



AIRSIDE / APPLIED / CONTROLS / SERVICE / SPECIAL SOLUTION / TOTAL SYSTEM / UNITARY

Case Study – Bentley College

EDUCATION / HEALTH CARE / LODGING / MANUFACTURING / OFFICE BUILDING / RETAIL / SPECIAL



Upgrades to Business School Yields Energy Savings, Rebates and Improved Bottom Line.

Project Objectives

Bentley College — located in Waltham, MA — had significant economic, comfort and IAQ concerns as the result of old, unreliable and deteriorating HVAC equipment in buildings throughout the campus. With several small inefficient boiler and chiller plants, much of the air handling equipment three to four decades old, and a library heated 100% by electricity, comfort complaints were becoming all too common. To correct the situation, they selected Carrier to meet their strategic goals, which included a reduction in operating costs, more precise equipment and system control for improved comfort.

Solution

To meet Bentley's efficiency and comfort requirements, Carrier's solution included new chillers and a chiller plant, a condensing central boiler plant, Air Handling Units with Variable Speed Drives, cooling towers, VAV boxes and Carrier Comfort Network (CNN) controls. Since the project would impact multiple buildings throughout the campus, Carrier's solution was executed in three phases during vacation breaks for minimal disruption. With the combined efficiencies of Carrier's equipment and controls, Bentley's student center, administration and faculty offices, library and classrooms are enjoying energy savings in addition to increased comfort and control.



Case Study – Bentley College continued



“Carrier came to the campus, faced the challenge and was able to meet the deadlines. The project is now complete and we had minimal interruption. The project team did a very good job in delivering this multi-phased project.”

John Shenette,
executive director of
facilities management,
Bentley College

Project Synopsis

Originally founded in 1917 as a school of accounting and finance, Bentley College has evolved as one of the nation’s leading business universities. But while it has been earning accolades for integrating advanced information technologies into its business curriculum, many of its buildings were suffering from outdated and inefficient HVAC equipment. This condition was having an increasingly negative effect on the comfort of students, faculty and staff as well as the school’s bottom line. Following a thorough energy and equipment audit of the school’s facilities, it was determined that the project would concentrate on several of Bentley’s upper campus buildings and be executed in three phases to accommodate the curriculum calendar and to have a minimal disruptive effect on classes and campus life.

Phase I involved the 103,000 sq. ft. LaCava Student Center complex, which contained three separate cooling systems operating completely independent of each other with two of the systems having reached the end of their life expectancy. Carrier removed LaCava II and III’s chillers and installed a 185-ton 30HXC Screw Chiller. The isolated loop systems were re-piped to provide for a primary/secondary loop chilled water pumping system and all pumps and valves were replaced. Significant utility savings were the result of two new AHUs with Variable Speed Drives (VSD) and the removal of existing electric heating coils in three AHUs replacing them with hot water coils. CCN controls were installed to control the chiller plant and air handlers with CO₂ sensors installed in the return air ducts of each air handler for IAQ override.

In Phase II, a 270-ton variable speed 19XRV chiller was installed in Morison Hall and acts as a central cooling plant for it and Baker Library. A plate and frame heat exchanger allows for “free cooling” during cooler weather. Additionally, two VSDs for the secondary chilled water pumps were installed. Carrier provided a Direct Digital Control (DDC) system to control the chiller plant and associated pumps. A new, energy efficient central hot water plant now serves Baker Library, Morison Hall, and Jennison Hall. The central plant consists of four high-efficiency condensing boilers and two new secondary water pumps with VSDs. For more efficient heating, hot water piping was run from Baker Library to Jennison. Two new pumps with VSDs were installed to circulate the hot water into the Jennison system.

During Phase III of the Bentley project, the Rauch Administration Center was connected to the chilled water loop via underground chilled water piping and internal chilled water piping in Jennison Hall, which lowered the operating costs of cooling this building. In Jennison Hall, Carrier installed an HVAC system consisting of 70 VAV boxes, five AHUs, two VSDs per AHU and all associated controls. The VAV boxes and AHUs are linked together and communicate with each other to ensure maximum system operation. This system incorporates approximately 600 control points to ensure maximum comfort and minimum operating costs.

Project Summary

Location: Waltham, MA

Project Type: Retrofit

Building Type/Size: Brick, 3 stories, LaCava 103,000 sq. feet., Morison 68,156 sq. ft., Baker about 60,000 sq. ft.

Building Usage: College classrooms, faculty offices, administrative offices, student center

Objectives: Replace aging HVAC equipment, reduce energy costs

Major Decision Drivers: No downtime, little disruption to campus

Design Considerations: Little disruption to campus, better control of equipment

Total Cooling (tons): 455 tons cooling, 8 million BTUs heating

HVAC Equipment: Model 19XRV chiller w/ VSD and R134a refrigerant, pumps, CCN controls, three (3) cooling towers, four (4) high-efficiency condensing boilers, CCN controls w/ ComfortVIEW, Air Handler Units, VAV boxes

Unique Features: Underground piping to centralize cooling and heating plants

Project Cost Range: \$1 to \$5 million

Installation Date: October 2001 to April 2004

For more information, contact your nearest Carrier Representative, call 1.800.CARRIER or visit our web site at www.commercialhvacservic.carrier.com