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BY BUILDING GREEN, ABBOTSFORD SENIOR SECONDARY SCHOOL BECOMES "A SCHOOL TO BE PROUD OF"

Known to locals as "Abby Senior," the new Abbotsford Senior Secondary School has achieved such a high standard of sustainability that the school district developed a special "Green Tour" just to show off its state-of-the-art engineering and technology – including technology suggested by BC Hydro's New Construction Program that has helped make the building a whopping 33 per cent more energy efficient than it might otherwise have been.

AFTER 60 YEARS, IT WAS TIME FOR A CHANGE

Located near the centre of downtown Abbotsford, the old Abby Senior was built in 1952 and, while it had been renovated, partially replaced and added to over the years, the main body of the school was "deteriorating rapidly," says Bob Mainman, Assistant Director of Facilities for School District No. 34 (Abbotsford). "It turned out that it was more economical to retain a few of the newer sections, two gyms and some classrooms, and build the rest new – and better. We had the opportunity to make the new school a school to be proud of, that the students would really like to come to every morning."

But the School District had even larger ideas for the campus, which also includes Abbotsford Middle School, says Mainman. "We wanted the new Abby Senior to be a gathering place for the whole community – a place where everyone would feel they belonged." Now, the new building houses not only the secondary school, but also a public library, a community arts centre and offices for a variety of community services, including a health clinic and the United Way.

School District 34 also wanted the new Abby Secondary to be a model of how to build responsibly, sustainably and energy efficiently – even on a limited budget – which is where the BC Hydro New Construction Program came in.

THE VALUE OF ASKING: WHAT IF?

The New Construction Program provides funding for an energy-modeling study, a simulation of how a building might function throughout a year if it's designed and built with a variety of energy-conservation measures, along with additional financial incentives for implementing those measures.

"Doing an energy-modeling study with BC Hydro made us think in a different way," says Rick Walker, in charge of energy management for School District No. 34 (Abbotsford). "We were able to ask all of the 'what if" questions: what if we turn the

FULL CIRCLE

The architect behind the beautiful new Abbotsford Senior Secondary School is Ryan Huston of Craven Huston Powers Architects, based not far away in Chilliwack.

Huston graduated from Abby Senior in 1975. Thirty-seven years later, he returned to design a new school for future generations.

JUST A FEW OF THE NEW ABBY SENIOR'S GREEN FEATURES

- Ground source heat pump system
- Daylight harvesting
- Automated lighting controls
- A wind and solar powered computer lab (if it's cloudy or calm, students pedal stationary bikes to generate electricity)
- A green roof
- Solar panels to pre-heat hot water
- Waste heat recovery.

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building this way, what if we add triple glazing, what if we go to three storeys instead of two."

The energy-modeling study allowed the Abby Senior design team to compare various lighting, heating and cooling systems as well as windows, roofing, wall and other products, and even look at how the building is situated on the site, to determine the most energy-efficient design.

THE RESULT

The result is a building that's very different from its original concept. Instead of a two-storey building designed in a more standard "V" shape and situated to directly face the front of the property, the final design turned the building slightly to situate it east-west to capture the most light and heat, and added a stunning, three-storey, cast-in-place concrete, steel, glass and wood rotunda. Off the main floor of the rotunda radiate a teaching kitchen, community library and an arts area, while other floors include classrooms and laboratories, as well as a number of what the architects call "bright gathering pockets, pull-out spaces and corridor seating areas" where students can gather.

In addition to its position on the site, other energy-conservation measures include natural "stack effect" ventilation techniques within the rotunda, increased roof and wall insulation, a heat recovery ventilator, low-flow fixtures and both occupancy and daylight sensors as well as shading. But perhaps the most innovative energy conservation measure of all is an open loop ground source heat pump system that uses well water for all space/ventilation heating and cooling.

LOCATION, LOCATION, LOCATION

"Abby Senior sits right on top an aquifer," says Rick Walker, "that feeds into the Fraser River. We drilled some test wells and found there was so much water, we could use the aquifer for our heating and cooling source year round, for both Abby Senior and Abby Middle." Most importantly, though, adds Bob Mainman, "Every drop of water that we pump out of the ground and around the buildings is released back into the aquifer. And it's perfectly clean."

By combining this range of energy-conservation measures, BC Hydro estimates that Abby Senior will save, year after year, over 258,000 kilowatt hours of electricity, which means it will use about 25 per cent less energy than a similar building constructed without those measures. Together with natural gas savings of about 58 per cent, the overall combined building energy savings should reach 33 per cent.

"I got a lot of joy out of this project," says Mainman. "It was great seeing it all come together. It's a beautiful building."

CONSTRUCTION AND DESIGN TEAM

- Architect: Craven Huston Powers Architects
- Energy Modeler: Recollective Consulting
- Electrical Engineer: Jarvis Engineering
- Mechanical Engineer: JM Bean & Co. Ltd
- Construction Manager: Unitech Construction Management

HOW THE GEO-EXCHANGE SYSTEM WORKS

In Abbotsford Senior Secondary's boiler room, the water passes through a heat exchanger into a piping loop and is pumped around Abby Senior and Abby Middle to over 80 individually controlled water source heat pumps.

The individual controls ensure occupant comfort, while occupancy sensors ensure heating or cooling occurs only when the zone is occupied or when ventilation is needed.

If the geo-exchange water system ever breaks down, heat can be added or rejected from the water loop using a boiler or a cooling tower, providing 100 per cent standby capability.

ABOUT THE NEW CONSTRUCTION PROGRAM

The New Construction Program provides financial incentives for new commercial, institutional and multi-unit residential buildings and major retrofits. If you qualify, BC Hydro will fund up to 100 per cent of an energy-modeling study that can be used towards LEED certification and to apply for FortisBC capital incentives (some restrictions apply).

To find out more, visit bchydro.com/construction, email incentives@bchydro.com or call 1 866 522 4713.

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