Halton Hills Climate Change Adaptation Plan

Research Findings

Open House & Public Meeting 1
June 24, 2019

TOWN OF HALTON HILLS

Klimate

LGL

Rivercourt
reinventing our natural habitat

MOTT MACDONALD

CANADIAN URBAN INSTITUTE

AGENDA OVERVIEW

- Presentation
  - Background
  - Technical Studies
  - Key Findings
  - Implications
- Roundtable Discussions
- Next Steps

Part 1

BACKGROUND

PROJECT TEAM

CANADIAN URBAN INSTITUTE

Project Lead

Project Management, Research, Analysis, and Engagement

MOTT MACDONALD

Facility Vulnerability Assessment

Climate Change Modelling

Natural Capital Assessment

Rivercourt
reinventing our natural habitat

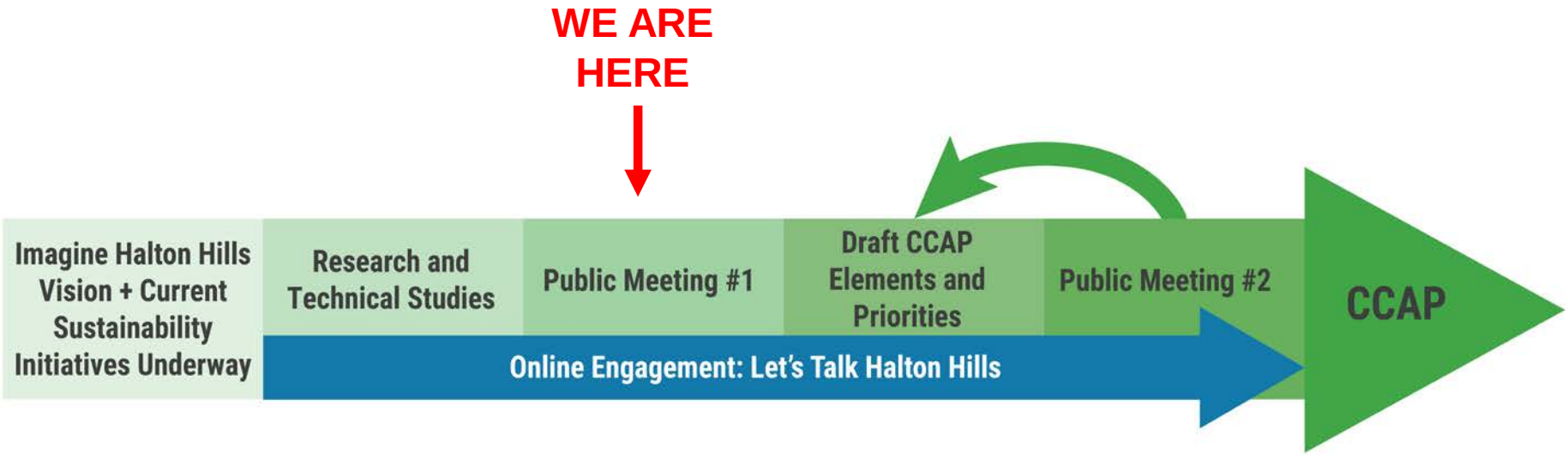
Advisory Services

BACKGROUND

The Halton Hills Climate Adaptation Plan will:

- Look at how Halton Hills' climate has changed in recent decades and how climate change is predicted to impact the Town until the year 2100;
  - Complete! Results from Climate Analysis presented today.
- Identify how the Town could be vulnerable to climate change and prioritize the potential risks;
  - Part of today's discussion.
- Identify strategies and actions to reduce or eliminate vulnerabilities.
  - To be completed later in 2019.

PROCESS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CCAP
Online Engagement: Let's Talk Halton Hills

BACKGROUND

Climate Change Mitigation vs. Adaptation

- Difference between climate change mitigation and adaptation:
  - **Mitigation** – Reducing climate change by reducing greenhouse gas emissions.
  - **Adaptation** – Adapting to life in a changing climate by preparing for actual and/or future climate conditions.
- The goal of mitigation is to directly reduce negative human impacts on the climate, while adaptation attempts to reduce our vulnerability to the harmful effects of climate change.

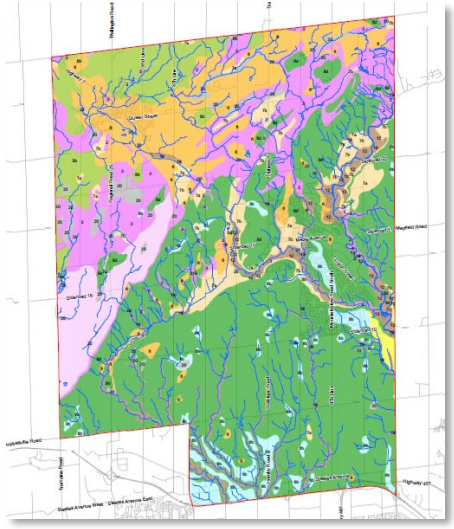
BACKGROUND

- Climate change mitigation requires a coordinated effort from all levels of government, industry, and society at large.
    - While Halton Hills can contribute to climate change mitigation, it cannot mitigate climate change alone.
    - *However*, Halton Hills can implement measures to adapt to a changing climate.
- This Climate Change Adaptation Plan will identify measures that the Town should implement over the next five (5) years to manage the risks associated with climate change.

