



TSH
engineers
architects
planners

Portfolio

t o t t e n s i m s h u b i c k i a s s o c i a t e s

TSH won the Ganaraska Region Conservation Authority's architectural design competition by providing a comprehensive, fully-integrated design that creatively suited the requirements of the Ganaraska Forest Centre facility. TSH's objective was to remain true to the client's vision by minimizing the building's effect on the forest's environment and carefully balancing the built infrastructure within the site, integrating renewable energy resources and energy saving initiatives, while remaining cost-effective.

The 1,530 m² facility is equipped with a loggia, a large covered porch entryway, leading to a lodge meeting room, suitable for gatherings. There is also a wing containing bunk areas that accommodate up to 80 visitors. To contribute to the learning environment inspired by the Ganaraska Forest Centre, electrical meters will allow students in the bunk areas to track their energy consumption

and compete in energy conservation.

In order to reduce energy consumption and eliminate the need for air conditioning, the building was positioned to optimize solar gain in the winter and provide shade in the summer. The sheltered buffer of the porch adds further

TSH staff offer sustainable building options for clients who want to minimize their facility's ecological footprint.

protection against the elements. Trees and other plantings will reduce ground reflectance, increase absorption of stormwater runoff and increase shading.

The building is also wrapped in a high performance envelope to minimize internal temperature ranges and allow for the use of natural ventilation. There will be an extensive, low-maintenance, green roof system on flat roof areas that will add insulation and allow absorption and evaporation of stormwater. Floors will be colour stained and heated with radiant hot water supplied by a combination propane/ wood-fired boiler and solar thermal hot water system. Heat recovery systems will be used to recycle energy.

In order to take advantage of local resources, timber harvested from the Ganaraska Forest will be used and all other building materials will be supplied from businesses within 800 km of the site.

TSH's forward thinking and respect for environmental concerns, as well as societal needs, made the conceptual design a perfect match for the objectives of the client.

TSH Employee Wins 2005 Canada Energy Efficiency Award for New Home

A landscape architect from TSH won the 2005 Canada Energy Efficiency Award for New Homes for his recently built home that incorporates renewable energy resources, including heating, power generation, landscape and systems integration.

Submissions were judged by National Resources Canada's (NRCan) Office of Energy Efficiency on: annual energy use, affordability, ability to replicate materials and systems used, innovation, creativity and comprehensiveness.

The 465 m² two-storey home is not only a beautiful and comfortable retreat for his family, but is also economical, self-sufficient and easy to operate. The use of renewable energy sources, local labour and locally-produced building materials have significantly reduced the family's energy costs and ecological footprint.

Both levels of the house are equipped with radiant heating systems that circulate warm water. From mid-May to mid-October, 60 vacuum solar thermal heating tubes supply the family's hot water, while a wood gasification/propane boiler delivers extra energy in winter. Twelve solar panels and a wind generator feed 24 batteries, backed by a propane generator, for the house's electrical needs. A typical new home rates 68 on the NRCan EnerGuide for Houses Report. This home achieves an annual energy efficiency rating of 81.



Wind Generator, PV Array and Solar Thermal Tubes

407 East Individual Environmental Assessment

On January 17, 2005, the Ontario Minister of the Environment (MOE) approved the Environmental Assessment (EA) Terms of Reference (ToR) for 407 East. TSH led a multidisciplinary team of transportation and environmental specialists to assist the Ontario Ministry of Transportation (MTO) complete the ToR. MTO also retained TSH to manage an individual EA for the province.

The individual EA will assess functionally different ways of approaching and coping with the transportation challenges and opportunities identified in the EA ToR. A significant component of the EA will be to define transportation problems within Durham Region and surrounding areas, and provide information on opportunities available to resolve those transportation problems. A 30-year planning horizon will be used in the transportation analysis.

The individual EA will assess and evaluate all practical planning alternatives, involving comprehensive environmental, economic and engineering criteria. The preferred planning alternative will be the focus of an intense exercise to identify, assess and evaluate different route alternatives, should a linear transportation corridor be recommended.

Another fundamental component of the EA will be extensive agency, stakeholder and public consultation. The ToR commits the province to use innovative and intensive public participation strategies to ensure wide-ranging and broad-based community involvement in the EA process.

