

# The Beaver Barracks Project

## Teamwork, co-operation and innovation achieve sustainability and affordable housing in downtown Ottawa



*Architect's rendering, Catherine Street building, Phase 2 Construction  
Rendering by Barry J. Hobin and Associates*



*Architect's rendering, Beaver Barracks central community garden  
Rendering by Barry J. Hobin and Associates*

STAFF WRITER – The Ottawa Construction News



*Left to right: Benjamin Moore, Lexus Mechanical;  
Kim Menard, Centretown Citizens Ottawa  
Corporation; Stacey Bernier, Corix Utilities*



*Corix Utilities, central  
geo exchange plant*

The massive Beaver Barracks redevelopment project in downtown Ottawa has proven how the spirit of creativity, co-operation and innovation can turn an under-utilized urban land parcel into a vibrant, affordable housing community.

Tenants have already started moving into the project's first 160-unit, \$30 million phase at 464 Metcalfe Street, with the second building at 160 Argyle to be completed in the next month. Much work remains to be done on the site. Work is scheduled to commence in January 2011 on the project's \$17 million second phase, adding another 88 units and 97,000 sq. ft. of construction.

The design and construction team including owner Centretown Citizens Ottawa Corporation (CCOC), Barry J. Hobin and Associates Architects and ZW Project Management Incorporated will continue working on the second phase, along with most of the sub-trades who built the first phase eight-storey high-rise as well as a four-storey apartment which encompasses four two-storey townhouse units, fronting on Argyle Avenue.

The project has had its share of special challenges: The downtown site is packed with underground utilities and services to service the 247 unit site. It had special planning, zoning and funding challenges (with many layers of approval), as well as demanding special affordability and environmental certification requirements. In addition, the existing paramedic station on Catherine Street next to the YMCA needed to remain in operation throughout construction and then be incorporated seamlessly into the final building design.

According to CCOC's Development and Construction Manager, Kim Menard, it was the co-operative spirit, innovation and energy of the designers, project team and sub-trades who made the project a great success as they partnered together to meet those challenges.

"Everyone has really pulled together to create an incredible project," she said. "I can't say enough how impressed I am with the work by the teams from ZW PMI, Barry Hobin & Associates, our sustainable design consultants, Halsall and Associates, and our geothermal energy provider, Corix Utilities."

Corix, based in Vancouver, B.C., is responsible for one of the project's most fascinating and unique features – a micro-utility geothermal heat and air conditioning system which is expected to meet the project's energy needs at rates near-current market rates for the next 30 years. (See related story.)



*160 Argyle, Phase 1, 4-storey apartment looking west at the north elevation*



## Beaver Barracks

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The project team had to work quickly over the last three years to put this project together and turn the dream of affordable, sustainable housing into a real and viable community.

The history of the site dates back to the 1800s, with the City of Ottawa eventually purchasing the site for a dollar from the federal government in 1992 then demolishing the former temporary wartime housing on the site, across the street on Argyle from the Canadian Museum of Nature.

“The site sat vacant for a decade, with all sorts of competing pressures on how use the land,” says Barry J. Hobin’s principal architect, Gordon Lorimer. “A community garden was added to the site and inserted into the zoning bylaw, and the city, needing a paramedic station downtown, decided to locate it there.”

In transferring the land to the city, the federal government included restrictive covenants, including a requirement that the design conform to National Capital Commission standards “as an important gateway to the parliamentary precinct”.

As well, the city imposed design guidelines for environmental sustainability and set out requirements for a mixture of affordable and market-rate housing, handicapped access facilities with special noise abatement requirements (the project is near the Queensway) in the requests for proposals for the site redevelopment.

CCOC, the largest private non-profit housing group in Ontario (and possibly Canada), as the successful proponent, proved to be the ideal owner, with an intimate knowledge of the community; neighbourhood values and requirements; and the patience and staff resources to brave the complex and prolonged review and approval process to make it through to the construction start in March 2009.

