





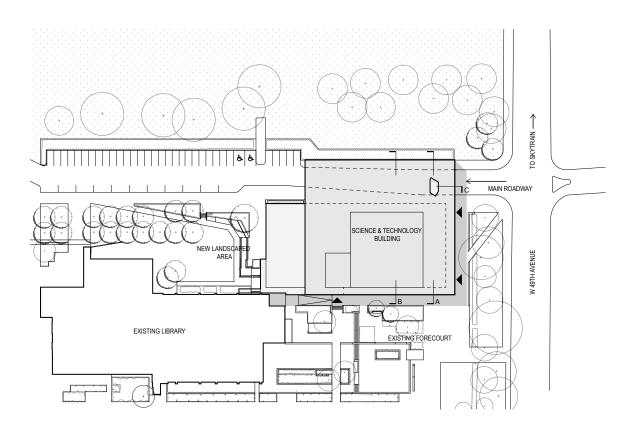
LANGARA COLLEGE SCIENCE & TECHNOLOGY BUILDING

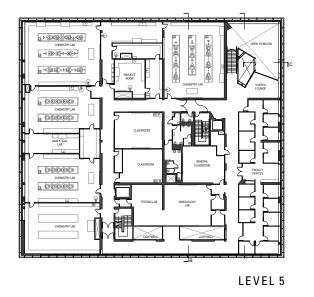
PROJECT PROFILE

Location // Vancouver, BC
Client // Langara College
Project Type // Higher Education,
Laboratory, Student Services
Size // 14,591 m²
Completion // 2016
LEED // Gold Certified

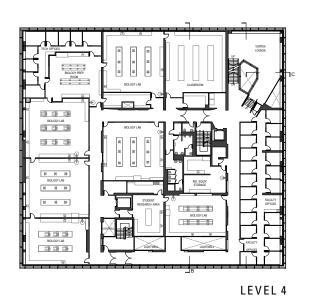
PROJECT SUMMARY

The Science & Technology building creates an iconic gateway into Langara College's campus while creating a state-of-the-art home for its science programs. Science laboratories and classrooms are located on the upper three levels—which frame the main driveway with a bold cantilever—while the lower levels consolidate essential student services at the campus' main entry, connecting to adjacent lounges, study and meeting spaces. Inside and out, the spatial experience is defined by visual and physical interconnectivity, designed to draw students together in a collaborative environment. A dramatic 16.1 metre cantilever presents student activity as the face of the College while also achieving a bold but pragmatic solution for a complex site and program. Certified LEED Gold, the remarkably cost-effective design achieves exceptional efficiency through a high-performance building envelope coupled with the premier installation of Thermenex-In-A-Box (TIAB) an innovative, locally-designed pre-fabricated energy management system, which carries energy redistribution far further than traditional heat recovery.





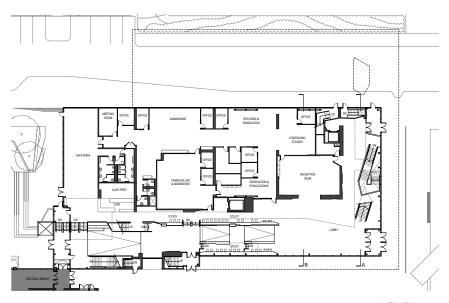






SUSTAINABLE DESIGN STRATEGIES

- Large building program on a minimal footprint
- + High performance, thermally broken envelope
- Thermenex-In-A-Box energy transfer system
- Passive ventilation integrated with 6-storey lightwell
- + Sculptural sun-shading louvre system



