

6**Paths to Achieving The Living City: Policies for Sustainable Communities**

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6.1 Introduction

The Living City vision is based on a foundation of Healthy Rivers and Shorelines, Regional Biodiversity, Sustainable Communities and Business Excellence. This section introduces some of the “paths” TRCA is following to realize the sustainable communities objective while indirectly meeting the other strategic objectives. These paths include: combatting the potential impacts of climate change through the promotion of an ecological design approach to development that uses *green infrastructure*, green buildings, near-urban agriculture, energy, and sustainable transportation to plan and build sustainable communities. These are further enhanced and supported by celebrating cultural heritage and fostering environmental education and stewardship. As a resource management agency, TRCA works in all of these areas in partnership with business, citizens, and all levels of government in science, research, education, and community involvement. Through this work, TRCA helps to identify issues, synergies and solutions for building sustainable communities. TRCA then advocates for the knowledge and understanding acquired through this work to be incorporated into ours and our partners’ policies and projects. The policies in this section are meant to facilitate the advocacy of these “other paths” in the planning and development process, building upon the foundation of TRCA’s mandated responsibilities of natural heritage and natural hazard management.

A Collaborative Approach

In moving towards sustainability and achieving the vision of The Living City, TRCA’s programs operate on the premise that cities are living systems where city building works with nature and these natural and human elements interact and thrive. The promotion of systems thinking in TRCA programs teaches us to view the world as working in a network of intricate connections, rather than in discrete and separate fragments. Understanding this connection leads to the fostering of values, behaviours, and lifestyles required to contribute to a sustainable future. No single organization has the mandate, resources or expertise to address sustainability at a local, regional or larger scale, and therefore a fundamental shift in the way we live today will only be successful when we all recognize and work together towards a shared vision for The Living City.

Elements of TRCA’s vision and objectives are common to many of our partners, including provincial ministries, municipalities, and environmental interest groups. The provincial government and municipalities have an important role to play in achieving sustainable communities as the primary implementers with statutory authority. TRCA functions as a scientific resource, a collaborator and supportive implementer in the planning and development of sustainable communities.

Sections 6, 7 and 8 of The Living City Policies are all closely related. Section 7 contains policies for TRCA’s role as a public commenting body in the planning and environmental assessment (EA) processes. Section 8 consists of policies for TRCA’s regulatory approval process. Section 6 is comprised of policies for TRCA’s advocacy role in both the planning/EA and regulatory review processes. As a watershed resource management agency, TRCA leads and partners in many research and community initiatives that inform and complement our plan review roles with respect to the planning and development of sustainable communities. The policies in this section are also meant to speak to efforts TRCA and its partners are making to deal with some of the issues and challenges described in Section 2.3 of The Living City Policies.

6.2 Climate Change

Climate change is expected to have a significant effect on temperature, precipitation and weather patterns in southern Ontario and the Greater Toronto Area. Predicted changes include:

- hotter summers with more heat waves and droughts
- warmer winters with less snow and more rain
- disappearance of the spring melt or freshet
- increase in extreme weather including thunderstorms, tornados and high wind events

These changes to the local climate are expected to precipitate other environmental and socio-economic impacts such as poorer air quality; heat-related health impacts including the introduction of new insect-borne diseases; a loss of native plants and animals and the proliferation of invasive species; increased flooding, erosion and water damage to property and infrastructure

from extreme weather; and reduced viability of weather-based recreation businesses (ski hill operators, etc.).



TRCA understands that climate change is a global crisis that demands the reduction of greenhouse gas emissions. However, it is likely that the greenhouse gases that have already been emitted will dramatically change the global and local climate even if emissions were ended immediately. Climate change is expected to exacerbate many of the stresses and challenges that already exist due to the extent of development in TRCA *watersheds*. For example, the spread of invasive species resulting from habitat fragmentation and *biodiversity* losses will be further increased, and flooding and erosion caused by the paving of watershed surfaces will be more frequent and dramatic. Further, TRCA's Rouge and Humber watershed plans revealed that climate change in our developed *watersheds* is likely to have a negative impact on water resources and ecosystems at least as severe as those that have been caused by human activity alone.



TRCA believes that a comprehensive approach to addressing climate change is required which includes both *mitigation* - actions to reduce greenhouse gas emissions – and, *adaptation* - actions to cope with the potential effects of climate change. In many cases, actions to address climate change can be taken that have both *adaptation* and mitigation benefits, such as reforestation. Overall, the compounding potential effects of climate change with those of urbanization, make it more important than ever for TRCA and its partners to take a precautionary and adaptive approach to the management of our watersheds. This is in order to protect and enhance remaining natural areas in both the natural and built environments and to protect the health and safety of our communities. In this regard, it is critical for TRCA and its partners to monitor watershed conditions in order to understand the local impacts of climate change and to ensure that TRCA and its partners are operating on the basis of the best possible information. To this end, TRCA is committed to advancing both *mitigation* and *adaptation* in its jurisdiction, and demonstrating leadership to support our communities and partners in dealing with climate change.

In 2008, TRCA developed a corporate strategy entitled *Meeting the Challenge of Climate Change: TRCA Action Plan for the Living City* (<http://www.trca.on.ca/dotAsset/16642.pdf>) that highlights the potential impacts of climate change within our jurisdiction and provides a business planning framework that builds on the TRCA's strengths in adaptive watershed and ecosystem management, natural hazard management, and leadership in the application of sustainability at the local level. The document identifies six key priorities for TRCA in order to contribute to both *adaptation* and *mitigation*.