Part 2

TECHNICAL STUDIES

NATURAL CAPITAL ASSESSMENT



Halton Hills Natural Capital Assessment
LGL Limited

Halton Hills' Climate Change Adaptation Plan includes a geospatial natural capital assessment to identify and map out significant natural assets and understand their vulnerability to climate change.

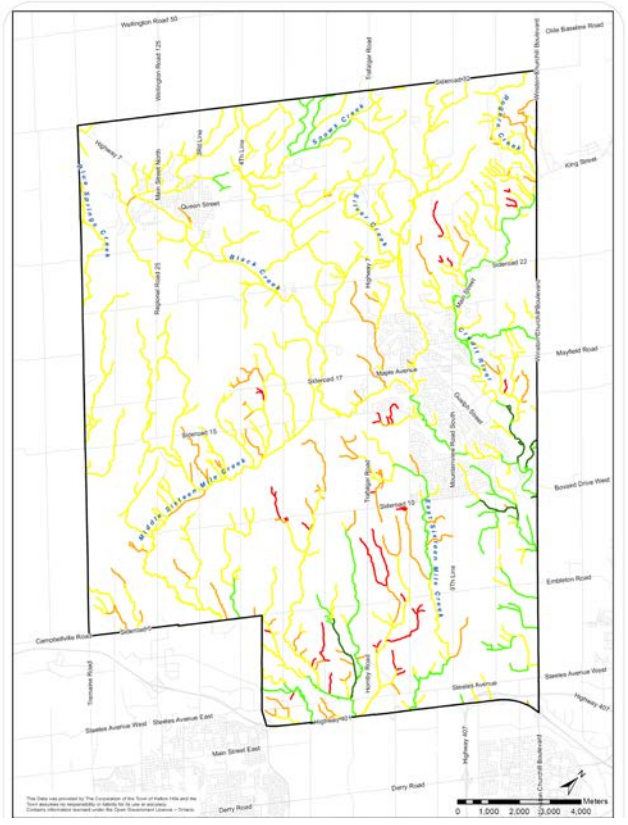
Ongoing: Natural Capital Assessment is currently being completed by LGL Limited

NATURAL CAPITAL ASSESSMENT

The Halton Hills Natural Capital Assessment will:

- Identify and map out significant natural assets that provide crucial ecosystem services (i.e. flood mitigation, carbon sequestration) and, if conserved/enhanced, will improve the Town's resilience to climate change;
- Identify and map out significant natural areas and environmental features that are particularly vulnerable to climate change; and
- Will inform the identification and prioritization of adaptation actions in Halton Hills' Climate Change Adaptation Plan.

NATURAL CAPITAL ASSESSMENT – Overall Stream Vulnerability



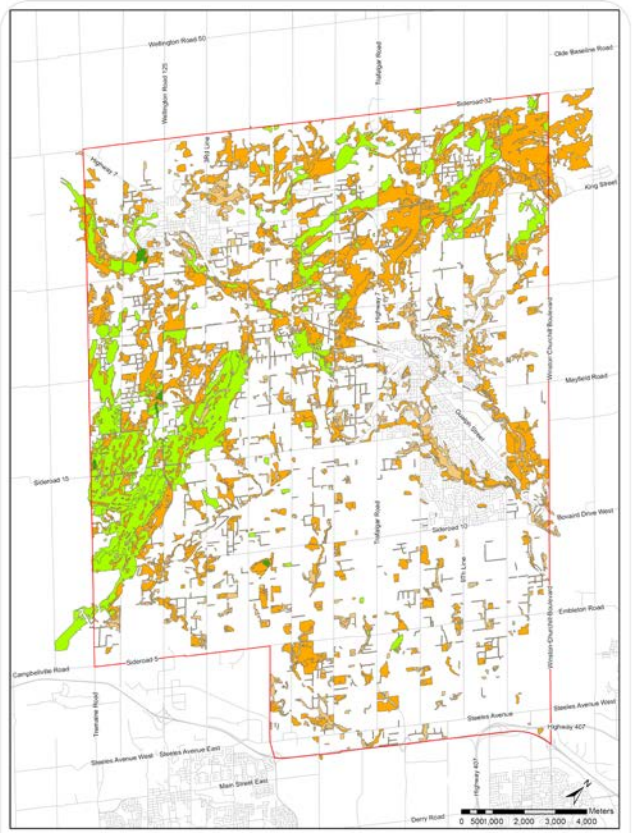
Town of Halton Hills Climate Change Adaptation Plan
Criterion 2: Overall Stream Vulnerability

- Low Vulnerability
- Low to Moderate Vulnerability
- Moderate Vulnerability
- Moderate to High Vulnerability
- High Vulnerability
- Roads
- Town of Halton Hills

LGL LIMITED

Project	TA8819	Figure	4-11
Date	June, 2019	Prepared By	JJP
Scale	1:75,000	Verified By	GNK

NATURAL CAPITAL ASSESSMENT – Overall Terrestrial Vulnerability



Town of Halton Hills Climate Change Adaptation Plan
Criterion 3 - Overall Terrestrial Ecosystem Vulnerability

- Town of Halton Hills
- Excellent (>10.5 to 12)
- Good (>9 to ≤10.5)
- Fair (>7.5 to ≤9)
- Poor (>6 to ≤7.5)
- Very Poor (4.5 to ≤6)

