

## REPORT

**REPORT TO:** Chair and Members of the Community Affairs Committee

**REPORT FROM:** Gabriel Clarke, Manager of Sustainability and Climate Change

**DATE:** July 28, 2017

**REPORT NO.:** PLS-2017-0002

**RE:** Climate Change Adaptation Plan Terms of Reference Update

### RECOMMENDATION:

THAT Report No. PLS-2017-0002 (dated July 28, 2017) regarding the updated Terms of Reference for the Town's Climate Change Adaptation Plan be received;

AND FURTHER THAT the proposed updated Terms of Reference for the Climate Change Adaptation Plan, attached as Appendix 1 to Report No. PLS-2017-0002, be approved.

### BACKGROUND:

Action 5A of Council's 2014-2018 Strategic Action Plan calls for the "Development of a Climate Change Adaptation Plan to address community responsiveness and resiliency to climate change".

In order to fulfill this direction, Town staff have:

- Prepared and presented an initial project Terms of Reference to Council on February 6<sup>th</sup> 2017 as part of Report No. P&I-2017-0002. The Terms of Reference were written to conform with ICLEI Canada's Building Adaptive and Resilient Communities (BARC) climate change adaptation planning framework;
- Participated in ICLEI Canada's Great Lakes Climate Change Adaptation Project between the fall of 2016 and the end of March 2017 to engage staff and community stakeholders in a conversation about the climate change risks and vulnerabilities facing the Town;
- Hosted a Council workshop on April 10<sup>th</sup> 2017 to present the initial results of the Great Lakes Climate Change Adaptation Project and discuss how a new grant program launched by the Federation of Canadian Municipalities (FCM) could enable the Town to complete a town-wide natural capital assessment and a

climate change modeling exercise to lay the groundwork for the development of a scenario-based Climate Change Adaptation Plan;

- Prepared and submitted a grant application requesting \$175,000.00 from FCM's Municipalities for Climate Innovation Program on June 2<sup>nd</sup> 2017 to fund the additional steps discussed at the April 10<sup>th</sup> Council workshop; and
- Received confirmation on June 29<sup>th</sup> 2017 that the grant application requesting \$175,000.00 had been approved.

## **COMMENTS:**

As a result of FCM's approval of the grant application, Town staff have updated the Term of Reference for the Climate Change Adaptation Plan project (attached as Appendix 1 to this report) to reflect the additional steps that the increased funding will enable the Town to complete.

The following outlines the recommended changes to the project's Terms of Reference.

### **Milestone 1 – Initiate:**

The focus of the Initiate Milestone is to set the groundwork for the remainder of the project. It involves the development of a work plan, an engagement plan and the completion of some initial research to understand municipal, regional and provincial approaches to climate change adaptation.

Staff are proposing 2 changes for the Initiate Milestone (Milestone 1).

- The first change involves adding the development of an engagement plan that would be implemented during Milestones 2 and 3. Due to resource constraints, the original Terms of Reference did not include the development of an engagement plan. However, the Town's new engagement platform "Let's Talk Halton Hills" and additional funding have opened up this possibility.
- The second change involves eliminating the climate change case study task. This task was originally included to produce anecdotal evidence of the impact of climate change on the Town. However, the addition of the natural capital assessment and the geospatial climate modeling exercise tasks (described below) will produce a stronger empirical dataset that obviates the need for the case study.

### **Milestone 2 – Research:**

The second Milestone (Research) is meant to produce a comprehensive understanding of historically measured and projected future climate change trends to identify the priority climate challenges that will need to be addressed in the Climate Change Adaptation Plan. It involves producing a series of models and empirical datasets that will serve as the basis for the Plan Milestone (Milestone 3).

Staff are proposing the following changes to the Research Milestone (Milestone 2).

- The first change involves implementing the first phase of the engagement plan to increase the level of community engagement and gain perspectives from residents and businesses on what they believe to be the priority climate challenges facing Halton Hills. Although the original Terms of Reference did include some community engagement, the proposed change would provide enhanced opportunities for the community to provide input.
- The second change involves replacing the “refined climate science report” task from the original Terms of Reference with an exercise that involves modeling and mapping out three climate change scenarios to identify priority adaptation challenges for each scenario at multiple intervals (i.e. 2030, 2050, 2080, and 2100). Originally, the consultant would have simply supplemented “The Science of Climate Change” report prepared by ICLEI Canada (attached as Appendix 2 to Report No. P&I-2017-0002) by assessing the frequency of future extreme weather events. However, by modeling three climate scenarios, Halton Hills will gain a much better understanding of the priority climate change challenges the Town will have to manage if the world:
  1. Fully transitions to a low carbon economy;
  2. Partially transitions to a low carbon economy; or
  3. Does not substantively reduce global greenhouse gas emissions.
- The third change involves completing a geospatial natural capital assessment to identify significant natural features and/or systems that will increase the Town’s resilience to climate change if conserved, enhanced or restored as well as significant natural features and/or systems that are particularly vulnerable to climate change.

### **Milestone 3 - Plan:**

Milestone 3 builds on the previous Milestones and culminates in the development of a climate change adaptation plan to address the priority climate change challenges facing the community.

Staff are proposing the following changes to the Plan Milestone:

- The first change involves introducing a community engagement component to Milestone 3 by implementing the second phase of the engagement plan. Residents will be invited to share ideas and opinions on actions that can be taken in the community to address the priority climate change challenges identified during the Research Milestone.
- The second change involves introducing the possibility of developing a scenario-based plan as opposed to employing a conventional plan format. The final format of the plan will be based on the findings of Milestone 2 and will be structured as a conventional plan if the divergence in terms of the priority

climate challenges identified for each of the three climate models is found to be insignificant, and will be structured as a scenario-based plan if the divergence is found to be significant. At this point, it is assumed that a scenario-based plan will be warranted, but the results of modeling exercise need to be produced and analyzed before this assumption can be borne out.

In sum, the proposed changes involve eliminating the case study, strengthening the level of community engagement, introducing the natural capital assessment and the climate change modeling exercise, and introducing the potential to develop a scenario-based plan.

