



2024 Canadian Consulting Engineering Awards

**uOttawa**  
**Faculty of Health Sciences Building**  
**Ottawa, Ontario**

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Buildings



ASSOCIATION OF CONSULTING  
ENGINEERING COMPANIES | CANADA



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## SUMMARY

uOttawa wanted to transform a former industrial brownfield site into its new home for the Faculty of Health Sciences building. As the prime engineering consultant for the project, WSP revitalized the site and designed a high-performance building using sustainable materials that is supportive of the area's Francophone and Indigenous culture.

The state-of-the-art LEED® Platinum facility significantly improves social fabric of the community while using 57.2% less energy and producing 57.8% less greenhouse gases than typical institutional buildings.

## Project Details

### Project Name:

uOttawa - Faculty of Health Sciences

### Submitting Firm:

WSP Canada Inc.

### Project Owner:

University of Ottawa

### Client:

PCL Constructors Canada Inc.

### Engineering Services Provided:

WSP was the Prime Consultant responsible for Design Management and provided the following engineering services:

- Mechanical & Electrical
- Structural
- Security & Technology
- SMART
- Energy Modeling
- LEED/Sustainability
- Building Envelope Commissioning
- Civil
- Landscape Architecture
- Acoustics & Vibration
- Food Services





**ARCHITECTURAL INNOVATION MEETS ACADEMIC EXCELLENCE:** Showcasing the pinnacle of educational engineering, the uOttawa Health Sciences Building harmoniously blends state-of-the-art technology with natural wood elements, creating warm social areas for collaborative learning. This project is a testament to innovative engineering practices, distinguished by its organic integration of materials advancing the skills and state of practice in the consulting engineering industry.

## Innovation

For many years uOttawa owned a 6.6-hectare parcel of land that was prominently located on the banks of the Rideau River in downtown Ottawa. The site was under-developed and contained contaminated soil because of its history as an industrial rail line. uOttawa wanted to transform this brownfield site into a vibrant, sustainable community space that would house its new home for the Faculty of Health Sciences building. WSP was engaged as Design Prime and provided a full suite of consulting engineering services to the builder, PCL Constructors Canada Inc., to revitalize the site and build a Faculty of Health Sciences building that is conducive to achieving excellence in healthcare training and research. The result is a 23,500 m<sup>2</sup> building that boasts aggressive energy and sustainability measures, including LEED® Platinum certification, a 57.8% reduction in greenhouse gas emissions, 57.2% reduction in energy use, and a 37.6 kWh/m<sup>2</sup> Thermal Energy Demand Intensity.

Innovative engineering methodologies and sustainable design principles were prioritized at the onset of the project where they would achieve the most impact:

- Parametric design tools were used to optimize the footprint and orientation of the building to minimize solar heat gain while maximizing access and views to natural light. This early analysis aided the space planning to ensure that the collaboration spaces benefited from a high degree of transparency and connectivity.
- Life-cycle analysis was employed to optimize the selection of cladding materials and concrete mix to reduce the embodied carbon footprint of the building by 10% compared to a reference building.
- Advanced energy modelling software was used to analyze and select the mechanical system strategy to meet the project's ambitious energy goals, and this influenced the inclusion of a 55kW array of rooftop solar panels.

One of the most important differentiators of this project is its advancement of structural engineering concepts. As an example, the structural connection between timber support, steel extension and concrete columns was previously undocumented in the industry and required detailed analysis of the buckling behaviour by the technical team. In addition, Research and Development credits were used to field test the stiffness/settlement performance of the 12-meter-long span cast-in-place concrete slabs to ensure they were fit for purpose before they were applied.



## Complexity

The Faculty of Health Sciences building project at the uOttawa faced several challenges that set it apart from typical construction endeavours.

