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DRAFT CLIMATE CHANGE ADAPTATION ACTION PLAN AND STAKEHOLDER WORKSHOP

The Planning and Economic Development Committee recommends:

- 1. Receipt of the presentation by Laura Atkins-Paul, Senior Planner, Long Range and Strategic Planning; and**
- 2. Adoption of the recommendations contained in the following report dated October 20, 2011, from the Acting Commissioner of Planning and Development Services.**

1. RECOMMENDATIONS

It is recommended that:

1. Council receive this report for information.
2. The Regional Clerk circulate this report to the Lake Simcoe Region Conservation Authority, Toronto and Region Conservation Authority and Local Municipalities for information and comments.

2. PURPOSE

This report outlines the purpose and expected outcomes of the upcoming Climate Change Workshop and provides a summary of the Draft Climate Change Adaptation Action Plan. The purpose of the workshop to obtain feedback on the action areas proposed in the Draft Action Plan, before finalization and endorsement by Council. The Action Plan focuses on the potential effects of climate change and how the Region can prepare for these changes to ensure more resilient Regional services and communities.

3. BACKGROUND

Municipalities need to consider Climate Change

Many Ontario communities (including Newmarket, Markham, Vaughan, Peterborough and Toronto) have experienced significant physical damage, economic loss and disruption as a result of violent storms. York Region has specifically 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.

Regional and local municipal governments and our partners have an important role to play in addressing climate change adaptation.

Municipalities are responsible, either solely, or in partnership with other government levels for providing and managing the systems our communities depend on. These include:

- Built systems such as roads, bridges, power, water, wastewater, stormwater, waste management and telecommunication.
- Human systems such as health care public health, social services and emergency response capabilities.
- Managing and protecting our natural systems such as groundwater resources, streams, forests and other natural heritage features.

These are all essential and, at the same time, vulnerable systems we depend on for quality of life and economic prosperity. It is important to collaborate on climate change issues and share best practices with our partner area municipalities, conservation authorities, school boards, utilities, emergency responders, the Provincial and Federal governments, and others as we determine adaptation to the changes.

York Region has made significant progress in addressing Sustainability

Sustainability is a key theme throughout the Region's key strategic documents including *Vision 2026*, the *York Region Official Plan* and the Sustainability Strategy. The new York Region Official Plan - 2010 includes policies for higher energy and water efficiency standards for new buildings, criteria for building new communities, Regional Centres and Corridors, transit infrastructure and significant woodlands. The majority of the over one hundred action items in the Sustainability Strategy are either completed or underway.

In 2008 Regional Council adopted the Corporate Air Quality Strategy to reduce emissions that contribute to climate change and poor air quality. Recommendation #3 of the Strategy specifies that climate change adaptation strategies be developed to help communities prepare for local impacts.

Over the past number of years, the Region has had a number of sustainability successes, many contributing to the overall climate change adaptation, including:

- The proportion of compact multiple housing units of the total housing supply mix increased from 29% in 2007 to 33% in 2009 and in 2010 (includes semis, rows and apartments).



- In 2010, York Region introduced a Heat Advisory Program to monitor extreme heat episodes and alert vulnerable populations (e.g. long term care facilities, day cares) and local municipalities.
- Due to the York Region Smart Commute initiatives, approximately 32,526 car trips were avoided and 466.48 tonnes of GHG and polluting emissions were reduced.
- Since adoption in 2001, implementation of the York Region Greening Strategy has resulted in the securement of 946 hectares of greenlands and the planting of over 850,000 trees and shrubs by the Region and our Greening Strategy partners.
- LEED® certification of eleven Regional buildings including Leeder Place Family Emergency Shelter opened in East Gwillimbury targeting LEED® silver and the Vaughan Community Environmental Centre which achieved LEED® gold.
- Alternate energy pilot projects in progress include: installations of solar electric tracking panels, solar air heating, geothermal, solar water heating, and feasibility studies of wind and wastewater biogas.
- Over the past 10 years, Water for Tomorrow has saved a total of 47 billion litres of water, at a rate of 22.4 million litres saved per day, enough to service a town of 88,000 people.
- Public Health conducts surveillance on extreme heat events, air quality, vector-borne and water-borne diseases, and other climate change risk factors.
- The Air Quality Health Index was introduced to York Region in 2008 and is now available in select communities across Canada. This health-protection tool was designed to help Canadians protect their health on a daily basis from the negative effects of air pollution.
- Together with local municipalities, the Region has developed of an Inflow and Infiltration Reduction Strategy which will reduce costs and sewer overflows and their associated health risks, property damage, and environmental effects provide both environmental and social benefits.
- McCleary Court Community Environmental Centre opened in 2009 - LEED gold achieved including water resistant plants and reuse of rainwater for low flow toilets in buildings.

The Region's Sustainability Strategy is meant to further inform and improve policies, programs and operations around the three sustainability pillars of economy, environment and community.

The *Vision 2026: Sustainability Progress Report 2010* was approved by Committee and Council (Report No. 6 of the Planning and Economic Development Committee Regional Council Meeting of June 23, 2011).

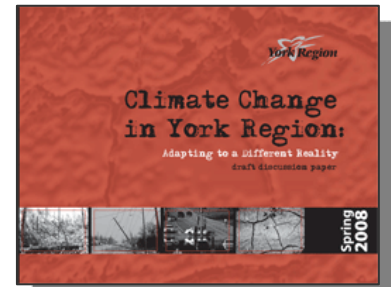
The report includes sections on indicators, Council initiatives, successes and innovations which include initiatives related to climate change. This annual report will serve as the reporting mechanism for the Climate Change Adaptation Strategy's implementation progress updates.

Vision 2051 – The Next 40 Years

In the coming year, *Vision 2026* is being updated to *Vision 2051*; taking a 40 year outlook on York Region's future. *Vision 2051* will build on the successes of the past 40 years and will look 40 years ahead to our future. The annual monitoring report will continue to be produced to address progress on Vision 2026 and Vision 2051 once adopted by Regional Council.

The York Region Sustainability Strategy and Regional Official Plan – 2010 call for a Climate Change Adaptation Strategy

In November 2007, Regional Council adopted the York Region Sustainability Strategy "Towards a Sustainable Region." The Strategy recommends the Region explore how it can adapt to climate change to ensure more resilient communities. The Strategy also recommended that the Region host a Climate Change Workshop to promote awareness of climate change, as well as explore adaptation and response strategies.



The Climate Change Workshop was held in April, 2008. A Draft Climate Change Discussion Paper was prepared and distributed prior to the workshop to foster and inform discussion for workshop participants. The Climate Change Discussion Paper report was provided to Committee and Council in draft prior to the workshop and in its published format in a report that highlighted workshop outcomes in April 2008 (Clause 7, Report No. 7 of the Planning and Economic Development Committee Regional Council Meeting of June 19, 2008).

The Workshop brought together staff from departments across the Region, as well as a broad cross section of staff from the local municipalities, Conservation Authorities, local utilities, school boards, and emergency responders to explore issues and implications for York Region, and immediate and long-term actions needed to better adapt to the effects of climate change.

The new York Region Official Plan - 2010, contains a number of policies directed to meeting the objective of mitigating and adapting the impacts of climate change. Specifically, Policy 3.2.2 requires the Region to prepare a climate change adaptation action plan in keeping with the York Region Sustainability Strategy.

4. ANALYSIS AND OPTIONS

The Draft Climate Change Adaptation Action Plan identifies climate change risks, opportunities, Best Management Practices and Actions

The draft Action Plan (appended to this report as *Attachment 1*) has been prepared in consultation with Regional Departments, and the York Regional Police, the Toronto and

Region Conservation Authority and the Lake Simcoe Region Conservation Authority.
The draft Action Plan:

- Provides an inventory of adaptation initiatives already underway or planned for in the future in order to adapt to climate change and ensure more resilient communities.
- A discussion of climate change impacts the Region has already experienced and is likely to experience in the future.
- Explores best management practices and risk management in other jurisdictions.
- Recommends Action Areas that the Region can implement most effectively.