### **RELATIONSHIP TO STRATEGIC PLAN:**

The development of the Climate Change Adaptation Plan fulfills Action 5A in Council's 2014-2018 Strategic Action Plan – Develop a Climate Change Adaptation Plan to address community responsiveness and resiliency to climate change.

### **FINANCIAL IMPACT:**

- There is no financial impact to the tax base associated with this report;
- \$175,000.00 in external grant funding was secured from the Federation of Canadian Municipalities' Municipalities for Climate Innovation Program by the Office of Sustainability; and
- The Climate Change Adaptation Plan will enable the Town to proactively manage the challenges posed by climate change. Implementation is expected to reduce the Town's financial exposure to climate change.

**COMMUNICATIONS IMPACT:** No communication impact is associated with this report.

### **SUSTAINABILITY IMPLICATIONS:**

The Town is committed to implementing our Community Sustainability Strategy, Imagine Halton Hills. Doing so will lead to a higher quality of life. The relationship between this report and the Strategy is summarized below:

The Climate Change Adaptation Plan will fulfill two key goals contained in the Town's Community Sustainability Strategy.

The first "be prepared for climate change" will be achieved through the development and implementation of a Climate Change Adaptation Plan because the Plan will identify what the Town needs to do to prepare for and adapt to a changing climate.

The second "raise community awareness of the opportunities and threats posed by climate change and inspire action, including efforts to reduce greenhouse gas emissions" will also be fulfilled by this project through the implementation of the engagement plan and the identification of community-level actions to reduce the Town's exposure to climate change.

Do the report’s recommendations advance the Strategy’s implementation? Yes

Which pillar(s) of sustainability does this report support?

Environmental Health, Economic Prosperity, Social Well-being

**In Summary, the Sustainability Implications of this report are as follows:**

Overall, the alignment of this report with the Community Sustainability Strategy is:  
Excellent

**CONSULTATION:**

Consultation with corporate and community stakeholders is proposed to be a fundamental component of the Climate Change Adaptation Planning process. Figure 1 (below) has been updated to reflect the proposed changes and outlines the project Milestones and the points at which various stakeholders will be consulted.

The updated Terms of Reference have been submitted for review to the Town’s GIS Coordinator, Corporate Asset Manager, Manager of Planning Policy, the Manager of Purchasing, the Commissioner of Planning and Sustainability and the Senior Management Team.

**Figure 1: Major Project Tasks and Consultations**

Milestone	Task / Sub-Task	Consulted Stakeholders
Milestone One: Initiate	Work Plan and Engagement Pla	●
	Existing Plan Scan	●
	Regional / Provincial Policy Review	●
	Milestone One Report	● ● ●
Milestone Two: Research	Historical and Future Climate Analysis	●
	Engaging Residents and Businesses I	● ●
	Natural Capital Assessment	●
	Facility Exposure Assessment	● ●
	Milestone Two Report	● ● ●
Milestone Three: Plan	Engaging Residents and Businesses II	● ●
	Vision and Mission	● ● ●
	Action Planning	● ● ● ●
	Draft Climate Change Adaptation Plan	● ● ● ●
	Final Climate Change Adaptation Plan	●

Legend:

- Project Manager
- Climate Change Adaptation Team (Town Staff)
- Senior Management Team
- ▨ Residents and businesses
- ⊞ Council

## **CONCLUSION:**

The development and implementation of a local Climate Change Adaptation Plan is an important step for managing risk and ensuring the continued prosperity of Halton Hills. According to the Insurance Bureau of Canada, severe weather caused by climate change has led to increasing damages and costs over the last decades, with insured damages costs reaching \$4.9 billion in 2016 from \$3.2 billion in 2013 (the year of the Toronto ice storm). With the wildfires having recently affected tens of thousands of people in British Columbia, the possibility that 2017 will become another record year for climate change related insurance claims in Canada is becoming very real. By gaining a better understanding of the implications of climate change for the community, residents, businesses and the Town will be in a better position to make informed decisions and coordinate the necessary actions to remain resilient into the future and protect the high quality of life that residents have come to enjoy and expect.

The project Terms of Reference – updated to reflect an expanded project scope that is now possible to due confirmed additional funding from the FCM’s Municipalities for Climate Innovation Program – outline how staff propose to complete this important project.

Respectfully submitted,

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Gabriel Clarke, MES, BA  
Manager of Sustainability and Climate Change

**Reviewed and Approved by,**

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John Linhardt, MCIP, RPP  
Commissioner of Planning and Sustainability

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Brent Marshall  
Chief Administrative Officer

## **APPENDIX 1: Proposed Terms of Reference for a Scenario-Based Climate Change Adaptation Plan for the Town of Halton Hills**

### **Executive Summary / Introduction**

The Town of Halton Hills (the “Town”) is inviting proposals from qualified consultants to assist the Town with the preparation of a scenario-based Climate Change Adaptation Plan, referred herein as the “CCAP”. The Plan will be comprised of local actions and strategies that will reduce the Town’s vulnerability to climate change, increase its ability to cope with the consequences of climate change (adaptation), and increase community preparedness and self-reliance (resiliency) in the face of future climate changes. It will also identify actions that the community can implement to take advantage of the opportunities that may emerge due to climate change.

The Plan will be based on ICLEI Canada’s Building Adaptive & Resilient Communities (BARC) Framework but will be tailored to the Town’s priorities and local conditions. Halton Hills has been a member of ICLEI since 2009. The BARC Milestone Framework provides a structured approach to climate change adaptation planning which moves local governments through a series of progressive steps where each Milestone builds on the findings of the preceding one. Inspired by the BARC Framework, Halton Hills seeks to create a Plan that will be led by the Town and enable community action. The project framework is comprised of the following:

- Milestone One (Initiate): Develop a project work plan and engagement plan, build corporate and community support; identify stakeholders; identify existing adaptation.
- Milestone Two (Research): Review climate change science for the municipality; conduct a community engagement exercise; conduct a three-scenario greenhouse gas emission modelling exercise; conduct a natural capital assessment; conduct a Town-owned facility climate change exposure analysis to assess; and identify priority impacts.
- Milestone Three (Plan): Establish a vision, mission, goals and objectives; identify and prioritize actions; develop monitoring and evaluation strategy; identify indicators; draft implementation plan.
- Milestone Four (Implement): Adopt and implement the actions contained in the Climate Change Adaptation Plan.
- Milestone Five (Monitor and Review): Track implementation, update the plan when necessary.

