

# H. Pre-Engineered and Prescriptive Foundation Designs

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<b>Drawing No.</b>	<b>Title</b>
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Notes

1. These recommended foundation designs contain guidance for making manufactured homes, placed in Special Flood Hazard Areas, resistant to natural hazards. The designs do not cover all installations. Manufactured homes placed in the following areas are excluded:
  - a. V zones
  - b. Coastal A zones: Areas identified on FIRM as areas of Limited Moderate Wave Action (LIMWA) where conditions can produce breaking wave heights of 1.5 feet or greater.
  - c. Floodways
  - d. Areas with Flood Velocities over 5 feet per second
  - e. Areas with Flood Depths over 3 feet
  - f. Areas with Seismic Spectral Acceleration Constants  $S_s$  greater than 0.5g or  $S_1$  greater than 0.15g
  - g. Areas with ground snow loads greater than 40 pounds per square foot
  - h. Installations with pier heights over 36 inches
  - i. Manufactured homes weighing less than 25 psf
  - j. Manufactured homes with frames spaced less than 95 inches
  - k. Manufactured homes with endwall heights over 8 feet 2 inches
2. The foundation systems have been designed to resist loads specified in ASCE 7 *Minimum Design Loads for Buildings and Other Structures*. Any locally adopted code or ordinance with more stringent requirements shall govern.
3. Designs are provided as guidance for foundations that satisfy the recommended design criteria specified in Chapter 10. Selection of specific foundation type and final design must be made on the basis of individual site conditions, manufacturer installation instructions, and regulatory requirements.
4. Recommended foundation design is based on a 14-foot wide (single unit) and a 28-foot wide (double unit) manufactured home. These designs can be used with section widths up to 16 feet provided the spacing of fasteners connecting the home to the longitudinal foundation walls are reduced by the factor (14 divided by the actual section width).
5. Seismic resistant foundation designs provided (drawings SP, SM, SWF) are a suitable for homes placed in areas with Seismic Design Criteria D<sub>0</sub>, D<sub>1</sub>, D<sub>2</sub> and E with a basic wind speed of 90 mph (3-second gust) or less.
6. The foundations are depicted on flat sites. Where manufactured homes are placed on sloped lots, refer to NFPA 5000 Chapter 36.8 or IRC-2009 Sections R403.1.5 and R403.1.7 for additional requirements.
7. Soil bearing capacity shall be as required by the authority having jurisdiction. Where presumptive values are allowed, they shall be per NFPA 5000-2009 Table 36.3.4(a) IRC 2009 Table R401.4.1 or 24CFR Table 3285.202 as directed by the Building official.
8. Anchor performance shall be based on load testing and probabilistic analysis of anchors tested in both dry and saturated soils. Anchor design values shall be based on a maximum 10% lower exclusion limit and a minimum 90% confidence interval. Anchor spacing in these designs is based on a minimum stiffness of 1,200 pounds per inch for in-line anchors and 675 pounds per inch for anchors used with 11"x17" steel stabilizer plates. These stiffness values were determined from tests of 5-foot anchors conducted in saturated and unsaturated uniform (poorly graded) medium to fine grained sandy soils (soil class 4 A) in Kissimmee, Florida, July 2002. Torque and/or Standard penetration tests (ASTM D-1586-99) tests should be used in ground anchor selection.
9. Preload anchors a minimum of 500 pounds or as required to fully activate the resistance of the stabilizer plates and the anchor helices.
10. Anchor straps shall be galvanized, tested per ASTM D3953, and shall have a minimum allowable working load of 3,150 pounds and a minimum tensile strength of 4,725 pounds.
11. Concrete anchors shall provide a minimum allowable working load of 3,150 pounds and a minimum ultimate load of 4,725 pounds. Place concrete anchors a minimum of 3 inches away from all edges of footings.
12. Concrete masonry units shall be Type I or Type II per ASTM C90. Mortar shall be Type M, N, or S per ASTM C270.
13. Polyurethane based masonry adhesives may be used in place of Portland cement/lime mortar. Masonry adhesives used shall have been tested and certified by a nationally recognized agency as equivalent to Type M, O, and S Portland cement/lime masonry. Certification shall indicate that masonry adhesive is applicable to masonry construction designed in accordance with the requirements of IRC Section 606. Masonry adhesives shall be installed in strict accordance with the manufacturer's instruction.

14. Grout shall be coarse aggregate and shall be apportioned per ASTM C476.
15. Surface bonded mortar shall meet ASTM C887-79a (2001) and ASTM C946-91 (2001).
16. Wind speed is a 3-second gust speed in miles per hour at 33 feet above ground in Exposure Category C.
17. Maximum anchor spacing is the spacing designed to limit manufactured home movement during a design event to 3" horizontal or 2" vertical. This criterion has historically been used by the manufactured housing industry.
18. End anchors shall be located no more than 2 feet from the ends of the home per 24 CFR Part 3280.306 (c)(2).
19. Flood vents required by the NFIP, in accordance with NFIP Section 60.3(c)(5), may be omitted for homes with non-structural skirting providing:
  - The skirting system will prevent differential flood depths from reaching 12 inches.
  - Performance of skirting under flood conditions is certified by a licensed professional engineer or architect.

Symbols and Abbreviations

ABS	- acrylonitrile butadiene styrene	o.c.	- on center
CMU	- concrete masonry unit	psf	- pounds per square foot
fps	- feet per second	psi	- pounds per square inch
$f_b$	- Bending strength (wood)	PL	- plate
$f_{c\parallel}$	- compressive strength parallel to grain (wood)	PT	- preservative treated
$f_{c\perp}$	- compressive strength perpendicular to grain (wood)	Ss	- spectral response acceleration at short periods
$f'_c$	- compressive strength (concrete)	$S_1$	- spectral response acceleration at a period of 1 second
$f_t$	- tensile strength parallel to grain (wood)	T and B	- top and bottom
$f_v$	- shear strength parallel to grain (wood)	Typ.	- typical
$f_y$	- yield strength of reinforcing steel	$a \geq b$	- a is greater than or equal to b
g	- gravitational force	$a < b$	- a is less than or equal to b
max	- maximum	$a < b$	- a is less than b
mph	- miles per hour		

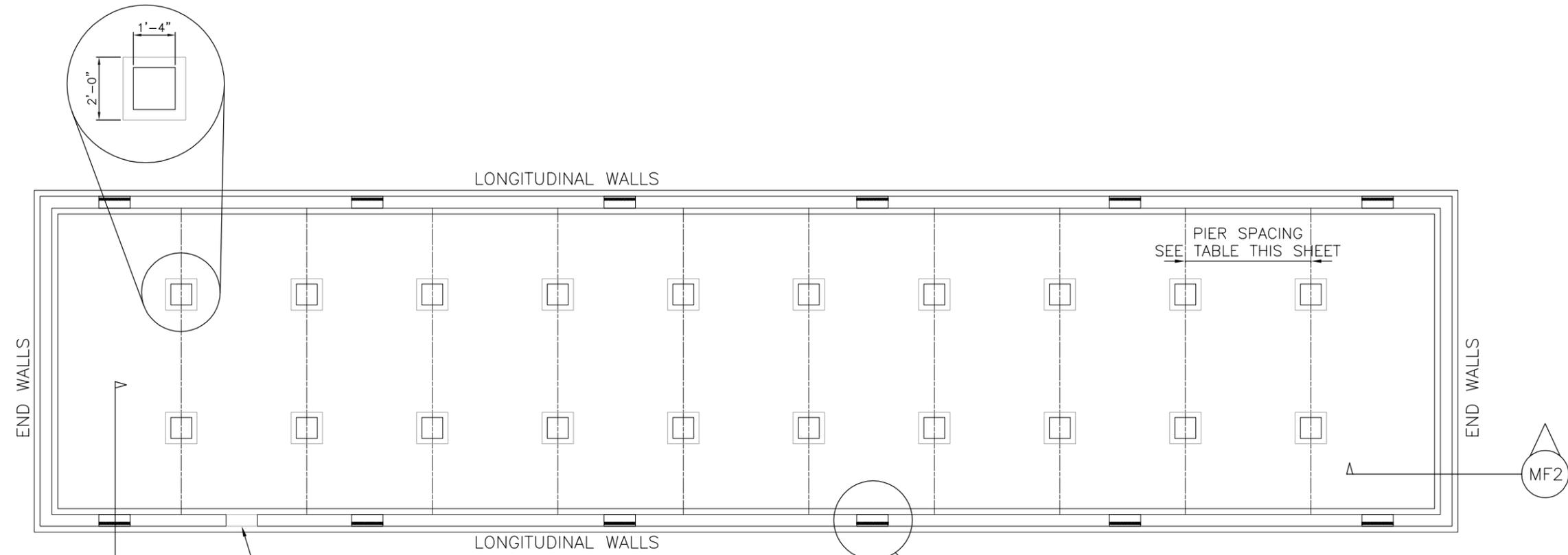
Material Specifications

1. All exposed hardware shall be hot dipped galvanized per ASTM A-153. Nails and hardware in contact with framing or plywood with preservative treatment concentration exceeding 0.40 pound per cubic foot shall be stainless steel.
2. All concrete shall be a mixture of Portland Cement, water, and aggregate and shall be proportioned to provide a minimum 3,000 psi 28-day compressive strength ( $f'_c$ ). Portland Cement shall be per ASTM C150.
3. Reinforcing steel shall be deformed bars per ASTM A615, A617 or A706 and shall have a minimum 60 ksi yield strength ( $f_y$ ). Lap splices in reinforcing steel a minimum of 36 bar diameters.
4. All wood below the BFE and not in contact with the soil (framing, shims, etc.) shall meet or exceed NFIP flood resistant material requirements. One acceptable method is to provide rot and insect resistance that meets or exceeds protection provided by ACQ (alkaline copper quaternary) at a retention of 0.25 pounds per cubic foot. See FEMA Technical Bulletin 2 for additional guidance.
5. All wood shall be of a species recognized for structural use by the authority having jurisdiction and shall provide the minimum design values as follows:

$f_b$	$\geq$	975 psi
$f_t$	$\geq$	550 psi
$f_v$	$\geq$	90 psi
$f_{c\perp}$	$\geq$	565 psi
$f_{c\parallel}$	$\geq$	1,450 psi

6. Foundation wall sheathing shall be American Plywood Association (APA) rated panels and constructed with cross laminated full width veneers that conform to Voluntary Product Standard PSI-95. Sheathing shall be pressure preservative treated with ACQ-B (ammoniacal copper quat) Type B or D to a minimum retention of 0.25 pounds per cubic foot.

**RECOMMENDED FOUNDATION-GENERAL NOTES**



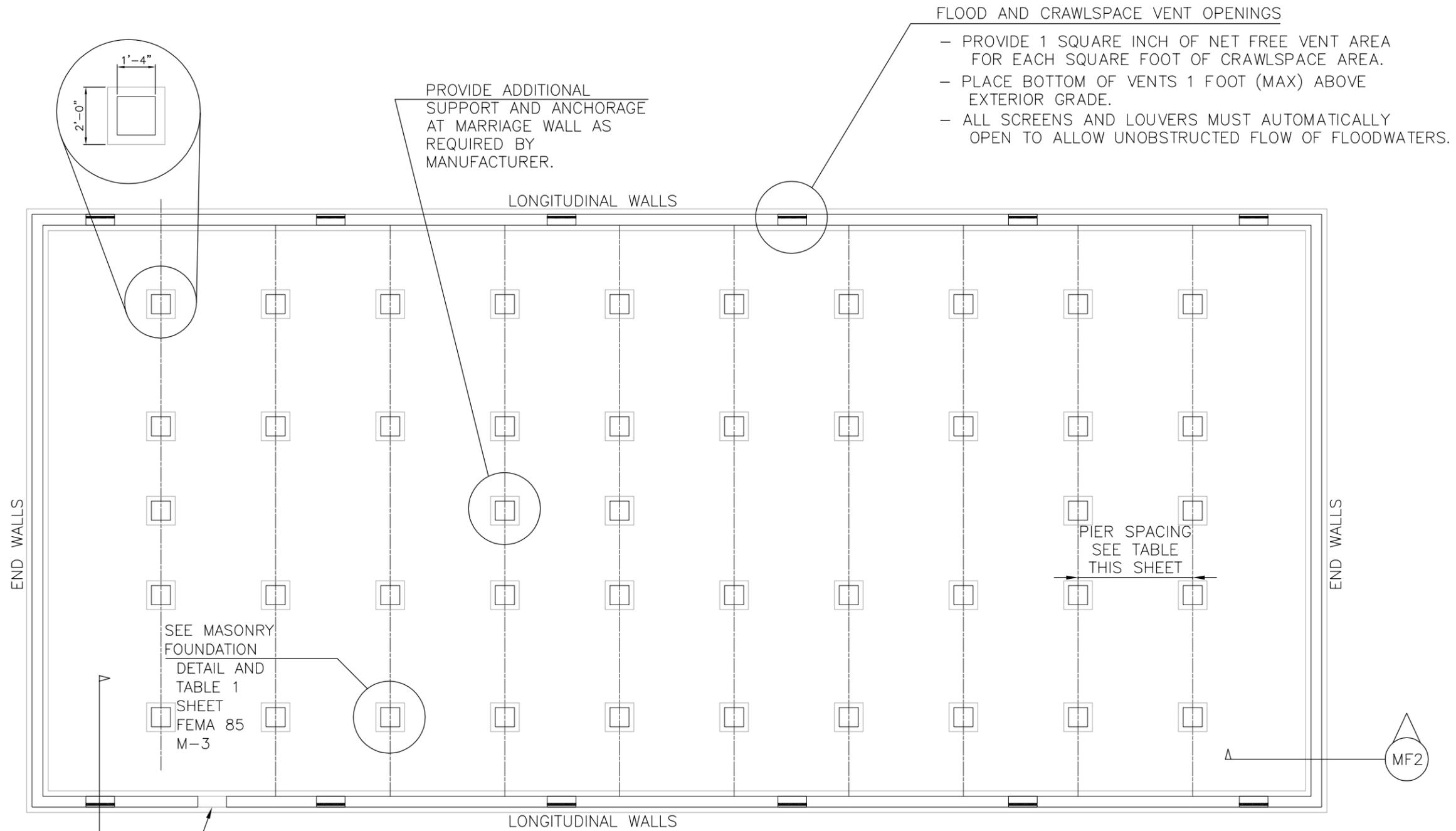
PROVIDE 32" WIDE BY 24" TALL SERVICE ACCESS OPENING WITH HINGED OR REMOVABLE TREATED WOOD OR METAL PANEL. DO NOT OBSTRUCT ACCESS OPENING WITH PIPING, DUCTS OR OTHER EQUIPMENT.

- FLOOD AND CRAWLSPACE VENT OPENINGS
- PROVIDE 1 SQUARE INCH OF NET FREE VENT AREA FOR EACH SQUARE FOOT OF CRAWLSPACE AREA.
  - PLACE BOTTOM OF VENTS 1 FOOT (MAX) ABOVE EXTERIOR GRADE.
  - ALL SCREENS AND LOUVERS MUST AUTOMATICALLY OPEN TO ALLOW UNOBSTRUCTED FLOW OF FLOODWATERS.

Maximum Pier Spacing Table									
Allowable Soil Bearing Pressure	1,000 psf To 1,500 psf			Greater Than 1,500 psf To 2,000 psf			Greater Than 2,000		
	20	30	40	20	30	40	20	30	40
Pier Spacing	5'-8"	5'-0"	4'-6"	8'-0"	8'-0"	7'-4"	8'-0"	8'-0"	8'-0"

**SINGLE UNIT MASONRY FOUNDATION PLAN**  
**NOT TO SCALE**

SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION, DESIGN CRITERIA AND LIMITATIONS. SHEET GN-1.1



PROVIDE 32" WIDE BY 24" TALL SERVICE ACCESS OPENING WITH HINGED OR REMOVABLE TREATED WOOD OR METAL PANEL. DO NOT OBSTRUCT ACCESS OPENING WITH PIPING, DUCTS, OR OTHER EQUIPMENT.

Maximum Pier Spacing Table										
Allowable Soil Bearing Pressure	1,000 psf To 1,500 psf			Greater Than 1,500 psf To 2,000 psf			Greater Than 2,000			
	Snow Load (psf)	20	30	40	20	30	40	20	30	40
Pier Spacing	5'-8"	5'-0"	4'-6"	8'-0"	8'-0"	7'-4"	8'-0"	8'-0"	8'-0"	8'-0"

**DOUBLE UNIT MASONRY FOUNDATION PLAN**  
**NOT TO SCALE**

SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION, DESIGN CRITERIA AND LIMITATIONS. SHEET GN-1.1

SECURE 2" X 8" TREATED SILL PLATE WITH 1/2" ANCHOR BOLTS NUTS, AND 3" BY 3" (OR 3" ROUND) BY 1/4" WASHERS. PLACE ANCHOR BOLTS 4'-0" (MAX) O.C. ON SIDE WALLS, WITHIN 1'-0" OF CORNERS AND WITHIN 1'-0" OF JOINTS IN SILL PLATE SECTIONS. SECURE BAND JOIST TO SILL PLATE WITH (1) GALVANIZED STEEL FRAMING PLATE AND FLOOR JOISTS TO SILL WITH (2) GALVANIZED STEEL FRAMING ANGLES. SPACE STEEL PLATES AND ANGLES PER TABLE 1.

CONSTRUCT BOND BEAM WITH #4 CONTINUOUS HORIZONTAL BAR.

CONSTRUCT FOUNDATION WALL FULLY GROUTED WITH 8" CMU REINFORCED WITH #4 VERT. BARS CENTERED ON CMU CELLS PLACED 8'-0" O.C. (4'-0" FOR 110, 130, AND 150 MPH WIND ZONES) WITHIN 12" OF CORNERS AND OPENINGS. EXTEND BARS INTO STANDARD HOOKS IN FOOTINGS.

FLOOD VENT

3-#4 CONT.

PRESSURE TREATED SHIM PAIR

SOLID BLOCK CAP

BASE FLOOD ELEVATION

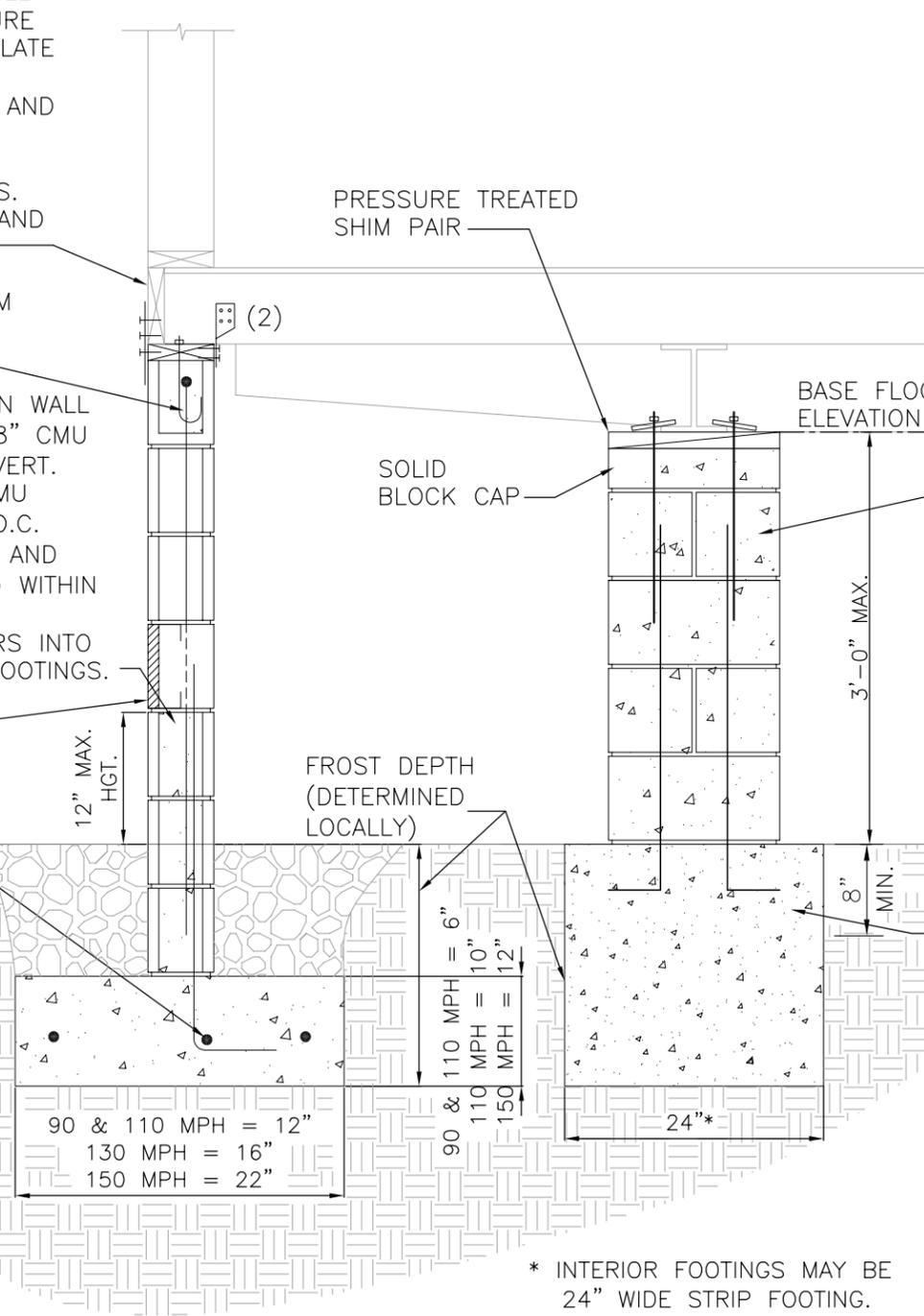
16" BY 16" MASONRY PIER: FOR FLOOD VELOCITIES UNDER 1.75 FT/SEC, DRY STACK BLOCK.

FOR FLOOD VELOCITIES BETWEEN 1.75 FT/SEC AND 3.0 FT/SEC, DRY STACK BLOCK AND APPLY 1/4" THICK (MIN) SURFACE BONDED MORTAR.

FOR FLOOD VELOCITIES OVER 3.0 FT/SEC, CONSTRUCT FULLY GROUTED PIER ON CAST-IN-PLACE FOOTING; ANCHOR PIER TO FOOTING WITH TWO #4 BARS AND ANCHOR PIER TO FRAME WITH TWO 1/2" ANCHOR BOLTS, NUTS AND 3" X 3" (OR 3" DIA.) X 1/4" STEEL PLATE WASHERS.

PLACE INTERIOR FOOTINGS AT FROST DEPTH IF REQUIRED BY AUTHORITY HAVING JURISDICTION.

INTERIOR PAD CONCRETE FOOTING: PROVIDE SCOUR PROTECTION FOR ALL INTERIOR FOOTINGS AND WITHIN 4 FEET OF EXTERIOR CORNERS FOR FLOOD VELOCITIES OVER 2 FT/SEC USING NON-ERODIBLE SOILS OR BY SETTING FOOTINGS BELOW MAXIMUM SCOUR DEPTH FOR THE FLOOD VELOCITIES PRESENT.



\* INTERIOR FOOTINGS MAY BE 24" WIDE STRIP FOOTING.

Table 1 - Floor Framing Connector Schedule

Wind Speed	Side Walls <sup>1</sup>	
	Single Unit	Double Unit
90 mph	8'-0"	8'-0"
110 mph	8'-0"	8'-0"
130 mph	4'-0"	4'-0"
150 mph	4'-0"	4'-0"
Wind Speed	Interior Shear Walls & End Walls <sup>2</sup>	
	Single Unit	Double Unit
90 mph	4'-0"	6'-0"
110 mph	2'-6"	5'-0"
130 mph	2'-0"	4'-0"
150 mph	2'-4" (2)	2'-4"

<sup>1</sup> Connector spacing is based on plate anchors capable of resisting (un-factored) 515# uplift and in-plane lateral loads and angle anchors each capable of resisting (un-factored) 340# uplift loads. Locate plate and angle anchors within 1'-4" of sill plate anchor bolts.

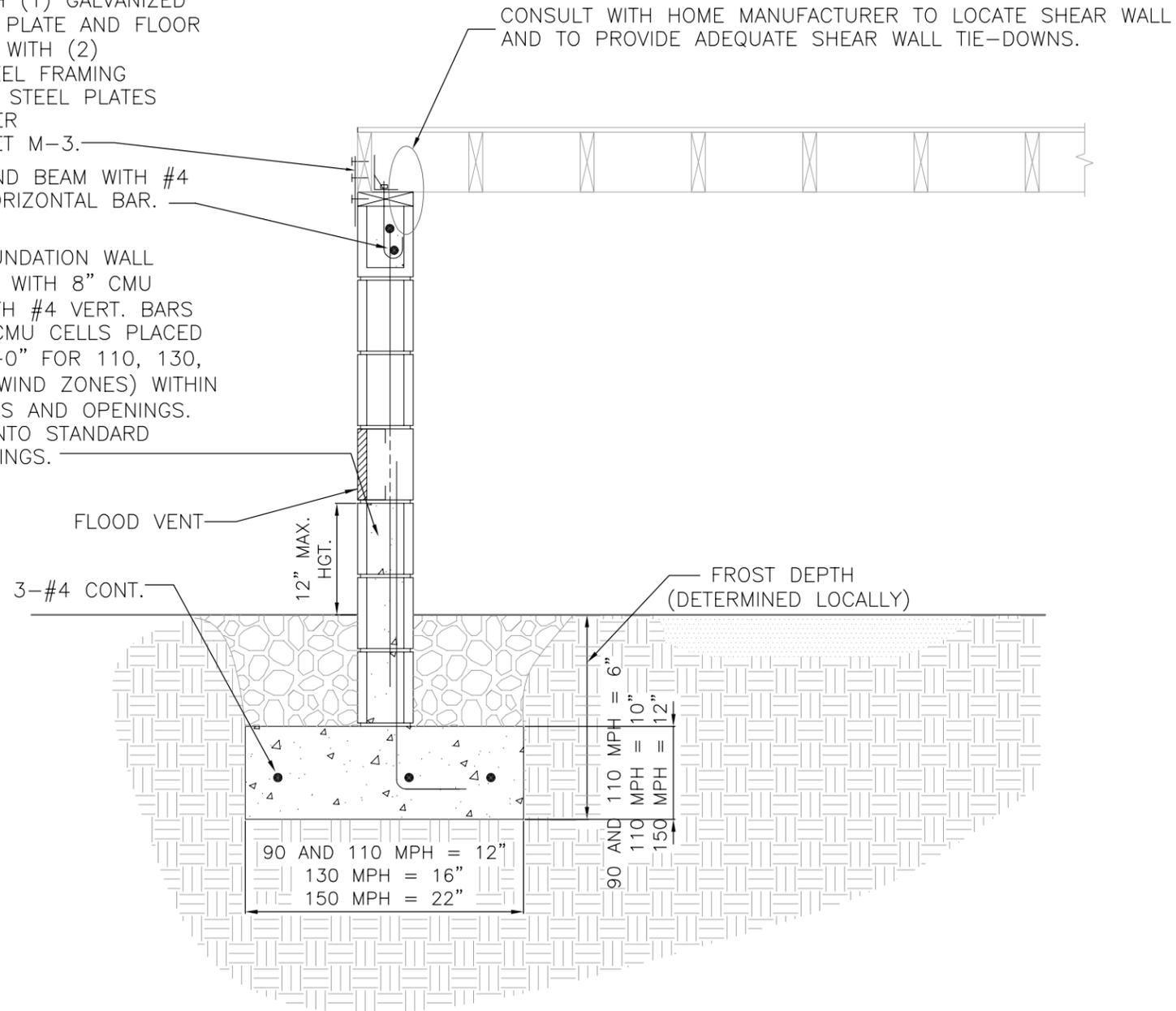
<sup>2</sup> Connector spacing is based on plate anchors capable of resisting (un-factored) 515# in-plane lateral load and angle anchors capable of resisting (un-factored) 850# in plane lateral loads.

SECURE 2 BY 8 TREATED SILL PLATE WITH 1/2" ANCHOR BOLTS NUTS, AND 3" BY 3" (OR 3" ROUND) BY 1/4" WASHERS. PLACE ANCHOR BOLTS 4'-0" (MAX) ON CENTERS ON SIDE WALLS, WITHIN 1'-0" OF CORNERS AND WITHIN 1'-0" OF JOINTS IN SILL PLATE SECTIONS. SECURE BAND JOIST TO SILL PLATE WITH (1) GALVANIZED STEEL FRAMING PLATE AND FLOOR JOISTS TO SILL WITH (2) GALVANIZED STEEL FRAMING ANGLES. SPACE STEEL PLATES AND ANGLES PER TABLE 1- SHEET M-3.

CONSTRUCT BOND BEAM WITH #4 CONTINUOUS HORIZONTAL BAR.

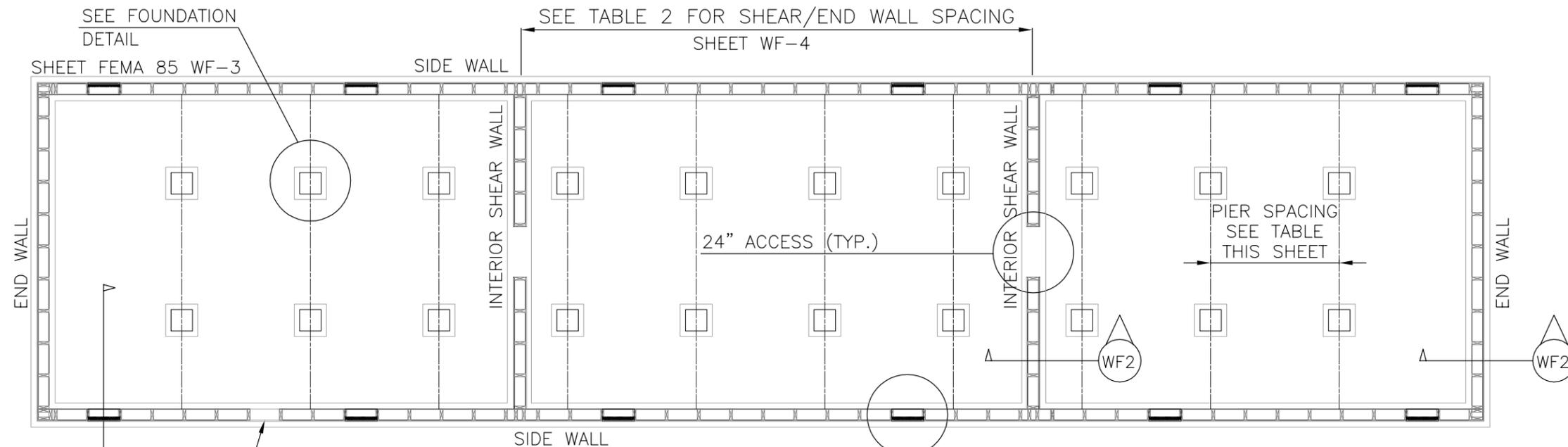
CONSTRUCT FOUNDATION WALL FULLY GROUTED WITH 8" CMU REINFORCED WITH #4 VERT. BARS CENTERED ON CMU CELLS PLACED 8'-0" O.C. (4'-0" FOR 110, 130, AND 150 MPH WIND ZONES) WITHIN 12" OF CORNERS AND OPENINGS. EXTEND BARS INTO STANDARD HOOKS IN FOOTINGS.

CONSULT WITH HOME MANUFACTURER TO LOCATE SHEAR WALL AND TO PROVIDE ADEQUATE SHEAR WALL TIE-DOWNS.



**MF2** **END WALL FOUNDATION DETAIL**  
**NOT TO SCALE**

SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION, DESIGN CRITERIA AND LIMITATIONS. SHEET GN-1.1



WF1

PROVIDE 32" WIDE BY 24" TALL SERVICE ACCESS OPENING WITH HINGED OR REMOVABLE TREATED WOOD OR METAL PANEL. DO NOT OBSTRUCT ACCESS OPENING WITH PIPING, DUCTS OR OTHER EQUIPMENT.

