

Climate **READY**

A CLIMATE CHANGE ADAPTATION
PLAN FOR THE TOWN OF ESSEX
2021 - 2026

essex

A photograph of a person walking through a fountain at sunset. The scene is bathed in a warm, golden light from the setting sun, which is visible in the background behind a line of trees. The fountain has several jets of water spraying upwards, and a large circular structure with the number '73's' is visible on the right. The person is walking from left to right, and their reflection is visible in the water. The overall mood is serene and peaceful.

ACKNOWLEDGMENTS

The preparation of *Climate Ready - A Climate Change Adaptation Plan* for the Town of Essex was supported by the knowledge, expertise, and effort of Town Council, community stakeholders, Town Administration, and residents. The time, efforts, and local knowledge of these individuals is crucial in building community resilience in the face of a changing climate.

This project was made possible with funding and support from the Federation of Canadian Municipalities (FCM) through the Municipalities for Climate Innovation Program (MCIP).



HOW TO USE THIS DOCUMENT

This document is intended to inspire both Town Administration and community members in working together towards addressing local climate issues. It is a reference and guide, not limited to the Administration of the Town of Essex, but also intended for use by Members of Council, various stakeholders and partners, and members of the public.

MEMBERS OF COUNCIL

As background on future investments and progress of *Climate Ready*.

ADMINISTRATION

As guidance on strategies and tasks to be accomplished and reported to senior management and Council.

STAKEHOLDERS

As information on possible collaborations with the Town of Essex and its partners.

MEMBERS OF THE PUBLIC

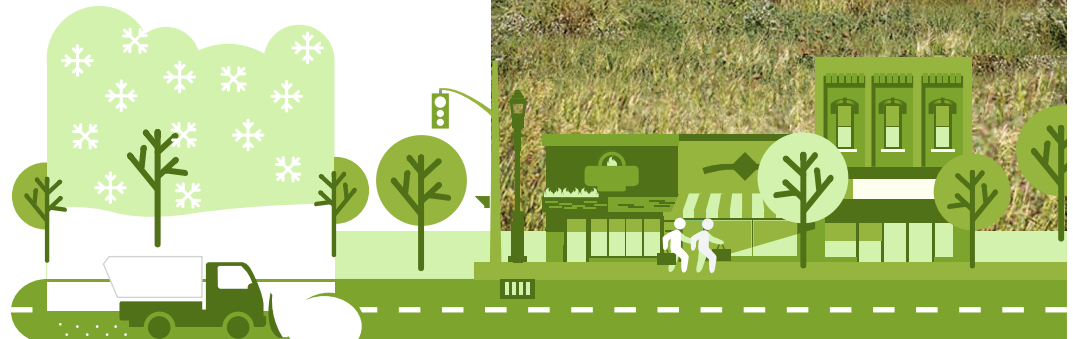
As data on what the Town is doing to address climate change adaptation.

Cover image courtesy of Laurie Beaten



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THE PLANNING GROUP



Climate Ready **Leadership Group**

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Internal Climate Adaptation Team (ICAT)

The ICAT was central to the development of this plan. The Team includes representatives from every division of the Corporation, who contributed their vital knowledge and experience through every step of the process - from identifying climate impacts to devising action items.

Essex Climate Adaptation Team (ECAT)

The Town is grateful to the following individuals for representing various stakeholder groups and the residents of the municipality as members of the ECAT - an ad-hoc committee of Council:

Amandeep Hans, Andrea Descargar, Brandi Bechard, Brian Hyland, Brian Lennie, Councillor Kim Verbeek, Dan Metcalfe, Gina Pannunzio, Kelsey Amlin, Maddie Peters, Matthew Child, Megan Balsillie, Tyler Oglan, William Baker.

Stakeholders

The Town would also like to thank the following individuals and their representative organizations for their knowledge, time, and expertise in developing *Climate Ready*:

Claire Sanders– Essex Region Conservation Authority

Karina Richters – City of Windsor

All other municipalities, organizations, and stakeholders that offered knowledge and contributed their time in the development of this project.

MESSAGE FROM THE MAYOR

First, I would like to thank the dedicated Town staff, members of the Essex Climate Adaptation Team, as well as my fellow Council Members for their ongoing input and hard work on this document. The adoption of this plan represents the culmination of significant investments in time and resources from many individuals throughout the Corporation and community.

As a local government, we may be limited in our capacity to mitigate climate change but we are well-positioned to adapt to its impacts. However, to accomplish that goal we must work together. Whether it is modifying our own operations, empowering our citizens to be prepared, or providing the necessary information and tools for local business owners and stakeholders, preparing for the impacts of climate change is truly a community-wide effort.

I encourage citizens and stakeholders to view this document as a roadmap not only for their municipal government, but also for their own efforts. It outlines the impacts we will likely face, how we plan to address them, and what community organizations and individuals can do to play their part.

On behalf of Council, thank you again to all those involved in the creation of this document and we are excited to see this vision become a reality.

Larry Snively
Mayor

MESSAGE FROM THE CAO

The impacts of climate change have given rise to complex, global challenges which call for immediate, local action. As a municipal government, we are at the forefront of these impacts, which often directly affect our operations, infrastructure, and facilities.

Whether it is flooding and erosion, risks to individual health, or the effect of warmer, wetter and wilder weather on our infrastructure, the impacts of climate change will continue to underscore the importance of taking the necessary steps for the Town to be prepared, as both a corporation and community. Identifying and taking concrete steps not only creates a safer, more resilient community, it also contributes to the adaptability and sustainability of our organization. While the plan is specific to the impacts of climate change, it will influence all of our departments and contribute to ongoing efforts to achieve our strategic goals.

As a local government, we recognize the importance of taking a leadership role in preparing for the impacts of climate change. However, while the Town of Essex will lead its implementation, its impacts will extend well beyond Town Hall.

Thank you again to all those who have been involved in the creation of this plan, from Town staff, to Council Members, to stakeholders, committee members, and individual citizens.

Chris Nepszy
Chief Administrative Officer



Bike repair station at the Kinsmen Field House, Essex Centre

EXECUTIVE SUMMARY

The evolving climate crisis is at our doorstep. This global warming phenomenon greatly exacerbated by industrial pollution in the form of greenhouse gas production is causing unprecedented seasonal changes in weather patterns, more frequent storm events, extreme heat and cold waves, and increasing concerns about a reduced quality of life in our municipality. The projections for these changes worsen as we advance into this century.

SUSTAINABLE DEVELOPMENT GOALS

13 CLIMATE ACTION

Taking urgent action to tackle climate change and its impacts.

Climate Ready aligns with Goal 13 of the United Nations' Sustainable Development Goals.

As a result, municipalities like ours are on the frontlines of responding to extreme climate events, which calls for a comprehensive and unique adaptation strategy. Working in line with Goal 13 of the *United Nations' Sustainable Development Goals*, and utilizing the *International Council for Local Environmental Initiatives' Building Adaptive and Resilient Communities (ICLEI-BARC)* framework, the Town of Essex has developed *Climate Ready - A Climate Change Adaptation Plan for the Town of Essex* to guide its adaptation efforts in building corporate-level and community-level climate resilience. This plan forms the framework for civic and community actions to help address and adapt to the impacts of climate change. It is flexible in its application to recognize that the impacts of climate change are changing over time and the ultimate extent of change is uncertain.

A series of strategic actions were carried out to procure baseline climate projection data, identify impacts, assess current and future vulnerability and risk, develop goals and actions, and establish implementation procedures; specifically suited to the Town of Essex's corporate and community needs.

Through consultations with Town Administration and key community stakeholders, two sets of focused objectives have been developed:

Community Engagement and Partnership Objectives - The Town will support, encourage, and promote community and residential resilience through the implementation of the action items under these objectives by working with stakeholders and community partners.

Corporate Objectives - The Town will increase the resilience of its infrastructure, assets, operations, administration, and service deliveries to climate impacts, through the execution of the action items under these objectives.

The ultimate goal of these objectives is to reduce risk, accelerate recovery, and help strengthen existing systems, as they pertain to the municipal duties of the Corporation of the Town of Essex, for:

- Public Health and Safety
- Local Economy and Growth
- Community and Lifestyle
- Environment and Sustainability
- Public Administration

As climate change adaptation is a dynamic and continuous process that revolves around evolving data prediction systems, the Town will update *Climate Ready* periodically when pertinent new information is made available. Town Administration will also report progress on the action items defined within this plan to Town Council on an annual basis. This will ensure that the Corporation continues to monitor and communicate its progress effectively to its residents and stakeholders, and deliver on its commitment to taking a leadership role in climate change adaptation.





Essex Pollution Control Plant near Essex Centre

INTRODUCTION

Climate Science 101

The Town of Essex, communities across southwestern Ontario, and the world are experiencing a climate crisis. It is the defining challenge of the 21st century: the **impacts** of which are a concern for individuals, communities, business sectors, and governments; from local and regional to national and international scales.

What is causing the climate crisis? The atmosphere is mostly composed of nitrogen (78%)

“CANADA IS WARMING AT ABOUT DOUBLE THE MAGNITUDE OF GLOBAL WARMING.”

- Canada's Changing Climate Report, 2019

and oxygen (21%), but it also contains lesser amounts of what are known as greenhouse gases (GHGs). GHGs, including carbon dioxide, methane, and nitrous oxide, are gas molecules which can absorb energy being emitted from the sun and energy re-radiated by the earth, acting as an insulating blanket surrounding the planet and keeping it warm. Without GHGs keeping the sun's energy in the atmosphere, the average

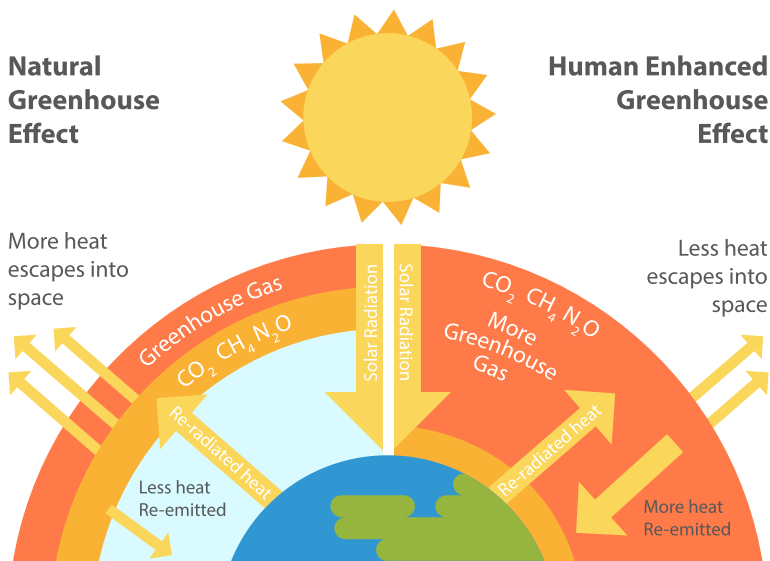


Figure 1: Natural greenhouse effect comparison to human enhanced greenhouse effect

temperature of the Earth would be -18°C , which would be very unsuitable for the existence of a large variety of life on earth, including humans. However, the rapid rate of GHG concentration rise in the atmosphere, caused by several human activities, is leading to increased trapping of heat and causing the earth to be warmer today than in the last 10,000 years.

