Grossman Hall: Home of DavisConnects
Green Building Case Study

Grossman Hall, the new home of DavisConnects, re-opened in fall 2017. The former residence hall was reimagined into modern administrative space that invites the community to engage. Designed by Ann Beha Architects, Grossman joins a traditional brick structure to a new open, contemporary addition. This inviting, transparent ensemble houses a resource library and commons, interview and recruitment suites, counseling offices and classrooms for seminars and training. A gesture to the past and to the future, the sustainable design explores innovation and respects campus heritage. Grossman is a destination for students on campus with the goal to make post-graduate planning an integral part of life at the College.

Grossman is a symbol of the College's commitment to enhanced student support, quality facilities, and care for the environment. Many sustainable design features have been integrated into the building. The glass-walled addition has a south-facing orientation, maximizing the passive solar heat gain for the interior spaces in the winter, thus reducing heating needs. An exterior brise-soleil shading system manages solar heat gain and reduces cooling loads in the summer. In the addition, the curtain wall maximizes natural light while an automatic lighting control system reduces electrical consumption. The reuse of an existing building greatly reduced the overall carbon footprint of the project. The project anticipates LEED Gold certification.

SUSTAINABLE COLBY
CARBON NEUTRAL SINCE 2013

Sustainable Sites

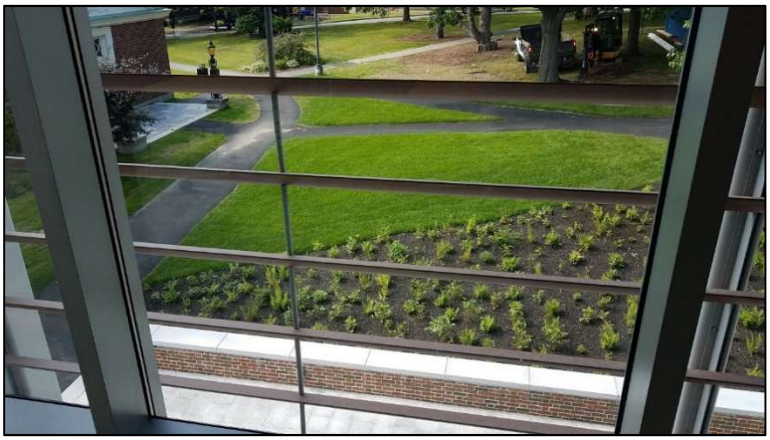
The Grossman Hall site and the Colby College campus are pedestrian friendly and within a ½ mile of 12 basic services. Close proximity to basic services makes it easier for students, faculty, and staff to walk or bike to town, rather than drive. In a commitment to open space, Colby has designated green space on campus that is twice the size of the building footprint and will be preserved for the life of the building.

The site design of the building incorporates a granite patio of highly reflective, locally quarried stone, which reduces the heat island impact of the project. The building will also provide 10% priority parking for Low Emissions and Fuel Efficient Vehicles.

Water Efficiency

The building utilizes high efficiency fixtures to reduce potable water consumption. Grossman Hall is equipped with low flush toilets and 1/8 gallon-per-flush urinals. The project achieves a 45.5% water use reduction though the use of the very high efficiency water fixtures.

Saving water on the exterior landscaping was also a priority for the project. Landscape plantings were selected based on their ability to thrive without permanent irrigation. The species installed are either native or "improved natives" (cultivated varieties of species native to Maine) which are known to thrive in the local climate with minimal attention. Through proper planning and research, the building's landscaping will not require any irrigation, saving thousands of gallons of potable water per year.



Energy and Atmosphere

The project achieved an overall energy cost savings of 43% with a 48% energy use savings compared to a baseline code-compliant building. These savings were achieved through a variety of sustainable design features and efficient technology.

Grossman is the first building at Colby to utilize a highly efficient variable refrigerant flow (VRF) system for heating and cooling. Refrigerant from four large heat pumps is modulated for distribution throughout the building according to the needs of individual spaces. Simultaneous heating and cooling capability allows heat that is normally rejected to be

redistributed within the building. The VRF system uses R-410A refrigerant, which does not contain harmful ozone depleting chemicals.

An energy recovery ventilation (ERV) system recovers sensible and latent heat from exhaust air streams to precondition the incoming fresh air. Energy recovery wheels inside the units rotate to transfer heat between the air streams. This adds approximately 65-80% recovered heat back to the incoming ventilation supply air. The system also uses variable speed drives to modulate fan speeds for maximum efficiency.

Domestic hot water for the building is provided by a hybrid heat pump hot water heater, which uses half as much electricity as a conventional hot water heater.

The lighting system pairs dimmable LED fixtures with occupancy and daylight sensors to adjust the lighting based on activity in the rooms and available sunlight. This creates a more comfortable indoor environment while reducing the lighting power density. The combination of LED fixtures with these lighting controls account for a 66% energy savings from typical lighting design.