Note: Highest possible score is 15. Actual scores range from 4.8 to 10.7.
Data Source: Southern Ontario Land Information Resources System (SOLRIS) version 2.0.
Terrestrial natural ecosystems that intersects the Town of Halton Hills include the following: Forest, Coniferous Forest, Mixed Forest, Deciduous Forest, Plantations - Tree Cultivated, Hedge Row, Treed Swamp, Thicket Swamp, Fen and Marsh. Open Water was not included in the Terrestrial Ecosystem analysis.
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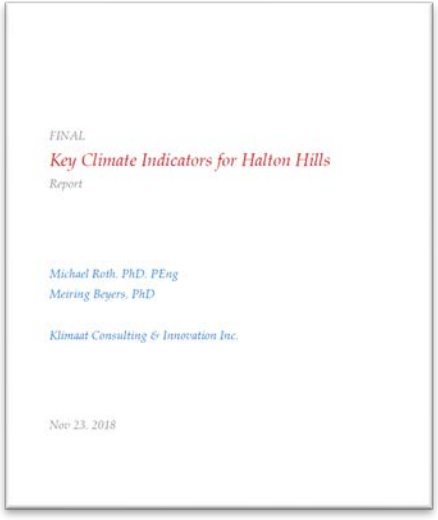
LGL LIMITED environmental research associates

Project	TA8819	Figure	4-16
Date	June 2019	Prepared By	KC
Scale	1:75,000	Verified By	GNK

HALTON HILLS CLIMATE ANALYSIS



Key Climate Indicators for Halton Hills
Klimaat Consulting & Innovation Inc.

Halton Hills' Climate Change Adaptation Plan includes a research-based analysis of historical and future climate conditions in the Town.

Complete: Detailed climate data analysis completed by Klimaat using historical meteorological data and the same climate models that are used by the United Nations.

SCOPE OF WORK

1. **Analyze historical climate data for Halton Hills.**

2. **Project local climate conditions to 2100 for three atmospheric gas scenarios (ambitious, moderate, ‘Business-as-Usual’).**

3. **Examine historical and future climate trends.**

DATA SOURCES

OBSERVATIONAL DATA

Environment Canada (EC):

Historical daily meteorological data collected at local weather monitoring stations.

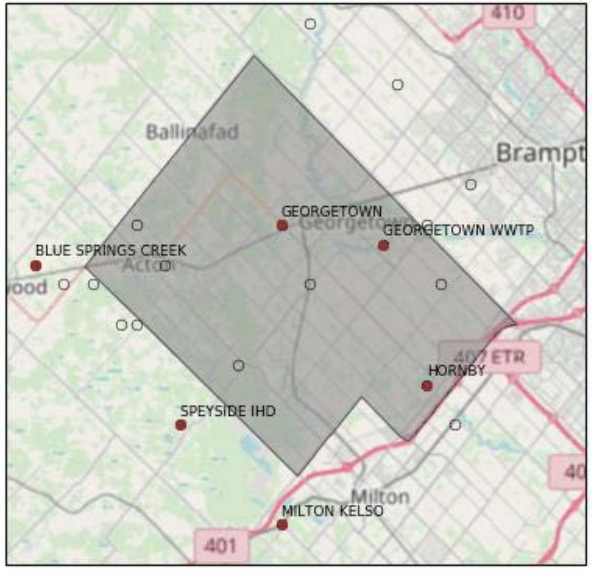


Photo: Weather monitoring stations in Halton Hills.

DATA SOURCES

MODELED DATA

Pacific Climate Impacts Consortium

Data for 3 Representative Concentration Pathway (RCPs) climate scenarios:

- RCP 2.6: Ambitious Scenario (progressive action on climate change)
- RCP 4.5: “Low-Range” Scenario (moderate action on climate change)
- RCP 8.5: Business-as-Usual (no action; current trends persist)
    - **We are currently following RCP 8.5.**

APPROACH

Climate Scenarios

Scenarios are intended to illustrate ‘best-’ and ‘worst-case’ scenarios of future climate conditions in Halton Hills.

- Approach acknowledges the uncertainty of the world’s ability to take action on climate change over the next century.
- Scenarios are *not* intended to reflect Halton Hills’ climate change mitigation efforts, but rather global efforts to reduce emissions.

APPROACH

Climate Scenarios

While the scenarios broadly reflect mitigation efforts, the results are intended to inform adaptation efforts in Halton Hills!