- FLOOD AND CRAWLSPACE VENT OPENINGS
- PROVIDE 1 SQUARE INCH OF NET FREE VENT AREA FOR EACH SQUARE FOOT OF CRAWLSPACE AREA.
  - PLACE BOTTOM OF VENTS 1 FOOT (MAX) ABOVE EXTERIOR GRADE.
  - ALL SCREENS AND LOUVERS MUST AUTOMATICALLY OPEN TO ALLOW UNOBSTRUCTED FLOW OF FLOODWATERS.

Maximum Pier Spacing Table									
Allowable Soil Bearing Pressure	1,000 psf To 1,500 psf			Greater than 1,500 psf To 2,000 psf			Greater than 2,000 psf		
	Snow Load (psf)	20	30	40	20	30	40	20	30
Pier Spacing	5'-8"	5'-0"	4'-6"	8'-0"	8'-0"	7'-4"	8'-0"	8'-0"	8'-0"

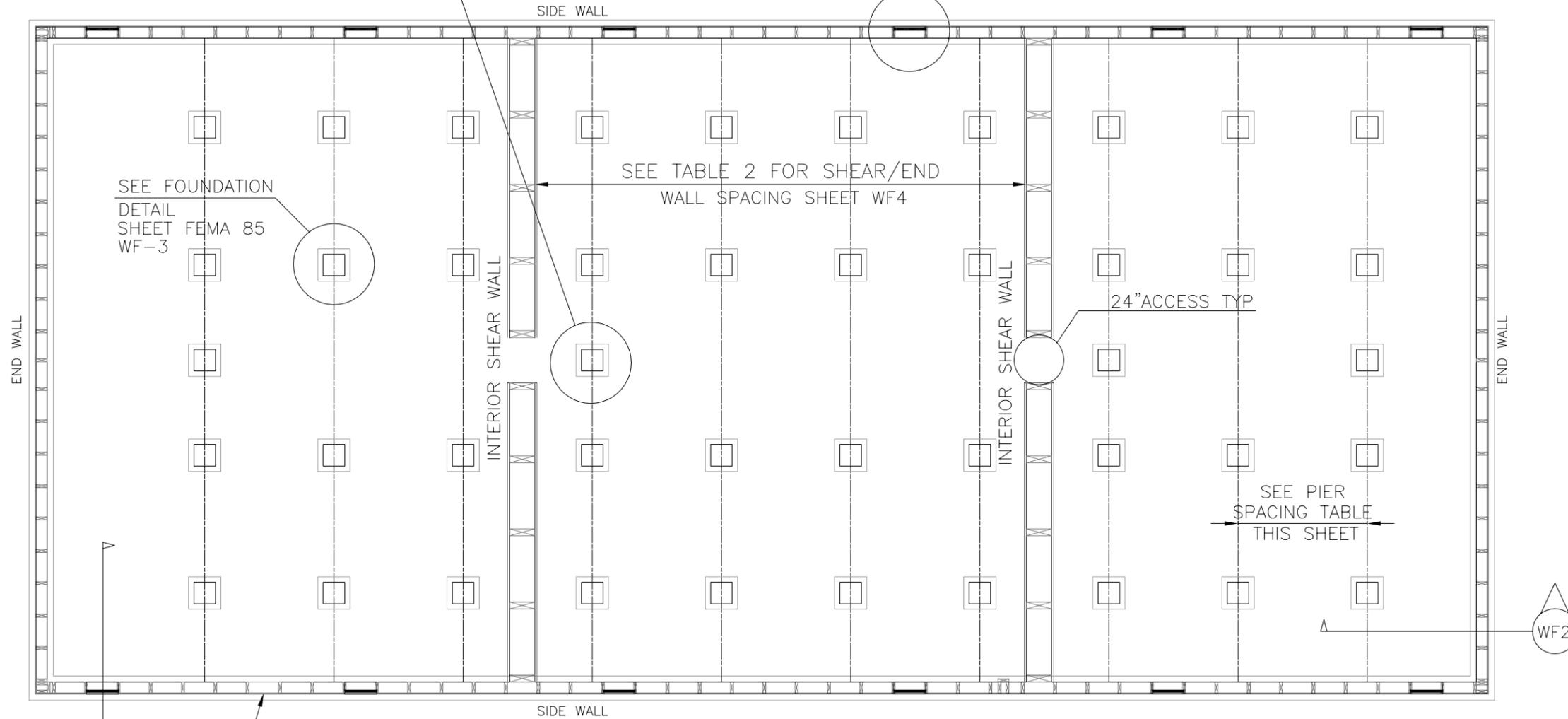
**SINGLE UNIT WOOD FRAMED FOUNDATION PLAN**  
**NOT TO SCALE - INTERIOR SHEAR WALL LOCATION FOR 90 AND 110 MPH DESIGN WIND SPEED**

SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION, DESIGN CRITERIA AND LIMITATIONS. SHEET GN-1.1

PROVIDE ADDITIONAL SUPPORT AND ANCHORAGE UNDER MARRIAGE WALL AS REQUIRED BY MANUFACTURER'S INSTALLATION INSTRUCTIONS.

**FLOOD AND CRAWLSPACE VENT OPENINGS**

- PROVIDE 1 SQUARE INCH OF NET FREE VENT AREA FOR EACH SQUARE FOOT OF CRAWLSPACE AREA.
- PLACE BOTTOM OF VENTS 1 FOOT (MAX) ABOVE EXTERIOR GRADE.
- ALL SCREENS AND LOUVERS MUST AUTOMATICALLY OPEN TO ALLOW UNOBSTRUCTED FLOW OF FLOODWATERS.



SEE FOUNDATION  
DETAIL  
SHEET FEMA 85  
WF-3

SEE TABLE 2 FOR SHEAR/END  
WALL SPACING SHEET WF4

24" ACCESS TYP

SEE PIER  
SPACING TABLE  
THIS SHEET

WF1

PROVIDE 32" WIDE BY 24" TALL SERVICE ACCESS OPENING WITH HINGED OR REMOVABLE TREATED WOOD OR METAL PANEL. DO NOT OBSTRUCT ACCESS OPENING WITH PIPING, DUCTS, OR OTHER EQUIPMENT.

WF2

**Maximum Pier Spacing Table**

Allowable Soil Bearing Pressure	1,000 psf To 1,500 psf			Greater than 1,500 psf To 2,000 psf			Greater than 2,000 psf		
	20	30	40	20	30	40	20	30	40
Pier Spacing	5'-8"	5'-0"	4'-6"	8'-0"	8'-0"	7'-4"	8'-0"	8'-0"	8'-0"

SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION, DESIGN CRITERIA AND LIMITATIONS. SHEET GN-1.1

**DOUBLE UNIT WOOD FRAMED FOUNDATION PLAN**

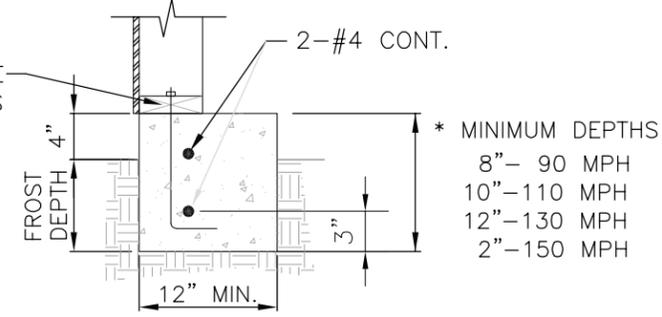
**NOT TO SCALE**

SECURE SILL PLATE TO FOUNDATION WALL WITH 1/2" ANCHOR BOLTS, NUTS, AND 3" BY 3" BY 1/4" PLATE WASHERS. SPACE BOLTS 4'-0" AND WITHIN 12" OF CORNERS O.C. AND HOOK INTO FOOTINGS.

SECURE TOP PLATE OF SITE BUILT FOUNDATION WALL TO BAND JOIST OF MANUFACTURED HOME WITH GALVANIZED PLATE AND ANGLE FRAMING CONNECTORS AT SIDE WALL SPACING SPECIFIED IN TABLE 1. THIS SHEET

CONSTRUCT FOUNDATION WALL WITH 2 X 6 (NOM) FRAMING 16" O.C. AND 15/32" PT CDX PLYWOOD SHEATHING. SECURE SHEATHING WITH 10d NAILS 6" O.C. AT PANEL EDGES AND 12" O.C. WITHIN PANEL. BLOCK ALL PANEL EDGES AND FRAME AROUND FLOOD VENTS.

SECURE SILL PLATE TO FOUNDATION WALL WITH 1/2" ANCHOR BOLTS, NUTS, AND 3" BY 3" (OR 3" DIA.) BY 1/4" WASHERS. SPACE BOLTS 4'-0" O.C. AND EXTEND INTO FOOTINGS.



**MONOLITHIC POUR  
ALTERNATE FOOTING**

\* MINIMUM DEPTHS  
8"- 90 MPH  
10"-110 MPH  
12"-130 MPH  
2"-150 MPH

\* INCREASE DEPTH OF FOOTING AS REQUIRED TO PLACE BOTTOM OF FOOTING AT OR BELOW DESIGN FROST DEPTH

MASONRY PIER:

FOR FLOOD VELOCITIES UNDER 1.75 FT/SEC, CONSTRUCT 16"x16" PIER WITH DRY-STACK BLOCK.

FOR FLOOD VELOCITIES BETWEEN 1.75 FT/SEC AND 3.0 FT/SEC, CONSTRUCT 16"x16" PIER WITH DRY-STACK BLOCK AND APPLY 1/4" THICK (MIN) SURFACE BONDED MORTAR.

FOR FLOOD VELOCITIES OVER 2.5 FT/SEC, CONSTRUCT 8"x16" FULLY GROUTED PIER ON CAST-IN-PLACE FOOTING; ANCHOR PIER TO FOOTING WITH TWO #4 BARS AND ANCHOR PIER TO FRAME WITH TWO 1/2" ANCHOR BOLTS, NUTS AND 3"x3" (OR 3" DIA.) X 1/4" STEEL PLATE WASHERS.

PLACE INTERIOR FOOTINGS AT FROST DEPTH IF REQUIRED BY AUTHORITY HAVING JURISDICTION.

(PIER SHOWN FOR FLOOD VELOCITIES UP TO 5 FT/SEC)

INTERIOR PAD CONCRETE FOOTING:

FOR FLOOD VELOCITIES UNDER 2 FT/SEC, SET 24"x24"x4" THICK CAST-IN-PLACE FOOTING.

FOR FLOOD VELOCITIES OVER 2 FT/SEC, POUR 24"x24"x8" THICK CAST-IN-PLACE FOOTING.

PLACE INTERIOR FOOTINGS AT FROST DEPTH IF REQUIRED BY AUTHORITY HAVING JURISDICTION.

PROVIDE SCOUR PROTECTION FOR ALL INTERIOR FOOTINGS AND WITHIN 4 FEET OF CORNERS FOR FLOOD VELOCITIES OVER 2 FT/SEC USING NON-ERODIBLE SOILS OR BY SETTING FOOTINGS BELOW MAXIMUM SCOUR DEPTH FOR THE FLOOD VELOCITIES PRESENT.

**Table 1 - Side Wall Framing Connector Schedule<sup>1</sup>**

Wind Speed	Single Unit	Double Unit
90 mph	8'-0"	8'-0"
110 mph	8'-0"	8'-0"
130 mph	4'-0"	4'-0"
150 mph	4'-0"	4'-0"

<sup>1</sup> INSTALL PLATE AND ANCHOR CONNECTORS IN PAIRS. PLATE AND ANCHOR CONNECTORS MAY BE OFFSET A MAXIMUM OF 8 INCHES TO REDUCE POTENTIAL FOR SPLITTING. CONNECTOR SPACING IS BASED ON PLATE AND ANGLE CONNECTOR CAPACITIES OF 330 AND 455 POUNDS, RESPECTIVELY. FOR REFERENCE, CONNECTION DESIGNS ARE BASED ON SIMPSON MODEL LTP4 PLATE CONNECTORS AND SIMPSON MODEL H3 ANGLE CONNECTORS.

**Table 2 - End/Shear Wall Spacing and Connector Schedule<sup>1,4</sup>**

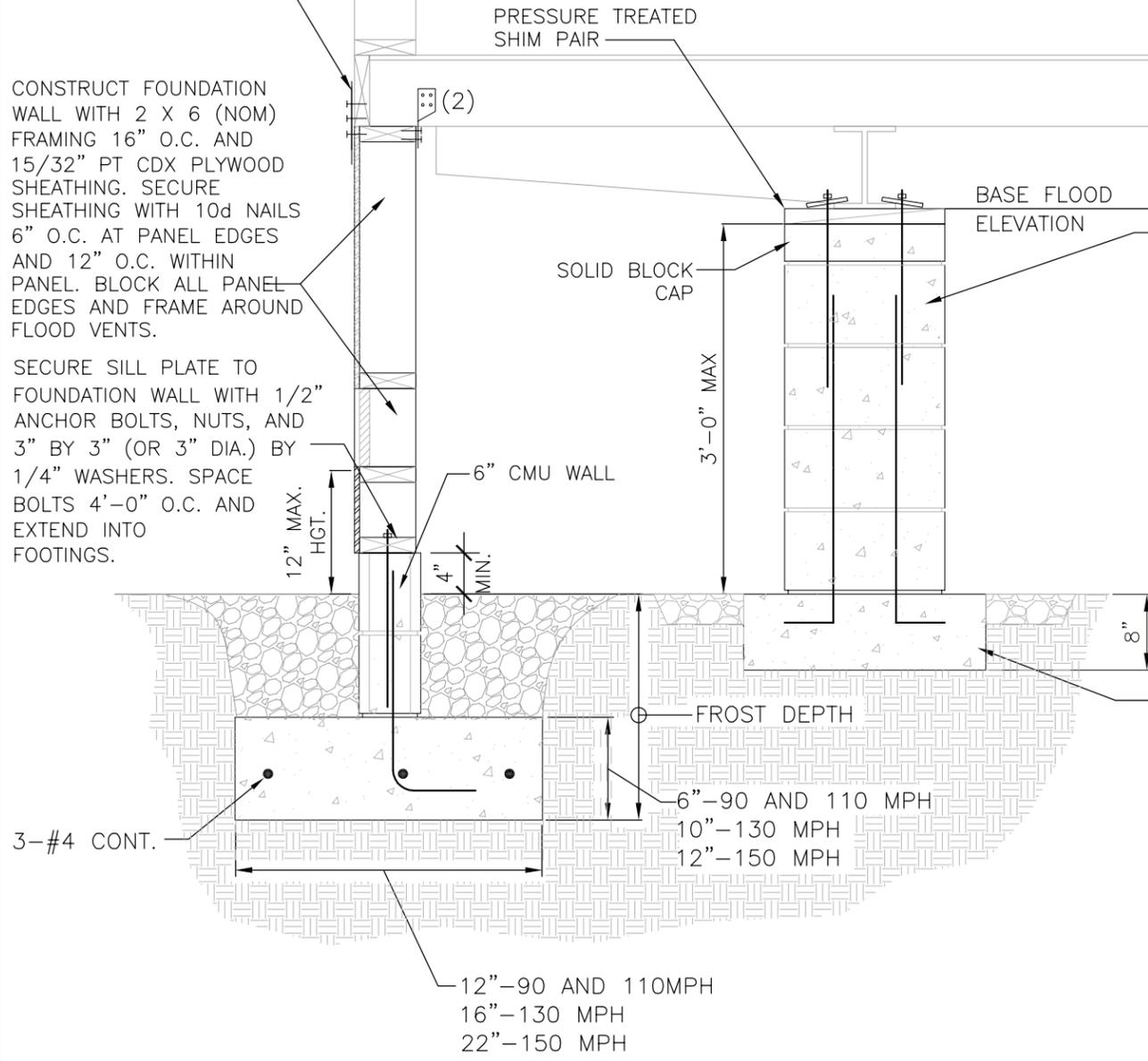
Configuration	Home Width(Ft)	Design Wing Speed Max. Shear/End Wall Spacing (Ft.) <sup>2</sup> Number of Connectors Per Section <sup>3</sup>			
		90 mph	110 mph	130 mph	150 mph
Single Unit	12	20	16	12	8
		5	5	6	5
	14	20	16	12	8
		5	6	6	5
	16	28	20	16	12
		7	7	7	7
Double Unit	24	36	24	20	16
		5	4	5	5
	28	44	32	20	16
		6	6	5	5
	32	40	32	24	20
		5	6	6	7

<sup>1</sup>Table is applicable to single and double unit manufactured homes with 8ft. wall height, roof slopes between 3:12 and 7:12 located in the special flood hazard area with flood velocities not exceeding 5 fps.

<sup>2</sup>Shear wall spacing is based on the wood frame foundations shear and end walls constructed as specified in Table 3.17D of the 2001 *Wood Framed Construction Manual*.

<sup>3</sup>Install plate and anchor connectors in pairs. Plate and anchor connectors may be offset a maximum of 8 inches to reduce potential for splitting. The number of connectors fastening the site built foundation wall to the manufactured home is based on angle and plate connectors installed in pairs and having a capacity of 395 and 515 pounds, respectively. For reference, connection designs are based on Simpson Model A34 angle connectors and LTP4 plate connectors.

<sup>4</sup>Consult with home manufacturer to verify the home framing is adequate to transfer specified loads at the connection points indicated.



SECURE TOP PLATE OF SITE BUILT FOUNDATION WALL TO BAND JOISTS/INTERIOR JOISTS OF THE MANUFACTURED HOME WITH GALVANIZED PLATE AND ANGLE CONNECTOR PAIRS. INSTALL THE NUMBER OF CONNECTORS SPECIFIED IN TABLE 2 - SHEET WF-3.

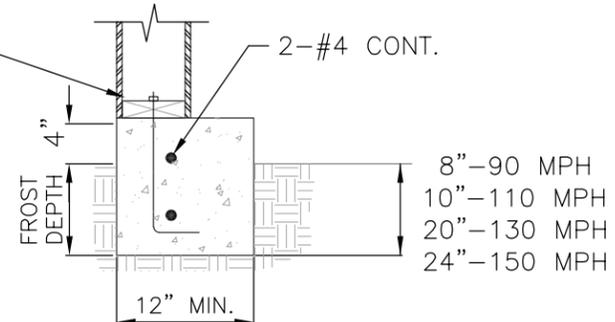
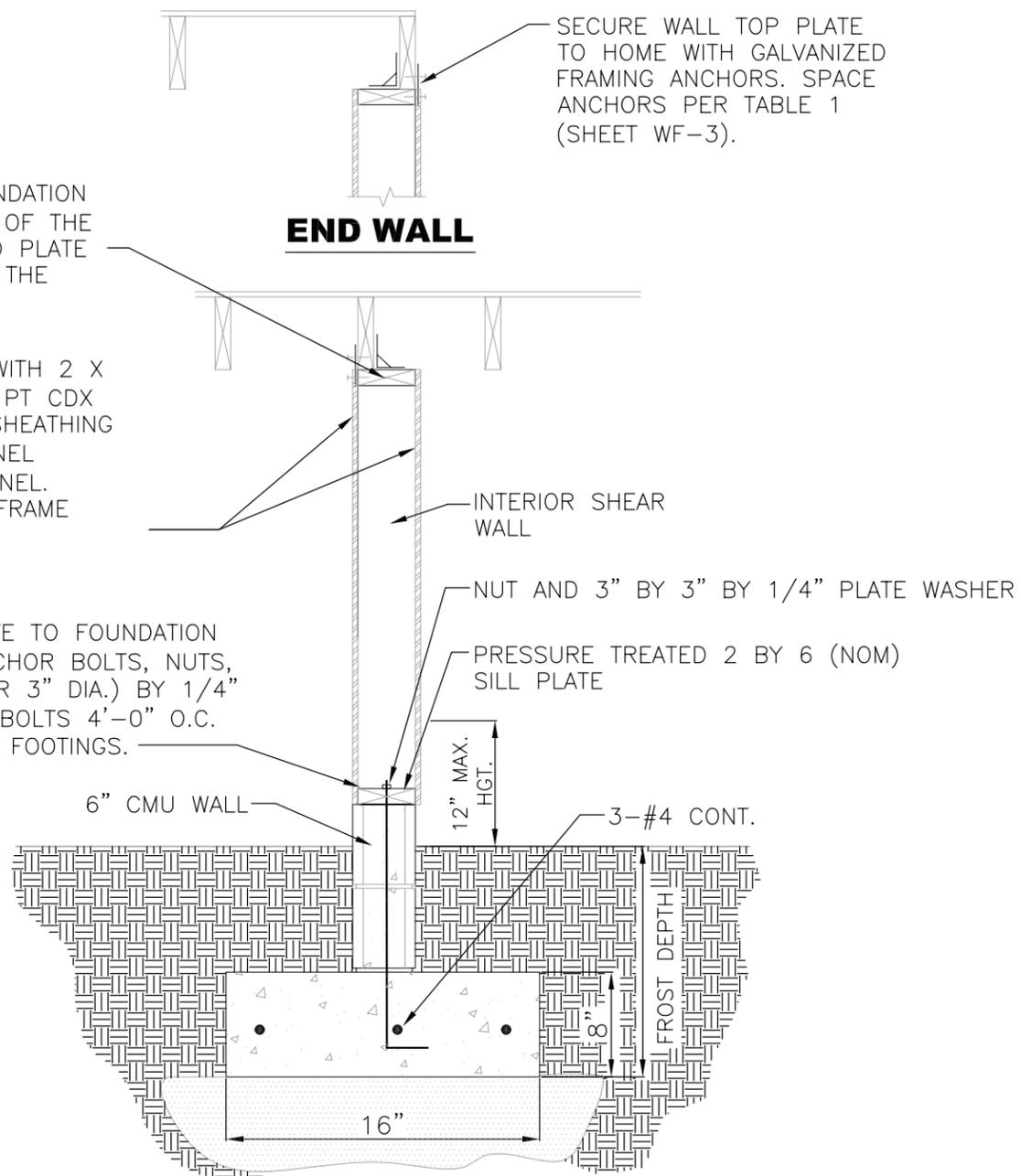
CONSTRUCT FOUNDATION WALL WITH 2 X 6 (NOM) FRAMING AND 15/32" PT CDX PLYWOOD SHEATHING. SECURE SHEATHING WITH 10d NAILS 6" O.C. AT PANEL EDGES AND 12" O.C. WITHIN PANEL. BLOCK ALL PANEL EDGES AND FRAME AROUND FLOOD VENTS.

SECURE SILL PLATE TO FOUNDATION WALL WITH 1/2" ANCHOR BOLTS, NUTS, AND 3" BY 3" (OR 3" DIA.) BY 1/4" WASHERS. SPACE BOLTS 4'-0" O.C. AND EXTEND INTO FOOTINGS.

SECURE SILL PLATE TO FOUNDATION WALL WITH 1/2" ANCHOR BOLTS, NUTS, AND 3" BY 3" (OR 3" DIA.) BY 1/4" WASHERS. SPACE BOLTS 4'-0" O.C. AND EXTEND INTO FOOTINGS.

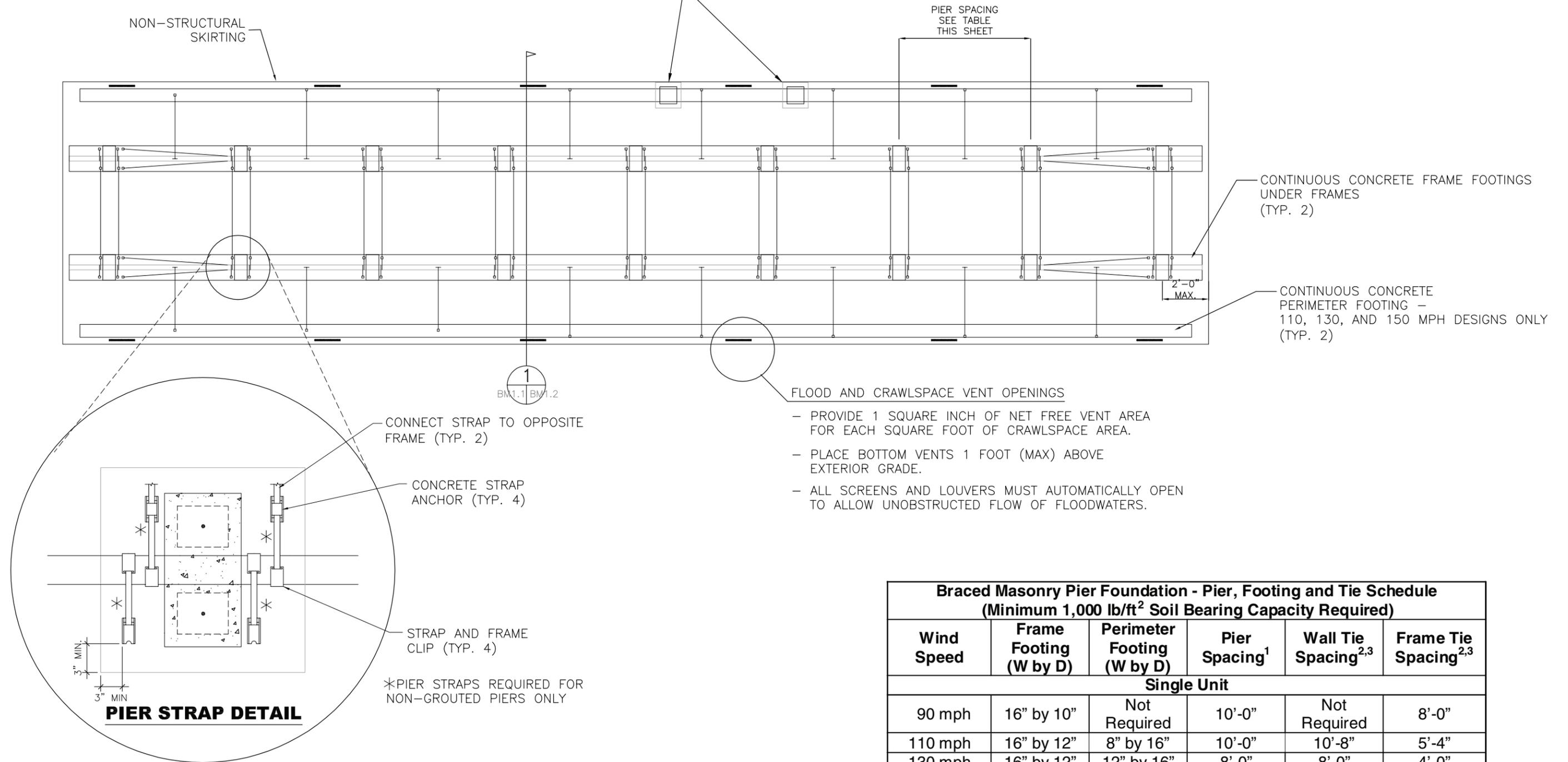
**END WALL**

SECURE WALL TOP PLATE TO HOME WITH GALVANIZED FRAMING ANCHORS. SPACE ANCHORS PER TABLE 1 (SHEET WF-3).



**MONOLITHIC POUR**  
ALTERNATE FOOTING

PROVIDE ADDITIONAL SUPPORT AND ANCHORAGE UNDER ENDS OF LARGE OPENINGS AND UNDER CONCENTRATED LOADS AS REQUIRED BY THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. SELECT PIERS TO RESIST THE DESIGN FLOOD VELOCITY PRESENT AT THE SITE.



Braced Masonry Pier Foundation - Pier, Footing and Tie Schedule (Minimum 1,000 lb/ft <sup>2</sup> Soil Bearing Capacity Required)					
Wind Speed	Frame Footing (W by D)	Perimeter Footing (W by D)	Pier Spacing <sup>1</sup>	Wall Tie Spacing <sup>2,3</sup>	Frame Tie Spacing <sup>2,3</sup>
<b>Single Unit</b>					
90 mph	16" by 10"	Not Required	10'-0"	Not Required	8'-0"
110 mph	16" by 12"	8" by 16"	10'-0"	10'-8"	5'-4"
130 mph	16" by 12"	12" by 16"	8'-0"	8'-0"	4'-0"
150 mph	16" by 12"	12" by 24"	8'-0"	5'-4"	2'-8"

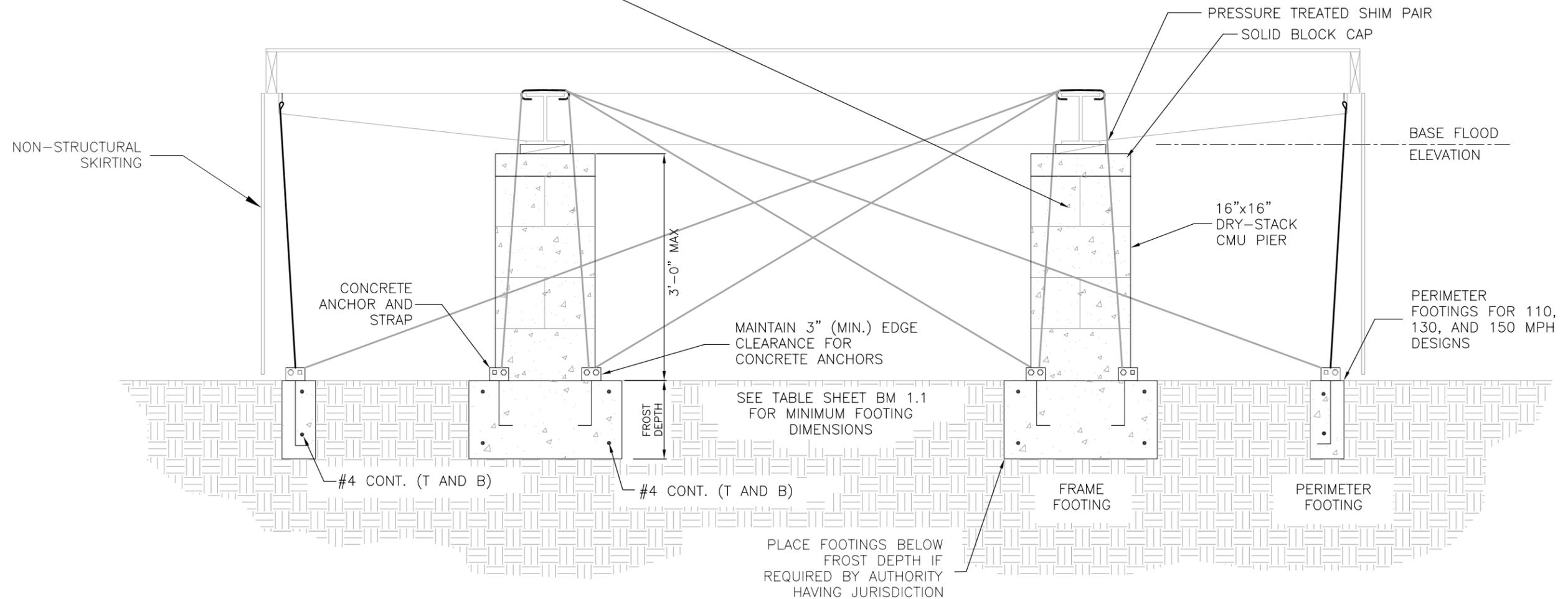
<sup>1</sup> Locate end piers within 2'-0" of the ends of the home.  
<sup>2</sup> Wall and frame ties may be connected to a single concrete anchor.  
<sup>3</sup> Install wall and frame straps in other locations if required by the manufacturer.

**SINGLE UNIT BRACED MASONRY PIER FOUNDATION PLAN**  
**NOT TO SCALE - CONTINUOUS SPREAD FOOTING**

SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION, DESIGN CRITERIA AND LIMITATIONS. SHEET GN-1.1

16" BY 16" MASONRY PIER AND CAST-IN-PLACE FOOTING:  
 SECURE PIER, FOOTING AND FRAME WITH STRAPS, FRAME CLIPS, AND CONCRETE ANCHORS. PROVIDE FRAME CLIP FOR EACH STRAP.

FOOTINGS SHALL BE CONTINUOUS CAST-IN-PLACE CONCRETE. PROVIDE FOOTINGS UNDER HOUSE FRAMES FOR ALL WIND ZONES UNDER PERIMETER WALLS FOR 110, 130, AND 150 MPH WIND ZONES. CONTINUE ALL FOOTINGS TO APPROXIMATELY 6" FROM THE ENDS OF THE HOME. SEE BRACED MASONRY PIER FOUNDATION - PIER, FOOTING, AND TIE SCHEDULE FOR PIER SPACING AND FOOTING DIMENSIONS.

