POST AND FRAME STRUCTURES
(Pole Barns)

Post and frame structures. The following requirements serve as minimum standards for post and frame structures within all of the following structural limitations:

1. Residential accessory structures
2. Single story
3. Metal roof on purlins with bracing and metal wall panels on girts, with bracing, or in lieu of bracing provide solid exterior structural sheathing
4. No attic storage
5. Maximum wall height of 16 feet
6. Maximum "mean" roof height of 20 feet
7. Maximum post spacing of 8 feet

Post and frame structures and portions thereof outside the above structural limitations of this standard shall be accompanied by structural calculations as required by the residential building official or shall comply with the structural design requirements of section R301.1.3 of the 2015 Michigan Residential Code.

Definition. Post and frame structures consist of primary members (posts, beams and single span trusses or ceiling joists and rafters) and secondary members (roof purlins, wall girts, bracing and sheathing) where all loads are transmitted from the sheathing and the secondary members to the primary members which transfer them to the ground through vertical posts bearing on footings embedded in the soil.

Footings & Foundations. Footings and foundations shall comply with applicable provisions of Section R401 of the 2015 MRC. Post frame structures shall have poured in- place concrete footings installed below all posts. The top of the footing shall be a minimum of 42 inches below finished grade and have footing diameters complying with the following tables based on soil conditions at the site and calculated weight bearing on the posts.

GW, GP soils (Sandy gravel and/or gravel) Soil bearing capacity = 3,000 psf.

Hole dia.	Equiv. s.f.	Allow. bearing (lbs)
12" dia.	.785 sf.	2,335
16" dia.	1.395 sf.	4,185
18" dia.	1.766 sf.	5,298
20" dia.	2.18 sf.	6,540
24" dia.	3.14 sf.	9,420
28" dia.	4.273 sf.	12,819

Tables continued page 2

SW,SP,SM,SC,GM and GC soils (sand, silty sand, clayey sand, silty gravel, and clayey gravel) Soil bearing capacity = 2,000 psf.

Hole dia.	Equiv. s.f.	Allow. bearing (lbs)
12" dia.	.785 sf.	1,570
16" dia.	1.395 sf.	2,790
18" dia.	1.766 sf.	3,532
20" dia.	2.18 sf.	4,360
24" dia.	3.14 sf.	6,280
28" dia.	4.273 sf.	8,546

CL, ML, MH and CH soils (Clay, sandy, silty clay, clayey silt, silt and sandy siltclay) Soil bearing capacity = 1,500 psf.

Hole dia.	Equiv. s.f.	Allow. bearing (lbs)
12" dia.	.785 sf.	1,177
16" dia.	1.395 sf.	2,092
18" dia.	1.766 sf.	2,649
20" dia.	2.18 sf.	3,270
24" dia.	3.14 sf.	4,710
28" dia.	4.273 sf.	6,409

Math equation to size post footings

Weight on footing ÷ soil bearing capacity = required square foot size for a square footing. To convert to round: convert sq. ft. to inches by multiplying the square footing size x 144. Take the square inches of the area and divide by 3.14159. Take the square root of the result. This is the radius. Multiply the radius by 2 to get the required diameter of the round footing. Minimum footing thickness should be 1/2 of the footing diameter unless calculations are provided.

Example: 9,429 lbs ÷ 1,500 = 6.28 sq. ft. x 144 = 904.32. ÷ by 3.14159 = 287.85. The √ of 287.85 is 16.96 inches. This is the radius. 16.96 inches x 2 = 33.94 inches = required footing diameter.

Column and wall construction. Columns shall be three (3) ply unspliced, reinforced spliced or solid wood and shall not be less than 6 inch by 6 inch nominal size. Columns shall comply with the requirements of Section R317 of the 2015 MRC (Protection of Wood) and shall be restrained to prevent lateral displacement.

Column uplift protection: Columns shall have uplift protection by one of the following methods:

1. Two 2x6x12 inch column uplift protection blocks attached to each side of the base of the column. The column uplift protection blocks must be placed horizontally, attached per Table 5 and comply with Section R317; or

2. 12-inch high, concrete collar poured on top of footing around the post, with 2-#5x9 inch rebar placed through the post at 3 inches and 9 inches from bottom of post in opposite directions. See figure 1 and 2 on following pages.

