

abaa 2026 building enclosure conference

Bridging Old and New: Best Practices for Building Enclosure Tie-Ins

Mike Nagle
CannonDesign

AIA
Continuing
Education
Provider



Bridging Old and New: Best Practices for Building Enclosure Tie-Ins



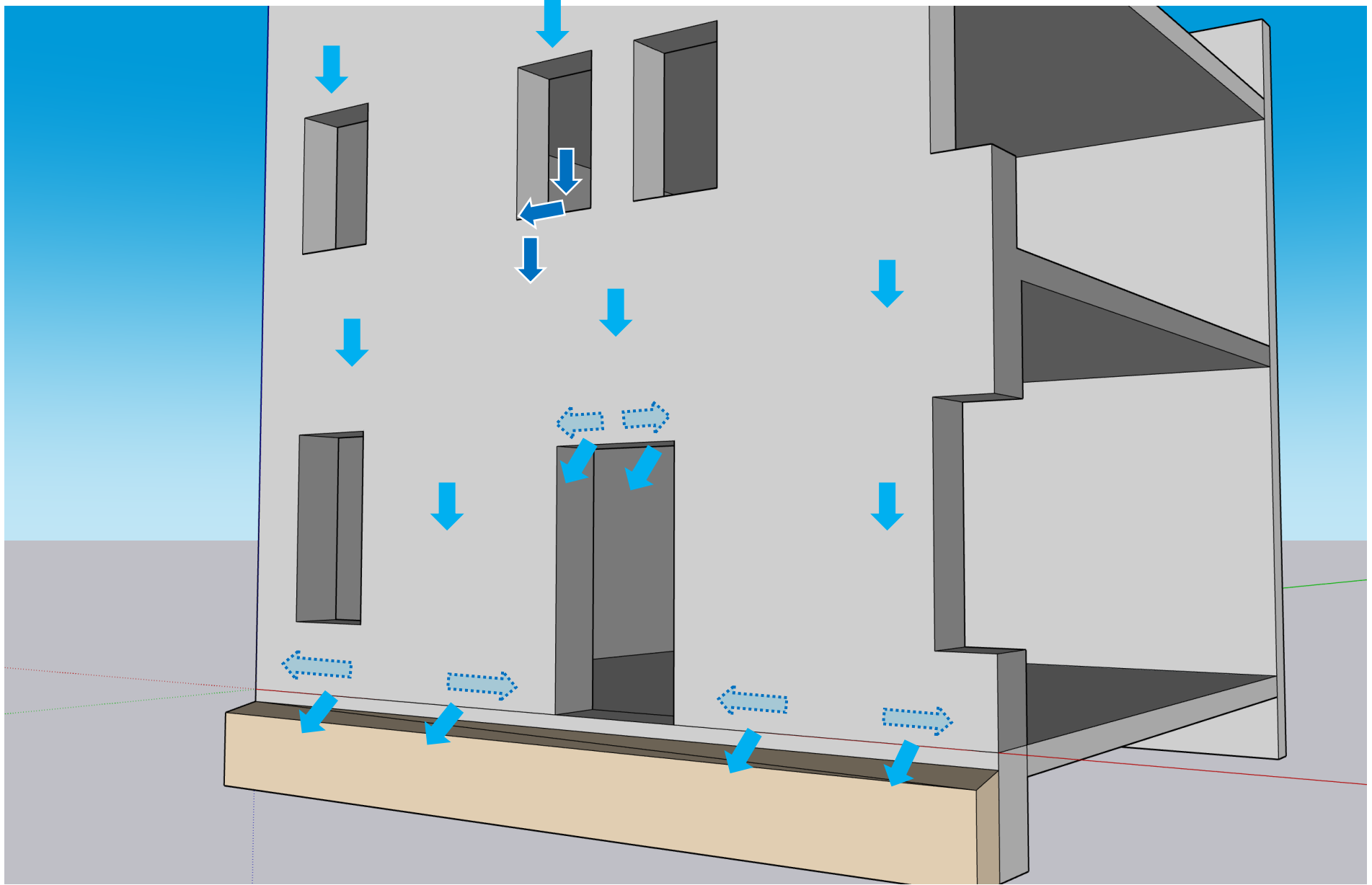
Learning Objectives

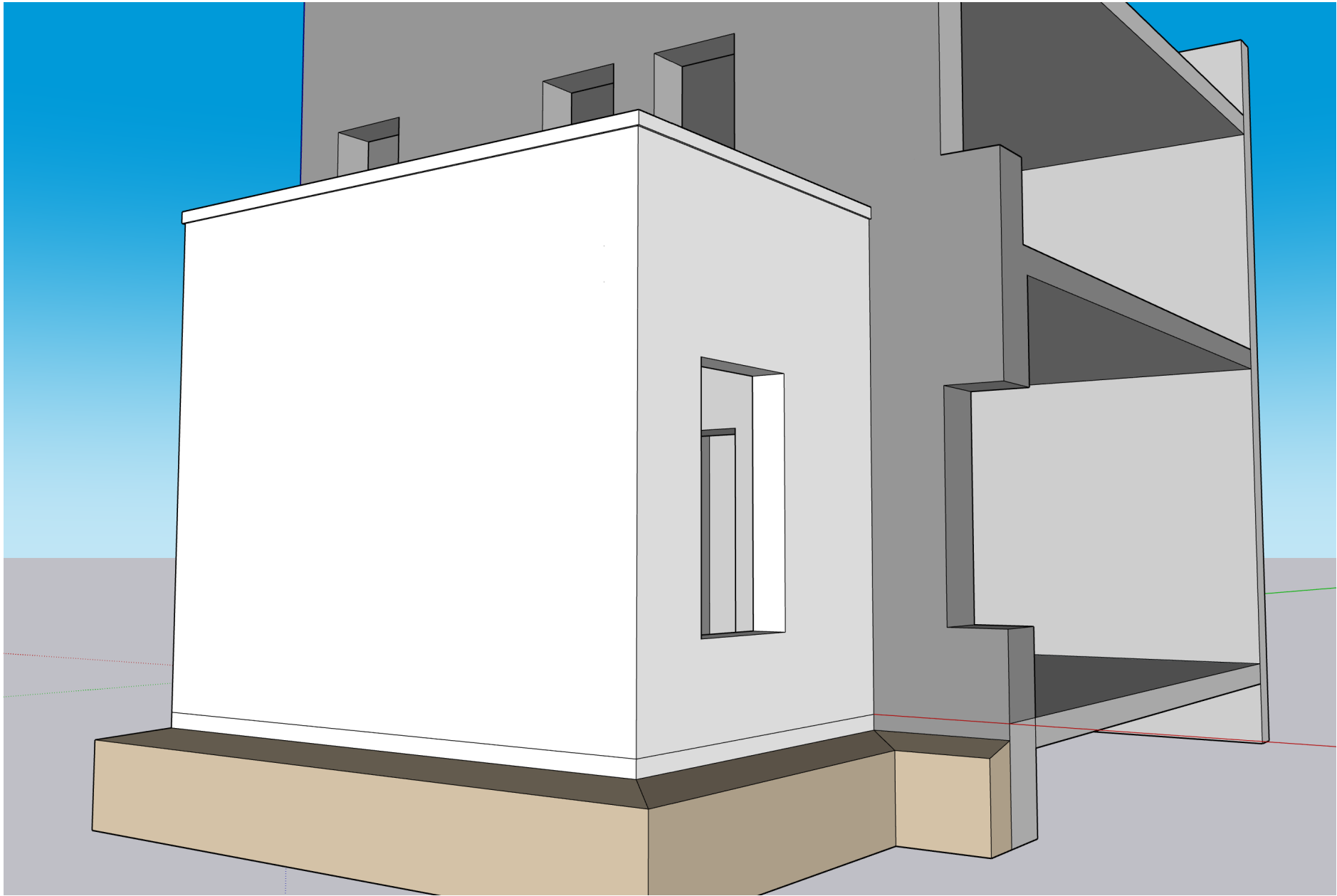
1. Analyze and compare the key features and functional differences among mass, transitional, barrier, drainage, and rainscreen exterior wall designs.
2. Review assembly and performance differences between conventional and protected membrane (inverted) roofing designs.
3. Assess, document, and verify the types of existing exterior walls and roofing systems using appropriate evaluation techniques.
4. Apply design fundamentals to develop technically sound new wall and roof tie-ins to existing structures, ensuring continuity of control layers.

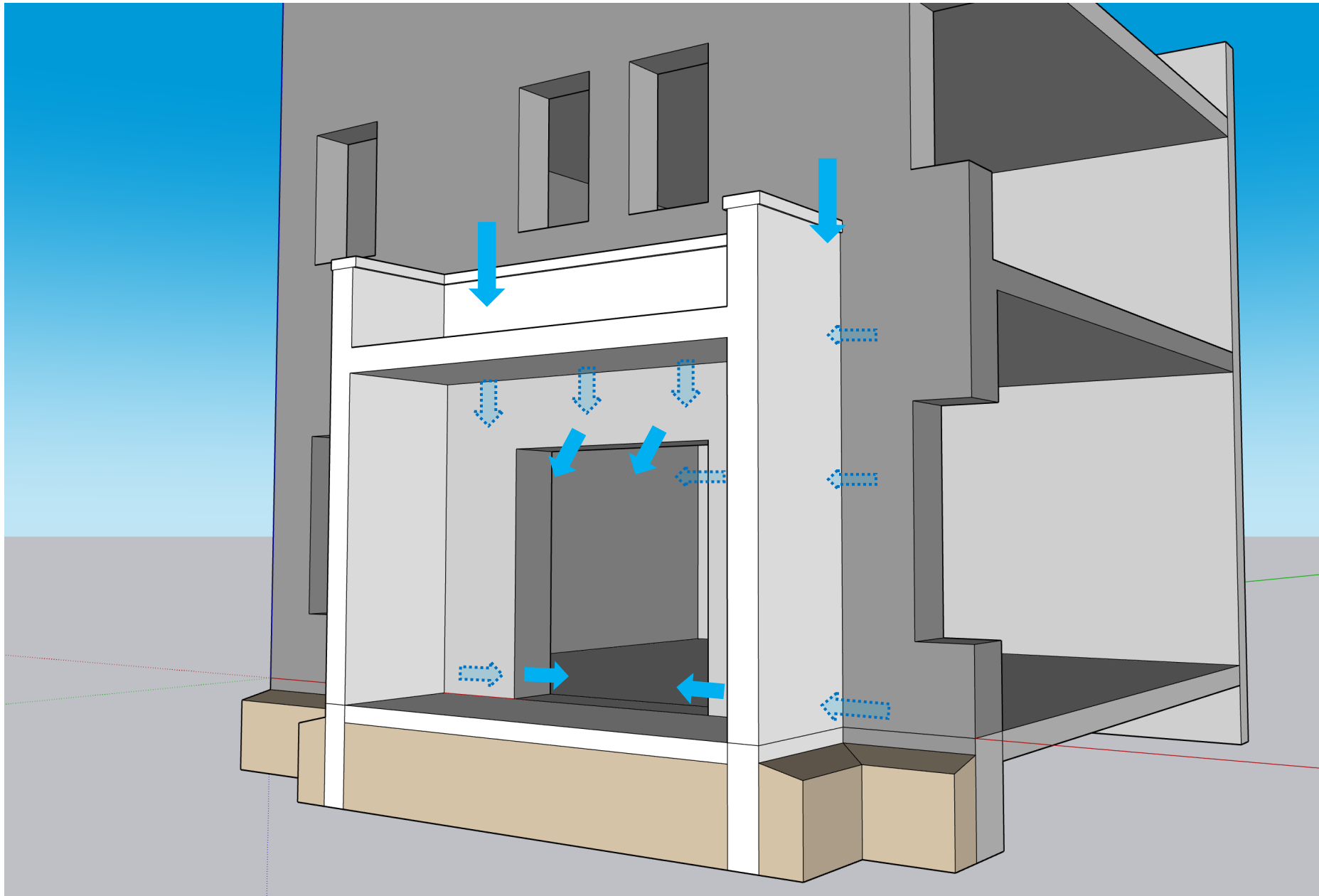


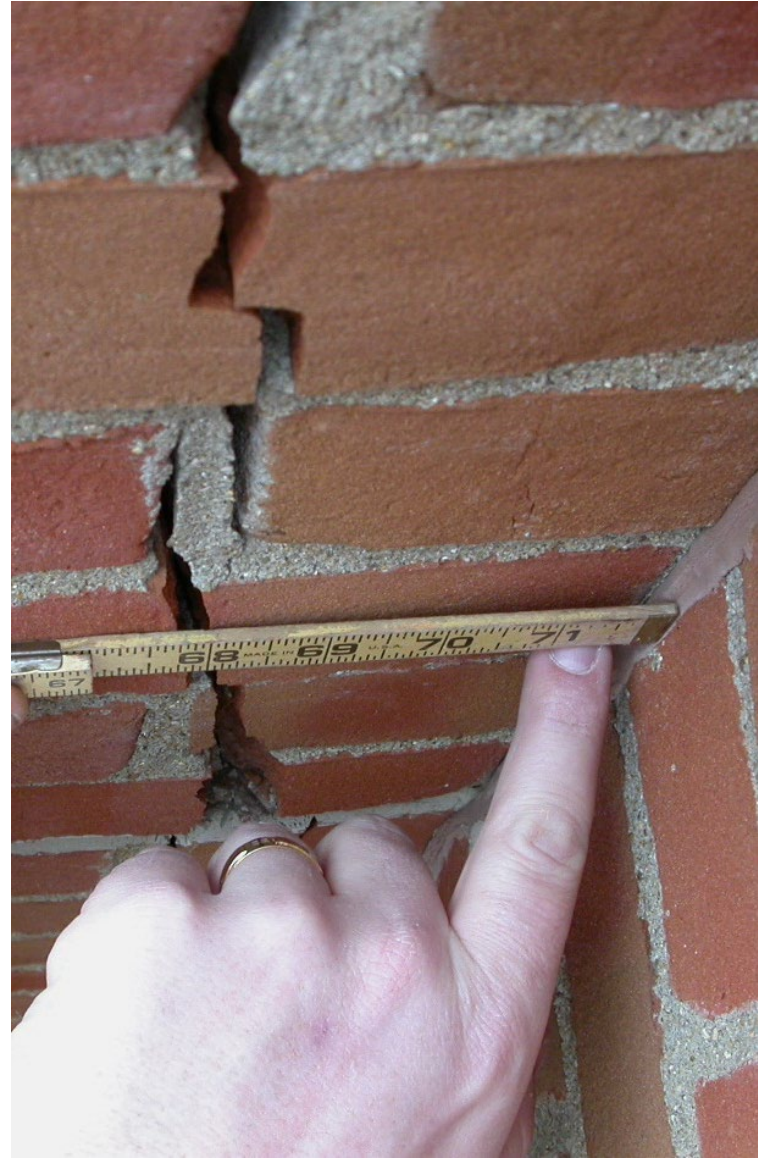
Mike Nagle

Introduction

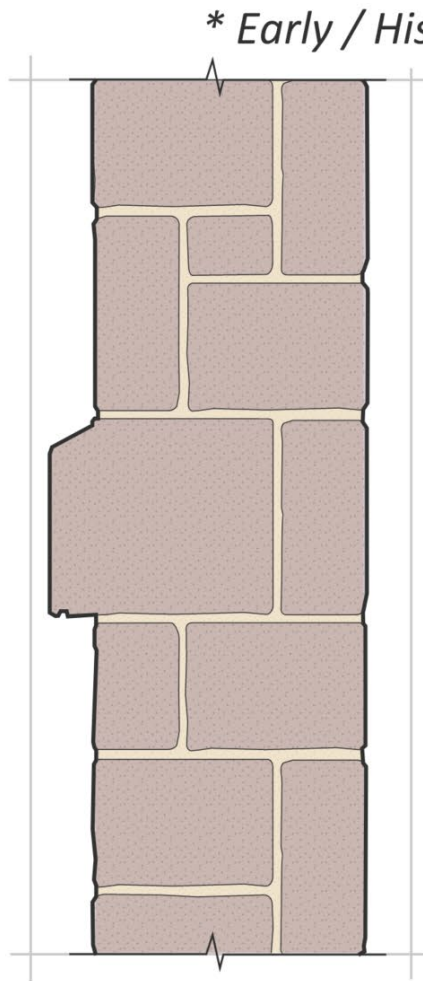




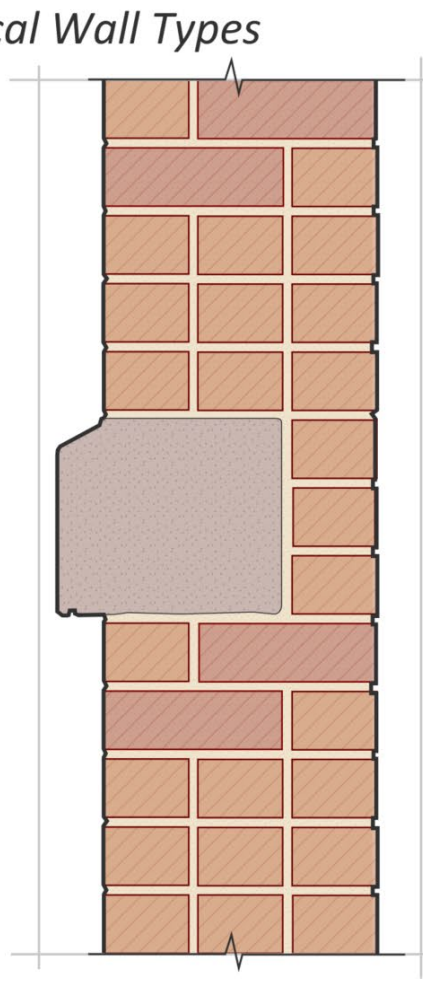




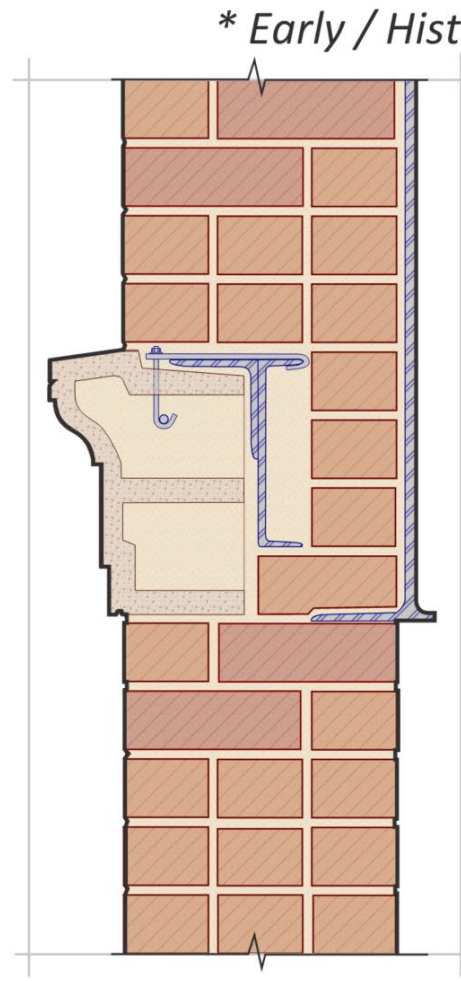
Exterior Wall Types



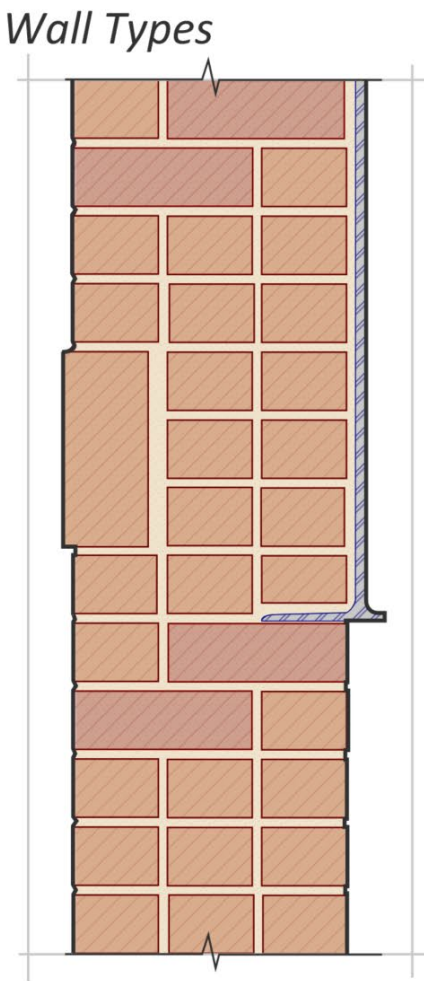
Stone *



Masonry & Stone *



Masonry, Architectural
Terra Cotta, & Structural
Steel *

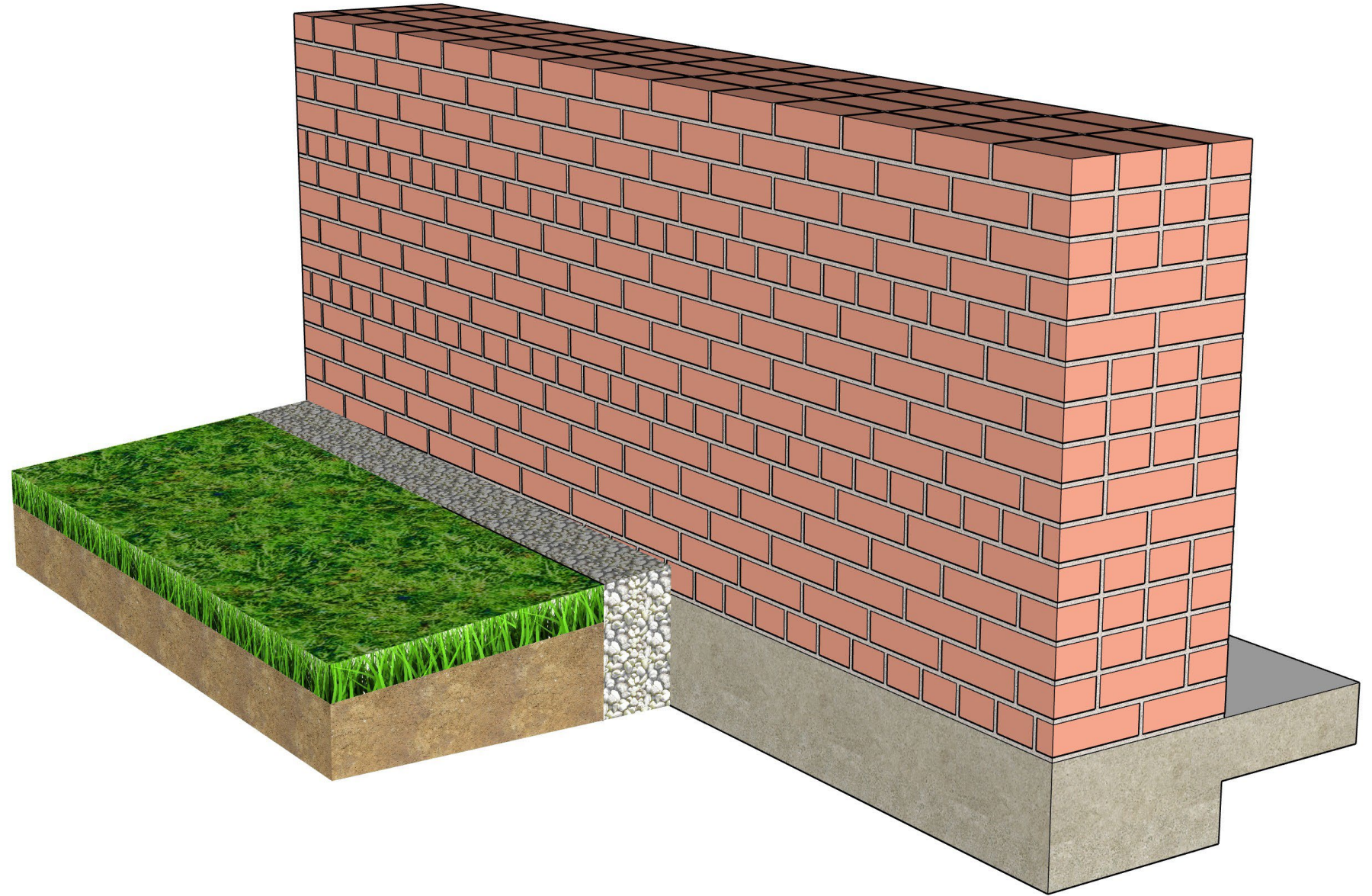


Masonry and
Structural Steel *

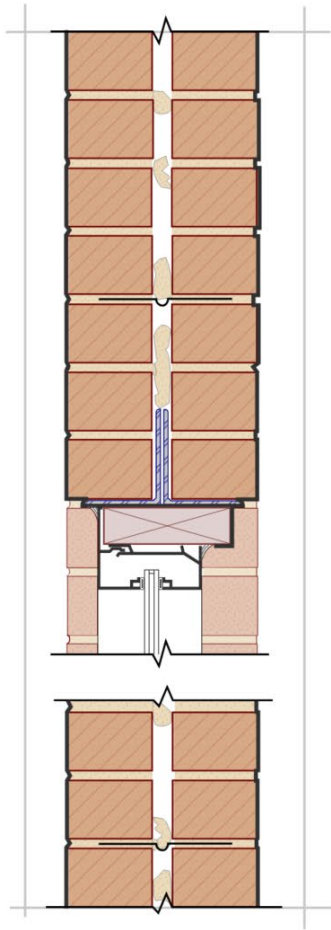
Mass Walls

FEATURES

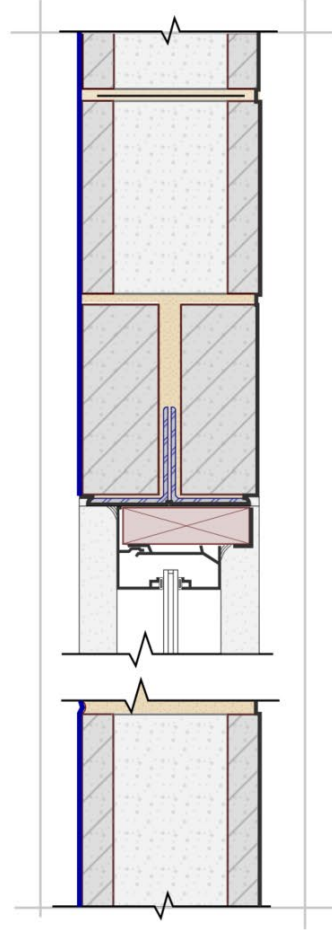
- Brick, Stone, or Terra Cotta
- Header Brick
- Embedded Steel (sometimes)
- Through-Wall Flashing & Weeps (sometimes)
- No Drainage Cavity, Weather-Resistive Barrier, or Air Barrier