In order to initiate the development of the CCAP, the Town of Halton Hills became a participant in ICLEI Canada’s Great Lakes Climate Change Adaptation Project (GLCCAP). The GLCCAP ran from the fall of 2016 until the end of March 2017, and was designed to help participating municipalities initiate the climate change vulnerability and risk assessments that are part of Milestone Two. Halton Hills hosted a series of workshops with local stakeholders in February and March 2017 to complete the vulnerability and risk assessments.

Successful implementation of the CCAP will require cross-departmental collaboration as various departments are the lead on different, but closely related, projects. For example, Planning and Sustainability staff are leading the Green Development Standards; Transportation and Public Works

staff are leading the Transportation Master Plan and the Storm Water Master Plan; Recreation and Parks staff are leading the Corporate/Departmental Asset Management Plans, and the Office of the CAO is providing strategic and intergovernmental integration through the “Halton Hills – Wenjiang Sister City Partnership”. In the course of preparing the Climate Change Adaptation Plan these various components will be pulled together and drawn upon, as appropriate.

The Town wishes to acquire the services of a consultant to create a scenario-based Climate Change Adaptation Plan which complies with ICLEI Canada’s BARC Milestones One, Two and Three. The consultant will be required to incorporate the results from GLCCAP workshops into the CCAP and supplement the information where necessary. The responsibility for completing Milestones Four and Five will rest with Town staff.

The Town of Halton Hills’ Planning and Sustainability Department received Council approval to proceed with the completion of the CCAP with a total budget of \$240,000.00.

The CCAP is to be completed in a timely fashion by March 2019.

## **1. Summary**

The Town of Halton Hills is seeking a qualified consultant to assist with the preparation of a scenario-based Climate Change Adaptation Plan (CCAP).

The Town will be building on ICLEI’s Building Adaptive and Resilient Communities (BARC) five Milestone framework for developing the CCAP. The consultant will be responsible for successfully completing Milestones One, Two and Three of the project as outlined in these Terms of Reference. Town staff will complete Milestones Four and Five.

The Town was a participant in ICLEI’s Great Lakes Climate Change Adaptation Project (GLCCAP) to assist with the completion of the vulnerability and risk assessments that are required as part of Milestone Two. The consultant will be required to incorporate the results from the GLCCAP into the CCAP and build on the results if/where needed.

### **1.1 Background**

#### **1.1.1 Local Context**

The Town of Halton Hills is unique. While the Town is located on the outer edge of the rapidly growing Greater Toronto Area, much of the municipality remains rural in character, with significant portions of the municipality protected by the Greenbelt Plan as well as the Niagara Escarpment Plan. Halton Hills is a lower tier municipality located within the Region of Halton.

The Town is a community of several urban communities, villages and rural settlements with a distinctive and enviable identity that comes from the beauty and tranquility of the rural setting, rolling hills, rivers and valleys.

Bordering the Town to the south and east are two of Canada’s fastest growing municipalities, the Town of Milton and the City of Brampton. In light of its geographic location, Halton Hills faces significant growth pressures.

Halton Hills is a place where residents enjoy safe family living, scenic beauty and active community life. The community recognizes the unique attributes that set it apart from other places and is passionate about preserving its small-town character and rural feeling. The preservation and enhancement of these features, while keeping pace with the diverse needs of the community, is at the forefront of the Town’s vision for its future.

In 2011, the Town’s population was about 59,000, growing by 6.7% since 2006. By 2031, the Town’s population is anticipated to reach 94,000.

**1.1.2 Climate Change Projections**

In 2016, ICLEI Canada developed a report entitled “The Science of Climate Change, Climate Data for the Town of Halton Hills”. The data contained in the Report is based on global climate models and greenhouse gas concentration scenarios developed by the Intergovernmental Panel on Climate Change (IPCC), drawn from both the Fourth Assessment Report (AR4) and Fifth Assessment Report (AR5) publications. ICLEI Canada has selected and tailored this information to fit the specific context of Halton Hills. A summary of the study findings are presented in Table 1 below and the full report is attached as **Appendix 2 to Report No. [P&I-2017-0002](#)**.

Table 1: Summary of Findings from ICLEI’s “The Science of Climate Change, Climate Data for the Town of Halton Hills ”

Climate Variable	Observed Measurements	Projected Changes to 2100
<b>Average Annual Temperature</b>	Average overland temperature increase of 1.5 °C between 1950 and 2010	Further average overland temperature increase between 1.5 °C and 4.7 °C by 2100.
<b>Hot Days</b> (days when temperature meets or exceeds 30°C)	Average of 10 hot days per year between 1971 and 2000	Total number of hot days per year: <ul style="list-style-type: none"> <li>• 2020s: 25</li> <li>• 2050s: 31-40</li> <li>• 2080s: 37-65</li> </ul>
<b>Precipitation</b>	Average annual precipitation of 884.9mm per year between 1971 and 2000	Increase in precipitation above the historically-observed average of 884.9mm per year: <ul style="list-style-type: none"> <li>• 2020s: 17.2mm-24.4mm</li> <li>• 2050s: 38.3mm-64.5mm</li> <li>• 2080s: 53.1mm-97.2mm</li> </ul>

The climate models studied in this report predict that Halton Hills will experience a continued increase in annual average temperature coupled with an increase in the number of hot days per year. The climate models also predict that the Town will experience increases in annual average precipitation levels and more frequent extreme weather events. If left unaddressed, these climate changes may pose

significant threats to human health and wellbeing, the local economy, the environment, the transportation network, as well as buildings and critical infrastructure.

### **1.1.3 Impetus for this plan**

The development of a Climate Change Adaptation Plan for the Town of Halton Hills is driven and supported by the following plans:

Action 5A of [Council's 2014-2018 Strategic Action Plan](#) specifically calls for the development of a "Climate Change Adaptation Plan to address community responsiveness and resiliency to climate change".