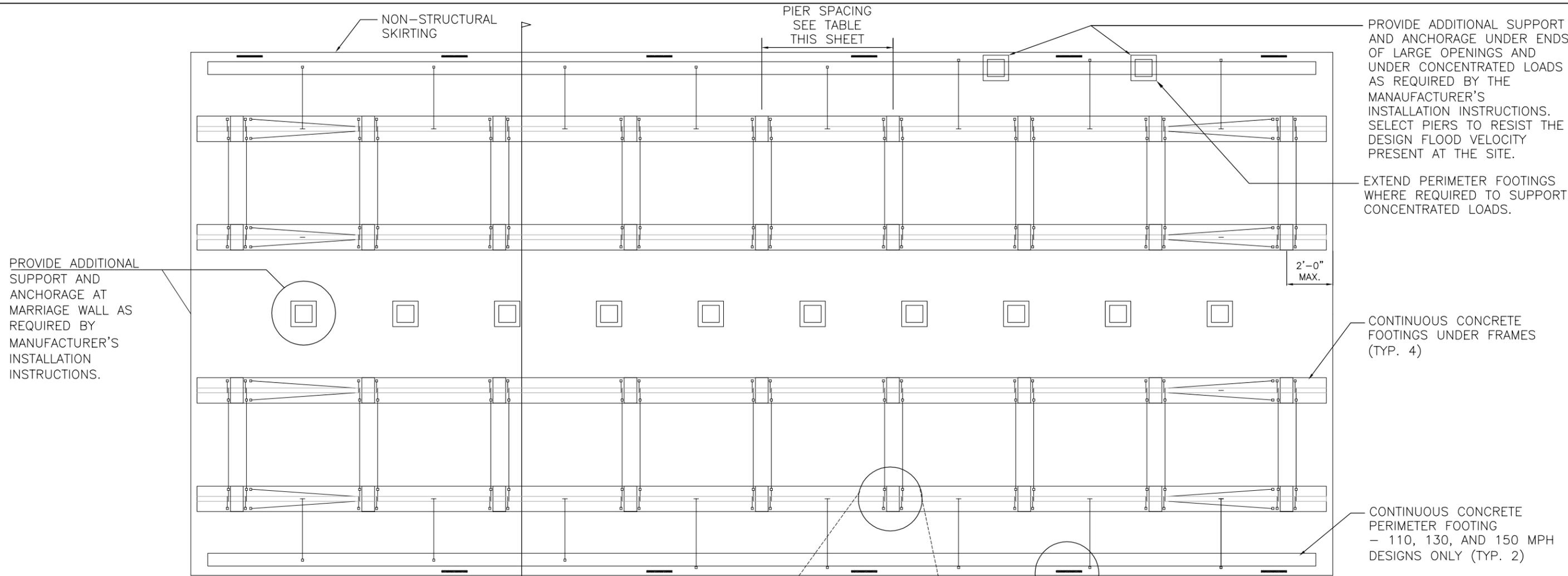


1  
 BM1.1 BM1.2

## BRACED MASONRY PIER DETAIL

NOT TO SCALE - PIER CONSTRUCTION FOR FLOOD VELOCITIES UP TO 1.75 FEET PER SECOND SHOWN

SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION, DESIGN CRITERIA AND LIMITATIONS. SHEET GN-1.1



PROVIDE ADDITIONAL SUPPORT AND ANCHORAGE AT MARRIAGE WALL AS REQUIRED BY MANUFACTURER'S INSTALLATION INSTRUCTIONS.

PROVIDE ADDITIONAL SUPPORT AND ANCHORAGE UNDER ENDS OF LARGE OPENINGS AND UNDER CONCENTRATED LOADS AS REQUIRED BY THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. SELECT PIERS TO RESIST THE DESIGN FLOOD VELOCITY PRESENT AT THE SITE.

EXTEND PERIMETER FOOTINGS WHERE REQUIRED TO SUPPORT CONCENTRATED LOADS.

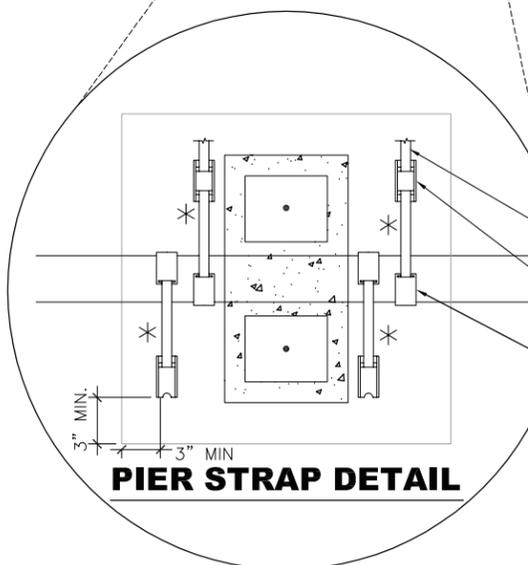
CONTINUOUS CONCRETE FOOTINGS UNDER FRAMES (TYP. 4)

CONTINUOUS CONCRETE PERIMETER FOOTING - 110, 130, AND 150 MPH DESIGNS ONLY (TYP. 2)

**FLOOD AND CRAWLSPACE VENT OPENINGS**

- PROVIDE 1 SQUARE INCH OF NET FREE VENT AREA FOR EACH SQUARE FOOT OF CRAWLSPACE AREA.
- PLACE BOTTOM VENTS 1 FOOT (MAX) ABOVE EXTERIOR GRADE.
- ALL SCREENS AND LOUVERS MUST AUTOMATICALLY OPEN TO ALLOW UNOBSTRUCTED FLOW OF FLOODWATERS.

<b>Braced Masonry Pier Foundation - Pier, Footing and Tie Schedule (Minimum 1,000 lb/ft<sup>2</sup> Soil Bearing Capacity Required)</b>					
Wind Speed	Frame Footing (W by D)	Perimeter Footing (W by D)	Pier Spacing <sup>1</sup>	Wall Tie Spacing <sup>2,3</sup>	Frame Tie Spacing <sup>2,3</sup>
<b>Double Unit</b>					
90 mph	16" by 12"	Not Required	10'-0"	Not Required	8'-0"
110 mph	16" by 12"	8" by 16"	10'-0"	6'-8"	3'-4"
130 mph	16" by 12"	12" by 16"	8'-0"	6'-8"	3'-4"
150 mph	16" by 12"	12" by 24"	8'-0"	5'-4"	2'-8"



CONNECT STRAP TO OPPOSITE FRAME (TYP. 2)

CONCRETE STRAP ANCHOR (TYP. 4)

STRAP AND FRAME CLIP (TYP. 4)

\*PIER STRAPS REQUIRED FOR NON-GROUTED PIERS ONLY

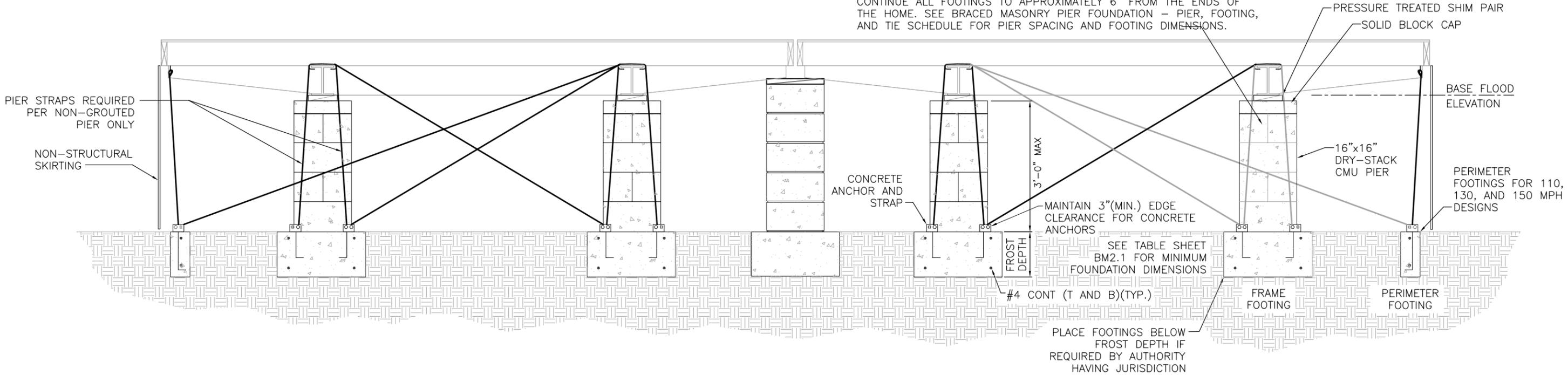
<sup>1</sup> Locate end piers within 2'0" of the ends of the home.  
<sup>2</sup> Wall and frame ties may be connected to a single concrete anchor.  
<sup>3</sup> Install wall and frame straps in other locations if required by the manufacturer.

SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION, DESIGN CRITERIA AND LIMITATIONS. SHEET GN-1.1

**DOUBLE UNIT BRACED MASONRY PIER FOUNDATION PLAN**  
**NOT TO SCALE - CONTINUOUS SPREAD FOOTING**

16" BY 16" MASONRY PIER AND CAST-IN-PLACE FOOTING:  
 SECURE PIER, FOOTING, AND FRAME WITH STRAPS, FRAME CLIPS, AND  
 CONCRETE ANCHORS. PROVIDE FRAME CLIP FOR EACH STRAP.

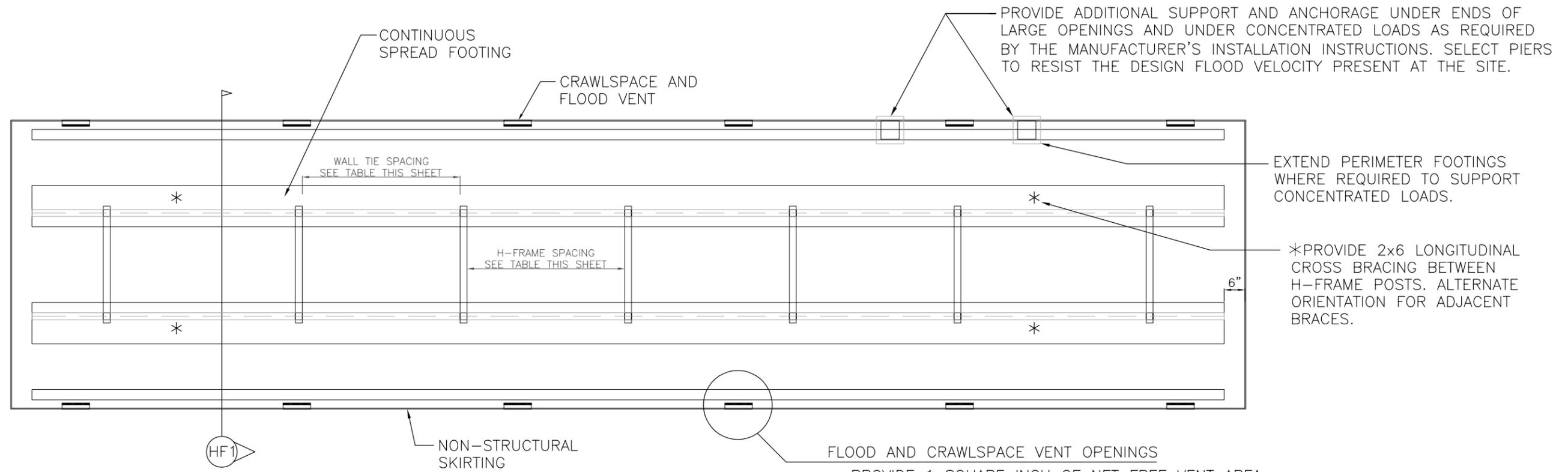
FOOTINGS SHALL BE CONTINUOUS CAST-IN-PLACE CONCRETE. PROVIDE  
 FOOTINGS UNDER HOUSE FRAMES FOR ALL WIND ZONES UNDER  
 PERIMETER WALLS FOR 110, 130, AND 150 MPH WIND ZONES.  
 CONTINUE ALL FOOTINGS TO APPROXIMATELY 6" FROM THE ENDS OF  
 THE HOME. SEE BRACED MASONRY PIER FOUNDATION - PIER, FOOTING,  
 AND TIE SCHEDULE FOR PIER SPACING AND FOOTING DIMENSIONS.



**BRACED MASONRY PIER DETAIL**

**NOT TO SCALE - PIER CONSTRUCTION FOR FLOOD VELOCITIES UP TO 1.75 FEET PER SECOND SHOWN**

SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION,  
 DESIGN CRITERIA AND LIMITATIONS. SHEET GN-1.1



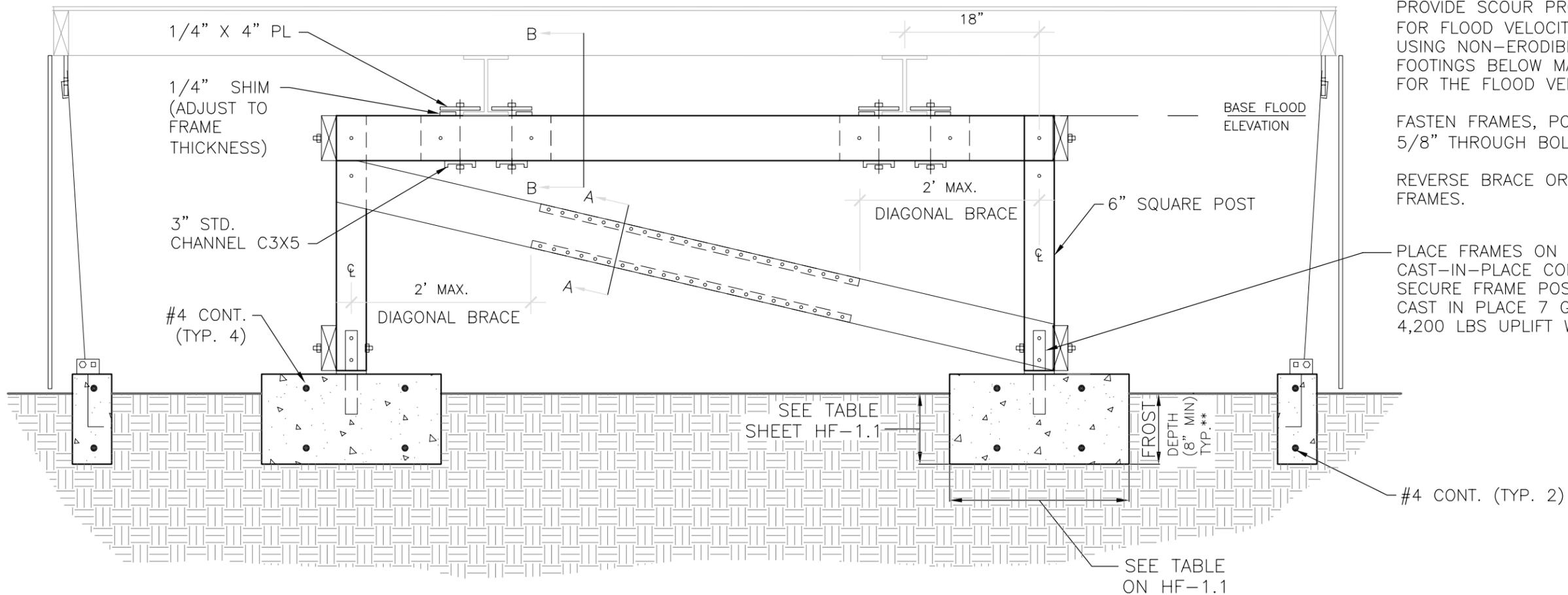
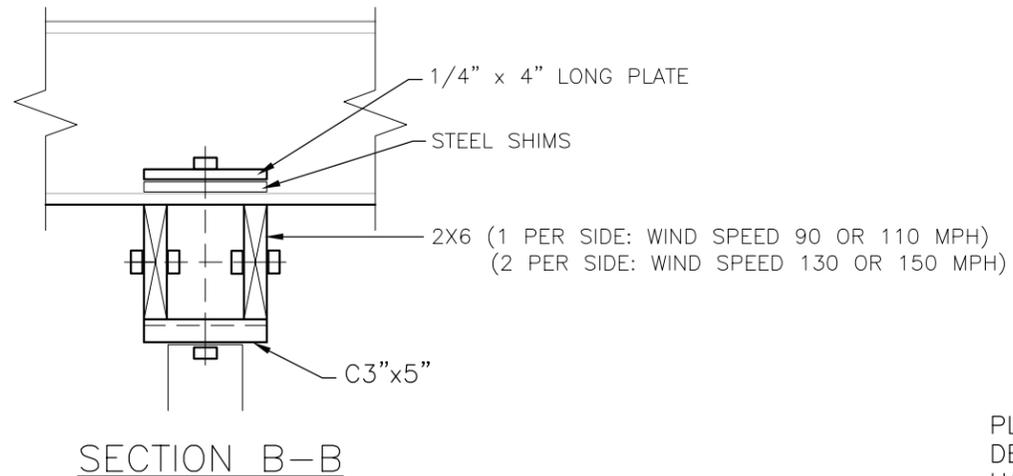
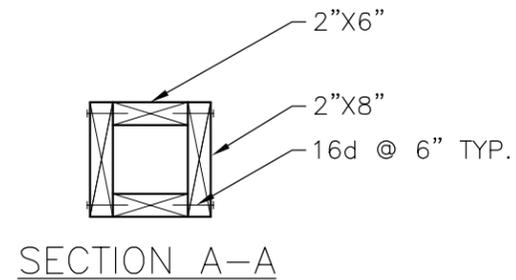
- FLOOD AND CRAWLSPACE VENT OPENINGS**
- PROVIDE 1 SQUARE INCH OF NET FREE VENT AREA FOR EACH SQUARE FOOT OF CRAWLSPACE AREA.
  - PLACE BOTTOM OF VENTS 1 FOOT (MAX) ABOVE EXTERIOR GRADE.
  - ALL SCREENS AND LOUVERS MUST AUTOMATICALLY OPEN TO ALLOW UNOBSTRUCTED FLOW OF FLOODWATERS.

H-FRAME SPACING TABLE

WIND SPEED	H-FRAME SPACING	WALL TIE SPACING	FRAME FOOTING (WxD)	PERIMETER FOOTING (WxD)
90 mph	8'-0"	-	16"X8"	-
110 mph	6'-8"	6'-8"	16"X8"	12"X12"
130 mph	5'-4"	5'-4"	16"X12"	12"X16"
150 mph	4'-0"	4'-0"	20"X12"	12"X18"

**SINGLE UNIT BRACED WOOD H-FRAME FOUNDATION PLAN**  
**NOT TO SCALE - CONTINUOUS SPREAD FOOTING**

SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION, DESIGN CRITERIA AND LIMITATIONS. SHEET GN-1.1



PLACE FOOTINGS AT OR BELOW FROST DEPTH AS DETERMINED BY BY AUTHORITY HAVING JURISDICTION.

PROVIDE SCOUR PROTECTION FOR FOOTINGS FOR FLOOD VELOCITIES OVER 2 FT/SEC USING NON-ERODIBLE SOILS OR BY SETTING FOOTINGS BELOW MAXIMUM SCOUR DEPTH FOR THE FLOOD VELOCITIES PRESENT.

FASTEN FRAMES, POSTS, AND BRACES WITH 5/8" THROUGH BOLTS.

REVERSE BRACE ORIENTATION ON ADJACENT FRAMES.

PLACE FRAMES ON CONTINUOUS CAST-IN-PLACE CONCRETE FOOTINGS. SECURE FRAME POSTS TO FOOTINGS WITH CAST IN PLACE 7 GA GALV. COLUMN BASES 4,200 LBS UPLIFT WORKING LOAD.

\* ON HOMES WHERE PERIMETER FOOTINGS ARE WITHIN 1 FOOT OF FRAME FOOTING, COMBINE FRAME FOOTING WITH PERIMETER FOOTING. SIZE OF COMBINED FOOTING MUST BE EQUAL OR GREATER THAN SUM OF INDIVIDUAL FOOTINGS AREAS.

\*\*INCREASE FOOTING DEPTHS AS REQUIRED TO PLACE BOTTOM OF FOOTING BELOW DESIGN FROST DEPTH AS DETERMINED BY LOCAL BUILDING OFFICIAL. FOOTING MAY BE REDUCED PROPORTIONALLY PROVIDED:  
(1) CROSS-SECTION AREA OF FOOTING IS NOT REDUCED AND  
(2) A MINIMUM WIDTH OF 16" IS MAINTAINED

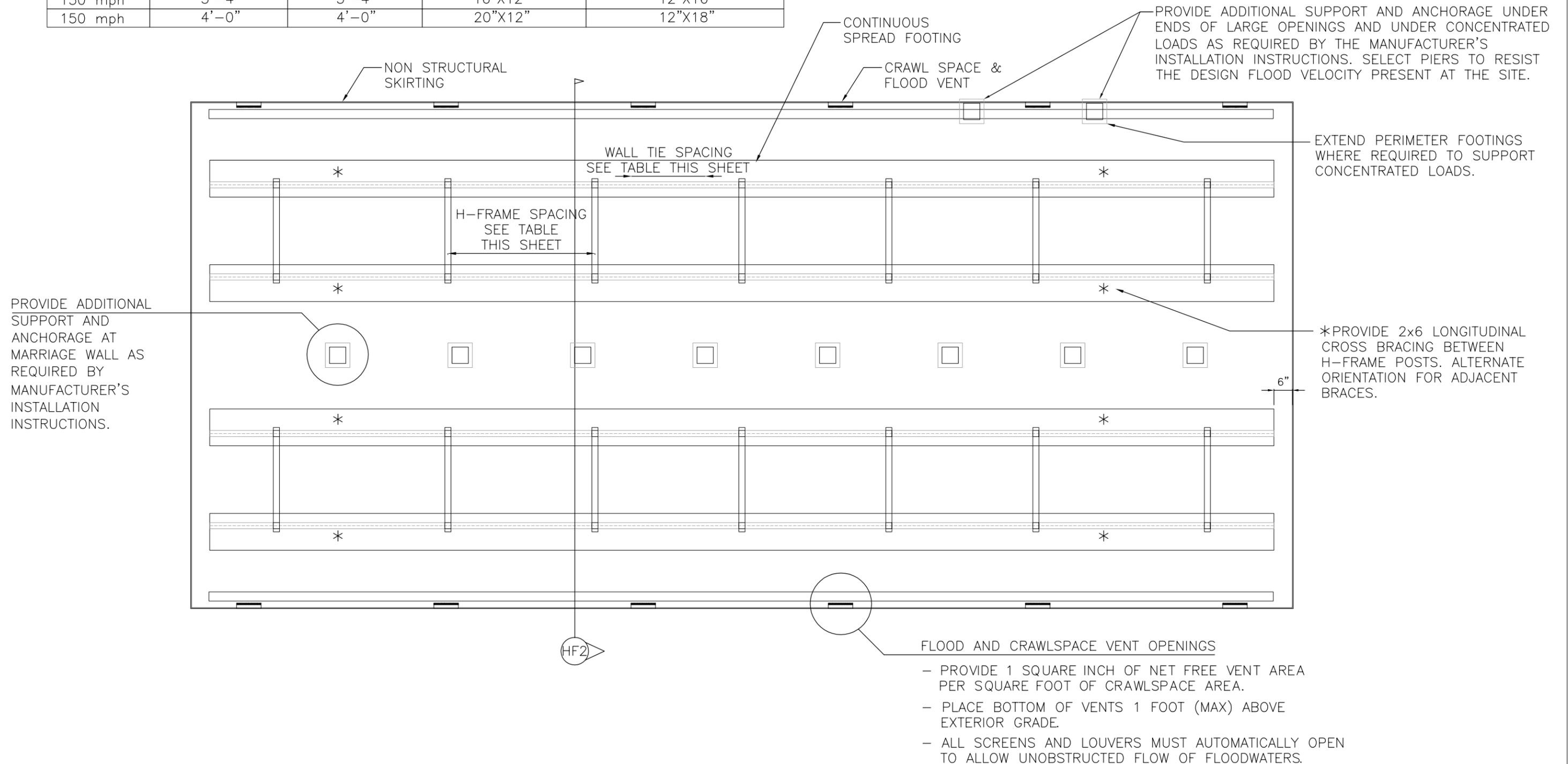
SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION, DESIGN CRITERIA AND LIMITATIONS. SHEET GN-1.1

**HF1 SINGLE UNIT WOOD H-FRAME DETAIL**

**NOT TO SCALE**

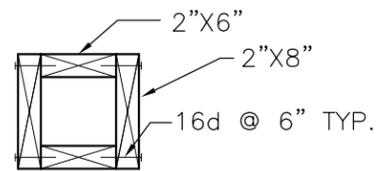
H-FRAME SPACING TABLE

WIND SPEED	H-FRAME SPACING	WALL TIE SPACING	FRAME FOOTING (WxD)	PERIMETER FOOTING (WxD)
90 mph	8'-0"	-	16"X8"	-
110 mph	6'-8"	6'-8"	16"X8"	12"X12"
130 mph	5'-4"	5'-4"	16"X12"	12"X16"
150 mph	4'-0"	4'-0"	20"X12"	12"X18"

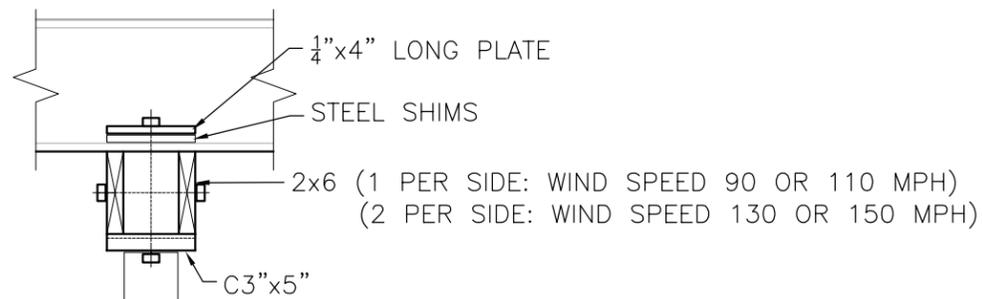


**DOUBLE UNIT BRACED WOOD H-FRAME FOUNDATION PLAN**  
**NOT TO SCALE - CONTINUOUS SPREAD FOOTING**

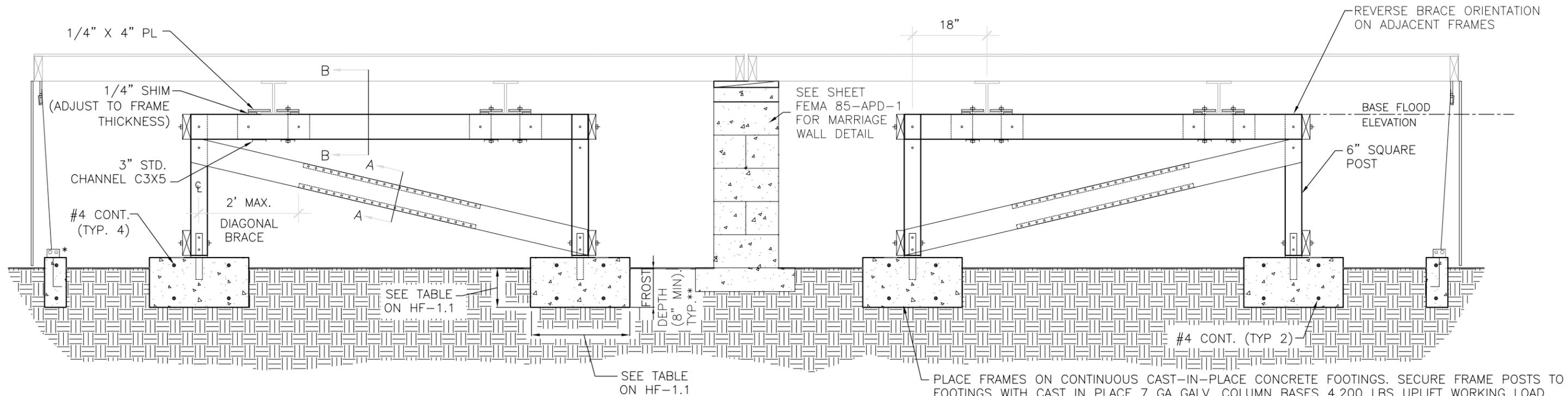
SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION, DESIGN CRITERIA AND LIMITATIONS. SHEET GN-1.1



SECTION A-A



SECTION B-B



\* ON HOMES WHERE PERIMETER FOOTINGS ARE WITHIN 1 FOOT OF FRAME FOOTING, COMBINE FRAME FOOTING WITH PERIMETER FOOTING. SIZE OF COMBINED FOOTING MUST BE EQUAL OR GREATER THAN SUM OF INDIVIDUAL FOOTINGS AREAS.

\*\*INCREASE FOOTING DEPTHS AS DETERMINED BY LOCAL BUILDING OFFICIAL TO PLACE BOTTOM OF FOOTING BELOW DESIGN FROST DEPTH. FOOTING MAY BE REDUCED PROPORTIONALLY PROVIDED:  
 (1) CROSS-SECTION AREA OF FOOTING IS NOT REDUCED AND  
 (2) A MINIMUM WIDTH OF 16" IS MAINTAINED

PLACE FRAMES ON CONTINUOUS CAST-IN-PLACE CONCRETE FOOTINGS. SECURE FRAME POSTS TO FOOTINGS WITH CAST IN PLACE 7 GA GALV. COLUMN BASES 4,200 LBS UPLIFT WORKING LOAD.

PLACE FOOTINGS AT FROST DEPTH AS DETERMINED BY LOCAL BUILDING OFFICIAL.

PROVIDE SCOUR PROTECTION FOR FOOTINGS FOR FLOOD VELOCITIES OVER 2 FT/SEC USING NON-ERODIBLE SOILS OR BY SETTING FOOTINGS BELOW MAXIMUM SCOUR DEPTH FOR THE FLOOD VELOCITIES PRESENT.

FASTEN FRAMES, POSTS, AND BRACES WITH 5/8" THROUGH BOLTS.

SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION, DESIGN CRITERIA, AND LIMITATIONS. SHEET GN-1.1

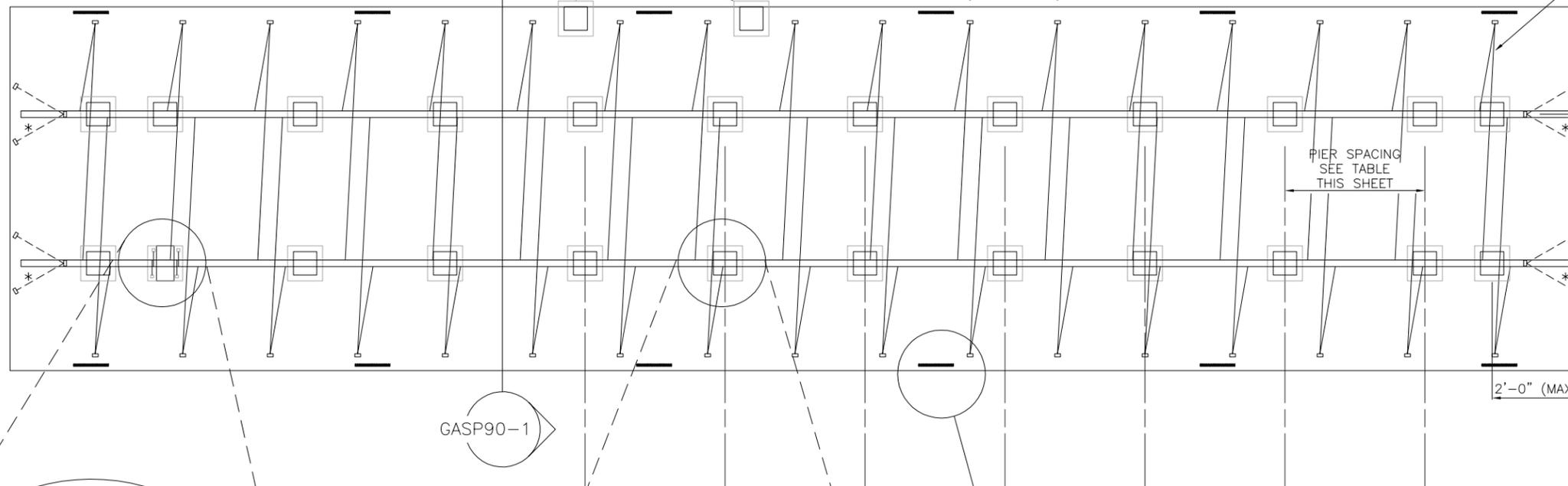
**HF2 DOUBLE UNIT WOOD H-FRAME DETAIL**

**NOT TO SCALE**

PROVIDE ADDITIONAL SUPPORT AND ANCHORAGE UNDER ENDS OF LARGE OPENINGS AND UNDER CONCENTRATED LOADS AS REQUIRED BY THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. SELECT PIERS TO RESIST THE DESIGN FLOOD VELOCITY PRESENT AT THE SITE.

