Troy Hall is a chemistry teaching and research laboratory. Buildings of this nature inherently have high energy use profiles. To reduce this profile the design team worked with the University in several ways. The team selected more efficient fume hoods than currently used at the University. In a typical lab building, outside air is conditioned only to be immediately exhausted due to laboratory equipment and fume hood air exchange requirements. A concerted design effort resulted in the transfer of air from other parts of the building to the labs to reduce the amount of outside air conditioned, drastically reducing energy use. A heat recovery coil was added to the exhaust air stream to extract energy for reuse elsewhere before loosing it to the environment; this resulted in heating, cooling and fan energy savings. To prevent conditioned air from escaping through the building envelope, spray foam insulation was used to provide a continuous air and vapor retarder on the 1.5 foot thick exterior brick walls. The uninsulated windows of the historic facade were replaced with thermally broken frames and insulated glazing, upping the window R value and reducing solar heat gain while allowing plenty of light to enter the building. The new insulated glazing on the addition of the building is shaded by the vertical and horizontal overhangs of the building addition.
Energy Conservation

The project reuses and maintains most of the existing historical exterior masonry facade.

Excessive heat gain at the site is reduced with the introduction of highly reflective paving and roofing.

The site design maximizes open space by protecting significant existing plantings and providing a total of 63% vegetated open space and 21% pedestrian-oriented open space of the total project site.

The building is adjacent to a multitude of public transport options, as well as campus and neighborhood services such as libraries, stores, and restaurants which encourage pedestrian travel and reduce vehicular use.

Water Conservation

Plant irrigation reduction of potable water of 53% was achieved through the use of native/adaptive, plants, minimal lawn cover and efficient irrigation to conserve local and regional potable water sources.

Low flow fixtures and low flush toilets and urinals reduce the overall water use by over 30%.

Energy Conservation

All energy systems are installed and calibrated to perform at the highest level to ensure energy savings.

Highly efficient HVAC systems provide a 23% energy cost savings when compared to baseline systems as demonstrated through simulated energy modeling.

To reduce maintenance and operation costs, an effective commissioning process was implemented which included a systems manual that provides operating information to allow optimal building operation.

An abundance of natural daylight from the atrium skylights and glass walls reduce the energy demand for artificial lighting. Dimming switches allow the occupants to control their lighting needs and automatic sensors detect when people are present in the room.

In order to reduce the amount of reheat energy within the building, the ventilation air from the office is transferred to the laboratories as make up air. This reduces the amount of outside air that needs to be conditioned and reheated, dramatically reducing the energy consumption in the building.

The design team worked with the University to decrease the fume hood face velocity and air change rates below University standards (but within a safe levels) to also reduce the amount exhaust air and outside air. This resulted in heating, cooling and fan energy savings.

Reused/Recycled Materials

Over 75% of the construction waste was diverted from the landfill and either recycled or reused.

Healthy Indoor Environment

Interior materials have been selected based on their low-emitting qualities and recycled content. Certified wood was used in millwork and laboratory cabinets.

All the materials and assemblies incorporate low-emitting and formaldehyde-free products.

The project utilizes sustainability sourced materials (FSC certified wood) and provides 20% of materials (by cost) with recycled content.

Openings made in the roof, floors and several walls improve access to views and daylight for staff and visitors.

Ground floor entrances directly connect to a feature stair that leads to laboratories and offices, encouraging student health with vertical circulation.