Structural Solutions for Small Bump-outs





With the right support, foundation-free additions can make a big impact

BY DEBRA JUDGE SILBER

Sometimes you don't need an entire room to make a floor plan work. Sometimes all you need is a few feet. But sometimes you're in a situation where adding a few feet to a home's footprint will throw off its style, crank up project costs, or put the owners on the wrong side of local zoning rules. In these cases, a small, self-supporting addition—a bump-out—can be the answer.

But it's an answer that immediately raises another question: If an addition won't be supported from underneath, how will it be held up?

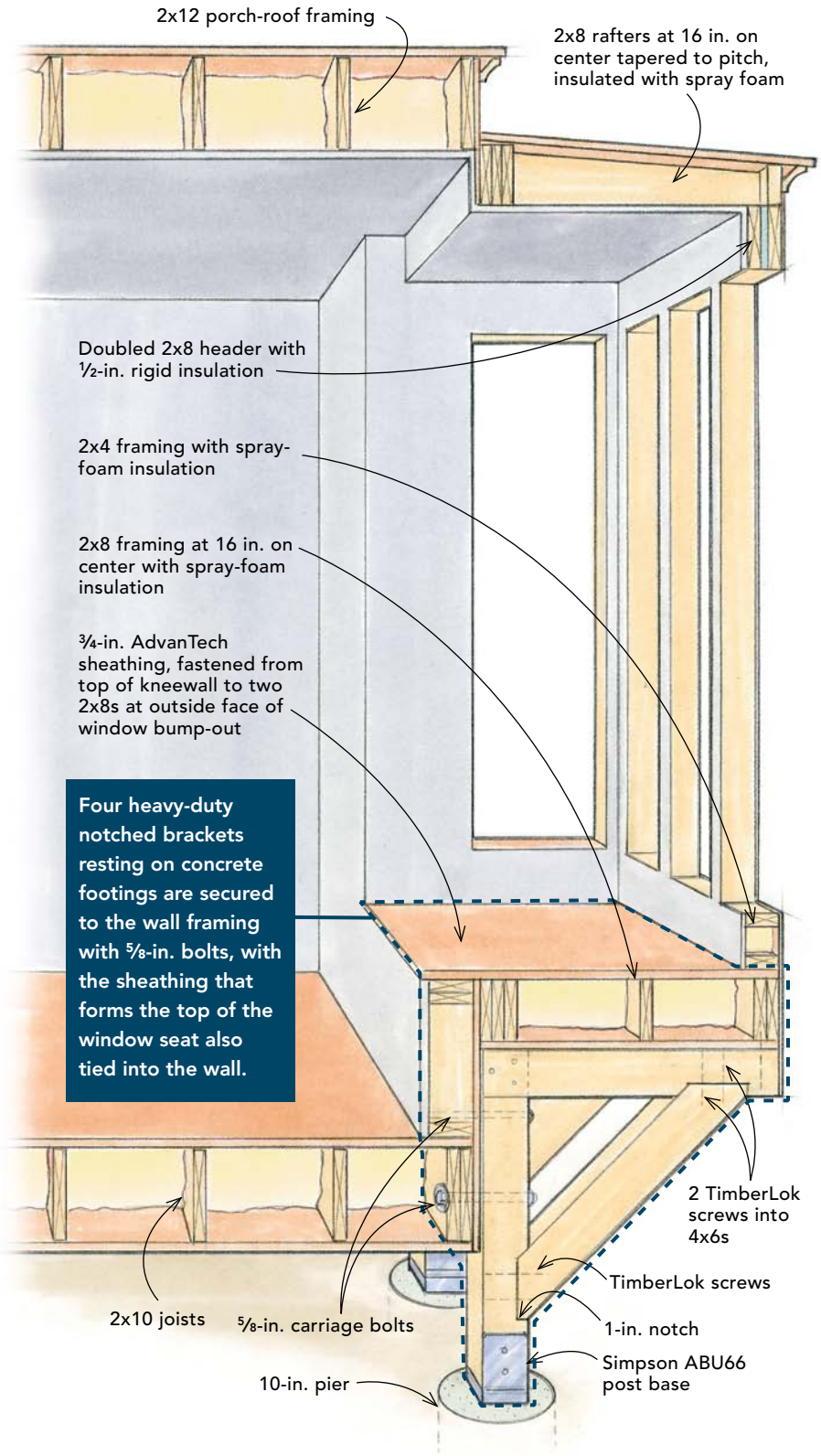
Here, we explore some of the structural options for bump-out additions, defined for our purposes as structures that extend a room by no more than 4 ft. and do so without significant ground contact outside the original footprint. The examples that follow run the gamut from bench-seat projections to floor-level extensions, and their support structures vary from grounded brackets to cantilevered floor joists. All deal with real-world restrictions, and none is without its own challenges that manage to remake this simple answer into a lesson in creative construction.

