

November 18, 2011

Mr. Bill Hughes
Commissioner of Finance and Treasurer
Regional Municipality of York
17250 Yonge Street
P.O. Box 147
Newmarket, ON L3Y 6Z1

Sent via email
bill.hughes@york.ca

Dear Mr. Hughes:

Re: TRCA 2012 BUDGET – PRIORITY ENHANCEMENTS

On behalf of Toronto and Region Conservation Authority (TRCA), I am submitting a request for funding additional to the operating and capital request included in the submission to the York Region Finance and Administration Committee being recommended by Regional staff. I very much appreciate the support TRCA has enjoyed from Regional staff in preparing TRCA's capital and operating budget request for 2012. TRCA's partnership with York Region continues to be very successful.

Regional staff advised TRCA staff that the guideline for 2012 funding of conservation authority programs and projects should not increase more than 4.5% of the 2011 base budget. TRCA has submitted capital and operating estimates that meet the guideline with a total increase of \$241,000. Detailed information on TRCA's core capital programs and projects has been submitted to Regional staff. TRCA's core capital programs provide for implementation of work critical to watershed management and support of TRCA's facilities. The existing funding is adequate but there exist other critical priorities that cannot be addressed within the existing core programs. Simply put, TRCA has already stretched its resources in York Region to maintain its core programs and much more needs to be done.

The Authority, at its meeting on October 28th, approved the preliminary estimates as submitted to the Region, including a request for funding of priority enhancement work which is not within the regional budget guideline. The priority enhancement requests are summarized below. Detailed business case descriptions are attached for reference.

PRIORITY ENHANCEMENTS

1. Kortright Visitor Centre Retrofit (\$300,000)

For over 35 years, the Kortright Centre has been Canada's leading centre for environmental education. With over 120,000 visitors annually, including 70,000 students, Kortright Centre has played, and continues to play, a key role in educating generations of youth and adults about nature, the environment and sustainability. Kortright has been described as a "natural jewel" in the crown of York Region. Today, Kortright's reputation and its \$1.5 million educational operation is in jeopardy if the serious infrastructure issues are not addressed.

Since 1976, the daily impact of over 3.5 million people walking through Kortright's doors, has taken a toll on the building. Also, some components of the mechanical system are at the end of their design life and need to be replaced with more efficient and greener technologies. Rising maintenance and energy costs are interfering with daily operations and consuming an ever increasing part of its annual operating budget. Left unchecked, these ongoing issues will result in Kortright having to close its doors, undermining years of providing high quality education programs to the citizens of York Region and beyond. York Region would lose a key natural asset in the education and tourism field.

TRCA proposes a \$5.125 million restoration plan for Kortright over 5 years with funding from York Region, Peel Region and TRCA's Living City Foundation. Attached is the detailed business plan including proposed funding. This plan is scaled back from an earlier, more dramatic transformation estimated to cost \$20 million. York Region has included in the base capital budget \$250,000 annually for the Kortright project. TRCA is seeking an additional \$300,000 each year for 5 years to enable the restoration work to proceed in a timely and cost effective manner.

When completed, the revitalized Kortright Visitors Centre with its unique combination of exhibits, demonstrations, research and programs will attract thousands of new visitors, increase revenues and grow the Living City Campus' reputation as Ontario's key environmental and sustainability education and tourism attraction.

2. Flood Management Service (\$200,000)

A principle mandate of the TRCA is to reduce the risk to life and damage to property during severe rainfall events and flood related emergencies. TRCA achieves this goal by providing local agencies and the public with notice, information and advice through the operation of a 24 hour/day flood forecasting and warning program. In addition, TRCA maintains two dams, Milne Dam (built 1968) and Stouffville Dam (built in 1969 for flood control) as well as two flood control channels (Woodbridge Channel and Stouffville Channel) within the Region of York. An extensive gauging network supports the work of on-call flood duty officers, and also provides valuable information for a number of other programs of interest to the Region.

In recent years, work has focused on understanding and identifying the flood risks within York Region. One of the critical components identified to uphold public safety standards, is the long term capital asset management of flood control infrastructure. In York Region, there is an immediate need to address this issue, starting with the Stouffville Dam and Channel. The details of this work are provided in a separate business case analysis. Another, critical step is to undertake additional flood remediation projects to reduce the risk of flooding in established areas wherever possible. Finally, the importance of maintaining up to date information on flood risk and disseminating that information to our municipal partners on a regular basis cannot be understated.

3. Stream Infrastructure Assessment & Major Remedial Erosion Control Works (\$100,000)

Through its inventory and inspection work, TRCA identifies major erosion problems that place infrastructure and property at risk. Where possible, erosion protection works are installed. Watershed plans have shown that increased erosion is expected with continued growth and “business as usual” storm water approaches. Hence, we can expect additional erosion and more threat to aging infrastructure.

Aging erosion control infrastructure can be replaced with more sustainable methods using innovative techniques, materials and technologies. Implementation of bank and slope stabilization measures which promote restoration and enhancement of riparian corridors and aquatic habitat, and the application of adaptive management principles which promotes the ongoing monitoring and re-assessment of site requirements in response to climate change is necessary.

This project differs from TRCA's existing Watershed Erosion Monitoring and Maintenance Program. The existing program identifies and prioritizes the work to be undertaken and provides for minor maintenance of the existing erosion control infrastructure to be done. This project supports the implementation of large-scale projects that are not financially possible under the existing regular monitoring and maintenance program. Proactive maintenance and replacement of an aging/failing erosion control infrastructure is critical to the protection of public safety and preservation of land and associated infrastructure.

4. Climate Change Consortium Research/Action/Integration (\$50,000)

Climate change response is among the most recent issues that municipalities are dealing with as they determine the mitigation and adaptation measures that will be required for the future. York Region has initiated a Climate Change Adaptation Action Plan and expressed interest in being part of a network with others who are struggling with the same issues. TRCA is involved in developing improved science tools for assessing the risk of climate change to infrastructure and the environment. TRCA has established a Climate Consortium for Research Action and Integration (CC-RAI) with York University as a response to the urgent need in the public, private and non-profit sectors for a major research and innovation centre that could bring together the disparate climate change research and policy actions among private sector, government and education institutions in Ontario and the Great Lakes region.

The CC-RAI founding partners recognized the potential for a single window consortium that could:

- Pool the diverse scientific and research expertise scattered throughout the region's universities, government institutions and private and non-profit organizations;
- Use climate science and research strategically in the development and application of regional data, approaches, and effective responses to regional climate change impacts in the GTA, Ontario and the Great Lakes area; and
- Enable participants and partners to deliver practical, locally relevant responses that are grounded in sound science, cross disciplinary and sectoral boundaries, and promote real-world solutions.