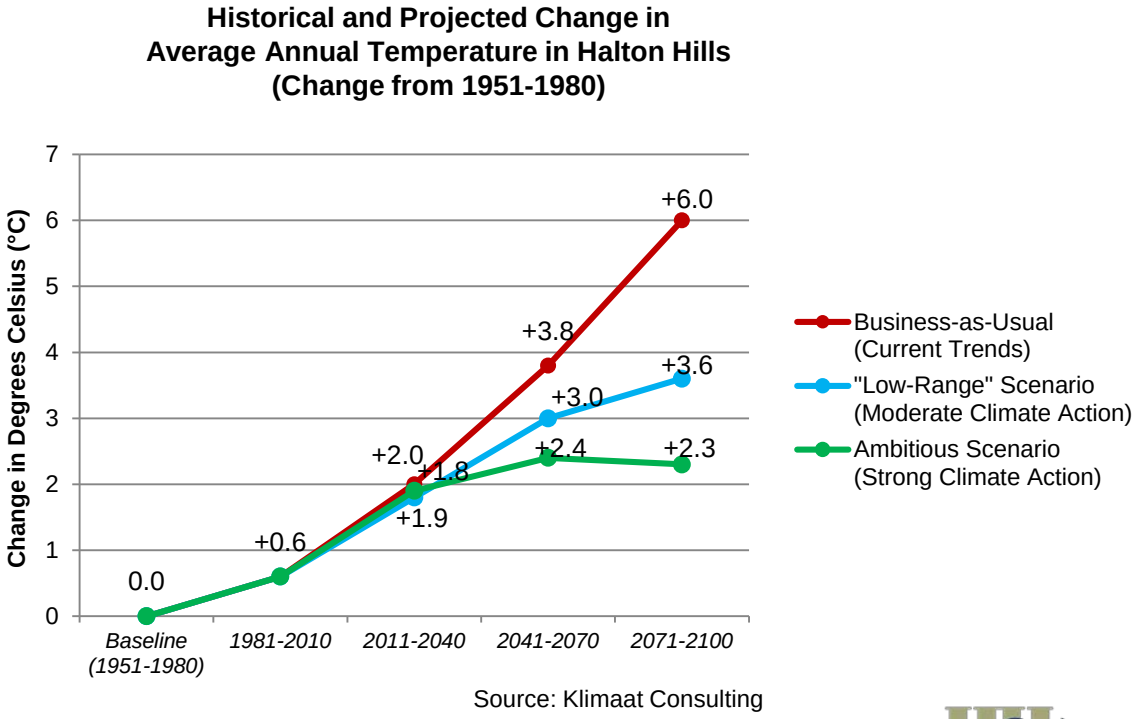
- Helps to understand how climate change is affecting and may potentially affect Halton Hills in the future.
- Results provide insights into areas of focus for adaptation efforts.

Part 3

FINDINGS

KEY FINDING: AVERAGE ANNUAL TEMPERATURE

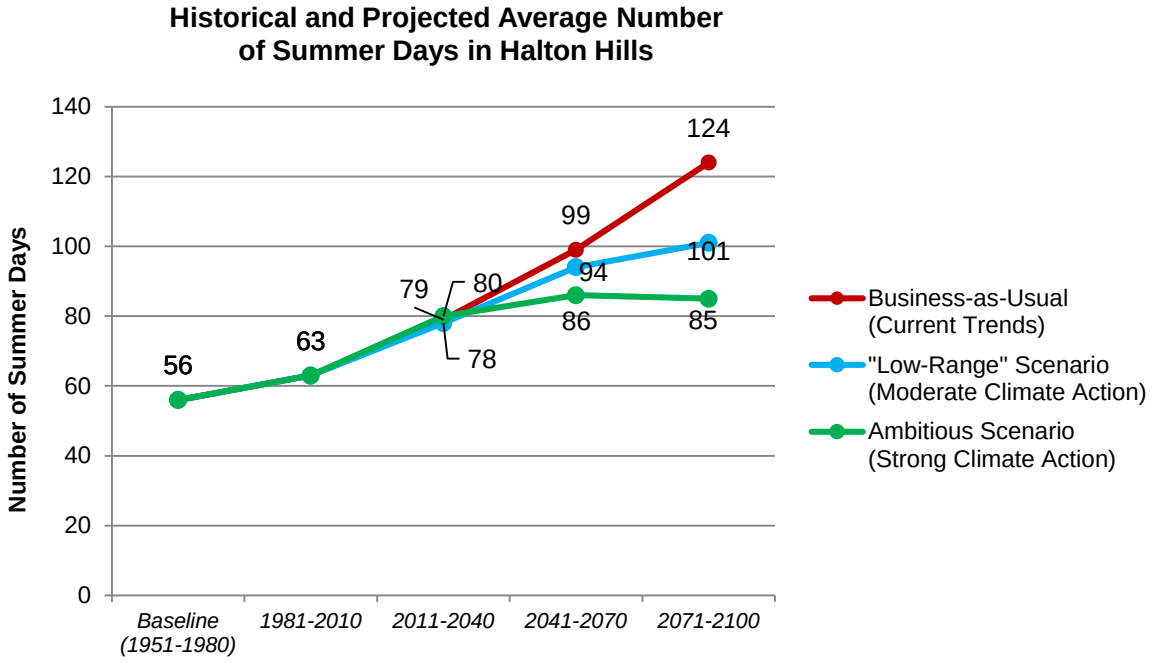
Since the 1980s, the decadal average annual temperature has risen by ~1°C. If current trends continue, temperatures are expected to rise by 2.0°C in 2011-2040, 3.8°C in 2041-2070, and 6.0°C in 2071-2100 (from the 1951-1980 baseline).



