Residential Builder's Technical Handbook

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1-833-MY-WALLS

Introduction to the Enviro-Cast Wall System

We have compiled this Builder's Technical Handbook as a reference to help you in successfully using the Enviro-Cast Wall System on your project. In order for that to happen everyone involved in the planning and construction process must give adequate consideration to the details of this wall system and follow and understand the guidelines provided in this handbook. This booklet is also available for download at www.VANHOOSECO.com.

Proper site preparation and framing connection details are of the utmost importance in proper completion of your project. Failure to properly conceive and execute these details will result in failure of the performance of this wall system. If you have any questions or are unclear about any information provided herein please contact your VANHOOSECO representative.

We have provided Code References from the 2018 International Residential Code® for One and Two Family Dwellings (often referred to as the "IRC"). These references are included to aid you in understanding of the details or application being discussed in the various sections of this handbook. Your municipality or County may have other requirements beyond and in addition to those outlined in the IRC code.

If you require additional information or for help with site-specific conditions and details, please consult your design professional or contact a VANHOOSECO representative at the number listed at the end of this page.

WARRANTY NOTE: The warranty covers defects in workmanship and materials as well as sidewall water penetration. Warranty terms may vary because of state and local regulations. See limited Warranty Agreement for exact terms and conditions.

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Builder / Owner Responsibilities

The builder / owner is responsible for the following items:

- Building Permits and Inspections
- Excavation
- Soils Verification (By a Licensed Professional)
- Drain Pipe and Sump Pit placement
- Placement of Crushed Stone Footing (Or other footing as indicated)
- Cold Weather Protection Requirements
- Installation of Filter Membrane
- Placement of Building Corner Pins and Establishment of final Grade
- Setback Requirements from property lines / easements (General Code compliance of site)
- Installation of Sill Plate and Framing Attachments
- Shear Wall Determination, design, and construction (By a licensed Design Professional)
- Completion of the Framing/ Decking connection at the top of the Enviro-Cast Wall System panels and the Floor Slab at the bottom of the Enviro-Cast Wall System panels prior to backfilling
- Installation of Functioning Gutters and Downspouts
- Site Accessibility for Trucks and Crane
- Grading and placement of backfill material as specified
- Final Site Grading

In order for VANHOOSECO to provide for you a product that fully meets the design and performance requirements of your project, you must provide the following information:

- All building drawings including floor framing plans, roof framing plans, and elevations
- Design load to be applied to the Enviro-Cast Wall System
- Soil type and / or bearing capacity
- Location and magnitude of any point loads
- Requirement and location of Shear Wall(s), if required
- Window and door locations and rough opening sizes and opening types
- Interior stairway locations and opening sizes
- Interior fill conditions (garage, porch, etc)
- Chimney details if applicable
- Grading plans
- Top-of-wall benchmark elevation / Finished grade elevation
- Beam and column locations, sizes and loads
- Egress considerations (Emergency Evacuation and Rescue Access)
- Locations and sizes of support ledges (brick ledge, slab supports, etc.)

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Foundation Drainage

Important Note: The base of the Enviro-Cast wall System must be located ABOVE the water table. Failure to do so could lead to leakage and/or failure of the wall system, and will void the Warranty.

Install perforated drain pipe

- Use a 4 inch perforated drainage pipe located on the exterior side of the wall system, installed below the base of the panel / wall in the crushed stone as shown in the details in this handbook.
- The pipe must be located at least one foot (12 inches) beyond the outside edge of the wall system.
- In the event that the Required Depth of the 1/2 inch Clean Crushed Stone Footing is greater than 20 inches, the pipe must be located at a greater distance than one foot (12 inches) in order to keep the pipe out of the Crushed Stone Footing “Load Distribution Path".

Install Sump Pit/ Daylight Drain

- Direct pipe to sump or daylight drain. (A second sump pit, a second drain pipe, and/or a second outlet to daylight should be considered for large foundations, for areas where you expect a high water table, or for a backup drainage option.)
- Sump Pump (provided by others) must be checked regularly to ensure proper working order.
- If a daylight drain is used, a backwater valve must be installed to prevent the backflow of moist air into the stone footing area. This will reduce the likelihood of excessive interior humidity.

Install filter membrane

- A drain sleeve filter fabric sock must be installed around the 4 inch perforated drain pipe prior to placement in the crushed stone footing in order to reduce the likelihood of the drain becoming clogged with the backfill material and not draining properly.
- If a drain sleeve filter fabric sock is not employed then a filter membrane acceptable to VANHOOSECO may be placed over the crushed stone footing area on the exterior of the panel / wall in lieu of the filter sock.

NOTE: The above requirements are for precast concrete walls that retain earth and enclose habitable or usable space located below-grade that rest on crushed stone footings.

Code Reference:
2018 IRC Section R405.1.1
"Precast Concrete Foundation"

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Backfilling

WARNING: The Building Code and VANHOOSECO require that the framing / decking connection at the top of the Enviro-Cast Wall System panels and the floor slab at the bottom of the Enviro-Cast Wall System panels MUST be completed prior to backfilling. ***Failure to do this will void the warranty and may cause property damage or bodily injury.***

- It is the builder's responsibility to provide proper site conditions and access.
- Use only granular backfill (clean, washed stone approximately ¾" in size) against the Enviro-cast Walls. Do not use **expansive soil** or **topsoil** for backfill.
- Backfill should not exceed 60 pounds per cubic foot (PCF) equivalent fluid pressure (EFP) for any Enviro-Cast Wall System application.
- When backfill exceeds 60 pounds per cubic foot (PCF) equivalent fluid pressure (EFP) consult a design professional or other person competent in applying the structural design principles involved.
- Maximum allowed backfill height is 12 inches below the top of the Enviro-Cast Wall System panels.
- Always slope grade away from the foundation according to local code or not less than 6 inch fall within the first 10 feet (5% slope).
- Provide functioning rain gutters, downspouts, and run-outs to direct water away from the foundations. **Down-spouts must NOT be run to the foundation drain.**
- Allowing heavy equipment to operate near backfilled walls may adversely affect the Enviro-Cast Wall System panels and ***will void*** the warranty.
- In a condition where there is more backfill inside than outside, the maximum differential is 36". (Additional reinforcement can be added to most Enviro-Cast panels for product applications that require backfill differential greater than 36". (Additional requirements must be discussed with your Enviro-Cast Wall System representative prior to panel manufacturing.)
- Request a backfill inspection from VANHOOSECO.

Code Reference:
2018 IRC Section R401.3
"Drainage"

Code Reference:
2018 IRC Section R404.1.6
"Height Above Finished Grade"

Code Reference:
2018 IRC Section R404.1.7
"*Backfill Placement"*

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This letter is to certify that all Expanded Polystyrene (EPS) used in the manufacture of the Enviro-Cast Wall Panels is Type 1 manufactured in accordance with ASTM C578, and has a Flame Spread Index of less than 75, and a Smoke-Developed Index of less than 450.

This will meet the requirements of IRC 2018 Section R316.3 for surface burning characteristics. The Enviro-Cast Wall System is designed to have interior finish of ½" minimum gypsum wallboard (sheetrock) in accordance with IRC 2018 Section R316.4.

Sincerely,

VANHOOSECO Precast

By: _____

Allen Trotter, Engineering Manager

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Below is a P.E. Stamped R-Value Certification for the Standard 10 foot tall EnviroCast Wall. See the following page for other typical configurations.

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R-Value and U-Factor Certification for Enviro-Cast Basement Wall System

Conductivity:			
Concrete		9.50	Btu*in/(hr*ft^2*F)
EPS Insulation Type I	(@75 degrees F)	0.28	Btu*in/(hr*ft^2*F)
EPS Insulation Type IX	(@75 degrees F)	0.24	Btu*in/(hr*ft^2*F)
Air Space		1.61	Btu*in/(hr*ft^2*F)
Sheetrock		1.10	Btu*in/(hr*ft^2*F)
Steel		26.20	Btu*in/(hr*ft^2*F)

R-Value:			
Concrete		0.11	R/inch
EPS Insulation Type I	(@75 degrees F)	3.60	R/inch
EPS Insulation Type IX	(@75 degrees F)	4.20	R/inch
Interior Air Film		0.68	R
Exterior Air Film		0.17	R
Air Space		0.62	R/inch
Sheetrock		0.91	R/inch
Steel		0.04	R/inch

R-Value of Air Space with Steel Studs:		**R-Values**	**U-Factors**	**Area (ft^2)**	**% Area**
Steel Stud	0.075	0.00			
Air Space Inside Studs	1.55	0.96			
Total		0.96	1.037	8.53	9.09%
Air Space Around Studs	1.625	1.01	0.993	84.96	90.63%
Steel Stud	1.625	0.06	16.123	0.26	0.28%
		0.96	1.039	93.75	100.00%

Section @ Concrete Top:						
Concrete	9.5	in	1.00			
EPS (Type IX)	1	in	4.20			
Interior Air Film	1	each	0.68			
Exterior Air Film	1	each	0.17			
Totals			6.05	0.165	2.92	3.02%

Section @ Concrete Ribs:						
Concrete Rib	7.5	in	0.79			
EPS Insulation (Type I)	1.375	in	4.95			
Interior Air Film	1	each	0.68			
Exterior Air Film	1	each	0.17			
Air Space	1	each	0.96			
Sheet Rock	0.5	in	0.45			
Totals			8.01	0.125	17.68	18.29%

Section @ Cavity:						
Concrete Face	2	in	0.21			
EPS Insulation (Type I)	6.875	in	24.75			
Interior Air Film	1	each	0.68			
Exterior Air Film	1	each	0.17			
Air Space	1	in	0.96			
Sheet Rock	0.5	in	0.45			
Totals			27.23	0.037	76.07	78.70%
					96.67	100.00%

Composite R-Value:	**U-Factors**	**% Area**	
Section @ Concrete Top	0.165	3.02%	0.005
Section @ Concrete Ribs	0.125	18.29%	0.023
Section @ Cavity	0.037	78.70%	0.029
		Total U-Factor	**0.057**
		Total R-Value	**17.6**

Note: The R-Value as shown above is for a Standard 10 foot tall wall using Type I White EPS. Other wall configurations and EPS materials will yield differing values. See follwing page for other Typical EnviroCast Wall Values. Please contact an EnviroCast Technical representative for other specifc R-Value specifications for your project.

DrJ ENGINEERING

September 26, 2019

Allen Trotter
Engineering Manager
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Dear Allen,

This letter[1] is to support the VANHOOSECO® wall assembly R-values and U-factors (Table 1). The two assemblies evaluated are comprised of a 2" layer of concrete with 5.5" concrete ribs extending from it at intervals and around all the edges. The areas between these ribs are filled with EPS foam which also extends over the top of the ribs. Steel drywall studs are then installed over the foam and used to attach 0.5" drywall to the assembly. The top exterior concrete rib extends 7.5" instead of 5.5", so a 1" layer of EPS foam is separately installed over the top. See Figure 1 and Figure 2 for assembly details. Rebar is used to reinforce the concrete ribs; however, it was considered negligible in these calculations.

TABLE 1. R-VALUES AND U-FACTORS OF VANHOOSECO® PRODUCTS

Wall Assembly Height (ft)	R-Value $\left(\frac{hr \cdot ft^2 \cdot F}{Btu}\right)$	U-Factor $\left(\frac{Btu}{hr \cdot ft^2 \cdot F}\right)$
10	17.6	0.057
12	16.6	0.060

The values were calculated consistent with IECC Section R402.1.4 using the parallel path method. The wall assembly was segmented into sections by differing thermal pathways, the R-value and U-factor of each was calculated, and then the U-factors were summed based on the weighted average of each section. All conductivity values were based on either the *ASHRAE Handbook of Fundamentals* or *ASTM C578*.

For this analysis, one-dimensional heat transfer with no generation was assumed, and all thermal resistances were conduction with the exception of surface film resistances. Contact resistances were considered negligible. See Figure 1, Figure 2, and Figure 3 for terminology used in the calculations.

[1] The scope of this evaluation did not include a detailed examination or analysis of structural components making up a complete building design or any site-specific installation issues that may present. This evaluation is limited to the specific analysis undertaken in this letter and did not include any testing. No representation or warranty is expressed or implied by this report that the subject is free of manufacturing conditions, design conditions, installation issues, or any other issues unknown to DrJ staff. Information or data that becomes available at a later date may justify modifications to this letter.

Surface film resistances were included per the *ASHRAE Handbook of Fundamentals*. Heat flow was considered horizontal to the vertical air space due to air permeance through walls.

The thermal resistance of the air in the stud cavity was interpolated from Table 3, Effective Thermal Resistance of Plane Air Spaces in the 2013 *ASHRAE Handbook of Fundamentals* (pg. 26.13). The mean temperature used was 75 degrees, the effective emittance was considered 0.82, and the heat flow was considered horizontal to the vertical air space, consistent with the surface film coefficients used.

The parallel paths through the stud web and the stud legs (Figure 3) were considered separate paths, as shown in the calculations included in Appendix A: 10 Foot Wall Assembly Calculation and Appendix B: 12 Foot Wall Assembly Calculations.

Any returns on the ends of the stud legs were negligible to the overall R-value and were therefore ignored. The other steel supports in the stud cavity were ignored, as calculations were performed that determined they were also negligible.

FIGURE 3. DEFINED STUD TERMINOLOGY USED IN CALCULATIONS

See Appendix A: 10 Foot Wall Assembly Calculations and Appendix B: 12 Foot Wall Assembly Calculations for further details. Please contact us at https://www.drjengineering.org/contact-drj if we can be of any additional assistance.

Respectfully Submitted by:

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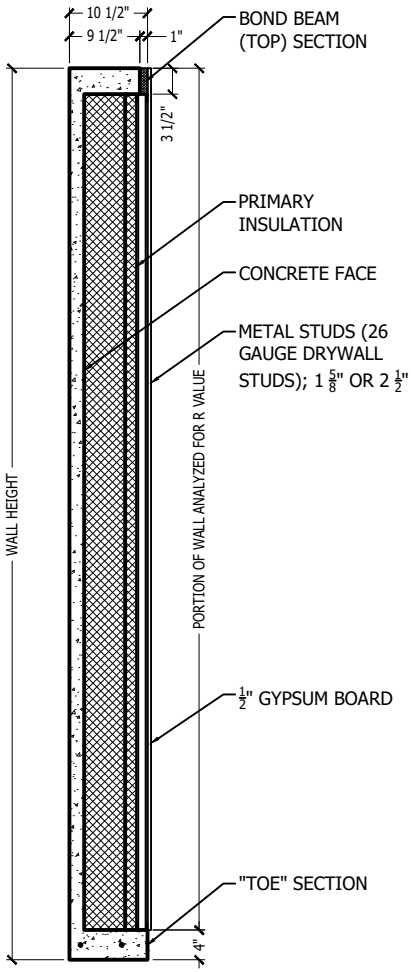
EnviroCast Wall System Typical Panel R/U Values

EnviroCast R-Value Comparison Chart					
Basement Walls; See Cut Sheets for Concrete Stud Spacings					
Wall Height	Concrete Stud Spacing	Wall Description	Primary Insulation	R-Value	U-Value *
9'-3 5/8"	19 1/8"	Standard	EPS Type 1, White ASTM C578	17.5	0.057
10'-0"	19 1/8"	Standard	EPS Type 1, White ASTM C578	17.6	0.057
11'-0"	19 1/8"	Standard	EPS Type 1, White ASTM C578	17.7	0.056
12'-0"	16"	Standard	EPS Type 1, White ASTM C578	17.1	0.058
9'-3 5/8"	19 1/8"	Standard	GPS Type 1, Neopor F2300 ASTM C578	20.3	0.049
10'-0"	19 1/8"	Standard	GPS Type 1, Neopor F2300 ASTM C578	20.4	0.049
11'-0"	19 1/8"	Standard	GPS Type 1, Neopor F2300 ASTM C578	20.5	0.049
12'-0"	16"	Standard	GPS Type 1, Neopor F2300 ASTM C578	19.8	0.051
Above Grade Profile; Concrete Studs @ 24" o.c.					
9'-3 5/8"	24"	1 5/8" Metal Studs	EPS Type 1, White ASTM C578	18.3	0.055
10'-0"	24"	1 5/8" Metal Studs	EPS Type 1, White ASTM C578	18.3	0.055
9'-3 5/8"	24"	1 5/8" Metal Studs	GPS Type 1, Neopor F2300 ASTM C578	21.2	0.047
10'-0"	24"	1 5/8" Metal Studs	GPS Type 1, Neopor F2300 ASTM C578	21.3	0.047
9'-3 5/8"	24"	2 1/2" metal studs	EPS Type 1, White ASTM C578	14.8	0.068
10'-0"	24"	2 1/2" metal studs	EPS Type 1, White ASTM C578	14.9	0.067
9'-3 5/8"	24"	2 1/2" metal studs	GPS Type 1, Neopor F2300 ASTM C578	16.7	0.060
10'-0"	24"	2 1/2" metal studs	GPS Type 1, Neopor F2300 ASTM C578	16.7	0.060
9'-3 5/8"	24"	2 1/2" metal studs, 2 1/2" face	EPS Type 1, White ASTM C578	14.3	0.070
10'-0"	24"	2 1/2" metal studs, 2 1/2" face	EPS Type 1, White ASTM C578	14.3	0.070
9'-3 5/8"	24"	2 1/2" metal studs, 2 1/2" face	GPS Type 1, Neopor F2300 ASTM C578	16.1	0.062
10'-0"	24"	2 1/2" metal studs, 2 1/2" face	GPS Type 1, Neopor F2300 ASTM C578	16.1	0.062

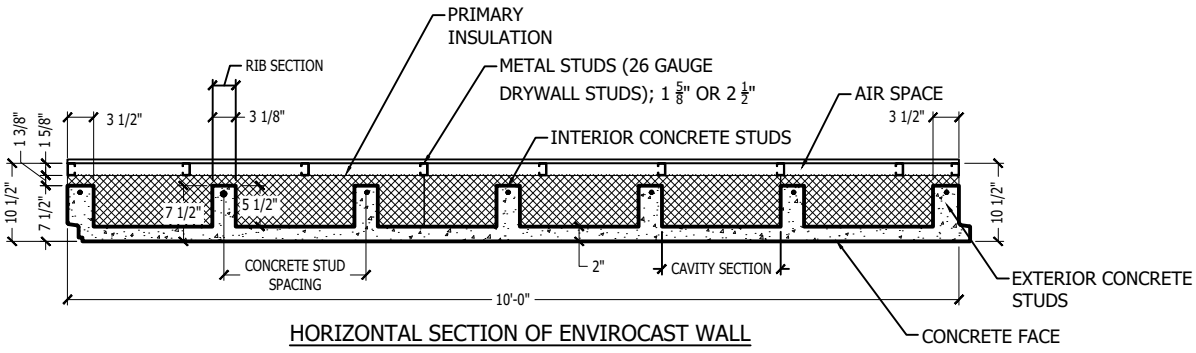
All above values are based on R Values @ 75 degrees Farenheit
All values shown are based on 10 foot long walls sections
Bond Beam insulation for White EPS is Type IX (R=4.2)
Bond Beam insulation for GPS is Type I Neopor F5300 Plus (R=5.0)
Toe portion of wall is NOT included in R-Value calculation as it is assumed to have a slab poured against it.
Values do not include openings for windows, doors, etc
Values do NOT include column studs or other internal structural components that are not part of the standard wall configuration
R/U Value calculations are obtained by the Parallel Path method in accordance with the ASHRAE handook of fundamentals
All calculated values include 1/2" gypsum board interior finish (by others)

For R-Values without Gypsum board deduct the following:
Walls with 1 5/8" Metal Studs:-R 1.46
Walls with 2 1/2" Metal Studs: -R1.93

* IECC / IRC code compliance is achieved through IECC 2018 Table R402.1.4 for U Values
U values shown shaded yellow ***DO NOT*** meet code complaince criteria.



VERTICAL SECTION OF ENVIROCAST WALL



HORIZONTAL SECTION OF ENVIROCAST WALL

CRUSHED STONE FOOTING.
REF: IRC 2018, SECTION
R403.4.1

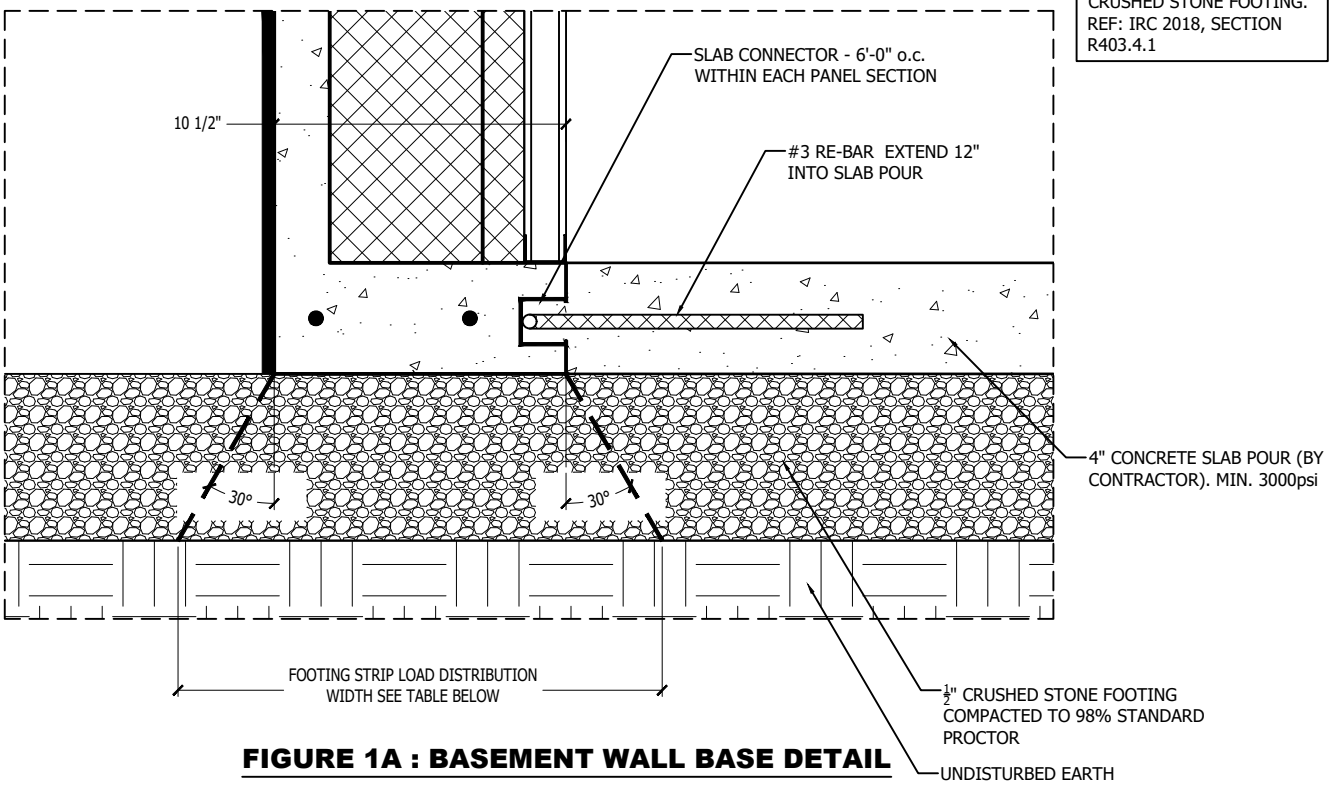


FIGURE 1A : BASEMENT WALL BASE DETAIL

TABLE 1:BEARING CAPACITY CHART FOR ALL WALL HEIGHTS

Crushed Stone Footing Bearing Width / Capacity Chart

Crushed Stone Depth (in.)	*Effective Bearing Width (inches)*	*Bearing Capacity 1500 psf Soil (PLF)*	*Bearing Capacity 2000 psf Soil (PLF)*
4	14.50	1813	2417
5	15.65	1957	2609
6	16.81	2101	2802
7	17.96	2246	2994
8	19.12	2390	3187
9	20.27	2534	3379
10	21.43	2679	3571
11	22.58	2823	3764
12	23.74	2967	3956
13	24.89	3112	4149
14	26.05	3256	4341
15	27.20	3400	4534
16	28.36	3545	4726
17	29.51	3689	4919
18	30.67	3833	5111
19	31.82	3978	5304
20	32.98	4122	5496

EFFECTIVE BEARING WIDTH ASSUMES AN ANGLE OF 60 DEGREES FROM HORIZONTAL

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NPCA CERTIFIED PLANT

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ALLAN R. YOUNG
REGISTERED ENGINEER
XVI
AGRICULTURE
COMMERCE
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WALL BASE DETAIL

Drawn By:	Checked By:
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Site Preparation

1. Determine your soil type from the table below. A minimum of 2000 PSF bearing capacity is required for the Enviro-Cast Wall System. If you do not know your soil type, contact your local Building Codes Office or consult a Design Professional.
2. Determine your soil drainage characteristics from the table on this page.
3. Determine the allowable Load-Bearing Pressure of your soil. This will determine the required depth of your crushed stone footings.
4. Determine total combined footing load in pounds per lineal foot. This should account for all possible loadings (and loading combinations), including but not limited to; dead loads, live load, wind, seismic, hydrostatic pressure, and snow loadings and any combinations of these loads required by the Building Code. This can be obtained from the Engineer of Record for the building.
5. Determine the required depth of the crushed stone footing.

TABLE 2

REFERENCE:IRC 2018 Table R405.1 and Table 401.4.1
PROPERTIES OF SOILS CLASSIFIED
ACCORDING TO THE UNIFIED SOIL CLASSIFICATION SYSTEM

SOIL GROUP	UNIFIED SOIL CLASSIFICATION SYSTEM SYMBOL	SOIL DESCRIPTION	DRAINAGE CHARACTERISTICS	FROST HEAVE POTENTIAL	VOLUME CHANGE POTENTIAL EXPANSION	PRESUMPTIVE LOAD-BEARING POTENTIAL (PSF)
GROUP I	GW	Well graded gravels, gravel sand mixtures, little or no fines	GOOD	LOW	LOW	3000
	GP	Poorly graded gravels, gravel sand mixtures, little or no fines	GOOD	LOW	LOW	3000
	SW	Well graded sands or gravelly sands, little or no fines	GOOD	LOW	LOW	2000
	SP	Poorly graded sands or gravelly sands, little or no fines	GOOD	LOW	LOW	2000
	GM	Silty gravels, gravel-sand-clay mixtures	GOOD	MEDIUM	LOW	2000
	SM	Silty sand, silt-sand mixtures	GOOD	MEDIUM	LOW	2000
GROUP II	GC	Clayey gravels, gravel-sand-clay mixture	MEDIUM	MEDIUM	LOW	2000
	SC	Clayey sands, sand-clay mixture	MEDIUM	MEDIUM	LOW	2000
	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	MEDIUM	HIGH	LOW	1500
	CL	Inorganic clays of low to medium plasticity, gravelly sands, sandy clays, silty clays, lean clays	MEDIUM	MEDIUM	MEDIUM TO LOW	1500
GROUP III	CH	Inorganic clays of high plasticity, fat clays	POOR	MEDIUM	HIGH	1500
	MH	Inorganic silts, micaceous diatomaceous fine sandy or silty soils, elastic silts	POOR	HIGH	HIGH	1500
GROUP IV	OL	Organic silts and organic silty clays of low plasticity	POOR	MEDIUM	MEDIUM	BY TEST
	OH	Organic clays of medium to high plasticity, organic silts	UNSATISFACTORY	MEDIUM	HIGH	BY TEST
	Pt	Peat and other highly organic soils	UNSATISFACTORY	MEDIUM	HIGH	BY TEST

SHADING INDICATES SOIL TYPES THAT ARE UNSUITABLE FOR BEARING FOR THE ENVIRO-CAST WALL SYSTEM

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SITE PREPARATION

How the Crushed Stone Footing Works

CODE REFERENCE:
2018 IRC SECTION: R402.3
(PRECAST CONCRETE)

CODE REFERENCE:
2018 IRC SECTION: R403.1
(GENERAL)

CODE REFERENCE:
2018 IRC SECTION: R403.4.1
(CRUSHED STONE FOOTINGS)

- The purpose of any wall footing is to spread the load from the wall over a sufficiently large area of soil thereby not exceeding the load bearing capacity of the soil.
- The load of the building is transferred into the Enviro-Cast Wall System, where it is transmitted to the crushed stone footings.
- The load distribution path width through the crushed stone travels downward through the stone increasing as it spreads at an angle of 60% from horizontal (30% from vertical) to the undisturbed soil below.
- As the depth of the crushed stone footing increases the effective bearing width of the crushed stone footing on the undisturbed soil also increases, resulting in a wider bearing surface on the soil. (See Figure 1 on sheet 6 for a visual reference).
- The tables on sheet 10 of this handbook give the approximate values of soil bearing capacity based on various depths of stone in the foundation.

Crushed Stone Footings

1. Place the crushed stone footing as determined from the table on the previous page.
2. Enviro-Cast Wall System panels must be placed on clean crushed stone that is free from organic matter and clay or silt. The crushed stone shall be angular and graded according to ASTM C33 with a maximum size not to exceed 1/2". ***Natural rounded river gravels should not be used.***
3. The crushed stone footing shall bear on in situ, undisturbed soil. DO NOT place crushed stone footing on fill.
4. Evenly grade the crushed stone to level.
5. Other sizes of stone may be used for under-slab applications but must terminate 2'-0" or more from the inside edge of the Enviro-Cast Wall System. Other stone types and sizes must not be within the load distribution path of the Enviro-Cast wall system.
6. Don't forget to retain some gravel for final grading.
7. All crushed stone used in the footings must be compacted to 98% standard Proctor.

TABLE 3

Minimum Depth of Crushed Stone Footing (inches)

Construction Type (Assumed Wall loading)		Soil Type and Load Bearing Capacity (PSF) 1500 MH, CH, CL, ML	2000 SC, GC, SM, GM, SP, SW	3000 GP, GW
Conventional Light Frame Construction (e)				
1 Story	1100 pounds per lineal foot	4"	4"	4"
2 Story	1800 pounds per lineal foot	7"	4"	4"
3 Story	2900 pounds per lineal foot	14" (a)	9" (a)	4"
Masonry Veneer over light frame construction (e)				
1 Story	1500 pounds per lineal foot	5"	4"	4"
2 Story	2700 pounds per lineal foot	13" (a)	8"	4"
3 Story	4000 pounds per lineal foot	22" (a)	14" (a)	7"

(a) Crushed stone must be consolidated in 8" lifts with a plate vibrator to 98% standard proctor
(b) Table allows for 430 pounds per lineal foot for self weight of foundation wall
(c) See note 2 above for stone specifications
(d) Consult drawings for the required depth of the crushed stone footing
(e) Assumed Wall Loading (plf) per 2018 IRC Table R403.4.1
(f) The above wall loads are presumptive and may not be equivalent to the loads of your project. Consult a Design Professional to calculate the actual loads for your project.

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CRUSHED STONE FOOTING

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Shear Walls

WOOD SHEAR WALLS SHALL BE DESIGNED & CONSTRUCTED USING THE ANSI / AF&PA SDPWS-2008 STANDARDS

MASONRY SHEAR WALLS SHALL BE DESIGNED & CONSTRUCTED USING THE TMS 402-13/ACI 530-13/ASCE 5-13 STANDARDS

CONCRETE SHEAR WALLS SHALL BE DESIGNED & CONSTRUCTED USING THE ACI318-14 STANDARDS

A shear wall is a wall that provides for lateral stability of a structure. While the exterior Enviro-Cast wall system functions as shear walls, one or more additional interior shear walls may be required to ensure lateral stability. Conditions such as large open spaces in a floor plan, differential backfilling, etc., may necessitate additional shear walls. The shear wall can be constructed by the Contractor from many different materials such as wood, masonry, steel, or even precast concrete. Shear wall requirements should be documented in the construction plans by the Architect or Engineer of Record, and should include such information as location, length, and anchorage requirements at the top and bottom of the shear wall. In some instances a shear wall may require an additional concrete placement within the floor placement area.

The 3d view below indicates the recommended maximum shear wall interval, regardless of soil backfill type or height, or other lateral load conditions. ***In all cases however, the need for shear walls along with their location and design must depend on the judgement of a Design Professional***.