The Draft Action Areas focus on vulnerability and risk reduction, emergency preparedness and greater collaboration between Regional departments and partner agencies

The key action areas developed are based on input from the Climate Change Workshop participants, the York Region Climate Change Adaptation Advisory Committee, Regional staff and research from other jurisdictions. Key actions include:

- Enhancing Emergency Planning Preparedness and Business Continuity.
- Coordination and Collaboration to develop stronger Regional tools to adapt to climate change.
- Exploring Financial and Liability Impacts of Climate Change.
- Undertaking a vulnerability and risk assessment.
- Strengthening Climate Change Response Expertise.
- Support Expansion of the Region's Greenlands System and Protection and Enhancement of Urban and Regional Forests.
- Ensure Resilient Public Health and Community supports.
- Explore Opportunities to Increase Vulnerable Populations Resiliency.
- Continue to Monitor and Respond to Water and Vector Borne Diseases and Provide Education.
- Multi-stakeholder education and awareness and partnerships.
- Work with First Nation, Métis, local municipalities and Provincial Government to Assist in Development of Climate Change Adaptation Tools.
- Continue to Explore New Community Design, Infrastructure and Engineering Standards.
- Continue to Explore Innovative Water and Energy Conservation Approaches.
- Explore Climate Change Implications for Solid Waste Management.
- Establish Partnerships to Identify and Fund Adaptation Opportunities.
- Advocate for support and assistance from other levels of government.

Climate change adaptation will reduce risk and ensure resilient communities

The draft Action Plan recommends that the Region undertake a comprehensive vulnerability and risk assessment, which will assist the Region in preparing for the impacts of Climate Change by assessing the vulnerability of our built, natural and human systems. A vulnerability assessment can help us to ensure that we, along with our partners and the public, are taking the steps necessary to minimize risk and prepare the Region and its services, built systems and communities we service for climate change impacts and to become more resilient to these impacts.

Next Steps - The Climate Change Adaptation Strategy Workshop will Focus on Best Management Practices, Partnerships and Priority Actions

A Climate Change Workshop is proposed for early 2012. Participants will be provided with a copy of the attached draft Action Plan in advance of the workshop. The purpose of the Workshop is to explore best management practices in other jurisdictions with presentations by climate change experts. Breakout discussion groups will focus on prioritizing actions and identifying partnerships for the Region's 'Action Plan.

Invitees will include staff of local municipalities, Regional Departments, Conservation Authorities, Provincial and Federal government representatives, academic partners, utilities, the development industry, emergency responders, and emergency planning personnel, and First Nations and Métis representatives.

A staff report will be prepared for Council on "What was Heard" at the Workshop and recommend the final Climate Change Adaptation Action Plan for Council's approval.

In addition, it is proposed that the draft Action Plan will be circulated widely to the region's stakeholders and reviewed with key organizations with expertise in the climate change field.

Link to Key Council-approved Plans

The Climate Change Adaptation Action Plan will address all eight goal areas of *Vision 2026* and sustainability, as well as support implementation of the *2011-2015 Strategic Plan* both of which feature actions to reduce impacts of climate change on York Region.

Ongoing implementation of climate change adaption work will be reported on through the *Vision 2026 Sustainability* annual report.

5. FINANCIAL IMPLICATIONS

The Climate Change Adaptation Action Plan is being undertaken within the existing staff complement and existing budget allocation for the Planning and Development Services Department. A York University student researcher was provided through the Climate Change Knowledge Mobilization Internship Program, funded through the Federal Government. Potential funding is being investigated through the Federation of Canadian Municipalities (FCM) in addition to other funding opportunities for implementation of the Action Plan. Our partners will provide contributions in kind.

6. LOCAL MUNICIPAL IMPACT

Local municipalities are already engaged in a number of progressive climate change initiatives. Staff from each area municipality have been, and will continue to be, consulted with on the development of the Climate Change Adaptation Action Plan and have been invited to attend the Climate Change Adaptation Action Workshop to provide further input. Collaboration with all Regional stakeholders and partners is fundamental to the concept of sustainability.

7. CONCLUSION

York Region has experienced many of the impacts of climate change, including higher temperatures, drought, floods and storms which are likely to increase in intensity and frequency.

York Region has put a progressive and comprehensive *Sustainability Strategy* in place and a majority of the over one hundred action items in the Sustainability Strategy are either completed or underway. The need for a York Region Climate Change Adaptation Plan has been identified in both the Sustainability Strategy and the Regional Official Plan.

This draft Action Plan outlines what the key issues are around climate change and why we need to adapt. The report further suggests action areas to help us achieve greater resiliency. York Region is already undertaking many climate change adaptation initiatives that are summarized in this report. The draft Action Plan also outlines a number of recommended Action Areas that will be discussed at an upcoming Climate Change Adaptation Workshop with partner local municipalities, conservation authorities and a wide cross-section of stakeholders. It also outlines adaptation approaches being taken in other municipal jurisdictions.

Collaboration with all stakeholders and partners is fundamental to the concept of sustainability and adaptation to climate change. The Climate Change Adaptation Action Plan will build on the knowledge and direction received to date and explore how we can

best work together to implement action areas. It is also proposed that the draft Action Plan be reviewed with key organizations with expertise in the climate change field.

It is anticipated that the draft final Climate Change Adaptation Action Plan along with what we heard at the Workshop will be presented to Committee and Council in early 2012.

For more information on this report, please contact Laura Atkins-Paul, Senior Planner at 905 830-4444, Ext. 1534 or Paul Bottomley, Acting Director of Long Range and Strategic Planning at Ext. 1530.

The Senior Management Group has reviewed this report.

(The attachment referred to in this clause is attached to this report.)



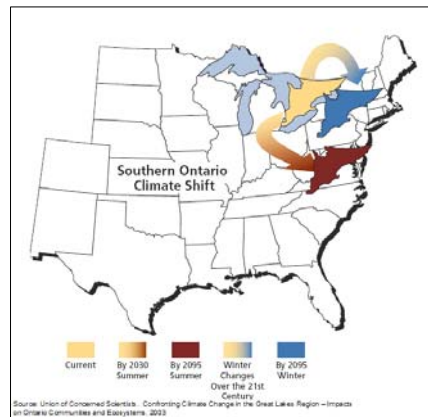
York Region Draft Climate Change Adaptation Action Plan and Stakeholder Workshop

Presentation to Planning and
Economic Development
Committee

Laura Atkins-Paul
November 2, 2011

York Region's Climate is Already Changing

- ❑ Winters are getting shorter
- ❑ Annual average temperatures are growing warmer
- ❑ The duration of lake ice cover is decreasing as air and water temperatures rise
- ❑ Heavy rainstorms are becoming more common



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November 2, 2011

Slide 2

Why Municipalities Need to Consider Climate Change

- ❑ Impacts on:
- ❑ Built Systems
- ❑ Natural System
- ❑ Human Systems



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Slide 3

Call for a Climate Change Adaptation Strategy

- ❑ Sustainability Strategy and Regional Official Plan 2010 call for a Climate Change Adaptation Strategy



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Slide 4

What is York Region Doing to Adapt?

- ✓ The York Region Official Plan 2009
- ✓ The Corporate Air Quality Strategy
- ✓ York Region Emergency Plan
- ✓ Heat Advisory Program
- ✓ Air Quality Health Index
- ✓ 20/20 The Way to Clean Air/EcoSchools Campaign
- ✓ The Water and Wastewater Master Plan Update 2009
- ✓ The Long Term Water Conservation Strategy 2011
- ✓ Water for Tomorrow Program
- ✓ Inflow and Infiltration Reduction Strategy 2011
- ✓ Natural Heritage Strategic Directions, 2008
- ✓ Greening Strategy, 2001
- ✓ Best Management Practices for New Communities
- ✓ Sustainable Development for LEED
- ✓ The Transportation Master Plan Update 2009
- ✓ Pedestrian and Cycling Master Plan 2008
- ✓ Vector-Borne Disease Surveillance including West Nile virus and Lyme Disease
- ✓ York Region Hazard Identification and Risk Assessment Report
- ✓ Climate Change Discussion Paper 2008
- ✓ UFORE inventory studies with local municipalities
- ✓ Community Services and Health Multi Year Plan 2010-2015



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Slide 5

Recommended Action Areas

- Draft Action areas focus on:
 - vulnerability and risk reduction
 - emergency preparedness
 - greater collaboration between Regional departments and partner agencies



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Slide 6

Recommended Action Areas - Examples

- ❑ Exploring Financial and Liability Impacts of Climate Change.
- ❑ Support Expansion of the Region's Greenlands System and Protection and Enhancement of Urban and Regional Forests.
- ❑ Build on existing business continuity plans to address longer business interruption.
- ❑ Explore Opportunities to Increase Vulnerable Populations Resiliency.
- ❑ Incorporate climate change adaptation best management practices into the New Communities Guidelines.
- ❑ Work with partners to reduce extreme weather flooding.