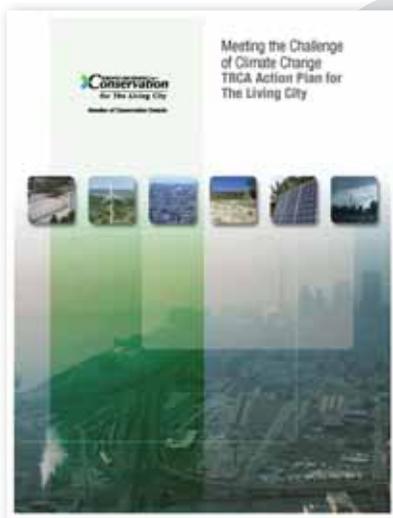
Priorities for contributing to adaptation include:

- Improving knowledge and understanding of climate change and its impacts to TRCA watersheds and communities, as current research focuses primarily on global- and national-scale impacts;
- Reducing risk to communities from the impacts of climate change and extreme weather, building on our experience in flood risk management; and
- Building a *natural system* that is resilient to climate change by protecting and enhancing the extent and diversity of terrestrial and aquatic ecosystems in our watersheds.

Priorities for mitigation include:

- Promoting a culture of conservation through market transformation, expanding on TRCA's experience in stewardship, education, and green building design;
- Greening our own operations and demonstrating leadership by minimizing the carbon footprint of the TRCA; and
- Developing partnerships with organizations within and outside of Canada to bring the best knowledge to the Greater Toronto Area on energy efficiency and emissions reduction.

This strategy is updated regularly to reflect the most current understanding of the impacts of climate change to TRCA watersheds based on ongoing work as well as new developments in science and practice related to climate change adaptation and mitigation. (<http://trca.on.ca/the-living-city/climate-change/>)



6.2.1 Policies for Climate Change

Goal: To strive to meet the challenge of climate change through supporting and undertaking research, *mitigation* and *adaptation*.

It is the policy of TRCA:

- a) To continue to advance the understanding of climate change, its effects, and how to reduce and

manage these effects, through TRCA partnerships, programs, and ongoing science and research.

- b) To take a precautionary and adaptive approach to watershed management that considers the compounding effect of climate change on current stresses, and to endeavour to protect natural heritage, water resources and the communities within TRCA watersheds to make them as resilient as possible to climate change.
- c) To consider climate change impacts and to promote *mitigation* and *adaptation* in all TRCA policies, programs and projects, as well as the policies, programs, and projects to which TRCA contributes.
- d) To continue to work with municipalities and the development industry in incorporating climate change *mitigation* and *adaptation* in their policies, operations, developments, and business planning.
- e) To support the climate change initiatives of academics, businesses, community groups, institutions, governments, and non-profit organizations, through our expertise in climate change science, impact assessment, *adaptation*, and *mitigation*.

6.3 Energy

The production and use of energy is one of the most significant factors affecting climate change, the *ecological footprint* of our communities, and ultimately our ability to create sustainable communities. Adoption of technologies and practices that reduce our use of energy as well as moving to sources of *renewable energy* and fuels have been identified as *sustainable energy* measures that would substantially reduce greenhouse gas emissions, begin to *mitigate* climate change, and lower operating costs. Such measures include *renewable energy* sources like hydroelectricity, solar energy (photovoltaic and heat), wind energy, wave power, geosxchange, bio-fuels, distributed generation and district energy systems.

An ecological footprint is a measure of the demands that people place on nature. It assesses this by measuring the area of land and water required to produce the natural resources consumed by the human population. By looking at human consumption and comparing it to nature's productivity, the ecological footprint provides a means of estimating the impact individuals, organizations, cities, regions or nations have on nature.

The draft policies of the Provincial Policy Statement Review under the *Planning Act* direct planning authorities to support energy conservation and efficiency through their land use and development patterns. This includes development design and orientation that: maximizes energy efficiency and conservation and considers the mitigating effects of vegetation; maximizes opportunities for the use of *renewable energy*; and takes into account the impacts of climate change. These policies represent amendments to the existing section on energy and air quality in the 2005 Provincial Policy Statement, with a new focus on energy conservation, efficiency and energy's relationship to climate change.



The Living City Campus (LCC) at TRCA's Kortright Centre for Conservation strives to be a net producer of renewable electricity. An energy plan for the campus has been developed and all new buildings being constructed will be designed with the most up-to-date sustainability technology. The Earth Ranger building located in the Southern Gateway of the LCC is already an energy efficient building. The Kortright Centre is supplied with 100% green electricity purchased from Bullfrog Power. Passive solar, geo-exchange and solar photovoltaic energy sources will heat, cool and power the buildings as much as possible. The large windmill in the centre of the energy trail will be another means of supplying the campus with power in addition to biomass and biofuels that will be produced in the agricultural zone.

6.3.1 Policies for Energy

Goal: To support the use of *sustainable energy* measures for their role in the planning and development of sustainable communities.

It is the policy of TRCA:

- a) To incorporate *sustainable energy* measures into all new and retrofitted buildings on TRCA-owned lands.
- b) To continue to advance the understanding of *sustainable energy* through TRCA partnerships, programs, and operations.
- c) To work with municipalities to develop, or continue to develop, policies to facilitate *sustainable energy* measures into their Master Plans, planning documents, and operations.
- d) To work with the development industry and other stakeholders to incorporate *sustainable energy* measures into new *development* and *redevelopment* projects.

6.4 Transportation

Sustainable transportation allows the basic mobility needs of individuals and communities to be met safely, while minimizing the ecological footprint. This is accomplished by limiting emissions, wastes, and the consumption of renewable and non-renewable resources. Sustainable transportation is ideally affordable, operates efficiently, and serves a compact, land-efficient community. A choice of transportation modes is offered by sustainable transportation such as public transit and private vehicles (electric, hybrids), in addition to active forms such as walking and cycling. Various programs in sustainable transportation encourage the use of green vehicles, auto-sharing, carpooling, High Occupancy Vehicle lanes, and time-of-use road pricing.