Source: Klimaat Consulting

KEY FINDING: SUMMER DAYS

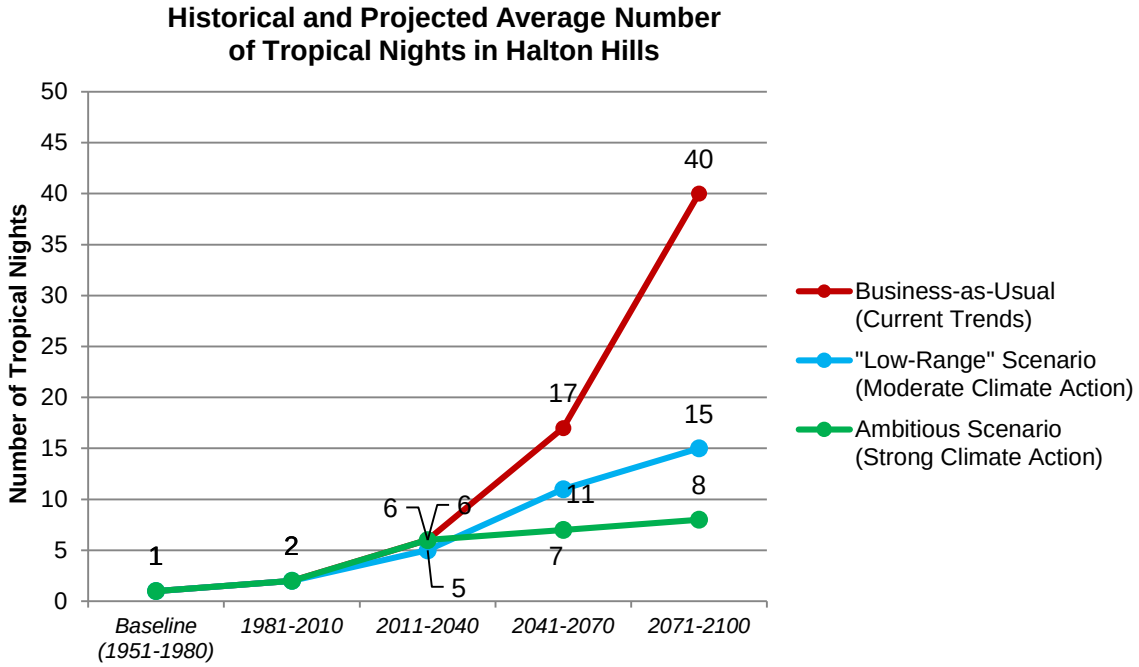
Rising temperatures are leading to more summer days and tropical nights, making it more difficult for urban centres (and individual buildings) to cool down in the evening.



*Summer days are defined as days when the daily high temperature is above 25°C. Source: Klimaat Consulting

KEY FINDING: TROPICAL NIGHTS

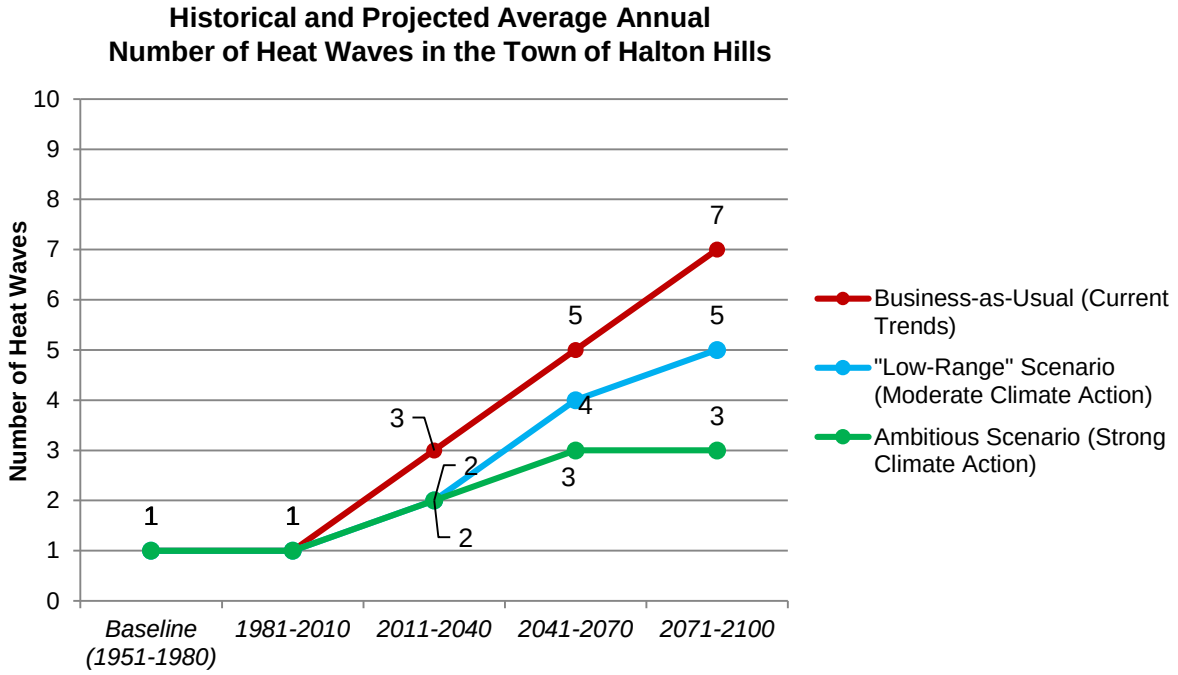
Rising temperatures are leading to more summer days and tropical nights, making it more difficult for urban centres (and individual buildings) to cool down in the evening.