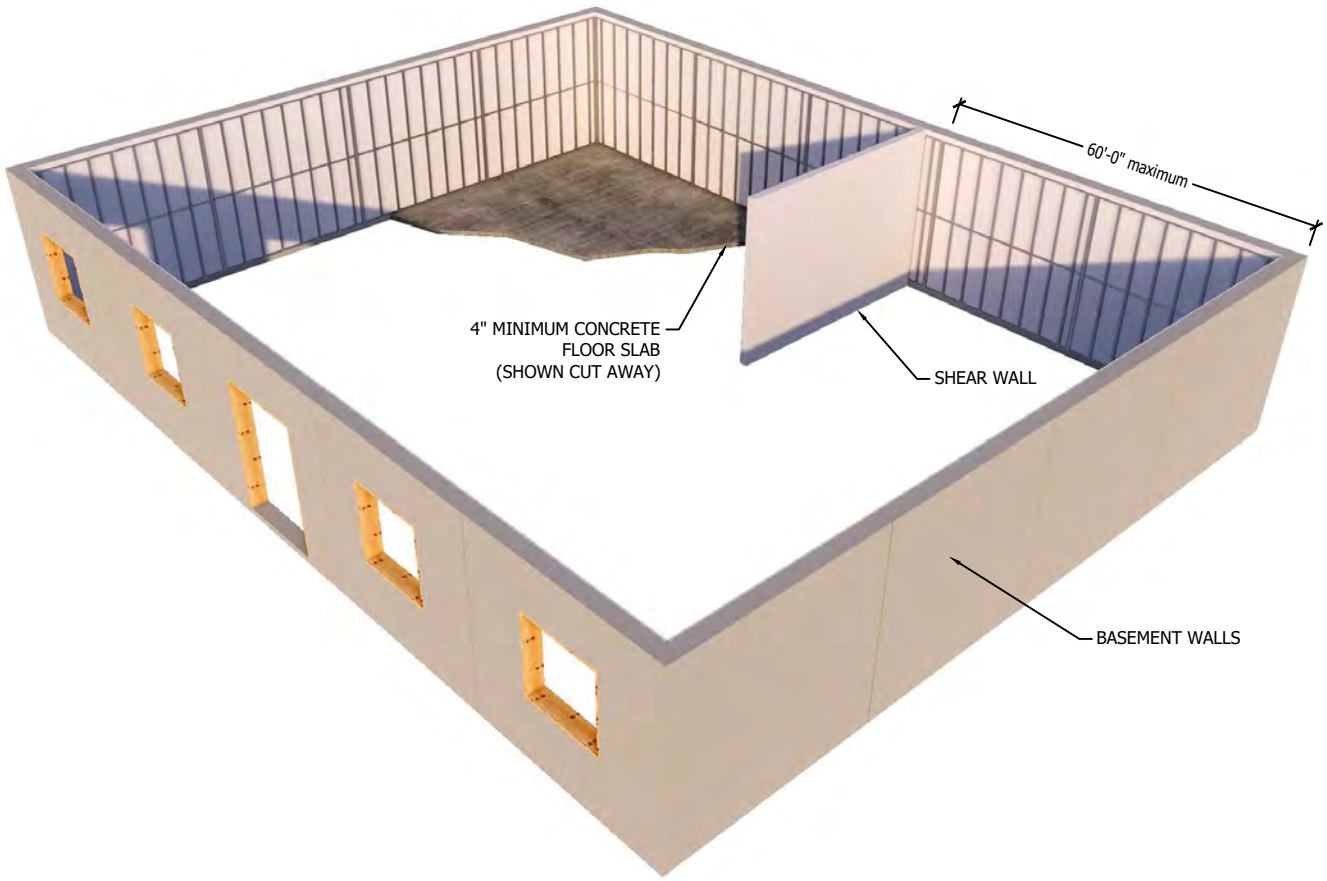

FIGURE 2 : 3D VIEW - SHEAR WALL

(FOR CONCEPT ONLY)

NOTE: VANHOOSECO DOES NOT PROVIDE LATERAL STABILITY DESIGN FOR STRUCTURES WHICH INCORPORATE THE ENVIROCAST WALLS UNLESS SPECIFICALLY CONTRACTED. THIS DESIGN IS THE RESPONSIBILITY OF THE ENGINEER OF RECORD. VANHOOSECO WILL PROVIDE INFORMATION REGARDING THE IN-PLANE (RACKING) SHEAR CAPACITY UPON REQUEST.

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SHEAR WALLS

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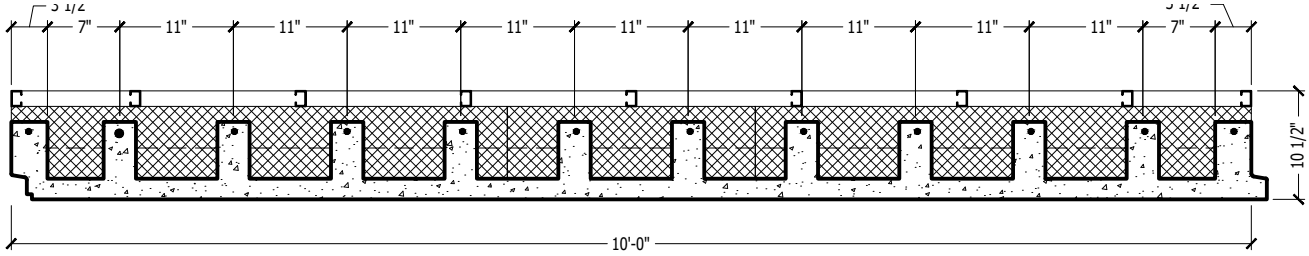
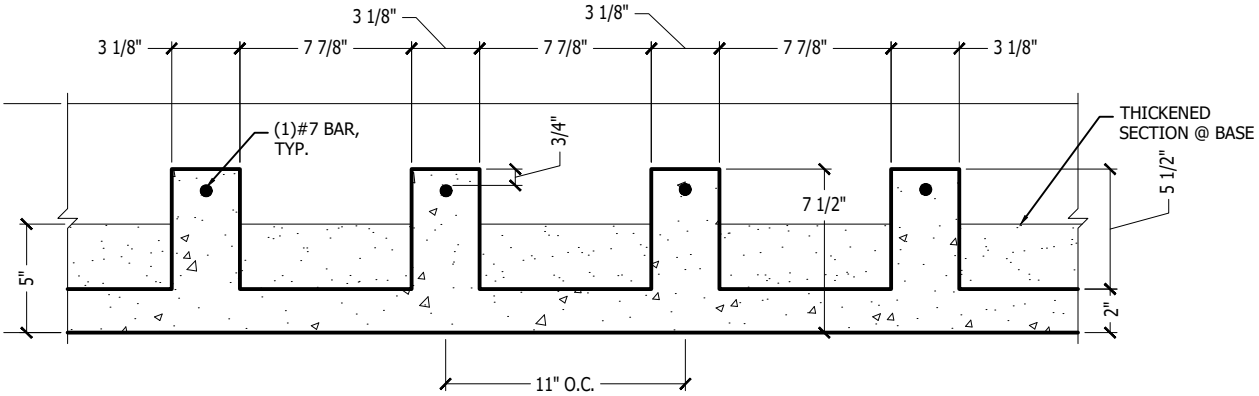


TOP VIEW / SECTION TYPICAL 13'-8" TALL BASEMENT WALL PANEL



ENLARGED DETAIL of CONCRETE RIBS

FIGURE 3 : 13'-8" TALL WALL

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13'-8" WALL PROFILE

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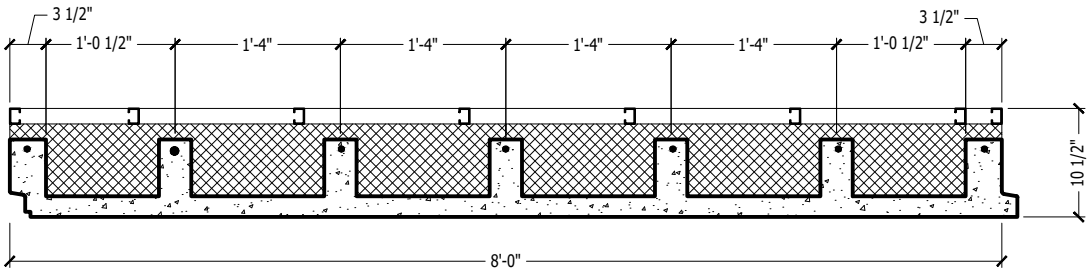
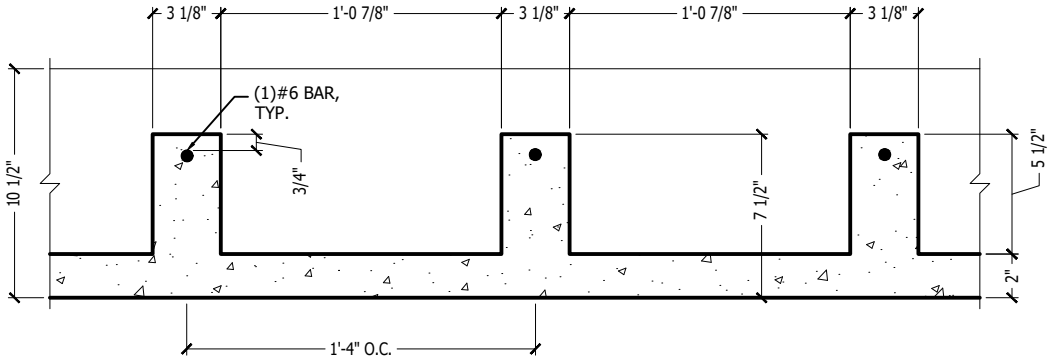


TOP VIEW / SECTION TYPICAL 12'-0" TALL BASEMENT WALL PANEL



ENLARGED DETAIL of CONCRETE RIBS

FIGURE 3A : 12'-0" TALL WALL

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12'-0" WALL PROFILE

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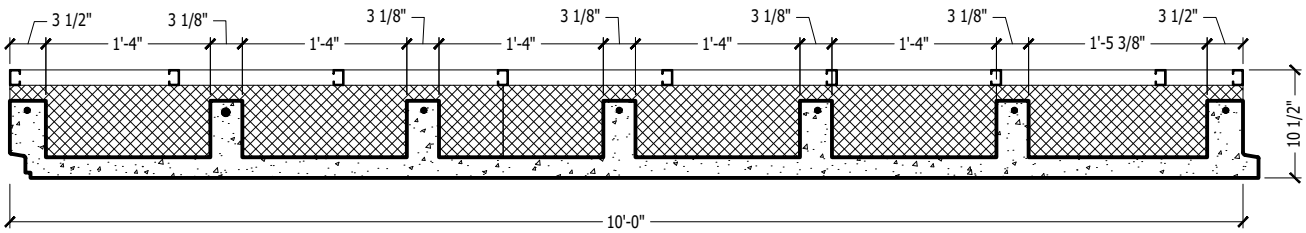
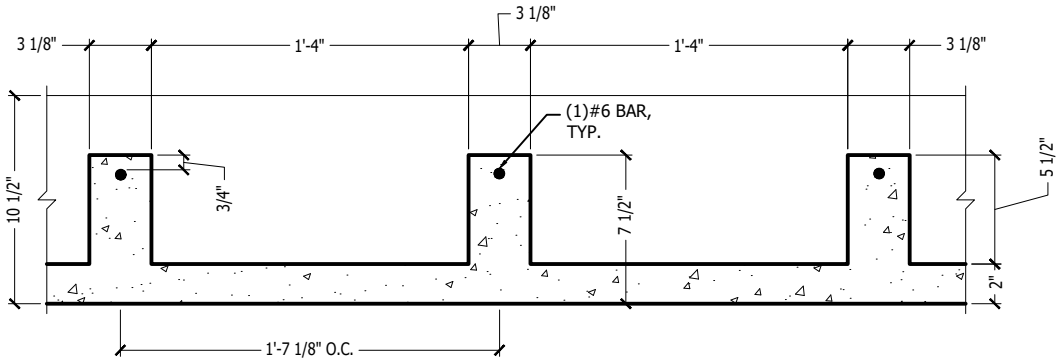


TOP VIEW / SECTION 9'-3 5/8" & 10'-0" TALL BASEMENT WALL PANEL



ENLARGED DETAIL of CONCRETE RIBS

FIGURE 4 : 9'-3 5/8", 10'-0", & 11'-0" TALL WALL

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10'-0" & 9'-3 5/8" PROFILE

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NOTE: GRADE SHALL BE SLOPED AWAY FROM WALL @ MINIMUM OF 5% FOR A MINIMUM DISTANCE OF 10 FEET.

CODE REFERENCE:
2018 IRC SECTION: R506.1
(GENERAL)

CODE REFERENCE:
2018 IRC SECTION: R506.2.2
(BASE)

CODE REFERENCE:
2018 IRC SECTION: R506.2.3
(VAPOR RETARDER)

CODE REFERENCE:
2018 IRC SECTION: R403.1.4
(MINIMUM DEPTH)

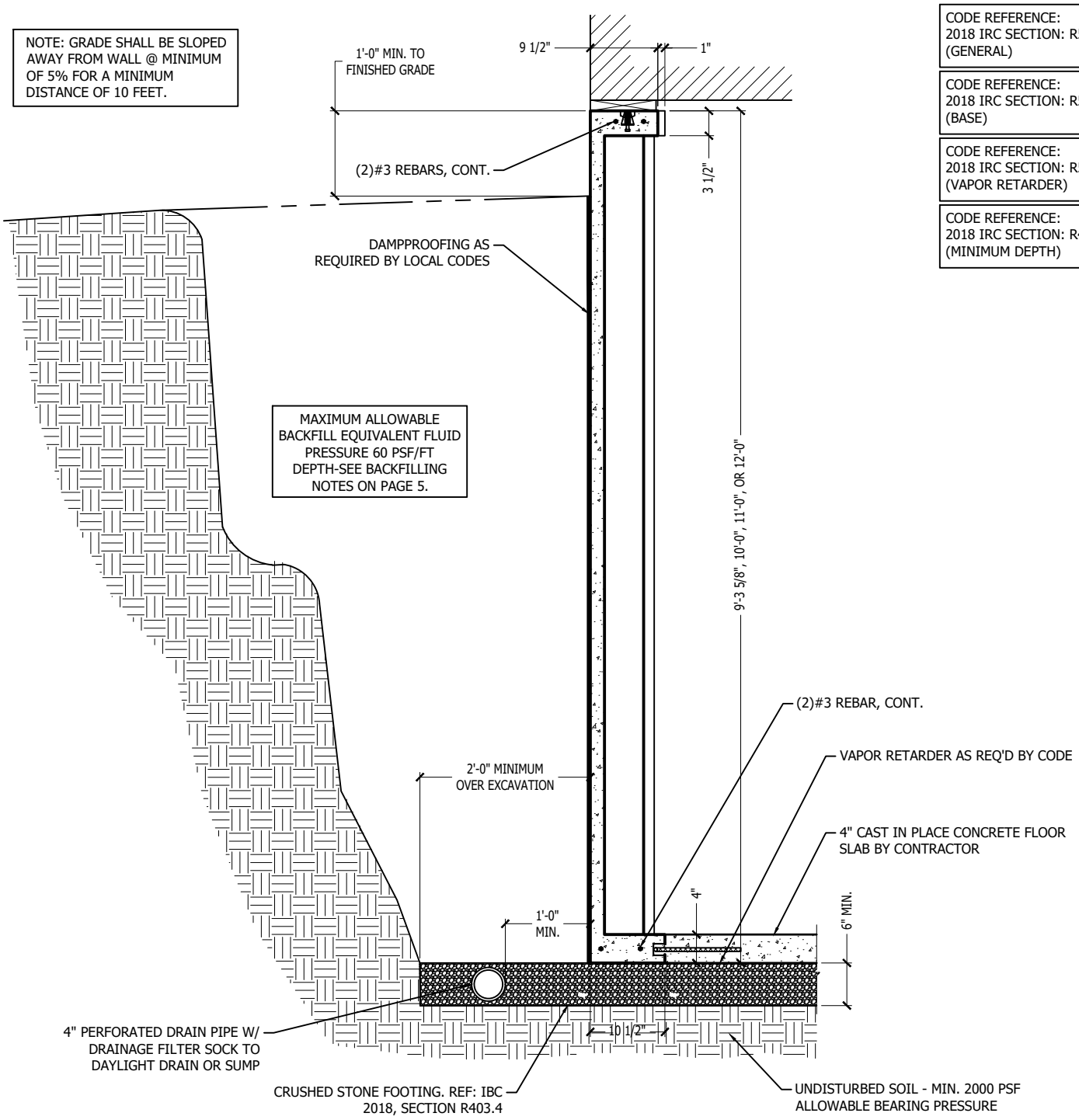

FIGURE 5 : TYPICAL WALL SECTION 9'-3 5/8", 10'-0", & 12'-0" BASEMENT WALL PANELS

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TYPICAL WALL SECTION 9'-3 5/8", 10'-0", & 12'-0" BASEMENT WALL PANELS

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NOTE: GRADE SHALL BE SLOPED AWAY FROM WALL @ MINIMUM OF 5% FOR A MINIMUM DISTANCE OF 10 FEET.

CODE REFERENCE:
2018 IRC SECTION: R506.1
(GENERAL)

CODE REFERENCE:
2018 IRC SECTION: R506.2.2
(BASE)

CODE REFERENCE:
2018 IRC SECTION: R506.2.3
(VAPOR RETARDER)

CODE REFERENCE:
2018 IRC SECTION: R403.1.4
(MINIMUM DEPTH)

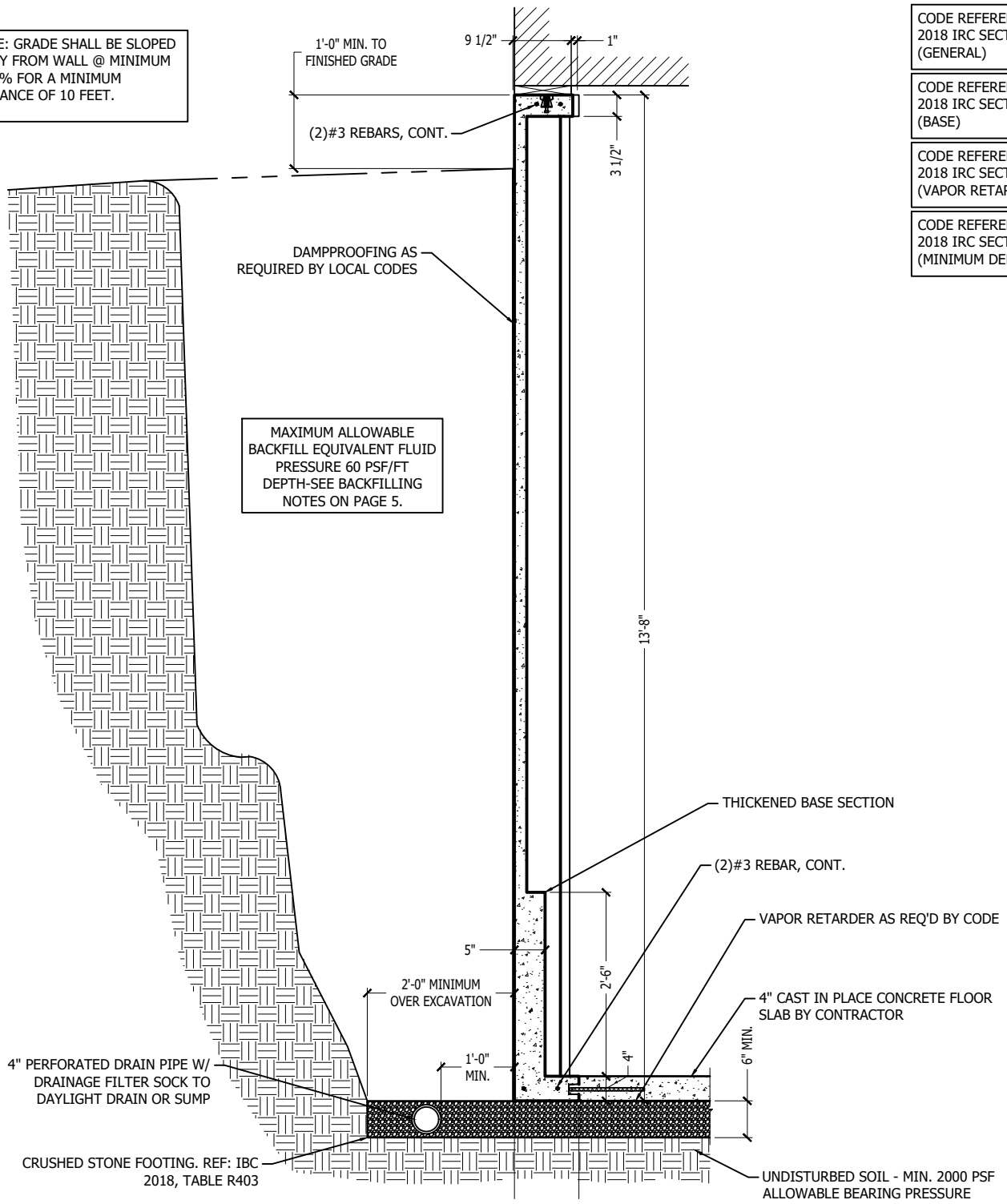

FIGURE 5A : TYPICAL WALL SECTION 13'-8" BASEMENT WALL PANELS

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TYPICAL WALL SECTION 13'-8" BASEMENT WALL PANELS

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NOTE: GRADE SHALL BE SLOPED AWAY FROM WALL @ MINIMUM OF 5% FOR A MINIMUM DISTANCE OF 10 FEET.

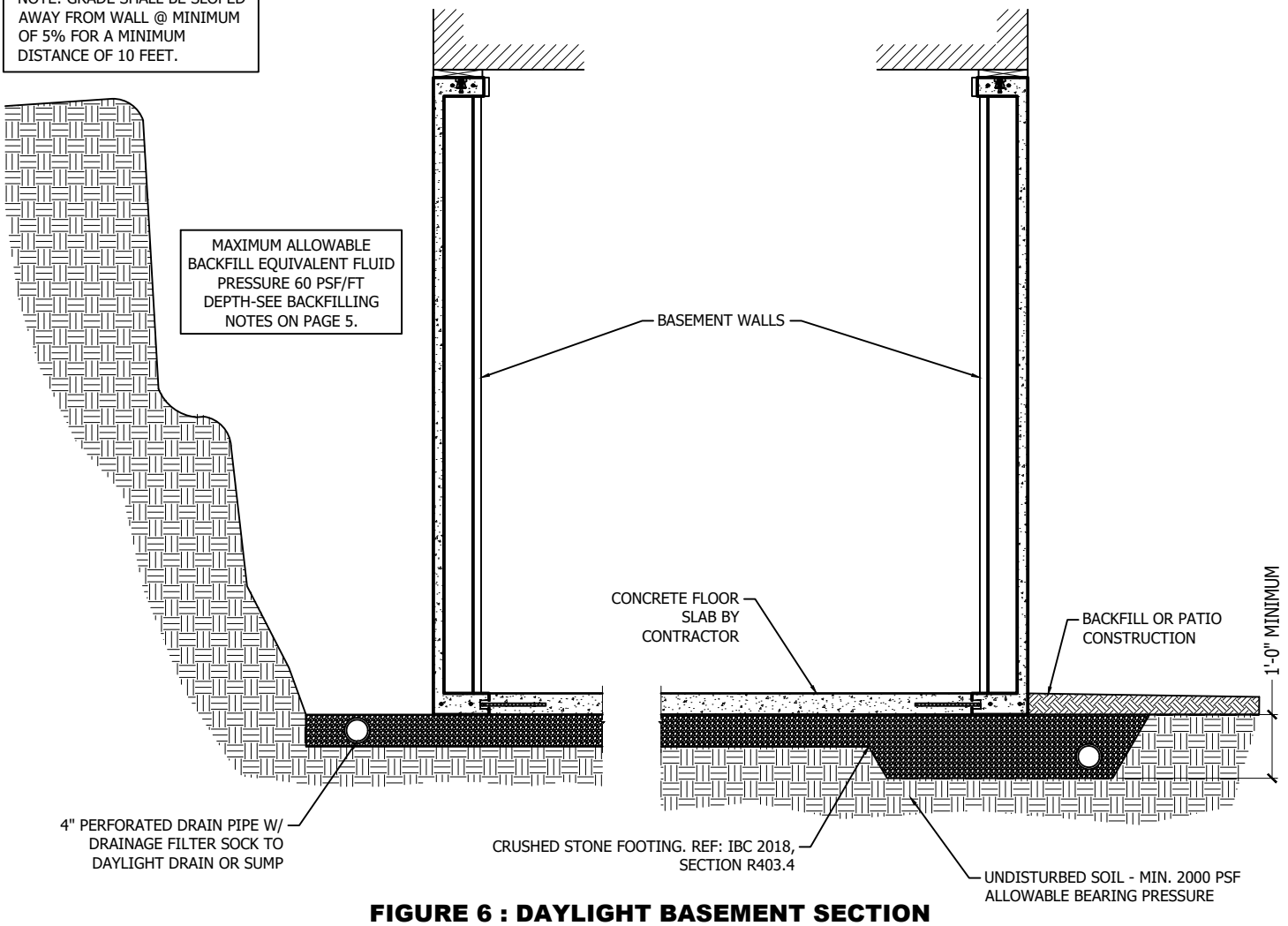

FIGURE 6 : DAYLIGHT BASEMENT SECTION

(LOW & NO FROST AREAS)

FOR DAYLIGHT BASEMENT CONSTRUCTION IN FROST AREAS CONSULT VANHOOSECO FOR REQUIREMENTS.

CODE REFERENCE:
2018 IRC SECTION: R506.1 (GENERAL)

CODE REFERENCE:
2018 IRC SECTION: R506.2.2 (BASE)

CODE REFERENCE:
2018 IRC SECTION: R506.2.3 (VAPOR RETARDER)

CODE REFERENCE:
2018 IRC SECTION: R403.1.4 (MINIMUM DEPTH)

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DAYLIGHT WALLS

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CODE REFERENCE:
2018 IRC SECTION: R703.8
(STONE & MASONRY VENEER GENERAL)

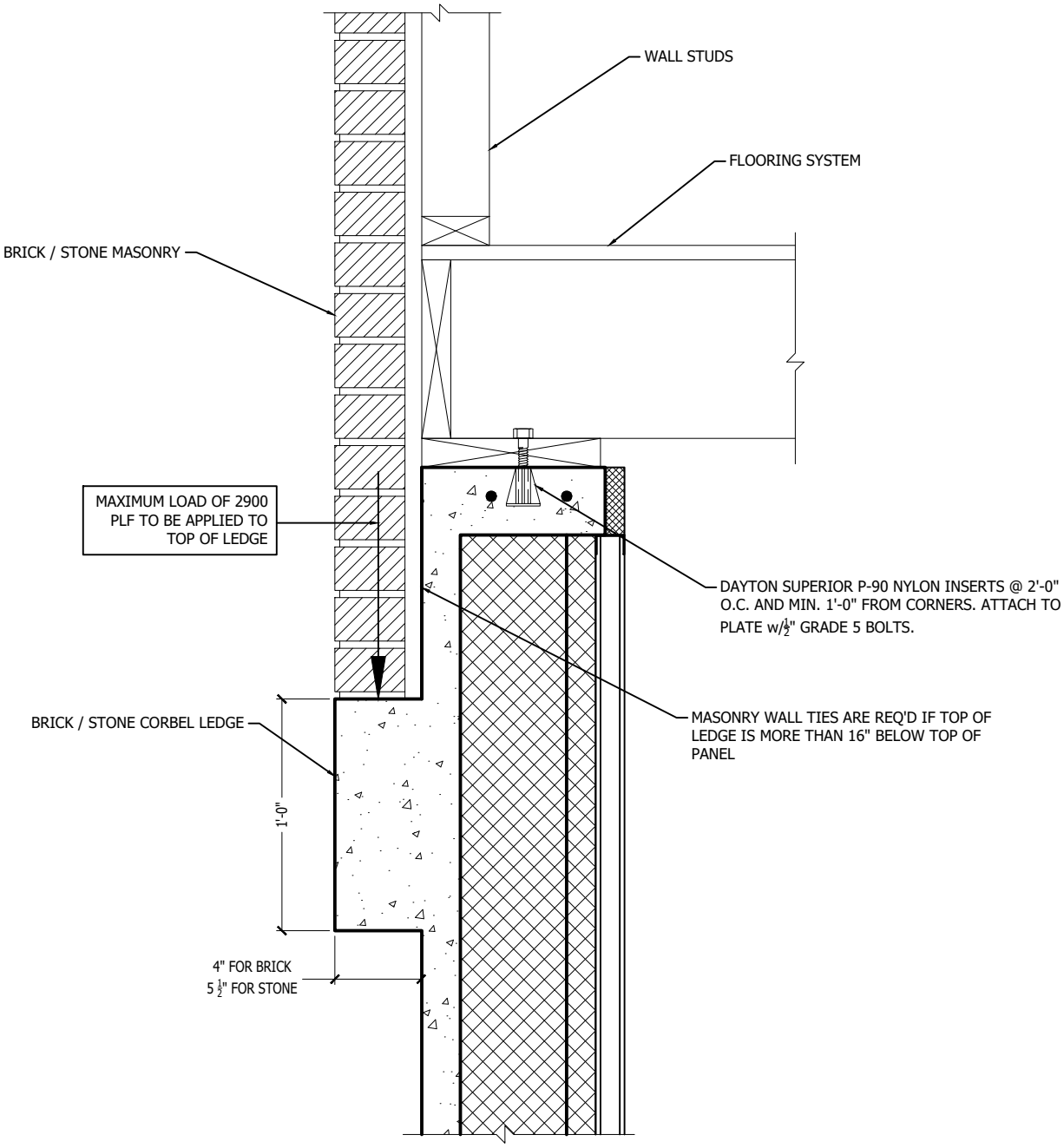

FIGURE 7 : BRICK / STONE CORBEL LEDGE DETAIL

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BRICK LEDGE

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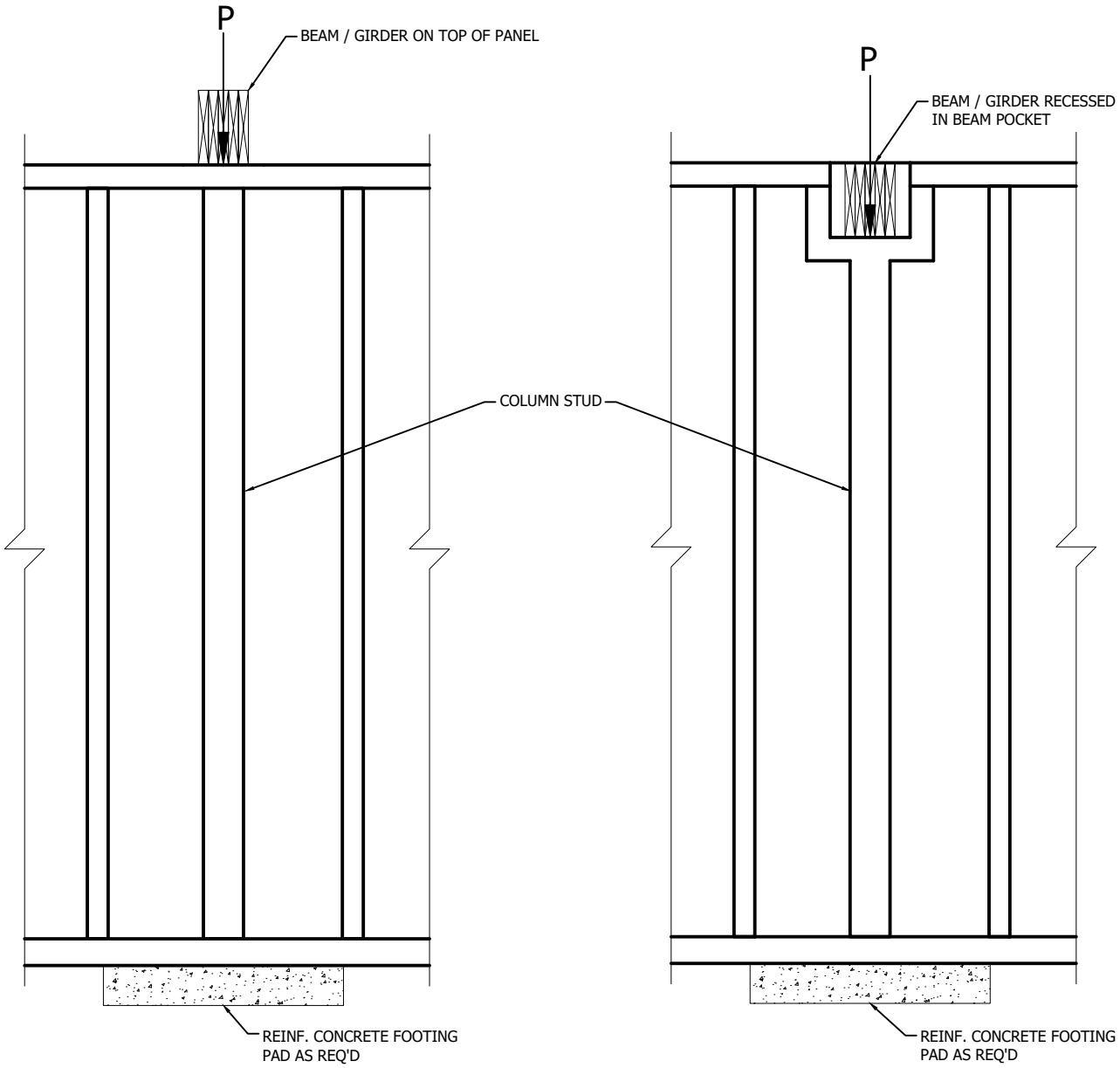

FIGURE 8 : BEAM POCKET / STUD COLUMN DETAILS

TABLE 4

Stud Column Capacity Chart

Stud Column Width	Reinforcing	Allowable Load
3 1/8"	(1)#6	10,000#
6 1/4"	(2)#6	20,000#
9 3/8"	(3)#6	30,000#

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BEAM POCKET / COLUMN STUD DETAILS

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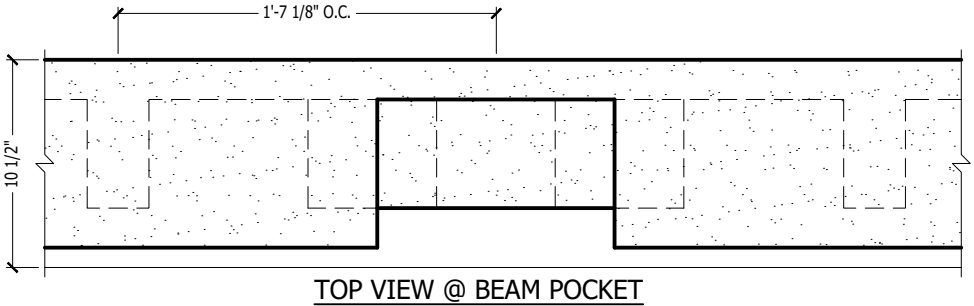
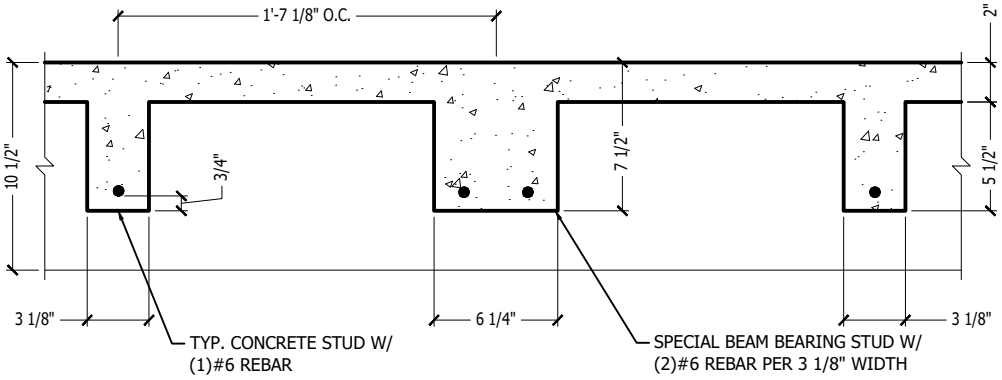


