



Local Governments
for Sustainability
Les gouvernements locaux
pour le développement durable
CANADA



STRATHCONA
COUNTY

DEGREES OF RESILIENCE: OUR CLIMATE ADAPTATION COMPASS

STRATHCONA COUNTY'S CLIMATE RESILIENCE PLAN

2024

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1. Land Acknowledgement

Strathcona County is located on Treaty Six Territory and the homeland of the Métis Nation of Alberta, Region Two and Four. Strathcona County honours the First Peoples of this land. We recognize that we stand upon land that carries the footsteps of Cree, Métis, and Blackfoot amongst many other Nations, who have been here for thousands of years. Therefore, Strathcona County has an inherent responsibility to foster healthier relationships with First Peoples and further the Calls to Action.

2. Executive Summary

Changes in Alberta's climate in recent decades have been directly related to average annual temperature increases. These changes lead to a variety of hazards, such as increased severity and frequency of extreme weather events (flood, drought, wind, heavy snow, wildfire, etc.). These hazards have major implications for municipalities, impacting water resources, infrastructure, and human health.

Already, we are seeing how climate change has impacted our infrastructure, economy, and well-being locally. In response to these challenges, Strathcona County's Strategic Plan provides direction for responsible development that stewards the environment and addresses climate change. Enabled by our Environmental Framework, which sets out our priorities and guides the assessment of environmental factors in planning and decision-making, Strathcona County is taking a proactive approach to reduce the impacts of a changing climate and extreme weather on the County's built, social, natural, and economic systems through the development of a corporate Climate Resilience Plan (hereafter referred to as the Plan). The development of this Plan, along with the forthcoming implementation of its actions, will help the County respond to the impacts of climate change by addressing local risks while also seizing any local opportunities to increase corporate resilience.

The resilience planning process has been supported by ICLEI Canada and utilizes the Building Adaptive and Resilient Communities (BARC) framework. A core Project Team and a Climate Adaptation Working Group (CAWG) were formed to provide input into the development of the County's Plan from February 2023 to June 2024. This working group was comprised of staff across affected County departments.

The Plan draws upon the latest climate projections and models to inform a long list of climate change impact statements. These statements reflect the comprehensive ways climate change could affect County operations and assets. Through a rigorous Vulnerability and Risk Assessment (VRA) process, involving extensive consultation across all County departments, the plan identifies critical climate impacts and prioritizes adaptive actions to mitigate these risks.

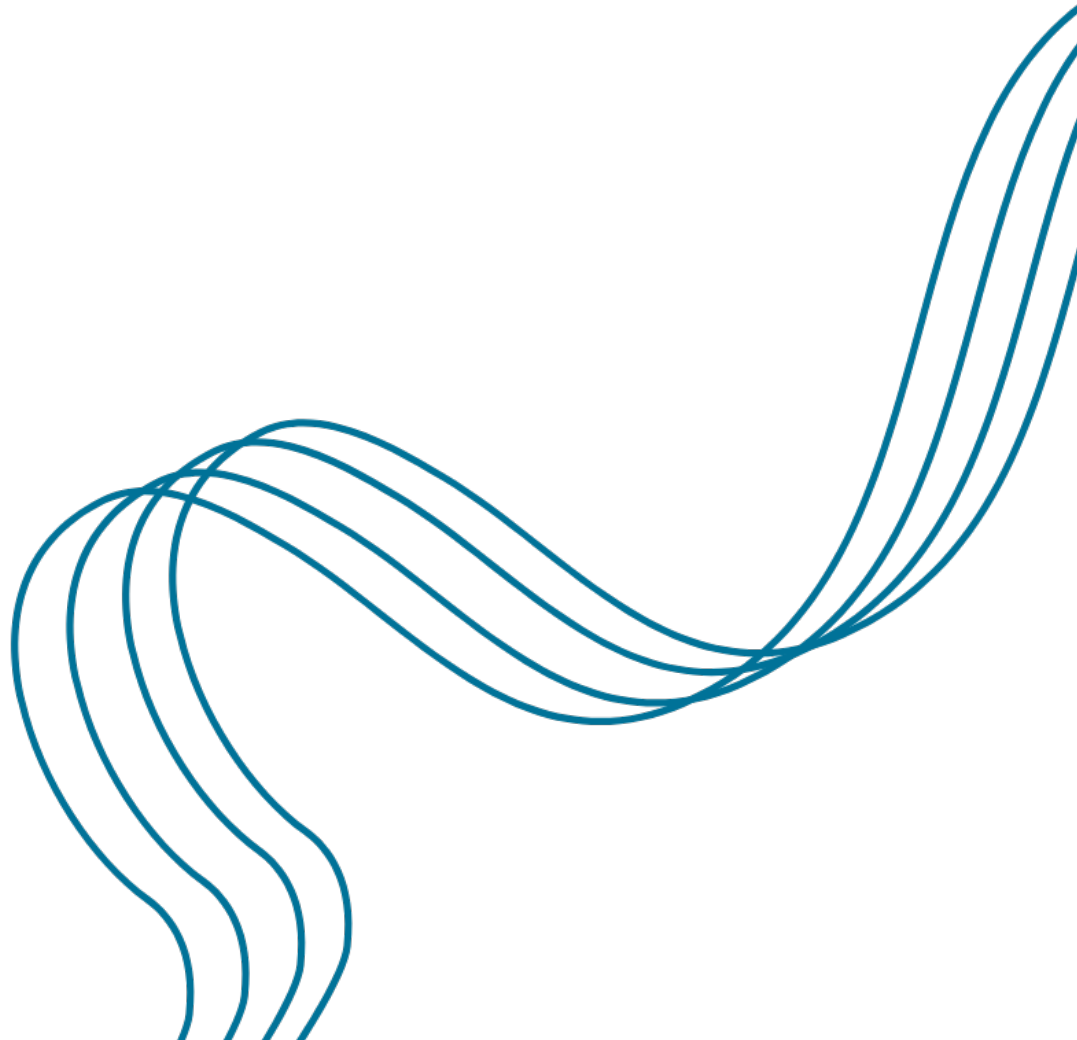
The Plan organizes these adaptive actions around four main themes:

1. Built Environment
2. People, Health, and Economy
3. Natural Environment and Agriculture
4. Resilient Governance

A strategic approach to implementation planning focuses on actionable steps, resources needed, and key metrics for monitoring progress. The Plan lays the groundwork for

ongoing development and refinement of action implementation schedules, ensuring adaptability and responsiveness to emerging challenges and opportunities.

As Strathcona County embarks on this journey, the emphasis is on building a future where the County not only responds to and withstands the impacts of climate change but also thrives as a resilient community.



3. Acknowledgements

PROJECT TEAM

Strathcona County

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CLIMATE RESILIENCE WORKING GROUP

Our sincere appreciation extends to the numerous stakeholders whose invaluable contributions of time, knowledge, and insights have played a pivotal role in the development of this Plan. Your dedicated involvement has profoundly influenced the Plan, ensuring it embodies a shared vision poised to benefit Strathcona County for many years ahead.



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4. Introduction

Strathcona County is located in the capital region of central Alberta. As a specialized municipality, the County has unique needs as a service provider to both a large urban centre (Sherwood Park) and a significant rural area and population, including eight hamlets. The total area of Strathcona County is 1,265 square kilometres; it is bounded on the north by the North Saskatchewan River and the City of Fort Saskatchewan, on the west by the City of Edmonton, on the east by Elk Island National Park and Cooking Lake-Blackfoot Provincial Recreation Area, Lamont and Beaver Counties, and the south by Leduc and Beaver Counties (Figure 1).

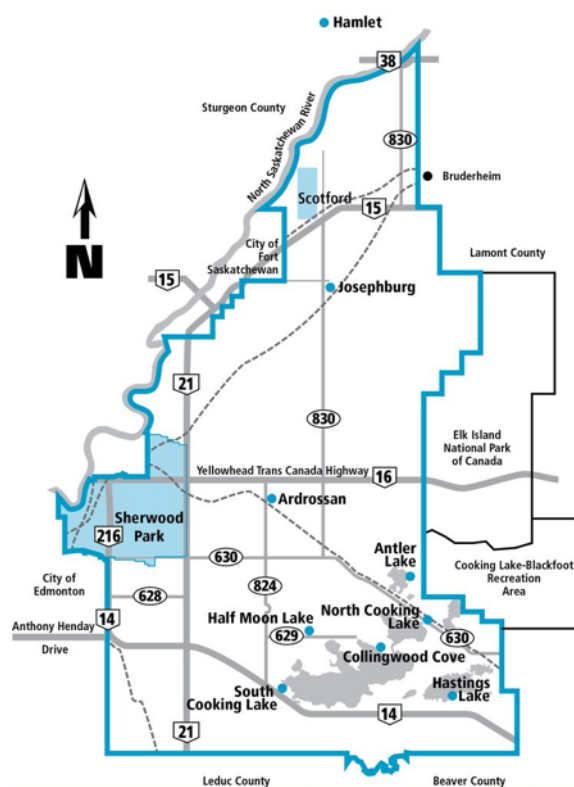


Figure 1: Strathcona County, Alberta

In 2022, the population of Strathcona County was [100,362](#), with over 70% of the population living in urban parts of the County and just under 30% living in rural areas. The predominant industries in Strathcona County include agriculture and agri-food, energy, technical services, construction, transportation, and manufacturing. Strathcona County also contains significant environmental assets, including the Beaver Hills Biosphere, fifteen named lakes, seven permanent creeks, and hundreds of wetlands, all of which support rich local biodiversity.

The climate trends in Canada depict a steady rise in both seasonal and annual temperatures, with significant increases in the number of intense precipitation events at the regional level. For Alberta, events have ranged from extreme hail and flooding to wildfires and wind storms. In Strathcona County, notable climate impacts have also been experienced locally. In April 2018, flooding occurred as a result of unseasonable temperatures, rain, and a rapidly melting snowpack. This led to localized road closures, over 500 reported culvert issues, and round-the-clock deployment of County staff to mitigate the high water levels¹.

Strathcona County has identified climate change as a priority in the County's 2021 Environmental Framework and has deemed it pertinent to all six of the Framework's topic areas (air, water, land, biodiversity, waste and energy). However, a gap currently exists in collaborative strategies and actions that limit the risk of negative climate impacts across Strathcona County as a corporate entity. Therefore, coordinating existing strategies, and

assessing and recommending new strategies and actions will result in a resilient municipality characterized by reduced exposure to severe climate events, shorter duration of impaired service levels, faster and more cost-efficient recovery, and restored service levels after an extreme climate event.

To address these impacts and adapt to changing climate conditions, Strathcona County is developing a corporate Climate Resilience Plan. The County is following ICLEI Canada's Building Adaptive and Resilient Communities (BARC) framework, which provides a structured approach to adaptation planning. The Plan was completed between February 2023 and June 2024 and includes the completion of Milestones One, Two, and Three of the BARC Program.

ADAPTATION VS. MITIGATION

Climate change refers to any change in global or regional climate patterns. Notably, this has been experienced since the mid-20th century onwards, predominantly due to increased atmospheric carbon dioxide levels from fossil fuel combustion. Historical records indicate natural climate variability over millions of years; however, recent decades have seen a significant human influence. Addressing climate change necessitates a dual approach: minimizing future changes to the climate and adapting to the changes that are already underway.