*Tropical nights are defined as nights when the minimum temperature is above 20°C. Source: Klimaat Consulting

KEY FINDING: HEAT WAVES

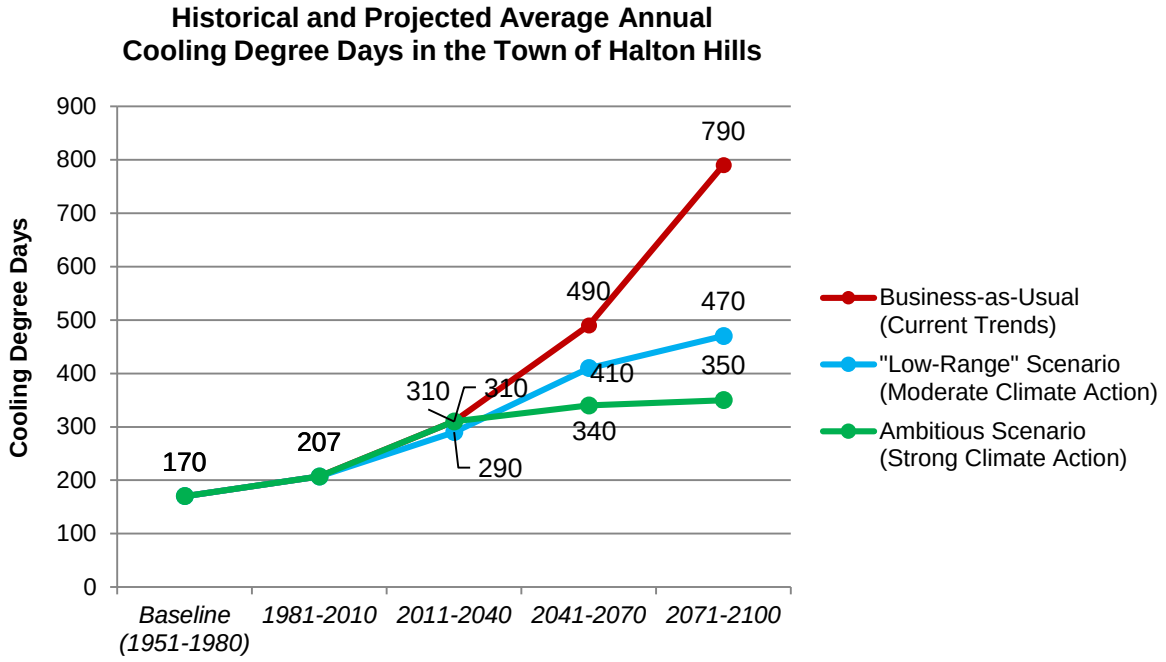
Rising temperatures are leading to more heat waves and cooling degree days, placing greater stress on human health and energy (air-conditioning) usage.



*Heat waves are defined as the number of times per year the daily high temperature remains above 30°C for at least three days in a row. Source: Klimaat Consulting

KEY FINDING: COOLING DEGREE DAYS

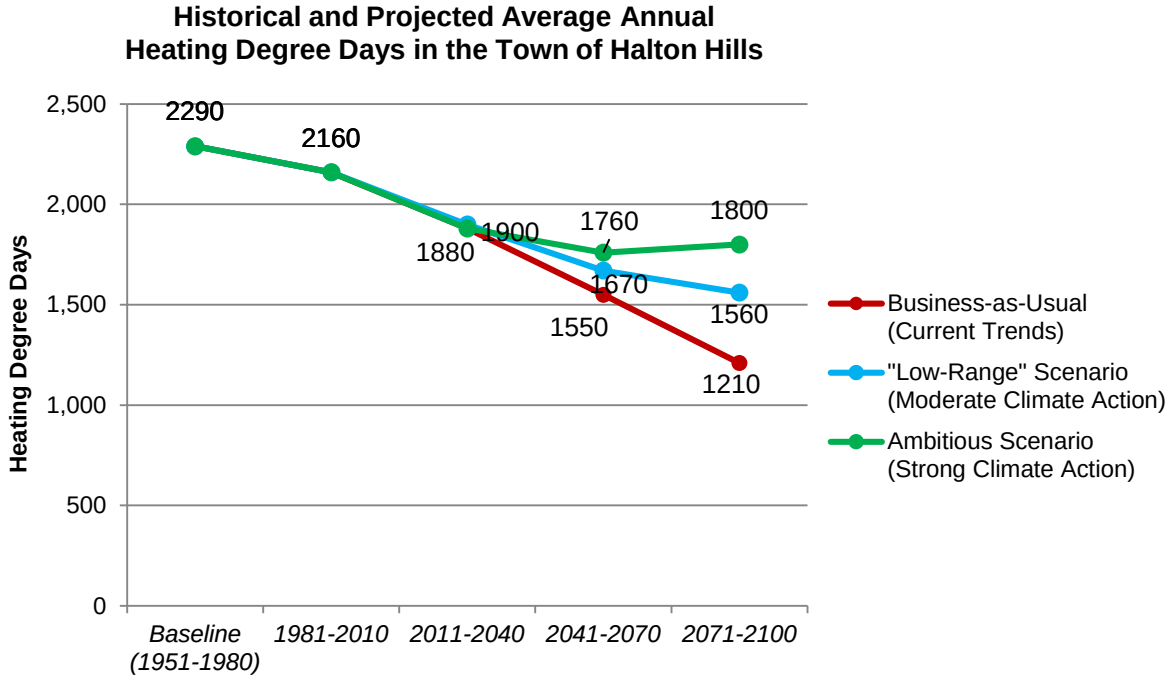
If current trends continue, cooling degree days in Halton Hills are expected to grow more than fourfold by 2100.