TOP VIEW @ BEAM POCKET



SECTION @ BEAM STUD

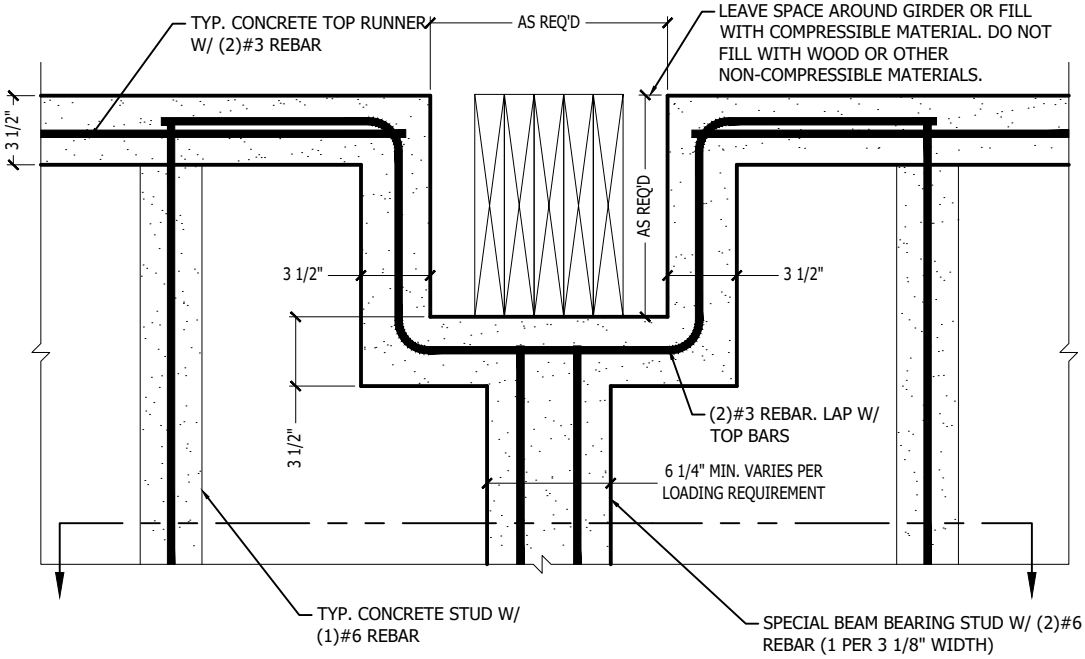


FIGURE 9 : BEAM POCKET DETAILS

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BEAM POCKET DETAILS

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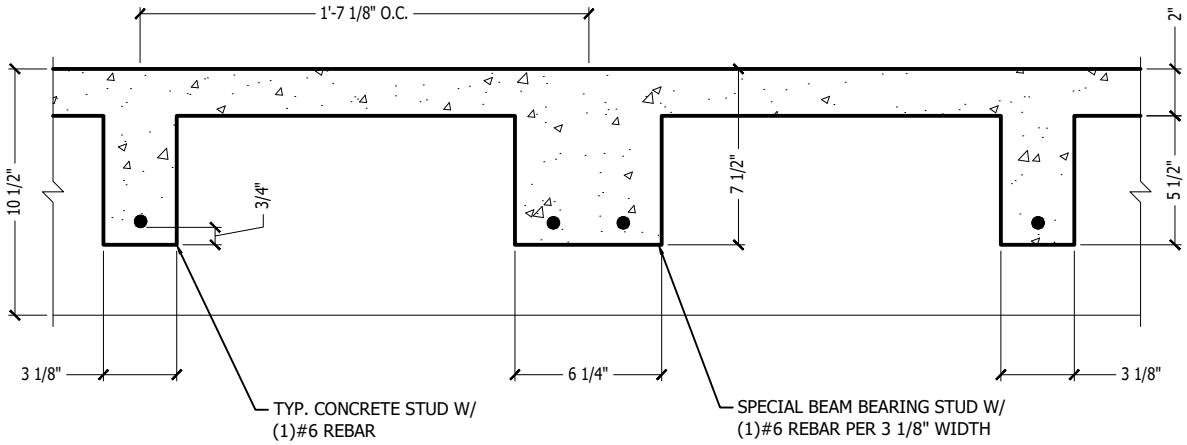

SECTION @ BEAM STUD

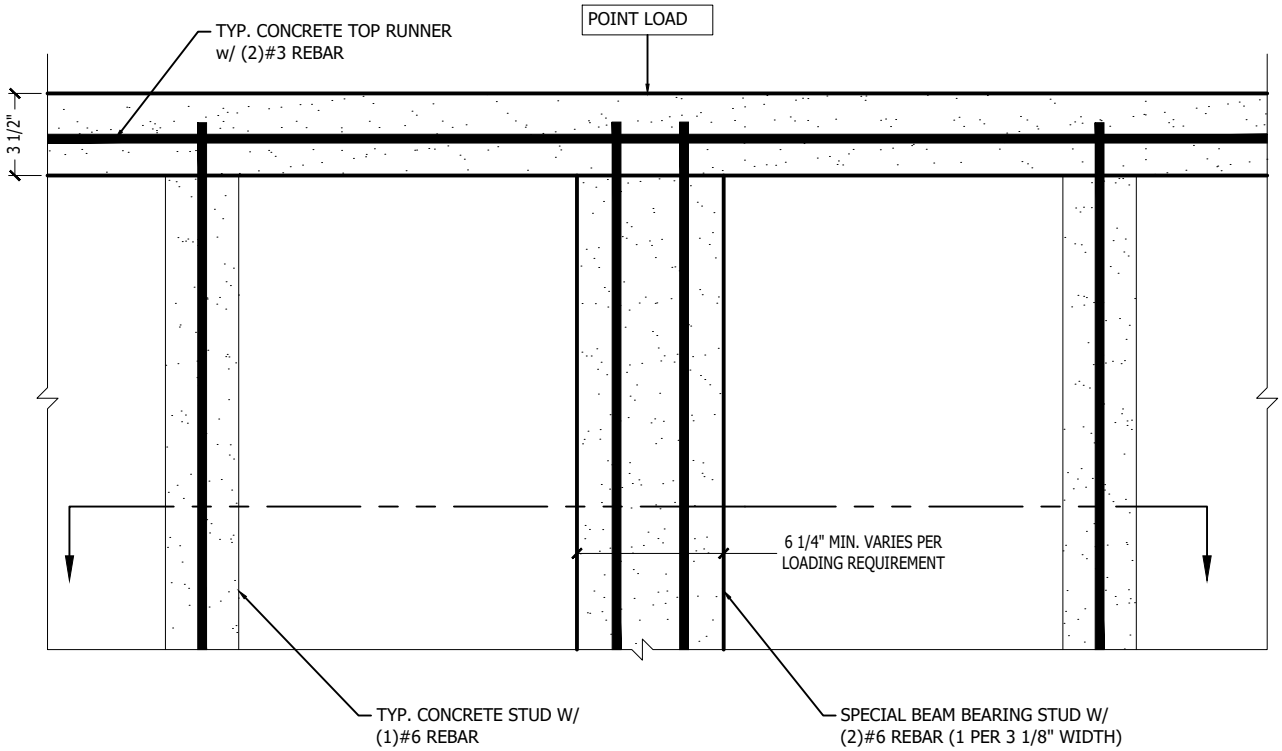

FIGURE 10 : POINT LOAD DETAIL

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COLUMN STUD DETAILS

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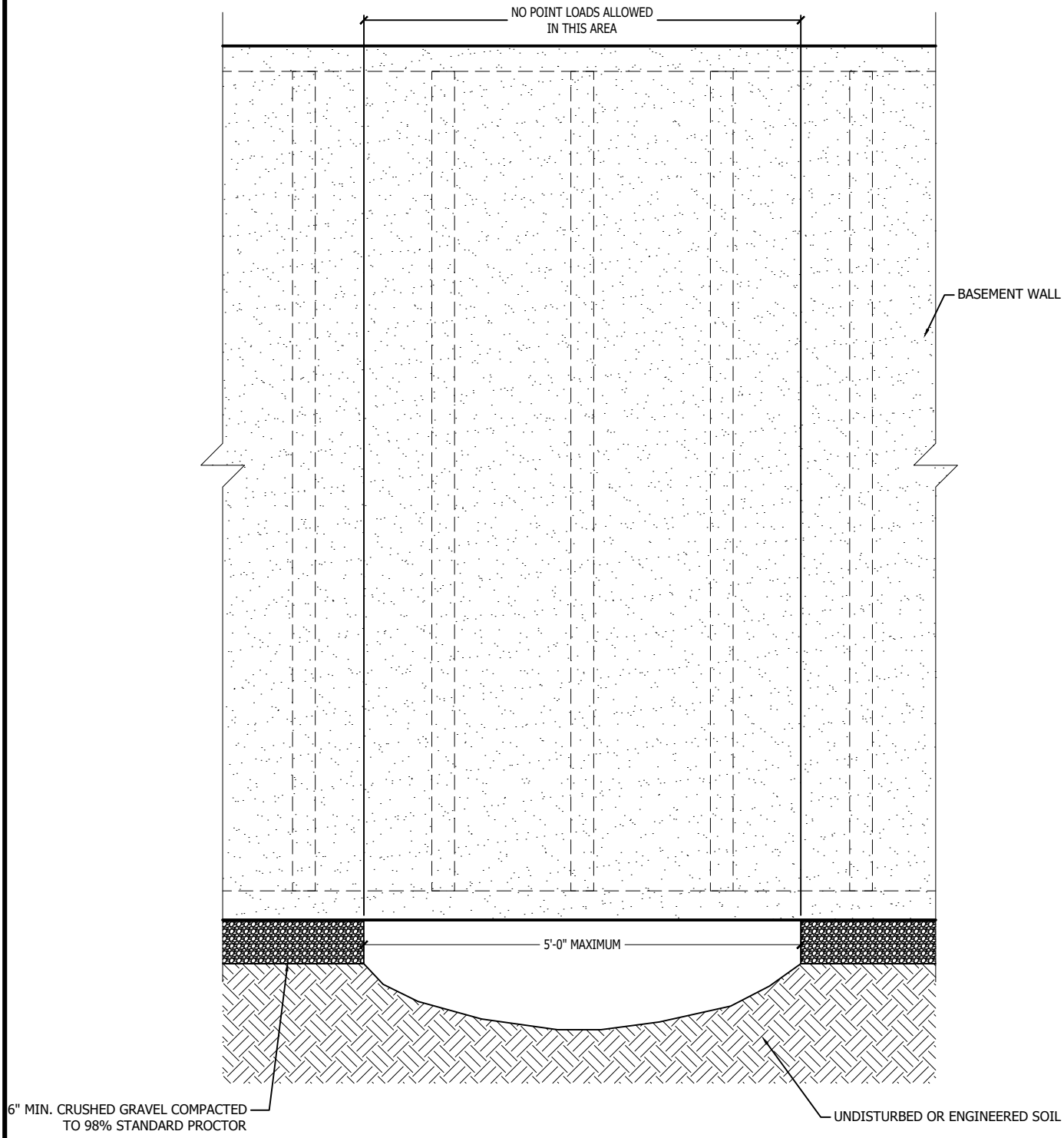

FIGURE 11 : WALL SPAN DETAIL

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WALL SPAN DETAILS

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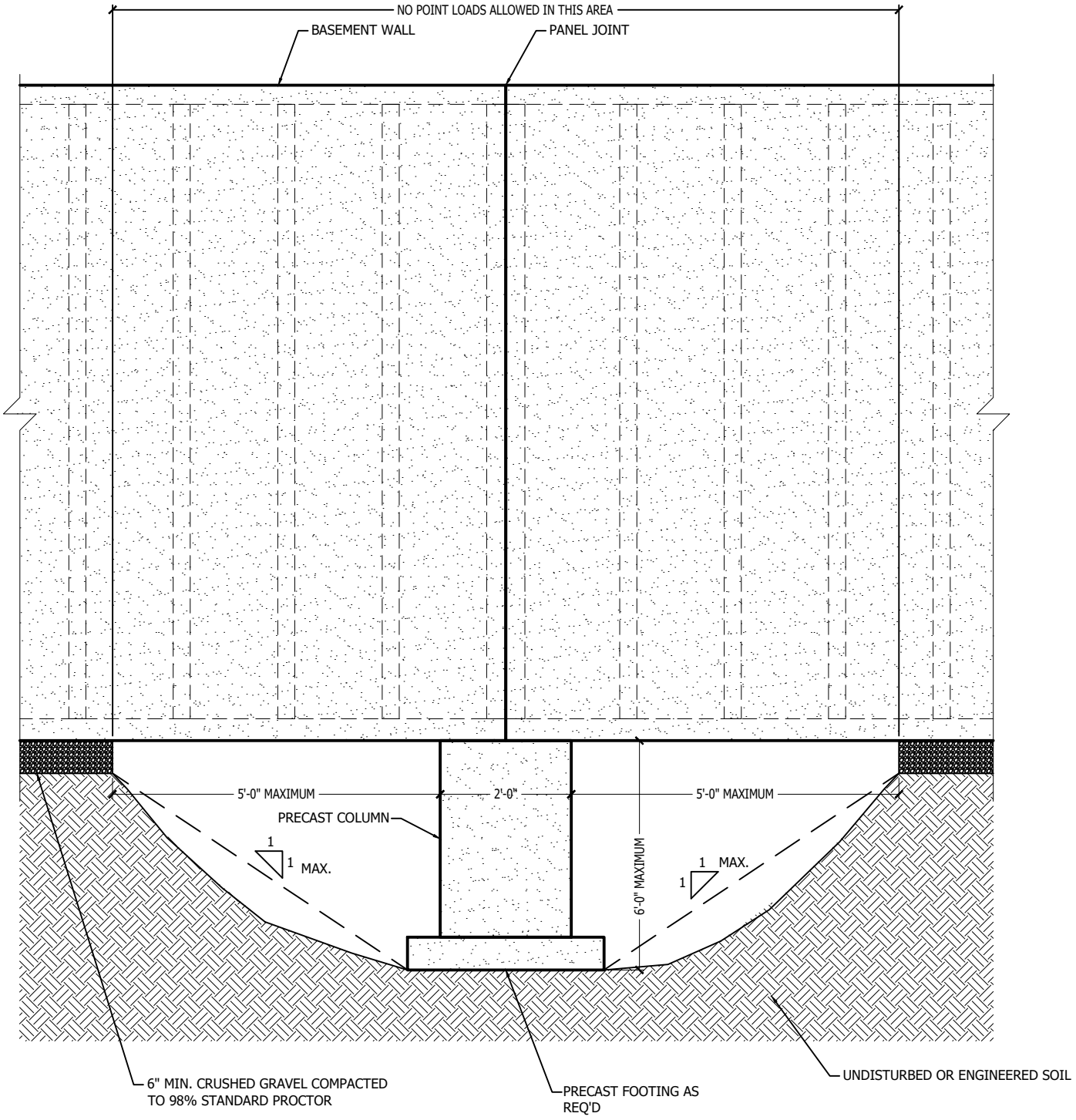

FIGURE 12 : PANEL WITH LONG SPAN OPENING

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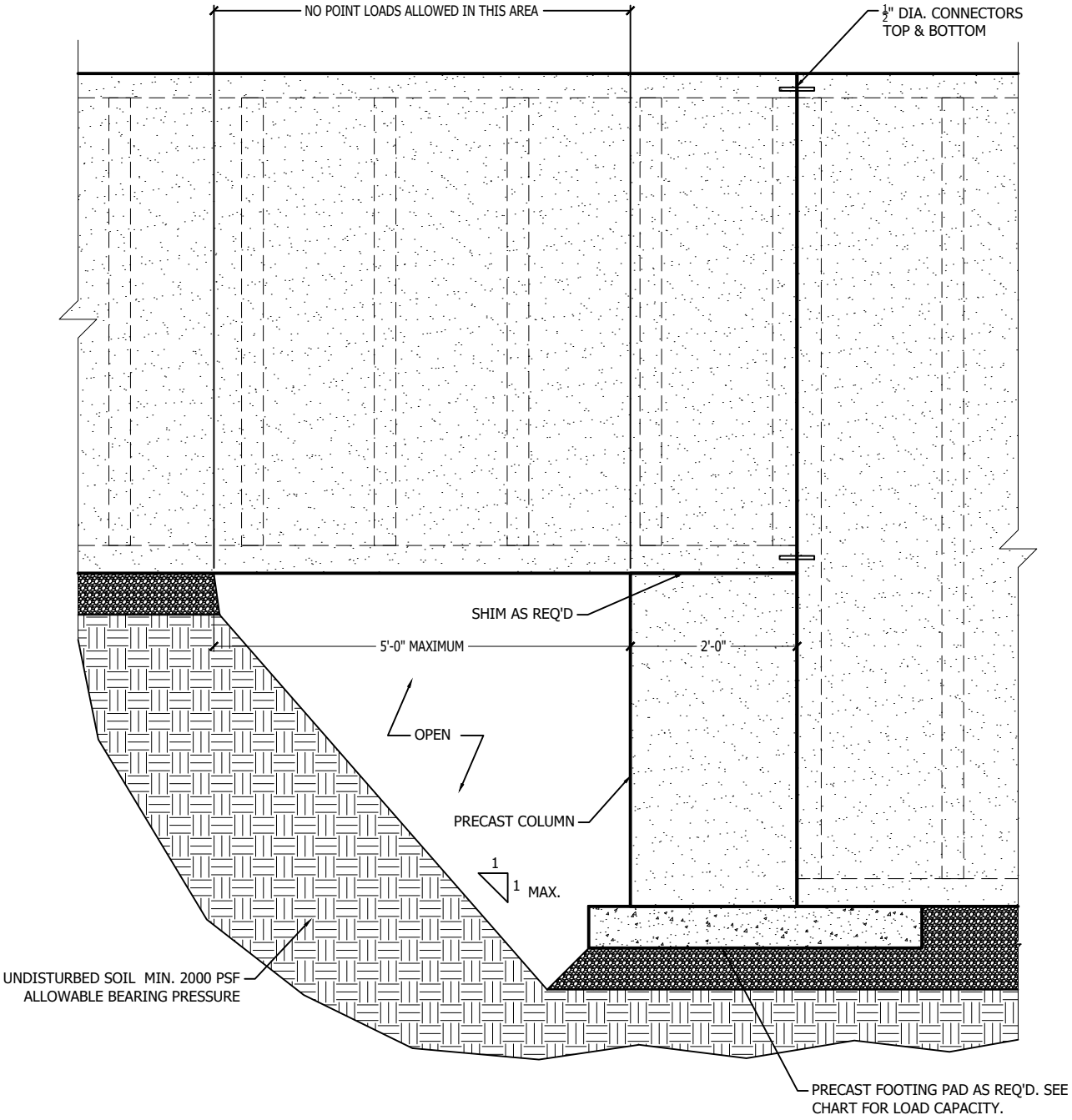

FIGURE 13 : CRAWL WALL TO BASEMENT WALL PARALLEL

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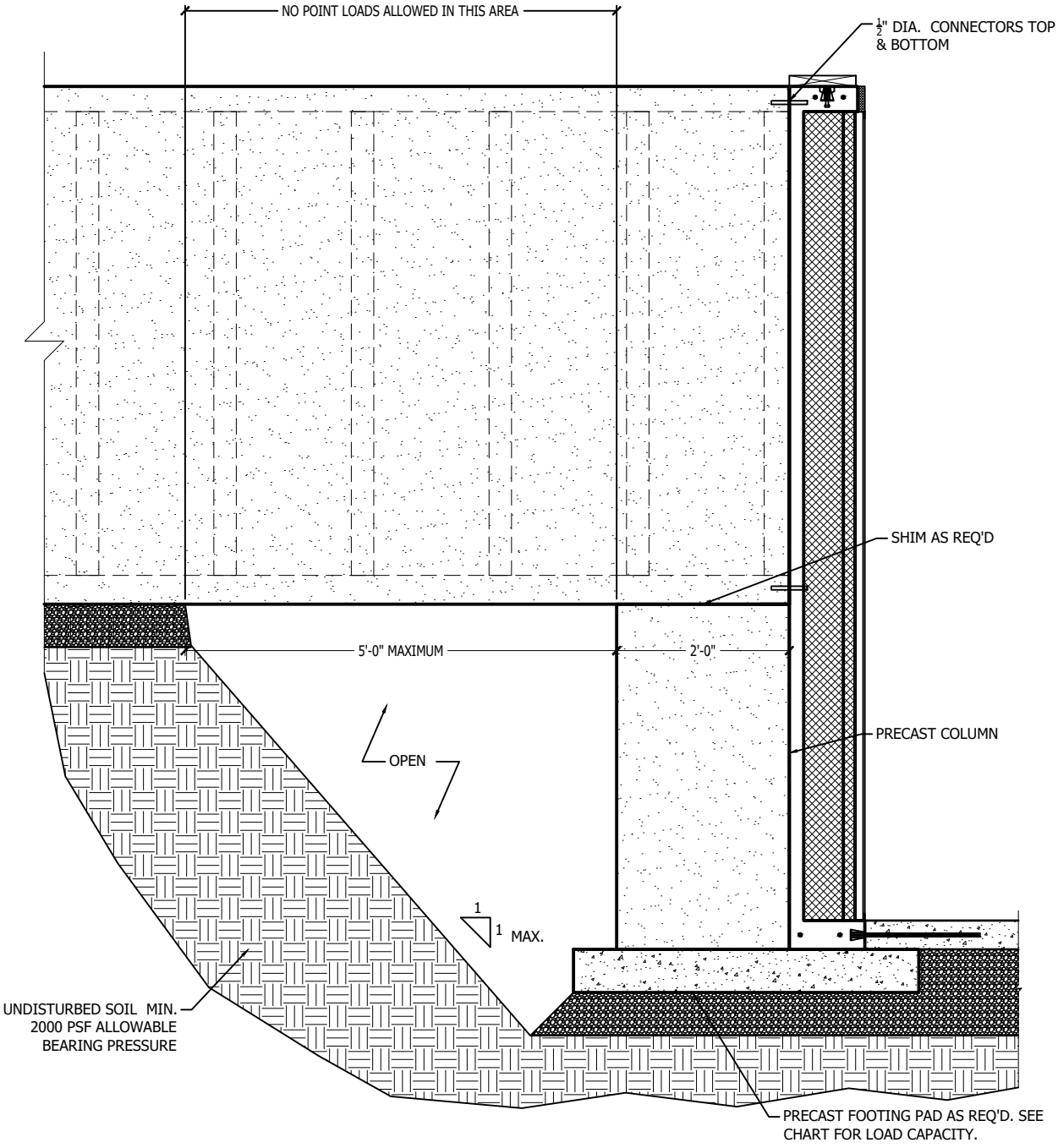

FIGURE 14 : CRAWL WALL TO BASEMENT WALL PERPENDICULAR

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COLUMN DETAILS

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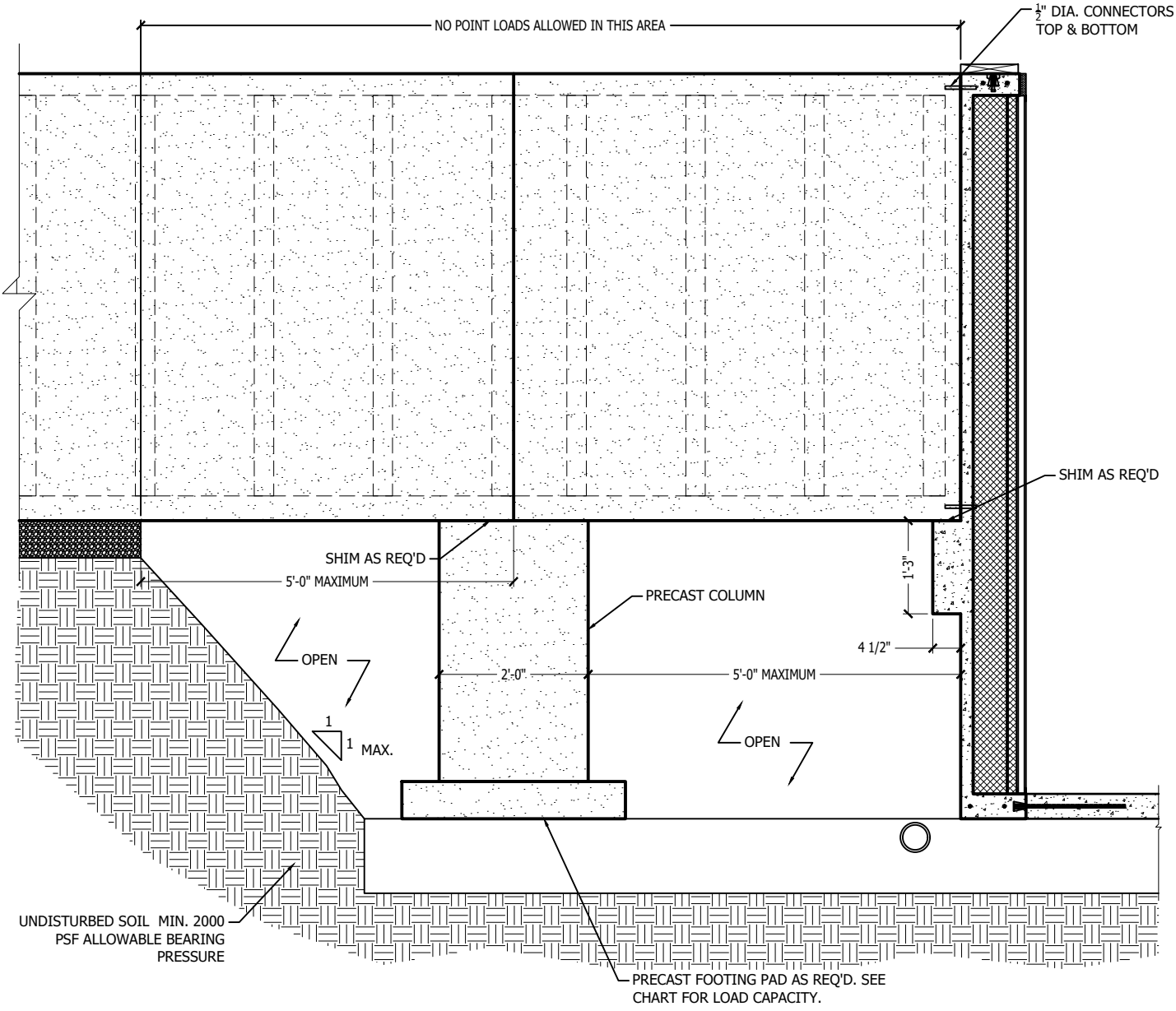

FIGURE 15 : CRAWL WALL TO BASEMENT WALL PERPENDICULAR

(LARGE OVER-EXCAVATION)

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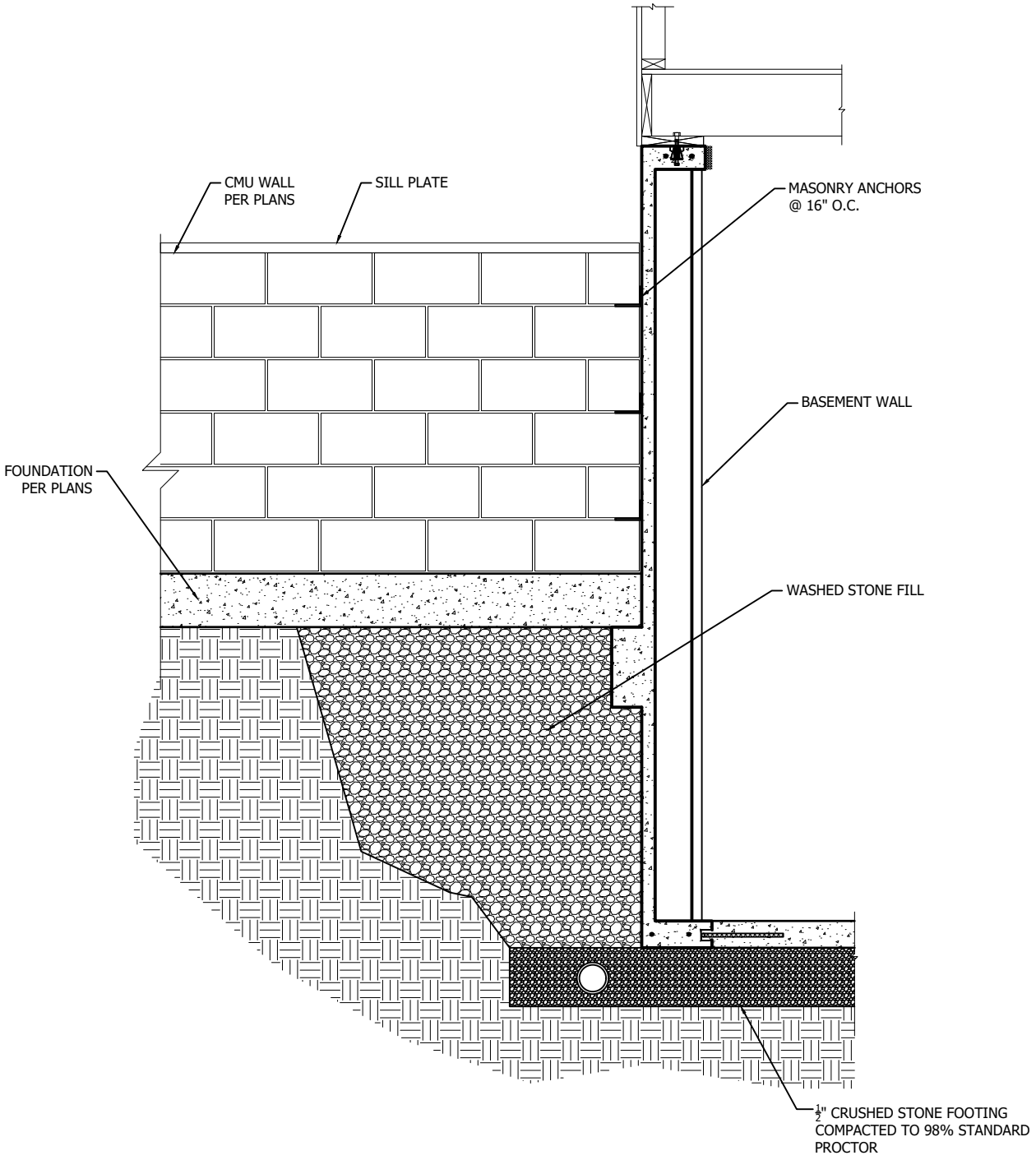

FIGURE 16 : CMU WALL TO BASEMENT WALL

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SUPPORT LEDGE

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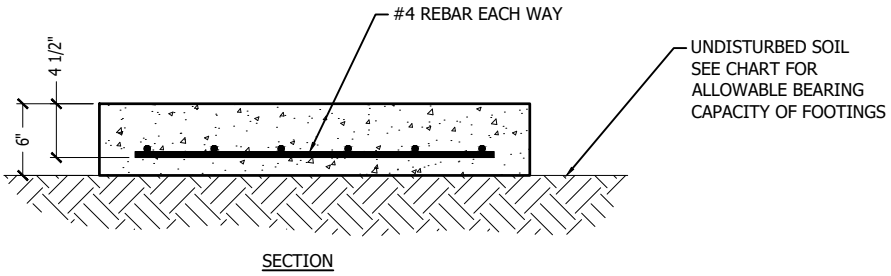

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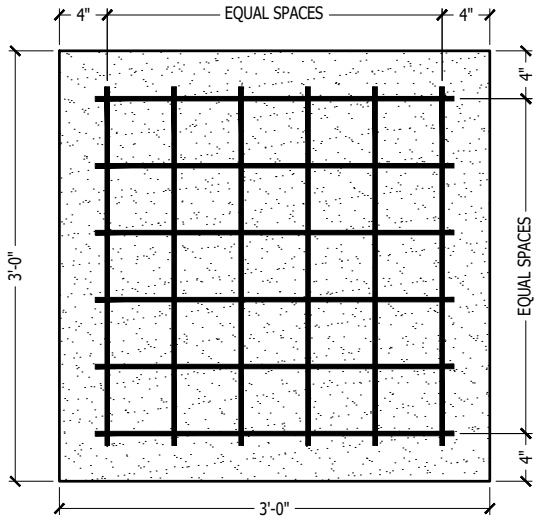

TOP VIEW

IF A FOOTING PAD BEARS ON IN SITU SOIL THEN THE SOIL MUST BE LEVEL ENOUGH TO ALLOW FOR "INTIMATE" CONTACT BETWEEN THE TOP OF THE SOIL AND THE BOTTOM FACE OF THE CONCRETE PAD.

FOOTING PADS NOT RESTING ON UNDISTURBED SOIL MAY BE SUPPORTED ON CRUSHED STONE IN ACCORDANCE WITH THE TABLES ON DRAWING SHEET 10 OF THIS MANUAL.

LOAD CAPACITY OF PRECAST FOOTING PADS IS BASED ON A MINIMUM COLUMN SIZE OF 6" SQUARE CENTERED ON THE FOOTING. OFF CENTER LOADINGS WILL REDUCE THE EFFECTIVE CAPACITY OF THE FOOTINGS. ALL ELEMENTS TRANSFERRING LOAD TO THE FOOTINGS SHALL BE POSITIVELY ATTACHED TO THE FOOTING WITH A PERMANENT CONNECTION.

