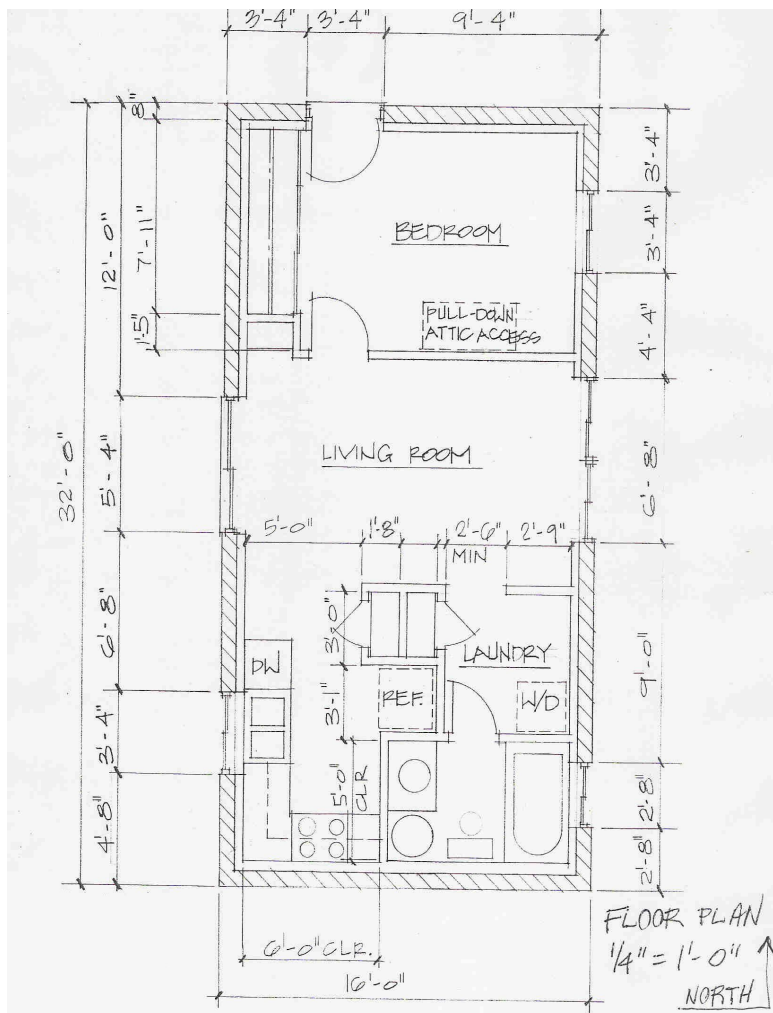


# A Cozy House in the Mountains

by Andrew Eriksen

New houses tend to be large and expensive, and often out of reach for people on disability. Small houses are more affordable, but with the smaller volume of air inside, they are more difficult to build right, so the person with MCS can feel good inside.

A woman had a tiny house built that is only 512 square feet (51 square meters), but is comfortable — both in layout and indoor air quality. She moved in during April 2007, only a month after it was finished. She had been living in a rented garage over the winter and was motivated to move in as soon as possible. Fortunately, she did well in her new house. Over the summer, she kept the windows open all the time, and by fall she felt good inside, even when she had to close it up.



The 16 ft x 30 ft (5 m x 10 m) house has an innovative floor plan, with a bathroom at one end, followed by a narrow utility corridor and kitchen, with an internal wall between them. The internal wall includes a pantry and a linen closet. Then comes a small living room, that extends the kitchen and utility areas. The other end of the house is a bedroom with a large closet, a large covered deck adds a lot of extra space.



The house is located at 7000 ft (2200 meter) elevation, near the town of Vernon in the White Mountains of Arizona. It is a climate of cool summers and bitterly cold winter nights, so insulation and a good heating system are essential.