** Early Wall Types - Limit Use*

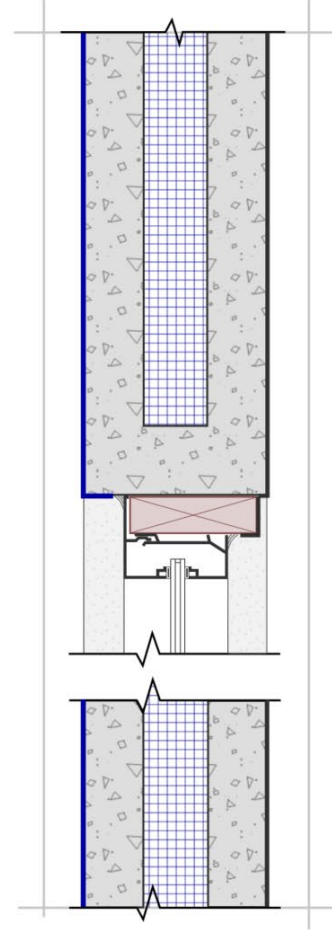


Brick *

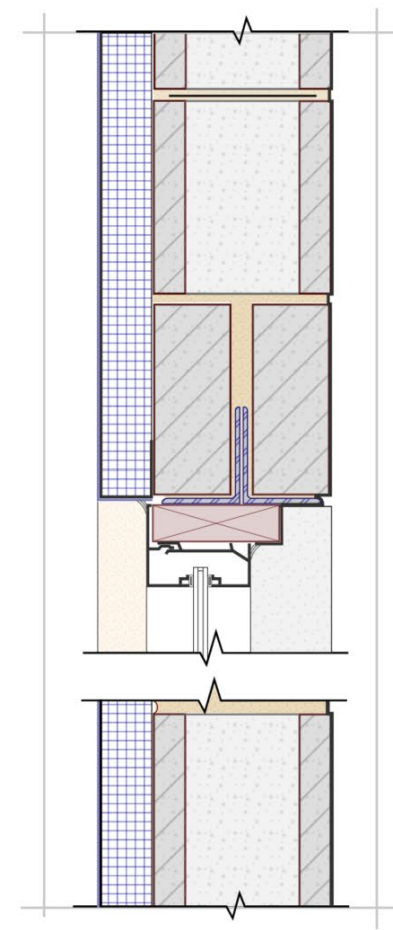


CMU *

** Early Wall Types - Limit Use*



Insulated
Concrete Panels *

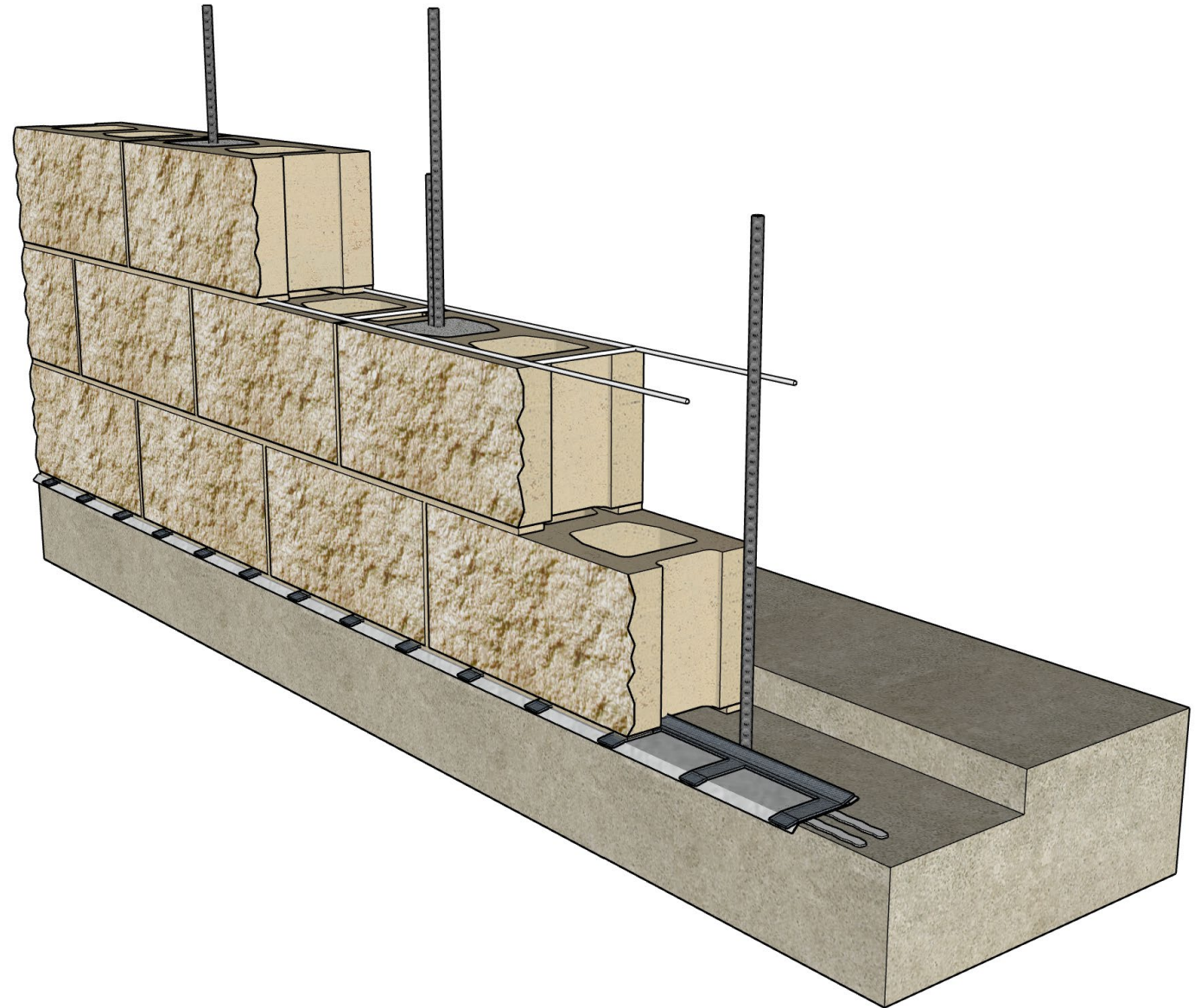


Barrier EIFS with
CMU Backup *

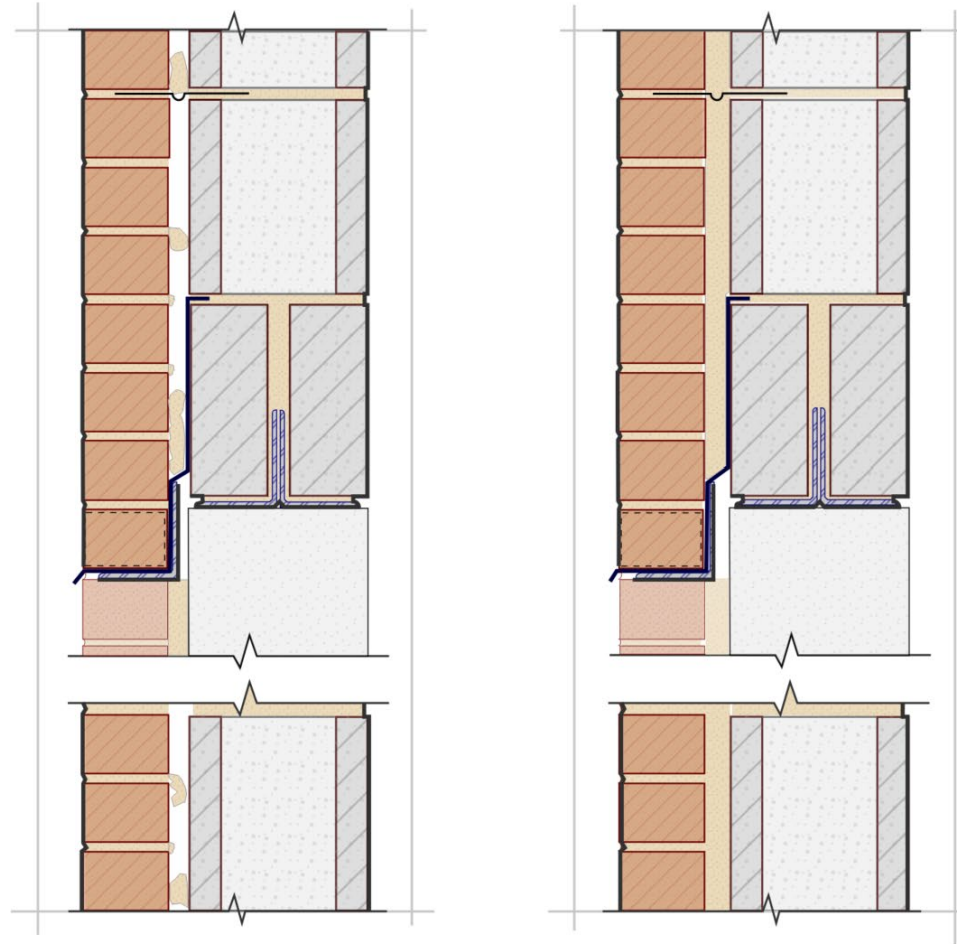
Barrier Walls

FEATURES

- Single-Wythe or Double-Wythe Masonry, Concrete Wall Panels, Barrier EIFS on Back-up Walls
- Through-Wall Flashing & Weeps (common)
- Embedded Steel (typical for masonry, concrete wall panels)
- No Drainage Cavity, Weather-Resistive Barrier, or Air Barrier



** Early Wall Types - Limit Use*



Brick and CMU with open collar joint *

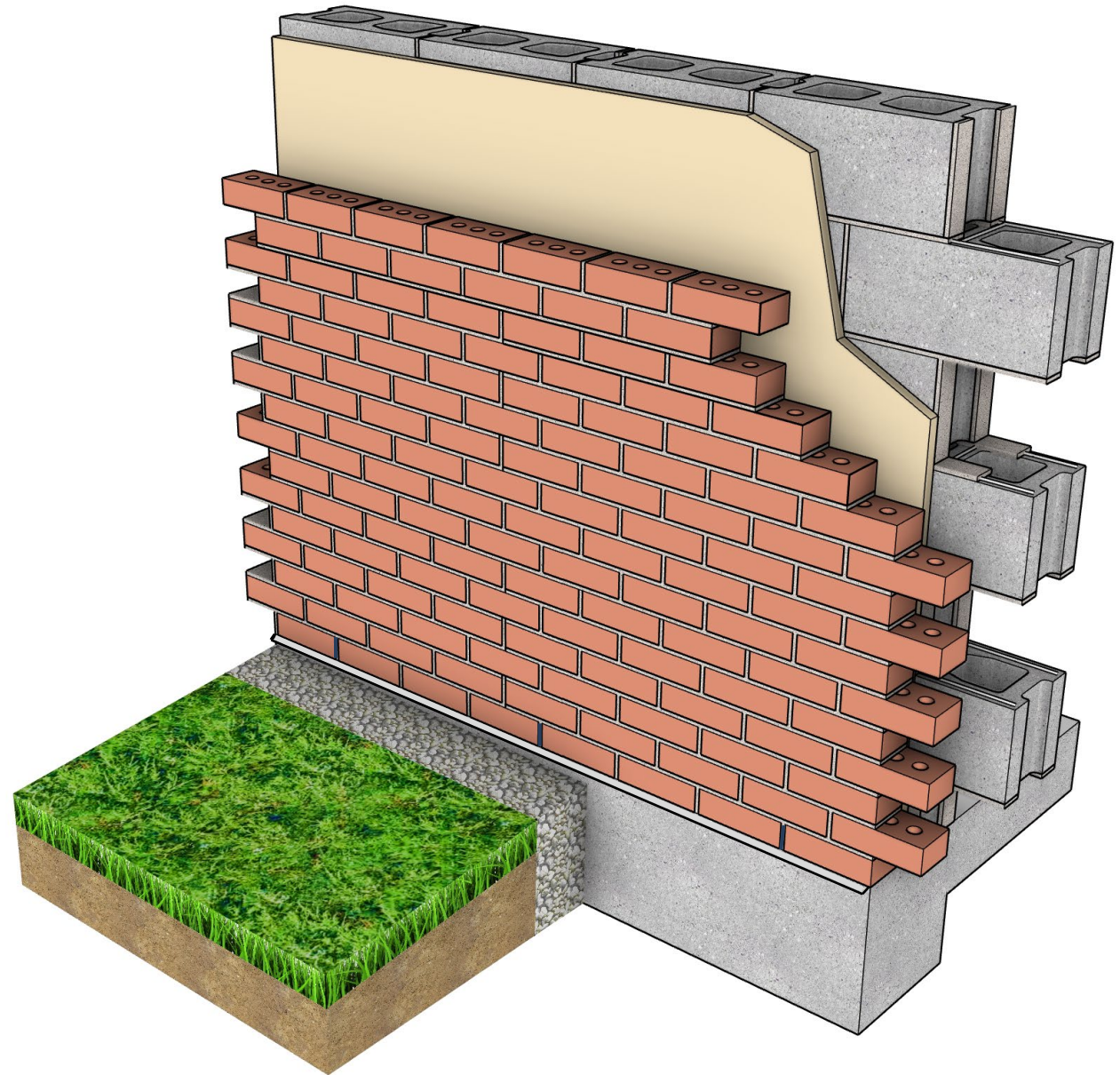
Brick and CMU with grouted collar joint *

Transitional Walls

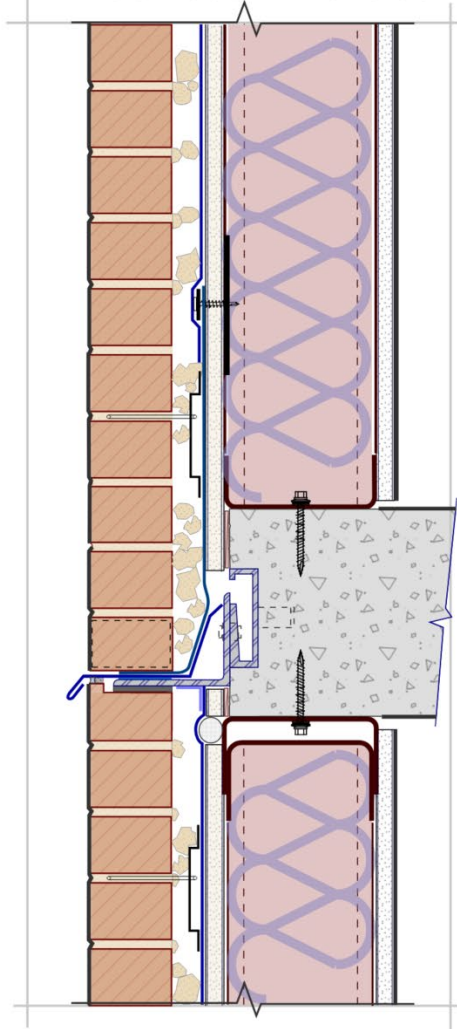
FEATURES

- Masonry with CMU Back-up
- Collar Joint or Air Space
- Embedded Steel
- Metal Wall Ties
- Dampproofing (sometimes)

- Through-Wall Flashing & Weeps (common)
- No Weather-Resistive Barrier or Air Barrier

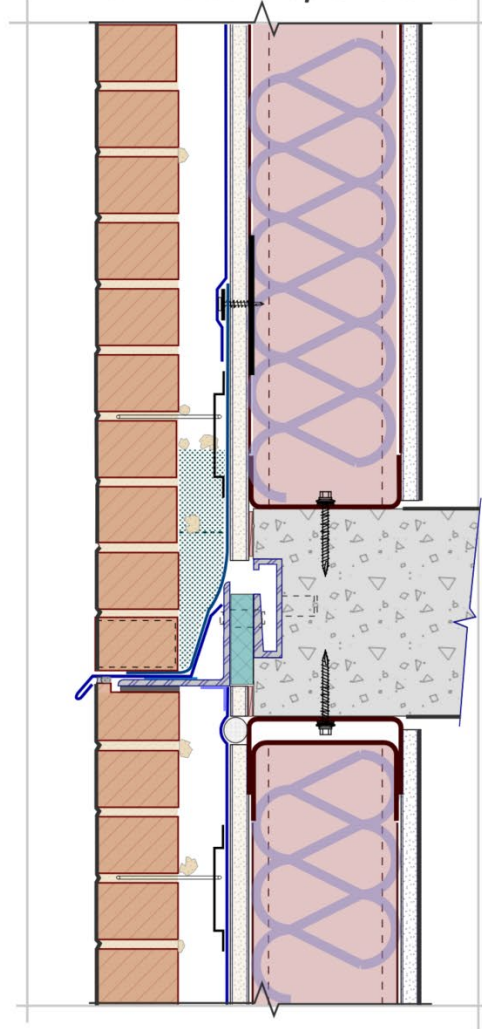


** Not Recommended*



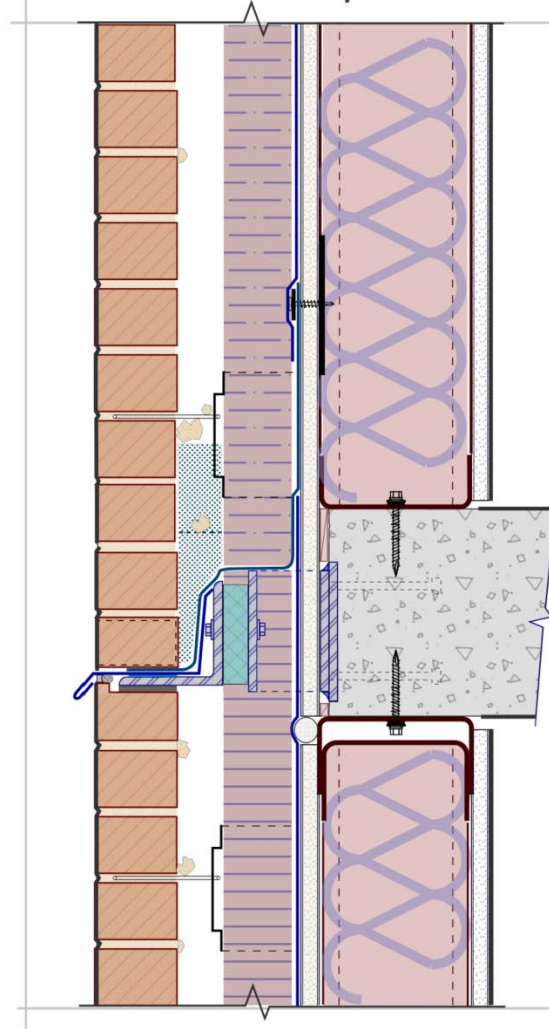
Masonry (cavity insulation, 1-inch air space) *

*** Climate Dependent*



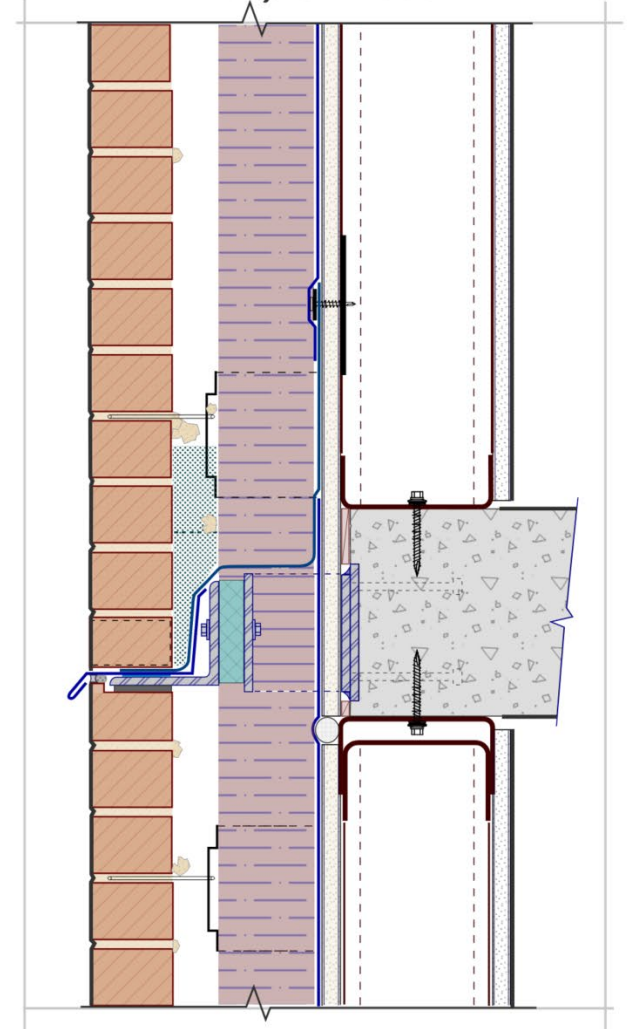
Masonry (cavity insulation, 2-inch air space) **

*** Climate Dependent*



Masonry (outboard & cavity insulation, 2-inch air space) **

**** Any Climate*

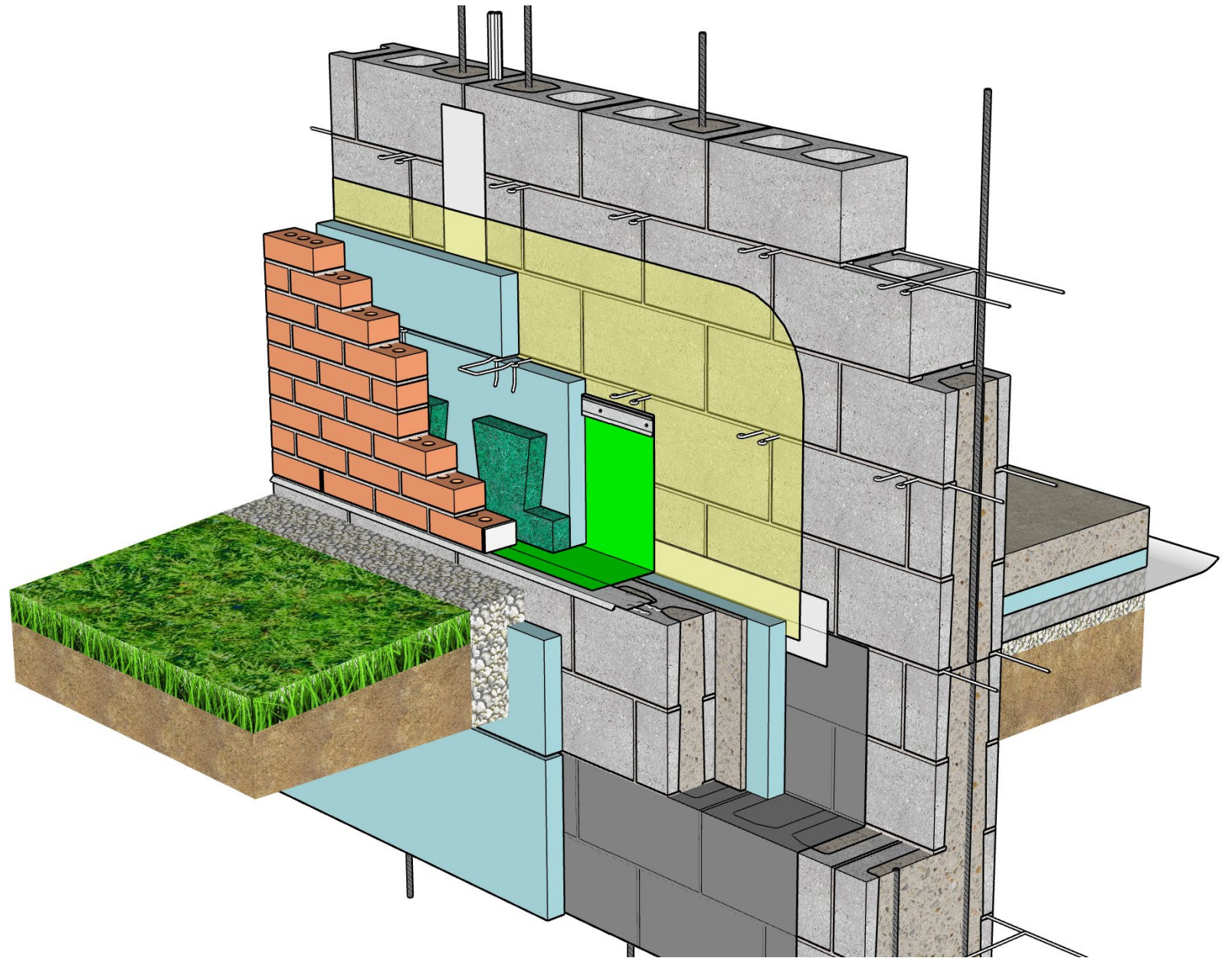


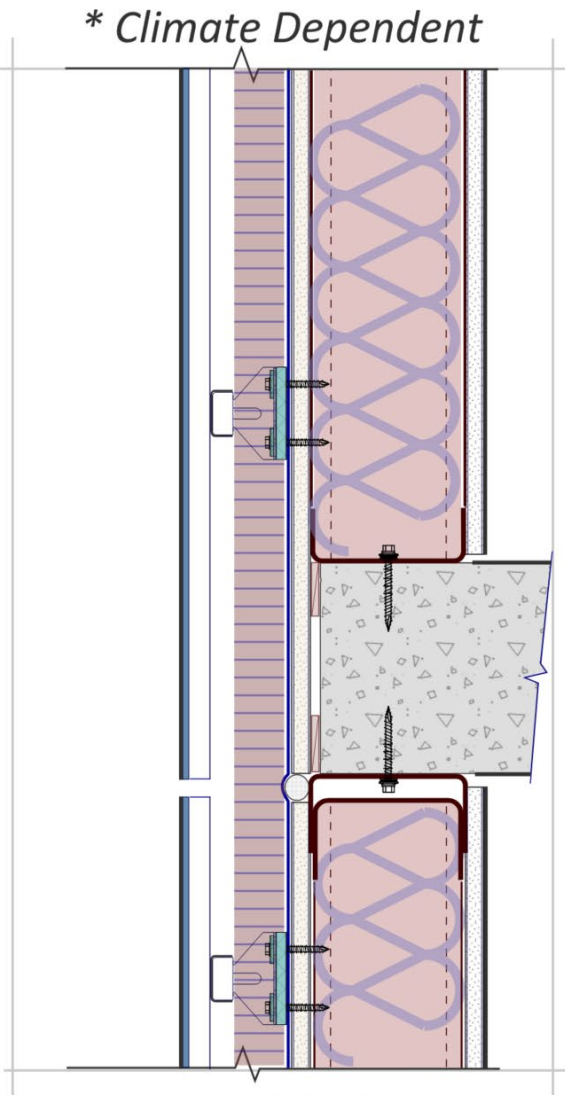
Masonry (outboard insulation, 2-inch air space) ***

