

Masonry Details That Work

Prepared by

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INTRODUCTION

The Canadian Masonry Research Institute

The Canadian Masonry Research Institute (CMRI) is a non-profit regional masonry association founded in 1971 to provide design advice and technical support to the construction industry across the prairie provinces. CMRI's membership includes all major masonry contractors and producers of masonry products in the region. Structural engineers, architects, researchers, contractors, developers and building owners are invited to visit or contact CMRI in Edmonton, Alta.

Acknowledgements

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Disclaimer

This manual is intended to encourage state-of-the-art masonry design by offering details of critical building features that can be adapted and developed by architectural and engineering professionals to suit the particular conditions of a building, including location, use and occupancy.

The user of "***Details That Work***" should be familiar with local building practices, and the requirements of the local Building Code and the CSA Masonry Standards. These standards include:

- ❑ CSA S304.1, *Masonry Design for Buildings, Limit States Design*
- ❑ CSA A179, *Mortar and Grout for Unit Masonry Canada*
- ❑ CSA A370, *Masonry Connectors*
- ❑ CSA A371, *Masonry Construction for Buildings*
- ❑ CSA A165 Series, *Concrete Masonry Units*
- ❑ CSA A82 Series, *Brick Masonry Units*
- ❑ CSA S478, *Guideline on Durability in Buildings*

The user should carefully evaluate the effects of all structural and non-structural environmental loads, and the masonry should be designed, and the appropriate materials, components and assemblies selected, to effectively resist these loads over the design service life. The sizes and configurations of the components and assemblies shown in the manual are for illustration purposes only, and are not intended to promote a specific product over others available on the market. The user may choose to substitute other components and assemblies where appropriate.

It is the responsibility of the user to apply professional knowledge in the use of the details. CMRI does not warrant or assume any liability for the accuracy or completeness of the details, or their fitness for any particular purpose or project.

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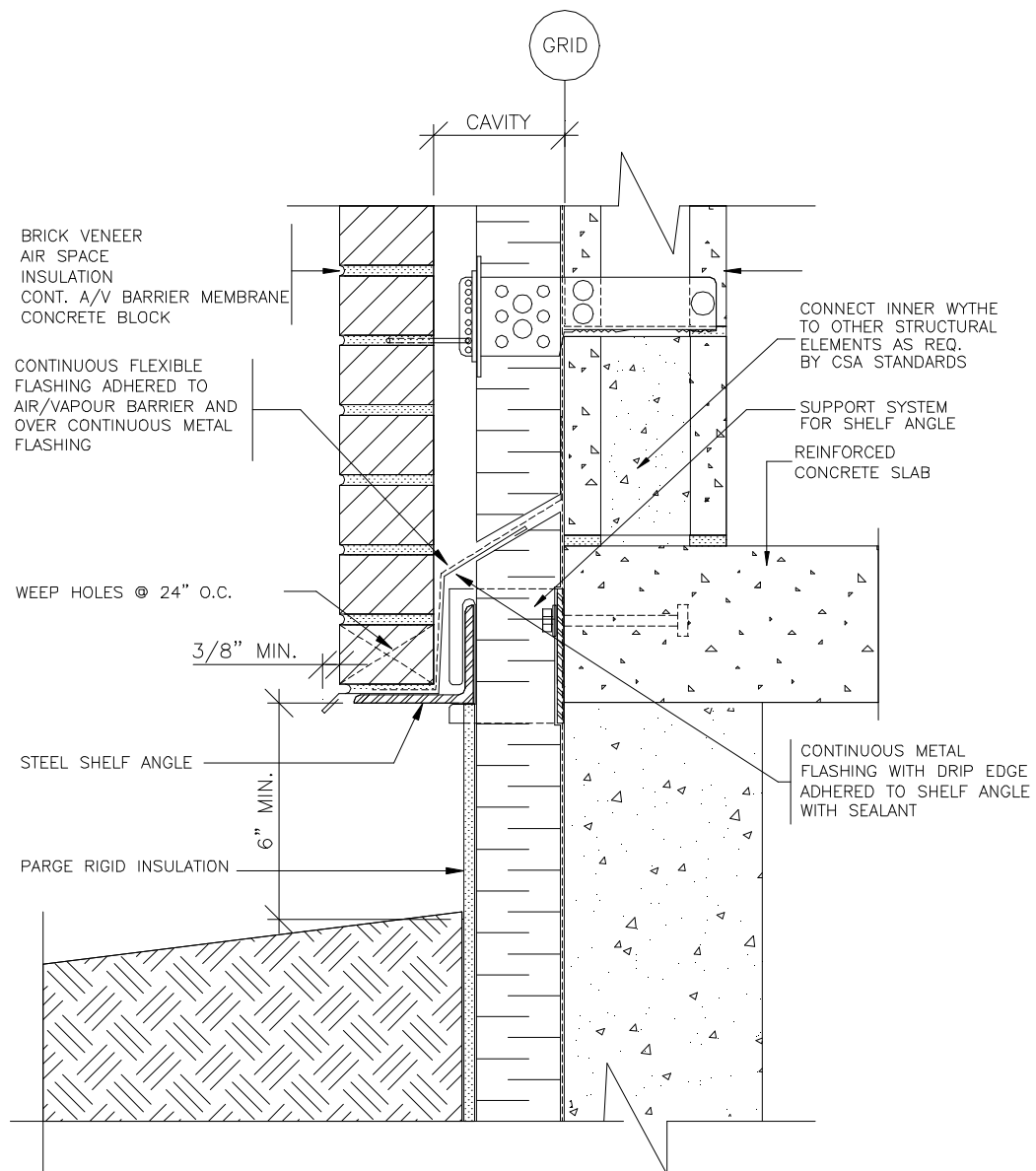
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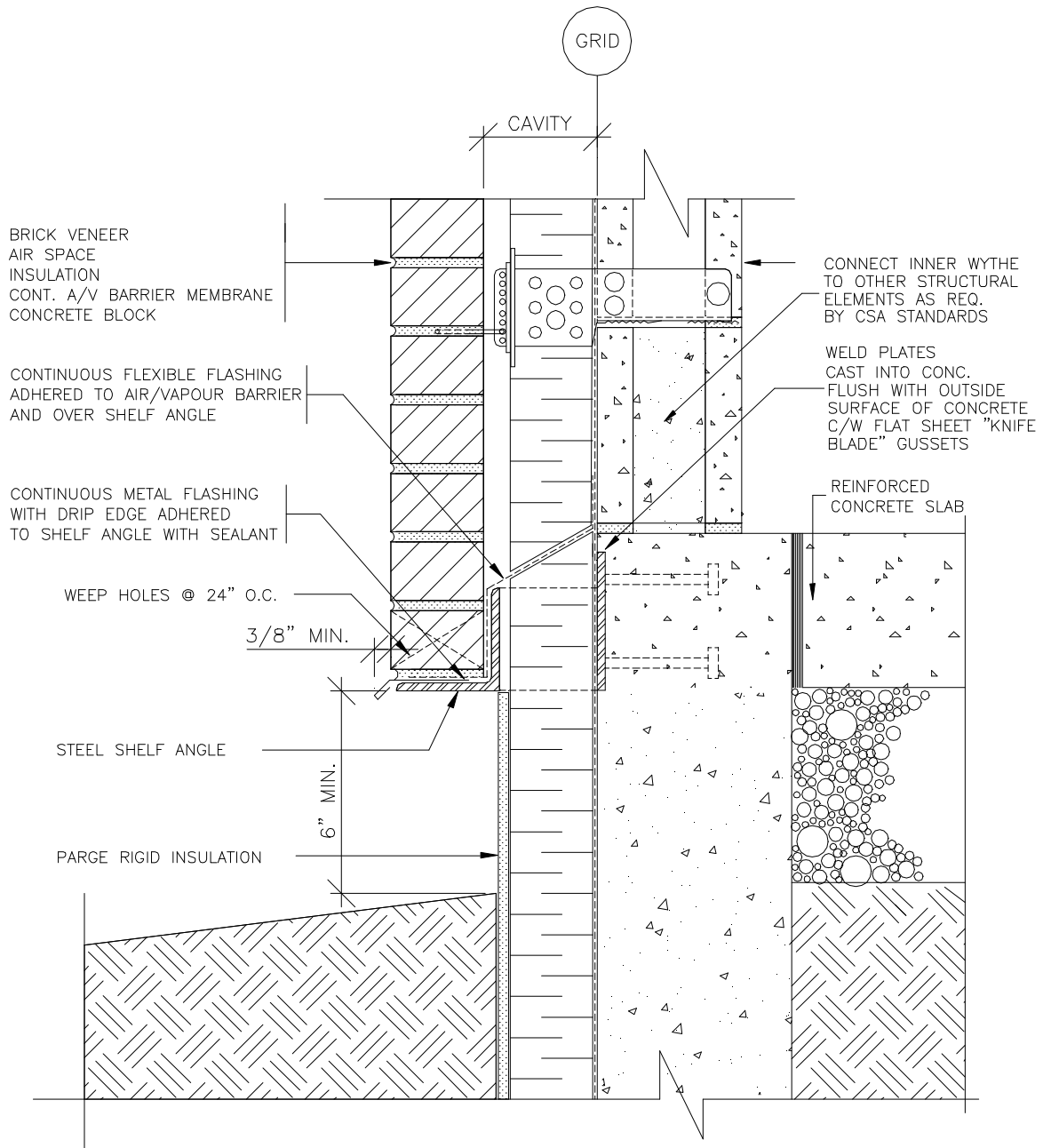
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MASONRY CAVITY WALL DETAILS, SHEAR CONNECTED

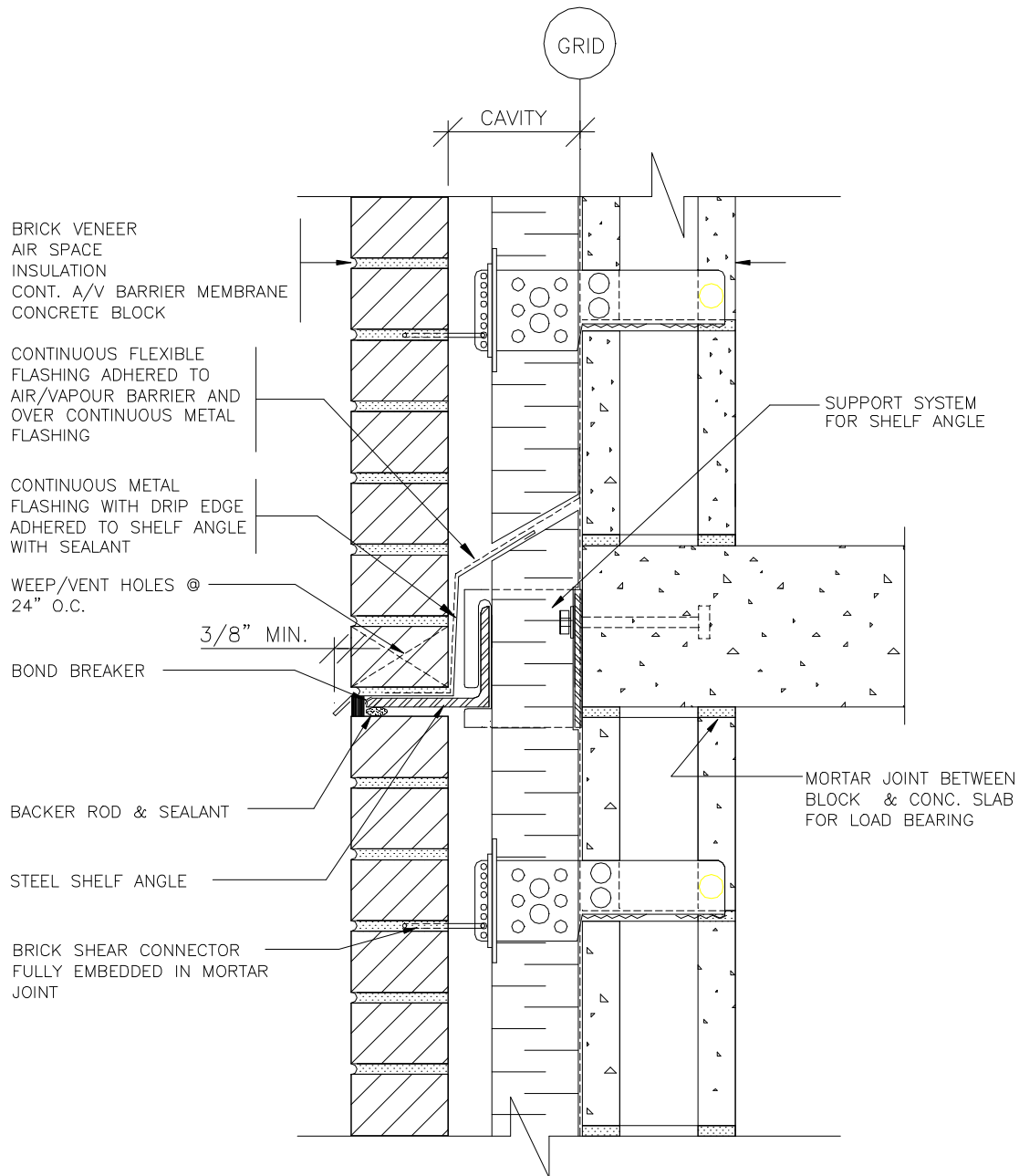
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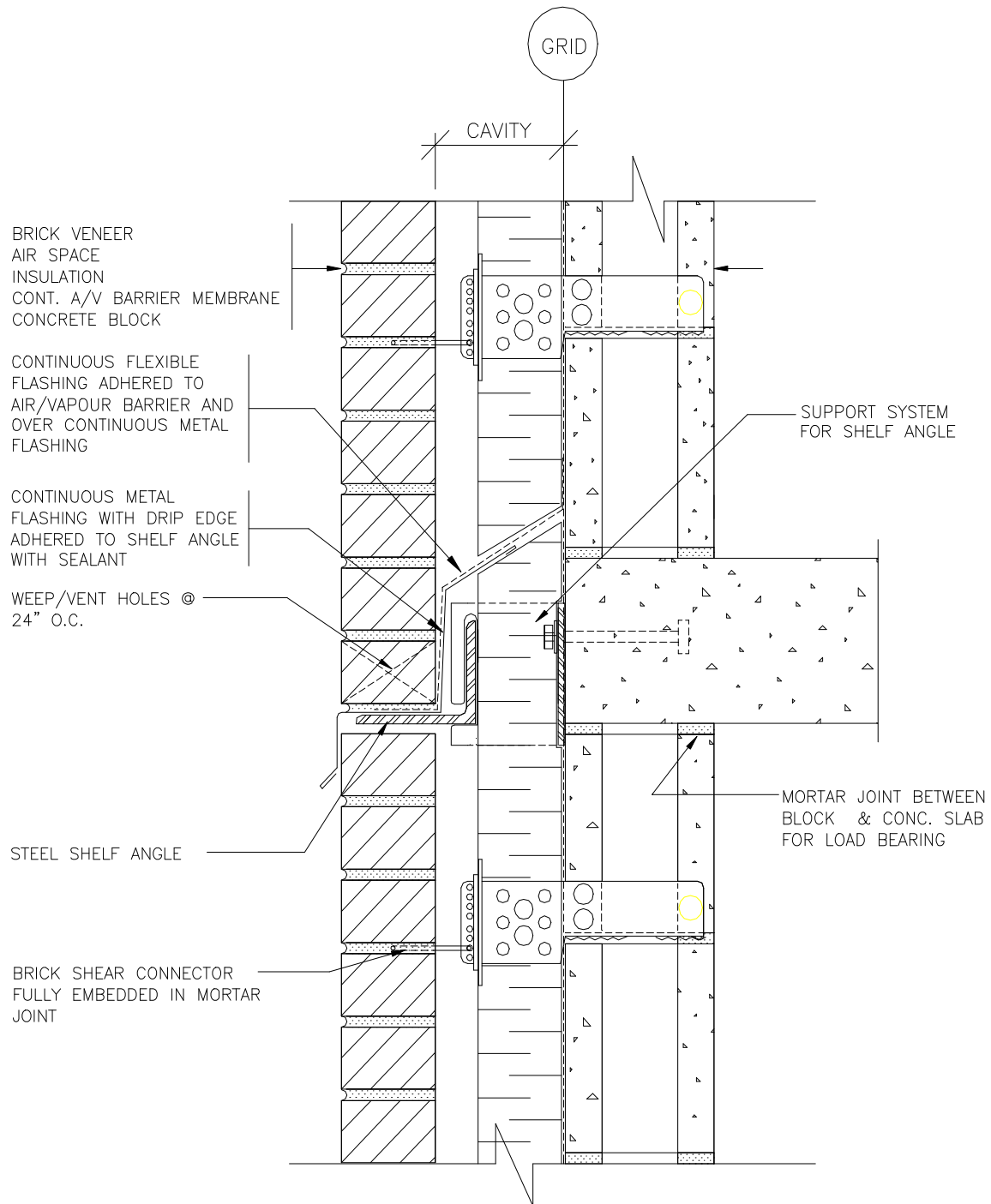
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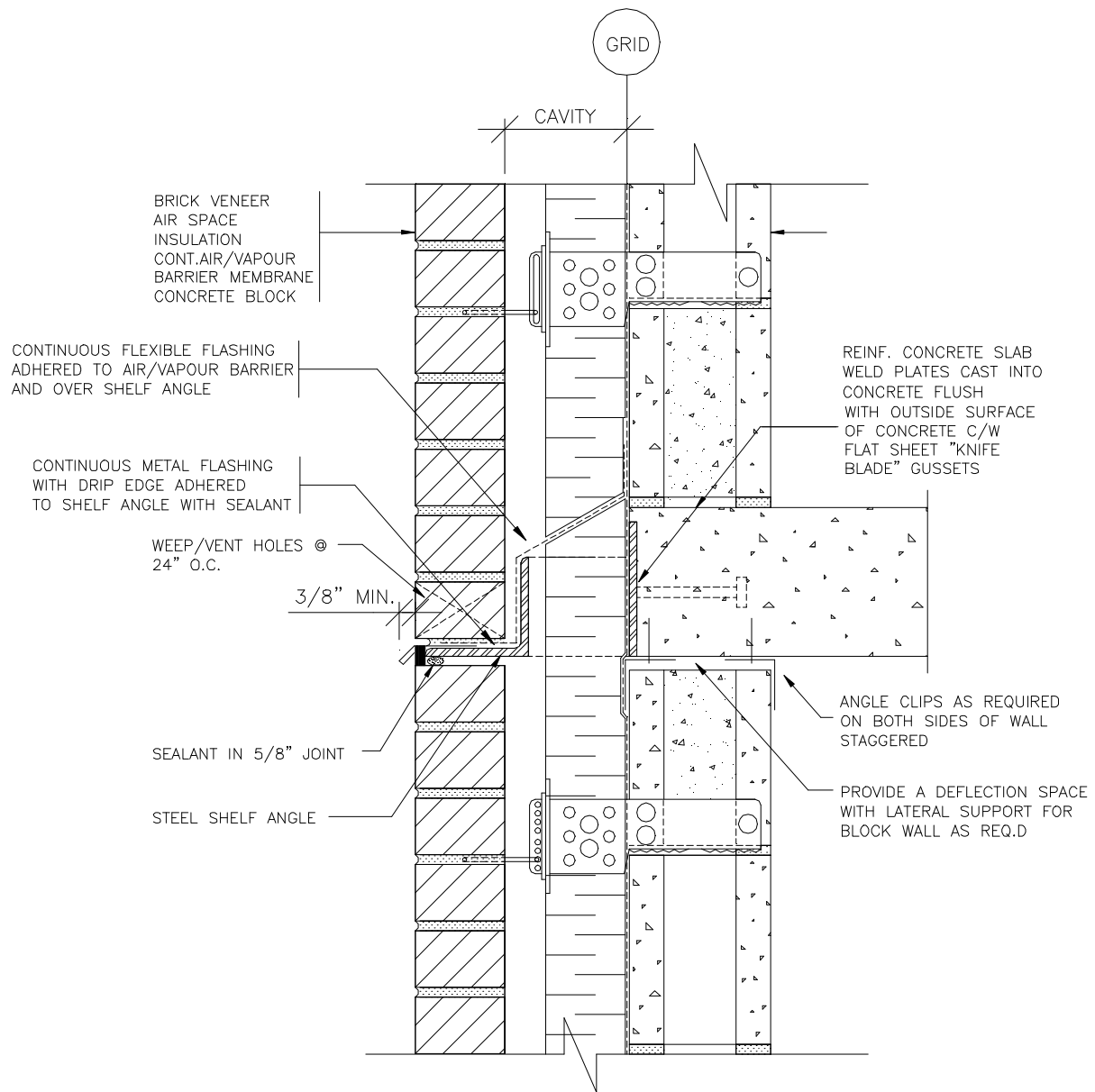
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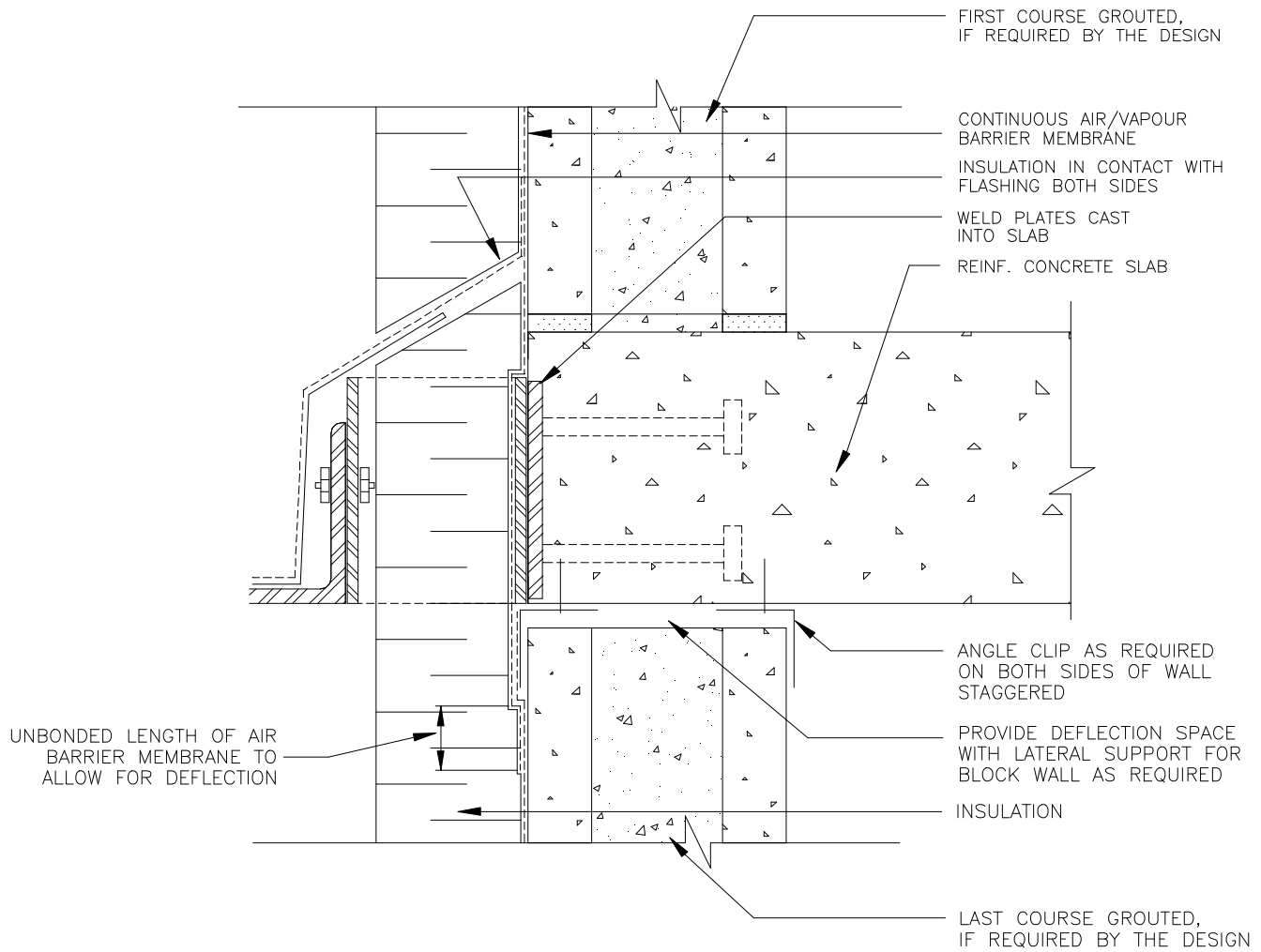
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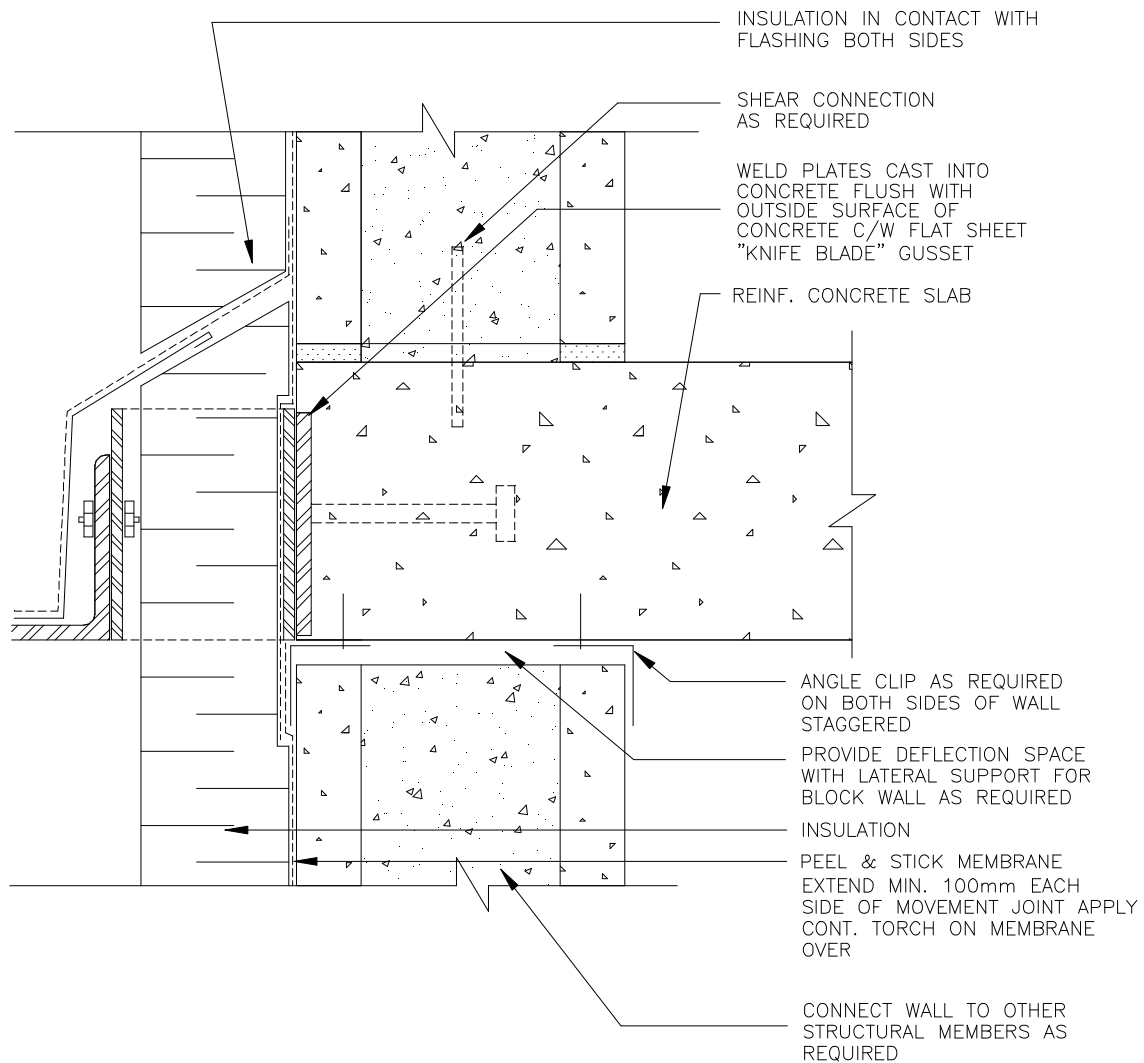
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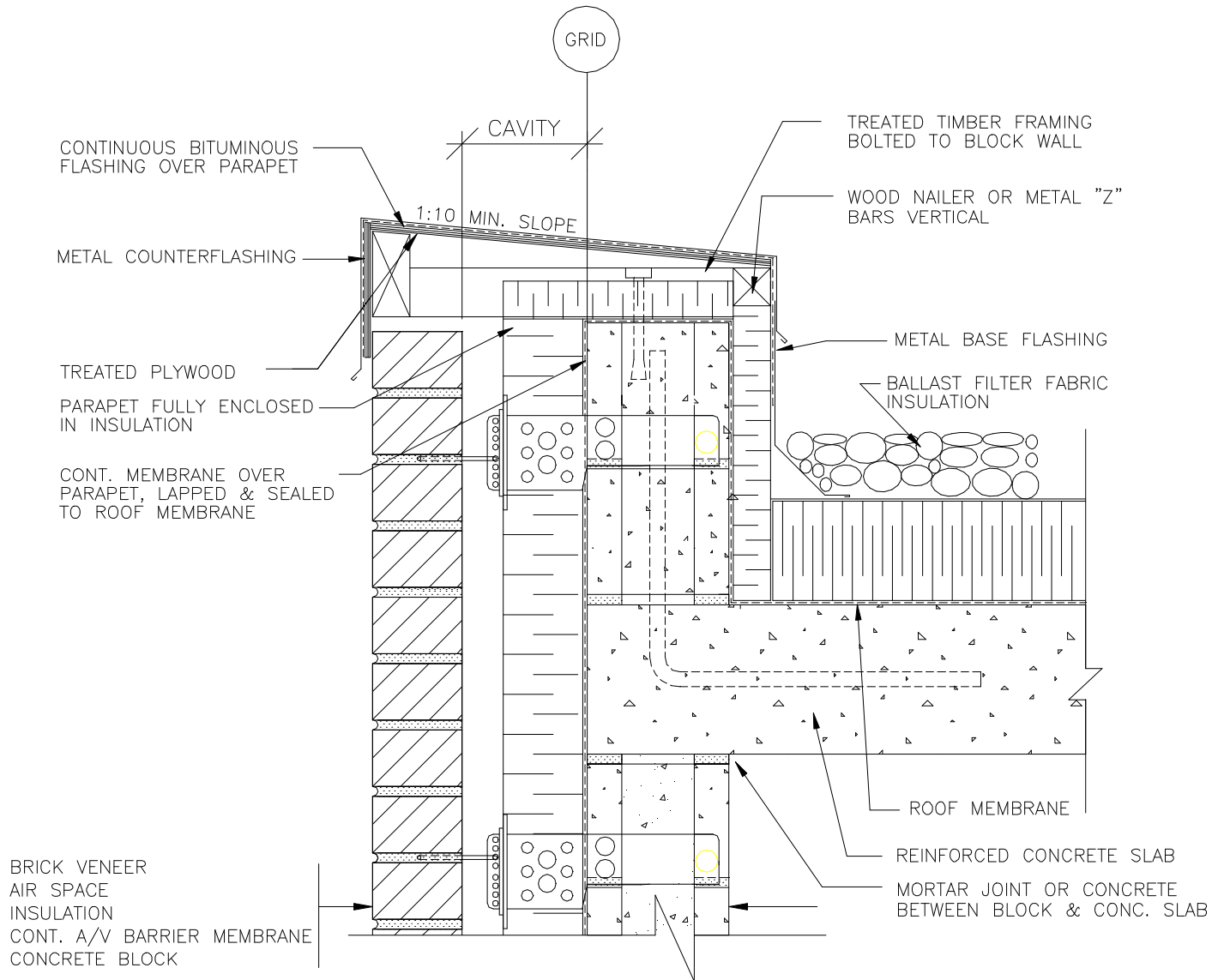
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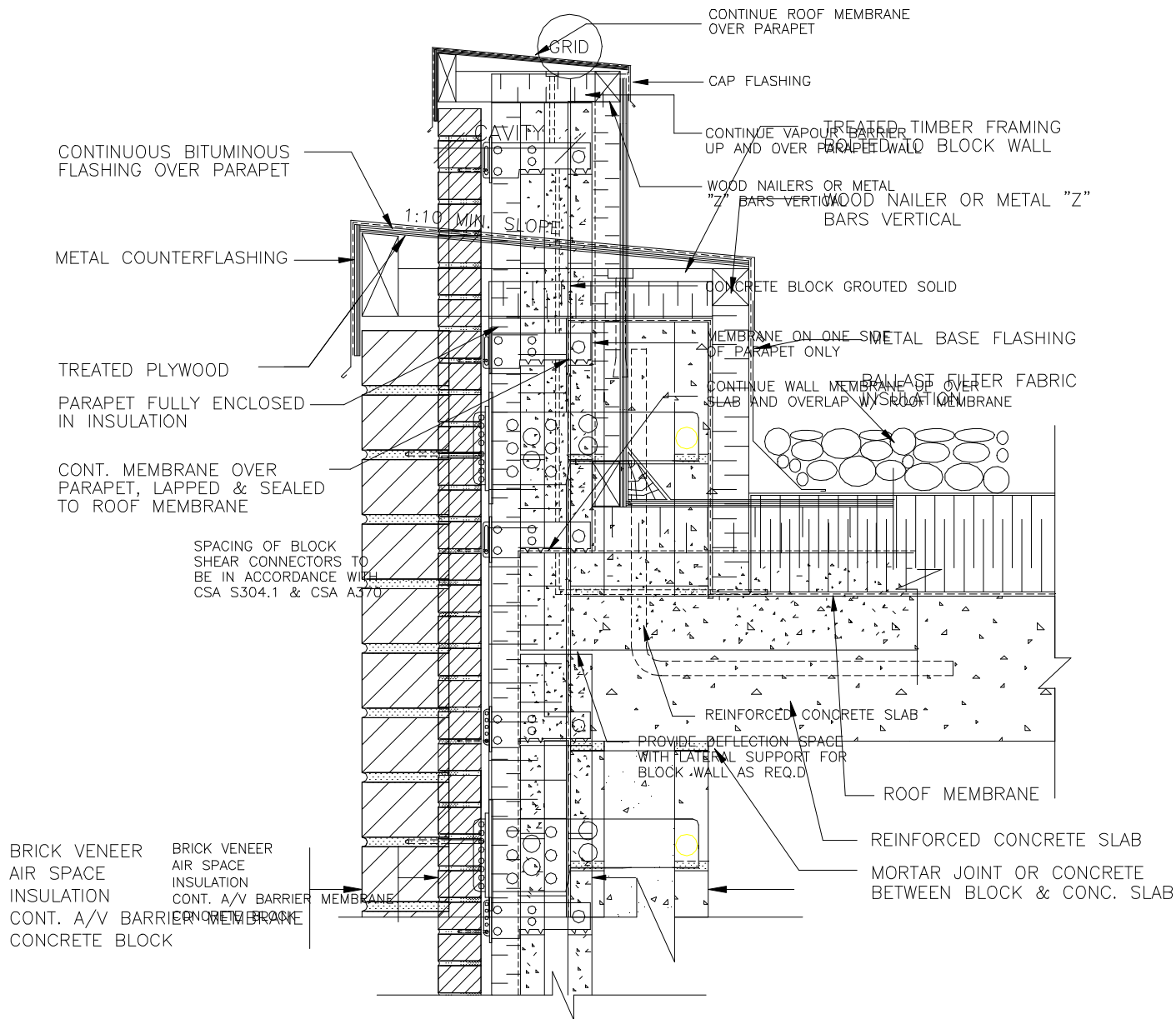
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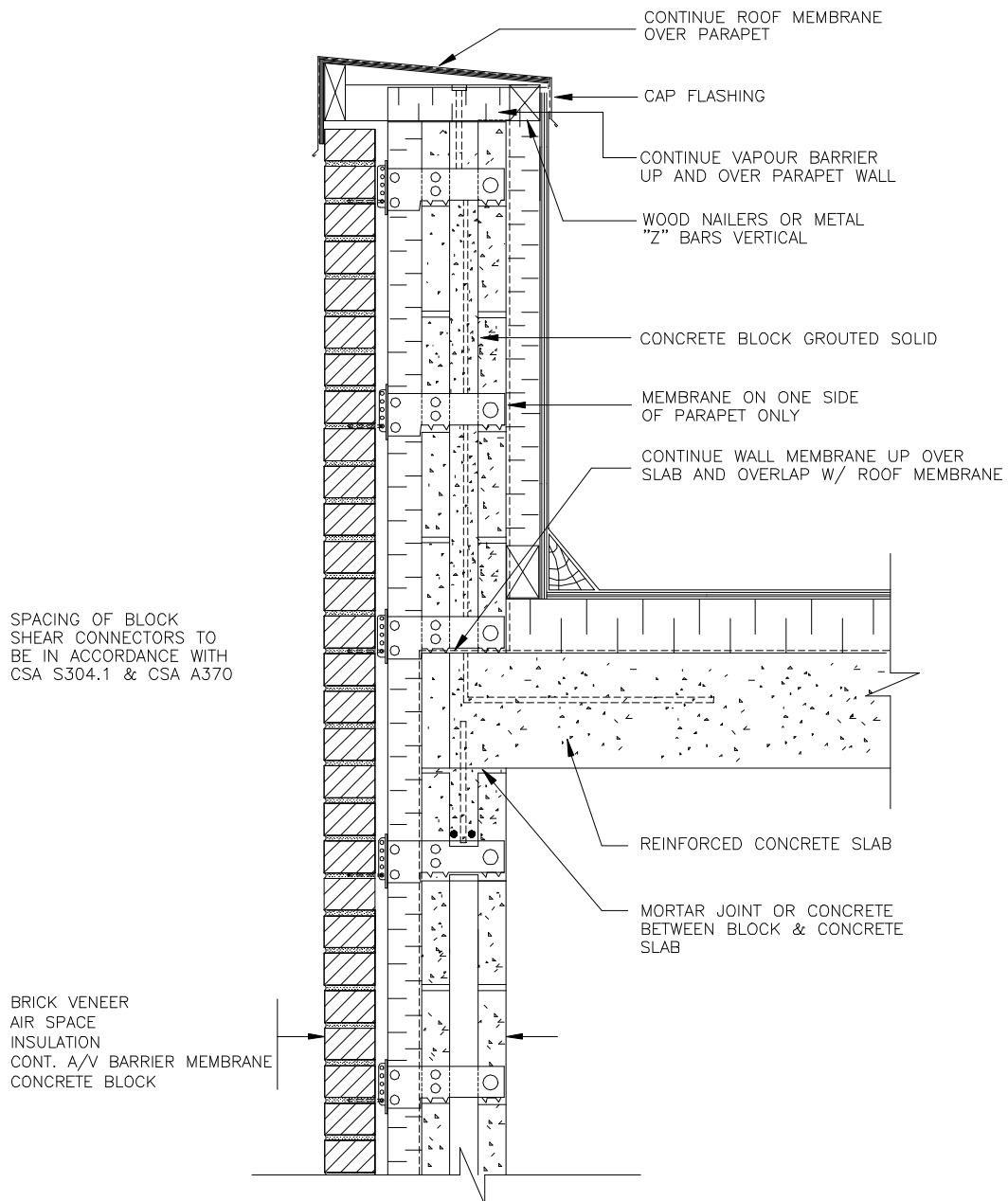
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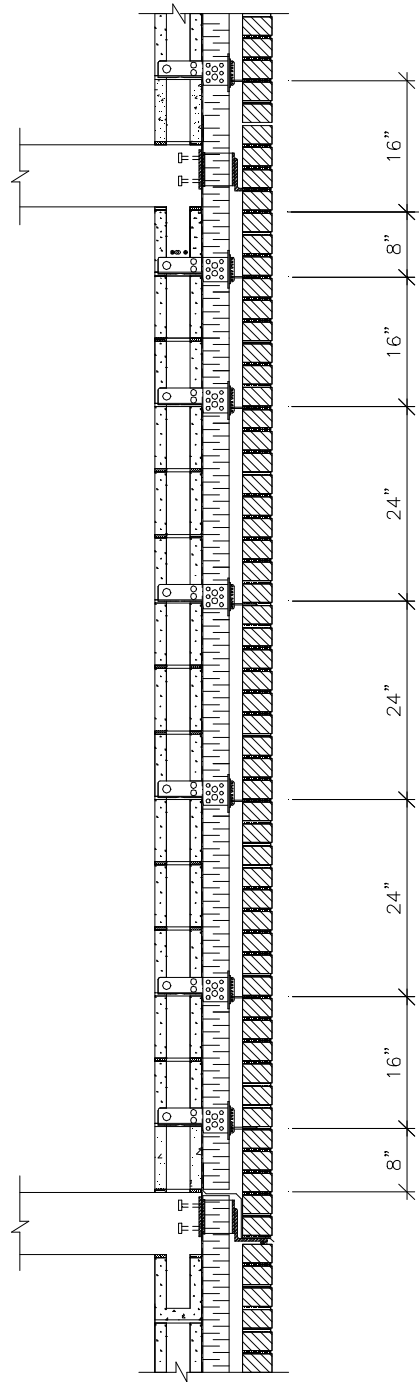
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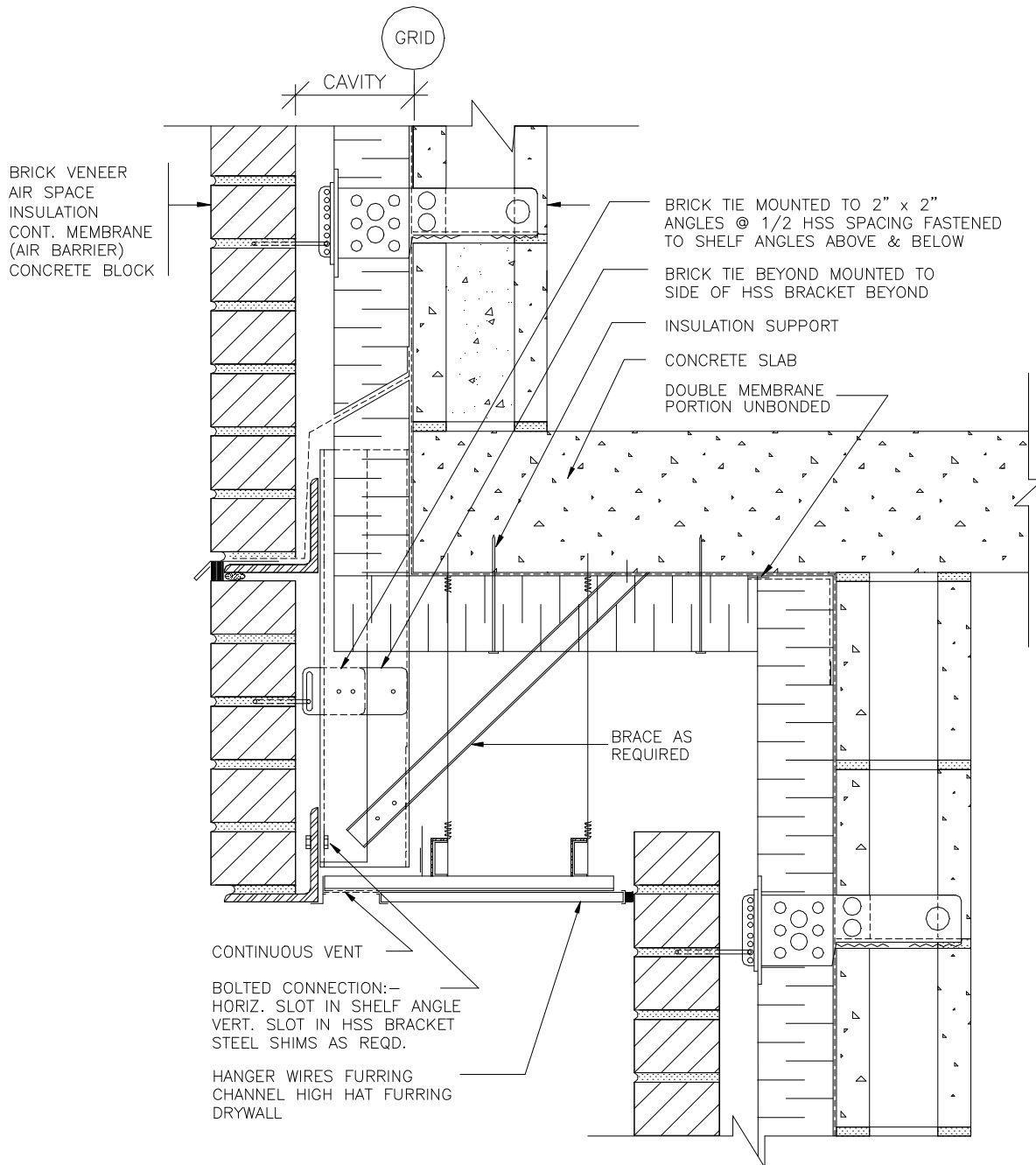
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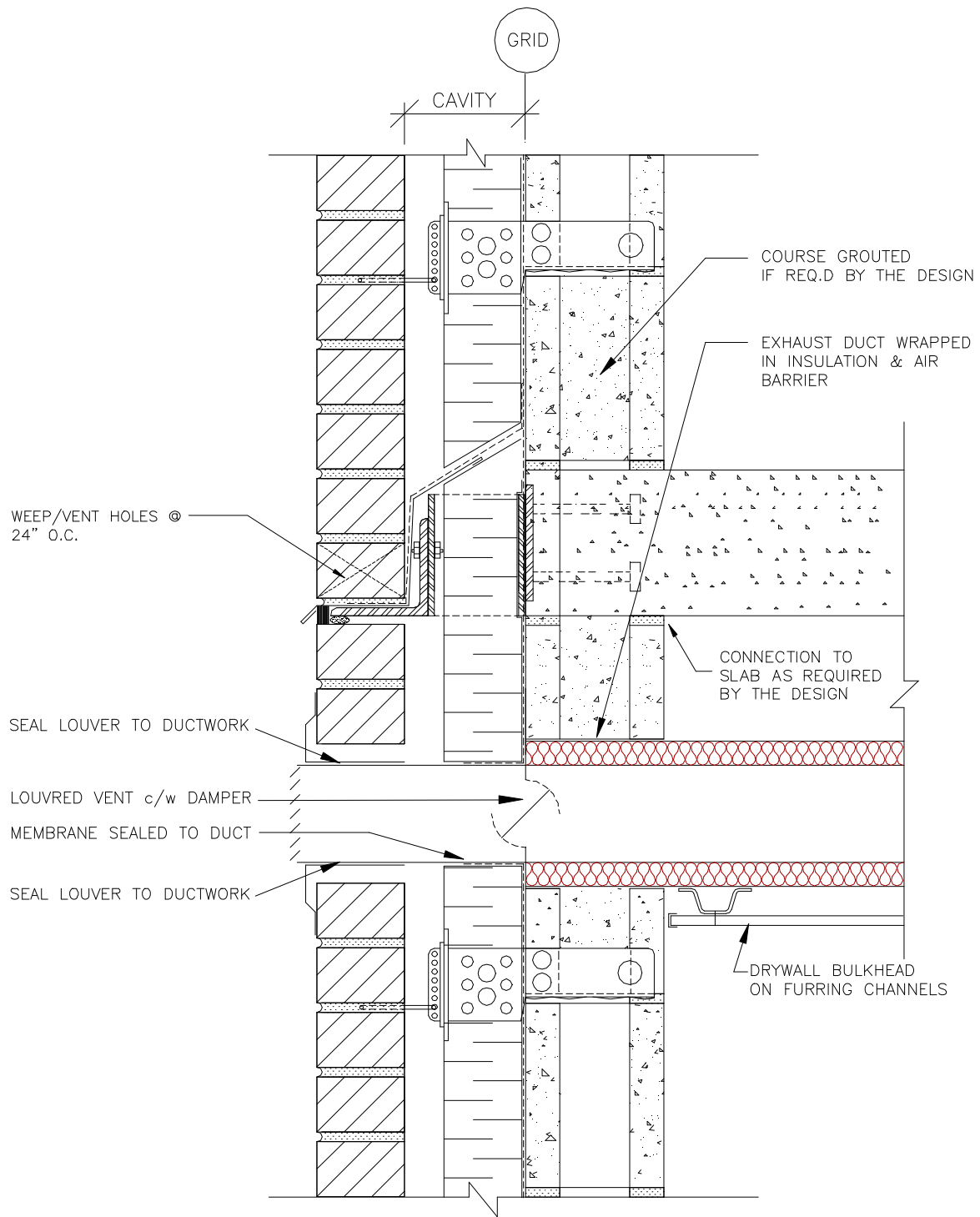
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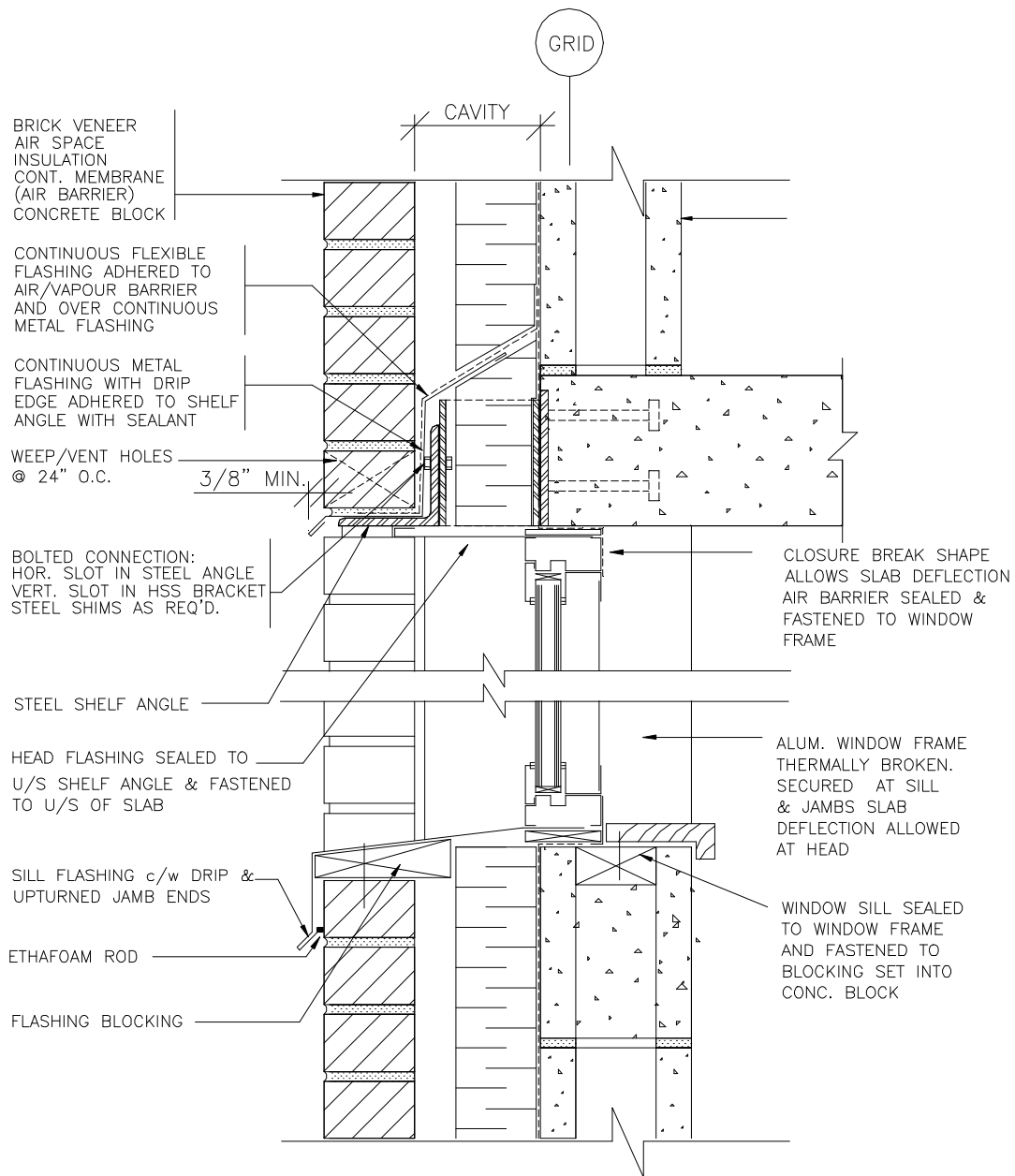
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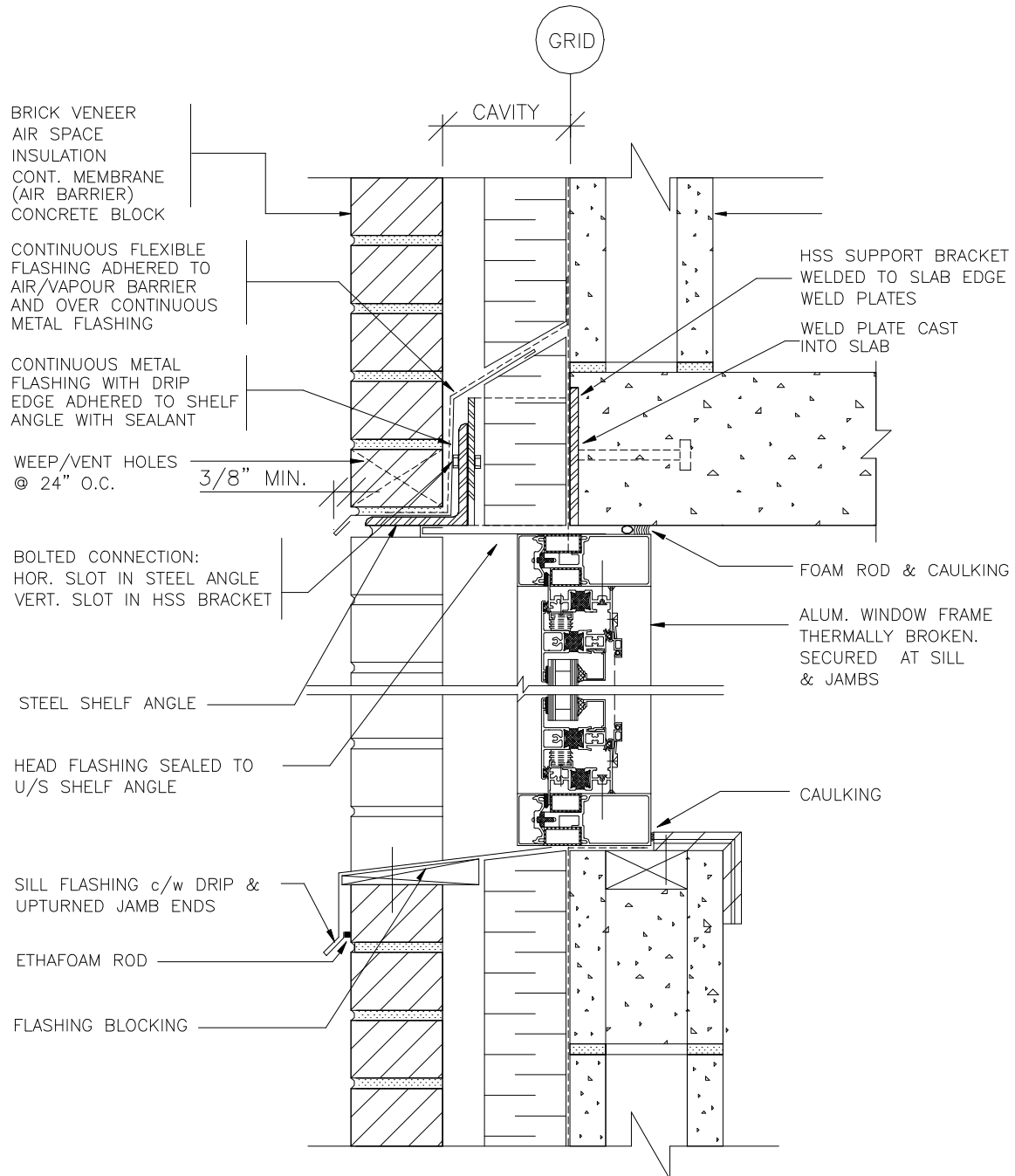
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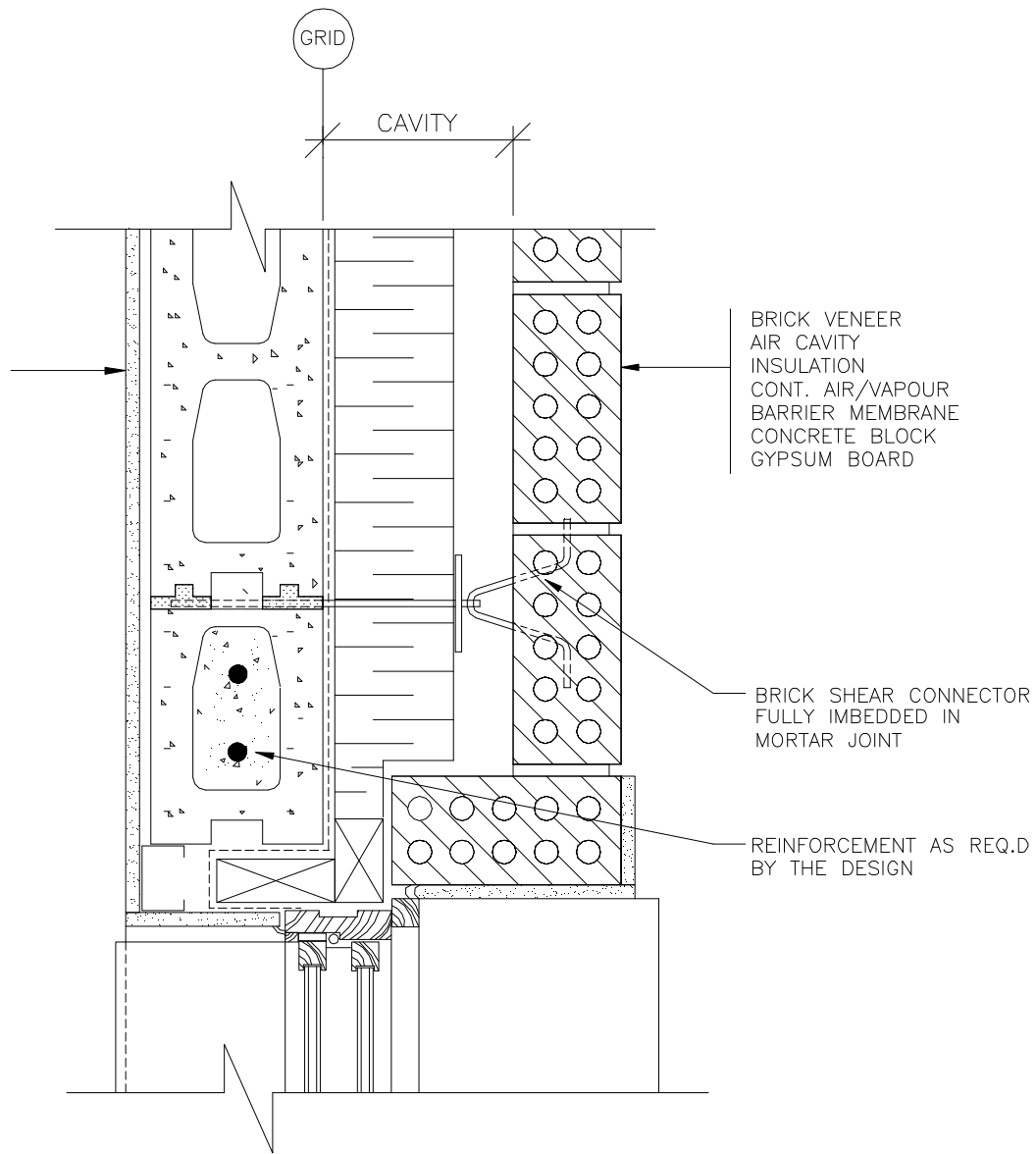
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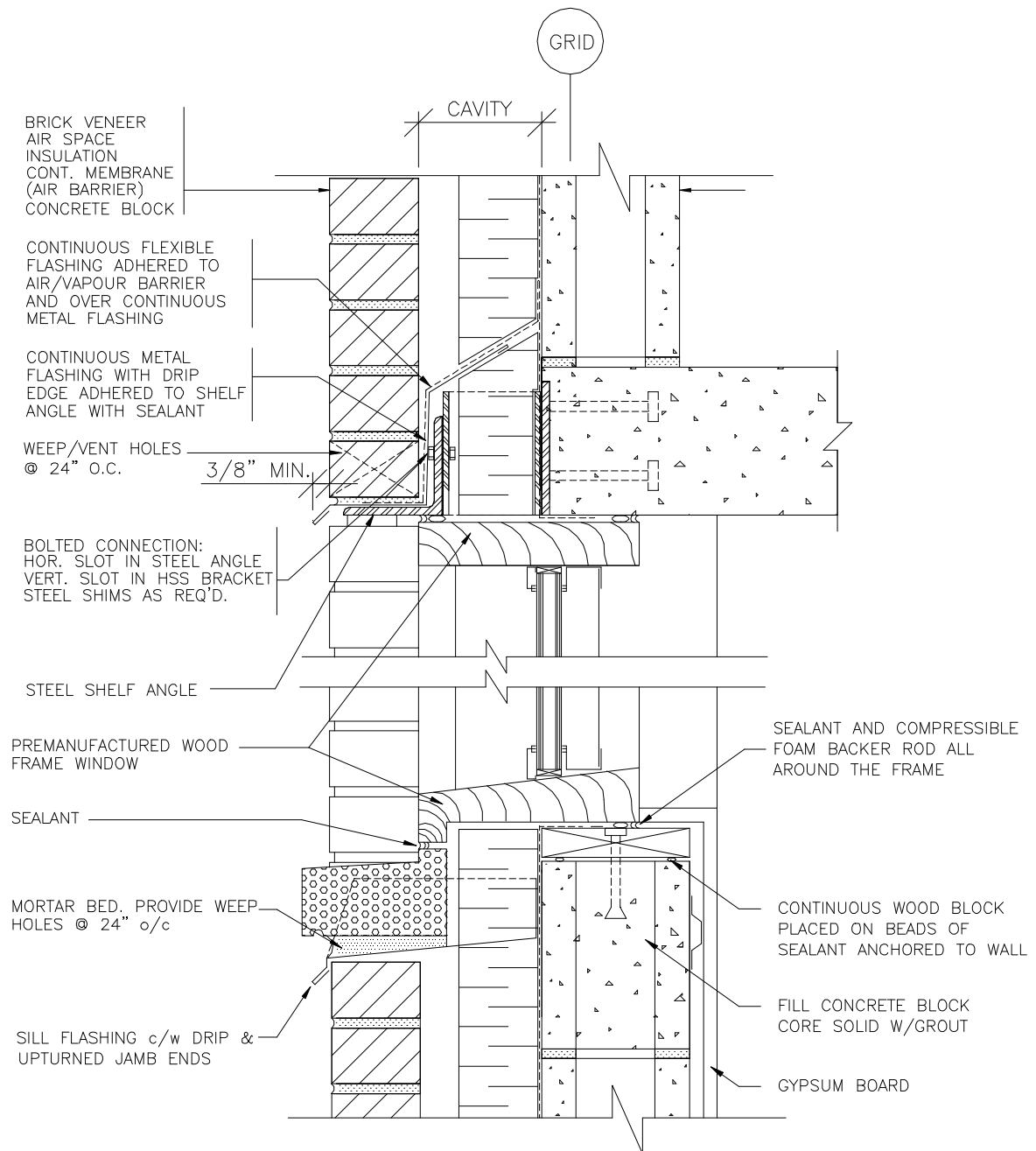
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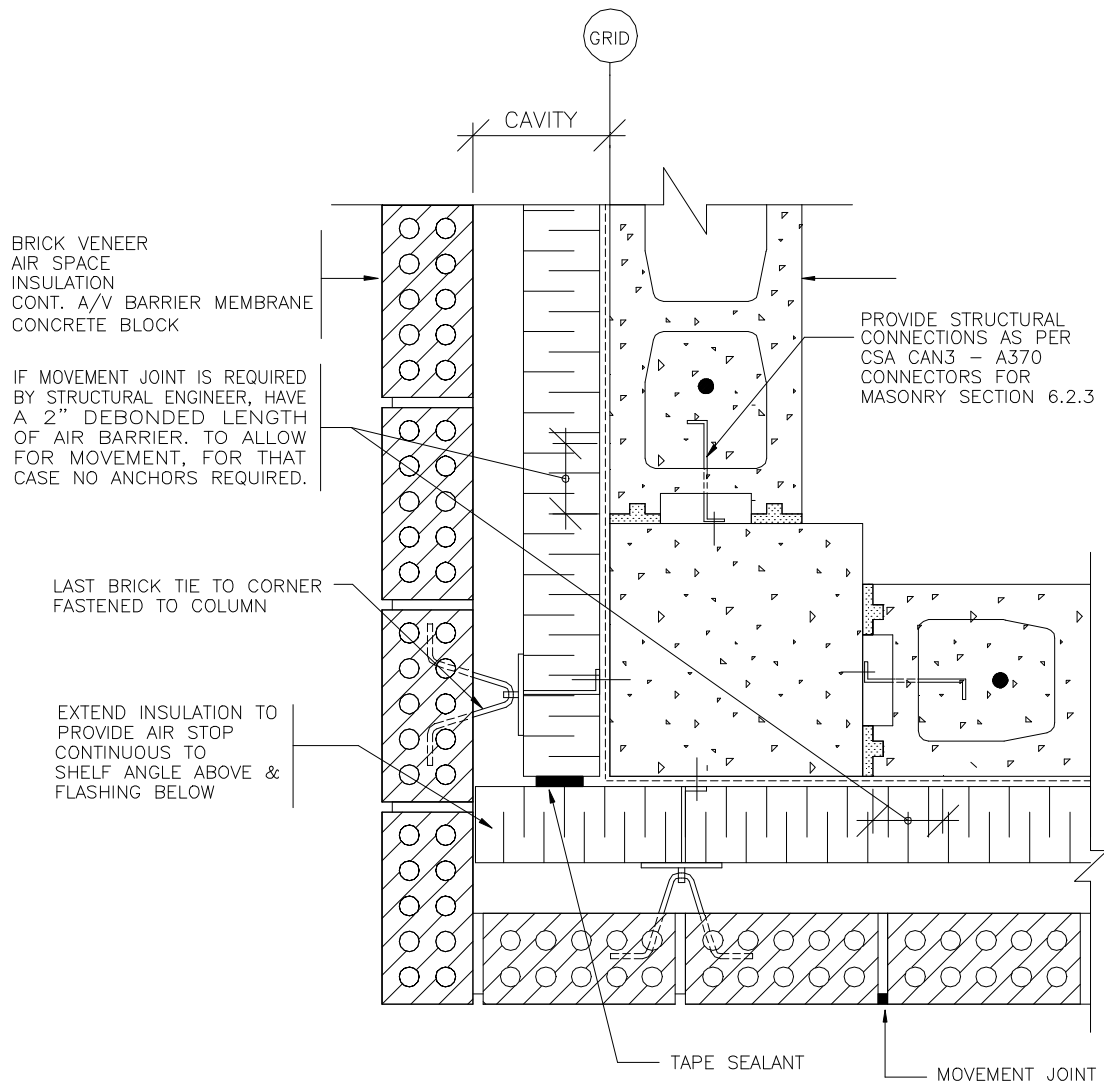
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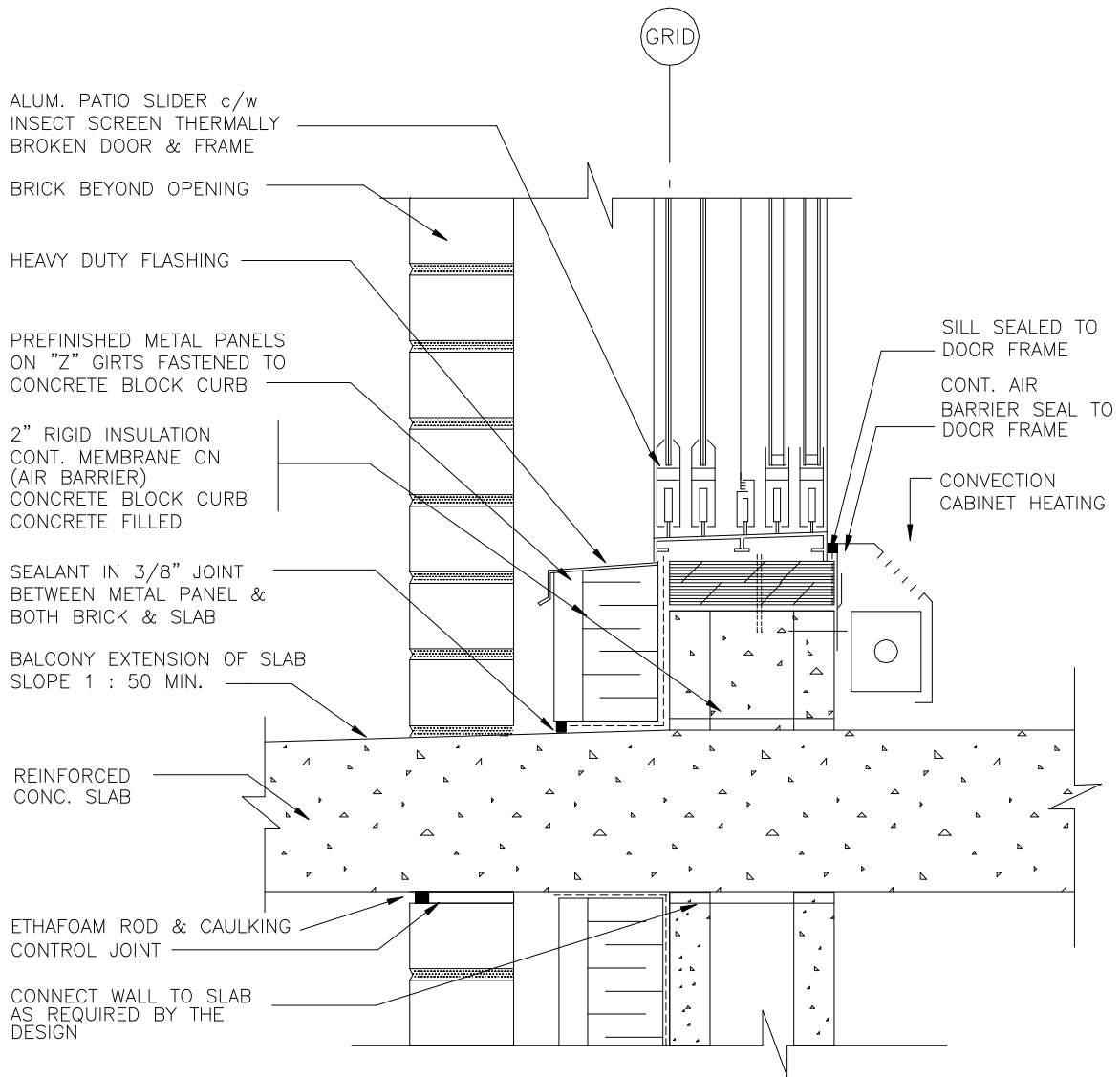
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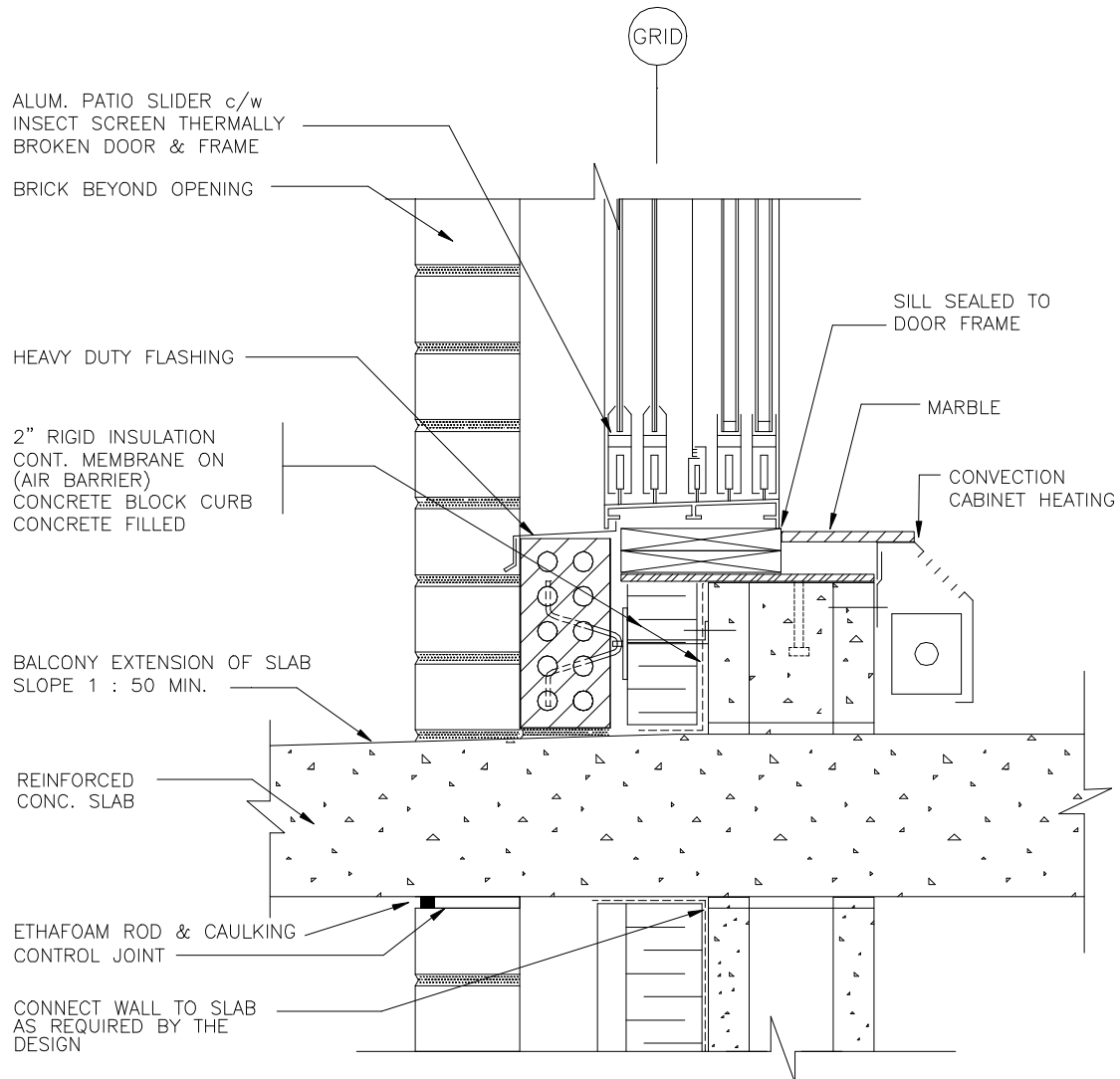
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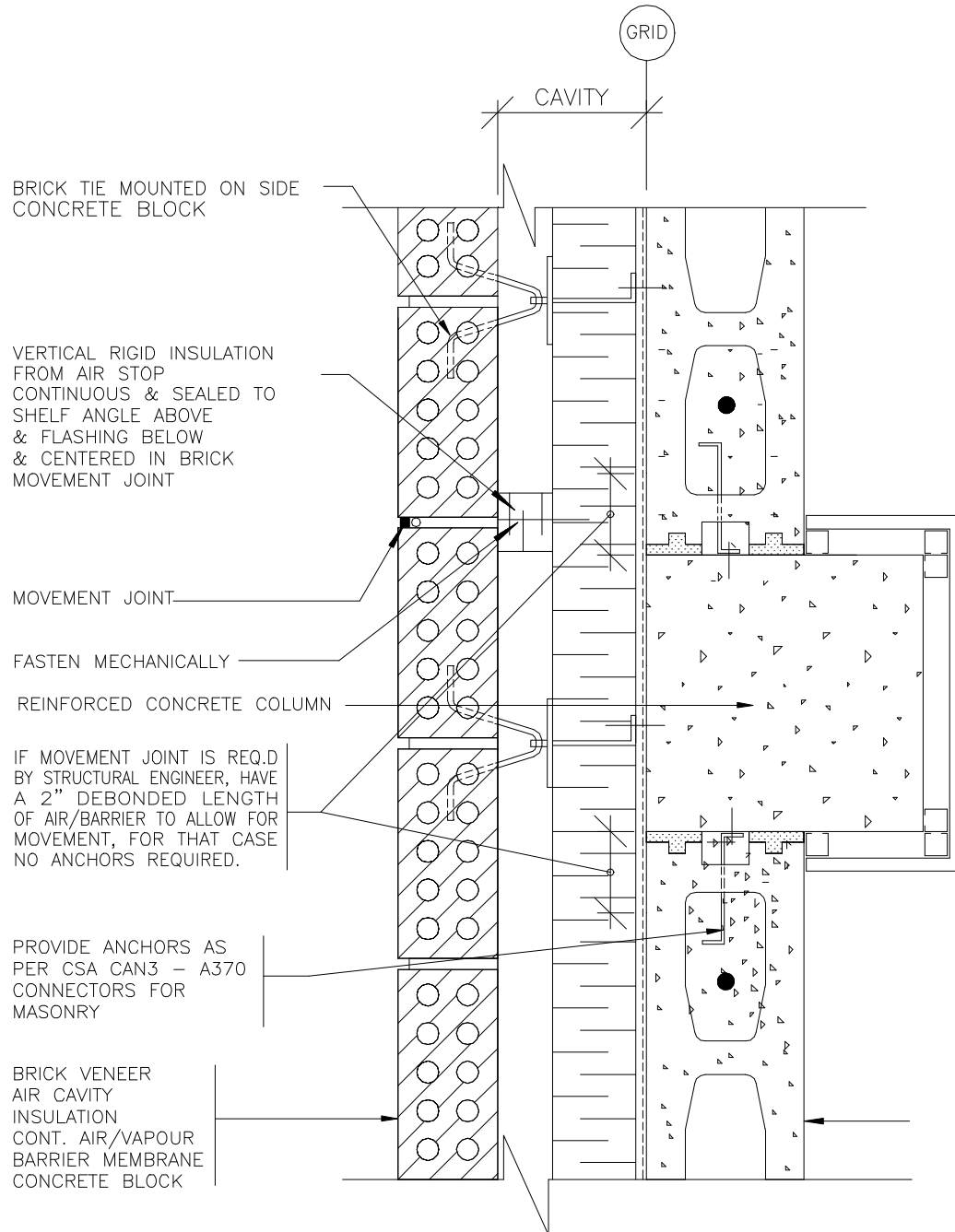
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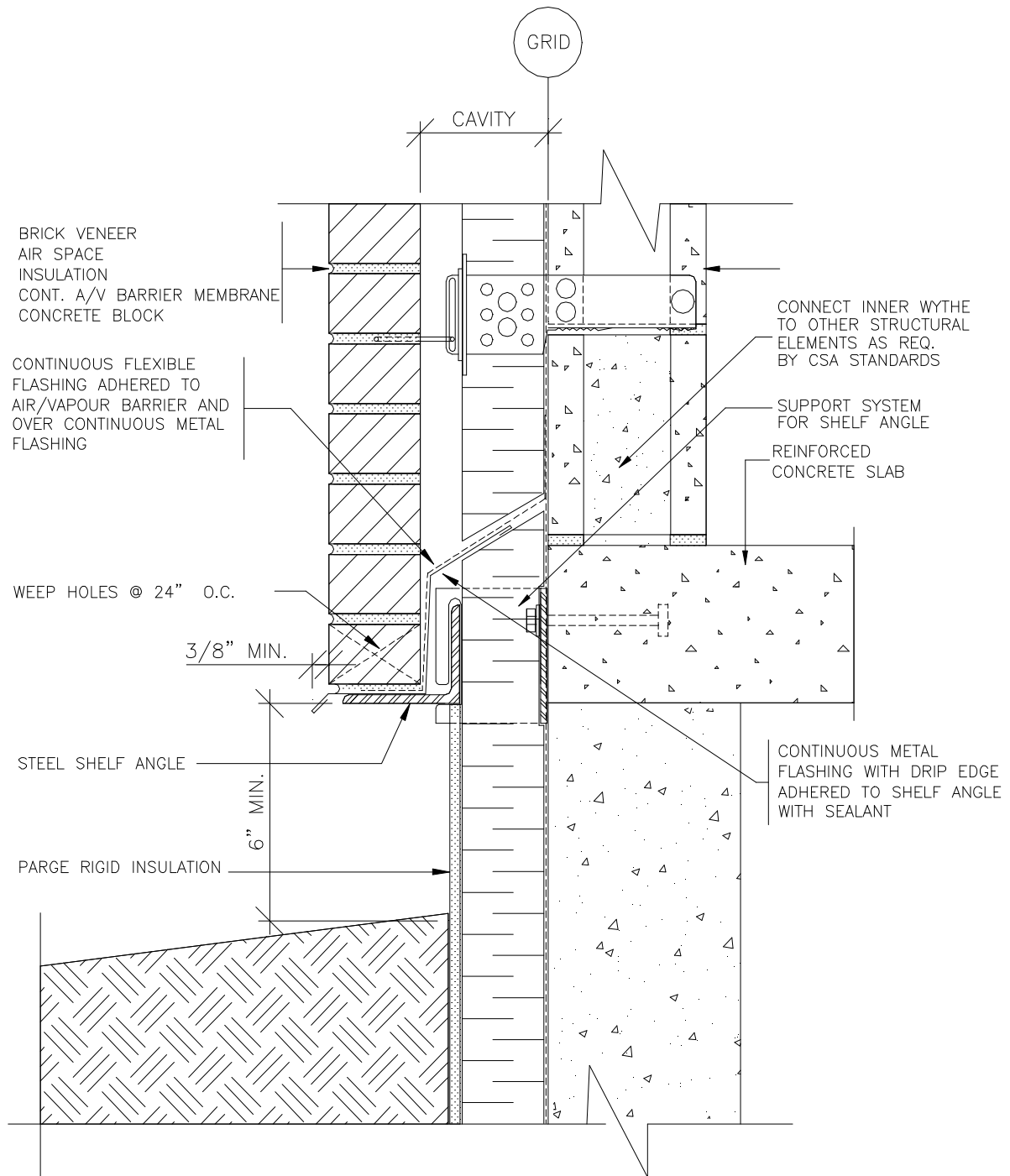