The *Planning Act*, the Provincial Policy Statement (PPS), and the Growth Plan for the Greater Golden Horseshoe provide strong language and direction in support of transportation systems that are designed to be



sustainable and offer a choice of transportation modes. For example, the PPS encourages land use patterns, densities, and a mix of uses that minimize the length and number of vehicle trips, facilitate public transit, and encourage cycling and walking. The promotion of streets that facilitate active transportation and community connectivity is particularly emphasized in the draft policies of the 2005 PPS Review. The *Planning Act* includes as a matter of provincial interest: "The promotion of development that is designed to be sustainable, to support public transit, and to be oriented to pedestrians." Similarly, the Growth Plan directs that population and employment growth be accommodated by compact, transit-supportive, and pedestrian-friendly communities that reduce reliance on the automobile.

Municipalities in TRCA's jurisdiction have followed provincial policy direction on transportation through a variety of measures in order to reduce greenhouse gas emissions, improve air quality, and ease congestion. In addition to official plan policies that conform to the Growth Plan and the PPS, municipalities are partnering with Metrolinx to establish sustainable transportation programs. Metrolinx is an agency created by the provincial government to improve the coordination and integration of all modes of transportation in the Greater Toronto and Hamilton Area; its mandate is to provide seamless, coordinated transportation throughout these areas.

Smart Commute, as one example, is an initiative of Metrolinx and the municipalities in the Greater Toronto and Hamilton Area. TRCA is one of the founding members of the Smart Commute North Toronto – Vaughan (SMCNTV). The SMCNTV mission is to advance sustainable transportation in the northwest part of Toronto and Vaughan to reduce traffic congestion and its associated negative impacts. SMCNTV also advocates for improved transit service, transportation demand management programs, and recruits local employers to implement green commuter programs within the workplace.

At The Living City Campus, Kortright Centre for Conservation, TRCA is showcasing fuel cell technology as one type of sustainable transportation innovation. Fuel cells are extremely attractive from an environmental perspective because they are able to convert hydrogen into energy to power a vehicle producing a by-product of only air and water vapour.

TRCA's extensive trail network that winds through conservation areas and parks offers an ideal opportunity for active transportation and public enjoyment that is compatible with the natural and cultural heritage of our *watersheds*. TRCA is supportive of working with our municipal partners to encourage connections from trails to streets, sidewalks and bicycle lanes. This may facilitate opportunities for destination-driven use of trails (e.g., bike to work, to shops, etc.), increasing the choice of transportation modes – an important component of sustainable transportation.

6.4.1 Policies for Sustainable Transportation

Goal: To support the uses of sustainable transportation in the planning and development of sustainable communities.

It is the policy of TRCA:

- a) To continue to advocate for sustainable transportation through TRCA partnerships, programs, and operations.
- b) To encourage municipalities to develop policies for implementing sustainable transportation into their Master Plans, planning documents and operations.
- c) To encourage municipalities to explore opportunities for integrating TRCA trail systems into their active transportation plans.

The concept of “complete streets” has been discussed as one way for transportation planners and engineers to encourage sustainable transportation through street design. A complete street is designed for all ages, abilities, and modes of travel. On complete streets, safe and comfortable access for pedestrians, bicycles, transit users and the mobility-impaired is not an afterthought, but an integral planning feature. Similarly, a complete streets policy ensures that transportation planners and engineers consistently design and operate the entire street network for all road users, not only motorists. (www.completestreetsforcanada.ca)

6.5 Green Buildings

Green building brings together best practices and technologies from a wide array of disciplines to reduce, and where possible, eliminate the impacts of buildings on the environment and human health. Green buildings address issues of site selection, choice of building materials and resources, construction, and maintenance methods among others. Rather than producing excess waste and harmful emissions, green buildings contribute to a healthy environment; they cost less to operate, are more durable and adaptable in the long term, and are a benefit to the community both

aesthetically and environmentally. There are elements of *green infrastructure* (e.g., trees, rain gardens) that can be used to help improve the efficiency of green buildings; in this sense, green buildings are most beneficial when implemented within a larger planning framework based on ecological design (see Section 6.8 Ecological Design).

Green buildings are encouraged through the Ontario Building Code, which was amended in 2006 to include a variety of measures to promote the use of green technologies such as solar panels, green roofs and grey-water systems. Also under the 2006 Building Code, houses are required to meet the performance level that is equal to a rating of 80 or more (based on the “EnerGuide Rating System” out of 100), when evaluated in accordance with Natural Resource Canada’s Energy Guide for New Houses.

TRCA has formed partnerships with two green building councils: the Canada Green Building Council - Greater Toronto Chapter, and the World Green Building Council (WGBC). In both cases, TRCA has assisted in programming and operations. In May 2007, TRCA won the bid to host the World Green Building Council Secretariat. The WGBC is an umbrella organization of national green building councils, whose common goal is the sustainable transformation of the global property industry by working together to share knowledge, resources, and common principles to advance the development of green buildings.



- The The Canada Green Building Council (CaGBC) and TRCA collaborated to produce a tool kit targeted specifically at municipal governments that provides a step-by-step approach on how local government can develop green building policies and programs for their own building projects. In 2012, the Ontario Green Policy Hub was developed as the one stop, searchable on-line resource for sustainability policies by Ontario municipalities. The www.ogph.ca portal is made possible through the support of the founding sponsor of the Greater Toronto Chapter of the CaGBC, TRCA, and funding from the Ontario Power Authority's Conservation Fund. In 2004, the Canada Green Building Council – Greater Toronto Chapter partnered with TRCA to engage local leaders to promote sustainable community development and community transformation within the GTA.