FIGURE 17 : REINFORCED CONCRETE FOOTING PAD

TABLE 5: FOOTING REINFORCEMENT & CAPACITY

FOOTING SIZE	FOOTING DEPTH	REINFORCING	ALLOWABLE LOAD (2000 PSF SOIL)
2'-0"x2'-0"	6"	(4)#4 EACH WAY	8000#
2'-6"x2'-6"	6"	(5)#4 EACH WAY	12,500#
3'-0"x3'-0"	6"	(6)#4 EACH WAY	18,000#
3'-6"x3'-6"	6"	(7)#4 EACH WAY	24,500#
4'-0"x4'-0"	6"	(8)#4 EACH WAY	32,000#

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FOOTING PADS

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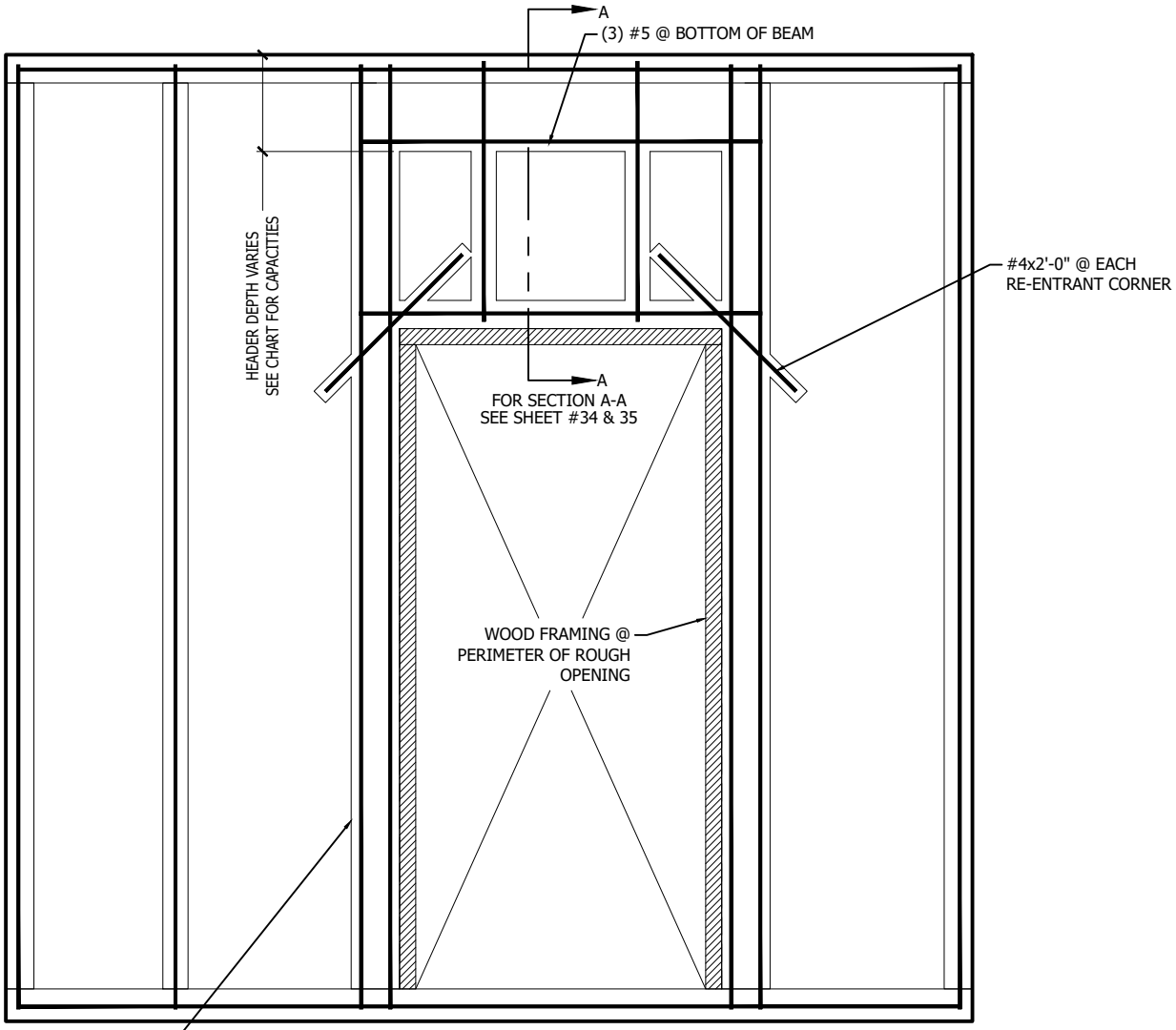

INSIDE VIEW OF PANEL WITH FORMED DOOR OPENING

(INSULATION AND METAL STUDS NOT SHOWN FOR CLARITY)

ALL LOADS INDICATED IN THESE TABLES ARE UNFACTORED SERVICE LOADS. ALL LOADS (DEAD, LIVE, ETC.) MUST BE COMBINED TO OBTAIN THE TOTAL SERVICE LOADS INDICATED.

TABLE 6

12" Header Span Table		8" Header Span Table	
Clear Span (feet)	Maximum Load (PLF)	Clear Span (feet)	Maximum Load (PLF)
4'-0"	3250	4'-0"	2100
6'-0"	2250	6'-0"	1400
8'-0"	1675	8'-0"	1050
10'-0"	1350	10'-0"	800
12'-0"	1100	12'-0"	700
14'-0"	950	14'-0"	450
16'-0"	850	16'-0"	250

CHART CAPACITIES ARE BASED ON HEADERS WITHOUT STIRRUPS. FOR HEADER CHARTS WITH STIRRUPS SEE PAGE 35.

FOR FULL CHART SEE SHEETS #34 & 35

FIGURE 18 : PANEL WITH DOOR OPENING

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DOOR OPENING DETAILS

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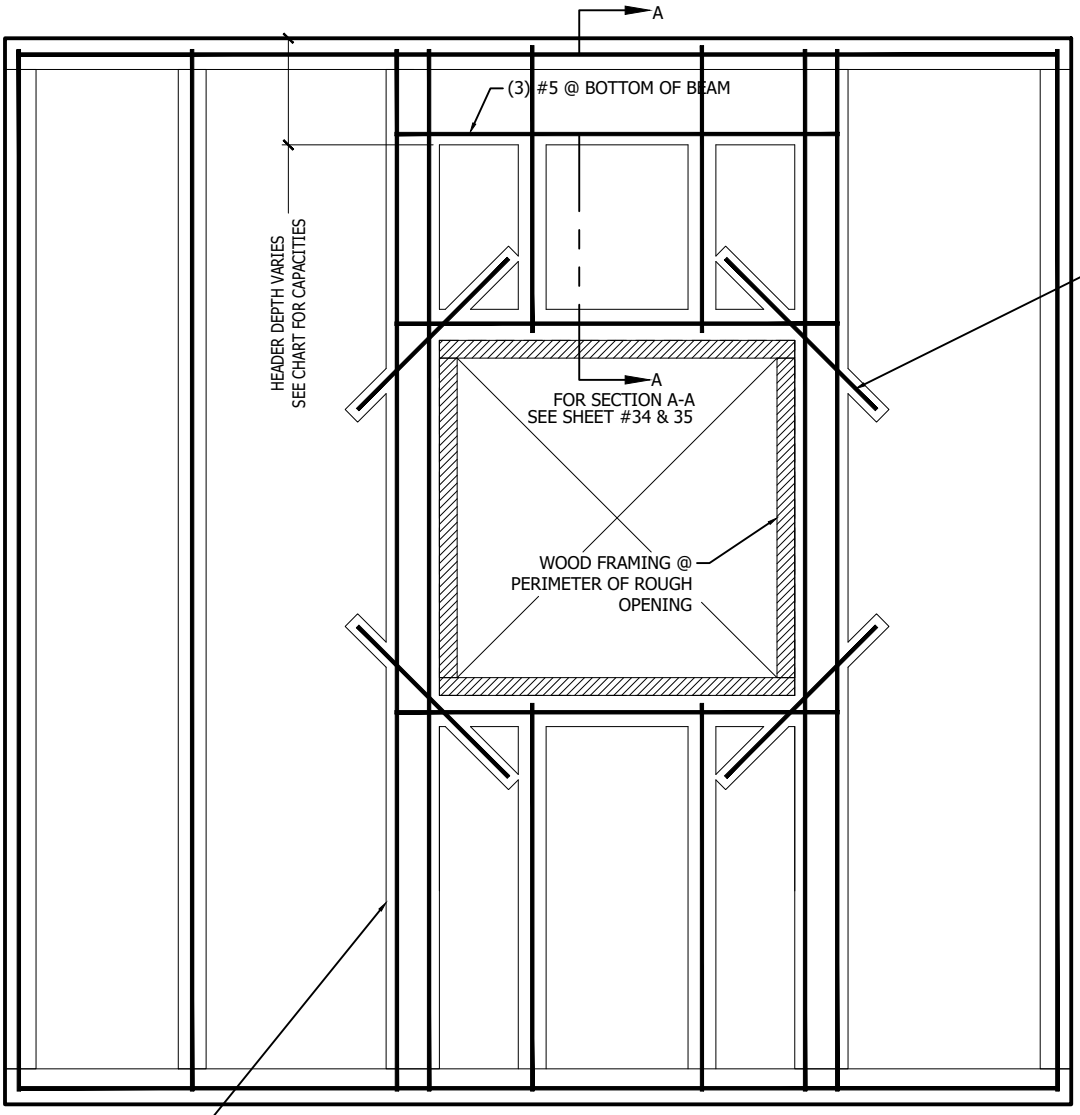

INSIDE VIEW OF PANEL WITH FORMED WINDOW OPENING
(INSULATION AND METAL STUDS NOT SHOWN FOR CLARITY)

ALL LOADS INDICATED IN THESE TABLES ARE UNFACTORED SERVICE LOADS. ALL LOADS (DEAD, LIVE, ETC.) MUST BE COMBINED TO OBTAIN THE TOTAL SERVICE LOADS INDICATED.

TABLE 7

12" Header Span Table		8" Header Span Table	
Clear Span (feet)	Maximum Load (PLF)	Clear Span (feet)	Maximum Load (PLF)
4'-0"	3250	4'-0"	2100
6'-0"	2250	6'-0"	1400
8'-0"	1675	8'-0"	1050
10'-0"	1350	10'-0"	800
12'-0"	1100	12'-0"	700
14'-0"	950	14'-0"	450
16'-0"	850	16'-0"	250

CHART CAPACITIES ARE BASED ON HEADERS WITHOUT STIRRUPS. FOR HEADER CHARTS WITH STIRRUPS SEE PAGE 35.

FOR FULL CHART SEE SHEETS #34 & 35

FIGURE 19 : PANEL WITH WINDOW OPENING

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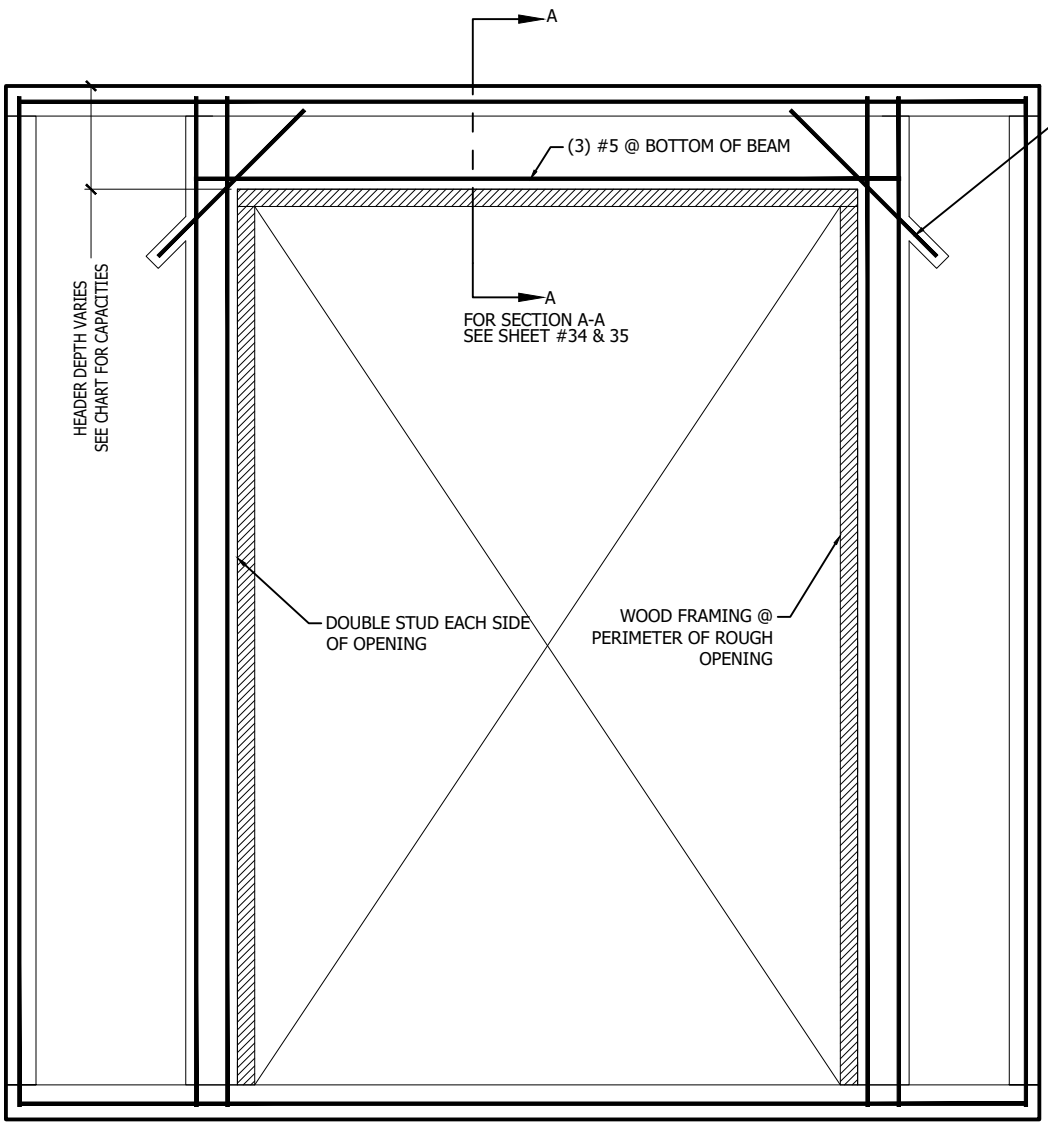

INSIDE VIEW OF PANEL WITH TALL FORMED DOOR OPENING
(INSULATION AND METAL STUDS NOT SHOWN FOR CLARITY)

ALL LOADS INDICATED IN THESE TABLES ARE UNFACTORED SERVICE LOADS. ALL LOADS (DEAD, LIVE, ETC.) MUST BE COMBINED TO OBTAIN THE TOTAL SERVICE LOADS INDICATED.

TABLE 8

12" Header Span Table		8" Header Span Table	
Clear Span (feet)	Maximum Load (PLF)	Clear Span (feet)	Maximum Load (PLF)
4'-0"	3250	4'-0"	2100
6'-0"	2250	6'-0"	1400
8'-0"	1675	8'-0"	1050
10'-0"	1350	10'-0"	800
12'-0"	1100	12'-0"	700
14'-0"	950	14'-0"	450
16'-0"	850	16'-0"	250

CHART CAPACITIES ARE BASED ON HEADERS WITHOUT STIRRUPS. FOR HEADER CHARTS WITH STIRRUPS SEE PAGE 35.

FOR FULL CHART SEE SHEETS #34 & 35

FIGURE 20 : PANEL WITH DOOR OPENING

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DOOR OPENING DETAILS

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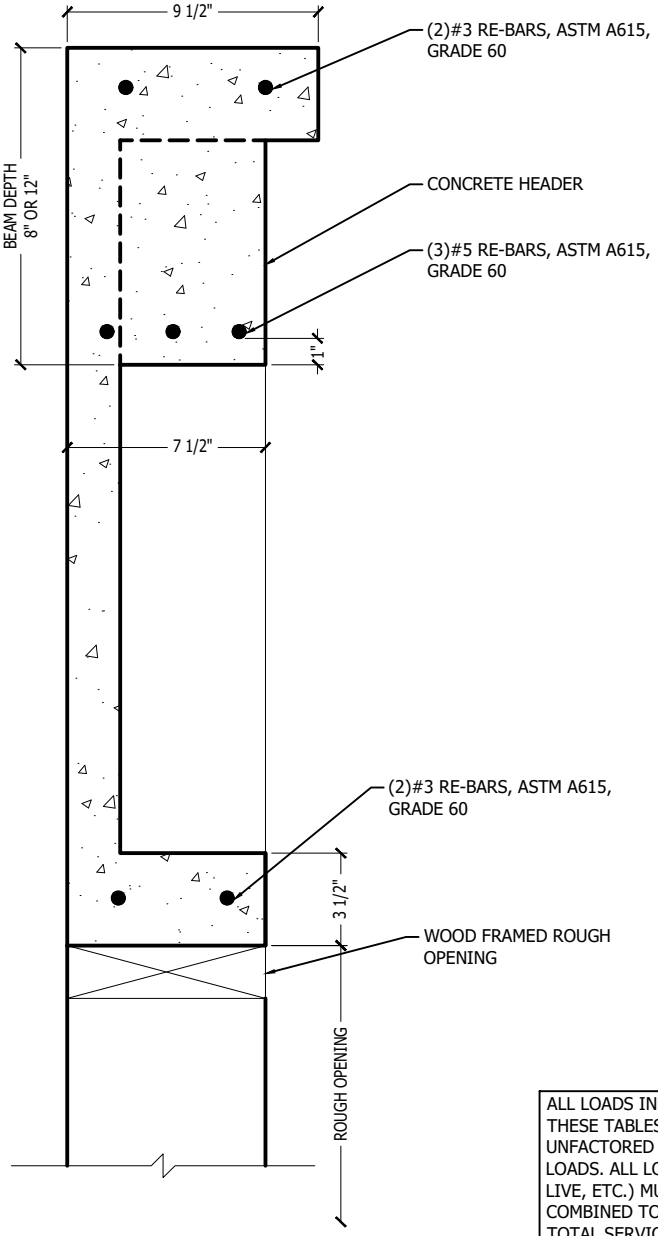

ALL LOADS INDICATED IN THESE TABLES ARE UNFACTORED SERVICE LOADS. ALL LOADS (DEAD, LIVE, ETC.) MUST BE COMBINED TO OBTAIN THE TOTAL SERVICE LOADS INDICATED.

FIGURE 21a : HEADER SECTION A-A

(INSULATION AND METAL STUDS NOT SHOWN FOR CLARITY)

TABLE 9

12" HEADER SPAN TABLE

Clear Span (feet)	Maximum Load (PLF)
3'-0"	4500
3'-6"	3750
4'-0"	3250
4'-6"	3000
5'-0"	2700
5'-6"	2400
6'-0"	2250
6'-6"	2000
7'-0"	1900
7'-6"	1750
8'-0"	1675
8'-6"	1500
9'-0"	1450
10'-0"	1350
11'-0"	1200
12'-0"	1100
13'-0"	1000
14'-0"	950
15'-0"	900
16'-0"	800

8" HEADER SPAN TABLE

Clear Span (feet)	Maximum Load (PLF)
3'-0"	2800
3'-6"	2400
4'-0"	2100
4'-6"	1850
5'-0"	1700
5'-6"	1500
6'-0"	1400
6'-6"	1300
7'-0"	1200
7'-6"	1100
8'-0"	1050
8'-6"	1000
9'-0"	900
10'-0"	800
11'-0"	750
12'-0"	700
13'-0"	600
14'-0"	450
15'-0"	300
16'-0"	250

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HEADER DETAILS

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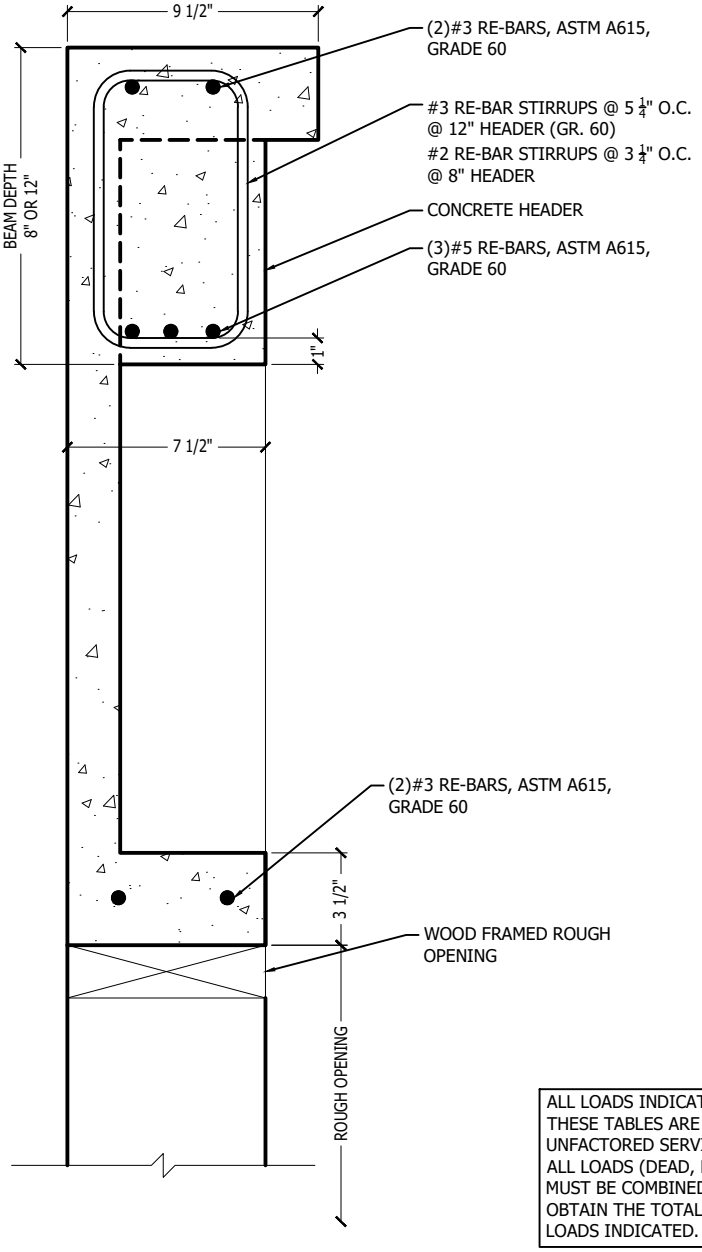

ALL LOADS INDICATED IN THESE TABLES ARE UNFACTORED SERVICE LOADS. ALL LOADS (DEAD, LIVE, ETC.) MUST BE COMBINED TO OBTAIN THE TOTAL SERVICE LOADS INDICATED.

FIGURE 21b : HEADER SECTION A-A

(INSULATION AND METAL STUDS NOT SHOWN FOR CLARITY)

TABLE 10

12" HEADER SPAN TABLE

Clear Span (feet)	Maximum Load (PLF)
3'-0"	6000
3'-6"	6000
4'-0"	6000
4'-6"	6000
5'-0"	6000
5'-6"	6000
6'-0"	6000
6'-6"	5150
7'-0"	4450
7'-6"	3850
8'-0"	3400
8'-6"	3000
9'-0"	2700
10'-0"	2150
11'-0"	1800
12'-0"	1500
13'-0"	1300
14'-0"	1100
15'-0"	950
16'-0"	850

8" HEADER SPAN TABLE

Clear Span (feet)	Maximum Load (PLF)
3'-0"	6000
3'-6"	5900
4'-0"	5200
4'-6"	4650
5'-0"	4150
5'-6"	3800
6'-0"	3500
6'-6"	3100
7'-0"	2650
7'-6"	2300
8'-0"	2000
8'-6"	1800
9'-0"	1600
10'-0"	1300
11'-0"	1050
12'-0"	900
13'-0"	600
14'-0"	450
15'-0"	300
16'-0"	250

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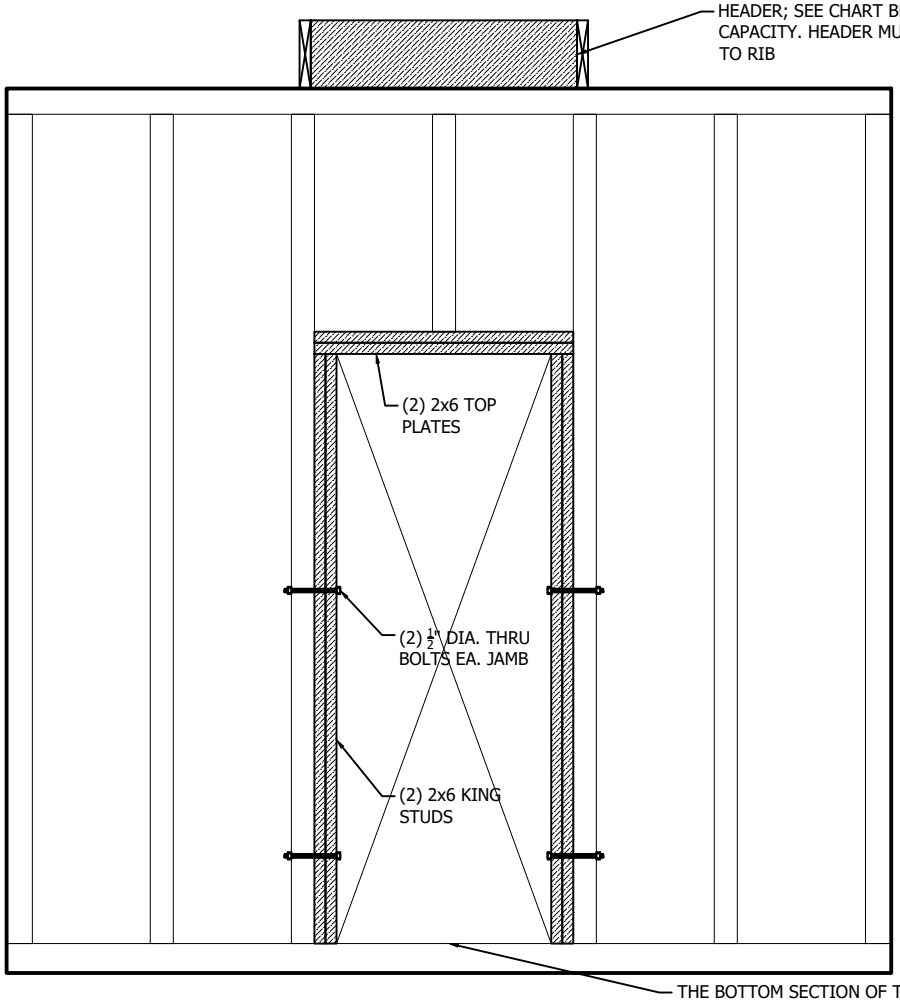

UNFORMED DOOR OPENING DETAIL

ALL LOADS INDICATED IN THESE TABLES ARE UNFACTORED SERVICE LOADS. ALL LOADS (DEAD, LIVE, ETC.) MUST BE COMBINED TO OBTAIN THE TOTAL SERVICE LOADS INDICATED.

Notes:

1) Consult VANHOOSECO for all openings cut after fabrication
2) All lumber to be pressure treated
3) No openings to be cut under a point load
4) Shim as required to provide tight fit between cut rib and wood
5) Locate thru bolts at 1/4 points
6) All fasteners to be hot dipped galvanized or stainless steel.

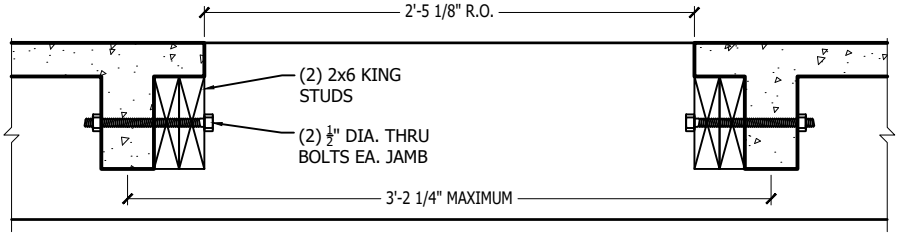

TABLE 11	
Wood Header Load Table	
(3) 2X10	2400
(2) 2X10	1700
(1) 2X10	900

SECTION @ DOOR OPENING

(DIMENSIONS SHOWN ARE FOR 10'-0" BASEMENT WALLS)

FIGURE 22 : UNFORMED DOOR OPENING

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CUT IN DOOR OPENING

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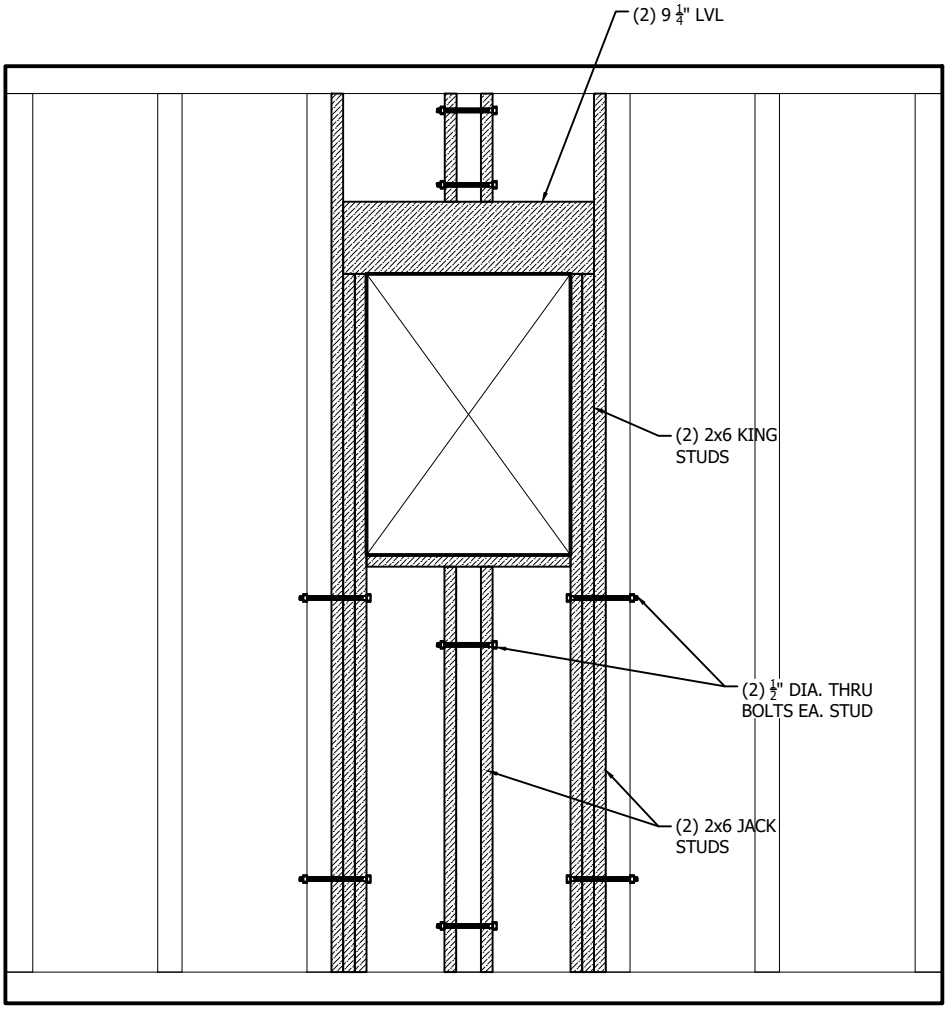

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UNFORMED WINDOW OPENING

Notes:

1) Consult VANHOOSECO for all openings cut after fabrication
2) All lumber to be pressure treated
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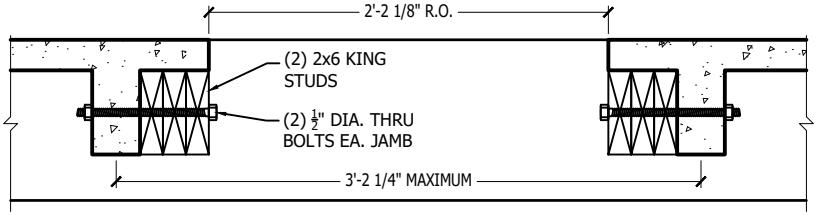

SECTION @ WINDOW OPENING

(DIMENSIONS SHOWN ARE FOR 10'-0" BASEMENT WALLS)

FIGURE 23 : UNFORMED WINDOW OPENING

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CUT IN WINDOW OPENING

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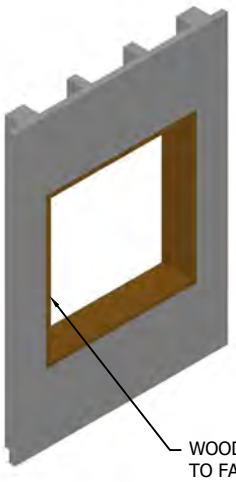
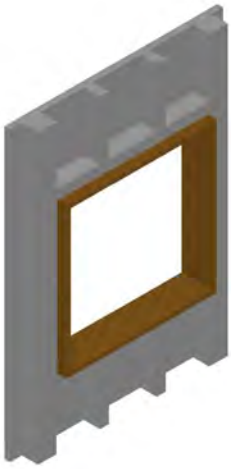
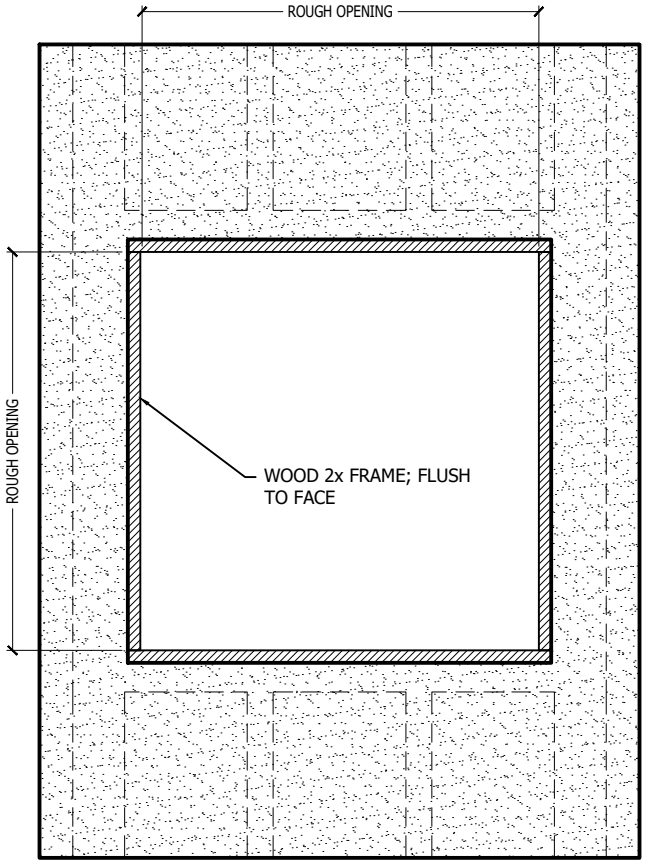


OUTSIDE ISOMETRIC

INSULATION & METAL STUD FRAME NOT SHOWN FOR CLARITY



INSIDE ISOMETRIC



ELEVATION

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WINDOW OPENING STYLE 1

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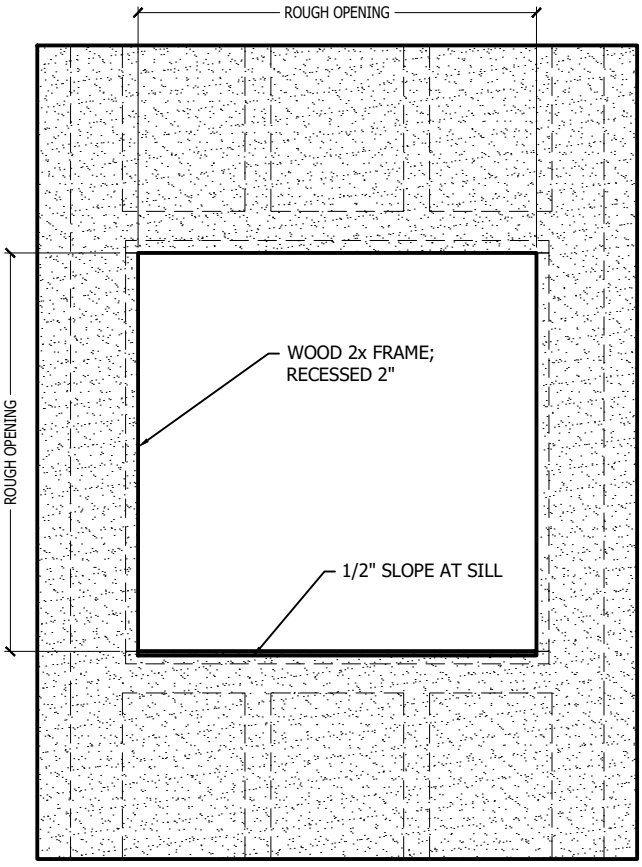
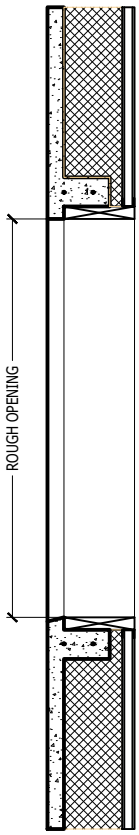
OUTSIDE ISOMETRIC

INSULATION & METAL STUD FRAME NOT SHOWN FOR CLARITY

INSIDE ISOMETRIC



ELEVATION



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WINDOW OPENING STYLE 2

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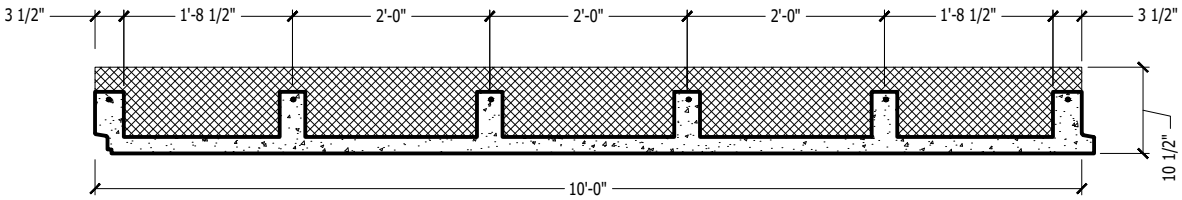
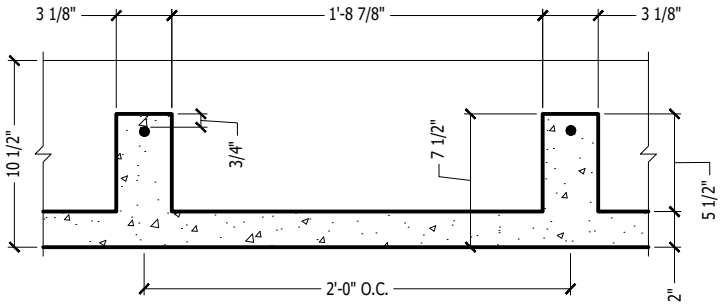


TOP VIEW / SECTION TYPICAL 6'-0" TALL CRAWL WALL PANEL



ENLARGED DETAIL of CONCRETE RIBS

FIGURE 24 : 6'-0" TALL CRAWL WALL

NOTE: CRAWL WALL PANELS DO NOT HAVE METAL STUD FRAME, BUT DO HAVE INSULATION. AS AN OPTION 6" SOLID PANELS MAY BE PROVIDED WITH A 6" BASE WIDTH OR AN ADDITIONAL 4 $\frac{1}{2}$" LEG FOR EXTRA BEARING CAPACITY. CONSULT VANHOOSECO FOR MORE INFORMATION.