LEVEL 1



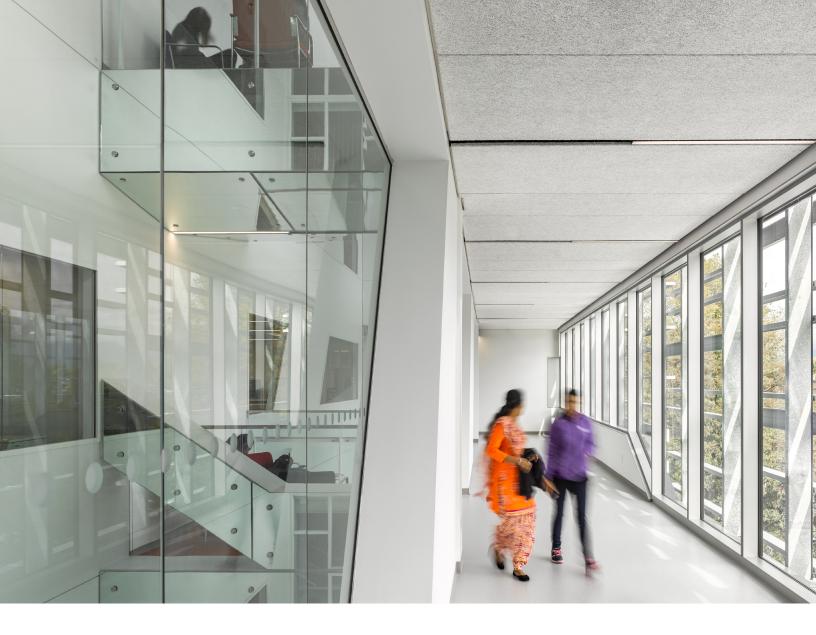
strategic decisions

The building's 16.1 metre cantilever allows a large program to be accommodated on a limited footprint, which avoids disrupting the adjacent public space, geothermal field and fire route, and creates a dynamic gateway oriented toward the nearby light rail transit station.

The building's energy strategy centres on the integration of a high-performance envelope, thoughtfully deployed passive lighting and ventilation measures, and innovative locally developed energy management technology.

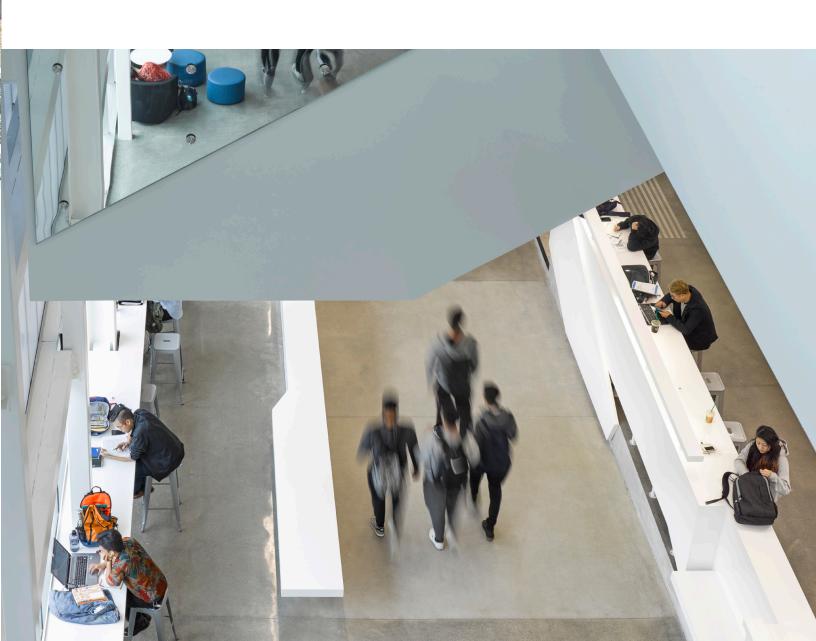






The project enhances the social sustainability of campus by creating a variety of environments for collaboration, and by strengthening connectivity within the campus and with the surrounding city.

The building represents exceptional value for the client, providing excellent long-term operational efficiency, state-of-the-art wet lab facilities, an innovative and expressive structure, and highly customized envelope for a final construction cost of less than \$285/s.f.



community

The project helps to transform a parkingfocused commuter campus into an inspiring, vibrant and sustainable indoor-outdoor learning environment by creating a striking new campus gateway, enhancing and extending circulation routes, and creating spaces for social and collaborative exchange.

The building actively encourages travel to campus by foot, transit or bicycle. The building and key interior public programs are oriented toward the nearby SkyTrain light rapid transit station. The facility replaces an existing parking lot, and, through collaboration with the City of Vancouver, involved a net reduction of parking. New bicycle parking was provided.





site ecology

Over half of the site drains into an on-site rain garden which captures 90% of the average annual rainfall and temporarily stores the stormwater flows, encouraging natural infiltration. Prior to leaving the site, all runoff is treated with a continuous deflective separation device that removes a large portion of the remaining pollutants and suspended solids.