This upsets the balance of the existing climate system, the impacts of which are numerous and complex, such as more extreme heat, more extreme precipitation, variable growing seasons, shorter snow and ice cover seasons, earlier spring peak stream-flow, thinning glaciers, thawing permafrost, and rising sea levels. Scientists around the world have confirmed this by studying data from ice cores drawn from Greenland, Antarctica, and tropical mountain glaciers, carbon records in tree rings, ocean sediments, and layers of sedimentary rocks, as well as monitoring daily atmospheric changes in multiple locations across the world.

Climate change is already being felt in towns and cities across the country and will continue to worsen in the projected future. Communities like the Town of Essex are becoming increasingly vulnerable to a range of impacts including rising temperatures, more frequent intense storms, and water level rise. As a result of that, municipal services, infrastructure, and the livelihoods of those in our communities are being negatively affected.

WEATHER vs CLIMATE

The terms “climate” and “weather” are often used alternatively in conversation, but there is a major difference between them. **Weather** refers to the temporary, short-term atmospheric conditions in a particular region. **Climate** refers to overall patterns of weather for a particular region averaged over long periods of time. When someone says, “It’s sunny out today”, they are referring to the weather. However, when they say “It gets hot in the summer in Essex County”, they are talking about the climate.

CLIMATE CHANGE VS GLOBAL WARMING

When first introduced, the phenomenon of climate change was commonly referred to as global warming. The more commonly used term of “**climate change**” today is not a change in science or a correction. **Global warming** is the larger phenomenon that is causing climate change. The rise in global temperatures, or global warming, is leading to various changes in the typical climate of various regions including precipitation patterns, ocean currents, ice coverage etc.

What are Climate Projections?

Climate projections are developed for a range of plausible scenarios or targets that capture the relationships between human choices, emissions, natural cycles, and temperature change; which determine seasonal patterns and average climate conditions in a region. Due to the increase in GHG concentrations in the atmosphere, average seasonal and climatic conditions in the Windsor-Essex region are getting **“Warmer, Wetter, and Wilder”** (Essex Region Conservation Authority, 2020) - which means that the average temperatures in the region are expected to increase throughout all seasons, precipitation events will increase in frequency, duration, and intensity, and the consequences of these changes will become more intense and erratic. These projections were developed by the combined efforts of climate data scientists at *Environment and Climate Change Canada*, *The Computer Research Institute of Montreal*, *The Prairie Climate Centre*, and associated partners.

What are Climate Impacts?

The various consequences arising from climate change that alter social, economic, physical and environmental systems are called climate impacts. Impacts are unique and specific to a community, determined by geography, demographics, available amenities and infrastructure, municipal services, etc. The climate impacts for the Town of Essex were developed based on the subject-matter expertise of Administration, community stakeholders, and research data from *Environment and Climate Change Canada* and the *Essex Region Conservation Authority*. Around 60 impacts were identified for individual Town departments and community sectors, which were prioritized based on extent of vulnerability and current **resilience** levels.



COVID-19 AND CLIMATE CHANGE

The COVID-19 pandemic has and is continuing to determine the trajectory of global health, economies, international relations, national security, and the environment. This phenomenon draws many parallels to the climate crisis, which is an ongoing set of complex challenges projected to worsen as we move further into the 21st century. Challenges of responding to the impact of the COVID-19 pandemic included timely resource development and distribution, education and awareness, improving accessibility, consistency in organization and mobilization – which also test the climate change planning process. As the Town of Essex recovers, it will be vital to strengthen our community in a cleaner, greener, safer, more equitable and a more resilient manner.

PROJECTIONS FOR THE TOWN OF ESSEX

The table below shows future climate trends for the Town of Essex, which is vital information used to anticipate related consequences and plan responses.

VARIABLE	SUB-VARIABLE	RECENT PAST AVG.(1976-2005)*	2040 PROJECTION	TREND
WARMER	ANNUAL AVG. TEMPERATURE (°C) Overall annual average temperatures are projected to increase for this region. Seasonal average temperatures for all four seasons will also increase by 2040.	9.6	11.9	↑
	NUMBER OF HEAT WAVES The number of heat waves in a year, as well as the duration of each heat wave event are projected to increase by 2040.	2.0	5.9	↑
	DAYS OVER 30°C The number of “Hot Days” or days over 30°C in a year are projected to increase by 198% in 2040.	15.4	45.9	↑
	DAYS BELOW -15°C The number of days with the minimum temperature lower than -15 °C are predicted to be fewer in this region in 2040.	8.0	2.0	↓
	FREEZE-THAW CYCLES The cycles of surface water freezing, melting, and re-freezing are projected to decrease further into the century.	57.2	49.2	↓
	FROST-FREE SEASON This is an indicator of the number of days in a year plants and crops have a window to grow and mature. This also alters the start time and lengths of various seasons.	193.4	214.7	↑
WETTER	ANNUAL AVG. PRECIPITATION (MM) Average yearly total precipitation (rain, snow, ice etc.) is projected to go up by 2040.	825.0	851.2	↑
	AVG. SPRING PRECIPITATION (MM) Springtime rain events are projected to increase by 11% in 2040. Rainfall is expected to fall faster and shorter storms will have increasingly higher intensity.	218.0	242.8	↑
	AVG. SUMMER PRECIPITATION (MM) Summer rain is expected to decrease by 13% in 2040, resulting in increased evaporation rates from ground and lake surfaces.	220.0	191.5	↓
	AVG. WINTER PRECIPITATION (MM) Winter precipitation rates and frequencies are expected to increase. More rainfall and freezing rain events instead of snow, as we progress further towards 2040.	181.0	190.3	↑
WILDER	STORM EVENTS Extreme storm events accompanied by intense winds, overland and shoreline flooding, and higher wave action along Lake Erie shoreline are expected to worsen into the century.	40% increase in 100-yr storms, 25% increase in 10-yr storms		↑
	LAKE LEVELS Lake level projections are uncertain for long-term durations. Over the short-term lake levels are estimated to experience higher highs and lower lows.			Variable and uncertain

Data acquired from: Environment and Climate Change Canada. (2019).

CLIMATE IMPACTS IN THE TOWN OF ESSEX

The table below shows current and expected future climate impacts for the Town of Essex. Following **vulnerability and risk assessments**, the impacts below were deemed top priority.

Hotter days and heatwaves will lead to decreased use of outdoor recreation facilities, less outdoor programming, decreased use of active transportation, and result in increased demand on indoor activities, cooling centres, shade structures, beaches and splash pads.
An increase in summer temperatures with a decrease of summer rainfall may lead to a decrease in wetland habitat and biodiversity leading to loss of ecosystem services.
Increased Urban Heat Island Effect resulting in increased health risks, higher energy demand, infrastructure damage, lower air quality, and lower water quality detrimentally affecting daily lives of residents.
Increased chances of heat-related illnesses, disease outbreaks, property damage, and mental stress to workers leading to less productivity, increased number of sick days, reduced worker health and safety, and increased backup manpower needs.
Longer heat waves will result in growing season and range shifts for local flora and crops leading to changes in planting practices, rezoning and policy, and crop choices.
Milder winter temperatures leading to more ice and freezing rain and less snow, resulting in infrastructure damage and public safety concerns throughout the community.
Higher demand on energy and water for cooling Town facilities, municipal infrastructure, private facilities, and homes resulting in increased costs, increased load, and increased maintenance.
More shoreline erosion during the winter due to unfrozen lake surfaces and higher wave action from high wind and precipitation events, leading to loss of shoreline, breakwall failures, shoreline flooding, and bank failures.
Increased flooding, erosion leading to changes in land uses and where new development can occur.
Increased annual precipitation causing stress on sewage, septic, and water treatment systems leading to reduced water pressures, surcharge, wastewater backup, and supply shortages.
Increased ground water saturation will lead to an increase in the ground water table, posing problems to pits and quarries, bluff failures, and overland flooding.
Higher lake levels will cause damage to shoreline and associated infrastructure and equipment, resulting in changes to design criteria, retrofitting existing infrastructure, and greater need for monitoring programs.
Increased stress, pollution, and damage to public and private infrastructure from urban flooding and soil erosion.
Less snow but more freezing rain may require increased road maintenance, resources, and emergency servicing.
Increased site specific flooding resulting in private infrastructure damage leading to economic loss and increased costs to rehabilitate.
An increase in algae blooms, E.coli, hypoxia and invasive aquatic species will result in reduced water quality, fewer recreational activities and tourism, and increased stress on shoreline water infrastructure.
Increased roadway flooding, debris, damaged infrastructure will limit safe access to less accessible communities for emergency personnel and may result in delayed responses, increased community vulnerability, and reduced safety.
Property loss, economic damage, physical accidents in public areas leading to increasing liability to Town.
Extreme heat, cold, and variability (freeze-thaw cycles) leading to increased preventative maintenance, repair, and labour costs of damaged infrastructure.