The individual EA will be undertaken in accordance with the conditions set out in the approved EA ToR, and will fulfill the requirements of both the Ontario Environmental Assessment Act (OEAA) and the Canadian Environmental Assessment Act (CEAA).

TSH is Bringing Buildings to Life with Green Roof Initiative

Through developments in green roof technology, TSH can offer clients a way to replace the landscape displaced by building construction while offering savings in building energy costs as well as extending the life cycle of the roofing system by over 50%. Although Green Roofs have higher initial costs

compared to conventional roofs, some of the costs can be recovered over time through energy savings, reduction of roof replacement frequency, and possible SWM incentive/credits (depending on location). Green Roofs present a unique opportunity to bring cities to life by adding a natural colour and texture by use of vegetation and planting in place of barren roof surfaces. Typical Green Roof installations involve a growing medium ranging from as low as 15mm to 150mm or more, placed over an impermeable roof membrane.

Green roofs are also an innovative stormwater management solution. Stormwater is stored within the medium and expelled through 'evapotranspiration', a process achieved in the growth cycle of planting material. Green Roofs can also improve the energy performance of a building, improve air quality, reduce the 'Heat Island' effect, improve urban ecology, extend roof life, and improve the site aesthetics.

TSH recently completed a Green Roof feasibility study for the City of Waterloo to identify city owned buildings that would benefit from a green roof installation. The study also included an implementation plan and a preliminary green roof design complete with a business plan for a potential demonstration site. TSH also designed Green Roofs for Millbrook South Cavan School, the Lake Simcoe Conservation Authority office and the Ganaraska Forest Centre.



Ontario 2008: Reaching 60% Diversion of Waste through Composting

In June 2004, the government of Ontario released *Ontario's 60% Waste Diversion Goal—Discussion Paper* encouraging a new, comprehensive approach to waste diversion that aims for 60 per cent waste diversion in municipalities by 2008. The goal of this provincial objective is to reduce Ontario's reliance on waste disposal, predominantly landfills. An effective composting strategy will be key to a municipality's success. Reaching this goal will depend on the commitment of municipalities to encourage active participation of its citizens and businesses to compost and remove organic and recyclable material from the waste stream. Organic material currently makes up about 38 per cent of the waste generated by households

and 11 per cent of the waste generated by the industrial, commercial and institutional sectors.

Currently, it appears less expensive to send waste to landfills than it is to establish and operate diversion programs; however, long-term environmental costs must be factored into these cost comparisons. TSH plans to work in conjunction with municipal clients to develop waste diversion strategies, proposing sustainable options that will be cost-effective, and assist in achieving the 2008 goal of 60 per cent waste diversion.

TSH staff spoke at the 14th Annual Canadian Composting Conference in Gatineau, Quebec about how municipalities can achieve Ontario's 60 per cent waste diversion target. TSH's

waste management experts can offer evaluations of municipal waste management systems and provide recommendations for enhancing existing systems or developing new systems to reach 60 per cent by 2008.



Compost harvesting

Bill 175: The Sustainable Water and Sewage Systems Act

In 2002, the Province of Ontario passed Bill 175: *The Sustainable Water and Sewage Systems Act* that requires municipalities to guarantee the sustainability of their water and sewage systems.

Municipalities will be required to have an independent engineer evaluate and certify the current condition, expected life, and replacement cost of their water and sewage infrastructure. Based upon this directive, municipalities will be required to establish rate structures and reserve funds in order to ensure adequate funding is in place to support the future replacement and renewal of its infrastructure.

The regulations, which will detail the specific requirements of *The Sustainable Water and Sewage Systems Act*, are

being developed by the Ministry of the Environment in consultation with the Ministry of Municipal Affairs and Housing and the Ministry of Public Infrastructure Renewal. It is anticipated that they will be released for public review and comment in summer 2005 and will become legislation by the end of 2005.

TSH's environmental engineers have successfully completed several Bill 175 related studies and have assisted municipalities in identifying and meeting the requirements of *the Sustainable Water and Sewage Systems Act*. In developing the rate structures to support Bill 175, TSH examines the impacts of future rate increases and proposes strategies to minimize that impact.

TSH Equipped to Handle Municipal Infrastructure Needs

In order to meet the needs of municipalities in Ontario, significant improvements need to be made to aging and out-of-date infrastructure. The Government of Canada and the Government of Ontario are each contributing \$298-million to the Canada-Ontario Municipal Rural Infrastructure Fund (COMRIF). With additional municipal investments, the total commitment will stimulate \$900-million in infrastructure improvement and development.

