

# MASONRY

## Institute of Michigan

### 12" SINGLE WYTHE CMU

- "SEMI-HEATED" BUILDINGS/SPACES
- "HEATED" BUILDINGS/SPACES

#### HIGH PERFORMANCE ATTRIBUTES

- ARCHITECTURAL
- STRUCTURAL
- ENERGY
- FIRE
- SOUND
- MOISTURE
- AIR

FOR ADDITIONAL INFORMATION ON HIGH PERFORMANCE ATTRIBUTES OF MASONRY WALLS, SEE ["MASS BENEFITS"](#)

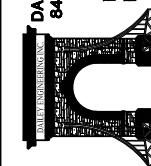
#### NOTES

- 1) MOISTURE MANAGEMENT: THIS SET OF DETAILS CALLS FOR THE USE OF AN INTEGRAL WATER REPELLANT (IWR) ADDED TO BOTH THE UNITS AND THE MORTAR. ADDITIONALLY, AFTER CLEANING A COMPATIBLE, BREATHABLE, FIELD-APPLIED WATER REPELLANT SHALL ALSO BE FIELD APPLIED.
- 2) JOINT TOOLING SHOULD BE PERFORMED ONLY WHEN THE MORTAR IS "THUMBPRINT HARD". THE TIME OF TOOLING IS ESPECIALLY IMPORTANT FOR MORTAR AND UNITS CONTAINING INTEGRAL WATER REPELLANTS.
- 3) THIS SET OF DETAILS SHOWS WALL CONSTRUCTION PRIMARILY AT HOLLOW CELLS. WHERE VERTICAL REINFORCEMENT AND GROUT OCCURS, THE PAN FLASHING, DRAINAGE MATERIAL AND INSULATION IS OMITTED. FOR CLARITY, SEE PHOTOGRAPH ON SHEET A-3 OF THE PAN FLASHING AT THE BASE OF A PARTIALLY GROUTED WALL. FLASHING IS NOT REQUIRED IN SOLID GROUTED SINGLE WYTHE WALLS PER NCMA 19-02B (2012).
- 4) THIS SET OF DETAILS WILL RESULT IN A WALL WITH THREE CONTROL LAYERS: THERMAL, AIR AND MOISTURE. (SEE SHEETS A-12 AND A-13 FOR ADDITIONAL INFORMATION). MOST DETAILS SHOWN IN THIS SET ARE FOR A "SEMI-HEATED BUILDING" DEPICTING ONLY CELL FILL INSULATION. IN CONTRAST, SHEETS A-8.1 AND A-8.2 DEPICT RIGID INSULATION AT THE INTERIOR SURFACE OF THE MASONRY WALL, WHICH CAN BE PART OF A COMPLIANCE OPTION FOR HEATED BUILDINGS.
- 5) FOR PLACING CONTROL JOINTS (CJs), TWO OPTIONS ARE AVAILABLE:
  - A) AWAY FROM THE OPENINGS (PREFERRED): SEE SHEETS A-10.1, AND A-10.2
  - B) AT THE OPENINGS: SEE SHEETS A-11.1, A-11.2 AND A-11.3

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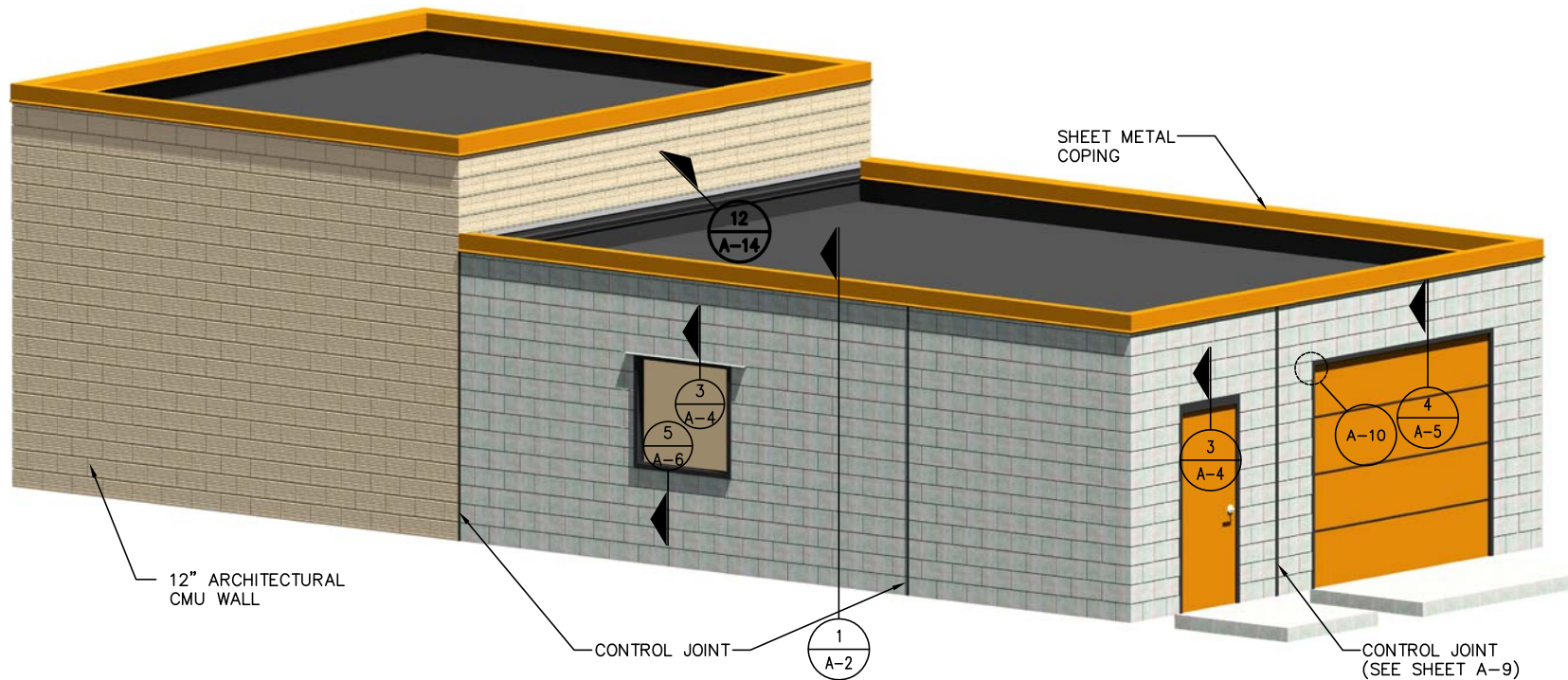
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 MASONRY  
Institute of Michigan

DETAIL SET SW.12 (12" SINGLE WYTHE)

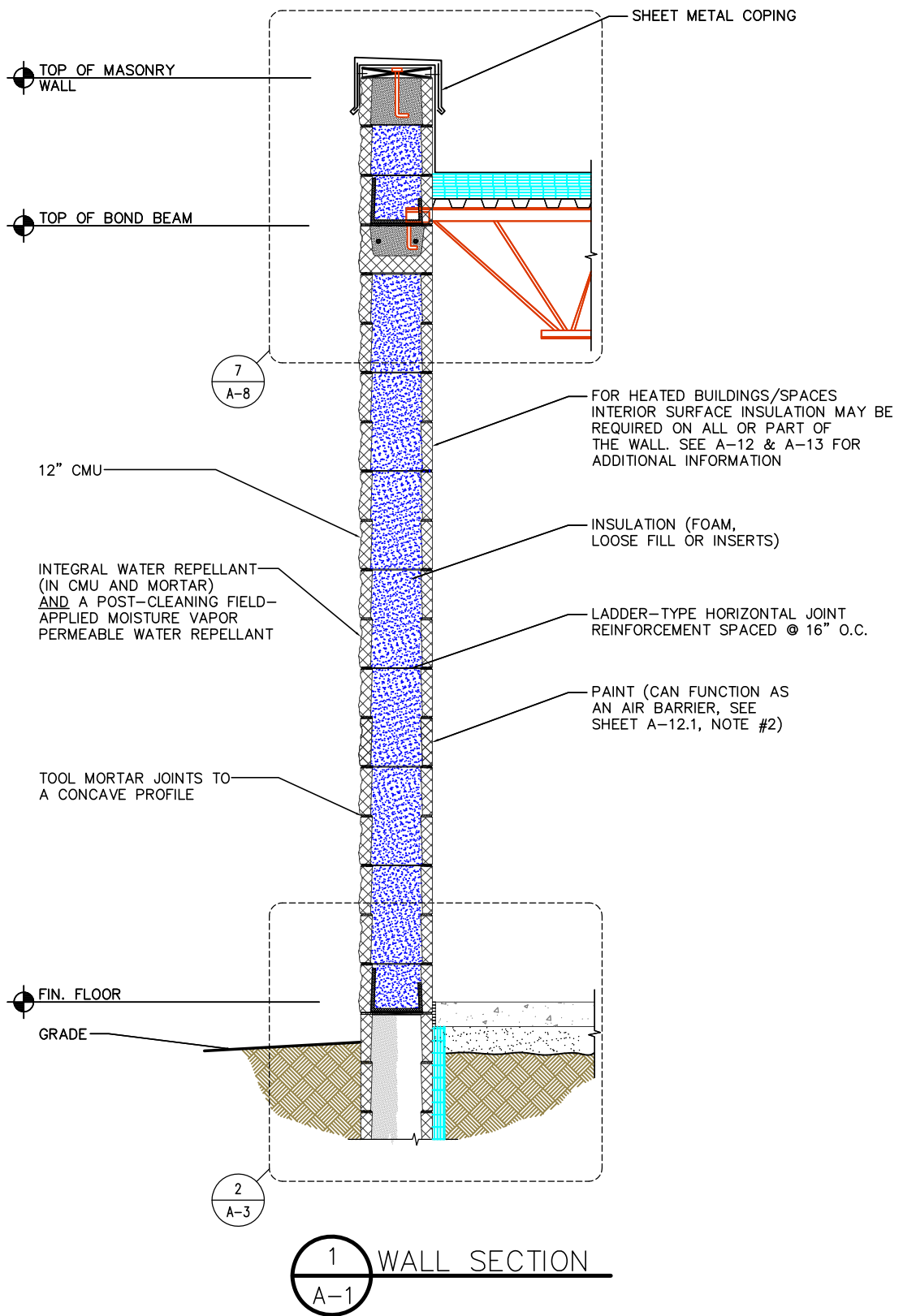
IN CHARGE:	
DRAWN:	M.W.F.
APPROVED:	
DATE:	01/28/2020
TITLE:	COVER SHEET
SHEET:	A-1.0



**GENERIC BUILDING**  
NOT TO SCALE

IN CHARGE:	
DRAWN:	M.W.F.
APPROVED:	
DATE:	01/28/2020
TITLE:	GENERIC BUILDING ISOMETRIC
SHEET:	A-1.1

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SHEET:	A-2
WALL SECTION	
TITLE:	
DATE:	01/28/2020
APPROVED:	
DRAWN:	M.W.F.
IN CHARGE:	

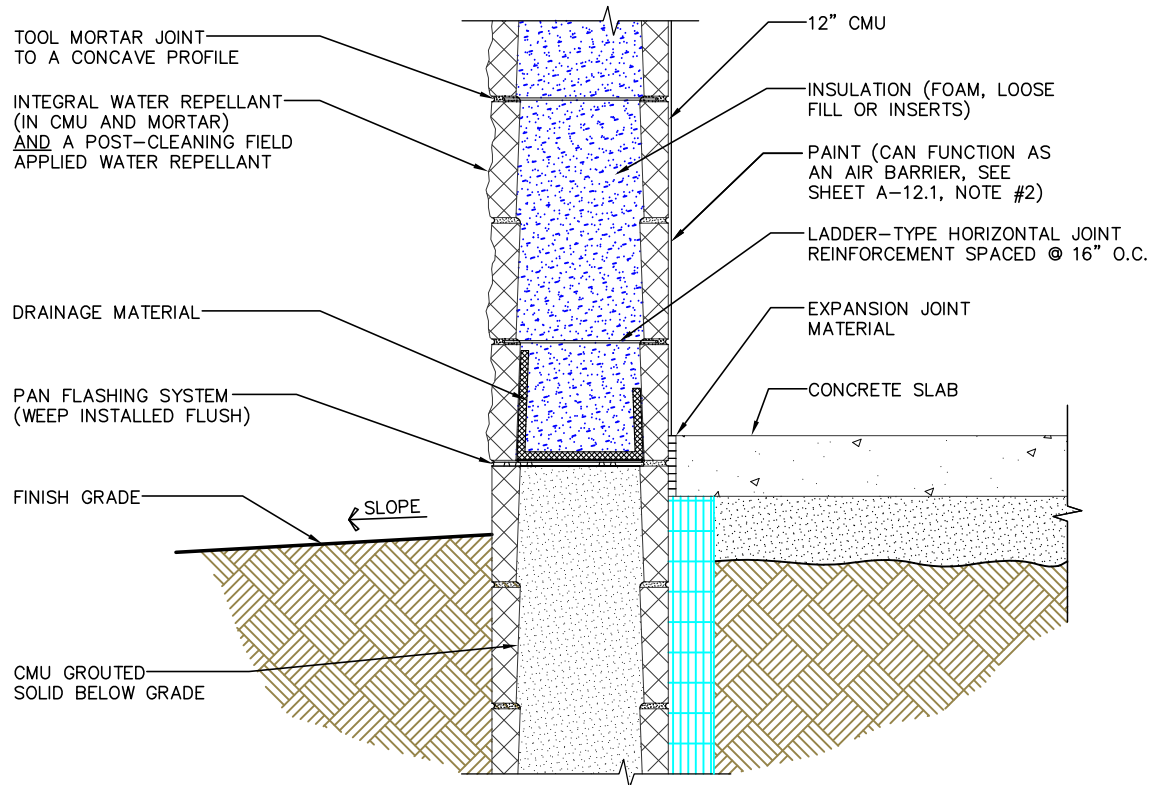
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DETAIL SET SW.12 (12" SINGLE WYTHE)



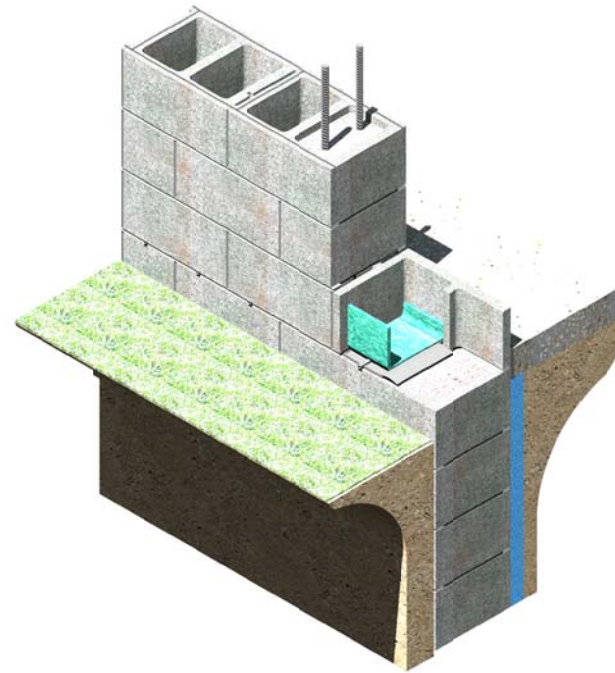
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2  
A-2 BASE DETAIL

NOTE: TOP OF CONCRETE SLAB TO BE ABOVE PAN FLASHING, BOTH OF WHICH ARE TO BE ABOVE FINISH GRADE.



ISOMETRIC VIEW



REINFORCED CELL PICTURE

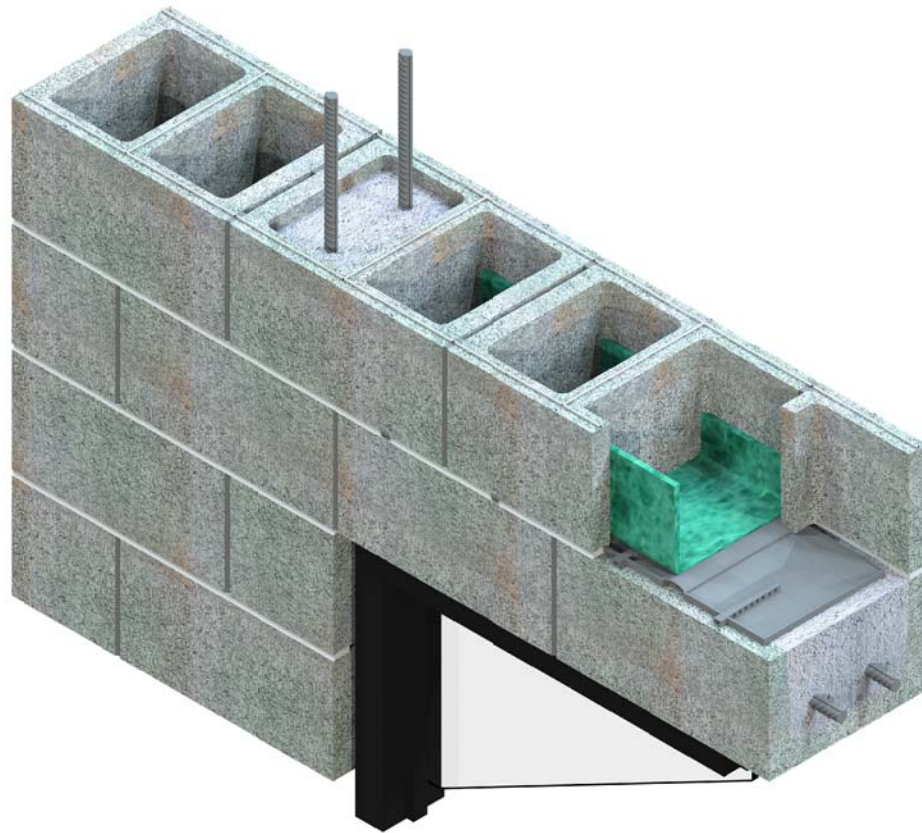
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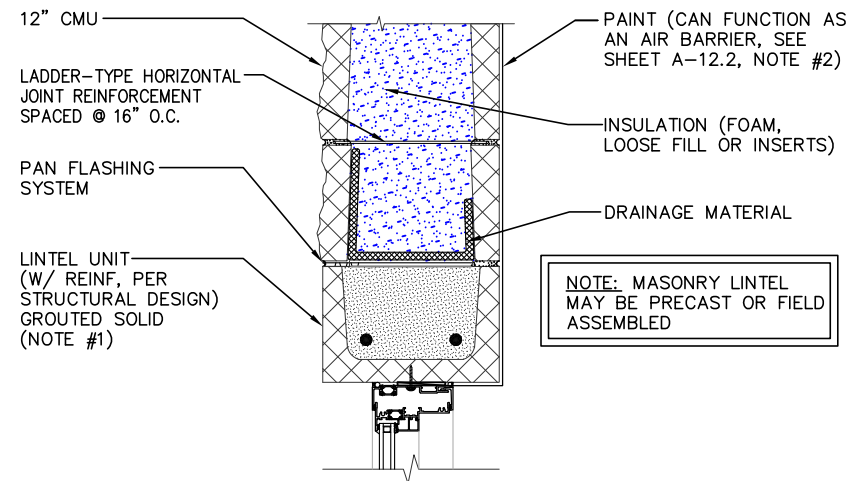
DETAIL SET SW.12 (12" SINGLE WYTHE)

IN CHARGE:	
DRAWN:	M.W.F.
APPROVED:	
DATE:	01/28/2020
TITLE:	BASE DETAIL
SHEET:	A-3





ISOMETRIC VIEW



SECTION VIEW

NOTES:

1) LINTEL UNITS AND OPEN BOTTOM UNITS ARE NOT AVAILABLE WITH SPLIT-FACE CMU. THEREFORE THE DETAIL SHOWS A SMOOTH FACE UNIT.

