

LIVING LIBATIONS headquarters

Passive House in the realms of human wellbeing and ecological responsibility



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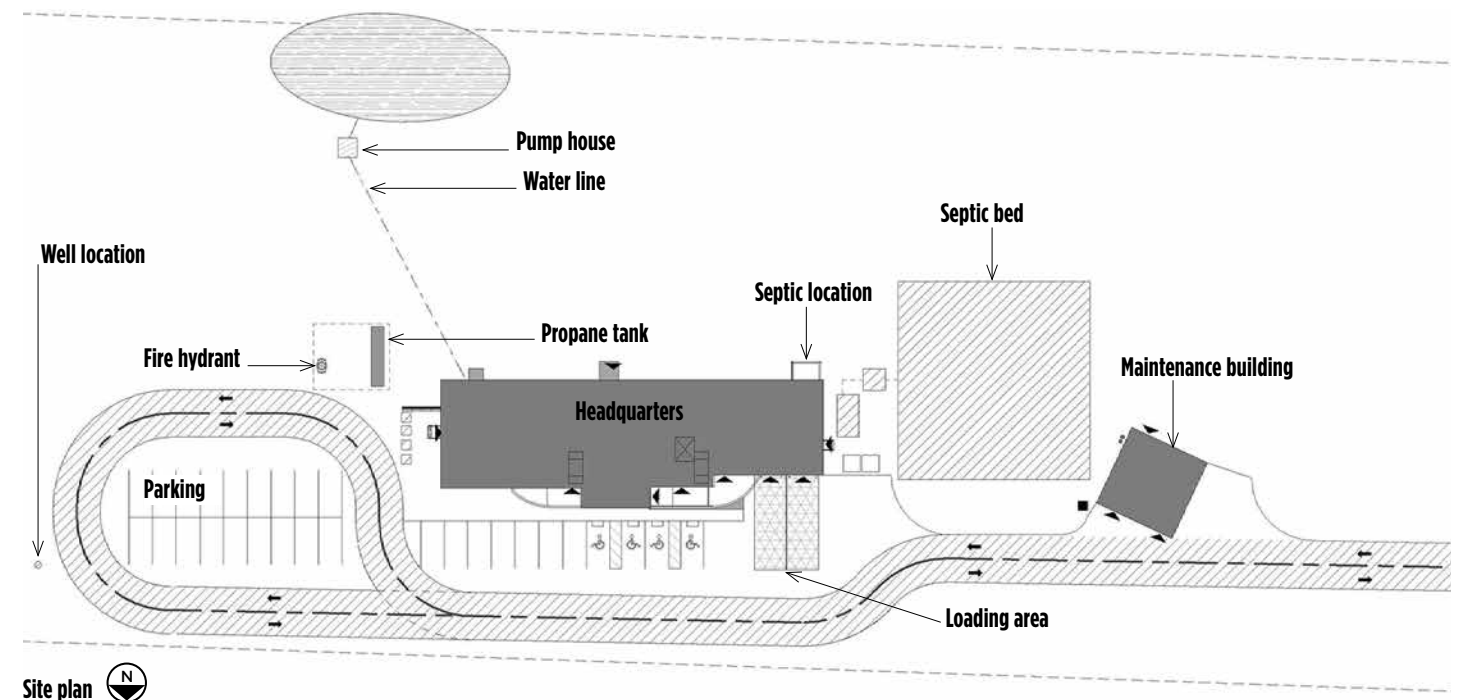
By Jim Taggart

Set on a south-facing slope amid the forested hills of Haliburton, Ontario, the design of the new Living Libations Headquarters reflects a corporate philosophy that places the highest value on nature, beauty and being. In building terms, this philosophy naturally led to the choice of a highly durable, low-energy form of construction, with a strong emphasis on indoor environmental quality and attractive common spaces that would have the minimum environmental impact over an extended life cycle. These criteria led in turn to the choice of a Passive House structure.

A manufacturer of organic beauty care products, Living Libations has a staff of 50 who, on completion of this project, now work in a production laboratory building with an exposed heavy timber structure and natural finishes that create a warm and welcoming atmosphere. The interior hardwood plywood finish is bonded with a food-grade soy-based adhesive, rather than urea formaldehyde (UF), which does not emit toxic air contaminants.

