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LEED-Certified Buildings

Stratus Winery



FIRST LEED Canada Silver!
 Niagara-on-the-Lake, Ontario
 Andrew Inc. Architect

Stratus Winery is a new 1,870 m² wine making facility located in Niagara-on-the-Lake, Ontario, Canada. The building is owned and operated by Stratus Vineyards Ltd. and consists of a production area, wine storage cellars, offices and a retail area.

From the inception of the project, Stratus Vineyards has recognized its responsibility to minimize any negative impact that its operations may have on the environment. Their intent for the new building was to create a leading example of advanced, low-impact, environmentally responsible design. The following section provides an overview of the architectural nature of the building. The subsequent section outlines the many green aspects of the building. These features are organized according to the main LEED® themes: Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials & Resources, Indoor Environmental Quality and Innovation & Design Process.

Beyond the many green features that have been included in the building, Stratus Vineyards has also made every effort to reduce the energy, water and material consumption associated with the wine making process. Furthermore, they have developed a comprehensive program of constant advancement, which will enable them to make changes for the better on an on-going basis.

Architectural Overview

The governing architectural design principles for the winery can be characterized as 'long life, loose fit, low energy'. The building achieves this in a number of ways:

- a) The 'long life' component is achieved by the choice of materials – all of the structural steel and exterior panels of the building (including the roof) are galvanized, thus adding to their longevity

LEED Canada-NC Registered Project

Stratus Winery

Surrey Transfer Station

MEC Winnipeg

Canmore Civic Centre

St. John Ambulance Headquarters

Crowfoot Library

Spring Creek Firehall

Technology Enterprise Facility III (TEF III)

Alberta Urban Municipality Association Building Expansion in Edmonton

City of Vancouver New Works Yard

The Semiahmoo Library RCMP District Office

Vancouver Island Technology Park

White Rock Operatic Building

and eliminating the need for re-painting or re-surfacing in the future. Interior floor finishes are designed to be easily cleaned without the use of harsh chemical products and also to be very low maintenance. The infrastructure of services is designed with 'optimum flexibility' in mind allowing the present winemaker and future generations of winemakers to adapt the building to their needs.

b) The 'loose fit' component is achieved by designing a large span building structure with a mezzanine suspended from the portal frame. This design frees up the floor space for this particular configuration of winery process, but also allows flexibility for future process designs. The main structural frame of the building has been designed to accommodate the structural loading and connections needed for future expansion plans.

c) The 'low energy' component is achieved through a number of measures: First by designing a compact building enclosure with an excellent 'surface area to volume enclosed ratio'. The exterior walls are highly insulated and solar heat gain from windows has been dramatically reduced by the use of sunshades above the small amount of southern exposure glazing (there is no glazing on the south and west of the actual process building). The primary glazing for the winemaking area is through a large clearstory-glazing band, which runs the length of the north face of the building at a high level. This clearstory window allows natural light into the process area, which in turn is filtered into the barrel cellar on the southern half of the building through the use of a translucent glazed wall. These measures significantly reduce the amount of artificial light needed to operate the building.

The building form of the winery is based on making fine wine using 'total gravity process' through the use of two elevating devices: one is a conventional freight elevator used to transport the containers of hand-picked grapes to the mezzanine level and the other is an elevating platform with two independently operated, stainless steel pressure vessels that allow infinite flexibility in the transportation and transfer of wine to four levels. This elevating device eliminates the need for any 'pumping' of wine, providing energy savings and an increase in quality for the winemaking process.

LEED® Project Narrative

Sustainable Sites

The winery building was sited to make use of a previously developed area covered by an old poultry farm and associated buildings. The demolition of these pre-existing buildings was carried out with re-use and recycling of the materials in mind. Even the existing Quonset hut was stripped down carefully to allow it to be re-used on another site. Great care was taken during construction to minimize the disturbance of the surrounding environment by establishing a soil erosion and sedimentation control plan, carefully monitored by the project and construction managers. Existing mature trees that were affected by the new construction were temporarily moved to a safe location on site with a large tree spade and transported back to their final location at the earliest opportunity (nine mature trees were saved). The stormwater management plan for the building site was designed to direct overland flow through a series of grassy swales and culverts into a sediment pond prior to exiting the site, thus allowing the maximum opportunity for percolation through the soil

and removal contaminants. Gabions/rip-rap, landscape cloth and silt fences were installed at every location where water run-off might cause soil erosion. Access to the site was limited to one entrance. This access point and the entire parking lot were stabilized with gravel from the start of the project to minimize contamination of the construction site and neighbouring streets.