Climate change mitigation strategies aim to stabilize or decrease greenhouse gas concentrations in the atmosphere. This can be achieved through various means, including adopting low-carbon energy sources, diminishing goods consumption, implementing energy-saving building retrofits, enforcing anti-idling regulations, and promoting active transportation.

Climate change adaptation measures, conversely, focus on adjusting our social, economic, built, and natural systems to the realities of climate change. Enhancements to the resilience of our infrastructure, public education on climate preparedness, conservation of natural environments, and business continuing planning are all examples of these measures. adaptation.

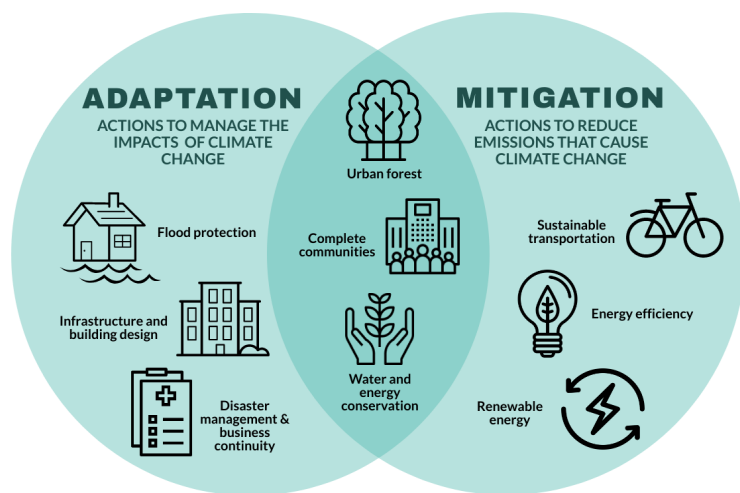


Figure 2: Overlap and Differences Between Adaptation and Mitigation (Source: ICLEI Canada, 2019)

Resilience is, in essence, 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. Given the effects of climate change can be wide-ranging, a multifaceted response is essential. Adaptation efforts are designed to work in tandem with mitigation, not as a substitute, reinforcing local government initiatives to ensure long-term resilience to climate change. Where possible and appropriate, local governments can apply a low carbon resilience (LCR) lens which integrates mitigation and adaptation through municipal planning and decision-making approaches that reduce GHG emissions and vulnerabilities to the impacts of climate change, and realize co-benefits of their activitiesⁱⁱ.

ADAPTATION = managing the unavoidable

MITIGATION = avoiding the unmanageable

POLICY DIRECTION ON ADAPTATION

Global and National Climate Change

Since the late 1800s, the Earth's temperature has risen by 1°C largely due to human activitiesⁱⁱⁱ. As fossil fuel extraction and consumption continue around the world, warming is accelerating at a faster rate. Earth's average surface temperature in 2020 tied 2016 for the hottest years since record-keeping began in the 1880s^{iv}. The ten warmest years on record have all occurred in the last decade (2014-2023)^v and July 2023 was likely the Earth's warmest month on record^{vi}.

Similar to global trends, Canada has been warming over the last six decades, with annual average surface air temperatures over land warming by 1.7°C since 1948, and even greater increases observed in the North, the Prairies, and northern British Columbia^{vii}. This rate of warming is almost double the global average reported over the same period, meaning an increase of 2°C globally could result in a 3-4°C change in Canada. The record-setting 2021 summer heatwave in British Columbia saw temperatures reach 49.6°C, resulting in over 500 heat-related deaths. In Alberta, 66 heat-related deaths were recorded during the summer 2021 heat dome, which saw temperatures spike as high as 37.0°C in Edmonton.^{viii}

Canada has also generally become wetter over the past several decades, with average annual precipitation across the country increasing by approximately 16% between 1950-2010. In Alberta specifically, seasonal average precipitation is projected to increase across all seasons and very wet days (more than 25mm in 24 hours) are expected to increase by 50%^{ix}. Extreme precipitation events are also likely to become more intense and more

frequent – recent studies show that a 1-in-20-year storm event is likely to become a 1-in-10-year storm event by the 2050s.

International

The United Nations Intergovernmental Panel on Climate Change (IPCC) is the UN institution tasked with assessing the scientific basis of climate change, its impacts and potential future risks, and potential response options. In its Sixth Assessment Report (AR6), released in 2022, the IPCC declared with certainty the widespread impact of human-caused climatic changes. The report stated:

“Human-induced climate change, including more frequent and intense extreme events, has caused widespread adverse impacts and related losses and damages to nature and people, beyond natural climate variability. The rise in weather and climate extremes has led to some irreversible impacts as natural and human systems are pushed beyond their ability to adapt”.^x

The latest and most pressing findings from the AR6 Report state that even with major reductions of GHG emissions in the short term (RCP2.5 scenario) there is greater than a 50% likelihood that global warming will reach or exceed 1.5°C in the near term. According to the report, “Global warming, reaching 1.5°C in the near-term, would cause unavoidable increases in multiple climate hazards and present multiple risks to ecosystems and humans. The level of risk will depend on concurrent near-term trends in vulnerability, exposure, level of socioeconomic development, and adaptation”.^{xi} In light of this, it is imperative now more than ever that local governments implement comprehensive, effective, and innovative responses between adaptation and mitigation efforts to advance responsible development and to leverage the mutual benefits these approaches can offer.^{xii}

Federal

In addition to signing onto the Paris Agreement, the Government of Canada has produced several policy documents that inform and guide decision-makers on climate change adaptation. Most recently, Canada’s first National Adaptation Strategy was released in June 2023 and outlines a shared path to a more climate-resilient Canada. This document sets out five common directions for action, which include:

- Disaster resilience
- Health and Well-Being
- Nature and Biodiversity
- Infrastructure
- Economy and Workers

This whole-of-society blueprint guides action in Canada to better adapt to and prepare for the impacts of climate change and addresses key climate risks in Canada. It emphasizes the crucial role of local governments in tailoring and implementing climate adaptation measures to address specific local challenges and vulnerabilities. The National Adaptation Strategy complements other national strategies that build resilience and reduce greenhouse gas emissions, including Canada's 2030 Emission Reduction Plan, National Housing Strategy, Poverty Reduction Strategy, Canadian Wildland Fire Strategy, the Emergency Management Strategy for Canada, and others. The National Adaptation Strategy was developed over several years with the involvement of provincial, territorial, and municipal governments, Indigenous Peoples, and other key partners. The new National Adaptation Strategy will coordinate efforts and investments to ensure climate adaptation actions are taken across the country.

Provincial

The Government of Alberta regulates GHG emissions through the provincial Emissions Management and Climate Resilience Act, which sets a target of “a reduction by December 31, 2020, of specified gas emissions relative to Gross Domestic Product to an amount that is equal to or less than 50% of 1990 levels.” The Act also enables the creation and funding of programs that facilitate adaptation to climate change impacts.

The Government of Alberta provides climate adaptation guidance through the [Climate Change Adaptation Framework](#) to encourage the incorporation of climate change considerations into organizational risk management planning. The Province also makes funding available for climate change adaptation programs through the Municipal Climate Change Action Centre (MCCAC), the establishment of a collaborative prairie climate data hub, ClimateWest, and for ongoing impact and adaptation research through the Prairie Adaptation Research Collaborative (PARC).

Regional/Local

In 2024, the Edmonton Metropolitan Region Board completed its first climate risk and vulnerability assessment for the Edmonton Metro region with participation and contribution from 13 regional municipalities, including Strathcona County. The assessment revealed 25 climate impact scenarios and the potential for \$4 billion in annual economic losses at the regional level by 2050 in a scenario where no adaptation actions are undertaken. The results of the study underscore the importance of acting both locally and regionally to adapt to climate change. Additional resilience-focused programs, frameworks, and tools have been developed since 2018 in Strathcona County and the broader Edmonton Metro Region such as the Climate Resilience Express Action Plan, the Edmonton Metropolitan Region Climate Resilience Collaboration Framework, and the Climate Resilience Exchange.

At the local level, Strathcona County Council has established environmental stewardship as a key priority in our 2023-2026 Strategic Plan, approved in 2022. Under the strategic goal of responsible development, Strathcona County is committed to “[address] climate change and demonstrate responsible use of land and natural resources.” The commitments to environmental stewardship and climate action are further reinforced in the environmental goals within the County’s Municipal Development Plan and expanded on within the Environmental Framework. The six topic areas of the Environmental Framework (air, water, land, biodiversity, waste, and energy) inform outcomes and objectives that prioritize healthy ecosystems to set the foundation for a healthy community. Strathcona County recognizes that addressing the impacts of climate change contributes to achieving the objectives set out in the Environmental Framework and supports our strategic goal of responsible development. Existing projects and programs that have the potential to enhance climate resilience in the County include the Astotin Creek Resiliency Study, the Wetland Replacement Project, and the naturalization of stormwater management facilities.

To complement the adaptation work taking place at the County, mitigation efforts are also underway. The Strategic Energy Management Plan is in progress to inventory and monitor corporate greenhouse gas (GHG) emissions, aiming to reduce County building emissions to a target of [15% of 2018 emissions by 2030](#). Furthermore, several projects, programs and policies have been implemented since 2021, subsequent to the approval of the Environmental Framework. For example, the Clean Energy Improvement Program (CEIP) and Hydrogen Bus pilot program (in collaboration with the City of Edmonton) were implemented in 2023 to help improve the energy efficiency of residential properties and the municipal transit system.

The Role of Local Governments in Climate Adaptation

The National Adaptation Strategy underscores the crucial role of local governments in deploying localized climate solutions across Canada. While the federal and provincial levels of government establish broad strategies, and standards, and offer potential funding avenues for adaptation efforts, the onus is on local governments to tailor these strategies to fit their unique local contexts and the distinct climate change challenges they currently face or expect to encounter.

The repercussions of climate change are deeply felt across municipal services and infrastructure, potentially impacting all departments within. Consequently, municipal governments are uniquely positioned and hold a vested interest in planning and adapting to these changes. They already have at their disposal critical tools for enhancing resilience, including emergency response teams, regulatory standards and codes, and comprehensive planning frameworks. Through the development of this Climate Resilience Plan, Strathcona County is upholding its commitment to ensuring the continuity of municipal services and minimizing service disruptions, thereby promoting the wellbeing of its community.



5. Our Approach

Municipalities of all sizes across Canada are employing planning processes to adapt to the realities of climate change. Adaptation plans must be relevant to local circumstances, resources, and capacity. Strathcona County's Climate Resilience Plan aims to enhance and extend the County's existing efforts in climate adaptation. It seeks to proactively identify and pursue opportunities that propel the County towards greater resilience across its social, economic, built, and natural environments. This Plan outlines strategies and actions designed to reduce the impacts of climatic changes on County-owned or controlled assets, operations, and services.

ICLEI Canada's Building Adaptive and Resilient Communities (BARC) Framework

The development of this plan took a broad approach and was facilitated by the County's participation in ICLEI Canada's Building Adaptive and Resilient Communities (BARC) framework and planning process. ICLEI (International Council for Local Environmental Initiatives) Canada – Local Governments for Sustainability provided expert advice and consultation throughout the entire planning process, planning resources, stakeholder engagement, and support in the drafting and review of the final plan.