To reduce hardscaping, vegetated open space was provided comprised of local species to provide appropriate habitat for area's fauna. Hardscaped areas employ high-reflective material to reduce heat island effect.

An exterior cleaning and maintenance program limits the use of salt-based de-icing products and harmful pesticides and herbicides, and mandates the use of environmentally friendly cleaning and maintenance equipment.

High-efficient LED exterior lighting fixtures equipped with full cutoff shielding reduce night sky pollution, allowing the site to have a luminance closer to its natural state.









light & air

The custom louvre system on the upper floors was designed based on a sun path analysis—choreographing views to the campus and distant mountains, while maximizing useful natural light. On the lower floors a translucent polycarbonate wall-panel system provides diffuse lighting to balance glare mitigation and thermal performance.

A 6-storey lightwell brings light deep into the floorplate (and also facilitates natural stack effect ventilation). Photocell sensors are installed in occupied perimeter spaces to reduce lighting when sufficient daylight is present.







90%

OF REGULARLY OCCUPIED SPACES HAVE ACCESS TO EXTERIOR VIEWS

40.7%

OF OCCUPIABLE FLOOR AREA IS WITHIN SEVEN METRES
OF AN OPERABLE WINDOW

 $19.7 \text{kWh/m}^2/\text{yr}$

PROJECTED ANNUAL LIGHTING CONSUMPTION

min 3.1 ACH

MINIMUM 3.1 AIR CHANGES PER HOUR REDUCE ENERGY DEMANDS





wellness

All circulation paths through the building—including the main atrium, multi-storey "Vortex Lounge" and fire stairs—are highly visible, animated by views to other levels and teaching spaces, and integrate a variety of study and lounge spaces, naturally promoting interaction and encouraging movement through the building via stairs rather than elevators. The atrium ties directly into the circulation spine of the adjacent existing Library building, enhancing the college's intuitively navigable indoor circulation network.

A green cleaning program has been developed mandating the use of Green Seal and EcoLogo certified cleaning supplies, and ergonomic, lownoise and environmentally conscious cleaning equipment. This program is currently being reviewed for implementation across the entire Langara College campus. Low VOC products were used throughout the building.













The landscape design utilizes trees, shrubs and perennials that are considered to be native/adaptive and drought-tolerant to the region, eliminating the need for irrigation.