2) UNPROTECTED ALUMINUM DOOR AND WINDOW FRAMES CAN INTERACT WITH CEMENT-BASED MATERIALS AND INCUR DAMAGE. SEE PCA "ALUMINUM FRAMES IN MASONRY WALLS" FOR RECOMMENDATIONS.

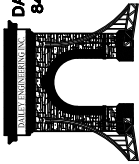
<http://www.cement.org/for-concrete-books-learning/materials-applications/masonry/construction/aluminum-frames-in-masonry-walls>

NOTE: MASONRY LINTEL MAY BE PRECAST OR FIELD ASSEMBLED

3A  
A-1

SHORT SPAN  
MASONRY LINTEL (PREFERRED)  
(PREFERRED DETAIL)

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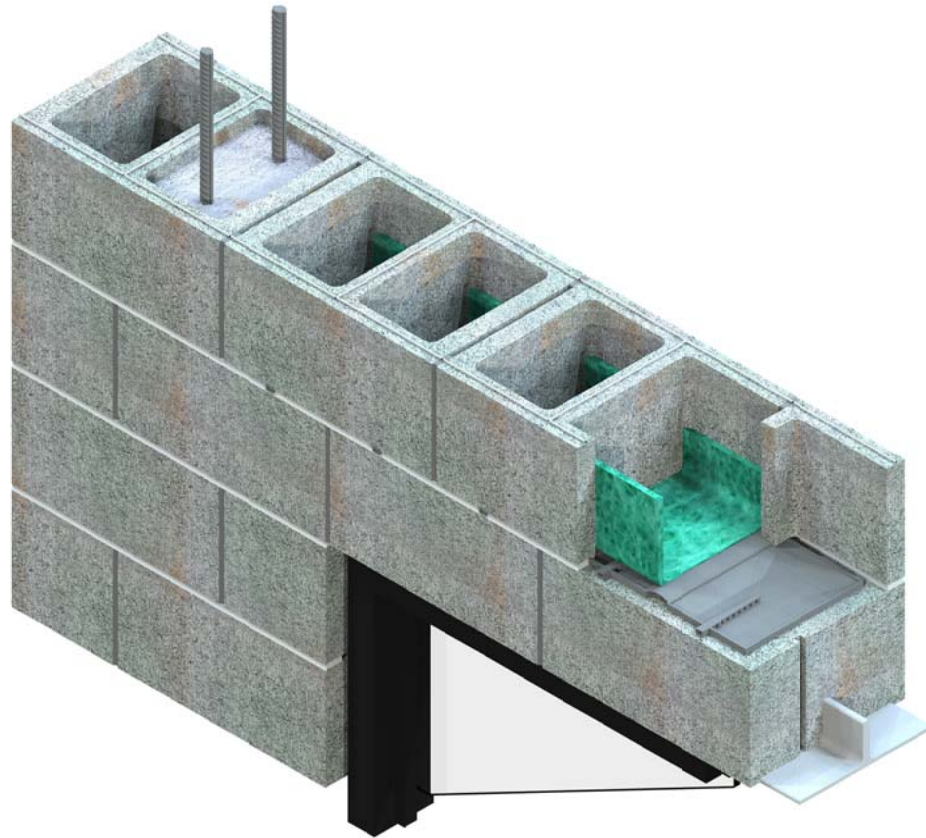


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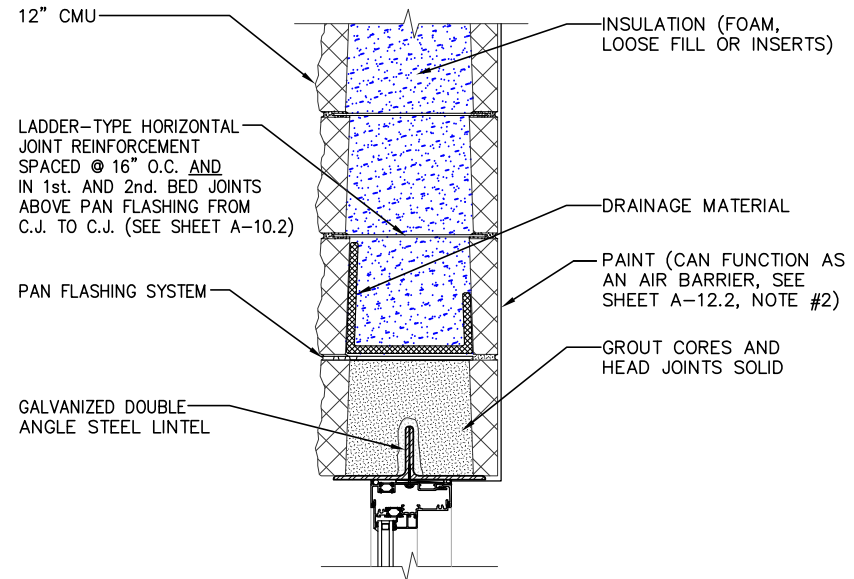
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DETAIL SET SW.12 (12" SINGLE WYTHE)

IN CHARGE:	
DRAWN:	M.W.F.
APPROVED:	
DATE:	01/28/2020
TITLE:	SHORT SPAN MASONRY LINTEL
SHEET:	A-4.1



ISOMETRIC VIEW



SECTION VIEW

NOTES:

1) CONTINUE PAN FLASHING SYSTEM A MINIMUM OF ONE CELL BEYOND BOTH JAMB EDGES OF THE OPENING.

2) UNPROTECTED ALUMINUM DOOR AND WINDOW FRAMES CAN INTERACT WITH CEMENT-BASED MATERIALS AND INCUR DAMAGE. SEE PCA "ALUMINUM FRAMES IN MASONRY WALLS" FOR RECOMMENDATIONS.

<http://www.cement.org/for-concrete-books-learning/materials-applications/masonry/construction/aluminum-frames-in-masonry-walls>

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DETAIL SET SW.12 (12" SINGLE WYTHE)

IN CHARGE:

DRAWN: M.W.F.

APPROVED:

DATE: 01/28/2020

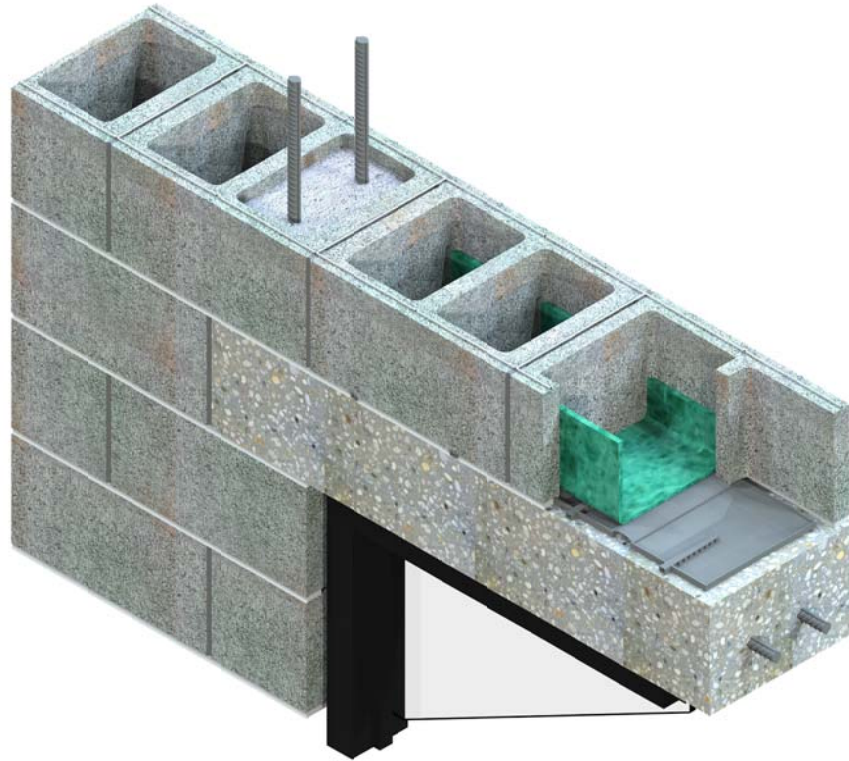
TITLE:

SHORT SPAN DOUBLE ANGLE STEEL LINTEL

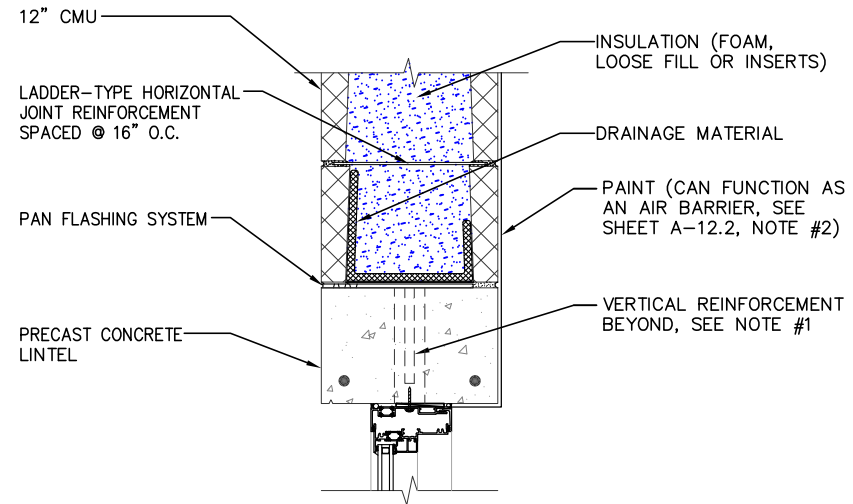
SHEET:

A-4.2

3B  
A-1  
SHORT SPAN  
DOUBLE ANGLE STEEL LINTEL



ISOMETRIC VIEW



SECTION VIEW

- NOTES:
- 1) NOTCH ENDS OF PRECAST LINTEL AS REQUIRED FOR VERTICAL REINFORCEMENT.
  - 2) UNPROTECTED ALUMINUM DOOR AND WINDOW FRAMES CAN INTERACT WITH CEMENT-BASED MATERIALS AND INCUR DAMAGE. SEE PCA "ALUMINUM FRAMES IN MASONRY WALLS" FOR RECOMMENDATIONS.  
<http://www.cement.org/for-concrete-books-learning/materials-applications/masonry/construction/aluminum-frames-in-masonry-walls>

3C  
A-1

SHORT SPAN  
PRECAST CONCRETE LINTEL

NOTE: FOR AESTHETIC REASONS, THIS DETAIL IS NORMALLY USED ONLY ON WALLS CONSTRUCTED OF STANDARD UNITS, NOT THOSE WITH ARCHITECTURAL CMU UNITS.

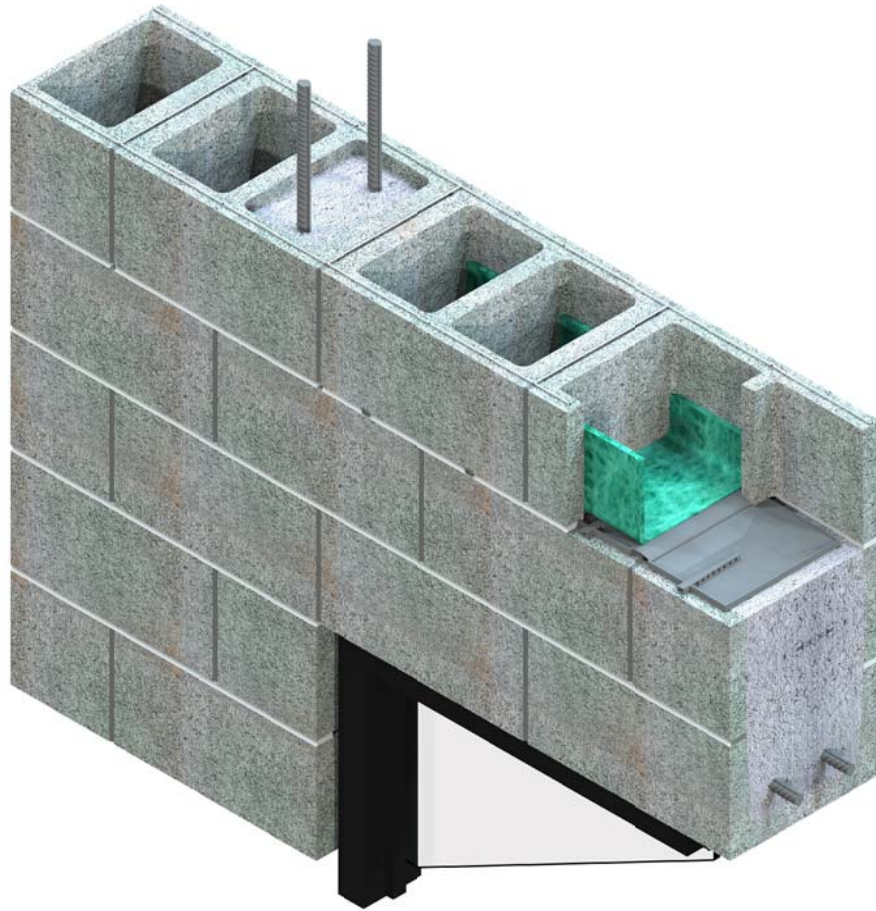
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DETAIL SET SW.12 (12" SINGLE WYTHE)

IN CHARGE:	
DRAWN:	M.W.F.
APPROVED:	
DATE:	01/28/2020
TITLE:	SHORT SPAN PRECAST CONCRETE LINTEL
SHEET:	A-4.3





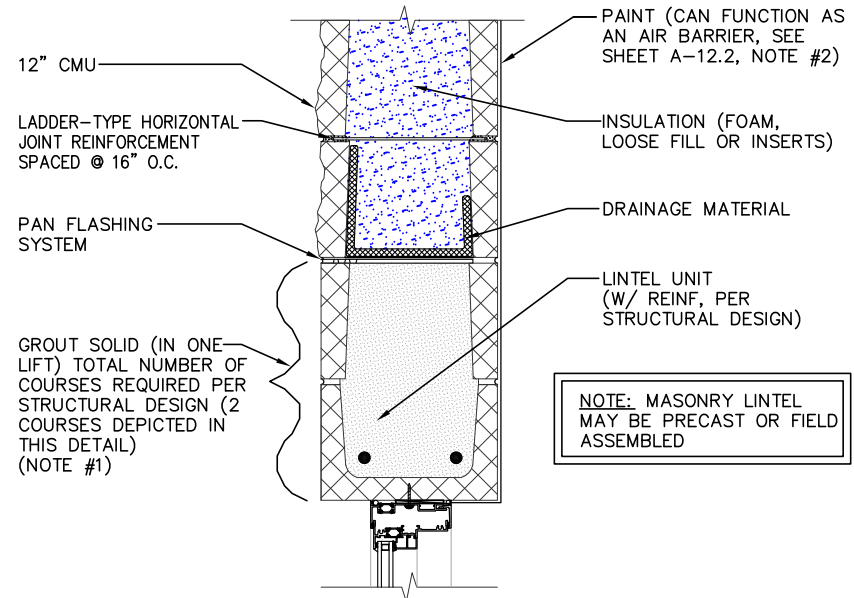
ISOMETRIC VIEW

NOTES:

1) LINTEL UNITS AND OPEN BOTTOM UNITS ARE NOT AVAILABLE WITH SPLIT-FACE CMU. THEREFORE THE DETAIL SHOWS A SMOOTH FACE UNIT.

2) UNPROTECTED ALUMINUM DOOR AND WINDOW FRAMES CAN INTERACT WITH CEMENT-BASED MATERIALS AND INCUR DAMAGE. SEE PCA "ALUMINUM FRAMES IN MASONRY WALLS" FOR RECOMMENDATIONS.

<http://www.cement.org/for-concrete-books-learning/materials-applications/masonry/construction/aluminum-frames-in-masonry-walls>



SECTION VIEW

4A  
A-1

LONG SPAN  
MASONRY LINTEL (PREFERRED)  
(PREFERRED DETAIL)

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DETAIL SET SW.12 (12" SINGLE WYTHE)

IN CHARGE:

DRAWN: M.W.F.

