



## BUILDING AND FIRE SAFETY SERVICES CLIENT ASSISTANCE MEMO

"THE MARITIME CITY"

### PRESCRIPTIVE FOUNDATION REQUIREMENTS

#### General

Footings and foundations must be constructed of concrete and must extend below the frost line. Foundations supporting wood shall extend at least 6" above the adjacent finish grade. Footings and foundation walls shall have a minimum depth, size and reinforcement as indicated in Figure 1 (unless another design is provided by a foundation engineer).

All bearing walls shall be supported on continuous concrete foundations or other approved foundation systems that shall be of sufficient size to support all loads. If the soil contains a lot of sand, clay or organic material, the design may require geotechnical and possibly foundation engineering. Where an engineered design is not provided, the minimum foundation requirements for stud-bearing walls shall be as seen in figure 1.

#### Exceptions

A one-story wood or metal-frame building not used for human occupancy and not over 400 sq. ft. in floor area may be constructed with walls supported on a wood foundation plate when approved by the building official. The support of buildings by posts embedded in earth (such as pole barns) shall be designed as specified in IBC Section 1805.7. Wood posts or poles embedded in earth shall be pressure treated with an approved preservative. Steel posts or poles shall be protected as specified in IBC Section 1808.2.17.

#### Stepped Foundations

Foundations for all buildings shall be level or shall be stepped so that both top and bottom of such foundation are level. Required reinforcement shall be continuous throughout the entire footing and foundation walls.

#### Post Footings

Individual pier footings for the support of bearing posts shall have reinforcement bars at least 12" on center in both directions if the depth of the footing is less than half its width (1:2 ratio). Pier footings shall have positive connections such as metal brackets or post bases connecting the footings to the posts they support.

#### Footings on or Adjacent to Slopes

The placement of buildings and structures adjacent to (either above or below) slopes steeper than one unit vertical in three units horizontal (33.3% slope) shall be set back from the slope in accordance with the following:

#### Building Clearance from Ascending Slopes

In general, buildings below slopes shall be set a sufficient distance from the slope to provide protection from slope drainage, erosion and shallow failures. Where the existing slope is steeper than one unit vertical in one horizontal (100% slope), the toe of the slope shall be assumed to be at the intersection of a horizontal plan drawn from the top of the foundation and a plane drawn tangent to the slope at an angle of 45° to the horizontal.

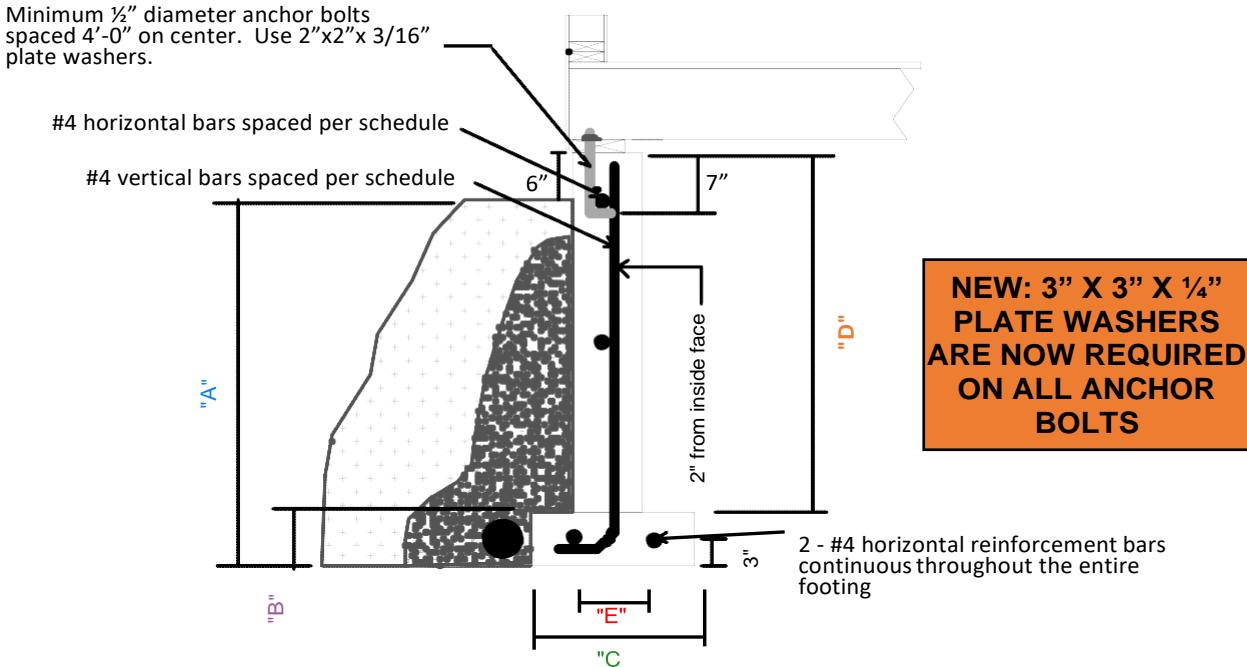
#### Footing Setback from Descending Slope Surface

Footings on or adjacent to slope surfaces shall be founded in firm material with an embedment and setback from the slope surface sufficient to provide vertical and lateral support for the footing without detrimental settlement. Where the slope is steeper than one unit vertical in one unit horizontal (100% slope), the required setback shall be measured from an imaginary plane 45° to the horizontal, projected upward from the toe of the slope (see Figure 2).