- TRCA's Restoration Services Centre is a green building. Completed in 2007, it was Ontario's first LEED® (Leadership in Energy and Environmental Design) Platinum building.
- The Kortright Centre for Conservation is the location of the Archetype Sustainable House Project (part of The Living City Campus), an energy conservation education facility for workshop participants and a model to help monitor and verify the effectiveness of materials, systems and technologies. TRCA partnered with BILD (Building Industry and Land Development association) in the construction of the LEED® Platinum-certified Archetype houses. The first home is designed to provide affordable green options that can be adopted by home builders and buyers in today's marketplace. The second home showcases alternative and future materials and technologies that will demonstrate the best in sustainable design, resource efficiency and energy management systems for the longer term.

6.5.1 Policies for Green Buildings

Goal: To support the use of green buildings in the planning and development of sustainable communities.

It is the policy of TRCA:

- To incorporate green building design into all new and retrofitted buildings on TRCA-owned lands.
- To continue to advance the research and understanding of green buildings and their role in reducing our ecological footprint, and mitigating the impacts of urbanization and climate change, through TRCA partnerships, programs, and operations.
- To continue to work with municipalities to incorporate policies and strategies for green buildings in their planning documents and operations.
- To work with the development industry and other stakeholders to incorporate green buildings into *development* and *redevelopment* projects.

6.6 Near-Urban Agriculture

A truly sustainable city-region needs to make provision for local food at many levels, from neighbourhood design to assuring the elements of the agri-food industry are accessible and viable. Near-urban agriculture promotes the basic activity of growing food in or around urban areas, such as community gardens, rooftop gardens, allotment plots, and on rural lands in proximity to towns and cities. Urban gardening and nearby rural agricultural production provide consumers with a local, healthy source of food that requires minimal transportation and fewer greenhouse gas emissions. It engenders a connection to the people's source of food - learning to value the land and the livelihood of the farmers who work the land.

TRCA's vision for *sustainable near-urban agriculture* on its own land includes the use of diverse crops, innovative and sustainable agricultural production methods,

beneficial management practices, and working with new partners who have the knowledge to make small acreage productive and economical. Agricultural production on TRCA lands, in most cases, is on a smaller scale than the typical agri-food industry approach. All TRCA agricultural land holdings are considered “near-urban” based on their location in the Greater Toronto Area.

The use of TRCA land for agriculture, supports the local food system, is often community-based, and promotes environmental sustainability. TRCA permits both organic and conventional forms of agriculture production on its land subject to all best management practices being implemented, e.g., Environmental Farm Plans are mandatory for TRCA agricultural land use.

Currently, almost 1,215 hectares (3,000 acres) of TRCA-owned lands are used for agriculture: 810 hectares (2,000 acres) in the Rouge River watershed, 381 hectares (900 acres) in the Humber River watershed, and 24 hectares (60 acres) in the Duffins Creek watershed. TRCA is involved in a number of agriculture-related partnerships such as the Black Creek Community Farm in one of Toronto’s priority neighbourhoods, Albion Hills Community Farm in Caledon, The Living City Farm at Kortright Centre in Vaughan, and the FarmStart program in the City of Brampton aimed at training and mentoring new farmers.



Developed in 2005, the Black Creek Community Farm (formerly the Toronto Urban Farm) is a partnership between TRCA and several community groups. This 3.2-hectare urban farm is located on TRCA-

owned land near Black Creek Pioneer Village in Toronto. The project focuses on food production, education and contributing food security options in the local community.

The Provincial Policy Statement, the Growth Plan and the Greenbelt Plan all legislate the protection of agricultural land in southern Ontario and the Greater Golden Horseshoe, thereby signifying the importance of local food sources to urban areas. Across TRCA’s jurisdiction, many municipalities are implementing policies and

practices regarding near-urban agriculture. The City of Markham is the first Canadian municipality to adopt Local Food Plus procurement practices for its municipal food services, an initiative to help support Ontario’s farm economy, reduce greenhouse gases, lower pesticide use, and to promote environmentally-friendly purchasing. The Town of Richmond Hill’s Official Plan has a policy that encourages the growing of produce through urban agriculture, including communal gardens.



In 2008, TRCA and FarmStart (<http://www.farmstart.ca>) signed a lease agreement for an urban agricultural project at the Claireville Conservation Area in Brampton. Farm Start is a not-for profit organization that receives provincial and federal government support to coordinate farm facilities, resources, and linkages important to new and immigrant farmers. FarmStart supports and encourages new farmers to establish locally based, ecologically sound and economically viable agricultural enterprises to supply local markets, conduct agricultural research and demonstration facilities, and offer new farmer training programs.

6.6.1 Policies for Near-Urban Agriculture

Goal: To promote the benefits of near-urban agriculture to the planning and development of sustainable communities.

It is the policy of TRCA:

- a) To continue TRCA partnerships and programs in near-urban agriculture on TRCA-owned lands, in compliance with TRCA’s Sustainable Near-Urban Agriculture Policy for lands owned and managed by TRCA.
- b) To continue to implement TRCA programs (and to seek funding for them), that provide grants or other mechanisms offering options to farmers

for the provision of *ecosystem services*, and the protection and improvement of water quality and natural habitats.