The other program spaces include (on the uppermost floor), a professional kitchen, a south-facing dining room that opens onto a 450m² outdoor terrace, a yoga room with adjoining meditation, and a light therapy solarium which opens onto a large rooftop terrace that has a panoramic view of the surrounding forest and beautiful sunsets.

The design approach was to let the geography of the site shape and locate all built form in order to minimize the ecological impact on the site. Compasses and a solar pathfinder were used to ensure the building was oriented for maximum cold season solar heat gains. The steep south-facing slope made it possible to capture solar heat by locating the majority of windows on the south side while the concrete construction of the ground floor, earth-sheltered by the slope, created a thermal flywheel to modulate diurnal temperature fluctuations.



Site plan

In combination with an unbroken R50 thermal separation, this strategy perfectly offsets peak heating and cooling demand. Wall and roof system designs were modelled for possible interior dew points in "U-WERT" software that proved the benefit of using a smart air-vapour control layer inside the building. "THERM" software was used to guide the design of thermally efficient structural connections.

The design team optimized the building layout, equipment selection, and operation schedule to minimize energy demand. Six air-to-air heat-pumps easily maintain comfortable conditions through -30C winter nights and +30C summer days. Evacuated solar tubes on the roof provide domestic hot water in the spring, summer, and fall, and even pre-warmed water in winter months. A propane back-up boiler system for make-up heat was required by the authority having jurisdiction, but to date it has not been needed.

The building was designed with natural light and healthy air in mind, so the highly efficient LED lights were all specified to be in the natural sunlight spectrum. Indoor lights are controlled by occupancy sensors and manual "off" overrides in every occupied room when sunlight is enough, which is often. Occupied rooms are located on the south side of the building and glass partitions are used in office and corridor areas to achieve maximum sunlight penetration. Outdoor lights are controlled by a timer and are full cut off luminaires to protect the view of the night sky.

Six highly efficient ERVs constantly supply fresh air throughout the building from 7 am to 7 pm, shutting down at night to conserve energy when the building is unoccupied. During operation, the six ERVs provide -0.66 air changes per hour. Of the building's 75 triple glazed 0.6 W/m²/sq/K windows, 58 are operable and 17 are fixed. All custom built solid wood workstations are within seven metres of an operable window.

The building modulates light and heat from the sun through orientation, window placement, solar control, and natural ventilation. Stormwater falling on its flat roofs and the surrounding site is directed to a pond located in an existing natural valley at the lowest part of the site in full view from the building. (Continued on p.14.)