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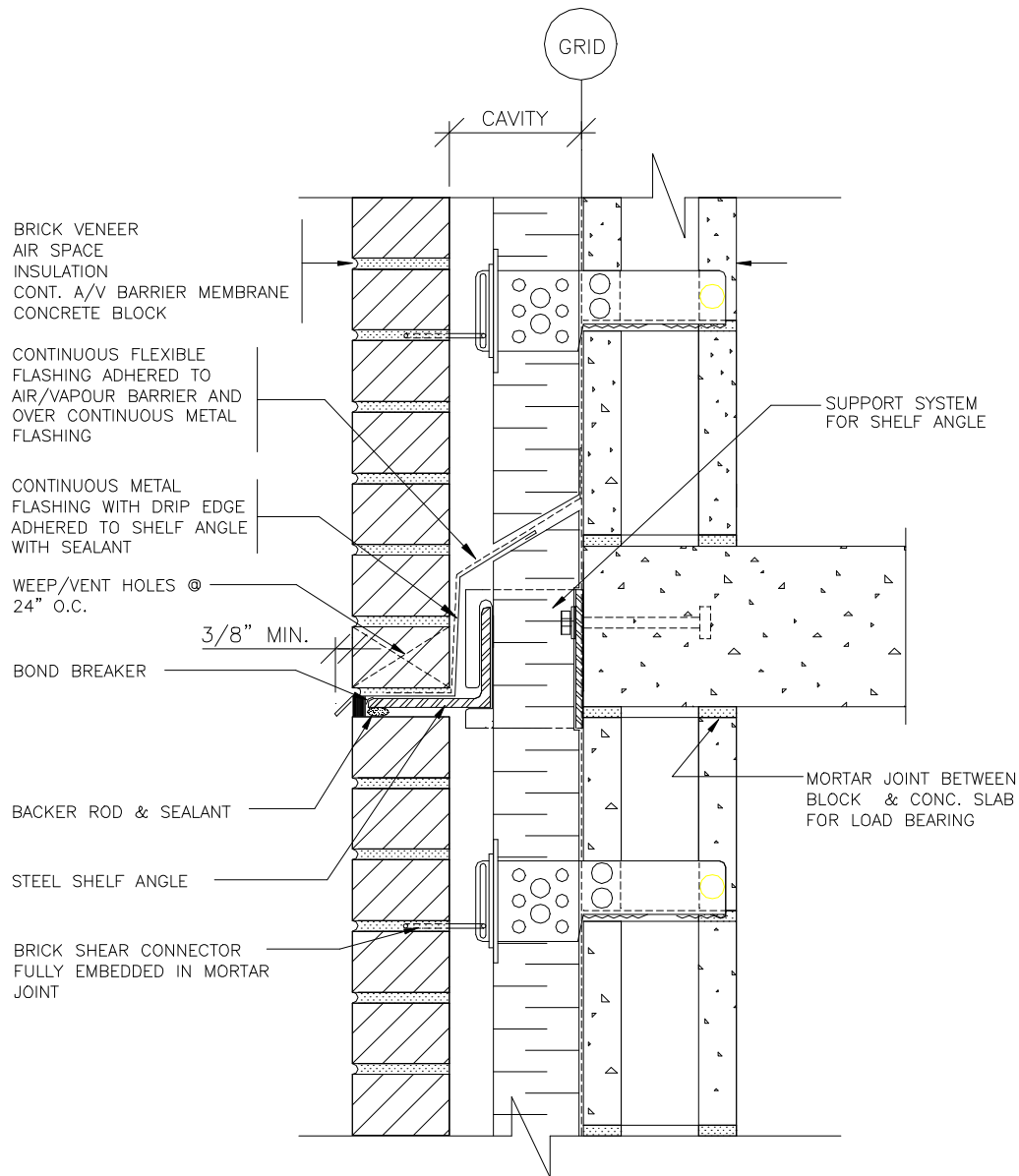
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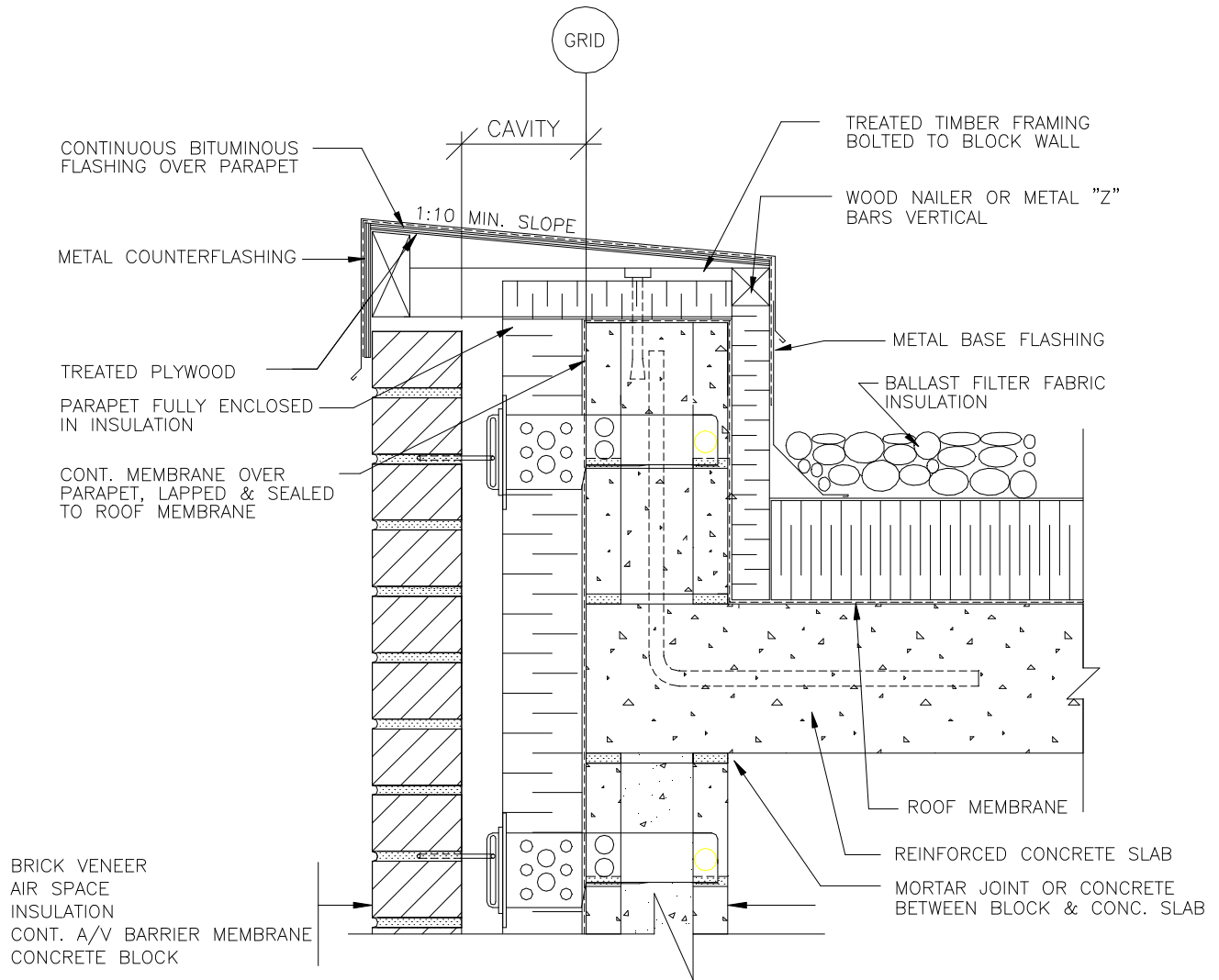
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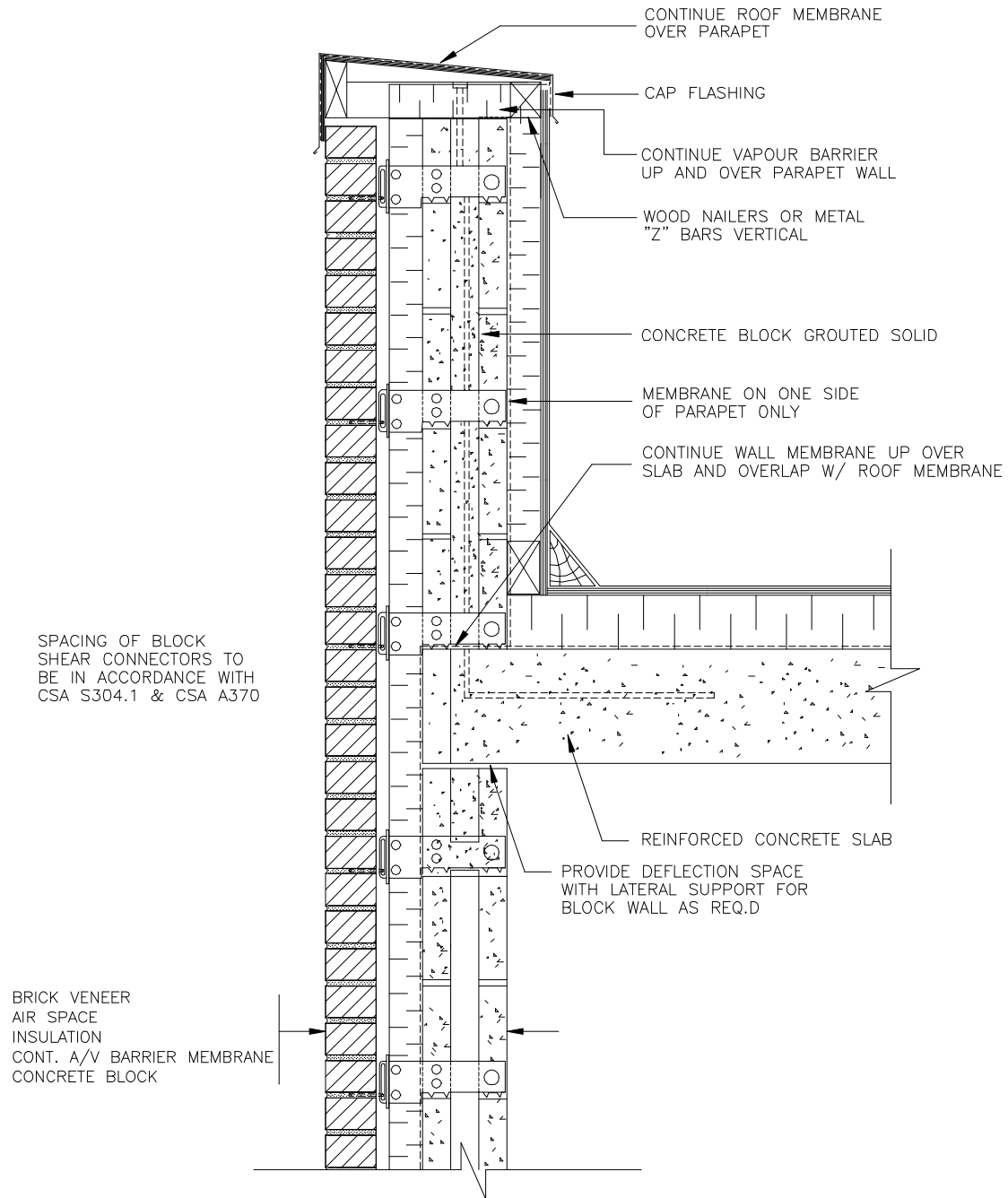
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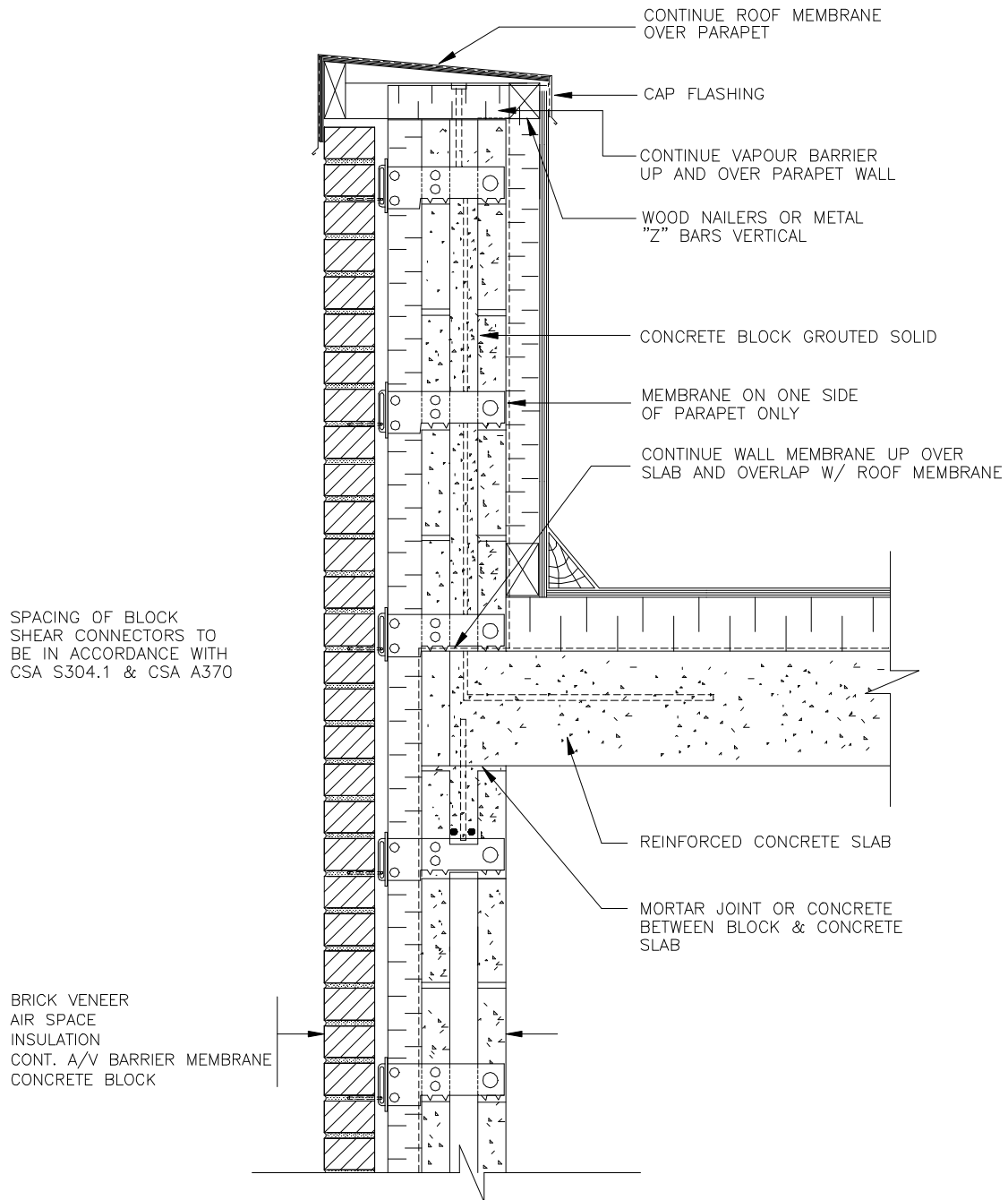
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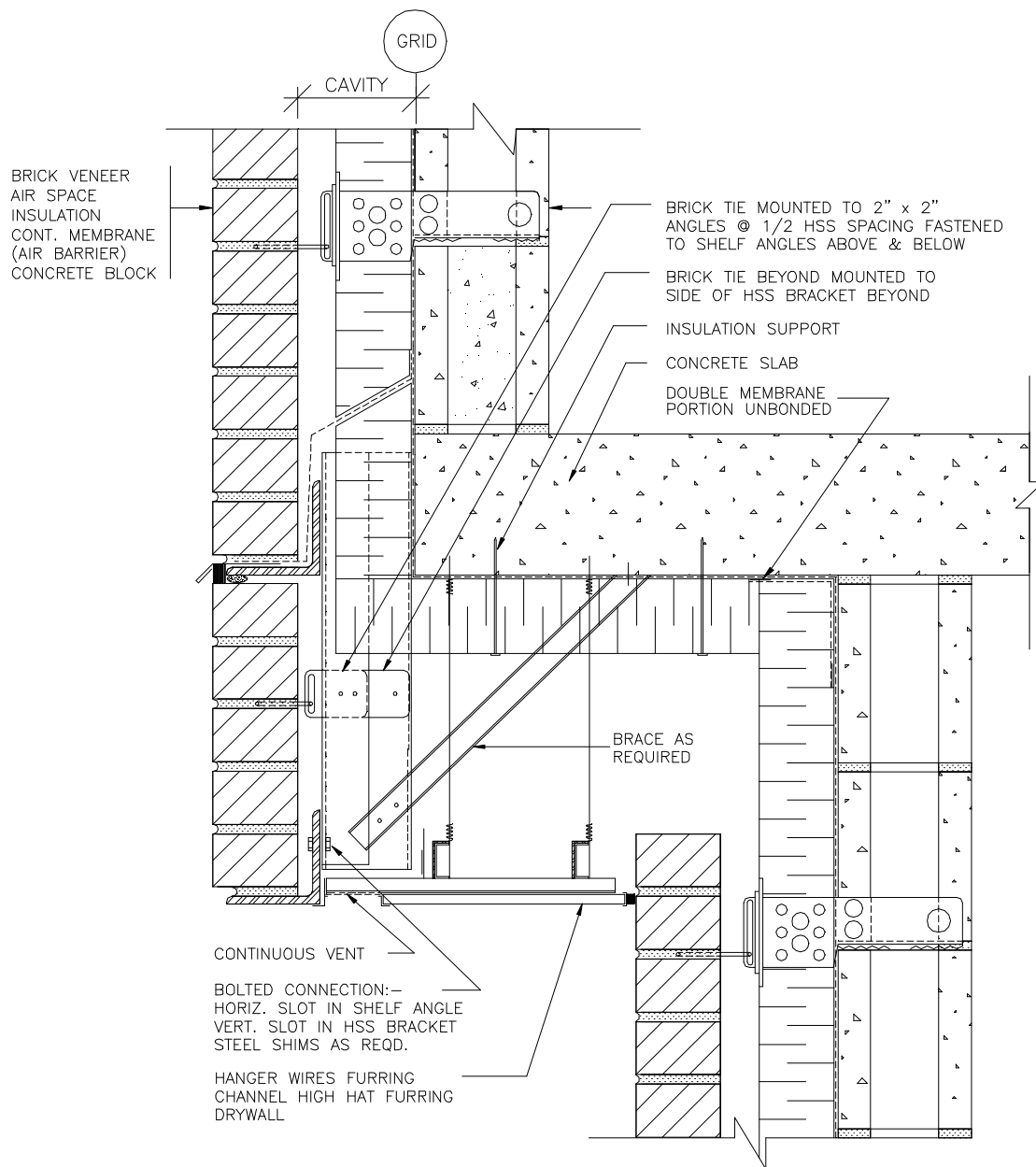
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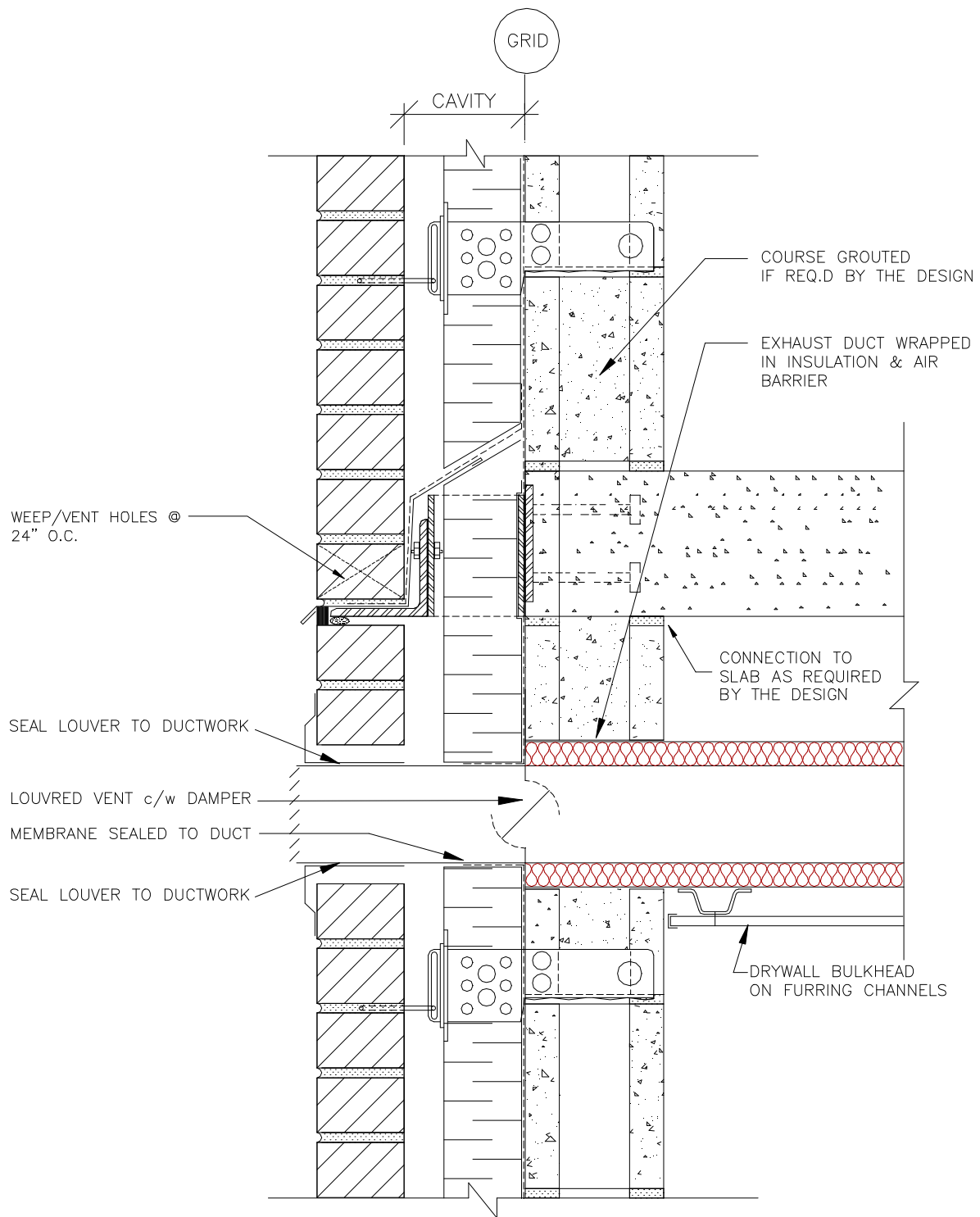
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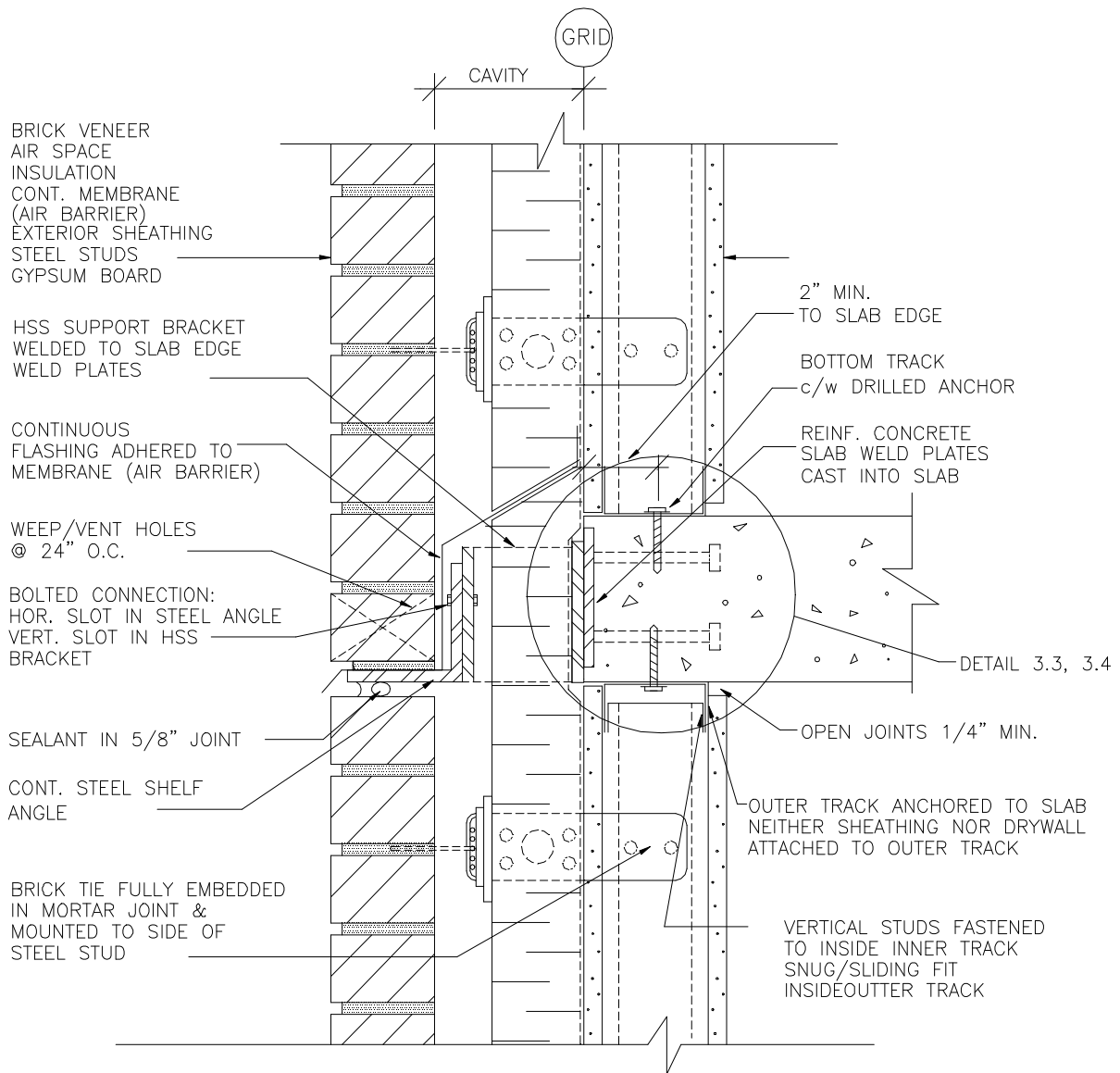


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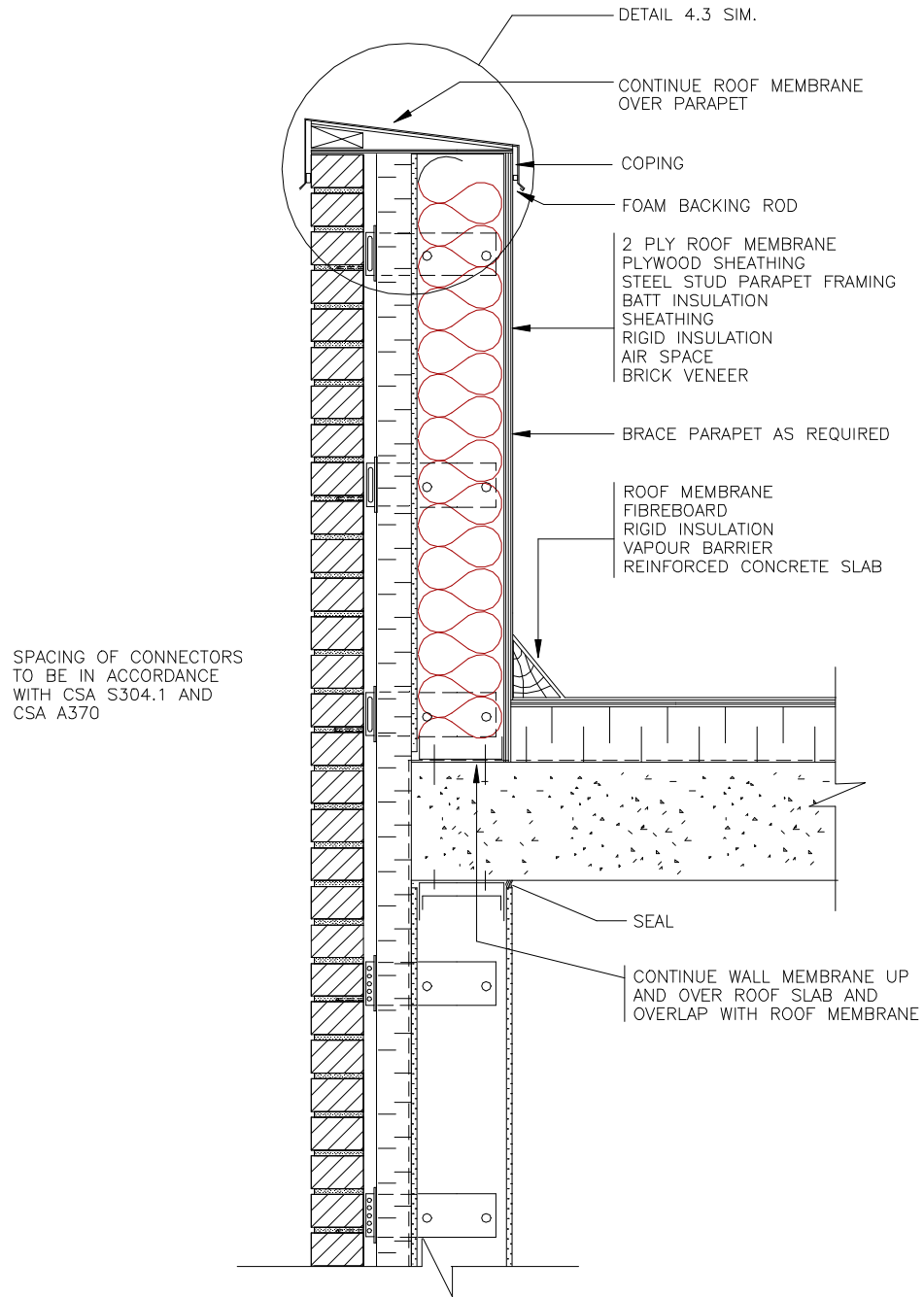
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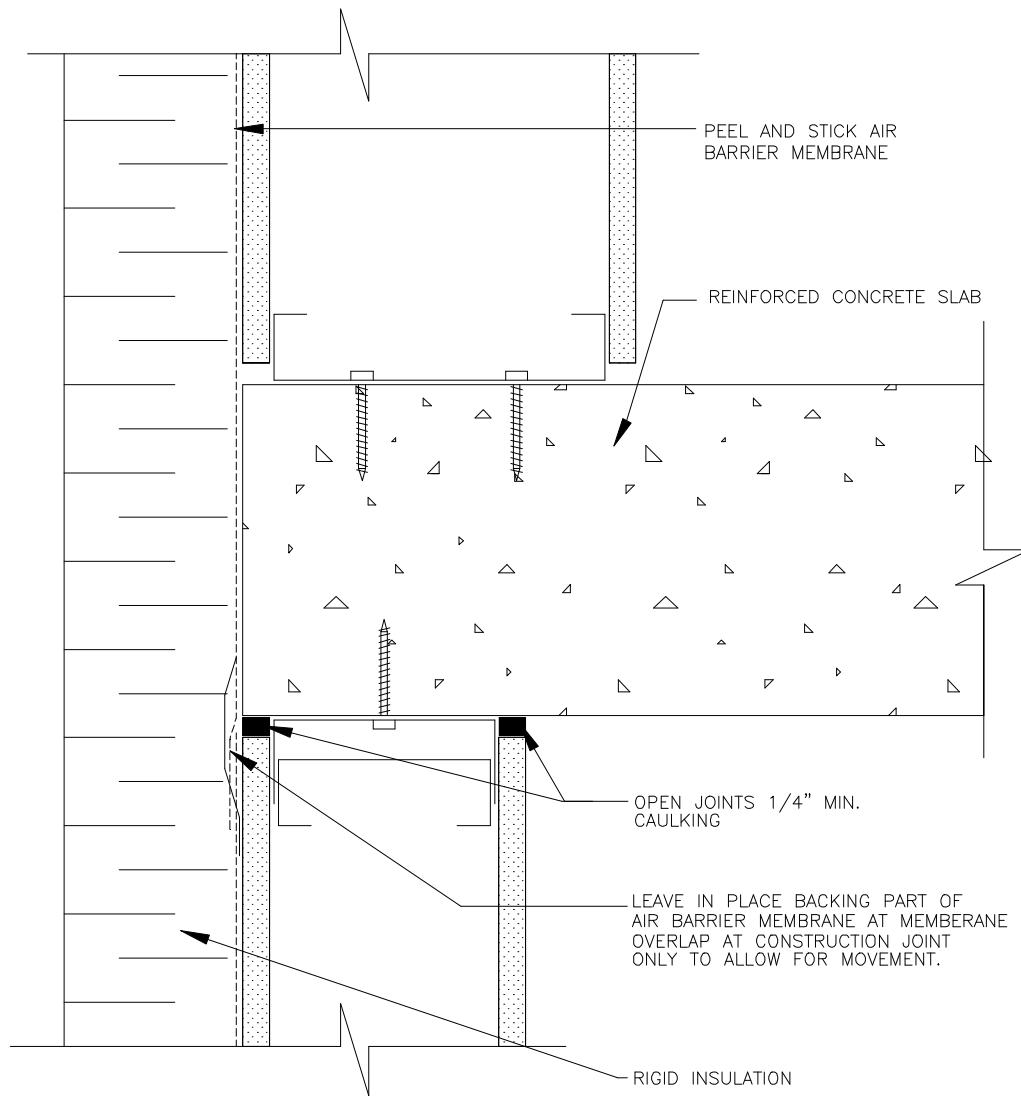
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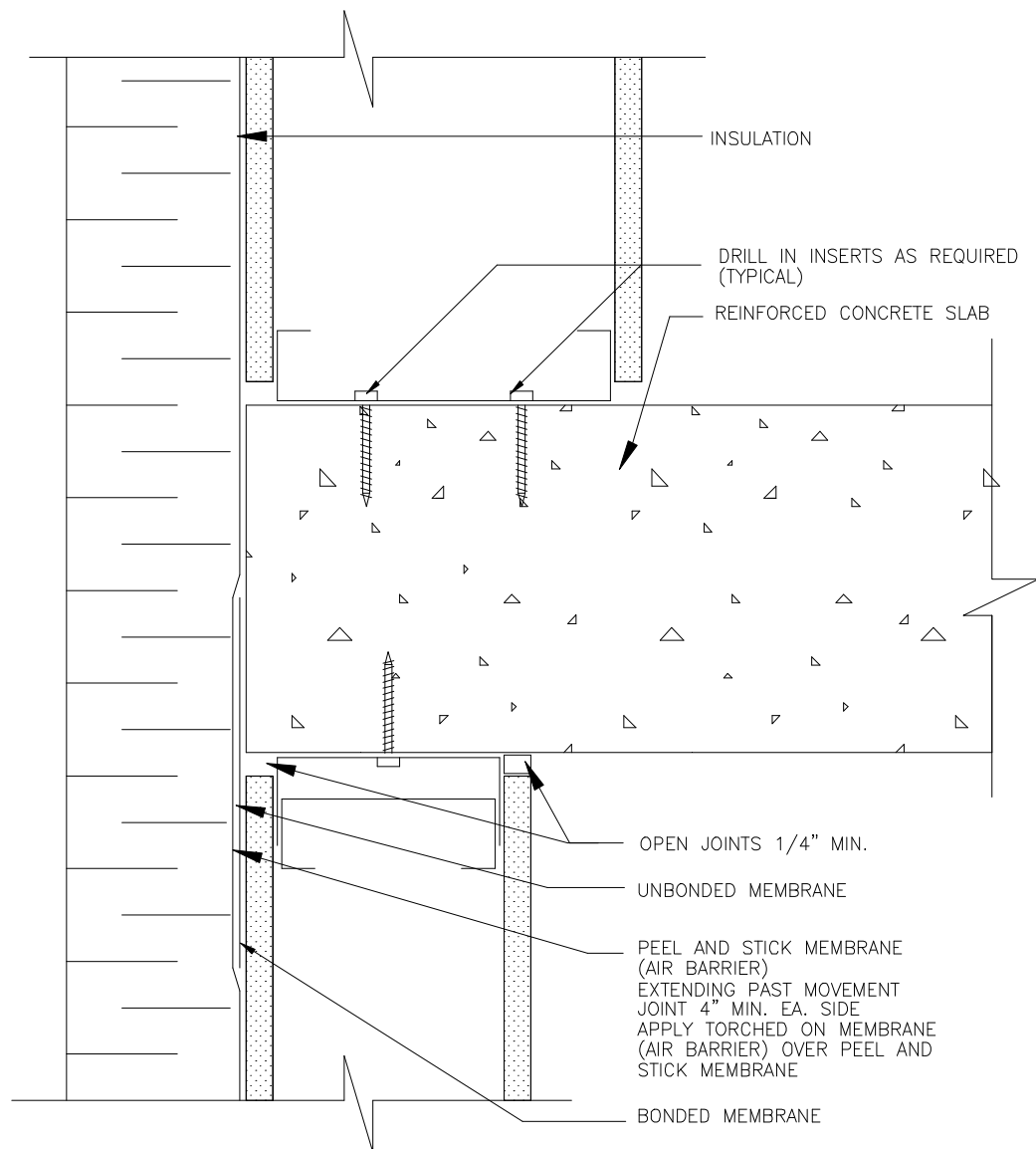
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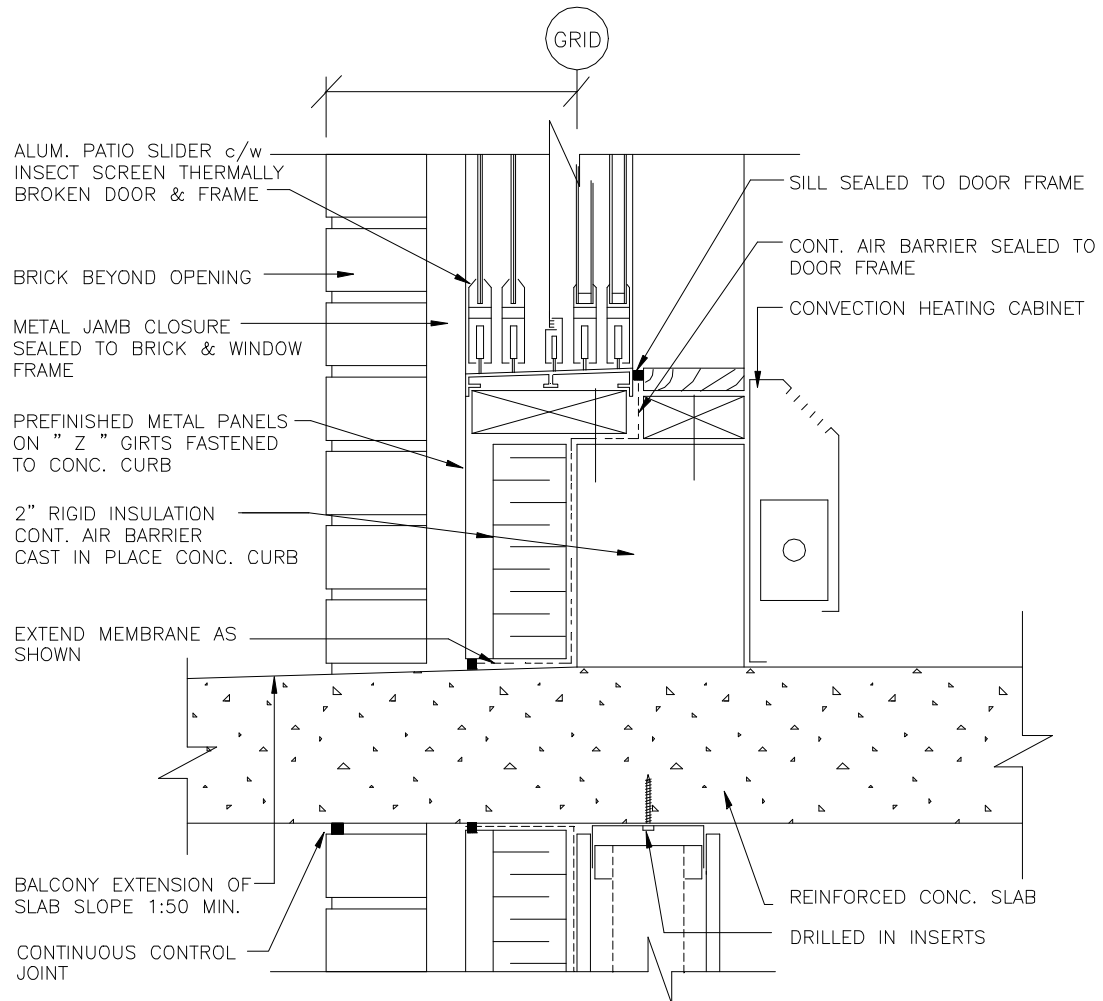
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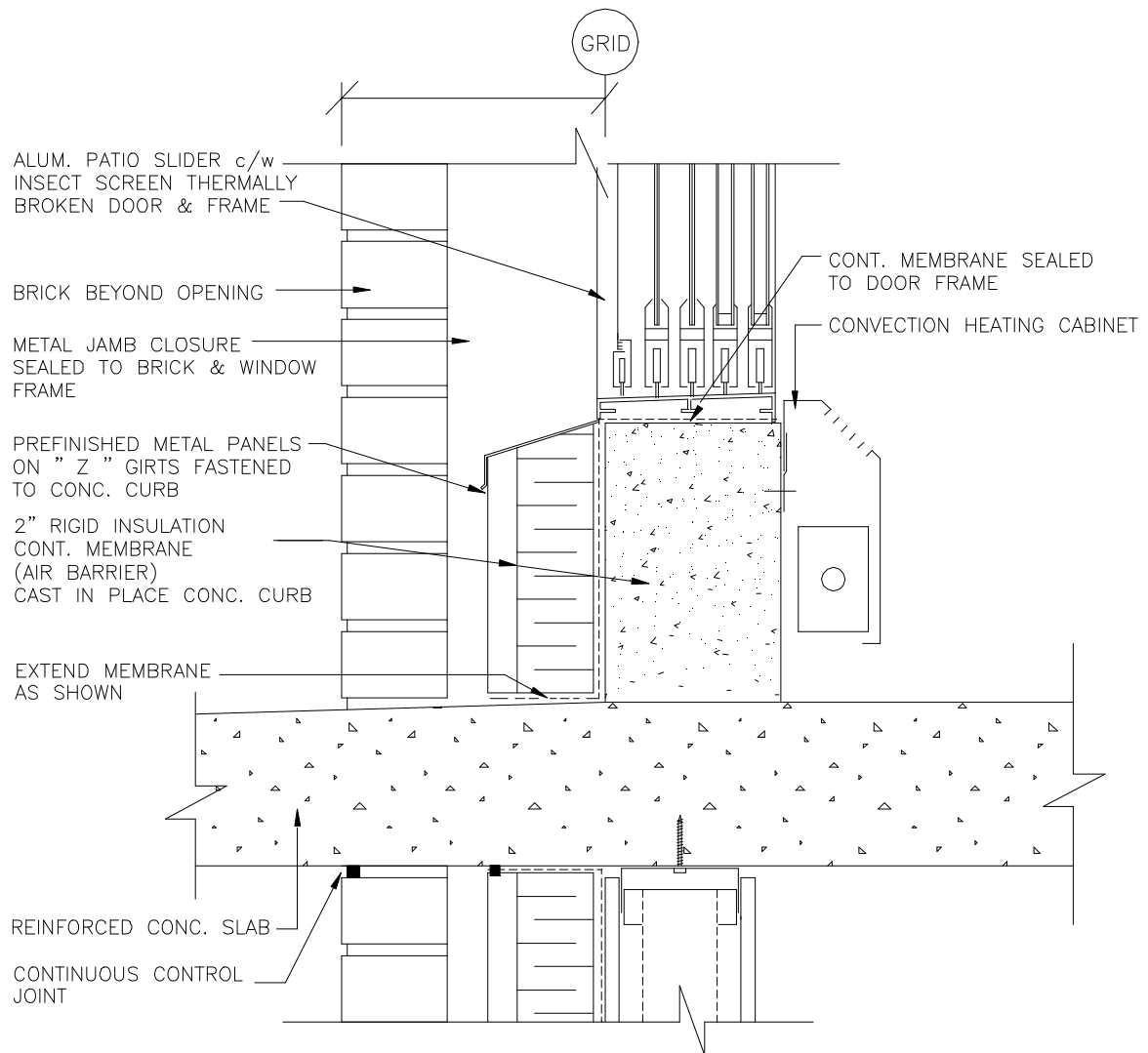
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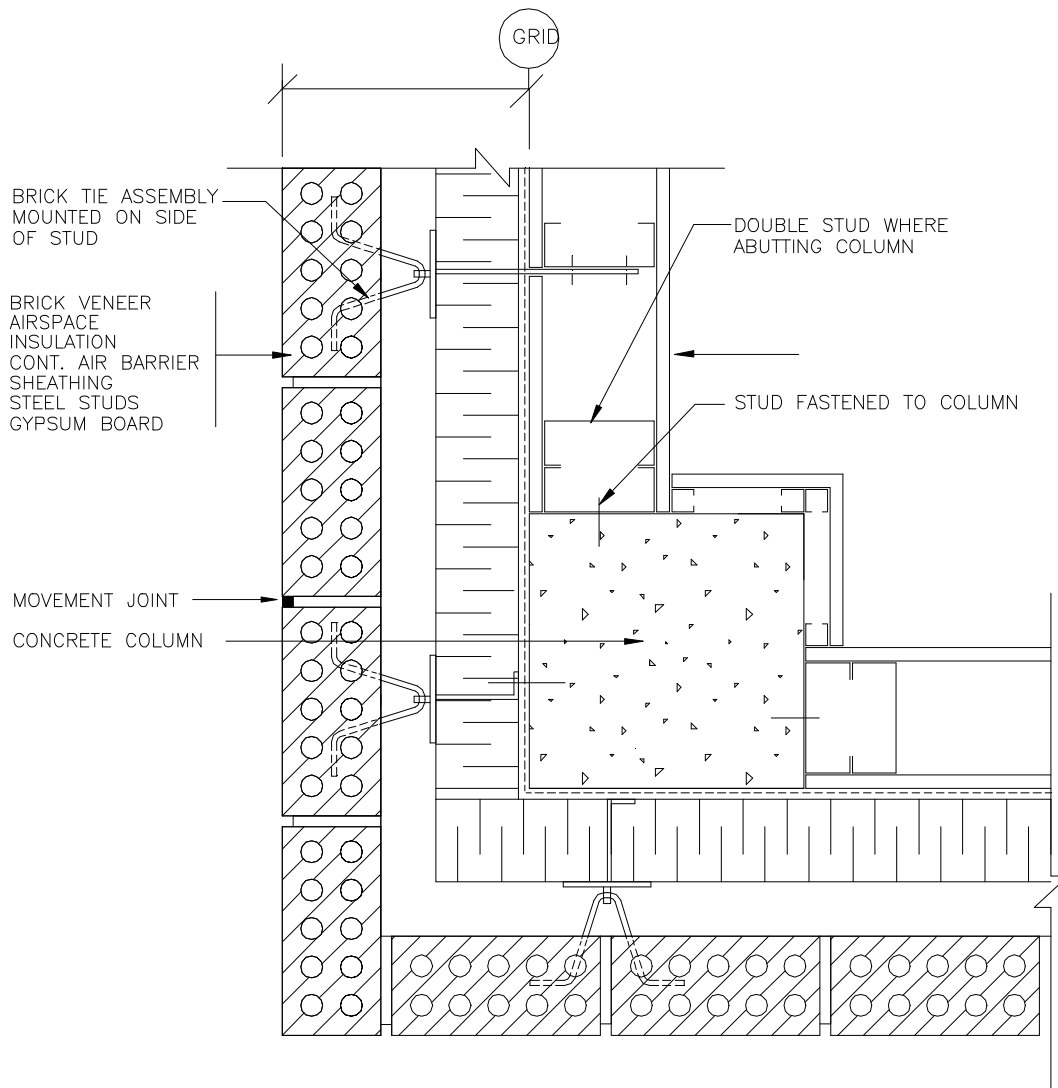
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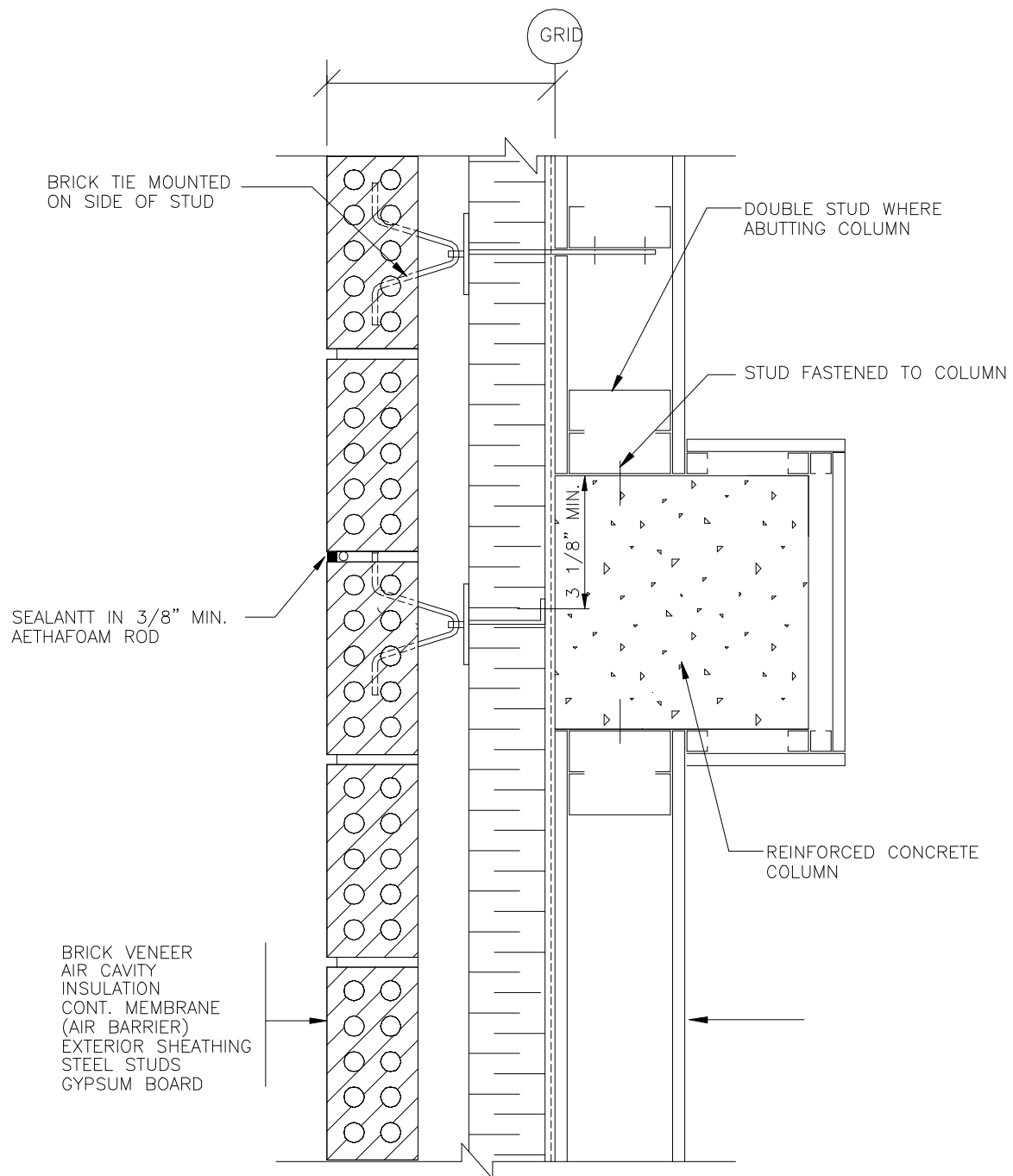
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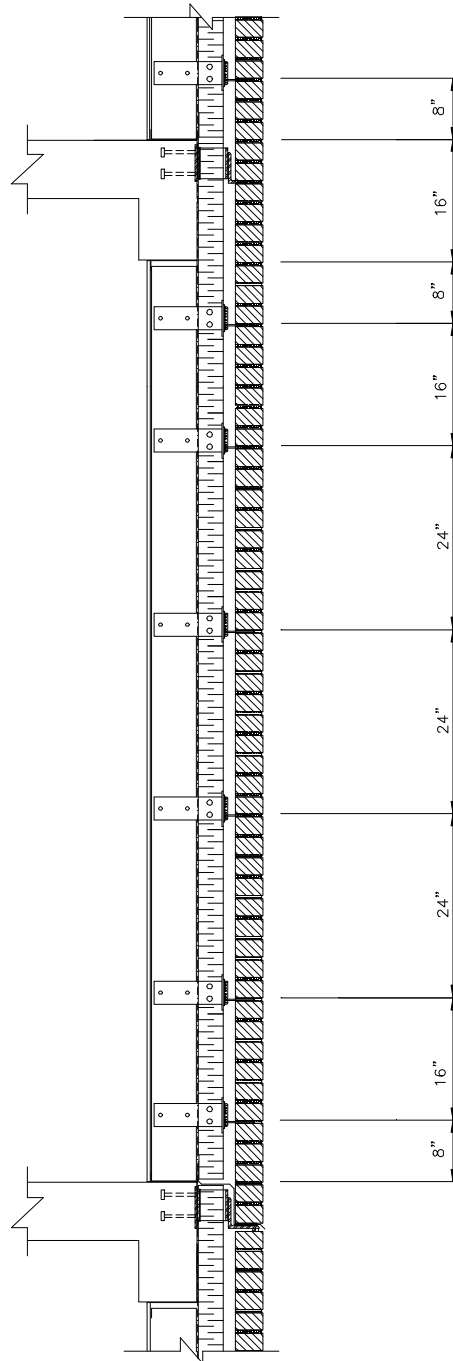
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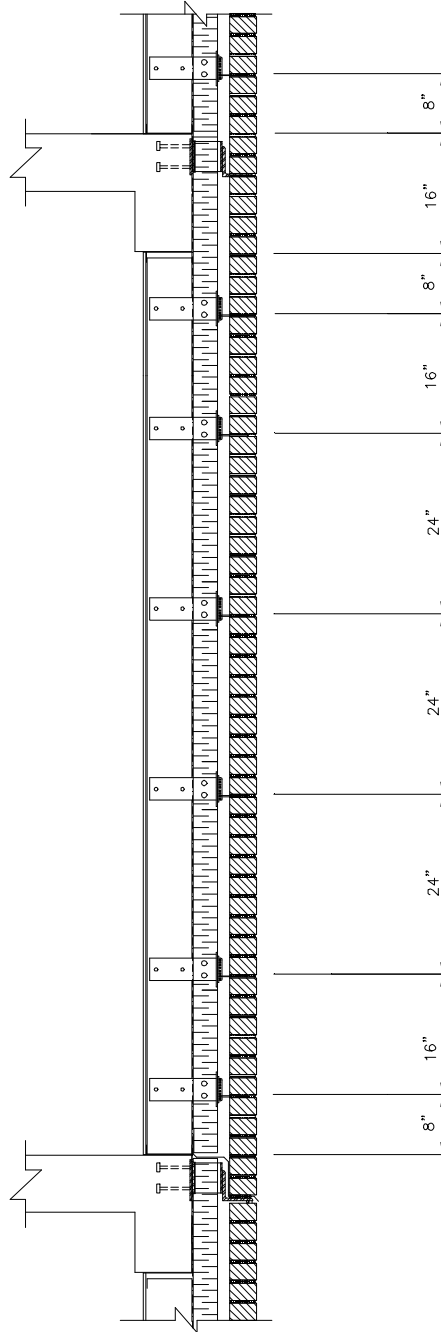
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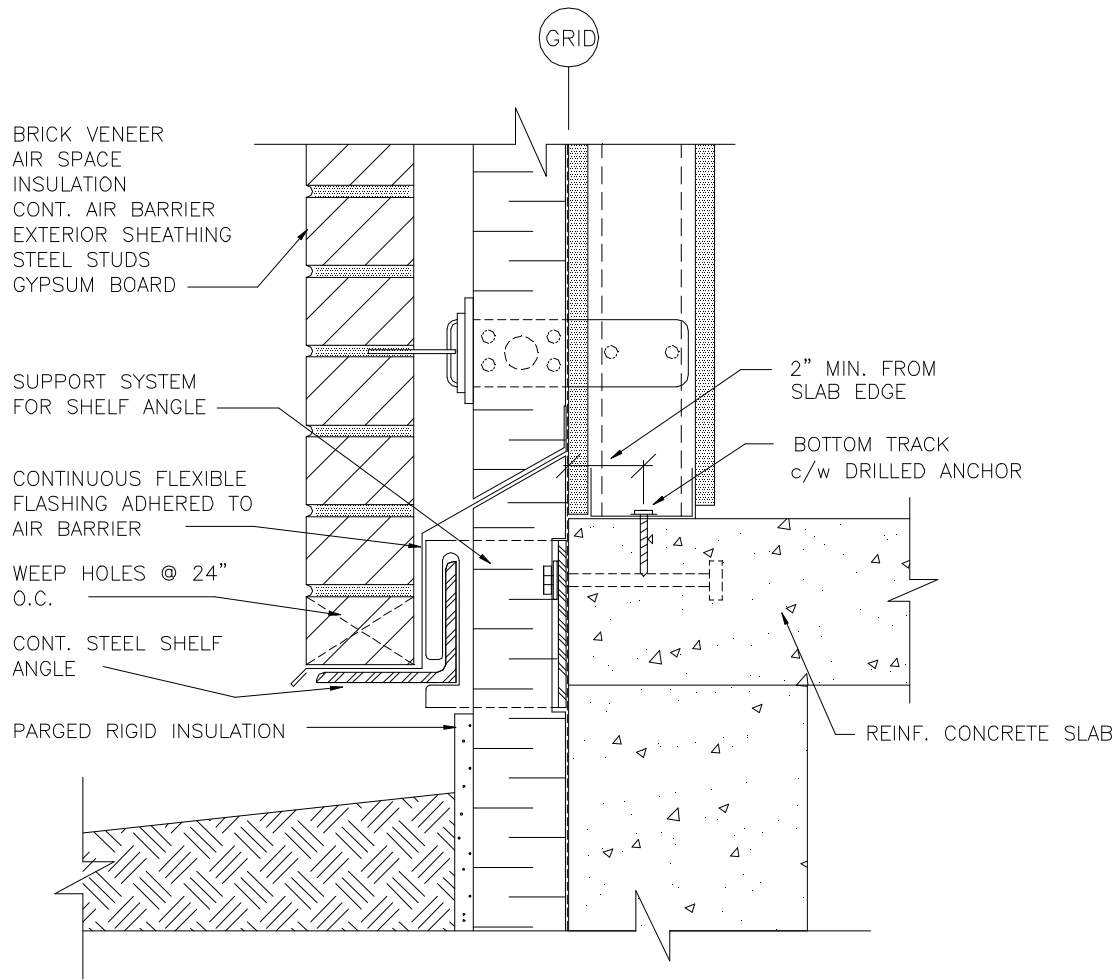