While there are some structural rules of thumb for cantilevers, brackets, and the other solutions found here, every situation is unique. It's always best to consult an engineer on any structure of this type, as the builders and architects featured here did on their projects.

Debra Judge Silber is managing editor of *Fine Homebuilding*.

Photos facing page: courtesy of Steve Lawrence.
Drawings: Dan Thornton

BRACKETS BRACE A BENCH



Objective

To add a bench seat for a dining area in a former screened porch that was converted into a sunroom

Why a bump-out?

Setbacks would not allow an extension of the footprint without a variance.

Exterior dimensions

Approximately 3 ft. by 12 ft. 6 in.

Support system

The extension is supported primarily by four brackets of 4x6 and 6x6 pressure-treated lumber, fastened to the rebuilt porch's floor and wall structure with ⅝-in. carriage bolts through predrilled holes. Each bracket is seated on a 10-in. pier poured flush to the ground at the porch's base. The bump-out's 2x4 sidewalls are fastened with a doubled 2x4 to doubled 2x4s at the wall opening with TimberLok screws every 12 in. While the supporting piers are within the home's setback, the bulk of this bump-out needed to clear the ground to meet local zoning rules.

Back story With a long farm table tucked against the seat created by the bump-out, builder Steve Lawrence was able to boost the functionality of the new sunroom by including a dining area that doesn't conflict with traffic through a door that leads to the patio outside. Below the bump-out, arched shrouds made of Azek protect the brackets' internal structure from the harsh New England environment while adding architectural interest to the boxy former porch. Also owing to the cold climate, the bottom of the bump-out is framed with 2x8s to provide room for 7 in. of spray-foam insulation.

Architect: Gail Hallock, Wickford, R.I.; www.gailhallockarchitect.com ***Consulting engineer:*** David Seymour, North Kingstown, R.I.
Builder: Steve Lawrence, Lawrence Builders Inc., Narragansett, R.I.; www.lawrencebuildersinc.com

LEDGER SUPPORTS A TUB DECK

Objective

To expand the interior space around a bathtub for a better bathing experience

Why a bump-out?

Because the extension is not at floor level, there's no need to support it with a foundation, which also would have altered the home's exterior aesthetics.