Drainage Walls

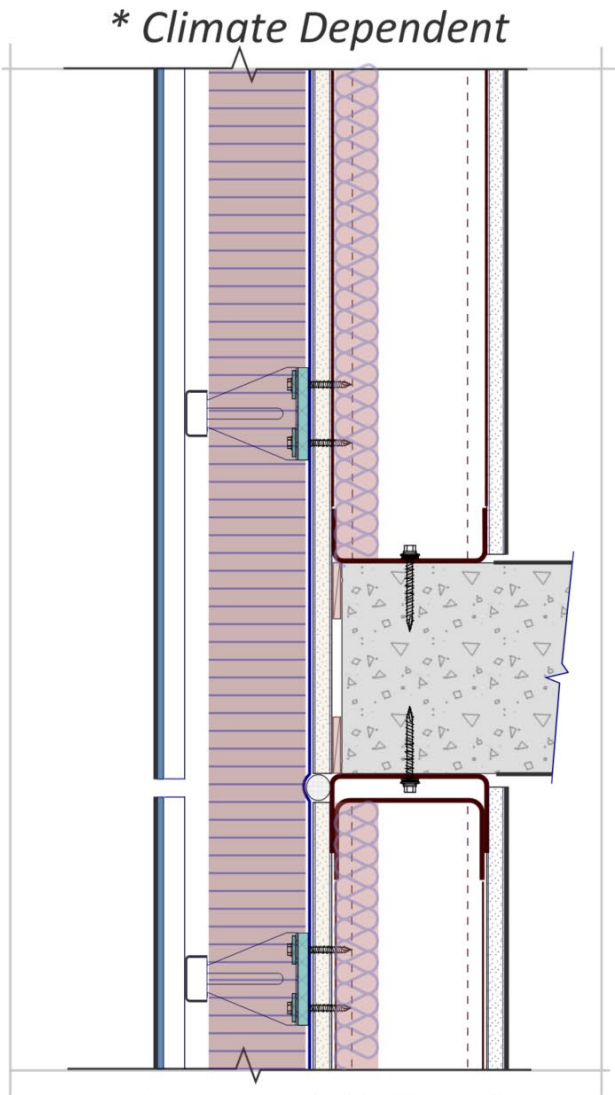
FEATURES

- Cladding
- Air/Drainage Cavity
- Weather-Resistive Barrier, Air Barrier, or AVB
- Through-Wall Flashing & Weeps
- Back-up Wall
- Embedded Steel
- Metal Wall Ties
- Thermal Insulation (cavity and/or continuous outboard insulation)

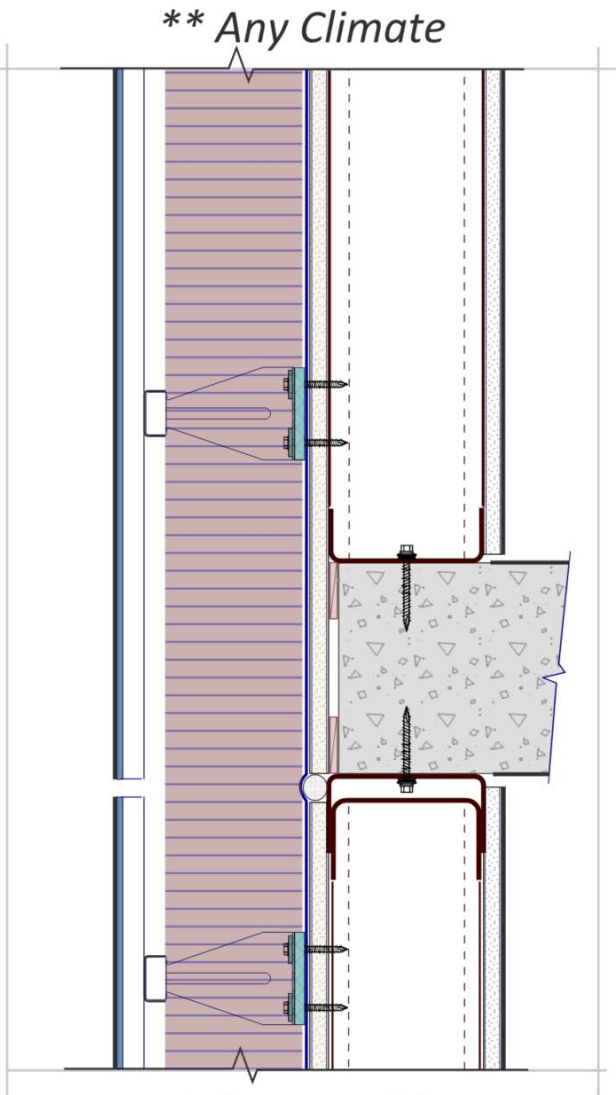




Rainscreen* (min. code prescribed, outboard & inboard insulation)



Rainscreen* (2/3 ratio, outboard & inboard insulation)

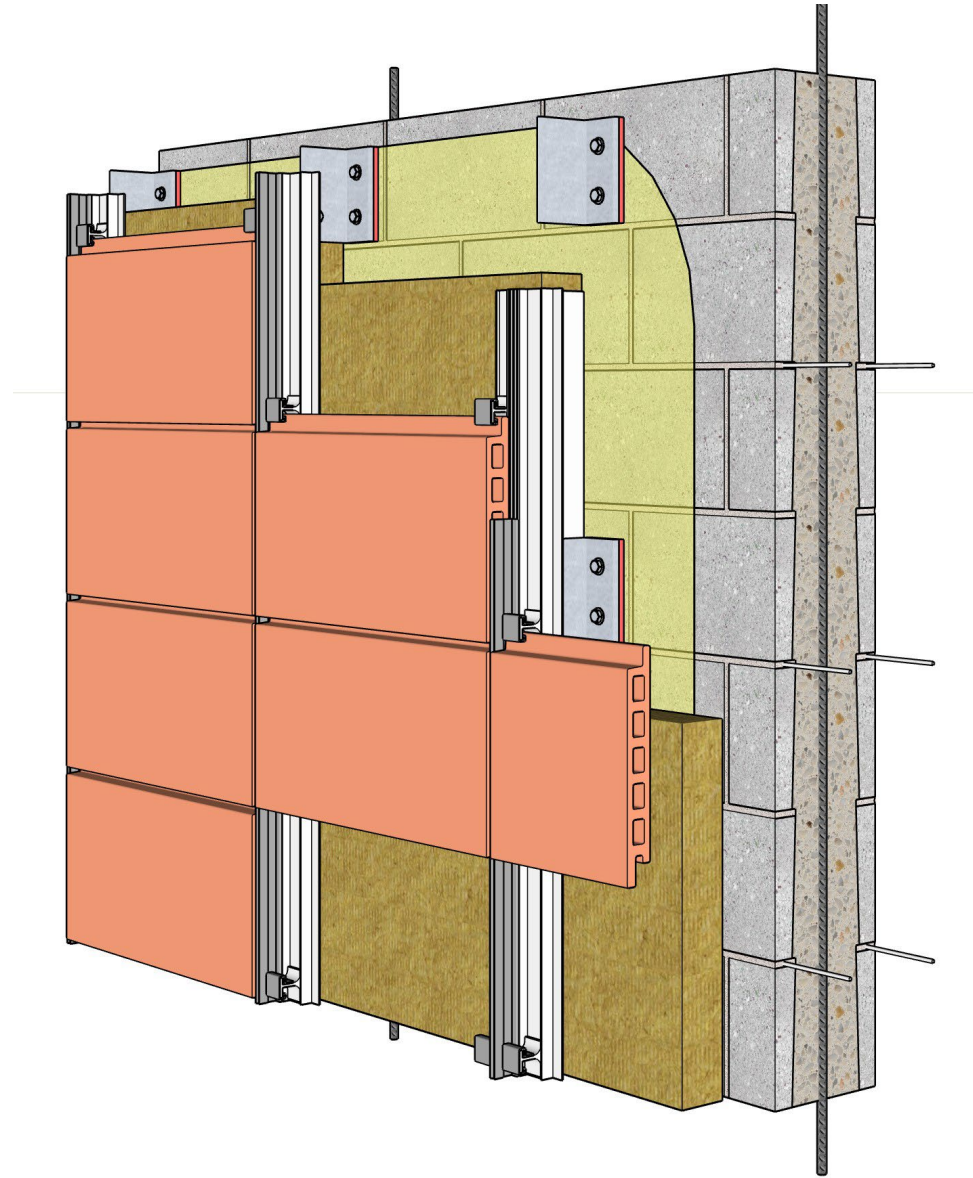


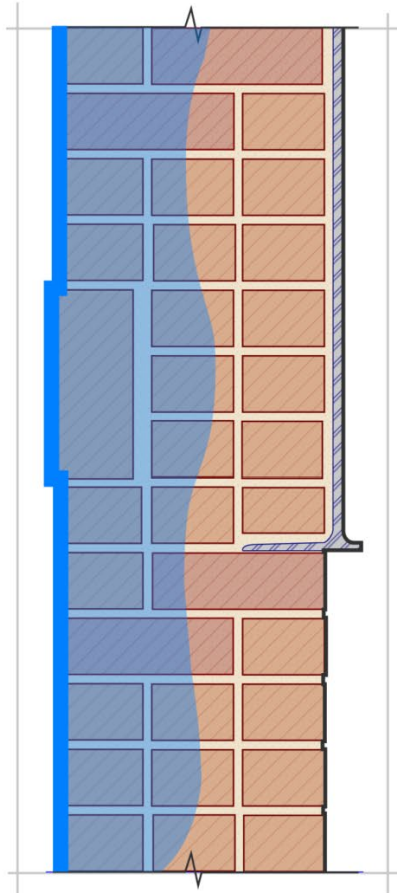
Rainscreen** (outboard insulation)

Rainscreen Walls

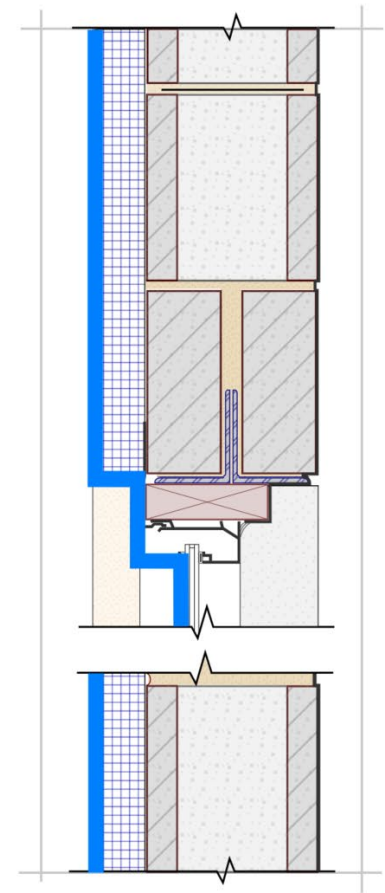
FEATURES

- Rainscreen Cladding
- Air/Drainage Cavity
- Thermal Insulation (continuous outboard insulation (cavity insulation sometimes))
- Air Barrier or AVB
- Through-Wall Flashing & Weeps
- Back-up Wall
- Embedded Steel
- Cladding Attachment System





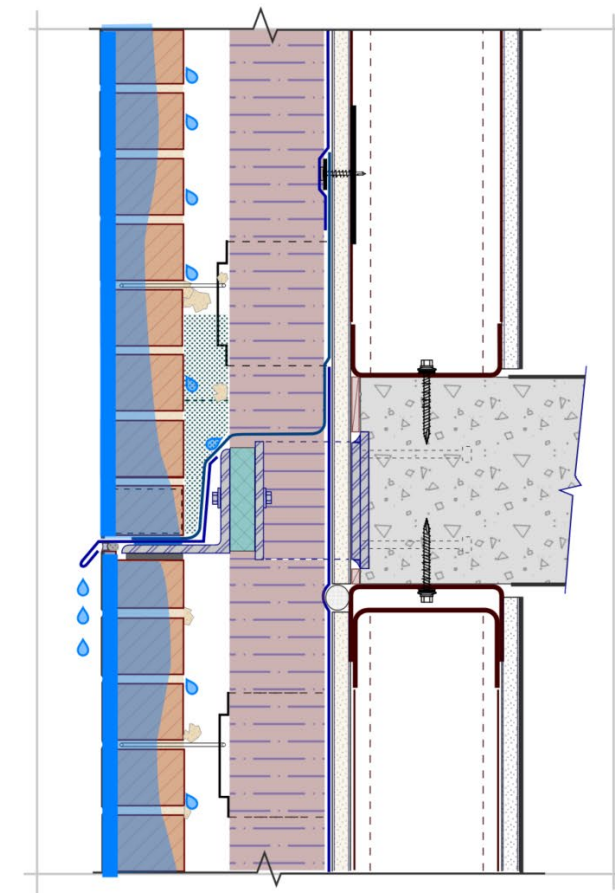
Mass Wall



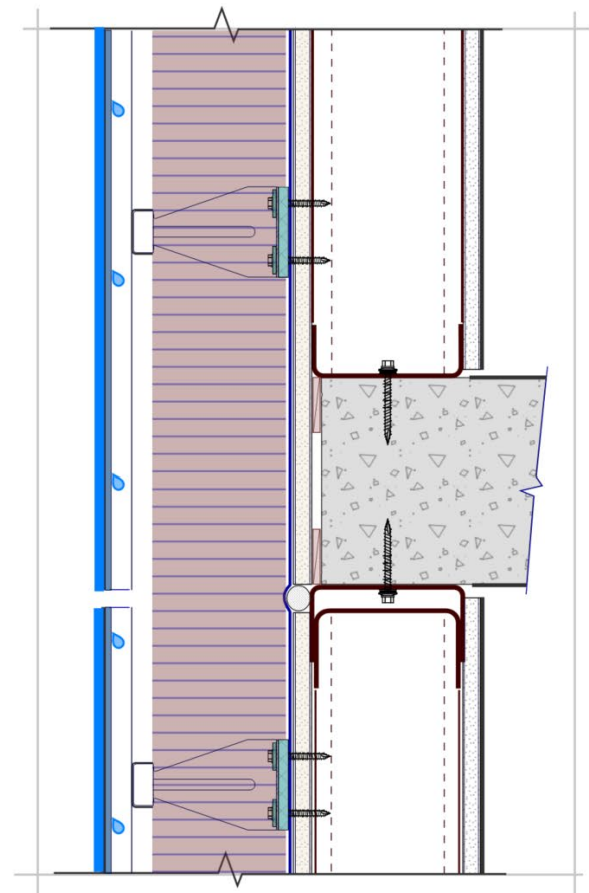
Barrier Wall



Transitional Wall



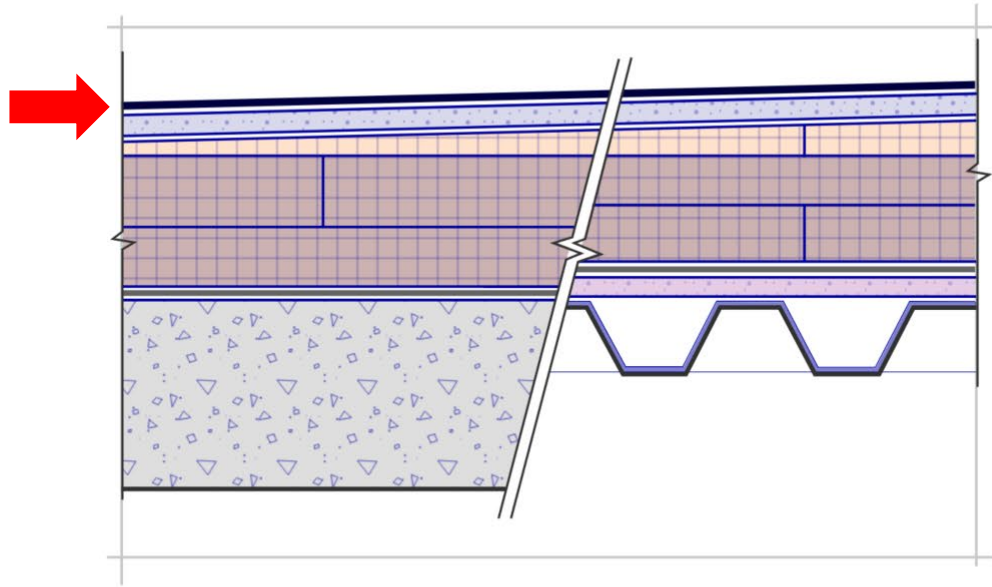
Masonry Drainage



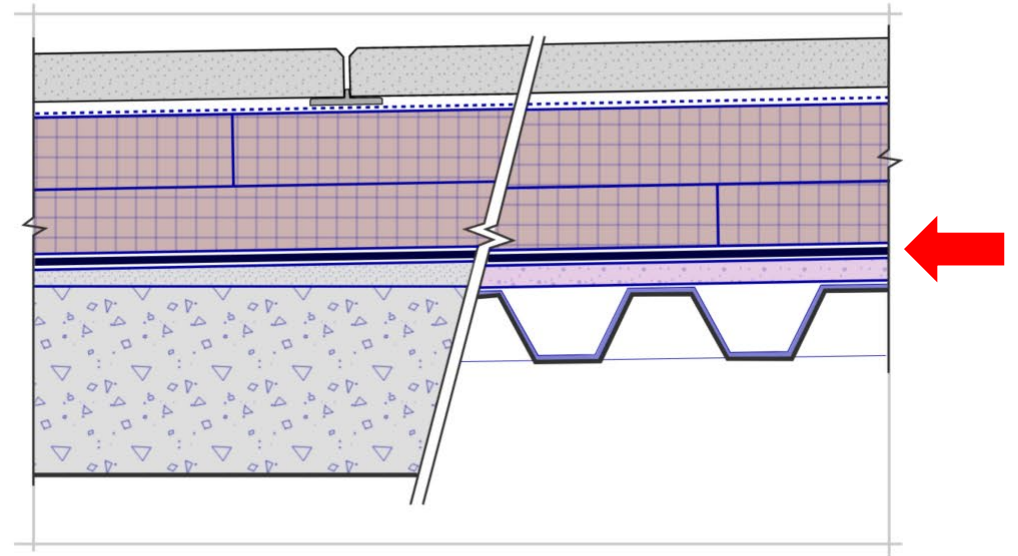
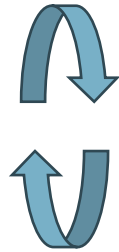
Rainscreen

Moisture Management

Roofing Types



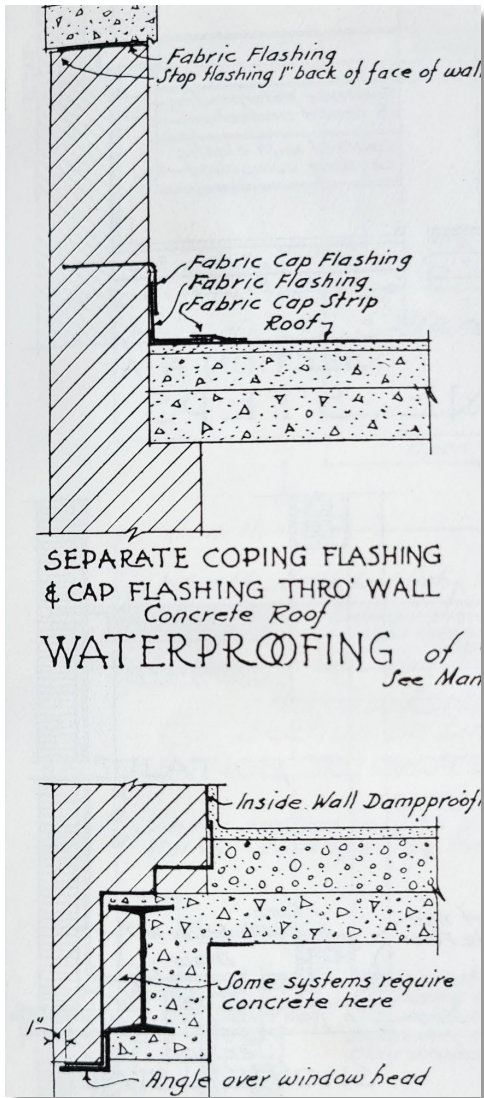
Conventional Roof



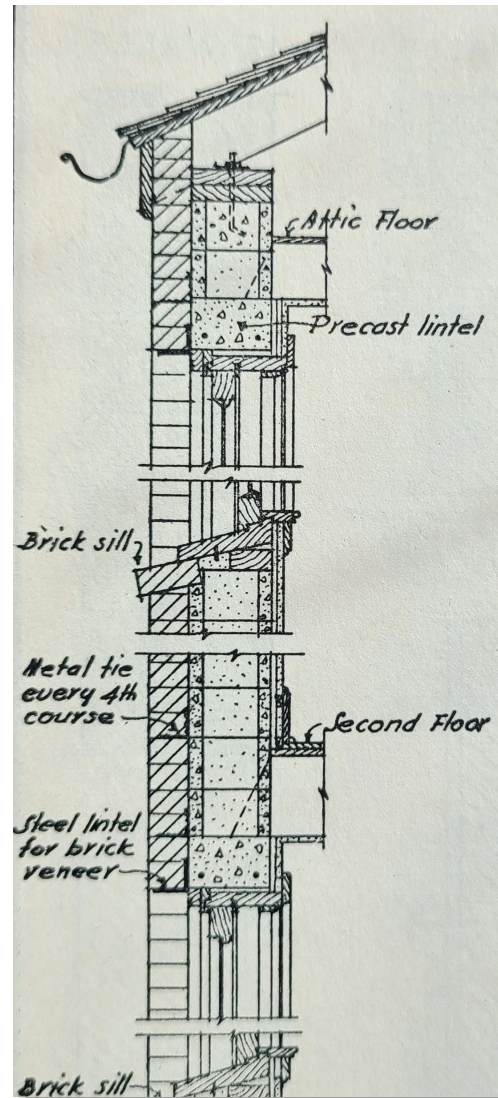
Protected Membrane Roof

Roof Assembly Types

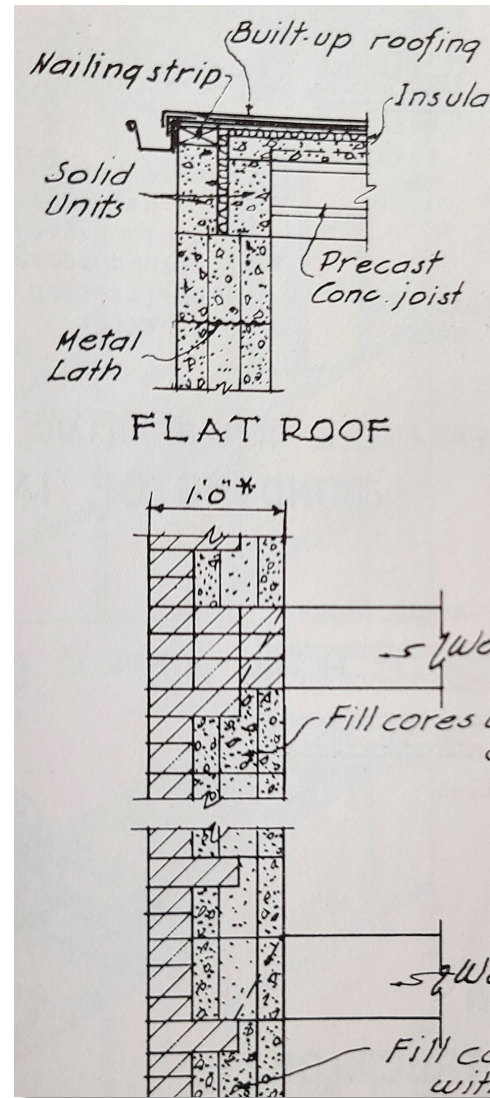
Existing Conditions



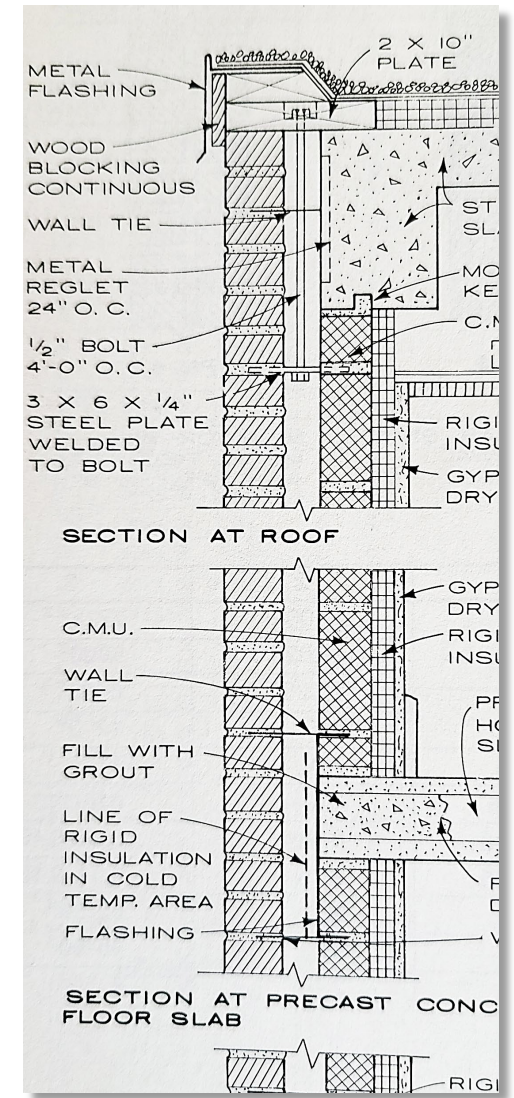
1st Edition (1932)