The creation of the Adaptation Plan followed the guidance of ICLEI Canada's BARC framework. BARC offers a structured five-milestone approach tailored for communities to enhance their preparedness for climate change impacts. This framework provides a thorough planning process, encompassing research, identification of climate impacts, assessments of vulnerabilities and risks, plan formulation, implementation strategies, and methods for ongoing monitoring and evaluation (see Figure 3). Designed in Canada, BARC is adaptable, meeting the unique needs and contexts of different communities with the overarching aim of safeguarding community residents, assets, and economic well-being. It adopts a systemic perspective on municipal climate adaptation and has been implemented by numerous municipalities across Canada. In developing the Plan we have achieved the framework's initial three milestones.



Figure 3: ICLEI Canada's Building Adaptive and Resilient Communities (BARC) Framework

MILESTONE ONE - INITIATE

Within this milestone, communities identify stakeholders to review and understand existing knowledge on how the regional climate is changing, followed by a brainstorming exercise to identify potential climate change impacts.

MILESTONE TWO - RESEARCH

The second milestone is meant to further develop a community's understanding of climate change impacts and the major service areas which are likely to feel these impacts most acutely. Within this milestone, a municipality will scope the climate change impacts for the region and conduct both a vulnerability and risk assessment.

MILESTONE THREE - PLAN

The third milestone provides guidance on how to establish a vision, set adaptation goals and objectives, identify adaptation options, and examine possible constraints and drivers for various actions. From there, a community will draft a Local Adaptation Strategy. Baseline data is collected and recorded, financing and budget issues are addressed, an implementation schedule is drafted, implementation responsibilities are determined, and progress and effectiveness indicators are identified in the Plan.

MILESTONE FOUR - IMPLEMENT

In the fourth milestone, communities work to ensure that they have the approval and support of council, municipal staff and the community in order to move forward on implementation. Communities will also make sure they have the appropriate implementation tools to ensure the ongoing success of the Local Adaptation Strategy.

MILESTONE FIVE - MONITOR & REVIEW

The fifth and final milestone serves to assess whether the goals and objectives of the Local Adaptation Strategy have been achieved, and helps communities identify any problems that have been encountered and develop solutions. Additionally, the fifth milestone helps communities communicate their progress to council and the general public.

Climate Resilience Working Group

Fulfilling the criteria of Milestone One, Strathcona County identified a core group of municipal stakeholders to participate in the adaptation planning process as part of a climate resilience working group (CRWG).

Climate change is expected to have a wide range of impacts in Strathcona County, including impacts on agriculture, infrastructure, land use, human health and wellbeing, the natural environment, and more. As such, municipal stakeholders were identified by the County to participate in the planning process, representing a range of departments and groups that play a key role in municipal resilience and service delivery that are expected to be affected by climate change (see Table 1 below).

Table 1: Working Group Representation

- Communications
- Council
- Emergency Services
- Family and Community Services (FCS)
- Finance and Strategic Services (FSS)
- Fleet and Facility Management (FFM)
- Planning and Development Services (PDS)
- Recreation Parks and Culture (RPC)
- Transit
- Transportation, Engineering and Operations (TEO)
- Intergovernmental Affairs
- Utilities

The working group was crucial in providing topic-specific knowledge and input, ensuring that the Plan aligned with County needs. By building upon the expertise of these individuals, the Plan is reflective of a wide range of perspectives and identifies needs and priorities for the County. Invitees to the working group participated in meetings and workshops to develop the Plan and/or were kept informed of progress and were encouraged to provide feedback throughout the development of the Plan. Throughout the planning process, the working group was the central body to contribute to the Plan.

Climate Science and Projections

To kick off Milestone Two, ICLEI Canada utilized national and global climate models featured in [Climatedata.ca](#) and the [Climate Atlas of Canada](#), applying various emissions scenarios to predict Strathcona County's climate throughout the 21st century. These forecasts for the County, under a high emissions scenario, are summarized in the climate projections infographic below.

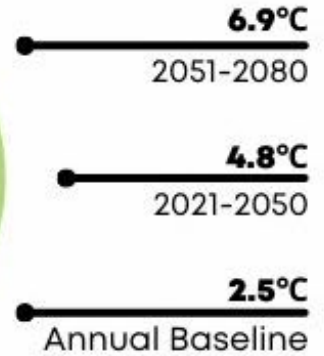
FUTURE CLIMATIC PROJECTIONS

Strathcona County

March, 2023

ANNUAL MEAN TEMPERATURES

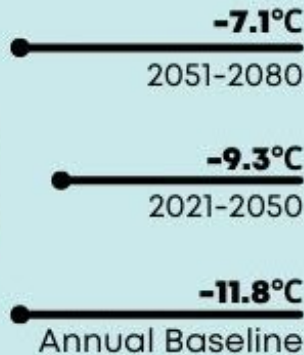
Mean temperatures are projected to increase annually and in every season.



SEASONAL MEAN TEMPERATURES



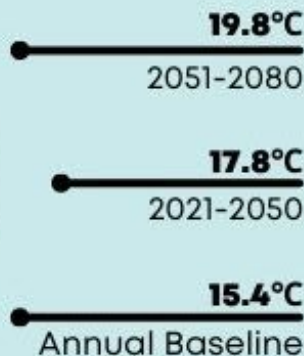
Winter
Dec - Feb



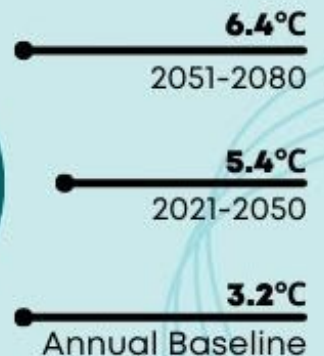
Spring
Mar - May



Summer
Jun - Aug



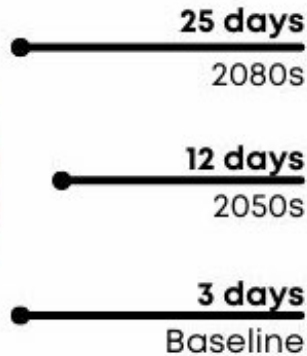
Fall
Sep - Nov



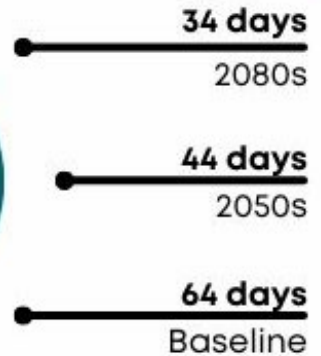
TEMPERATURE EXTREMES



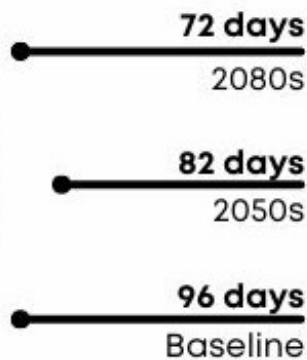
Days Above
30°C



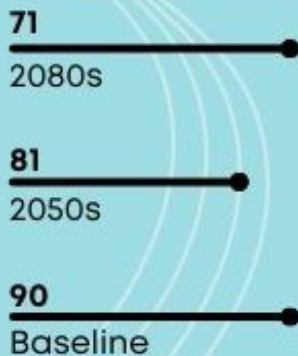
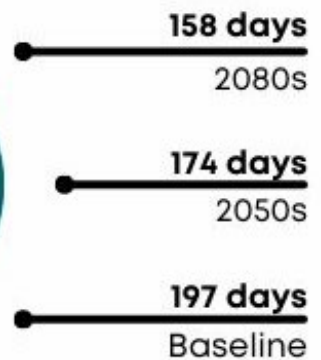
Days Below
-15°C



Icing Days



Frost Days



ANNUAL MEAN FREEZE-THAW CYCLES

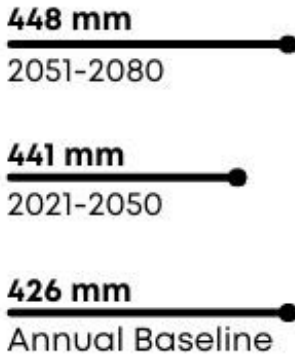
There will be a decrease in freeze-thaw cycles, where the daily maximum temperature is higher than 0°C and the daily minimum temperature is less than or equal to -1°C

Baseline period: 1971 - 2000

Sources: Canadian Climate Data and Scenarios Network, Climate Atlas of Canada Tool.

GROWING SEASONS

First frost dates will be later, and last frost days will be earlier.



ANNUAL MEAN PRECIPITATION

Annual precipitation is expected to increase. Winter and Spring are projected to get significantly wetter, with a slight decline in the Summer.

SEASONAL MEAN PRECIPITATION



Winter
Dec - Feb



Spring
Mar - May



Summer
Jun - Aug

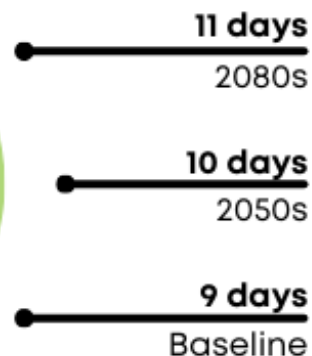


Fall
Sep - Nov



HEAVY RAINFALL DAYS

Days with precipitation over 10 mm and 20 mm are considered Heavy Rainfall days, and are projected to increase. Data indicated is for days over 10 mm.



PRECIPITATION EVENTS

Precipitation events in general are projected to become more intense and extreme.



- **Frequency**

Precipitation will fall at a faster rate (mm/h)

- **Intensity**

Shorter storms will have an increasingly high intensity

- **Duration**

Return periods of heavy storm will shorten (increased frequency)



WILDFIRES

Research shows that extreme wildfire risk in Western Canada has increased by a factor of 1.5 to 6 from climate change.

More large and high-intensity wildfires, such as that experienced in Fort McMurray, are expected under current climate change projections.

Baseline period: 1971 - 2000

THIS INFOGRAPHIC WAS CREATED BY ICLEI CANADA.

Impact Identification and Impact Statements

To commence adaptation planning, the County held two virtual kickoff workshops on April 26, 2023 and May 19, 2023. The purpose of these workshops was to introduce the project and the BARC framework, outline the findings of the Climate Science Report and together identify *impact statements*, (i.e. potential impacts to services and assets that the County would face as a result of climate change).

Climate change alters weather patterns, significantly impacting people’s health and wellbeing, their properties; the built environment, including structures and transportation systems; as well as the natural environment, ecosystem functioning, disease vectors, and more. These are the ramifications referred to as climate change impacts.

From the BARC perspective, climate change impact statements are succinct summaries that detail locally specific projected threats and their anticipated effects on the built, natural, social, and economic systems throughout Strathcona County. Drawing on Strathcona County’s Climate Science Report, these statements serve as the cornerstone for the Vulnerability and Risk Assessments, developed by addressing the following key questions:

- What are the climatic changes?
- What outcomes are these changes expected to bring?
- What are the associated consequences of these outcomes?

An example of what the impact statement development process looks like is shown below:

Climatic Threat	Outcome and Consequence
Increase in extreme weather events	Damage to tree canopy increasing the number of hazardous trees/branches

In reviewing this information, the final impact statement for this example would read as follows:

“Increase in extreme weather events (e.g. ice storms, windstorms, flooding, thunderstorms, freezing rain, hail storms, tornadoes, etc.) leading to more damage to the tree canopy, resulting in an increased number of hazardous trees/branches.”