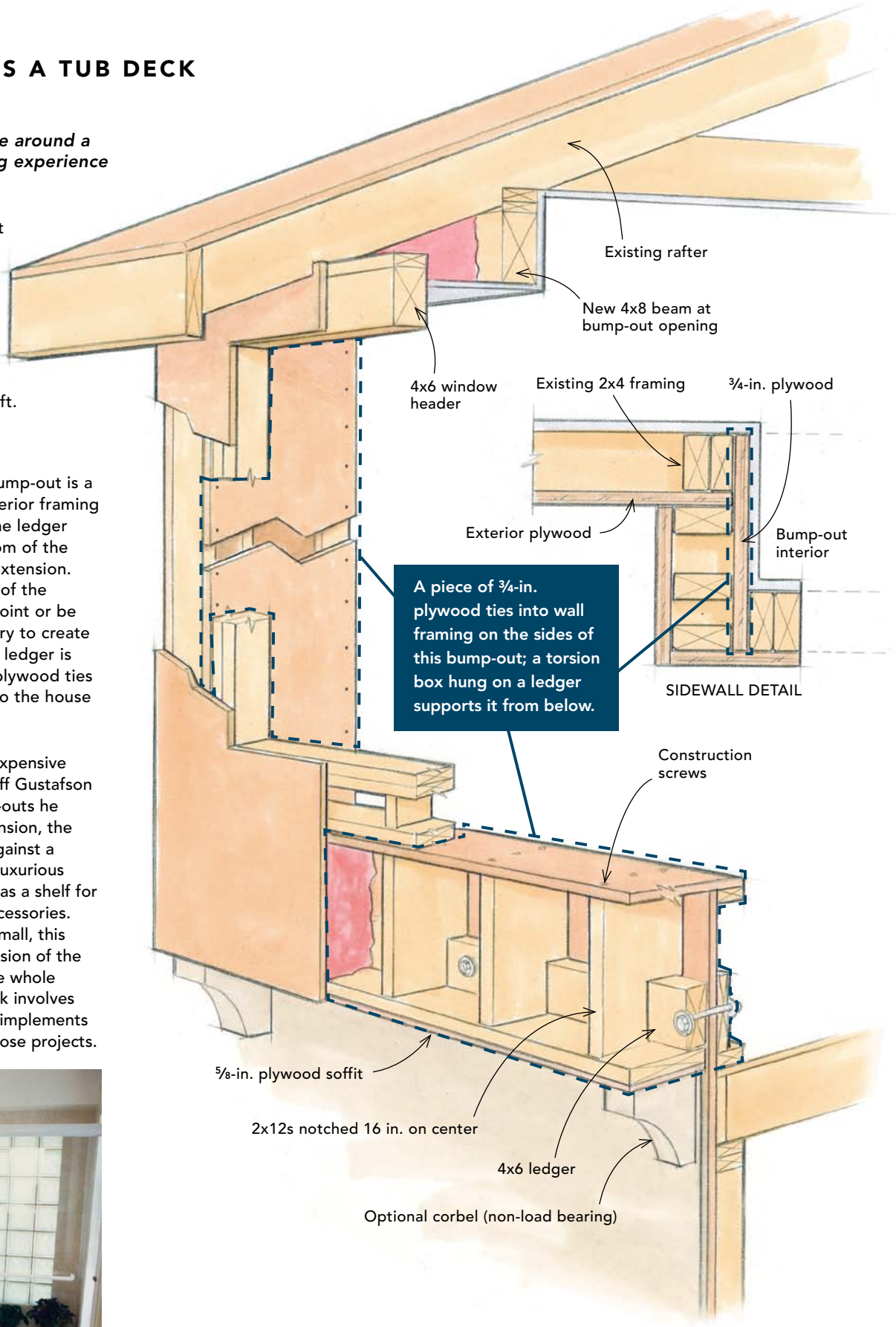
Exterior dimensions

Approximately 6 ft. wide by 1 ft. deep by 8 ft. high

Support system

The primary support for this bump-out is a wood ledger bolted to the exterior framing of the house. The bottom of the ledger is about 18 in. below the bottom of the interior space created by the extension. This design allows the bottom of the exterior mass to stop at that point or be framed down as far as necessary to create exterior balance. Although the ledger is the load-bearing component, plywood ties the bump-out's sidewall back to the house (detail) for additional support.

Back story This relatively inexpensive method is one that architect Jeff Gustafson employs for many of the bump-outs he designs. With this modest extension, the bathtub is no longer pressed against a vertical wall, providing a more luxurious experience for the user as well as a shelf for plants, candles, and bathing accessories. Because bathrooms are often small, this method also provides an expansion of the interior space that improves the whole room. Much of Gustafson's work involves remodels, and he estimates he implements bump-outs in 80% to 90% of those projects.



Architect: Jeff Gustafson, Tiburon, Calif.; 415-435-4840
Consulting engineer: Sarah Leong, San Francisco
Builder: Hoffman Construction, Novato, Calif.