The outer walls are made of split-face concrete blocks. On the back of the blocks are metal framing, with formaldehyde-free fiberglass insulation from Johns Manville (see vendor list at end of article). Behind that is another layer of insulation, using Prodex. Prodex is a sandwich of polyethylene foam with aluminum foil on both sides, to act as both a vapor barrier and an infra-red heat reflector. The Prodex strips were taped together with acrylic aluminum tape from E.L. Foust, to make an air tight barrier, sealing in fumes from the insulation in the wall (the Polyken aluminum tape is not durable).

The inner wall is made of Dragonboard wall boards, which are made of magnesium oxide, instead of the usual gypsum wall boards. The spaces between the Dragonboards were taped with regular tape, and then smoothed with the M-100 joint compound from Murco. M-100 is a special hypo-allergenic product.

The inside walls of the Dragonboards were textured using Murco M-100, which works very well for this purpose too. The textured wall was then painted with a no-VOC paint from American Pride. The complete wall is 13 inches (33 cm) thick.



The roof is held up by conventional wooden trusses. On top of them is decking with regular plywood, which is sealed on both sides with A-100 primer from Sherwin Williams, to keep in the gasses from the glues in the plywood. Since the roof structure is not part of the interior house, it was okay to choose less-perfect materials here.

On top of the plywood decking is a roofing underlayment of Titanium brand UDL. UDL is a felt-like material, which is impervious to moisture and thus should minimize future mold problems there. The roof itself is made of Propanel II steel plates from Metal Sales.

Under the trusses hang the ceiling, which is similar to the walls, i.e. fiberglass and Prodrex insulation, with Dragonboard as the ceiling.

The walls in the bathroom are made of Wonderboard cementboard, with tiles covering the entire wall. The thinset and grout was specially ordered from a paint store in Phoenix, where she was able to find traditional mixes without latex and other additives that are used in the regular mixes of today.

The floor is a cement slab with tiles, also set with the traditional old-fashioned additive-free thinset and grout.

The kitchen cabinets are of steel with baked-on epoxy coating from Phillip Metal Cabinet company in Chicago. The countertop is a granite slab, mounted on Dragonboard.

Instead of using wooden trim around the windows on the outside, cement stucco was used. The stucco was applied over a steel mesh and built up in layers. It was very labor intensive and took three days.

The house is heated by a single electric heater, located in the living room in the center of the house. An additional heater in the bedroom is never used. The heater is an ETS – Electronic Thermal Storage heater from Steffes. It uses heavy bricks as thermal mass, to provide a comfortable, even heat. And it really does!

The house has no steps, only a ramp up to the deck and to the back door in the bedroom. However, the house may be a little small to comfortably operate a wheel chair, especially in the kitchen area.



The covered deck was in place before the house was built. Building the house itself took about five months.

### **Vendor List**

American Pride (no-VOC paint)  
1-601-271-2588  
[www.americanpridepaint.com](http://www.americanpridepaint.com)

E.L. Foust (acrylic aluminum tape)  
1-800-353-6878  
[www.foustco.com](http://www.foustco.com)

Fillip Metal Cabinet Company  
1-800-535-0733  
[www.fillipmetal.com](http://www.fillipmetal.com)

Pioneer Building Products of Taishon, Ltd. (Dragonboard)  
1-201-938-0303  
[www.dragonboardus.com](http://www.dragonboardus.com)

Metal Sales (Propanel II roofing plates)  
1-800-289-7663  
[www.metalsales.us.com](http://www.metalsales.us.com)

Miracle Cover Inc. (grout)  
1-800-304-7325  
[www.miraclecoverinc.com](http://www.miraclecoverinc.com)

Murco (M-100 joint compound/wall texture)  
1-800-446-7124  
[www.murcowall.com](http://www.murcowall.com)

Johns Manville (formaldehyde-free fiberglass insulation)  
[www.jm.com](http://www.jm.com)

Energy Conservation Distributors (Prodex insulation)  
[www.insulation4less.com](http://www.insulation4less.com)  
[www.prodex-insulation.com](http://www.prodex-insulation.com)

InterWrop Corp. (titanium UDL roofing felt)  
1-800-567-9727  
[www.InterWrop.com](http://www.InterWrop.com)

Steffes (thermal storage heater)

1-701-483-5400

[www.steffes.com](http://www.steffes.com)