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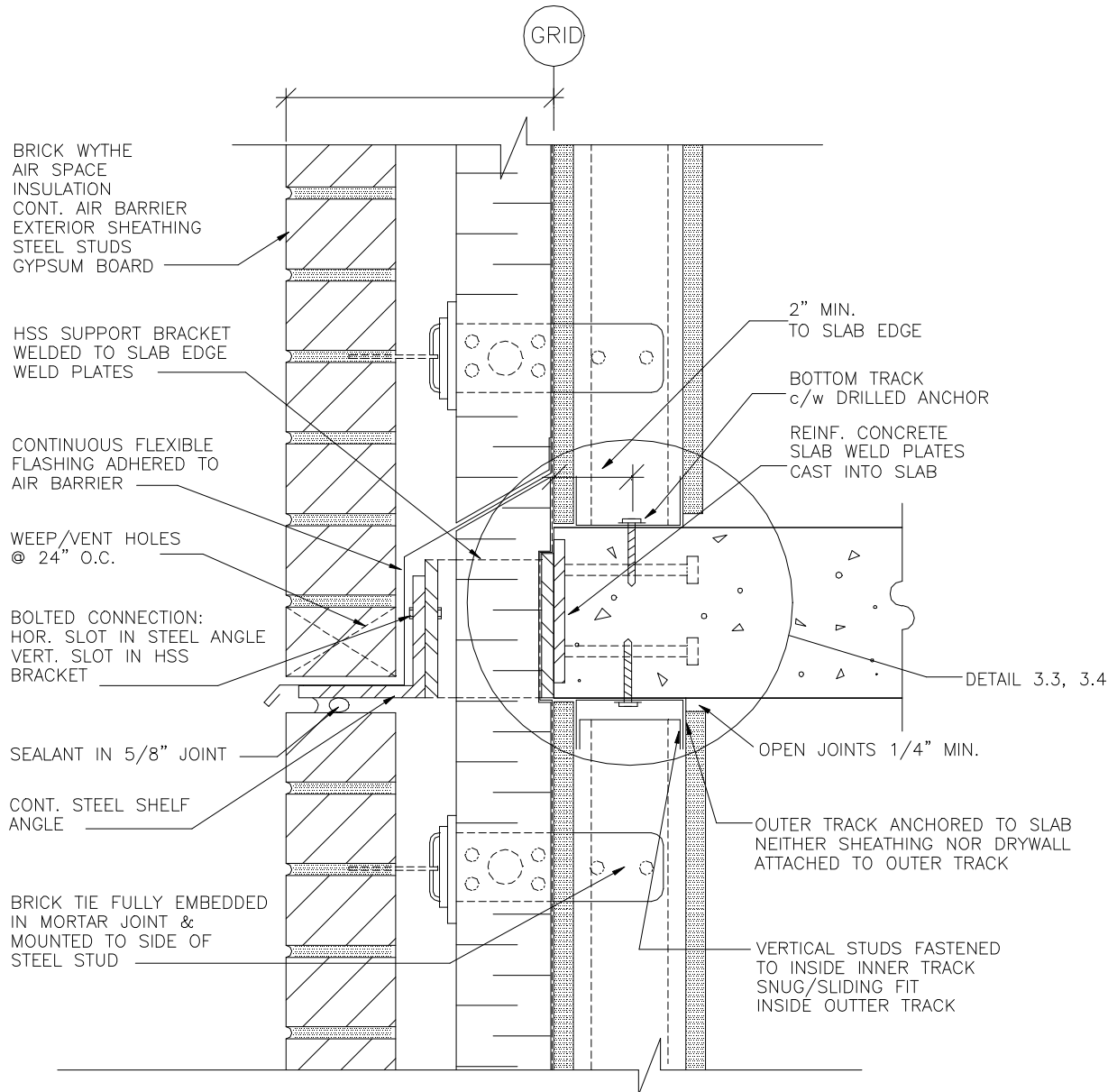
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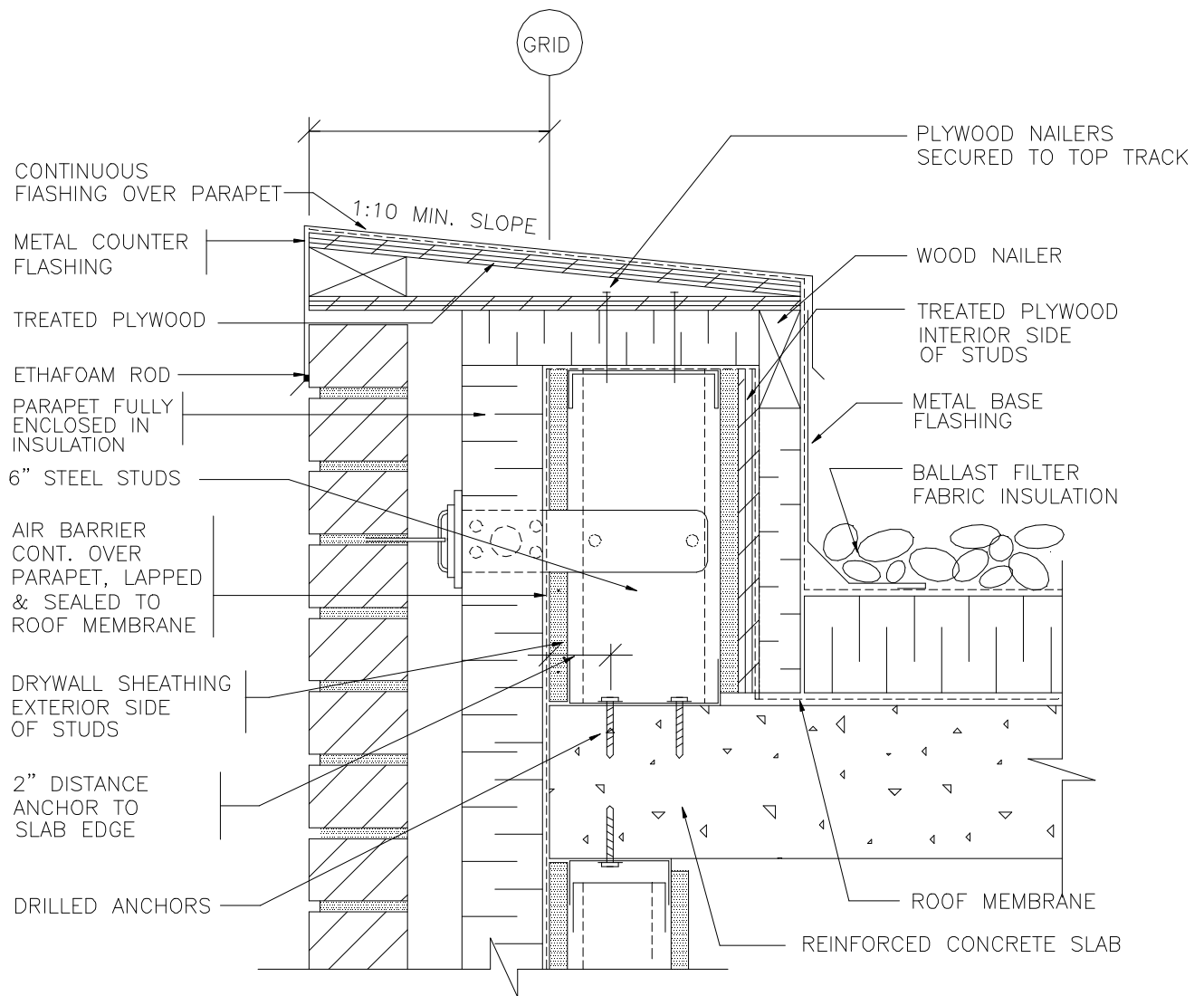
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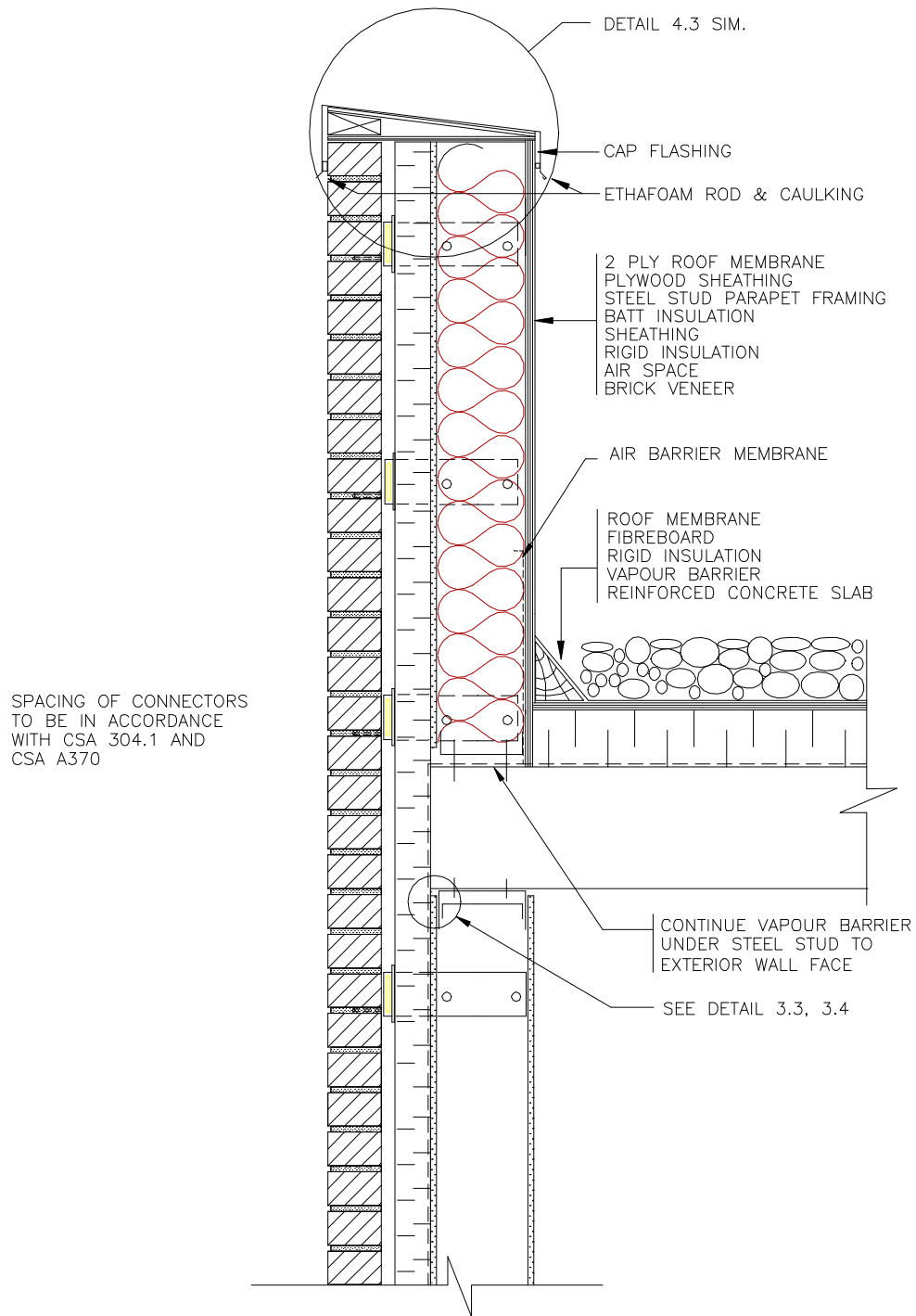
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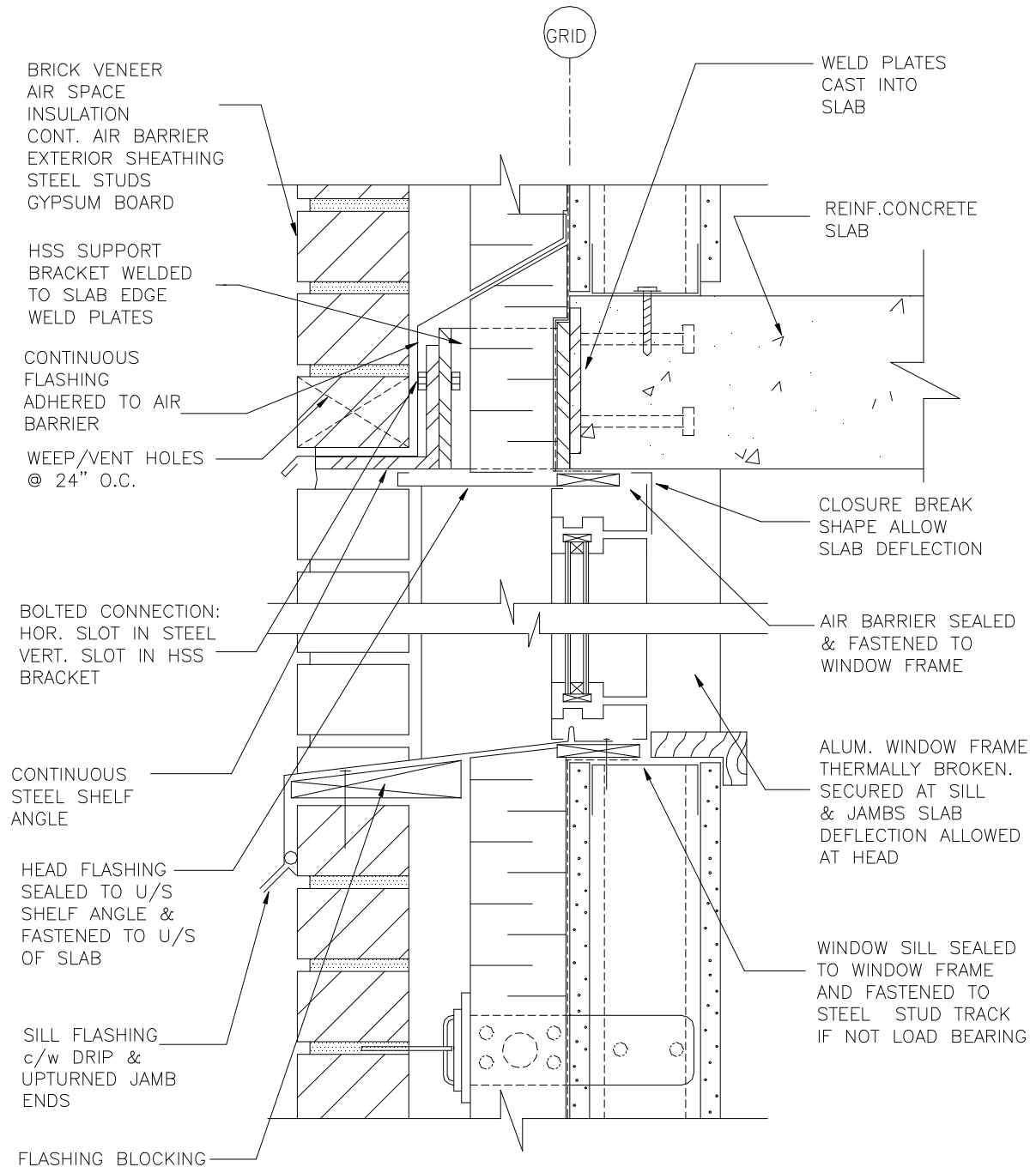
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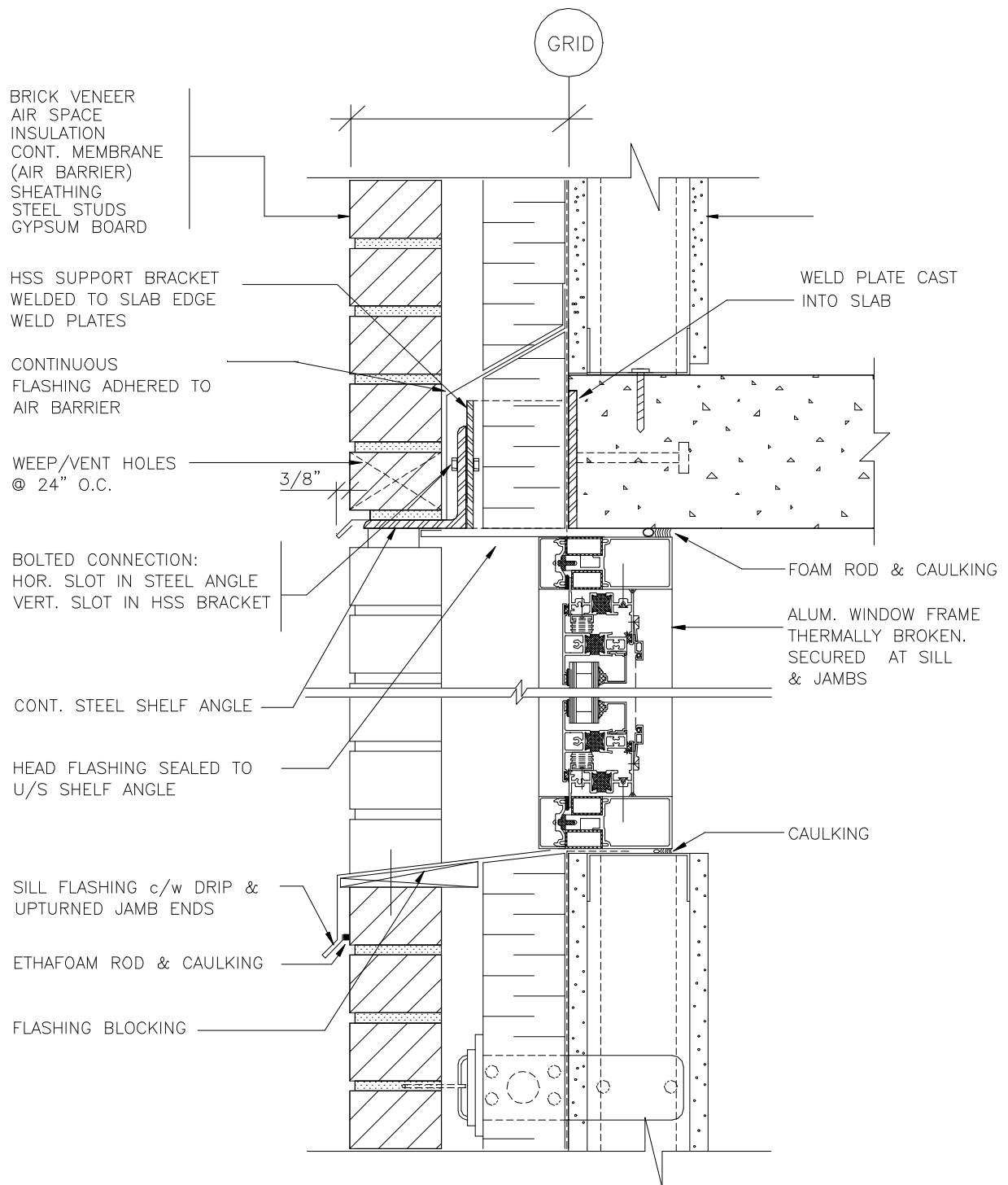
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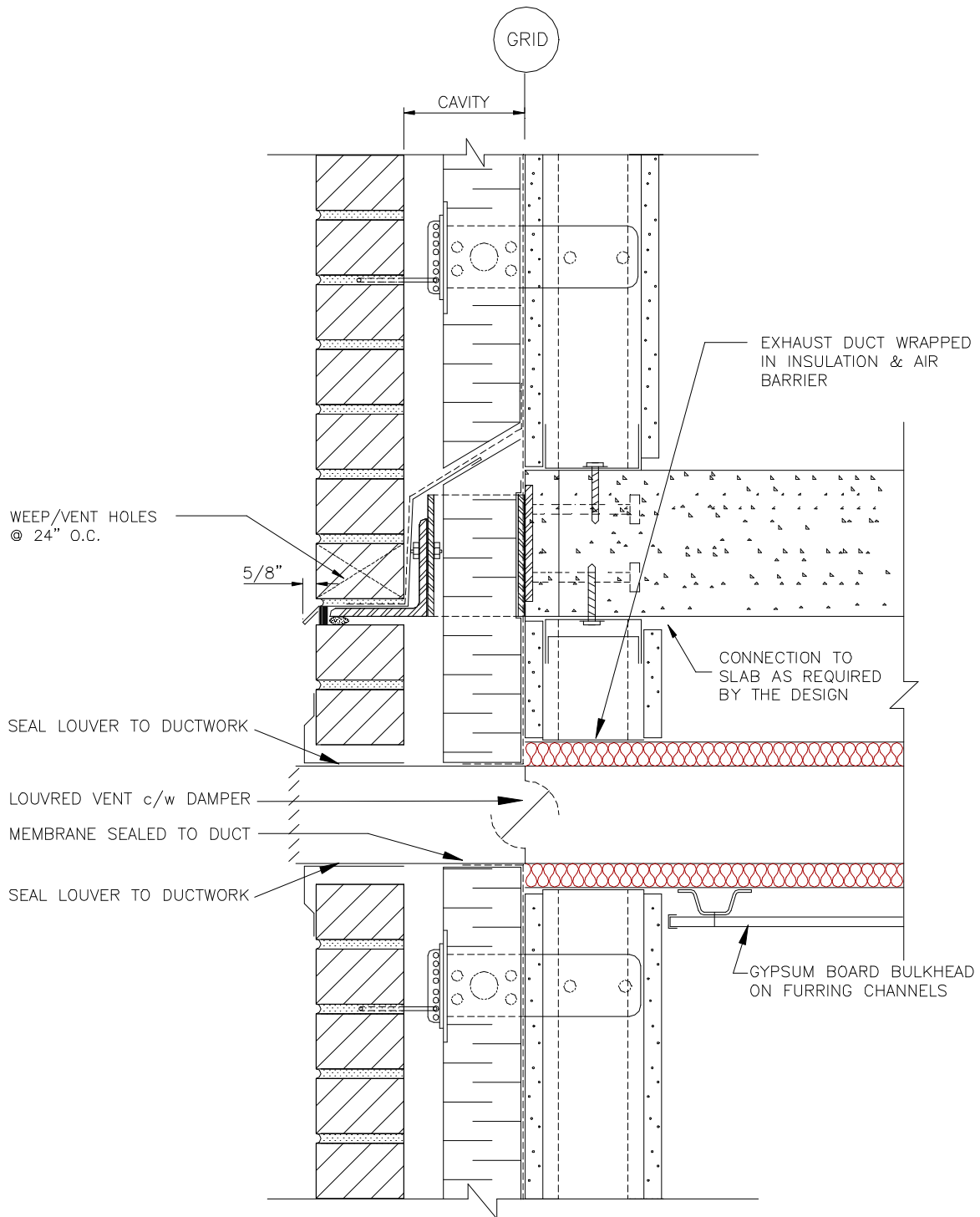
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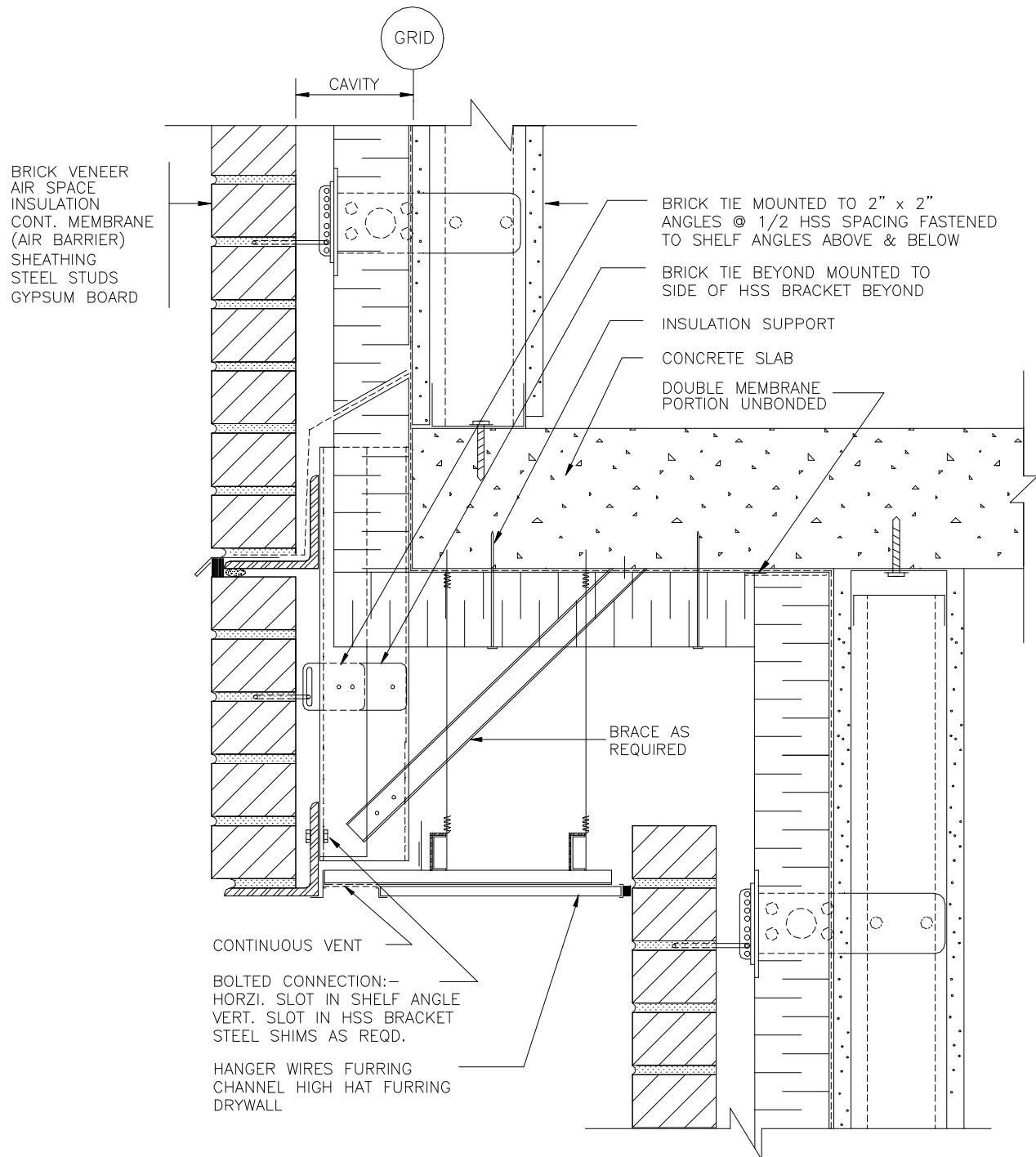
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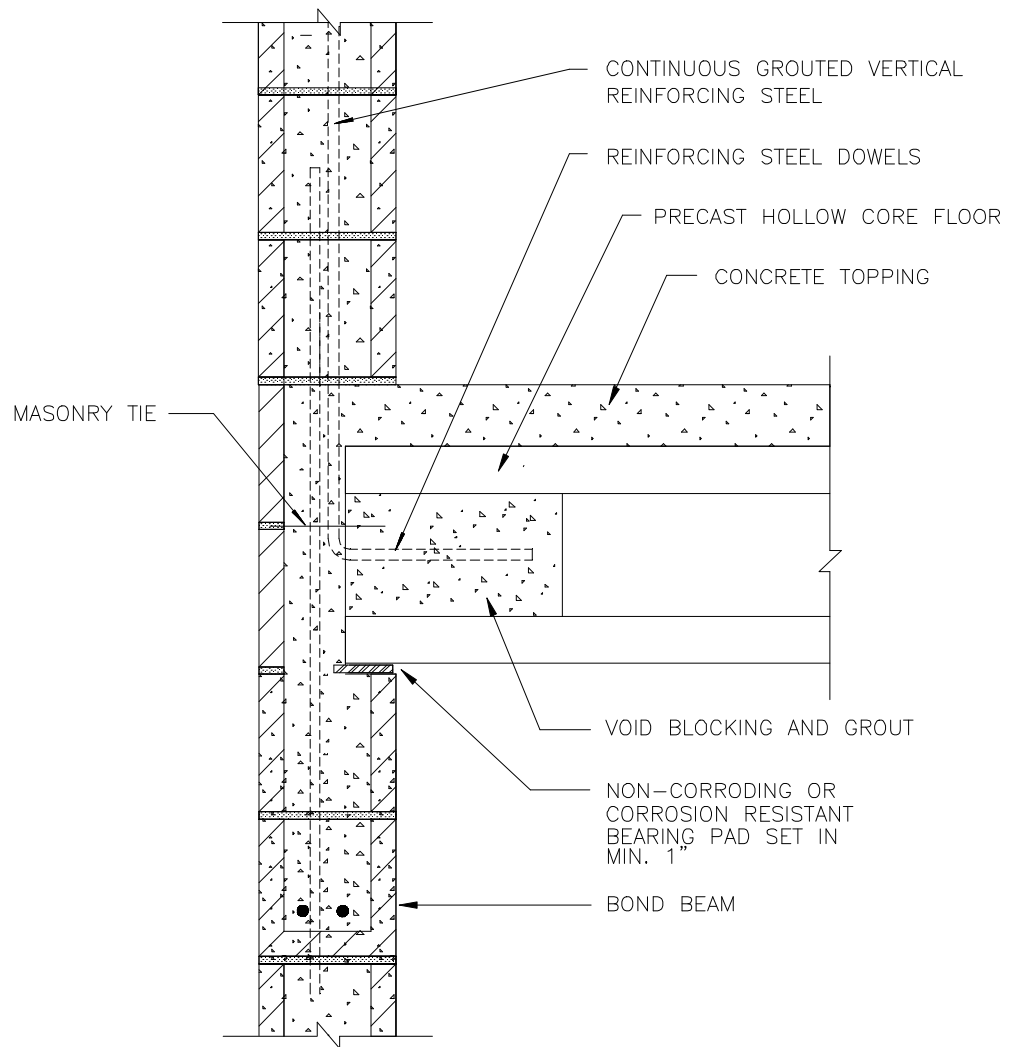


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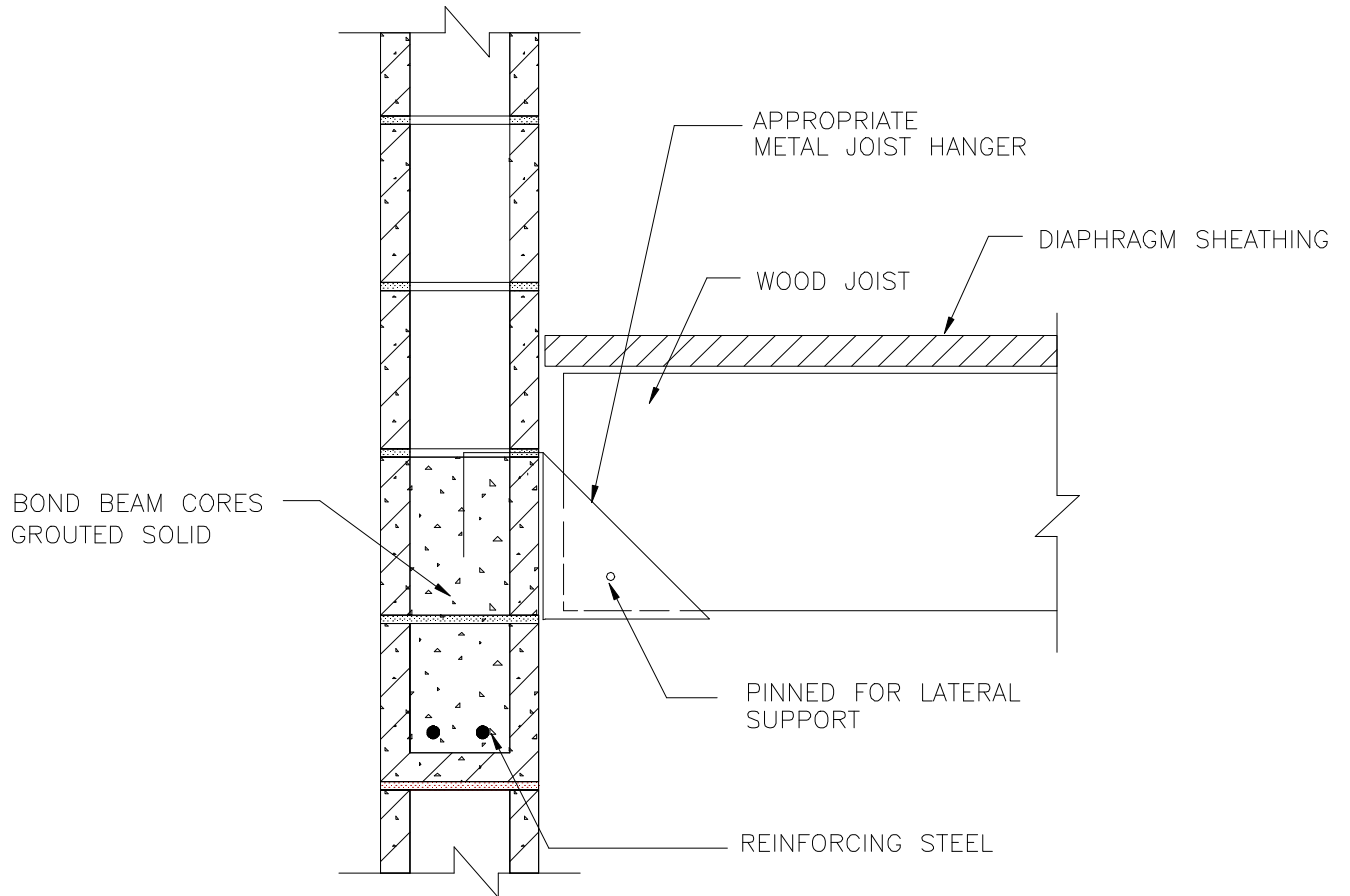
CHAPTER 5

