



Hydronic Systems
Case Study Library



The Science of Comfort™

Project: Ogden High School

Location: Ogden, Utah

Project Cost: \$48,823,000

Square Footage: 8,000 ft²

Architect: EDA Architects Inc.

Mechanical Engineer: Colvin Engineering Associates, Inc.

Price Representative: Midgley-Huber, Inc.

The Challenge: Built in 1936, Ogden High School relied on noisy unit ventilators for cooling. The project mandated that the art deco façade of the building be maintained, meaning that the renovations required to lower ceilings and allow ductwork would not be possible. The temperature extremes in Salt Lake City also meant that comfort would be a significant concern. With spaces like the Commons Area accommodating 600-800 people at one time, the design team wanted to ensure that the students would not be hot or uncomfortable, and that the HVAC system could adapt to large variations in occupant load.

The Solution: Price Active Beams were able to meet the comfort requirements of the space without disrupting the aesthetic of the building. The piping requirements were easily incorporated into the existing structure of the school, eliminating the need for extensive renovation. After the beams were installed, the occupants reported that they loved how quiet the system was and were impressed with the high level of thermal comfort and the virtual elimination of cold drafts. In the Commons Area, the beams were attractively integrated into the 16-foot high cloud ceiling. The system has also proven to be extremely low maintenance, which was an important consideration for the school custodians.



