



31 August 2016

Mr. John Lanou
4014 34th Street
Mount Rainier, MD 20712

RE: 4014 34th Street - Brief Opinion Letter Regarding Ridge Beam Size
Our Project No. 216D155

John S. Rossi, P.E.

Principal

Matthew A. Rudy, P.E.

Associate

Charles J. Angelilli, P.E.

Senior Project Engineer

Dear John:

Thank you for engaging RESolutions to provide a size for the Ridge Beam in the garage that you are in the process of converting to a sound studio. Please see our recommendation below.

We based our analysis of the ridge beam on standard roof loading (15 psf dead loading and 30 psf roof live loading) for a span of approximately 19'-6". The minimum properties for the LVL are as follows: $F_b = 2,600$ psi for 12" depth, $F_v = 285$ psi, $E = 1,900,000$ psi (these are the typical minimum properties for LVL beams by Weyerhaeuser). Other manufacturers may have different properties. Please ensure that the properties of your beam meet or exceed those listed above. Please follow the manufacturer's instructions connecting the different plies of the LVLs together. The beam should be installed in a way to ensure that the rafters are bearing on the beam and each rafter should be connected to the beam. It is also important to brace the bottom of the beam on both sides every 4'-0" or so to ensure that the beam does not twist. See the two ridge beam size options below:

- 1) 2-ply, 1 $\frac{3}{4}$ "x16" LVL beam (3 $\frac{1}{2}$ " wide x 14" tall)
- 2) 3-ply, 1 $\frac{3}{4}$ "x11-7/8" LVL beam (5 $\frac{1}{4}$ " wide x 11-7/8" tall) (*this is our recommendation*)

The posts that should go below each end of the beam should be standard stud-grade or better Spruce-Pine-Fir wood (this is the typical 'white' wood found in local lumber yards). The tops of the posts should be connected to the LVL beam with AC style metal connectors by Simpson Strong Tie (or something similar, we can help you decide once a beam and post size are selected.) The bottoms of the posts should be connected to a concrete footing above grade with an AC style metal connectors by Simpson Strong Tie (or something similar, we can help you decide once a beam and post size are selected.) See the four post options below:

- 1) 6x6 post (*this is our recommendation*)
- 2) 4x6 post
- 3) 4-ply 2x4 post
- 4) 3-ply 2x6 post

Lastly, it is important to install a solid concrete footing below the posts to ensure that the post and beam assembly does not settle. We calculated a maximum load in the posts of approximately 4,550 lbs. The concrete footings should bear a minimum of 30" below grade (below the frost line) and project above grade by about 2". The minimum compressive strength of the concrete should be $F'_c = 2,000$ psi (this is fairly low strength and typical bag mix concrete meets this standard).

Please see the two options for a minimum footing size below based on a soil bearing capacity of 2,000 psf:

- 1) 22" diameter concrete pier footing (*this is our recommendation*)
- 2) 20" square concrete footing (10" thick) with a 12" concrete pier footing centered above

Please note that without Structural Design Drawings and Specifications prepared by a Maryland registered Professional Engineer, the information contained herein is considered incomplete. We assume that your contractor has the required level of experience and expertise to properly install and brace the recommended beam, posts and footings. We recommend having our firm perform a site visit after the beam and columns are installed (prior to covering things with drywall) in order to ensure proper installation and the correct material.

Thank you for using RESolutions as your structural engineering consultant and let us know if you have any questions.

Very truly yours,



Charles J. Angelilli, P.E.
Senior Project Engineer