SINGLE WYTHER LOADBEARING MASONRY WALL DETAILS

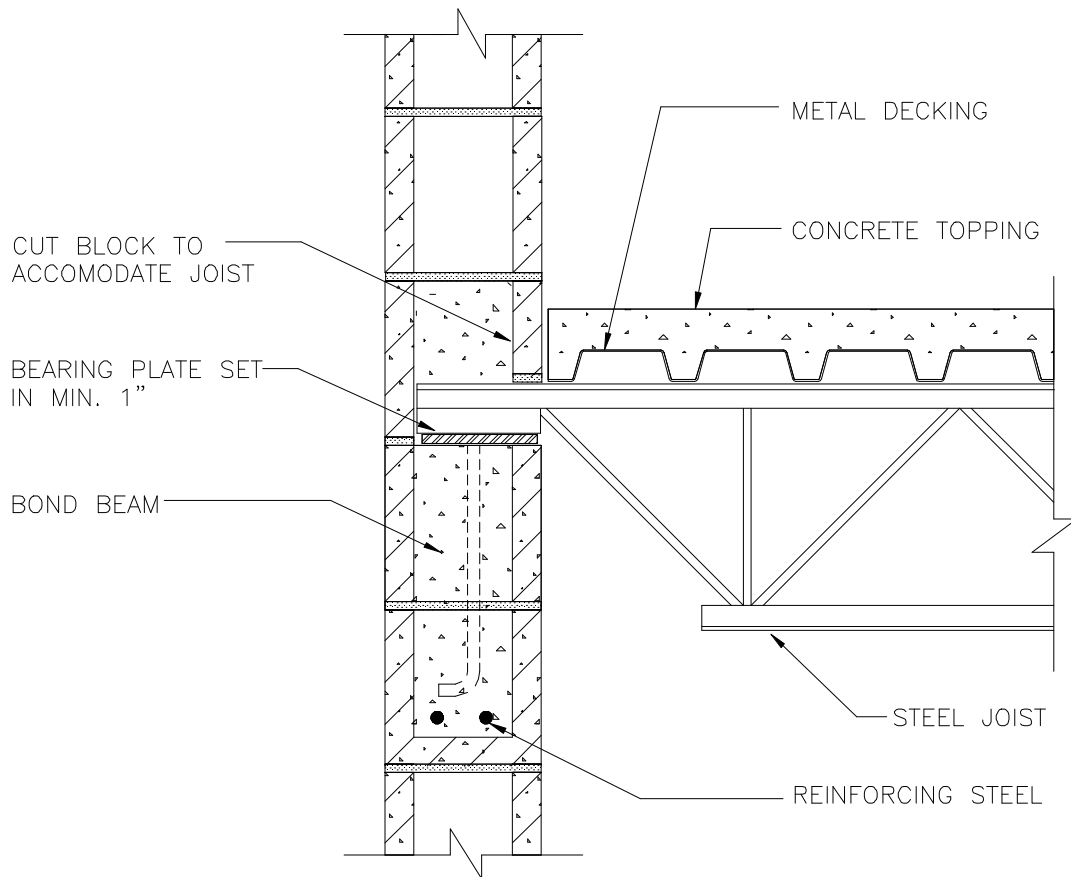
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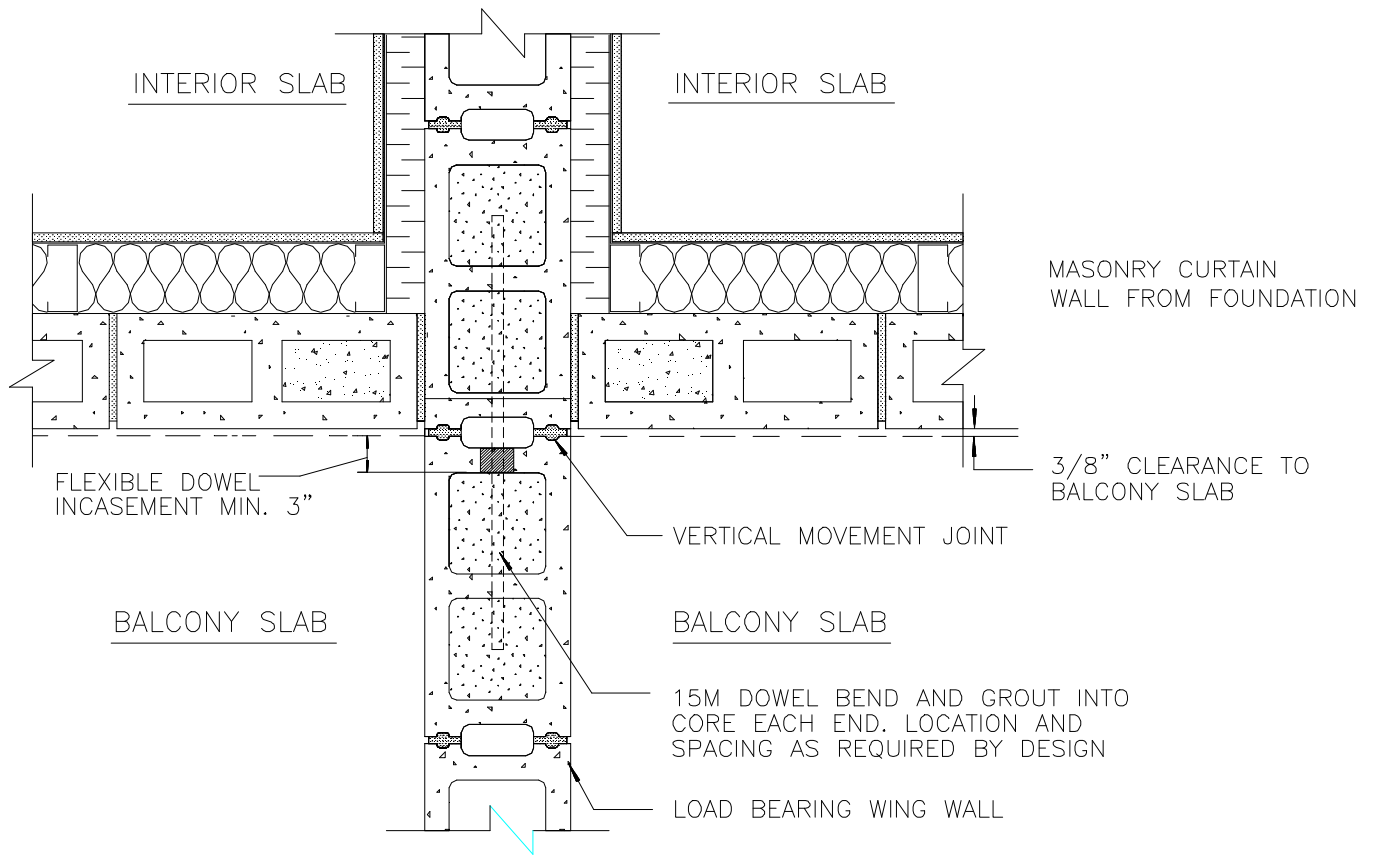
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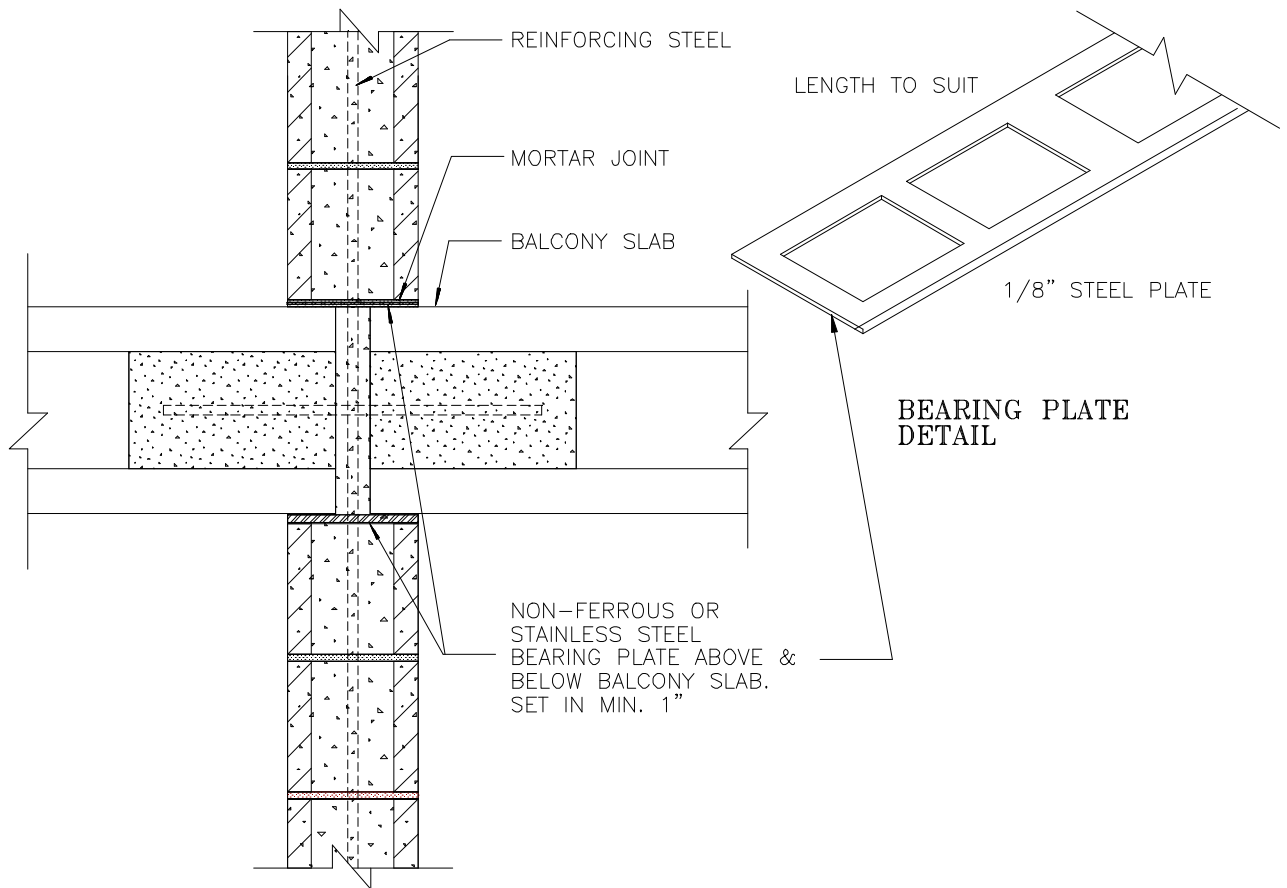
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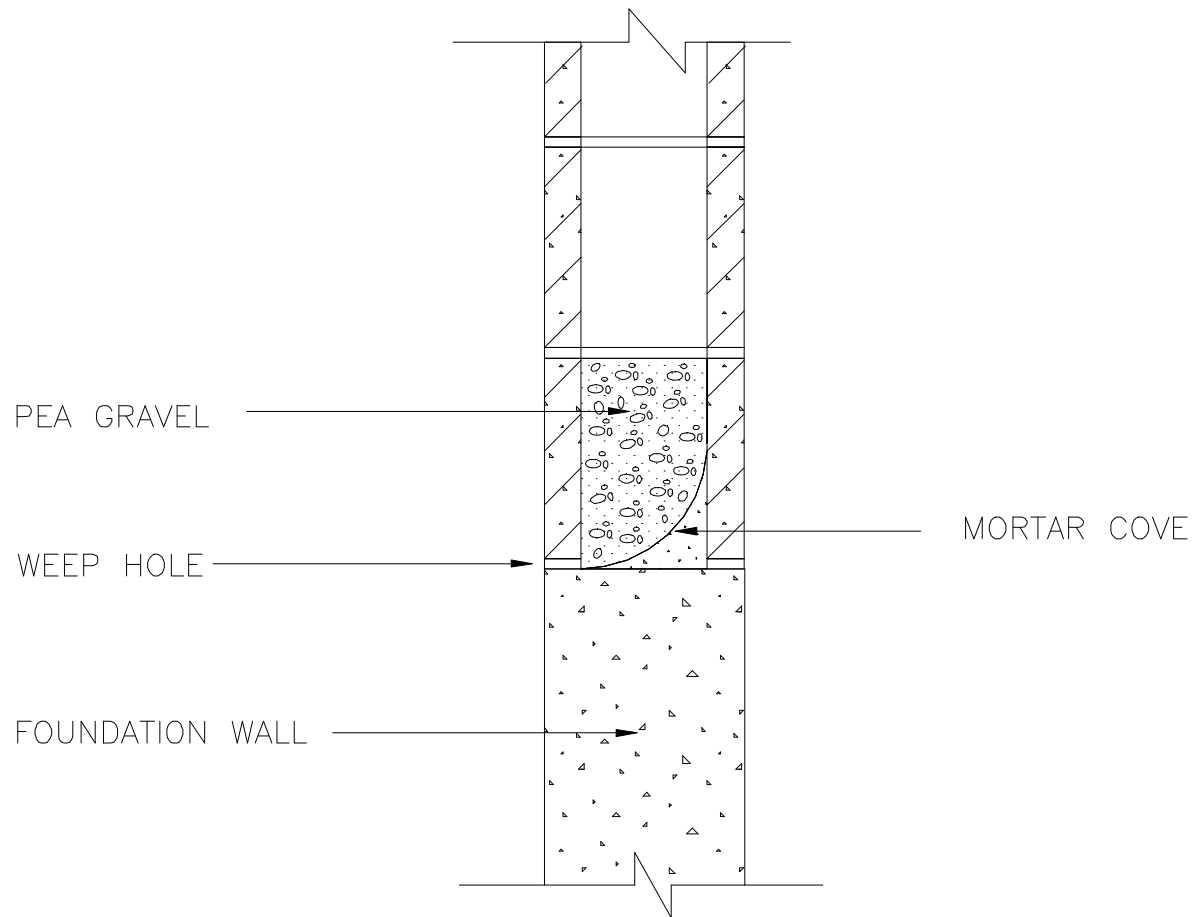
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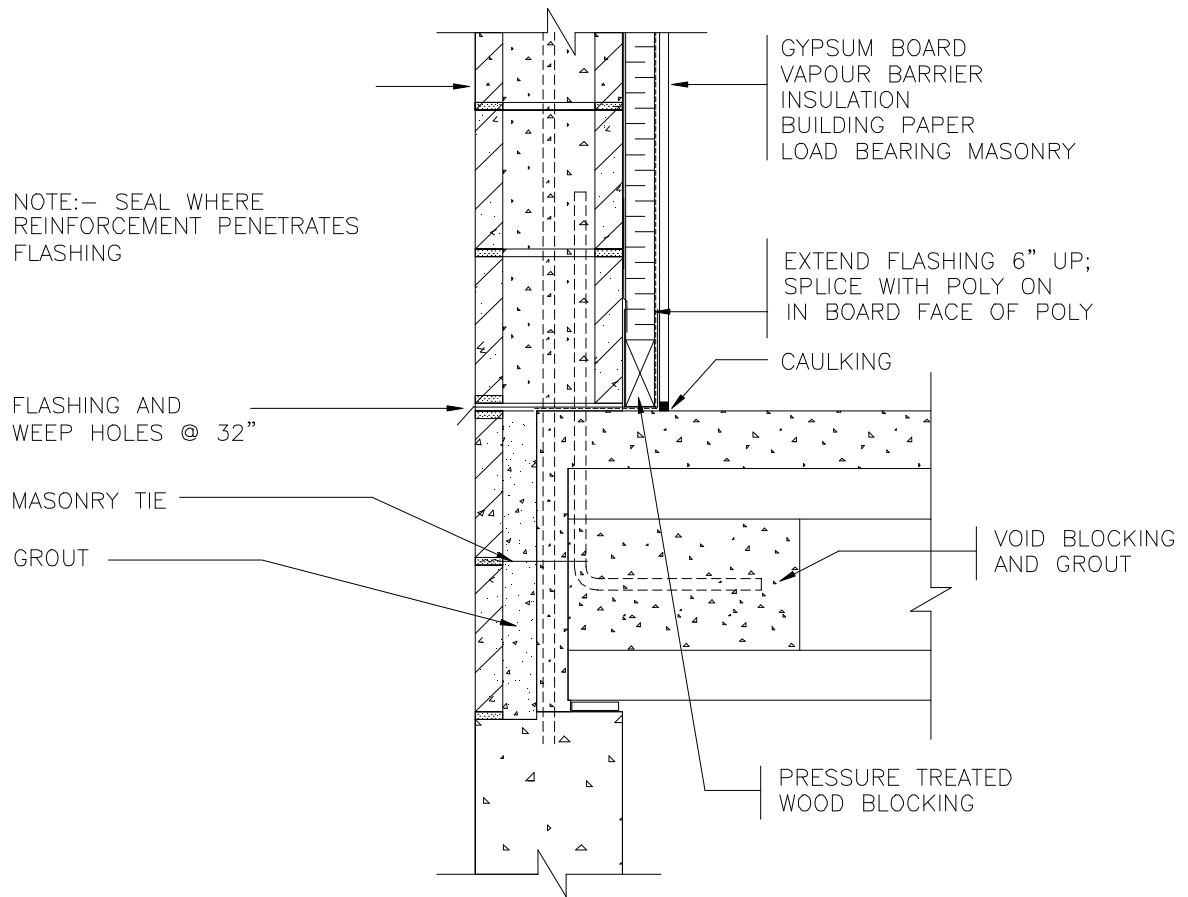
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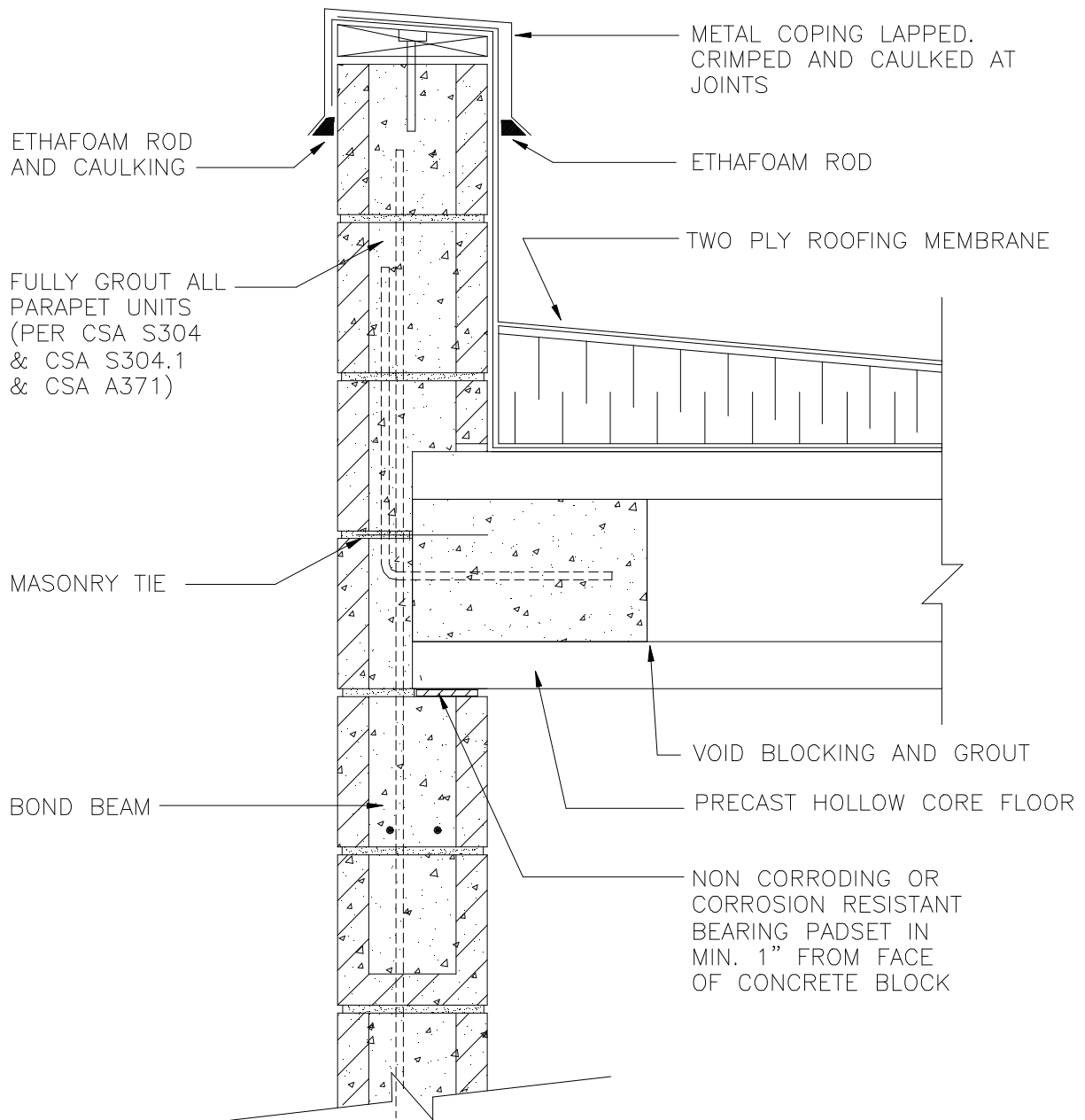
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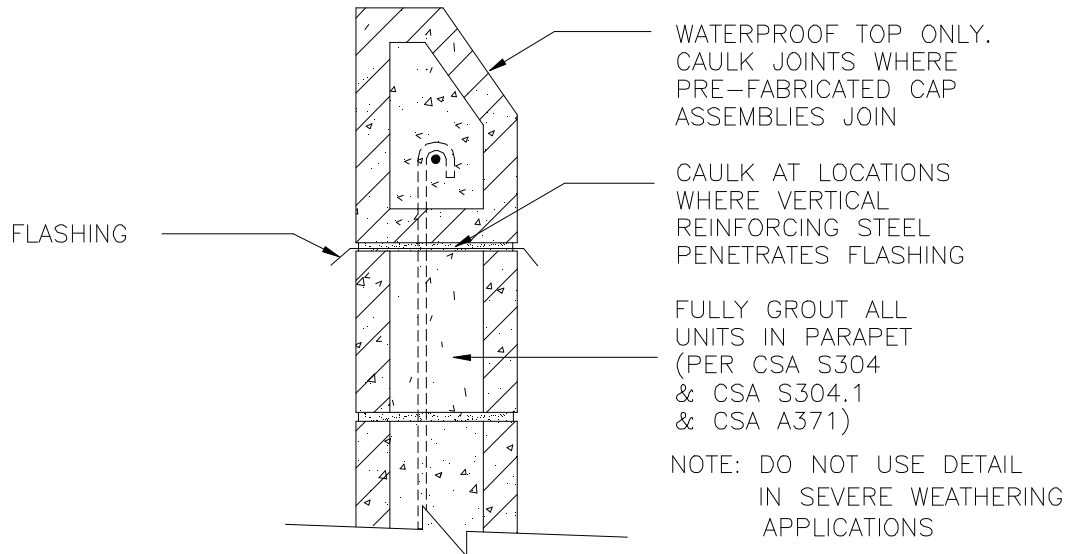
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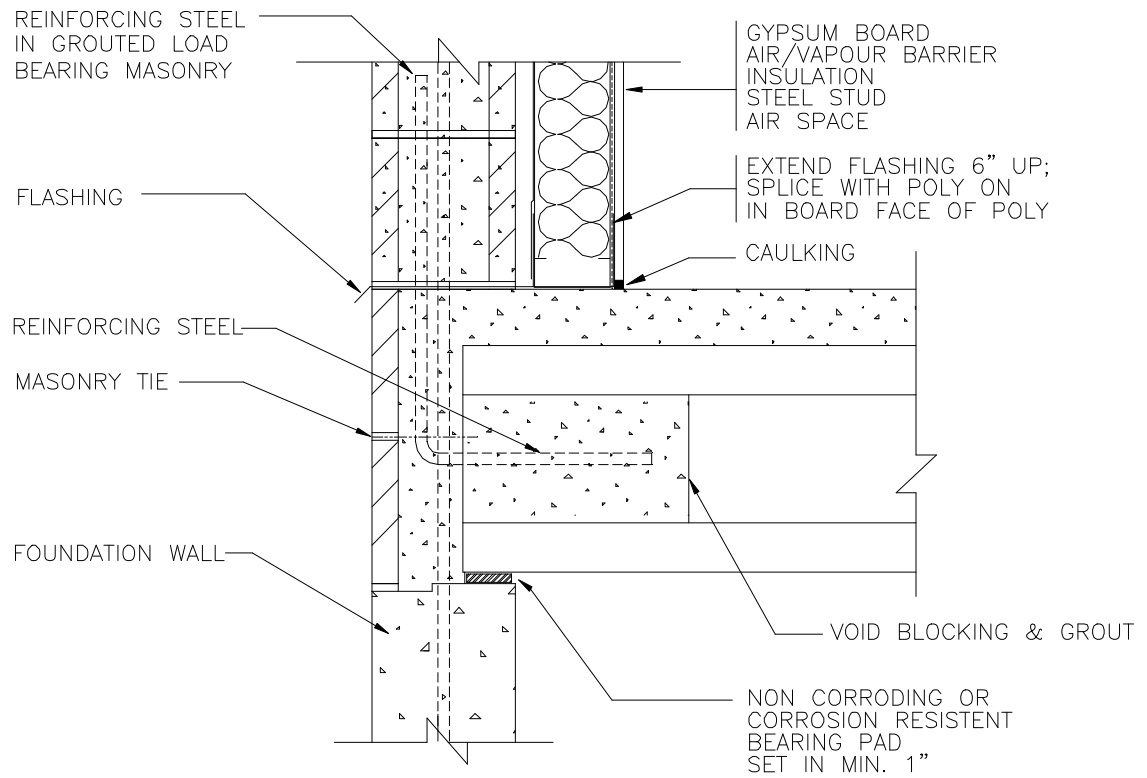
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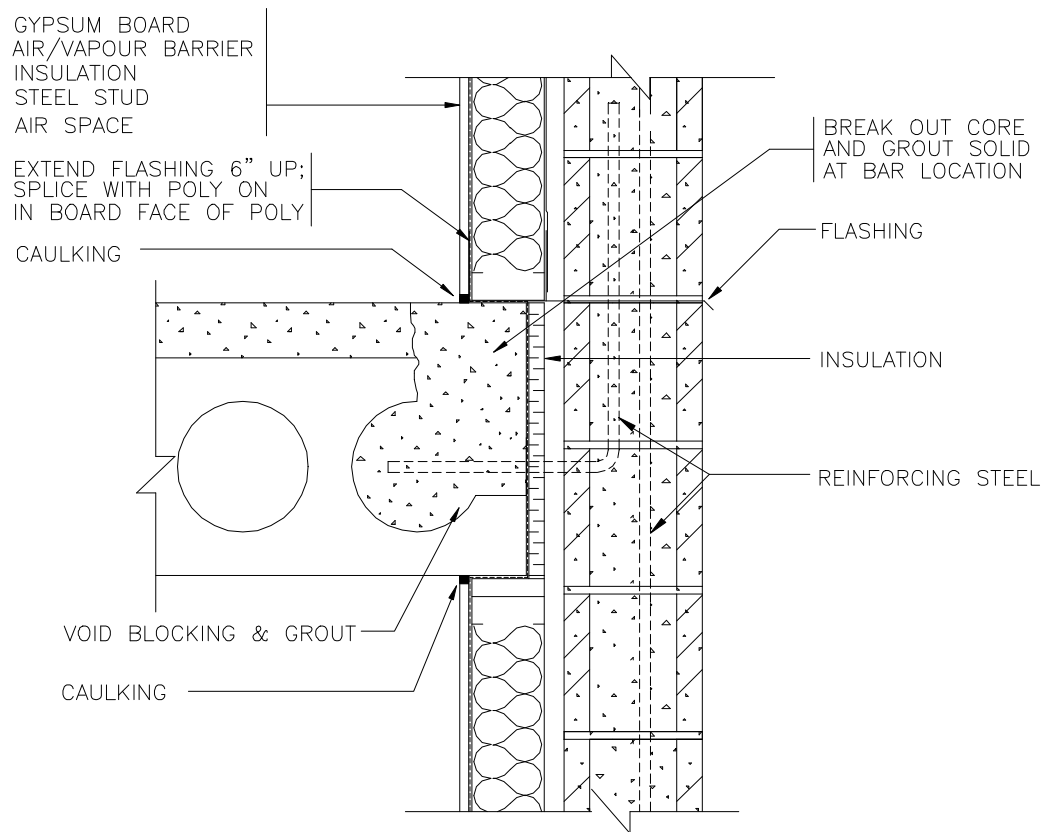
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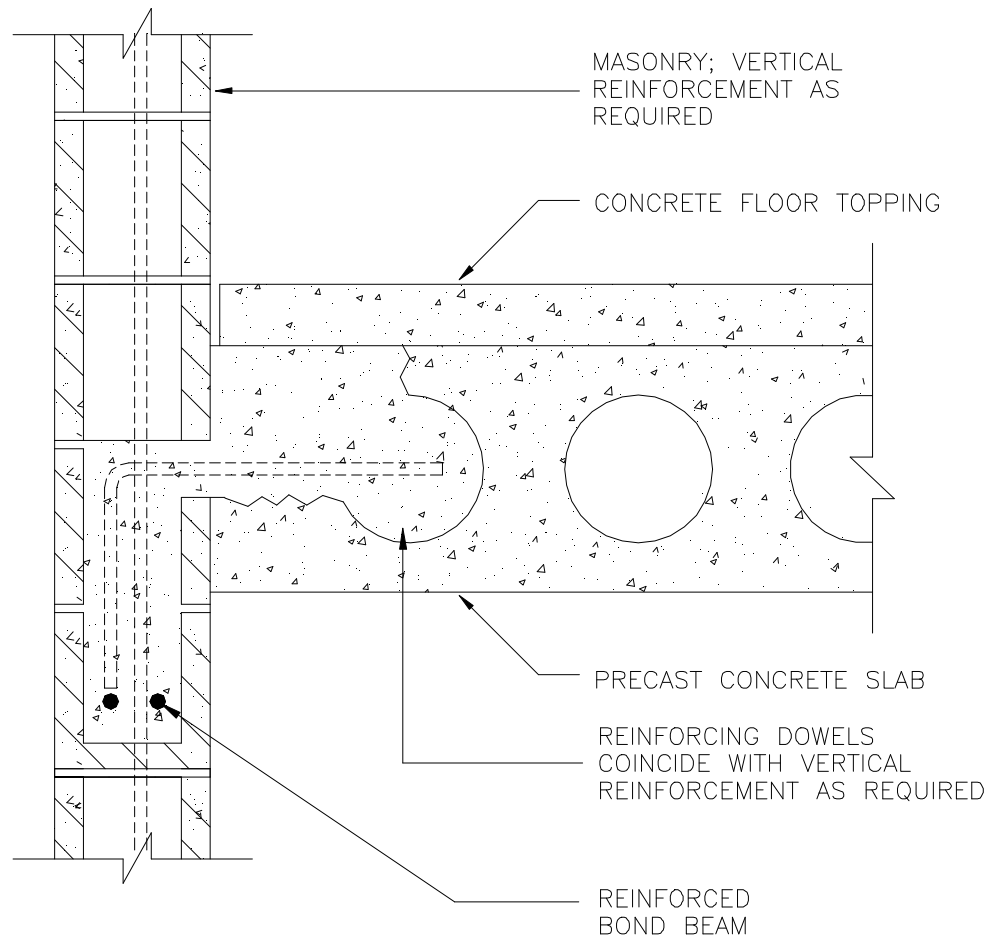
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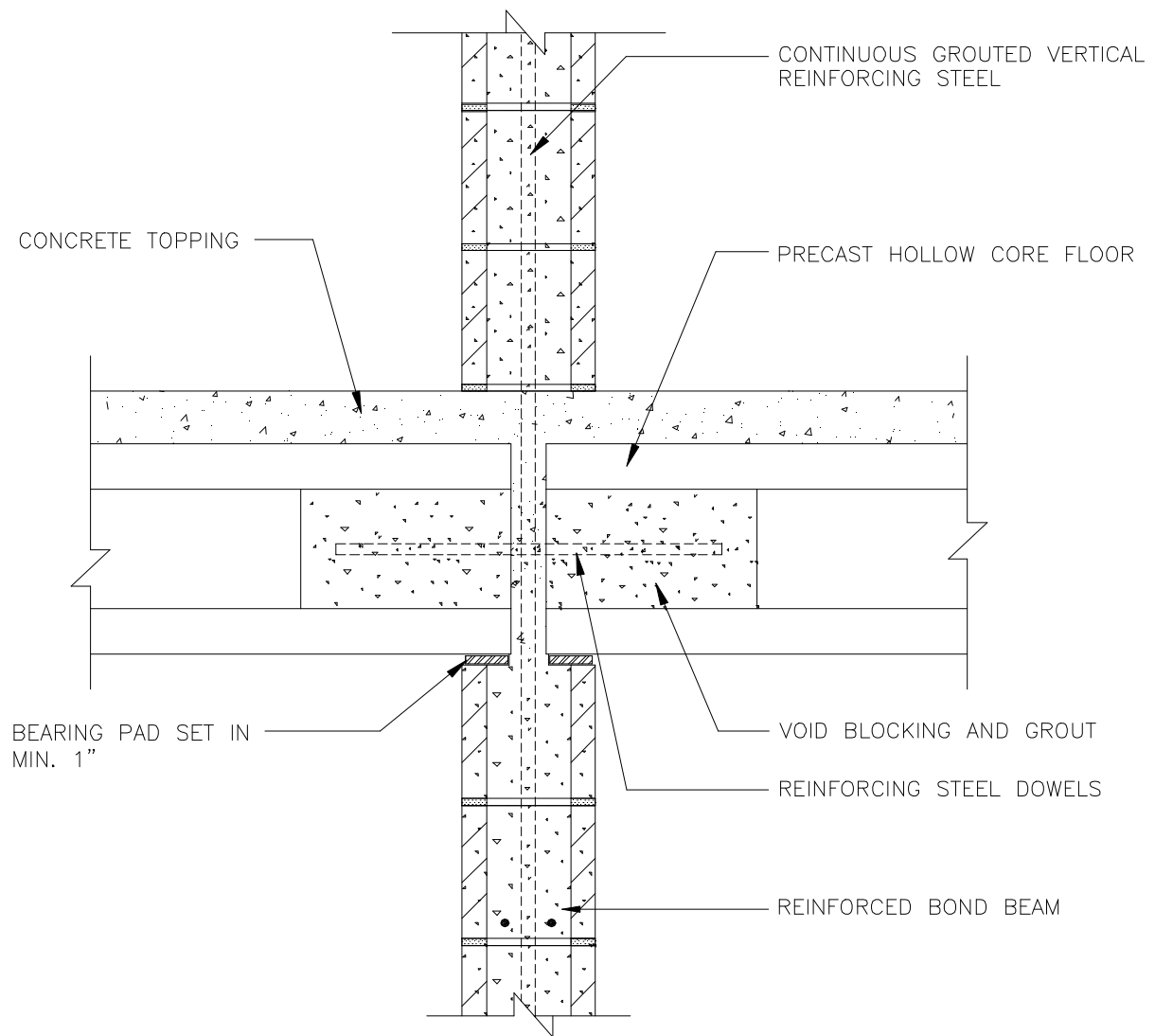
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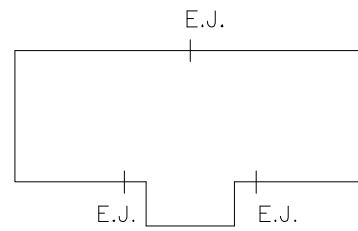
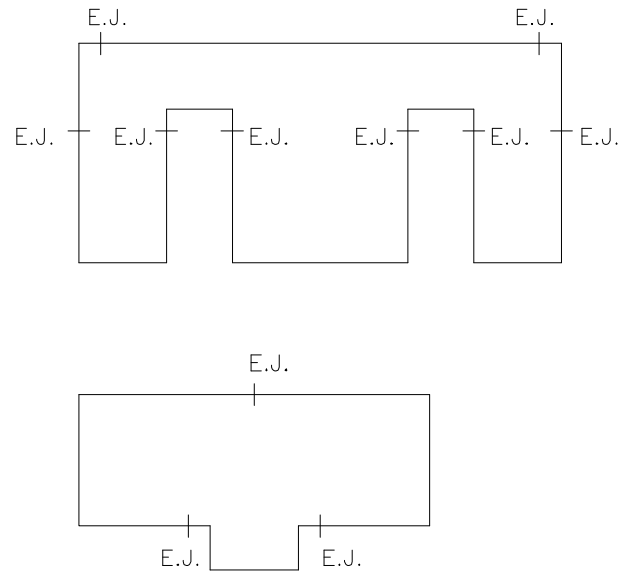
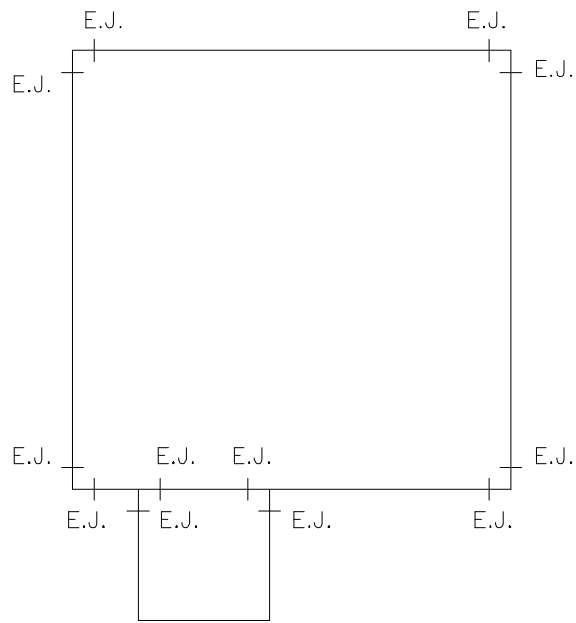
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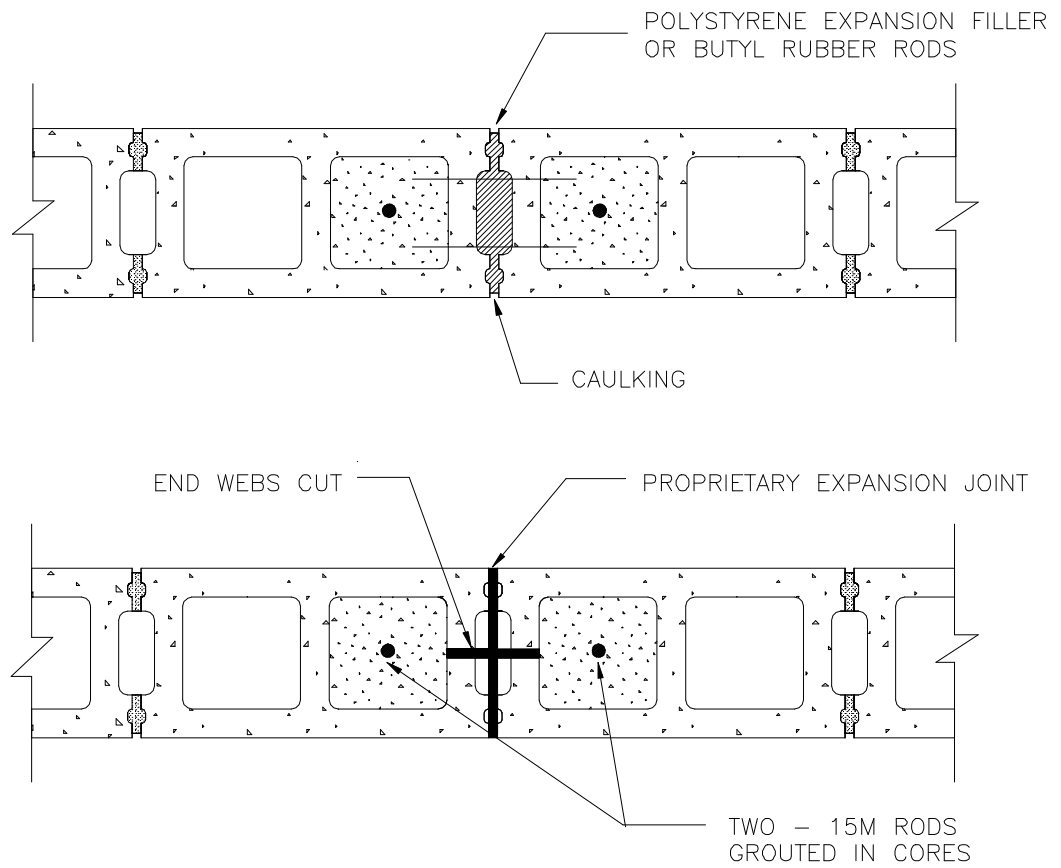
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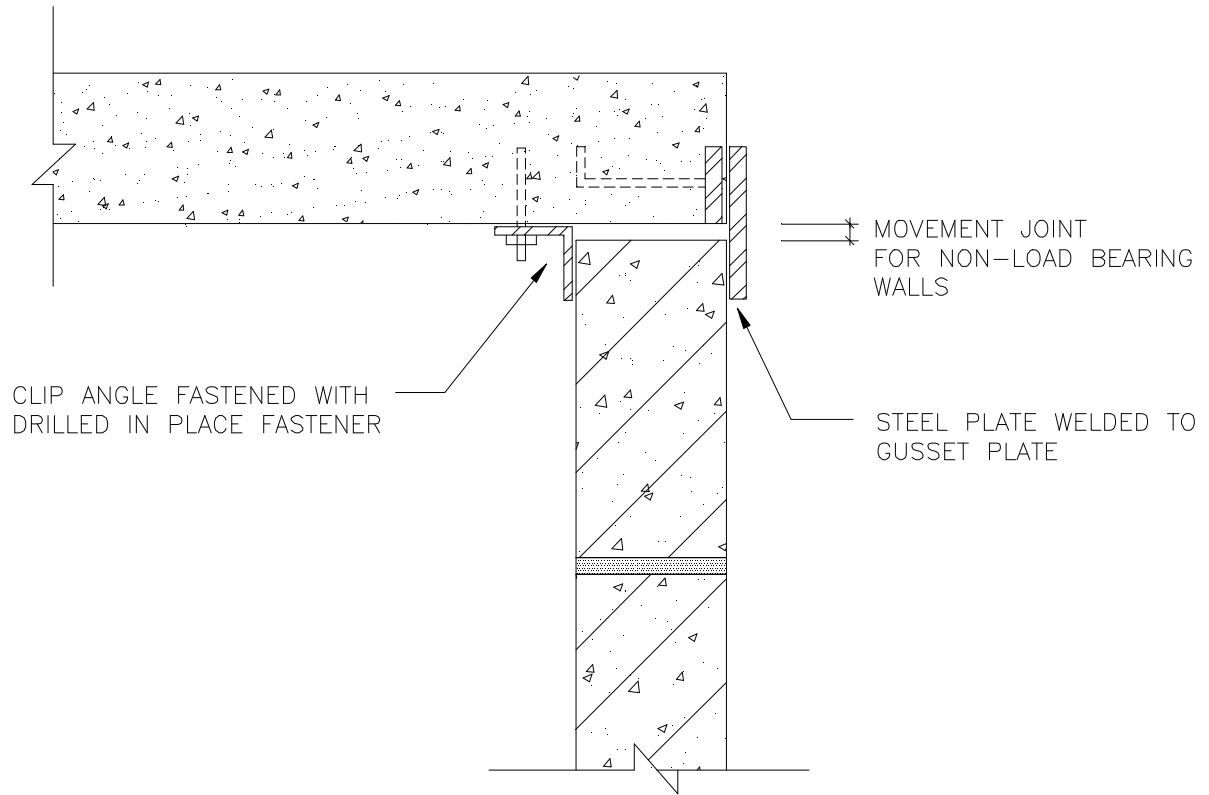
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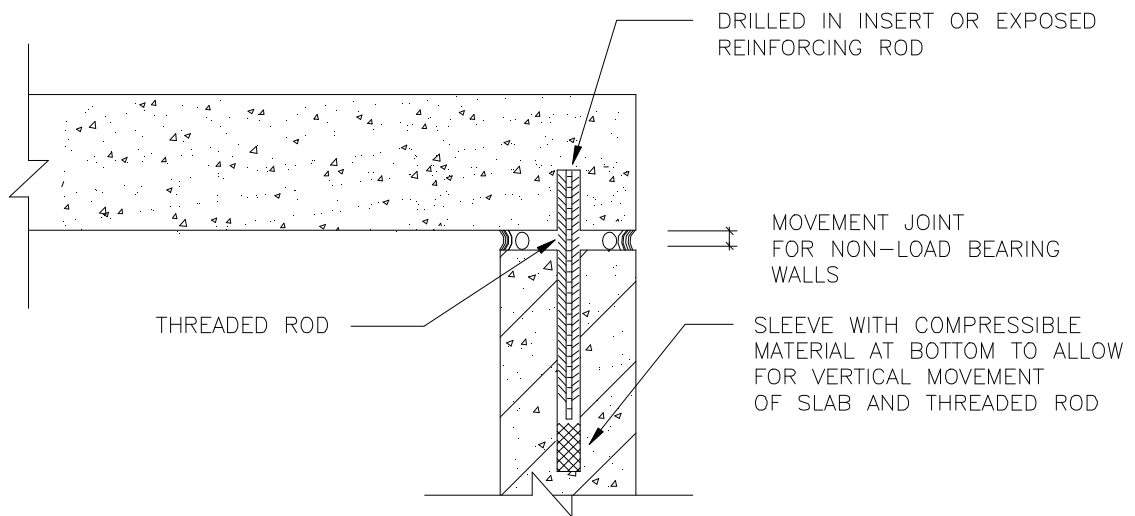
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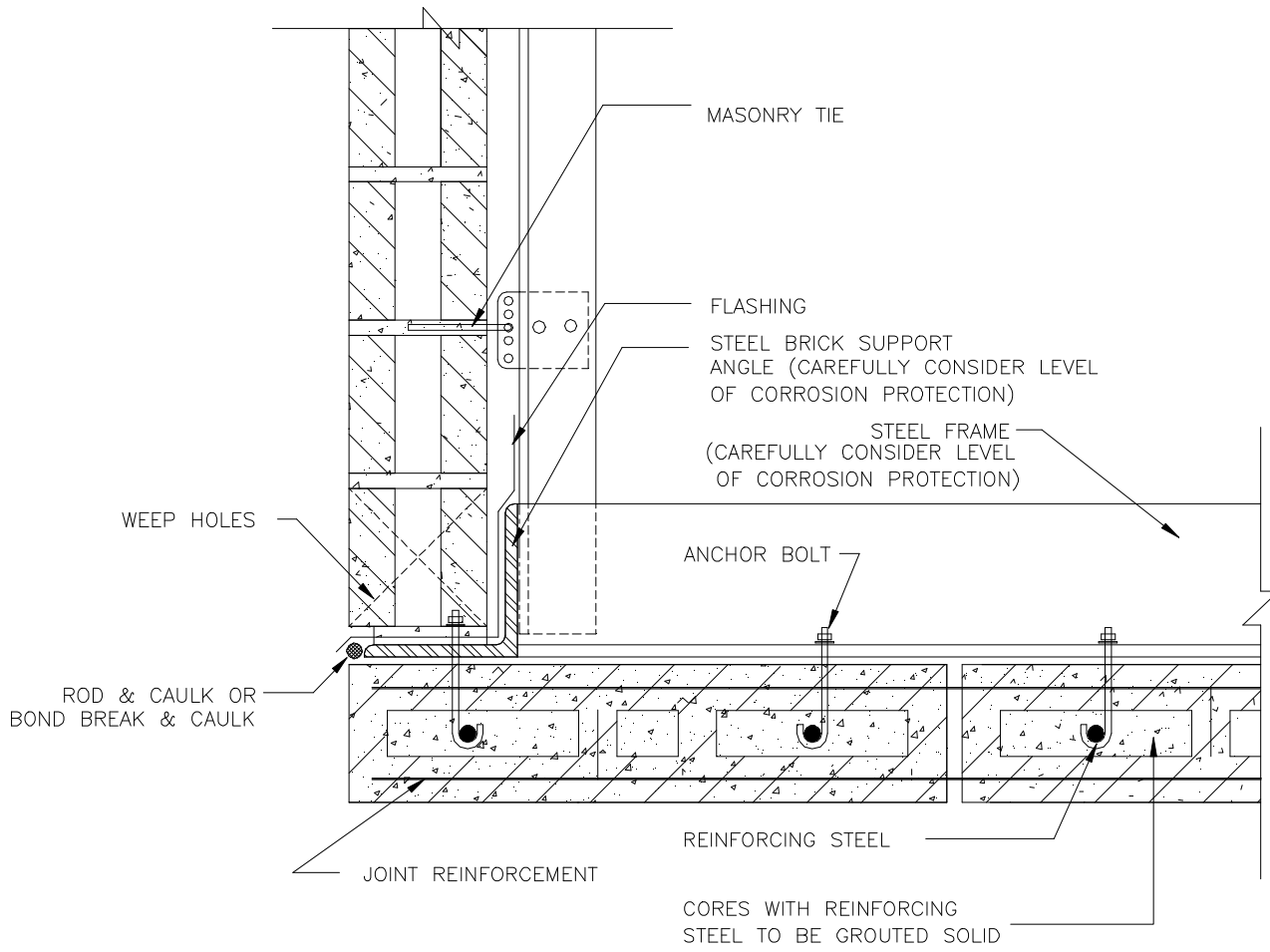
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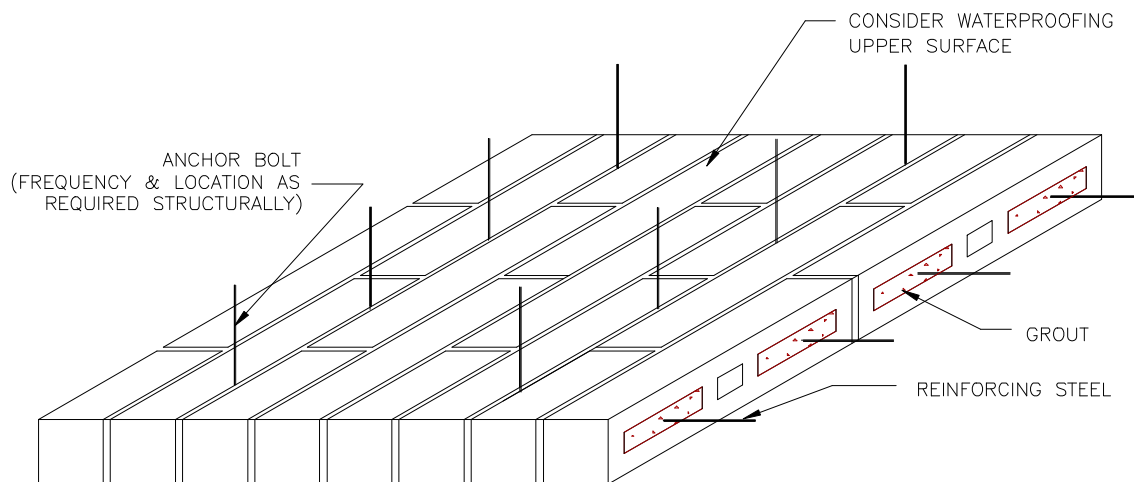
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Detail 6.1 – Installed Soffit Detail

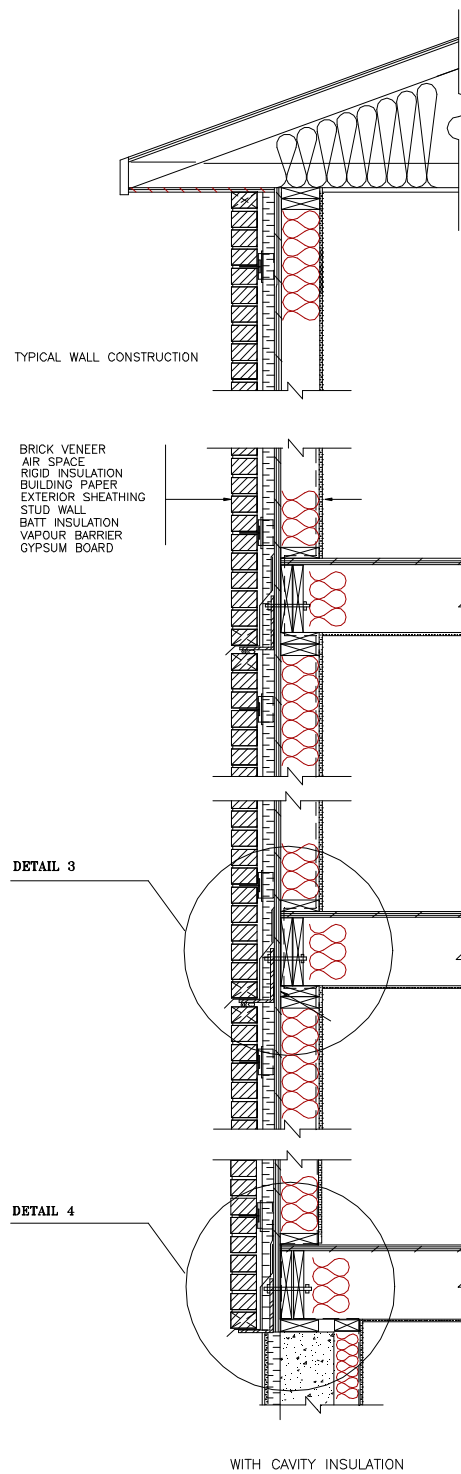
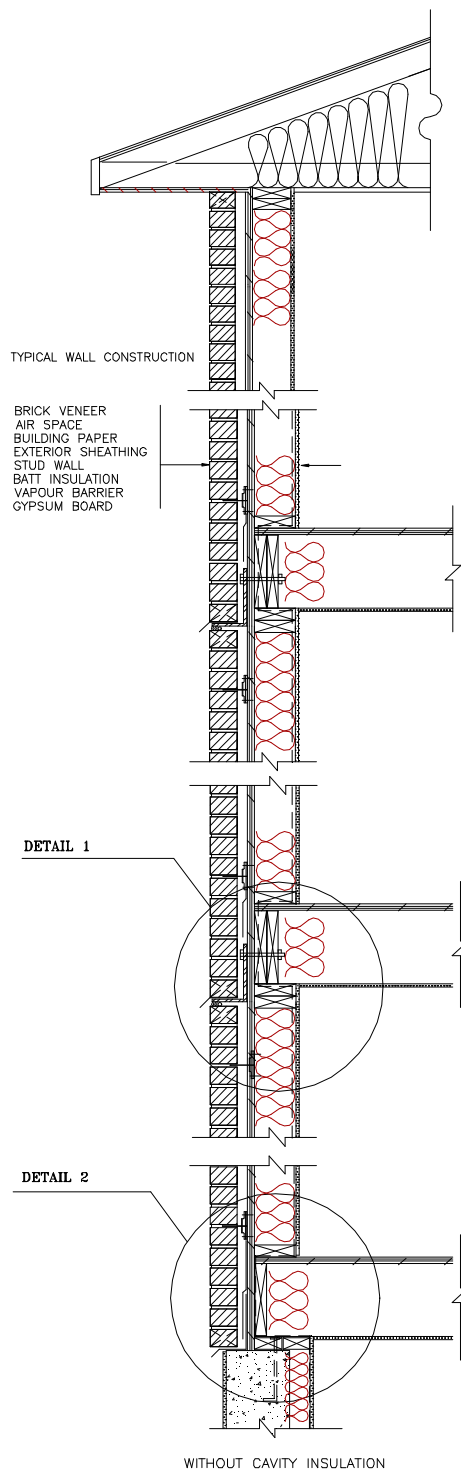


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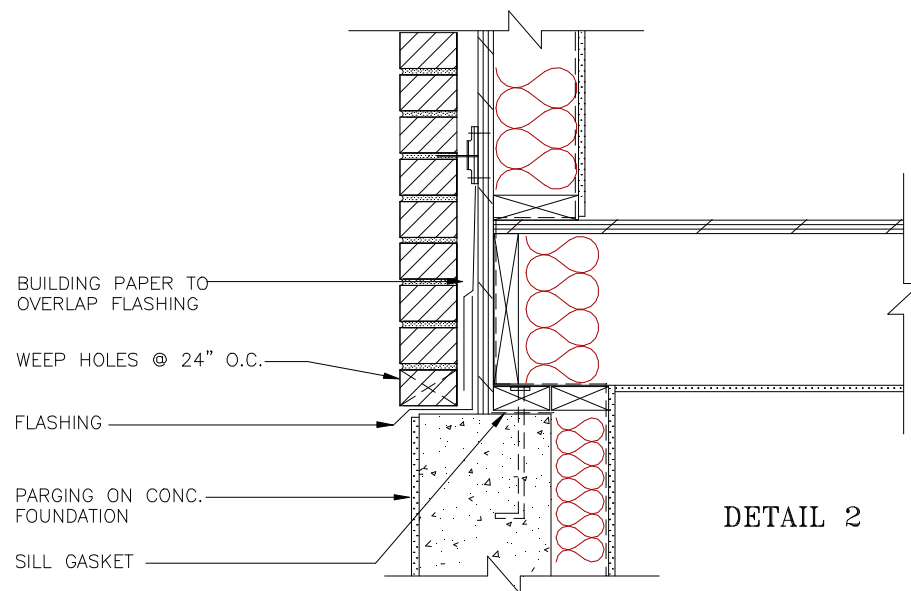
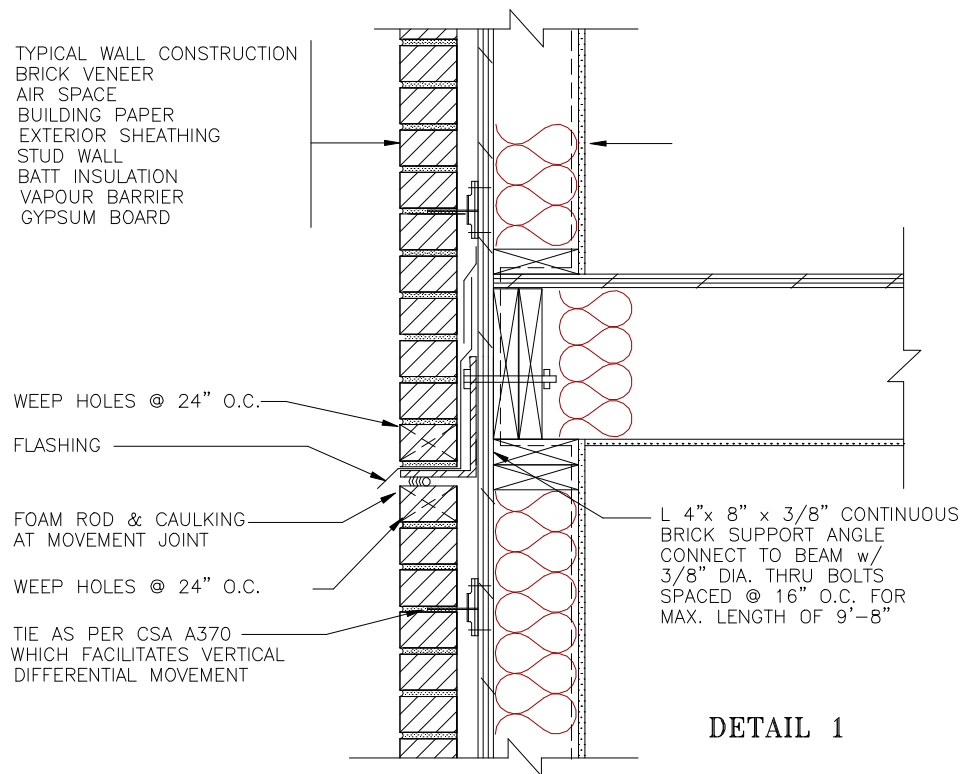
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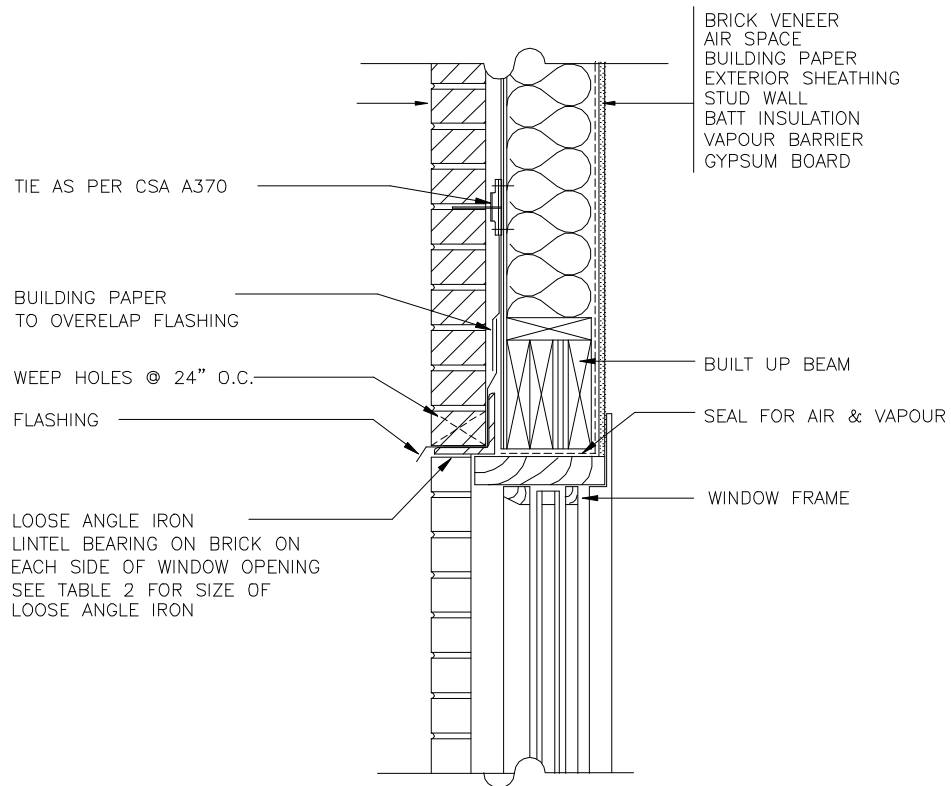
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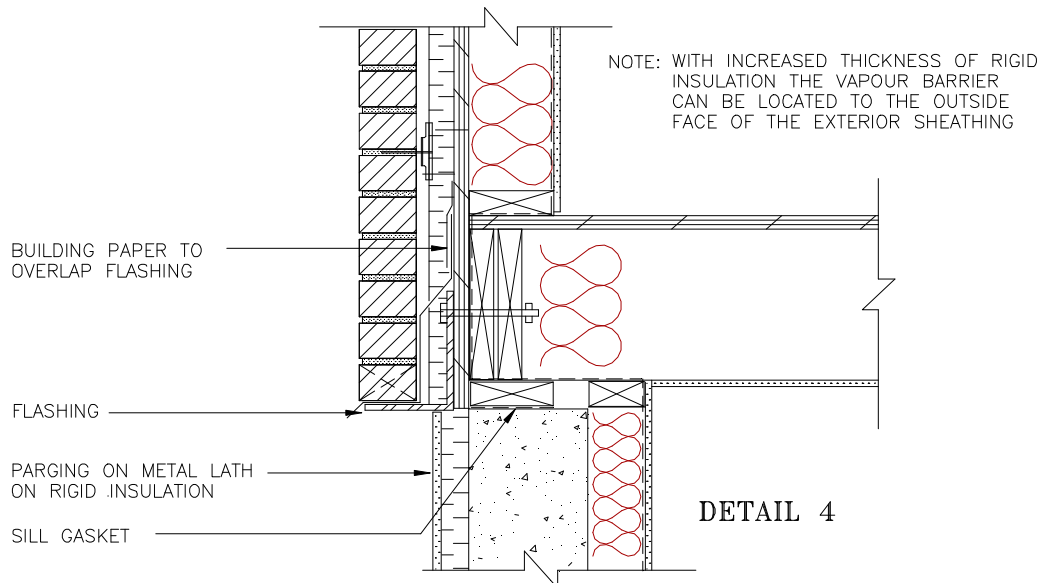
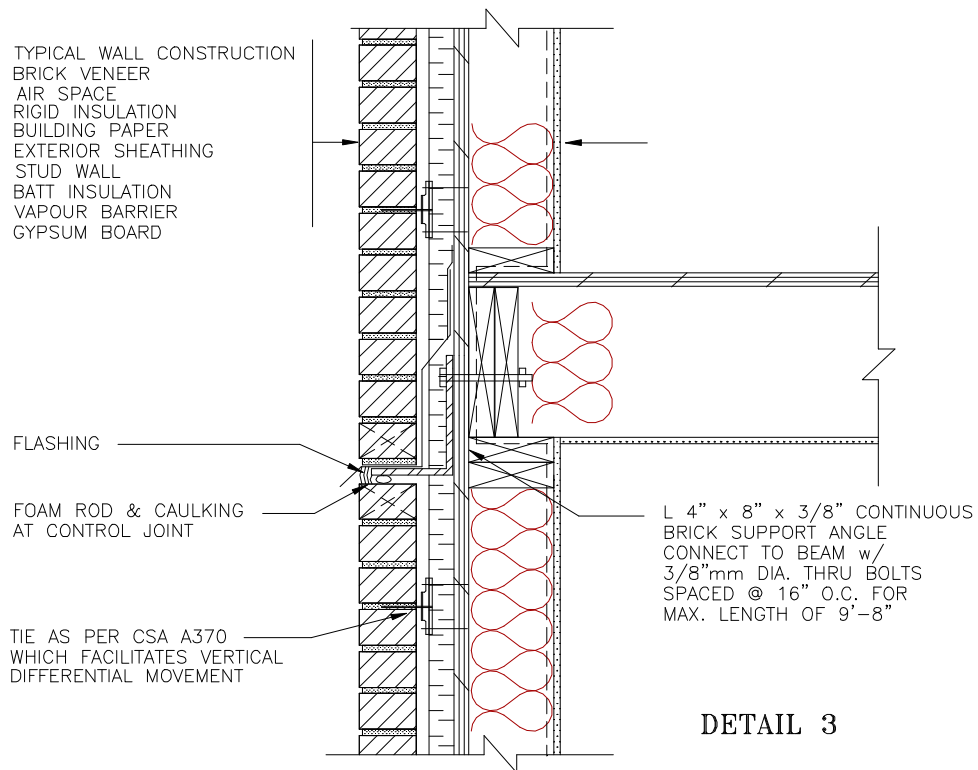
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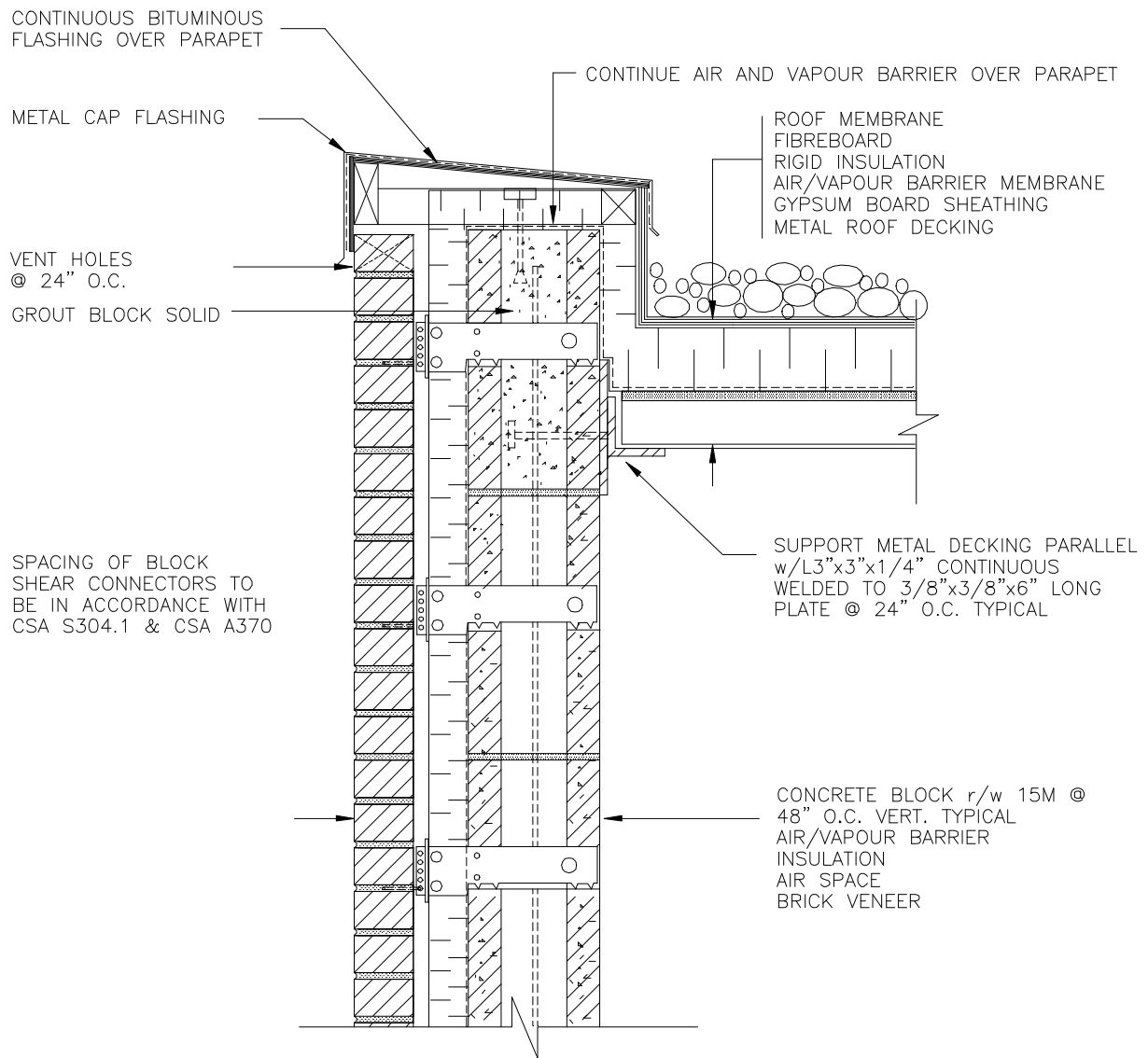


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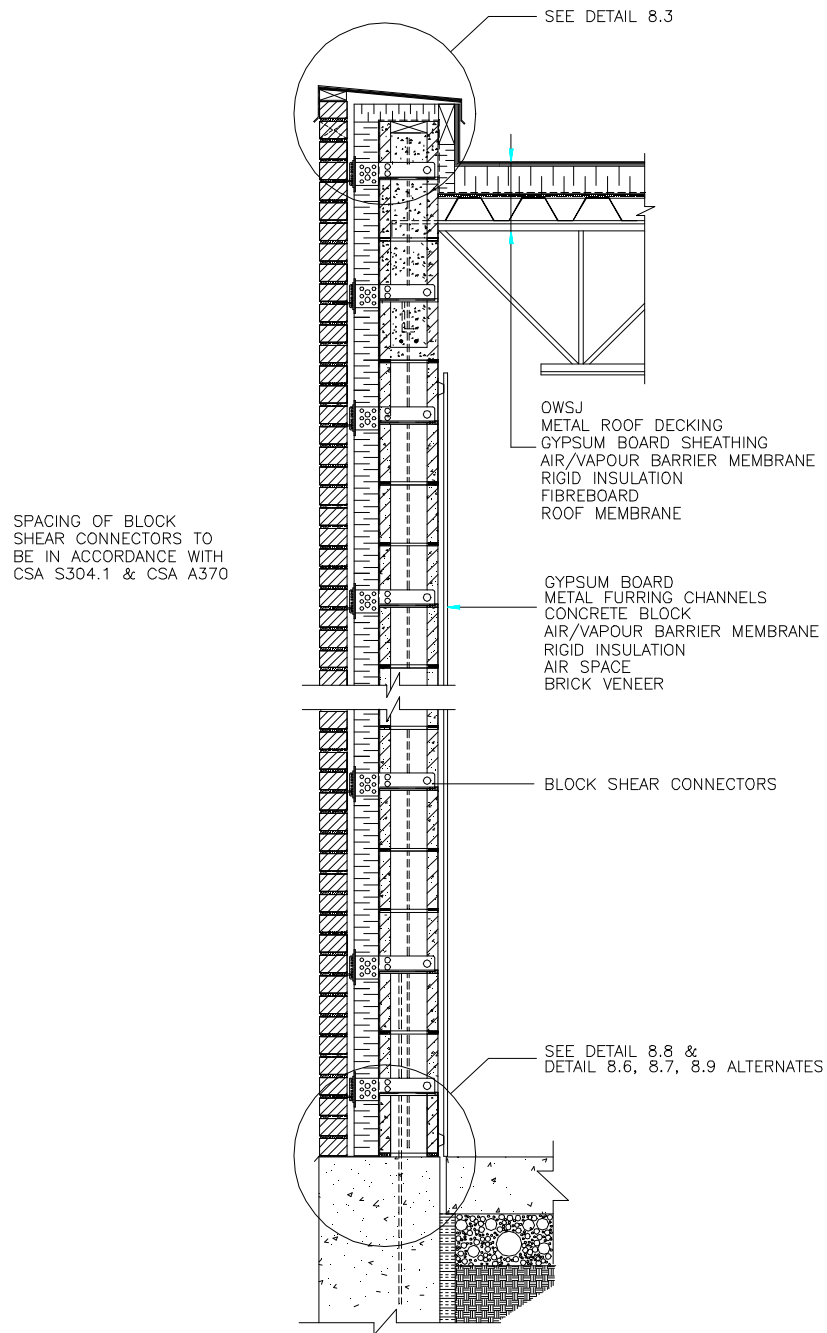
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COMMERCIAL BUILDINGS

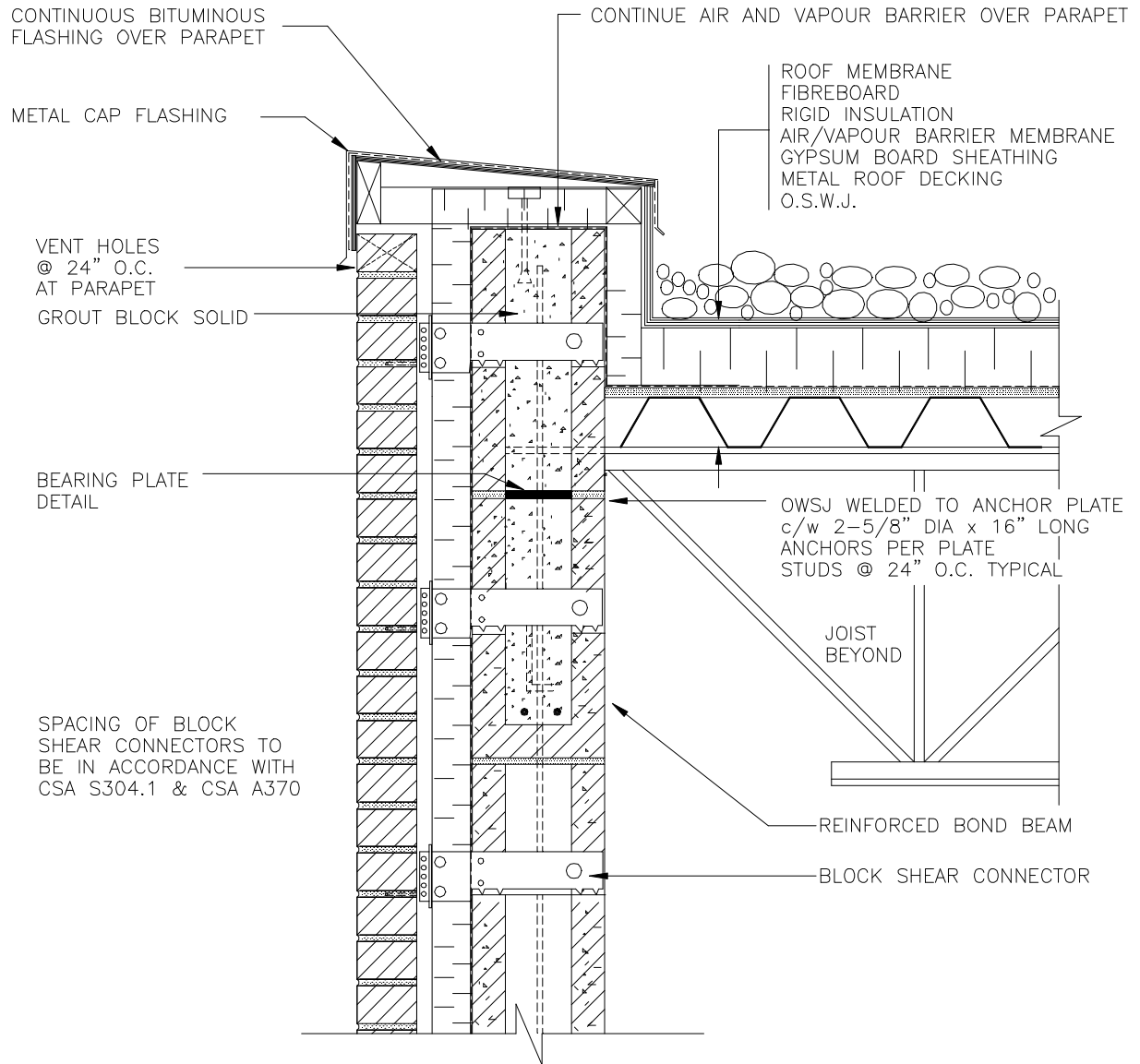
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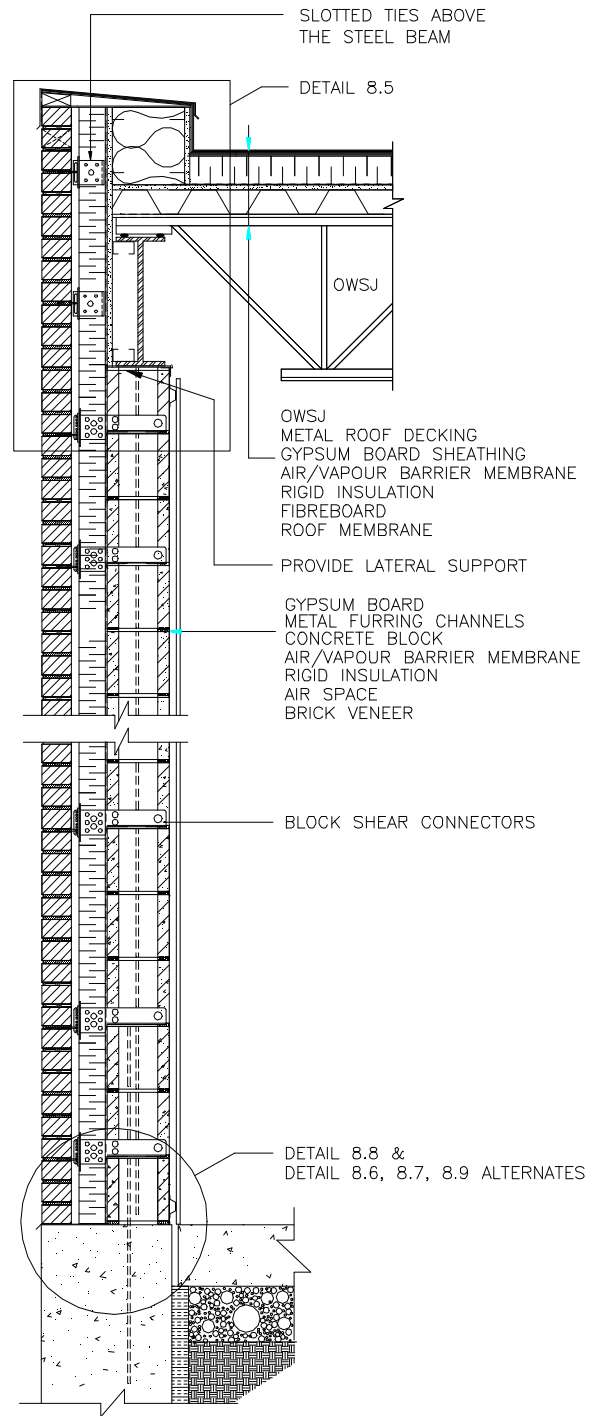


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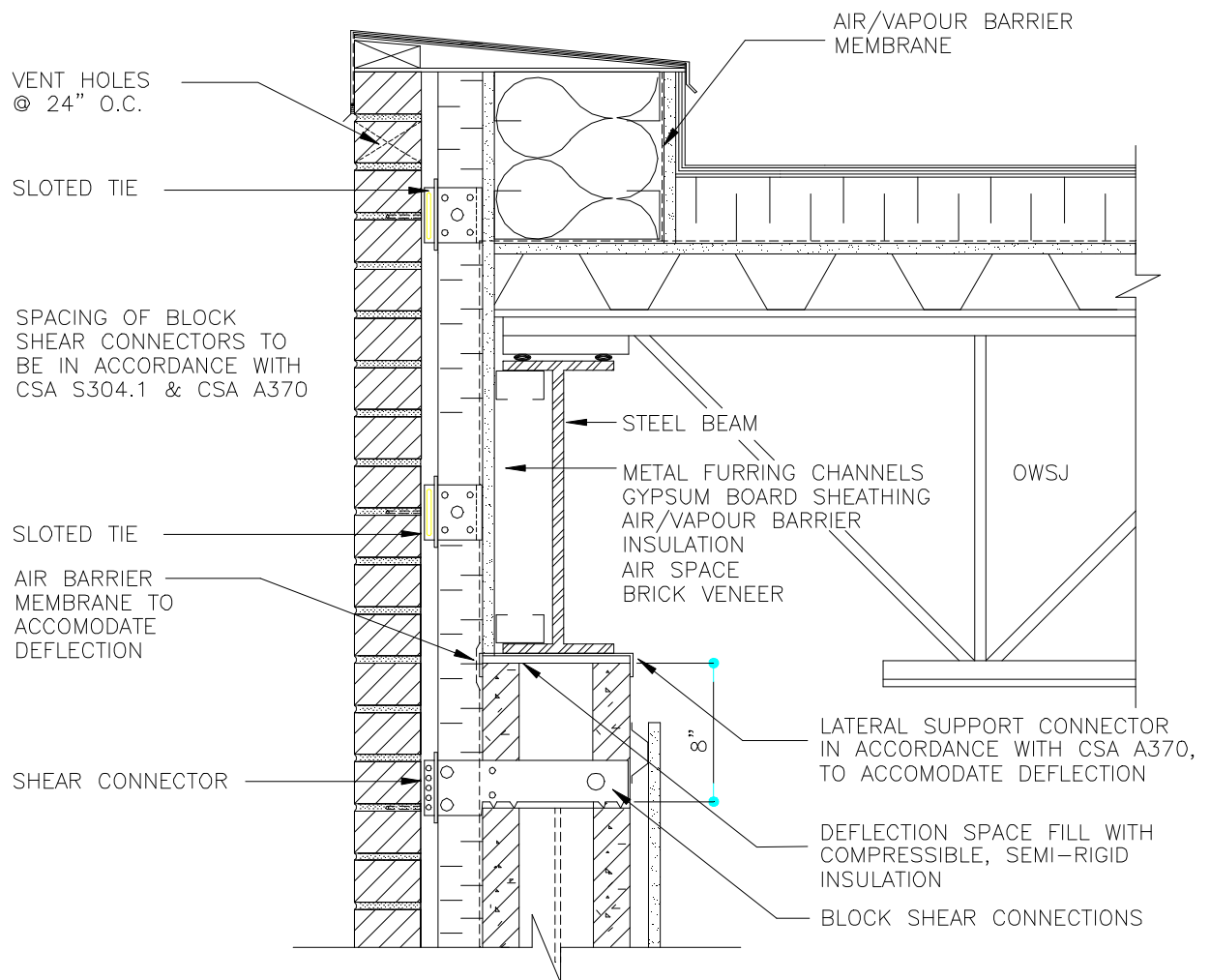


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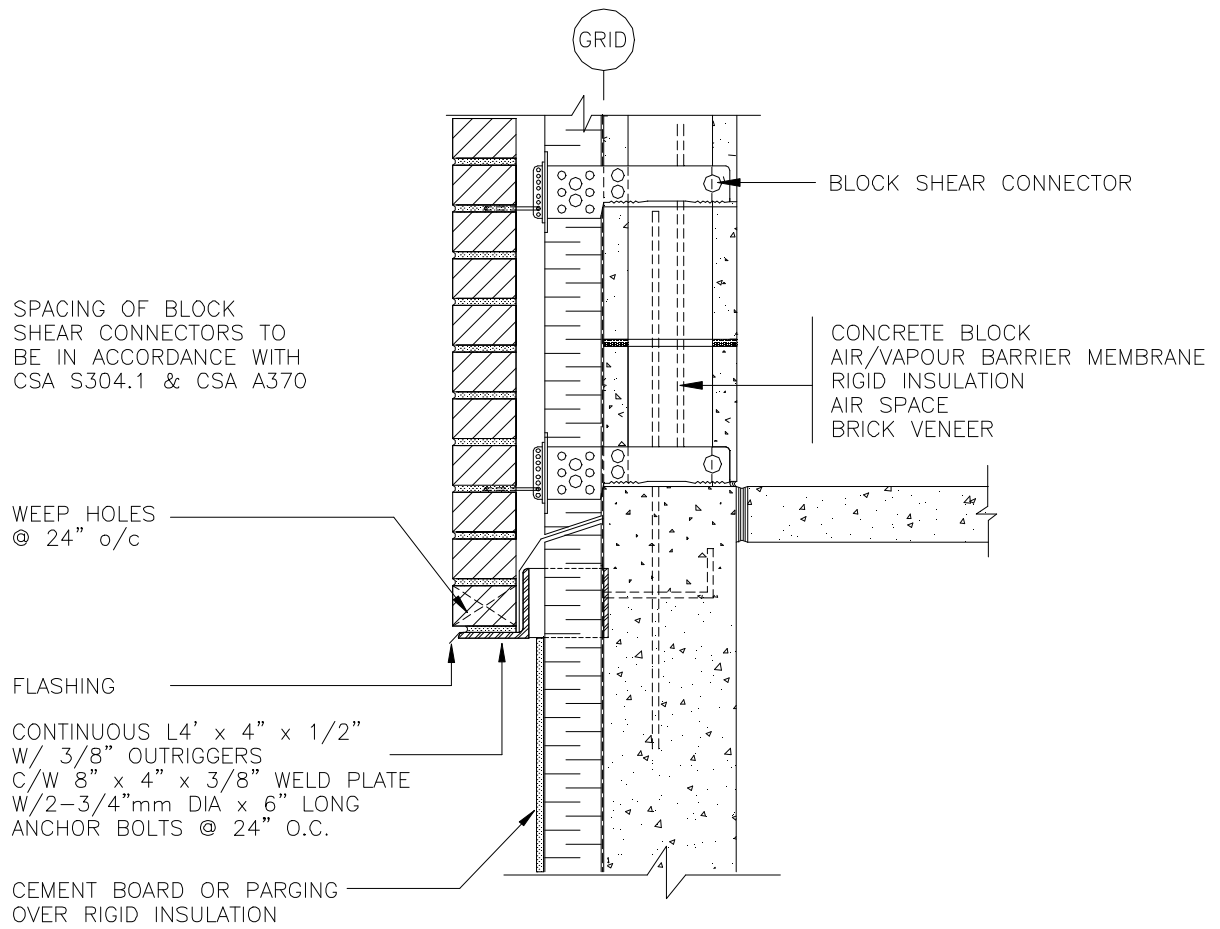
SPACING OF BLOCK
SHEAR CONNECTORS TO
BE IN ACCORDANCE WITH
CSA S304.1 & CSA A370