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Slide 7

Adaptation Action Plan supports Key Council Approved Plans

- ❑ The Climate Change Adaptation Action Plan will support:
 - ❑ *Vision 2026* goal areas and Sustainability Strategy
 - ❑ Implementation of the *2011-2015 Strategic Plan*
- ❑ Annual monitoring will be reported through *Vision 2026* and *Vision 2051* (once adopted by Council)



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November 2, 2011

Slide 8

Next Steps - The Climate Change Adaptation Strategy Workshop

- ❑ Workshop in early 2012.
- ❑ Purpose:
 - ❑ Explore jurisdictional BMP's
 - ❑ Hear from experts
 - ❑ Prioritize actions and identify partnerships
- ❑ Broad partner/stakeholder representation.
- ❑ "What was Heard" staff report and final recommendations to PEDC/Council in early 2012.



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November 2, 2011

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York Region

Draft Climate Change Adaptation Action Plan

November 2011

We'd Like to Hear from You...

Tell us what you think of the York Region Climate Change Adaptation Action Plan:

Mail or in Person:

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Regional Municipality of York
17250 Yonge Street, 4th Floor
Newmarket, ON L3Y 6Z1

Phone:

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For more information on anything listed in this report, please contact us or visit us at at:

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Frank Scarpitti
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Regional Councillor
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Regional Councillor
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Town of Richmond Hill



Regional Councillor
Vito Spatafora
Town of Richmond Hill



Regional Councillor
Brenda Hogg
Town of Richmond Hill



Mayor
Maurizio Bevilacqua
City of Vaughan



Chairman & CEO
Bill Fisch



Mayor
Tony Van Bynen
Town of Newmarket

A Message from York Regional Council

The Regional Municipality of York experiences the effects of severe weather, including intense storms, floods and heat waves. These events have significant impacts on municipal infrastructure, human services, the local economy, the natural environment and the lives of our friends, neighbours and families.

The York Region Climate Change Adaptation Action Plan explores the risks, vulnerabilities and opportunities related to severe weather that need to be addressed across Regional departments, in partnership with local municipalities, conservation authorities, utilities, emergency responders and our stakeholders.

York Region has undertaken or participated in a range of initiatives that help to address climate change. We have implemented the Sustainability Strategy, Greening Strategy, Smart Commute initiatives, alternate energy pilot projects, LEED certification of new Regional buildings, water conservation programs and an Air Quality Health Index Pilot.

We track extreme weather conditions, including heat advisories, and we monitor the impacts on our facilities, programs and services.

Our goal is to undertake multiple actions that combine to reduce the impacts of climate change on York Region. We want to help ensure the essential systems we depend on to sustain economic prosperity, the natural environment and quality of life are protected and preserved.



Regional Councillor
Gino Rosati
City of Vaughan



Regional Councillor
John Taylor
Town of Newmarket



Regional Councillor
Michael Di Biase
City of Vaughan



Regional Councillor
Deb Schulte
City of Vaughan



Mayor
Robert Grossi
Town of Georgina



Regional Councillor
Danny Wheeler
Town of Georgina



Mayor
Geoffrey Dawe
Town of Aurora



Mayor
Virginia Hackson
Town of East Gwillimbury



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Steve Pellegrini
Township of King



Mayor
Wayne Emmerson
Town of Whitchurch-Stouffville

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Introduction

Public decision-makers have a critical opportunity –and a need – to start preparing today for the impacts of climate change, even as we collectively continue the important work of reducing current and future greenhouse gas emissions. If we wait until climate change impacts are clear to develop preparedness plans, we risk being poorly equipped to manage the economic and ecological consequences, and to take advantage of any potential benefits.

Preparing for Climate Change: A Guidebook for Local, Regional, and State Governments

Many of the impacts of climate change York Region has already experienced are likely to increase in intensity and frequency. Higher temperatures, drought, floods and storms have already impacted communities across Ontario, and give us an indication of the impacts we will need to adapt to in the future.

This Action Plan outlines what the key climate change issues are and why York Region needs to adapt and suggests action areas to help us achieve greater resiliency. York Region is undertaking many climate change adaptation initiatives that are summarized in this report. What can we learn from other municipal jurisdictions that have also begun to think about adaptation?

What Does Mitigation, Adaptation and Resiliency Mean?

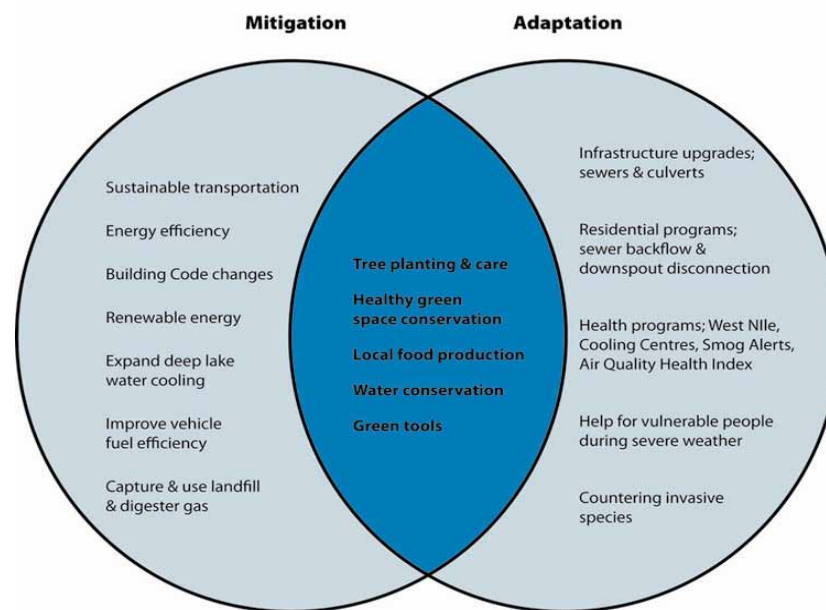
When looking at what climate change adaptation and mitigation mean, it may be helpful to view climate change as a stressor that we must become more resilient to.

Mitigation refers to changing behaviours, actions and decisions in order to reduce our production of greenhouse gasses.

Adaptation refers to changing our behaviour, planning or building techniques in order to better cope with the impacts of Climate Change.

Resiliency refers to the ability of a community, nature, and the built environment to not only cope with Climate Change through mitigation and adaptation measures, but also to continue thriving under any number of circumstances.

Examples of Actions to Combat Climate Change



Source: City of Toronto, Environment Office

“...mitigation and adaptation measures can have co-benefits. For example, forests act as carbon sinks, absorbing and storing carbon dioxide (a kind of mitigation) but they also reduce flood levels, control soil erosion (adaptation in response to increased precipitation). Moreover, urban forest reduces the heat island effect (adaptation in response to increased temperatures).”

Adapting to Climate Change in Ontario, Expert Panel on Climate Change.

Why Municipalities Need to Consider Climate Change

"The question is whether we're going to start taking the steps now to avoid the really big jumps that are in store if we don't do something now."

David Suzuki

Many Ontario communities (including Newmarket, Markham, Vaughan, Peterborough, Goderich and Toronto) have recently experienced significant physical damage, economic loss and disruption as a result of violent storms. York Region has specifically experienced the 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.