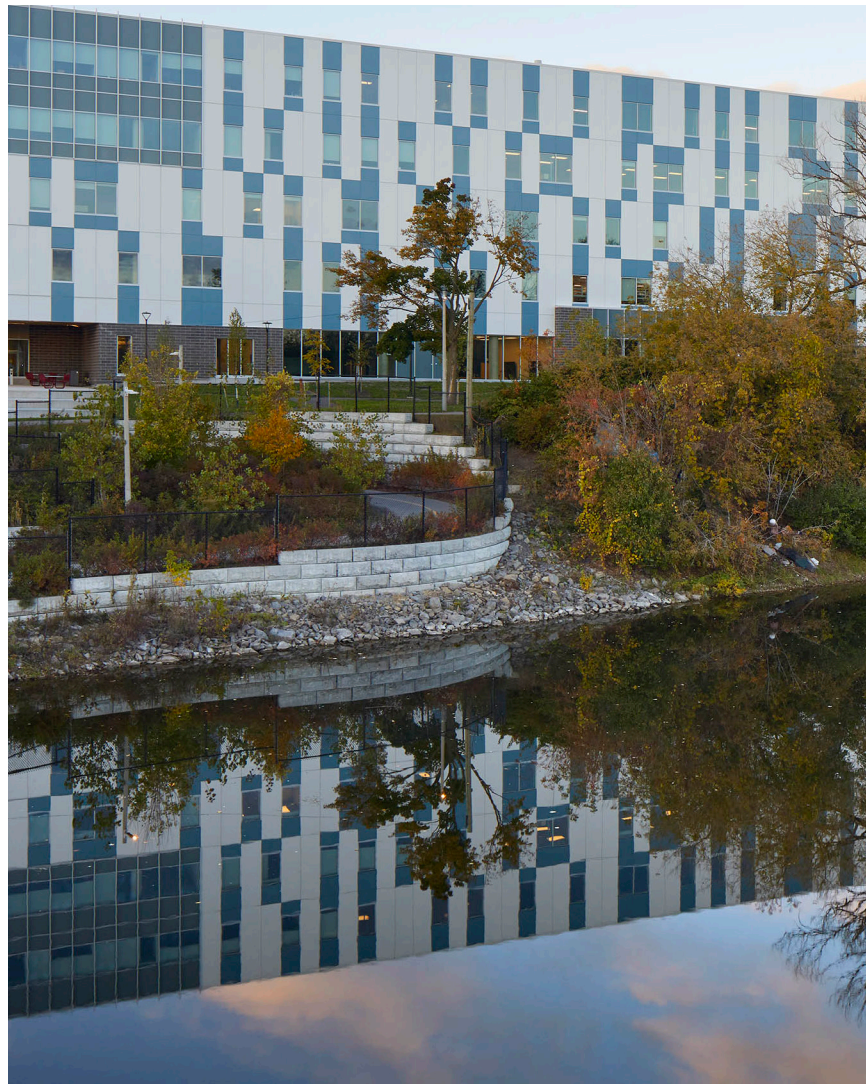
First and foremost was the project site. For many years, the land served as an industrial area with a rail line. After World War II, the contaminated soil from the rail activities was left on site.

When planning for the construction of the new building, the design team was faced with a challenge: how to transform this once brownfield site into a healthy vibrant space. In the early design stages the project was at risk of being cancelled because it became apparent that it was cost prohibitive to remediate all contaminated soils on site.

The structural engineering design team proposed an elegant and cost-effective solution to support the building with bored concrete caissons and driven steel pipe piles. This design solution reduced the amount of excavation required to build the foundation and in turn reduced disturbance to the contaminated soil.

Strategic volumes of contaminated soil were remediated that were closest to the surface, and the building's Level 1 floor was elevated 1.5m above the existing grade on site.

Although this design solution did not remediate all low-lying contaminated soil on the project site, it was effective at providing a healthy growing layer for the indigenous trees and landscaping while also respecting the owner's project budget.



“Engineering the future of healthcare education requires not only a foundation of technical expertise, but a passion for innovative solutions. At the uOttawa Faculty of Health Sciences building we have pushed the boundaries of what is possible, integrating advanced mechanical and electrical systems that are resilient and flexible to adapt to the needs of tomorrow.”

-Tom LeRoy, P.Eng., PMP, LEED AP  
Senior Manager, Ottawa Buildings –  
Mechanical & Electrical - WSP Canada Inc.



**WHERE NATURE AND KNOWLEDGE FLOW TOGETHER:** Building Communities, Fostering Futures: The UOttawa Health Sciences Facility is more than a building; it's a catalyst for social and economic enrichment. Designed with inclusivity in mind, it serves local communities, Indigenous populations, providing a dynamic educational environment. The facility not only creates economic opportunities through its construction and operation but also enhances quality of life by offering state-of-the-art learning resources, with the ripple effects promising long-term community benefits.

## Social and Economic Impact

The uOttawa Faculty of Health Sciences building project yielded significant social and economic benefits. Most immediately, the project generated employment opportunities for local laborers, contractors, and suppliers during its two-year construction.

As an example, the timber that was used to construct the feature areas of the building was purchased from Forestry Stewardship Council certified woodlands and sawmills in Ontario. But the social and economic benefits go much beyond this immediate impact.

Second, the site was a former industrial brownfield. Contaminated soil was removed during the project and the site was transformed into a healthy space that reconnects its relationship with the adjacent river and its immediate urban neighbourhood.

Students, faculty, and the general public are now able to move throughout the grounds as they arrive by light-rail transit, bicycle, or on foot. Users can experience the indigenous landscape and mature trees, the open Fire Circle, the vibrant Social Heart, the smart teaching labs and the unique biophilic design elements of the facility. For example, the Entrance Spine and the Feature Classroom are built using exposed wood construction (cross-laminated timber) that brings the outdoors inside and ties the building to its natural setting.