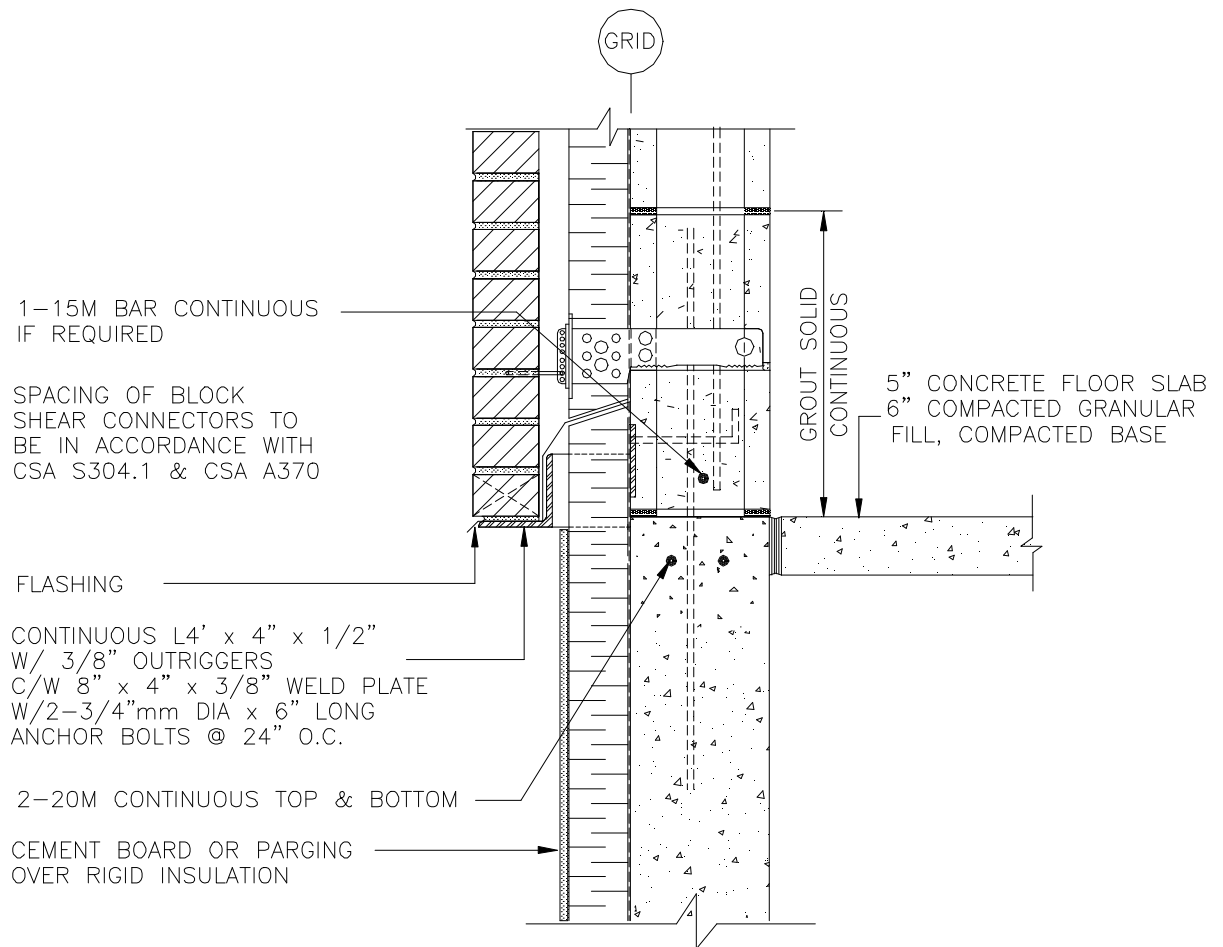
Detail 8.4 – Brick Veneer / Concrete Block O.W.S.J. Connection at Steel Beam



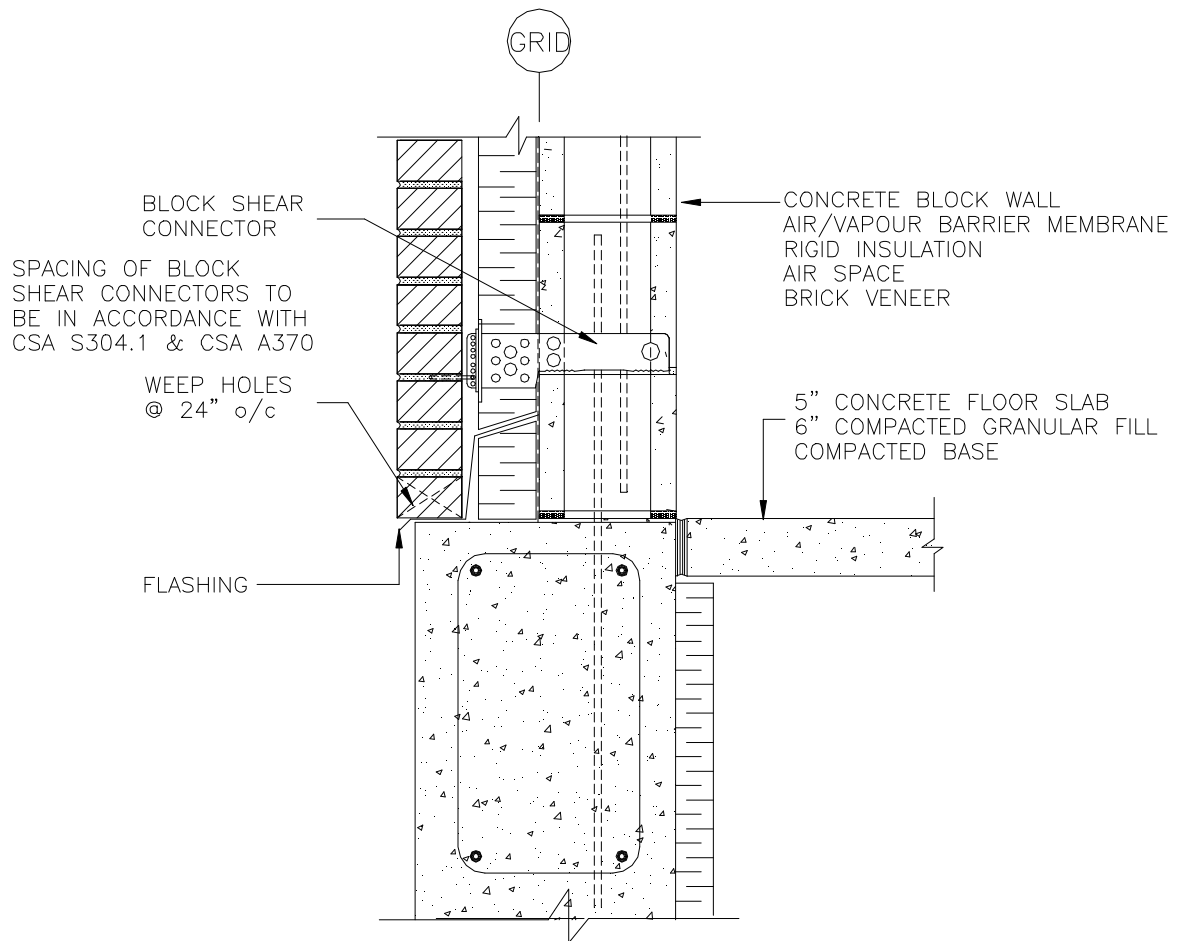
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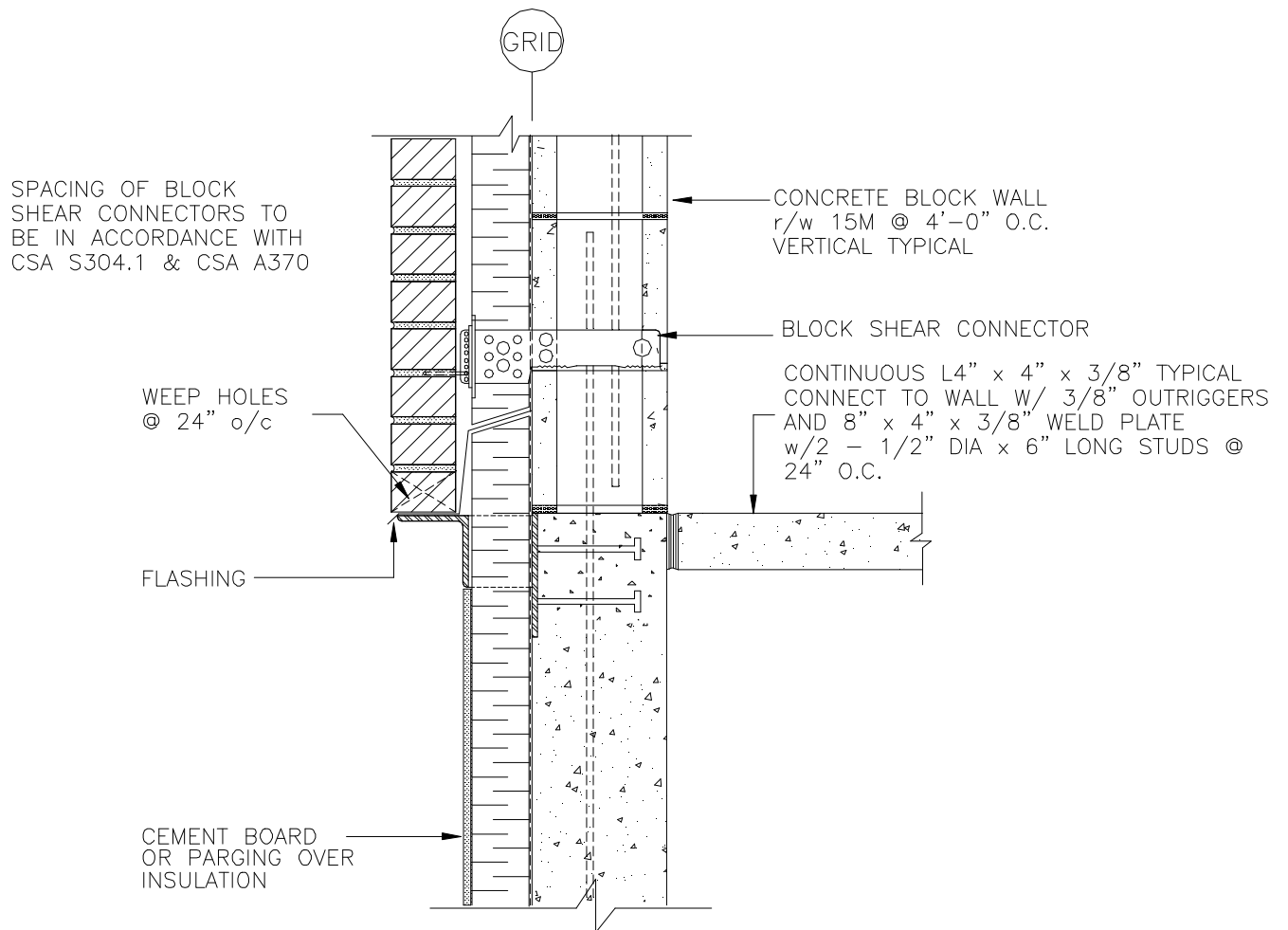
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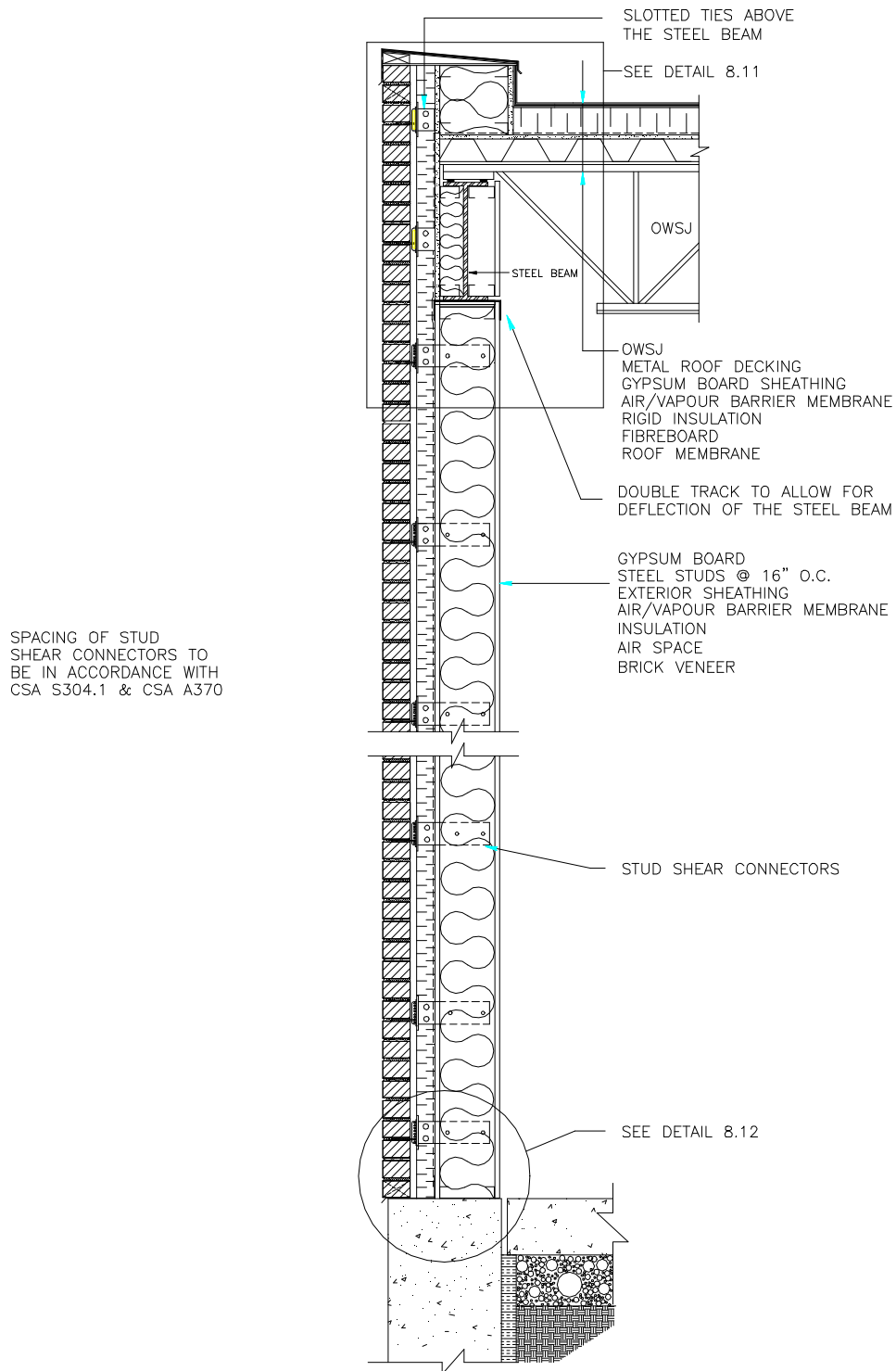
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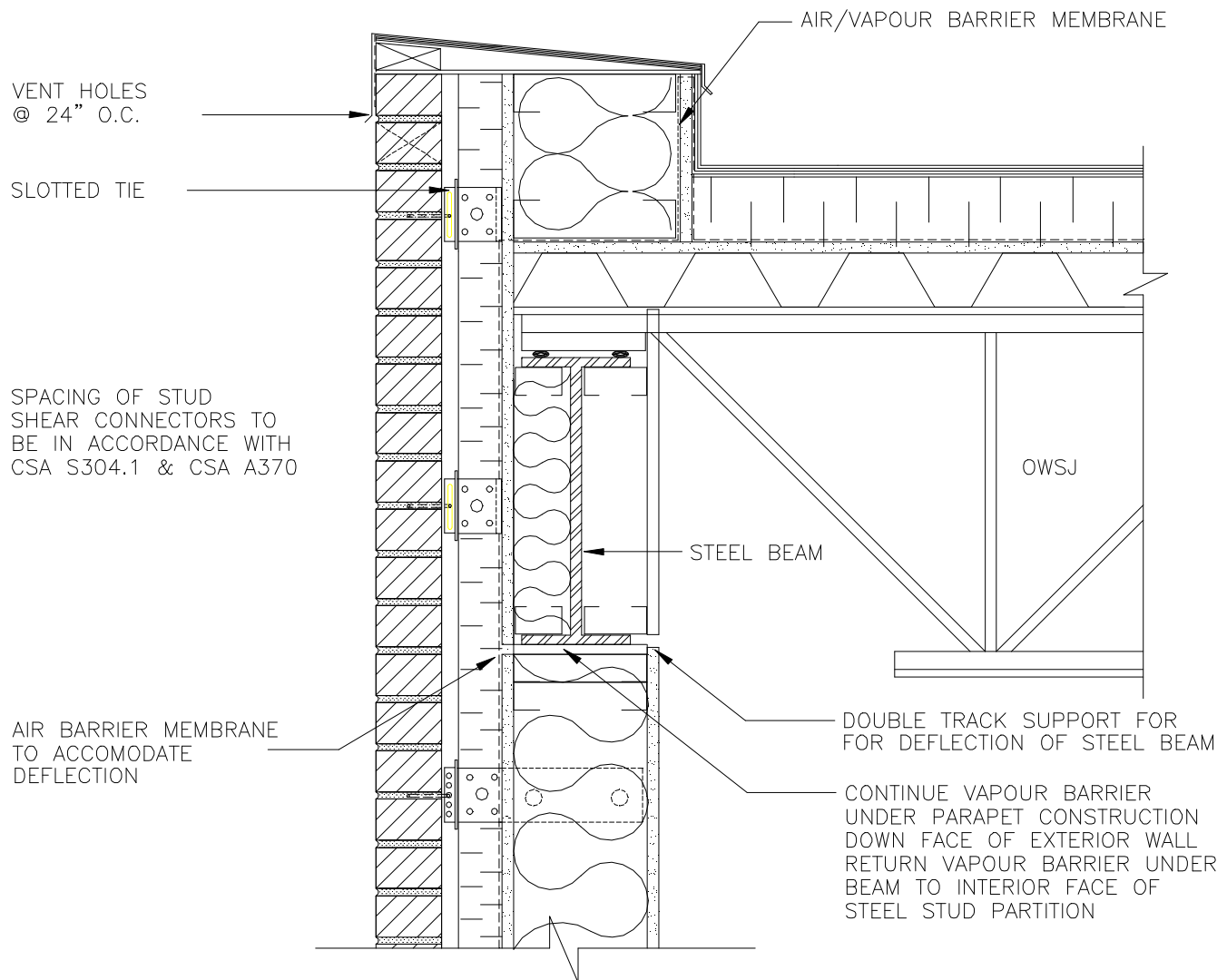
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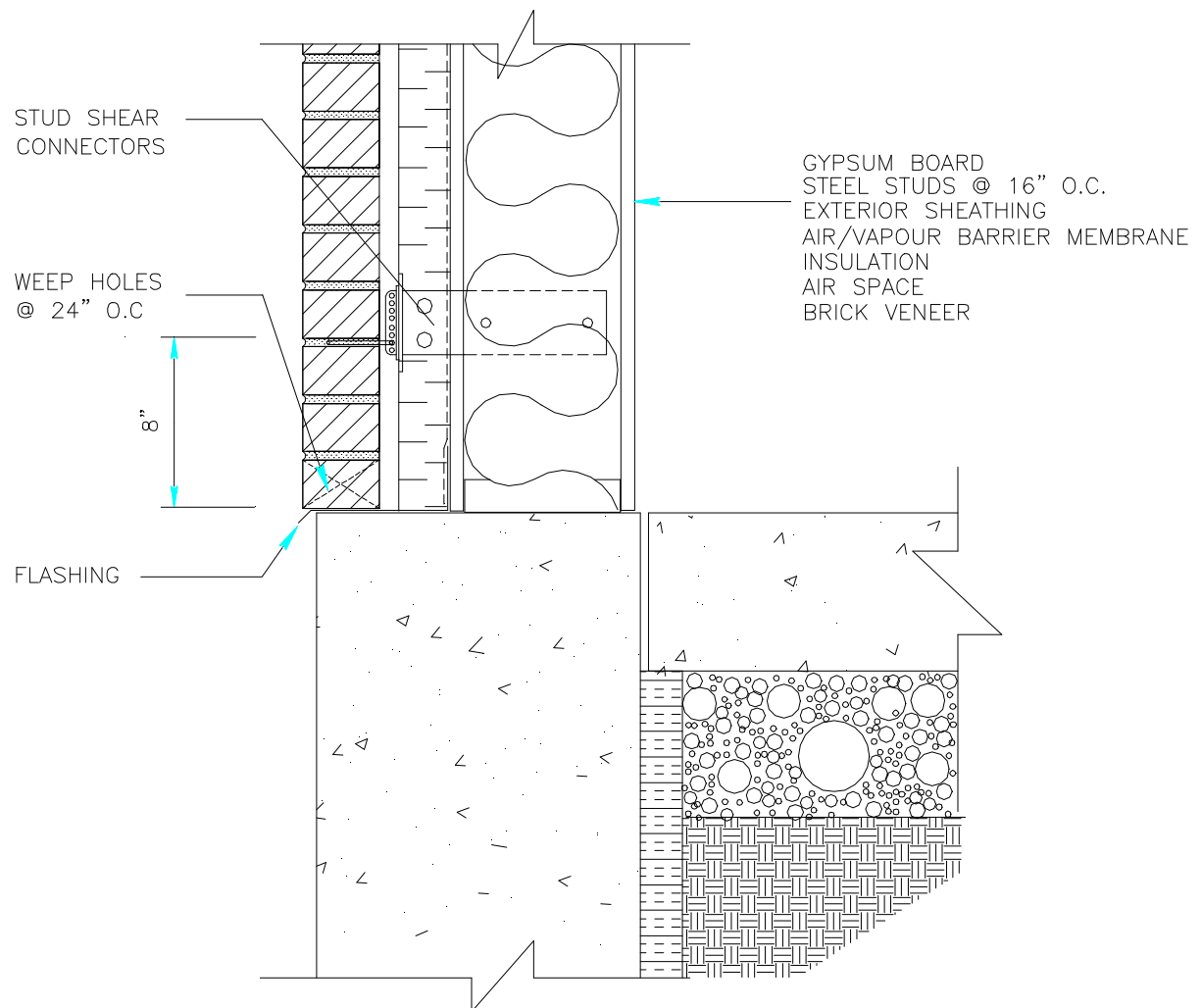
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Detail 8.10 – Brick Veneer / Steel Stud O.W.S.J.



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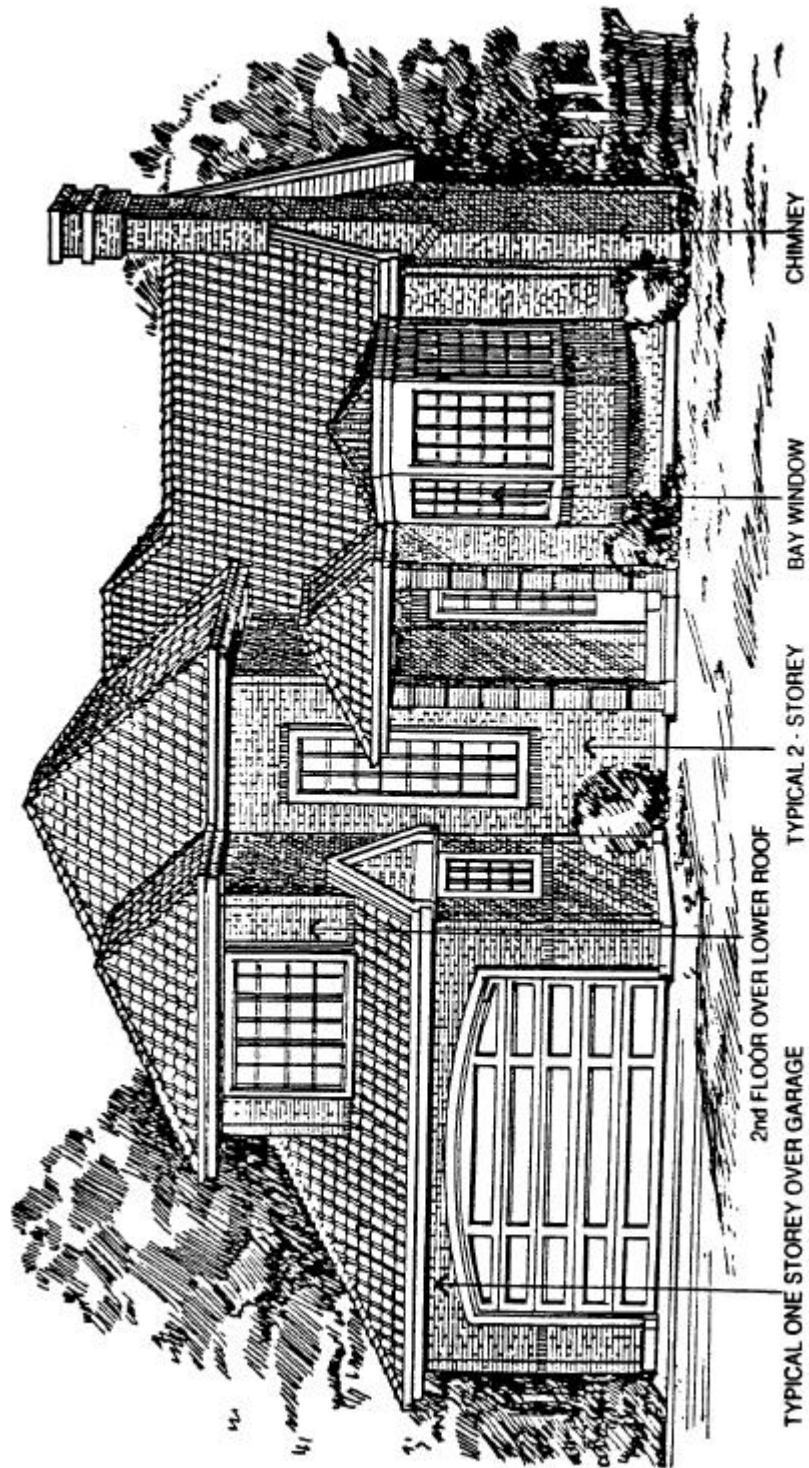
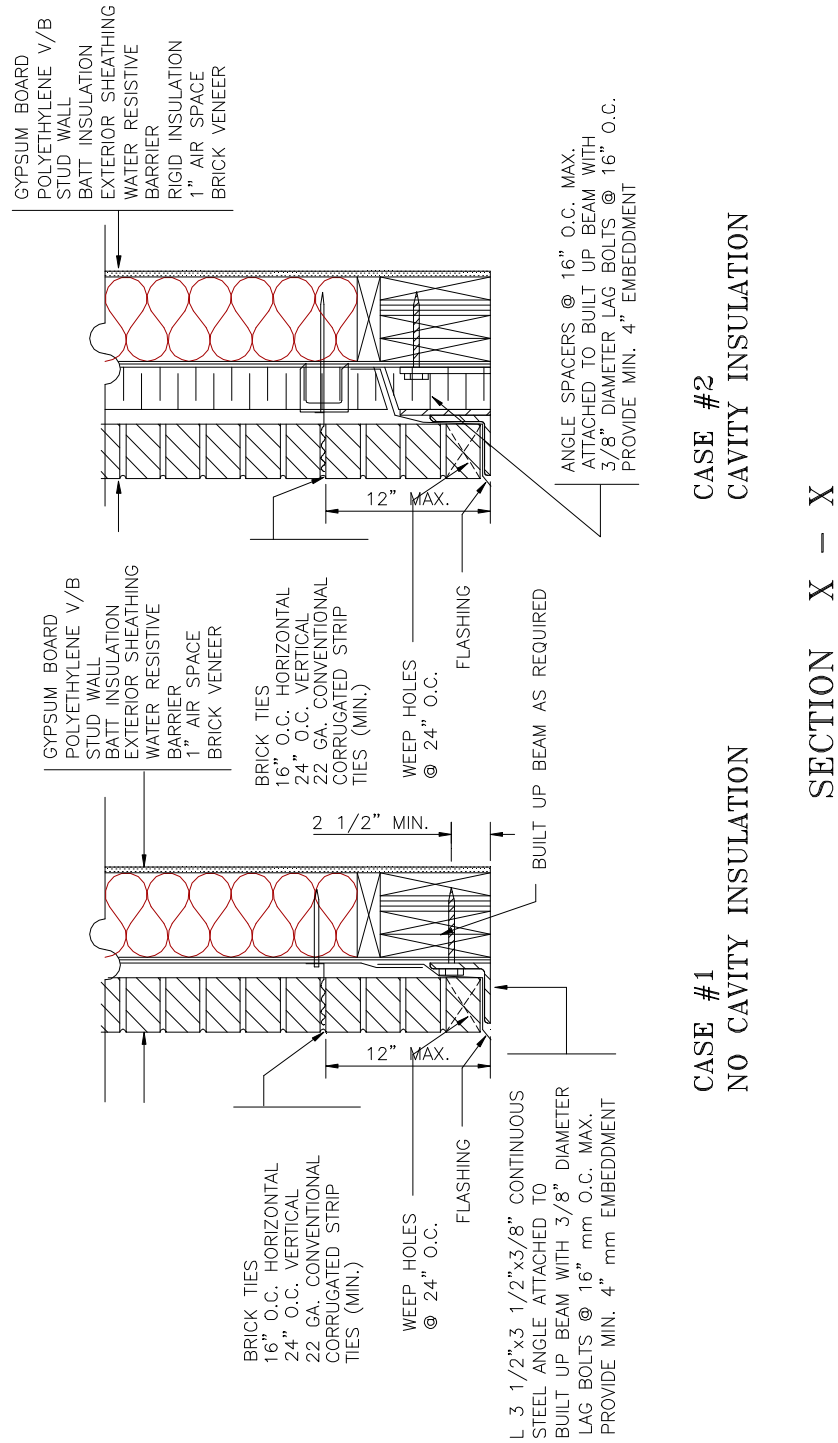
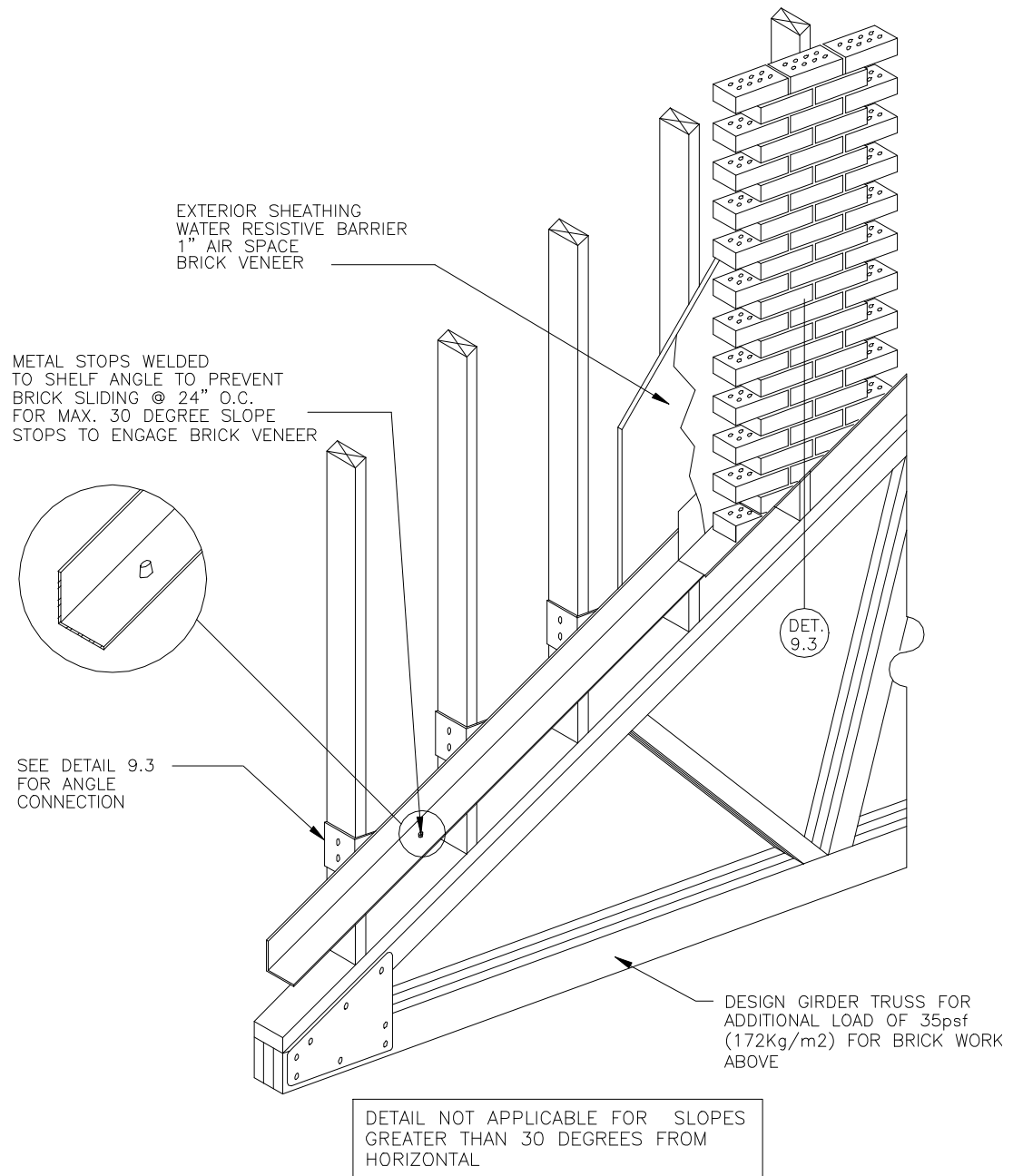


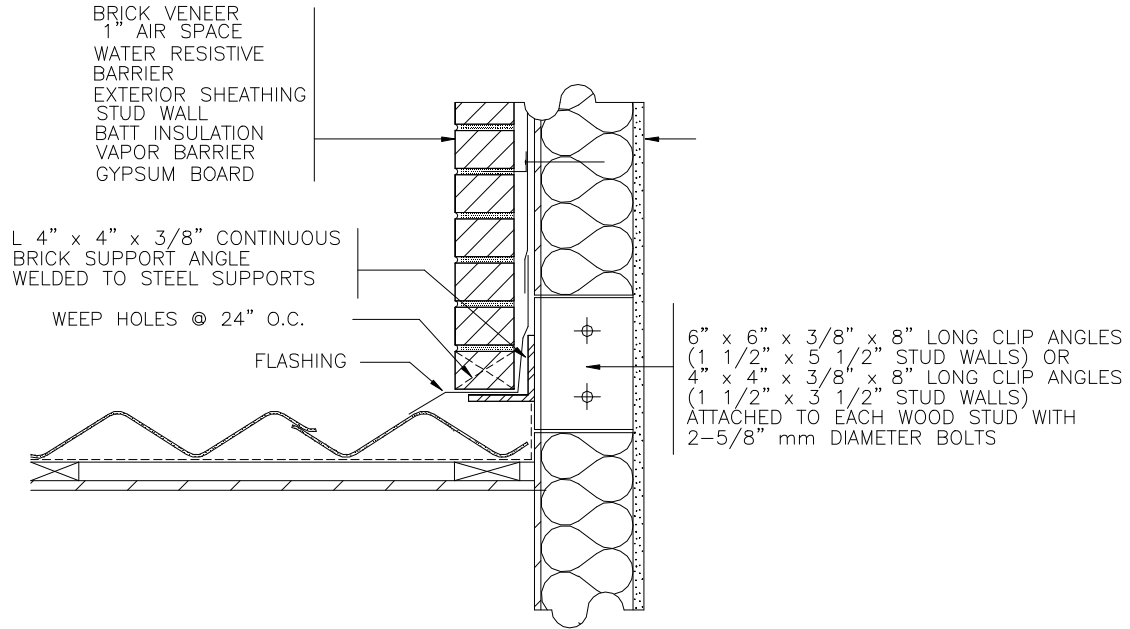
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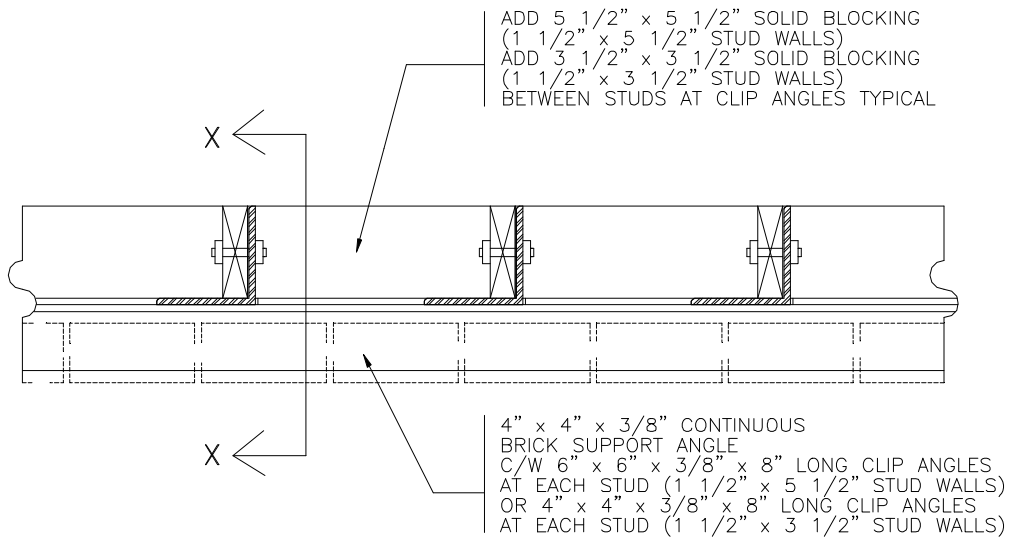




Detail 9.2 – Brick Veneer Supported by Truss (Typical Over Attached Garages)

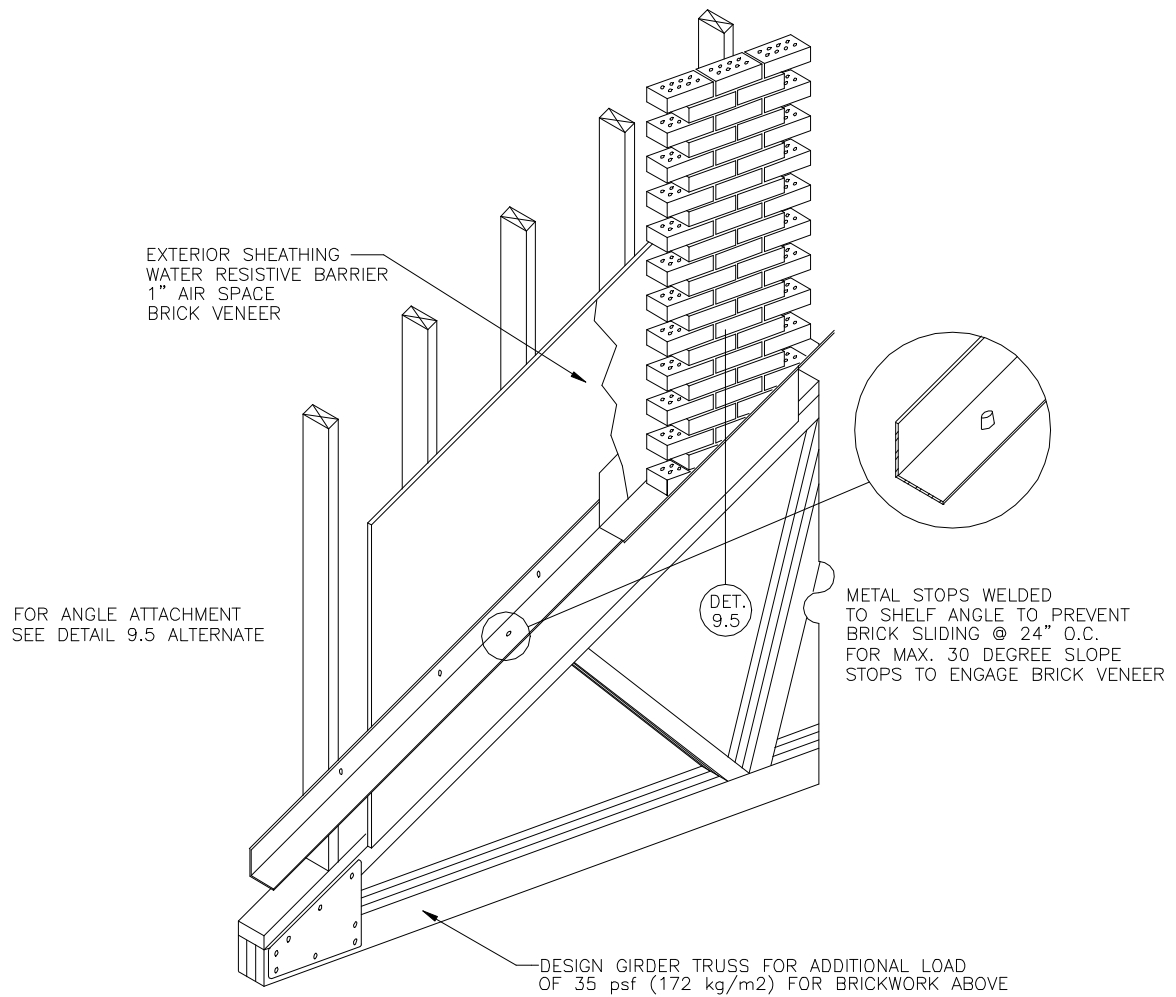


SECTION X - X

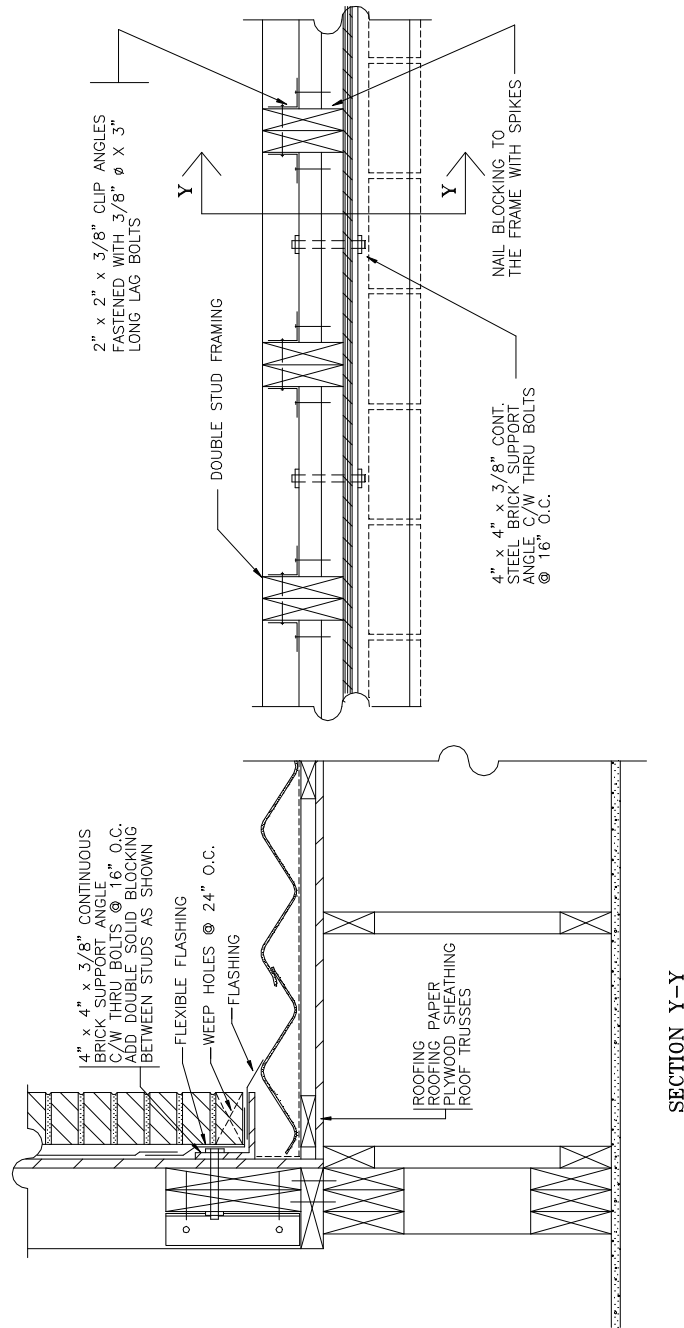


PLAN

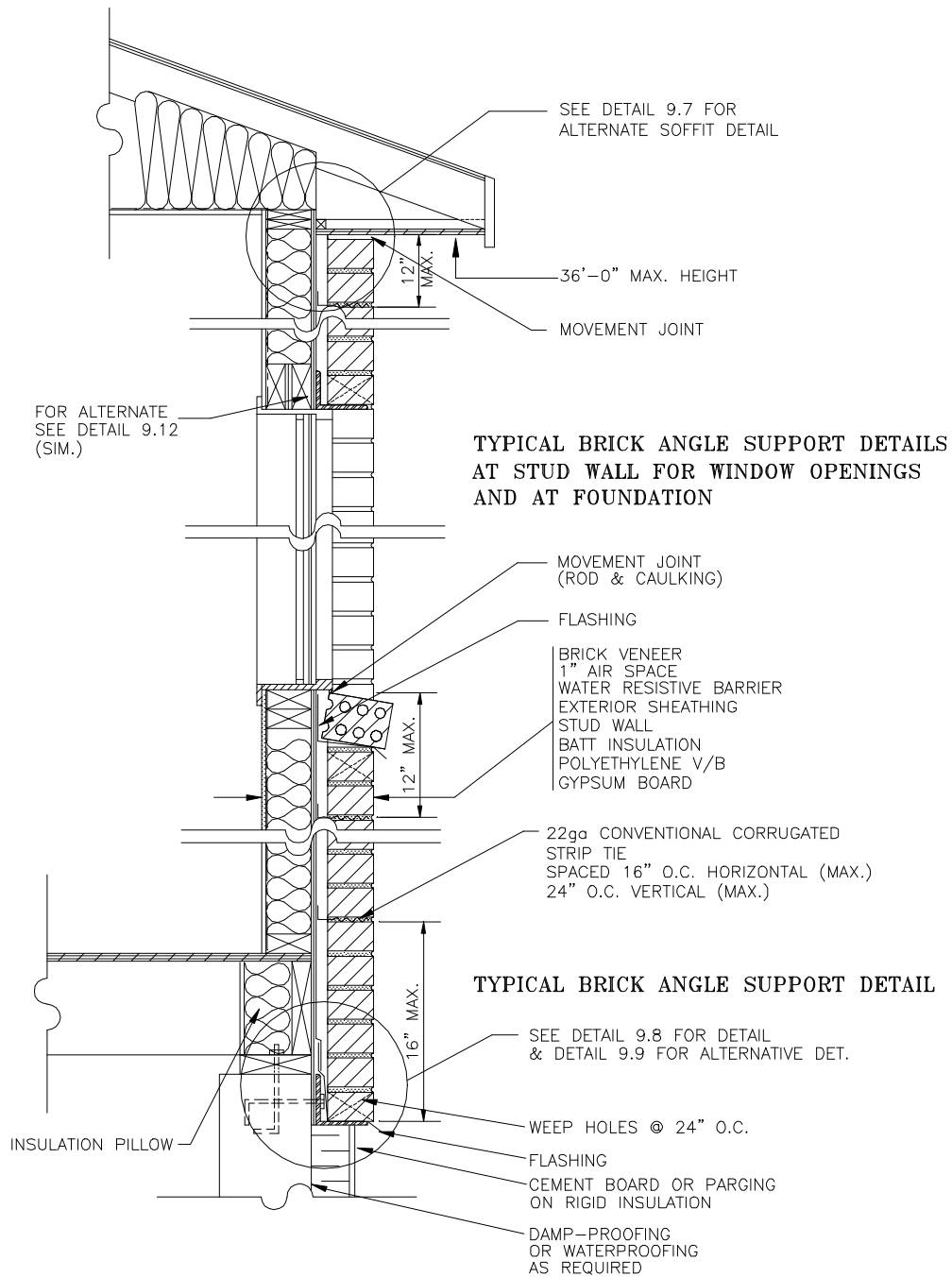
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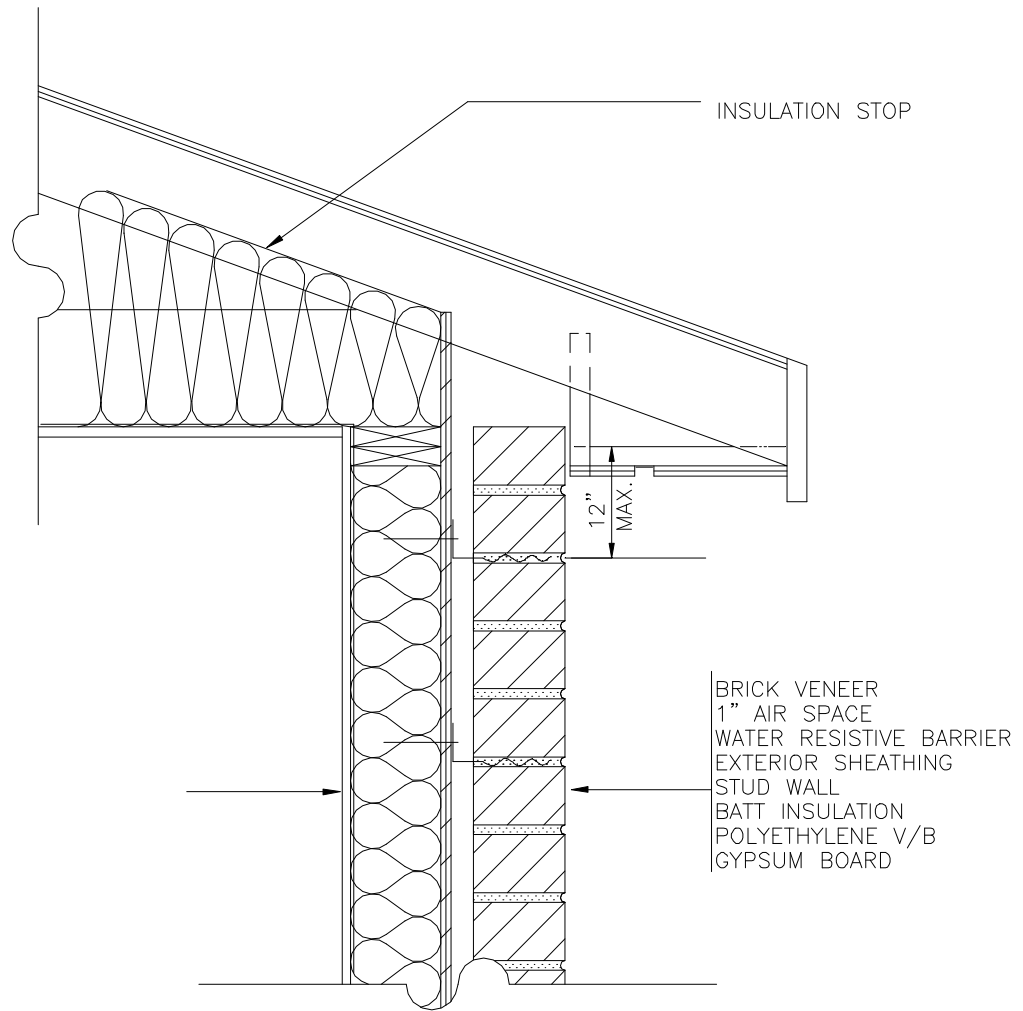
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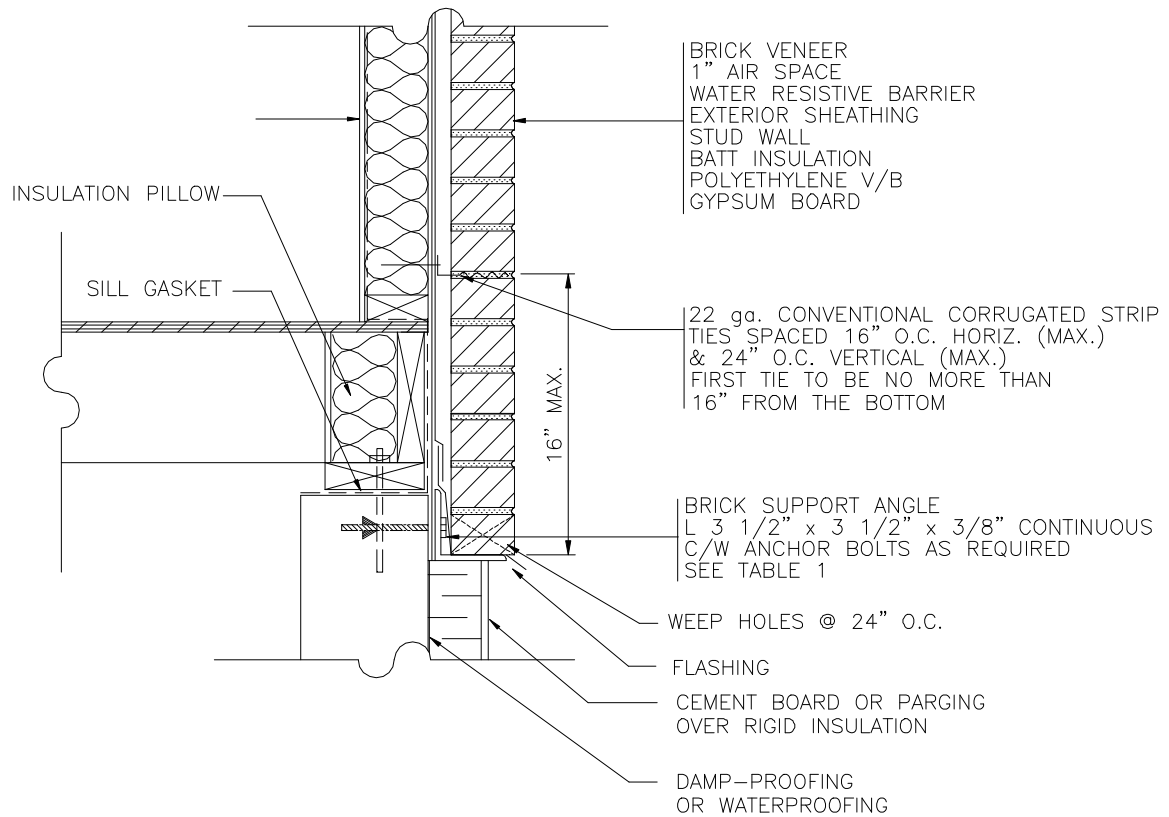
Detail 9.5 – Section Through Brick Veneer Supported by Truss



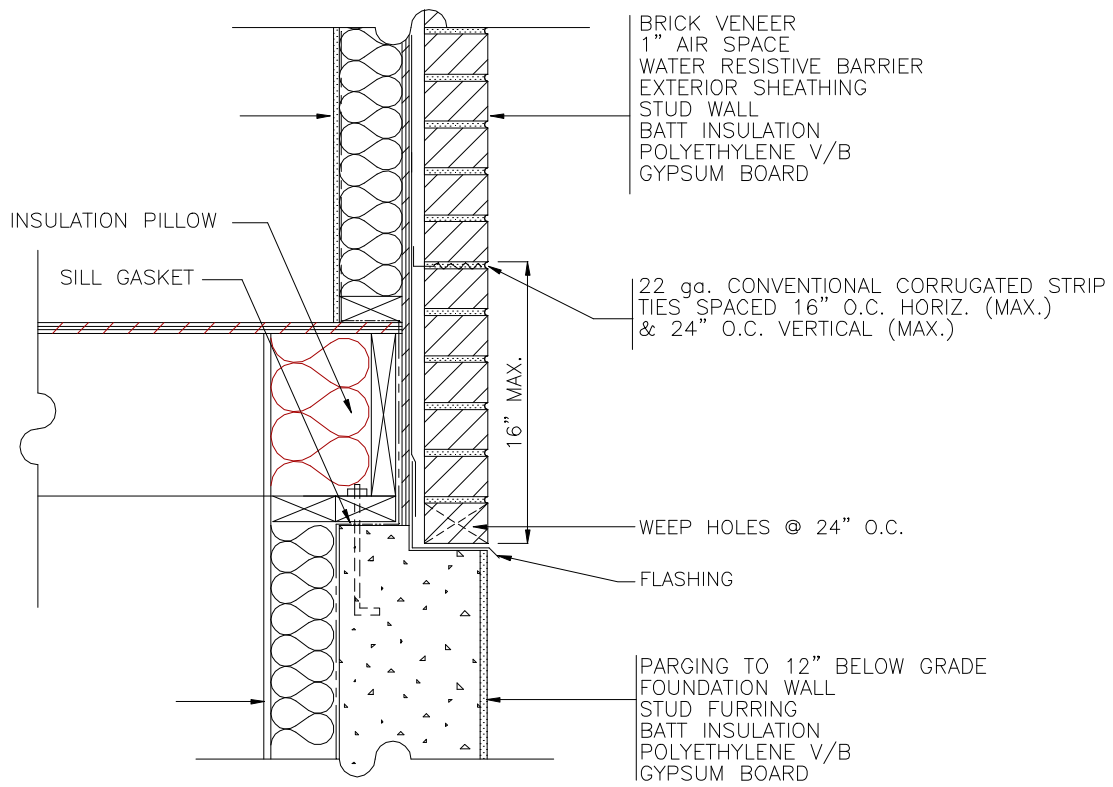
Detail 9.6 – Typical Wall Section



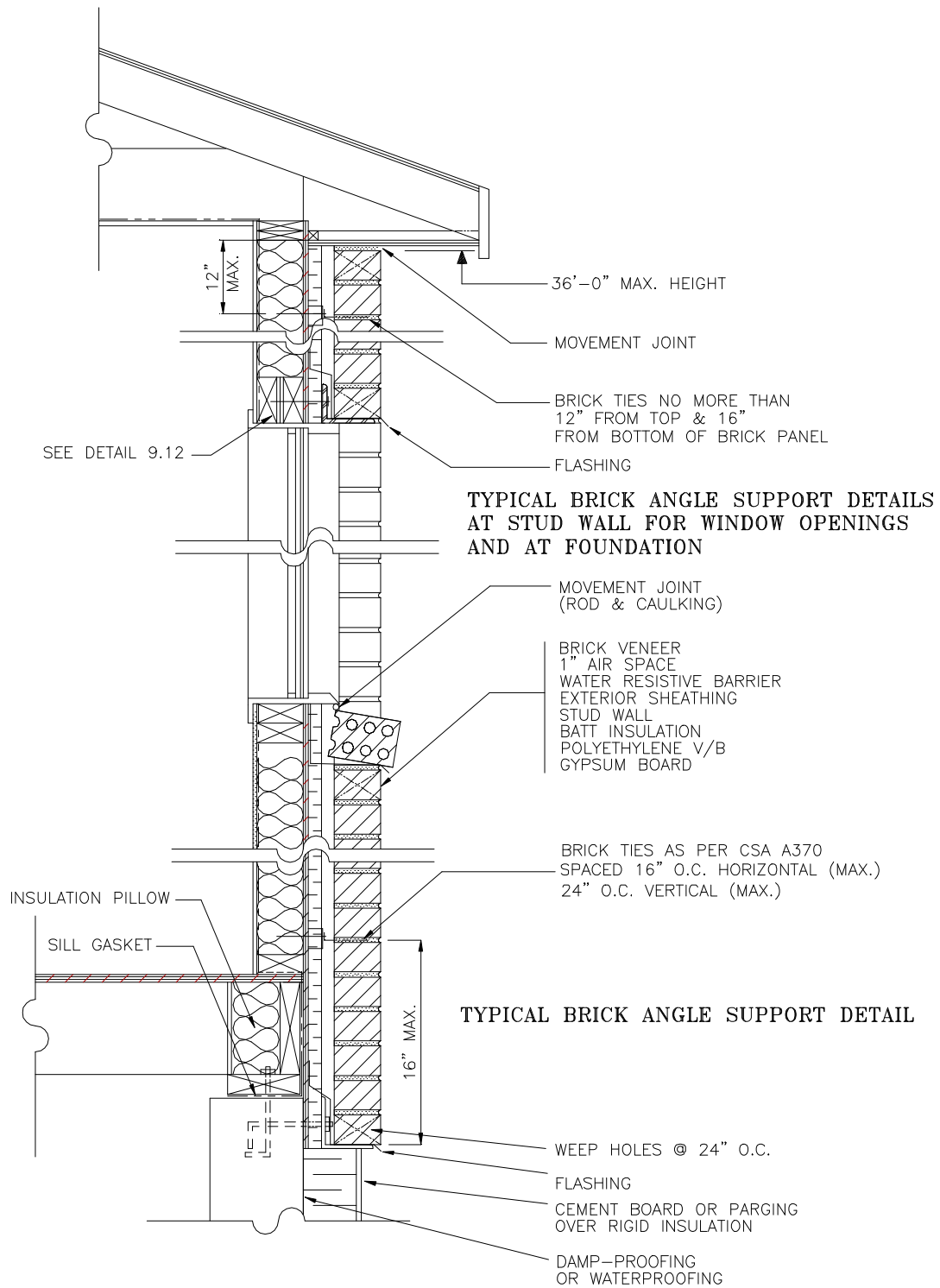
Detail 9.7 – Alternate Brick Detail at Soffit



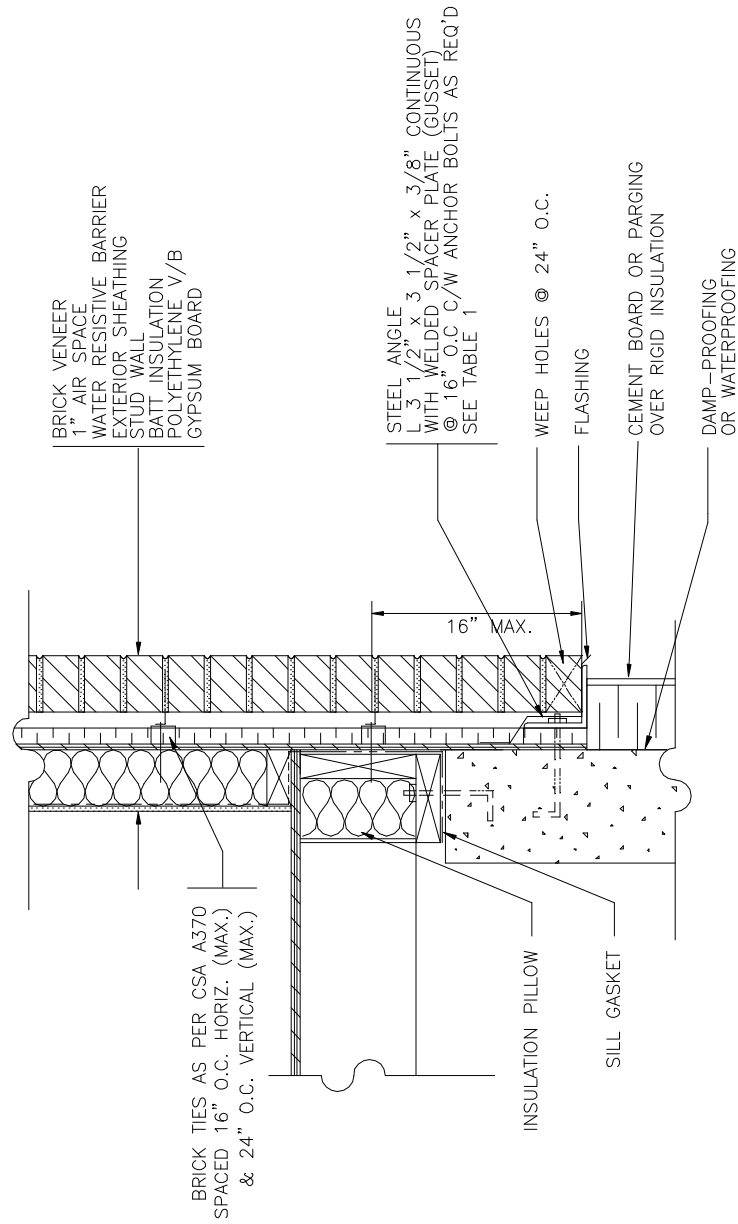
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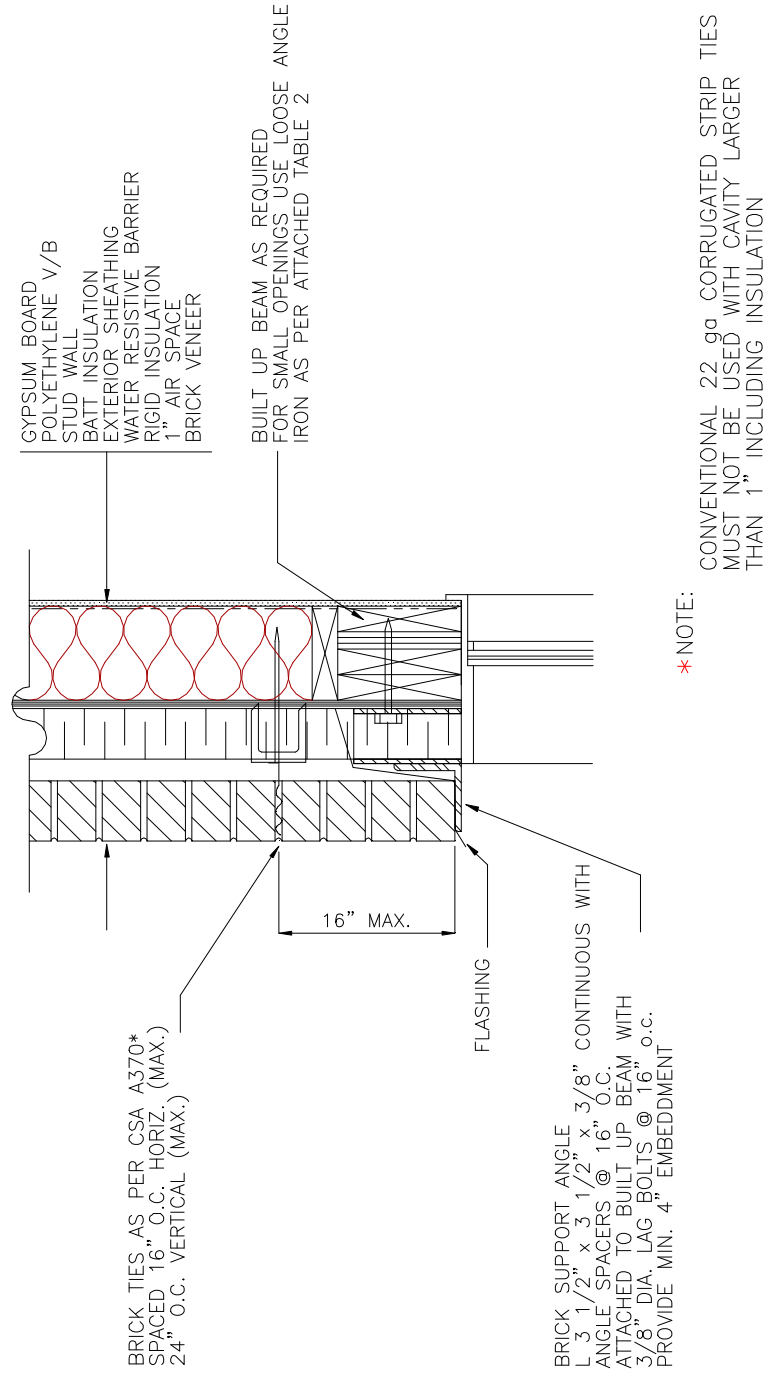
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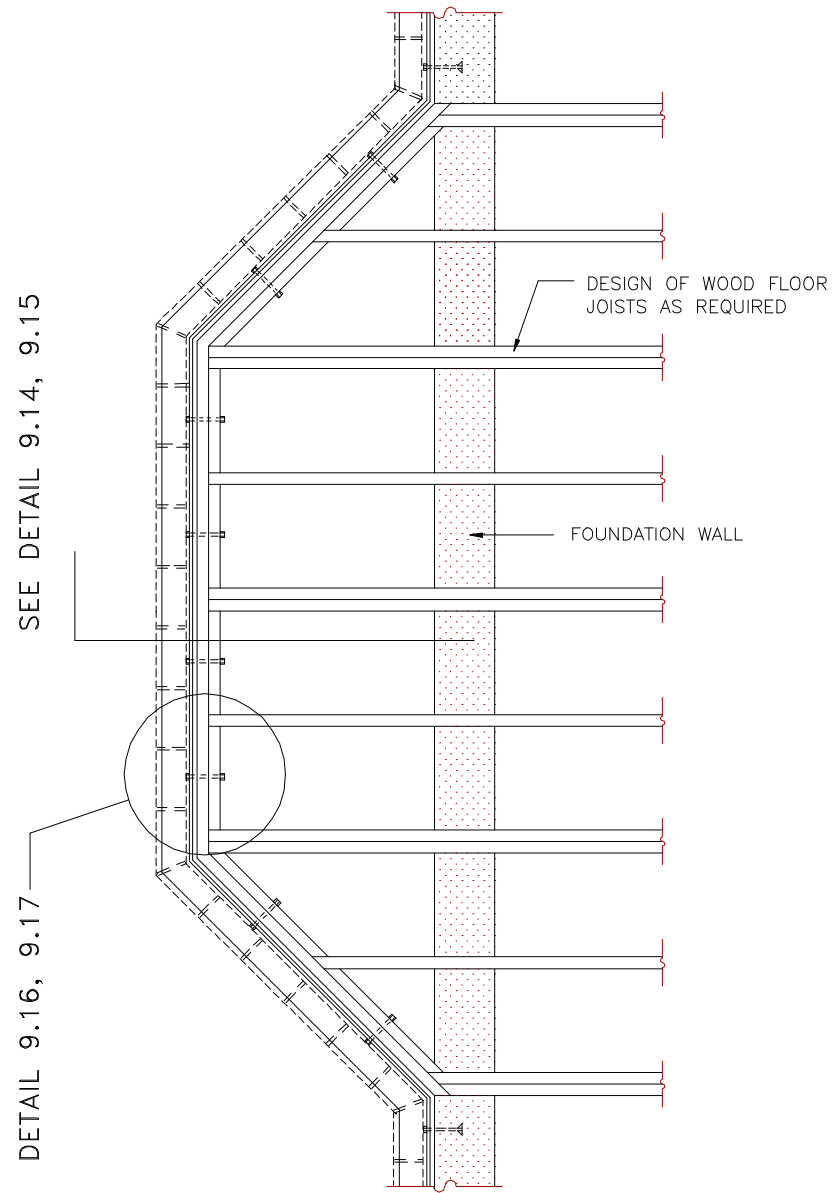
Detail 9.10 – Wall Section with Insulation in the Cavity