APPROVED:

DATE: 01/28/2020

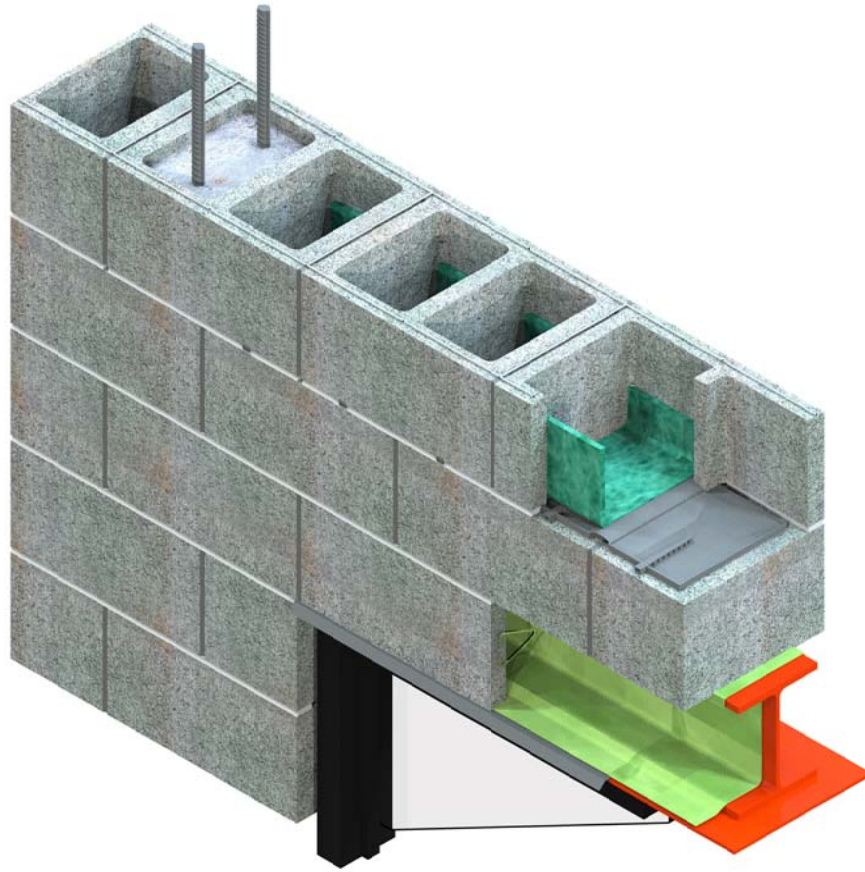
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LONG SPAN  
MASONRY LINTEL

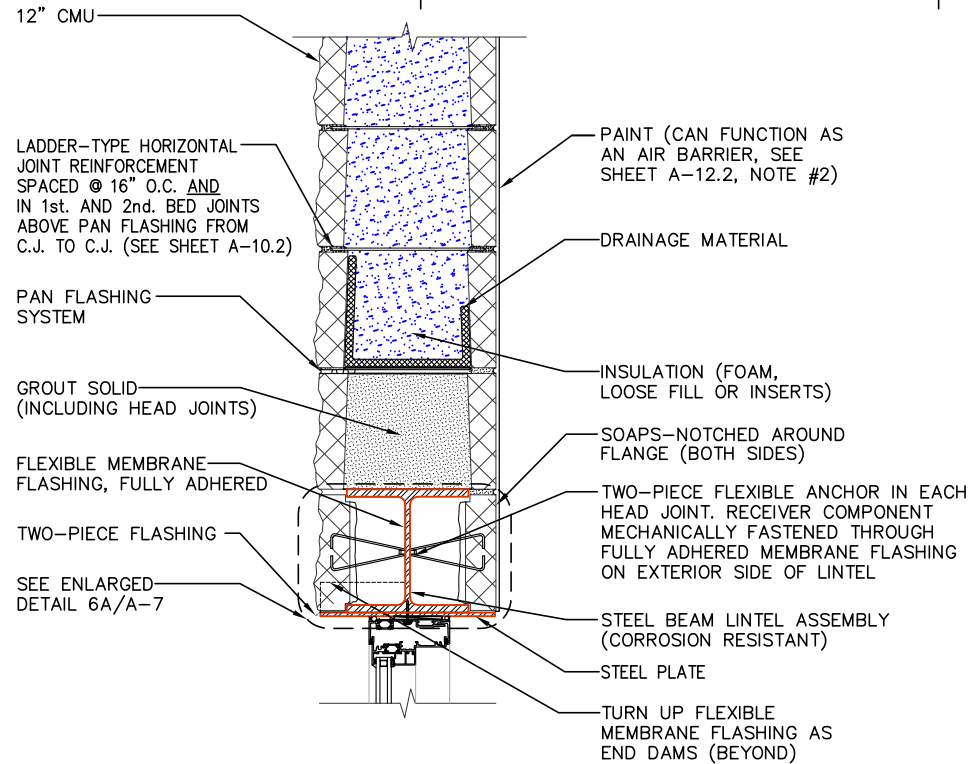
SHEET:

A-5.1





ISOMETRIC VIEW



SECTION VIEW

NOTES:

1) CONTINUE PAN FLASHING SYSTEM A MINIMUM OF ONE CELL BEYOND BOTH JAMB EDGES OF THE OPENING.

2) UNPROTECTED ALUMINUM DOOR AND WINDOW FRAMES CAN INTERACT WITH CEMENT-BASED MATERIALS AND INCUR DAMAGE. SEE PCA "ALUMINUM FRAMES IN MASONRY WALLS" FOR RECOMMENDATIONS.

<http://www.cement.org/for-concrete-books-learning/materials-applications/masonry/construction/aluminum-frames-in-masonry-walls>

4C  
A-1

LONG SPAN WIDE FLANGE  
8" STEEL LINTEL DETAIL

NOTE: WITH THIS DETAIL  
SOAPS REQUIRE NOTCHING.

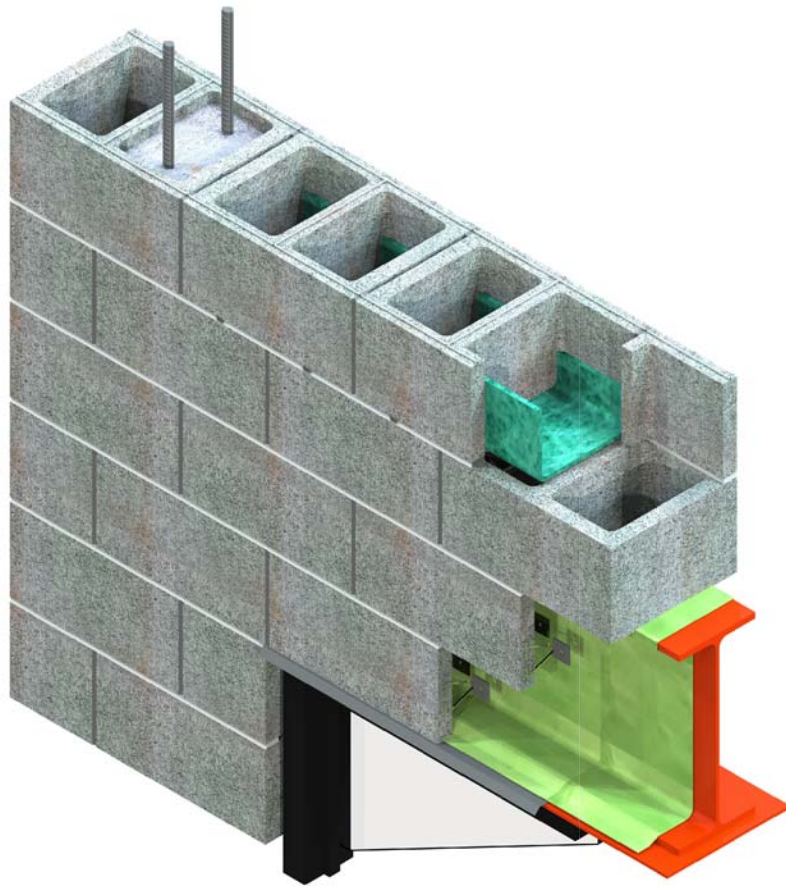
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DETAIL SET SW.12 (12" SINGLE WYTHE)

IN CHARGE:  
DRAWN: M.W.F.  
APPROVED:  
DATE: 01/28/2020  
TITLE:  
LONG SPAN WIDE  
FLANGE 8" STEEL  
LINTEL DETAIL  
SHEET:  
A-5.3



ISOMETRIC VIEW

LADDER-TYPE HORIZONTAL  
JOINT REINFORCEMENT  
SPACED @ 16" O.C. AND  
IN 1st. AND 2nd. BED JOINTS  
ABOVE PAN FLASHING FROM  
C.J. TO C.J. (SEE SHEET A-10.2)

12" CMU

INSULATION (FOAM,  
LOOSE FILL OR INSERTS)

PAN FLASHING  
SYSTEM

GROUT SOLID  
(INCLUDING HEAD JOINTS)

FLEXIBLE MEMBRANE  
FLASHING, FULLY ADHERED

TWO-PIECE FLASHING

SEE ENLARGED  
DETAIL 6B/A-7

DRAINAGE MATERIAL

PAINT (CAN FUNCTION AS  
AN AIR BARRIER, SEE  
SHEET A-12.2, NOTE #2)

SOAPS-NOTCHED AROUND  
FLANGE (BOTH SIDES)

TWO-PIECE FLEXIBLE ANCHOR IN EACH  
HEAD JOINT IN EACH SOAP COURSE  
RECEIVER COMPONENT MECHANICALLY  
FASTENED THROUGH FULLY  
ADHERED MEMBRANE FLASHING  
ON EXTERIOR SIDE OF LINTEL

STEEL BEAM LINTEL ASSEMBLY  
(CORROSION RESISTANT)

STEEL PLATE

TURN UP FLEXIBLE  
MEMBRANE FLASHING AS  
END DAMS (BEYOND)

SECTION VIEW

NOTES:

1) CONTINUE PAN FLASHING SYSTEM A MINIMUM  
OF ONE CELL BEYOND BOTH JAMB EDGES OF  
THE OPENING.

2) UNPROTECTED ALUMINUM DOOR AND WINDOW  
FRAMES CAN INTERACT WITH CEMENT-BASED  
MATERIALS AND INCUR DAMAGE. SEE PCA  
"ALUMINUM FRAMES IN MASONRY WALLS"  
FOR RECOMMENDATIONS.

<http://www.cement.org/for-concrete-books-learning/materials-applications/masonry/construction/aluminum-frames-in-masonry-walls>

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DETAIL SET SW.12 (12" SINGLE WYTHE)

IN CHARGE:

DRAWN: M.W.F.

APPROVED:

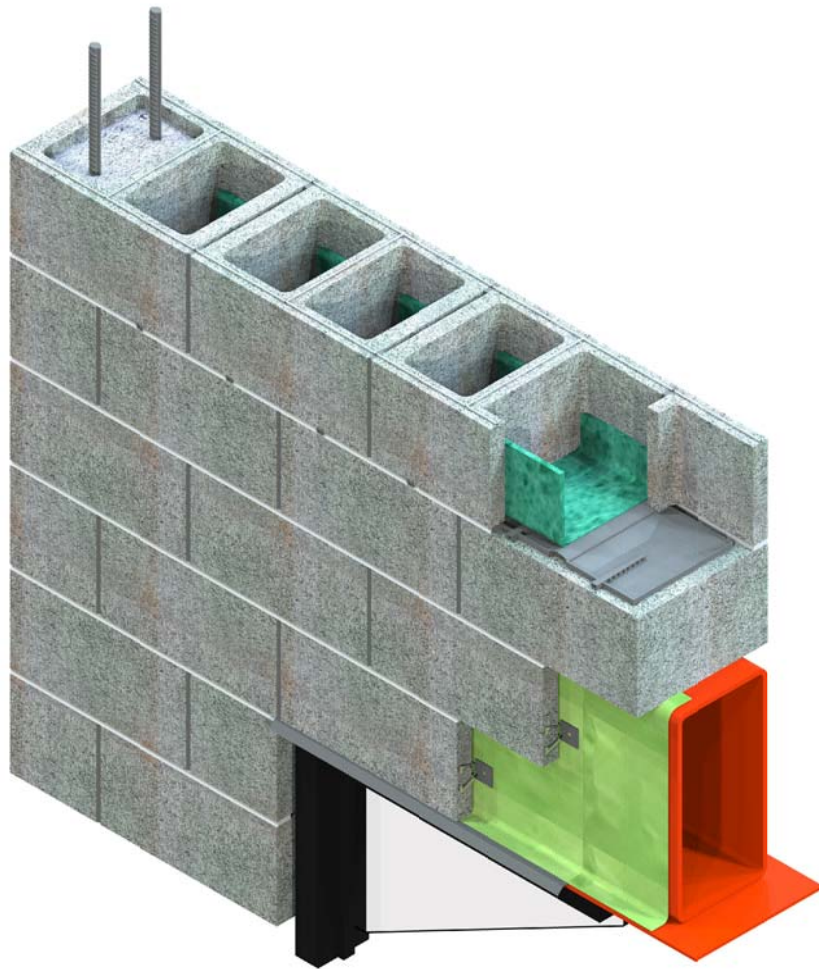
DATE: 01/28/2020

TITLE:  
LONG SPAN 16"  
DEPTH STEEL  
LINTEL DETAIL

SHEET:  
A-5.4

4D  
A-1  
LONG SPAN 16"  
DEPTH STEEL LINTEL DETAIL

NOTE: WITH THIS DETAIL  
SOAPS REQUIRE NOTCHING.



ISOMETRIC VIEW

LADDER-TYPE HORIZONTAL  
JOINT REINFORCEMENT  
SPACED @ 16" O.C. AND  
IN 1st. AND 2nd. BED JOINTS  
ABOVE PAN FLASHING FROM  
C.J. TO C.J. (SEE SHEET A-10.2)

12" CMU

INSULATION (FOAM,  
LOOSE FILL OR INSERTS)

PAN FLASHING  
SYSTEM

GROUT SOLID  
(INCLUDING HEAD JOINTS)

FLEXIBLE MEMBRANE  
FLASHING, FULLY ADHERED

TWO-PIECE FLASHING

SEE ENLARGED  
DETAIL 6B/A-7  
(SIMILAR)

DRAINAGE MATERIAL

PAINT (CAN FUNCTION AS  
AN AIR BARRIER, SEE  
SHEET A-12.2, NOTE #2)

SOAPS-(BOTH SIDES)

TWO-PIECE FLEXIBLE ANCHOR IN EACH  
HEAD JOINT IN EACH SOAP COURSE  
RECEIVER COMPONENT MECHANICALLY  
FASTENED THROUGH FULLY  
ADHERED MEMBRANE FLASHING  
ON EXTERIOR SIDE OF LINTEL

HSS STEEL LINTEL ASSEMBLY  
(CORROSION RESISTANT)

STEEL PLATE

TURN UP FLEXIBLE  
MEMBRANE FLASHING AS  
END DAMS (BEYOND)

SECTION VIEW

**NOTES:**

1) CONTINUE PAN FLASHING SYSTEM A MINIMUM  
OF TWO CELLS BEYOND BOTH JAMB EDGES OF  
THE OPENING.

2) UNPROTECTED ALUMINUM DOOR AND WINDOW  
FRAMES CAN INTERACT WITH CEMENT-BASED  
MATERIALS AND INCUR DAMAGE. SEE PCA  
"ALUMINUM FRAMES IN MASONRY WALLS"  
FOR RECOMMENDATIONS.

<http://www.cement.org/for-concrete-books-learning/materials-applications/masonry/construction/aluminum-frames-in-masonry-walls>

4E  
A-1

LONG SPAN HSS  
STEEL LINTEL DETAIL

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Institute of Michigan

DETAIL SET SW.12 (12" SINGLE WYTHE)

IN CHARGE:

DRAWN: M.W.F.

APPROVED:

DATE: 01/28/2020

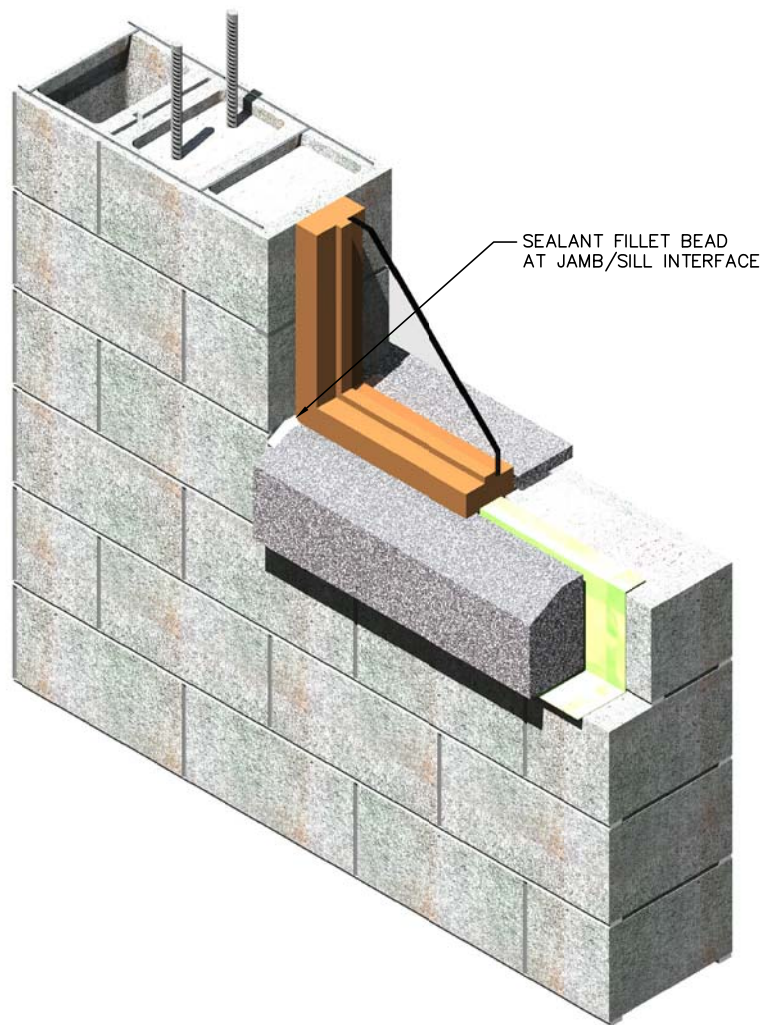
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LONG SPAN HSS  
STEEL LINTEL

SHEET:

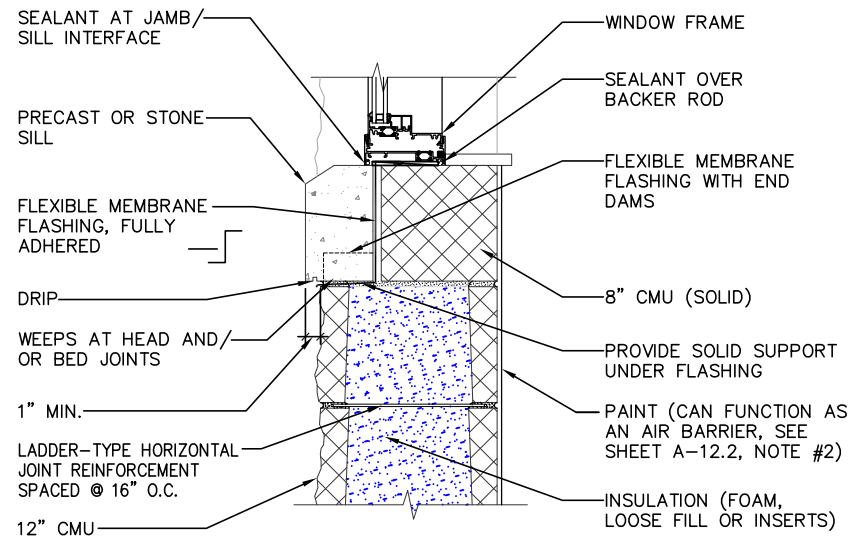
A-5.5





ISOMETRIC VIEW

NOTE: MULTIPLE PIECE SILLS  
MAY REQUIRE MASONRY  
ANCHORS IN THE HEAD JOINTS

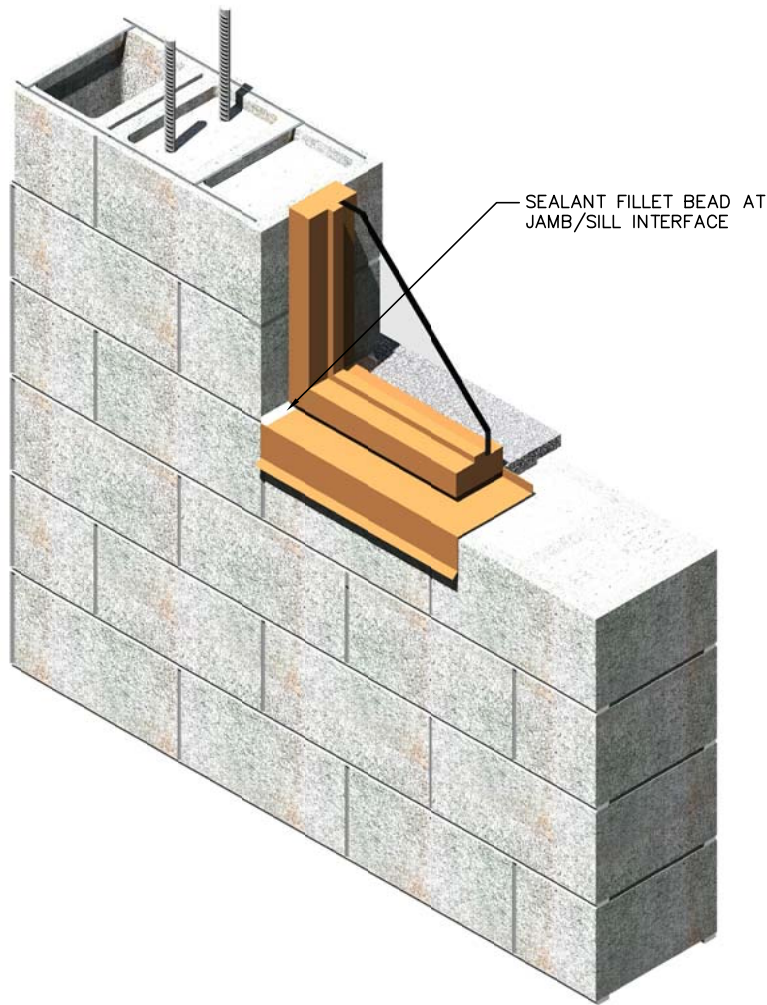


SECTION VIEW

5A  
A-1 PRECAST OR STONE SILL

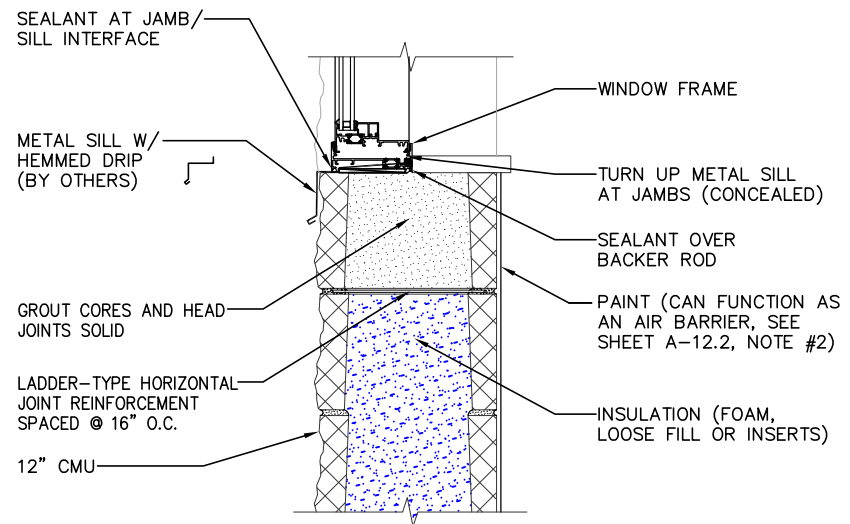
IN CHARGE:	
DRAWN:	M.W.F.
APPROVED:	
DATE:	01/28/2020
TITLE:	PRECAST SILL DETAIL
SHEET:	A-6.1





ISOMETRIC VIEW

**NOTES:**  
CAUTION SHOULD BE USED WHEN USING EXPOSED METAL DRIP EDGES AT LOCATIONS WITHIN PEDESTRIAN REACH. SEE M.I.M. "EXPOSED METAL FLASHING" BULLETIN FOR ADDITIONAL INFORMATION.



SECTION VIEW

5B  
A-1 METAL SILL

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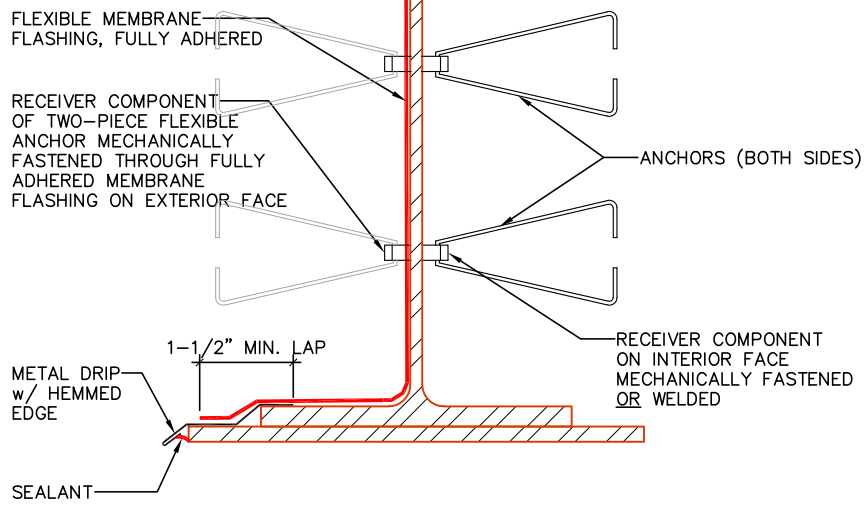
DETAIL SET SW.12 (12" SINGLE WYTHE)

IN CHARGE:	
DRAWN:	M.W.F.
APPROVED:	
DATE:	01/28/2020
TITLE:	
METAL SILL DETAIL	
SHEET:	
A-6.2	

IN CHARGE:	
DRAWN:	M.W.F.
APPROVED:	
DATE:	01/28/2020
TITLE:	TWO-PIECE FLASHING DETAILS
SHEET:	A-7

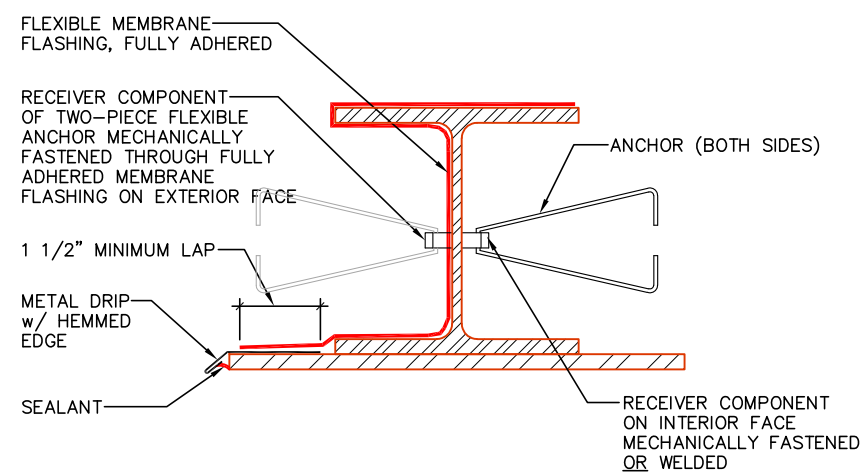
NOTE:  
TURN UP FLEXIBLE MEMBRANE  
FLASHING AS END DAMS AT  
BOTH ENDS OF STEEL BEAM

(CMU NOT SHOWN FOR CLARITY)

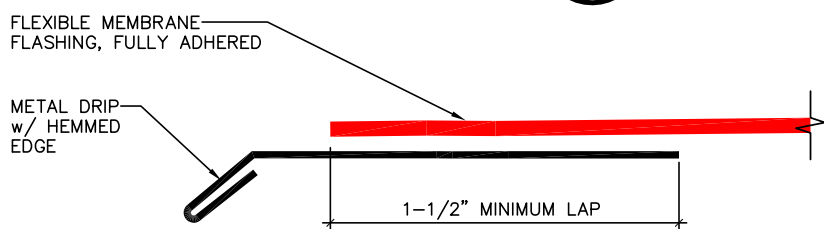


6B  
A-5  
ENLARGED FLASHING DETAIL  
AT 16" DEPTH STEEL BEAM LINTELS

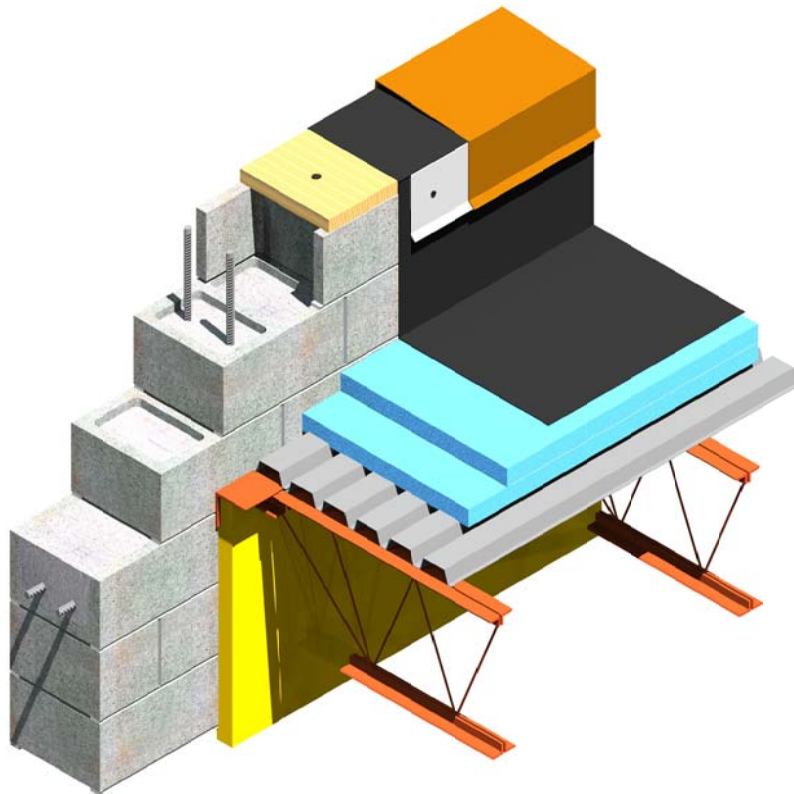
(CMU NOT SHOWN FOR CLARITY)



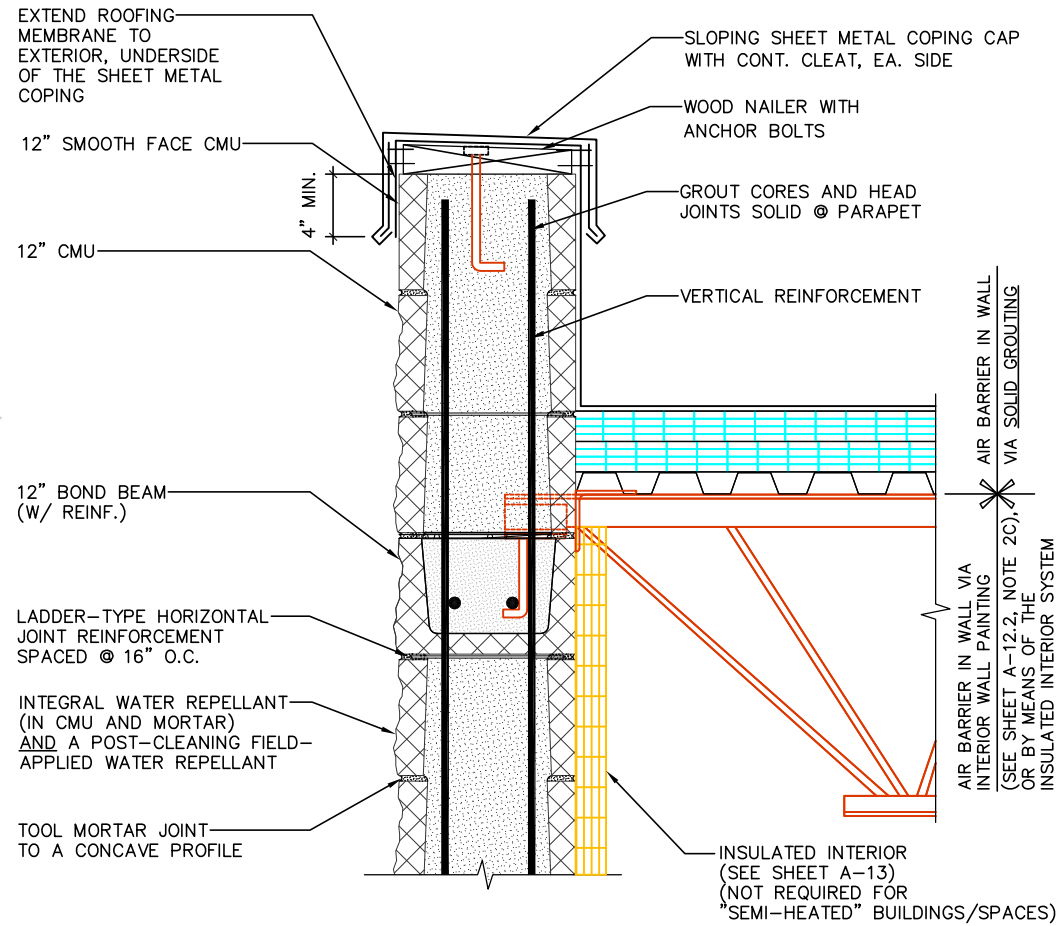
6A  
A-5  
ENLARGED FLASHING DETAIL  
AT 8" DEPTH STEEL BEAM LINTELS



6C  
A-5  
ENLARGED TWO-PIECE FLASHING DETAIL



ISOMETRIC VIEW



SECTION VIEW

7A SHORT PARAPET DETAIL  
A-2

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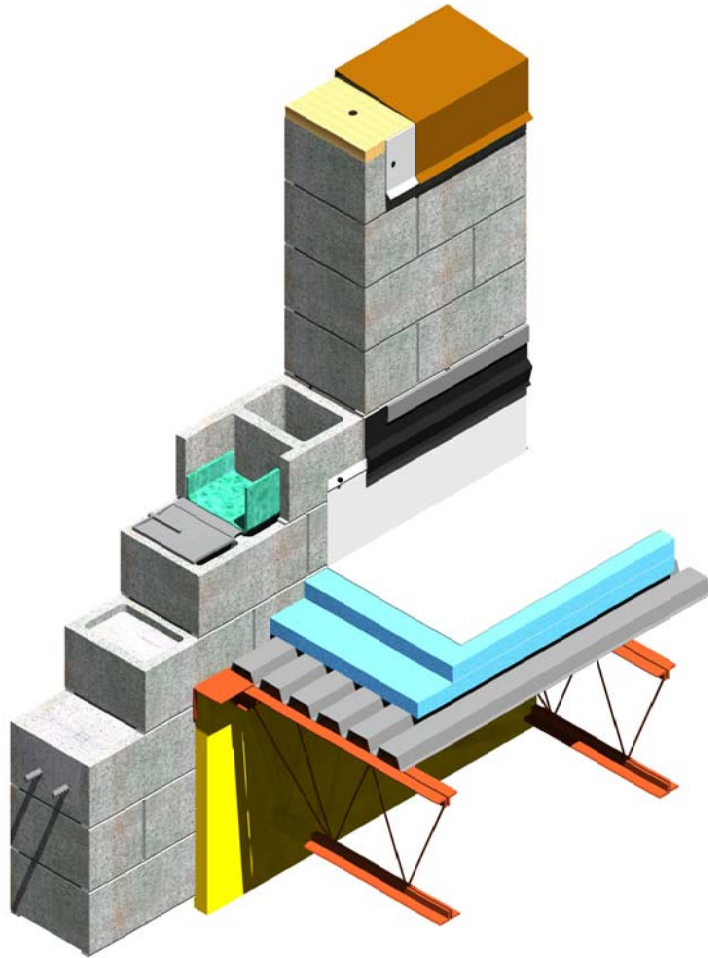
**111 MASONRY**  
Institute of Michigan

DETAIL SET SW.12 (12" SINGLE WYTHE)

IN CHARGE:	
DRAWN:	M.W.F.
APPROVED:	
DATE:	01/28/2020
TITLE:	SHORT PARAPET DETAIL
SHEET:	A-8.1

**NOTES:**

- 1) THIS DETAIL ONLY APPLICABLE TO A REINFORCED WALL DUE TO FLASHING/BOND BREAK CONCERNS.



ISOMETRIC VIEW

7B  
A-2 TALL PARAPET DETAIL

ROOFING OPTION:  
EXTEND ROOFING  
MEMBRANE TO  
EXTERIOR, UNDERSIDE  
OF THE SHEET METAL  
COPING

12" SMOOTH FACE CMU

NOTE:  
VERTICAL REINFORCEMENT  
NOT SHOWN FOR CLARITY

12" CMU

REMOVABLE FASTENERS  
BY ROOFING  
CONTRACTOR)

PAN FLASHING SYSTEM

DRAINAGE MATERIAL

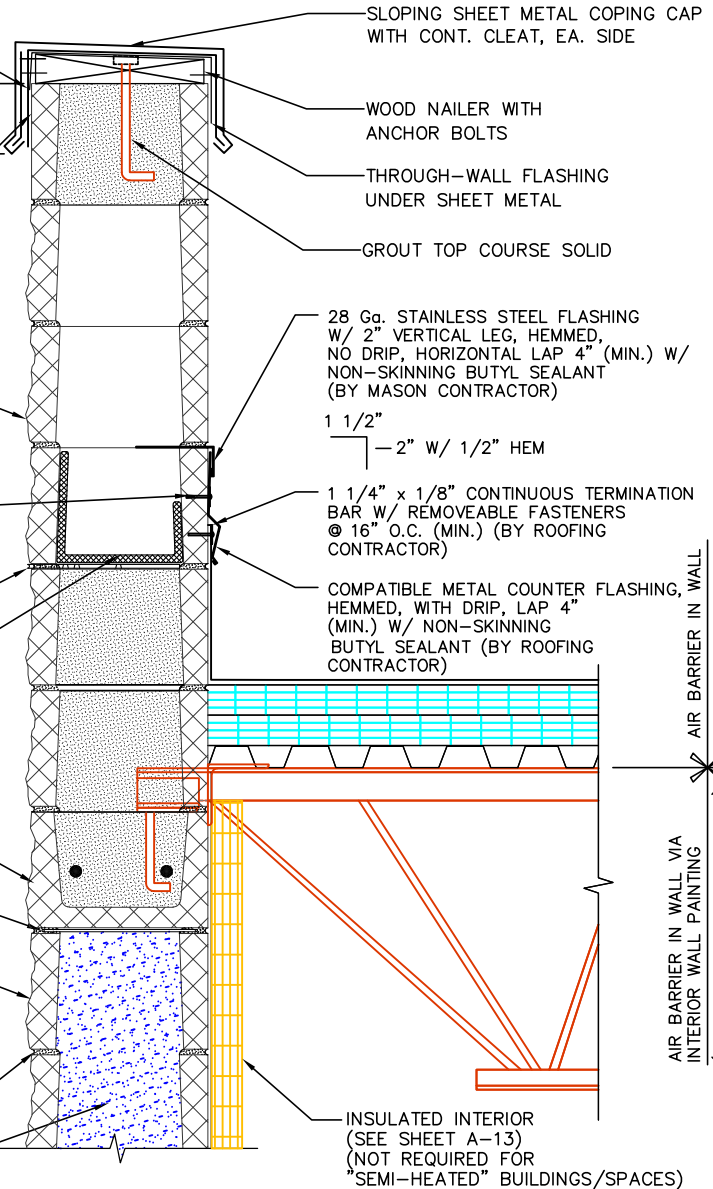
12" BOND BEAM  
(W/ REINF.)