Commitment of \$50,000 by York Region for climate change initiatives will enable the Region to participate and share in developing the tools and connections that will aid in effective municipal responses to climate change.

TRCA asks that this request for funding of additional priority projects be presented to the Region Finance and Administration Committee as part of the 2012 budget process. TRCA staff is available to provide additional information or clarification as may be required. Staff will be present at the December 1st Committee meeting to make a presentation in support of this request.

Thank you for your consideration.

Sincerely

A handwritten signature in black ink that reads "Brian Denney". The signature is fluid and cursive, with the first name "Brian" and last name "Denney" clearly distinguishable.

Brian Denney, P.Eng.
Chief Administrative Officer

cc. Mayor Dave Barrow
Regional Councillor Michael DiBiase
Regional Councillor Gino Rosati
Deputy Mayor Jack Heath
Councillor Linda Papst

/Encl.

KORTRIGHT VISITOR CENTRE RETROFIT

1.0 Executive Summary

For over 35 years the Kortright Centre has been Canada's leading centre for environmental education. With over 120,000 visitors annually, including 70,000 students, the Kortright Centre has played, and continues to play, a key role in educating generations of youth and adults about nature, the environment and sustainability. Kortright has been described as a natural jewel in the crown of York Region. However Kortright's reputation and its \$1.5 million educational operation is in jeopardy if the serious infrastructure issues are not addressed immediately. Over the past 35 years the impact of over 3.5 million visitors walking through Kortright's doors, has taken a toll on the building and its mechanical systems. Rising maintenance and energy costs are interfering with daily operations and consuming an ever increasing part of its annual operating budget. Left unchecked these ongoing issues will eventually result in Kortright having to close its doors, undermining years of providing high quality education programs to the citizens of York Region and beyond. York Region would lose a key natural asset in the education and tourism field.

Poor insulation, windows, and doors; leaky roofs, poor indoor air quality issues, undermined foundations, and deteriorating deck and siding has initiated the need to aggressively move on remediating the infrastructure at Kortright. To continue to effectively engage, educate and entertain visitors from around the region and country, Kortright needs to dramatically improve the welcome centre for all its visitors.

When completed, the revitalized Kortright Visitors Centre with its unique combination of exhibits, demonstrations, research and programs will attract thousands of new visitors, increase revenues and grow the Kortright's reputation as Ontario's key environmental and sustainability education and tourism attraction.

Our enhancements focus on implementing two specific components:

1. **Sustainable Facilities** – A major retrofit of the facility will improve:

- Thermal performance of the building through better insulation, doors, windows and heating systems with energy cost reductions of 65%.
- Day lighting – more windows and skylights
- Environmental performance by reducing both the ecological and carbon footprint of the building and daily operations
- Water quality by connecting the property to the York Region water system
- Water conservation via a rain water recycling system
- Waste water treatment
- Energy self-sufficiency through a 25kw roof mounted Photovoltaic system
- Indoor air quality with the addition of a new ventilation system
- Meet accessibility legislated standards
- Client and corporate services with improved kitchen and eating facilities
- Building automation that reduces operation and maintenance costs
- Media and web presence

2. **Exhibits** - The re-design of the Kortright visitor centre will dramatically improve the indoor environment to introduce and engage visitors with innovative multimedia exhibits that develops a sense of place, for the purposes of orientation; a sense of wonder about the natural world; and a sense of anticipation of what lies outside the four walls; and a sense of hope by demonstrating positive actions in the community and around the world.

It will take a number of years to fully retrofit the Kortright visitors centre as it plans to remain operational during this time. Planning, design and implementation of the building began in 2010 with the implementation of a new heating, cooling and ventilation system in 2011. With the enhanced capital of \$300,000 per year from York Region until 2016, our other municipal partners and our fund raising efforts to match the enhanced capital will see the Kortright retrofit completed over the next 5 years.

2.0 Recommendation

TRCA is requesting that the Region of York support the major retrofit of the Kortright Visitor Centre for 2012 and 2013 at a total of \$300,000 per annum. Based on a progress report on other funding sources and building activity, consideration of continued contributions will be reviewed until 2016 to allow for completion of the retrofit.

Implement the following enhanced capital infrastructure over the next 5 years and complete the retrofit of the Kortright Centre: *(TRCA will continue to seek alternative funding)*

Benefits:

1. Accelerates Capital Retrofit to be completed in five years
 - a. Retrofit of the visitors Centre
 - b. Connecting the visitors centre to York Region water
 - c. Connect the campus to high speed internet with fibre
2. Improves and accelerates the business service opportunities to provide ongoing support for the education programs.
3. Provides a safer, healthier, and more impactful visitors experience
4. Supports York Regions economic, public engagement and monitoring principles, strategies, and actions as outlined in the York Region Sustainability Strategy.
5. Completes the indoor interactive education theme exhibits in the newly expanded exhibit area.
6. Reinstates Kortright as a strong regional attraction

Deliverables:

PROJECT	PROPOSED BUDGET
2012 - Complete phase two of Visitor Centre Retrofit: Re-skinning the building shell; - Upgrade existing roof insulation; - Replace existing roof with recycled steel roofing; - Other components to be implemented through with enhanced capital fundraising program already in progress-this will continue for future phases: - Upgrade existing wall insulation; - Upgrade existing floor insulation; - Replace existing exterior siding; - Walk out viewing platform; - Expand daylighting opportunities (new skylights, windows on lower floor and south high end wall); - New eaves troughing, snow guards, rainwater collection - Connect Kortright to the York Region water system - Install fiber optic lines	\$1, 025,000
2013 Complete Structural Retrofit - Phase Three of Visitor Centre Retrofit - Replace the Woodland glass pavilion to become a four season extension of the main building which will provide improved healthy student luncheon facilities, new staffing offices, and improved community meeting facilities.	\$1,025,000
2014 - Design and implement a 25 kw roof mount Photovoltaic system - Phase Four - Re-organize the interior areas to improve the functionality of the centre and enhance exhibit, washrooms and classroom areas for student and family visitors;	\$1,025,000
2015 Replace the aging waste water treatment system with state of the art system that demonstrates innovative water treatment for medium sized business and small communities	\$1,025,000
2016 - Implement first phase of Water, Energy, Biodiversity and Urban Farm Exhibits, Web enhancements and smart phone - Design and implement wheel chair lift alongside of the building to allow physically challenged individuals access to the valley. - Design Interactive Exhibits, Web and Smart phone apps. The Centre will develop a series of interactive displays that investigate everything from the natural history of the property to the latest building automation and monitoring equipment. Using interactive projections, and smart phone Apps visitors will be able to explore building and trail activities.	\$1,025,000
TOTAL	\$ 5,125,000