Full list to be made available at www.essex.ca/ClimateReady

CLIMATE CHANGE IN THE TOWN OF ESSEX



Figure 2: Flooding in fields across the municipality delayed the planting season for many farmers in 2019. Field on South Malden Road, June 2019
© Windsor Star/ Dax Melmer, 2019



Figure 3: Intense storm events have resulted in flooded residential streets and drains. Colchester, 2018

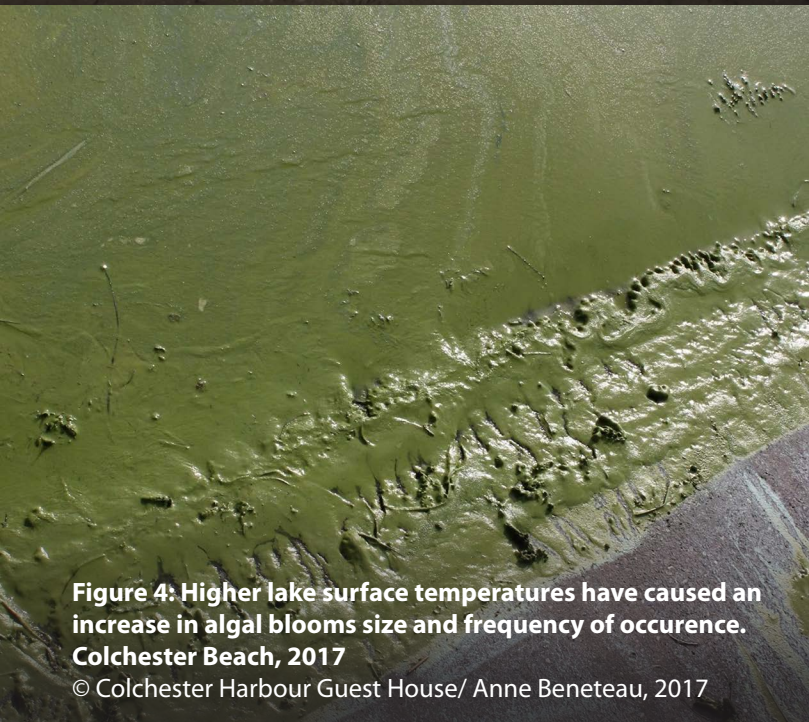


Figure 4: Higher lake surface temperatures have caused an increase in algal blooms size and frequency of occurrence. Colchester Beach, 2017
© Colchester Harbour Guest House/ Anne Beneteau, 2017

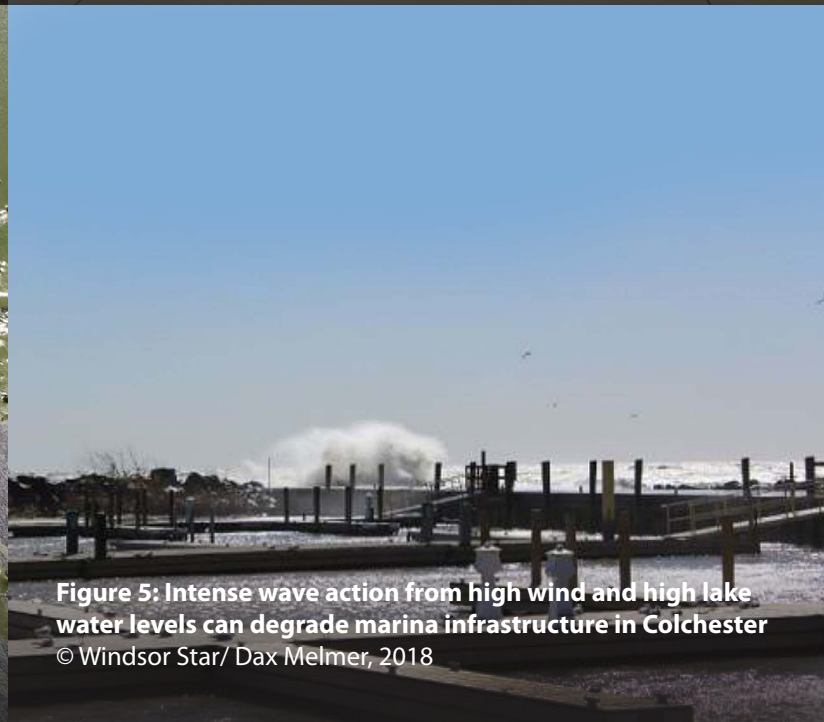


Figure 5: Intense wave action from high wind and high lake water levels can degrade marina infrastructure in Colchester
© Windsor Star/ Dax Melmer, 2018



Figure 6: highway 3 concrete buckling during a six day long heat wave in 2018
© CBC



Figure 7: Grape buds in a Colchester winery were damaged due to severe frost from a cold snap, 2019.
© Windsor Star

STRATEGIES TO MANAGE CLIMATE RISKS

Mitigation vs Adaptation

There are two routes to dealing with climate impacts. The first, **mitigation**, is a set of actions designed to reduce GHG emissions and the causes of climate change. An action plan primarily targeted at the reduction of GHG emissions would be a **mitigation plan**. The second, **adaptation**, recognizes that we are already facing the impacts of climate change, and a plan identifying strategies and solutions to deal with them in the present and future is called an **adaptation plan**.

MITIGATION IS NECESSARY TO REDUCE THE RATE AND MAGNITUDE OF CLIMATE CHANGE, WHILE ADAPTATION IS ESSENTIAL TO REDUCE THE DAMAGES FROM CLIMATE CHANGE THAT CANNOT BE AVOIDED.

- Natural Resources Canada. (2009)

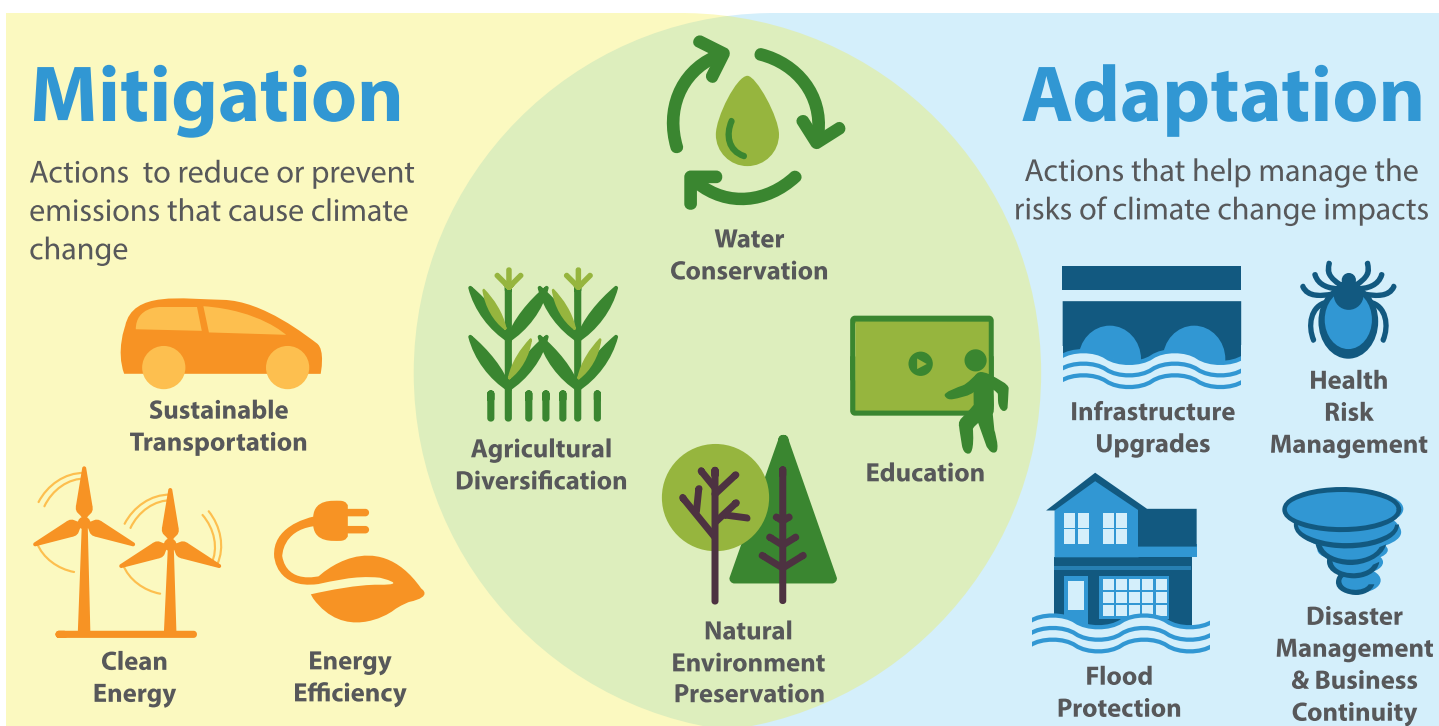


Figure 8: Examples of mitigation-based actions, adaptation-based actions, and actions that accomplish both goals.

As shown in the figure above, some actions exclusively address mitigation and some are specifically adaptation-based in nature. However, there are several actions that can accomplish both; like increasing tree cover or agricultural diversification, which remove GHGs from the atmosphere and also help diminish the effects of climate impacts like increased heat and increased soil erosion.

The Need for Adaptation

Both mitigation and adaptation strategies can help lessen the effects of climate change; however, adaptation was selected as the primary first route for the Town of Essex. **The current immediate need based on the results of vulnerability and risk assessments performed on Town services, assets, infrastructure, and community needs indicated adaptation planning has greater, immediate, and concentrated bearings to the local community.**

Additionally, studies have found that for every dollar invested in adaptation efforts, there is a return of 6-11\$ in averted damages (*Insurance Board of Canada, 2020*). Mitigation, on the other hand, must be a regional and global effort to succeed and the resulting returns are likely to manifest on longer timescales and on higher levels. Additionally, the Town of Essex is partnered with the County of Essex, municipalities, and industry in Essex County to develop the **Essex County Regional Energy Plan**, which would help address its mitigation needs.

The Town of Essex, lying in the Great Lakes region with an extensive farming community, has and will continue to experience its own unique set of climatic challenges. Urban and shoreline communities are suffering from flooding, erosion, heat islands – to name a few issues. Rural communities are threatened by reduced accessibility to vital resources and aid. Vulnerable populations, including children, the elderly, and those with economic challenges are particularly susceptible to heat waves and large storm events. The Town of Essex, with all of its diverse communities, also boasts a plethora of floral and faunal biodiversity, whose habitats are degraded from extreme impacts. An Adaptation Plan will help the Town and the community prepare themselves for shifting conditions; protect its people, environment, and economy; and optimize any opportunities via tangible action

items. Anticipatory adaptation planning can reduce future risks associated with climate change, decrease vulnerability while also identifying any of the benefits of climate change.