Project: Gensler Los Angeles Office



Location: Los Angeles, CA

Square Footage: 45,000 ft²

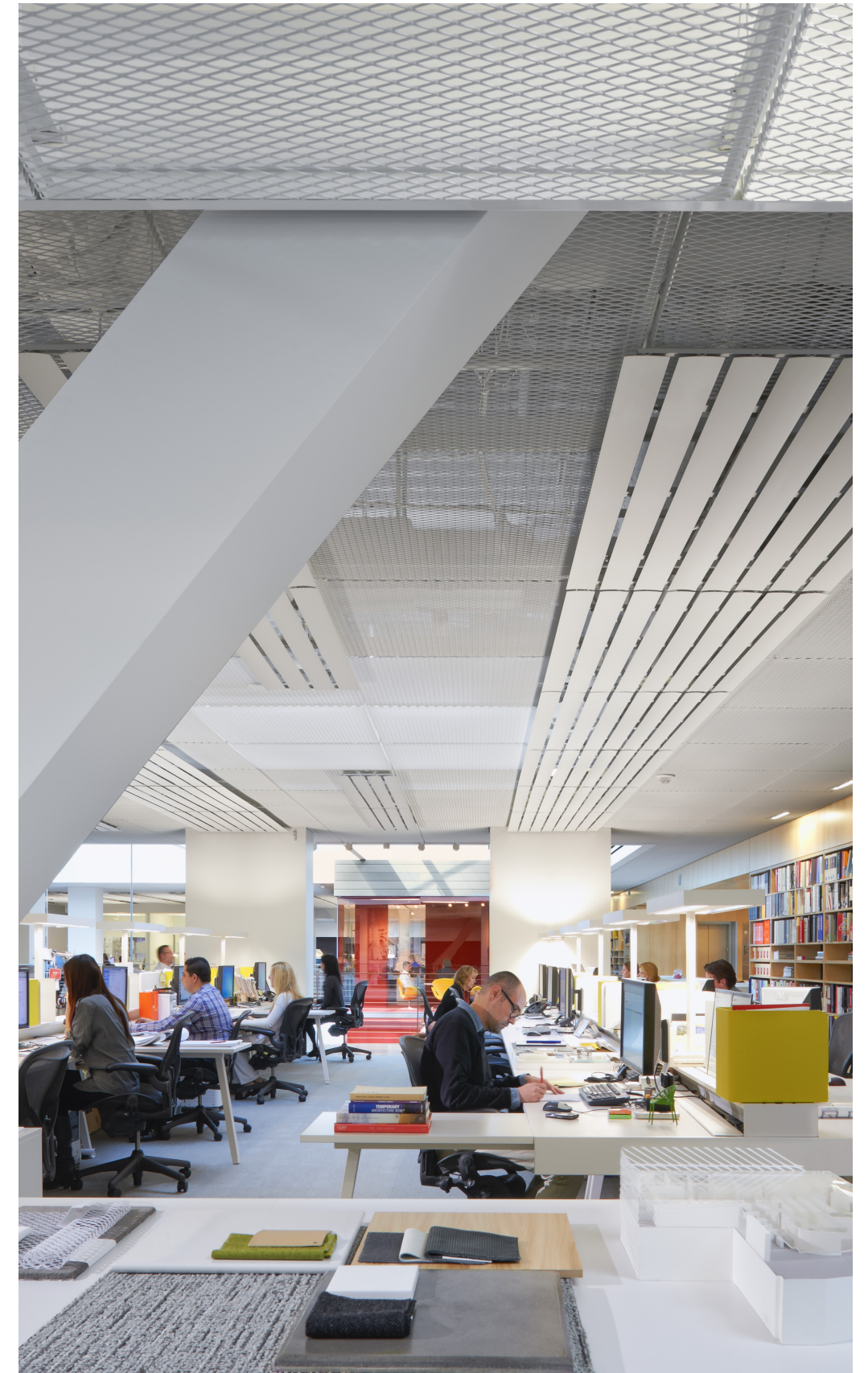
Architect: Gensler

Mechanical Engineer: Glumac

Price Representative: Norman S. Wright /
Airelink Mechanical

The Challenge: When Gensler, one of the world's leading architecture firms, designed their new Los Angeles office, visual elegance was of the utmost importance. However, the air distribution solution also needed to be functional, providing a comfortable space that would promote creative thinking and cutting-edge design. The conference room was going to be used as a video conference area, which put strict noise requirements on the mechanical system. Energy efficiency was also a goal, with Gensler hoping to reduce energy consumption below California Title 24 standards.

The Solution: The employees at Gensler's L.A. Office spend their careers creating beautiful spaces for people to work and live in, and require a workspace that will be conducive to creativity and collaboration. In the open office area, Price Chilled Sails were used to create a space that would allow free expression of ideas, balancing comfort and energy efficiency through sustainable design. Round floor displacement diffusers were used to supply the space with clean, fresh air, while also minimizing energy use. In the conference room, active beams with slimline coupling were integral in providing a continuous, pleasing look. The beams also fulfilled the room's tight acoustical requirements, eliminating the need for an oversized mechanical system. Together, these solutions help Gensler's L.A. office to serve as a model workplace of the future, providing inspiration to those who inspire us.