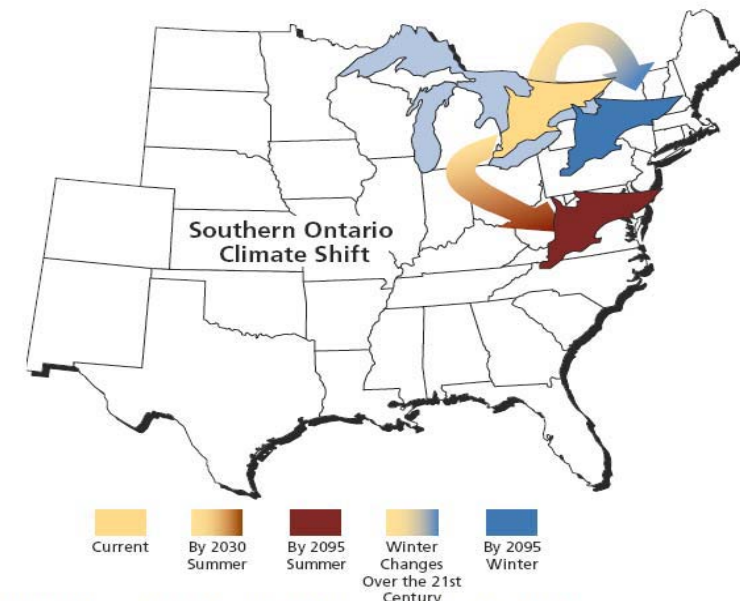
Municipalities are responsible, either solely, or in partnership, for providing and managing the systems our communities depend on. These include built systems like roads, bridges, power, water and waste management and human systems like medical and social welfare services. Municipalities are also responsible for managing and protecting our natural systems like groundwater, streams, forests and other natural heritage features.

These are all essential and, at the same time, vulnerable systems we depend on for quality of life, environmental protection and economic prosperity.

Municipal governments and our partners have an important role to play in addressing climate change.

Our Climate is Already Changing

In Ontario, average temperatures have increased by up to 1.4°C since 1948, the most notable increases being in the spring, and mostly in northern Ontario. This may seem like a small change but changes in temperature are linked to extreme weather because warmer air holds more moisture that can cause severe weather events. Climate change is expected to increase the duration and intensity of both heat waves and drought. Trends to date seem to suggest that minimum winter temperatures will increase more than summer temperatures.¹ In the Great Lakes Region, temperatures have increased by about 0.6°C in this time frame and some areas of Ontario have experienced a significant increase in the number of days with rainfall and lake-effect snow. Conversely, while precipitation is increasing overall, Environment Canada has found that there are also increasing periods of drought.



Source: Union of Concerned Scientists. Confronting Climate Change in the Great Lakes Region – Impacts on Ontario Communities and Ecosystems. 2003

Growing evidence suggests that the climate of Ontario and closer to home, the Great Lakes Region which York Region is a part of, is already changing:

- Winters are getting shorter
- Annual average temperatures are growing warmer
- The duration of lake ice cover is decreasing as air and water temperatures rise
- Heavy rainstorms are becoming more common.”²

“Climate envelopes” or climactically suitable habitats are moving northwards at several tens of kilometres a decade, whereas boreal tree species can migrate only very few kilometres in the same time.”
Adaptation in Ontario: Expert Panel on Climate Change in Ontario.

By 2050 it is estimated that the average number of days with temperatures above 30°C is expected to double with increases in the intensity and duration.³

Increasing temperature changes have the potential to result in:

- An increased frequency in severe weather events like intense localized storms, heavy rains, ice storms, tornadoes, floods, droughts and heat waves which could impact human lives and property.
- Longer and more intense heat waves making air pollution in larger urban areas worse, leading to increased illness and deaths from asthma and respiratory disease.
- Growing seasons may lengthen, but crop yields may be impacted by increased and longer droughts.
- Warmer winters could result in an increase in non-native pests and diseases, and long drier summers increase the risk of forest fires.
- Drier conditions could affect the quality and quantity of our water resources and Great Lakes water levels.⁴

As our climate continues to change, and our urban populations and areas grow, more people, property and infrastructure systems will be at risk, including the services the municipalities provide such as:

- Water and Wastewater Systems
- Transportation Systems
- Energy Systems
- Health Care System
- Public Health and Social Services
 - Emergency Response Capabilities.

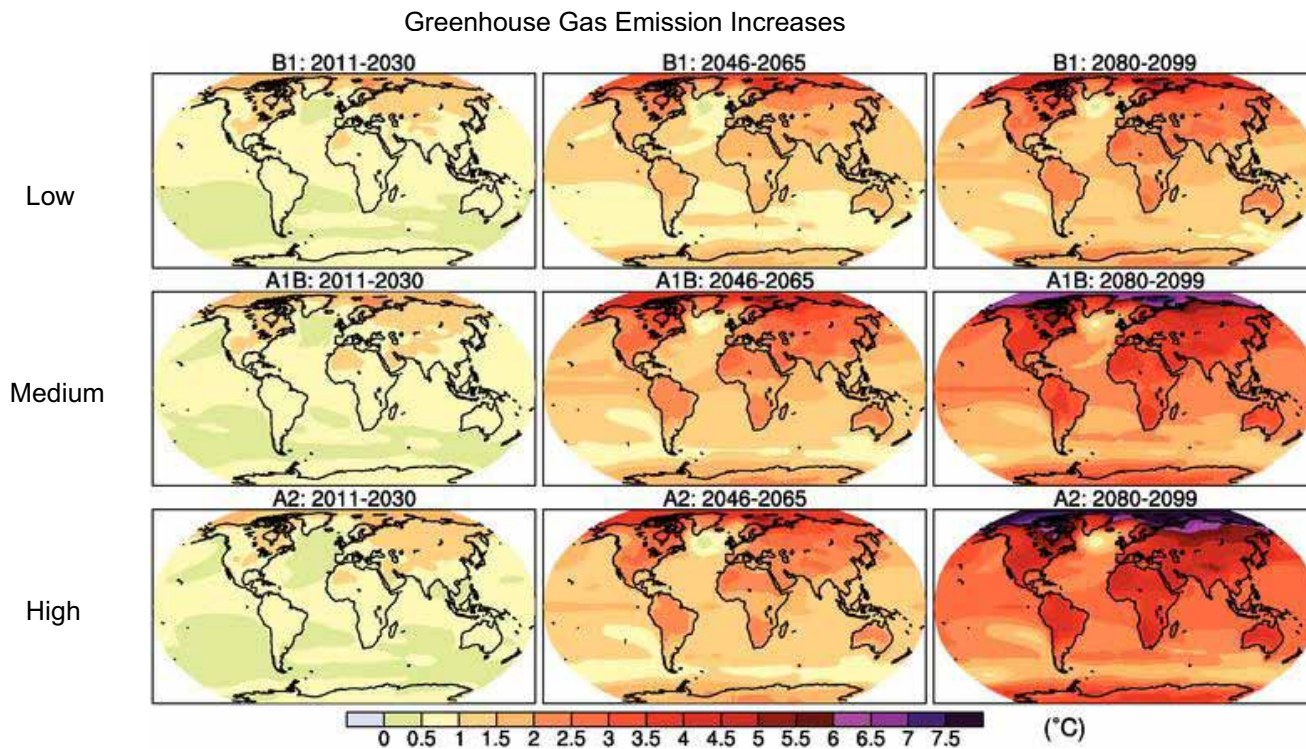
Table 1: A Sample of Municipal Services and Potential Climate Change Impacts

Municipal Service Areas	Impacts could include...
Water Resources and Aquatic Ecosystems	• Earlier snowmelt in spring • Lower summer water levels and streamflow • Increased risk of drought • Increased risk of flooding • Increased competition for water • Warmer water temperatures in lakes and rivers • Changes in water quality • Shifts in species range and distribution • Increased competition from invasive species • Increased stress on coldwater species in lakes and rivers
Biodiversity and Forests	• Shift in distribution and range of species • Loss of species not able to adapt to changes • Increased competition from invasive species, insect outbreaks • Loss of habitat • Increased risk of forest fire
Transportation	• More travel disruptions due to flooding, winter storms, road washouts • Increased pavement damage from higher temperatures and freeze-thaw cycles • Increased maintenance requirements for roads, medians and boulevards including hardscape and vegetative materials
Water and Wastewater Infrastructure	• Need for new or enhanced flood and erosion control structures • Increased demand on stormwater management systems • Increased inflow and infiltration with intense rain events
Health	• More heat-related stress, particularly among the elderly, low income and other vulnerable populations • Fewer extreme cold-related health risks • Increased vector borne illnesses • Reduced summer air quality in urban areas
Emergency Response	• Increased demands on emergency response services related to extreme weather events (e.g. heat, flooding, storms)
Business	• Price volatility in energy due to more extreme weather events • Increased insurance premiums due to more extreme weather events • Impacts on business infrastructure located in floodplains • Shifts in business opportunities

Tourism	• Decreased opportunities for warm season activities during heat events (e.g. from heat, low water levels, reduced urban air quality, forest fires) • Reduced opportunities for cold season recreation due to reduced snow, ice quality • Shifts in tourism dollars from one recreation sector to another
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Adapted From: Preparing for Climate Change: A Guidebook for Local, Regional, and State Governments. Centre for Science in the Earth System (The Climate Impacts Group), Joint Institute for the Study of the Atmosphere and Ocean, University of Washington, and King County Washington in association with ICLEI. 2007.

