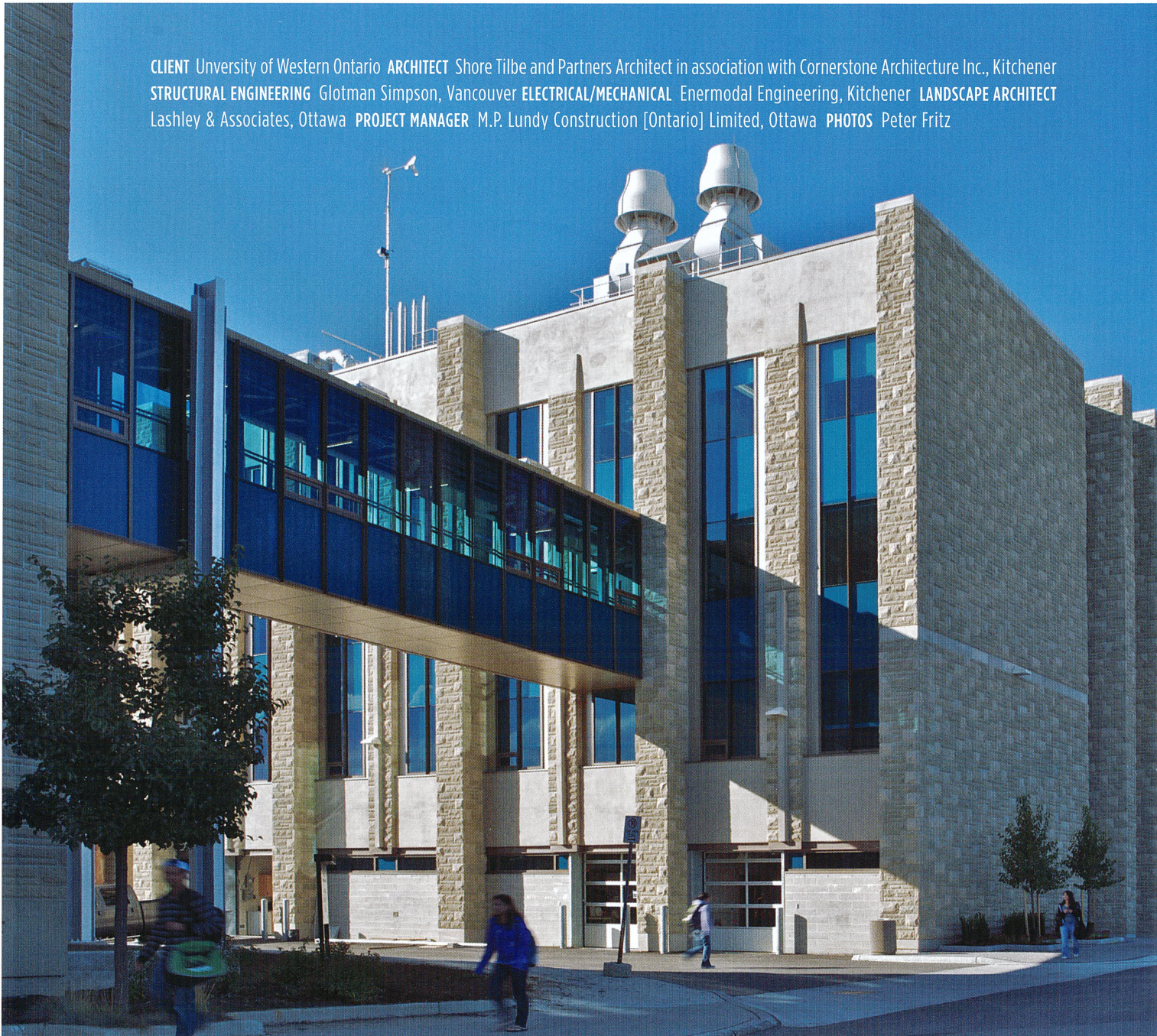


CLAUDETTE MCKAY-LASSONDE

PAVILION

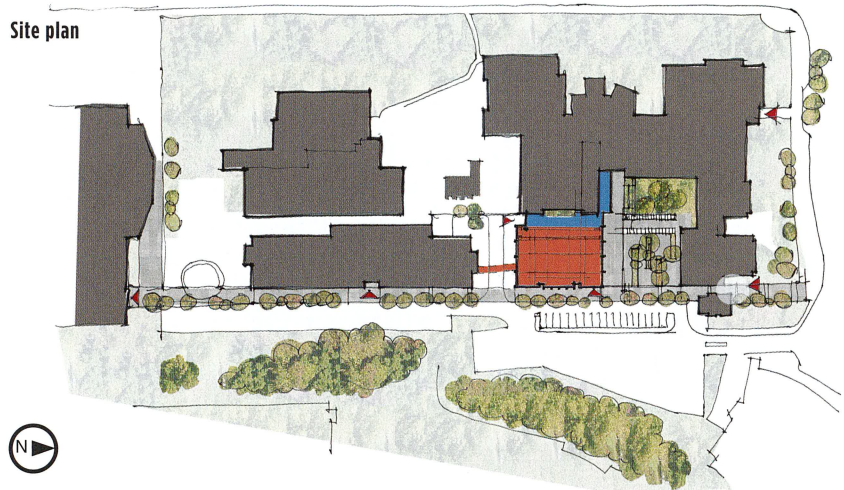
New Eco-lab puts focus on green building technologies

CLIENT University of Western Ontario **ARCHITECT** Shore Tilbe and Partners Architect in association with Cornerstone Architecture Inc., Kitchener
STRUCTURAL ENGINEERING Glotman Simpson, Vancouver **ELECTRICAL/MECHANICAL** Enermodal Engineering, Kitchener **LANDSCAPE ARCHITECT** Lashley & Associates, Ottawa **PROJECT MANAGER** M.P. Lundy Construction [Ontario] Limited, Ottawa **PHOTOS** Peter Fritz



BY ANDREW FRONTINI AND RICHARD HAMMOND

Claudette McKay Lassonde was an innovator in Canadian Engineering and instrumental in raising the profile of women in engineering practice and education. It is fitting that the addition to the UWO engineering school that bears her name, is equally committed to the spirit of innovation.



THE CMLP IS AN ADDITION TO THE THREE-STOREY, NEO-GOTHIC SPENCER ENGINEERING BUILDING THAT DATES FROM THE 1960S. THE EXTERIOR CHARACTER OF THE BUILDING WAS STRONGLY INFLUENCED BY UWO'S ARCHITECTURAL DESIGN GUIDELINES [1].

The 4,200m² [45,000sf] Claudette McKay Lassonde Pavilion [CMLP] was conceived as an "eco-lab", with key design decisions driven by the desire to make the building a teaching tool. The school focuses on the development and testing of green building technologies in four key areas: energy from renewable sources, fuel cells and bio-fuels, air and water hydrogen production and development of innovative materials for green processes.