The Town's [Integrated Community Sustainability Strategy](#), adopted in 2013, supports the development of a Climate Change Adaptation Plan through the following goals:

- Raise community awareness of the opportunities and threats posed by climate change and inspire action, including efforts to reduce greenhouse gas emissions.
- Be prepared for climate change.

Halton Hills' [Corporate Sustainability Action Plan](#) contains four (4) actions that will be fulfilled by the development of a Climate Change Adaptation Plan:

- Action A1 — Complete a climate change vulnerability assessment of the Town's facilities and infrastructure to assess how they may be impacted by extreme weather events and changing climate
- Action A2 — Based on the climate change vulnerability assessment (Action A1), prepare a climate change adaptation plan to identify a range of adaptation options.
- Action D7 – Complete a climate change vulnerability assessment of the Town's vulnerable populations to assess how they are impacted by a changing climate and what services are required to mitigate these impacts. Integrate this with the Climate Change Adaptation Plan.
- Action E5 – Integrate climate change impacts and adaptation project(s) into the Asset Management Program and regular Capital Investment Planning process as they are identified in the climate change vulnerability assessment and the climate change risk management strategy.

The Town began developing a Storm Water Master Plan in 2017. As part of this project, the consultant will be conducting a comprehensive inventory of the Town's storm water management infrastructure. The Climate Change Adaptation Plan will identify any flood-prone areas within the Town and the actions that need to be taken to reduce those vulnerabilities. As a result, the two projects will support each other.

The Town is developing an Asset Management Program to enhance its ability to manage and undertake lifecycle costing analyses while building, maintaining, decommissioning and/or replacing municipal

assets. The Climate Change Adaptation Plan will produce data that will inform the development of the Asset Management Program by clarifying if any Town assets are vulnerable to climate change.

In addition to identifying the development of the Climate Change Adaptation Plan as a strategic priority for its current term, Council also approved a budget of \$75,000.00 (plus taxes) to support the project. Town Staff have also been successful in securing an additional \$175,000.00 from the Federation of Canadian Municipalities (FCM). Town staff are reserving \$10,000.00 for incidental expenses which brings the total project budget to \$240,000.00.

Proponents are strongly encouraged to familiarizing themselves with the documents hyperlinked throughout this document and the list of documents contained in Section 7 of this document prior to submitting their proposal.

## **2. Project Overview**

The overall goal of this project is to develop a local scenario-based Climate Change Adaptation Plan that will enable the Town to adapt to and remain resilient to climate change.

The Climate Change Adaptation Plan will:

- i. Identify and assess historically-observed climate change impacts experienced by Halton Hills.
- ii. Model the projected climate change impacts specific to Halton Hills using three atmospheric greenhouse gas concentration scenarios utilized in the Intergovernmental Panel on Climate Change Assessment Report 5 (analyzed for the time frames: 2030, 2050, 2080 and 2100);
- iii. Identify significant natural features and/or systems that are particularly vulnerable or resilient to climate change through the completion of a natural capital assessment;
- iv. Assess the ability of the Town's facilities to withstand predicted climate change impacts
- v. Identify the community's physical, social, and economic systems and services that are at risk and most vulnerable to climate change;
- vi. Identify the community's physical social and economic systems and services that are likely to remain resilient to climate change and any opportunities that climate change may present the Town; and
- vii. Outline adaptation strategies through the development of a scenario-based action plan.

The consultant will be required to develop the Climate Change Adaptation Plan in conformance with ICLEI Canada's BARC Milestones One, Two and Three (recognizing that the natural capital assessment, the geospatial modelling exercise, the Town facility assessment and the scenario-based plan exceed BARC requirements); provide direction for the Town to strengthen policies; develop new programs or practices where gaps exist; and identify the steps necessary to integrate climate change adaptation as a core function within the corporation and engender behavioral change in the community. To ensure that the work completed for this project complies with these Terms of Reference, reflects an integrated corporate approach, and is tailored to the needs and local conditions of Halton Hills and fiscal realities of the Town, consultation with the Town's Climate Change Adaptation Team, the Stakeholder Group, Town departments, Senior Management Team and Council will be essential.

## **2.1 Scope of Work**

The following outlines the Scope of Work required to create a scenario-based Climate Change Adaptation Plan for Halton Hills. The Plan will be completed in three Milestones, as outlined below.

The consultant will be responsible for undertaking the following work:

### **2.1.1 Milestone One – Plan Initiation**

By the time that the consultant has been selected the Town will have established a Stakeholder Group and a Climate Change Adaptation Project Team to assist with the development of this plan.

The *Climate Change Adaptation Team* is a multi-disciplinary cross-departmental staff team experienced with the management of infrastructure, public communications, natural resources, economic development, recreation and parks, finances, tourism, agriculture, and emergency services. The Team may also include representatives from the Regional government, conservation authorities and other Halton area municipalities. The Adaptation Team will act as the corporate Stakeholder group and will be participating select engagement sessions related to this project.

The *Stakeholder Group* is comprised of external stakeholders from the community (i.e., environmental or community groups, not-for-profits, local businesses, industry associations, utility service providers, school boards, etc.) and will be responsible for providing input and advice, from a community perspective at key points during the development of the Plan.

The Town's Manager of Sustainability will act as the Project Manager for the development of the CCAP, and will act as the liaison between the consultant, the Climate Change Adaptation Team, the Stakeholder group, Town staff, Senior Management Team, Council and external partners.

#### Task A: Work Plan and Engagement Plan

Within four weeks of being awarded the contract, the Consultant will develop a work plan for completing Milestones One, Two and Three as described in this document. In order to avoid unnecessary duplication, the work plan will integrate all relevant results generated from the Town's participation in ICLEI's Great Lakes Climate Change Adaptation Project. The work plan will include a description of the meetings that the consultant will hold for each of the project Milestones and a detailed project timeline.