Temperature Increase Based on Low, Medium and High Greenhouse Gas Emission Scenarios For 2011-2030; 2046-2065; and 2080-2099 (Based on normal temperatures from 1980-1999)



Source: Clean Air Partnership. Protecting your Community from Climate Change: A Training Program for Ontario Municipalities (from IPCC 2007).

The Intergovernmental Panel on Climate Change concluded that the evidence for climate change is now "incontrovertible" and that a large part of the ongoing change can be attributed to human activities, especially the release into the atmosphere of GHG's. A range of projection of future emissions...all indicate, even with the most optimistic assumptions, the planet's climate will continue to change well beyond the end of the 21st century. Adaptation is therefore not a choice but an imperative.

The Expert Panel on Climate Change Adaptation. Adapting to Climate Change in Ontario: Towards the Design and Implementation of a Strategy and Action Plan. 2009.

How Climate Change Impacts Built Systems

Our built systems are constructed to specific standards, municipalities invest billions of dollars in them, and they are expected to last for decades. Until now, municipalities have had few reasons to consider these systems as vulnerable. Given the climate changes expected over the next century, infrastructure design standards, based on historic conditions, may no longer provide accurate guidance for building or maintenance.

Built infrastructure systems are more exposed to extreme events that will result in an increased need for maintenance and upgrades. Energy transmission networks are vulnerable as their towers can be damaged by severe windstorms and ice build up as was witnessed in the 1998 ice storm. To date, climate change events like more intense snowmelts and warmer weather has lead to higher inflow and infiltration in the Region's sanitary sewer system, and raised uncertainties around the adequacy of current stormwater infrastructure sizing.

Water and sewage networks may need to accommodate both more intense and frequent rainfall events as well as droughts such as the one experienced in the summer of 2007.

The Hurricane Hazel storm in 1954, representing the worst flooding in Ontario in a 200 year period, has been used as the "design storm" for flooding in southern Ontario.⁵ In the past 5 years, Ontario has experienced several storms that have exceeded the 1 in 100 year design storm. What implications does this increased frequency have on the design criteria for our built infrastructure?

The August 19, 2005 storm, classified as one that exceeded the 1 in 100 year storm, lasted 2 to 3 hours but resulted in a recorded 180 mm of rainfall concentrated in isolated areas of north Toronto. The event resulted in erosion in ravines and waterways, collapse of Finch Avenue at Black Creek, collapse of the Highland Creek Trunk sanitary sewer, widespread basement flooding, watermain breaks and wastewater treatment plant flooding.⁶ According to the Insurance Bureau of Canada, this storm represented the highest insured loss in Ontario's history, exceeding \$500 million⁷, mostly in claims for sewer backups.

On August 22nd, 2009 a category F2 tornado touched down in the City of Vaughan with minimum wind gusts of 180 kilometres and another touchdown in the Town of Newmarket. News reports state that as many as 44 homes and schools were deemed unsafe in the two municipalities, with about 2,500 people displaced in Vaughan; and both municipalities declaring a state of emergency. The same storm system caused a power outage in the City of Toronto with 25,000 homes left without electricity. The repairs to a Vaughan elementary school alone cost \$25 million.

In addition higher winter temperatures may increase the frequency of freeze-thaw cycles, causing increased stresses on infrastructure systems, and the need for more frequent repairs and replacement of road pavement

The combined effects of climate change could make travel on all forms of transport more uncomfortable and less predictable in the future...

Anecdotal evidence suggests that extreme weather – high temperatures, rainfall or storminess – discourages people from using public transport, so unless steps are taken to manage the impacts of extreme weather on the transport network, the changing climate could make achieving the Mayor's ambitions of getting people out of their cars and onto public transport more difficult.

The London climate change adaptation strategy draft report, 2008.



Source: Vaughan Ontario Damage Investigation – The August 20, 2009 Tornadoes⁸

.How Climate Change Impacts Natural Systems

While natural systems are expected to adapt to shorter winters and earlier springs in the long term, these changes will alter ecosystems and species' lifecycles. A warmer climate is likely to result in changing habitat ranges bringing an increased risk of pests and diseases as well as issues around competition from non-native species. Rising urban temperatures and heat waves frequently cause smog and diminished air quality, both of which affect the health of plant and animal species.

Strong winds during storms, such as downbursts, are becoming more intense in the Great Lakes Region and can affect large areas of land. Heavy winds can also cause large-scale forest destruction through blowdown or microbursts.

Water resources will also be under considerable stress, both for environmental and human use. Projected changes to rainfall, evaporation and groundwater recharge rates in Ontario will impact all water users, specifically:

- Warmer temperatures may lead to declines in lake levels in both the Great and inland lakes with more evaporation, less spring runoff, and less ice cover.
- Increased demand for water takings from the Great Lakes, which is already a concern.
- Reduced summer water levels due to reduced rainfall and increased evaporation will decrease groundwater recharge, dry up small streams, and reduce wetland areas, resulting in poorer water quality and less wildlife habitat. Increase in impervious surfaces as a result of urbanization and Climate Change together may lead to decreased flood-absorbing capacities of wetlands and floodplains, resulting in increased erosion, flooding and runoff polluted with nutrients, pesticides and other toxins.⁹

Understanding Climate Change Impacts on the Urban Forest

Urban forests are vital for the health and livability of our cities and towns. They sequester carbon dioxide and other pollutants, improve our water and air quality, lower air temperatures and noise levels, provide wildlife habitat, increase property value and beautify the urban environment.

Urban ecosystems compete with urban infrastructure for light, water and space in which to grow. In urban areas, vegetation is subject to increased heat due to the urban heat island effect, inferior soils due to compaction and development, high levels of salinity from the use of road salt and physical damage from human interference. This state of stress leaves urban forests more vulnerable to additional stressors such as climate change. Hotter weather, increased incidence of storms and other climate change effects mean that urban forest growth and survival to maturity are more difficult than ever to attain.

At the same time, their survival and success has never been more important, because urban trees can offset some of the impacts of climate change by reducing air temperatures and air conditioning needs, and absorbing stormwater.

Clean Air Partnership. Protecting Your Community from Climate Change, 2011

How Climate Change Impacts Human Systems

Human systems like medical systems, public health and social services may experience increased need to respond to emergency management of vulnerable populations like seniors and the homeless during more frequent extreme heat days and the need to house larger populations after events like floods. For example, within a few hours of the July 15, 2004 flood that struck the City of Peterborough, emergency shelter was needed for 200 people including 134 residents of a nursing home¹⁰. During that event, 245 mm of rain fell in a 12 hour period beginning in the early hours of the morning. This overwhelmed storm sewers and backed up sanitary sewers into homes, businesses and submerging the downtown core. The total cost to the City for recovery was \$100 million.

Climate Change will have significant impacts on human health. Health Canada has identified eight significant health concerns related to Climate Change. They include health effects from increased smog episodes, illnesses and deaths caused by heat and cold waves, water- and food-borne contamination, diseases transmitted by insects, health effects of stratospheric ozone depletion, and extreme weather events.

“Hot spots” in urban areas pose a particular health risk, especially to vulnerable populations and people with existing health conditions, low income residents or those living either alone or in crowded conditions¹¹ as well as children, the elderly, disabled people, immigrant populations and Aboriginal people.¹² In addition, healthy individuals are susceptible to extreme heat, including dehydration, heatstroke, and heat exhaustion.