COMRIF's goal is to enhance and renew Ontario's aging public infrastructure, improve the quality of the environment, protect the health and safety of citizens, support long-term economic growth and build strong communities by giving small, urban and rural municipalities, with populations less than 250,000, the funding they need.

COMRIF's funding application process is complex and requires detailed documentation. Not only can TSH staff help clients navigate through this process, their multidisciplinary team is also perfectly equipped to handle a municipality's infrastructure needs, from roads, transit systems, schools and parks, to water and sewage systems. TSH staff have the expertise to assist municipalities with establishing asset management systems, to develop programs for enhancements to existing infrastructure, or to provide designs and project administration for new projects.

Uplands Drive Site Remediation

Public Works and Government Services Canada (PWGSC) and the Department of National Defence (DND) commissioned the TSH-Jacques Whitford team to perform a site remediation in a brownfield area adjacent to the Ottawa Macdonald-Cartier International Airport. The site previously had several large fuel storage tanks on it and several contaminants had seeped into the ground. The TSH-Jacques Whitford team, completed a plan for excavating the site and the adjacent road, Uplands Drive, treating the contaminated soil on-site, diverting traffic during the excavation and construction process and reconstructing the road. The project was successfully completed in spring 2004, and the area is now safe from contaminants.

2005 OALA Carl Borgstrom Award

"Michael Hubicki won the OALA's 2005 Carl Borgstrom Service to the Environment Award. It's an annual award established in 1995 to recognize an OALA member who has made a special contribution to the sensitive, sustainable design for human use of the environment. The award acknowledges Michael's special contribution to environmentally responsible design for his home and TSH projects."

Wastewater Treatment Enhancements Protect Bay of Quinte

The International Great Lakes Joint Commission designated the Bay of Quinte as a Remedial Action Plan (RAP) area. As part of the RAP, all the wastewater treatment plants discharging to the Bay of Quinte would have to maintain effluent phosphorous concentrations of 0.3 mg/L or less. In order to maintain the integrity of the Bay of Quinte, the RAP also capped phosphorous inputs to the bay, allowing no increase to the total phosphorous load.

TSH was retained to upgrade the Deseronto Water Pollution Control Plant to tertiary treatment by adding enhanced tertiary sedimentation and less harmful UV disinfection. The tertiary treatment plant reduced the effluent phosphorous concentrations from between 0.5 and 1.0 mg/L to consistently less than 0.07 mg/L, well below the RAP requirement.

The Mohawks of the Bay of Quinte wanted to extend municipal servicing throughout their territory. As a result of the cap on overall phosphorous loadings to the bay, current treatment plants had to reduce their effluent phosphorous levels to accommodate the Mohawks' needs. Based on the successful enhancements at the Deseronto Water Pollution Control Plant, TSH staff undertook a pilot study and determined that sewage flows to the plant could be increased by over 60 per cent without exceeding the Certificate of Approval and RAP phosphorous loading limits.

Environmental Protection Planning, Subwatershed Planning

The Ontario Ministry of the Environment (MOE) works to protect, restore and enhance the environment through legislation, innovative programs and initiatives and strong partnerships. Emerging issues such as water source protection, the protection of the Oak Ridges Moraine and the Greenbelt Plan demand an environmental management approach that fulfills these objectives.

TSH staff have worked closely with a range of public agencies to develop several environmental protection plans. TSH staff have also participated on numerous provincial and conservation committees that create guidelines for these plans as well as related guidelines and policies for tools such as stormwater management and pollution prevention methods.

TSH's approach balances the environment, the community and the economy and focuses on implementation to ensure that municipal clients are provided with a workable plan.



Burlington Pier: Measuring Sustainability

TSH staff are applying the International Federation of Consulting Engineers' Project Sustainability Management (PSM) methodology to the proposed pedestrian pier being designed for the City of Burlington. The 200m by 7.6m wide S shaped pier will be cantilevered from a series of single caissons running along the length of the structure.

During the design and implementation of the \$ 6 million project TSH is evaluating, not only the optimal utilization of materials, but also the maintenance and ultimate recycling opportunities or disposal of those materials. The methodology for benchmarking sustainable development project performance ensures that development in one area is not accomplished at the expense of another.