Menard says when CCOC realized the City would be ready to receive proposals to develop the land in 2007, they contracted with Barry J. Hobin and ZW PMI to begin working on the design and construction portion of the submission. CCOC’s proposal succeeded despite stiff competition from several other qualified bidders.

CCOC raised \$18.3 million under the Canada-Ontario Affordable Housing program and \$11.9 million from Action Ottawa, the City’s primary program for increasing Ottawa’s supply of low-income affordable housing and in municipal financing incentives. CCOC used its own equity, private contributions, and mortgage borrowing to cover the balance of the project’s \$51 million financing.

In the early stages, CCOC scheduled a sustainable design charrette with funding assistance and support from Canada Mortgage and Hous-

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## Resolving noise, accessibility and environmental issues



### Noise and acoustics

The Beaver Barracks project has special acoustical challenges. Located downtown, next to the Queensway, the Canadian Museum of Nature and the Elgin Street police station, the site also houses a paramedic station. (Fortunately, ambulances will keep their sirens off when they rush to calls.)

Integral DX Engineering Ltd., with a previous relationship with the Centretown Citizens Ottawa Corporation (CCOC), has the responsibility for designing and managing the site’s noise and acoustic solutions.

The project has three different types of buildings – concrete apartments, wood apartments and stacked townhouses. “Each has its own challenges and requirements,” says Gregory E. Clunis, P. Eng.

The engineers pointed out special concerns with the wood townhouse apartments when they noticed the potential for noise leaks between the units. They recommended quick design changes in consultation with the project team and the mechanical contractor to solve these problems, which also included the compatibility of the floating floor system with vinyl sheet flooring in the original design. “Rapid consultations between all concerned including the flooring suppliers, installers and InsulFloor (the supplier of the resilient flooring) resulted in two mock-ups and an agreed way ahead,” said Clunis.

### Accessibility

“We are collaborating with a number of supportive housing organizations who work with people with physical and developmental disabilities or with a history of homelessness to ensure that these people have access to permanent quality housing,” CCOC says in its project description. “These groups include the In Community, Families Matter Co-operative, Options Bytown and Ottawa Salus Corporation.”

CCOC’s Kim Menard and Barry Hobin architect Gordon Lorimer say that the designers paid special attention to access throughout the building so that persons with mobility deficits would be able to go out and visit their neighbours anywhere within the development. 10% of all units are design for residents with special mobility needs. Countertops, bathrooms and windows are all designed to provide a high-quality living environment.

### Environmental sustainability

The Beaver Barracks project is a model for sustainable development. Features such as the community garden, recycling facilities and building systems are complemented by special Green Education programs for tenants to encourage sustainable behaviour and teach tenants how to use the building system. “This is important because tenant behaviour has a large impact on the overall environmental performance of the buildings, and because of the importance of reducing individual carbon footprints,” CCOC says.

As well, every unit has low-flow water fixtures, energy-efficient lighting, smart meters and Energy Star appliances. The building uses low-emitting adhesives, sealants and paints, with durable low-maintenance materials throughout the site.



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**Wished to congratulate Centretown Citizens Ottawa Corporation (CCOC) and ZW Project Management Inc., it was a pleasure working with you.**



**BARRY J. HOBIN & ASSOCIATES ARCHITECTS**

*Faces Changing Places*





South elevation of 160 Argyle overlooking future community garden

## Beaver Barracks

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ing.. “We invited all of the stakeholders to a two-day workshop including CCOC staff, the consulting team, the neighbours, including the Museum of Nature, the YMCA and the owner of the adjacent Windsor Arms Apartments,” Menard said. “There were people from five or six city departments, planners, building officials, representatives

of the NCC, the Canada Mortgage and Housing Corporation.”

Gord Lorimer noted that the charette was effective in setting a number of project goals including the decision to use a geothermal heating system and to achieve a 40 per cent energy cost reduction over conventional apartment buildings.