The consultant will also develop an engagement plan to achieve the engagement objectives described in this document. The engagement plan will outline the target audiences, methods, tools, timelines and any Town resources that the consultant proposes to use. The consultant is encouraged to develop an innovative, multi-pronged engagement plan that maximizes the potential to obtain the participation of the Climate Change Adaptation Team, the Stakeholder Group, residents of all ages and abilities as well as a wide variety of businesses. The consultant will be required to develop the community engagement plan in conformance with the Town's [approach to public engagement](#).

## Task B: Defining Current Adaptation

I. Existing Plan Scan: The consultant will identify existing Town plans, programs and policies across all departments that already include elements of, or address climate change adaptation, as well as those that should include climate adaptation provisions in the future. The [Town's Official Plan](#) and its [Emergency Response Plan](#) need to be reviewed as part of this task. A list of recommended material for this task is provided at the end of these Terms of Reference.

This data will assist the Town in identifying climate change stressors that are already being addressed by the Town and where improvements are needed to increase resiliency and adaptability.

II. Regional and Provincial Policy Review: The consultant will undertake a policy review that summarizes the relevant climate change policy direction of the [Region of Halton Official Plan](#), the Provincial [Growth Plan for the Greater Golden Horseshoe](#), the [Niagara Escarpment Plan](#), the [Provincial Climate Change Action Plan](#), the [Greenbelt Plan](#), the [Provincial Policy Statement](#) and the upcoming Provincial Climate Change Adaptation Plan.

### Milestone One Deliverables

- a. A draft and final work plan and engagement plan to the Town's Project Manager outlining how the consultant intends to complete this project and detailing how Milestones One (Task B), Two and Three described below will be achieved, including a list of proposed meetings and a proposed timeline (i.e., Gantt chart).
- b. A draft and final Milestone One Report summarizing:
  - i. Existing knowledge and data on current climate change impacts to community systems and service areas;
  - ii. Existing municipal actions that improve adaptive capacity;
  - iii. Municipal plans and activities that should include climate adaptation components; and
  - iv. Regional and provincial climate change policy direction.
- c. A draft and final document containing the documentation required to receive ICLEI Canada's BARC Milestone One recognition.

### **2.1.2 Milestone Two – Research**

The second Milestone of the project is meant to develop a comprehensive understanding of how climate change will impact Halton Hills and the community systems and service areas which are likely to feel these impacts most acutely. Milestone Two will involve five major tasks.

- Task A will involve completing an analysis of historical climate records and modelling three future climate change scenarios (i.e. low, medium and high greenhouse gas atmospheric concentration scenarios) to produce a detailed understanding of the projected climate trajectories and priority climate change impacts for Halton Hills.
- Task B will involve engaging residents and businesses to identify the community's opinions on the threats posed by climate change.

- Task C will involve completing a geospatial natural capital assessment to identify significant natural features and/or systems that would increase the Town’s resilience to climate change if conserved/enhanced/restored (i.e. wetlands) and significant natural features and/or systems that are particularly vulnerable to climate change.
- Task D will involve completing an assessment of the Town’s facilities to assess their ability to withstand future climate change impacts.
- Task E involves producing a report which outlines the methodology employed, summarizes and analyses the finding from tasks A-D and comprehensively outlines the climate change impacts that Halton Hills is currently facing and is likely to face in the future under each of the three climate change scenarios. Task E will also include completing the items required for meeting BARC Milestone Two.

Throughout this Milestone, the consultant will refer to and build on the work that the Town has completed through its involvement in ICLEI’s Great Lakes Climate Change Adaptation Project where appropriate.

#### Task A: Historical and Future Climate Change Impact Analysis

A comprehensive and localized analysis of historically-observed climate records and of future climate modelling data will be completed. This will enable the Town to gain a detailed understanding of the nature, extent, frequency and magnitude of any historical climate changes that Halton Hills has already experienced as well as what the best available climate models predict in terms of the nature, extent, frequency and magnitude of future climate changes for Halton Hills.

For the historically-observed portion of this task, the consultant will utilize measured historical climactic records to produce an analysis of historical weather trends for Halton Hills. The consultant will analyze historical climate trends; produce a detailed climate timeline for Halton Hills and highlight the noteworthy/substantive climate changes that have occurred since pre-industrialization (or as far back as the records go). The consultant may refer to the [“The Science of Climate Change, Climate Data for the Town of Halton Hills”](#) report prepared by ICLEI.

For the future-based portion of this task, the consultant will develop three future climate change scenarios by modeling the projected impacts of three Representative Concentration Pathways (RCP) developed for the Intergovernmental Panel on Climate Change’s Assessment Report 5 (i.e. low, medium, and high GHG atmospheric concentration) on the Town’s various community systems in its urban and rural areas at specific time intervals (i.e. 2030, 2050, 2080 and 2100) and analyze the following parameters (at a minimum):

- i. Annual average temperature
- ii. Annual number of hot days
- iii. Annual average total precipitation
- iv. Annual average snow and ice-based precipitation
- v. The intensity, duration and frequency of the extreme weather events:
  - a. Wind / tornadoes
  - b. Rain and flooding

- c. Droughts
- d. Snow and ice storms

The consultant will then identify and prioritize the nature, extent, magnitude and frequency of the climate change impacts facing the Town for each of the three scenarios and analyse how these changes will impact the Town's Community Systems and Service Areas. Finally, the three scenarios will be compared to one another and the presence of any significant divergence between the climate scenarios (i.e. whether different priority climate change issues rise to the top under each scenario) will be illustrated and analyzed by the consultant.

The consultant will be required to work very closely with the Project Manager throughout this task and produce a number of illustrative graphics and usable GIS mapping products that are compatible with the Town's GIS systems. For example: flood maps, annual average temperature change maps and heat island maps will need to be produced for each of the three climate models at the above-specified time intervals. Items that cannot be easily mapped out (i.e. intensity, duration and frequency of extreme weather events) will need to be analysed statistically and illustrated graphically.

A historically-observed climate analysis, three climate change scenario models, and a series of graphs, illustrations, maps, and draft and final versions of Geographical Information System (GIS) datasets will be produced by the consultant as part of this task.