- c) To recommend to municipalities that they develop policies to encourage and support the provision of agricultural uses within urban boundaries and on rural land into their planning documents and operations.

intensification, redevelopment, or urban renewal. Green infrastructure can be implemented at multiple scales, ranging from regional networks of open spaces and natural areas to site-specific practices such as green roofs, porous pavements and rain gardens. And, there is flexibility as to when and how it is integrated into developed areas. Green infrastructure provides a wealth of ecosystem services, such as improved air and water quality, erosion control, stormwater retention, shading and urban heat island mitigation.

6.7 Green Infrastructure

Green infrastructure is a concept that has been under discussion in the technical and scientific fields for quite some time, but only beginning to be explored in the land use planning regime. It is rooted in science and based on the philosophy that water sustains life and *green infrastructure* sustains water. *Green infrastructure* refers to *natural green elements* (street trees, *wetlands*, meadows, soil (gardens and cropland), etc.) and *built green elements* (green roofs, bioswales, permeable pavement, etc.) that are present in both urban and rural settings.

Green infrastructure can complement and extend the life of many types of traditional infrastructure. TRCA promotes incorporating *green infrastructure* into both proposed and existing communities, particularly for water management in areas that are undergoing

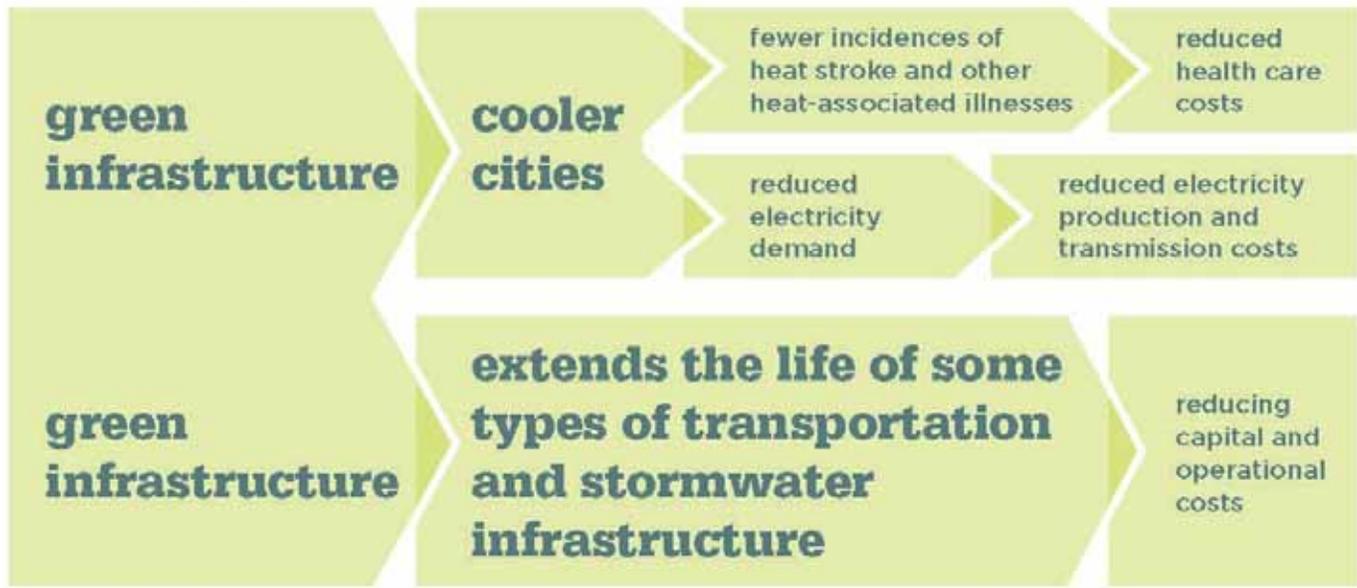


Diversity of Green Infrastructure Elements



Source: adapted from CIP Spring 2009, Vol. 49, No.1

Source: Health, Prosperity and Sustainability: The Case for Green Infrastructure in Ontario, 2011.



Overall, *green infrastructure* enhances quality of life and neighbourhood desirability while managing the effects of, and providing a greater resilience to the impacts of urbanization and the potential impacts of climate change. As such, it should be valued and supported in the planning and development process.

In 2009, individuals representing municipal and provincial governments, conservation authorities, the landscape trades and environmental organizations came together to discuss shared interests, concerns and ideas related to green infrastructure. The Green Infrastructure Ontario Coalition (<http://www.greeninfrastructureontario.org>) is led by a seven-member steering committee with representatives from TRCA, Conservation Ontario, Local Enhancement and Appreciation of Forests (LEAF), Landscape Ontario, Ontario Parks Association, Green Roofs for Healthy Cities - North America Inc., Evergreen, and the Ontario Association of Landscape Architects (OALA). With funding from the Ontario Trillium Foundation, the Coalition released a report in Spring 2012 (co-authored with Ecojustice) which recommend actions the Government of Ontario can take to better support *green infrastructure* across the Province. The Green Infrastructure Ontario Coalition is building a strong and convincing case for a shift in public and private policies and investment towards *green infrastructure* protection, enhancement and development. Currently an alliance of almost 100 organizations, they share a common vision for a healthy, green Ontario where the economic, social, environmental and health benefits of *green infrastructure* are fully realized.

6.7.1 Policies for Green Infrastructure

Goal: To support the use of *green infrastructure* in the planning and development of sustainable communities.

It is the policy of TRCA:

- a) To continue to advance the research and understanding of the uses and benefits of natural and engineered elements of *green infrastructure* in urban design, to maximize *ecosystem services*, and *mitigate* the impacts of urbanization and the potential impacts of climate change through TRCA partnerships, programs, and operations.
- b) To work with municipalities to protect, enhance and expand the *urban forest* for the benefits that trees contribute to residents.
- c) To work with municipalities, the building industry and other stakeholders to implement *green infrastructure* through land use planning for development patterns, and site and building design.