ADDITIONALLY, STUDIES HAVE FOUND THAT FOR EVERY DOLLAR INVESTED IN ADAPTATION THERE IS A RETURN OF SIX TO ELEVEN DOLLARS IN AVERTED DAMAGES.

- Insurance Bureau of Canada, Federation of Canadian Municipalities (2020)



Winery on County Road 50, Colchester

BENEFITS AND CHALLENGES OF ADAPTATION PLANNING

BENEFITS

- Risk mitigation
- Reducing vulnerability
- Creating opportunities
- Lower long-term costs

CHALLENGES

- Degree of uncertainty in severity of projections
- Benefits of advance planning may only appear upon impact
- Limited resources and support
- Duty of care towards residents

The Role of the Corporation of the Town of Essex

The onus of responsibility to combat climate impacts does not only lie with federal and provincial governments but local municipal governments as well. **Governments and citizens need to understand how climate change will impact them, in order to plan and prepare for the challenges that it brings.** Municipalities like the Town of Essex are on the frontlines of responding to their unique challenges. We are responsible for key service areas, like infrastructure, community services, development, emergency services etc.

Additionally, we have a duty of care towards the safety, health and welfare of our communities both in the present and in the future. Local challenges and climate impacts require tailored solutions that the Town of Essex is best placed and equipped to tackle. Additionally, at the local level, citizens, property owners, and stakeholders have more access to their elected representatives, who act as a conduit of communication to higher tier officials and administration.

This Adaptation Plan, accomodating the Town of Essex's unique needs, is built on the foundation of the Town's **Official Plan, Strategic Plan,** by-laws, policies, and practices.



The Federal Government declared a National Climate Emergency in 2019 to support the country's commitment to meeting the targets outlined in the Paris Agreement.

The City of Windsor and the County of Essex declared climate emergencies in 2019 as well, recognizing that future climate performance must be a high priority in all regional decision-making.



Aerial view of Essex Centre



Farm fields and wind turbines in Harrow

METHODOLOGY

Developing a Strategy

The Town, guided by the *International Council for Local Environmental Initiatives' Building Adaptive & Resilient Communities (ICLEI - BARC)* methodology, developed this action plan in collaboration with Town Administration, community stakeholders, and government officials (refer to Figure 9). The five-milestone ICLEI - BARC methodology provides a robust step-by-step approach to initiating the planning process, conducting area and sector-specific research, conducting impact, vulnerability and risk assessments, and devising appropriate



Figure 9: ICLEI's Building Adaptive & Resilient Communities Framework (See Appendix B for complete framework)

solutions for the creation of a Climate Change Adaptation Plan, as well as a system for monitoring and review of progress. This also includes ongoing community and stakeholder consultations.

Following Council’s decision to commence *Climate Ready’s* process, two steering teams were established: the Internal Climate Adaptation Team (ICAT), consisting of Administration’s representatives from all divisions, and the Essex Climate Adaptation Team (ECAT), consisting of a range of community stakeholders in Essex. Both teams were created to provide direction and advise the content of *Climate Ready*.



on improving adaptation, reducing vulnerability, and identifying hazards and opportunities related to the local community impacts of climate change.

Consultations

The Internal Climate Adaptation Team (ICAT), consisting of Town department representatives, was involved in creating, informing, and guiding the foundational content of this document. Members provided vital information on current concerns and vulnerabilities, future needs to build resiliency, and ongoing actions underway to addressing climate distress in the township.

The Essex Climate Adaptation Team (ECAT) consisting of 14 members chosen by Town of Essex Council, to represent various community interests, stakeholder groups, and residents, provided the Town of Essex with vital assistance towards developing *Climate Ready*, and advice

The knowledge gathered through these consultations was distilled quantitatively and qualitatively, using the aforementioned ICLEI - BARC framework, to determine the highest vulnerabilities, risks, and priorities for the Corporation and the community. An array of proposed solutions to various climate related issues and threats were considered and finalized based on effectiveness, feasibility, resource availability, versatility, robustness, and acceptability. Executive decisions on the final solutions were made by the *Climate Ready* Leadership Group. A reporting structure was also determined to monitor the progress on action items presented in the Plan, as well as a timeline to review and update *Climate Ready*.



Figure 10: Climate Ready Development Process

This graphic is a representation of the tasks performed in the creation of *Climate Ready*, and how they align with the ICLEI - BARC five milestone framework. The ICAT, ECAT, and Leadership Group were consulted at every stage of this process.



VISION

The Town of Essex will adapt to changing climate conditions and embrace new opportunities for a healthy, vibrant, and sustainable community benefiting residents, businesses, and visitors.

OBJECTIVES

While the Vision statement is the overall summary of values and the purpose of *Climate Ready*, the objectives are second-tier expectations or high level intentions that set direction to action items and help develop a path to achieving them. Based on the impacts, variety of service deliveries, and the Town’s partnerships with stakeholders, two sets of objectives have been developed.

Community Engagement and Partnership Objectives

These are objectives identified to be accomplished in partnership with stakeholders, private and public entities, and residents, in order to promote a culture of sustainability and support climate resilience in the community.

- 1 Support the Enhancement of the Health, Safety, and Quality of Life of the Town of Essex Community**
- 2 Encourage the Preservation of the Natural Environment and Support the Adoption of Nature-Based Solutions**
- 3 Minimize Risk to Private Buildings and Property**
- 4 Support Opportunities for Investment into Adaptation-Based Innovation for Local Business**
- 5 Help Advocate for Community Emergency Preparedness**
- 6 Promote Community Engagement and Participation in Climate Change Awareness and Adaptation Opportunities**

Corporate Objectives

These are objectives identified to be accomplished by targeting current services, operations, assets, policies, and utilities managed by the Corporation of the Town of Essex.

- 1 Enhance Staff Health And Safety**
- 2 Protect the Town’s Natural Assets and Emphasize Nature-based Solutions**
- 3 Build and Strengthen the Town’s Infrastructure Resilience**
- 4 Integrate Climate Change Adaptation into Town Planning and Policy Making**
- 5 Build Community Services Tempered to Climate Change Impacts**

GUIDING PRINCIPLES

The development process of this document and future implementation of action items identified here will be guided by some important underlying principles. Administration will ensure that project planning and implementation will occur by:

1. **Prioritizing the health and safety of residents and community throughout the design, development, implementation, and monitoring of action items.**
2. **Building awareness about climate risks and promoting adaptation strategies.**
3. **Using latest climate projections and scientific information to guide project development and execution.**
4. **Collaborating and leveraging community partnerships as pertinent to the process of building community resilience.**
5. **Delivering a high quality of service to residents and community stakeholders.**
6. **Exercising a duty of care to ensure the well-being of the residents.**
7. **Using measurable data and indicators to monitor the implementation of *Climate Ready*.**

TIMELINE

The timeline for the implementation of this document has been set for 2021-2026. Action items identified in this plan are expected to fall into one of the following categories:

2021-2022: Current	Action items that will be initiated/implemented within the first two years of the adoption of <i>Climate Ready</i>
2023-2024: Short Term	Action items that will be initiated/implemented in the near future
2025-2026: Long Term	Action items that will be initiated/implemented in the longer term
Ongoing	Action items that have already been initiated and will be developed through the course of <i>Climate Ready</i> term and beyond

COST

The cost of implementing action items in this document have been estimated in the ranges stated below. These costs are based on supplementary additions to the annual operating or capital budgets, as well intents to seek external funding opportunities:

\$	\$0 - \$25K
\$\$	\$25K - \$50K
\$\$\$	>\$50K
----	Cost is incorporated within operating/capital budget

THEMES

Climate actions have been assigned themes, which are four primary implementation mechanisms. These implementation mechanisms are intended to signify the primary tools that the action item will be implemented through.



POLICY

Any project or strategy that would require a change in Town policy or planning process



PROCESS

Any project or strategy that would impact a current municipal process or would require a new process to be established



COMMUNICATION

Any project or strategy that would require public engagement or communication



PHYSICAL

Any project or strategy that requires the construction of new infrastructure

LEAD DEPARTMENT

This category indicates the department within the Town's Administration that will take the lead on an action item's commencement, development, and implementation. The implementation of action items may include other departments as well, but the lead department would set the primary direction and provide information into the annual reporting to Council on progress:

Office of the CAO

Infrastructure Services

Development Services

Corporate Services

Community Services





*Town of Essex Legacy
Tree Planting Project*

COMMUNITY ENGAGEMENT AND PARTNERSHIP OBJECTIVES

Each action item in this category of objectives is intended for the Town to accomplish by working with stakeholders and community partners; to support, encourage, and promote community resilience. Engagement and advocacy







are important components in the pursuit of community resilience-building, and all the objectives and corresponding action items can be best implemented through the support of the community.

- 1** Support the Enhancement of the Health, Safety, and Quality of Life of the Town of Essex Community
- 2** Encourage the Preservation of the Natural Environment and Support the Adoption of Nature-based Solutions
- 3** Minimize Risk to Private Buildings and Property
- 4** Support Opportunities for Investment into Adaptation-based Innovation for Local Business
- 5** Help Advocate for Community Emergency Preparedness
- 6** Promote Community Engagement and Participation in Climate Change Awareness and Adaptation Opportunities

OBJECTIVE 1

1 SUPPORT THE ENHANCEMENT OF THE HEALTH, SAFETY, AND QUALITY OF LIFE OF THE TOWN OF ESSEX COMMUNITY

In the face of a changing climate, the Town of Essex is committed to supporting the enhancement of the health, safety, and wellness of the whole community.

#	Action Item	Approx. Cost	Timeline	Lead Department	Implementation Theme
1.1	Integrate climate change messaging into Town's Communication Strategy:				
	• Participate in the climate change communication project developed by WECHU	\$	Short-term	CAO's Office	
	• Enhance Town website to provide resources and best practices for residents and business owners	\$	Current	CAO's Office	
	• Include climate change information when providing advisories on Town communications platforms	---	Current	CAO's Office	
	• Develop targeted communication campaigns for various <i>Climate Ready</i> related action items (e.g. tree plantings, vulnerable population emergency preparedness)	\$	Short-term	CAO's Office	
1.2	Develop a checklist for event organizers and vendors providing flexible and climate adaptive options (e.g. shade tents, water trucks, misters, location and time slot suggestions)	---	Current	Community Services	
1.3	Develop natural and constructed shade, and water filling stations on public property (e.g. parks, CWATS, community centres, splash pads) and encourage the same on private property*	\$	Ongoing	Community Services	

* Based on project-based needs







 Policy  Process  Communication  Physical



OBJECTIVE 2

2 ENCOURAGE THE PRESERVATION OF THE NATURAL ENVIRONMENT AND SUPPORT THE ADOPTION OF NATURE-BASED SOLUTIONS

By acknowledging the intrinsic value of ecosystems and their contributions to the quality of life in Essex, the Town will help preserve the natural environment and support the adoption of nature-based solutions, with the help of stakeholder groups (e.g. land-managers, Essex Region Conservation Authority), businesses, and residents.