REFER TO ANCHOR SPACING TABLE ON SHEET GASP90-1.2.

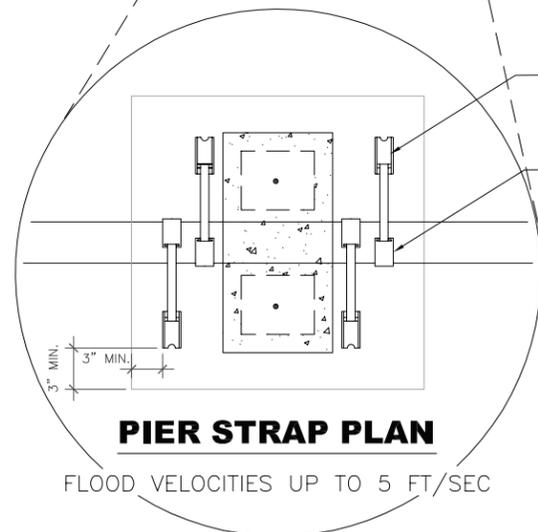
GROUND ANCHORS AND CONNECTION HARDWARE—(STRAPS ARE SHOWN OFFSET FOR CLARITY).



\* LONGITUDINAL ANCHORAGE (TYP.)

FLOOD AND CRAWLSPACE VENT OPENINGS

- PROVIDE 1 SQUARE INCH OF NET FREE VENT AREA FOR EACH SQUARE FOOT OF CRAWLSPACE AREA.
- PLACE BOTTOM OF VENTS 1 FOOT (MAX) ABOVE EXTERIOR GRADE.
- ALL SCREENS AND LOUVERS MUST AUTOMATICALLY OPEN TO ALLOW UNOBSTRUCTED FLOW OF FLOODWATERS.



**PIER STRAP PLAN**

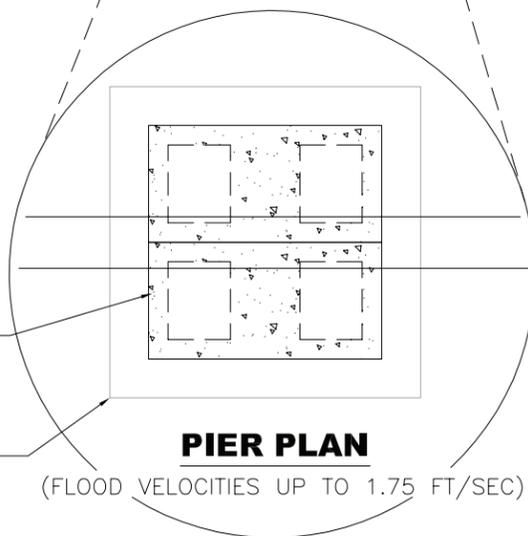
FLOOD VELOCITIES UP TO 5 FT/SEC

SEE SHEET APD 1.1 FOR PIER DESIGN

CONCRETE STRAP ANCHOR (TYP. 4)  
STRAP AND FRAME CLIP (TYP. 4)

16"X16" DRY-STACK CMU PIER

24"X24" CONCRETE FOOTING



**PIER PLAN**

(FLOOD VELOCITIES UP TO 1.75 FT/SEC)

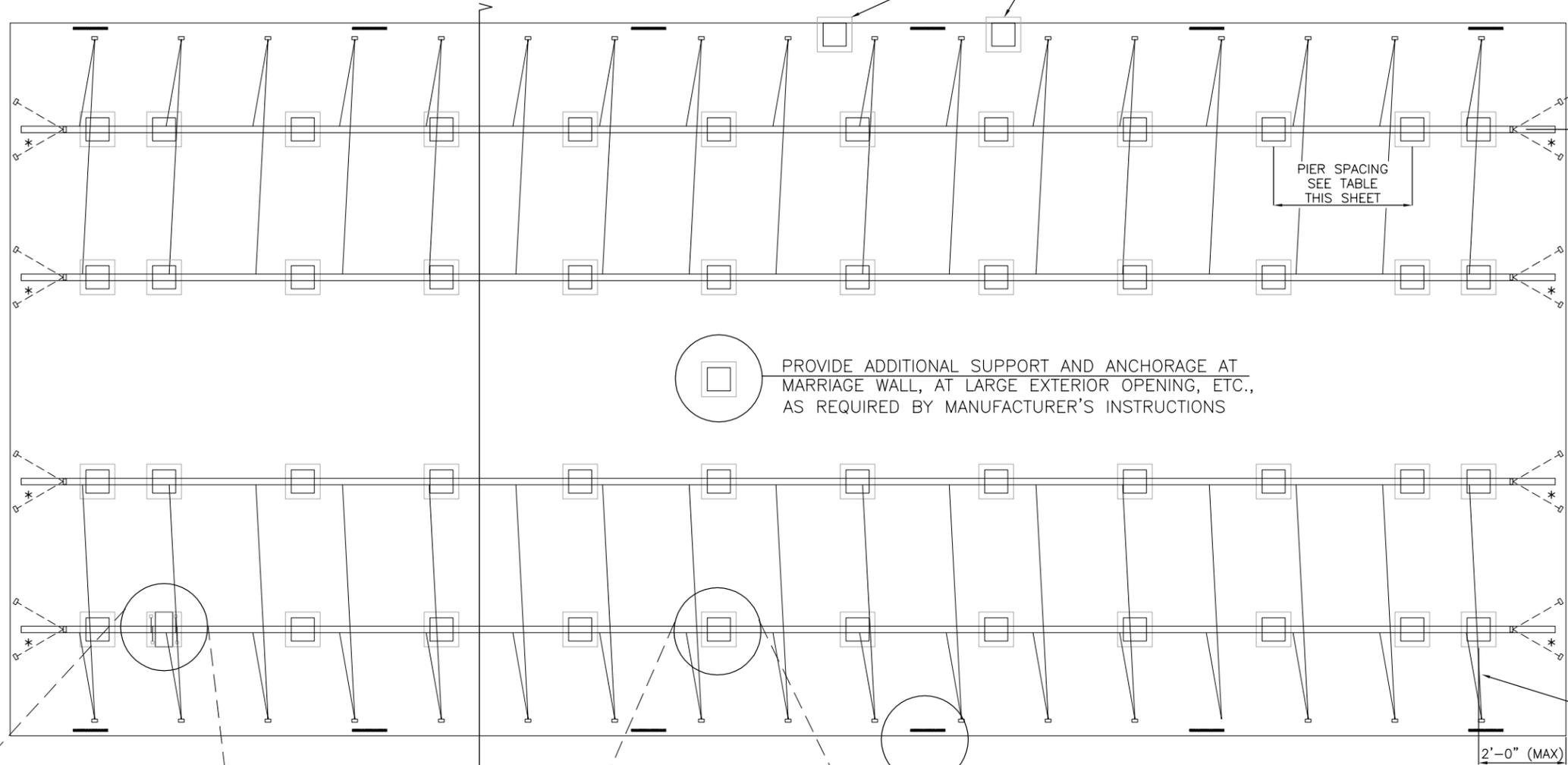
**SINGLE UNIT GROUND ANCHOR FOUNDATION PLAN**  
**NOT TO SCALE - CONTINUOUS SPREAD FOOTING**

Maximum Pier Spacing Table									
Allowable Soil Bearing Pressure (lb/ft <sup>2</sup> )									
Footing Style	1,000 To 1,500			Greater Than 1,500 To 2,000			Greater Than 2,000		
	Ground Snow Load (lb/ft <sup>2</sup> )			Ground Snow Load (lb/ft <sup>2</sup> )			Ground Snow Load (lb/ft <sup>2</sup> )		
	Less Than 20	20 To Less Than 30	30 To Less Than 40	Less Than 20	20 To Less Than 30	30 To Less Than 40	Less Than 20	20 To Less Than 30	30 To 40
Concrete	5'-3"	4'-9"	4'-2"	7'-10"	7'-2"	6'-6"	8'-0"	8'-0"	8'-0"
ABS	4'-7"	4'-3"	4'-0"	7'-0"	6'-4"	5'-10"	8'-0"	8'-0"	7'-10"

SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION, DESIGN CRITERIA AND LIMITATIONS. SHEET GN-1.1



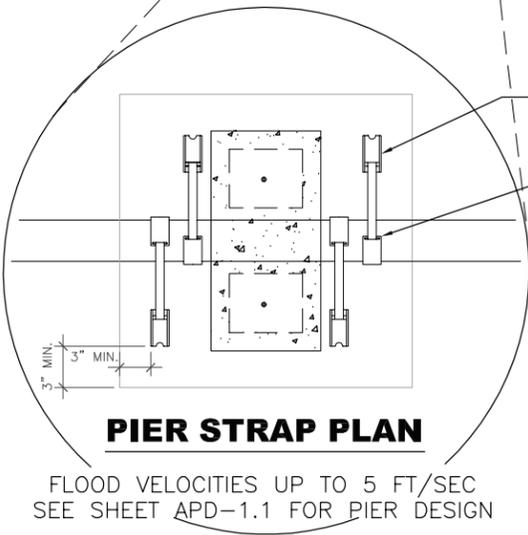
PROVIDE ADDITIONAL SUPPORT AND ANCHORAGE UNDER ENDS OF LARGE OPENINGS AND UNDER CONCENTRATED LOADS AS REQUIRED BY THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. SELECT PIERS TO RESIST THE DESIGN FLOOD VELOCITY PRESENT AT THE SITE.



PROVIDE ADDITIONAL SUPPORT AND ANCHORAGE AT MARRIAGE WALL, AT LARGE EXTERIOR OPENING, ETC., AS REQUIRED BY MANUFACTURER'S INSTRUCTIONS

GROUND ANCHORS AND CONNECTION HARDWARE - SEE ANCHOR SPACING TABLE SHEET GASP90-2.2.

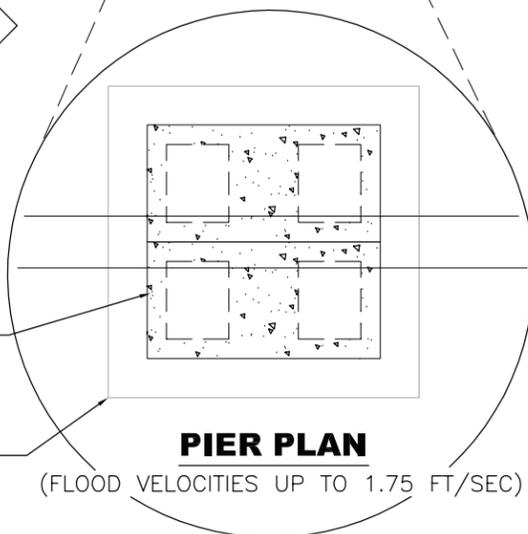
- FLOOD AND CRAWLSPACE VENT OPENINGS
- PROVIDE 1 SQUARE INCH OF NET FREE VENT AREA FOR EACH SQUARE FOOT OF CRAWLSPACE AREA.
  - PLACE BOTTOM OF VENTS 1 FOOT (MAX) ABOVE EXTERIOR GRADE.
  - ALL SCREENS AND LOUVERS MUST AUTOMATICALLY OPEN TO ALLOW UNOBSTRUCTED FLOW OF FLOODWATERS.



GASP90-2

16"X16" DRY-STACK CMU PIER

24"X24" CONCRETE FOOTING



Maximum Pier Spacing Table									
Allowable Soil Bearing Pressure (lb/ft <sup>2</sup> )									
Footing Style	1,000 To 1,500			Greater Than 1,500 To 2,000			Greater Than 2,000		
	Ground Snow Load (lb/ft <sup>2</sup> )			Ground Snow Load (lb/ft <sup>2</sup> )			Ground Snow Load (lb/ft <sup>2</sup> )		
	Less Than 20	20 To Less Than 30	30 To Less Than 40	Less Than 20	20 To Less Than 30	30 To Less Than 40	Less Than 20	20 To Less Than 30	30 To 40
Concrete	5'-3"	4'-9"	4'-2"	7'-10"	7'-2"	6'-6"	8'-0"	8'-0"	8'-0"
ABS	4'-7"	4'-3"	4'-0"	7'-0"	6'-4"	5'-10"	8'-0"	8'-0"	7'-10"

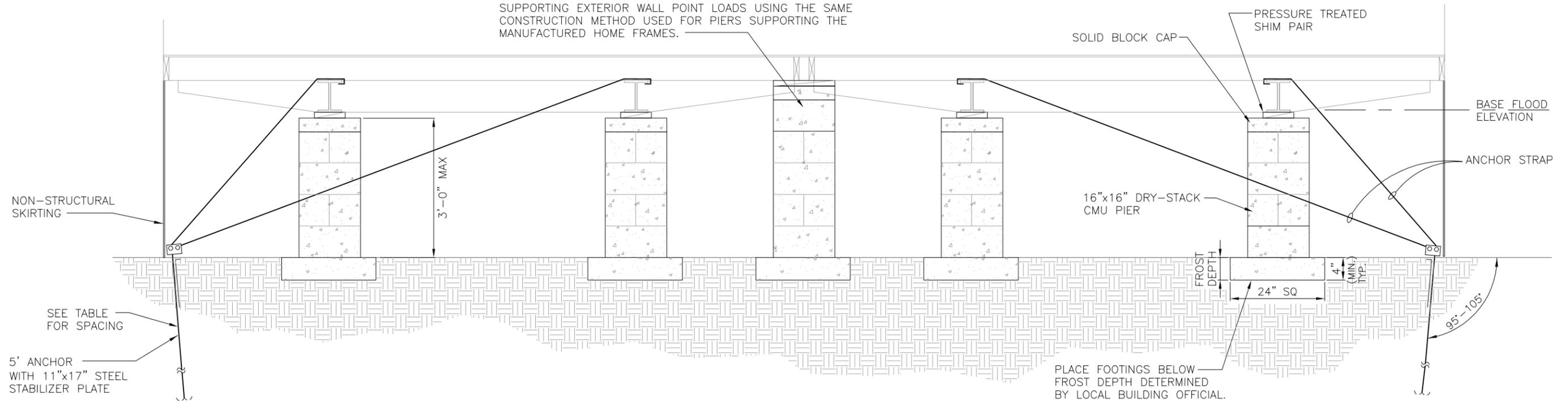
**DOUBLE UNIT GROUND ANCHOR FOUNDATION PLAN**  
**NOT TO SCALE - CONTINUOUS SPREAD FOOTING**

SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION, DESIGN CRITERIA AND LIMITATIONS. SHEET GN-1.1

**ANCHOR SPACING**

FOR STANDARD PIER- PLEASE SEE TABLES IN SHEET AS1.1 WITH ANCHOR STRENGTH 2,000 LBS  
 FOR ALTERNATE PIER- PLEASE SEE TABLES IN SHEET AS1.1 WITH ANCHOR STRENGTH 1,500 LBS

CONSTRUCT PIERS SUPPORTING THE MARRIAGE WALL AND SUPPORTING EXTERIOR WALL POINT LOADS USING THE SAME CONSTRUCTION METHOD USED FOR PIERS SUPPORTING THE MANUFACTURED HOME FRAMES.



SEE ALTERNATIVE PIER DETAILS FOR FLOOD VELOCITIES GREATER THAN 1.75 FPS. SHEET APD-1.1  
 SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION, DESIGN CRITERIA AND LIMITATIONS. SHEET GN-1.1

GASP90-2

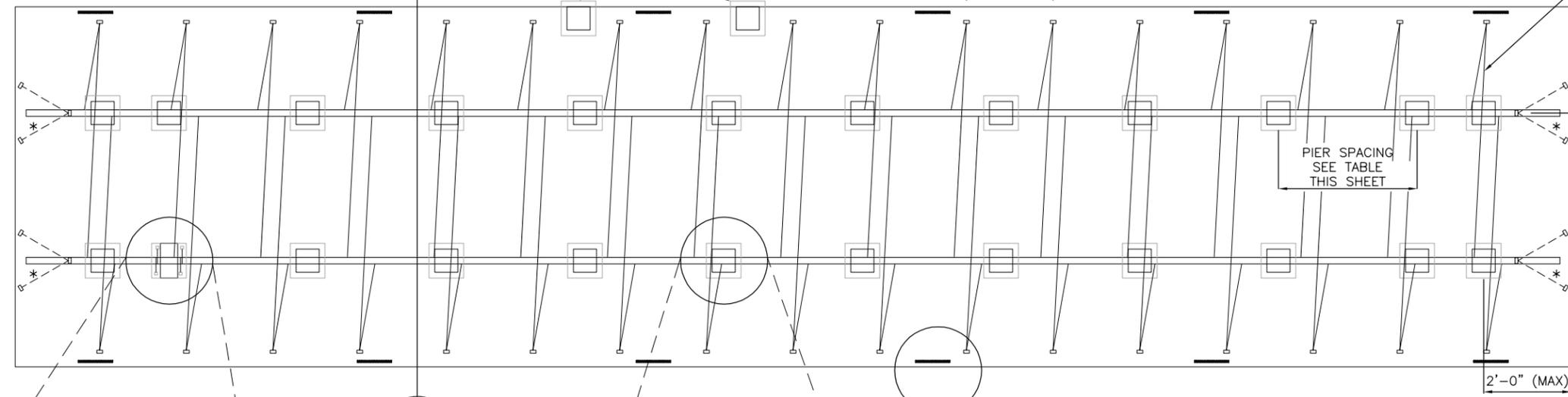
**GROUND ANCHOR AND PIER DETAIL (DOUBLE UNIT)**

**NOT TO SCALE - PIER CONSTRUCTION FOR FLOOD VELOCITIES UP TO 1.75 FEET PER SECOND SHOWN**

PROVIDE ADDITIONAL SUPPORT AND ANCHORAGE UNDER ENDS OF LARGE OPENINGS AND UNDER CONCENTRATED LOADS AS REQUIRED BY THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. SELECT PIERS TO RESIST THE DESIGN FLOOD VELOCITY PRESENT AT THE SITE.

REFER TO ANCHOR SPACING TABLE ON SHEET GASP110/130/150-1.2

GROUND ANCHORS AND CONNECTION HARDWARE—(STRAPS ARE SHOWN OFFSET FOR CLARITY)



\* LONGITUDINAL ANCHORAGE (TYP.)

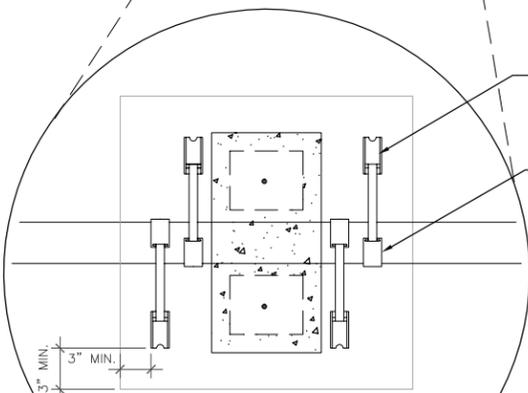
GASP110/130/150-1

FLOOD AND CRAWLSPACE VENT OPENINGS

- PROVIDE 1 SQUARE INCH OF NET FREE VENT AREA FOR EACH SQUARE FOOT OF CRAWLSPACE AREA.
- PLACE BOTTOM OF VENTS 1 FOOT (MAX) ABOVE EXTERIOR GRADE.
- ALL SCREENS AND LOUVERS MUST AUTOMATICALLY OPEN TO ALLOW UNOBSTRUCTED FLOW OF FLOODWATERS.

CONCRETE STRAP ANCHOR (TYP. 4)

STRAP AND FRAME CLIP (TYP. 4)

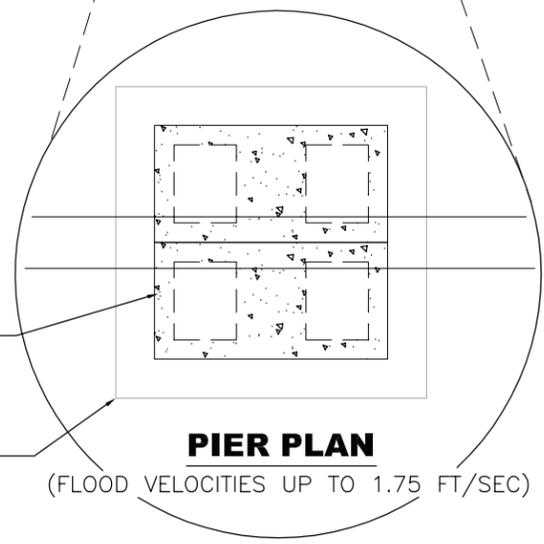


**PIER STRAP PLAN**

FLOOD VELOCITIES UP TO 5 FT/SEC SEE SHEET APD-1.1 FOR PIER DESIGN

16"X16" DRY-STACK CMU PIER

24"X24" CONCRETE FOOTING



**PIER PLAN**

(FLOOD VELOCITIES UP TO 1.75 FT/SEC)

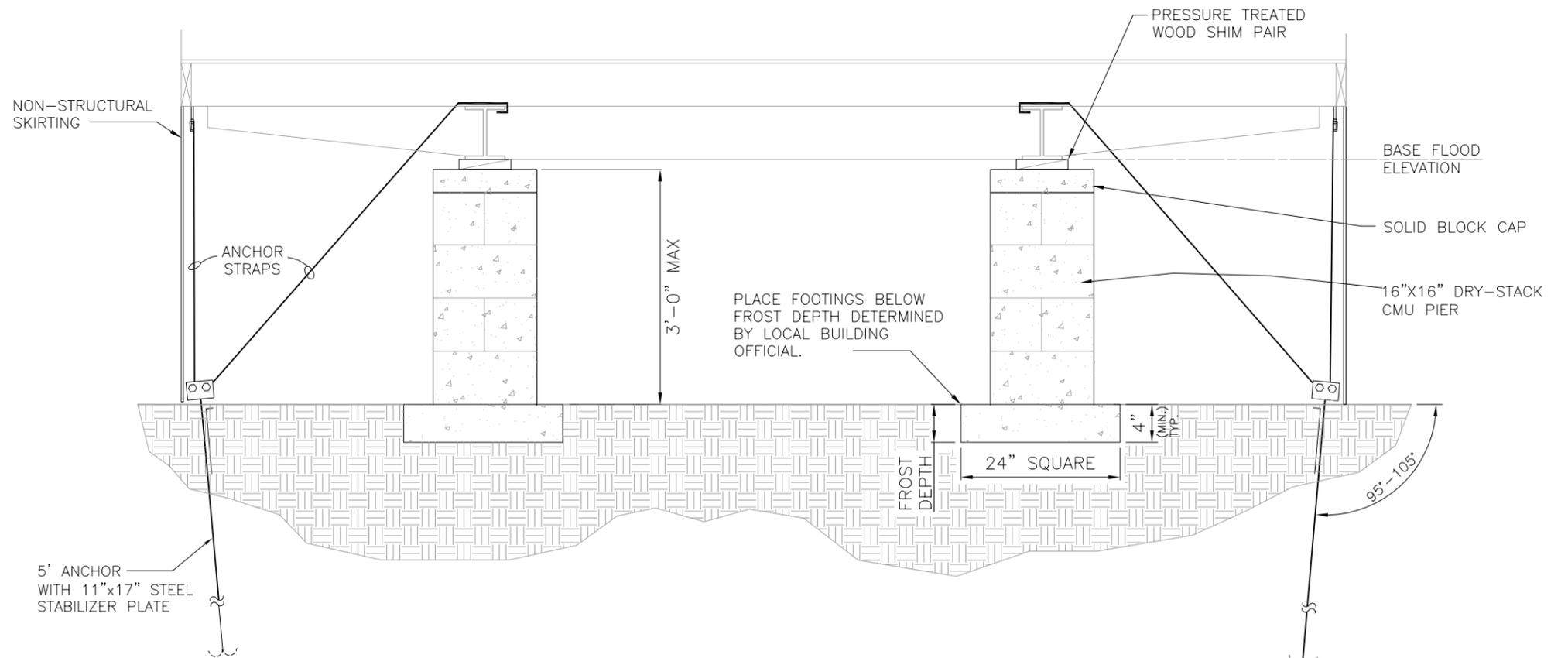
Maximum Pier Spacing Table									
Allowable Soil Bearing Pressure (lb/ft <sup>2</sup> )									
Footing Style	1,000 To 1,500			Greater Than 1,500 To 2,000			Greater Than 2,000		
	Ground Snow Load (lb/ft <sup>2</sup> )			Ground Snow Load (lb/ft <sup>2</sup> )			Ground Snow Load (lb/ft <sup>2</sup> )		
	Less Than 20	20 To Less Than 30	30 To Less Than 40	Less Than 20	20 To Less Than 30	30 To Less Than 40	Less Than 20	20 To Less Than 30	30 To 40
Concrete	5'-1"	4'-7"	4'-2"	7'-7"	6'-10"	6'-4"	8'-0"	8'-0"	8'-0"
ABS	4'-7"	4'-3"	4'-0"	7'-0"	6'-4"	5'-10"	8'-0"	8'-0"	7'-10"

**SINGLE UNIT GROUND ANCHOR FOUNDATION PLAN**  
**NOT TO SCALE - CONTINUOUS SPREAD FOOTING**

SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION, DESIGN CRITERIA AND LIMITATIONS. SHEET GN-1.1

**ANCHOR SPACING**

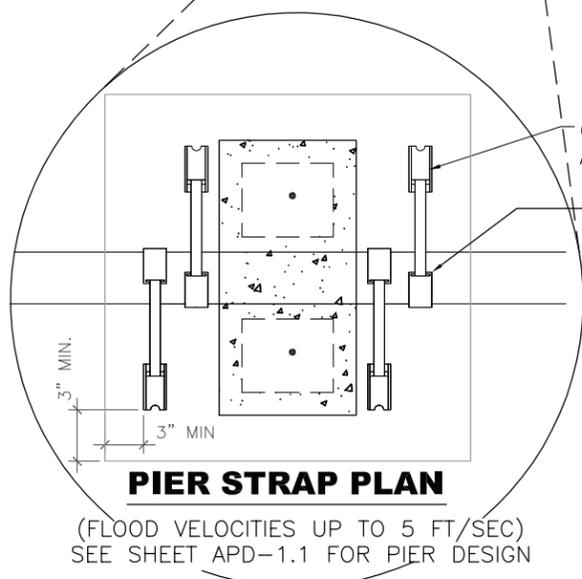
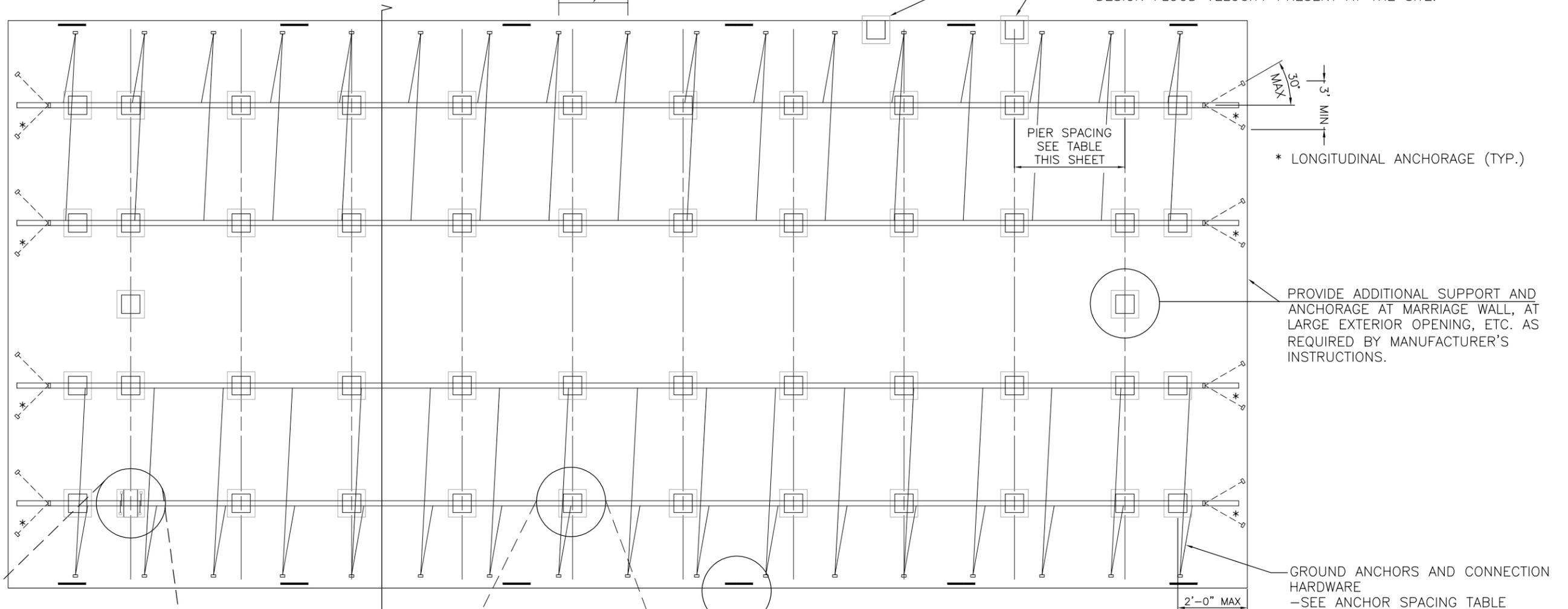
FOR STANDARD PIER- PLEASE SEE TABLES IN SHEET AS1.1 WITH ANCHOR STRENGTH 2,000 LBS  
 FOR ALTERNATE PIER- PLEASE SEE TABLES IN SHEET AS1.1 WITH ANCHOR STRENGTH 1,500 LBS



SEE ALTERNATIVE PIER DETAILS FOR FLOOD VELOCITIES GREATER THAN 1.75 FPS. SHEET APD-1.1  
 SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION, DESIGN CRITERIA AND LIMITATIONS. SHEET GN-1.1

REFER TO ANCHOR SPACING TABLE ON SHEET GASP110/130/150-2.2.

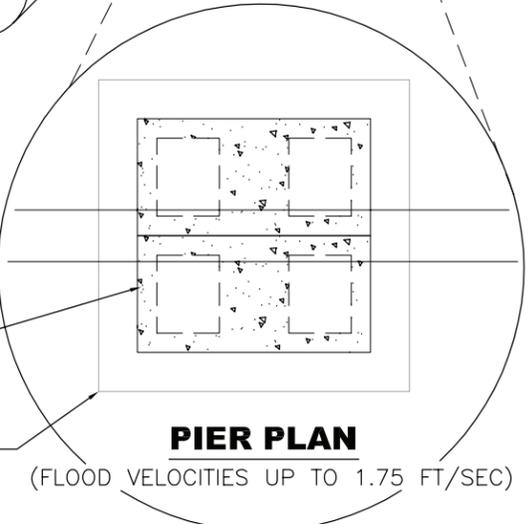
PROVIDE ADDITIONAL SUPPORT AND ANCHORAGE UNDER ENDS OF LARGE OPENINGS AND UNDER CONCENTRATED LOADS AS REQUIRED BY THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. SELECT PIERS TO RESIST THE DESIGN FLOOD VELOCITY PRESENT AT THE SITE.