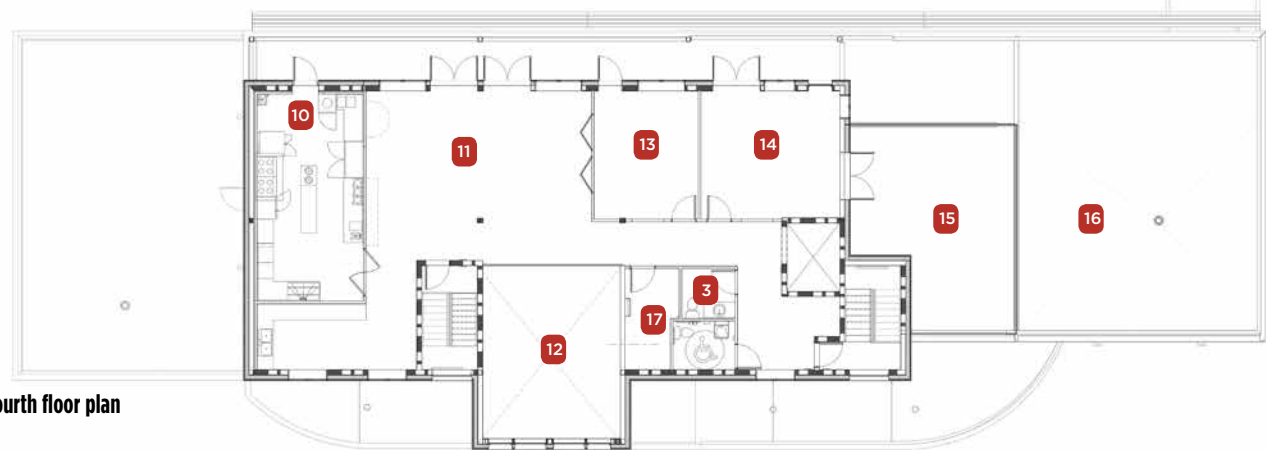


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1. The east elevation.
2. The north and west elevations.
3. The third level south-facing offices. Innovative and customizable Boxx panels from Element5 efficiently span long distances between supporting structural members and are well suited for floor and roof applications in multi-storey buildings. The interior hardwood plywood finish is bonded with a food-grade soy-based adhesive, rather than urea formaldehyde, which does not emit toxic air contaminants. Six Tempeff North America RGSP Series Dual-Core energy recovery ventilators recover both heat and humidity in winter allowing for continuous fresh air supply and a frost-free operation in extremely cold conditions without need for preheat or defrost.



Main floor plan



Fourth floor plan

Floor plans 

- | | | | |
|-----------------|---------------|------------------|-----------------|
| 1 Main entrance | 6 Packing | 11 Cafeteria | 15 Solarium |
| 2 Grand gallery | 7 Shipping | 12 Open to below | 16 Rooftop deck |
| 3 Bathroom | 8 Loading bay | 13 Boardroom | 17 Storage |
| 4 Production | 9 Warehouse | 14 Lounge | |
| 5 Assembly | 10 Kitchen | | |

4. The grand gallery entrance area is open to levels three and four above the main floor. Six Air-to-Air heat pumps by Mitsubishi Electric Heating & Cooling, which can work efficiently below -25C°, provide cooling and heating.

5. The fourth level south-facing covered balcony leads to the west side roof top terrace.

6. The fourth level rooftop terrace connects to the S/W facing solarium. The Katana™ by Moso® bamboo decking is a sustainable, long lasting, class A fire rated natural alternative to other decking products, and very stable in all weather conditions. Aluminum railing profiles by Dekrail are designed for both optimal strength and visual aesthetics.



PROJECT PERFORMANCE

Energy intensity (building and process energy) =
59.7kwhr/m²/year

Water consumption from municipal sources = 0
litres/occupant/year

Recycled material content by value = 5%

Regional materials (800km radius) by value = 54%

Construction waste diverted from landfill = 20%

PROJECT CREDITS

OWNER/DEVELOPER: Nadine & Ron Artemis / Living Libations

BUILDING DESIGN: G West Building Services in collaboration with Steenhof Building Services Group & CHORNY Associates Architect Inc.

PROJECT MANAGEMENT: G West Building Services

CONSTRUCTION CONTRACTOR: CDH Carpentry in collaboration with many other trades.

LANDSCAPE: Kevin Forbes

CIVIL ENGINEER: Greenview Environmental

ELECTRICAL AND STRUCTURAL ENGINEER: Steenhof Building Services Group

MECHANICAL ENGINEER: Brumar Engineering Services Ltd.