#### Task B: Engaging Residents and Businesses

Understanding the community's opinions and attitudes towards climate change is a key component of the research Milestone and will inform the Plan Development Milestone. The information produced during this task will clarify, among other things, the degree to which the community understands the issue and feels a sense of urgency to act. It will also enable the community to weigh in on what they believe to be the priority climate change impacts that the Town will need to address. The Town has gathered input from staff and community stakeholders as a result of the Town's participation in ICLEI's Great Lakes Climate Change Adaptation Project, and the consultant will need to incorporate this information in this task.

The consultant will be required to incorporate this task during the development of the community engagement plan (Milestone 1 Task A) and identify effective ways to maximize the active participation of the Town's residents and businesses. Creative and innovative approaches are encouraged. One of the tools that the consultant should employ during this task is the new Halton Hills online engagement platform: Let's Talk Halton Hills (<http://www.letstalkhaltonhills.ca/>)

Special consideration will be given to vulnerable populations (i.e. youth, elderly, disabled, lower income etc.) to assess how they are impacted by a changing climate and what services are required to mitigate these impacts.

The consultant will initiate the implementation of the engagement plan to obtain input from staff, stakeholders, residents and businesses. The consultant will then analyze and identify priority climate change challenges based on the input received.

### Task C: Geospatial Natural Capital Assessment

A Town-wide geospatial natural capital assessment will be completed to identify and map out significant natural areas and/or systems that provide crucial ecosystem services (i.e. flood mitigation, carbon sequestration, heat refuges etc.), and which if conserved/enhanced/restored, will enhance the Town's ability to leverage its natural capital assets to remain resilient to climate change. The natural capital assessment will also identify and map out significant natural areas and/or systems that are particularly vulnerable to climate change. This task will further increase the amount of data available to decision makers to inform the selection of appropriate policies and programs.

This task will involve the following components:

1. Selecting the environmental features to be analyzed (i.e. tree stands, wildlife corridors, water courses, wetlands, highly sloped lands, tall grasses, etc.)
2. Selecting and acquiring appropriate Geographic Information Systems (GIS) datasets that represent the selected environmental features (i.e. LiDAR, probability of depression analysis, open water analysis, vegetation inventories, ortho-photography etc.)
3. Integrating the climate projections from the three climate models developed in Milestone 2 Task A.
4. Developing evaluation criteria through the selection and weighting of appropriate indicators.
5. Completing a GIS Multi-Criteria Decision Analysis to map out climate change resilient and vulnerable natural areas and/or systems.

The consultant will be required to work very closely with the Project Manager throughout this task and produce a number of illustrative graphics and usable GIS mapping products that are compatible with the Town's GIS systems. A series of graphs, illustrations, maps and draft and final versions of Geographical Information System datasets will be produced by the consultant as part of this task.

### Task D: Assessing the exposure of the Town's facilities to climate change

The consultant will complete an assessment of the Town's facilities to evaluate how they are likely to be impacted by a gradually changing climate and from extreme weather events as predicted by the modelling exercise (Milestone 2 Task A). During this technical exercise, the consultant will review the level of exposure for 10 Town-owned facilities (see table 1 below) and assign a score for each of the following:

1. Temperature and hot days;
2. Precipitation;
3. Extreme weather events (wind tornadoes, rain and flooding, droughts, snow and ice storms);  
and
4. Overall exposure rating for each facility.

Table 1: Town Facilities

Building Name	Address	Building size (sq ft)
Acton Arena	415 Queen Street	45,908.00
Acton Library Branch	17 River Street	9,000.00
Robert C Austin Public Works Operations Centre	11620 Trafalgar Road	31,200.00
District One Fire Station (Acton)	21 Churchill Road S	11,136.00
District Three Fire Station - HHFD HQ	14007 10 Side Road	13,616.00
District Two Fire Station (Georgetown)	53 Maple Avenue	15,934.00
Gellert Community Centre	10241 Eighth Line	36,285.00
Halton Hills Cultural Centre and Library	9 Church Street	50,500.00
Mold-Masters Sports Plex	221 Guelph Street	151,000.00
Town Hall	1 Halton Hills Drive	40,000.00

The consultant will include the results of this task and an analysis of the results in the Milestone Two Report.

#### Task E: Milestone 2 Report

Task E involves producing a draft and final report which summarizes and analyses the finding from tasks A-D and creates a comprehensive picture of the priority climate change-related issues facing Halton Hills. Task E will also include completing the items required for meeting BARC Milestone Two.

The consultant-prepared Milestone 2 Report will include at a minimum:

- A description of the objectives of each task;
- The methodology employed to complete the task;
- Written descriptions, explanations and interpretations of the results of each task;
- Graphical representations of the results (i.e. charts, tables, maps etc.);
- A comprehensive list of the priority issues that Halton Hills should address during the Plan Development Milestone; and
- A scientifically-defensible technical appendix for Tasks A,C and D documenting the detailed methodology employed, the source of and reliability of all GIS data layers used, and other relevant information required to enable the replication of the work that the consultant will have employed.

#### Milestone Two Deliverables

During Milestone 2, the consultant will produce:

- Task A: A Historically-observed climate analysis; three climate change scenario models; graphics; illustrations; draft and final Geographical Information System (GIS) datasets utilized and geospatial mapping products created by the consultant.
- Task B: A summary and analysis of the input provided by residents and businesses; raw engagement results (i.e. excel format); interpreted (prioritized) engagement results.

- Task C: A geospatial natural capital assessment; draft and final GIS datasets utilized and geospatial mapping products created by the consultant.
- Task D: An assessment of the exposure of the Town's facilities to climate change; raw and interpreted results.
- Task E: A draft and final report containing all items outlined above.
- A draft and final document containing: the documentation required to receive ICLEI Canada's BARC Milestone Two recognition.

### **2.1.3 Milestone Three – Plan Development**

Drawing on the results produced in the previous Milestones the consultant will be tasked with completing Milestone Three and producing a Local Adaptation Plan.

The consultant will ensure that residents, businesses, Council, the Climate Change Adaptation Team, the Stakeholder Group and Town's Project Manager are actively engaged throughout Milestone Three.