GASP110/130/150-1

CONCRETE STRAP ANCHOR (TYP. 4)  
STRAP AND FRAME CLIP (TYP. 4)

16"X16" DRY-STACK CMU PIER  
24"X24" CONCRETE FOOTING



**FLOOD AND CRAWLSPACE VENT OPENINGS**  
 - PROVIDE 1 SQUARE INCH OF NET FREE VENT AREA FOR EACH SQUARE FOOT OF CRAWLSPACE AREA.  
 - PLACE BOTTOM OF VENTS 1 FOOT (MAX) ABOVE EXTERIOR GRADE.  
 - ALL SCREENS AND LOUVERS MUST AUTOMATICALLY OPEN TO ALLOW UNOBSTRUCTED FLOW OF FLOODWATERS.

Maximum Pier Spacing Table									
Allowable Soil Bearing Pressure (lb/ft <sup>2</sup> )									
Footing Style	1,000 To 1,500			Greater Than 1,500 To 2,000			Greater Than 2,000		
	Ground Snow Load (lb/ft <sup>2</sup> )			Ground Snow Load (lb/ft <sup>2</sup> )			Ground Snow Load (lb/ft <sup>2</sup> )		
	Less Than 20	20 To Less Than 30	30 To 40	Less Than 20	20 To Less Than 30	30 To 40	Less Than 20	20 To Less Than 30	30 To 40
Concrete	5'-1"	4'-7"	4'-2"	7'-7"	6'-10"	6'-4"	8'-0"	8'-0"	8'-0"
ABS	4'-4"	4'-0"	3'-6"	6'-6"	6'-0"	5'-6"	8'-0"	7'-6"	7'-0"

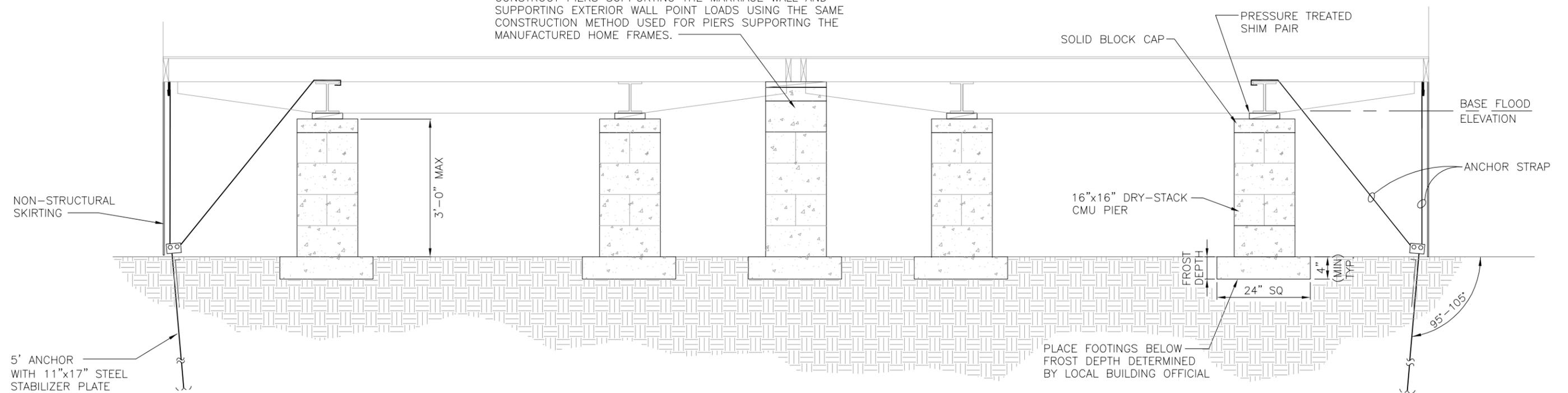
**DOUBLE UNIT GROUND ANCHOR FOUNDATION PLAN**  
**NOT TO SCALE - CONTINUOUS SPREAD FOOTING**

SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION, DESIGN CRITERIA AND LIMITATIONS. SHEET GN-1.1

**ANCHOR SPACING**

FOR STANDARD PIER- PLEASE SEE TABLES IN SHEET AS1.1 WITH ANCHOR STRENGTH 2,000 LBS  
 FOR ALTERNATE PIER- PLEASE SEE TABLES IN SHEET AS1.1 WITH ANCHOR STRENGTH 1,500 LBS

CONSTRUCT PIERS SUPPORTING THE MARRIAGE WALL AND SUPPORTING EXTERIOR WALL POINT LOADS USING THE SAME CONSTRUCTION METHOD USED FOR PIERS SUPPORTING THE MANUFACTURED HOME FRAMES.



SEE ALTERNATIVE PIER DETAILS FOR VELOCITIES GREATER THAN 1.75 FPS. SHEET APD 1.1  
 SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION,  
 DESIGN CRITERIA AND LIMITATIONS. SHEET GN-1.1

GASP110/130/150-1

**GROUND ANCHOR AND PIER DETAIL (DOUBLE UNIT)**

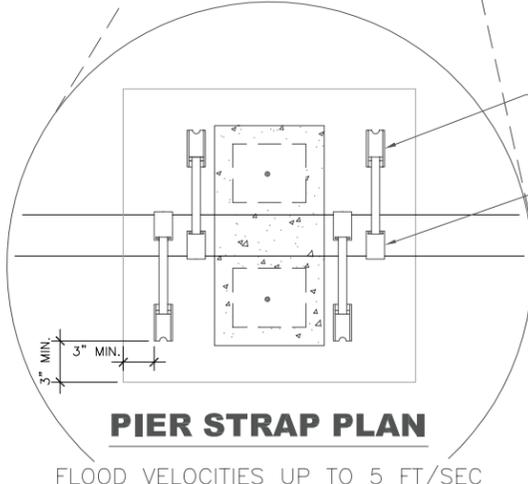
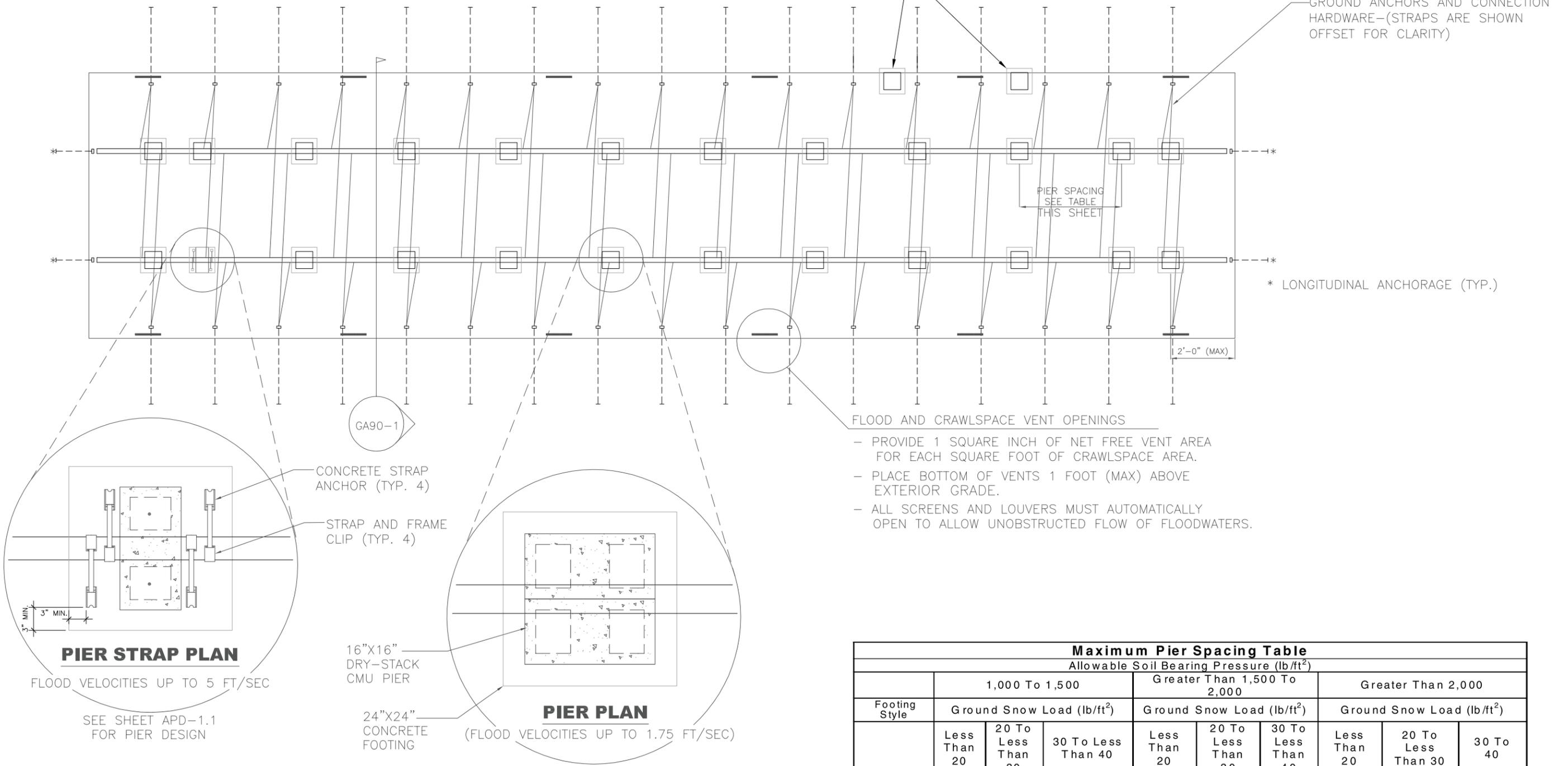
**NOT TO SCALE - PIER CONSTRUCTION FOR FLOOD VELOCITIES UP TO 1.75 FEET PER SECOND SHOWN**

FEMA 85 GASP110/130/150-2.2

Sept 2009

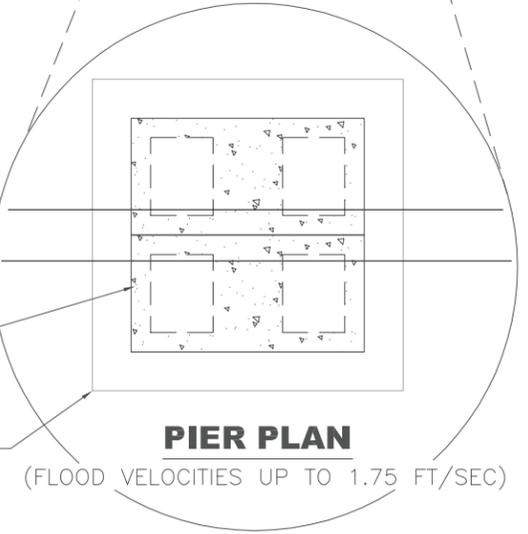
PROVIDE ADDITIONAL SUPPORT AND ANCHORAGE UNDER ENDS OF LARGE OPENINGS AND UNDER CONCENTRATED LOADS AS REQUIRED BY THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. SELECT PIERS TO RESIST THE DESIGN FLOOD VELOCITY PRESENT AT THE SITE.

GROUND ANCHORS AND CONNECTION HARDWARE—(STRAPS ARE SHOWN OFFSET FOR CLARITY)



CONCRETE STRAP ANCHOR (TYP. 4)  
STRAP AND FRAME CLIP (TYP. 4)

**PIER STRAP PLAN**  
FLOOD VELOCITIES UP TO 5 FT/SEC  
SEE SHEET APD-1.1 FOR PIER DESIGN



16\"X16\" DRY-STACK CMU PIER  
24\"X24\" CONCRETE FOOTING  
(FLOOD VELOCITIES UP TO 1.75 FT/SEC)

- FLOOD AND CRAWLSPACE VENT OPENINGS
- PROVIDE 1 SQUARE INCH OF NET FREE VENT AREA FOR EACH SQUARE FOOT OF CRAWLSPACE AREA.
  - PLACE BOTTOM OF VENTS 1 FOOT (MAX) ABOVE EXTERIOR GRADE.
  - ALL SCREENS AND LOUVERS MUST AUTOMATICALLY OPEN TO ALLOW UNOBSTRUCTED FLOW OF FLOODWATERS.

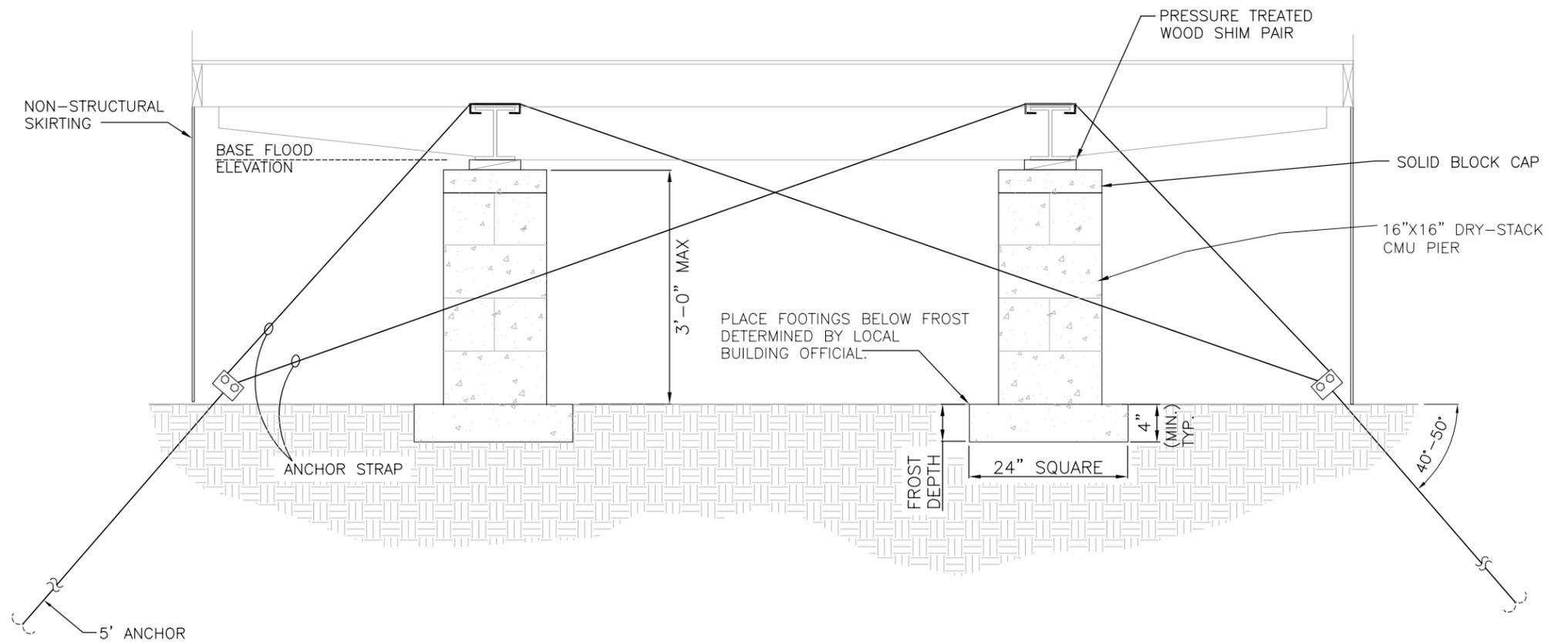
Maximum Pier Spacing Table									
Allowable Soil Bearing Pressure (lb/ft <sup>2</sup> )									
Footing Style	1,000 To 1,500			Greater Than 1,500 To 2,000			Greater Than 2,000		
	Ground Snow Load (lb/ft <sup>2</sup> )			Ground Snow Load (lb/ft <sup>2</sup> )			Ground Snow Load (lb/ft <sup>2</sup> )		
	Less Than 20	20 To Less Than 30	30 To Less Than 40	Less Than 20	20 To Less Than 30	30 To Less Than 40	Less Than 20	20 To Less Than 30	30 To 40
Concrete	5'-3"	4'-9"	4'-2"	7'-10"	7'-2"	6'-6"	8'-0"	8'-0"	8'-0"
ABS	4'-7"	4'-3"	4'-0"	7'-0"	6'-4"	5'-10"	8'-0"	8'-0"	7'-10"

**SINGLE UNIT GROUND ANCHOR FOUNDATION PLAN**  
**NOT TO SCALE**

SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION, DESIGN CRITERIA AND LIMITATIONS. SHEET GN-1.1

**ANCHOR SPACING**

FOR STANDARD PIER- PLEASE SEE TABLES IN SHEET AS1.1 WITH ANCHOR STRENGTH 3,150 LBS  
 FOR ALTERNATE PIER- PLEASE SEE TABLES IN SHEET AS1.1 WITH ANCHOR STRENGTH 2,000 LBS

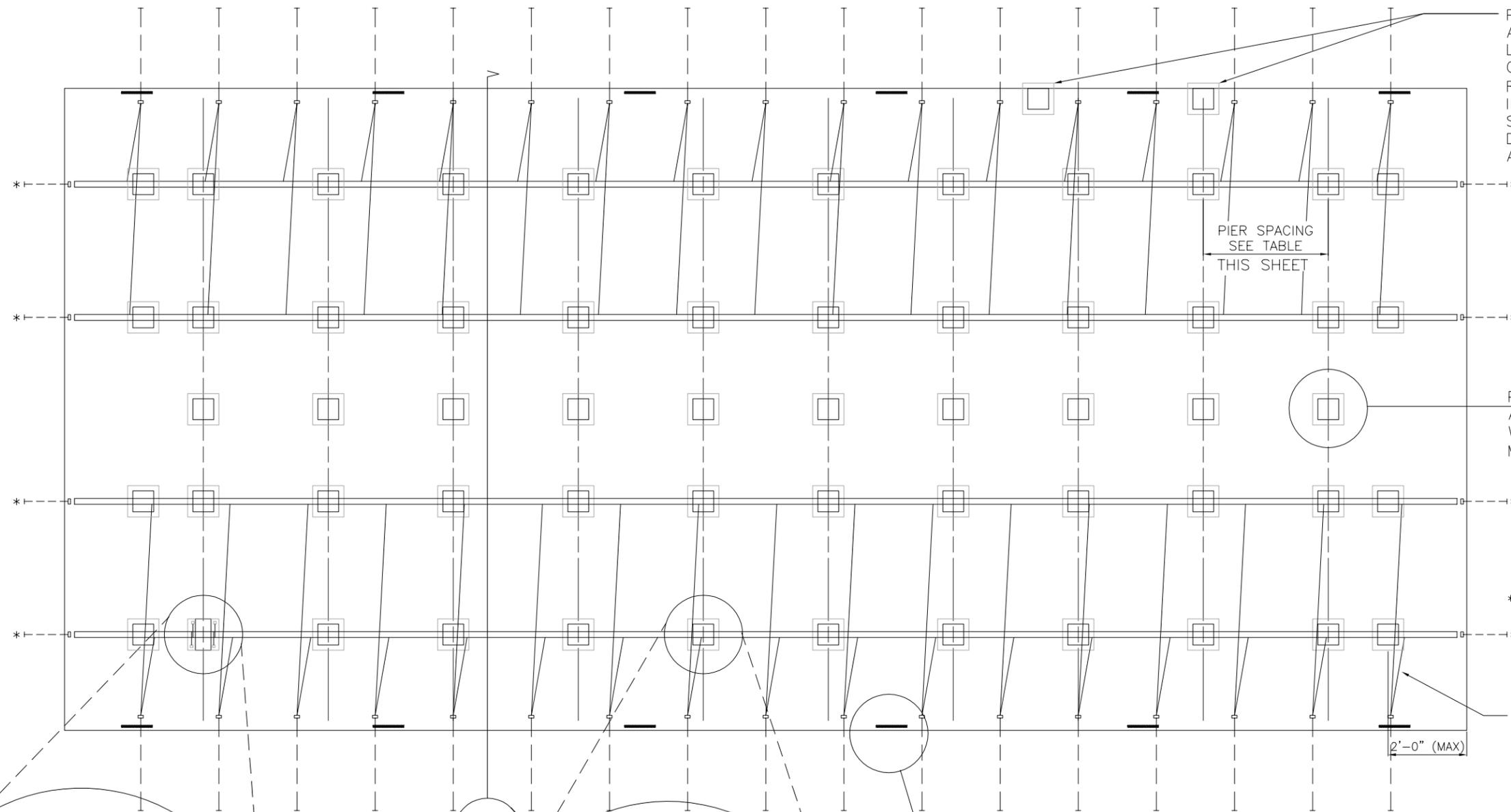


GA90-1

**GROUND ANCHOR AND PIER DETAIL (SINGLE UNIT)**

**NOT TO SCALE - PIER CONSTRUCTION FOR FLOOD VELOCITIES UP TO 1.75 FEET PER SECOND SHOWN**

SEE ALTERNATIVE PIER DETAILS FOR FLOOD VELOCITIES GREATER THAN 1.75 FPS. SHEET APD 1.1  
 SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION,  
 DESIGN CRITERIA AND LIMITATIONS. SHEET GN-1.1



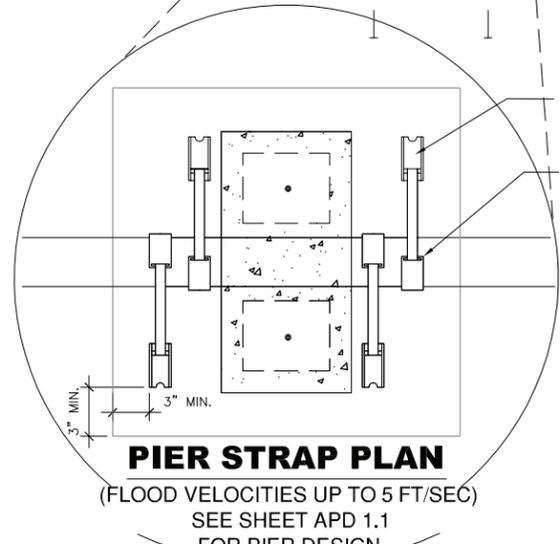
PROVIDE ADDITIONAL SUPPORT AND ANCHORAGE UNDER ENDS OF LARGE OPENINGS AND UNDER CONCENTRATED LOADS AS REQUIRED BY THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. SELECT PIERS TO RESIST THE DESIGN FLOOD VELOCITY PRESENT AT THE SITE.

PROVIDE ADDITIONAL SUPPORT AND ANCHORAGE AT MARRIAGE WALL, AS REQUIRED BY MANUFACTURER'S INSTRUCTIONS.

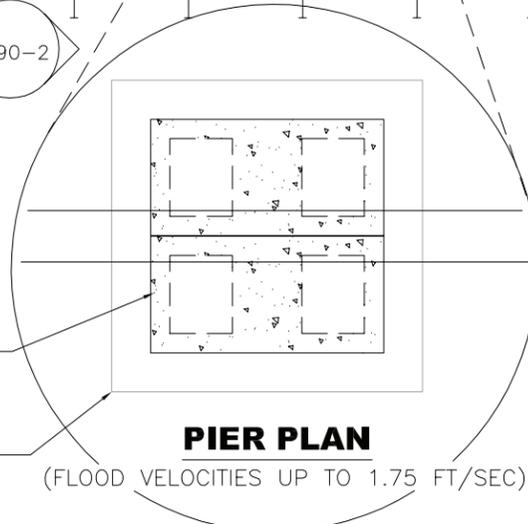
\* LONGITUDINAL ANCHORAGE (TYP.)

GROUND ANCHORS AND CONNECTION HARDWARE—(STRAPS ARE SHOWN OFFSET FOR CLARITY).

FLOOD AND CRAWLSPACE VENT OPENINGS  
 - PROVIDE 1 SQUARE INCH OF NET FREE VENT AREA FOR EACH SQUARE FOOT OF CRAWLSPACE AREA.  
 - PLACE BOTTOM OF VENTS 1 FOOT (MAX) ABOVE EXTERIOR GRADE.  
 - ALL SCREENS AND LOUVERS MUST AUTOMATICALLY OPEN TO ALLOW UNOBSTRUCTED FLOW OF FLOODWATERS.



CONCRETE STRAP ANCHOR (TYP. 4)  
 STRAP AND FRAME CLIP (TYP. 4)



16"X16" DRY-STACK CMU PIER  
 24"X24" CONCRETE FOOTING  
 (FLOOD VELOCITIES UP TO 1.75 FT/SEC)

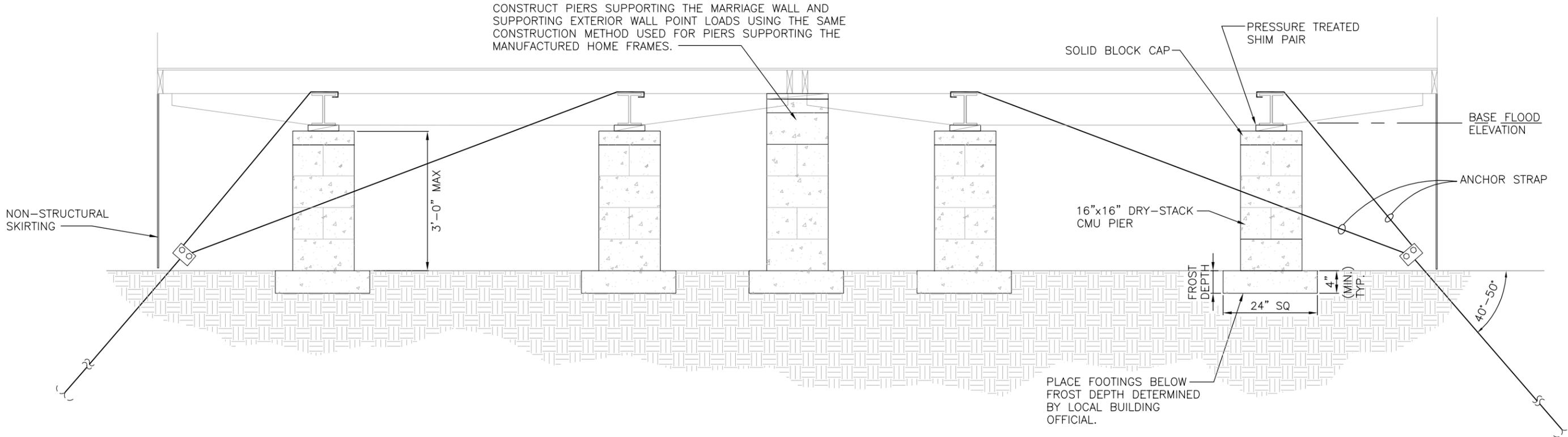
**DOUBLE UNIT GROUND ANCHOR FOUNDATION PLAN**  
**NOT TO SCALE**

Maximum Pier Spacing Table									
Allowable Soil Bearing Pressure (lb/ft <sup>2</sup> )									
Footing Style	1,000 To 1,500			Greater Than 1,500 To 2,000			Greater Than 2,000		
	Ground Snow Load (lb/ft <sup>2</sup> )			Ground Snow Load (lb/ft <sup>2</sup> )			Ground Snow Load (lb/ft <sup>2</sup> )		
	Less Than 20	20 To Less Than 30	30 To 40	Less Than 20	20 To Less Than 30	30 To 40	Less Than 20	20 To Less Than 30	30 To 40
Concrete	5'-3"	4'-9"	4'-2"	7'-10"	7'-2"	6'-6"	8'-0"	8'-0"	8'-0"
ABS	4'-7"	4'-3"	4'-0"	7'-0"	6'-4"	5'-10"	8'-0"	8'-0"	7'-10"

SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION, DESIGN CRITERIA AND LIMITATIONS. SHEET GN-1.1

**ANCHOR SPACING**

FOR STANDARD PIER- PLEASE SEE TABLES IN SHEET AS1.1 WITH ANCHOR STRENGTH 3,150 LBS  
 FOR ALTERNATE PIER- PLEASE SEE TABLES IN SHEET AS1.1 WITH ANCHOR STRENGTH 2,000 LBS



CONSTRUCT PIERS SUPPORTING THE MARRIAGE WALL AND SUPPORTING EXTERIOR WALL POINT LOADS USING THE SAME CONSTRUCTION METHOD USED FOR PIERS SUPPORTING THE MANUFACTURED HOME FRAMES.

NON-STRUCTURAL SKIRTING

3'-0" MAX

SOLID BLOCK CAP

PRESSURE TREATED SHIM PAIR

BASE FLOOD ELEVATION

ANCHOR STRAP

16"x16" DRY-STACK CMU PIER

FROST DEPTH

24" SQ

4" (MIN.) TYP.

PLACE FOOTINGS BELOW FROST DEPTH DETERMINED BY LOCAL BUILDING OFFICIAL.

40°-50°

GA90-2

**GROUND ANCHOR AND PIER DETAIL (DOUBLE UNIT)**

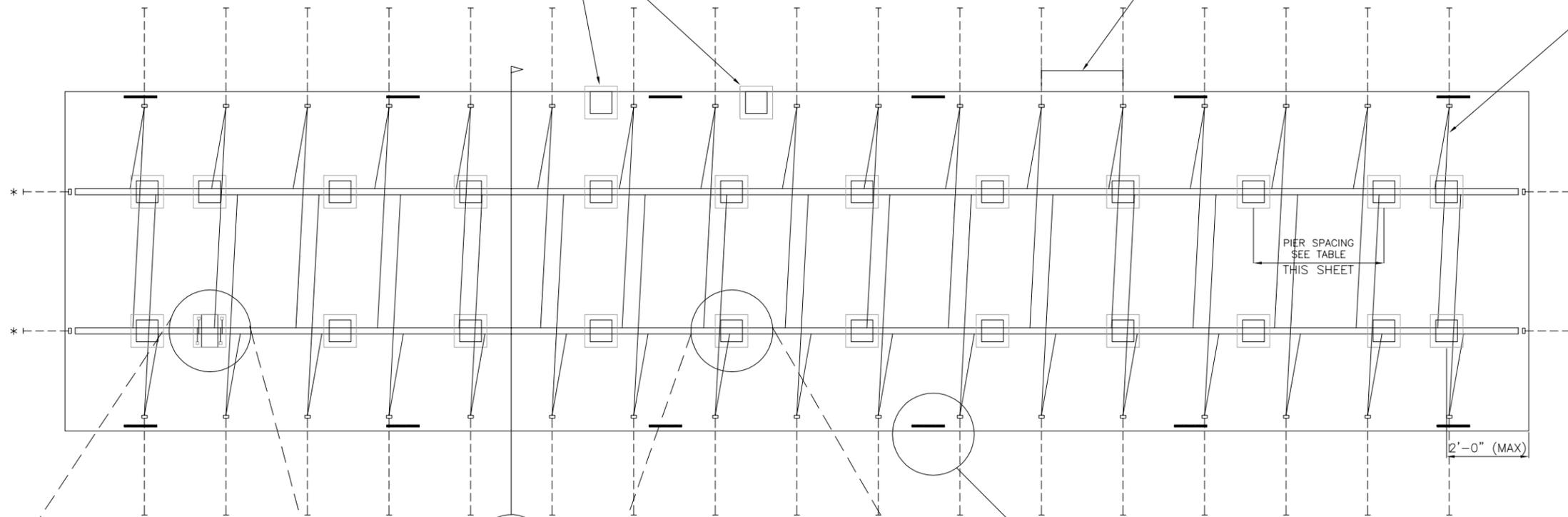
**NOT TO SCALE - PIER CONSTRUCTION FOR FLOOD VELOCITIES UP TO 1.75 FEET PER SECOND SHOWN**

SEE ALTERNATIVE PIER DETAILS FOR FLOOD VELOCITIES GREATER THAN 1.75 FPS. SHEET APD-1.1  
 SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION, DESIGN CRITERIA AND LIMITATIONS. SHEET GN-1.1

PROVIDE ADDITIONAL SUPPORT AND ANCHORAGE UNDER ENDS OF LARGE OPENINGS AND UNDER CONCENTRATED LOADS AS REQUIRED BY THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. SELECT PIERS TO RESIST THE DESIGN FLOOD VELOCITY PRESENT AT THE SITE.

REFER TO ANCHOR SPACING TABLE ON SHEET GA110/130/150-1.2.