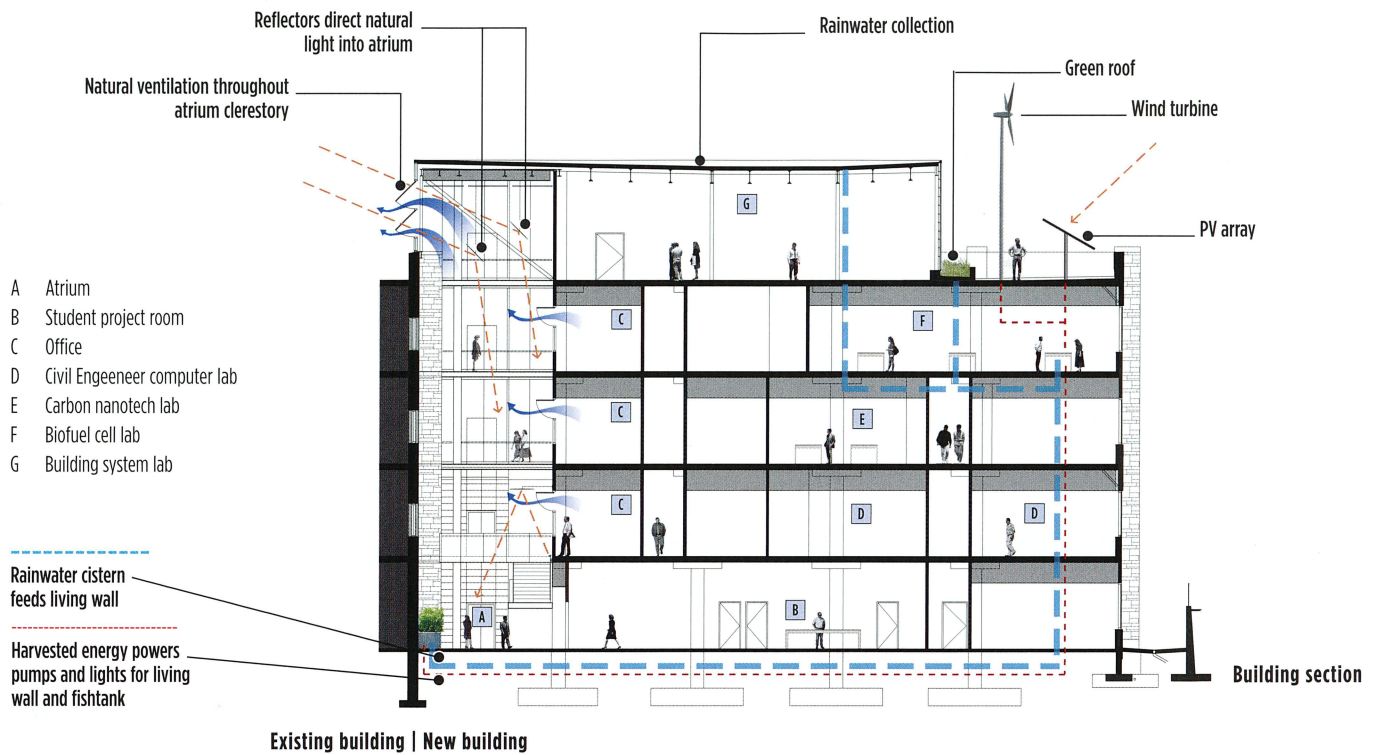
While the exterior character of the building was strongly influenced by UWO's architectural design guidelines, the interior breaks free of these constraints. Within, a series of dramatic public spaces clearly communicate the importance of environmental protection and restoration.

The CMLP is an addition to the three-storey, neo-Gothic Spencer Engineering Building that dates from the 1960s. The addition creates a new public face to the school and frames the Eco-Court, a combination of hard and soft landscaped features that

restore green space to a site formerly occupied by a portable building. Permeable, highly reflective pavers and native drought-tolerant landscaping are used in the courtyard and at the building's perimeter. As a result, no permanent irrigation is required.

The Eco-Court is designed as an educational tool as well as a social space. Within the courtyard, a pair of geothermal wells, with exposed heads and integrated measurement read-outs, allows students to study geothermal performance under various conditions. Similarly, a rain water cistern providing grey water for sewage conveyance offers water level read-outs as data for integration into student projects.

This didactic approach to landscaping is echoed on top of the building where a demonstration lab showcases examples of sustainable building technology. The roof of the building is partly vegetated, and partly finished with a highly reflective roof membrane. Rainwater collected on the roof feeds a cistern which



