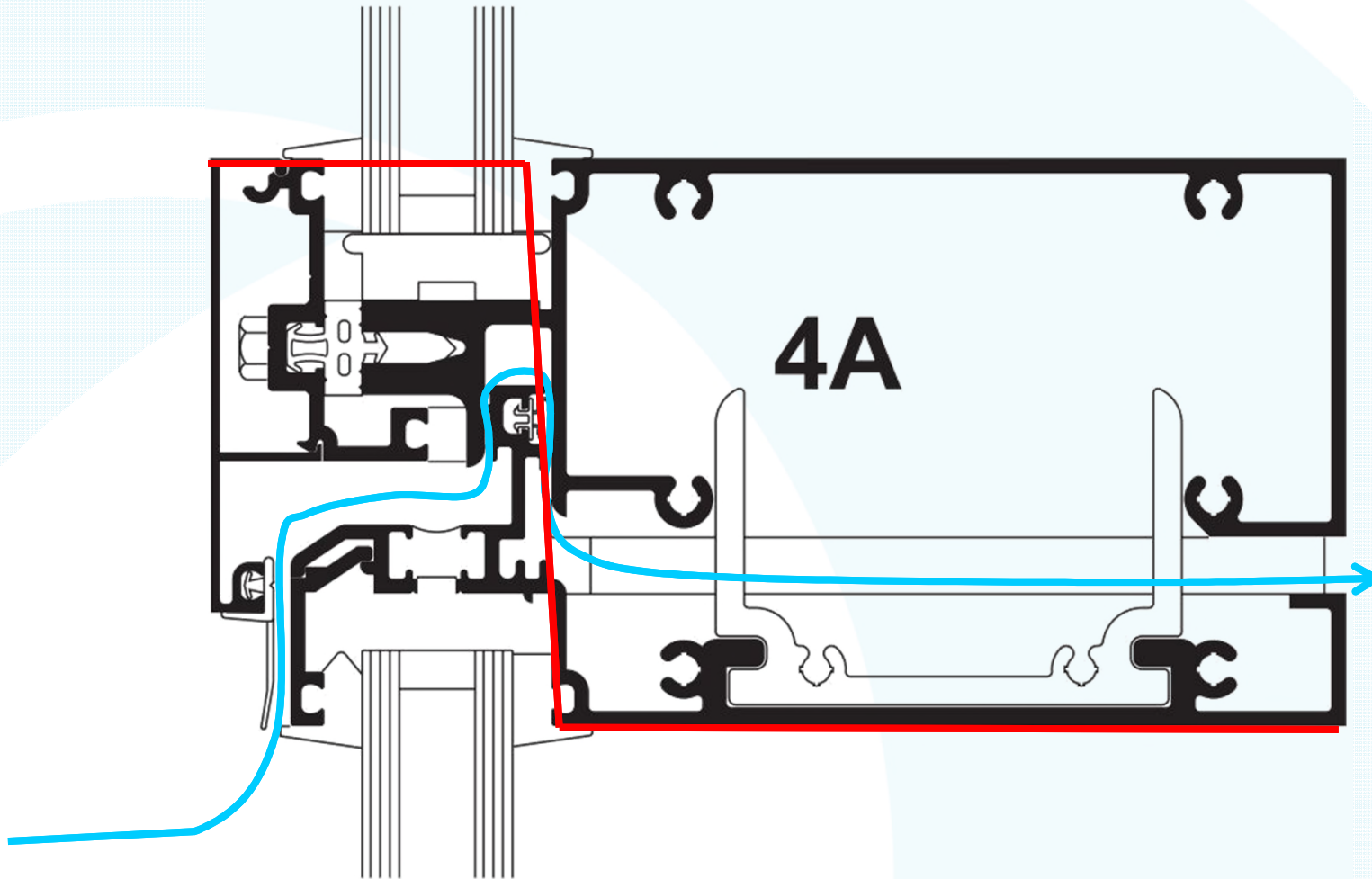


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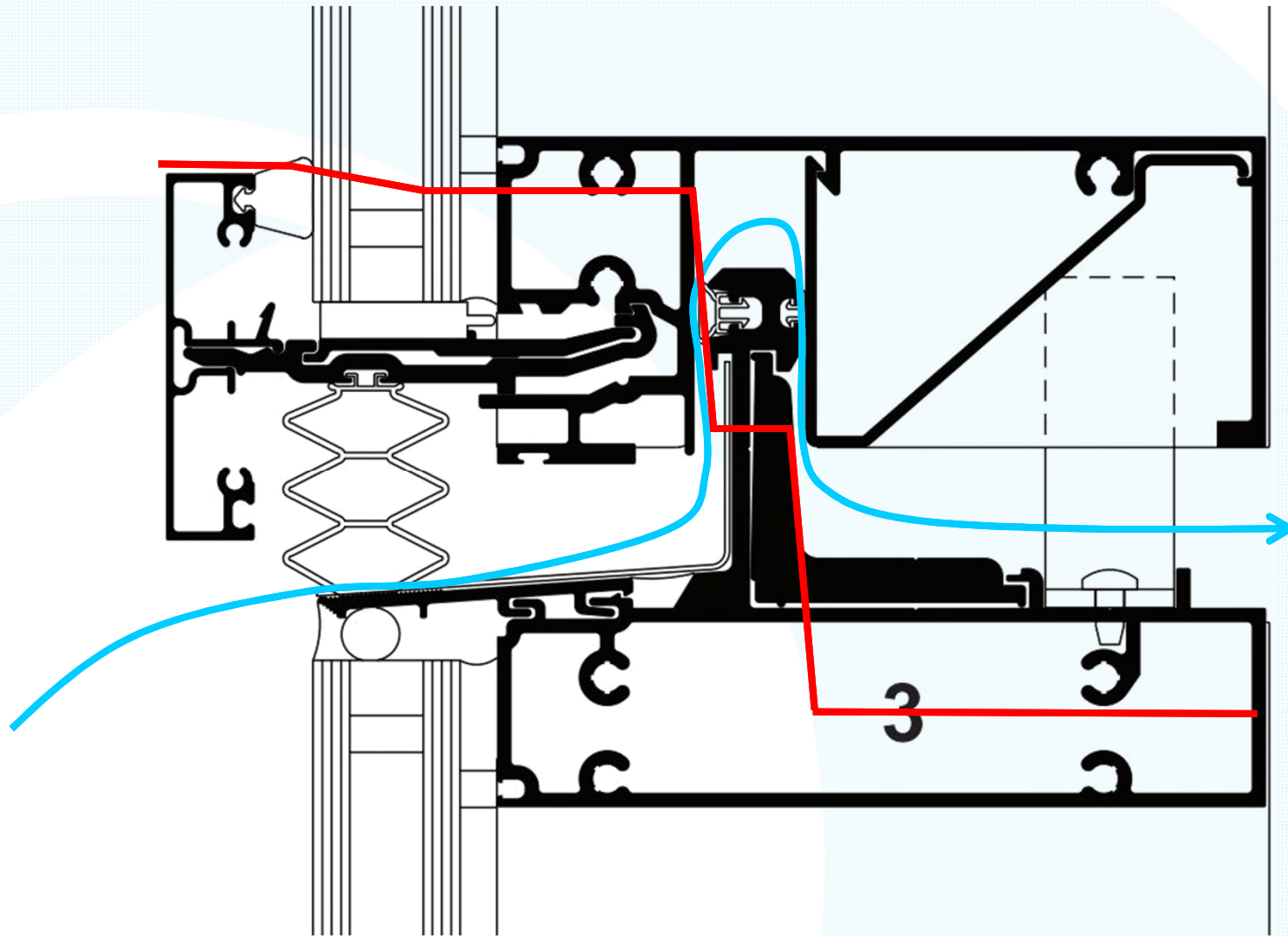




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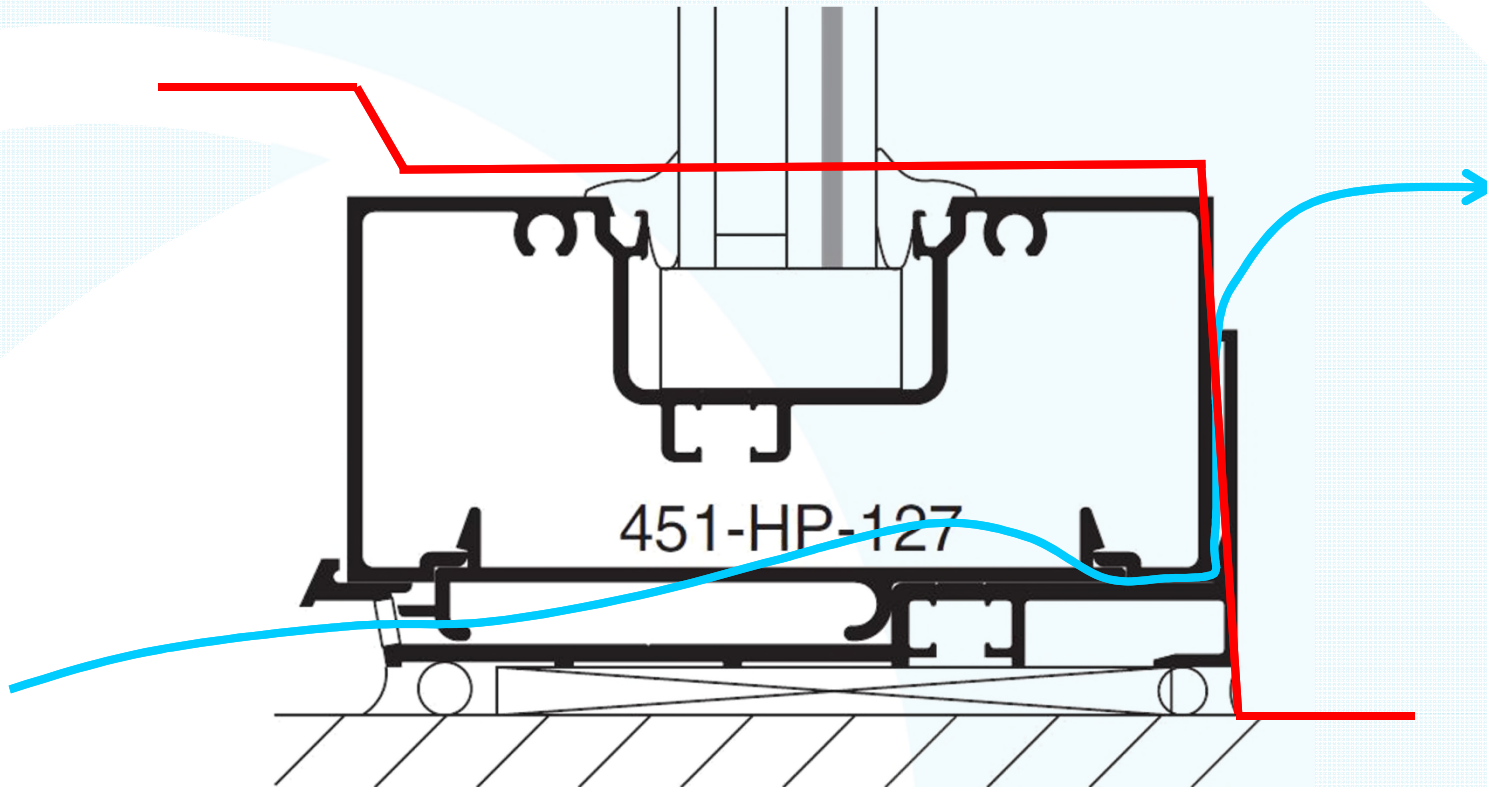


