# 900 on Lee Elevates WV Capital

## Project
Huntington Bank - VRF

## Location
Charleston, WV

## Comparison Date
December 2021 - August 2022

## The Team

### Owner
AB Contracting

### Project Developer
AB Contracting

### HVAC Engineer
Thrasher Group

### HVAC Contractor
Darnold Mechanical

### HVAC Distributor
Ferguson Enterprises

*At 17 stories, at 900 Lee St. E is one of the tallest building in Charleston, WV*

With roughly 50,000 inhabitants, Charleston, WV is one of the smaller state capitals in the country. Yet it boasts no shortage of historic intrigue, culture, or recreational panache.

*AB Contracting is known for creating exceptional living spaces, as indicated by the comfort level and quality of finishes inside 900 on Lee.*

Charleston was home to the country's first public college, museum, playhouse and golf club. The city is completely surrounded by vast expanses of state forest, and acts as one of the western gates to the Appalachian Mountains.

In 2013, the Downtown Charleston Redevelopment Plan was approved to preserve the capital's history and increase its attractiveness as a modern urban center. As part of a broader comprehensive plan for the city, this provided a vision and dynamic framework to create a sustainable future.

Changes over the next decade included improvements to auto, bicycle and pedestrian access, preservation of historical assets, and development of individual districts. Today, as work draws to a close, the improvements in downtown Charleston have attracted an abundance of private investment.

One of the tallest buildings in the city, at 900 Lee St. E, was originally the Charleston division of Huntington National Bank. AB Contracting Inc. acquired the 17-story building in April of 2021 and immediately began creating a modern, mixed use-space in the circa-1960 high-rise.

AB Contracting, founded by Allen Bell in 1989, is a 100-person construction and property management company in Point Pleasant, WV.

"'900 on Lee,' as we call it, is a departure from our usual business model, which typically includes buying bare land, building multi-family residences, and operating the properties," said AB Contracting's COO, Brian Wadsworth.

"The fact that this was an old commercial property being renovated into mostly residential space didn't impede Allen's vision at all," Wadsworth continued. "He's known for creating amazing spaces, and the fact that this would make a big impact on downtown Charleston only increased his desire to create something unique and to raise the bar for the city."

*Sheet metal worker Spencer Faber connects ductwork to a high-static air handler.*

That vision included new office space on the lower floors with apartments occupying all levels above.

A large void stood between the existing property and Bell's goal for it, however. Bridging it would require a to-the-studs remodel of the all-glass structure, including new elevators, HVAC, plumbing, electrical, fire suppression, etc.

## Three decades of networking

After more than 30 years in the commercial construction market in WV and OH, Bell has forged the connections to complete substantial renovations in grand style.

*(left to right) Spencer Faber, Noah Darnold, Brian Wadsworth, Billy Brinck and Scott Darnold.*

Architects and engineers at Thrasher Group redesigned the structure to serve its new purpose, as well as create plans for all MEP components.

"We were awarded the project based on our existing relationship with AB Contracting, and the fact that we have both Architectural and MEP staff in house," said Thrasher Group's Ken Smith, PE, whose main focus was design of the new HVAC system.

"The challenge on this project was converting old commercial space into modern, high-end apartments while converting the HVAC systems from a centralized system to something that could accommodate half a dozen zones per floor," he continued. "Ultimately, a VRF system was specified for this reason, but other possibilities had been considered."

The question of where the plumbing, mechanical and electrical components would be sourced – and who would install them – was answered early in the design phase when Billy Brinck, at Ferguson Enterprises, called on AB Contracting.

"We're longtime customers of Ferguson and they've always been a great partner," said Wadsworth. "Brinck mentioned discussing the project with Darnold Mechanical. The owner, Scott Darnold, has a phenomenal reputation and the capacity to do great work on this scale."

Darnold's son and son-in-law, Noah Darnold and Spencer Faber, are the fourth generation in the mechanical trade. The family has served WV, KY and OH since immediately after World War II, and now employs more than 30 people.

After jumping into the project a quarter of the way through the design process, Darnold submitted and won the bid for HVAC, all dryer exhaust installation, construction of fan risers, and more.

## Basis of design

900 on Lee was originally served by a centralized boiler/chiller system, and when AB Contracting first purchased the building, there was no immediate decision as to whether the system would be rehabilitated or replaced. The need for individual control in the new apartments weighed heavily when selecting a basis of design.

AB Contracting already had a new boiler/chiller design when Brinck suggested the possibility of using VRF systems. He brought Nathan Howell, Ferguson Eastern Region VRF Division Business Development Manager, and Richard Glatt, Fujitsu Sales Engineer, into the conversation. Together they conducted a feasibility analysis. Howell also assisted Thrasher Group with system selection, layout and application considerations during the design, which won out over a second VRF package submitted by a different design team.

"We decided on a VRF system because of its energy efficiency and the simplicity of creating many zones per floor across the 14 residential stories," said Wadsworth. "Fujitsu's Airstage line was selected due to their competitive package and the fantastic support we'd already received from Billy Brinck and Nathan Howell."

