

# art,

## AN INTIMATE FRIEND



» Bowdoin College Preserves Its Art Collection and a Historic Building

## Bowdoin College

in Brunswick, Maine, has a long history of dedication to the arts and environment. The "Offer of the College," written in 1885, begins, "To be at home in all lands and all ages; to count Nature a familiar acquaintance and Art an intimate friend." • The college always has endeavored to preserve and present its impressive collection of European and American art. The Bowdoin College Museum of Art was commissioned in 1891 to serve this purpose. The Renaissance-revival building was designed by McKim, Mead and White, a well-respected East-coast firm of the late 19th and early 20th centuries whose other designs include the West and East Wings of the White House in Washington, D.C. •



The building's exterior has changed little since its dedication in 1894. It has become a fixture at the college and a landmark historic building in the state of Maine. A few interior and HVAC renovations have been made during the years, but outdated environmental control systems and a shortage of usable storage and exhibit space in the museum were making it increasingly difficult for the college to care for its artistic treasures. The college needed to find a way to meet the modern needs of its art collection while maintaining respect for the history of this classic structure.



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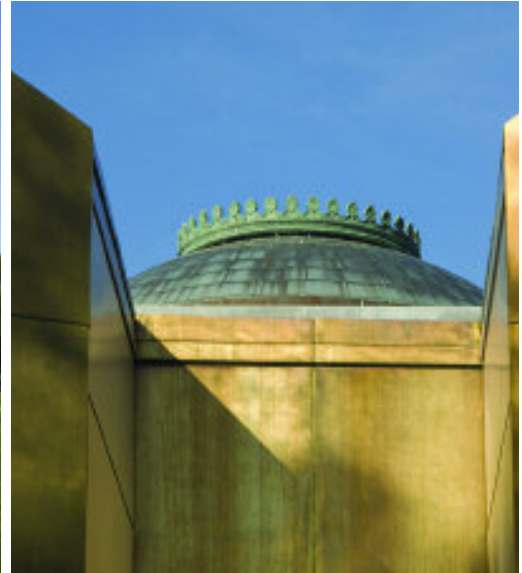
#### **A DELICATE REHAB**

The college turned to Boston architecture firm Machado and Silvetti Associates and Portland, Maine-based Consigli Construction Co. Inc., a general contractor well known for its historic restoration work. Early project goals were to upgrade temperature and humidity controls, create universal access, and add new galleries and enhanced teaching spaces.



CLERESTORY WINDOWS IN THE BELOW-GRADE AREAS ENSURE THAT EVEN THE SUBTERRANEAN GALLERIES RECEIVE SOME DAYLIGHT.





THE GEOTHERMAL SYSTEM CONSISTS OF FOUR, 1,500-FOOT- (452-M-) DEEP STANDING-COLUMN WELLS MATED TO 14, 10-TON (9.1-METRIC TON) HEAT PUMPS. THIS PROVIDES ALL THE COOLING FOR THE BUILDING, AS WELL AS THE REHEAT FOR HUMIDIFICATION.

"They've got an incredible collection and it's not very well known because they didn't have the facilities to properly store or display the artwork," says Nick Collins, project manager for Consigli Construction. "A large part of the collection was at other institutions, in museum storage facilities, or huddled in a small area of the building that had the best control over temperature and humidity."

Achieving the proper environmental parameters for the preservation of the college's art collection was a key component to the renovation project. The goal was to maintain an internal atmosphere of 70 F (21 C) with 50 percent humidity and a plus- or minus-5 percent variation in either direction for temperature and humidity. That was easier said than done in an

uninsulated brick building that has battled harsh Maine winters for more than a century.

"It was quite a challenge to shoehorn a modern, high-flow, low-velocity HVAC system into a building that was built in the late 1800s," Collins explains. "This was a building that, as far as the interior fit-out went, was well beyond its useful life. On the inside it was a dark, dank building."

As the scope of the project came into full focus, the design team found itself faced with a complete gut rehab and expansion that required attention to energy efficiency and all the delicacy involved with historic preservation. This complex set of challenges inspired innovation on a number of fronts.

#### DOWN AND OUT

Because the building is a state landmark, no real changes could be made to the façade and any addition would have to carefully complement the existing structure without upstaging it. "We could not tamper with the exterior of the original building. That was an absolute no-no," Collins says. "We were, however, able to put an addition on the back."

Anything that would connect to the main building would have to be very sensitive in its design. "We worked closely with Bowdoin College and the Maine Historic Preservation Commission [Augusta] to come up with an appropriate response for the rear addition," says Conrad Ello, formerly a senior associate at Machado and Silvetti Associates, now principal





An updated entrance was added to embrace a modern sensibility.



of Oudens Ello Architecture in Boston. "It's a very deferential response to the historic building. It has the same brick patterning, but the details are pared down so there's a distinction between the old and new."