6.8 Ecological Design

Ecological design is development design that seeks integration of built form with nature's processes. TRCA advocates for an ecological design approach

that uses *green infrastructure* and green buildings to integrate natural and engineered green elements into development. The application of ecological design demonstrates how natural and built areas of *green infrastructure* add value to a community for the *ecosystem services* they provide. This is in contrast to the traditional view that they are “take aways” from the “net-developable” area.

Ecological design is an emerging interdisciplinary field influenced largely by environmental planning and engineering, architecture, and landscape architecture studies. By placing ecology in the foreground of urban design, ecological design enables a strong sense of connection between the built and natural environments. This is counter to traditional design approaches in which an artificial boundary seems to exist between “city” and “nature,” making it easy for urban dwellers to be unaware of their impact on nature. For example, typical urban design of new subdivisions involves private rear yards backing onto natural areas with no common area, which can limit stewardship opportunities. The establishment of public common areas along the edge (but outside) of natural areas would make natural areas destinations for residents as well as gateways (e.g., trailheads) into the open space system. Similarly, in *redevelopment* or *intensification* scenarios, multi-residential and/or commercial buildings’ common areas could be situated so that the natural elements in and around the building are easily seen. Opportunities for visibility and passive enjoyment of natural spaces from the built environment are keys to inspiring stewardship of these spaces; essentially, what we enjoy, we are more likely to help protect.

Cities around the world are applying ecological design, incorporating new thinking for their urban renewal. This approach looks to integrate *redevelopment* and urban design with opportunities to make ecological improvements at the site level. In many situations, the growing need to restore important natural elements in cities, such as streams and *flood plains*, remnant forests and *wetlands*, can often be the driver to re-examine community planning and open up opportunities for urban *redevelopment* in an exciting, non-traditional form. These design efforts enhance the public and private realm, not just improving ecological benefits

but creatively building beautiful spaces for residents and visitors to enjoy.

Leading-edge design professionals and academic directions are rapidly moving to set new standards for urban design incorporating fresh ideas around urban ecology, water management and outdoor built spaces. The scale of these projects can range from major urban riverway revitalization, through to urban parks, downtown and neighbourhood streetscapes, greenways, signature urban places and private landscapes and rooftops. The perspective on the value of “green” is changing to become one of a key contributor to interconnected multi-functional landscapes providing benefits for urban *biodiversity* and improved urban spaces for beauty and social activities.

Cities such as Portland, Oregon, have transformed their downtown with a major change to the management of urban water: water is used in the design of city landscapes and streets as an element to be celebrated, and at the same time, is engineered to function for volume control and water quality improvements. The public and private investment into these multi-functional urban landscapes reduces costs at many levels and produces multiple benefits for rejuvenating a healthy, attractive urban realm. Countries including Germany, Holland, Sweden and Denmark have been working towards this site planning shift for decades in their use of *green infrastructure* in community plans and high profile urban centres; the design imperative is embodied in public and private *redevelopment* projects alike.



TRCA leads a number of partnership initiatives or programs that promote the use and benefits of an ecological design approach. Some of these include:

- The Sustainable Neighbourhood Retrofit Action Plan (SNAP) (<http://sustainableneighbourhoods.ca>) program to help established communities become more environmentally friendly and prepare for climate change at the local neighbourhood scale by improving rain water management, making provision for food production, increasing the urban tree canopy, creating wildlife habitat, and conserving both energy and water across both public and private lands.
 - The Low Impact Development Stormwater Management Guide (http://www.sustainabletechnologies.ca/Portals/_Rainbow/Documents/LID%20SWM%20Guide%20-%20v1.0_2010_1_no%20appendices.pdf), developed by TRCA and Credit Valley Conservation, it provides engineers, ecologists, planners and landowners with up-to-date information and direction on landscape-based stormwater management planning and low impact development stormwater management practices. Examples of LID include green roofs, rainwater harvesting, rain gardens, permeable pavement, grass swales and constructed wetlands, and an enhanced urban tree canopy.
 - The Sustainable Technologies Evaluation Program (STEP) (www.sustainabletechnologies.ca) is a multi-agency program designed to provide the data and analytical tools necessary to support broader implementation of sustainable technologies and practices within a Canadian context. Technologies evaluated under the STEP program include physical structures, preventative measures, implementation protocols, alternative urban site design and other practices which promote more sustainable ways
- of living. Technologies such as green roofs, bio-retention swales, and erosion and sediment control ponds are being evaluated under the program.
- Partners in Project Green (PPG) (<http://www.partnersinprojectgreen.com>) is a growing community of businesses working together to green their bottom line by creating an internationally-recognized “eco-business zone” that includes four municipal jurisdictions – the Region of Peel, City of Toronto, City of Mississauga and City of Brampton. Given that PPG operates under four different official plans and three zoning by-laws, municipal land-use policies and regulations in the Pearson Eco-Business Zone have inadvertently been a barrier to eco-business development projects. In order to overcome these barriers and encourage green business development, the PPG Policy Toolkit was developed. Working in partnership with its municipal partners and funding from the Federation of Canadian Municipalities Green Municipal Fund, PPG developed the Toolkit, which consists of 11 tools for municipal use. These include communications tools, primers and policy templates that each municipality can use to encourage green business development and a more consistent approach to eco-economic development across the Pearson Eco-Business Zone. Moving forward, the municipalities that govern the Pearson Eco-Business Zone will apply the toolkit to aid in the sustainable development of the region. And, just as important, all of the tools can be used by other municipalities looking to emulate a progressive land-use framework that encourages green business.