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CRAWL WALL PROFILE

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NOTE: GRADE SHALL BE SLOPED AWAY FROM WALL @ MINIMUM OF 5% FOR A MINIMUM DISTANCE OF 10 FEET.

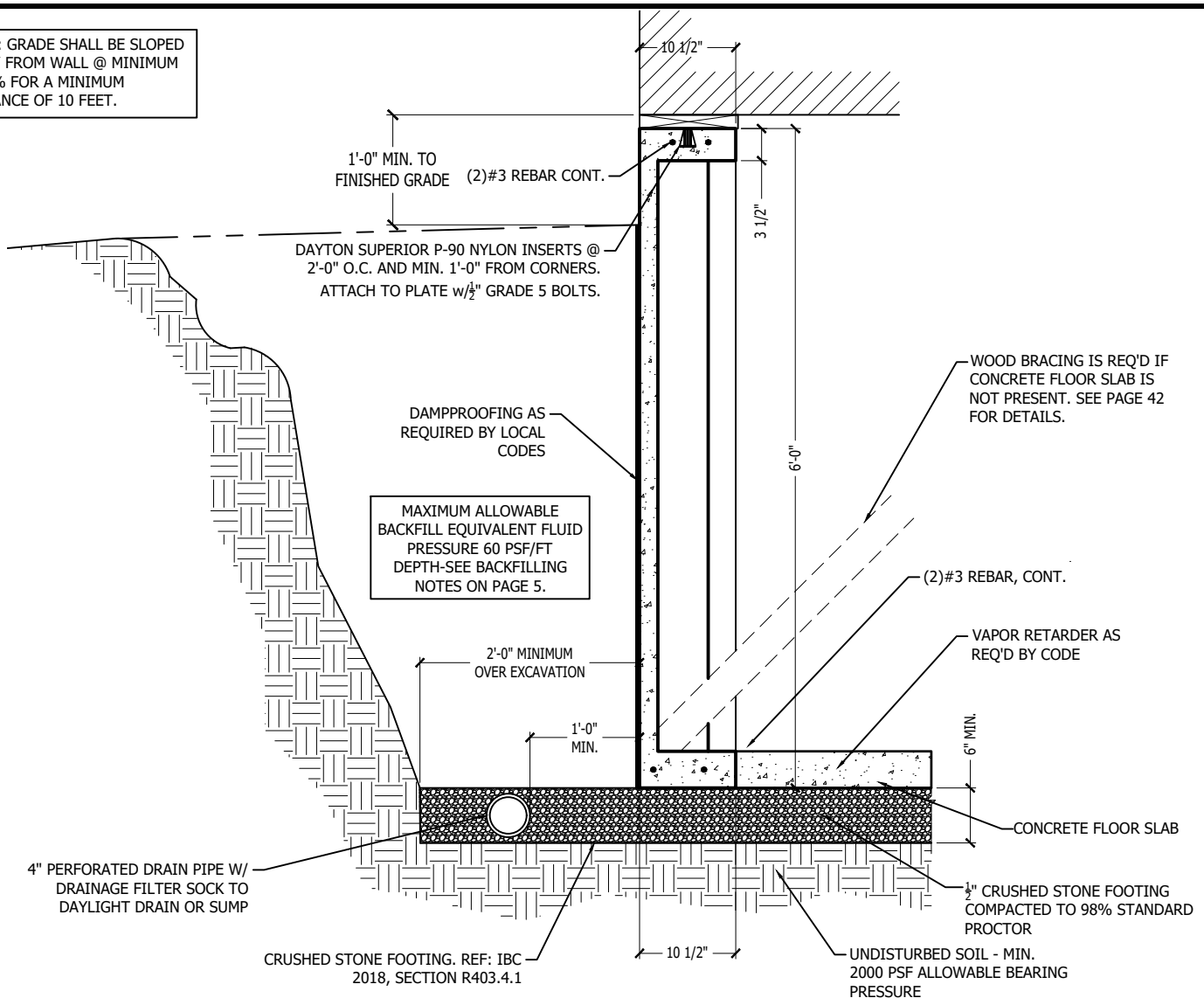

FIGURE 25 : TYPICAL WALL SECTION CRAWL WALL WITH CONCRETE FLOOR SLAB OPTION 'A'

SEE TABLE ON SHEET 10 FOR DEPTH OF CRUSHED STONE FOOTING.

CODE REFERENCE: 2018 IRC SECTION: R506.1 (GENERAL)

CODE REFERENCE: 2018 IRC SECTION: R506.2.2 (BASE)

CODE REFERENCE: 2018 IRC SECTION: R506.2.3 (VAPOR RETARDER)

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CRAWL WALL SECTION 1

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NOTE: GRADE SHALL BE SLOPED AWAY FROM WALL @ MINIMUM OF 5% FOR A MINIMUM DISTANCE OF 10 FEET.

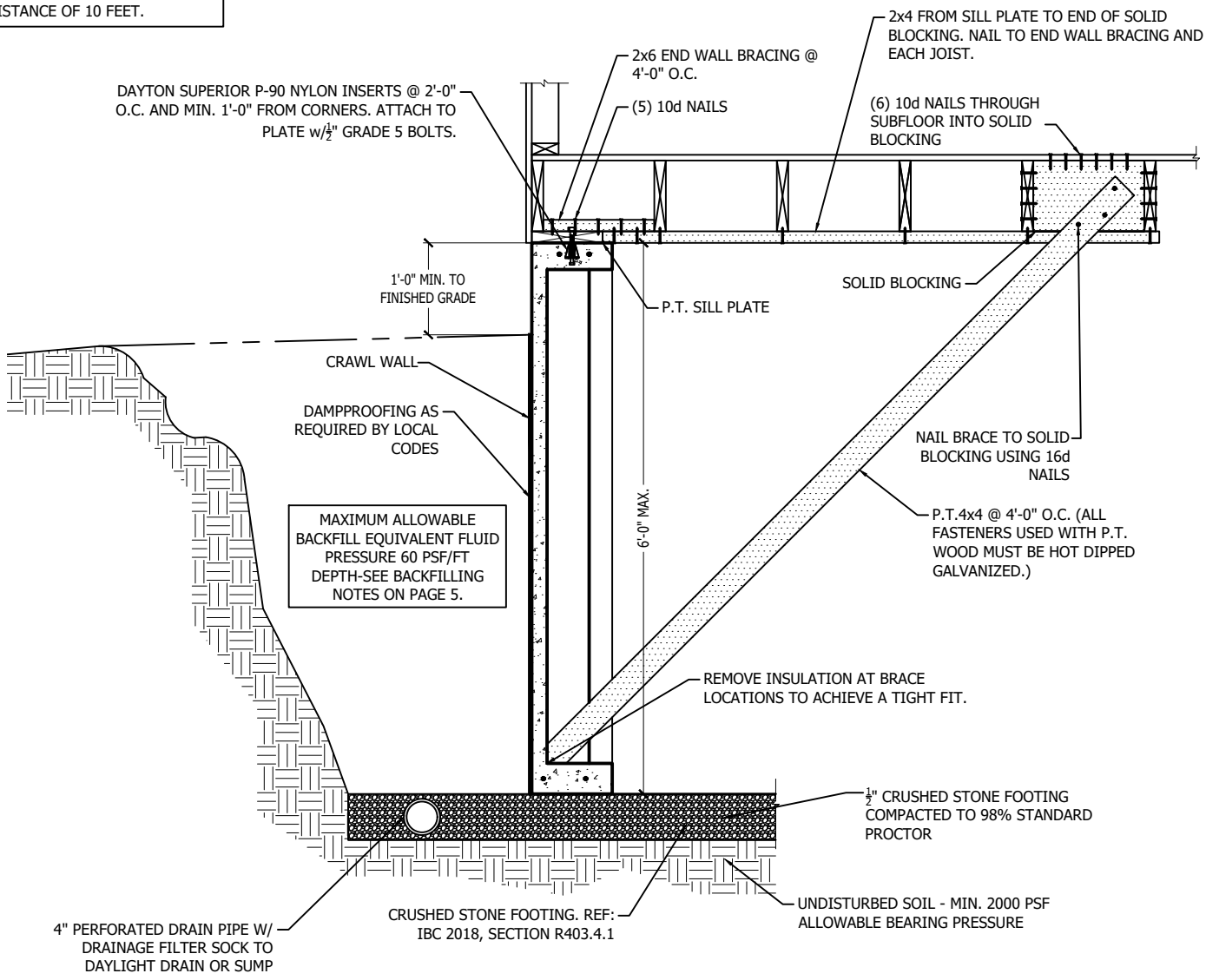

FIGURE 26 : CRAWL WALL WITHOUT CONCRETE FLOOR SLAB OPTION 'B'

NOTE: CRAWL WALL PANELS DO NOT HAVE METAL STUD FRAME, BUT DO HAVE INSULATION. AS AN OPTION 6" SOLID PANELS MAY BE PROVIDED WITH A 6" BASE WIDTH OR AN ADDITIONAL 4 ½" LEG FOR EXTRA BEARING CAPACITY. CONSULT VANHOOSECO FOR MORE INFORMATION.

CODE REFERENCE:
2018 IRC SECTION: R408 (UNDER FLOOR SPACE)

CODE REFERENCE:
2018 IRC SECTION: R318.4 (FOAM PLASTIC PROTECTION)

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CRAWL WALL SECTION 2

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NOTE: GRADE SHALL BE SLOPED AWAY FROM WALL @ MINIMUM OF 5% FOR A MINIMUM DISTANCE OF 10 FEET.

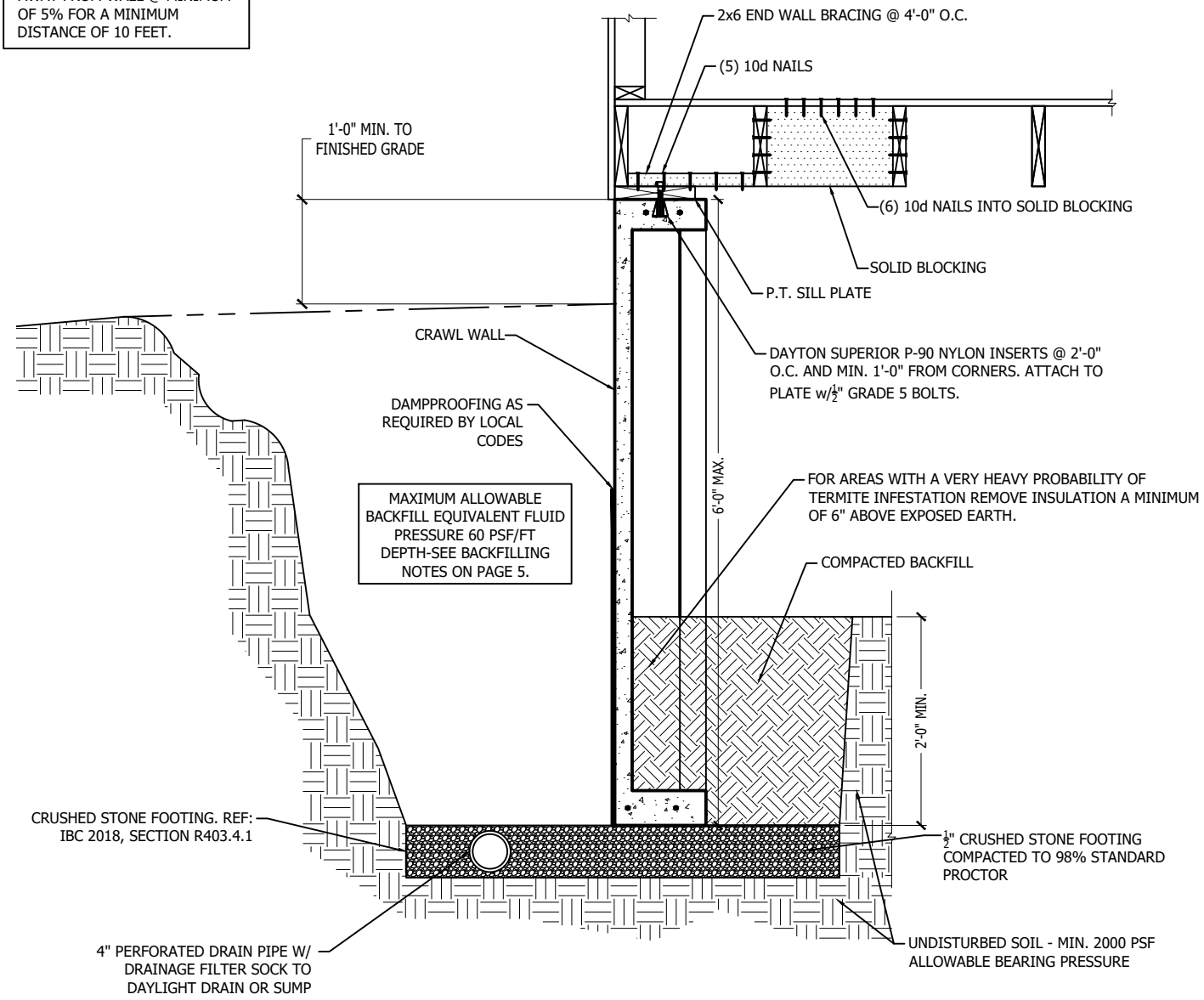

FIGURE 27 : CRAWL WALL WITHOUT CONCRETE FLOOR SLAB

OPTION 'C'

NOTE: CRAWL WALL PANELS DO NOT HAVE METAL STUD FRAME, BUT DO HAVE INSULATION. AS AN OPTION 6" SOLID PANELS MAY BE PROVIDED WITH A 6" BASE WIDTH OR AN ADDITIONAL 4 ½" LEG FOR EXTRA BEARING CAPACITY. CONSULT VANHOOSECO FOR MORE INFORMATION.

CODE REFERENCE:
2018 IRC SECTION: R408 (UNDER FLOOR SPACE)

CODE REFERENCE:
2018 IRC SECTION: R318.4 (FOAM PLASTIC PROTECTION)

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CRAWL WALL SECTION 3

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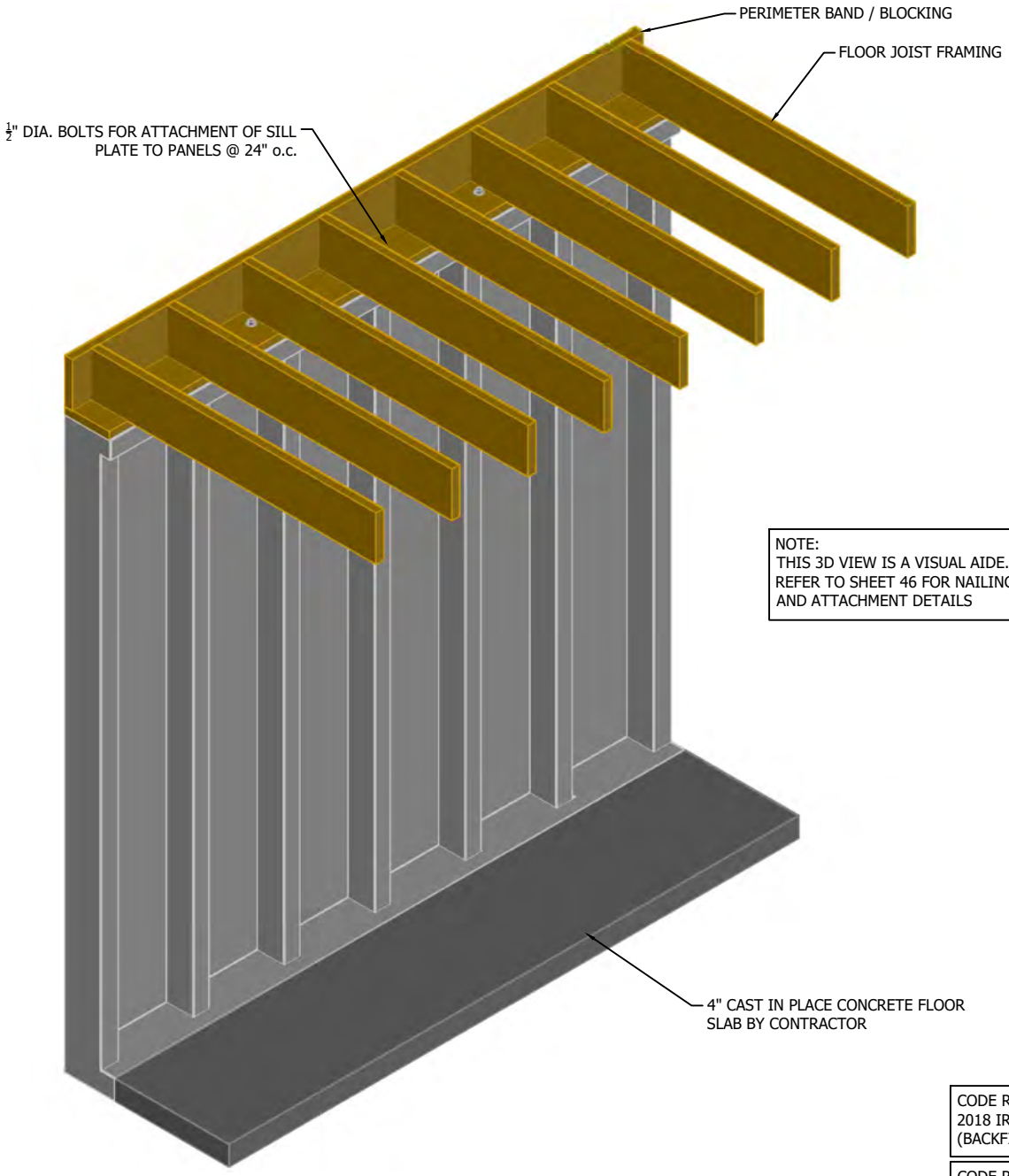

NOTE:
THIS 3D VIEW IS A VISUAL AIDE.
REFER TO SHEET 46 FOR NAILING AND ATTACHMENT DETAILS

FIGURE 28 : 3D VIEW - FLOOR JOISTS PERPENDICULAR TO WALL

CODE REFERENCE:
2018 IRC SECTION: R404.1.7
(BACKFILL PLACEMENT)

CODE REFERENCE:
2018 IRC SECTION: R403.1.6
(FOUNDATION ANCHORAGE)

CODE REFERENCE:
2018 IRC SECTION: R317.3.1
(FASTENERS FOR PRESERVATIVE TREATED WOOD)

NOTE: FRAMING FOR I-JOISTS IS SIMILAR. REFER TO DETAIL SHEETS FOR MORE INFORMATION.

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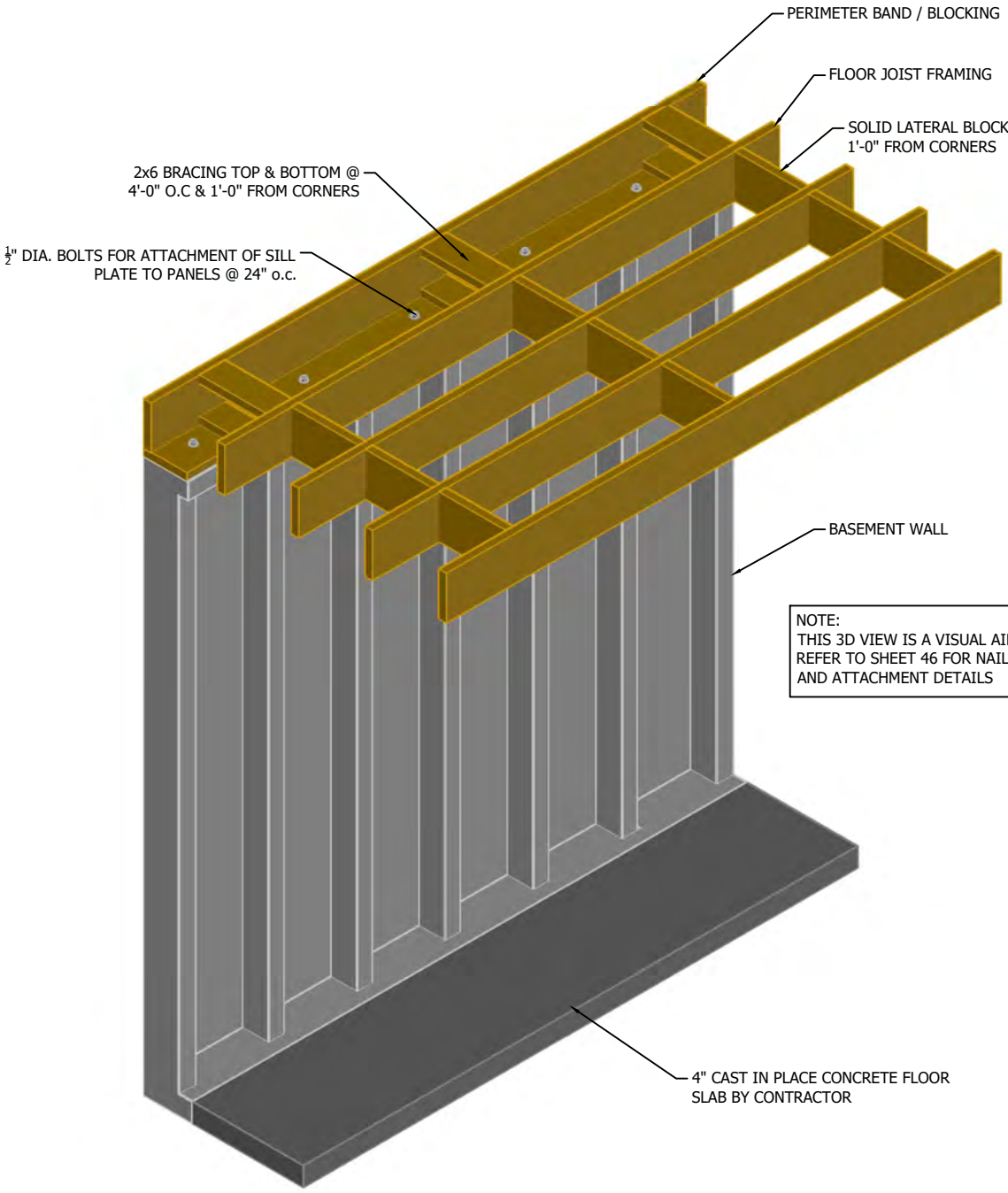

NOTE:
THIS 3D VIEW IS A VISUAL AIDE.
REFER TO SHEET 46 FOR NAILING AND ATTACHMENT DETAILS

CODE REFERENCE:
2018 IRC SECTION: R404.1.7
(BACKFILL PLACEMENT)

CODE REFERENCE:
2018 IRC SECTION: R403.1.6
(FOUNDATION ANCHORAGE)

CODE REFERENCE:
2018 IRC SECTION: R317.3.1
(FASTENERS FOR PRESERVATIVE TREATED WOOD)

FIGURE 29 : 3D VIEW - FLOOR JOISTS PARALLEL TO WALL

NOTE: FRAMING FOR I-JOISTS IS SIMILAR. REFER TO DETAIL SHEETS FOR MORE INFORMATION.

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CODE REFERENCE:
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CODE REFERENCE:
2018 IRC SECTION: R403.1.6
(FOUNDATION ANCHORAGE)

CODE REFERENCE:
2018 IRC SECTION: R317.3.1
(FASTENERS FOR PRESERVATIVE TREATED WOOD)

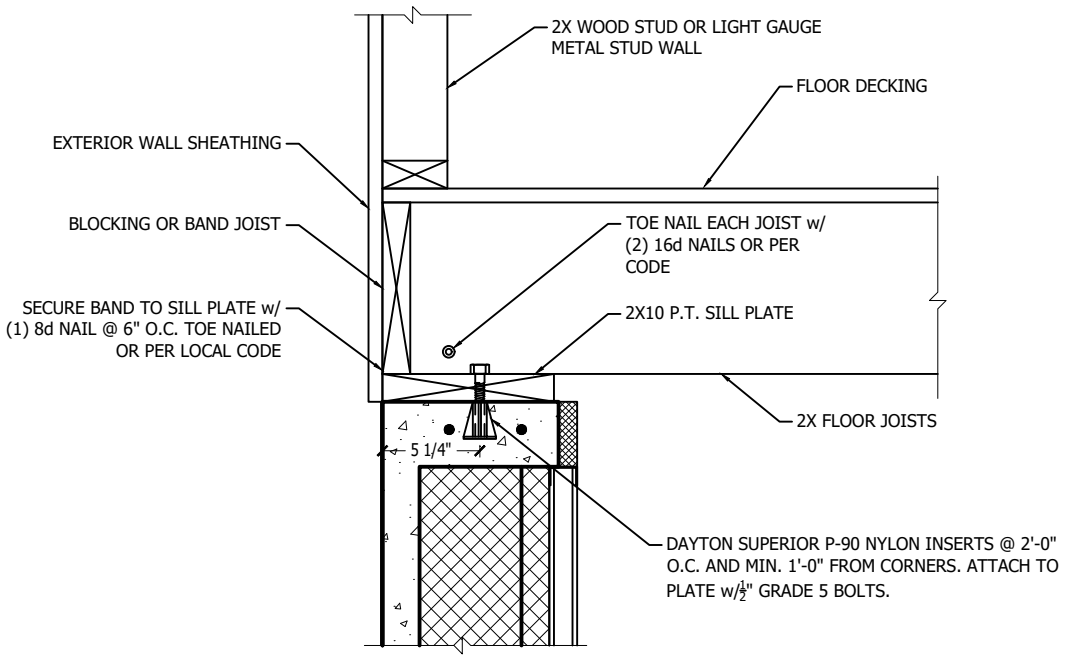
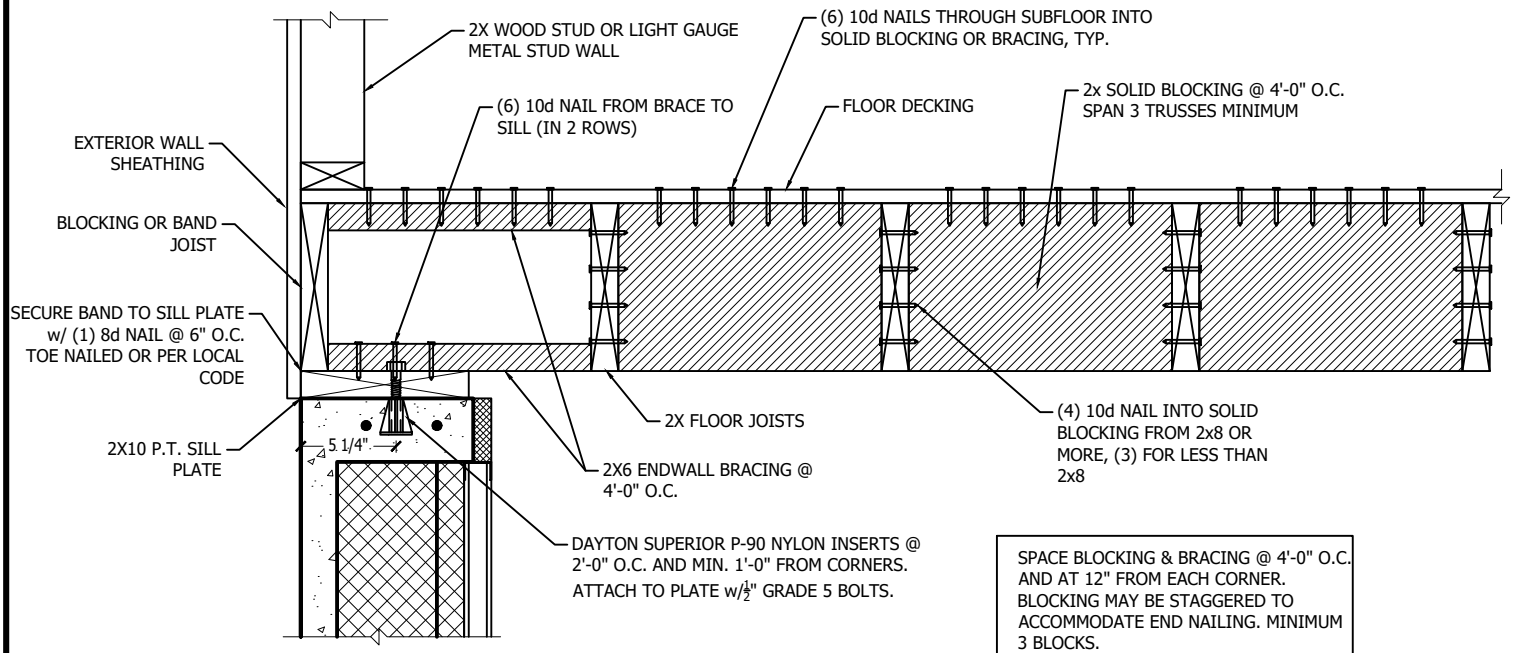


FIGURE 30 : 2X FLOOR JOISTS PERPENDICULAR TO WALL



SPACE BLOCKING & BRACING @ 4'-0" O.C. AND AT 12" FROM EACH CORNER. BLOCKING MAY BE STAGGERED TO ACCOMMODATE END NAILING. MINIMUM 3 BLOCKS.