Photos: this page, courtesy of Jeff Gustafson; facing page, courtesy of Russell Hamlet.

SISTERED JOISTS EXPAND A ROOM

Objective

To expand a dark, cramped dining room into usable space

Why a bump-out?

A ground-supported structure would have required a concrete foundation, adding another phase and subcontractor (meaning cost and construction time) to a second-floor remodel that otherwise required no concrete. Also, a ground-supported structure would have added more mass to the bump-out, making it feel more dominant, which would have been at odds with the architect's goal of making the addition feel like an integral part of the house.

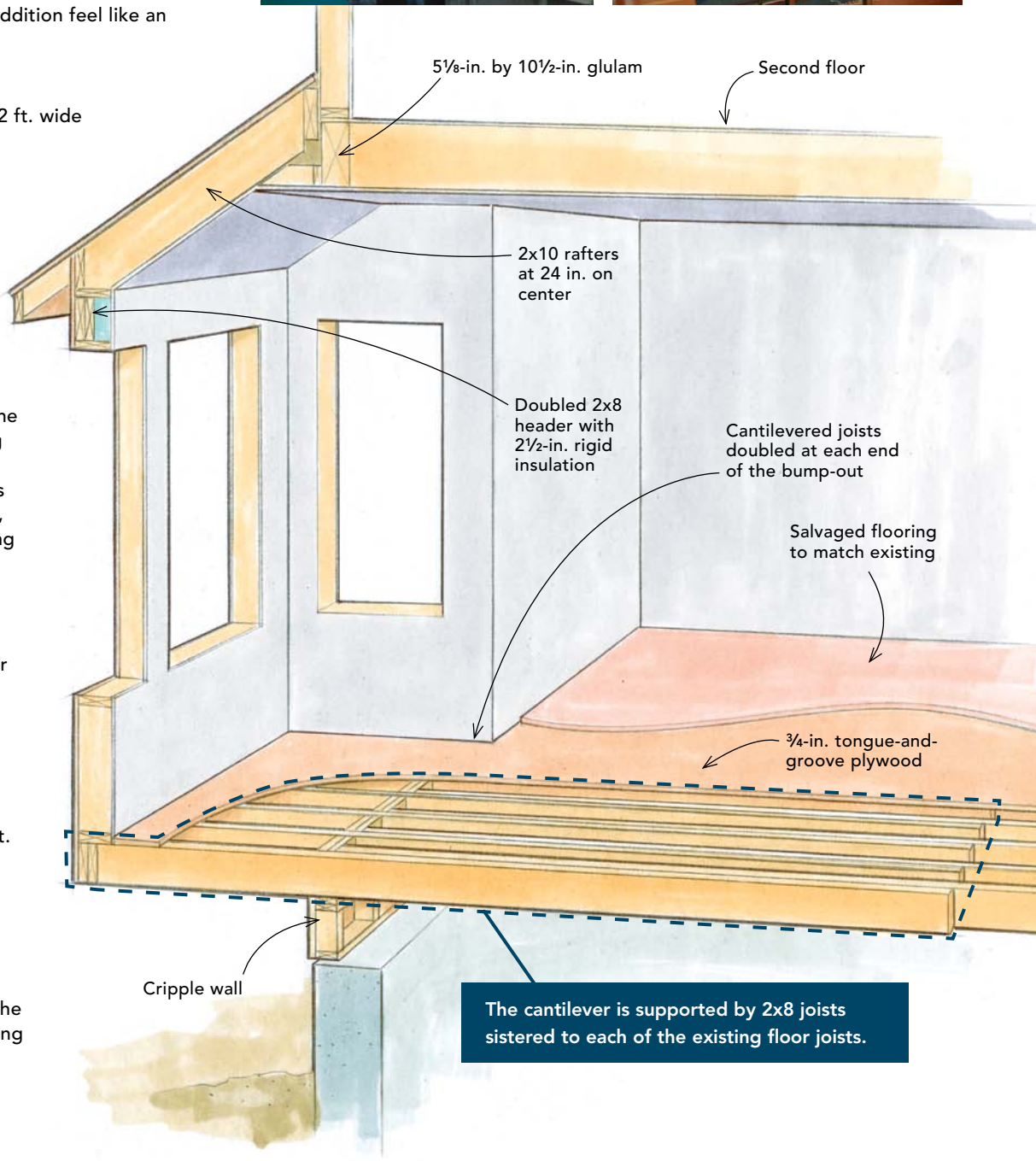
Exterior dimensions

Approximately 3 ft. 6 in. deep by 12 ft. wide

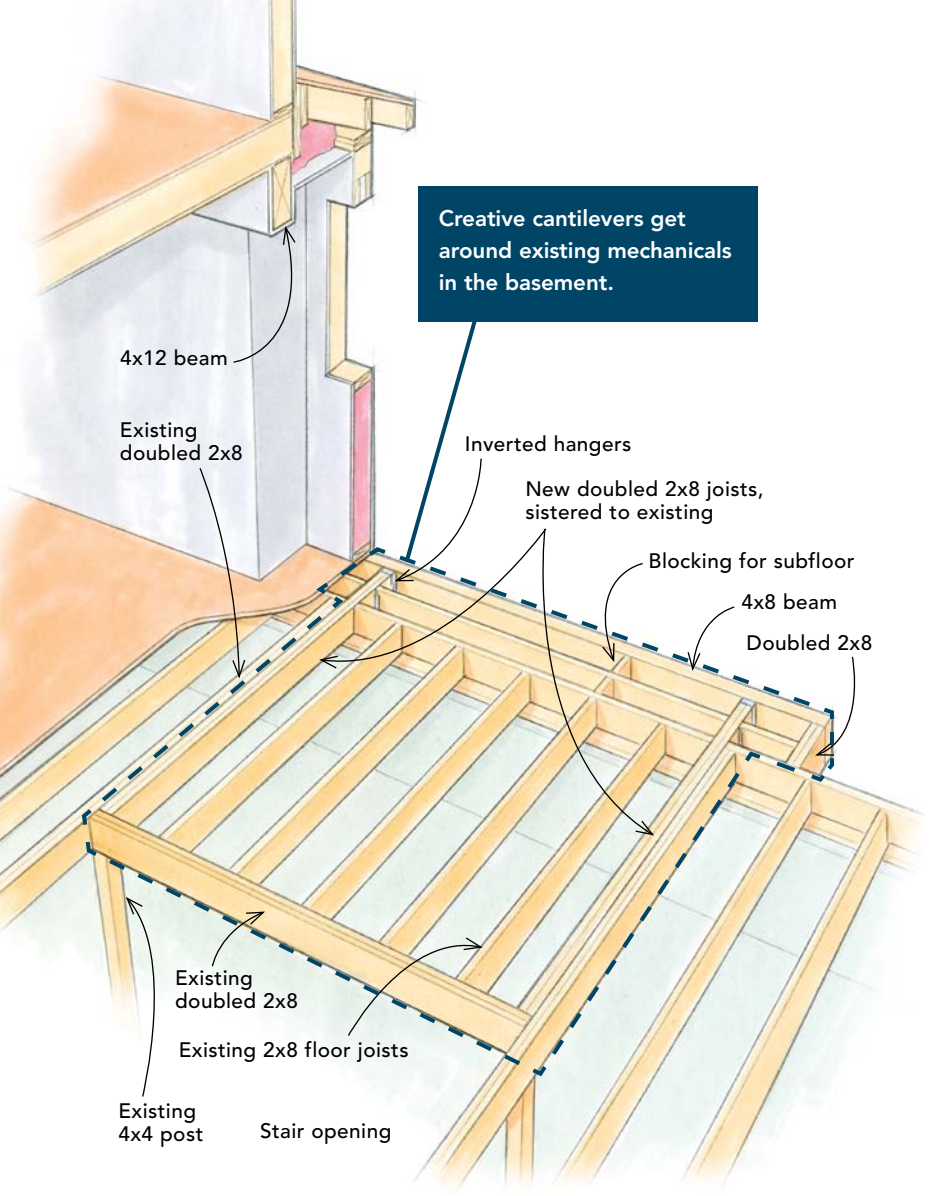
Support system

Because existing floor joists ran parallel to the bump-out, it was possible to sister 2x8 Douglas-fir joists to the existing floor joists to create the cantilever. The outside cantilevered joists are doubled, as is the rim joist. The back span of the sistered joists is in a two-thirds ratio to the bump-out, or 7 ft. for the 3-ft. 6-in. cantilever. At the opening in the existing exterior wall, a 5⅛-in. by 10½-in. glulam header carries the load. At the ends of the glulam, 6x6 posts were added in the existing exterior wall for support.

Back story The clients for this project love entertaining, but they were extremely frustrated with their dining room. Dark and cramped, the space was more like a hall with a table than a room. The bump-out reproportioned the layout and expanded the sense of space by