The designers also turned design requirements and aspirations into specific im-

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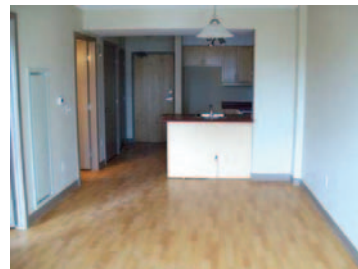
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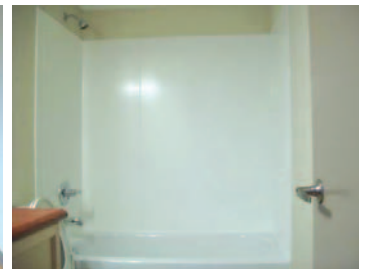


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provements:

Special, large ground-floor amenity rooms provide space for tenant community involvement and special events from outside organizations (Menard said, for example, their new neighbours at the Ottawa Police headquarters or any other group could rent the ground floor room if they wish to use it for special functions or events.)

Rooms have been designed with operable windows, but the building design is such that tenants will be equally comfortable if they keep the windows closed. The designers decided to avoid balconies for units fronting the Queensway or Metcalfe Streets. "Our analysis showed that Queensway noise levels would make balconies so uncomfortable that no one would use them. We were concerned that the balconies would simply become unsightly storage areas," said Lorimer.

The building, hosts a rooftop terrace community garden, which will provide a respite and social environment in the warmer months;

The buildings don't have garbage chutes, which can become blocked and (worse) encourage tenants not to take responsibility for their waste and recycling. Tenants will receive encouragement to engage in good environmental practices from

an on-site CCOC facilitator.

Handicapped units are designed with accessible bathrooms, kitchens, and hands free access control door systems for the suite entry doors

The paramedic facility has been incorporated into the new structure, with special access and egress for the ambulances. "I don't think tenants in this building will have to worry about response time if they need to call 911," joked ZW PMI Project Manager, Thady Murray..

The buildings feature a diversity of unit types. Everything from bachelor, one, two and three bedroom apartment and townhouse units provide an ideal living environment for people who want to live in affordable rental accommodations in the central core. "CCOC offers a mix of market rent units and affordable units that are income based," noted Menard.

These positive elements challenges brought with them a host of design difficulties.

The most notable, say the designers, was the decision to use wood frame construction for the four-storey apartment building on Argyle Avenue.

"We believed at the outset that wood would be less expensive and quicker to construct," said Gord Lorimer. "We had done three-storey wood frame projects without problem, but no one appreciated the scale of problems we would encounter by adding the fourth floor.

"The addition of a fourth floor shifts the design to a completely different set of On-



(left to right) Kim Menard, CCOC; Thady Murray, ZWP/MI; Gerry Nault, ZWP/MI; Gordon Lorimer, Barry J. Hobin & Associates

tario Building Code provisions. The sprinkler and seismic requirements imposed on a four-storey wood frame building make the integration of sound control and fire separations much more complex," he said. "As well, the extra floor has made it much harder to run the piping and duct work for the heat recovery ventilators we are using."

"The additional code requirements added about 20 per cent to the structure's cost and intensified the labour component," ZW's Murray said. "The Argyle building was supposed to be finished first ahead of the Metcalfe high rise, but because of the complex construction it will finish a month later."

In some other projects, these types of design and construction problems with delays and cost over-runs, might cause tension and disputes between the project participants, but no one is playing the blame game at Beaver Barracks.

"We're very fortunate to have the kind of team we've had for this project," said Menard. "ZW's site superintendent Gerry Nault really is the driving force behind keeping this project on track despite significant last minute site services changes which threw a real wrench into our carefully thought out construction plans..