#	Action Item	Approx. Cost	Timeline	Lead Department	Implementation Theme
2.1	Identify opportunities and sites to create, and protect natural assets within the Town, with regional partners:				
	<ul style="list-style-type: none"> Promote conservation land tax incentives to encourage long-term private stewardship of natural areas 	---	Short-term	Development Services	
	<ul style="list-style-type: none"> Acquire and incorporate Heat Island GIS data into Town planning to assess total green spaces, tree canopy, and heat islands in the municipality 	\$	Short-term	Corporate Services	
	<ul style="list-style-type: none"> Label and recognize heritage trees on Town property 	\$	Short-term	Community Services	
2.2	Explore and engage in regional partnerships to improve various regional environmental quality issue:				
	<ul style="list-style-type: none"> Development and implementation of controls to limit the spread of non-native invasive species 	---	Ongoing	All	
	<ul style="list-style-type: none"> Participate in regional efforts to develop a Tree-cutting By-Law/ Tree Policy 	---	Ongoing	All	
	<ul style="list-style-type: none"> Participate in the Improvement of Lake Erie water quality issues 	---	Ongoing	All	




 Policy  Process  Communication  Physical



OBJECTIVE 3

3 MINIMIZE RISK TO PRIVATE BUILDINGS AND PROPERTY

The changing climate will affect the ways in which buildings and landscapes are designed, constructed, managed, and maintained. The Town of Essex is dedicated to minimizing risks from climate change to private buildings and property in order to protect public health and safety, reduce property loss, and minimize economic damage.








#	Action Item	Approx. Cost	Timeline	Lead Department	Implementation Theme
3.1	Establish Low Impact Development practices and higher building standards for private property by updating bylaws, Development Standards Manual , and zoning regulations (e.g. improving hardscape permeability with permeable pavers)	---	Ongoing	Development Services	
3.2	Join in regional collaboration with County of Essex, municipalities, and the City of Windsor on Green Infrastructure Policy development and guidelines (e.g. green roof and white roof policy)	---	Ongoing	All	
3.3	Advocate to County leadership for incentive programs directed towards climate mitigation and adaptation	---	Ongoing	All	

OBJECTIVE 4

 Policy  Process  Communication  Physical

4 SUPPORT OPPORTUNITIES FOR INVESTMENT INTO ADAPTATION-BASED INNOVATION FOR LOCAL BUSINESS





The Town of Essex will help local business and industry (agriculture, tourism etc.) in ensuring their continuity of operations and improving their ability to reduce and manage climate-risk.

#	Action Item	Approx. Cost	Timeline	Lead Department	Implementation Theme
4.1	Help the community gain access to regional, provincial, and federal funding sources to assist with climate resilience in agriculture and business sectors	---	Ongoing	Development Services	
4.2	Participate in regional partnership and investment opportunities for green jobs	---	Ongoing	All	
4.3	Promote local businesses and business owners that have adopted climate-friendly business practices	\$	Current	CAO's Office	
4.4	Augment agri-tourism strategies to promote and support on-farm diversified uses	---	Current	Development Services	 
4.5	Participate in the implementation of a regional best practice network/climate incubator program for businesses to explore climate-friendly innovation ideas	---	Ongoing	Development Services	 

OBJECTIVE 5

5 HELP ADVOCATE FOR COMMUNITY EMERGENCY PREPAREDNESS

The Town of Essex will take measures to ensure that the emergency resilience needs of the community are met by strengthening partnerships with local and regional stakeholders, businesses, and residents, and supporting social and volunteer groups in building more resilient social infrastructure.

#	Action Item	Approx. Cost	Timeline	Lead Department	Implementation Theme
5.1	Identify opportunities to improve resiliency for vulnerable populations to extreme weather events (e.g. County of Essex's Interdev program applicability)	\$	Ongoing	Community Services	
5.2	Advocate for volunteer programs for assistance of vulnerable populations (e.g. snow angel program)	---	Ongoing	Community Services	
5.3	Promote emergency preparedness and self-reliance in the Town of Essex community*	\$	Ongoing	Community Services	
5.4	Incorporate climate change service provision information into ongoing cultural programming activities like Seniors' Day, Fire Prevention Week, and Emergency Preparedness Week	---	Current	CAO'S Office	

*Project-based







 Policy  Process  Communication  Physical



OBJECTIVE 6

6 PROMOTE COMMUNITY ENGAGEMENT AND PARTICIPATION IN CLIMATE CHANGE AWARENESS AND ADAPTATION OPPORTUNITIES

To ensure that the Town of Essex is able to withstand and recover from the impacts of climate change it will be important to encourage the involvement of residents, businesses, and stakeholder groups in climate impact education and engagement opportunities and help build a culture of sustainability.

#	Action Item	Approx. Cost	Timeline	Lead Department	Implementation Theme
6.1	Promote tree planting opportunities within the community: <ul style="list-style-type: none"> Plant 250 trees by 2026, and consider developing a residential tree planting engagement campaign Investigate options to develop a tree distribution/purchase program for residents 	\$	Long-term	Community Services	
		\$	Short-term	Community Services	
6.2	Explore options to utilize surplus public land as community green spaces (e.g. raingardens, edible landscapes, community gardens) and encourage the same on private and institutional lands	\$-\$\$\$	Long-term	Development Services	 
6.3	Conduct outreach and education campaigns with partners to encourage climate change awareness and sustainable practices (e.g. site level flooding mitigation, invasives, fertilizer use, energy use, biodiversity enhancement) for residents, business owners, and housing landlords	\$-\$\$\$	Current	Development Services	
6.4	Advocate for cross-jurisdictional resource sharing and partnerships on climate adaptation and response/ consistent knowledge and policy development	---	Ongoing	All	

 Policy  Process  Communication  Physical





Town Hall, Essex Centre

CORPORATE OBJECTIVES




These are objectives with respect to services, operations, natural and built assets and systems, administration, policies, and specific utilities that come under the management of The Corporation of the Town of Essex.

- 1** Enhance Staff Health And Safety
- 2** Protect the Town's Natural Assets and Emphasize Nature-based Solutions
- 3** Build and Strengthen the Town's Infrastructure Resilience
- 4** Integrate Climate Change Adaptation into Town Planning and Policy Making
- 5** Build Community Services Tempered to Climate Change Impacts

OBJECTIVE 1

1 ENHANCE STAFF HEALTH AND SAFETY

The Town of Essex commits to ensuring the health and safety of staff on an ongoing basis to ensure their wellness through changing climate conditions.

#	Action Item	Approx. Cost	Timeline	Lead Department	Implementation Theme
1.1	Provide weather appropriate Personal Protective Equipment to outdoor workers as required*	---	Current	All	
1.2	Include a Green Tips segment on staff newsletter and intranet to encourage staff awareness of climate adaptation best practices	---	Current	CAO's Office	
1.3	Create a staff green team for sustainability and adaptation initiatives	---	Current	CAO's Office	




* Based on departmental needs

 Policy  Process  Communication  Physical

OBJECTIVE 2

2 PROTECT THE TOWN'S NATURAL ASSETS AND EMPHASIZE NATURE BASED SOLUTIONS








The Town of Essex wants to continue to protect and enhance its natural heritage and green spaces and adopt nature-based solutions to mitigate effects of climate change on Town's grey infrastructure.

#	Action Item	Approx. Cost	Timeline	Lead Department	Implementation Theme
2.1	Ensure tree and plant species established are native, diverse, disease resistant, and have high climate adaptability	---	Ongoing	Development Services, Community Services	
2.2	Develop a buffer strip policy to increase native vegetation and improve water quality while reducing drainage-related issues	---	Current	Infrastructure Services	
2.3	Utilize the ERNHSS as the basis for the Town's natural heritage system, including the identification, protection, enhancement, and restoration of natural sites	---	Short-term	Development Services	
2.4	Investigate nature-based techniques to mitigate erosion along the shoreline, wherever possible	\$	Long-term	Infrastructure Services	

OBJECTIVE 3

3 BUILD AND STRENGTHEN THE TOWN'S INFRASTRUCTURE RESILIENCE

The Town will incorporate measures to strengthen its existing and new assets and infrastructure and ensure the resilience of Town-owned property that is on the frontline of climate change impacts.










#	Action Item	Approx. Cost	Timeline	Lead Department	Implementation Theme
3.1	Explore implementation of a Storm Sewer Surcharge	---	Long-term	Infrastructure Services	
3.2	Investigate the development of a Rain Barrel Subsidy Program	---	Current	Infrastructure Services	
3.3	Continue to review and integrate climate projection and green technology considerations into infrastructure and retrofit projects:				
	• Integrate Low Impact Development considerations in capital projects wherever possible	\$\$\$	Ongoing	Infrastructure Services	
	• Review and integrate Regional Stormwater Guidelines into infrastructure decisions	---	Ongoing	Infrastructure Services	
	• Consider green technology options for road development and re-construction projects	\$\$-\$\$\$	Ongoing	Infrastructure Services	
• Ensure new capital projects and existing hardscapes for public use incorporate thermal comfort (e.g. white roofs, comfort splash pads) and other extreme weather resistance measures	\$\$-\$\$\$	Ongoing	Infrastructure Services		
3.4	Include climate vulnerability and risks (e.g. power outages, capacity limitations, health and safety impacts, road drainage, failure) in infrastructure planning and asset management	---	Ongoing	Infrastructure Services, Community Services	

 Policy  Process  Communication  Physical

OBJECTIVE 4

4 INTEGRATE CLIMATE CHANGE ADAPTATION INTO TOWN PLANNING AND POLICY MAKING

Integrating climate change considerations into municipal policies and policy-making procedures will allow the Town to be strategically and fiscally proactive in protecting its operations, service deliveries, assets, and infrastructure against climate change impacts and associated consequences.