extending views in multiple directions while adding natural light. To maintain the illusion that the extension was part of the original house, the contractor coordinated the dimensions of the bump-out carefully with the new roof so that the two could tie together at the same plane and pitch. To enhance the illusion inside, old Douglas-fir flooring was salvaged from an attic storage area and reused in the bump-out to make a seamless transition from existing flooring to addition.



Architect: Russell Hamlet, Bainbridge Island, Wash.; www.studiohamlet.com ***Consulting engineer:*** ADI Structures, Bainbridge Island, Wash. ***Builder:*** Dave Carley Construction, Bainbridge Island, Wash.



BEAMS WORK AROUND OBSTACLES

Objective

To gain counter and floor space with minimal cost

Why a bump-out?

A bump-out was chosen primarily to save money, but also to keep from adding additional mass to the exterior of the house.

Exterior dimensions

Approximately 2 ft. deep by 10 ft. wide by 8 ft. tall

Support system

Although existing floor joists ran parallel to the extension, the number of utilities present made it impractical to sister cantilevered joists to every existing floor joist. Instead, the architects chose to cantilever two doubled 2x8 beams from two relatively clear bays in the existing floor framing; these beams are set 1 ft. and 2 ft. inside the end walls of the bump-out. The beams, which are sistered to existing floor framing, cantilever out 2 ft. with an 8-ft. back span to existing bearing walls in the basement. Inverted hangers are used to support the 4x8 beam at the ends of the cantilevered double joist beams. The floor of the overhang is framed with a single 2x8 parallel to the exterior wall; this is connected with standard joist hangers.