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While the rest of the project team scrambled to put the project back on track on paper, Nault kept trades moving ahead and progressing with construction. The real measure of success is that everyone is still talking to each other at the end of this process.” CCOC’s Menard said. “I can’t speak highly enough about ZW and Hobin’s design team. They’ve all been great to work with. We set our minds on this project at the start to partner together and work through the challenges and its safe to say we’ve still got a very good working relationship with each other,” she paused, “even if I can’t seem to win the ZW hockey pools.”

Similarly, ZW’s project manager Thady Murray and Barry Hobin architect Gordon Lorimer had words of praise for Menard’s many years of construction experience in residential and ICI projects, both on the contracting side and the owner’s side, which allowed her to respond quickly and fairly when site issues needed direction or decisions from the owner.



*Architect's rendering of Phase I and II of the Beaver Barracks Project, Ottawa, ON  
Rendering by Barry J. Hobin and Associates*

## BEAVER BARRACKS SUPPLIERS' LIST

Construction Managers ZW Group PMI - 150 Richmond Road, Ottawa, ON, K1Z 6W2	Inspections & Testing Paterson Group Inc.	Structural Steel Raycon Steel Inc. 14 - 2295 Stevenage Drive, Ottawa, ON, K1G 3W1	S&I)	313-17750 65A Avenue, Surrey, BC, V3S 5N4
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**Congratulations to the whole team working on the Beaver Barracks project.**



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# GeoExchange system provides ground source heating and cooling

STAFF WRITER – The Ottawa Construction News

The Beaver Barrack's most impressive achievement cannot be seen from the surface. You need to go below ground where 54 geothermal wells connect to an incredible array of pipes, valves and electronic equipment to generate heating and cooling year-round under a contract that assures the CCOC and its tenants stable energy costs for the next three decades.

"GeoExchange, also known as geothermal heat pump technology, takes advantage of the abundant low-grade solar thermal energy that is stored in the ground year-round – literally energy under your feet," says Ruben Arellano, an engineer with Hemmera Energy, which designed the system for Corix Utilities. "Only a small amount of electricity is used to operate the system resulting in overall energy efficiency 300 to 500 per cent greater than common natural gas or electric equipment," he says. "Greenhouse gas emissions are reduced dramatically by the same degree."

This system required significant up-front capital investments and the central Ottawa site also had special challenges. The geothermal wells needed to be drilled in soft leda clay with a patchwork of municipal services and utilities including sewer, water, gas and electrical lines overlaid on the borefield, plus the added requirements to meet new seismic code regulations.



"If you could see what things looked like underground, you would be amazed," said ZW Group's project manager Thady Murray. "We started off with contaminated soil conditions which needed to be corrected first, storm water management requirements, and of the utilities and site services competing for space within the same area as

the 54 wells." It was agreed that the best way to manage the complex environment would be to dig down to the bottom of the proposed excavation elevation and then build up the layers of geo exchange lines, utilities and site services in layers in a patchwork to avoid interference issues and pace the work

with various approvals as they were received from different authorities.

Corix Utilities took on the challenge of building and managing the GeoExchange system in a co-operative agreement with CCOC to install the system under a micro utilities contract. Lead on site by Stacey Bernier, Technical Director Sustainable Energy, Corix owns the system and is responsible for its design and management, recuperating its capital investment over the project's operating life. CCOC Development and Construction Manager Kim Menard says the project assures that energy rates will be virtually fixed, aside from cost of living increases, at current market rates for the next three decades.

Corix's third party ownership added another level of complexity to the work since Corix worked with its own sub trades and suppliers, but the utility's representatives integrated their efforts with the overall project team to ensure the project remained on schedule and budget.

"To date, this is the largest central residential system that we are aware of in Canada," says Menard.

While the designers expect that the Geoexchange system will provide most of the project's heating, cooling and domestic hot water, the year-round, the system is a hybrid design that uses natural gas boilers for additional energy to support heating and domestic hot water during peak periods.

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