A Water-Pump Bunker

BY STEVEN BACZEK AND JIM WOLFFER

Basements can be handy places for bulky mechanicals such heating systems and water tanks. But full basements can be costly and on a recent project on Cape Cod, our clients opted for slab-on-grade construction to lower the budget. The project home was a single-story building, so space was limited. And with the house in an area without a municipal water supply, we needed to find a place for a well and pump.

REMOTE LOCATION

There were two buildings on the property: the main house and an existing guest cottage. We had to locate the well at least 100 feet from both septic systems. Our site contractor, George Botelho, helped us settle on a location for the well, and we decided to sink a well pit for the well head and related equipment.

We did some research and learned that well pits had been used successfully in places with much colder climates, such as northern Michigan. The ambient temperature of the earth keeps the system from freezing even when temps routinely fall well below zero.

The well pit provided several benefits. For one, we saved precious floor space. A small equipment room in the house was already jam-packed with the water heater, air handler, and ERV unit. (We installed the Sanden heat pump outside, which also saved space). Having the water system in its own dedicated space would also make servicing the equipment easier. Finally, the pump was to serve two structures—the main house and guest house—and we could feed the water for both of these buildings more efficiently from a single source.

BUILDING THE EQUIPMENT ROOM

With the remote location, the well driller was able to come in with his rig and sink the well without disturbing the jobsite. The well ended up being 31 feet deep; when he finished up, he left the PVC well casing a few feet above the ground with a pipe from the pump coming out of the casing.

Botelho dug around the pipe to a depth of about 7 to 8 feet and about 8 feet across at the bottom. He dumped crushed stone in to bring the floor of the hole up to a depth of about 6 feet, compacting the stone flat and level.

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The well had to be located a minimum of 100 feet from any septic system, so the well pit (in the lower left corner of the photo), is barely visible from the house **(1)**. The well driller tested the flow from the pump in the PVC well casing **(2)**. After running the water lines and power supply to the well pit, the excavator backfilled and compacted the soil around the pit **(3)**. A 6-foot-tall-by-60-inch-diameter precast concrete pipe makes up the walls of the pit, and a reinforced concrete manhole ring was cemented to the top of the pipe **(4)**.

Photos 2 & 3 by George Botelho; all others by Roe Osborn

The well pit was actually a 6-foot-high-by-60-inch-diameter section of precast concrete pipe. Because other equipment would be located in the room, Botelho laid out the placement of the pit a couple of feet off-center from the well casing. Using a crane, the precast delivery crew placed the pipe section on Botelho's layout points. The crew then topped the pipe with a reinforced concrete manhole grade ring that was cemented into place.

CONNECTING TO THE HOUSE

Before backfilling around the well pit, Botelho dug trenches to both the main house and the guest house at a depth below the frostline. He laid 1-inch flexible water pipe in the trenches and then fed the pipe for the main house through a PVC pipe sleeve that we had installed under the footing and up into the home's equipment room before the slab was poured. The power-supply conduit also followed the same trench to provide electricity for the pump.

The well pit had knock-outs on the side, one to feed the water pipes through and the other for the power supply. With the pipes run, Botelho carefully backfilled around the well pit in 1-foot lifts, compacting the soil at each layer until he'd reached the top of the grade ring. The grade slopes away on all sides for drainage.

THE EQUIPMENT GOES IN

A cast-iron-manhole-cover assembly fit over the hole in the grade ring. The weight of the 24-inch-diameter manhole cover is quite formidable. Lifting it requires a pair of crowbars, and once raised above its sleeve, it takes two strong adults to lift the cover off completely.

Next, the pump equipment was lowered through the manhole cover and into the well pit. The largest part of the well system was the pressure tank. The pump itself is contained in the well casing, so once the tank was in place, installation was straightforward. The supply pipe exits the well head and connects to the pressure tank with separate valves and a pressure gauge to control the supplies to each building.

Inside the house, the water pipe enters through one corner of the equipment room, where it connects to the domestic water system. The water pipe for a future guest house emerges from its trench in a coil, ready to be installed after the building is renovated.

Steven Baczek, of Reading, Mass., is an architect specializing in energy-efficient design and certified passive homes. Follow Steven on Instagram @stevenbaczekarchitect.

Jim Wolffer owns Shoreline Builders (shorelinebuilders.net), a custom home builder in Scituate, Mass. Follow Jim on Instagram @jimwolffer.

A manhole cover and sleeve provide access to the well pit **(5)**. Removing the cast-iron cover requires crowbars and two strong adults. Water lines exit and power supplies enter through knock-outs in the wall of the well pit **(6)**. The ambient earth temperature keeps the well, supply pipes, and pressure tank from freezing. Water pipe enters the main house through a corner in the equipment room **(7)**. A second water line remains coiled above ground, awaiting the renovation of a nearby guest cottage on the property **(8)**.