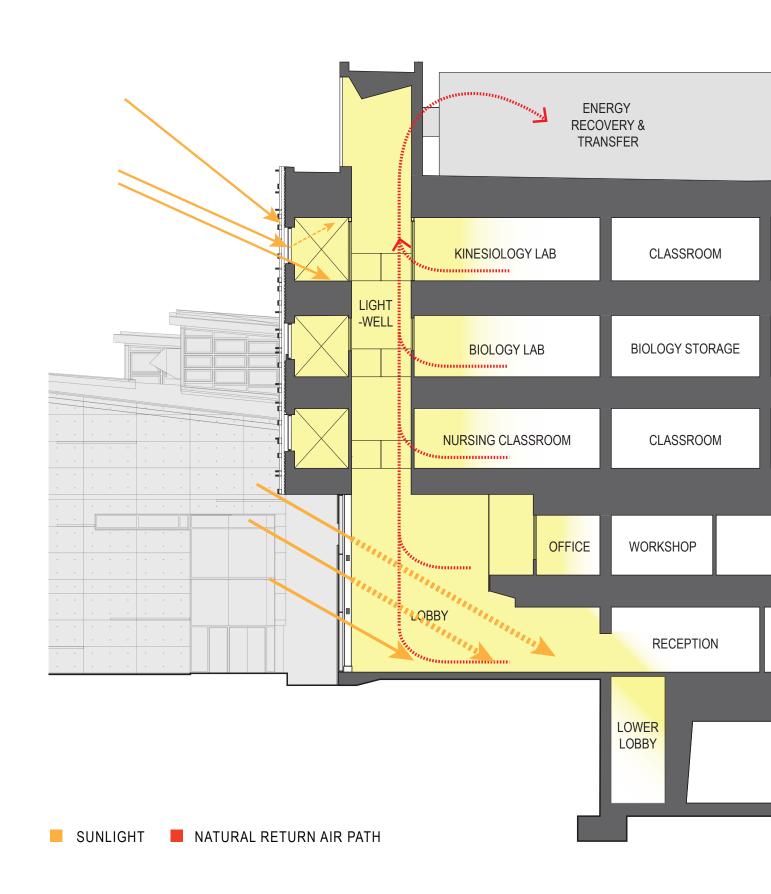


Wate conservati **〇 5**

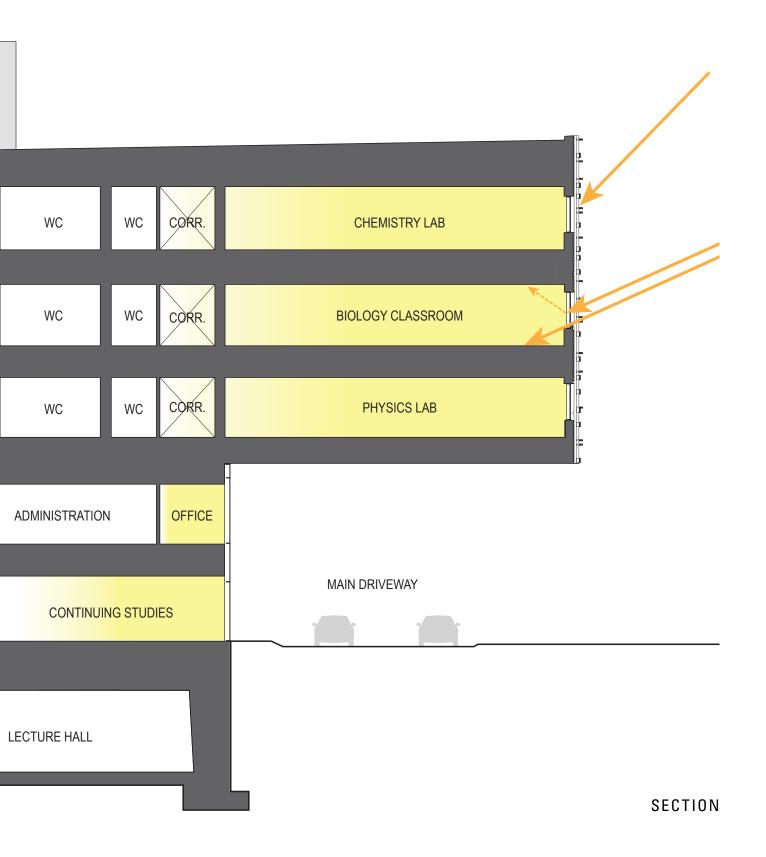
Low-flow fixtures reduce building potable water consumption by 864,000 litres annually beyond the reference building, representing savings of 44.34% and projected water consumption of 613.8 litres/person/annum.

energy bresent & future

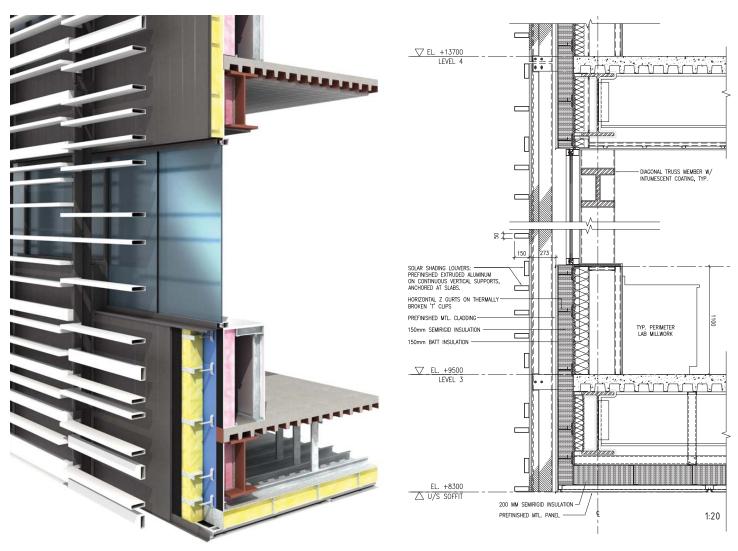
The mechanical system employs the locally developed Thermenex energy management system. Thermenex goes beyond traditional heat recovery in that no external source of heat is added or required until all the building's latent and waste heat has been utilized, allowing the building to share and distribute heating and cooling energy effectively in the building, eliminating redundant and counteracting sources of heat and cold. "Thermenex in a Box" (TIAB), installed for the first time in this building, combines all components of the energy transfer system in a single unit, which is manufactured off-site and craned into place on the roof, requiring less than two days of installation.