County staff engaged in extensive consultations to gain a comprehensive understanding of how local climate impacts would affect their assets, services, and operations. A long list of these impact statements was identified, covering a range of affected areas including the natural environment and various ecosystems, agriculture, public health and safety, tourism and economy, infrastructure, and more (Appendix A). The working group identified a long list of over 300 ideas. This list was reviewed, edited, and revised to more closely and concisely reflect the changes that are expected to affect the County. Ultimately 39 impact



statements were finalized through this process. These were categorized by the following climate event categories:

- Changes in temperature,
- Changes in precipitation,
- Extreme weather events (e.g. ice storms, windstorms, flooding, thunderstorms, freezing rain, hail storms, tornadoes, etc.)
- Wildfires

Vulnerability Assessment

A vulnerability assessment was conducted for each impact statement to identify how vulnerable the community is to various impacts and to prioritize areas of focus.

Vulnerability is a function of two criteria – the **sensitivity** of the County to a given climate change impact, and its **adaptive capacity**, or ability to respond, recover and/or cope with given climate change impacts. This includes considering how the impact would affect the County’s ability to deliver and access services, continue regular functionality, etc.

The County Vulnerability Assessment was carried out using an online survey and was completed by the working group. Under the premise of the impact occurring today, both *sensitivity* and *adaptive capacity* were considered when assigning a vulnerability ranking to each of the shortlisted 39 impact statements. The following scale was used to assign the vulnerability rankings:



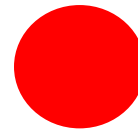
Low Vulnerability

Not very/not at all vulnerable to harm arising from the impacts



Medium Vulnerability

Somewhat vulnerable to harm arising from the impact



High Vulnerability

Very vulnerable to harm arising from the impacts

To determine sensitivity, how the functionality of the community would be affected should the impact occur today, is considered. This includes assessing how the impact would affect the County’s ability to deliver and access services, maintain regular functionality, etc. In contrast, adaptive capacity refers to the ability of systems, institutions, individuals, and other assets to adjust to potential damage, take advantage of opportunities, or respond to consequences. To determine adaptive capacity, the working group considered the time and resources required to restore the community or assets to its previous functionality should the impact occur today, as well as consider any plans, policies, and actions already in place to address this issue.

The results of the vulnerability assessment offered a first look into prioritizing impacts ahead of a detailed analysis of future risks. A 'high' vulnerability ranking signals those impacts to which Strathcona County is particularly sensitive or possesses limited adaptive capacity (the ability to cope with or recover from effects) to respond.

As an example, when evaluating the impact of increasing wildfires on public health, participants would assess the vulnerability as 'high' if they perceived Strathcona County to be particularly susceptible to wildfires and if they believed that the County had a lower capacity to adapt to the adverse health outcomes. Conversely, the vulnerability would be considered 'low' if participants determined that the County was not as sensitive to such events, and had a robust capacity to manage and mitigate the health impacts of wildfires effectively. Impacts that scored 'medium' or 'high' vulnerability proceeded to the risk assessment stage. Detailed findings from the Vulnerability Assessment are presented in Appendix A.

Risk Assessment

The risk assessment process is used to further analyze and prioritize which risks are most pertinent in a climate-adjusted future. Risk is the function of two criteria – the **likelihood** of an event occurring and its negative **consequences**. It can be expressed as a function of $risk = likelihood \times consequence$. Likelihood refers to the probability of a projected impact occurring, and Consequence refers to the known or estimated outcomes of a particular climate change impact.

When determining likelihood, both recurring (flooding, extreme weather) and slow-onset events (biodiversity loss, shifting eco regions) were considered and rated on a scale of 1 – 5, with 1 being 'very unlikely', and 5 being 'almost certain'. These ratings were informed both by the localized climate change projections, as well as local knowledge and expertise of current conditions.

Likelihood	Rating	Recurrent Impact	Slow Onset
Almost Certain	5	At least once per year (Annual chance: 100%)	Almost certain - 95% or greater chance of occurrence in the next 50 years
Likely	4	Once in 1 to 5 years (Annual chance: 20%-100%)	Likely - 65% to 90% chance of occurrence in the next 50 years
Possible	3	Once in 5 to 10 years (Annual chance: 10% to 20%)	Possible - 35%-65% chance of occurrence in the next 50 years

Unlikely	2	Once in 10 to 50 years (Annual chance: 2% to 10%)	Unlikely - 5% to 35% chance of occurrence in the next 50 years
Very Unlikely	1	Once in 50 years or more (Annual chance: <2%)	Very unlikely - less than 5% chance of occurrence in the next 50 years

Figure 4: Likelihood Matrix

Consequences refer to the known or estimated consequences of a particular impact. To determine consequences, the working group assessed the 39 shortlisted impacts across twelve different consequence criteria (see Figure 5 below).

Social Consequences	Economic Consequences	Environmental Consequences
Health & Safety	Property Damage	Air
Displacement	Local Economy & Growth	Soil and Vegetation
Loss of Livelihood	Community Livability	Water
Cultural Aspects	Public Administration	Ecosystem Function

Figure 5: Consequence Criteria

Consequence criteria were divided into three categories – economic, social, and environmental. Each of the twelve criteria receives a score from 1 (negligible) to – 5 (catastrophic). As such, each impact receives a risk score for each category, as well as one overall risk score. This approach highlights the notion that an impact might not score highly in one category but could have significant consequences in another. Therefore, to guide planning, both the individual category risks and the comprehensive overall risk scores were used to prioritize impacts effectively.

Two Risk Assessment workshops were held on July 5, 2023, and August 10, 2023, to complete this assessment. After these meetings, additional follow up was conducted where required to finalize the results. Based on the results of the Risk Assessment, the working group narrowed down 16 impacts that moved forward into planning. Impacts were prioritized if they had an overall risk score of Medium-low or higher. The Project Team also strategically selected an impact that scored Low through the assessment but was deemed imperative to plan for. This was done to ensure that impacts that posed a significant risk to a specific category, but may have presented an overall lower score were not left out of the process.






Priority Climate Change Impacts

Through the vulnerability and risk assessment process and results, a list of priority climate change impacts was identified for the County and carried forward as those impacts deemed most pertinent to address in this iteration of the Climate Resilience Plan. Based on results from the Risk Assessment, impacts that were ranked Medium-low to High were prioritized and moved forward into planning due to the greater risk they pose to the County and its community. One impact that was scored Low was also brought forward, as it was critically assessed by the Project Team and deemed necessary for the County to plan for in the near future. It is recognized, however, that other climate impacts are also important. Moving forward, we will continue to monitor these impacts for the next iteration of the plan or if circumstances change or new opportunities to address these arise. For the full list of climate impacts evaluated in the Risk Assessment, see Appendix A. However, it must be taken into consideration that certain impact statements were combined and merged in the prioritization process, thus resulting in omission of certain impact numbers (e.g. Impact 6) as seen in Appendix A.

Legend

Table 2: Impact grouping legend

Icon	Impact Group
	Natural Environment
	Socioeconomic system(s)
	Built Environment

High Ranking Impacts



Impact 3: Increase in average annual temperatures leading to a longer growing season, subsequent drought and increased weed control needs, as well as potential agricultural livestock/crop failure (i.e. disrupted growth cycles and growing regions of temperature- and moisture-sensitive plants/crops, more invasive species, etc.).



Impact 4: Increase in average annual temperatures resulting in an increased spread of invasive species (e.g. zebra & quagga mussels, Prussian carp), pests (e.g. mosquitoes, rodents, etc.), growth/spread of noxious weeds and plants (e.g. absinthe wormwood, hawkweed, giant hogweed) affecting the forestry and agriculture sectors, urban tree canopies, and natural ecosystems (terrestrial and aquatic).

Medium-High Ranking Impacts



Impact 5: Increased average annual temperatures leading to increased algal blooms and elevated lake, stormwater management facility, and wetland bacteria levels/counts, affecting water quality and potentially causing fish and invertebrate die-offs.



Impact 10: Increased average annual temperatures and increased frequency and duration of hot days (>30 C) resulting in drought events, low water levels, and low base flow, leading to stress on natural ecosystems (e.g. changing wetland boundaries, species mortality/extinction, biodiversity loss, pollinator impacts, decreased shade canopy) and reduced water quality.



Impact 25: Increase in frequency, severity, and length of wildfires leading to health and safety concerns and subsequent reduction in outdoor recreation, events, and tourism.

Medium Ranking Impacts



Impact 17: Increased frequency and intensity of precipitation events leading to more overland flooding, resulting in greater runoff and sediment loading into streams and rivers and loss of wildlife habitat and ecosystem services.



Impact 24: Increase in frequency, severity, and length of wildfires leading to health and safety concerns for outdoor workers and the public due to poor air quality and poor visibility (e.g. traffic accidents).



Impact 27: Increased frequency, severity, and length of wildfires leading to significant damage to the land, such as altered landscapes, destruction of forests and wildlife habitats. Consequently, this also affects industry and agriculture, and potentially causing ecological shifts (e.g. loss of trees) as well as subsequent mental health implications for the agricultural community.

Medium-Low Ranking Impacts



Impact 8: Increased frequency and duration of hot days (> 30 °C) resulting in heatwaves and reduced air quality leading to health and safety risks (e.g. heat stress, domestic violence/violent altercations, cardiovascular disorders, food-borne/water-borne illnesses, etc.) especially to vulnerable populations (e.g. outdoor workers, seniors, women, children, those with chronic health conditions, temporary foreign workers, those without air conditioning, etc.).



Impact 23: Increase in frequency, severity, and length of wildfires leading to damage to County-owned assets and infrastructure, increased water demand for firefighting, and increased administrative strain and demand on emergency response resources and continuity of support (e.g. increased call volumes to staff, evacuations, arranging temporary accommodation, etc.).



Impact 29: Increase in the frequency and intensity of precipitation events, extreme weather & back-to-back events resulting in higher mental and physical health implications (from hazardous travel/living conditions, power outages, unsafe food safety practices, boil advisories, etc.) for residents, especially vulnerable populations (e.g. seniors, socially-isolated, children, those with chronic health conditions, low-income households, etc.).



Impact 11: Increased frequency and duration of hot days (>30 C), resulting in increased demand and pressure on electric grid, causing more power outages (blackouts and brown outs) and service disruptions (i.e. business, flow of goods/services, etc.)



Impact 31: Increase in extreme weather events resulting in demand for emergency shelters and services (i.e. warming/cooling centres, power generation, responding to injuries, etc.) leading to an increased strain on emergency planning and resources.



Impact 1: Increase in average annual temperatures and hot days (> 30 C) leading to escalating energy consumption and utility costs, GHG output, potential failures of critical systems (e.g. HVAC) and increased demand on County operations (e.g. increased call volumes to facility managers).



Impact 36: Increase in high wind events/windstorms and heavy precipitation leading to crop loss/damage, damage to tree canopies and natural areas.

Low Ranking Impacts



Impact 20: Increased frequency and intensity of precipitation events (especially in, winter and spring), freezing rain events, and ice loading resulting in flooding, leading to damage to County assets and infrastructure (i.e. stormwater management infrastructure and water treatment plants, sports fields, buildings, roads, pavements, bridges, culverts, trees, streetlights, signs, etc.) and associated maintenance requirements.