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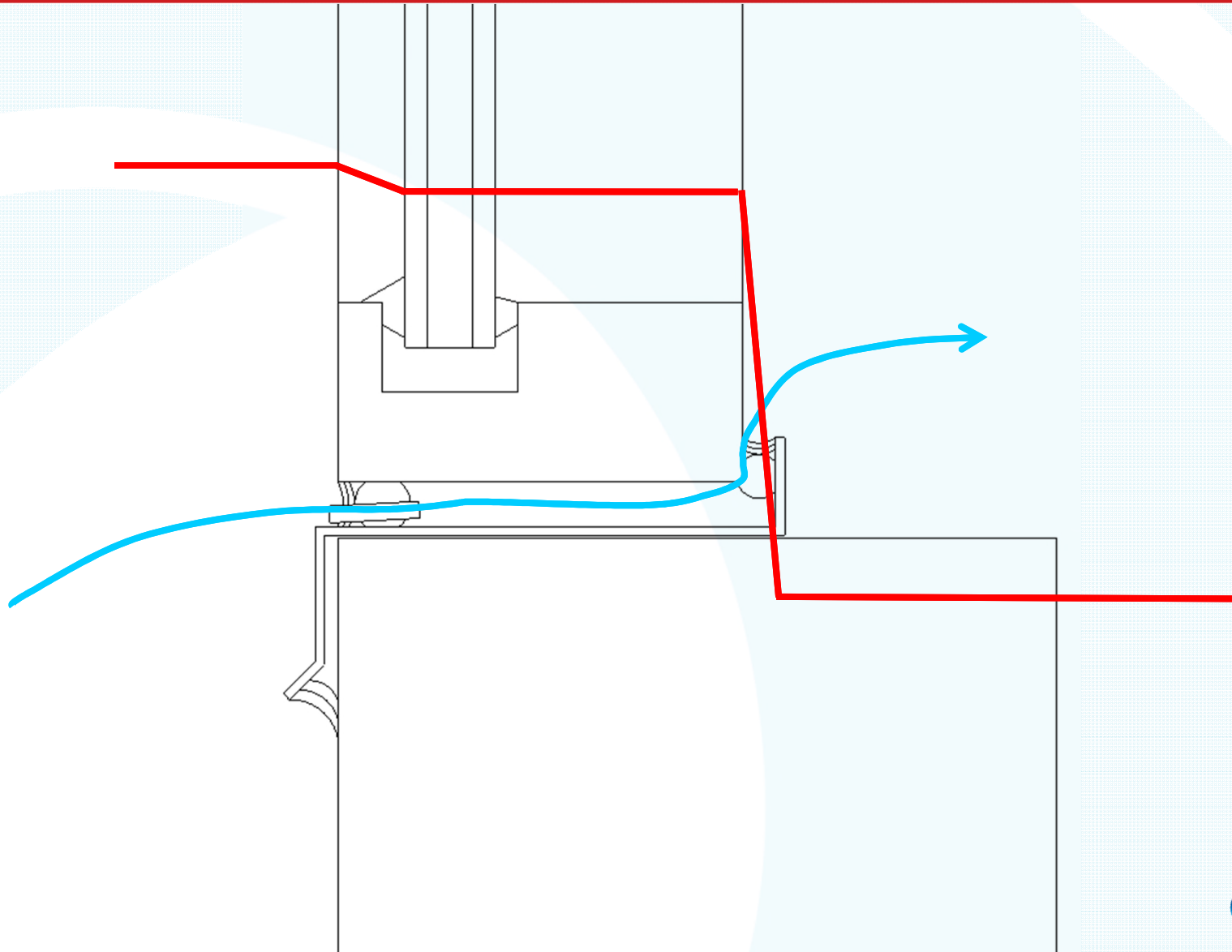




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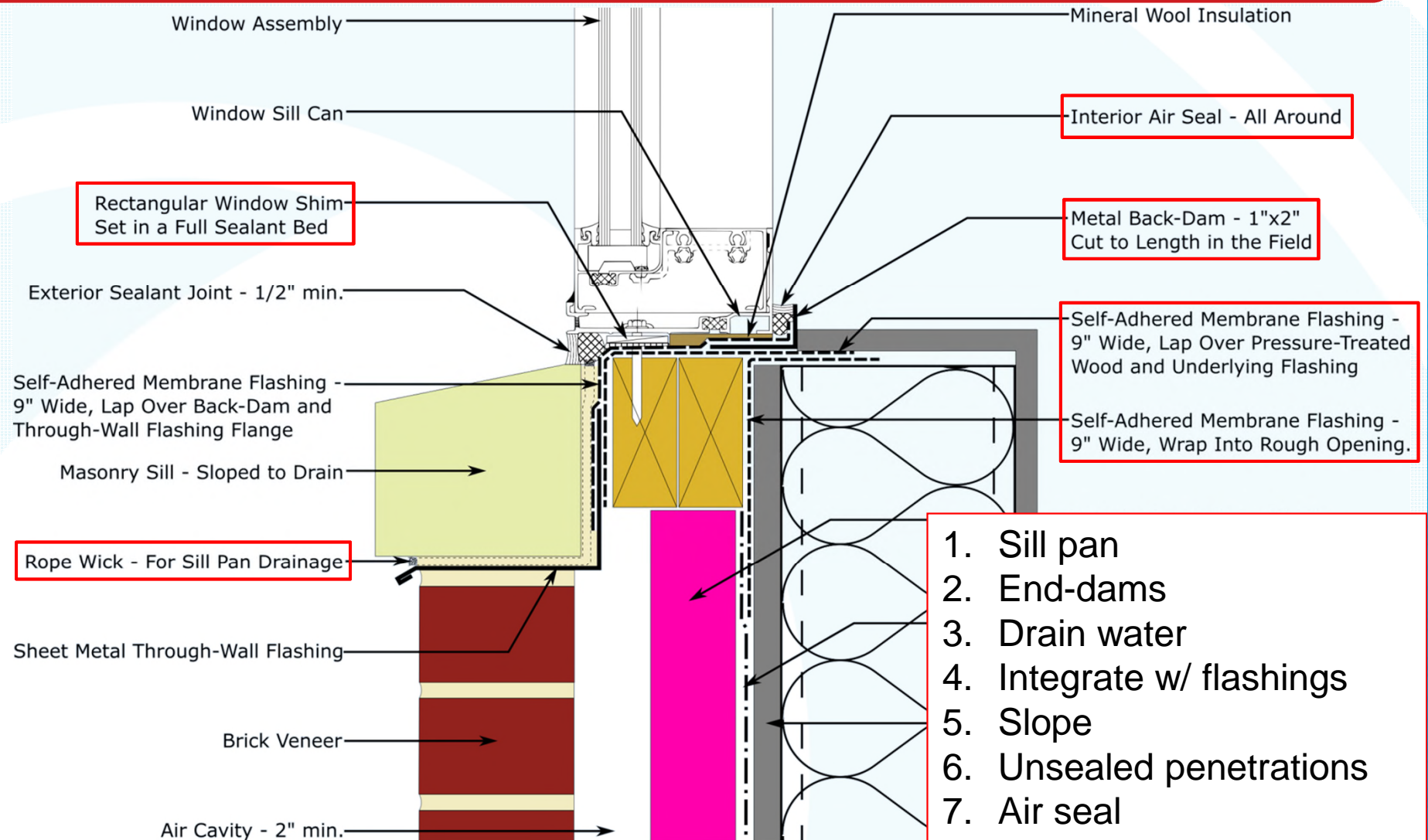




# Example Flashing

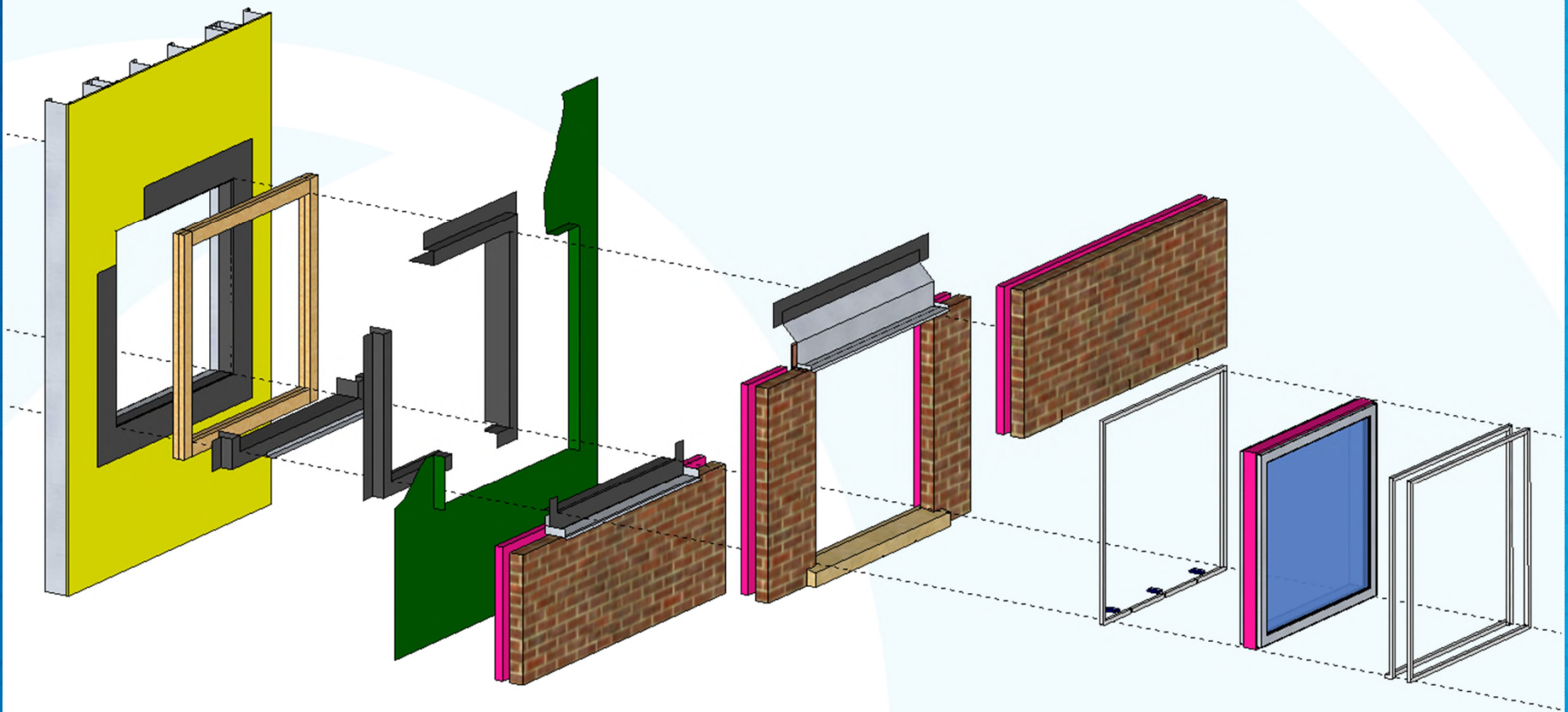
- (For the Owner with little tolerance for window leaks and budget constraints.)