Natural stack effect ventilation in the 6-storey lightwell acts as principal return air flow, significantly reducing HVAC loads, while also shaping an inspiring space.







Heating loads were reduced by the building's high performance envelope—including a thermally broken rainscreen system—while lighting loads were reduced via extensive daylighting, mediated by insulated translucent assemblies and custom louvers.

Langara College is currently investigating the feasibility of large scale Solar Photo-Voltaic deployment throughout campus as part of their Master Plan update (developed by the same architects), including the deployment of solar thermal systems for water heating.

The modelled EUI of 138.7 ekWh/m²/yr represents a 63% energy savings and 46% energy cost savings over the ASHRAE 90.1-2007 reference building.



materials & resources

90.6%

OF CONSTRUCTION MATERIALS DIVERTED FROM THE LANDFILL VIA THE PROJECT'S CONSTRUCTION WASTE MANAGEMENT PROGRAM

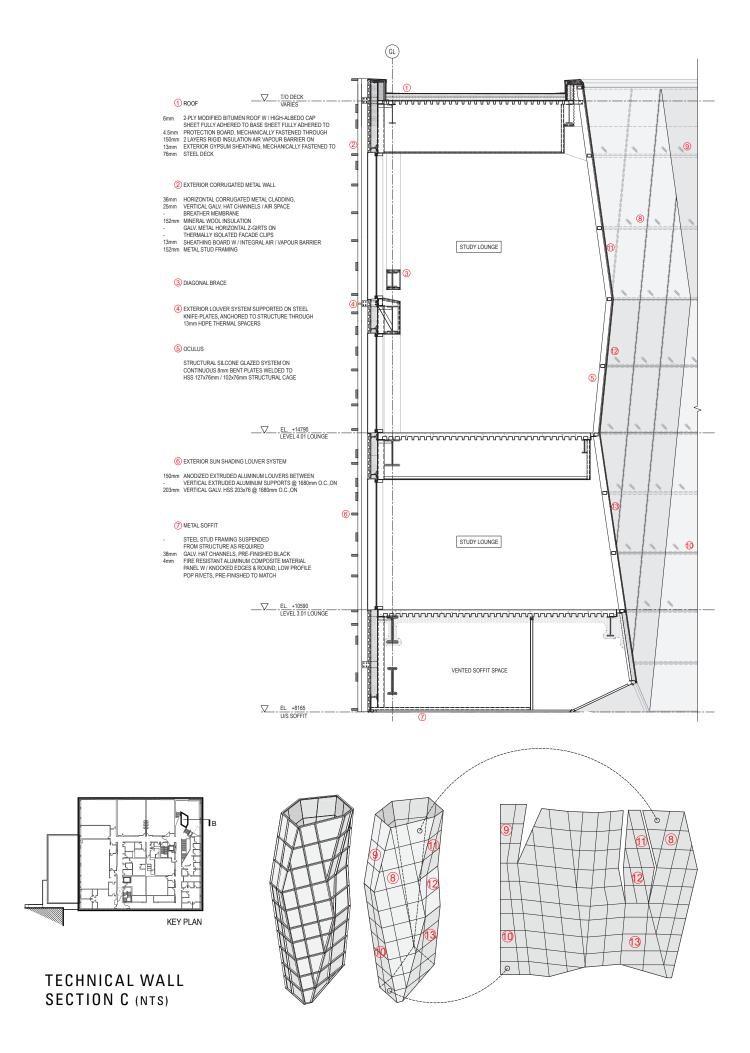
14.86%

OF BUILDING MATERIALS CONTAIN POST-CONSUMER

AND PRE-CONSUMER RECYCLED CONTENT

8%

OF MATERIALS WERE EXTRACTED, PROCESSED AND MANUFACTURED WITHIN 800KM FROM THE PROJECT SITE (2400KM IF SHIPPED BY WATER/RAIL)