Action Identification and Action Prioritization

A range of adaptation strategies can be used to address climate change impacts. These include proactive or anticipatory measures (i.e. before an impact is observed) and reactive measures (i.e. after an impact has occurred). A Visioning, Objectives and Action Identification workshop was held with the working group on September 12, 2023. During this workshop, participants were presented with the list of prioritized climate impacts and were invited to brainstorm potential actions to increase resilience. The workshop underscored the diversity of adaptation actions and participants were encouraged to consider all the different types of measures, such as:

- Research and monitoring
- Early warning systems
- Hazard information provision
- Awareness raising and education
- Alterations to operations and practices
- Supporting existing plans
- Bylaws, policies or plans
- Technologies
- Infrastructure
- Economic instruments
- Forming partnerships

Through this workshop, hundreds of action ideas were identified. All actions were thoroughly investigated by the Project Team to address gaps, compare to best practices across Canada, as well as coalesce, edit, and streamline as necessary. A total of 23 actions and 66 associated supporting actions were shortlisted.

Once actions were shortlisted, they were further evaluated using action prioritization criteria adapted from the Canadian Communities Guidebook for Adaptation to Climate Change. These criteria are shown in Figure 6 below. The goal of this activity was to identify whether the shortlisted actions were effective/urgent, affordable, feasible, acceptable, equitable, and flexible. The Project Team ranked the adaptation actions across these six criteria, consulting the working group where required. In turn, through ranking these actions across these five criteria, the Project Team was able to classify actions into three levels of priority:

- Urgent (i.e. it is in the County's best interest to complete this over the short-term,)
- High (i.e. it is in the County's best interest to complete this over the medium-term,)
- Medium (i.e. it is in the County's best interest to complete this over the long-term,).

The prioritization process identified 14 'Urgent' priority actions, 8 'High' priority actions, and 2 'Medium' priority actions. By applying this prioritization matrix, this activity aids the County in allocating its resources towards initiatives that will most holistically bolster the County's capacity to adapt to and be resilient in the face of climate change impacts.

This action prioritization also allowed for a first look into the anticipated timing for each action. After this exercise, a strategic analysis was conducted by the Project Team to determine if anticipated timing for each action was, in fact, achievable. In doing so, some

actions were updated to more accurately reflect the timelines that might already be in place or that reflect the time needed to secure buy-in, funding, or carry out the projects/initiatives themselves.

It is important to recognize that this Plan focuses on actions for the impacts considered most significant identified through the Vulnerability and Risk Assessments. This emphasis does not diminish the importance of addressing other impacts with lower vulnerability and risk levels, nor does it suggest that additional actions beyond those listed should not be considered. Rather than serving as a definitive guide, this Plan highlights key areas for concentrated effort but acknowledges that climate change could influence all that we do and experience. As part of our ongoing commitment, we will continue to integrate climate change considerations into all areas of County operations and service delivery.

Criteria	Score			
	1	2	3	4
Effectiveness/ Urgency	Minor contribution to management of risk; Not urgent	↔		Vital to effective management of risk and achievement of objectives; High urgency
Affordability	Requires significant budget for implementation	↔		Can be completed within planned budgets
Feasibility	Lack of human, legal, knowledge, technical or administrative capacity to implement	↔		Sufficient human, legal, knowledge, technical and administrative capacity to implement
Acceptability	Significant pushback likely from specific stakeholders, elected officials	↔		Supported by the majority of stakeholders, elected officials
Equity	Minimal improvement in the livelihood of equity-deserving groups*	↔		Provides clear and distinct benefits for equity-deserving groups*
Flexibility	Difficult to reverse, inflexible	↔		Easy to scale up or down, flexible, no-regret

Figure 6: Action Prioritization Criteria



***Equity-deserving groups:** are communities that face significant collective challenges in participating in society. This marginalization could be created by attitudinal, historical, social, and environmental barriers based on age, ethnicity, disability, economic status, gender, nationality, race, sexual orientation and transgender status, etc. Equity-deserving groups are those that identify barriers to equal access, opportunities, and resources due to disadvantage and discrimination and actively seek social justice and reparation.



Vision Statement

Strathcona County's Strategic Plan (2023-2026) sets out the vision of "becoming Canada's most liveable community." Drawing on our community vision along with contributions from the working group and their priority values for the Climate Resilience Plan, we are guided by the following Vision Statement:

"Strathcona County is responding to the challenges of climate change so we can remain an inclusive, healthy, and resilient place to live for generations to come."

6. The Path to a Climate Resilient Strathcona County: Themes, Objectives, and Actions

This section outlines the four interconnected themes, as well as high-level objectives and actions identified to address the prioritized climate impacts in Strathcona County. These objectives, actions, and supporting actions are integral in advancing Strathcona County towards becoming a climate resilient community.

The four themes are as follows: Built Environment; People, Health and the Economy; Natural Environment and Agriculture; and Resilient Governance. These themes serve as a cohesive structure to articulate specific, theme-oriented outcomes that the Plan aims to realize in Strathcona County.

A total of 23 actions (with additional supporting actions) are identified below to prepare Strathcona County for current and future climate challenges. These are designed to address the 16 prioritized climate impacts that were identified in the Vulnerability and Risk Assessment. Many actions expand on existing County initiatives, extending beyond those explicitly identified as 'climate action.' The Plan emphasizes leveraging existing resources to enhance resilience, fortifying policies, introducing new programs or practices to fill existing gaps, fostering collaboration among stakeholders, and embedding climate action into the core operations of the community. Actions contributing to both adaptation and mitigation goals are marked with the following co-benefit resilience symbol:



Theme #1 – Built Environment




Focusing on the Built Environment within Strathcona County is essential for bolstering our resilience against climate change. This theme emphasizes the need for our infrastructure — from essential water systems and energy systems to roads and buildings — to be resilient to climate impacts through strategic design, construction, and maintenance. By enhancing the durability and adaptability of our built environment, the County is better prepared to face climate-related challenges, ensuring stability and safety for our residents and minimizing disruptions in critical services. This effort is a cornerstone in our journey towards a more sustainable, climate-resilient future.

Objective #1 – Design, construct, and maintain infrastructure that is resilient to climate-related risks and impacts.

Action 1.1

Conduct studies/assessments to determine climate-related risks (i.e. wildfire, extreme weather and temperatures) throughout the County and develop plans to design, construct, and maintain County infrastructure (i.e. buildings, trails, roads, water/stormwater/wastewater infrastructure, etc.) to minimize service disruptions and increase resilience

Supporting actions:

-  **1.1.1:** Identify and prioritize County buildings and assets in need of upgrades or retrofits (e.g. in older communities/neighbourhoods, rural areas).
-  **1.1.2:** Identify assets and infrastructure nearing the end of life-cycle to retrofit or replace with climate-resilient materials and building standards.
-  **1.1.3:** Continue incorporating climate change considerations into the County's approach to asset management and provide training to staff as required (e.g. lifecycle costing, asset level of service, accelerated deterioration rates).
- 1.1.4:** Work with relevant County departments to identify relevant bylaws, policies, development guidelines, and zoning regulations with climate resilience implications and determine if updates are needed.

1.1.5: Periodically review best practices and new research in climate resilient infrastructure, design, and construction and propose incorporation of relevant information into asset planning and management.




Priority Climate Change Impacts addressed through Action

Impacts #1, 11, 20, 23

Action 1.2

Continue to encourage the incorporation of climate-resilient natural asset infrastructure (grey and green) into new development, redevelopment, and retrofit projects

Supporting actions:

-  **1.2.1:** Continue to identify opportunities for and prioritize incorporation of green natural asset infrastructure (i.e. retention of natural wetlands, naturalization of stormwater management facility shorelines) as part of stormwater management planning.
-  **1.2.2:** Continue to develop and implement progressive urban streetscape policies and standards that facilitate stormwater diversion using low impact development (LID).
-  **1.2.3:** Continue incorporating green infrastructure assets into natural asset management planning with multi-year budgets AND develop a corporate-wide strategy to incorporate green infrastructure assets within our new development that is supported in the long term through additional operational and capital funding.

Priority Climate Change Impacts addressed through Action

Impacts #3, 4, 5, 8, 10, 17, 20, 27, 36

Objective #2 – Improve the resilience of energy infrastructure to weather-related disruptions.

Action 2.1

Continue with completion and implementation of the County's Energy Management Plan

Supporting Actions:



2.1.1: Support additional staff capacity to facilitate completion of the plan.



2.1.2: Update and complete a full inventory of corporate carbon emissions and plan associated emission reduction monitoring.

Priority Climate Change Impacts addressed through Action

Impacts #1, 11, 31

Action 2.2

Ensure continuity of critical services and functionality of all County-owned facilities providing critical services in the event of widespread power outages (i.e., ensuring reliable back-up power systems are in place)

Supporting actions:

2.2.1: Investigate opportunities to collaborate with utility companies to conduct localized vulnerability assessments on power infrastructure.

2.2.2: Work with Strathcona County Emergency Management Agency (SCEMA) and other affected departments on climate-related business continuity planning to understand how to maintain supply chain and/or critical services during extreme weather events.

2.2.3: Add a climate resilience lens to the ongoing identification of critical functions and infrastructure that may be vulnerable to power outages.



2.2.4: Research and consider innovative opportunities/technology for resilient, ideally low-carbon, emergency power (e.g. solar PV and battery energy storage) for County-owned facilities providing critical services.

2.2.5: Ensure contingency operating procedures are up to date/in place in the case of blackouts or power disruptions due to extreme weather events.

Priority Climate Change Impacts addressed through Action

Impacts #1, 11, 23, 31

Objective #3 – Reduce transportation disruptions due to extreme weather events and improve the safety of travel on roads, sidewalks, and trails.

Action 3.1

Promote safer travel practices, choices, and alternatives that account for weather-related climate impacts in all seasons

Supporting actions:

3.1.1: Apply climate resilience lens to salt management plan to ensure adequate monitoring, maintenance, and environmentally-friendly salt application in the face of more flooding and freezing rain (e.g. review other de-icing materials for viability and longevity).

3.1.2: Apply climate resilience lens to current practices to ascertain future needs and service levels needed to maintain safe travel conditions within Strathcona County (i.e. for winter snow/ice clearing, seasonal maintenance of transportation infrastructure, etc.).

3.2.1: Apply a climate resilience lens to the Integrated Transportation Master Plan to ensure all users of the transportation network are considered (motorists, pedestrians, cyclists).

3.2.2: Assess existing safe travel and or telecommuting/work-from-home policies for employees to enact during periods of extreme weather.

3.2.3: Assess safety of transportation options for essential workers who must be on-site during extreme weather conditions.

Priority Climate Change Impacts addressed through Action

Impacts #8, 17, 20, 24, 29



Theme #2 – People, Health, and the Economy

Addressing the theme of People, Health, and the Economy is vital in ensuring Strathcona County's resilience to climate change, focusing on protecting public health and maintaining economic stability amidst wildfires, extreme weather, and temperature shifts. This theme prioritizes emergency preparedness, safeguarding our community and vulnerable populations, and supporting the County's workforce against climate impacts.

Objective #4 – Minimize and manage risks to public health and safety associated with impacts of wildfire, extreme weather and temperatures.

Action 4.1

Evaluate current response programming/planning (e.g. Municipal Emergency Plan), shelter plans, and warming/cooling centre programming to help protect residents and vulnerable populations from climate-related risks (e.g., wildfires, extreme cold, extreme heat, etc.)

