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Installation Manual

FOUNDATION SIPs & FROST WALLS SIPs

Thermapan
Structural
Insulated
Panels

PWF FOUNDATION & FROST WALL SIPs
Installation Manual

Table of Contents

Topics

Details

FOUNDATION SIPs & FROST WALL SIPs
Installation Manual

1. General Requirements

1.1 Scope

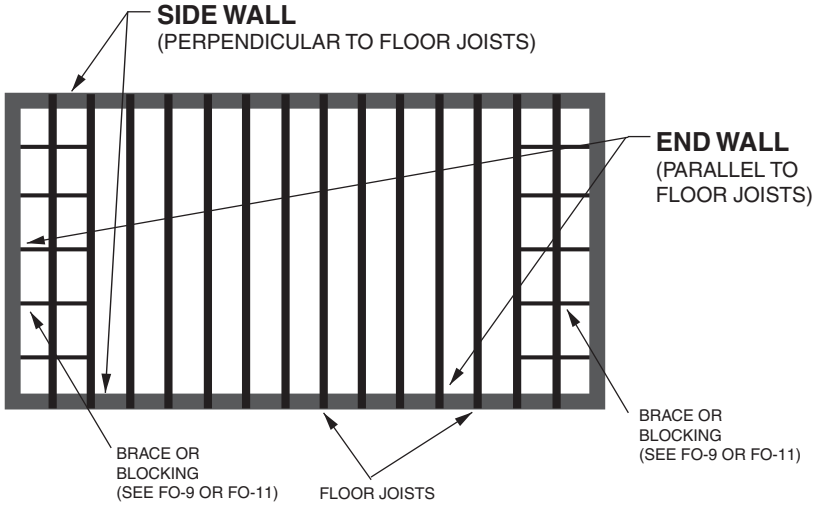
The basic design and construction requirements for the Thermapan Permanent Wood Structural Insulated Panel (PW SIP) foundation systems are set forth in this specification. Criteria for materials, preservative treatment, soil characteristics, environmental control, design loads, and structural design are included. Where requirements are based on internationally recognized standards and specifications, these standards and specifications are referenced without elaboration.

Installers shall reference engineering design package for fastening arrangements.

2. Terms

End Walls are the exterior walls parallel to the floor joists. They do not support the floor joists.

Side Walls are the exterior walls that are perpendicular to the floor joists.



3. Materials

PW SIP Foundation Wall (See Figure FO-1)

3.1 The Thermapan PW SIP is composed of an expanded polystyrene (EPS) foam core laminated between two layers of preservative treated plywood with a structural adhesive.

3.2 Top Plate **(See Detail FO-1)**. The top plate shall be untreated DOC PS 20 or NLGA No.2 or better.

3.3 Cap Plate **(See Detail FO-1)**. The cap plate shall be untreated DOC PS 20 or NLGA No.2 or better. If the cap plate is to be used as a brick ledge, it shall be treated to AWPA UC2 or CSA O80-08 UC2.

3.4 Framing Lumber shall be pressure treated DOC PS 20 or NLGA No.2 or better and shall be treated to AWPA UC2 and CSA O80-08 UC2. Cut ends shall be treated with preservatives.**(See Detail FO-1)**

3.5 Fasteners and Connectors. Fasteners used shall be of Type 304, Type 316 stainless steel or ASTM A153 Hot Dip Galvanized. Connectors shall conform to ASTM A653.

3.6 Caulking Compounds shall conform to CAN/CGSB 19.13 or ASTM C 920.

3.7 Polyethylene Sheeting shall conform to CAN/CGSB-37.2, CAN/CGSB-37.16, or ASTM D 4397.

3.8 Manufactured Drainage Layer shall conform to ICC-ES AC114.

3.9 Granular Drainage Layer shall consist of clean crushed stone or clean gravel which will pass through a 40 mm (1.5 in) sieve and contain not more then 10% of fine material that will pass a 4mm (0.15 in) sieve.

3.10 Low expansion foam seal shall conform to AAMA 812-04.

4. Site Preparation

4.1 Excavation requirements shall conform to those of the appropriate building code.

4.2 All top soil and vegetation matter that would be under the building must be removed.

4.3 The bottom of the excavation must be free of all organic matter and standing water.

4.4 A continuous granular drainage layer shall be installed under floors of PW-SIP-F's and not be less then 125mm (5").

4.5 The excavation and granular drainage layer shall drain to a sump, which shall be provided with positive drainage, by gravity or pump, to a final disposal point outside the building.

4.6 Perimeter drainage tile or pipe shall **NOT BE USED** with PW-SIP foundations.

5. Footings – Concrete

5.1 Concrete footings supporting PW SIP foundation walls shall be constructed in conformance with appropriate building code.

5.2 Concrete footings shall be placed on undisturbed soil or on 125mm (5") granular drainage layer. **See Detail FO-2**

5.3 When concrete footings are placed on undisturbed soil, drainage shall be provided by casting 60mm (2-1/4") diameter water passages (pipes) at 1200mm (4') on centre in the footing. **See Detail FO-2**

5.4 Concrete footings shall be designed for point loads. **See Details FO-5 and FO-6.**

5.5 The use of any drainage tile or pipe will void the Thermapan warranty.

6. Foundation Columns

Columns supporting floor beams and/or point loads above shall be constructed in conformance with appropriate building code.
See Details FO-5 and FO-6

7. Exterior Walls

Framing and fastening around wall openings shall conform to **Detail FO-7**

8. Concrete Slab Floors

Concrete slab floors shall not be less than 75mm (3") thick exclusive of concrete topping. **See Detail FO-2.**

9. Crawl Spaces

Crawl spaces (with no concrete slab) shall be backfilled and compacted to a minimum of 2/5 of the exterior backfill height for lateral support and lined with a poly ground cover. **See Detail FO-3.**

10. First Floors

10.1 The first floor system is an integral part of the entire foundation.

10.2 Floor at the top of the foundations shall be constructed to prevent inward movement of the exterior walls due to lateral pressure.

10.3 A PW-SIP foundation shall never be backfilled before the entire first floor system (joists, subfloor, etc.) and basement floor are completely installed.

10.4 Support for side walls see **Detail FO-8.**

10.5 Support for end walls see **Detail FO-9.**

10.6 When the backfill heights are at different heights around the building, additional nailing requirements must be incorporated for the foundation wall sheathing.

11. Stairwell Openings

11.1 When openings are greater than 1200mm (4') from a side wall and 1800mm (6') from an endwall, stairwell opening construction shall conform to the minimum requirements for wood frame construction in the appropriate building code.

11.2 When openings are closer to their adjacent walls then specified previously, they shall conform to the following **Details FO-10 and FO-11.**

12. Support of Masonry Veneer

See Detail FO-8 or FW-1.

13. Exterior Moisture Barrier

See Detail FO-2.

13.1 The below grade portion of the exterior face of the wall sheathing on a PW-SIP foundation enclosing living space shall be protected by a moisture barrier and manufactured drainage layer.

13.2 A polyethylene sheet moisture barrier shall be applied to the wall sheathing.

13.3 A manufactured drainage layer shall be applied over the polyethylene moisture barrier to the exterior wall sheathing and at the soil grade. The manufactured drainage layer is to be installed as per the manufacturer's instructions.

13.4 The moisture barrier and manufactured drainage layer shall cover the entire surface below grade and extend to the bottom edge of the concrete footing. It shall not obstruct the required drainage passages.

13.5 The adherence of any water-proofing membrane to any Thermapan SIP PWF plywood surface will void the Thermapan warranty.

14. PWF Wall to Existing Foundation

See Detail FO-12.

15. Electrical Wiring

15.1 All wire chases to be vertically cut into the PW-SIP at a minimum depth of 2". **See Detail FO-13.**

15.2 All electrical boxes shall be plastic.

15.3 All fasteners shall be of Type 304, Type 316 stainless steel or ASTM A153 Hot Dip Galvanized.

16. Interior Finish

The interior of the PW-SIP foundation can be finished with any of the common materials. The interior plywood of the SIP makes this a relatively simple operation without consuming floor area as would be the case with other types of foundations that require interior wood frame walls to be built before finishing.

17. Frost Walls

See Details FW-1, FW-2, FW-3 and/or FW-4.

18. Backfilling

18.1 PWF SIP foundations shall not be backfilled until the basement floor slab and the floor on top of the foundation are completely installed.

18.2 Heavy equipment and loads shall be kept a safe distance from foundations.

18.3 Backfill shall be placed in uniform lifts not exceeding 600mm (2') around the foundation.

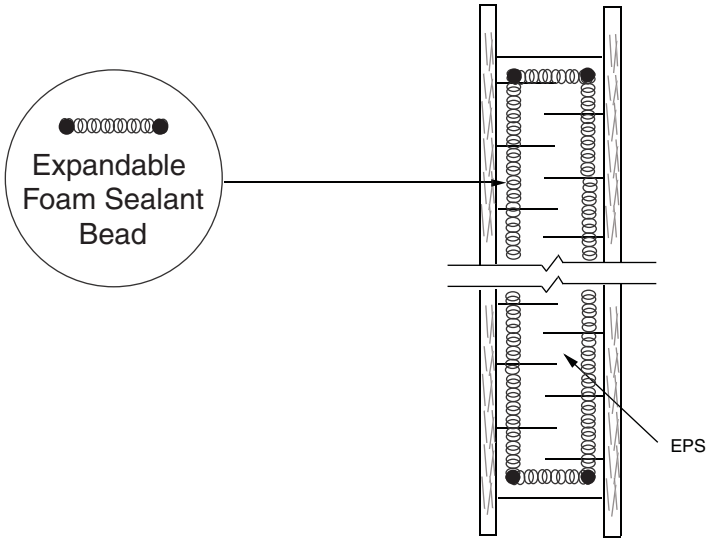
18.4 The site shall be graded sloping away from the foundation or to appropriate building code.

AIR BARRIER

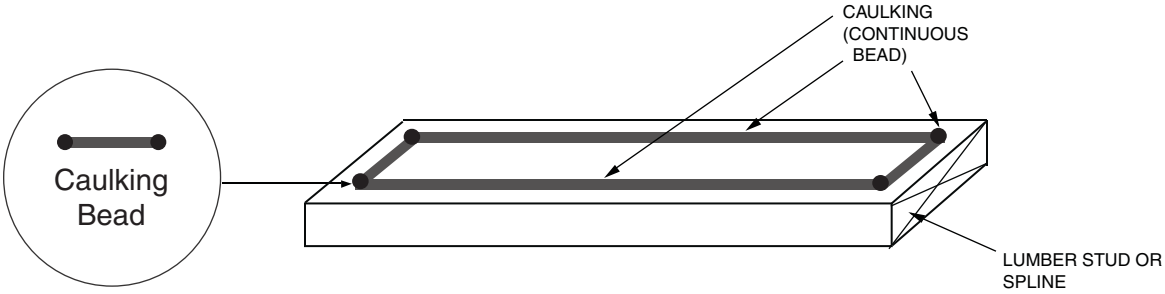
RECOMMENDED DETAILS FOR AIR BARRIER SEALANTS

All sealants, FOAM (A) or CAULKING (B), should be applied onto the SIP in a continuous rectangular pattern along the outer most edge of the area to be sealed.