Project: Fraunhofer CSE Building Technology Showcase

Green Project Award of Merit, 2013 -
Engineering News-Record New England

Location: **Boston, MA**

Square Footage: **50,000 ft²**

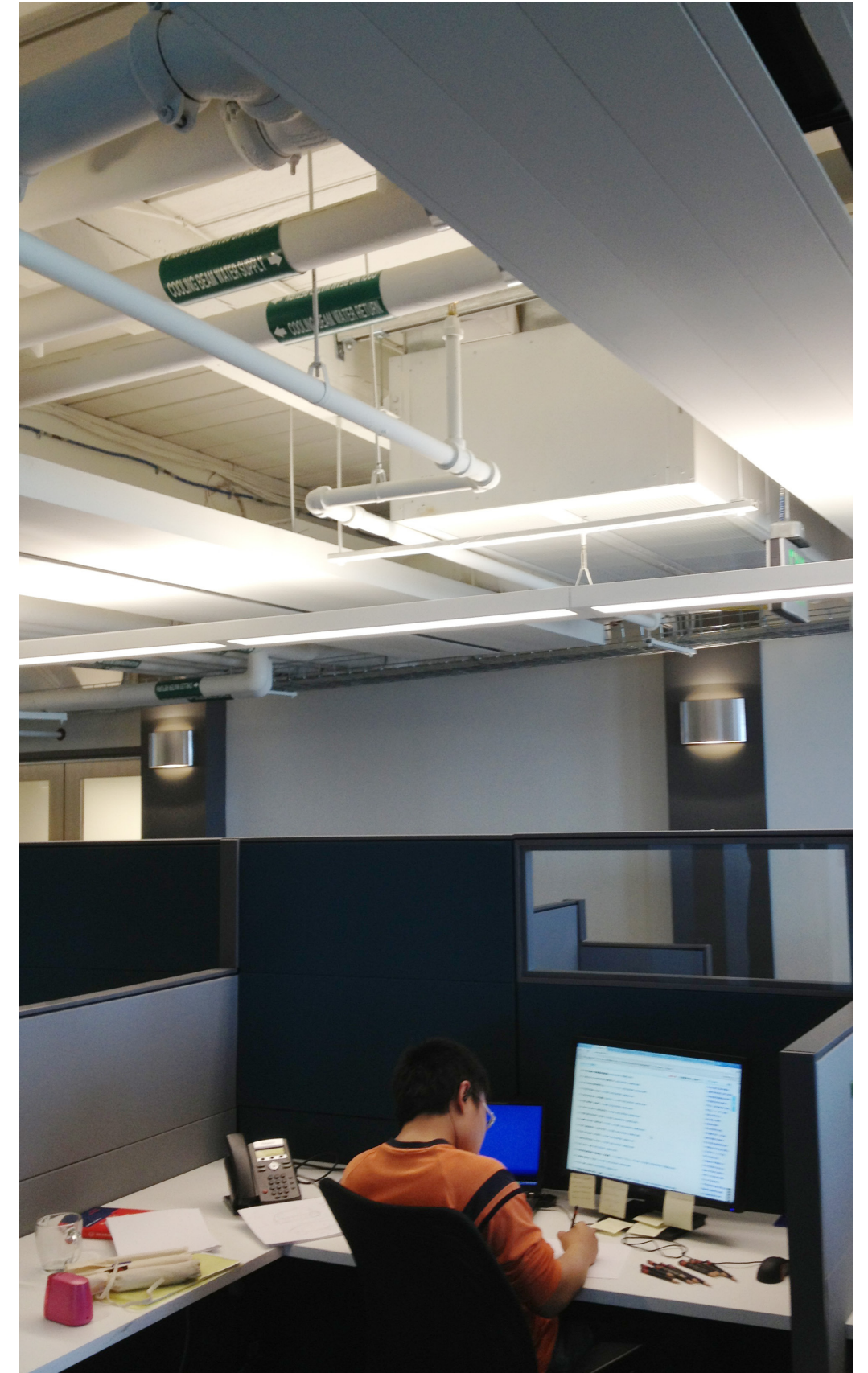
Architect: **DiMella Shaffer**

Engineer: **BR+A Consulting Engineers**

Price Representative: **Buckley Associates, Inc.**

The Challenge: The vision for Fraunhofer CSE's Building Technology Showcase (BTS) was straightforward, but difficult to achieve – push the boundaries of building performance by incorporating sustainable, cutting-edge design concepts. To make matters more complicated, the headquarters was being built in a retrofitted facility that was nearly a century old, forcing the design team to work within the infrastructure of the existing building.

The Solution: The BTS relies on over 20 different Price products to achieve substantial energy savings throughout the facility. In the first floor lobby, chilled sails are used in conjunction with a displacement ventilation system. The second floor houses the wet chemistry laboratory, where Price supplied venturi valves, air dampers, single duct terminals, and radial flow diffusers. One of the most interesting applications can be found on the sixth floor, where Price Natural Ventilation is used in combination with a radiant ceiling. This space is used to evaluate occupant comfort and indoor conditions during various periods of the year. Price is working with Fraunhofer on other research initiatives as well, including sustainable energy analysis and real time data logging. These substantial contributions have helped the BTS become the home of Fraunhofer CSE's research & development operations in Massachusetts.



Project: 130 Bishop Allen Drive

Location: Cambridge, MA

MEP/FP: SMMA

Architects: HMFH Architects Inc.,
Ruhl Walker Architects,
Anderson Porter Design

Price Representative: Buckley Associates, Inc.

The Challenge: The retrofit of this facility's structure and mechanical equipment was initiated to facilitate the development of a multi-tenant commercial space. The low ceiling heights presented a significant challenge and required a creative solution that minimized ductwork.

The goal was to keep the design as flexible as possible for the widest range of appeal to prospective tenants, while ensuring energy efficiency, occupant comfort and air quality were uncompromised.

The Solution: The collaboration between Price, the engineer and the architect was significant to ensure a custom solution that would meet not only the performance requirements of the space but also high aesthetic standards. This was particularly important on the fourth floor, where HMFH Architects were designing their own corporate space. Price active beams, passive beams and chilled sails were integrated throughout this retrofitted building to achieve both goals.