Supporting actions:

4.1.1: Support the ongoing development of emergency shelter plans, and incorporate climate lens to improve vulnerable populations' access to emergency resources (e.g. providing transit for people to access shelters)

4.1.2: Work with Strathcona County Emergency Management Agency (SCEMA) to evaluate existing extreme weather emergency shelter plans and communication tactics for climate resilience and equity considerations

4.1.3: Identify and understand any obstacles in accessing or utilizing cooling/warming centres (e.g. lack of transport, hours of operation, family-friendly, pet-friendly, etc.) and implement strategies to overcome them.

4.1.4: Continue to identify a list of existing and potential safe and accessible emergency shelter locations and work with facility owners (e.g. County facilities, churches, hotels, local community halls, etc.) to identify capacities and logistics in improving/increasing access to emergency shelters during periods of extreme weather.



Priority Climate Change Impacts addressed through Action

Impacts #1, 8, 11, 23, 24, 25, 29, 31

Action 4.2

Identify areas where residents may have diverse needs or experience increased vulnerability related to climate change impacts

Supporting actions:

4.2.1: Conduct population mapping in relation to available climate impact mapping data (e.g. urban heat island areas, flood susceptibility, etc.), building on information that may be available through existing and upcoming plans and strategies (e.g. the Social Framework, the Affordable Housing Strategy, etc.).

Priority Climate Change Impacts addressed through Action

Impacts #8, 11, 20, 23, 24, 25, 27, 29, 31

Action 4.3

Ensure a coordinated response (internally and with neighbouring municipalities) to respond and recover from wildfires and other extreme weather events

Supporting actions:

4.3.1: Assess relevant plans, policies and guiding documents and refresh as needed to ensure inclusion of recovery sections to support damage repairs, educational campaigns and programs for residents and businesses that teach wildfire risks, FireSmart, and safe behaviours to reduce human-caused wildfires.

4.3.2: Assess Emergency Operation Centre/IMT procedures to ensure procedures are up to date and relevant to current risks as well as update any/all operating

procedures for staff related to wildfire and other extreme weather events (e.g. air quality, evacuation and re-entry criteria/planning, etc.).

4.3.3: Assess training needs for staff to ensure an informed response to extreme weather events and include this in corporate and departmental program plans.

4.3.4: Continue to work with regional municipal partners/organizations to facilitate and support coordinated regional response and recovery efforts.

4.3.5: Continue to work with other orders of government (i.e. provincial and federal) to coordinate and support wildfire and extreme weather response measures.

Priority Climate Change Impacts addressed through Action

Impacts #23, 24, 25, 27, 31

Objective #5 – Improve community preparedness and resilience to respond to climate-related risks from wildfire, extreme weather, and temperatures.

Action 5.1

Continue to educate community members on the risks associated with climate change (i.e. health impacts, property damage, etc.) and what residents and businesses can do to prevent and prepare for climate impacts

Supporting actions

5.1.1: Evaluate education and communication measures already in place for the impacts of extreme weather (wind, tornadoes, flooding, etc.) as well as wildfires, poor air quality, and extreme temperatures (hot days) and the steps staff and community members can take to prevent and prepare for them with future climate change impact considerations in mind.

5.1.2: Expand emergency preparedness education programing to include messaging and planning tactics for agricultural producers.

5.1.3: Increase the uptake of emergency preparedness kits among community members and the agricultural community (e.g. update/increase communications on what emergency kits are, different types of kits, why people need them and how to access them etc.) and consider subsidized/free kits for vulnerable populations.

Priority Climate Change Impacts addressed through Action

Impacts #1, 3, 4, 8, 20, 23, 24, 25, 27, 29, 31, 36

Objective #6 - Create conditions to minimize health and safety risks to County staff working outdoors.

Action 6.1

Continue to update and expand upon federal/provincial guidelines (e.g., OHS) for safe working conditions related to extreme temperatures and air quality for County staff using best practices

Supporting actions:

6.1.1: Review existing guidelines, bylaws, policies, and plans in conjunction with climate risk and future scenarios (climate resilience lens) to identify gaps and any additional measures required.

6.1.2: Develop/update additional guidelines, bylaws, policies, and plans (e.g. climate standards bylaw, alternate working hours protocol) to protect staff working outdoors from extreme conditions and provide guidance.

Priority Climate Change Impacts addressed through Action

Impacts #8, 24, 25, 29

Objective #7 – Minimize air quality and wildfire-related disruption to outdoor recreation, events, and tourism.

Action 7.1

Explore the creation of air quality health index (AQHI) guidelines for safe operation of outdoor events during extreme heat, wildfire smoke, and other air-quality-impacting environmental conditions

Supporting actions:

7.1.1: Investigate feasibility of implementing measures such as indoor ventilated shelter areas at outdoor events.

7.1.2: Support and educate County event coordinators in utilizing existing airshed monitoring information to adjust/adapt outdoor events and recreation.

Priority Climate Change Impacts addressed through Action

Impacts #8, 24, 25



Theme #3 – Natural Environment and Agriculture

The Natural Environment and Agriculture theme is focused on conserving our natural ecosystems and supporting our agricultural community and producers in responding to climate change. This theme aims to protect water resources, enhance biodiversity, manage invasive species, and improve agricultural resilience. By prioritizing these areas, the County commits to maintaining its natural heritage and supporting agriculture to strengthen community and ecological resilience and health.


Objective #8 – Protect local water quality and quantity.


Action 8.1

Continue to reduce erosion and runoff into waterways to ensure stormwater and natural water systems are healthy and resilient to cope with increased intensity of precipitation events due to climate change

Supporting actions:

8.1.1: Explore additional regulatory tools and land use planning tools to help minimize runoff and erosion from agricultural practices. Review and update existing guidelines and requirements for erosion and run-off prevention.

 **8.1.2:** Continue to expand usage of LID interventions/techniques to collect and/or attenuate water and mitigate flooding.

 **8.1.3:** Inventory problem areas/current buffers and develop and enhance existing restoration strategies (e.g. Stormwater Management Facility (SWMF) naturalization program, expanded naturalized buffers) to manage erosion of stream banks, trails, soils, and other water-related features.

Priority Climate Change Impacts addressed through Action

Impacts #10, 17, 20, 36

Action 8.2

Continue to enhance the management, protection, and restoration of existing natural assets such as tree canopy, wetlands, rivers, open spaces, floodplains, etc., especially as part of stormwater management

Supporting actions:

8.2.1: Ensure land use plans support adequate watershed and stormwater management, including inter-municipal boundary interactions.

8.2.2: Work across departments to minimize impacts to and restore existing natural assets (e.g. wetlands, forests, and other open spaces).



8.2.3: Leverage partnerships and funding opportunities to restore or create wetlands and riparian areas to increase drought resilience and flood mitigation

8.2.4: Implement flooding, erosion and sediment control protection measures for Municipal Reserve, Environmental Reserve, parks, trails, and other County owned/operated outdoor recreational spaces.



8.2.5: Continue undertaking a natural asset inventory and integrate these into the County's asset management plans.

Priority Climate Change Impacts addressed through Action




Impacts #3, 4, 5, 10, 17, 27, 36

Objective #9 – Monitor, maintain and improve the diversity and resiliency of urban trees and forests.

Action 9.1

Work with local partners to continue tree planting, naturalization and conservation of open spaces in the County

Supporting actions:

-  **9.1.1:** Partner with local organizations to explore opportunities for tree planting, tree maintenance, and other strategies to improve tree coverage in the County.
-  **9.1.2:** Continue to promote increased planting of native species and native plants.
-  **9.1.3:** Identify, maintain and expand ecological corridors, including those that are conducive to different types of wildlife.

Priority Climate Change Impacts addressed through Action

Impacts #3, 4, 5, 10, 17, 20, 27, 36

Action 9.2

Develop a forest conservation directive

Supporting actions:

-  **9.2.1:** Seek Council support for the development of a forest conservation directive.

Priority Climate Change Impacts addressed through Action

Impacts #3, 4, 10, 27, 36

Objective #10 – Monitor, plan for, and manage the increasing threat of invasive species (i.e. plants and wildlife).

Action 10.1

Increase monitoring, surveillance, and communication of invasive species risks and threats

Supporting actions:

10.1.1: Partner with the Province, and Non-Governmental Organizations (NGOs) to continue monitoring and evaluating invasive species, especially those with regulatory requirements (e.g. Strategic Invasive Plant Management Program, Weed Control Act, etc.).

10.1.2: Increase communication to the public about invasive species.

10.1.3: Increase available resources for agricultural producers about invasive species that have the potential to threaten crops and livestock.

10.1.4: Investigate options to minimize ideal conditions for establishment and spread of invasive species in parks and natural areas (e.g. timing of trimming of grasses near hydro corridors).

Priority Climate Change Impacts addressed through Action

Impacts #3, 4, 10, 27

Objective #11 – Improve and support agricultural resilience to climate change.

Action 11.1

Increase advocacy efforts on behalf of the agricultural community to ensure agricultural-specific climate resiliency programs are available in the County and reflect agriculture-specific needs

Supporting actions:

11.1.1: Advocate to other orders of government to ensure local agricultural needs are included in climate resiliency programs (e.g. Agri-Recovery Program, Sustainable Canadian Agriculture Partnership, Resilient Agricultural Landscape Program, Results Driven Agricultural Research projects etc.).

11.1.2: Utilize the Agriculture Service Board (ASB) resolution process to ensure the amplification of advocacy efforts for emergent issues regarding climate resiliency participation.

Priority Climate Change Impacts addressed through Action

Impacts # 3, 4, 5, 10, 17, 27, 36

Action 11.2

Develop and deliver a robust agricultural extension program that highlights diversity and best management practices to encourage and support producers to adopt climate resiliency practices

Supporting actions:

11.2.1: Gather information on climate resiliency specific agricultural initiatives, grants, research, and collaboration opportunities to share with agricultural producers in the area.

11.2.2: Work with/establish partnerships to collect or integrate emerging/best information available on climate adaptation for agricultural producers.



Priority Climate Change Impacts addressed through Action

Impacts #3, 4, 5, 10, 17, 27, 36

Action 11.3

Continue to work directly with producers and organizational partners to provide agricultural producers with the information and resources needed to cope, appropriately adapt, and build resilience to climate change impacts

Supporting actions:

11.3.1: Continue to promote and enhance data collection on both livestock and crop diseases to ensure relevant and local data sets for accurate decision-making criteria.

11.3.2: Enhance agriculture producer advisory services to ensure the inclusion of climate resiliency topics.

Priority Climate Change Impacts addressed through Action

Impacts #3, 4, 5, 10, 17, 27, 36



Theme #4 – Resilient Governance

The Resilient Governance theme is focused on integrating climate change adaptation across Strathcona County's operational, capital and strategic planning. By reviewing policies for climate resilience, establishing mechanisms for plan implementation, and identifying funding for resilience projects, the County commits to a governance model that proactively enhances climate resilience. This approach ensures Strathcona County is well-prepared and financially equipped to protect its communities and resources against anticipated climate change impacts.

Objective #12 - Integrate climate change adaptation into operational, capital and strategic planning processes.

Action 12.1

Create a formal Community of Practice to audit existing plans, policies, etc. for climate resilience considerations and track progress against implementation

Supporting actions:

12.1.1: Create a formal community of practice made up of County staff from affected departments to define, coordinate and track the audit process.