The pier will become a tourist attraction, and anchor the City of Burlington's massive downtown waterfront revitalization program. Scheduled for completion in September 2006, the pier will exemplify sustainable principles from its planning and design phase to the selection of materials and methods, to its maintenance and operation. The TSH design will also capitalize on locally available materials and labour force.



InfraGuide-Innovations and Best Practices

TSH has provided a wide variety of guidelines and policy documents to assist its public sector clients to carry out their administrative and regulatory responsibilities in a more effective and efficient manner. TSH contributed to the development of the InfraGuide Best Practices Guide, prepared through the support of Infrastructure Canada, the Federation of Canadian Municipalities and the National Research Council.

TSH used its expertise and carried out extensive research to prepare the Guide for Best Practices related to Road Drainage. The guide focuses on current practices, as well as an adaptive management philosophy related to the planning, design, maintenance and rehabilitation of road drainage systems.

Leadership in Energy and Environmental Design

The Leadership in Energy and Environmental Design (LEED) Green Building Rating System is a voluntary, consensus-based national standard for developing high-performance, sustainable buildings.

LEED provides a complete framework for assessing building performance, water savings, energy efficiency, selection of renewable or recycled materials, and indoor environmental quality. LEED recognizes achievements and promotes expertise in sustainability through a comprehensive system, offering project certification, professional accreditation, training and practical resources. The Canadian Green Building Council is responsible for

administering LEED in Canada. Applicants register their completed projects for review and approval by submitting detailed documentation that shows how each sustainable objective outlined by LEED was met.

Very few firms have LEED professional accreditation in Canada, although the qualification is internationally accepted. TSH's LEED accreditation sets us apart as a leading sustainable design consultant. TSH designers and engineers develop design objectives in consensus with our clients, providing a greater understanding of the impact of their choices and more pride in their completed projects.

Recently Completed

Ottawa's Rapid Transit Study

The City of Ottawa hired the TSH—EarthTech team to conduct a Rapid Transit Expansion Study. The study's goal was to meet future transportation needs by developing a strategic plan to expand the current rapid transit system in the City of Ottawa. The study focused on Ottawa's ongoing commitment to promoting alternatives to passenger cars, including bus rapid transit (BRT) and light rail transit (LRT).

The study was completed in June 2003 and recommendations of the study are now being implemented. Two Environmental Assessments, the North/South corridor and the East/West corridor have been initiated. The North/South corridor has a \$600-million budget commitment from all three levels of government with the cost divided evenly between them.

Ottawa's commitment to providing quality and convenient rapid transit will reduce the growth in traffic congestion and emissions released into the environment.

CSO Facility Improves Quality of Water in St. Mary's River

In order to avoid contamination of an international waterway, identified as a priority in the St. Mary's River Remedial Action Plan, TSH was part of a consulting team that was commissioned to design an offline storage facility that would act in conjunction with the Clark Creek Pumping Station and mitigate sewage overflows to the river.

The Clark Creek Pumping Station did not have the capacity to treat higher than usual waterflow, causing sewage backups, flooded basements, and untreated sewage to enter St. Mary's River whenever there was a heavy rainfall or snow melted rapidly.

TSH was part of the team led by Earth Tech that designed and constructed the Bellevue Park CSO Facility. The CSO system is designed to divert excess waterflow to its 12,000 m³ underground, reinforced, concrete storage tank, and stores this extra volume until the Clark Creek Pumping Station can handle the flow.

TSH completed the site and pipe works design, acted as contract administrator and provided resident inspection for the project. The design and specifications focused on local resources and materials and the utilization of local labour.

Xinyu China Sports and Culture Park Design Competition



TSH partnered with the Jiangxi Chief Construction, Design and Research Institute of Nanchang, China to enter the Xinyu China Sports and Culture Park design competition. Working under a tight two-week deadline, TSH led the master planning and design for this submission.

Other submissions treated the entire 30-hectare site as a hard-surfaced plaza. TSH proposed a concept that minimized hard surfaces and incorporated a better balance between societal needs and the impact on the environment. The park concept integrated passive and functional open spaces within an extension of the urban street grid. The large stadium and public facilities were concentrated along the major transit arterials, creating a dynamic urban area for spectator venues. The architecture was designed to take advantage of local Xinyu steel supplies and materials.