PROJECT PERFORMANCE

Projected total energy consumption:
1663MJ/m²/year

Projected energy savings relative to MNECB: 42%

Projected potable Water Consumption in l/m²/year:
246 litres/m²/year

Saving relative to reference building: 50%

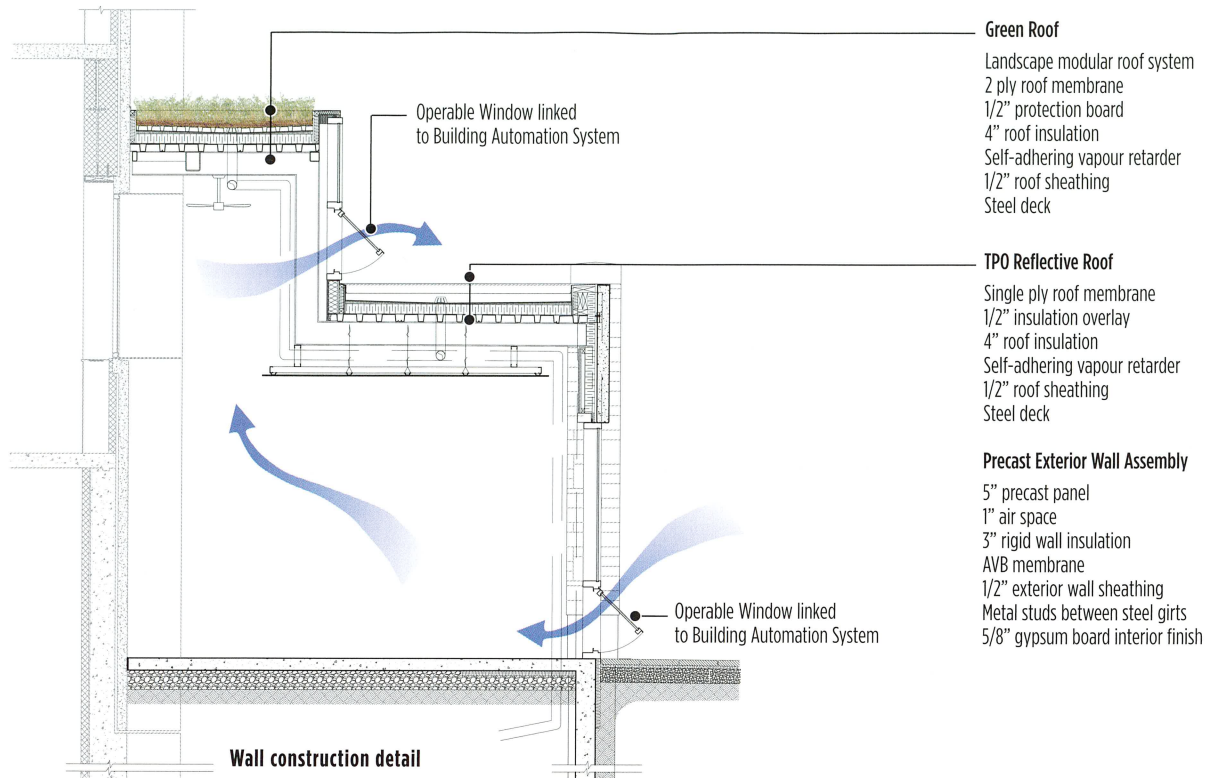
Locally sourced materials [by value]: 37.8%

Recycled materials [by value]: 18.4%

Energy consumption projections reflect the specialized nature of this building in which some of the lab spaces require a dedicated 400 Amp electrical service.



LABORATORIES, STUDENT DESIGN SHOPS AND FACULTY OFFICES LOOK INTO A NARROW FIVE-STOREY ATRIUM THAT SEPARATES THE NEW CONSTRUCTION FROM THE EXISTING BUILDING [2].



PHOTOVOLTAIC ARRAYS ARE MOUNTED ON THE GREEN ROOF. TOGETHER WITH A WIND TURBINE, THEY PROVIDE ABOUT 7KW OF ELECTRICITY [3].

provides grey water for toilets and urinals. Ultra low flow fixtures and automatic controls on faucets are used throughout and consumption is monitored for student reference.

Photovoltaic arrays and a wind turbine provide about 7KW of electricity for the building. A student laboratory monitors these systems and observes its effects on the building's energy performance. This information is also available on the University network. Stale air from laboratories is exhausted through a large roof top fan with integrated heat recovery, the benefits of which can also be monitored in the rooftop laboratory.

Further demonstrations of sustainable technology are provided in the building's key public spaces. Laboratories, student design shops and faculty offices look into a narrow five-storey atrium that separates the new construction from the existing building. A series of discs reflect daylight to the lowest level of the atrium. In the evening the discs bounce light from high efficiency LED spot lights back down to the floor.