3rd Edition (1941)



4th Edition (1951)



7th Edition (1981)



Weep Tubes



Drip Edges



Rope Wicks



Single Wythe



Open Head Joint (Weep)



No Flashing & Weeps

Visual Assessment



Close-Range



Borescope



Roof Test Cuts



Inspection Openings



Concealed Cavity



Inspection Openings

Detailed Assessment

Fundamentals

Control Layer Continuity

Water Control Layer

Controls water

Air Control Layer

Controls airflow between conditioned and unconditioned spaces

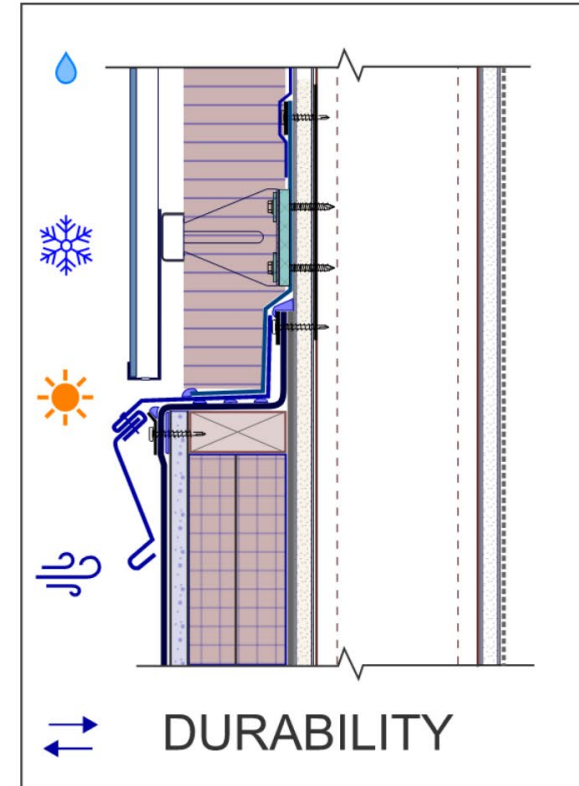
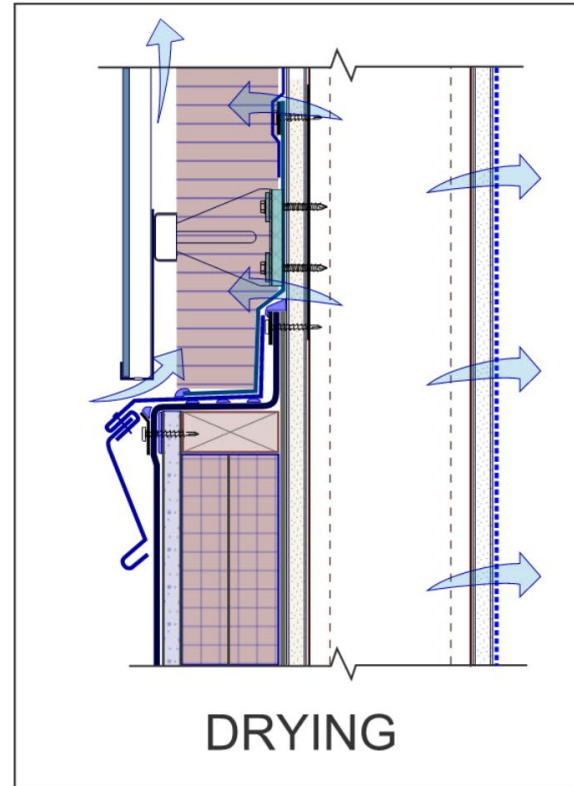
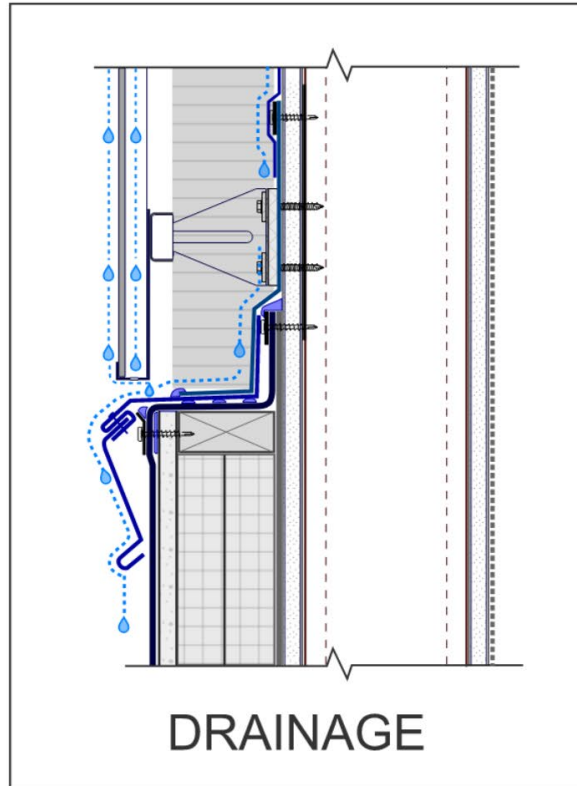
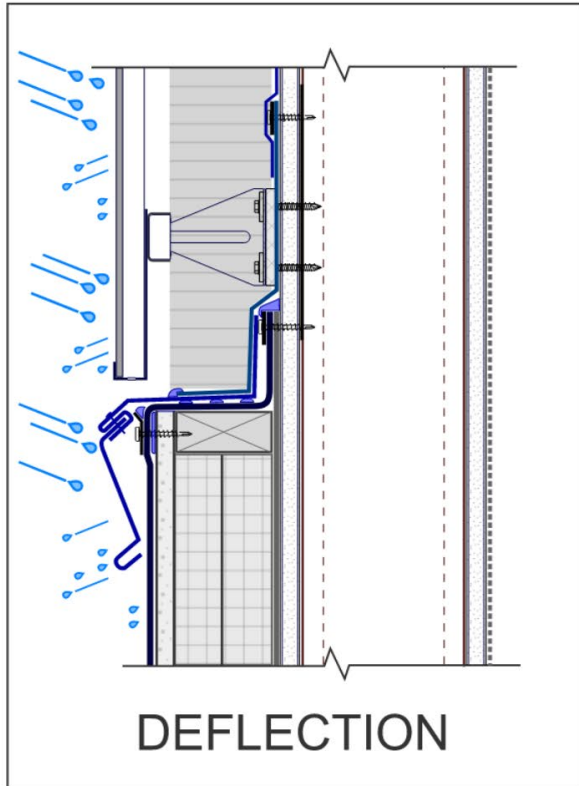
Vapor Control Layer

Control the movement of water vapor by diffusion

Thermal Control Layer

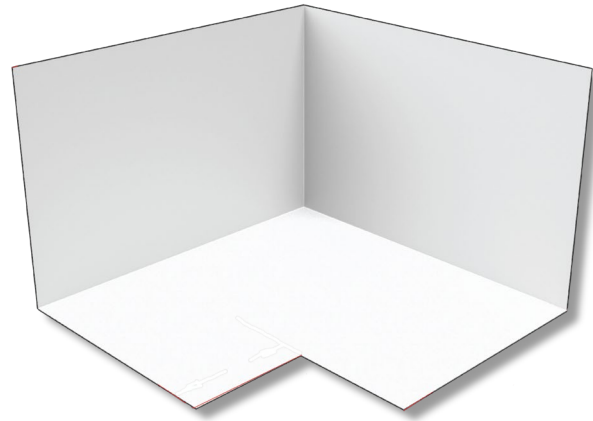
Controls the transfer of thermal energy (heat)

The Four D's





Cell Vent



Flashing Corners



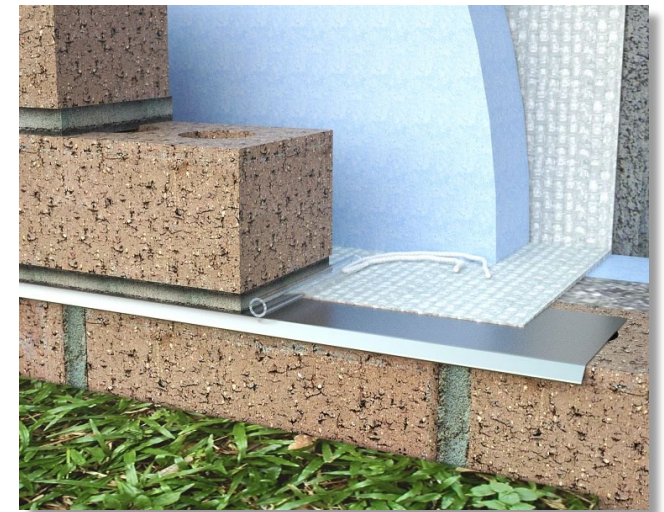
Cavity Drainage Material



Screened Weep Tubes & Wicks

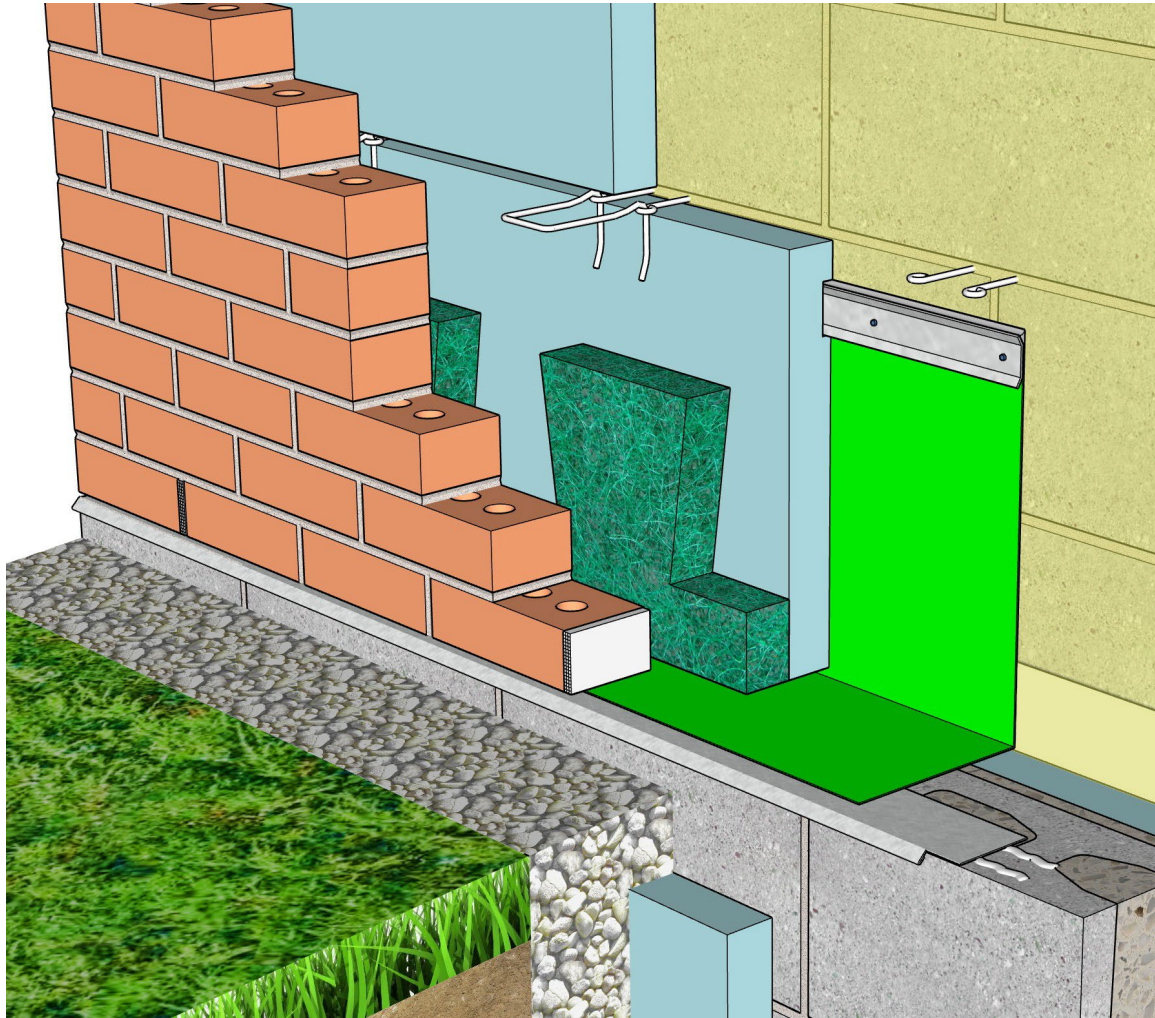


Drip Edge

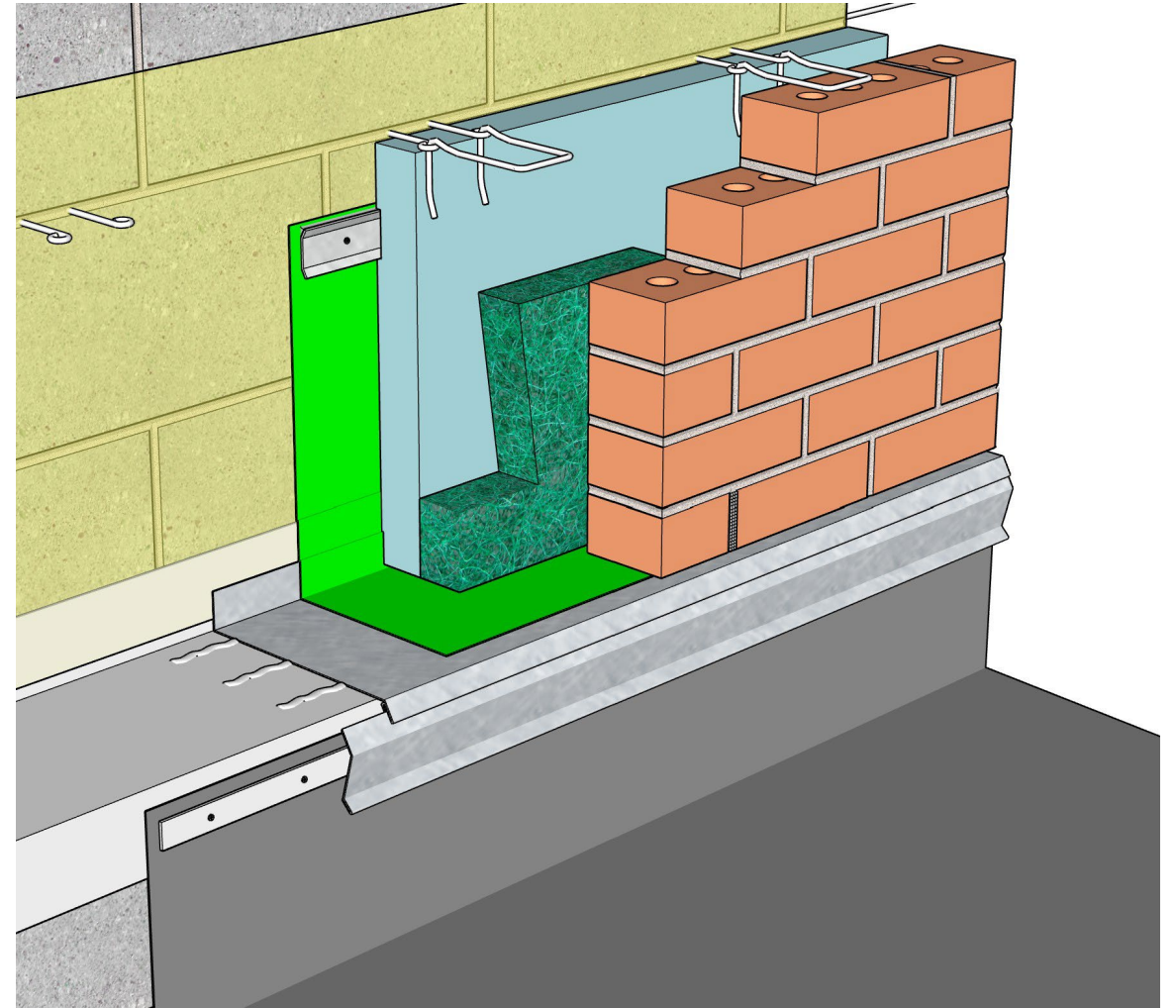


Through-Wall Flashing

Moisture Management Components



Base of Wall Integration *



Roof-to-Wall Integration *

* Images Courtesy of IMI

Interface Conditions



* Images Courtesy of IMI

Flashing Replacement



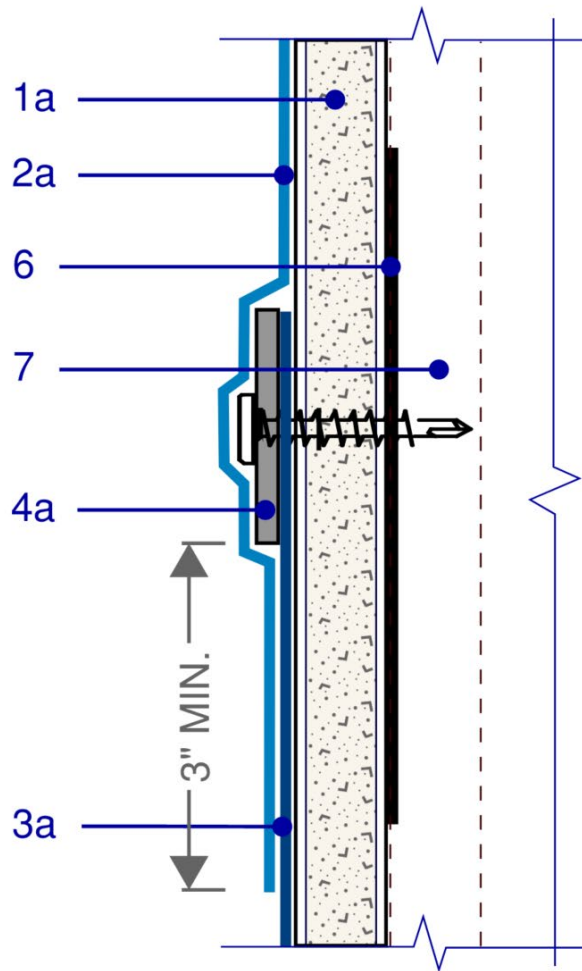
* Images Courtesy of IMI

Flashing Replacement

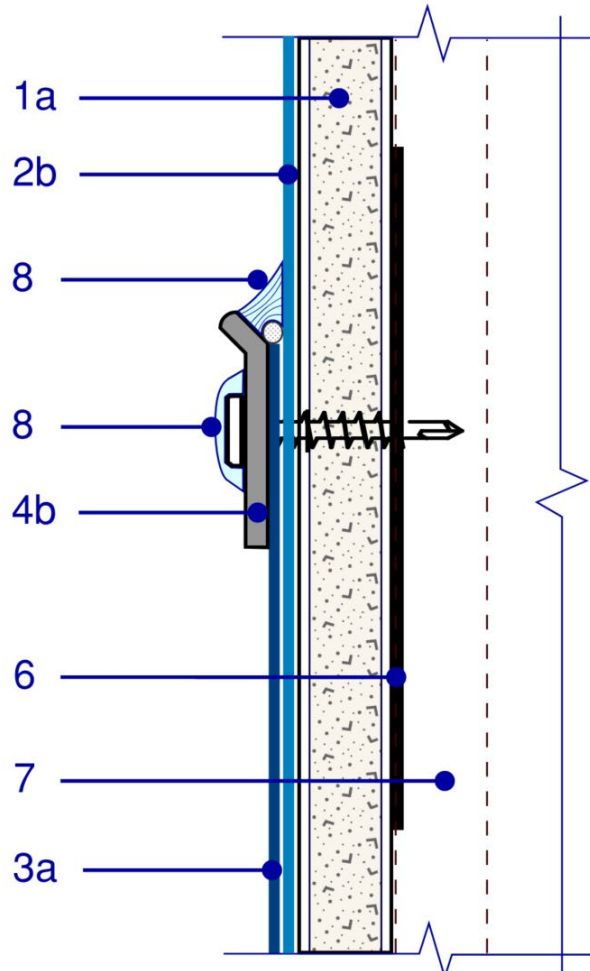


* Images Courtesy of IMI

Flashing Replacement



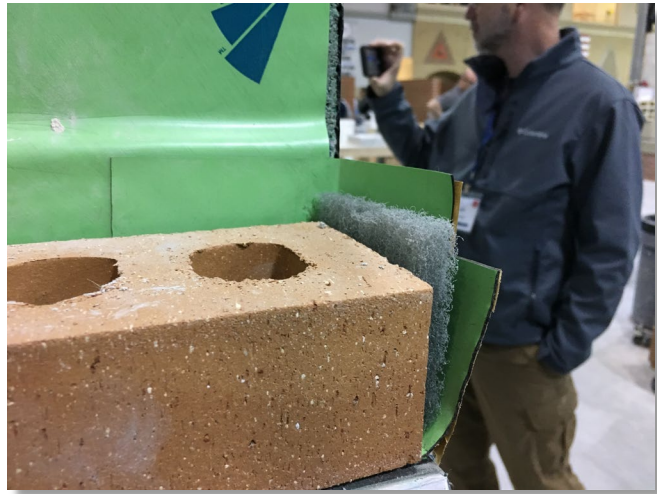
"SELF-ADHERED" AVB
TO THRU-WALL FLASHING
TIE-IN DETAIL



"FLUID-APPLIED" AVB
TO THRU-WALL FLASHING
TIE-IN DETAIL

- 1 – Substrate
- a - Sheathing
- 2 – Weather-Resistive Air Barrier (WRAB)
- a – Self-Adhered
- b – Fluid-Applied
- 3 – Through-Wall Flashing
- a – Self-Adhered
- 4 – Termination Bar
- a - Flat
- b – Flared (Lip)
- 5 – Not Used
- 6 – Sheet Metal Backer Plate
- 7 – Cold-Formed Metal Framing
- 8 – Sealant and Backer

TWF to AVB Tie-In Details



End Dam with Weep Vent



End Dam with Weep Vent



Through-Wall Flashing



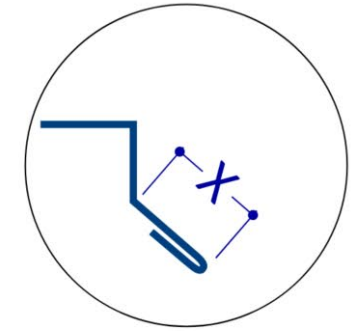
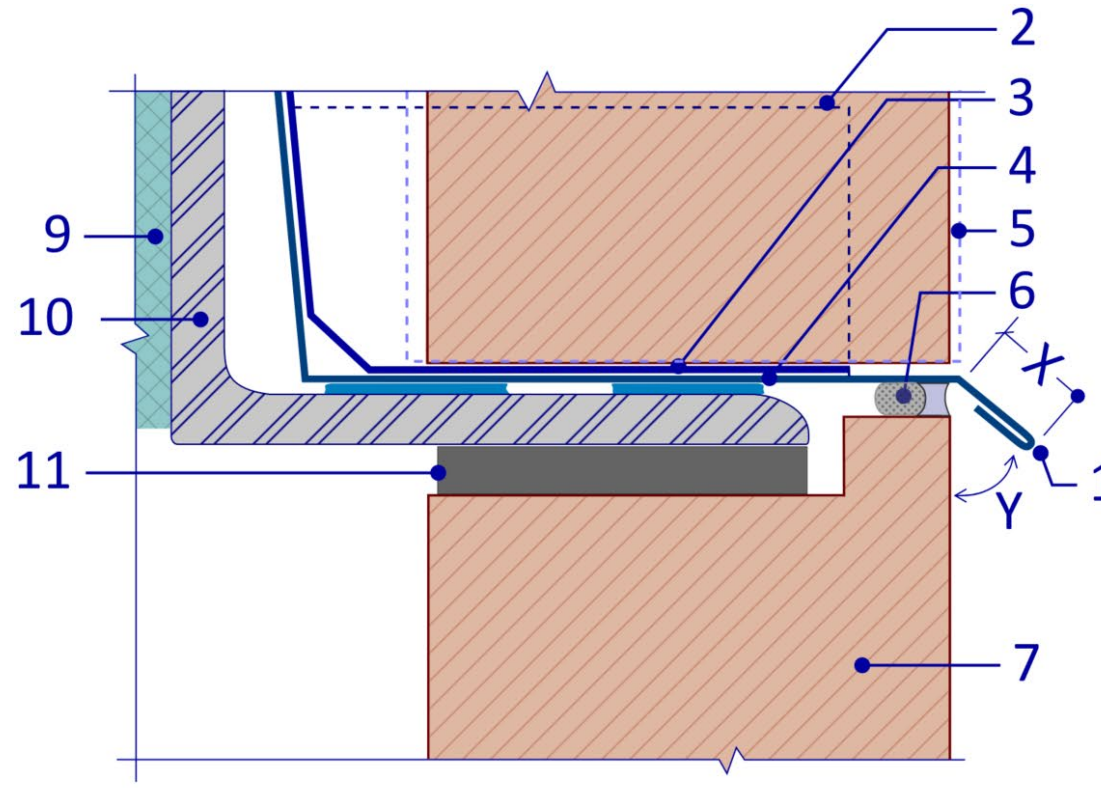
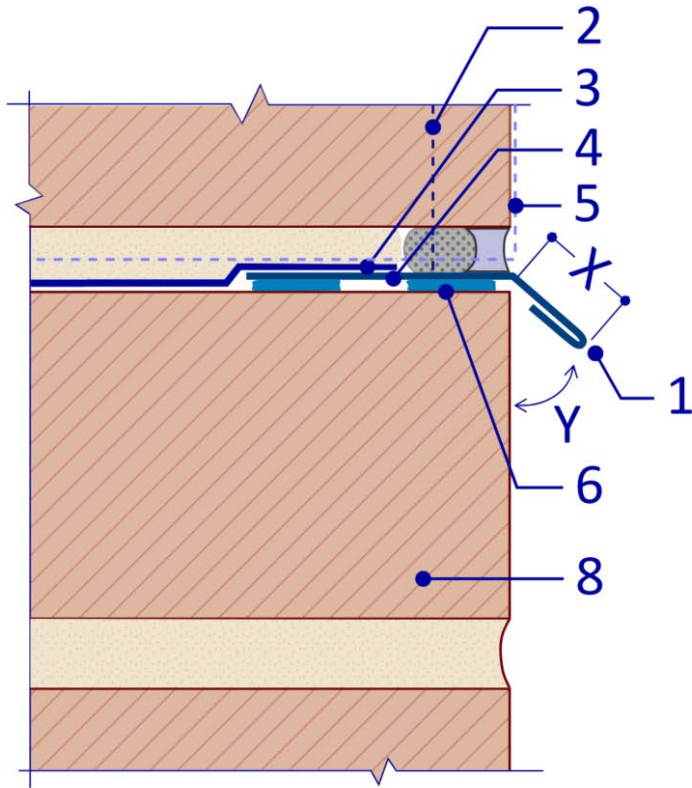
Through-Wall Flashing