Lengthening heat waves are compounded by an increased need to use air conditioning, leading to higher energy use. Because Ontario’s power systems are usually at capacity during heat events, there is a higher dependence on coal-fired energy from the Ohio valley, generating more air pollution and smog days in Ontario.¹³

Did You Know?
In 2007, York Region incurred \$30.86 million in health care costs and \$24.96 million due to lost productivity as a result of air pollution
Corporate Clean Air Strategy

In 2010, York Region issued 3 heat advisories totalled 9 days. Between 2003 and 2009, the Air Quality Index reached the moderate or poor category an average of 100 days annually, as measured at the Newmarket Air Monitoring Station. Ground level ozone, as measured at the Newmarket Stations, exceeded the Ministry of Environment 1-hour ozone standard on 10, and the 8-hour Canada Wide Standard on 6 days (based on 2009 figures).

Public works, health care, police and EMS are already putting systems in place to support and protect workers who are either at risk of being exposed to extreme weather conditions or are dealing with loss of life and loss of property situations.

The Ontario Medical Association estimates that in Ontario, 17,000 hospital admissions and 60,000 emergency room visits were attributable to air pollution in 2005. By 2026, these numbers are expected to increase to 25,000 and 88,000 respectively. These increases are attributed to higher ozone concentrations and a growing urban population.

If nothing is done to further improve the quality of air in Ontario, the number of premature deaths is estimated to hit 10,000 lives by the year 2026. The combined healthcare and lost productivity costs are expected to reach well over a billion dollars.”

Ontario Medical Association, 2005a. The Illness Costs of Air Pollution: 2005-2026 Health & Economic Damage Estimates. Ontario Medical Association, June 2005.

Shorter winters and warmer overall temperatures mean that disease carrying insects are able to survive in broader ranges and further north than before. In addition to vector borne diseases such as West Nile, the black-legged tick, present in southern Ontario and expected to move northward, carries Human Granulocytic Ehrlichiosis and Lyme disease.¹⁴

Climate and extreme weather events may significantly impact the health of our communities. Adaptation and preparation to reduce the impacts associated with climate change and the resulting extreme weather events will be necessary in order to protect those most at risk.



York Region's 2008 Climate Change Adaptation Workshop: What We Heard from Our Stakeholders

The Climate Change Workshop was held In April of 2008. It brought together staff from departments across the Region, as well as a broad cross section of participants from the local municipalities, Conservation Authorities, local utilities, school boards, and emergency responders. Together, this group explored issues and implications for York Region, and immediate and long-term actions needed to better adapt to the effects of climate change.

A Draft Climate Change Discussion Paper was prepared and distributed prior to the workshop to foster and inform discussion for workshop participants.

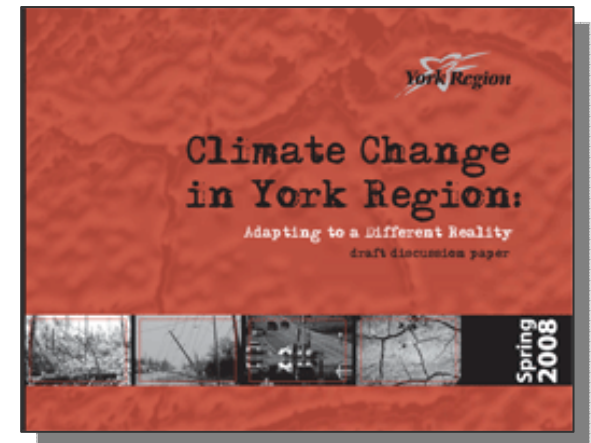
The Workshop explored potential impacts of Climate Change on our:

- Water, Wastewater and Stormwater Systems
- Transportation Systems
- Energy Systems
- Natural Heritage Systems
- Health Care Systems
- Emergency Response Capabilities.

Workshop participants identified the following adaptation priorities:

- Multi-stakeholder education and awareness
- New community design, infrastructure and engineering standards
- Improved monitoring and maintenance of infrastructure
- Regional level energy plans
- Increased and innovative water conservation in communities
- Undertake vulnerability and risk assessment
- Establish and encourage partnerships to identify and fund adaptation opportunities.

Other suggestions included: adaptation of agricultural practices, full cost accounting of infrastructure and municipal services, and a sustainability tax to help fund sustainability initiatives. In addition, there was as a considerable amount of consensus around the need for more discussion around Climate Change adaptation partnerships and actions.



What Other Jurisdictions are Doing

“The majority of local governments in Ontario have responded to the concerns about climate change by putting into place mitigation programs to reduce greenhouse gas emissions. However, it is becoming clear that communities and municipalities will also have to plan to adapt to some of the changes that are inevitable. Adaptation to climate change means taking actions to protect our natural, built and social environments from the impacts of climate change.”

The Clean Air Partnership, 2011

Many jurisdictions have begun to recognize the threats that climate change poses to natural, built, and human systems and have undertaken action plans to respond. Most jurisdictions have undertaken a mitigation-based approach, which generally focuses on an initial GHG inventory, setting of reduction goals, and subsequent back casting to determine how to reach those goals. A few jurisdictions have begun to contemplate adaptation, which involve a review of adaptation best practices, a thorough vulnerability assessment, and finally the drafting of an adaptation plan to prioritize approaches to dealing with these risks.

The following are examples of the leading edge actions from adaptation strategies already developed in places like Toronto, Halifax, Calgary, Saanich B.C., New York City, Chicago, Keene New Hampshire, Portland Oregon, London England and Brisbane Australia.

- Heat Alert System and Hot Weather Response Plan
- Basement Flooding Protection Subsidy Program
- Flood Warning Forecasting
- Green development building and energy incentive programs
- Invasive Species Strategies
- Green or Climate Change Adaptation Development Standards
- Heat island controls e.g. white, reflective pavement and roof surfaces, green roofs and enhanced urban forest
- Cost-benefit study of burying electrical utilities
- Detailed risk strategies prioritizing actions for each municipal business unit
- Expert advisory partnerships to provide advice and prepare climate change adaptation tools
- Building adaptive capacity by developing and altering existing policies, plans, standards, codes, regulation, and legislation
- Collaborating with the insurance industry to facilitate the use of risk-sharing mechanisms
- Ensuring increased food security for the future
- Establishing essential service location for life essential goods and services
- Setting clean energy and district energy targets for new development
- Supporting community-wide telecommuting to reduce emissions and improve emergency response times
 - Urban forest canopy expansion programs
 - Wind powered light rail transit system
- Green power production from waste treatment plant methane gas
- Municipal wastewater recycling programs

What is York Region Doing to Adapt?

“Insurance companies call it ‘due diligence’; ordinary people call it thinking ahead and being ready for what they see. That’s what adapting to changing weather patterns is all about.”

*Dr. David Pearson, Professor of Earth Sciences at Laurentian University,
Co-Chair of Ontario’s Expert Panel on Climate Change Adaptation
Climate Ready, Ontario’s Adaptation Strategy and Action Plan 2011-2014. Province of Ontario. 2011*

The following provides a brief overview of what York Region is doing already to address climate change. Much of this work is supported by corporate strategic documents that have been produced by each department for its own unique business needs, and have been developed through extensive consultation with other departments, partnership municipalities, stakeholders and the public. A detailed overview of what the Region is doing can be found on the Region’s Climate Change Webpage (currently under development).

Towards a Sustainable Region Sustainability Strategy

The Sustainability Strategy provides a long-term framework for making smarter decisions on growth management and municipal responsibilities that integrate the economy, environment and community. The final strategy contained over 125 actions, the majority of which are well underway. Each year, beginning in 2009, an annual report is produced and distributed widely to communicate implementation of the Sustainability Strategy.

The Sustainability strategy provides a framework for Regional strategic documents, including the Climate Change Adaptation Action Plan.

In 2008 Regional Council adopted the Corporate Air Quality Strategy to reduce emissions that contribute to climate change and poor air quality. Recommendation #3 of the Strategy specifies that climate change adaptation strategies be developed to help communities prepare for local impacts.