The atrium and the adjacent entry lobby provide opportunities for casual exchange between faculty and students, as well as space for special events and the display of student projects such as the prototype solar vehicle "Sunstang". The main floor of the atrium is

MATERIALS

Structure

- Concrete with masonry exterior and aluminum, thermally-broken curtainwall

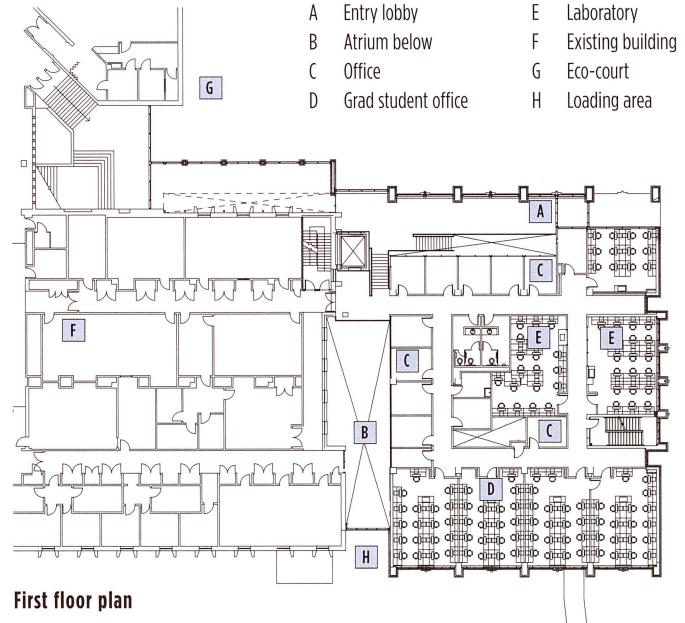
Interior and Lighting

- Low VOC paint, **Forbo** linoleum flooring, **InterfaceFLOR** carpet tile; Central control lighting system used for exterior and interior common areas, analog photocell and astronomic timer control lights outside and inside the building in areas where daylight can be harvested, occupancy sensors in many rooms; power from PV panels feeds selected lighting circuits inside the building

HVAC

- Variable frequency drives used for motor control to economise HVAC system operation; central air handling units serve VAV distribution systems with terminal reheat for laboratory and office cooling and fume exhaust makeup; geothermal water-source heat pump system heats and cools front lobby; low-flow plumbing fixtures and rainwater collection provide a 50% water use reduction. [Courtesy Chorley & Bisset Ltd. Consulting Engineers, www.chorley.com]

More details on the lighting and HVAC are found in the web version of this article found at www.sabmagazine.com, issue 20 Nov/Dec 2009



dominated by a living wall and a large fish tank. Lighting for the Living Wall and the pump for the fish tank are powered by the solar and wind systems on the roof. Water for the fish tank comes from the rain water collection cistern after being filtered through the living wall. The ecosystem of the fish tank

is maintained as part of a student project.

Throughout the building, every opportunity has been taken to maximize access to natural daylight and views. The laboratories occupy the building's perimeter and have large windows to the exterior. Many offices get borrowed light from the atrium and entrance lobby.

A less obvious sustainable strategy is the extensive use of adaptable modular laboratory systems. Laboratory benches are mobile with lab service delivery being modular from above. This allows rooms to be reconfigured easily without demolition or new construction. This "lab loft" concept also facilitates dynamic approaches to research.

At every scale, from the individual research station to the campus open space system, the CMLP sets new precedents for sustainable design at the University of Western Ontario; precedents it is hoped that will help shape the engineering minds and practices of tomorrow. ◀

ANDREW FRONTINI IS DESIGN PARTNER AT SHORE TILBE IRWIN AND PARTNERS AND RICHARD HAMMOND IS PRINCIPLE, OF CORNERSTONE ARCHITECTURE INC



A SERIES OF DISCS REFLECT DAYLIGHT TO THE LOWEST LEVEL OF THE ATRIUM. IN THE EVENING THE DISCS BOUNCE LIGHT FROM HIGH EFFICIENCY LED SPOT LIGHTS BACK DOWN TO THE FLOOR [4].