This recommendation is based on annual capital funding from regional partners as follows:

Funder	2012 (\$)	2013 (\$)	2014 (\$)	2015 (\$)	2016 (\$)	5-year Total 2012-2016 (\$)
City of Toronto						
Durham Region	0	0	0	0		0
Peel Region	175,000	175,000	175,000	175,000	175,000	875,000
York Region	250,000	250,000	250,000	250,000	250,000	1,250,000
Adjala & Mono						0
Subtotal	425,000	425,000	425,000	425,000	425,000	2,125,000
Federal						0
Provincial						0
Enhanced	300,000	300,000	300,000	300,000	300,000	1,500,000
CFGF Foundation	300,000	300,000	300,000	300,000	300,000	1,500,000
Subtotal	0	0	0	0		0
TOTAL	1,025,000	1,025,000	1,025,000	1,025,000	1,025,000	5,125,000

Peel Region has committed to the above funding schedule

TRCA is fully committed to the Kortright retrofit and is therefore, continuously seeking out additional funding opportunities. Working closely with the Conservation Foundation of Greater Toronto the TRCA will mount a capital fundraising campaign through:

- Seeking of corporate sponsorships
- Conservation Foundation of Greater Toronto fundraising
- Seeking of grants and other funding opportunities
- Partnerships

3.0 Current State Analysis

The gateway to all the natural, cultural and built wonders on the property is the Kortright Visitors Centre, a 30,000 square foot, 3 level post and beam structure, with a 140 seat theatre, 8 classrooms, café and gift shop. This visitors centre is the hub of all the educational/training/recreational programs and activities that are featured in the building. The Centre also acts as a trailhead guiding visitors to either a natural adventure (e.g. hiking, skiing, orienteering, geocaching, birding and dogsledding) or lessons in the latest sustainable energy or green building demonstrations in Canada.

For 35 years this grand post and beam structure has awed over 3.5 million visitors. This magnificent structure with its openness and towering beams is a lasting memory for many visitors especially the many international guests who equate the natural wood of the building to Canada's vast forest and wilderness.

In order to accommodate existing programming and realize the new revenue opportunities associated with the Kortright's new vision called the "Living City Campus" the Kortright visitors centre needs to be retrofitted. The current building structure is suffering from leaky roofs, mold, siding falling off the building, erosion undermining the building footings, unsafe decks, crowded classrooms, café and staff areas. All the mechanical equipment is over 35 years old and is continually breaking down impacting operating costs and in some cases impacting the our clients for corporate and special events. If the building infrastructure is not resolved the building maintenance will consume operating budgets for the foreseeable future, taking away budgets from our core educational programming.

4.0 Project Description (Future State)

The retrofit will allow the visitors centre to become an integrated gateway designed to inform the visitors about the outdoor opportunities and entice them to get outside and experience, explore and discover the unique natural, cultural, historical, and built splendours found throughout the 250 hectares that make up the Kortright property. From the moment you enter the building the idea of openness, and connection to the natural environment will be obvious. Using glass in the south walls will allow the sunlight to penetrate the deepest parts of the visitor centre. The natural day lighting will not only save energy but it will also lighten up the heaviness of the wooden beams and show off the grandness of the cathedral ceiling.

With the addition of skylights along the roof line off the main floor and windows along the north and west side of the lower floor will give an instantaneous connection to the immense forest that surrounds Kortright. Visitors will immediately gravitate to the balcony, or the windows on lower floor to peer into the canopy of the maple beech forest. The new facilities will meet legislated accessibility standards.

What was used as office space on the mezzanine now becomes an opportunity to impress the visitor with a different perspective of the outdoor world. The mezzanine will be surrounded by sliding glass doors which allows the visitor to step outside onto a deck that peaks out into the maple beech canopy. From here visitors step off the deck onto a tree canopy walk.

The renovation also includes the dismantling of the glass pavilion to be replaced by 4000 sq. ft of four season space, connecting indoor and outdoor space. On the Ground Floor is a proposed 3500sf exhibit/event hall capable of sustaining multimedia exhibits and social events for up to 250 people. The ground floor will also house an enhanced 140-person theatre, retail and gift store, a commercial kitchen and catering facilities, and a flexible 200-person visitor eating area to better accommodate the eating needs for the thousands of students. On the Lower Level there will be a 3000sq.ft student gathering and exhibit area, twelve classrooms with flexible walls, new washrooms, and building support spaces. Paths and trails can enter directly to this lower level. The perimeter terrace around this level will provide new wheel chair access into the Humber River trail system.

The new energy and conservation measures will dramatically reduce the operating costs of the building which allows more funds to support new and engaging community programs.

Objectives:

1. Improve the thermal efficiency and durability of the structure
 - a. To reduce energy use by 50% and further reduce water consumption.
 - b. Reduce operating costs associated with energy consumption and use
 - c. To significantly reduce carbon footprint of the facility
2. Improve the structural integrity and durability of the building
3. Increase functionality of the Visitor's Centre through the creation of additional space and internal re-organization of floor space that will better meet user needs and make room for community events and social gatherings.
4. Enhance the indoor space to accommodate opportunities for interactive exhibits that connect the visitor with the natural, historical, cultural and built points of interest on the property.
5. Act as a demonstration for green retrofits
6. Improve the educational and entertainment experience all its visitors

Exhibits

The re-design of the Kortright visitor centre is an opportunity to embrace the original purpose of the open concept of the building. The centre becomes an open slate for a series of engaging traditional displays and innovative multimedia exhibits that develops a sense of place, for the purposes of orientation; a sense of wonder about the natural world; and a sense of anticipation of what lies outside the four walls; and a sense of hope by demonstrating positive actions in the community and around the world.

- Developing a **sense of place** for our visitors as it is an opportunity to orient them to the building, the trails and the landscapes and activities that are scattered over the 250 hectares of the Humber River.
- A **sense of wonder** is an opportunity to build some basic eco-literacy knowledge about the natural habitats and cycles on the property.
- Building **sense of anticipation** is important because we want the visitors to explore the property to re-connect with the natural world, as well as discover the positive actions we can undertake in our built communities for make them more sustainable.
- Building a **sense of hope** is based on the premise of demonstrating positive examples of what people and organizations are doing in their communities and around the world that are improving the environment and making our

communities more sustainable. It is also important that our visitors walk away with some understanding, ideas, knowledge and skills that allows them to become more engaged in building sustainable communities.