#### Task A: Engaging Residents and Businesses II

The consultant will engage the Town's residents and businesses to solicit input on the vision, mission and actions for the Climate Change Adaptation plan. The consultant will be required to incorporate this task during the development of the community engagement plan and identify effective ways to maximize the active participation of the Town's residents and businesses. Creative and innovative approaches are encouraged. One of the tools that the consultant should employ during this task is the new Halton Hills online engagement platform: Let's Talk Halton Hills (<http://www.letstalkhaltonhills.ca/>)

With regards to actions, the consultant will need to integrate the priority climate change impacts identified during Milestone 2 into this task and solicit community input to generate ideas for initiatives that would partially or fully address the impacts.

The community engagement strategy developed during Milestone one will be implemented. Input from residents and businesses will be sought and ideas for the plan vision, mission and initiatives will be will be collected and analyzed by the consultant during this task.

#### Task B: Climate Change Adaptation Vision and Mission

The consultant will work with the Climate Change Adaptation Team and the Project Manager to establish a Climate Change Community Vision and a Plan Mission that will incorporate the values that are important to the community (gathered as part of Milestone 3 Task A) while also communicating the purpose and intended outcome of the Climate Change Adaptation Plan. The consultant will design and host a minimum of one in-person engagement session with the Climate Change Adaptation Team and one in-person engagement session with the Stakeholder Group to complete this task.

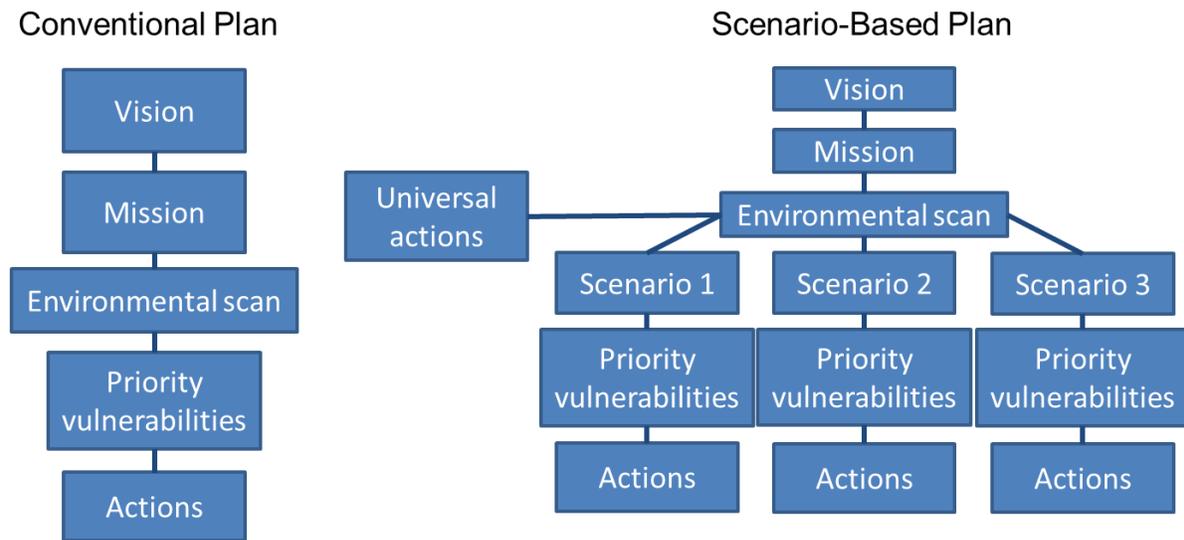
#### Task C: Plan Development

The consultant will work closely with the Project Manager while leading the development of the Climate Change Adaptation Plan document for Halton Hills. The format of the plan will be informed by the findings of Milestone 2 Task A and will be structured either as a conventional plan or a scenario-based

plan. It will be structured as a conventional plan if the divergence in terms of the priority impacts identified for each of the three climate models is found to be insignificant, and be structured as a scenario-based plan if the divergence between the three climate models is found to be significant. The consultant will make a recommendation to the Project Manager on which format they believe will be most appropriate and the Project Manager will retain the final call.

Figure 1 below highlights the different structure that a conventional plan would take as opposed to a scenario-based plan.

Figure 2: Conventional vs. Scenario-Based Plan Structure



At this time, the Town anticipates (and the consultant must assume) that the plan will be structured as a scenario-based plan, and contain:

- A distinct set of actions to address the priority impacts identified for each of the three climate models developed during the completion of Milestone 2 Task A;
- A set of universal actions that are to be implemented no matter which climate scenario arises;
- A set of “early warning triggers”, or conditions that if met, will indicate which of the three sets of actions the Town will need to implement.

The consultant is required to include pricing for both a conventional plan and a scenario-based plan as part of their proposal.

This task will include the following sub-tasks:

- i. Best Practice Review: The consultant will conduct a scan of community-based climate change adaptation Best Management Practices (BMPs) being employed in other jurisdictions in Canada. A focus will be placed on communities with similar characteristics as Halton Hills (i.e., small to medium sized municipalities; mix of urban and rural communities; rural values; growth pressures, etc.).

- ii. Action Planning: The consultant will lead the process to identify necessary adaptation initiatives to address the priority climate impacts for each climate scenario modeled in Milestone Two. For each initiative, the consultant will conduct a cursory feasibility analysis to better understand:
  - a. Cost and resources required vs. available (including grants and external funding);
  - b. Implementation timeline (based on the urgency of the vulnerability/risk);
  - c. Alignment with existing municipal priorities and plans;
  - d. Implementation responsibilities and risks; and
  - e. Effectiveness of the action to increase the adaptive capacity of Halton Hills.