(A) A low expansion EXPANDABLE FOAM SEALANT should conform to the AAMA 812-04 standard. Apply a 1/2 inch or a 12.5 mm diameter of a *continuous* bead of expandable foam sealant onto the SIP:



(B) A CAULKING SEALANT should conform to ASTM C920-02 and/or CAN/CGSB 19.13-M. Apply a 3/8 inch or a 10 mm diameter *continuous* bead of caulking onto the lumber spline:



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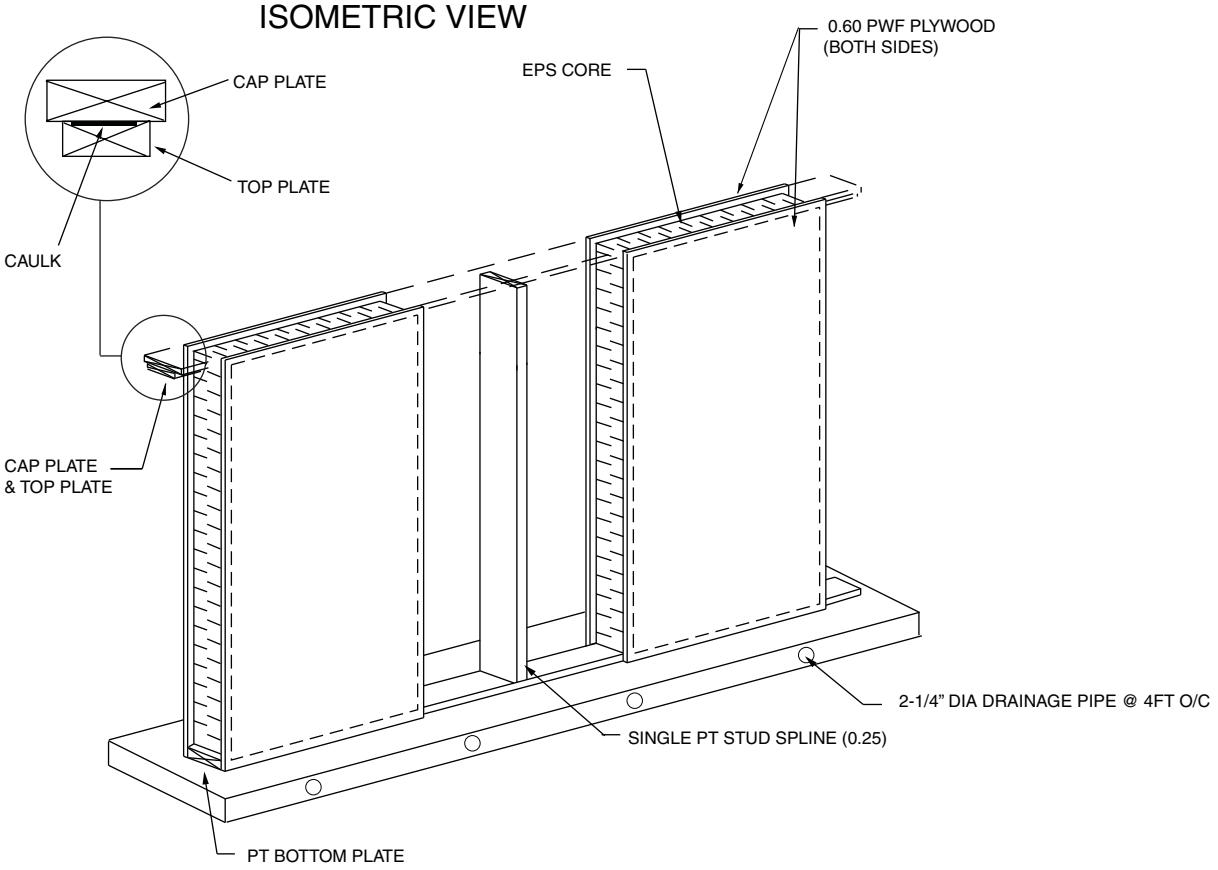
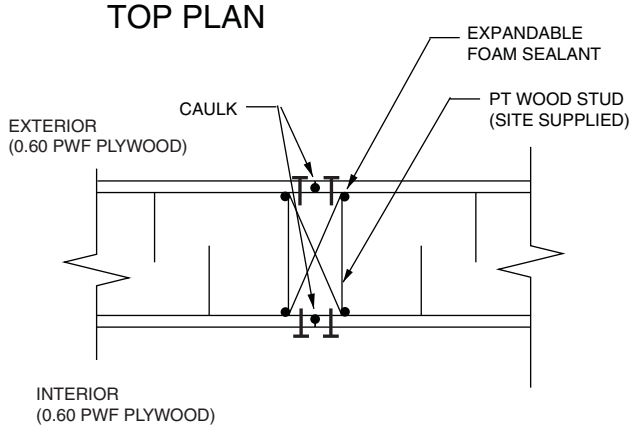
TITLE		PROJECT
AIR BARRIER DETAILS FOR AIR BARRIER SEALANTS		
REFERENCE	SCALE N.T.S.	
DATE NOVEMBER 2010	REVISION 1	DWG. No. AB-1

ISOMETRIC VIEW



TOP PLAN



NOTES: REFER TO AIR BARRIER (AB-1) DETAILS FOR SEALING SIP CONNECTIONS.

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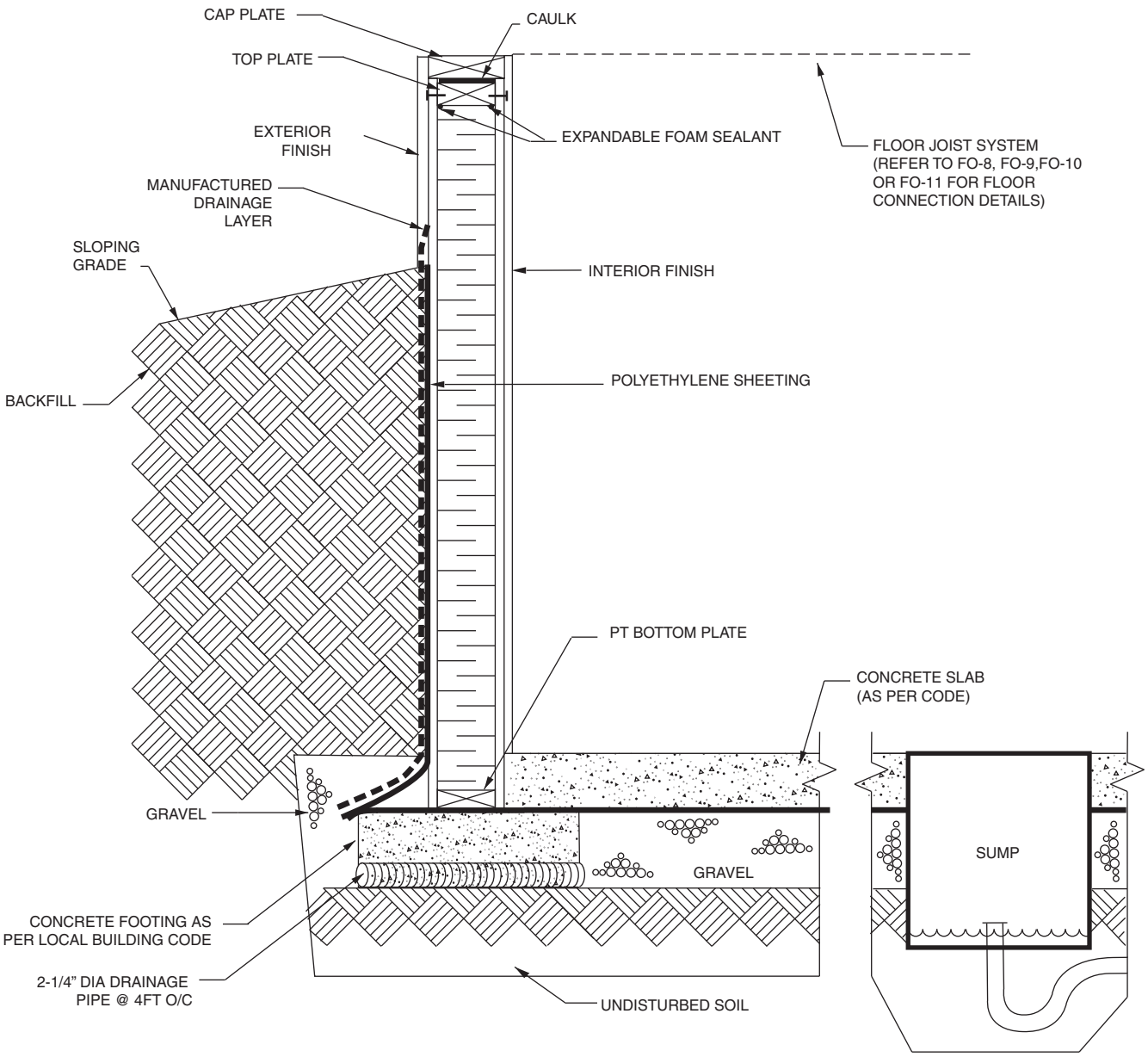
TITLE			PROJECT
FOUNDATION WALL LUMBER SPLINE CONNECTIONS			
REFERENCE	SCALE		
	N.T.S.		
DATE	REVISION	DWG. No.	
FEBRUARY 2012	2	FO-1	



NOTES: THE ADHERENCE OF ANY WATER-PROOFING MEMBRANE TO ANY THERMAPAN SIP PWF PLYWOOD SURFACE WILL VOID THE THERMAPAN WARRANTY

REFER TO AIR BARRIER (AB-1) DETAILS FOR SEALING SIP CONNECTIONS.

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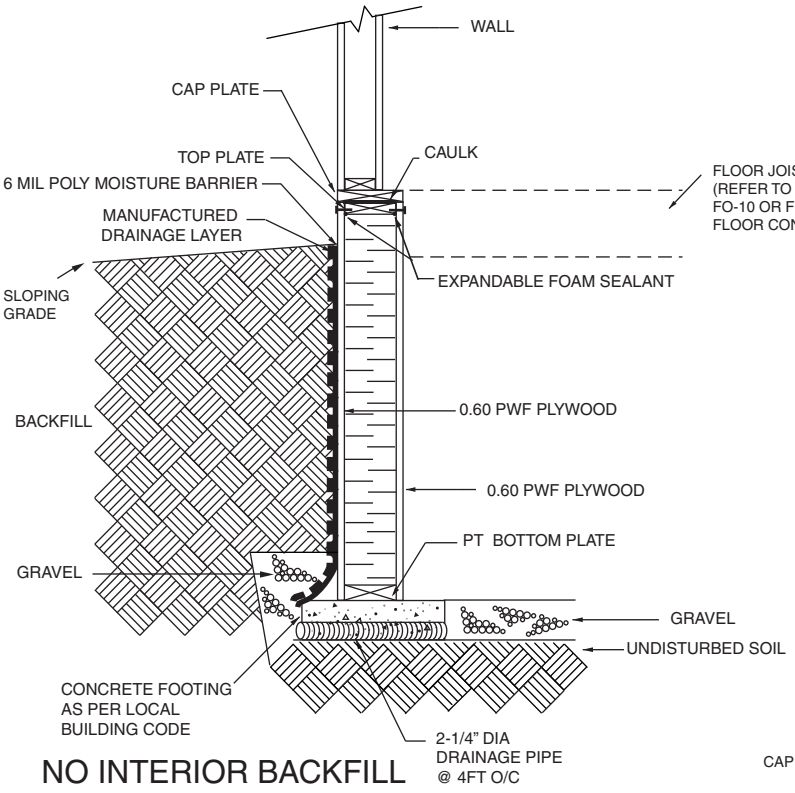
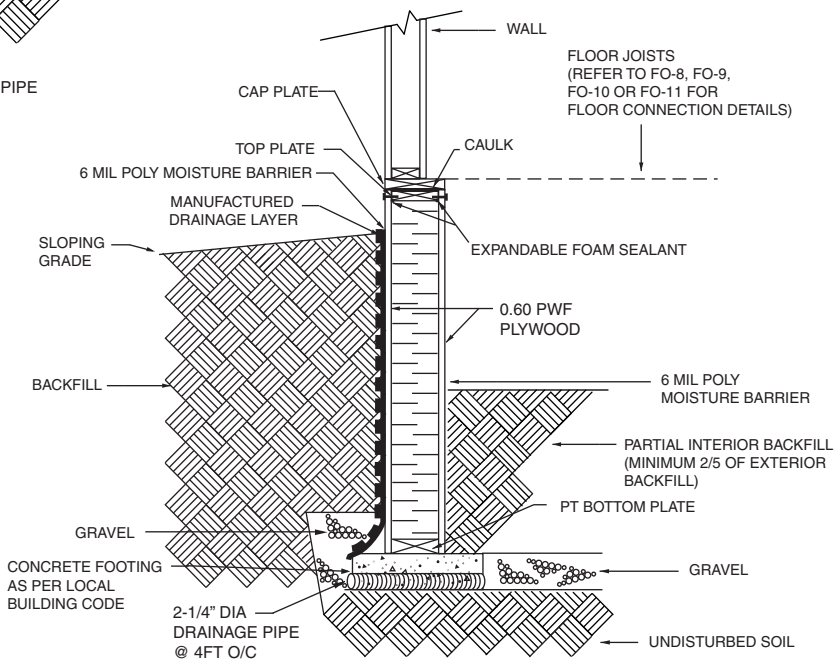
TITLE		PROJECT
TYPICAL FOUNDATION WALL (CONCRETE FOOTING)		
REFERENCE	SCALE: N.T.S.	
DATE: FEBRUARY 2012	REVISION: 2	DWG. NO.: FO-2



NO INTERIOR BACKFILL

PARTIAL INTERIOR BACKFILL



NOTE: THE ADHERENCE OF ANY WATER-PROOFING MEMBRANE TO ANY THERMAPAN SIP PWF PLYWOOD SURFACE WILL VOID THE THERMAPAN WARRANTY.
REFER TO AIR BARRIER (AB-1) DETAILS FOR SEALING SIP CONNECTIONS.