HMFH Architects, the fourth floor tenants, integrated beams into a drop ceiling in their lobby and hallways, using slimline coupling to create the visually pleasing appearance of one continuous beam. In their office space, beams were suspended from the slab and integrated into a special drywall ceiling along the perimeter of the building. Both active and passive beams were used to meet the load requirements of the space and were developed with a matching face, so that from the outside they appear identical for visual consistency.

On the fifth floor, Anderson Porter Design used suspended beams in exposed ceilings to maximize the feeling of space within Workbar's open office plan.

The third floor, designed by Ruhl Walker Architects, was last to be completed and reflects a similar solution and layout to the fourth floor, where the office space is similarly open concept.



Photos courtesy of Ed Wonek © 2014

Project: Upper Iowa University Liberal Arts Building



Location: **Fayette, Iowa**

Project Cost: **\$8.6 million**

Square Footage: **34,000 ft²**

Architect: **Meyer Scherer & Rockcastle**

Mechanical Engineer: **Karges-Falconbridge, Inc.**

Price Representative: **TMS Johnson Inc.**

The Challenge: The core objectives for the Liberal Arts Building's HVAC system were not unlike those another institution might deem important – deliver a solution that would reduce operating costs, provide maximum comfort for students, and afford future flexibility as the space evolves. Demonstrating leadership through forward thinking and sustainable building design was another key goal for the team, with LEED Silver certification being targeted from the outset. Extremely close collaboration at all stages of design and construction would be essential.

The Solution: The UIU team challenged conventional performance expectations by selecting a cutting-edge hybrid HVAC system that incorporates both underfloor air distribution and chilled sails – one of the first designs of its kind. This unique system helped the Liberal Arts Building achieve its LEED Silver target, and received further recognition when Alliant Energy of Iowa offered the university a six-figure rebate based on the energy efficiency of the facility. Ultimately, the building was found to be 67% more efficient than a conventionally designed “baseline” building, and is projected to recoup its initial investment in energy saving systems within three and a half years through reduced operating expenses.



Project: Memorial Hospital & Health Care Center

Patient Safety Excellence and Outstanding Patient Experience Awards, 2012 - HealthGrades

Location: Jasper, IN

Square Footage: 5,600 ft² (Pharmacy, 2009);
36,000 ft² (Patient Wings, 2012)

Architect & Engineer: BSA LifeStructures

Price Representative: R.L. Craig Company, Inc.
& Colby Equipment

The Challenge: Price Active Beams were selected for the Pharmacy renovation in 2009, and the immense success of these beams in meeting the design team's goals led to their inclusion in the Patient Wing renovation in 2012.

There were several shared goals of both renovations: improving energy efficiency (and subsequently reducing operating costs), working with restricted interstitial space, and controlling humidity. Occupant safety was prioritized in different ways: the pharmacy renovation needed to account for the regulatory requirements of a compounding pharmacy, and geriatric psychiatry patient wing required a secure diffuser solution to restrict potential occupant ductwork access.

The Solution: Price Active Beams were selected for the pharmacy and subsequently the patient wings for their energy efficient performance (via reduced air handler requirements), space savings and the high standard of occupant comfort and air quality they provide. Humidity control was easily addressed through the primary air handler, and moisture sensors were incorporated into the active beams for additional safety.

Installing beams in the patient rooms allowed the engineers to use 100% outside air. By combining the active chilled beams with a Dedicated Outdoor Air System (DOAS), the design team reduced the volume of primary air supplied to the space by 30-60% when compared to a conventional overhead mixed air system, resulting in both significant operating cost savings and a great reduction of the risk of airborne infection.

The security needs of the second-floor patient wing were addressed by applying the same perforated face used for Price's maximum security grilles to the beams.