# Example Flashing

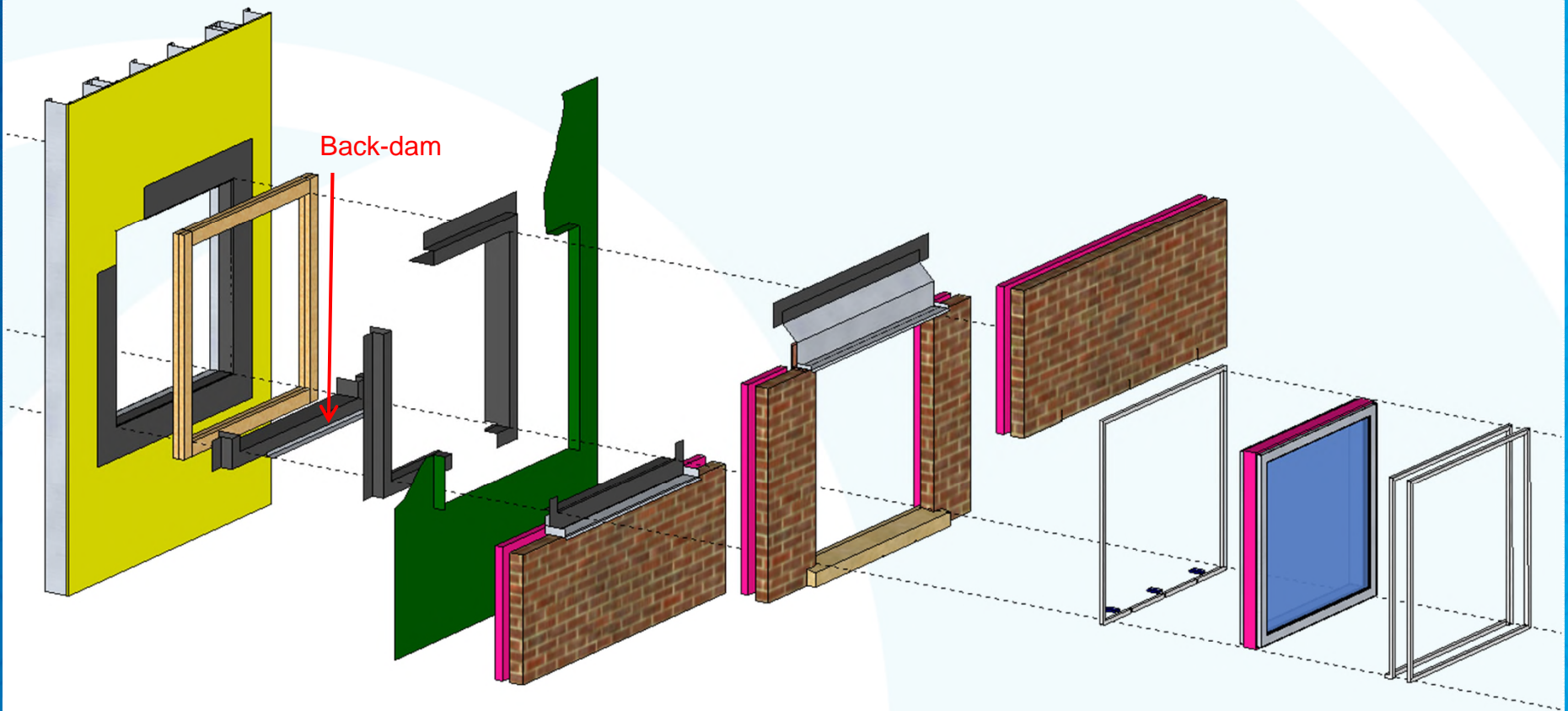




## Example Flashing

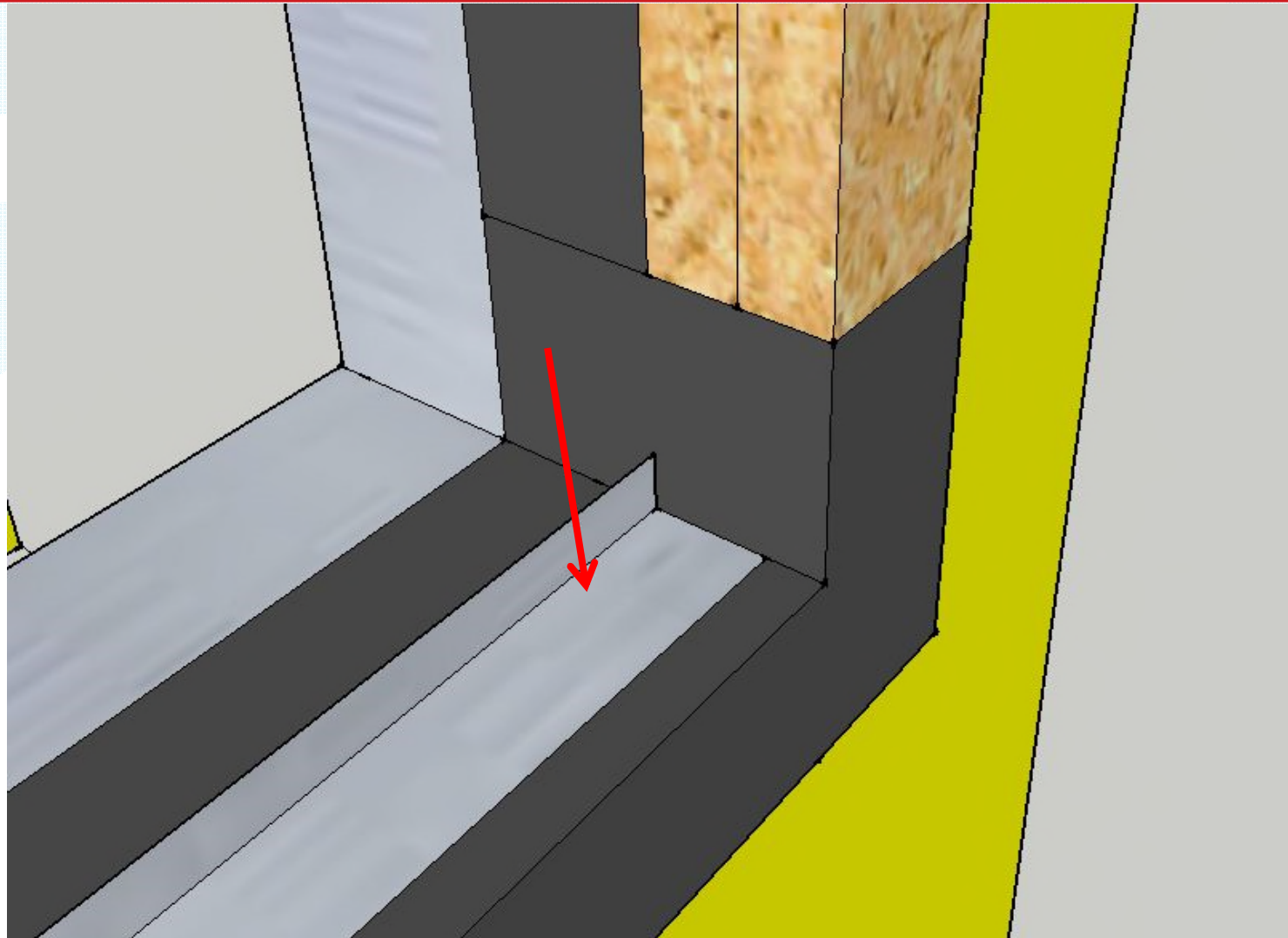


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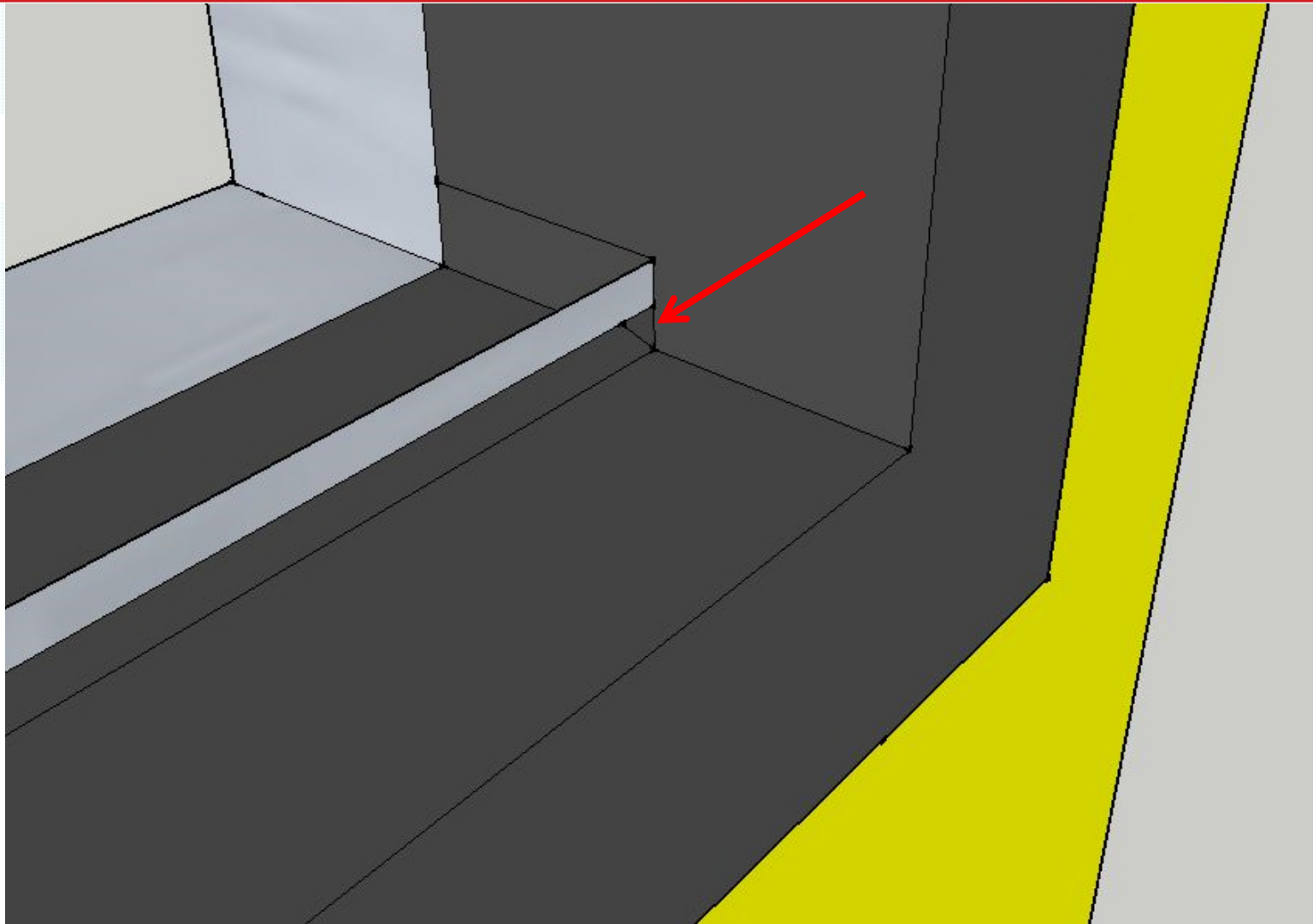




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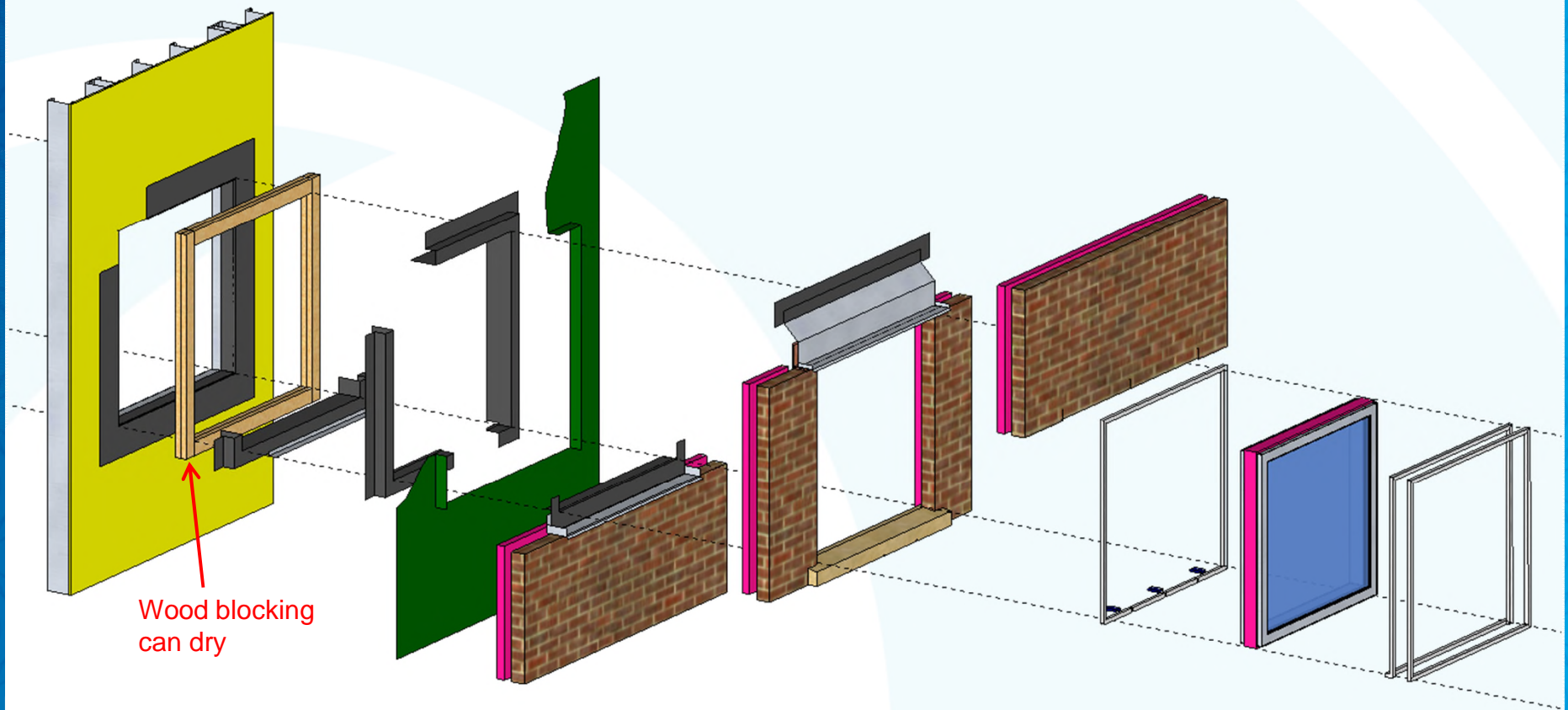


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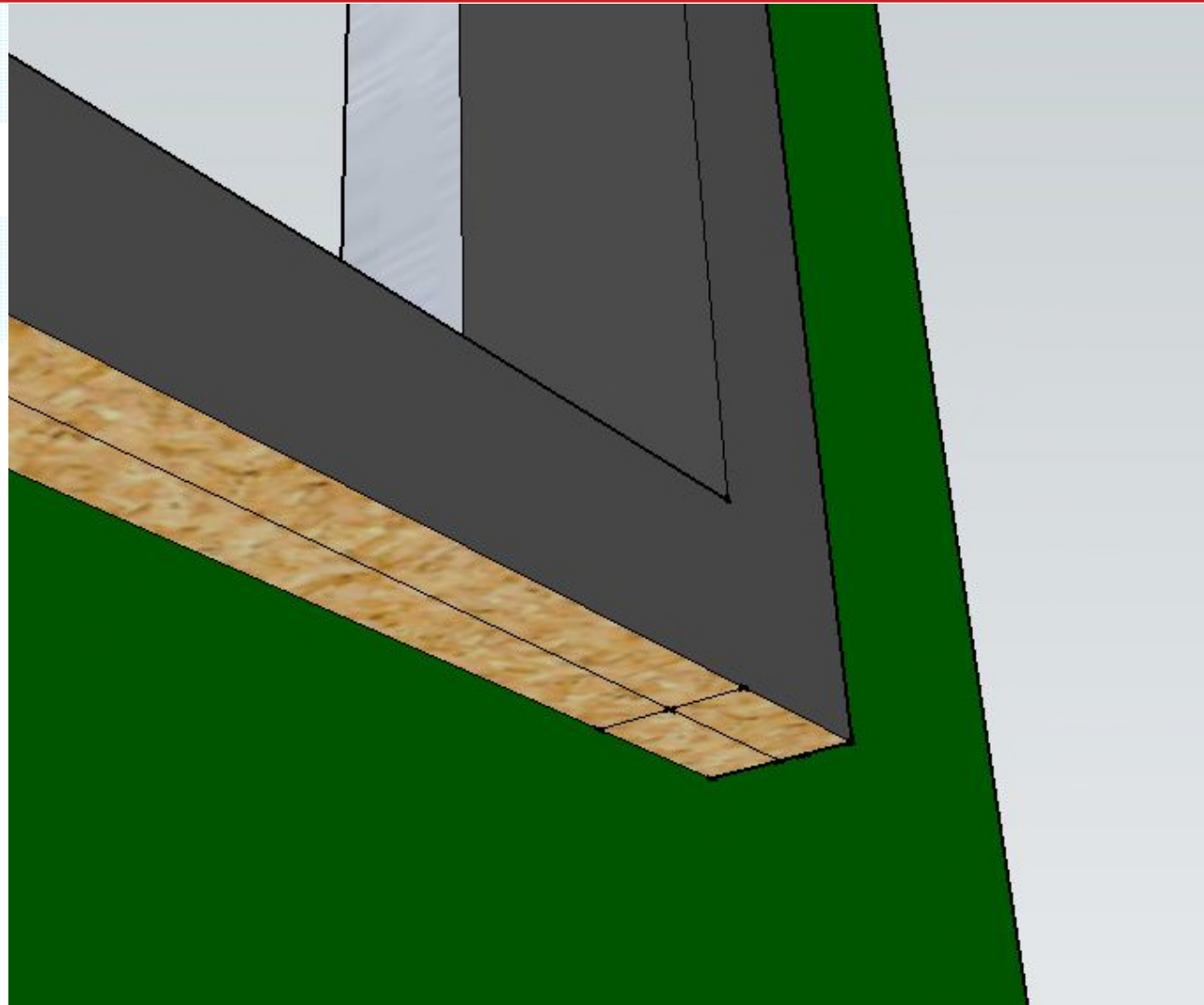