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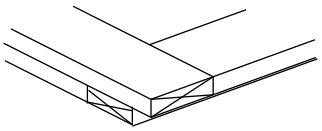
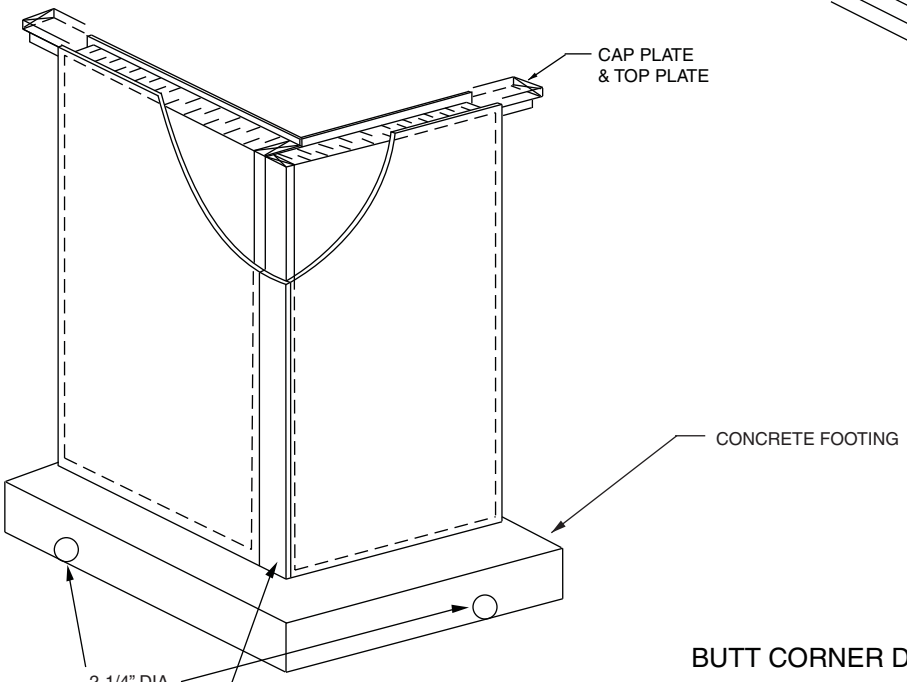
TITLE		PROJECT
CRAWL SPACE WALL DETAIL		
REFERENCE	SCALE	
	N.T.S.	
DATE	REVISION	DWG. No.
FEBRUARY 2012	2	FO-3

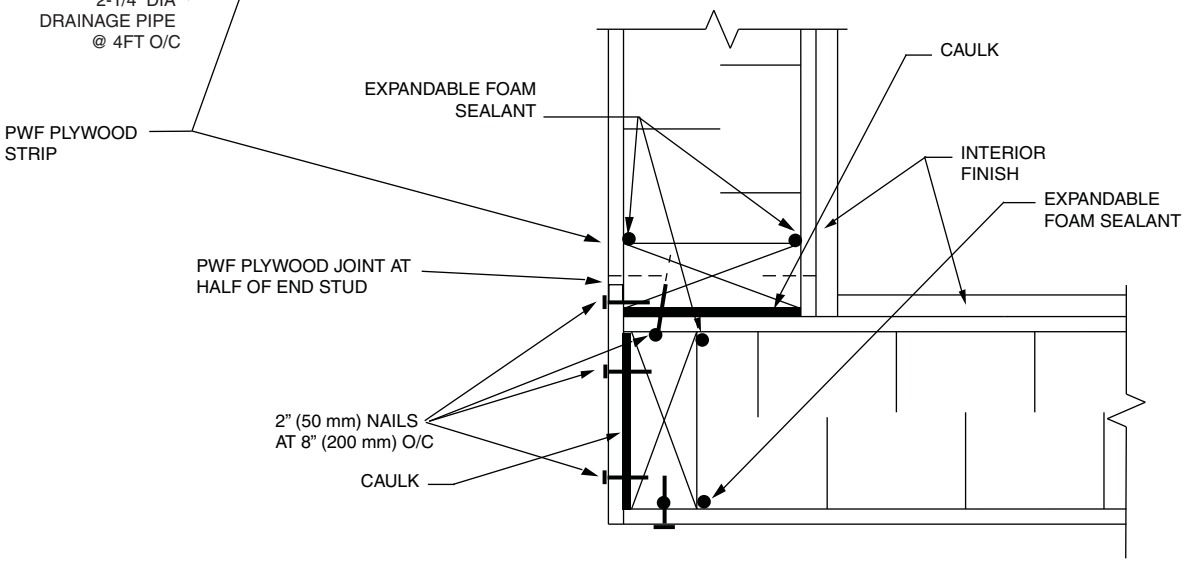
CAP PLATE & TOP PLATE
(CORNER DETAIL)



ISOMETRIC VIEW



BUTT CORNER DETAIL



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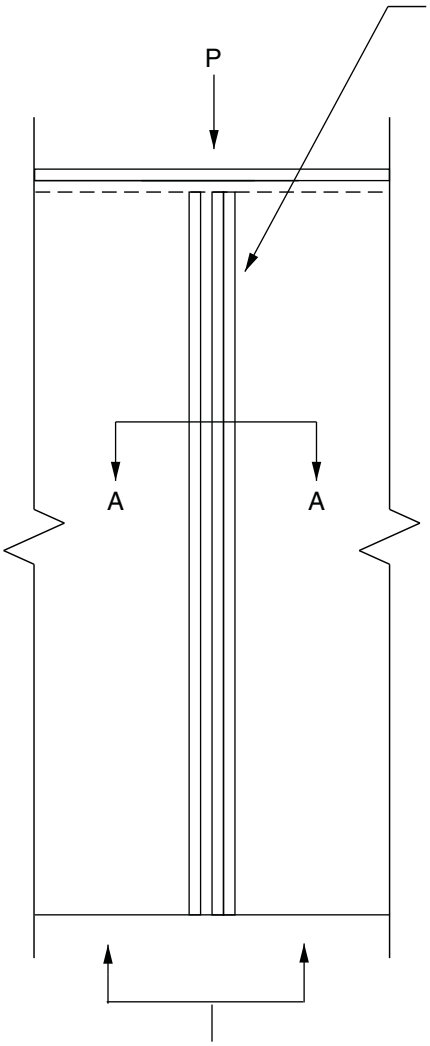
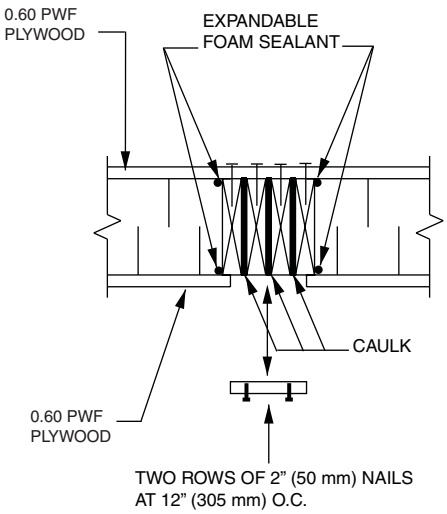
TITLE

FOUNDATION CORNER DETAIL

REFERENCE	SCALE	
	N.T.S.	
DATE	REVISION	DWG. NO.
FEBRUARY 2012	2	FO-4



**COLUMN FOOTING
TO SUPPORT ALL LOADS**



SECTION A-A

NOTES: COLUMNS SUPPORTING FLOOR BEAMS SHALL BE CONSTRUCTED IN CONFORMANCE WITH LOCAL BUILDING CODE.

REFER TO AIR BARRIER (AB-1) DETAILS FOR SEALING SIP CONNECTIONS.

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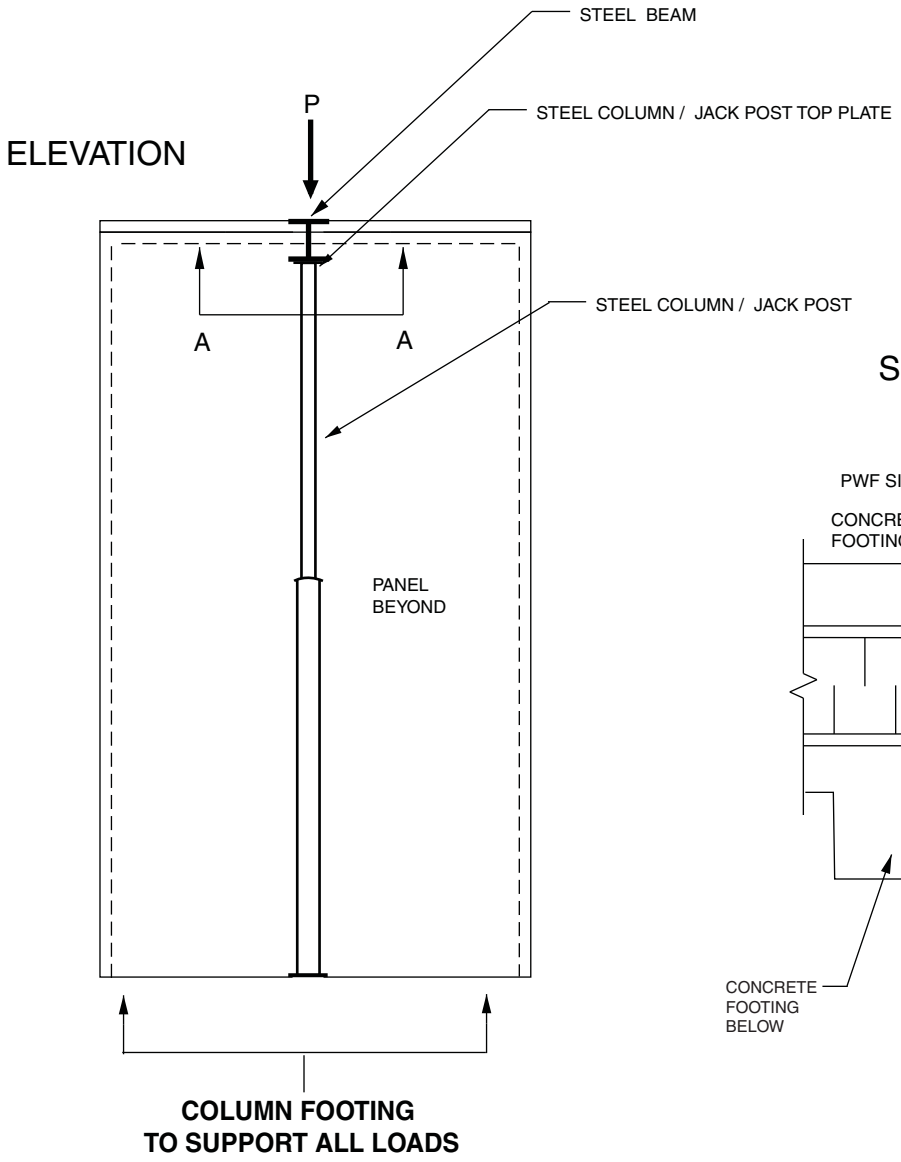
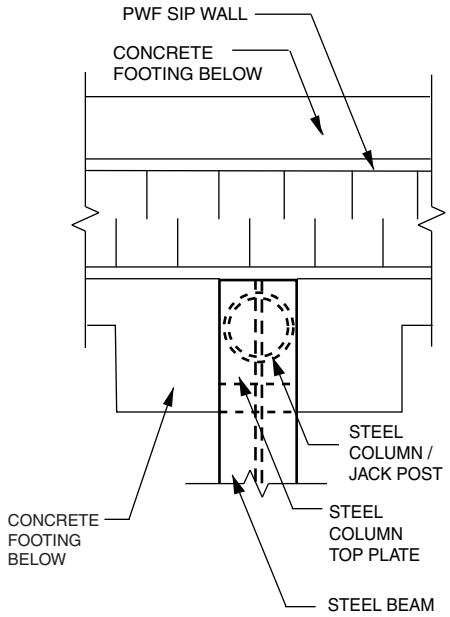
TITLE			PROJECT
POINT LOAD DETAIL - WOOD COLUMN			
REFERENCE	SCALE		
	N.T.S.		
DATE	REVISION	DWG. No.	
NOVEMBER 2011	2	FO-5	