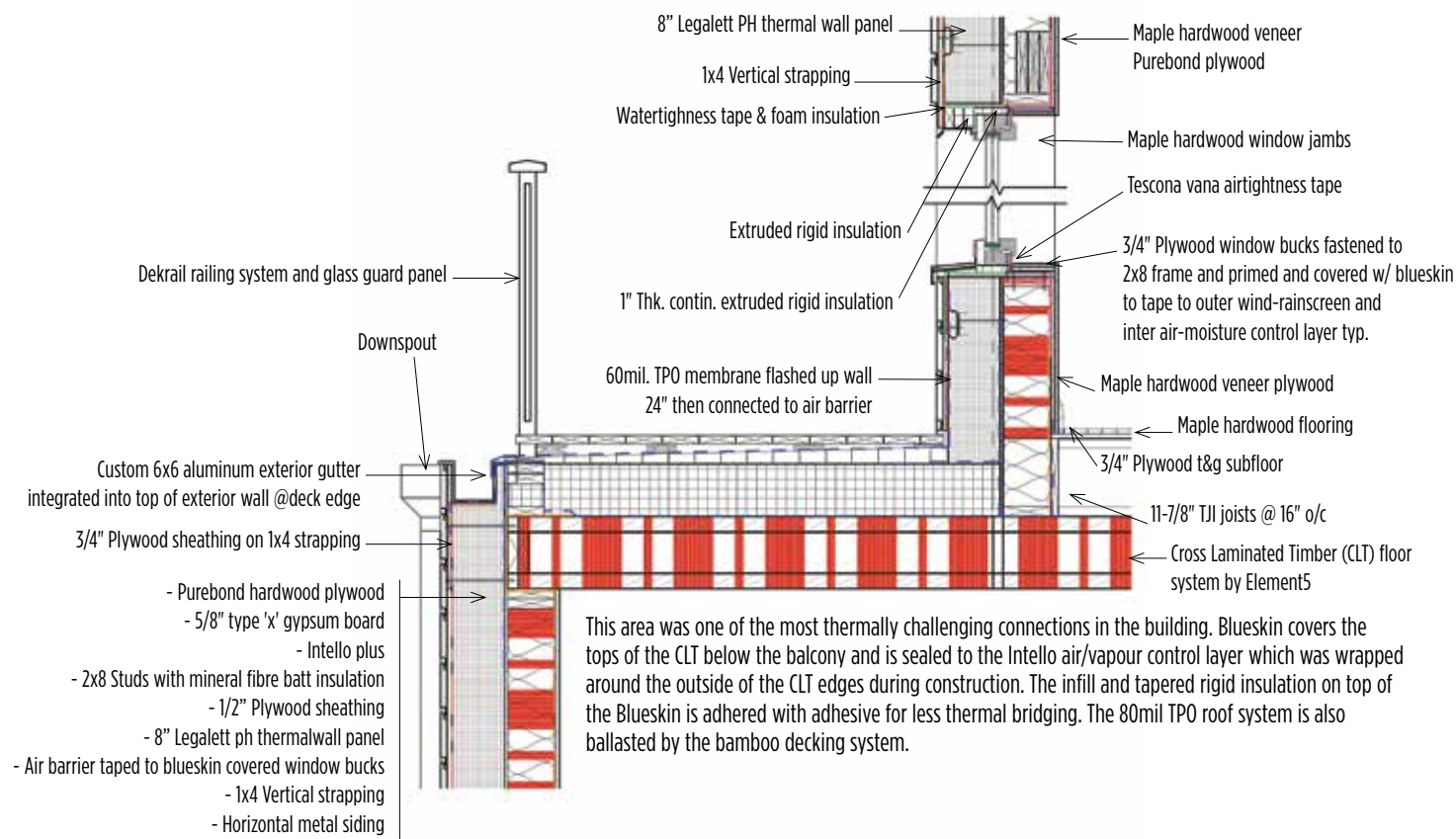
PASSIVE HOUSE DESIGN CONSULTANT: Peel Passive House Consulting

INTERIOR DESIGN & FURNISHINGS: Nadine Artemis & Jamie Lee Mason

PHOTOS: Greg West. Photo 4: John Lehmann Photography

Steenhof Building Services Group was proud to be the prime consultants for all disciplines of Engineering including Mechanical, Electrical & Architectural (Chorny Associates Architects Inc.)





Section of the south-facing balcony

This area was one of the most thermally challenging connections in the building. Blueskin covers the tops of the CLT below the balcony and is sealed to the Intello air/vapour control layer which was wrapped around the outside of the CLT edges during construction. The infill and tapered rigid insulation on top of the Blueskin is adhered with adhesive for less thermal bridging. The 80mil TPO roof system is also ballasted by the bamboo decking system.

This water feature, surrounded by indigenous trees and grasses, will provide habitat for frogs, turtles, and waterfowl. On this remote rural site, a drilled well provides all water required for domestic use and fire suppression. There is no municipal connection and no water leaves the site except through natural evaporation and occupant hydration. The industrial production process requires very little water and all waste water is recycled back to the site through a natural drainage Infiltrator® septic leach field chamber system.

7. The south elevation and pump house in the left foreground. All 75 high-performance windows were supplied by ENERsign.

With upstream filters and separators, the whole system was planned to ensure that water coming into the building was returned to the site in an environmentally responsible manner.

As a direct result of the client's particular vision, the Living Libations Headquarters places the rigorous methodology of Passive House construction firmly within the more holistic and qualitative framework of human wellbeing and ecological responsibility.

Jim Taggart, FRAIC is the editor of SABMag.



The PASSIVE HOUSE issue

LIVING LIBATIONS HEADQUARTERS
Passive House in the realms of human wellbeing and ecological responsibility

DESIGNING FOR ACCESSIBILITY
The Rick Hansen Foundation

VIEWPOINT
Making building performance a selling point, and moving on from the glass tower