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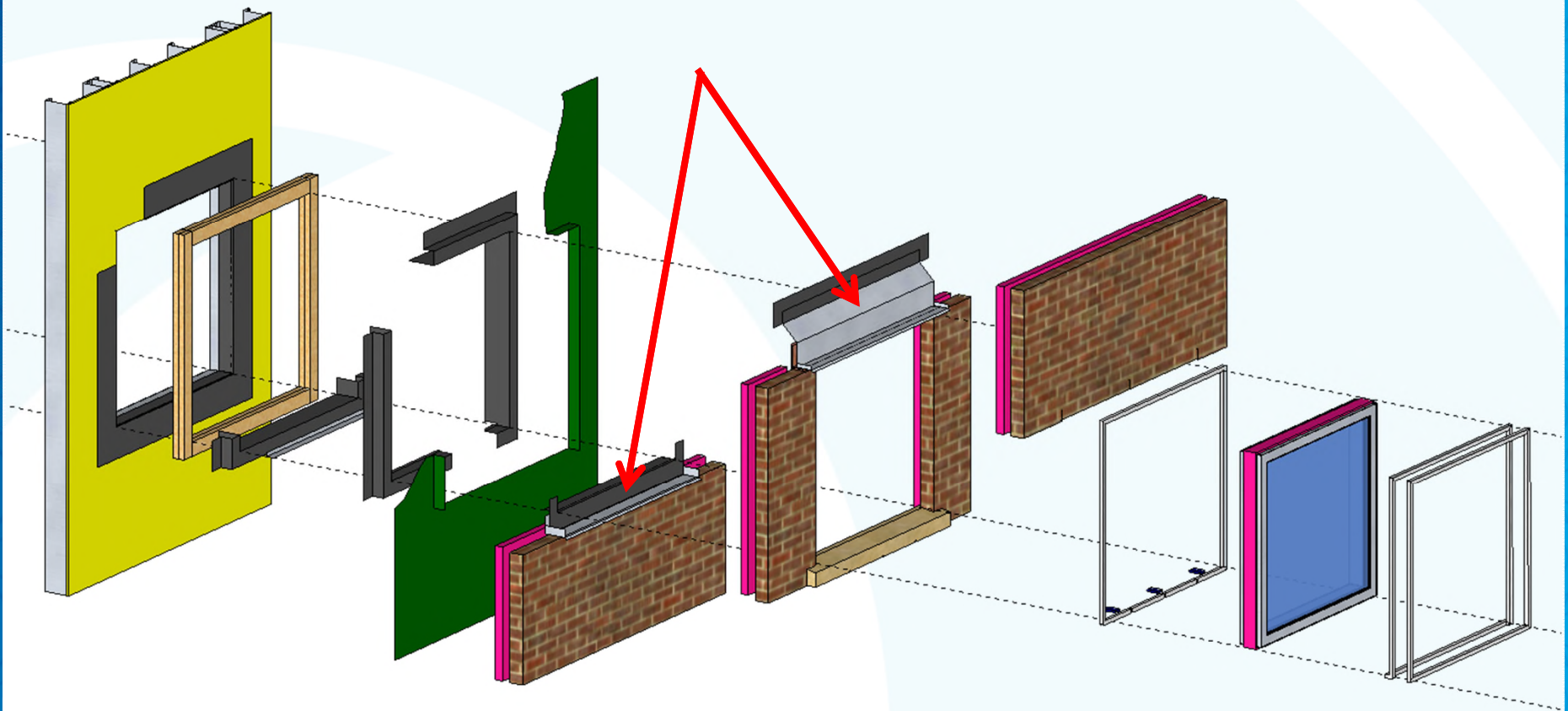


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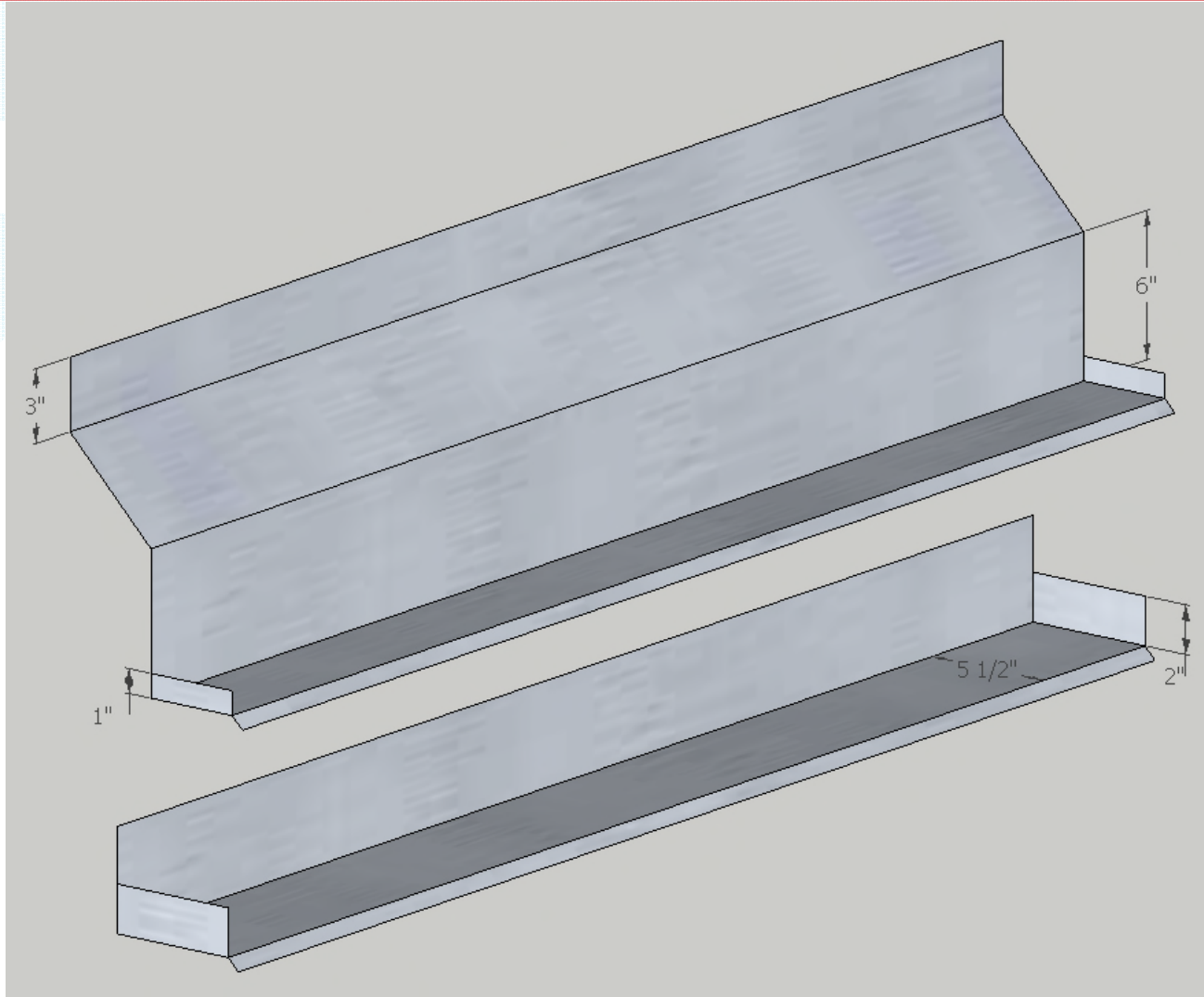




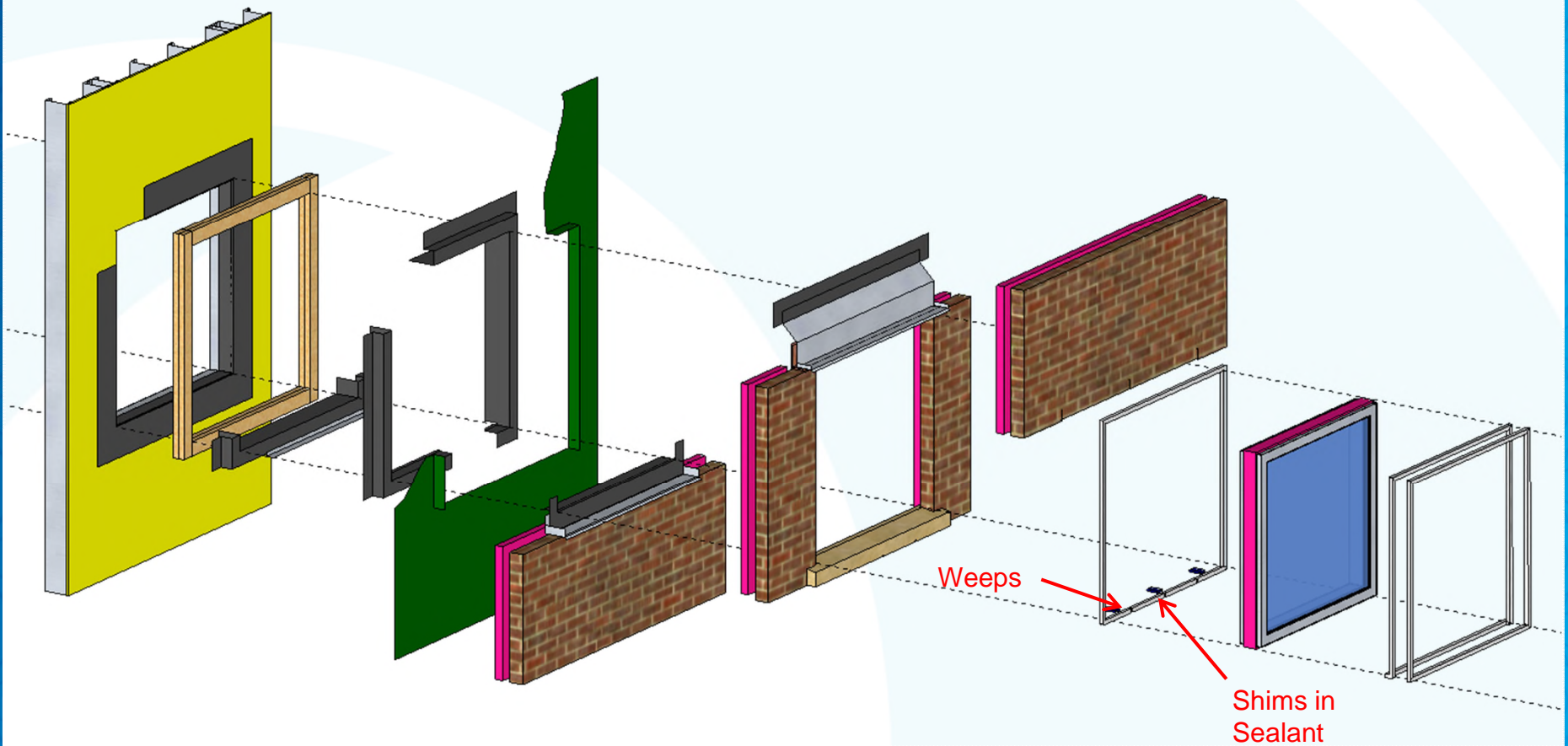
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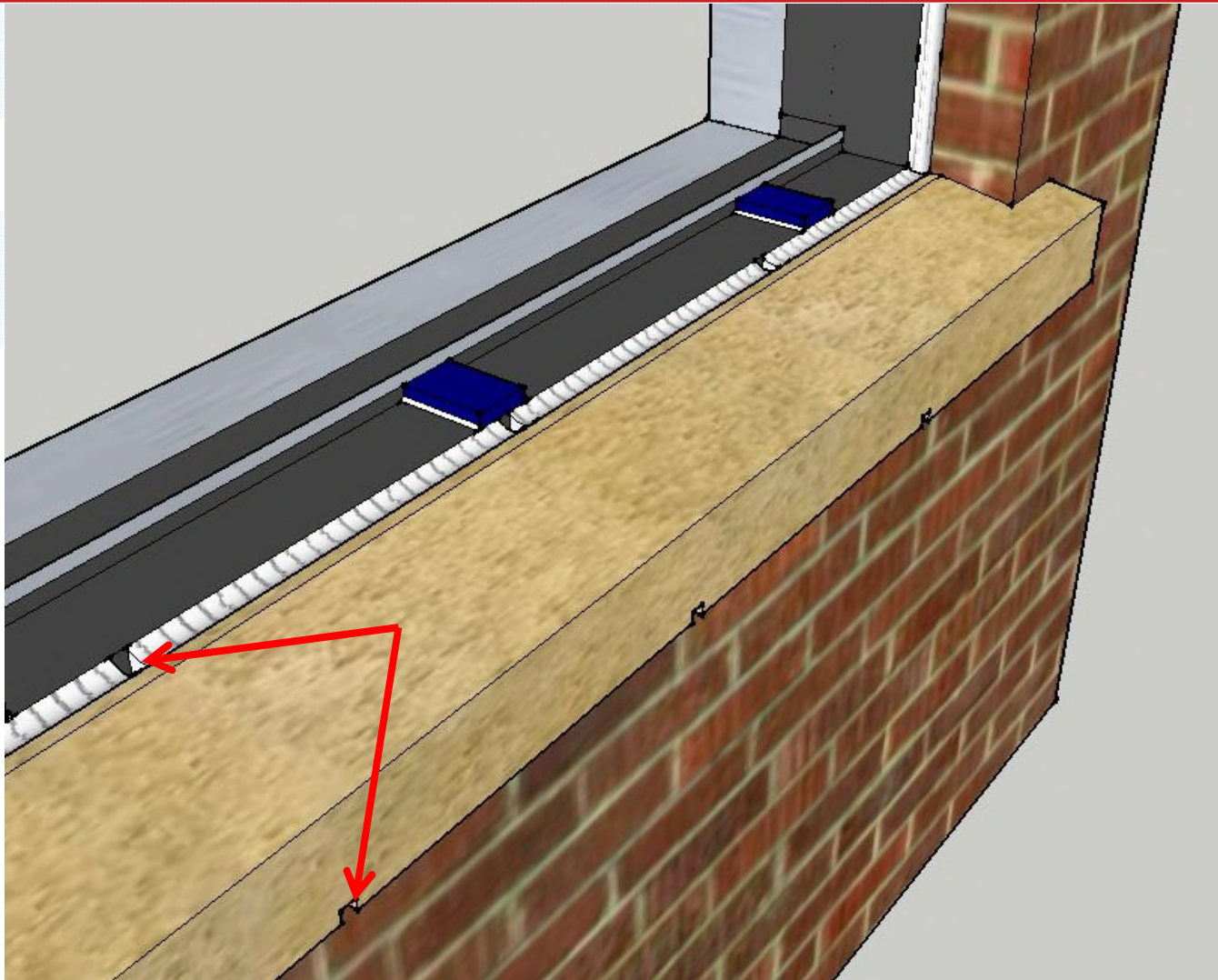