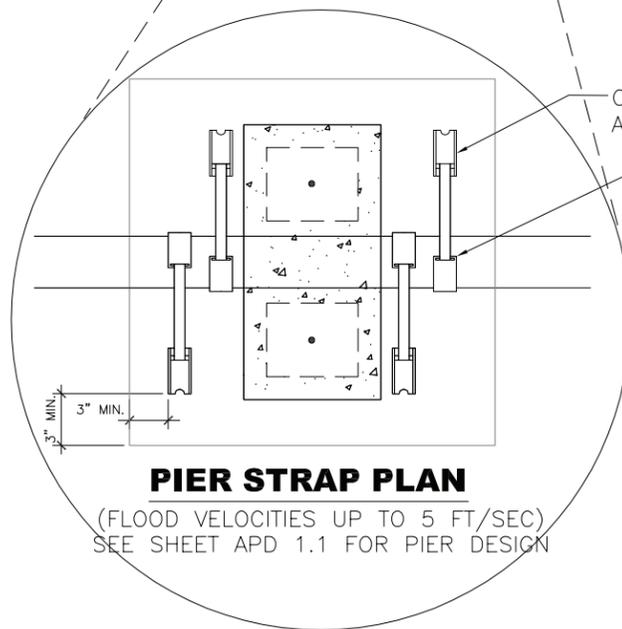
GROUND ANCHORS AND CONNECTION HARDWARE—(STRAPS ARE SHOWN OFFSET FOR CLARITY).



GA110/130/150-1

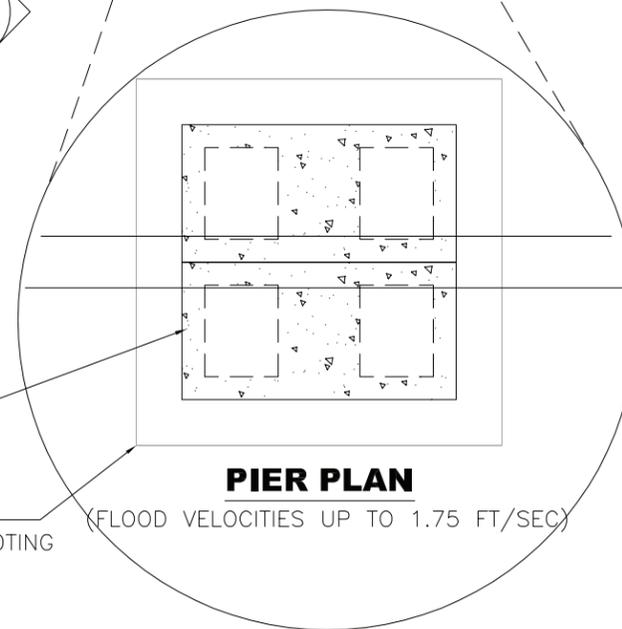
FLOOD AND CRAWLSPACE VENT OPENINGS

- PROVIDE 1 SQUARE INCH OF NET FREE VENT AREA FOR EACH SQUARE FOOT OF CRAWLSPACE AREA.
- PLACE BOTTOM OF VENTS 1 FOOT (MAX) ABOVE EXTERIOR GRADE.
- ALL SCREENS AND LOUVERS MUST AUTOMATICALLY OPEN TO ALLOW UNOBSTRUCTED FLOW OF FLOODWATERS.



CONCRETE STRAP ANCHOR (TYP. 4)  
STRAP AND FRAME CLIP (TYP. 4)

16"X16" DRY-STACK CMU PIER  
24"X24" CONCRETE FOOTING



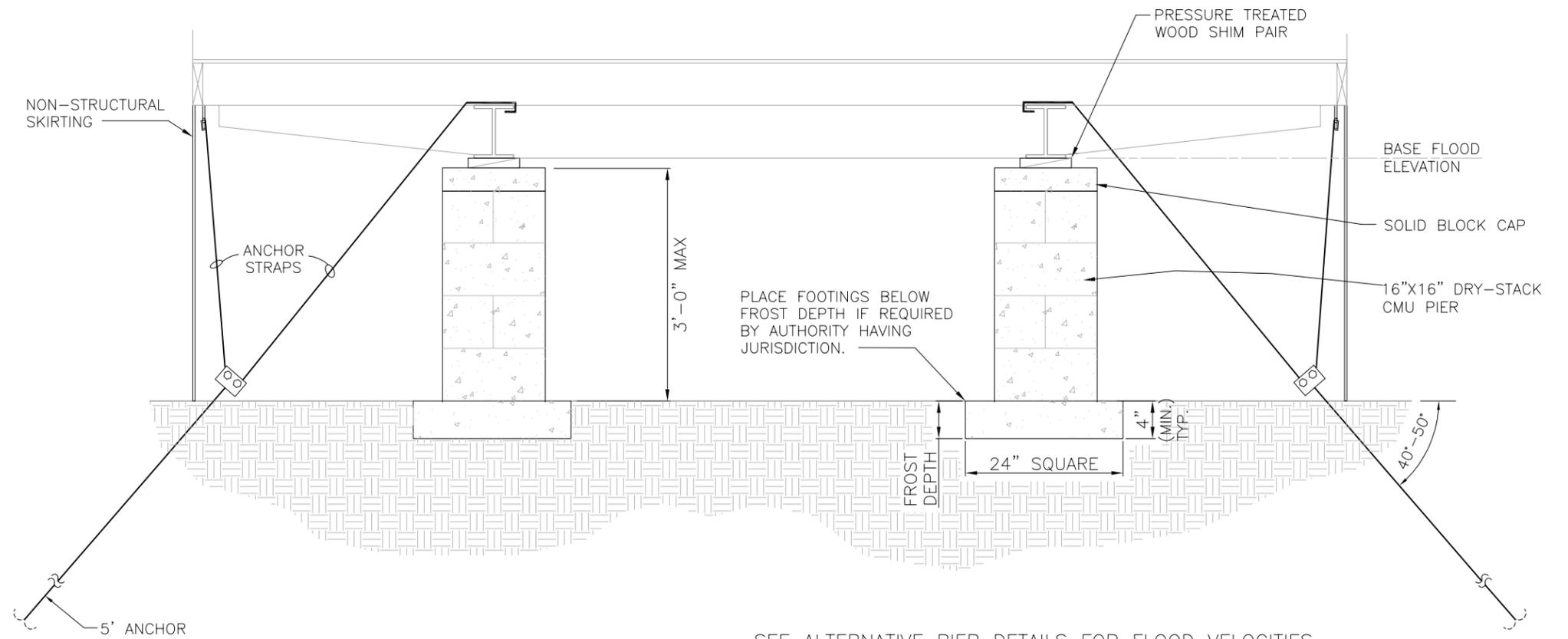
Maximum Pier Spacing Table									
Allowable Soil Bearing Pressure (lb/ft <sup>2</sup> )									
Footing Style	1,000 To 1,500			Greater Than 1,500 To 2,000			Greater Than 2,000		
	Ground Snow Load (lb/ft <sup>2</sup> )			Ground Snow Load (lb/ft <sup>2</sup> )			Ground Snow Load (lb/ft <sup>2</sup> )		
	Less Than 20	20 To Less Than 30	30 To 40	Less Than 20	20 To Less Than 30	30 To 40	Less Than 20	20 To Less Than 30	30 To 40
Concrete	5'-1"	4'-7"	4'-2"	7'-7"	6'-10"	6'-4"	8'-0"	8'-0"	8'-0"
ABS	4'-7"	4'-3"	4'-0"	7'-0"	6'-4"	5'-10"	8'-0"	8'-0"	7'-10"

**SINGLE UNIT GROUND ANCHOR FOUNDATION PLAN**  
**NOT TO SCALE**

SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION, DESIGN CRITERIA AND LIMITATIONS. SHEET GN-1.1

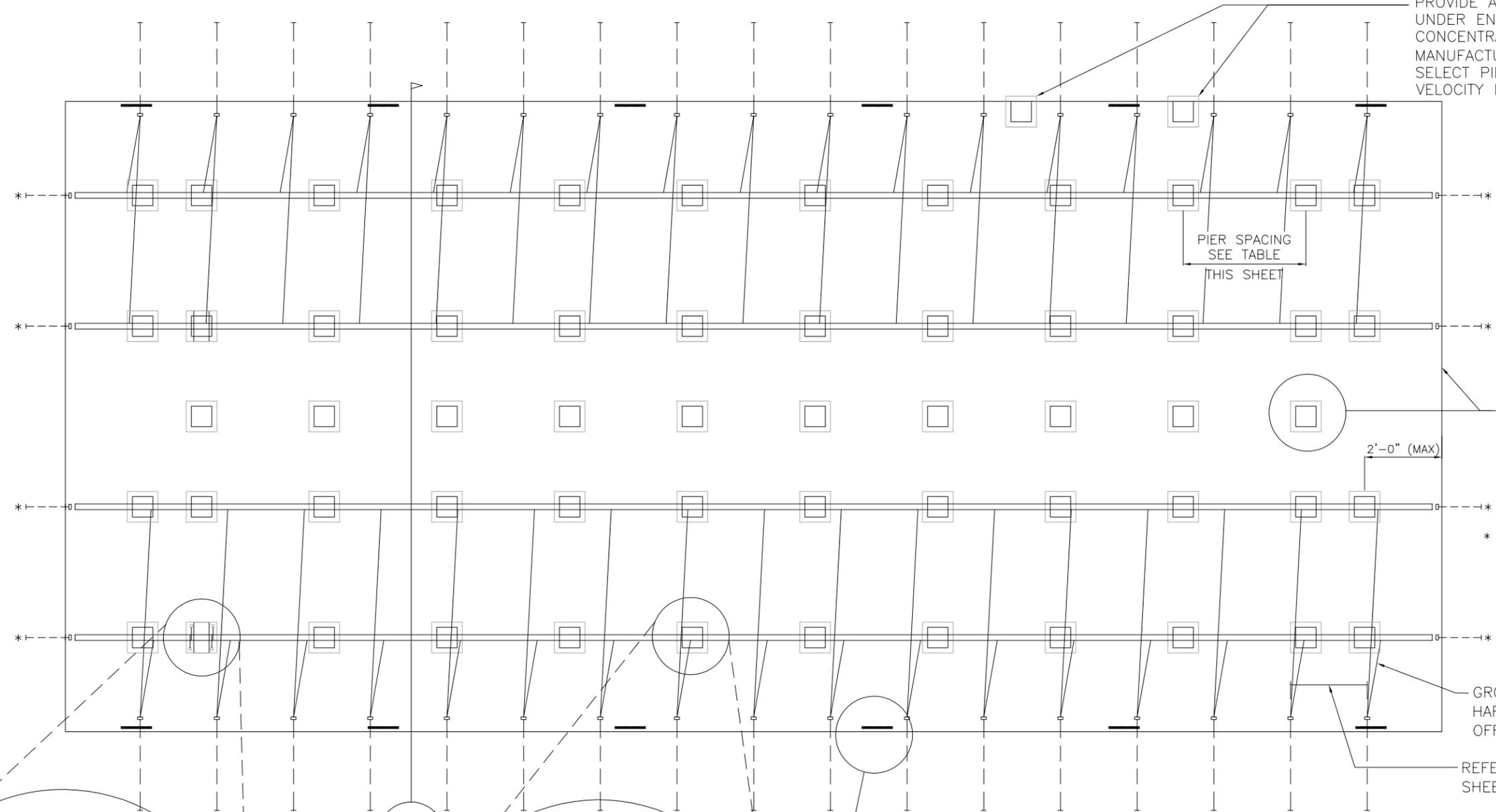
**ANCHOR SPACING**

FOR STANDARD PIER- PLEASE SEE TABLES IN SHEET AS1.1 WITH ANCHOR STRENGTH 3,150 LBS  
 FOR ALTERNATE PIER- PLEASE SEE TABLES IN SHEET AS1.1 WITH ANCHOR STRENGTH 2,000 LBS



SEE ALTERNATIVE PIER DETAILS FOR FLOOD VELOCITIES GREATER THAN 1.75 FPS. SHEET APD-1.1  
 SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION, DESIGN CRITERIA AND LIMITATIONS. SHEET GN-1.1

PROVIDE ADDITIONAL SUPPORT AND ANCHORAGE UNDER ENDS OF LARGE OPENINGS AND UNDER CONCENTRATED LOADS AS REQUIRED BY THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. SELECT PIERS TO RESIST THE DESIGN FLOOD VELOCITY PRESENT AT THE SITE.



PROVIDE ADDITIONAL SUPPORT AND ANCHORAGE AT MARRIAGE WALL, AT LARGE EXTERIOR OPENING, ETC., AS REQUIRED BY MANUFACTURER'S INSTRUCTIONS.

\* LONGITUDINAL ANCHORAGE (TYP.)

GROUND ANCHORS AND CONNECTION HARDWARE—(STRAPS ARE SHOWN OFFSET FOR CLARITY).

REFER TO ANCHOR SPACING TABLE SHEET GA110/130/150-2.2.

**FLOOD AND CRAWLSPACE VENT OPENINGS**

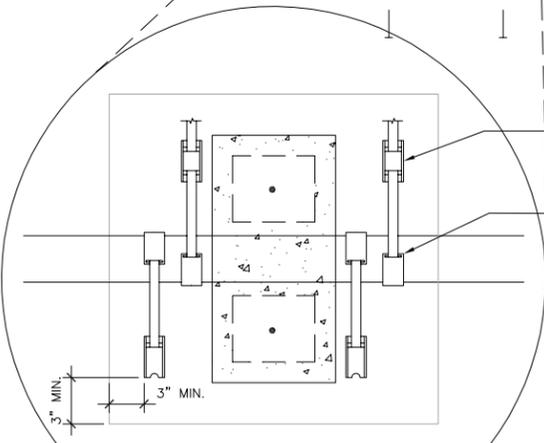
- PROVIDE 1 SQUARE INCH OF NET FREE VENT AREA FOR EACH SQUARE FOOT OF CRAWL SPACE AREA.
- ALL SCREENS AND LOUVERS MUST AUTOMATICALLY OPEN TO ALLOW UNOBSTRUCTED FLOW OF FLOODWATERS.
- PLACE BOTTOM OF VENTS 1 FOOT (MAX) ABOVE EXTERIOR GRADE.

GA110/130/150-2

CONCRETE STRAP ANCHOR (TYP. 4)  
STRAP AND FRAME CLIP (TYP. 4)

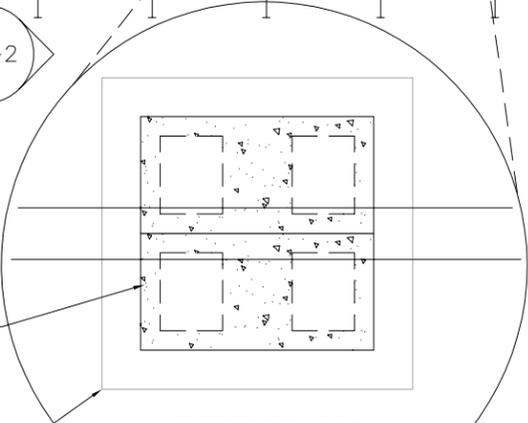
16"X16" DRY-STACK CMU PIER

24"X24" CONCRETE FOOTING



**PIER STRAP PLAN**

(FLOOD VELOCITIES UP TO 5 FT/SEC)  
SEE SHEET APD-1.1 FOR PIER DESIGN



**PIER PLAN**

(FLOOD VELOCITIES UP TO 1.75 FT/SEC)

**Maximum Pier Spacing Table**

Allowable Soil Bearing Pressure (lb/ft <sup>2</sup> )									
Footing Style	1,000 To 1,500			Greater Than 1,500 To 2,000			Greater 2,000		
	Ground Snow Load (lb/ft <sup>2</sup> )			Ground Snow Load (lb/ft <sup>2</sup> )			Ground Snow Load (lb/ft <sup>2</sup> )		
	Less Than 20	20 To Less Than 30	30 To 40	Less Than 20	20 To Less Than 30	30 To 40	Less Than 20	20 To Less Than 30	30 To 40
Concrete	5'-1"	4'-7"	4'-2"	7'-7"	6'-10"	6'-4"	8'-0"	8'-0"	8'-0"
ABS	4'-4"	4'-0"	3'-6"	6'-6"	6'-0"	5'-6"	8'-0"	7'-6"	7'-0"

SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION, DESIGN CRITERIA AND LIMITATIONS. SHEET GN-1.1

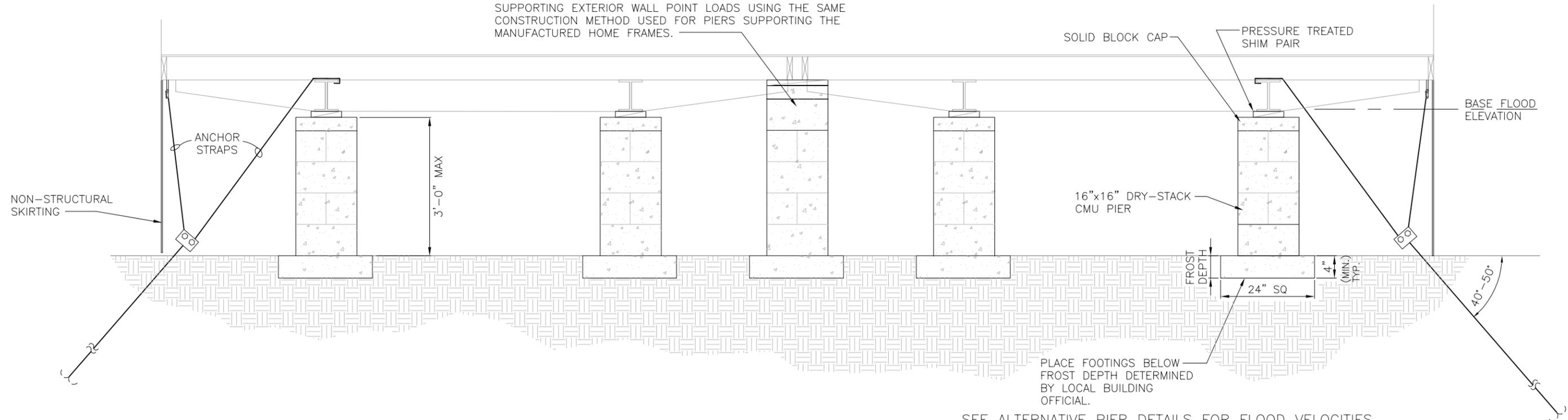
**DOUBLE UNIT GROUND ANCHOR FOUNDATION PLAN**

**NOT TO SCALE**

**ANCHOR SPACING**

FOR STANDARD PIER- PLEASE SEE TABLES IN SHEET AS1.1 WITH ANCHOR STRENGTH 3,150 LBS  
 FOR ALTERNATE PIER- PLEASE SEE TABLES IN SHEET AS1.1 WITH ANCHOR STRENGTH 2,000 LBS

CONSTRUCT PIERS SUPPORTING THE MARRIAGE WALL AND SUPPORTING EXTERIOR WALL POINT LOADS USING THE SAME CONSTRUCTION METHOD USED FOR PIERS SUPPORTING THE MANUFACTURED HOME FRAMES.

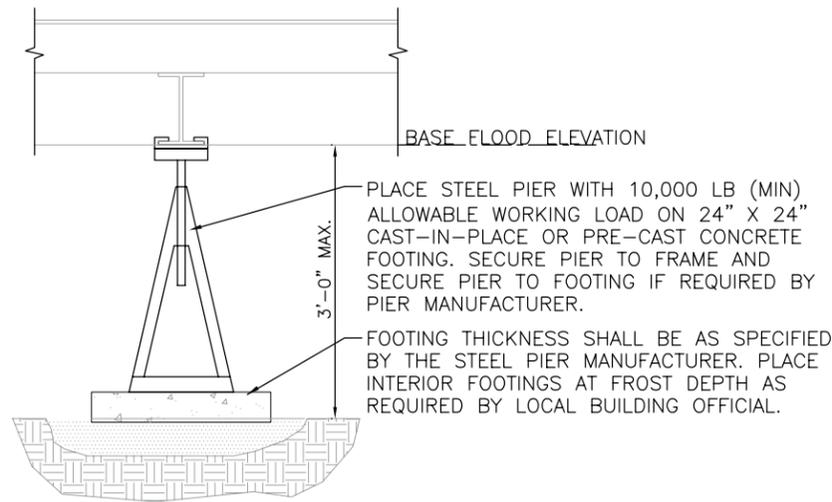


SEE ALTERNATIVE PIER DETAILS FOR FLOOD VELOCITIES GREATER THAN 1.75 FPS. SHEET APD-1.1  
 SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION, DESIGN CRITERIA AND LIMITATIONS. SHEET GN-1.1

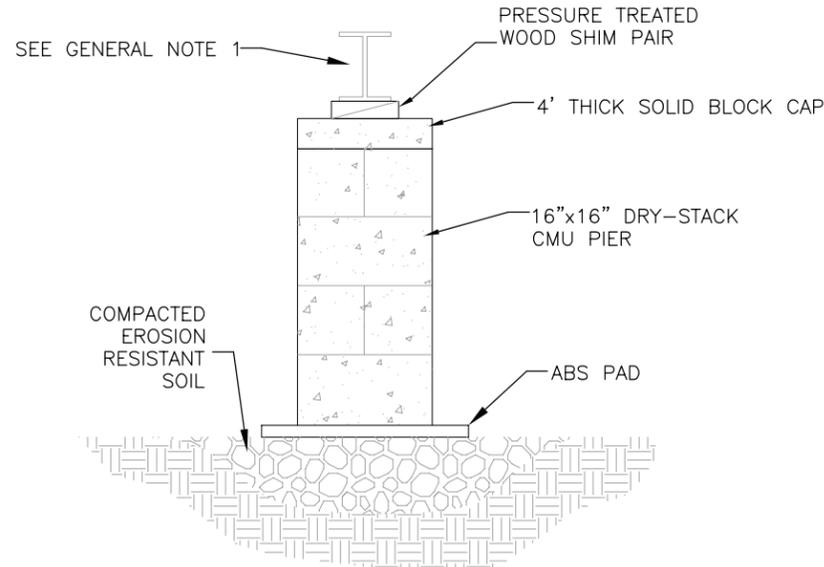
GA110/130/150-2

**GROUND ANCHOR AND PIER DETAIL (DOUBLE UNIT)**

**NOT TO SCALE - PIER CONSTRUCTION FOR FLOOD VELOCITIES UP TO 1.75 FEET PER SECOND SHOWN**



**STEEL PIER**  
**ALTERNATIVE FOR FLOOD VELOCITIES UP TO 1 FT/SEC**



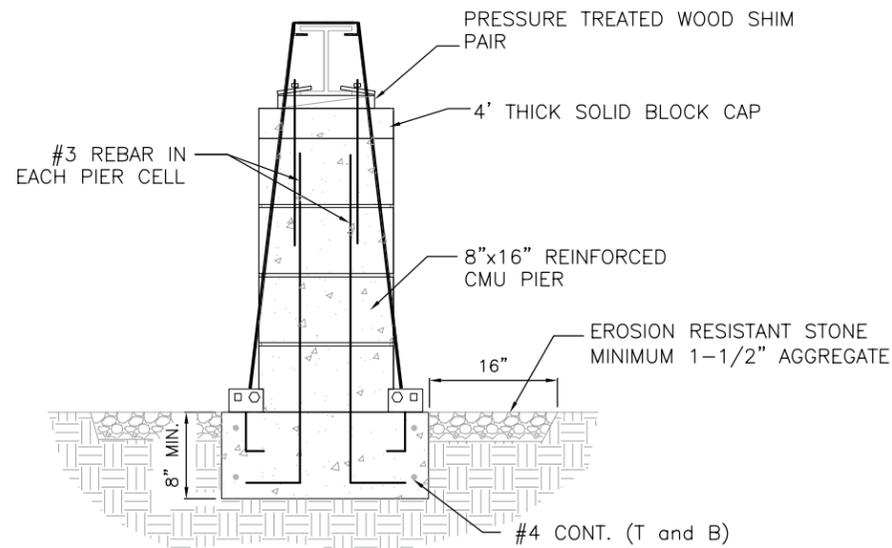
**ALTERNATIVE MASONRY PIER DETAIL FOR**  
**FLOOD VELOCITIES UP TO 1.25 FT/SEC**

Masonry Pier Construction	Dry-Stack	Dry-Stack Face Mortar	Bonded <sup>2</sup> Stack	Fully Grouted, Reinforced and Anchored to Concrete Foundation
Single Stack	1.00 fps <sup>3</sup>	2.00 fps	2.50 fps	5.00 fps
Double Stack	1.25 fps <sup>4</sup> 1.75 fps	3.00 fps	3.00 fps	5.00 fps

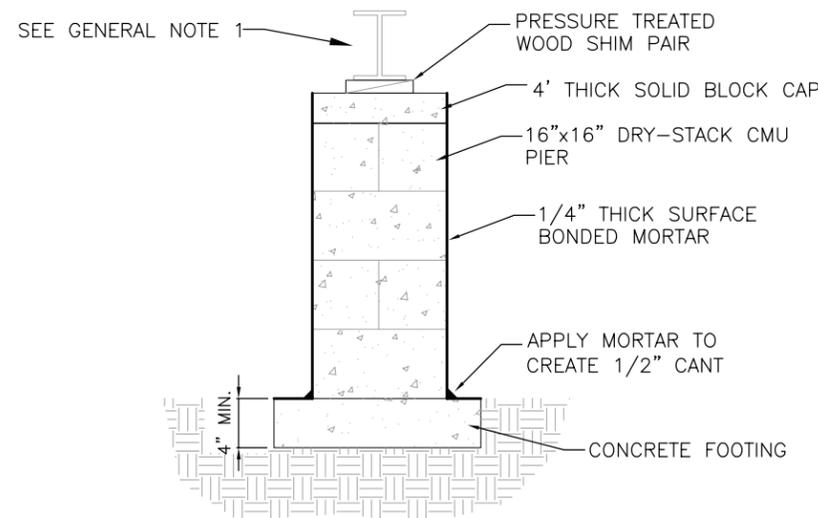
<sup>1</sup>Velocities are the maximum design flood flow for each masonry block pier shown. Design velocity applicable to piers up to 36 inches high.  
<sup>2</sup>Bonded piers use Type M or S Portland cement and lime mortar to adhere horizontal and vertical joints between block. Polyurethane based masonry adhesive certified by a recognized national agency for use in masonry construction in accordance with the IRC and IBC also may be used.  
<sup>3</sup>Single block dry-stack pier design velocity applies to piers supported on ABS pads as well as concrete foundations.  
<sup>4</sup>Design velocity of 1.25 fps applies to double block dry-stacked pier supported on ABS pad.

**GENERAL NOTES**

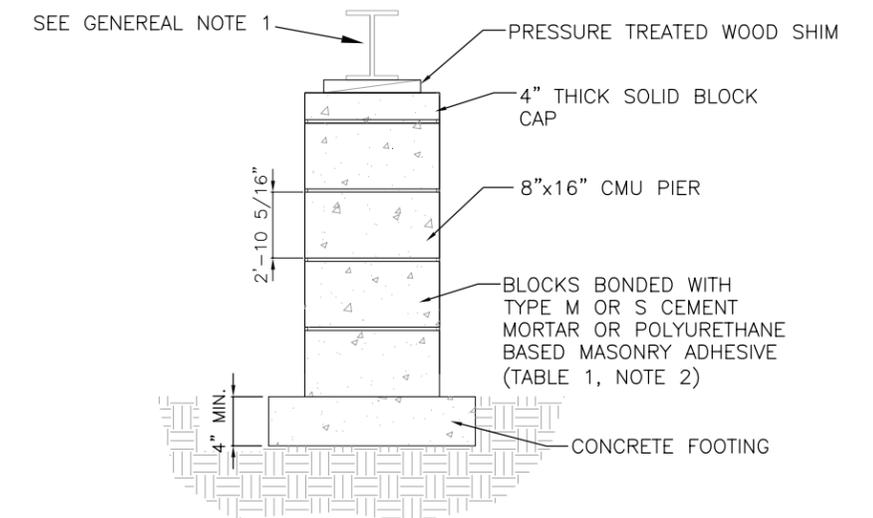
1. Pier may support manufactured home main frame beam or marriage wall.
2. Footing dimensions (W, L, and D) shall be as indicated on applicable foundation type detail sheets.



**ALTERNATIVE MASONRY PIER DETAIL FOR**  
**FLOOD VELOCITIES UP TO 5 FT/SEC**



**ALTERNATIVE MASONRY PIER DETAIL FOR**  
**FLOOD VELOCITIES UP TO 3 FT/SEC**



**ALTERNATIVE MASONRY PIER DETAIL FOR**  
**FLOOD VELOCITIES UP TO 2.5 FT/SEC**

16" BY 8" MASONRY PIER AND CONCRETE FOOTING:  
 SECURE PIER, FOOTING, AND FRAME WITH STRAPS, FRAME CLIPS, AND CONCRETE ANCHORS. PROVIDE FRAME CLIP FOR EACH STRAP.

PROVIDE SCOUR PROTECTION AROUND PIERS IN AREAS WHERE FLOOD VELOCITIES EXCEED 3 FT/SEC USING NON-ERODIBLE SOILS OR BY PLACING FOOTINGS BELOW THE MAXIMUM SCOUR DEPTH FOR THE FLOOD VELOCITIES PRESENT.