The quiet children's parkette, contemplative gardens, sweeping lawns and forests were placed adjacent to future residential and city hall precincts. Symbolic tributaries of the Kongmu River meander through the park. Passive solar, rainwater collection and drought tolerant plantings were also incorporated into the public landscape to ensure sustainable user comfort regardless of the harshness of the weather conditions.

Recently Started

Green Office Expansion: Focus on Energy Efficiency Using LEED



TSH's multidisciplinary team, led by its Leadership in Energy and Environmental Design (LEED) accredited professional, completed the comprehensive design for a 1,530 m² addition to the existing Lake Simcoe Conservation Authority Administration Centre. TSH designers worked in conjunction with the client to establish project goals and objectives, adhering to the LEED and Commercial Building Incentive Program (CBIP) certification criteria. The project is scheduled for completion in Fall 2005.

This project will be submitted for LEED and CBIP certification. In order to accommodate LEED specifications, the design incorporated: landscaping that requires no irrigation and site surfacing that allows for natural percolation; an extensive green roof; a high performance envelope to take advantage of solar gain in winter and shading in summer; use of daylighting to minimize the use of electrical light; radiant in-floor heating; an allowance for integration of solar thermal hot water heating for the in-floor system and domestic hot water; an allowance for wind turbine technology to power an emergency backup power system; and use of wood harvested from the site to finish the interior.

Whitchurch-Stouffville Open Space Guidelines

The community of Whitchurch-Stouffville is one of Canada's fastest growing urban centres. Located within the sensitive environmental area of the Oak Ridges Moraine, all new development must be carefully planned and executed to meet the municipality's environmental objectives. TSH's team of landscape architects was commissioned to develop new guidelines and design standards for the trails, parks and open spaces within the community.

Working closely with the Planning and Community Services departments, TSH created a development strategy for the area based upon seven key themes: completeness of design; quality of construction; optimization of facility maintenance; maximization of accessibility and safety; level of enjoyment; limitations; and technology and infrastructure integration. The guidelines envision and promote landscapes that conserve water, reduce waste and recycle resources, improve water quality, nurture plants, protect existing resources, rehabilitate injured resources, and protect and enhance the habitat. The guidelines and design standards will provide the municipality with the necessary tools to inform new development, as well as the rehabilitation and restoration of existing landscapes.

Muskoka Composting Study

TSH has been retained by the District Municipality of Muskoka to lead a composting study to determine the feasibility of composting biosolids from their sewage treatment facilities, sludge from their septage treatment lagoons and residential organics from households. The biosolids and residential organics will be composted at a central facility that will be located at a district landfill site. The sludge will be dewatered and composted on-site. The project will be partially funded through a grant from the Green Municipal Enabling Fund (GMEF). The feasibility study will run for one year in order to evaluate composting over four seasons. TSH's multidisciplinary team is uniquely qualified to complete this study because we have developed economical and environmentally sustainable composting programs for municipal clients.

Burlington Beachway Node Brownfield Redevelopment

An 8.2 hectare parcel of land, 25 metres from Lake Ontario, and the current location of the Ministry of Transportation's (MTO)



Burlington Skyway Bridge Operations Centre, has been identified as a focal point in the City of Burlington's approved Downtown Waterfront Implementation Plan. The brownfield site, although historically used for storage and operations, is designated as a significant tourist

destination opportunity. TSH led a team in the site analysis and conceptual development of several redevelopment scenarios. In order to free up a portion of this site for the tourist destination, TSH staff developed a series of MTO relocation scenarios. These scenarios took into account site conditions and MTO requirements, and illustrated a rationalized property fabric and site program.

TSH staff also explored the integration of special characteristics proposed in the Burlington plan including the ecological restoration and creation of an ecological oasis, integration of ecological best management practices, exploration of Lakeshore Road realignment to circumscribe the MTO property, optimizing the connectivity to the beach and ecological treatment of stormwater within the site.



Head Office

300 Water Street, Whitby, Ontario L1N 9J2
Phone: 905 668-9363 • 1-800-668-1983
Fax: 905 668-0221
E-mail: tsh@tsh.ca • www.tsh.ca

Barrie • Bracebridge • Cobourg
Kingston • Kitchener-Waterloo
Ottawa • St. Catharines
Sault Ste. Marie • Whitby