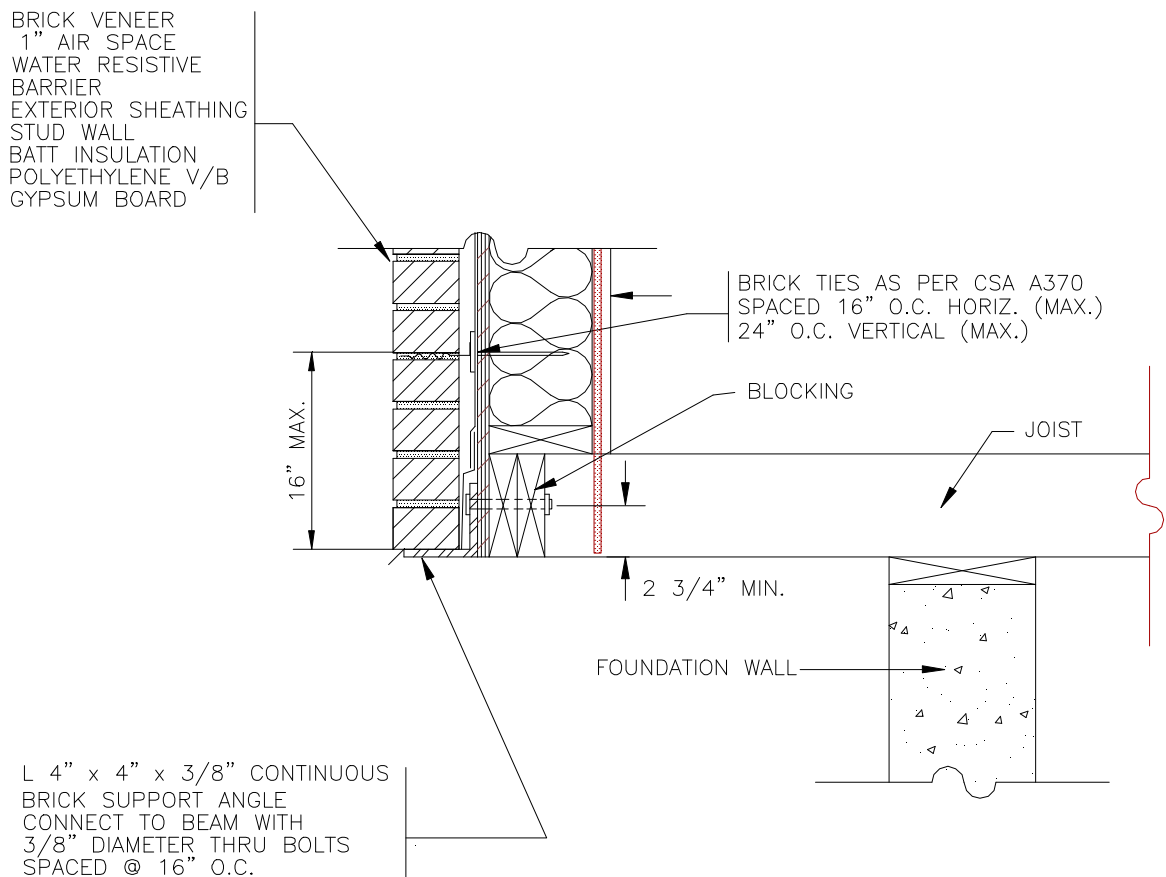
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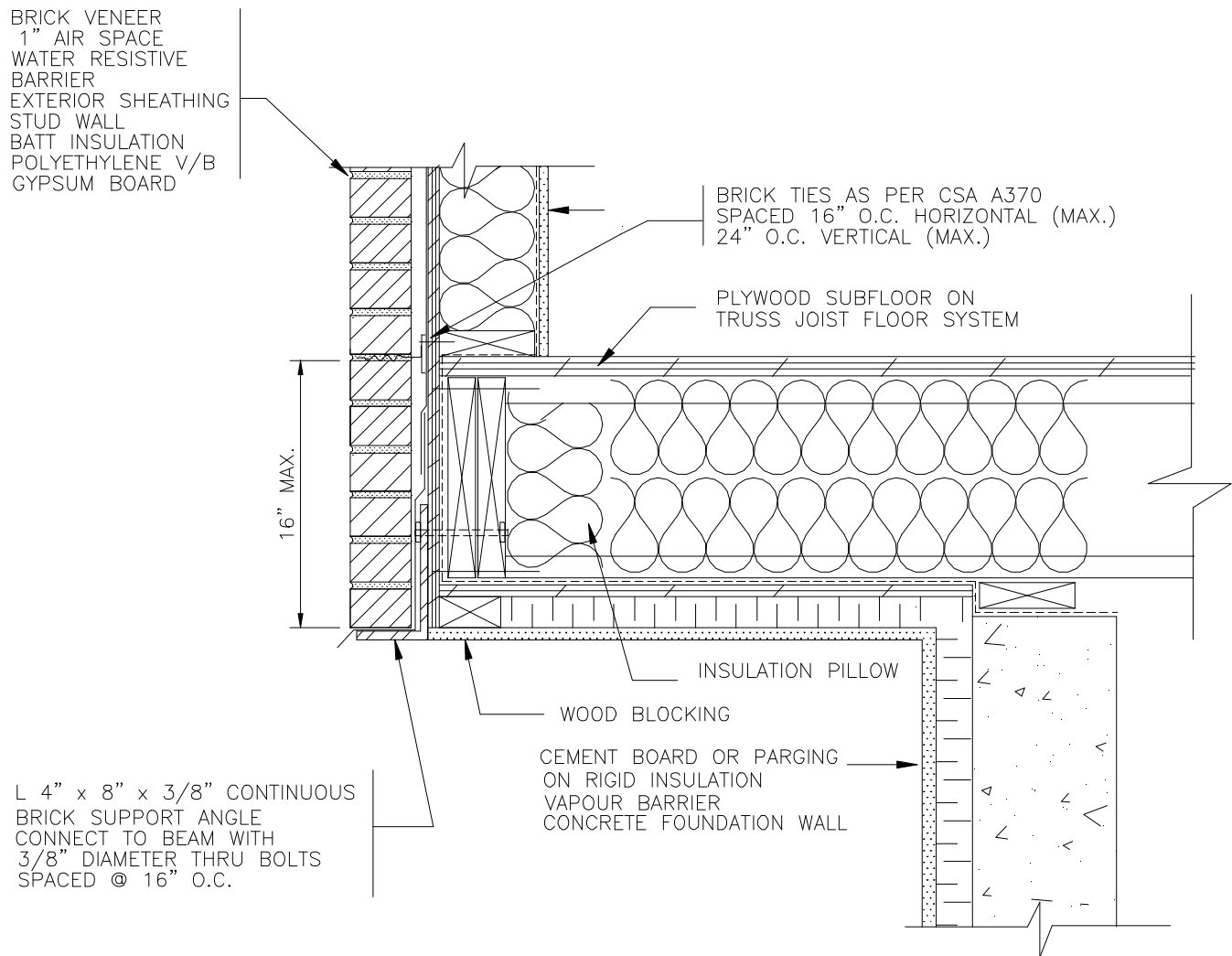
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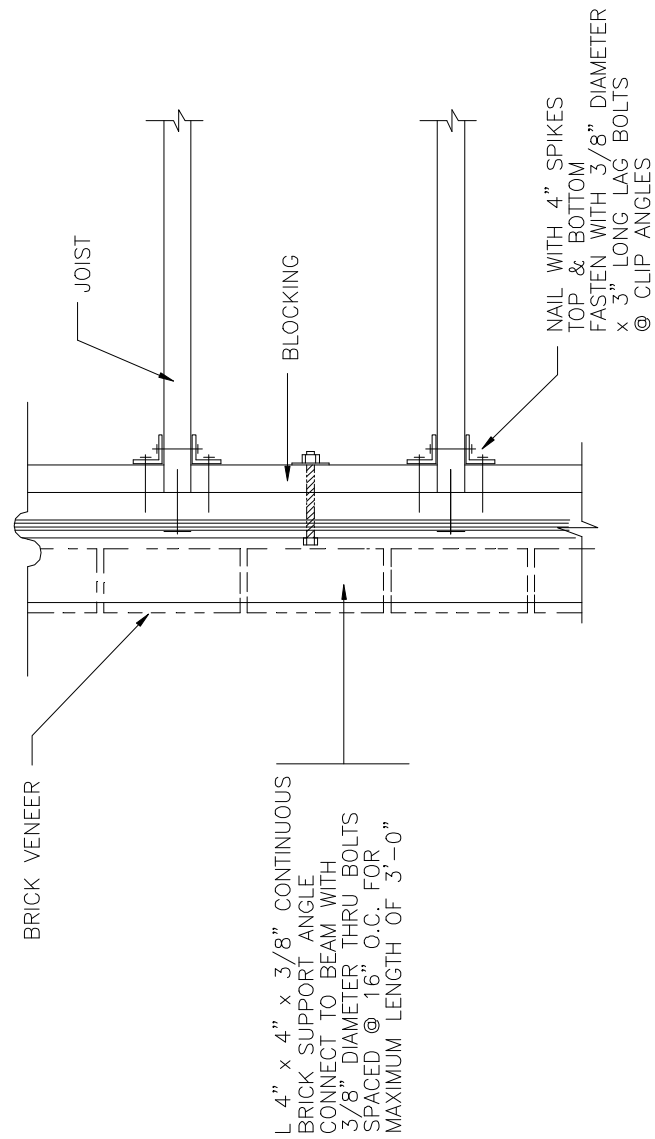
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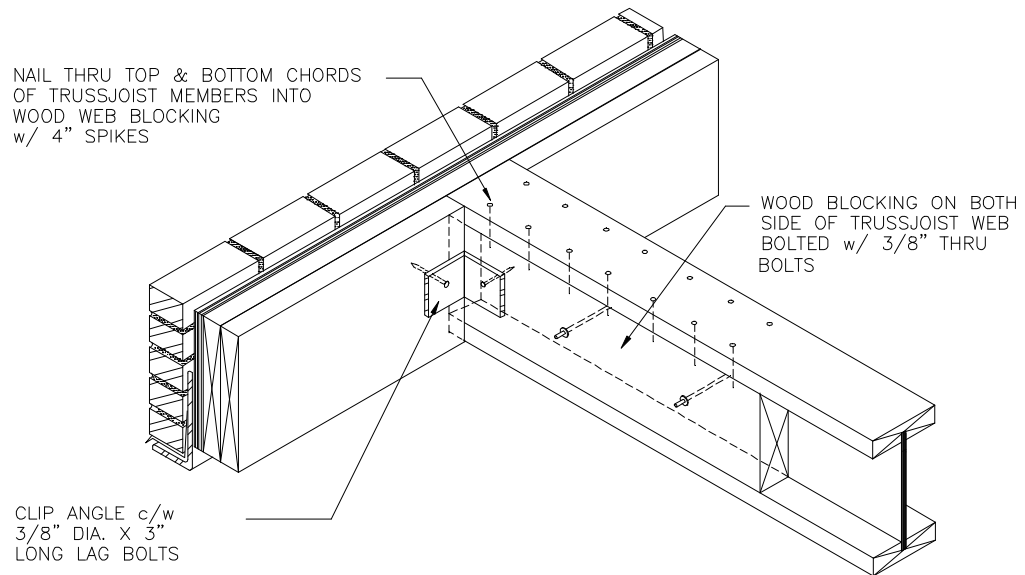
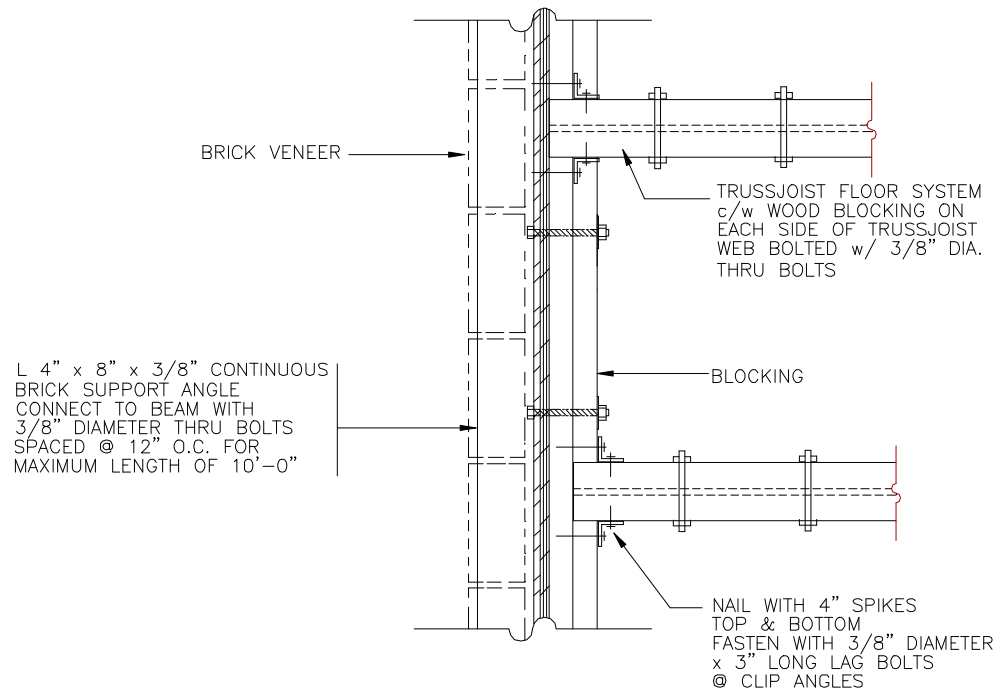
Detail 9.14 – Section Through Typical Brick Shelf Angle Support Detail for Bay Window



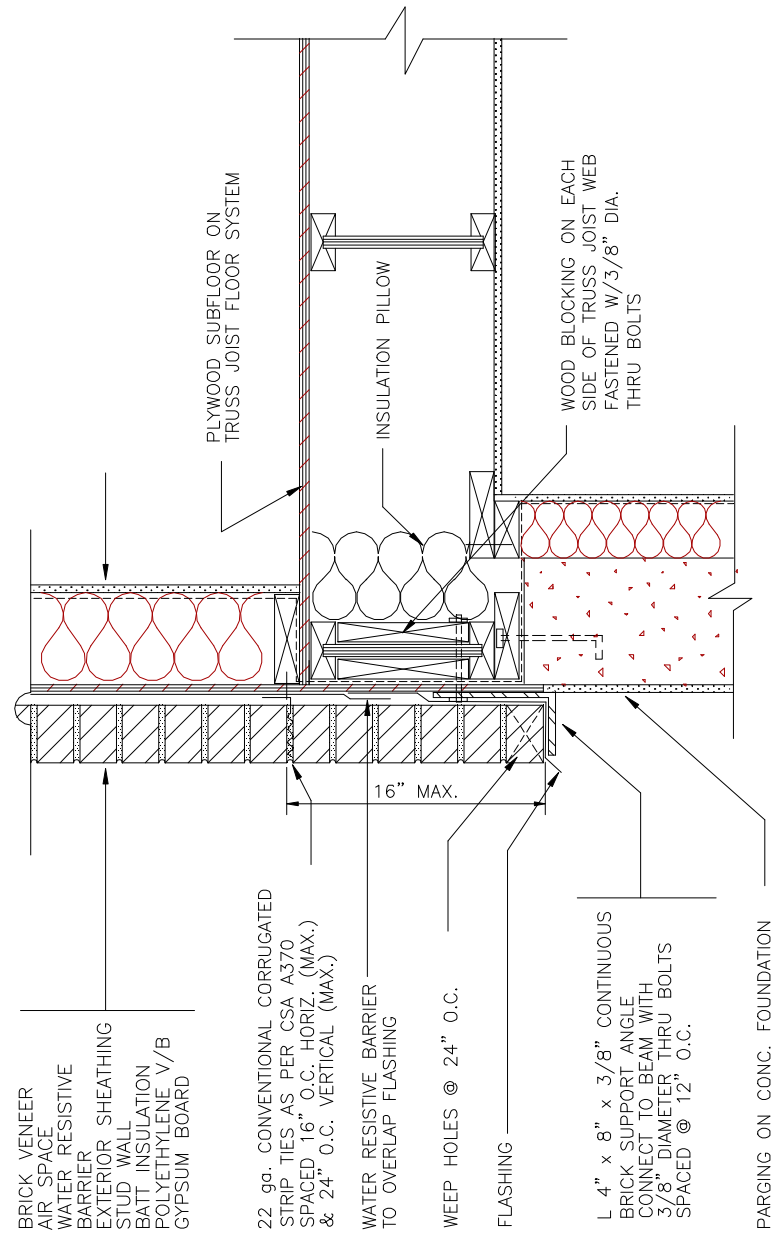
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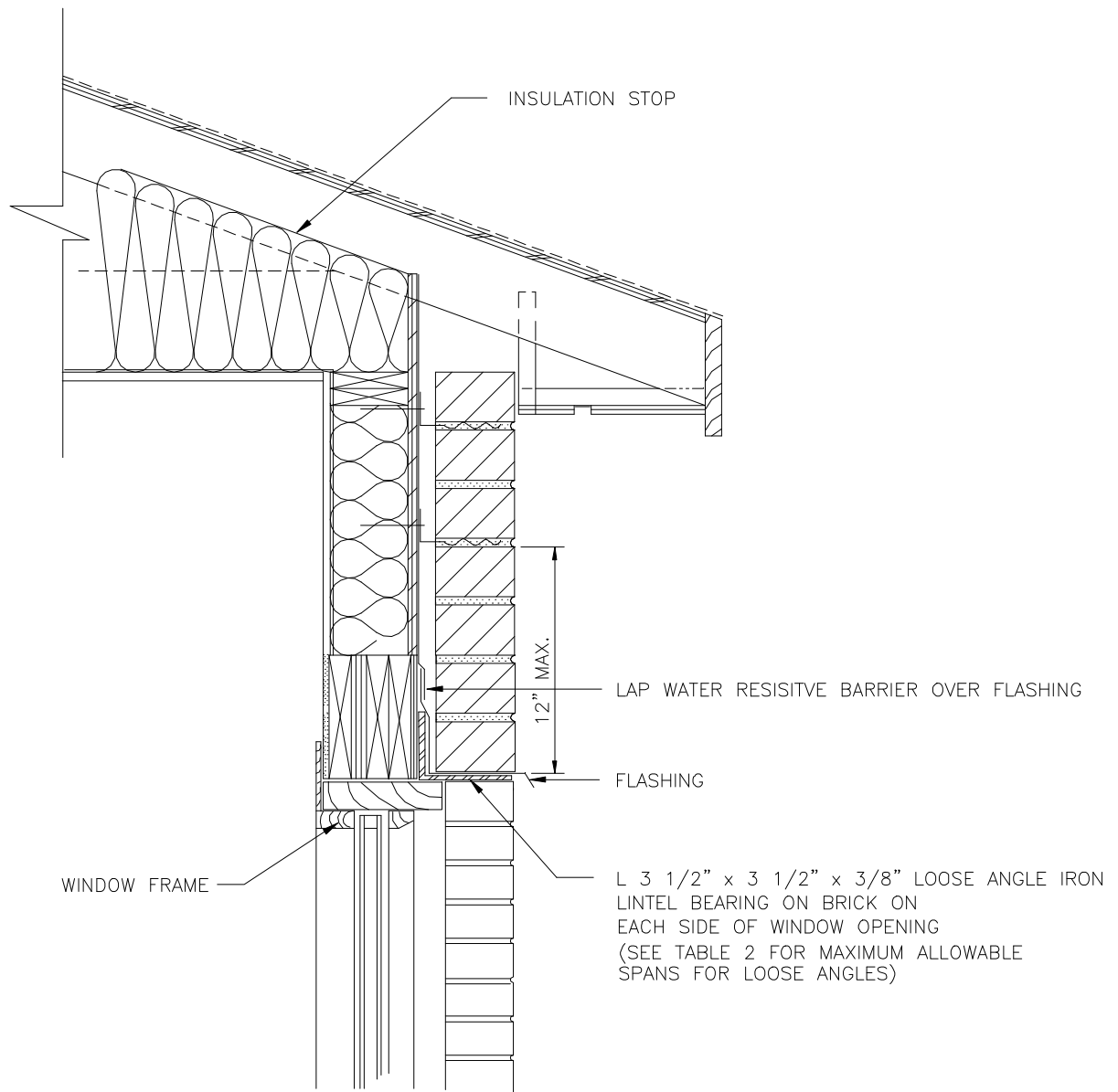
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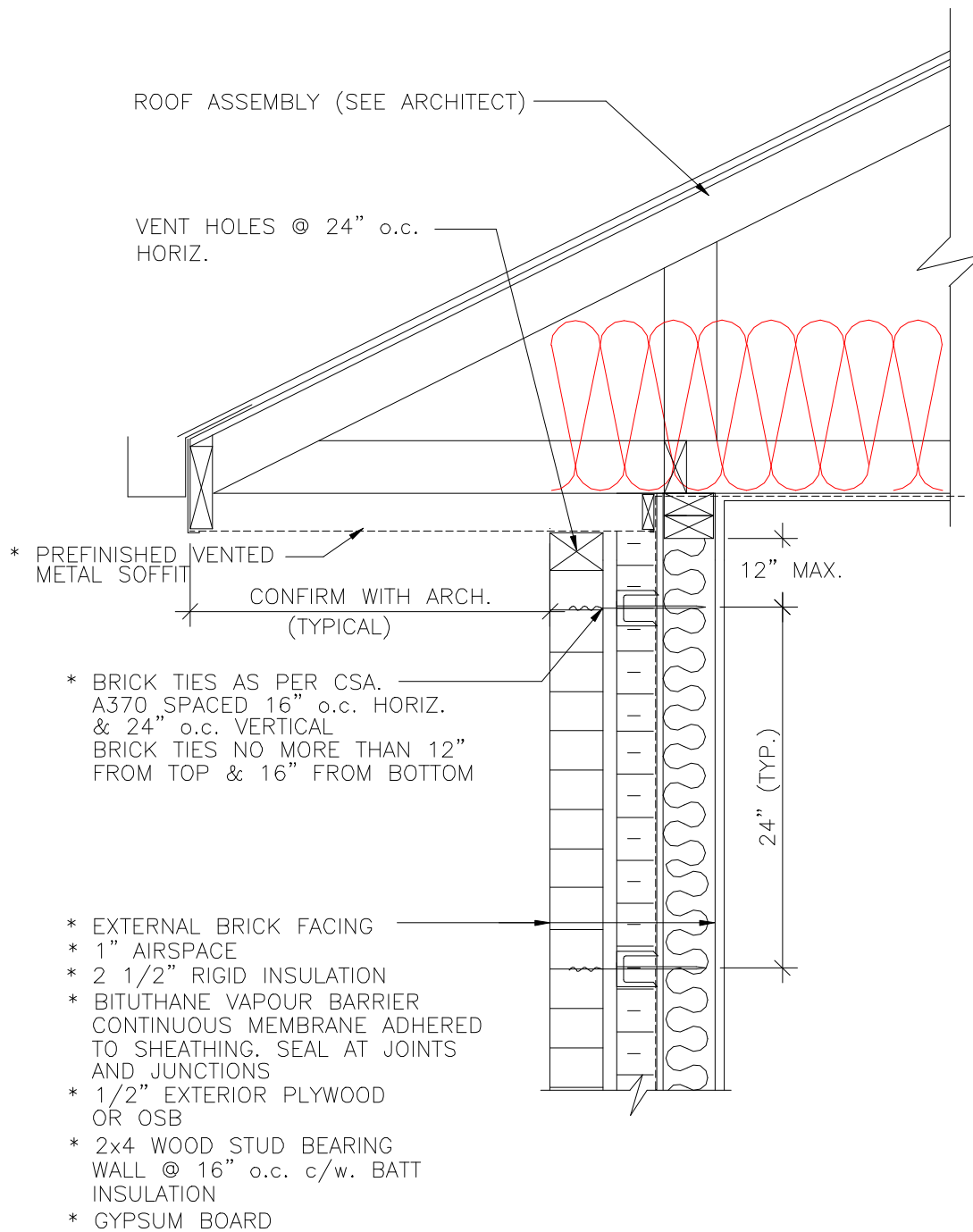
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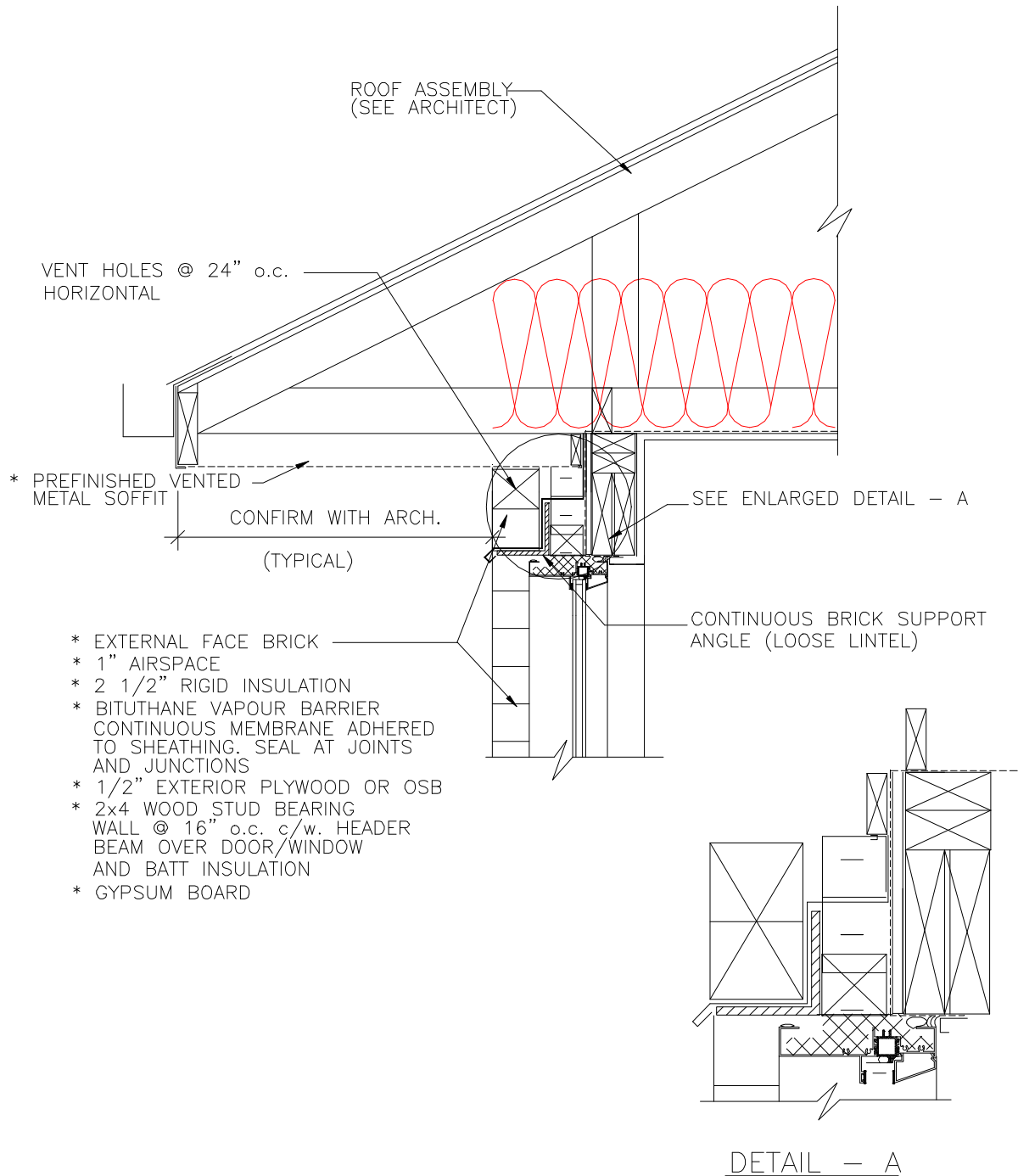
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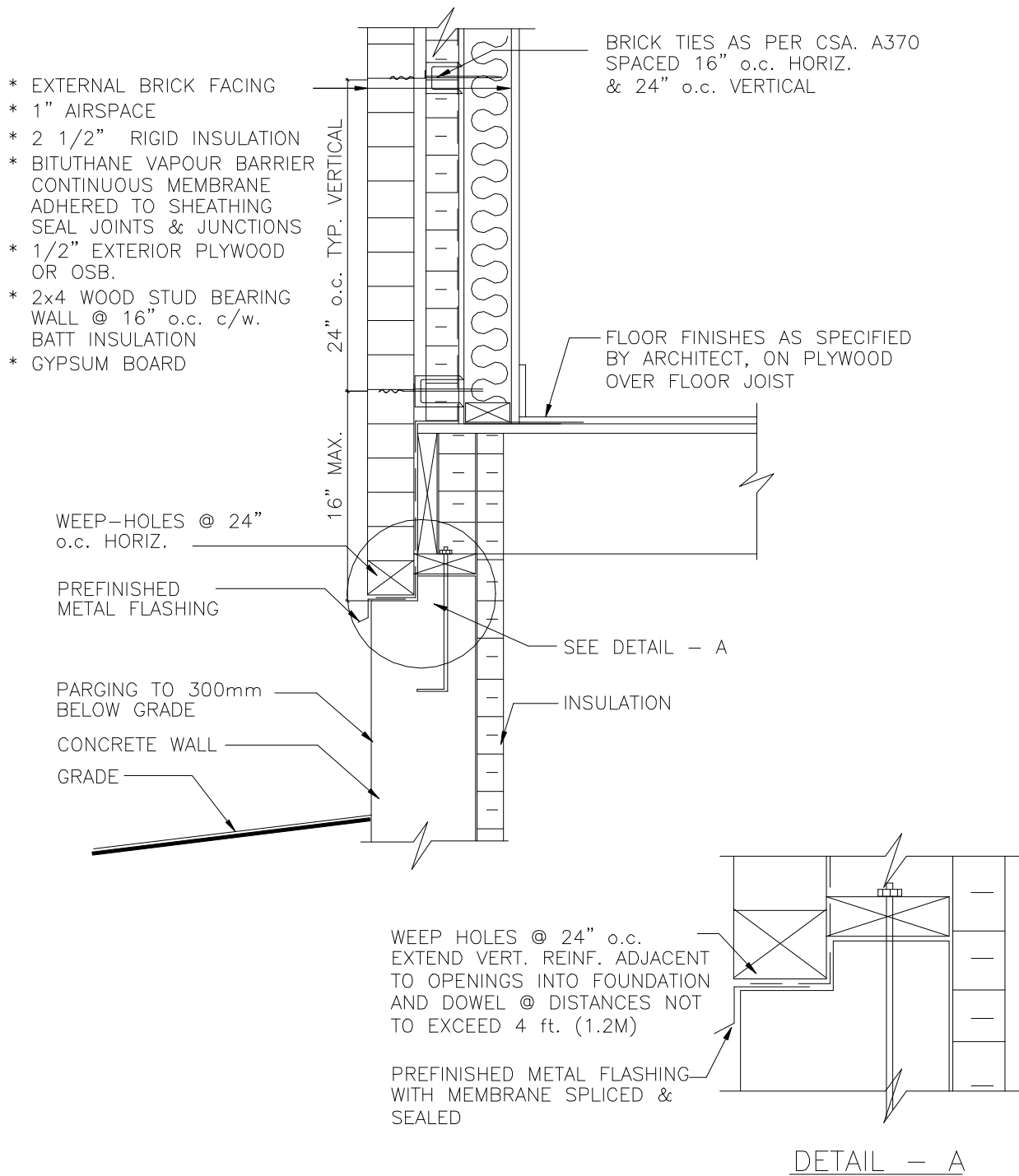
Detail 9.19 – Window Opening with Loose Iron Lintel



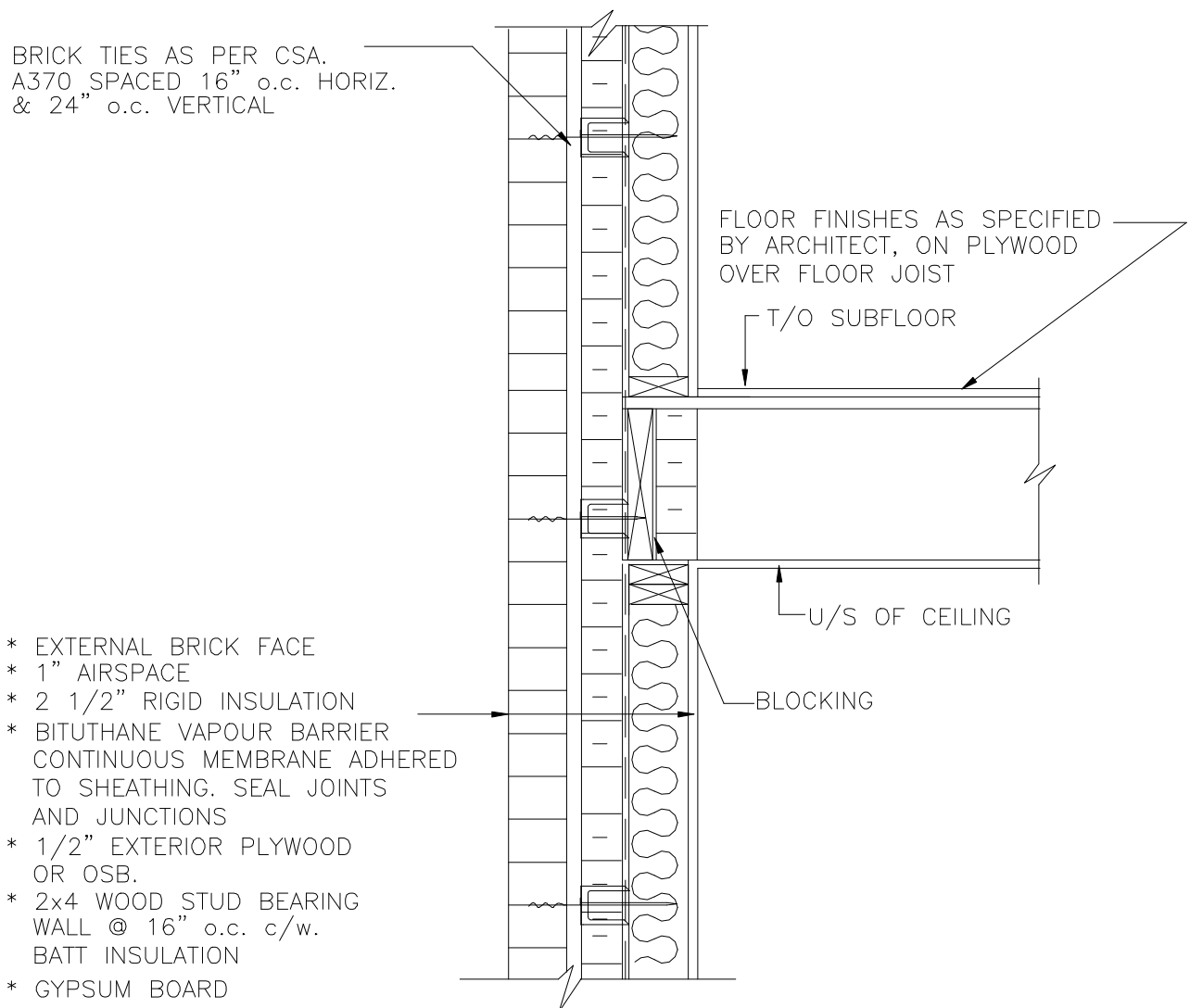
Detail 9.20 – Roof Truss Bearing on Load Bearing Stud Wall



Detail 9.21 – Roof Truss Bearing on Lintel

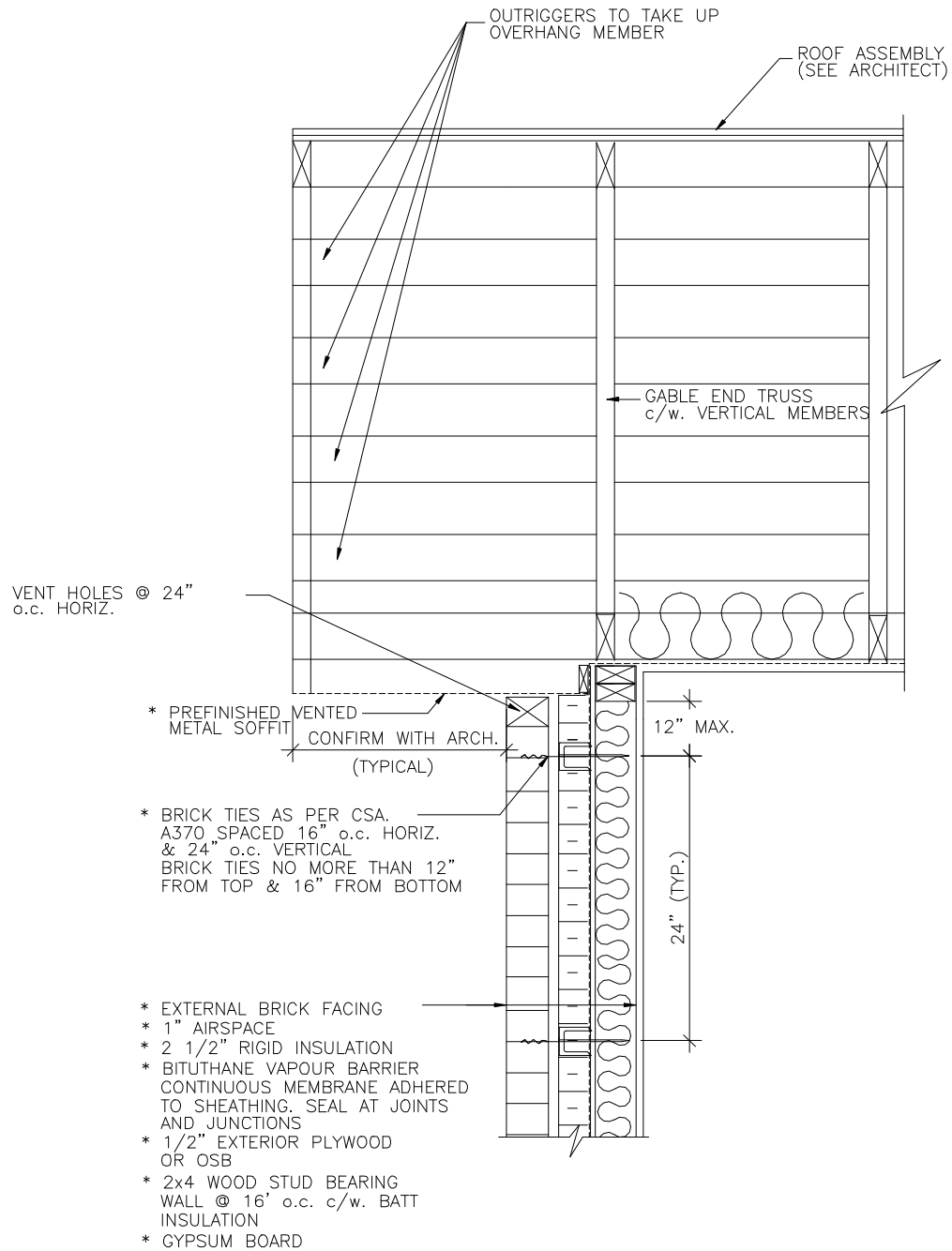


Detail 9.22 – External Brick Face on Basement Wall

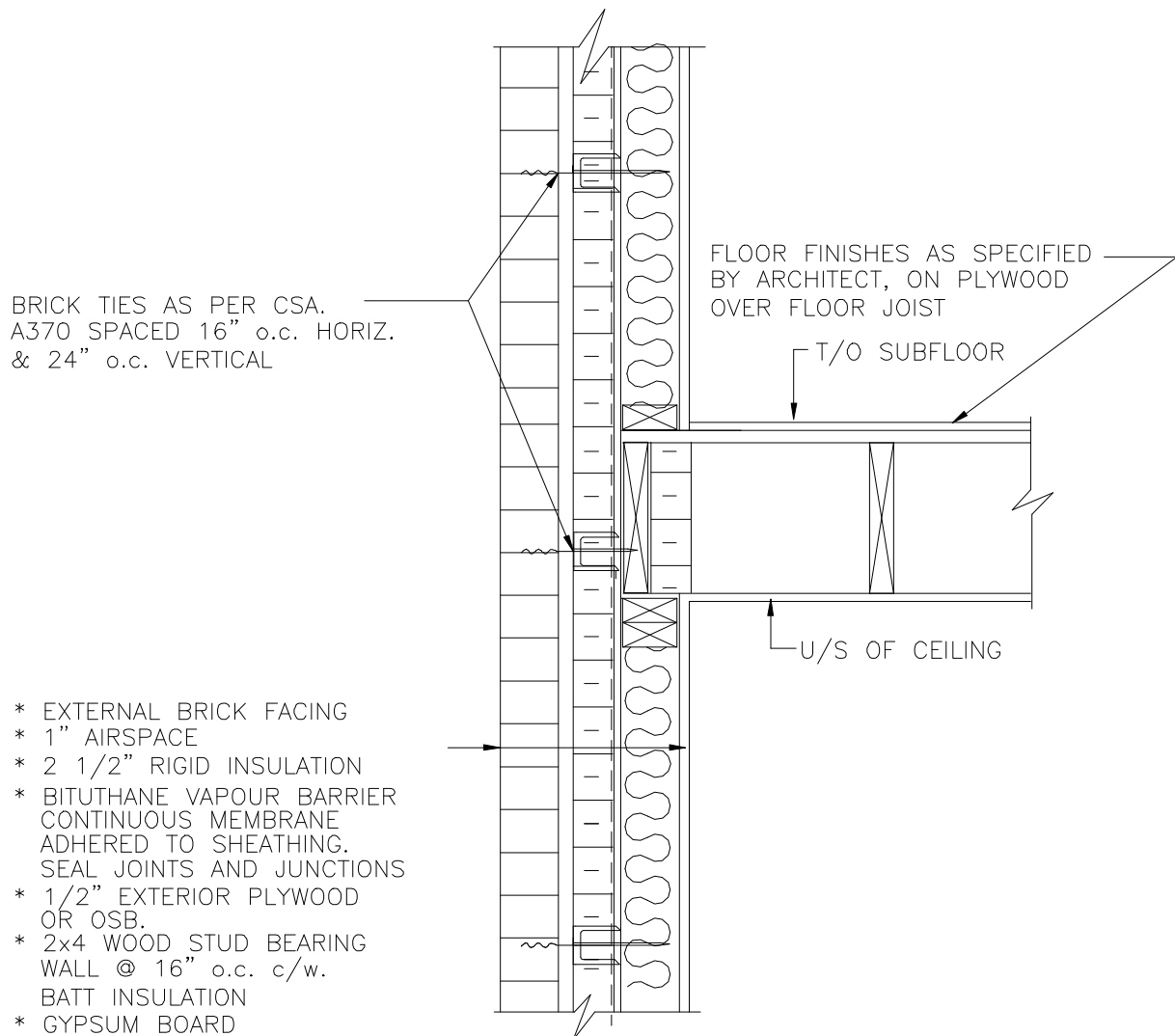


PROVIDE SAME ASSEMBLY ABOVE
MID-FLOOR LEVEL

Detail 9.23 – Floor Joist Bearing on External Wood Stud Wall

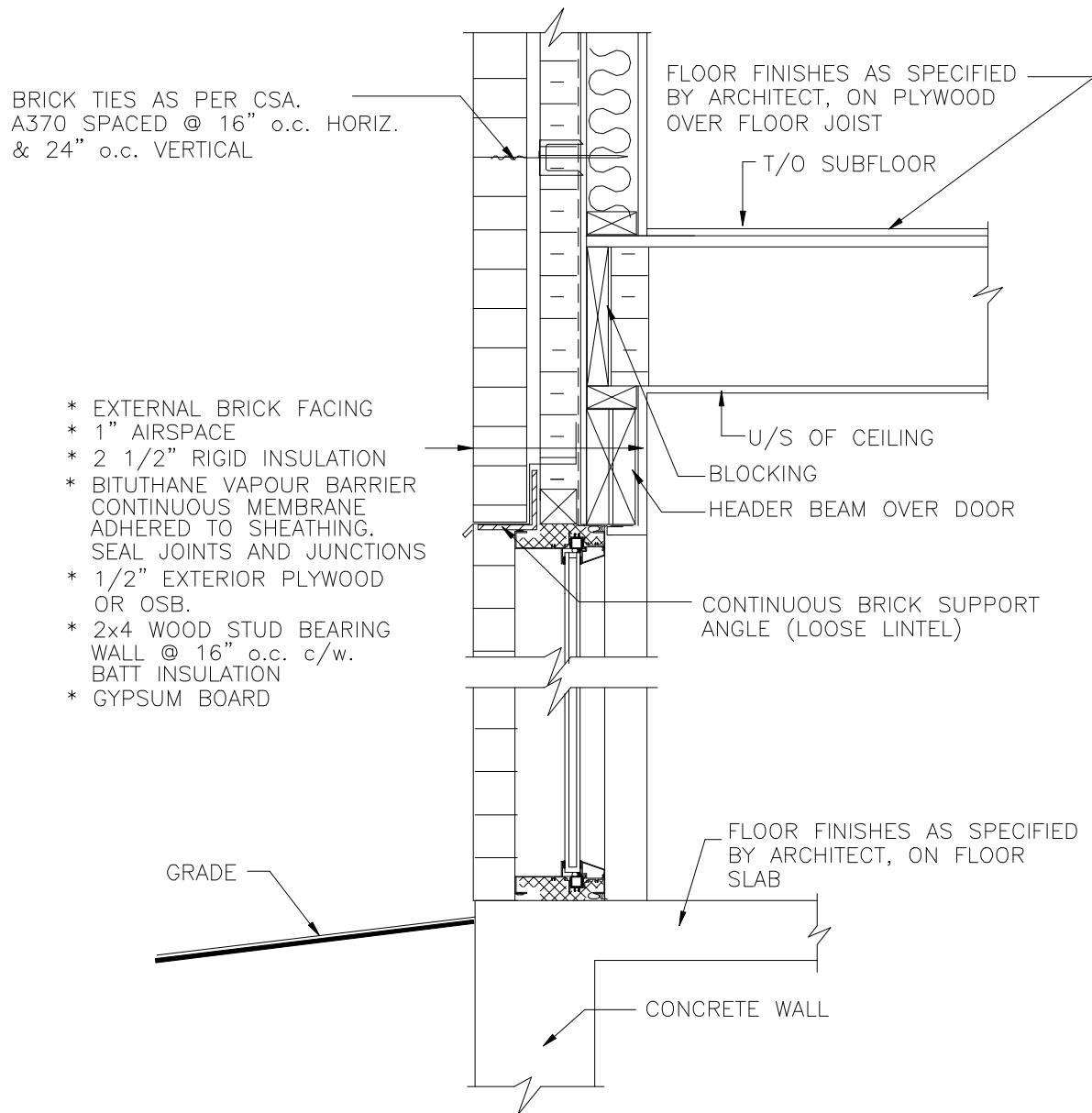


Detail 9.24 – Wood Truss Parallel to External Wood Stud Wall c/w Soffit

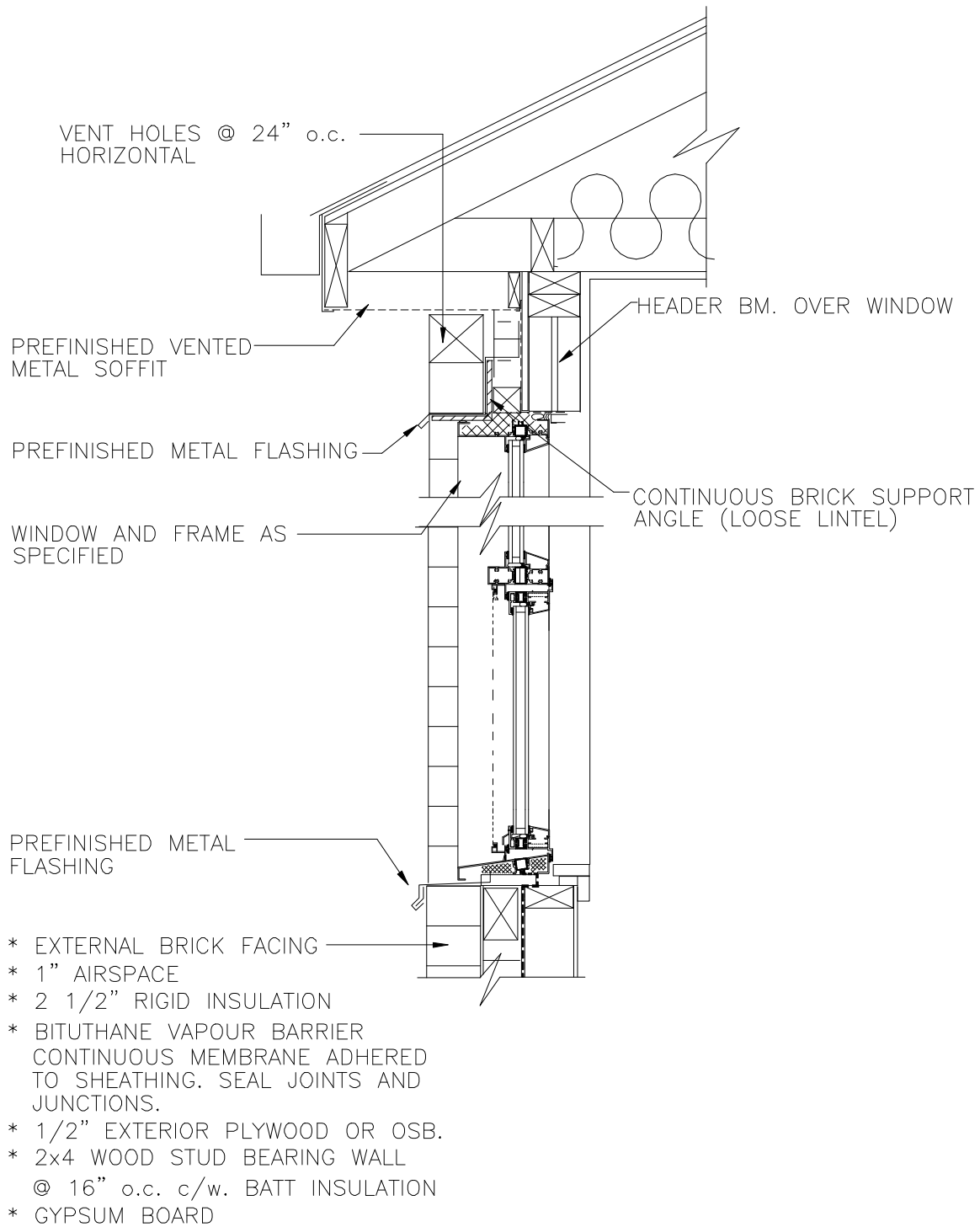


PROVIDE SAME ASSEMBLY ABOVE
MID-FLOOR LEVEL

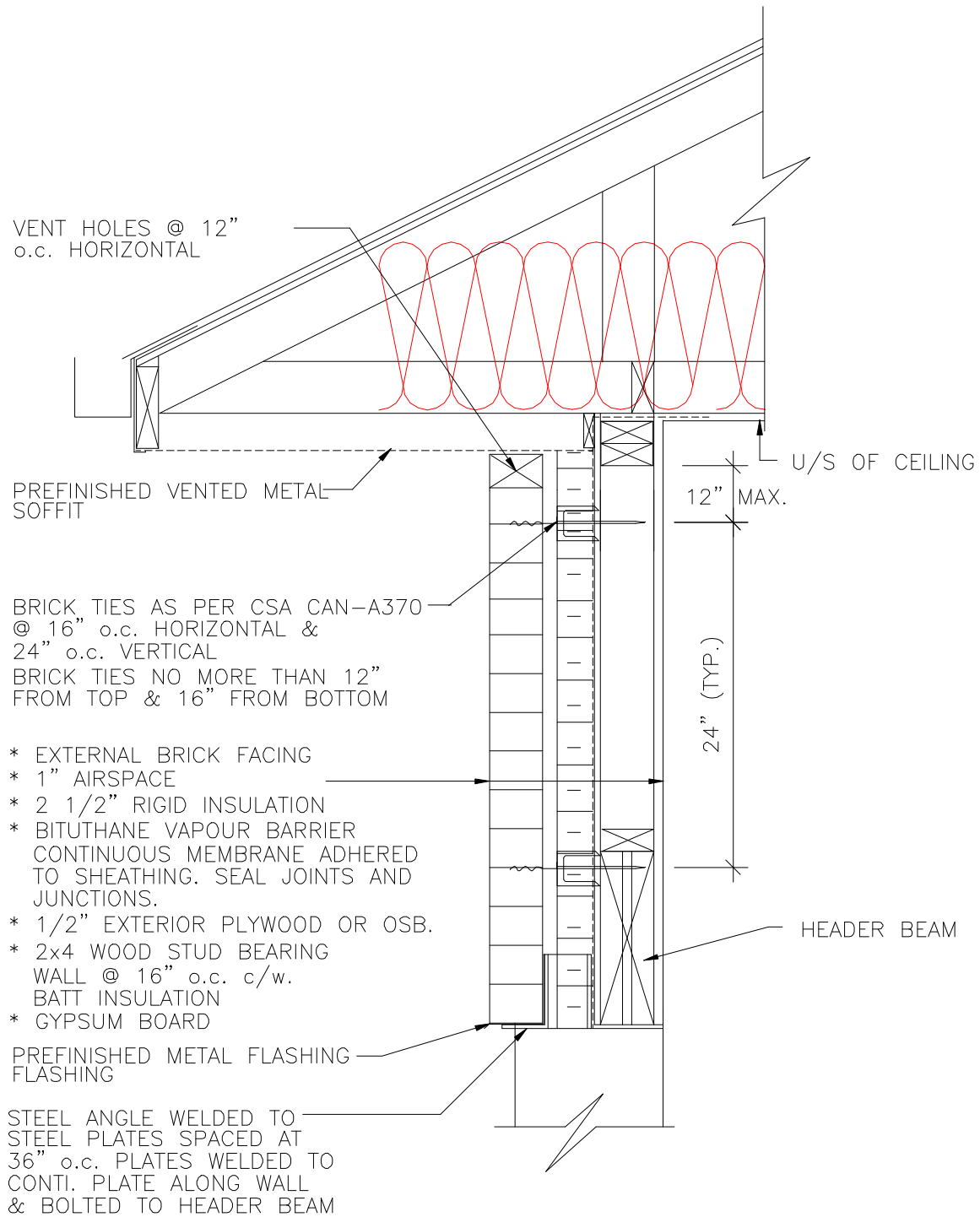
Detail 9.25 – Floor Joist Parallel to External Wood Stud Wall



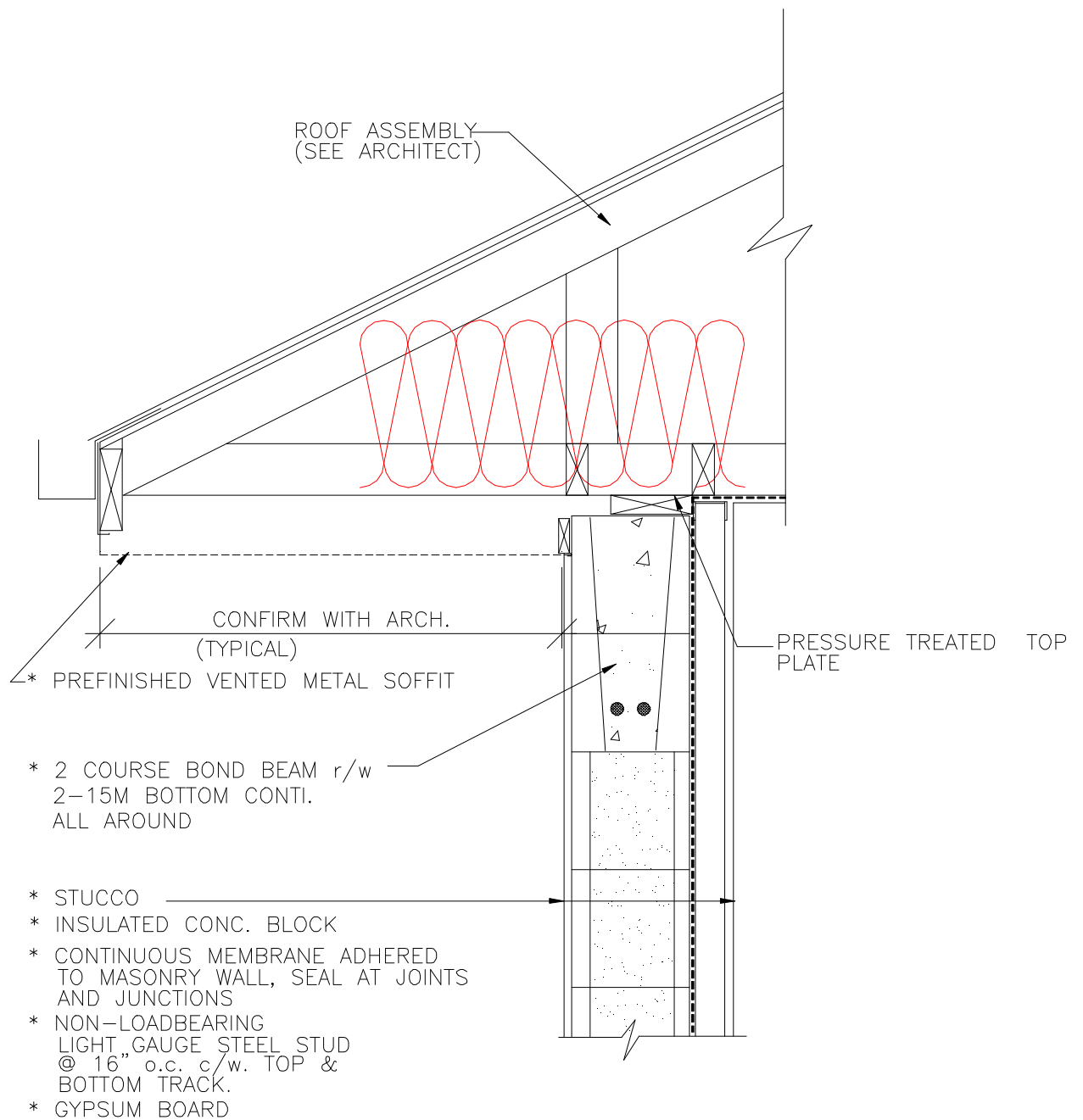
Detail 9.26 – Walk-Out Basement Through Load Bearing External Wall



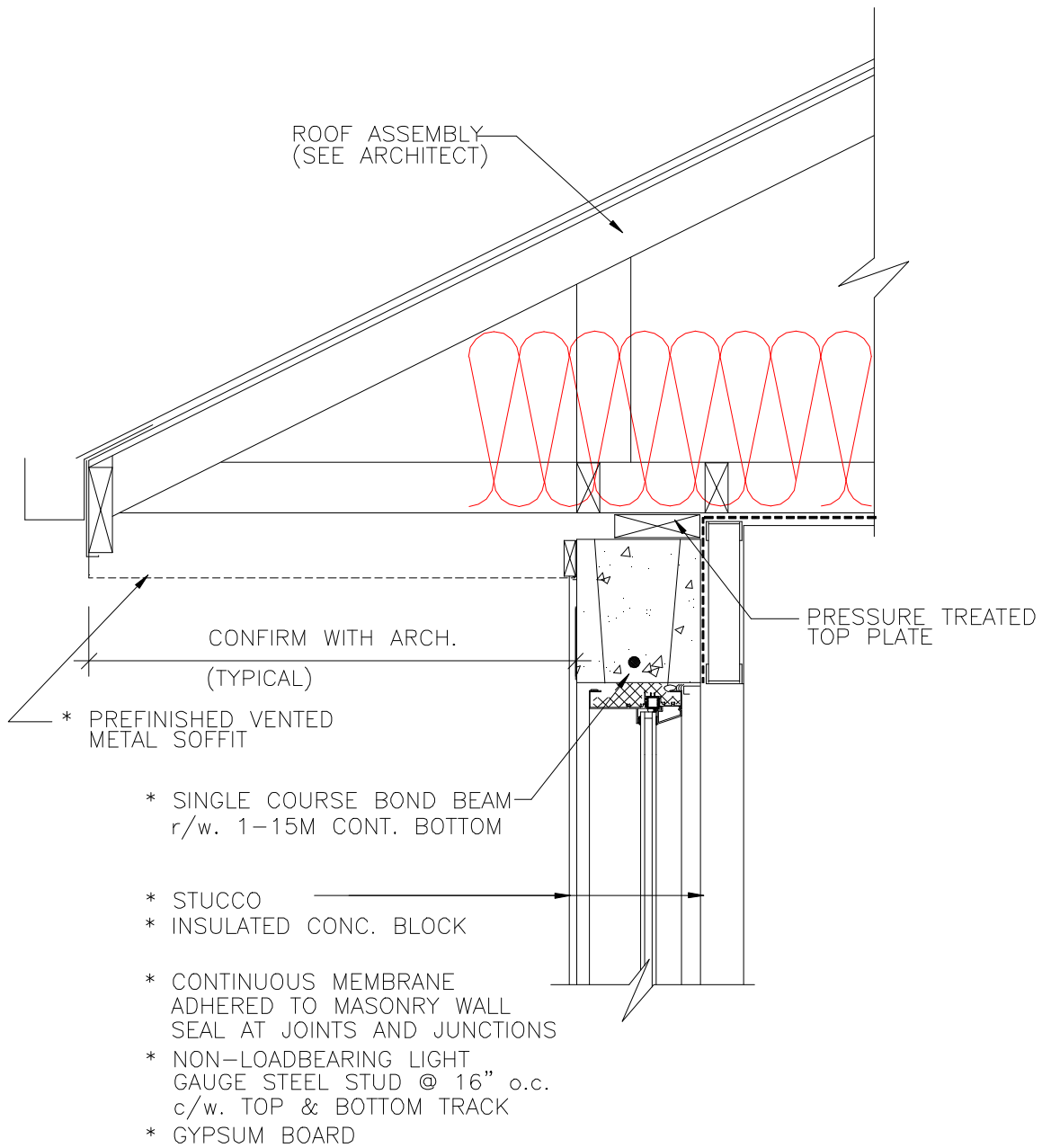
Detail 9.27 – Projected Bay Window & Truss Bearing on Stud Wall