6.8.1 Policies for Ecological Design

Goal: To support the use of ecological design in the planning and development of sustainable communities.

It is the policy of TRCA:

- a) To continue research into the use and benefits of ecological design in new *development* and *redevelopment* scenarios to maximize *ecosystem services* through TRCA partnerships, programs, and operations.

- b) To continue to work with municipalities, the building industry and other stakeholders to encourage ecological design through land use planning, site planning and urban design, as well as building design.

6.9 Cultural Heritage

Cultural heritage plays a key role in building sustainable communities where residents enjoy a satisfying quality of life and sense of place. Tree-lined country roads, farm

fields and rolling hills of green, dotted with historic barns and farm houses, can create a lasting visual image of landscape beauty for the viewer. Working to preserve and celebrate the cultural heritage of our watersheds can also provide a connection to the past that increases our understanding of human relationships with the environment.

Various mechanisms exist to facilitate conservation of heritage features. The Ontario Heritage Trust receives heritage information and investigates properties with both cultural and natural heritage values for their Natural Spaces Land Acquisition and Stewardship Program. Moreover, the *Ontario Heritage Act* requires that the investigation and conservation of cultural heritage be undertaken prior to changes in land use, including development, trail creation, and reforestation. The revised *Ontario Heritage Act* includes conservation measures such as property listing and designation on municipal and provincial heritage registers, easements, architectural design guidelines and grants for heritage conservation. As well, the Ministry of Tourism, Culture and Sport has published an on-line guide to “Heritage Resources in the Land Use Planning Process,” that explains how the *Planning Act* and the Provincial Policy Statement direct municipalities to conserve cultural heritage. In response, municipalities have adopted official plan objectives and conservation policies and procedures to protect cultural heritage, such as demolition control by-laws and requirements for heritage impact assessments and conservation plans.



Cultural heritage in TRCA's jurisdiction consists of *cultural heritage landscapes* (e.g. countryside roads, agricultural communities, clusters of century homes and 20th century ethnic architecture), *built heritage resources* (heritage buildings and structures), and *archaeological resources*. Watershed groups on the Rouge and the Don have developed cultural heritage master plans to help identify opportunities to integrate heritage features, landscapes, and stories into new developments. Retention and conservation of heritage buildings on their original site is encouraged, as well as the integration of these resources into new development proposals in their original use, or an appropriate adaptive re-use. For example, heritage buildings can be incorporated into proposed developments rather than being demolished. New development in the vicinity of *cultural heritage landscapes* should maintain the integrity of these landscapes. Where possible, Aboriginal *archaeological sites* are incorporated into the *Natural System* and preserved for the future, with limited investigative excavations.

TRCA leads a number of partnership initiatives or programs that identify, conserve and promote Aboriginal and non-Aboriginal/Settlement Period *cultural heritage landscapes* and resources, including:

- The Boyd Archaeological Field School, a summer credit course for high school students established in 1975 with more than 1,100 graduates to-date.
- *Black Creek Pioneer Village*, a TRCA facility in the City of Toronto set in the 19th century with more than 35 historic buildings and extensive programming to educate students on the lifeways of settlers in the 1800s.



- Humber River's *Canadian Heritage River System* (CHRS) designation, illustrating the 10,000+ year history of Aboriginal and early European reliance on the Toronto Carrying Place Trail.
- Conservation Area and Resource Management Tract Management Plans, which identify best management practices for cultural heritage resources on specific TRCA properties.
- Watershed Strategies that integrate the obligations and benefits of identifying, protecting and promoting cultural heritage (the tangible and the intangible resources) for watershed communities by all forms of public agencies.
- TRCA's Aboriginal Engagement Guidelines outlines our commitment to growing our relationships with Anishinaabe, Huron-Wendat, Haudenosaunee and Métis communities, whether that be relatively informal partnerships in various initiatives or formal engagement for large-scale projects.



In TRCA watersheds, cultural heritage programs enhance interpretive and tourism opportunities. They draw upon the databases and inventories of cultural heritage including built structures and landscapes and identify architectural assets in need of *restoration*. As well, heritage properties are revitalized, often through partnerships, to increase revenue and find adaptive re-use as community centres, art centres, pubs, restaurants, and other businesses. TRCA's major cultural heritage programs include Black Creek Pioneer Village and the Archaeological Resource Management Services program.

The unique riverine association of TRCA lands provides an unlimited potential for holding *archaeological resources*. Recognizing the heritage value of these resources, TRCA worked with the Province to prepare an Archaeological Master Plan that documented *archaeological sites* and made recommendations for the proper management of these resources. The Master Plan's goal for resource management is to manage the archaeological resources found on TRCA-owned or managed land, consistent with legislative requirements and approved technical practices.

TRCA's jurisdiction contains many overlapping Traditional territories and Treaty areas relating to Anishnaabe, Haudenosaunee, Huron-Wendat and Métis nations, thus TRCA lands contain hundreds of known *ancestral archaeological sites* as well as high potential for many hundreds more. TRCA's in-house licensed archaeologists regularly communicate two-way information with the modern descendant communities of the people who occupied these past site locations, particularly when there is the need to

investigate a site during an *archaeological assessment*. For the archaeological resources on TRCA-owned or managed lands, TRCA is formulating Aboriginal Engagement Guidelines to obtain guidance on stewardship and management decisions within the the *archaeological assessment* process and other land management processes.

Through the planning and development process, TRCA ensures that an *archaeological assessment* is conducted on any TRCA-owned or managed property that is proposed for ground disturbance. Policy 7.3.2 f) in Section 7.0 makes reference to this requirement; further details on this process can be found in TRCA's Planning and Development Procedural Manual.