MATERIALS

Structure

- Concrete with masonry exterior and aluminum, thermally-broken curtainwall

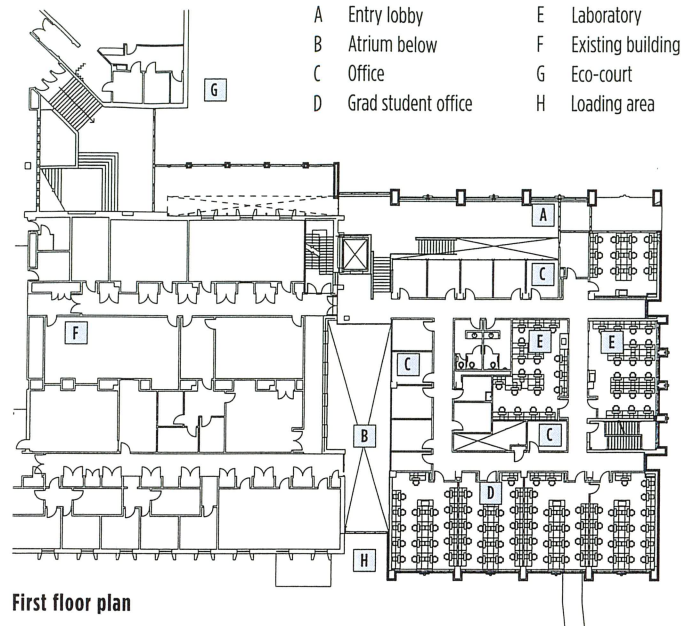
Interior and Lighting

- Low VOC paint, **Forbo** linoleum flooring, **InterfaceFLOR** carpet tile; Central control lighting system used for exterior and interior common areas, analog photocell and astronomic timer control lights outside and inside the building in areas where daylight can be harvested, occupancy sensors in many rooms; power from PV panels feeds selected lighting circuits inside the building

HVAC

- Variable frequency drives used for motor control to economise HVAC system operation; central air handling units serve VAV distribution systems with terminal reheat for laboratory and office cooling and fume exhaust makeup; geothermal water-source heat pump system heats and cools front lobby; low-flow plumbing fixtures and rainwater collection provide a 50% water use reduction. [Courtesy Chorley & Bisset Ltd. Consulting Engineers, www.chorley.com]

More details on the lighting and HVAC are found in the web version of this article found at www.sabmagazine.com, issue 20 Nov/Dec 2009



First floor plan

dominated by a living wall and a large fish tank. Lighting for the Living Wall and the pump for the fish tank are powered by the solar and wind systems on the roof. Water for the fish tank comes from the rain water collection cistern after being filtered through the living wall. The ecosystem of the fish tank

is maintained as part of a student project.

Throughout the building, every opportunity has been taken to maximize access to natural daylight and views. The laboratories occupy the building's perimeter and have large windows to the exterior. Many offices get borrowed light from the atrium and entrance lobby.

A less obvious sustainable strategy is the extensive use of adaptable modular laboratory systems. Laboratory benches are mobile with lab service delivery being modular from above. This allows rooms to be reconfigured easily without demolition or new construction. This "lab loft" concept also facilitates dynamic approaches to research.

At every scale, from the individual research station to the campus open space system, the CMLP sets new precedents for sustainable design at the University of Western Ontario; precedents it is hoped that will help shape the engineering minds and practices of tomorrow. ◀

ANDREW FRONTINI IS DESIGN PARTNER AT SHORE TILBE IRWIN AND PARTNERS AND RICHARD HAMMOND IS PRINCIPLE, OF CORNERSTONE ARCHITECTURE INC



A SERIES OF DISCS REFLECT DAYLIGHT TO THE LOWEST LEVEL OF THE ATRIUM. IN THE EVENING THE DISCS BOUNCE LIGHT FROM HIGH EFFICIENCY LED SPOT LIGHTS BACK DOWN TO THE FLOOR [4].