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HYDRONICS

This historic Washington, D.C., row house recently was transformed in name, form and significance. Located in the fashionable neighborhood of Dupont Circle, it is known as the Barcode House, in reference to the rhythmic structural steel rods that support the all-glass expansion designed by renowned architect David Jameson, FAIA.

BY LAURA DURAN

A free-standing, 600-square-foot glass tower now opens up the rear of the home and connects it visually and experientially to a charming and intimate alleyway. From the outside looking in, one might assume that this transparent structure could leave its occupants feeling exposed. But living on the inside and looking out, the owners, in fact, feel a comforting awareness of, and connection to, the surrounding light, weather, seasonal changes and neighborhood.

"We feel completely comfortable here," says owner Tony Anderson on behalf of himself and co-owner Willie Agosto. "We love the space and openness, which gives a sense of floating in air. We're able to observe the most subtle changes in nature, whether we're watching it snow or observing the budding spring leaves and their varying shades of green. "Every single day," he says, "we really appreciate living here."

The collaboration

When Tony and Willie hired Jameson to design their expansion, they had already established trust in his creativity and process as a result of working with him on a prior project. "We love David. He is a cross between purely artistic and purely functional, and, while we might push back on some things or need to understand some of his choices, our trust in him allowed us to give him the freedom to really express his artistic sense."

When Jameson began the design for



The Barcode House

A modern masterpiece that transcends paradigms

this all-glass masterpiece, he knew he could count on Dan Foley's team at Lorton, Va.-based Foley Mechanical to bring a sophisticated mechanical solution to the table, one that would perform to uncompromising standards while integrating seamlessly with the design. In fact, Jameson removed the mechanical design job from the general contractor's control and assigned it to Foley so that he could be assured it would be well conceived from the start.

"We trust Dan's vision of how to approach mechanical systems, just as our clients trust our architectural vision," Jameson said. "The performance of the home, including how the mechanical elements work in concert with the entire building envelope, is of such critical importance to the success of the project that the process shouldn't be about a GC rooting out the least expensive bid for mechanical systems."

The project's challenges included the need for technology that could perform within the unique space and envelope and without intrusiveness, in a design where nearly every square

inch is visible, open living space. Mechanicals, after all, are not easy to revisit, explains Jameson.

"In construction projects, especially when the goal is to realize an inherently beautiful product, clients are typically not contemplating the boiler or cooling systems. They are interested in elements they can experience or touch. But when the project is completed, if you weren't careful, you can easily have a multi-million-dollar project in which the mechanical systems should have been done in a better way," he says. "You must approach it correctly from the start."

"At the most basic systems level," continues Jameson, "integrating a unique mechanical solution within the constraints of each project is what we're always looking for. With Dan Foley and his team, their versatility and knowledge allow them to bring a very specific response to each project."

Foley technician Slavko Nisevic agrees. "It's what we do; very rarely do we do anything repetitive," he says.

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“Every project is a unique challenge; for me, that’s what makes it fun. David is a brilliant architect who really knows how to bring out the best in us for his projects. He values each and every one of our team and what we do.”

In addition to delivering the highest standard of work, Foley’s team is known for leveraging the individual specialties of every team member, not unlike a surgical team, according to Jameson. Each person on the team generally could perform every task, but they typically do what they are best at and most passionate about. And, working as a non-hierarchical team of experts, they support each other in those roles.

A job requiring intense planning and collaboration

While a typical construction project is forgiving in that you most likely have a basement, an attic or a crawl space, with the Barcode House all of the mechanicals had to be planned to an exacting level of detail.

“We began to collaborate on this project when it was just a concept on paper,” said Foley, noting that good communication and frequent in-person meetings were essential. “At times we were down to just a quarter-inch, figuring out what could fit where and laying it out in programs that show three dimensions, displayed on two 30-inch monitors that show all of the detail.”

“The complexities of our architecture require someone with the gift of being able to read drawings but, more importantly, to visualize the space,” said Jameson.

Aside from the space constraints, another extreme challenge was making the all-glass space consistently comfortable. The only way, of course, was radiant. “When you stand next to

a big piece of glass you feel chilly, because the mass pulls the heat off your body, even though the air temperature might be 70 degrees,” Foley said. “Cold 70’, as it were. You counteract that phenomenon by surrounding yourself with warm mass in the form of radiant heat.”

“You can be here in the dead of winter, and you don’t feel like you have to put a sweater on,” said owner Tony. “I can’t say enough about the floors. When your feet feel warm, you feel warm all over.”

Radiant also is a great fit because each level of the freestanding tower is made of poured concrete slab and structural steel, similar to a commercial building.