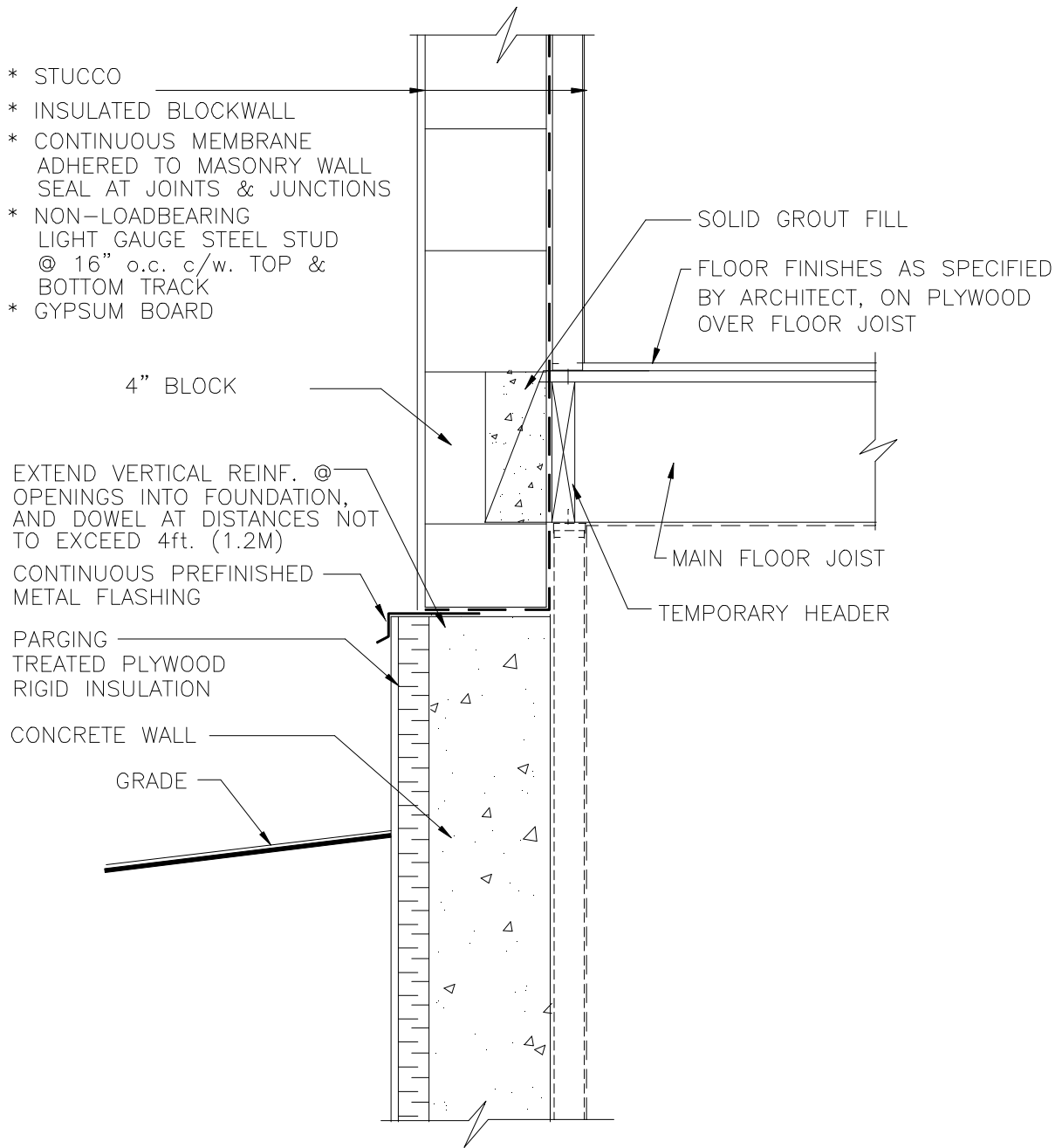
Detail 9.28 – Garage Door Lintel



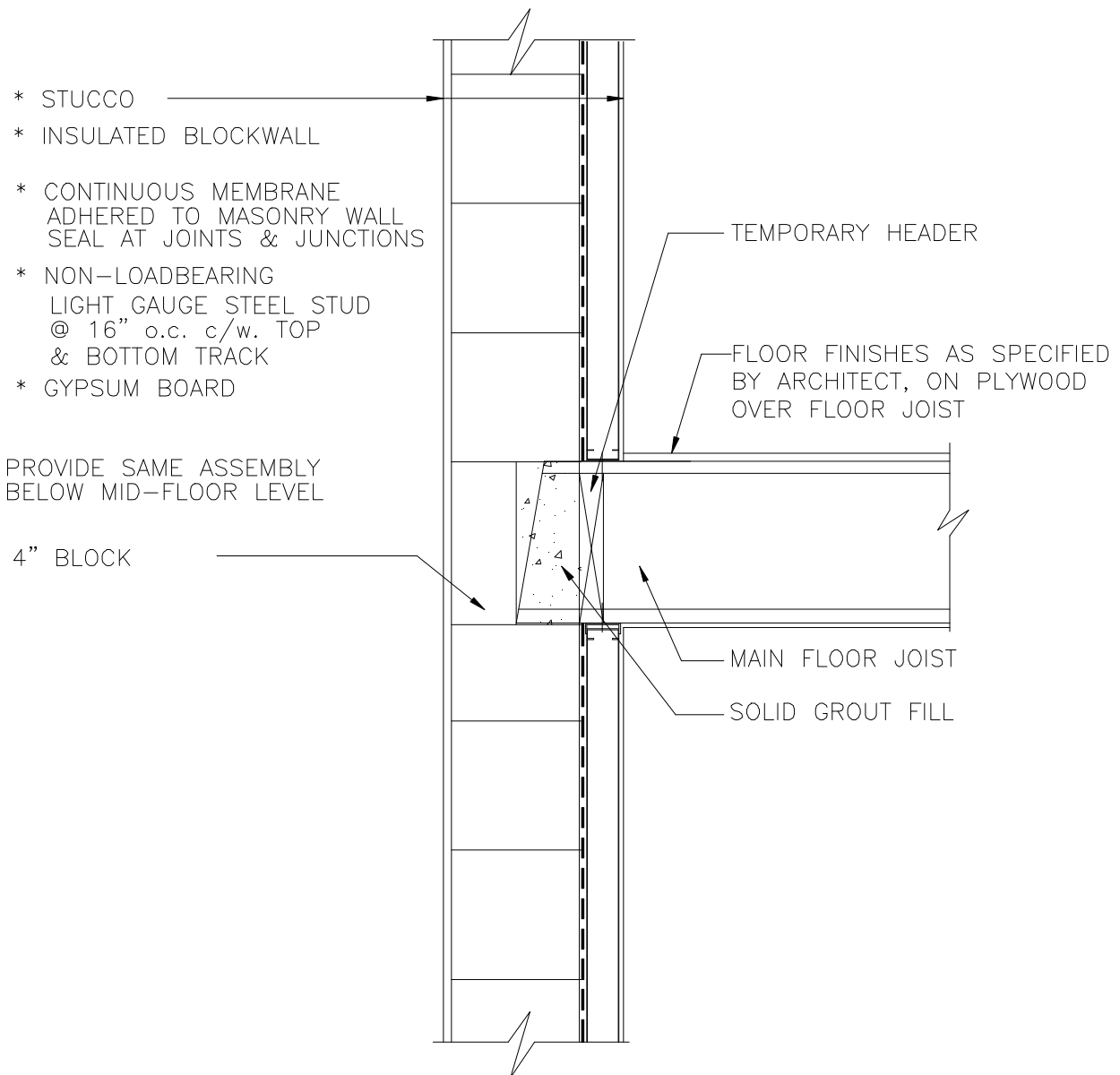
Detail 9.29 – Roof Truss Bearing on Block Wall



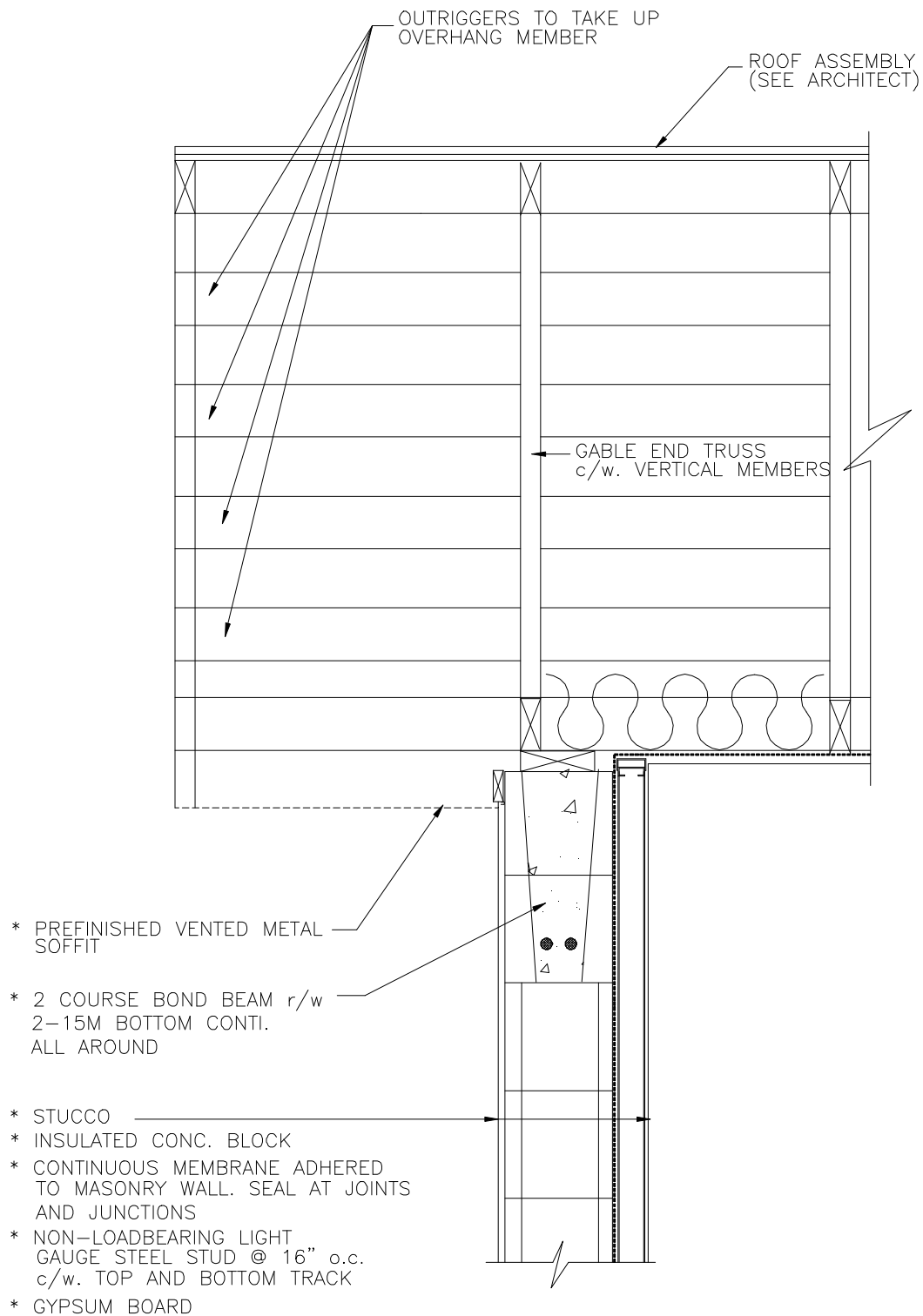
Detail 9.30 – Roof Truss Bearing on Bond Beam



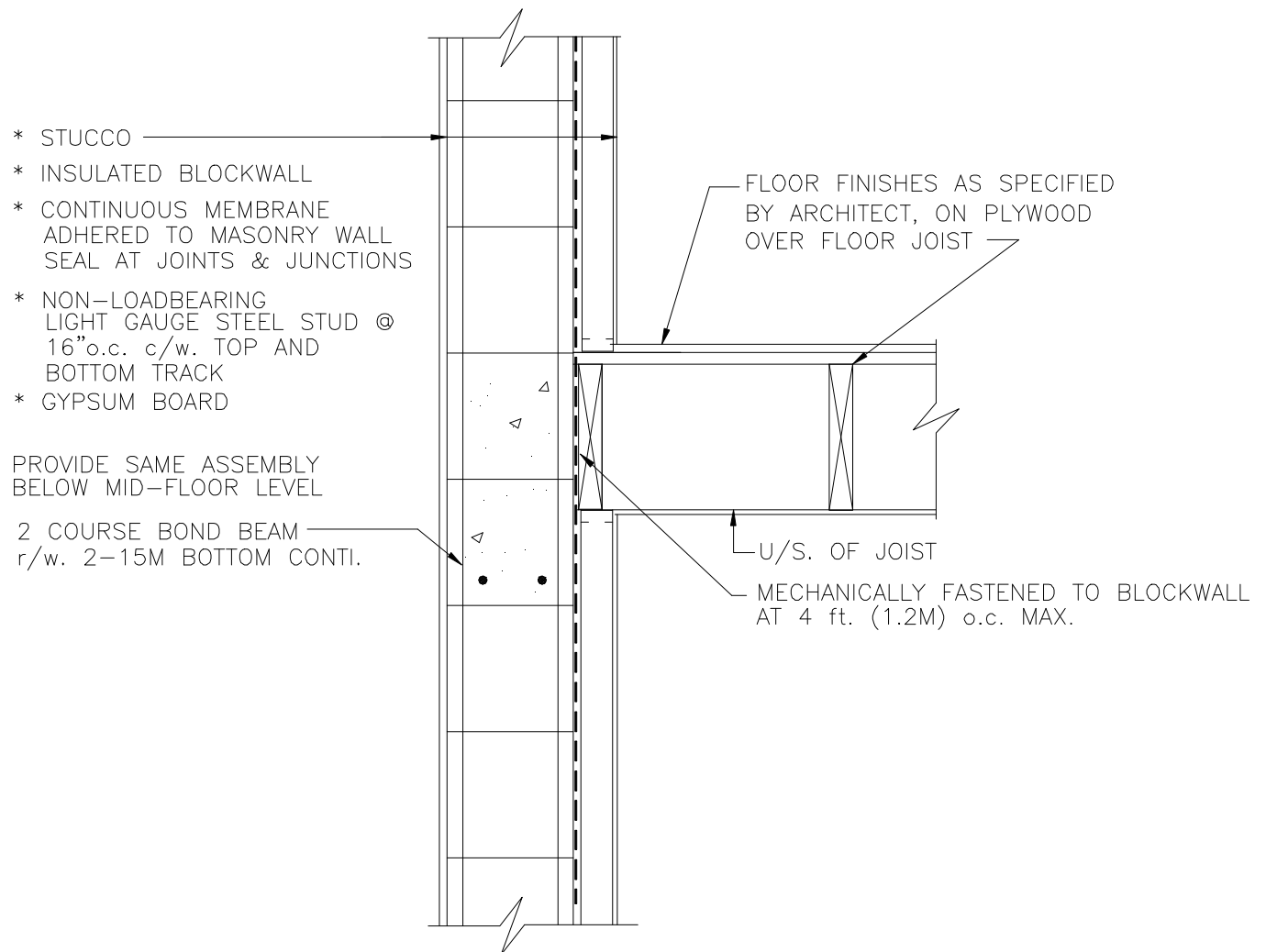
Detail 9.31 – Block Wall on Concrete Basement Wall



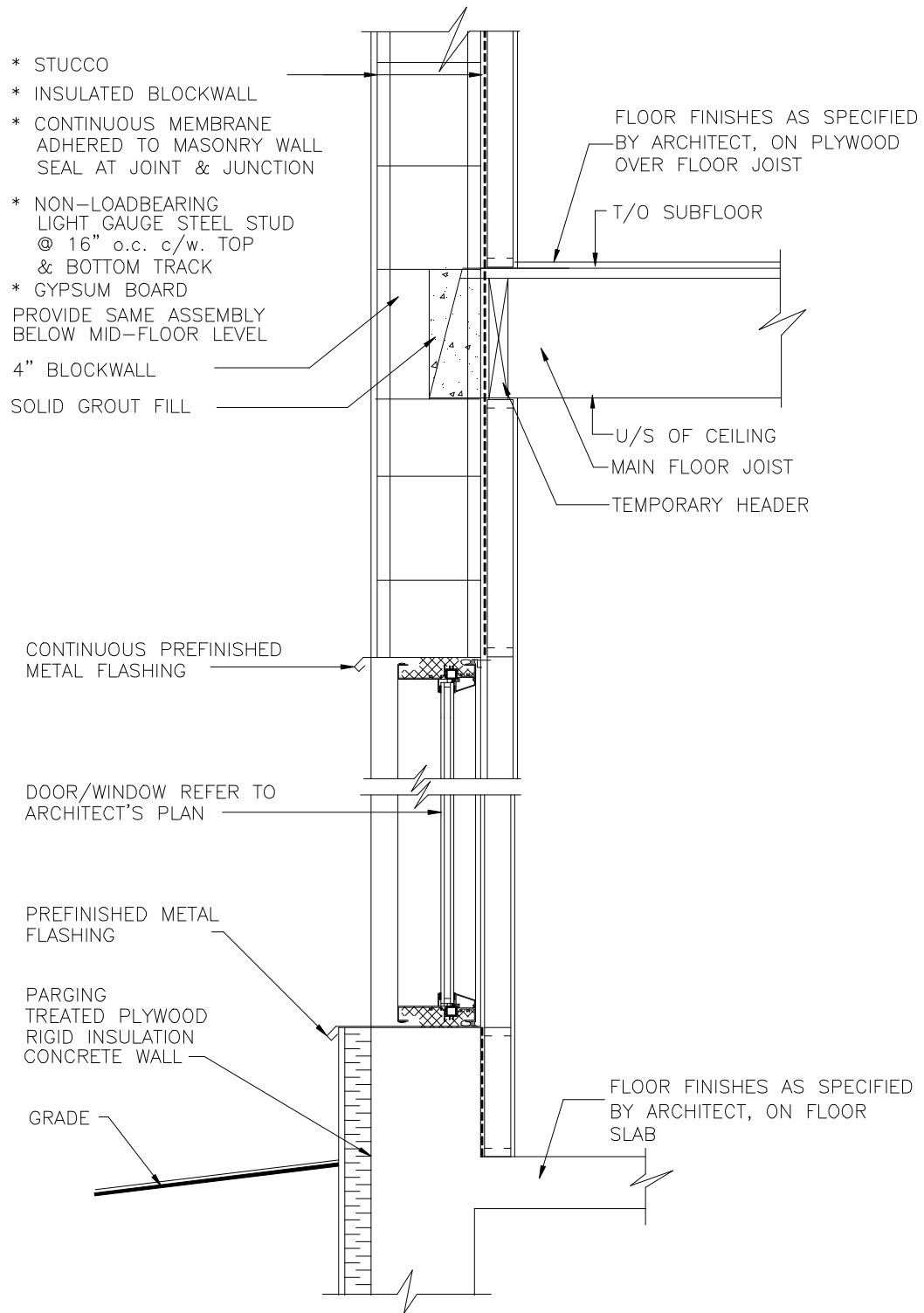
Detail 9.32 – Floor Joist Bearing on External Block Wall



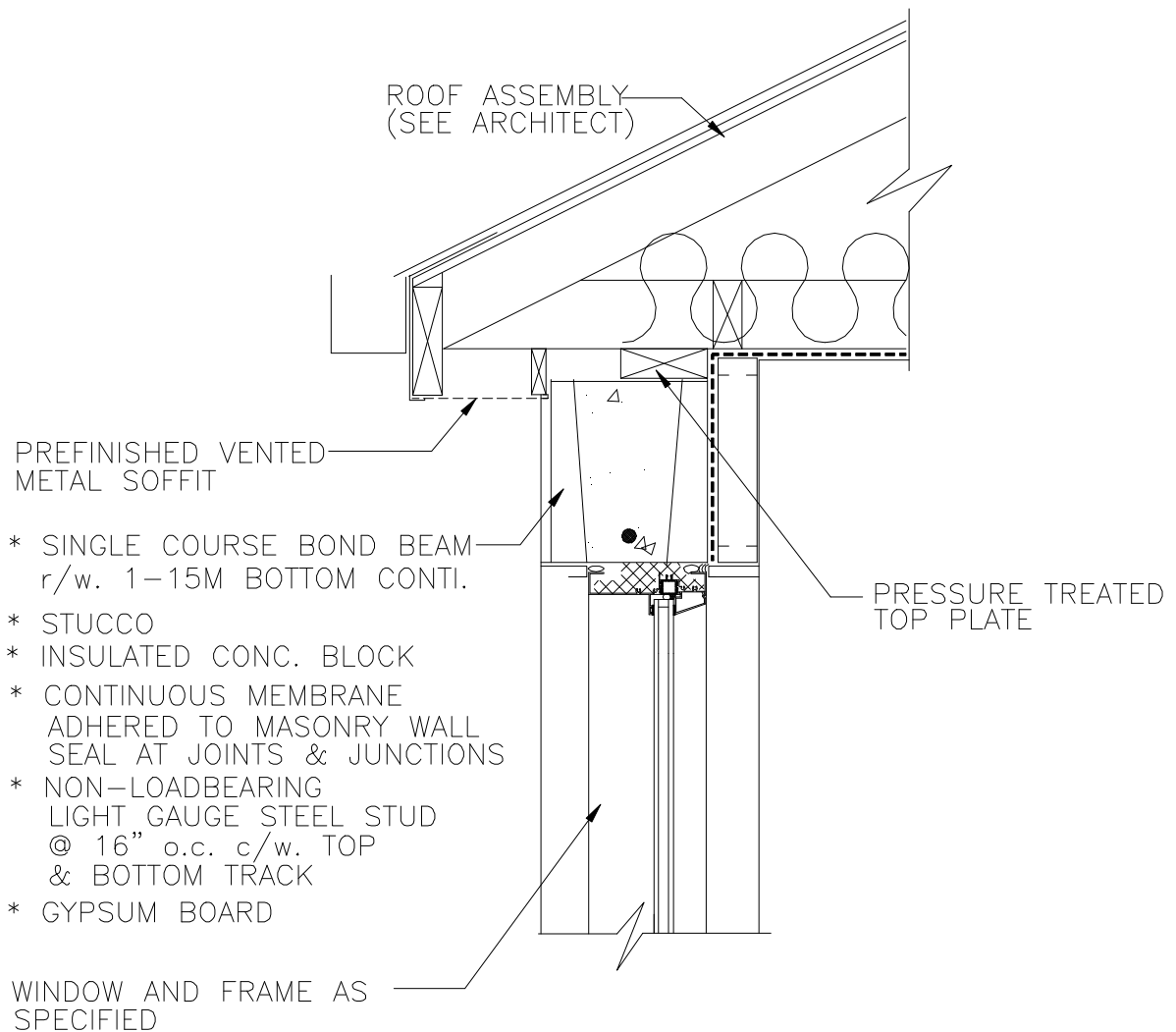
Detail 9.33 – Roof Truss Parallel to External Block Wall



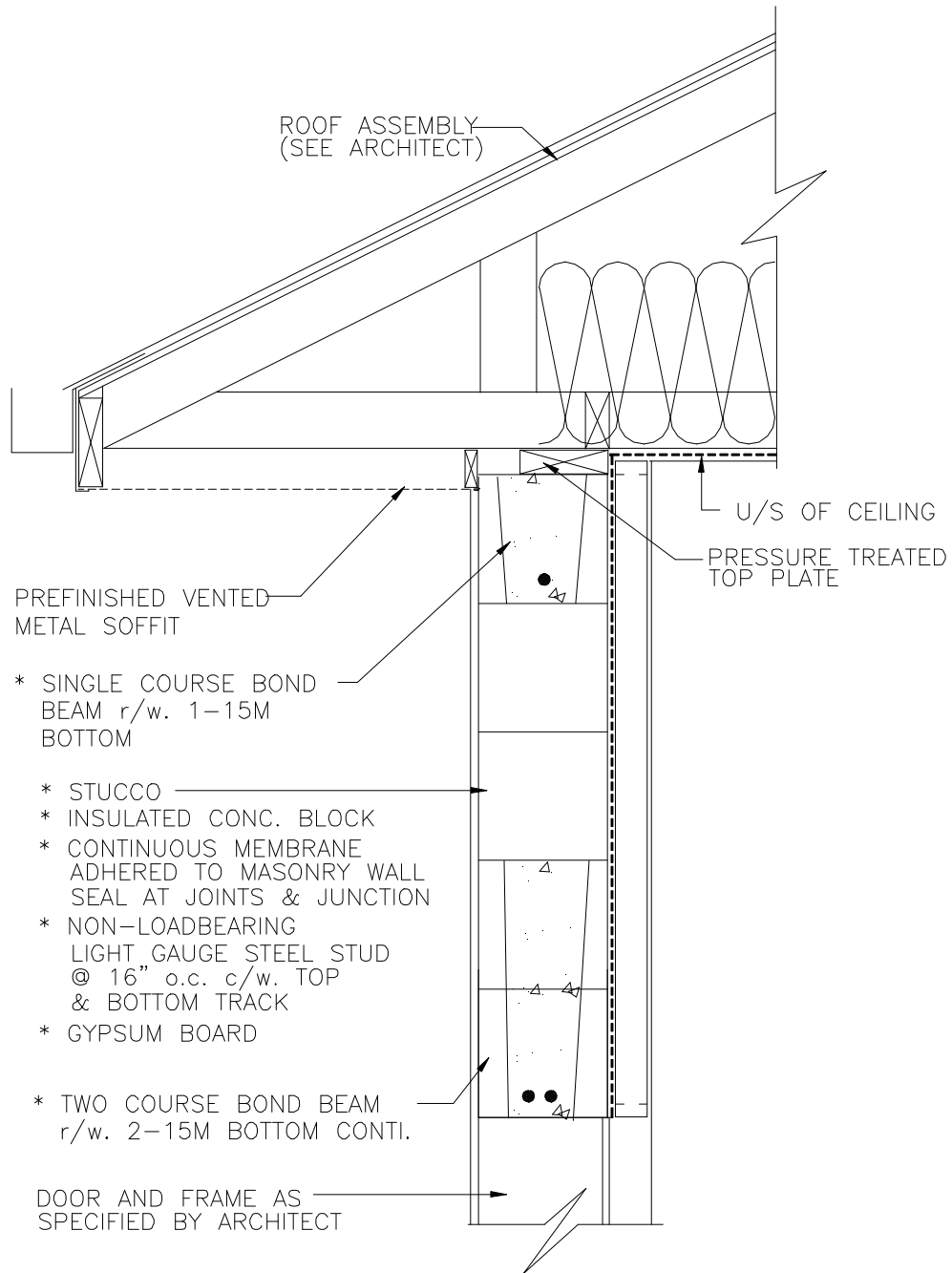
Detail 9.34 – Floor Joist Parallel to External Block Wall



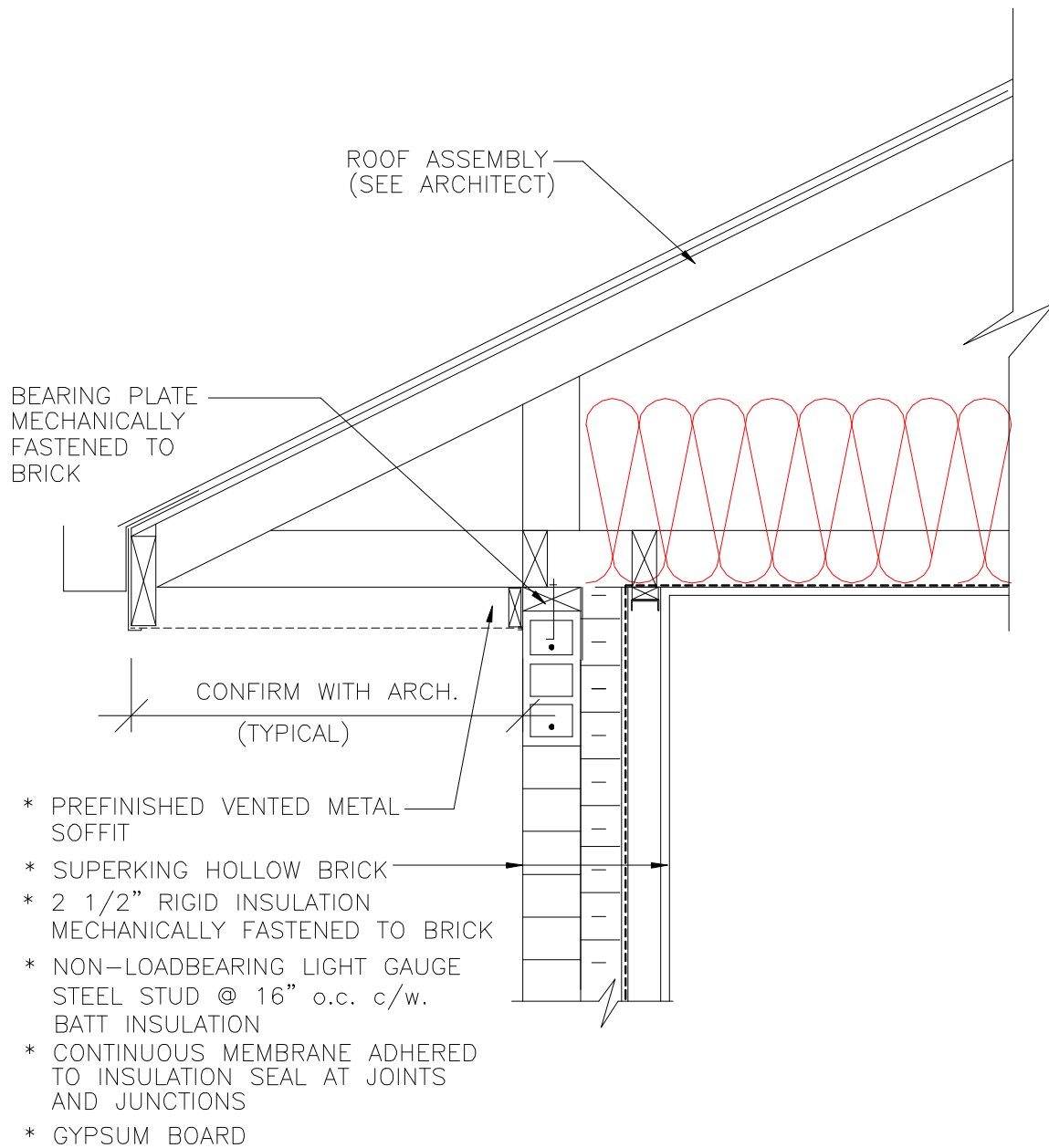
Detail 9.35 – Walk-Out Basement Through External Block Wall



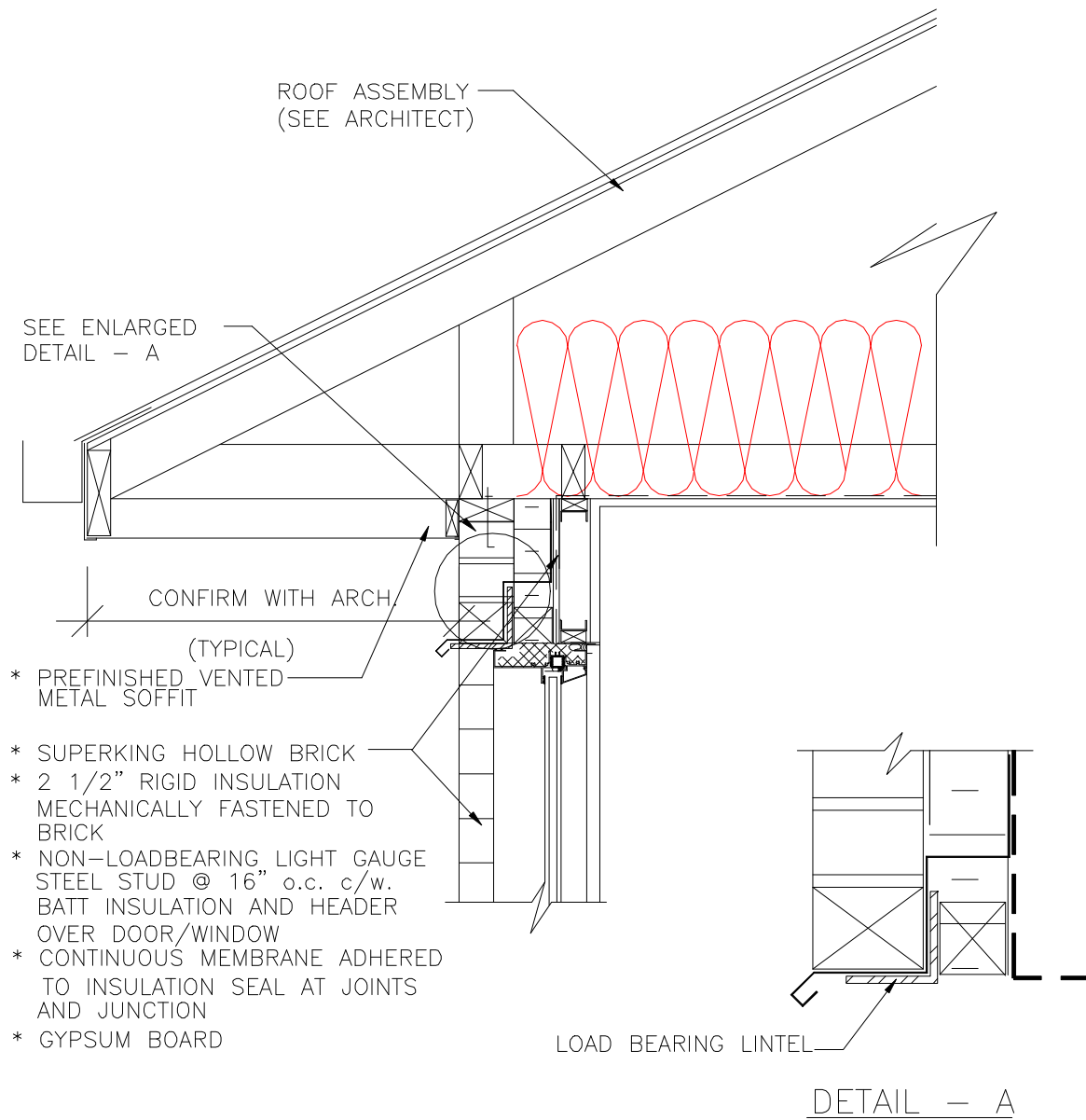
Detail 9.36 – Projected Bay Window and Truss Bearing on Block Wall



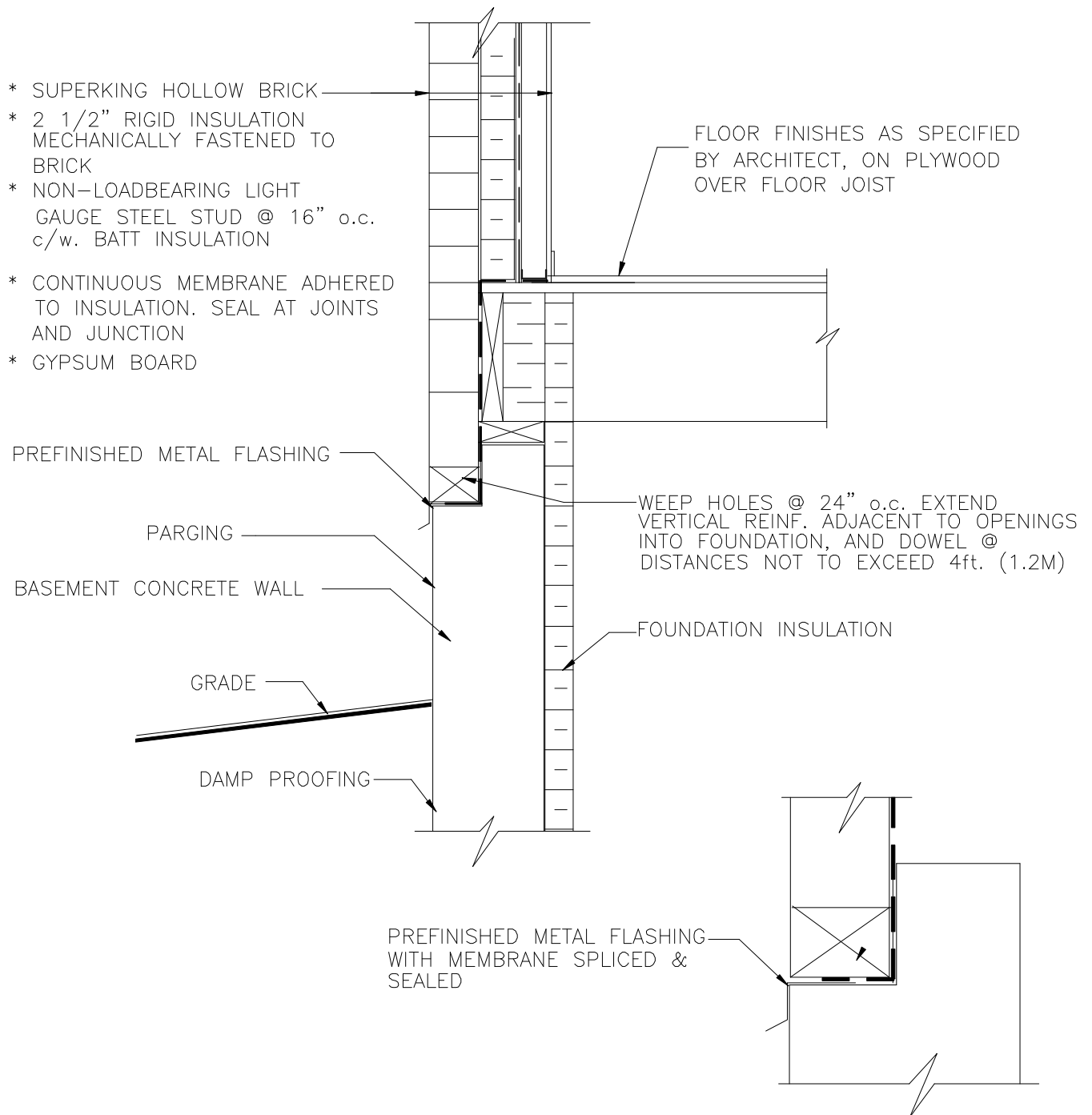
Detail 9.37 – Garage Door Lintel



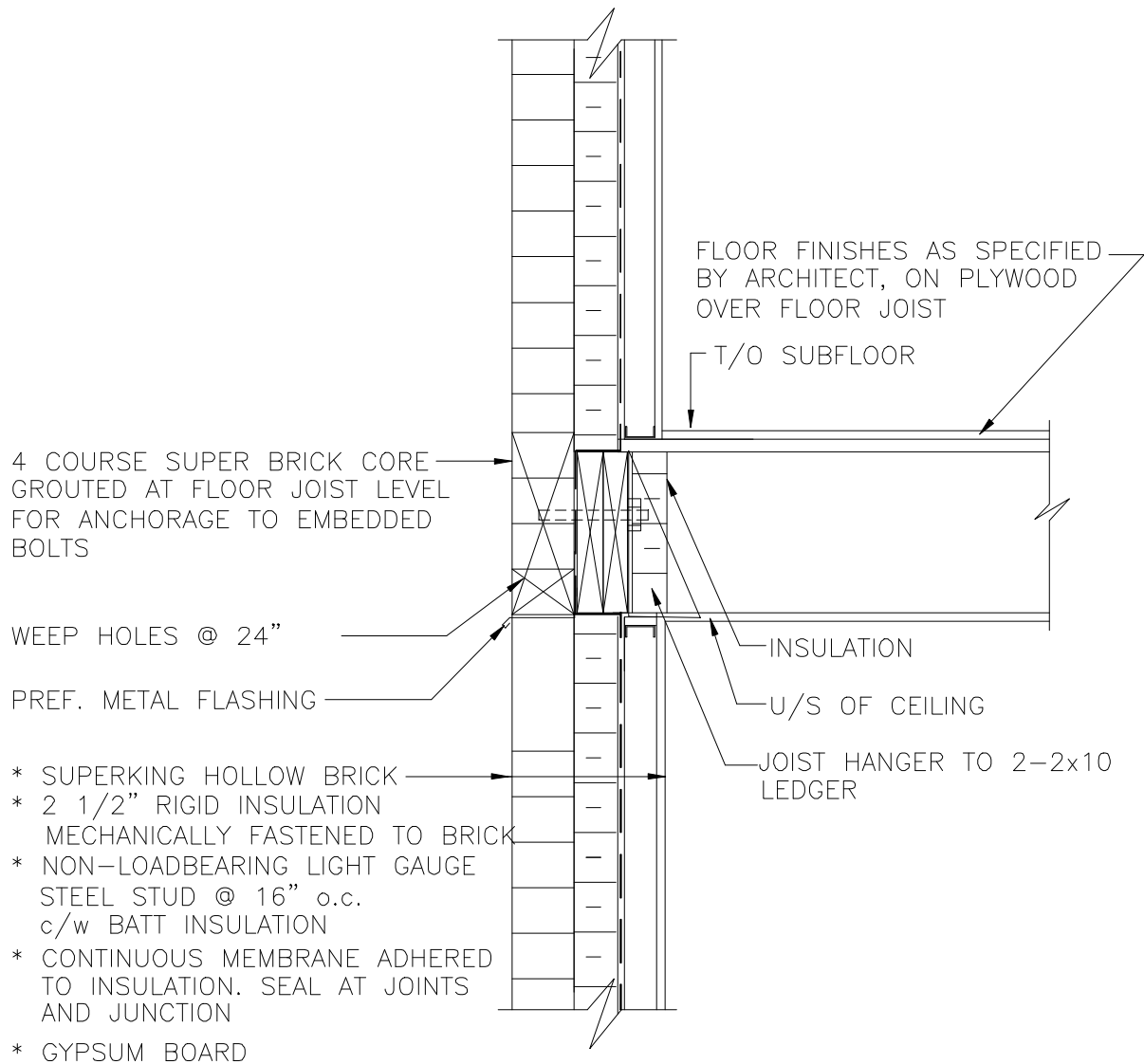
Detail 9.38 – Roof Truss Bearing on External Brick Wall



Detail 9.39 – Roof Truss Bearing on Lintel External Wall

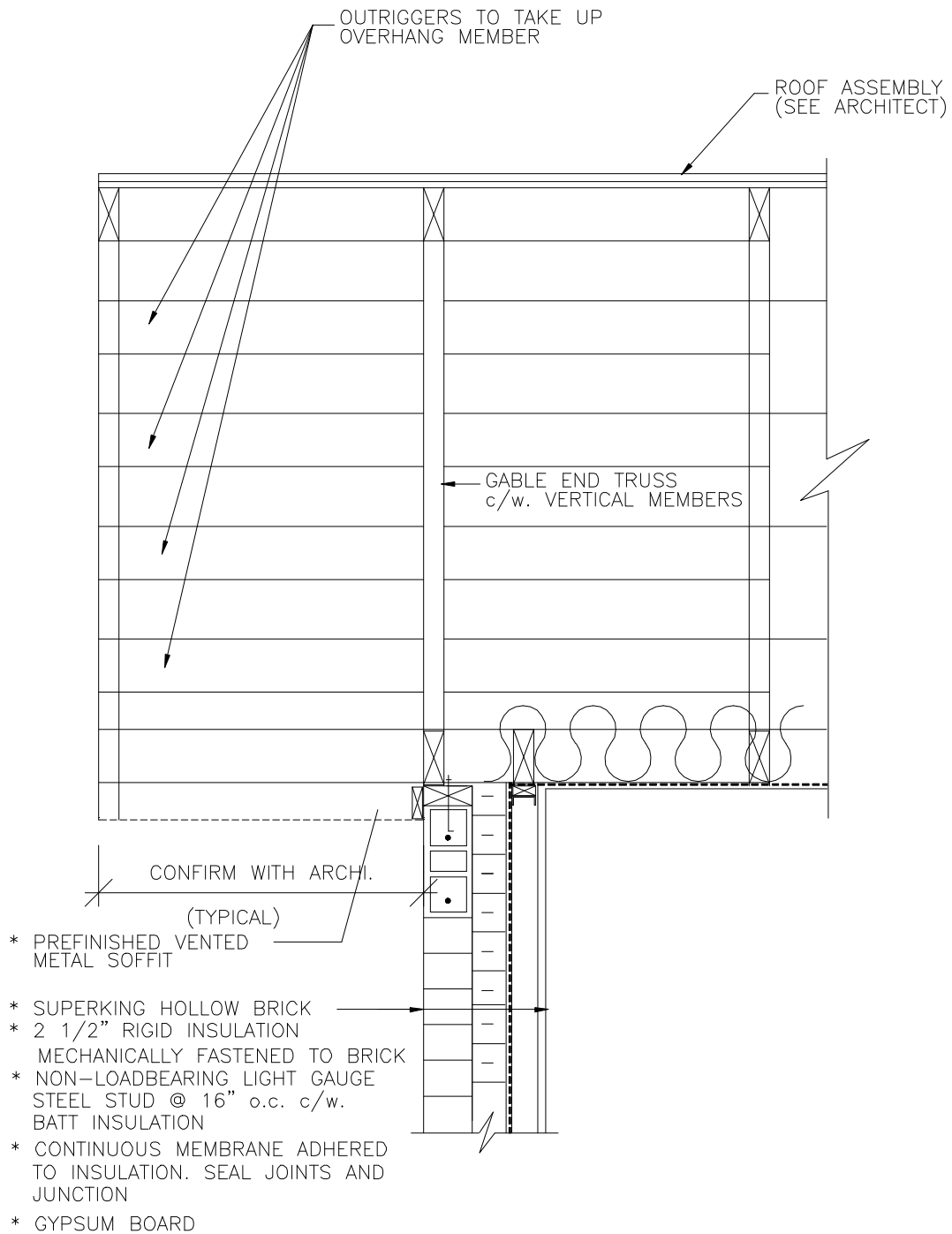


Detail 9.40 – External Bearing Wall on Basement Wall

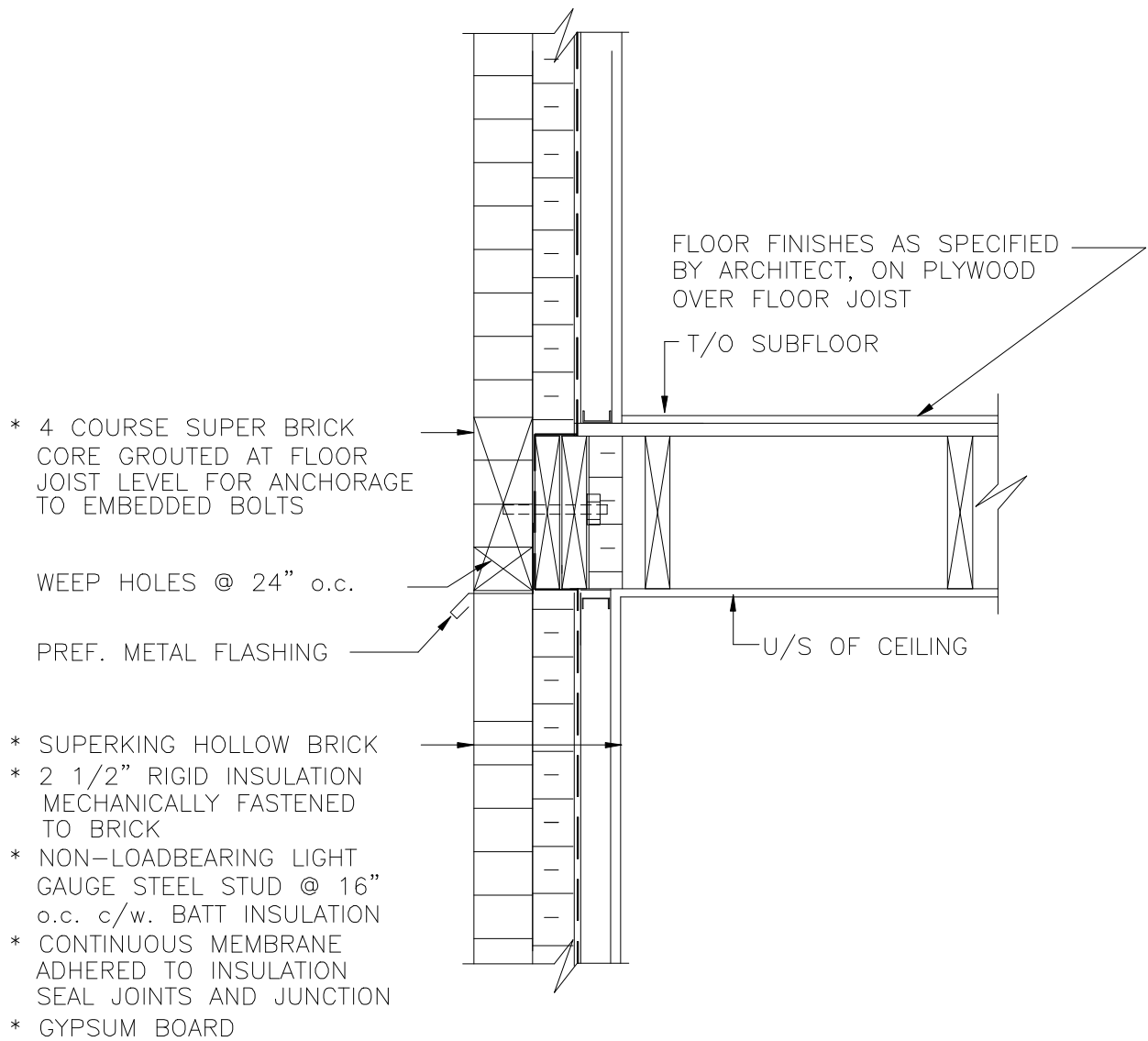


PROVIDE SAME ASSEMBLY ABOVE
MID-FLOOR LEVEL

Detail 9.41 – Floor Joist Bearing on External Wall

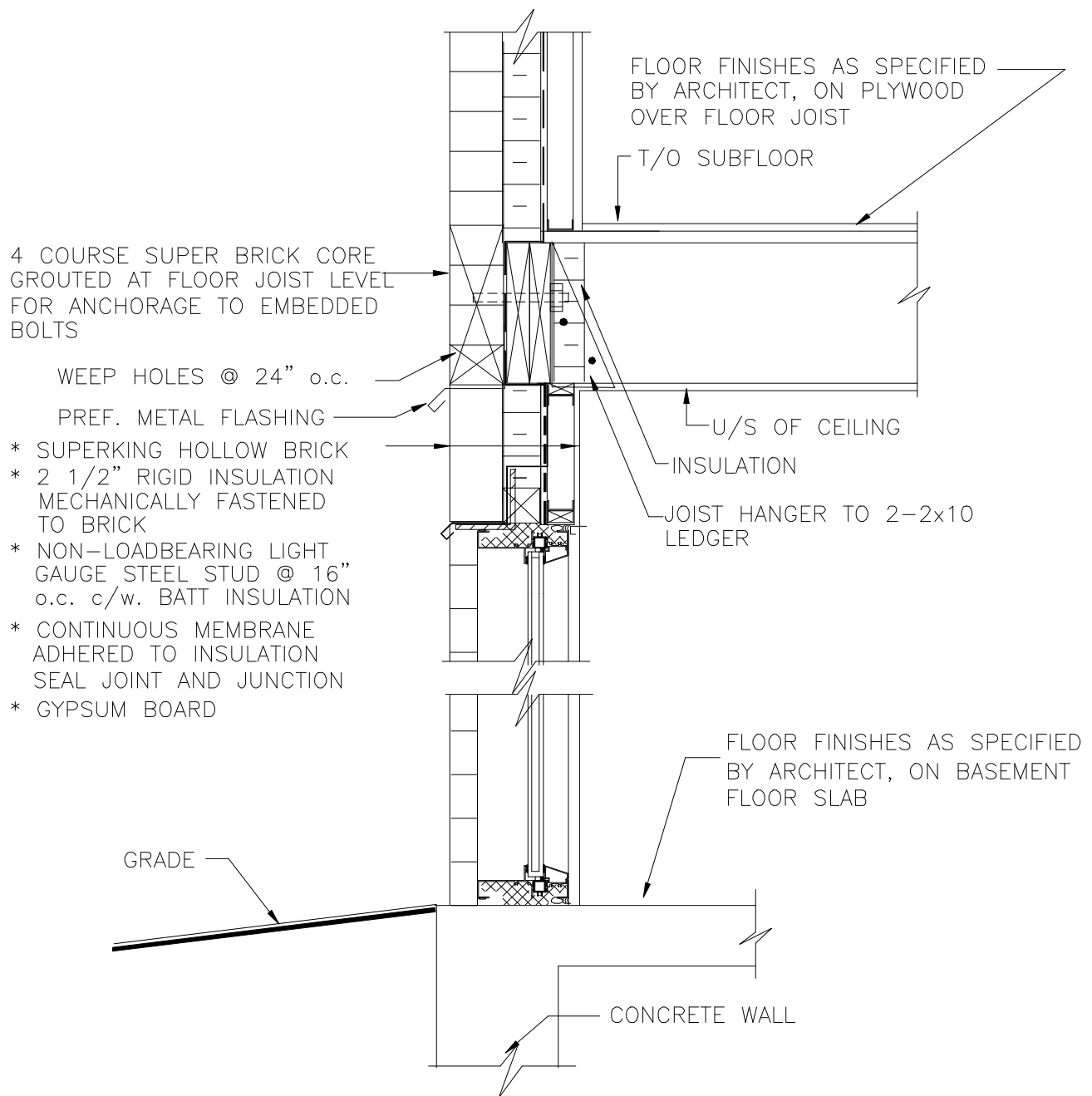


Detail 9.42 – Roof Truss Parallel to External Wall c/w Soffit

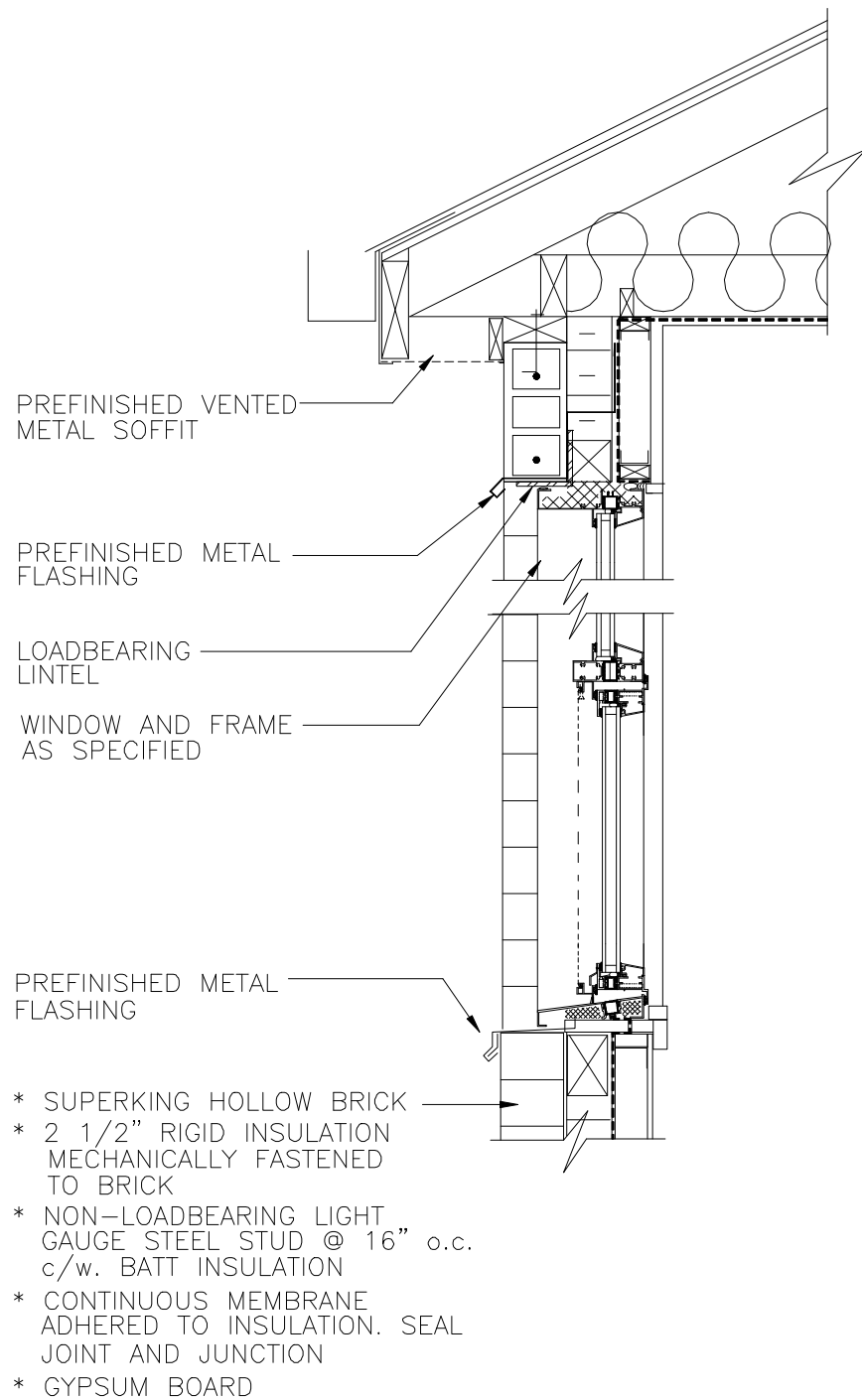


PROVIDE SAME ASSEMBLY ABOVE
MID-FLOOR LEVEL

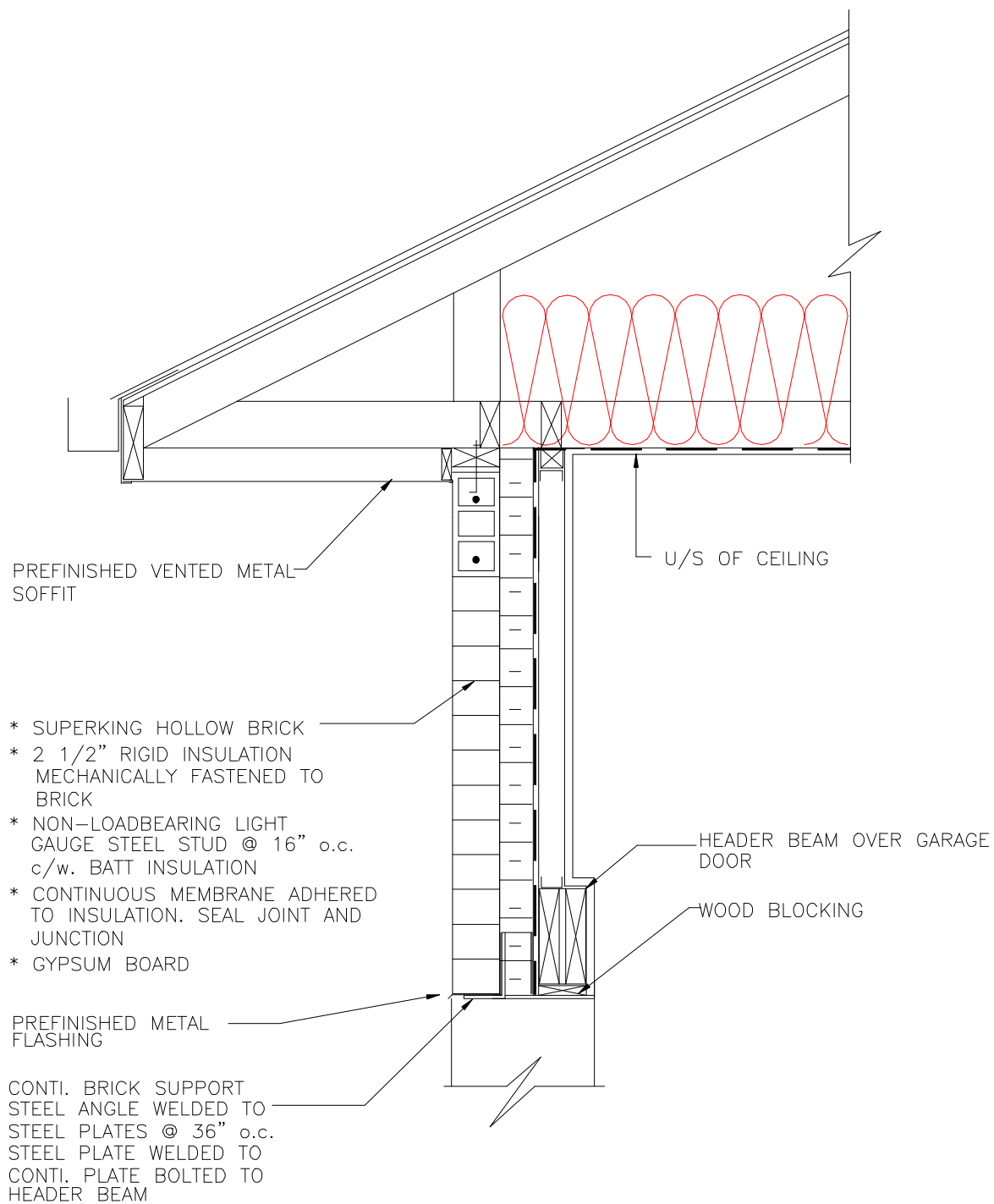
Detail 9.43 – Floor Joist Parallel to External Wall



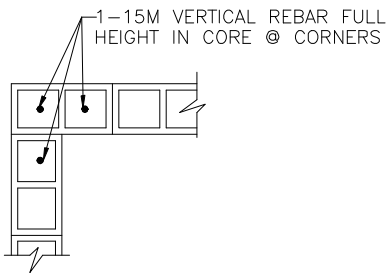
Detail 9.44 – Walk-Out Basement Through Load Bearing External Wall



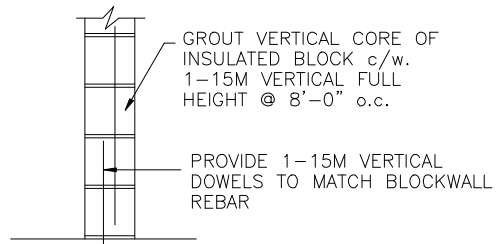
Detail 9.45 – Projected Bay Window & Truss Bearing on Brick



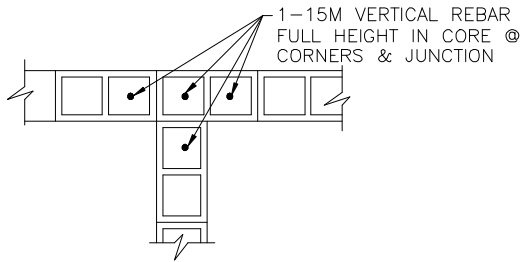
Detail 9.46 – Garage Door Lintel



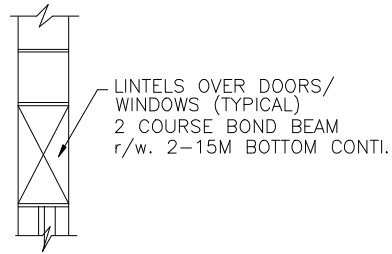
CORNER REBAR DETAIL



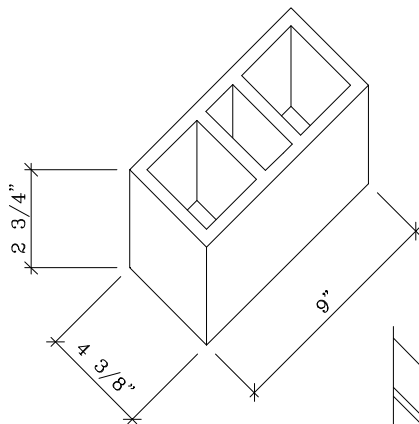
REBARS IN LOAD BEARING WALL



JUNCTION REBAR DETAIL

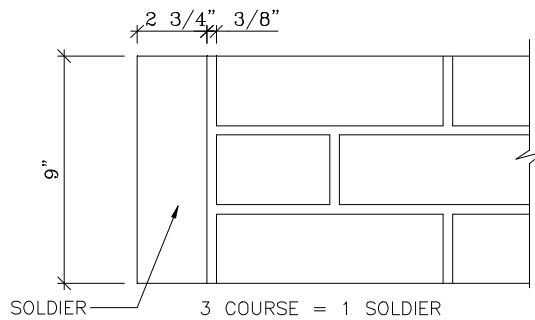


REBARS IN LINTEL LOAD BEARING

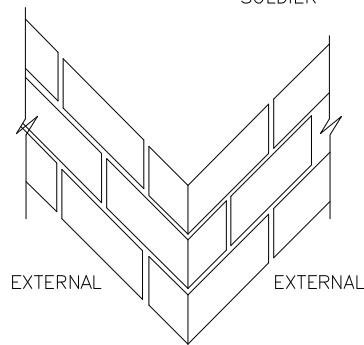


3/8" JOINT

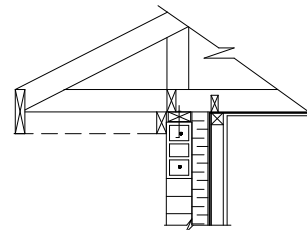
BRICK SIZE



SOLDIER COURSE



HALF BOND



Detail 9.47 – Masonry Reinforcing Details

Table 1

Anchoring a concrete basement wall 3 ½" x 3 ½" x 3/8" angle iron to provide support for brick veneer