6.9.1 Policies for Cultural Heritage

Goal: To promote the importance of cultural heritage to the planning and development of sustainable communities.

It is the policy of TRCA:

- a) To encourage the protection and enjoyment of *built heritage resources, cultural heritage landscapes, and archaeological resources* throughout our *watersheds'* urban and rural landscapes.
- b) To work with municipal partners and stakeholders to update planning documents

and implement community projects supporting opportunities for the recognition, preservation, and celebration of cultural heritage.

- c) To promote the continuing public and private awareness, appreciation and enjoyment of cultural heritage through education and guidance on sound conservation practices.
- d) To continue TRCA partnerships and programs in cultural heritage through land management planning on TRCA-owned lands and TRCA-managed lands.
- e) To continue to celebrate the interpretive value of cultural heritage through adaptive re-use, *restoration*, and education programs on TRCA-owned lands and TRCA-managed lands.
- f) To ensure appropriate levels of engagement with Aboriginal nations and heritage stakeholders for the management of archaeological resources on TRCA-owned lands and TRCA-managed lands, in accordance with *Provincial and TRCA standards* (also see policy 7.3.2 f) on *archaeological assessments*).

6.10 Environmental Education And Stewardship

Environmental education increases the general public's knowledge and awareness about the environment and associated challenges to building sustainable communities. If we are inspired to value the environment through investigating and experiencing its many systems first-hand, then we are more likely to change our behaviour toward sustainability. Providing this inspiration, investigation and experience, is the work of TRCA's Education and Stewardship programs. With roots in the conservation education movement and TRCA's long history of partnership building, TRCA is well positioned to be a champion of education for stewardship and sustainable living.

As one of Canada's largest providers of outdoor and experiential education, TRCA offers a wide range of

programs that encourage the growth and development of life-long learning, creative problem solving skills, ecological literacy, and fostering commitment to action. TRCA operates a number of education programs designed to connect learners to their environment through fun and meaningful hands-on exploration of local natural systems and sustainable technologies. These include environmental and cultural heritage education programs offered through Black Creek Pioneer Village, Kortright Centre for Conservation, three residential field centres (Albion Hills, Lake St. George and Clarendon); Watershed on Wheels and Yellow Fish Road outreach programs; and various seasonal initiatives offered in TRCA parks and other conservation lands. A number of popular hands-on heritage-centred programs are also offered including an annual archaeological field school for high school students, public archaeology events, sight-seeing events, in-class programs, presentations and artifact displays.

TRCA also educates and engages new Canadians in stewardship activities by reducing language, cultural and economic barriers. Developed by and delivered regularly by TRCA education staff, are curriculum-linked adult English as a Second Language lessons on climate change, water conservation, the Great Lakes, land use, transportation and solid waste management.

In the development approvals process, education of residents and businesses occupying developments adjacent to natural areas is also an important step in fostering stewardship of nature. Established as a condition of approval for residential subdivisions abutting natural spaces, simple educational materials are distributed to residents and posted at trail heads. These materials describe appropriate treatment of natural areas that will benefit them and generations to come; this is often a joint



project of the municipality, developer and TRCA. Similarly, education of the public about municipal tree by-laws or other environmental protection by-laws is key to their success; because public resources to enforce compliance are often low, using proactive measures such as environmental education would be a prudent approach for municipalities that have such laws.

Finally, TRCA's Sustainable Technologies Evaluation Program (STEP) disseminates the results and recommendations of its research, and promotes the use of effective technologies through education and advocacy to the building industry, municipalities, the public, and other stakeholders.



TRCA's Healthy Yards (<http://www.trca.on.ca/yards>) program is a web-based tool that provides watershed residents with the local resources, information, and direction to create naturally beautiful lawns and gardens. Healthy Yards encourages sustainable behaviours in private yards including:

- gardening with native plants
- removing invasive exotic plants
- landscaping for energy conservation
- creating wildlife habitat
- composting
- conserving water
- reducing the use of polluting equipment
- reducing the use of chemical fertilizer and pesticides



Yellow Fish Road (<http://www.yellowfishroad.org>) is a nation-wide environmental education program designed and managed by Trout Unlimited Canada (TUC) since 1991. TRCA has partnered with the Yellow Fish Road program to educate the public about the impacts of pollution entering

urban storm drains with painted yellow fish symbols beside the drains. The goal of the program is to help Canadians understand that storm drains are doorways to our rivers, lakes and streams. Preventing pollutants from entering our storm drains is critical to protecting and improving water quality and aquatic habitat.

Watershed on Wheels (WOW) (<http://www.trca.on.ca/school-programs/facilities-and-programs/watershed-on-wheels>) is a TRCA-led environmental educational program that brings exciting and unique outdoor conservation experiences into the classroom. WOW is designed to meet Ontario Science and Technology Curriculum expectations for grades 1 to 8.

6.10.1 Policies for Environmental Education and Stewardship

Goal: To promote the benefits of environmental education and stewardship in the planning and development of sustainable communities.

It is the policy of TRCA:

- a) To continue TRCA partnerships and programs in environmental education and stewardship that increase watershed awareness and encourage sustainable behaviours and stewardship among residents and neighbourhoods.
- b) To continue to provide environmental learning opportunities on TRCA lands in conjunction with school boards and other partners in education.
- c) To recommend to municipalities that they develop policies to encourage and support opportunities for environmental education and stewardship in their planning documents and operations.
- d) To recommend, through the planning process, where appropriate and in cooperation with the municipality, that a brochure with information and advice on environmental stewardship be provided to (future) residents, particularly those adjacent to natural areas.
- e) To promote the use of sustainable environmental technologies through education, training and advocacy to the building industry, municipalities, the public, and other stakeholders.