Flashing & Drip Installation

- 1 – Drip Edge
- 2 – End Dam, 2-inch High
- 3 – Flexible Flashing
- 4 – Sheet Metal Flashing

- 5 – Weep / Cell Vent
- 6 – Adhesive or Sealant & Backer Rod
- 7 – Lipped Brick

- 8 – Brick Masonry
- 9 – Structural Thermal Break
- 10 – Steel Lintel / Shelf Angle
- 11 – Compressible Filler



Optional Drip Profile

X = 3/4"
Y = 45°

Drip Edge @ Brick,
Typ. Profiles

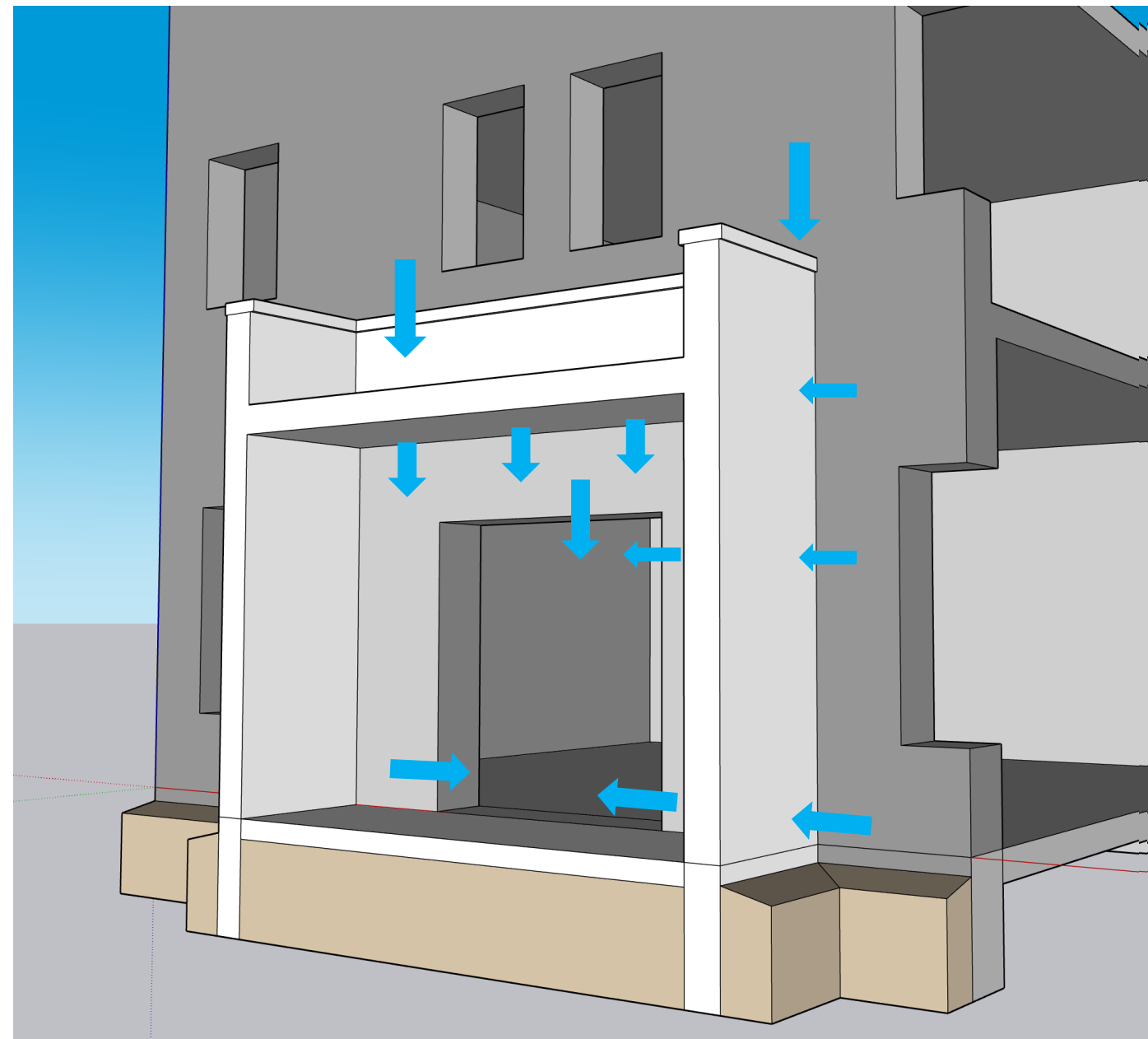
Drip Edge @ Shelf Angle with
Upturned Lipped Brick

Drip Edge Details

Tie-In Details

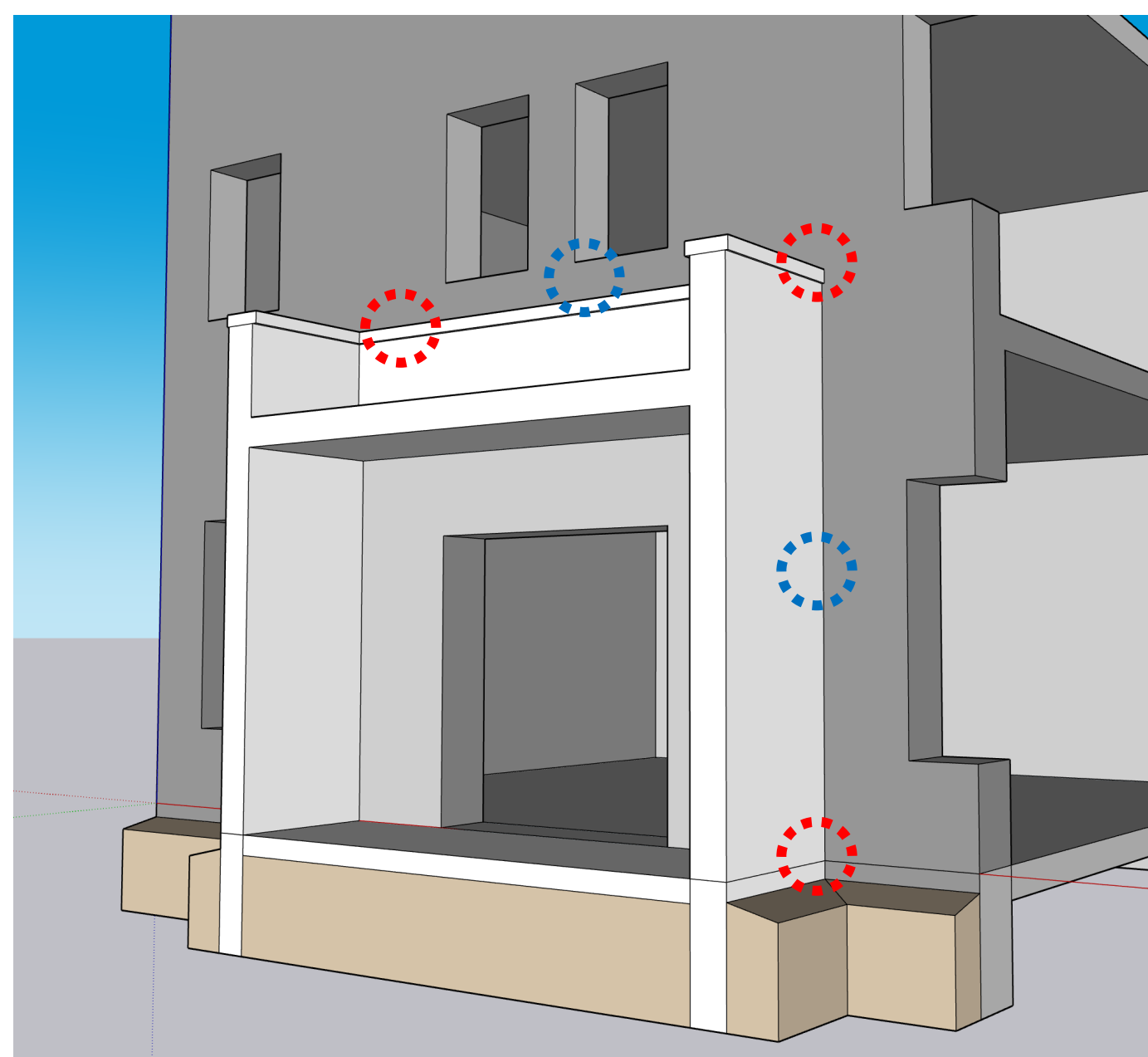
Case Study

- Existing Drainage Wall with Cavity Insulation
- New Drainage Wall with Outboard Insulation
- New Conventional Roof

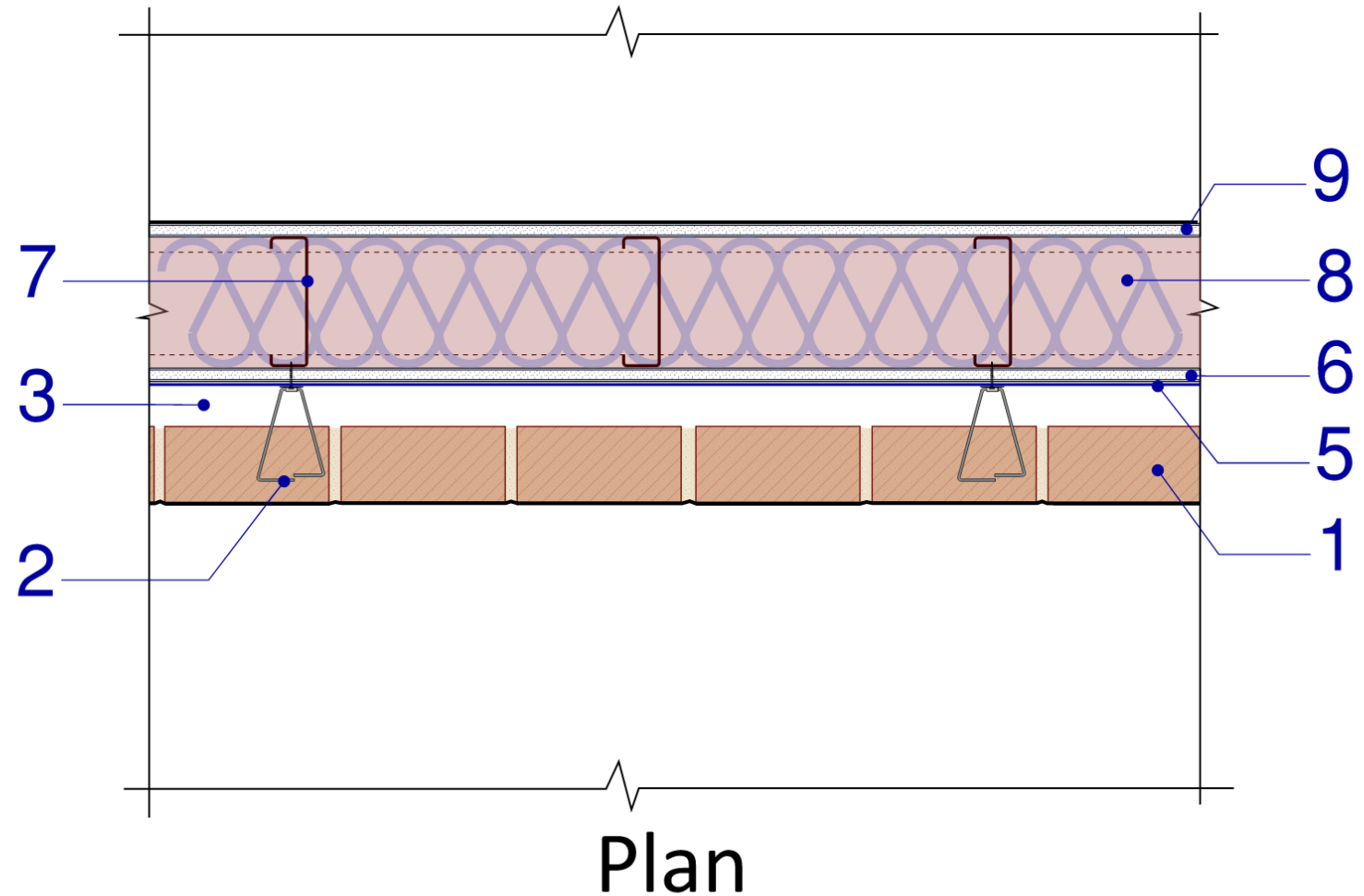


Interface Conditions

- Wall-to-Wall
- Roof-to-Wall
- Saddle Flashing



- 1 - Brick Masonry
- 2 - Masonry Anchor
- 3 - Drainage Cavity
- 4 - Not Used
- 5 - Weather-Resistive Air Barrier (WRAB)
- 6 - Exterior Sheathing
- 7 - Cold-Formed Metal Framing
- 8 - Cavity Insulation
- 9 - Interior Wallboard



Existing Wall Assembly

1 - WRAB

2 - Termination
Bar Sealant

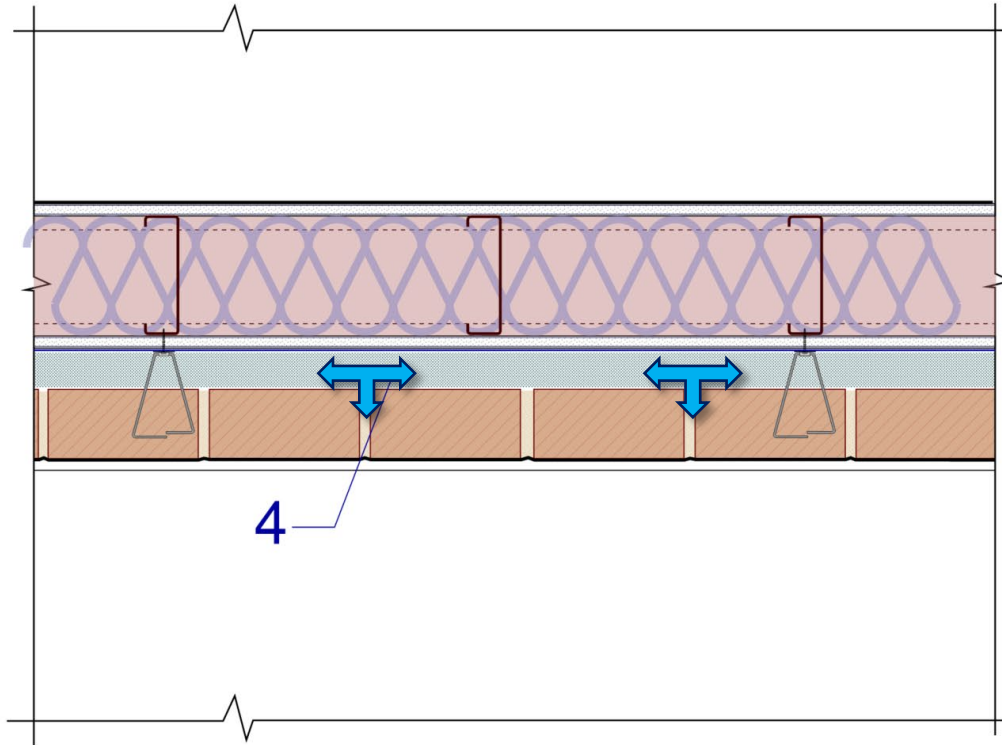
3 - Not Used

4 - Cavity Drainage
Material

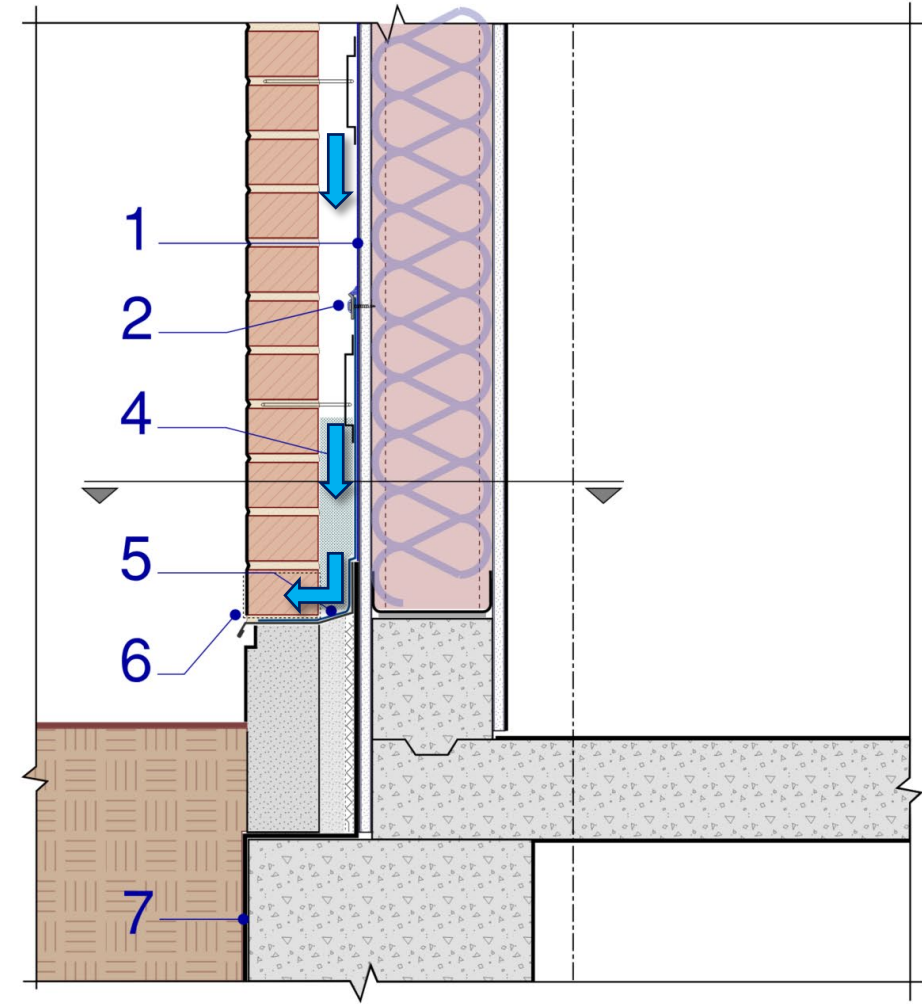
5 - Through-Wall
Flashing & Drip

6 - Weep / Cell
Vents

7 - Waterproofing



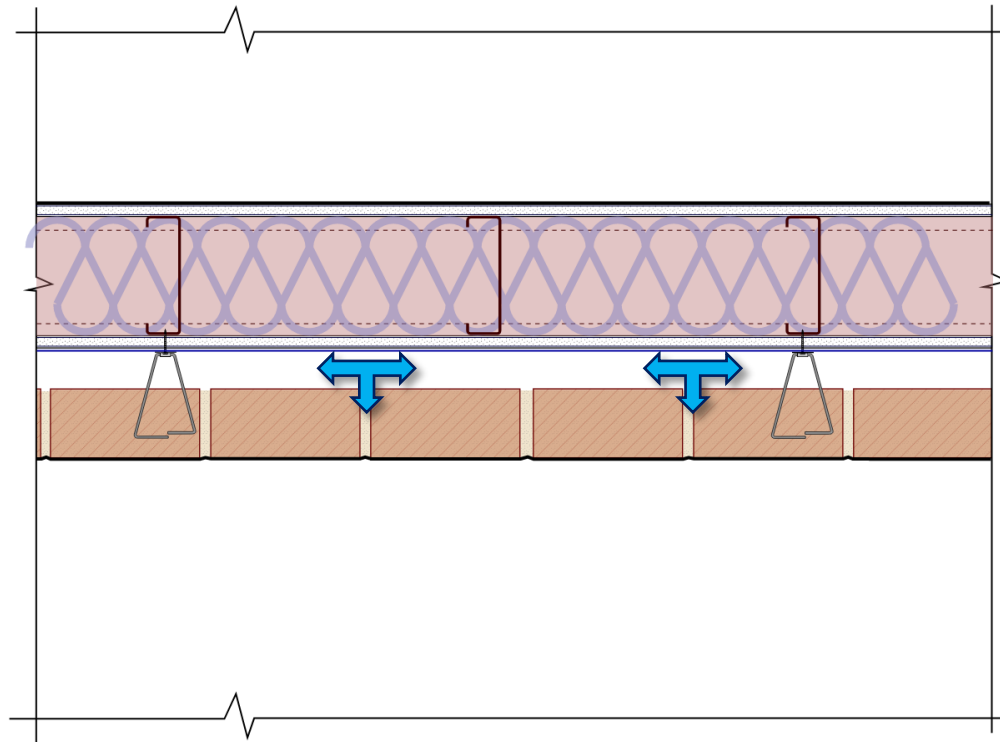
Plan



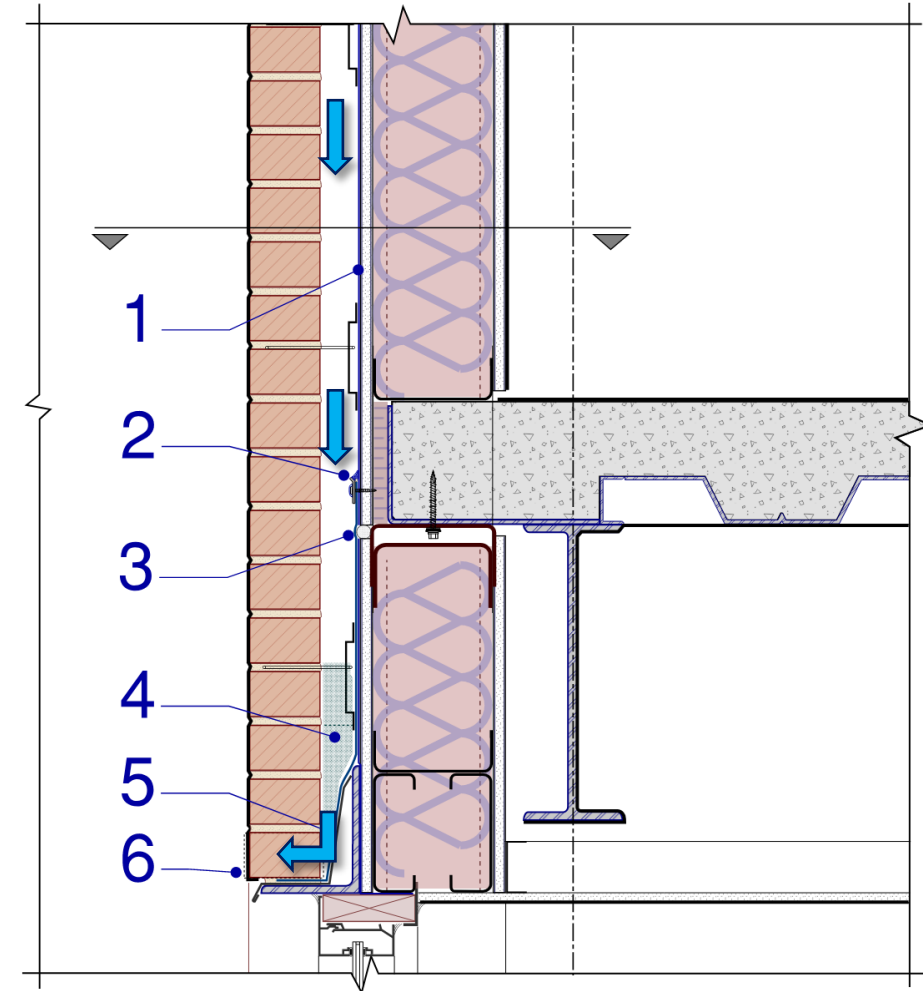
Section

Existing Wall Assembly

- 1 - WRAB
- 2 - Termination Bar Sealant
- 3 - Movement Joint
- 4 - Cavity Drainage Material
- 5 - Through-Wall Flashing & Drip
- 6 - Weep / Cell Vents
- 7 - Waterproofing