#	Action Item	Approx. Cost	Timeline	Lead Department	Implementation Theme
4.1	Identify a Climate Change Adaptation Champion to represent climate change initiatives at the Town and lead outreach activities	---	Current	CAO's Office	
4.2	Consider declaring a Town-wide Climate Emergency to align with County and Federal climate action interests	---	Current	CAO's Office	
4.3	<p>Incorporate climate change considerations into the Town's plans, policies, projects and procedures:</p> <ul style="list-style-type: none"> During revisions and amendments of Town policy and procedure documents (e.g. Official Plan, Strategic Plan, infrastructure studies, environmental assessments, budgets, zoning by-laws), include climate change language Consider financial, social, and environmental costs and benefits (Triple-Bottom Line assessment) when making project decisions Consider incorporating sustainable sourcing and low carbon resiliency considerations into tendering documents/scoring matrices Investigate the application of the Climate Lens Assessment 	---	Current	All	
		---	Current	All	
		---	Current	All	
		---	Current	All	
4.4	Investigate the feasibility and ramifications of having Town insurance policies account for climate change	---	Short-term	CAO's Office	
4.5	Conduct a Vulnerability and Risk Assessment using climate considerations for all Town divisions on a 5 year basis	\$\$	Long-term	CAO's Office	
4.6	Review and revise current green funding strategies to enhance reserve for Town-wide sustainability initiatives	---	Short-term	Corporate Services	

 Policy  Process  Communication  Physical

OBJECTIVE 5

5 BUILD COMMUNITY SERVICES TEMPERED TO CLIMATE CHANGE IMPACTS

The Town will amend and adapt its community services and service deliveries to changing climate conditions.

#	Action Item	Approx. Cost	Timeline	Lead Department	Implementation Theme
5.1	Diversify local tourism and recreation in the community: <ul style="list-style-type: none"> Investigate modifying season start, end and duration dates as well as general schedules for recreational programming, where possible, to try to avoid spring flooding and summer heat Introduce more Fall season outdoor programming Continue to develop Virtual Tourism opportunities 	---	Ongoing	Community Services	
		---	Ongoing	Community Services	
		\$	Short-term	Development Services	
5.2	Consider incorporating Complete Street design in providing easy access to green spaces for diverse commuters, where possible	---	Ongoing	Development Services	
5.3	Explore implementation of the Geese Management Program	\$	Ongoing	Community Services	

 Policy  Process  Communication  Physical

CLIMATE ACTION IN THE TOWN OF ESSEX

Adaptation initiatives are not new within the Town of Essex. The Town has invested time and resources into several key actions that address various climate threats in the past. Some key examples are shown in the images below. For a full list of completed and ongoing climate mitigation and adaptation initiatives, refer to Appendix C of this document.



Colchester Marina Harbour, Colchester

Figure 11: The Colchester Harbour Marina received a Blue Flag certification in 2019, the third year in a row, from Environmental Defence, a national environmental charity. A Blue Flag signifies that the beach/marina has met high international standards in water quality, environmental management, and safety and services.



Figure 12: Partnering with our seven local municipalities, the County of Essex, ERCA, the WECHU, and the MTO, the Town of Essex has developed the County Wide Active Transportation System that spans over 800km, promoting low carbon transportation, natural heritage, healthy lifestyles, and local tourism.



Figure 13: The Town of Essex has implemented its Downspout Disconnection and Basement Flooding Subsidy Programs to assist homeowners in reducing site-level flooding issues caused by increased precipitation in the region.



Figure 14: The Colchester Harbour Marina, was the first to have a floating dock in all of the Windsor-Essex region. A floating dock is more suited to adjusting to fluctuating lake levels and storm-prone regions, as opposed to fixed docks that do not adjust to lake levels.





*Town of Essex Legacy
Tree Planting Project*

IMPLEMENTATION, MONITORING, AND REVIEW

Implementing the Plan



The implementation of this Plan will commence following Council adoption. The Corporation is committed to being prepared and building

resilience to the ongoing and worsening effects of climate change, and recognizes the importance of urgent and timely action.

To ensure this, the town has assigned a budget, timeline and department to every action item. This will help departments take the lead and integrate appropriate action items of *Climate Ready* into their annual strategic plans and timelines. As a Corporation, this will ensure that climate adaptation is being prioritized and integrated over time.

Monitoring Progress

Monitoring progress is vital to the process of climate readiness in the Town. By keeping track of the actions that are being implemented, the Corporation will be able to assess the progress it has made, as well as pave the way forward for future action.

A list of indicators has been devised to help measure the progress of each action item, which will be used by divisions and departments (see Appendix D). They can be divided into four broad categories:

1. Annual reporting,
2. Relevant changes to municipal administrative functions, policies, and practices,
3. Completed and ongoing progress of Partnership initiatives,
4. Documented community interest and participation

Administration will be delivering an annual report to Town Council, which will highlight the actions that have been initiated and implemented across the Corporation and the community, as well as provide an opportunity to discuss any challenges or future improvements (refer to the Monitoring Progress Workflow illustration on page 39). This will also be an opportunity to seek feedback from residents and the community on their evaluation of the Town's progress. All reports to Town Council on *Climate Ready* will be made available on the Town's website. Divisions and departments will also report on individual progress in quarterly updates to department directors. This will give departments an opportunity to share their successes and achievements, as they work to reduce climate-related vulnerabilities in their own service areas.

Review & Update

Preparing for climate impacts and building resilience is a constantly evolving and dynamic process. Scientists are constantly updating climate projection data and it becomes imperative to keep track of this information as it pertains to us. Additionally, community needs and urgencies also evolve based on social, political, economic, and environmental factors.

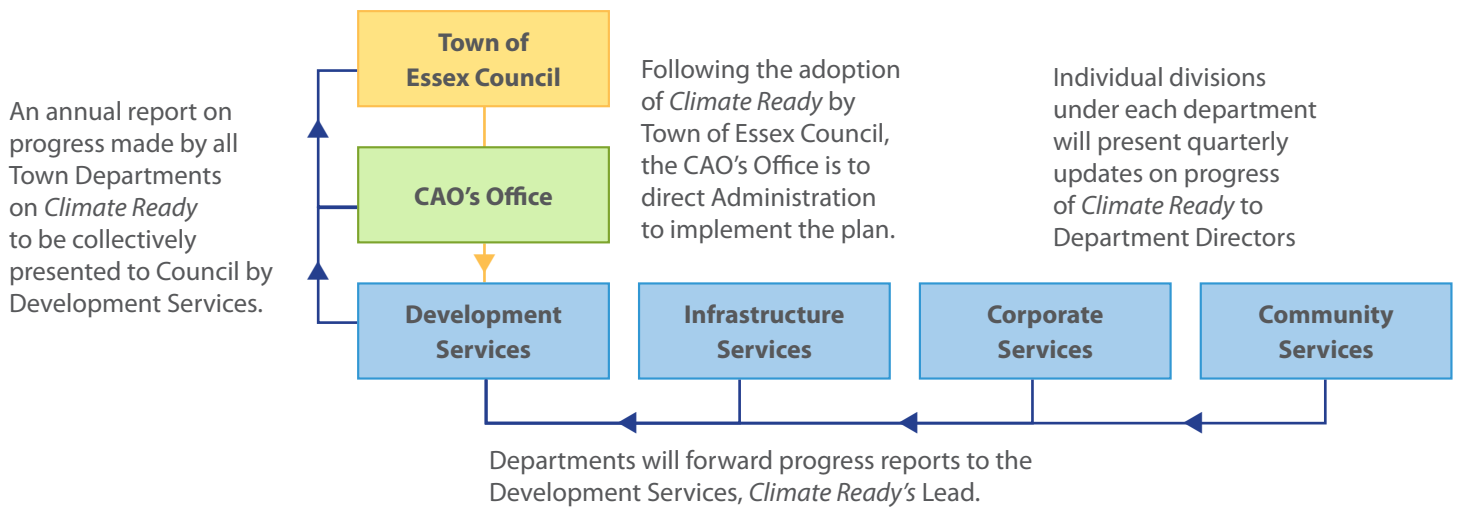
Therefore, this document has been designed for a period of implementation over 5 years, and subject to regular review and update during the course of this period. Following this period, *Climate Ready* will be re-evaluated and updated based on the latest available information and resources.

A template has been provided to the Town to help guide future vulnerability and risk assessment activities. This will be a guide to help the Town continue with climate leadership in this region.

OPPORTUNITIES FOR FUTURE ACTION

- **Collaborate with ERCA on the Regional Watershed Plan development**
- **Investigate and explore opportunities to collect and recycle water and storm water for further use in future buildings and developments**
- **Investigate the creation of an Emergency Services volunteer Team**
- **Develop an inspection check-list for high risk infrastructure to identify and anticipate any damage from extreme weather events**
- **Examine municipal projects and assets that can be used as offset credits for federal carbon tax**

Monitoring Progress Workflow



CONCLUSION

The negative impacts of climate change are both immediate and increasing. Addressing them requires community-wide efforts by adopting short and long-term mitigation and adaptation measures. Mitigation efforts, like the greater adoption of clean energy, reducing energy demands and achieving higher energy efficiency, must be largely national and global in scale. However, adaptation efforts must be taken at all levels: community, regional, provincial and national. At the community level, the challenges are to insure against future risks, reduce the vulnerability of our infrastructure, reduce threats to the health of our population and environment, and create economic opportunities where possible.

The Council of the Town of Essex, working with its Administration, community partners, the County of Essex, and sister municipalities, undertakes to carry out actions to accomplish those goals under *Climate Ready, Climate Change Adaptation Plan for the Town of Essex 2021-2026*.



It is understood that this is a community-wide effort, as climate-induced impacts cross all boundaries - social, physical, economic, and addressing these impacts requires a community-wide response. This climate change adaptation plan affects and involves all members of our community. Actions to meet the objectives of the plan require that we all work cooperatively for our mutual benefit.