EXAMPLE CROSS SECTION

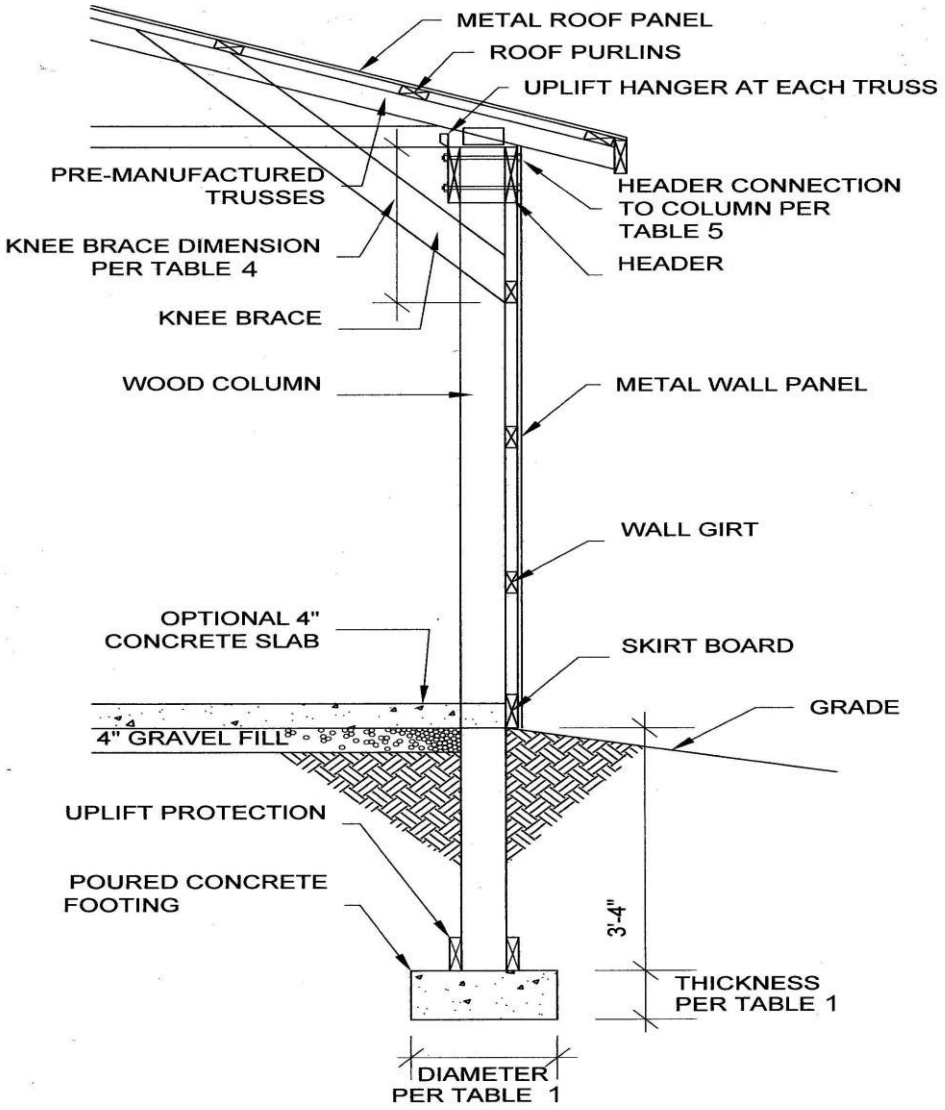

Figure 1
Post and frame wall
section. No scale

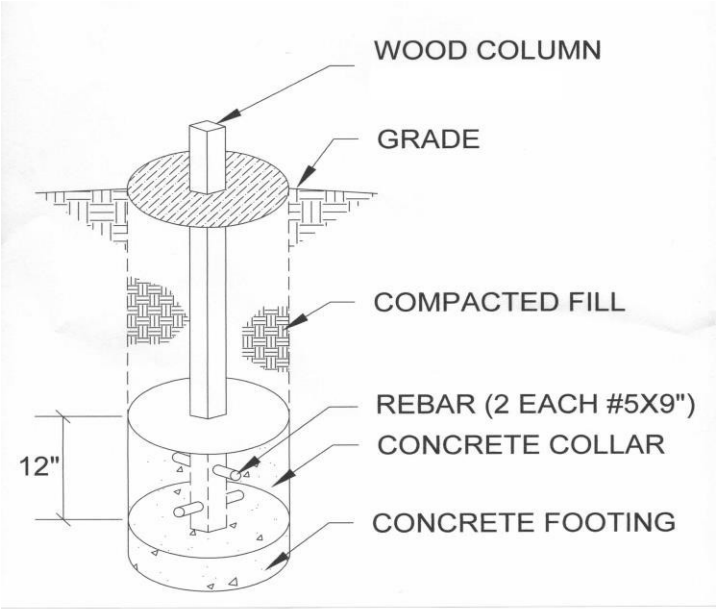

Figure 2

TYPICAL POLE BARN STRUCTURE

Figuring calculated loads on footings is based on the square foot area ½ the distance between the posts and the roof area directly above. Calculated snow loads (25-35 psf) + roof dead weight (20 psf) + wall dead weight (15 psf). Example: 30 psf snow load + 20 psf roof load + 15 psf wall load x Area (120 snow= 3,600 + 120 roof=2,400 + 96 wall = 1,440) for a total of 7,440 on each post. Posts would need to be sized accordingly. Footings sized accordingly or reduce distances between posts to reduce calculated loads on posts and footings based on soil conditions.