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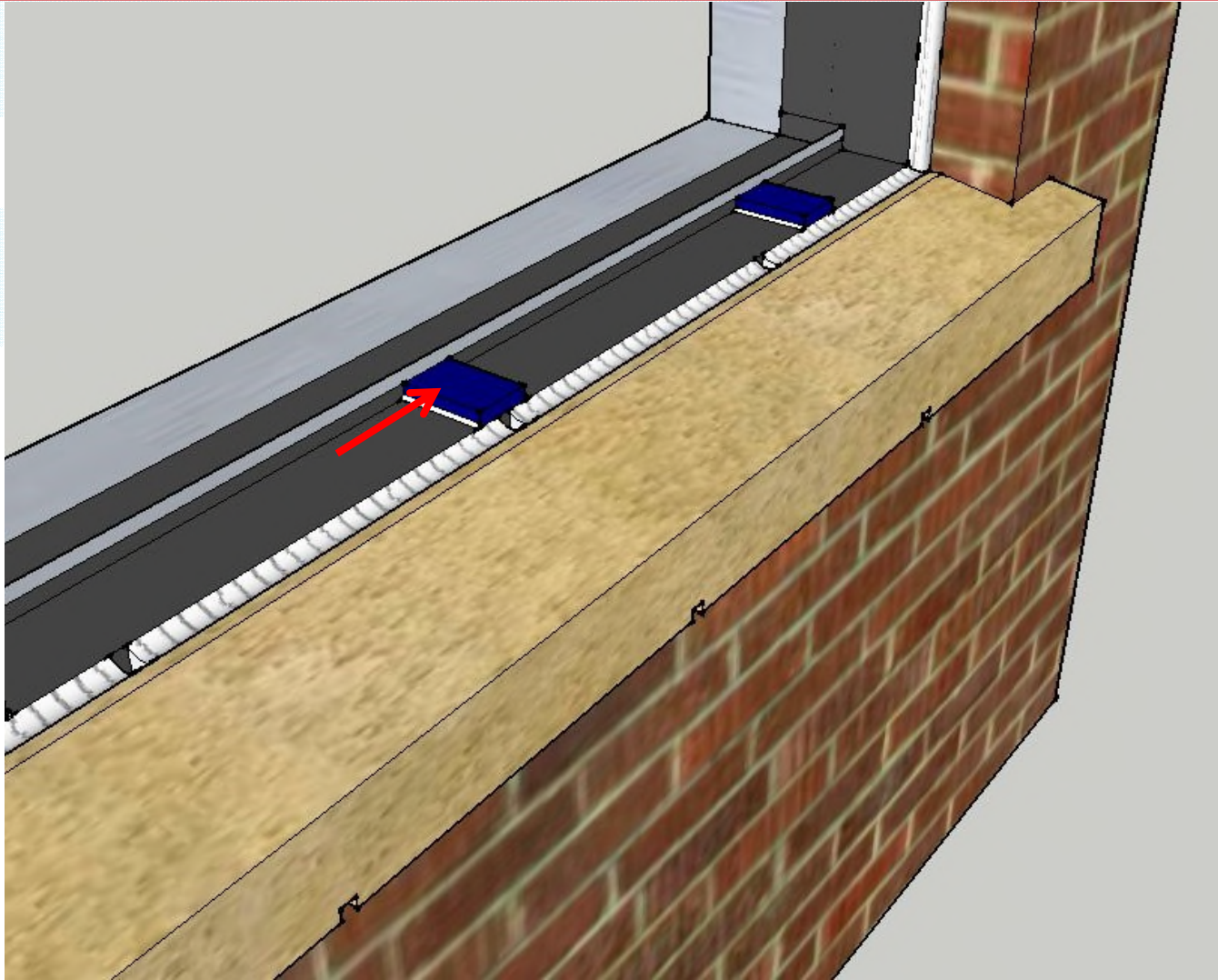




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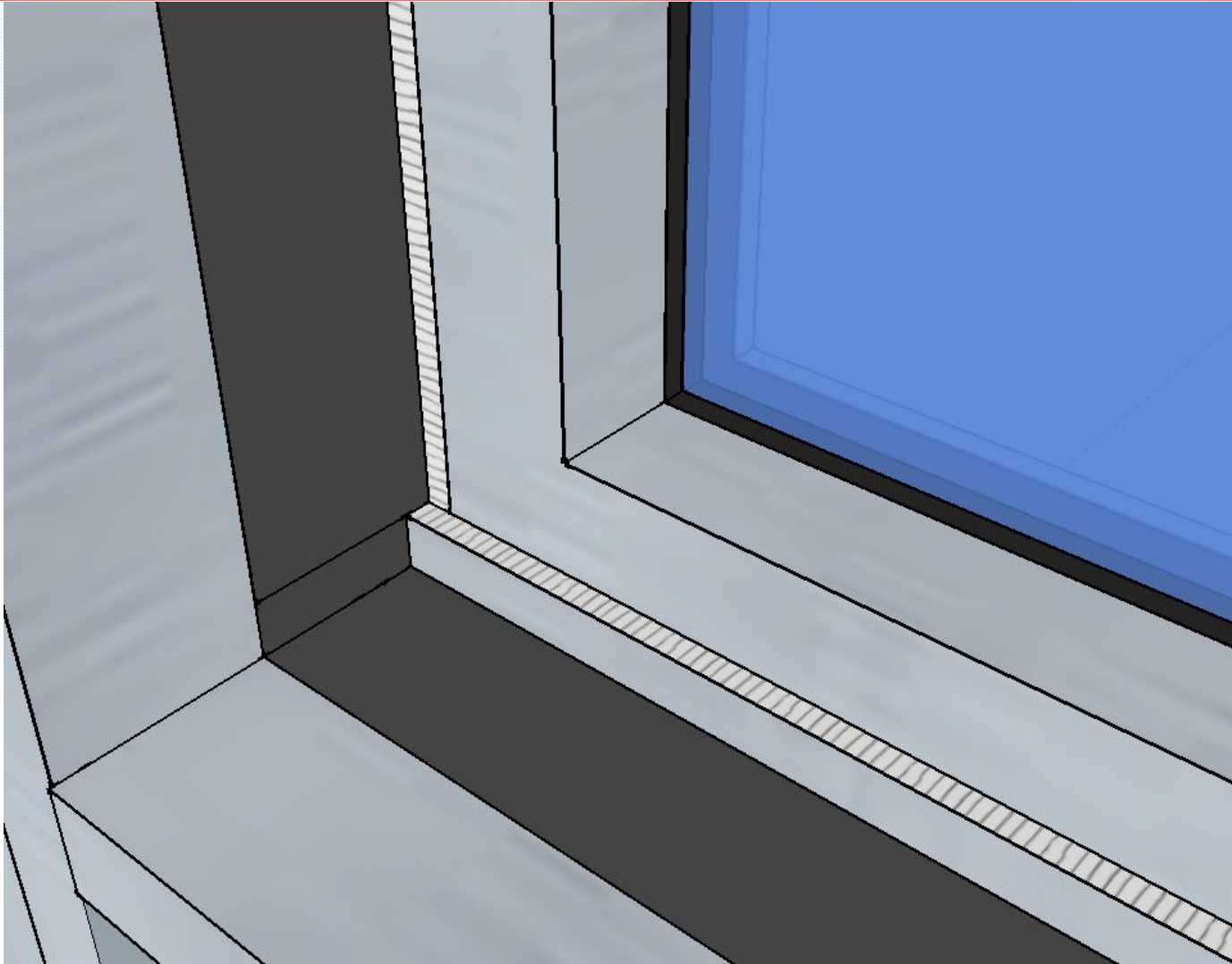


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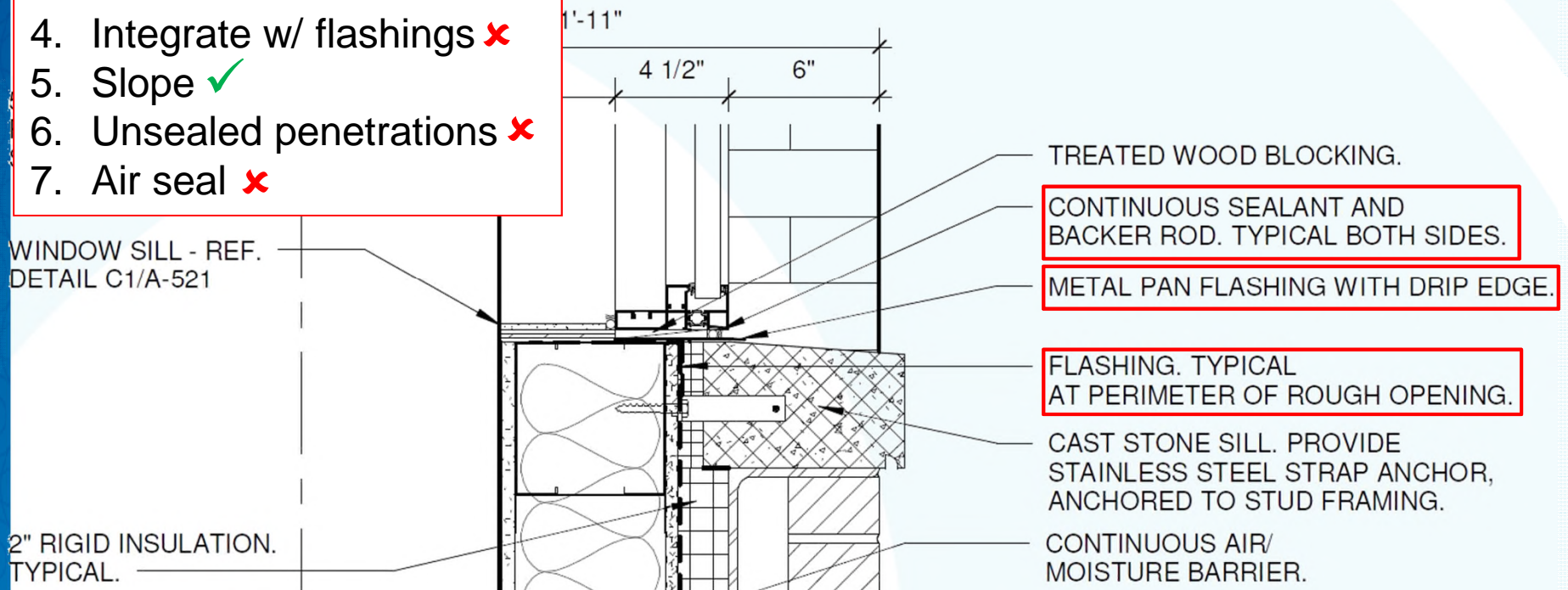