NOTE: COLUMNS SUPPORTING FLOOR BEAMS AND FOOTINGS SHALL CONFORM WITH LOCAL BUILDING CODE.

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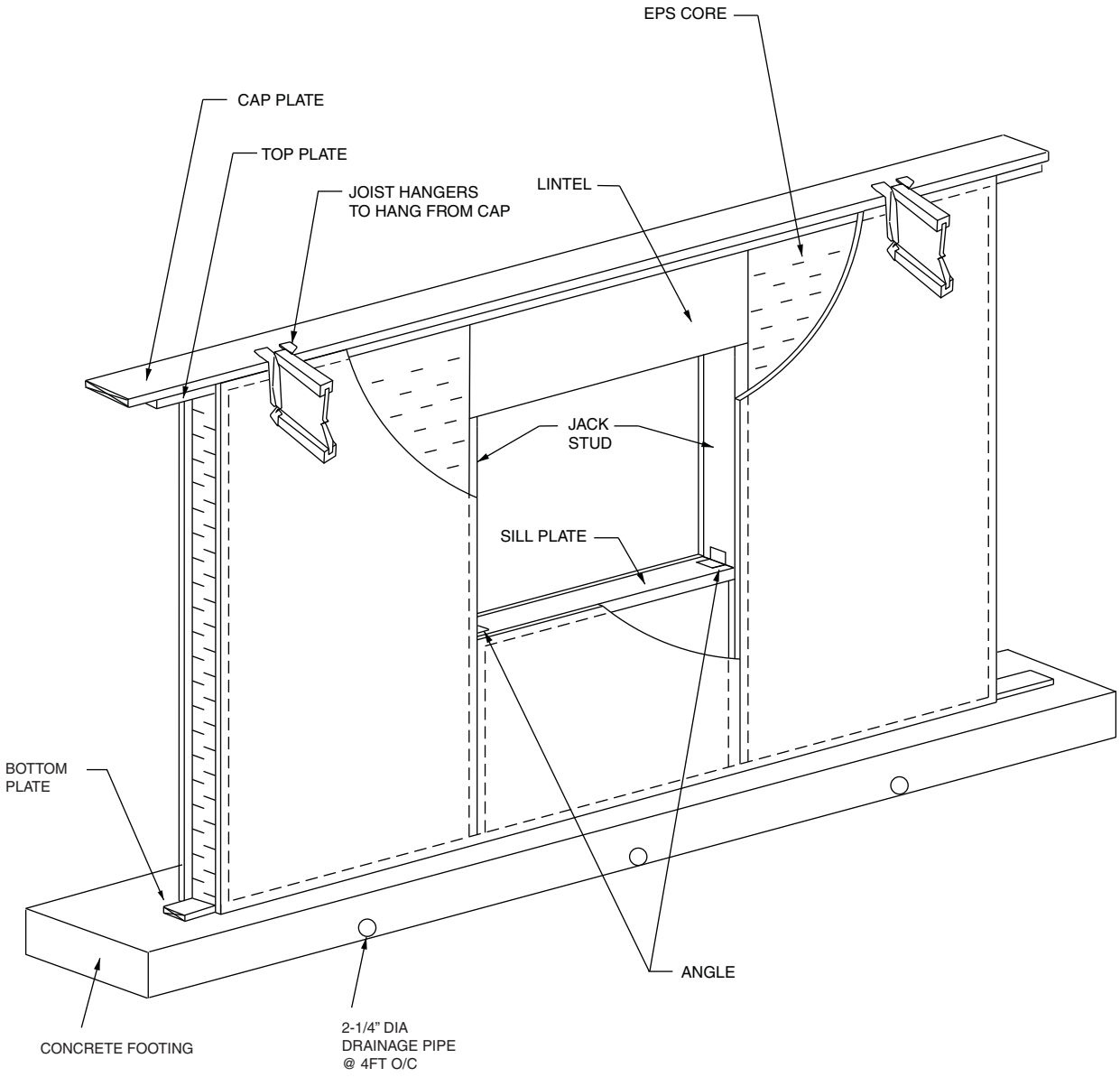
TITLE			PROJECT
POINT LOAD DETAIL - STEEL COLUMN			
REFERENCE	SCALE		
	N.T.S.		
DATE	REVISION	DWG. No.	
MAY 2011	1	FO-6	



NOTES: REFER TO AIR BARRIER (AB-1) DETAILS FOR SEALING SIP CONNECTIONS.

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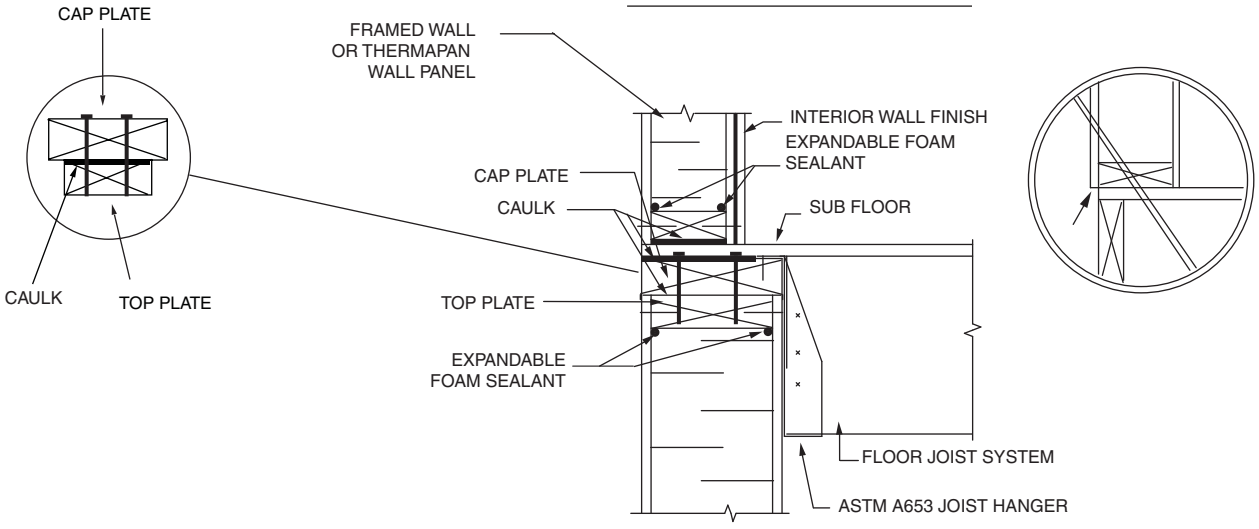
TITLE

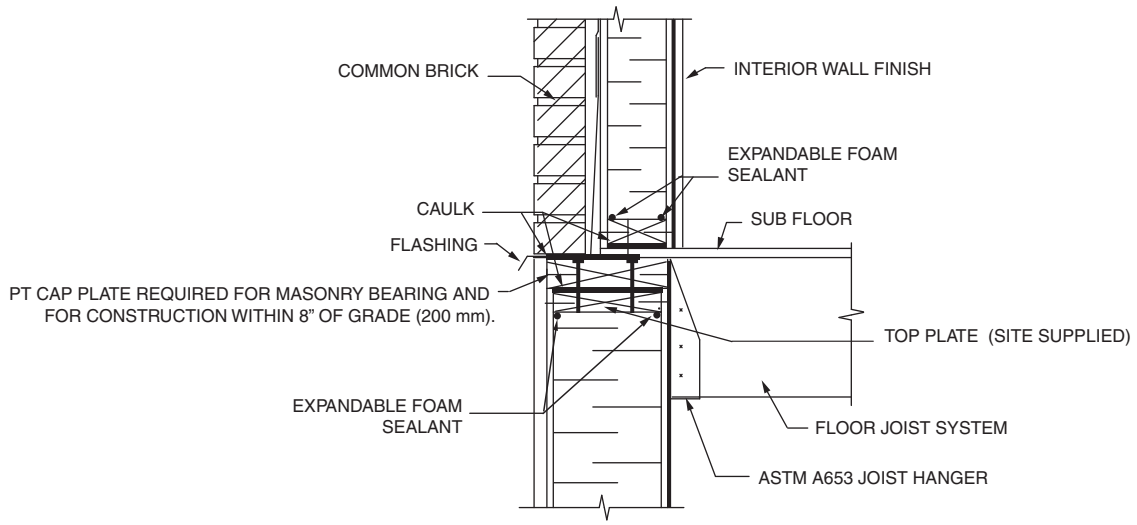
SUSPENDED FLOOR WINDOW HEADER DETAIL

REFERENCE	SCALE	
	N.T.S.	
DATE	REVISION	DWG. No.
FEBRUARY 2012	2	FO-7

SUSPENDED FLOOR DETAIL



SUSPENDED FLOOR DETAIL
(BRICK VENEER/PANEL FOUNDATION)



NOTES: REFER TO AIR BARRIER (AB-1) DETAILS FOR SEALING SIP CONNECTIONS.