LADDER-TYPE HORIZ.  
JOINT REINFORCEMENT  
SPACED @ 16" O.C.

INTEGRAL WATER REPELLANT  
(IN CMU AND MORTAR)  
AND A POST-CLEANING FIELD-  
APPLIED WATER REPELLANT

TOOL MORTAR JOINT  
TO A CONCAVE PROFILE

INSULATION (FOAM,  
LOOSE FILL OR INSERTS)



SECTION VIEW

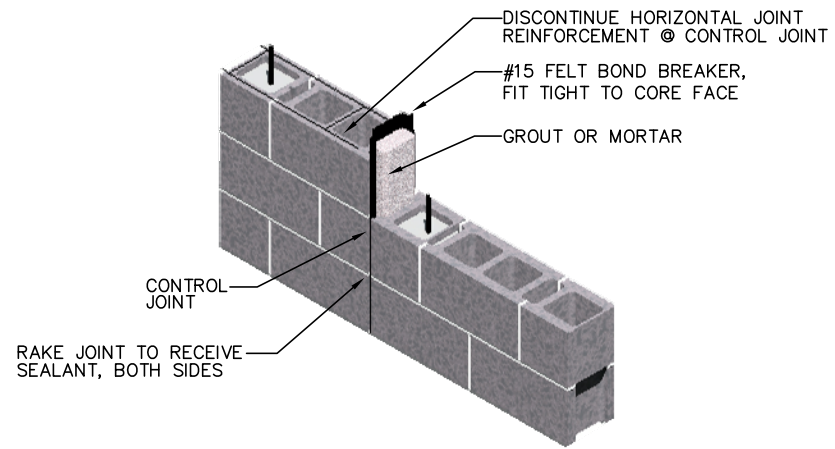
DAILEY ENGINEERING, INC.  
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DETAIL SET SW.12 (12" SINGLE WYTHE)

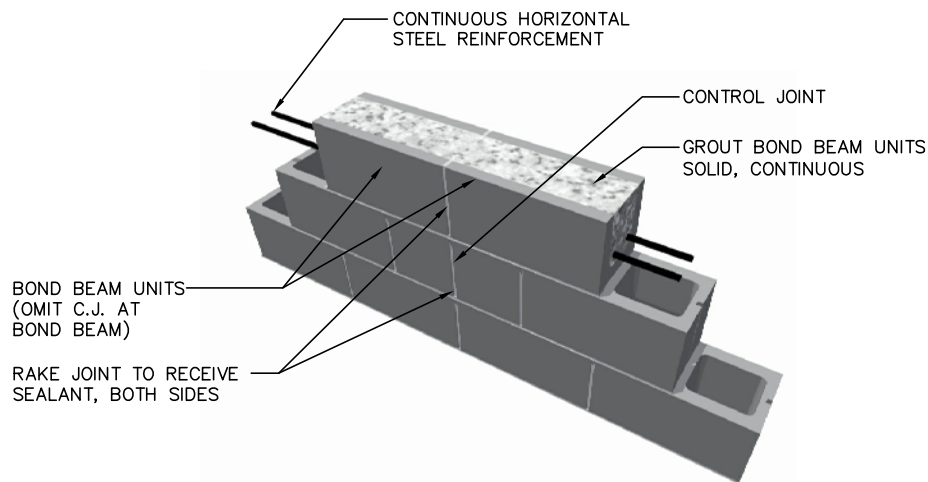
IN CHARGE:  
DRAWN: M.W.F.  
APPROVED:  
DATE: 01/28/2020  
TITLE:  
TALL  
PARAPET DETAIL  
SHEET:  
A-8.2





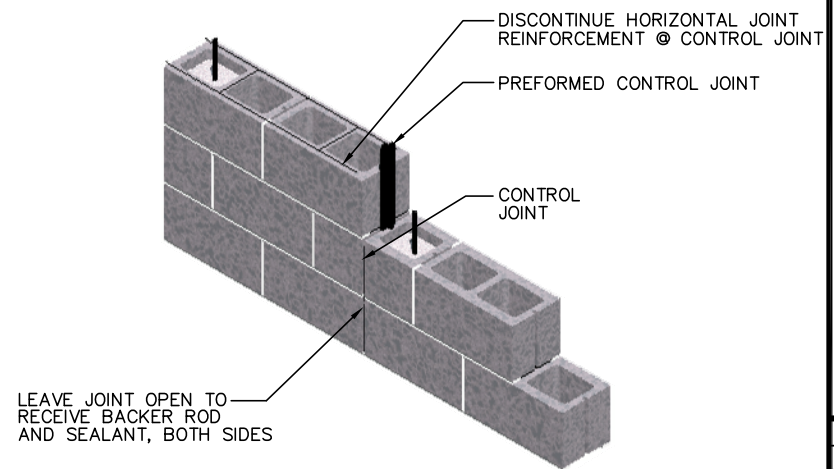
8A  
A-9

MASONRY CONTROL JOINT — MICHIGAN DETAIL



8C  
A-9

MASONRY CONTROL JOINT @ CONTINUOUS BOND BEAM DETAIL (PER STRUCTURAL REQUIREMENTS)



8B  
A-9

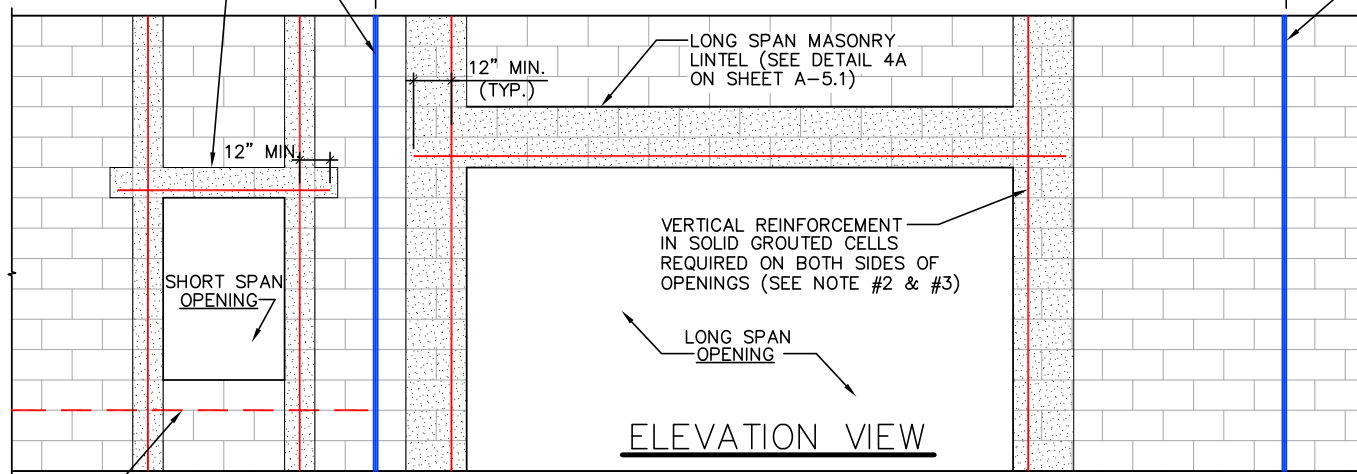
MASONRY CONTROL JOINT — ALTERNATE DETAIL

CONTROL JOINT (LOCATED AWAY FROM EDGE OF WALL OPENINGS (NOTE #4))

SHORT SPAN MASONRY LINTEL (SEE DETAILS 3A AND 3C ON SHEETS A-4.1 AND A-4.3)

MAX. CONTROL JOINT SPACING (TYPICALLY 20'-0") BUT NOT TO EXCEED TWICE THE HEIGHT OF WALL

CONTROL JOINT (LOCATED AWAY FROM EDGE OF WALL OPENINGS (NOTE #4))



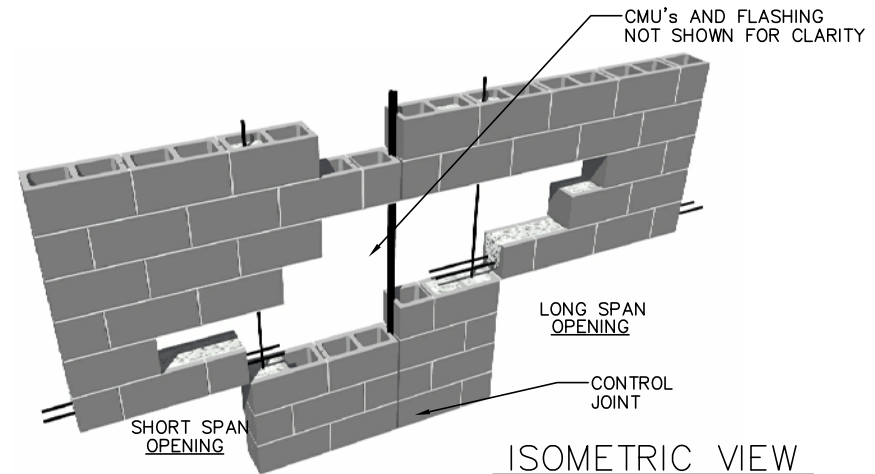
LADDER JOINT REINFORCEMENT IN MORTAR JOINT BELOW SILL FROM CONTROL JOINT TO CONTROL JOINT

## REINFORCED MASONRY OPENING & ASSOCIATED CONTROL JOINT DESIGN FOR MASONRY LINTELS

9A  
A-10

### NOTES:

- 1) TRADITIONALLY, CONTROL JOINTS HAVE TYPICALLY BEEN LOCATED AT OR VERY CLOSE TO THE SIDES OF UNREINFORCED OPENINGS. HOWEVER IT IS THE MIM'S PREFERENCE FOR CONTROL JOINTS TO BE LOCATED AWAY FROM THE EDGE OF OPENINGS AND TO ADD REINFORCEMENT AROUND THE OPENINGS.
- 2) FOR BEST PERFORMANCE, THE VERTICAL REINFORCEMENT SHOULD BE PREFERABLY PLACED IN THE CELL IMMEDIATELY ADJACENT TO THE OPENING. HOWEVER IF THIS CELL IS CONGESTED, THE VERTICAL REINFORCEMENT MAY BE PLACED IN THE 2nd. CELL FROM THE OPENING.
- 3) ON LONG SPAN OPENINGS IT IS RECOMMENDED TO GROUT BOTH THE 1st. AND 2nd. CELLS FROM THE OPENING TO PROVIDE ADDITIONAL RESISTANCE FOR ATTACHING THE DOOR OR WINDOW FRAME.
- 4) FOR CONTROL JOINT DETAILS SEE SHEET A-9.
- 5) FOR ADDITIONAL INFORMATION ON CONTROL JOINT SPACING/LOCATIONS, SEE NCMA TEK 10-3.



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GENERIC WALL DESIGN - 8" SINGLE WYTHE CMU

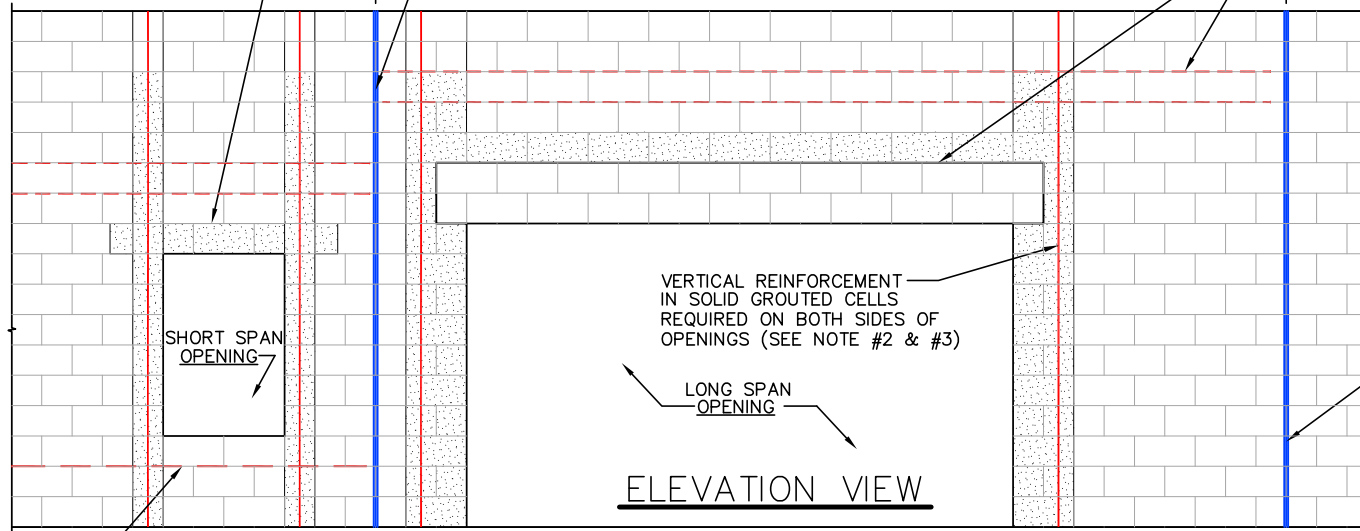
IN CHARGE:	
DRAWN:	M.W.F.
APPROVED:	
DATE:	01/28/2020
TITLE:	REINFORCED MASONRY OPENING & ASSOCIATED CONTROL JOINT DESIGN
SHEET:	A-10.1

SHORT SPAN DOUBLE ANGLE-  
STEEL LINTEL (SEE DET. 3B ON  
SHEET A-4.2) W/ JOINT REINF.  
IN THE 1st. & 2nd. BED JOINTS  
ABOVE THE PAN FLASHING FROM  
CONTROL JOINT TO CONTROL JOINT

MAX. CONTROL JOINT SPACING (TYPICALLY 20'-0")  
BUT NOT TO EXCEED TWICE THE HEIGHT OF WALL

CONTROL JOINT (LOCATED  
AWAY FROM EDGE OF WALL  
OPENINGS (NOTE #4))

LONG SPAN STEEL LINTEL  
(SEE DETAILS 4C THROUGH  
4E ON SHEETS A-5.3 THROUGH  
A-5.5, WITH JOINT REINFORCEMENT  
IN THE 1st. & 2nd. BED JOINTS  
ABOVE THE PAN FLASHING FROM  
CONTROL JOINT TO CONTROL JOINT



SHORT SPAN  
OPENING

VERTICAL REINFORCEMENT  
IN SOLID GROUTED CELLS  
REQUIRED ON BOTH SIDES OF  
OPENINGS (SEE NOTE #2 & #3)

LONG SPAN  
OPENING

ELEVATION VIEW

LADDER JOINT REINFORCEMENT  
IN MORTAR JOINT BELOW SILL  
FROM CONTROL JOINT TO CONTROL  
JOINT

CONTROL JOINT (LOCATED  
AWAY FROM EDGE OF WALL  
OPENINGS (NOTE #4))

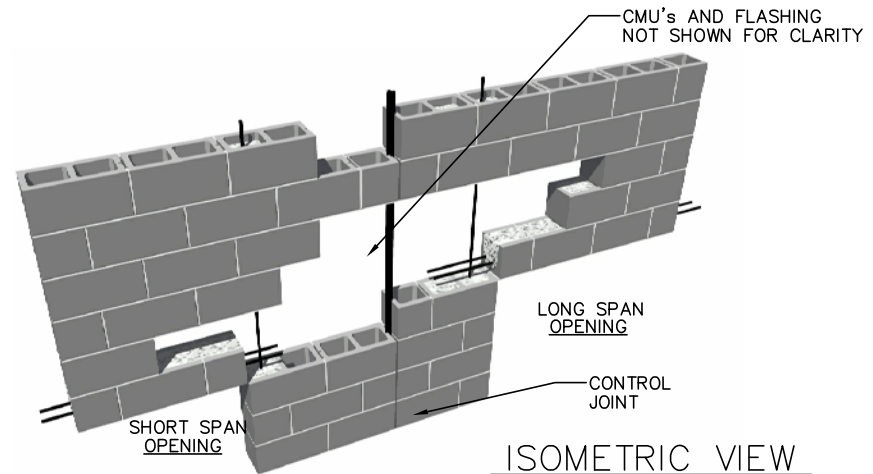
## REINFORCED MASONRY OPENING & ASSOCIATED CONTROL JOINT DESIGN FOR STEEL LINTELS

9B

A-10

### NOTES:

- 1) TRADITIONALLY, CONTROL JOINTS HAVE TYPICALLY BEEN LOCATED AT OR VERY CLOSE TO THE SIDES OF UNREINFORCED OPENINGS. HOWEVER IT IS THE MIM'S PREFERENCE FOR CONTROL JOINTS TO BE LOCATED AWAY FROM THE EDGE OF OPENINGS AND TO ADD REINFORCEMENT AROUND THE OPENINGS.
- 2) FOR BEST PERFORMANCE, THE VERTICAL REINFORCEMENT SHOULD BE PREFERABLY PLACED IN THE CELL IMMEDIATELY ADJACENT TO THE OPENING. HOWEVER IF THIS CELL IS CONGESTED, THE VERTICAL REINFORCEMENT MAY BE PLACED IN THE 2nd. CELL FROM THE OPENING.
- 3) ON LONG SPAN OPENINGS IT IS RECOMMENDED TO GROUT BOTH THE 1st. AND 2nd. CELLS FROM THE OPENING TO PROVIDE ADDITIONAL RESISTANCE FOR ATTACHING THE DOOR OR WINDOW FRAME.
- 4) FOR CONTROL JOINT DETAILS SEE SHEET A-9.
- 5) FOR ADDITIONAL INFORMATION ON CONTROL JOINT SPACING/LOCATIONS, SEE NCMA TEK 10-3.



LONG SPAN  
OPENING

CONTROL  
JOINT

SHORT SPAN  
OPENING

ISOMETRIC VIEW

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GENERIC WALL DESIGN - 8" SINGLE WYTHE CMU

IN CHARGE:	
DRAWN:	M.W.F.
APPROVED:	
DATE:	01/28/2020
TITLE:	REINFORCED MASONRY OPENING & ASSOCIATED CONTROL JOINT DESIGN
SHEET:	A-10.2

NOTE: 8" BEARING IS SHOWN AND IS TYPICAL, BUT SHOULD BE INCREASED IF NECESSARY BASED ON STRUCTURAL BEARING CALCULATIONS

STEEL REINFORCEMENT  
IN SOLID GROUTED CELLS

CONTROL JOINT (BACKER ROD  
AND SEALANT)

GROUT SOLID (IN ONE  
LIFT) TOTAL NUMBER OF  
COURSES REQUIRED PER  
STRUCTURAL DESIGN (3  
COURSES DEPICTED IN  
THIS DETAIL)

LINTEL STEEL  
REINFORCEMENT

MASONRY LINTEL  
(MAY BE PRE-CAST  
OR FIELD ASSEMBLED)

SLIP PLANE W/ BOND BREAK MATERIAL BETWEEN  
MASONRY LINTEL AND MASONRY BEARING.  
BACKER ROD AND SEALANT ON ALL THREE  
EXPOSED FACES.