Back story The greatest challenge of this bump-out is what drove its design—namely, the extent of utilities blocking access to the basement ceiling. In addition, the design concentrated several structural elements in close proximity to each other, necessitating some creative rerouting of plumbing and heating. With the new bump-out in place, two people could comfortably use this kitchen at the same time, as well as enjoy the benefit of additional counter space. The new windows are larger than the original ones, helping the kitchen to feel more open and filled with light. The supporting beam for the wall above creates a coffer that defines the counter workspace and provides space for a pair of worklight pendants.

A work-in-progress shot shows utilities crowding the cantilever.

Architects: Larry Johnson, Howard Miller, and Ellen Mirro, The Johnson Partnership, Seattle; www.tjp.us
Consulting engineer: John S. Apolis, PE, Seattle ***Builder:*** Dan Buker, Seattle

Photos this page: bottom right, courtesy of Howard Miller; other photos, Charles Miller. Photos facing page: left, courtesy of Mike Kehoe; right, Debra Silber.

ENGINEERED FLOOR EXPANDS A CORNER

Objective

To create an alcove with banquette-style seating for a site-challenged home that otherwise could not accommodate a dining area

Why a bump-out?

The house is a nonconforming structure built on a rocky outcropping on a hillside, limiting construction to the existing foundation.