The new exhibits will use remote controlled web cams to connect visitors directly to the outdoor activity and learning zones, interactive floor projections to explore innovative ways to experience various water, land and air habitats, interactive wall projections to be a virtual window on the good works of the TRCA and other national and international groups. The Centre will also use other interactive displays that investigate everything from natural history of the property to the latest building automation and monitoring equipment. Using GPS chip technology visitors will be able to track variety of animals on the property on digital maps. The ultimate building activity will be a high ropes course the exits into the canopy surrounding the visitor centre.



Flood Management Service

1.0 Executive Summary

A principle mandate of the TRCA is to reduce the risk to life and damage to property during severe rainfall events and flood related emergencies. We achieve this goal by providing local agencies and the public with notice, information and advice through the operation of a 24 hour/day flood forecasting and warning program. In addition, TRCA maintains two dams, Milne Dam (built 1968) and Stouffville Dam (built in 1969 for flood control) as well as two flood control channels (Woodbridge Channel and Stouffville Channel) within the Region of York. An extensive gauging network supports the work of on-call flood duty officers, and also provides valuable information for a number of other programs of interest to the Region.

Work over the past several years has focused on understanding and identifying the flood risks within York Region. One of the critical components identified to uphold public safety standards, is the long term capital asset management of flood control infrastructure. In York Region, there is an immediate need to address this issue, starting with the Stouffville Dam and Channel. The details of this work are provided later in this report. Another, critical step is to undertake flood remediation projects to reduce the risk of flooding in established areas wherever possible. Finally, the importance of maintaining up to date information on flood risk and disseminating that information to our municipal partners on a regular basis cannot be understated.

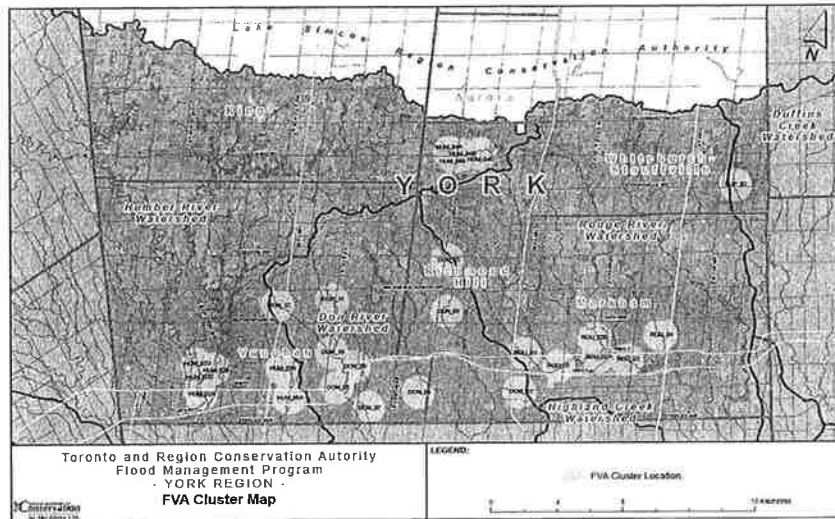
Situational Assessment and Problem Statement (Current State)

The TRCA's Flood Management Service has been developed in order to *prepare* and *respond* to our changing environment, the increasing needs of our municipal partners and the health and well being of our living city. This is being achieved through the four components of the Flood Management Service (Flood Risk Management, Flood Infrastructure, Hydrometrics and Data Management) in the follow ways:

Flood Risk Management

- developing a comprehensive database of flood vulnerable structures and roads (FVA Database) based on the latest Regulatory floodline mapping for each watershed (19 key risk areas have been identified in York Region and are illustrated below)
- prioritizing areas where flood mitigation capital works projects would either eliminate or reduce the existing risks to life and property in the Region through the TRCA Flood Protection and Remedial Capital Works Strategy
- providing clear and consistent flood warning procedures including communication and coordination with municipalities before, during events and post events
- strengthening relationships with municipal emergency management offices and coordinating policies and procedures

- improving our ability to predict when and where a flood may occur through the continuous development of new tools and technology



FVA Clusters within York Region

Flood Infrastructure

- long term capital asset management of aging infrastructure in coordination with Municipal and Regional capital works plans to maximize opportunities for efficient use of resources
- maintaining and operating flood control infrastructure in compliance with the new (forthcoming) Ministry of Natural Resources Regulations and, where applicable, the Canadian Dam Association Guidelines

Special Mention: Stouffville Dam and Channel

At present, the Stouffville channel is up to 50% blocked in some locations with sediment buildup and thick vegetation. This has resulted in reduced capacity of the channel to convey flood waters and increased risk of flooding to several private properties near the top of bank. In 2004, a Dam Safety Review (DSR) was conducted for the Stouffville Dam. It found that the Stouffville Dam is a passive drop structure which is in extremely poor condition structurally, and is in need of major concrete repairs or replacement. The two most significant issues for the dam include: 1) cracks in the concrete structure due to alkali-aggregate reaction (which is common in older concrete and results in progressive deterioration of a structure); and 2) disintegration of the low flow pipe rendering the structure without an emergency drainage outlet. These issues need to be addressed immediately to restore the original functions of both the channel and the dam, as well as to prevent failure of the structures.

Hydrometrics

- collection, interpretation, and dissemination of water quantity, water quality, and meteorological data that is vital to meet flood and watershed management needs

Data Management

- provide staff, the public, and stakeholders easy and timely access to accurate information, analysis, and data
- advancement of web-based technologies; the flagship of this being TRCA's Real Time Gauging and Flood Monitoring website (www.trcagauging.ca) which provides stream flow and precipitation data in near real-time for public consumption

SUMMARY OF FLOOD MANAGEMENT IN YORK REGION

Flood Mitigation Sites (note: not listed in priority order)	
1. Woodbridge SPA (Hum02) 2. Lake Wilcox (Hum04) 3. Black Creek south of Hwy 7 (HUM05) 4. Don Mills Ditch (Don03) 5. German Mills Creek – Major Mackenzie to 16 th Ave (Don04) 6. German Mills Creek – Elgin Mills and Yonge St (Don 05) 7. East Don at Yonge (Don06) 8. Westminister Creek at Steeles (Don07) 9. Westminister spill (Don08) 10. Tributary 6 between Keele and Dufferin (Don09)	11. Langstaff (Don10) 12. Rupert's Creek (Don11) 13. Basin 1 west of Hwy 400 (DON12) 14. Rouge at Hwy 7 and Hwy 404 (ROU01) 15. Unionville SPA (ROU02) 16. Markham SPA (ROU03) 17. Robinson Creek (ROU04) 18. Beaver Creek/Markham Centre (ROU05) 19. Duffins Creek at Stouffville (DUF02)
Flood Control Infrastructure in York Region (owned and maintained by TRCA)	
Stouffville Dam* Stouffville Channel* *in critical need of repair	Milne Dam Woodbridge Channel
Hydrometrics Resources in York Region (owned and maintained by TRCA)	
2 Real-time gauges 4 streamflow gauges 9 precipitation gauges	4 snow course sites 3 meteorological gauges 350 low flow monitoring locations

2.0 Project Description (Future State)

Future targets for the Flood Management Service include:

- 1) capital asset maintenance of flood control infrastructure, and
- 2) implementation of the Flood Protection and Remedial Capital Works Program to begin the formal process of addressing those areas which are most at risk due to the devastating effects of flooding.