*A cooling degree day (CDD) is the number of degrees that a day's average temperature is above 18.3°C. For example, if the day's average temperature is 28.3°C, CCD = 10. Source: Klimaat Consulting

KEY FINDING: HEATING DEGREE DAYS

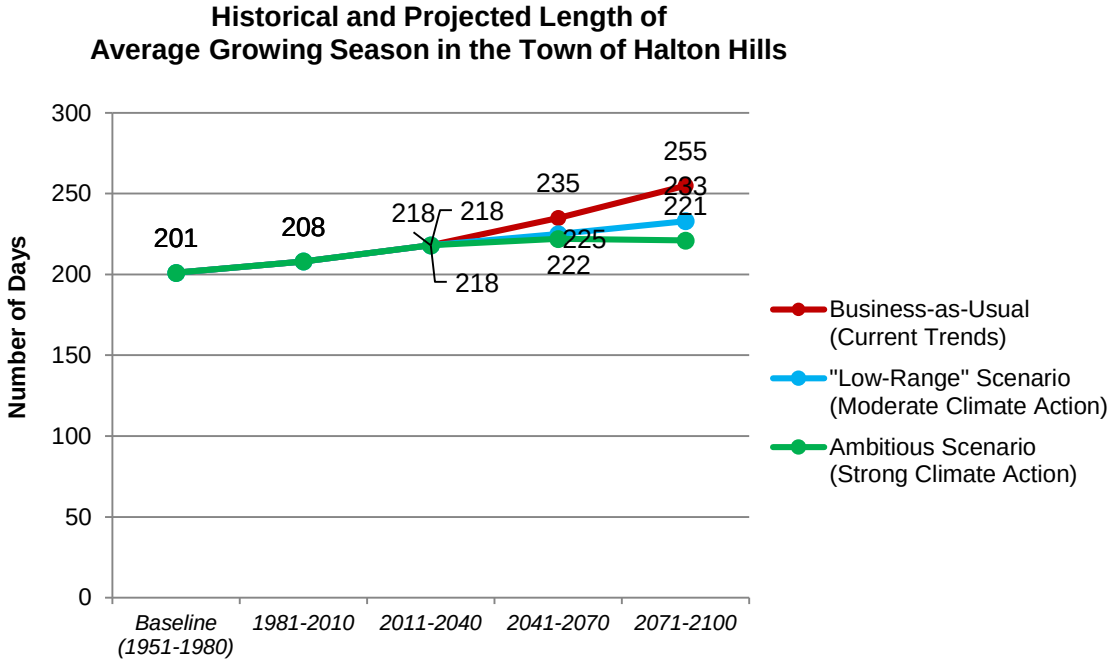
If current trends continue, heating degree days in Halton Hills are expected to decline by almost half (47%) by 2100.



*A heating degree day (HDD) is the number of degrees that a day's average temperature is below 10.0°C. For example, if the day's average temperature is 3.0°C, HDD = 7. Source: Klimaat Consulting

KEY FINDING: LENGTH OF GROWING SEASON

Warmer temperatures and fewer frost days are lengthening the average growing season, creating opportunities and potential challenges for agriculture in Halton Hills. However, wet spring and fall conditions also impact planting and harvesting schedules.

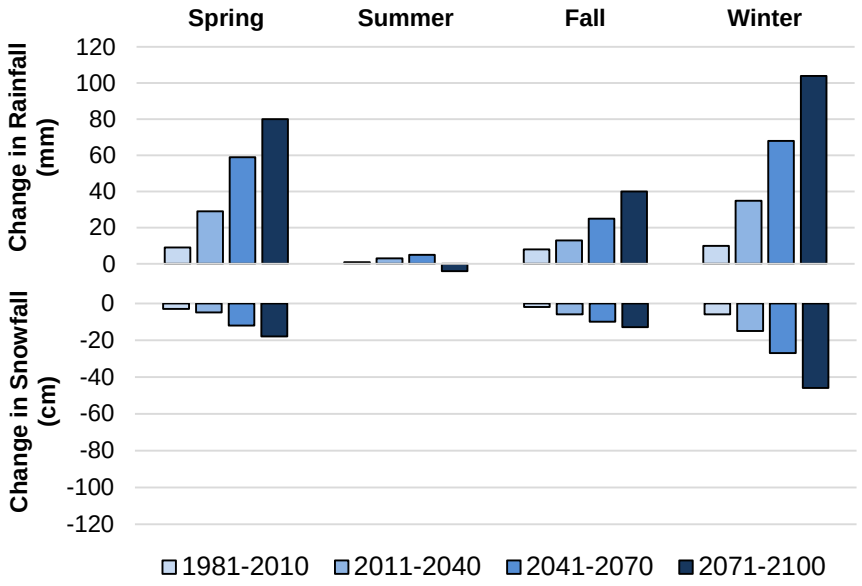


*Growing Season Length is defined as the number of days between the first span of six days above 5°C in spring and the first span of six days below 5°C in fall. Source: Klimaat Consulting

KEY FINDING: PRECIPITATION

Halton Hills can expect more rainfall and less snowfall during the spring and winter months. With rainfall gains outpacing snowfall declines, overall precipitation is increasing.