## Alternate Setback and Clearance

The building official may approve alternate setbacks and clearances upon evidence from a geotechnical report and recommendation of a qualified engineer. The geotechnical report shall include consideration of material, height of slope, slope gradient, load intensity and erosion characteristics of slope material. Such alternative setbacks shall be justified by an engineered analysis and shall contain full foundation construction and placement requirements.

**FIGURE 1 – PRESCRIPTIVE FOUNDATION REQUIREMENTS**



## MINIMUM REQUIREMENTS FOR FOUNDATIONS SUPPORTING BEARING WALLS

NUMBER OF FLOORS SUPPORTED BY FOUNDATION	"E" MINIMUM STEM WALL THICKNESS	"A" DEPTH TO BOTTOM OF FOOTING	"B" MINIMUM FOOTING THICKNESS	"C" MINIMUM FOOTING WIDTH	MINIMUM FOOTING REINFORCEMENT
1	6"	12"	6"	12"	2 - #4 bars cont.
2	8"	18"	7"	15"	2 - #4 bars cont.
3	10"	24"	8"	18"	2 - #4 bars cont.

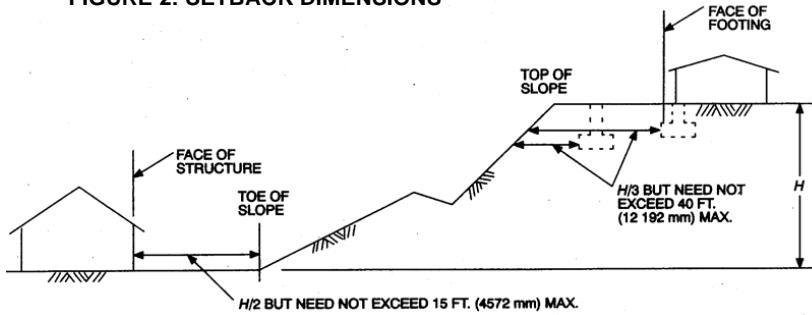
## MINIMUM WALL REINFORCEMENT

DIMENSION "D"	HORIZONTAL STEEL	VERTICAL REINFORCEMENT	MAXIMUM HEIGHT "D"
Less than 24"	1 - #4 Bar	#4 bars at 18" o.c.	
24" – 36"	2 - #4 Bars	#4 bars at 18" o.c.	
36" – 48"	3 - #4 Bars	#4 bars at 18" o.c.	
6" wall – Dim. "E"	4 - #4 Bars	#4 bars at 18" o.c.	5'
8" wall – Dim. "E"	#4 Bars at 10" o.c. or #5 bars at 15" o.c.	#4 bars at 18" o.c.	8'
10" wall – Dim. "E"	#5 bars at 10" o.c.	#5 bars at 18" o.c.	8'

## Foundation Plates or Sills

Wood plates or sills shall be bolted to the foundation or foundation wall. Steel bolts with a minimum nominal diameter of  $\frac{1}{2}$  inch shall be used in Seismic Zone D-2 (all of Gig Harbor). Bolts shall be embedded at least 7" into the concrete and shall be spaced not more than 5' apart. There shall be a minimum of two bolts per piece with one bolt located not more than 12" or less than seven bolt diameters ( $3\frac{1}{2}$ " with  $\frac{1}{2}$ " bolt) from each end of the piece. A properly sized nut and 3" x 3" x  $\frac{1}{4}$ " thick plate washer shall be tightened on each bolt to the plate. Foundation plates and sill shall be of pressure-treated wood or foundation redwood.

FIGURE 2: SETBACK DIMENSIONS



## Construction Methods

In Seismic Zone D-2 (all of Gig Harbor), all footings and foundation walls shall be reinforced. Placement of reinforcement shall be in accordance with Figure 1, or in accordance with an engineered design.

- All reinforcement bars must be accurately placed and adequately prior to the placement of concrete. No "wet setting" is allowed without an engineer's analysis. Vertical bars must be hooked and extend a minimum of 14" into the stem wall.
- All hooked bars shall have a 90° bend plus an extension at the free end of at least 12 times the bar diameter (6" for #4, 7  $\frac{1}{2}$ " for #5).
- All reinforcement shall be placed such that there is at least 3" of concrete between the bottom of bars and the exposed earth.
- All reinforcement bars where lapped to extend the length of the bars shall overlap the previous bar by length at least 30 times the diameter of the bar (15" for #4, 19" for #5).
- All reinforcement bars shall be free of mud, oil, form release agents or other nonmetallic coatings that decrease bond.

## Slabs-on-Ground with Turned-Down Footings

Slabs-on-ground with turned-down footings shall have a minimum of two #4 bars at the bottom, and one #4 at the top. The bottom of the slab edge shall be at least 12" wide and at least 12" below grade (see Figure 3).

FIGURE 3 – SLABS-ON-GROUND WITH TURNED-DOWN FOOTINGS.