The site landscaping plan was designed to incorporate native and adapted vegetation to reduce water consumption and restore open spaces. Bicycle racks have been provided for both staff and visitors to reduce the use of automobiles (a shower and changing facility has been provided for the staff). Additionally, a hybrid vehicle has been leased for use by employees – with a reserved parking space allotted (noting its use for a hybrid vehicle). The parking lot has been surface treated to lighten the surface colour and reduce heat island effects. Site lighting has been reduced to a minimum and full-cutoff fixtures were specified to eliminate light trespass. Exterior lights are controlled by timers and motion sensors to further reduce unnecessary lighting and reduce energy consumption.

Water Efficiency

Measures have been taken to reduce the amount of water consumption at the site; low flush toilets and waterless urinals were specified in washrooms and the drought resistant landscaping design with native species of grasses and trees has allowed us to eliminate the need for a permanent irrigation system.

Energy & Atmosphere

Throughout the design and construction of the winery, the design team focused on the reducing energy consumption of the building. Starting with the building itself, an east-west orientation was combined with a well insulated envelope to reduce heating and cooling loads. Clearstory windows on the north wall and an interior translucent glazed wall were designed to provide daylighting to both the winemaking areas and the barrel cellars, thus greatly reducing the need for artificial lighting.

Electric lighting was designed to match or have lower lighting power densities than Model National Energy Code (MNECB) allowances and occupancy sensors were included to further improved energy performance.

In terms of the mechanical systems, a ground source heat pump system was devised to provide heating and cooling for the building and the process. A series of 25 boreholes were drilled, each 270 feet deep to achieve a ground loop capable of delivering all of the heating and cooling needs of the winery building and the wine making process itself. This system eliminates the need for inefficient and unsightly rooftop mechanical units. The winery is a near perfect application for ground loop technology because of the net balance of heating and cooling (chilling) needs between the building and the actual wine making process throughout the seasons.

In summary, annual energy consumption has been reduced by an estimated 42% through a combination of process and building system enhancements including:

- High performance building envelope (windows, walls, and roofs)
- Extensive use of daylighting in office and retail areas

- Efficient lighting and occupancy sensors
- Ground-source heat pump system
- High efficiency boilers for tank wash-downs

Materials & Resources

A comprehensive construction waste management program was implemented throughout the project starting with the demolition of the old, pre-existing buildings. Waste materials were separated on site and recycled when possible. The calculated waste diversion rate was approximately 83%.

Materials were selected to maximize recycled content and local content when possible. As a highlight, the pre-engineered steel building had 49% post-consumer and 29% post-industrial recycled content. Additionally, the wall insulation had 75% post-consumer recycled content.

Some rapidly renewable material was used including natural linoleum flooring – although it had insufficient cost to qualify for the LEED® point.

Indoor Environmental Quality

Great care was taken to provide a superior indoor environment for employees and to maintain an immaculate process area for the production of premium wines. A comprehensive Construction IAQ Plan was followed to protect materials and prevent contamination of the building from dust, dirt, moisture and other harmful contaminants. Materials such as paints, architectural coatings and carpets were selected to minimize off-gassing of VOCs. A strict non-smoking policy is enforced. The building was also designed to provide a connection with the surrounding environment through abundant windows with views of the site.

Innovation & Design Process

The energy saving and environmentally responsible measures will be promoted in the winery through a Green Building Education Program involving signage and education material. Visitors will be actively encouraged to learn about green building and the features of Stratus Winery that have been incorporated to improve energy and environmental performance.

A Green Housekeeping Program has been developed that adopts best practices in environmentally friendly cleaning. Products that meet the requirements of Green Seal Standard GS-37 have been specified for use in the building to improve indoor air quality and minimize harm to the environment.

Furniture in the building has been selected based on the GREENGUARD Standard for Low-Emitting Furniture to improve indoor air quality.

A comprehensive operational waste management program has been developed to divert over 95% of process waste materials from landfill.