The well-chosen mechanicals

Taking a carefully thought-out approach to the mechanicals, Foley selected a Triangle Tube Prestige condensing boiler to serve the domestic hot water, the cast iron radiators in the old portion of the house and radiant heat in the expansion. At 96 percent efficiency, the Prestige replaces a 20-year-old atmospheric cast iron boiler that was perhaps 70 percent efficient. It provides ample output during peak demands, yet adjusts output during lower demands to minimize boiler cycling and maximize efficiency.

“We removed the old tank-style water heater and replaced it with a Triangle Tube Smart 50,” said Foley. The stainless steel indirect ties to the boiler to produce domestic hot water abundantly and quickly at the lowest possible cost.

Uponor was the radiant manufacturer of choice because of the quality and exceptional local support. “A good local rep will deliver what you need if something doesn’t go as



Grundfos variable speed pumps provide flow for the radiant zones and DHW tank. Cimberio press ball valves provide isolation for the hydronic components.

planned; that kind of support puts your mind at ease,” said Foley.

An Uponor electronic mixing control package was the go-to control. Like cruise control for your heating system, it has an outdoor sensor that modulates the supply water temperature to the floor based on the outdoor temperature.

Grundfos pumps were chosen for their versatility and reliability. SuperBrute 3-speed pumps power the DHW and radiator zones. The flexibility of 3-speeds, the ease of quick-connect wiring, and the built-in check valve make the SuperBrute the workhorse pump on Foley’s hydronic systems.

An ALPHA variable speed pump using super-efficient ECM technology was chosen for the three radiant zones. Set to AutoADAPT, the pump automatically adjusts to varying flow rates as the three zone valves open and close, while drawing a fraction of the energy of a PSC pump. This technology also eliminates the need for a differential pressure bypass valve that would typically be a requirement in this application.

“Cimberio ball valves were chosen because they’re built to a high standard of quality,” said Foley’s lead fitter Brian Golden. The heavy-duty aluminum handles are durable and with the double O-ring cimPRESS technology, “We’ve never had one leak,” Golden said. The ball valves are designed for direct connection to



Foley Mechanical technician Brian Golden did a masterful job fitting the Triangle Tube boiler and tank, Uponor manifolds and boiler piping in this tight mechanical closet.

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stainless steel pipe and hard drawn copper tubing using standard copper press tools. “We get better depth insertion of the copper,” said Golden. Cimberio balance valves allow the balancing of flow to individual zones and, with 10 full turns, they allow precise balancing.

A slim, high-efficiency Daikin VRV-S (variable refrigerant volume, single-phase system) AC unit was hoisted onto the roof of Barcode using a crane positioned in the alley. Three indoor, deftly positioned Daikin units connect to it, providing separate cooling zones for each level of the house. With dozens of different indoor unit options offered by Daikin for this system, Foley was able to create just the right unit configuration to meet the strict space constraints. One unit is mounted above the refrigerator. Another is concealed behind a cabinet with just a narrow linear diffuser as the only visible mechanical component. The third is ceiling-mounted in a small storage area in the basement.

The Daikin VRV-S uses inverter drive technology so that the

compressor motor varies to match the load, running at one speed when it's 100 degrees outside and another when it's 85. The inverter technology reduces start-up time and keeps temperatures closer to set point without the greater fluctuations of conventional systems. And it's ultra-quiet. “With all of these hard surfaces, it's very easy to have noises amplify or echo,” said Foley. “We didn't want this beautiful addition to go up and have the house sound like a jet engine spooling up.”

With the Daikin's ability to provide heat as well, the mechanical team had to be careful not to allow the two heating systems to fight each other. The Daikin will serve as a backup source for heat just in case it's ever needed.

A place that transcends paradigms

“Barcode is a unique place to live,” said Jameson. “In addition to the aesthetic beauty of the project, an uncompromising quality of comfort has to be provided.”

Jameson explains that there must

be a kind of neutralizing comfort to overcome the paradigm that glass and steel are cold materials. “The radiant heat envelops the occupants so they can transcend that glass-is-cold paradigm and enjoy the pure delight of the space.”

Pure delight it is. Born out of precise planning and a trust that allowed every part of the team to accomplish its goals, the comfort paradox was achieved to a supreme level. The result is a masterpiece that provides an uncompromisingly comfortable living experience. ●

Foley Mechanical, Inc., based in Lorton, Va., specializes in radiant, hydronics and steam systems as well as mechanical systems for large custom homes. For more information, visit www.FoleyMechanical.com.

David Jameson Architect is a seven-person design studio based in Washington, D.C. whose work is rooted in the distillation of an elemental architecture.

Laura Duran is president of Philadelphia-based Laura Duran & Associates LLC.

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