Key initiatives which have been identified as having an immediate need for implementation include:

- Develop and implement long term capital asset maintenance plans for Stouffville Dam and Channel

- In coordination with the municipalities, and based on potential flood risk reduction and urban development priorities, undertake flood mitigation projects to reduce flood risk at the 19 priority sites within York Region (listed above)

In addition, the following projects are imperative to achieving our mandate of reducing the risk to life and property due to flooding:

- Ensure infrastructure is in compliance with Regulatory requirements and have sufficient structural capacity for the future (including Woodbridge Channel and Milne Dam, in addition to Stouffville Dam and Channel)
- Conduct annual municipal workshops and develop a municipal outreach program to improve communications and establish clear and consistent procedures
- Initiate a public awareness campaign to inform people of their existing risks due to flooding

Benefits:

- Maintain and operate flood control infrastructure with a long term capital asset plan. This will allow for sustainable practices and optimized flood protection for the future.
- Begin a formal process of reducing flood risk at priority locations through the implementation of capital works projects
- Improve partnerships between the Region, Municipalities and TRCA to allow for effective response to flood emergencies
- Provide residents of York Region with valuable information about the risks associated with flooding and the tools to prepare their families and homes for such events

3.0 Solution Design

Recommended Solution:

York Region has many policies in the new Official Plan which target floodplain management, as well as emergency management. For example, Section 2.3 (9) details the following policy:

“To work with the conservation authorities to identify valley and stream corridors and areas subject to flood and erosion risk and to require the identification of such areas in area municipal plans”

In order to fulfill the objectives of both the Region and TRCA with respect to flood vulnerable areas and emergency management, it is recommended that TRCA's Flood Management Service move forward with implementation of the identified program objectives.

Maintaining Status Quo

- Existing infrastructure will be subject to failure in the future without adequate maintenance

- The implementation of capital works projects identified through the Flood Protection and Remedial Capital Works Strategy will not move forward (i.e., no Environmental Assessments for flood protection projects will be undertaken at any of the 19 identified sites).
- TRCA will not be able to benefit from the advancement of technological tools to predict flooding in our jurisdiction and thus improve our ability to provide relevant (and timely) flood forecasting information.

Cost of Status Quo

- The cost of maintaining the status quo is extreme – with thousands of people residing within flood vulnerable areas and millions of dollars worth of potential property damage due to flooding. Many of the damages are, in fact, intangible due to the nature of a flood event and associated devastation. With climate change, the type, severity and frequency of flood events can be expected to change and we must prepare to deal with all possible scenarios in the future.

4.0 Cost-Benefit Analysis

The main projects funded under this program include:

- 1) Flood Remedial Capital Works
- 2) Infrastructure Operations and Maintenance (dams and channels)
- 3) Flood Forecasting & Warning (Flood Duty Officer program)
- 4) Municipal and Public Outreach
- 5) Flood Forecasting Tools

The benefits of providing an effective flood management program far outweigh the investment required. Recent events such as the August 19th, 2005 storm, which resulted in the largest amount of insurance claims for a single event in Canada and disruption to numerous public services, the Peterborough floods of 2004 and several others, remind us that the potential for flooding exists. We must be prepared and have the appropriate tools in place to respond to flood events in an effective and timely fashion.

Projects such as Flood Remedial Capital Works include a cost-benefit analysis in the decision making process as part of the prioritization process when selecting sites for remediation. The strategy looks at each flood vulnerable area, the magnitude of the risk to life and the potential damages at each area. This is weighed against the cost of construction flood mitigation or flood elimination projects. This is one project where there are tangible costs. Some of these areas have significant development or redevelopment potential that is not being realized with the current flood vulnerability. However, many of the projects under the broader Flood Management Program provide significant intangible benefits. For example, increasing the amount of lead time for warnings that can be provided to First Responders during a flood event, or the outreach projects that serve to get information into the hands of emergency planners in advance of emergencies provide multiple benefits that cannot be assigned a dollar value.

TRCA's total budget for providing all of the components of the Flood Management Service is approximately \$700,000 dollars per year which is provided by our municipal partners (York Region, Peel Region, the City of Toronto and Durham Region). Staff provide the basic daily flood warning service and messaging within the operating budget, 25% of which is provided by York Region. This however, would not allow for the advancement in service to stay abreast of the evolving technology and changing climate.

Capital dollars account for approximately one half of the total Flood Management budget; 34% of the capital budget is provided by York Region. Continued investment in TRCA's capital budget will enable the Flood Management Service to provide some of the basic services that are mandatory for fulfilling our mandate of protecting the public.

5.0 Implementation Strategy

2012

- Complete survey of Stouffville Channel and assess repair/maintenance requirements
- Begin repair work to Stouffville Dam as outlined in the 2004 Dam Safety Review
- Continue the development of flood forecasting tools and outreach programming

2013

- Undertake Stouffville Channel repair/maintenance
- Continue repair work to Stouffville Dam as outlined in the 2004 Dam Safety Review
- Continue the development of flood forecasting tools and outreach programming
- Select flood priority site for an Environmental Assessment in consultation with the Region and municipality (e.g., Beaver Creek at Markham Centre)

2014

- Complete survey of Woodbridge Channel and assess repair/maintenance requirements
- Continue the development of flood forecasting tools and outreach programming
- Begin construction of flood remedial works based on the results of the EA above

2015

- Undertake Woodbridge Channel repair/maintenance as required
- Determine repair and maintenance requirements for Milne Dam
- Continue the development of flood forecasting tools and outreach programming
- Select flood priority site for an Environmental Assessment in consultation with the Region and municipality (e.g., Don Mills Ditch)

2016

- Undertake Milne Dam repair/maintenance
- Continue the development of flood forecasting tools and outreach programming
- Begin construction of flood remedial works based on the results of the EA above

6.0 Critical Assumptions and Risk Assessment

There are approximately 36,000 people living in flood vulnerable areas within TRCA's jurisdiction, 9,000 of those residing in York Region. There is also a substantial amount of potential property damage due to flooding which could occur in York Region, including an estimated \$103,000,000 dollars of residential property damage and \$225,000,000 dollars of non-residential property damage...\$329 million dollars total potential damage.