The types of initiatives that the consultant will explore include, but are not limited to the following:

- Short, medium and long-term actions;
  - Pilot and demonstration projects;
  - Programs;
  - Feasibility studies;
  - Capital projects;
  - Fiscal tools;
  - Multi-objective projects; and
  - Partnerships with other levels of government, community groups and the private sector.
- iii. Policies and Standards: The consultant will review the Town's Official Plan as well as the Town's Emergency Response Plan and make policy recommendations to address priority development and emergency response-related climate change impacts facing the Town (identified as part of Milestone Two). A report will be produced as part of this sub-task.
  - iv. Monitoring: The consultant will identify performance indicators to capture each of the initiatives selected for inclusion in the Climate Change Adaptation Plan.
  - v. Funding: Once actions are identified and agreed upon by the Town, the consultant will identify potential external funding sources to support the implementation of the actions.

#### Milestone Three Deliverables

- a. Task A: A summary and analysis of the input provided by residents and businesses; raw engagement results (i.e. excel format)
- b. Task B: A custom plan vision and mission
- c. Task C: A draft and final Best Management Practices Report
- d. Task C: A minimum of two in-person action planning workshops (one with the Stakeholder group, one with the Climate Change Adaptation Team); a summary and analysis of the input received at the action planning workshops; raw engagement results (i.e. excel format)
- e. Task C: A draft and final Official Plan Policies and Standards Report

- f. Task C: A draft and final Climate Change Adaptation Plan document. The draft plan will be submitted to the Project Manager for review and comment. The Plan will include, but not be limited to the following:
  - i. Title page, executive summary, table of contents;
  - ii. A section on the plan development process and project framework;
  - iii. A section on the Climate Change Adaptation Vision and Plan Mission;
  - iv. A sections summarizing the public and stakeholder engagement process;
  - v. A section on the historically observed and projected climate changes predicted by the three climate models;
  - vi. A section on the natural capital assessment;
  - vii. A section on the Town Facility exposure assessment;
  - viii. A section on the priority climate impacts facing the Town;
  - ix. A section on the Best Practices Scan;
  - x. The Scenario-Based Action Plan;
  - xi. A section on the “Early Warning Triggers”/Conditions to identify which set of actions needs to be implemented;
  - xii. A section on implementation and monitoring;
  - xiii. A section on external funding opportunities
  - xiv. A section containing appendices, as appropriate.
- b. A draft and final document containing the documentation required to receive ICLEI Canada’s BARC Milestone Three recognition.

### **3. Communications**

The Consultant will provide brief electronic (email) progress reports to the Town’s Project Manager on a bi-weekly basis, and include:

- Reports on progress made against the work plan (created in Milestone One Task A)
- Documentation of key decisions
- Identification technical, financial or management issues that require resolution and or direction from the Project Manager
- The consultant will monitor the project budget throughout the entire project to ensure that costs do not exceed quoted costs

### **4. Town Responsibilities**

The Town of Halton Hills Planning and Sustainability Department, through the Office of Sustainability, will be responsible for securing and providing existing information, and managing the consultant-led portion of the Climate Change Adaptation Plan project.

The Manager of Sustainability will coordinate action between the Climate Change Adaptation Team, the Stakeholder Group, the Senior Management Team, Council and the consultant in order to complete the Climate Change Adaptation Plan in a timely and effective manner. The responsibility of the Manager of Sustainability will be to:

- Coordinate activities with the Climate Change Adaptation Team, the Stakeholder Group, the Senior Management Team, Council and the consultant;
- Provide all relevant results produced through the Town's participation in ICLEI Canada's Great Lakes Climate Change Adaptation Project to the consultant;
- Ensure compliance with these Terms of Reference;
- Ensure the participation of all stakeholders;
- Organize and host engagement sessions related to the Town's participation in the Great Lakes Climate Change Adaptation project and any additional engagement sessions the consultant will have identified as necessary to complete Milestone Two;
- Organize the logistics (dates, invitations, venue, refreshments, agenda), for all engagement sessions related to Milestone Three;
- Coordinate communications; and
- Coordinate with other projects, as appropriate.

##### **5. Consultant Responsibilities**

The consultant will be responsible for:

- Appointing a single point of contact from their team;
- Adhering to these Terms of Reference, the work plan, the engagement plan the consultant will prepare during Milestone One;
- Ensuring that all tasks and deliverables are completed in accordance with the project timeline;
- Ensuring that all tasks are completed and all deliverables outlined in these Terms of Reference are produced;
- Organizing and facilitating meetings, telephone calls and other communications related to the project;
- Preparing materials (Presentations, handouts, participant materials) and facilitating engagement sessions related to Milestones Two and Three, as outlined above;
- Ensuring that deliverables are compatible with ICLEI's BARC Milestones One, Two and Three;
- Ensuring that financial resources are well-managed; and
- Ensuring that project costs do not exceed the agreed-upon budget.

##### **6. Project Timelines**

Figure 2 (below) outlines the general timeline that the consultant will be required to adhere to during the development of the Climate Change Adaptation Plan. As part of the development of the work plan (Milestone One Task A), the consultant will be required to further refine the timeline to include each task and subtask outlined in these Terms of Reference. The consultant may recommend changes to the proposed timeline in their Request for Proposal (RFP) submission based on their professional opinion of the time requirements for completing each task and subtask. However, the Town requires that all project Milestones will be completed and deliverables will be produced by March 31<sup>st</sup> 2019.

**Figure 2: General Timeline for the consultant.**

Climate Change Adaptation Plan Timeline - Consultant																					
	Q3 2017			Q4 2017			Q1 2018			Q2 2018			Q3 2018			Q4 2018			Q1 2019		
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar
Request for Proposal																					
Milestone One: Initiate																					
Milestone Two: Research																					
Milestone Three: Plan																					
Draft Plan Review and Finalization																					

**7. Additional Relevant Resources**

ICLEI Canada Resources:

- [Changing Climate, Changing Communities: Guide and Workbook for Municipal Climate Adaptation](#)
- [Having the Climate Conversation: Strategies for Local Governments](#)

Halton Hills Resources:

- [Halton Hills Community Improvement Plan](#)
- [Mayor’s Community Energy Plan](#)
- [Halton Hills Cultural Master Plan](#)
- [Halton Hills Transportation Master Plan](#)
- [Halton Hills Corporate Sustainability Action Plan](#)
- [Halton Hills Green Development Standards](#)

Region of Halton Resources:

- [Halton Region Corporate Sustainability Assessment](#)