Over the past number of years, the Region has had a number of sustainability successes, many contributing to adaptation, including:

- The proportion of compact multiple housing units of the total housing supply mix increased from 29% in 2007, to 33% in both 2009 and in 2010 (includes semis, rows and apartments).
- In 2010, York Region introduced a Heat Advisory Program to monitor extreme heat episodes and alert vulnerable populations (e.g. long term care facilities, day care facilities) and local municipalities. Due to the York Region Smart Commute initiatives, approximately 32,526 car trips were avoided and 466.48 tonnes of GHG and polluting emissions were reduced.
- Since adoption in 2001, implementation of the York Region Greening Strategy has resulted in the securement of 946 hectares of greenlands and the planting of over 850,000 trees and shrubs by the Region and our Greening Strategy partners.



- LEED® certification of eleven Regional buildings including Leeder Place Family Emergency Shelter opened in East Gwillimbury targeting LEED® silver and the Vaughan Community Environmental Centre which achieved LEED® gold.
- Alternate energy pilot projects in progress include: installations of solar electric tracking panels, solar air heating, geothermal, solar water heating, and feasibility studies of wind and wastewater biogas.
- Over the past 10 years, Water for Tomorrow has saved 47 billion litres of water, at 22.4 million litres saved per day, enough to service a town of 88,000 people.
- The Public Health Branch conducts surveillance on extreme heat events, air quality, vector-borne and water-borne diseases, and other climate change risk factors.
- The Air Quality Health Index was introduced to York Region in 2008, and is now available in select communities across Canada. This health-protection tool was designed to help Canadians protect their health on a daily basis from the negative effects of air pollution.
- Together with local municipalities, the Region has developed of an Inflow and Infiltration Reduction Strategy which will reduce costs and sewer overflows and their associated health risks, property damage, and environmental effects provide both environmental and social benefits.
- West Nile virus exposure reduced by treating 82,897 catch basins across York Region in 2009.
- McCleary Court Community Environmental Centre opened in 2009- LEED gold achieved including water resistant plants and reuse of rainwater for low flow toilets in buildings.

In addition, the following strategic documents address both climate change mitigation and adaptation and contain specific policies and in some cases targets and timeframes to achieve specific initiatives:

- ✓ The York Region Official Plan 2009
- ✓ The Corporate Air Quality Strategy
- ✓ York Region Emergency Plan
- ✓ Heat Advisory Program
- ✓ Air Quality Health Index
- ✓ 20/20 The Way to Clean Air/EcoSchools Campaign
- ✓ York Region Joint Waste Diversion Strategy 2009
- ✓ The Water and Wastewater Master Plan Update 2009
- ✓ The Long Term Water Conservation Strategy 2011
- ✓ Water for Tomorrow Program
- ✓ Inflow and Infiltration Reduction Strategy 2011
- ✓ Natural Heritage Strategic Directions, 2008
- ✓ Greening Strategy, 2001
- ✓ Best Management Practices for New Communities
- ✓ Sustainable Development for LEED
 - ✓ The Transportation Master Plan Update 2009
 - ✓ Pedestrian and Cycling Master Plan 2008
- ✓ Vector-Borne Disease Surveillance including West Nile virus and Lyme Disease
- ✓ York Region Hazard Identification and Risk Assessment Report



- ✓ Climate Change Discussion Paper 2008
- ✓ Community Services and Health Multi Year Plan 2010-2015
- ✓ Transit Oriented Development Guidelines, 2006

Vision 2051 – The Next 40 Years

In the coming year, *Vision 2026* is being updated to *Vision 2051*; taking a 40 year outlook on York Region's future. *Vision 2051* will build on the successes of the past 40 years and will look 40 years ahead to our future. The annual monitoring report will continue to be produced to address progress on *Vision 2026* and *Vision 2051* once adopted by Regional Council.

Recommended Action Areas

"Preparing for climate change is "good government". Governments share a common goal of ensuring the safety, health and welfare of their communities now and into the future. Meeting this goal and maintaining the integrity of essential public services requires that governments anticipate trends and changes that could affect their environment, economy and community well-being. Because climate change will affect a broad range of community assets and government services, operations and policy areas, preparing for climate change is thus a matter of "good government" and risk management.

Preparing for Climate Change: A Guidebook for Local, Regional, and State Governments

The following action areas have been developed for review and are based on research from other jurisdictions on climate change adaption and input from:

- The Climate Change Workshop participants around climate change adaptation priorities.
- The York Region Climate Change Adaptation Advisory Committee, Department Staff, and the York Regional Police.

Better Coordination, Collaboration and Information to Enhance the Region's ability to adapt to climate change

- Better coordinated corporate strategies, programs and decision making processes to increase the Region's awareness and effective decision making on climate change adaptation.
- Better communicate emergency response system and incident management so that departments understand who does what when, what are the roles and responsibilities.
- Identify department leads to implement the Region's Climate Change Adaptation Action Plan.
- Continue to communicate to inform and engage staff and elected officials on adaptation initiatives.
- Continue working with York Regional Police on emergency preparedness information sharing.
 - Create an ad-hoc committee of regional staff to share ideas, successes and best management practices.
 - Enhance tracking of climate change related incidents.
- Explore partnerships and funding opportunities to implement action areas.

Enhance Emergency Planning Preparedness and Business Continuity Planning

- Review Department programs and emergency plans to prepare for increased numbers and scope of climate change related events.
- Determine the Region's response and recovery capabilities in all key business and service delivery areas in the event of a lengthy extreme weather event.
- Build on existing business continuity plans to ensure that all Regional functions can address business interruption for a long duration.
- Explore next steps to implementing the Hazard Identification and Risk Assessment Emergency Plan to include more specific information on climate change hazards.
- Enhance emergency management expertise around climate change adaptation education and program implementation.



Undertake a Vulnerability and Risk Assessment

- Continue discussion on climate change risk and vulnerability priority areas.
- Assess all major projects and initiatives for climate change risk and vulnerability.
- Work with partners and experts to understand the legal and financial risks of climate change for York Region and its local municipalities.
- Work with the local municipalities to evaluate and mitigate urban heat island impacts as the Region intensifies.
- Explore the need to update current flood and hazard mapping with the conservation authorities.
- Work with the business sector to consider the benefits and costs of climate change adaptation.

Multi-stakeholder education and awareness and partnerships

- Explore partnership opportunities with local municipalities, conservation authorities, stakeholder groups, the provincial and federal governments and universities to further research climate change impacts and adaptation best management practices.
- Work with the province and the Lake Simcoe Region Conservation Authority on implementation of the Lake Simcoe Protection Plan Climate Change Strategy.
- Develop a public education and outreach campaign to increase awareness of climate change impacts and adaptation.

Collaborate with Local Municipalities and other Agencies on Emergency Management and Community Resiliency

- Partner with local municipalities, agencies, businesses etc., to open cooling centres, emergency centres, extend hours of facilities like pools, libraries, and to establish designated distribution centres for emergency assistance (e.g. food, water, shelter).
- Partner with local businesses and media on heat awareness and home emergency kit preparation.

- Collaborate with Health Units to coordinate heat advisories across the GTA.
- Work with hospitals to track heat-related Emergency Room admissions.
- Following on the *Expert Panel on Climate Change in Ontario's Recommendation 37*, work with the Province, First Nations and Métis to determine existing climate change adaptation planning tools and their potential for application in First Nations communities in York Region.
- Continue to Work with the Conservation Authorities on water and natural heritage resource enhancement and resiliency on a watershed basis.
- Develop a near urban food production strategy to identify areas for local food production, to help address food security and support small scale local food production.

Advocate for Support and Assistance from other Levels of Government

- Advocate that the Ministry of Health develop tools to assist health units in increasing capacity to deal with climate change.
- Advocate for the incorporation of sustainability and climate change considerations in the building code (national and Ontario).
- Advocate that the Ministry of Health develop tools with the Federal Government and MOE to monitor air quality and heat to better predict climate change impacts across the Region and province.
- Encourage the Province of Ontario to provide financial support to implement the adaptation actions in "Climate Ready: Ontario's *Adaptation Strategy and Action Plan*", which is based on the recommendations in the *Report of the Expert Panel on Climate Change Adaptation*.