At present, there are no capital funds allocated to the implementation of flood mitigation projects (19 priority sites listed above). Capital funds are available to undertake preliminary studies for one of the four flood control infrastructure projects (Stouffville Channel survey in 2012, and strategy development/implementation in 2013).

In order to ensure compliance with existing and upcoming legislation, TRCA must undertake Dam Safety Reviews and prepare Operations, Surveillance and Maintenance plans for the Stouffville and Milne Dams every 5 years. It is important to budget appropriately for these intensive studies and to plan for the implementation of the study findings.

Toronto and Region Conservation Authority's Flood Vulnerable Areas (FVA's)

Watershed	Number of Structures (FVAs)	Flood Vulnerable Non-residential	Damage Estimation \$ Non-residential	Flood Vulnerable Residential	Damage Estimation \$ Residential	Number of People within Floodplain
TRCA's Jurisdiction	7816	642	1,215,600,000	7083	1,897,700,000	35,625
York Region	1902	166	224,907,000	1736	102,743,000	8956

Total Potential Damage Estimation

TRCA's Jurisdiction:

\$ 3.1 Billion

York Region:

\$ 329 Million

Note:
• Some assumptions were made for the purpose of determining the Flood Damage Estimation and the Loss of Life calculation
• Damage Estimation was calculated using the value for commercial/industrial buildings, and assumed residences were 2 storeys with a basement
• # of people calculation based on 125 people/ha for comm/ind and 3 people/household

7.0 Conclusions and Recommendations

With thousands of people residing within flood vulnerable areas within York Region and millions of dollars worth of potential property damage, there is an immense need for the continued support and development of TRCA's Flood Management Service and the projects within its' portfolio. Funding will support five key program components:

- 1) Flood Remedial Capital Works
- 2) Infrastructure Operations and Maintenance (dams and channels)
- 3) Flood Forecasting & Warning (Flood Duty Officer program)
- 4) Municipal and Public Outreach
- 5) Flood Forecasting Tools

It is important to note that due to limited resources, staff were not able to implement some of the initiatives outlined in the 2009 budget and therefore a portion of the funding from that year was carried forward into 2010 and 2011. The requested funding for 2012 does not represent a new request for funds, but rather, it is a continuation of funding that was provided in previous years. Due to both staffing and the progression of the Flood Protection Strategy, TRCA is now in a position to move forward on a number of critical program initiatives and requires the continued support for the Flood Management Service.

Stream Infrastructure Assessment & Major Remedial Erosion Control Works

1.0 Executive Summary

The watercourses within TRCA's jurisdiction are inhabited by a wide array of municipal infrastructure: sanitary sewer crossings, pedestrian bridges, storm outfalls, road crossings, and bank/bed armoring, amongst others. And while the effects of infrastructure on urban watercourses is well documented, what is less known is how and at what rate the infrastructure in TRCA's watersheds is being impacted by our streams and rivers as they respond and adapt to activities that alter stream flows, sediment supply, channel geometry and other variables influencing stability. Figure 1 below show the effects of natural stream processes on municipal infrastructure.



Figure 1. The effects of lateral migration on a typical storm sewer outfall.

Several different groups, departments, and agencies are vested with the responsibility for maintaining the infrastructure in and near watercourses. The departmentalization of this responsibility inherently promotes a piecemeal approach to stream work. TRCA, like Transportation, Parks, and Water departments all share the responsibility of protecting their property and public safety from the hazards of flooding and erosion, but limited budgets with distinct priorities and tight deadlines create major barriers to working together.

Although several parties are responsible for maintaining infrastructure in and near watercourses, a general lack of understanding of channel processes can lead to seemingly sudden failures that are not budgeted for to address (Figure 2). Although reactionary maintenance will always exist due to the effects of extreme weather, it can be reduced through the addition of information about changing stream conditions and how these changes are impacting individual structures.



Figure 2. Failures like the one above appear to have overnight and are often not budgeted for, but must be addressed quickly to protect public safety

As the regulatory body governing alterations to watercourses, wetlands and shorelines in the Greater Toronto Area, TRCA has constructed and is responsible for the maintenance of more than 500 flood and erosion control structures. Through the ongoing inspection and maintenance of these structures, TRCA has amassed a wealth of knowledge in the identification and assessment of hazards to municipal infrastructure in our valleys and streams and have identified numerous benefits and opportunities for efficiencies through a collaborative approach to stream asset management.

It is TRCA's objective to apply our expertise in data collection, knowledge of stream processes and experience in remedial and maintenance erosion control work in a manner that adds value to our municipal partners' stream protection/restoration efforts while promoting a cooperative and holistic approach to asset management. It is recommended that TRCA complete a detailed structural inventory and preliminary assessment of all TRCA regulated watercourses in York Region over the next three years at a cost of approximately \$100,000 per year to establish the baseline information needed to achieve these objectives. Data collected is proposed to be stored in TRCA's existing *Stream Erosion and Infrastructure Database* (Figure 3), managed by Restoration Services' staff who will work in partnership with York Region and the applicable municipalities to avoid duplication of effort and ensure that information is shared in an efficient and timely manner.

The figure displays four screenshots of the TRCA's Stream Erosion and Infrastructure Database inspection form, organized into a 2x2 grid. Each screenshot shows a different section of the software interface.

- Top-Left Screenshot:** Shows the 'INSPECTION DETAILS' and 'OBSERVED DEFICIENCIES' sections. It includes fields for 'INSPECTION DATE', 'INSPECTOR', 'LOCATION', and 'STRUCTURE ID'. The 'OBSERVED DEFICIENCIES' section has checkboxes for various issues like 'BANK EROSION', 'VEGETATION', and 'STRUCTURAL DEFICIENCIES'.
- Top-Right Screenshot:** Shows the 'LOCATION DETAILS' and 'STRUCTURAL DETAILS' sections. It includes a map of the location and fields for 'STRUCTURE ID', 'TRCA ID', 'LOCATION', 'REGION', 'MUNICIPALITY', 'WATERWAY', 'WATERCOURSE', 'UTM COORDINATES (NAD83)', 'BANK SLOPE CHARACTERISTICS', and 'STRUCTURAL DETAILS'.
- Bottom-Left Screenshot:** Shows the 'PHOTOGRAPHS' section, which displays four photo thumbnails of stream bank erosion and infrastructure. Each photo has a 'DIRECTION' and 'DESCRIPTION' label.
- Bottom-Right Screenshot:** Shows the 'CONTRIBUTING FACTORS' and 'MAINTENANCE RECOMMENDATIONS' sections. It includes fields for 'CONTRIBUTING FACTORS', 'GENERAL CONDITION', 'MAINTENANCE RECOMMENDATIONS', and 'PRIORITY'.