**ALTERNATIVE PIER DETAILS FOR FLOOD VELOCITIES NOT SHOWN ON PLANS**

**NOT TO SCALE**

Maximum Ground Anchor Spacing Table:Design Wind Speed 90 mph														
Anchor Strength (lbs)	Strap Connection Height (in)	Roof Pitch	Building Width - Single Unit						Building Width - Double Unit					
			12 ft		14 ft		16 ft		24 ft		28 ft		32 ft	
			I-Beam Spacing (in)	I-Beam Spacing (in)	I-Beam Spacing (in)	I-Beam Spacing (in)	I-Beam Spacing (in)	I-Beam Spacing (in)	I-Beam Spacing (in)	I-Beam Spacing (in)	I-Beam Spacing (in)	I-Beam Spacing (in)		
			82.5	99.5	82.5	99.5	82.5	99.5	82.5	99.5	82.5	99.5	82.5	99.5
1500	25	3:12	9'-0"	9'-3"	9'-4"	9'-7"	9'-9"	9'-10"	8'-9"	7'-1"	10'-3"	9'-4"	11'-1"	10'-7"
		5:12	9'-1"	9'-3"	9'-6"	9'-8"	9'-8"	9'-10"	7'-4"	6'-0"	8'-4"	7'-8"	8'-9"	8'-6"
		7:12	8'-6"	8'-8"	8'-8"	8'-10"	8'-9"	9'-0"	6'-6"	5'-3"	7'-2"	6'-7"	7'-6"	7'-2"
	33	3:12	8'-8"	8'-10"	9'-1"	9'-3"	9'-6"	9'-8"	7'-7"	5'-10"	9'-3"	8'-3"	10'-4"	9'-9"
		5:12	8'-9"	9'-0"	9'-2"	9'-4"	9'-6"	9'-8"	6'-4"	4'-10"	7'-7"	6'-8"	8'-2"	7'-8"
		7:12	8'-2"	8'-6"	8'-6"	8'-8"	8'-7"	8'-9"	5'-7"	4'-3"	6'-7"	5'-9"	7'-0"	6'-7"
2000	25	3:12	12'-0"	12'-3"	12'-7"	12'-9"	13'-0"	13'-2"	11'-9"	9'-6"	13'-8"	12'-7"	14'-9"	14'-2"
		5:12	12'-1"	12'-4"	12'-7"	12'-10"	13'-0"	13'-2"	9'-10"	8'-0"	11'-2"	10'-3"	11'-9"	11'-3"
		7:12	11'-3"	11'-7"	11'-7"	11'-10"	11'-9"	12'-0"	8'-8"	7'-0"	9'-8"	8'-10"	10'-0"	9'-7"
	33	3:12	11'-7"	11'-10"	12'-2"	12'-4"	12'-7"	12'-10"	10'-2"	7'-9"	12'-4"	11'-0"	13'-9"	13'-0"
		5:12	11'-8"	12'-1"	12'-2"	12'-6"	12'-7"	12'-10"	8'-6"	6'-6"	10'-1"	9'-0"	11'-0"	10'-3"
		7:12	10'-10"	11'-3"	11'-3"	11'-7"	11'-9"	11'-9"	7'-6"	5'-8"	8'-9"	7'-9"	9'-3"	8'-9"
2500	25	3:12	15'-1"	15'-4"	15'-8"	16'-0"	16'-3"	16'-6"	14'-8"	11'-10"	16'-0"	15'-8"	16'-0"	16'-0"
		5:12	15'-2"	15'-7"	15'-9"	16'-1"	16'-2"	16'-6"	12'-4"	10'-0"	14'-0"	12'-9"	14'-8"	14'-1"
		7:12	14'-1"	14'-6"	14'-6"	14'-9"	14'-8"	15'-0"	10'-9"	8'-9"	12'-1"	11'-1"	12'-6"	12'-0"
	33	3:12	14'-6"	14'-10"	15'-2"	15'-7"	15'-9"	16'-0"	12'-8"	9'-9"	15'-6"	13'-9"	16'-0"	16'-0"
		5:12	14'-7"	15'-1"	15'-3"	15'-8"	15'-9"	16'-0"	10'-7"	8'-2"	12'-8"	11'-2"	13'-8"	12'-10"
		7:12	13'-8"	14'-1"	14'-1"	14'-6"	14'-4"	14'-8"	9'-3"	7'-2"	10'-10"	9'-8"	11'-8"	11'-0"
3150	25	3:12	16'-0"	16'-0"	16'-0"	16'-0"	16'-0"	16'-0"	16'-0"	15'-0"	16'-0"	16'-0"	16'-0"	16'-0"
		5:12	16'-0"	16'-0"	16'-0"	16'-0"	16'-0"	16'-0"	15'-7"	12'-7"	16'-0"	16'-0"	16'-0"	16'-0"
		7:12	16'-0"	16'-0"	16'-0"	16'-0"	16'-0"	16'-0"	13'-8"	11'-0"	15'-2"	14'-0"	15'-8"	15'-1"
	33	3:12	16'-0"	16'-0"	16'-0"	16'-0"	16'-0"	16'-0"	16'-0"	12'-3"	16'-0"	16'-0"	16'-0"	16'-0"
		5:12	16'-0"	16'-0"	16'-0"	16'-0"	16'-0"	16'-0"	13'-4"	10'-3"	16'-0"	14'-2"	16'-0"	16'-0"
		7:12	16'-0"	16'-0"	16'-0"	16'-0"	16'-0"	16'-0"	11'-9"	9'-0"	13'-9"	12'-2"	14'-8"	13'-9"

Maximum Ground Anchor Spacing Table:Design Wind Speed 110 mph														
Anchor Strength (lbs)	Strap Connection Height (in)	Roof Pitch	Building Width - Single Unit						Building Width - Double Unit					
			12 ft		14 ft		16 ft		24 ft		28 ft		32 ft	
			I-Beam Spacing (in)	I-Beam Spacing (in)	I-Beam Spacing (in)	I-Beam Spacing (in)	I-Beam Spacing (in)	I-Beam Spacing (in)	I-Beam Spacing (in)	I-Beam Spacing (in)	I-Beam Spacing (in)	I-Beam Spacing (in)		
			82.5	99.5	82.5	99.5	82.5	99.5	82.5	99.5	82.5	99.5	82.5	99.5
1500	25	3:12	5'-7"	5'-8"	5'-10"	5'-8"	6'-1"	5'-8"	7'-3"	7'-4"	7'-4"	7'-4"	7'-4"	7'-6"
		5:12	5'-8"	5'-9"	5'-10"	5'-9"	6'-1"	5'-9"	6'-8"	6'-8"	6'-7"	6'-7"	6'-6"	6'-7"
		7:12	5'-3"	5'-4"	5'-6"	5'-4"	5'-7"	5'-4"	6'-0"	5'-9"	5'-10"	6'-8"	5'-7"	5'-7"
	33	3:12	5'-4"	5'-6"	5'-8"	5'-6"	5'-10"	5'-6"	7'-2"	7'-4"	7'-3"	7'-4"	7'-4"	7'-4"
		5:12	5'-6"	5'-6"	5'-8"	5'-6"	5'-10"	5'-6"	6'-8"	6'-7"	6'-7"	6'-6"	6'-6"	
		7:12	5'-1"	5'-2"	5'-3"	5'-2"	5'-6"	5'-2"	5'-10"	5'-8"	5'-9"	5'-9"	5'-7"	5'-7"
2000	25	3:12	7'-6"	7'-7"	7'-9"	7'-7"	8'-1"	7'-7"	9'-8"	9'-10"	9'-9"	9'-10"	9'-10"	10'-0"
		5:12	7'-7"	7'-8"	7'-10"	7'-8"	8'-2"	7'-8"	8'-10"	9'-0"	8'-9"	8'-10"	8'-8"	8'-8"
		7:12	7'-1"	7'-2"	7'-3"	7'-2"	7'-6"	7'-2"	7'-10"	7'-10"	7'-8"	7'-8"	7'-6"	7'-6"
	33	3:12	7'-2"	7'-3"	7'-7"	7'-3"	7'-9"	7'-3"	9'-7"	9'-10"	9'-8"	9'-10"	9'-10"	9'-10"
		5:12	7'-3"	7'-4"	7'-8"	7'-4"	7'-10"	7'-4"	8'-10"	9'-0"	8'-9"	8'-9"	8'-8"	8'-8"
		7:12	6'-9"	7'-0"	7'-1"	7'-0"	7'-3"	7'-0"	7'-10"	7'-10"	7'-8"	7'-8"	7'-4"	7'-6"
2500	25	3:12	9'-4"	9'-6"	9'-9"	9'-6"	10'-1"	9'-6"	12'-1"	12'-4"	12'-3"	12'-4"	12'-4"	12'-6"
		5:12	9'-6"	9'-7"	9'-10"	9'-7"	10'-2"	9'-7"	11'-1"	11'-2"	11'-0"	11'-1"	10'-10"	10'-10"
		7:12	8'-10"	9'-0"	9'-2"	9'-0"	9'-4"	9'-0"	9'-10"	9'-10"	9'-7"	9'-7"	9'-3"	9'-3"
	33	3:12	9'-0"	9'-1"	9'-6"	9'-1"	9'-9"	9'-1"	12'-1"	12'-4"	12'-2"	12'-3"	12'-3"	12'-4"
		5:12	9'-1"	9'-2"	9'-7"	9'-2"	9'-10"	9'-2"	11'-1"	11'-2"	11'-0"	11'-1"	10'-10"	10'-10"
		7:12	8'-7"	8'-8"	8'-10"	8'-8"	9'-1"	8'-8"	9'-9"	9'-10"	9'-7"	9'-7"	9'-3"	9'-3"
3150	25	3:12	11'-9"	11'-10"	12'-3"	11'-10"	12'-8"	11'-10"	15'-3"	15'-7"	15'-4"	15'-7"	15'-8"	
		5:12	12'-0"	12'-1"	12'-6"	12'-1"	12'-10"	12'-1"	14'-0"	14'-2"	13'-10"	13'-10"	13'-9"	
		7:12	11'-2"	11'-4"	11'-7"	11'-4"	11'-9"	11'-4"	12'-4"	12'-6"	12'-1"	12'-1"	11'-8"	
	33	3:12	11'-4"	11'-6"	11'-10"	11'-6"	12'-4"	11'-6"	15'-2"	15'-7"	15'-3"	15'-6"	15'-6"	
		5:12	11'-6"	11'-7"	12'-0"	11'-7"	12'-6"	11'-7"	14'-0"	14'-2"	13'-10"	13'-10"	13'-8"	
		7:12	10'-9"	11'-0"	11'-2"	11'-0"	11'-6"	11'-0"	12'-4"	12'-6"	12'-1"	12'-1"	11'-8"	

Maximum Ground Anchor Spacing Table:Design Wind Speed 130 mph														
Anchor Strength (lbs)	Strap Connection Height (in)	Roof Pitch	Building Width - Single Unit						Building Width - Double Unit					
			12 ft		14 ft		16 ft		24 ft		28 ft		32 ft	
			I-Beam Spacing (in)	I-Beam Spacing (in)	I-Beam Spacing (in)	I-Beam Spacing (in)	I-Beam Spacing (in)	I-Beam Spacing (in)	I-Beam Spacing (in)	I-Beam Spacing (in)	I-Beam Spacing (in)			
			82.5	99.5	82.5	99.5	82.5	99.5	82.5	99.5	82.5	99.5	82.5	99.5
1500	25	3:12	3'-10"	3'-10"	4'-0"	3'-10"	4'-2"	3'-10"	4'-8"	4'-9"	4'-8"	4'-9"	4'-8"	4'-8"
		5:12	3'-10"	4'-0"	4'-1"	4'-0"	4'-2"	4'-0"	4'-7"	4'-7"	4'-6"	4'-7"	4'-6"	4'-6"
		7:12	3'-8"	3'-8"	3'-9"	3'-8"	3'-10"	3'-8"	4'-1"	4'-2"	4'-0"	4'-0"	3'-10"	3'-10"
	33	3:12	3'-8"	3'-8"	3'-10"	3'-8"	4'-0"	3'-8"	4'-8"	4'-10"	4'-8"	4'-8"	4'-8"	4'-8"
		5:12	3'-9"	3'-9"	4'-0"	3'-9"	4'-1"	3'-9"	4'-7"	4'-8"	4'-6"	4'-7"	4'-6"	4'-6"
		7:12	3'-7"	3'-7"	3'-8"	3'-7"	3'-9"	3'-7"	4'-1"	4'-2"	4'-0"	4'-0"	3'-10"	3'-10"
2000	25	3:12	5'-2"	5'-2"	5'-4"	5'-2"	5'-6"	5'-2"	6'-3"	6'-3"	6'-4"	6'-3"	6'-3"	
		5:12	5'-2"	5'-3"	5'-6"	5'-3"	5'-7"	5'-3"	6'-1"	6'-2"	6'-0"	6'-1"	6'-0"	
		7:12	4'-10"	5'-0"	5'-1"	5'-0"	5'-2"	5'-0"	5'-6"	5'-7"	5'-3"	5'-4"	5'-2"	5'-2"
	33	3:12	5'-0"	5'-0"	5'-2"	5'-0"	5'-4"	5'-0"	6'-3"	6'-6"	6'-3"	6'-3"	6'-3"	
		5:12	5'-0"	5'-1"	5'-3"	5'-1"	5'-6"	5'-1"	6'-1"	6'-2"	6'-0"	6'-1"	6'-0"	
		7:12	4'-8"	4'-9"	4'-10"	4'-9"	5'-0"	4'-9"	5'-6"	5'-7"	5'-3"	5'-4"	5'-2"	5'-2"
2500	25	3:12	6'-6"	6'-6"	6'-8"	6'-6"	6'-10"	6'-6"	7'-10"	8'-1"	7'-10"	7'-10"	7'-10"	
		5:12	6'-7"	6'-7"	6'-9"	6'-7"	7'-0"	6'-7"	7'-7"	7'-8"	7'-7"	7'-7"	7'-6"	
		7:12	6'-2"	6'-2"	6'-4"	6'-2"	6'-6"	6'-2"	6'-10"	6'-8"	6'-8"	6'-6"	6'-7"	
	33	3:12	6'-2"	6'-2"	6'-6"	6'-2"	6'-8"	6'-2"	7'-10"	8'-1"	7'-9"	7'-10"	7'-9"	
		5:12	6'-3"	6'-3"	6'-3"	6'-3"	6'-9"	6'-3"	7'-7"	7'-9"	7'-6"	7'-7"	7'-6"	
		7:12	5'-10"	6'-0"	6'-1"	6'-0"	6'-3"	6'-0"	6'-9"	7'-0"	6'-8"	6'-6"	6'-4"	
3150	25	3:12	8'-1"	8'-2"	8'-6"	8'-2"	8'-8"	8'-2"	10'-0"	10'-2"	10'-0"	10'-0"	9'-10"	
		5:12	8'-3"	8'-3"	8'-7"	8'-3"	8'-10"	8'-3"	9'-7"	9'-9"	9'-6"	9'-7"	9'-6"	
		7:12	7'-9"	7'-10"	8'-0"	7'-10"	8'-2"	7'-10"	8'-7"	8'-8"	8'-4"	8'-6"	8'-3"	
	33	3:12	7'-9"	7'-9"	8'-2"	7'-9"	8'-6"	7'-9"	9'-10"	10'-2"	9'-10"	10'-0"	9'-10"	
		5:12	7'-10"	8'-0"	8'-3"	8'-0"	8'-7"	8'-0"	9'-7"	9'-9"	9'-6"	9'-7"	9'-4"	
		7:12	7'-6"	7'-7"	7'-8"	7'-7"	7'-10"	7'-7"	8'-7"	8'-9"	8'-4"	8'-6"	8'-2"	

Maximum Ground Anchor Spacing Table:Design Wind Speed 150 mph														
Anchor Strength (lbs)	Strap Connection Height (in)	Roof Pitch	Building Width - Single Unit						Building Width - Double Unit					
			12 ft		14 ft		16 ft		24 ft		28 ft		32 ft	
			I-Beam Spacing (in)	I-Beam Spacing (in)	I-Beam Spacing (in)	I-Beam Spacing (in)	I-Beam Spacing (in)	I-Beam Spacing (in)	I-Beam Spacing (in)	I-Beam Spacing (in)				
			82.5	99.5	82.5	99.5	82.5	99.5	82.5	99.5	82.5	99.5	82.5	99.5
1500	25	3:12	2'-9"	2'-9"	2'-10"	2'-9"	3'-0"	2'-9"	3'-3"	3'-4"	3'-3"	3'-3"	3'-3"	
		5:12	2'-10"	2'-10"	3'-0"	2'-10"	3'-1"	2'-10"	3'-3"	3'-4"	3'-3"	3'-3"	3'-2"	
		7:12	2'-8"	2'-8"	2'-9"	2'-8"	2'-10"	2'-8"	3'-0"	3'-0"	2'-10"	2'-10"	2'-10"	
	33	3:12	2'-8"	2'-8"	2'-9"	2'-8"	2'-10"	2'-8"	3'-3"	3'-4"	3'-3"	3'-3"	3'-2"	
		5:12	2'-9"	2'-9"	2'-10"	2'-9"	3'-0"	2'-9"	3'-3"	3'-4"	3'-3"	3'-2"		
		7:12	2'-7"	2'-7"	2'-8"	2'-7"	2'-9"	2'-7"	3'-0					

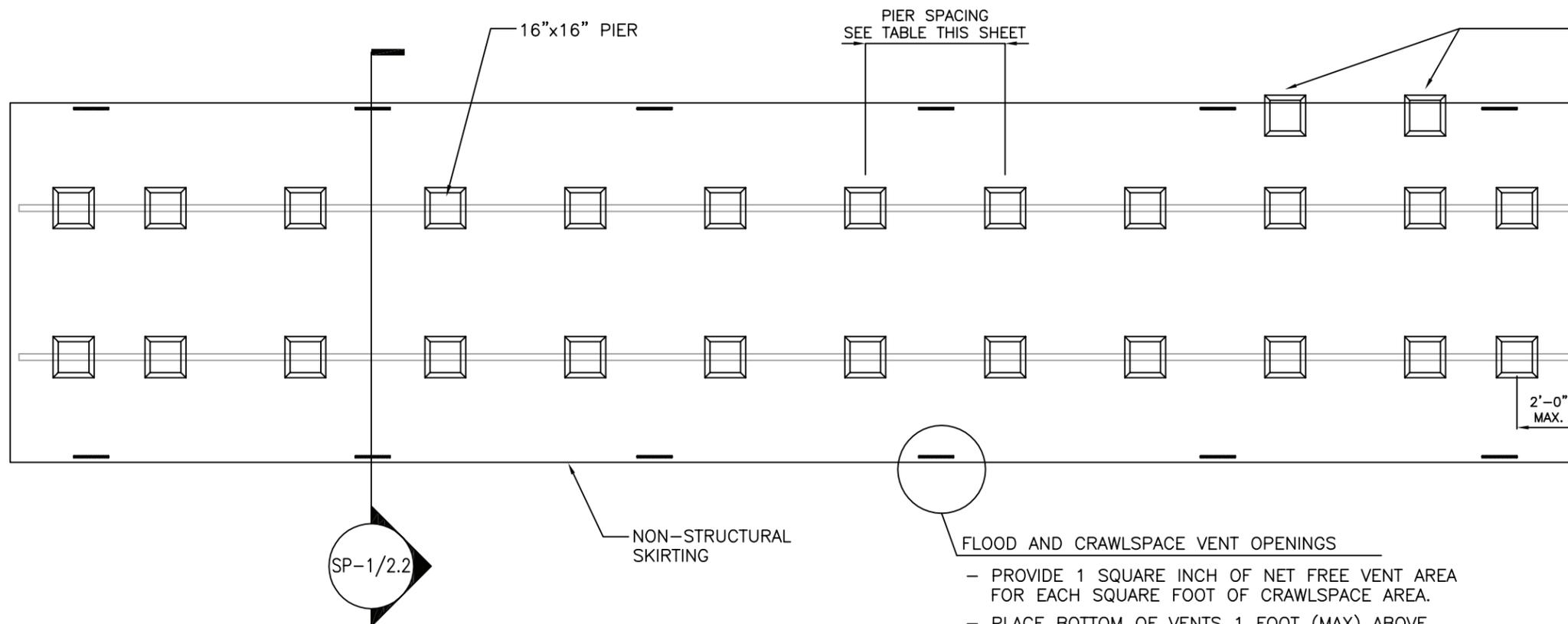
Longitudinal Ground Anchors – Number of Anchors @ Each Building End							
Design Wind Speed (mph)	Anchor Strength (Pounds)	Building Width – Single Unit			Building Width – Double Unit		
		12 ft.	14 ft.	16 ft.	24 ft.	28 ft.	32 ft.
90	1,500	2	2	2	3	4	4
	2,000	2	2	2	3	3	4
	2,500	1	2	2	2	3	3
	3,150	1	1	1	2	2	2
110	1,500	3	3	3	5	6	6
	2,000	2	3	3	4	4	4
	2,500	2	2	2	3	4	4
	3,150	2	2	2	3	3	3
130	1,500	4	4	4	7	7	7
	2,000	3	4	4	5	6	7
	2,500	2	3	3	4	5	5
	3,150	2	2	2	3	4	4
150	1,500	5	5	6	9	10	12
	2,000	4	4	5	7	8	9
	2,500	3	3	4	6	6	7
	3,150	2	3	3	4	5	6

**Ground Anchor Notes**

1. Maximum recommended ground anchor spacing is 16 feet for both lateral and longitudinal applications.
2. Minimum recommended spacing between ground anchors is 2 ft. 8 in. to minimize soil stress overlap of adjacent anchors. For anchors closer than 2 ft. 8 in. use alternative support and anchorage system unless manufacturer certifies ground anchor capacity for the required spacing.
3. Recommended ground anchor spacing is based on wind Exposure C conditions for basic wind speed conditions specified in ASCE/SEI 7-05.
4. Recommended ground anchor spacing is based on manufactured home with 8ft. wall height, 1ft. eave overhang and a minimum average weight of 20 pounds per square foot.
5. Ground anchors must be located within 2 ft. of the exterior walls of the manufactured home.
6. Linear interpolation between I-beam spacing is permitted.

**Longitudinal Ground Anchor Spacing and Anchor Notes**

**NOT TO SCALE**



PROVIDE ADDITIONAL SUPPORT AND ACHORAGE AT LARGE WALL OPENINGS AND AT MARRIAGE WALLS (IN MULTIPLE SECTION HOMES) AS REQUIRED BY MANUFACTURER'S INSTALLATION INSTRUCTIONS.

**Table SP-1.1 Pier Minimum Square Footing Side Dimension and Depth<sup>1,2</sup>**

Width	Pier Height (ft) <sup>3</sup>	Pier Spacing Along Chassis (ft)	Allowable Soil Bearing Pressure (psf)		
			1000	1500	2000
<b>Seismic or 90 mph Wind - Flood Velocities 0 to 2fps</b>					
single	3	4	3'-0" x 3'-0" x 16"	-	-
		7	4'-0" x 4'-0" x 20"	-	-
		10	4'-6" x 4'-6" x 20"	4'-0" x 4'-0" x 20"	-
double	3	4	3'-0" x 3'-0" x 16"	2'-6" x 2'-6" x 16"	-
		7	3'-6" x 3'-6" x 20"	-	-
		10	4'-0" x 4'-0" x 20"	-	-
single	5	4	3'-6" x 3'-6" x 20"	-	-
		7	4'-6" x 4'-6" x 20"	4'-0" x 4'-0" x 20"	-
		10	5'-0" x 5'-0" x 20"	4'-6" x 4'-6" x 20"	-
double	5	4	3'-0" x 3'-0" x 16"	-	-
		7	3'-6" x 3'-6" x 20"	-	-
		10	4'-0" x 4'-0" x 20"	-	-
<b>90 mph Wind Plus Non-Coastal A-Zone Flood<sup>4</sup> - Flood Velocities 2<sup>+</sup> to 5 fps</b>					
single	3	4	3'-6" x 3'-6" x 20"	-	-
		7	4'-0" x 4'-0" x 20"	-	-
		10	4'-6" x 4'-6" x 20"	-	-
double	3	4	3'-0" x 3'-0" x 16"	-	-
		7	4'-0" x 4'-0" x 20"	-	-
		10	4'-6" x 4'-6" x 20"	-	-
single	5	4	4'-0" x 4'-0" x 20"	-	3'-6" x 3'-6" x 20"
		7	4'-6" x 4'-6" x 20"	-	-
		10	5'-0" x 5'-0" x 20"	-	-
double	5	4	3'-6" x 3'-6" x 20"	-	-
		7	4'-0" x 4'-0" x 20"	-	-
		10	4'-6" x 4'-6" x 20"	-	-

- FLOOD AND CRAWLSPACE VENT OPENINGS**
- PROVIDE 1 SQUARE INCH OF NET FREE VENT AREA FOR EACH SQUARE FOOT OF CRAWLSPACE AREA.
  - PLACE BOTTOM OF VENTS 1 FOOT (MAX) ABOVE EXTERIOR GRADE.
  - ALL SCREENS AND LOUVERS MUST AUTOMATICALLY OPEN TO ALLOW UNOBSTRUCTED FLOW OF FLOODWATERS.

<sup>1</sup> Top of concrete footing shall not extend above finished grade. Provide greater footing depth where required to satisfy local frost depth requirements. Circular footing of equal area permitted, with minimum diameter equal to 1.13 times tabulated side dimension.

<sup>2</sup> Increase footing depth or provide erosion protection around piers in flood hazard areas where the maximum predicted scour depth exceeds 16 in (406 mm).

<sup>3</sup> Pier height measured from top of grade.

<sup>4</sup> Flood velocities not greater than 5 ft/sec (1.52 m/sec) with depths not exceeding the elevation of the lowest edge of the longitudinal support frame.

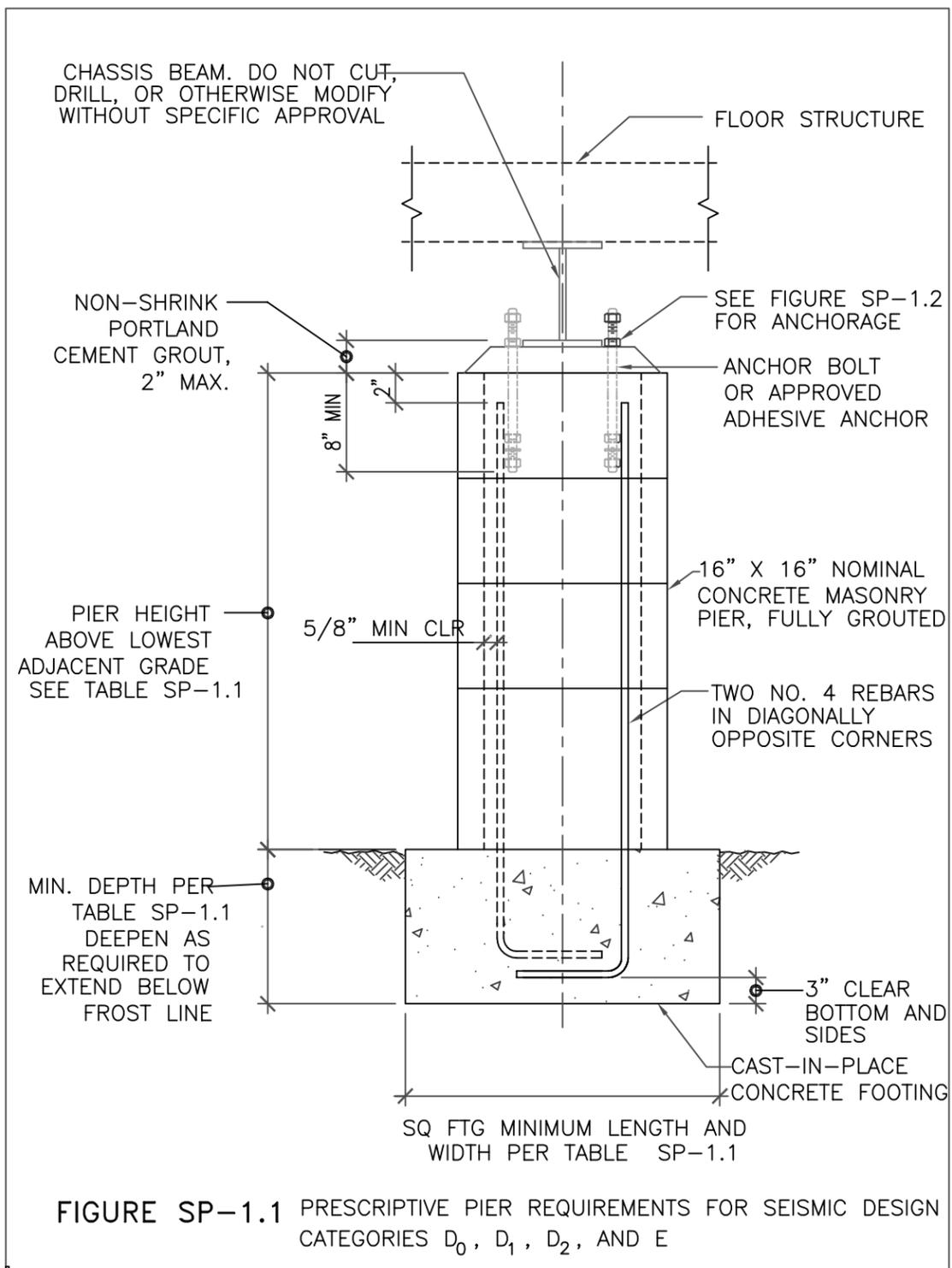
NOTE: THIS DESIGN IS SUITABLE FOR 3-SECOND GUST DESIGN AND SPEEDS UP TO 90 MILES PER HOUR.

"IF FOOTING SIZE NOT SHOWN FOR SITE SPECIFIC ALLOWABLE BEARING PRESSURE, USE THE FOOTING SIZE FOR NEXT LOWEST ALLOWABLE BEARING PRESSURE."

# SINGLE UNIT CONCRETE MASONRY PIER FOUNDATION PLAN

**NOT TO SCALE**

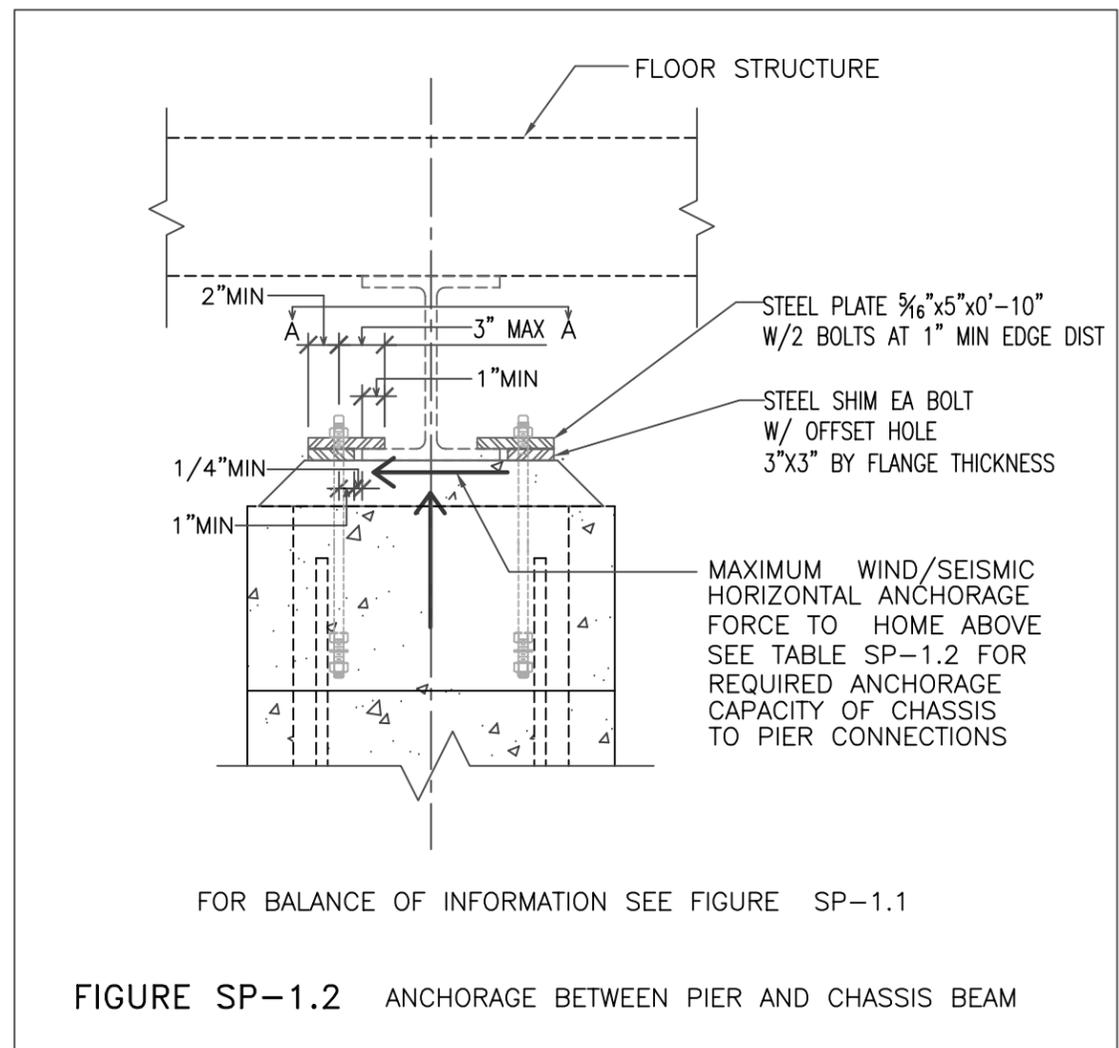
SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION, DESIGN CRITERIA AND LIMITATIONS. SHEET GN-1.1



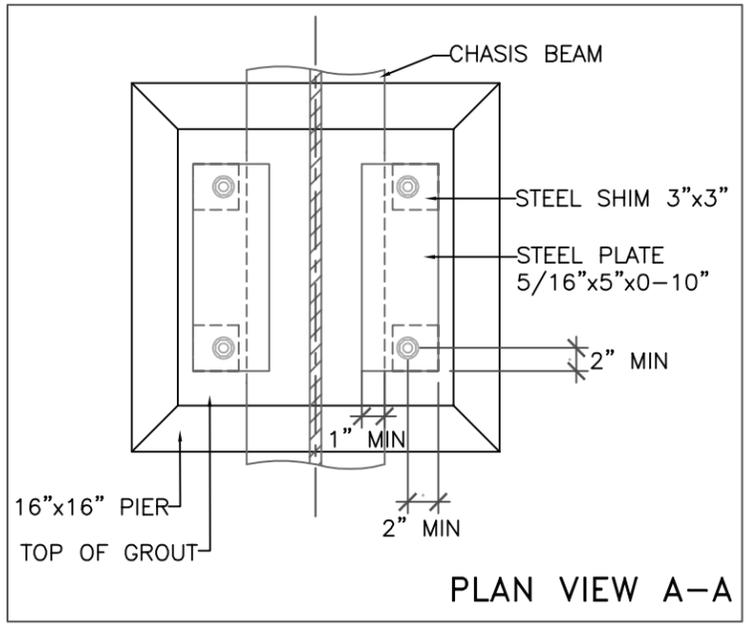
**FIGURE SP-1.1** PRESCRIPTIVE PIER REQUIREMENTS FOR SEISMIC DESIGN CATEGORIES D<sub>0</sub>, D<sub>1</sub>, D<sub>2</sub>, AND E

THE HEIGHT OF PIERS ABOVE LOWEST ADJACENT GRADE SHALL NOT VARY BY MORE THAN TWO FT, AND NO PIER SHALL EXTEND TO MORE THAN 5 FT. ABOVE ADJACENT GRADE.