Ensure Resilient Public Health and Community supports

- Build on Heat Advisory Notification program to establish a Regional extreme weather notification program.
- Continue to publish the Emergency Preparedness suite of documents and continue to plan for and educate the public on extreme weather events, preparedness and coping.
- Continue to ensure resilient communities through public education and awareness of vector borne diseases, smog alerts, and extreme weather events including heat, cold and flooding.
- Continue to monitor and conduct surveillance of water borne and vector borne disease and explore tools to assess climactic relationships, and emerging threats.
- Consider requiring emergency plans for multi-story building tenants and residents.
- Explore the relationship between health-related climate change impacts and social determinants of health (e.g. poverty, homelessness, literacy).

Explore Opportunities to Increase Vulnerable Populations Resiliency

- Identify and map vulnerable populations in order to develop approaches to providing support during extreme weather events.
- Explore developing a self-identifying vulnerable person's registry.

- Develop current and projected heat and air quality issues mapping with information on vulnerable persons populations in the built environment.
- Work in partnership with the AODA committee to develop emergency preparedness tools for people with disabilities.

Support Expansion of the Region's Greenlands System and Protection and Enhancement of Urban and Regional Forests

- Develop an adaptive management plan for Regional and urban forests.
- Expand the Region's emerald ash borer program to the public through education and communication.
- Develop a fire response plan for the Regional forest.
- Continue with research collaboratives underway on climate change, invasive species, impacts and adaptation options for flora and fauna.

Continue to Explore New Community Design, Infrastructure and Engineering Standards

- Continue to work with the development industry to ensure greener, low impact, compact, walkable and energy efficient communities.
- Incorporate climate change adaptation best management practices into the New Communities Guidelines.
- Build on and update strategic plans and initiatives, policies, guidelines and standards related to land use and urban design to achieve sustainable, compact, complete communities to adapt to and mitigate climate change.
- As municipal official plans, by-laws and policies are updated, ensure that they reflect climate change adaptation considerations targeted to reduce vulnerabilities to projected impacts.
- Explore urban heat island mitigation for existing and new Regional facilities, and existing and new urban areas, such as promotion of green roofs, enhanced vegetative cover, and use of pavement and roof surfaces that reflect less heat back.
- Consider climate change impacts in the Environmental Assessment process.
- Explore technologies that can increase the safety of road surfaces under changing weather extremes.
- Explore existing back-up and redundancy water and energy systems used by the Region and determine where improvements are required.
- Consider requiring emergency evacuation or short term back-up power for multi-storey buildings in increasingly intensifying urban areas.
- Monitor GHG emissions from York Region facilities, fleets, etc in order to address the Corporate Air Quality Strategy recommendations and meet the Green Energy Act reduction targets, once enacted.
- Investigate the projected impacts of in snow loads on municipal facilities.
- Consider undertaking a joint feasibility study with the local municipalities to determine how to optimize the use of alternative energy sources through community energy planning.

Continue to Explore Innovative Water and Energy Conservation Approaches

- Identify new opportunities for water conservation and efficiency, through new development standards, water re-use, pricing structures, partnerships with local municipalities and conservation authorities and enhanced community involvement and education.
- Research requirements for infrastructure sizing based on climate change impacts.
- Continue to investigate water and wastewater unit rates considering climate change and energy efficiencies.

Improved Monitoring and Maintenance and Resiliency of Water, Wastewater, Transportation and Solid Waste Infrastructure

- Incorporate infrastructure adaptation into the design, planning, maintenance and replacement cycle of existing infrastructure including the reduction of premature deterioration.
- Work with the Conservation Authorities to examine the need for redesign and retrofit of stormwater infrastructure and systems to reduce extreme weather related flooding and erosion.
- Explore solutions to extreme weather impacts on infrastructure including roads, communications towers etc.
- Work with local municipalities to address aging infrastructure and impacts around Inflow & Infiltration, flooding and leak detection, etc. especially in older, vulnerable areas.
- Look for opportunities to share resources to ensure more resilient infrastructure, e.g. public education, common design standards, maintenance processes.
- Explore integration of emergency planning for Roads and Transit and other Regional operations and determine linkages with Corporate Emergency Plan.
- Determine how the Green Roads climate change guidance document can be incorporated in York Region's Climate Change Adaptation Action Plan.
- Examine ways in which solid waste management processes are impacted by climate change.
- Determine emergency management approaches for waste as part of the integrated waste management plan.

Next Steps: Moving Towards more Climate Resilient Region

There is still time to avoid the worst impacts of climate change, if we take strong action now.

Nicolas Stern

Thinking about the impacts the Region has experienced to date can assist in taking a proactive, coordinated and strategic approach to enhancing existing policies and practices to reduce vulnerability and enhance resiliency.

While higher levels of government have a role to play in setting policy direction and delivering funding programs to encourage adaptation, local and regional governments have a more direct role in climate change adaptation through the services they deliver and through more direct knowledge of local communities, environment and economies. Locally-based strategies can allow more flexible approaches to a changing climate, and enable closer monitoring of how effective implementation is occurring.

There is mounting evidence that climate change impacts are being felt, however, there is not precise information about what will happen in the future. Experts tell us that while past weather data can be used to give us an indication of what might happen in the future, climate change will likely continue to bring more frequent and intense events, and the progress at which that happens will be unpredictable.

Climate change is happening and will demand a more comprehensive and flexible approach to dealing with the uncertainties that these changes will bring in the future. The Region can ensure a more robust approach to adaptation and resiliency by:

- Taking into account current information on climate change impacts.
- Considering a reasonable range of extremes.
- Increased awareness and sharing of information on risks and strategies.
- Stronger partnerships with local municipalities, conservation authorities and stakeholders to work together and to collectively seek funding supports for collaborative efforts.
- Developing stronger ties with expert organizations such as ICLEI, the Clean Air Partnership, and the Institute for Catastrophic Loss.

This Draft Climate Change Action Plan will assist the Region by identifying priority areas to focus on. This will help to promote a better understand our vulnerability and risk, and provide direction on how programs and initiatives can be strengthened, and finally, through the recommended Action Areas, encourages exploration of innovative ideas to become a more adaptive and resilient organization.

Taking steps now to prepare for climate change can help to avoid or lessen the substantial costs associated with the climate change impacts that the Region is already experiencing and will experience into the future.

“...preparing for climate change is not about making your community “climate proof” but rather making it “climate resilient”
Preparing for Climate Change: A Guidebook for Local, Regional, and State Governments.

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- ¹ Clean Air Partnership. Protecting Your Community from Climate Change, 2011.
- ² Union of Concerned Scientists and the Ecological Society of America. Confronting Climate Change in the Great Lakes Region. Page 1.
- ³ Clean Air Partnership. Protecting your Community from Climate Change: A Training Program for Ontario Municipalities. Page 2-2. 2011.
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- ⁵ http://www.c-ciarn.ca/pdf/atmospheric_hazards_ontario_understanding_risks_joan_klaassen_guelph_workshop.pdf
- ⁶ http://www.toronto.ca/involved/projects/east_highland_creek/pdf/flood_presentation.pdf
- ⁷ http://ontario.hazards.ca/historical/Tornado_Ontario-e.html (Environment Canada)
- ⁸ Morrison, Murray et al. Vaughan Ontario Damage Investigation – The August 20, 2009 Tornadoes. Boundary Layer Wind Tunnel Laboratory, Faculty of Engineering, University of Western Ontario
- ⁹ Union of Concerned Scientists. Confronting Climate Change in the Great Lakes Region – Impacts on Ontario Communities and Ecosystems. 2003.
- ¹⁰ <http://www.redcross.ca/article.asp?id=009553&tid=032>
- ¹¹ Clean Air Partnership. Protecting your Community from Climate Change: A Training Program for Ontario Municipalities. Page 2-3. 2011.
- ¹² http://www.hc-sc.gc.ca/ewh-semt/climat/health_table-tableau_sante_e.html
- ¹³ Clean Air Partnership. Protecting your Community from Climate Change: A Training Program for Ontario Municipalities. Page 2-4, 5. 2011.
- ¹⁴ Clean Air Partnership. Protecting your Community from Climate Change: A Training Program for Ontario Municipalities. Page 2-5. 2011.