REFERENCES

- Bizikova, L., Neale, T., & Burton, I. (2008). Canadian Communities' Guidebook for Adaptation To Climate Change. In Environment Canada.
- Bush, E., & Lemmen, D. S. (2019). Canada's Changing Climate Report. <https://changingclimate.ca/CCCR2019/>
- Environment and Climate Change Canada. (2019). Climate Data Canada. <https://climatedata.ca/>
- Essex Region Conservation Authority. (n.d.). Regional Climate Impacts - Essex Region Conservation Authority. Retrieved November 2, 2020, from <https://essexregionconservation.ca/watershed-health/climate-change/regional-climate-impacts/>
- Great Lakes Integrated Science and Assessment Centre & Environment and Climate Change Canada. (2018). 2017 Annual Climate Trends and Impacts Summary for the Great Lakes Basin. 6.
- Hammer, J., & Pivo, G. (2017). The Triple Bottom Line and Sustainable Economic Development Theory and Practice. *Economic Development Quarterly*, 31(1), 25–36. <https://doi.org/10.1177/0891242416674808>
- Insurance Bureau of Canada (IBC), & Federation of Canadian Municipalities (FCM). (2020). Investing in Canada's future: The cost of Climate adaptation at the local level. (Issue February). <https://data.fcm.ca/documents/reports/investing-in-canadas-future-the-cost-of-climate-adaptation.pdf>
- Local Governments for Sustainability (ICLEI). (n.d.). Changing Communities: Changing Climate, Guide and Workbook for Municipal Climate Adaptation.
- Ministry of Municipal Affairs and Housing. (2020). Provincial Policy Statement Under the Planning Act. [Ontario.ca/PPS](https://www.ontario.ca/PPS)
- NRCan. (2009) Adaptation 101: What is Adaptation?
- Ripple, W. J., Wolf, C., Newsome, T. M., Barnard, P., & Moomaw, W. R. (2020). World Scientists' Warning of a Climate Emergency. In *BioScience* (Vol. 70, Issue 1, pp. 8–12). Oxford University Press. <https://doi.org/10.1093/biosci/biz088>
- Sawka, M. (2017). A Roadmap for Green Infrastructure in Ontario. Clean Air Partnership, Green Infrastructure Ontario Coalition. <https://www.cleanairpartnership.org/wp-content/uploads/2019/12/DRAFTRoadmap-for-Green-Infrastructure-in-Ontario-2017-rv51.pdf>
- Sea Grant Michigan. (n.d.). Increased Resilience at Marinas and Harbors Reinforcing our Waterfronts. Retrieved November 6, 2020, from www.glcleanmarina.org
- Stantec Consulting Ltd. (2018). Windsor/Essex Region Stormwater Management Standards Manual. <https://essexregionconservation.ca/wp-content/uploads/2018/12/WE-Region-SWM-Standards-Manual.pdf>
- USEPA. (n.d.). Low Impact Development (LID) | Polluted Runoff (Nonpoint Source Pollution) | US EPA. Retrieved October 6, 2020, from <https://www.epa.gov/nps/urban-runoff-low-impact-development>
- Wellesley Institution. (n.d.). Green Space in the City: How Toronto's Green Spaces Promote Mental Health | Wellesley Institute. Retrieved October 6, 2020, from <https://www.wellesleyinstitute.com/healthycommunities/green-space-in-the-city-how-torontos-green-spaces-promote-mental-health/>

APPENDICES

Appendix A - Glossary

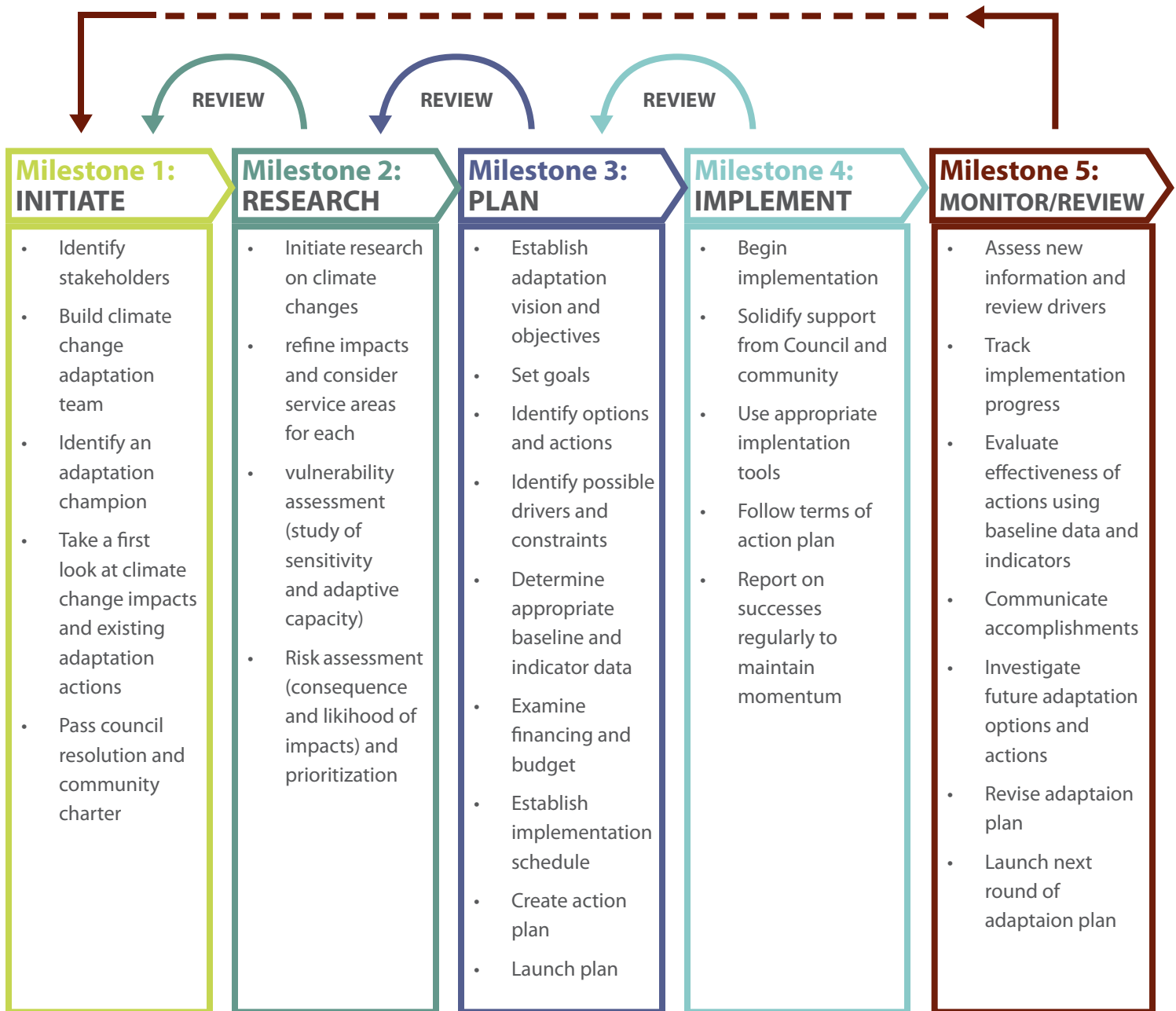
The following glossary lists terminology emphasized in bold within the document, in alphabetical order.

Adaptation	Includes any initiatives or actions in response to actual or projected climate change impacts and which reduce the effects of climate change on built, natural and social systems.
Annual Average Precipitation	The mean total precipitation (rain and snow) in a given year. Precipitation patterns are critical for many important issues, including water availability, crop production, electricity generation, wildfire suppression, snow accumulation, seasonal and flash-flooding, and short- and long-term drought risk.
Annual Spring Precipitation	This is the mean total amount of rain or drizzle expected during the months of March, April, and May in a given year.important issues, including water availability, crop production, electricity generation, wildfire suppression, snow accumulation, seasonal and flash-flooding, and short- and long-term drought risk.
Annual Summer Precipitation	This is the mean total amount of rain or drizzle expected June through August in a given year
Annual Winter Precipitation	This is the mean total amount of rain, drizzle, snow, sleet, etc expected in the months of December through February in a given year. Shifts in precipitation from snow to rain & warming winter temperatures to increase ice events.
Buffer Strip Policy	A policy directed towards the management and requirements for the creation and maintenance of buffer strips - which are small areas or strips of land in permanent vegetation, designed to intercept pollutants and manage other environmental concerns.
Climate	Patterns of variability in atmospheric conditions in each region over an extended period, often decades or longer. This contrasts with weather which describes current atmospheric conditions (i.e. it is currently raining or windy).
Climate Change	Climate change refers to a statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer). Climate change may be due to natural internal processes or external forces, or to persistent anthropogenic changes in the composition of the atmosphere or in land use.
Climate Lens Assessment	A guide designed to help decision-makers understand the climate change risks and impacts associated with the design, construction and operation of infrastructure and capital projects and to ensure that the project does not negatively impact the Town's ongoing climate adaptation efforts.
Complete Streets	Streets that are designed to be safe for everyone: people of all ages and abilities who walk, bicycle, take transit or drive.

Days below -15° C	The number of days with minimum temperatures less than -15°C in any given year; gives an indication of how cold winters are.
Development Standards Manual	A technical design and business process manual intended to provide clarity for internal staff, contractors, developers, consulting engineers/designers and others to use when submitting development applications/ plans to the Municipality.
Days over 30° C	The number of days when the daily maximum temperature is greater than 30°C and gives an indication of the number of very hot days.
ERHNSS	The Essex Region Natural Heritage System Strategy (ERHNSS); a system developed by the County of Essex and ERCA to accurately map existing natural heritage features as well as to prioritize habitat restoration opportunities within the Windsor-Essex region.
Freeze-Thaw cycles	The process of water freezing and thawing multiple times during a winter season. This is a problem when water slips into a material, such as a pipe or a road, and then freezes and expands, causing cracking. Each instance of water freezing and then thawing is one freeze thaw cycle.
Frost-free season	The approximate length of the growing season during which there are no freezing temperatures to kill or damage plants.
Heatwave	Environment Canada issues heatwave warnings for central and southern Ontario when two consecutive days of daytime maximum temperatures are expected to reach 31°C or when two consecutive days of humidex values reach 40°C or more.
Impact	The effects of existing or forecasted changes in climate on built, natural, and human systems. One can distinguish between potential impacts (impacts that may occur given a projected change in climate, without considering adaptation) and residual impacts (impacts of climate change that would occur after adaptation).
Likelihood	The state of a phenomenon being likely, namely its probability to occur.
Low Impact Development	Low-impact development (LID) is a type of Green Infrastructure practice directed towards land planning and engineering design to manage stormwater runoff. LID emphasizes on water and environmental conservation and use of on-site natural features to protect water quality.
Mean Annual Temperature	The average temperature over the course of one year.
Mitigation	The promotion of policy, regulatory and project-based measures that contribute to the stabilization or reduction of greenhouse gas concentrations in the atmosphere. Renewable energy programs, energy efficiency frameworks and substitution of fossil fuels are examples of climate change mitigation measures.
Official Plan	A comprehensive municipal wide policy document intended to ensure that the Town evolves, improves and realizes its full potential in areas such as transit, land use development and the environment.