Historical and Projected Change in Annual Rainfall and Snowfall by Season of Year in Halton Hills (Change from 1951-1980)



*Figures represent Business-as-Usual Scenario.
Source: Klimaat Consulting

KEY FINDING: WEATHER VARIABILITY

Average temperatures in Halton Hills are not only rising, but also becoming more variable (uncertain) over time.

- Halton Hills is experiencing more variable (uncertain) weather patterns over time.
- Variability in temperature is projected to *decrease* during the winter months (consistently warmer and wetter winters), while variability is projected to *increase* during the summer months (unpredictably hot and cool summers).
- Spring and fall will experience only minor increases in variability.

Part 4

IMPLICATIONS

IMPLICATIONS

- **Human Health Stress:** Human health impacts from rising temperatures and more heat waves will likely rise, affecting heat stress-related illness, mortality, and productivity, especially for vulnerable populations.

- **Energy and Water Consumption:** More heat events may increase cooling energy demand, as well as water consumption.

- **Nighttime Cooldown:** More Tropical Nights may affect capacity for urban centres and individual buildings to shed heat at night, imposing further upward pressure on energy and water demand.

IMPLICATIONS

- **Building Use and Design:** Warmer temperatures and declining capacity for nighttime cooldown will have implications for how existing buildings are operated (and retrofitted) and how new buildings should be designed in the future (e.g. warm in winter, well-ventilated in summer).

- **Infrastructure:** Warmer and more variable temperatures (e.g. more winter days in which the temperature fluctuates around 0°C) may have significant impacts on frost heave (roads and structures shifting) and ice dams (building leakage).

- **Uncertainty for Agriculture:** Rising temperatures and altered precipitation patterns will likely create challenges for existing crops but may also create opportunities for new crops and new methods of production.

Questions of clarification?

Part 5

DISCUSSION

DISCUSSION

1. How have you been affected by climate change and how do you think you will be affected in the future?

2. Given the Community Sustainability Strategy vision to 2060, what do you think the Town should do to prepare for climate change?

3. Do you have any advice for us?

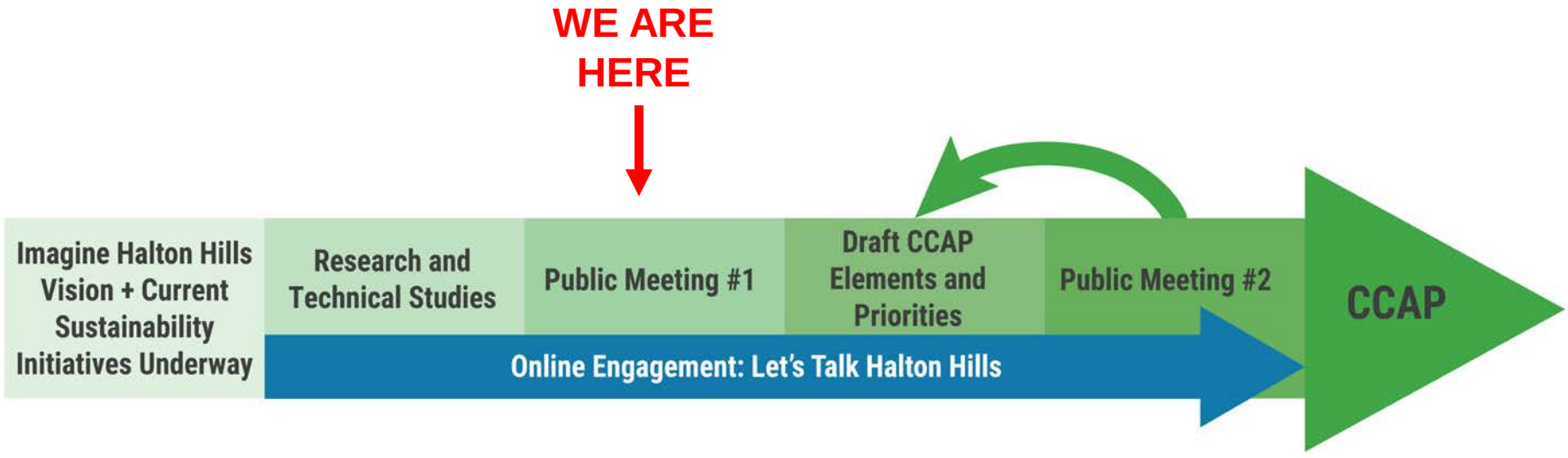
Community Sustainability Strategy (Imagine Halton Hills)
Long term vision to 2060

In 2060, the urban and rural communities of Halton Hills balance economic prosperity with a deep commitment to the natural environment, while retaining viable local agriculture and small-town feel, and being socially equitable, culturally vibrant and strongly connected.

Imagine Halton Hills' Four Pillars of Sustainability:

- Cultural vibrancy
- Environmental health
- Economic prosperity
- Social well-being

NEXT STEPS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WE WANT TO HEAR FROM YOU!

We want to understand your views, awareness of and interest in climate change. The community is central to the development and implementation of the **Halton Hills Climate Change Adaptation Plan** and we highly value your ideas and input.

Fill out our HALTON HILLS CLIMATE CHANGE ADAPTATION PLAN COMMUNITY SURVEY

Visit: www.letstalkhaltonhills.ca/climate-change-adaptation

Survey closes July 8, 2019

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