GROUT SOLID UNDER  
LINTEL BEARING AS REQUIRED

OPENING

ELEVATION VIEW

NCMA RECOMMENDS WIRE: 24" LONG  
HORIZONTAL JOINT REINFORCEMENT  
AT LINTEL BEARING AND TWO  
COURSES BELOW LINTEL BEARING

SLIP PLANE/CONTROL JOINT  
@ LONG SPAN MASONRY LINTEL

10A  
A-11.1

NOTE: EVEN FOR FIELD ASSEMBLED MASONRY  
LINTELS, DO NOT OVERLAP/INTERLOCK THE  
LINTEL REINFORCING WITH THE WALL REINFORCING.  
NO REINFORCING (VERTICAL OR HORIZONTAL) SHALL  
PASS THROUGH THE CONTROL JOINT.

PREFORMED CONTROL  
JOINT GASKET (SEE  
SHEET A-9)

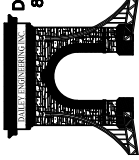
BACKER ROD AND SEALANT  
ON BED JOINT ON ALL  
THREE EXPOSED FACES

BOND BREAKER MATERIAL

JAMB OPENING  
FACE

ISOMETRIC VIEW

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8485 STEPHENSON ROAD  
ANN ARBOR, MI 48106  
PH. # (517) 467-9000  
FAX # (517) 467-9010

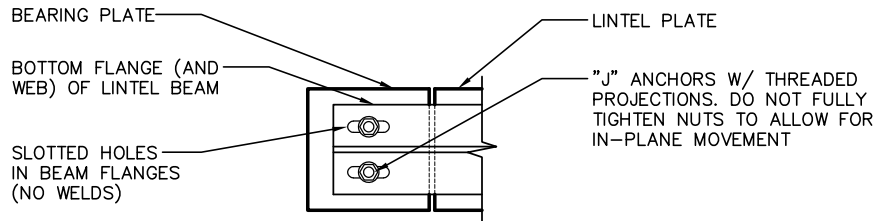


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Institute of Michigan

DETAIL SET SW.12 (12" SINGLE WYTHE)

IN CHARGE:	
DRAWN:	M.W.F.
APPROVED:	
DATE:	01/28/2020
TITLE:	SLIP PLANE/ CONTROL JOINT @ MASONRY LINTEL
SHEET:	A-11.1

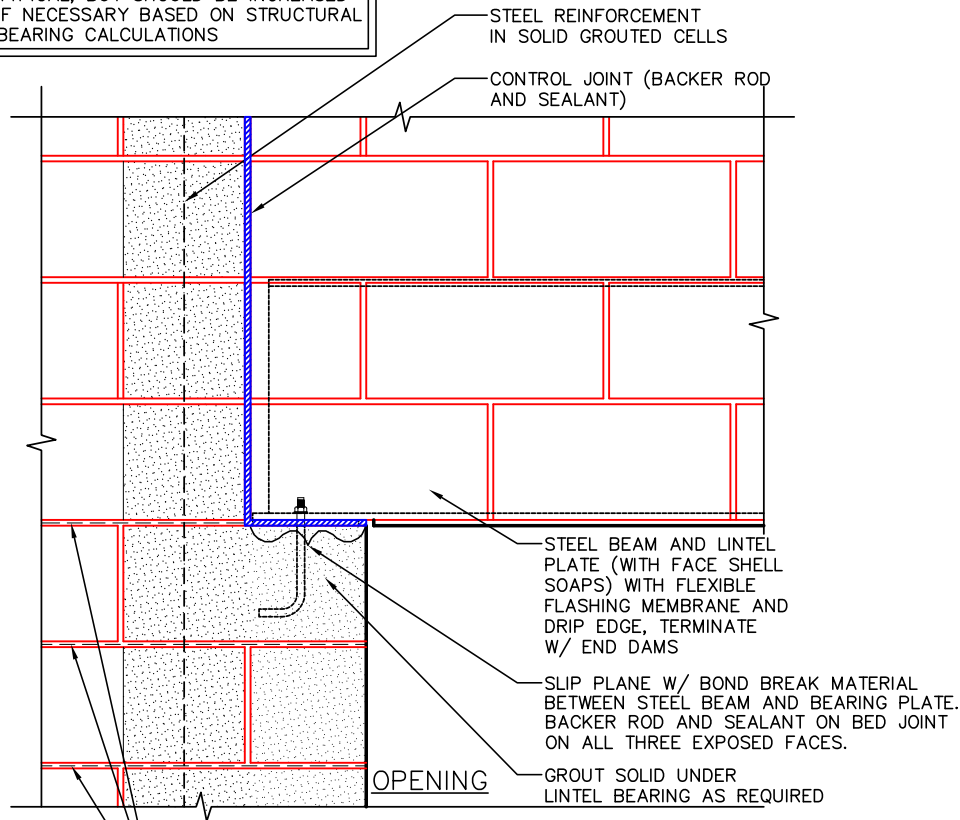




- NOTES:**
- 1) DO **NOT** WELD STEEL BEAM LINTEL PLATE TO BEARING PLATE (TYPICAL BOTH SIDES).
  - 2) STEEL BEAM TO HAVE SLOTS ON BOTTOM FLANGES TO ALLOW FOR IN-PLANE MOVEMENT.

## PLAN OF LINTEL/BEARING PLATE

**NOTE:** 8" BEARING IS SHOWN AND IS TYPICAL, BUT SHOULD BE INCREASED IF NECESSARY BASED ON STRUCTURAL BEARING CALCULATIONS



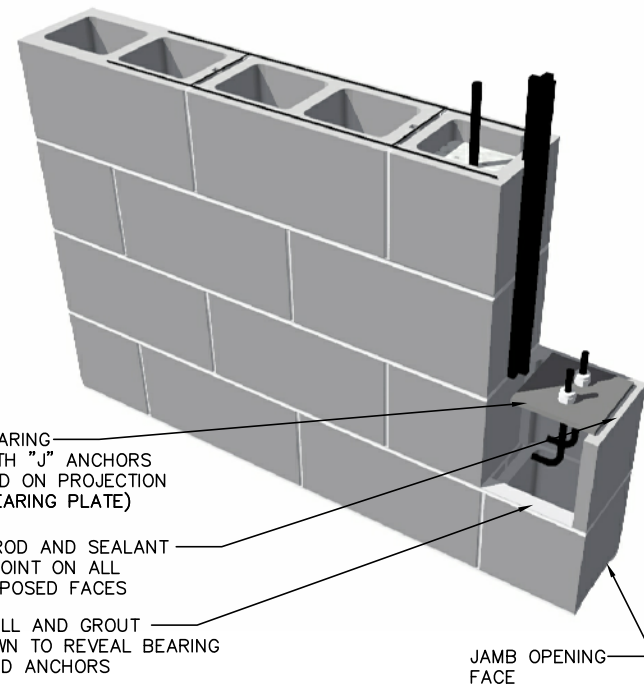
## ELEVATION VIEW

NCMA RECOMMENDS WIRE: 24" LONG HORIZONTAL JOINT REINFORCEMENT AT LINTEL BEARING AND TWO COURSES BELOW LINTEL BEARING

10B  
A-11.2

## SLIP PLANE/CONTROL JOINT @ LONG SPAN WIDE FLANGE STEEL LINTEL

**NOTE:**  
NO REINFORCEMENT (VERTICAL OR HORIZONTAL) SHALL PASS THROUGH THE CONTROL JOINT.



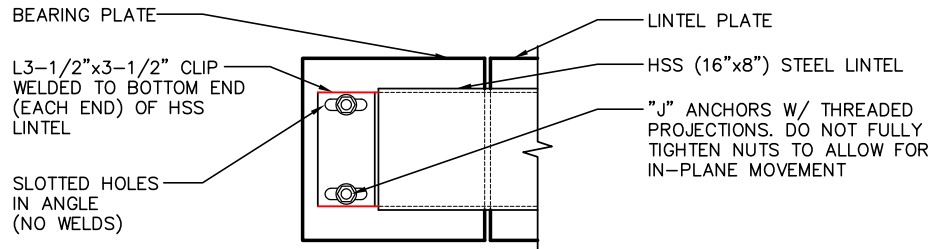
## ISOMETRIC VIEW

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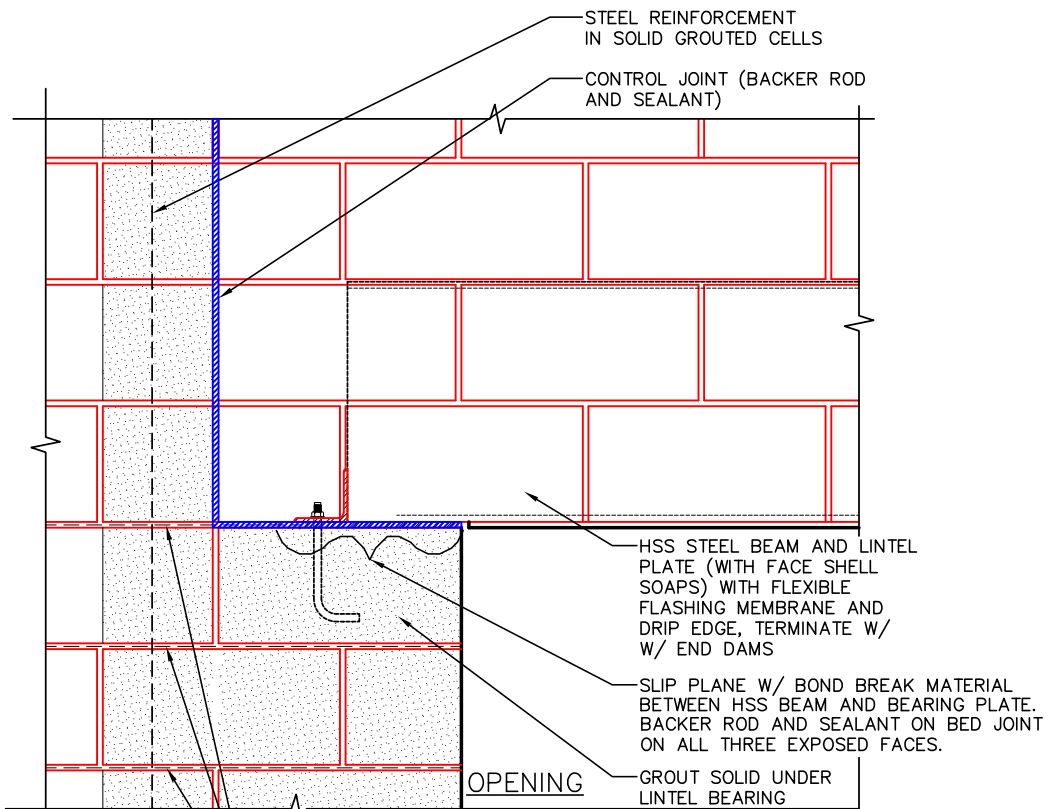
DETAIL SET SW.12 (12" SINGLE WYTHE)

IN CHARGE:  
DRAWN: M.W.F.  
APPROVED:  
DATE: 01/28/2020  
TITLE:  
SLIP PLANE/  
CONTROL JOINT  
@ STEEL LINTEL  
SHEET:  
A-11.2



PLAN OF LINTEL/BEARING PLATE

**NOTES:**  
1) DO NOT WELD STEEL BEAM LINTEL PLATE TO BEARING PLATE (TYPICAL BOTH SIDES).

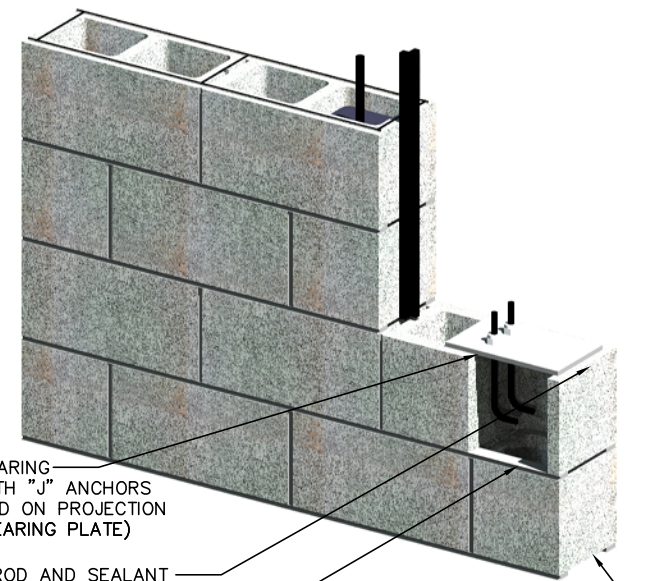


ELEVATION VIEW

NCMA RECOMMENDS WIRE: 24" LONG  
HORIZONTAL JOINT REINFORCEMENT  
AT LINTEL BEARING AND TWO  
COURSES BELOW LINTEL BEARING

10C  
A-11.2

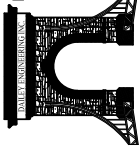
SLIP PLANE/CONTROL JOINT  
@ LONG SPAN HSS STEEL LINTEL



ISOMETRIC VIEW

**NOTE:**  
NO REINFORCEMENT (VERTICAL OR HORIZONTAL)  
SHALL PASS THROUGH THE CONTROL JOINT.

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DETAIL SET SW.12 (12" SINGLE WYTHE)

IN CHARGE:	
DRAWN:	M.W.F.
APPROVED:	
DATE:	01/28/2020
TITLE:	SLIP PLANE/ CONTROL JOINT @ STEEL LINTEL
SHEET:	A-11.3

# "CONTROL LAYER" INFORMATION

## 1) THERMAL CONTROL LAYER OVERVIEW:

### COMPLIANCE OPTIONS:

- 1) FOR "SEMI-HEATED" BUILDINGS SEE NOTE 1A BELOW AND SHEET A-12.3.  
(CONVENTIONAL UNITS – PRESCRIPTIVE METHOD, COMCHECK NOT REQUIRED).
- 2) FOR "HEATED" BUILDINGS:
  - A) FOR SINGLE WYTHE WALLS EXPOSED ON THE EXTERIOR AND FULLY INSULATED ON THE INTERIOR FACE, SEE NOTE 1BA BELOW AND SHEET A-13,  
(CONVENTIONAL UNITS – PRESCRIPTIVE METHOD, COMCHECK NOT REQUIRED).
  - B) FOR SINGLE WYTHE WALLS EXPOSED ON THE EXTERIOR AND PARTIALLY INSULATED ON THE INTERIOR FACE, SEE NOTE 1BB BELOW AND SHEETS A-12.4 THRU A-12.7 (CONVENTIONAL UNITS – COMCHECK METHOD).
  - C) FOR SINGLE WYTHE WALLS EXPOSED ON THE EXTERIOR AND EXPOSED ON THE INTERIOR FACE (USING SPECIAL ENERGY UNITS), SEE NOTE 1BC BELOW AND SHEET A-12.8  
(SPECIALITY ENERGY UNITS – PRESCRIPTIVE METHOD, COMCHECK NOT REQUIRED).

## 1A) THERMAL CONTROL LAYER – "SEMI-HEATED" BUILDINGS/SPACES:

A) ASHRAE 90.1-2013 PRESCRIPTIVE COMPLIANCE REQUIREMENTS FOR MASS WALLS FOR CLIMATE ZONES 5, 6, & 7; AND ALTERNATE INSULATION OPTION:

ZONE	WALLS ABOVE GRADE		
	CONTINUOUS INSULATION METHOD (Rci MINIMUM)	U <sub>max</sub> METHOD (U <sub>max</sub> OF ENTIRE WALL ASSEMBLY)	ALTERNATE INSULATION OPTION:
5	Rci ≥ 5.7	U <sub>assembly</sub> ≤ 0.151	ASTM C90 CONCRETE BLOCK WALLS, UN-GROUTED OR PARTIALLY GROUTED AT 32" OR LESS ON CENTER VERTICALLY AND 48" OR LESS ON CENTER HORIZONTALLY, WITH ALL UN-GROUTED CORES FILLED WITH MATERIAL HAVING A MAXIMUM THERMAL CONDUCTIVITY OF 0.44 BTU·in/h·ft <sup>2</sup> ·°F, COMPLY PER SECT. 5.5.3.2 EXCEPTION (SEE SHEET A-12.3)
6	Rci ≥ 5.7	U <sub>assembly</sub> ≤ 0.151	
7	Rci ≥ 7.6	U <sub>assembly</sub> ≤ 0.123	NOT APPLICABLE

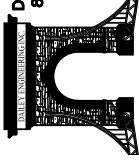
### TABLE NOTES:

- 1) MICHIGAN RANGES FROM ZONE 5 IN THE SOUTH TO ZONE 7 IN THE NORTH.
- 2) SEE NCMA TEK 06-02C, TABLE 5, FOR R-VALUES AND U-FACTORS OF SINGLE WYTHE CONCRETE MASONRY WALLS, AND ADDITIONAL THERMAL DATA INFORMATION.
  - B) IN ORDER TO USE THE PRESCRIPTIVE PROVISIONS OF REFERENCED ENERGY CODE, WALL OPENINGS ARE LIMITED TO A MAXIMUM 40% OF GROSS WALL AREA, AND SKYLIGHTS ARE LIMITED TO A MAXIMUM 5% OF THE GROSS ROOF AREA.

## 1B) THERMAL CONTROL LAYER – "HEATED" BUILDINGS/SPACES:

- A) FOR OCCUPANCIES SUCH AS OFFICE, RETAIL, ASSEMBLY, ETC.; WHERE THE EXTERIOR WALLS ARE COMMONLY FINISHED ON THE INTERIOR SIDE WITH FURRING AND INSULATION, SEE SHEET A-13 FOR EXAMPLES OF INSULATION OPTIONS.
- B) FOR INDUSTRIAL WAREHOUSE OCCUPANCIES, IT IS POSSIBLE TO HAVE EXPOSED CMU ON THE LOWER PART OF THE WALL (FOR SUPERIOR DURABILITY), AND DIRECT APPLY RIGID FOAM INSULATION ON THE UPPER PART OF THE WALL. SEE SHEETS A-12.4 THRU A-12.7 FOR GUIDANCE ON USING "COMCHECK" TO ACHIEVE ENERGY CODE COMPLIANCE USING THIS APPROACH.
- C) SPECIAL ENERGY UNITS (PROPRIETARY) PROVIDE ANOTHER OPTION. SEE SHEET A-12.8 FOR ADDITIONAL INFORMATION.