FIGURE 31 : 2X FLOOR JOISTS PARALLEL TO WALL

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CODE REFERENCE:
2018 IRC SECTION: R403.1.6
(FOUNDATION ANCHORAGE)

CODE REFERENCE:
2018 IRC SECTION: R317.3.1
(FASTENERS FOR PRESERVATIVE TREATED WOOD)

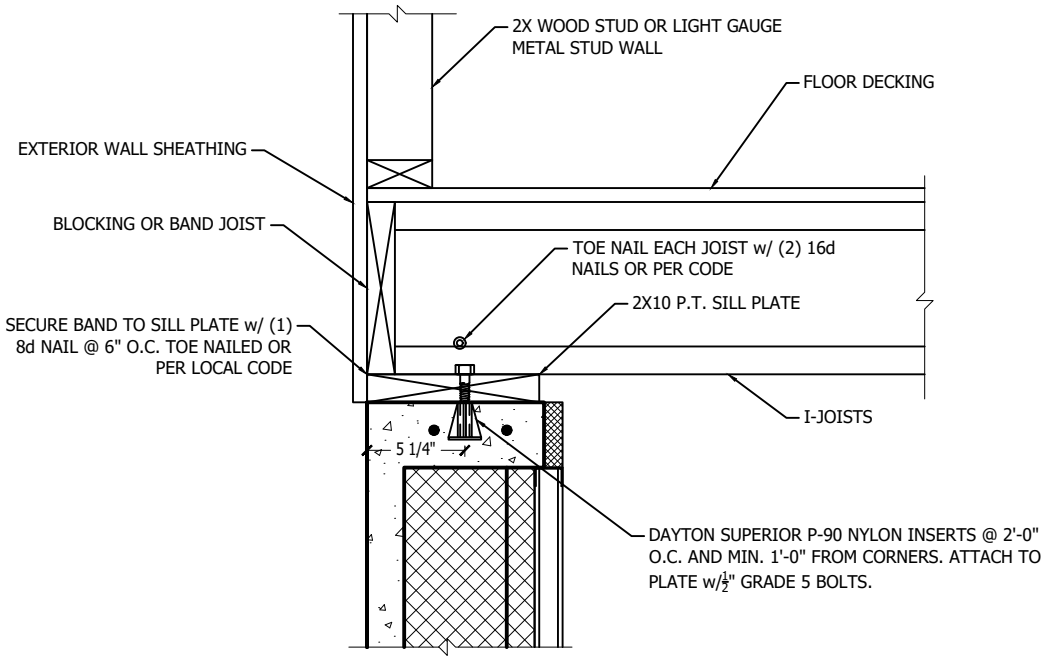
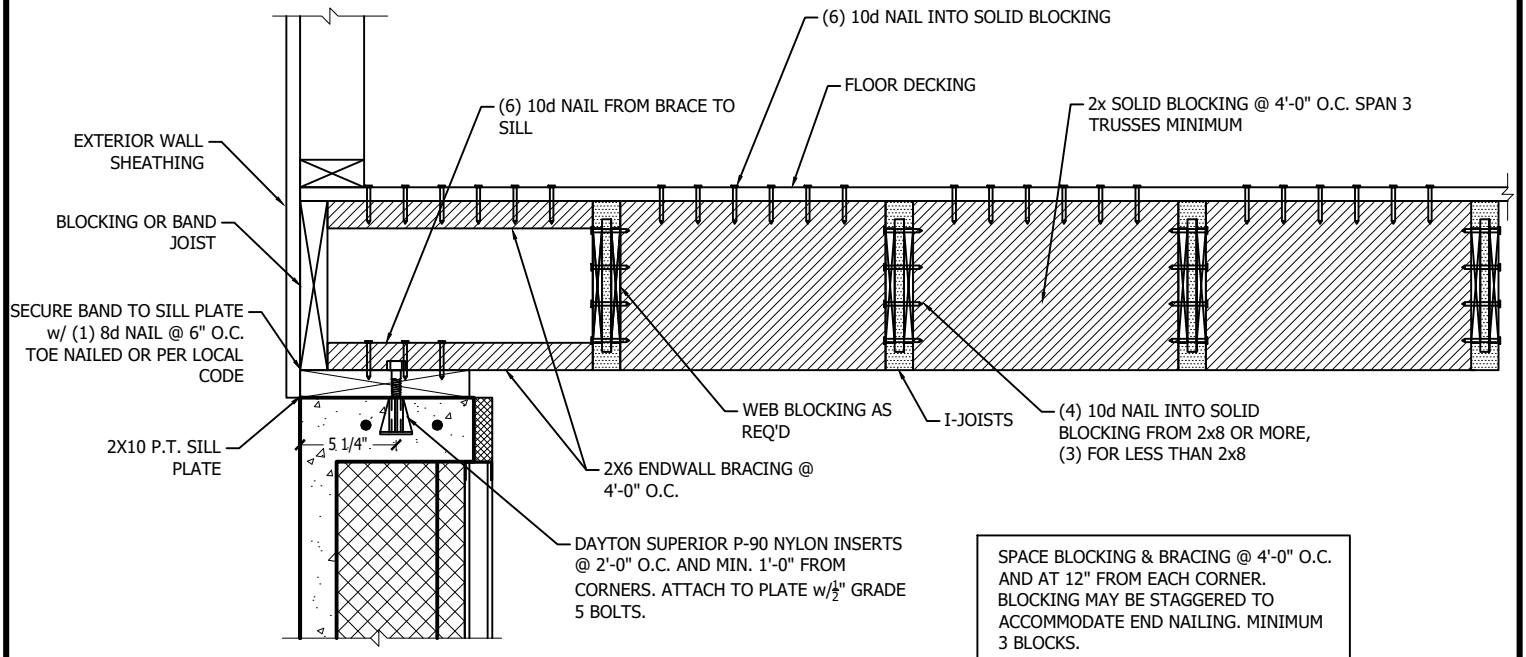


FIGURE 32 : I-JOISTS PERPENDICULAR TO WALL



SPACE BLOCKING & BRACING @ 4'-0" O.C. AND AT 12" FROM EACH CORNER. BLOCKING MAY BE STAGGERED TO ACCOMMODATE END NAILING. MINIMUM 3 BLOCKS.

FIGURE 33 : I-JOISTS PARALLEL TO WALL

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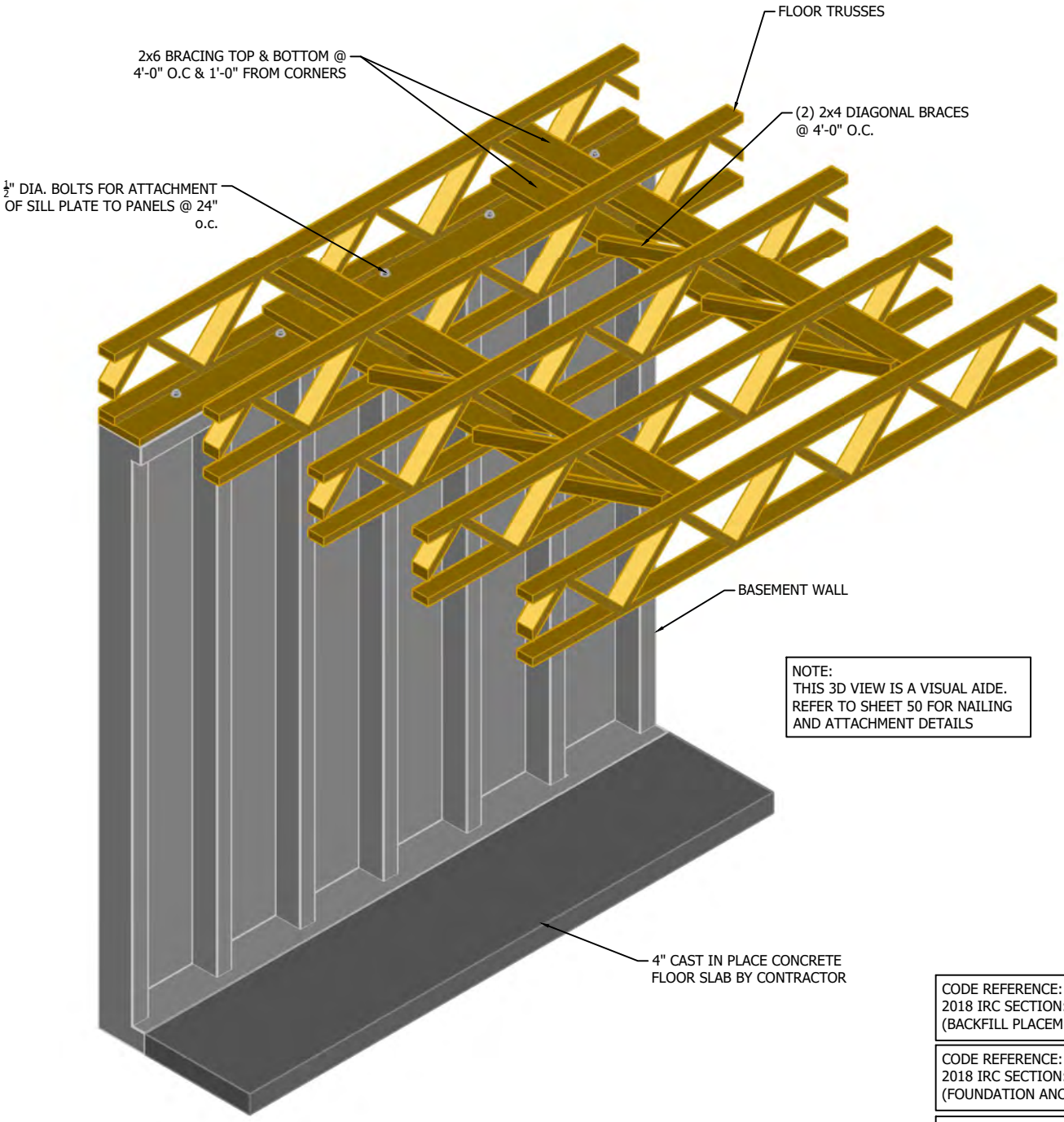

NOTE:
THIS 3D VIEW IS A VISUAL AIDE.
REFER TO SHEET 50 FOR NAILING AND ATTACHMENT DETAILS

CODE REFERENCE:
2018 IRC SECTION: R404.1.7
(BACKFILL PLACEMENT)

CODE REFERENCE:
2018 IRC SECTION: R403.1.6
(FOUNDATION ANCHORAGE)

CODE REFERENCE:
2018 IRC SECTION: R317.3.1
(FASTENERS FOR PRESERVATIVE TREATED WOOD)

FIGURE 34 : 3D VIEW - FLOOR TRUSSES PARALLEL TO WALL

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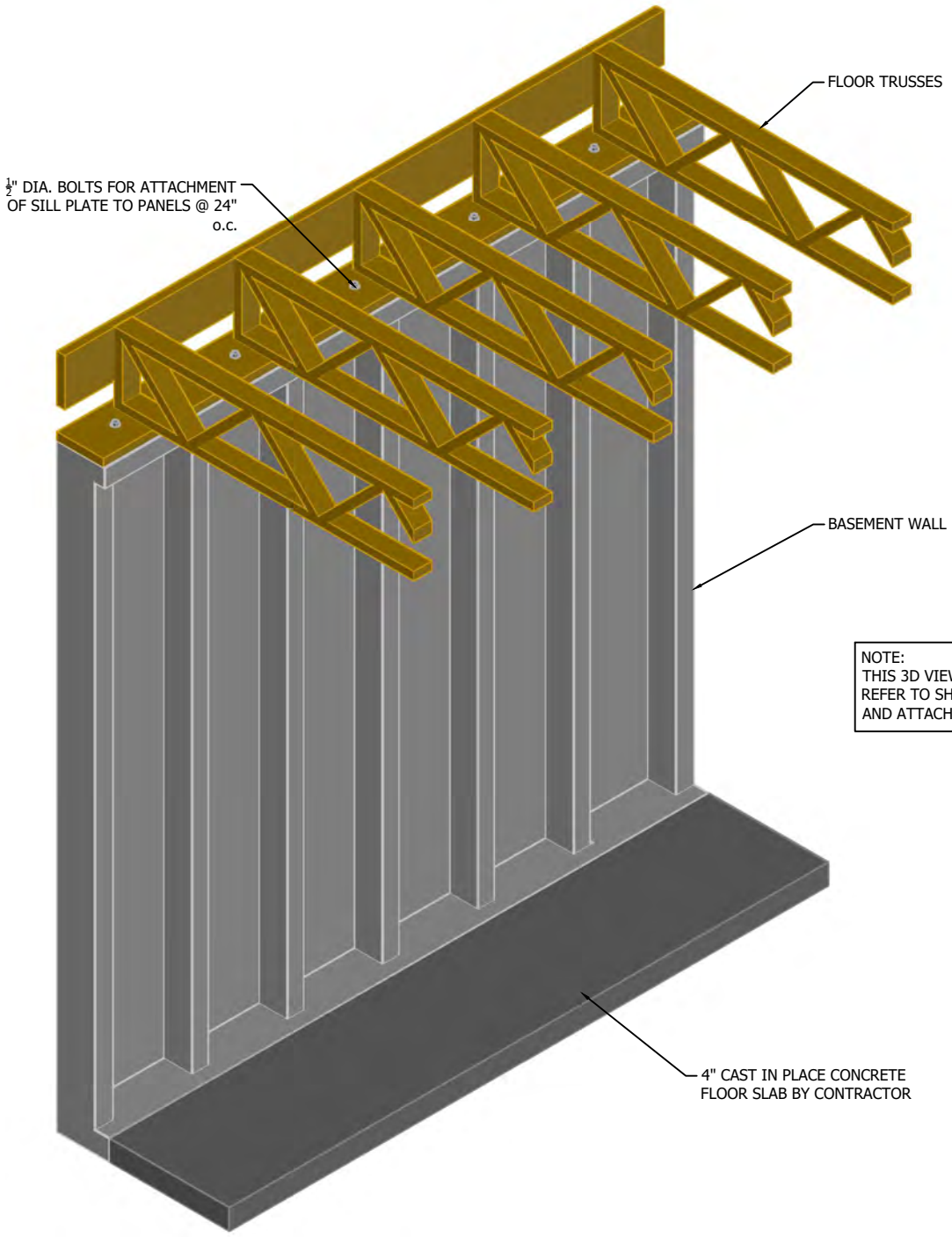

NOTE:
THIS 3D VIEW IS A VISUAL AIDE. REFER TO SHEET 50 FOR NAILING AND ATTACHMENT DETAILS

CODE REFERENCE:
2018 IRC SECTION: R404.1.7
(BACKFILL PLACEMENT)

CODE REFERENCE:
2018 IRC SECTION: R403.1.6
(FOUNDATION ANCHORAGE)

CODE REFERENCE:
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FIGURE 35 : 3D VIEW - FLOOR TRUSSES PERPENDICULAR TO WALL

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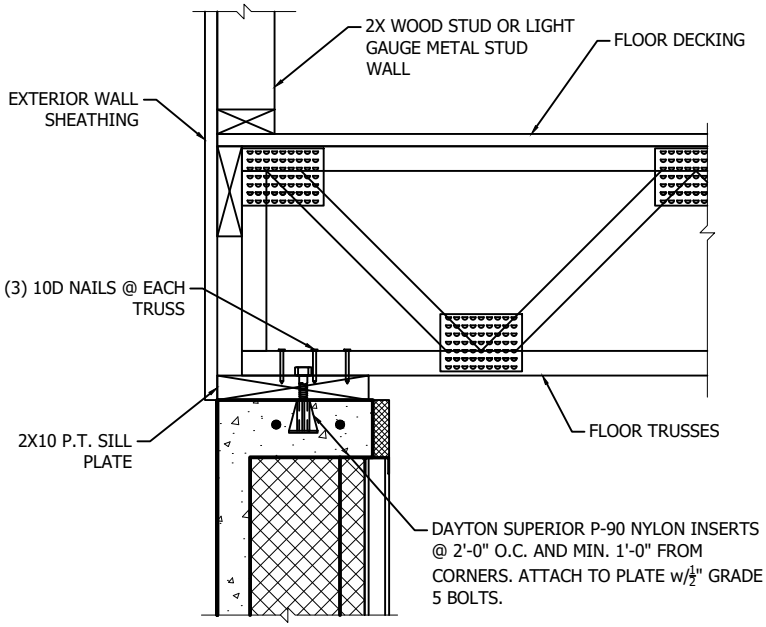
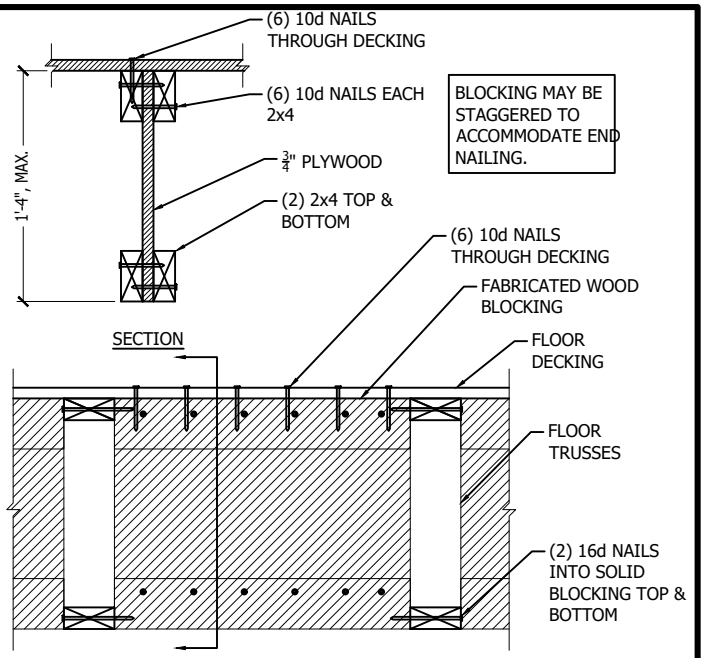
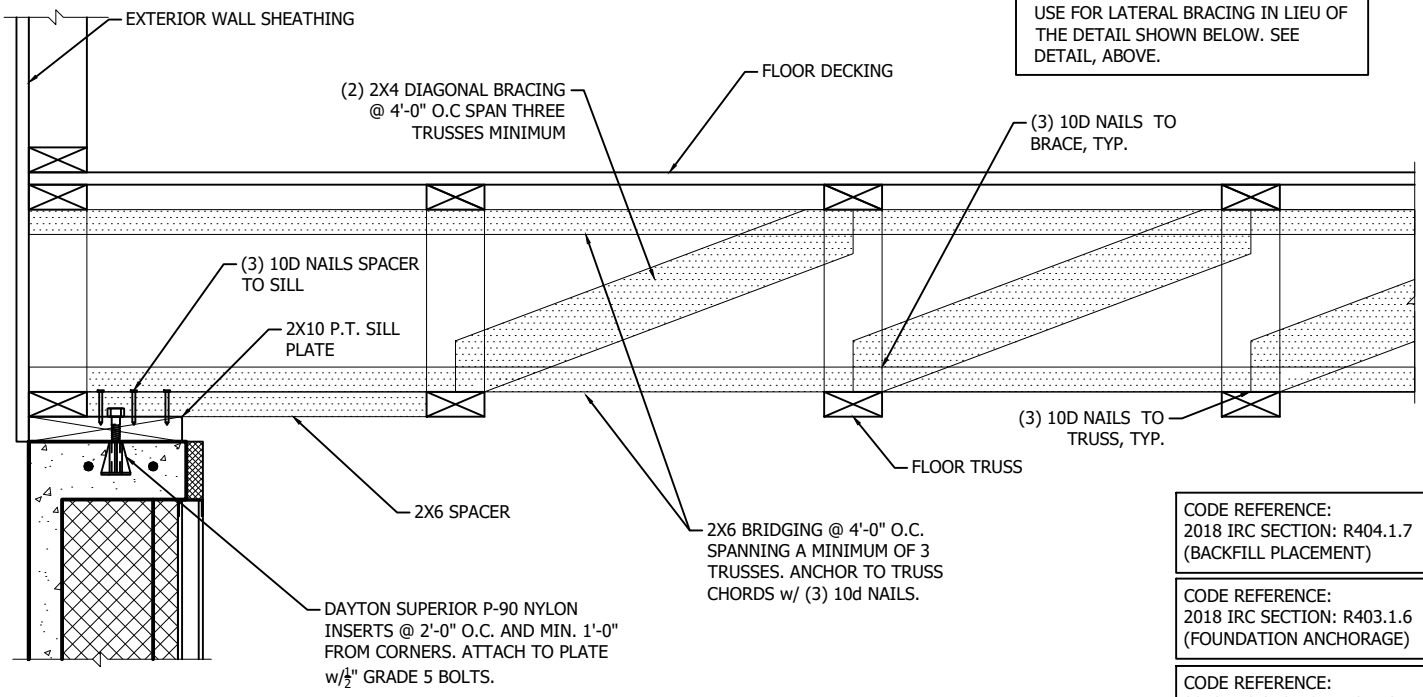




FABRICATED WOOD BLOCKING DETAILS

FIGURE 36 : FLOOR TRUSS PERPENDICULAR TO WALL

FOR TRUSSES 16" AND LESS IN DEPTH, FABRICATED SOLID BLOCKING MAY BE USE FOR LATERAL BRACING IN LIEU OF THE DETAIL SHOWN BELOW. SEE DETAIL, ABOVE.



CODE REFERENCE:
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2018 IRC SECTION: R403.1.6
(FOUNDATION ANCHORAGE)

CODE REFERENCE:
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(FASTENERS FOR PRESERVATIVE TREATED WOOD)

FIGURE 37 : FLOOR TRUSS PARALLEL TO WALL

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(FASTENERS FOR PRESERVATIVE TREATED WOOD)

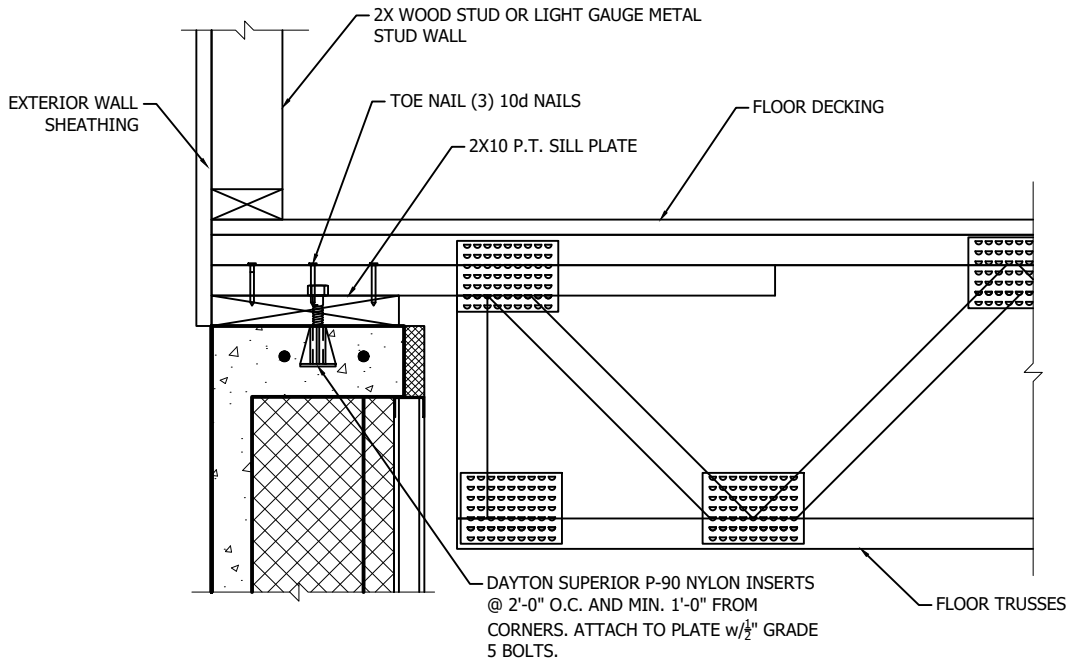

FIGURE 38 : TOP CHORD TRUSS PERPENDICULAR TO WALL

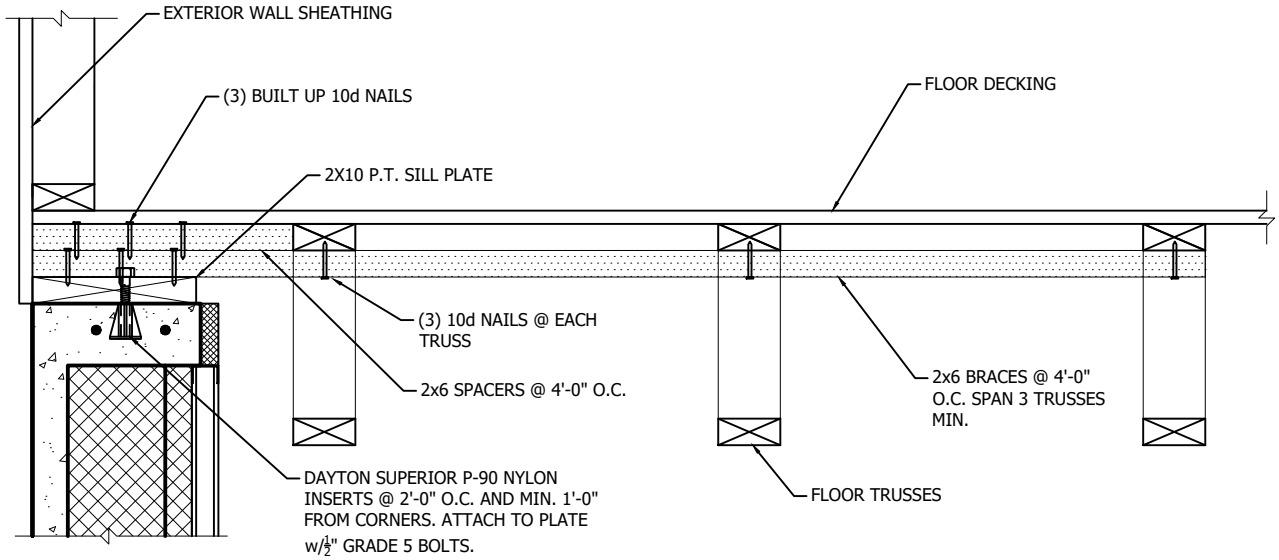

FIGURE 39 : TOP CHORD TRUSS PARALLEL TO WALL

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CODE REFERENCE:
2018 IRC SECTION: R403.1.6
(FOUNDATION ANCHORAGE)

CODE REFERENCE:
2018 IRC SECTION: R317.3.1
(FASTENERS FOR PRESERVATIVE TREATED WOOD)

Modular Construction Notes:

Modular housing manufacturer may attach the sill plate in the factory as part of the modular construction or the sill plate may be attached to the Enviro-Cast Wall System prior to installation of the modular unit.

Construction adhesive is recommended between the sill plate and the top of the Enviro-Cast wall system.

Bolt the sill plate to the top of the Enviro-Cast Wall System panels per the sill plate fastening requirements on this page.

When the sill plate is attached prior to installation of the modular construction nail each joist to the sill plate with two 16d nails or more if required by local code. If there is not adequate room for nailing then framing straps should be employed to attach the modular unit to the sill plate.

The framing strap is located between the band joist and the sill plate and should be secured with 1 1/2" galvanized nails in every hole of the framing strap.

Nail 2x6 end wall braces to the sill plate at 4'-0" on center using five 10d nails. Braces must be located no more than 12" from each interior corner.

Add solid blocking per drawing sheet 32.

A shear wall may be required is certain instances.

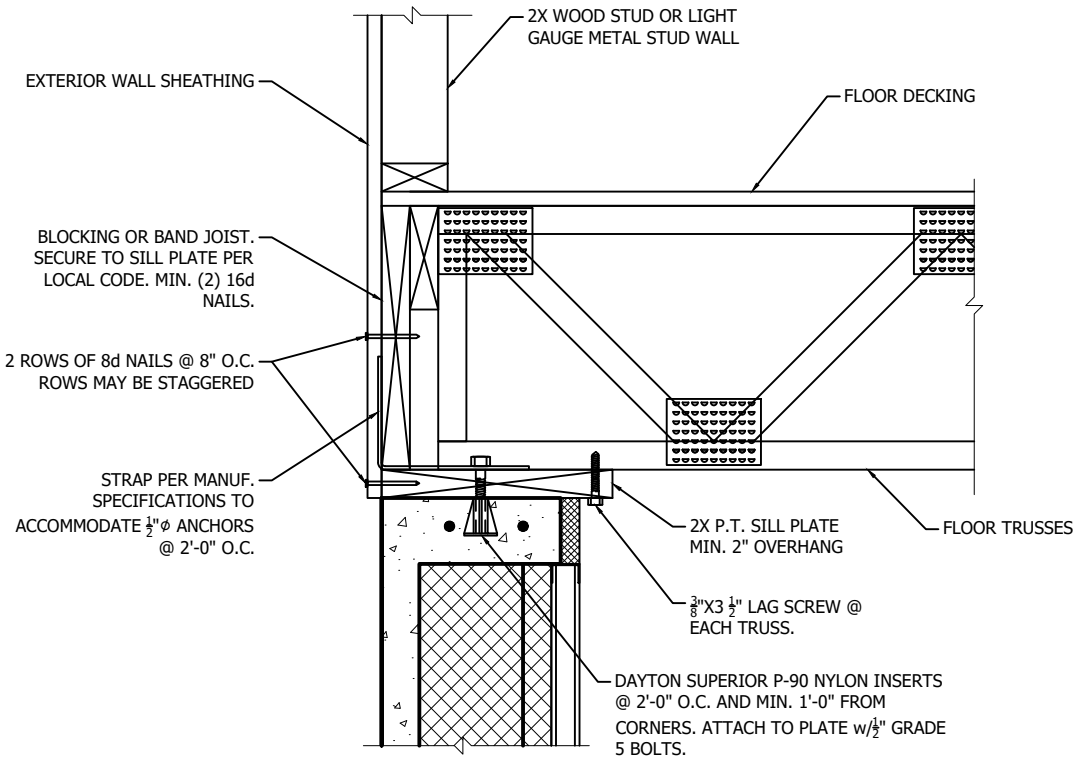

FIGURE 40 : MODULAR CONSTRUCTION CONNECTION

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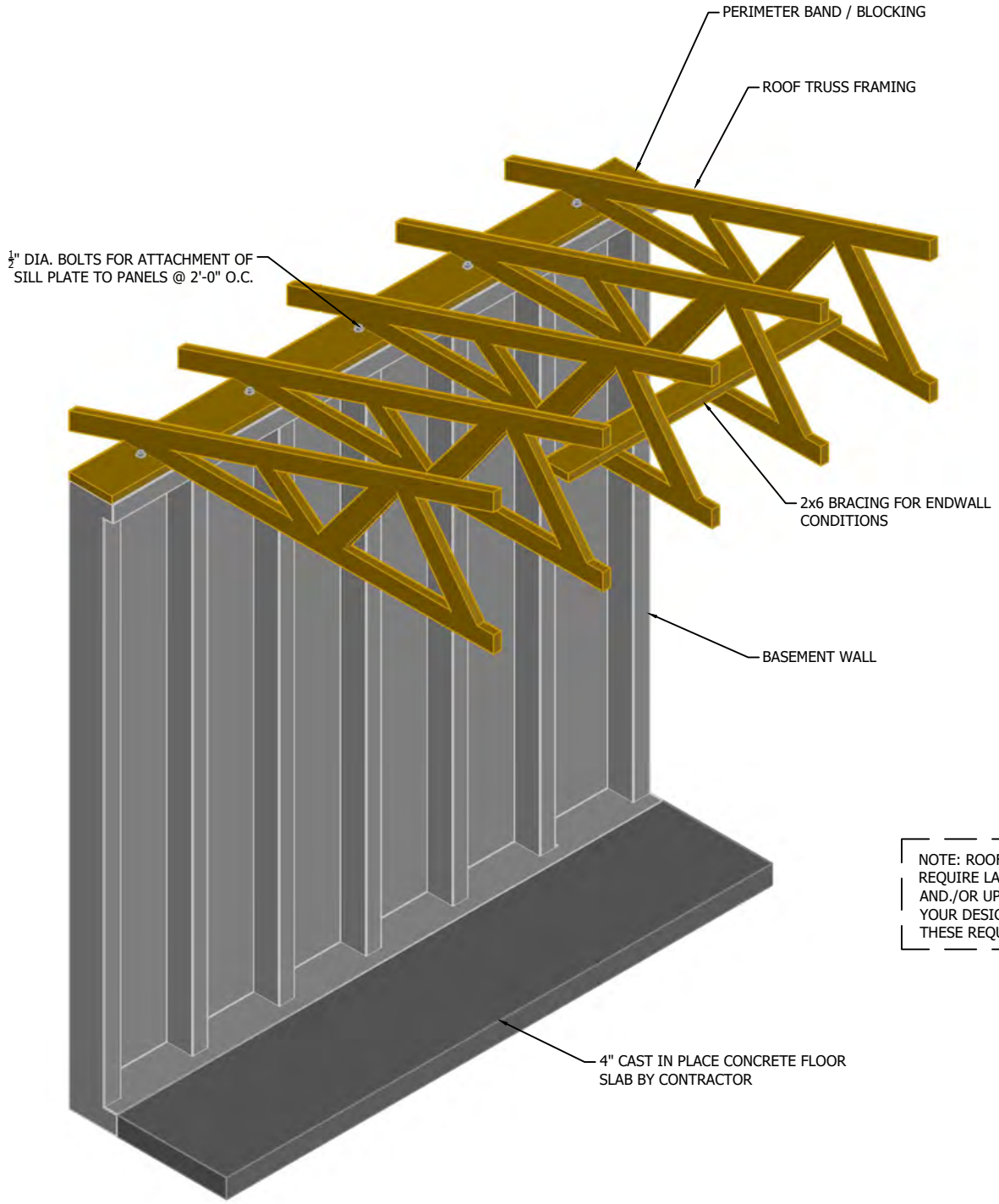

NOTE: ROOF TRUSSES MAY REQUIRE LATERAL CROSS BRACING AND./OR UPLIFT CLIPS. CONSULT YOUR DESIGN PROFESSIONAL FOR THESE REQUIREMENTS.