Priority Climate Change Impacts addressed through Action

All Impacts

Action 12.2

Develop a coordinating structure to implement and report on the plan

Supporting actions:

12.2.1: Create a formal community of practice made up of County staff from affected departments to coordinate, track and report on the implementation process.

12.2.2: Create a schedule for meeting and reporting on plan implementation (e.g. quarterly meetings with annual reporting to Council).

Priority Climate Change Impacts addressed through Action

All Impacts

Objective #13 – Identify project and program-specific and ongoing funding for climate resilience supportive projects/programs that take into account financial planning & priorities.

Action 13.1

Identify funding/financing opportunities to support climate resilience efforts

Supporting actions:

13.1.1: Implement a process for tracking and evaluating grant funding/financing opportunities.

13.1.2: Develop a procedure/process guide for County staff to facilitate working through internal requirements when seeking to apply for funding/financing opportunities.

Priority Climate Change Impacts addressed through Action

All Impacts

Action 13.2

Ensure year-over-year budget items/flexibility in place to support strengthening climate resilience of natural and built infrastructure through protection, restoration and maintenance measures

Supporting Actions:

13.2.1: Prepare implementation action business cases for budget consideration based on prioritization considerations (i.e. urgency level, ease of implementation, cost, etc.)

13.2.2: Explore process improvements/updates for facilitating incorporation of external funding/financing opportunities into multi-year budgets.

Priority Climate Change Impacts addressed through Action

All Impacts



7. Implementation, Monitoring and Evaluation

Implementation

The Climate Resilience Plan for Strathcona County is designed to guide the corporation and its stakeholders through the process of preparing for and adapting to the impacts of climate change. As such a strong focus on implementation, governance, and monitoring is essential to the Plan's success.

It is recommended that Strathcona County continue to finalize the implementation details for all the actions. A comprehensive and detailed set of implementation schedules is being developed through extensive consultation and review with the working group. The implementation schedule for each action will, at a minimum, outline:

- Action and supporting actions
- Action scope
- Approximate timelines for implementation
- Immediate, specific next step(s) that would need to happen to begin implementation.
- Lead department(s) and supporting department(s)/organization(s)
- Relevant current practices and existing initiatives to build upon
- Action priority/urgency level
- Monitoring metrics to evaluate progress

This implementation schedule is meant to act as a living document that is subject to changes due to new information, new adaptation priorities being identified, and new funding sources becoming available.

Monitoring and Evaluation

Monitoring and evaluation form the cornerstone of the adaptation planning cycle, ensuring that Strathcona County's actions are executed as intended and lessons learned are captured for continual improvement. Though individual indicators will be identified to track and monitor progress against each action, Strathcona County is encouraged to adopt a learning-oriented approach to implementation, one that embraces the iterative nature of adaptation work.

It is expected that adjustments to the Plan will be necessary due to changes in federal and provincial legislations and regulations, continued/changing lived experience of climate change impacts, new insights, and any technological advancements. By staying committed

to this approach, Strathcona County can ensure that its Plan remains effective and relevant. Such flexibility is key, allowing the County to adapt its strategies without being limited by initial assumptions should any new opportunities arise.



8. Conclusion

This Climate Resilience Plan is a testament to Strathcona County's proactive stance on climate adaptation, integrating environmental stewardship, prosperity, health, and equity into the core of its operations and planning. The development of this plan signifies a concerted and collaborative effort to extend and enhance existing programs while innovating new strategies to safeguard the County's infrastructure, environment, and community against the foreseeable impacts of climate change. This Plan reflects our commitment to leadership and collaboration, not only within our corporate structure but also in our engagements with other jurisdictions, showcasing the importance of pioneering solutions for the challenges ahead. Our vision is clear:

“Strathcona County is responding to the challenges of climate change so we can remain an inclusive, healthy, and resilient place to live for generations to come.”

A resilient Strathcona County is one where climate-related health impacts are minimized, community prosperity is enhanced through adaptation efforts, long-term nature-based solutions are implemented, and the benefits of adaptation are equitably distributed, especially to those most in need. As we advance, every department within Strathcona County must recognize its role in this journey. The actions outlined in our Plan, along with a commitment to ongoing evaluation and adaptation, are geared toward achieving these goals.

9. Appendices

Appendix A: Vulnerability and Risk Assessment Outcomes

Impact Statement	Vulnerability Ranking	Likelihood (/5)	Social Risk Score (/100)	Economic Risk Score (/100)	Environmental Risk Score (/100)	Total Risk Score (/300)	Overall Risk Ranking
Impact 1: Increase in average annual temperatures and hot days (> 30 C) leading to escalating energy consumption and utility costs, GHG output, potential failures of critical systems (e.g. HVAC) and increased demand on County operations (e.g. increased call volumes to facility managers).	Medium	5	25	45	20	90	Medium-Low
Impact 2: Warmer winters leading to an inability to use outdoor rinks, a limited ski season and an overall reduction in winter tourism and recreational activities (ultimately also leading to a reduction in revenue as well).	Medium	4	36	36	16	88	Medium-Low
Impact 3: Increase in average annual temperatures leading to a longer growing season, subsequent drought and increased drought conditions and weed control, as well as potential agricultural livestock/crop failure (e.g. disrupted growth cycles and growing regions of temperature- and moisture-sensitive plants/crops, more invasive species, etc.).	Medium	5	50	65	80	195	High
Impact 4: Increase in average annual temperatures resulting in an increased spread of invasive species (e.g. zebra & quagga mussels, Prussian carp), pests (e.g. mosquitoes, rodents, etc.), growth/spread of noxious weeds and plants (e.g. absinthe wormwood, hawkweed, giant hogweed) affecting the forestry and agriculture sectors, urban tree canopies, and natural ecosystems (terrestrial and aquatic).	Medium	5	45	75	90	210	High

Impact Statement	Vulnerability Ranking	Likelihood (/5)	Social Risk Score (/100)	Economic Risk Score (/100)	Environmental Risk Score (/100)	Total Risk Score (/300)	Overall Risk Ranking
Impact 5: Increased average annual temperatures leading to increased algal blooms and elevated lake, stormwater management facility, and wetland bacteria levels/counts, affecting water quality and potentially causing fish and invertebrate die-offs.	High	5	40	60	80	180	Medium-High
Impact 7: Increase in average annual temperatures resulting in drought conditions, leading to reduced water availability for agriculture and increasing pest species (e.g. grasshoppers).	High	5	35	45	50	130	Medium
Impact 8: Increased frequency and duration of hot days (> 30 °C) resulting in heatwaves and reduced air quality leading to health and safety risks (e.g. heat stress, domestic violence/violent altercations, cardiovascular disorders, food-borne/water-borne illnesses, etc.) especially to vulnerable populations (e.g. outdoor workers, seniors, women, children, those with chronic health conditions, temporary foreign workers, those without air conditioning, etc.).	High	4	40	24	40	104	Medium-Low
Impact 10: Increased frequency and duration of hot days (>30 °C) resulting in drought events, low water levels, and low base flow, leading to stress on natural ecosystems (e.g. changing wetland boundaries, species mortality/extinction, biodiversity loss, pollinator impacts, decreased shade canopy) and reduced water quality.	High	4	40	52	68	160	Medium-High
Impact 11: Increased frequency and duration of hot days (>30°C), resulting in increased demand and pressure on electric grid, causing more power outages (i.e. blackouts and brown outs) and service disruptions (i.e. business, flow of goods/services, etc).	Medium	4	36	40	44	120	Medium-Low
Impact 12: Increased frequency and duration of hot days (> 30° C) resulting in potential failures of critical systems (e.g. HVAC) and reduced access to cooling resources leading to increased demand on County operations (e.g. increased call volumes to facility managers).	Medium	4	32	36	36	104	Medium-Low

Impact Statement	Vulnerability Ranking	Likelihood (/5)	Social Risk Score (/100)	Economic Risk Score (/100)	Environmental Risk Score (/100)	Total Risk Score (/300)	Overall Risk Ranking
Impact 13: Increased frequency and duration of hot days (> 30° C), resulting in deterioration of and increased maintenance requirements for roads, rural roads, culverts, sidewalks, trails and parking lots.	Medium	3	18	33	15	66	Low
Impact 14: Increased frequency and duration of hot days (> 30° C), resulting in project delays, reduced productivity (i.e. from heat stress to workers) and increased need to redesign infrastructure to adhere to higher resiliency standards (i.e. more research, staff capacity, cost, etc.).	Medium	3	18	18	12	48	Very Low
Impact 15: Increased summer temperatures, drought and changing precipitation patterns leading to reduced/altered groundwater levels, resulting in water quantity concerns for human and ecosystem use (i.e. residents, parks, natural assets, etc.) and potential damaged infrastructure if subsidence occurs.	Medium	3	12	21	36	69	Low
Impact 16: Increased frequency and intensity of precipitation events leading to higher rates of soil erosion and landslides causing increased damage of County-owned assets and infrastructure (e.g. trees, signs, streetlights, buildings, roads, stormwater facilities, etc.).	High	3	27	36	24	87	Medium-Low
Impact 17: Increased frequency and intensity of precipitation events leading to more overland flooding, resulting in greater runoff and sediment loading into streams and rivers and loss of wildlife habitat and ecosystem services.	Medium	4	36	52	64	152	Medium
Impact 18: Increased frequency and intensity of precipitation events leading to flooding, erosion and sedimentation, causing project delays (e.g. missed work days) and increased need to redesign infrastructure to adhere to higher resiliency standards (i.e. upsize drainage infrastructure like bridges, culverts etc., staff capacity, cost, etc.).	High	3	15	36	21	72	Low

Impact Statement	Vulnerability Ranking	Likelihood (/5)	Social Risk Score (/100)	Economic Risk Score (/100)	Environmental Risk Score (/100)	Total Risk Score (/300)	Overall Risk Ranking
Impact 19: Increased frequency and intensity of precipitation events (especially in winter and spring) and freezing rain events resulting in flooding and increased salt use, leading to reduced water quality.	Medium	3	36	24	18	78	Low
Impact 20: Increased frequency and intensity of precipitation events (especially in, winter and spring), freezing rain events, and ice loading resulting in flooding, leading to damage to County assets and infrastructure (i.e. stormwater management infrastructure and water treatment plants, sports fields, buildings, roads, pavements, bridges, culverts, trees, streetlights, signs, etc.) and associated maintenance requirements.	High	3	21	27	30	78	Low
Impact 21: Increased frequency and intensity of precipitation events resulting in overburdening and stress on stormwater systems and wastewater treatment facilities, including more bypass discharges to local watercourses (i.e. from snowmelt facilities), contaminating local water.	Medium	3	24	27	30	81	Low
Impact 22: Increase in the frequency and intensity of precipitation events causing increased flooding of private properties/homes, resulting in more displacement or evacuation of residents from homes, physical injuries, and mental health impacts/stress, especially to vulnerable populations (e.g. seniors, socially-isolated, children, those with chronic health conditions, low-income households, etc.).	Medium	4	40	52	40	132	Medium
Impact 23: Increase in frequency, severity, and length of wildfires leading to damage to County-owned assets and infrastructure, increased water demand for firefighting, and increased administrative strain and demand on emergency response resources and continuity of support (e.g. increased call volumes to staff, evacuations, arranging temporary accommodation, etc.).	High	3	36	36	45	117	Medium-Low