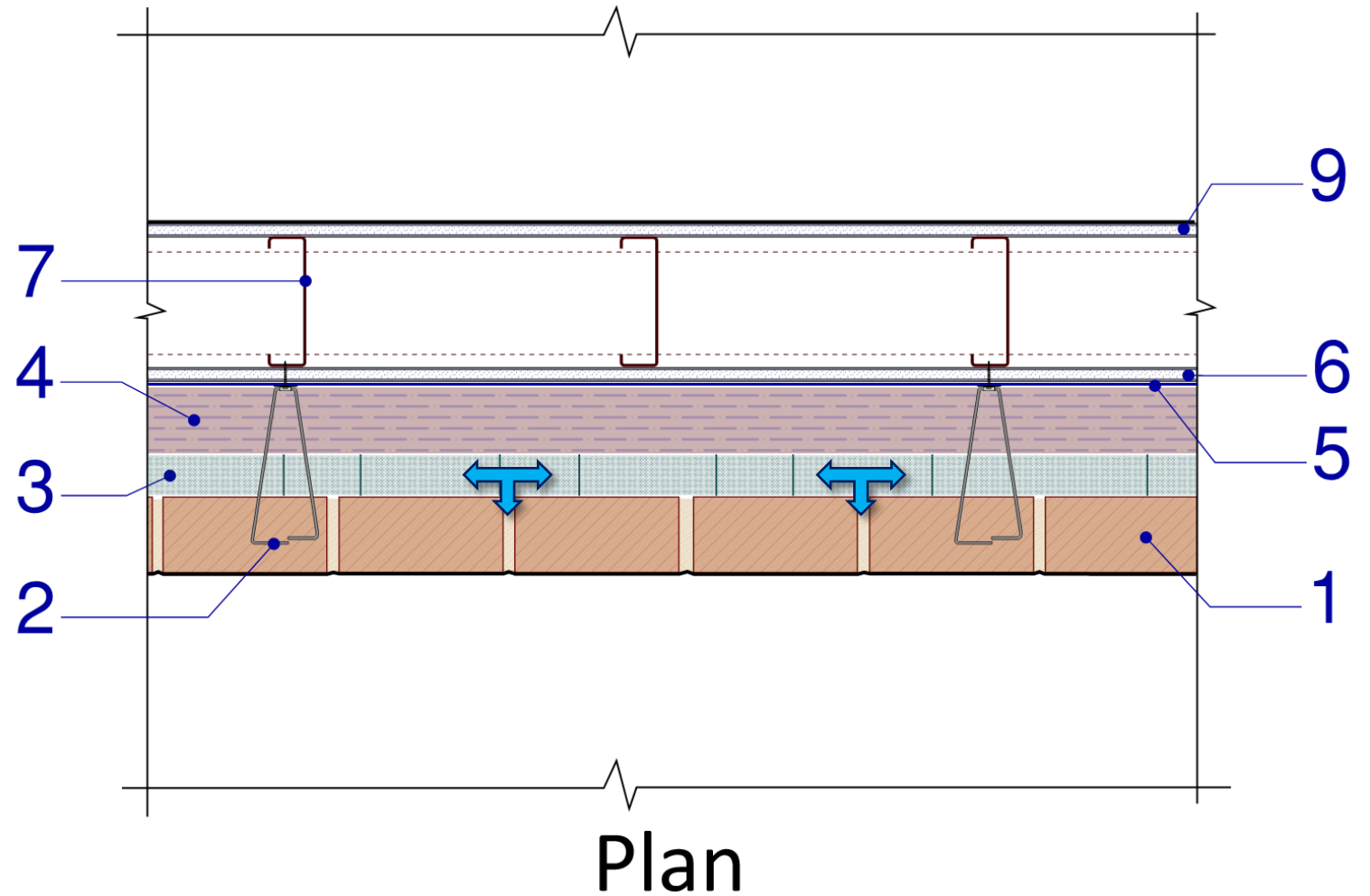
Plan



Section

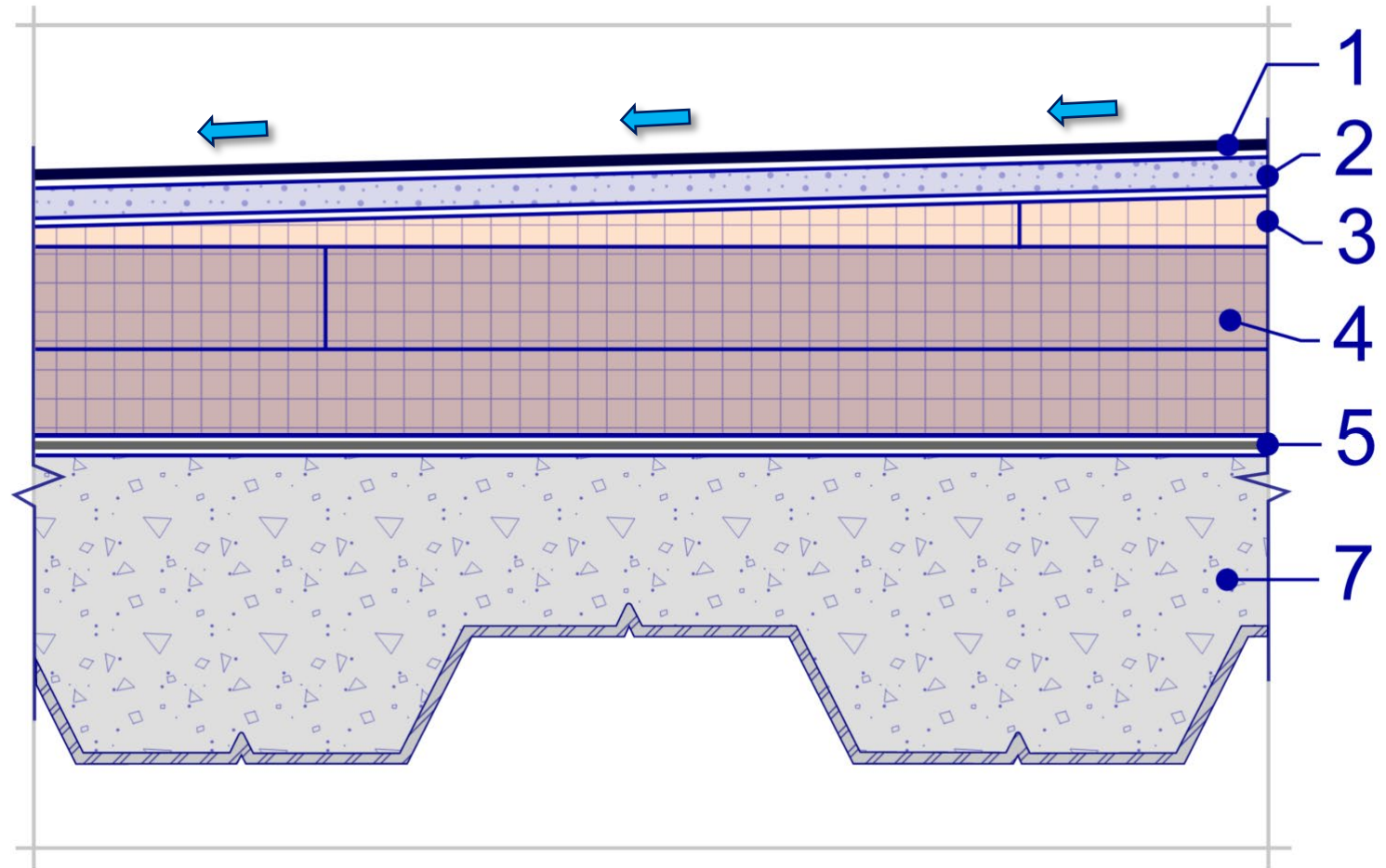
Existing Wall Assembly

- 1 - Brick Masonry
- 2 - Masonry Anchor
- 3 - Drainage Cavity
- 4 - Outboard Insulation
- 5 - Weather-Resistive Air Barrier (WRAB)
- 6 - Exterior Sheathing
- 7 - Cold-Formed Metal Framing
- 8 – Not Used
- 9 - Interior Wallboard



New Wall Assembly

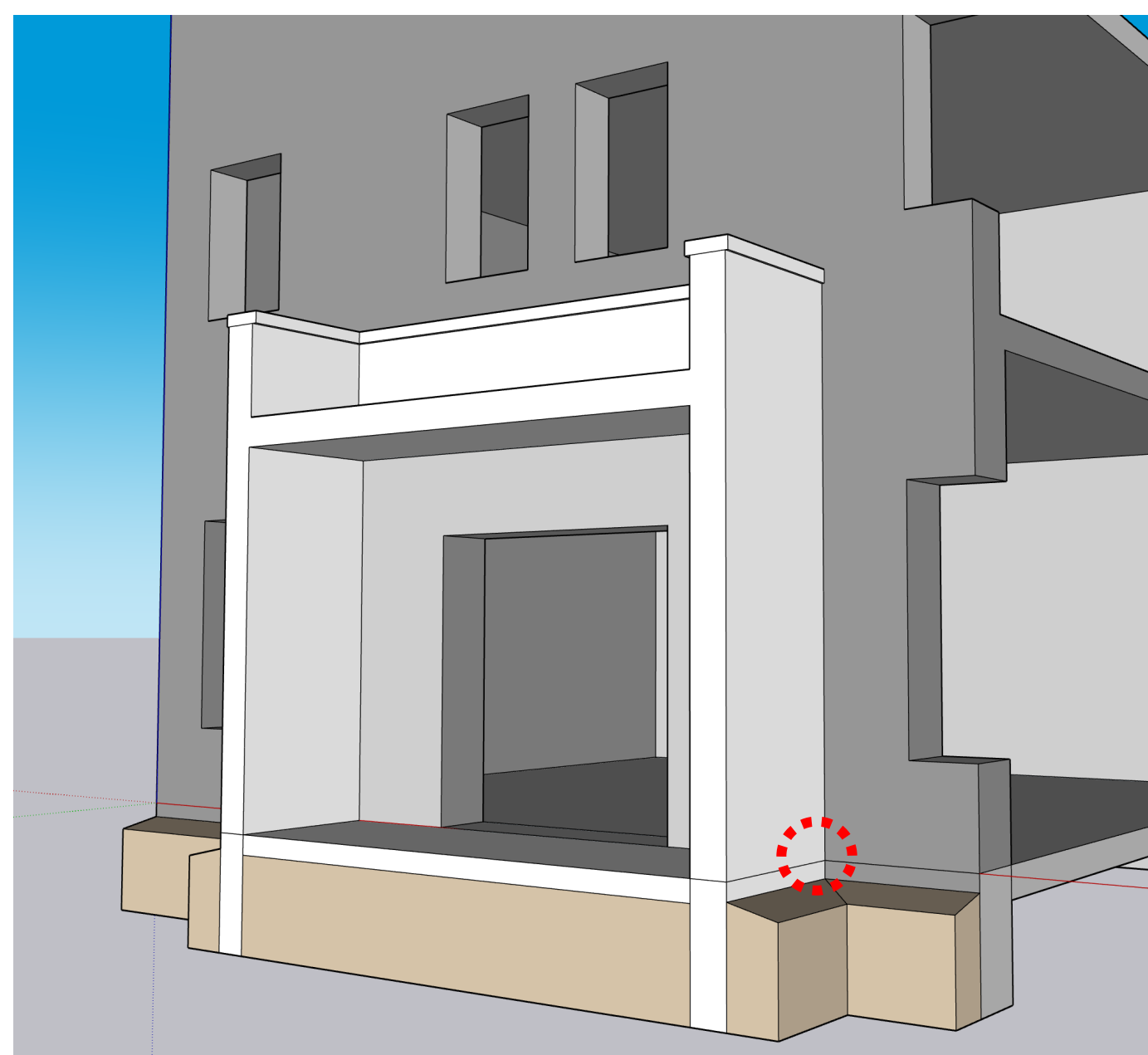
- 1 – Roofing, Single-Ply
- 2 – Cover Board
- 3 – Tapered Insulation
- 4 - Rigid Insulation, Min. 2
Staggered Layers
- 5 – Air/Vapor Control Layer
- 6 - Not Used
- 7 – Structural Deck



New Roofing Assembly

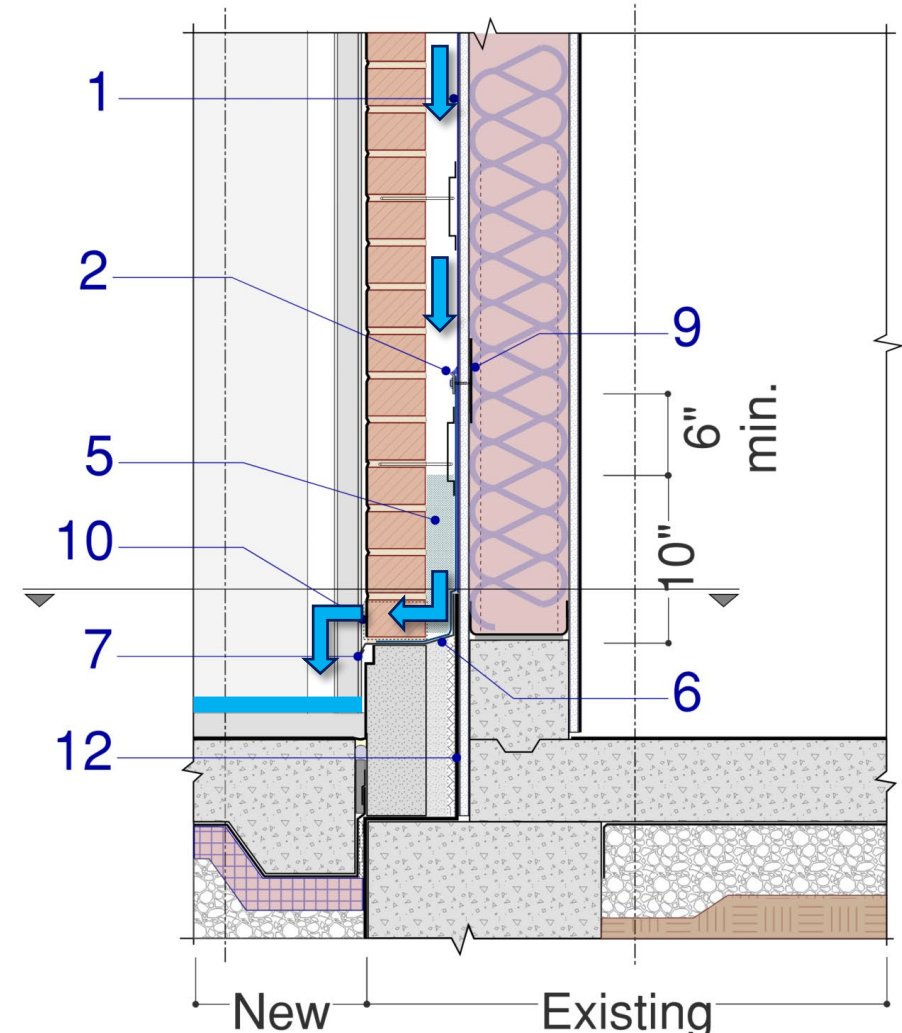
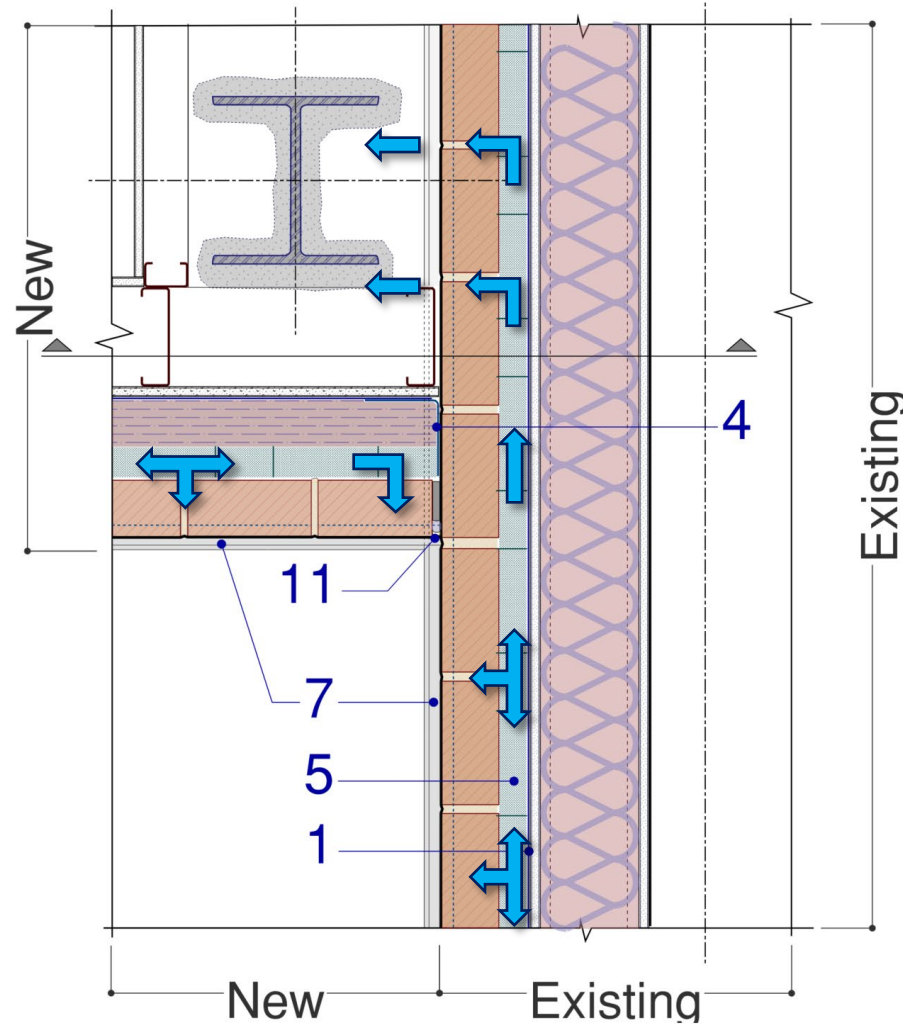
Interface Conditions

- **Wall-to-Wall**
- Roof-to-Wall
- Saddle Flashing



Base of Wall Tie-In

- 1 - WRAB
- 2 - Termination Bar & Sealant
- 3 - Not Used
- 4 - Transition Membrane
- 5 - Cavity Drainage Material
- 6 - Through-Wall Flashing
- 7 - Drip Edge
- 8 - Not Used
- 9 - Backer Plate
- 10 - Weep / Cell Vents
- 11 - Sealant and Backer
- 12 - Waterproofing



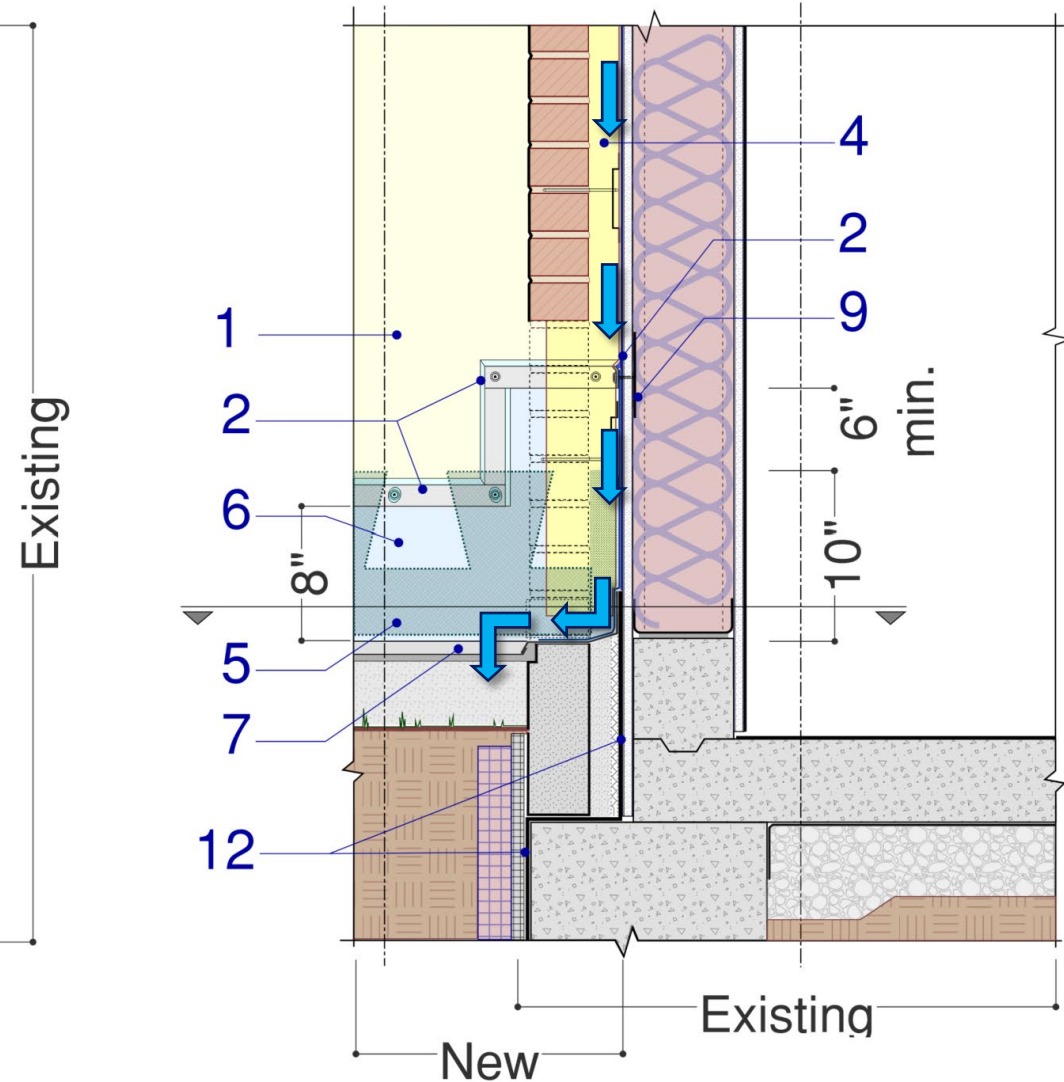
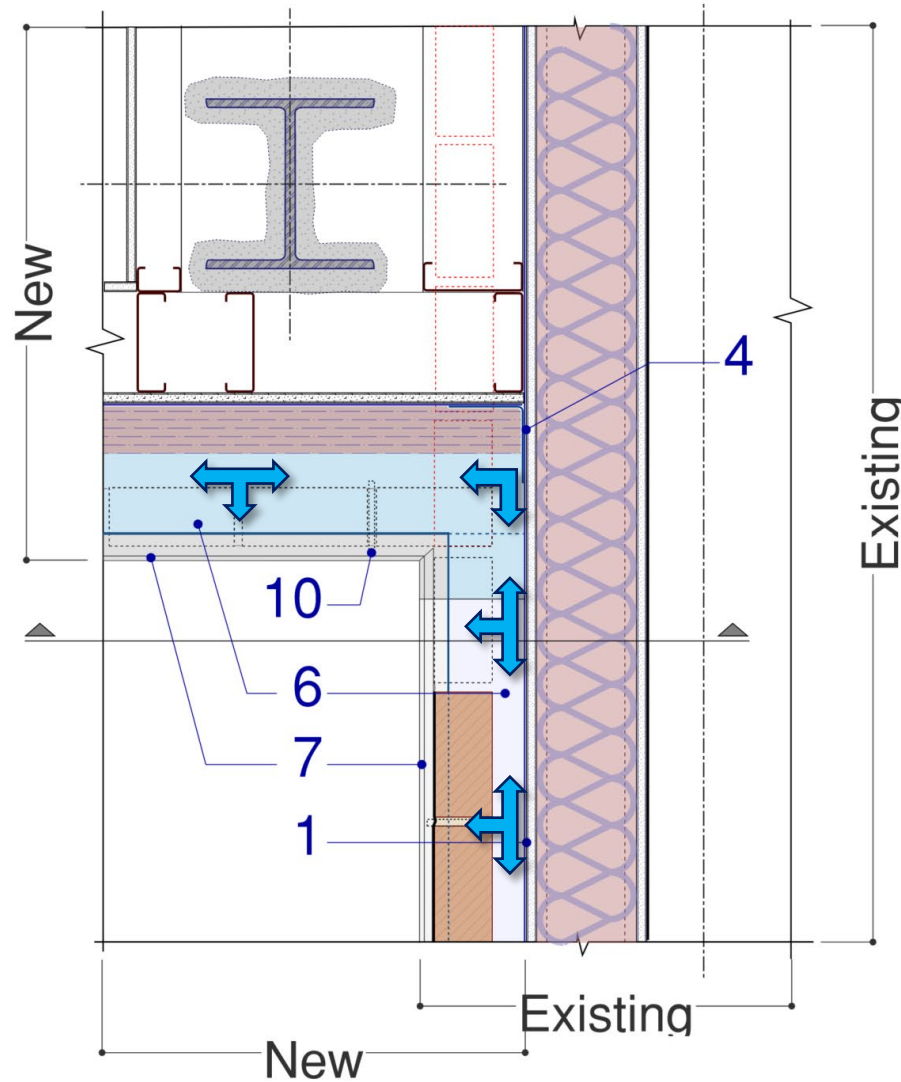
“Discontinuous” Base of Wall Tie-In



* Images Courtesy of IMI

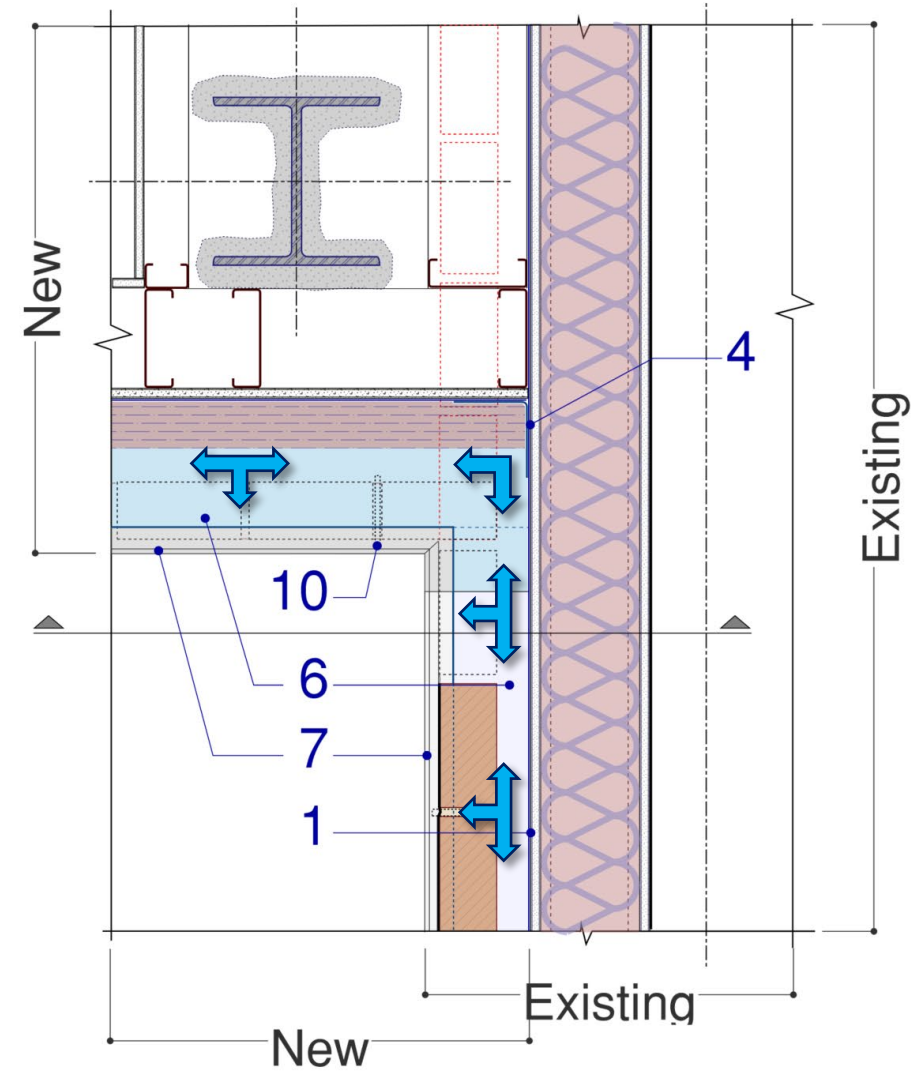
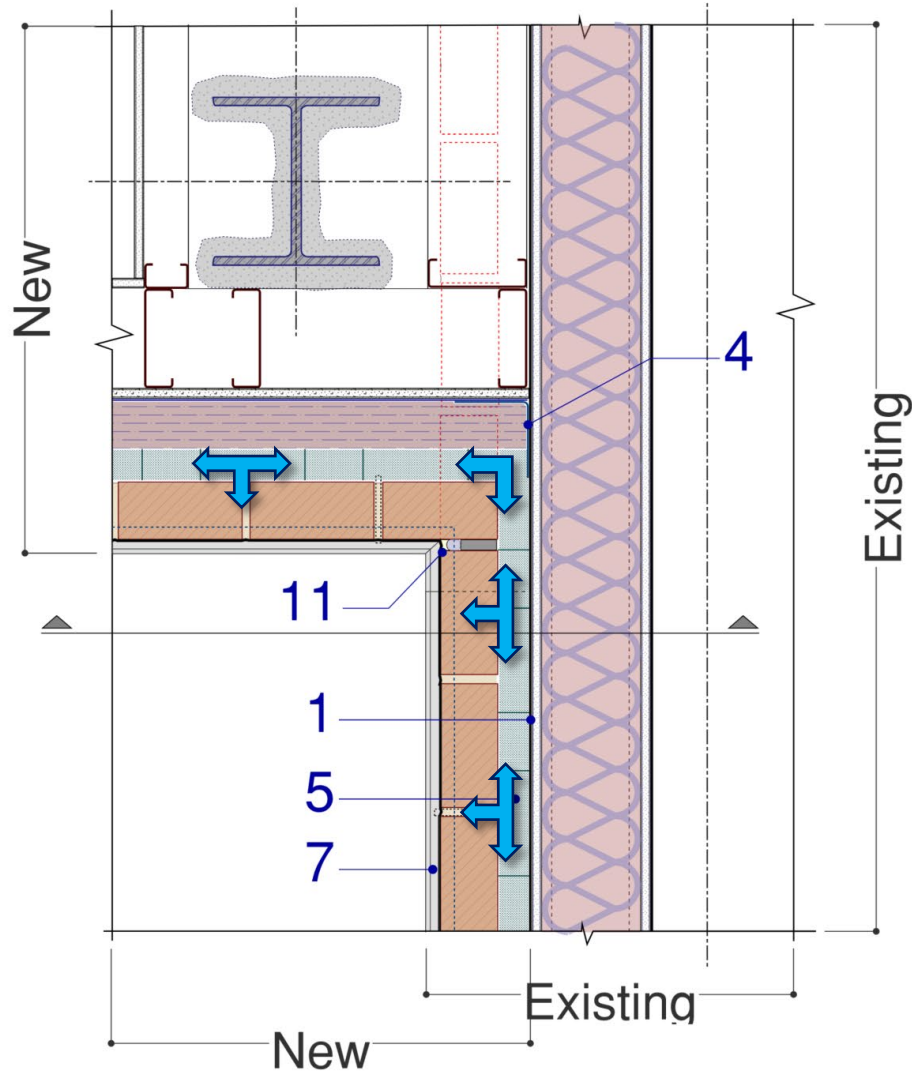
Alternating Flashing Install.

