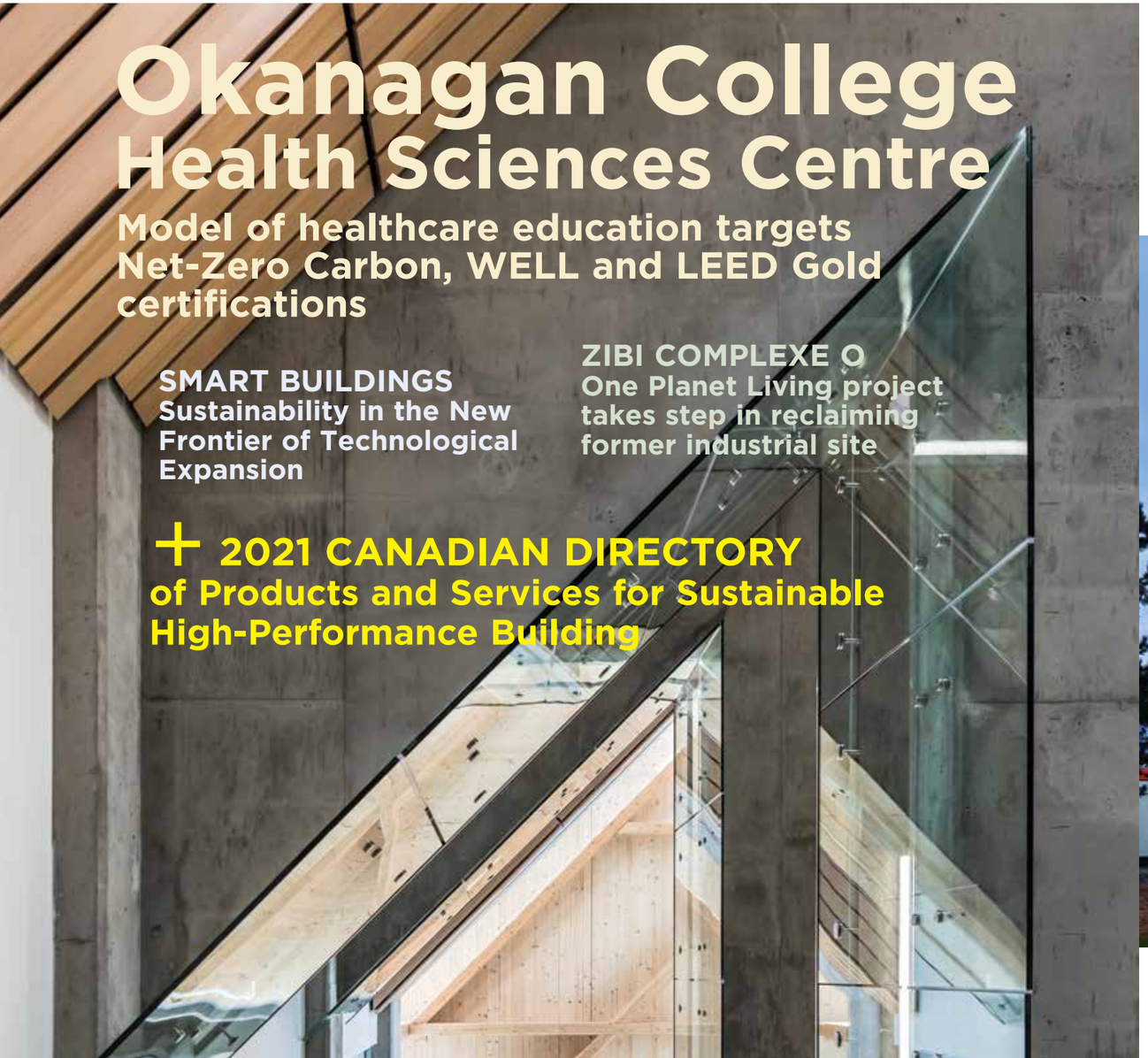
SABMag
SUSTAINABLE ARCHITECTURE & BUILDING MAGAZINE

ISSUE NUMBER 73 | WINTER 2022 | PM40024961 | $6



Okanagan College
Health Sciences Centre

Model of healthcare education targets Net-Zero Carbon, WELL and LEED Gold certifications

By Peter Osborne

Located on a narrow brownfield site on the Kelowna campus of Okanagan College, the Health Sciences Centre includes technology-enhanced and student-centred labs, classrooms, and offices for health and social development programs.

The chosen site allowed the building to make use of existing campus infrastructure; create a new front door to the existing laboratory building; and provide opportunities for shared use. The 3,300m² building is organized around a three-storey day-lit atrium, with ample interior glazing providing views into the generous program spaces and facilitating social connections.

1. The use of waste heat from a wastewater treatment plant, along with integrated photovoltaic panels, means that no gas-fired HVAC systems were required which helped the project to earn the CaGBC's Zero Carbon Building Design certification.