## Shifting loads

The tall, narrow building's entirely-glass façade meant wildly shifting solar loads and significant heat loss during the winter. As a result, most of the VRF equipment specified were heat recovery units, providing the ability to reclaim energy where heat is being rejected and sharing it with zones simultaneously calling for heat. This provides an obvious advantage in a facility with 360-degree glass exposure.

*Billy Brinck opens the access panels where all the VRF condensing units where lifted to the upper roof deck. Crane lifting would have been difficult, so Darnold elected to rig them through the access panel.*

"We'll be applying for state and federal historic tax credits for the work on this property," said Wadsworth. "This prohibits us from tinting the windows to reduce solar gain. As a result, the heat recovery component of the system is critical."

Thrasher Group's design included 278 tons of heat recovery capacity, with an additional 80 tons of heat pump capacity. The latter was used almost exclusively throughout common areas in the lower commercial floors, which are already leased by WesBanco.

## Training and installation

Before installation began, Darnold Mechanical staff attended Airstage training webinars with Fujitsu's commercial trainer, Juan Perez. Alan Dukes, at Ferguson, also helped with training as the company received its Fujitsu certification.

*High-static air handlers were installed in larger apartments, the downstairs atrium, and office areas.*

"We've installed VRF equipment from a number of manufacturers, and each brand has a few unique requirements," said Darnold. "With the training we attended, the installation went very well."

"Ken Smith and Nathan Howell were diligent in selecting appropriate locations for the condensers," continued Darnold. "This ensured that we avoided potential oil traps as we ran pipe and installed branch boxes."

The building's floorplan is served by a variety of terminal unit types. Slim duct air handlers were installed in corridors and smaller apartments, while a combination of medium- and high-static units were installed in larger apartments. High-static ducted air handlers were also used exclusively in the atrium, offices and basement.

*Spencer Faber installs Fujitsu's ARUH high-static air handler.*

"Physical constraints were big drivers of design," said Smith. "Vertical separation was the primary constraint, and we cleared this hurdle by splitting the 42 condensers between two farms; one on the main roof, and one on the fourth story mezzanine roof between the parking deck and main building.

It was preferable to avoid installing the condensers directly on the roof proper, as it was too high and exposed. Instead, the rooftop well that once contained the original cooling towers was repurposed for condensers. The space is sheltered on three sides with screens on the fourth."

"The system includes 21 refrigerant circuits in all," said Howell. "We try to optimize around 20-ton systems because they provide the most value for tonnage. The smallest system here is 12 tons."

*The larger of the two condenser farms is located in the rooftop well that once housed the building's cooling towers.*

John Grose, superintendent at Darnold Mechanical, ran the installation. Spencer Faber oversaw piping, and Noah Darnold was called off another VRF project to help spencer as needed.

## IAQ and commissioning

After the installation began, AB Contracting made an additional request for an IAQ package. To meet the need, a CaptiveAire 100 percent DOAS makeup air unit was installed for the commercial floors. Separate ductwork ties to the returns on each VRF head.

*All apartments are provided individual zoning provided by Fujitsu controls*

With assistance from Ferguson's VRF Division, Darnold Mechanical installed and commissioned the systems between December, 2021 and August, 2022. Data captured during commissioning was sent to Fujitsu for review.

Fujitsu's System Controller is also being used to remotely monitor the entire VRF system and ensure quality control and conformance to manufacturer's standards.

*Darnold Mechanical's Spencer Faber inspects the disconnect on an Airstage condenser during commissioning.*

The entire renovation process, including HVAC installation, proceeded so well that the timeline was moved forward a month. Residential tenants began occupying apartments in August. WesBanco took possession of the commercial space on August first, and was operational in early September.

"The project progressed very well," said Darnold. "The equipment itself has been great. I believe these condensers are the quietest we've ever installed, but beyond that, the whole team; AB Contracting, Fujitsu, Ferguson and Thrasher Group, has been outstanding. It's an overwhelming success and a win for Charleston."

## Tax Credits

"A year from concept to start-up is amazing on a renovation of this scale," said Wadsworth. "Everyone worked together seamlessly, navigated supply chain issues, and really brought this design to fruition. Absolutely the icing on the cake are the historical tax incentives that will make the whole project feasible."

*(Left to right) Spencer Faber, Noah Darnold and Scott Darnold review plans with Billy Brinck.*

The applicable tax credits, which include 20 percent Federal and 25 percent State tax credit, would cover everything but interior finishes. AB Contracting's applications are pending approval. Meanwhile, they're looking into the availability of energy incentives that may apply to the new HVAC system.

"I'm very impressed with everything here," said Wadsworth. "We have year-old renderings that people confuse for actual photos when comparing them to the interior spaces. The spaces are so well controlled. The systems were commissioned on some of the hottest days of the year and proved themselves immediately."

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