# Case Study – Indianapolis Hotel

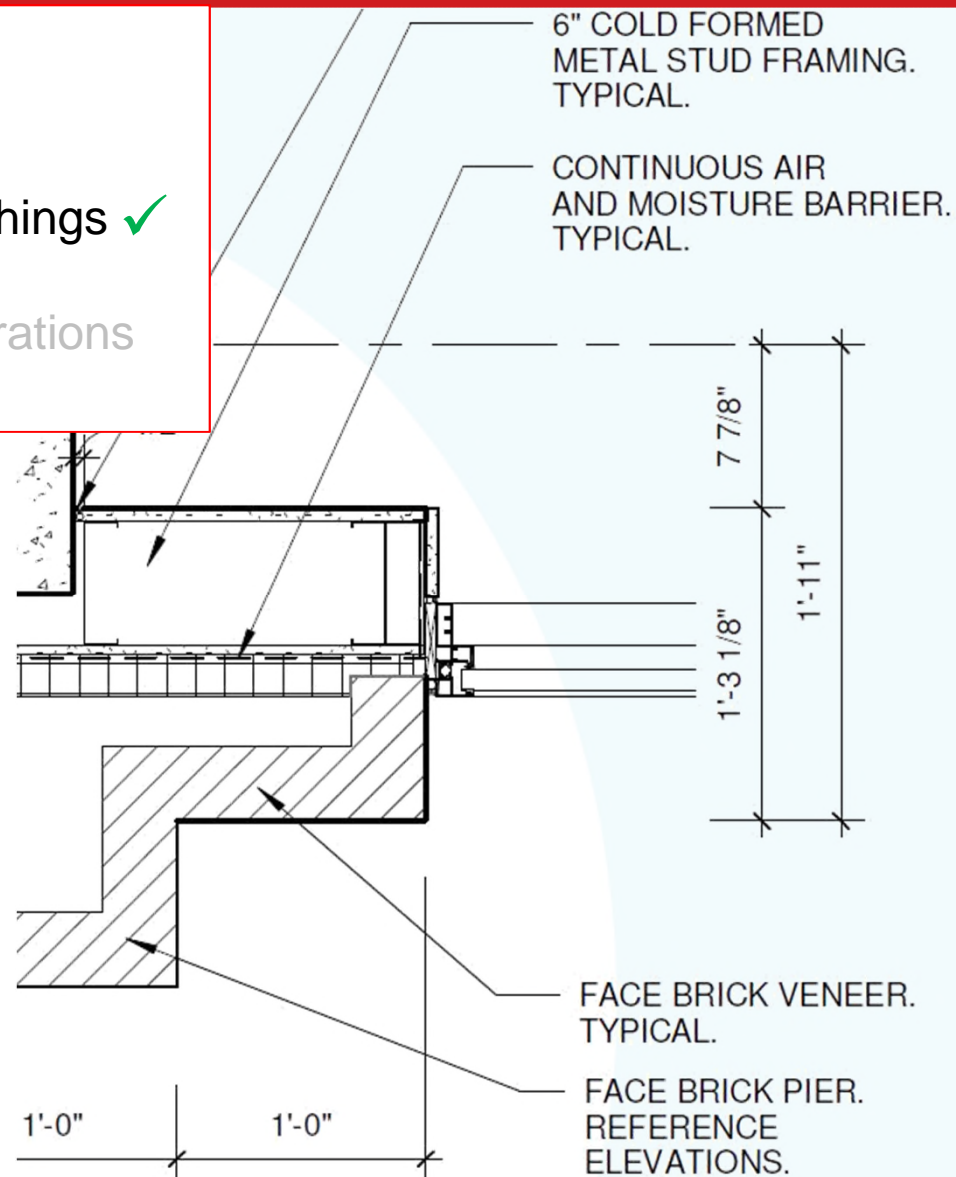
# Case Study – Indianapolis Hotel

1. Sill pan ✓
2. End-dams ✓
3. Drain water ✗
4. Integrate w/ flashings ✗
5. Slope ✓
6. Unsealed penetrations ✗
7. Air seal ✗



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1. Sill pan
2. End-dams
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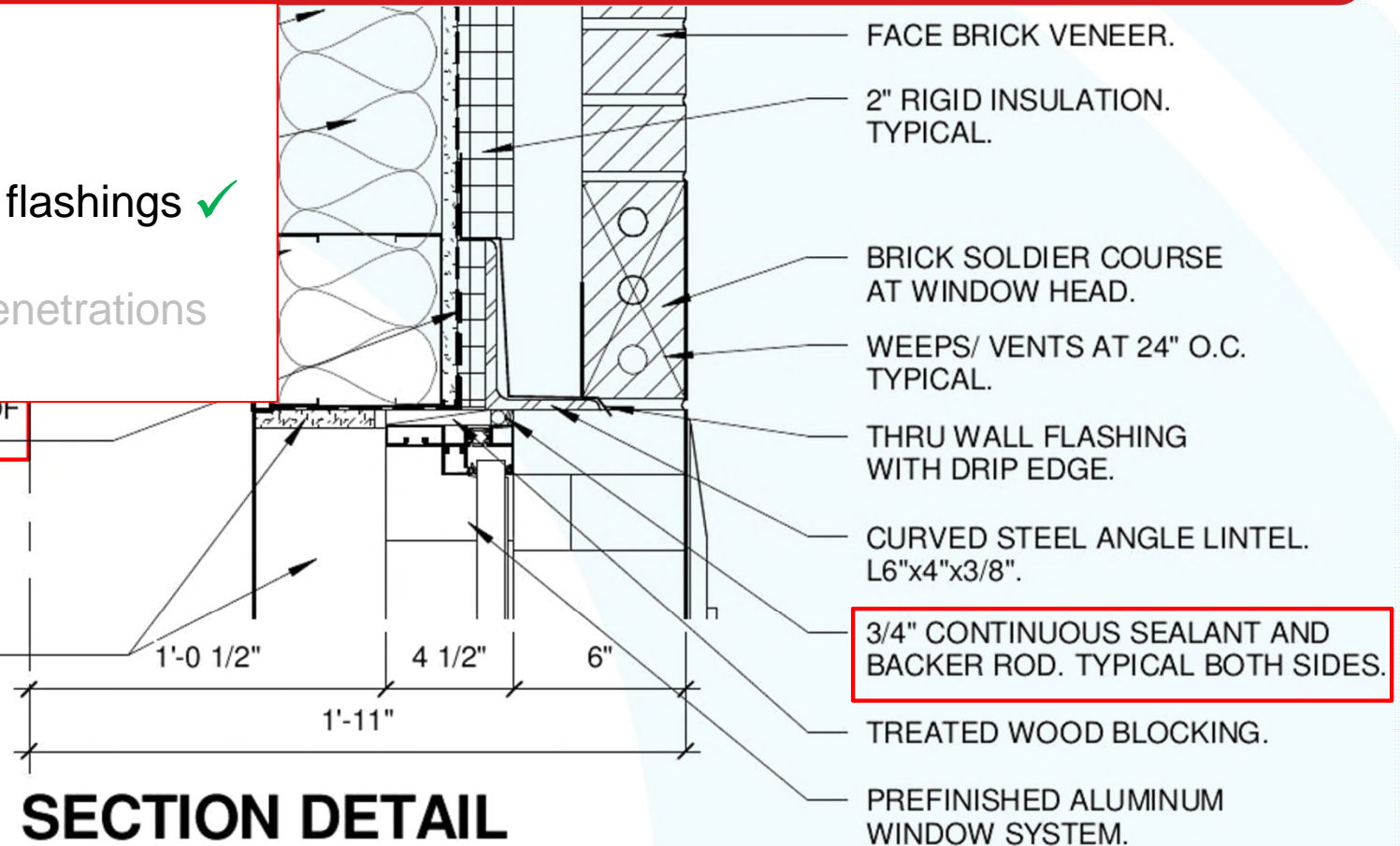
ENTIRE PERIMETER OF  
ROUGH OPENING.

5/8" GYPSUM  
BOARD. RETURN  
TO WINDOW  
SYSTEM AT HEAD  
AND JAMBS.



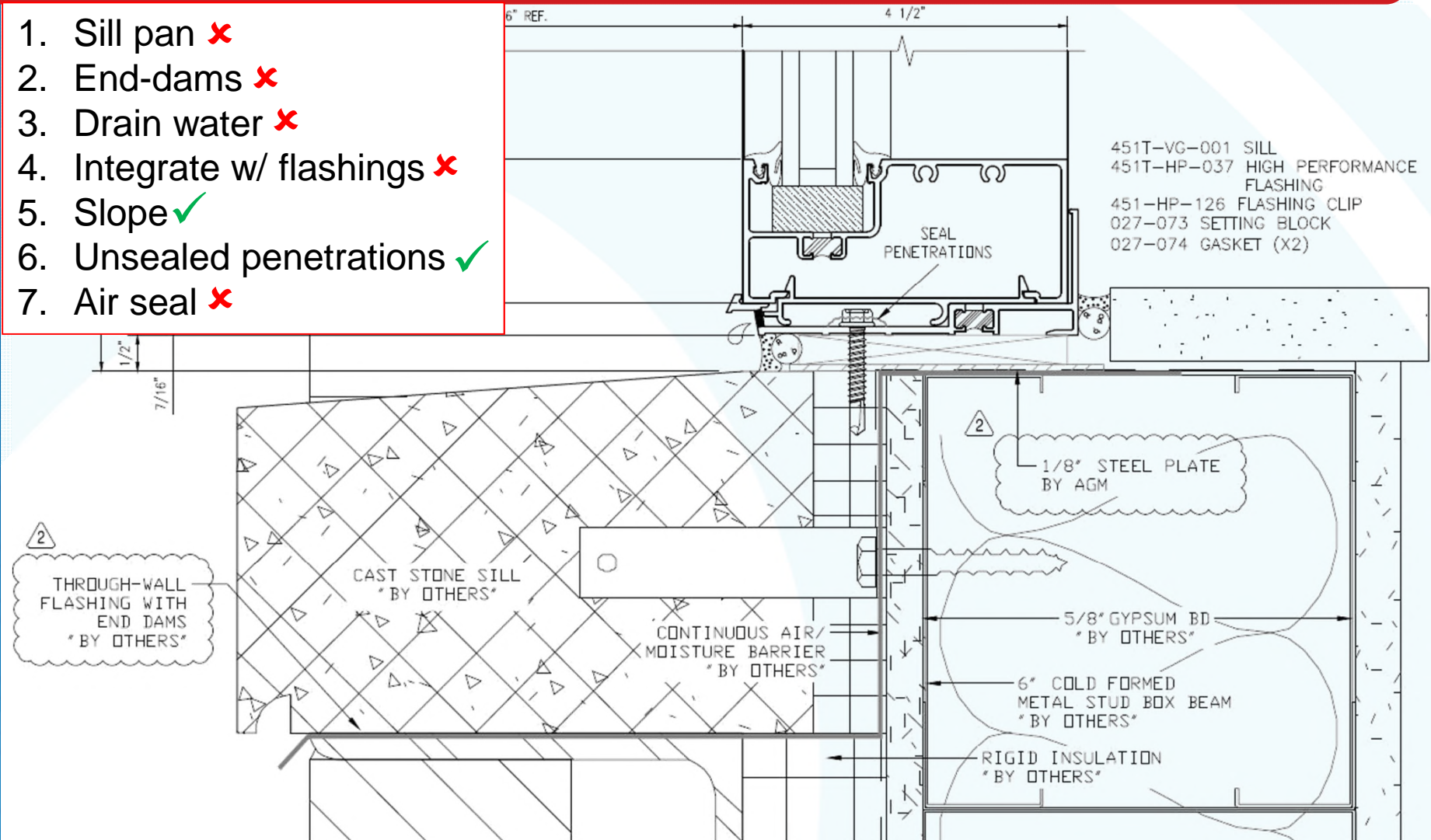
## SECTION DETAIL

1 1/2" = 1'-0"