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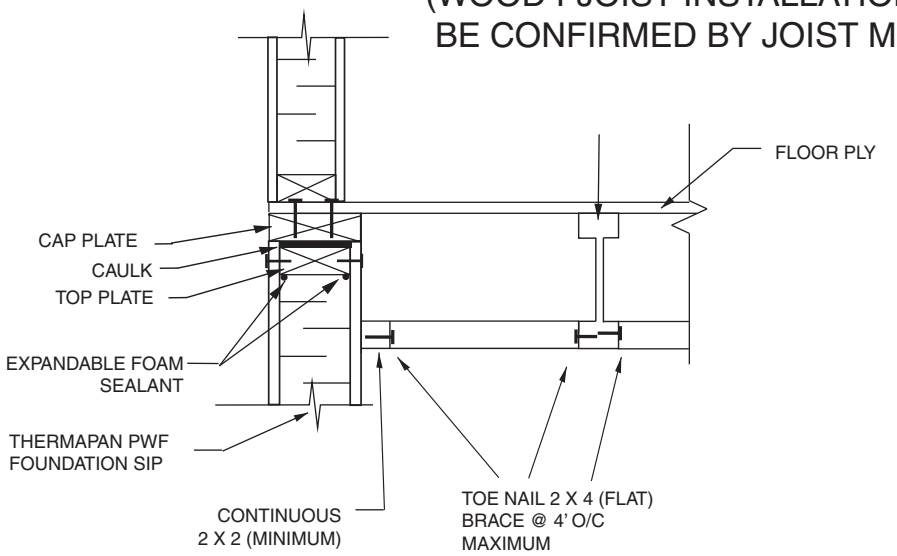
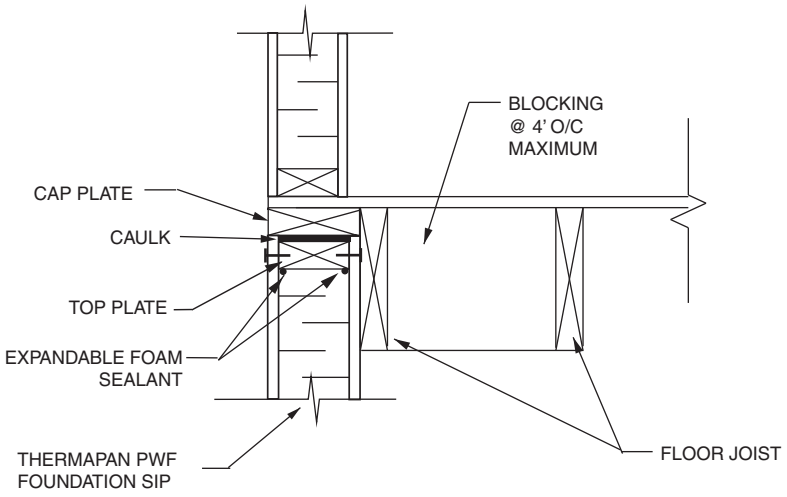
TITLE: SUSPENDED (HUNG) FLOOR CONNECTIONS (SIDE WALLS)			PROJECT
REFERENCE	SCALE: N.T.S.		
DATE: FEBRUARY 2012	REVISION: 2	DWG. No.: FO-8	

WOOD I-JOIST FLOOR DETAIL
(WOOD I-JOIST INSTALLATION TO BE CONFIRMED BY JOIST MANUFACTURER)



2X_ JOIST FLOOR DETAIL



NOTES: REFER TO AIR BARRIER (AB-1) DETAILS FOR SEALING SIP CONNECTIONS.

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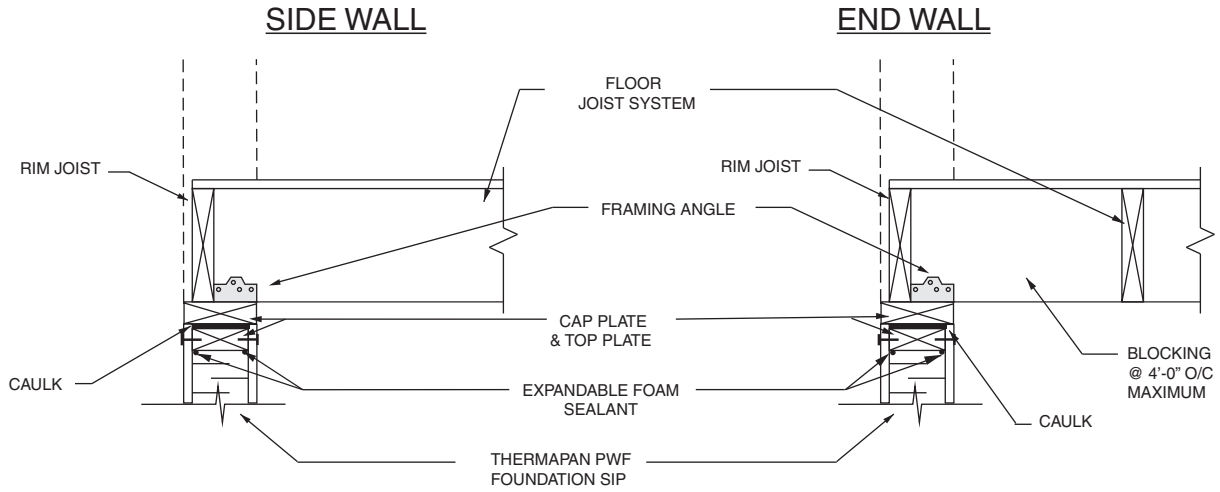
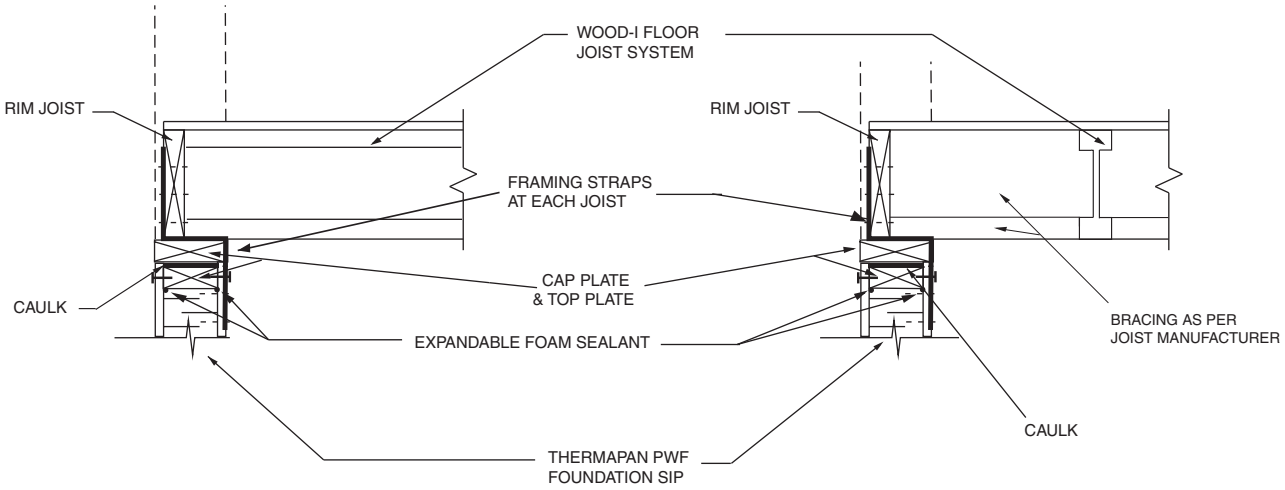
TITLE: SUSPENDED (HUNG) FLOOR CONNECTIONS (END WALLS)			PROJECT
REFERENCE	SCALE: N.T.S.		
DATE: FEBRUARY 2012	REVISION: 2	DWG. NO.: FO-9	

STANDARD FLOOR JOIST



WOOD-I FLOOR JOIST

(INSTALLATION TO BE CONFIRMED BY JOIST MANUFACTURER)



NOTES: REFER TO AIR BARRIER (AB-1) DETAILS FOR SEALING SIP CONNECTIONS.

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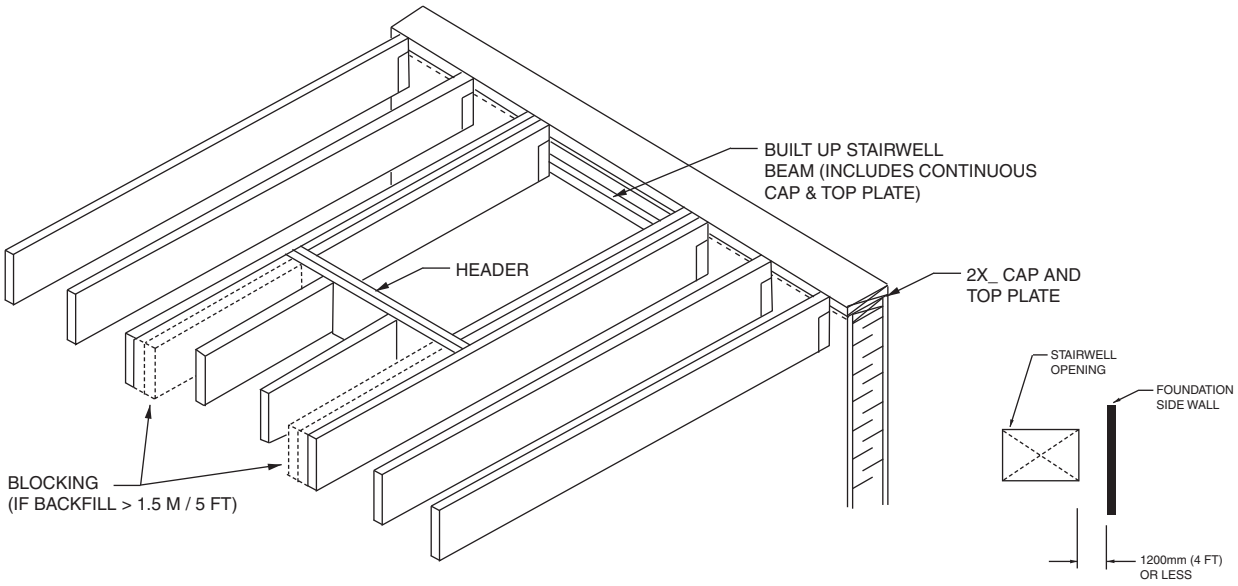
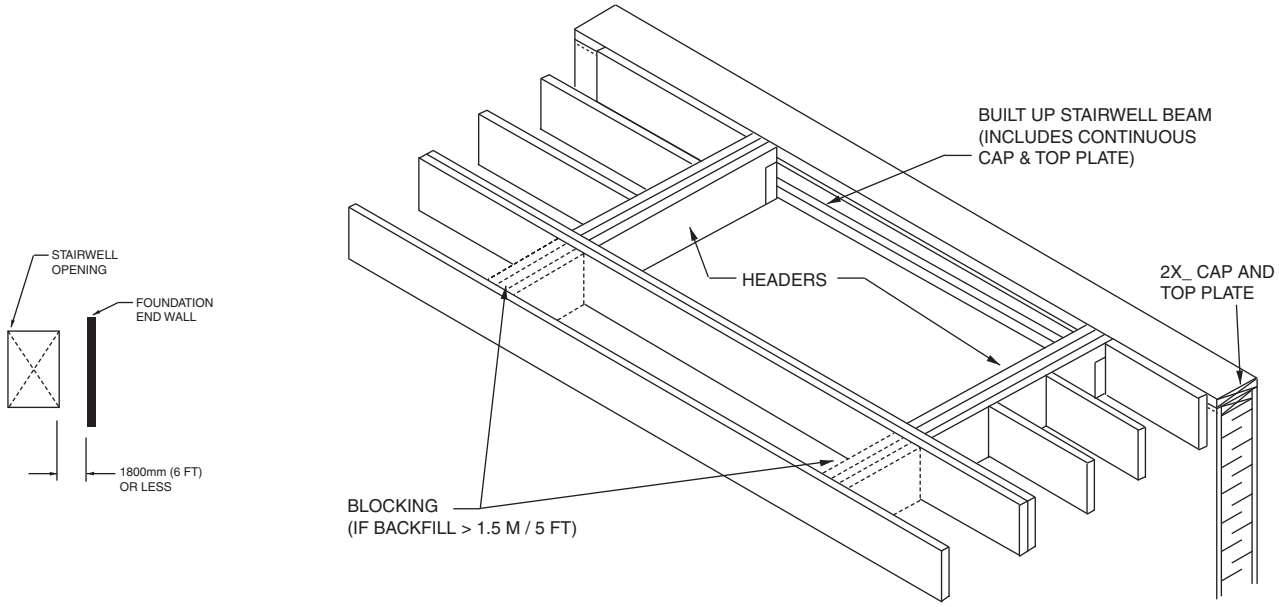
TITLE: PLATFORM FLOOR CONNECTIONS		PROJECT
REFERENCE	SCALE: N.T.S.	
DATE: FEBRUARY 2012	REVISION: 3	DWG. No.: FO-10