An updated entrance was added to embrace a modern sensibility. "The entrance pavilion is connected underground and physically separated above grade," Ello explains. "It is a 21st-century structure made out of glass and bronze. It's dramatic but small enough to be respectful to the main building. Pairing the new entrance pavilion with the historic building is reflective of the two-sided nature of the collection, which is modern and historic."

While the exterior of the building was off limits, the interior was another story entirely. "We completely gutted the interior. If it didn't hold up the building, we took it out," Collins recalls. "And because much of the museum is below grade, we were able to expand the square footage of the building by adding a large, below-grade expansion to the north."

This was a clever, if challenging, solution to the museum's space problems.

By increasing the square footage of the basement, green space on the grounds above could be preserved and the view of the original building from the campus quad could remain virtually untouched. However, the original basement ceilings were only about 8-feet (2.4-m) high. The foundation had to be lowered 4 feet (1.2 m) to provide greater overhead space.

Months of painstaking digging and careful monitoring were required as the old building settled onto its new foundation. Workers underpinned the structure and excavated beneath the building's rubble foundation. The voids were filled with reinforced concrete to ensure the original stone and granite foundation would remain stable. This massive technical undertaking transformed a cramped basement space into an airy, open gallery accessible from the new entrance pavilion.

"Visitors walk into the cubed glass entry and go directly downstairs," Collins explains. "The above-grade footprint is small, but there is a lot of gallery space downstairs. We were able to almost double the square footage of the building while having a minimal increase to the above-grade footprint."

### THE AIR IN THERE

Having addressed the museum's space concerns, heating and cooling once again took center stage. While meeting the environmental needs of the art collection was a primary goal, energy efficiency also was important to the design team. "Bowdoin College has made a commitment to sustainable design and building," Collins says. "The college has developed its own sustainability program and requirements. They've got a lot of really old buildings on campus, so they have different standards for new construction and existing buildings."

To deal with the building's temperature challenges, the team again looked under-ground. "We implemented a geothermal system, so there wouldn't be a lot of energy expended for cooling," Ello says. "It was tricky because we were working around exquisite historic galleries. It was difficult to get all the ductwork to run in a building of that stature."

The geothermal system consists of four, 1,500-foot- (452-m-) deep standing-column wells mated to 14, 10-ton (9.1-metric ton) heat pumps.





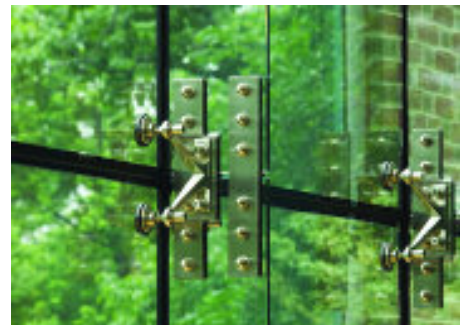
This provides all the cooling for the building, as well as the reheat for humidification. “We’re not burning any additional fossil fuels,” Collins adds. “We’ve got no CFC-based refrigerants or anything.”

Heating for the Bowdoin College Museum of Art has always come from Bowdoin College’s central steam plant and still does today. However, because of upgrades to the building envelope and air-distribution system, the museum draws less pounds of steam per hour than it did before the renovation, despite the near doubling of the building’s square footage.

The building envelope did present its own challenges. “Certainly with no insulation and the brick mass of the exterior walls serving as the only safeguard against outside temperatures, we wanted to create a tighter building,” Elio says. “Maine winters have cold, dry air and that is juxtaposed against the warmer, more humid air inside the wall. That also creates a lot of condensation. We wanted to tighten up the overall envelope and reduce the overall heating and cooling load on the building.”

To combat temperature and moisture issues, joints were carefully sealed and new interior walls created an airtight building within a building. “We furred the new plaster wall off the brick by about 6 inches (152 mm),” Collins explains. “We turned the cavity between the plaster and brick wall into a return-air plenum. The warm, conditioned air works its way down through the room and then is drawn under the plaster wall. It washes up the wall between the plaster and brick where it is drawn into the ductwork and returned to the air-handling unit.”

This negative-air-pressure cavity was developed collectively by Machado and Silvetti Associates



# Bowdoin College Museum of Art [ Brunswick, Maine ]



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Brunswick, Maine, [www.bowdoin.edu](http://www.bowdoin.edu)

[ ARCHITECT ] MACHADO AND SILVETTI ASSOCIATES,  
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[ GENERAL CONTRACTOR ] CONSIGLI CONSTRUCTION CO.  
INC., Portland, Maine, [www.consigli.com](http://www.consigli.com)

[ MECHANICAL ENGINEER ]  
ALTIERI SEBOR WIEBER LLC,  
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[ WATERPROOFING/EXTERIOR ENCLOSURE CONSULTANT ]  
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[ AIR-HANDLING UNITS ] York by  
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[ WINDOWS ] KAWNEER, Norcross, Ga.,  
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