Rain Barrel Subsidy	A subsidy or rebate program directed towards encouraging residents to purchase and install rain barrels on their property
Regional Stormwater Guidelines	A comprehensive set of guideline standards specifically related to storm water management. It is county-wide in its application so as to address regional development and related storm water flows affecting trans-boundary watershed regions.
Resilience	The capacity of a system, community or society exposed to hazards to adapt, by resisting or changing in order to reach and maintain an acceptable level of functioning and structure.
Risk	Risk can be considered as the combination of an event, its likelihood and its consequences – risk equals the probability of climate hazard multiplied by the consequence of that event.
Storm Events	A precipitation event created by a violent disturbance in the atmosphere usually resulting in strong winds, rain, thunder, lightning or snow.
Storm Sewer Surcharge	A fair and equitable fee based on runoff contribution to storm drains (assessed to all private properties in the same manner) as a mechanism to ensure that privately owned storm-water facilities are maintained.
Strategic Plan	A guideline and policy document that sets out long term goals and objectives for the long term economic, cultural, social and environment benefit of the community. It goes beyond the objectives of the Official Plan in that it also deals with more expansive matters beyond land use planning.
Tendering	A tender is a submission made by a prospective contractor or supplier in response to an invitation to tender. It makes an offer for the supply of goods or services.
Tree Cutting Bylaw	A policy geared towards the protection of trees from cutting on private property
Urban Heat Island Effect	Urban areas, where buildings, roads, and other hard, non-reflective surfaces are highly concentrated and greenery is limited, become “islands” of higher temperatures relative to outlying areas, and result in higher energy costs, higher pollution levels, lower air quality, and higher health hazards.
Vulnerability	The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of both the sensitivity and the adaptive capacity of a given sector.
Vulnerability & Risk Assessment	Vulnerability Assessments (VAs) and Climate Risk Assessments (CRAs) help to identify the nature and extent to which climate change and its impacts may harm a country, region, sector or community. The assessments of vulnerability and/or climate risks is therefore a central component of adaptation action.
Zoning	A zoning by-law controls the use of land in the community. It states how land may be used, where buildings and other structures can be located, their permitted heights and minimum setbacks from lot boundaries, the lot sizes and dimensions, associated parking requirements. It is a tool whose purpose is to implement the guidelines and mandates of the Official Plan.

Appendix B - ICLEI - BARC Milestone Framework



Appendix C - Continuing and Completed Action Items

Maintenance of drainage and road infrastructure, and conductions of regular inspections
Creation of a Sustainability Action Plan
Creation and periodic updates to the Energy Conservation and Demand Management Plan
Insurance of functionality of Town Hall and associated operations during inclement weather events (e.g. generator backups, internet service)
Insurance of communication plans between divisions (e.g. Environmental Services, Roads, Parks, and Facilities) to provide efficient clean-up after an extreme weather event
Continuous development of by-laws, options and policies to encourage more on-site/site-level residential storm water retention and reduction (e.g. cisterns)
Continuing efforts to increase online presence for local businesses in the Town of Essex
Continuing collaboration with community partners on providing essential goods and supplies (e.g. Harrow Community Pantry)
Continuing collaborations with WECHU, EMS, County, OPP, adjacent municipalities, and the provincial government to improve access to drinking water, cooling/warming stations, and temporary shelters for assistance during extreme weather events
Continuing to work with the County to ensure that Town of Essex's needs are being met during the development of plans for transit infrastructure, social services, affordable housing, and health care
Continue to review staff and/or resource needs (i.e. budget practices)
Reinforcing and reiterating severe weather protocol and safety training for staff on a regular basis via Safety Talks. Add additional climate impact related training where necessary
Continuing to review policies and procedures for outdoor worker shifts (i.e. make working hours more flexible)
Promoting tree planting opportunities within the community: <ul style="list-style-type: none"> Continuing to collaborate with ERCA and community partners on tree planting events Continuing to secure tree donations and implementing tree memorial programs
Continuing to advocate for better internet connectivity and broadband infrastructure investments throughout the municipality
Continuing shoreline assistance to vulnerable properties when required (e.g. sandbagging, Shoreline Assistance Program)
Continuing to implement winter control measures (snow removal and de-icing) on waterfront park and community park pathways and parking lots
Continuing collaboration with the Essex Region Conservation Authority and the Windsor-Essex County Health Unit on their climate change mitigation and adaptation planning
Update the inflow and infiltration reduction program as required
Created the energy management for future asset management plan
Continuing to strengthen building bylaws and zoning regulations
Continuing to explore options for pre-treatment of roads to reduce the amount of salt used during freezing rain/snow events

Appendix D - Indicators

Indicators have been developed for each action, wherever feasible. These indicators will be used to track the progress of each action item. Effort was taken to identify indicators that already exist. For some action items, indicators will be identified as the implementation of *Climate Ready* progresses.

Community Engagement and Participation Objectives

Objective 1

- 1.1 Number of posts on social media on climate related information
 - Community uptake/download analytics from website and social media statistics
 - News media coverage
 - New information shared on Essex.ca/Climate Ready
- 1.2 Number of vendor requests for climate adaptive options at events
- 1.3 Number of existing and new shade structures in parks and other community spaces
 - Number of existing and new water filling stations in community spaces
- 1.4 Frequency of geese management program implementation

Objective 2

- 2.1 Track changes on a yearly spreadsheet – donated trees, planted trees, allotted budget
 - Completed projects based on increasing green cover/acreage of new green cover
 - Number of heritage trees identified and labelled

- 2.2 Number of events attended pertaining to the above-mentioned issues (conferences, symposiums, council meetings, stakeholder meetings etc.)
 - Number of person hours spent at aforementioned events
 - Summary reports of aforementioned events
 - Any progress reports published by lead agencies

Objective 3

- 3.1 Number of applications for site changes (e.g. site plan approval, building permits)
 - Number of updates to relevant OP policies and zoning by-law provisions
 - Number of Low Impact Development features introduced to private properties
 - Number of new standards pertaining to LID in Development Standards Manual
- 3.2 Number of partnership projects developed and implemented
 - Number of collaborative projects with land managers, municipalities, and County (e.g. ERCA, Nature Conservancy of Canada)
- 3.3 Number of recommendations made to and adopted by County Council regarding climate action incentive programs

Objective 4

- 4.1 Number of funding assistance (grants, loan programs etc.) applications supported
- 4.3 Number of social media posts showing awareness features related to local green businesses
 - Site analytics – social media engagement statistics
- 4.4 Number of new local green businesses

Objective 5

- 5.1 Updates to Town policies for community emergency preparedness
- 5.2 Number of assistance programs supported for extreme weather adaptation
 - Number of facilities/paths closed due to extreme weather
- 5.3 Number of projects/campaigns developed towards improving community emergency self-preparedness
 - Number of weather-related advisories posted on Essex Alerts
 - Number of new Essex Alerts sign-ups
- 5.4 Council, staff and community attendance during Senior's Day, Fire Prevention Week, and Emergency Preparedness Week events

Objective 6

- 6.1 Updates to tree log
 - Number of resident complaints on tree maintenance/removal
 - Number of resident requests for tree planting
 - Creation of tree plantation engagement campaign
 - Development of tree distribution options for residents
- 6.2 Number of converted spaces (new rain gardens, edible landscapes etc.)
- 6.3 Number of climate change awareness events
Council, staff and community attendance at climate change awareness events
- 6.4 Number of recommendations made to and adopted by County Council regarding crossjurisdictional resource sharing and partnerships

Corporate Objectives

Objective 1

- 1.1 Updates to PPE-related policy
 - Number of units of PPE provided
- 1.2 Creation of Green Tips segments on staff newsletter and intranet
 - Updates to aforementioned newsletter and intranet
- 1.3 Creation of a staff green team
 - Number of recommendations made by green team and adopted

Objective 2

- 2.1 Update to tree policy
 - Number of native tree species
 - Updates to Development Standards Manual regarding permitted tree species and inclusion of trees in development plans
 - Number of natural heritage sites (or sq. acreage) added to the OP schedules and GIS layers
- 2.2 Development of buffer strip policy
 - Number of drainage related complaints
- 2.3 Number of updates to Town policies pertaining to natural heritage restorations
- 2.4 Number of new restoration projects along shoreline
 - Number of applicants for shoreline assistance program

Objective 3

- 3.1 Updates regarding status on Storm Sewer Surcharge development
- 3.2 Number of subsidy applications made by residents/ receipts from purchase

- 3.3 Number of LID features on Town owned infrastructure and assets (e.g. roads, sewers, drains)
 - Number of updates to asset and infrastructure plans and documents pertaining to LID, green technology options etc.
 - Number of completed projects pertaining to thermal comfort (e.g. white roofs, splash pads)
- 3.4 Number of asset maintenance projects (prior to inclusion of climate considerations and after)
 - Comparison metrics of impacts of climate vulnerability and risk considerations
- 5.2 Number of projects with complete street design features
 - Expansion of the complete street network

Objective 4

- 4.1 Appointment of a Climate Change Adaptation Champion by Town Council
- 4.2 Adoption of the motion to declare a Townwide Climate Emergency by Town Council
- 4.3 Inclusion of climate change language and considerations into OP, Strategic Plan, annual budgets, zoning-by-laws etc.
 - Updates to tendering documents to include low carbon resiliency considerations
 - Number of applications of the Triple Bottom Line approach on municipal and municipally sanctioned projects
- 4.5 Completed Vulnerability and Risk Assessments of Town divisions in 2026 with updated climate projections

Objective 5

- 5.1 Number of cultural programming schedule changes
 - Number of beach closures
 - Number of new Fall events/programs
 - Number of virtual tourism events
 - Number of visitors per virtual event – site analytics