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THE GUIDING PRINCIPLE FOR TEEPLE ARCHITECTS' LATEST GREEN PROJECT IN VANCOUVER: HARNESSING THE WIND

BY MICHAELA RISING
PHOTOGRAPHY BY SHAI GIL

During the design of Langara College's new library, Toronto architect Stephen Teeple learned a lot about Vancouver's unique air currents and how much they differ from the winds that blow through his own city. Consequently, the three-storey library required him and his team to devise new ways of using the prevailing winds to create a passive cooling system. The result is a unique LEED Gold standard building that houses five vented wind towers.

"We thought there would primarily be a westerly wind off the ocean, and in the spring and summer southeasterly ones, as there are here in Toronto," Teeple recalls of the project's inception four years ago. "But of course the winds in Vancouver get tossed around so much by the mountains that they prevail from all directions." As a result, the library's rooftop bows and droops in various directions, its form dictated by the forces of nature.

Teeple turned to fluid dynamics as a solution for modelling the behaviour of the wind to capture and circulate it within the building. Air enters through vents at ground level, and the towers help to maximize the wind's capacity to pull the interior air through and out of the building, creating an upward circulation system. "How it works is quite simple," explains Teeple. "Warm air rises, so the

ATTRIBUTES OF LIGHT AND WIND
Most of the librarian and staff facilities are located on the main floor (above), with reference materials and stacks housed on the second and third floors. Part of the main stairway (right), directly below one of the wind towers.

INNER WORKINGS
Profolit glazing reduces glare in a second-floor open study area (below). The undulating ceiling echos the rooftop's unique form, which dips and droops, using the prevailing winds to enhance the building's passive air circulation

shape of the roof and another set of vents at the top of the towers maximize the wind's potential for passive cooling." A weather station senses the wind's speed and humidity, and through a computerized control system the tower vents open and close as needed. The airflow is so effective that no other air conditioning system is employed.

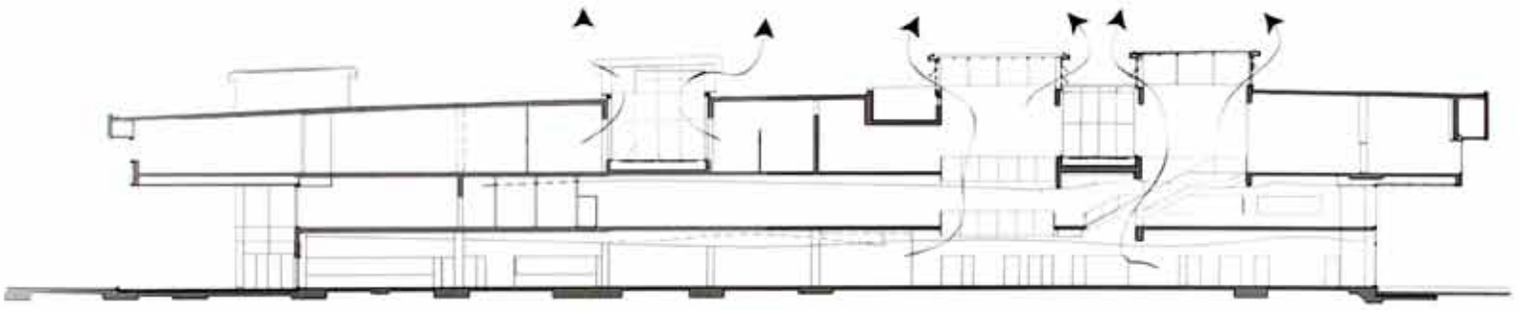
In addition to the towers, a geothermal system, consisting of 78 holes burrowed 250 metres into the ground, keeps the interior at a comfortable and consistant temperature, via heated or cooled water flowing through pipes embedded in the interior concrete floors, ceilings and walls. "We're giving environmental meaning to the attributes of concrete," says Teeple of the building's thermal mass system. "We relate to the planet differently than in Le Corbusier's time, so this use of concrete is a different expression of our evolving world view, which can be developed further by embracing the attributes of sustainable construction. In turn, those attributes can be part of the experience of the form and space of the architecture."