Figure 3. Snapshots of TRCA's Stream Erosion and Infrastructure Database inspection form.

2.0 Problem Statement

There are two main problems this project seeks to resolve: piecemeal stream work, and a reactive approach to stream asset management. TRCA recognizes the challenges of overcoming these problems with limited budgets, defined responsibilities amongst the different parties involved, aging infrastructure and more intense and damaging storm events. By applying TRCA's well-established erosion monitoring and maintenance program and existing database to the inventory and preliminary assessment of municipal infrastructure, a significant amount of information can be collected and disseminated in a timely and cost effective manner. Coupled with TRCA's expertise in the design and implementation of stream protection and restoration work, opportunities for cooperation and partnerships are more easily identified and coordinated, potentially realizing huge cost savings through shared resources and reduced duplication of effort in consulting, permitting, tendering and construction mobilization/demobilization.

3.0 Project Description

3.1 Stream Infrastructure Inventory and Assessment

This project proposed to build a detailed inventory of infrastructure in/near TRCA regulated watercourses in York Region using existing information from the Region and the various municipalities in combination with field reconnaissance. Once all existing information has been collected, structures will be visually inspected in the field to assess their condition with respect to the surrounding environmental conditions to ultimately assign a priority ranking for future maintenance.

All information is to be stored in a Microsoft SQL web-accessible database dynamically linked to GIS software to visualize and interpret the structural condition of the watercourse at different scales to reveal areas of concern, trends, and the relationship between stream stability and structural integrity (Figure 4).

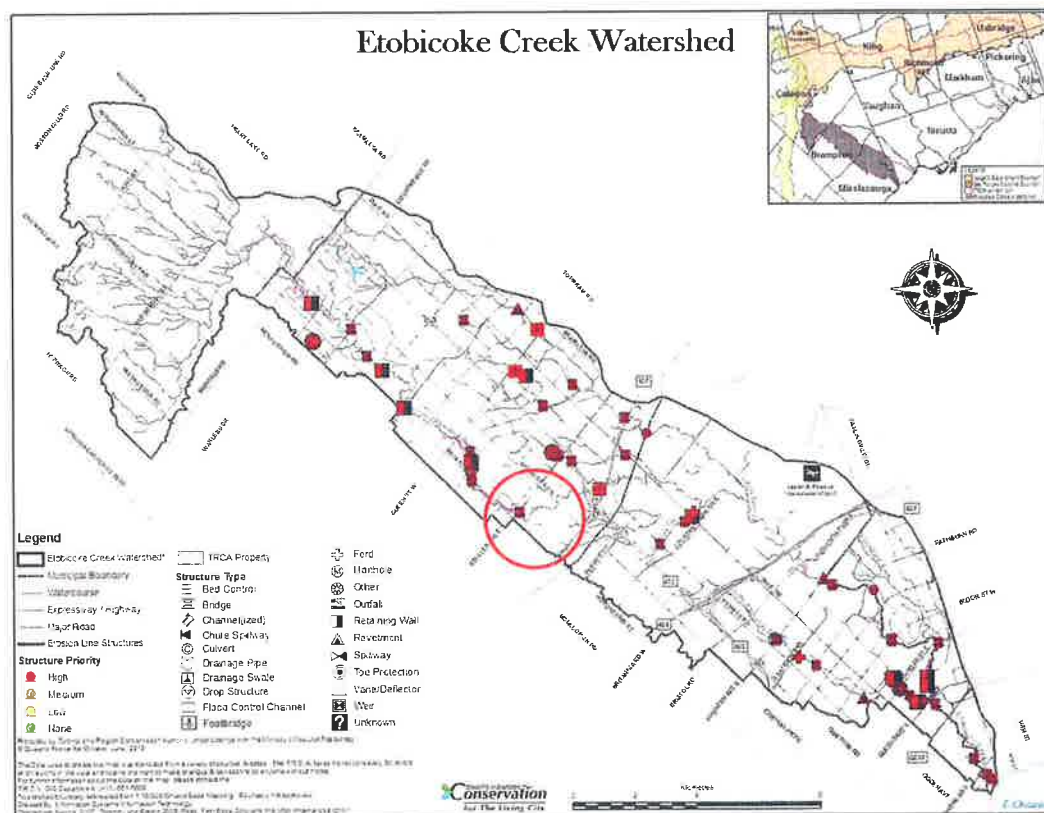


Figure 4. GIS query results from TRCA's Stream Erosion and Infrastructure Database showing all infrastructure ranked high priority in the Etobicoke Creek Watershed (2009), to reveal potential opportunities for reach-based, collaborative works.

3.2 Major Remedial Erosion Control Works

As it is recognized that the inspection phase of the project will likely identify areas requiring immediate attention, this project requires the flexibility to allocate some of the project budget to expedite the planning and implementation of remedial works to address hazards to essential infrastructure and public safety. As with TRCA's existing core program, *Watershed Erosion Monitoring and Maintenance*, all work is done on a priority basis and subject to the receipt of all necessary approvals and funding. Where private property or municipal infrastructure is at risk, agreements would be required to ensure benefiting parties assume their share of the total cost of the work.

4.0 Implementation Strategy

The inventory of all TRCA regulated watercourses in York Region is proposed to be completed over three years, commencing in the summer of 2012. Pending receipt of funding, a desktop review of existing information and strategy sessions with York Region and municipal staff responsible for known infrastructure will be held to identify any modifications required to TRCA's existing *Stream Erosion and Infrastructure Database* and field collection methods prior to the commencement of field work to avoid duplication of effort and ensure a useful dataset. Annual reports will be available to York Region and municipalities in December of each year of the project to document progress made to date, present the data collected, and provide recommendations for erosion mitigation and collective restoration opportunities, however any serious risks to life and/or property identified in the field will be identified to the responsible party/parties at the time of inspection for timely follow up.