Overall dimensions

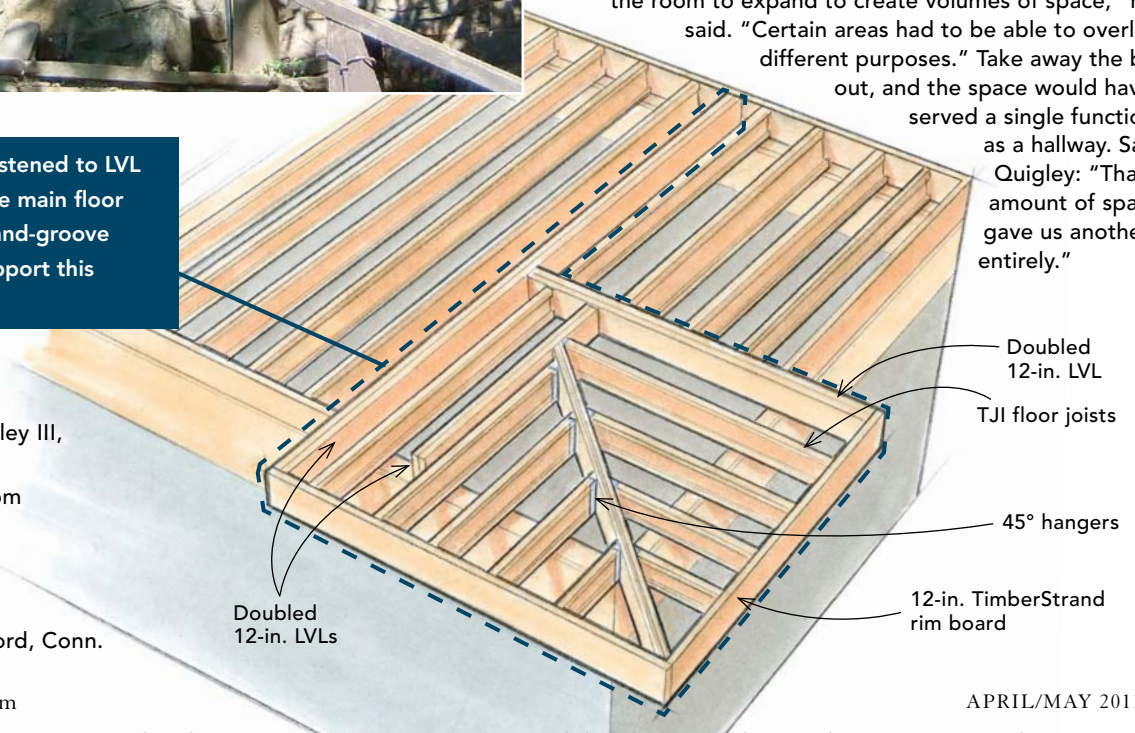
2 ft. deep by 8 ft. wide by 8 ft. long

Support system

The bump-out framing consists of a TJI floor system that is integral with the floor framing of the adjoining room, which was rebuilt to replace an existing screened porch. A doubled 12-in. LVL beam is cantilevered at 45° to support the corner. The two outside ends of the bump-out are also cantilevered, using two 12-in. LVLs. The outside ends are 12-in. TimberStrand rim board. The assembly is held together using Simpson joist hangers and connectors as specified by the joist manufacturer. The subfloor is ¾-in. tongue-and-groove plywood integrated with the rest of the floor area.

Back story Designer Wesley Quigley III favors TJI floor systems for their strength and uniform components—the additional plus here being that their nominal dimensions match that of the LVL beams used for the cantilever. He also appreciates the limited movement that results from shrinkage when materials dry out. From a design perspective, Quigley said he knew this project could be successful only if he used small spaces in unique ways. "We just didn't have the room to expand to create volumes of space," he said. "Certain areas had to be able to overlap for different purposes." Take away the bump-out, and the space would have served a single function: as a hallway. Says Quigley: "That small amount of space gave us another room entirely."

Engineered I-joists fastened to LVL beams and tied to the main floor with a ¾-in. tongue-and-groove plywood subfloor support this corner extension.



Designer: Wesley Quigley III, Torrington, Conn.; www.whqwoodworks.com

Floor system: iLevel Javelin software

Builder: Keyhoe Bros. Construction, New Milford, Conn.