A Pair of Floating Shelves

BY DAVE HOLBROOK

Instead of wall cabinets above the countertop in a small kitchen that I built this past winter, my client wanted a pair of open shelves made of 8/4 pine. He wanted them to float on the wall, with no visible means of support. This was a detail he'd done himself previously, by aligning holes drilled in the back edge of the planks with short steel support rods epoxied into the wall studs along a level line. That sounded OK to me, but too demanding for these shelves, which would be wrapping an inside corner in a 3-foot-by-6-foot L-shape. I wanted a clean, secure way to tie the legs together at the corner and didn't like the idea or the logistics of doing that in place, using biscuits, dowels, or any number of other options.

'EIGHT-QUARTER-THICK' PINE SHELVES

Instead, I decided to make the planks hollow, by gluing two 1x12 boards together over 1/2-inch spacers, capped at the front edge with a 1-by face band. The slot, rather than individual holes for the dowels, allowed me to prefab an L-shaped shelf and slip the shelves onto 1/2-inch square steel rod. The slot provided lateral flexibility for positioning and installing the shelves. This laminated approach would also help resist warping, which can be a problem with solid planks.

Eight-quarter pine dresses out at 1 3/4 inches, and I wanted to keep that as the shelf thickness. Because I'd be using 1/2-inch square steel rod for the supports, I planed the 1x12 boards to 5/8 inch thick, along with spacer stock that I dressed to 1/2 inch thick and ripped to inch-wide strips. Then I cut the boards to rough length, added spacers just at the ends for the moment, and glued up my four sandwiched blanks, clamping them overnight.

While I was careful to align the long edges, I still wanted flawless glue lines for the edge cap. I trimmed one edge with a track saw and then ran my sandwiches through the table saw to final width, about 11 inches. I squared the ends and then added the 1-by cap pieces, mitered at the outside ends. To avoid visible fasteners, I relied solely on yellow glue and clamps.

HIDDEN SHELF SUPPORT

While the shelf glue was curing, I worked on planting the steel dowels in the wall studs. I cut eight 12-inch lengths of square rod. I planned to use three dowels for each 6-foot run, and only one for the 3-foot leg. Using

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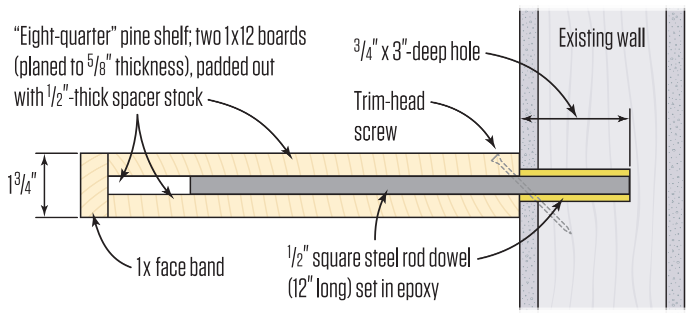
Hidden Shelf Support



The author was tasked to install a pair of "floating" corner shelves, which he accomplished by building hollow shelves mounted on 1/2-inch square steel dowels **(1, 2)**. The steel dowels were aligned and leveled using plywood strips mounted horizontally on the wall and vertical support sticks **(3)**.

Photos by Eve Aspinwall and Dave Holbrook; illustration by Tim Healey wood spacers to spline internally across the joint, the short leg would be supported by the long run.

To align the steel dowels, I shot laser lines for the bottoms of both shelf locations. I accurately located all studs, edge-to-edge to ensure drilling into their centers, and screwed straight plywood rips along the horizontal lines. For the 1/2-inch rod, I drilled 3/4-inch holes, 3 inches deep, eyeballing level. The hole centers were 7/8-inch above the shelf bottom line, giving me just enough wiggle room to allow the rods to rest on 5/8-inch spacers (taped to the plywood strips) while the epoxy set up.

I did a dry run at all locations, to make sure the rods would install exactly level, strictly aligned to each other. I cut vertical support sticks that I leaned against the wall alongside each support location and pinned at their base with brads to keep them from wandering. I leveled each dowel and scribed its location on the support sticks.

Once I had all four locations dress-rehearsed and triple-checked for level and true point-to-point sight lines, I committed to the epoxy. I used a West Systems product, a thickened, two-part pliable gunk that does not run and has a generous open time so you're not rushed. I stuffed all holes, using a putty knife and a push-stick until the gunk mounded out, then inserted the steel rods, spring-clamped them to the support sticks, and re-checked level. I carefully cleaned away all the squeeze-out while it was still liquid so it wouldn't interfere with shelf installation later, when it had hardened.