Site plan

1. Health Sciences Centre
2. Laboratory building
3. Cafeteria
4. Solar carport
5. Electric vehicle charging stations
6. Carpool priority parking
7. Bicycle parking

2. View into the Early Childhood Education Lab at the north end of the building. The strategic use of glazing contributes to a high-performance building envelope.

Contrasting the solid facade, ground floor entries and public spaces are transparent, guiding visitors into and through the building. This strategic use of glazing contributes to a high-performance building envelope, greater resilience and occupant comfort.

The building utilizes waste heat generated by the nearby wastewater treatment plant, integrates photovoltaic panels for its primary heating and energy needs, requires no natural gas-fired HVAC systems and will earn the CaGBC's Zero Carbon Building Design certification through demonstration of zero-carbon balance, meeting a defined threshold for thermal energy demand intensity and the provision of on-site renewable energy systems.

It was important to the College that the architecture of this new educational facility embody the health and wellness its programs support, through its use of materials, light, and landscape. As such, it is a catalyst for sustainability and wellness-focused policy changes across campus.

The design process included comprehensive consultation with local First nations, whose traditional notions of health and wellbeing will provide new insights into healthcare education in Canada. The design grew from a narrative, developed in consultation with the Westbank First Nation, around the act of weaving. The narrative provided a contemporary methodology to explore the connected histories and futures of the Syilx people, the College and students. This is evident, both in the building's facade that references the warp and weft of fabric; and in the mass timber clerestory that criss-crosses the length of the building. These consultations also informed the selection of traditional medicinal plant species for the two new landscaped areas that bookend the building.

Operable windows and the central atrium create a natural stack effect within the building, allowing air to move up through the building to be exhausted through an energy recovery ventilator. Daylight penetrates the floor plate through clerestory glazing and all regularly occupied spaces have access to daylight and views.

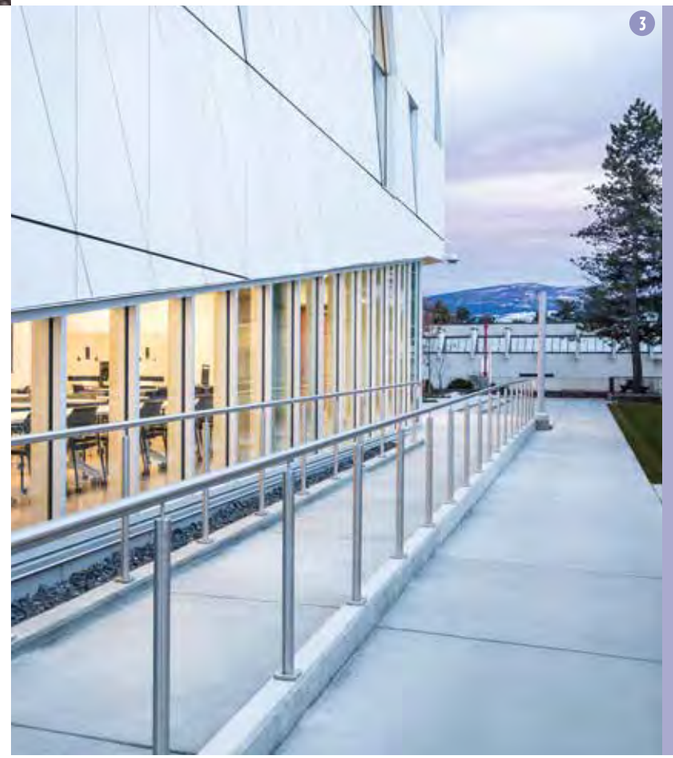
Level 1

Level 2

Floor plans

Level 1

1. Early childhood education lab
2. Classroom
3. Model learning classroom
4. Pharmatech lab
5. All gender washroom
6. Therapy assistant lab
7. Home care lab
8. Medium fidelity lab
9. Project room
10. Health care lab
11. Faculty offices
12. Dental lab
13. Reception
14. Lab building



