



COOLING & HEATING

West Line Historic District Home Austin, Texas

An HVAC spec can make the difference between a mechanical system that merely serves a function and one that checks all the right boxes, especially on an idiosyncratic structure. Consider, for example, an historic house in Austin's West Line Historic District neighborhood. Its oldest portion consists of two Civil War-era structures that were built from materials found abundantly on the land. The 20-inch-thick walls were made of a wooden form filled with stone, mud and straw, and when it came time to remodel and add on, the Austin-based Pilgrim Building Company stripped the house to its bones, repairing or rebuilding roughly half of the earthen walls. "We had to go back in time, rebuilding in a similar fashion so as not to have any structural discrepancies that would cause a failure point," said President, Branson J. Fustes.

► Challenge

The historic home required a cooling and heating system that could accommodate its unusual wall construction and handle an extremely variable latent load.

The remodel included a restoration of the original perpendicular wings, one housing the bedrooms and the other the living room/great room. A new core – kitchen/dining area and office – fills the void between the wings. "We essentially peeled off all the subsequent wood frame additions and added one consistent frame addition, thereby leaving us with three separate zones to condition – two original structures and one new," said homeowner, Andrew McCalla.

In choosing a heating and cooling system, the team members initially considered a ground-source heat pump. But with no effective way to add a vapor barrier to the oldest parts of the house, they needed equipment that could actively deal with moisture. In addition to the region's high humidity, there was significant ground water from a spring that runs through the property. "We needed something that could be extremely variable in addressing the latent load, or humidity," Fustes said. Another concern was the building's high thermal mass, which



can store a lot of heat during Austin's long summers. The system, they agreed, would have to handle high cooling demand.

Given these conditions, an S-Series Variable Refrigerant Flow (VRF) zoning system from Mitsubishi Electric US Cooling & Heating Division (Mitsubishi Electric) seemed a better choice than the ground-source heat pump, whose electric pumps often undermine the rated geothermal efficiencies. The way building science consultant Kristof Irwin, founder of Positive Energy, described it, "My goal was to avoid the extra cost and complexity associated with a ground-source heat pump and to capture the latent control and reduced power draw benefits associated with VRF."

"As the name implies, VRF equipment has the ability to vary refrigerant flow to the evaporator coil. This allows the system to adjust its output capacity to align with the building loads, which increases the run time and improves latent control," Irwin said. "Mitsubishi Electric's VRF system has a broad dynamic range of output capacity; a 1-ton unit will operate all the way down to the half-ton range."

► Solution

A Mitsubishi Electric VRF zoning system preserved the architectural integrity and historic value of the home and was able to handle the varying load demands.

Stan's Heating & Air Conditioning, Austin, installed two outdoor condenser units (one 4-ton and one 3-ton) and three interior units—one in each of the two old buildings and one in the addition. Each older section has a ducted, ceiling-mounted air handler, while the addition is equipped with a vertical air handler installed in a utility room. "That unit is unique in that it's a full-size air handler and can move a larger air

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Project Location:
Austin, Texas

Completion Date:
May 2011

Project Team

Owner:
Andrew McCalla, Austin, Texas

Building Science & High Performance HVAC Consultant:
Positive Energy Building Science and Performance Testing, Austin, Texas

HVAC Contractor:
Stan's Heating & Air Conditioning, Austin, Texas

General Contractor:
Pilgrim Building Company, Austin, Texas

Mitsubishi Electric Equipment Installed

- (2) PUMY S-Series Outdoor Units
- (2) PEFY Ceiling-concealed Indoor Units
- (1) PVFY Vertical-concealed Indoor Unit
- (2) PAR-30 Controllers
- (1) PAC Simple MA Controller

volume than Mitsubishi Electric's other units," said John Williams, executive vice president of Stan's Heating & Air Conditioning.

For McCalla, the unobtrusive operation was another drawing card. "Because the house is historic, we specifically chose concealed attic units, and ones that could be driven by outdoor units that could be placed some distance away from the house," he said. "As for system performance, we're comfortable." Remodeling is an opportunity to update the aesthetic and practical appeal of an old house, and a resilient, custom-tailored mechanical system is fundamental to its success. ■