LIVING WITH LAKES
CENTRE FOR FRESHWATER RESTORATION AND RESEARCH

Sudbury, Canada

INTRODUCTION

The Living with Lakes Centre (LWL) is a collaborative, working laboratory situated in the drinking water source for the City of Greater Sudbury, Ontario. It is located within the Holland Marsh, a region home to some 170,000 acres and with its lakes and wetland areas, is the site of one of the largest systems of freshwater ecosystems in the world. Sudbury is home to some 170,000 people and with its lakes and wetland areas, it is the site of one of the largest systems of freshwater ecosystems in the world. Sudbury is home to some 170,000 people and with its lakes and wetland areas, it is the site of one of the largest systems of freshwater ecosystems in the world.

The natural environment surrounding what is now Sudbury and its lakes is also an extension of the biologically diverse ecosystems and stunning landscapes that map across many of Canada's most remote areas. Because of this, the region is home to some 170,000 people and with its lakes and wetland areas, it is the site of one of the largest systems of freshwater ecosystems in the world. Sudbury is home to some 170,000 people and with its lakes and wetland areas, it is the site of one of the largest systems of freshwater ecosystems in the world.

1.8 billion years ago

1871

[Image: Map of the Holland Marsh showing the location of the Living with Lakes Centre and surrounding wetlands and lakes.]
ECOLOGICAL HEALING:
a building with a positive footprint

ECOLOGICAL QUALITY & ENERGY CONSERVATION

With water at the forefront of the research being conducted at the Living with Lakes Centre, a watershed study was undertaken to understand the local ecology of the site and the potential synergies with building systems. This work and a long-term study of the influence of a storm and grey water reuse system and the constructed wetland is improving the water balance of the site. Together these elements will integrate with the landscape to form a positive feedback loop for improved water quality and increases biodiversity. These systems are part of an integrated approach that not only addresses current conditions but looks well into the future through a 2050 CLIMATES. This approach combines with a mandate to maintain energy efficiency and minimize operating costs.

DESIGNING FOR 2050:
a building that adapts to climate change

addressing the implications of climate change

QUANTUM CHANGE

The Living with Lakes Centre is the culmination of years of research, evaluations and memorial healing and environmental consciousness, government institutions and local citizens. Together with an award winning design firm, this group sought to design a building that goes beyond the current model of deflecting energy and focuses on the idea that buildings can have a positive impact on the environment and community at large. To facilitate this paradigm shift, an integrated design process was used that saw engineers, architects, and clients of similar stature who collectively developed knowledge and shared a collective mission with a specific strategy. By integrating the building environment with the natural and addressing impacts of climate change, the Living with Lakes Centre ensures that the resilience of the site will be resilient in the natural sense. This shift from reactive to ecological transformation is essential for sustainable development.

The project links between water, energy, and the environment are embedded in the history of Saudbury and reflected in the Centre's design. The Living with Lakes Centre will stimulate the city through its research, public programs, web-based media and design that saves 17% less energy, almost 95% less water, and costs $75,000 less per year to operate than a conventional building. - A practical example of the triple bottom line philosophy that will transform our current unsustainable models. The Centre aims to become a collaborative research facility that is a living demonstration of sustainable technologies, allowing it to become a local, regional and global knowledge source for adaptive ecological re-wrapping.

ENVIRONMENTAL
UNDERSTANDING ECOLOGICAL SYSTEMS: the Laurentian University Watershed

This graph from studies tracking the occupancy of lakes showed a dramatic decrease in 1990, a drought year. The reason for this is thought to be related to decreased precipitation, which in turn caused lower water levels, productivity, and the food web to be disrupted as a result of soil and water runoff.

1988 DROUGHT

UNDERSTANDING CLIMATE: analyzing Sudbury in a 2050 climate

With climate change a focus of the Centre’s research, the building is being designed to go beyond LEED Platinum standards and address global warming by reimagining the building as a carbon sink. The core strategy was to use a modular mechanical system that relies on a closed-loop ground-source heat pump system combined with roof radiant heating/cooling and an ETFE foil to trap energy in the building. This system impacts on a scale of least warming, and out of the ground. Stormwater runoff is captured as the building’s rainwater harvesting system.

KnowLEDGE DISSEMINATION: a local solution with a global impact

Field crews of students and scientists gather samples from the surrounding lakes, rivers, and streams of the Keweenaw region. This information is then transported back to the Living with Lakes Centre for further analysis.

1930 - 1971: Shredding woods and railroad tracks

The encroachment of the rails disrupted the timber market, which led to deforestation and industrialization. The railroad tracks were used for logging and mining operations.

1969 - 1970: Sudbury's industry grew rapidly as copper and nickel exports increased, leading to the growth of the mining industry.

1971: Hard rock mining at Sudbury, which is the leading source of nickel, copper, silver, and palladium.