The windows for the project were selected for their high solar heat gain coefficient and low U-factor. Solar heat gain coefficient (SHGC) is a measurement of the amount of solar radiation that can pass through a window. During Maine's cold winters, the high SHGC of the windows will allow for more heat from the sun to enter the building, thus lowering heating demand. Alternatively, the U-factor gauges a window's resistance to heat flow, so a lower U-Value means better insulating properties and less heat loss. An exterior brise-soleil shading system manages solar heat gain and reduces cooling loads in the summer. The design of the brise-soleil was optimized for overall energy efficiency, daylighting and peak cooling load performance.

The masonry walls of the existing building are insulated with 2 1/2 inches of spray foam insulation inside the original structure. In the new addition, the rain screen walls include 3 ½ inches of mineral wool insulation over 2 ½ inches of spray foam which will reduce thermal bridging which significantly impacts building envelope performance.

Colby has been carbon neutral since 2013 and installed a large photovoltaic solar array on campus in 2017. A portion of the power produced by the solar array will be allocated to Grossman Hall, bringing the total energy savings over 50%. For the balance of the electricity used in the building Colby has signed a Green Power Agreement to purchase Green-e Certified Wind Power for 2 years, totaling 360,000 kWh.

Materials and Resources

Grossman Hall incorporates many sustainable materials including those made with recycled content or extracted and manufactured in close proximity to Waterville. Custom-built recycling receptacles were provided to make recycling convenient for occupants and support increasing recycling rates on campus.

Construction waste was separated into dedicated dumpsters for wood, metal, concrete and other materials. This allowed 77% of the construction waste to be recycled, rather than sent to a landfill.

Maine is a state of forests, and supporting sustainable forestry was a goal of the project. For this reason a majority of the wood used in the project, including cabinetry, doors, and lumber, was grown and harvested from FSC certified forests.

Regional materials that were extracted and manufactured within 500 miles of the project site include: bricks and mortar, concrete, insulation, sheetrock, doors, granite caps and granite pavers. Selecting materials that originate near a project means lower delivery costs and less CO2 put into the atmosphere.

For this project, the structural steel, metal decking, reinforcing steel, copper flashing, curtain wall, sheetrock, carpet, and carpet tiles all contain recycled content. A significant effort was made to research, purchase, and document products with high recycled content. Using recycled materials minimizes the amount of raw materials that need to be extracted from the natural environment and the amount of chemicals that are created during the manufacturing process.

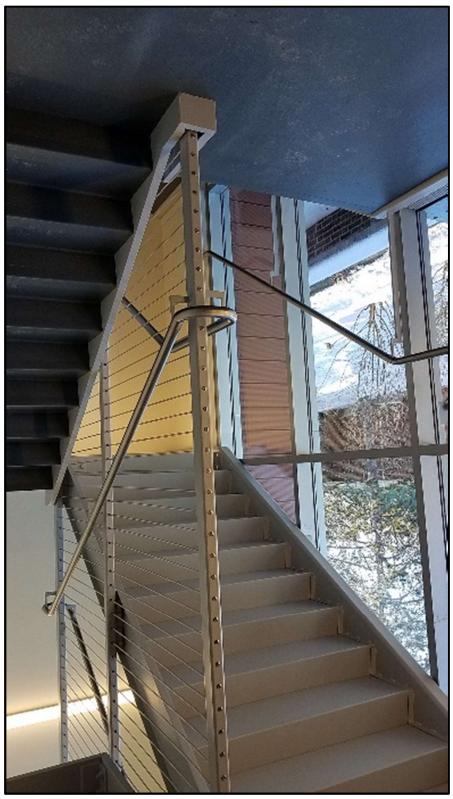
Indoor Environmental Quality

Grossman Hall has carbon dioxide monitoring with CO_2 sensors located in densely occupied spaces throughout the building. When CO_2 levels get too high, the building automation system alerts operations and maintenance staff. This allows operational issues to be addressed in a timely manner to ensure effective indoor air quality is provided in the building. To help maintain indoor air quality, smoking is prohibited on campus. Office windows are operable, providing occupants additional control of their indoor environment.

During construction, targeted practices protected ventilation systems from dust infiltration and avoided development of mildew or other moisture problems in stockpiled materials.

Special care was taken to select adhesives, sealants, paints, and carpeting that contain low or no volatile organic compounds (VOCs). Products with low or no VOCs are a much healthier choice when selecting materials for the indoor environment. VOCs are emitted as gases from materials and can cause both short and long-term health effects. Indoor VOC concentrations can be up 10 times higher than outdoor levels.

Innovation in Design



The campus has a Green Cleaning policy that requires the implementation of a high-performance cleaning program, including the purchase and use of sustainable cleaning products and materials. Cleaning products must meet Green Seal, Environmental Choice, or other LEED-accepted standards. This will reduce the exposure of building occupants and maintenance staff to potentially harmful chemicals and reduce the impact cleaning products have on the environment.

On the east side of the building, the main communicating stair was specifically designed to include large windows. Providing windows in the stairwell makes for a more inviting space, especially when compared to typical stairwells that can be dark and confining. The natural light makes the stairwell an attractive space, which encourages occupants to take the stair, reducing energy use from taking the elevator.