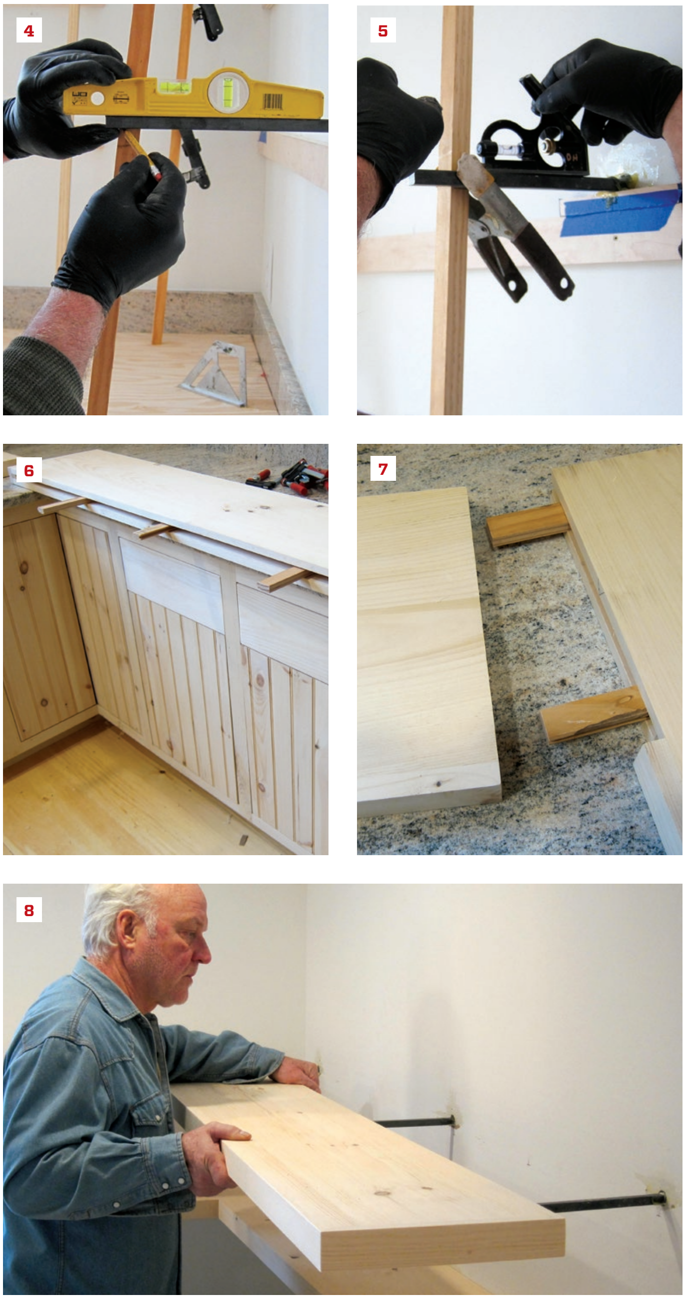
The next day, I stripped away the temporary supports and re-checked all for level. Happily, the epoxy was rock solid and nothing had moved, but it would still have been possible to get a lever on any wayward dowel and bend it back to true.

SPACERS AND SPLINES

I rested my shelf sections on the dowels and scribed them true to their respective walls, first squaring them to each other at the corner joint. I marked the dowel locations on the shelves, then took them down and added more spacers. Since the action of shelf installation would be sliding leftward into place over the dowels, I kept the spacers well to the right of each dowel location. A pair of spacers splined the butted shelf joints. When all spacers were laid out to my satisfaction, I added yellow glue and clamps, completing the shelf assembly.

Once the glue had dried, I easily slipped the 6-foot leg over the three dowels on the long wall and then slid the L-shaped shelf unit leftward over the dowel on the short wall. With the shelves in place, I pinned them to the walls using just two trim-head screws per unit, toed in at the back edge and capped with wood dough.

Dave Holbrook is a JLC *contributing editor.*



Each dowel was leveled, its location scribed on the support sticks **(4)**. The steel dowels were set with two-part epoxy, spring-clamped to the support sticks, and obsessively rechecked for level **(5)**. Additional 1/2-inch spacer strips were inserted into the shelves, located to allow for a "leftward slide" when the shelves were mounted on the wall **(6)**. A pair of spacers splined the butted shelf joints **(7)**. The shelf units easily slipped into place over the steel dowels **(8)**.