STAIRWELL OPENING PERPENDICULAR TO SIDE WALL



STAIRWELL OPENING PARALLEL TO END WALL



NOTES: ABOVE DETAILS APPLY TO OPENINGS LESS THAN 1200mm (4 FT) FROM A SIDE WALL OR LESS THAN 1800mm (6 FT) FROM AN END WALL. OPENINGS FURTHER THAN THESE MEASUREMENTS CAN BE FRAMED AS PER STANDARD FRAMING METHODS

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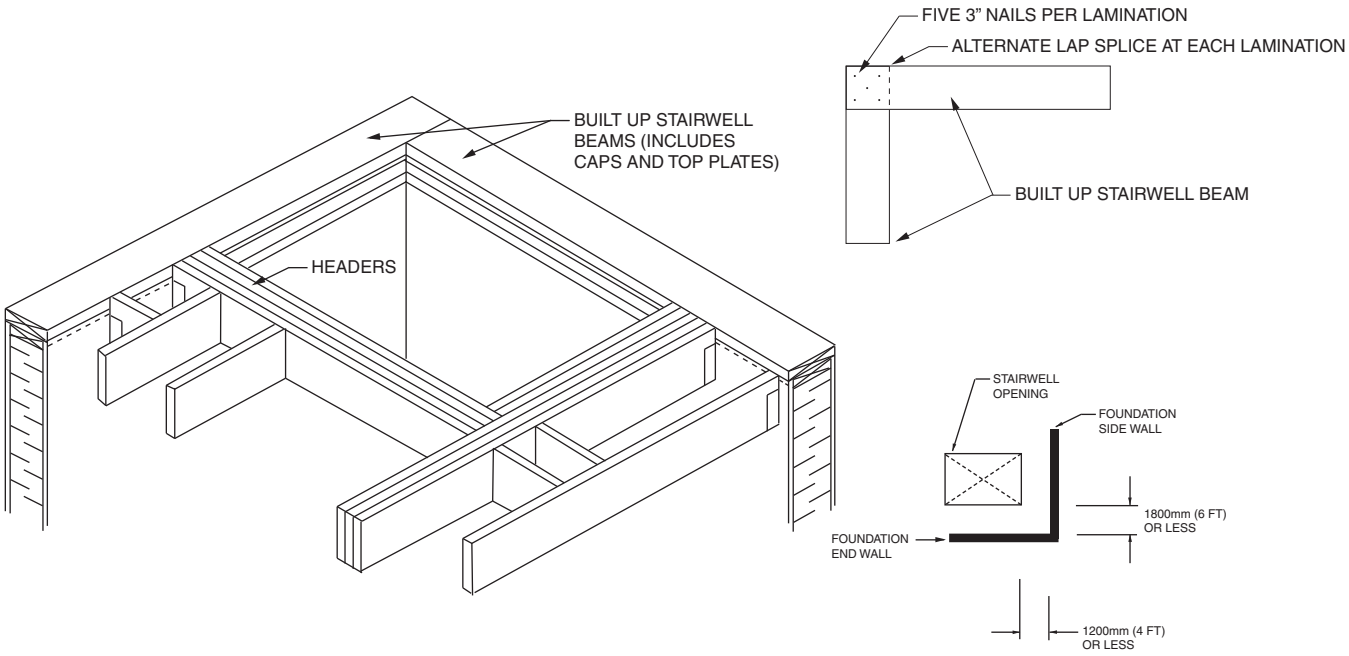
TITLE		PROJECT
STAIRWELL OPENINGS		
REFERENCE	SCALE	
	N.T.S.	
DATE	REVISION	DWG. NO.
MAY 2011	1	FO-11



FRAMING FOR FLOOR OPENINGS GREATER THAN 1200mm (4 ft) IN OPENING WIDTH

(WOOD SLEEPER OR CONCRETE SLAB FLOOR TYPES)

Stairwell Opening Width*	Backfill Height (Max)	Number of Stairwell Beam Laminations 2x6	2x8	2x10	Minimum No. of Joist Headers	Maximum spacing for subfloor joist header and trimmer joist nailing, 76 mm (3") nails
≤ 3200 mm	1500 mm (6'0")	3	2	-	2	2 rows, 150 mm (6") centres
10'6"	2300 mm (7'6")	9	6	4	3	2 rows, 50 mm (2") centres
	2900 mm (9'6")	-	10	7	3	2 rows, 50 mm (2') centres
≤ 3600 mm	1500 mm (6'0")	3	3	2	2	2 rows, 150 mm (6") centres
12'0"	2300 mm (7'6")	11	8	5	3	2 rows, 50 mm (2") centres
	2900 mm (9'6")	-	12	8	3	2 rows, 50 mm (2') centres
≤ 4300 mm	1500 mm (6'0")	5	3	2	2	2 rows, 150 mm (6") centres
14'0"	2300 mm (7'6")	-	11	8	3	2 rows, 50 mm (2") centres
	2900 mm (9'6")	-	-	12	3	2 rows, 50 mm (2') centres

NOTES: ABOVE DETAILS AND TABLE APPLY TO OPENINGS LESS THAN 1200mm (4 FT) FROM A SIDE WALL OR LESS THAN 1800mm (6 FT) FROM AN END WALL. OPENINGS FURTHER THAN THESE MEASUREMENTS CAN BE FRAMED AS PER STANDARD FRAMING METHODS.

* THE WIDTH IS MEASURED PARALLEL TO THE FOUNDATION WALL. THE REQUIREMENTS OF THIS TABLE SHALL APPLY AS APPROPRIATE TO A STAIRWELL BEAM LYING IN THE DIRCTION OF MEASUREMENT. IN THE CASE OF A STAIRWELL CORNER OPENING, THE TABULATED WIDTH AND FRAMING REQUIREMENTS SHALL BE APPLIED SEPARATELY AND INDEPENDENTLY IN BOTH MAJOR DIRECTIONS.

** JOIST HEADERS WHICH EXCEED 3200 mm (10'6") IN UNSUPPORTED LENGTH SHALL ALSO BE SIZED BY CALCULATION OR MAY BE DETERMINED FROM TABLES FOR BUILTUP FLOOR BEAMS.

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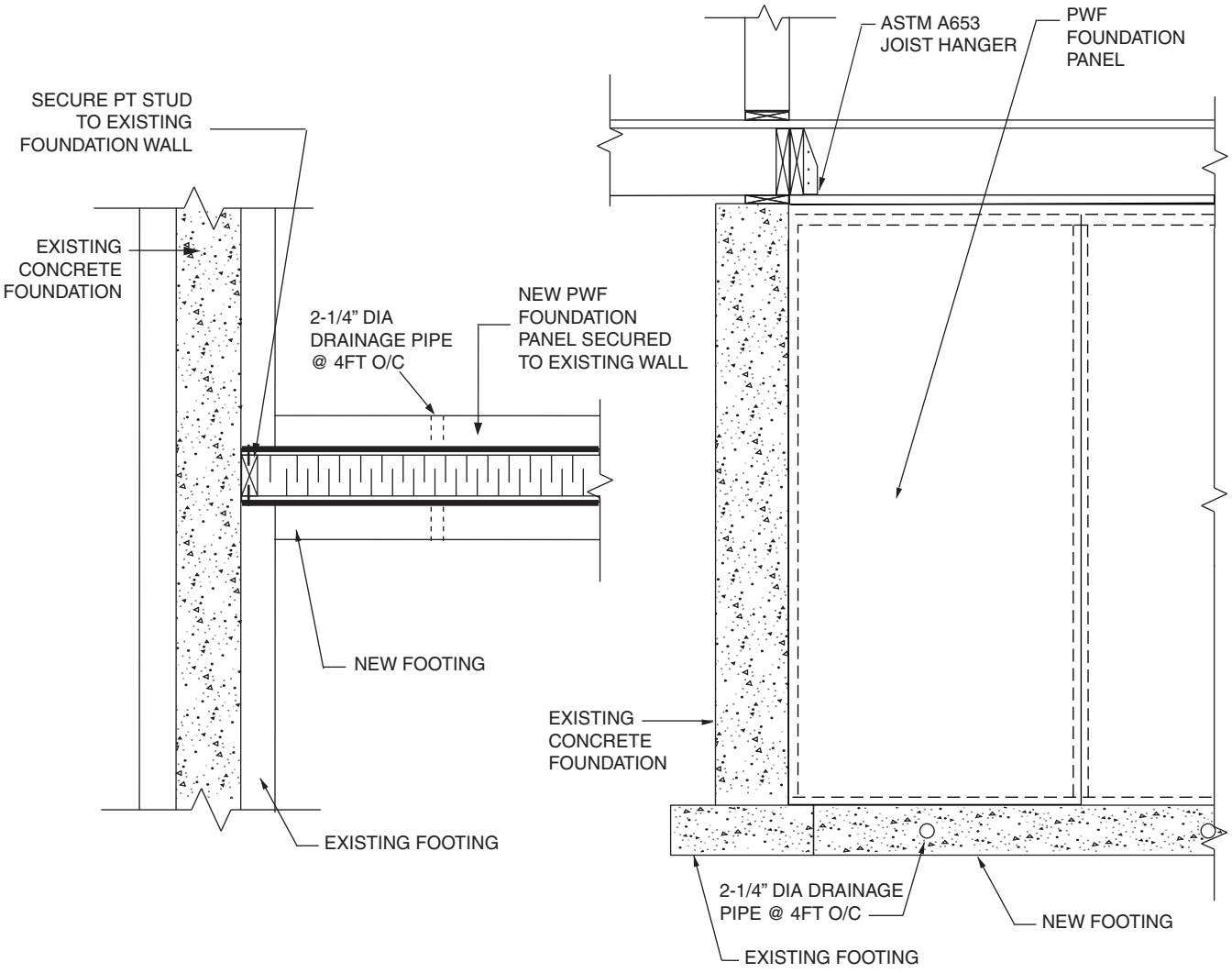
TITLE	PROJECT
CORNER STAIRWELL OPENINGS & FRAMING TABLE	

REFERENCE	SCALE	
	N.T.S.	
DATE	REVISION	DWG. NO.
MAY 2011	1	FO-12

TOP PLAN

ELEVATION



NOTE: THE ADHERENCE OF ANY WATER-PROOFING MEMBRANE TO ANY THERMAPAN SIP PWF PLYWOOD SURFACE WILL VOID THE THERMAPAN WARRANTY.