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DETAIL SET SW.12 (12" SINGLE WYTHE)

IN CHARGE:  
DRAWN: M.W.F.  
APPROVED:  
DATE: 01/28/2020  
TITLE:  
CONTROL  
LAYER INFORMATION  
SHEET:  
A-12.1



## "CONTROL LAYER" INFORMATION (CONTINUED)

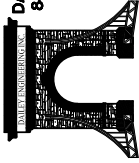
### **2) AIR CONTROL LAYER:**

- A) THE AIR CONTROL LAYER IS OFTEN REFERED TO AS AN "AIR BARRIER" (SYSTEM). SEVERAL PRODUCTS AND OPTIONS (SUCH AS LIQUID OR MEMBRANE APPLIED PROPRIETARY SYSTEMS) ARE AVAILABLE, WITH DIFFERING LEVELS OF COST AND COMPLEXITY. SEE NOTE # 2 ON SHEET A-13.1 FOR MORE COMMENTS ADDRESSING AN AIR CONTROL LAYER.
- B) THIS SET OF DETAILS REFLECTS AN AIR BARRIER SYSTEM ACHIEVED WITH SPECIFIC MASONRY DETAILING/CONSTRUCTION AND NON-PROPRIETARY COATINGS DESCRIBED IN NOTE C BELOW.
- C) THE FOLLOWING NON-PROPRIETARY COATINGS ARE CONSIDERED TO MEET AN AIR LEAKAGE OF LESS THE 0.04 CFM/SQ. FT. @ 75 Pa. (SEE NCMA TEK 6-14A FOR ADDITIONAL INFORMATION).
- 1) PRESCRIPTIVE COMPLIANCE:
    - FULLY GROUTED CMU
    - CMU WALL WITH ONE APPLICATION OF BLOCK FILLER AND TWO APPLICATIONS OF A PAINT OR SEALER COATING
    - CMU WALL WITH A PORTLAND CEMENT/SAND PARGE, STUCCO OR PLASTER WITH A MINIMUM THICKNESS OF 1/2".
  - 2) BY LABORATORY TESTING:
    - 12" CMU SEALED WITH AT LEAST (2) COATS OF COMMERCIAL-GRADE LATEX PAINT.
    - 8" CMU COATED WITH A SINGLE COAT OF HIGH QUALITY LATEX PAINT.
    - 8" CMU COATED WITH A SINGLE COAT OF MASONRY BLOCK FILLER.

### **3) MOISTURE CONTROL LAYER:**

- A) SINGLE WYTHE WALL ASSEMBLIES DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THESE DETAILS PROVIDE PROTECTION AGAINST WATER PENETRATION, ESPECIALLY FOR LOW-RISE BUILDINGS. FOR IMPROVED PROTECTION, CONSIDER THE DRAINAGE WALL ASSEMBLIES SHOWN IN M.I.M. DETAIL SET CW.8 (8" CAVITY WALL). SEE NOTE #3 ON SHEET A-13 FOR MORE COMMENTS ADDRESSING A VAPOR CONTROL LAYER.

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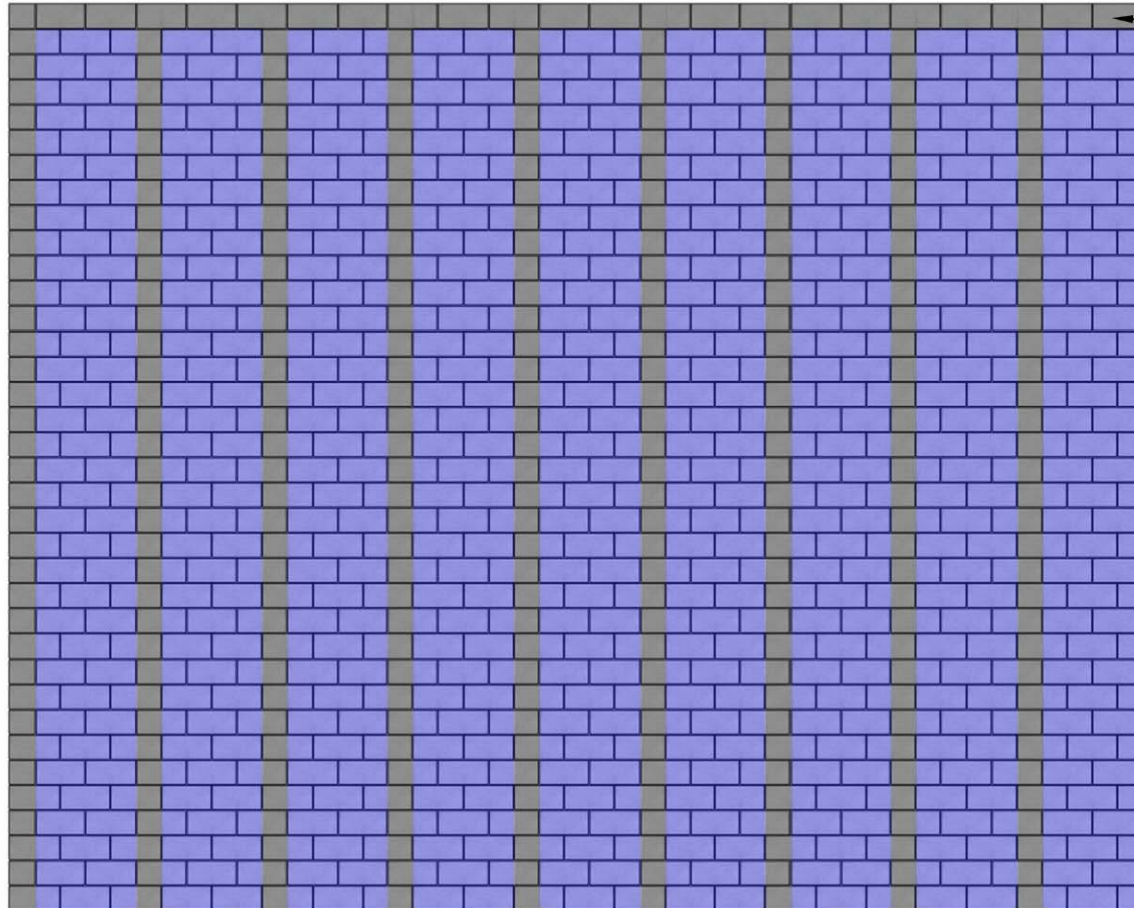


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Institute of Michigan

DETAIL SET SW.12 (12" SINGLE WYTHE)

IN CHARGE:	
DRAWN:	M.W.F.
APPROVED:	
DATE:	01/28/2020
TITLE:	CONTROL LAYER INFORMATION
SHEET:	A-12.2

SEMI-HEATED BUILDING W/CONVENTIONAL UNITS  
(PRESCRIPTIVE METHOD, COMCHECK NOT REQUIRED)  
ALTERNATE INSULATION OPTION



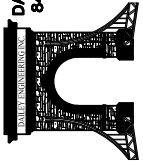
Bond Beam  
 $\geq 48"$  O.C.

■ Grout

■ Insulation: Maximum Thermal Conductivity of  $0.44 \text{ Btu}\cdot\text{in}/\text{H}\cdot\text{Ft}^2 \cdot ^\circ\text{F}$   
 (See NCMA TEK 6-2C, Table 5)

$\geq 32"$  O.C. Grouted Cells

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DETAIL SET SW.12 (12" SINGLE WYTHE)

IN CHARGE:	
DRAWN:	M.W.F.
APPROVED:	
DATE:	01/28/2020
TITLE:	SEMI-HEATED ALTERNATE INSULATION OPTION
SHEET:	A-12.3

# HEATED BUILDING W/CONVENTIONAL UNITS (COMCHECK METHOD)

- Exposed on the Exterior
- Partially Insulated on the Interior

Select  $U_T$

8" CMU	polyisocyanurate, HD (interior face)			
DENSITY	2"	2-1/2"	3"	3-1/2"
105	0.061	0.051	0.043	0.038
115	0.062	0.051	0.043	0.038
125	0.062	0.051	0.044	0.038
135	0.062	0.051	0.044	0.038

Select  $U_B$

See Sheet A-12.5 for Cell Fill

$U_{max}$		
Zone 5	Zone 6	Zone 7
0.090	0.080	0.071

$$B = H \left( \frac{U_{max} - U_T}{U_B - U_T} \right)$$

SAMPLE WALL FOR COMCHECK EXAMPLE

**Rigid Insulation**  
Polyisocyanurate

**Interior Side of Wall**

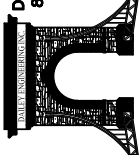
**Cell Fill**  
Polyurethane  
Perlite  
Vermiculite  
Inserts

H-B

H

B

DAILEY ENGINEERING, INC.  
8485 STEPHENSON ROAD  
ONSTED, MI 49286  
PH. # (517) 467-9000



**111 MASONRY**  
Institute of Michigan

DETAIL SET SW.12 (12" SINGLE WYTHE)

IN CHARGE:  
DRAWN: M.W.F.  
APPROVED:  
DATE: 01/28/2020  
TITLE: COMCHECK SUPPORT INFORMATION  
SHEET: A-12.4



## HEATED BUILDING W/CONVENTIONAL UNITS (COMCHECK METHOD)

- Exposed on the Exterior
- Partially Insulated on the Interior

### POLYURETHANE

12" CMU	BAR SPACING, polyurethane foamed-in-place, R=5.9 per in. (cell fill)														
DENSITY	8"	16"	24"	32"	40"	48"	56"	64"	72"	80"	88"	96"	104"	112"	120"
105	0.427	0.277	0.227	0.202	0.187	0.177	0.170	0.164	0.160	0.157	0.154	0.152	0.150	0.148	0.147
115	0.446	0.296	0.246	0.221	0.206	0.196	0.188	0.183	0.179	0.176	0.173	0.170	0.168	0.167	0.166
125	0.466	0.316	0.267	0.242	0.227	0.217	0.210	0.204	0.200	0.197	0.194	0.192	0.190	0.188	0.187
135	0.485	0.339	0.290	0.265	0.250	0.241	0.234	0.228	0.224	0.221	0.219	0.216	0.214	0.213	0.211

### PERLITE

12" CMU	BAR SPACING, perlite, R=3.12 per in. (cell fill)														
DENSITY	8"	16"	24"	32"	40"	48"	56"	64"	72"	80"	88"	96"	104"	112"	120"
105	0.427	0.281	0.233	0.209	0.194	0.184	0.178	0.172	0.168	0.165	0.163	0.160	0.158	0.157	0.155
115	0.446	0.300	0.252	0.227	0.212	0.203	0.196	0.191	0.187	0.183	0.181	0.178	0.177	0.175	0.174
125	0.466	0.320	0.272	0.248	0.233	0.224	0.217	0.211	0.207	0.204	0.202	0.199	0.197	0.196	0.195
135	0.485	0.342	0.295	0.271	0.257	0.247	0.241	0.235	0.231	0.228	0.226	0.223	0.222	0.220	0.219

### VERMICULITE

12" CMU	BAR SPACING, vermiculite, R=2.27 per in. (cell fill)														
DENSITY	8"	16"	24"	32"	40"	48"	56"	64"	72"	80"	88"	96"	104"	112"	120"
105	0.427	0.285	0.238	0.214	0.200	0.190	0.184	0.178	0.174	0.171	0.169	0.167	0.165	0.163	0.162
115	0.446	0.303	0.256	0.232	0.218	0.208	0.202	0.196	0.193	0.189	0.187	0.185	0.183	0.181	0.180
125	0.466	0.324	0.276	0.253	0.238	0.229	0.222	0.217	0.213	0.210	0.208	0.205	0.203	0.202	0.201
135	0.485	0.346	0.299	0.276	0.262	0.252	0.246	0.241	0.237	0.234	0.232	0.229	0.227	0.226	0.225



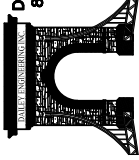
Conventional Unit w/Insert\*  
(Typical U-values range from 0.14 to 0.20)

#### \*NOTES:

- 1) This is a proprietary product, consult the manufacturer for U-Values and technical information and guidance for structural design
- 2) Basis of design for Conventional Units with inserts is "Korfil ICON."

## CONVENTIONAL CMU'S "U<sub>B</sub>" VALUES

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8485 STEPHENSON ROAD  
ONSTED, MI 49266  
PH. # (517) 467-9000



**MASONRY**  
Institute of Michigan

DETAIL SET SW.12 (12" SINGLE WYTHE)

IN CHARGE:	
DRAWN:	M.W.F.
APPROVED:	
DATE:	01/28/2020
TITLE:	U-VALUE REFERENCE CHARTS
SHEET:	A-12.5

MIM Building 10-4-19.cck - COMcheck 4.1.1.0 Code: 90.1 (2013) Standard

File Edit View Options Code Help

Project Envelope Interior Lighting Exterior Lighting Mechanical Requirements

Roof Skylight Exterior Wall Semi-Exterior Wall Window Door Basement Floor

#	Component	Assembly	Building Area Type	Orientation	Fenestration Details	Construction Details	Gross Area or Slab Perimeter	Units	Cavity Insulation R-Value	Continuous Insulation R-Value	U-Factor	SHGC	Projection Factor	VT	Heat Capacity
1	Roof 1	Insulation Entirely Abo...	1 - Warehous...				5000	ft2		30.0	0.032				
2	South (lower)	Other Mass Wall	1 - Warehous...	South			808	ft2			0.272				15.30
3	Door 1	Insulated Metal			Non-Swin...		576	ft2			0.500				
4	East (lower)	Other Mass Wall	1 - Warehous...	East			408	ft2			0.248				13.80
5	West (lower)	Other Mass Wall	1 - Warehous...	West			408	ft2			0.248				13.80
6	North (lower)	Other Mass Wall	1 - Warehous...	North			808	ft2			0.249				13.80
7	Door 2	Insulated Metal			Swinging		49	ft2			0.500				
8	South (upper)	Other Mass Wall	1 - Warehous...	South			2222	ft2			0.043				15.30
9	North (upper)	Other Mass Wall	1 - Warehous...	North			2222	ft2			0.043				13.80
10	Window 5	Metal Frame:Fixed			Code default ...	Glazing: Sing...	16	ft2			1.250	0.82	0.00	0.76	
11	Window 6	Metal Frame:Fixed			Code default ...	Glazing: Sing...	16	ft2			1.250	0.82	0.00	0.76	
12	Window 7	Metal Frame:Fixed			Code default ...	Glazing: Sing...	16	ft2			1.250	0.82	0.00	0.76	
13	Window 8	Metal Frame:Fixed			Code default ...	Glazing: Sing...	16	ft2			1.250	0.82	0.00	0.76	
14	East (upper)	Other Mass Wall	1 - Warehous...	East			1122	ft2			0.043				13.80
15	Window 9	Metal Frame:Fixed			Code default ...	Glazing: Sing...	16	ft2			1.250	0.82	0.00	0.76	
16	Window 10	Metal Frame:Fixed			Code default ...	Glazing: Sing...	16	ft2			1.250	0.82	0.00	0.76	
17	West (upper)	Other Mass Wall	1 - Warehous...	West			1122	ft2			0.043				13.80
18	Window 11	Metal Frame:Fixed			Code default ...	Glazing: Sing...	16	ft2			1.250	0.82	0.00	0.76	
19	Window 12	Metal Frame:Fixed			Code default ...	Glazing: Sing...	16	ft2			1.250	0.82	0.00	0.76	
20	Exterior Wall 9	Click here to select As...	1 - Warehous...				0	ft2			0.051				
21	Floor 1	Wood-Framed, 16" o.c. Wood-Framed, 24" o.c. Steel-Framed, 16" o.c. Steel-Framed, 24" o.c. Metal Building Wall Solid Concrete Concrete Block Other (U-Factor Option)	Warehous...			Insulation...	303	linear ft.			15.0				

#1

#2

#3

STEP 1: Select Exterior Wall

STEP 2: Select Other U-Factor Option

STEP 3: Select Mass Wall

Check Envelope Compliance Help Envelope TBD Interior Lighting TBD Exterior Lighting TBD

Invalid assembly type(s)

## COMCHECK STEPS #1 - #3

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PH. # (517) 467-9000

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Institute of Michigan

DETAIL SET SW.12 (12" SINGLE WYTHE)

IN CHARGE:  
DRAWN: M.W.F.  
APPROVED:  
DATE: 01/28/2020  
TITLE:  
COMCHECK  
SUPPORT INFORMATION  
SHEET:  
A-12.6

MIM Building 10-4-19.cck - COMcheck 4.1.1.0 Code: 901 (2013) Standard

File Edit View Options Code Help

Project Envelope Interior Lighting Exterior Lighting Mechanical Requirements

Roof Skylight Exterior Wall Semi-Exterior Wall Window Door Basement Floor

	Component	Assembly	Building Area Type	Orientation	Fenestration Details	Construction Details	Gross Area or Slab Perimeter	Units	Cavity Insulation R-Value	Continuous Insulation R-Value	U-Factor	SHGC	Projection Factor	VT	Heat Capacity
▼ Building															
1	Roof 1	Insulation Entirely Abo...	1 - Warehous...				5000	ft2		30.0	0.032				
2	▼ South (lower)	Other Mass Wall	1 - Warehous...	South			808	ft2			0.272				15.30
3	Door 1	Insulated Metal				Non-Swin...	576	ft2			0.500				
4	East (lower)	Other Mass Wall	1 - Warehous...	East			408	ft2			0.248				13.80
5	West (lower)	Other Mass Wall	1 - Warehous...	West			408	ft2			0.248				13.80
6	▼ North (lower)	Other Mass Wall	1 - Warehous...	North			808	ft2			0.249				13.80
7	Door 2	Insulated Metal				Swinging	49	ft2			0.500				
8	South (upper)	Other Mass Wall	1 - Warehous...	South			2222	ft2			0.043				15.30
9	▼ North (upper)	Other Mass Wall	1 - Warehous...	North			2222	ft2			0.043				13.80
10	Window 5	Metal Frame:Fixed			Code default	Glazing: Sing...	16	ft2			1.250	0.82	0.00	0.76	
11	Window 6	Metal Frame:Fixed			Code default	Glazing: Sing...	16	ft2			1.250	0.82	0.00	0.76	
12	Window 7	Metal Frame:Fixed			Code default	Glazing: Sing...	16	ft2			1.250	0.82	0.00	0.76	
13	Window 8	Metal Frame:Fixed			Code default	Glazing: Sing...	16	ft2			1.250	0.82	0.00	0.76	
14	▼ East (upper)	Other Mass Wall	1 - Warehous...	East			1122	ft2			0.043				13.80
15	Window 9	Metal Frame:Fixed			Code default	Glazing: Sing...	16	ft2			1.250	0.82	0.00	0.76	
16	Window 10	Metal Frame:Fixed			Code default	Glazing: Sing...	16	ft2			1.250	0.82	0.00	0.76	
17	▼ West (upper)	Other Mass Wall	1 - Warehous...	West			1122	ft2			0.043				13.80
18	Window 11	Metal Frame:Fixed			Code default	Glazing: Sing...	16	ft2			1.250	0.82	0.00	0.76	
19	Window 12	Metal Frame:Fixed			Code default	Glazing: Sing...	16	ft2			1.250	0.82	0.00	0.76	
20	Exterior Wall 9	Other Mass Wall	1 - Warehous...	Unspec...			0	ft2			0.000				1.00
21	Floor 1	Slab-On-Grade:Unhea...	1 - Warehous...			Insulation...	303	linear ft.		15.0					

Invalid Area(s)

Check Envelope Compliance Help Envelope TBD Interior Lighting TBD Exterior Lighting TBD

**STEP 4:** Enter Wall Area

**STEP 5:** Select U-Factors from Tables and enter

**STEP 6:** Select Heat Capacity from NCMA TEK 6-16A

COMCHECK STEPS #4-#6

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DETAIL SET SW.12 (12" SINGLE WYTHE)