Furthermore, the facility now serves as a hub for health education and research, public events, and outreach activities. By building a best-in-class teaching facility, the faculty proudly connects students with leading global thinkers in healthcare research to exchange knowledge and ideas that will transform the healthcare of tomorrow. These programs are only available because of the success of this project.



**57.8%**

GHG Emission reduction  
vs baseline (T of CO<sup>2</sup>)



**57.2%**

Energy use reduction vs  
baseline building

**42%**

Reduction in potable  
water use vs baseline

**HARMONIZING PROGRESS WITH NATURE:** The UOttawa - Health Sciences Building showcases cutting-edge sustainable design, integrating energy-efficient materials and systems to minimize its carbon footprint. With a commitment to eco-conscious construction and operation, this landmark mirrors the tranquility of its riverside setting while enhancing local ecosystems and promoting a greener future in education.

## Environmental Impact

The uOttawa Faculty of Health Sciences building project exemplifies a holistic approach to environmental stewardship. Commitment to sustainability is highlighted by LEED® BD+C Platinum certification.

During the design phase, energy modelling software was used to analyze mechanical system options and select the best option to meet project's energy goals. The building uses 57.2% less energy and produces 57.8% less greenhouse gases than typical institutional buildings.

The building envelope was analyzed using BC Hydro Thermal Bridging methodology and design team used an integrated process to explore opportunities for improvements to reduce the impact of point and thermal bridges. This process was critical to achieve the overall building Thermal Energy Demand Intensity of 37.6 kWh/m<sup>2</sup>. This achievement makes the building one of the most efficient research-focused institutional buildings in Canada.

Life-cycle analyses were employed to optimize selection of cladding materials and concrete mix to reduce embodied carbon footprint of the building by 10% compared to reference building. Sustainable materials played crucial roles in reducing project's environmental footprint. Materials with low embodied carbon and high recycled content were prioritized, such as FSC-certified wood and recycled steel. Low-flow plumbing fixtures were installed throughout the building, resulting in 42% reduction in potable water use compared to baseline standards.

Environmental impacts during construction was managed in a variety of ways. Comprehensive Construction Waste Management, Indoor Air Quality, Erosion, Sediment and Control plans were developed, implemented, and enforced throughout the construction phase. Over 90% of all demolition and construction waste was diverted from landfills and sent to recycling facilities.



**EFFICIENT INNOVATION WITHIN REACH:** The Ottawa University Health Sciences Facility embodies the client's vision for cost-effective architecture without compromising quality. Adhering to a strict budget and timeline, the project prioritizes economical solutions, delivering an exceptional educational environment on schedule and within financial targets.

## Meeting and Exceeding Owner's/Client's Needs

uOttawa's goals for the Faculty of Health Sciences building were centered around sustainability, functionality, adherence to budget and timeline constraints. These goals were met through a comprehensive approach that prioritized collaboration, innovation, and efficiency.

The project ensured sustainability by integrating advanced energy-efficient technologies and sustainable materials, meeting LEED® Platinum certification requirements. Energy modelling software leveraged to optimize building performance, resulting in significant energy savings and reduced environmental impact. Additionally, Francophone and Indigenous principles and biophilic design elements were incorporated to honour area's history and enhance the connection between occupants and nature.

Functionality was addressed by designing flexible and adaptable spaces that cater to the diverse needs of students, faculty, and researchers. The design team was focused to create a "future ready" building and to serve the University's needs of both today, and tomorrow.

The University wanted the building to be ready for the Fall 2023 semester. The design-build contract was executed July 2021 and the project obtained substantial completion June 2023, meaning that the overall project was completed in less than 24 months. This incredible speed of construction is nearly unheard of in the industry and was achieved through rigorous design planning and proactive risk mitigation strategies.

Despite challenges such as procurement delays and cost escalations, the team remained committed to delivering within the established budget and timeline. The construction value was initially \$116,500,000 and the final cost was \$118,379,900, with the variance due to owner-requested changes that increased overall contract value by only 1.6% and maintained owner's overall budget including contingency.





WSP is one of the world's leading engineering professional services consulting firms, bringing together talented people from around the globe. We are technical experts who design and provide strategic advice on sustainable solutions and engineering projects that will help societies grow for lifetimes to come. With an intimate sense of local realities, there is no challenge in the built and natural environment that our experts won't see as a possibility. From the tallest towers to the deepest stations, we plan, design and deliver value for our clients and a sustainable future for the planet. As a company with deep roots coast-to-coast-to-coast in Canada, WSP aims to be at the forefront of the transition to a more equitable, inclusive, and low-carbon world. Both in our own activities and in the work we undertake for our clients. As a world-class professional services firm, our reputation depends on our ability to value our people and be outstanding professionals. Acting with honesty, integrity and transparency in our daily dealings with colleagues, clients and other business partners.