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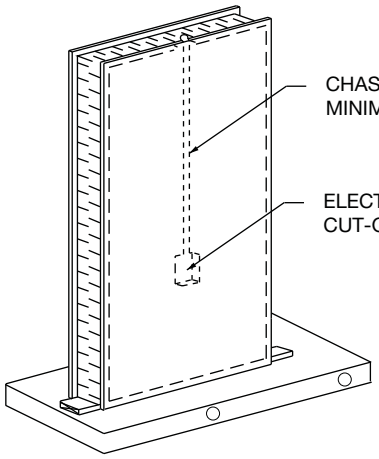
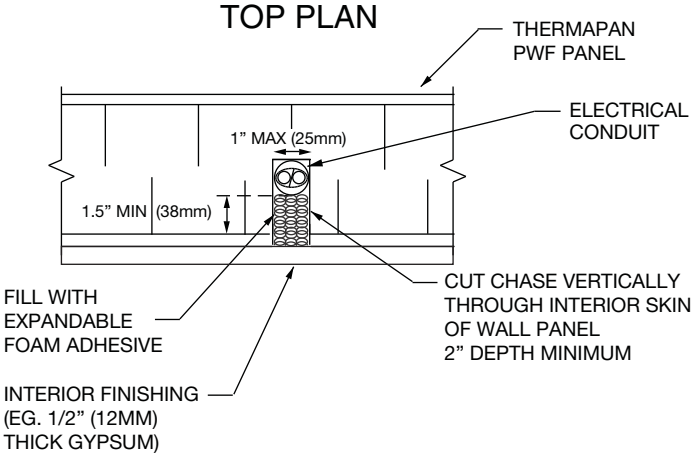
TITLE			PROJECT
FASTENING PWF WALL TO EXISTING FOUNDATION			
REFERENCE	SCALE		
	N.T.S.		
DATE	REVISION	DWG. NO.	
FEBRUARY 2012	2	FO-13	

OPTION A: FINISHED BASEMENT

ISOMETRIC VIEW (FINISHING NOT SHOWN)

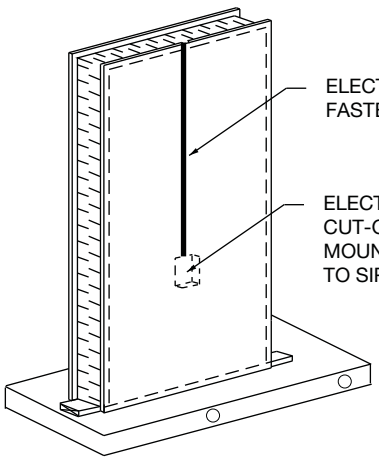


TOP PLAN

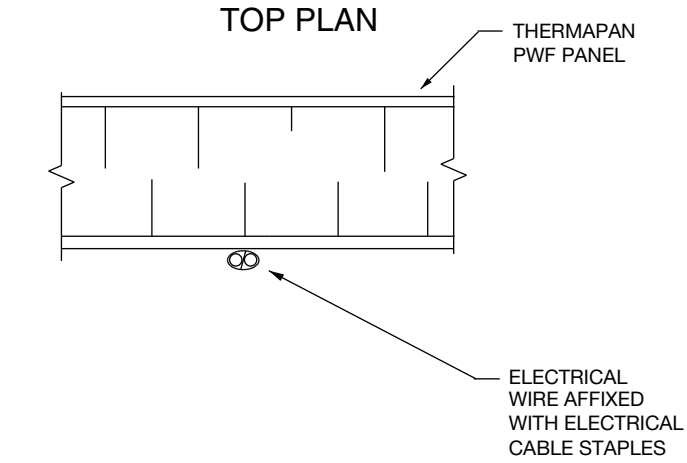


OPTION B: UNFINISHED BASEMENT

ISOMETRIC VIEW (FINISHING NOT SHOWN)



TOP PLAN



NOTE: USE PLASTIC ELECTRICAL BOX ONLY

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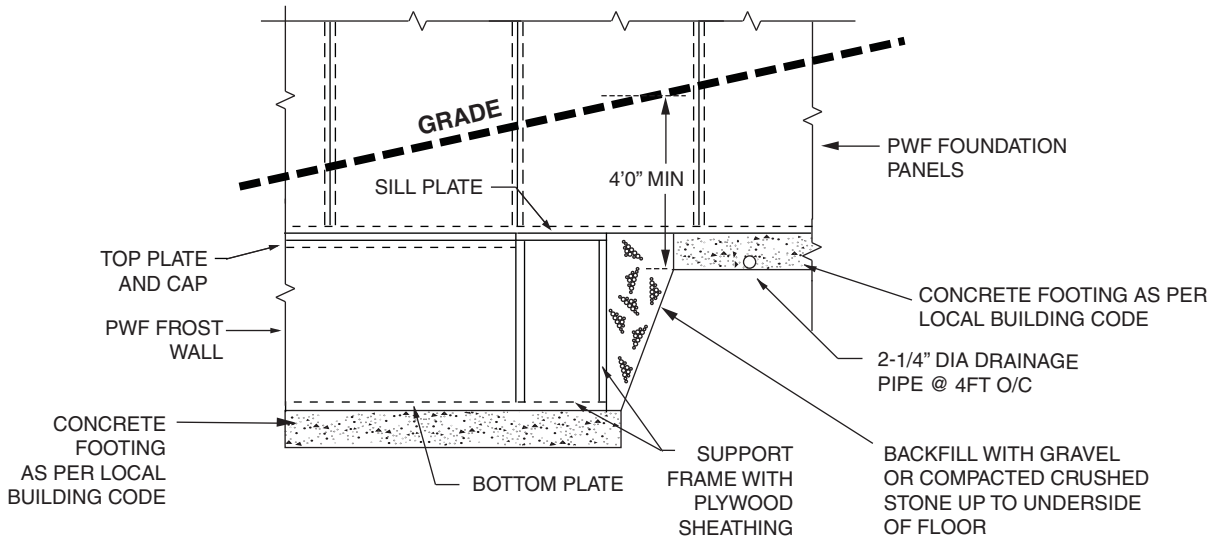
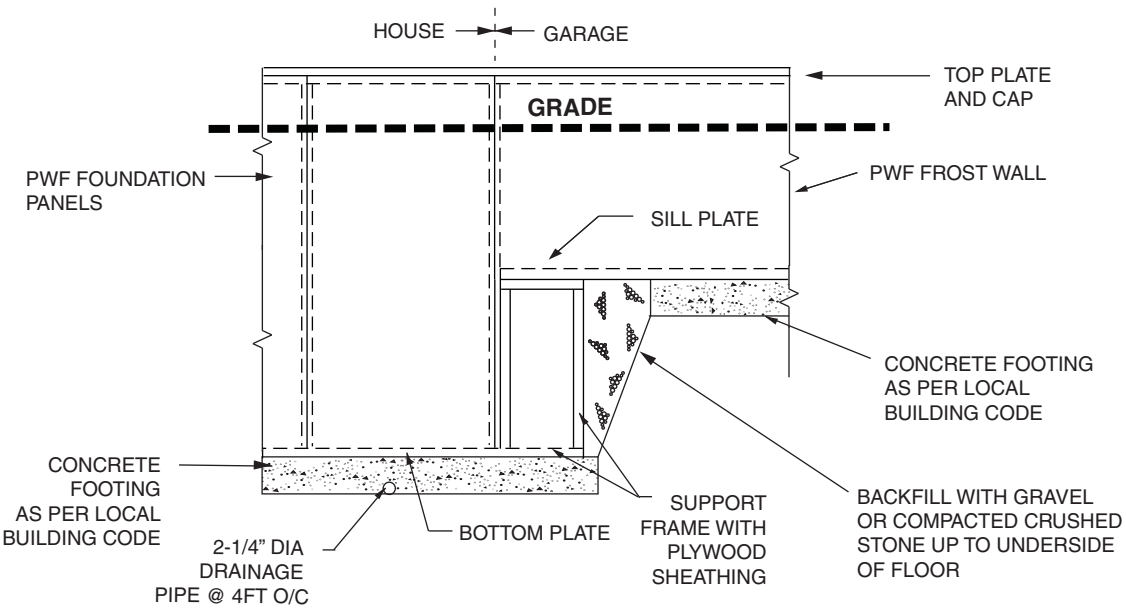
TITLE			PROJECT
ELECTRICAL INSTALLATION			
REFERENCE	SCALE		
	N.T.S.		
DATE	REVISION	DWG. No.	
FEBRUARY 2012	3	FO-14	

PWF BASEMENT WALL ALIGNED WITH FROST WALL



SIP FOUNDATION TO GARAGE FOUNDATION



NOTE: THE ADHERENCE OF ANY WATER-PROOFING MEMBRANE TO ANY THERMAPAN SIP PWF PLYWOOD SURFACE WILL VOID THE THERMAPAN WARRANTY.

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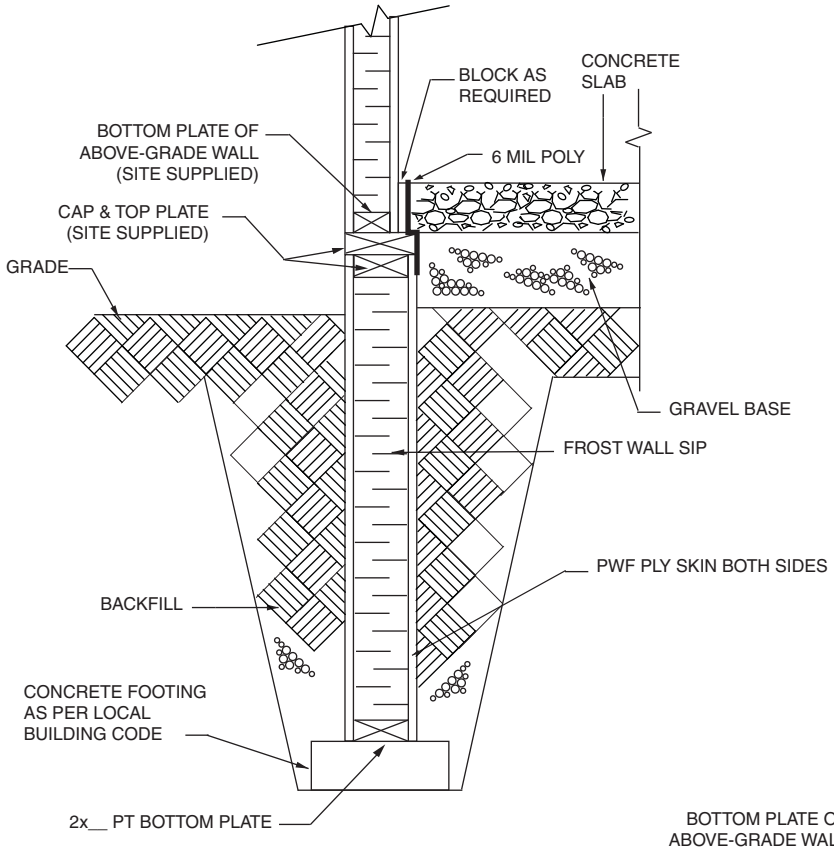
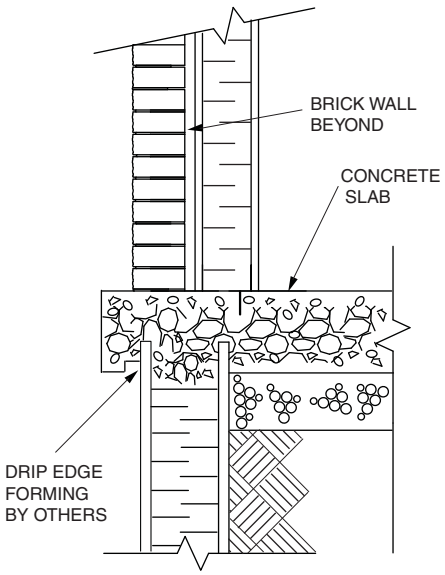
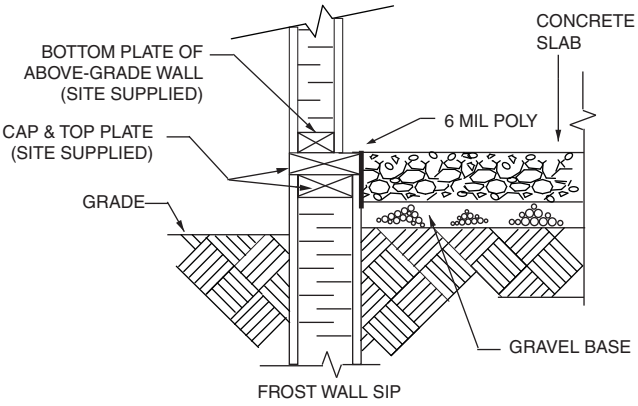
TITLE		PROJECT
BASEMENT PWF WALL CONNECTION TO FROST WALL		
REFERENCE	SCALE	
	N.T.S.	
DATE	REVISION	DWG. NO.
FEBRUARY 2012	3	FO-15



