

YWCA Elm Centre - Environmental Sustainability

Geo-Thermal Radiant Heating & Cooling System

From the outset, a major emphasis of all participants in the planning and design process of YWCA Elm Centre has been to achieve the highest possible level of energy efficiency within the development. This emphasis corresponds closely to the City of Toronto's ongoing efforts at reducing energy consumption to a sustainable level.

A requirement of the funding for this project is that YWCA Toronto achieve a level of sustainability similar to LEED® Silver. LEED® is one of the systems for measuring the sustainability of building design in Canada and the U.S. Numerous measures are being taken to enable the project to achieve this standard, representing a level of sustainability consistent with the City's green building standards.

In moving forward with the development, YWCA Toronto and its project partners have recognized that we have both an opportunity and a responsibility to exceed this level of sustainability, and to help set a new and important direction for future affordable housing projects (and indeed for all multi-residential buildings) being developed in the city. Taking this initiative and making this commitment will contribute to the City's sustainability targets, significantly reduce the level of greenhouse gas emissions and also help achieve long-term financial stability within the project. Not only will this approach greatly reduce energy use within the building, it will also significantly enhance affordability for the residents.

After an in-depth analysis of a variety of alternatives, the team has agreed to incorporate an innovative geothermal/in-slab radiant heating and cooling system within the development. While the cost of this system is significant, \$4 million, an estimated savings of 45% (415 tonnes per year) in greenhouse gas emissions beyond the City's green building standard could be achieved— far exceeding the level of energy savings available from conventional mechanical systems.

Green Spaces

YWCA Elm Centre will incorporate five green roof spaces, plus the two rooftop gardens mentioned previously, providing many economic and community benefits.

Economic Benefits - cost savings opportunities include:

- Protection of roof membrane resulting in a longer material lifespan (up to twice as long as conventional roofs), and decreased maintenance, and savings in replacement costs;
- Savings on energy heating and cooling costs. Field experiments by Karen Liu in Ottawa found that a six inch extensive green roof reduced heat gains by 95% and heat losses by 26%, compared to a reference roof.

- Soil, plants and the trapped layer of air can be used to insulate for sound.
- Satisfying the aesthetic needs of people looking down upon the roof from adjacent buildings.
- Potential to score more than 7 credits under the US and Canadian Green Building Council LEED® certification system.

Community cost savings opportunities include:

- **Reducing the "Urban Heat Island Effect"** and the need for interior building insulation.
The 'Urban Heat Island Effect' is the difference in temperature between a city and the surrounding countryside. It is mainly due to the expanse of hard and reflective surfaces, such as roofs, which absorb solar radiation and re-radiate it as heat. Reduction of the 'Urban Heat Island Effect' will also reduce the distribution of dust and particulate matter throughout the city and the production of smog. This can play a role in reducing greenhouse gas emissions and adapting urban areas to a future climate with warmer summers.
- **Extending the lifespan of landfill sites by reducing re-roofing material waste.**
- **Opportunities to recycle aggregate and compost.**
- **Improved Air Quality** – A green roof will not only absorb heat, decreasing the tendency towards thermal air movement, but will also filter the air moving across it.
- **Carbon Dioxide/Oxygen Exchange** – Through the process of photosynthesis, plants convert carbon dioxide, water and sunlight/energy into oxygen and glucose.
- **Temperature Regulation** – Through the daily dew and evaporation cycle, plants on vertical and horizontal surfaces are able to cool cities during hot summer months. In the process of evapotranspiration, plants use heat energy from their surroundings when evaporating water.

(source: http://www.greenroofs.org/index.php?option=com_content&task=view&id=26&Itemid=40)

YWCA Elm Centre - Urban Planning Benefits

Sustainable development has become a 'buzz-word' in the planning industry, with the recognition that present ways of consumption and living have led to problems like the overuse of natural resources, ecosystem destruction, pollution, growing inequality in cities, the degradation of human living conditions and human-induced climate change. Planners have, as a result, advocated for the development of sustainable cities.

Stephen Wheeler, in a 1998 article, suggests a definition for sustainable urban development to be "development that improves the long-term social and ecological health of cities and towns." He goes on to suggest a framework that might help us all to understand better what a 'sustainable' city might look like. This includes compact, efficient land use; less automobile use yet with better access; efficient resource use, less pollution and waste; the restoration of natural systems; good housing and living environments; a healthy social ecology; sustainable economics; community participation and involvement; and preservation of local culture and wisdom.

(source: http://en.wikipedia.org/wiki/Urban_planning)

Community Gathering Areas

Building a safe and supportive environment for our residents is paramount. YWCA Elm Centre will include a secure outdoor play area, as well as an indoor play area for the children and their caregivers. The outdoor play area will be housed within the residents' secure courtyard. We envision the outdoor area to include an all-in-one type apparatus that would be made out of recycled wood materials and include a bridge, slide, climbing areas, with a seating area for their caregivers, as well as a hard surface area for basketball and net ball.

The indoor play area will be housed within the tenant lounge on the main floor, and will provide a safe and stimulating environment, including a child-friendly floor covering.

An open-concept, public courtyard and walkway running along the Chestnut Street side of the property will engage the larger community and provide attractive outdoor amenity space for residents.

There will also be two rooftop gardens contributing to the environmental benefits of the development, as well as providing a secure and relaxing area for the residents. One garden will be on the roof of the 9th floor, adjacent to the residents' laundry area, providing an area to enjoy the out-of-doors and allow the children to play. There are also plans to develop a community garden for the residents' use. The second roof garden will be on the roof above the Wigwamen portion of the building.

YWCA Elm Centre will bring together 300 families from many cultures, in an attractive and functional setting. The centre will provide a mix of income levels, reversing the idea that living in downtown Toronto is only for high income earners.

YWCA Elm Centre will also be built to the highest energy efficiency possible, using green products where possible. It is also located close to public transit and shopping centres.