Impact Statement	Vulnerability Ranking	Likelihood (/5)	Social Risk Score (/100)	Economic Risk Score (/100)	Environmental Risk Score (/100)	Total Risk Score (/300)	Overall Risk Ranking
Impact 24: Increase in frequency, severity, and length of wildfires leading to health and safety concerns for outdoor workers and the public due to poor air quality and poor visibility (e.g. traffic accidents).	High	4	40	44	48	132	Medium
Impact 25: Increase in frequency, severity, and length of wildfires leading to health and safety concerns and subsequent reduction in outdoor recreation, events, and tourism.	High	4	60	60	68	188	Medium-High
Impact 26: Increase in frequency, severity, and length of wildfires leading to altered landscapes, destruction of forests and wildlife habitats.	High	4	36	40	64	140	Medium
Impact 27: Increased frequency, severity, and length of wildfires leading to significant damage to the land, such as altered landscapes, destruction of forests and wildlife habitats. Consequently, this also affects industry and agriculture, and potentially causing ecological shifts (e.g. loss of trees) as well as subsequent mental health implications for the agricultural community.	High	3	48	42	42	132	Medium
Impact 28: Increase in the frequency and intensity of extreme weather events, resulting in disruptions to or damage/failure of power infrastructure and telecommunication lines, causing more/prolonged power outages (brown-outs and blackouts).	Medium	3	39	39	18	96	Medium-Low
Impact 29: Increase in the frequency and intensity of precipitation events, extreme weather & back-to-back events resulting in higher mental and physical health implications (from hazardous travel/living conditions, power outages, unsafe food safety practices, boil advisories, etc.) for residents, especially vulnerable populations (e.g. seniors, socially-isolated, children, those with chronic health conditions, low-income households, etc.).	High	3	42	39	33	114	Medium-Low

Impact Statement	Vulnerability Ranking	Likelihood (/5)	Social Risk Score (/100)	Economic Risk Score (/100)	Environmental Risk Score (/100)	Total Risk Score (/300)	Overall Risk Ranking
Impact 31: Increase in extreme weather events resulting in demand for emergency shelters and services (i.e. warming/cooling centres, power generation, responding to injuries, etc.) leading to an increased strain on emergency planning and resources.	Medium	4	52	36	16	104	Medium-Low
Impact 32: Increased extreme weather events resulting in unsafe road and travel conditions, leading to disruptions to all transportation (active & vehicular), emergency services, and other essential services (i.e. food systems, medical care/hospitals, airports, etc.).	Medium	3	33	45	24	102	Medium-Low
Impact 33: Increased frequency and intensity of extreme weather events and winter/spring precipitation leading to more frequent accidents (vehicular & active)/dangerous conditions on sidewalks and walking paths resulting in more legal and financial implications for the County (i.e. higher insurance premiums, claims against County, etc.).	Medium	4	32	36	28	96	Medium-Low
Impact 34: Increase in the frequency and intensity of extreme weather events resulting in higher mental and physical health implications (from hazardous travel/living conditions, physical damage to assets, power outages, unsafe food safety practices, etc.) for residents and staff.	Medium	3	30	24	18	72	Low
Impact 35: Increase in the frequency and intensity of extreme weather and back-to-back events causing severe damage/mass system failures of life safety systems such as electricity, water, and sanitary systems.	Medium	2	24	30	22	76	Low
Impact 36: Increase in high wind events/windstorms and heavy precipitation leading to agricultural crop loss/damage, and damage to tree canopies and natural areas.	Medium	4	32	44	28	104	Medium-Low

Impact Statement	Vulnerability Ranking	Likelihood (/5)	Social Risk Score (/100)	Economic Risk Score (/100)	Environmental Risk Score (/100)	Total Risk Score (/300)	Overall Risk Ranking
Impact 37: Increase in the frequency and intensity of wind events/windstorms and other extreme weather events could lead to damage and/or toppling of/loss of County trees and subsequent reduced tree cover.	Medium	3	15	33	39	87	Medium-Low
Impact 38: Increased frequency and intensity of extreme weather events and increased intensity and frequency of precipitation events, resulting in more damage to natural systems, leading to a decreased ability for natural systems to provide ecosystem services (e.g. reduced shading from extreme heat, landscape more vulnerable to flooding, depleted recharge abilities, reduced air quality from tree decline, etc.).	Medium	3	33	36	27	96	Medium-Low
Impact 39: Changing temperature and precipitation patterns leading to shifting natural ecoregions, resulting in shifting species, loss of species, spread of invasive species, and loss of ecosystem services (e.g. can lead to further risk of destabilized landscapes).	Medium	3	27	30	39	96	Medium-Low
Increase in summer temperatures resulting in increased demand for indoor activities (e.g. recreation centres, pools, etc.) or outdoor shaded areas and cooling spaces (e.g. splash pad, trees, shading structures).	Low						
Increase in hot days over 30 °C resulting in disruptions/cancellations of outdoor events and recreation.	Low						
Impact 30: Increased frequency/intensity of extreme weather events (especially freezing rain) leading to increased damage to County-owned assets (e.g., fleet vehicles) and infrastructure (e.g. buildings, signs, streetlights, roads, etc.) resulting in increased maintenance, relocation, or redevelopment of assets and infrastructure.	Low						

Appendix B: Glossary of Terms

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.

Adaptive Capacity: The ability of built, natural and social systems to adjust to climate change (including climate variability and extremes), to moderate potential damage, to take advantage of opportunities, or to cope with the consequences.

Baseline: A climatological baseline is a reference period, typically three decades (or 30 years), that is used to compare fluctuations of climate between one period and another. Baselines can also be called references or reference periods.

Climate: The weather of a place averaged over a period of time, often 30 years. Climate information includes the statistical weather information that tells us about the normal weather, as well as the range of weather extremes for a location.

Climate Change: Climate change refers to changes in long-term weather patterns caused by natural phenomena and human activities that alter the chemical composition of the atmosphere through the build-up of greenhouse gases which trap heat and reflect it back to the earth's surface.

Climate Change Atlas of Canada: The Climate Atlas of Canada is an interactive tool that combines climate science, mapping, and storytelling to depict expected climatic changes across Canada to the end of the century. The 250-layer map is based on data from 12 global climate models. Users are shown a baseline period of warming trends by region that spans from 1950 to 2005 and can toggle between two future projection periods, 2021 to 2050 and 2051 to 2080.

Climate Data Canada: Offers local climate data and advanced customization options to allow for a better understanding of changes likely to be experienced by Canadian communities. Climate Data Canada is a collaboration between Environment and Climate Change Canada, the Computer Research Institute of Montréal, Ouranos, the Pacific Climate Impacts Consortium, the Prairie Climate Centre, and HabitatSeven.

Climate Projections: Climate projections are a projection of the response of the climate system to emissions or concentration scenarios of greenhouse gases and aerosols. These projections depend upon the climate change (or emission) scenario used, which is based on assumptions concerning future socioeconomic and technological developments that may or may not be realized and are therefore subject to uncertainty.

Climate Change Scenario: A climate change scenario is the difference between a future climate scenario and the current climate. It is a simplified representation of future climate

based on comprehensive scientific analyses of the potential consequences of anthropogenic climate change. It is meant to be a plausible representation of the future emission amounts based on a coherent and consistent set of assumptions about driving forces (such as demographic and socioeconomic development, and technological change) and their key relationships.

Ensemble Approach: An ensemble approach uses the average of all global climate models (GCMs) for temperature and precipitation. Research has shown that running many models provides the most realistic projection of annual and seasonal temperature and precipitation than using a single model.

Extreme Weather Event: A meteorological event that is rare at a place and time of year, such as an intense storm, tornado, hail storm, flood or heat wave, and is beyond the normal range of activity. An extreme weather event would normally occur very rarely or fall into the tenth percentile of probability.

Greenhouse Gas (GHG) Emissions: Greenhouse gases are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of thermal infrared radiation, emitted by the Earth's surface, the atmosphere itself, and by clouds. Water vapour (H₂O), carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), ozone (O₃), and chlorofluorocarbons (CFCs) are the six primary greenhouse gases in the Earth's atmosphere in order of abundance.

Climate Impact: The effects of existing or forecast 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).

Impact Statement: Climate-related impact statements are concise statements that outline locally relevant projected threats and how those changes are expected to affect the built, natural, social, and economic systems of the municipality.

Local Adaptation Strategy: A tailored approach developed by a specific local government or region to anticipate, plan for, and reduce/lessen the negative impacts of climate change in that community. A strategy as such focuses on the specific actions, plans, programs, or policies that address the unique environmental, social, and economic challenges the locality faces as a changing climate and extreme weather.

Low Carbon Resilience (LCR): an approach to climate action that encourages coordination and co-evaluation of mitigation and adaptation measures to reduce greenhouse gas emissions while also building resilience. Applying an LCR lens bridges the gap between mitigation and adaptation silos by finding alignment in planning, policies and programs. LCR brings with it a number of operational benefits and climate action synergies including cost savings and resource efficiencies, reduced reliance on grey infrastructure, improved

flood and heat management, improved carbon sequestration, as well as a number of co-benefits for health, air quality, infrastructure, equity, preserving ecosystem health and biodiversity.

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.

Representative Concentration Pathways: Representative Concentration Pathways (RCPs) are four greenhouse gas concentration (not emissions) trajectories adopted by the IPCC for its fifth Assessment Report (AR5) in 2014. It supersedes the Special Report on Emissions Scenarios (SRES) projections published in 2000. For information on the Shared Socio-economic Pathways (SSPs) in the 6th Assessment Report (AR6) see below.

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: The combination of the likelihood of an event occurring and its negative consequences. Risk can be expressed as a function where $Risk = likelihood \times consequence$. In this case, *likelihood* refers to the probability of a projected impact occurring, and *consequence* refers to the known or estimated outcomes of a particular climate change impact.

Shared Socio-economic Pathways (SSP): The SSPs describe five different storylines of alternate socio-economic developments, including sustainable development, regional rivalry, inequality, fossil-fueled development, and middle-of-the-road development. While the Representative Concentration Pathways (RCPs) focus on mitigation targets to address the physical climate, the SSPs focus on the storylines and associated socio-economic ramifications of different scenarios including different challenges for climate adaptation and mitigation. The SSPs are featured in the IPCC's Sixth Assessment Report (AR6) which was launched in 2021.

Sensitivity: Measures the degree to which the community will be affected when exposed to a climate-related impact. Sensitivity reflects the ability of the community to function (functionality) as normal when an impact occurs.

Vulnerability: Vulnerability refers to the susceptibility of the community to harm arising from climate change impacts. It is a function of a community's sensitivity to climate change and its capacity to adapt to climate change impacts.

Vulnerable Populations: Certain populations may be more likely to experience the impacts of climate change due to individual susceptibility, geographic location, socio-

economic factors, and a wide range of other factors that determine an individual or community's susceptibility to harm and ability to cope with an event. For example, certain individuals can be vulnerable to extreme heat events because of where they live (parts of cities that warm more than others) and characteristics of their dwelling (such as whether there is cross-ventilation)^{xiii}

Weather: The day-to-day state of the atmosphere, and its short-term variation in minutes to weeks.

Acronyms

BARC – Building Adaptive and Resilient Communities

ICLEI – International Council for Local Environmental Initiatives

IPCC – Intergovernmental Panel on Climate Change

LCR – Low Carbon Resilience

LID – Low Impact Development

RCP – Representative Concentration Pathways

SSP - Shared Socio-economic Pathways

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