- 1 - WRAB
- 2 - Termination Bar & Sealant
- 3 - Not Used
- 4 - Transition Membrane
- 5 - Cavity Drainage Material
- 6 - Through-Wall Flashing
- 7 - Drip Edge
- 8 - Not Used
- 9 - Backer Plate
- 10 - Weep / Cell Vents
- 11 - Sealant and Backer
- 12 - Waterproofing



“Continuous” Base of Wall Tie-In

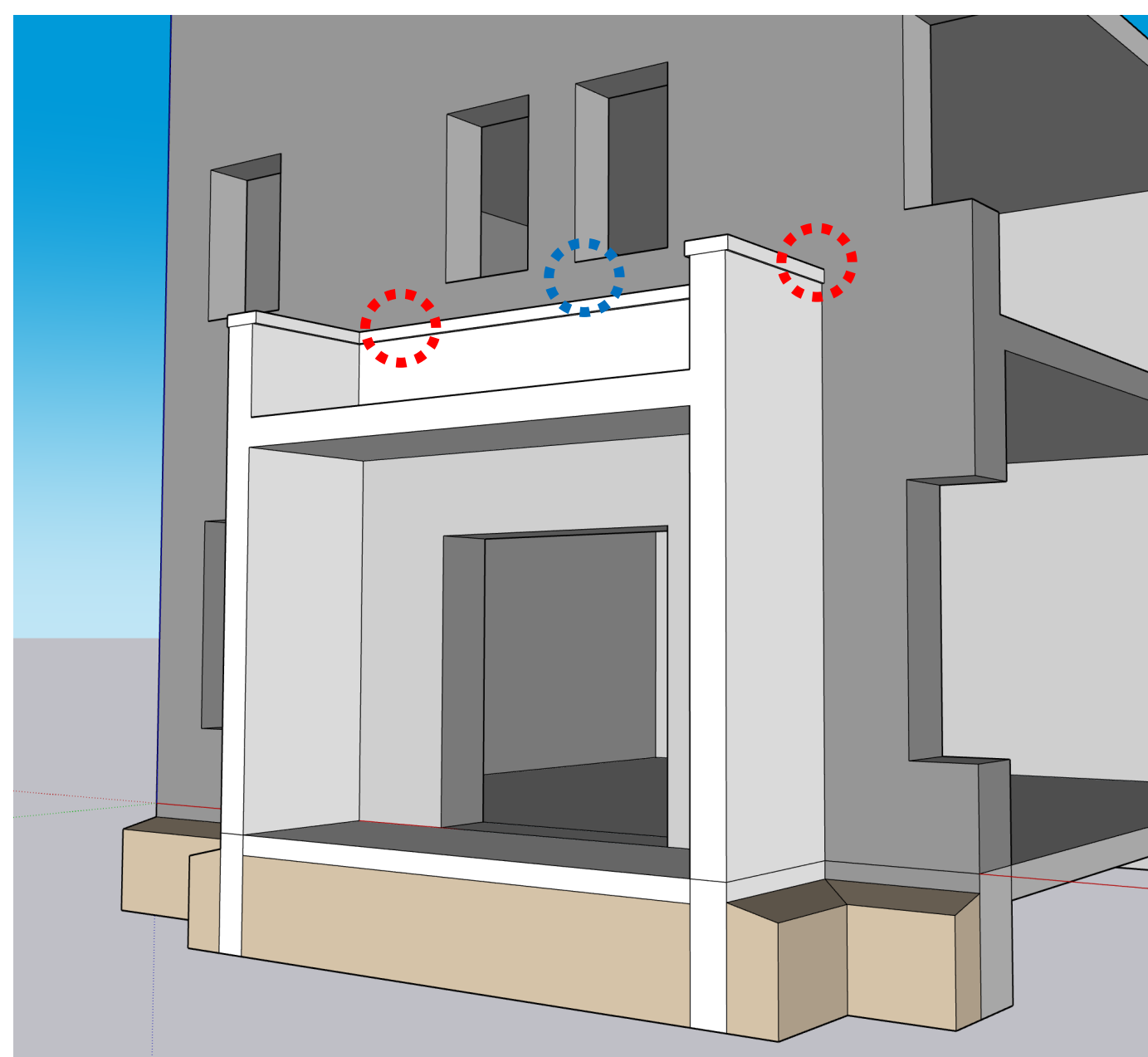
- 1 - WRAB
- 2 – Not Used
- 3 – Not Used
- 4 – Transition Membrane
- 5 - Cavity Drainage Material
- 6 - Through-Wall Flashing
- 7 - Drip Edge
- 8 – Not Used
- 9 – Not Used
- 10 - Weep / Cell Vents
- 11 - Sealant and Backer



“Continuous” Base of Wall Tie-In

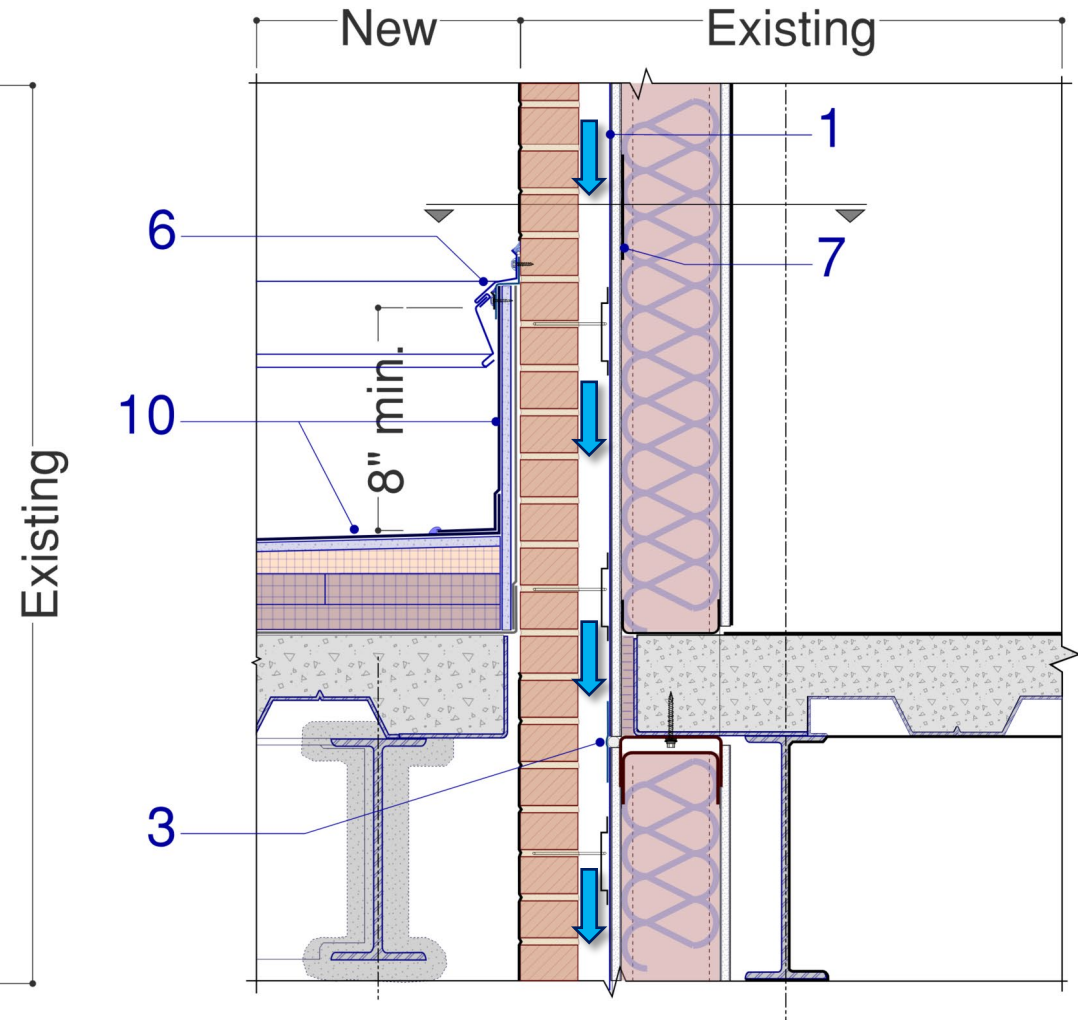
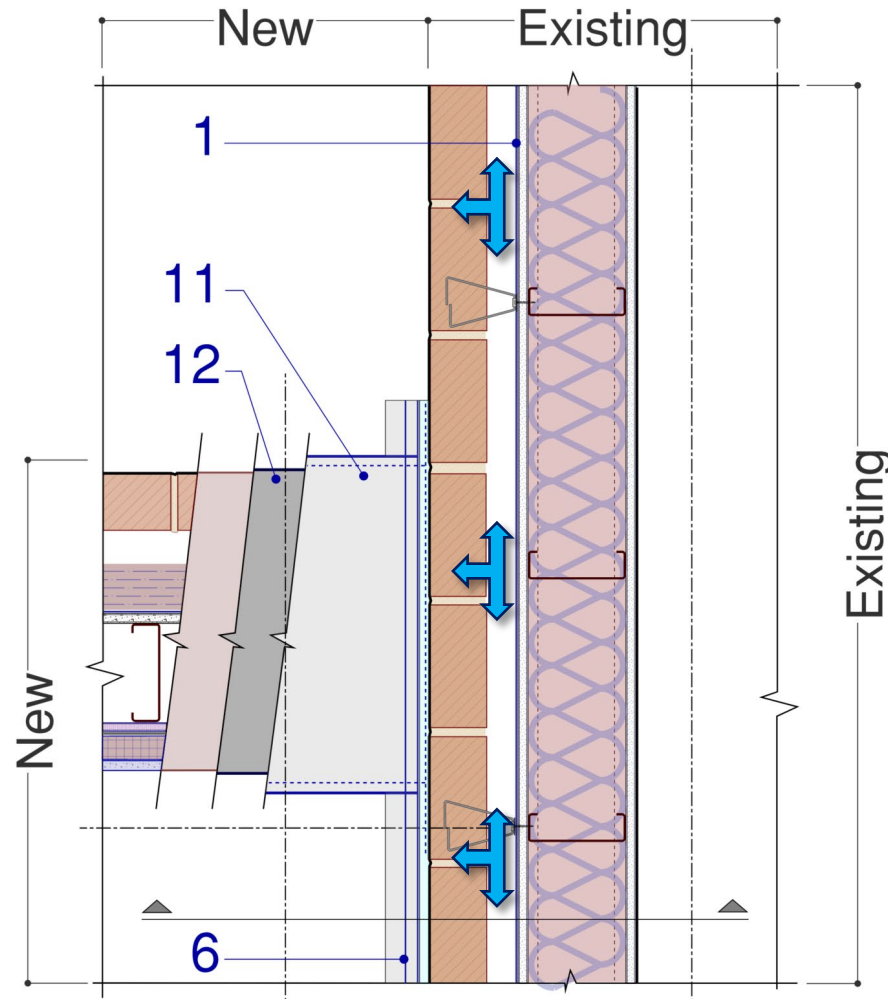
Interface Conditions

- Wall-to-Wall
- **Roof-to-Wall**
- Saddle Flashing



Roof-to-Wall Tie-In

- 1 - WRAB
- 2 – Not Used
- 3 - Movement Joint
- 4 – Not Used
- 5 – Not Used
- 6 - Counterflashing
- 7 – Backer Plate
- 8 – Not Used
- 9 – Not Used
- 10 – Roofing
- 11 – Saddle Flashing
- 12 - Underlayment



“Discontinuous” Roof-to-Wall Tie-In

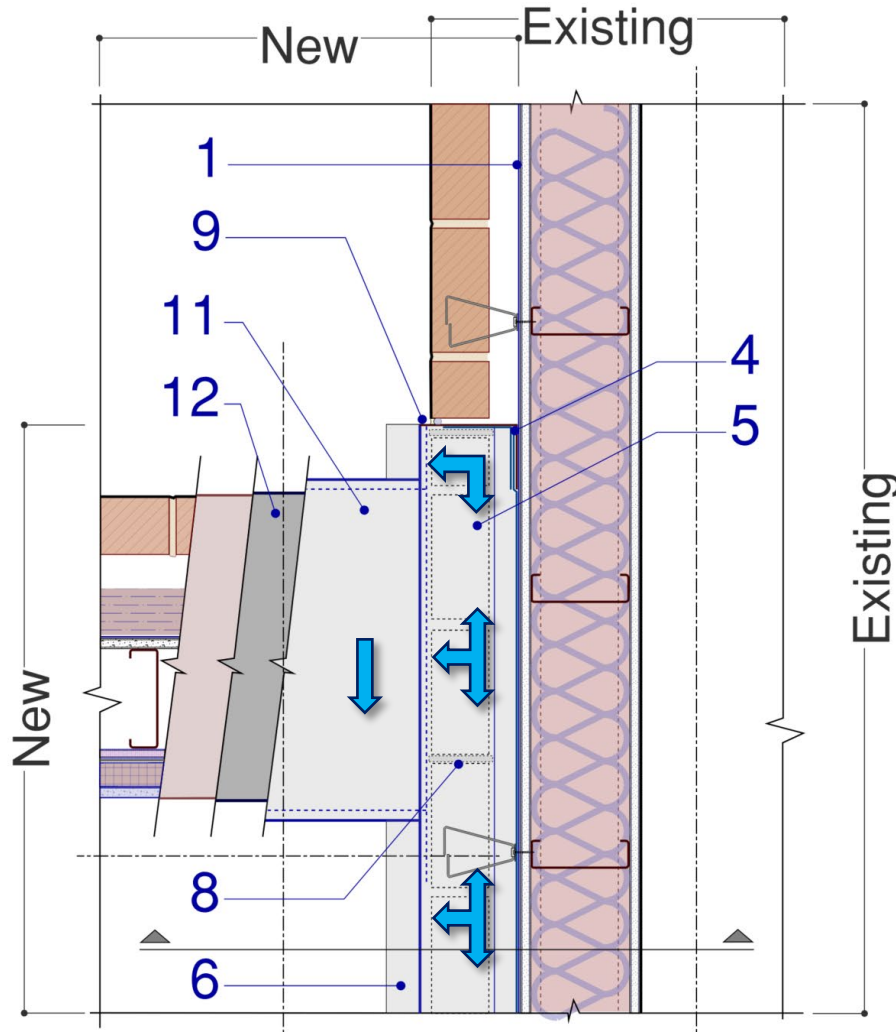


* Images Courtesy of IMI

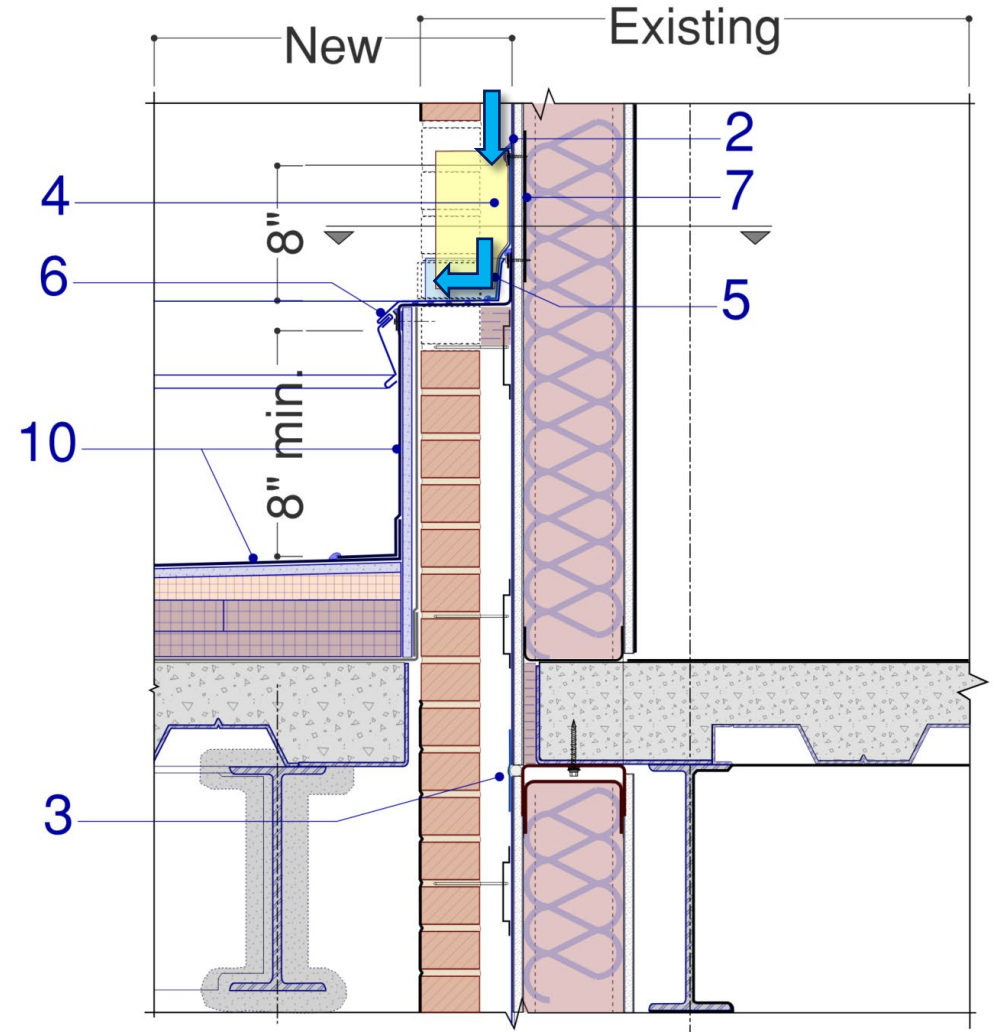
Alternating Flashing Install.

abaa building
enclosure
conference

- 1 - WRAB
- 2 - Termination Bar & Sealant
- 3 - Movement Joint
- 4 - Transition Membrane
- 5 - Through-Wall Flashing & End Dam
- 6 - Counterflashing
- 7 - Backer Plate
- 8 - Weep / Cell Vents
- 9 - Sealant and Backer
- 10 - Roofing
- 11 - Saddle Flashing
- 12 - Underlayment

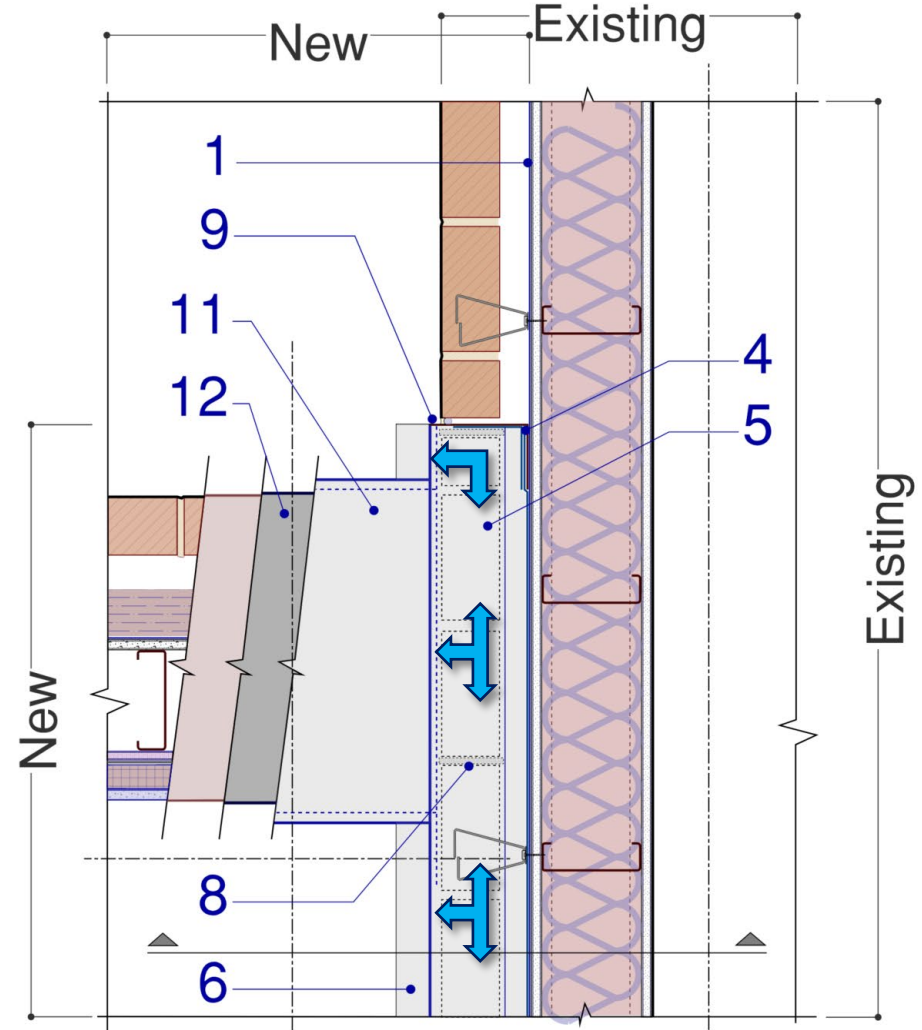
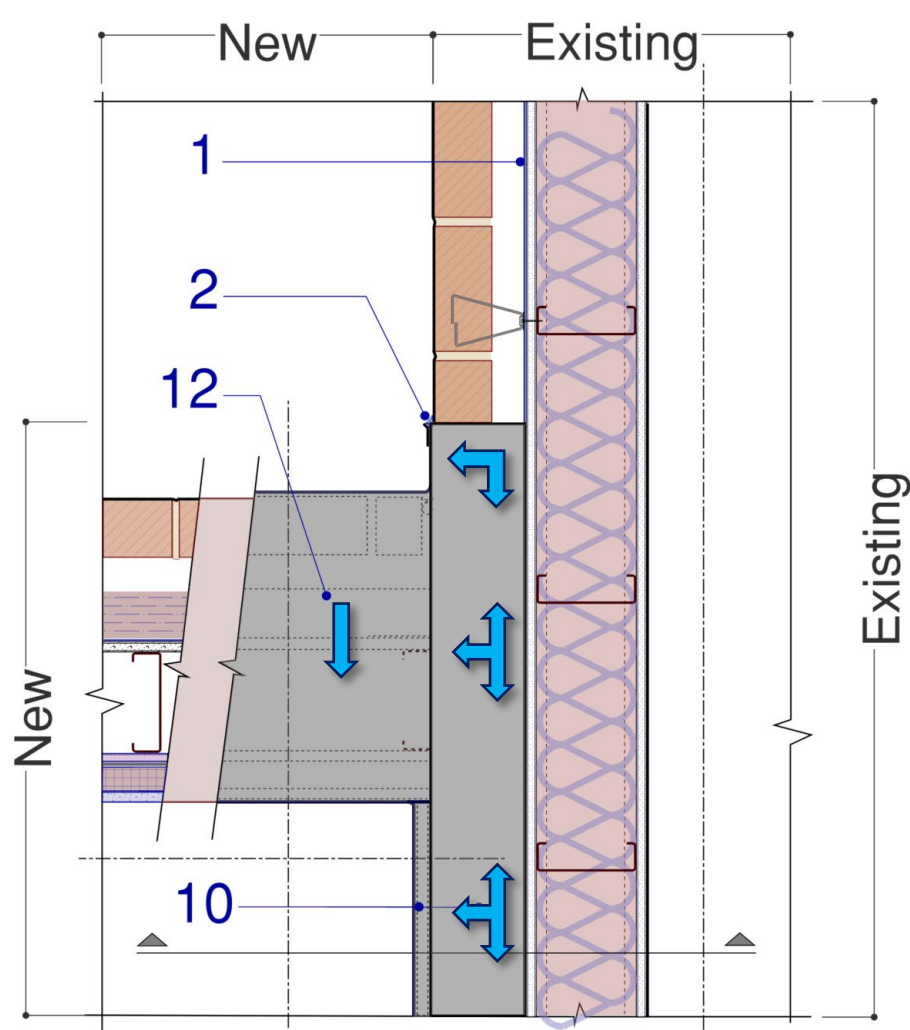