IN CHARGE:  
DRAWN: M.W.F.  
APPROVED:  
DATE: 01/28/2020  
TITLE:  
COMCHECK  
SUPPORT INFORMATION  
SHEET:  
A-12.7



# HEATED BUILDING W/SPECIALTY ENERGY UNITS (PRESCRIPTIVE METHOD, COMCHECK NOT REQUIRED)

- Exposed on the Exterior
- Exposed on the Interior

## Specialty Energy Unit



Special Energy Unit #1\*  
 (Typical U-values range from  
 0.033 to 0.035)

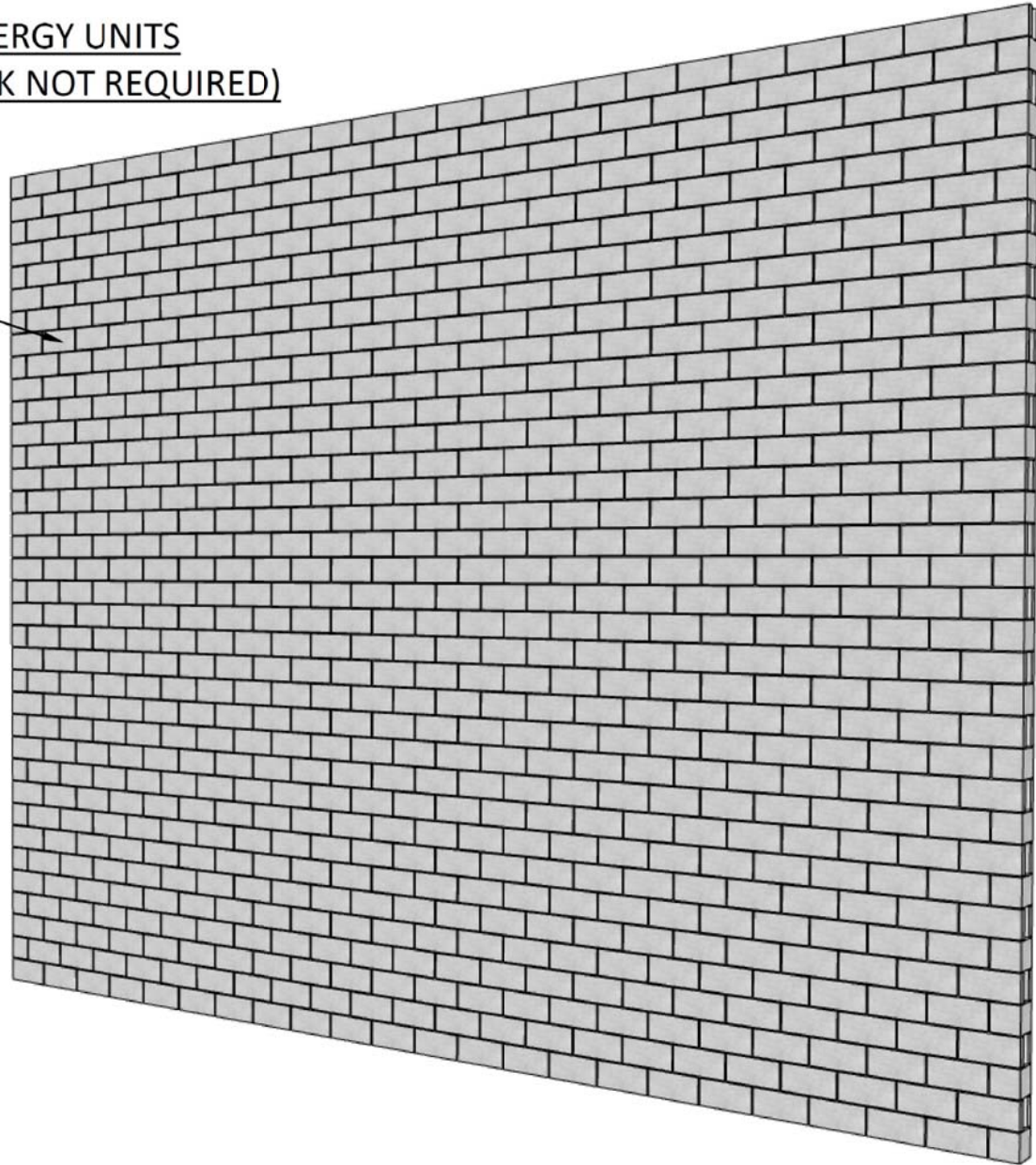


Special Energy Unit #2\*  
 (Typical U-values range from  
 0.07 to 0.09)

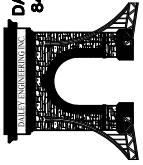
### \*NOTES:

- 1) These are proprietary products, consult the manufacturer for U-Values and technical information and guidance for structural design
- 2) Basis of design for Special Energy Unit #1 is "Omniblock." Basis of design for Special Energy Unit #2 is "Korfil HiR-H."

U <sub>max</sub>		
Zone 5	Zone 6	Zone 7
0.090	0.080	0.071



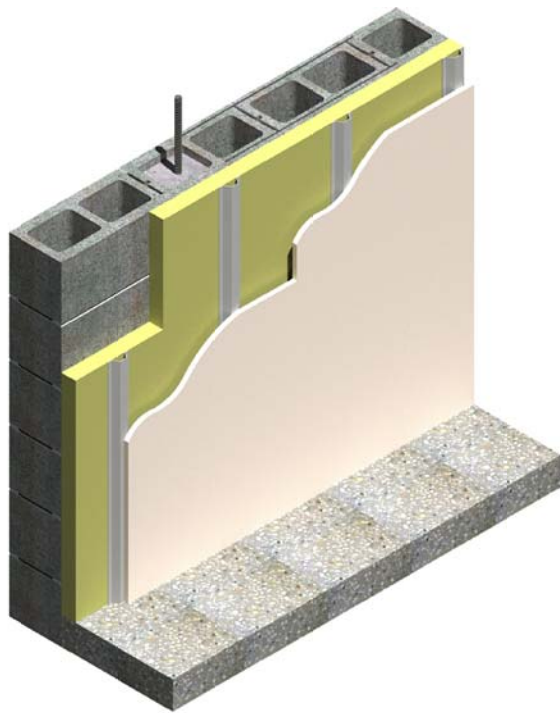
DAILEY ENGINEERING, INC.  
 8485 STEPHENSON ROAD  
 ONSTED, MI 49266  
 PH. # (517) 467-9000



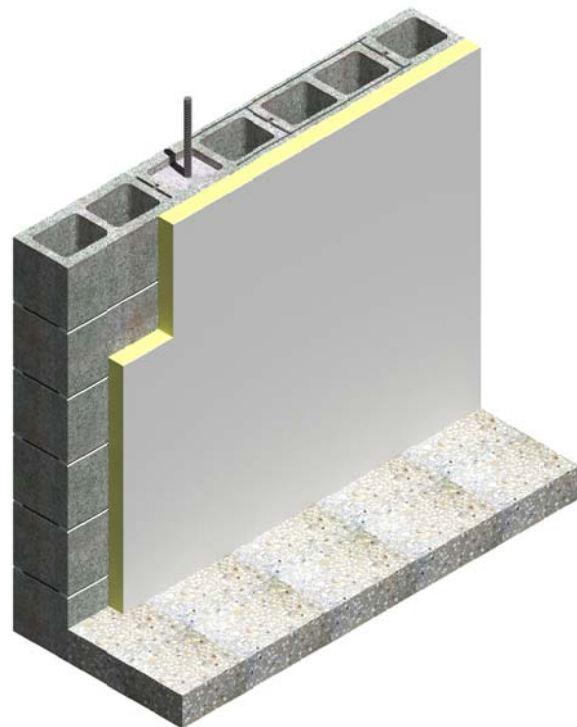
**111 MASONRY**  
 Institute of Michigan

DETAIL SET SW.12 (12" SINGLE WYTHE)

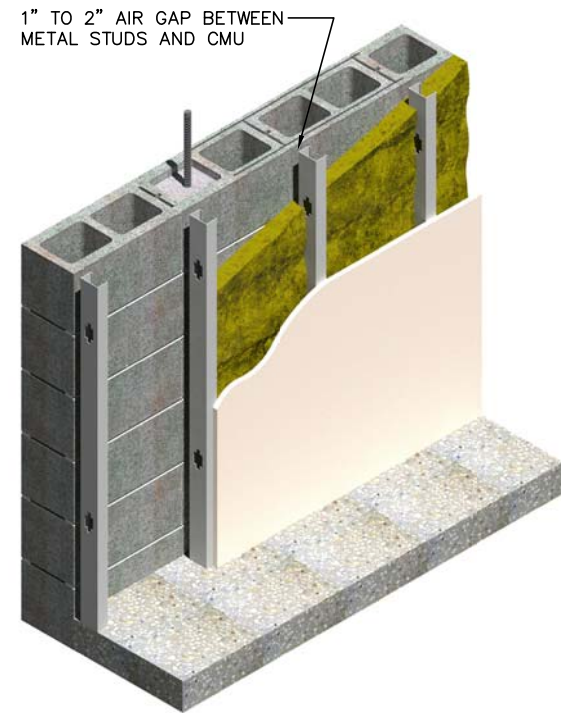
IN CHARGE:  
 DRAWN: M.W.F.  
 APPROVED:  
 DATE: 01/28/2020  
 TITLE:  
 SPECIAL  
 ENERGY UNITS  
 SHEET:  
 A-12.8



RIGID INSULATION WITH  
FURRING/GYP. BOARD



RIGID FOAM WITH  
COMPOSITE THERMAL BARRIER



SPRAY FOAM WITH  
METAL STUDS/GYP. BOARD

**NOTES:**

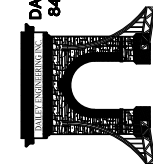
THE THREE OPTIONS SHOWN ABOVE:

- 1) ARE JUST A FEW REPRESENTATIVE SAMPLES OF THE MULTITUDE OF AVAILABLE INTERIOR INSULATION SYSTEMS:
  - A) RIGID BOARD – EXTRUDED OR EXPANDED POLYSTYRENE, OR POLYISOCYANURATE
  - B) CLOSED-CELL SPRAY POLYURETHANE FOAM
  - C) CELLULAR GLASS
  - D) FIBROUS BATT
  - E) FIBROUS BLOW-IN
- 2) DO NOT ADDRESS A VAPOR CONTROL LAYER, AND HAVE VARYING LEVELS OF VAPOR PERMEABILITY. THE DEGREE OF VAPOR PERMEABILITY AND INTERIOR SPACE HUMIDITY SHOULD BE CAREFULLY EVALUATED (DEWPOINT ANALYSIS) IN ORDER TO ACHIEVE PROPER CONDENSATION CONTROL.
- 3) HAVE NOT BEEN ANALYZED FOR AIR CONTROL LAYER PERFORMANCE. THE OTHER DETAILS IN THIS SET REFLECT AN AIR BARRIER SYSTEM ACHIEVED WITH SPECIFIC MASONRY DETAILING/ CONSTRUCTION AND NON-PROPRIETARY COATINGS APPLIED DIRECTLY TO THE CMU (SEE SHEET A-12, NOTE #2). IF AN INTERIOR WALL INSULATION SYSTEM IS INCLUDED IN THE DESIGN, THE USER MAY WISH TO CONSIDER OTHER AIR BARRIER SYSTEMS (PERHAPS EVEN UTILIZING COMPONENTS OF THE INTERIOR WALL INSULATION SYSTEM, IF APPLICABLE).

11A  
A-13.1

INSULATION OPTIONS FOR  
INTERIOR SURFACE OF EXTERIOR WALL

DAILEY ENGINEERING, INC.  
8485 STEPHENSON ROAD  
ONSTED, MI 49286  
PH. # (517) 467-9000  
FAX # (517) 467-9010



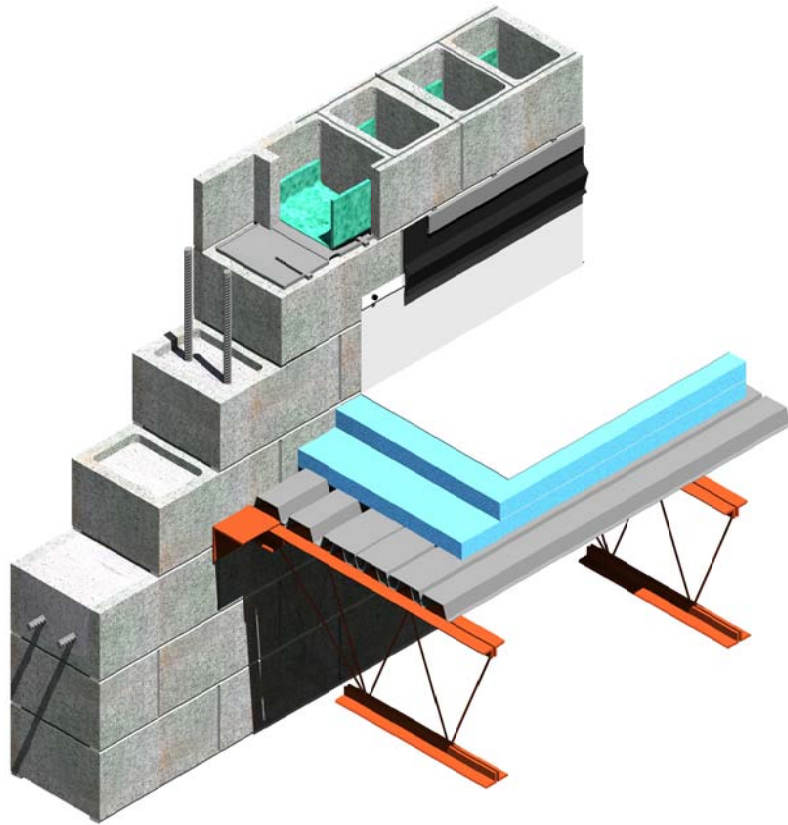
**111 MASONRY**  
Institute of Michigan

DETAIL SET SW.12 (12" SINGLE WYTHE)

IN CHARGE:	
DRAWN:	M.W.F.
APPROVED:	
DATE:	01/28/2020
TITLE:	INSULATION OPTIONS FOR INTERIOR SURFACE OF EXTERIOR WALL
SHEET:	A-13

**NOTES:**

- 1) THIS DETAIL ONLY APPLICABLE TO A REINFORCED WALL DUE TO FLASHING/BOND BREAK CONCERNS.



ISOMETRIC VIEW

NOTE:  
VERTICAL REINFORCEMENT  
NOT SHOWN FOR CLARITY

12" CMU

INSULATION (FOAM,  
LOOSE FILL OR INSERTS)

PAINT (CAN FUNCTION AS  
AN AIR BARRIER, SEE  
SHEET A-12.2, NOTE #2)

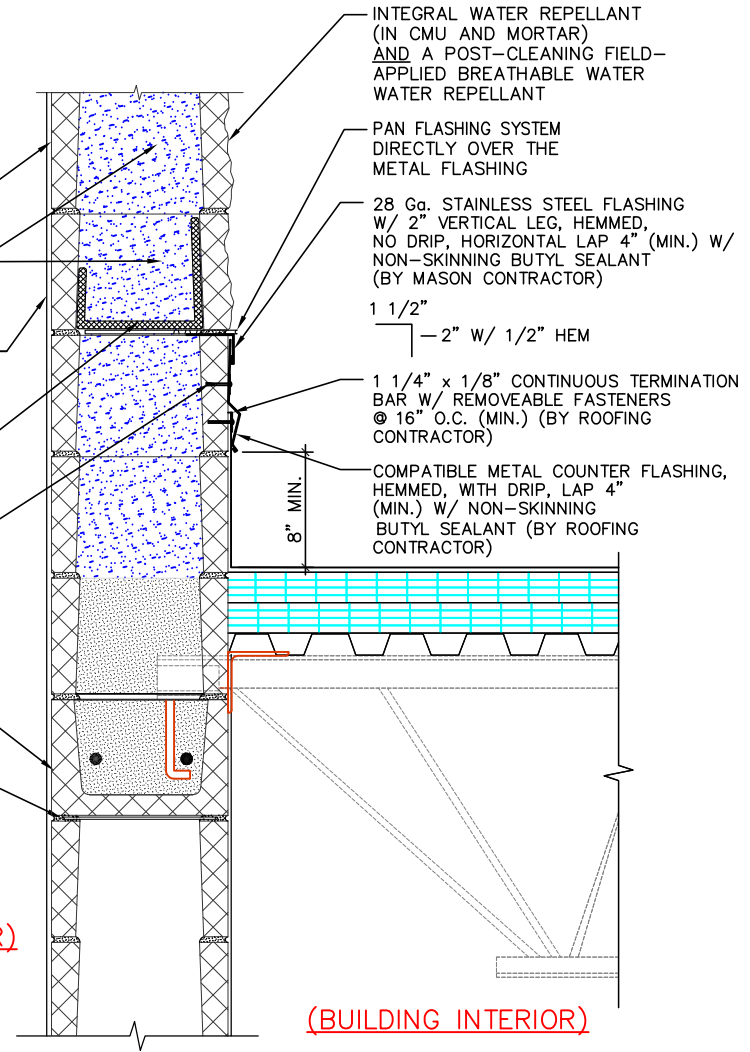
DRAINAGE MATERIAL

REMOVABLE FASTENERS  
BY ROOFING  
CONTRACTOR)

12" BOND BEAM  
(W/ REINF.)

LADDER-TYPE HORIZ.  
JOINT REINFORCEMENT  
SPACED @ 16" O.C.

(BUILDING INTERIOR)



INTEGRAL WATER REPELLANT  
(IN CMU AND MORTAR)  
AND A POST-CLEANING FIELD-  
APPLIED BREATHABLE WATER  
WATER REPELLANT

PAN FLASHING SYSTEM  
DIRECTLY OVER THE  
METAL FLASHING

28 Ga. STAINLESS STEEL FLASHING  
W/ 2" VERTICAL LEG, HEMMED,  
NO DRIP, HORIZONTAL LAP 4" (MIN.) W/  
NON-SKINNING BUTYL SEALANT  
(BY MASON CONTRACTOR)

1 1/2"  
- 2" W/ 1/2" HEM

1 1/4" x 1/8" CONTINUOUS TERMINATION  
BAR W/ REMOVABLE FASTENERS  
@ 16" O.C. (MIN.) (BY ROOFING  
CONTRACTOR)

COMPATIBLE METAL COUNTER FLASHING,  
HEMMED, WITH DRIP, LAP 4"  
(MIN.) W/ NON-SKINNING  
BUTYL SEALANT (BY ROOFING  
CONTRACTOR)

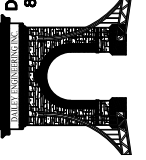
(BUILDING INTERIOR)

SECTION VIEW

UPPER WALL /  
LOW ROOF FLASHING DETAIL

12  
A-1.1

DAILEY ENGINEERING, INC.  
8485 STEPHENSON ROAD  
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Institute of Michigan

DETAIL SET SW.12 (12" SINGLE WYTHE)

IN CHARGE:	
DRAWN:	M.W.F.
APPROVED:	
DATE:	01/28/2020
TITLE:	UPPER WALL / LOW ROOF FLASHING DETAIL
SHEET:	A-14