FIGURE 41 : 3D VIEW - ROOF TRUSSES PERPENDICULAR TO WALL

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FRAMING DETAILS

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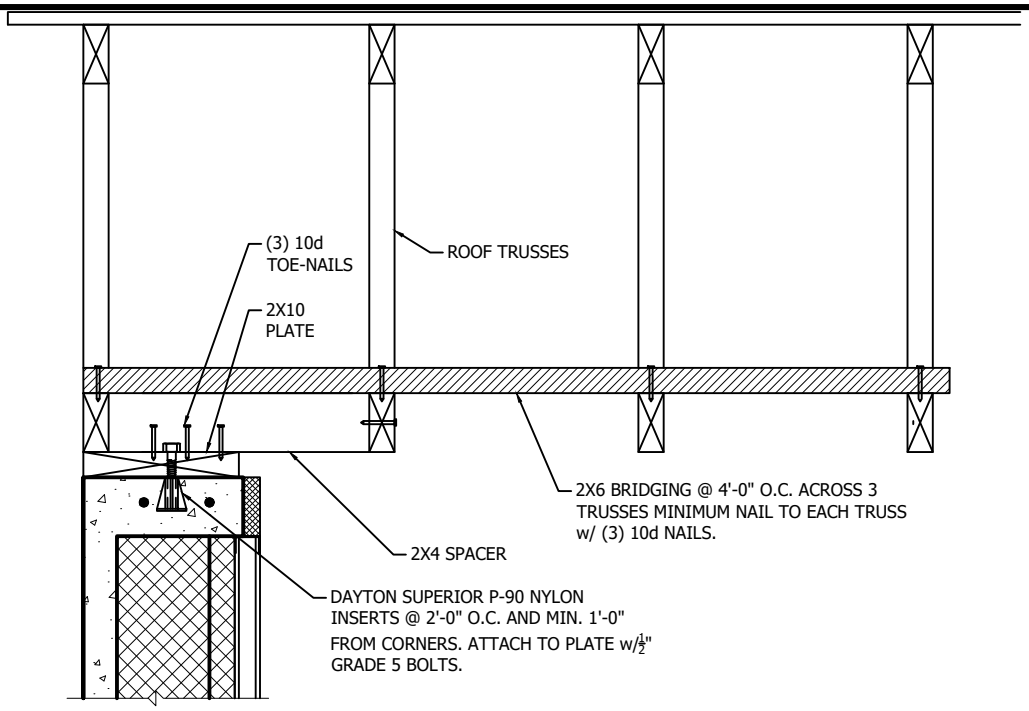
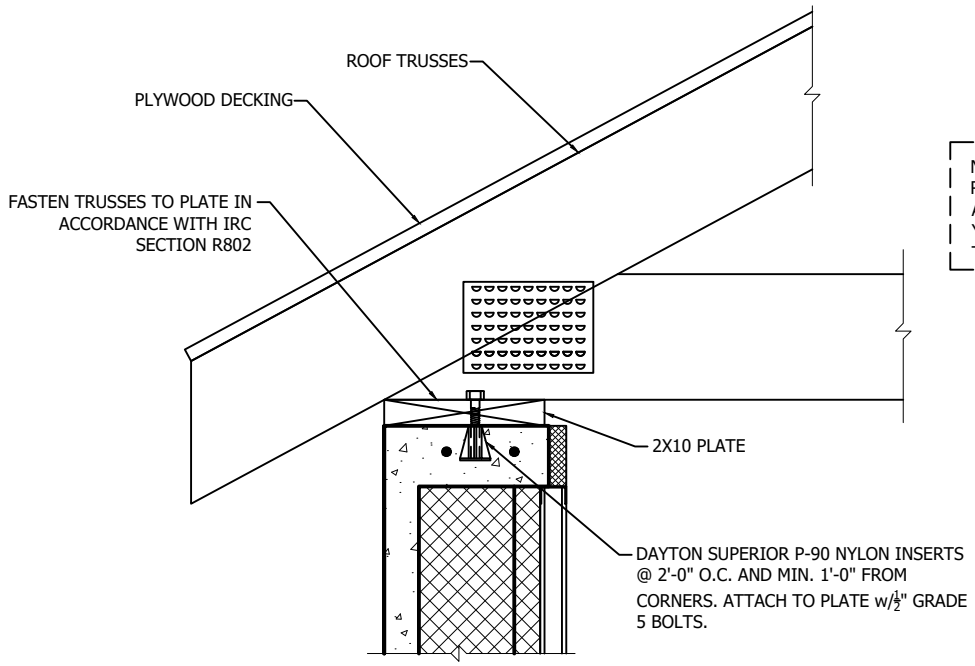


FIGURE 42 : ROOF TRUSS PARALLEL TO WALL



NOTE: ROOF TRUSSES MAY REQUIRE LATERAL CROSS BRACING AND./OR UPLIFT CLIPS. CONSULT YOUR DESIGN PROFESSIONAL FOR THESE REQUIREMENTS.

FIGURE 43 : ROOF TRUSS PERPENDICULAR TO WALL

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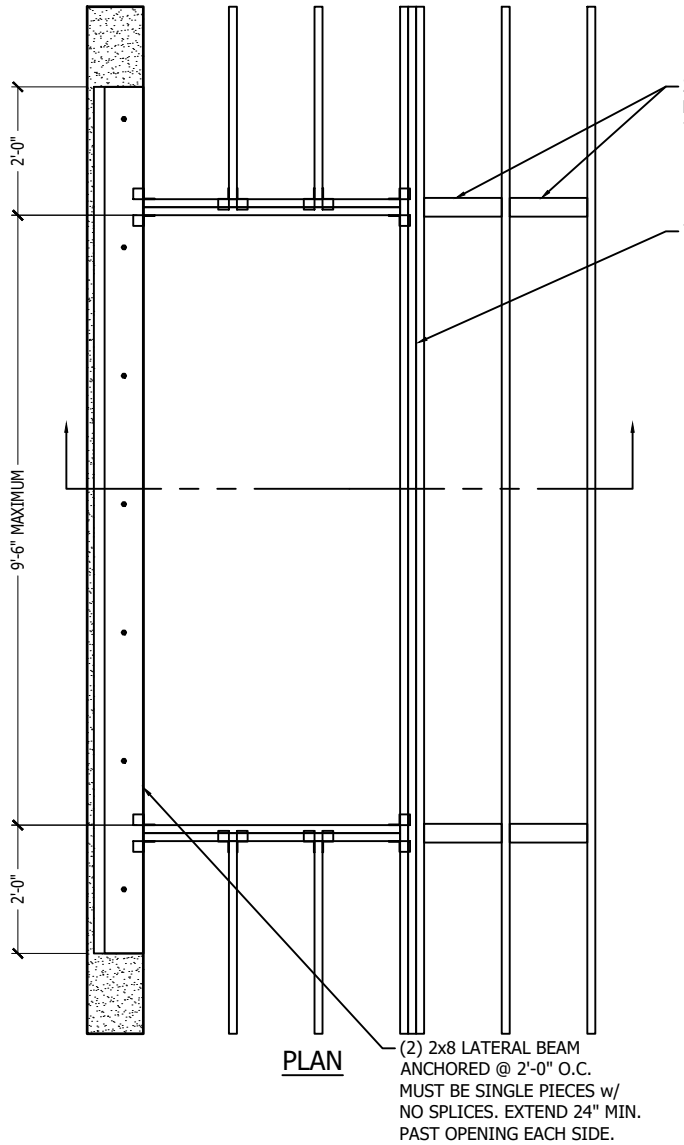
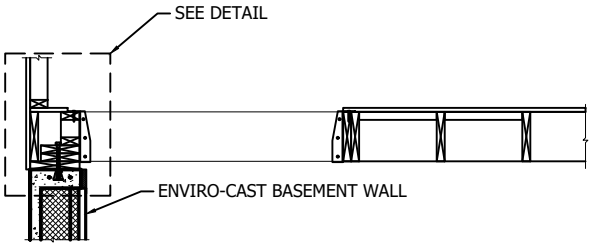
CODE REFERENCE:
2018 IRC SECTION: R404.1.7
(BACKFILL PLACEMENT)

CODE REFERENCE:
2018 IRC SECTION: R403.1.6
(FOUNDATION ANCHORAGE)

CODE REFERENCE:
2018 IRC SECTION: R317.3.1
(FASTENERS FOR PRESERVATIVE TREATED WOOD)



PLAN



SECTION

Stairwell Header Procedures

Stairwell openings in a Enviro-Cast basement wall requires special considerations because the stairwell opening creates a location where there is no lateral resistance at the top of the wall. For these conditions a special header is required to transfer the load to adjacent floor members.

For stairwell openings up to 9'-6" long in the direction of the wall and within 8 feet of the foundation panels follow the framing guidelines on this and the following page.

- Always use construction adhesive between the sill plate and the top of the Enviro-Cast panels.
- Build a support beam using a 2X10 sill plate and two 2X8s. without splices, extending at least 2 feet beyond the stair opening on each side.
- Bolt the support beam to the panels at every location provided using 1/2" diameter bolts and washers (minimum Grade 5 bolts).
- For openings larger than 9'-6" consult VANHOOSECO or a Design Professional for support arrangement.

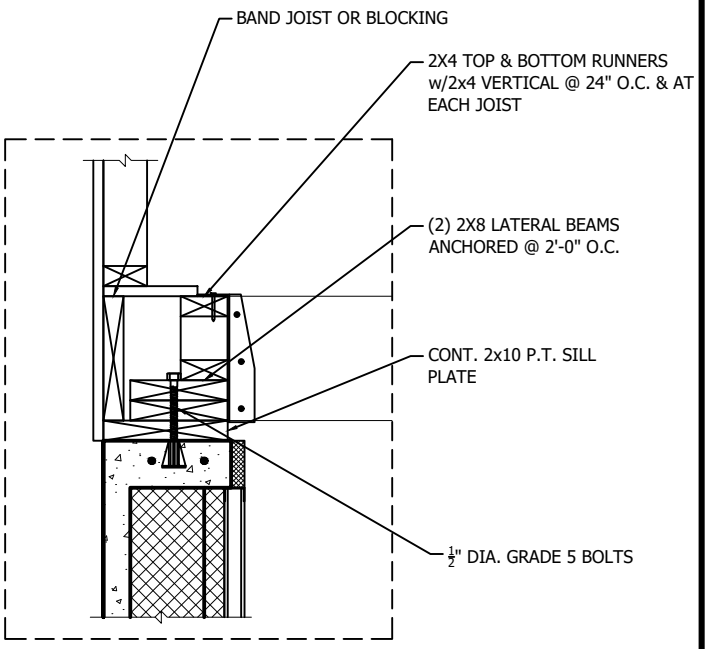


FIGURE 44 : FRAMING AT STAIR OPENING
JOISTS PARALLEL TO WALL

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CODE REFERENCE:
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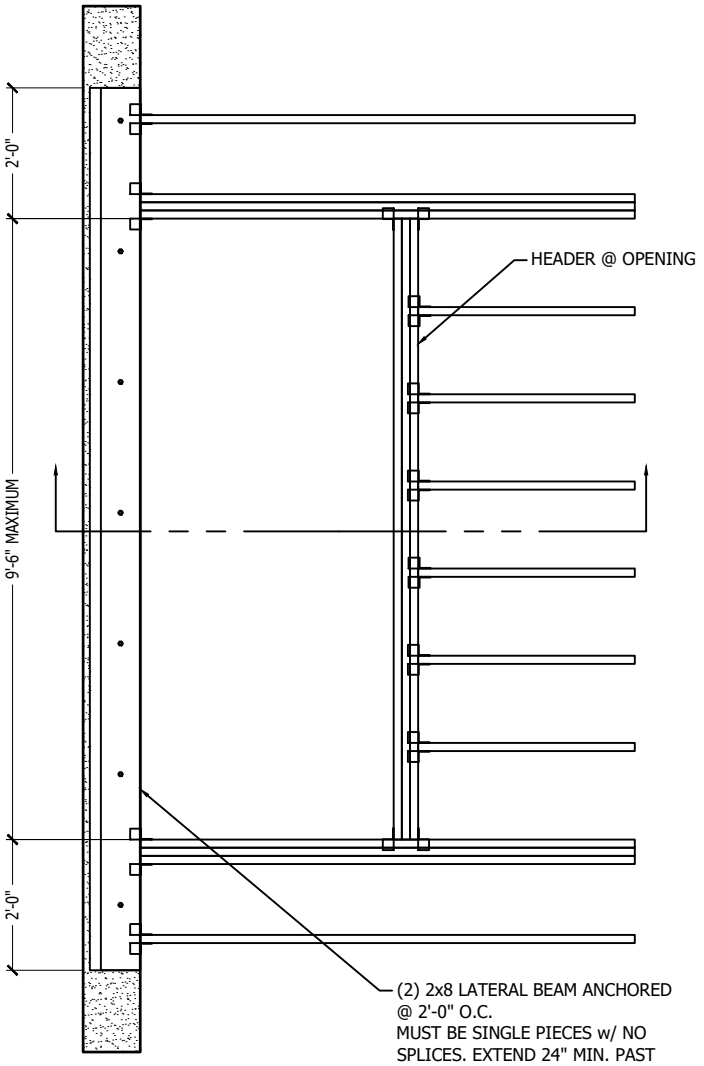
(BACKFILL PLACEMENT)

CODE REFERENCE:
2018 IRC SECTION: R403.1.6
(FOUNDATION ANCHORAGE)

CODE REFERENCE:
2018 IRC SECTION: R317.3.1
(FASTENERS FOR PRESERVATIVE TREATED WOOD)



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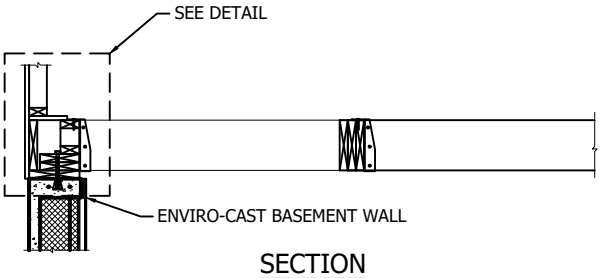

SECTION

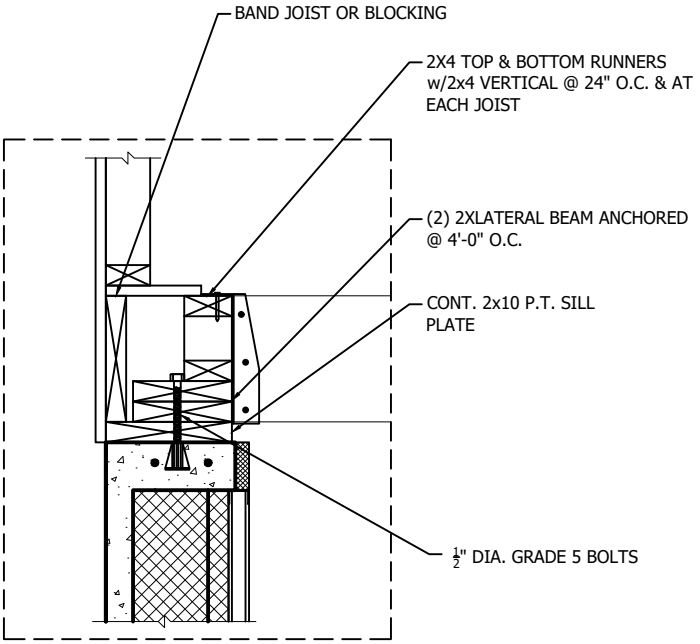

FIGURE 45 : FRAMING AT STAIR OPENING
JOISTS PERPENDICULAR TO WALL

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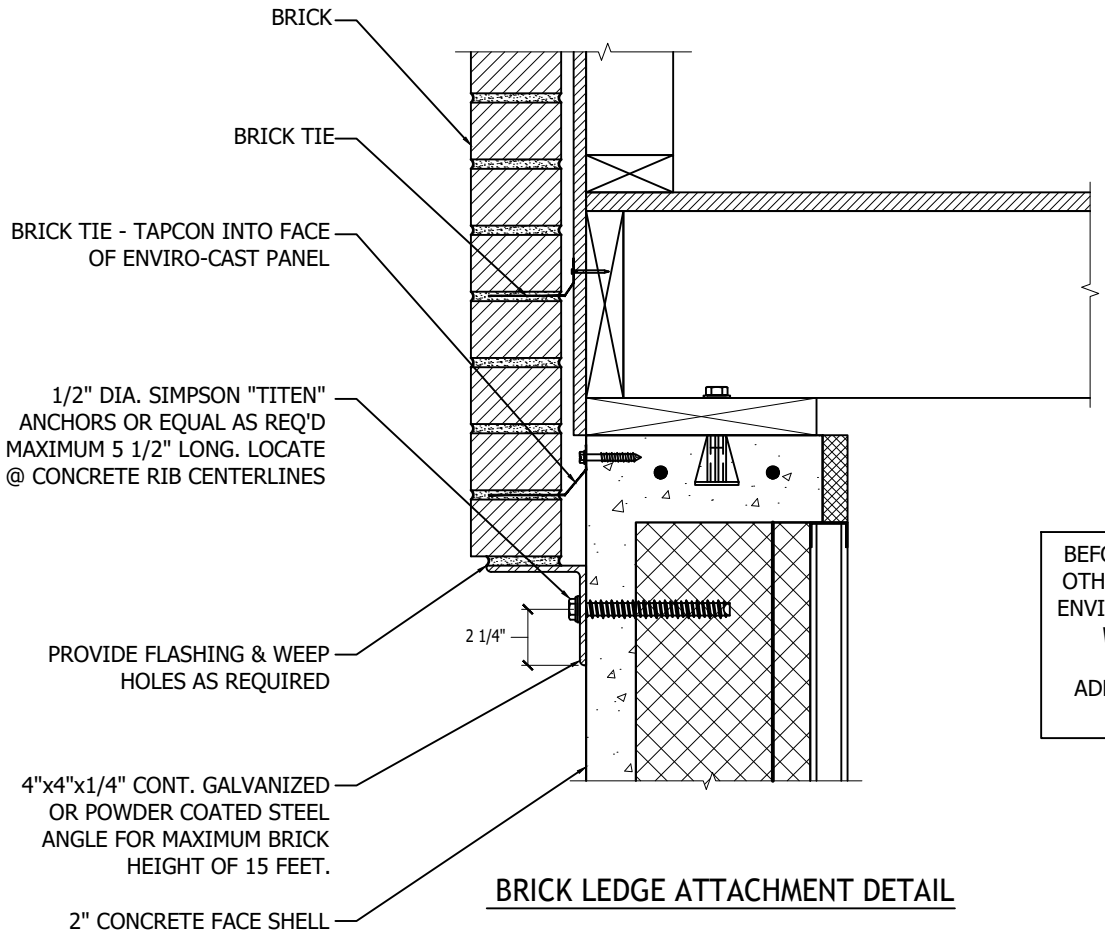
NOTE: THIS IS A GENERAL CONCEPTUAL DESIGN AND SHOULD BE CAREFULLY REVIEWED FOR JOB SPECIFIC APPLICATIONS PRIOR TO USE. SOME JURISDICTIONS MAY REQUIRE REVIEW BY A REGISTERED DESIGN PROFESSIONAL.



BRICK LEDGE ATTACHMENT DETAIL

BEFORE ADDING BRICK, STONE, OR OTHER MATERIALS TO AN EXISTING ENVIROCAST APPLICATION CONSULT *VANHOOSECO O*R A DESIGN PROFESSIONAL TO ENSURE ADEQUACY OF THE FOOTING FOR THE ADDITIONAL LOADS.

ALL ANCHORS SHALL BE PLACED IN THE CONCRETE STUDS.

NOTE: ALL BOLTS, NUTS, & WASHERS TO BE GALVANIZED OR STAINLESS STEEL (TYPE 304). IF STAINLESS STEEL IS USED A PROTECTIVE BARRIER SHALL BE PLACED BETWEEN STAINLESS STEEL & CARBON STEEL ELEMENTS.

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BRICK SUPPORT ANGLE

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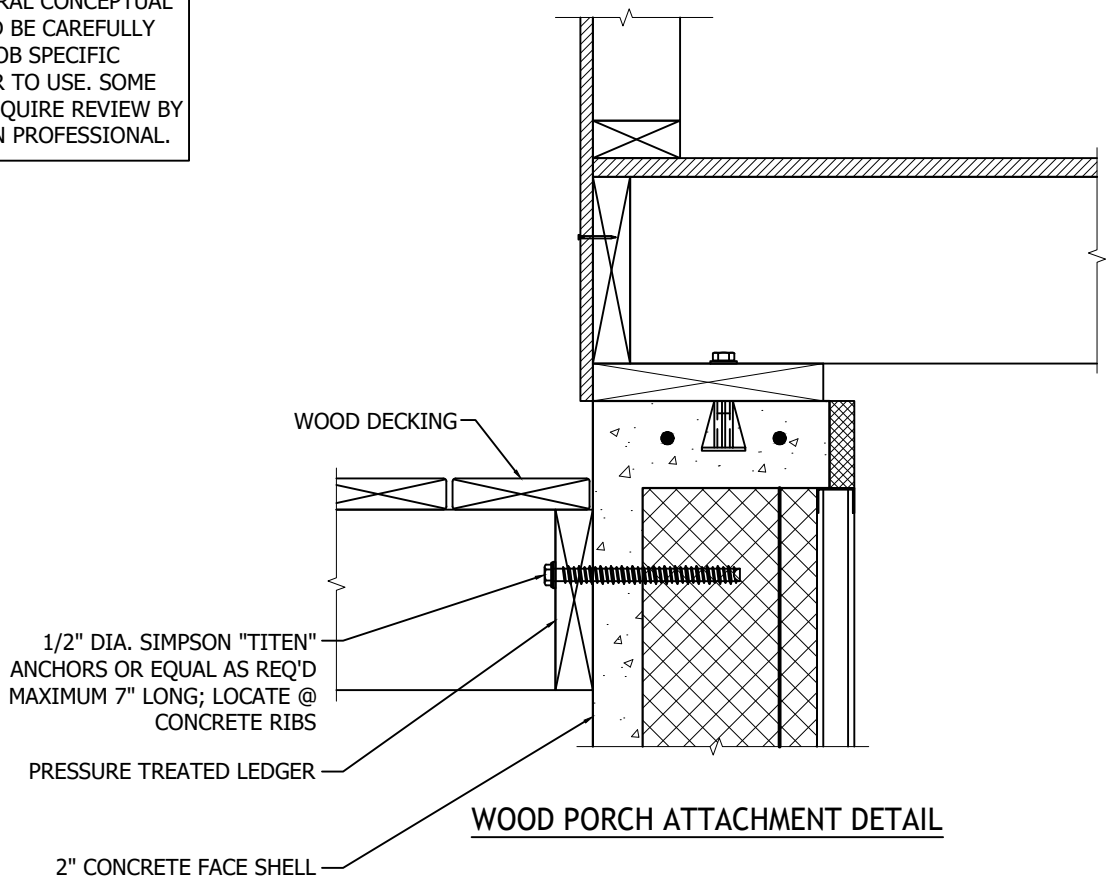
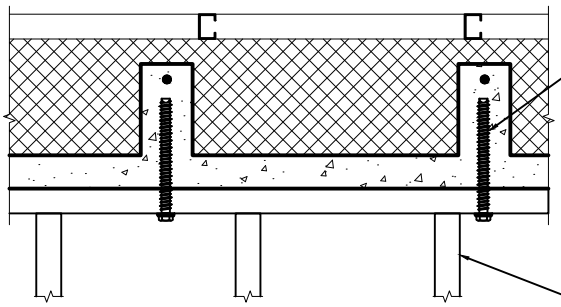


WOOD PORCH ATTACHMENT DETAIL



HORIZONTAL SECTION SHOWING BOLTING PATTERN

BEFORE ADDING DECKS TO AN EXISTING ENVIROCAST APPLICATION CONSULT *VANHOOSECO O*R A DESIGN PROFESSIONAL TO ENSURE ADEQUACY OF THE FOOTING FOR THE ADDITIONAL LOADS.

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PORCH SUPPORT DETAIL

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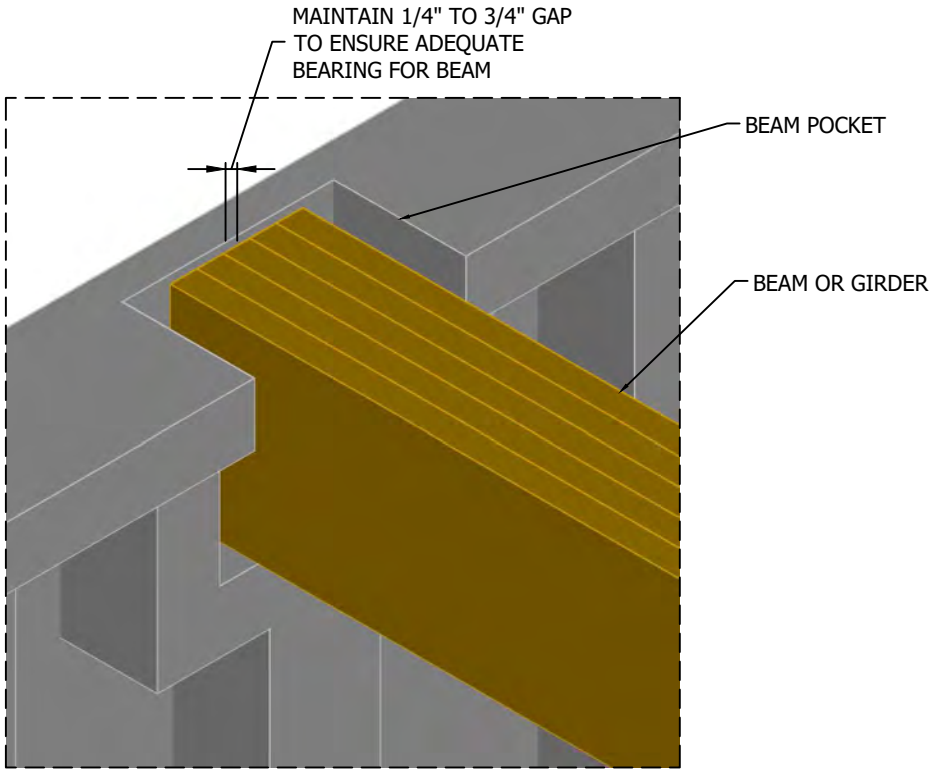
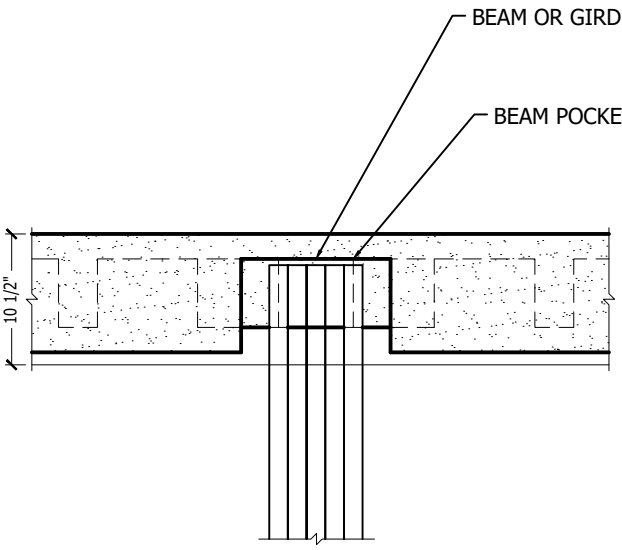
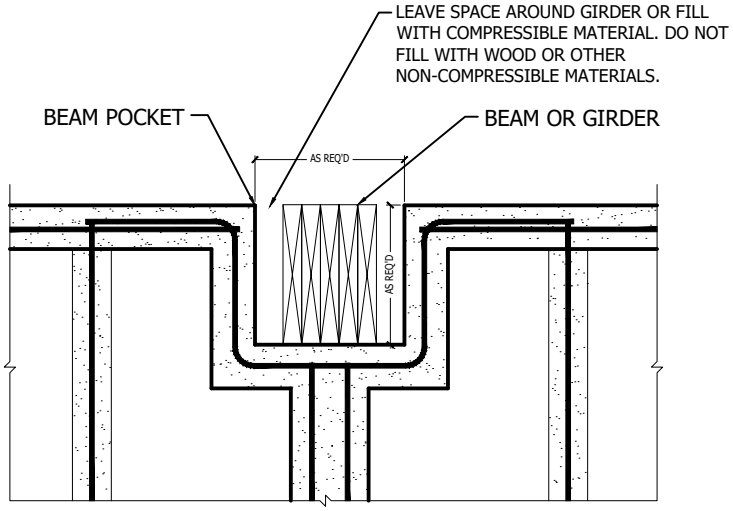


ISOMETRIC VIEW



PLAN VIEW



ELEVATION VIEW

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BEAM POCKET DETAILS

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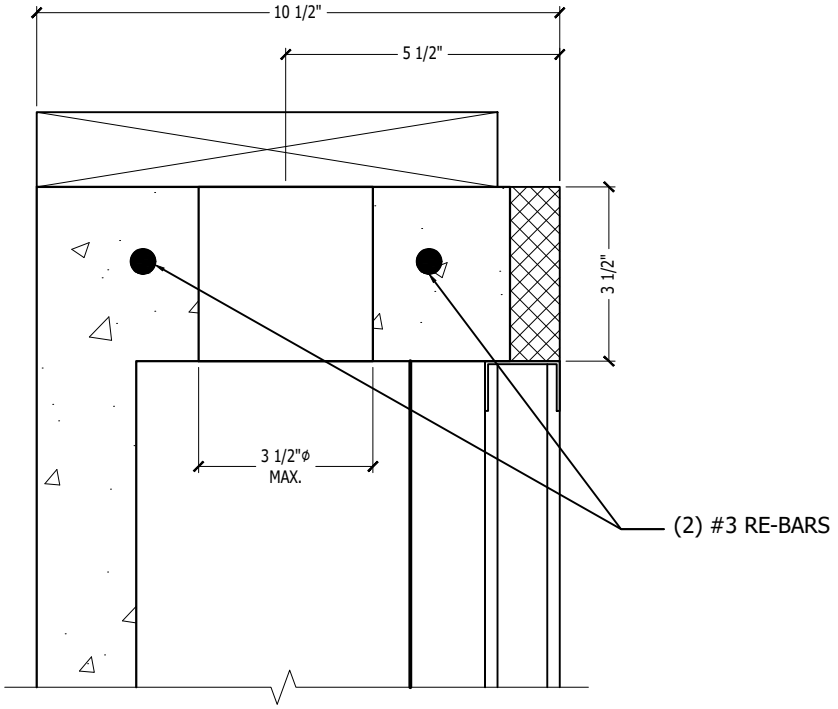
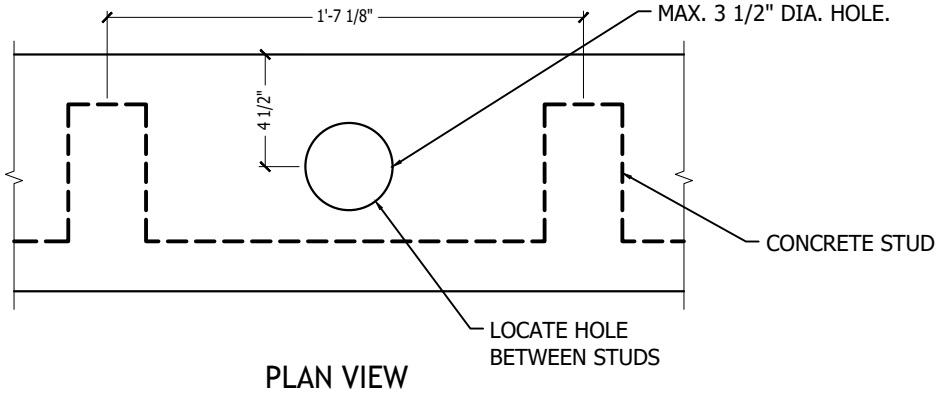


SECTION VIEW

HOLES MAY BE DRILLED THROUGH CONCRETE BOND BEAM FOR ELECTRICAL & PLUMBING DROPS. SEE BELOW FOR PROPER PLACEMENT.

CAUTION: AVOID CUTTING STEEL REINFORCEMENT. DO NOT CUT OR DRILL INTO WALL STUDS.