5.0 Conclusion

Dealing with stream asset management reactively results in higher costs in the long term as a result of additional damage and disturbance to the natural environment from structural failure. Working in isolation on piecemeal stream protection work also results in additional disturbance to the natural environment through the creation of construction access routes and staging/stockpile areas, and higher project costs through the mobilization and demobilization of equipment, detailed studies and design plans, tendering processes for contractors and materials, and the securing of permits and approvals.

The benefits of partnerships are well documented, and it is a common goal amongst those responsible for stream asset management to work proactively and cooperatively, however constraints on time, resources and funding make this difficult to achieve. TRCA has the ability to assist our regional and municipal partners with asset management by monitoring the relationship between structural stability and stream processes, and by identifying priorities on a broader scale not limited to departmental responsibility, ultimately managing risk more effectively and holistically across our jurisdiction.

Climate Consortium for Research Action and Integration

1.0 Executive Summary

The Regional Municipality of York and its local municipal partners have all undertaken many effective sustainability and climate change initiatives to reduce their climate impact. These efforts can be further enhanced to address future climate change challenges resulting from severe weather such as intensive storms, heat waves, and flooding.

Urban centers in York Region such as Vaughan, Markham and Richmond Hill are at the forefront of climate change challenges. The challenges and opportunities that climate change presents include:

- designing, managing and protecting built, human and natural systems from extreme weather;
- prioritizing climate change adaptation actions given finite funds and resources;
- meeting green house gas (GHG) reductions targets while accommodating major population growth;
- becoming leading examples as energy efficient municipalities;
- influencing public behaviour to create a culture of conservation; and
- creating green economic development and new jobs.

To support these challenges and opportunities, York Region will want access to a variety of complex research, climate data, tools and technical support. Currently, there is little direction on local-level needs and priorities in climate science research and risk assessment tools. Delay in addressing these challenges has the potential to put vulnerable human and natural systems at risk with negative economic implications.

A recently established climate change partnership with York University has resulted in the development of an Ontario Regional Climate Change Consortium (Consortium), which is supported by Region of Peel, City of Toronto and York University. Participation from 13 Ontario universities and different levels of government has also been solicited through this pan- Ontario research initiative.

Support from York Region will enhance Toronto and Region Conservation Authority's (TRCA) capacity to create and disseminate climate data, tools, training and technical guidance to York Region staff and communities through collaboration with Consortium researchers and scientist

Further, this will assist York Region with the implementation of recommendations contained in the Regional Council Report dated April 27, 2010, regarding "Climate Change Adaptation Strategy Workplan", objectives set out in the Region's *Sustainability Strategy* including eight goal areas of *Vision 2026* as well as policies in the 2009 Official Plan.

Recommendation:

Provide capital funding to support the implementation of climate adaptation and mitigation activities in York Region through the Consortium. Funding in 2012 will be used to undertake the following activities in consultation with York Region staff:

1. Climate science guidance technical support to York Region to advance adaptation planning (including high resolution local climate parameters downscaled from Regional and Global Climate Models)
2. Facilitated interaction and support from a range of climate modelling experts and researchers from universities across Ontario.
3. Risk and vulnerability assessment tools and technical support (community services, infrastructure, heat vulnerability assessment [public health], building resilience best practices etc.).
4. Public health related research, strategies and programs.
5. Range of climate/energy training opportunities for staff, residents, and businesses.

Financial Impact:

	2012	2013	2014
Funding Request			
York	50,000	100,000	100,000
Peel Funding	105,000	200,000	200,000
Toronto (in-kind and indirect cash contribution towards projects)			
York University Contribution	70,000	tbd	tbd
Federal (application in process)	310,000	tbd	tbd
Provincial			
Total	535,000	300,000	300,000

Assumptions:

- Funding from other external sources/partners and collaborators anticipated in year two and three.

2.0 Situational Assessment and Problem Statement

Problem:

York Region has already experienced effects of climate change in the form of more severe weather such as intensive storms, heat waves, flooding, and most recently, the 2009 tornado in the City of Vaughan. Over the coming decades, communities in York Region are going to be faced with climate change challenges resulting in potential risk to:

- infrastructure such as roads, bridges, power, water, wastewater, stormwater, waste management and telecommunication;
- community services such as medical and social welfare; and
- natural systems such as groundwater, streams, forests and other natural heritage features.

Adaptation planning to manage risk and vulnerabilities to infrastructure, human communities and natural system needs the best, most recent or most defensible information which is currently not available.

3.0 Project Description

TRCA, through CC-RAI, will assist York Region with the implementation of recommendations contained in the Regional Council Report dated April 27, 2010, regarding "Climate Change Adaptation Strategy Workplan", objectives set out in the Region's *Sustainability Strategy*, eight goal areas of *Vision 2026* as well as policies in the 2009 Official Plan.

Specific benefits to York Region include:

- Climate science data and technical support to York Region to advance adaptation planning.
- Facilitated interaction and support from a range of climate modelling experts and researchers from universities across Ontario.
- Risk and vulnerability assessment tools and technical support (community services infrastructure, heat vulnerability assessment [public health], building resilience best practices, etc.).
- Public health related research, strategies and programs.
- Assistance with GHG target setting and associated activities.
- Range of climate/energy training opportunities for staff, residents, and businesses.

4.0 Cost-Benefit Analysis

This analysis cannot be completed as the value to having data to support decisions and actions cannot be quantified in this way.

5.0 Critical Assumptions and Risk Management

Assumptions:

- Risk to all essential and at the same time, vulnerable systems (infrastructure, human and natural) may result in negative economic implications.
- Adaptation strategies may not be developed with sufficient speed, or alternatively may be developed based on inaccurate non-local information and may be ineffective or involve unnecessary expenditure.

Risk Management:

- Ongoing uncertainty regarding science, modelling and regional impacts of climate change on meteorology, hydrology, flooding and municipal infrastructure in TRCA's jurisdiction and other partner municipalities needs to be addressed.
- Any delay in the project would remove the momentum developed and harm the goodwill that has been developed among partners.
- Not moving forward with the project would mean that significant opportunities to address climate change and eco-business opportunities within York Region would be eliminated.

6.0 Conclusion

York Region has a progressive Sustainability Strategy in place and several climate change initiatives that are currently underway. Over the coming decades, communities in York Region are going to be faced with climate change challenges resulting in potential risk to infrastructure, community services and natural systems. Addressing these risks will require access to best science, tools and technologies; collaboration with neighbouring jurisdictions; and support from all levels of governments.

In support of York Region's leadership in this area, TRCA, through its CC-RAI initiative will offer climate science research, data and technical support to advance adaptation planning.