TYPICAL FROST WALL
FOUNDATION SECTION



GARAGE DOOR
FLOOR DETAIL SECTION



OPTION: TOP OF SLAB FLUSH
OR BELOW TOP OF FROST WALL

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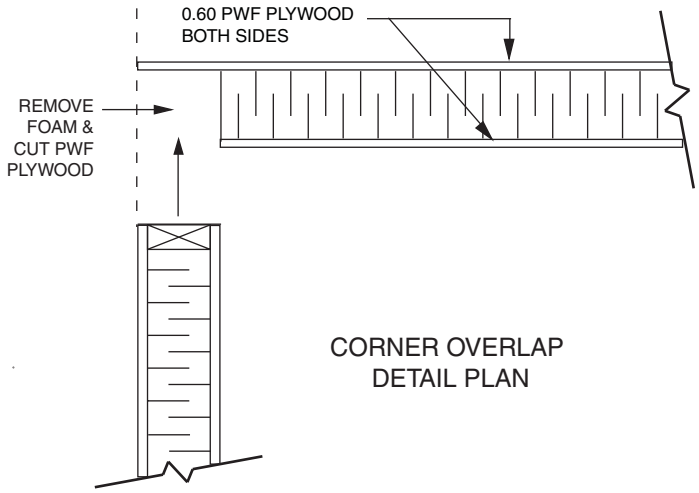
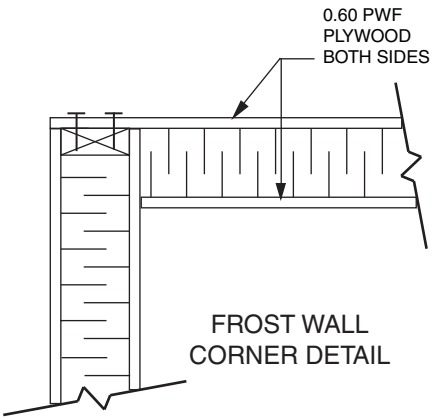
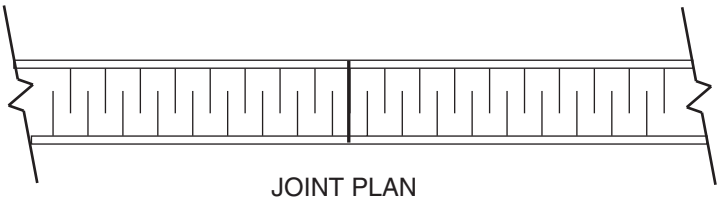
TITLE		PROJECT
FROST WALL DETAILS		
REFERENCE	SCALE	
	N.T.S.	
DATE	REVISION	DWG. No.
FEBRUARY 2012	2	FW-1



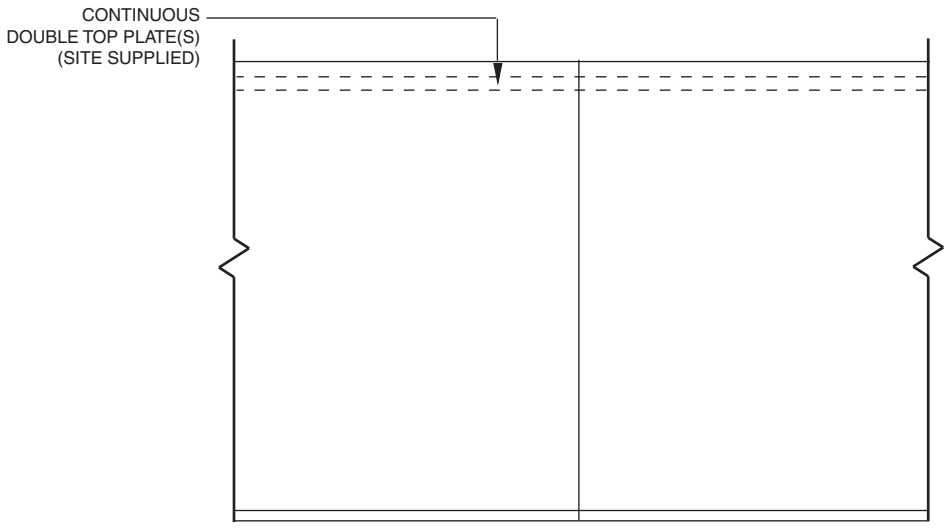
CORNER OVERLAP
DETAIL PLAN



FROST WALL
CORNER DETAIL



JOINT PLAN



JOINT ELEVATION

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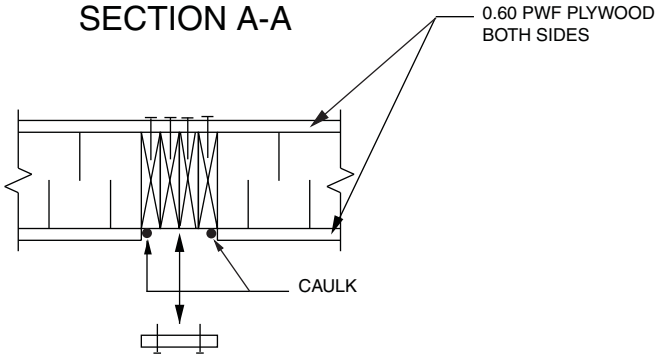
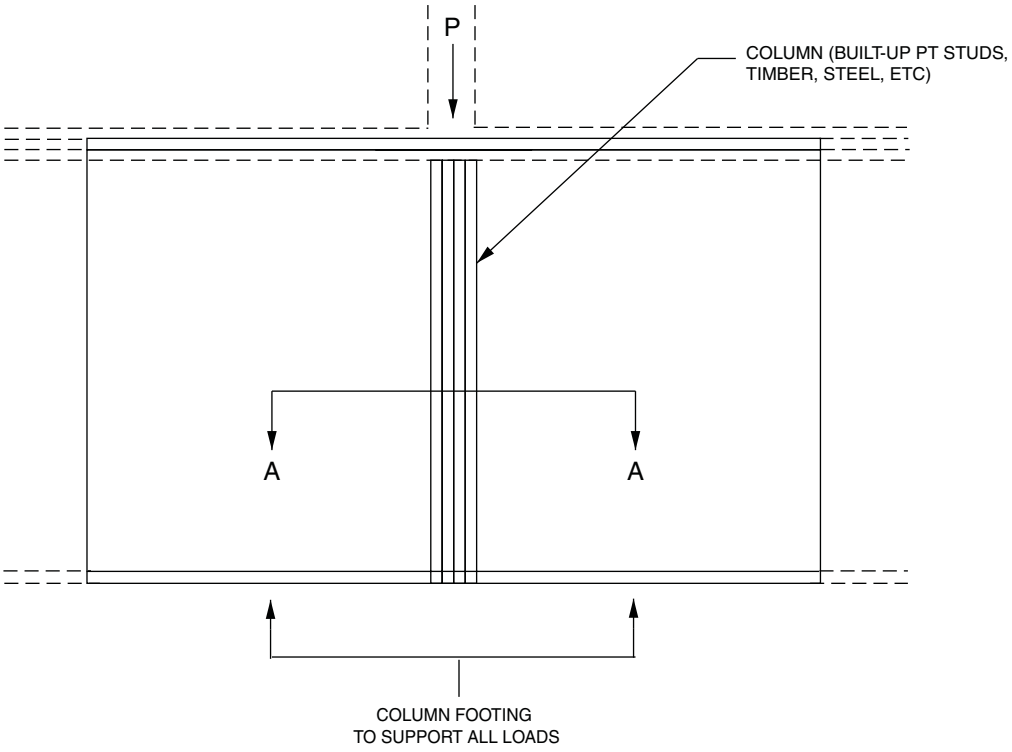
TITLE: FROST WALL PANEL CONNECTIONS			PROJECT:
REFERENCE:	SCALE: N.T.S.		
DATE: FEBRUARY 2012	REVISION: 2	DWG. No.: FW-2	

SECTION A-A





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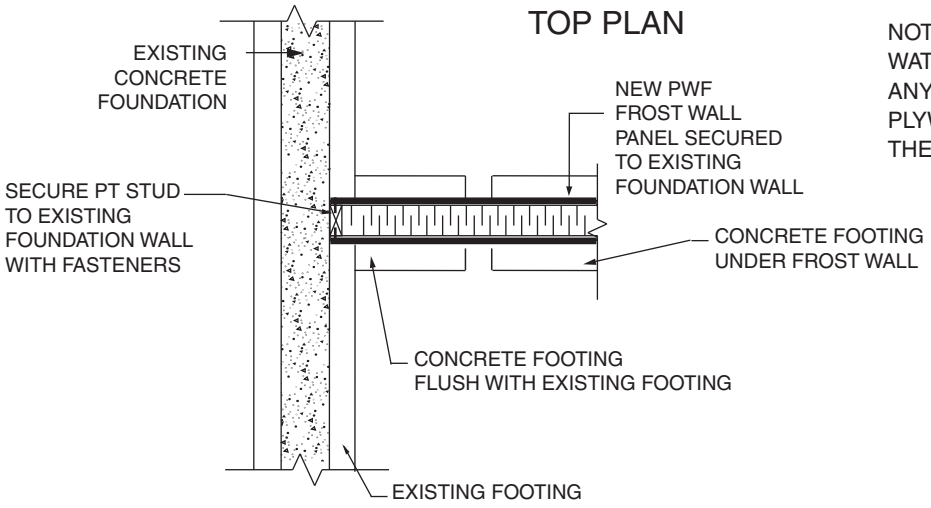
TITLE			PROJECT
FROST WALL POINT LOAD DETAIL			
REFERENCE	SCALE		
	N.T.S.		
DATE	REVISION	DWG. No.	
FEBRUARY 2012	2	FW-3	

TOP PLAN



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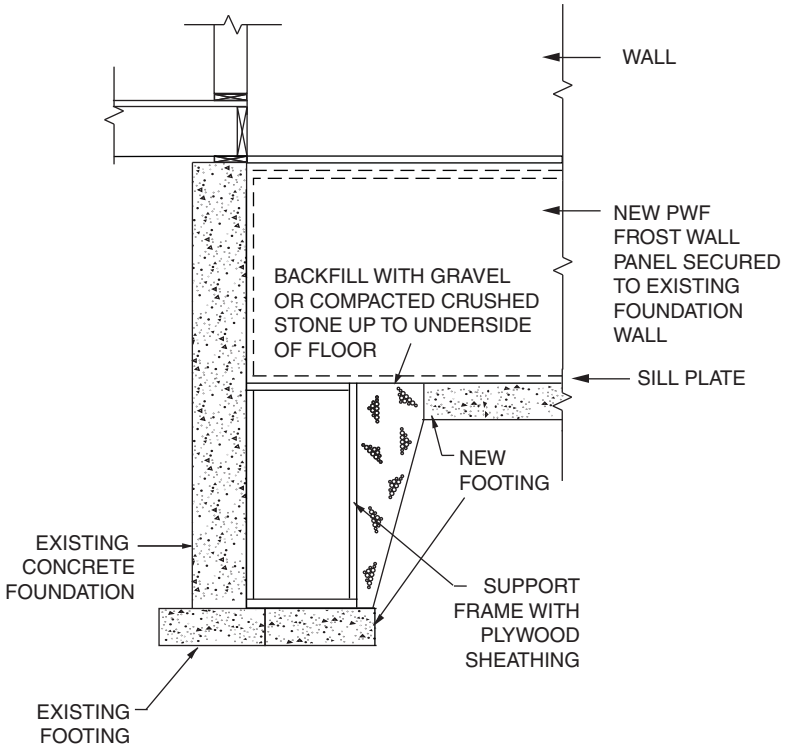
ELEVATION - NEW GARAGE FOUNDATION



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TITLE			PROJECT
FASTENING PWF FROST WALL TO EXISTING FOUNDATION			
REFERENCE	SCALE		
	N.T.S.		
DATE	REVISION	DWG. NO.	
FEBRUARY 2012	2	FW-4	