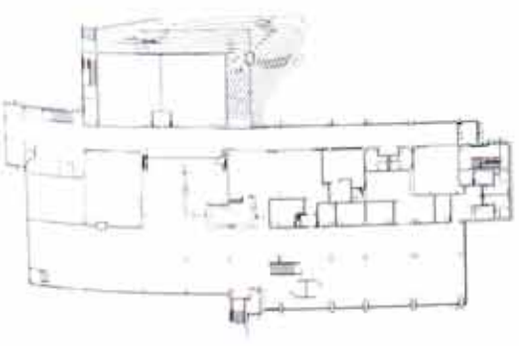
In fact, form has closely followed function with this project. The building's public stairways, for instance, are located under (or, more precisely, in) the five wind towers and define the building's principal public spaces. "The towers have become the expressive force of the interior architecture," says Teeple. Clad in glass, they also provide large wells for letting in natural light.

The building itself is an elegant response to the campus's original buildings, erected in the 1960s and '70s at the height of brutalism. While Teeple chose to keep the interior concrete raw, the exterior is stained deep brown, in contrast to Vancouver's ubiquitous grey skies. High-performance glass and frit glazing throughout brings in natural light, illuminating classrooms, study areas, computer labs and walkways while providing a visual counter to the weighty feel of the concrete.

Inside are various striking viewpoints with open volumes and cathedral-height hallways, a plan that makes navigating the space logical and unforced. Most of the administrative facilities are on the main floor, with the second and third floors housing the library stacks and study areas, including study nooks surrounded in glass so students can enjoy both privacy and a view.

The 7,700-square-metre facility is a $39-million collaboration between Teeple Architects, Vancouver's IBI/HB Architects, and landscape architects Phillips Farevaag Smallenberg. It is also the first building of a 25-year master plan for the city college. The brief: to unify the campus, currently an unwelcoming





MORE GREEN FEATURES

The circulation spine (below) reveals various sustainable features, including thermal-mass concrete heated through a geothermal loop. Cantilevered stairs between classrooms use eco-friendly carpeting by interface; the flooring is coated in water-based epoxy.

PLANNING FOR THE FUTURE

Over 100,000 books fill the library's stacks (below), but Teeple has designed the space for future expansion. The walls of two nearby study areas can be removed, doubling the shelving space.

WATER WORKS

The massive reflective pool (bottom), designed by Phillips Farevaag Smallenberg of Vancouver, is an inviting spot for students to gather. It is also part of the college's master plan to renaturalize the campus with ample green space and fewer parking lots.

A VIEW FROM EVERY ANGLE

Looking down from the third floor (right). Large open volumes below the towers and an abundant use of glass throughout, including on the railings, make it easy for visitors to navigate the building.

patchwork of parking lots, buildings and leftover spaces. The plan calls for several outdoor spaces, including a central student quadrangle, which will require more buildings – including a student centre, also by Teeple Architects and currently under construction.

The core idea for the library was to bury an existing parking lot and add a garden that faces onto the street. "The city was involved in terms of how the college interacts with the public," Teeple explains. As a result, an immense reflective pool now links the college to a neighbouring residential community and a soon-to-be completed public transit station; and parking, for the most part, has been relocated to a three-level underground garage with entrance ramps at the south end.

Langara College library's various sustainable attributes have made it more than 72 per cent more energy efficient than required by the Model National Energy Code – an accomplishment acknowledged with an award from Switzerland's Holcim Foundation. "The most important thing with sustainable architecture is that it is conceptual," says Teeple, who now has a number of LEED standard structures under his belt. "And," he adds, "it's cultural. Architecture is a cultural position, fundamentally." AZ