Existing

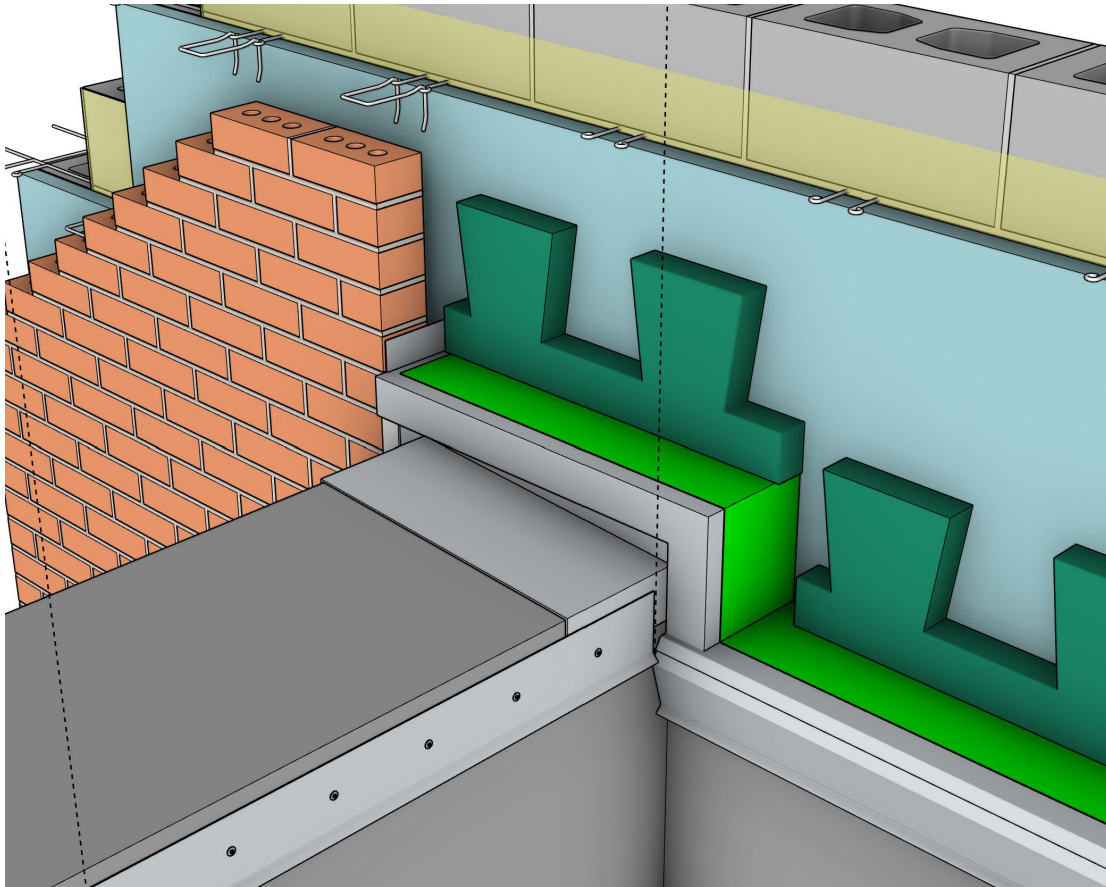


“Continuous” Roof-to-Wall Tie-In

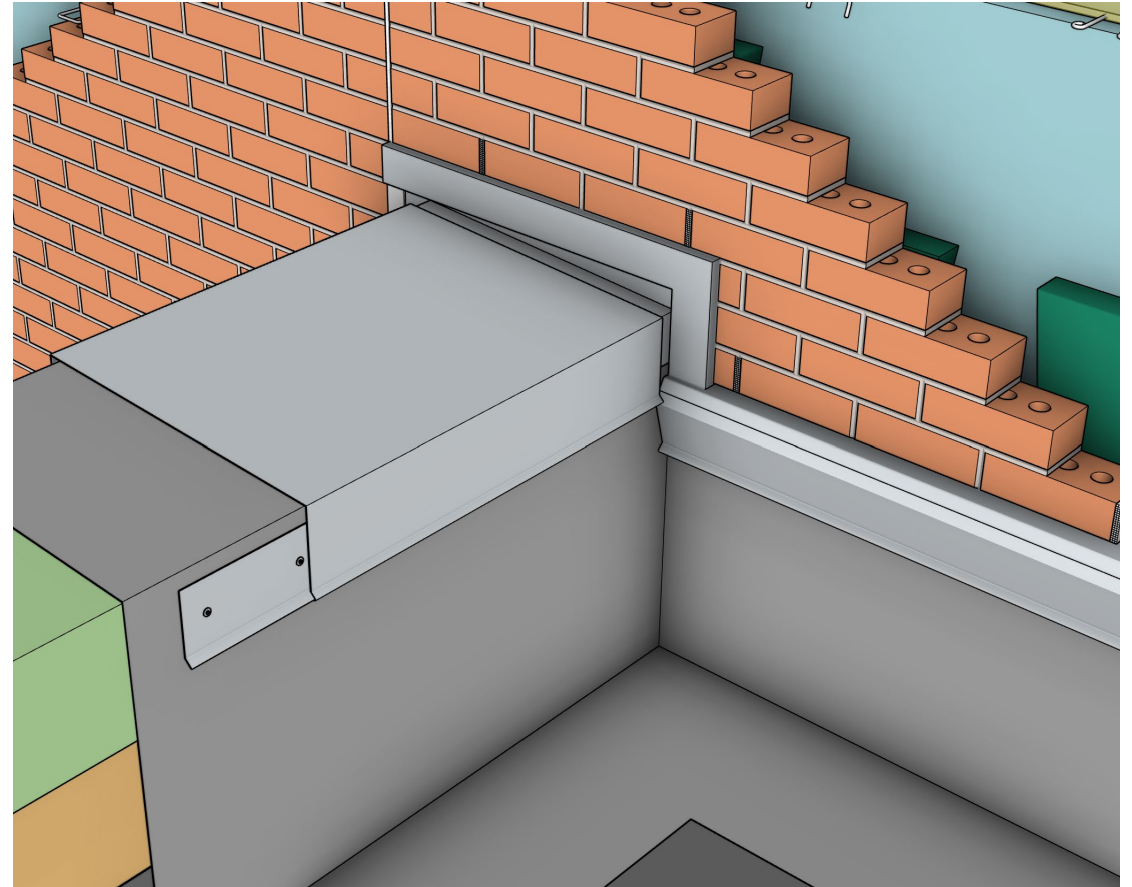
- 1 - WRAB
- 2 - Termination Bar & Sealant
- 3 - Movement Joint
- 4 - Transition Membrane
- 5 - Through-Wall Flashing & End Dam
- 6 - Counterflashing
- 7 - Backer Plate
- 8 - Weep / Cell Vents
- 9 - Sealant and Backer
- 10 - Roofing
- 11 - Saddle Flashing
- 12 - Underlayment



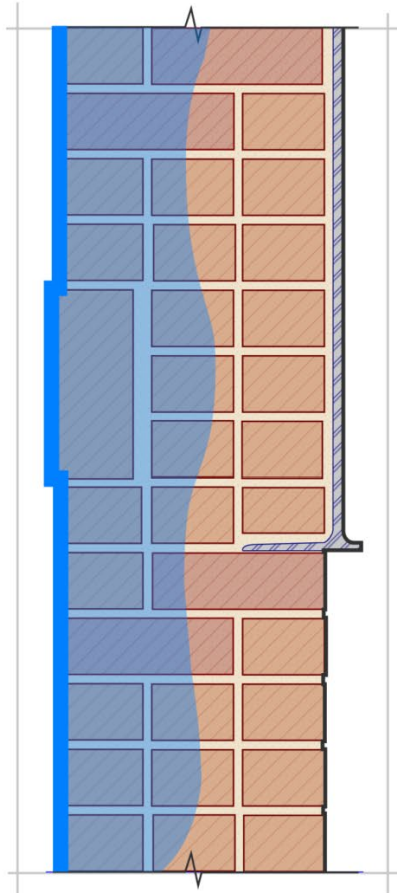
“Continuous” Roof-to-Wall Tie-In



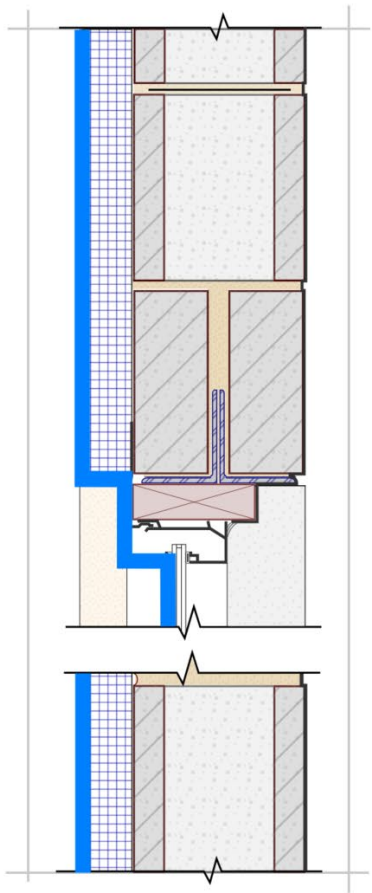
Saddle Flashing – Through-Wall Flashing



Saddle Flashing - Final



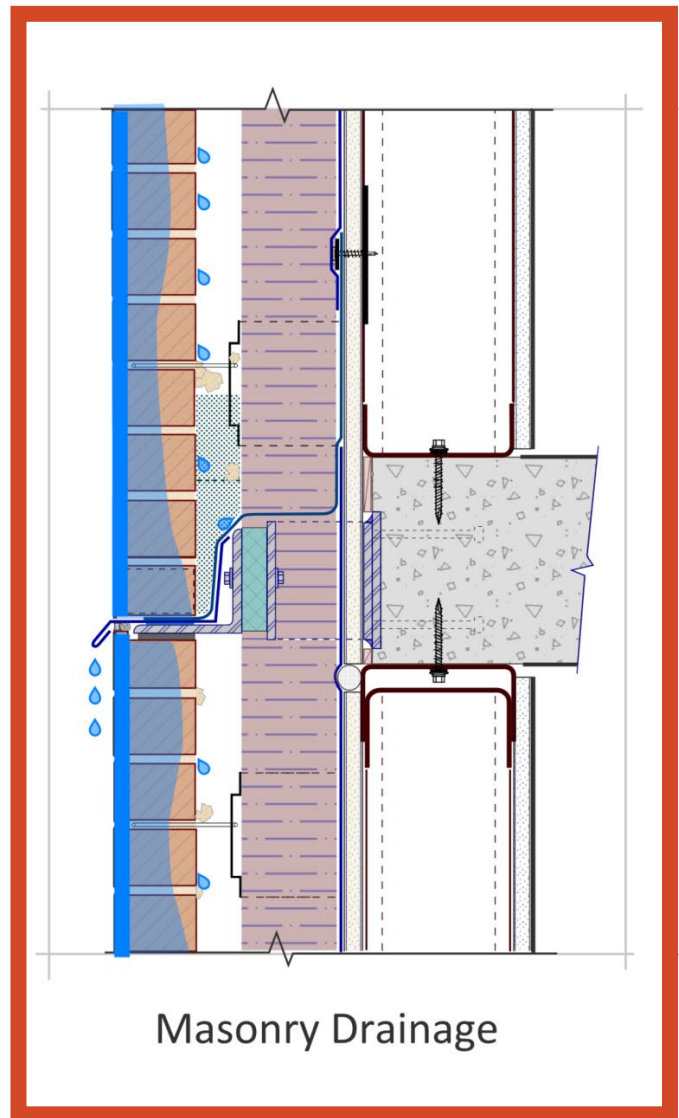
Mass Wall



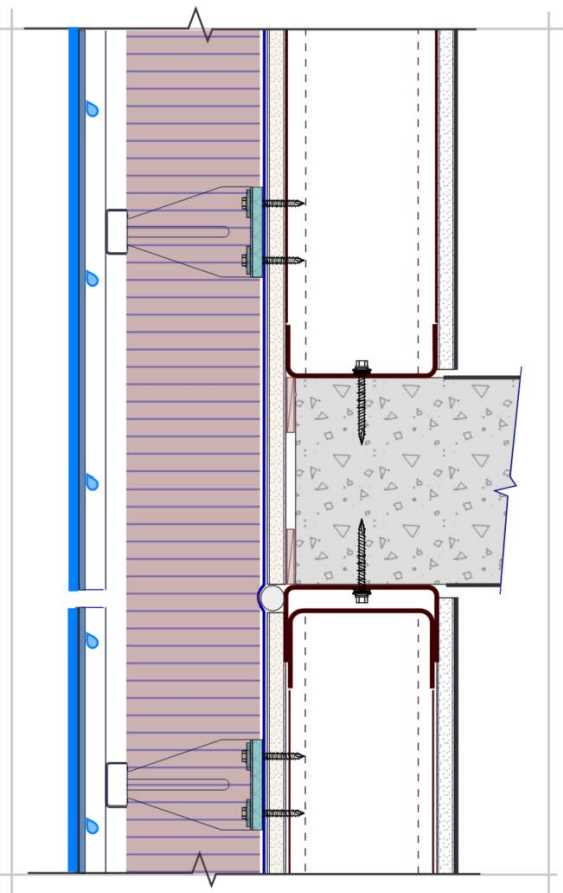
Barrier Wall



Transitional Wall

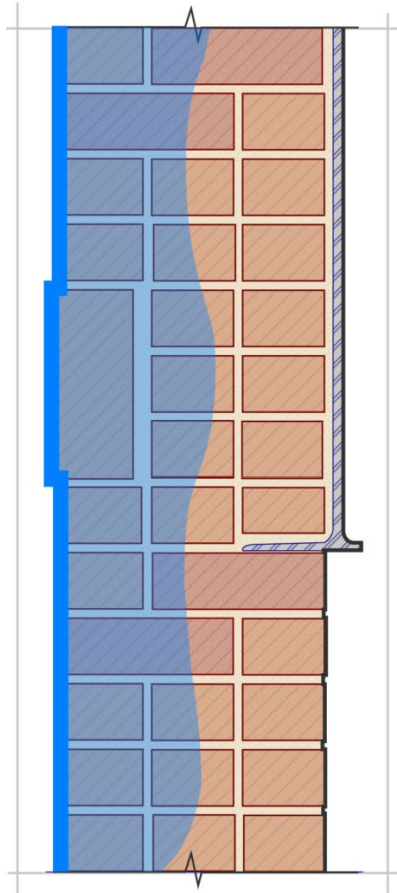


Masonry Drainage

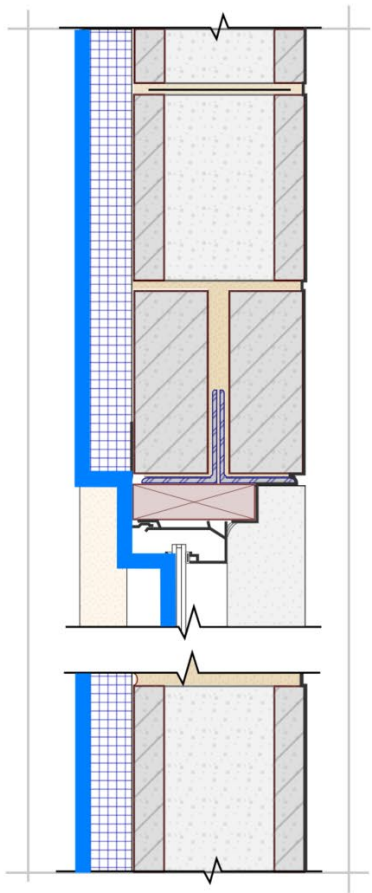


Rainscreen

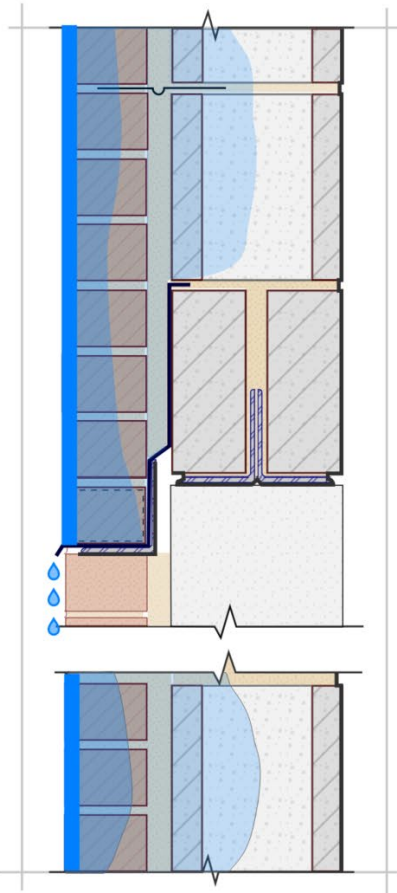
Exterior Wall Assembly Types



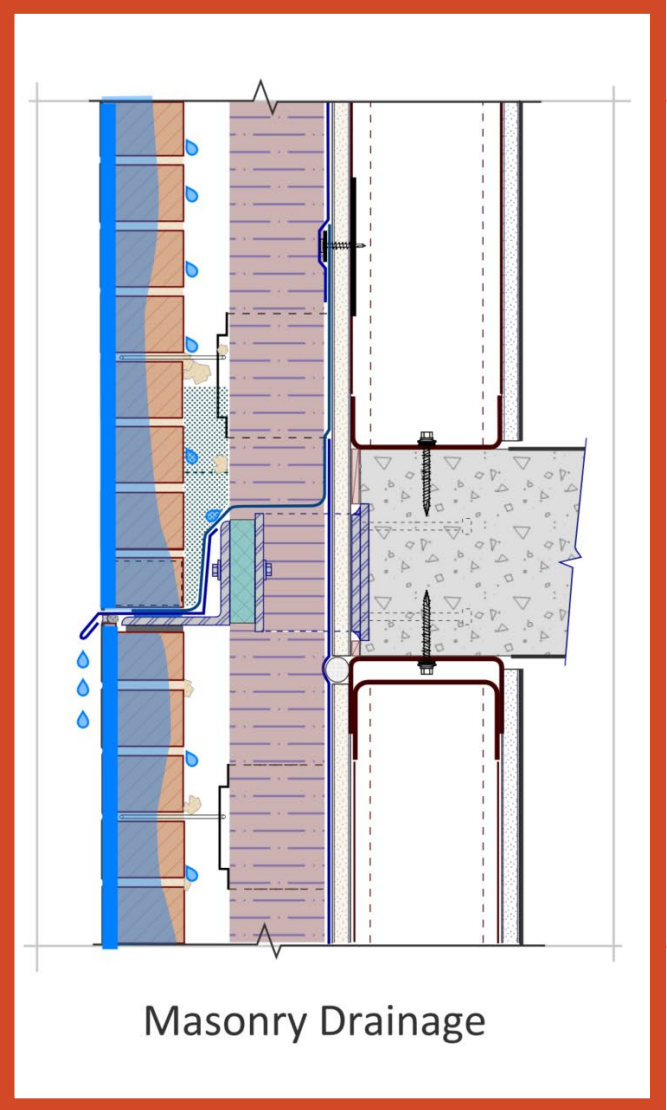
Mass Wall



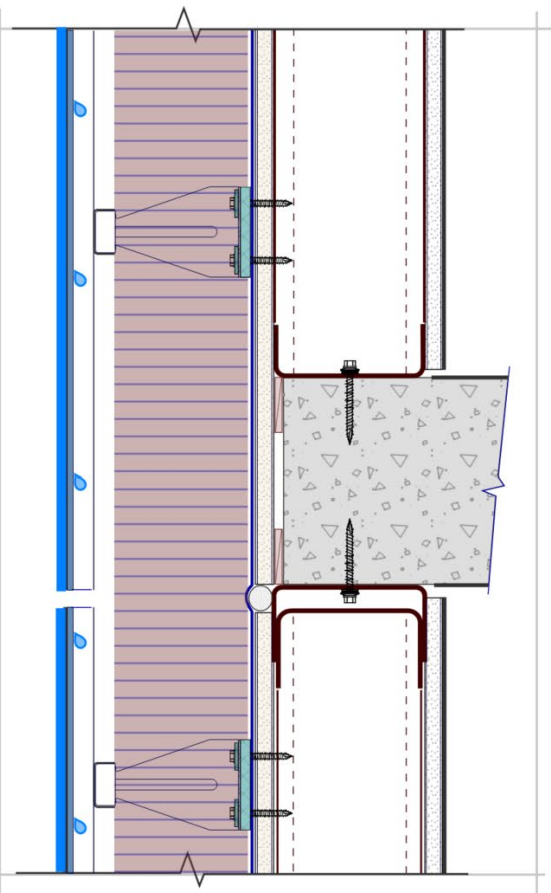
Barrier Wall



Transitional Wall



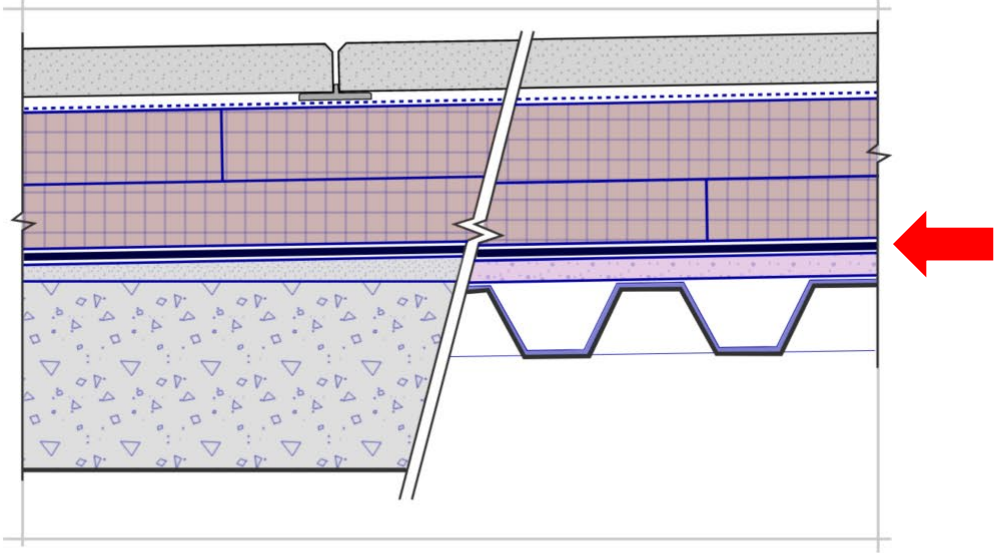
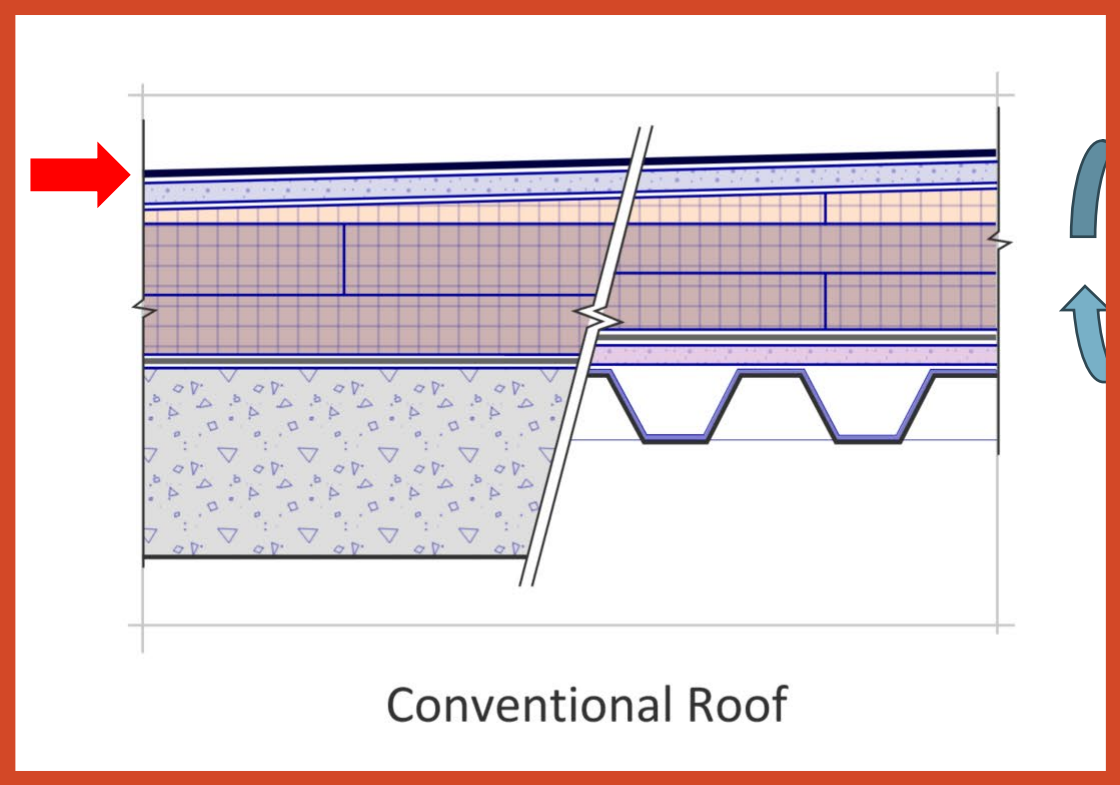
Masonry Drainage



Rainscreen

Exterior Wall Assembly Types

Roofing Assembly



**Sr. Technical Leader – Enclosures
CannonDesign**

E: mnagle@cannodesign.com

T: 614.641.2272



Mike Nagle



abaa 2026 building
enclosure
conference