LARGER HOLES CAN BE FORMED INTO PANELS IF THE LOCATION IS PROVIDED PRIOR TO FABRICATION



PLAN VIEW

SAFE LOCATION TO DRILL HOLES THROUGH BOND BEAM

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BOND BEAM HOLE DETAIL

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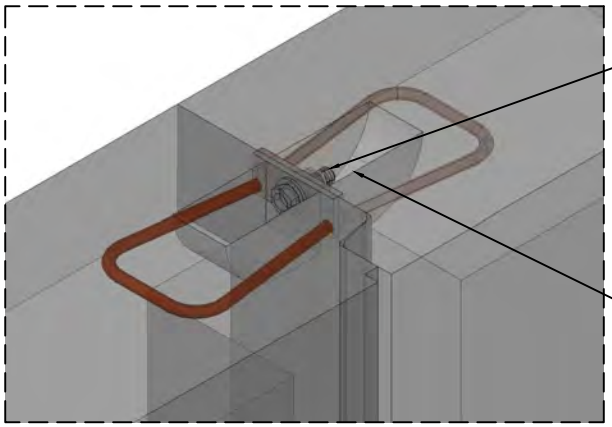

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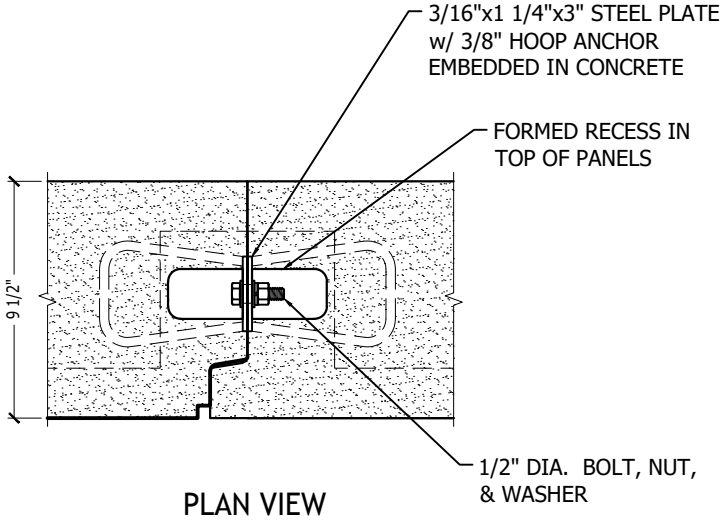

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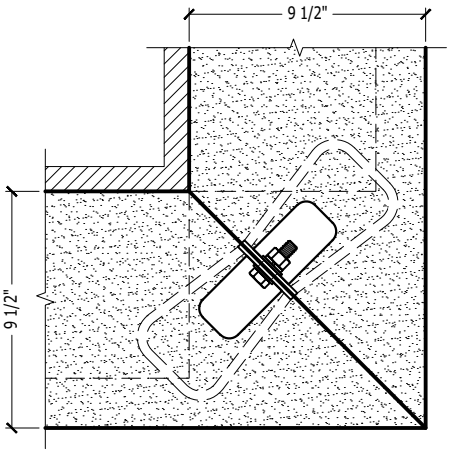
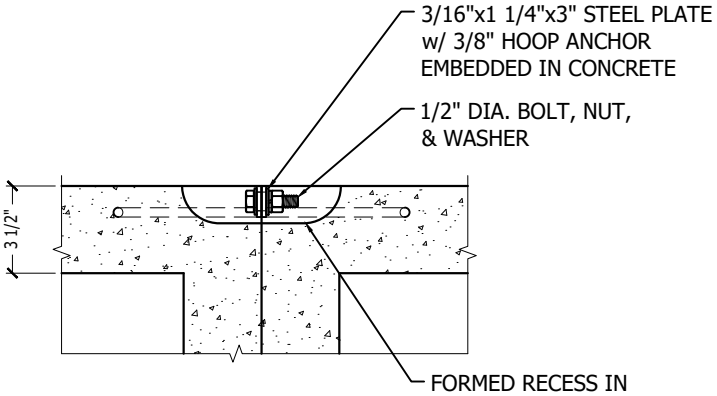
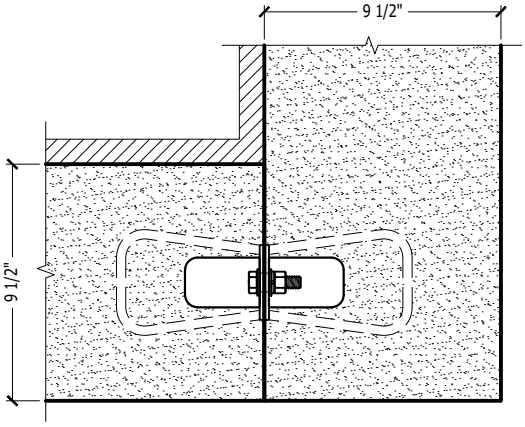


PLAN VIEW @ MITERED CORNER



SECTION VIEW



PLAN VIEW @ BUTT CORNER

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TOP SADDLE CONNECTION

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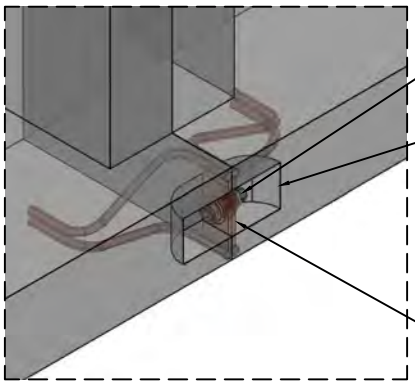
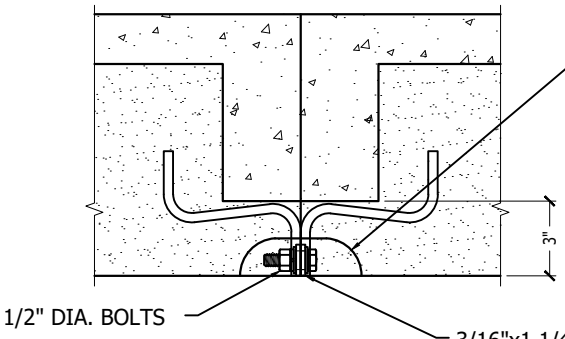
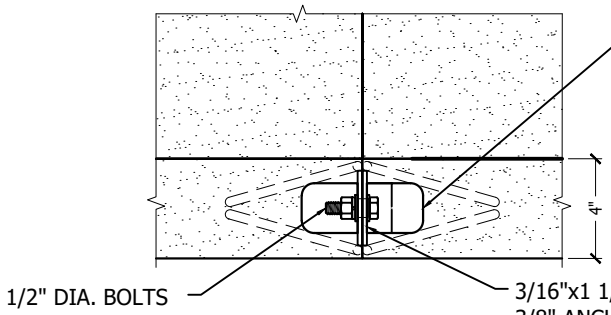


ISOMETRIC VIEW MITERED JOINT



PLAN VIEW @ BASE



ELEVATION @ BASE

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BASE SADDLE CONNECTION

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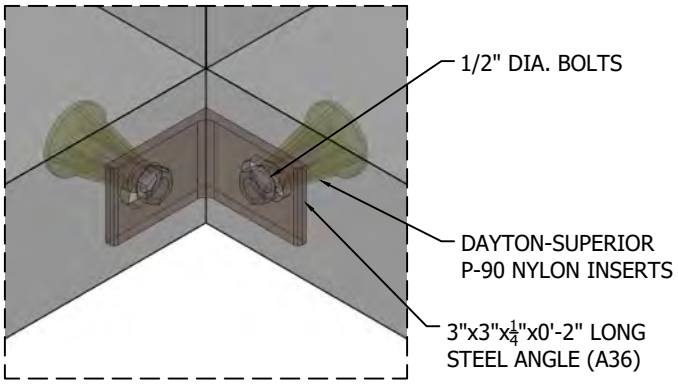
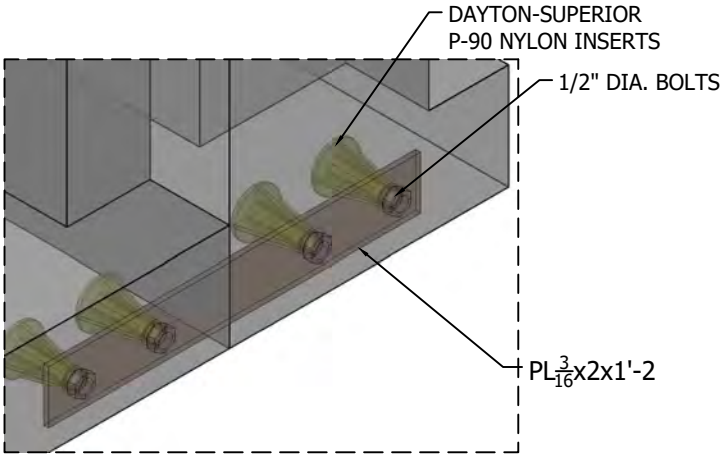
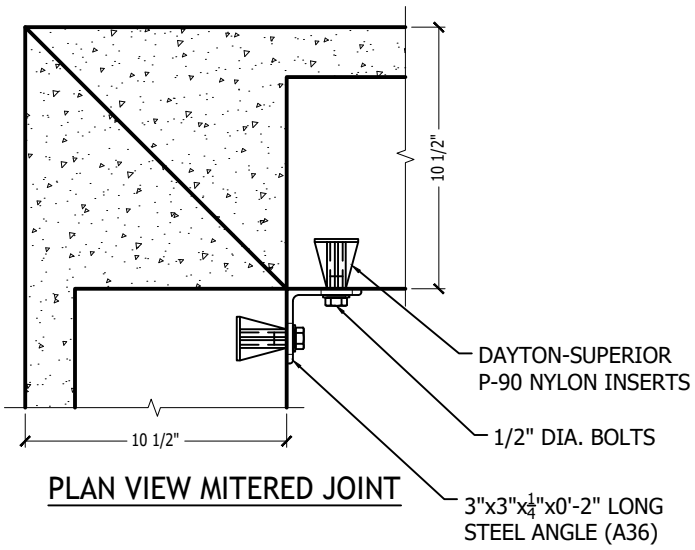


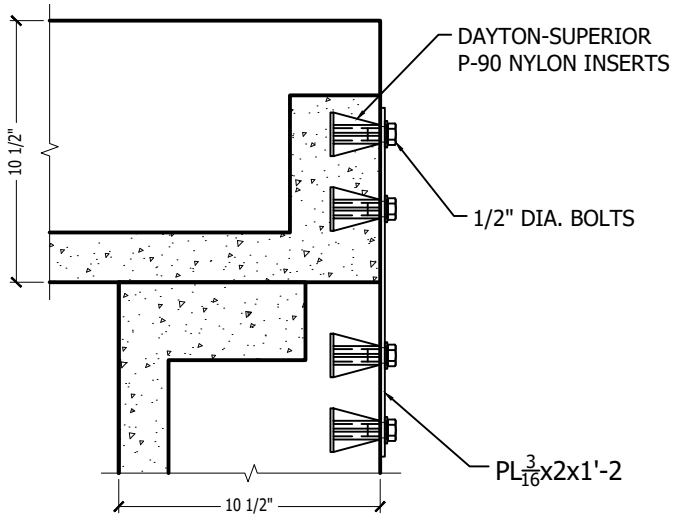
ISOMETRIC VIEW MITERED JOINT



ISOMETRIC VIEW BUTT JOINT



PLAN VIEW MITERED JOINT



PLAN VIEW BUTT JOINT

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BASE CORNER CORNER CONNECTIONS

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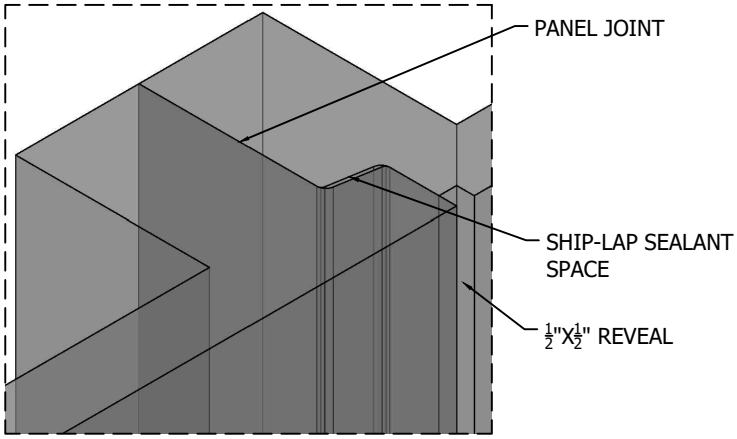
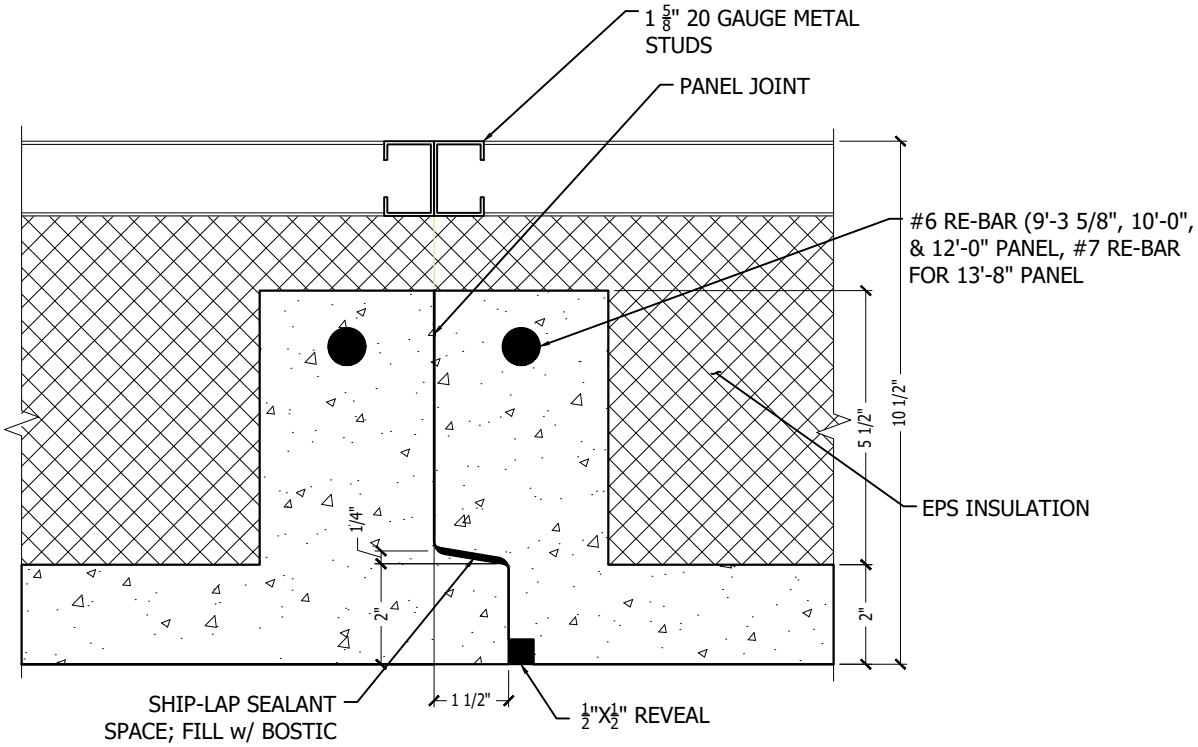


ISOMETRIC VIEW SHIP-LAP JOINT



PLAN VIEW

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SHIP-LAP JOINT

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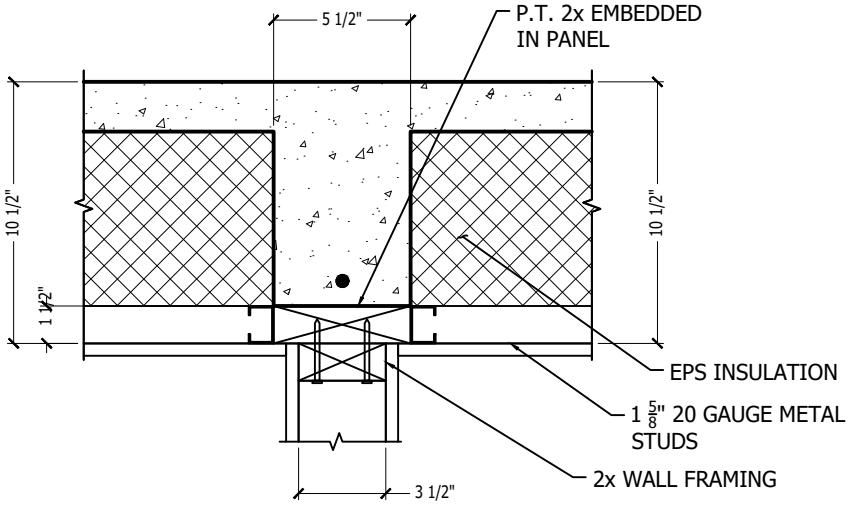
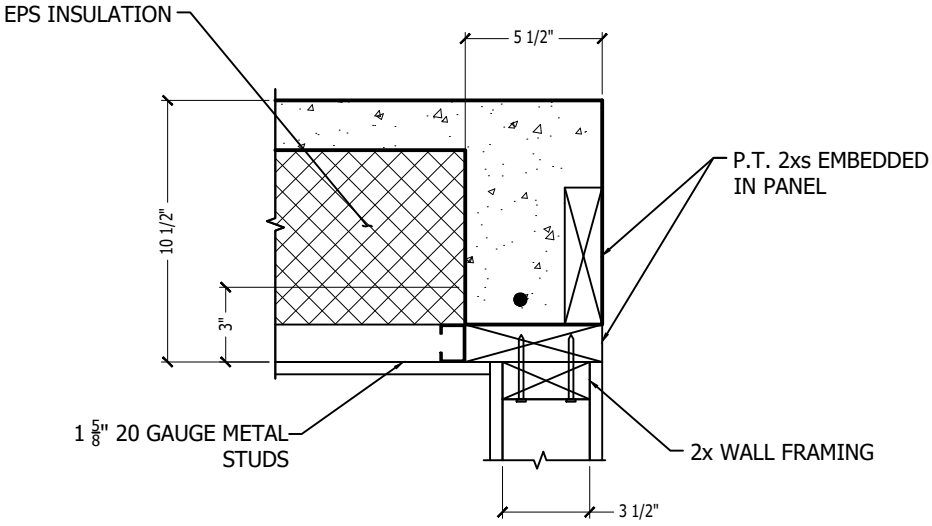


PLAN VIEW @ STRAIGHT WALL



PLAN VIEW @ END OF WALL

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WOOD BUTT DETAILS

Drawn By:	Checked By:
ART	ART
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HOMEOWNER GUIDE

Additional copies of this Homeowner Guide are available for download at www.VANHOOSECO.com.

Controlling Humidity and Condensation
Modern construction methods have resulted in tighter, more energy-efficient homes that require planning for the control of humidity and condensation. Because an Enviro-Cast wall panel is constructed with a high-performance concrete mix and lined with closed-cell foam insulation, it prevents the free flow of moisture through the wall panel. Though this is a good thing when seeking to keep ground water out of your basement, it also acts to keep moisture vapor inside the house.

In certain conditions of high interior humidity and low exterior temperatures, it is possible that condensation may form on the interior surface of the Enviro-Cast panel. Condensation can occur anytime moist air contacts a surface that has a temperature less than the dew-point of the air.

Condensation may be controlled in a number of ways:

1. By reducing the amount of moisture in the air:
   a. Limit moisture-producing sources or activities like non-vented clothes dryers or hot tubs
   b. Use a dehumidifier.
2. By preventing the moisture from reaching the cold wall surface:
   a. Remove the moist air with an exhaust fan or other ventilation.
3. By increasing the temperature of the room:
   a. Add heat and the air will hold more moisture.
   b. increase the room temperature and you will also increase the temperature of the wall surface.

It is usually most effective to use more than one of these methods in order to effectively control condensation.

"Original Equipment" Foam Insulation
Enviro-Cast Wall System products are tested to the UL1715 fire test standard and comply with the requirements of the 2018 international Residential Code - Section R316 (Foam Plastic). No additional thermal barrier is required UNLESS additional foam insulation has been added after the panel was manufactured.

Exterior Helpful Hints

- **Grade** - Slope the ground away from the home a minimum of 6 inches within the first 10 feet from the wall (additional slope may be required by your local building code). Re-grade if soil settles over time.
- **Gutters and Downspouts** - Keep gutters and downspouts free of leaves and debris. Splash blocks or down spout extensions should be used to divert water away from the foundation.

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Interior Finishing of Enviro-Cast Wall Panels

Corner Studs and Blocking -Always use preservative-treated lumber for corner studs and nailers placed against the concrete. For areas where there will be objects fastened to the finished walls between existing studs, install appropriate wood blocking. (i.e. For curtain rods, cabinets, doorstops, or electrical and plumbing fixture locations.)

Wiring and Plumbing - Using the pre-cast holes in the studs, install all electrical wiring and small plumbing lines according to local codes. Holes may be drilled through the top bond beam for wiring and plumbing drops.

Drywall and Interior Finishes -After the corner studs and all blocking are in place, the Enviro-Cast Wall Panels are ready for drywall. Regular 1/2' drywall is recommended to span the stud spacing. It is best to leave a 1/2" gap between the concrete floor and the bottom of the drywall to prevent moisture absorption into the drywall. This moisture can cause drywall deterioration and paint finish problems. Attach the drywall using 1" drywall screws (fine thread/sharp point). A solid bead of construction adhesive should be applied to the top bond beam and the face of the stud. The use of paneling or other similar products should still be backed with a layer of drywall.

Exterior Holes in Enviro-Cast Wall Panels -Any exterior holes that may be required for such things as sanitary soil lines, electrical service entrance cables, or chimney flues, should be made following these simple procedures:

1. Mark-out the location and size of the hole required.
2. Use a masonry hole saw or a hammer drill with a small bit (to drill a series of holes around the perimeter of the hole). With a hammer and chisel start to work the area inside the small holes until the hole is the required size and shape.
3. After the pipe is installed, completely seal the entire area around it with a flexible sealant to prevent water penetration. A one part urethane or polyurethane sealant, available from your local hardware store, is recommended. (Do not use Acytoxy-cure silicones.)

Adding Insulation to an Enviro-Cast Wall Panel

There are two insulation methods that will consistently yield satisfactory results and prohibit condensation from forming within the wall cavity:

- Spray-on 2-part polyurethane foam. This is a closed cell material and completely closes off the cavity from moisture penetration. It can be obtained both professionally and as a DIY kit. Several DIY kits are available on the internet. Foam can be sprayed to the required thickness to achieve the desired R-value.
- Add extruded/expanded polystyrene foam board between the studs, and seal between the foam board and studs with a ("great stuff-type") canned polyurethane. The polystyrene foam board is closed cell; moisture cannot pass through, and when used in conjunction with the canned foam, completely closes off the cavity from moisture penetration. Foam board is readily available for the DIY market, as is the canned polyurethane foam.

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Generally speaking, after adding any type of exposed foam insulation to the interior of a wall assembly, the building code requires that you cover the insulation with a thermal barrier to protect the insulation from fire - see your local building code for details.

When adding other types of insulation to am Enviro-Cast wall panel, it is important to consider two factors to ensure that water vapor does not condense within the wall cavity:

1. Controlling the moisture content of the air trapped in the cavity while adding the insulation. (Use of a dehumidifier is recommended.)
2. Restricting moisture-laden air from entering the cavity from the living space or from the earth beneath the wall. (This may be accomplished through the use of paints, sealants, and spray foams. Daylight drains require a backwater valve on the drain line to prevent a back-flow of moist air.)

The essential issue is that you must stop moisture from entering the stud cavity.

- Fiberglass batt, cellulose, Icynene®, or other materials may perform satisfactorily if the considerations noted above are handled properly.

NOTE: This information is general in nature and may not be applicable in every situation. Your design professional (i.e. builder, architect, engineer, or supplier) can assist you in special conditions. When in doubt, please ask for guidance concerning your particular application.

Still have questions? Contact your Enviro-Cast Wall System representative for answers to your questions, or visit our website at www.VANHOOSECO.com

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BUILDER'S CHECKLIST

For use by builders and general contractors to ensure proper foundation design, construction, installation, and performance. All page references made below use the Enviro-Cast Wall System Builder's Technical Handbook and the 2018 international Residential Code. Additional copies of this checklist are available for download at www.VANHOOSECO.com.

1. Provide your local Enviro-Cast Wall System representative with:
- Floor plans and elevations
- Design load (total pounds) per linear foot on the foundation
- Beam and column locations, sizes and point loads
- Additional point loads and locations
- Window and door locations, rough opening sizes, and opening style
- Egress (Emergency Escape and Rescue Openings) considerations
- Exterior finishes requiring support ledges
- Interior stairway locations, opening sizes (affects panel lengths)
- inside fill conditions
- Exterior basement entry system specifications
- Chimney details

2. Prepare Site:
- Building Permits and Inspections
- Soils Verification
- Excavation
- Placement of Drain Pipe and Sump Pit
- Installation of Filter Membrane
- Cold Weather Practice
- Placement of Crushed Stone Footing
- Locate Building Corner Pins and Establish Grade
- Site Accessibility: Truck and Crane Access, Trailer Unload Area, Crane Pad(s)
- Installation of Sill Plate and Framing Attachments
- Backfill After Concrete Floor has been Poured and Framing/ Decking Connection is complete

3. Provide checklist from Builder's Technical Handbook for:
- Excavation
- Concrete floor
- Framing
- Inspection

4. Provide approved drawings (Date: _____Revision: _____)for:
- Excavation
- Concrete
- Framing

5. Soil characteristics (Pg. 11)
- Determine type and allowable Load-Bearing Pressure (Table on Pg. 11)
- Determine combined footing load per linear foot

6. Crushed stone footing (Pg. 10)
- Determine stone depth (Table # on Pg. 10)
- Communicate stone depth to excavator

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7. Excavation (Pg. 9)
- Provide elevations
- Set corner pins
- Communicate to excavator: site accessibility needs (trucks and crane)

8. Drain system and daylight drain or sump (Pg. 4)
- Communicate to excavator: placement of perforated drain pipe in reference to corner pin location (Figure on Pg. , Foundation Drainage on Pg. 4)
- Communicate to excavator: location of daylight drain and backwater valve (Pg. 4)
- or location of sump accumulation tank (s)
- Install filter membrane

9. Shear walls (Pg. 13)
- Verify need for shear walls _
- lf required, verify that shear walls are attached to floor, outside wall and joist(s) above
- Choose shear wall construction: ____Enviro-Cast Wall Panel or ____ Other construction
- lf other construction, communicate construction requirements

10. Concrete floor (Pg. 9)
NOTE: To comply with building code and Enviro-Cast Wall System requirements, the framing / decking connection at the top of the Enviro-Cast Panels and the floor slab at the bottom of the Enviro-Cast Wall panels MUST be completed prior to backfilling!
- Communicate need to embed Enviro-Cast Walls Slab Connector (if included) into concrete floor pour
- Communicate slab specifications per Code and Builder's Technical Handbook requirements

11. Crawl space (Pg. 41-43): Choose one of the following:
- Treated wooden bracing at 48” O.C., or
- 12” minimum inside fill, or
- 2” minimum poured concrete floor

12. Framing/ Modular connection (Pg. 44 to 54)
NOTE: To comply with building code requirements, the framing I decking connection at the top of the Enviro-Cast Wall System and the floor slab at the bottom of the Enviro-Cast Wall System MUST be completed prior to backfilling!
- Determine fastening schedule (____" OC)
- Communicate fastening schedule to framers
- Bolted not more than 12" from the ends of each sill plate section (R403.1.6)
- Framing strap (if used) lies between band joist and sill plate (Figure # on Pg.), is fastened with 1-1/2” nails provided, 1 nail per hole, Verify strap spacing (Table # on Pg.52)

13. Electrical/ Plumbing
- Communicate proper method to drill / cut holes through Enviro-Cast Wall Panels.
Exterior Holes in Enviro-Cast Panels -Any exterior holes that may be required for such things as sanitary soil lines, electrical service entrance cables, or chimney flues, should be made following these simple procedures:

1. Mark-out the location and size of the hole required.
   1.1.1. Use a masonry hole saw or a hammer drill with a small bit (to drill a series of holes around the perimeter of the hole). With a hammer and chisel start to work the area inside the small holes until the hole is the required size and shape.
   1.1.2. After the pipe is installed, completely seal the entire area around it with a flexible sealant to prevent water penetration. A one part urethane or polyurethane is recommended. (Do not use Acytoxycure silicones.)

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EXCAVATOR'S CHECKLIST

For use by excavators to ensure accuracy of excavation, efficiency in foundation installation, and proper backfilling and grading. All page references made below use the Enviro-cast Wall System Builder's Technical Handbook and the 2018 International Residential Code. Additional copies of this checklist are available for download at www.VANHOOSECO.com.

1. Builder' Technical Handbook
   - ○ Obtain your personal copy of the Enviro-Cast Wall System Builder's Technical Handbook
2. Site drawings
   - ○ Confirm you are working from the approved drawing before you dig
- ○ Drawing date:_____ Drawing Rev:_____
3. Building placement
   - ○ Obtain required benchmark elevations from builder
- ○ Excavate per set pins from builder
4. Excavation (Pg. 9)
   - ○ Trench dug below frost line
- ○ Verify with builder either: _____sump pump or _____ daylight drain
- ○ lf sump pump, number of accumulation tanks_____
- ○ Provide minimum 24" over-dig at base of foundation (both sides of wall) (Pg. 9)
- ○ Properly bench banks (for excavations more than 5'-0" deep, bench or slope in accordance with OSHA Standard 1926.652)
- ○ Provide ramp for access to hole if required
- ○ Pile soil a safe distance from hole
- ○ Excavate for column pads as required
- ○ Prepare access driveway, trailer location pads, and crane pad(s)
5. Crushed stone footing (Pg. 10)
   - ○ Obtain required stone depth from builder (_____inches)
- ○ Dig footing per required stone depth (Table # on Pg. 10)
- ○ Use 4 inch perforated pipe (Figure on Pg. 9) and locate pipe (Foundation Drainage on Pg. 4)
- ○ Place drain pipe (Figure on Pg. 9 and Foundation Drainage on Pg. 4)
- ○ Clean crushed stone (1/2" max; Pg.)
- ○ Consolidate stone in a maximum of 8" lifts with plate vibrator '
- ○ Direct drain pipe to accumulation tank(s) or daylight (Foundation Drainage on Pg.)
- ○ Evenly grade the stone to within +/- 1 inch of level
- ○ Leave enough stone behind for use in final grading by the wall installation crew
- ○ Install filter membrane on top of stone footing prior to backfill (R405.1.1)
6. Concrete floor (Pg. 9)
   - ○ Clean 4" base provided (R506.2.2)

7. Backfilling (Pg. 5)
   - ○ Get approval to backfill from builder

8. Final grading (Pg. 9)
   - ○ Slope the final soil grade a minimum of 6" fall within the first 10"-0" to divert ground water away from foundation (Pg.9 and R401 .3)
- ○ Finished soil grade must be at least 6" below top of the Enviro-Cast Wall Panels (Pg. 9)

NOTE: To comply with building code requirements, the framing I decking connection at the top of the Enviro-Cast Wall Panels and the floor slab at the bottom of the Enviro-Cast Wall Panels MUST be completed prior to backfilling!

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CONCRETE WORK CHECKLIST

For use by concrete flatwork contractor in pouring the basement floor. All page references made below use the Enviro-Cast Wall Systems Builder's Technical Handbook and the 2018 International Residential Code. Additional copies of this checklist are available for download at www.VANHOOSECO.com.

1. Builder Guideline Booklet
   - ○ Obtain your personal copy of the Enviro-Cast Wall System Builder's Technical Handbook
2. Building drawings
   - ○ Confirm you are working from the approved drawing
- ○ Drawing date: _____Drawing Rev:_____
3. Crawl space (Pg 41-43): Confirm, with builder, one of the following:
   - ○ Treated wooden bracing at 48” OC, or
- ○ 12” minimum inside backfill, or
- ○ 4” minimum poured concrete floor thickness
4. Concrete floor (Pg.9)
   - ○ Clean 4" base (R506.2.2)
- ○ Install vapor retarder under floor pour as required by local code (R506.2.3)
- ○ 3 1/2" minimum concrete floor thickness (R506.1)
- ○ Fasten lath at the desired height of the concrete floor to form a screed board
- ○ Screw slab connectors (if present) into the threaded insert in the bottom portion of the Enviro-Cast panels that form a mating surface with the floor pour before pouring concrete floor

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FRAMER'S CHECKLIST

For use by framing contractors to ensure proper framing connection to top of Enviro-Cast Wall panels. All page references made below use the Enviro-Cast Wall System Builder's Technical Handbook and the 2018 International Residential Code. Additional copies of this checklist are available for download at www.VANHOOSECO.com.

1. Builder Guideline Booklet
   - ○ Obtain your personal copy of the Enviro-Cast Wall System Builder's Technical Handbook
2. Building drawings
   - ○ Confirm you are working from the approved drawing
- ○ Drawing date: Drawing Rev:_____
3. Crawl space (Pg. 41-43): Confirm, with builder, one of the following:
   - ○ Treated wooden bracing at 48" OC, or
- ○ 12" minimum inside till, or
- ○ 2" minimum poured concrete floor thickness
4. Sill plate framing connection (Pg. 44-54)
   - ○ Obtain sill plate bolting frequency from builder (___24" OC or ___48" OC)
- ○ bolts with washers used to attach the sill plate to the top bond beam
- ○ Fastened above window & door headers
- ○ A minimum of 2 bolts per sill plate section
- ○ Bolted within 12" of the ends of each sill plate section (R403.1.6)
- ○ Sill plate splices are at least 48" from any foundation panel joint
5. Perpendicular floor joist connection (Pg. 46)
   - ○ Each joist nailed to sill plate with two 16d nails (or three 8d nails per code)
6. Parallel floor joist connection (Pg. 46)
   - ○ 2 x 6 end-wall braces and joist blocking located every 48" and within 12" from the interior of each corner (Figure 31 on Pg. 46)
- ○ 2 x 6 end-wall brace nailed to sill plate with five 10d nails
- ○ Obtain number of solid blocks required from builder
- ○ 1 solid block used if backfill is 0' to 7'-6"
- ○ 2 solid blocks used if backfill is between 7'-6" and 9'-6" for joists less than 10" in height
- ○ 3 solid blocks used if backfill is between 7'-6" and 9'-6" for joists that are greater than or equal to 10" in height (See fastening details on Pg. 46)
- ○ Blocking requires six 10d nails through floor (conventional construction) or construction adhesive on top of blocking (modular construction) (Pg. 52)
7. Modular connection (Pg. 52)
   - ○ Obtain required spacing (32" or 48" OC) for framing straps from builder
- ○ install framing straps between band joist and sill plate
- ○ Nail framing strap with 1 1/2" nails provided with straps
- ○ 1 nail in every nail hole
8. Wooden Shearwall (Pg. 13)
   - ○ Determine from builder if a wooden shear wall is required (___Yes ___ No)
   - ○ Shear wall attached to concrete floor, wall and floor joist(s) above (per design professional specifications)
9. stairwell header (Pg. 55 to 56).
   - ○ Is the long side of the stairway opening within 8' of the parallel Enviro-Cast Wall Panels?
   If "YES": '
   - ○ Support beam (2 x 10 sill plate and two 2 x 8's) 2'-0" past each end of the opening without splices
- ○ Use 1/2" bolts in every precast hole through the bond beam
- ○ Openings larger than 9'-6" must be reviewed by an engineer
10. Roof truss connections (Pg. 54)
    - ○ Obtain sill plate bolting frequency from builder (____24" OC or ____ 48" OC)
- ○ Verify with builder what structural cross bracing (for wind loads or backfill) is required for the trusses (per manufacturers specs)
- ○ Verify with builder if uplift clips are required for the trusses

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