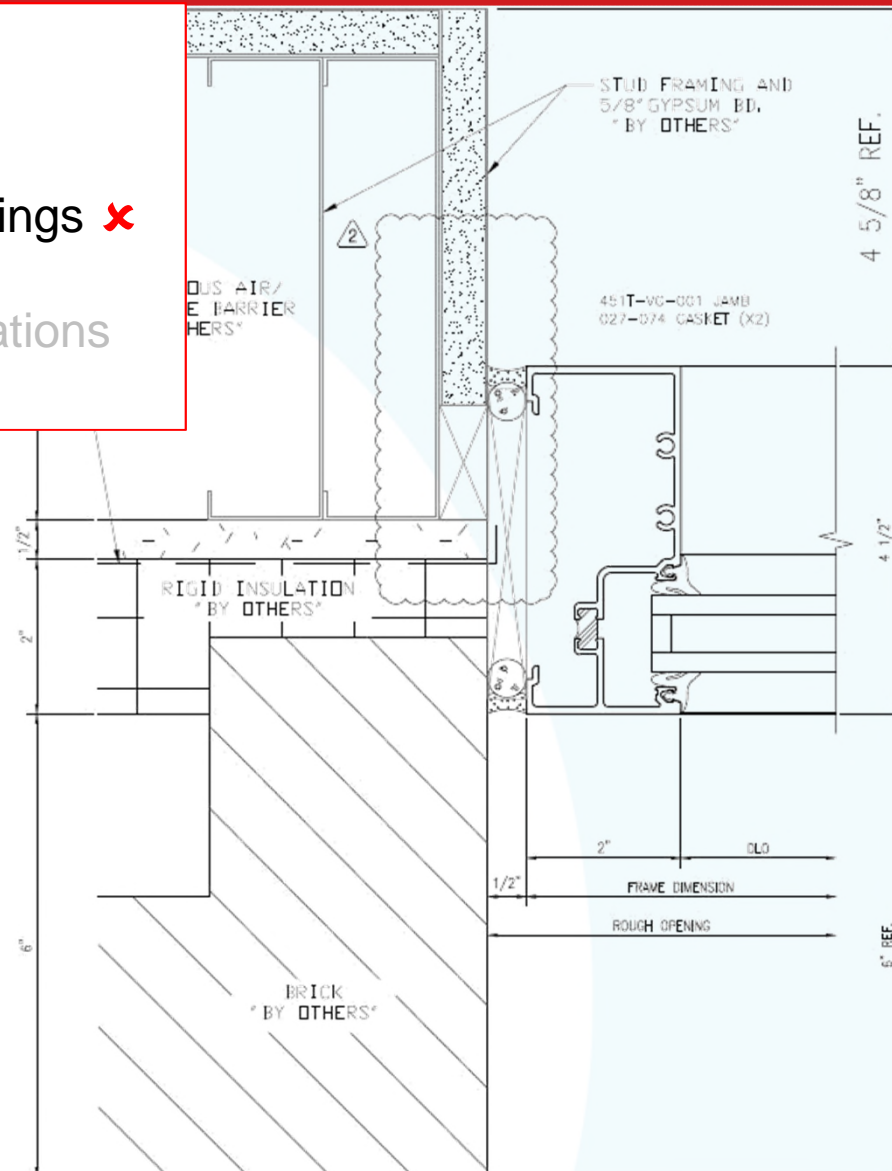
# Case Study – Indianapolis Hotel

1. Sill pan ✗
2. End-dams ✗
3. Drain water ✗
4. Integrate w/ flashings ✗
5. Slope ✓
6. Unsealed penetrations ✓
7. Air seal ✗



# Case Study – Indianapolis Hotel

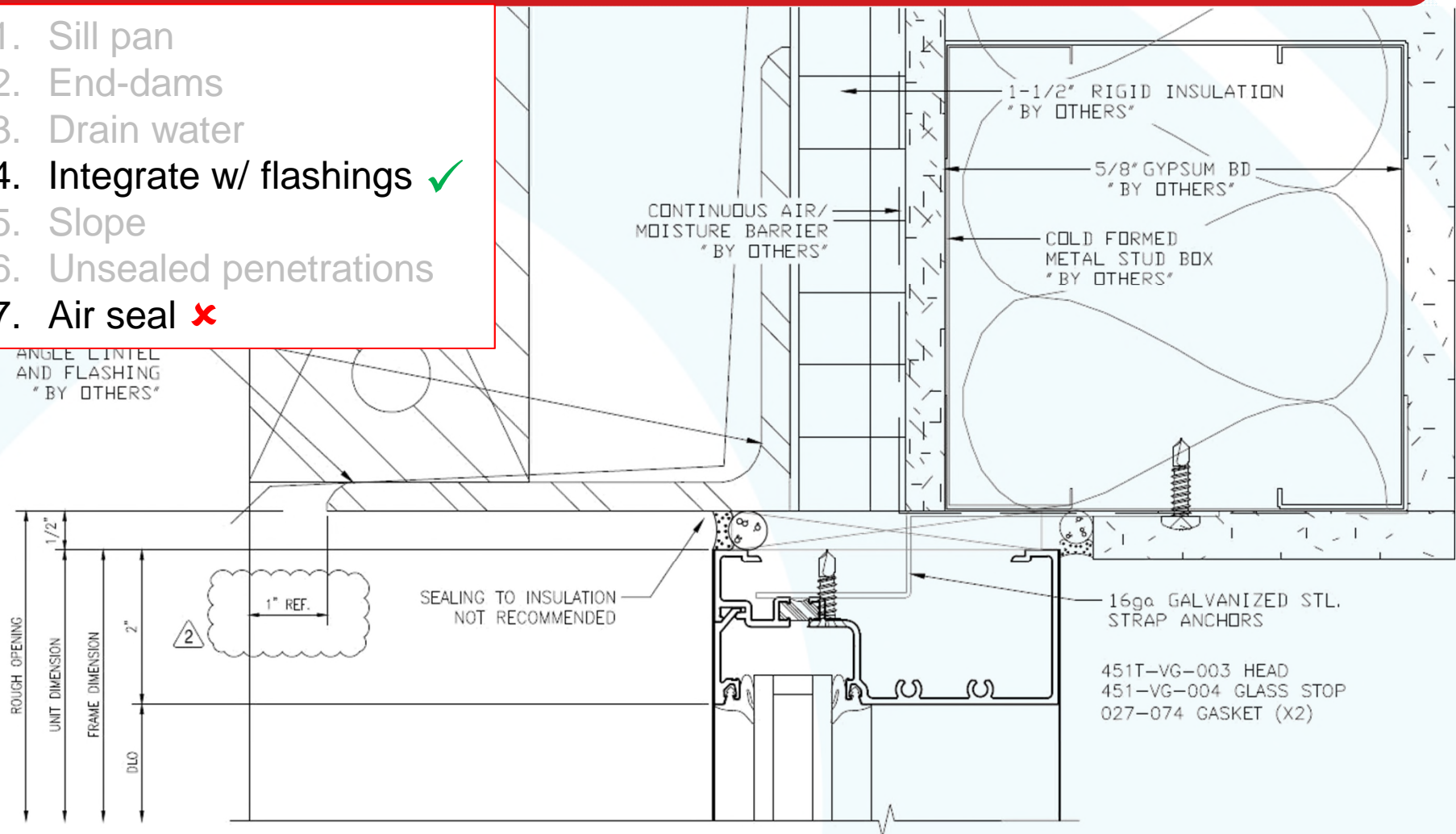
1. Sill pan
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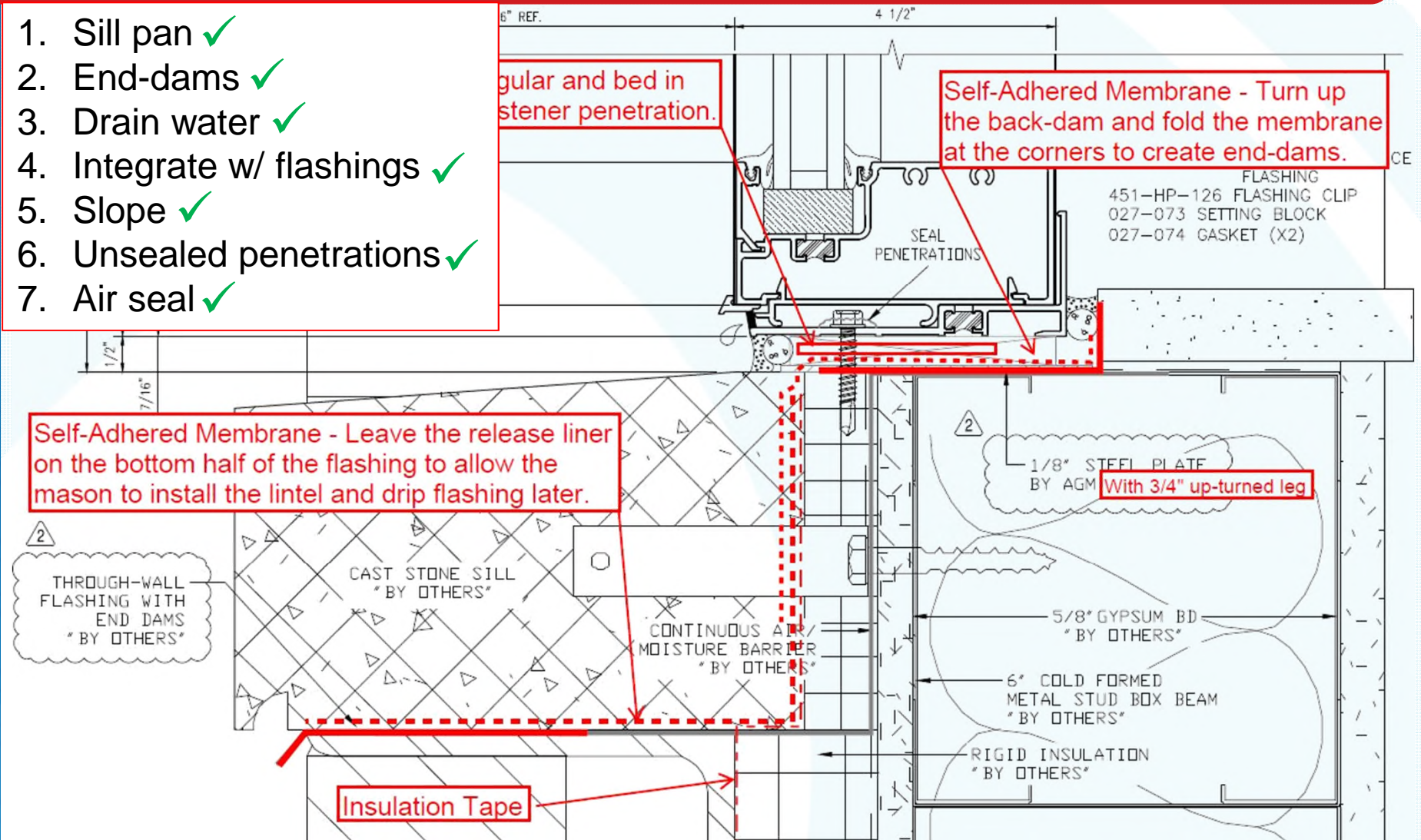
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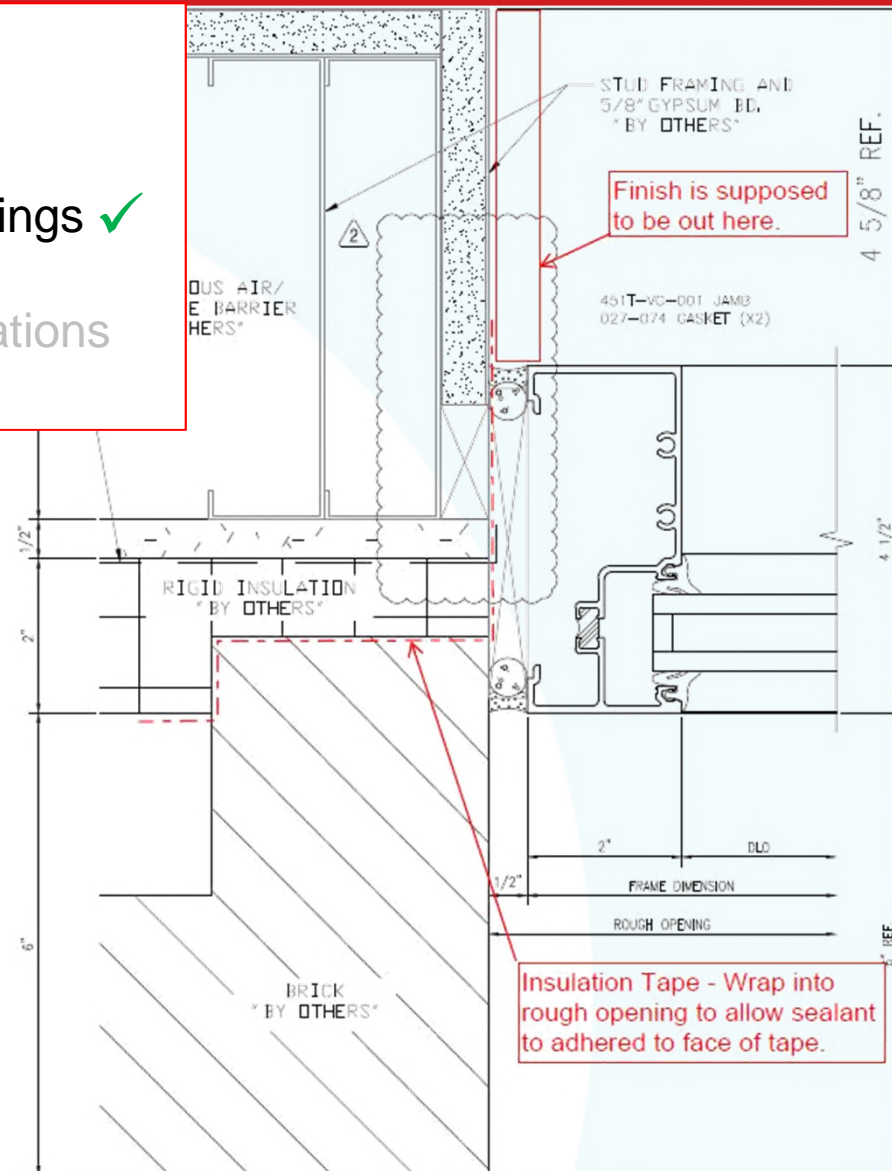
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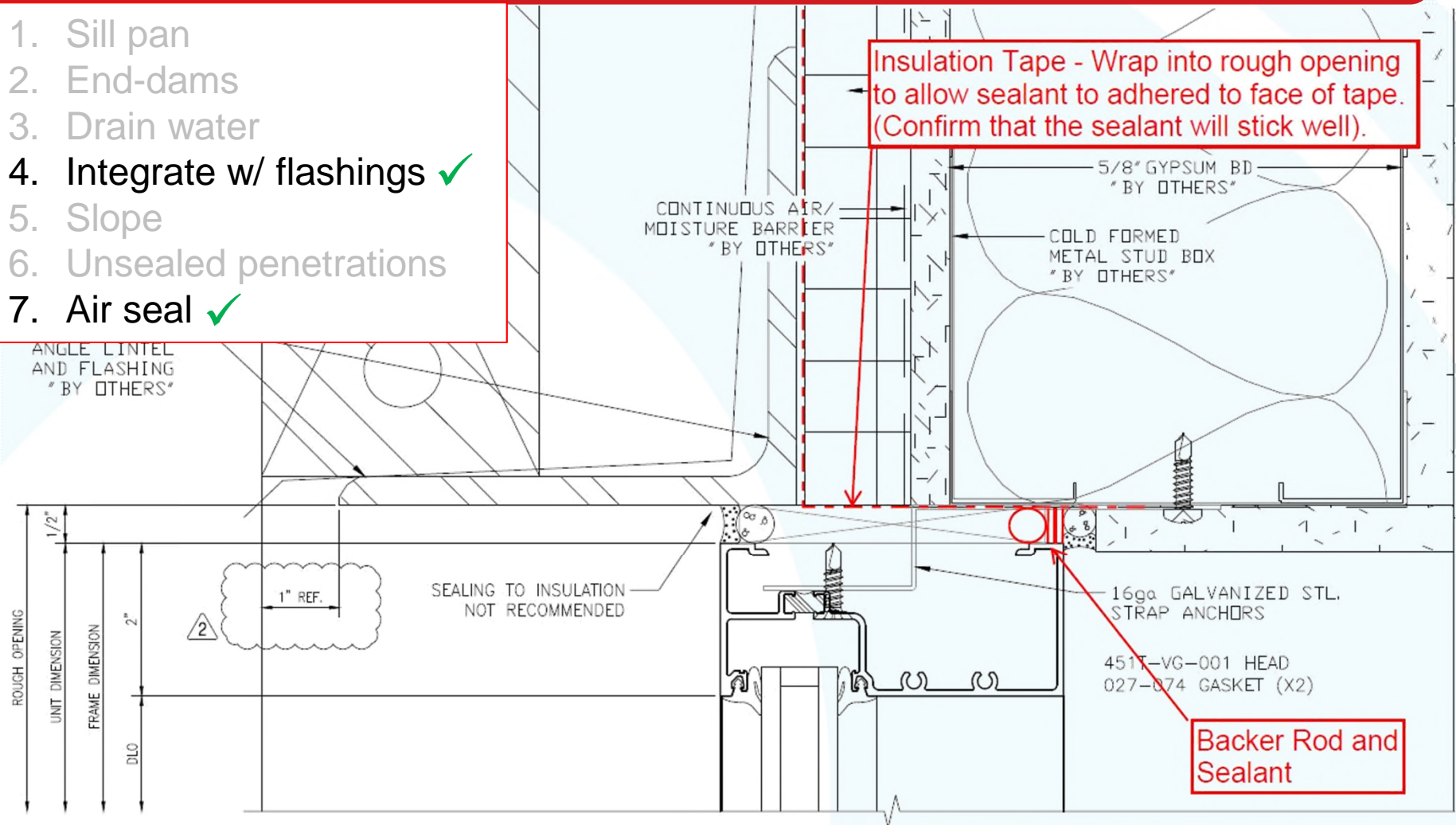
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# Case Study – Indianapolis Hotel