THE LENGTH AND WIDTH OF THE PIER FOOTING SHALL NOT BE LESS THAN REQUIRED BY TABLE SP-1.1 (SHEET SP-1/2.1), BASED ON THE APPLICABLE ALLOWABLE STRESS DESIGN SOIL BEARING STRENGTH.



**FIGURE SP-1.2** ANCHORAGE BETWEEN PIER AND CHASSIS BEAM



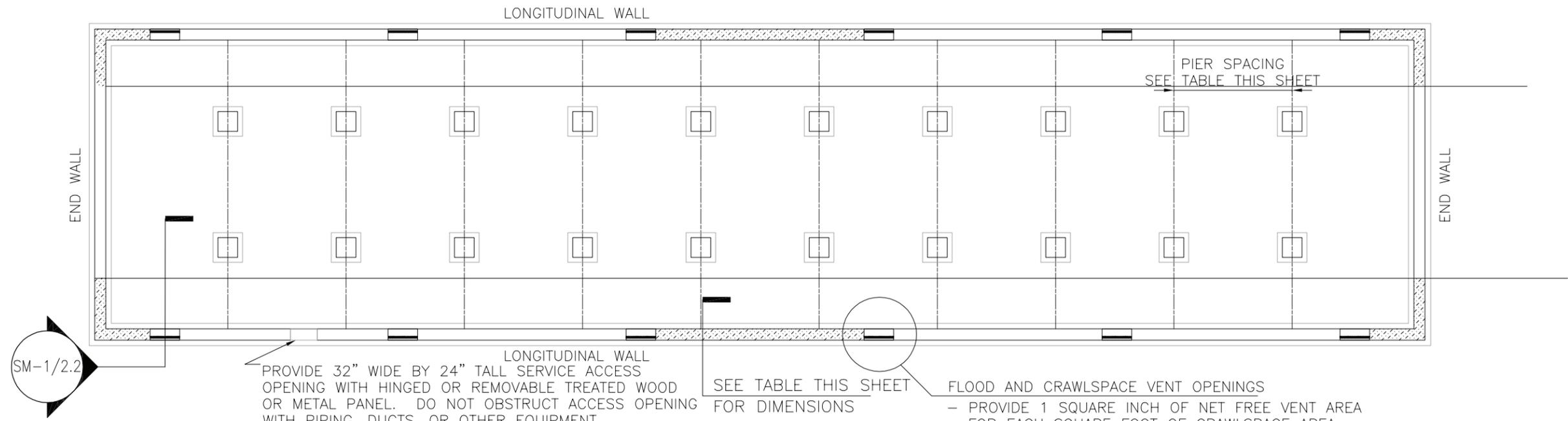
Width	Pier Height (ft)	Maximum Pier Spacing (ft)	Horizontal Seismic/Wind Force Each Pier (lb)	Net Seismic/Wind Uplift Force Each Pier (lb) <sup>2</sup>
single	3	4	320	720
		7	560	1250
		10	800	1790
double	3	4	290	860
		7	440	1510
		10	600	2150
single	5	4	350	720
		7	620	1250
		10	880	1790
double	5	4	340	860
		7	490	1510
		10	650	2150

Notes  
 1. Listed loads are in accordance with ASCE/SEI 7 Section 2.4 Allowable Stress Design (ASD)  
 2. Based on 14 ft section width. Multiply by 1.15 for 16 ft section width

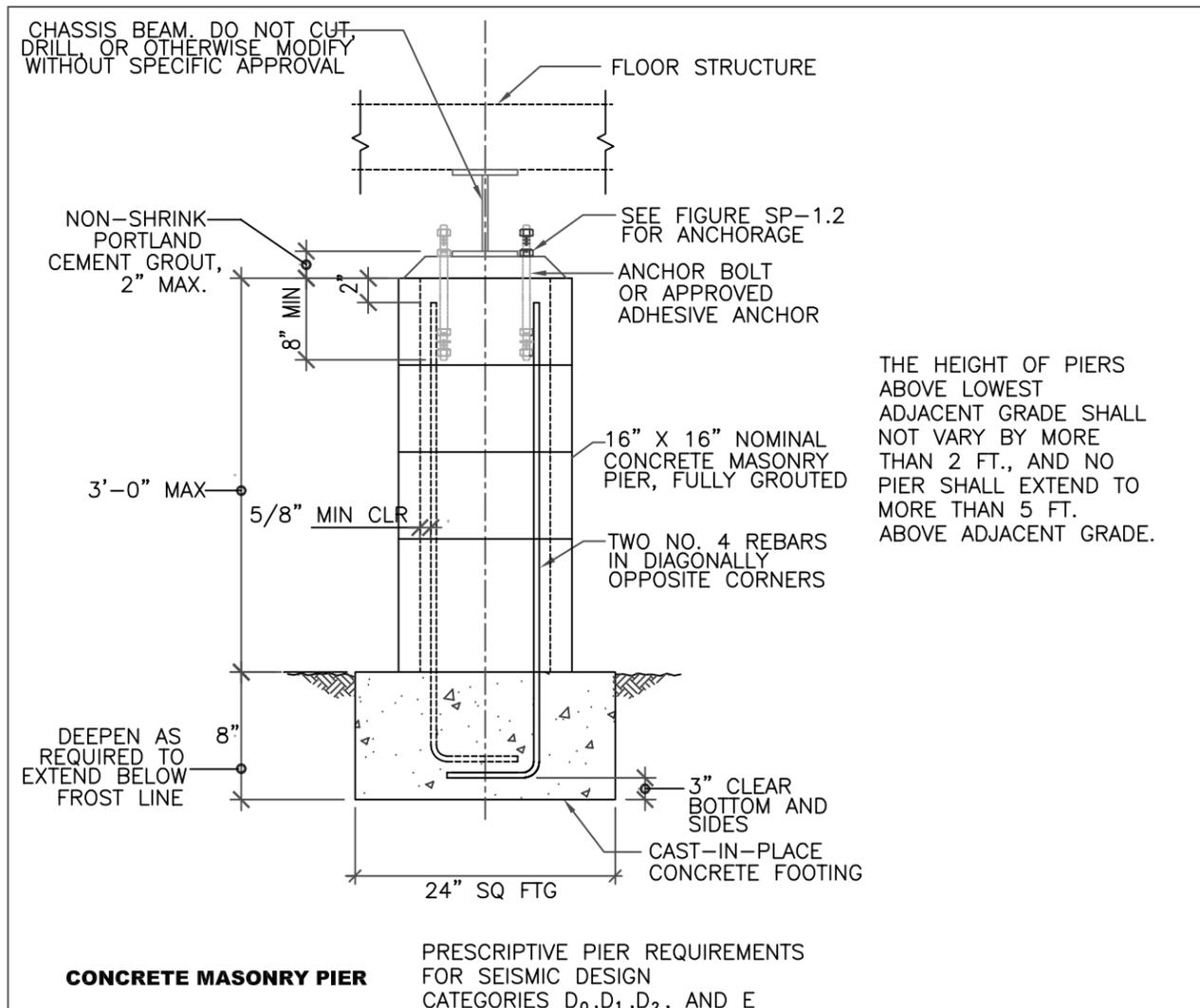
SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION, DESIGN CRITERIA AND LIMITATIONS. SHEET GN-1.1

# CONCRETE MASONRY PIER DETAILS

**NOT TO SCALE**



- FLOOD AND CRAWLSPACE VENT OPENINGS
- PROVIDE 1 SQUARE INCH OF NET FREE VENT AREA FOR EACH SQUARE FOOT OF CRAWLSPACE AREA.
  - PLACE BOTTOM OF VENTS 1 FOOT (MAX) ABOVE EXTERIOR GRADE.
  - ALL SCREENS AND LOUVERS MUST AUTOMATICALLY OPEN TO ALLOW UNOBSTRUCTED FLOW OF FLOODWATERS.

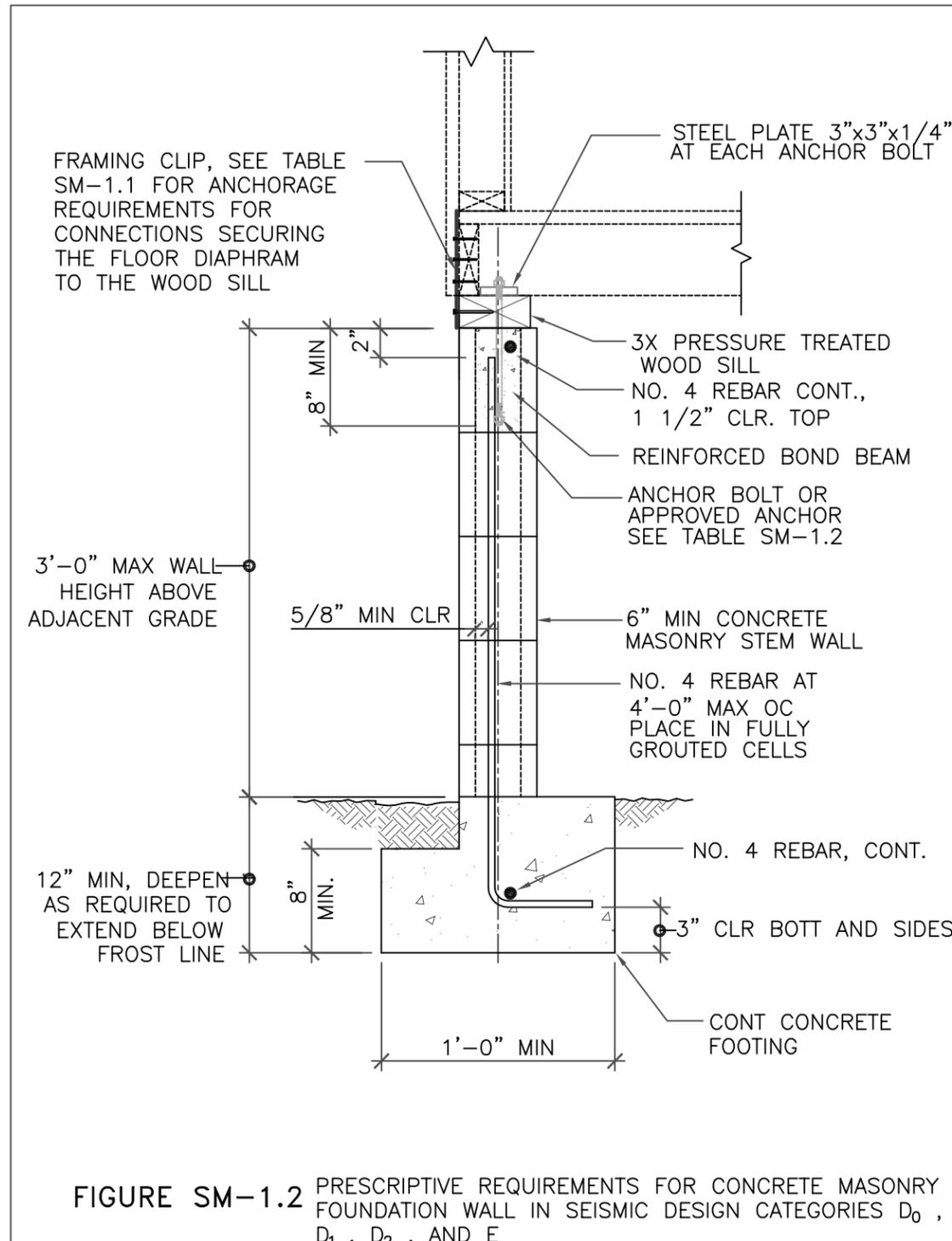
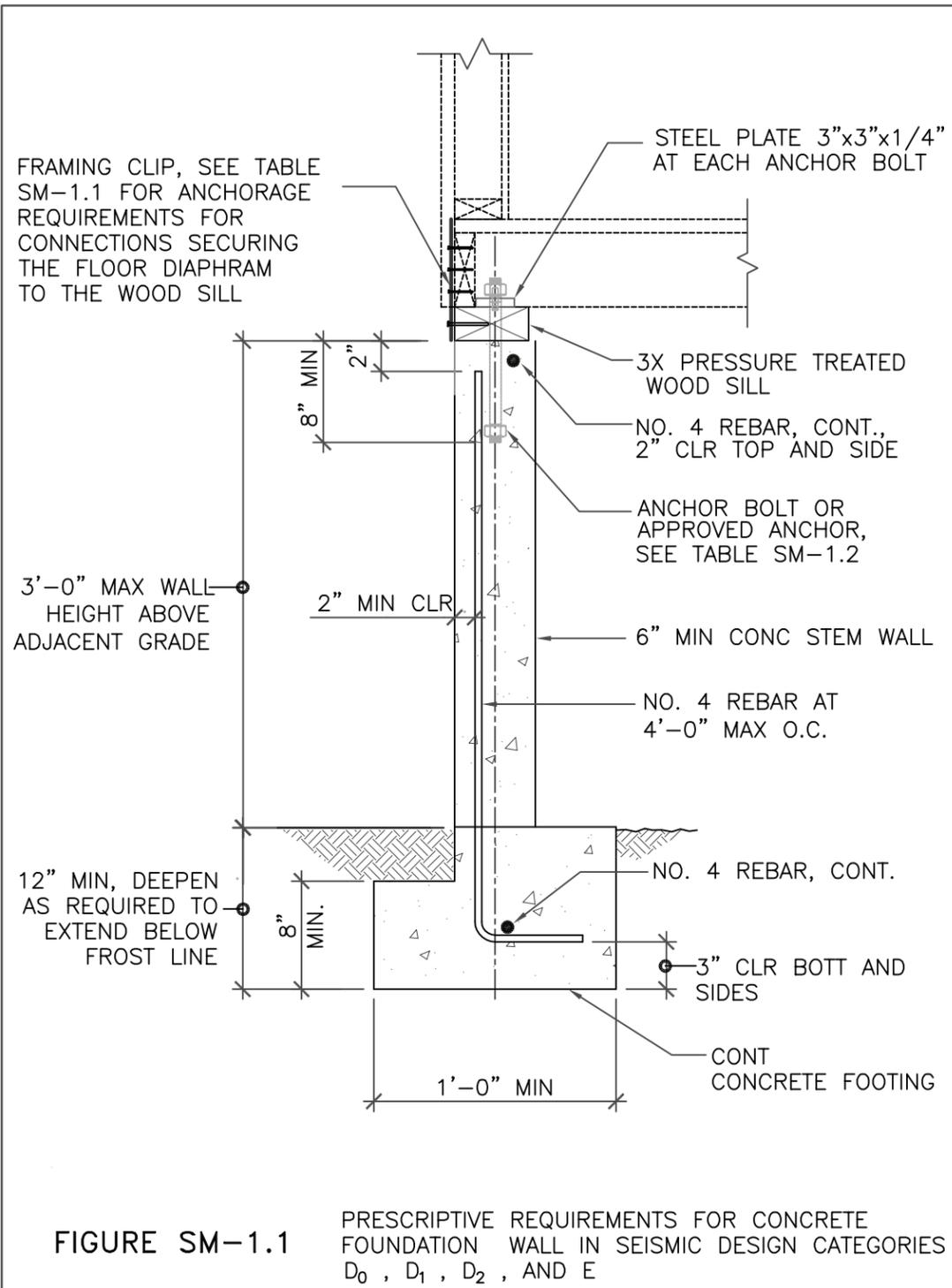


Maximum Pier Spacing Table - Single Unit									
Allowable Soil Bearing Pressure (lb/ft <sup>2</sup> )									
	1,000 Less Than 1,500			1,500 To Less Than 2,000			Greater Than 2,000		
Wind Speed	Ground Snow Load (lb/ft <sup>2</sup> )			Ground Snow Load (lb/ft <sup>2</sup> )			Ground Snow Load (lb/ft <sup>2</sup> )		
	Less Than 20	20 To Less Than 30	30 To 40	Less Than 20	20 To Less Than 30	30 To 40	Less Than 20	20 To Less Than 30	30 To 40
90	5'-3"	4'-9"	4'-2"	7'-10"	7'-2"	6'-6"	8'-0"	8'-0"	8'-0"

- NOTES
1. THIS DESIGN IS SUITABLE FOR 3-SECOND GUST DESIGN AND SPEEDS UP TO 90 MILES PER HOUR.
  2. FOR DOUBLE UNITS, CONSTRUCT FOUNDATION WALL UNDER MARRIAGE LINE.

**SINGLE UNIT CONCRETE MASONRY WALL FOUNDATION PLAN**  
**NOT TO SCALE**

SEE PRE-ENGINEERED FOUNDATION GENERAL NOTES FOR ADDITIONAL INFORMATION, DESIGN CRITERIA AND LIMITATIONS. SHEET GN-1.1



**Table SM-1.1 Required Anchorage Capacity Between Foundation Wall and Floor Diaphragm.**

Home Width	Wall Location	Horizontal Seismic/Wind Force Per Foot Wall (Shear) (lb/ft) <sup>1</sup>	Net Seismic/Wind Uplift Force Per Foot Wall Length (lb/ft) <sup>1</sup>
single	end	510	50
	side	70	120
double	end	260	50
	side	140	150

<sup>1</sup>Based on anchorage over entire home perimeter. Forces shall be increase proportionally if anchorage length on any side is decreased.

WHERE ANCHORAGE REQUIREMENTS FROM THE HOME MANUFACTURER ARE NOT AVAILABLE, REQUIRED ANCHORAGE SHALL BE PERMITTED TO USE THE ANCHOR BOLT AND FRAMING PLATES IN ACCORDANCE WITH TABLE SM-1.2.

EACH ANCHOR BOLT SHALL BE PROVIDED WITH A STEEL PLATE WASHER NOT LESS THAN 1/4"x3"x3", WITH A HOLE DIAMETER OF 11/16" AND INSTALLED WITH A STANDARD CUT WASHER. SEE FIGURE SM-1.1 AND SM-1.2 FOR PLACEMENT.

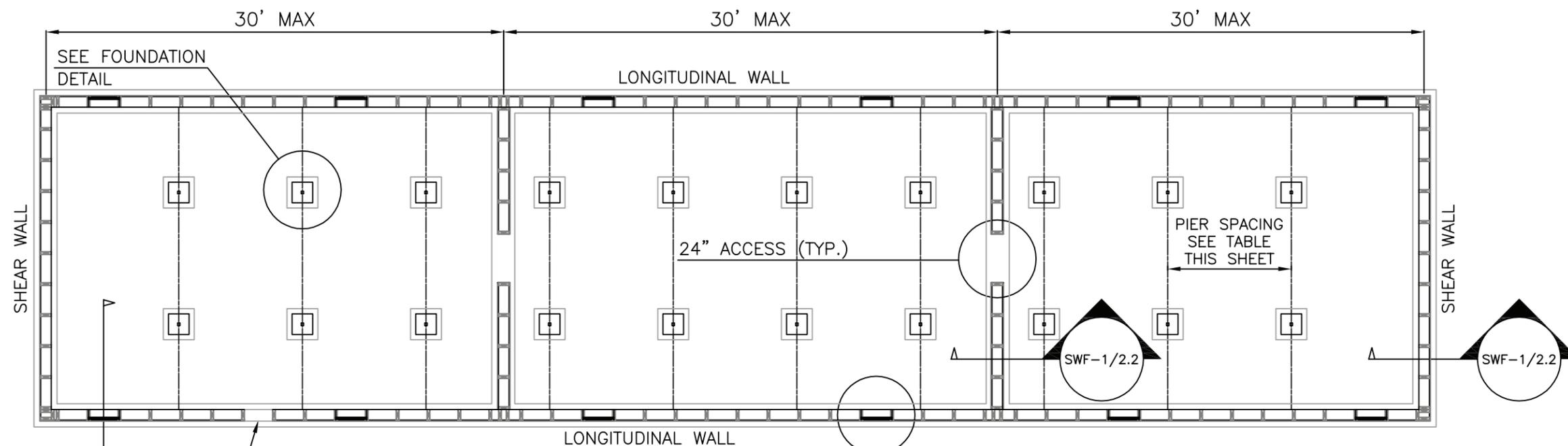
**Table SM-1.2 Manufactured Home Minimum Perimeter to Foundation Wall Seismic/Wind Anchorage**

Home Width	Wall Location	Maximum Spacing for 1/2-in Anchor Bolt Anchoring Sill to Foundation Wall (in)	Maximum Spacing for Framing Plate with Shear and Uplift Capacity (in)
single	end	16	12
	side	48	42
double	end	32	18
	side	32	18

<sup>1</sup>Not less than 18 ga. Galvanized plate, fastened to sill and home with not less than six 8d common short nails each.

FOOTING SHALL BE UNIFORM IN THICKNESS ALONG IT'S LENGTH. WHERE REQUIRED FOR SLOPED LOTS FOOTINGS SHALL BE STEPPED WITH MAXIMUM ELEVATION CHANGE OF 18" AND MINIMUM STEP SPACING OF 36".

**CONCRETE MASONRY WALL FOUNDATION DETAIL**  
**NOT TO SCALE**



PROVIDE 32" WIDE BY 24" TALL SERVICE ACCESS OPENING WITH HINGED OR REMOVABLE TREATED WOOD OR METAL PANEL. DO NOT OBSTRUCT ACCESS OPENING WITH PIPING, DUCTS, OR OTHER EQUIPMENT.

- FLOOD AND CRAWLSPACE VENT OPENINGS**
- PROVIDE 1 SQUARE INCH OF NET FREE VENT AREA FOR EACH SQUARE FOOT OF CRAWLSPACE AREA.
  - PLACE BOTTOM OF VENTS 1 FOOT (MAX) ABOVE EXTERIOR GRADE.
  - ALL SCREENS AND LOUVERS MUST AUTOMATICALLY OPEN TO ALLOW UNOBSTRUCTED FLOW OF FLOODWATERS.

Pier Spacing Table - Single Unit									
Allowable Soil Bearing Pressure (lb/ft <sup>2</sup> )									
Wind Speed	1,000 To Less Than 1,500			1,500 To Less Than 2,000			Greater Than 2,000		
	Ground Snow Load (lb/ft <sup>2</sup> )			Ground Snow Load (lb/ft <sup>2</sup> )			Ground Snow Load (lb/ft <sup>2</sup> )		
	Less Than 20	20 To Less Than 30	30 To 40	Less Than 20	20 To Less Than 30	30 To 40	Less Than 20	20 To Less Than 30	30 To 40
90	5'-3"	4'-9"	4'-2"	7'-10"	7'-2"	6'-6"	8'-0"	8'-0"	8'-0"

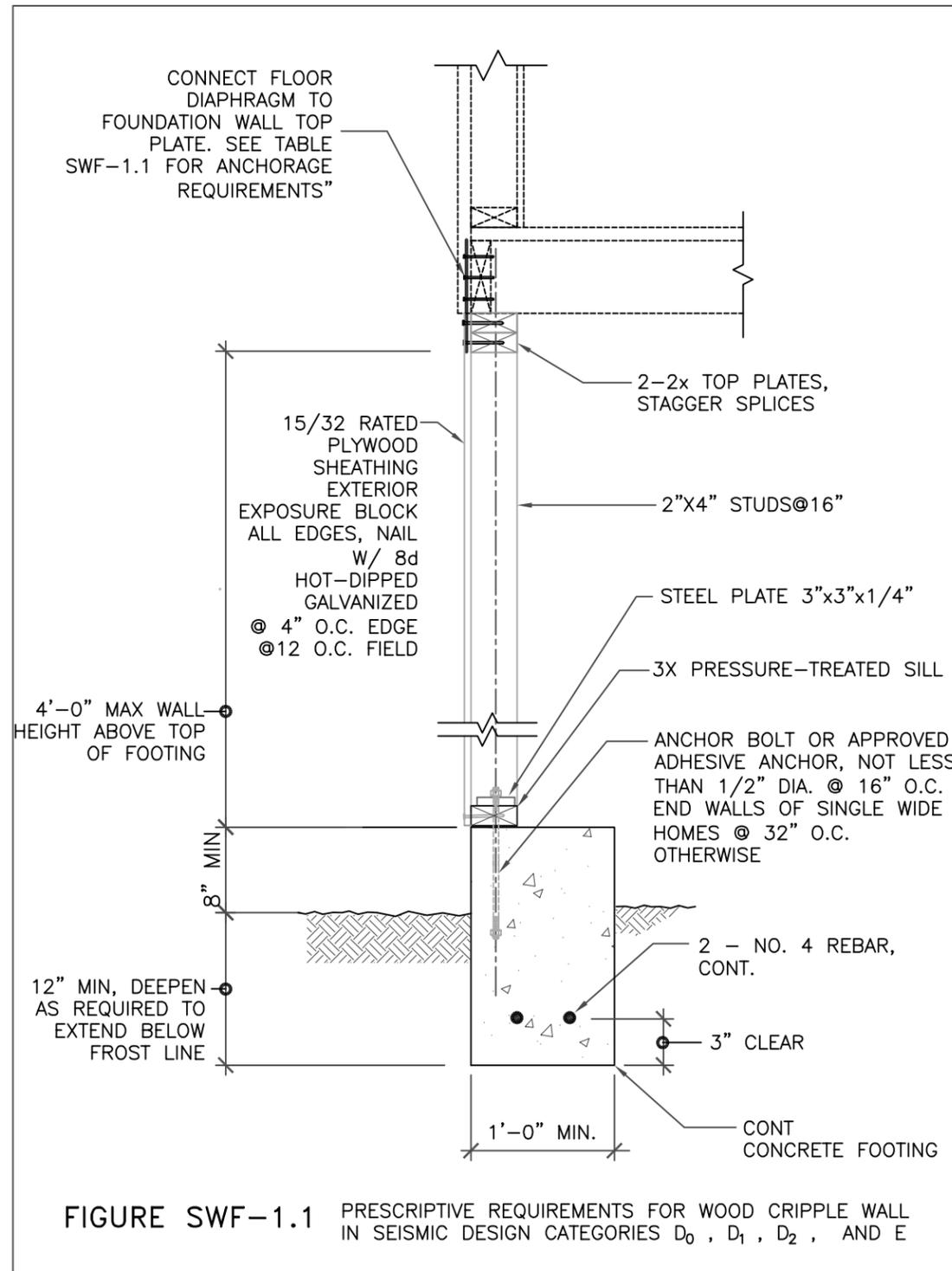
- NOTES**
1. THIS DESIGN IS SUITABLE FOR 3-SECOND GUST DESIGN AND SPEEDS UP TO 90 MILES PER HOUR.
  2. FOR DOUBLE UNITS, CONSTRUCT FOUNDATION WALL UNDER MARRIAGE LINE.

# SINGLE UNIT WOOD FRAMED FOUNDATION PLAN

**NOT TO SCALE - INTERIOR SHEAR WALL LOCATION FOR 90 MPH DESIGN WIND SPEED**

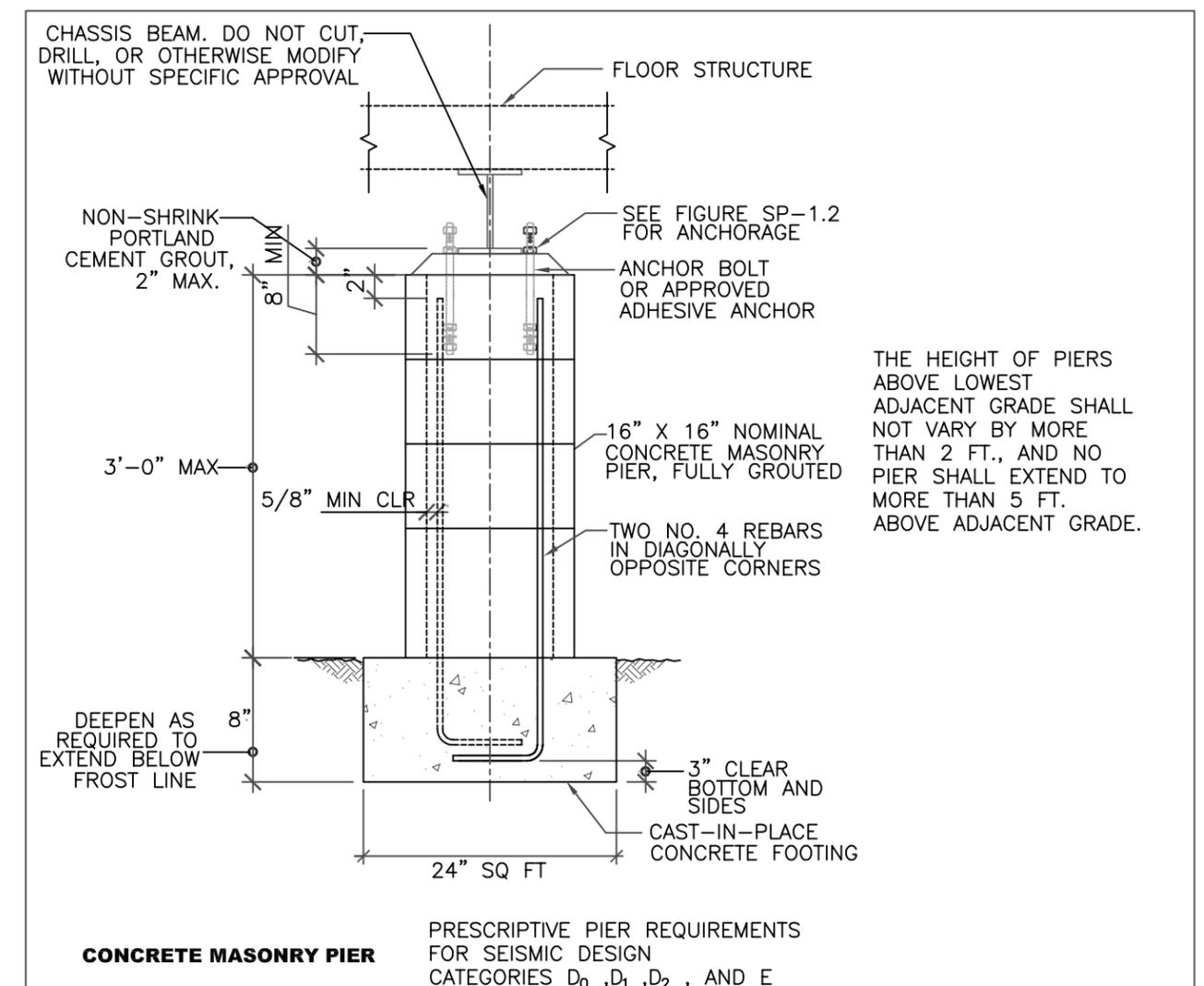
SEE PRE-ENGINEERED GENERAL FOUNDATION NOTES FOR ADDITIONAL INFORMATION, DESIGN CRITERIA AND LIMITATIONS. SHEETS GN-1, WF-3 AND WF-4.

FOOTING SHALL BE UNIFORM IN THICKNESS.  
WHERE REQUIRED FOR SLOPED LOTS FOOTINGS SHALL BE STEPPED  
WITH MAXIMUM ELEVATION CHANGE OF 18" AND MINIMUM STEP  
SPACING OF 36".



Home Width	Wall Location	Horizontal Seismic/Wind Force Per Foot Wall (Shear) (lb/ft) <sup>1</sup>	Net Seismic/Wind Uplift Force Per Foot Wall Length (lb/ft) <sup>1</sup>
single	end	510	50
	side	70	120
double	end	260	50
	side	140	150

<sup>1</sup>Based on anchorage over entire home perimeter. Forces shall be increase proportionally if anchorage length on any side is decreased.



## WOOD FRAMED FOUNDATION DETAIL

NOT TO SCALE