3

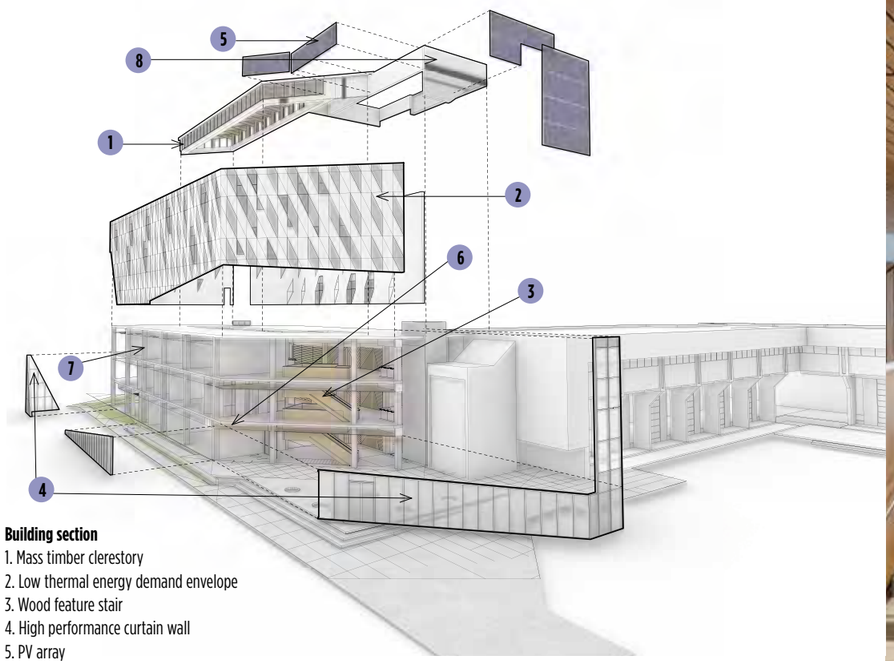
PROJECT PERFORMANCE

Energy intensity (building and process energy) = 94KWhr/m²/year
Energy intensity reduction relative to reference building (under NECB 2011) = 46 %
Percentage of annual energy consumption met with renewables = 48%
Recycled material content by value = 29%
Construction waste diverted from landfill = 80%

PROJECT CREDITS

OWNER/DEVELOPER Okanagan College
ARCHITECT GEC Architecture
GENERAL CONTRACTOR Stuart Olson
LANDSCAPE ARCHITECT WSP
CIVIL ENGINEER WSP
ELECTRICAL ENGINEER Falcon Engineering
MECHANICAL ENGINEER CIMA+
STRUCTURAL ENGINEER RJC Engineers
COMMISSIONING AGENT Inland Technical
SUSTAINABILITY CONSULTING EcoAmmo
PHOTOS Latitude Photography

3. Consultation with the Westbank First Nation influenced the weave pattern design of the facade that references the warp and weft of fabric; and in the criss-cross pattern of the timber clerestory.The Fibre C cladding supplied by **Sound Solutions** is a glassfibre reinforced cementitious product in Polar White Matt finish and Polar White Ferro finish. It has ISO 9001 and ISO 14001 certifications, and an environmental product declaration (EPD).



Building section
1. Mass timber clerestory
2. Low thermal energy demand envelope
3. Wood feature stair
4. High performance curtain wall
5. PV array
6. Western hemlock wood soffit
7. High fly ash concrete frame
8. Heat recovery system


4


6


5

4. The feature stair near the main entrance. Contrasting the solid facade, ground floor entries and public spaces are transparent, guiding visitors into and through the building.

The all-LED lighting system includes both daylight and occupancy sensors as well as dimming and multi-level switching in all instructional areas and offices to decrease energy consumption while still allowing for individual control.

Ventilation air is provided by a 100% outside air-to-air energy recovery ventilator (ERV), which pre-heats and cools the air from the building exhaust. Ventilation is delivered as needed to each space by monitoring the CO_2 and occupancy levels to reduce demand during off-peak times. The peak design flow for the outside air is one air change/hour.

Ultra-low flow and WaterSense labelled fixtures reduce potable water consumption, and the project uses a highly efficient automated irrigation system with in-ground sensors.

The project is part of a WELL educational building pilot program that has resulted in organizational and policy changes designed to create an environment that positively impacts human health (i.e. stress and addiction treatment, structured fitness opportunities and a smoke-free campus). The design synthesizes architecture and program to provide leadership in healthcare education, sustainable development, and consultation with indigenous peoples.

5. The three-storey day-lit atrium, with ample interior glazing, provides views into the program spaces and facilitates social connections.
6. The project is part of a WELL educational building pilot program that has resulted in organizational and policy changes designed to create an environment that positively impacts human health.

The high-performance building envelope meets a defined threshold for thermal energy demand intensity (TEDI), reducing the requirements of the heating system and eliminating the need for perimeter radiant panels. High efficiency and demand-controlled mechanical and electrical systems reduce overall energy consumption. The team also developed a 'PV plan' to accommodate future sources of solar power, including PV integrated paving and glazing as well as more traditional roof-mounted panels.

The Health Sciences Centre prioritizes materials and systems that promote occupant health and comfort by meeting stringent low-VOC thresholds. Transparency of materials is promoted through the integration of over 20 materials with health product declarations and 20 with environmental product declarations. In addition, wood products are FSC certified.

Based on successive LCA calculations, the project demonstrates a reduction of over 10% in three environmental impact categories due in large part to the use of high fly-ash content concrete as the main structural system. Other building products and systems were selected based on durability and longevity and were independently reviewed as part of the building envelope commissioning process.

The sustainability goals on this project were driven by the College's commitment to support BC's GHG emission reduction targets; and its desire to offer students, staff, and industry insights into new green building techniques and technologies. In addition to Net-Zero Carbon and WELL certification, the project is targeting LEED Gold.

PETER OSBORNE IS A PARTNER AT GEC ARCHITECTURE.