DEVASTATION

Living with Lakes Centre

REGIONAL research & information gathering

$200,000

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ETHICAL STANDARDS

Freshwater is the very essence of life and highlights our responsibility to the environment. Ensuring access to clean freshwater is one of the greatest ethical challenges we face. There can be no social equity without it. At present, almost one billion people are lacking access to clean water and current projections suggest that need will increase by 50% by 2025. Ensuring global water security and the sustainable development of our ecosystems is a collective responsibility, especially for developed countries such as Canada. Protecting and restoring our water resources is essential for both future generations and for our own survival.

The research at the Living with Lakes Centre will seek to address a variety of water pollution problems. The Living with Lakes Centre is utilizing a site-integrated rainwater and greywater reclamation system to reduce total water consumption by almost 75%. This extensive research project and the example of water conservation practices are designed to help address global water issues. Thus access to the knowledge gained will be provided to developing countries.

The notion of social equity has been brought into the design of the buildings as well, where everyone, regardless of their position or role, has equal access to natural daylight and fresh air. This planning is consistent with the overarching philosophy of the staff and researchers, who believe that education is the key to creating an environment that respects their own values and principles. Believing that we cannot continue to prioritize environmental concerns and economic issues surrounding human rights in favor of profit-oriented projects, we believe that our research and education will be conducted according to this principle. For instance, the water conservation measures specified for the project, the FSC-recognized Forest Stewardship Council, ensure a sustainable forest management system, while supporting local economies. The integrated facility, with its shared purpose of celebrating local communities and providing a space for research and education, serves as an example of how we can work together towards a more sustainable future.

GLOBAL
helping communities worldwide

RECLAMATION
2005

Baren Landscape
1981
1997
2001

Reclaimed Landscape
2005

1978 - 2005:

- Baren Landscape:
  - 4.20 ha of wetlands
  - 1.40 ha of wetland
  - 1.80 ha of wetland
  - 1.40 ha of wetland

- Reclaimed Landscape:
  - The baren site has been transformed into a vibrant natural environment with a diverse range of plant and wildlife species.
ECONOMIC PERFORMANCE & COMPATIBILITY

The economic performance of this building is tied to the social and environmental aspects of the life saving with Lakes Centre, addressing the notion of triple bottom line in a holistic manner. The reduction in annual operating costs compared to a reference building is projected to be $7,500 per year. Savings from these measures include:

- Reduced maintenance costs
- Lower energy consumption
- Improved indoor air quality
- Increased employee productivity

These savings are due to the implementation of sustainable design principles, reducing the building's environmental impact and improving its overall performance.

EXCELLENCE IN ENERGY:
77% Reduction = $75,600 annual savings

GROUND FLOOR PLAN

SECOND FLOOR PLAN

2006:
Living with Lakes Centre: RTP pilot project facilitates a holistic approach to sustainable design, aiming to create a self-sufficient and environment-friendly facility.

2010:
Living with Lakes Centre: RTP pilot project successfully demonstrates the integration of sustainable design principles, showcasing a model for future development.

For more information, please visit the project's official website at [www.lakescentre.com](http://www.lakescentre.com).

2006:
Living with Lakes Centre: RTP pilot project.

2010:
Living with Lakes Centre: RTP pilot project.

Economic data provided by Smith & Smith Economic Consulting. The cost savings were calculated based on an average energy consumption rate and operational costs for a typical reference building, adjusted for inflation and other relevant factors.
CONTEXTUAL & AESTHETIC IMPACT

Imagine a setting of Lakeside cabins operated by scientists, taking domestic spaces and framing them with laboratories – kitchens, living rooms and bedrooms are staffed with lab equipment, beakers and petri dishes occupying every nook and cranny. Each of these houses has named after notable scientists convened for their area of study – the Fresh House, the Bug House, the White House, etc. This village-like setting is the impetus for the Lakeside with Lakeside Centre and the inspiration behind the design – a building with enormous, flowing structures that wrap around the outposts of the lake. Integrating itself into the local topography and landscape, it highlights the natural landscape features. This singular idea has allowed the current scientists to rework the existing work facades to shape their daily work environment. To some, a bending glass sheet, beams a floating roof. The vertical and undulating stories extend into main entries as well, the weather is cloaked in order, the crests resemble tree facades that seem neither old to survive. Its structural plan of spaces and paths tell the story of the ancient natural forests of the eight, while the four-sticky building represents the 1% award winning community land recycling program where living by over 1000 people was used to reclaim our last forests. The undulating nature of the setting suggests a close link to the glacial glinting and capturing the east light and energy – a symbol of building sustainably in northern landscapes.

The adjacency of the lake speaks to the presence of humans through time to settle at the edge of the water. Such interactions between land and water are the most profound examples of how humanity has transformed relationships with nature. The result is not only a core is building, but the integration of site, building and ecology into a living system, creating an interdependency that turns the boundaries between the natural and built environments.

SITE & BUILDING INTEGRATION

Both buildings have given each other a new vision, allowing each to act as an extension of the existing landscape to provide habitat for wildlife, framing the boundaries between the built and natural environments.

2011 FUTURE PROJECTIONS 2050