Height of Brick Feet	Spacing			
	Drop-In Anchor		Wedge Anchor	
	1/2" Dia.	5/8" Dia.	1/2" Dia.	5/8" Dia.
4.0'	3.6'	4.0'	4.0'	4.0'
6.0'	2.3'	4.0'	3.6'	4.0'
8.0'	1.6'	3.0'	2.6'	3.6'
10.0'	1.5'	2.3'	2.0'	3.0'
12.0'	1.0'	2.0'	1.6'	2.5'
Min. Embedment	2.0"	2.4"	2.4"	2.8"
Min. Edge Distance	2.5"	3.0"	2.5"	3.0"

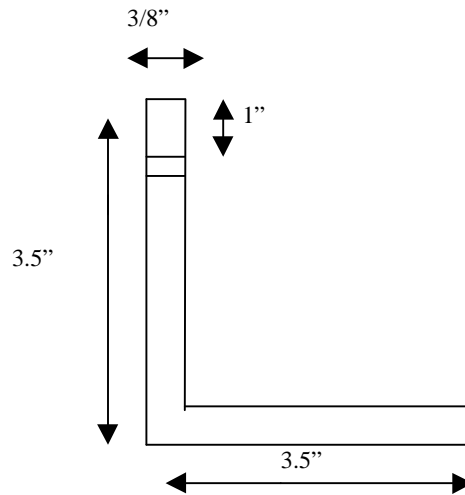


Table 2

Maximum Allowable Spans for Steel Lintels

Supporting Masonry Veneer – With Imperial Equivalents

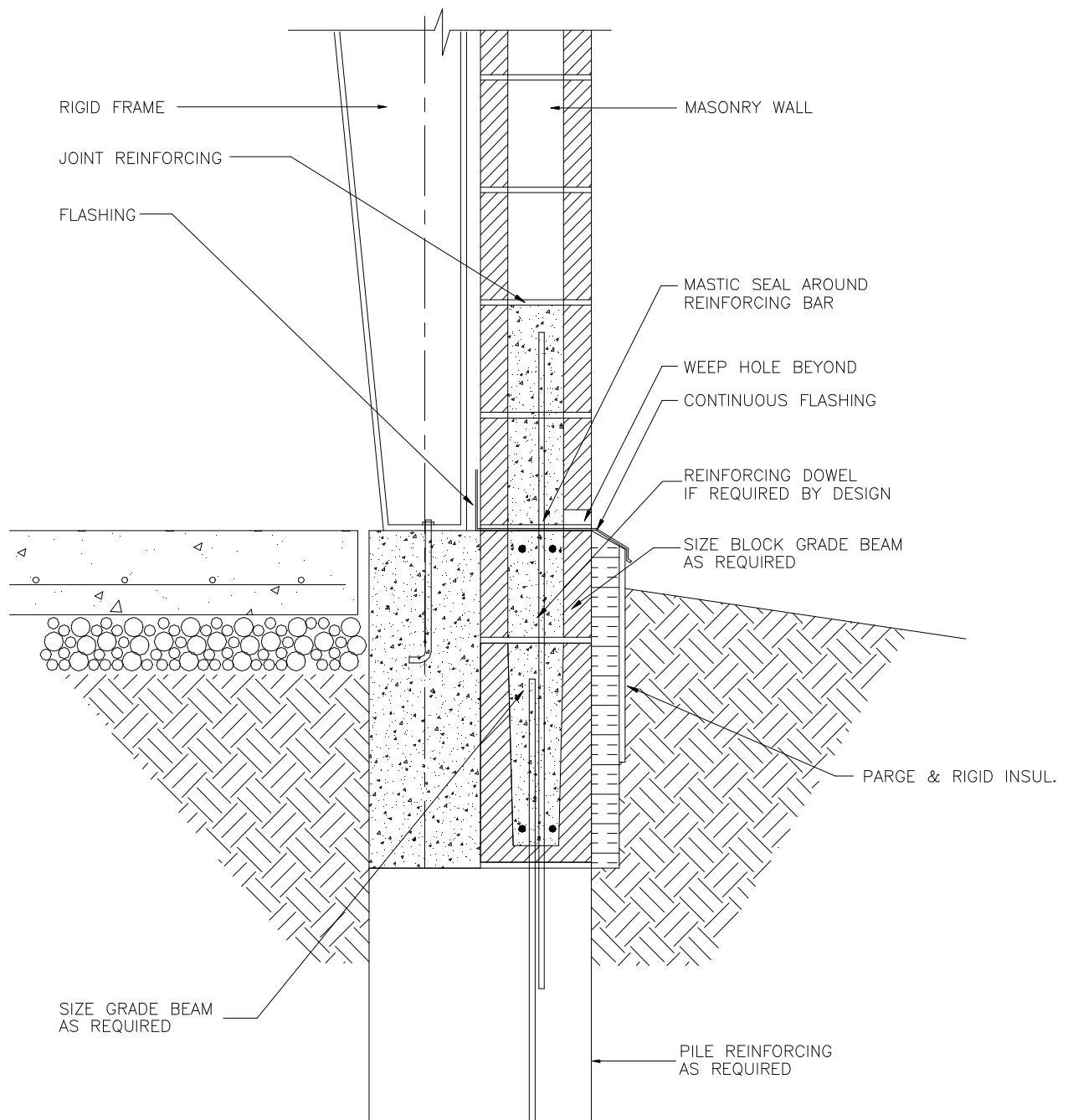
Minimum Angle Size		Brick Thickness				Stone Thickness	
mm	Inches	75mm	3"	90mm	3-5/8"	100mm	4"
		Span		Span		Span	
90x75x6.0	3.5x3x0.25	2500"	8ft 4in	--	--	--	--
90x90x6.0	3.5x3.5x0.25	2600"	8ft 5in	2500	8ft 1in	2300"	7ft 7in
100x90x6.0	4.3x5x0.25	2800"	9ft 3in	2700	8ft 10in	2500"	8ft 3in
125x90x6.0	5x3.5x0.25	3300"	10ft 10in	3100	10ft 4in	2900"	9ft 7in
150x90x6.0	6x3.5x0.25	3700"	12ft 3in	3500	11ft 8in	3300"	10ft 11in

Adopted from CSA Standard CAN3-A370-M84 "Connectors For Masonry"

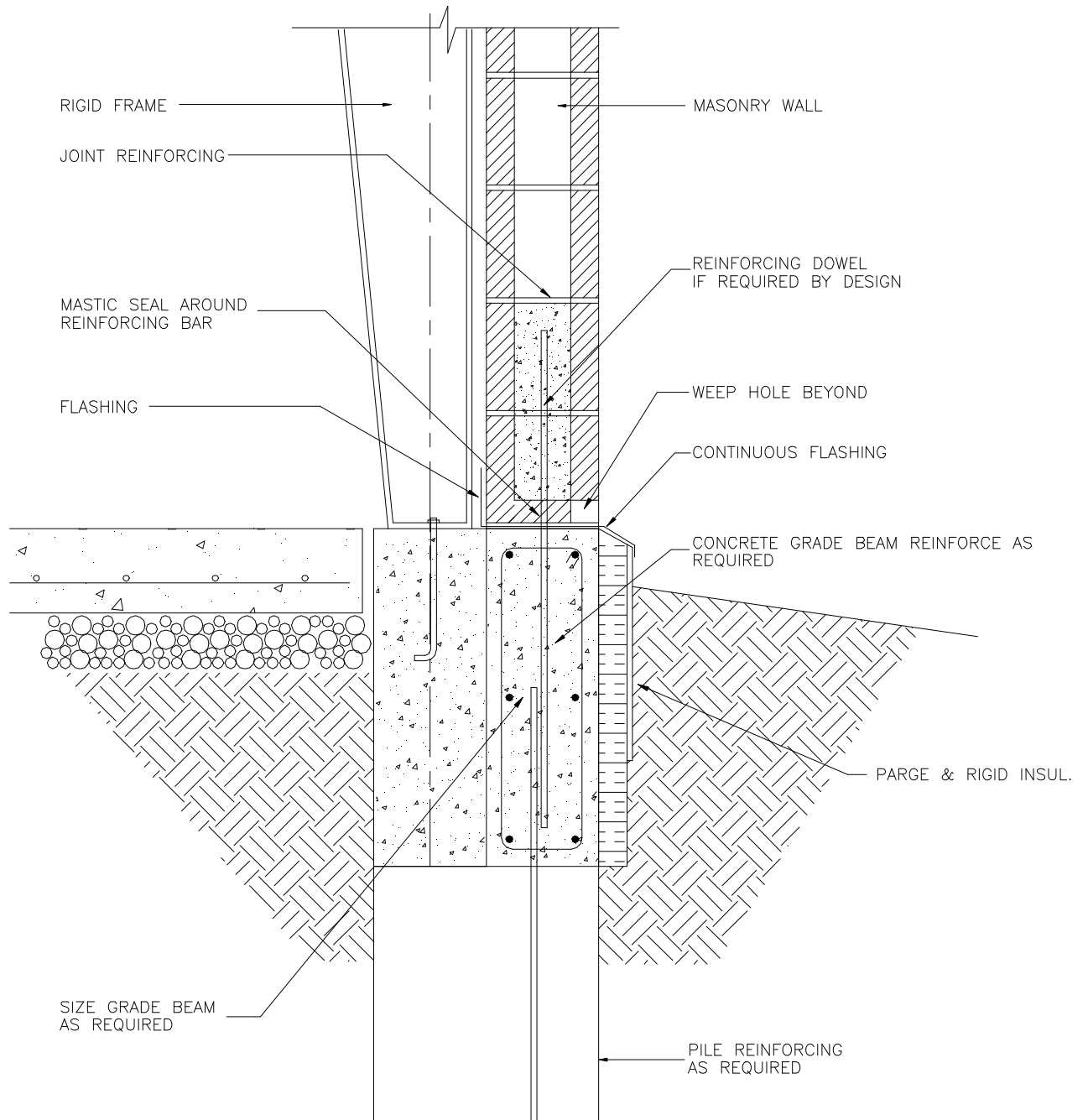
CHAPTER 10

PRE-ENGINEERED METAL BUILDINGS

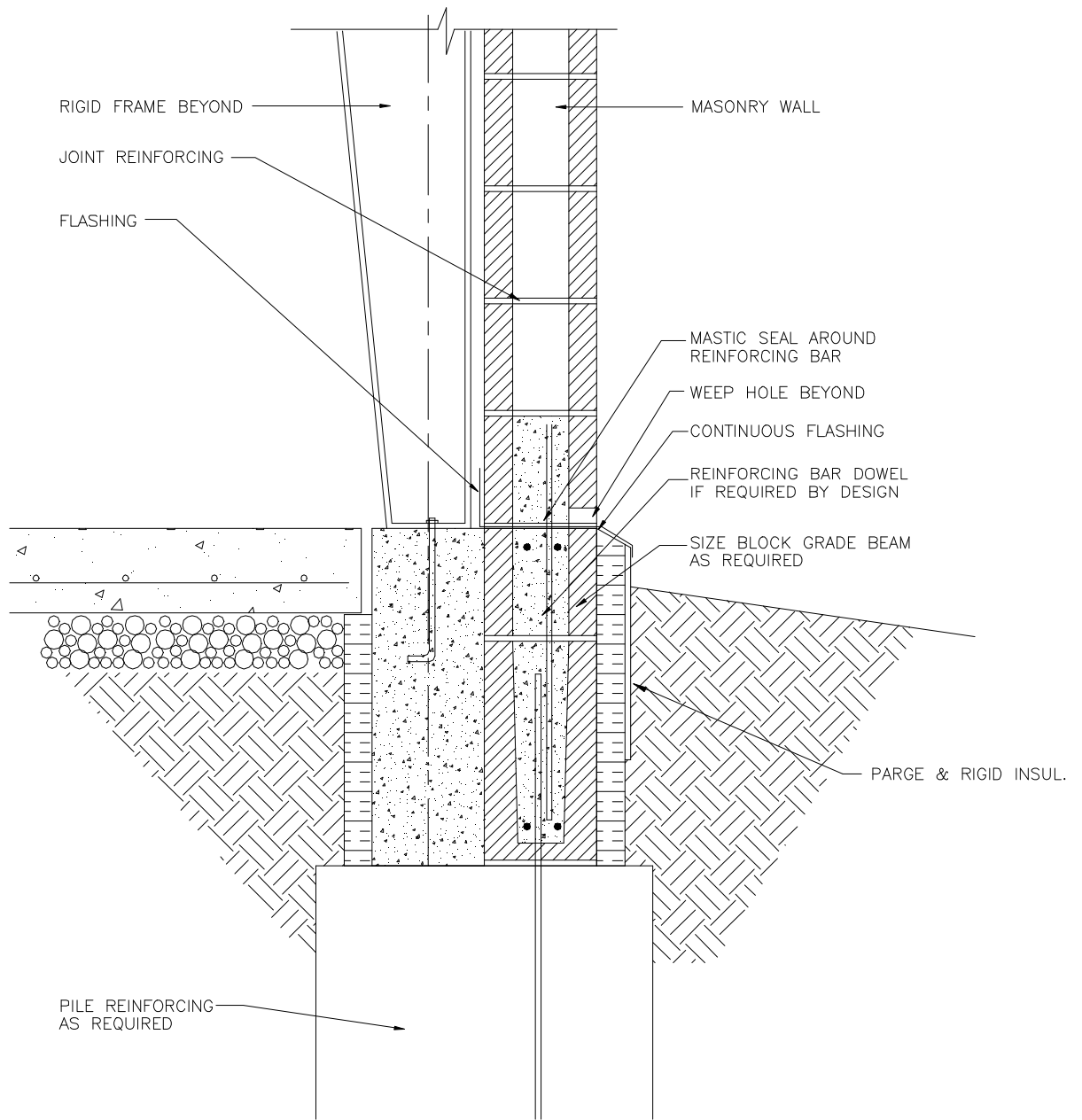
Detail 10.1 – Plain Concrete Masonry Wall Detail at Pile Foundation with Masonry Grade Beam.....	2
Detail 10.2 – Plain Concrete Masonry Wall Detail at Pile Foundation with Concrete Grade Beam	3
Detail 10.3 – Plain Concrete Masonry Wall Detail at Foundation with Masonry Grade Beam ...	4
Detail 10.4 – Reinforced Concrete Masonry Wall Detail at Pile Foundation with Masonry Grade Beam.....	5
Detail 10.5 – Reinforced Concrete Masonry Cavity Wall Detail at Foundation	6
Detail 10.6 – Masonry Wall Detail at Sidewall Eave for Walls Spanning Vertically.....	7
Detail 10.7 – Masonry Wall Detail at Sidewall Eave for Walls Spanning Horizontally.....	8
Detail 10.8 – Masonry Wall Detail at Low Sidewall for Walls Spanning Vertically	9
Detail 10.9 – Masonry Wall Detail at Low Sidewall for Walls Spanning Horizontally	10
Detail 10.10 – Gable End Wall Detail	11
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Detail 10.12 – Load Bearing End Wall (For Light Loads).....	13
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Detail 10.16 – Connection of Wall to Steel Column	17
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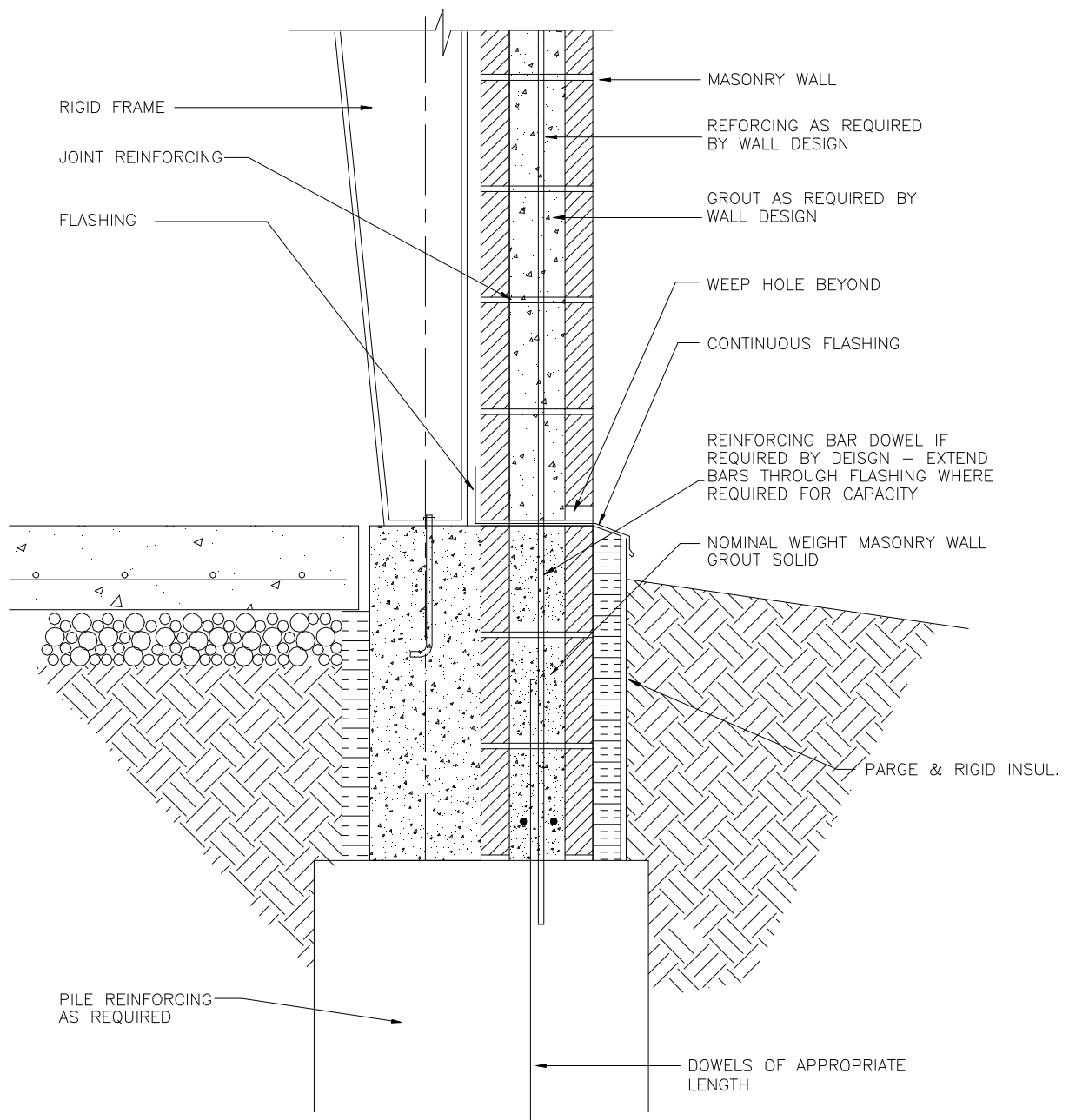
Detail 10.1 – Plain Concrete Masonry Wall Detail at Pile Foundation with Masonry Grade Beam



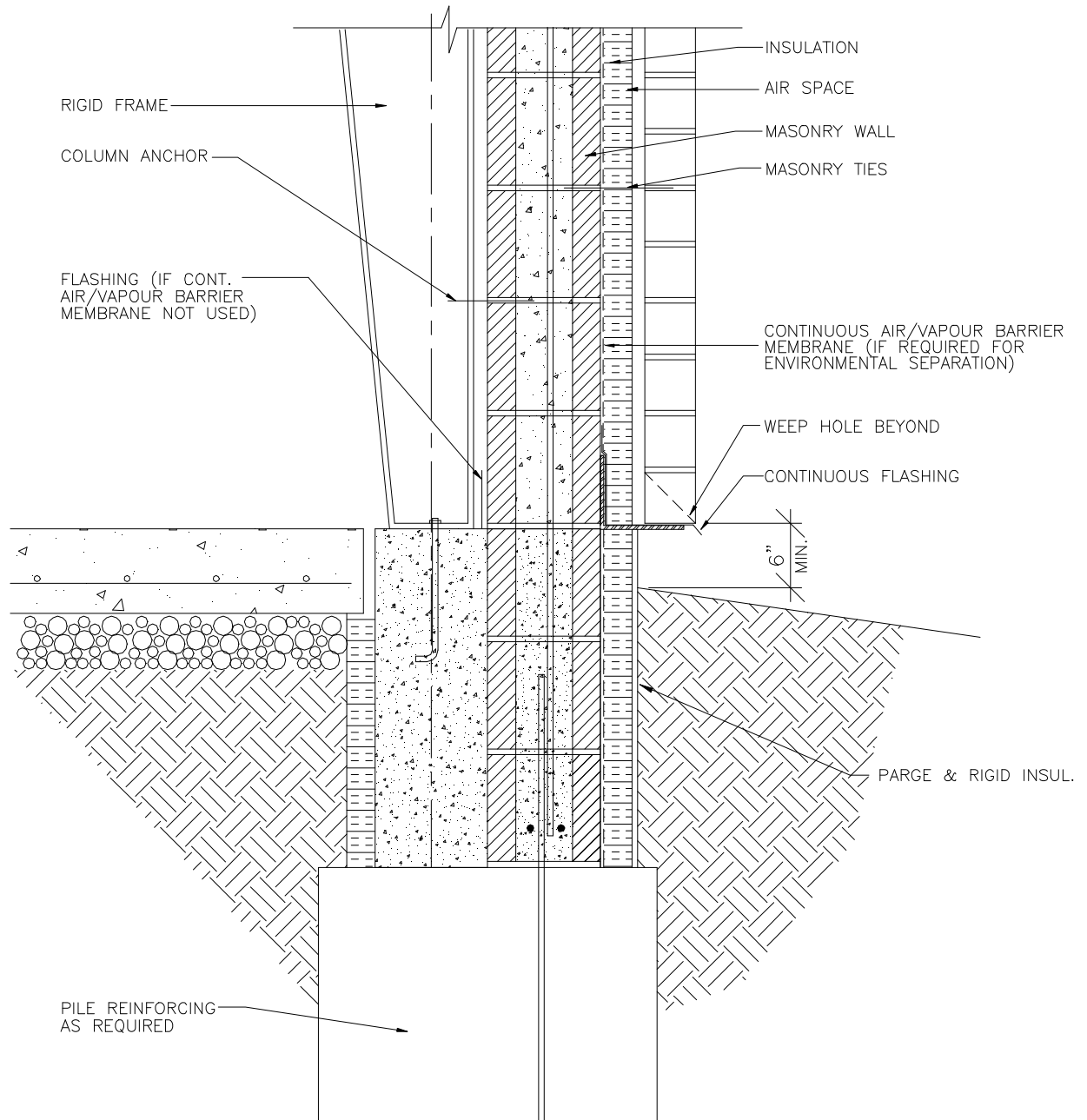
Detail 10.2 – Plain Concrete Masonry Wall Detail at Pile Foundation with Concrete Grade Beam



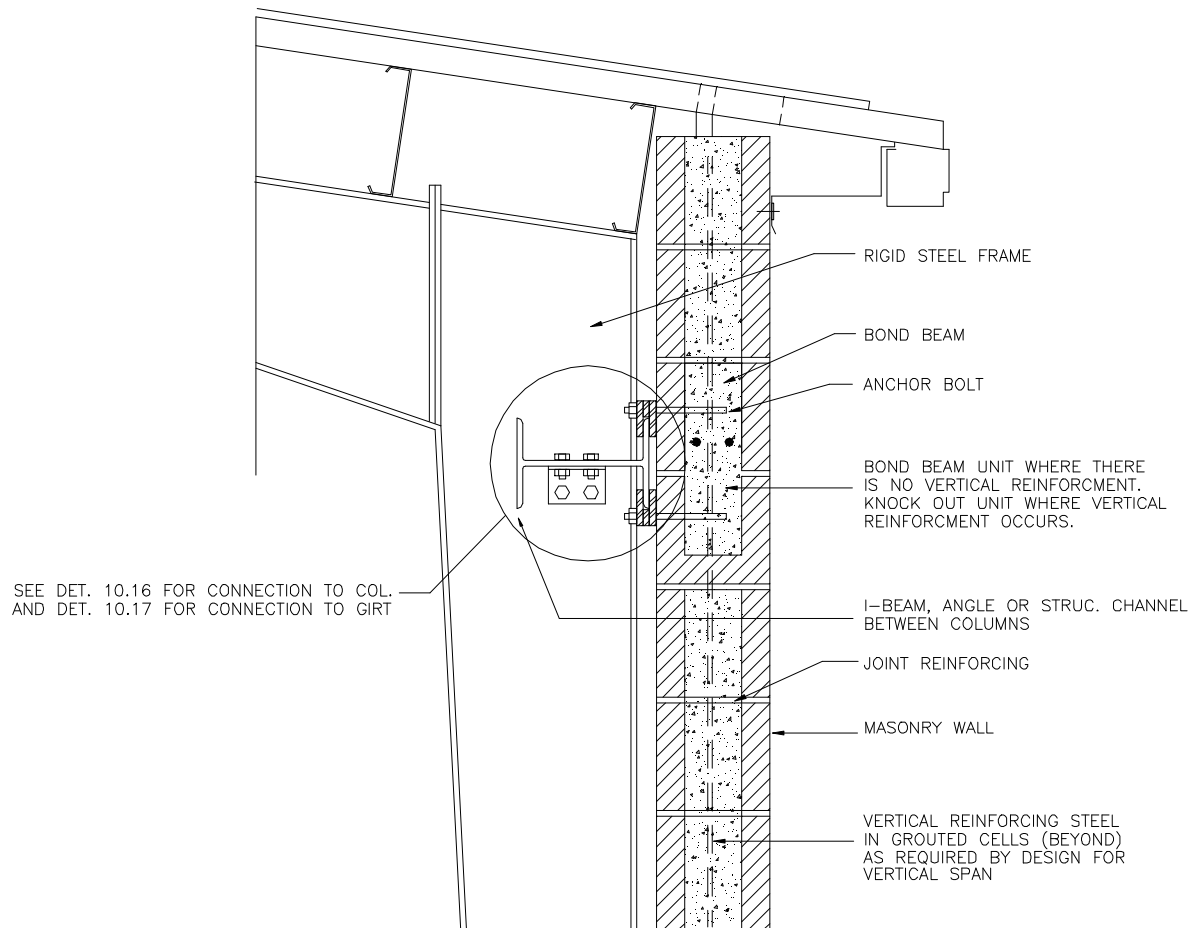
Detail 10.3 – Plain Concrete Masonry Wall Detail at Foundation with Masonry Grade Beam



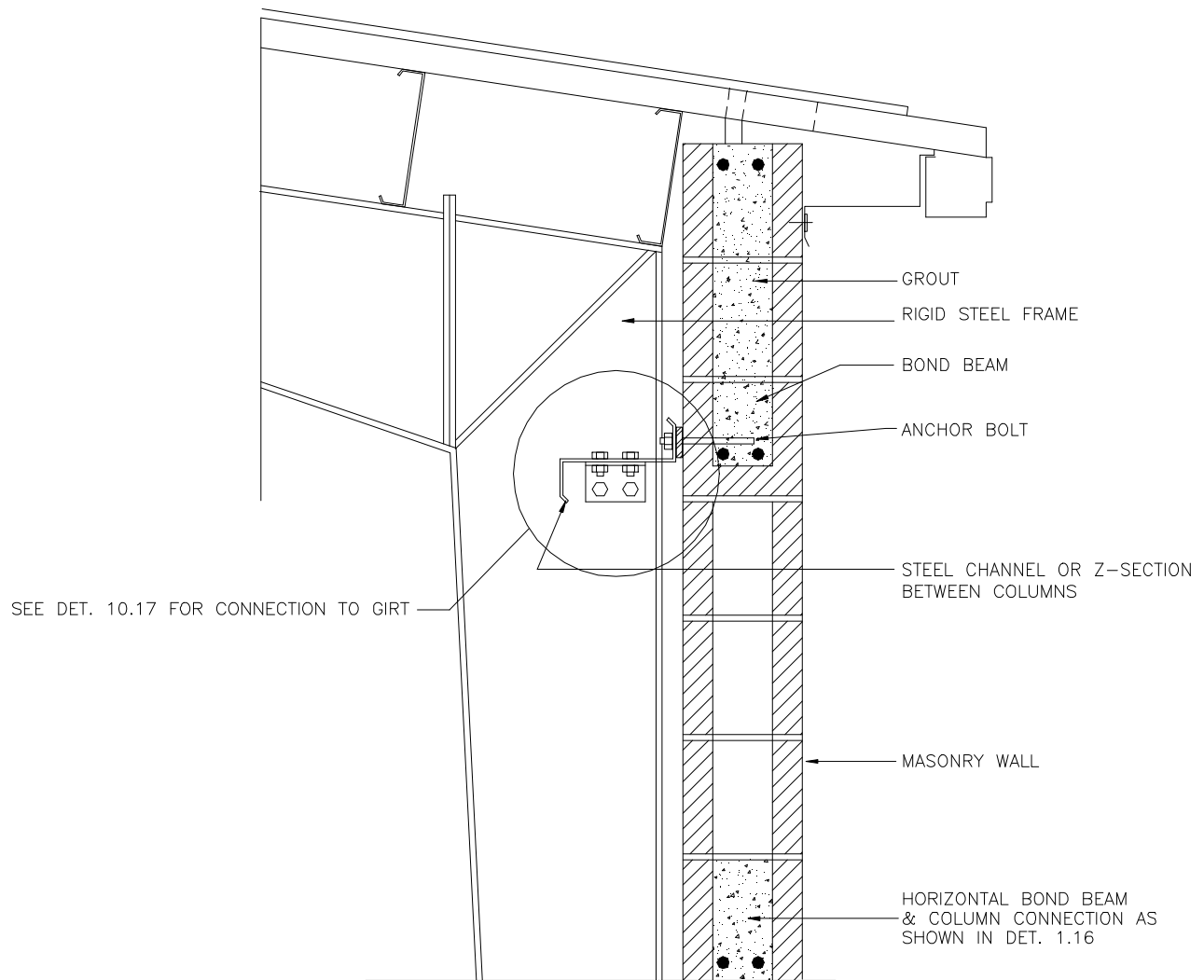
Detail 10.4 – Reinforced Concrete Masonry Wall Detail at Pile Foundation with Masonry Grade Beam



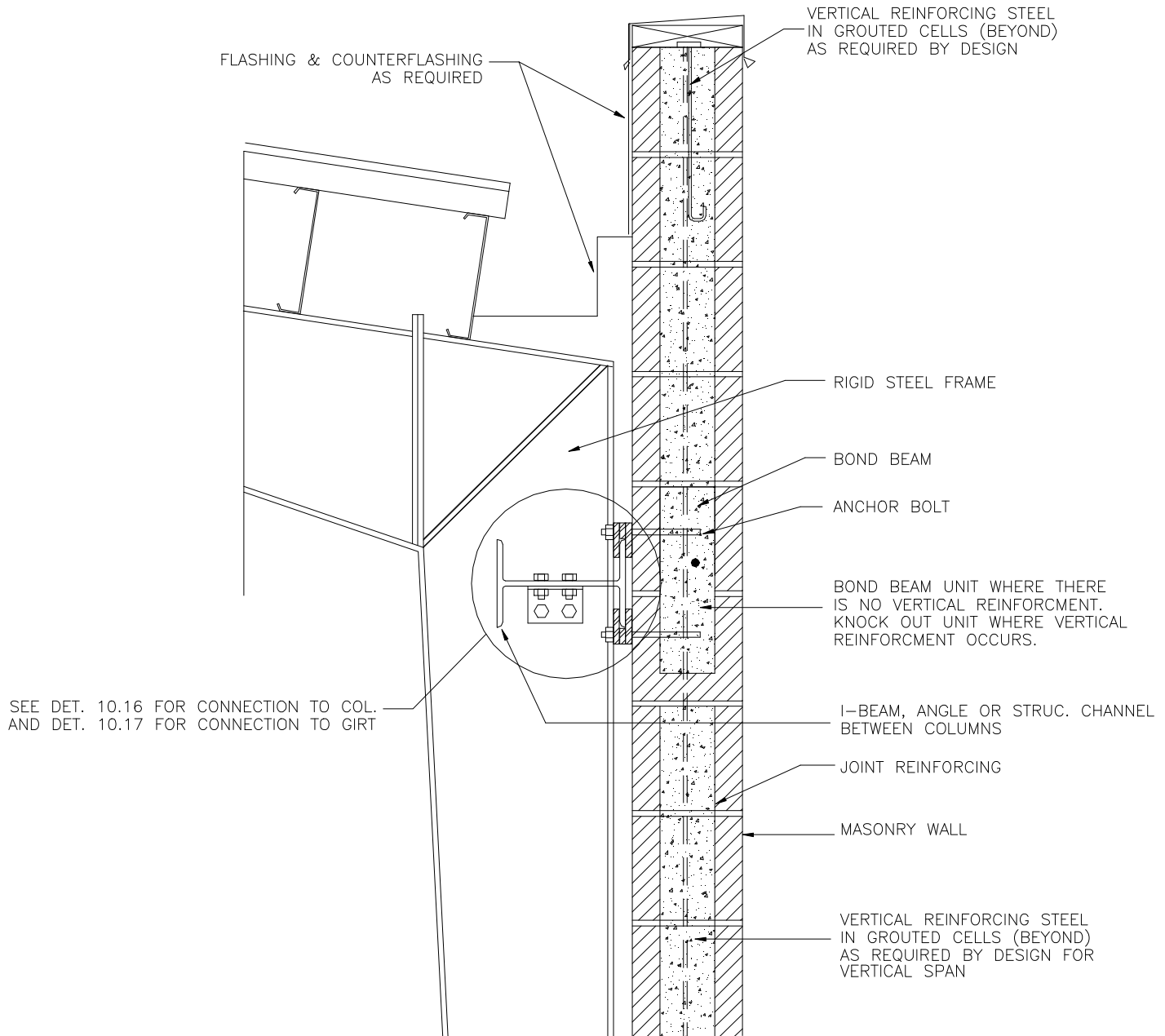
Detail 10.5 – Reinforced Concrete Masonry Cavity Wall Detail at Foundation



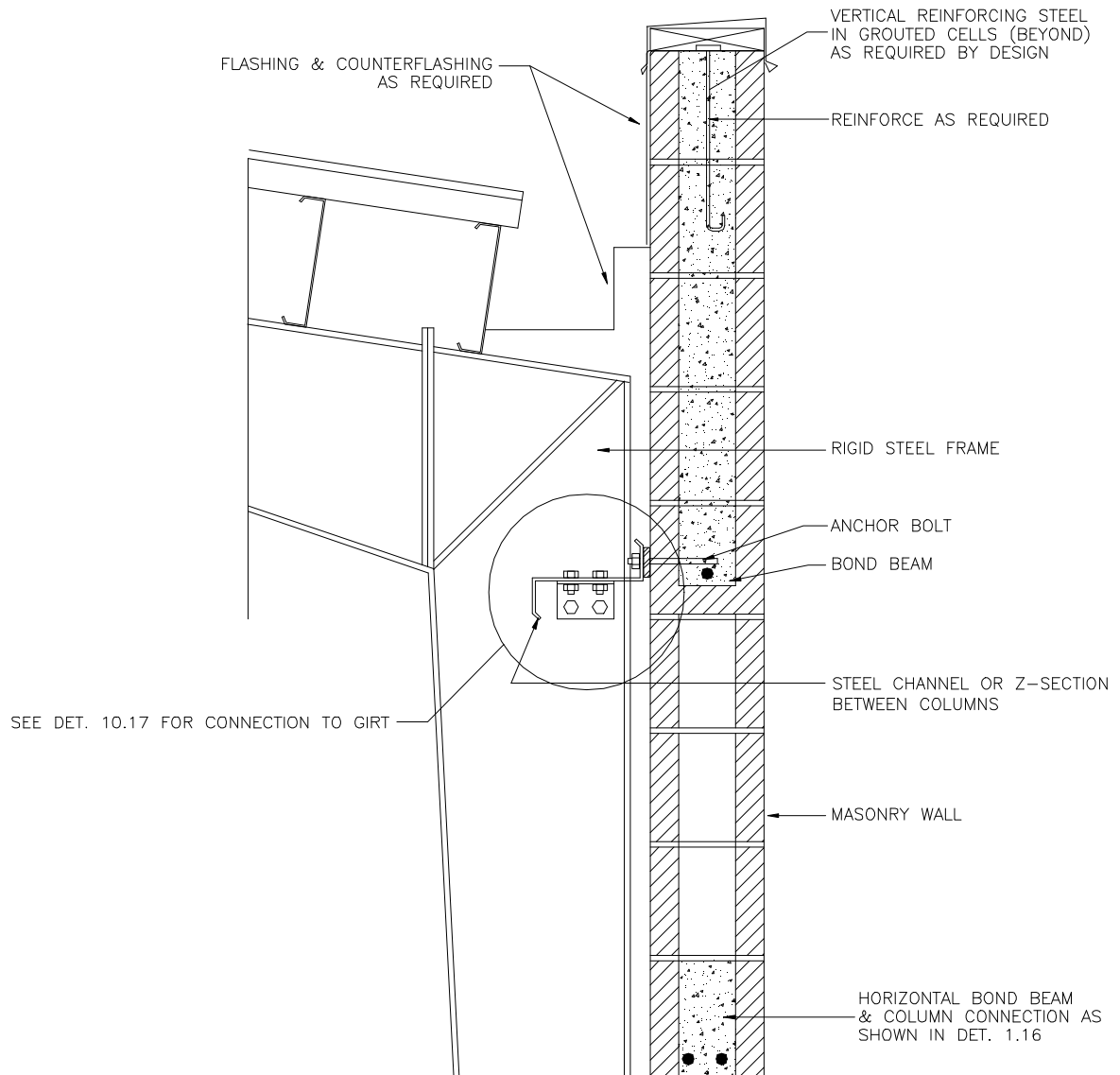
Detail 10.6 – Masonry Wall Detail at Sidewall Eave for Walls Spanning Vertically



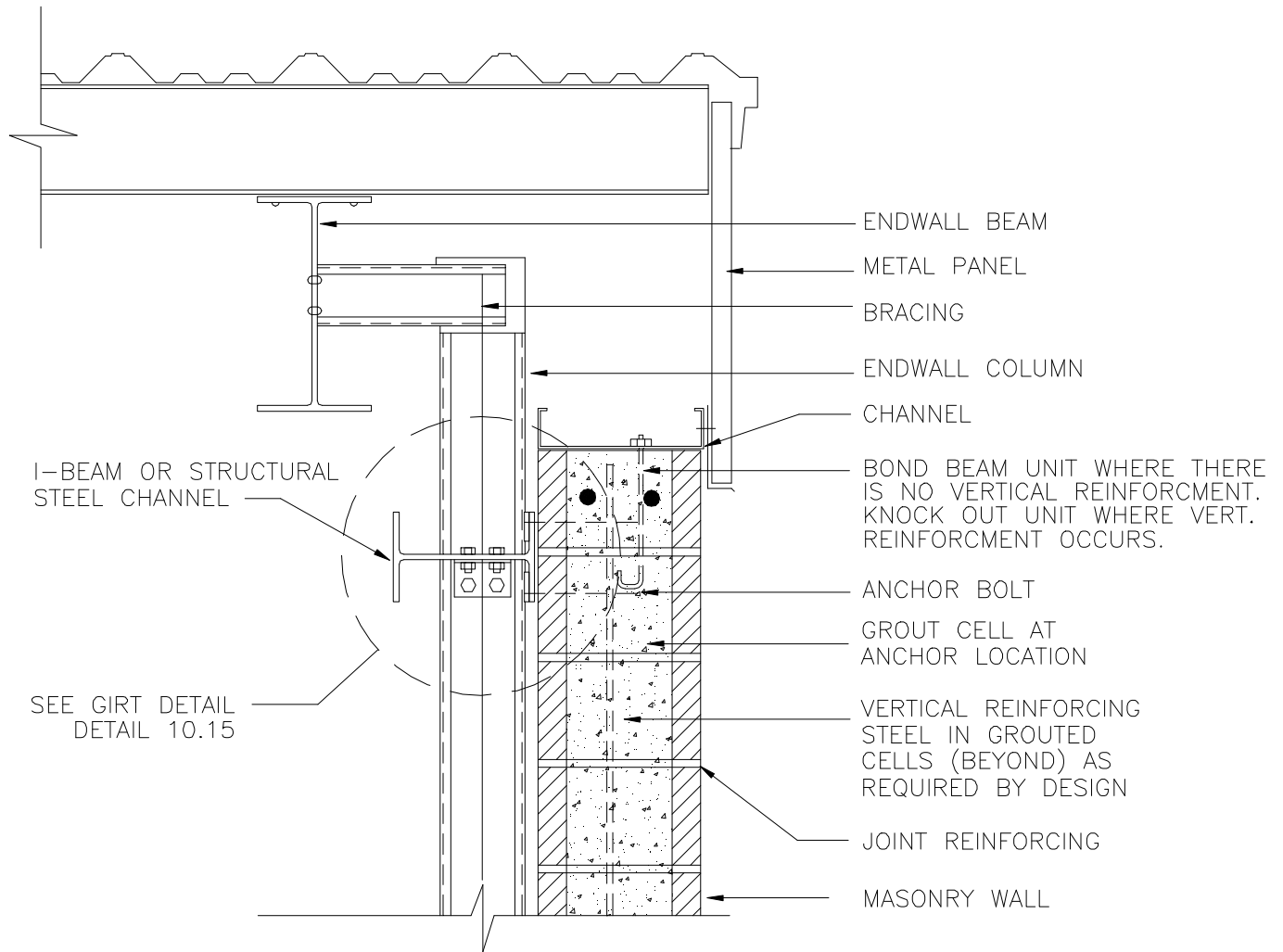
Detail 10.7 – Masonry Wall Detail at Sidewall Eave for Walls Spanning Horizontally



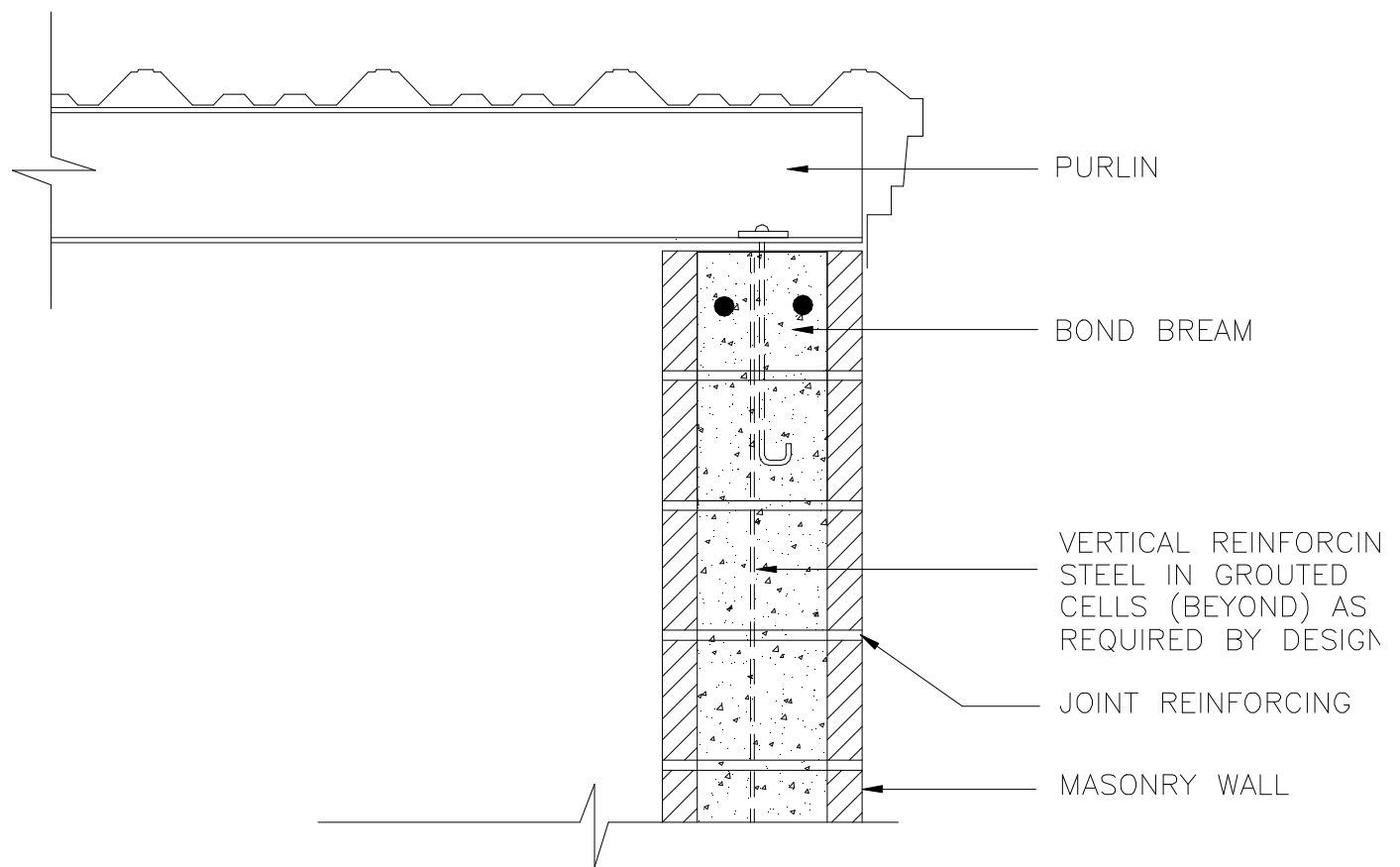
Detail 10.8 – Masonry Wall Detail at Low Sidewall for Walls Spanning Vertically



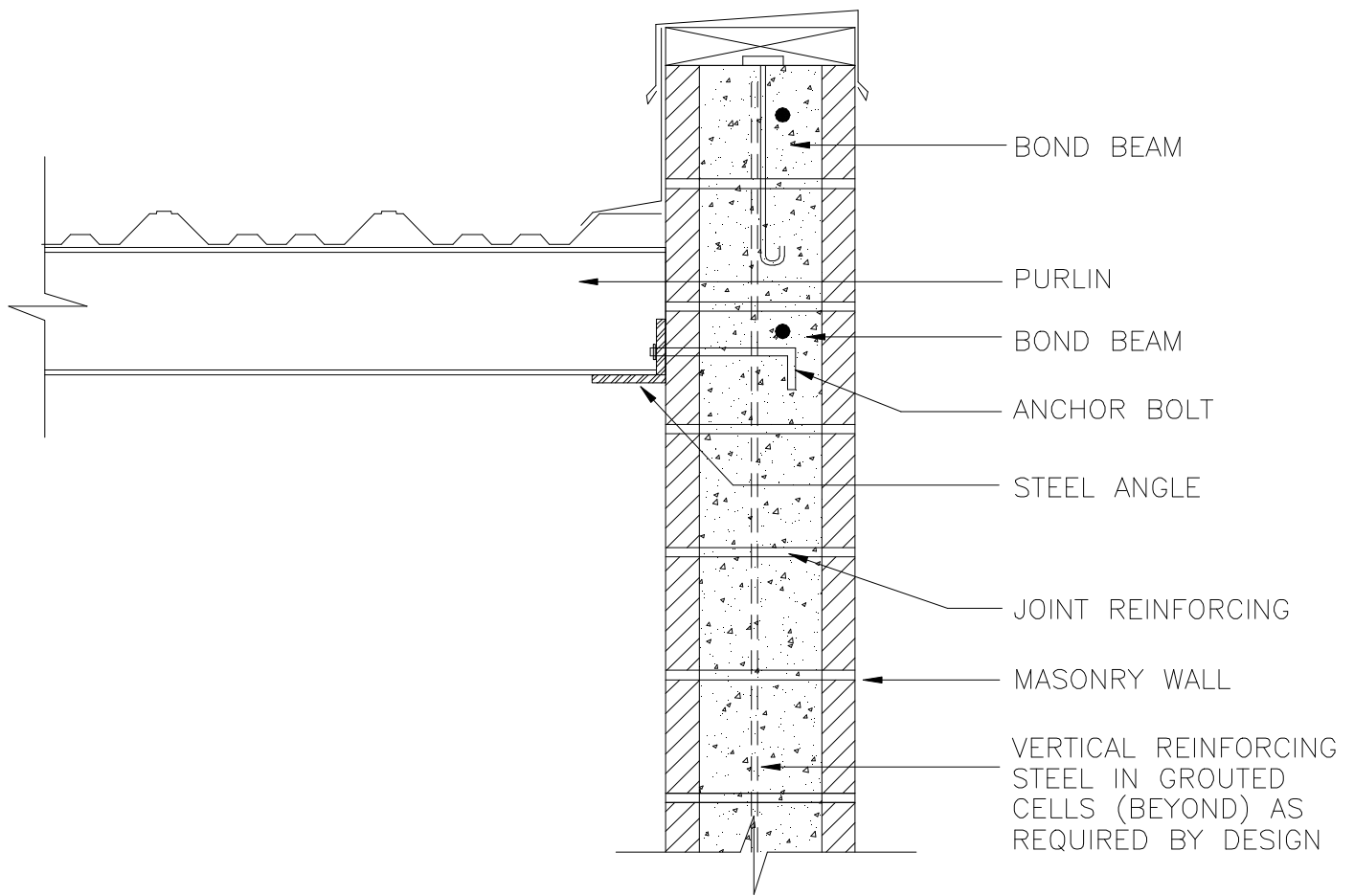
Detail 10.9 – Masonry Wall Detail at Low Sidewall for Walls Spanning Horizontally



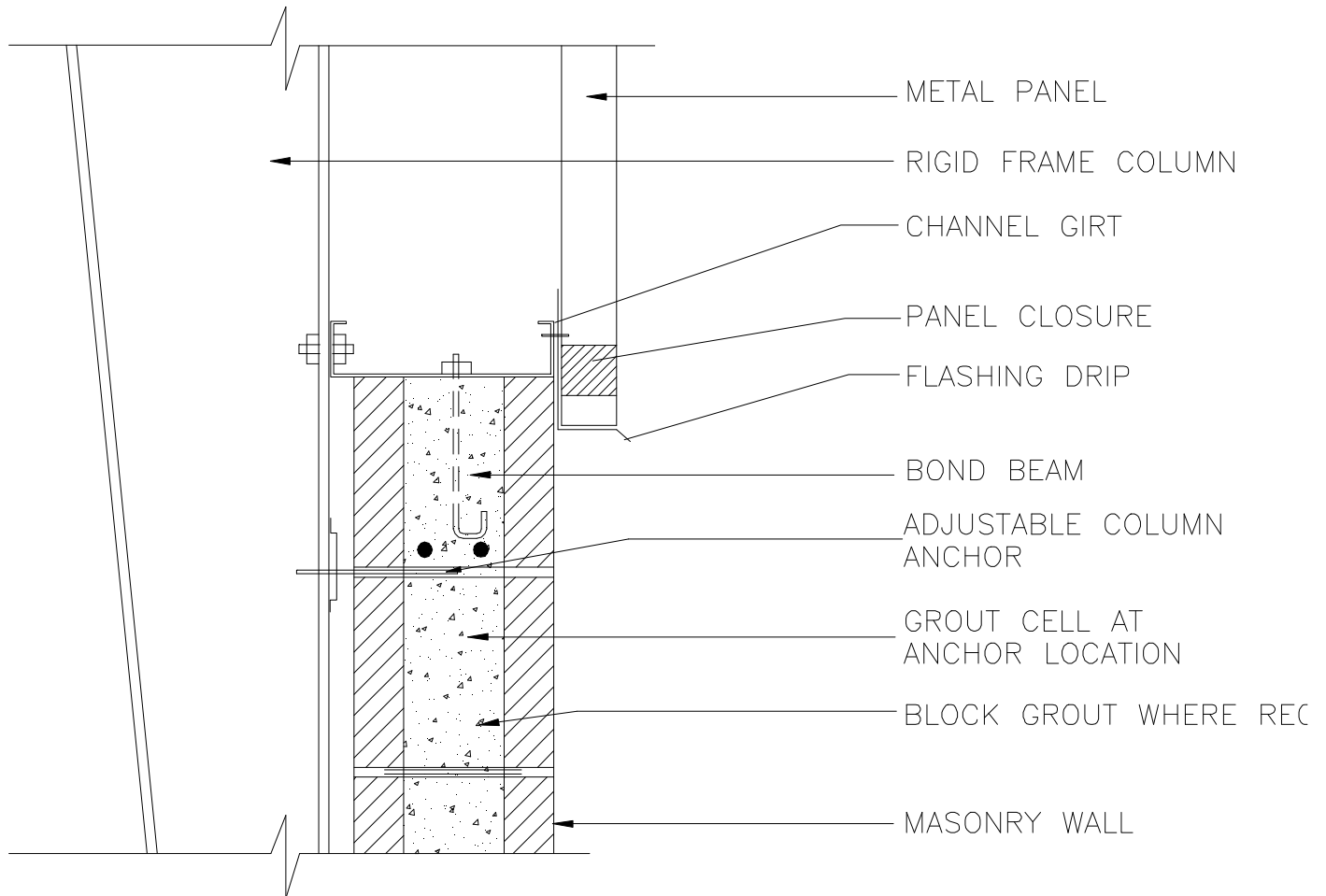
Detail 10.10 – Gable End Wall Detail



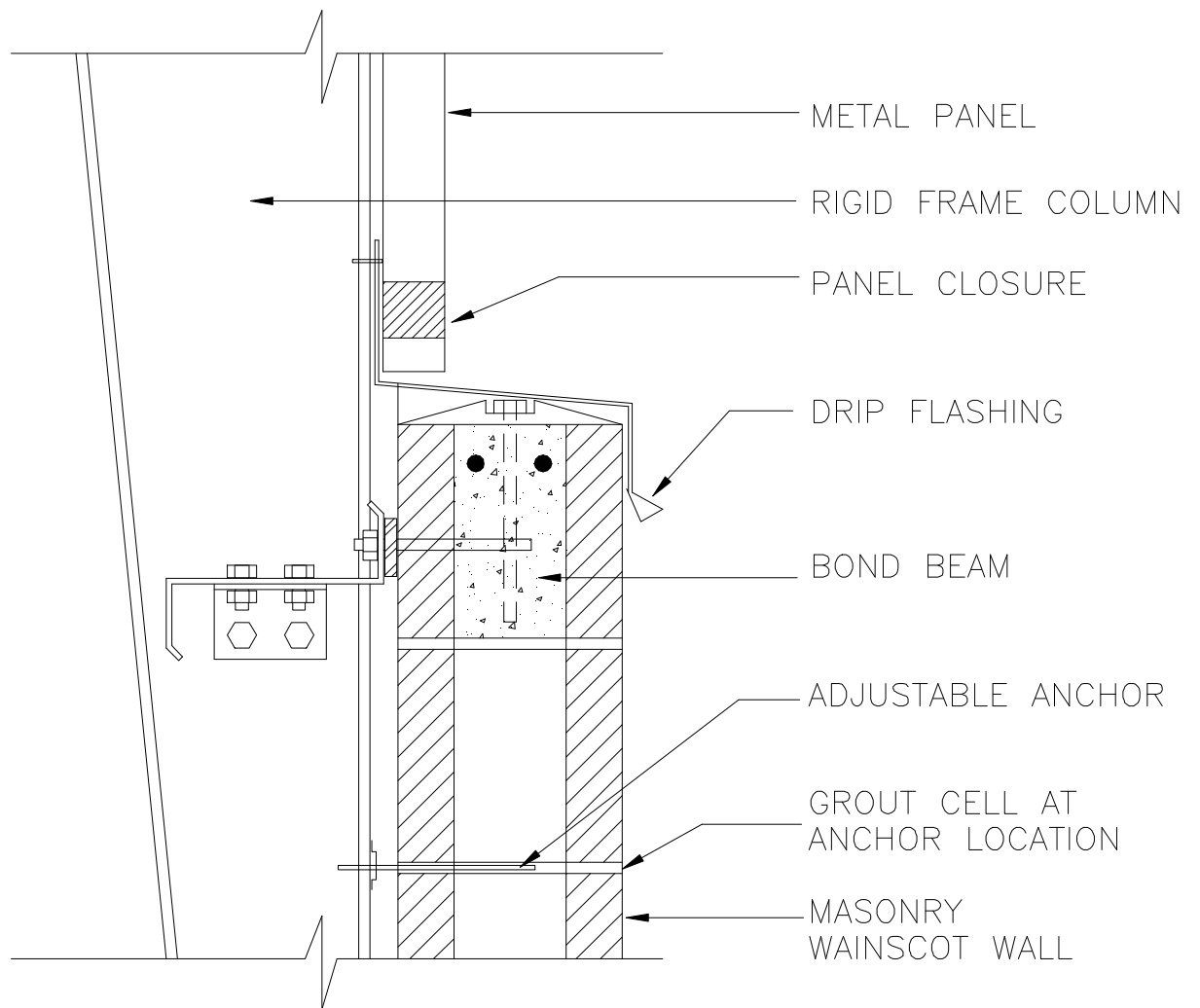
Detail 10.11 – Load Bearing End Wall



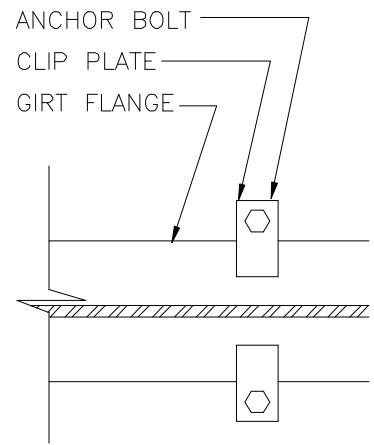
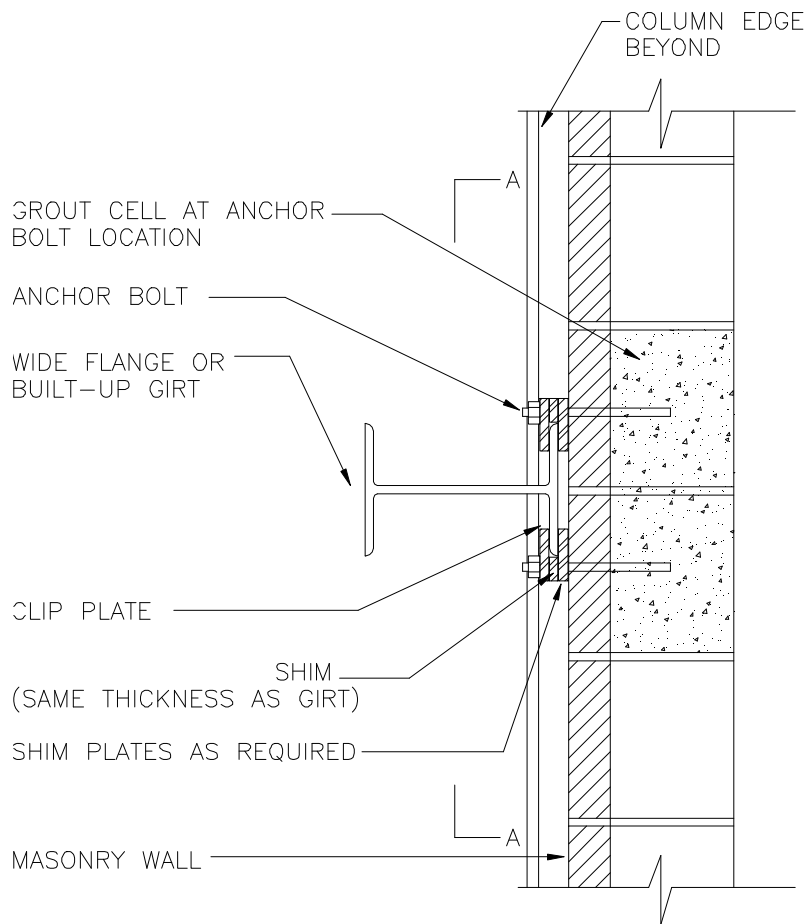
Detail 10.12 – Load Bearing End Wall (For Light Loads)



Detail 10.13 – Wall Detail with Structural Steel Channel Support

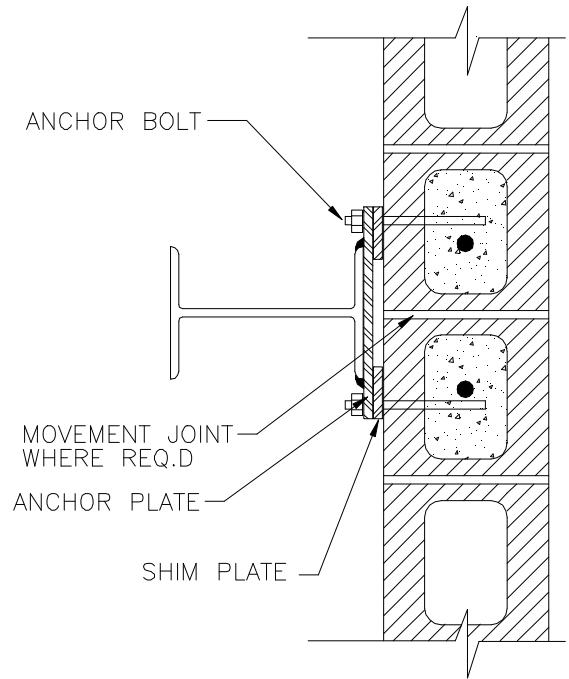
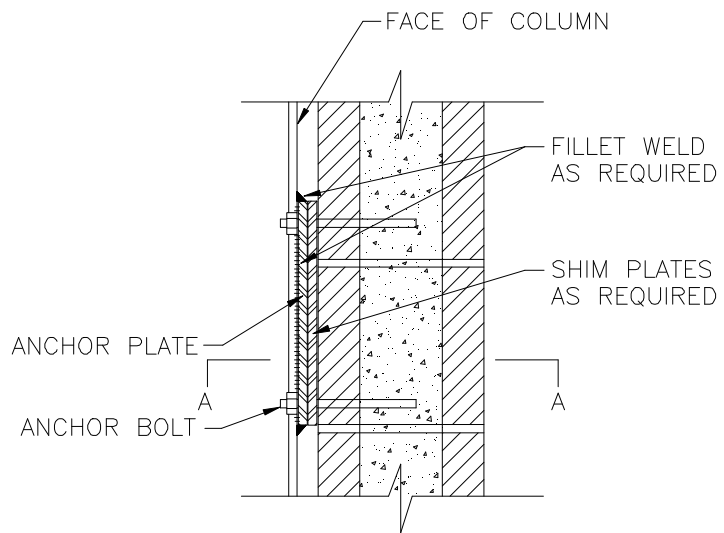


Detail 10.14 – Connection of Wall to Structural Channel



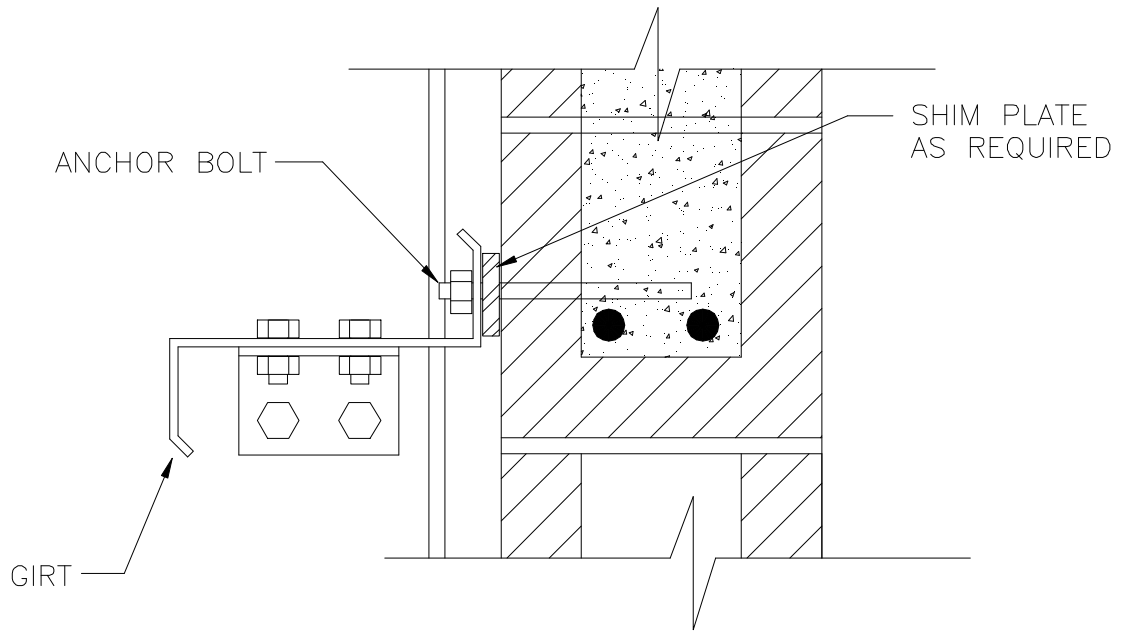
SECTION A-A

Detail 10.15 – Connection of Wall to Horizontal I-Beam Detail



SECTION A-A

Detail 10.16 – Connection of Wall to Steel Column



Detail 10.17 – Connection of Wall to Horizontal Z-Section Girt