Project: Bournedale Elementary School

Location: Bourne, MA

MEP Construction Cost: \$3.7 Million

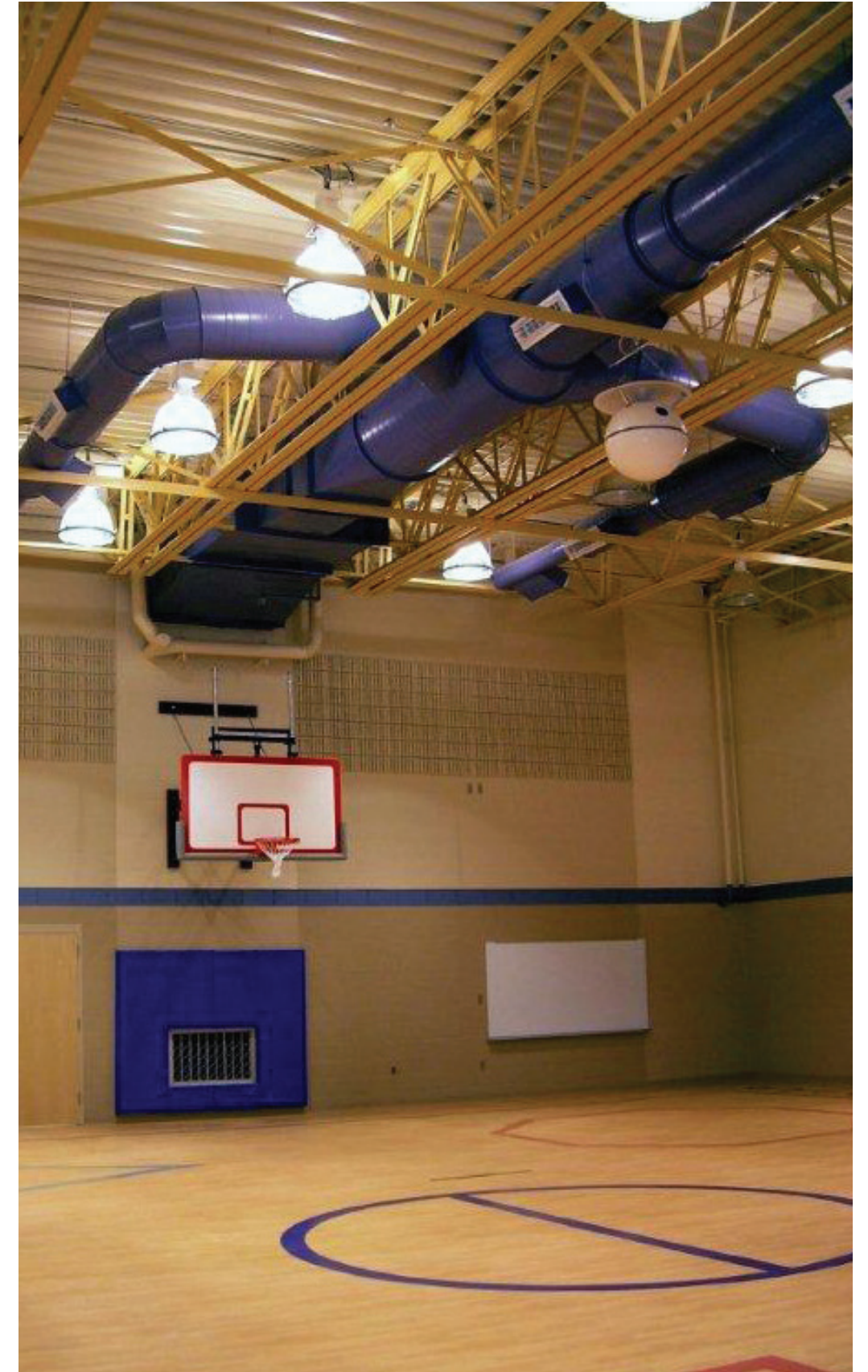
Square Footage: 68,200 ft²

Engineer: Garcia Galuska DeSousa Consulting Engineers

Price Representative: Buckley Associates

The Challenge: Comfort, energy efficiency, and a high level of indoor air quality were the primary goals of the Bournedale Elementary design team. The HVAC system also had to address the high humidity that is typical in ocean boundary communities, as well as the owners' desire for air-conditioning. Maintaining simplicity in maintenance and control, as well as the conservative noise levels recommended by the American National Standards Institute (ANSI), presented additional challenges. Finally, all of these concerns needed to be addressed at or below the cost of traditional system design.

The Solution: The design team selected to employ both Price Active Beams and Displacement Ventilation to meet their goals. Displacement diffusers were integrated seamlessly into the classroom cabinetry at Bournedale, providing comfortable cooling and improved indoor air quality at noise levels under 25 dBA. Price also conducted a classroom mock-up so the design team could witness displacement ventilation under typical conditions experienced at Bournedale Elementary. The team was also able to familiarize themselves with the features and performance of the active chilled beams that were selected for the design. The final construction cost of the HVAC system was \$23.60/ft², almost a 27% reduction compared to conventional mechanical system design.



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