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# Case Study – Indianapolis Hotel



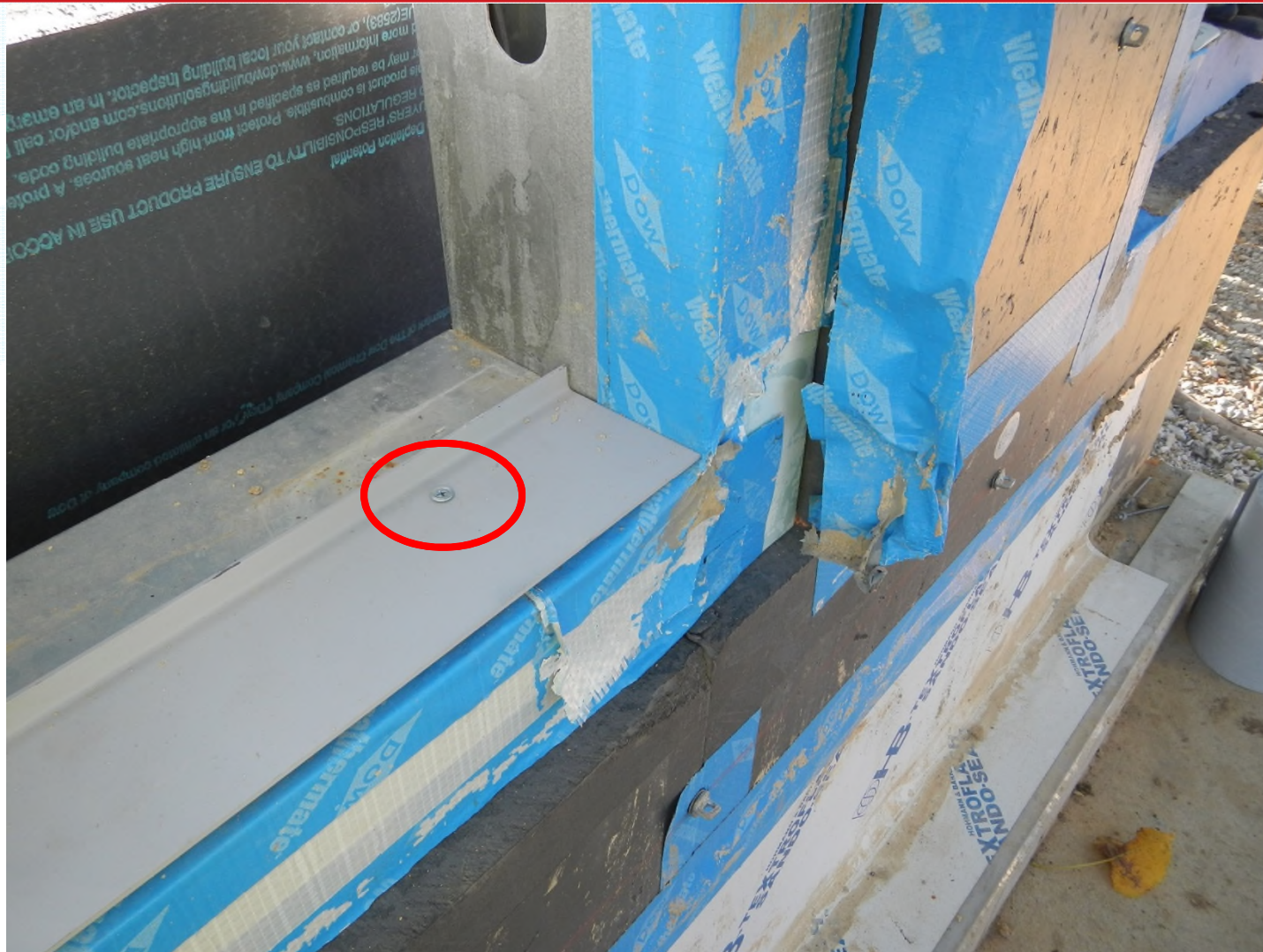


# Case Study – Indianapolis Hotel





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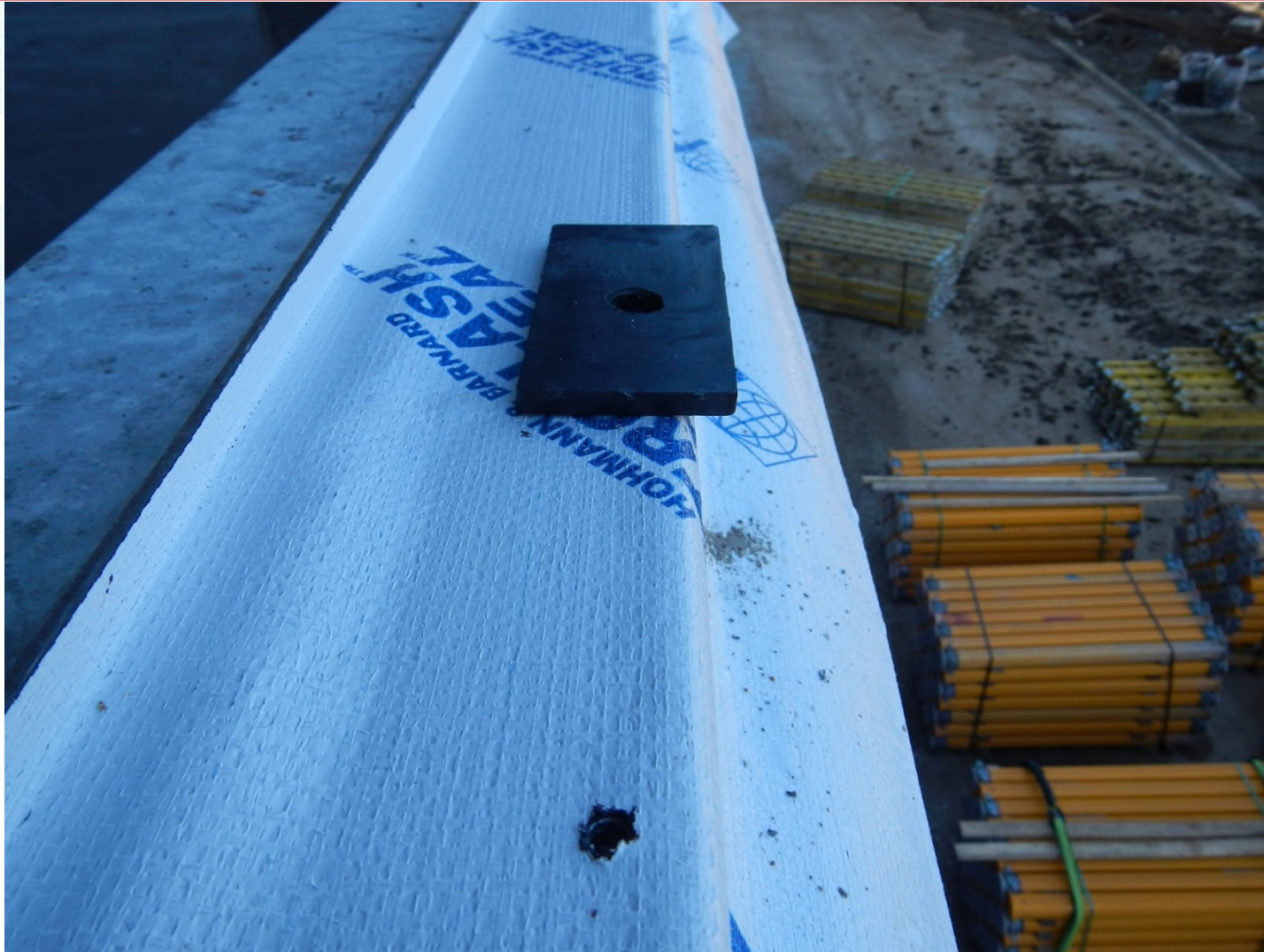


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# Case Study – Indianapolis Hotel





# Case Study – Indianapolis Hotel



# Case Study – Indianapolis Hotel



# Take Aways

- Do you need high performance windows/flashings?
- Copy window manufacturers' designs
  - Provide a sill pan
  - Give it three sides
  - Drain it to the exterior
  - Integrate it with the wall flashings
  - Slope it to the exterior
  - Don't puncture it
  - Provide an interior air seal



# Questions