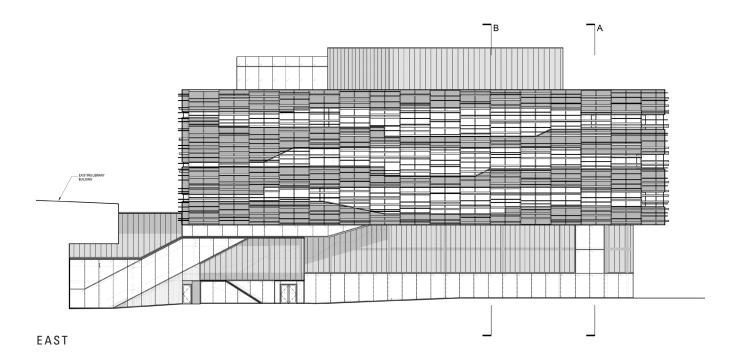


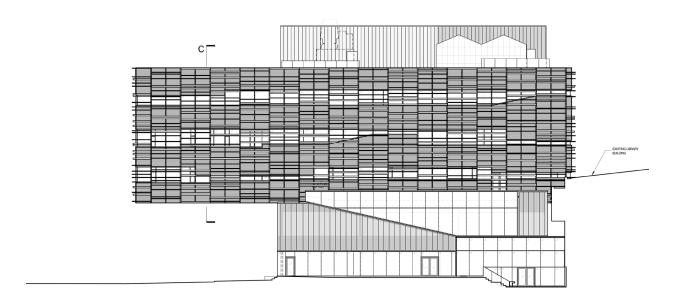
building life cycle conside-rations

A building durability consultant was brought onboard early on to ensure consideration was given to full life cycle implications of material, detail and system choices. The consultant conducted design reviews and site inspections to evaluate the various building components with the design service life requirements of CSA S478-95, and developed a quality assurance plan in accordance with the CSA standard. Building mechanical and electrical systems underwent a rigorous commissioning process.

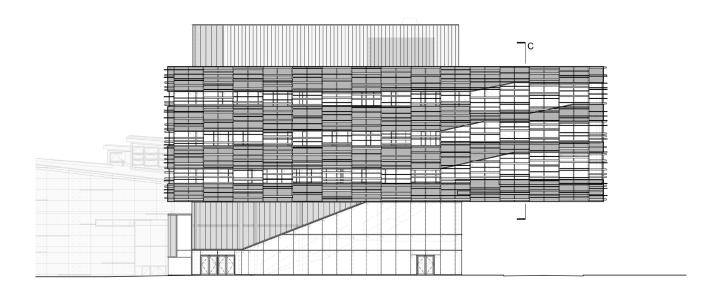




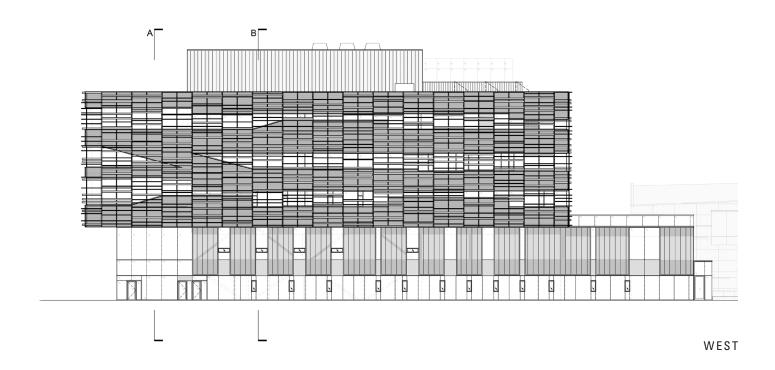




SOUTH



NORTH







education & information sharing

An education outreach program was developed with Open Green Building Society including an audio building tour and an on-line case study. The tour identifies key sustainable design features and is available 24/7 on location or via web or podcast.





